



CCSBT-ESC/0509/08

## 8.4 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 fourth 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 \$674,000 was agreed for the fourth year of the program. \$100,000 was for coordination expenses and \$574,000 for tag deployment costs.

### 3. RESULTS OF TAG DEPLOYMENT IN SURFACE TAGGING PROGRAM

#### Summary of Results

	Target Number of Tagged fish	Actual Number of Tagged Fish	Active Tagging Days (i)	Tagging Dates	Number of charter boats
Western Australia	5-7,000	7,796	36	5Jan to 4 Mar	1
South Australia	8-10,000	9,036	15	3 Dec to 17 Dec and 7-17 Mar	1
Total	10-15,000	16,832	51		2

(i) Number of days where fish were actually tagged out of total of 75 days funded.

More fish were tagged in each state this year than in previous years but there were some unusual features, which are examined in more detail below, along with a comparison of major changes in the area of distribution and size ranges of fish tagged during the Recruitment Monitoring Program (RMP) of the 1990's and the CCSBT program.

The fish distribution in South Australia was more restrictive this year and the majority of fish tagged were two year olds with fewer than normal one year olds or fish older than two being found. For both the December and January legs there were greater than normal short term recaptures of fish tagged in these months.

In Western Australia it seems as if there are more and smaller patches present, and although these patches are spread throughout a greater area than in previous years, the vast majority of fish tagged were one year olds. Two year old fish were very scarce in comparison to their continual presence during the last three years.

Table 1. Numbers of Fish Tagged.

Season	WA	SA
2001/02	2855	464
2002/03	6684	6412
2003/04	5234	5009
2004/05	7796	9036

## Western Australia

In contrast to previous years when fish were located only at Daw Island in the far east of the search area, fish this year were routinely located in three major areas, Daw Island, and also to the west at Middle Island and the Dampier Reefs, covering a band of longitude from about 124 to 122 E. In addition 87 fish were tagged to the west in the Bremer Bay to Albany area (119 E) in December and early January during a separate charter aimed at acoustic tagging but these fish are not included in the totals outlined above.

The vast majority of fish located were one year olds, with very few two year olds at all (Fig 1). Patch sizes appeared to be smaller and more numerous this year, and the increase in the total number of fish tagged was due to more patches than normal being located (147 patches were fished this year in comparison to 96 last year). In 2003/04 it was noticeable that the ratio of 1 to 2 year old fish tagged was approximately 40:60 which is in contrast to the approximately 90:10 ratio for this season (Fig 1). This may indicate a poor recruitment of 1 year old fish last year as for other years if the majority of fish tagged were 1 year olds, appreciable numbers of 2 year olds were tagged in the following year.

A comparison of the results from this tagging program compared to the RMP program of the 1990's indicates several substantial differences. It is noticeable that the ratio between 1 and 2 year old fish tagged has decreased for the CCSBT program to about 50:50 in comparison to the 90:10 ratio for the RMP program (Fig 2). In general the patches of 1 year old fish tagged now seem to contain more 2 year old fish than previously. It is now common for this age group to now appear first when chumming is started, and then after a while for only 1 year old fish to rise to the chum.

There has also been a basic change in the distribution of fish within Western Australia (Fig 3). During the RMP period the vast majority of fish located were on the shelf edge between Bremer Bay and Esperance, and very few were found on the inshore lumps. In contrast, for the past 4 years, no fish have been located on the shelf edge despite one or two trips each year to examine this area and despite a continual contact being maintained with local fishers who have reported on fish activity on the shelf, and until this season all fish located have been on the inshore lumps to the far east of the area searched. This season has been the first in the recent series that substantial numbers of fish have been tagged in localities other than this far eastern area at Daw Island.

