U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southwest Fisheries Center
Honolulu and La Jolla Laboratories
P. O. Box 3830
Honolulu, Hawaii 96812

Date: November 9, 1976 **Reply to Attn. of:**

To: Director, Honolulu Laboratory

From: Thomas K. Kazama, Biological Technician (Fisheries)

Subject: Report on my tour of duty on the Mary Elizabeth

This report covers observations made during my tour of duty on board the Mary Elizabeth, one of three purse seiners chartered by the PTDF (Pacific Tuna Development Foundation) of the PIDC (Pacific Islands Development Commission). I was assigned to accompany the vessel as an observer to record results of fishing operations, and to conduct various kinds of biological sampling.

Attachment

The Pacific Tuna Development Foundation contract specified that the vessel Mary Elizabeth, in conjunction with the Apollo and the Zapata Pathfinder, carry out exploratory fishing for a minimum of 80 days in the area delineated by the following coordinates: 20°S and 170°W; 10°S and 170°W; 10°S and 180°; 20°N and 180°; 20°N and 155°E; 30°N and 155°E; 30°N and 127°E; 7°N and 127°E; 0° and 132°E; 11°S and 151°E; 20°S and 151°E. (See attachment 1 for specifics of the contract.)

The general goal of the charter was to establish whether or not a viable American purse seine fishery could be established in this area.

Specifications of Mary Elizabeth

The Mary Elizabeth has the following specifications: Length, 194.4 ft; beam, 36.1 ft; depth, 14.8 ft; gross tonnage, 916 tons; fish carrying capacity, 1,100 tons. The ship's tanks and double bottoms have a fuel capacity of 93,446 gal. The fuel consumption per day is rated at 3,600 gal at a cruising speed of 15 knots.

Fishing

The Mary Elizabeth departed Panama on June 30, 1976. Search for fish commenced on July 9 after crossing the boundary of the CYRA (Commission's Yellowfin Regulatory Area) at lat. 8°29'N and long. 121°30'W. On July 22 the vessel entered the contract area at lat. 5°N and long. 177°E. Sightings of porpoise herds or bird flocks averaged less than one per day for the first 7 days after crossing the CYRA. Inclement weather precluded search from July 16 to 20.

Scouting was resumed in the Caroline Islands around Kusaie, Ponape, and Truk Islands. Fair numbers of fish signs were seen but the schools were either not large enough (<5 tons) or moving too fast for seining. On July 28, on the northeastern end of Condor Reef,[1] we made our first set on a boiling school of mixed yellowfin and skipjack tunas estimated at 300 tons. The set was unsuccessful, as were sets No. 2 (est. 25 tons), No. 3 (est. 40 tons), No. 4 (est. 60 tons), and No. 5 (est. 10 tons), all of which were made on breezing tuna schools sighted on the southward leg toward New Guinea.

At lat. 0° and long. 140°E, we made our first set on a school associated with drifting log, which resulted in a catch of 15 tons. Three other log sets (sets 7-9), made further south, produced only 9 tons of tuna. Set No. 10, made off New Guinea at lat. 2°S and long. 142°E on a breezing, mixed school of large yellowfin and small skipjack tunas, estimated at 25 tons, was again unsuccessful.

We then proceeded north to concentrate our fishing efforts on log-associated schools. An area with a large number of drifting logs was located between

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[1]Caution when seining. Fish is closely associated with the edge of the bank. Currents have been reported to be swift at times.

lat. 1°N and 2°N, long. 138° to 139°E. During the succeeding days from August 13 to 21, nine log sets were made, and these resulted in a total catch of 124 tons. On August 21, we departed the area for Guam to refuel.

