

Annex Table 6

Record of Bait Fish Catching Test (Boukeami)

Date		21. 5 '78	22. 5. '78	25. 5. '78	26. 5. '78	27 5. '78
Moon age		1 3 8	1 4 8	1 7 8	1 8. 8	1 9 8
Operation No		1	2	3	4	5
Time	Putting on light	0 1 0 0	0 1 0 0	1 8 5 0	1 8 5 0	1 8 5 0
	Setting net	0 4 5 0	0 5 0 0	2 0 5 5	2 2 0 0	2 2 0 0
	Hauling net	0 5 0 5	0 5 2 0	2 1 1 5	2 2 3 0	2 2 3 0
Position	Area	Tarawa	Tarawa	Tarawa	Tarawa	Tarawa
	Latitude	0 1 - 2 3 2 N	0 1 - 2 1 6 N	0 1 - 2 2 5 N	0 1 - 2 2 5 N	0 1 - 2 2 5 N
	Longitude	1 7 3 - 0 4 2 E	1 7 3 - 0 2 2 E	1 7 3 - 0 5 9 E	1 7 3 - 0 5 9 E	1 7 3 - 0 5 9 E
Fish school	Status	Slight	Slight	Slight	Slight	Slight
	Size	Small	Small	Medium	Medium	Medium
Distance from shore (m)		1 6'	0 7'	0 8'	0 8'	0 8'
Bottom material		Co	Co	Co	Co	Co
Depth (m)		1 8	7	1 1	1 1	1 1
Transparency (m)		4	3	4	3	4
Weather		b c	b c	b c	b c	b c
Wind direction and force		NE 3	E 2	E 3	E 3	E 3
Air pressure (mb)		1 0 0 9 0	1 0 0 9 0	1 0 1 4 0	1 0 1 4 0	1 0 1 2 1
Air temperature (°C)		2 8 0	2 8 5	2 8 4	2 8 3	2 8 3
Water surface temp (°C)		2 8 8	2 9 0	2 9 3	2 9 3	2 8 0
Sea condition		1	2	2	2	2
Current		W +	W +	W +	W +	W +
Catch	<i>Herengula ovalis</i>	7	4	2 8	3 8	3 2
	<i>Allanetta ovalava</i>					
	<i>Spratelluides delicaturus</i>	1 2	5	1		
	<i>Dassumeria hasselti</i>					
	<i>Etrumeus micropus</i>					
	<i>Archamia fucata</i>					
	<i>Caesio caeruleureus</i>	1				
	Others					
Total		2 0	9	2 9	3 8	3 2
Remarks						

28 5. '78	30. 5. '78	31. 5. '78	1. 6. '78	3 6. '78	4. 6. '78	4. 6 '78
2 0 8	2 2 8	2 3. 8	2 4 8	2 6 8	2 7 8	2 7 8
6	7	8	9	10	11	12
1 8 5 0	1 8. 5 0	1 8 5 0	0 1 0 0	1 8 5 0	0 1. 0 0	1 9 0 0
2 2 0 0	2 1 2 5	2 1 0 0	0 5 0 0	2 1 1 5	0 5 0 5	2 1 3 5
2 2. 2 5	2 1 5 0	2 1. 2 5	0 5 2 5	2 1 4 5	0 5 3 5	2 2 0 0
Tarawa	Tarawa	Tarawa	Tarawa	Tarawa	Tarawa	Tarawa
0 1 - 2 2. 5 N	0 1 - 2 2. 5 N	0 1 - 2 2. 5 N	0 1 - 2 2. 5 N	0 1 - 2 2. 3 N	0 1 - 2 2. 3 N	0 1 - 2 2. 3 N
1 7 3 - 0 5. 9 E	1 7 3 - 0 5. 9 E	1 7 3 - 0 5. 9 E	1 7 3 - 0 5. 9 E	1 7 3 - 0 5. 8 E	1 7 3 - 0 5. 8 E	1 7 3 - 0 5. 8 E
Rather dense	Dense	Rather dense	Rather dense	Rather dense	Slight	Slight
Medium	Large	Medium	Medium	Medium	Small	Small
0 8'	0. 8'	0. 8'	0 8'	0 6'	0 6'	0 6'
Co	Co	Co	Co	Co & S	Co	Co
1 1	1 1	1 1	1 1	1 0	1 0	1 0
4	4	4	4		3. 8	3. 8
b c	b	b	b	b c	b c	c
E S E 4	E 1	E 2	E 2	E 3	E 3	E 2
1 0 1 2. 0	1 0 1 3. 8	1 0 1 1. 7	1 0 1 0. 9	1 0 1 0. 5	1 0 0 9. 3	1 0 1 1. 0
2 8 4	2 8 5	2 8 5	2 8 0	2 8 2	2 7 5	2 8 6
2 9 0	2 9. 4	2 9 6	2 9 1	2 9 2	2 8 9	2 9. 4
3	1	2	1	2	2	1
W +	W +	W +	W +	W +	W +	W +
6 4	5 5	3 4	2 5	3 0	1 8	1 0
	5	4				
	1 0	2	1 0			
				2		
	5	3				
6 4	7 5	4 3	3 5	3 2	1 8	1 0
					Trevally 50 pieces	Trevally 50 pieces.

5.6 '78	8.6. '78	9.6. '78	9.6. '78	10.6 '78	10.6. '78	11.6 '78
288	22	32	3.2	42	42	52
13	14	15	16	17	18	19
0100	1850	0100	1850	0100	1850	0100
0510	2105	0505	2115	0510	2130	0505
0535	2130	0540	21.40	0545	2200	0535
Tarawa	Tarawa	Tarawa	Tarawa	Tarawa	Tarawa	Tarawa
01-223N	01-224N	01-224N	01-224N	01-224N	01-224N	01-224N
173-058E	173-060E	173-060E	173-060E	173-060E	173-059E	173-059E
Slight	Rather dense	Dense	Dense	Dense	Slight	Dense
Medium	Medium	Large	Medium	Medium	Small	Medium
06'	06'	06'	04'	04'	07'	07'
Co	Co	Co	Co	Co	Co	Co
10	10	10	10	10	11	11
38	34	34	34	34	35	30
bc	bc	b	bc	bc	R	bc
E 2	E 3	ESE 3	ESE 3	E 3	E 2	ENE 3
10093	10105	10098	10112	10092	10100	10080
280	284	280	283	275	280	275
294	294	292	290	290	292	287
1	2	3	3	2	1	3
W +	W +	W +	W +	W +	W +	W +
22	32	65	30	29	20	35
					1	
2	4	3			1	2
	4	4	2		5	3
24	40	72	32	29	27	40
Travally 25 pieces	Travally 5, Benthonic fishes 30 pieces	Benthonic fishes, 20 pieces	Travally 3, Others 20 pieces.	Trevally 10, Sting ray 1, Others 20 pieces.	Trevally Spanish-mackerel and Others 50 pieces.	Spanish mackerel, Benthonic fishes 30 pieces.

11.6 '78	12.6. '78	12.6. '78	13.6 '78	13.6 '78	14.6 '78	15.6 '78
5 2	6.2	6 2	7.2	7 2	8 2	9 2
2 0	2 1	2 2	2 3	2 4	2 5	2 6
1 8 5 0	0 1 0 0	1 8 5 0	0 1 0 0	1 9 0 0	0 1 0 0	1 8 5 0
2 1 1 5	0 5 0 0	2 1 1 5	0 5 1 0	2 2 2 0	0 5 2 0	2 2 0 5
2 1 3 5	0 5 3 5	2 1 3 5	0 5 4 0	2 2 5 0	0 5 4 5	2 2 2 5
Tarawa 0 1 - 2 2 4 N 1 7 3 - 0 5 9 E	Tarawa 0 1 - 2 2 4 N 1 7 3 - 0 5 9 E	Tarawa 0 1 - 2 2 4 N 1 7 3 - 0 5 9 E	Tarawa 0 1 - 2 2 4 N 1 7 3 - 0 5 9 E	Tarawa 0 1 - 2 1.9 N 1 7 2 - 5 6 0 E	Tarawa 0 1 - 2 1.9 N 1 7 2 - 5 6 0 E	Butaritari 0 3 - 0 2 7 N 1 7 2 - 4 7.2 E
Slight Small	Dense Medium	Slight Small	Dense Medium	Dense Large	Dense Large	Slight Small
0 7'	0 7'	0 7'	0 7'	0.4'	0 4'	1 0'
Co	Co	Co	Co	Co & S	Co & S	Co
1 1	1 1	1 1	1 1	1 0	1 0	9
3 0	3 0	2 8	2 8			7 5
b c	c	c & r	c & r	c	b c	b c
E 3	E 3	E 2	SE 2	ENE 3	ESE 3	NNE 1
1 0 0 9 7	1 0 0 8 5	1 0 0 9 0	1 0 0 7 0	1 0 0 9 0	1 0 0 8 8	1 0 1 2 0
2 8 4	2 8 2	2 8 0	2 8 0	2 7 4	2 7 4	2 7 2
2 9 3	2 8 9	2 9 6	2 9 2	2 9 1	2 8 2	2 8 9
3	3	2	2	2	2	1
W +	W +	W +	W +	W +	W +	NW+
2 0	3 0	1 5	2 0	4 6	2 7	3
1		1			1	8
1			2		6 4	1 0
5	5	4	1 8			1 1
						3
2 7	3 5	2 0	4 0	4 6	9 2	3 5
Spanish mackerel, Ben- thonic fishes 10 pieces.	Trevally 10, Benthonic fishes 3 pieces	Spanish mackerel, Ben- thonic fishes 15 pieces.	Trevally 24, Benthonic fishes, Spanish mackerel 10 pieces.			

16. 6 '78	16. 6. '78	17. 6. '78	18. 6. '78	23. 6. '78	23. 6. '78	24. 6. '78
102	102	112	122	172	172	182
27	28	29	30	31	32	33
0100	1850	0100	0100	1850	2120	1920
0520	2215	0520	0510	2055	2305	2030
0545	2230	0540	0540	2115	2325	2045
Butaritari	Butaritari	Butaritari	Butaritari	Abemama	Abemama	Abemama
03-027N	03-027N	03-027N	03-027N	00-242N	00-242N	00-218N
172-472E	172-472E	172-472E	172-472E	173-544E	173-544E	173-513E
Slight	Slight	Slight	Slight	Dense	Slight	Slight
Small	Small	Small	Small	Large	Small	Small
10'	10'	10'	10'	10'	10'	08'
Co	Co	Co	Co	S	S	Co
9	9	9	10	10	10	17
75	75	75	75	78	78	17以上
bc	bc	bc	bc	bc	bc	bc
NE3	NE3	ENE3	E3	ESE4	ESE4	NE2
10112	10110	10105	10083	10098		10104
273	290	285	278	282		278
288	291	290	286	282		280
2	2	1	2	3	3	1
W+	W+	W+	W++	N+++	N++	ENG+
12	7	33	9	3	1	
4	6	25	25	2	1	
1	05	07	05	27	6	55
					5	
17	15	08	13	2		55
1						
35	15	37	25	34	13	11
				Dense formation (About 200 B/K), Poor catches due to wind and tidal current		

25. 6. '78	25. 6. '78	1. 7. '78	2. 7. '78	4. 7. '78	4. 7. '78	5. 7. '78
192	192	252	262	282	282	292
34	35	36	37	38	39	40
1850	2125	1850	0100	1850	0100	1900
2100	2300	2105	0505	0025	0515	2355
2120	2320	2125	0535	0050	0535	0015
Abemama	Abemama	Butaritari	Butaritari	Butaritari	Butaritari	Butaritari
00-249N	00-249N	03-128N	03-128N	03-030N	03-030N	03-027N
173-543E	173-543E	172-472E	172-472E	172-469E	172-469E	172-472E
Dense	Slight	Slight	Rather slight	Rather slight	Slight	Slight
Medrum	Small	Small	Medium	Medium	Small	Small
10'	10'	10'	10'	13'	13'	13'
Co	Co	Co	Co	Co	Co	Co
13	13	10	10	16	16	13
85	85	62	62	65	65	90
b	b	bc	bc	bc	bc	bc
NE 2	NE 2	E 2	SE 4	ESE 4	S 4	E 2
10100	10100	10099	10092	10090	10085	10108
280	280	280	282	284	273	285
286	284	291	282	284	284	288
Calm	Calm	3	3	2	3	2
NIL	S +	W +	W +	W +	W +	W +
2		12	3	17	1	20
2		5		3		5
22	1	2	1	3	2	
	3					
15	3	3	13		2	5
	13					
41	20	22	17	23	5	30
	*Sardinella clupeoides					

5. 7. '78	8. 7. '78	9 7. '78	10. 7. '78	10. 7. '78	11. 7. '78	12. 7. '78
292	26	36	46	46	56	66
41	42	43	44	45	46	47
0100	1850	1850	0100	1850	0100	1900
0500	2050	2115	0515	2225	0515	0030
0520	2115	2145	0535	2245	0535	0055
Butaritari 03-027N 172-47.2E	Butaritari 03-028N 172-47.2E	Butaritari 03-032N 172-47.2E	Butaritari 03-032N 172-47.2E	Butaritari 03-035N 172-47.3E	Butaritari 03-03.5N 172-47.3E	Butaritari 03-033N 172-47.2E
Slight Small	Slight Small	Slight Small	Rather dense Medium	Rather dense Medium	Rather dense Medium	Slight Small
13'	10'	14'	14'	15'	15'	15'
Co	Co	Co	Co	Co	Co	Co
13	13	25	25	24	24	23
90	8	13	13	13	13	11
bc	bc	bc	bc	bc	bc	R
E 3	SE1	E 2	E 2	E 3	E 3	E 3
10094	10108	10105	10096	10105	10098	10111
282	283	284	280	280	288	278
290	290	291	291	290	290	287
2	1	1	1	3	3	2
W +	W +	W +	NW+	W +	E +	W +
6	2	8	5	3	2	2
	2	3	2	8	5	3
2	4	6	20	15	15	8
10	4	3	3	2	2	2
18	12	20	30	28	24	15
	Net broken by coral reef.			Rough sea		

12.7.'78 66 48	13.7.'78 76 49	13.7.'78 76 50	16.7.'78 106 51	16.7.'78 106 52	17.7.'78 116 53	19.7.'78 136 54
0100 0515 0535	2100 0125 0150	0200 0520 0535	0100 0300 0318	0325 0520 0540	0200 0515 0535	1845 2000 2020
Butaritari 03-033N 172-47.2E	Butaritari 03-032N 172-47.7E	Butaritari 03-03.2N 172-47.7E	Tarawa 01-219N 172-56.0E	Tarawa 01-21.9N 172-56.0E	Tarawa 01-21.9N 172-55.9E	Butaritari 03-032N 172-47.5E
Slight Small	Rather dense Medium	Slight Small	Dense Medium	Dense Medium	Dense Medium	Slight Small
15' Co 23 11 c ESE 3 10095 278 288 3 E +	11' Co 20 11 bc ESE 2 10105 285 291 1 W +	1.1' Co 20 11 bc SE 2 10098 27.8 288 1 W +	03' S 11 bc SE 2 10100 27.5 290 2 W +	03' S 11 bc SE 2 10104 27.5 288 2 W +	03' S 95 9 c E 4 10100 280 288 4 W++	10' R 205 13 0 S 3 10100 280 293 2 W +
2 3 7 2	5 5 12 4	5 3 7 2	4 36	42	12 1 17	2 4
14	26	17	40	42	30	6
					Rough sea	Not being lured due to bright moon

20.7 '78	21.7. '78	22.7. '78	22.7 '78	22.7. '78	25.7. '78	26.7. '78
146	156	166	166	176	196	206
55	56	57	58	59	60	61
1845	1850	0200	1850	2045		1900
2000	2225	0515	2015	0030	2305	2115
2013	2240	0535	2040	0050	2330	2135
Butaritari 03-032N 172-47.8E	Butaritari 03-044N 172-52.5E	Butaritari 03-044N 172-52.5E	Butaritari 03-03.7N 172-49.8E	Butaritari 03-037N 172-49.8E	Tarawa 01-21.9N 172-56.1E	Tarawa 01-21.9N 172-56.0E
Slight Small	Rather dense Small	Slight Small	Slight Small	Dense Medium	Slight Small	Slight Small
09'	08'	08'	05'	05'	025'	025'
Co	Co & S	Co & S	Co	Co	S	S
22	22	22	23	23	10	11
	135	135	14	14	3	3
bc	c	bc	o	bc	bc	c
SE 2	NNE 2	Ca lm	Ca lm	Ca lm	ESE 3	ESE 5
10098	10105	10090	10086	10090	10082	10086
285	279	280	262	273	27.5	290
293	282	290	289	291	294	281
1	1	Ca lm	Ca lm	Ca lm	3	4
W +	W +				W +	W +
1			5	4	16	8
1			5	20	2	
	16	9	10		8	4
3			4			
5	16	9	24	24	26	12
As the left.	As the left.	As the left.			Rough sea.	Rough sea

27 7. '78	28 7. '78	29 7. '78	29 7. '78	30. 7. '78	30. 7. '78	31. 7. '78
2 1.6	2 2.6	2 3.6	2 3.6	2 4.6	2 4.6	2 5.6
6 2	6 3	6 4	6 5	6 6	6 7	6 8
0 1 0 0	1 8 5 0	0 1 0 0	1 8 5 0	0 1 0 0	1 8 5 0	0 1 0 0
0 5 1 5	2 1.1 5	0 5 0 0	2 1 3 0	0 5 0 5	2 1 3 5	0 5 1 5
0 5 3 7	2 1 3 5	0 5 2 0	2 1 5 0	0 5 4 0	2 1 5 5	0 5 5 0
Tarawa	Abemama	Abemama	Abemama	Abemama	Abemama	Abemama
0 1 - 2 1 9 N	0 0 - 2 7.4 N	0 0 - 2 7 4 N	0 0 - 2 4 3 N	0 0 - 2 4 3 N	0 0 - 2 4 3 N	0 0 - 2 4 3 N
1 7 2 - 5 6 0 E	1 7 3 - 5 1 6 E	1 7 3 - 5 1 6 E	1 7 3 - 5 4 4 E	1 7 3 - 5 4 4 E	1 7 3 - 5 4 4 E	1 7 3 - 5 4 4 E
Slight	Slight	Slight	Slight	Dense	Rather dense	Dense
Small	Small	Small	Small	Medium	Medium	Large
0 2 5'	1 1'	1 1'	1 0'	1 0'	1 0'	1 0'
S	Co	Co	Co	Co	Co	Co
1 1	1 1	1 1	1 1	1 1	1 4	1 4
3	5 5	5 5	5 5	5 5	5 5	5 5
b	c	c	bc	bc	bc	bc
E 4	ESE 3	ESE 4	SE 4	ESE 4	ESE 3	E 3
1 0 0 7 3	1 0 0 8 9	1 0 0 9 0	1 0 0 9 3	1 0 0 8 2	1 0 0 9 8	1 0 0 8 8
2 8 2	2 8 5	2 6 8	2 7 5	2 7 7	2 7 9	2 7 6
2 8 8	2 8 8	2 8 1	2 8 5	2 8 4	2 8 6	2 8 4
3	3	4	3	3	2	2
W +	WNW+	WNW+	NW+	WNW+	W +	WNW+
1 1	1		1	5	2	2 0
	1		2	2	4	4
1 2	4	2	1 0	3 0	1 7	4 1
	2	2		2	1	
		1	1		1	
2 3	8	5	1 4	3 9	2 5	6 5
Rough sea	Rough sea.	Rough sea *Sardinella clupeoides	*Sardinella clupeoides		*Sardinella clupeoides	

2.8 '78	3.8. '78	4.8 '78	5.8 '78	5.8. '78	6.8 '78	6.8 '78
276	286	296	10	10	2.0	2.0
69	70	71	72	73	74	75
1900	0200	1900	0200	1900	0200	1900
2140	0525	2335	0520	2340	0520	2355
2205	0545	2357	0543	2405	0542	0017
Tarawa	Tarawa	Butaritari	Butaritari	Butaritari	Butaritari	Butaritari
01-219N	01-219N	03-025N	03-025N	03-025N	03-025N	03-025N
172-561E	172-561E	172-473E	172-473E	172-473E	172-473E	172-473E
Slight	Slight	Slight	Slight	Slight	Slight	Slight
Medium	Small	Small	Small	Small	Small	Small
02	02'	08'	08'	08'	08'	08'
S	S	S	S	S	S	S
10	10	8	8	8	8	8
		65	65	65	65	52
bc	c	o	bc	bc	bc	bc
SSE3	SE3	E4	E4	ESE4	E3	SSE3
10100	10090	10095	10082	10100	10098	10114
280	278	265	278	270	276	280
292	288	291	287	280	284	284
2	2	3	3	2	2	2
W+	W+					
41	10	19	13	15	18	18
		6	2	2	05	1
	17	3				
		1		1	1.5	3
41	27	29	15	18	20	22
Trevally	Trevally					

7 8 '78	8 8. '78	8. 8. '78	12 8 '78	12 8. '78	13. 8. '78	14. 8. '78
30	40	40	80	80	90	100
76	77	78	79	80	81	82
0025	1900	0200	0200	1850	0100	0100
0520	0020	0520	0510	2115	0515	0515
0545	0040	0550	0530	2135	0545	0550
Butaritari	Butaritari	Butaritari	Tarawa	Tarawa	Tarawa	Tarawa
03-025N	03-025N	03-025N	01-22N	01-220N	01-220N	01-220N
172-473E	172-473E	172-473E	172-561E	172-561E	172-561E	172-561E
Slight	Dense	Dense	Rather dense	Slight	Slight	Rather dense
Small	Medium	Medium	Medrum	Small	Small	Medium
08'	07'	07'	07'	07'	07'	07'
S	S	S	S	S	S	S
8	8	8	10	10	10	10
52	53	53	8	8	8	8
c	bc	bc	bc	bc	bc	bc
S 2	Ca lm	SE 1	E 1	E 3	S 2	ESE 4
10100	10110	10086	10085	10099	10070	10098
280	268	269	278	280	278	284
285	276	279	293	293	292	292
1	Ca lm	1	1	2	1	3
			NW+	WNW+	NW++	W +
8	47	57	7	3	6	16
4	3	2	3	2	2	3
6		4	29	10	17	27
			05			
			05			
20	50	63	40	15	25	46
			Middle size spanish mackerel about 150 pieces.	Not being lured due to moonlight.		

15.8 '78	16.8 '78	17.8. '78	22.8. '78	27.8. '78	28.8 '78	1.9. '78
110	120	130	180	230	240	280
83	84	85	86	87	88	89
1900	0100	0100	1910	1930	1930	0200
2355	0515	0525	2140	0000	2350	0530
0015	0535	0545	2202	0030	0005	0545
Butaritari	Butaritari	Butaritari	Tarawa	Butaritari	Butaritari	Tarawa
03-024N	03-024N	03-024N	01-221N	03-025N	03-025N	01-209N
172-472E	172-472E	172-472E	172-561E	172-472E	172-472E	172-560E
Slight	Slight	Slight	Dense	Dense	Slight	Slight
Small	Small	Small	Medium	Medium	Small	Small
12'	12'	12'	12'	12'	12'	01
Co	Co	Co	Co	Co	Co	S
9	9	9	11	95	95	7
8	8	8	58			5
bc	q	b	b	bc	bc	bc
NE3	NNE4	ESE2	E2	SE2	E3	NE3
10128	10112	10098	10110	10122	10124	10112
281	252	274	282	282	288	280
289	283	287	291	288	287	295
2	3	1	1	1	2	1
SW+	NW++	NW++		SW++	SW+	W++
	1	3	18	18		5
	2	1		2		
	3	9	19	2		20
		2		12		
				1		
0	6	15	37	35	0	25
Not being lured due to bright moon.	As the left.	As the left.	Scattered by big fishes	As the left	As the left. (Trevally, Squid)	As the left Trevally 30 pieces.

1.9.'78	2.9.'78	2.9.'78	3.9.'78	3.9.'78	4.9.'78	4.9.'78
280	290	290	03	03	13	13
90	90	92	93	94	95	96
1900	0200	1850	0200	1850	0100	0100
2310	0525	2140	0520	2315	0515	0520
2335	0545	2200	0540	2335	0535	0540
Tarawa	Tarawa	Abemama	Abemama	Abemama	Abemama	Abemama
01-21.9N	01-21.9N	00-24.3N	00-24.3N	00-24.3N	00-24.3N	00-24.9N
172-56.2E	172-56.2E	173-54.3E	173-54.3E	173-54.3E	173-54.3E	173-54.6E
Slight	Slight	Lather dense	Lather dense	Slight	Slight	Slight
Small	Small	Medium	Medium	Small	Small	Small
013'	013'	12'	12'	12'	12'	07'
S	S	S	S	S	S	Co
10	10	12	12	12	12	11
55	55'	50	50	50	50	45
bc	b	bc	bc	bc	bc	q
ENE3	ENE3	ESE2	ESE3	SE	SE4	ENE1
10136	10118	10125	10109	10126	10110	10110
285	276	285	273	282	282	272
294	292	286	285	286	284	284
2	2	2	2	2	3	Calm
SW++	W++	NW++	SW++	NW++	SW++	SW++
5	2	2	5	4	6	8
1						2
20	10	30	33	22	18	13
			2		1	
					1	2
2						
28	12	32	40	26	26	25
Trevally, Benthonic fishes Others 60 pieces	Spanish mackerel 30 pieces.	S. d larva 50%.	S. d. and H O larva 50%			

6.9.'78	6.9.'78	7.9.'78	7.9.'78	9.9.'78	10.9.'78	11.9.'78
33	33	43	43	63	73	83
97	98	99	100	101	102	103
1910	0100	1900	0100	1900	0100	1900
0103	0520	0055	0515	2230	0520	0515
0120	0545	0115	0535	2248	0542	0540
Abemama 00-243N 173-542E	Abemama 00-243N 173-542E	Abemama 00-243N 173-543E	Abemama 00-243N 173-543E	Abemama 00-243N 173-543E	Abemama 00-243N 173-543E	Abemama 00-217N 173-557E
Lather dense Medium	Lather dense Large	Slight Small	Lather dense Medium	Dense Large	Dense Large	Slight Small
12'	12'	12'	12'	13'	13'	08'
Co	Co	Co	Co	S	S	S
11	11	11	11	12	12	11
48	48	38	38			
b	bc	b	bc	bc	bc	bc
ESE2	ESE2	Ca lm	SSE2	SE3	E3	ENE4
10113	10099	10102	10101	10118	10098	10112
280	280	283	275	282	278	280
286	284	288	287	287	288	287
1	1	Ca lm	Ca lm	1	3	2
W+	W++	SW+	W++	N++	NW+	
8	12	5	8	1		5
2	4	1	4			
12	51	9	32	21	306	55
				05		15
8	5		2			
		1		05	25	
30	72	16	46	23	33	12

12.9 '78	14.9. '78	29.9. '78	29.9. '78	29.9. '78	30.9. '78	1.10. '78
93	113	263	263	263	273	283
104	105	106	107	108	109	110
1900	0100	1900	0100	1850	0100	1930
0510	0525	0037	0515	2340	0520	0000
0530	0545	0105	0538	2400	0540	0029
Nonouti	Abemama	Abemama	Abemama	Abemama	Abemama	Abemama
00-412S	00-242N	00-242N	00-242N	00-242N	00-242N	00-242N
174-259E	173-543E	173-544E	173-544E	173-544E	173-544E	173-544E
Slight	Slight	Rather dense	Rather dense	Slight	Slight	Slight
Small	Small	Medium	Medium	Small	Small	Small
70'	13'	12'	12'	12'	12'	12'
S & Co	S	Co	Co	Co	Co	Co
18	12	14	14	14	14	13
		53	53	53	53	55
bc	bc	bc	bc	bc	b	o
ENE 4	ESE 4	E 4	ENE 4	ESE 3	SE 3	S 4
10108	10075	10100	10094	10110	10088	10104
284	285	283		282		283
282	288	289	286	288	285	289
2	2	3	3	3	3	3
Various		E++		E++		
	2	15	5	6	8	4
		7	2	2	2	3
	12	5	18	5	11	1
			3	2	4	
				4		
		30		2 ㄗㄗ		
0	14	57	28	21	25	8
Strong tidal current.		*Sardinella clupeioides				

1 10 '78	1 10. '78	2 10. '78	2. 10 '78	3. 10 '78	5 10 '78	6. 10. '78
283	283	293	293	07	27	37
111	112	113	114	115	116	117
0100	1850	0100	1900	0100	1900	0100
0520	2140	0515	2200	0520	2128	0520
0540	2210	0535	2215	0540	2155	0540
Abemama	Abemama	Abemama	Abemama	Abemama	Tarawa	Tarawa
00-242N	00-235N	00-235N	00-234N	00-234N	01-218N	01-218N
173-544E	173-542E	173-542E	173-542E	173-542E	172-559E	172-559E
Dense Small	Dense Large	Dense Large	Slight Small	Dense Large	Dense Medium	Rather dense Small
12'	16'	16'	16'	16'	02'	02'
Co	Co	Co	Co	Co	S	S
13	20	20	18	18	10	10
55	70	70	9	9		
c	bc	bc	bc	q	bc	bc
S 4	Cal m	E 1	NE 4	NE 4	SE 4	ESE 3
10080	10111	10096	10120	10095	10093	10080
277	278	273	285	280	286	280
289	290	289	290	288	295	291
3	Cal m	1	3	3	3	2
	E +		E++	SW++++	++	++
5	10	12	4		39	23
2	4	3	1			
10	30	20	10	11	34	2
3	30	10				
20	74	45	15	11	73	25
				Strong tidal current.		

7 10 '78	8 10. '78	9. 10 '78	9. 10 '78	11. 10. '78	22 10. '78	Total
47	57	67	67	87	197	
118	119	120	121	122	123	
1900	0100	1930	0100	0100	1850	
2350	0520	0000	0520	0520	2350	
0012	0540	0025	0540	0540	2423	
Butaritari 03-025N 172-472E	Butaritari 03-025N 172-472E	Butaritari 03-025N 172-472E	Butaritari 03-025N 172-472E	Butaritari 03-025N 172-472E	Butaritari 03-025N 172-473E	
Dense Large	Rather dense Medium	Rather dense Medium	Slight Small	Dense Large	Slight Small	
07' S 85 85 以上 bc E 3 10093 285 290 2 +	07' S 85 85 以上 bc ESE3 10085 282 290 1 0	07' S 85 7.0 bc ESE4 10097 290 292 3 ++	07' S 85 bc ESE4 10088 286 289 2 ++	07' S 85 bc Calm 10120 280 286 Calm o	05' S & Co 8 8 以上 bc SSW2 10117 275 296 1 E+	
24 05	22 05	15 2	6	29	2	1614 2105 11972 73 185 1778 69 107
85 7	225	13	7		4 7	
40	45	30	13	29	15	3407
		Strong ray 2 pieces.				

Annex Table 7

Record of Bait Fish Catching Test
at Each Month and Area (Boukeami)

Month	Area of operation	Days of operation	No. of operation	Catch amount			
				Harengula Ovalis	Sprateiluides delicaturus	Allanetta Ovalava	Apogonidae
May	Tarawa	8	8	262	30	9	0
June	Tarawa	11	17	474	89	4	0
	Abemama	3	5	6	615	5	265
	Butaritari	4	5	64	127	23	433
	Total	18	27	544	1632	32	688
July	Tarawa	5	6	51	119	3	0
	Abemama	4	6	29	104	13	7
	Butaritari	15	21	105	139	73	68
	Total	24	33	185	362	89	75
August	Tarawa	6	7	101	119	10	05
	Butaritari	11	13	217	27	255	225
	Total	17	20	318	146	355	23
Sept.	Tarawa	2	3	12	50	1	0
	Abemama	12	17	100	328	26	11
	Total	14	20	112	378	27	11
October	Tarawa	2	2	62	36	0	0
	Abemama	3	6	35	82	13	0
	Butaritari	5	6	96	0	5	0
	Total	10	14	193	118	18	0

Grand Total	Tarawa	26	43	962	443	27	05
	Abemama	22	34	170	5755	57	435
	Butaritari	35	45	482	1787	1265	1338
	Total	83	122	1614	11972	2105	1778

Percent (%)	Tarawa			63.9%	29.4%	1.8%	0
	Abemama			18.5	6.26	6.2	4.7%
	Butaritari			46.3	1.72	1.22	1.29
	G. Total			46.6	3.45	6.1	5.1

(Unit : bucket 1 bucket = 3kg)						Average catch
Sardinella clupeoides	Dassumeria hasselti	Caesio Caerulaureus	Dussumeriidae	Carangidae	Total	per day
0	0	9	0	0	310	388
0	52	0	0	0	619	364
13	8	0	0	0	119	238
0	0	4	0	0	147	294
13	60	4	0	0	885	328
0	0	0	0	0	173	288
3	0	0	0	0	156	260
0	0	0	0	0	385	183
3	0	0	0	0	714	216
0	0	0	0.5	0	231	330
0	0	1	0	0	293	225
0	0	1	0.5	0	524	262
0	11	0	0	2	76	253
32	0	0	18	0	515	303
32	11	0	18	2	591	296
0	0	0	0	0	98	490
43	0	0	0	0	173	288
0	2	55	0	14	172	287
43	2	55	0	14	443	316

0	63	9	0.5	2	1507	350
48	8	0	18	0	920	271
43	2	60	0	14	1040	231
91	73	69	185	16	3467	284

0%	42%	06%	0%	01%	100%	
52	08	0	20	0	100	
41	02	58	0	13	100	
26	21	20	05	05	100	

Annex Table 8

Record of Bait Fish Catching Test (Purse Seine)

Note of Type : of Fish school.	Coloured	- Shows the change of sea surface in the colour because of running of dense fish school.
	Birds Fitting	- shows the bird associated with fish school.
	No Bird	- shows no bird associated with fish school.

Date		20 May '78	20 May '78	21 May '78	21 May '78	21 May '78
Moon age		12.8	12.8	13.8	13.8	13.8
Operation No.		1	2	3	4	5
Time	Commence to set net	1500	1530	1500	1530	1610
	Finished with haul up net	1525	1600	1520	1620	1620
Position	Area	Tarawa	Tarawa	Tarawa	Tarawa	Tarawa
	Latitude	01-21.0N	01-21.0N	01-21.0N	01-21.0N	01-21.0N
	Longitude	173-025E	173-025E	173-019E	173-019E	173-019E
Fish school	Type	No Bird, Coloured	No Bird, Coloured	No Bird, Coloured	No Bird, Coloured	No Bird, Coloured
	Size	Small	Medium	Small	Medium	Small
Distance from shore (m)		50	100	150	200	200
Bottom material		S	S	Co	Co	Co
Depth (m)		1.5	1.5	1.7	1.7	1.7
Weather		bc	bc	b	b	b
Wind direction and force		E 2	E 2	E 2	E 2	E 2
Air pressure (mb)		1008.0	1008.0	1008.5	1008.5	1008.7
Air temperature (°C)		29.4	29.4	29.5	29.5	29.5
Water surface temp. (°C)		29.0	29.0	29.5	29.5	29.5
Sea condition		1	1	1	1	1
Current		The direction of current is shown by E (East), W (west), NE (North East) and others (+, ++ indicate the degree of current strength. + = rather strong, ++ = strong.)				
Catch	Harengula ovalis	3	1	1	20	
	Allanetta ovalava					
	Spratelluides delicaturus	2		1		
	Dassumeria hasselti					
	Etrumeus micropus					
	Archamia lineatus					
	Caesio caeruleaureus					
Others						
Total		5	1	2	20	-
Remarks		Most of spratelluides delicaturus were larval. So they almost fled from net	Failed in setting net	Larval of spratelluides delicaturus fled from net	Failed in setting net. 2/3 of catch fled.	Failed in setting net

22 May '78	24 May '78	24 May '78	24 May '78	24 May '78	27 May '78	28 May '78
14.8 6	16.8 7	16.8 8	16.8 9	16.8 10	19.8 11	20.8 12
1530 1540	1705 1715	1720 1735	1740 1750	1755 1805	1730 1740	0740 0750
Tarawa 01-21.8N 173-030E	Tarawa 01-20.6N 173-022E	Tarawa 01-20.6N 173-022E	Tarawa 01-20.6N 173-022E	Tarawa 01-20.6N 173-022E	Tarawa 01-21.7N 173-060E	Tarawa 01-21.7N 173-058E
No Bird, Coloured Small	No Bird, Jumping Small	No Bird, Coloured Small	No Bird, Jumping Small	No Bird, Jumping Small	Plain school Smallest	Plain school Smallest
50 Co 1.5 b E 1 1007.2 29.5 29.3 1	150 Co 1.2 b ESE 1 1009.5 29.5 29.6 1 E +	150 Co 1.2 b +SE1 1009.5 29.5 29.6 1 E +	50 S 1.2 b ESE 1 1009.3 29.5 29.6 1 E +	50 S 1.2 b ESE 1 1009.1 29.5 29.6 1 E +	20 S 0.8 bc ESE 3 1012.5 28.1 29.3 1 E +	30 S 0.9 b E 3 1012.0 28.2 29.2 1 E +
		3	2			
-	-	3	2	-	-	-
Failed in setting net	Failed in catching because of the rapid moving school.			Failed in catching because of the rapid moving school.		Failed in setting net

28 May '78 20.8 13	29 May '78 21.8 14	29 May '78 21.8 15	29 May '78 21.8 16	29 May '78 21.8 17	29 May '78 21.8 18	29 May '78 21.8 19
0815 0830	0855 0910	0920 0930	0945 0955	1000 1013	1018 1030	1045 1100
Tarawa 01-21.7N 173-05.7E	Tarawa 01-20.7N 173-02.4E	Tarawa 01-20.7N 173-02.4E	Tarawa 01-20.6N 173-02.4E	Tarawa 01-20.6N 173-020E	Tarawa 01-20.6N 173-020E	Tarawa 01-20.6N 173-020E
Plain school Smallest	No Bird, Coloured Smallest	Coloured Smallest	Coloured Smallest	Coloured Smallest	Coloured Smallest	Coloured Smallest
70 S 0.7 b E 3 1012.0 28.4 29.0 1 E +	120 S 0.9 bc E 3 1012.1 28.4 29.4 1 E +	120 S 0.9 bc E 3 1012.1 28.4 29.4 1 E +	120 S 0.9 bc E 3 1012.1 28.4 29.4 1 E 3	140 S 0.9 bc E 3 1012.0 28.4 29.4 1 E +	140 S 0.9 bc E 3 1012.0 28.5 29.5 1 E +	140 S 0.8 bc E 3 1011.8 28.6 29.6 1 E +
	1	1	1	2	1	2
-	1	1	1	2	1	2
Failed in setting net	Failed in setting net	Failed in controlling bait boat	Failed in controlling bait boat	Failed in controlling bait boat	Failed in controlling bait boat	Failed in controlling bait boat

30 May '78	30 May '78	31 May '78	31 May '78	31 May '78	31 May '78	3 June '78
22.8 20	22.8 21	23.8 22	23.8 23	23.8 24	23.8 25	26.8 26
1000 1010	1015 1025	1125 1135	1150 1200	1320 1330	1340 1350	1430 1440
Tarawa 01-21.6N 173-033E	Tarawa 01-21.6N 173-033E	Tarawa 01-21.5N 173-033E	Tarawa 01-21.5N 173-033E	Tarawa 01-20.6N 173-020E	Tarawa 01-20.6N 173-023E	Tarawa 01-20.6N 173-019E
Fitted with 6 Birds, Jumping Smallest	Plain school Smallest	Plain school Smallest	Plain school Small	Coloured Small	Coloured Small	Plain school Small
40 Co 0.5 b E 2 1013.0 29.5 29.8 1 W+	40 Co 0.5 b E 2 1013.0 29.0 29.8 1 W+	40 Co 0.5 b E 2 1013.2 29.5 29.8 1 W+	40 Co 0.5 b E 2 1013.2 29.5 29.8 1 W+	150 Co 1.3 b E 2 29.5 29.8 1 W+	200 Co 1.5 bc E 2 29.5 29.8 1 W+	100 S 1.0 bc ESE 3 1008.5 28.8 28.7 2
12 1	2	5		3	7	0.5
13	2	5	-	3	7	0.5
			Failed in setting net	Most of catch fled.		

3 June '78 26.8 27	3 June '78 26.8 28	3 June '78 26.8 29	3 June '78 26.8 30	4 June '78 27.8 31	4 June '78 27.8 32	4 June '78 27.8 33
1445 1455	1500 1510	1540 1545	1555 1610	1425 1435	1445 1455	1500 1510
Tarawa 01-20.6N 173-019E	Tarawa 01-21.2N 173-027E	Tarawa 01-21.2N 173-027E	Tarawa 01-21.2N 173-027E	Tarawa 01-21.8N 173-068E	Tarawa 01-21.8N 173-068E	Tarawa 01-21.8N 173-068E
Plain school Small	Plain school Small	Plain school Small	Plain school Small	Plain school Smallest	Plain school Smallest	Plain school Smallest
100 S 1.0 bc ESE 3 1008.5 28.8 28.7 2	40 S 0.7 bc ESE 3 1008.5 28.8 28.7 2	40 S 0.7 bc ESE 3 1008.5 28.8 28.7 2	40 S 0.7 bc ESE 3 1008.5 28.8 28.7 2	80 S 1.2 bc ESE 2 1008.0 29.2 29.6 1 W+	80 S 1.0 bc ESE 2 1008.0 29.2 29.6 1 W+	80 S 1.0 bc ESE 2 1008.0 29.2 29.6 1 W+
2		2	2	1	5	0.5
2	-	2	2	1	5	0.5

4 June '78	4 June '78	5 June '78	5 June '78	10 June '78	12 June '78	12 June '78
27.8 34	27.8 35	27.8 36	28.8 37	28.8 38	2.4 39	6.2 40
1535 1550	1620 1630	1530 1545	1615 1630	0815 0825	0745 0755	0810 0820
Tarawa 01-21.7N 173-06.0E	Tarawa 01-21.8N 173-06.8E	Tarawa 01-21.8N 173-05.6E	Tarawa 01-21.7N 173-06.9E	Tarawa 01-21.7N 173-05.4E	Tarawa 01-21.9N 173-05.6E	Tarawa 01-21.9N 173-05.6E
Plain school Smallest	Plain school Smallest	Plain school Smallest	Plain school Smallest	Coloured Smallest	Coloured Small	Roughly formed school Smallest
80 S 0.8 bc ESE 2 1008.0 29.2 29.6 1	100 S 1.1 bc ESE 2 1008.0 29.2 29.6 1	70 S 0.9 b ESE 2 1008.0 29.9 30.0 1	120 S 1.0 b ESE 2 1008.0 29.9 30.0 1	20 S 0.8 b ESE 2 1009.7 27.8 29.7 1	20 S 0.6 b E 1 1008.5 27.9 29.2 1	20 S 0.6 b E 1 1008.5 27.9 29.2 1
1	1	2	1	3	12	2 1
1	1	2	1	3	12	3

12 June '78	12 June '78	20 July '78	20 July '78	20 July '78	20 July '78	17 Aug. '78
6.2 41	6.2 42	14.6 43	14.6 44	14.6 45	14.6 46	13.0 47
0835 0845	0900 0915	1450 1500	1520 1530	1600 1615	1630 1640	1625 1640
Tarawa 01-21.9N 173-05.6E	Tarawa 01-21.9N 173-05.5E	Butanitari 03-02.8N 172-48.6E	Butanitari 03-02.8N 172-48.7E	Butanitari 03-03N 172-49.3E	Butanitari 03-03N 172-49.3E	Butaritani 03-02.8N 172-48.8E
Roughly formed school Smallest	Plain school Smallest	Plain school Small	Plain school Medium	Plain school Medium	Plain school Large	Coloured Large
20 S 0.6 b E 1 1008.5 27.9 29.2 1	20 S 0.6 b E 1 1009.0 28.0 29.2 1	50 Co & S 0.9 bc SE 2 1011.5 29.0 31.0 1	80 Co & S 0.8 bc SE 2 1011.5 29.0 29.5 1	100 Co & S 0.7 bc SE 2 1011.5 28.9 29.2 1	100 Co & S 0.7 bc SE 2 1011.5 28.7 29.2 1	250 S 1.5 bc ENE 1 1009.5 28.5 28.9 1 NE +
2	1 2	1	2	1	1 2	45
2	3	1	2	1	3	45
	Two bucket of catch of others are 2-3cm milk fish.	Though succeeded in setting net, most of catch fled.	Though succeeded in setting net, most of catch fled.	Though succeeded in setting net, most of catch fled.	Large school feld from net.	The first trial of catching after remodelled Failed in catching whole school due to its large size

17 Aug. '78	17 Aug. '78	18 Aug. '78	19 Aug. '78	20 Aug. '78	20 Aug. '78	24 Aug. '78
13.0 48	13.0 49	14.0 50	15.0 51	16.0 52	16.0 53	26.0 54
1645 1655	1720 1730	1415 1430	0720 0750	0725 0735	0745 0755	0915 0927
Butaritari 03-02.8N 172-48.8E	Butaritari 03-02.8N 172-48.8E	Butaritari 03-01.8N 172-47.0E	Butaritari 03-02.8N 172-48.5E	Butaritari 03-02.9N 172-49.0E	Butaritari 03-03N 172-49.0E	Butaritari 03-03N 172-48.2E
Coloured Medium	Coloured Small	Fitted with 30 Birds, coloured Large	Fitted with 60 Birds, coloured Large	Coloured Small	Coloured Medium	Plain school Large
250 S 1.5 bc ENE 1 1009.5 28.5 28.9 1 NE +	250 S 1.5 bc ENE 1 1009.4 28.5 28.9 1 NE +	400 Co 15 bc E 4 1009.2 29.5 29.5 2 W +	350 Co 1.2 c E 2 1009.8 28.2 29.0 2 W +	300 Co 1.0 q SE 4 1007.7 28.2 28.8 3 W +	300 Co 0.8 o SE 4 1007.7 28.2 28.8 3 W +	400 Co & S 1.0 bc SE 3 1011.0 29.0 29.3 2 E +
20	10	65	150	10	80	3 3
20	10	65	150	10	80	6
		100 buckets of catch fled due to over filling in net.	100 buckets of catch fled due to over filling in net.			Failed in catching due to the school break.

24 Aug '78 20.0 55	24 Aug. '78 20.0 56	24 Aug. '78 20.0 57	25 Aug. '78 21.0 58	25 Aug. '78 21.0 59	25 Aug. '78 21.0 60	26 Aug. '78 22.0 61
1015 1025	1035 1045	1100 1115	0710 0722	0725 0735	0745 0755	0815 0835
Butaritari 03-03N 172-48.1E	Butaritari 03-02.3N 172-47.8E	Butaritari 03-02.6N 172-47.8E	Butaritari 03-02.2N 172-47.9E	Butaritari 03-02.2N 172-47.9E	Butaritari 03-02.2N 172-47.9E	Butaritari 03-02.7N 172-48.3E
Plain school Medium	Plain School Medium	Plain School Medium	Coloured Large	Coloured Medium	Coloured Medium	Coloured Medium
400 Coral & Sand 1.0 bc SE3 1011.0 29.0 29.3 2 E+	450 S 0.8 bc SE3 1011.0 29.0 29.4 2	450 S 0.8 bc SE3 1011.0 29.2 29.2 2	400 S 0.8 bc SE2 1010.0 29.0 29.1 1	400 S 0.8 bc SE2 1010.0 29.0 29.1 1	400 S 0.8 bc SE2 1010.0 29.0 29.1 1	400 S 1.0 bc SE2 1010.7 28.0 28.9 1
1 1		45	23 23	7 8	6 6	64
2	—	45	46	15	12	64
Failed in setting net	Failed in setting net					

26 Aug. '78 22.0 62	27 Aug. '78 23.0 63	28 Aug. '78 24.0 64	28 Aug. '78 24.0 65	28 Aug. '78 24.0 66	29 Aug '78 25.0 67	29 Aug. '78 25.0 68
0845 0905	0735 0800	1055 1110	1125 1140	1145 1200	1200 1220	1235 1255
Butaritari 03-02.7N 172-48.4E	Butaritari 03-02.6N 172-48.3E	Butaritari 03-02.0N 172-46.6E	Butaritari 03-02.0N 172-46.6E	Butaritari 03-02.0N 172-46.6E	Butaritari 03-02.0N 172-46.6E	Butaritari 03-02.0N 172-46.6E
Coloured Medium	Coloured Medium	Coloured Large	Plain School Medium	Plain School Medium	Coloured Medium	Coloured Medium
300 S 0.9 bc SE2 1011.4 28.5 29.0 2	300 S 0.9 bc SE2 1012.0 29.5 29.2 2	300 S 0.8 bc E3 1010.8 29.2 29.3 2	300 S 0.8 bc E3 1010.8 29.2 29.3 2	300 S 0.8 bc E3 1010.8 29.2 29.3 2	300 S 0.9 bc E3 30.0 29.6 2	300 S 0.9 bc E3 30.0 29.6 2
47	75	53	20	29	48	46
47	75	53	20	29	48	46

13 Sep. '78 10.3 69	13 Sep. '78 10.3 70	14 Sep. '78 11.3 71	14 Sep '78 11.3 72	14 Sep. '78 11.3 73	20 Sep. '78 17.3 74	20 Sep. '78 17.3 75
0840 0900	0910 0920	0855 0910	0920 0930	0950 1005	0710 0721	0725 0740
Abemama 00-215N 173-56.0E	Abemama 00-21.5N 173-56.0E	Abemama 00-19.7N 173-55.9E	Abemama 00-19.7N 173-55.9E	Abemama 00-19.7N 173-56.1E	Butaritari 03-03.2N 172-48.9E	Butaritari 03-03.2N 172-48.9E
Coloured Large	Coloured Small	Coloured Large	Coloured Small	Plain School Small	Jumping Small	Jumping Medium
300 S 0.9 bc ESE4 1010.8 28.5 28.8 2 NW+	300 S 1.0 bc ESE4 1010.8 28.5 28.8 2 NW+	400 S 1.4 bc ESE5 1008.7 28.9 28.7 3 NW+	400 S 1.4 bc ESE5 1008.7 28.9 28.7 3 NW+	500 S 1.3 bc ESE5 1010.0 29.0 28.6 3 NW+	300 Co 1.4 bc ESE3 1009.8 28.6 28.9 2 E+	300 Co 1.4 bc ESE3 1010.0 28.6 28.9 2 E+
55	2	19	2		6	51
55	2	19	2	-	6	51
	Failed in setting net	Failed in setting net	Failed in setting net	The catch wholly consisted of the larval of Sprat- tellundes delica- turus Therefore all of catch were discarded to the sea.	Failed in setting net	

20 Sep. '78	21 Sep. '78	21 Sep. '78	21 Sep. '78	22 Sep. '78	22 Sep. '78	23 Sep. '78
17.3 76	18.3 77	18.3 78	18.3 79	19.3 80	19.3 81	20.3 82
0750 0805	0725 0736	0755 0810	0825 0835	0732 0740	0755 0850	0720 0730
Butaritari 03-03.2N 172-48.9E	Butaritari 03-02.5N 172-48.2E	Butaritari 03-02.5N 172-48.2E	Butaritari 03-03N 172-48.3E	Butaritari 03-03.1N 172-49.0E	Butaritari 03-03.1N 172-49.2E	Butaritari 03-03N 172-49E
Coloured Medium	Coloured Medium	Breezing Small	Coloured Large	Coloured Medium	Coloured Small	Coloured Small
300 Co 1.4 bc ESE3 1010.5 28.6 28.9 2 E+	100 Co 1.0 r ESE4 1009.5 26.1 28.8 3 E+	100 Co 1.0 o ESE4 1010.0 26.1 28.8 3 E+	300 Co 1.5 o ESE4 1010.5 26.0 28.8 4 E+	350 Co 1.5 bc ESE3 1009.2 28.7 29.3 2 E+	350 Co 1.0 bc ESE3 1009.5 28.7 29.3 2 E+	350 Co 1.0 bc SE3 1009.4 28.8 29.2 2 E+
55	35	5 7	53	65	15	5
55	35	12	53	65	15	5
						Failed in setting net

24 Sep. '78 21.3 83	Oct. 9 '78 6.7 84	Oct. 9 '78 6.7 85	Oct. 9 '78 6.7 86	Oct. 10 '78 7.7 87	Oct. 10 '78 7.7 88	Oct. 10 '78 7.7 89
0740 0745	0720 0735	0740 0755	0805 0820	1220 1235	1230 1245	1320 1340
Butaritari 03-02.9N 172-48.2E	Butaritari 03-030N 172-48.4E	Butaritari 03-030N 172-48.4E	Butaritari 03-030N 172-48.4E	Butaritari 03-02.8N 172-48.2E	Butaritari 03-02.8N 172-48.2E	Butaritari 03-02.8N 172-48.2E
Jumping Large	Birds fitting and coloured Large	Birds fitting and coloured Large	Birds fitting and coloured Medium	Coloured Large	Birds fitting and coloured Large	Birds fitting and coloured Large
300 Co 0.8 bc SSE1 1009.8 29.5 29.5 1 E+	400 S 1.3 bc ESE4 1009.0 28.5 29.0 2 ++	400 S 1.3 bc ESE4 1009.0 28.5 29.0 2 ++	400 S 1.3 bc ESE4 1009.0 28.5 29.0 2 ++	400 S 1.2 bc ESE1 1012.5 30.0 30.0 0 +	400 S 1.2 bc ESE1 1012.5 30 30 0 +	400 S 1.2 bc ESE1 1012.5 30 30 0 +
154	12	9	15	29 1	24 1	42 3
154	12	9	15	30	25	45
About 50 buckets of catch were put in the sea due to over filling.						