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

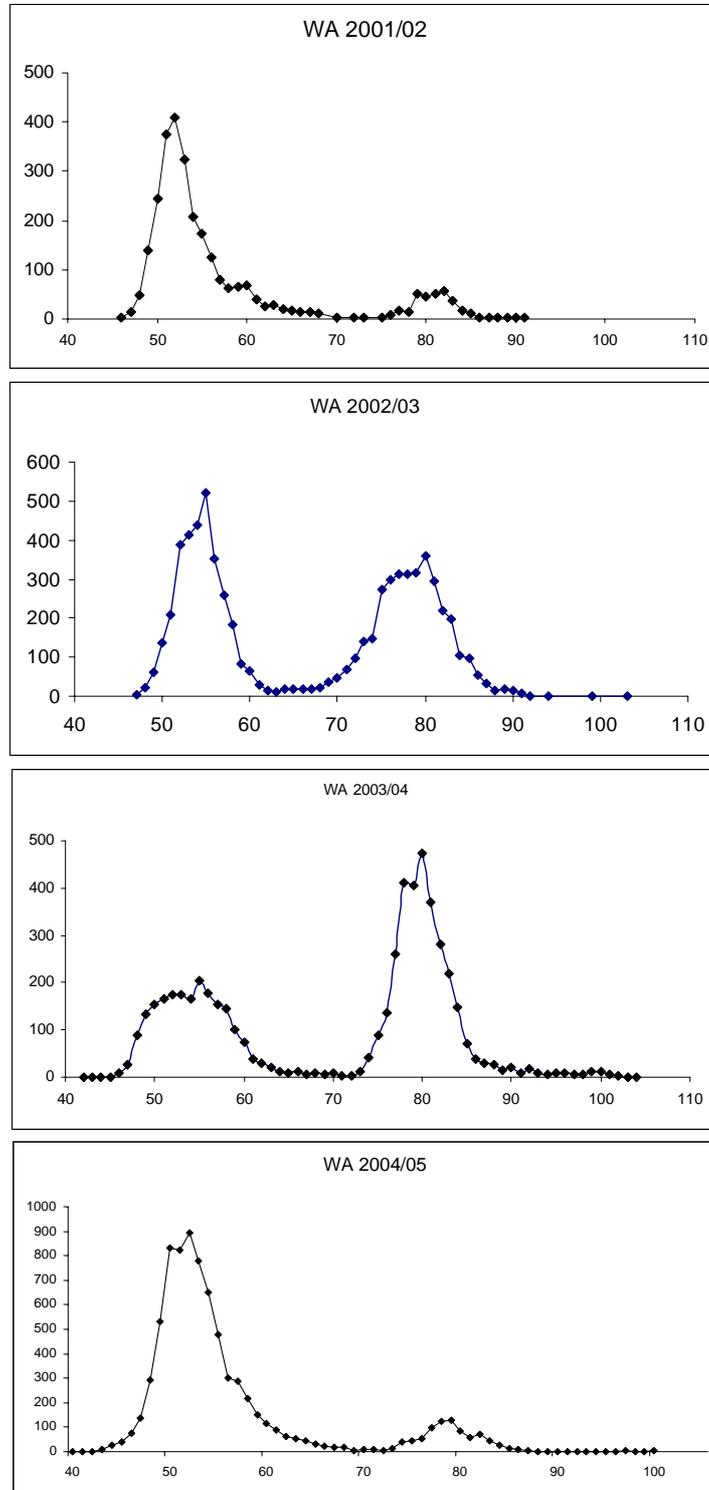
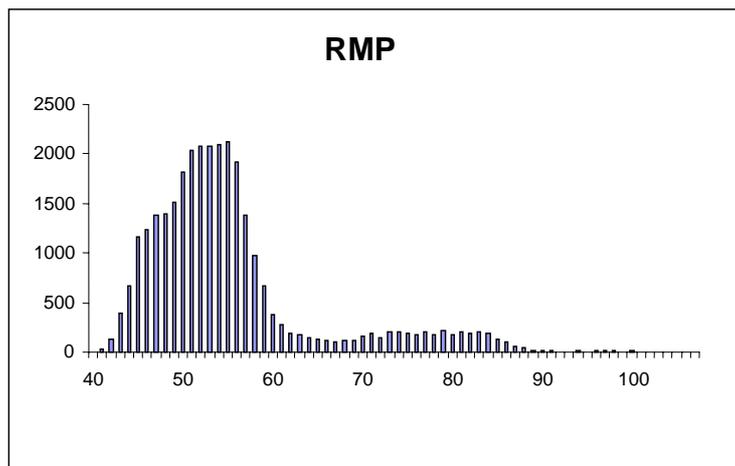
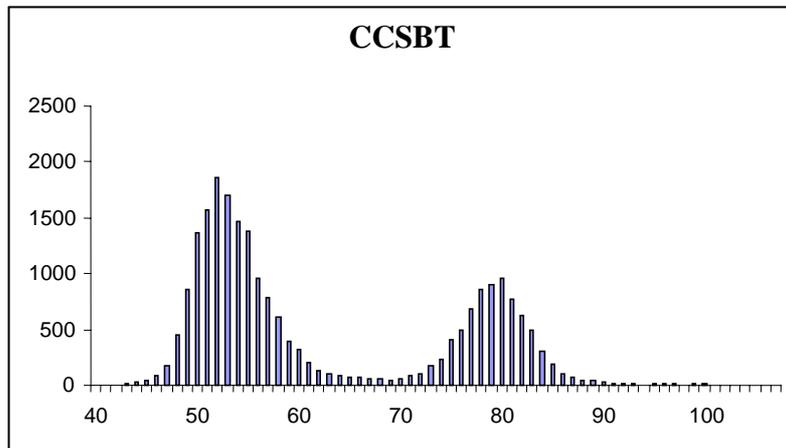
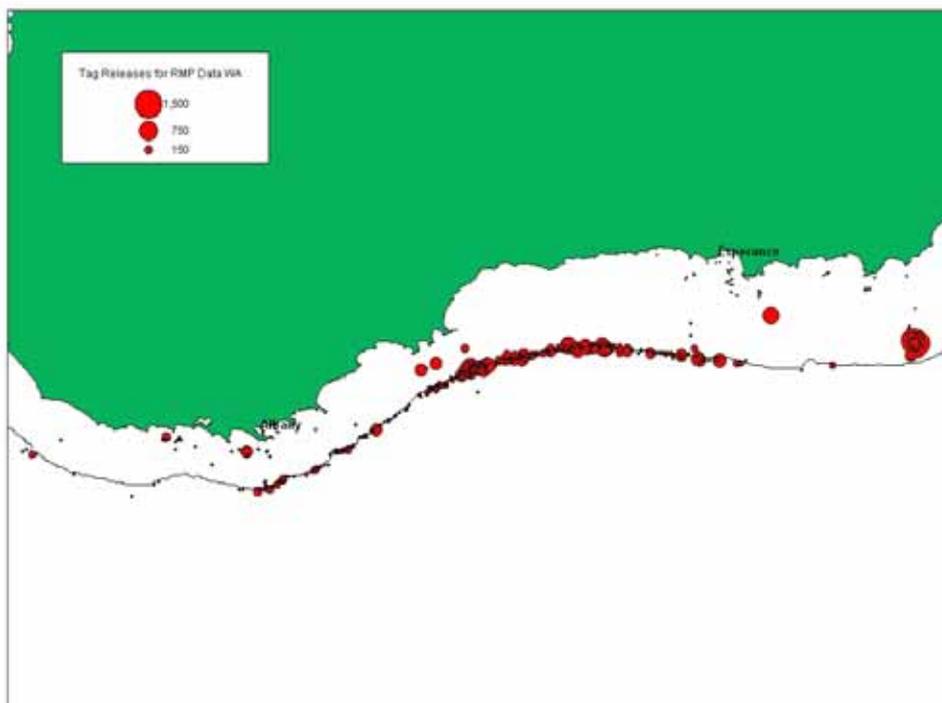


