

Marine Species Collected by Women in Palau, Micronesia

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Abstract—Women in Palau, Micronesia regularly collect sea cucumbers, mollusks, urchins, crabs, and reef fish from shallow nearshore areas according to a survey of 54 Palauan women. This article describes the most common methods Palauan women utilize to collect marine species for subsistence and local commercial purposes. Of the women interviewed, most collect invertebrates by reef gleaning. Some women collect mangrove clams, commercially their most important species. Some women catch land crabs, coconut crabs or mangrove crabs. Many women use handlines to catch reef fish. Few women use spearguns or nets to catch fish. There is some concern among the women that several of the invertebrates they collect are harder to find now than they were in the recent past. In particular, the women are concerned about the status of stocks of giant clams, short-spined urchins, mangrove clams, and a species of swimming crab that is collected for subsistence use.

Introduction

Fishing lore has been a popular subject for study for many generations of anthropologists and biologists. In the tropical Pacific, as elsewhere, catching fish is generally thought of as men's work, as the term "fisherman" implies. The collection of marine species other than fish, especially invertebrates that can be collected from the reef flat at low tide, has been largely ignored by researchers (Chapman 1987, Matthews 1993). The collection of these species is often the responsibility of women, and sometimes, their children. Little has been written about women's collecting activities in the tropical Pacific, even in places such as Palau where women have been long known to collect a variety of marine species. Anthropologists and other scientists have studied the structure and knowledge of traditional Palauan society, and have placed an emphasis on the men's catch

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of fish, lobster, and large crabs (Kramer 1917, Johannes 1981). Kramer's extensive documentation of Palauan life in the early 1900s includes some descriptions of the marine collection activities of women and children. These descriptions are based on the observations of food preparation made by his wife, Elizabeth. In his beautifully descriptive account of fishing lore in Palau, Johannes (1981:3) merely mentioned women's gleaning activities and the need for their further study in a footnote. Little else has been written.

Women in Palau are more often associated with taro cultivation than with marine species collection. Klee (1976:215) stated bluntly that, "Women also have their place in traditional Palauan society, and that is in the taro swamps." Klee (1980:253) argued that Palauan men were more tied to the cycles of nature than women since "the reef, lagoon, and sea were primarily the domain and habitat of men" and the women's activities "were primarily concentrated on the land in the cultivation of taro, an activity that varies little with the seasons." While Klee (1980) acknowledges that women "occasionally comb the tidal flats for shellfish, sea urchins, sea cucumbers, and some varieties of small fish," he minimizes the biological knowledge associated with this activity considerably. In Palau, the cultivation of taro is still a major activity for many women and fishing is more often a job for men. However, it is equally true that many women spend a great deal more time in the water collecting marine species than has been recognized by outside writers. They also have considerable knowledge of the rhythms of this life.

In the past, women's collecting activities were generally restricted to the inner reef areas accessible by foot or bamboo raft. They usually collected near-shore invertebrates, especially sea cucumbers and mollusks, for family consumption (Kramer 1917). This activity is called reef gleaning. The mere use of the word "gleaning" while descriptive, also minimizes the importance of this type of nearshore resource collecting activity. The word has connotations of the action of picking up leftovers after a harvest, especially those pieces that were not large or important enough to collect the first time. Such collection seems to require little more than a sharp eye and some spare time. In fact, the women interviewed during a study on the roles of women in Palauan fisheries know quite a lot about the species they collect: they know when and where to find particular types of seafood and the collection methods they use are usually more involved than the simple and mechanical process of stooping to pick up what they see.

Today with some access to gasoline-powered boats, Palauan women can collect more than nearshore invertebrates. They occasionally catch fish with lines, nets, and spearguns. Women are also beginning to collect species, such as mangrove crabs, that have a higher market value than the species they normally and traditionally collect. However, most women who fish or collect other marine foodstuffs still tend to stay close to shore within the barrier reef.

