REPORT
ON
A DEVELOPMENT SURVEY OF FISHERY RESOURCES
IN
THE GILBERT ISLANDS
(SKIPJACK FISHING AND LIVE BAIT FISHING)

January 1979

Japan International Cooperation Agency

Preface

The Government of the Gilbert Islands requested the Government of Japan to extend cooperation in the development of its fisheries. In view of the fact that the waters around the Gilbert Islands are rich in marine resources and that exploitation of marine resources will contribute to the economic development of that country, the Japanese Government was considering the matter to meet to the above request.

At such time, the Chief Minister of the Gilbert Islands visited Japan in July 1976 and asked for an early realization of Japan's cooperation in fisheries.

In the light of the importance of the matter, the Japanese Government decided to extend cooperation to the Gilbert Islands, and the Japan International Cooperation Agecny (JICA) conducted a preliminary survey on fishery resoureces for 17 days from November 26 and a costal fishery survey, mainly on bait fish from September 18, 1977, to March 18, 1978.

Following the above surveys, a survey on the pole-and-line fishing of skipjack and bait fish was carried out from May 1,1978, to October 31 of the same year.

This report contains the result of the above survey.

I am pleased to note that the survey has been accomplished as scheduled, proving that the skipjack fishery of the Gilbert Islands is extremely promising. I hope that this survey will serve for the smooth fishery development of the Gilbert Islands.

I should like to express my deep appreciation to the Government and the officials concerned of the Gilbert Islands for the close cooperation extended to the survey team.

January 1979

Shinsaku Hogen,
Presidnet,
Japan International
Cooperation Agency.

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ABBREVIATIONS

1. Bouke(ami) = Boke(ami) = stick-held dip net

2. Bait fish

   H = HA = Harengula ovalis
   A = AL = Allanetta ovalava
   M = Milkfish
   S = SP = Spratelluides delicaturus
   AP = Apogonidae
   D = DA = Dassumieria hasselti
   C = CC = Caesio caerulaureus
   SC=SA = Sardinella clupeoides
   CA=RM = Caesionidae

3. Sex
   M = Male, F = Female

4. Gonad
   A = Immature, B = Maturing, C = Mature, D = Spawned,

5. Condition of stomatch
   G Empty, H Half filled, I Full,

6. Natural fish (Contents in stomach)

LF = Little fish,	LFF = A full of little fish,
LFB = A few of little fish,	IK = Cuttlefish,
TA = Scabbard fish,	LT = Little tuna,
SH = Sguilla,	KF = Filefish,
SL = Mackerel,	LC = Shrimp,
FF = Flying fish,	BN = Little bonito,
PU = Octopus,	HM = Horse mackerel,
SR = Sardine,	

Summary

A marine survey was performed by the skipjack pole-and-line fishing vessel, Hatsutori Maru NO.3 (79.37 tons), onskipjkck and bait fish for the pole-and-line fishing of skipjack in the Gilbert Islands for 163 days from May 19, 1978, to October 28, while Betio Port on Tarawa Island was used as her base.

As the period of this survey coincided with a season of moderate easterly monsoon, the weather conditions were continuously stable and the marine survey could be stepped up as scheduled, thus making it possible to gain greater achievements than previous expectation.

With respect to bait fish, it was ascertained that Harenguia ovalis, Spratelluides delicaturus, Allanetta ovalava Apogonidae, Sardinella clupeoides, Dassumieria hasselti, Caesio caerulaureus, Dussmieriidae and Carangidae usable in the pole-and-line fishing of skipjack are distributed in the lagoons of Tarawa, Abemama and Butaritari Islands. It was also demonstrated that Harenguia ovails and Spratelluides delicaturus which are particularly useful for the pole-and-line fishing are distributed in aboundance and may readily be hauled in large quantities with Bouke-Ami Net and Purse Seine.

Harenguia ovalis are available in large quantities at Tarawa and Spratelludies delicaturus at Abemama, and the use of Bouke-Ami Net proved effective, whereas it was demonstrated that Purse Seine were of much use in catch of Harenguia ovalis.

The catch by Bouke-Ami Net were 3,467 buckets (10,401 kgs), averaging 28.4 buckets (85.2 kgs) per haul. Harenguia ovalis accounted for 96.6% and Spratelludies delicaturus 34.5%. With Purse Seine, the catch stood at 2,738 buckets (8,214 kgs), averaging 25.1 buckets (75.3 kgs)per haul, and Harenguia ovalis accounted for 96%.

Of the principal bait fishes which may be caught in this region, Harenguia ovalis excels in durability. The results of a

breeding test with bait pens suggest that the durability varies, depending on the catching method, means of transport and the dimensions of the fish body, but the mortality was high for those which were caught with Purse Seine and transported in Living Net for tagging and those whose body is less than 6 cm in length. Of for former group, about 15% will die out in 12 hours and about 20% in 24 hours after they are put into bait pens. Of the latter group, nowever, about 5% will die out. In either case, the mortality will sharply drop after an elapse of 24 hours, suggesting that they will survive long periods of breeding,as long as their feeding is not suspended. Spratellides delicaturus are of less lasting quality and unsuitable for breeding.

Skipjack are widely distributed in the three to ten nautical-mile offshore the Islands. In the peripheral waters of Tarawa, Abemama and Butaritari, thick schools of skipjack including yellowfin are spotted. The chumming proved generally good because of the availability of costal, natural feeds in small quantities. As these favorable fishing grounds are situated close to the Islands of Tarawa, Abemama and Butaritari, a fishing operation method was adopted whereby bait fish would be caught in a lagoon with Bouke-Ami Net at night or with Purse Seine in the morning, pole-and-line fishing performed in the daytime before the fishermen were to return to the lagoon's bait area before sunset.

In the pole-and-line fishing operations which stretched over 76 days, 219,011 kgs of skipjack, 34,734 kgs of yellowfin and 86 kgs of other fishes were caught. The total catch stood at 253,831 kgs,averaging 3,340 kgs a day. Of this total catch 68.6% were caught in the peripheral waters of Butaritari. The average weight was 2.76 kgs for the skipjack and 4.54 kgs for the yellowfin.

I. Outline of Survey Program

1. Purpose of the Survey

The Daini Kyoryo Maru, 59.98 tons, was engaged in carrying out a costal survey on bait fish for the pole-and-line fishing of skipjack in the waters of the Gilbert Islands for 119 days from November 7, 1977, to March 5, 1978. As this period coincides with a season of unstable westerly monsoon and there is a long spell of stormy weather, discouraging the appearance of skipjack and bait fish. For this reason, it was considered that this period alone would not be enough to grasp the actual status of the resources. The survey was therefore designed to clarify the year-round conditions of skipjack and bait fish for the pole-and-line fishing in the waters with a view to working for a sound development of the skipjack fishing operation.

2. Survey Program

With Betio on Tarawa Island in the Gilbert Islands selected as the survey base, a skipjack pole-and-line fishing test, a bait fish catching test with Bouke-Ami Net and Purse Seine and a bleeding test on bait fish caught were performed along the coasts of the islands extending from Butaritari Island in the north to Nonouti Island in the south, in addition to meteorological and oceanographic observations and a biological survey.

II. Outline of the Survey

1. Priorities in the Survey

1-1. A catching test on bait fish for the pole-and-line fishing of skipjack in the costal waters of the Gilbert Islands and a survey on the classification, distribution and ecology of bait fish.

1-2 Test on the breeding of bait fish in the bait pen

1-3 Test on the durability of bait fish in ship holds

1-4 Test on the aptitude of bait fish in skipjack pole-and-line fishing operations

1-5 Test on the pole-and-line fishing of skipjack and a survey on the distribution and ecology of skipjack in the peripheral waters of the Gilbert Islands

1-6 Meteorological and oceanographic observations at the fishing grounds

2. Survey Period and Sea Region

2-1 Period of Charter
184 days from May 1 to October 31, 1978

2-2 Survey Period
163 days form May 19 to October 28, 1978

2-3 Survey Area

In order to clarify the characteristics of each fishing grounds on the basis of the distribution of bait fish and skipjack , the survey area was divided into four sea regions around Tarawa, Abemama, Butaritari and Nonouti

Tarawa Sea Region: Situated between Lat. $2^{\circ}30'$N and $0^{\circ}40'$N. Includes the peripheral waters of Tarawa, Abaiang, Marakei and Maiana.

Abemama Sea Region: Situated between Lat. $0^{\circ}40'$N and the equator. Includes the peripheral waters of Abemama, Aranuka and Kuria.

Butaritari Sea Region: Situated north to Lat. $2^{\circ}30'$. Includes the peripheral waters of Butaritari and Little Makin.

Nonouti Sea Region: Situated south to the equator. Includes Nonouti and Tabiteua.

Fig. 1 Track
Fig. 2 Survey Area
Table 1 Navigation Log
Table 2 Items of Operation

3. Survey Ship

Table 3 Specifications of the Survey Ship

Name: Hatsutori Maru NO. 3
Shipowner: Hokoku Marine Products Co., Ltd.
Registration Number: TK2-1275
Ship Structure: Steel
Date Completed: April 25, 1974
Shipyard: Nagasaki Shipbuilding Co., Ltd., Nagasaki City
Gross Tonnage: 79.37 tons
Main Dimensions: 35.00 x 5.70 x 2.75 m
Main Engine: Diesel 550 PS
Auxiliary Engine: Diesel 120 KVA x 2
Radio: Transmitter 1 set receiver 1 set
Freezing Capacity: about 7 tons per day
Navigation Gear: Radar, Direction finder, Echo sounder
Electronic thermometer, Automatic steering system

Fig. 1 Track

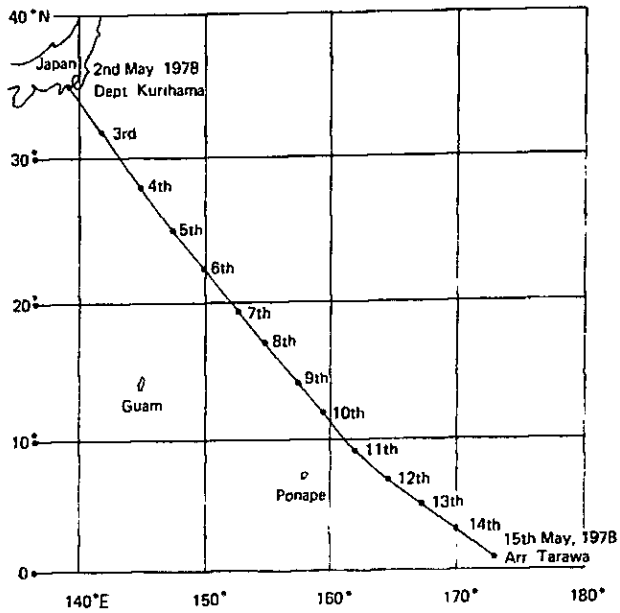


Fig 2 Survey Area

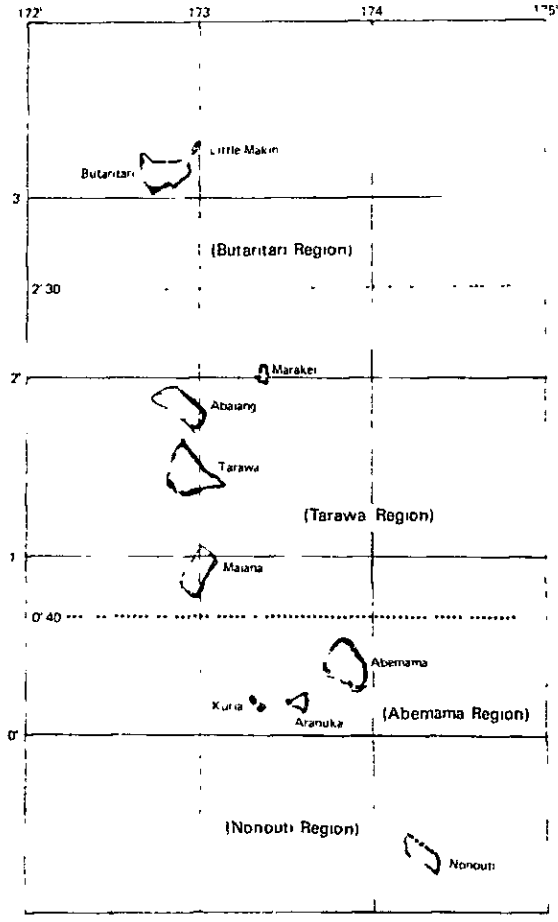


Table 1 Navigation Log

(Unit: Days)

Date	Item	Navigation	Classification of navigation					Remarks
			Mooring	Sailing	Operation	Non-operation	Total	
53 5. 1	Charter started		1	0	0	0	1	Loading of equipment and materials
2	Left Kurihama Port		0	13	0	0	13	
15	Entered Betio (Tarawa)		4	0	0	0	4	
19	Left Betio (Tarawa)		0	0	3	0	3	Breeding test in Tarawa Lagoon
22	Entered Betio (Tarawa)		2	0	0	0	2	Supplying
24	Left Betio (Tarawa)		0	0	5	0	5	Breeding test in Tarawa Lagoon
29	Entered Betio (Tarawa)		1	0	0	0	1	Supplying
30	Left Betio (Tarawa)	1	0	0	3	0	3	Bait fish catching survey and pole-and-line fishing
6. 2	Entered Betio (Tarawa)		1	0	0	0	1	Supplying
3	Left Betio (Tarawa)	2	0	0	4	0	4	Bait fish catching survey and pole-and-line fishing
7	Entered Betio (Tarawa)		1	0	0	0	1	Supplying
8	Left Betio (Tarawa)		0	0	5	0	5	Bait fish survey in Tarawa Lagoon
13	Entered Betio (Tarawa)		1	0	0	0	1	Supplying
14	Left Betio (Tarawa)	3	0	1	4	0	5	Survey on Butaritari Sea Region
19	Entered Betio (Tarawa)		2	0	0	0	2	Supplying and landing
21	Entered Betio (Tarawa)	4	0	1	5	0	6	Survey on Abemama Sea Region
27	Entered Betio (Tarawa)		2	0	0	0	2	Supplying
29	Left Betio (Tarawa)	5	0	1	5	1	7	Survey on Butaritari Sea Region
7. 6	Entered Betio (Tarawa)		2	0	0	0	2	Supplying
8	Left Betio (Tarawa)	6	0	1	4	1	6	Survey on Butaritari Sea Region
14	Entered Betio (Tarawa)		2	0	0	0	2	Supplying

53 7. 16	Left Betio (Tarawa)	7	1	1	5	1	8	Survey on Butaritari Sea Region
24	Entered Betio (Tarawa)		2	0	0	0	2	Supplying
26	Left Betio (Tarawa)	8	0	1	4	1	6	Survey on Abemama Sea Region
8. 1	Entered Betio (Tarawa)		2	0	0	0	2	Supplying and boat repair
3	Left Betio (Tarawa)	9	0	1	4	1	6	Survey on Butaritari Sea Region
9	Entered Betio (Tarawa)		2	0	3	0	5	Supplying, landing and cargo transfer
14	Left Betio (Tarawa)	10	0	1	5	1	7	Survey on Butaritari Sea Region
21	Entered Betio (Tarawa)		2	0	0	0	2	Supplying and landing
23	Left Betio (Tarawa)	11	0	1	6	0	7	Survey on Butaritari Sea Region
30	Entered Betio ((Tarawa)		2	0	0	0	2	Supplying and landing
9. 1	Left Betio (Tarawa)	12	0	1	5	0	6	Survey on Abemama Sea Region
7	Entered Betio (Tarawa)		2	0	0	0	2	Supplying and landig
9	Left Betio (Tarawa)	13	0	2	4	0	6	Survey on Abemama and Nonouti Sea Regions
15	Entered Betio (Tarawa)		2	0	0	0	2	Supplying and landing
17	Left Betio (Tarawa)	14	0	2	6	0	8	Survey on Butaritari Sea Region
25	Entered Betio (Tarawa)		2	0	0	0	2	Supplying and landing
27	Left Betio (Tarawa)	15	0	2	5	0	7	Survey on Abemama Sea Region
10 4	Entered Betio (Tarawa)		2	0	0	0	2	Supplying and landing
6	Left Betio (Tarawa)	16	0	1	6	0	7	Survey on Butaritari Sea Region
13	Entered Betio (Tarawa)		3	0	0	0	3	Supplying and landing
16	Left Betio (Tarawa)	17	1	1	9	1	12	Survey on Butaritari Sea Region
28	Entered Betio (Tarawa)		4	0	0	0	4	Supplying and landing
31	Charter released							Landing of equipment and materials
Total			Days 46	Days 31	Days 100	Days 7	Days 184	

Table 2 Items of Operation

Classification	Content	Number of Days	Total
Mooring	Japan	1	46 Days
	Local base	43	
	Bait ground	2	
Sailing	Between Japan and Gilbert Islands	13	31 Days
	Shifting fishing grounds	18	
Operation	Bait fish survey, breeding and pole-and-line fishing	100	100 Days
Suspension of fishing operations	No bait caught	2	7 Days
	Remodelling and repair of fishing nets	4	
	Rest	1	
Total			184 Days

4. Organization of the Staff

4-1 Research Specialists and Crewmen

Research specialists: Takuji Hirota and Iwao Shindo
(Total: 2 persons)

Crewmen: Mitsutoyo Kaneda (captain), Yukihiro Momma (chief engineer), Yukio Sasaya (radio operator) and 11 other crewmen (Total: 14 persons)

4-2 Organization of the Staff by Trip

Table 4 Organization of the Staff by Trip

(Unit: persons)

Trip	Research specialist	Japaness crewmen	Gilbert crewmen	Gilbert government officials	Total
1	Shindo	14	10	1	26
2	Hirota	14	10	1	26
3	H	14	10	1	26
4	H	14	8	1	24
5	S	14	9	1	25
6	S	14	10	0	25
7	H	14	10	1	26
8	S	14	9	1	26
9	H	14	10	0	25
10	S	14	10	2	27
11	H	14	7	3	25
12	S	14	8	3	26
13	H	14	9	3	27
14	S	14	9	0	24
15	S	14	9	1	26
16	H	14	9	1	26
17	S	14	9	1	26

5. Survey Items and System

5-1 Skipjack Pole-and-Line Fishing Test

The existance of schools of fish was ascertained by sighting. In respect to those for which chumming had been performed, a series of numbers was assigned and documentation was made on the following items.

1) Time a fish school detected, time chumming started and time catching started

2) Sea Region for operations, latitude and longitude

3) Species and type of the fish school (associated or non-associated with birds, number of birds, associated with drifting log, associated with whale shark, etc.), chumming conditions (no strike, bad strike, somewhat good strike or good strike)

4) Species of bait fishes and the quantity used (in terms of 3 kg buckets)

5) Meteorological and Oceanographic Observation: Weather, wind direction, wind velocity, waves, air pressure, air temperature, surface water temperature

6) Number of fish caught by species, average body weight, catches

5-2 Biological Survey on Skipjack

1) The body length was measured with 100 fish sampled per species at random out of the catches of a single operation

2) The body length and weight were measured with 20 fish sampled per species at random for the catches of a single operation. The sex classification, maturity of the genital gland (not matured, somewhat matured or matured; spawned or not), conditions of the stomach (empty, half-full or full), and contents in stomach (natural bait, or bait cast; number of fish by species)

5-3 Bait Fishing Catching Test by Bouke-Ami

Schools of fish were lured by underwater and on-the-water fishing light at night and caught by Bouke-Ami. A series of numbers was assigned to each operation and documentation conducted on the following matters;

1) Time the light turned on, time the net cast, and time fish hauled inboard (or into a pen)

2) Sea Region for operation, latitude and longitude

3) Luring of fish schools around fishing lights (none, slight,rather dense, dense or very dense) and size (large, medium or small)

4) Meteorological and Oceanographic observation: Distance of the site of operations from the land coast, bottom texture, depth, transparency, weather, wind direction, wind velocity, air pressure, air temperature, temperature of surface water, waves and tidal current

5) Catches by species (in terms of number of buckets)

5-4 Bait Fish Catching Test by Purse Seine

Schools of fish a lagoon were caught by a Purse Seine, transferred into a catch net and then into a Living Net, before they were transported by the survey ship. A series of operation numbers was assigned to each operation, and documentation was made on the following matters;

1) Time net casting started and time hauling into a Living Net completed

2) Sea Region for operations,latitude and longitude

3) Type of fish school (associated or non-associated with birds, conditions of movement), size (large, medium, small or extremely small)

4) Meteorological and Oceanographic observation: Distance of the site of operation from the land coast, bottom texture, transparency, weather, wind direction, wind velocity, air

pressure, air temperature, temperature of surface water, waves and tidal current (note, however, that pressure, temperature and surface water temperature were measured at the point the ship moored)

5) Catches by species

5-5 Biological Survey on Bait Fish

1) One hundred fish per species were sampled at random from the catch of each operation and the body length was measured.

2) Twenty fish were sampled per species at random from the catch of each operation (those big enough to undergo a sex differentiation), body length, sex classification, maturity of the genital gland (not matured or matured; spawned or not).

5-6 Test on the Breeding and Durability of Bait Fish

Two bait pens, large and medium, were positioned in a lagoon to carry out a breeding test. A durability test was also carried out with a live-fish hold. The lapse of time and the survival of bait fish were observed.

5-7 Test on Aptitude of Bait Fish

Differences were observed by species in respect to the movement of bait fish when living bait were cast into the sea during a skipjack pole-and-line fishing operation (conditions of swimming and habit of homing to the ship), effects of luring schools of skipjacks to the ship, effects of keeping them at the ship side, and skipjacks' selection and taste of bait fish.

5-8 Meteorological and Oceanographic Observation

1) In addition to the meteorological and oceanographic observation performed during above mentioned fishing operations, the ship's position, sea region, weather, wind direction, wind velocity, waves, air perssure, air temperature and surface water temperature were also observed at every noon.

2) Thirty-one points were selected in the sea regions for the pole-and-line fishing of skipjack and each point was assigned with a serial number to observe the ship's position, weather, wind direction, wind velocity, air pressure, air temperature, waves, transparency,and surface water temperature in addition to the measurement with BT of each layer from the water surface down to 250 m in depth.

6. Fishing Gear and Method

6-1 Pole-and-Line Fishing of Skipjack

Glass fiber poles (3.1, 3.5 and 3.75 m in length) were used. The total number of poles used was 17, including eight at the bow and nine at the stern in normal circumstances.

6-2 Bouke-Ami Net

Luring lights and Bouke-Ami Net were used for a bait fish catching test at night. The construction of the Bouke-Ami Net and the method of its use are shown in Figs. 1 and 2.

6-3 Purse Seine

For a bait fish catching test along the coast of a lagoon in the daytime, a purse seine which could be manually carried around in the sea was used. The construction of the purse seine and the method of its use are shown in Figs. 3 and 4.

6-4 Bait Pen

The construction of medium-type and large-type bait pens and a living net for tagging is illustrated in Figs. 5, 6 and 7.

7. Outline on Development of Affairs

7-1 Outline on Movement of Research Specialists

Two Japanese research specialists left Tokyo International Airport on May 8, 1978, and arrived at Tarawa in the Gilbert Islands on May 10 by way of Guam and Nauru. They opened their office in the Bureau of Fisheries at

Betio on Tarawa Island, they survey base, on May 11. The research specialists, in principle, went aboard the survey ship in shifts for each trip during the course of an on-the-sea survey. During on board, they were engaged in the planning and management of the survey, performance of the survey and collection of data. While staying on the land, they carried out on-the-land surveys, held negotiations with the Government, updated date and exchanged messages with Japan. During the survey period, Mr. Hirota, a research specialist, was aboard the ship for 72 days and Mr. Shindo, another research specialist, for 89 days.

7-2 Outline on Operation of the Survey Ship

The survey ship Hatsutori Maru NO. 3 left Kurihama Port on May 2, 1978, and arrived at Betio Port of Tarawa Island on May 15 of the same year. After going through formalities for entry into the country and port, landing spare ship's gear and survey equipments and fishing gear, the survey ship left Betio Port on May 19 to perform a bait fishing breeding test. The anchor was cast at a deep end of the Tarawa Lagoon to place living bait pens. The bait fish which were caught in a fishing test with Bouke-Ami net and Purse Seine were put into the bait pens. In addition to the catching test, a breeding test was continuously performed until June 19. During this period, the bait fish thus bred were used for skipjack pole-and-line fishing tests in three trips.

To assure a continuity of the skipjack pole-and-line fishing test and the breeding of bait fish, a catching test was carried out with Bouke-Ami Net and Purse Seine until October 27. Also to keep bait fish for the pole-and-line fishing of skipjacks during this period, bait pens were placed, depending on the catch of bait fish, and bait fish were kept to observe their conditions.

The supplying of fuel, fresh water and provisions could not be conducted at any places other then Betio Port, Betio Port was selected as the supply port and the period of one trip was set at about eight days.

Bait fish were abundantly distributed in the lagoons of

Tarawa, Abemama and Butaritari and their conditions for anchorages were favorable. Besides, the peripheral waters of these islands are good fishing grounds for skipjack. For this reason, emphasis was put on these three sea regions -- particularly, the Butaritari Sea Region -- in carring out surveys.

The Betio anchorage and its periphery are a good bait fishing ground, a catching test was performed with Bouke-Ami Net at the anchorage after supplying had been completed at Betio. After a catching test had been completed off Tarawa, the ship moved to other sea regions, where bait fish were caught in the lagoon with Bouke-Ami net at night and purse seine in the morning and a pole-and-line fishing operation was carried out off the shore. Before, sunset, the ship returned to the lagoon to the land the catches. This pattern of operation was repeated.

In perallel to other surveys, oceanographic observation was started with BT on September 17. The observation was continued at 31 points until October 3.

The on-the-sea surveys in 17 trips had been completed on October 28. The ship returned to Betio Port to land the catches and the equipment which was to be tranferred to the Government of the Gilbert Islands. The Gilbert crewmen were discharged and the charter of the survey ship came an end on October 31.

III. Results of the Survey

In this survey, meteorological and oceanographic observation, skipjack catching test, bait fish catching test and bait fish breeding and durability tests were carried out off the islands of the Gilbert Islands extending from Butaritari to Nonouti and also in the costal waters including lagoons.

1. Sea Regions for the Survey

1-1 Meteorological and Oceanographic Observation

The survey area included the waters along the islands extending from Butaritari to Nonouti and also on the lagoons of Butaritari, Tarawa, Abemama and Nonouti Islands. The 31 points for BT observation are indicated in Table 2 (Record of Oceanographic Observation) and Fig. 8 (Tracks of Oceanographic Observation).

1-2 Survey on Bait Fish

A catching test was carried out in the lagoons of Butaritari, Tarawa, Abemama and Nonouti Islands and breeding test in the lagoons of Tarawa and Butaritari.

1-3 Survey on Skipjacks

Skipjacks were surveyed along the chain of islands extending from Butaritari to Nonouti and in the waters west to the chain -- primarily, in the waters about 20 nautical miles from the coasts of Butaritari, Abaiang, Tarawa, Maiana, Abemama, Marakei, Kuria and Nonouti.

2. Meteorological and Oceanographic Observation

2-1 Outline

During 5½-month period of the survy which extedned from May 16 to October 31, the meteorological conditions continued to be stable, and no major changes were observed by month.

A regular meteorological observation was conducted every hour (weather, wind direction, wind velocity, waves, atmospheric pressure, air temperature and surface water temperature). The wind velocity stood at a maximum of 6 and a minimum of 0, whereas the air pressure was recorded at a maximum of 1,015 mb and a minimum of 1,004.2 mb.

The observation results recorded at the noon of every day indicate that ESE accounted for 23.0%, E 20.6%, SE 18.2%, ENE 12.7%, S 6.1%, SSE 5.5%, calm 4.8% and NE 2.2% in the wind direction and that westerlies were registered at only 3.0%. The wind directions of ENE to SE accounted for 74.5%, indicating that the wind directions were extremely stable.

In terms of Beaufort's wind scale, Force 3 accounted for 46.2%, which was followed by Force 4 with 23.6%, Force 2 with 18.2%, Force 1 with 4.8%, Force 0 with 4.8% and Force 5 with 2.4%. The average velocity stood at 2.9, and there were signs that the velocity was greater in the southern waters than in the northern waters.

With respect to weather, be accounted for 86% and was followed by "o" with 6.8%, "c" with 5.3%, "b" with 1.2%, "r" with 0.6% and "q" with 0.6%. The weather conditions were generally stable, and the rainfalls were greater in the northern waters than in the southern waters.

2-2 Butaritari Sea Region

The average velocity at noon was 2.6 and the easterlies were stable. The winds from E to SE were prominent. No significant changes were observed by month. In October, the occasions on which the south winds blew or "calm" were greater with the wind direction ratio standing at 17.6%. The wind direction and velocity at the noon of every day are indiated in Table 5.

In general, the weather was "bc". In this sea region, however, the weather was more variable than in other sea regions, and there were relatively many rainfalls. With respect to the weather at the noon of every day, "bc" accounted for 76.7%, "o" 13.3%, "c" 8.3% and "q" 1.7%.

The vertical distribution of water temperatures which was found in the BT observation of the Butaritari Sea Region are indicated in Fig. 3. The temperatures of the surface water ranged from 29.1°C to 29.6°C, higher than in other sea regions.

The spring layer of the water temperature ranged from 100 to 130m.

2-3 Tarawa Sea Region

The mean velocity at noon stood at 2.9 and the easterlies were stable. The winds from E to ES were predominant. The westerlies accounted for a mere 1.2%. The wind direction and velocity at the noon of every day are indicated in Table 6.

In respect to the weather, "bc" accounted for 93%, "b" 2.3%, "c" 2.3%, "o" 1.2% and "r"1.2%, and the weather conditions in every sea regions were stable.

The vertical distribution of water temperatures which was found in the BT observation of the Tarawa Sea Region was shown in Fig. 4. The temperatures of the surface water ranged from 28.8°C to 29.4°C. In the offshore waters west to the chain of the islands, the temperatures of the surface water ranged from 28.8°C to 29.9°C. The spring layer of the water temperature was situated in the neighborhood of 100 m.