12 Oct. '78 9.7 90	12 Oct. '78 9.7 91	12 Oct. '78 9.7 92	12 Oct. '78 9.7 93	17 Oct. '78 14.7 94	17 Oct. '78 14.7 95	17 Oct. '78 14.7 96
0820 0835	0842 0857	0910 0930	0940 0955	1325 1340	1350 1405	1425 1430
Butaritari 03-02.4N 172-47.9E	Butaritari 03-02.4N 172-47.9E	Butaritari 03-02.4N 172-47.9E	Butaritari 03-02.4N 172-47.9E	Butaritari 03-02.9N 172-48.2E	Butaritari 03-02.9N 172-48.2E	Butaritari 03-02.9N 172-48.2E
Birds fitting and coloured Medium	Birds fitting and coloured Medium	Plain school Medium	Plain school Medium	Birds fitting and coloured Medium	Birds fitting and coloured Medium	Birds fitting and coloured Large
350 S 0.9 bc Calm 1011.5 30 29.5 0 +	350 S 0.9 bc Calm 1011.5 30 29.5 0 +	300 S 0.7 bc Calm 1012.7 31.5 29.8 0 +	300 S 0.7 bc Calm 1012.7 31.5 29.8 0 +	350 Co & S 0.8 o S2 1010.0 27.5 29.2 1 W+	350 Co & S 0.8 o S8 1010.5 27.0 29.2 1 W+	350 Co & S 1.0 r S4 1011.0 27.0 29.2 2 NW+
15	14	13 2	24 1	120	80	220
15	14	15	25	120	80	220
				Breeding in the Large type bait pen.	As same Left	Breeding in the Large type bait pen. Other 300 buckets of catch were discarded to the sea.

20 Oct. '78 17.7 97	20 Oct. '78 17.7 98	20 Oct. '78 17.7 99	20 Oct. '78 17.7 100	20 Oct. '78 17.7 101	22 Oct. '78 19.7 102	22 Oct. '78 19.7 103
0715 0720	0730 0745	0750 0810	0830 0850	0910 0930	0700 0710	0800 0810
Butaritari 03-02.5N 172-48.1E	Butaritari 03-02.5N 172-48.1E	Butaritari 03-02.5N 172-48.1E	Butaritari 03-02.7N 172-48.0E	Butaritari 03-02.7N 172-48.0E	Butaritari 03-02.5N 172-48.2E	Butaritari 03-02.5N 172-48.8E
Jumping Small	Jumping Medium	Jumping Medium	Coloured Medium	Coloured Medium	Jumping Small	Jumping Small
120 S 0.7 b SW1 1012.4 27.5 28.9 1 SE+	120 S 0.9 b SW1 1012.4 27.5 28.9 1 SE+	120 S 0.8 b SW1 1012.7 28.0 28.9 1 o	200 S 1.0 b SW1 1013.0 28.5 29.8 1 W+	200 S 1.0 b SW1 1013.1 29.0 29.8 1 W+	80 Co 0.5 bc Calm 1011.0 28.0 28.9 0 WNW++	80 Co 0.5 bc Calm 1012.2 30.0 29.2 0 WNW++
55 15	70 10	100	70	70	1 2	1 3
70	80	100	70	70	3	4
Breeding in the Large type bait pen	As same Left	As same Left	As same Left			

23 Oct. '78	24 Oct. '78	24 Oct. '78	24 Oct. '78	24 Oct. '78	24 Oct. '78	Total
20.7 104	21.7 105	21.7 106	21.7 107	21.7 108	21.7 109	
0710 0745	0700 0710	0725 0735	0740 0750	0755 0805	0820 0830	
Butaritari 03-02.7N 172-50.0E	Butaritari 03-02.6N 172-48.9E	Butaritari 03-02.9N 172-50.3E	Butaritari 03-02.9N 172-50.3E	Butaritari 03-02.9N 172-50.3E	Butaritari 03-02.9N 172-50.3E	
Birds fitting and coloured Medium	Coloured Smallest	Coloured Small	Coloured Small	Coloured Smallest	Coloured Smallest	
500 Co 0.8 bc Calm 1011.7 28.5 29.3 0 ESE+	450 Co 0.6 q SW3 1010.3 26.8 28.8 2 ESE+	100 Co 0.6 q SW3 1010.4 26.8 28.8 2 ESE+	100 Co 0.6 o SW2 1010.6 27.0 28.8 1 ESE+	100 Co 0.7 bc SW2 1010.9 28.0 28.8 1 ESE+	100 Co 1.0 bc SW2 1011.1 28.0 28.8 1 ESE+	
100 6	2	12	35 5	15	5	2,628 105 3 0 0 0 0 2
106	2	12	40	15	5	2,738

Annex Table 9

Record of Bait Fish Catching Test
at Each Month and Area
(Purse Seine)

Month	Area of operation	Days of operation	No of operation	Catch (Unit: Bucket 1 bucket = 3kg)					Average catch per day
				Harengula Ovals	Spratelluides delicaturus	Allanetta ovalava	Milk fish	Total	
May	Tarawa	9	25	67	3	1	0	71	28
June	Tarawa	5	17	38	0	1	2	41	24
July	Butaritari	1	4	1	0	6	0	7	18
August	Butaritari	10	22	847	0	41	0	888	404
September	Abemama	2	5	78	0	0	0	78	156
	Butaritari	5	10	444	0	7	0	451	451
	Total	7	15	522	0	7	0	529	353
October	Butaritari	8	26	1,153	0	49	0	1,202	462

Grand Total	Tarawa	14	42	105	3	2	2	112	27
	Abemama	2	5	78	0	0	0	78	156
	Butaritari	16	62	2,445	0	103	0	2,548	411
	Total	32	109	2,528	3	105	2	2,738	251

Percent (%)	Tarawa			93.7%	27%	18%	18%	100%
	Abemama			100	0	0	0	100
	Butaritari			960	0	40	0	100
	Total			960	01	38	01	100

Annex Table 10

Body Length Distribution of Skipjack

Area	Tarawa		Abemama		Butaritari		Total		
	Range of fork length (cm)	No. of fish	%	No. of fish	%	No. of fish	%	No. of fish	%
31 (cm)					1	0	1	0	
32					1	0	1	0	
33					5	0.2	5	0.1	
34					30	1.1	30	0.7	
35					49	1.8	49	1.1	
36					13	0.5	13	0.3	
37					1	0	1	0	
38					1	0	1	0	
39									
40				3	0.3	5	0.2	8	0.2
41				6	0.7	6	0.2	12	0.3
42				10	1.1	19	0.7	29	0.6
43				6	0.7	33	1.3	39	0.8
44	4	0.4		9	1.0	64	2.4	77	1.7
45	14	1.4		18	2.0	162	6.0	194	4.3
46	24	2.4		46	5.2	318	11.8	388	8.5
47	53	5.4		99	11.1	396	14.7	548	12.0
48	115	11.7		137	15.4	332	12.4	584	12.8
49	164	16.9		174	19.6	270	10.1	608	13.3
50	195	19.8		146	16.4	247	9.2	588	12.9
51	141	14.3		104	11.7	247	9.2	492	10.8
52	90	9.2		60	6.8	184	6.8	334	7.3
53	51	5.2		44	4.9	115	4.3	210	4.7
54	25	2.5		14	1.6	47	1.8	86	1.9
55	17	1.7		6	0.7	25	0.9	48	1.1
56	9	0.9		3	0.3	8	0.3	20	0.4
57	11	1.1		2	0.2	6	0.2	19	0.4
58	19	1.9		2	0.2	6	0.2	27	0.6
59	19	1.9		0		9	0.3	28	0.6
60	17	1.7		1	0.1	22	0.8	40	0.9
61	12	1.2				30	1.1	42	0.9
62	4	0.4				25	0.9	29	0.6
63						11	0.4	11	0.2
64						2	0.1	2	0
65						2	0.1	2	0
N	984	100	890	100	2,692	100	4,566	100	
\bar{X}	507		491		485		491		
S	33		25		43		42		

Area School No Date Position Water surface temp. (°C)	Tarawa 16 7, June '78 01-46.5N 172-47.5E 28.4		Tarawa 18 14, June '78 01-49.0N 172-48.0E 28.4		Butaritari 21 16, June '78 03-08.0N 172-37.0E 28.6		Butaritari 27 17, June '78 03-09.5N 172-30.5E 28.6		Butaritari 31 18, June '78 03-04.0N 172-35.0E 28.3		Butaritari 33 18, June '78 03-25.0N 172-25.0E 28.6	
Range of fork length (cm)	No. of fish	%	No. of fish	%	No. of fish	%	No. of fish	%	No. of fish	%	No. of fish	%
30 (cm)												
31									1	1		
32									1	1		
33									5	5		
34									30	30		
35									49	49		
36									13	13		
37									1	1		
38												
39												
40												
41												
42												
43												
44	2	21										
45	1	10					1	1				
46	3	32			2	2	3	3				
47	3	32	4	4	5	5	3	3			1	1
48	7	74	1	1	15	15	9	9			3	3
49	18	191	16	16	14	14	13	13			6	6
50	22	234	14	14	24	24	18	18			11	11
51	11	118	23	23	17	17	31	31			8	8
52	12	128	16	16	13	13	13	13			21	21
53	8	85	17	17	8	8	7	7			21	21
54	3	32	7	7	1	1	2	2			12	12
55	4	43	2	2	1	1					7	7
56											5	5
57											2	2
58											2	2
59											0	0
60											1	1
61												
62												
63												
64												
65												
66												
67												
68												
69												
70												
N	94	100	100	100	100	100	100	100	100	100	100	100
\bar{X}	50.2		51.1		50.1		50.3		34.9		52.2	
S	2.3		1.8		1.8		1.8		0.9		2.4	

Abemama 49 26. June '78 00-15 ON 173-17 OE 28.3		Butaritari 53 30. June '78 03-16 ON 172-26 8E 29.0		Butaritari 60 4, July '78 03-08 ON 172-40 OE 28.4		Butaritari 68 10, July '78 03-07.5N 172-25.0E 29.0		Butaritari 74 11, July '78 03-06.ON 172-34.0E 29.1		Butaritari 77 12, July '78 03-06 ON 172-42.0E 28.9		Tarawa 86 16, July '78 01-36.8N 172-49.5E 28.3	
No of fish	%	No of fish	%	No. of fish	%	No. of fish	%	No of fish	%	No of fish	%	No of fish	%
		2	2					2	2				
		6	6	3	3			7	7				
		21	21	12	12			13	13	7	7		
2	2	31	31	19	19			29	29	19	19	1	11
2	2	27	27	22	22			24	24	23	23	4	44
14	14	9	9	18	18			15	15	15	15	6	67
18	18	2	2	9	9			8	8	12	12	13	145
16	16			7	7			1	1	11	11	20	222
14	14			6	6					3	3	23	256
10	10	1	1	1	1					2	2	14	155
9	9	1	1	3	3					2	2	7	78
6	6									1	1	2	22
4	4									2	2		
2	2					1	1	1	1				
1	1					1	1						
2	2					2	2						
						8	8			1	1		
						18	18			2	2		
						30	30						
						25	25						
						11	11						
						2	2						
						2	2						
100	100	100	100	100	100	100	100	100	100	100	100	90	100
508		463		475		611		466		483		504	
25		15		20		15		17		29		17	

Tarawa 91 17, July '78 01-29 0N 172-34 0E 28.5		Butaritari 94 21, July '78 03-03.7N 172-43.6E 29.2		Butaritari 98 23, July '78 02-53 0N 172-49.0E 29.1		Butaritari 102 26, July '78 01-20 5N 172-50 0E 28.2		Abemama 109 30, July '78 00-07 0N 173-25 0E 28.1		Abemama 113 31, July '78 00-00 173-23E 29.5		Tarawa 120 3, Aug. '78 01-51.6N 172-38 1E 28.1	
No of fish	%	No. of fish	%	No of fish	%	No of fish	%	No of fish	%	No. of fish	%	No. of fish	%
		1	1										
		3	3										
		1	1	2	2			1	1				
		8	8	7	7	1	1	2	2	2	23		
		31	31	18	18	2	2	10	10	9	100	1	1
		30	30	18	18	2	2	15	15	12	134	1	1
		19	19	24	24	13	13	20	20	13	145	6	6
		6	6	12	12	16	16	28	28	19	211	14	14
		1	1	10	10	26	26	12	12	17	189	28	28
1	1			5	5	22	22	6	6	8	89	20	20
				1	1	11	11	2	2	4	45	13	13
				2	2	4	4	2	2	3	34	9	9
4	4							2	2	1	10	7	7
7	7			1	1	2	2			1	10		
7	7											1	1
11	11												
18	18					1	1						
19	19												
17	17									1	10		
12	12												
4	4												
100	100	100	100	100	100	100	100	100	100	90	100	100	100
584		465		479		501		486		491		507	
22		18		20		19		19		20		18	

Butaritari 129 6. Aug '78 03-09 0N 172-38 0E 28.2		Butaritari 134 7. Aug. '78 03 07.5N 172-41 0E 28.0		Butaritari 137 8. Aug '78 03-04.0N 172-41.0E 28.4		Butaritari 159 19. Aug '78 03-12 0N 172-37.0E 28.9		Butaritari 166 20. Aug '78 03-02 0N 172-37.0E 29.3		Tarawa 167 23. Aug '78 01-36.0N 172-50.0E 28.9		Butaritari 171 24. Aug '78 03-09.0N 172-31 0E 29.3	
No of fish	%	No. of fish	%	No of fish	%	No. of fish	%	No. of fish	%	No. of fish	%	No. of fish	%
				1	1								
		2	2	2	2	2	2						
1	1			1	1	1	1					2	22
3	3			4	4	4	4	1	1			13	141
6	6	10	10	12	12	9	9	4	4	2	2	28	304
26	26	16	16	13	13	12	12	8	8			18	195
24	24	26	26	21	21	22	22	4	4	6	6	20	218
18	18	13	13	25	25	18	18	14	14	12	12	8	87
12	12	9	9	8	8	10	10	22	22	19	19	1	11
5	5	10	10	10	10	6	6	14	14	29	29		
2	2	10	10	1	1	9	9	7	7	17	17	2	22
2	2	1	1	1	1	5	5	9	9	11	11		
1	1	2	2			1	1	7	7	4	4		
		1	1					5	5				
						1	1	2	2				
								2	2				
								1	1				
100	100	100	100	100	100	100	100	100	100	100	100	92	100
473		478		475		477		498		498		462	
18		22		21		23		28		16		14	

Butaritari 174 25, Aug '78 03-05 ON 172-33.OE 29.1		Butaritari 177 26, Aug '78 03-06.ON 172-41.OE 28.9		Butaritari 183 27, Aug. '78 03-07.ON 172-38.OE 29.1		Tarawa 192 1, Sep. '78 01-15.7N 172-53.2E 29.1		Tarawa 194 2, Sep '78 01-16 8N 172-52.1E 28.6		Abemama 205 6, Sep. '78 00-26 ON 173-44.3E 28.6		Abemama 208 7, Sep. '78 00-27.ON 173-42 OE 29.2	
No of fish	%	No. of fish	%	No of fish	%	No of fish	%	No. of fish	%	No. of fish	%	No. of fish	%
												3	3
1	1	3	3									6	6
4	4	10	10									10	10
7	7	17	17	1	1							5	5
8	8	15	15	8	8			2	2			1	1
10	10	17	17	6	6	2	2	7	7			2	2
16	16	15	15	17	17	5	5	9	9			1	1
28	28	15	15	38	28	15	15	13	13	1	1	7	7
19	19	6	6	18	18	27	27	21	21	3	3	7	7
4	4			10	10	18	18	25	25	15	15	18	18
2	2	1	1	2	2	19	19	17	17	17	17	18	18
		1	1			9	9	3	3	21	21	9	9
						2	2	3	3	21	21	6	6
						1	1			18	18	7	7
						1	1			2	2		
						1	1			1	1		
										1	1		
100	100	100	100	100	100	100	100	100	100	100	100	100	100
461		448		493		488		482		511		477	
20		20		14		18		1.8		1.5		38	

Butaritari 248 8 Oct '78 03-17.0N 172-33.0E 29.0		Butaritari 256 12, Oct '78 03-09.0N 172-36.0E 30.8		Butaritari 261 18, Oct. '78 03-21.0N 122-25.0E 29.4		Butaritari 267 19, Oct. '78 03-16.0N 172-30.0E 30.3		Butaritari 268 20, Oct '78 03-10.0N 172-37.1E 30.4					
No of fish	%	No. of fish	%	No of fish	%	No of fish	%	No. of fish	%				
				1	1			1	1				
				1	1	4	4	4	4				
1	1			5	5	3	3	2	2				
4	4			4	4	7	7	17	17				
11	11	7	7	9	9	15	15	25	25				
20	20	12	12	16	16	20	20	14	14				
26	26	21	21	25	25	22	22	16	16				
20	20	25	25	24	24	18	18	1	1				
12	12	20	20	10	10	4	4						
5	5	9	9	4	4	2	2						
1	1	5	5			3	3						
		1	1										
				1	1								
100	100	100	100	100	100	100	100	100	100				
51.1		51.9		50.9		50.7		48.6					
15		15		19		22		16					

Annex Table 11

Biological Survey on Skipjack

Note

Sex, M = Male, F = Female,
Gonad, A = Immature, B = Maturing,
C = Mature, D = Spawned,

Condition of stomach (Natural fish)

G=Empty, LF=Little fish, LFF=A full of little fish,
H=Half filled, LFB=A few of little fish, IK=Cuttle fish,
I=Full, TA=Scabbard fish, LT=Little tuna,
SH=Squilla, KF=File fish,
SL=Mackerel, LC=Shrimp,
FF=Flying fish, BN=Little bonito,
PU=Octopus, HN=Horse mackerel,
SR=Sardine,

Contents in stomach (Bait fish)

HA = Harengua ovalis,
SP = Spratelluoides delicaturus,
AL = Allanetta ovalava,
AP = Apogonidae,
DA = Daussumieria hasselti,
CC = Caesio caeruleaureus,
DU = Dussumieridae,
MF = Milkfish,
RM = Caesionidae,
SA = Sardinella clupeioides,

School	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach						
				M	F	?	A	B	C	D	Natural feed			Bait fish			
											G	H	I	Stomach contents	Stomach contents		
1	1	570	34		○			○									
	2	530	30	○				○									
	3	600	44		○			○									
	4	500	22	○				○									
	5	500	21		○			○									
	6	500	24	○				○									
	7	500	28		○			○				○		LF8, LC2			
	8	520	27	○				○				○		IK3			
	9	490	23	○				○				○		LF10			
	10	530	25	○				○				○		IK1		HA15	
	11	470	18		○			○				○					
	12	500	25		○			○				○		LF15, IK2			
	13	490	20		○			○				○		IK2		HA2	
	14	500	27	○				○				○		LF5			
	15	510	27	○				○				○		IK2, LF3			
	16	520	26	○				○				○		LF5			
	17	480	22	○				○				○		TA1			
	18	500	26		○			○				○					
	19	510	26		○			○				○					
	20	520	26	○				○				○					HA13
		Ave	512	26	11	9	0	0	20	0	0	16	4	0			
4	1	520	25	○				○			○						HA7
	2	510	24	○				○			○						HA10
	3	460	21		○			○			○			IK12			
	4	480	20	○				○			○						HA10
	5	480	21		○			○			○						HA10
	6	490	21		○			○			○			IK10			HA3
	7	470	22	○				○			○			IK6			
	8	490	22	○				○			○			IK8			
	9	480	23	○				○			○			IK10			
	10	470	21	○				○			○			IK10			HA10
	11	490	22	○				○			○			IK2			HA2
	12	460	19	○				○			○						HA6
	13	510	23		○			○				○		IK20			HA4
	14	500	22		○			○			○						HA2
	15	530	30	○				○			○						HA12
	16	500	23	○				○			○			IK1			HA1
	17	500	22	○				○			○			IK1			HA13
	18	490	24	○				○				○		IK10			HA14
	19	530	32		○			○			○			IK1			HA2
	20	500	22	○				○			○			IK3			HA5
		Ave	493	23	10	10	0	0	20	0	0	18	2	0			

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach					
				M	F	?	A	B	C	D	G	H	I	Natural feed		
														Stomach contents	Bait fish	
12	1	540	32		○				○						LFB	
	2	530	30		○				○							HA1
	3	510	26		○				○						LFB	HA1
	4	510	29		○				○		○				LFB	
	5	510	28	○					○							
	6	520	27	○					○							
	7	510	26	○					○		○				IK, LF	
	8	530	29		○				○							
	9	520	26	○					○						LF	
	10	520	26		○				○							
	11	530	31	○					○						LF2	
	12	530	28	○					○			○			LF5, IK2	HA2
	13	530	29	○					○			○			LF3, IK1	
	14	520	27	○					○			○			LF1, IK1	
	15	540	31		○				○						LF1	
	16	530	30	○					○							
	17	510	28	○					○			○			LF1	
	18	530	29	○					○							
	19	490	25	○					○							MA1, RM1
	20	510	29	○					○							MA1
	Ave.	521	28	13	7	0	0	0	20	0	14	5	1			
14	1	61	40	○			○					○			LF	
	2	61	40	○			○						○		LF, SH	HA2
	3	66	50		○		○					○			LF, IK	
	4	63	44		○		○				○				LF, IK	
	5	65	46		○		○					○			LF, LC	HA4
	6	64	40		○		○					○			LF, IK	HA3
	7	69	54		○		○					○			LF, IK	HA2
	8	65	44		○		○					○			KF	
	9	68	56		○		○					○			LF, IK	HA1
	10	64	46		○		○					○			LF, LC	HA6
	11	64	46		○		○					○			LF	HA3
	12	57	34		○		○					○			LF	HA6
	13	64	47		○		○					○			LF	HA2
	14	63	45		○		○					○			LF, IK	
	15	70	54		○		○					○			LF, IK	HA3
	16	63	48		○		○					○			LF, IK	HA4
	17	61	41		○		○					○			LF, IK	HA17
	18	69	57		○		○					○			IK	HA5
	19	68	56		○		○					○			LF, IK	
	20	61	38		○		○					○			LF, IK	HA1
	Ave.	643	463	2	18	0	20	0	0	0	1	10	9			

School No	Fish No	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach						
				M	F	?	A	B	C	D	G	H	I	Natural feed		Bait fish	
														Stomach contents		Stomach contents	
15	1	48	20		○				○								
	2	50	24	○					○								
	3	52	26		○				○						LF1		
	4	51	24	○					○						LF3		
	5	57	34	○					○				○		LF	HA4	
	6	54	28	○					○						LF3		
	7	52	24	○					○								HA1
	8	52	22	○					○								HA1
	9	58	32	○					○						LF, IK1		
	10	53	28		○				○				○		LF		
	11	54	28	○					○								HA1
	12	53	24	○					○								HA1
	13	53	26		○				○								HA2
	14	51	24	○					○								
	15	48	22	○					○								HA3
	16	55	30	○				○									
	17	56	30	○					○								HA2
	18	55	32	○					○						LF1, IK2		
	19	51	28	○					○					○	LF3		HA13
	20	51	28	○					○								
		Ave.	527	267	16	4	0	0	1	19	0	17	2	1			
17	1	55	30		○				○						IK1		HA7, SP1
	2	54	31	○					○								HA7
	3	53.5	29	○					○								HA8, SP2
	4	53	28	○					○								HA10
	5	56.5	37		○				○			○			LF1, IK1		HA1, SP1
	6	55	30		○				○								HA6, SP1
	7	57	34		○				○								HA8, SP8
	8	56.5	35	○					○						TK5		HA4
	9	54.5	30	○					○						LF1		HA2
	10	54	30		○				○						LF2		
	11	53	28		○				○						LF1		
	12	54	32		○				○								SP1
	13	52.5	29	○					○								SP1
	14	54.5	32		○				○								HA6, SP1
	15	56.5	36	○					○								HA12, AL1, SP3
	16	53.5	30	○					○								
	17	55	32		○				○								HA6
	18	56.5	34		○				○								HA7, SP2
	19	53.5	29		○				○								HA3, SP2
	20	50	23		○				○								HA2
		Ave	544	31	8	12	0	0	0	20	0	19	1	0			

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach						
				M	F	?	A	B	C	D	G	H	I	Natural feed			
														Stomach contents	Bait fish		
18	1	550	30		○					○						IK1	HA7, SP1
	2	540	31	○						○							HA7
	3	535	29	○						○							HA8, SP2
	4	530	28	○						○							HA10
	5	565	37		○					○						IK1, LF1	HA1, SP1
	6	550	30		○					○							HA6, SP1
	7	570	34		○					○							HA8, SP8
	8	565	35	○						○						IK5	HA4
	9	545	30	○						○						LF1	HA2
	10	540	30		○					○						LF2	
	11	530	28		○					○						LF1	
	12	540	32		○					○							SP1
	13	525	29	○						○							SP1
	14	540	32		○					○							HA6, SP1
	15	565	36	○						○							HA12, SP3, AL1
	16	535	30	○						○							
	17	550	32		○					○							HA6
	18	565	34		○					○							HA7, SP2
	19	535	29		○					○							HA3, SP2
	20	500	23		○					○							HA2
		Ave	544	31	8	12	0	0	0	20	0	20	0	0			
21	1	550	31		○					○						SH1	
	2	560	32		○					○							HA3, SP3, AP4, AL1, AP3
	3	560	33	○						○							AL1, CC3
	4	560	34		○					○							
	5	555	32		○					○							
	6	600	36		○					○							CC1
	7	540	28		○					○							SP1, AP2
	8	550	30	○						○							AL1, AP1
	9	545	32		○					○						SH1	
	10	580	38	○						○							AP1, AL1, CC2
	11	555	32		○					○							AP1
	12	540	31	○						○						LF2	CC1
	13	535	27	○						○							
	14	670	53	○						○							SH1
	15	580	34		○					○							
	16	575	36	○						○							CC1, AP2
	17	550	32		○					○							HA6, SP6, AL5
	18	550	32	○						○							AP10, CC6
	19	560	34	○						○							AL4, CC1
	20	520	24		○					○							HA1, AL1, CC1
		Ave.	562	32	9	11	0	0	0	20	0	20	0	0			

School	Fish No	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach					
				M	F	?	A	B	C	D	G	H	I	Natural feed		
														Stomach contents	Bait fish	
No	No	(cm)	(kg)	M	F	?	A	B	C	D	G	H	I	Stomach contents	Stomach content	
27	1	560	34	○					○				○	LT4	AP1	
	2	520	25	○					○				○	LT2		
	3	530	26	○					○					LF1	HA1 SP1 AL2, AP1	
	4	540	29		○				○							
	5	530	30		○				○						HA4, AP15, AL1, SP1	
	6	560	35		○				○						HA1	
	7	540	32	○					○						HA8, AL1, CC1, AP3	
	8	510	24		○				○						HA3, AL2, SP1, AP30	
	9	570	35	○					○				○	LT1		
	10	560	34	○					○						HA6, SP5, AL3, AP10	
	11	530	30	○					○						HA3, CC1, AP4	
	12	530	30	○					○						HA3	
	13	550	34		○				○					○	LT2	HA1
	14	530	30	○					○					○	LT2	SP1, AL1
	15	540	31		○				○					○	LT1	HA1
	16	530	30	○					○							AL2, CC1, AP3
	17	510	25		○				○							
	18	540	30		○				○						LT1	
	19	550	31		○				○						LT1	HA3, SP3, AL2, AP7 HA9, SP3, AL1, AP10 CC2
	20	530	27		○				○							
Ave		538	30	10	10	0	0	0	20	0	12	4	4			
33	1	585	40		○				○							
	2	580	37		○				○						CC1	
	3	510	37		○				○					LF4		
	4	580	36	○					○					LF1	HA4	
	5	585	37		○				○						HA1	
	6	555	35	○					○							
	7	550	31	○					○						HA3	
	8	560	37	○					○							
	9	550	31	○					○							
	10	570	36		○				○							
	11	585	38		○				○							
	12	590	41		○				○						HA2	
	13	590	41		○				○					LF1		
	14	585	38		○				○							
	15	585	41		○				○							
	16	535	32	○					○						HA20, AL2	
	17	565	34		○				○							
	18	565	35	○					○						HA1	
	19	550	30		○				○						HA4, CC1	
	20	520	30		○				○						HA2	
Ave		568	35	9	11	0	0	0	20	0	20	6	0			

School No	Fish No	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach				
				M	F	?	A	B	C	D	Natural feed			Bait fish	
											G	H	I	Stomach contents	Stomach contents
38	1	490	31	○				○			○				HA11
	2	555	32	○				○			○		IK2, SH2		HA2 AL1
	3	520	28		○			○				○	IK8, SH1		HA11
	4	57.5	36		○			○			○				
	5	520	26	○				○			○		IK6		HA4
	6	540	30	○				○				○	LFF		HA5
	7	545	30		○			○				○	LF2		HA14
	8	560	34	○				○				○	IK6, SH6		HA11
	9	565	34	○				○				○			HA27, CC1
	10	655	52	○				○				○			HA1
	11	530	30	○				○				○	LF8, SH2		HA9
	12	530	28		○			○				○			
	13	535	28		○			○				○	LF7, IK6		HA4
	14	530	28	○				○				○	IK2		HA1
	15	545	30		○			○				○	LF, IK3		HA5
	16	555	34	○				○				○			HA1
	17	520	26		○			○				○	LF, SH		HA2
	18	560	34		○			○				○	LF, SH		HA4
	19	585	40	○				○				○	LF, IK4		HA3
	20	540	30		○			○				○			HA3
	Ave.	547	316	11	9	0	0	6	14	0	8	10	2		
46	1	480	22	○				○							AP2, SP1, AL1 HA5 DA1
	2	500	23		○			○					IK1		HA5
	3	480	22		○			○					IK3, LF3		HA3, SP1
	4	495	23		○			○					IK3		HA5 SP3 AP8 AL2
	5	465	21		○			○					IK5		SP2
	6	475	23		○			○					IK1		SP8, AP1, AL1
	7	520	26		○			○					IK1		HA3, DA1
	8	505	25		○			○					IK2, LF2		HA6
	9	500	24		○			○					IK4		HA3, AP4
	10	490	22	○				○					IK4		HA2, SP2, AP2 DA2
	11	475	23	○				○							HA7 DA2
	12	480	22		○			○					IK4		HA1
	13	485	22		○			○					IK3		HA3, SP1, DA1
	14	505	26		○			○					IK7		AL1, SP3, AP2
	15	500	27	○				○					IK4		HA3, SP3, AL1, AP12
	16	480	23		○			○					IK1		HA1, SP10, AP3
	17	525	26	○				○							
	18	520	26	○				○					IK5		HA2, SP2, DA8, AP17
	19	540	30	○				○							HA3 SP4, AP5, DA5
	20	510	24		○			○						IK7, LF2	
	Ave.	497	24	7	13	0	0	9	11	0	0	0	0		

School	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach				
				M	F	?	A	B	C	D	G	H	I	Natural feed	
														Stomach contents	Bait fish
No.	No.	(cm)	(kg)	M	F	?	A	B	C	D	G	H	I	Stomach contents	Stomach contents
49	1	580	36	○					○			○		IK3, LF	
	2	530	30	○				○					○	IK19, SH10	HA1, AP25
	3	550	30		○								○	IK2, LF2, SH1	AP3
	4	525	28	○							○			IK1, LF12	
	5	555	31		○						○				DU3
	6	500	22		○			○			○			LF2, SH1	
	7	520	25	○								○		IK2, LF1	DU3
	8	520	28	○									○	IK2, LF3, SH3	DU1
	9	555	29	○									○	LF2, SH4	HA1
	10	510	23	○				○					○	LF15	AP3
	11	535	26		○						○			LF3	
	12	535	28		○								○	IK2, LF3	DU2
	13	545	29		○								○	IK9, LF2	
	14	510	23	○				○				○		IK1, LF15	
	15	540	29		○				○				○	IK6, LF5	AP8
	16	560	31		○			○					○	IK4	DU1, AP6
	17	550	31		○								○	IK3	
	18	505	23	○									○	IK2, LF3	HA1, DU1
	19	570	37	○									○	LF4, SH37	HA2, AP36
	20	520	27		○								○	IK12	DU1
	Ave	536	288	13	10	0	0	5	15	0	4	11	5		
53	1	500	22		○			○			○			LF3	
	2	490	19	○				○			○			IK1	HA1
	3	485	20	○				○			○			LF1	HA5
	4	510	23		○			○			○				
	5	475	20	○				○			○			LF1	HA1
	6	495	21	○				○			○				HA7
	7	510	25	○				○			○				
	8	480	20	○				○			○			LF1	HA3
	9	500	25		○			○			○				
	10	490	22		○			○			○			LT1	
	11	485	21	○				○			○			LF1	HA1
	12	495	21		○			○			○				
	13	490	21	○				○			○				
	14	500	23	○				○			○				
	15	505	21	○				○			○				
	16	495	24		○			○			○				HA1
	17	485	20		○			○			○				
	18	495	22	○				○			○			LF10	
	19	490	23	○				○			○				HA16
	20	495	22		○			○			○			LF3	HA8
	Ave	493	215	13	7	0	0	6	14	0	20	0	0		

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach							
				M	F	?	A	B	C	D	Natural feed			Bait fish				
											G	H	I	Stomach contents				
57	1	550	30	○					○								HA4, AP4	
	2	550	29		○				○									
	3	540	30		○				○						LF1		AP9	
	4	555	33		○				○								AP9, AL11	
	5	535	29		○				○								AP4	
	6	545	28		○				○						LF1		AP5	
	7	540	30	○				○									AP5, AL2	
	8	535	32		○				○								AP15, AL1	
	9	500	21		○				○								AL1	
	10	560	33		○				○								AL1	
	11	540	26		○				○									
	12	545	29		○				○									
	13	530	26		○				○									
	14	560	34	○					○								AP16, AL2	
	15	545	30	○					○								HA1, AL1	
	16	535	29		○				○								AP6, AL1	
	17	525	28	○					○								AP8, AL1, SP1	
	18	535	27		○				○								HA1, AP19, AL5	
	19	545	32	○					○									
	20	555	33	○					○									HA3, AP8, AL5
		Ave.	541	295	7	13	0	0	2	18	0	20	0	0				
60	1	505	23		○				○								HA1	
	2	500	21		○				○						LF			
	3	560	30		○				○								HA2	
	4	485	21	○				○									HA1	
	5	490	21	○					○									
	6	480	22		○				○								HA5	
	7	490	21	○					○								HA2, SP1	
	8	560	33	○					○						LF		HA6	
	9	520	24	○					○								HA1	
	10	520	27		○				○									
	11	490	21		○				○								HA2	
	12	530	28		○				○								HA2	
	13	540	29		○				○									
	14	510	23	○					○									
	15	510	23	○					○									
	16	490	22	○					○									
	17	475	20	○					○									
	18	500	22		○				○								HA4, AL1, SP2	
	19	485	21		○				○						LC2			
	20	535	25		○				○									HA4
		Ave.	513	239	10	10	0	0	9	11	0	20	0	0				

School No	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach				
				M	F	?	A	B	C	D	G	H	I	Natural feed	
														Stomach contents	Bait fish
64	1	650	54	○				○		○					HA30, AP25, AL5
	2	650	52		○			○		○					HA35, AP15, AL1
	3	655	54	○				○		○					HA23, AP22, AL2
	4	635	51		○			○		○					HA41, AP4, AL2
	5	645	56		○			○		○					HA26, AP4, AL4
	6	645	51	○				○		○					HA8
	7	670	59		○			○		○					HA8, AP16
	8	650	53	○				○		○					HA10, AP2
	9	665	58	○				○		○					HA26, AP17, AL2
	10	665	56	○				○		○					HA10, AP5, AL5
	11	665	59	○				○		○			LC5		ミズン3 1 テン1 1
	12	670	56	○				○		○			LF1		HA31, AP11, SP1
	13	635	51		○			○		○					HA13, AP13, AL4, SP2
	14	650	52		○			○		○			SL2, LF3		HA13, SP2
	15	635	52		○			○		○					HA20, AP17, SP1
	16	650	53	○				○		○					HA25, AP12, AL2
	17	645	52		○			○		○					HA22, AP7, SP4, AL3
	18	655	59	○				○		○			LF1		HA14, AP8, SP2
	19	655	54		○			○		○					HA7, AP2, SP3, AL2
	20	625	49		○			○		○			LC5		HA10, AP6, SP2
		Ave	650	54.6	10	10	0	0	0	20	0	20	0	0	
68	1	650	48		○			○		○				IK3	AL4
	2	660	52	○				○		○				IK8	SP10, AL2
	3	650	54	○				○		○				IK1	SP2
	4	650	52		○			○		○				IK2, FF2	SP35
	5	640	50	○				○		○				IK3, TA3	SP40, AL10
	6	650	52	○				○		○				IK3	SP8
	7	670	63	○				○		○		○		IK3, LT1	
	8	640	50	○				○		○				IK1	SP3
	9	650	50	○				○		○				IK12, TA1	SP2
	10	640	52		○			○		○		○		IK1, LT1, TA1	SP1, AP1
	11	650	56	○				○		○		○		IK9, LT1	SP12, AL2
	12	800	96		○			○		○		○		IK2, LT1, FF1	SP5, AL4
	13	645	51		○			○		○				IK9	SP18, AL3
	14	640	50	○				○		○				IK3	SP10
	15	645	52	○				○		○				IK6	SP3
	16	660	58	○				○		○		○		IK12, LF1	SP8, AL2
	17	665	58	○				○		○				IK1	AP1
	18	645	49		○			○		○				IK6	SP1
	19	665	58	○				○		○				IK1	SP8
	20	660	50	○				○		○		○		IK11, LT1	SP3
		Ave	659	55.1	14	6	0	0	0	20	0	14	6	0	

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach					
				M	F	?	A	B	C	D	Natural feed			Bait fish		
											G	H	I	Stomach contents	Stomach contents	
74	1	510	22		○		○					○			IK1	SP2
	2	510	22	○								○			IK6	SP8, HA1
	3	505	21	○								○			IK8	SP4, HA1, AL1
	4	510	22	○								○			IK1	
	5	505	22		○		○					○			IK4	SP20, AL1
	6	485	20		○		○					○			IK3	SP2, AL1
	7	495	22	○			○					○			IK5	SP1, AL2, HA3
	8	490	20		○		○						○		IK6, LT1	SP2
	9	485	20	○			○					○			IK5	SP1, AL3
	10	480	20				○					○			IK2	SP10, AL2
	11	490	20	○				○				○			IK7	
	12	495	19				○					○			IK5	SP8, AL1, HA4
	13	515	22		○		○					○			IK6	SP1, AL2
	14	495	20	○				○				○			IK7	HA5
	15	515	22	○				○				○			IK4	SP1, AL1
	16	505	20		○		○					○			IK4	HA1, AL1
	17	480	18		○		○					○			IK3	SP7, AL1
	18	515	20		○		○					○			IK4	SP3, AL4
	19	500	24		○		○						○		IK14	AL4
	20	480	20		○		○						○		IK11	SP1, AL1
	Ave	498	208	8	12	0	14	6	0	0	17	3	0			
82	1	510	24	○			○				○					HA3, AL10, CC1
	2	490	20		○		○				○					
	3	495	22	○				○			○				HA1, SP4	
	4	480	20		○		○				○				HA1, SP1, AP3	
	5	505	23		○		○				○					
	6	495	23		○		○				○				HA2	
	7	480	21	○			○				○				HA2, AL1	
	8	510	24	○				○			○				HA1, AL5, AP1	
	9	500	21		○		○				○				HA2, AL1	
	10	545	32		○		○				○				HA1	
	11	475	20		○		○				○				HA4, AL3	
	12	510	26		○		○				○					
	13	500	23	○			○				○				SP1, AL4	
	14	500	23	○			○				○				HA3, AL2	
	15	500	21		○			○			○					
	16	485	22		○			○			○				HA4, SP3, AL4, AP1	
	17	485	18		○		○				○				HA2, SP1, AL9, AP8	
	18	570	34	○				○			○				HA2, AL4	
	19	505	24		○		○				○				HA1, AL2, CC1	
	20	490	21		○		○				○				HA6, CC1, SP1, AL6	
	Ave	501	231	7	13	0	15	5	0	0	20	0	0			

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach					
				M	F	?	A	B	C	D	G	H	I	Natural feed		Bait fish
														Stomach contents		Stomach contents
86	1	530	26	○				○		○						
	2	510	26	○				○		○						SP16
	3	525	27		○			○		○						SP12
	4	535	30	○			○			○			LF1			SP10
	5	535	30		○			○		○						SP4
	6	540	32	○				○		○						
	7	540	31	○				○		○						SP3
	8	543	32	○				○		○						SP9
	9	535	30	○				○		○						SP7, HA3
	10	520	25	○				○		○			IK13, LF2			SP15
	11	537	29		○			○		○						SP10
	12	535	29		○			○			○		LC30			SP29
	13	520	28	○				○		○						
	14	535	31		○			○		○						
	15	500	24		○			○		○						SP13
	16	518	26		○			○		○						SP3
	17	570	35	○				○		○						SP1
	18	568	31		○			○		○						
	19	535	29	○				○		○						SP7
	20	537	27		○			○		○						SP2
	Ave.	533	28.9	11	9	0	0	1	19	0	19	1	0			
90	1	625	48		○			○			○		LF12			HA9, SP33
	2	620	42		○			○			○		LF5, LT1			SP5
	3	650	52		○			○		○			LF6			SP6
	4	630	46	○				○			○		LF10, IK1			SP65, HA6
	5	630	51	○				○		○			LF8			SP5, HA8, AL1
	6	605	41		○			○			○		LF25			SP14, HA3
	7	605	48		○			○			○		LF21, BN1			SP26
	8	625	50		○			○			○		LF15, PU1, IK4			SP6
	9	630	46	○				○		○			LF4, IK2			HA1
	10	640	52		○			○			○		BN1			SP2, HA1
	11	645	57		○			○			○		LF23			SP27, HA1
	12	635	50		○			○		○			LF7			SP9, HA2
	13	635	49		○			○			○		BN1, IK2, LF3			SP1
	14	615	46		○			○		○			LF1			
	15	620	43	○				○			○		BN1, LF3			
	16	665	51	○				○			○		LF6, IK1			SP5
	17	600	42		○			○			○		LF8			SP16, AL1
	18	615	45	○				○			○		LF23, IK1			SP26
	19	550	32	○				○			○		LF11, IK1			SP5, HA1
	20	630	50		○			○			○		LF10			SP8, HA2
	Ave.	623	47	7	13	0	0	0	20	0	5	14	1			

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach						
				M	F	?	A	B	C	D	Natural feed			Bait fish			
											G	H	I	Stomach contents			
94	1	490	22		○				○								HA4, AP2, AL1
	2	485	20		○			○									HA1
	3	490	20		○			○									
	4	525	24	○					○								AL1
	5	495	20		○				○								HA1
	6	505	23		○			○									
	7	500	22		○				○								
	8	485	20		○				○								
	9	505	23		○			○									
	10	515	25	○					○								AL1, AP2
	11	520	24		○				○					LC			HA1
	12	490	21		○				○								LC
	13	490	23		○				○								AP4
	14	505	23		○				○								HA1
	15	480	20		○				○								
	16	490	23		○				○								HA1
	17	495	20		○				○								
	18	495	22		○				○								HA2, AL2
	19	500	23		○				○								
	20	495	21	○					○								
		Ave.	503	219	3	17	0	0	8	12	0	20	0	0			
95	1	400	12		○			○									HA3
	2	450	16	○				○						LC20			HA1
	3	445	15	○				○						LC18			
	4	521	23		○				○					LF8			
	5	500	20		○				○								
	6	440	14		○			○									SP1
	7	430	13	○				○									SP4
	8	490	19		○				○								HA1
	9	500	20		○				○								SP6
	10	515	21	○					○								SP2
	11	495	19	○					○					LC1			
	12	510	21		○				○			○		LC			
	13	410	12	○				○						LC12			
	14	445	14	○				○									SP19, HA1
	15	425	12	○				○									SP9
	16	500	20	○					○			○		LC			SP15, HA1
	17	430	12	○				○									
	18	455	15		○			○									
	19	510	21	○				○									SP22, HA1
	20	500	19	○				○									
		Ave.	469	169	12	8	0	11	9	0	0	18	2	0			

School No	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach					
				M	F	?	A	B	C	D	Natural feed			Bait fish		
											G	H	I	Stomach contents	Stomach contents	
99	1	525	22	○				○			○					HA1, AL3, SP1
	2	490	24		○			○			○					HA1
	3	520	24	○					○		○					HA1
	4	510	22		○			○			○					HA4, AL2, SP1, AP2
	5	510	20		○			○			○					HA4, AL4, SP4, AP2
	6	485	18	○				○			○					SP1
	7	495	20	○				○			○			LF2		HA1, AL2, SP2
	8	485	20		○			○			○					HA4, AL1, SP7, AP2
	9	500	20	○				○			○					HA1, AL2, SP4, AP6
	10	500	20		○			○			○					HA8, AL2, SP1, AP1
	11	503	22	○				○			○			LF1		HA1, AP2
	12	500	20		○			○			○					HA1, AL1, SP1
	13	510	22		○				○		○			LF1		SP2
	14	515	20	○				○			○					AL1
	15	505	20		○				○		○					HA2
	16	485	1.8		○			○			○					HA2
	17	510	22		○				○		○					HA1, AL1, SP2
	18	500	21	○				○			○					SP1
	19	585	36		○				○		○					SP16, AL1, AP10
	20	505	21	○					○		○					
	Ave	507	215	9	11	0	0	14	6	0	20	0	0			
102	1	535	26	○				○			○					
	2	515	25		○			○			○					HA3
	3	533	28		○				○		○					HA4
	4	550	27	○				○			○			IK1		HA10, SP6
	5	520	24		○				○		○					HA3
	6	570	34		○				○		○					HA1
	7	525	28		○				○		○			LF1		HA3
	8	518	26	○				○			○			IK1		HA1
	9	558	28	○				○			○					HA11
	10	540	30	○				○			○					HA13
	11	542	28	○				○			○					HA1, CC1
	12	525	26		○			○			○					HA8
	13	530	28		○				○		○					HA1
	14	580	35	○				○			○			LF1		HA11
	15	530	26	○				○			○					HA4
	16	518	27	○				○			○					HA1
	17	570	32		○				○		○					HA1
	18	500	22	○				○			○					HA1
	19	518	26	○				○			○					HA4
	20	535	28	○				○			○					HA2
	Ave	536	277	12	8	0	0	14	6	0	20	0	0			

