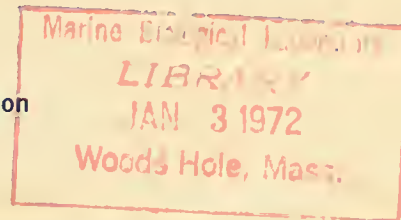


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NOAA Technical Report NMFS CIRC-353

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service



Truk Live-Bait Survey

PETER T. WILSON

NOAA TECHNICAL REPORTS

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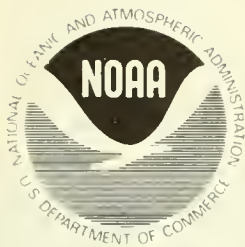
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NOAA Technical Report NMFS CIRC-353

Truk Live-Bait Survey

PETER T. WILSON

SEATTLE, WA.

August 1971



Takabe, Gymnocaesio argenteus, the best bait species in the Truk lagoon, are shown here seeking shelter and protection around a coral head.

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Truk Live-Bait Survey

By

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ABSTRACT

A survey of the bait resources of Truk lagoon was made in June-August 1970. Directed by an Okinawan with extensive pre-World War II fishing experience in Truk, the survey showed the presence of six bait species, some of which live around the coral heads and must be taken with a specially designed net. Baitfish from Truk lagoon supported a Japanese skipjack tuna fishing fleet of about 40 vessels during prewar years.

INTRODUCTION

During 1968, the Trust Territory of the Pacific Islands entered into a formal agreement with a United States tuna company to conduct a bait survey of the Truk lagoon. The results of this survey showed that commercial concentrations of known live-bait species were not available in Truk during the survey period and that baiting methods utilized in Hawaii and Palau were not effective for capturing those species which were utilized in Truk prior to World War II.

The Second Marine Resources Conference held in Hawaii in 1969 and the Truk Marine Resources Conference held in May of 1970 recommended that further efforts be made to identify the live-bait resources of the Truk lagoon in order to determine their relative abundance, their proper identification, and their distribution. Both conferences also recommended that an Okinawan live-bait fisherman experienced in the prewar bait fisheries of the Truk lagoon be obtained to direct the bait survey.

OBJECTIVES

The objectives of the second Truk bait survey were:

- 1) To identify properly the live-bait species of the Truk lagoon,
- 2) To determine the relative abundance and

distribution of the live-bait species in the Truk lagoon,

- 3) To survey the day bait resources of the Truk lagoon,
- 4) To evaluate the prewar baiting method as practiced in the Truk lagoon.

PROCEDURE

Captain Jinzo Izumi, an Okinawan skipjack fishing captain with 11 years fishing experience in Truk prior to the second world war and 6 years of postwar fishing experience in Palau, was recruited for a 3-month period (June-August 1970) to survey the prewar bait grounds of Truk. Captain Izumi was provided a 17-foot Mokil type open boat with a 20 hp outboard motor, a full-time assistant, Hiroshi Inengau, and the necessary support equipment to make the survey. On weekends, Izumi was assisted by Kimio Aisek, an experienced skipjack tuna fisherman trained in Hawaii and Palau. Aisek headed up a team of five or six local scuba divers who assisted with the catching of sample bait species using scuba gear and an Okinawan bait net.

During the week, Izumi and his assistant Inengau would travel through the lagoon to the baiting grounds which Izumi had used during the prewar years. The abundance and type of bait in each of these areas were determined by diving and swimming to depths of about 60 feet,

using only wooden goggles to make underwater observations.

On weekends, he and Aisek's diving crew would then visit certain grounds where they would catch a few buckets of each species of bait, using an Okinawan bait net. These samples were preserved in Formalin and sent to Dr. John E. Randall of the Bishop Museum for identification. During the 3-month survey, most of the prewar baiting areas were surveyed and bait samples of each species taken. Underwater photos of the bait concentrations were also made.

AREA DESCRIPTION

The Truk Atoll

Geologists state that 1 to 10 million years ago Truk was one island with Udot the approximate center. With the passing of time it has slowly sunk into the sea, leaving several high islands and many low islands within its lagoon. Therefore, by definition, Truk is not a true atoll but an enormous coral ring, ranging in diameter from 30 to 40 miles and containing many islands of volcanic origin. Approximately 20,000 Trukese live on 16 permanently inhabited islands; many other islands are used solely for farming or fishing.