Search was again resumed at lat. 5°N and long. 140°E heading southward towards the log area. Set No. 20, conducted on a log-associated school at lat. 1°N and 138°E, resulted in a catch of 5 tons. On September 1, we departed this area because of increasingly unfavorable weather and proceeded southeastward to around New Ireland. At the southern end of New Ireland we encountered very rough seas. We then headed north, making passage through St. Georges channel toward the area outside of Rabaul, New Britain. At lat. 4°S and long. 150°E, two sets were made, one a log set and the other on an estimated 5 tons of breezing skipjack tuna. Only the log set was successful, with a catch of 6 tons. As fish signs were poor, we continued running northward. Poor weather at lat. 2°N and long. 151°E on September 12 compelled us to head south and west to around New Ireland and New Britain. Poor search conditions forced us to alter our course and to run northward through the Vitiaz strait between New Britain and New Guinea. Fishing resumed between lat. 1° and 2°S and long. 140° and 141°E. Forty-five tons of tuna were caught on three log sets. Fish signs were plentiful, but an excessive number of logs and debris discouraged us from making additional sets as fish were seen breezing rapidly along from log to log. On September 23 we left the log area to fish toward the southeast. Two sets on skipjack boilers were made at lat. 1°N and long. 151°E. Only one was successful in catching 2 tons of skipjack tuna. The rest of the run towards American Samoa was uneventful. The fishing contract was terminated on October 5.

The tonnage and size breakdown of tuna unloaded at Van Camp, American Samoa were as follows:

Yellowfin tuna under 7.5 lb	52.9 tons
Yellowfin tuna over 7.5 lb	28.6
Skipjack tuna under 4.0 lb	55.5
Skipjack tuna 4.0 to 5.0 lb	31.5
Skipjack tuna over 5.0 lb	47.2
Total	215.7 tons

Catch data by area

Area	No. days in area	No. of sets	No. successful sets	No. of log sets	No. of schoolfish sets	Estimated catch (ton) Yellowfin	Estimated catch (ton) Skipjack	Catch/set (ton)
1976								
Aug.-Sept. 2°N-4°S 138°-147°E	36	18	15	17	1	89	109	11.0
July 22-31 8°-3°N 177°W-147°E	11	5	0	0	5	0	0	0.0
Sept. 4-17, 27-28 0°-6°S 148°-173°E	15	4	2	1	3	3	5	2.0

The following observations are covered by subject:

A. Search
B. Seining operation
C. School-fish
D. Logs
E. Marine mammals
F. Physical characteristics
G. Summary
H. Acknowledgment

A. Search

Search was conducted with two 20X binoculars mounted on the deck of the bridge. Scan range was estimated to be 6 miles on either side of the vessel traveling at an average scouting speed of 14-15 knots. All bird flocks and associated fish schools sighted were evaluated at a distance prior to making contact with them. This versatility resulted in only schools with good surface indications to be actively pursued. Consequently, more fish schools were sighted than were actively pursued or fished. Also, a general tendency toward the latter period of the cruise was to pursue only bird flocks and fish schools associated with logs. Thus, areas with logs were more intensively searched than others. Sixty-two scouting days resulted from 80 days spent in the charter area. Thirty-six days were spent in the log area from lat. 2°N to 4°S and long. 138° to 147°E, 11 days between lat. 3° and 8°N, long. 147°E and 177°W, and 15 days between 0° and 6° S, long. 148° and 173°E. No scouting was possible on 18 days because of adverse weather or because the ship was shifting from one area to another.

B. Seining operation

The net used during the charter cruise was modified from the net used in the eastern Pacific tuna fishery by increasing the fishing depth to 240 m (20 strips). It had a length of 1,600 m. This modified net was comparable in dimensions to those presently used by the Japanese tuna purse seiners (attachment 2).

The net performed very well during fishing operations with the exception of only one instance when the "bunch line" got caught on the cork line, resulting in a 12-ft tear in the net. This incidence was attributed to improper stacking of the net following the previous set. The corks lagged behind the net during retrieval indicating an excess of corks for the net.

