

ANDAMAN AND NICOBAR SEA TURTLE PROJECT

PHASE VI

RPT  
BHA/74648

Report submitted by Satish Bhaskar, 2 October 1994.

Period covered by Phase VI : 21 June 1994 to 18 Sep 1994.

Period of field studies : 27 June to 9 September 1994.

Investigator : Satish Bhaskar

Objectives : To conserve and manage sea turtle populations in the Andaman and Nicobar Islands by locating prime nesting and feeding areas, monitoring population trends and identifying threats to turtle populations.

1. Survey findings.

1.1 Incidental catch of sea turtles :

A major factor that threatens to exterminate sea turtles in the Andamans was identified during this survey. This is shark fishing. While its exact impact - past and present - on sea turtle populations needs to be quantified, preliminary information suggests that the number of sea turtles drowned in shark nets in the Andamans (excluding the Nicobars) exceeds 1500 a year. These include juvenile and adult turtles. Prior to 1993, the majority are believed to have been green turtles (Chelonia mydas), though at present, following the decimation of green turtle populations in the Andamans, it is possible that the hawksbill (Eretmochelys imbricata) is now caught as frequently as the green turtle.

In the Andamans, shark fishing is undertaken throughout the year, even during the period of rough weather that extends usually from June to November, a period which also includes the main nesting season for the hawksbill and the green turtle. Shark nets are set during all but the roughest spells of bad weather.

A shark fisherman based at Mayabunder, when interviewed, stated that his party, which operated two 'dungies' (mechanized dugout boats) caught about 10 turtles a month, most of them juveniles or sub-adults. Their favoured fishing grounds lie off the west coast of North and Middle Andaman. Since there are, at present, five such shark fishing parties based at or near Mayabunder, the number of turtles caught annually in this area alone would therefore be about  $10 \times 12 \times 5$  i.e. 600. Based on the fact that other shark fishing parties operate from Betapur in Middle Andaman and Wandoor in South Andaman - there may be others - the yearly incidental catch of sea turtles in the Andamans is not likely to be less than 1500, as was stated above. Few of the turtles drowned in shark nets appear to be utilized for human consumption, the majority of the carcasses simply being discarded at sea. Two hawksbill carcasses have so far been found on South Reef Island during our surveys - a fresh carcass of a sub-adult measuring 48½ cm Standard Carapace Curved Length (SCCL) and 43 cm Standard Carapace Curved Width (SCCW) that lacked superficial injuries and which had died on about 5 November 1993, and an adult whose skeletal remains were found on 15 September 1993. Both are believed to have drowned in shark nets, which are often set in the channel between South Reef and Anderson Island. Favoured campsites used illegally by shark fishermen exist near the north-east and southern ends of North Reef Island, the beach on the western side of Interview Island's southern end, and several spots on Anderson Island's western shore.

Some of these campsites number among those used by foreign poachers operating from Myanmar, whose activities usually span the period October-May.

Shark fishermen camp legally at several sites on the

for example at Hoare Bay, McPherson Bay and Coffrie Bay. Their net effect on turtles, especially on the green turtle can be gauged from the fact that on Interview Island's west coast a survey on 8 Sep 1993 showed only 28 nests of this species, as compared to 105 nests on a survey on 11 Dec 1983. On South Reef Island, the period mid-July 1992 to 12 Dec 1992 saw 44 green turtle nests (Table 11); 55 nests were made between 15 July 1993 and 22 Nov 1993; but in 1994, there had been only 16 nests between 27 June and 8 September, almost certainly a result of incidental catch during shark fishing operations in the neighbourhood.

A channel of width about 1 km separates Interview Island from Anderson Island. A  $\frac{1}{2}$  km long shark net that had been set longitudinally in this channel was observed on 9 September 1994. The regular use of such nets will prove disastrous to sea turtles using the channel. Sea grass pastures - grazing areas for sea turtles - are known from the vicinity of North Reef Island. Shark nets that are set in the vicinity undoubtedly cause heavy losses among green turtle populations here.

The year 1994 was a "bumper" year for the hawksbill turtle on South Reef - 81 nests in 73 days between 28 June and 8 September as compared to 48 and 50 nests respectively during corresponding periods in 1992 and 1993 (see also Table 3). There is therefore cause for concern that no hawksbill nests were visible on North Reef or Latouche islands at least upto 5 Aug 1994 and on Point Island at least upto 14 Aug (Table 1).

