



# Local Knowledge about Dugongs in Palau



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# Introduction

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The Palau Conservation Society was contracted by The Nature Conservancy to conduct interviews with people knowledgeable about Palauan dugongs (*Dugong dugon*), known locally as *mesekiu*. The goal of the interviews was to obtain local knowledge about the habits, status and uses of dugongs in Palau. What comes through as a result of these interviews are some of the commonly held perceptions about dugongs in Palau, as well as some information about their preferred habitats and recent behaviors. The history of dugong hunting, uses and cultural value were also subjects of the interviews, enabling a comparison of some of the perceptions of changes that have occurred over time.

Palau is home to the only dugong population in Micronesia, although the animals are occasionally sighted near Yap and Guam (Marsh 2002). Palau's is the most isolated population of dugongs in the world. This makes Palauan dugongs especially vulnerable, since the population probably cannot be replenished from outside populations.

Dugongs are vegetarians and their diet consists almost completely of seagrasses. They prefer to eat certain kinds of seagrasses and occasionally will eat other kinds of marine algae. Their preferred habitats are shallow bays, mangrove channels, tidal areas of some rivers and deeper waters offshore where there are seagrass beds. They have been known to move large distances between one seagrass bed and another (Marsh 2002).

Dugongs are culturally important in Palau. They are one of four animals (dugong, shark, stingray and sea turtle) that symbolize the strength and values of the traditional leadership system (Palau Society of Historians 1998). Traditionally, one of three dugong bones was used to make a bracelet (called *olecholl*): skull or forehead was for the *rubaks* (chiefs) of lowest rank, the mid-section of the head was for the head *rubak* and the vertebrae between the head and neck was for men who had distinguished themselves by some brave deed (Krämer 1919). A great deal of pain accompanied the placement of one of the vertebrae bracelets on the wearer's wrist - the bones in the hand or fingers were broken and skin was torn off as the bones were too small for most men's hands. Wearing such a bracelet was a sign of prestige and high rank. Today the bracelets have lost much of this traditional prestige and are occasionally seen worn as accessories by young women.

The dugong was also used symbolically in the inaugural feasts of the four highest ranking *rubaks* in the form of large dugong-shaped sweets made from Tahitian almonds (*miich*) mixed with coconut syrup. These sweets, called *debechel miich el mesekiu* or *Debechellir ar Rubak*, were very large and took many days to prepare. They were brought to the *bai* to be divided symbolically among the *klobak* (highest chiefs) (Palau Society of Historians 1998). This practice continues for the inaugural feasts of the high chiefs in some areas in Palau to this day.

Dugongs were hunted for their meat. Traditionally, only the wealthiest people could afford the nets or the purchase of the meat. The capture of a dugong with traditional gear was difficult and brought the successful hunter a great reputation (Krämer 1919). During World War II, dugongs were hunted extensively by Japanese troops as well as Palauans hungry for food. Explosives left in Palau after the war became popular weapons for dugong hunting (Brownell et al. 1981).

Legislation banning the hunting or taking of dugong was first imposed by the Japanese administration in the early 1930s. A Palau District Order (US Trust Territory) protected dugongs in the early 1950s. Today, the hunting or possession of dugong is prohibited by Palau national law. In 2002 the fines were increased significantly and the registration of dugong bracelets was made mandatory. The fines for possessing or hunting dugong rose from \$500 to \$5,000. This change in the law occurred one month before these interviews began. As a result, it was very difficult to obtain honest answers to questions about current dugong hunting activities. Many of the people interviewed were very wary about talking about the extent of hunting activities that may be taking place. It is generally known that dugongs are still hunted for an elite group of people in Palau.

This study on local knowledge of dugongs provides some insight into the perceptions held by some people in Palau about dugongs. The people interviewed for this study are those who are locally known to have some knowledge about dugongs. Their observations about dugong behavior and perceived threats

provide depth to the biological surveys that were conducted in June 2003 to assess the status of dugongs in Palau.