Moen Island

Moen Island is the headquarters for the District Administration. It is roughly triangular in shape, about 5 miles on a side with an area of about 8.5 square miles. Its population is approximately 5,000. Moen Island, with three major trading companies, is also the business center of the district and the site of the airfield and the only deepwater dock in the lagoon.

Dublun Island

Dublun Island is the seat of the former Japanese and German government headquarters. Many remnants of the war years remain there. Its land area is roughly 3.7 square miles and its population is approximately 2,000. During the Japanese administration there were approximately 45,000 Japanese living on this island. Utilities, including power, water, and roads, were developed to support this population. Some of the basic support facilities such as the former water system remain in evidence and could be put back into use if funds were made available.

Tol Island

Tol is the largest island in the district. It consists of four separate municipalities: Tol Harbor, Pata, Polle, and Wonei. Its total area is about 15 square miles. Its population is approximately 5,000.

Other Lagoon Islands

There are a number of other inhabited islands within the lagoon but on all of them water, power, docking, and access to Moen are not as favorable as they are on Dublun.

CLIMATE

The climate zone is classified as tropical. Temperature averages from 21° to 28° C. The humidity is high, averaging 70% to 80%, and the rainfall averages about 150 inches annually. There is a "dry" season during the period December through March. Truk lies in the belt of the northeast trade winds, which blow for about 4 months out of the year.

RESULTS

The bait species deemed most valuable during the prewar years cannot be taken by the conventional Hawaiian and Palauan methods of baiting. The 1968 bait survey indicated that night lighting for small engraulids such as exist in Palau is unproductive. In addition, shallow water seining for sardines and silversides does not yield the amount of good baitfish required to support a commercial skipjack fishery.

The baitfish of Truk are not located in habitats in which a Hawali- or Palau-trained fisherman would normally fish. Rather, they are found around coral heads throughout the lagoon. The important species follow:

| | |
|-----------------|------------------------------------|
| FAMILY NAME | Lutjanidae |
| SCIENTIFIC NAME | <u>Gymnocaesio argenteus</u> |
| TRUKESSE NAME | Tinika or Tinipu |
| OKINAWAN NAME | Takabe (young) Akamoro (mature) |
| ENGLISH NAME | Snapper |

This is considered the best bait species in Truk. There are also about four other species of this or a similar genus which are also called takabe but these have not been identified. They reportedly come into the lagoon around May or



Takabe which have been startled and are seeking shelter around coral heads in about 50 ft of water.

June when quite small. They swim in dense schools in the midwater area between the surface and the coral heads. When startled they seek shelter around the coral, and divers with a special net are required to catch them.

This bait is very strong and can be carried for long distances at sea and under much more crowded conditions than is possible with the Palauan baitfish, Stolephorus heterolobus. About 10 buckets of takabe were carried from Truk to Palau in 4 days during 1968 with no mortality.

This bait is not abundant during January, February, March, and April and other species are normally used during this period. Their growth rate is not known; however, as they grow larger they move into deeper water and become more difficult to catch. The larger fish, called akamoro, are not as good a bait as the smaller ones.

Takabe can be found in abundance in the shoal areas between Dublon, Fefan, Param, Udot, and

Tol (see map) where most of the prewar baiting operations were carried on.

| | |
|-----------------|-----------------------------|
| FAMILY NAME | Apogonidae |
| SCIENTIFIC NAME | <u>Rhabdamia cypselurus</u> |
| TRUKESSE NAME | Sipu |
| PALAUAN NAME | Sebus lbad |
| OKINAWAN NAME | Akaesa |
| ENGLISH NAME | Cardinalfish |

This is reported to be an excellent baitfish and considered second only to takabe. It forms dense clouds around coral heads and does not swim about in the midwater level, but stays close to or actually within coral heads and coral crevices during daylight hours. This species is taken by divers using the same type of net that is used for catching takabe. Both species live in approximately the same environment, the difference being that takabe swims in the midwater area between the surface and



Map of the bait grounds of Truk.

coral when not disturbed and akaesa lives in close proximity to coral heads and crevices.