1.2 . Nesting seasons : With the discovery of nests on South Reef in June, both hawksbills and green turtles have now been confirmed to nest in all months of the year in the Andamans. The lean period for nesting by hawksbills has been confirmed to be December to June (inclusive)

i.e. 7 months, with the main nesting season spanning the remaining 5 months, July to November (inclusive) (Tables 3,4,and 5).

The hawksbill nesting season was confirmed to peak in the month of September, as was the case in the two previous nesting seasons, <sup>also</sup> i.e. in 1992 and in 1993 (Tables 3 and 6). The eight-day period between 1 and 8 September 1994 saw the heaviest nesting intensity ever recorded for the hawksbill on an island in the Andamans and Nicobars - 26 nests (Tables 3 and 5). This included a night (that of 2/3 September) during which a record 8 hawksbills came up on South Reef; 7 of these nested that night. In the two previous years, the maximum recorded to nest in a night was 5.

A clear peak for the nesting season of the green turtle could not be identified (Tables 11 and 13).

### 1.3 The number of nesting turtles :

During the survey and study, an estimated 32 hawksbills and 6 green turtles made 81 and 16 nests respectively between 27 June and 8 September (Table 5); 26 of the 32 hawksbills and 4 out of the 6 green turtles were tagged (Tables 10 and 17). Since the study ended during the peak of the hawksbills nesting season, it is certain that several more than the estimated 32 hawksbills nested after 8 September.

### 1.4 Remigration intervals :

No turtles - green or hawksbill - found nesting during the period of study in 1994 carried tags from previous years. This makes it most likely that hawksbills in the Andamans do not nest on a two-year cycle, though this requires confirmation. It is necessary to learn remigration intervals for each population of sea turtles before any meaningful estimates of nesting population can be made. It is likely

that, as is the case in several other parts of the world, hawksbills in the Andamans nest mainly on a 3-year cycle. In these islands, hawksbills were first tagged on South Reef in 1992, when 27 out of an estimated 41 hawksbills that nested that year on the island were tagged. Further tagging studies are slated for the 1995 season.

The number of green turtles tagged in 1992 (5 out of an estimated 11 that nested on South Reef that year) is too small to maintain that green turtles in this area do not nest on a 2-year cycle. Further studies will establish remigration intervals.

#### 1.5 Non-nesting crawls :

at South Reef in 1994 (28 June-29 July and 25 Aug-2 Sep) During the period of study, hawksbills came ashore 74 times onto the beach but did not nest on 17 occasions i.e. 23% of total crawls were non-nesting crawls. On the average, about 1 hawksbill crawl in 5 was a non-nesting crawl (Table 7).

During the study period in 1994, green turtles more often than not failed to nest during their excursions onto the beaches on South Reef (Table 14), whereas in 1992 and in 1993 nestings outnumbered non-nesting crawls. This is believed to be due to the prevalence of a wetter monsoon in 1994.

#### 1.6 The number of clutches per turtle within the nesting season, 1994

The maximum number of within-season nestings recorded for a hawksbill this season was six. The turtle that did this was double-tagged with the numbers CA 708 and CA 710, and measured SCCL  $81\frac{1}{2}$  cm and SCCW  $74\frac{1}{4}$  cm. This was the fourth largest among the 26 hawksbills that were tagged this year (Table 10). It is possible that the turtle eventually nested more than 6 times this season, as the study period covered only about half of the main nesting season of the hawksbill.

The first 12 hawksbills listed in Table 10 were seen nesting a total of 41 times. The average number of nests within the season per turtle is therefore at least  $\frac{41}{12}$  i.e. 3.4. The figure stated for the 1992

(2.85)

nesting season is now believed to be lower than the actual figure.

A green turtle (tag no. CA703) that measured SCCL  $94\frac{1}{4}$  cm and

and green turtles have been known to nest upto 9 times within a season. Elsewhere both hawksbills and green turtles have been known to nest upto 9 times within a season.