2-4 Abemama Sea Region

The mean velocity at noon stood at 3.4 and the easterlies were stable. The winds of ESE were predominant. The westerlies accounted for 4.5%. The wind direction and velocity at the noon of every day are indicated in Table 7.

In respect to the weather "bc" accounted for 86.4%, "c" 9.1%, "o" 4.5%.

The vertical distribution of water temperatures which was found in the BT observation of the Abemama Sea Region was shown in Fig. 5. The temperatures of the surface water ranged from 28.6°C to 29.1°C and the water temperature of observed in the southern part was generally lower than the northern part in this region. The spring layer of the water temperature was situated in the neighborhood of 100 m.

Table 5 Wind Direction and Wind Velocity
in Butaritari Sea Region

Wind Velocity / Wind Direction		0	1	2	3	4	5	6	total
N	days								
	%								
N N E	days								
	%								
N E	days			2	3				5
	%			(3.3)	(5.0)				(8.3)
E N E	days			2	2	2			6
	%			(3.3)	(3.3)	(3.3)			(10.0)
E	days			2	5	4			11
	%			(3.3)	(8.3)	(6.7)			(18.3)
E S E	days		1	1	4	3			9
	%		(1.7)	(1.7)	(6.7)	(5.0)			(15.0)
S E	days		1	2	5	2	1		11
	%		(1.7)	(3.3)	(8.3)	(3.3)	(1.7)		(18.3)
S S E	days		1	3		1			5
	%		(1.7)	(5.0)		(1.7)			(8.2)
S	days		1		4				5
	%		(1.7)		(6.7)				(8.3)
S S W	days		1						1
	%		(1.7)						(1.7)
S W	days								
	%								
W S W	days		1						1
	%		(1.7)						(1.7)
W	days								
	%								
W N W	days								
	%								
N W	days					1			1
	%					(1.7)			(1.7)
N N W	days								
	%								
Calm	days	5							5
	%	(8.3)							(8.3)
Total	days	5	6	12	23	13	1		60
	%	(8.3)	(10.0)	(20.0)	(38.3)	(21.7)	(1.7)		(100.0)

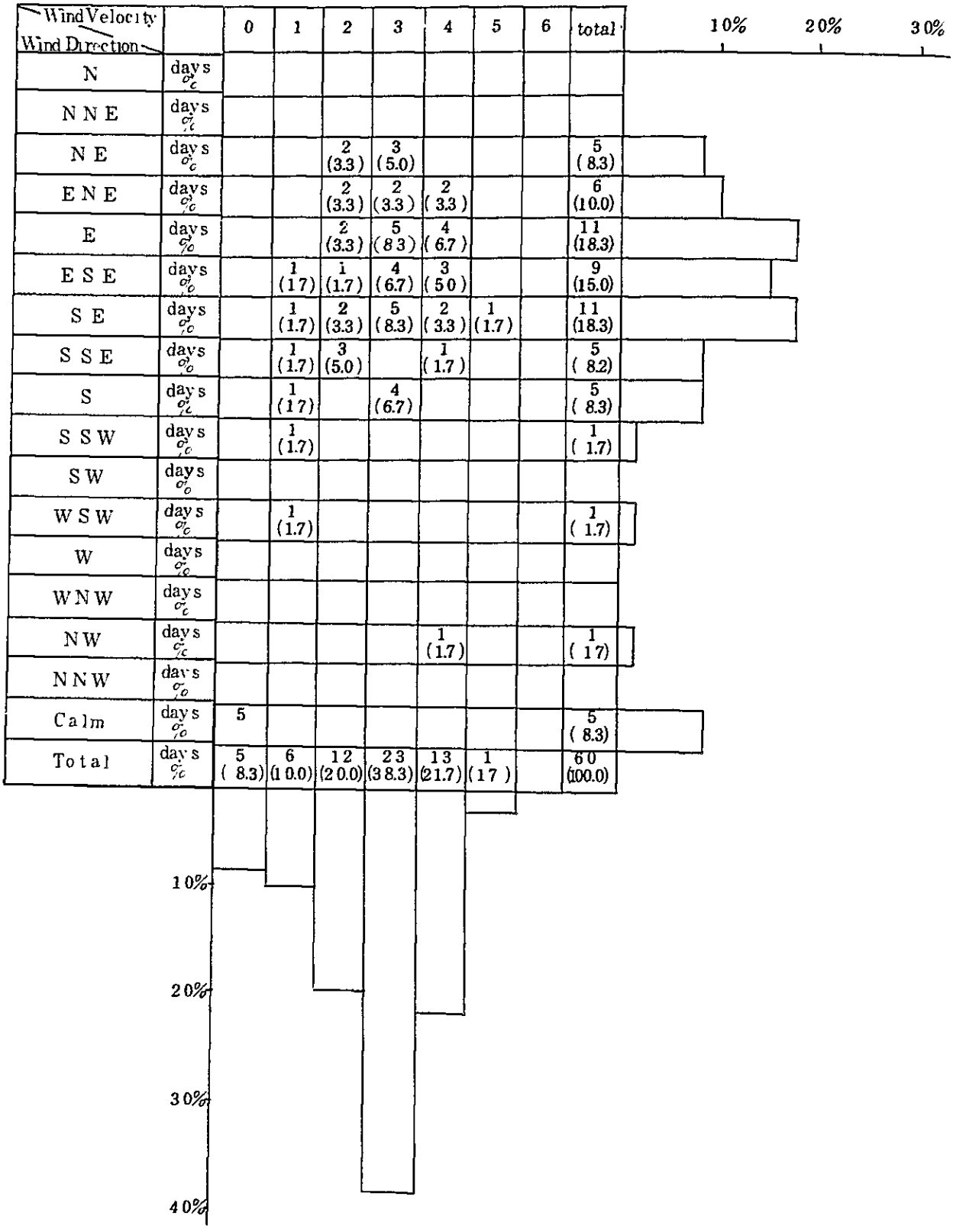
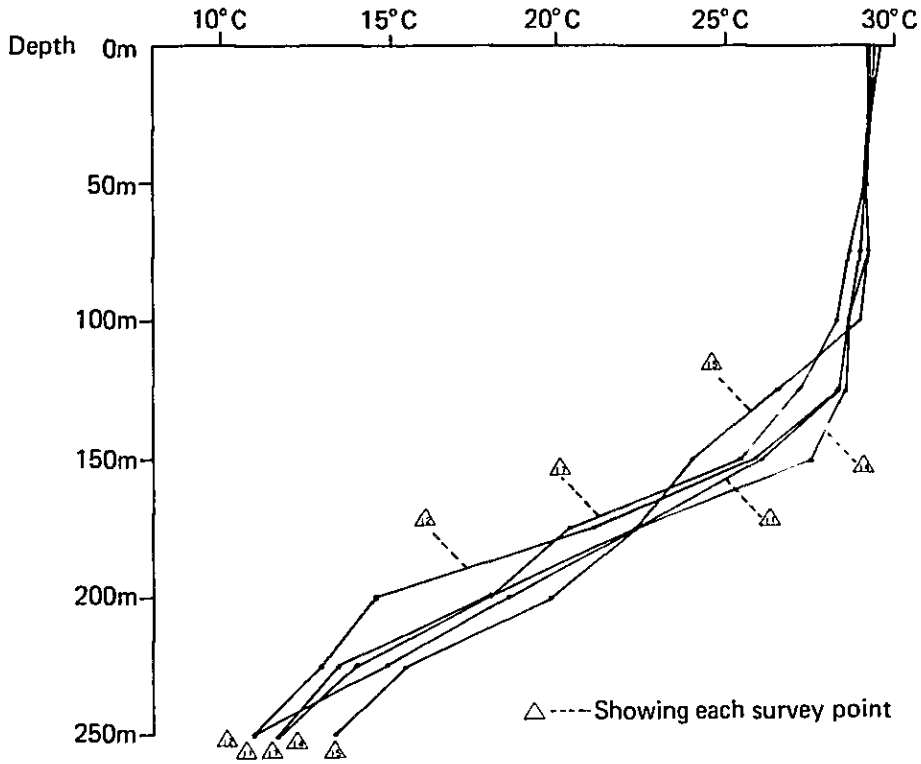


Fig. 3 Vertical distribution of Water temperature in Butaritari Area

(19th Sept. — 24th Sept.)



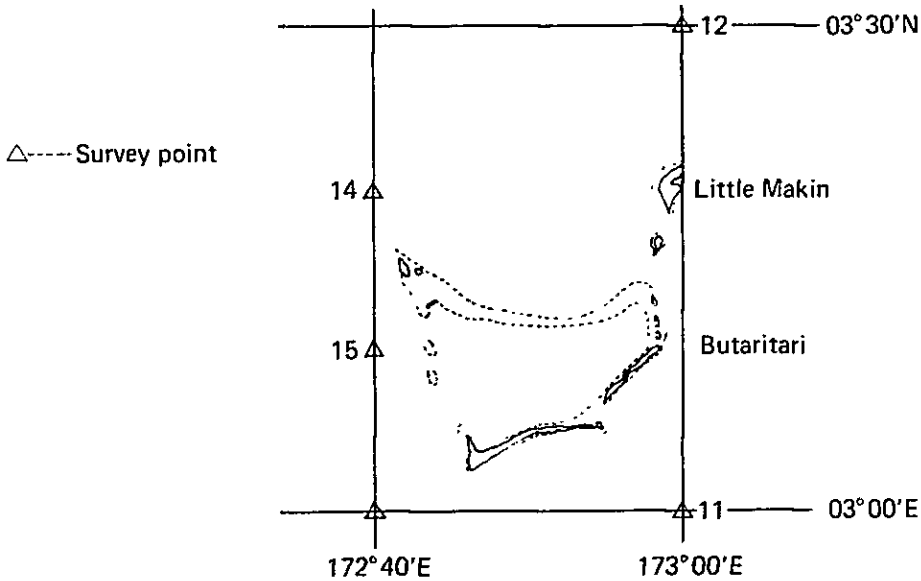


Table 6 Wind Direction and Wind Velocity in Tarawa Sea Region

Wind Velocity / Wind Direction		0	1	2	3	4	5	6	total
N	days								
	%								
NNE	days			1	1				2
	%			(1.2)	(1.2)				(2.4)
NE	days				1	1			2
	%				(1.2)	(1.2)			(2.4)
ENE	days			2	4	4			10
	%			(2.4)	(4.9)	(4.9)			(12.2)
E	days			2	16	3			21
	%			(2.4)	(19.5)	(3.7)			(25.6)
ESE	days			2	10	8	1		21
	%			(2.4)	(12.2)	(9.8)	(1.2)		(25.6)
SE	days		1	4	8	2			15
	%		(1.2)	(4.9)	(9.8)	(2.4)			(18.3)
SSE	days			2	1				3
	%			(2.4)	(1.2)				(3.7)
S	days		1	2	1				4
	%		(1.2)	(2.4)	(1.2)				(4.9)
SSW	days				1				1
	%				(1.2)				(1.2)
SW	days								
	%								
WSW	days								
	%								
W	days								
	%								
WNW	days								
	%								
NW	days								
	%								
NNW	days								
	%								
Calm	days	3							3
	%	(3.7)							(3.6)
Total	days	3	2	15	43	18	1		82
	%	(3.7)	(2.4)	(18.3)	(52.4)	(22.0)	(1.2)		(100)

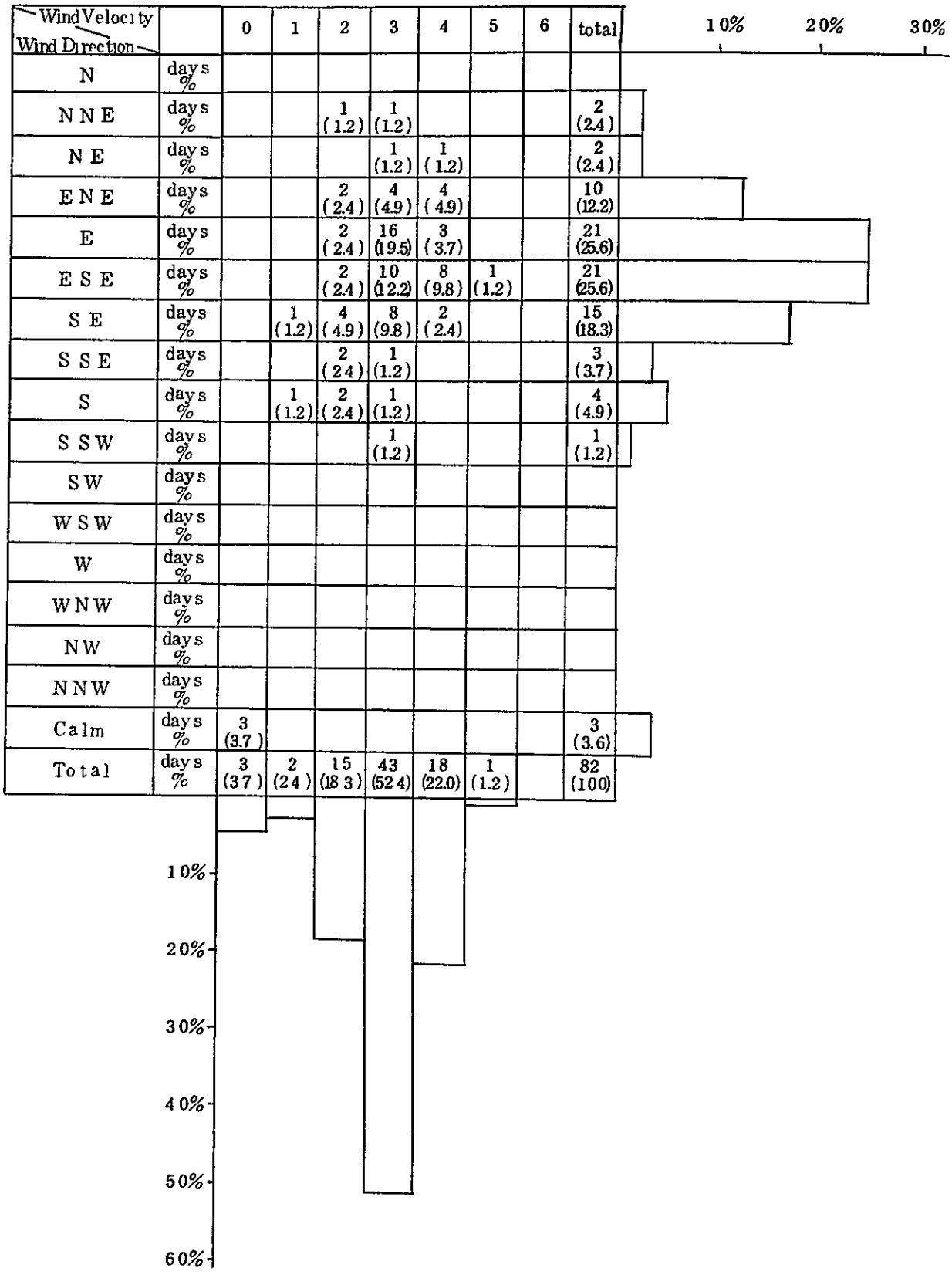


Fig. 4 Vertical distribution of Water temperature in Tarawa Area

(18th Sept. — 3rd Oct.)

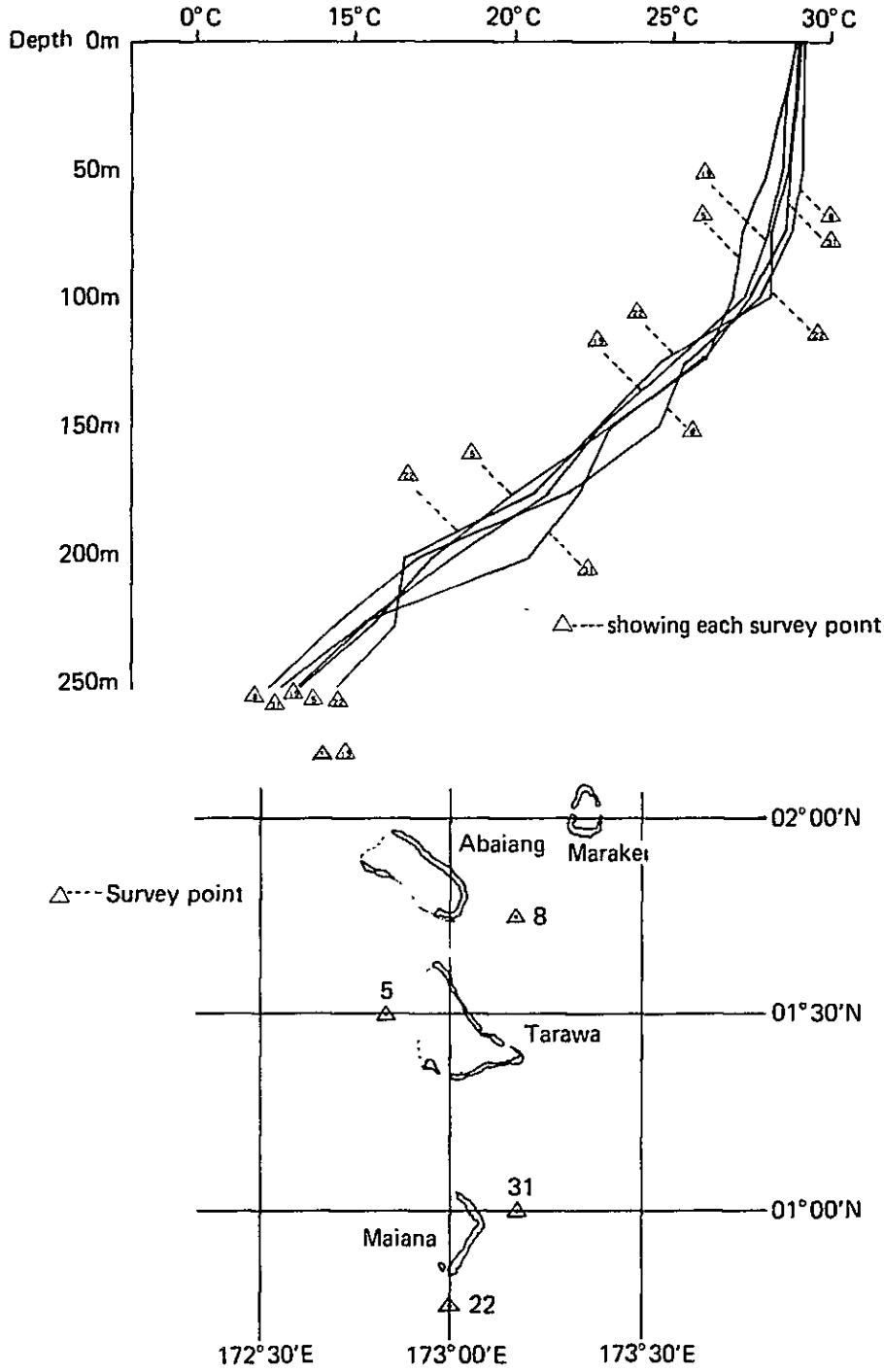


Table 7 Wind Direction and Wind Velocity in Abemama Sea Region

Wind Velocity / Wind Direction		0	1	2	3	4	5	total
N	days							
	%							
N N E	days					1		1
	%					(4.5)		(4.5)
N E	days							
	%							
E N E	days				2	2		4
	%				(9.1)	(9.1)		(18.2)
E	days			1	1			2
	%			(4.5)	(4.5)			(9.1)
E S E	days			1	2	4	1	8
	%			(4.5)	(9.1)	(18.2)	(4.5)	(36.3)
S E	days				3		1	4
	%				(13.8)		(4.5)	(18.2)
S S E	days				1			1
	%				(4.5)			(4.5)
S	days				1			1
	%				(4.5)			(4.5)
S S W	days							
	%							
S W	days							
	%							
W S W	days							
	%							
W	days							
	%							
W N W	days			1				1
	%			(4.5)				(4.5)
N W	days							
	%							
N N W	days							
	%							
Calm	days							
	%							
Total	days			3	10	7	2	22
	%			(13.6)	(45.5)	(31.8)	(9.1)	(100)

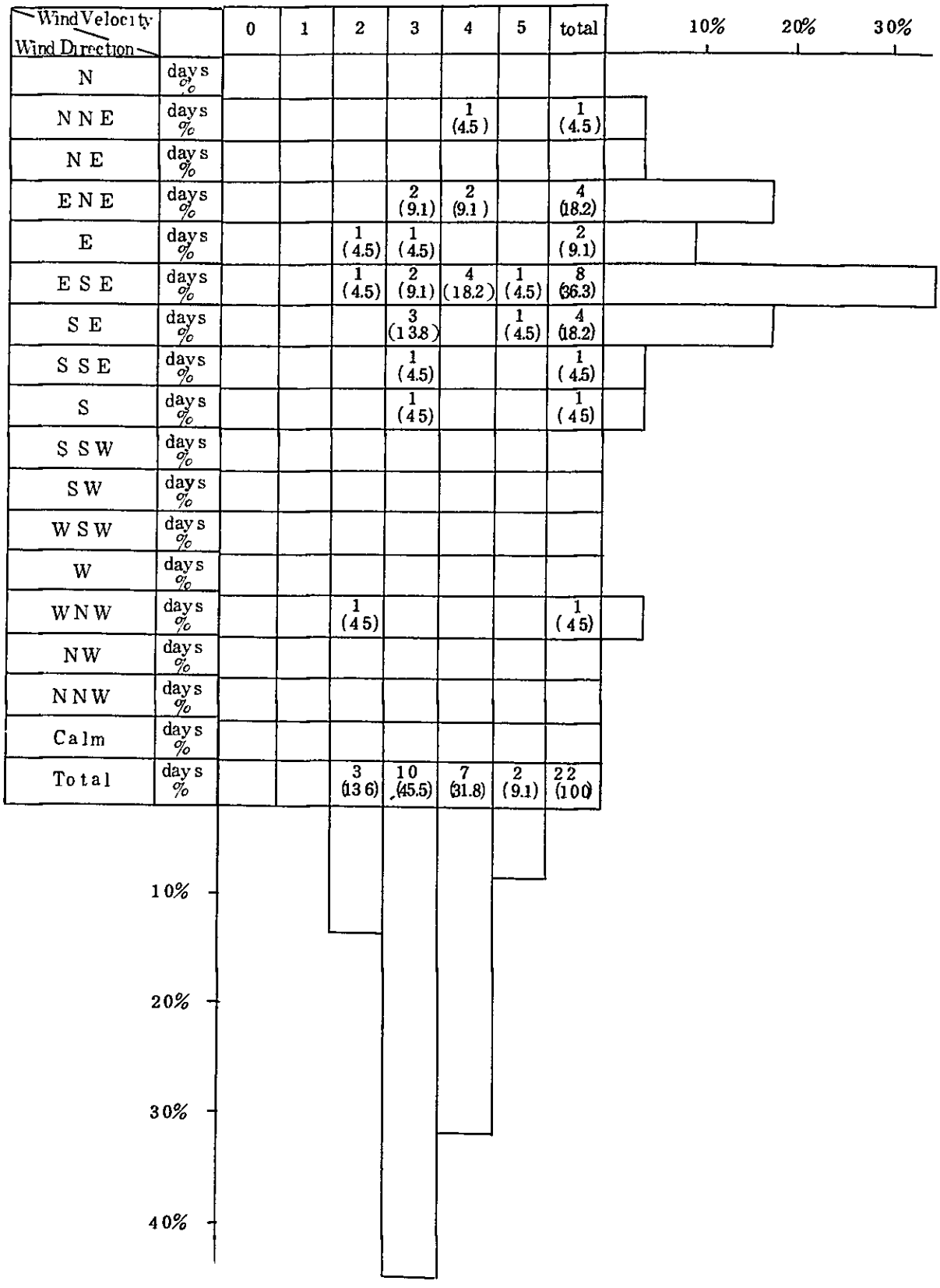
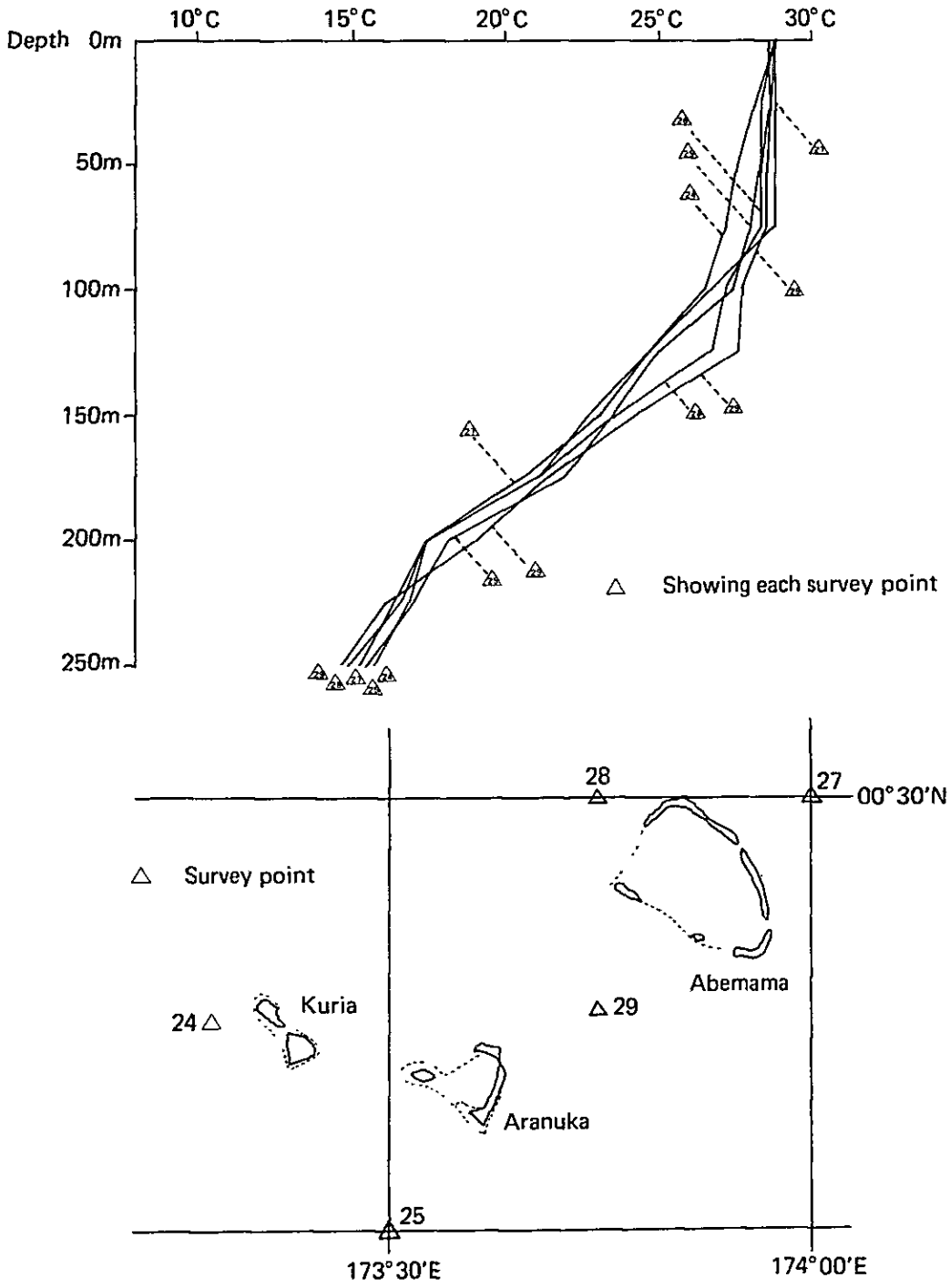


Fig. 5 Vertical distribution of Water temperature in Abemama Area

(27th Sept. — 3rd Oct.)



3. Survey on Bait Fish

3-1 Environment of Fishing Grounds and Distribution of Fish Schools

1) Geographical Environment

The Gilbert Islands is the chain of islands which runs across the Equator from NNW to SSE. Practically every island forms and atoll with its opening or gap on its western side encloses a lagoon. As a land is formed from east to south, the lagoon is calm when the easterly monsoon blow. The lagoon is connected with the open sea. Its depth is great and there are many coral reefs, so that the lagoon is suitable for the growth of small fish. Of the sea regions on which a survey was conducted, Butaritari, Tarawa and Abemama have broad and deep lagoons and therefore were found to be suitable for the catching of bait fish, whereas the opening of Abaiang's lagoon is so shallow in depth that it is difficult to enter it and Nonouti has so many unknown reefs that it was difficult for the survey ship to navigate. For this reason, the survey was limitted to the three islands of Butaritari, Tarawa and Abemama.

2) Fish Species

The fish species which were caught with Bouke-Ami Net and Purse Seine and found to be usable for the pole-and-line fishing of skipjacks are enumerated in Table 8.

3) Distribution of Fishes

Harengula ovalis, Sardinella clupeoides, Allanetta ovalava, Spratelluides delicatunus, Dassumieria hasselti, Caessio caerulaureus, Apogonidae and Carangidae inhabit every lagoon.

Harengula ovalis is distributed in Butaritari, Tarawa and Abaiang in large numbers, but its distribution in the seas south to Abemama is small. Its distribution is also seen in various places of each lagoon. Forming thick groups in the daytime, they approach the shallow sea immediately off the coastline, so that

they may readily be caught with Purse Seine. They are so attractable to light that they may also readily be caught with Bouke-Ami Net at night.

Sardinelle elupeoides was caught with Bouke-Ami net in the lagoons of Butaritari and Abemama, but its distribution seem thin.

Allanetta ovalava normally migrate as they are mixed with schools of Cluperidae. The distribution of Cluperidae is large particularly in Butaritari.