During the pursing operation, the purse seine and "hammer plate" were pounded to prevent fish from escaping under the vessel. Whether this pounding was successful in containing the fish could not be ascertained. All sets were completed in 5 to 6 minutes from the time the skiff was released to the time the vessel came up to the skiff. The net was completely pursed in an average of 37 minutes for the 27 sets. Total time from start of set to resumption of search averaged 1.8 hours for the "water-haul" sets.

C. School-fish - Jumpers, breezers, and boilers (not associated with logs)

Most of the schools fished were fast moving and erratic in their behavior, thus making them difficult to set on. Several passes were made around each school prior to seining in order to determine whether or not the school was seinable. Sets were conducted on schools when they appeared on the surface as boilers. Eight sets were made on school-fish between 1100 and 1800 but only one set was successful in catching 2 tons of tuna.

Three schools escaped under the net before the vessel reached the skiff. Three others escaped by running out of the open ends before the set could be completed. We were unable to determine how the fish escaped from the other two sets. Generally, the fish managed to escape from the net within 5 minutes of the start of set.

D. Logs

Few logs were encountered between lat. 8° and 3°N, long. 147°E. Sightings of logs increased considerably toward the south between lat. 2°N and 4°S, long. 138° and 147°E, numbering into several hundreds per day. The greatest singular concentration of logs was sighted on August 29 at lat. 1°36'N, long. 139°30'E (see photograph). This log jam was estimated to be 1 mile long and 50 ft wide, oriented along a northeast to southwest eddy.

In general, logs of all kinds and sizes, from the largest measuring 50 ft to the smallest twigs and debris, were accompanied by fish community with the potential of attracting tuna. The most common fish associated with drift objects was the triggerfish (family Balistidae). Sharks, mahimahi, yellowtail, opelu, and frigate mackerel (Auxis thazard), were intermittently caught in log sets. The presence of tuna near a log was never too obvious. During the day only a few jumpers were seen in close proximity to the log. Breezing fish were often observed at some distance from the log, at times approaching the log and then moving off again. Schools generally returned to the log just before dark, as indicated by an increase in activity of jumpers around the log. This is in contrast to Japanese findings by remote sonar sensors that the greatest concentrations occur during noon.

When fishing in areas with large numbers of logs, the largest ones were lashed together and others were brought aboard. The intent was to concentrate the tuna under a single drifting object rather than have them under many scattered ones. As logs were towed behind the skiff, even briefly, we noticed that tunas always surfaced in the wake. Sometimes, a boiling school developed in the wake of a towed log. The log with the best fish signs was selected and marked with a light buoy (25 w, 12 v) and followed during the night. A set was made before sunrise, in darkness, around the light.

Eighteen sets were made around logs and 16 of these were successful in catching an estimated total of 204 tons of tuna. Species composition was 45% yellowfin tuna and 55% skipjack tuna. Two daybreak sets resulted in only one being successful in catching 3 tons of skipjack tuna. Fifty-five percent (113 tons) of the total catch was caught around two logs as follows: Seventy-five tons were caught in three sets over a 4-day period around the very same log. Thirty-eight tons were caught in two sets on consecutive days around a bamboo bush. It is interesting to note that the productive log as well as the bamboo bush were both vertically oriented in the water, the former extending some 30 ft below the surface, and the latter extending its roots down 6 ft. Although it has not been confirmed, we believe that the Apollo may also have fished around this same bamboo bush. The catches suggest strongly that vertically oriented drift objects have better tuna-attracting qualities than those objects that float horizontally on the surface.

E. Marine mammals

Porpoise.--A total of 20 porpoise herds was encountered within the contract area. The largest contained approximately 500 porpoises. Ten contained less than 50 animals. No tuna were observed to be associated with the porpoise except in one instance when it appeared that there may have been some. The possible association in this one case was debatable since the porpoise were located astern of a baitboat actively fishing tuna. Pursuit of the porpoise did not prove any fish to be present.

Dolphins.--Two bottlenose dolphin herds were sighted but no tunas were observed to be associated with them.