# Methods

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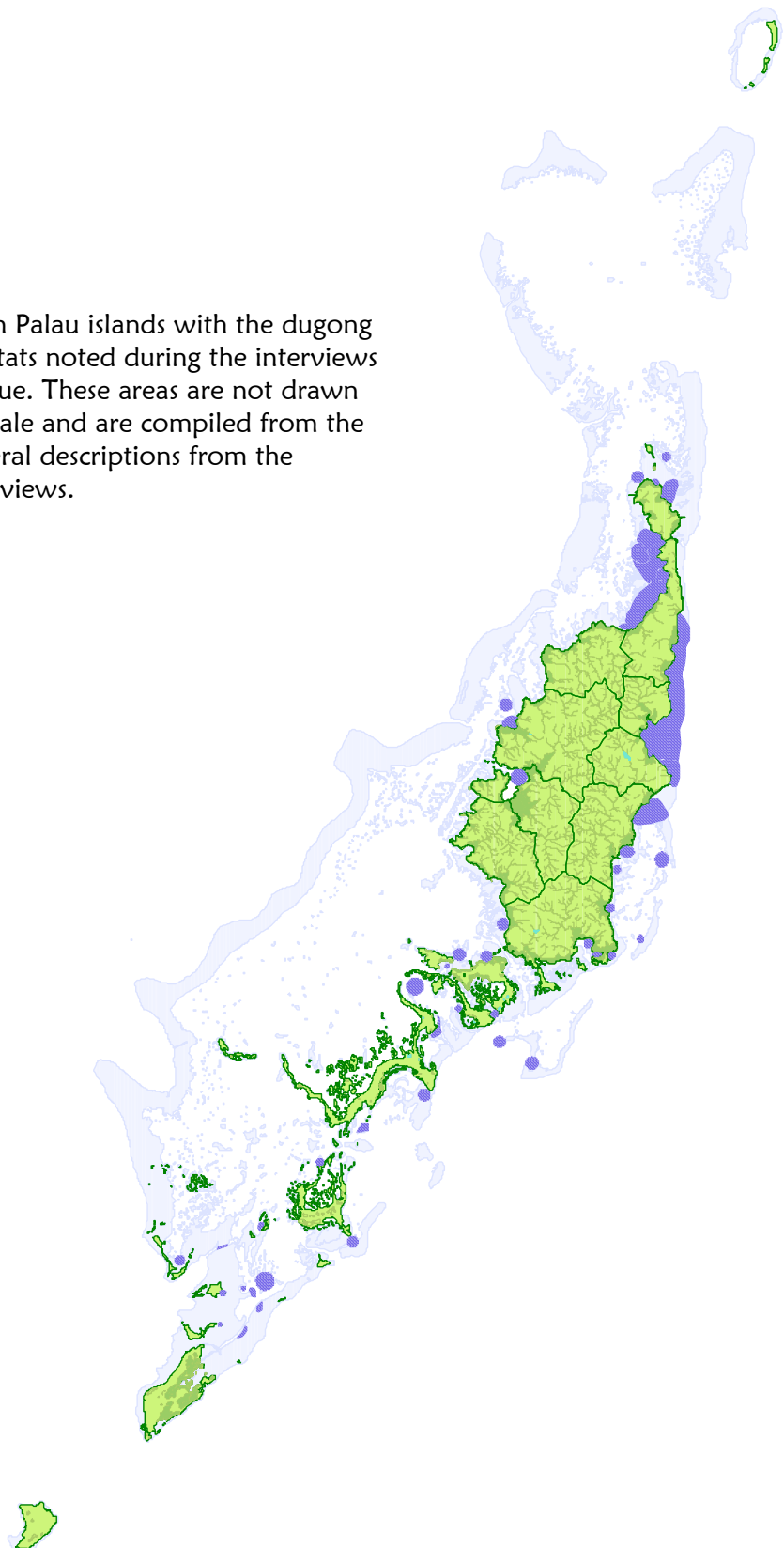
A total of 47 men were interviewed from December 2002 to February 2003. These men were known to be knowledgeable about dugongs - mostly through their experience as fishermen and hunters. A team of one or two interviewers visited the men at their homes or in meeting areas and asked questions from a written questionnaire (see page 19). The men were also encouraged to refer to topographic maps to locate the places where dugongs are frequently seen. Interviews generally took an hour or less.

The number of interviews that were conducted in each of 14 of Palau's 16 states are shown in Table 1 below. States with known dugong populations were surveyed, as well as Angaur and Kayangel which are known to have occasional sightings, but no resident population of dugongs.

Aimeliik	1
Airai	5
Angaur	1
Kayangel	2
Koror	7
Melekeok	5
Ngaraard	5
Ngarchelong	2
Ngardmau	1
Ngaremlengui	2
Ngatpang	2
Ngchesar	5
Ngiwal	2
Peleliu	6
<b>Total</b>	<b>47</b>

The results of the interviews were compiled in a database and processed into tabular form. The results are based on qualitative information from fishermen and as such are not reliable to determine the actual number of dugongs in Palau, although some rough estimates can be extrapolated from the responses.