Women's and men's fishing domains are slightly different; women tend to remain close to shore, while the men more often catch fish from deeper waters that are accessible only by boat. Development activities that enhance fisheries often ignore the fishing activities of women (Schoeffel 1985). As a result, women

have been left out of the development process until fairly recently. In addition, resource management programs often fail to address the fact that species collected primarily for subsistence use, i.e., those that are not easily tracked through analysis of commercial landings and those species that are usually collected by women, may also be in need of protective measures. In recent years the importance of the contribution of women to the fisheries of Pacific island nations has been acknowledged. Several studies on the roles of women in fisheries have been done throughout the Pacific, including studies in Fiji (Lal & Slatter 1982), Kosrae (Des Rochers 1992), and the regionwide program sponsored by the South Pacific Commission. This article describes the marine species collected by women interviewed in 1991 during a three-month study of women's marine collection activities in Palau (Matthews & Oiterong 1991).

Methods

The study of the role of women in Palauan fisheries was conducted from June to September 1991 by a three-person team based at the Division of Marine Resources. Seven of Palau's 16 states were chosen for the survey as a result of information from market surveys and other existing data previously compiled by the staff of the Division. The market surveys indicated those seven states to be areas where women were actively collecting marine species to be sold in local markets. These states also represented a variety of habitats. The states surveyed were Aimeliik, Airai, Koror, Ngaraard, Ngardmau, Ngatpang, and Ngeremlengui.

Upon entering a village, the survey team asked for those women who were known to go fishing and gleaning most regularly. A questionnaire was used to guide interviews with these women. It included questions about the marine resource collection methods the women use, the species collected, the estimated size of each catch, and whether the catch was primarily for subsistence or commercial use. The women were also asked if they process and/or sell fish caught by male relatives. They were asked if they had noticed any changes in the marine environment and if they encounter specific problems that may affect their access to and utilization of the resources.

A total of 54 women were interviewed from the seven states. Individual interviews, conducted in Palauan, generally lasted one to two hours.

Results and Discussion

The survey found that women are involved in five general types of marine collection activities: general and specialized reef gleaning, mangrove clam collection, crab collection, and fishing (Table 1). General gleaning involves the collection of many species of invertebrates and small fish. Specialized gleaning refers to methods involving special techniques to collect one target species (activities that could otherwise be categorized as forms of reef gleaning). Mangrove clam collection is a very important commercial activity, especially for older women. Crab collection includes several techniques to collect three types of crabs. The

Table 1. Seafood collection methods used by Palauan women.
Numbers represent percent of responses.

	Total (n=54)
General gleaning	96
Specialized gleaning	
<i>Olengimes</i> (sea cucumber)	91
<i>Omatairimd</i> (sea cucumber)	57
<i>Mengduul</i> (mangrove clam collection)	74
Crab Collection	
Land crabs	11
Coconut crabs	2
Mangrove crabs	2
Fishing	
Handlining	65
<i>Meluich</i> (night fishing)	44
<i>Kesokes</i>	20
Surround net	17
Spearfishing	2
<i>Bidekill</i> (cast net)	2

fishing activities include six different methods, each utilizing specialized gear and nets.

GENERAL REEF GLEANING

At low tide, women and occasionally children can be seen wading in the shallow nearshore waters around Palau. They stop to collect sea cucumbers, mollusks, crabs, and urchins. This collection method, known throughout the Pacific as reef gleaning, is by far the most common form of marine collection activity for Palauan women. Ninety-six percent of the women surveyed in this study engage in some form of reef gleaning. The species most often collected by this method are listed in Table 2. Women collect invertebrates to sell to local markets as well as for subsistence purposes. Often, the species that are collected to be sold differ from those that are collected for subsistence purposes alone (Table 3). A small amount of almost all commercial catches is kept for food for family and friends.

Sea Cucumbers

The sea cucumbers, *Actinopyga miliaris* and *A. echinites*, *cheremrum*, are collected for subsistence as well as commercial purposes by Palauan women from all seven surveyed states. The women who collect to sell their catch, spend two to three hours collecting all the large and small individuals they can find and are able to clean before the sea cucumbers disintegrate. Commercial collectors gather an average of 20 kg of sea cucumbers each time they sell at the markets. They

Table 2. Invertebrates typically collected by Palauan women. Each group is listed in order of importance in the women's catch.