Izumi reported that this is a very strong baitfish and that many can be carried in a baitwell for extended periods. Other species are also used as bait and akaesa is a general name rather than a specific one. However, only one species was collected and identified, a circumstance that led me to believe that this must be the one of primary importance.

Akaesa is not attracted to a night light and cannot be taken with this method. It can be found in abundance around the coral heads between Dublon, Fefan, Param, Udot, and Tol and around coral heads that occur inside the reef, north of the Northeast Pass up to Tora Island.

Akaesa was used for bait between November and February when takabe could not be taken.

Izumi stated that akaesa is not visible from the surface during daylight hours and that it lives in coral areas that afford it protection from fishing during the day. However, it leaves these areas at night, after which the fishermen set their net over the coral. The nets would remain in place until just before daylight when the fish return to the coral and gather over the nets. The fishermen would then dive down, as soon as they could begin to see, and lift the net, usually catching enough bait for a day's fishing. The wear and tear on the nets and the difficulty of working in the deeper water made this a method of fishing which was avoided if takabe could be taken.



Captain Jinzo Izumi, an experienced live-bait skipjack fisherman, in 50 ft of water looking for concentrations of baitfish in the Truk lagoon.

Takabe in the midwater area concentrated around the mast of a sunken Japanese ship.



| | |
|-----------------|----------------------------------|
| FAMILY NAME | Clupeidae |
| SCIENTIFIC NAME | <u>Herklotsichthys punctatus</u> |
| TRUKES NAME | Senif |
| PALAUAN NAME | Mekebud |
| OKINAWAN NAME | Iwashi |
| ENGLISH NAME | Sardine |

This sardine is common in Truk and can be found along beaches and off the mangrove coastline of many of the islands. It lies quietly in dense schools, usually mixed with Allanetta ovalaua (harara, shibura, or nou). Interestingly, Izumi states these fish do not school together in deep water, only shallow water. It is

considered to be a good bait species and was used with A. ovalaua, even though A. ovalaua was considered a poor bait. Iwashi is considered to be strong and it will live for several days in a baitwell. It is not attracted to night lights in large numbers but it can easily be taken with a Hawaiian day bait net.

This is a popular food fish with Micronesians and is considered a treat raw, cooked, or pickled. It is often taken with throw nets and illegally with explosives. It is also an important forage fish as schools of predatory fish are often seen feeding on it. It was most frequently used during November through February when takabe, the preferred bait species, could not be taken.

Shira is considered to be a good bait, but it is weak and difficult to hold for any period in a baitwell. It is not difficult to take and scattered schools occur throughout the lagoon. It has been taken at night in commercial quantities, but most baiting for this species in Truk was carried on during the day. In Palau it is not used extensively as bait as it seldom comes to the light in commercial concentrations.

Two species which closely resemble each other, Spratelloides delicatulus and S. gracilis, are found in this area. They were usually taken by the prewar Okinawan fishermen from March through May when takabe was difficult to catch. Each lives in shoal-clear water areas and is captured by the same type of

| | |
|-----------------|---|
| FAMILY NAME | Dussumieriidae |
| SCIENTIFIC NAME | <u>Spratelloides delicatulus</u> (Bennett) <u>Spratelloides gracilis</u> |
| TRUKES NAME | Nienika |
| PALAUAN NAME | Kuaol |
| OKINAWAN NAME | Shira |
| JAPANESE NAME | Aoesa |
| ENGLISH NAME | Round herring |

Akaesa concentrated around a coral head in 40 ft of water between Tol and Fala-Beguets Islands.



net which is used for taking takabe (see net description).

Shira was not taken in the deeper waters which takabe frequented but in shallower water as it does not swim deep; it remains near the surface at all times.