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach					
				M	F	?	A	B	C	D	G	H	I	Natural feed		
														Stomach contents	Bait fish	
109	1	505	24		○			○				○			LF2	SP5
	2	510	24		○			○				○			LF5	SP4
	3	450	20		○			○					○		LF13, LT3	AL2
	4	475	22		○			○				○			LF2	SP1
	5	475	21	○				○				○			LF4	SP8, HA6
	6	465	21	○				○					○		LF1, TA1	SP5, HA2
	7	480	24	○					○						LF8	SP20, AL2
	8	515	28		○					○					LF3	AL2
	9	480	20	○				○								SP6, HA1, AL1
	10	495	22		○			○							LF8	SP1, HA1
	11	460	20		○			○							LF3	
	12	455	20	○				○							LF2	SP8, HA2
	13	500	26	○				○								HA6
	14	470	20	○				○								HA4
	15	485	24		○			○					○		LF10, LT1	
	16	505	26	○				○					○		LF2	SP7
	17	495	26	○				○					○			SP3
	18	500	23		○			○					○			SP5
	19	475	20		○			○					○			SP5, HA3, AL1
	20	57.0	38		○			○					○			SP4
	Ave.	488	235	9	11	0	0	18	2	0	17	3	0			
120	1	540	32	○					○			○				HA6, SP2
	2	580	40	○					○			○			LF1	HA3
	3	565	32	○					○				○		LF1, IK1	
	4	555	30		○				○				○		LF8	HA3
	5	550	30		○				○							HA6
	6	540	28	○					○							
	7	550	30		○			○								HA3
	8	535	29	○				○								HA8
	9	520	29		○				○						LF1	HA7
	10	580	34	○					○						LF1	HA2
	11	525	28		○			○					○		LF3	HA8, AL1
	12	560	33	○					○							
	13	57.0	35	○				○					○		LF7	HA4
	14	530	30	○					○							HA1
	15	560	32	○					○						LF1	HA6
	16	545	30		○				○						LF1	HA1
	17	535	29	○				○							LF2	HA1
	18	545	30		○				○						LF2	HA1
	19	560	31	○				○					○		LF9	HA9, SP2
	20	530	29	○				○					○		LF8	HA13, SP5
	Ave.	549	311	13	7	0	0	7	13	0	14	6	0			

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach						
				M	F	?	A	B	C	D	G	H	I	Natural feed		Bait fish	
														Stomach contents	Stomach contents		
129	1	505	22	○				○				○				LF	
	2	500	23		○							○					HA1, SP2
	3	502	22		○							○					HA1, AL1, AP1
	4	512	24	○								○					HA8, AL2
	5	510	24		○				○			○				LF4	HA2
	6	508	23		○							○				LF1	
	7	503	22	○								○				LF3	HA1
	8	523	26	○								○				LF4	HA1
	9	496	20		○							○				LF1	HA1, AL1
	10	525	22	○								○				LF1	
	11	506	23		○							○					HA6, AP2
	12	505	24		○							○		○		LF10, IK1	HA2, AL2
	13	495	22		○							○					HA6, AL1, AP7
	14	485	20		○							○					HA7, AL2
	15	493	22		○							○					HA6
	16	505	22		○							○					AL1
	17	506	24	○								○				LF3	
	18	505	20		○							○					HA5, AP4
	19	500	20	○								○				LF3	
	20	535	28		○								○			IF10, IK3	AL1
		Ave.	506	227	7	13	0	0	9	11	0	18	2	0			
134	1	513	22	○					○			○					
	2	485	18	○								○				LF2	HA2
	3	485	20		○							○					HA1
	4	495	18	○								○					HA1
	5	480	18		○							○					HA12, AP7
	6	485	18		○							○					HA5, AP2
	7	485	20		○							○					HA1
	8	490	18		○							○					AP2
	9	490	20	○								○					HA7, AL1
	10	490	20		○							○					HA6, AL1
	11	480	18	○								○					HA2
	12	480	20	○								○					
	13	480	18		○							○					HA2
	14	495	20		○							○					HA8
	15	480	18		○							○					HA1
	16	475	18		○							○					HA6, AL1
	17	490	22		○							○					HA8
	18	460	18		○							○					HA1
	19	505	22	○								○					
	20	490	20		○							○					
		Ave.	487	193	7	13	0	0	7	13	0	20	0	0			

School No	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach						
				M	F	?	A	B	C	D	G	H	J	Natural feed		Bait fish	
														Stomach contents		Stomach contents	
137	1	490	24		○				○								HA15, AL4, SP1
	2	510	24	○					○								HA1
	3	525	30		○				○								HA1
	4	560	34	○					○					LC1, SH1			HA15, AL1
	5	490	22		○				○								HA3
	6	500	22	○					○								HA4
	7	500	22	○					○								HA3
	8	495	24	○					○					LF1			
	9	490	24	○					○					LF1			HA1
	10	560	33		○				○				○	LF1, IK2			HA5
	11	520	25	○					○					LF1			
	12	510	23	○					○								HA2
	13	500	23		○				○					IK2			
	14	500	22		○				○				○	IK2, LF1			AP1
	15	520	26		○				○								HA1
	16	500	24		○				○								HA6
	17	490	23		○				○								HA6
	18	520	24	○					○								HA1
	19	500	25	○					○								HA5
	20	500	22	○					○								HA1
		Ave.	509	248	11	9	0	0	4	16	0	18	2	0			
152	1	508	20		○				○								
	2	540	30	○					○								
	3	508	24	○					○					LF1			HA1
	4	517	24		○				○								
	5	525	26	○					○					LF3			
	6	508	22		○				○								
	7	544	26	○					○								
	8	530	22		○				○								HA1
	9	525	24		○				○								HA3
	10	496	20	○					○					LF1			HA4
	11	492	19		○				○					LF3			HA2
	12	526	26		○				○								
	13	526	24	○					○								
	14	58	24	○					○								
	15	50	22	○					○								
	16	490	20	○					○								HA2
	17	550	30		○				○								HA1
	18	560	30		○				○					LF1			HA1
	19	540	26	○					○								
	20	538	28	○					○								
		Ave	523	244	11	9	0	0	16	4	0	20	0	0			

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach						
				M	F	?	A	B	C	D	Natural feed			Bait fish			
											G	H	I	Stomach contents	Stomach contents		
159	1	510	24		○		○				○					HA1	
	2	490	21		○		○				○			LF8		HA6	
	3	515	25		○		○				○					HA1	
	4	495	21		○		○				○			LF1, IK4		HA1	
	5	500	22		○		○				○			IK1		HA1	
	6	500	21		○		○				○			LF1		HA4	
	7	465	18	○			○				○					HA6	
	8	510	24	○				○			○					HA4	
	9	535	29		○				○		○				IK2		HA19
	10	490	22		○		○				○				LF5		HA4
	11	495	20		○		○				○						HA9
	12	500	24	○			○				○				LF1		HA13
	13	530	27		○			○			○						HA1
	14	520	24		○		○				○				LF6		HA2
	15	545	31	○				○			○						HA2
	16	505	24		○		○					○			LF17, IK1		HA11
	17	500	22	○			○				○				LF3, IK1		HA10
	18	520	26	○				○			○						HA1
	19	505	24	○			○				○				LF8		HA2
	20	505	25	○			○				○						HA8
	Ave.	506	23.8	8	12	0	15	5	0	0	19	1	0				
166	1	540	30	○					○		○			IK6, LT			
	2	530	28	○					○		○			IK17, LT1			
	3	580	35		○		○				○			IK7, LF3		HA2	
	4	555	32	○					○		○			IK7		HA20	
	5	515	28	○				○			○			IK2, LT1, LF3		HA11	
	6	550	32	○				○			○			IK7, LF2			
	7	520	28	○			○				○			IK6, LF1		HA10	
	8	555	35		○		○				○			IK2, LF10		HA4	
	9	510	26	○			○				○			IK6, LF2		HA2	
	10	530	31		○				○		○			IK7, LF2		HA1	
	11	500	25		○		○				○			LF2		HA1	
	12	520	27		○		○				○			IK5, LF5		HA11	
	13	550	34		○		○				○			IK9, LF17		HA1	
	14	545	32		○						○			LF3			
	15	530	32	○				○			○			IK9, LT5			
	16	485	24		○		○				○			LF8		HA1	
	17	525	31	○				○			○			IK2, LF3		HA8	
	18	550	33		○				○		○			IK13, LF12			
	19	565	34		○			○			○					HA4	
	20	535	31	○				○			○			IK17, LF2		HA7	
	Ave.	535	30.4	10	10	0	8	5	7	0	2	11	7				

School	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach				
				M	F	?	A	B	C	D	Natural feed			Bait fish	
											G	H	I	Stomach contents	Stomach contents
167	1	545	32		○				○			○		LF1, LF4	SP1
	2	515	27		○			○					○	IK1, LF13	SP4, HA2, HM1
	3	540	30	○								○			SP1, HA4
	4	520	28		○								○	IK2, LF11	SP4, HA2
	5	530	28		○								○	IK2, LF3	
	6	550	28	○									○	IK1, LF7	HA3
	7	535	28		○							○			
	8	540	28		○								○	LT1	SP8, HM2
	9	530	28	○									○		SP1, HA1
	10	530	32	○									○	LT2	SP2
	11	515	27	○									○	LF2	HM1
	12	535	28		○								○	IK1, LF1	SP1, HA1
	13	520	28		○				○				○	LF4	HA3
	14	510	27		○				○				○	LT1, LF5	
	15	530	29		○				○				○	LT1, IK2, LF2	
	16	530	26	○					○				○		SP1
	17	520	27		○				○				○	IK1, LF7	HA1
	18	510	25		○				○				○	IK2, LF6	HA3, SP1
	19	510	25	○					○					LF1	SP2
	20	545	32		○				○					IK1, LF3	SP1, HM2
	Ave	528	282	7	13	0	0	3	17	0	6	12	2		
171	1	515	24		○				○						HA8
	2	505	22	○					○				○	LT1	HA1
	3	520	26	○					○				○		HA18
	4	500	22		○				○				○	IK2, LF1	HA10
	5	500	23		○				○				○		HA11
	6	520	22		○				○				○	LF1	HA1
	7	500	24		○				○				○		HA4
	8	497	25		○				○				○	LT1	HA2
	9	490	22		○				○				○		HA1
	10	495	22		○				○				○		HA14
	11	520	24	○					○				○	LF1	HA2
	12	524	25	○					○				○		HA1
	13	495	22	○					○				○	IK1	
	14	514	24		○				○				○		HA9
	15	502	22	○					○				○		HA8
	16	508	24		○				○				○	IK1	
	17	498	23		○				○				○	LF1	HA14
	18	507	24	○					○				○		HA11
	19	498	24		○				○				○	LF7	HA7
	20	513	24	○					○				○	LF2	HA5
	Ave	505	234	8	12	0	0	8	12	0	16	4	0		

School No	Fish No	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach					
				M	F	?	A	B	C	D	Natural feed			Stomach contents	Stomach contents	
											G	H	I			
174	1	496	22	○					○						LF5	HA5, AL2
	2	453	19	○			○									HA7, AL5
	3	488	21		○										LF2	HA2, AL2
	4	489	21	○				○								HA1, AL3
	5	505	25	○					○							
	6	505	25	○				○							LF2, LC10	HA7, AL8
	7	505	24		○				○							HA7, AL7
	8	490	20		○			○								HA1, AL2
	9	450	17	○			○								LF1	HA9
	10	478	21		○				○						IK3, LF1	HA5, AL6
	11	488	22		○			○							LF4	HA4
	12	484	21		○				○							HA4, AL2
	13	484	21		○				○						LF2	HA5, AL2
	14	490	23		○				○						LC4	HA3, AL4
	15	501	24		○				○							HA2, AL1
	16	493	23	○				○							LF1, LC	
	17	495	21		○				○						LF6, IK1	HA6, AL2
	18	500	22		○				○							HA5, AL2
	19	489	19		○				○							HA6, AL1
	20	447	17		○			○								HA6, AL3
	Ave	486	22.4	7	13	0	3	5	12	0	14	6	0			
177	1	495	21	○					○							HA7
	2	480	18	○			○								LC11	HA2
	3	525	25	○					○						LF1	HA1
	4	515	23	○					○						LF2	HA10
	5	510	23		○				○				○		LC	HA6
	6	500	22		○				○							HA15
	7	470	18		○				○							HA6
	8	520	25	○					○					○	LC	SP
	9	510	23		○				○							
	10	500	25		○				○							HA6
	11	505	22		○				○							HA11
	12	485	20	○				○								HA4, SP
	13	500	22		○				○							HA4, SP
	14	515	24		○				○							
	15	510	23		○				○							HA6, SP
	16	485	22		○				○							
	17	470	19		○			○								HA4
	18	500	24		○				○							SP
	19	505	23	○					○							HA3
	20	475	20	○				○								HA2, SP
	Ave	500	22.1	9	11	0	3	1	16	0	18	1	1			

School No	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach				
				M	F	?	A	B	C	D	G	H	I	Natural feed	
														Stomach contents	Bait fish
												Stomach contents	Stomach contents		
183	1	512	25	○				○			○		LF	HA8	
	2	500	22		○			○		○			LFB	HA2	
	3	513	25		○			○			○		LF	HA4	
	4	534	27		○			○				○	LF, IK4	HA7	
	5	523	25		○			○			○		LF	HA3	
	6	51.2	23		○			○		○			LFB	HA2	
	7	520	23		○			○			○		LF	HA2	
	8	57.5	1.8		○			○			○		LF	HA4	
	9	52.4	23	○						○			LF1		
	10	523	25	○							○		IK1, LF		
	11	51.5	24	○				○			○		LF	HA4	
	12	486	2.0		○			○			○		IK1, LFB		
	13	500	22		○			○				○	LF, CT	HA3	
	14	51.4	23	○				○			○		CT	HA1	
	15	499	23		○			○			○		LF	HA9, AL1	
	16	51.5	2.2	○				○			○		LFB	HA3	
	17	507	23	○				○			○		LF	HM1	
	18	520	24	○				○			○		LF, CT	HA1	
	19	51.5	23		○							○		LF, CT	
	20	518	25	○				○			○			LF	HA2
	Ave.	51.6	233	9	11	0	0	3	17	0	6	11	3		
192	1	520	29	○				○			○			SP5	
	2	510	25		○			○			○			SP30	
	3	525	26		○			○			○			SP1, MF1	
	4	495	24	○				○			○			SP3	
	5	525	31	○				○			○			SP42	
	6	495	24		○			○			○			SP8	
	7	500	26	○				○			○			SP10	
	8	495	22	○				○			○			SP2	
	9	520	27		○			○			○				
	10	490	24	○				○			○		LF1		
	11	495	25		○			○			○				
	12	500	24		○			○			○			SP25, MF4	
	13	505	25		○			○			○			MF1	
	14	51.5	27	○				○			○				
	15	480	24		○			○			○			SP21	
	16	490	25	○				○			○			SP2	
	17	505	26	○				○			○			SP14, MF4	
	18	495	25	○				○			○			SP16	
	19	505	28	○				○			○			SP74	
	20	490	23		○			○			○			SP2	
	Ave.	50.3	255	11	9	0	0	13	7	0	20	0	0		

School No	Fish No	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach							
				M	F	?	A	B	C	D	G	H	I	Natural feed				
														Stomach contents	Bait fish			
194	1	535	27	○			○										SP1	
	2	510	24		○			○									SP9	
	3	495	24	○				○										
	4	520	27	○					○									
	5	525	28		○					○								
	6	510	27	○					○									SP2, HA7
	7	490	24			○					○							SP1
	8	510	23			○						○						SP1
	9	490	22			○							○					SP1
	10	515	26	○			○											
	11	511	25	○														SP4
	12	500	24	○														SP1, HA4
	13	510	25		○													
	14	510	26		○													SP2
	15	520	30		○													
	16	518	28	○														
	17	511	28	○														SP12, HA4
	18	509	25	○														SP3, HA1
	19	530	26			○												SP5, HA6
	20	510	24			○										LF1		HA1
		Ave.	511	257	10	10	0	2	8	10	0	20	0	0				
205	1	530	28	○														
	2	535	28		○													
	3	500	25	○														SP7
	4	525	26		○													SP1
	5	515	26	○														
	6	590	43	○						○								
	7	540	29		○													SP16
	8	515	26	○														SP20
	9	535	31	○														SP2
	10	515	26			○												SP5
	11	510	26			○												SP11
	12	525	28			○												SP1
	13	520	30	○														SR1
	14	530	28	○														SR1
	15	530	30			○												SR1
	16	505	26			○												
	17	520	26	○														SP1
	18	575	38			○												SR2
	19	545	30			○												SP1
	20	530	30	○														
		Ave.	529	29	10	10	0	0	16	4	0	20	0	0				

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach							
				M	F	?	A	B	C	D	G	H	I	Natural feed		Bait fish		
														Stomach contents		Stomach contents		
209	1	550	25	○					○								SP1	
	2	513	26	○					○								SP1	
	3	503	22	○					○								SP1	
	4	508	25		○				○									SP1
	5	518	26		○				○									SP1
	6	570	30	○					○									SP1
	7	530	24		○				○									SP1
	8	518	25	○					○									SP1
	9	529	26	○					○									SP1, HA1
	10	528	22		○				○									SP5
	11	515	24		○				○									SP2
	12	517	26		○				○									
	13	534	27	○					○									
	14	530	26	○					○									
	15	543	26	○					○									
	16	507	24		○				○									SP21
	17	527	24	○					○									
	18	541	28	○					○									SP9
	19	514	26	○					○									SP5
	20	517	24		○				○									SP1
		Ave	526	253	12	8	0	0	4	16	0	20	0	0				
212	1	540	31		○				○								HA8	
	2	545	25		○				○			○			IK1, LF5		HA3	
	3	550	30	○					○			○			IK1, LF3		HA5	
	4	528	25		○				○								HA5	
	5	532	26	○					○						LF1		HA9	
	6	542	27		○				○								HA3	
	7	526	25		○				○								HA2	
	8	550	27		○				○									
	9	560	28		○				○									
	10	571	31		○				○									HA17
	11	518	24	○					○									HA2
	12	556	31		○				○									HA2
	13	558	30		○				○									HA2
	14	527	24		○				○									HA2
	15	550	26	○					○									HA1
	16	505	22		○				○									HA5
	17	534	26		○				○				○		LF3			
	18	552	27		○				○									HA8
	19	562	28	○					○						LF2			HA2
	20	538	29		○				○									
		Ave.	542	271	6	14	0	0	0	20	0	17	3	0				

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach				
				M	F	?	A	B	C	D	G	H	I	Natural feed	
														Stomach contents	Bait fish
												Stomach contents	Stomach contents		
217	1	630	49	○					○			○		IK2, LF2	HA2
	2	580	35	○				○				○		IK2, LF10	HA1
	3	531	23		○			○				○		IK7, LF17	HA9
	4	543	22		○			○				○		IK2, LF3, FF1	HA26
	5	545	21	○					○			○		IK2, LF2, LT1	HA7
	6	564	25		○			○				○		IK1	HA10
	7	575	31	○				○				○		IK1, LF2	HA1
	8	551	25		○		○					○		IK2, LF18, LT2	HA14
	9	546	29	○				○				○		IK2, LT5	HA1
	10	545	21		○			○				○		LF10	HA13
	11	592	28		○			○				○		LF4	HA2
	12	534	20	○				○				○		IK2, LF8	HA16
	13	574	29	○				○			○				HA7
	14	576	27		○			○				○		IK1, LF16	HA1
	15	560	25	○				○				○		IK1, LF10	
	16	550	23	○			○					○		IK1, LF9	HA5
	17	605	33	○					○			○		IK3, LF4	HA16
	18	565	27	○				○				○		IK1, LF10	HA2
	19	542	29		○			○				○		IK1, LF14	
	20	542	25	○				○				○		IK3, LF23	HA3
	Ave.	563	274	12	8	0	2	15	3	0	1	12	7		
219	1	500	24		○				○						HA1
	2	495	25		○				○					IK1	HA15, AL2
	3	490	24		○				○					LF1	HA10
	4	500	26		○			○							HA23, AL2
	5	480	24	○			○								HA2, AL1
	6	475	23	○				○							
	7	505	28		○			○							HA1
	8	490	24		○			○							HA1
	9	485	26	○			○								HA18
	10	495	25	○			○								HA3
	11	490	25		○		○								HA4
	12	480	24		○		○								HA18, AL1
	13	490	26		○			○							
	14	505	28		○			○							HA8
	15	495	25		○			○							HA4
	16	460	21	○			○								HA4
	17	580	42		○		○								
	18	470	23	○			○								HA2
	19	480	23	○				○							HA3
	20	485	24		○			○							HA2
	Ave.	493	26	7	13	0	8	9	3	0	20	0	0		

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach						
				M	F	?	A	B	C	D	G	H	I	Natural feed		Bart fish	
														Stomach contents		Stomach contents	
230	1	540	33	○					○								
	2	535	32	○				○			○						
	3	495	22	○					○								
	4	495	25	○				○									
	5	490	22		○		○							LF20			
	6	51.0	24	○					○								
	7	500	25		○									LF3			
	8	485	23	○													
	9	500	23	○					○								
	10	510	24	○										LF15			
	11	505	25	○													
	12	475	22		○									LF5			
	13	500	25		○									LF2		SP1	
	14	495	24	○												SA1, MF1	
	15	480	28		○									LF10		HA4	
	16	490	21	○			○									HA1	
	17	525	22	○			○							LF2			
	18	515	27	○					○								
	19	520	28		○				○					LF3		SA1	
	20	505	25		○				○					LF2			
		Ave.	504	25	13	7	0	3	5	12	0	20	0	0			
237	1	505	24	○					○								SP1
	2	490	23	○					○								HA2
	3	505	24		○				○								HA1
	4	490	23	○					○								
	5	485	20		○				○								
	6	505	24	○					○								HA1, AL1, SP1
	7	50	26		○				○								
	8	47.0	18		○				○								
	9	490	20		○				○								
	10	500	22		○		○										HA1
	11	465	20		○				○								
	12	49.5	24	○						○							HA1
	13	490	23		○				○								HA1
	14	505	23	○						○							
	15	47.5	21		○				○								HA1, AL1
	16	49.5	24	○					○								HA1
	17	490	24		○				○								HA1
	18	500	25	○					○								
	19	480	22		○				○								
	20	490	21	○					○								HA3
		Ave.	49.2	23	9	11	0	1	13	6	0	20	0	0			

School No.	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach						
				M	F	?	A	B	C	D	G	H	I	Natural feed		Bait fish	
														Stomach contents		Stomach contents	
239	1	520	28		○			○				○					HA8, SP1
	2	502	24		○			○				○					AL1, SP1
	3	488	22	○				○				○					HA1
	4	484	22		○			○				○					
	5	537	26		○			○				○					
	6	511	22		○			○				○					SA1
	7	512	26	○				○	○			○					HA1, SP1
	8	526	28	○				○	○			○					
	9	495	22		○			○				○			IK2, LF10		HA1
	10	523	23		○			○				○			LF1		HA1
	11	526	28		○			○	○			○					SA2
	12	540	26		○			○	○			○					HA1
	13	532	28	○				○	○			○					
	14	542	28		○			○				○					SA3
	15	508	24		○			○				○			IK1, LF2		
	16	496	24	○				○	○			○					SA1, HA1
	17	550	32	○				○				○			LF3		
	18	526	24	○				○				○					HA1, AL1
	19	515	26	○				○	○			○					SA1
	20	512	22	○				○				○					HA1
		Ave.	517	25	9	11	0	0	12	8	0	19	1	0			
242	1	525	31	○				○			○			LF			HA4
	2	530	32		○			○			○		○	LF, IK6, CT			HA3
	3	535	29	○				○			○			LF			HA8
	4	520	29		○			○			○			IK2, LF5			HA5
	5	510	26		○			○			○			LF			HA2
	6	515	26		○			○			○			LF			
	7	580	39		○			○			○			IK5			HA1
	8	530	30		○			○			○			LF			
	9	515	27		○			○			○			LF			HA3, SP1
	10	525	30	○				○			○			LF			HA3
	11	540	31	○				○			○			LF			
	12	515	24	○				○			○			LF			HA3, SP1
	13	540	31		○			○			○			LF			HA4, SP2
	14	525	29	○				○			○			LF			HA3
	15	565	38	○				○			○						HA1
	16	540	32		○			○			○						HA4
	17	535	29		○			○			○			IK4, LT4			HA3, SP2
	18	545	36	○				○			○			LF			HA2
	19	540	31		○			○			○						HA9, HM2
	20	525	29	○				○			○		○	LF			
		Ave.	533	30	9	11	0	0	5	15	0	4	14	2			

School	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach					
				M	F	?	A	B	C	D	G	H	I	Natural feed		Bait fish
														Stomach contents		Stomach contents
248	1	513	32		○			○				○			IK3	CC1, AL1
	2	500	31		○			○			○					
	3	541	39		○								○		IK6	
	4	503	30	○					○		○					
	5	547	39		○				○		○					
	6	535	37	○					○		○				LF2	HA1, AP1
	7	515	30		○			○			○					HA2
	8	535	39	○					○		○				IK5	AL13
	9	525	34	○				○				○			LC	
	10	510	32		○				○		○					AL5
	11	520	34		○				○		○					CC2
	12	525	37		○				○		○					
	13	510	28		○			○			○					HA3
	14	530	35	○				○			○					
	15	535	36		○				○		○					
	16	520	32		○				○		○					HA3
	17	535	39		○				○			○			LF	
	18	515	33		○				○		○					TL1
	19	535	36		○				○		○					
	20	550	38	○					○		○				LF1	
		Ave.	525	35	6	14	0	0	6	14	0	16	3	1		
256	1	520	34	○				○			○					
	2	535	36	○				○			○		○		LF10	HA2
	3	530	34	○				○			○					
	4	540	33		○			○			○					HA1
	5	525	35	○				○			○					HA2, AL1
	6	545	34	○				○			○					
	7	520	32		○			○			○					
	8	550	38	○				○			○					
	9	520	31	○				○			○					
	10	515	32	○				○			○					HA2
	11	515	30	○				○			○					AL1
	12	535	35	○				○				○			LF	
	13	515	33	○				○					○		IK4, LF10	
	14	530	35	○				○			○				LF	HA1
	15	555	37		○				○		○					HA1
	16	525	31	○				○			○					
	17	545	37	○				○			○					
	18	560	36	○				○			○					HA1
	19	535	34	○				○			○				LF1	HA1
	20	515	29	○				○			○				LF1	
		Ave.	532	34	17	3	0	0	4	16	0	17	1	2		

School No	Fish No.	Body length (cm)	Body weight (kg)	Sex			Gonad				Condition of stomach						
				M	F	?	A	B	C	D	G	H	I	Natural feed			
														Stomach contents	Bait fish		
261	1	480	23		○			○								LF12	
	2	500	24	○			○									LF3, IK2	HA5
	3	530	30	○			○									LF6, IK2	HA12
	4	515	26		○			○								LF5, IK6	HA7
	5	515	30	○				○								LF7	
	6	550	32		○			○								LF7, IK1	
	7	540	30		○			○								LF1, IK7	HA15
	8	535	32	○					○							LF2, IK3	HA13
	9	545	32	○				○								LF6	
	10	535	30	○				○								LF9, IK1	
	11	540	31		○			○								LF10, IK4	HA5
	12	520	29	○			○									LF2, IK1	
	13	560	42	○			○									LF3, IK5	
	14	570	40	○				○								LF4, IK5	HA3
	15	535	32		○			○								LF3, IK6	HA14
	16	575	34		○			○								LT1, IK5	HA5
	17	550	38		○			○								IK3	HA1
	18	540	34	○			○									LF4, IK3	HA12
	19	555	32		○			○								LF2	HA4
	20	550	30	○					○							LF2, IK2	
		Ave	537	32	11	9	0	5	13	2	0	8	12	0			
269	1	530	30		○			○									HA2, AL1
	2	510	28		○			○									HA2
	3	565	34	○			○										
	4	515	26	○				○				○				LF30, IK6	
	5	525	30	○				○				○				LF2	HA1
	6	535	32	○			○					○				LF20	
	7	510	25		○			○				○					
	8	530	28		○			○				○					HA9
	9	525	26		○			○				○					HA1
	10	515	26	○			○					○				LF4	HA1
	11	520	28		○			○				○				LF2	HA13
	12	540	32		○			○				○				LF40	
	13	590	48	○				○				○					HA13, AL1
	14	530	30		○			○				○				IK1	HA3
	15	510	28	○				○				○					HA8
	16	520	30	○			○					○					HA2
	17	550	38	○			○					○					HA8
	18	510	28	○			○					○					
	19	515	25		○			○				○				LF2	HA7
	20	505	26		○			○				○				LF5, IK2, LT3	
		Ave.	528	30	10	10	0	6	14	0	0	16	4	0			

Annex Table 12

Body Length Distribution of Bait Fish

Note

- H = Harengula Ovalis
- A = Allanetta Ovalava
- M = Milkfish
- S = Spratelluoides Delicaturus
- AP = Apogonidae
- D = Dassumieria Hasselti
- C = Caesio Caerulaureus
- SC = Sardinella Clupeoides

Fish kind	Harengula ovalis							
Area	Tarawa		Abemama		Butaritari		Total	
Range of fork length (mm)	No. of fish	%	No. of fish	%	No. of fish	%	No. of fish	%
25								
30					1	01	1	0
35	6	05			19	09	25	07
40	36	30	1	03	71	34	108	30
45	74	62			93	45	167	46
50	171	144	6	1.7	81	39	258	7.1
55	182	154	17	4.7	58	28	257	7.1
60	116	98	29	8.1	82	40	227	6.3
65	87	73	35	9.7	189	88	311	8.6
70	85	72	24	6.7	367	178	476	13.2
75	104	88	31	8.6	439	213	574	15.9
80	179	151	52	14.4	375	182	606	16.8
85	87	73	63	17.5	208	101	358	9.9
90	44	3.7	56	15.6	69	34	169	4.7
95	13	1.1	30	8.3	14	0.7	57	1.6
100	2	0.2	13	3.6	2	0.1	17	0.4
105			3	0.8			3	0.1
N	1,186	100	360	100	2,068	100	3,614	100
X	649		786		707		696	
S	143		133		128			

Fish kind	Spratelluoides delicatulus							
Area	Tarawa		Abemama		Butaritari		Total	
Range of fork length (mm)	No. of fish	%	No. of fish	%	No. of fish	%	No. of fish	%
25	16	38	5	0.1			21	1.3
30	31	7.4	38	3.3			69	4.1
35	76	18.1	111	9.7			187	11.2
40	77	18.3	199	17.4			276	16.6
45	60	14.3	241	21.1			301	18.1
50	64	15.2	234	20.5	11	11.0	309	18.6
55	49	11.7	180	15.8	46	4.60	275	16.5
60	43	10.2	89	7.8	36	3.60	168	10.1
65	4	1.0	43	3.8	7	7.0	54	3.2
70			4	0.4			4	0.2
75			1	0.1			1	0.1
80								
85								
90								
95								
100								
105								
N	420	100	1,145	100	100	100	1,665	100
X	440		472		570		470	
S	98		87		39		90	

Area (lagoon) Operation No. Date Fish kind	Tarawa (eita) A No. 1 21, May, '78 H		Tarawa (eita) A No. 1 21, May, '78 S		Tarawa (ambo) A No. 2 22, May, '78 H		Tarawa (ambo) A No. 2 22, May, '78 S		Tarawa (eita) A No. 3 25, May, '78 H		Tarawa (eita) A No. 4 28, May, '78 H		
	No of fish	I	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	
20 以上													
25 "			13	13									
30 "			12	12									
35 "	2	2	14	14				36	36	3	3		
40 "	18	18	25	25				20	20	4	4	2	2
45 "	16	16	15	15	1	1	17	17	7	7	8	8	
50 "	23	23	8	8	10	10	11	11	26	26	27	27	
55 "	21	21	6	6	38	38	6	6	34	34	30	30	
60 "	6	6	6	6	20	20	10	10	20	20	17	17	
65 "	10	10	1	1	12	12			5	5	8	8	
70 "	4	4			16	16			1	1	4	4	
75 "					3	3					2	2	
80 "											2	2	
85 "													
90 "													
95 "													
100 "													
105 "													
110 "													
115 "													
120 "													
125 "													
130 "													
135 "													
140 "													
145 "													
150 "													
155 "													
160 "													
165 "													
170 "													
175 "													
180 "													
185 "													
190 "													
195 "													
200 "													
N	100 100%		100 100%		100 100%		100 100%		100 100%		100 100%		
\bar{X}	511		401		596		431		535		581		
S	87		101		69		83		66		7.7		

A = Boukeami.
B = Purse seine

Tarawa (ambo) B No. 20 30, May, '78 H		Tarawa (eita) A No. 15 9, June, '78 H		Tarawa (eita) A No. 21 12, June, '78 H		Tarawa (eita) A No. 21 12, June, '78 D		Tarawa (eita) A No. 23 13, June, '78 D		Butaritari A No. 27 16, June, '78 H		Butaritari A No. 30 18, June, '78 H	
No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%
												1	05
3	3			3	3					7	7	11	51
11	11			7	7					26	26	44	203
16	16	4	4	23	23					35	35	53	246
7	7	9	9	23	23					15	15	54	250
7	7	12	12	29	29			4	4	7	7	19	88
6	6	16	16	12	12	7	7	11	11	5	5	8	37
9	9	10	10	2	2	10	10	20	20	4	4	12	56
								27	27			8	37
17	17	21	21	1	1	16	16	14	14	1	1	5	23
17	17	22	22			7	7	9	9			1	05
7	7	4	4			8	8	4	4				
		2	2			14	14	5	5				
						9	9	2	2				
						11	11	1	1				
						5	5	1	1				
						2	2	1	1				
						1	1						
						4	4	1	1				
						4	4						
						1	1						
						1	1						
100	100%	100	100%	100	100%	100	100%	100	100%	100	100%	216	100%
647		701		559		900		726		463		490	
141		99		68		167		116		76		97	

Abemama A No. 31 23, June, '78 S		Abemama (Southern channel) A No. 33 24, June, '78 S		Abemama A No. 34 25, June, '78 S		Butantari A No. 40 5, July, '78 H		Butantari A No. 40 5, July, '78 AP		Butantari A No. 40 5, July, '78 A		Butaritari A No. 44 10, July, '78 A	
No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%
2	2							7	60				
7	7			6	54			20	171				
4	4			26	232			27	231				
18	18	2	2	32	286			25	214				
35	35	5	5	24	214			20	171				
26	26	20	20	17	151			8	68	1	1		
6	6	41	41	6	54			1	08	17	17	1	1
2	2	26	26	1	09			3	26	30	30	7	7
		6	6					4	34	30	30	39	39
						7	52	2	17	14	14	40	40
						25	188			5	5	9	9
						38	27.8			3	3	4	4
						37	271						
						20	146						
						9	60						
						1	08						
100	100%	100	100%	112	100%	137	100%	117	100%	100	100%	100	100%
44.5		551		429		775		348		583		63.1	
70		52		66		67		100		6.2		46	

Butaritari A No. 44 10, July, '78 S		Tarawa (betio) A No. 52 16, July, '78 S		Tarawa (betio) A No. 53 17, July, '78 H		Abemama A No. 66 30, July, '78 S		Abemama A No. 66 30, July, '78 H		Abemama A No. 68 31, July, '78 S		Tarawa (betio) A No. 69 2, Aug., '78 H	
No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%
		3	3							3	1.9		
		19	19							11	6.9		
		25	25							22	13.8		
		26	26							32	200		
		10	10				7	57		42	262		
11	11	12	12			22	17.9	1	17	29	181		
46	46	4	4			29	236	2	33	14	88		
36	36	1	1	2	36	30	244			6	37		
7	7			5	91	30	244	2	33	1	06	1	1
				10	182	4	32	4	67			12	12
				9	164	1	08	8	133			13	13
				17	3,09			12	150			44	44
				10	182			8	133			20	20
				2	36			9	150			7	7
								10	167			3	3
								3	50				
								1	17				
100	100%	100	100%	55	100%	123	100%	60	100%	160	100%	100	100%
57.0		389		765		578		829		437		802	
38		76		73		65		12.0		7.9		60	

Butaritari A No. 74 6, Aug., '78 H		Butaritari A No. 78 8, Aug., '78 H		Tarawa (betio) A No. 81 13, Aug., '78 H		Tarawa (betio) A No. 81 13, Aug., '78 S		Butaritari B No. 51 18, Aug., '78 H		Tarawa (betio) A No. 86 22, Aug., '78 H		Butaritari B No 58 24, Aug., '78 H	
No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%
						1	08			1	09		
				4	33	6	50			2	1.8		
				7	5.7	18	150			14	130		
				3	24	33	275	4	3.3	32	297		
5	5	3	3	1	08	33	275	7	58	15	139		
12	12	8	8			26	217	5	42	2	18	6	6
17	17	10	10	1	08	3	25	11	91	5	46	18	18
27	27	10	10	1	08			20	165	11	102	22	22
16	16	23	23	15	122			18	149	7	65	32	32
20	20	28	28	30	244			20	165	8	74	17	17
3	3	15	15	23	188			18	149	8	7.4	5	5
		3	3	26	211			16	132	3	28		
				10	81			1	08				
				2	1.6			1	08				
100	100%	100	100%	123	100%	120	100%	121	100%	108	100%	100	100%
705		751		796		525		753		602		726	
7.6		84		143		62		111		142		63	

Butaritari B No. 61 25, Aug., '78 H		Butaritan B No. 63 26, Aug., '78 H		Butaritari B No. 64 27, Aug., '78 H		Butaritari B No. 67 29, Aug., '78 H		Abemama A No. 93 3, Sep., '78 S		Abemama A No. 95 4, Sep., '78 H		Abemama A No. 95 4, Sep., '78 S	
No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%
								8	8			2	2
1	1							14	14			15	15
		1	1					20	20	1	1	26	26
2	2	2	2					26	26			23	23
4	4	1	1					20	20	3	3	26	26
6	6	5	5					9	9	8	8	7	7
13	13	6	6	6	6			3	3	17	17	1	1
26	26	18	18	6	6					22	22		
20	20	26	26	22	22	2	2			10	10		
19	19	23	23	29	29	11	11			7	7		
8	8	12	12	26	26	43	43			7	7		
1	1	5	5	8	8	37	37			6	6		
		1	1	3	3	6	6			6	6		
						1	1			9	9		
										2	2		
										2	2		
100	100%	100	100%	100	100%	100	100%	100	100%	100	100%	100	100%
668		701		786		819		438		718		441	
88		90		68		43		75		143		64	

Abemama A No. 98 6, Sep., '78 S		Abemama B No. 70 13, Sep., '78 H		Abemama B No. 72 14, Sep., '78 H		Butaritari B No. 76 20, Sep., '78 H		Butaritari B No. 77 20, Sep., '78 H		Butaritari B No. 84 24, Sep., '78 H		Abemama A No. 112 1, Oct., '78 S	
No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%
4	27												
23	153											7	7
32	213											22	22
28	187					1	1					27	27
32	213			2	2	3	3					25	25
20	133			7	7	6	6					12	12
7	47			12	12	3	3	2	2	1	1	5	5
4	27			11	11	18	18	6	6	10	10	2	2
		2	2	8	8	28	28	22	22	17	17		
		4	4	12	12	28	28	37	37	20	20		
		24	24	9	9	8	8	16	16	25	25		
		35	35	14	14	5	5	14	14	17	17		
		24	24	17	17			3	3	4	4		
		6	6	5	5					6	6		
		5	5	3	3								
150	100%	100	100%	100	100%	100	100%	100	100%	100	100%	100	100%
45.6		85.7		76.0		70.0		75.7		77.8		46.8	
81		60		132		81		63		81		68	

Abemama A No. 112 1, Oct., '78 SC		Abemama A No. 115 3, Oct., '78 S		Tarawa (betio) A No. 116 5, Oct., '78 H		Butaritari A No. 119 8, Oct., '78 H		Butaritari B No. 94 12, Oct., '78 H		Butaritari B No. 97 17, Oct., '78 H		Butaritari B No. 102 20, Oct., '78 H	
No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%	No of fish	%
		15	15										
		24	24	3	3								
		17	17	7	7								
		36	36	4	4								
		8	8	1	1	4	4	2	2				
				6	6	5	5	9	9	11	11	1	1
				5	5	18	18	33	33	35	35	22	22
				16	16	26	26	38	38	32	32	21	21
				39	39	28	28	14	14	16	16	36	36
				15	15	16	16	4	4	6	6	13	13
1	1			4	4	2	2					7	7
						1	1						
2	2												
1	1												
2	2												
11	11												
19	19												
18	18												
16	16												
15	15												
5	5												
7	7												
2	2												
1	1												
100	100%	100	100%	100	100%	100	100%	100	100%	100	100%	100	100%
1566		499		746		765		760		736		780	
106		62		114		69		5.7		5.2		5.9	

Butaritari B No. 105 23, Oct., '78 H													
No of fish	%												
1	1												
10	10												
27	27												
21	21												
21	21												
15	15												
4	4												
1	1												
100	100%												
808													
73													

Annex Table 13

Biological Survey on Bait Fish

Operation No	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Bouke No. 1	1	Harengula ovalis	65			○	○				21.5.'78 Tarawa
	2	"	60			○	○				
	3	"	55			○	○				
	4	"	45			○	○				
	5	"	55			○	○				
	6	"	7.0			○	○				
	7	"	4.5			○	○				
	8	"	65			○	○				
	9	"	55			○	○				
	10	"	45			○	○				
	11	"	45			○	○				
	12	"	45			○	○				
	13	"	55			○	○				
	14	"	60			○	○				
	15	"	65			○	○				
	16	"	60			○	○				
	17	"	45			○	○				
	18	"	5.0			○	○				
	19	"	55			○	○				
	20	"	50			○	○				
		Average	55	0	0	20	20	0	0	0	
Bouke No. 2	1	Harengula ovalis	69	○	○		○				22.5.'78 Tarawa
	2	"	56			○	○				
	3	"	50			○	○				
	4	"	58		○		○				
	5	"	7.2		○		○				
	6	"	77		○		○				
	7	"	58			○	○				
	8	"	55			○	○				
	9	"	7.5		○		○				
	10	"	7.5		○		○				
	11	"	61			○	○				
	12	"	60			○	○				
	13	"	55			○	○				
	14	"	56			○	○				
	15	"	66		○		○				
	16	"	54			○	○				
	17	"	62			○	○				
	18	"	70	○			○				
	19	"	70		○		○				
	20	"	70		○		○				
		Average	63	2	8	10	20	0	0	0	

Operation No	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Bouke No 3	1	Harengula ovalis	63			○	○				25.5.'78 Tarawa Except smaller size.
	2	"	67			○	○				
	3	"	69			○	○				
	4	"	75			○	○				
	5	"	52			○	○				
	6	"	58			○	○				
	7	"	73			○	○				
	8	"	62			○	○				
	9	"	63			○	○				
	10	"	59			○	○				
	11	"	54			○	○				
	12	"	55			○	○				
	13	"	63			○	○				
	14	"	57			○	○				
	15	"	54			○	○				
	16	"	68			○	○				
	17	"	60			○	○				
	18	"	60			○	○				
	19	"	63			○	○				
	20	"	56			○	○				
		Average	62	0	0	20	20	0	0	0	
Purse seine No. 20	1	Harengula ovalis	80		○		○				30.5.'78 Tarawa
	2	"	65			○	○				
	3	"	70	○			○				
	4	"	72	○			○				
	5	"	75		○		○				
	6	"	80		○		○				
	7	"	63			○	○				
	8	"	85		○		○				
	9	"	85		○			○			
	10	"	60			○	○				
	11	"	80		○			○			
	12	"	56			○	○				
	13	"	78		○			○			
	14	"	75		○		○				
	15	"	76			○	○				
	16	"	75	○			○				
	17	"	77		○		○				
	18	"	82		○		○				
	19	"	86		○		○				
	20	"	72			○	○				
		Average	75	3	11	6	17	3	0	0	

Operation No	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Bouke No. 15	1	Harengula ovalis	72		○		○				9.6.'78 Tarawa
	2	"	77	○			○				
	3	"	85		○		○				
	4	"	80		○		○				
	5	"	7.6	○			○				
	6	"	65			○	○				
	7	"	82		○		○				
	8	"	7.8		○		○				
	9	"	70		○		○				
	10	"	68		○		○				
	11	"	8.2		○			○			
	12	"	71		○		○				
	13	"	67			○	○				
	14	"	7.0		○		○				
	15	"	59			○	○				
	16	"	81		○		○				
	17	"	7.0		○		○				
	18	"	7.2		○		○				
	19	"	65			○	○				
	20	"	63			○	○				
		Average	73	2	13	5	19	1	0	0	
Bouke No. 23	1	Harengula ovalis	75		○		○				13.6.'78 Tarawa
	2	"	80		○		○				
	3	"	7.4		○		○				
	4	"	7.0		○		○				
	5	"	72		○		○				
	6	"	74		○		○				
	7	"	7.7		○		○				
	8	"	66			○	○				
	9	"	65		○		○				
	10	"	66			○	○				
	11	"	67		○		○				
	12	"	65			○	○				
	13	"	67	○			○				
	14	"	69			○	○				
	15	"	6.2			○	○				
	16	"	64			○	○				
	17	"	70			○	○				
	18	"	67			○	○				
	19	"	65			○	○				
	20	"	7.5	○		○	○				
		Average	70	2	9	9	20	0	0	0	

Operation No.	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Bouke No. 30	1	Harengula ovalis	7.0		○		○				18 6.'78 Butaritari On bigger size picked up.
	2	"	7.0	○				○			
	3	"	7.6		○			○			
	4	"	7.5	○				○			
	5	"	8.0		○			○			
	6	"	7.7		○		○				
	7	"	7.9		○			○			
	8	"	7.3	○			○				
	9	"	7.7		○			○			
	10	"	7.5	○				○			
	11	"	7.5	○				○			
	12	"	7.5		○			○			
	13	"	7.2	○				○			
	14	"	7.2	○			○				
	15	"	7.3	○				○			
	16	"	6.7	○				○			
	17	"	6.7	○			○				
	18	"	6.6	○			○				
	19	"	6.8	○			○				
	20	"	6.8	○			○				
		Average	7.3	13	7	0	8	12	0	0	
Bouke No. 40	1	Harengula ovalis	8.9		○			○			5.7.'78 Butaritari
	2	"	8.6		○			○			
	3	"	8.7		○			○			
	4	"	8.5		○		○				
	5	"	8.5		○		○				
	6	"	7.8	○				○			
	7	"	8.4	○			○				
	8	"	7.5	○			○				
	9	"	9.0		○			○			
	10	"	6.7			○	○				
	11	"	6.1			○	○				
	12	"	5.7			○	○				
	13	"	8.3		○			○			
	14	"	5.6			○	○				
	15	"	6.4			○	○				
	16	"	5.8			○	○				
	17	"	8.8		○			○			
	18	"	6.7			○	○				
	19	"	7.8		○			○			
	20	"	7.1		○			○			
		Average	7.5	3	10	7	11	9	0	0	

Operation No.	Fish No	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Bouke No. 53	1	Harengula ovalis	9.3		○			○			17.7.'78 Tarawa
	2	"	6.8		○		○				
	3	"	9.5		○			○			
	4	"	8.5		○			○			
	5	"	6.3			○	○				
	6	"	8.2		○			○			
	7	"	5.8			○	○				
	8	"	7.6	○				○			
	9	"	6.6			○	○				
	10	"	7.6		○		○				
	11	"	6.5			○	○				
	12	"	7.4		○		○				
	13	"	5.6			○	○				
	14	"	7.7		○		○				
	15	"	5.8			○	○				
	16	"	7.7	○				○			
	17	"	5.9			○	○				
	18	"	7.5	○				○			
	19	"	5.6			○	○				
	20	"	4.6			○	○				
		Average	7.0	3	8	9	13	7	0	0	
Bouke No. 61	1	Harengula ovalis	5.9		○			○			26.7.'78 Tarawa
	2	"	6.3			○	○				
	3	"	6.1		○			○			
	4	"	6.2		○			○			
	5	"	6.4		○			○			
	6	"	6.0		○			○			
	7	"	6.2	○				○			
	8	"	6.5		○			○			
	9	"	5.7		○			○			
	10	"	6.5		○			○			
	11	"	6.3			○	○				
	12	"	5.8	○				○			
	13	"	5.5		○			○			
	14	"	6.2		○			○			
	15	"	6.0		○		○				
	16	"	6.2		○			○			
	17	"	5.7		○		○				
	18	"	6.5		○			○			
	19	"	6.0		○			○			
	20	"	5.9		○			○			
		Average	6.1	2	16	2	4	16	0	0	

Operation No.	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position	
				M	F	?	A	B	C	D	Remarks	
Bouke No. 44	1	Harengula ovalis	77		○					○		10.7.'78 Butaritari
	2	"	88		○					○		
	3	"	88		○					○		
	4	"	60			○	○					
	5	"	82	○						○		
	6	"	78			○	○					
	7	"	72			○	○					
	8	"	79	○				○				
	9	"	78		○					○		
	10	"	78		○					○		
	11	"	86		○					○		
	12	"	77			○	○					
	13	"	84		○			○				
	14	"	77		○					○		
	15	"	80	○			○					
	16	"	75			○	○					
	17	"	72	○			○					
	18	"	64			○	○					
	19	"	80	○			○					
	20	"	72	○						○		
		Average	77	6	8	6	9	2	9	0		
Bouke No 52	1	Spratelluides delicaturus	100		○					○		16.7.'78 Tarawa On bigger size picked up.
	2	"	75	○				○				
	3	"	87		○					○		
	4	"	82		○					○		
	5	"	79		○					○		
	6	"	68		○					○		
	7	"	84	○				○				
	8	"	85	○				○				
	9	"	83	○						○		
	10	"	73	○				○				
	11	"	93		○					○		
	12	"	77		○			○				
	13	"	95		○					○		
	14	"	92	○				○				
	15	"	86	○						○		
	16	"	95	○							○	
	17	"	75	○						○		
	18	"	75	○						○		
	19	"	83	○						○		
	20	"	83	○						○		
		Average	84	12	8	0	0	6	13	1		

Operation No.	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position	
				M	F	?	A	B	C	D	Remarks	
Bouke No. 53	1	Harengula ovalis	93		○			○				17.7.'78 Tarawa
	2	"	68		○		○					
	3	"	95		○			○				
	4	"	85		○			○				
	5	"	63			○	○					
	6	"	82		○			○				
	7	"	58			○	○					
	8	"	76	○				○				
	9	"	66			○	○					
	10	"	76		○		○					
	11	"	65			○	○					
	12	"	74		○		○					
	13	"	56			○	○					
	14	"	77		○		○					
	15	"	58			○	○					
	16	"	77	○				○				
	17	"	59			○	○					
	18	"	75	○				○				
	19	"	56			○	○					
	20	"	46			○	○					
		Average	70	3	8	9	13	7	0	0		
Bouke No 61	1	Harengula ovalis	59		○			○			26.7.'78 Tarawa	
	2	"	63			○	○					
	3	"	61		○			○				
	4	"	62		○			○				
	5	"	64		○			○				
	6	"	60		○			○				
	7	"	62	○				○				
	8	"	65		○			○				
	9	"	57		○			○				
	10	"	65		○			○				
	11	"	63			○	○					
	12	"	58	○				○				
	13	"	55		○			○				
	14	"	62		○			○				
	15	"	60		○		○					
	16	"	62		○			○				
	17	"	57		○		○					
	18	"	65		○			○				
	19	"	60		○			○				
	20	"	59		○			○				
		Average	61	2	16	2	4	16	0	0		