Fig 2. Length frequency distributions of fish tagged in Western Australia during the RMP and CCSBT tagging programs



**Fig 3. Comparison of tagging positions for CCSBT and RMP tagging programs in Western Australia.**



## South Australia

The timing of the tagging program in South Australia was amended to have the second leg in January rather than at the end of the season in March/April. This proved to be very beneficial and almost double the number of fish were tagged than in previous years (Table 1).

Throughout the first leg in December the weather was consistently poor, cloudy and with too much wind which restricted the ability to spot fish on the surface. The sea surface temperatures were also not high enough to encourage fish up to the surface. This weather was also not suitable for any aerial spotting of surface schools. Thus activities were restricted to the Nuyts Reef area, the only area where fish were located after examining all inshore lumps between Port Lincoln and Nuyts Reef. Many small patches of fish were reported from this area before tagging operations started, and they remained in the general area for the entire month. Thus it was possible, when the weather was suitable, to locate and tag fish. However towards the end of the December trip a disturbing number of recently tagged fish (17) were recaptured suggesting that all available patches of fish had been located.

In January the only fish located were at Yatala Reef, and again fishing operations were restricted to this area. And again towards the end of the trip large numbers of recently tagged fish (34) were recaptured.

For both trips this concentration on only two areas and on resident fish in these areas for the duration of tagging operations resulted in the tagging of two year old fish only and in a lack of both younger and older age classes tagged in comparison to previous years (Fig 4). The much greater than normal recapture of recently tagged fish is also worthy of note and suggests that at least in the two areas where fish were tagged population sizes were small.

A comparison of the results from this tagging program compared to the RMP program of the 1990's again indicates several substantial differences. Over the period of the CCSBT program fewer three year old fish (90-100cm) have been tagged (Fig 5). Basically the same areas have been covered for both the RMP and CCSBT programs (Fig 6), but for this program despite having paid as much attention to the shelf area and the inshore lumps as previously, few fish have been located on the shelf edge or on many of the inshore lumps (most of the small dots in the CCSBT figure both on the shelf edge and inshore represent the location and tagging of very small numbers of fish in places where much larger numbers were tagged during the RMP program). In general fish have been located much farther to the west for the CCSBT program.

The comparison of the two sets of data is complicated by changes in the times during which tagging trips were made. During the RMP program vessel charter was available during and towards the end of the fishing season. In contrast for the CCSBT program vessels have only been available either before the start of the season, during it (this last season), or substantially after the end of the season. But as exemplified by this year's results in January no fish were located in areas where they were in the same period during the RMP program.