Table 8 Species and Names of Bait Fish

Japanese name	Scientific name	English and local names
Nishin Family	Clupeidae	
Mizun	Harengula ovalis	Gold-spot herring (English) Tarabuti (Local)
Yamatomizun	Sardinella clupeoides	
Togoroiwashi Family	Atherinidae	
Togoroiwashi	Allanetta ovalava	Narrow striped hardyhead (English) Rerekoti (Local)
Urumeiwashi Family	Bussmieriidae	
Minamikibinago	Spratelluides delicaturus	Blue-backed sprat (English) Anan (Local)
Niseginiwashi	Dassumieria hasselti	Van hasset's sprat (English) Tarabuti (Local)
Takasago Family	Caesiodae	
Sasamuro	Caesio caerulaureus	Tenenei (Local)
Tenjikudai Family	Apogonidae	
Atochikitenjikudai	Achamia fucata	
Aji Family	Caragidae	
	Chanos chanos	Milkfish (English)

The distribution of Spratelluides delicatunus is large in the Abemama lagoon. Larval fish approach the periphery of the coast, but adult fish normally inhabit the periphery of a reef. They are not fit for catching with Purse Seine, but they are suitable for catching with Bouke-Ami Net at night, as their habit of gathering around a light is strong.

Dassumieria hasselti, Caesio caerulaureus and Apogonidae the periphery of a deep reef, so that they are not fitted for catching with Purse Seine. However, they are suitable for catching with Bouke-Ami Net at night. The distribution is thin.

Table 9 indicates the composition of catches by sea region and fish species.

Table 9 Compostion of Fish Catches by Sea Region and Fish Species

(in terms of 3kg bucket)

Sea region / Fish species	Butaritari		Tarawa		Abemama		Total	
	Fish catch (bucket)	%	Fish catch (bucket)	%	Fish catch (bucket)	%	Fish catch (bucket)	%
Harengula ovalis	2927.0	816	1067.0	66.0	248.0	24.8	4242.0	68.4
Spratelluides delicaturus	1787	50	446.0	27.5	575.5	57.6	1200.2	19.3
Allanetta ovalava	229.5	64	29.0	1.9	57.0	5.7	315.5	5.1
Apogonidae	1338	37	0.5	0	435	4.4	177.8	2.8
Sardinella clupeoides	430	12	0	0	48.0	48	91.0	1.5
Dassumieria hasselti	20	0	630	39	80	0.8	73.0	1.2
Caesio caerulaureus	600	1.7	9.0	05	0	0	69.0	11
Bussmieriidae	0	0	0.5	0	18.0	1.8	18.5	03
Carangidae	140	0.4	2.0	01	0	0	16.0	0.3
Milkfish	0	0	20	01	0	0	2.0	0
Total	3588.0	100	16190	100	9980	100	6205.0	100

3-2 Bait Fish Catching Test

A bait fish catching test was performed with purse seine in the daytime and with purse seine and fish lights at night. Schools of bait were observed at a place which is situated near the seacoast with a depth of 70 cm to 1.2 m and the bottom materials are favorable, and they were contained and caught with a purse seine, which was carried with hands. There were some restrications on the water depth and bottom materials, but this fishing method proved extremely efficient. The species of bait fish which were available for the catching test consisted mainly of Harengula ovalis and Allanetta ovalava, which migrated along the coast in thick groups. In this method, hauled bait fish have to be carried in a tagged living net and damage is apt to be inflicted on the fish bodies. On the other hand, the Bouke-Ami et is not likely to be restricted by the bottom materials, as long as the water depth is greater than the height of the net. But the moonlight extremely reduces the effects of a fish light, depending on the age of the moon. In the case of Spratelluides delicaturus, the habit of gathering around a light is conspicuous, but this habit is not so conspicuous in the case of Harengula ovalis. In a Bouke-Ami Net operation, hauled fish may be accommodated directly into the live fish hold of a fishing vessel, so that damage is inflicted on the fish bodies in few cases and the bait fish thus accommodated excel in durability.

At Butaritari, thick groups of Harengula ovalis migrate in shallow depths near the coast, so that the effects of catching them with a purse seine were great. At places where the water depth is great, the Bouke-Ami Net turned out to be of effect for Spratelluides delicaturus, Harenguia ovalis, Allanetta ovalava, Apogonidae, Caesio caerulaureus and Spradinella clupeoides.

The migration of Harenguia ovalis was thin in the neighborhood of Tarawa's seacoast, but the Bouke-Ami net proved effective for Harenguia ovalis, Spratelluides delicaturus, Dassumieria haseelti and Allanetta ovalava.

At Abemama, the distribution of Spratelluides delicaturus

is thick and that of Harenguia ovalis is thin. For this reason, a Bouke-Ami Net operation was performed in most cases.

In the periphery of Nonouti's coast, the existence of Harenguia ovalis was not observed and Spratelluides delicaturus did not respond to fish lights. Therefore, no bait fish were caught and the survey was suspended.

1) Bouke-Ami Catching Test

Table 10 Results of Catching with Bouke-Ami (in 3 kg buckets)

Sea region	Number of operations	Catches (buckets)	Mean catches per operation	Harengula ovalis	Spratelluides delicaturus	Allanetta ovalava	Apogonidae	Others
Butaritari	45	1,040	23.1	46.3 %	17.2 %	12.2 %	12.9 %	11.4 %
Tarawa	43	1,507	35.0	63.9 %	29.4 %	1.8 %	0 %	4.3 %
Abemama	34	920	27.1	18.5 %	62.6 %	6.2 %	4.7 %	8 %
Total	times 122	buckets 3,467	buckets 28.4					

The results of catching by month and sea region are elaborated in Table 7 (Record of Bait Fish Catching Test with Bouke-Ami Net in Each Month and Region).

2) Results of Catching with Purse Seine

Table 11 Results of Catching with Purse Seine (in 3 kg buckets)

Sea region	Number of operations	Catches(buckets)	Mean Catches per operation	Harengula ovalis	Spratelluides delicaturus	Allanetta ovalava	Others
Butaritari	62	2,548	41.1	96.0 %	0 %	4.0 %	0
Tarawa	42	112	2.7	93.7 %	2.7 %	1.8 %	1.8 %
Abemama	5	78	15.6	100.0 %	0 %	0	0
Total	times 109	2,738 buckets	25.1 buckets				

The results of catching by month and sea region are elaborated in Table 9 (Record of Bait Fish Catching Test with in Each Month and Region).

3-3 Bait Fish Breeding Test

A breeding test was carried out on the bait fish caught with Bouke-Ami net and purse seine from May 19 to June 19, using a large bait pen, a medium pen and the live fish hold of the survey ship. The record of this bait fish breeding test is elaborated in Table 14. As a result, it was ascertained that the breeding of Harengula ovalis might readily be carried out. During the breeding period, however, there was a case in which several large trevally, 15 - 20 kgs each, leapt over the frame of the pen into a net. Two or three frequently jumped into a net there were two accidents in which the bottom of the net ripped off.

At 1500, October 17, 420 buckets of Harengula ovalis were put into a large pen. At 0800, October 18, it was found that two large sharks were swimming and the bottom had been ripped off at two places. Although emergency repair work was done, the remaining Harengula ovalis, as much as about 300 buctets, were believed to have slipped away, and the mortality was unknown as there had been no death. At 0615, October 19, four large sharks were detected. There were no death, the remaining quantity was 150 buckets and the mortality could not be ascertained, so that the pen was removed.

On October 20, a pen was once again put into position. At 1000, 300 buckets of Harengula ovalis were put into the pen. At 1800, five sharks were detected and the pen was found to have been greatly damaged, thereby making it inevitable to suspend the breeding test. For the breeding of bait fish in a lagoon, therefore, it is essential to come out with measures against the invasion of large trevally, sharks and other damage-inflicting fishes.

3-4 Adaptability of Bait Fish to Pole-and-Line Fishing

Harengula ovalis, Spratelluides delicaturus, Allanetta ovalava, Apogonidae, Dassumieria hasselti, Sardinella clupeoides and Caesio caerulaureus, which were caught in the bait fish breeding test, are adapable as bait fish, but the species that necessary quantity of which may be available at the all times are Harengula ovalis and Spratelluides delicaturus.

Harengula ovalis excels in durability and extremely active in movement. When they have been thrown into the sea, Harengu a ovalis markedly tend to chase the shadow of a ship. For this reason, they are suitable for inducing schools of skipjack to the ship side and most promising as bait fish. The adult fish measures about 7 cm in body length.

Spratelluides delicaturus is inferior in durability and activity to Harengula ovalis. As its body is thin and small, it features an accommodation of large numbers in one and the same capacity. When they have been thrown into the sea, Spratelluides delicaturus are inferior in homing to the ship side to Harengula ovalis. Migrating in the surface layer, Spratelluides delicaturus leap over the water surface when they are chased by skipjack , so that they are of effect in inducing a school of skipjack to the periphery of the water surface and then onto the ship side.

Allanetta ovalava has a habit similar to that of Harengula ovalis, but it appears that its habit of homing to the ship side is inferior.

Dassumieria hasselti and Sardinella clupeoides are active in movement but inferior in durability. Thrown into the sea, they are less inclined to home to the ship side and submerge under the water. Their body is big and there is a limit to the capacity of their accommodation.

Apogonidae is less active and small in body size, thereby excelling in durability. Thrown into the sea, they submerge under the water but are effective for the skipjack lured to the ship side.

Caesio caerilaureus are superior in durability to Harengula ovalis. In view of their submerging habit, they would be less effective for the luring of skipjack.

Milkfish is superior in durability to any other bait fish. It has the habit of homing on the water surface to the ship side but its movement is less active. As far as the effects of luring schools of skipjack to the ship side are concerned, it appears that milkfish is inferior to Harengula ovalis. Bred milkfish grow fast, and their adults measure 4-7 cm in body length in most cases. Being over 12 cm, their effects are extremely reduced. Judging from the contents of a skipjack's stomach, the skipjack's selection of, and taste to, bait fish are not conspicuous.

3-5 Biological Survey

1) Construction of Body Length

The constitution of Harengula ovalis' body length by sea region is shown in Fig. 6.

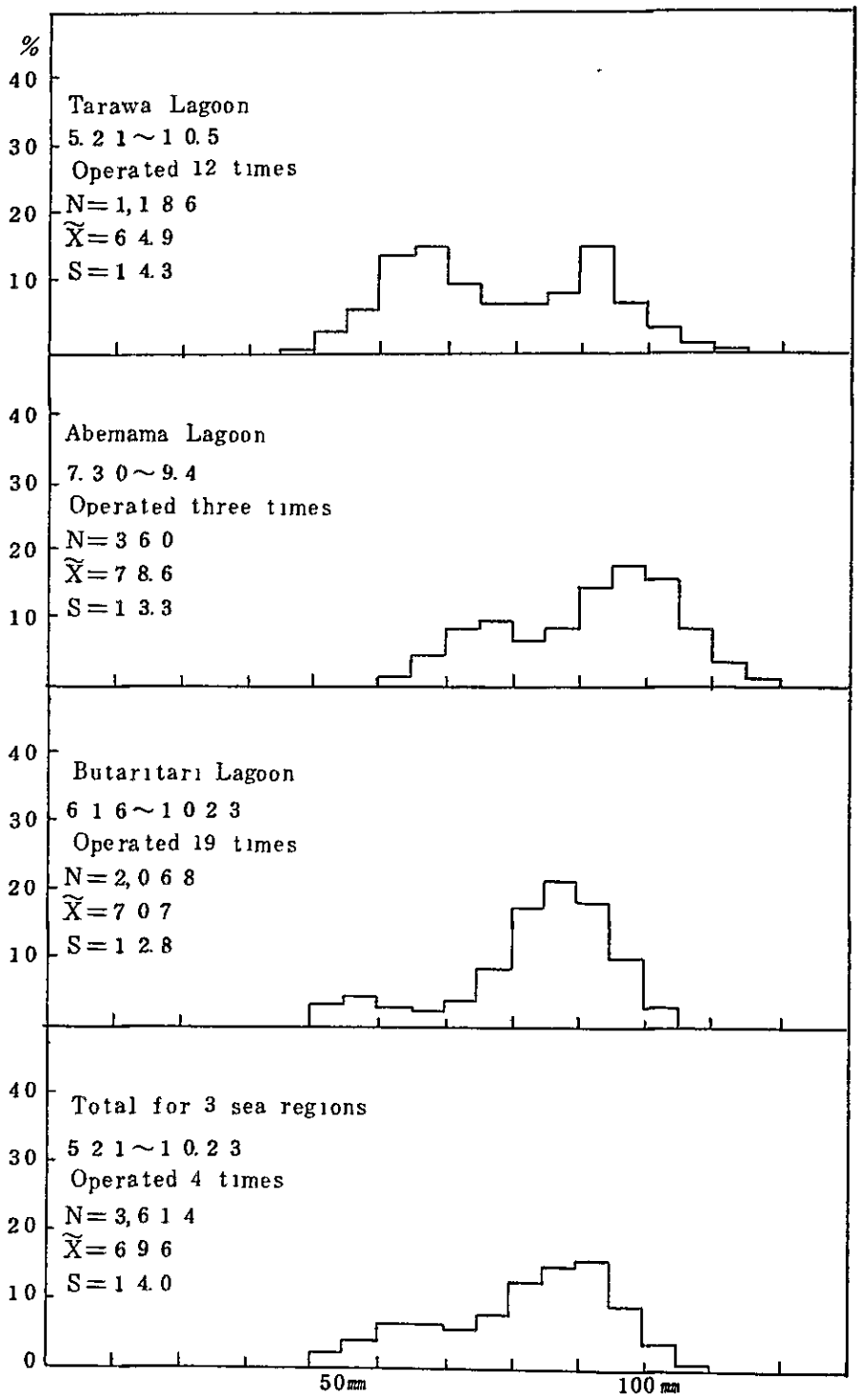
The constitution of Spratelluides delicaturus' body length by sea region is shown in Fig. 7.

2) Measurement of Fish Body

The record of the body-length measurement of bait fish is given in Table 13 (Measurement of Bait Fish Body Length).

Harengula ovalis becomes mature when the body length has reached about 70 mm. A spawning season seems to fall somewhere between August and October.

Fig. 6 Constitution of Harengula ovalis' Body Length

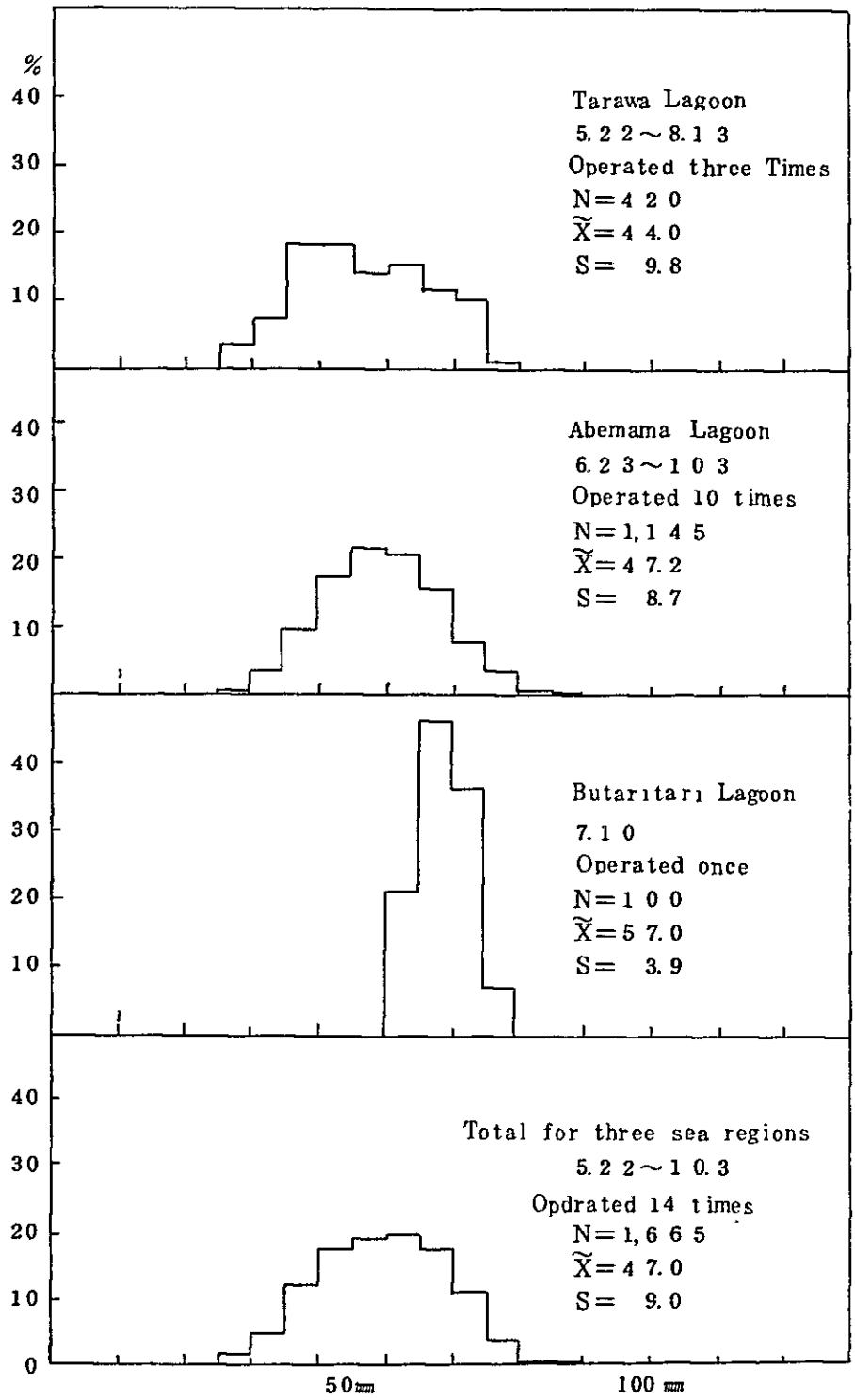


Note: N Total numfer

X Mean body leugth (mm)

S Standard deviation (mm): degree of variation around the mean value

Fig. 7 Constitution of Spratelluides delicaturus' Body Length



4. Survey on Skipjack

4-1 Environment of Fishing Grounds and Distribution of Fish Schools

As the three islands of Tarawa, Abemama and Butaritari have favorable conditions for bait fish supply bases, emphasis was put on their peripheral waters in carrying out a survey.

These peripheries are situated right in the stream of the southern equatorial sea current. Along the western coast of this chain of islands, a sea current runs from SE to NW. In the water belt, 3 to 15 nautical miles off the coast along this sea current, schools of skipjack , including yellowfin , are distributed in abundance. These skipjack schools are believed to be in the habit inhabiting shallows.

In the waters between islands and in their peripheries, the flow and the distribution of water temperatures is complicated due partly to the influences from the tide.

The surface water temperature was high in the north and low in the south, and there were tendency of rising up of the temperature throughout the survey period.

In June, the surface water temperature stood at 28.2°C - 28.5°C in the Tarawa sea region, was practically the same in the Abemama sea region as in the Tarawa sea region, and was recorded at 28.6°C - 28.8°C in the Butaritari sea region.

In July, it stood at 28.3°C - 28.6°C in the Tarawa sea region, 28.2°C - 28.5°C in the Abemama sea region and 28.8°C - 29.2°C in the Butaritari sea region.

In September, the rises in the water temperature were generally conspicuous. On many occasions, the temperature fell in a range of 28.8°C - 29.4°C in the Tarawa sea region, 28.6°C - 29.1°C in the Abemama sea region and 29.1°C - 29.6°C in the Butaritari sea region.

Engraulis japonica, which were used for bait fish in the offshore waters, seldom make their appearance. It was also found that the migrating speed of skipjack was generally fast but their biting response was good.

Table 12 indicates the catches of skipjack and yellowfin and their average body weight by month and sea region.

Table 12 Catches and Average Body Weight of skipjack and Yellowfin by Month and Sea Region

Month	Sea Region	Days operated	Skipjack		Yellowfin		Catches per day (kg)	
			Catches(kgs)	Average body weight	Catches(kgs)	Average body weight	Skipjack	Yellowfin
June	Tarawa	4	3,417	2.75	150	4.55	854.3	37.5
	Abemama	3	4,675	2.42	4,756	3.48	1558.3	1585.3
	Butaritari	4	12,210	3.00	98	3.92	3052.5	24.5
	Total	11	20,302	2.80	5,004	3.51	1845.6	454
July	Tarawa	4	6,930	2.97	0	0	1732.5	0
	Abemama	2	3,859	2.59	308	3.50	1929.5	159.0
	Butaritari	10	20,884	2.57	1,510	4.24	2038.4	151.0
	Total	16	31,673	2.65	1,818	4.09	1979.5	113.6
Aug.	Tarawa	3	5,492	2.77	1,205	5.02	1830.7	401.7
	Abemama	0	0	0	0	0	0	0
	Butaritari	14	34,586	2.35	8,392	4.22	2470.4	599.4
	Total	17	40,078	2.40	9,597	4.31	2357.5	564.5
Sept.	Tarawa	2	4,309	2.60	0		2154.5	0
	Abemama	11	29,099	2.73	3,234	4.38	2645.4	294.0
	Butaritari	4	19,536	2.60	10,550	5.10	4884.0	2637.5
	Total	17	52,944	2.67	13,784	4.90	3114.3	810.8
Oct.	Tarawa	1	3,385	3.02	0	0	3385.0	0
	Abemama	3	8,536	2.53	207	4.50	2845.3	69.0
	Butaritari	11	62,093	3.26	4,324	6.25	5644.8	393.0
	Total	15	74,014	3.14	4,531	6.14	4934.2	302.1
Entire period	Tarawa	14	23,533	2.82	1,355	4.96	1680.9	96.8
	Abemama	19	46,169	2.65	8,505	3.80	2429.9	447.6
	Butaritari	43	149,309	2.75	24,874	4.85	3472.3	578.4
	Total	76	219,011	2.76	34,734	4.54	2881.7	457.0

4-2 Pole-and-Line Fishing Test

The catching record is shown in Table 5 (Record of Skipjack Pole-and-Line Catch by Each Trip).

The catching record for 76 days of operation for an average of 17 poles is as follows;

		Average weight per fish
Skipjack	219,011 kgs	2.76 kgs
Yellowfin	34,734 kgs	4.54 kgs
Enthynnus affanis yaito	54 kgs	2.25 kgs
Elagatis hipinnulatus	20 kgs	1.43 kgs
Dorado	12 kgs	2.00 kgs
Total	253,831 kgs	

As classified by sea region, the record is as follows.

Sea Region		Days operated	Catches per day
Butaritari	174,207 kgs	43	4,051 kgs
Tarawa	24,898 kgs	14	1,788 kgs
Abemama	54,726 kgs	19	2,880 kgs

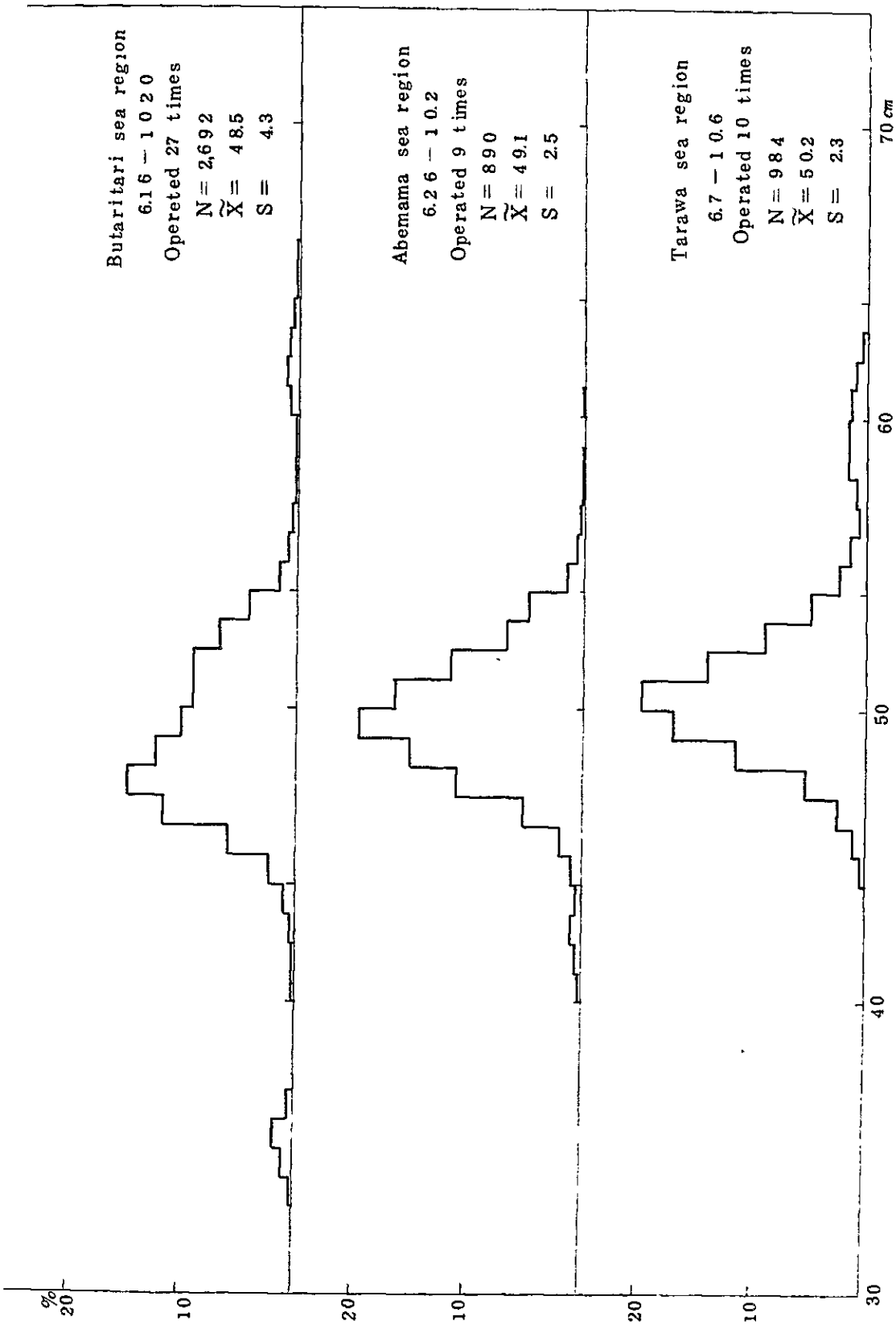
As bait fish were not available in the Nonouti sea region, visual search was performed at daytime, and three schools of skipjack were observe in the waters five to 15 nautical miles NW of the island.

4-3 Biological Survey

1) Consitution of Body Length

The consitution of skipjacks' body length by sea region is indicated in Fig. 8.

Fig. 8 Constitution of Skipjacks' Body Length



2) Measurement of Fish Body

The results of skipjacks' body measurement are indicated in Table 10 (Body Length Distribution of Skipjack)

4-4 Disposition of Catches

The refrigeration house of Betio, a local base, is designed to store frozen food imported from foreign countries, and there is no room for the catches of the Hatsutori Maru NO.3. Moreover, the demand of fish at the local market was about 20 tons a month, and there was an anxiety that the lives of local fishermen would be endangered, if the catches of the survey ship were put on the market. With respect to exports of catches, there was no alternative but to use a reguler container ship, which would visit once a month. There was no way of keeping catches before shipment, nor were there inquiries about their possible export. all catches were unexceptionally put under the supervision of the local Government. As there were no means and ways to dispose of them, most of them were offered free of charge to local inhabitants at the bait fish supply base. The disposition was done as follows:

Sold locally	49.8 tons
Exported to U.S.	15.2 tons
Offered free of charge to islanders	178.5 tons
Discarded into the sea	0.5 tons
Tagging	1.8 tons
Test sampling and inboard consumption	8.0 tons
Total	253.8 tons

5. Conclusions

On the occasion of the marine survey performed by the Dainı Kyoryo Maru in the previous year (November 7,1977, to March 5, 1978), the survey period coincided with the season which featured seasonal westerlies. Storms frequently came on and the sea

conditions were unfavorable. The catches were poor and satisfactory results could not be obtained. On the other hand, the period of this survey coincided with the blowing of stable, seasonal easterlies, and the seas were calm, making it feasible to accomplish better results than ealier anticipated. A comparison of the results of both surveys might be described as a comparison of both seasons. Smooth bait fish catching and skipjack pole-and-line fishing operations may be expected for seven months from mid-April to mid-November.

With respect to bait fish, rich resources, consisting mainly of Harengula ovalis and Spratelluides delicaturus, are available in the lagoons of Tarawa and Butaritari. Harengula ovalis and Spratelluides delicaturus are highly suitable for bait fish in the pole-and-line fishing of skipjack . Forming large groups, they inhabit a lagoon and are habitually attractable to light, so that the use of Bouke-Ami net at night will be of effect. Harengula ovalis in dense groups approach the periphery of a coast and come out to the surface, so that the use of purse seine will be of effect. The use of Bouke-Ami net in the moonlight is less effective, and the use of both fishing methods will facilitate the catching of bait fish. Harengula ovalis features a high durability and is ready to keep. As there are many damage-inflicting fishes in a lagoon, the pens should be provided with appropriate protective measures to facilitate their keeping.

In the peripheral waters of Tarawa, Abemama and Butaritari, skipjack mingled by yellowfin were abundantly distributed throughout the survy period. The fishing ground in the peripheral waters of each island is located within a sphere of a day's trip from the island, so it will be possible for a fishing vessel to catch bait fish and operate the pole-and-line fishing of skipjack within a day's trip from its base. Particularly, the peripheral waters of Butaritari happen to be a rich skipjack fishing ground, and another favorable fishing ground stretches over the offshore waters in the north. Its lagoon is expansive, the greatest water depth being about 30 m and the concentration of bait fish resources consisting mainly of Harengula ovalis and Spratelluides

delicaturus is high. The landform of the periphery of the coast is suitable for purse seine operations, so that there is every reason to believe that Butaritari will become a future base for the skipjack fishing operations.