Common name	Scientific name	Palauan name
ECHINODERMS		
sea cucumber	<i>Stichopus variegatus</i>	<i>ngimes</i>
sea cucumber	<i>Actinopyga miliaris</i> and <i>A. echinites</i>	<i>cheremrum</i>
sea cucumber	<i>Holothuria scabra</i>	<i>molech</i>
sea cucumber	?	<i>irimd</i>
short-spined urchin	<i>Tripneustes gratilla</i>	<i>ibuchel</i>
sea cucumber	<i>Holothuria</i> sp.	<i>sekesakel</i>
long-spined urchin	<i>Diadema</i> sp.	<i>choalech</i>
sea cucumber	<i>Holothuria</i> sp.	<i>delal a molech</i>
sea cucumber	<i>Bohadschia argus</i>	<i>meremarech</i>
MOLLUSKS		
giant clams	<i>Tridacna crocea</i> and <i>T. maxima</i> (?)	<i>oruer</i>
ark shell	<i>Anadara</i> sp.	<i>kikoi</i>
mangrove clam	<i>Anodontia</i> sp.	<i>ngduul</i>
giant clams	<i>Tridacna</i> sp. and <i>Hippopus</i> <i>hippopus</i>	<i>kim</i>
tiger cowrie	<i>Cypraea tigris</i>	<i>buich</i>
spider shell	<i>Lambis lambis</i>	<i>sang</i>
sand clam	<i>Atactodea striata</i>	<i>chesechol</i>
nut clam	?	<i>delbekai</i>
snails	<i>Nerita</i> spp.	<i>delsangel</i>
CRUSTACEANS		
swimming crab	<i>Portunus pelagicus</i>	<i>kmai</i>
land crabs	<i>Cardisoma hirtipes</i> and <i>C. carnifex</i>	<i>rekung</i>
mangrove crab	<i>Scylla serrata</i>	<i>chemang</i>
coconut crab	<i>Birgus latro</i>	<i>ketat</i>

Table 3. Invertebrate species most often collected by women while reef gleaning.

Commercial and subsistence uses	Subsistence uses only
Sea cucumbers: <i>cheremrum</i> <i>molech</i> <i>sekesakel</i>	<i>ibuchel</i> (short-spined urchin) <i>buich</i> (cowrie) <i>sang</i> (spider shell)
Mollusks: <i>kim</i> (giant clam) <i>oruer</i> (giant clam) <i>kikoi</i> (ark shell)	<i>kmai</i> (swimming crab)

clean the animals with salt or ashes to rid them of the thin, slimy coating of the skin. They are then cut lengthwise and the viscera are discarded. After a salt-water rinsing, the sea cucumbers are cut into small pieces. They are sold in small jars or plastic bags. They are eaten raw with lemon or with amra leaves and fruits (*Spondias pinata*, *titimel*). Since salt is used during the cleaning process, the sea cucumbers remain fresh for two to three days without refrigeration.

Holothuria scabra, *molech*, is collected for subsistence as well as for commercial purposes by many women throughout Palau. This species, however, is not collected as regularly or in as great an amount as *cheremrum*. The linings of the body cavity of *molech* are eaten.

The Palauan women named four other sea cucumbers that they generally collect for subsistence use: *sekesakel*, *chederngor*, and *delal a molech* (*Holothuria* spp.) and *meremarech* (*Bohadschia argus*). These species are only collected occasionally while reef gleaning. These sea cucumbers are sold only if they are found in unusually large amounts.

Mollusks

Seven species of giant clams (*Tridacna* spp. and *Hippopus hippopus*) are known to inhabit Palauan waters (Yamaguchi 1989). The Palauan language has six names for these clams, but the women interviewed used only two: *kim* and *oruer*. *Kim* is a general term for the free-living giant clams (usually *Hippopus hippopus*), and *oruer* refers to the smaller species that inhabit holes in rocks and corals (*Tridacna crocea* and *T. maxima*?).

More than half of the women interviewed collect *kim* and/or *oruer*, especially to sell to local markets. The women expressed concern, as others have, that the stocks of giant clams are diminishing (Munro 1993). They, however, gave no indication of limiting their harvest of these popular clams. Rather, they were often eager to obtain access to boats in order to reach more remote fishing and gleaning areas.