Main Palau islands with the dugong habitats noted during the interviews in blue. These areas are not drawn to scale and are compiled from the general descriptions from the interviews.



# Results and Discussion

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## Distribution, abundance and general behavior

Dugongs have been spotted in the past year in 12 of the 14 states where interviews were conducted (Table 2).<sup>1</sup> Dugongs were not seen by the men interviewed in Angaur and Ngardmau. The states where the most dugongs were seen, with the average numbers in parentheses, are: Ngaremlengui (13), Koror (12), Ngaraard (10) and Aimeliik (10). The total number of dugongs seen (averaged by states) was 70. The map on page 4 shows the general areas that were indicated by the men as places that dugongs were seen recently.

Table 3 lists the size estimates (in feet) by state. The average for all states is 9 feet. The sizes estimated ranged from 7 feet (Airai) to 15 feet (Ngaraard). Adult dugongs are typically no more than 11 feet in length (Carpenter and Niem 2001).

Table 4 lists the numbers of calves seen averaged by state. A total of 10 calves were seen in all states. Calves were seen in Koror, Melekeok, Ngaraard, Ngarchelong, Ngaremlengui, Ngatpang, Ngchesar and Peleliu. The most calves were noted in Ngarchelong (3), Ngaremlengui (3) and Koror (2).

Most of the men interviewed (53%) thought that dugongs were close to their states all year long (Table 5). Many of the men had seen the dugongs more than 5 times in the past year

(43%) (Table 6). The states where they were sighted more than 5 times are:

Aimeliik	Ngarchelong	Ngiwal
Koror	Ngaremlengui	Peleliu
Melekeok	Ngatpang	
Ngaraard	Ngchesar	

Most of the men (77%) had not seen the dugongs feeding (Table 7). Those states where they were seen feeding were:

Airai	Ngarchelong
Koror	Ngaremlengui
Melekeok	Ngchesar
Ngaraard	Ngiwal

Table 8 summarizes the sites mentioned during the interviews as important feeding or resting habitat for the dugongs. In addition, areas where large groups of dugongs were seen either one year ago or up to five years ago, and places where dead or sick dugongs were seen are also indicated on this table.

## Changes over time

The men were asked if they had noticed if there were more or less dugongs compared to 5, 10 and 50 years ago (Tables 9 to 11). Most men (53%) said there were less dugongs compared to 5 years ago; although some men (32%) said there were more and 6% said there were about the same numbers. Most men (57%) said there were less dugongs compared to 10 years ago; some men (28%) said there were more and 6% said there were about the same numbers. Most men (57%) said there were less dugongs compared to 50 years ago;

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<sup>1</sup> All tables summarizing the interview results are collected at the end of this document, starting on page 10.

some men (28%) said there were more and 6% said there were about the same numbers.

There was a range of answers to questions about whether there were any changes in behavior (Table 12). Some men (37%) said the animals were wilder or smarter than they were before; some (30%) said they were tamer and some (6%) said they were in different areas.

The changes were mostly attributed in some way to boats (41%) or hunting (43%) (Table 13). Boat-related responses included increased boat use, boat noise, the dugongs are afraid of the boats and there are fewer boats. Hunting-related responses include past hunting, more hunting, less hunting and hunting with modern tools. Other responses included pollution and the implementation of laws that banned dugong hunting.

### Past uses for food

Most of the men (91%) said that dugong had been eaten in their state in the past (Table 14). Generally, dugongs were eaten less than once a year (62%) (Table 15). However, 11% of the men said that they were eaten more than once a month. Table 16 lists the responses to whether everyone could eat dugong. The intent of the question was to find out if there were any traditional taboos or restrictions on who could eat the meat, especially as it pertains to different ranks or social classes. However, 53% of the respondents said that the meat could be eaten by everyone and 25% said it could not. The reasons given for why people could not eat the meat were related to personal taste:

- ♦ story that dugong was a human stops some from eating the meat

- ♦ some don't like the meat
- ♦ women and small children don't like the meat.

A question (Table 17) about when dugong was eaten gave similar results: 60% of the people said dugong was eaten at anytime and 30% said it was eaten when it was caught. Only 4% of the men said it was eaten on special occasions.