Whales.--One set (No. 3) was conducted on an estimated 40-ton breezing tuna school associated with two sei whales (identification not positive). The set was unsuccessful as the whales led the fish out of the open end of the net. The set had been intentionally made to exclude the whales from the set.

F. Physical characteristics

Comparison of catches made on nighttime sets around logs ("night-log sets") in areas of deep mixed layer (>100 m) with catches made on school-fish sets in areas of shallow thermocline (27-40 m) indicate that the former was much more productive. It appears that fishing at night around a log-associated school is far more important than fishing in areas of shallow thermocline. On the other hand, since only two sets were made around logs during daylight hours, the results are inconclusive. However, only one of the two daylight sets was successful.

G. Summary

1. Few logs were encountered in waters north of lat. 3°N, long. 147°E, and southeast of long. 148°E on the run toward American Samoa.

2. Considerable quantities of logs were sighted between lat. 2°N and 4°S, long. 147° and 138°E.

3. The majority of tuna schools sighted were estimated to contain less than 20 tons of fish. Five schools were estimated between 25 and 80 tons, and three were in excess of 200 tons.

4. "Night-log" sets were far more successful than "day school-fish" sets. "Day-log" sets could not be evaluated due to insufficient data. The "night-log" relationship was more significant than that imposed by the deep mixed layer.

5. Areas with isolated logs, where the fish-to-log association could be determined, were significantly more productive than areas with excessive numbers of logs.

6. "Beeper" and sonar instrumentation may increase catch rates substantially during log associated purse seining.

H. Acknowledgment

Appreciation is expressed to Captain Darryl Doiron, Navigator Bob Newton, Chief Engineer Al Simonetti, and the crew of the Mary Elizabeth for their cooperation in helping me get my job done.

CONTRACT BETWEEN PACIFIC TUNA DEVELOPMENT FOUNDATION AND Zapata Ocean Resources Corp.

This contract entered into between Pacific Tuna Development Foundation, hereinafter called "Foundation," represented by the Contracting Officer executing this Contract, and Zapata Ocean Resources Corp., hereinafter called "Contractor," witnesseth that the parties hereto do agree as follows:

Contractor agrees:

1. To furnish the vessel Mary Elizabeth Registration Number 536 720 for a minimum of 120 calendar days commencing on or about May 15, 1976 but not later than June 1, 1976 for the purpose of carrying out exploratory fishing of the tuna resources of the central and western Pacific Ocean. To base the vessel and operate from the island of Guam during the above-mentioned 120-day period, with allowances of 20 days' travel time each way to and from Panama to Guam.

2. To carry out exploratory fishing for a minimum of 80 days in the general area delineated by the following coordinates: 20° S and 170° W; 10° S and 170° W; 10° S and 180°; 20° N and 180°; 20° N and 155° E; 30° N and 155° E; 30° N and 127° E; 7° N and 127° E; 0° and 132° E; 11° S and 151° E; 20° S and 151° E (See attached figure).

3. To operate the vessel approximately 40 days to the north of Guam along the Mariana Island chain toward the Bonin-Volcano Island group and about 40 days to the south of Guam in the general area of Palau, Yap, Truk and Ponape. However, if weather or fishing conditions dictate, the general plan may be modified to accommodate prevailing conditions.

4. To operate the vessel as a single exploratory unit, but be obligated to have the captain

(a) keep the project manager (Living Marine Resources, Inc., Attn: Frank Alverson) informed of his activities and plans.

(b) consult daily with the two other vessel captains operating on the same project to exchange information necessary to coordinate the operations with the project manager.

(c) at all times use his own judgment as to the safety of the vessel and its crew.

5. To provide a tuna seine of the required depth/length ratio having a depth of 20 strips, prior to departure of the vessel from Guam.

6. To provide the vessel with equipment, supplies and personnel for the duration of the contract and to be responsible for all operating expenses of the vessel, including but not limited to crew payments, fuel oil, lube oil, filters, etc.