### 1.7 Largest clutch and largest nesting hawksbill :

A hawksbill that was double tagged with the numbers CA 711 and CA 714 laid 217 eggs on South Reef on 2 July 1994. This is the largest clutch recorded for a turtle nest in India. This turtle was also the second largest of the hawksbills tagged this year, measuring SCCL  $82\frac{1}{2}$  cm and SCCW  $76\frac{3}{4}$  cm. The clutch sizes of the largest hawksbill tagged this year (this was also the largest hawksbill nester recorded upto the present from South Reef) were not counted. This turtle carried tag no. CA 718 and measured SCCL  $86\frac{1}{4}$  cm and SCCW  $76\frac{3}{4}$  cm. It has been demonstrated for sea turtles that clutch size is strongly correlated to the size of the turtle.

The record clutch was only the second of 81 hawksbill clutches laid during the study on South Reef and was also the first among these clutches from which hatchlings are known to have emerged during the season. The first hatchlings emerged from this nest on the night of 29/30 August 1994 59 days after the date of oviposition, the night of 2/3 July 1994. Heavy monsoonal rains had kept beach sand temperatures low, despite which incubation was completed relatively quickly.

This must be attributed to the heat generated within the nest by the large number of metabolizing eggs - of the 217 that were laid, 174 eggs (i.e. 80%) hatched and a further 33 showed various degrees of development before spoilage.

#### 1.8 Nesting by daylight :

On the morning of 27 August 1994 came ashore on South Reef at 8-40 a.m. on a flooding tide almost exactly at mid-tide, and nested. The turtle was double-tagged with the numbers CA 726 and CA 727. It was below average in size, measuring SCCL  $73\frac{1}{4}$  cm and SCCW  $67\frac{1}{4}$  cm (average measurements are  $77\frac{1}{4}$  cm and  $68\frac{3}{4}$  cm respectively). This is only the third recorded instance of a hawksbill nesting by daylight in India; earlier instances are known from South Reef and from Great Nicobar Island.

#### 1.9 Renesting intervals :

For the hawksbill on South Reef, the average renesting interval over the periods of study between 12 September 1992 and 8 September 1993 was 14.0 days (n=79 renesting intervals, sample S.D.=1.15 days, range=12-17 days) ( Table 9). About 1 in 3 hawksbill renesting intervals occupied 14 days and 1 in 4 intervals occupied 15 days (Table

The average renesting interval for the green turtle was 12.7 days (n=40 renesting intervals, S.D.= $1.1_{\lambda}$  and range=12-15 days). About 1 in 3 green turtle renesting intervals were of 13 days' duration. Two in five green turtle renesting intervals occupied 12 days (Tables 15 and 18).

#### 1.10 Deepest nest :

A green turtle which was tagged with the number CA 703 and which measured SCCL  $94\frac{1}{4}$  cm and SCCW 87 cm (Table 17) made a nest 95 cm deep

on South Reef on the night of 3/4 July 1994. This is the deepest sea turtle nest recorded from India, exceeding the deepest leatherback nest known from this country by 9 cm. Coincidentally, the green turtle clutch consisted of 95 eggs. Hatchlings emerged onto the beach on the night of 4/5 September, 63 days after oviposition. Only 53 of the eggs hatched, possible reasons being temporary inundation of the nest by high spring tides, or a shortage of oxygen in the nest.

#### 1.11 Largest green turtle nester :

A green turtle that nested on South Reef on 28 August 1994 was the biggest of its kind recorded to nest so far in the Andamans. It measured SCCL 99 cm and SCCW 94½ cm and was double-tagged, the tag numbers being 004 X and 005 X. Green turtles with shells measuring over 1 metre in SCCL have been recorded from the Nicobars. The disparity in sizes may reflect higher mortality among green turtles in the Andamans, apparently due to overhunting in the past (green turtles were being exported to Calcutta prior to 1960) and to incidental catch in recent years.

## 2. RECOMMENDATIONS

### 2.1 Control of foreign poachers :

It is strongly recommended that the Andaman & Nicobar Forest Department acquires at least two of the fast shallow-draft mechanized dugout boats of the kind used by poachers who arrive annually from Myanmar. Patrol parties armed with advanced weapons need to regularly cover the islands of North Reef, Latouche, Interview, Anderson, Kwangtung and Snark as well as the intervening channels and offshore areas whenever the weather and sea conditions allow, especially between the months October to May inclusive, but also during the rest of the year.