### Present uses for food

The question about whether or not dugong was still eaten in the state gave more mixed results: 44% said yes and 43% said no (Table 18). Table 19 illustrates how reluctant the men were to discuss the current use of dugongs for food: 34% of the men said that dugongs are eaten less than once a year while 60% had no answer.

Many of the men (34%) did not know if the dugongs tasted differently at different times of the year and 53% said they did not taste different (Table 20).

### Past hunting activities

The majority of the men (74%) said that anyone could hunt dugongs in the past (Table 21). The most common hunting method was spear (60% of the responses) or *kadiosang* (a large pointed spear) (10%). Dynamite was also mentioned in 10% of the responses.

Preferred hunting targets are summarized in Table 23. Many of the men (32%) said that calves were the preferred target, 13% said males were preferred, 6% said males or

females were targets and 17% said there was no preference.

### Present hunting activities

Table 24 shows the responses to a question about whether dugongs are still hunted in Palau: 59% of the men said yes, 9% said no and 30% said they did not know. Again this indicates the reluctance of people to talk about current hunting activities.

Many of the men responded to the question about how dugongs are hunted now regardless of how they answered the previous question (Table 25). The responses to this question differed slightly from responses about how the animals were hunted in the past. The men said that now dugongs are hunted with spear (46%), speargun (17%), boat (11%), and/or dynamite (9%).

The preferred target appeared to be the same, according to the men that answered this

Explanation of value:
◆ valuable if they get bracelet
◆ everyone eats them
◆ in past bracelet showed high clan or lot of money
◆ too hard to find so not used in customs
◆ not common food, hard to catch, culture doesn't depend on them
◆ not like pigs, not easy to catch, people don't depend on them
◆ important to higher castes
◆ not important
◆ delicacy, before meat was distributed for special occasions and bone sold to high clan (delicacy was mentioned 23 times)
◆ not anymore because of laws (laws banning hunting mentioned 5 times)
◆ never was valuable
◆ delicacy for special occasion, chiefs don't wear bracelet
◆ they were, but not used now for customs

question (Table 26): 34% said calves are preferred, 11% said male or female, and 17% said there was no preference.

### *Olecholl* (bracelets)

Table 27 summarizes the responses to a question about whether the dugong bracelet (*olecholl*) was made in the local area in the past. Most of the men (70%) said that it was, 11% said no, and 13% did not know. The respondents said the bone for the bracelets were bought from someone in the village (38%), from another village (2%), from an animal that the carver hunted himself (9%), or all of the above (13%) (Table 28). Most of the men did not believe that the bracelets were still made in Palau (72%) (Table 29). However, again, many of the men either did not answer (15%) or did not know (11%).

### *Debechellir ar Rubak* (*mesekiu miich*)

Many of the men (57%) thought that the dugong made of *miich* nuts was still made in their state, 23% said it was not and 13% did not answer (Table 30). The states where the men say it is still made are:

Airai	Kayangel
Koror	Ngchesar
Melekeok	Ngiwal
Ngarchelong	Peleliu

### Cultural value

Most of the men interviewed (74%) felt that dugongs are not valuable in Palauan culture today. Only 11% thought that they were still valuable. The explanations given for their responses are shown in the box to the left.

## Conclusion

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Dugongs had great cultural significance in Palauan society. Historically they were difficult to catch with traditional tools and had great value in the society. Successful dugong hunting carried prestige and the wearing of a bracelet made of dugong bone indicated bravery or high status. Dugongs symbolized the values of the traditional leadership system.

Today much of their symbolism and value has been lost in Palauan society. They are no longer as difficult to catch as they once were. Spearguns, boats and dynamite make their capture much easier. In addition, Palauan men are no longer defined quite so much by their hunting and fishing ability.

Although many of the men were reluctant to discuss current hunting activities because of the recent change in laws regulating their capture, it is apparent that dugongs are still hunted in Palau. In addition, when they are hunted, there is some preference for the calves. Such selective hunting could be devastating to the future population of these animals.

A Palauan legend tells the tale of a young girl who disobeyed a cultural taboo and was banished from her village. As she ran away and jumped into the sea, she transformed into

a dugong. Some of the people who were interviewed stated that there are some Palauans who will not eat the dugong because of this story. They say that the dugong cannot be eaten because according to the legend they were human at one time.