7. To provide adequate quarters and meals for one Foundation scientist during the term of the contract.

8. To have the contract payment reduced by a prorate on a daily basis based on the total sum due the Contractor, only if the vessel fails to render the required services under the terms of this contract because of defects in the vessel, or equipment, absence of fish captain, chief or other failures on the part of the Contractor for a period of five consecutive days.

In the event of any such failures, the penalty, beginning on the sixth day until resumption of normal operations, shall be deducted from the total amount of the contract at the rate of $3,050.00 per day. It is understood that any penalty days lost as a result of failures mentioned above may be recovered at the option of the Contractor, providing the vessel continues operating for an equal number of days beyond the 120-day contract.

9. To provide the Foundation with a letter from his insurance company prior to departure from Panama stating full liability coverage for any Foundation scientific crew member assigned to his vessel. Scientific crew members, if any, will be limited to one (1) per vessel.

10. To sign an agreement holding the Foundation, project manager and United States Government free and harmless in the event of injury to crew members, or damage to the vessel, its equipment or third parties.

11. To submit progress invoices for 25 per cent of the contract fee every 30 days, commencing 60 days after departure of the vessel from Panama. Invoices to be mailed to:

Mr. Doyle Gates
Pacific Tuna Development Foundation
c/o Tuna Research Foundation
215 Cannery Street
Terminal Island, California 90731

12. To perform or assist the Foundation personnel to carry out the following services:

(a) Take weather observations.

(b) Launch expendable BT's furnished by the government at least two times daily.

(c) Record sightings - birds, mammals, fronts, etc.

(d) Record observations on fish schools; observe species, types of schools, size fish, size school, etc.

(e) Observe fish behavior and record same.

(f) Record set data, i.e., time set, time completion, reaction of fish to set, etc.

(g) Comment as to any factors which might lead to improved net design or fishing techniques which will facilitate the capture of fish in the future.

(h) The collection of other scientific information as opportunity affords.

(i) The contract crew shall assist in all phases of the research activity as long as giving such assistance does not interfere with the operation, safety of the vessels, and normal fishing activity. It shall be fully understood that the vessel captain is solely in charge of his vessel at all times and, therefore, responsible for the safety and well being of the crew and Foundation representative on board.

(j) The vessel will radio information to the Guam Coast Guard Weather Center per government format on XBT probes expended during the course of the trip on a daily basis. (Frequencies, schedules for SSB and FAX communication detailed in separate report "Background Information for Purse-Seining in the Western Pacific" dated March 17, 1976.)

Foundation Agrees: 620 TONS

1. To guarantee payment of $366,000 for the full term of the contract, subject to the terms and conditions as specified. Payments to be made as per paragraph 11 (Contractor obligations).

2. That all fish caught during the terms of the contract are the property of the Contractor and may be disposed of in accordance with applicable laws and regulations.

Attachments:

A. Copy of the charter bid.

B. Copy of qualifying requirements for charter.

C. The attached General Provisions, May 1974, are made a part of this contract.

This contract shall bind and inure to the benefit of the heirs, successors and assigns of the parties hereto. The prevailing party in any litigation arising out of this contract shall be entitled to reasonable attorneys' fees and costs as may be determined by the court.

IN WITNESS WHEREOF, the parties hereto have executed this contract as of the day and year written below:

Zapata Ocean Resources Corp
CONTRACTOR

By Wm J. Miller Jr.
Title V.P. & General Manager
Date March 26, 1976

PACIFIC TUNA DEVELOPMENT FOUNDATION

By John J. Boyd
Title
Date

Doyle E. Gates
Secretary / Treasurer PTDF
March 19, 1976

HOLD HARMLESS AGREEMENT

For good and valuable consideration, receipt of which is hereby acknowledged, the undersigned Contractor hereby holds Pacific Tuna Development Foundation, Living Marine Resources, Inc., the United States Government, and their respective agents and employees, free and harmless from all liability, damages, costs or expenses in the event of any injury to crew members, damage to the undersigned vessel, its equipment or the person or property of any third party pertaining to the performance of the contract between Pacific Tuna Development Foundation and the undersigned.