Operation No.	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Bouke No. 44	1	Harengula ovalis	77		○					○	10.7.'78 Butaritari
	2	"	88		○					○	
	3	"	88		○					○	
	4	"	60			○	○				
	5	"	82	○						○	
	6	"	78			○	○				
	7	"	72			○	○				
	8	"	7.9	○					○		
	9	"	7.8		○					○	
	10	"	7.8		○					○	
	11	"	8.6		○					○	
	12	"	7.7			○	○				
	13	"	8.4		○				○		
	14	"	7.7		○					○	
	15	"	80	○			○				
	16	"	7.5			○	○				
	17	"	7.2	○			○				
	18	"	6.4			○	○				
	19	"	80	○			○				
	20	"	7.2	○						○	
		Average	7.7	6	8	6	9	2	9	0	
Bouke No. 52	1	Spratelludes delicaturus	100		○					○	16.7.'78 Tarawa On bigger size picked up.
	2	"	7.5	○					○		
	3	"	87		○					○	
	4	"	8.2		○					○	
	5	"	7.9		○					○	
	6	"	68		○					○	
	7	"	84	○					○		
	8	"	85	○					○		
	9	"	83	○						○	
	10	"	7.3	○					○		
	11	"	93		○					○	
	12	"	7.7		○				○		
	13	"	95		○					○	
	14	"	9.2	○					○		
	15	"	8.6	○						○	
	16	"	95	○						○	
	17	"	7.5	○						○	
	18	"	75	○						○	
	19	"	8.3	○						○	
	20	"	83	○						○	
		Average	8.4	12	8	0	0	6	13	1	

Operation No.	Fish No	Fish kind	Body length (cm)	Sex			Gonad				Date and position	
				M	F	?	A	B	C	D	Remarks	
Bouke No. 61	1	<i>Spratelludes delicaturus</i>	58	○						○		26.7.'78 Tarawa On 5cm over in body length picked up.
	2	"	53		○		○					
	3	"	54		○		○					
	4	"	56		○				○			
	5	"	52	○					○			
	6	"	54	○					○			
	7	"	61		○				○			
	8	"	53		○				○			
	9	"	56	○					○			
	10	"	60		○		○					
	11	"	54		○		○					
	12	"	54		○		○					
	13	"	66		○					○		
	14	"	62		○				○			
	15	"	67		○					○		
	16	"	57		○		○					
	17	"	67		○					○		
	18	"	56		○				○			
	19	"	64			○	○					
	20	"	52			○	○					
		Average	58	4	14	2	8	8	4	0		
Bouke No. 66	1	<i>Harengula ovalis</i>	91	○			○					30.7.'78 Abemama
	2	"	90		○		○					
	3	"	67			○	○					
	4	"	87	○			○					
	5	"	96		○					○		
	6	"	75	○			○					
	7	"	95		○					○		
	8	"	66			○	○					
	9	"	72			○	○					
	10	"	86		○						○	
	11	"	74			○	○					
	12	"	82		○		○					
	13	"	81	○			○					
	14	"	92	○							○	
	15	"	64			○	○					
	16	"	85	○			○					
	17	"	80			○	○					
	18	"	92	○			○					
	19	"	101	○						○		
	20	"	83		○		○					
		Average	83	8	6	6	15	0	3	2		

Operation No	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Bouke No. 68	1	Spratelluides delicatulus	57		○		○				31.7.78 Abemama On bigger size picked up.
	2	"	62		○		○				
	3	"	64		○		○				
	4	"	63		○		○				
	5	"	57		○		○				
	6	"	55		○		○				
	7	"	59		○		○				
	8	"	53	○			○				
	9	"	63		○					○	
	10	"	58		○		○				
	11	"	62		○		○				
	12	"	6.2	○						○	
	13	"	6.2		○		○				
	14	"	6.1		○		○				
	15	"	5.6	○					○		
	16	"	6.0		○		○				
	17	"	6.6		○				○		
	18	"	6.4		○				○		
	19	"	6.2		○		○				
	20	"	5.9		○		○				
		Average	6.0	3	17	0	15	0	3	2	
Bouke No. 70	1	Harengula ovalis	83		○				○		3.8.78 Tarawa
	2	"	94		○				○		
	3	"	82	○			○				
	4	"	78	○					○		
	5	"	82	○					○		
	6	"	93		○				○		
	7	"	84		○				○		
	8	"	97		○				○		
	9	"	83	○			○				
	10	"	80	○			○				
	11	"	88		○					○	
	12	"	94		○				○		
	13	"	88		○				○		
	14	"	78	○			○				
	15	"	77	○			○				
	16	"	87	○			○				
	17	"	81	○						○	
	18	"	80	○					○		
	19	"	87	○						○	
	20	"	80	○			○				
		Average	85	12	8	0	7	0	10	3	

Operation No.	Fish No	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Bouke No. 74	1	Harengula ovalis	84	○			○				6.8.'78 Butaritari
	2	"	75	○				○			
	3	"	78		○				○		
	4	"	74	○					○		
	5	"	73	○				○			
	6	"	71	○			○				
	7	"	82		○					○	
	8	"	75	○				○			
	9	"	83	○			○				
	10	"	84	○					○		
	11	"	79	○				○			
	12	"	65	○			○				
	13	"	75	○				○			
	14	"	68		○				○		
	15	"	65		○				○		
	16	"	69		○				○		
	17	"	82	○			○				
	18	"	71	○					○		
	19	"	73	○			○				
	20	"	75	○			○				
		Average	75	15	5	0	7	5	7	1	
Bouke No. 78	1	Harengula ovalis	76	○					○		8.8.'78 Butaritari
	2	"	67	○					○		
	3	"	83		○				○		
	4	"	86		○				○		
	5	"	76	○					○		
	6	"	84		○				○		
	7	"	68	○					○		
	8	"	82		○				○		
	9	"	76		○		○		○		
	10	"	87		○				○		
	11	"	64			○	○				
	12	"	73		○				○		
	13	"	78	○				○			
	14	"	78		○			○			
	15	"	78	○				○			
	16	"	77		○			○			
	17	"	85		○				○		
	18	"	64			○		○			
	19	"	69		○			○			
	20	"	79	○					○		
		Average	77	7	11	2	2	6	12	0	

Operation No.	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Bouke No. 81	1	Harengula ovalis	90		○				○		13.8.'78 Tarawa
	2	"	93		○				○		
	3	"	88		○				○		
	4	"	85		○				○		
	5	"	90		○				○		
	6	"	86	○					○		
	7	"	94		○				○		
	8	"	92	○					○		
	9	"	88		○				○		
	10	"	89		○				○		
	11	"	92		○				○		
	12	"	79		○			○			
	13	"	85	○					○		
	14	"	87		○				○		
	15	"	87	○					○		
	16	"	100		○				○		
	17	"	90		○				○		
	18	"	82		○				○		
	19	"	84	○					○		
	20	"	92		○				○		
		Average	89	5	15	0	0	1	19	0	
Bouke No. 81	1	Spratelludes delicaturus	61		○				○		13.8.'78 Tarawa On 5cm over in body length picked up.
	2	"	57		○				○		
	3	"	62		○				○		
	4	"	57		○				○		
	5	"	57	○					○		
	6	"	55		○			○			
	7	"	59	○					○		
	8	"	55	○					○		
	9	"	61		○				○		
	10	"	59	○					○		
	11	"	60		○				○		
	12	"	59		○				○		
	13	"	62		○				○		
	14	"	56		○				○		
	15	"	60		○				○		
	16	"	60		○			○			
	17	"	58		○			○			
	18	"	59		○				○		
	19	"	60	○					○		
	20	"	58		○				○		
		Average	59	5	15	0	0	3	17	0	

Operation No	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Purse seine No 51	1	Harengula ovalis	94		○				○		19.8.'78 Butaritan
	2	"	7.8	○			○				
	3	"	74	○			○				
	4	"	82	○			○				
	5	"	89	○				○			
	6	"	92		○				○		
	7	"	86	○					○		
	8	"	72		○		○				
	9	"	71		○		○				
	10	"	83	○				○			
	11	"	78		○				○		
	12	"	77	○			○				
	13	"	86	○				○			
	14	"	70		○		○				
	15	"	91	○					○		
	16	"	86	○					○		
	17	"	75	○			○				
	18	"	70		○		○				
	19	"	95	○					○		
	20	"	85	○				○			
		Average	82	13	7	0	9	4	7	0	
Bouke No. 86	1	Harengula ovalis	89		○				○		22.8.'78 Butaritan on bigger size pick up.
	2	"	94		○				○		
	3	"	94		○				○		
	4	"	87		○				○		
	5	"	89		○				○		
	6	"	87		○				○		
	7	"	89		○				○		
	8	"	93		○				○		
	9	"	85		○				○		
	10	"	86		○				○		
	11	"	82		○				○		
	12	"	81		○				○		
	13	"	79		○				○		
	14	"	74	○			○				
	15	"	80	○			○				
	16	"	83	○			○				
	17	"	81		○			○			
	18	"	82		○			○			
	19	"	7.6	○			○				
	20	"	85		○				○		
		Average	85	4	16	0	4	2	14	0	

Operation No.	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Purse seine No. 58	1	Harengula ovalis	77	○				○			25.8.'78 Butantari
	2	"	75	○				○			
	3	"	72	○			○				
	4	"	7.7	○				○			
	5	"	7.2	○			○				
	6	"	75	○					○		
	7	"	87		○		○				
	8	"	8.5		○				○		
	9	"	7.8	○				○			
	10	"	80	○			○				
	11	"	62	○			○				
	12	"	78	○				○			
	13	"	75		○		○				
	14	"	82		○				○		
	15	"	83		○		○				
	16	"	7.1	○			○				
	17	"	61			○	○				
	18	"	8.4		○			○			
	19	"	7.5			○	○				
	20	"	67		○		○				
		Average	76	11	7	2	11	6	3	0	
Purse seine No. 61	1	Harengula ovalis	78	○			○				26.8.'78 Butaritari
	2	"	81	○			○				
	3	"	83	○					○		
	4	"	65	○			○				
	5	"	7.7		○		○				
	6	"	7.7	○			○				
	7	"	7.4		○		○				
	8	"	7.2	○			○				
	9	"	7.3	○			○				
	10	"	70	○			○				
	11	"	6.8	○			○				
	12	"	76	○				○			
	13	"	73		○		○				
	14	"	70		○		○				
	15	"	84	○				○			
	16	"	67	○			○				
	17	"	6.4	○			○				
	18	"	71		○		○				
	19	"	67			○	○				
	20	"	59			○	○				
		Average	7.2	13	5	2	17	2	1	0	

Operation No	Fish No	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Purse seine No. 62	1	Harengula ovalis	72	○			○				26.8.'78 Butaritari
	2	"	84		○			○			
	3	"	83	○					○		
	4	"	72	○			○				
	5	"	90	○				○			
	6	"	80	○				○			
	7	"	79		○		○				
	8	"	68			○	○				
	9	"	79	○			○				
	10	"	67		○		○				
	11	"	74		○		○				
	12	"	68	○			○				
	13	"	84	○				○			
	14	"	85	○					○		
	15	"	81		○		○				
	16	"	77		○		○				
	17	"	65		○		○				
	18	"	69		○		○				
	19	"	7.7		○		○				
	20	"	83	○					○		
		Average	77	10	9	1	13	4	3	0	
Purse seine No 63	1	Harengula ovalis	70	○			○				27.8.'78 Butaritari
	2	"	85	○				○			
	3	"	83	○			○				
	4	"	79		○		○				
	5	"	86	○					○		
	6	"	78	○			○				
	7	"	77		○		○				
	8	"	76		○		○				
	9	"	77		○			○			
	10	"	88		○			○			
	11	"	86		○				○		
	12	"	92		○				○		
	13	"	75	○			○				
	14	"	77	○				○			
	15	"	82		○				○		
	16	"	74	○			○				
	17	"	71	○			○				
	18	"	83	○					○		
	19	"	81	○				○			
	20	"	86	○					○		
		Average	80	12	8	0	9	5	6	0	

Operation No	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Purse seine No. 67	1	<i>Harengula ovalis</i>	90		○				○		29.8 '78 Butaritan
	2	"	81		○		○				
	3	"	80	○				○			
	4	"	93	○					○		
	5	"	88		○				○		
	6	"	83	○					○		
	7	"	87		○				○		
	8	"	83	○			○				
	9	"	86	○					○		
	10	"	84	○					○		
	11	"	82		○			○			
	12	"	84		○				○		
	13	"	84	○					○		
	14	"	85	○					○		
	15	"	87		○				○		
	16	"	87	○					○		
	17	"	84	○					○		
	18	"	86		○				○		
	19	"	87		○				○		
	20	"	92		○				○		
		Average	86	10	10	0	2	2	16	0	
Bouke No 93	1	<i>Spratelluides delicaturus</i>	59		○				○		3.9.'78 Abemama On 5cm over in body length picked up at random
	2	"	55		○		○				
	3	"	57		○		○				
	4	"	60	○						○	
	5	"	57		○		○				
	6	"	64		○		○				
	7	"	56		○		○				
	8	"	61		○		○				
	9	"	61		○		○				
	10	"	62		○		○				
	11	"	64		○		○				
	12	"	60	○			○				
	13	"	60		○		○				
	14	"	60			○	○				
	15	"	59	○					○		
	16	"	56		○		○				
	17	"	61		○		○				
	18	"	56	○			○				
	19	"	56	○			○				
	20	"	53		○		○				
		Average	59	5	14	1	17	0	2	1	

Operation No.	Fish No	Fish kind	Body length (cm)	Sex			Gonad				Date and position	
				M	F	?	A	B	C	D	Remarks	
Bouke No. 95	1	Harengula ovalis	92		○						○	4.9.'78 Abemama
	2	"	86	○						○		
	3	"	66			○	○					
	4	"	70			○	○					
	5	"	95	○							○	
	6	"	95	○							○	
	7	"	75			○	○					
	8	"	74		○		○					
	9	"	87	○			○					
	10	"	98	○						○		
	11	"	100		○						○	
	12	"	78			○	○					
	13	"	98		○						○	
	14	"	88	○						○		
	15	"	91	○						○		
	16	"	68			○	○					
	17	"	107		○					○		
	18	"	96		○					○		
	19	"	96	○			○					
	20	"	87	○			○					
		Average	87	9	6	5	10	0	6	4		
Bouke No 95	1	Spratelluides delicaturus	65		○		○					4.9.'78 Abemama On bigger size picked up at random
	2	"	65		○		○					
	3	"	62		○		○					
	4	"	56	○			○					
	5	"	62		○		○					
	6	"	56	○							○	
	7	"	57		○		○					
	8	"	64		○		○					
	9	"	65		○		○					
	10	"	59		○		○					
	11	"	63		○		○					
	12	"	57	○			○					
	13	"	56		○		○					
	14	"	63		○		○					
	15	"	64		○		○					
	16	"	64		○		○					
	17	"	60	○							○	
	18	"	64		○		○					
	19	"	62		○		○					
	20	"	64		○		○					
		Average	61	4	16	0	18	0	0	2		

Operation No.	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position Remarks
				M	F	?	A	B	C	D	
Bouke No. 103	1	Harengula ovalis	85	○					○		19.78 Abemama
	2	"	98		○				○		
	3	"	100		○				○		
	4	"	82	○					○		
	5	"	93	○					○		
	6	"	95		○				○		
	7	"	78	○				○			
	8	"	94	○					○		
	9	"	82	○					○		
	10	"	89		○				○		
	11	"	88	○					○		
	12	"	87	○					○		
	13	"	84	○					○		
	14	"	86	○					○		
	15	"	85	○					○		
	16	"	71		○		○				
	17	"	94	○					○		
	18	"	97		○				○		
	19	"	92	○					○		
	20	"	91		○				○		
		Average	89	13	7	0	1	1	18	0	
Purse seine No. 70	1	Harengula ovalis	88	○				○			13 9.78 Abemama
	2	"	84	○					○		
	3	"	95	○					○		
	4	"	80	○				○			
	5	"	92	○					○		
	6	"	89		○				○		
	7	"	80	○				○			
	8	"	77		○			○			
	9	"	87		○			○			
	10	"	93	○					○		
	11	"	7.9	○					○		
	12	"	82		○				○		
	13	"	8.3	○					○		
	14	"	8.9		○				○		
	15	"	8.4	○					○		
	16	"	8.2		○				○		
	17	"	8.2		○		○				
	18	"	7.7	○				○			
	19	"	8.5		○				○		
	20	"	8.3	○				○			
		Average	85	12	8	0	1	7	12	0	

Operation No.	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Purse seine No. 72	1	Harengula ovalis	68		○		○				14.9.'78 Abemama
	2	"	71		○		○				
	3	"	84		○				○		
	4	"	87	○					○		
	5	"	77		○		○				
	6	"	72		○		○				
	7	"	83	○				○			
	8	"	67		○		○				
	9	"	92		○				○		
	10	"	82	○				○			
	11	"	88		○				○		
	12	"	64			○	○				
	13	"	64			○	○				
	14	"	77	○				○			
	15	"	89	○					○		
	16	"	80	○					○		
	17	"	67			○	○				
	18	"	95		○				○		
	19	"	92		○				○		
	20	"	88		○				○		
		Average	79	6	11	3	8	4	8	0	
Purse seine No. 84	1	Harengula ovalis	97		○			○			9.10.'78 Butaritari
	2	"	92		○			○			
	3	"	80	○				○			
	4	"	81			○	○				
	5	"	77			○	○				
	6	"	84	○			○				
	7	"	84		○		○				
	8	"	69	○			○				
	9	"	77	○			○				
	10	"	70	○			○				
	11	"	97		○					○	
	12	"	81		○		○				
	13	"	78		○		○				
	14	"	90	○			○				
	15	"	98		○					○	
	16	"	74	○			○				
	17	"	87	○			○				
	18	"	77	○			○				
	19	"	76	○			○				
	20	"	83	○			○				
		Average	83	11	7	2	15	3	0	2	

Operation No.	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Bouke No. 112	1	Sardinella clupeioides	144		○		○				1.10.'78 Abemama
	2	"	147		○		○				
	3	"	150	○				○			
	4	"	156	○			○				
	5	"	153	○			○				
	6	"	148	○			○				
	7	"	150	○				○			
	8	"	154	○				○			
	9	"	154	○				○			
	10	"	160		○		○				
	11	"	182		○			○			
	12	"	176		○			○			
	13	"	145		○		○				
	14	"	17.2		○		○				
	15	"	153	○			○				
	16	"	152		○		○				
	17	"	165	○				○			
	18	"	145		○			○			
	19	"	144		○		○				
	20	"	167		○			○			
		Average	156	9	11	0	11	9	0	0	
Bouke No. 119	1	Harengula ovalis	86	○				○			8.10.'78 Butaritari
	2	"	7.8	○				○			
	3	"	84		○			○			
	4	"	81		○		○				
	5	"	78		○		○				
	6	"	82		○		○				
	7	"	73		○		○				
	8	"	7.9		○				○		
	9	"	81		○				○		
	10	"	80		○		○				
	11	"	89		○				○		
	12	"	7.6		○			○			
	13	"	87	○				○			
	14	"	8.4	○					○		
	15	"	80		○			○			
	16	"	7.1		○		○				
	17	"	7.2		○			○			
	18	"	7.2		○		○				
	19	"	6.4		○		○				
	20	"	6.6		○		○				
		Average	7.8	4	16	0	9	7	4	0	

Operation No.	Fish No	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Purse seine No. 94	1	Harengula ovalis	73	○				○			17.10.'78 Butaritari
	2	"	78		○			○			
	3	"	73	○				○			
	4	"	78		○				○		
	5	"	76	○				○			
	6	"	70		○		○				
	7	"	79	○					○		
	8	"	78		○		○				
	9	"	80		○				○		
	10	"	73		○			○			
	11	"	81	○					○		
	12	"	78		○				○		
	13	"	80		○			○			
	14	"	84	○					○		
	15	"	79		○		○				
	16	"	73		○				○		
	17	"	81	○				○			
	18	"	75		○		○				
	19	"	75		○				○		
	20	"	69	○				○			
		Average	7.7	8	12	0	4	8	8	0	
Purse seine No 97	1	Harengula ovalis	85		○		○				20.10.'78 Butaritari
	2	"	85	○			○				
	3	"	72.2	○			○				
	4	"	98		○				○		
	5	"	80	○			○				
	6	"	80		○		○				
	7	"	74	○			○				
	8	"	78	○			○				
	9	"	85	○			○				
	10	"	76		○		○				
	11	"	80	○			○				
	12	"	90		○				○		
	13	"	80		○		○				
	14	"	79	○			○				
	15	"	85		○			○			
	16	"	72.2		○		○				
	17	"	86	○			○				
	18	"	80		○		○				
	19	"	73	○			○				
	20	"	85		○		○				
		Average	86	10	10	0	17	1	2	0	

Operation No.	Fish No.	Fish kind	Body length (cm)	Sex			Gonad				Date and position
				M	F	?	A	B	C	D	Remarks
Purse seine No. 102	1	Harengula ovalis	83		○		○				22.10.'78 Butaritari
	2	"	82		○		○				
	3	"	86	○			○				
	4	"	91		○			○			
	5	"	85	○			○				
	6	"	81		○		○				
	7	"	90		○		○				
	8	"	84	○				○			
	9	"	89		○		○				
	10	"	90		○		○				
	11	"	85	○			○				
	12	"	82		○		○				
	13	"	90	○				○			
	14	"	82		○		○				
	15	"	74		○		○				
	16	"	84		○		○				
	17	"	83		○		○				
	18	"	87		○			○			
	19	"	88		○			○			
	20	"	88		○			○			
		Average	85	5	15	0	14	6	0	0	

M = Male F = Female
 A = Immature B = Maturing
 C = Mature D = Spawned

Month	Fish kind	Harengula ovalis										Spratelluoides delicatulus										
		No Picked up	Average body length (cm)	Sex		Gonad			Number picked up	Average body length (cm)	Sex		Gonad									
				M	F	?	A	B			C	D	M	F	?	A	B	C	D			
May	Tarawa	80	64	5	19	56	77	3	0	0	0	0	0									
June	Tarawa	40	72	4	22	14	39	1	0	0	0											
	Butaritari	20	7.3	13	7	0	8	12	0	0												
	Total	60	72	17	29	14	47	13	0	0												
July	Tarawa	40	81	18	16	6	9	8	22	1	0											
	Abemama	20	8.3	8	6	6	15	0	3	2												
	Butaritari	40	73	6	18	16	24	16	0	0												
	Total	100	78	32	40	28	48	24	25	3												
August	Tarawa	60	86	21	39	0	11	3	43	3												
	Butaritari	160	78	91	62	7	70	34	55	1												
	Total	220	80	112	101	7	81	37	98	4												
September	Abemama	80	85	40	32	8	20	12	44	4												
October	Butaritari	100	8.2	40	60	0	59	25	14	2												
Grand Total	Tarawa	220	75	48	96	76	136	15	65	4												
	Abemama	100	85	48	38	23	35	12	47	6												
	Butaritari	320	78	150	147	14	161	87	69	3												
	Grand Total	640	7.8	246	281	113	332	114	181	13												

Annex Table 14

Record of Bait Fish Breeding Test

- a) Large type bait pen
- b) Middle type bait pen
- c) Bait hold

(Large type)

Operation No.	Bouke No. 4-13 Purse Seine No. 31-35
Area	Eita, Tarawa Lagoon
Date	26th May - 5th June, 1978
Breeding position	01-22 4N, 173-06 0E
Distance from shore (m)	0 7M, 10m
Size and No. of bait pen	3m x 8 sides, 8m in depth, One set
Date of transferring on board	21st June, 1978

Fish kind	Quantity (B/K)	%	Remarks
Harengula Ovalis	258	89	1 Bucket = 3 kg
Spralelludes delicaturus	17	5.8	Average body length H.O. 4.5 - 8.5 cm
Dassumeria Hasselti	9	3.1	S.D 3.5 - 6.0
Caesionidae	5	1.6	D.H 6.0 - 13.0
Allanetta Ovalava	1	0.5	C 4.5 - 6.0 A.O 5.0 - 6.5
Total	290	100	

Date	Time	Works	Collecting (B/K)	Death (B/K)	Remainder (B/K)	Transparency (m)	Water temp (°C)	Remarks
26 May	2300	Bouke No 4	38		38		29.3	H.O 100% Average body length 5.5cm
27	0930	Underwater Observation No 1		13	25	3.0	29.3	Died 4 kg.
	2300	Bouke No 5	32		57		28.0	H O 100% Averaged body length 5.5 cm
28	1000	Underwater Observation No. 2		14	43	4.0	29.5	Died 5 kg
	2200	Bouke No 6	64		107		29.0	H O 100%
29	0900	Underwater Observation No. 3		5	102	3.5	29.3	Died 2 kg
30	1400	No. 4		5	97	4.0	29.8	Almost fled due to net broken About 15 b/k left.
	2220	Bouke No. 7	70		85		29.4	Mostly H.O
31	0900	Underwater Observation No. 5		13	72	4 0	29.3	Mainly H.O died.
	1600	" No. 6		15	57	4 0	29.8	"
1 Jun								Poling at fishing ground
3	1815	Underwater Observation No. 7		0	57	4 0	29.7	Fled due to net broken About 20 b/k left
	2200	Bouke No 10	30		20		29 2	
4	0530	" No 11	18		68		28.9	H.O 100%
	1700	Purse Seine No 31-35	7		75		29.6	"
	2200	Bouke No 12	9		84		29.4	"
5	0550	No 13	22		106		29.4	Mostly H O
	1500	Underwater Observation No. 8		0	106	3 8	29 7	Big fishes jumped in.
	1700	" No 9		2	104	3.8	29.7	Took into bait hold
					100	3 8	29.7	Quantity took in 100 b/k.
Total			290	Died 67 Fled 119	100			Test uncompleted due to the fled and big fishes, but mortality showing less than 50%.

(Large type)

Operation No.	Bouke No. 14-20
Area	Eita, Tarawa Lagoon
Date	8th June-11th June, 1978
Breeding position	01-22.4N, 173-06.0E
Distance from shore and depth (m)	0.7M 11m
Size and No. of bait pen	3m x 8 sides, 8m in depth, One set
Date of transferring on board	21st June, 1978

Fish kind	Quantity (B/K)	%	Remarks
Harengular Ovalis	232	87.4	1 Bucket = 3 kg
Dassumiera hasselti	23	8.6	Average body length
Spratelludes delicatulus	11	4.0	H.O 4.5-8.5 cm D.H 6.0-13.5
Allanetta Ovalava	2	0	S.D 3.0-6.0 A.O 5.0-6.5
Total	268	100	

Date	Time	Wrks	Collecting (B/K)	Death (B/K)	Remainder (B/K)	Transparency (m)	Water temp (°C)	Remarks
8 Jun	2130	Bouke No. 14	40			3.4	29.4	Mostly H.O
9	0530	No. 15	70		110	3.4	29.4	"
	1200	Underwater Observation No. 1		7	103	3.0	29.6	Mainly D.H died, 22 kg
	2130	Bouke No. 16	32		135	3.0	29.6	Mostly H.O
10	0530	" No. 17	29		164		29.0	H.O 100%
	0900	Underwater Observation No. 2		6	158	3.0	29.7	Mainly D.H died 18 kg
	1000	Purse Seine No. 38	1		159	3.0	29.7	H.O 100%
	1500	Underwater Observation No. 3		5	154	3.5	29.7	Mainly D.H died. 15 kg
	2200	Bouke No. 18	27		181		29.2	Mostly H.O
11	0530	" No. 19	40		221		28.8	"
	0900	Underwater Observation No. 4		8	213	3.0	29.2	Died 22 kg (D.H 50%) (H.O 50%)
	1500	" No. 5		2	211	3.0	29.6	Died 5 kg (")
	2100	Bouke No. 20	27		238		29.3	Mostly D.H.
12	1000	Underwater Observation No. 6		19	219	3.0	29.6	Died 56 kg (D.H 70%) (H.D 30%)
	1600	" No. 7		7	212	2.8	30.5	Mainly H.O died 20 kg
13	0630	" No. 8		4	208	2.8	29.2	" 12 kg
14	0930	" No. 9		3	205	3.0	29.4	" 10 kg
15	1000	" No. 10		1	204	3.0	29.0	Fed
17	1000	" No. 11		0	204	3.0	29.2	"
19	1400	" No. 12		0		3.0	29.7	"
Total			266	62	204			Mortality 23.3%

(Middle type)

Operation No.	Purse Seine No. 1-30
Area	Ambo, Tarawa Lagoon
Date	21st May-3rd June, 1978
Breeding position	01-21.5N, 173-02.4E
Distance from shore and depth (m)	0 7M 7m
Size and No of bait pen	3m x 6 sides, 5m in depth, One set.
Date of transferring on board	11th June, 1978

Fish kind	Quantity (B/K)	%	Remarks
Harengula Ovalis	42	91.3	1 Bucket = 3 kg Average body length
Spratelluoides delicaturus	3	6.6	H O 45-8.0 cm
Allanetta Ovalava	1	2.1	S.D 3.5-6.0 A O 5.0-7.0
Total	46	100	

Date	Time	Works	Collecting (B/K)	Death (B/K)	Remainder (B/K)	Transparency (m)	Water temp (°C)	Remarks
21 May	1000	Purse Seine No. 1-2	2			4	29.3	H. O 100%
	1700	" No. 3-4	13		15	4	29.5	Mostly H.O
22	1300	Underwater Observation No 1		12	3	4	29.6	Mainly H.O died.
24	1100	" No. 2		0	3	2.5	29.0	
	1900	Purse Seine No. 8-9	3		6		29.4	Mostly H.O.
27	1000	Underwater Observation No. 3		0	6	2.4	29.3	
29	1130	" No 4		0	0	3.5	29.8	All fled over frame
	1200	Purse Seine No. 15-19	8		8	3.5	29.8	H.O 100%
30	0900	Underwater Observation No. 5		6	2	3.5	29.4	Died, 18 kg.
	1200	Purse Seine, No 20	12		14		29.8	H.O 90% A.O 10%
31	1500	Underwater Observation No. 6		11	3	3.5	29.8	H.O died
	1530	Purse Seine No. 22-25	5		8		29.8	H O 100%
1 Jun								Poling at fishing ground.
3	1350	Underwater Observation No 7		0	1.5		28.7	6.5 b/k fled.
	1650	Purse Seine No. 26-30	3		4.5		28.7	Mostly H.O
11	0800	Underwater Observation		0	1	3.0	29.2	3.5 b/k fled
	0920				1			Took into bait hold
Total			46	Died 29 Fled 16	1			

(Middle type)

Operation No	Bouke No. 21-22 Purse Seine No 39-41
Area	Eita, Tarawa Lagoon.
Date	12th June, 1978
Breeding position	01-22.4N, 173-05.9E
Distance from shore and depth (m)	0 7M 11m
Size and No. of bait pen	3m x6 sides 5m in depth, One set
Date of transferring on board	21st June, 1978

Fish kind	Quantity (B/K)	%	Remarks
Harengula Ovalis	55	82.1	1 Bucket = 3 kg. Average body length
Dassumeria hasselti	9	13.4	H.O 4.5-8.5 cm
Milk fish	2	3.0	D.H 6.5-13.5
Allanette Ovalava	1	1.5	Milk 2.5-4.0 A O 5.0-6.5
Total	67	100	

Date	Time	Works	Collecting (B/K)	Death (B/K)	Remainder (B/K)	Transparency (m)	Water temp. (°C)	Remarks
12 Jun	0530	Bouke No 21	35		35		28.9	Mostly H O
	0930	Underwater Observation No. 1		7	28	3.0	29.6	All D.H died.
	1000	Purse Seine No. 39-41	12		40	3.0	29.6	Mostly H.O
	1100	Underwater Observation No. 2		3	37	3.0	29.6	H.O died.
	1600	" No. 3		13	24	2.8	30.5	Mainly H.O. died (40 kg)
	2130	Bouke No. 22	20		44		29.6	Mostly H O
13	0630	Underwater Observation No. 4		7	37	2.8	29.2	Mainly H.O died (20 kg)
14	0930	" No. 5		5	32	3.0	29.4	" (15 kg)
15	1000	" No. 6		1	31	3.0	29.0	Fed, somewhat good
17	1000	" No. 7		0		3.0	29.2	" "
19	1400	" No. 8		0		3.0	29.6	" "
Total			67	36	31			Mortality 53.7%

(Bait hold)

Operation No	Bouke No. 1
Area	Eita, Tarawa Lagoon.
Date	21st May, 1978
Breeding position	Bait hold No 4
Date of cease	

Fish kind	Quantity (B/K)	%	Remarks
Harengula Ovalis	17	50	1 Bucket = 3 kg Average body length
Spratelluides delicatulus	16	47	H. O 4.5-6.5 cm
Caesionidae	1	3	S.D 3.5-5.0 CA 5.0-6.0
Total	34	100	

Date	Time	Works	Collecting (B/K)	Death (B/K)	Remainder (B/K)	Transparency (m)	Water temp (°C)	Remarks
21 May	0520	Bouke No 1	20		20		28.3	
	1000	Observation No. 1		2	18		29.3	Mainly H.O died
	1700	" No 2		1	17		29.3	"
22	0800	" No 3		1	16		29.0	"
	1100	" No 4		0	16		29.6	"
	1700	" No. 5		0	16		29.3	Surface S D Bottom H.O
23	0900	" No. 6		2	14		29.0	
24	0800	" No 7		0	14		29.0	
	1500	" No 8		0	14		29.0	Fed, baiting little
25	0800	" No. 9		0	14		29.7	Fed, baiting better
	2100	Bouke No. 3	14		28		29.3	2215-2245 Circulation stop
26	0900	Observation No 10		11	17		29.4	Condition bad
	1530	" No 11		2	15		29.7	Mainly H O died
27	0900	" No 12		2	13		29.3	
28	0930	" No. 13		0	13		29.5	
30	1200	" No. 14		0	13		29.8	
	1400	Transferring			13			Transferred to No 4 bait hold
Total			34	21	271	13		Higher mortality due to circulation stop by generator trouble.

(Bait hold)

Operation No.	Bouke No. 2-3
Area	Eita, Tarawa Lagoon
Date	22nd May-25th May, 1978
Breeding position	Bait hold No. 2
Date of cease	1st June, 1978

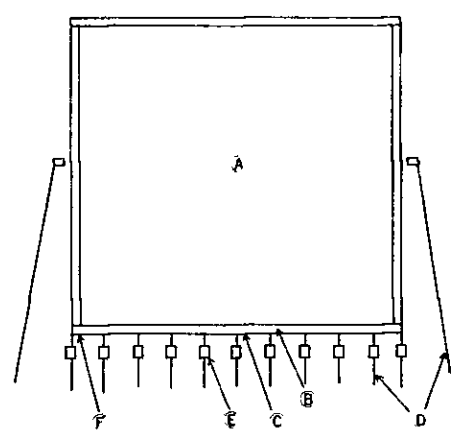
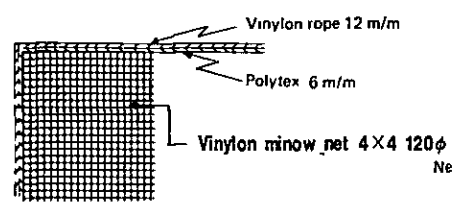
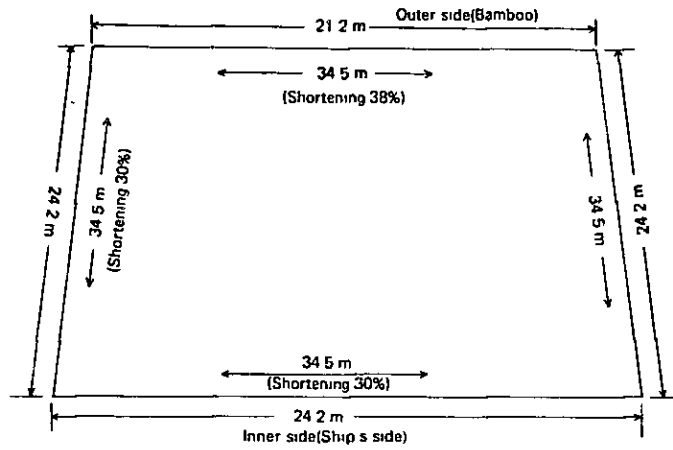
Fish kind	Quantity (B/K)	%	Remarks
Harengula Ovalis	25	67.6	1 Bucket = 3 kg. Average body length
Spratelluides delicaturus	10	28.9	H O 4.5 ~ 8 cm
Caesionidae	2	3.5	S.D 3.5 ~ 6 CA 4 ~ 5.5
Total	37	100	

Date	Time	Works	Collecting (B/K)	Death (B/K)	Remainder (B/K)	Transparency (m)	Water temp (°C)	Remarks
22 May	0530	Bouke No. 2	9		9		29.0	H.O 80% S.D 20%
	1100	Observation No 1		0.5	8.5		29.6	Small quantity Condition good
	1700	" No 2		0	8.5		29.3	S.D Surface H.O Bottom
23	0900	" No. 3		0.5	8		29.0	
24	0800	" No. 4		0	8		29.0	
	1500	" No 5		0	8		29.9	Fed, no baiting
25	0800	" No 6		0			29.7	Fed, baiting little
	2100	Bouke No. 3	15		23		29.3	Generator trouble Disturbance due to no circulation
26	0900	Observation No. 7		9	14		29.4	Mainly H O died.
	1530	" No. 8		1	13		29.4	"
27	0900	" No 9		1	12		29.3	
28	0930	" No. 10		0	12		29.5	Fed, baiting good
29	0800	" No. 11		0	12		29.4	"
30	1200	" No 12		0	12		29.8	"
	1400	Transferring	13		25			Transferred from No. 4 bait hold
31	0900	Observation No. 13		1	24		29.3	Remarkably wounded by transferring
	1600	" No. 14		0	24		29.8	Fed, baiting good
Total			37	13	24			Mortality 35%

CONTENTS OF ANNEX FIGURE

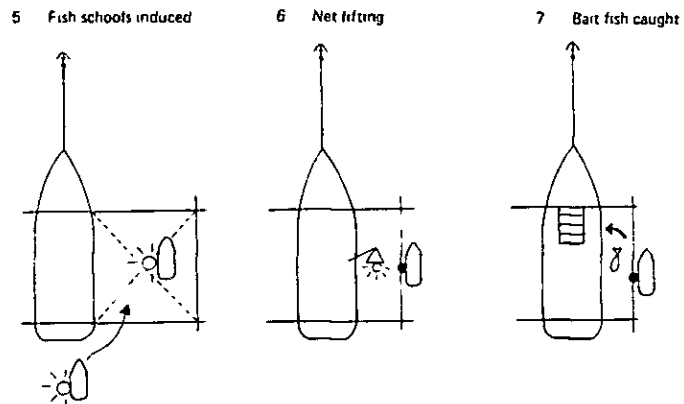
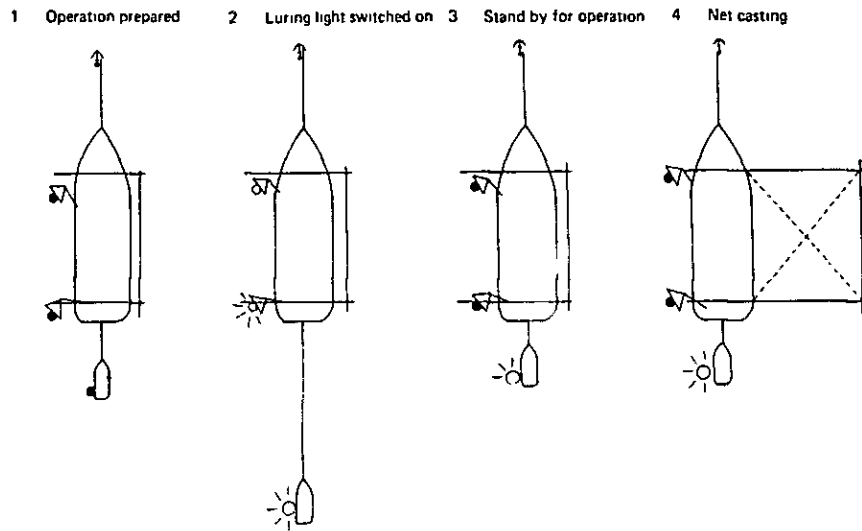
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Fig. 1 Construction of Bouke Ami



- Netting Vinylon minnow net 4 x 4, dyed by tan
120 meshes, 68 sheets (including 30% Shortening)
 - Triangle net Nylon 210 d/6 12 mm, 6 x 24 m
 - Rope Vinylon rope 6 mm 34 m
 - Hand rope Vinylon rope 20 mm 35 m
 - Spring rope Polytex 20 mm 35 m
 - Sinker Lead 150 g 260 pieces
 - Sinker Lead in oblong shape 3.5 kg 11 pieces
 - Stick held bamboo 4 poles connected, 23 m
 - Bamboo for pushing out 2 poles connected, 20 m
- A Main net
 - B Trianglnet
 - C Rope
 - D Hand rope
 - E Sinker
 - F Sinker

Fig. 2 Bouke-Ami Operation



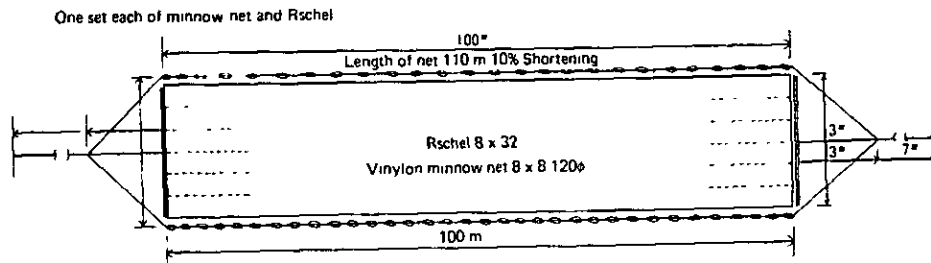
Luring light

Main Light on the water	Front	500 W	1
	Rear	1 KW	1
Tender boat	Underwater light	2 KW	1

Note

- △ On the-water light (switched off)
- ◊ On the-water light (switched on)
- Underwater light (switched off)
- ⊙ Underwater light (switched on)
- ⊞ Tender boat (mounted with 2 PS generator)

Fig. 3 Construction of Purse Seine



Note As the shortening was small in an operation with the above webbing construction, the behavior of the net was poor and this arrangement was unsuitable for fast-moving *Harengula ovalis*. For this reason, the following reform was made at the operation site

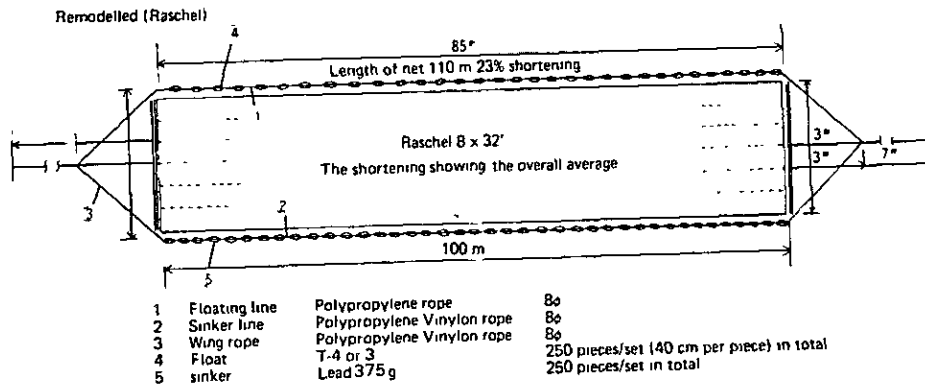
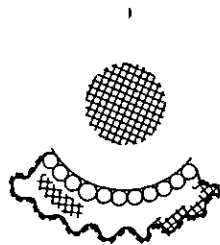
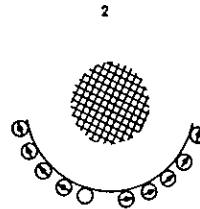


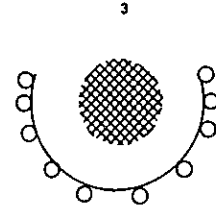
Fig. 4 Purse Seine Operation



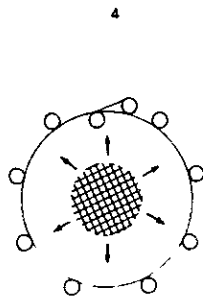
First, the most suitable school floating in water depths of 0.5-1.5 meters will be selected. As indicated in the above figure, 8-10 persons will make preparations for the casting of the seine.



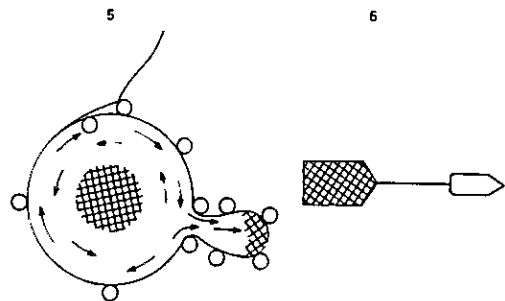
Quietly closing in on the fish school, the man at the center will begin to cast the seine, taking advantage of the best timing. Following the first person, the remaining persons will start casting the seine one by one.



Following the procedure shown in Fig 2, the fish school will be contained in the seine.



Fishes which are sealed in the seine will begin to try to flee away at a very fast speed. For this reason, the persons who are casting the seine will be required to take quick action at this moment. The enclosed fishes will be taken into a drive in net. At the same time, some persons will be assigned around the seine to prevent fishes from fleeing away near the surface. To minimize their fleeing, the floating line will be pulled up 20-30 cm above the water surface.



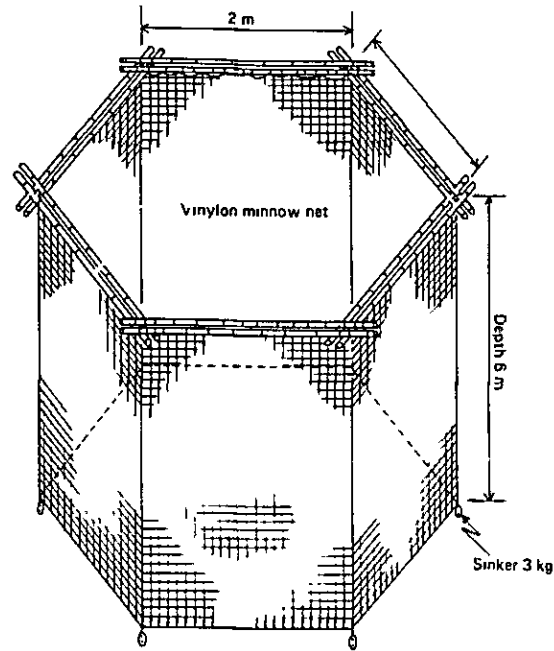
Drive in net

For transferring fishes into the drive in net, the best position will be the wing end or the leeward. As fishes slip into the drive in net in a natural condition without trouble, one feature of this system lies in the fact that little damage will be inflicted on them and their body strength will hardly be reduced. When more than 50 B/K are enclosed in the net end will be closed and then fishes will be transferred into a living net for transport to the ship. There are cases in which fishes must be taken in for the second time, depending on the size of the fish school. Here the same procedure will be repeated.

(Remark)

In view of the relationship between the construction of the net and the water depth, the net bottom cannot be closed up as in the case of a purse seine. For this reason, the above taking in method was adopted while taking full advantage of the characteristics of the fish group. Under this system, 80% of the fish school thus driven in may be captured.