IV. Relations with the Government of the Gilbert Islands

1. Governmental Organization

Governor: Wallace O.B.E.
- Office of the Governor
  - High Court
  - Magistrates' Court
  - Police
  - House of Assembly

Chief Minister: Ieremia Tabai
- Office of the Chief Minister
  - Broadcasting and Publication Division
  - Printing Division
- The Minister of Local Government
  - Minister: Ieremia Tabai
  - Lands and Survey Division
- Office of the Director of Audit
  - Director: Tim Iotaba
- Office of the Attorney General
  - Attorney General: G. Pimm
- Ministry of Finance
  - Minister: Yiwau Awira
  - Accounting and Taxation
  - Customs and Excise Division
  - Supplies Division
  - Gilbert Islands National Provident Fund
  - Gilbert Islands National Loans Fund
- Ministry of Labour and Manpower
  - Minister: Abete Werang
  - Personnel Division
  - Public Service Commission

Ministry of National Resources Development
Minister: Taomati T. Iuta
Agriculture Division
Fisheries Division
Ministry of Trade and Communication
Minister: Roniti Teiwaki
Postal Division
Telecommunications Division
Operating Service
Technical Service
Marine Division
Aviation Division
Meteorological Division
Shipyard
Co-operative Division
Ministry of Works and Public Utilities
Minister: Ieremia Tata
Ministry of Health and Community Affairs
Minister: Babera Kirata O.B.E.
Ministry of Education, Trading and Culture
Minister: Teratao Teannaki

2. Organization of Fisheries Administration

Ministry of National Resources Development
Minister of National Resources Development (Taomati T.Luta)
Secretary for National Resources Development (R.O. Campbell)
Fisheries Division
Chief Fisheries Officer (A.P.J. Holness)
Fisheries Training Officer (B. Dalley)
Fisheries Officer (J.N. Hoogesteger)
Senior Assistant Fisheries Officer (Bareiri Onorio)

3. The Government's Cooperation

3-1 Agencies of Cooperation

The Fisheries Division served as the organ for the direct cooperation to the survey team, and Mr. B. Dalley, the Fisheries training officer,served for liaison and negotiations between both parties.

3-2 Offer of Facilities

1) Offer of Research Specialists Office

One of the rooms of the Fisheries Divisiom was offered with necessary office equipment (telephones, desk, electric fan, electric lamps, etc.).

2) Offer of Dwellings for Research Specialists

Furnished dwellings were offered to the research specialists.

3) Offer of Assistants

Sernices were offered by staff officials of the Fisheries Division (typists, drivers, clerks and messenger boys), whenever necessary.

4) Offer of Means of Transport

Jeeps and motorboats of the Fisheries Division were offered, wherever necessary.

5) Exemption of Income Tax and Customs Duties

The income tax on the research specialist and the customs duties on ship gear and research equipment and the personal belongings of the research specialist were exempted.

6) Authorization of Radio Communication

Radio communication between the survey ship in the port or the territorial waters and Japan and also radio communication with research specialists' dwellings were authorized.

7) Offer of Medical Care

Medical care was offered free of charge at governmental medical care institutions.

8) Offer of Pilots

Pilots were offered to the survey ship for its first entry into Tarawa Port and its navigation to the bait fish catching ground of the Tarawa lagoon.

9) Offer of Data

The data necessary for the survey were offered upon request.

10) Offer of Land Warehouse

A land warehouse was offered to store ship's gear and research equipment and a guard was assigned.

11) Offer of Services for Gilbertese Crewmen's Employment

The services for the subscription and selection of Gilbertese crewmen were offered by the Fisheries Division, and the travel allowance for their assignment and return was offered by the Fisheries Division.

4. Role and Training of Gilbertese People

During the survey period, the local counterparts of the Japanese research specialist, local fishing trainees and local engine trainees went aboard the survey ship and underwent on-the-job training in various fields from the Japanese research specialist and crewmen through the ship's routine work.

4-1 Research Specialists' Counterparts

One staff official from the Fisheries Division or FAO/UNDP went aboard the ship in shifts to serve as a research counterparts in observing the operations and extending cooperation in research work. Guidance was also provided by Japanese research specialists on surveys.

4-2 Fishing Trainees

1) One fishing master trainee went aboard the ship in four navigations to direct purse seine operations and at the same time to undergo training in Bouke-Ami net and skipjack pole-and-line fishing operations.

2) Three fishing trainees went aboard the ship in nine navigations to undergo on-the-job training while they were engaged in the ship's routine deck and fishing operations in the same manner as the Gilbertese crewmen. One of them became a deck officer trainee and directed the Gilbertese crewmen under the guidance of a Japanese deck officer to undergo training as a deck officer. Another became a baiting trainee to receive guidance from a Japanese baiting instructor on baiting technology. In the last two navigations, he was in charge of baiting during the fishing operations.

4-3 Engine Trainees

Of two engine trainees, one went aboard the ship in five navigations and the other in seven navigations. They were assigned as an alternate duty officer for the Japanese engineer and trained as engineers in respect to an engine in all aspects and the handling of a brine freezing system.

4-4 Ordinary Crewmen

Under the direction of a Japanese deck officer, ordinary crewmen were treated in the same status as their Japanese counterparts. While receiving technical guidance from Japanese crewmen, they were engaged in the ship's deck and fishing operations.

V. Development of the Gilbert Islands' Fisheries

1. Present Situation of Fisheries

On every island, practically every islander is engaged in catching fish with their hands or with a cast or gill net, or in pole-and-line or vertical-line fishing by canoe along the coast

for his or her own consumption. Tarawa Island is the only where fishing operations are performed on a commercial basis, and 10 outboard motor vessels are operated on a family basis. The fishing operations include the pole-and-line fishing of skipjacks (shell lure used but bait fish not used) and the vertical-line fishing of demersal fish, and they are performed only on days when the seas are calm, catching about 100 kgs of fish per ship a day on the average. The fish thus caught are sold directly by the fishermen as they are still fresh. The fish prices are not fixed, ranging from 35 Australian cents for skipjack and tuna per pound to 30 Australian cents for demersal fish. The fish demand of Taraw Island is about one ton a day, and there are signs that demand is somewhat stronger than supply.

On every island, lobsters inhabit its eastern reef coast and many caught by the hands at night. As no means of transport are available, Abaiang Island turns out to be the only place which may ship lobsters to Tarawa Island. Still fresh, lobsters are delivered to marchants on Tarawa Island for 75 Australian cents per pound. Boiled, they are sold for A$1 per pound.

The fish demand of the domestic markets is extremely small, and there is little likelihood that the fisheries oriented toward the domestic markets would be developed to a greater extent than at present.

The ice plant of Tarawa Island has a production capacity of one ton a day. However, as the demand does not exceed this capacity, production is done just to meet the demand. The price is A$70.50 per ton. The refrigeration house's capacity is about 20 tons. Designed mainly for the storing of imported food, this refrigeration house has little room for the keeping their catches. As no fish processing facilities whatever are available, there is no way of diverting catches to foreign countries.

2. Necessity of Fisheries Development

The principal industry of the Gilbert Islands is the exportation of phosphorous ores on Ocean Island and copras on each

island. The phosphorous ore resources are just about to dry up and the exports of copras account for only 10% of those of phosphorous ores in value, and no big rise can be expected in the output.

The only resources which could presumably take the place of phosphorous ores in sustaining the national finances seem to be skipjack and tuna , which aboundantly inhabit the Gilbert Islands' vast territorial waters. It is already known that the skipjack and tuna resources are aboundantly available in the Gilbert Islands. As a result of this survey, it has been confirmed that skipjack and yellowfin are aboundantly distributed in the costal waters of Gilbert Islands and that bait fish may be sufficiently secured for the pole-and-line fishing of skipjacks. For this reason, it constitutes the most essential economic task to work for the development of fisheries with primary stress on the pole-and- line fishing of skipjacks.

3. Direction and Policy of Fisheries Development (private opinion of reporter)

3-1 Constraction of Fishing base

Aside from the fact that marine resources are available aboundantly in the waters of the Gilbert Islands, there are few factors which will justify the establishment of fisheries as its basic industry. For the development of fisheries, it is necessary to:

1) Prepare water, fuel and ice supply facilities and repair shops to assure the operation of fishing boats;

2) Construct port facilities for the landing of catches and the loading of equipment and materials; and

3) Establish a freezing plant for the freezing of catches, refrigeration facilities for the storing of catches, and canning, fish meal and other processing facilities for added values.

Betio on Tarawa Island is the only port furnished as a commercial port but so small in scale that there is little room to accept additional groups of fishing boats. Moreover, ships, over 2.5 m in draft, cannot come alongiside the pier. For this reason, the construction of a fishing port with the aforementioned facilities will be an essential condition for a successful development of the Gilbert Islands' fisheries.

The Government sees it necessary to construct a fishing base for the development of fisheries and intends to work out a program with Butaritari Island looked upon as a likey fishing base. For the formulation of this program, the Government has expressed its desire to invite a survey team from Japan.

3-2 Chief Fisheries Officer

The Government, which intends to give priority in its fisheries administration to the development of skipjack and tuna fisheries, has called on the Japanese Government to dispatch an appropriate person from Japan, an advanced country in the fisheries of skipjack and tuna , who will be able to serve as Chief Fisheries Officer, the highest post for fisheries administration.

3-3 Milkfish Breeding Projects

Foreseeing the future demand of milkfish as bait fish for pole-and-line fishing of skipjack and also as food, the Government has been engaged in a milkfish breeding test on Tarawa Island since 1976 with the assistance of FAO/UNDP. A 40-hectares fishpond was newly completed on Tarawa Island in June 1978 and construction work is under way to expand it to 100 hectares by 1980.

It appears that the Government intends to build milkfish fishpond on Butaritari and Abemama Islands in the future.

Milkfish have an excellent biting response as bait fish in the pole-and-line fishing of skipjack but grow so fast that their size becomes excessive even when they are still young.

3-4 Constuction of Skipjack Pole-and-Line Fishing Vessels

With economic cooperation from the British Government, the Government of the Gilbert Islands has placed an order with Japan for a 99-grosston skipjack pole-and-line fishing vessel (valued at about ¥180 million), which will be completed and delivered on December 12, this year. After being diverted to the Gilbert Islands, the ship will be used for familiarization with the techniques used for the development of skipjack and tuna fisheries, while surveys, training and effective operations are performed for the fishing of skipjacks, under an FAO/UNDP aid program. The Japanese Government has been called on to dispatch experts, who will provide technical guidance on the ship's engine and freezing facilities.

4. Expectations on Joint Venture

In order to work for an early realization of the use of bait fish in the lagoons and skipjack resources in the costal waters -- the bait fish and skipjacks the abundant distributions of which has been ascertained by the latest survey, the Government strongly hopes to embark upon an undertaking with foreign businesses in some form or the other, but various approaches thus far made are not successful as yet.

Judging from the present situation of the Gilbert Islands, the form of joint venture which could be realized would be a fisheries project of the mothership operation type. The most geographically advantageous operation base is Butaritari Island. There would be a need for a mothership equipped with freezing, ice production, water and fuel supply facilities in place of the land facilities. A medium or large second-hand fishing vessel could serve as the mothership, if it could be put to use after some repair work and some lacking facilities were added. Now that skipjack fishing boats may be engaged in fishing operations on a day's trip, the size of the ship would not pose any problem, as long as it was equipped with fish holds and bait holds. The size of a fleet of fishing boats will be determined, depending on the

mothership's capacity of accepting catches, storing frozen products and supplying materials.

In view of the Butaritari lagoon's capacity of continuously supplying bait fish, the size of the convoy should not exceed six fishing boats in terms of the Hatsutori Maru NO3 class (79 tons). However, this project would make it necessary to establish projects for the breeding of milkfish and for the keeping of bait fish. If the initiation of these projects resulted in boosting the bait fish supplying capacity, it would become possible to further enlarge the size of the fishing fleet. If the Butaritari lagoon's bait fish supplying capacity dropped, it would be possible to transfer the operation base to Tarawa or Abemama at once.

Catches must be unexceptionally frozen for export. As the only means of transport available on a reguler basis at present is a container ship, whcih visits Tarawa Island once a month. If the joint venture becomes larger in dimension, it would be necessary to have an exclusive carrier. By so doing, it would be feasible to have many places of destination, such as Japan, Fiji, Samoa and Guam.

At present, the stockpiles of skipjack are globally large and the prices are on the downturn. Therefore, it would not be an easy task to secure markets and keep the project profitable.

CONTENTS OF ANNEX TABLE

Annex Tabel I

Record of Noon Position and Trip

Date	Noon Position			Weather	Wind direction	Wind force	Sea condition	Air pressure	Air temp.	Water surface temp.
	Latitude	Longitude	Area							
5.1 '78			Kurihama Port							
2	35－120	139－450	Uraga suido	bc	S	5	5	10015	190	170
3	31－520	142－000	Izu islands east	bc	WNW	3	3	1017.8	198	208
4	28－390	145－010	Mukoshima retto east	c	ENE	3	3	10185	220	215
5	25－530	147－370	Iōshima east	bc	SE	3	3	10190	250	248
6	22－450	150－120	Minami Torishima west south west	bc	E	3	3	1017.8	270	265
7	19－460	152－380	Marianas east	bc	ENE	4	4	10155	272	272
8	17－230	155－040	–do–	bc	ENE	4	4	10130	279	276
9	14－550	157－290	East Caroline island north	o	E	4	4	10120	283	273
10	12－260	159－490	Brawn island north west	bc	NE	5	6	10088	280	282
11	09－330	162－000	Ujelang atoll east south east	o	ENE	4	4	10083	28.1	284
12	07－170	164－430	Marshall islands west	c	ENE	5	5	10075	28.5	283
13	05－210	167－310	–do–	o	NE	6	5	10070	27.8	285
14	03－020	170－060	Marshall islands south	r	ESE	5	4	10065	263	284
15	01－370	172－440	Gilebrt islands west	bc	E	3	3	10075	292	285
16	01－220	172－560	Betio Port	bc	E	3	2	10075	292	285
〃										
17	01－220	172－560	–do–	bc	E	4	3	10070	300	293
18	01－220	172－560	–do–	bc	ESE	4	3	10072	298	284
19	01－220	172－560	–do–	bc	ENE	4	3	10065	290	296
20	01－22.2	173－045	Tarawa Lagoon	bc	E	3	2	10098	295	300
〃										
21	01－216	173－023	–do–	bc	ENE	3	2	10099	295	300
〃										
22	01－21.6	173－023	–do–	bc	E	3	2	10105	295	298
〃										
23	01－219	172－560	Betio Port	bc	SE	3	2	10080	295	290
24	01－218	173－022	Tarawa Lagoon	bc	SSE	2	2	10112	295	305
〃										
25	01－225	173－059	–do–	bc	ESE	2	1	10125	290	298
〃										
26	01－225	173－059	Tarawa Lagoon	bc	ESE	3	3	10133	285	297
〃										
27	01－225	173－059	–do–	bc	SE	3	3	10135	283	296
28	01－225	173－059	–do–	bc	ESE	4	3	10112	285	304
29	01－218	173－023	–do–	bc	E	3	3	10121	287	300
〃										
30	01－218	173－023	–do–	bc	ENE	2	2	10125	295	304

Stick-held dip net		Purse seine		Pole and line		Remarks
Times	Catches (B/K)	Times	Catches (B/K)	Times	Catches (KG)	
						Started chater. Supply material loading.
						11.45 Left Kurihama to Tarawa;
						14'40 Arrived at Tarawa, Betio.
						7 Gilbertes crew on board, Supply fuel, water, Material unloading
						Invited V.I.P. Reception on board
						Material unloading. Preliminary meeting with fishery.
						Survey material and Fishing gear assembling
						13:30 Left Betio 15:00 Arrived Eita bait area Standby operation
		2	6			Bouke-ami lighting test. Survey bait area.
						15:00 Purse seine 17:00 Shift anch.
1	20	3	22			03.50 Bouke-ami 07'50 Shift anch. 15 00 Purse seine
						Large bait pen assembling Bait breeding test.
1	9	1	0			05:00 Bouke-ami 14:00 Left bait F.G. 15.10 Arrived Betio.
						15:30 Purse seine.
						Supply water, provision.
		4	5			07:30 Left Betio 08:40 Arrived Anbo bait F.G.
						17.05 Purse seine.
1	29					08:50 Shift bait area to Eita.
						20:55 Bouke-ami
1	38					Visual survey bait area
						22:00 Bouke-ami
1	32	1	0			Visual survey bait area
1	64	2	0			07:40 Purse seine Visual survey bait area 22:00 Bouke-ami
		6	8			08.55 Purse seine 12:35 Left bait area 13:50 Arrived Betio.
						Supply water, gasoline.
1	75	2	15			08:05 Left Betio 09:05 Arrived Ambo 10·00 Purse seine

Date	Noon Position			Weather	Wind direction	Wind force	Sea condition	Air pressure	Air temp.	Water surface temp
	Latitude	Longitude	Area							
5.30.'78										
31	01－223	173－058	Tarawa Lagoon	bc	NNE	2	1	10135	282	298
6 1	01－148	173－003	Tarawa South	bc	E	3	2	10118	275	288
2	01－218	172－559	Betio Port	bc	SE	2	2	10120	285	286
3	01－220	172－560	–do–	bc	ESE	3	2	1011.2	293	296
〃										
4	01－223	173－058	Tarawa Lagoon	bc	ESE	3	2	10102	290	284
5	01－223	173－058	–do–	b	SE	2	1	10090	286	310
6	01－402	172－455	Abaiang South West	bc	ESE	3	2	10100	283	284
7	01－370	172－508	Tarawa North West	bc	E	3	2	10090	287	284
8	01－220	172－560	Betio Port	bc	SE	4	3	10112	285	293
9	01－224	173－060	Tarawa Lagoon	bc	ESE	4	3	10112	291	296
10	01－224	173－059	–do–	bc	ESE	4	3	10090	290	296
11	01－224	173－059	–do–	bc	ENE	4	3	10085	288	296
12	01－224	173－059	–do–	bc	E	3	1	10088	287	298
13	01－219	172－562	Betio Port	r	E	4	3	10090	280	290
〃										
14	01－558	172－441	Abaiang West	bc	E	3	3	10090	292	284
15	03－027	172－472	Butaritari Lagoon	o	SE	2	1	10110	272	290
16	03－210	172－255	Butaritari West	bc	NE	3	2	10120	287	290
〃										
17	03－258	172－300	–do–	bc	ENE	4	3	10104	290	288
18	03－283	172－255	Butaritari North West	bc	E	4	3	10100	285	289
19	01－220	172－560	Betio Port	bc	E	3	2	10095	290	292
〃										
20	01－220	172－560	–do–	bc	ENE	2	1	10100	285	289
21	01－220	172－560	–do–	bc	E	2	1	10105	285	300
〃										
22	00－120	173－167	Kuria West	bc	ESE	3	2	10098	285	286
23	00－242	173－544	Abemama Lagoon	bc	SE	3	2	10097	285	285
24	00－073	173－272	Aranuka South West	bc	ESE	3	2	10095	290	285
25	00－218	173－513	Abemama Lagoon	bc	WNW	2	1	10102	288	282
26	00－130	173－188	Kuria West	bc	ESE	2	1	10100	290	285
27	01－219	172－562	Betio Port	bc	SE	3	2	10107	285	289
28	01－219	172－562	–do–	bc	S	3	2	10108	285	288
29	01－219	172－562	–do–	bc	ENE	4	3	10100	290	295
〃										
30	03－410	172－340	Butaritari North West	bc	E	4	4	10095	288	284

Stuck-held dip net		Purse seine		Pole and line		Remarks
Times	Catches (B/K)	Times	Catches (B/K)	Times	Catches (KG)	
						13 05 Shift bait F.G. to Eita 21:25 Bouke-ami
1	43	4	15			11.25 Purse seine, Bait Boat Screw-shaft dropped, 21:00 Bouke-ami
1	35			5	909	05:00 Bouke-ami 06:30 Left bait area (First Trip) 14 30 Purse seine 09 20 Arrived Betio, Water supply, Provision unloading
1	32	5	65			12 00 Left Betio 12·50 Arrived Ambo bait area
						17:15 Shift bait area to Eita 21.25 Bouke-ami
2	28	5	85			05.05 Bouke-ami 14:25 Purse seine 21.35 Bouke-ami
1	24	2	3			05:10 Bouke-ami 15·30 Purse seine
				3	778	06:30 Left bait area (Second Trip)
				2	418	14:00 Arrived Betio Supply fuel, water
1	40					14:00 Left Betio 15:25 Arrived Eita bait area. 21:05 Bouke-ami
2	104					05:05 Bouke-ami 21 15 Bouke-ami
2	56	1	3			05:10 Bouke-ami 08 15 Purse seine 21.30 Bouke-ami
2	67					05·05 Bouke-ami Middle type bait pen assembling 21 15 Bouke-ami
2	55	4	20			05·00 Bouke-ami 07 45 Purse seine 21:15 Bouke-ami
2	86					05:00 Bouke-ami 07:00 Left bait area 08:25 Arrived Betio
						Supply water 22 20 Bouke-ami
1	92			2	1472	05 20 Bouke-ami 06:20 Left Betio (Third Trip)
1	35					11.20 Arrived Butaritari bait area 22·05 Bouke-ami
2	50			5	4342	05 20 Bouke-ami 06:30 Left bait area 17:42 Arrived bait
						22 15 Bouke-ami
1	27			4	1831	05:20 Bouke-ami 06·10 Left bait area 18:15 Arrived bait area
1	25			4	4061	05 10 Bouke-ami 06:18 Left bait area 13:15 Left F.G. for finished bait 06:35 Arrived Betio Supply fuel, water, provision
						Unloading catches
						—do—
						13.00 Left Betio (Forth Trip)
						15:40 Left bait area after took in bait from bait pen of Ambo, Eita
				4	6753	01·10 Arrived F G. and drifting 15 05 Left F.G. to Abemama for finished bait
2	47					08.35 Arrived Abemama bait area Unloading catches 22 50 Bouke-ami
1	11			2	367	07:00 Left bait area 19:05 Arrived bait area 20 30 Bouke-ami
2	61					12 12 Shift bait area 21:00 Bouke-ami Unloading catches
				1	2311	07.00 Left bait area 15 45 Left F.G. for finished bait
						07:20 Arrived Betio. Supply water, fishing gear unloading
						Visual survey Tarawa Lagoon bait area
						14:00 Left Betio after withdrawed Large type bait pen at Eita (Fifth Trip) 16.05 Left bait area
				4	2087	18.00 Left F.G. to Butaritari for finished bait

Date	Noon Position			Weather	Wind direction	Wind force	Sea condition	Air pressure	Air temp.	Water surface temp
	Latitude	Longitude	Area							
7.1.'78	03 - 047	172-463	Butaritari Lagoon	bc	SE	4	4	10090	290	292
〃										
2	03 - 110	172-218	Butaritari West	bc	ESE	4	4	10102	28.8	289
〃										
3	03 - 030	172-469	Butaritari Lagoon	c	ESE	3	3	10082	292	292
4	03 - 027	172-472	-do-	bc	ESE	4	3	10102	292	291
〃										
5	03 - 283	172-277	Butaritari North	bc	ENE	3	2	10102	292	28.5
6	01 - 218	172-560	Betio Port	bc	SE	1	1	10108	295	29.5
7	01 - 218	172-560	-do-	bc	S	2	1	10112	282	288
8	02 - 111	172-422	Abaiang North	b	SSE	2	1	1011.8	285	284
〃										
9	03 - 028	172-472	Butaritari Lagoon	bc	NE	2	1	10112	29.2	292
10	03 - 190	172-105	Butaritari West	bc	E	3	2	10101	291	292
〃										
11	03 - 095	172-371	Butaritari West	c	E	4	3	10113	282	290
〃										
12	03 - 032	172-477	Butaritari West	bc	SE	4	3	10103	292	295
〃										
13	02 - 350	172-442	Butaritari South	bc	SSE	2	2	10100	289	289
14	01 - 219	172-562	Betio Port	bc	calm	0	0	10102	310	315
15	01 - 219	172-562	-do-	bc	calm	0	0	10100	290	291
16	01 - 268	172-524	Tarawa North West	bc	ESE	3	2	10110	290	285
〃										
17	01 - 292	172-333	Tarawa West	bc	ENE	3	2	10110	280	285
〃										
18	01 - 218	172-560	Betio Port	bc	SE	3	2	10095	285	288
〃										
19	03 - 027	172-473	Butaritari Lagoon	bc	S	3	2	10105	27.8	292
〃										
20	03 - 032	172-475	-do-	bc	SE	3	3	10115	290	310
〃										
21	03 - 044	172-525	-do-	c	calm	0	0	10112	295	295
〃										
22	03 - 037	172-498	Butaritari West	c	NE	2	1	10100	298	297
〃										
23	02 - 572	172-444	-do-	bc	E	2	1	10088	285	295
〃										

Stick-held dip net		Purse seine		Pole and line		Remarks
Times	Catches (B/K)	Times	Catches (B/K)	Times	Catches (KG)	
1	22					12 30 Arrived Butaritari bait area Unloading catches 14:52 shift bait area 21 05 Bouke-ami
1	17			3	1024	05:05 Bouke-ami 06 18 Left bait area 17 15 Finished bait
						18:43 Arrived bait area
						Unloading Bouke-ami and repaired
2	28			2	2740	00 25 Bouke-ami 06:00 Left bait area 08:45 Finished bait
						10 57 Arrived bait area, Unloading catches 23 55 Bouke-ami
2	48			3	824	05:00 Bouke-ami 06·20 Left bait area 17 40 Left F.G for finished bait 06:55 Arrived Betio Supply fuel, water
						Preliminary meeting with SPC
1	12					06:30 Left Betio to Butaritari (Sixth Trip)
						18 40 Arrived Butaritari bait area 20:50 Bouke-ami broken
1	20					Unloading Bouke-ami and repaired 20.15 Bouke-ami
2	58			4	3227	05·15 Bouke-ami 06 15 Left bait area 14:15 Finished bait
						19:35 Arrived bait area 22.25 Bouke-ami
1	24			4	3777	05 15 Bouke-ami 06:15 Left bait area 15 00 Finished bait
						16:00 Arrived bait area
2	29			2	2510	00 30 Bouke-ami 06:15 Left bait area 09:40 Finished bait
						10.40 Arrived bait area
2	43			6	3261	01:25 Bouke-ami 06·18 Left bait area 10·05 Left F.G for finished bait 06·00 Arrived Betio. Supply water, provision
						Visual survey Tarawa Lagoon bait area
2	82			4	3667	03·00 Bouke-ami 06:00 Left Betio (Seventh Trip)
						10:30 Finished bait 12 48 Arrived Betio bait area
1	30			3	1338	05:15 Bouke-ami 06·15 Left bait area 13·05 Finished bait
						16 05 Arrived Betio bait area. Bait fishing boat docking for shaft repairing Unloading catches, Supply water. 17:00 Left bait area to Butaritari
1	6					07.55 Arrived Butaritari bait area Unloading catches
						20·00 Bouke-ami Broken
1	5	4	7			Bouke-ami repaired 14·50 Purse Seine
						20.00 Bouke-ami
1	16			1	546	07 05 Left bait area 09.35 Finished bait 11·35 Arrived bait area
						22 25 Bouke-ami
2	33			1	479	05:15 Bouke-ami 06:20 Left bait area 10 30 Finished bait
						13:00 Arrived bait area 20 15 Bouke-ami
1	24			5	4006	00 30 Bouke-ami 06:38 Left bait area
						14 40 Left F.G for finished bait

Date	Noon Position			Weather	Wind direction	Wind force	Sea condition	Air pressure	Air temp.	Water surface temp
	Latitude	Longitude	Area							
7.24.'78	01 - 218	172-560	Betio Port	bc	E	3	2	1007.8	295	299
25	01 - 218	172-560	-do-	bc	ESE	4	4	10085	290	296
26	01 - 219	172-560	-do-	bc	ESE	5	4	10080	285	29.3
〃										
27	00 - 495	172-529	Maiana West	bc	E	4	4	10085	291	282
〃										
28	00 - 274	173-516	Abemama Lagoon	bc	ENE	4	3	10085	289	287
〃										
29	00 - 261	173-502	-do-	c	SE	5	4	1009.2	285	287
〃										
30	00 - 11.9	173-197	Kuria South West	bc	ESE	4	3	10090	289	282
〃										
31	00 - 01.3	173-187	Kuria South	bc	E	3	3	10094	285	295
8 1	01 - 218	172-560	Betio Port	bc	ENE	3	3	10095	284	284
2	01 - 218	172-560	-do-	bc	ESE	3	2	10100	297	292
〃										
〃										
3	01 - 51.6	172-381	Abaiang West	o	NNE	3	3	10 10	27.8	281
〃										
4	03 - 025	172-473	Butaritari Lagoon	o	ESE	4	3	10099	288	289
〃										
5	03 - 100	172-390	Butaritari West	o	ENE	4	4	1011.0	27.7	284
〃										
6	03 - 062	172-419	-do-	bc	E	3	3	10102	285	286
〃										
7	03 - 076	172-410	-do-	o	calm	0	0	10122	252	281
〃										
8	03 - 050	172-393	-do-	bc	S	1	1	10090	28.5	284
〃										
9	01 - 218	172-560	Betio Port	bc	E	3	2	10080	252	289
〃										
10	01 - 218	172-560	-do-	bc	ESE	2	1	1007.9	285	289
11	01 - 21.8	172-560	-do-	bc	E	3	2	10098	284	294
12	01 - 220	172-560	-do-	bc	SSE	2	1	10087	285	292
13	01 - 220	172-561	-do-	bc	SE	3	2	10092	280	298
14	01 - 220	172-561	-do-	bc	ESE	4	3	10091	285	295
〃										
15	03 - 048	172-428	Butaritari West	bc	NE	3	3	10130	295	290