The meat of these clams is sold in markets raw or with slices of lemon. Giant clams are often collected for important events, such as funerals, in which a large quantity of food is prepared and shared.

Ark shells (*Anadara* spp., *kikoi*) live just under the substrate close to mangrove areas. These mollusks are an important part of women's catches in Koror and Ngeremlengui states. Women walk along feeling for the shells with their toes. Some women can spot the small hole made by the clams. Once found, the women pick up the shells with their feet or stoop to pick them up with their hands.

Women occasionally collect a small sand clam they call *chesechol*. This species (*Atactodea striata*) lives on sandy beaches at the level where waves break. These tiny clams are an important subsistence species for some of the women living on the east side of Ngaraard where there are long stretches of sandy beaches. Women can collect several hundred of these clams in a few hours. They usually collect this clam when they cannot go further into the water because of storms, pregnancy, or because they have small children to watch.

Women also occasionally collect tiger cowries (*Cypraea tigris*, *buich*), spider shells (*Lambis lambis*, *sang*), nut clams (Nuculacea, *delbekai*), and marine snails (*Nerita* spp., *delsangel*) while reef gleaning. The cowries and spider shells can be found on the reef flat at low tides. The nut clams are often found when the women are collecting ark shells near mangrove areas. The marine snails are found living on rocks, especially along the shoreline of the small islands in the Rock Islands. These mollusks are collected solely for subsistence use.

Urchins

Both long- and short-spined urchins are collected from the reef flats. The short-spined urchin called *ibuchel* (*Tripneustes gratilla*) is generally found in large numbers with large ripe gonads in June. This is when the women collect as many as they can find. The long-spined urchin (*Diadema* sp., *choalech*) is collected with less frequency, although it is easier to find. The collection and processing of this urchin requires an entire day. Only one woman interviewed collects this species; however, she said she cannot collect enough to meet the demand of people who want to buy them. Several people search for an area where the urchins are abundant. Several hundred are collected with tongs and placed in a large chicken wire basket with a bamboo handle on either side. The filled basket is shaken underwater for several hours until the spines are broken off. Care is taken to ensure the spines float downstream with the current, away from those shaking the basket. The five gonads ("meat") from each of 12 to 18 urchins are placed in one large test and sold for \$2.50. The best time to collect these urchins is a day or two before the full moon, when the gonads are "fat." The processed long-spined urchins received the highest market price of any of the species sold by the women interviewed: approximately \$125 per sale.

SPECIALIZED REEF GLEANING

Olengimes: Sea Cucumber Collection

Reef gleaning generally involves the collection of many different species at a time, but women often wish to collect only one species. Some species require special methods for their collection, and hence it is more efficient for women to focus on collecting just one species at a time, as with the long-spined urchin. Some species are simply required in large amounts. There are specific Palauan terms for several popular specialized methods of collection that could otherwise be considered gleaning.

When women focus on the collection of the sea cucumber, *Stichopus variegatus* (*ngimes*), the method is termed *olengimes*. *Ngimes* is found in seagrass beds in the inshore areas. The Palauan name, *ngimes*, means "to stretch," which is exactly what this sea cucumber does if it is held too long. It is collected for food as well as for bait for handlining. Since the internal organs are the preferred parts for consumption, *ngimes* are collected during the early morning low tide (*bor*), before they have eaten and are still free of sand. The sea cucumber is cut in two, the gut is removed, and the two pieces of the body wall are thrown back

in the water where they will regenerate. Women sell the internal organs in local markets by the pint or quart. Usually the viscera of 20 animals are needed to make one pint. One woman commented that this species used to be popular only among older people, but now young people enjoy the taste as well.

The women know that both halves of the cut sea cucumber will regenerate into a complete organism. In areas where they are often collected, many small individuals can be found. Some women believe that *ngimes* tastes better if it has come from animals recently cut in half. If the *ngimes* from an area have never been collected by this method, some people complained of a bad aftertaste. If this is the case, collecting this species on a regular basis and returning the opened animals to the sea is practically a farming operation.