Izumi reports that there is more shira present in Truk than in Palau but that because of its weakness only 20 buckets could be carried on a boat as compared to 50 buckets of takabe. Shira was also always handled with buckets when transferring it from the bait net to the fishing boat while takabe was moved with scoop nets because of its greater strength.

| | |
|-----------------|--|
| FAMILY NAME | Atherinidae |
| SCIENTIFIC NAME | <u>Allanetta ovalaua</u> <u>Pranesus pinguis</u> (Lacépède) |
| TRUKES NAME | Nou |
| PALAUAN NAME | Teber |
| OKINAWAN NAME | Yajanguwa |
| ENGLISH NAME | Silverside |

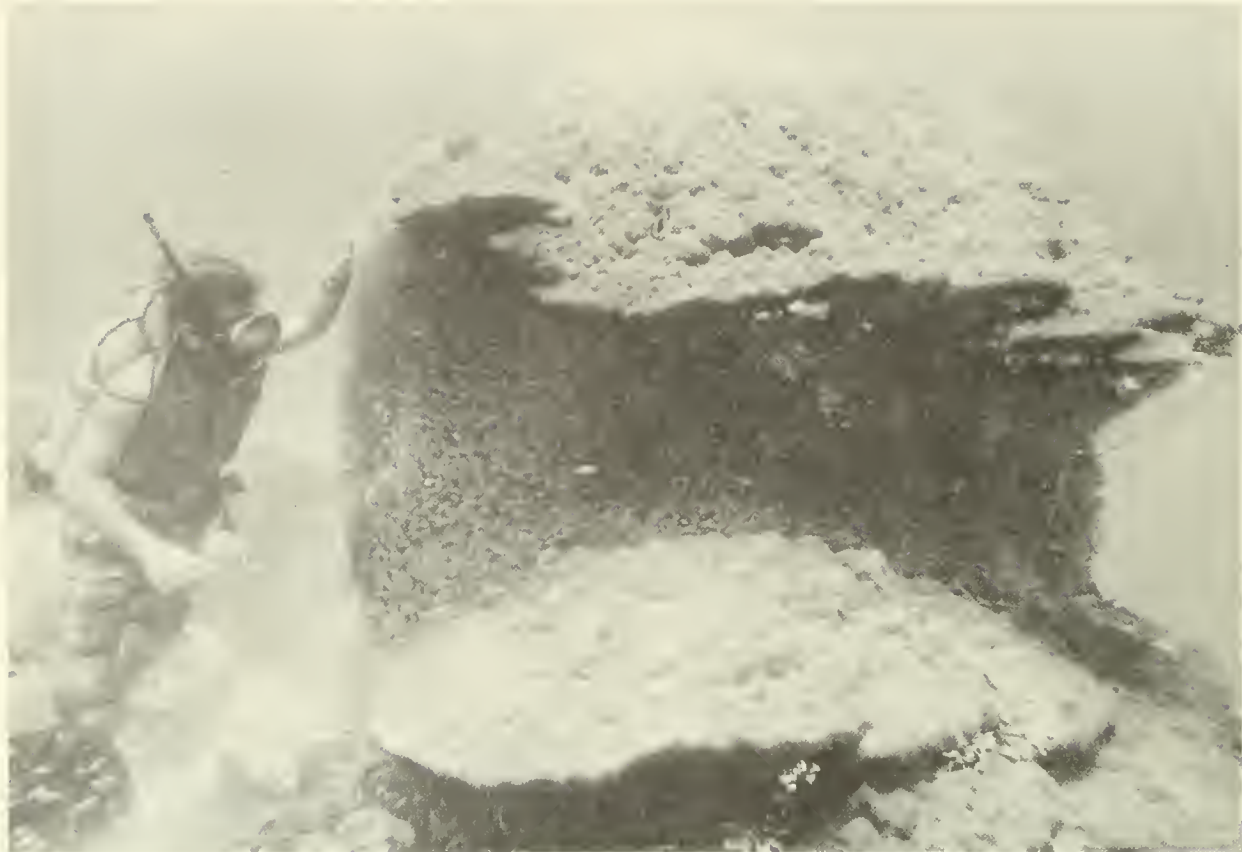
Two species within this genus resemble each other, Allanetta ovalaua and A. woodwardi. The former does not have the wide, hard head that is typical of A. woodwardi. A. ovalaua can be used as bait while A. woodwardi, the "hard head," is a poor baitfish.

Both species are strong and can be carried easily on board a fishing vessel. The Okinawans call A. ovalaua "yajanguwa" and will use it as bait when other species are not available. A. woodwardi is called "harara" or "shibura" and is not used. It occurs throughout the year and lives near mangroves and beaches in calm, sheltered water. It schools with the Trukese sardine, Herklotsichthys melanura, in shallow water and can be taken with a Hawaiian type day bait net.