Fig. 5 Construction of Medium Type Bait Pen



Netting Vinylon minnow net 5 x 5
Pen frame bamboo (φ 10-14 cm x 3.5 cm)
Specifications of pen (inner diameter 3 m x 6 angles x depth 6 m)
Sinker 3 kg x 6 pieces

Setting method

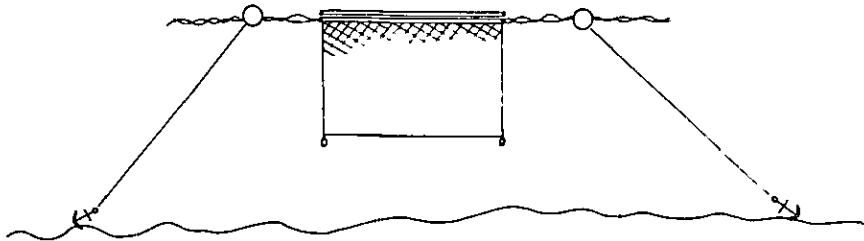
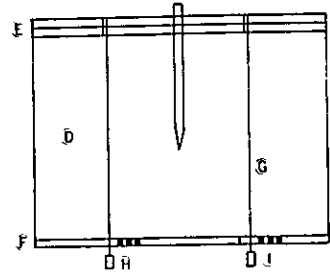
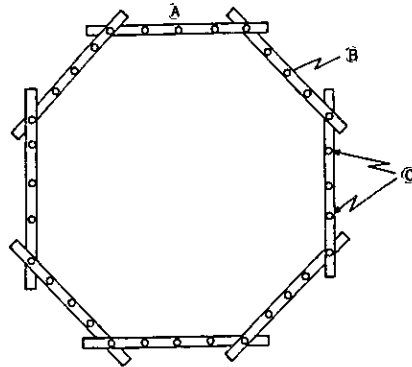


Fig. 6 Construction of Large Type Bait Pen

L 3 m x 8 angles x D 8 m



- A Frame wood
- B Wooden pin ϕ 6 cm x 3.5 m
- C Border net pole ϕ 6 cm x 35 cm
- D Netting
- E Upper border rope
- F Lower border rope
- G Rib line
- H Lead sinker
- I Fixed sinker
- J Float
- K Net tank for dead
- L Anchor
- M Anchor rope

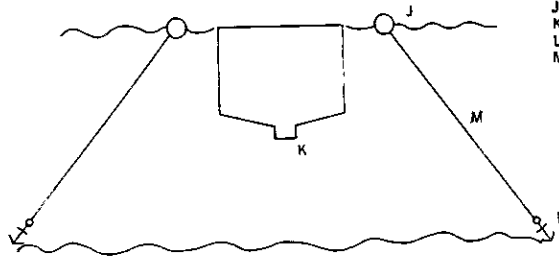
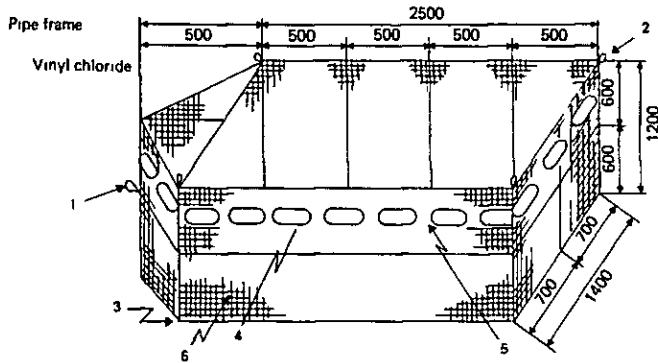


Fig. 7 Construction of Living Net

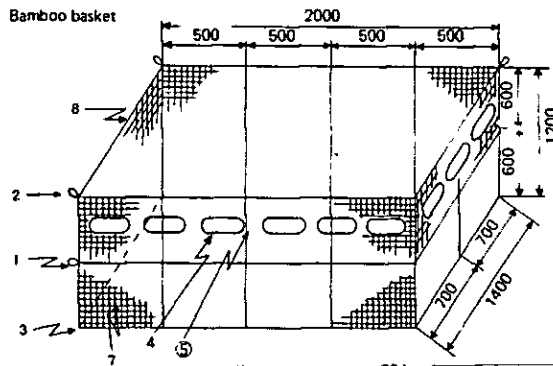
SPECIFICATIONS

(1) Ship shape



- 1 Weight in air 57 kg
- 2 Weight in water 28
- 3 Floats' buoyancy 53
- (3)-(2) Surplus buoyancy 25 kg

(2) Square Shape



- 1 Weight in air 92 kg
- 2 Weight in water 21
- 3 Floats' buoyancy 39
- (3)-(2) Surplus buoyancy 18 kg

Note

A living net of the ship shape, which was simple to use was used at all times. The water flow which was absorbed from the front (convex part) directly produces a bad influence on fishes. Both sides of the convex walls are covered with plywood boards to be slow down the water flow in the net. In this case, the tracking flow became larger because of a rise in towing speed, and there emerged spiral flows behind. In an overall aspect, this phenomenon produced a favorable effect on the migration of fishes. The shielding of the convex part also made it possible to accelerate the towing speed.

No	Name	Remarks
1	Towing hook	
2	Lifting hook	
3	Frames (steel)	External 12 φ Internal 9 φ
4	Floats (G-35)	Ship shape 27 pieces Square shape 20
5	External frame	Vinyl chloride
6	Net	
7	Bamboo (25 mmφ)	
8	Vinyl cover	

Fig. 8 Tracks of Oceanographic Survey

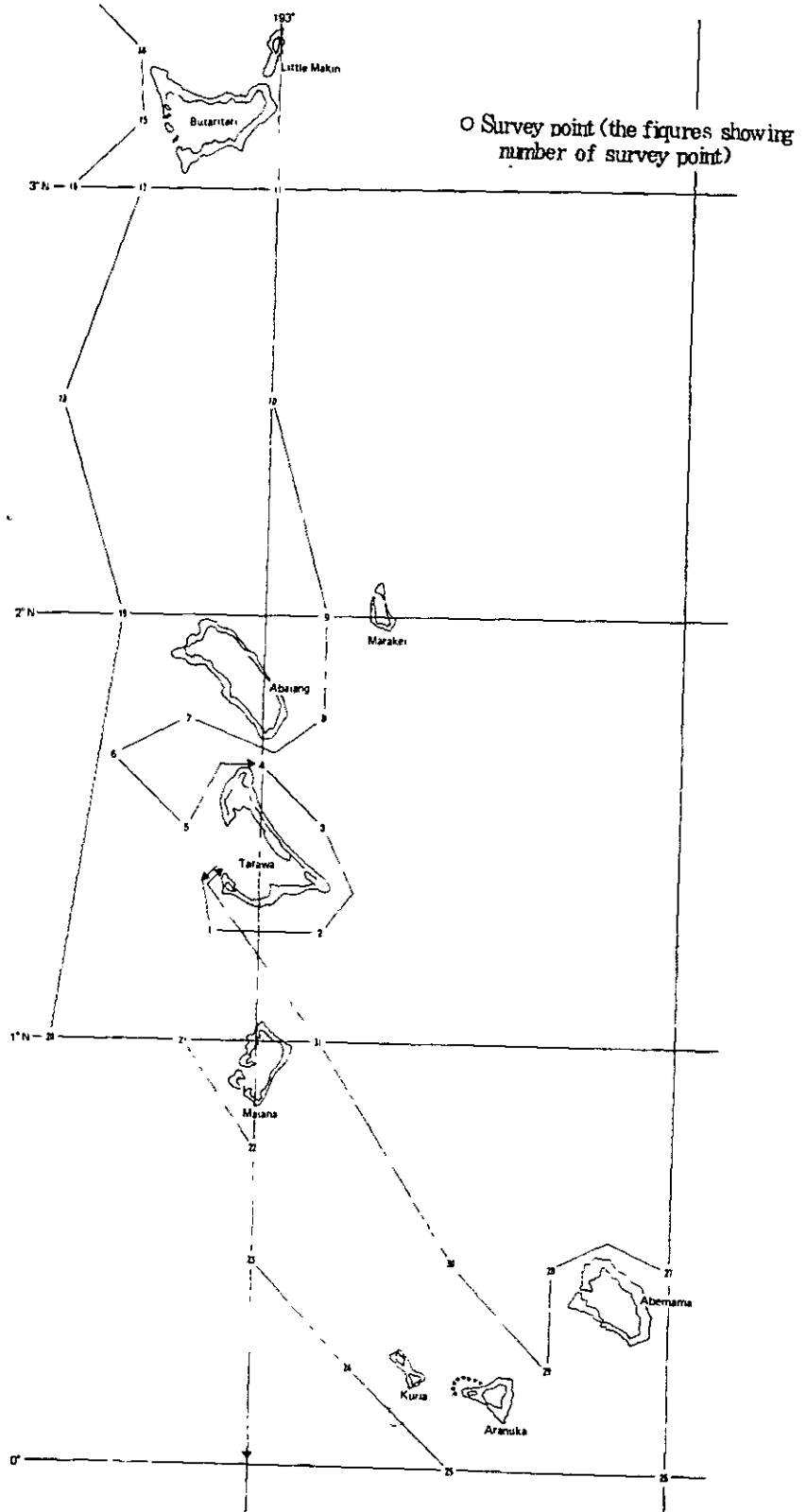
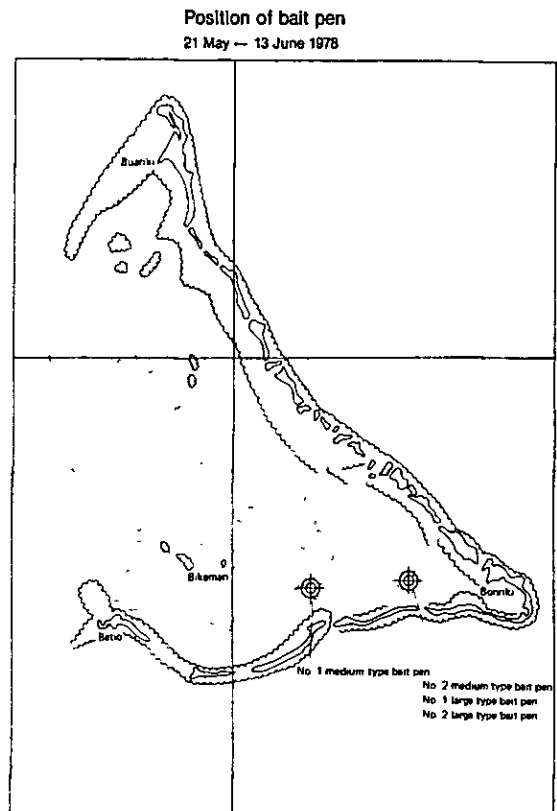
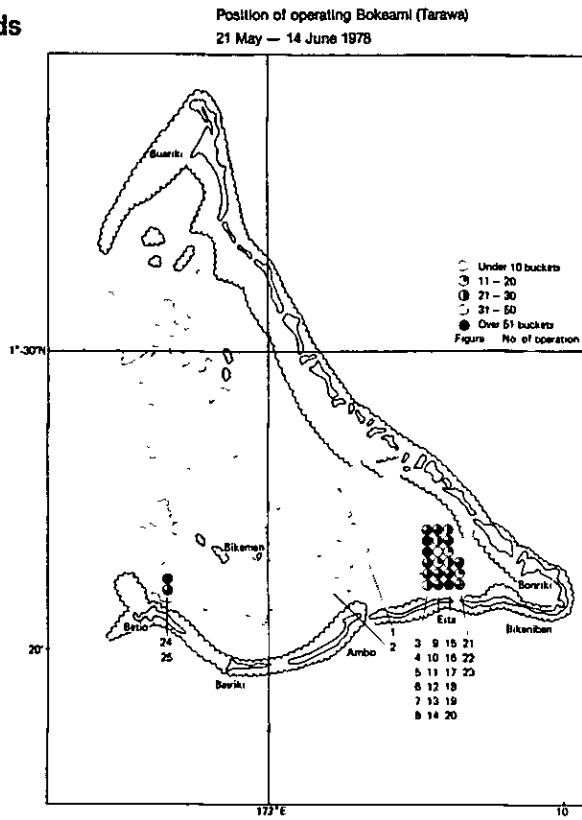
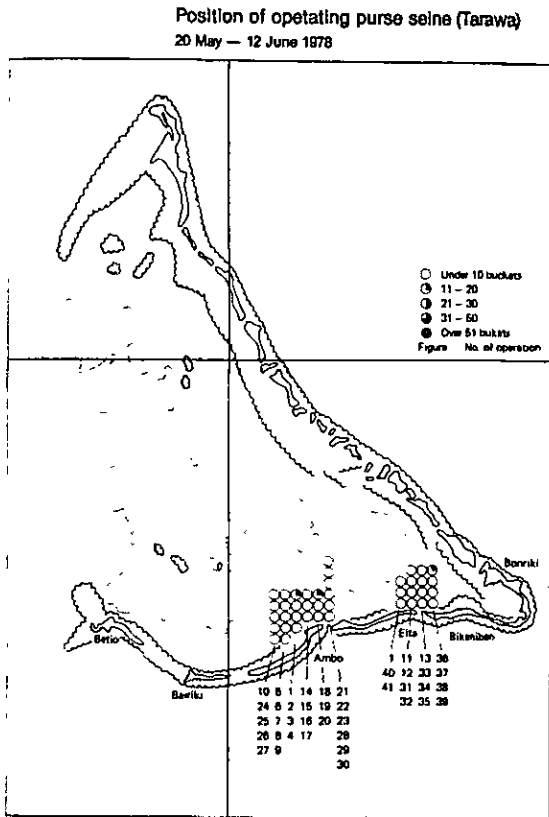
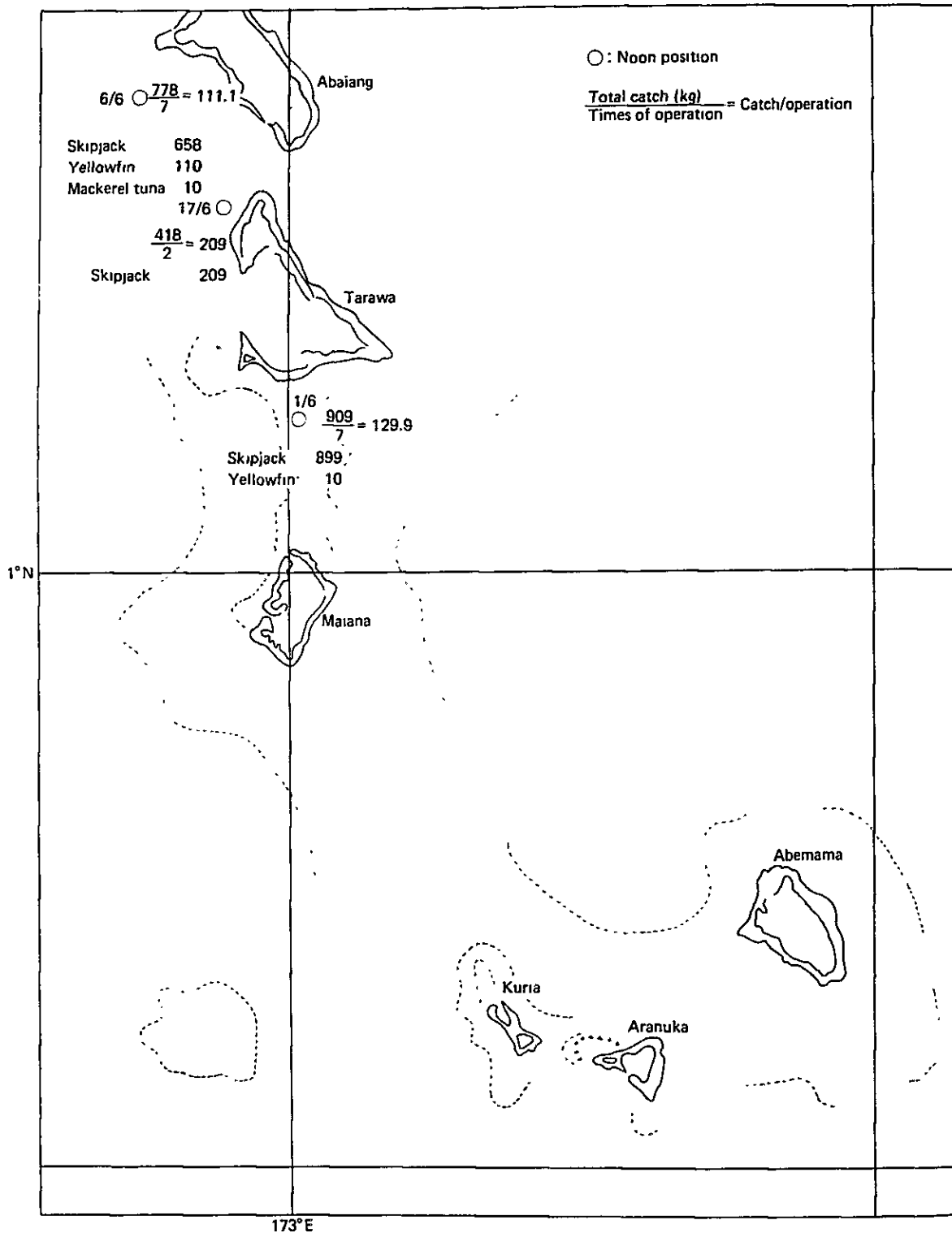


Fig. 9 Tracks by Navigation and Fishing Grounds

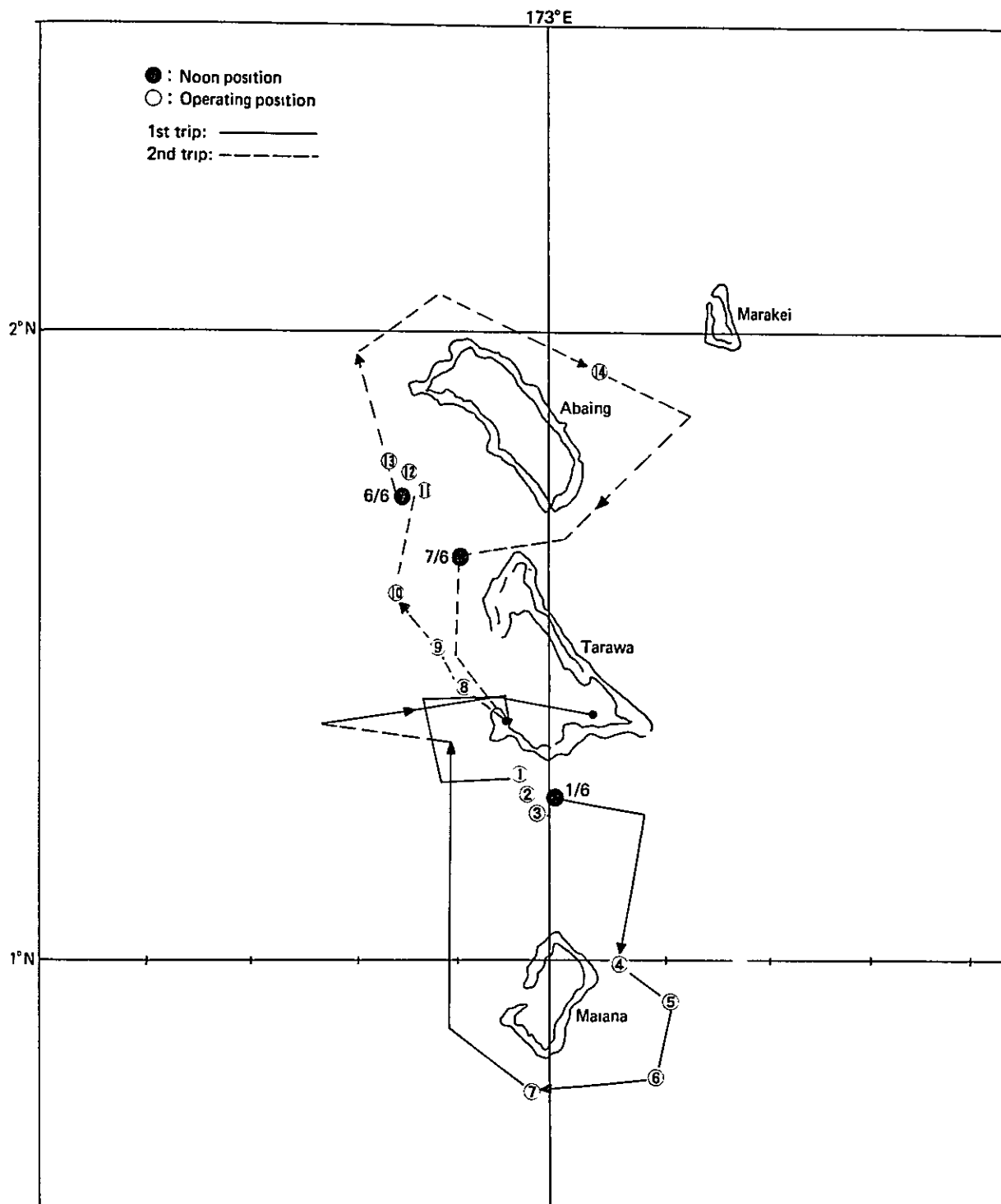
a) 1st and 2nd Trip



Daily catch
1st trip (Maiana)
2nd trip (Abaiang)

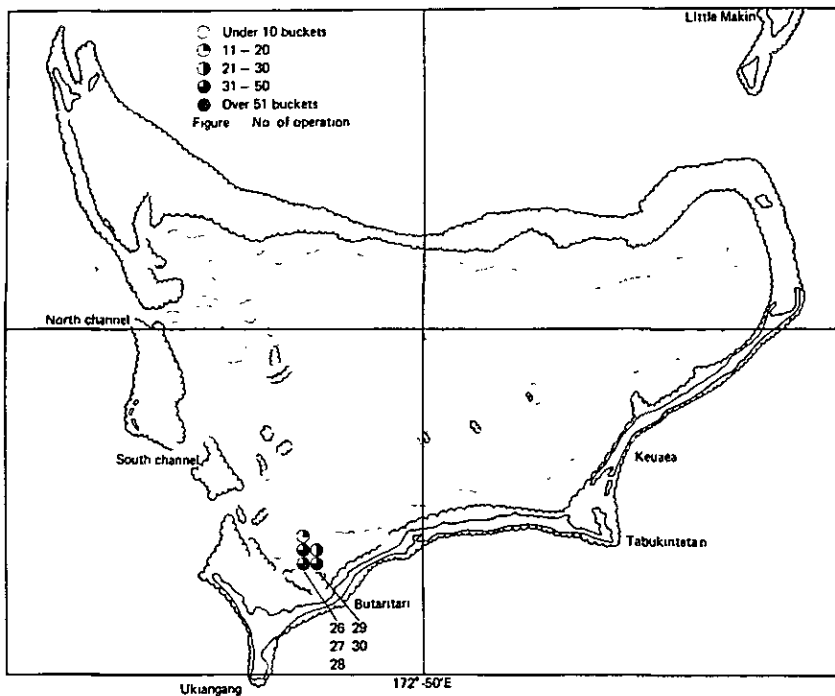


1st trip 1 June — 2 June
 2nd trip 6 June — 7 June

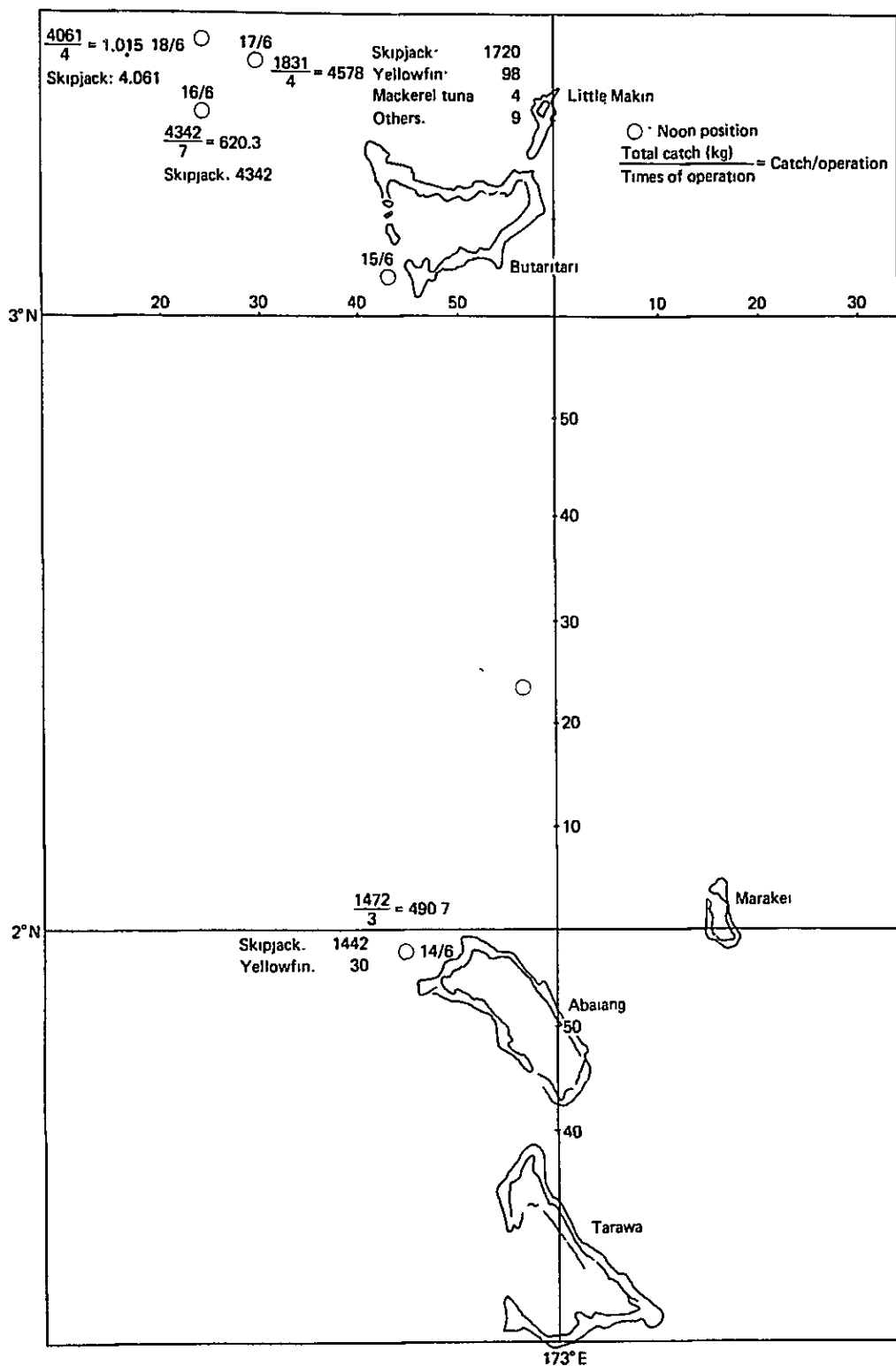


b) 3rd Trip

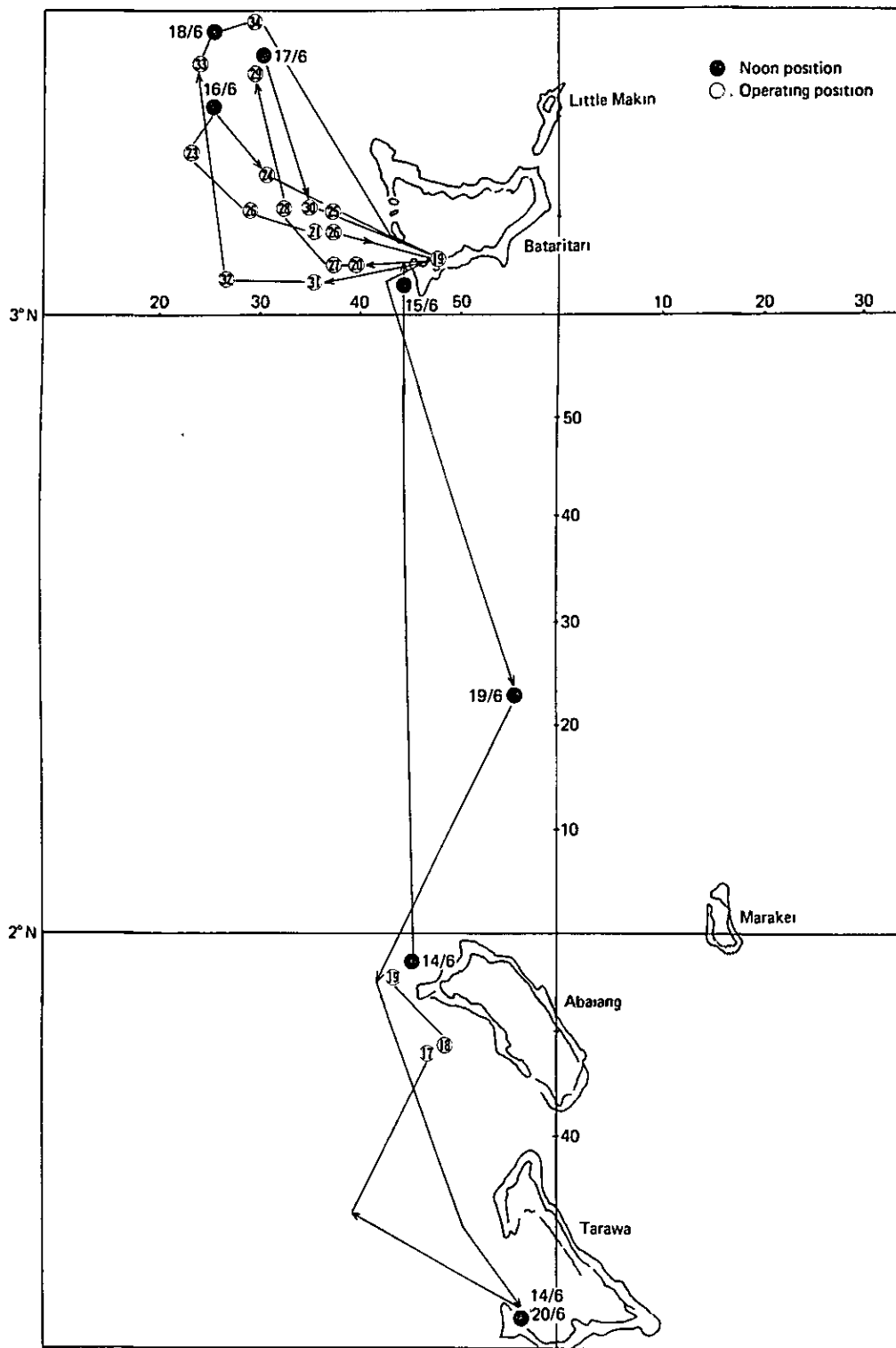
Position of operating Bokeami (Butaritari)
15 June -- 18 June 1978



Daily catch (Butaritari)

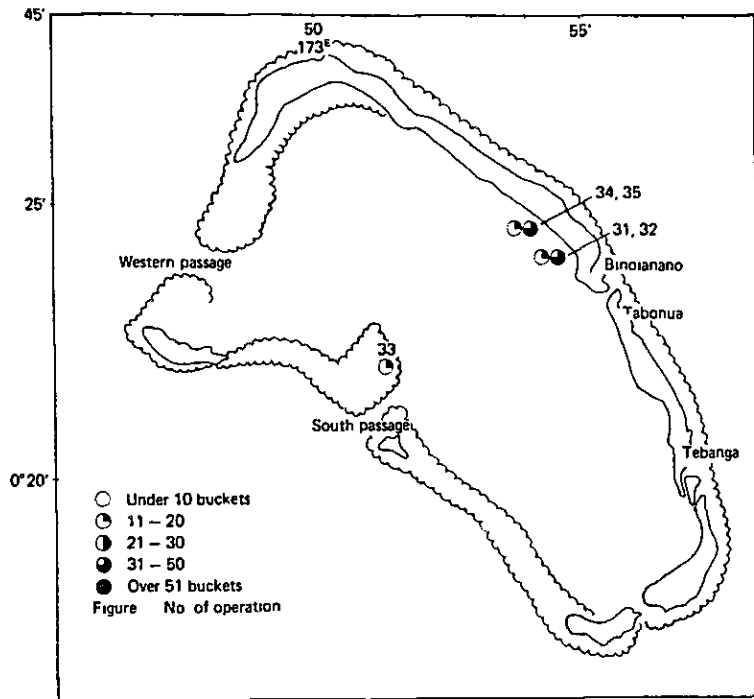


3rd Trip
14 June — 19 June 1978

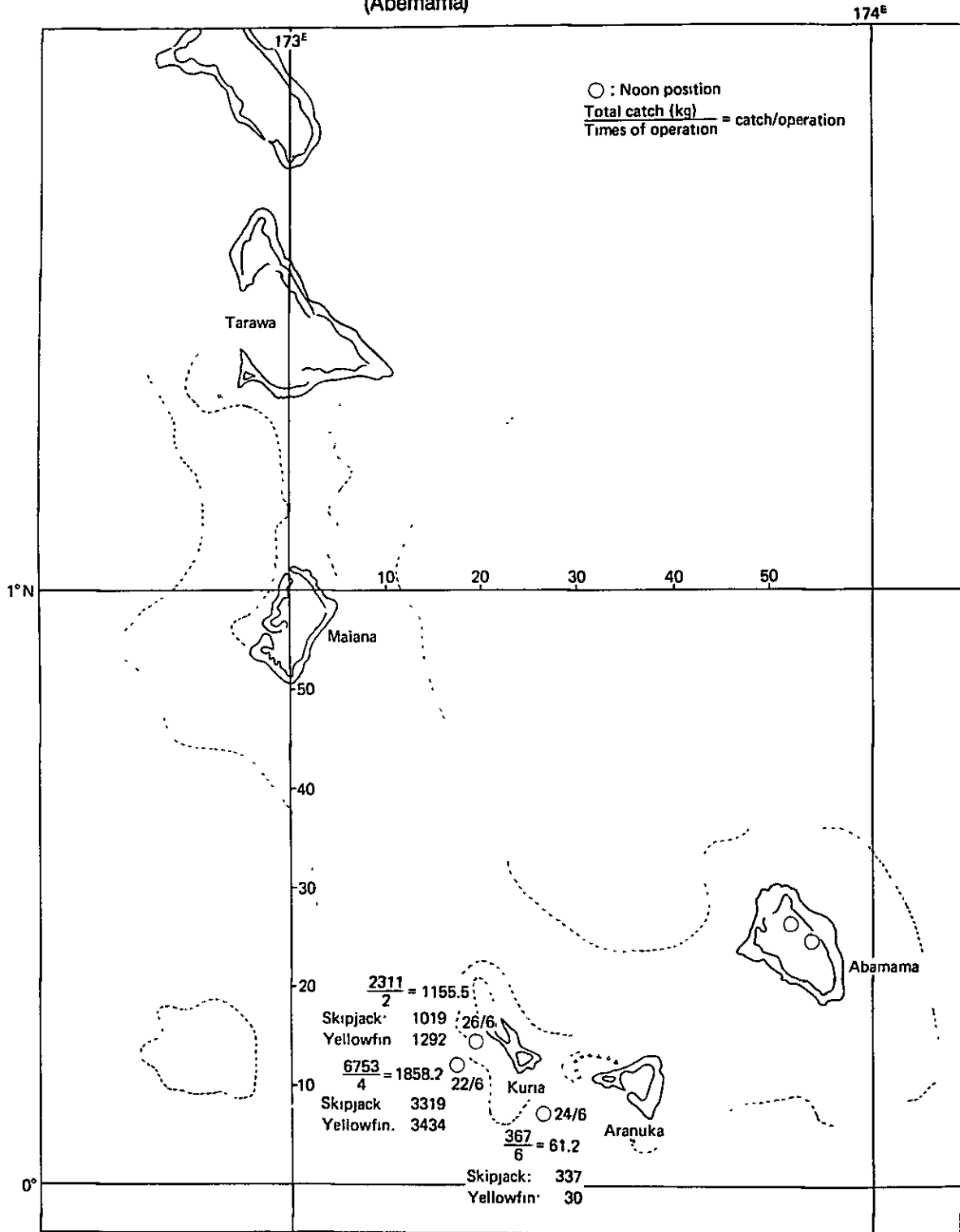


c) 4th Trip

**Position of operating Bokeami (Abemama)
21 June — 27 June 1978**

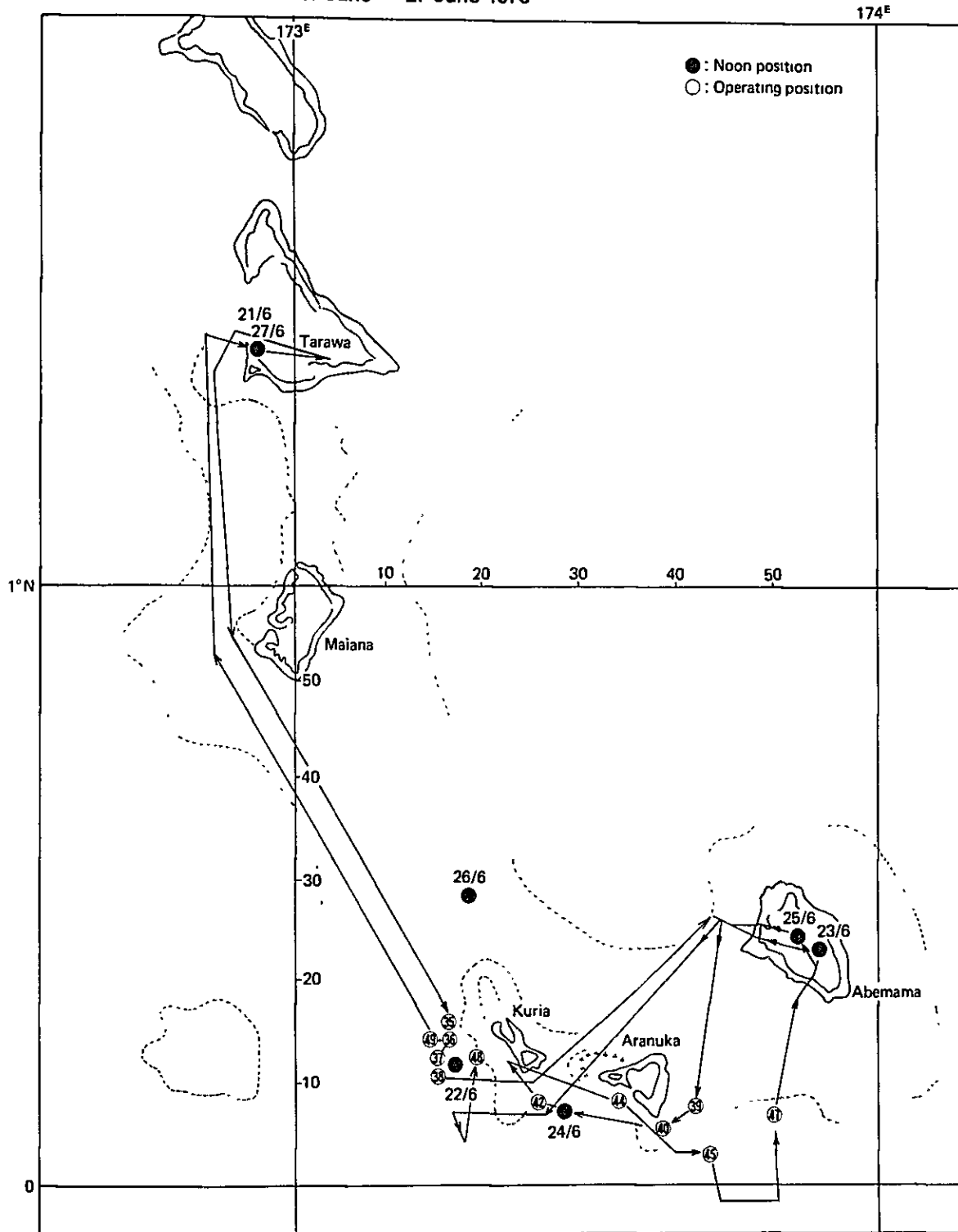


Daily catch 4th trip (Abermama)



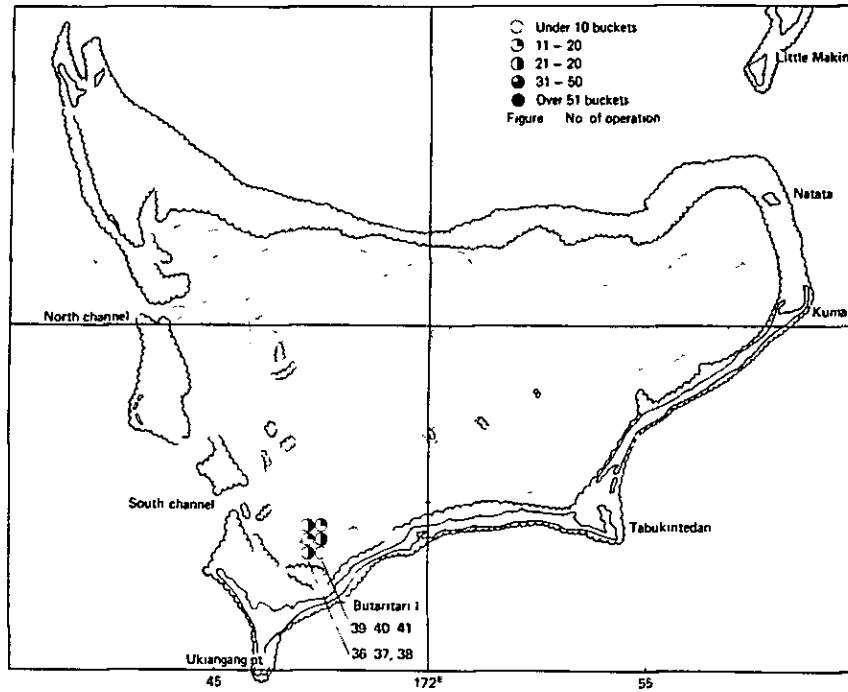
4th Trip

21 June — 27 June 1978

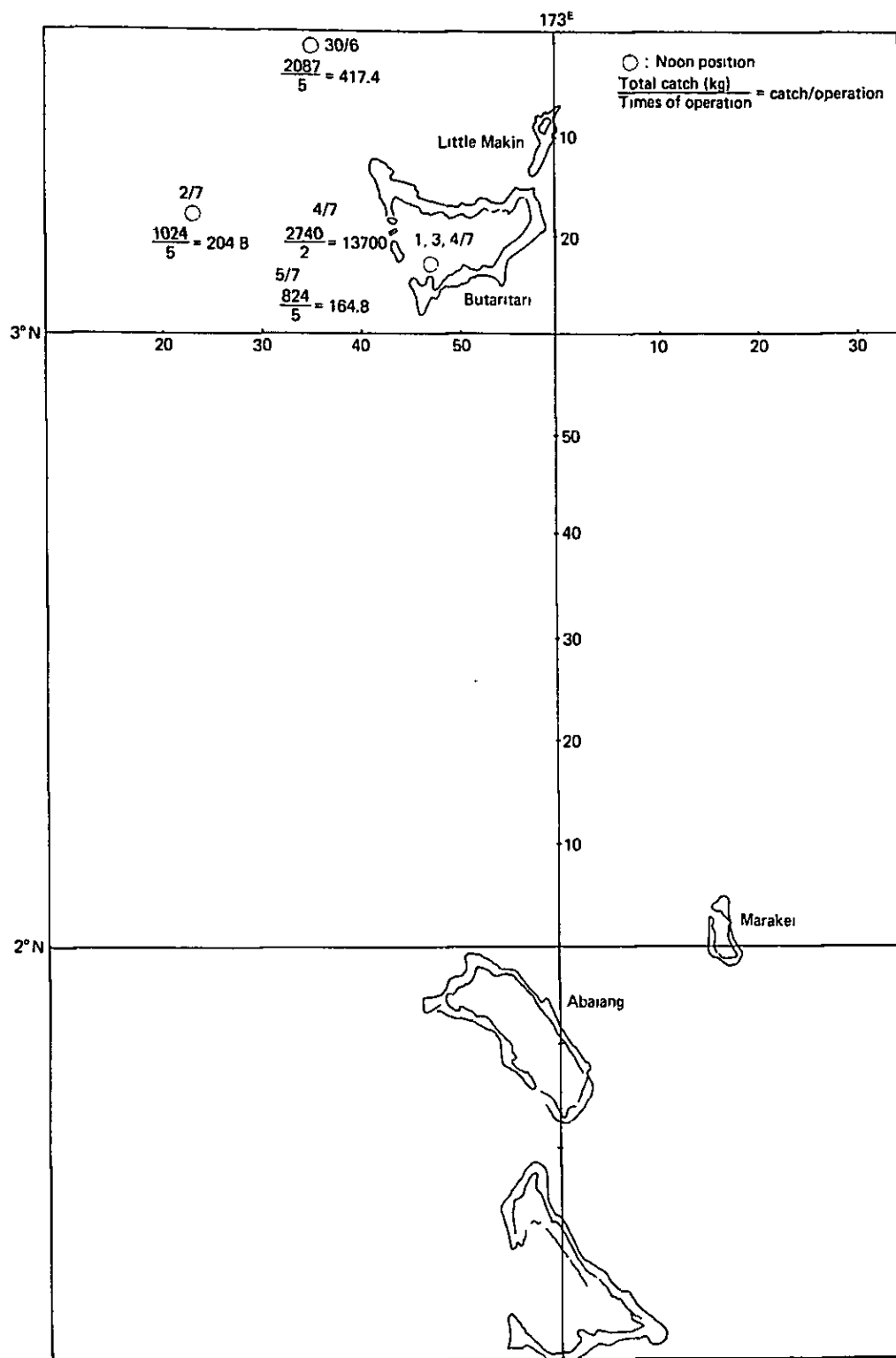


d) 5th Trip

Position of operating Bokeami (Butaritari)
29 June — 6 July 1978

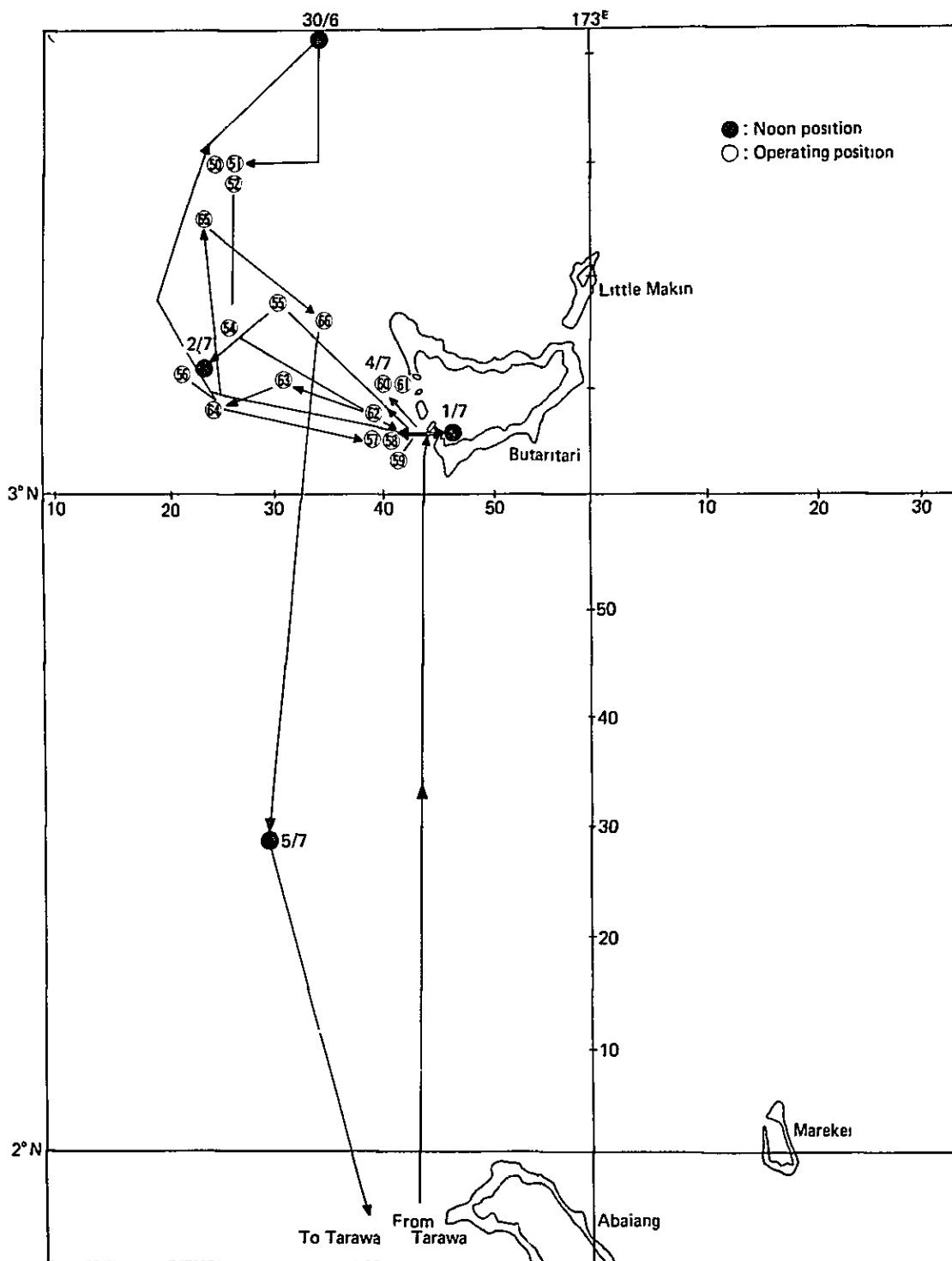


Daily Catch (Butaritari)