Fig 4. Length Frequency distributions of fish tagged in South Australia

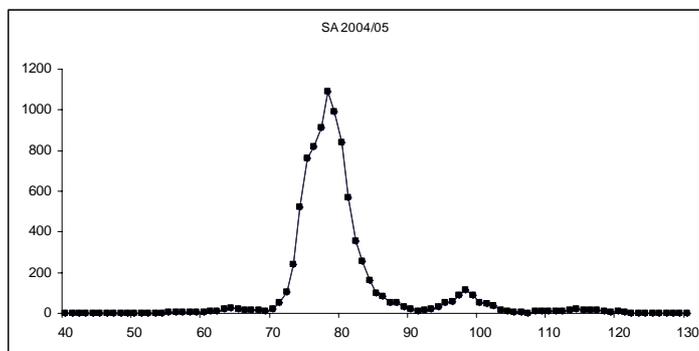
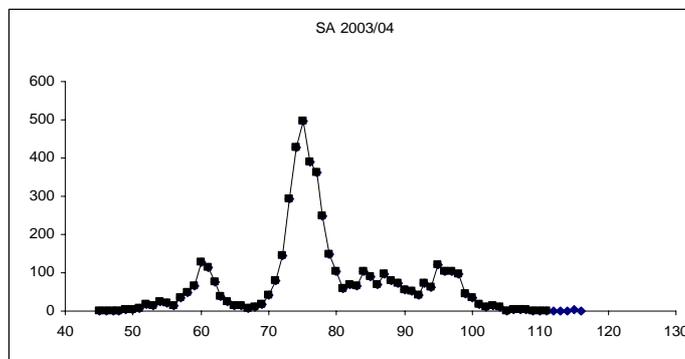
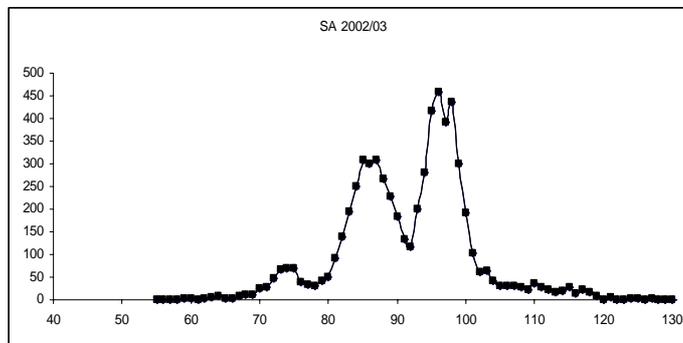
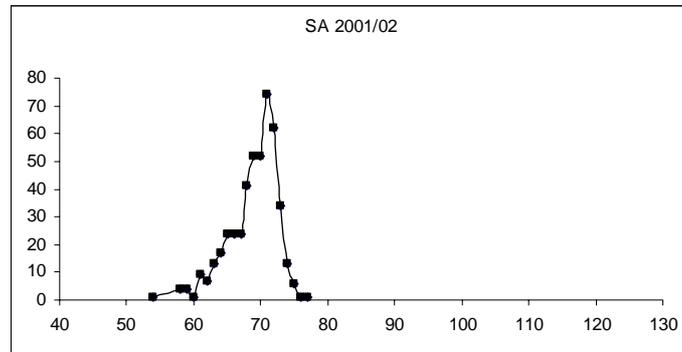


Fig 5. Length frequency distributions of fish tagged in South Australia during the RMP and CCSBT tagging programs.