Both species are attracted to night lights in limited numbers but are seldom caught in commercial quantities in this manner.

A closeup of akaesa around a coral head in 40 ft of water between Tol and Fala-Beguets Islands.





Akaesa concentrated around a coral head in 40 ft of water between Tol and Fala-Beguets Islands.

| | |
|-----------------|---------------------------------|
| FAMILY NAME | Pomacentridae |
| SCIENTIFIC NAME | <u>Pomacentrus pavo</u> (Bloch) |
| TRUKESE NAME | Nisom |
| OKINAWAN NAME | Hikiwa |
| ENGLISH NAME | Damselfish |

This damselfish, hikiwa, was reportedly used as bait in Saipan during prewar years and in Truk only when bait was really difficult to take. It was most difficult to catch and the method of capture was very destructive to the area fished. Damselfish seek shelter within coral branches and to capture enough of this fish for bait took at least 3 days as the fishermen would literally pick up individual coral heads and break them up in order to get the live bait out. It would take a boat crew of about 20 men a day to catch a bucket of bait and three or four buckets were required to go fishing.

It was considered an adequate baitfish but was used most sparingly and only when it was

certain that the fish would bite. Owing to the difficulty of capture, it was seldom used in Truk.

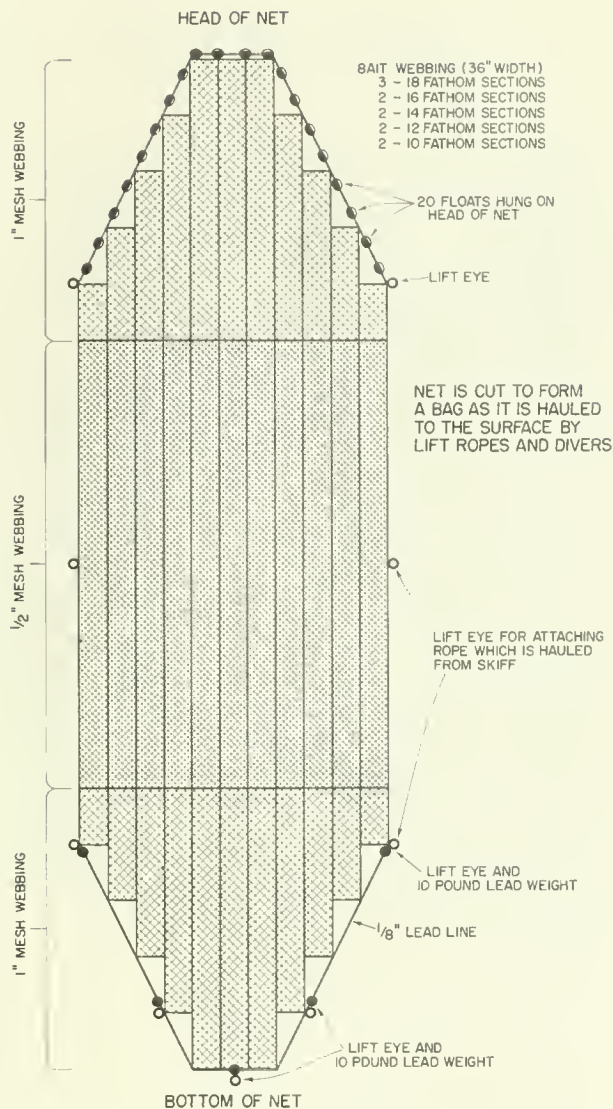
TRUK BAIT NETS

The species of bait fished in the Truk lagoon required the development of a special type of net.

It was made to form a bag and floats and selvages were added as usual. The total width approximated the length and material cost was estimated at about \$450.00. Okinawa Gyomo in Naha, Asato can supply such a net according to Captain Izumi.