Stick-held dip net		Purse seine		Pole and line		Remarks
Times	Catches (B/K)	Times	Catches (B/K)	Times	Catches (KG)	
						07 30 Arrived Betio Supply fuel, water Renewal of brine fluid
1	26					Supply water 23:05 Bouke-ami
1	12			1	1463	06:50 Left Betio (Eighth Trip) 09 25 Finished bait
						10.40 Arrived Betio bait area 21·15 Bouke-ami
1	23			3	462	05 15 Bouke-ami 06:15 Left bait area 16 20 Left F.G. to Abemama for finished bait
1	8					07:34 Arrived Abemama bait area Unloading Purse seine and reconstructed.
						21·15 Bouke-ami
2	19					05·00 Bouke-ami, No operation for wanting bait 11·48 Shift bait area for strong wind.
						21:30 Bouke-ami
2	64			3	2457	05 05 Bouke-ami 06:15 Left bait area 14 00 Finished bait
						18·50 Arrived bait area 21 35 Bouke-ami
1	65			3	1710	05:15 Bouke-ami 06:15 Left bait area. 16 20 Left F.G. for finished bait.
						07 45 Arrived Betio
1	41					Supply water, provision Bait fishing boat docking for repaired shaft
						14.00 Left Betio after received milkfish at Ambo
						18:00 Arrived Betio 21:40 Bouke-ami
1	27			6	3716	05:25 Bouke-ami 06.12 Left Betio (Ninth Trip)
						17·00 Left F.G to Butaritari for finished bait
1	29					08 23 Arrived Butaritari bait area. Unloading catches
						Unloading Purse seine and reconstructed 23:35 Bouke-ami
2	33			4	956	05:20 Bouke-ami 06·23 Left bait area 15.40 Left F.G. to bait area for strong wind and rain
						17:00 Arrived bait area 23·40 Bouke-ami
2	42			3	1552	05·20 Bouke-ami 06:27 Left bait area. 11.30 Finished bait
						13 25 Arrived bait area 23·55 Bouke-ami
1	20			5	3042	05:20 Bouke-ami 09:10 Left bait area 13:40 Finished bait
						14.42 Arrived bait area
2	113			11	10025	00.20 Bouke-ami 05:20 Bouke-ami 10.40 Left bait area
						17:00 Left F G. for finished bait
						06.00 Arrived Betio Supply fuel, water Unloading catches
						Bait fishing boat docking to measure screw shaft
						Waiting freighter in harbour
						Waiting freighter Middle type bait pen assembling
2	55					Waiting freighter 05:10 Bouke-ami 21 15 Bouke-ami
1	25					05 15 Bouke-ami 17 05 Catch fish 15 tons ship to ship
1	46			2	1343	05 15 Bouke-ami Supply water, provision 14:40 Left Betio (Tenth Trip)
						18 50 Turned Butaritari offing
1	0			2	520	10 55 Finished bait 13·05 Arrived Butaritari bait area

Date	Noon Position			Weather	Wind direction	Wind force	Sea condition	Air pressure	Air temp	Water surface temp
	Latitude	Longitude	Area							
8.15 '78										
16	03－024	172－472	Butaritari Lagoon	c	ENE	2	1	10126	270	290
〃										
17	03－113	172－325	Butaritari West	bc	ENE	2	2	10120	272	284
〃										
18	03－112	172－375	－do－	bc	E	4	4	10110	295	289
〃										
19	03－130	172－362	－do－	q	E	3	3	10093	272	289
〃										
20	03－130	172－350	－do－	bc	SE	5	4	10094	292	288
〃										
21	01－218	172－560	Betio Port	bc	ESE	3	2	10080	288	295
〃										
22	01－218	172－560	－do－	bc	NE	3	2	10095	292	296
23	01－360	172－498	Tarawa West	bc	E	2	1	10108	290	289
〃										
24	03－034	172－483	Butaritari Lagoon	bc	SE	3	2	10105	292	292
〃										
25	03－037	172－451	Butaritari West	bc	SE	3	2	10111	297	296
〃										
26	03－088	172－404	－do－	bc	SSE	2	1	10102	293	292
〃										
27	03－150	172－342	－do－	bc	ESE	2	1	10102	302	296
〃										
28	03－025	172－472	Butaritari Lagoon	bc	E	3	2	10108	290	293
29	03－025	172－472	－do－	bc	SE	3	2	10115	295	294
〃										
30	01－209	172－560	Betio Port	bc	SSW	3	2	10125	290	300
31	01－218	172－560	－do－	bc	SSE	3	2	10115	285	292
9 1	01－219	172－562	－do－	bc	ENE	3	2	10122	292	297
〃										
2	00－583	173－088	Maiana East	bc	E	3	2	10128	288	290
〃										
3	00－252	173－514	Abemama Lagoon	bc	SE	3	3	1011.8	290	285
〃										
4	00－065	173－280	Aranuka west	bc	SSE	3	3	10120	290	286
〃										
5	00－320	173－465	Abemama North West	bc	ENE	3	2	10118	290	291

Stick-held dip net		Purse seine		Pole and line		Remarks
Times	Catches (B/K)	Times	Catches (B/K)	Times	Catches (KG)	
						Unloading catches 23 55 Bouke-ami
1	6					05:15 Bouke-ami No bait caught
						Unloading Purse Seine and reconstructed
1	15	3	75	2	158	05:25 Bouke-ami 09.00 Left bait area 12:50 Finished bait
						13:20 Arrived bait area 16.25 Purse Seine
		1	65	1	429	10 00 Left bait area 12:10 Finished bait 13:40 Arrived bait area
						14:15 Purse Seine
		1	150	4	3206	07 20 Purse seine 08·50 Left bait area 16·25 Finished bait
						17:45 Arrived bait area
		2	90	3	5484	07:25 Purse seine 09:07 Left bait area 16·00 Finished bait
						17.30 Arrived Butaritari 18·30 Left Butaritari to Betio
						08:00 Arrived Betio Supply water, provision Unloading catches)
						Bait fishing boat docking for measured screw
1	37					Unloading catches 21:40 Bouke-ami
				3	1638	06:40 Left Betio (Eleventh Trip) 10:00 Left Ambo after received milkfish
						14.10 Left F.G. to Butaritari for finished bait
		4	53	4	2229	07·15 Arrived bait area 09 15 Purse seine 12.00 Left bait area
						17:00 Finished bait 19.10 Arrived bait area
		3	73	3	2010	07 10 Purse seine Unloading catches 11:30 Left bait area
						17:00 Finished bait 18 30 Arrived bait area
		2	111	6	4141	08:15 Purse seine 09·30 Left bait area. 17 10 Finished bait
						18:50 Arrived bait area
1	35	1	75	4	8802	00:00 Bouke-ami 07.35 Purse seine 08.45 Left bait area
						13:20 Finished bait 16 05 Arrived bait area Unloading catch fish
1	0	3	102			10:55 Purse seine Unloading catches 23.50 Bouke-ami
		2	94	1	424	12:00 Purse Seine 12·55 Left bait area. 18:40 Finished bait
						07:50 Arrived Betio Supply fuel, water Unloading catches
						Unloading catches Towing milkfish boat from Ambo
2	53			2	2000	05:20 Bouke-ami 06 30 Left Betio (Twelfth Trip)
						10.20 Finished bait 12:00 Arrived Betio bait area 23.35 Bouke-ami
2	44			2	2309	05 25 Bouke-ami 06 17 Left bait area 09 00 Finished bait
						19.00 Arrived Abemama bait area 21:40 Bouke-ami
2	66			3	596	05:20 Bouke-ami 06:10 Left bait area 10:05 Finished bait
						12 25 Arrived bait area 23:15 Bouke-ami
1	26			2	1275	05:15 Bouke-ami 06 15 Left bait area 12:25 Finished bait
						17.00 Arrived bait area
1	25			2	628	05 20 Bouke-ami 09 08 Left bait area 12·55 Finished bait

Date	Noon Position			Weather	Wind direction	Wind force	Sea condition	Air pressure	Air temp.	Water surface temp
	Latitude	Longitude	Area							
9.5.'78										
6	00 – 269	173–521	Abemama Lagoon	bc	E	2	1	10112	300	289
〃										
7	00 – 445	173–232	Maiana South East	bc	calm	0	0	1011.0	289	295
〃										
8	01 – 220	172–560	Batio Port	bc	S	2	1	10088	289	294
〃										
9	01 – 01.5	173–126	Maiana East	c	SE	3	2	10104	290	292
〃										
10	00 – 163	173–428	Abemama West	bc	ESE	4	4	10110	287	288
〃										
11	00 – 030S	173–500	Aranuka East	bc	ENE	4	4	10118	292	288
〃										
12	00 – 412S	174–259	Nonouti Lagoon	bc	ENE	4	3	10110	296	285
〃										
13	00 – 265	173–434	Abemama Lagoon	bc	ESE	4	3	10090	295	291
〃										
14	00 – 256	173–480	Abemama West	bc	ESE	5	5	10088	298	288
〃										
15	01 – 218	172–560	Betio Port	bc	ESE	3	2	10098	297	298
16	01 – 218	172–560	–do–	bc	E	3	2	10100	295	302
〃										
17	01 – 192	173–100	Tarawa South East	bc	SE	3	3	10108	288	291
18	01 – 290	172–496	Tarawa West	bc	SE	4	4	10090	294	288
〃										
19	03 – 200	172–400	Butaritari North West	bc	E	3	3	10107	295	292
〃										
20	03 – 180	172–353	–do–	bc	ESE	3	3	10105	298	295
〃										
21	03 – 085	172–396	Butaritari West	o	E	3	3	10098	285	292
〃										
22	03 – 110	172–362	–do–	bc	ESE	3	3	10090	298	295
〃										
23	03 – 024	172–473	Butaritari Lagoon	bc	SE	3	2	10102	298	292
24	03 – 154	172–339	Butaritari West	bc	E	2	2	10120	290	294
〃										
25	01 – 218	172–560	Betio Port	c	ESE	3	2	10092	289	300
26	01 – 218	172–560	–do–	bc	E	3	2	10102	29.0	292

Stick-held dip net		Purse seine		Pole and line		Remarks
Times	Catches (B/K)	Times	Catches (B/K)	Times	Catches (KG)	
						14·15 Arrived bait area Unloading catches
2	102			1	9501	01:30 Bouke-ami 05:20 Bouke-ami 06:07 Left bait area
						09.30 Finished bait 11.45 Arrived bait area Unloading catches
2	62			3	5053	00 55 Bouke-ami 05:15 Bouke-ami 06:05 Left bait area
						08 55 Left F.G. for finished bait 17:00 Arrived Betio
						Supply water, Unloading catches
1	23					07:55 Left Betio to Abemama (Thirteenth Trip)
						18·30 Arrived Abemama bait area 22·30 Bouke-ami
1	33			1	2659	05:20 Bouke-ami 06.05 Left bait area 11:20 Finished bait
						14:25 Arrived bait area Unloading catches
1	12			0	0	05:15 Bouke-ami 06:00 Left bait reaa 09 30 Left F.G. to Nonouti for finished bait
						18:40 Arrived Nonouti bait area
中止						05:10 Bouke-ami 10·10 Shift bait area Visual Survey
						12:45 Left bait area to Abemama
		2	57	2	2285	07.45 Arrived Abemama bait area 08.40 Purse Seine 09 55 Left bait area
						14:05 Finished bait 16:40 Arrived bait area Unloading catches
1	14	3	21	2	1320	05:25 Bouke-ami 08:55 Purse seine 10:45 Left bait area
						14 40 Left F.G for finished bait
						07 35 Arrived Betio Supply fuel water Unloading catches
						12 05 Left Betio 13:08 Arrived Eita bait area Visual Survey
						15:10 Left bait area 16:28 Arrived Betio
						06:30 Left Betio, Observed B T. 17:20 Arrived Betio
						Supply water, provision 11:15 Left Betio (Fourteenth Trip)
						Turned Butaritari observing B.T.
						13:22 Finished observing B.T. 14:45 Arrived Butaritari bait area
						Unloading catches
		3	112	4	6612	07 10 Purse seine 09 05 Left bait area 15 35 Finished bait
						18·00 Arrived bait area
		3	100	4	8711	07:25 Purse seine 09 25 Left bait area 12 55 Finished bait
						15:05 Arrived bait area Unloading catches
		2	80	3	11589	07:32 Purse seine 08:55 Left bait area 13:53 Finished bait
						16 45 Arrived bait area Unloading catches
		1	5			07.20 Purse seine Unloading catches No bait caught
		1	154	4	3174	07:40 Purse seine 08:48 Left bait 14:30 Finished bait
						Left F.G. Observing B.T.
						09:30 Arrived Betio Supply water provision Unloading catches
						12 00 Left Betio after received milkfish at Ambo

Date	Noon Position			Weather	Wind direction	Wind force	Sea condition	Air pressure	Air temp.	Water surface temp
	Latitude	Longitude	Area							
9 26.'78										
27	01－013	172－530	Maiana West	bc	E	4	4	10088	292	285
〃										
28	00－261	173－531	Abemama Lagoon	o	ESE	4	3	10105	285	290
〃										
29	00－020	173－380	Aranuka South	c	ENE	4	4	10102	292	292
〃										
30	00－032	173－427	Aranuka South East	bc	SE	3	3	10099	287	282
〃										
10 1	00－068	173－380	－do－	bc	S	3	3	10097	288	293
〃										
2	00－045	173－503	Aranuka East	bc	ENE	3	3	10098	285	295
〃										
3	00－123	173－480	Tarawa South West	bc	NE	4	4	10112	298	291
〃										
4	01－218	172－559	Betio Port	bc	E	3	2	10090	288	292
5	01－218	172－559	－do－	bc	SE	3	2	10080	289	293
6	02－061	172－399	Abaiang North West	bc	ESE	3	3	10095	305	289
〃										
7	03－031	172－476	Butaritari Lagoon	bc	ENE	3	2	10090	305	295
〃										
8	03－090	172－378	Butaritari West	o	NE	3	3	10090	272	291
〃										
9	03－160	172－352	－do－	bc	ESE	4	4	10103	308	298
〃										
10	03－045	172－510	Butaritari Lagoon	bc	ESE	1	1	10125	300	300
11	03－065	172－310	Butaritari West	bc	calm	0	0	10130	290	305
〃										
12	03－058	172－415	－do－	bc	SSE	1	1	10120	290	294
〃										
13	01－219	172－560	Betio Port	bc	S	2	1	10110	288	285
14	01－219	172－560	－do－	bc	SE	2	1	10110	286	295
15	01－219	172－560	－do－	bc	ESE	4	3	10120	290	290
16	01－290	172－482	Tarawa West	bc	SE	2	2	10130	298	293
17	03－025	172－473	Butaritari Lagoon	o	S	3	1	10032	275	292
〃										
18	03－310	173－250	Butaritari North West	bc	S	3	3	10122	284	294
〃										

Stick-held dip net		Purse seine		Pole and line		Remarks
Times	Catches (B/K)	Times	Catches (B/K)	Times	Catches (KG)	
						15 10 Arrived Betio
						07·45 Left Betio observing B T. (Fifteenth Trip)
						09:25 Finished observing B.T. 10:50 Arrived Abemama bait area
						Unloading catches
3	106			2	5066	00.37 Bouke-ami 05:15 Bouke-ami 06:00 Left bait area
						12 30 Finished bait 16.40 Arrived bait area 23·40 Bouke-ami
1	25			2	4002	05·20 Bouke-ami 06·00 Left bait area 12:15 Finished bait
						15 35 Arrived bait area Unloading catches
3	102			2	1746	00:00 Bouke-ami 05:20 Bouke-ami 06:30 Left Bait area
						12·45 Finished bait 15 55 Arrived bait area 21:40 Bouke-ami
2	60			2	4950	05·15 Bouke-ami 06·05 Left bait area 14:25 Finished bait
						17·30 Arrived bait area 22 00 Bouke-ami
1	11			2	2047	05:20 Bouke-ami 08·05 Left bait area 14.30 Left F.G. Observing B.T. for finished bait
						06:40 Arrived Betio Supply fuel, water, Unloading catches
1	73					21 38 Bouke-ami
1	25			5	3385	05·20 Bouke-ami 06:10 Left Betio (Eixteenth Trip)
						18:00 Left F.G. to Butaritari for finished bait
1	40					07:00 Arrived Butaritari bait area Unloading catches
						23:50 Bouke-ami
1	45			1	11429	05 20 Bouke-ami 06 00 Left bait area 11 30 Finished bait
						13.50 Arrived bait area. Unloading catches
2	43	3	36	4	3003	00:00 Bouke-ami 05:20 Bouke-ami 07:20 Purse seine
						09:05 Left bait area 17:55 Finished bait 18:25 Arrived bait area
		3	100			12 20 Purse seine
1	29			3	1834	05:20 Bouke-ami 06.05 Left bait area 11:45 Finished bait
						15 10 Arrived bait area
		4	69	2	9161	08·20 Purse seine 11.05 Left bait area. 15·40 Finished bait
						18:00 Arrived Bikasi Unloading catches 18 40 Left Bikasi
						07 30 Arrived Betio Supply water, provision Unloading catches
						Visual survey Tarawa Lagoon bait area
						Waiting supply water, provision
						Supply water 11 15 Left Betio to Butaritari (Seventeenth Trip)
		3	420			07 30 Arrived Butaritari bait area. Unloading catches, Large type bait pen assembling 13:25 Purse seine, Breeding test
				2	5694	08 00 Left bait area 12 40 Finished bait 15:30 Arrived bait area
						Unloading catches

Date	Noon Position			Weather	Wind direction	Wind force	Sea condition	Air pressure	Air temp.	Water surface temp
	Latitude	Longitude	Area							
10 19'78	03 – 172	172 – 305	Butaritari West	bc	SE	1	1	10125	287	304
〃										
20	03 – 050	172 – 402	–do–	bc	WSW	1	1	10120	285	304
〃										
〃										
21	03 – 178	172 – 300	–do–	bc	calm	0	0	10110	289	305
〃										
22	03 – 055	172 – 542	Butaritari Lagoon	o	NW	4	3	10110	295	295
〃										
23	03 – 192	172 – 335	Butaritari North West	bc	SSW	1	1	10110	285	297
〃										
24	03 – 106	172 – 290	Butaritari West	bc	S	3	3	10099	301	302
〃										
25	03 – 025	172 – 473	Butaritari Lagoon	bc	SE	2	1	10090	290	303
26	03 – 025	172 – 473	Butaritari Lagoon	bc	calm	0	0	10072	305	309
27	03 – 025	172 – 473	Butaritari Lagoon	bc	ESE	2	1	10055	305	308
28	01 – 218	172 – 559	Betio Port	bc	ESE	4	3	10072	296	298
〃										
29	01 – 218	172 – 559	–do–	bc	ESE	4	3	10080	300	293
30	01 – 218	172 – 559	–do–	bc	NNE	4	4	10090	295	297
31	01 – 218	172 – 559	–do–	bc	NNE	4	3	10090	295	297

Stick-held dip net		Purse seine		Pole and line		Remarks
Times	Catches (B/K)	Times	Catches (B/K)	Times	Catches (KG)	
				6	4828	Withdrawn Large type bait pen (Net broken for shark) 08 00 Left bait area 13:40 Finished bait 16:48 Arrived bait area Unloading catches
		5	390	4	6154	Large type bait pen assembling 07.15 Purse seine Breeding test reopen 10.40 Left bait area 16 25 Finished bait 18 25 Arrived bait area Unloading catch fish
				5	12020	Withdrawn Large type bait pen (Net broken for shark) 07.42 Left bait area 14:05 Finished bait 16:35 Arrived bait area Unloading catches
1	15	2	7			07:00 Purse seine, No operation for bait little. Unloading catches
						23:50 Bouke-ami
		1	106	6	6182	07:10 Purse seine 08 20 Left bait area 17.35 Finished bait
						18 40 Arrived bait area
		5	74	2	6123	07:00 Purse seine 09 15 Left bait area 14 10 Finished bait
						16:30 Arrived bait area Unloading catches
						Unloading catches, Visual survey bait, No operation
						Reception on board Gilbertes
						Visual survey bait 17·50 Left Butaritari
						09:05 Arrived Betio, Supply water, provision
						Unloading survey material and checked
						Arranged fishing gear. Cleaning of fish hold
						Supply fuel, Unloading catches Unloading materiaal
						Checked remaining fuel, Discharged Gilbertes crew, chater released

Annex Table 2

Record of Oceanographic Observation

Trip order	14	—	—	—	—	—	—	—	—
Observation No.		1	2	3	4	5	6	7	8
Date		17,Sep.'78	〃	〃	〃	18,Sep.'78	〃	〃	〃
Time		0917	1130	1315	1440	1239	1340	1555	1845
Position	Area	TARAWA	〃	〃	〃	〃	〃	ABAIANG	〃
	Latitude	01–160N	01–148N	01–298N	01–388N	01–300N	01–299N	01–455N	01–450N
	Longtude	172–530E	173–098E	173–102E	172–599E	172–496E	172–399E	172–498E	173–096E
Sea Water Temp.	0m	292	292	294	295	288	288	294	292
	25m	290	292	292	293	285	285	286	291
	50m	287	291	291	293	280	282	283	291
	75m	269	291	291	292	272	278	276	287
	100m	256	274	287	292	269	276	270	277
	125m	251	250	235	260	260	265	256	254
	150m	225	234	231	230	230	243	225	245
	175m	200	210	208	219	200	217	193	215
	200m	170	175	186	201	174	174	160	170
	225m		163	133	138	156	150	145	145
	250m		150	120	126	132	132	129	122
Weather		bc	bc	bc	bc	bc	bc	bc	bc
Wind direction		SE	SE	SSE	SE	SE	SE	SE	ESE
Wind force		3	3	3	3	4	4	4	4
Air pressure (mb)		1011.5	1010.8	1009.5	1008.5	1009.8	1008.8	1007.0	1008.5
Sea Condition		2	2	2	2	3	3	3	3
Transparency (m)		25	23	25	23	24	22	20	
Air temperature (°C)		28.6	28.8	29.5	30.0	29.4	29.0	29.2	28.9
Water surface temp. (°C)		29.1	29.2	29.4	29.5	28.8	28.8	29.1	28.9
Remarks									

—	—	—	—	—	—	—	—
9	10	11	12	13	14	15	
18, Sep '78	19, Sep. '78	〃	〃	〃	〃	〃	
2035	2400	0325	0700	1020	1200	1320	
MARAKEI	ABAIANG	BUTARITARI	LITTLE MAKIN	BUTARITARI	BUTARITARI	BUTARITARI	
02—00N	02—30N	03—00N	03—30N	03—30N	03—20N	03—10N	
173-10E	173—00E	173—00 E	173—00E	172—303E	172—40E	172—40 E	
291	292	293	291	293	293	296	
291	292	292	291	293	292	293	
290	287	292	290	292	292	292	
288	285	29.2	290	291	290	292	
285	282	286	285	287	287	290	
265	255	284	284	285	286	266	
233	232	261	259	284	275	240	
21.5	208	225	210	230	223	224	
200	175	18.5	145	185	180	198	
13.5	15.5	149	130	140	140	155	
125	12.3	110	110	11 4	118	134	
bc	bc	bc	bc	bc	bc	bc	
ESE	ESE	ESE	ESE	E	E	ESE	
3	2	3	3	3	3	3	
10098	10096	10092	10104	10118	10107	10092	
3	2	2	2	2	2	2	
			20	25	20	25	
291	285	284	290	305	295	291	
291	292	292	289	292	292	295	

—	—	—	—	—	—	—	—
16	17	18	19	20	21	22	23
24, Sep '78	〃	〃	〃	27, Sep. '78	〃	〃	〃
1705	1830	2250	0430	1135	1435	1655	1835
BUTARITARI	BUTARITARI	BUTARITARI	ABAIANG	MAIANA	MAIANA	MAIANA	MAIANA
03—00N	03—00N	02—30N	02—00N	01—01N	01—00N	00—45N	00—30N
172—30E	172—40E	172—30E	172—40E	172—303E	172—50E	173—00E	173—00E
296	295	294	289	288	290	290	289
296	293	291	286	285	284	288	287
288	292	290	285	282	275	276	286
286	287	288	280	278	275	271	275
285	283	284	273	274	273	270	272
275	272	271	250	260	265	245	246
266	255	230	226	230	238	225	222
220	204	210	210	207	210	205	205
192	180	169	181	180	173	166	173
135	135	145	153	159	163	163	166
124	117		126	150	156	153	150
bc	bc	bc	bc	bc	b	bc	bc
E	NE	SE	SE	E	ENE	ENE	ENE
3	3	2	2	4	3	3	4
10100	10105	10105	10090	10088	10060	10070	10080
3	3	2	2	4	4	3	3
23	20			22	22	19	
286	268	277	283	292	289	285	285
295	294	293	288	285	290	289	288

—	—	—	—	—	—	—	—
24	25	26	27	28	29	30	31
27, Sep. '78	28, Sep. '78	〃	〃	〃	〃	〃	〃
2120	2400	0420	07.30	0915	1300	1535	1930
KURIA	ARANUKA	ABEMAMA	ABEMAMA	ABEMAMA	ABEMAMA	ABEMAMA	MAIANA
00—15N	00—00N	00—00N	00—30N	00—30N	00—150N	00—30N	01—00N
173—15E	173—30E	174—00E	174—00E	173—45E	173—45E	173—30E	173—10E
288	286	286	287	288	288	291	290
282	286	286	287	283	286	286	289
276	283	285	287	283	285	285	287
27.2	280	285	287	283	285	280	285
265	274	272	267	272	277	270	27.5
247	25.0	251	247	267	275	266	260
230	236	240	226	236	242	237	230
205	219	215	210	210	214	215	220
175	182	175	171	174	191	168	204
169	170	17.2	164	166	161	162	154
157	155	137	15.2	148	147	136	131
bc	bc	bc	0	c	bc	b	bc
E	E	E	E	E	NE	NE	ENE
3	3	3	3	2	4	4	3
10105	10102	10090	10110	10113	10101	10092	10108
3	3	3	3	2	3	3	2
			23	29	23	22	
286	283	282	286	287	288	290	280
287	28.5	285	288	288	288	291	289

Annex Table 3

Record of Skipjack Pole-and-Line Catching Test

Note

H = Harengula Ovalis
A = Allanetta Ovalava
M = Milkfish
S = Spratelluides Delicaturus
AP = Apogonidae
D = Dassumieria Hasselti
C = Caesio Caerulaureus
SC = Surdinella Clupeoides
CA = Caesionidae

Date		1 June '78	1 June '78	1 June '78	1 June '78	1 June '78
Moon age		24 8	24.8	24.8	24.8	24.8
School No.		1	2	3	4	5
Time	Located	10.15	11.25	12.10	14.25	15.20
	Chum started	10 43	11.50	12.28	14.55	16.05
	Catch started	10 45	11.55	12.30	15.00	–
	Catch finished	11 05	12.10	12 40	15.15	–
Piston	Area	South of Tarawa	South of Tarawa	South of Tarawa	East of Maiana	East of Maiana
	Latitud	01-16 0N	01-15.0N	01-15.0N	01-00 0N	00-57.0N
	Longitud	172-57.0E	172-58.0E	172-59.0E	173-13.0E	173-10 0E
Fish school	Species	Skipjack	Skipjack	Skipjack	Skipjack Yellow-fin tuna mixed	Skipjack
	Kind	Birds associated 30~40	Birds associated 40~50	Birds associated 30~40	Birds associated 100	Birds associated 50~60
	Status	Jumping	Jumping	Jumping	Jumping	Jumping
	Size	Small	Small	Small	Small	Small
	Baiting tendency	Bad	Some what good	Bad	Bad	None
Bait fish	Species	H	H.S	H.S.	H.	H
	Amount used(b/k)	10	15	5	10	5
Weather		b	r	r	b	b
Wind direction and fore		E 2	E 2	E 2	E 2	E 2
Air pressure (mb)		1010 8	1011.0	1011 0	1009 4	1009.0
Air temp. (°C)		28 5	27.5	27.5	28.0	28.0
Sea surface temp. (°C)		28.8	28.8	28 8	28.5	28.5
Sea condition		2	2	2	2	2
Fish school: Skipjack	No of fish	87	155	34	60	
	Ave weight (kg)	2.28	2.28	2.28	2.29	
	Catch amount (kg)	198	353	78	137	
Fish school: Yellowfin tuna	No of fish				2	
	Ave. weight (kg)				2.5	
	Catch amount (kg)				5	
Fish school: Mackerel tuna	No. of fish					
	Catch amount (kg)					
Fish school: Rainbow runner	No of fish					
	Catch amount (kg)					
Fish school: Others	No of fish					
	Catch amount (kg)					
Fish school: Total	No. of fish	87	155	34	62	–
	Catch amount (kg)	198	353	78	142	–
Remarks						

1 June '78 24.8 6	1 June '78 24.8 7	6 June '78 0.2 8	6 June '78 0.2 9	6 June '78 0.2 10	6 June '78 0.2 11	6 June '78 0.2 12
16.25 17.05 – –	17.10 17.43 17.45 18.00	08.50 08.57 – 09-00	09.10 09.37 09.39 09.50	10.40 10.57 – 11.00	11.36 11.49 – 11.52	11.58 12.00 12.00 12.15
East of Maiana 00-50.0N 173-08.0E	South of Maiana 00-48.0N 172-58.0E	West of Tarawa 01-25.0N 172-52.0E	West of Tarawa 01-28.0N 172-50.5E	West of Tarawa 01-33.2N 172-43.5E	Between Tarawa and Abaiang 01-39 5N 172-45.5E	West of Abaiang 01-40.5N 172-45.5E
Skipjack Yellow-fin tuna mixed Birds associated 40~50 Jumping Small None	Skipjack Yellow-fin tuna mixed Birds associated 30~40 Jumping Small Bad	Mackerel tuna Birds associated 100 Sink ? None	Skipjack Yellow-fin tuna mixed Birds associated 100 Jumping Small Bad	Yellowfin tuna Birds associated 200 Jumping Small None	Skipjack Birds associated 30 Jumping Small None	Skipjack Birds associated 30 Jumping Medium Somewhat good
H. 5	H. 10	H. 1	H. 6	H. 2	H. 4	H. 20
b E 2 1009.5 28.0 28.5 2	bc E 1 1009.8 28.0 28.5 1	bc ESE 3 1010.5 29.5 28.2 2	bc ESE 3 1010.5 28.5 28.0 2	bc ESE 3 1011.0 28.3 28.0 2	bc ESE 3 1010 0 28.3 28.3 3	bc ESE 3 1010.0 28.3 28.3 3
	58 2.3 133		1 2.4 2.4		1 2.2 2.2	224 2.83 634
	1 5		1 3.2 3.2			
		1 1.2	3 9			
– –	59 138	1 1.2	5 14	– –	1 2.2	224 634
		Only Trawling catch	Yellowfin tuna Trawling catch		Only Trawling catch	