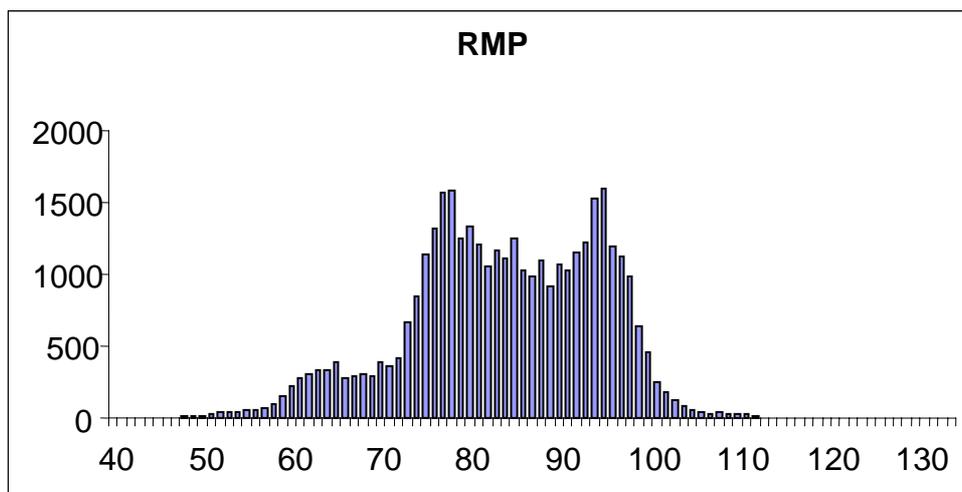
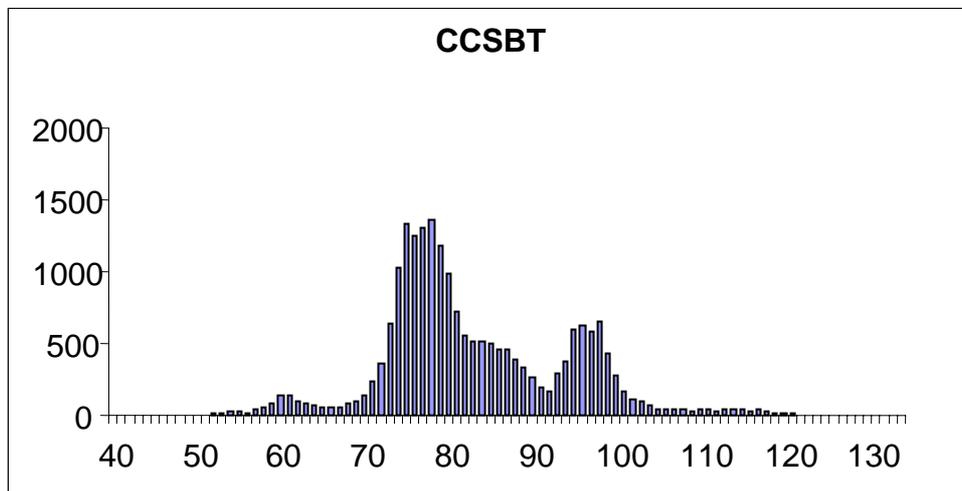
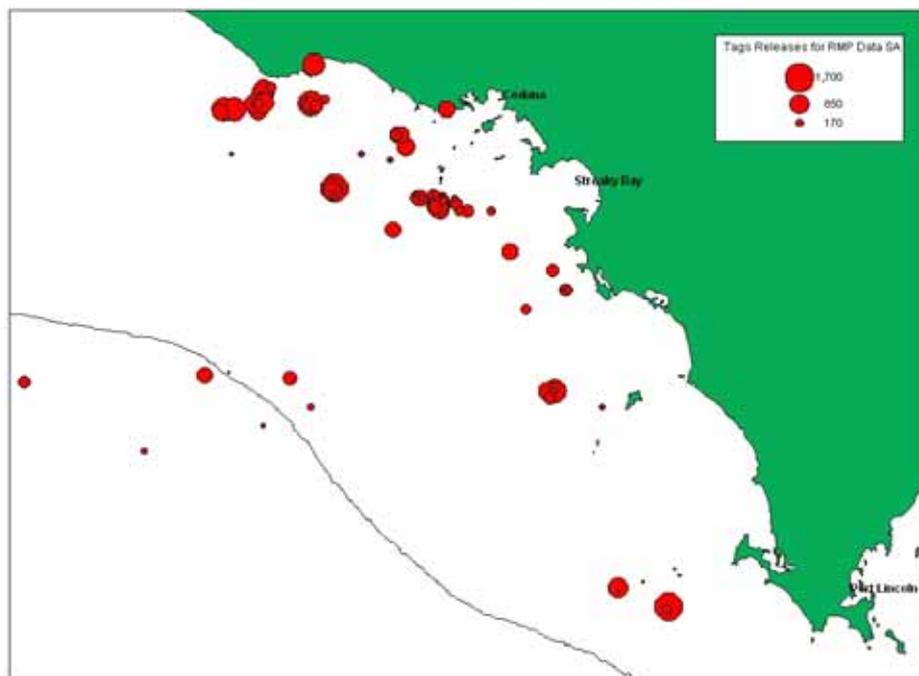
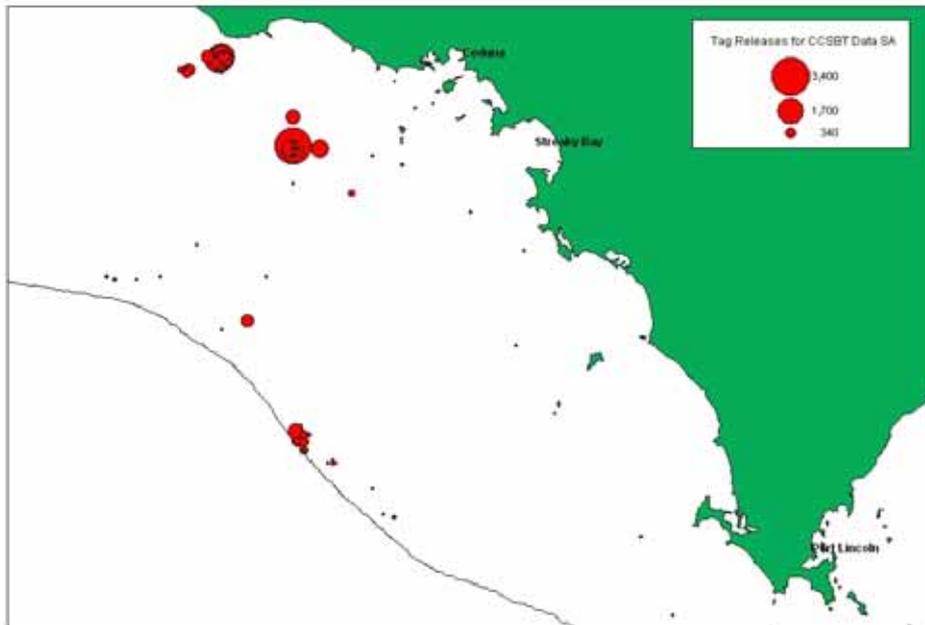


Fig 6. Comparison of tagging positions for CCSBT and RMP tagging programs in South Australia



#### 4. RESULTS OF TAG RECOVERY

A total of 2,773 fish have been recaptured from the surface fishery tagging program<sup>1</sup>. As would be expected, most (2,470) of these fish were recovered from the sea cages in Port Lincoln tuna farms. 303 fish were recaptured from the wild, including 189 commercial fishing captures, 71 while conducting tagging in the surface fishery, 16 from amateur fishers and 27 from other sources including tags found on beaches.

If releases in the past two years are excluded because the fish are unlikely to have entered the longline fisheries, the tag recovery rate from commercial fishing now stands at 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 2005m 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 advertising the tag recovery program with vessels at sea
- recreational fishing associations in Australia publicising tag recovery by their members
- an arrangement with the Indonesian catch monitoring team at Bena
- 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

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<sup>1</sup> These are fish that had been reported to the Secretariat as at 29 July 2005. However, there are a significant number of fish that have been recaptured at Port Lincoln which have recently been recaptured, but for which the details have yet to reach the Secretariat.