Omatairimd: Sea Cucumber Collection

Omatairimd is the name of the method used to collect the sea cucumber *irimd*. This species is collected for subsistence use during low tide within *Enhalus* seagrass beds where *Halimeda* is also common. Women bring a bucket, fresh water, and salt to the gleaning area. The women usually keep the collected sea cucumbers in a basin of seawater so the animals do not disintegrate. The women put the animals in a basket, add salt (traditionally ashes, *chab*, were also added), and rub and shake the basket against a rock to remove the slime covering the sea cucumbers' skin. When the sea cucumbers turn white, they are clean and are said to taste better. They are rinsed in seawater and put in a bucket of freshwater prepared with amra fruits (*Spondias pinata*, *titimel*) or vinegar.

MENGDUUL: MANGROVE CLAM COLLECTION

The collection of the thin-shelled mangrove clam (*Anodontia* sp., *ngduul*) is arguably the prototypical women's marine collection activity in Palau. The mangrove clams live a few feet deep in the mud in and around mangrove forests. Palauan women go out to collect this species (a process called *mengduul*) mostly during neap tides (*mengeai*). The women, submerged in the mud with water up to their chests, feel for the clams with their feet. When the tide is too low and the mud is not wet enough to dig in easily, the women dig a pool within the mud to allow some water to flow into the area. This makes the mud more manageable and the women can then wade inside the pool to feel for the clams with their feet.

The women usually go in groups of two to five to *ongduoll*, the gleaning areas for mangrove clams. The best mangrove clam spots are said to be small inlets in the mangroves (*dermetaoch*), the edge of the mangroves (*lalou*), and pools in the mangroves (*uet*) in areas near seagrass beds. The mangroves at Ngesaol in Koror contain all three types of *ongduoll*, which is rare in other areas around Palau.

Some women described a technique they use to manage and conserve their mangrove clam resources. These women will collect clams from only one side of the area they select, working their way towards shore or away from shore depending on the direction of the current. If the tide is coming in, they will go

all the way inside the mangroves (*uchul a ducher*) and collect as they move towards the sea. Thus, the ungleaned areas will not be disturbed by sediments from their digging that are pushed by the tide. The next time they visit a previously worked area, they collect from the undisturbed side of the spot. Usually mangrove clams take a few months to reach marketable size, so conscientious women wait three to six months before returning to an area to harvest the clams.

Mangrove clams are a major commercial species. All local markets, as well as several restaurants, buy and sell them. Generally, clams larger than 5 cm are sold to the markets; smaller clams or those with broken shells are kept for family use. Mangrove clams are collected mostly by women older than 40 years of age (*maas*). Younger women voiced a dislike of the hard, dirty work involved in this clam's collection.

CRAB COLLECTION

Land Crabs

The land crabs, *Cardisoma hirtipes* and *C. carnifex*, are generally called *rekung* in Palau. However, other names such as *rekung el daob*, *rekung el beab*, and *kakum* are also used. Land crabs make burrows in the forest floor 30 to 180 cm in length with a depth that depends on the water table. The crabs emerge from their burrows at night or during long, heavy rains—when they are collected by the sackful. Women from the southern states of Airai and Koror collect the crabs from the Rock Islands during the few days around the full moon, especially in the summer, when the females are “fat” with eggs. Women from Ngaraard can collect the crabs easily year round from local forests. Ngaraard is the primary source of land crabs caught for commercial purposes according to the women in the states interviewed during this study. Johannes (1981) described land crab collection in the islands of Angaur and Peleliu, which are the states responsible for the majority of land crabs sold in restaurants and markets in Koror.

Coconut Crabs

When coconut crabs (*Birgus latro*, *ketat*) are caught using bait, the Palauans call the method *omekang*. This crab is generally collected by men. However, occasionally women go with their husbands or with friends to collect this crab. Only two of the women interviewed said they trap coconut crabs on their own. Coconuts are most often used for bait. A coconut is cut in half and hung from rocks or trees where crabs are likely to be. The bait is set early in the evening and visited every two hours. The Palauans catch the crabs when they come out of hiding to eat the bait. Some collectors use ground coconut, saying that it will keep the crabs out of their holes longer as they try to eat the small crumbs. Coconut crabs can also be caught when the fruit of the seeded breadfruit tree (*Artocarpus marianensis*, *ebiei*) and the football fruit tree (*Bangius edule*, *riamel*) are ripe. The crabs are attracted to the ripe, fallen fruits of these trees.