## 2.2 Establishment of a Marine National Park :

A Marine National Park to include 7 islands - North Reef, Latouche, Interview, South Reef, Kwangtung, Snark and Hump (this island lies within the Jarawa Tribal Reserve) - and the surrounding sea to a distance of at least 1 km urgently needs to be established in order to effectively protect hawksbills and green turtles as well as two species of sea kraits, the dugong, the endemic Andaman Teal, the saltwater crocodile and diverse marine fauna.

## 2.3 Control on shark fishing :

Shark fishing activities need to be totally excluded from the islands and areas mentioned above (Art. 2.2) i.e. from the section of the North and Middle Andaman coast extending from 1 km north of Snark Island to 1 km south of Hump Island.

## 3. ACKNOWLEDGEMENTS

Permission to undertake the survey and study was received from the office of the Chief Wildlife Warden, Mr.I.H.Khan. The Centre for Herpetology and I are grateful for his active interest in wildlife conservation, including that of sea turtles.

Mr. Rajesh, IFS, the Divisional Forest Officer at Mayabunder who also holds the charge of Wildlife Division II very kindly provided hospitality and support. This included the services of Forest Department personnel , the use of the Department's 'dunghie' as well as of departmental accommodation and storage space at Mayabunder.

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and Aung Wing I wish to convey my deep appreciation for the help they provided, in particular while landing on and while taking me off South Reef Island in rough weather.

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Finally, I thank Mr. Harry Andrews, Deputy Director, Centre for Herpetology, for having obtained funds to continue the project; the trustees of the Centre for having sanctioned the funds; and Mrs. Romaine Andrews for help in bringing out this report.

Table 1. Hawksbill and Green turtle nest counts, 1994

Island	Number of visible nests		Date of survey
	Hawksbill	Green turtle	
North Reef	0	0	5 Aug
Latouche	0*	0	5 Aug
***Kwangtung	19	0	10 Aug
****Snark	14**	11	13 Aug
Point	0	0	14 Aug
South Reef	81	16	29 Jun to 8 Sep

\* Two sets of non-nesting tracks made by Hawksbills were present on Latouche Island.

\*\* Tracks were visible at 5 of the 14 nest sites.

\*\*\* By 10 Aug, South Reef Island had 33 Hawksbill nests; Kwangtung therefore had  $\frac{19}{33} \times 100$  i.e. 58 % of the nesting intensity at South Reef.

\*\*\*\* By 13 Aug, South Reef had 36 Hawksbill nests. The Hawksbill nesting intensity on Snark Island was therefore  $\frac{14}{36} \times 100$  i.e. 39 % of that on South Reef.

Table 2 . South Reef, 1994. No. of Hawksbill and Green turtles that nested.

	Period of field study	Nos. that nested	Nos. tagged	Total nests
Hawksbill	27 June to 8 Sep '94**	32*	26	81
Green turtle		6*	4	16

\* Estimated

\*\* The study covered approximately half of the main nesting season of the Hawksbill

Table 3. Eretmochelys, South Reef. Monthly nesting intensities.

Month	Average number of nests per day		
	1992	1993	1994
June	*	*	0.33 (28-30)
July	0.73 (21-31)	0.68 (12-31)	0.74
Aug	0.52	0.87	1.00
Sep	1.23	1.37	3.25 (1-8)
Oct	1.03	1.1	*
Nov	0.63	0.62 (1-21)	*
Dec	0.36 (1-11)	*	*

average

The figures relate to the number of nests per month for the entire month except where dates are mentioned in parenthesis.

\* No data available.

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Table 4. Eretmochelys, South Reef I. Carapace measurements of nesters.

		1992 (n=27 turtles)	1993 (n=28 turtles)	1994 (n=26 turtles)	Overall (n=81 turtles)
SCCL (cm)	Average	77.7	77.1	76.7	77.2
	Range	71 - 85.25	64 - 86.5	69.75-86.75	64 -86.75
	Sample S.D.	4.25	4.74	4.39	4.43
SCCW (cm)	Average	68.5	69.1	68.3	68.75
	Range	58.5- 79.25	58.5- 79	59-76.75	58.5-79.25
	Sample S.D.	4.68	5.25	4.68	4.88

Table 5. Eretmochelys, South Reef I. Nesting intensity, 1994.