## **6. THE 2006 PROGRAM**

The 2006 program, the last year of the five year program agreed by the CCSBT, will be conducted along the lines of the activity in 2005 unless the Scientific Committee considers an amendment is required. 15,000 fish will be targeted for the 2005-06 season with the same distribution between South Australia and Western Australia and the same timing.

.Continued emphasis will be devoted to tag recovery mechanisms. There are however some observations:

- Establishing an agent in Cape Town remains a difficulty. The Taiwan office in Cape Town seems reluctant to assist the Secretariat and does not return e-mails; the Government of South Africa is not cooperating with the CCSBT; and the Secretariat cannot locate a contractor who could manage tag recovery.
- Observers on vessels in the fishery became more active in 2005 and more emphasis will be placed on this source for tag recovery. Up to the time of producing this report, no tags from the surface fishery program have been recovered through observers on any of the longline fleets.

A draft budget for 2006 based on a continuation of the original plan for the surface fishery tagging program, is at Attachment D.

**Prepared by the Secretariat**

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

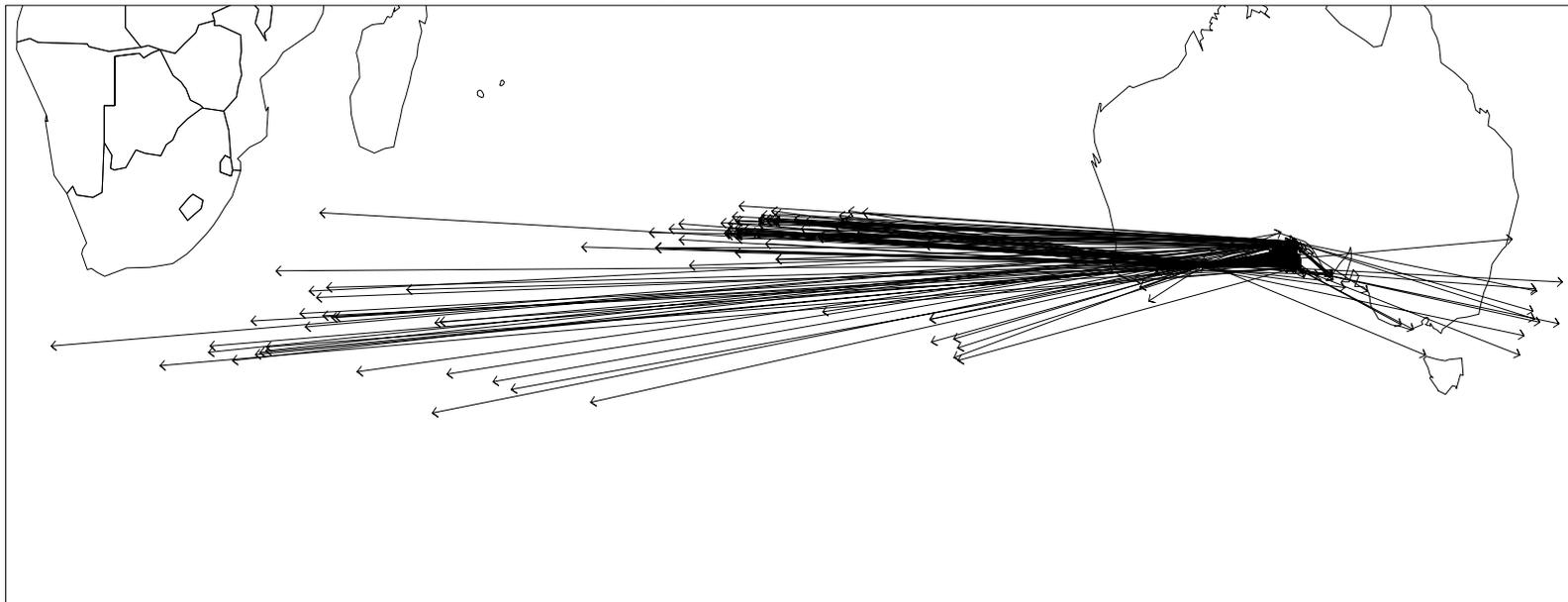
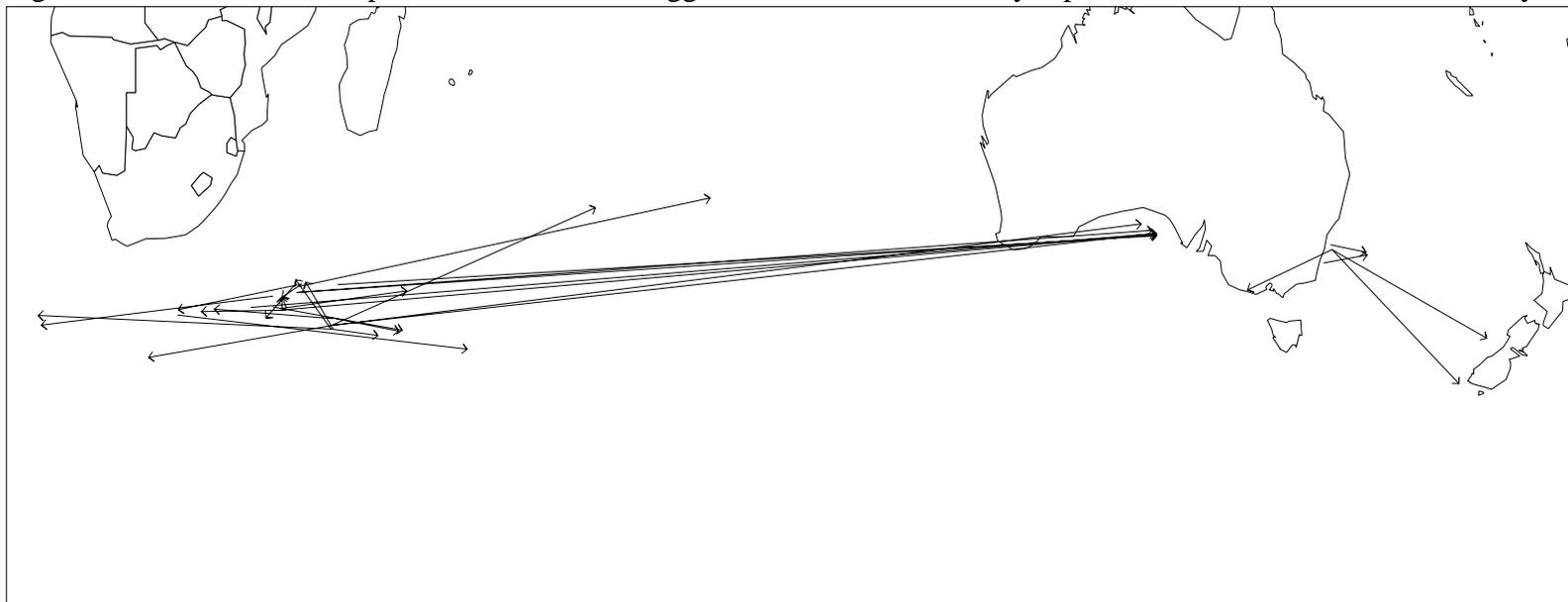