Mangrove Crabs

Besides an occasional find by some of the women collectors, only one of the interviewed women regularly collects mangrove crabs (*Scylla serrata*, *chemang*)

by trapping. Traps are made of chicken wire or plastic mesh with a height and diameter of 75 cm and a length of 90 cm. They are set along the mangrove channels and at the outside edge of the mangroves. The woman traps during the new moon when the winds are from the west. She visits her traps during the morning high tide when these areas are accessible by bamboo raft. She adds fresh bait (fish: skipjack tuna, shark meat, or canned mackerel) each time she goes to the traps. She catches an average of eight crabs per trip. Sometimes she snares 15 crabs from the 12 traps she and her husband own. Since her husband only helps with the crab trapping occasionally, she regularly visits and collects the crabs herself and sells them in markets and one hotel in Koror.

In addition to these crab species, women often collect the swimming crab (*Portunus pelagicus*, *kmai*) while reef gleaning or while fishing at night with a flashlight and a spear. This crab is collected entirely for subsistence use. More than half of the women interviewed (all of those who collect this species on a regular basis) remarked that this crab is harder to find now than it was in the past.

FISHING

In addition to collecting invertebrates, a number of women collect fish. Men are the predominant fish catchers in Palau, however, women are beginning to capitalize on the rich local fish resources. A few women own their boats and fish independently. However, the majority of women who said they fish accompany their husbands or other male relatives for fishing expeditions. Those species of fish most often mentioned by the women interviewed are listed in Table 4. For brevity, only common and Palauan names are used in the description that follows. For additional Palauan fish names see Helfman & Randall (1973) and Snyder et al. (1982). The species collected by most women are slightly different from those collected by most men, because women and men use different fishing techniques and fish in different areas. Men, for instance, generally travel by boat to relatively

Table 4. Fish most often caught by Palauan women. Listed in order of importance in the women's catches.

Common name	Scientific name	Palauan name
yellow-stripe emperor	<i>Lethrinus nematacanthus</i>	<i>chudech</i>
groupers	<i>Anypardon</i> spp., <i>Epinephelus</i> spp.	<i>temekai</i>
humpback snapper	<i>Lutjanus gibbus</i>	<i>keremlai</i>
rabbitfish	<i>Siganus canaliculatus</i> , <i>S. fuscescens</i>	<i>meas</i>
lined rabbitfish	<i>Siganus lineatus</i>	<i>klesebuul</i>
yellow-cheeked tuskfish	<i>Choerodon anchorago</i>	<i>budech</i>
emperor	<i>Lethrinus</i> sp.	<i>metengui</i>
yellowlip emperor	<i>Lethrinus xanthochilus</i>	<i>mechur</i>
longnose emperor	<i>Lethrinus miniatus</i>	<i>melangmud</i>
Pacific longnose parrotfish	<i>Hipposcarus longiceps</i>	<i>ngiaoch</i>
red snapper	<i>Lutjanus bohar</i>	<i>kedesau</i>
spinecheeks	<i>Scolopsis</i> sp.	<i>chibars</i>

deep spots within Palau's barrier reef. They catch fish with spearguns or by trolling, and are more likely to catch parrotfish, large wrasses, and pelagic fish such as tuna and mackerel (Division of Marine Resources 1991). On the other hand, women usually stay closer to shore and use handlines or nets. The fish they catch are generally smaller than those of the men.

Handlining

Women go handlining during the day with their children or with other female friends and relatives. During low tide, women wade in the nearshore water to fish in deep, blue pools within the inner reef flat (*lemau*) and in the shallow pools within the exposed areas nearshore (*lkes* or *chis*). Bamboo rafts or canoes are used to reach more distant fishing areas within the barrier reef, whatever the level of the tide. Sometimes the women collect the sea cucumber *ngimes*, as they walk along, saving the viscera for bait. The most commonly caught species are small emperors, especially *chudech*, *mechur*, *chibars*, and *budech*. All of the interviewed women who fish with handlines during the day keep their catch for subsistence use.