The dugong population in Palau is small and isolated. They are very vulnerable to overexploitation. They may be threatened by other human activities and habitat loss as well. Boat traffic has increased in areas where dugongs feed or rest and they appear to be more wary of boats in some areas. There have been reports of dugongs being hit and injured by boats. Dredging and other land-based activities may be having a negative impact on the nearshore habitats that dugongs depend on as well.

The protection of certain sites in Palau, especially rich seagrass beds, may help in the protection of dugongs. Some of these important habitats, for instance Ngederak in Koror and Ngelukes in Ngchesar, are already under some form of protection. Other areas may need to be protected as well in order to ensure the survival of this unique and vulnerable species.

## Acknowledgements

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# Interview results summary tables

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## Distribution, abundance and behavior

Table 2. Average number of dugongs seen by state	
<i>State</i>	<i>number</i>
Aimeliik	10.0
Airai	1.0
Angaur	0
Kayangel	0.5
Koror	12.3
Melekeok	5.4
Ngaraard	10.3
Ngarchelong	4.3
Ngardmau	0
Ngaremlengui	13.0
Ngatpang	3.0
Ngchesar	3.2
Ngiwal	3.5
Peleliu	3.5
Total for all states	70.0

Table 3. Average size (ft) of dugongs by state	
<i>State</i>	<i>number</i>
Aimeliik	10.0
Airai	7.0
Angaur	-
Kayangel	8.0
Koror	8.0
Melekeok	10.5
Ngaraard	15.0
Ngarchelong	8.0
Ngardmau	-
Ngaremlengui	10.5
Ngatpang	8.0
Ngchesar	9.8
Ngiwal	8.0
Peleliu	8.3
Avg for all states	9.3

Table 4. Average number of calves seen by state	
<i>State</i>	<i>number</i>
Aimeliik	0
Airai	0
Angaur	0
Kayangel	0
Koror	2.2
Melekeok	0.3
Ngaraard	1.0
Ngarchelong	2.7
Ngardmau	0
Ngaremlengui	2.5
Ngatpang	1
Ngchesar	0.4
Ngiwal	0
Peleliu	0.2
Total for all states	10.0

Table 5. Do you think they are here all year long?		
	<i>number</i>	<i>%</i>
yes	25	53
no	4	9
territorial	1	2
migrate	1	2
don't know	10	21
no answer	6	13
Total	47	

Table 6. How often have you seen them in the past year?		
	<i>number</i>	<i>%</i>
0 times	5	11
1 time	10	21
2 times	1	2
2-5 times	5	11
> 5 times	20	43
don't know	1	2
no answer	5	11
Total	47	

Table 7. Have you seen them feeding?		
	<i>number</i>	<i>%</i>
yes	9	19
no	36	77
no answer	2	4
Total	47	

Table 8. Important dugong habitats and sighting areas.

<i>Site Name</i>	<i>State</i>	<i>Sighted</i>	<i>Feeding</i>	<i>Lg Group 5yrs ago</i>	<i>Lg Group 1yr ago</i>	<i>Sick or Dead</i>	<i>No Longer Seen</i>	<i>Sleeping</i>
Badsch e mark	Aimeliik	x						
Bkul rengesukl	Aimeliik	x					x	
Etebtel a kiangs	Aimeliik	x					x	
Medal a toach ra medorm	Aimeliik	x						
Bkul a chemelochl	Airai						x	
Bkul chomelochel	Airai						x	
Btil ngebas	Airai						x	
lasumba	Airai	x					x	
Beab	Koror	x						
Belaot	Koror	x						
Betaat	Koror	x	x					
Bkul a esmiich	Koror	x						
Chol	Koror	x						
Echang	Koror	x						
Ewid lechol	Koror	x						
Kesebeku	Koror	x						
Koror dock	Koror						x	
Mantekang	Koror	x					x	
Mantekang tabelrakl	Koror	x						
Ngederak	Koror	x		x	x			
Ngemelis	Koror	x						
Ngerchelengael	Koror	x						
Ngerdeliches	Koror	x						
Ngeremdiu	Koror	x						
Omkang	Koror	x						
Tabelrakl	Koror	x						
Arngerang	Melekeok							x
Bkul a bkong	Melekeok	x						
Chesengel	Melekeok	x		x				
Chis ra ngai	Melekeok	x						
Mekerel	Melekeok	x	x					
Meteu a toachel	Melekeok	x	x	x				
Ngebloi	Melekeok	x						
Ngerak	Melekeok	x						
Ngermecheluch	Melekeok	x						
Ngerutoi	Melekeok	x						
Ngibtal	Melekeok							x
Sebong	Melekeok	x						
Toachel a cheseng	Melekeok	x	x					
Ched el dil	Ngaraard	x						
Medal choll	Ngaraard						x	
Ngerkeliks	Ngaraard	x						
Ngidil uet	Ngaraard	x	x					

Table 8. Important dugong habitats and sighting areas.