Dated: March 21, 1976.

Pan Ta Ocean Resources Corp.

CONTRACTOR

By Wm. J. Miller Jr.
Name/Title

Mary Elizabeth
Name of Vessel

PACIFIC TUNA DEVELOPMENT FOUNDATION

c/o Living Marine Resources, Inc.
11339 Sorrento Valley Road
San Diego, California 92121
(714) 453-4871

DATE: March 5, 1976
MEMORANDUM: Prospective Offerors
SUBJECT: Tuna Purse-Seine Charters (3)

The Pacific Tuna Development Foundation (PTDF) program represents a joint effort by government (Federal, State and Territory) and industry (processors, producer and labor) to develop the central, south and western Pacific tuna grounds to the mutual benefit of the parties concerned. Living Marine Resources is the contractor chosen to run the development program. PTDF has, as a development goal, the establishment of a viable commercial tuna fishing industry in this area. It is known that considerable quantities of fish, primarily skipjack, are to be found in the general area to be investigated. The annual potential catch for skipjack in the western Pacific has been estimated at 800,000 to 1,000,000 short tons, whereas in both 1973 and 1974 the annual production estimated 400,000 tons. Thus, there appears to be considerable room for additional harvesting.

PTDF will charter three (3) modern tuna seiners for approximately four months to investigate the tuna resources and fishing conditions of the central and western Pacific Ocean. The expected base of operation will be Guam which has adequate large-vessel accommodations. Exploratory work will take place both north of Guam along the Mariana Islands chain and south in the general vicinity of Palau, Yap, Truk and Ponape. Seiners which have contributed to financing of the American Tuna Research Foundation (ATRF) program will receive first consideration.

The survey is expected to commence on or about May 15, 1976 and not later than June 1, 1976 (subsequent to the closure of the CYRA

yellowfin season) and will conclude approximately 120 days after the date of departure. The Foundation has $1.1 million to finance this work. Each vessel will received $366,000 to complete the charter.

The nets to be carried and fished by the charter vessels will be 20 strips (4-1/4-inch mesh x 100 md) deep with hanging length being commensurate with depth (approximately 6.5-10.0 x depth).

GENERAL CHARTER TERMS AND REQUIREMENTS

- Three (3) charters will be let.
- Each charter will be for a minimum of 120 days.
- Each vessel will be required to fish a minimum of 80 days in the designated exploratory area.
- Each vessel will be allowed 20 days' passage time to Guam and another 20 days to return to California.
- Upon selection for charter by the PTDF, the vessel owner will provide a letter from his insurance company stating full liability coverage for any PTDF scientific crew member assigned to his vessel. Scientific crew members, if any, will be limited to one (1) per vessel.
- All vessels accepted will be required to sign an agreement holding the PTDF and LMR harmless in the event of injury to crew members or damage to the vessel and its gear for the duration of the charter.
- Vessels will be required to operate within the area designated in the charter outline (see attached figure), weather conditions permitting. The general intent of the charter is to fish approximately 40 days to the north of Guam along the Mariana Island chain toward the Bonin-Volcano Island group and about 40 days to the south of Guam in the general area of Palau, Yap, Truk and Ponape. However, if weather or fishing conditions dictate, the general plan may be modified to accommodate prevailing

conditions. All vessels will operate as a single exploratory unit, and will keep the project manager informed of their activities and plans. A captain will, at all times, use his own judgment as to the safety of the vessel and crew.

- Area of Exploratory Fishing

The general area of investigation is delineated by the following coordinates: 20°S and 170°W; 10°S and 170°W; 10°S and 180°; 20°N and 180°; 20°N and 155°E; 30°N and 155°E; 30°N and 127°E; 7°N and 127°E; 0° and 132°E; 11°S and 151°E; 20°S and 151°E (see attached figure).