PREWAR SKIPJACK TUNA FISHERY OF TRUK

The Japanese recognized the value of the off-shore skipjack tuna, Katsuwonus pelamis, fish-



was done in a series of small plants scattered on various islands throughout the lagoon. These plants and boats were reportedly based in the following areas:

| | |
|--------------|----------|
| Dublon | 8 boats |
| Moen | 2 boats |
| Fefan | 7 boats |
| Uman | 1 boat |
| Param | 1 boat |
| Eot | 1 boat |
| Udot | 1 boat |
| Fala-Beguets | 6 boats |
| Tol | 12 boats |

Izumi reported that about 40 skipjack boats were operating in Truk during the prewar years. The above listing should be considered as an approximation of their number and location as there is some conflict on the actual number of boats reported fishing during this period.

The Truk boats were not able to take bait at night as is done in Palau as the baitfish in the lagoon were not attracted to a light. For this reason they baited during the daylight hours prior to going out fishing for a day. When bait was abundant, an hour or two was all that was required for baiting. The vessels then left for the fishing grounds. The boats based on Moen, Dublon, and Fefan would usually fish out of the Northeast Pass and the South Pass. They would also fish out of the North Pass but never out of the Piaanu Pass owing to the distance.

The Tol boats always fished out of the Piaanu Pass, the North Pass, and the South Pass, but never out of the Northeast Pass owing to the distance and the lack of refrigeration. According to Izumi, the best fishing grounds were apparently to the east and south of Truk.

The skipjack fishing season in Truk is long. The best months are October and November, with a decline in December, probably due to a shortage of bait. January is also considered to have good fishing, but February, March, and April are poor. During the later part of April, fishing is supposed to start improving and it gets better in May and good in June, July, August, and September. The size of the skipjack is about the same as the Palau fish, running around 10 pounds; but the 15-pound fish and the undersize fish that are common in Palau are seldom seen in Truk.

The fishing vessels used by the Okinawans during the prewar years ranged in size from 13 tons up to 20 tons. (The Van Camp boats now fishing in Palau are in the 30-ton class.) A 20-

eries of Micronesia very early and started the development of this resource for their own benefit shortly after taking the islands from Germany at the beginning of World War I. In the 1920's they initiated an investigation of the skipjack resources and started commercial fishing in Palau in 1925. It was not until 7 years later that the production of skipjack became sizable and in 1937 it reached its peak when a total of 33,000 metric tons of skipjack was landed in Micronesia. During this year Truk landed 12,433.5 metric tons of fish and Palau landed 13,774.7 metric tons. Ponape landed a total of 4,064.0 metric tons and Saipan 2,697.3 metric tons.

Truk's production was processed into katsuo-bushi and exported to Japan. The processing

ton boat was about 65 feet long and had a beam of about 14 feet. The boats carried crews of 20 to 23 men and could carry about 50 buckets of bait. The high capacity for carrying bait was apparently due to the greater strength of the Truk bait and its ability to be concentrated in the live wells of the fishing boats.

After fishing for a day, the vessels would return to their home islands where the families of the fishermen would assist with the offloading of the boat. Processing was done immediately before the fish could spoil. The boats would leave their home islands shortly before daybreak in order to be at the baiting grounds at daylight. A couple of hours of baiting was usually sufficient to fill a boat for a day's fishing and they would then leave for the fishing grounds by 7:00 to 9:00 in the morning returning around 8:00 at night.

The Okinawans had a saying about the fishing in Palau and Truk that said, "In Palau, the bait is easy and the tuna hard. In Truk the bait is hard and the tuna easy." After looking at many aspects of both fisheries, I would certainly agree.

THE FUTURE SKIPJACK TUNA FISHERY OF TRUK

The demand for skipjack tuna on the world market, the need for the development of Truk's limited natural resources, the shortage of fresh fish for local consumption, the need for employment, and other reasons indicate that the skipjack fisheries of Truk will be developed sometime in the near future.

Factors hindering the development of Truk's skipjack fishery include the complete lack of a suitable dock site with power, potable water, ice, and cold storage facilities. No slipways for the maintenance of the fishing boats are available and the lack of a machine shop, machinists, electricians, carpenters, and other skilled technicians complicates the problem.

Once these technicalities are resolved and it becomes possible to operate and maintain a fishing plant and offshore vessel properly, the skipjack fishery should develop rapidly. It is probable that this development will utilize to some degree skills and knowledge of the Okinawans who successfully fished the area during the prewar years; however, care must be taken to prevent the over-exploitation of the baitfish stocks and to make certain that Micronesians participate fully in the shoreside and fishing operations.



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