<i>Site Name</i>	<i>State</i>	<i>Sighted</i>	<i>Feeding</i>	<i>Lg Group 5yrs ago</i>	<i>Lg Group 1yr ago</i>	<i>Sick or Dead</i>	<i>No Longer Seen</i>	<i>Sleeping</i>
Oketol	Ngaraard	x						
Btil a rikr	Ngarchelong	x						
Ngerchur	Ngarchelong	x						
Ngetmel	Ngarchelong	x						
Oketol	Ngarchelong	x	x					
Ngertuker	Ngardmau	x						
Mutukr	Ngaremlengui	x						
Subungl	Ngaremlengui	x						
Uluiul	Ngaremlengui	x						
Usas el mor lild	Ngaremlengui	x						
Ngeraul bay	Ngatpang	x						
Ngeremduu	Ngatpang	x						
Bkul a ngetchuil	Ngchesar	x						
Bkul ngetchuil	Ngchesar						x	
Btelul a change ra rai	Ngchesar	x						
Btil ngebas	Ngchesar	x						
Kliis	Ngchesar	x						
Krel rutoit	Ngchesar						x	
Ngebiul	Ngchesar	x						
Ngedesang	Ngchesar	x						
Ngelukes	Ngchesar	x						
Rael raus	Ngchesar	x	x					
Uchul a ngemrong	Ngchesar	x						
Iasumba ra ngkeklau	Ngiwal	x						
Mekaib	Ngiwal	x	x					
Ngebedchal	Ngiwal	x						
Ongil	Ngiwal	x						
Aerial survey (80)	Peleliu			x				
Belngel a sebs	Peleliu						x	
Beluul a smau	Peleliu	x						
Bkul a obechad	Peleliu	x					x	
Bkul a sang	Peleliu	x						
German channel	Peleliu	x						
Madecholl	Peleliu						x	
Medal a todai	Peleliu	x						
Ngchesau	Peleliu	x						
Ngerchong	Peleliu	x						
Ngeruchebetang	Peleliu						x	
Ochadu	Peleliu	x						
Olukam	Peleliu	x						
Omekang	Peleliu	x						
Sebesb	Peleliu	x						

## Changes over time

Table 9. Are there more or less <i>mesekiu</i> around here compared to 5 years ago?		
	<i>number</i>	<i>%</i>
more	15	32
less	25	53
about the same	3	6
don't know	2	4
no answer	2	4
Total	47	

Table 10. Are there more or less <i>mesekiu</i> around here compared to 10 years ago?		
	<i>number</i>	<i>%</i>
more	13	28
less	27	57
about the same	3	6
don't know	2	4
no answer	2	4
Total	47	

Table 11. Are there more or less <i>mesekiu</i> around here compared to 50 years ago?		
	<i>number</i>	<i>%</i>
more	13	28
less	27	57
about the same	3	6
don't know	2	4
no answer	2	4
Total	47	

Table 12. Have you noticed any changes in any ways <i>mesekiu</i> behave?		
	<i>number</i>	<i>%</i>
tame	14	30
wild (smart)	17	37
very wary	1	2
afraid of boats	1	2
in different areas	3	6
always running	1	2
harder to find	1	2
no changes	1	2
yes	1	2
don't know	3	6
no answer	4	9
Total	47	

Table 13. Why have these changes happened?		
	<i>number</i>	<i>%</i>
boat use	11	20
more boats (afraid of them)	9	16
few boats	2	4
boat noise	1	2
<i>all boat related responses</i>	<i>23</i>	<i>41</i>
past hunting	5	9
more hunting	5	9
less hunting	11	20
hunting with modern tools	3	5
<i>all hunting related responses</i>	<i>24</i>	<i>43</i>
laws implemented	2	4
pollution	1	2
don't know	3	5
no answer	3	5
Total (multiple answers)	56	

## Past use for food

	<i>number</i>	<i>%</i>
yes	43	91
no	1	2
don't know	2	4
no answer	1	2
Total	47	

	<i>number</i>	<i>%</i>
≤ 1/year	29	62
> 1/year	3	6
1/month	1	2
> 1/month	5	11
when caught	1	2
not often	1	2
no answer	7	15
Total	47	