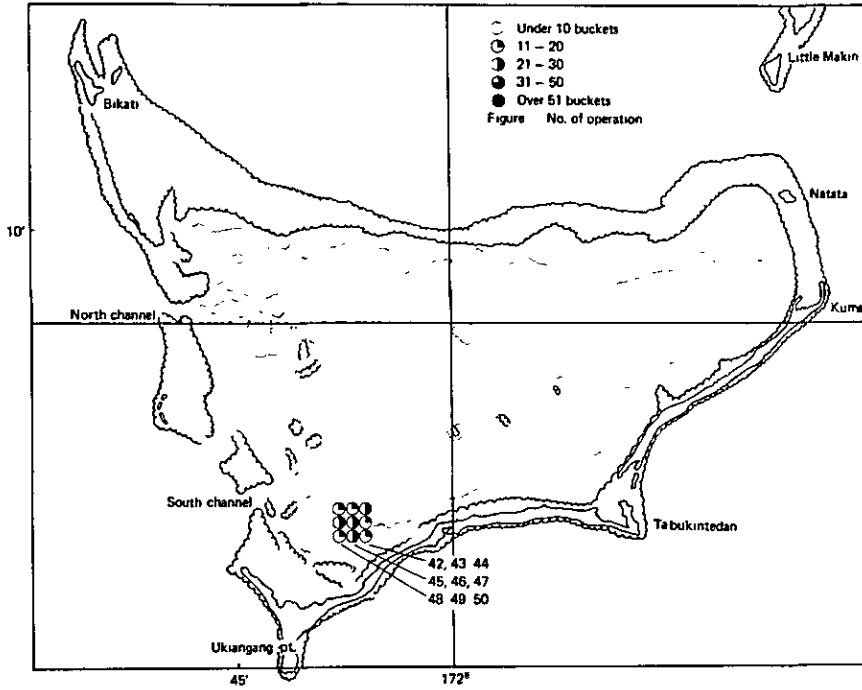
5th trip

29 June — 6 July 1978

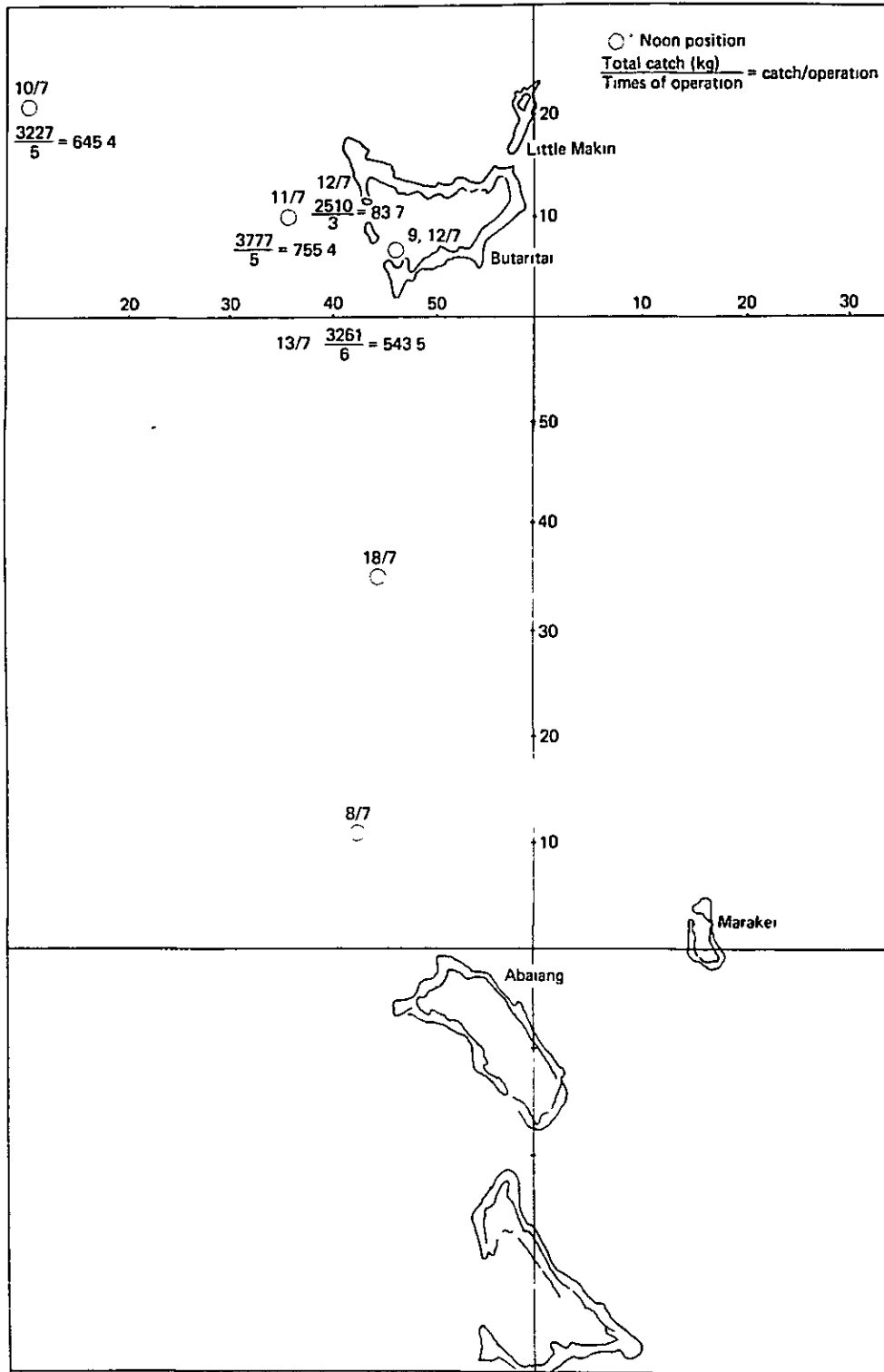


e) 6th Trip

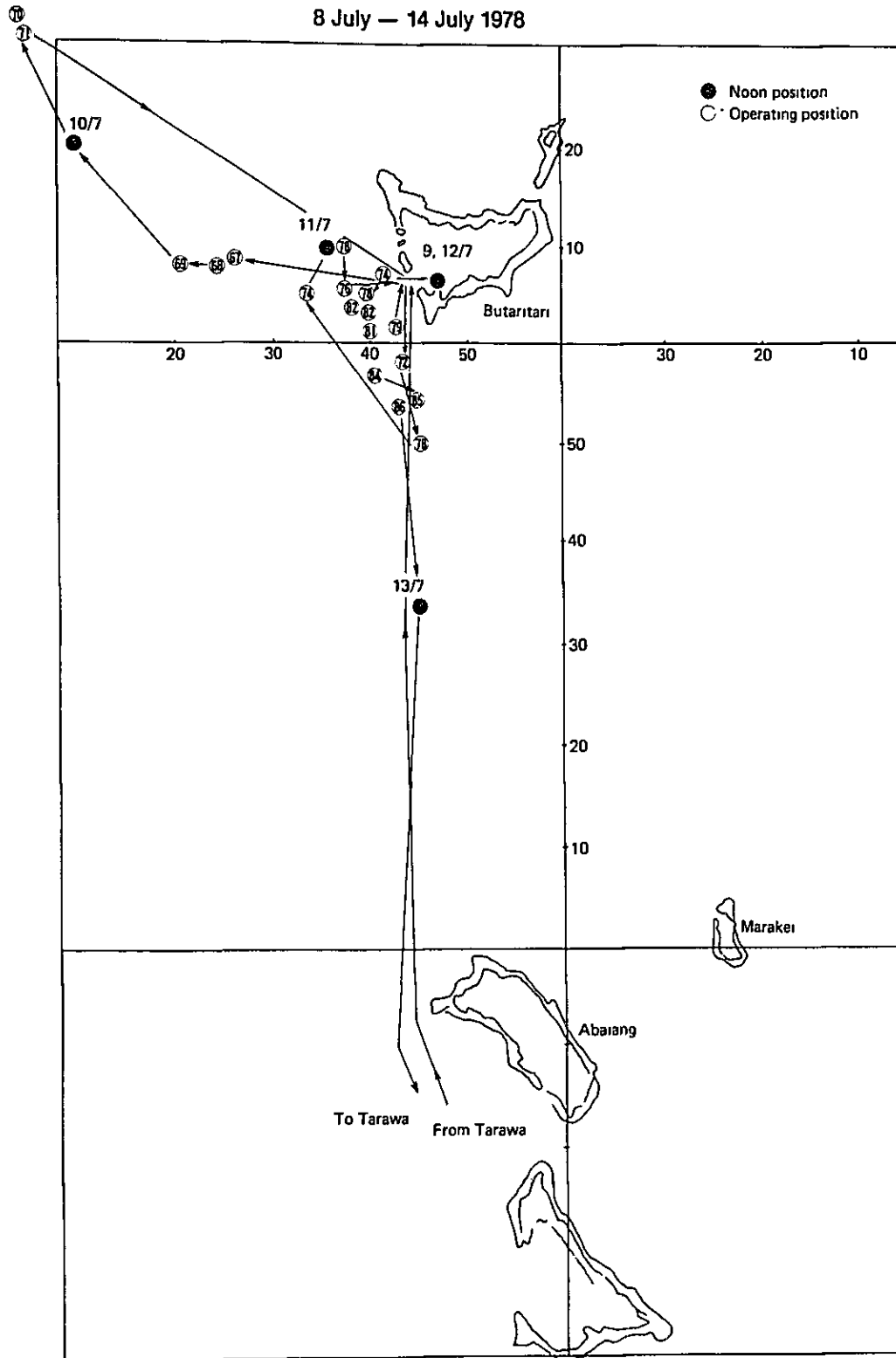
position of operating Bokeami (Butaritari)
8 July — 14 July 1978



Daily catch (Butaritari)

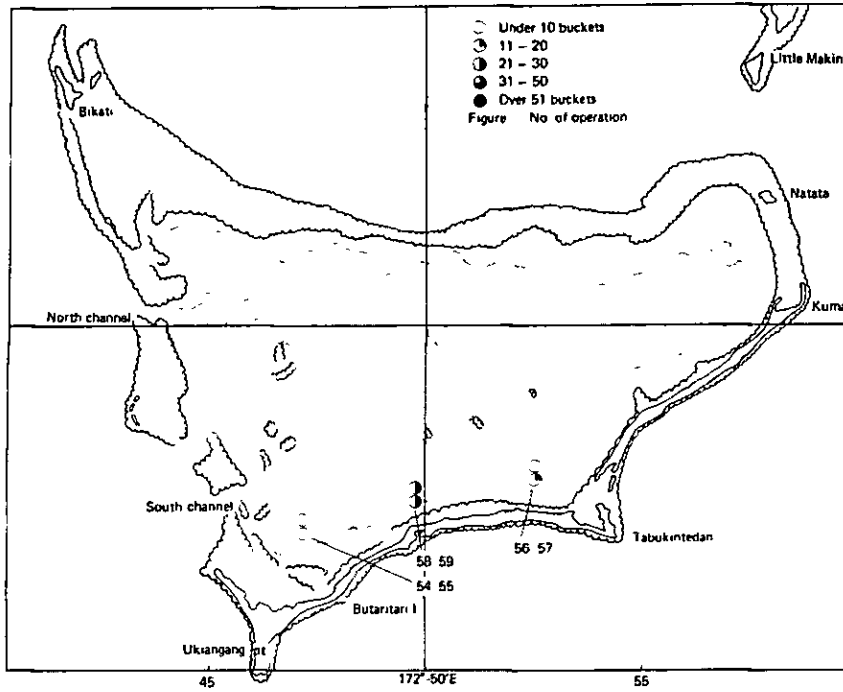


6th Trip
8 July — 14 July 1978

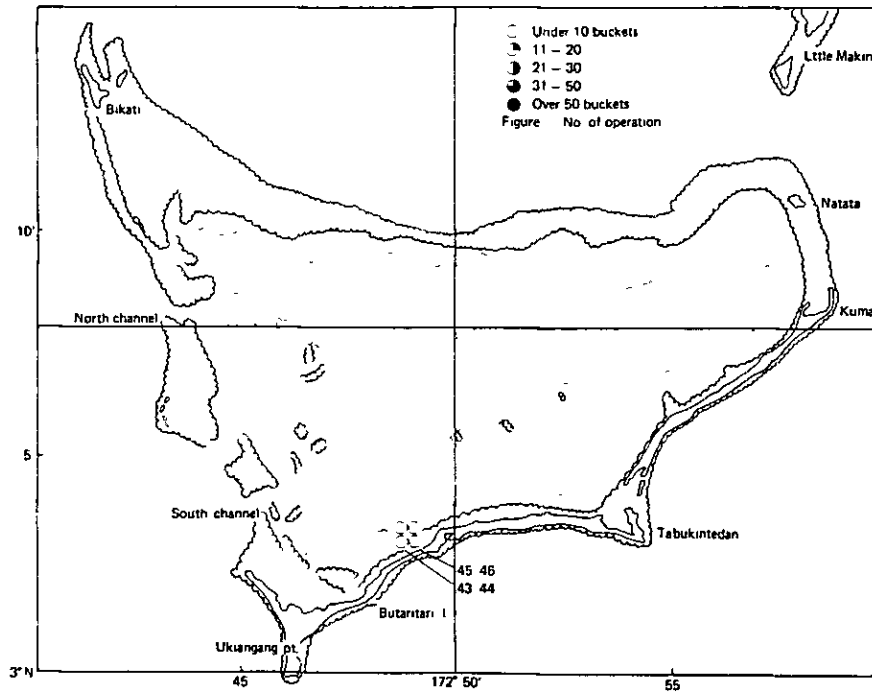


f) 7th Trip

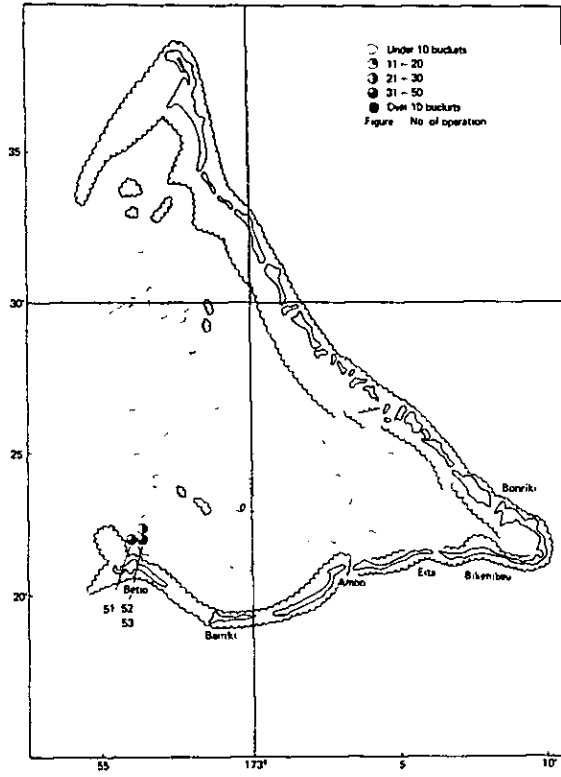
Position of operating Bokeami (Butaritari)
16 July — 24 July 1978



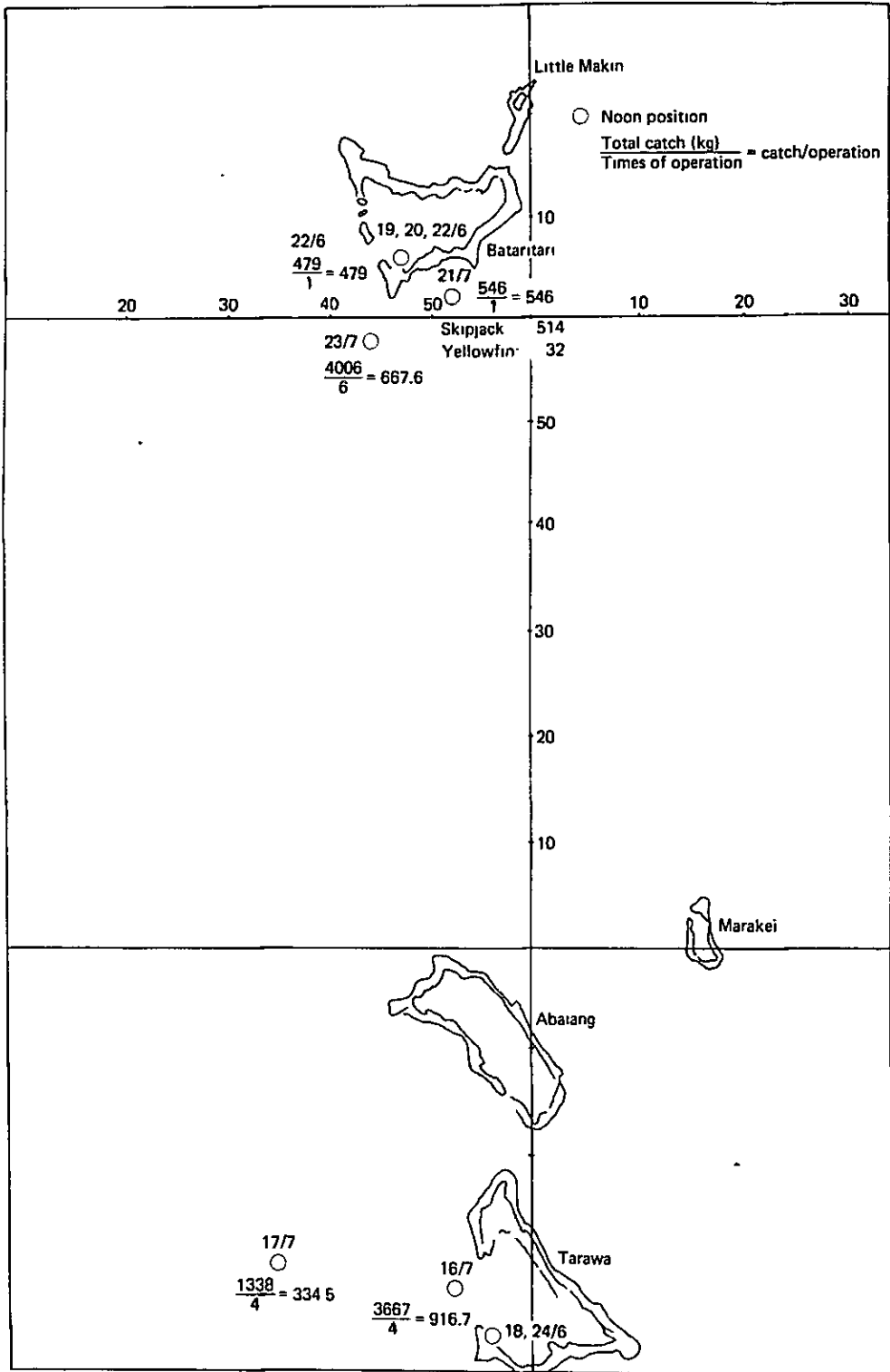
Position of operating purse seine (Butaritari)



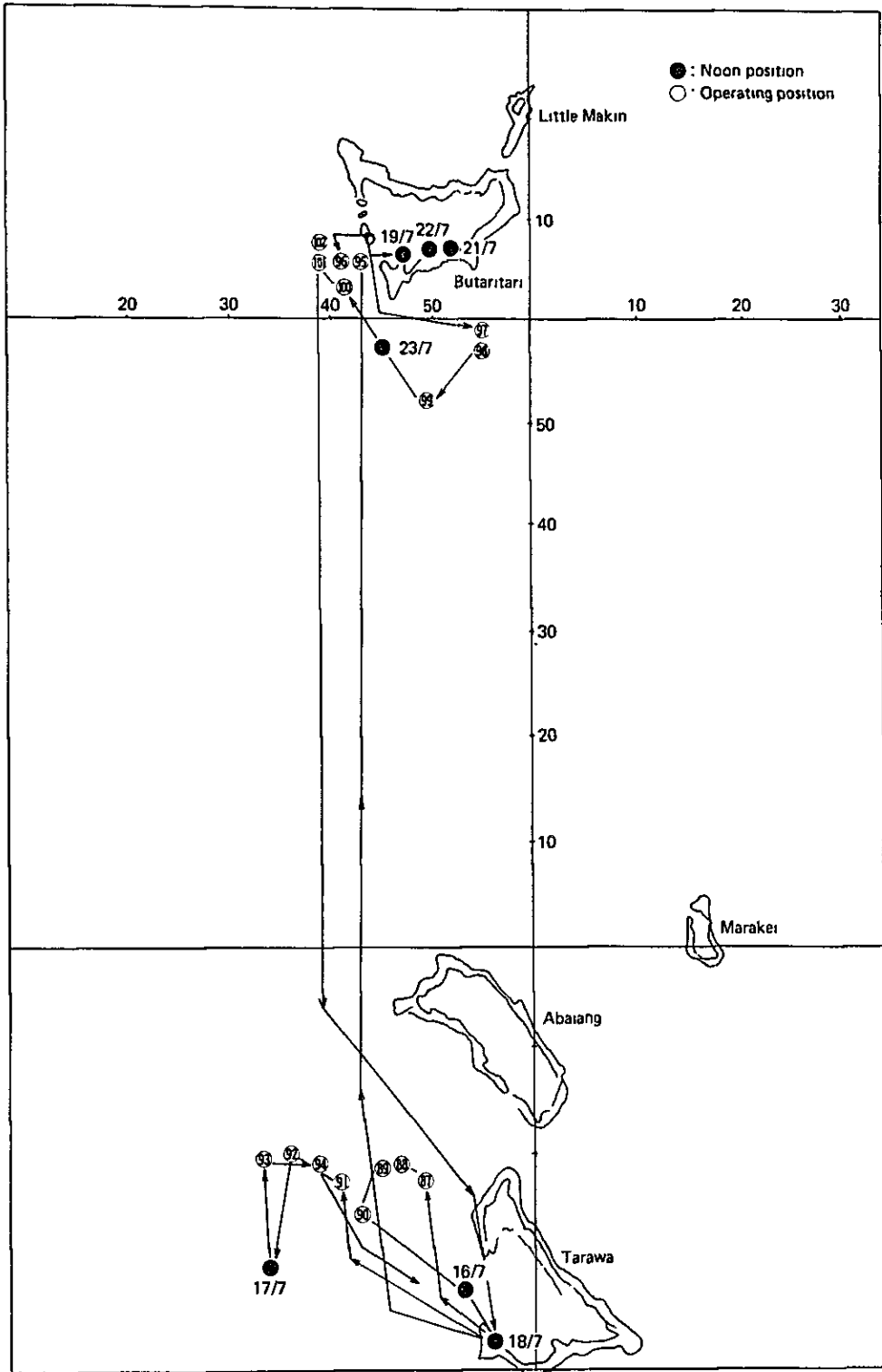
Position of operating purse seine (Tarawa)



Daily catch
(Tarawa and Butaritari)

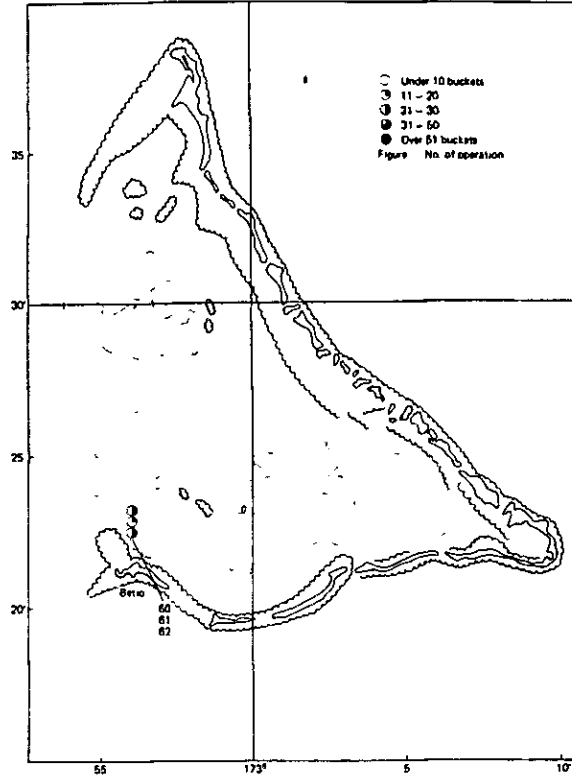


7th Trip
 16 July — 24 July 1978

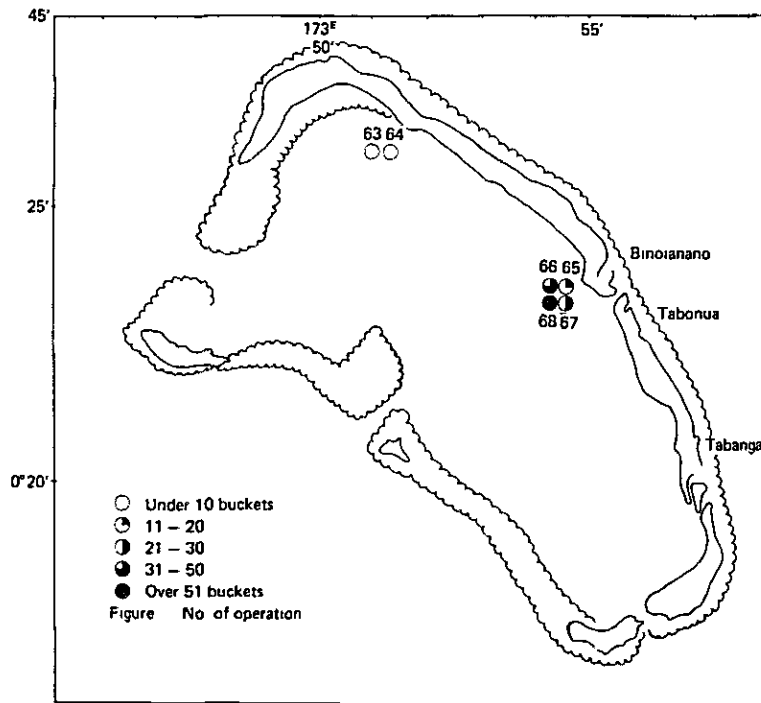


g) 8th Trip

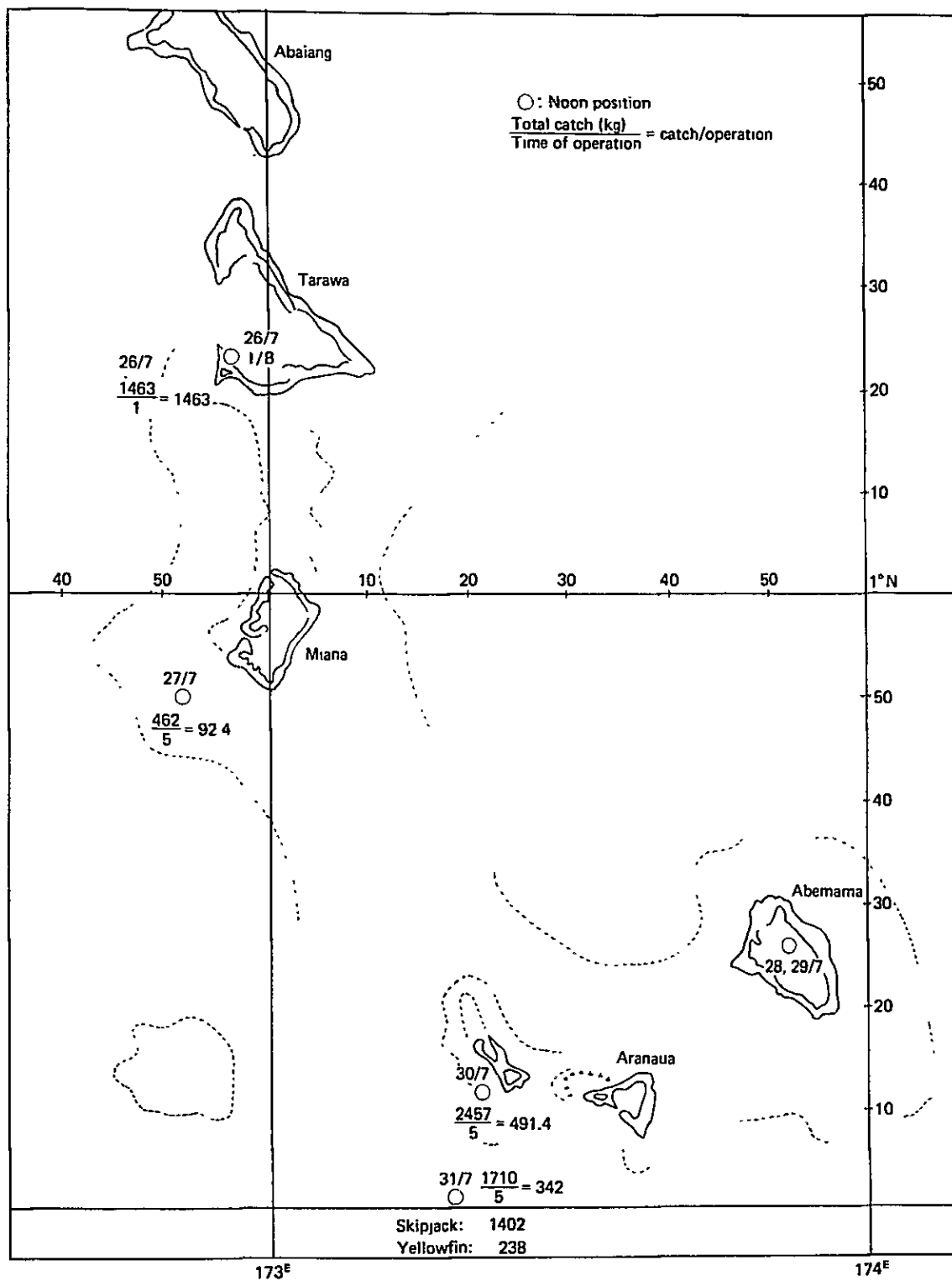
position of operating Bokeami (Tarawa)
26 July — 4 August 1978



Position of operating Bokeami (Abemama)

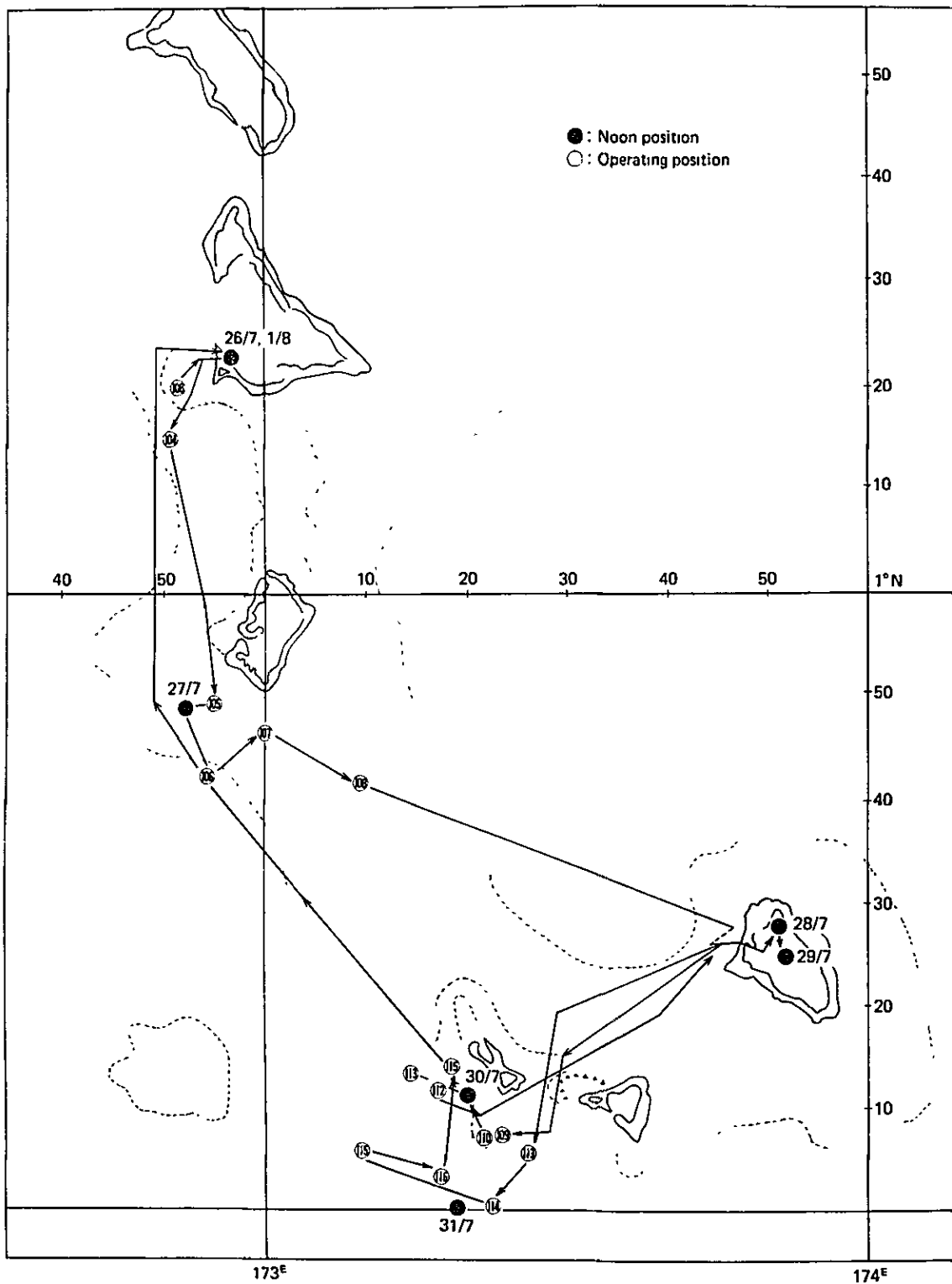


Daily catch (Tarawa, Maiana, Abemama)



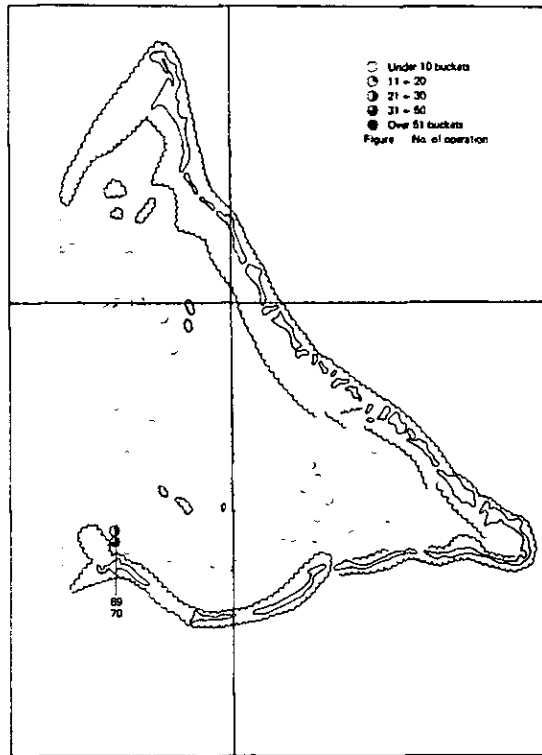
8th Trip

26 July — 1 August 1978

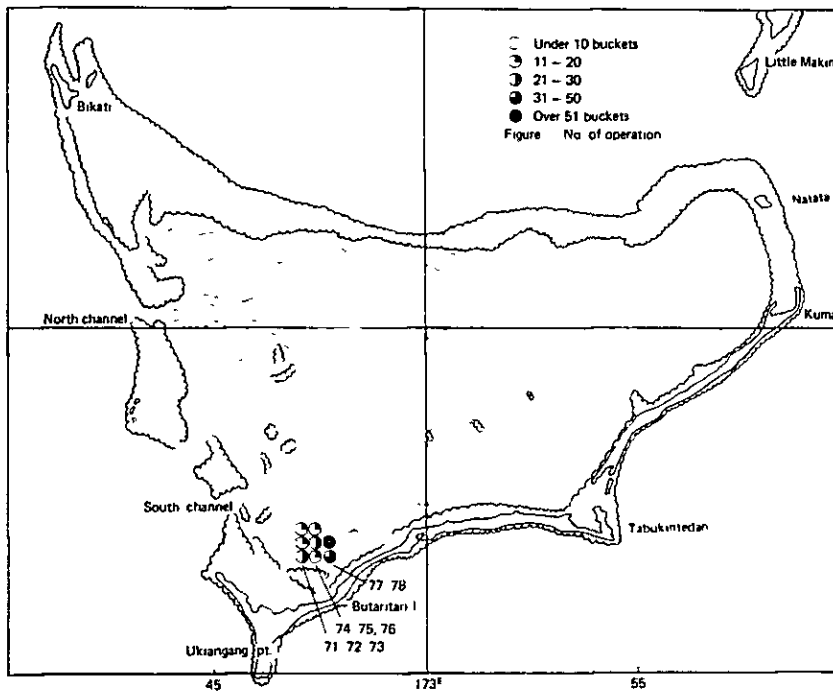


h) 9th Trip

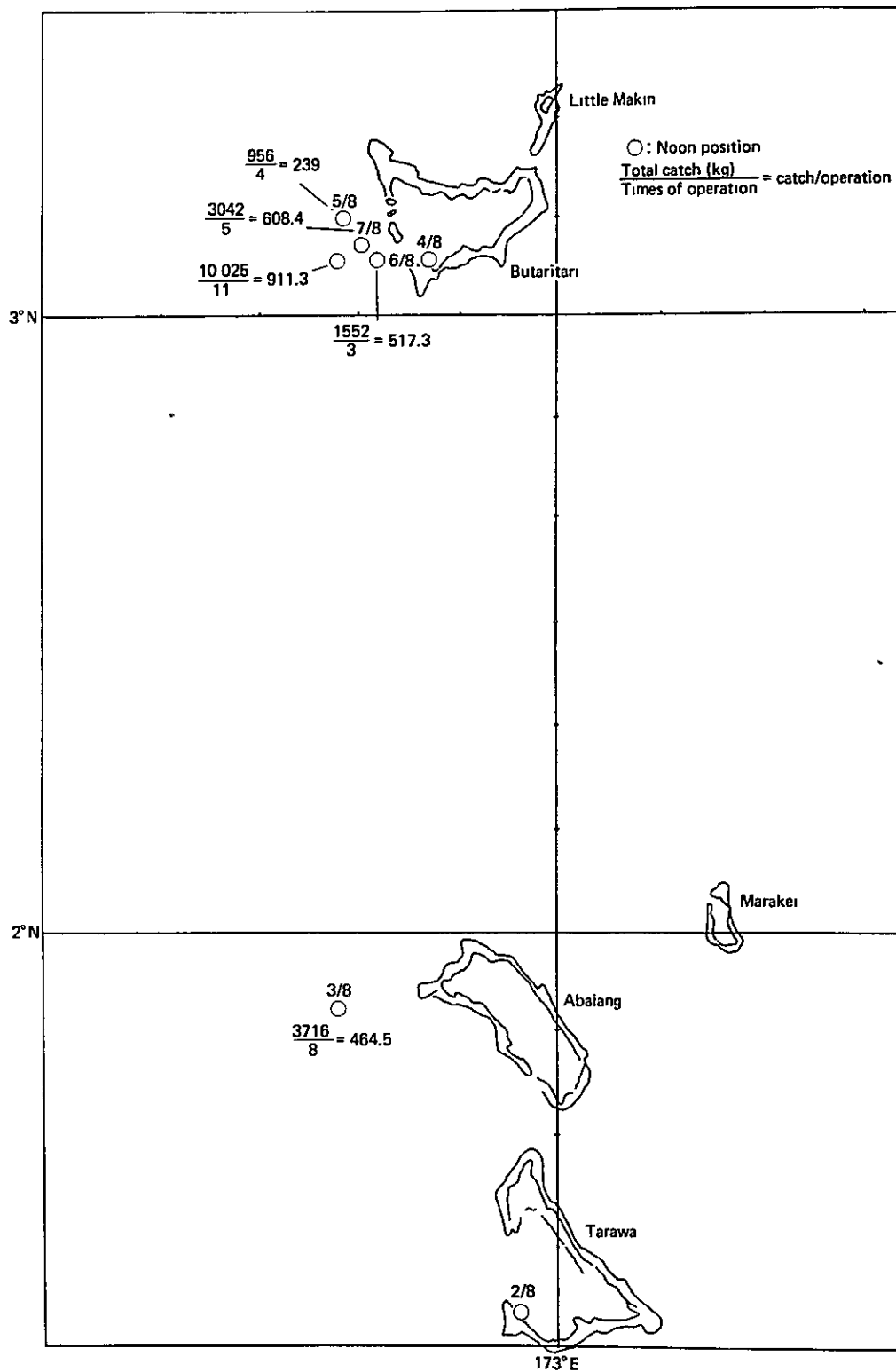
Position of operating Bokesami (Tarawa)
3 August — 9 August 1978



Position of operating Bokeami (Butaritari)
3 August — 9 August 1978

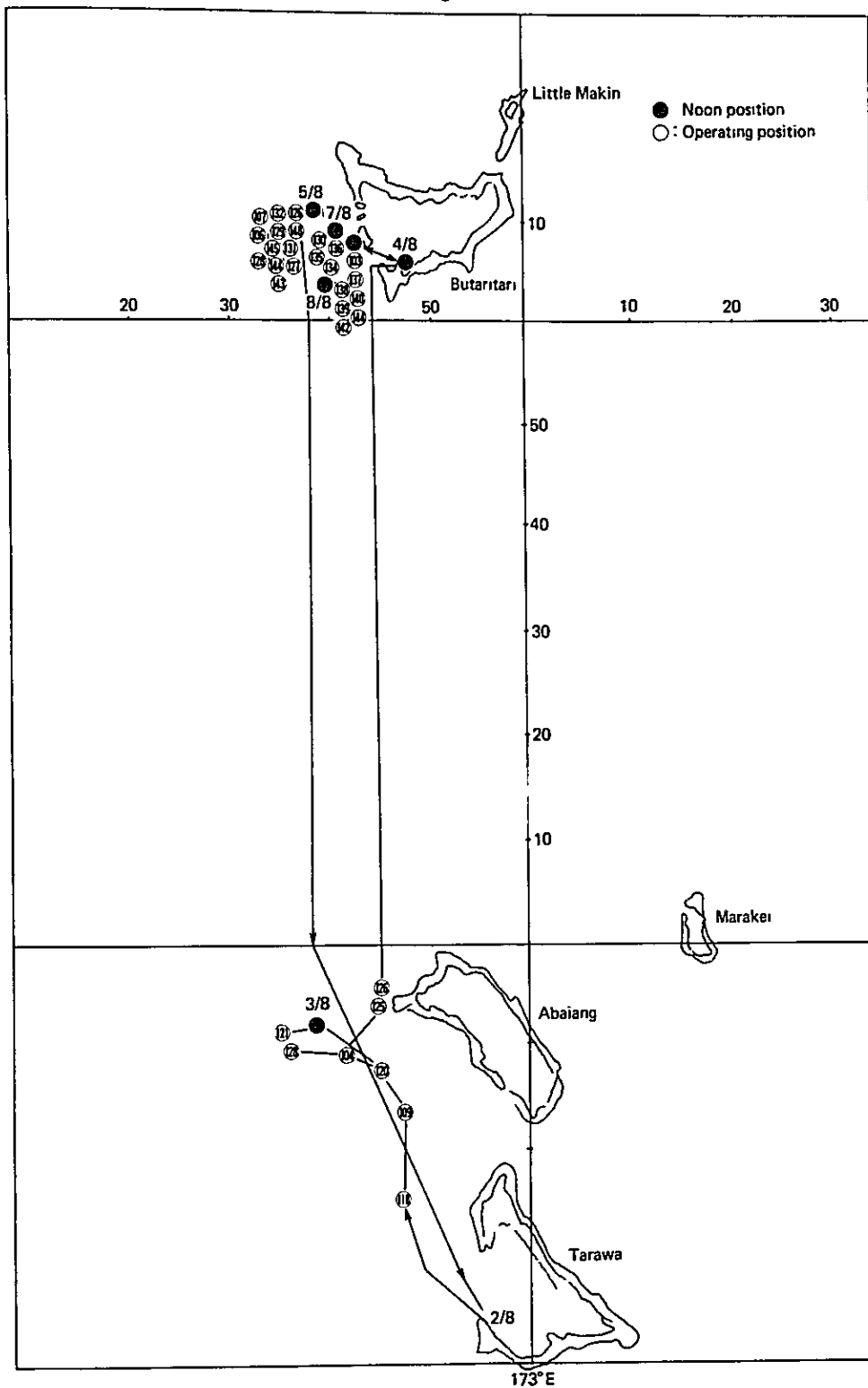


Daily catch (Tarawa, Abalang, Butaritari)



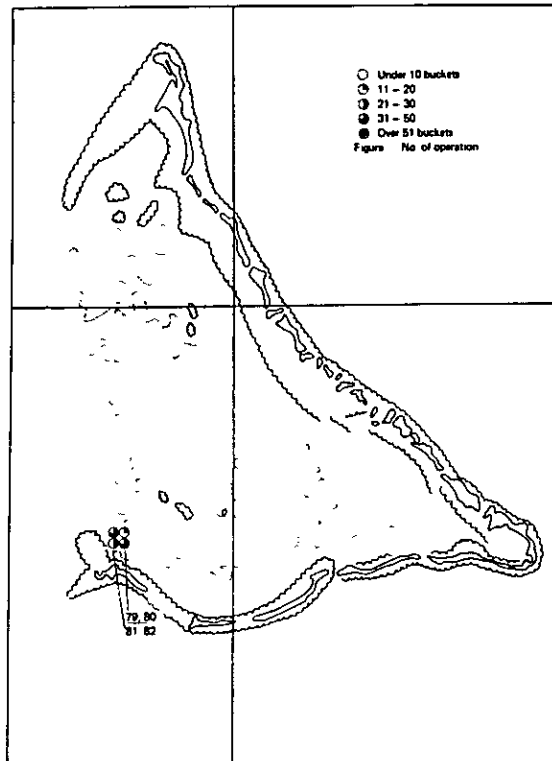
9th Trip

2 August — 9 August 1978

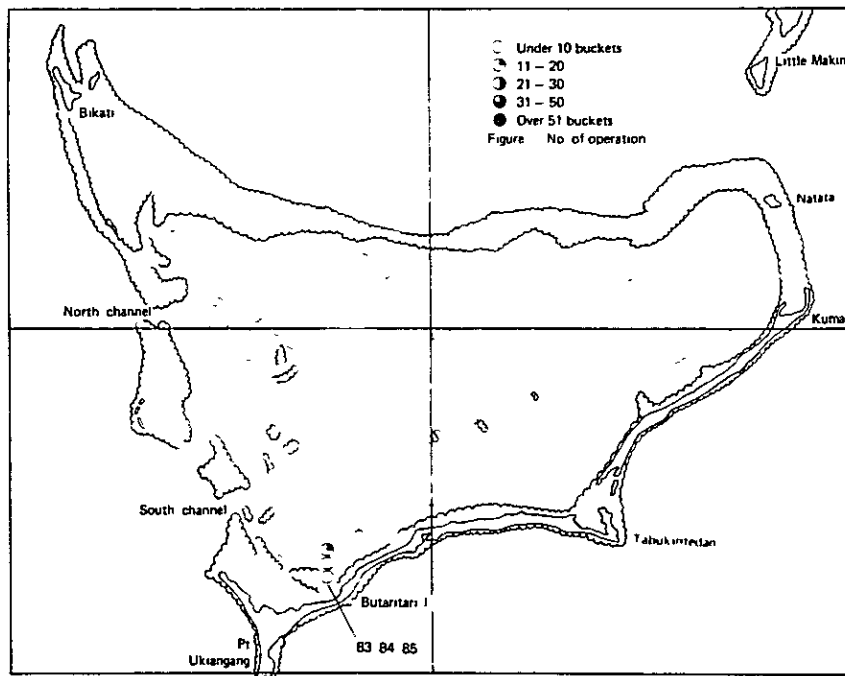


i) 10th Trip

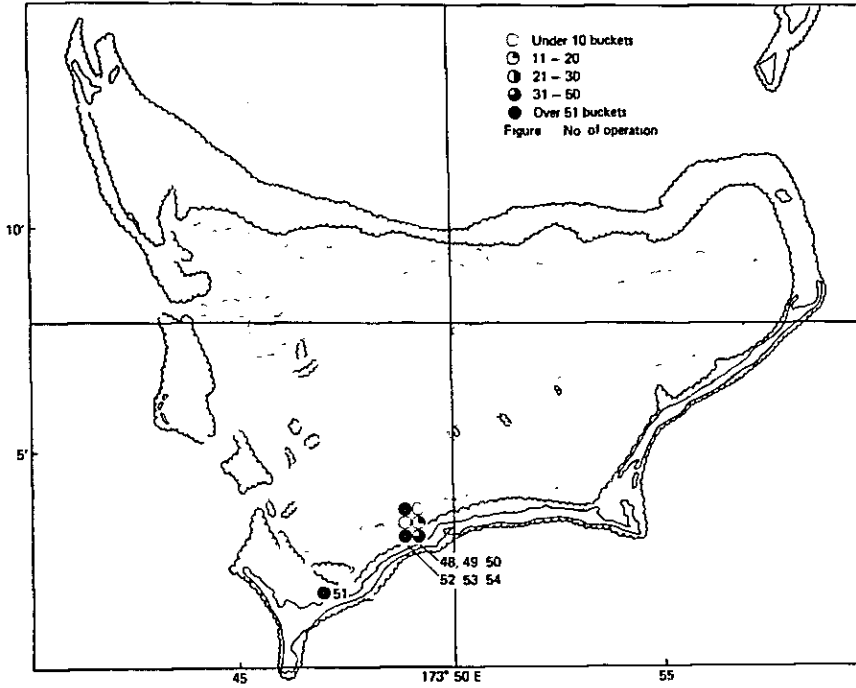
Position of operating Bokeami (Tarawa)
14 August -- 21 August 1978



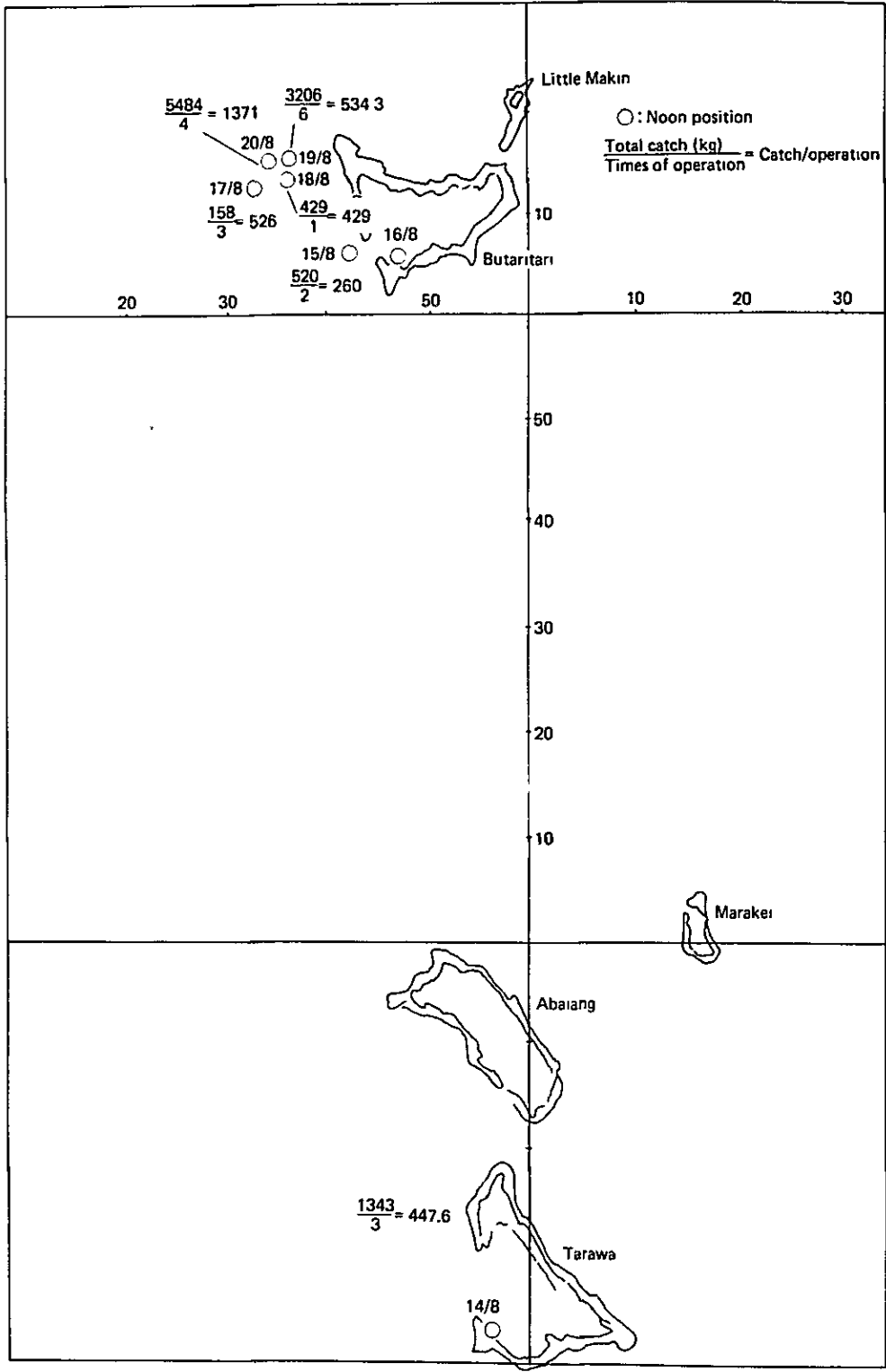
Position of operating Bokeami (Butaritari)