Women who accompany their husbands or who are able to fish in groups by boat can reach more distant fishing grounds and can catch more and larger fish. These fishing trips occur both during the day and at night. When women fish with handlines from boats, they prefer to use skipjack tuna, which is usually bought in the markets, and small fish, squid, and octopus that they have caught, for bait. The species most often caught are snappers, emperors, and groupers: *chudech*, *keremlal*, *temekai*, *melangmud*, *kedesau*, *mechur*, and *metengui*. Of the 32 women who said that they went handlining, 20 generally fish from motorized boats. Nineteen of the 20 women who fish from boats sell their catch, either fresh, smoked, or fried, to the markets in Koror.

Meluich: Night Fishing

At night, women use flashlights or lanterns and long-handled spears to catch fish. Traditionally, torches of dried coconut leaves were used. Women spear fish inside the barrier reef in the nearshore areas during the low tides at night, especially when there is a new moon during the summer. This method is called *meluich*. One woman interviewed remarked that the most fish could be caught with this method in November and December. Women usually go on foot or use bamboo rafts. Women seldom sell their catch, but instead keep it for relatives.

Kesokes

The *kesokes* method requires barrier nets that are set for a length of 150 to 300 m along the nearshore area. *Kesokes* are usually set from boats or rafts, when the tide has fallen half way down. Fish that feed inshore and in the mangroves are trapped by the net when they try to return to deeper water when the tide falls completely. Women involved in this fishing method accompany their husbands or other fishermen who own the nets. This type of fishing is practised all year long, but most commonly during the summer low tides and during the two

spawning seasons of the rabbitfish (the main season lasts from February to May and a less important season occurs in July). Johannes noted that once the imported barrier nets replaced the traditional leaf sweeps, rabbitfish became the most important catch in Ngeremlengui, the area he studied with a masterfisherman (1981:17). Four women catch fish with their husbands using *kesokes*. Most of the catch is sold to the markets and a small percentage is kept for family use.

Sometimes when a fisherman sets the net nearshore, young women and children who are gleaning nearby help by spearing the fish and gathering them from the net. This activity is called *mengesiau* and the participants that help the fisherman collect the fish can bring some home for their own families.

Surround Net

Surround nets are used in areas where schools of fish are usually seen. They are set in front of rocks where the fish are known to exit when they head for deeper waters. The bag of this long net is set in front of the rocks with its open end facing inshore. Fish are chased from either end of the net and trapped in the bag. Only one of the interviewed women uses this method. She is unique in that she owns her own boat and nets. If not accompanied by men, she fishes with two or three other women. The catch is distributed among them for family use.

Spearfishing

One woman of the 54 interviewed uses a speargun to catch fish. This is almost exclusively a male pursuit in Palau, where some of the region's most sought after spearguns are made. The survey team learned through additional, informal inquiries that a very few women use spearguns to catch fish. Those who do, usually have their own boat and gear. Most women who spearfish, apparently do so alongside their husband or other male as a recreational activity.

Bidekill: Cast Net

One of the women interviewed uses a cast net (*bidekill*) to catch small fish. This circular net has small weights at its edge that sink and trap fish underneath once the net is thrown. This woman catches small, schooling fish such as herring (*Herklotsichthys* sp., *mekebud*) for subsistence use or for bait. She catches an average of 10 pounds of fish per trip. Very few women are said to fish regularly with this method; however, a few older women apparently use their husband's cast nets to catch fish for subsistence use.

Conclusion

Palauan women use the local marine resources to both earn money and to feed their families. The women collect numerous species by walking or by paddling rafts to known collecting sites. They know where and when to find certain species, and how to catch them. The older women commented that many of the younger women are not practising some of the more time-consuming, traditionally female marine pursuits, especially the collection of mangrove clams. In ad-

dition, several times during the interviews, it appeared that some of the older women had some memory of other species that they used to collect. Much of the special knowledge required to collect many of these species has been lost as there is less interest in the younger generation for such traditional lore. Store bought processed foods have become standard in most Palauan households. Also, Palauan women are increasingly holding full- and part-time jobs that leave little time for them to collect their own seafood.

