Creel Survey

Nonouti Island

Kiribati

November 2017

Rateiti Vaimalie

Research and Monitoring Unit

Coastal Fisheries Division

Ministry of Fisheries and Marine Resources Development

1.0 Acknowledgment

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ACRONYMS

CFD	Coastal Fisheries Division
CPUE	Catch per Unit Effort
ECD	Environment Conservation Division
FL	Fork Length
g	gram
GEF	Global Environment Fund
GPS	Global Positioning System
LDCF	Least Developed Countries Fund
m	meters
mm	millimeters
MFMRD	Ministry of Fisheries and Marine Resources Development
SPC	The Pacific Community
TL	Total Length

Executive summary

2.0 Introduction

This report provides information for creel survey conducted in Nonouti Island in November in 2017 by Research staffs from Coastal Fisheries Division under the Ministry of Fisheries and Marine Resources Development. Data obtained from the survey could be used as baseline data for creel survey as this was the first time the survey conducted on the island. More importantly, the data collected in this survey could provide information to support the development of Bonefish Management Plan for Nonouti Island.

The objectives of the survey were to meet with fishers returning from fishing and documenting information related with fishing trip such as fishers demographic and fishing behavior, weight and sizes of individual catches, effort such as duration, time spent and gear used, Catch per Unit Effort and fishers perceptions on resource status.

A total of sixteen landings were met during the survey and the majority of fishers (n=15) were fishers returning from gillnetting or *te orooro* for bonefish *Albula glossondonta*. The average number of fishers involved with bonefish fishing was 2.80 fishers and lasted for 3.59 hours. The mean catch per trip was 54.69 fish or 31.17 kg. Average CPUE was 16.5 fish per hour per trip or 8.75 kg per hour per trip. Only males involve with fishing activities while women responsible for processing of catches for subsistence and commercial. For bonefish fishery, a total of 874 individuals of fish observed with 405 were bonefish representing 46% of catch abundance and 66% of catch weight.

Fork length (FL) data were collected from all bonefish surveyed and length ranged from 14 to 57.9 cm with a modal length of 34 to 35.9cm. The average length was 33.04cm. Length frequencies by different gillnet mesh size showed that fishing trips using small mesh size net (2 inch or 2.5 inch) captured large number of small individuals mostly immature fish compared to net with larger (3 inch) mesh size.