Month	Period	No. of days	No. of nests	Avg. no. of nests per day	No. of days	No. of nests	Avg. no. of nests per day
June	28-30	3	1	0.33	3	1	-
July	1-7	7	5	0.71	31	23	0.74
	8-15	8	2	0.25			
	16-23	8	8	1.00			
	24-31	8	8	1.00			
Aug	1-24	24	24	1.00	31	31	1.00
	25-31	7	8	1.14			
Sep	1-8	8	26	3.25	8	26	3.25
Total period (28 Jun - 8 Sep)					73	81	1.11

Table 6 . Eretmochelys, South Reef. Month-wise number of nests.

Month	Number of nests		
	1992	1993	1994
June	*	*	1 (28 to 30)
July	8 (21 to 31)	13 (12 to 31)	23
Aug	16	27	31
Sep	37	41	26 (1 to 8)
Oct	32	34	*
Nov	19	13 (1 to 21)	*
Dec	4 (1 to 11)	*	*

All figures relate to nests made during the entire month except in cases where dates are mentioned in parenthesis.

\* No data available.

Table 7. Eretmochelys, South Reef. Non-nesting crawls.

	1992	1993	1994	Overall
Dates of study	12 Sep-11 Dec	14 Sep-22 Nov	28 Jun-29 Jul & 25 Aug-8 Sep	
Total crawls	102	83	74	259
Non-nesting crawls & % w.r.t. total crawls	22 (21.6 %)	11 (13.3 %)	17 (23 %)	50 (19.3%)
Nesting crawls & % w.r.t. total crawls	80 (78.4 %)	72 (86.7 %)	57 (77 %)	209 (80.7%)

Table 8 . Eretmochelys, South Reef Island. Frequencies of reneesting intervals

R.I. (days)	Number of reneesting intervals (RIs)							
	1992		1993		1994		Overall	
	(n=15 RIs)	% of 15 RIs	(n=35 RIs)	% of 35 RIs	(n=29 RIs)	% of 29 RIs	(n=79 RIs)	% of 79 RIs
11	0	0	0	0	0	0	0	0
12	1	6.7	6	17.1	1	3.4	8	10.1
13	5	33.3	11	31.4	2	6.9	18	22.8
14	3	20	9	25.7	14	48.3	26	32.9
15	4	26.7	7	20	9	31	20	25.3
16	1	6.7	2	5.7	3	10.3	6	7.6
17	1	6.7	0	0	0	0	1	1.3
18	0	0	0	0	0	0	0	0

Table 9 . Eretmochelys, South Reef I. Average reneesting intervals.

	1992 (n=15 RIs)	1993 (n=35 RIs)	1994 (n=29 RIs)	Overall (n=79 RIs)
Average RI (days)	14.1	13.7	14.4	14.0
Range (days)	12 - 17	12 - 16	12 - 16	12 - 17
Sample S.D. (days)	1.36	1.16	0.90	1.15

Tagged	of nos.	(days)	of non-nesting crawl	(cm)	(cm)	
28 Jun	CA 707	14, 16	28/6; 11/7; 12/7, 28/7	77	68½	3
2 Jul	CA 708, CA 710	13, 13, 14, 14, 14	2,15,28/7;11 & 25/8;3/9	81½	74¼	6
2	CA 711, CA 714	15	2/7, 17/7	82½	75¼	2
5	CA 704	12	5/7, 17/7	73	65	2
5	CA 705	14, 14, 15, 15	5,19/7;2,17/8; 1/9	79½	75¼	5
7	CA 706	16	7/7,22/7*,23/7*, 23/7	74½	66	2
20	CA 717	15, 15, 16	20/7; 4 & 19/8; 4/9	75¾	66¼	4
21	CA 718	15, 15, 15	21/7; 5 & 20/8;2/9;4/9	86¾	76¾	4
22	CA 719	14, 14, 14	22/7; 5 & 19/8; 2/9	72	62	4
26	CA 720		26/7	71¾	66	1
27	CA 725	14, 14, 15	27/7; 10/8, 24/8; 8/9	77¼	66¾	4
27 Jul	CA 721, CA 724	14, 14, 14	27/7; 10/8, 24/8; 7/9	81½	74½	4
27 Aug	CA 726, CA 727		27/8	73¼	67¾	1
27	028 X, 029 X		27/8	79½	69	1
31	006 X		31/8	79¼	68¾	1
1 Sep	009 X		1/9	80	69¼	1
1	008 X		1/9*, 2/9	80½	73	1
2	010 X		2/9	75½	66½	1
2	011 X		2/9	70	59	1
2	013 X		2/9	76½	63½	1
2	014 X		2/9	78	71½	1
5	016 X		5/9	78½	71¼	1
7	003 X		7/9	69¾	63½	1
7	012 X		7/9	70½	65¾	1
7	017 X		7/9	70½	62	1
8	018 X		8/9	78	67½	1

N = Minimum no. of times the turtle nested during the series

\* Non-nesting crawl.