Many of the women interviewed during the course of this study also voiced concern about degradation of the marine environment and species that are becoming increasingly harder to find. Coral dredging for use in road construction and coastal development have led to increased siltation in several nearshore areas that women use for invertebrate and small fish collection. The impacts of this siltation are currently being analyzed by the Division of Marine Resources. In addition, women noted that giant clams, urchins, mangrove clams, and the small swimming crab (*kmai*) are becoming scarcer. National and regional campaigns are underway to protect such commercially important species as giant clams. However, care must be taken not to ignore the pressure on less visible species—especially those not counted as part of commercial fish and non-fish landings. Many of the species that the women in Palau collect are easily overexploited, especially in the more populous areas around Koror. Management plans must include provisions for species collected for subsistence purposes as well as mechanisms to include the women in the process of conserving and protecting the marine resources of the area.

Acknowledgments

This work was supported by the University of Oregon Micronesia Program (Eugene, Oregon), the Food and Agriculture Organization's Regional Fishery Support Programme (Suva, Fiji), and the Palau Job Training Partnership Act. The authors wish to thank the staff of the Division of Marine Resources, especially Noah Idechong and Ann Kitalong, for their guidance; Courtland Smith and Jefferson Gonor of Oregon State University and Peter Newell of the University of the South Pacific for their editorial comments; and the two anonymous reviewers who helped with invertebrate taxonomy.

References

- Chapman, M. D. 1987. Women's fishing in Oceania. *Human Ecology* 15 (3):267-288.
- Des Rochers, K. 1992. Women's fishing on Kosrae: A description of past and present methods. *Micronesica* 25:1-22.
- Division of Marine Resources. 1991. 1990 Annual Report. Ministry of Natural Resources, Bureau of Resources and Development, Koror, Palau.
- Helfman, G. S. and J. E. Randall. 1973. Palauan fish names. *Pacific Science* 27 (3):136-153.
- Johannes, R. E. 1981. *Words of the Lagoon: Fishing and Marine Lore in the Palau District of Micronesia*. University of California Press, Berkeley, CA.

- Klee, G. A. 1976. Traditional time reckoning and resource utilization. *Micronesica* 12:211-246.
- Klee, G. A. 1980. Oceania. *In* G. A. Klee (ed.), *World Systems of Traditional Resource Management*, pp. 245-281. John Wiley and Sons, New York.
- Kramer, A. 1917. Palau. *In* G. Thilenius (ed.), *The results of the South Sea expedition of 1908-1910 Vols III and IV*. Friedrichsen & Co. Hamburg.
- Lal, P. N. & C. Slatter. 1982. *The Integration of Women in Fisheries Development in Fiji: Report of an ESCAP/FAO Initiated Project on Improving the Socio-economic Condition of Women in Fisherfolk Communities*. Fisheries Division, Ministry of Agriculture and Fisheries, Fiji.
- Matthews, E. 1993. Women and fishing in traditional Pacific island cultures. *In* *Workshop on People, Society and Pacific Islands Fisheries Development and Management: Selected Papers*, pp. 29-34. Technical Document No. 5, South Pacific Commission, Noumea, New Caledonia.
- Matthews, E. & E. Oiterong. 1991. *The Role of Women in the Fisheries of Palau*. MRD Tech. Rpt. No. 91.10. Division of Marine Resources, Koror, Palau.
- Munro, John L. 1993. Giant clams. *In* A. Wright & L. Hill (eds), *Nearshore Marine Resources of the South Pacific*, pp. 431-449. Institute of Pacific Studies, University of the South Pacific, Suva, Fiji.
- Myers, R. F. 1989. *Micronesian Reef Fishes*. Coral Graphics, Guam.
- Schoeffel, P. 1985. Women in the fisheries of the South Pacific. *In* *Women in Development in the South Pacific: Barriers and Opportunities*, pp. 156-175. Development Studies Centre, Australian National University, Canberra.
- Snyder, D., K. Blaiyok, D. Mobel & R. Metes. 1982. *Ngikel: an alphabetical index of fish by Belauan name*. On file at the Center for Archaeological Investigations, Southern Illinois University.
- Yamaguchi, M. 1989. *Report on a baseline study for fisheries development in Oceania, with special reference to sedentary organisms on coral reefs and lagoons*. Japan International Cooperation Agency.