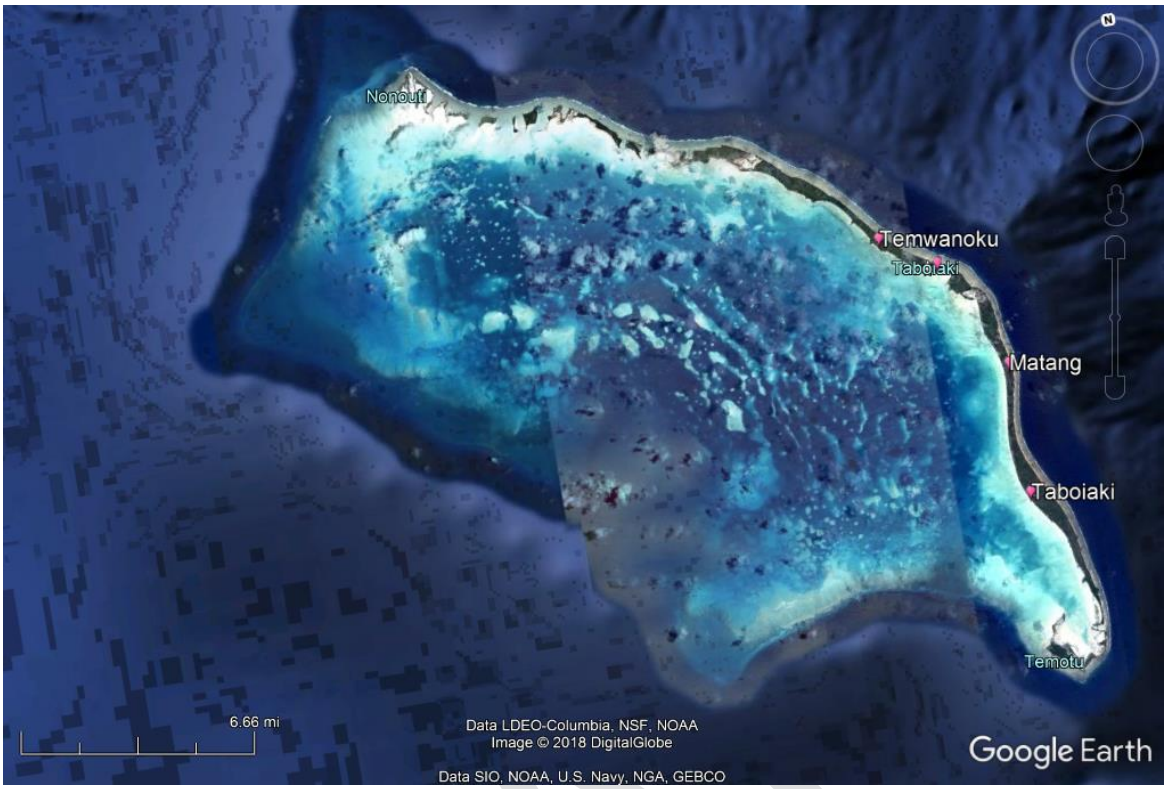


Figure 1 *Map of Nonouti with sampling sites*

3.0 Methodology

3.1Creel survey

Creel survey conducted at Nonouti Island focused on fishing methods used for harvesting reef and lagoon fish such as gillnetting and handlining. The creel survey had the following objectives:

1. Document fishers demographics and fishing behavior
2. Document catch (including length and weight of all individuals), effort (including trip duration, time spent fishing and gear used and Catch per Unit Effort for monitoring purposes
3. Catch composition for each fishing method
4. Document fishers perceptions of the status of the fisheries resources

During the survey, the lead fisher was asked questions relating to fishing trip including the number of fishers, fishing methods used, fishing location, distance travelled, time spent and costs involved. Their historical fishing pattern and perceptions of the state of the resources were also documented however perceptions recorded once only for each lead fisher, regardless of how many times that fisher was interviewed. All fish caught were identified to their species level, measured to the nearest mm and weighed to the nearest 10g. A copy of the creel survey form is attached (appendix 1)

3.2 Biological sampling

Biological sampling for monitoring purposes in Nonouti focused on bonefish (*Albula glossondonta*) only. All samples were collected from commercial fishers and the lengths to caudal fork (FL) were measured to the nearest millimeter (mm) for each fish collected, unless damaged. Each individual was weighed to the nearest 10g, unless damaged. Sex and maturity stage were determined from examining of the gonads, based on the criteria adapted from Moore et al (2011) (Table1). Otoliths were removed from samples, cleaned dried and stored in plastic vials. Finclips were also cut from each individual fish's dorsal fin and stored in vials containing 80% ethanol. These samples are sent to SPC for laboratory processing and analysis.

3.3 Data analysis

Summary analysis include the compilation of mean number of fishers per trip, mean trip duration and mean catch (individual and kg) for each fishing method. Catch composition were also determined for each method. Length frequency plots established for target species and Catch per Unit Effort was also calculated for each fishing method.

4.0 Results

A total number of 16 landings were surveyed during the survey in which two fishing methods commonly used namely gillnetting and handlining. Gillnetting was dominantly practiced in most of the fishing trips met; therefore, the analysis below was focused on gillnetting or *te orooro* for bonefish *Albula glossondonta*

Bonefish fishery

A total of fifteen surveys conducted for bonefish in which males involved in the fishing activity while females involved with the processing and selling of fish. The mean number of fishers per trip was 2.80 ± 0.18 and lasted for 3.59 ± 0.23 hours. The average catch per trip was 54.69 ± 8.82 fish or 31.17 ± 8.84 kg. Average CPUE was 16.5 ± 3.13 fish per hour per trip or 8.75 ± 2.24 kg per hour per trip.