Figure 2: Movement of recaptured fish that were tagged in the Indian Ocean by Japan and the east coast of Australia by Australia.



**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 20 July 2005 - most of the 2004/05 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	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	6	0
SRP_SEED	Area 03	2004	1	39	22	0	0	0	22	0	0	0	0	22	0
SRP_SEED	Area 03	2004	2	50	11	0	0	0	11	0	0	0	1	10	0
SRP_SEED	Area 03	2004	3	90	66	0	0	0	66	0	0	0	0	66	0
SRP_SEED	Area 03	2004	4	19	5	0	0	0	5	0	0	0	0	5	0
SRP_SEED	Area 03	2004	12	20	0	0	0	0	0	0	0	0	0	0	0
SRP_SEED	Area 03	2005	1	91	9	0	0	0	0	9	0	0	0	9	0
SRP_SEED	Area 03	2005	2	110	8	0	0	0	0	8	0	0	1	7	0
SRP_SEED	Area 03	2005	3	90	0	0	0	0	0	0	0	0	0	0	0
SRP_SEED	Area 03	2005	4	30	1	0	0	0	0	1	0	0	1	0	0
SRP_TAG	Area 02	2002	12	51	2	0	0	1	1	0	0	1	0	1	0
SRP_TAG	Area 02	2004	1	34	1	0	0	0	0	1	0	1	0	0	0
SRP_TAG	Area 02	2004	12	50	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
SRP_TAG	Area 03 (SA)	2002	4	464	78	0	0	12	65	1	7	2	0	68	1
SRP_TAG	Area 03 (SA)	2002	12	4284	670	0	0	344	324	2	35	2	4	625	4
SRP_TAG	Area 03 (SA)	2003	3	1928	445	0	0	6	435	4	18	0	0	425	2
SRP_TAG	Area 03 (SA)	2003	4	200	32	0	0	0	32	0	1	1	0	30	0
SRP_TAG	Area 03 (SA)	2003	12	4914	395	0	0	0	344	51	18	8	1	367	1
SRP_TAG	Area 03 (SA)	2004	4	80	4	0	0	0	0	4	0	0	0	4	0
SRP_TAG	Area 03 (SA)	2004	12	3394	32	0	0	0	0	32	0	24	4	4	0
SRP_TAG	Area 03 (SA)	2005	1	5642	21	0	0	0	0	21	2	16	1	2	0
SRP_TAG	Area 03 (WA)	2002	1	522	13	0	1	1	11	0	0	0	0	12	1
SRP_TAG	Area 03 (WA)	2002	2	1655	107	0	1	39	66	1	13	1	2	90	1
SRP_TAG	Area 03 (WA)	2002	3	678	25	0	0	2	23	0	0	1	0	24	0
SRP_TAG	Area 03 (WA)	2003	1	1760	281	0	0	7	263	11	27	4	0	249	1
SRP_TAG	Area 03 (WA)	2003	2	3310	283	0	0	10	266	7	26	7	0	249	1
SRP_TAG	Area 03 (WA)	2003	3	1614	52	0	0	2	48	2	5	0	0	45	2
SRP_TAG	Area 03 (WA)	2004	1	2386	11	0	0	0	1	10	3	0	0	6	2
SRP_TAG	Area 03 (WA)	2004	2	2848	24	0	0	0	11	13	5	3	1	8	7
SRP_TAG	Area 03 (WA)	2005	1	3703	2	0	0	0	0	2	0	0	0	0	2
SRP_TAG	Area 03 (WA)	2005	2	2794	0	0	0	0	0	0	0	0	0	0	0
SRP_TAG	Area 03 (WA)	2005	3	1162	0	0	0	0	0	0	0	0	0	0	0
SRP_TAG	Area 07	2004	4	15	2	0	0	0	1	1	1	0	0	1	0
SRP_TAGA	Area 04	2002	7	159	3	0	1	2	0	0	2	0	0	0	1
SRP_TAGA	Area 04	2002	8	59	1	0	0	0	1	0	1	0	0	0	0