6 June '78 0.2 13	6 June '78 0.2 14	7 June '78 1.2 15	7 June '78 1.2 16	14 June '78 8 2 17	14 June '78 8.2 18	14 June '78 8.2 19
13 15 13.30 – 13.32	18 10 18.15 18.17 18.28	09.10 09.15 19.16 09.50	10.30 10 40 10 40 10.45	10.05 10.14 – 10 17	10.17 10 25 10.26 11.30	11.55 11.59 11.59 12 10
West of Abaiang 01-44.0N 172-45.5E	East of Abaiang 01-54.0N 173-05.0E	West of Abaiang 01-44.0N 172-48.0E	West of Abaiang 01-46.5N 172-47.5E	West of Abaiang 01-48.0N 172-49.0E	West of Abaiang 01-49.0N 172-48 0E	West of Abaiang 01-55.8N 172-44.1E
Yellowfin tuna Birds associated 50 Jumping Small None	Skipjack Yellow-fin tuna mixed Birds associated 20 Jumping Small Bad	Skipjack Birds associated 200 Plain school Large Bad	Skipjack Birds associated 50 Jumping Small Somewhat good	Yellowfin tuna Birds associated 200 Jumping Medium None	Skipjack Birds associated 50 Jumping Small Good	Yellowfin tuna Birds associated 100 Jumping Small Bad
H. 2	H. 8	H 18	H. 6	H 4	H.S. 30	H.S. 4
bc ESE 3 1008.0 28 0 28 6 2	bc ESE 3 1007 0 28.0 29.0 2	bc E 3 1010 0 29.0 28.4 2	bc E 3 1010.3 28.7 28.4 2	bc E 3 1010.1 28.8 28.2 2	bc E 3 1010.1 28.8 28.2 2	bc E 3 1009.0 29.2 28.4 2
	6 3.3 19.8	33 2 67 88	118 2.8 330		465 3.1 1442	
	23 4.63 106 5					6 5 0 30
– –	29 126.3	33 88	118 330	– –	465 1442	6 30
		No strike				

16 June '78 10 2 20	16 June '78 10.2 21	16 June '78 10.2 22	16 June '78 10.2 23	16 June '78 10 2 24	16 June '78 10 2 25	16 June '78 10 2 26
07 45 07.55 – 08.03	08.30 08.35 08.35 08.45	09.45 09.55 09.55 10.00	10.45 10.55 10.55 11.10	13.25 13.33 13.33 13.50	14.25 14.30 14.30 14.50	15 50 16.00 – 16 05
West of Butaritari 03-05.5N 172-39 5E	West of Butaritari 03-08.0N 172-37.0E	West of Butaritari 03-12.0N 172-29.0E	West of Butaritari 03-17.5N 172-23.0E	West of Butaritari 03-13.0N 172-31.0E	West of Butaritari 03-09.5N 172-38.0E	West of Butaritari 03-05.5N 172-38 0E
Yellowfin tuna Birds associated 50 Sink ? None	Skipjack Birds associated 20 Sink Small Somewhat good	Skipjack Birds associated 10 Sink Small Bad	Skipjack Birds associated 10 Jumping Small Somewhat good	Skipjack Birds associated 8 Jumping Medium Good	Skipjack Birds associated 10 Plain school Small Good	Skipjack Birds associated 200 Jumping Small None
H.S.AP 4	H.AP 16	H.AP 6	H.AP 6	H.AP ' 10	H.A.AP 6	AP.H 2
bc NE 3 1013.0 29 0 28.8 2	bc NE 3 1013.0 29.0 28.6 2	bc NE 3 1012 8 29 0 28.6 2	bc NE 3 1012.0 28.8 29.0 2	bc NE 3 1009.8 28.7 29.3 2	bc NE 3 1009 0 28.7 28.9 2	bc NE 3 1009 0 28.8 29.0 2
	330 3.3 1089	6 4.5 27	268 5.1 1367	582 2.35 1368	182 2.7 491	
– –	330 1089	6 27	268 1367	582 1368	182 491	– –

17 June '78 11.2 27	17 June '78 11.2 28	17 June '78 11.2 29	17 June '78 11 2 30	18 June '78 12 2 31	18 June '78 12.2 32	18 June '78 12.2 33
08.45 08.50 08 50 08.56	12 00 12.05 12 05 12.30	15 45 15 50 15.51 15 53	16.30 16.35 16.36 16 50	07.35 07.50 07.50 08.00	08.40 08.46 08.47 08.50	10.25 10.34 10.36 11.40
West of Butaritari 03-09 5N 172-30.5E	West of Butaritari 03-26.0N 172-30E	West of Butaritari 03-09 0N 172-35 5E	West of Butaritari 03-05.0N 172-39.0E	West of Butaritari 03-04.0N 172-35 0E	West of Butaritari 03-05.0N 172-27.0E	North West of Butaritan 03-25.0N 172-25.0E
Skipjack Birds associated 20 Plain school Small Somewhat good	Skipjack Birds associated 15 Jumping Small Good	Mackerel tuna rainbow runner mixed Birds associated 60 Jumping Small Somewhat good	Skipjack Yellowfin tuna mixed Birds associated 10 Jumping Small Somewhat good	Skipjack Birds associated 100 Jumping Small Somewhat good	Skipjack Birds associated 30 Jumping Small Bad	Skipjack Birds associated 40 Plain school Medium Good
H A.AP 8	H AP.A 20	H.A 1	H AP 7	H.AP 5	H.AP 1	H.AP 25
bc ENE 3 1010.8 30.0 28 6 2	bc ENE 3 1010.4 29 0 28.8 2	bc E 3 1008.2 29.3 28.9 2	bc E 3 1008.2 29.3 28 8 2	bc ESE 4 0009.9 28.5 28.3 3	bc ESE 4 1010.0 28.8 28.7 3	bc E 4 1010.8 28.8 28.6 3
130 3.0 390	296 4.0 1214		50 2.3 116	132 1.0 132	5 2.85 14	915 3.4 3110
			25 3.9 98			
		2 4				
		4 9				
130 390	296 1214	6 13	75 214	132 132	5 14	915 3110
				Baits remained 20 B/K		

18 June '78 12 2 34	22 June '78 16.2 35	22 June '78 16.2 36	22 June '78 16.2 37	22 June '78 16.2 38	24 June '78 18.2 39	24 June '78 18 2 40
12.50 13.05 13.10 13.45	09.30 09.45 09.47 10.10	10.15 10.25 10.25 11.25	11.40 11.50 11.52 13.18	14 15 14.25 14.25 15 05	10 10 10.25 – 10.32	10.50 10.55 – 10.58
North West of Butaritari 03-29.0N 172-29.0E	West of Kuria 00-14.8N 173-16.6E	West of Kuria 00-13.5N 173-17.0E	West of Kuria 00-12 0N 173-16.7E	West of Kuria 00-11.0N 173-15.0E	East of Aranuka 00-08.5N 173-40.0E	East of Aranuka 00-06.0N 173-37.0E
Skipjack Birds associated 20 Plain school Medium Good	Skipjack Birds associated 15 Jumping Small Bad	Skipjack Yellow-fin tuna mixed Birds associated 100 Jumping Large Good	Skipjack Yellow-fin tuna mixed Birds associated 50 Jumping Large Good	Skipjack Yellow-fin tuna mixed Birds associated 30 Jumping Large Somewhat good	Skipjack Birds associated 30 Sink ? None	Unknown Birds associated 20 Sink ? None
H 4	H 6	H 30	H 33	H 20	S 2	S 1
bc E 4 1009.0 28.5 28.6 3	bc ESE 3 1011.0 28.7 28.0 3	bc ESE 3 1011.0 28.7 28.0 3	bc ESE 3 1009.8 28.5 28.0 3	bc ESE 3 1009.8 28.7 28.2 3	bc ESE 4 1010.0 28.5 28.4 3	bc ESE 4 1010.0 28.5 28.4 3
244 3.3 805	18 2.45 44	639 2.36 1508	660 2.36 1558	72 2.90 209		
		513 3.44 1765	397 3.44 1366	86 3.52 303		
244 805	18 44	1152 3273	1057 2924	158 512	– –	– –
	Tagged 5	Tagged 139	Tagged 104	Tagged 6		

24 June '78 18.2 41	24 June '78 18.2 42	24 June '78 18.2 43	24 June '78 18 2 44	24 June '78 18.2 45	24 June '78 18.2 46	24 June '78 18.2 47
11.15 11.20 – 11.25	12.35 12 45 – 12 50	13.00 13.05 – 13.08	14 00 14.05 – 14.10	15.10 15.15 – 15.20	15.35 15.42 15.45 16.05	16.20 16.25 16.26 16.30
South of Aranuka 00-06 0N 173-34.0E	West of Aranuka 00-09.0N 173-26 0E	West of Aranuka 00-12.0N 173-28 0E	South of Aranuka 00-08 0N 173-35 0E	South East of Aranuka 00-03 0N 173-41.0E	South East of Aranuka 00-04.5N 173-47.0E	East of Aranuka 00-07.0N 173-47.0E
Skipjack yellow-fin tuna mixed Birds associated 10 Jumping Small None	Skipjack yellow-fin tuna mixed Birds associated 30 Jumping Small None	Rainbow runner Birds associated 20 Sink ? None	Unknown Birds associated 15 Sink ? None	Skipjack Birds associated 20 Jumping Small None	Skipjack Birds associated 5 Jumping Small Somewhat good	Yellowfin tuna Birds associated 2 Jumping Small Bad
S 2	S 4	S 2	S 2	S 2	S 14	S 3
bc ESE 4 1010.0 28.5 28 4 3	bc ESE 3 1008 0 29 0 28.3 3	bc ESE 3 1008.0 28.5 27.9 3	bc ESE 3 1008.0 28.5 28.4 3	bc ESE 3 1008.0 28 5 28.3 3	bc ESE 3 1008.3 28.5 28 3 3	bc ESE 3 1008.5 28.5 28.3 3
					153 2 2 337	
						10 3.0 30
– –	– –	– –	– –		153 337	10 30
					Tagged 28	

26 June '78 20 2 48	26 June '78 20.2 49	30 June '78 24.2 50	30 June '78 24.2 51	30 June '78 24.2 52	30 June '78 24.2 53	30 June '78 24.2 54
11.30 11.35 – 12.00	14.10 14.15 14.20 15.45	13.15 14.05 – 14.13	14 15 14.25 14.26 14.33	15.35 16.00 – 16.04	16.05 16.40 16.41 17 00	17.00 17.24 17.25 17.40
West of Kuria 00-13.0N 173-18.8E	West of Kuria 00-15.0N 173-17.0E	North West of Butaritari 03-31.0N 172-25.6E	North West of Butaritari 03-31.0N 172-27.0E	North West of Butaritan 03-27.0N 172-26.0E	North West of Butaritari 03-16.0N 172-26.8E	North West of Butaritari 03-17.0N 172-27.0E
Skipjack yellow-fin tuna mixed Birds associated 30 Sink Small None	Skipjack yellow-fin tuna mixed Birds associated 15 Sink ? Good	Skipjack Birds associated 30 Jumping Small None	Skipjack Birds associated 20 Jumping Small Bad	Skipjack Birds associated 20 Jumping Small None	Skipjack Birds associated 200 Breezer Medium Good	Skipjack Birds associated 200 Breezer Medium Somewhat good
S.AP 5	AP.H 35	H 3	H 8	H 2	H 20	H 10
bc ESE 2 1010.0 29.0 28.1 1	bc ENE 2 1010.0 29.2 28.3 1	bc E 4 1007.9 28.5 29.2 4	bc E 4 1007.5 28.5 29.2 4	bc E 4 1007.2 28.5 29.2 4	bc E 4 1007.0 28 5 29.0 4	bc E 4 1007.0 28.5 29.0 4
	386 2.64 1019	1 5.0	24 5.4 130		647 2.15 1391	261 2.15 561
	361 3.58 1292					
– –	747 2311	1 5	24 130	– –	647 1391	261 561
	Tagged 3					

2 July '78 26 2 55	2 July '78 26 2 56	2 July '78 26.2 57	2 July '78 26.2 58	2 July '78 26 2 59	4 July '78 28.2 60	4 July '78 28.2 61
08.30 08 50 – 09 00	10 50 11.05 – 11 10	13.55 14.24 14.25 14.40	15 00 15.28 15.30 15.35	16.10 16.48 16.50 17.10	06.50 07 19 07.20 07.50	08.15 08.25 08 25 08.43
North West of Butaritari 03-17.0N 172-31 0E	North West of Butaritari 03-12 0N 172-22 0E	North West of Butaritari 03-05 0N 172-40.0E	West of Butaritari 03-06 0N 172-39.0E	West of Butaritari 03-08 0N 172-41.0E	West of Butaritari 03-08.0N 172-40.0E	West of Butaritari 03-08.0N 172-39.0E
Skipjack Birds associated 30 Jumping Small None	Skipjack Birds associated 20 Jumping Small None	Skipjack Birds associated 50 Jumping Small Somewhat good	Skipjack yellow-fin tuna mixed Birds associated 20 Jumping Small Bad	Skipjack Birds associated 50 Jumping Small Bad	Skipjack Birds associated 60 Jumping Medium Bad	Skipjack Birds associated 50 Jumping Medium Somewhat good
AP.A.H 2	AP.A.H. 3	AP.A.H 15	AP.A.H.S 5	AP.A 10	H.A.AP 15	H.A.AP.S 10
bc E 4 1011.0 28 5 28.9 4	bc E 4 1010.2 28.5 28.9 4	bc ESE 4 1007.6 29.2 29.1 4	bc ESE 4 1006.9 29 2 29 1 3	bc ESE 3 1006.7 29.2 29.1 3	bc ESE 4 1009.5 28.8 28.4 3	bc SE 4 1009.8 28.8 28.4 3
		27.8 2.93 815	2 4.0 8	42 4.5 189	338 2.5 845	758 2.5 1895
			3 4.0 12			
– –	– –	27 8 815	5 20	42 189	338 845	758 1895

5 July '78 29.2 62	5 July '78 29.2 63	5 July '78 29 2 64	5 July '78 29 2 65	5 July '78 29.2 66	10 July '78 4.6 67	10 July '78 4.6 68
07.00 07.30 – 07.40	08.05 08.30 – 08.35	08.50 09.14 09.15 09 25	14.20 14.52 14.55 15.00	17.00 17.24 17.26 17.35	07.50 08.40 08 45 09.00	09.00 09.14 09 15 09.35
West of Butaritari 03-07.0N 172-40.0E	West of Butaritari 03-10.0N 172-31.0E	West of Butaritari 03-09.5N 172-24 5E	North West of Butaritari 03-25.0N 172-22.5E	North West of Butaritari 03-18.0N 172-33 5E	West of Butaritari 03-08 5N 172-33.5E	West of Butaritari 03-07.5N 172-26.0E
Skipjack Birds associated 60 Jumping Small None	Skipjack Birds associated 20 Jumping Small None	Skipjack Birds associated 30 Jumping Small Bad	Skipjack Birds associated 20 Jumping Small Bad	Skipjack Birds associated 30 Jumping Small Bad	Skipjack Birds associated 30 Jumping Small Bad	Skipjack Birds associated 30 Jumping Medium Bad
H.AP 3	H.AP.A 2	H.AP.A.S 15	H.AP.A 10	H.AP.S 15	H.A.S 8	H.A.S 15
bc E 3 1010.3 29.2 28.7 3	bc E 3 1010 8 29.2 28.7 3	bc E 3 1011.0 29.7 28 7 3	bc ENE 3 1010.0 29.2 28.5 3	bc ENE 3 1009.0 29.5 28.5 3	bc E 2 1010.8 28.5 29.0 2	bc E 2 1011.0 28.5 29.0 2
		44 5.4 238	49 6.0 294	53 5.5 292	93 5.2 484	301 5.25 1589
– –	– –	44 238	49 294	53 292	93 484	301 1589
		Tagged 8	Tagged 10	Tagged 11		

10 July '78 4.6 69	10 July '78 4.6 70	10 July '78 4.6 71	11 July '78 5 6 72	11 July '78 5.6 73	11 July '78 5.6 74	11 July '78 5.6 75
99.55 10.29 10 30 10.35	11.00 13.10 13.15 13.20	13 20 13.47 – 13.55	07.20 07.40 – 07.45	07.45 08.23 08.25 08.35	09.00 10.10 10.10 10.30	11.30 12.03 12.05 12.10
West of Butaritari 03-08.0N 172-21.0E	North West of Butaritari 03-32 0N 172-02.0E	North West of Butaritari 03-30.0N 172-04.0E	South West of Butaritari 02-57 0N 172-43.0E	South West of Butaritari 02-50.0N 172-44.0E	West of Butaritari 03-06.0N 172-34.0E	West of Butaritari 03-09.5N 172-37.0E
Skipjack Birds associated 20 Jumping Small Bad	Skipjack Birds associated 10 Jumping Small Bad	Skipjack Birds associated 30 Jumping Small None	Skipjack Birds associated 15 Jumping Small None	Skipjack Birds associated 50 Jumping Small Bad	Skipjack yellow-fin tuna mixed Birds associated 100 Jumping Medium Good	Skipjack yellow-fin tuna mixed Birds associated 100 Jumping Medium Bad
H.A.S 10	H.A S 10	H.A.S 4	H.A S 3	H.A S 7	H.A.S 25	H.A.S 5
bc E 2 1011 7 29 2 29.3 2	bc E 3 1009.0 29.2 29.5 2	bc E 3 1008 8 29.2 29.5 2	bc SE 4 1010.5 28 5 29.1 3	bc SE 4 1011.0 28.5 29.1 3	r SE 4 1011.7 28 0 29.1 4	r SE 4 1011.3 28.0 29.1 3
145 5.2 754	77 5.2 400			84 2.2 185	542 2.2 1192	2 5.5 11
					152 4.2 638	10 4.5 45
145 754	77 400	– –	– –	84 185	694 1830	12 56

11 July '78 5 6 76	12 July '78 6.6 77	12 July '78 6.6 78	12 July '78 6.6 79	13 July '78 7 6 80	13 July '78 7.6 81	13 July '78 7.6 82
13.30 14 10 14.10 14.55	06.40 07.09 07.10 07.50	08.30 08.50 – 08.55	09.00 09.24 09.25 09 35	06.45 07.04 07.05 07 15	07.15 07.24 07 25 07.32	07.35 07.44 07 45 08.05
West of Butaritari 03-05.0N 172-38.0E	West of Butaritari 03-06.0N 172-42.0E	West of Butaritari 03-04.0N 172-40.0E	West of Butaritari 03-02.5N 172-42.0E	West of Butaritari 03-03.0N 172-41.0E	West of Butaritari 03-03.0N 172-41.0E	West of Butaritari 03-06.5N 172-42 5E
Skipjack Birds associated 200 Breezer Large Good	Skipjack yellow-fin tuna mixed Birds associated 200 Jumping Large Good	Yellowfin tuna Birds associated 50 Jumping Small None	Skipjack Birds associated 100 Breezer Large Good	Skipjack Birds associated 50 Breezer Medium Somewhat good	Skipjack Birds associated 30 Jumping Small Bad	Skipjack yellow-fin tuna mixed Birds associated 100 Breezer Large Good
H.A.S 20	H.A AP.S 22	H.A.AP S 2	H.A.AP.S 3	H.A.AP.S 10	H.A.AP.S 5	H.A.AP.S 10
bc SE 4 1010.0 28 5 29.2 3	bc ESE 3 1010.5 28.5 28.9 3	bc ESE 3 1010.2 28.5 28.9 3	bc ESE 3 1011.0 28.5 28.9 3	c ESE 2 1010.3 28.5 28.9 1	bc ESE 2 1010.4 28.5 28.9 1	bc ESE 2 1010.9 28 5 28.9 1
812 2 1 1706	668 2.2 1469		145 2.2 319	400 2.2 880	57 2.2 125	544 2.3 1251
	168 4.3 722					3 4.5 13
812 1706	836 2191	– –	145 319	400 880	57 125	544 1265

13 July '78 7 6 83	13 July '78 7.6 84	13 July '78 7.6 85	16 July '78 10 6 86	16 July''78 10.6 87	16 July '78 10.6 88	16 July '78 10 6 89
08 20 08.42 08 43 08.50	08.55 09.30 09.30 09.45	09.45 10 00 10 00 10.05	07.45 07.58 08.00 08.30	08 40 08.55 08.57 09.05	09.05 09.10 09.12 09 25	09.25 09.35 09.35 10 10
South West of Butaritari 02-59 0N 172-40 0E	South West of Butaritari 02-54.0N 172-43.0E	South West of Butaritari 01-36.8N 172-49.5E	North West of Butaritari 01-36 8N 172-49.5E	North West of Butaritari 01-37.8N 172-46.5E	North West of Butaritari 01-37.3N 172-45.5E	North West of Butaritan 01-35.6N 172-43.0E
Skipjack Birds associated 50 Jumping Small Bad	Skipjack Birds associated 100 Jumping Medium Bad	Skipjack Birds associated 70 Jumping Small Somewhat good	Skipjack Birds associated 70 Jumping Small Somewhat good	Skipjack Birds associated 30 Jumping Small Somewhat good	Skipjack Birds associated 500 Jumping Medium Somewhat good	Skipjack Birds associated 500 Jumping Medium Good
H A.AP S 5	H 5	H 5	H.S 22	H.S 16	H.S 18	H.S 13
bc ESE 2 1011.0 28 8 28.9 1	bc ESE 2 1011.1 29.0 29.3 1	bc ESE 2 1011.1 29.0 29 3 1	bc SE 3 1012.0 28.5 28.3 2	bc ESE 3 1012.1 29.0 28.2 2	bc ESE 3 1012.1 29.2 28 2 2	bc ESE 3 1011.8 29.0 28.5 2
115 2 5 287	130 2.5 325	123 2 7 332	313 2 7 845	174 2.7 470	204 2.7 551	655 2.74 1801
8 4.0 32		4 4 0 16				
123 319	130 325	127 348	313 845	174 470	204 551	655 1801

17 July '78 11.6 90	17 July '78 11.6 91	17 Jluly '78 11.6 92	17 July '78 11.6 93	21 July '78 15.6 94	22 July '78 16.6 95	23 July '78 17.6 96
09.40 09.52 09.55 10.00	11.35 11.45 11.52 12.05	12.25 12.35 12.40 12 50	12.55 13 05 – –	07 25 07 45 07 50 08 30	08.40 09.00 09.03 10.30	09 40 09.50 – –
North West of Tarawa 01-37.0N 172-41.0E	North West of Tarawa 01-29.0N 172-34.0E	North West of Tarawa 01-29.0N 172-36.5E	West of Tarawa 01-28.5N 172-39.0E	West of Butaritari 03-03.7N 172-43.6E	West of Butaritari 03-05 0N 172-40.0E	South of Butaritari 02-59.0N 172-56 0E
Skipjack Birds associated 10 Jumping Small Somewhat good	Skipjack Birds associated 70 Jumping Medium Somewhat good	Skipjack Birds associated 50 Jumping Small Somewhat good	Skipjack Birds associated 50 Sink ? None	Skipjack Birds associated 1000 Jumping Large Bad	Skipjack Birds associated 500 Jumping Large Bad	Skipjack Birds associated 100 Jumping Medium None
H.S 10	H.S 8	H 4	H 2	H AP A 13	S 20	S 2
r NEN 3 1011.2 28 2 28.1 2	bc ENE 3 1011.0 28.0 28.5 2	bc ENE 3 1011.0 28.5 28.3 2	bc ENE 3 1011.0 28.6 28.3 2	bc Calm 1011.0 28 3 29 2 Calm	bc E 1 1010.9 28 3 29.2 1	bc E 2 1009 5 29.0 29 1 1
51 4.5 230	122 4.6 561	119 4.6 547		257 2.0 514	282 1.7 479	
				8 4 32		
51 230	122 561	119 547	– –	265 546	282 479	– –

23 July '78 17.6 97	23 July '78 17 6 98	23 July '78 17.6 99	23 July '78 17.6 100	23 July '78 17.6 101	26 July '78 20.6 102	27 July '78 21.6 103
10 00 10.10 10.11 10.13	1055 11.08 11.10 11.20	12.30 12.43 12.45 12.55	13.25 13.38 13 40 14.05	14.05 14.12 14.15 14.40	07.50 08.15 08.20 09.20	07.55 08.15 – 08.20
South of Butaritari 02-58.0N 172-54.0E	South of Butaritari 02-53.0N 172-49.0E	West of Butaritari 03-03 5N 172-41.0E	West of Butaritari 03-05.0N 172-39.3E	West of Butaritari 03-05.8N 172-40.0E	West South West of Butaritari 01-20.5N 172-50.0E	West of Tarawa 01-15.0N 172-49.7E
Skipjack yellow-fin tuna mixed Birds associated 100 Jumping Medium Bad	Skipjack Birds associated 60 Jumping Medium Somewhat good	Skipjack Birds associated 50 Jumping Medium Somewhat good	Skipjack Birds associated 70 Jumping Medium Good	Skipjack Birds associated 150 Jumping Large Good	Skipjack Birds associated 200 Breezer Large Bad	Skipjack Birds associated 50 Jumping Small None
S 2	S 8	S 6	S 12	H.S 10	H.S 26	H.S 4
bc E 2 1009 5 29.0 29.1 1	bc E 2 1009.0 29.0 29.1 1	bc E 1 1008.5 29.0 29.5 1	bc E 1 1007 0 29.0 29.9 1	bc E 1 1007.0 29.0 29 9 Calm	bc SE 6 1008.2 28.0 28.2 5	bc E 4 1008.8 29.0 28.6 4
1 2.0 2	466 2 1 979	211 2 16 456	609 2.3 1401	508 2.3 1168	532 2.75 1463	
						– –
1 2	466 979	211 456	609 1401	508 1168	532 1463	– –
			Tagged 23		Chase and fishing	

27 July '78 21.6 104	27 July '78 21.6 105	27 July '78 21.6 106	27 July '78 21.6 107	30 July '78 24.6 108	30 July '78 24 6 109	30 July '78 24 6 110
10.30 11.03 11.05 11.20	11.55 12.28 12 30 12.35	14 05 14.45 14.45 14.50	15.35 16 10 16.10 16.15	09.50 10 25 10 25 10.37	10 38 10.50 10.50 11.15	12.05 12.45 12.48 13.05
West of Maiana 00-49.0N 172-52.5E	South West of Maiana 00-42.0N 172-55.0E	South of Maiana 00-47.0N 173-00.0E	South East of Maiana 00-42.5N 173-10.2E	South of Kuria 00-07.5N 173-23.5E	South of Kuria 00-07.0N 173-25 0E	West of Kuria 00-15 0N 173-15.0E
Skipjack Birds associated 200 Jumping Medium Bad	Skipjack Birds associated 50 Jumping Small None	Skipjack Birds associated 100 Jumping Small Bad	Skipjack Birds associated 50 Jumping Small Bad	Skipjack Birds associated 100 Breezer Medium Bad	Skipjack Birds associated 100 Breezer Medium Bad	Skipjack Birds associated 150 Breezer Medium Bad
H.S 15	H.S 5	H.S 6	H.S 5	H.A.S 15	H.A.S 15	H.A.S 15
bc E 4 1009.0 29.0 28 1 4	bc E 4 1008.5 29.5 28.2 4	bc E 4 1007.0 29.5 28.2 4	bc E 4 1006.0 29.5 28.3 4	bc ESE 4 1009.3 28.8 28 1 4	bc ESE 4 1009.1 28.8 28 1 4	bc ESE 4 1008 3 28.8 28.2 3
75 2.6 195		15 2.6 39	76 3 0 228	310 2.7 837	422 2 5 1055	217 2 6 565
75 195	– –	15 39	76 228	310 837	422 1055	217 565
Scattered school						

30 July '78 24.6 111	31 July '78 25.6 112	31 July '78 25.6 113	31 July '78 25.6 114	31 July '78 25.6 115	31 July '78 25.6 116	3 Aug. '78 28.6 117
13.10 13.45 – 13.55	09 40 10.15 – 10.30	10.31 11.10 11.15 11.40	12.10 12.40 – 13 00	13.10 13.50 14.10 14.35	15.00 15.40 15.45 16.05	08.10 08.35 – 08.50
West of Kuria 00-13.0N 173-18.0E	South East of Kuria 00-06.0N 173-26 0E	South of Kuria 00-00.0N 173-23.0E	South of Kuria 00-06.0N 173-10 0E	South of Kuria 00-03.0N 173-18.0E	West of Kuria 00-15.5N 173-19.0E	North West of Tarawa 01-35.0N 172-47.5E
Skipjack Birds associated 200 Foaming Medium None	Skipjack Birds associated 200 Jumping Small None	Skipjack Birds associated 50 Breezer Medium Bad	Skipjack Birds associated 100 Jumping Small None	Skipjack yellow-fin tuna mixed Birds associated 50 Jumping Medium Bad	Skipjack yellow-fin tuna mixed Birds associated 100 Jumping Small Bad	Skipjack Birds associated 200 Jumping Medium None
H.A S 5	H.A S 5	H.A.S 25	H.A.S 8	H.A.AP 25	H.A.AP 15	H.S 4
bc ESE 3 1007.7 28.8 28 2 3	bc E 3 1009.8 28.4 29.3 3	bc E 3 1009.3 28 5 29.5 3	bc E 3 1008.5 28 7 29.5 3	bc E 3 1008.0 28 7 29 9 3	bc E 3 1007.5 28 9 28.6 3	o SE 4 1010.8 28.5 28.1 3
		270 2.6 702		160 2.6 416	109 2.6 284	
				86 3.5 301	2 3.5 7	
–	–	270	–	246	111	–
–	–	702	–	717	291	–