Position of operating Bokeami (Butaritari)

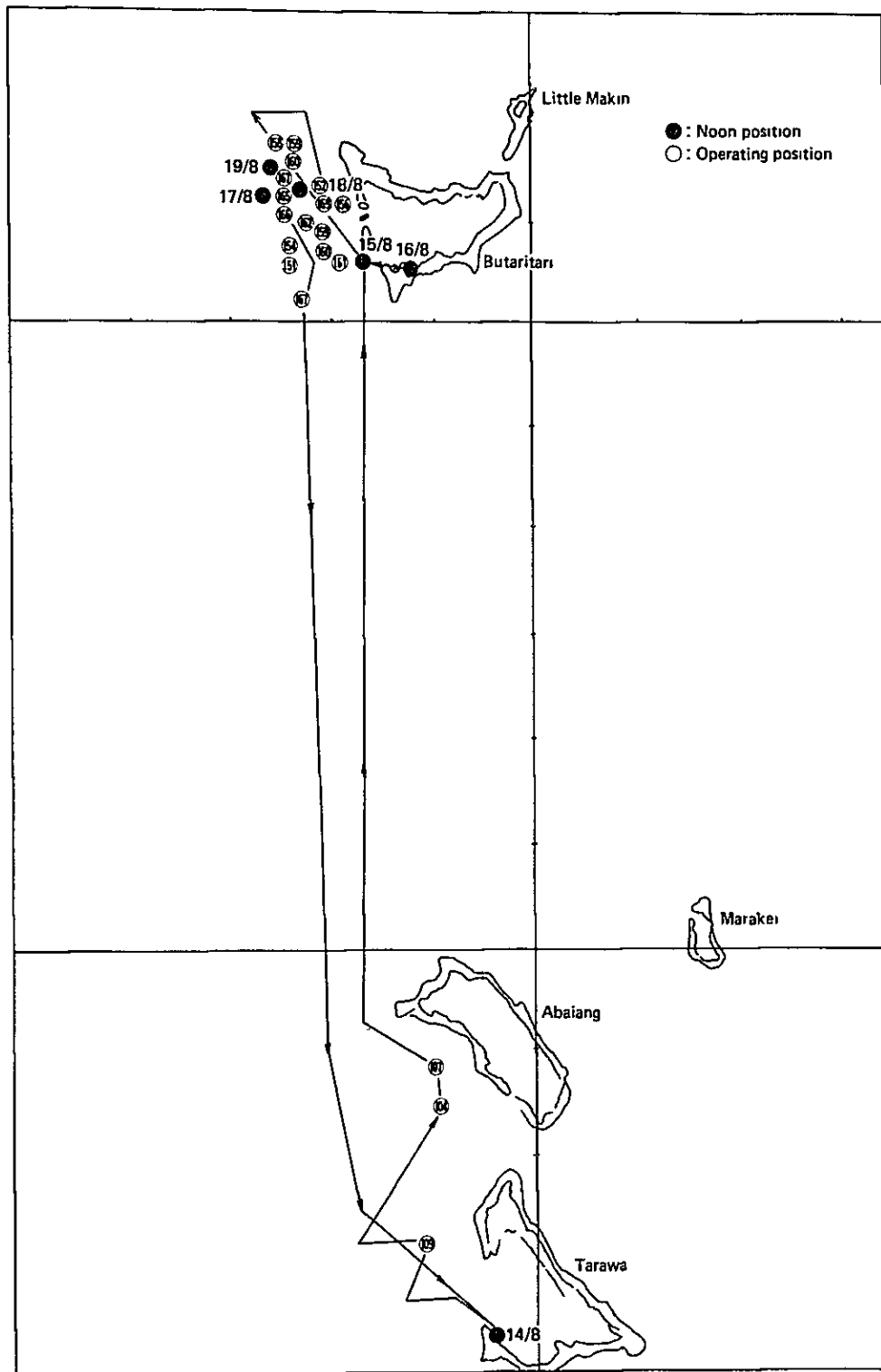


Daily catch (Tarawa, Abaiang, Butaritari)



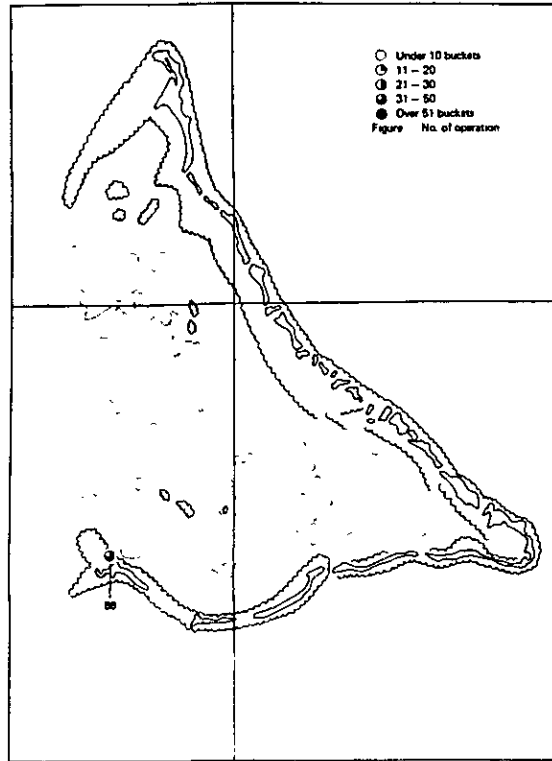
10th Trip

14 August — 21 August 1978

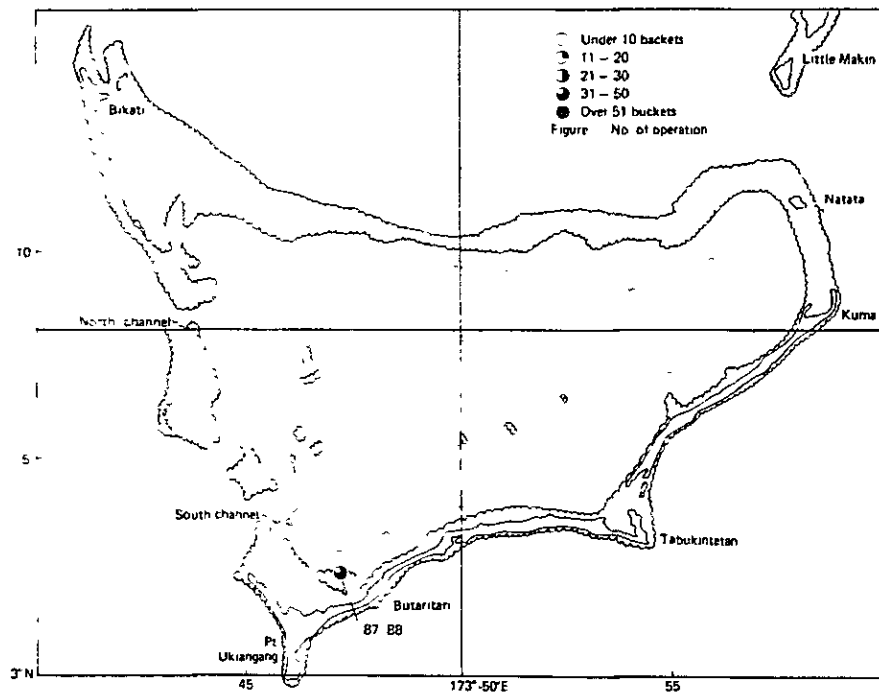


j) 11th Trip

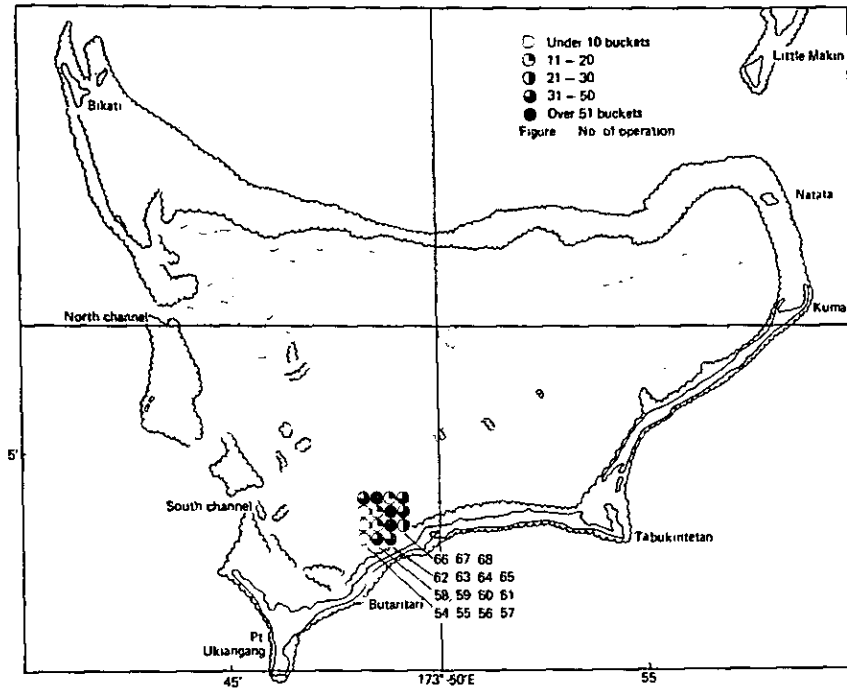
Position of operating Bokeami
23 August — 30 August



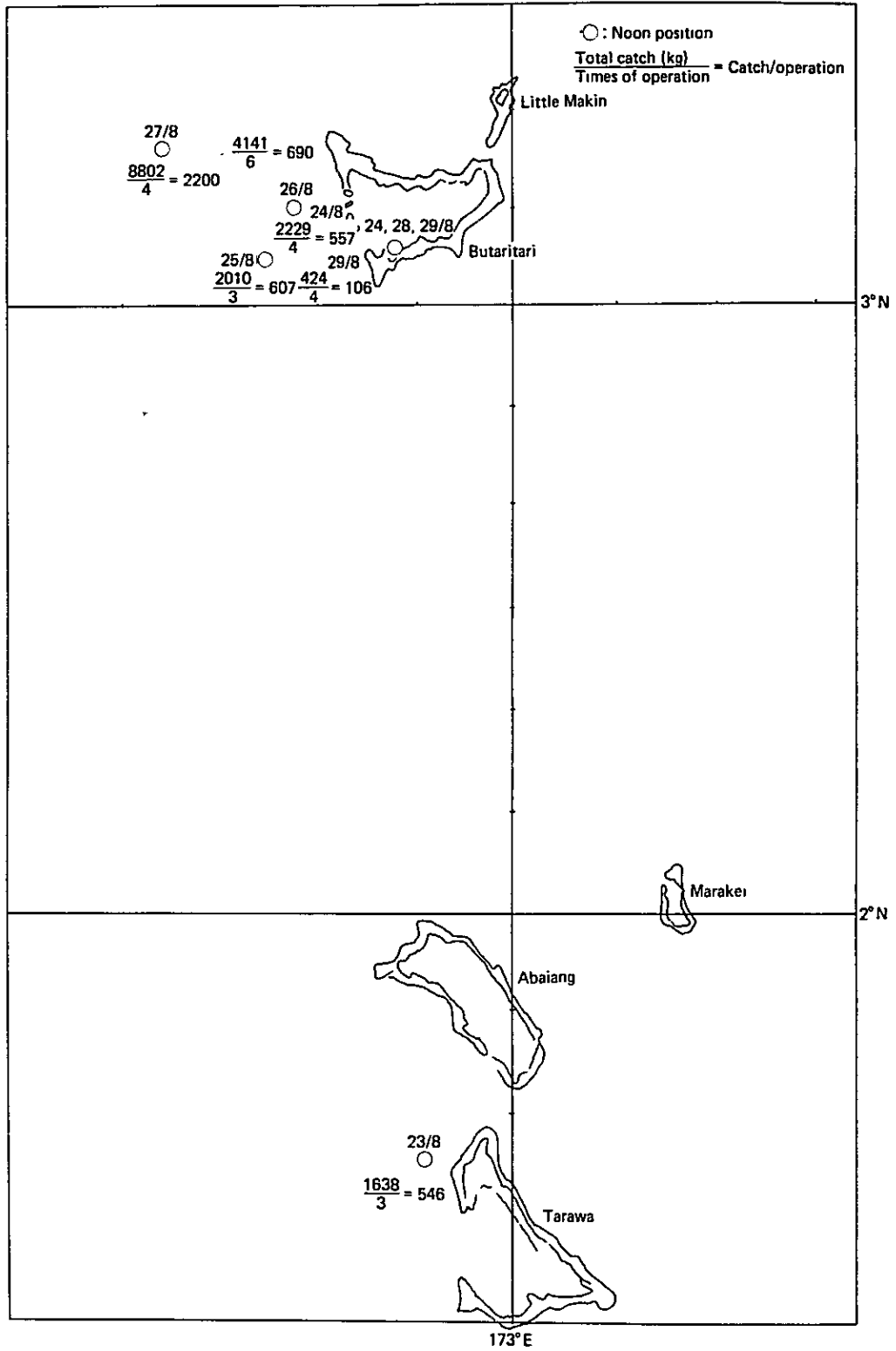
Position of operating Bokeami
23 August — 30 August 1978



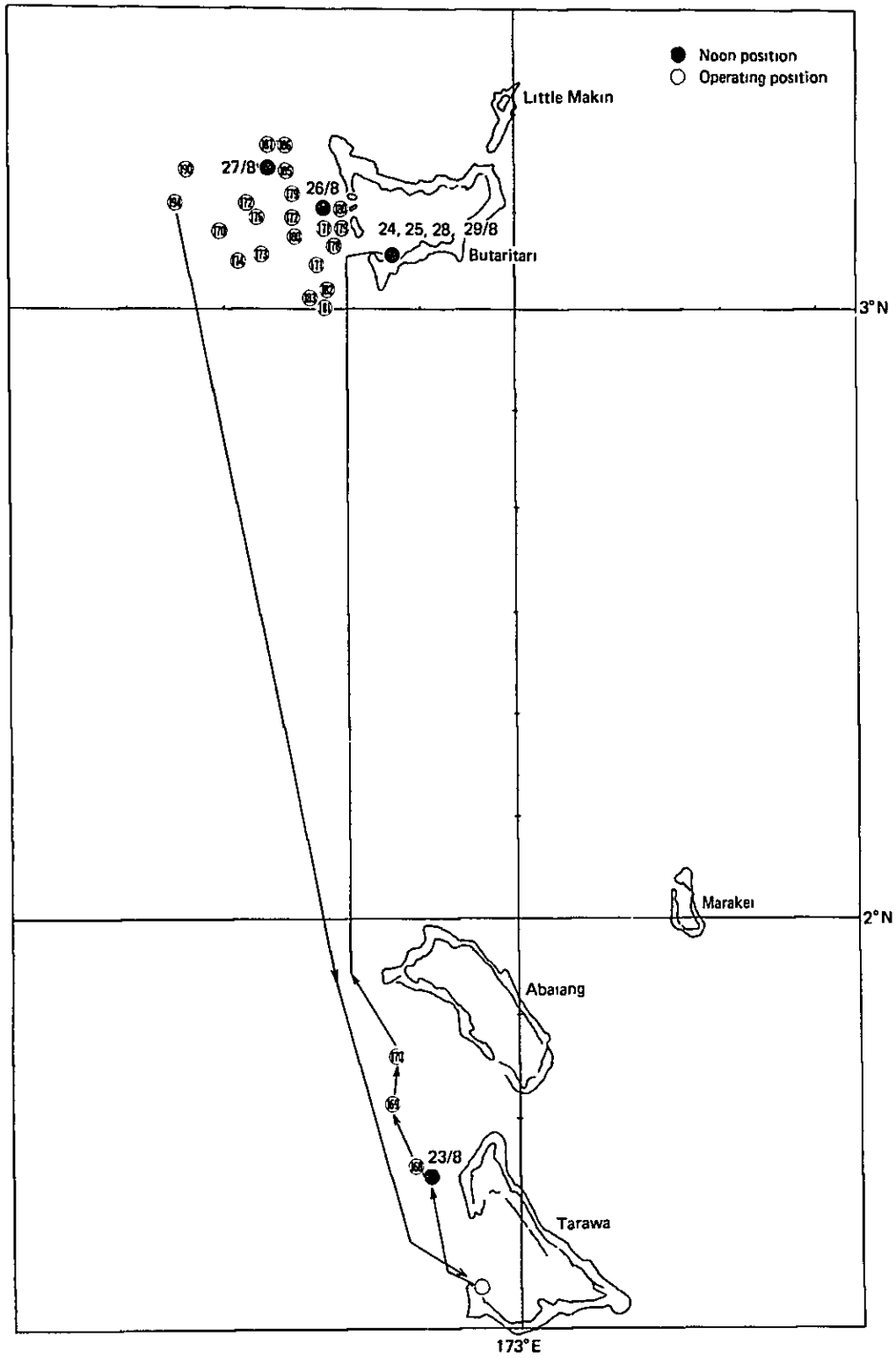
Position of operating purse seine
 23 August — 30 August 1978



Daily catch (Tarawa, Abalang, Butaritari)

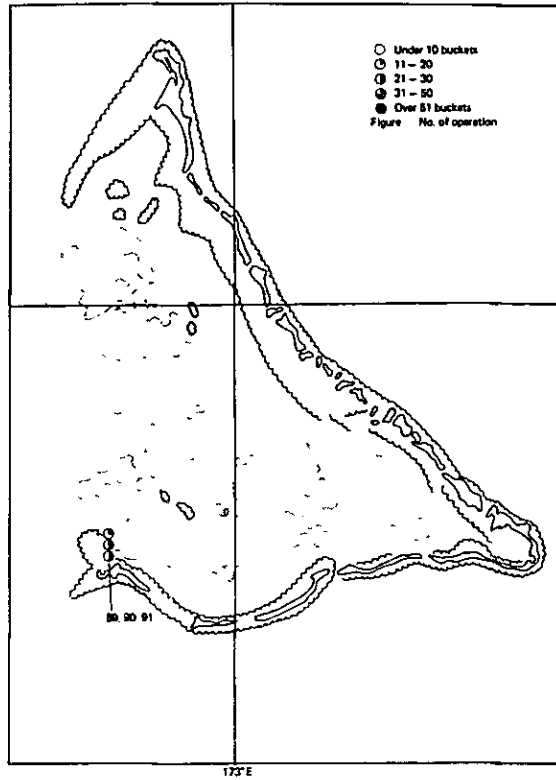


11th Trip
23 August — 30 August 1978

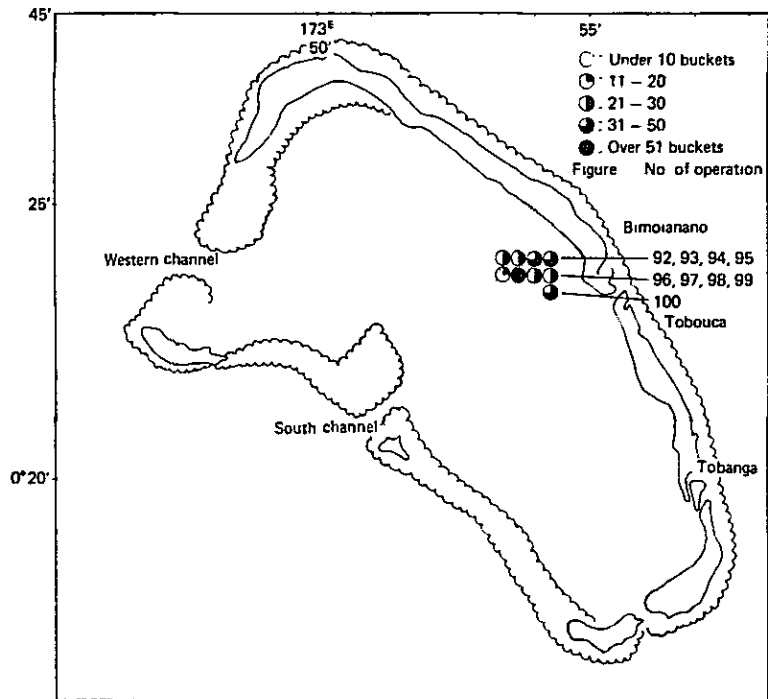


k) 12th Trip

Position of operating Bokeami (Tarawa)
1 September — 7 September 1978

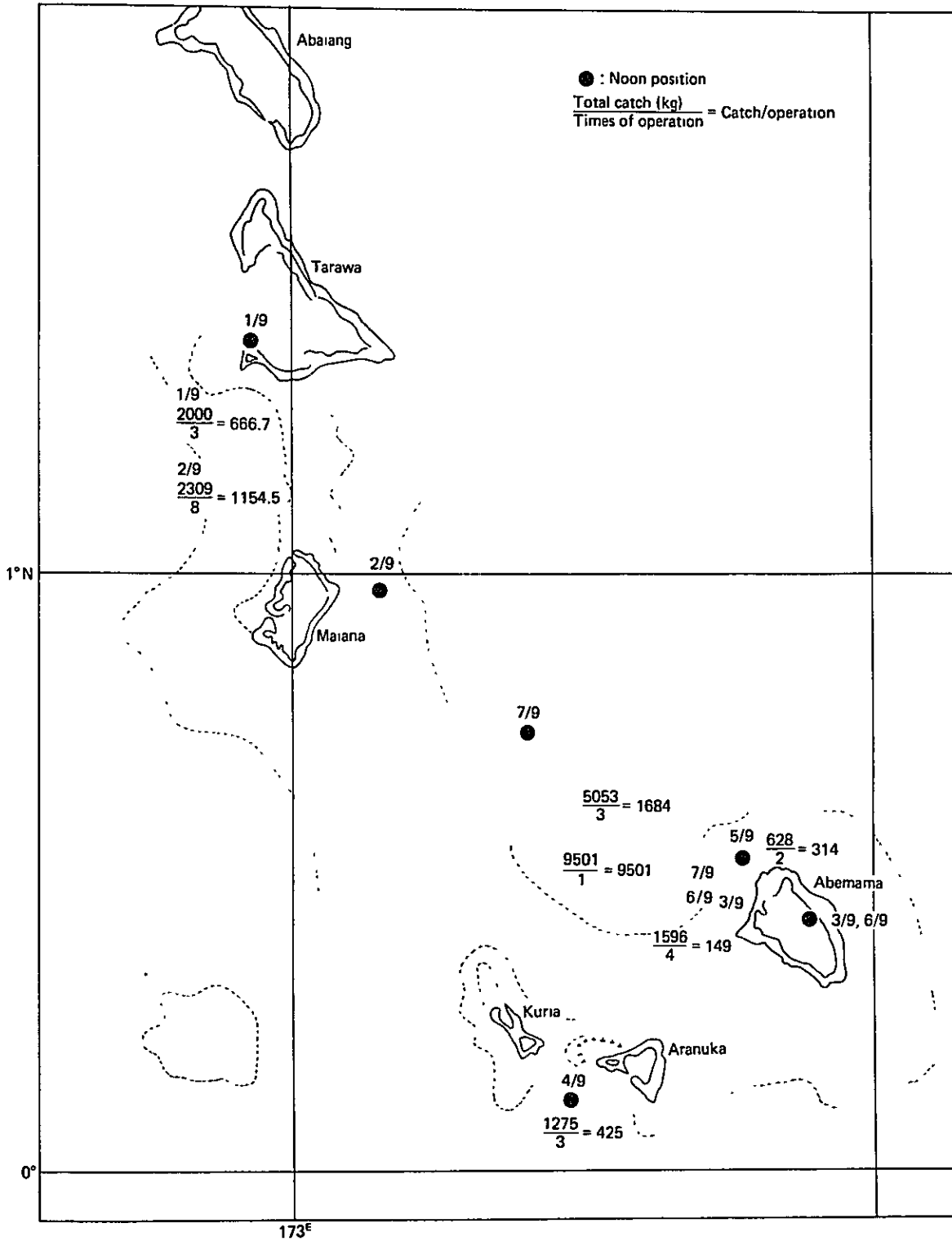


Position of operating Bokeami (Maiana)
1 September — 7 September 1978



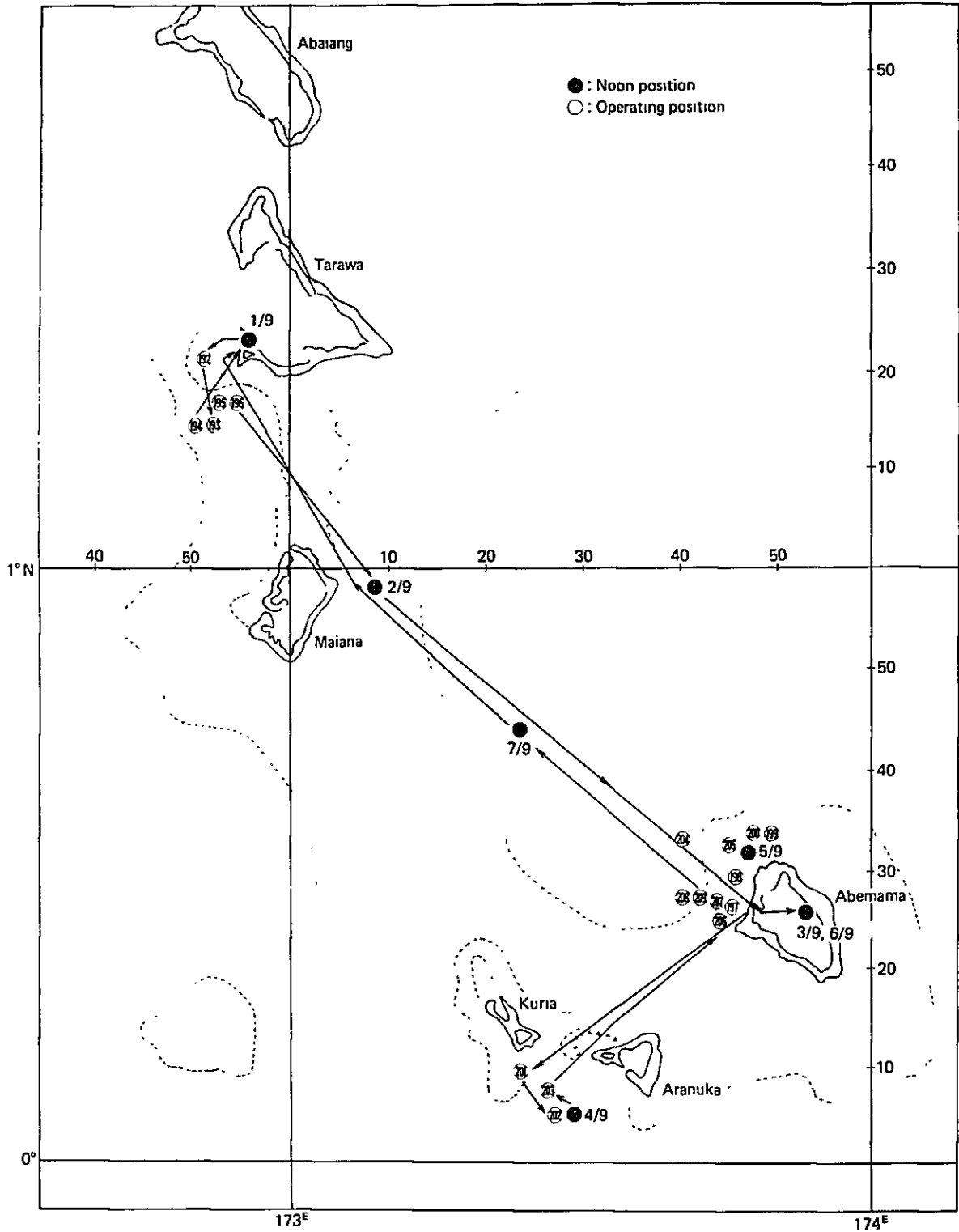
Daily catch

(Tarawa, Maiana, Abemama)



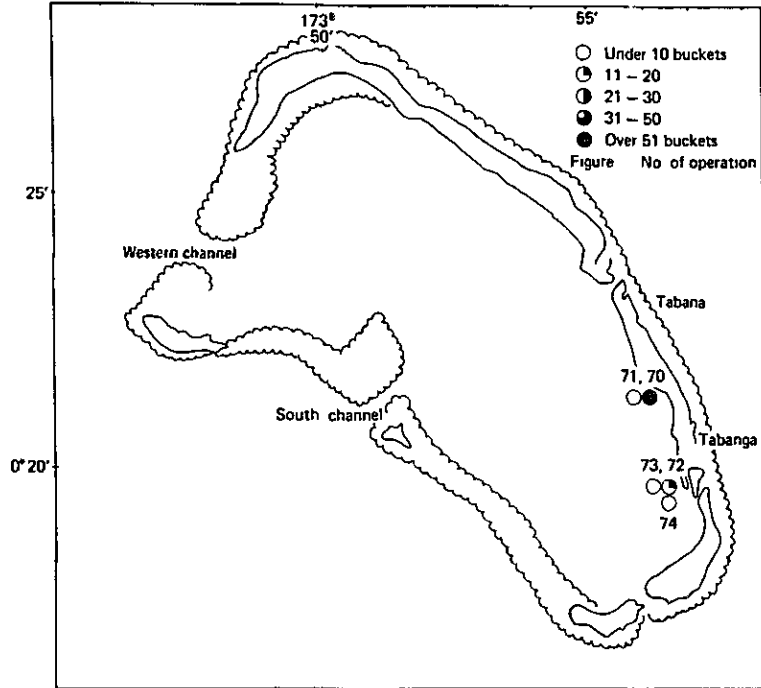
12th Trip

1 September — 7 September 1978

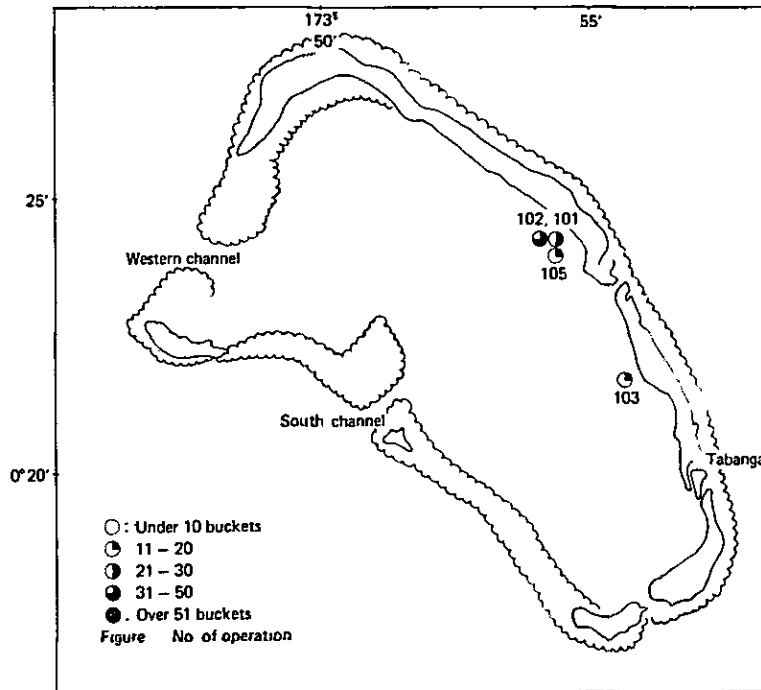


I) 13th Trip

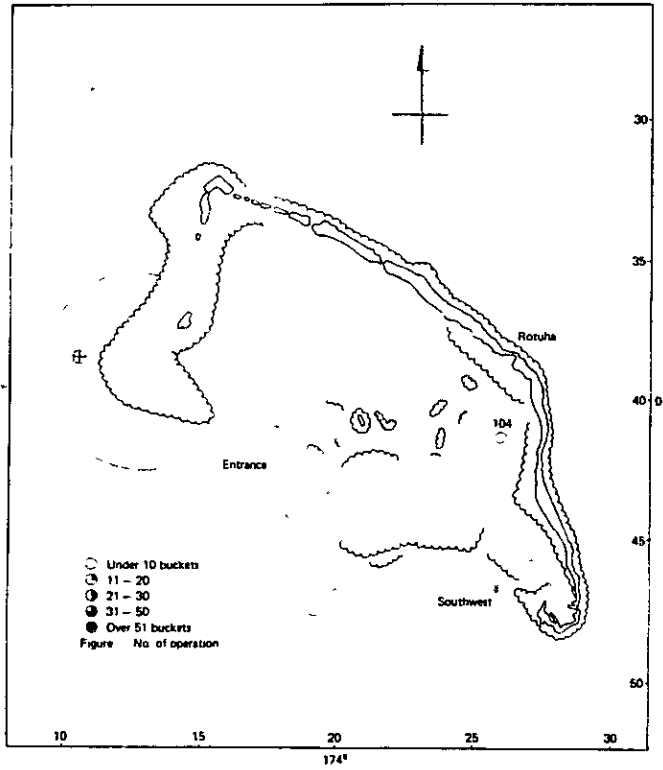
Position of operating purse seine (Abemama)
9 September — 16 September 1978

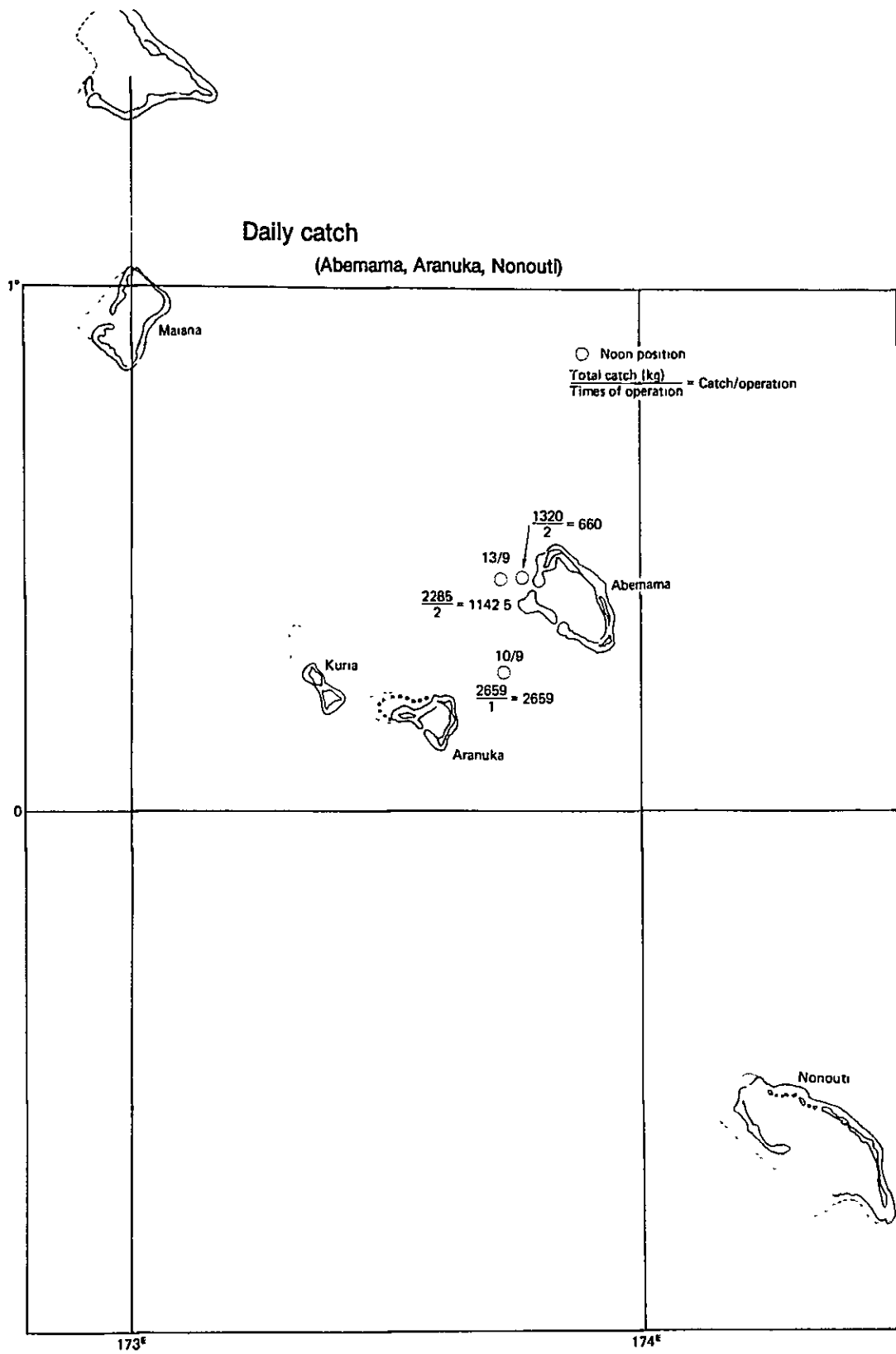


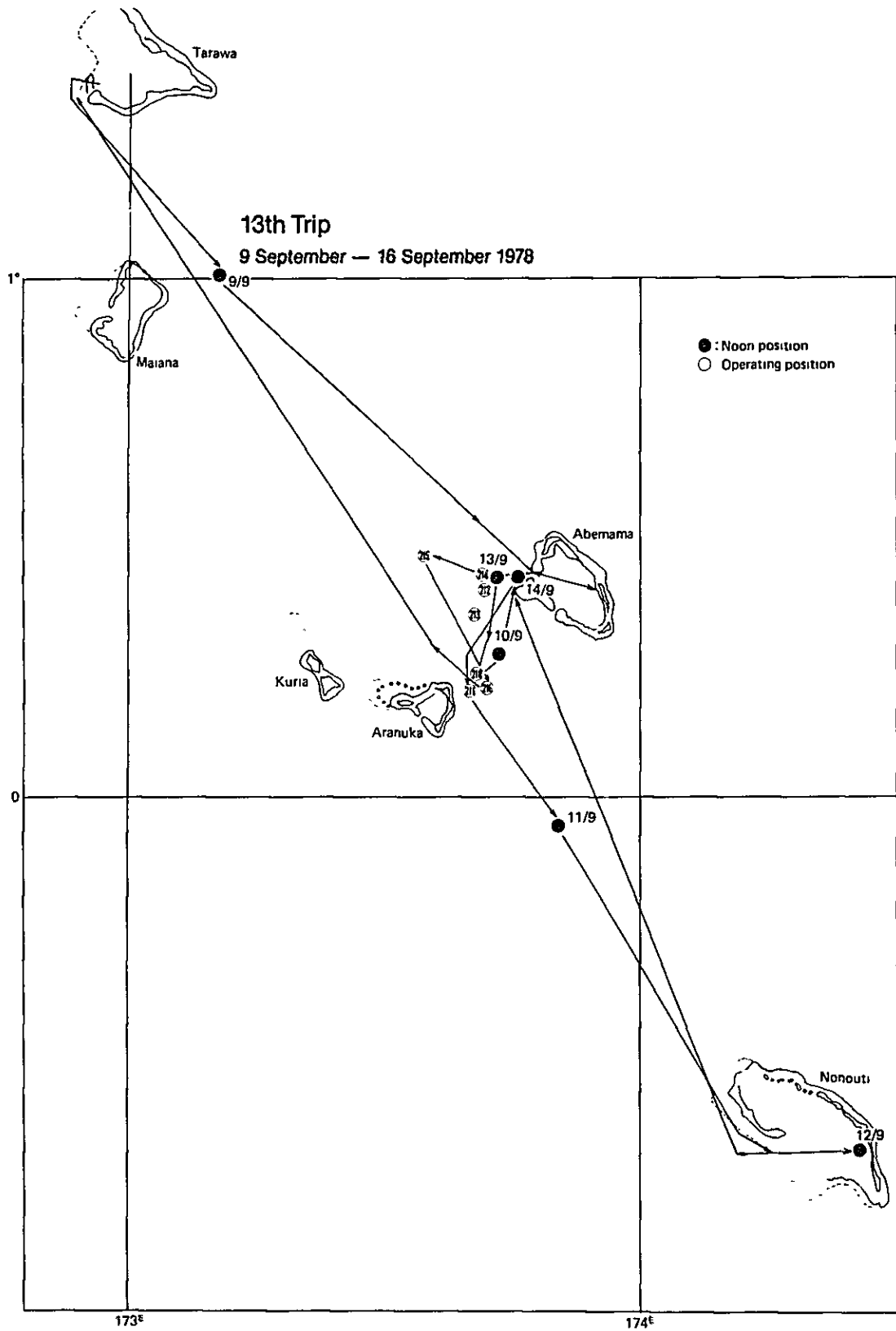
Position of operating Bokeami (Abemama)
9 September — 16 September 1978



Position of operating Bokaemi (Nonout)
9 September — 16 September 1978

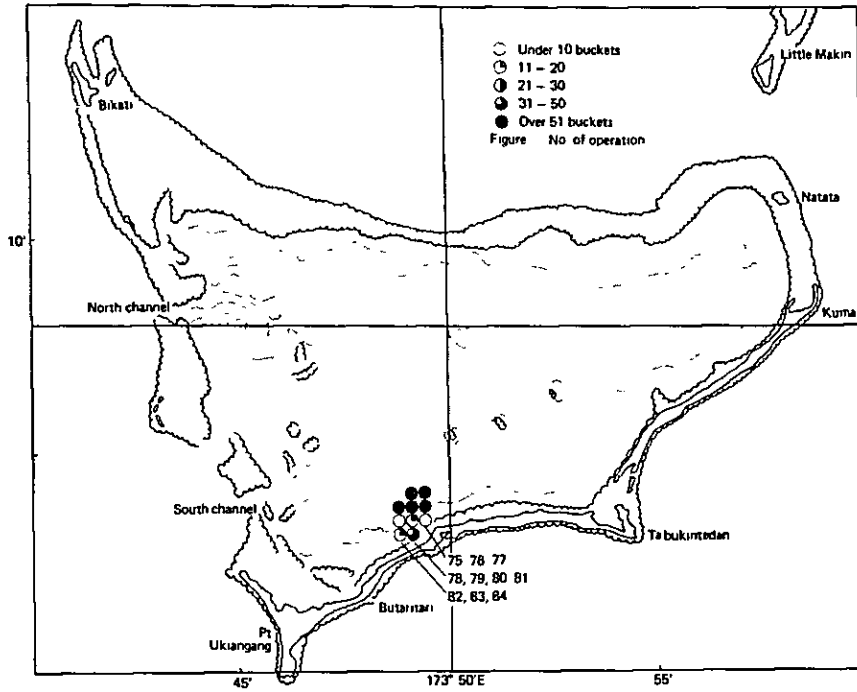




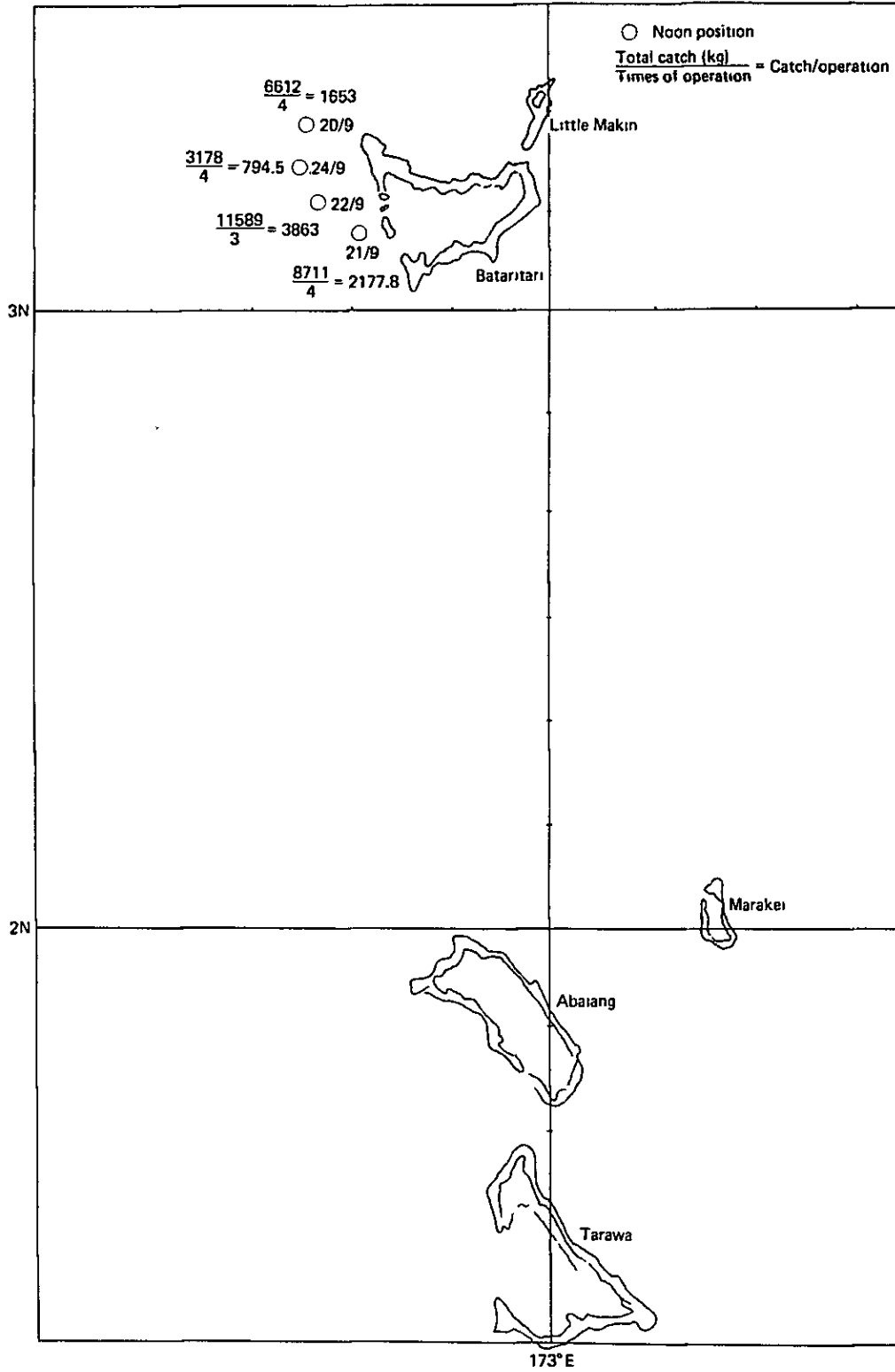


m) 14th Trip

Position of operating purse seine (Butaritari)
16 September — 25 September 1978

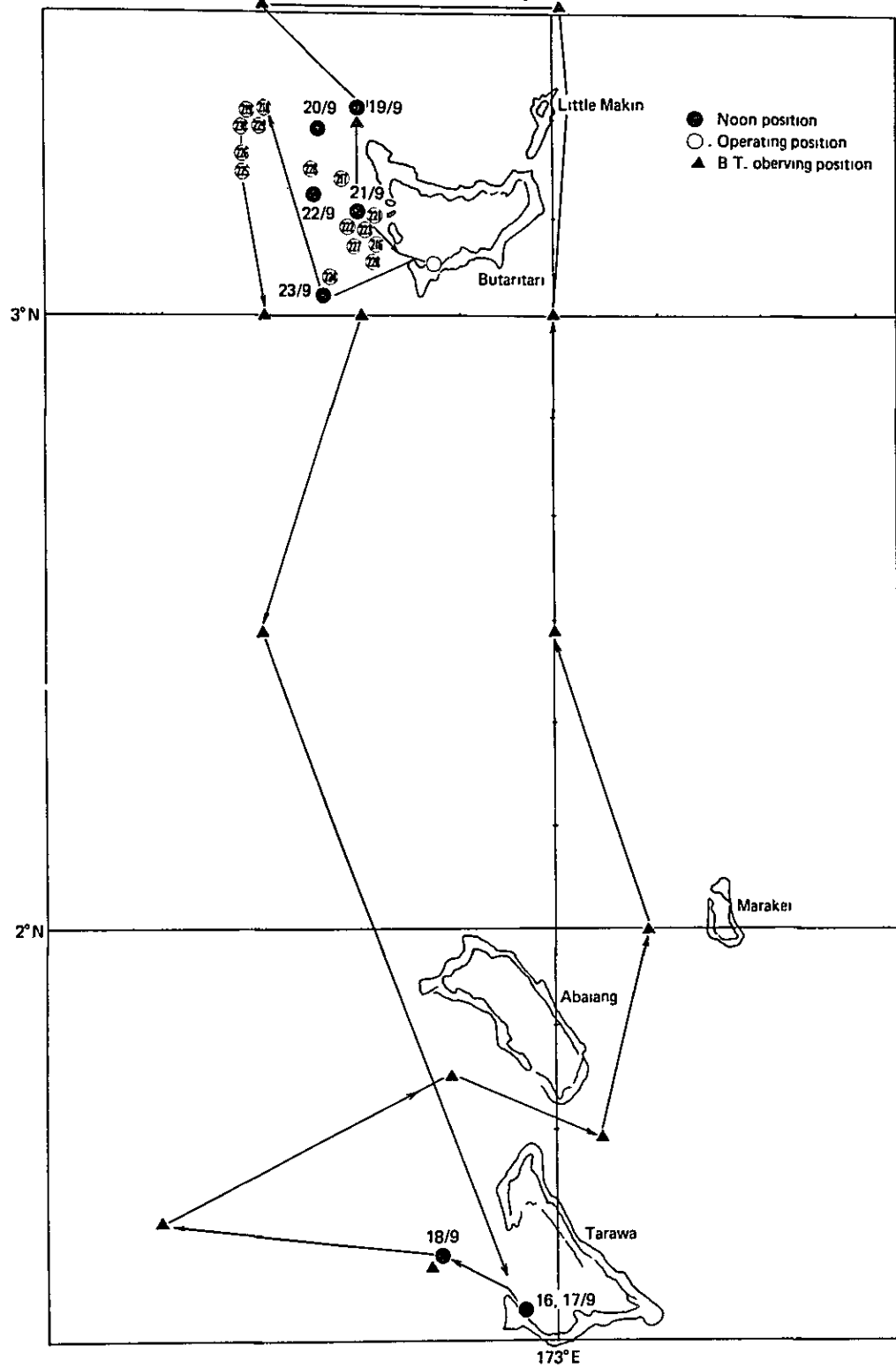


Daily catch (Butaritari)