	<i>number</i>	<i>%</i>
yes	25	53
no	12	25
don't know	5	11
no answer	5	11
Total	47	

	<i>number</i>	<i>%</i>
anytime	28	60
when caught	14	30
special occasions	2	4
not since 1959	1	2
no answer	2	4
Total	47	

## Current use for food

	<i>number</i>	<i>%</i>
yes	21	44
no	20	43
don't know	4	9
no answer	2	4
Total	47	

	<i>number</i>	<i>%</i>
≤ 1/year	16	34
> 1/year	0	0
1/month	1	2
> 1/month	0	0
when caught	1	2
not often	0	0
don't know	1	2
no answer	28	60
Total	47	

	<i>number</i>	<i>%</i>
yes	1	2
no	25	53
don't know	16	34
no answer	5	11
Total	47	

## Past hunting activities

Table 21. In the past, could anyone hunt *mesekiu*?

	<i>number</i>	<i>%</i>
yes	35	74
no	6	13
don't know	2	4
no answer	4	9
Total	47	

Table 22. How were they hunted in the past?

	<i>number</i>	<i>%</i>
spear	33	60
<i>kadiosang</i> (spear)	6	10
dynamite	6	10
net	3	4
speargun	1	2
gillnet	1	2
rifle	1	2
rope	1	2
spotlight	1	2
<i>beroel</i> (1-prong spear)	1	2
trap	1	2
<i>dilkork</i> (hibiscus fiber net)	1	2
Total (multiple answers allowed)	56	

Table 23. Was there a preferred target in the past?

	<i>number</i>	<i>%</i>
big male or female	2	4
male or female	3	6
male	6	13
female	1	2
calves	15	32
no preference	8	17
don't know	8	17
no answer	4	9
Total	47	

## Present hunting activities

Table 24. Do you think *mesekiu* are still hunted in Palau?

	<i>number</i>	<i>%</i>
yes	28	59
no	4	9
don't know	14	30
no answer	1	2
Total	47	

Table 25. How are they hunted now?

	<i>number</i>	<i>%</i>
spear	21	46
<i>kadiosang</i> (spear)	1	2
dynamite	4	9
net	1	2
speargun	8	17
rifle	1	2
rope	1	2
boat	5	11
harpoon	2	4
<i>bekebokt</i> (speargun)	2	4
Total (multiple answers allowed)	46	

Table 26. Is there a preferred target now?

	<i>number</i>	<i>%</i>
big male or female	1	2
male or female	5	11
female or calves	3	6
calves	16	34
biggest	1	2
no preference	8	17
don't know	6	13
no answer	7	15
Total	47	

## *Olecholl* (bracelets)

Table 27. Did people make <i>olecholl</i> (bracelets) here in the past?		
	<i>number</i>	<i>%</i>
yes	33	70
no	5	11
don't know	6	13
no answer	3	6
Total	47	

Table 28. Where did the carvers get the bone from?		
	<i>number</i>	<i>%</i>
bought from someone in village	18	38
bought from another village	1	2
hunted the dugong themselves	4	9
all of the above	6	13
given to the carver	2	4
carver asked around	1	2
don't know	10	21
no answer	5	11
Total	47	

Table 29. Do you think that anyone still makes <i>olecholl</i> in Palau?		
	<i>number</i>	<i>%</i>
yes	1	2
no	34	72
don't know	5	11
no answer	7	15
Total	47	

## *Mesekiu miich*

Table 30. Does anyone make <i>Debechellir ar Rubak</i> ( <i>delobh/mesekiu</i> ) around here?		
	<i>number</i>	<i>%</i>
yes	27	57
no	11	23
don't know	3	6
no answer	6	13
Total	47	

## Cultural value

Table 31. Do you think <i>mesekiu</i> are valuable in Palauan culture today?		
	<i>number</i>	<i>%</i>
yes	5	11
no	35	74
don't know	4	8
no answer	3	6
Total	47	

# Questionnaire

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## Local knowledge about Dugong dugon (mesekiu)

(1) Name: \_\_\_\_\_ (2) Date: \_\_\_\_\_

(3) Hamlet: \_\_\_\_\_ (4) State: \_\_\_\_\_

### *Historical and contemporary uses*

(5) Did people from this area eat mesekiu in the past?  Yes  No  Don't know

(6) If yes, how often was mesekiu eaten in the past?  1 time per year or less  1 time per month  
 more than 1 time per month  everyday

(7) Could everyone eat mesekiu?  Yes  No  Don't know

(8) If no, who could not eat mesekiu? \_\_\_\_\_

(9) Mesekiu were eaten  at any time  on special occasions  Other \_\_\_\_\_

(10) If special occasion, what was the occasion? \_\_\_\_\_

(11) Do you think that people still eat mesekiu around here?  Yes  No  Don't know

(12) If yes, how often do you think that mesekiu is eaten around here now?