3 Aug. '78 28.6 118	3 Aug. '78 28.6 119	3 Aug. '78 28.6 120	3 Aug. '78 28.6 121	3 Aug. '78 28.6 122	3 Aug '78 28.6 123	3 Aug '78 28.6 124
09.40 09.47 09.50 09.55	10.15 10.26 10.30 10 50	11.15 11.25 11.28 12.10	12.40 12.50 – 13.02	13.35 13.50 14.30 15.00	15.40 16.00 16 10 16.20	16.20 16.30 16.40 16.45
North West of Tarawa 01-43.0N 172-46.0E	West of Abaiang 01-41.0N 172-44.0E	West of Abaiang 01-51.6N 172-30.0E	West of Abaiang 01-50.0N 172-36.5E	West of Abaiang 01-49.0N 172-42.0E	West of Abaiang 01-55.0N 172-44.0E	West of Abaiang 01-54.0N 172-45.5E
Skipjack Birds associated 200 Jumping Medium None	Skipjack Birds associated 100 Jumping Small Bad	Skipjack Birds associated 100 Jumping Medium Somewhat good	Skipjack Birds associated 150 Jumping Medium None	Skipjack yellow-fin tuna mixed Birds associated 50 Jumping Medium Good	Skipjack Birds associated 150 Jumping Small Good	Skipjack Birds associated 200 Sink Small Somewhat good
H.S 7	H.S 15	H.S 18	H 6	H.M 15	M 7	M 2
O SE 4 1011.4 28 1 28.3 3	R SE 4 1011.4 28.1 28.3 3	R NNE 3 1011.0 27.8 28.1 3	R NNE 3 1010.0 27.5 28.1 3	R NNE 3 1010.0 27.7 28.1 2	O NNE 3 1009.0 27.6 28.2 2	O NNE 3 1009.0 27.5 28 2 2
1 3.0 3	35 2 9 102	332 2.9 963		513 2.84 1457	309 2.9 896	118 1.3 153
				34 4.18 142		
1 3	35 102	332 963	– –	547 1599	309 896	118 153
		Catch SPC Tagged 1				

5 Aug '78 1.0 125	5 Aug. '78 1.0 126	5 Aug. '78 1.0 127	5 Aug '78 1.0 128	6 Aug. '78 2.0 129	6 Aug. '78 2.0 130	6 Aug. '78 2.0 131
11.40 11 59 12.00 12 04	12 04 12 22 12 22 12 25	12.30 12.52 12 55 13.00	13.00 13.10 13 12 13 15	08.10 08.30 08.32 18 50	09.05 09.20 09.23 09.28	09.45 10.07 10 10 11.00
West of Butaritari 03-10.0N 172-39 0E	West of Butaritari 03-06.0N 172-39.5E	West of Butaritari 03-07.0N 172-34 5E	West of Butaritari 03-08.0N 172-36.0E	West of Butaritari 03-09.0N 172-38.0E	West of Butaritari 03-09.0N 172-35.0E	West of Butaritari 03-10.0N 172-36.5E
Skipjack Birds associated 100 Jumping Small Somewhat good	Skipjack Birds associated 150 Jumping Small Somewhat good	Skipjack Birds associated 150 Jumping Small Bad	Skipjack Birds associated 50 Jumping Small Bad	Skipjack Birds associated 100 Jumping Small Somewhat good	Skipjack Birds associated 100 Jumping Small Bad	Skipjack Birds associated 150 Jumping Small Somewhat good
H.A 8	H A 12	H.A 9	H.A 8	H 20	H 2	H 14
R ENE 4 1011 0 27 7 28.4 3	R ENE 5 1011.0 27.4 28.2 4	R E 5 1011.0 27.4 28.2 4	R E 5 1010.0 27.4 28.2 4	bc E 3 1010 0 27.8 28.2 2	bc E 3 1010.8 28.2 28.6 2	bc E 3 1010.2 28.3 28.6 2
120 2 64 317	160 2.64 422	80 1 9 152	24 2.7 65	355 2.1 746	12 2.22 26	351 2.22 780
120 317	160 422	80 152	24 65	355 746	12 26	351 780

7 Aug. '78 3 0 132	7 Aug. '78 3.0 133	7 Aug. '78 3.0 134	7 Aug. '78 3.0 135	7 Aug '78 3.0 136	8 Aug. '78 4 0 137	8 Aug '78 4.0 138
09.55 10.18 10 20 10.45	10.45 11.00 11.00 11.20	11.20 11.40 11.41 11.55	11.55 12.10 12.10 12.15	12.50 13 23 13.25 13.40	10.45 11.05 11.11 11.55	11.55 12.10 12.13 12 45
West of Butaritari 03-05.0N 172-41.5E	West of Butaritari 03-05.5N 172-40.0E	West of Butaritari 03-07.5N 172-41.0E	West of Butaritari 03-08.0N 172-41.0E	West of Butaritari 03-06.5N 172-41.7E	West of Butaritari 03-04 0N 172-41.0E	West of Butaritari 03-06.0N 172-42.0E
Skipjack yellow-fin tuna mixed Birds associated 120 Jumping Medium Somewhat good	Skipjack yellow-fin tuna mixed Birds associated 150 Jumping Medium Somewhat good	Skipjack Birds associated 120 Jumping Medium Bad	Skipjack yellow-fin tuna mixed Birds associated 200 Jumping Medium Bad	Skipjack yellow-fin tuna mixed Birds associated 300 Jumping Large Good	Skipjack Birds associated 80 Jumping Large Somewhat good	Skipjack Birds associated 50 Jumping Medium Good
H 13	H 12	H 5	H 2	H 5	H 18	H 14
q E 2 1013.3 25.5 28 0 1	R NE 2 1013.0 25.5 28.0 1	R NE 2 1013.0 25.5 28.0 1	o Calm 1012.2 25.2 28.1 Calm	o Calm 1010.0 26.3 28.3 Calm	bc S 1 1009.0 28 5 28.4 1	bc S 1 1009 0 28.5 28.4 1
47 3.24 152	24 3.3 79	195 1.93 376	18 3.3 59	45 2 8 125	750 2 88 1710	726 2 14 1554
182 3 96 721	254 4.15 1067		22 4 15 91	93 4.0 372		
229 373	281 1146	195 376	40 150	138 497	750 1710	726 1554

8 Aug. '78 4.0 139	8 Aug. '78 4 0 140	8 Aug '78 4.0 141	8 Aug '78 4.0 142	8 Aug. '78 4.0 143	8 Aug '78 4.0 144	8 Aug. '78 4.0 145
12.45 12.54 12.56 13.04	13.04 13.20 13.22 13.38	13 40 13.45 13.55 14.02	14.02 14 10 14.12 14 27	14.30 14.40 14.40 14.55	15.00 15.15 15.18 15.23	15.25 15.35 15.35 16.00
West of Butaritari 03-07.0N 172-41.0E	West of Butaritari 03-05.5N 172-40.0E	West of Butaritari 03-06 5N 172-40.0E	West of Butaritari 03-07.5N 172-40.0E	West of Butaritari 03-08.5N 172-39.0E	West of Butaritari 03-09.0N 172-39.0E	West of Butaritan 03-09.0N 172-37.0E
Skipjack Birds associated 100 Jumping Medium Bad	Skipjack Birds associated 50 Jumping Medium Bad	Skipjack Birds associated 50 Jumping Small Somewhat good	Skipjack Birds associated 20 Jumping Small Good	Skipjack Birds associated 30 Jumping Small Good	Skipjack Birds associated 30 Jumping Small Good	Skipjack Birds associated 10 Jumping Medium Good
H 8	H 8	H 10	H 8	H 10	H 6	H 8
bc SSE 2 1008.0 28.5 29 1 1	bc SSE 2 1008.0 28.5 29.1 1	bc SSE 2 1008.0 28.5 29.1 1	bc SSE 2 1008.0 28.5 29.1 1	bc SSE 2 1008.0 28.5 29.1 1	bc SSE 2 1007.8 28.5 29.2 1	bc SSE 2 1007.8 28.8 29.2 1
40 2 15 86	70 2.15 151	240 2.15 516	250 2.15 538	605 2.15 1301	114 2.1 239	661 2.07 1368
40 86	70 151	240 516	250 538	605 1301	114 239	661 1368
			Catch SPC Tagged 2			

8 Aug. '78	8 Aug. '78	14 Aug. '78	14 Aug '78	14 Aug. '78	15 Aug '78	15 Aug '78
4.0	4.0	10.0	10.0	10.0	11.0	11.0
146	147	148	149	150	151	152
16.00	16.16	15.30	16.45	18.20	09.30	10.30
16.10	16.30	15.58	17.15	18.35	10.10	10.40
16 11	16.35	16.00	–	18.35	10.15	10.40
16.16	16.50	16.15	17.20	18.50	10.30	10.55
West of Butaritari	West of Butaritari	West of Tarawa	North West of Tarawa	West of Abaiang	North West of Butaritari	North West of Butaritari
03-10.5N	03-10.0N	01-29.9N	01-45.0N	01-47.0N	03-12.5N	03-10.5N
172-38.0E	172-37.5E	172-47.9E	172-48.0E	172-49.0E	172-39.0E	172-40.0E
Skipjack	Skipjack yellow-fin tuna mixed	Skipjack yellow-fin tuna mixed	Skipjack	Skipjack	Skipjack	Skipjack
Birds associated 15	Birds associated 15	Birds associated 300	Birds associated 50	Birds associated 50	Birds associated 100	Birds associated 100
Jumping	Jumping	Jumping	Jumping	Jumping	Breezer	Breezer
Small	Small	Medium	Small	Small	Medium	Large
Somewhat good	Good	Bad	None	Somewhat good	Bad	Good
H	H	H.S	H.S	H.S	H	H
6	4	20	3	15	8	5
bc	bc	bc	bc	bc	bc	bc
SSE 2	SSE 2	ESE 4	ESE 4	ESE 3	E 3	E 3
1007.8	1007.0	1010.0	1010.2	1011.8	1014.0	1014.0
28.8	28.8	28.5	28.5	28.0	28.5	28.5
29.2	29.2	29.1	29.1	29.1	28.8	28.8
1	1	3	3	3	3	3
170	225	3		307	11	188
2.07	2.07	2.6		3.0	3.5	2.56
352	466	8		921	39	481
	453	88				
	3.85	4.7				
	1744	414				
170	678	91	–	307	11	188
352	2210	422	–	291	39	481

17 Aug '78 13.0 153	17 Aug '78 13.0 154	17 Aug. '78 13.0 155	18 Aug. '78 14.0 156	19 Aug. '78 15.0 157	19 Aug. '78 15.0 158	19 Aug. '78 15.0 159
10.00 10.25 – 10.35	10.45 10.53 10.55 11 05	12.05 12.35 12.35 12 45	11.20 11.40 11.40 12.00	10.55 11.14 11.15 11.20	11.20 11.38 11.40 11.50	11.50 12.00 12.00 12.25
North West of Butaritari 03-06 0N 172-40.0E	North West of Butaritari 03-10.0N 172-39.0E	North West of Butaritari 03-06.0N 172-36.0E	West of Butaritari 03-07.0N 172-38 0E	North West of Butaritari 03-13.0N 172-36.0E	North West of Butaritari 03-12.0N 172-36.0E	North West of Butaritari 03-12.0N 172-37.0E
Skipjack Birds associated 100 Jumping Small None	Skipjack Birds associated 200 Jumping Medium Bad	Skipjack Birds associated 500 Jumping Medium Bad	Skipjack Birds associated 200 Breezer Medium Good	Skipjack Birds associated 100 Jumping Small Bad	Skipjack Birds associated 150 Jumping Small Bad	Skipjack yellow-fin tuna mixed Birds associated 200 Jumping Medium Good
A.S 5	A.S 10	H.A.AP 4	H 6	H 10	H 15	H 25
q ESE 2 1012.3 26.7 28.5 1	R ESE 2 1012.1 26 7 28.5 2	b ESE 1 1010.8 28 2 28.5 1	bc E 4 1010.3 29.5 28.9 3	q E 3 1009.3 27.2 28.9 3	q E 3 1009.2 27.2 28.9 3	bc E 2 1009.1 27.2 28.9 3
	19 3.5 67	39 2.6 91	134 3.2 429	90 3.0 270	55 3.0 165	923 2.4 2215
						120 4.0 480
– –	19 67	39 91	134 429	90 270	55 165	1043 2695
					Catch SPC Tagged 1	Catch SPC Tagged 4

19 Aug. '78 15.0 160	19 Aug. '78 15.0 161	19 Aug. '78 15 0 162	20 Aug. '78 16 0 163	20 Aug '78 16.0 164	20 Aug '78 16 0 165	20 Aug '78 16.0 166
14.00 14.28 14.30 14 40	14.45 15.20 – 15.30	15.45 16.03 16.05 16.10	10.00 10.43 10.45 11 05	11 08 11.33 13.35 11 45	12.05 12.17 – 12.23	14 40 15 05 15.05 15.40
West of Butaritari 03-06.0N 172-37.0E	West of Butaritari 03-08.0N 172-38.0E	West of Butaritari 03-06 0N 172-39.0E	North West of Butaritari 03-13.0N 172-35.5E	North West of Butaritari 03-12.0N 172-34.0E	North West of Butaritari 03-12.0N 172-34.0E	West of Butaritari 03-02.0N 172-37.0E
Skipjack Birds associated 50 Breezer Large Bad	Skipjack Birds associated 20 Breezer Small None	Skipjack Birds associated 50 Breezer Medium Bad	Skipjack Birds associated 150 Jumping Medium Bad	Skipjack Birds associated 200 Jumping Medium Bad	Skipjack Birds associated 100 Jumping Small None	Skipjack yellow-fin tuna mixed Birds associated 50 Jumping Large Good
H 15	H 5	H 5	H 20	H 20	H 5	H 30
bc E 2 1006.8 28.5 28.9 2	b E 2 1006 4 28.8 29.0 2	b E 2 1006.4 28.8 29 0 2	bc SE 5 1009.6 28.5 28.7 4	bc SE 5 1009 4 28.5 29 0 4	bc SE 5 1009.4 28.5 29.2 4	bc SE 4 1007 1 29.2 29.3 3
18 3.0 54		9 2.4 22	192 2.7 518	186 2 7 502		559 3.1 1733
						607 4.5 2731
18 54	– –	9 22	192 518	186 502	– –	1166 4464
			Catch SPC Tagged 3			Catch SPC Tagged 7

23 Aug. '78 19.0 167	23 Aug '78 19.0 168	23 Aug '78 19.0 169	24 Aug. '78 20.0 170	24 Aug. '78 20.0 171	24 Aug. '78 20.0 172	24 Aug. '78 20.0 173
11.50 11.58 12.00 12.25	12.55 13.05 13.08 13.20	13.50 13.55 13.58 14.15	12.45 13.05 13.06 13.10	14.40 15.12 15.15 15.55	15.56 16.18 16.20 16.30	16.45 16.56 16.58 17.05
North West of Tarawa 01-36.0N 172-50 0E	West of abaiang 01-42.0N 172-48.0E	West of abaiang 01-47.0N 172-46.5E	West of Butaritari 03-07.0N 172-40.0E	West of Butaritari 03-09.0N 172-31.0E	West of Butaritari 03-07.0N 172-30.0E	West of Butaritan 03-05.0N 172-31.0E
Skipjack Birds associated 200 Jumping Medium Bad	Skipjack Birds associated 20 Jumping Medium Bad	Skipjack yellow-fin tuna mixed Birds associated 100 Jumping Medium Somewhat good	Skipjack Birds associated 50 Sink Small Bad	Skipjack Birds associated 70 Sink Small Bad	Skipjack Birds associated 30 Sink Small Bad	Skipjack Birds associated 30 Sink Small Bad
H.M.S 28	M 5	M 11	H 4	H 12	H 11	H 8
bc E 2 1010.8 29 0 28.9 1	bc E 2 1010.0 29.5 29.7 1	bc ENE 2 1008.0 29 7 30.0 1	bc ESE 4 1010.0 30.0 29.2 3	bc ESE 4 1008.4 30.0 29.3 3	bc ESE 4 1008.4 29.5 29.3 3	bc ESE 4 1009.0 29.5 29.3 3
153 2.72 416	69 2.75 190	142 2.7 383	30 2.4 72	516 2.24 1156	343 2.3 789	92 2.3 212
153 416	69 190	260 1032	30 72	516 1156	343 789	92 212

25 Aug '78 21.0 174	25 Aug. '78 21.0 175	25 Aug. '78 21.0 176	26 Aug. '78 22.0 177	26 Aug. '78 22.0 178	26 Aug. '78 22.0 179	26 Aug. '78 22.0 180
12.25 13.00 13.00 13.50	14.10 14.37 14.40 14.45	15.40 16.10 16.12 16.32	10.00 10.32 10.35 10.55	10.55 11.05 11.07 11.35	11.35 12.08 12.12 12.35	14.30 15.00 15.02 15.08
West of Butaritari 03-05.0N 172-33.0E	West of Butaritari 03-08.0N 172-31.0E	West of Butaritari 03-10.5N 172-37.0E	West of Butaritari 03-06.0N 172-41.0E	West of Butaritari 03-07.0N 172-40.5E	West of Butaritari 03-08.8N 172-40.4E	South West of Butaritari 03-00.0N 172-39.0E
Skipjack Birds associated 80 Jumping Medium Bad	Skipjack yellow-fin tuna mixed Birds associated 50 Jumping Medium Bad	Skipjack Birds associated 30 Jumping Medium Bad	Skipjack Birds associated 100 Jumping Small Bad	Skipjack Birds associated 50 Jumping Medium Somewhat good	Skipjack Birds associated 150 Jumping Medium Somewhat good	Skipjack yellow-fin tuna mixed Birds associated 50 Jumping Small Bad
H.A 22	H.A 13	H.A 20	H 10	H 21	H 23	H 8
bc SE 3 1008.0 29.6 29.1 3	bc SE 3 1007.5 29.5 29.0 3	bc SE 3 1007.3 29.5 29.4 3	bc SSE 2 1011.0 29.0 28.9 2	bc SSE 2 1010.2 29.2 29.1 2	bc SSE 3 1010.2 29.3 29.2 2	bc SSE 3 1008.0 29.0 29.4 2
424 2.13 903	51 4.4 97	317 2.48 786	171 2.1 359	512 2.45 1254	582 2.33 1356	28 3.0 84
						2 4.0 8
424 903	73 321	317 786	171 359	512 1254	582 1356	30 92
Catch SPC Tagged 4		Catch SPC Tagged 4	Catch SPC Tagged 2	Catch SPC Tagged 1		

26 Aug '78 22.0 181	26 Aug '78 22.0 182	27 Aug. '78 23.0 183	27 Aug '78 23.0 184	27 Aug. '78 23.0 185	27 Aug. '78 23.0 186	29 Aug '78 25.0 187
15.08 15.18 15.30 15.45	16.35 17.00 17.05 17.14	09.35 10.15 10.17 10.30	10.30 11.02 11.05 11.10	11.10 11.15 11.18 11.50	11.50 12.27 12.30 13.30	13.30 13.50 – 13.55
South West of Butaritari 03-01.5N 172-40 0E	South West of Butaritari 03-01 0N 172-40.5E	West of Butaritari 03-07.0N 172-38.0E	North West of Butaritari 03-12.0N 172-33.0E	North West of Butaritari 03-14.0N 172-33.0E	North West of Butaritari 03-15.0N 172-36.0E	West of Butaritari 03-05.0N 172-40.0E
Skipjack Birds associated 20 Jumping Small Bad	Skipjack yellow-fin tuna mixed Birds associated 40 Jumping Medium Good	Skipjack Birds associated 200 Jumping Large Bad	Skipjack Birds associated 80 Jumping Large Good	Skipjack Birds associated 100 Jumping Large Good	Skipjack Birds associated 100 Jumping Large Good	Skipjack yellow-fin tuna mixed Birds associated 40 Jumping Small None
H 8	H 8	H 12	H 16	H 34	H 25	H 3
bc SSE 3 1008.0 29.0 29.5 2	bc SSE 3 1009.0 29.0 29.2 2	bc SE 2 1012.0 30.0 29.1 2	bc SE 2 1010.5 30 0 29.1 2	bc SE 2 1010.2 30 2 29.6 2	bc ESE 2 1010.0 30.2 29.6 2	bc SE 3 1010.2 30.5 29.2 2
80 2.7 216	72 2.59 186	143 2.23 319	220 2.3 506	2356 2.3 5419	1075 2.38 2558	
	153 4.43 678					
80 216	225 864	143 319	220 506	2356 5419	1075 2558	– –
Catch SPC Tagged 5	Catch SPC Tagged 3	Catch SPC Tagged 1	Catch SPC Tagged 5			

29 Aug. '78 25.0 188	29 Aug. '78 25.0 189	29 Aug. '78 25.0 190	1 Sep. '78 28.0 191	1 Sep. '78 28.0 192	1 Sep. '78 28.0 193	2 Sep '78 29.0 194
14.15 14.28 – 14.44	16.35 17.05 17.08 17.15	17.15 17.30 – 17.40	07 00 07.20 – 07.35	08.30 08.58 09.00 09.20	09.20 09.39 19.40 10.15	07.20 07.50 07.50 08.20
West of Butaritari 03-09.0N 172-37.0E	North West of Butaritari 03-14.0N 172-27.0E	North West of Butaritari 03-10.0N 172-26.0E	West of Tarawa 01-21.0N 172-52.0E	South of Tarawa 01-15 7N 172-53.2E	South of Tarawa 01-16.0N 172-52.0E	South of Tarawa 01-16.8N 172-52.1E
Skipjack Birds associated 30 Jumping Medium None	Skipjack yellow-fin tuna mixed Birds associated 10 Jumping Small Bad	Skipjack Birds associated 30 Jumping Medium None	Skipjack Birds associated 100 Jumping Small None	Skipjack Birds associated 100 Jumping Medium Bad	Skipjack Birds associated 100 Jumping Medium Bad	Skipjack Birds associated 150 Breezer Large Bad
H 3	H 10	H 4	S 5	S 20	M 8	S 30
bc SE 3 1010.2 30.5 29.2 2	bc SSE 3 1009.4 30.2 29.4 2	bc SSE 3 1009.5 29.0 29.1 2	bc NE 2 1011.8 30.0 28.7 1	bc NE 2 1012.8 30.0 29.1 2	bc NE 3 1013.2 30.0 29.1 2	bc ESE 2 1013.2 29.2 28.6 2
	8 2.6 21			531 2.6 1381	238 2.6 619	636 2 6 1654
	77 5.24 403					
– –	85 424	– –	– –	531 1381	238 619	636 1654

2 Sep '78	3 Sep. '78	3 Sep. '78	3 Sep. '78	3 Sep. '78	4 Sep. '78	4 Sep. '78
29.0	0.3	0.3	0.3	0.3	1.3	1.3
195	196	197	198	199	200	201
08.35	06.50	07.25	08.35	09.15	09.55	11.20
08.45	17.15	07.40	09.00	09.35	10.05	11.46
08.45	–	07.43	09 00	09.40	10.15	–
09.00	07.20	07.55	09.15	10.00	10.45	11.55
South of Tarawa	West of abemama	West of Abemama	South West of Abemama	South West of Abemama	South of Kuna	South of Kuna
01-17.0N	00-27.0N	00-29.0N	00-34.0N	00-34.0N	00-10.0N	00-06.0N
172-53.0E	173-44.0E	173-44.0E	173-49.0E	173-49.0E	173-23.0E	173-29.0E
Skipjack	Skipjack yellow-fin tuna mixed	Skipjack yellow-fin tuna mixed	Skipjack	Skipjack	Skipjack	Skipjack
Birds associated 50	Birds associated 100	Birds associated 200	Birds associated 200	Birds associated 100	Birds associated 300	Birds associated 300
Breezer	Jumping	Jumping	Jumping	Jumping	Breezer	Breezer
Large	Small	Medium	Medium	Small	Large	Large
Bad	None	Bad	Bad	Bad	Bad	None
H.S	S	S	S	H.S	H.S	H.S
8	5	20	25	10	35	5
bc	bc	bc	bc	bc	bc	bc
ESE 2	ESE 3	ESE 3	ESE 3	ESE 3	SSE 4	SSE 4
1013 5	1012 0	1012.3	1012.9	1012.8	1013.0	1012.2
29.2	28.5	28.5	28.5	28.5	29.0	29.2
28.6	28.3	28 3	28.3	28.8	28.4	28.8
2	2	2	2	2	3	3
252		9	91	80	293	
2.6		2.5	2.8	3.2	2.5	
655		23	255	256	733	
		1	1			
		5.0	5.0			
		5	5			
		18				
		40				
		6				
		12				
252	–	34	92	80	293	–
655	–	80	260	256	733	–

4 Sep. '78 1.3 202	5 Sep. '78 2.3 203	5 Sep. '78 2.3 204	6 Sep '78 3.3 205	7 Sep. '78 4.3 206	7 Sep. '78 4.3 207	7 Sep. '78 4.3 208
11.55 12.05 12.05 12.20	10.35 10.58 11.00 11.15	12.20 12.40 12.40 12.55	07.15 07.30 07.40 08.35	07.00 07.20 07.20 07.35	07.35 07 55 07.55 08.10	08.10 08.20 08.20 08.45
South of Kuria 00-09.0N 173-25 0E	West of Abemama 00-33.0N 173-40.0E	West of Abemama 00-27.5N 173-48.0E	West of Abemama 00-26.0N 173-44.3E	West of Abemama 00-27.0N 173-45.0E	West of Abemama 00-27.2N 173-41.9E	West of Abemama 00-27.0N 173-42.0E
Skipjack Birds associated 100 Jumping Medium Good	Skipjack Birds associated 100 Jumping Medium Bad	Skipjack Birds associated 300 Breezer Medium Bad	Skipjack Birds associated 60 Jumping Large Good	Skipjack Birds associated 100 Jumping Medium Bad	Skipjack Birds associated 200 Jumping Medium Bad	Skipjack yellow-fin tuna mixed Birds associated 200 Jumping Large Good
H.S 5	S 15	H.A 6	H.S 85	S 10	H.S 10	H.A.S 30
bc SSE 4 1011.6 29.2 28.8 3	bc ENE 3 1011.9 29.0 28.7 2	bc ENE 3 1010.6 29.0 29.1 2	bc E 2 1011.5 29.0 28.6 1	bc Calm 1011.3 28.8 29.1 Calm	bc Calm 1011.5 28.8 29.1 Calm	bc Calm 1011.9 28.8 29.2 Calm
417 1.3 542	71 3.3 234	118 3.3 389	2803 3.2 8970	145 3 15 457	155 3.15 488	1081 3.15 3402
	1 5.0 5		118 4.5 531			157 4.5 706
417 542	72 239	118 389	2921 9505	145 457	155 488	1238 4108
						Catch SPC Tagged 1

10 Sep. '78 7.3 209	11 Sep. '78 8.3 210	13 Sep. '78 10.3 211	13 Sep. '78 10.3 212	14 Sep. '78 11.3 213	14 Sep. '78 11.3 214	20 Sep. '78 17.3 215
09.45 10.02 10.05 11.15	09.15 09.40 – 10.40	10.45 11.10 11.15 11.30	12.40 13.00 13.00 14.10	12.00 12.30 12.35 13.10	13.50 14.13 14.15 14.35	09.45 09.55 09.55 10.05
East of Aranuka 00-13.0N 173-41 0E	East of Aranuka 00-11.0N 173-40 0E	West of Abemama 00-24.5N 173-43.5E	West of Abemama 00-21 5N 173-37.0E	West of Abemama 00-26.0N 173-41.5E	West of Abemama 00-28.0N 173-33.5E	West of Butaritan 03-07.1N 172-41.3E
Skipjack Birds associated 100 Jumping Large Somewhat good	Skipjack Birds associated 100 Jumping Small None	Skipjack Birds associated 70 Jumping Small Bad	Skipjack Birds associated 20 Jumping Large Somewhat good	Skipjack Birds associated 30 Sink Large Bad	Skipjack Birds associated 30 Sink Large Somewaht good	Skipjack Birds associated 200 Breezer Medium Bad
S 41	H.S 12	H 6	H 27	H.A 8	H.D 18	H 15
bc ESE 4 1011.5 29.0 28.9 3	bc ENE 4 1012.3 29.5 29.0 3	bc ESE 4 1009.0 29.5 29.1 3	bc ESE 4 1007.2 29.5 28.9 3	bc ESE 4 1008.8 29.8 28.8 4	bc ESE 4 1006.4 30.5 29.4 4	bc ESE 3 1011.2 29.5 29.4 2
1141 2.33 2659		70 2 35 165	841 2.52 2120	147 2.4 253	387 2.5 967	162 2.32 376
						4 40 4
1141 2659	– –	70 165	841 2120	147 353	387 967	163 380
						Catch SPC Tagged 2