The total number of fish observed in the survey was 874 individuals with 26 different species. Gillnetting or *te orooro* targeted mainly bonefish *A. glossodonta* with 405 individuals representing 46% of the catch abundance (figure 1) and 66% of catch weight (figure 2). A few bycatches were also observed during the survey however they were not included in the analysis as they contributed in low amount compared to bonefish.

As observed from length data collected, bonefish lengths (FL) ranged from 14 to 57.9 FL cm with a modal length size of 34 to 35.9 FL cm. The average size for bonefish observed was 33.04 cm. Length frequencies by different gillnet mesh size showed that fishing trips using small mesh size net (2-3 inch) captured large number of small individuals mostly immature fish compared to net with larger (3 inch) mesh size (figure 4).

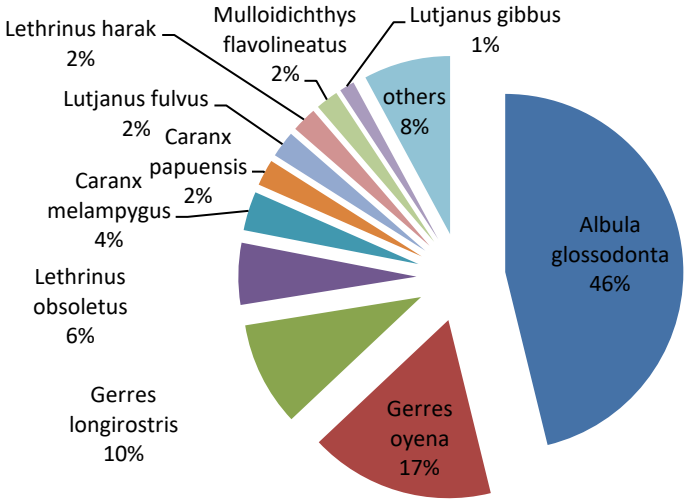


Figure 2 Percent contribution by abundance of species caught by Gillnetting

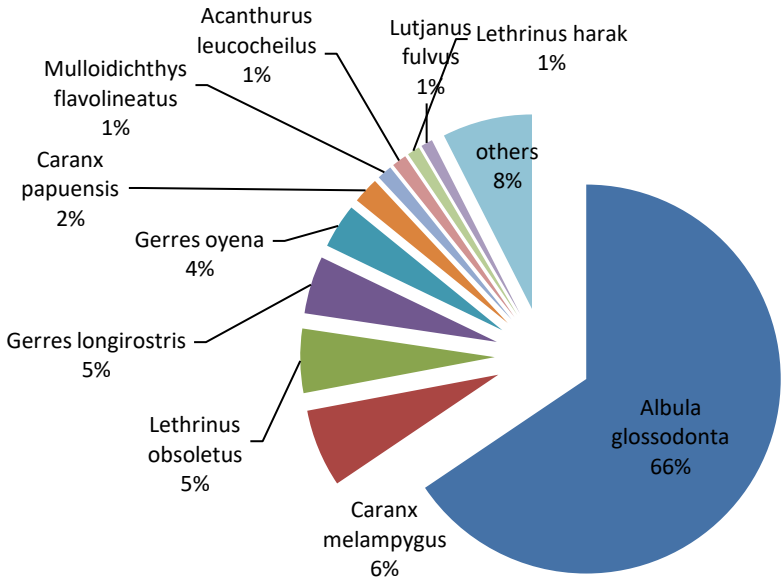
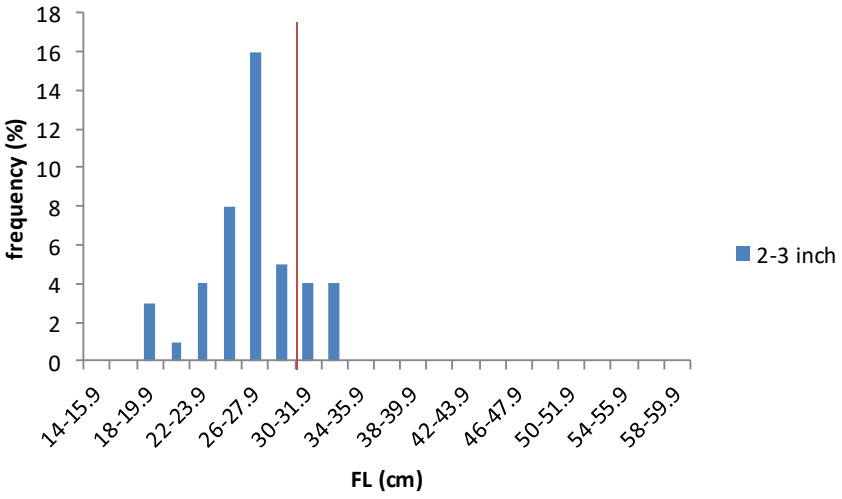
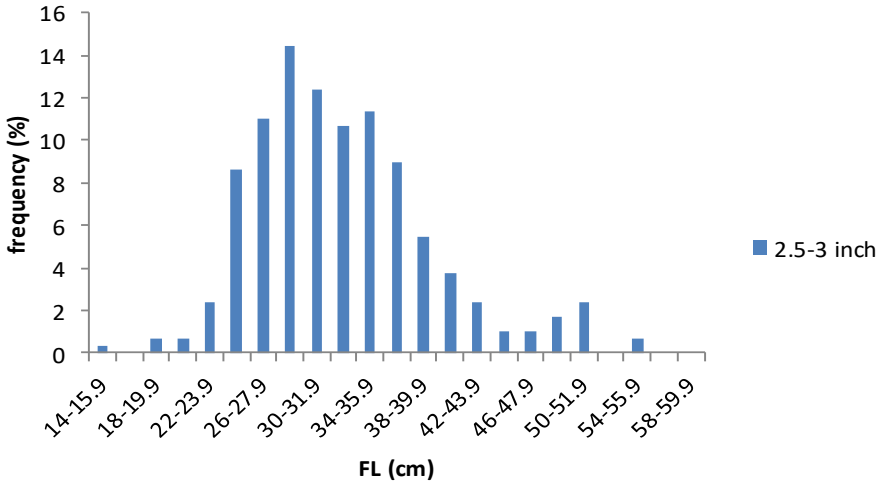
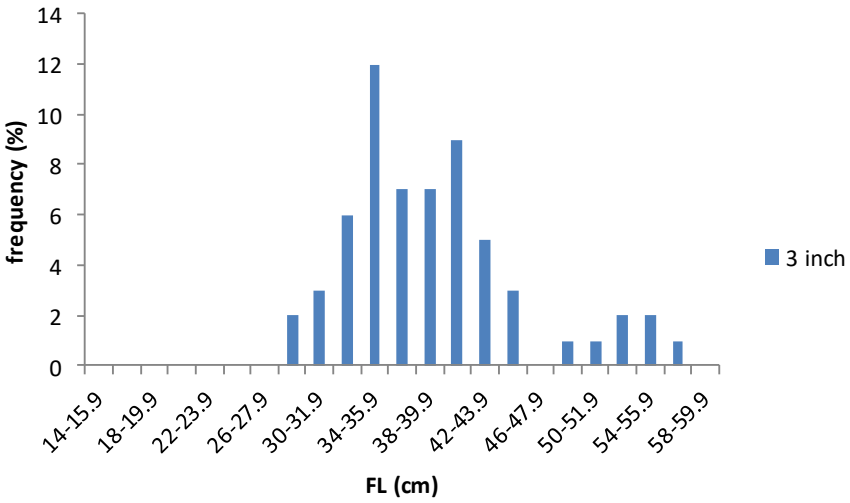


Figure 3 Percent contribution by weight of species caught by Gillnetting


18
16
14
12
10
8
6
4
2
0
frequency (%)
14-15.9
18-19.9
22-23.9
26-27.9
30-31.9
34-35.9
38-39.9
42-43.9
46-47.9
50-51.9
54-55.9
58-59.9
FL (cm)
2-3 inch


16
14
12
10
8
6
4
2
0
frequency (%)
14-15.9
18-19.9
22-23.9
26-27.9
30-31.9
34-35.9
38-39.9
42-43.9
46-47.9
50-51.9
54-55.9
58-59.9
FL (cm)
2.5-3 inch