1 time per year or less  1 time per month  more than 1 time per month  everyday

(13) Do you know if the mesekiu taste different at different times of the year?  Yes  No  Don't know

(14) If yes, please describe the differences in taste \_\_\_\_\_

(15) In the past, could anyone hunt mesekiu?  Yes  No  Don't know

(16) Who made the decision that it was time to hunt mesekiu? \_\_\_\_\_

(17) How were they hunted in the past? \_\_\_\_\_

(18) Was there a preferred target?  males  females  calves  no preference  don't know

(19) When were they hunted in the past?  when they were seen  for special occasions   
Other \_\_\_\_\_

(20) Do you think mesekiu are still hunted in Palau?  Yes  No  Don't know

(21) If yes, how are they hunted now? \_\_\_\_\_

(22) Is there a preferred target now?  males  females  calves  no preference  don't know

(23) When are they hunted now?  when they are seen  for special occasions   
Other \_\_\_\_\_

(24) Did people make olecholl (bracelets) here in the past?  Yes  No  Don't know

(25) Where did the carvers get the bone from?  hunted the animal themselves  bought the bone from  
someone else in the village  bought the bone from another village  don't know

Other \_\_\_\_\_

- (26) Do you think that anyone still makes olecholl in Palau?  Yes  No  Don't know
- (27) Does anyone make Debechellir ar Rubak (delobch/mesekiu) around here?  Yes  No  Don't know

*Distribution, movements, habits and general behavior*

- (28) Have you seen mesekiu near here in the past year?  Yes  No
- (29) Where have you seen them? (mark areas on map) \_\_\_\_\_
- (30) How many did you see in the past year? \_\_\_\_\_
- (31) How big do you think the mesekiu were? \_\_\_\_\_
- (32) Were there any calves with them?  Yes  No  Don't know
- (33) If yes, how many calves did you see? \_\_\_\_\_
- (34) When did you see them? (month or season, day or night) \_\_\_\_\_
- (35) Do you think they are here all year long?  Yes  No  Don't know
- (36) How often have you seen them in the past year?  one time  two times  more than 2 times  
 more than 5 times
- (37) Have you seen them feeding?  Yes  No
- (38) When did you see them feeding?  day  night
- (39) If you said Yes in #37, what made you think they were feeding? (Did you see sediment turned up in the water? Or did you see something else?) \_\_\_\_\_
- (40) Where were they feeding? (mark on map) \_\_\_\_\_
- (41) Are they in different areas at different times of the month? \_\_\_\_\_
- (42) Are they in different areas at different times of the year? \_\_\_\_\_
- (43) Have you seen large groups of mesekiu around here in the past (more than 5 or 10 years ago)? If yes, please show where on the map.  Yes  No
- (44) Have you seen large groups of mesekiu around here in the past year? If yes, please show on the map.  Yes  No
- (45) Have you seen sick or dead mesekiu here?  Yes  No
- (46) How many mesekiu do you think live around here? \_\_\_\_\_

*Changes over time*

Are there more or less mesekiu around here now

- (47) a. compared to 5 years ago  more  less  about the same
- (48) b. compared to 10 years ago  more  less  about the same
- (49) c. compared to 50 years ago  more  less  about the same
- (50) Have you noticed any changes in any ways mesekiu behave? Please describe these changes.
- (51) Why do you think these changes have happened? \_\_\_\_\_

(52) Are there places where you used to see mesekiu where they are not seen anymore? If yes, please show on the map.  Yes  No

(53) Do you think mesekiu are valuable in the Palauan culture today?  Yes  No  Don't know

(54) Please explain. \_\_\_\_\_

(55) What do you think are the most important issues associated with mesekiu today? \_\_\_\_\_

(56) Do you have any questions or other comments? \_\_\_\_\_

Thank you for answering our questions.