- Bidding Information

1. Bids will be evaluated from information presented on the attached form. All forms must be signed by the managing owner and in possession of Living Marine Resources by 1630 hours Wednesday, March 17, 1976.

2. PTDF reserves the right to refuse any bid. The Foundation Directors are concerned with getting the best overall vessels with qualified and experienced personnel. If more than three vessels are deemed equal, the winners will be determined by a drawing.

3. Vessels chosen will be notified by the selection committee by March 19, 1976.

The vessels chosen for charter will be selected by a group of knowledgeable industry people. The selection will be made on the basis of: (1) expertise and experience of the captain, chief and crew and (2) overall vessel characteristics, equipment and mechanical condition.

NET MODIFICATION

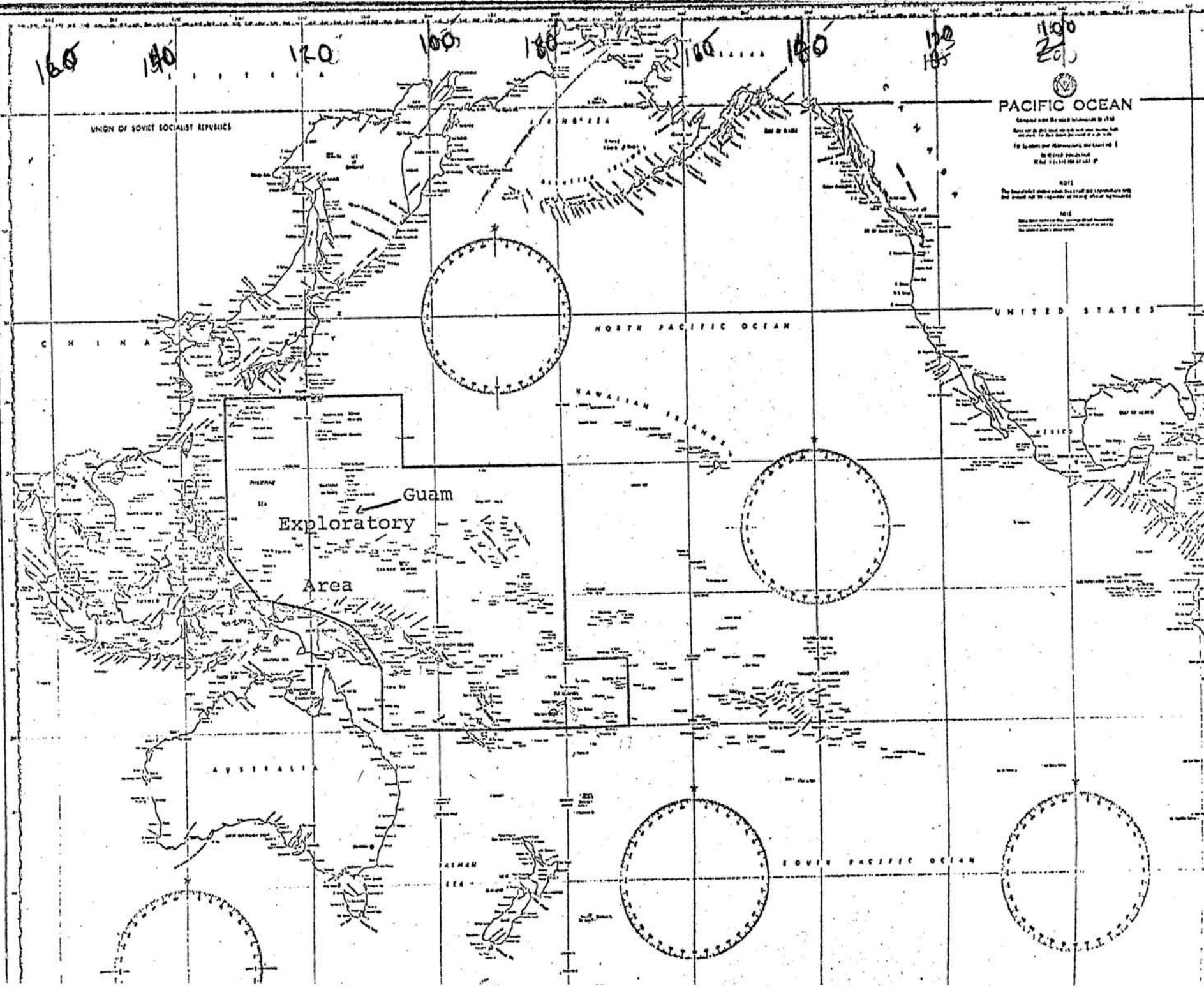
- A vessel may either depart San Diego or any other port, with its net modified to the required depth/length (20 strips) or may modify its net in Guam prior to fishing.