(SCCL=Standard Carapace Curved Length

SCCW=Standard Carapace Curved Width

Table 10. *Eretmochelys* South Reef Island, 1994. Tag nos., nesting intervals, measurements



Table 11. *Chelonia mydas*, South Reef. Month-wise number of nests.

Month	Number of nests		
	1992	1993	1994
June	*	*	2 (27-30)
July	16 (21-31)	12 (8-31)	7
Aug	7	10	7
Sep	5	17	0 (1-8)
Oct	5	12	*
Nov	8	4 (1-21)	*
Dec	3 (1-11)	*	*

All figures relate to nests made during the entire month except in cases where dates are mentioned in parenthesis.

\* No data available.

Table 12. *Chelonia mydas*, South Reef, 1994. Nesting intensity.

Month	Period	No. of days	No. of nests	Avg.no. of nests per day	No. of days	No. of nests	Avg. no. of nests per day
June	27-30	4	2	0.5	4	2	0.5
July	1-7	7	2	0.29	31	7	0.23
	18-15	8	2	0.25			
	16-23	8	0	0			
	24-31	8	3	0.38			
Aug	1-24	24	4	0.17	31	7	0.23
	25-31	7	3	0.42			
Sep	1-8	8	0	0	8	0	0
Total period (27 June to 8 Sep)					74	16	0.22

Table 13 . *Chelonia mydas*, South Reef. Monthly nesting intensities.

Month	Period	No. of days	Average no. of nests per day		
			1992	1993	1994
June	27-30	4	*	*	0.5
July	1-20	20	*	0.52	0.2
	21-31	11	1.46	0.52	0.27
Aug	1-31	31	0.23	0.32	0.23
Sep	1-30	30	0.17	0.57	*
Oct	1-31	31	0.16	0.39	*
Nov	1-21	21	0.24	0.19	*
	22-30	9	0.33	*	*
Dec	1-11	11	0.27	*	*

\* Data unavailable.

Table 14. *Chelonia mydas*, South Reef. Non-nesting crawls.

	1992	1993	1994	Overall
Dates of study	12 Sep-11 Dec	14 Sep-22 Nov	28 Jun-29 Jul & 25 Aug-8 Sep	
Total crawls	26	46	30	102
Non-nesting crawls & % w.r.t. total crawls	6 (23.1%)	21 (45.7%)	19 (63.3%)	46 (45.1%)
Nesting crawls & % w.r.t. total crawls	20 (76.9%)	25 (54.3%)	11 (36.7%)	56 (54.9%)

Table 15. *Chelonia mydas*, South Reef. Average renesting interval.

	1992 (n=13)	1993 (n=17)	1994 (n=10)	Overall (n=40)
Average RI (days)	13.2	12.8	12.0	12.7
Range (days)	12-15	11-15	11-13	11-15
Sample S.D. (days)	1.09	1.24	0.67	1.1

Table 16. *Chelonia mydas*, South Reef. Carapace measurements of nesters.

		1992 (n=5 turtles)	1993 (n=7 turtles)	1994 (n=4 turtles)	Overall (n=16 tur
SCCL (cm)	Average	90 $\frac{1}{2}$	94 $\frac{3}{4}$	94 $\frac{1}{4}$	93 $\frac{1}{4}$
	Range	86 $\frac{1}{2}$ -93 $\frac{1}{4}$	92-96 $\frac{1}{2}$	91-99	86 $\frac{1}{2}$ -99
	Sample S.D.	2.79	1.48	3.43	3.04
SCCW (cm)	Average	83	85	87	85
	Range	81 -85 $\frac{1}{4}$	81 $\frac{1}{2}$ -89	81 $\frac{1}{4}$ -94 $\frac{3}{4}$	81-94 $\frac{3}{4}$
	Sample S.D.	1.83	3.1	5.69	3.69