20 Sep. '78 17.3 216	20 Sep. '78 17.3 217	20 Sep. '78 17.3 218	21 Sep. '78 18.3 219	21 Sep. '78 18.3 220	21 Sep. '78 18.3 221	21 Sep. '78 18.3 222
10.25 10.53 10.55 11.25	12.35 12.57 12.58 13.40	14.25 14.52 14.55 15.30	09.50 10.10 10.10 11.00	11.00 11.20 11.20 11.50	11.50 12.10 12.13 12.20	12.25 12 46 12.46 12.52
North West of Butaritan 03-14.2N 172-37.6E	North West of Butaritari 03-19.0N 172-30.0E	North West of Butaritari 03-18.5N 172-29.0E	West of Butaritari 03-07.0N 172-42.0E	West of Butaritari 03-10.0N 172-41.0E	West of Butaritari 03-08.0N 172-38.0E	West of Butaritari 03-08.0N 172-39.0E
Skipjack Birds associated 200 Foaming Large Bad	Skipjack yellow-fin tuna mixed Birds associated 200 Breezer Large Good	Skipjack Birds associated 100 Jumping Medium Somewhat good	Skipjack Birds associated 100 Breezer Medium Somewhat good	Skipjack yellow-fin tuna mixed Birds associated 200 Breezer Large Good	Skipjack Birds associated 50 Jumping Medium Somewhat good	Skipjack Birds associated 100 Jumping Medium Somewhat good
H 25	H 35	H 20	H 45	H 30	H 10	H 3
bc ESE 2 1010.8 29.8 29.5 2	bc ESE 3 1010.0 30.0 29.5 2	bc ESE 3 1008.1 30.2 29.4 2	o E 3 1010.2 28.2 29.2 2	o E 3 1009.8 28.5 29.2 2	o E 3 1009.5 28.5 29.2 2	o E 3 1009.0 28.5 29.2 2
412 2.7 1112	566 2.73 1545	529 2.7 1428	1054 2.5 2635	747 2.5 1867	320 2.5 800	115 2.5 288
	421 5.1 2147			612 5.1 3121		
412 1112	987 3692	529 1428	1054 2635	1359 4988	320 800	115 288
Catch SPC Tagged 1		Catch SPC Tagged 4	Catch SPC Tagged 4	Tagged 182	Catch SPC Tagged 7	

22 Sep. '78 19.3 223	22 Sep '78 19.3 224	22 Sep. '78 19.3 225	24 Sep. '78 21.3 226	24 Sep. '78 21.3 227	24 Sep. '78 21.3 228	24 Sep '78 21.3 229
09.50 10.14 10.15 10.26	12 05 12.30 12.30 13.30	13.30 13.35 13.35 13.50	10.00 10.24 10.25 10.36	11.05 11.48 11.48 12.04	12.04 12.28 12.28 13.10	14.00 14.14 14.15 14.29
West of Butaritari 03-04.0N 172-37.0E	North West of Butaritari 03-15.0N 172-29.0E	North West of Butaritari 03-16.0N 172-29.0E	West of Butaritari 03-07.0N 172-39.0E	North West of Butaritari 03-15 0N 172-34.0E	North West of Butaritari 03-19.0N 172-30.0E	North West of Butaritari 03-19.5N 172-29.0E
Skipjack yellow-fin tuna mixed Birds associated 500 Jumping Large Good	Skipjack yellow-fin tuna mixed Birds associated 500 Breezer Large Good	Skipjack yellow-fin tuna mixed Birds associated 200 Jumping Medium Good	Skipjack Birds associated 300 Jumping Large Bad	Skipjack Birds associated 500 Jumping Large Bad	Skipjack Birds associated 100 Breezer Large Somewhat good	Skipjack Birds associated 100 Jumping Medium Bad
H 25	H 40	H 10	H 10	H 15	H 40	H 5
bc ESE 3 1010.0 30.5 29.6 3	bc ESE 3 1008.2 30.0 29 5 3	bc ESE 3 1008 0 29.8 29.5 3	bc E 1 1013.0 29.0 29.5 1	c E 2 1012.0 29.0 29.5 2	bc E 2 1011.0 29.4 29.6 2	bc E 3 1010.5 29.2 29.6 2
423 2.6 1100	1600 2.6 4160	404 2.6 1051	12 2.7 32	120 2.7 324	1036 2.7 2798	9 2.7 20
383 5 1 1953	601 5.1 3065	51 5.1 260				
806 3053	2201 7225	457 1310	12 32	120 324	1036 2798	9 20
	Catch SPC Tagged 12	Catch SPC Tagged 5			Catch SPC Tagged 4	

29 Sep. '78	29 Sep. '78	30 Sep. '78	30 Sep '78	1 Oct. '78	1 Oct. '78	1 Oct '78
26.3	26.3	27.3	27.3	28 3	28.3	28.3
230	231	232	233	234	235	236
10.25	11.34	09.30	11.05	08.10	10.00	11.00
10.57	11.50	10.05	11.40	08.30	10 25	11.33
10.58	11.50	10.05	11.40	–	–	11.35
11.34	12.30	10.10	12 10	08.34	10.35	11.42
South of Aranuka	South of Aranuka	South of Aranuka	South of Aranuka	West of Aranuka	South East of Aranuka	South East of Aranuka
00-03.0N	00-02.0N	00-02.0N	00-03.0N	00-17.0N	00-03.0N	00-07.0N
173-38.0E	173-39.0E	173-42.0E	173-43.0E	173-43.0E	173-40.0E	173-38.0E
Skipjack yellow-fin tuna mixed	Skipjack yellow-fin tuna mixed	Skipjack	Skipjack yellow-fin tuna mixed	Yellowfin tuna	Skipjack	Skipjack
Birds associated 200	Birds associated 200	Birds associated 30	Birds associated 50	Birds associated 30	Birds associated 20	Birds associated 200
Breezer	Breezer	Jumping	Jumping	Jumping	Jumping	Jumping
Large	Large	Small	Large	Small	Small	Medium
Good	Good	Bad	Good	None	None	Bad
H.SC.S	H.M.SC.S	H.S	H.S	H.S	H.S	H.S
45	40	15	25	22	3	10
bc	c	bc	bc	bc	bc	bc
ENE 4	ENE 4	SE 3	SE 3	S 3	S 3	S 3
1010.8	1010.0	1011.0	1009.9	1010.0	1010.1	1009.8
29.2	29.2	28.5	28.7	28.6	28.6	28.6
29.2	29.2	28.8	28.7	28.7	29.0	29.2
4	4	3	3	3	3	3
804	660	154	1186			136
2.4	2.4	2.7	2.7			2.0
1930	1584	370	3202			272
300	61		100			
4.3	4.3		4.3			
1290	262		430			
1104	721	154	1286	–		136
3220	1846	370	3632	–		272
				Large school of killer whale nearby.		

1 Oct. '78	2 Oct. '78	2 Oct. '78	3 Oct. '78	3 Oct. '78	6 Oct. '78	6 Oct. '78
28.3	29.3	29.3	0.7	0.7	3.7	3.7
237	238	239	240	241	242	243
11.50	09.15	13.10	09.10	09.35	11.30	13.00
12.15	09.49	13.32	09.30	10.04	12.18	13.24
12.15	09.50	13.35	09.30	10.05	12.20	13.25
12.35	10.00	14.20	09.34	10.18	13.00	13.30
South East of Aranuka	East of Aranuka	South East of Aranuka	West of Abemama	West of Abemama	North West of Abaiang	North West of Abaiang
00-06.0N	00-16.0N	00-05.0N	00-27.0N	00-23.5N	00-06.0N	02-12.0N
173-38.5E	173-39.0E	173-44.0E	173-41 0E	173-40.0E	172-40.0E	172-36.0E
Skipjack	Skipjack	Skipjack	Skipjack	Skipjack	Skipjacp	Skipjack
Birds associated 100	Birds associated 50	Birds associated 200	Birds associated 100	Birds associated 200	Birds associated 100	Birds associated 40
Jumping	Jumping	Jumping	Jumping	Breezer	Sink	Sink
Medium	Small	Large	Small	Medium	Large	Medium
Somewhat good	Bad *	Good	Bad	Good	Bad	Bad
H.S	S	SC.A.S	H.S	H.S	H.S	H
10	10	65	5	15	32	10
bc	bc	bc	bc	bc	bc	bc
S 3	ENE 3	ENE 3	NE 5	NE 4	ESE 3	E 3
1009.3	1011.0	1008.5	1012.1	1012.0	1009.5	1009.0
28.6	28.2	29.2	28.7	29.0	30.5	29.5
29.2	28.9	29.4	28.8	29.0	28.9	29.2
3	3	3	4	4	3	3
614	123	1768	10	721	386	187
2.4	2.2	2.53	2.5	2.8	3.05	3.0
1474	270	4473	25	2022	1177	561
		46				
		4.5				
		207				
614	123	1814	10	721	386	187
1474	270	4680	25	2022	1177	561

6 Oct. '78 3.7 244	6 Oct '78 3.7 245	6 Oct. '78 3.7 246	6 Oct. '78 3.7 247	8 Oct. '78 5.7 248	9 Oct. '78 6.7 249	9 Oct. '78 6.7 250
13.50 14.10 14.15 14.25	14.20 14.48 14.50 14.55	14.55 15.15 15.17 15.25	17.45 18.00 – –	07.40 08.20 08.21 11.00	09.45 10.20 10.23 10 40	12.15 12.40 12.42 13.00
North West of Abaiang 02-18.0N 172-33.0E	North West of Abaiang 02-20.0N 172-32.0E	North West of Abaiang 02-22.0N 172-34.0E	North West of Abaiang 02-43.0N 172-33.0E	North West of Abaiang 03-17.0N 172-33.0E	West of Butaritari 03-19.0N 172-36.0E	North West of Abaiang 03-19.0N 172-33.0E
Skipjack Birds associated 40 Sink Small Bad	Skipjack Birds associated 40 Sink Small Somewhat good	Skipjack Birds associated 15 Sink Small Somewhat good	Unknown Birds associated 15 Jumping Small None	Skipjack yellow-fin tuna mixed Birds associated 1000 Jumping Large Somewhat good	Skipjack Birds associated 600 Jumping Large Bad	Skipjack Birds associated 200 Jumping Medium Bad
H 6	H 10	H 10	H 2	H.CA 80	H.CA 15	H CA 16
bc E 3 1006.8 30.8 29.6 3	bc E 3 1006.8 30.8 29.6 3	bc E 3 1006.8 30.5 29.5 3	bc ESE 3 1008.0 29.1 29.5 2	c E 3 1009.8 27.8 29.0 2	bc ESE 4 1010.9 29.2 29.6 3	bc SE 4 1008.5 29.2 29.5 3
52 3.0 156	275 3.0 825	222 3.0 666		2817 3.45 9719	107 3.37 361	248 3.37 836
				285 6 1710		
52 156	275 825	222 666		3102 11429	107 361	248 836

9 Oct. '78	9 Oct. '78	11 Oct. '78	11 Oct. '78	11 Oct. '78	12 Oct. '78	12 Oct. '78
6.7	6.7	8.7	8.7	8.7	9.7	9.7
251	252	253	254	255	256	257
13.00	17.05	09.10	10.00	10.35	12.15	14.20
13.19	17.32	09.42	10.25	11.17	12.42	14.44
13.20	17.35	09.45	10.28	11.20	12.45	14.45
13.45	17.55	10.00	10.35	11.40	13.40	15.40
North West of Butaritari	Inlet of Butaritari	West of Butaritari	West of Butaritari	West of Butaritari	West of Butaritari	North West of Butaritari
03-22.0N	03-05.0N	03-10.5N	03-13.5N	03-08.0N	03-09.0N	03-20.0N
172-35.0E	172-44.0E	172-32.5E	172-31.0E	172-31.0E	172-36.0E	172-25.0E
Skipjack	Rainbow runner	Skipjack	Skipjack	Skipjack yellow-fin tuna mixed	Skipjack	Skipjack
Birds associated 100	Birds associated 100	Birds associated 500	Birds associated 200	Birds associated 200	Birds associated 400	Birds associated 200
Jumping	Sink	Jumping	Jumping	Jumping	Jumping	Jumping
Medium	Medium	Medium	Medium	Medium	Large	Large
Somewhat good	Bad	Bad	Bad	Somewhat good	Somewhat good	Somewhat good
H	H	H	H	H	H	H
18	7	18	6	12	45	15
bc	bc	bc	bc	bc	bc	bc
SE 4	SE 4	Calm	Calm	Calm	WNW 1	Calm
1008.5	1009.2	1013.5	1013 5	1013.0	1011.0	1009.5
29.2	29.0	28.9	28.9	29.0	29.5	29.5
29.5	29.1	29.8	29.8	30.5	30.8	30.5
3	3	0	0	0	1	0
528		174	31	318	1807	906
3.4		3.4	3.4	3.4	3.38	3.37
1795		592	105	1081	6108	3053
				8		
				7		
				56		
	10					
	11					
528	10	174	31	326	1807	906
1795	11	592	105	1137	6108	3053

18 Oct. '78 15.7 258	18 Oct. '78 15.7 259	18 Oct. '78 15.7 260	19 Oct. '78 16.7 261	19 Oct. '78 16.7 262	19 Oct. '78 16.7 263	19 Oct. '78 16.7 264
09.30 10.10	10.45 11.10 11.10 11.50	11.50 12.00 12.10 12.38	08.05 08.38 08.40 09.00	10.50 11.14 11.15 11.30	11.30 11.40 11.40 11.55	11.55 12.20 12.25 12.35
North West of Butaritari 03-10.0N 172-36.0E	North West of Butaritari 03-18.0N 172-25.0E	North West of Butaritari 03-21.0N 172-25.0E	West of Butaritari 03-04.0N 172-39.5E	North West of Butaritari 03-16.0N 172-32.0E	North West of Butaritari 03-17.0N 172-32.0E	North West of Butaritari 03-21.0N 172-34.0E
Skipjack Birds associated 200 Jumping Medium None	Skipjack yellow-fin tuna mixed Birds associated 200 Jumping Medium Somewhat good	Skipjack yellow-fin tuna mixed Birds associated 100 Jumping Large Somewhat good	Skipjack Birds associated 500 Jumping Medium Bad	Skipjack Birds associated 200 Jumping Medium Bad	Skipjack Birds associated 100 Jumping Small Bad	Skipjack Birds associated 100 Jumping Small Bad
H 3	H 35	H 30	H 15	H 15	H 10	H 6
bc S 3 1013.8 28.8 29.1 2	bc S 3 1013.1 28.4 29.4 2	bc S 3 1012.8 28.4 29.4 2	b ENE 1 1013.8 28.2 29.1 1	b SE 1 1012.8 28.7 30.3 1	b SE 1 1012.8 28.7 30.3 1	b SE 1 1012.1 28.8 30.3 1
	804 3.16 2541	542 3.16 1713	55 3.0 165	100 3.0 300	79 3.0 237	71 3.0 213
	200 6.4 1280	25 6.4 160				
– –	1004 2821	567 1873	55 165	100 300	79 237	71 213
		Catch SPC Tagged 8				

19 Oct. '78 16.7 265	19 Oct. '78 16.7 266	20 Oct. '78 17.7 267	20 Oct. '78 17.7 268	20 Oct. '78 17.7 269	20 Oct. '78 17.7 270	21 Oct. '78 18.8 271
12.45 12.50 12.50 13 05	13.10 13.25 13.25 13.40	12.40 13.13 13.15 13.40	13.40 13.50 13.50 14.30	14.50 15.22 15.24 15.38	15.50 16.18 16.20 16.25	09.00 09.28 09.30 09.55
North West of Butaritari 03-21.0N 172-36.0E	North West of Butaritari 03-16.0N 172-30.0E	West of Butaritari 03-10.0N 172-37.0E	West of Butaritari 03-09.0N 172-37.0E	West of Butaritari 03-04.0N 172-32.0E	West of Butaritari 03-02.0N 172-34.0E	North West of Butaritari 03-11.0N 172-38.0E
Skipjack Birds associated 150 Jumping Medium Somewhat good	Skipjack yellow-fin tuna mixed Birds associated 200 Jumping Medium Good	Skipjack Birds associated 1000 Jumping Large Somewhat good	Skipjack Birds associated 200 Jumping Medium Somewhat good	Skipjack Birds associated 200 Jumping Small Bad	Skipjack Birds associated 100 Jumping Small Bad	Skipjack Birds associated 1000 Jumping Medium Bad
H 15	H 20	H 35	H 30	H 15	H 5	H 20
b SE 1 1011.8 28.8 30.3 1	b SE 1 1011.5 28.9 30.3 1	bc WSW 1 1011.0 28.5 30.4 1	bc WSW 1 1009.5 28.5 30.4 1	bc WSW 1 1009.8 28.5 30.5 1	bc Calm 1010.0 28.6 30.5 1	bc Calm 1012.5 28.8 29.2 0
278 3.2 887	677 3.2 2166	1030 2.99 3080	801 2.99 2395	199 2.99 595	28 2.99 84	324 3.2 1037
	134 6.4 858					
278 889	811 3024	1030 3080	801 2395	199 595	28 84	324 1037
Catch SPC Tagged 1	Catch SPC Tagged 1	Catch SPC Tagged 11			Catch SPC Tagged 1	

21 Oct. '78 18.8 272	21 Oct. '78 18.8 273	21 Oct. '78 18.8 274	21 Oct. '78 18.8 275	23 Oct. '78 20.8 276	23 Oct. '78 20.8 277	23 Oct.'78 20.8 278
09.55 10.35 10.35 11.10	11.10 11.25 11.25 11.47	11.50 12.25 12.25 12.55	13.05 13.55 13.55 14.04	09.00 09.20 09 25 09.40	10.55 11.33 11.40 12.15	12.45 13.25 13.25 13.40
North West of Butaritari 03-14.0N 172-33.0E	North West of Butaritari 03-16.0N 172-30.0E	North West of Butaritari 03-19.0N 172-28.0E	North West of Butaritari 03-16.0N 172-31.0E	West of Butaritari 03-06.0N 172-41.0E	North West of Butaritari 03-19.0N 172-34.0E	North West of Butaritari 03-23.0N 172-31.0E
Skipjack Birds associated 600 Jumping Large Good	Skipjack Birds associated 300 Jumping Medium Good	Skipjack Birds associated 200 Jumping Medium Good	Skipjack Birds associated 500 Jumping Large Good	Skipjack Birds associated 500 Foaming Medium Bad	Skipjack yellow-fin tuna mixed Birds associated 300 Jumping Medium Bad	Skipjack Birds associated 50 Jumping Small Bad
H 35	H 30	H 25	H 10	H 15	H 20	H 15
bc Calm 1011.5 28.8 29.8 0	bc Calm 1011.0 28.9 30.5 0	bc NW 1 1010.0 29.0 30.5 1	bc NW 1 1009.0 29.5 30.5 1	o WNW 4 1012.1 28.0 29.1 3	bc SSW 1 1011.0 28.5 29.2 1	bc SSW 1 1009.0 29.0 29.3 1
1023 3.2 3274	837 3.2 2678	1179 3.2 3773	293 3.2 1258	114 3.2 365	153 3.2 489	66 3.2 211
					40 6.5 260	
1023 3274	837 2678	1179 3773	393 1258	114 365	193 749	66 211
	Catch SPC Tagged 2	Catch SPC Tagged 5		Catch SPC Tagged 2		Catch SPC Tagged 2

23 Oct. '78 20.8 279	23 Oct. '78 20.8 280	23 Oct. '78 20.8 281	24 Oct. '78 21.8 282	24 Oct. '78 21.8 283		Total
13.45 14.12 14.15 14 20	16.00 16.54 16.55 17.15	17.15 17.20 17.20 17.30	09.50 10 15 10.17 10.40	12.40 13.16 13.17 14.05		
North West of Butaritan 03-21.0N 172-29.0E	West of Butaritan 03-06.0N 172-38 0E	West of Butaritan 03-05.0N 172-38.0E	West of Butaritan 03-07.3N 172-40.8E	West of Butaritan 03-10.0N 172-29.0E		
Skipjack Birds associated 30 Jumping Small Bad	Skipjack Birds associated 200 Jumping Medium Somewhat good	Skipjack Birds associated 30 Jumping Medium Somewhat good	Skipjack Birds associated 1000 Foaming Medium Bad	Skipjack Birds associated 500 Jumping Medium Somewhat good		
H 30	H 12	H 10	H 20	H 50		3,806 (B/K)
bc SSW 3 1009.0 29.5 30.3 2	bc SSW 2 1009.7 29.7 29 6 2	bc SSW 2 1009.7 29.7 29.6 2	bc S 3 1011.0 30.2 29.8 2	r S 3 1008.7 27.8 30.0 3		
999 3.2 3197	301 3.2 962	218 3.2 697	307 3.2 982	1558 3.3 5141		79,295 2.76 (kg) 219,011 (kg)
						7,643 4.54 (kg) 34,734 (kg)
						24 54 (kg)
						14 20 (kg)
						6 12 (kg)
999 3197	301 962	218 697	307 982	1558 5141		86,982 253,831 (kg)
		Catch SPC Tagged 4	Catch SPC Tagged 3	Catch PSC Tagged 8 and Hatsutori-maru No.3 Tagged 2		

Annex Table 4

Record of Skipjack Pole-and-Line Catch by Sea Area

Note
H = Harengula Ovalis
A = Allanetta Ovalava
M = Milkfish
S = Spratelluides Delicaturus
AP = Apogonidae
D = Dassumieria Hasselti
C = Caesio Caerulaureus
SC = Surdinella Clupeoides
CA = Caesionidae

Area. Tarawa

Date of operation	No of operation	No of fishing	Species of bait fish (mainly)	Skipjack		
				No. of fish	Ave. weight (kg)	Catch Amount (kg)
1, June '78	7	5	H, S	394	228	889
6	7	3	H	232	284	658
7	2	2	"	151	277	418
14	3	2	H, S	465	310	1442
16, July	4	4	"	1346	272	3667
17	4	3	"	292	458	1338
26	1	1	"	532	275	1463
27	5	4	"	166	278	462
3, Aug.	8	6	"	1308	273	3574
14	3	2	"	310	300	929
23	3	3	H, M	364	272	989
1, Sep.	3	2	S, M	769	260	2000
2	2	2	H, S	888	260	2309
10 Oct	5	5	"	1122	302	3385
Total	57	44		8339	282	23,533

Area. Abemama

Date of operation	No. of operation	No. of fishing	Species of bait fish (mainly)	Skipjack		
				No. of fish	Ave. weight (kg)	Catch Amount (kg)
22, June '78	4	4	H	1389	239	3319
24	9	2	S	153	220	337
26	2	1	S, AP	386	264	1019
30, July	4	3	H, S	949	259	2457
31	5	3	"	539	260	1402
3, Sep.	4	3	S	180	297	534
4	3	2	H, S	710	180	1275
5	2	2	S	189	330	623
6	1	1	H, S	2803	320	8970
7	3	3	"	1381	315	4347
10	1	1	S	1141	233	2659
11	1	0	H, S	0		0
13	2	2	H	911	251	2285
14	2	2	H, D	534	247	1320
29	2	2	H, S	1464	240	3514
30	2	2	"	1340	267	3572
1, Oct.	4	2	"	750	233	1746
2	2	2	S	1891	251	4743
3	2	2	H, S	731	280	2047
Total	55	39		17,441	265	46,169

Yellow fin			Others		Total	
No. of fish	Ave. weight (kg)	Catch amount (kg)	No. of fish	Catch amount (kg)	No. of fish	Catch amount (kg)
3	333	10	0	0	397	909
24	458	110	4	10	260	778
0		0	0	0	151	418
6	500	30	0	0	471	1472
0		0	0	0	1346	3667
0		0	0	0	292	1338
0		0	0	0	532	1463
0		0	0	0	166	462
34	418	142	0	0	1342	3716
88	470	414	0	0	398	1343
118	5.50	649	0	0	482	1638
0		0	0	0	769	2000
0		0	0	0	888	2309
0		0	0	0	1122	3385
273	496	1,355	4	10	8616	24,898

Yellow fin			Others		Total	
No. of fish	Ave. weight (kg)	Catch amount (kg)	No. of fish	Catch amount (kg)	No of fish	Catch amount (kg)
996	345	3434	0	0	2385	6753
10	300	30	0	0	163	367
361	358	1292	0	0	747	2311
0		0	0	0	949	2457
88	350	308	0	0	627	1710
2	500	10	24	52	206	596
0		0	0	0	710	1275
1	500	5	0	0	190	628
118	450	531	0	0	2921	9501
157	450	706	0	0	1538	5053
0		0	0	0	1141	2659
0		0	0	0	0	0
0		0	0	0	911	2285
0		0	0	0	534	1320
361	430	1552	0	0	1825	5066
100	430	430	0	0	1440	4002
0		0	0	0	750	1746
46	450	207	0	0	1937	4950
0		0	0	0	731	2047
2,240	380	8,505	24	52	19,705	54,726

Area Butaritari

Date of operation	No. of operation	No. of fishing	Species of bait fish (mainly)	Skipjack		Catch amount (kg)
				No. of fish	Ave. weight(kg)	
16, Jun.'78	7	5	H. AP	1368	317	4342
17	4	4	"	476	361	1720
18	4	4	"	1296	313	4061
30	5	3	H	933	224	2087
2, July	5	3	A, AP	322	314	1012
4	2	2	H, A	1096	250	2740
5	5	3	H, AP	146	564	824
10	5	4	S, A	616	524	3227
11	5	4	H, S	1440	215	3094
12	3	2	"	813	220	1788
13	6	6	"	1369	234	3200
21	1	1	A, AP	257	200	514
22	1	1	S	282	170	479
23	6	5	"	1795	223	4006
5, Aug	4	4	H, A	384	249	956
6,	3	3	H	718	216	1552
7	5	5	"	329	240	791
8	11	11	"	3851	215	8281
15	2	2	"	199	261	520
17	3	2	A, S	58	272	158
18	1	1	H	134	320	429
19	6	5	"	1095	249	2726
20	4	3	"	937	294	2753
24	4	4	"	981	227	2229
25	3	3	H, A	792	242	1913
26	6	6	H	1445	239	3455
27	4	4	"	3794	232	8802
29	4	1	"	8	263	21
20, Sep.	4	4	"	1669	267	4461
21	4	4	"	2236	250	5590
22	3	3	"	2427	260	6311
24	4	4	"	1177	270	3174
6, Oct.	1	0	H	0		0
8	1	1	H, C	2817	345	9719
9	4	4	H	883	339	2992
11	3	3	"	523	340	1778
12	2	2	"	2713	338	9161
18	3	2	"	1346	316	4254
19	6	6	"	1260	315	3970
20	4	4	"	2058	299	6154
21	5	5	"	3756	320	12020
23	6	6	"	1851	320	5922
24	2	2	"	1865	3.28	6123
Total	171	151		53,515	279	149,309

Yellow fin			Others		Total	
No. of fish	Ave. weight (kg)	Catch amount (kg)	No. of fish	Catch amount (kg)	No. of fish	Catch amount (kg)
0		0	0	0	1368	4342
25	392	98	6	13	507	1831
0		0	0	0	1296	4061
0		0	0	0	933	2087
3	400	12	0	0	325	1024
0		0	0	0	1096	2740
0		0	0	0	146	824
0		0	0	0	616	3227
162	422	683	0	0	1602	3777
168	430	722	0	0	981	2510
15	407	61	0	0	1384	3261
8	400	32	0	0	265	546
0		0	0	0	282	479
0		0	0	0	1795	4006
0		0	0	0	384	956
0		0	0	0	718	1552
554	406	2251	0	0	883	3042
453	385	1744	0	0	4304	10025
0		0	0	0	199	520
0		0	0	0	58	158
0		0	0	0	134	429
120	400	480	0	0	1215	3206
607	450	2731	0	0	1544	5484
0		0	0	0	981	2229
22	441	97	0	0	814	2010
155	443	686	0	0	1600	4141
0		0	0	0	3794	8802
77	523	403	0	0	85	424
422	510	2151	0	0	2091	6612
612	510	3121	0	0	2848	8711
1035	510	5278	0	0	3462	11589
0		0	0	0	1177	3174
0		0	0	0	0	0
285	600	1710	0	0	3102	11429
0		0	10	11	893	3003
8	700	56	0	0	531	1834
0		0	0	0	2713	9161
225	640	1440	0	0	1571	5694
134	640	858	0	0	1394	4828
0		0	0	0	2058	6154
0		0	0	0	3756	12020
40	650	260	0	0	1891	6182
0		0	0	0	1865	6123
5130		24874	16	24	58661	174,207

Annex Table 5

Record of Skipjack Pole-and-Line
Catch by Each Trip

Trip order	Trip period		Sea Area of operation	Days of operation	Skipjack			Yellow fin			Others		Total	
	Started	Ended			No. of fish	Ave. weight (kg)	Catch amount (kg)	No.of fish	Ave. weight (kg)	Catch amount (kg)	No.of fish	Catch amount (kg)	No.of fish	Catch amount (kg)
1	'78 1, June	'78 2, June	Tarawa	1	394	228	899	3	333	10	0	0	397	909
2	6	7	Tarawa	2	383	281	1,076	24	458	110	4	10	411	1,196
3	14	19	Butaritari	4	3,605	321	11,565	31	413	128	6	13	3,642	11,706
4	21	27	Abemama	3	1,928	242	4,675	1,367	348	4,756	0	0	3295	9,431
5	29, June	6, July	Butaritari	4	2,497	267	6,663	3	400	12	0	0	2,500	6,675
6	8, July	14	Butaritari	4	4238	267	11,309	345	425	1,466	0	0	4,583	12,775
7	16	24	Tarawa Butaritari	5	3,972	252	10,004	8	400	32	0	0	3,980	10,036
8	26, July	1, Aug.	Tarawa Abemama	4	2,186	265	5,784	88	350	308	0	0	2274	6,092
9	3, Aug.	9	Butaritari	5	6,590	230	15,154	1,041	397	4,137	0	0	7,631	19,291
10	14	21	Tarawa Butaritari	6	2,733	275	7,515	815	445	3,625	0	0	3,548	11,140
11	23	30	Tarawa Butaritari	6	7,384	236	17,409	372	493	1,835	0	0	7,756	19244
12	1, Sep.	7, Sep.	Tarawa Abemama	7	6,920	290	20058	278	450	1252	24	52	7,222	21,362
13	9	15	Abemama	4	2,586	242	6,264	0		0	0	0	2586	6,264
14	18	25	Butaritari	4	7,509	260	19536	2069	510	10,550	0	0	9,578	30086
15	27, Sep.	4, Oct.	Abemama	5	6,167	253	15,622	507	432	2189	0	0	6683	17811
16	6, Oct.	13, Oct.	Butaritari	5	8058	336	27035	293	603	1,766	10	11	8361	28812
17	16	28	Butaritari	6	12,136	317	38,443	399	641	2,558	0	0	12535	41001
Total				75	79,295	276	219011	7643	454	34,734	44	86	86,982	253,831

Note One day only with no catch not involved in days of operation