- Subsequent to net modification in Guam, a vessel must spend 80 days in the exploratory-development fishing phase of the charter, equal to the time spent on the grounds by a vessel modifying its net prior to departure.
- Preference will be given to those vessels that modify nets prior to departure.
- A vessel modifying its net in Guam has the responsibility of getting all materials to that location.

ADDITIONAL CONTRACT REQUIREMENTS AND INFORMATION

- The vessel owner will provide his vessel with equipment, supplies and personnel for the charter trip and will be responsible for all operating expenses of the vessel, including but not limited to, fuel oil, lube oil, filters, etc.
- Each vessel will provide adequate quarters and meals for one PTDF scientist during the cruise.
- If the vessel fails to render the required service under this contract because of defects in the vessel or equipment, absence of fish captain, chief or other failures on the part of the contractor for five days, then beginning with the sixth day, the amount paid to the vessel will be reduced by a prorate on a daily basis of the total sum due the vessel.
- In order to achieve optimal fishing results, vessel captains will consult with each other on a daily basis and exchange the information necessary to coordinate the operations with PTDF.
- All fish caught during the course of the charter are the property of the vessel and may be disposed of in accordance with applicable laws and regulations.
- Progress invoices for 25 percent of the charter fee will be submitted every 30 days, commencing 60 days after departure of the vessels.

Owners interested in bidding should contact Living Marine Resources, Inc., 11339 Sorrento Valley Road, San Diego, California 92121. Telephone (714) 453-4871, Mr. Franklin G. Alverson, Project Manager, Mr. Doug Souter or Mr. Paul Patterson.


PACIFIC OCEAN
UNION OF SOVIET SOCIALIST REPUBLICS
UNITED STATES
NORTH PACIFIC OCEAN
CHINA
HAWAIIAN ISLANDS
Guam
Exploratory
Area
AUSTRALIA
SOUTH PACIFIC OCEAN

Attachment No. 2

Vessel	Area used	Size of net
Nippon Maru	Eastern Pacific and West Africa (U.S.-type seiner)	110 m deep x 1,025 m long or 118 m deep x 1,350 m long
Hayabusa Maru	North of Papua New Guinea	220 m deep x 1,600 m long
No. 58 Tokiwa Maru	North of Papua New Guinea	250 m deep x 1,960 m long
No. 55 Hakuryu Maru	Japan coastal waters for skipjack and yellowfin tunas	150 m deep x 1,500 m long or 220 m deep x 1,500 m long
Wakaba Maru	do.	220 m deep x 1,500 m long
No. 23 Taikei Maru	do.	200 m deep x 1,500 m long
No. 28 Kohoku Maru	do.	261 m deep x 2,025 m long
No. 85 Seishin Maru (two-boat seining)	do.	350 m deep x 1,700 m long
No. 7 Konpira Maru (two-boat seining)	do.	240 m deep x 2,400 m long

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From Trip report: Trip to Japan, January 31-February 22, 1975, by Tamio Otsu.