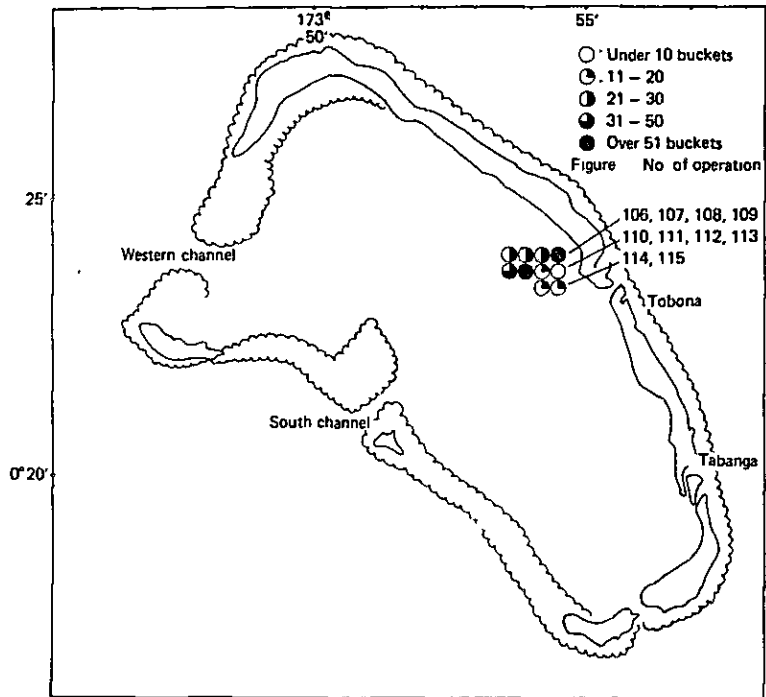
14th Trip

16 September — 25 September 1978

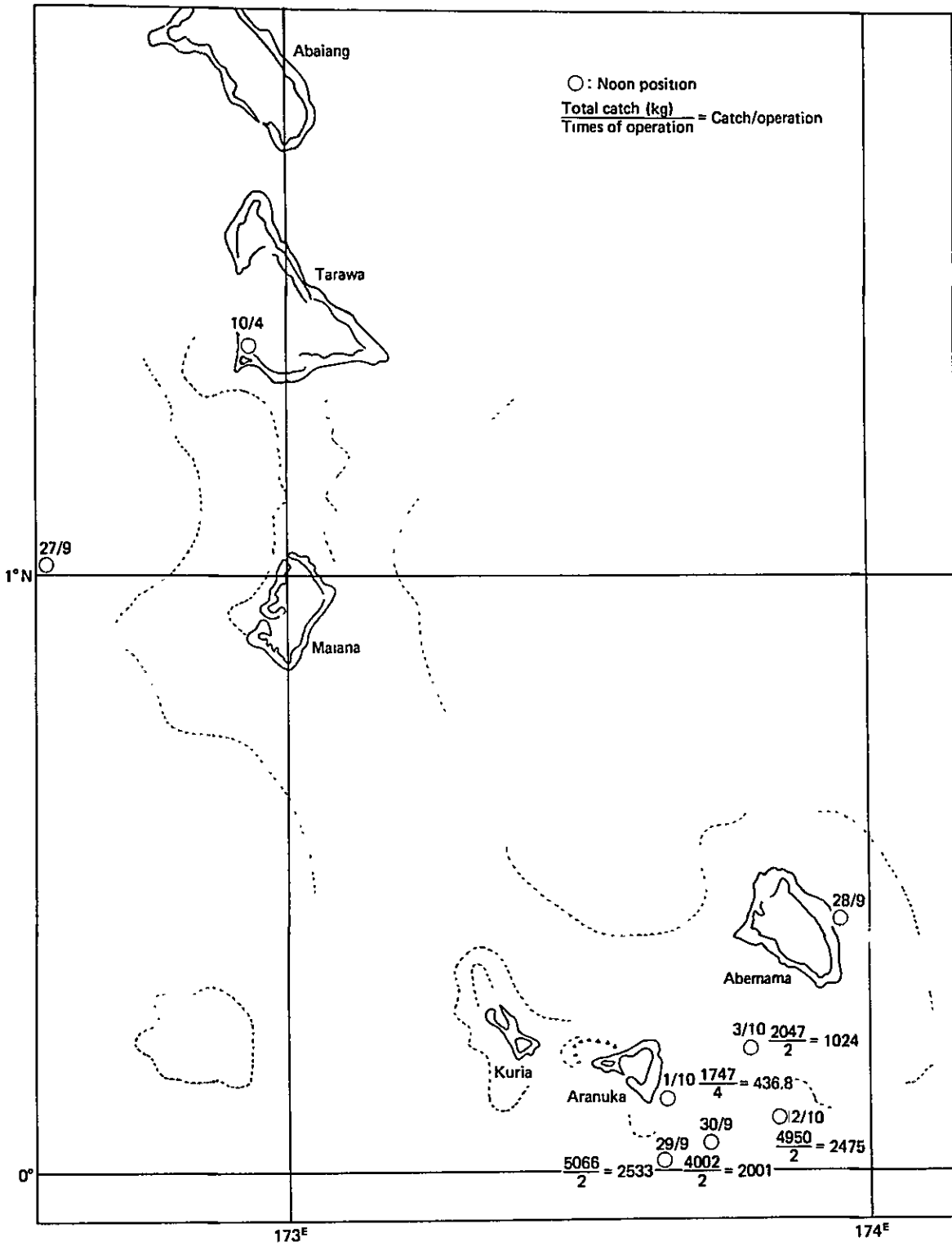


n) 15th Trip

Position of operating Bokeami
27 September — 4 October 1978

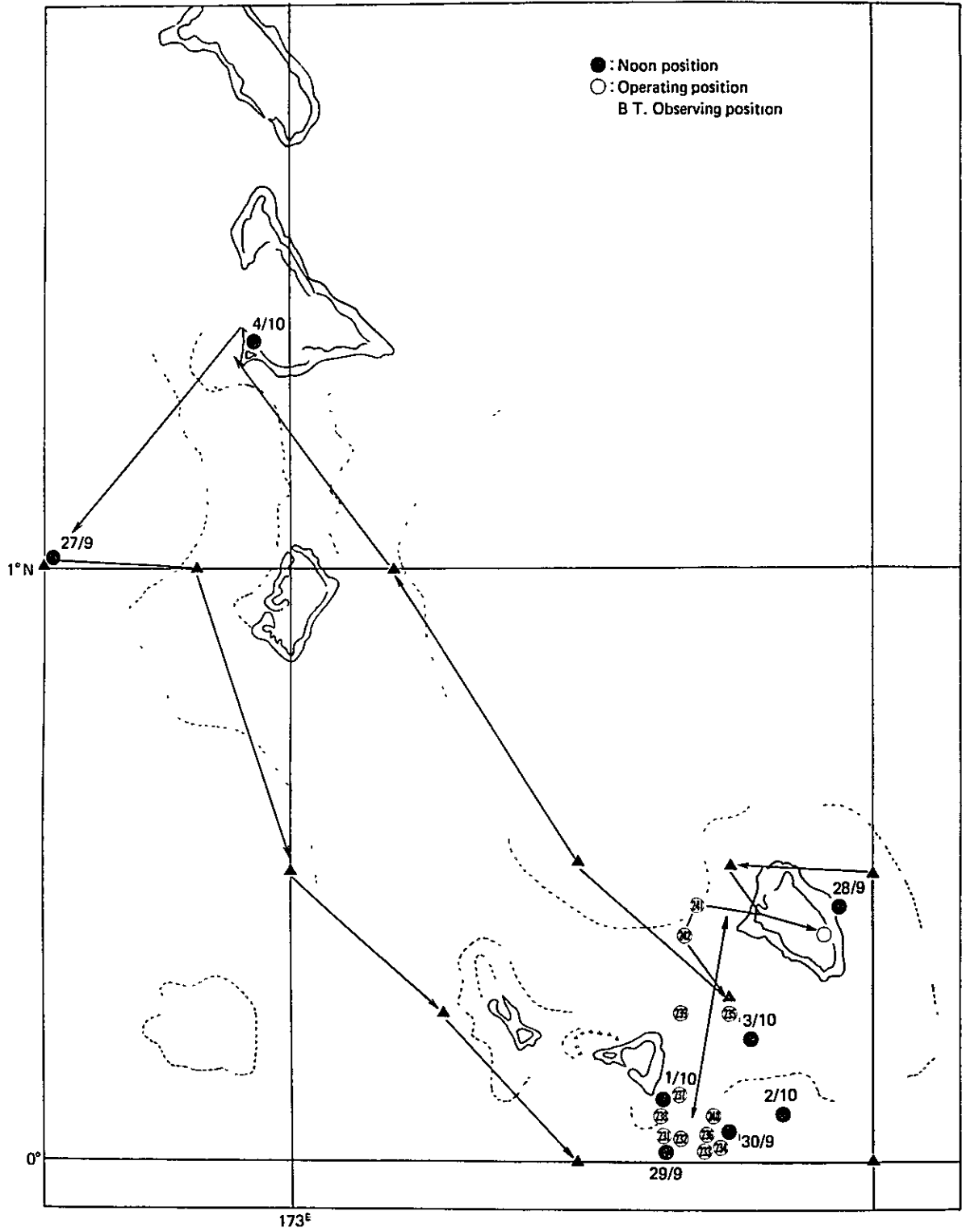


Daily catch (Abemama)



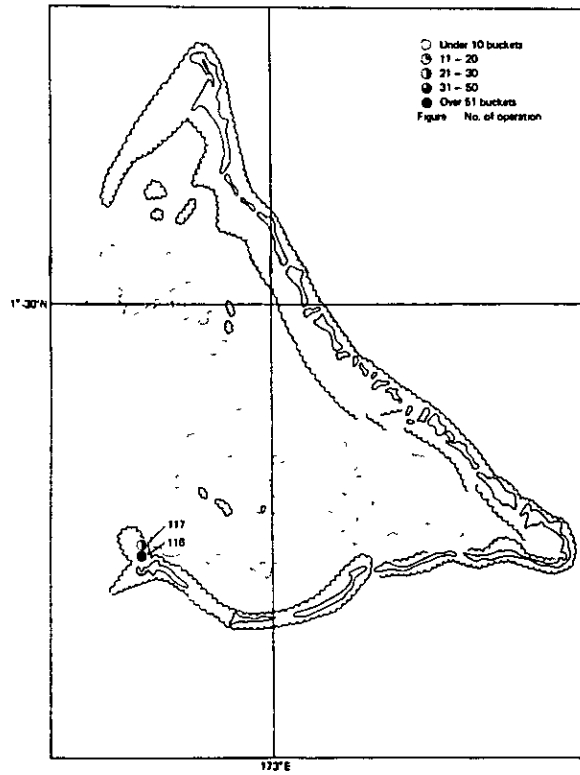
15th Trip

27 September — 4 October 1978

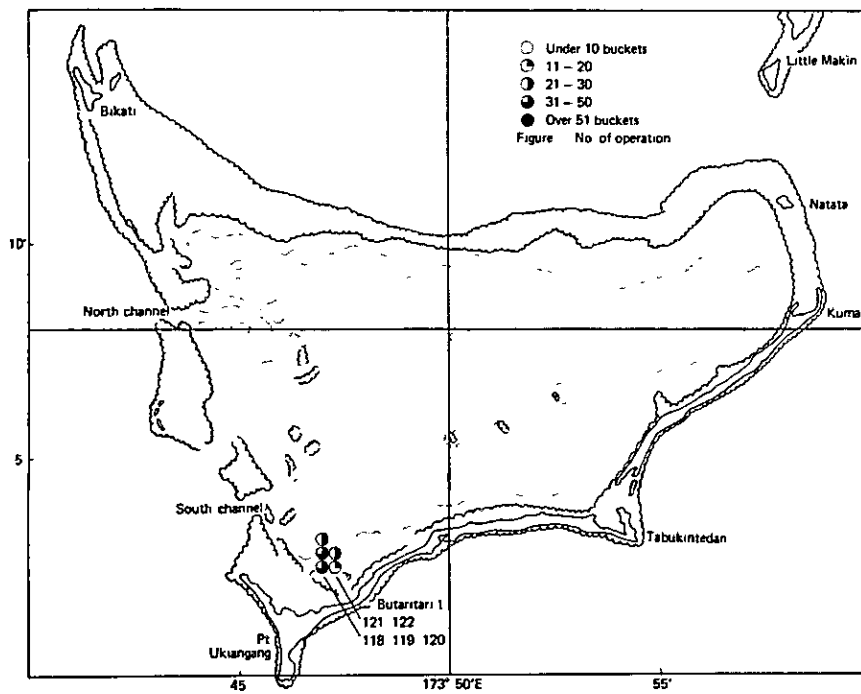


o) 16th Trip

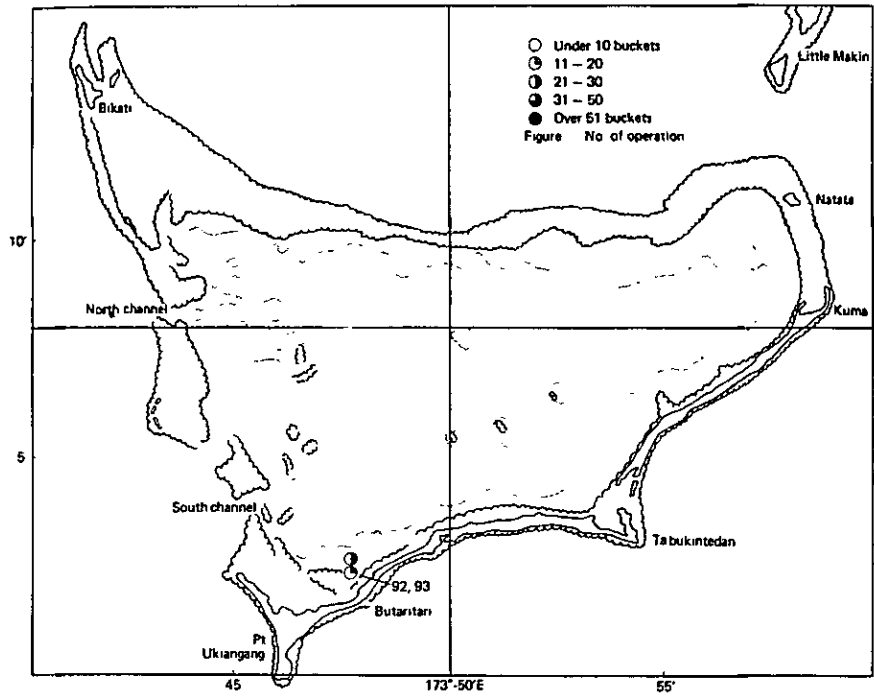
o) 16th trip
Position of operating Bokeami (Tarawa)
6 October — 13 October 1978



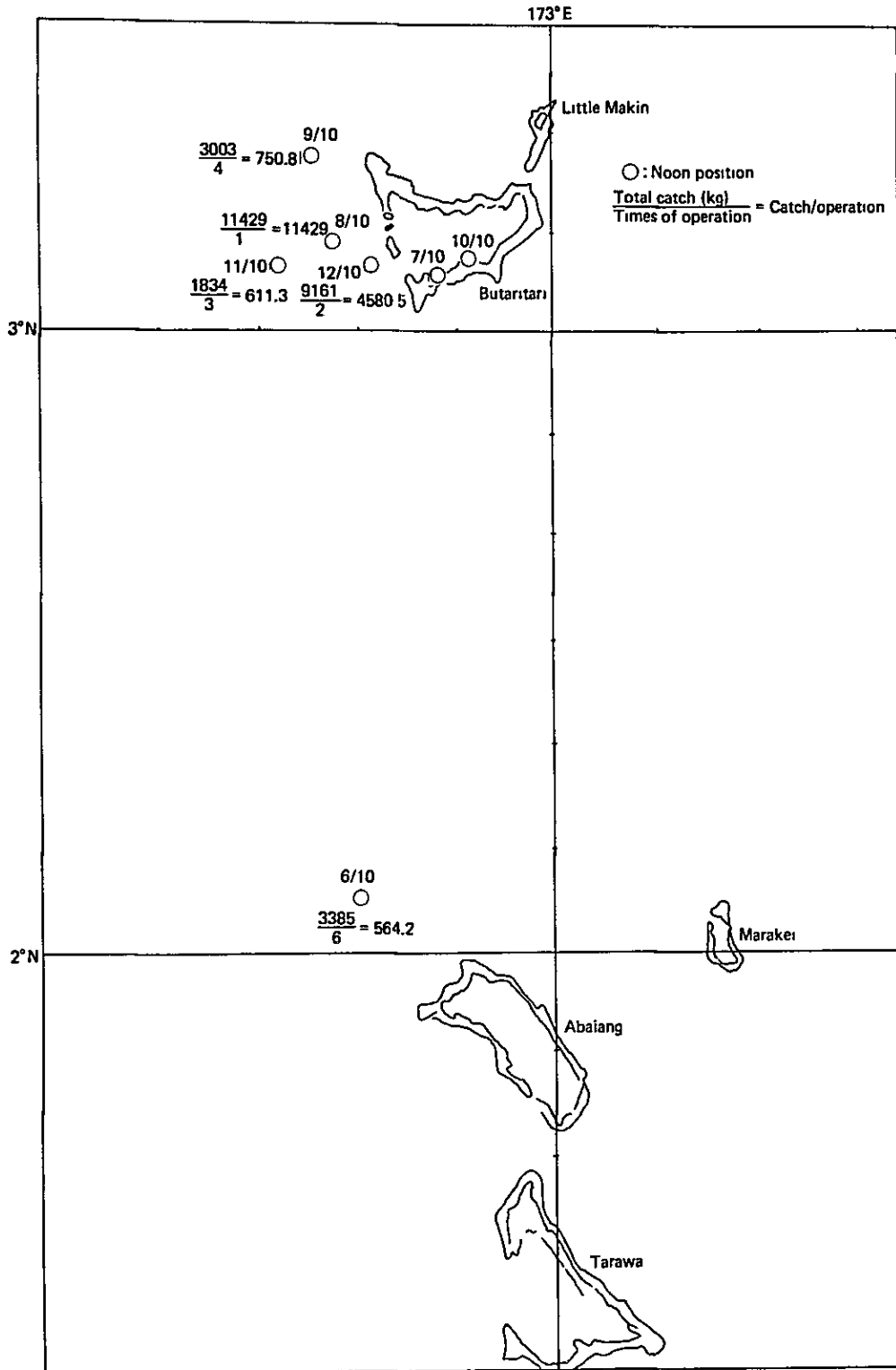
Position of operating Bokeami (Butaritari)
6 October — 13 October 1978



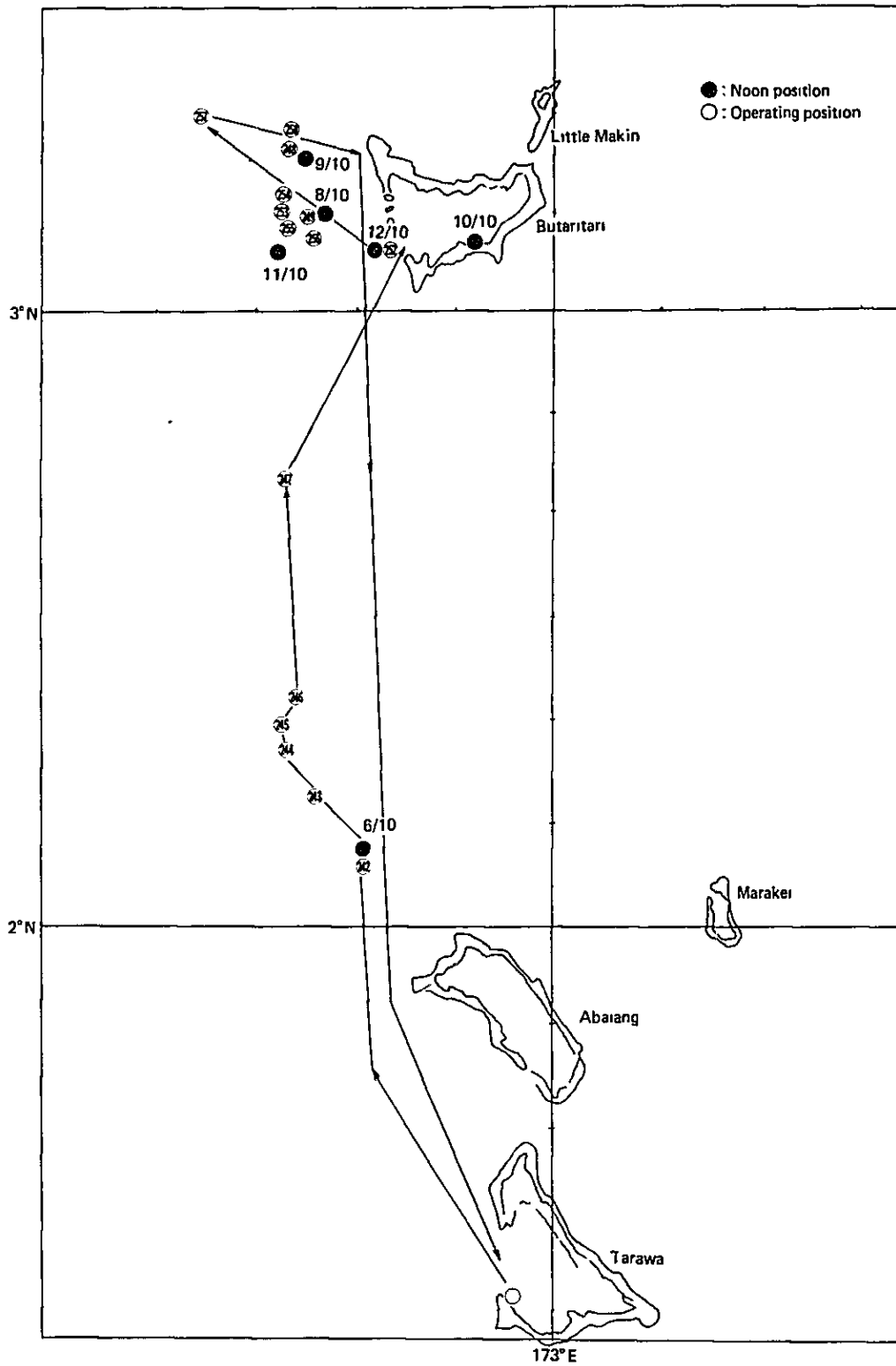
Position of operating purse seine (Butaritari)
 6 October — 13 October 1978



Daily catch (Butaritari)

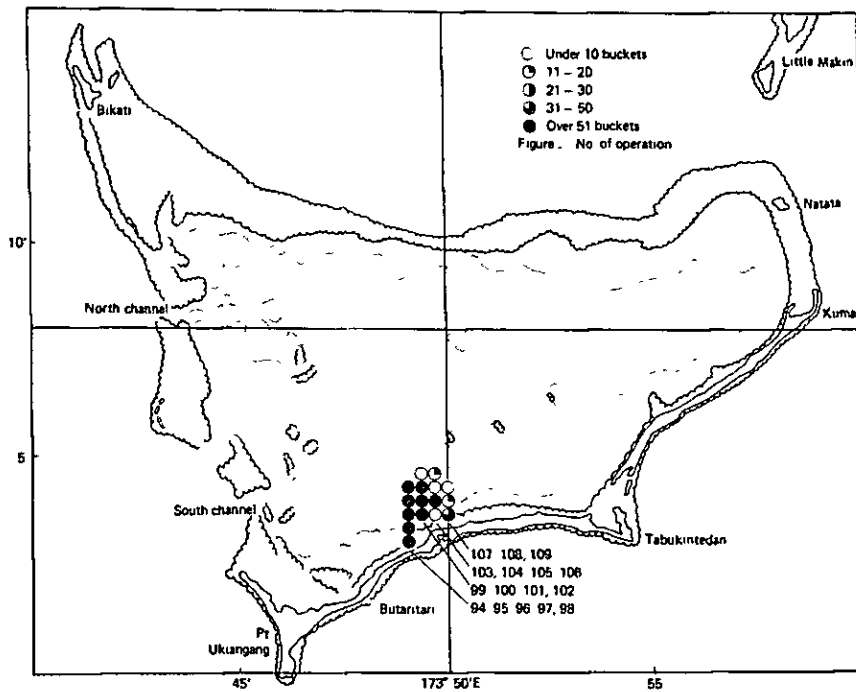


16th Trip
6 October — 13 October

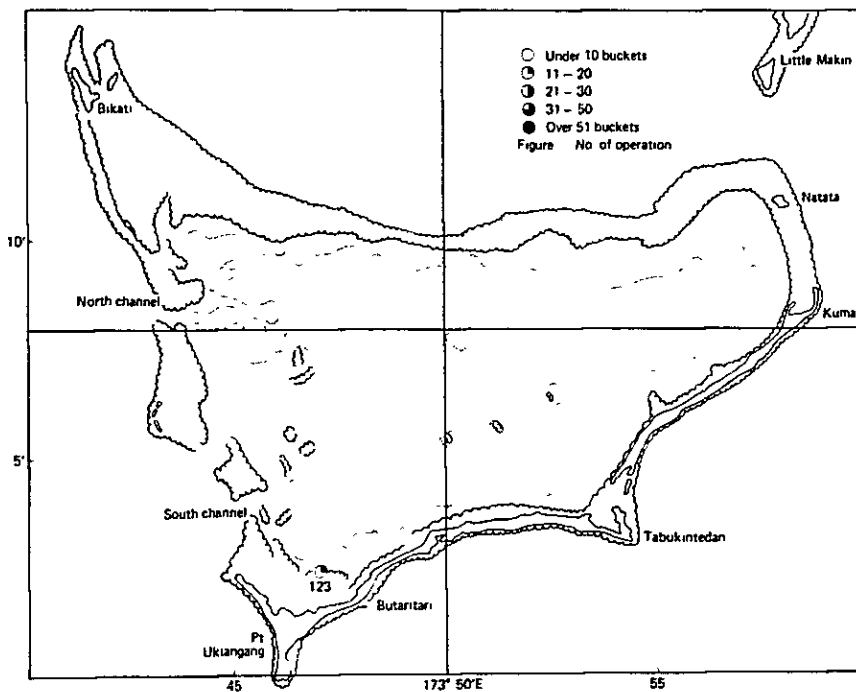


p) 17th Trip

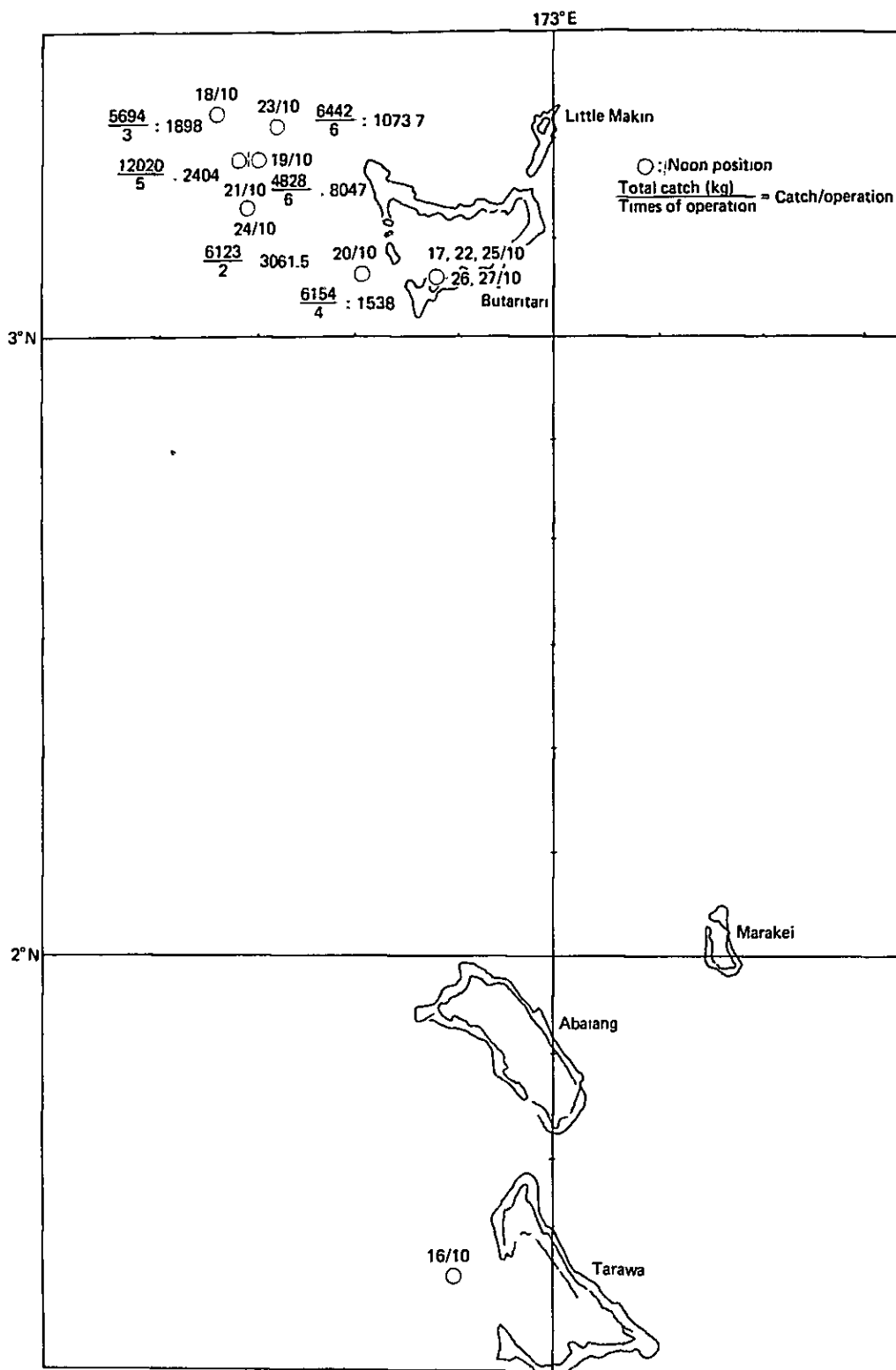
Position of operating purse seine (Butaritari)
16 October — 28 October 1978



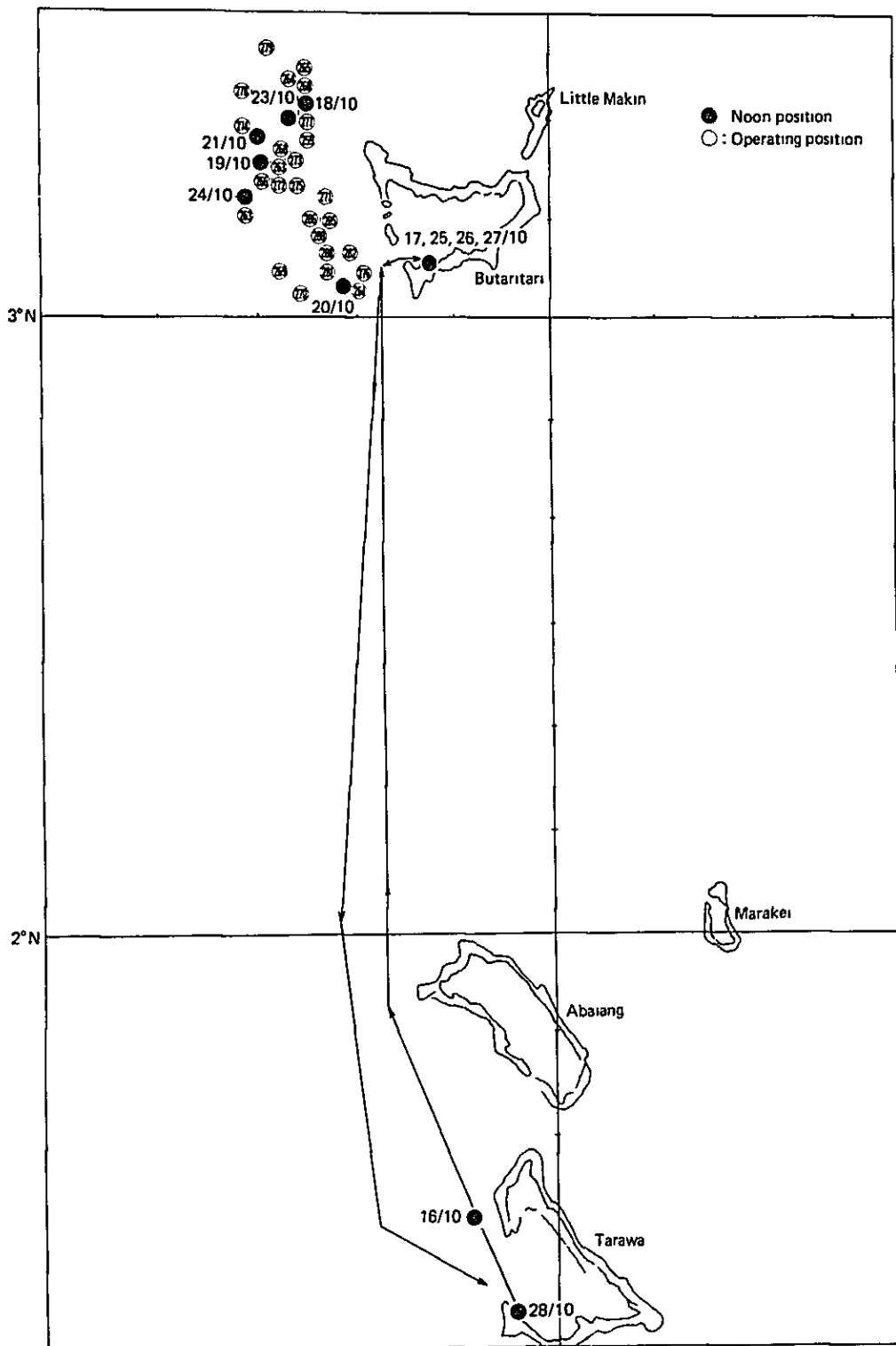
Position of operating Bokeami (Butaritari)
16 October — 28 October 1978



Daily catch (Butaritari)



17th Trip
16 October — 28 October



Reference Data

- A. Scope of Work
- B. Living Net

REFERENCE DATA A.

Scope of Work for the Fisheries Resources Development Project in the Gilbert Islands

(Phase Two)

I INTRODUCTION

In response to the request of the Government of the Gilbert Islands, the Government of Japan has decided to conduct a survey for the Development of the Fisheries Resources of the Gilbert Islands in accordance with the laws and regulations governing technical co-operation in force in Japan, and the Japan International Co-operation Agency (JICA), the official agency responsible for the implementation of technical assistance programs of the Government of Japan, will carry out the survey.

This document sets forth the scope of work for the survey which is to be carried out in close co-operation with the Government of the Gilbert Islands and the authorities concerned.

II OUTLINE OF THE SURVEY

The survey will consist of a survey of skipjack and bait-fish for skipjack pole-and-line fishing.

I. Skipjack Survey

- (1) An environmental survey including meteorological and oceanographic observations such as recording of ocean temperatures down to the ocean currents, barometric pressures, wind speeds and directions;
- (2) Test fishing (pole-and-line);
- (3) Study of the distribution of skipjack schools by ocular and electronic observation;
- (4) Study of the biological features of skipjack;
- (5) Liberation of tagged skipjack with a target of 1000, 500 of which should be for JICA and 500 for SPC. The Fisheries Division biologists will undertake the tagging the SPC quota.

2. Baitfish Survey

- (1) An environmental survey including meteorological and oceanographical observations as in the skipjack survey in I (I) above,
- (2) Test fishing using stick-held-dip nets, beach seine nets and other methods;
- (3) Study of biological features of bait-fish;
- (4) Keeping tests during transportation and survival testing in live bait wells and floating net cages;
- (5) Suitability test of bait-fish (including milk-fish) for skipjack pole-and-line fishing.

III SURVEY AREA

The lagoons and surrounding waters of the Gilbert Islands.

IV PERIOD OF SURVEY

The survey will be carried out from May to November.

V REPORT

20 copies of the final reports will be prepared and submitted to the Government of the Gilbert Islands within three months of the completion of the survey.

VI UNDERTAKING OF THE GOVERNMENT OF THE GILBERT ISLANDS

- (1) To provide the survey team with data and information necessary for the survey;
- (2) To exempt the Japanese members of the survey team from taxes on emoluments payable from overseas sources in respect of work performed in the Gilbert Islands to a non-resident person or to any person who is resident solely for the purpose of performing such work;
- (3) To exempt the survey from customs and import duties on the materials and equipment brought into the Gilbert Islands for use in the survey and on the personal effects of the Japanese members of the team;
- (4) To provide the survey team with an office and suitable accommodation where necessary and if possible accommodation for on-shore recreation;

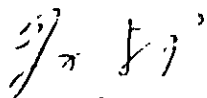
- (5) To provide the survey team with transportation facilities, such as vehicles, boats etc. when necessary;
- (6) To provide the survey team with means of radio communication to and from the survey vessel at sea and at base port and if necessary free licences to operate a shore station to communicate with the survey vessel and for the survey vessel to communicate with Japan on technical matters concerning the survey and in emergencies;
- (7) To take necessary measures for the security and safety of the members of the survey team, the survey vessel and its equipment and instruments;
- (8) To provide counterparts and or senior fisheries staff as agreed between the Chief Fisheries Officer and the Survey Leader;
- (9) To recruit 11 or more Gilbertese fishermen to be trained on the survey;
- (10) To be responsible for the claims in respect of death or injury of any Government officials involved in the survey incurred while in the performance of their duties;
- (11) To exempt the survey vessel from the terms of the Employment Ordinance in respect of the maximum hours of work in accordance with the normal practice of the sea;
- (12) To assign a liaison officer for the survey as a co-ordinator between the Survey Leader and the Government of the Gilbert Islands;
- (13) To provide free pilotage, if required, in Tarawa lagoon and sailing instructions and local charts as available for islands to be visited by the survey vessel;
- (14) To provide bait-fish to the survey free of charge;
- (15) To provide other assistance deemed necessary for the survey as may be agreed between the Chief Fisheries Officer and the Survey Leader.

VII UNDERTAKING OF THE GOVERNMENT OF JAPAN

- (1) To dispatch a survey vessel of not less than 79 registered tons and to defray the expenses thereof;
- (2) To provide all fishing gear, equipment and instruments necessary for both the fishing and the bait-fish survey such as beach seine nets, floating net cages, trip thermometers, anemometer, barograph, drift bottles etc.;
- (3) To defray expenses for compiling the findings of the survey, preparing reports and submitting them to the Government of the Gilbert Islands;
- (4) To contribute towards the emoluments of the Gilbertese fishermen employed on the survey vessel;
- (5) To contribute to the cost of the insurance of the Gilbertese fishermen employed on the survey vessel against normal employer's liability under the Gilbert Islands workmen's Compensation Ordinance in the event of death or injury whilst on duty;
- (6) Submit a report (fishing log) at the end of each voyage containing such information as may be agreed between the Chief Fisheries Officer and the Survey Leader.

VIII DISPOSAL OF CATCH

All fish etc. caught surplus to the requirements of the survey shall be the property of the Gilbert Islands Government and disposed of under the directions of the Chief Fisheries Officer.



On behalf of the
Japan International
Co-operation Agency



On behalf of the
Government of the
Gilbert Islands

TOKYO

24th March 1978

REFERENCE DATA B.

Living Net

When live bait fish have been captured at a shallow water in a lagoon, the fishing boat cannot approach that place, with the result that the live bait fish thus caught must be put into a living net, which in turn has to be towed so that they may be stored into the ship. In the case of the first survey, a small living net, which was made with fishing nets, was towed to carry live bait fish. But it was difficult to keep the shape of the living net as it should be, with the consequence that the capacity of the net was reduced, much damage was inflicted on bait fish and the mortality was high. For the latest survey, it was decided to use a living net made of bamboo and a pen made with molded nets.

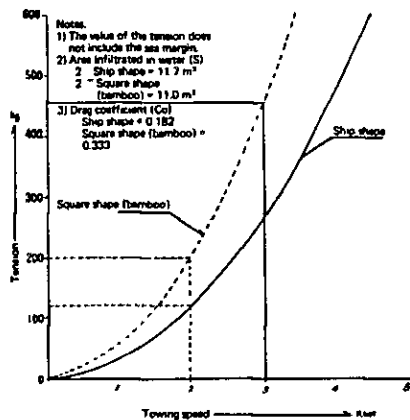
Bamboo living net have already been used near Kagoshima, but molded-net living net have never been put to use before. For this reason, a basic model test was performed in a water tank on molded-net.

1. Model Test

Square and ship-shaped models were used for the test.

1) Tension on Towing Rope

A living net is towed by a dinghy with an outboard motor at a towing speed of about 2 knots. In the test, therefore, the tension on the towing rope at various flow speeds up to 1.5 knots in actuality was computed.

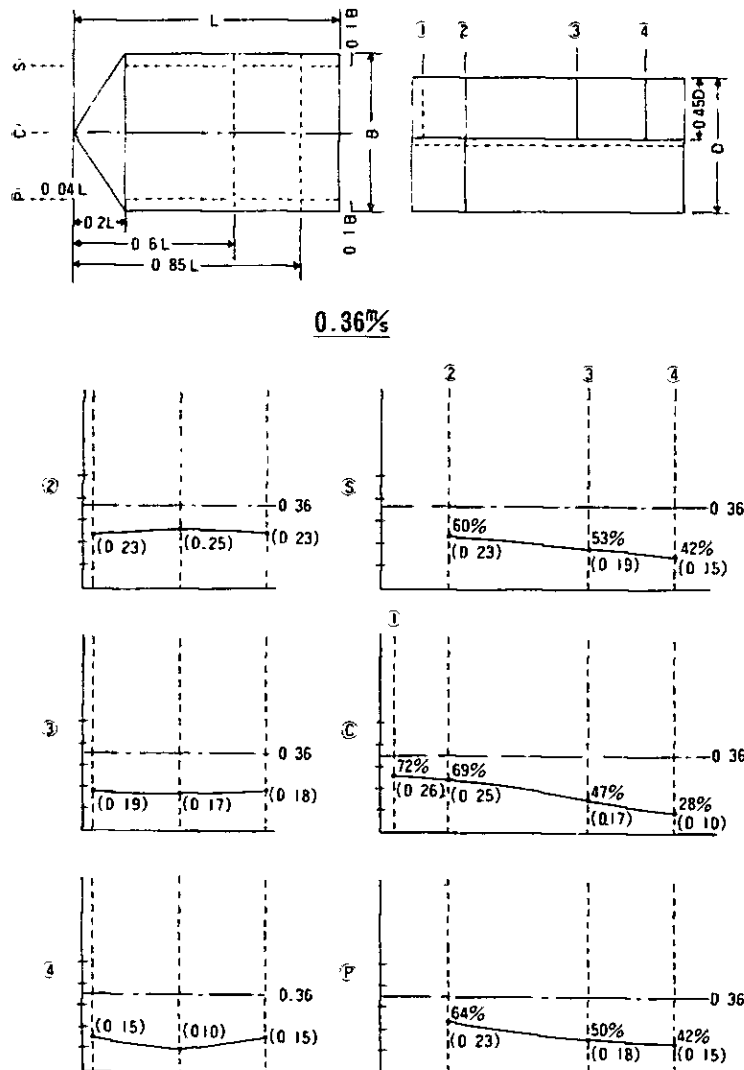


As a result of the measurement, it was found that the tension was 125 kg for the ship shape and 200 kg for the square shape, 1.6 times greater, at a towing speed of about 2 knots; 270 kg for the ship shape and 400 kg, 1.5 times greater, for the square shape at a towing speed of 3 knots. Therefore, it is evident that the ship shape is more favorable for towing.

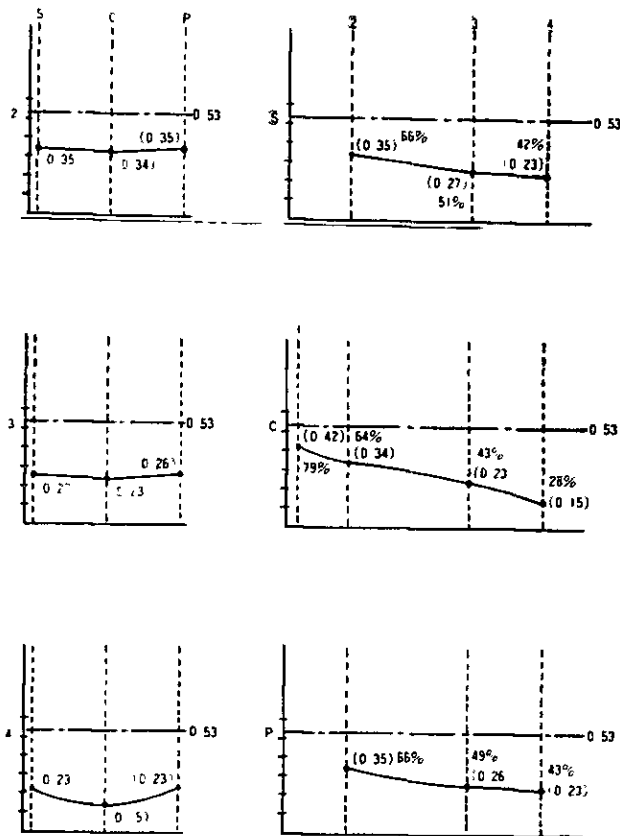
2) Water Flow in a Living Net

As the direction and speed of water flowing in a living net produce on extremely great influence on bait fish inside the net, observation and measurement were carried out. The finding for the ship shape are given below:

Distribution of Flow Speeds in a Living net
Position of Measurement (1.02 knots for life-size)



0.53 m/s (1.5 knots for life-size)

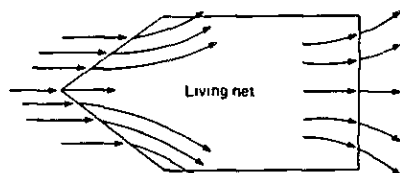


As a result of the measurement, it was found that the flow speed inside the net stood at 70% of the towing speed in the neighborhood of the frontal part (1) of the towing direction, but the closer to the rear part, the lower the flow speed, as it stood at 50-55% at the center and about 40% at the rear part.

How bait fish would respond the flow speed inside the net depended on the species and durability of locally available bait fish, and it was decided to carry out a local survey.

Flow Direction in a living net

The flow direction inside the net is just as important a factor as the flow speed, and a survey was performed to observe the flow direction. The flow direction is generalized in the following illustration.



The pattern of the flows was such that the pattern fans out immediately before or after passing through the frontal net. Coming from inside the net through the right-hand, left-hand and near walls, the flows deviate immediately before and after the passage. The deviation of the flows depends on the angle of the flow to the net, and the same thing can also be said of the flow which has just passed through the net.

For this reason, there seems to be a need for a full study on the angle of the ship shape to the head part. This time, however, the study was not broadened to that extent, and it was decided to make a further study on the basis of the results of the local use.

Position of Towing Fulcrum

When the towing speed was made faster during the experiment, the frontal part nosed down. It was ascertained that this phenomenon could be prevented either with an addition of floats or by moving the fulcrum in a downward direction as long as the towing speed did not exceed 2-3 knots. Locally, it was easier to increase the number of floats, so that it was decided to increase the number of floats, wherever necessary. For this purpose, spare floats were kept in reserve.

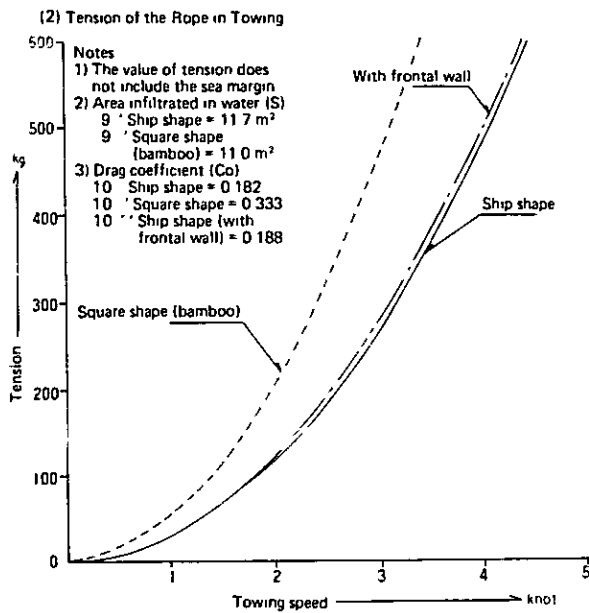
2. Local Use of a Living Net

Two types of living net were prepared -- a bamboo square type and a molded-ship type, but the ship shape were put to use

practically throughout the survey period as they were easier to use and stronger.

As a result of the use of the ship shape, it was found that they were less resistant. But the flows of water inside the net were so fast that damage was likely to be inflicted on bait fish. To prevent this phenomenon, the frontal part of the net was covered with a plywood board to reduce the flow of water inside the net. The results proved satisfactory.

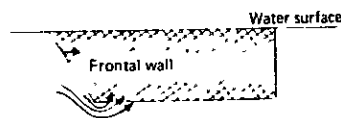
1) Tension in Towing



During the towing, there was no difference in tension between before and after the placing of a plywood board, and it was found that there would actually appear no influences.

2) Flow Direction and Speed in the Net

As a result of an observation of the flows of water inside the net, it was found that the following flows existed.



Under the influence of the frontal wall, the spiral flows indicated in the above figure were created, thus giving rise to the appearance of weak spiral flows inside the net. Now that the water does not flow in a certain direction as in the case where the front wall is constructed of a net, it is surmisable that there will appear practically no influence on bait fish inside the net.

In actual use, mortality was lower when the frontal wall is covered with a plywood board. Therefore, this system was put to use.

3) Stability in Towing

As a result of the test, it was found that there appeared spiral flows, although weak, inside the net. This indicated the possibility of the net being shaken horizontally during its towing, thereby reducing its stability. To maintain this stability, there appeared to be a need to remodel the ship shape, but the reduced stability was not so conspicuous as to produce a bad influence on the actual use of the crawl.

3. Conclusion

The living net of the molded ship shape, which has been used in the latest survey, is easy to use and assures low mortality. In other words, the results turned out to be more satisfactory than anticipated at the beginning. As this living net may be remodelled in the size and construction which are best fitted to the place of its use, it is surmisable that it would be usable not only at fishing bases in the South Pacific but also in Japanese territory to the full extent.

In case this living net is to be stored, there will be a need to set aside a larger space than in the case of a net pen.