Attachment B

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	Commercial Fishing Recaptures	Research Fishing Recaptures	Amateur Fishing Recaptures	Farming Related Recaptures	Other Recaptures
SRP_TAGA	Area 04	2003	7	159	1	0	0	0	1	0	1	0	0	0	0
SRP_TAGA	Area 04	2003	8	47	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGA	Area 04	2003	9	5	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGA	Area 04	2003	10	11	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGA	Area 04	2004	6	2	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGA	Area 04	2004	7	118	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGA	Area 04	2004	8	32	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGA	Area 04	2004	9	9	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGJ	Area 02	2002	12	3	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGJ	Area 03 (WA)	2003	1	1	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGJ	Area 03 (WA)	2003	2	29	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGJ	Area 08	2003	1	3	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGJ	Area 09	2001	11	119	4	0	2	1	1	0	4	0	0	0	0
SRP_TAGJ	Area 09	2001	12	251	11	0	1	6	4	0	9	0	0	2	0
SRP_TAGJ	Area 09	2002	1	11	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGJ	Area 09	2002	10	36	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGJ	Area 09	2002	11	79	2	0	0	1	1	0	1	0	0	1	0
SRP_TAGJ	Area 09	2002	12	203	7	0	0	3	4	0	6	0	0	1	0
SRP_TAGJ	Area 09	2003	10	19	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGJ	Area 09	2003	11	280	5	0	0	0	4	1	2	0	0	3	0
SRP_TAGJ	Area 09	2003	12	338	2	0	0	0	2	0	2	0	0	0	0
SRP_TAGN	Area 05	2004	6	2	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGN	Area 06	2004	5	1	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGN	Area 06	2004	6	3	0	0	0	0	0	0	0	0	0	0	0
SRP_TAGN	Area 06	2004	7	1	0	0	0	0	0	0	0	0	0	0	0
					2644	0	3	437	2019	182	189	71	16	2342	26

**Source of Recaptures for the SRP Tagging Projects**

*(Includes all data received by the Secretariat as at 20 July 2005 - most of the 2004/05 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	16	2	0	0	0	0	0	0
SRP_TAG	2001/02	0	1	1	0	0	0	0	0
SRP_TAG	2002/03	369	27	13	4	13	0	0	1
SRP_TAG	2003/04	1753	22	53	32	28	0	2	1
SRP_TAG	2004/05	92	68	0	0	4	0	0	1
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_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	1	0	0	0	0	0	0	0

The following table outlines the proposed budget for 2006 together with a comparison with estimated outlays in 2005.

<b>Expenditure Type</b>	<b>2005 Estimate \$</b>	<b>2006 Budget \$</b>
<b>Coordination Expenses</b>		
- Tag purchase	34,000	0 <sup>1</sup>
- Tag rewards	65,000	110,000 <sup>2</sup>
- Advertising material	0	8,000 <sup>3</sup>
- Promotion expenses	0	5,000 <sup>4</sup>
- General administration	8,000	8,000 <sup>5</sup>
<b>Total Coordination Expenses</b>	<b>107,000</b>	<b>131,000</b>
<b>Tag Deployment Expenses</b>		
- Tag placement contract	240,000	246,000 <sup>6</sup>
- Vessel charter	348,750	360,000 <sup>7</sup>
<b>Total Deployment Expenses</b>	<b>588,750</b>	<b>606,000</b>
<b>Total Expenditure</b>	<b>697,750</b>	<b>737,000</b>

<sup>1</sup> Current stocks of tags are sufficient for 2006 targets. If it is agreed to extend the program beyond five years, additional expenditure of \$35,000 will be required.

<sup>2</sup> Estimated outlays in 2005 are \$65,000 and tags deployed have increased by about 60%. The estimate is based on past patterns of tag recoveries from farms and the increased population of tagged fish. However, until returns from the farms in 2005 are available in sufficient numbers this estimate should be regarded as tentative. An updated estimate may be available for the Scientific Committee meeting.

<sup>3</sup> 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.

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

<sup>5</sup> The budgeted amount includes provision for freight and mailing costs for reward materials.

<sup>6</sup> Provides for a 3% increases in wage costs of tag deployment personnel.

<sup>7</sup> Calculated on the basis of the number of charter days and vessel hire rates in 2005 plus a provision for cost increases, particularly fuel expenses.