14
12
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8
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4
2
0
frequency (%)
14-15.9
18-19.9
22-23.9
26-27.9
30-31.9
34-35.9
38-39.9
42-43.9
46-47.9
50-51.9
54-55.9
58-59.9
FL (cm)
3 inch

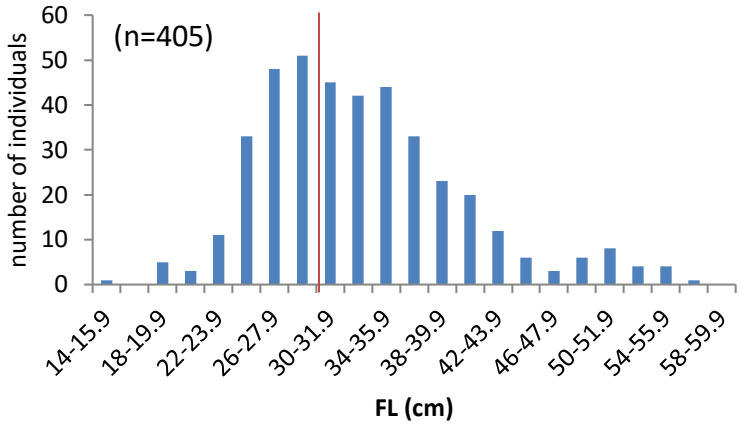

Figure 4 Size frequency of bonefish *Albula glossodonta* for different gillnet mesh size
The red line indicates estimate length at 50% maturity (SPC unpublished data)

Fisher perceptions

Fisher perceptions were collected from 9 landings and most of fishers interviewed were men. The figure below depicted that the majority of fishers reported that they had seen little change in the fishery over the last five years in which 67% of all respondents mentioning that the sizes of fish caught were the same and 60% claiming that the number of fish caught was also the same as five years ago. Fishers also asked about their concern on resource and most of them claiming that still there were plenty of fish.

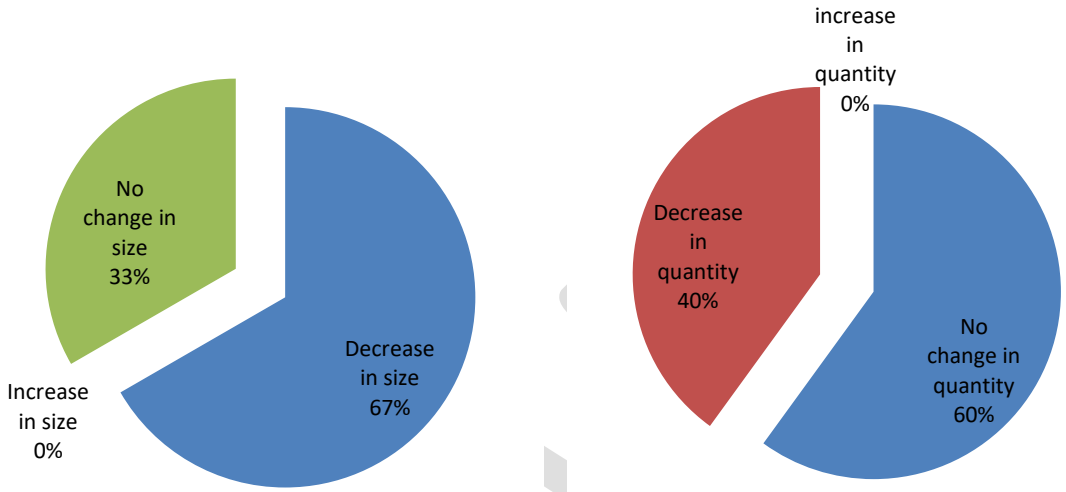

Figure 5 Lead fishers responses on whether the catch sizes (left) and quantities (right) have changed over the last five years

5.0 Recommendations

- The creel surveys conducted at Nonouti was a result from sixteen surveys carried out within around three weeks which provide a brief summary of fisher behavior, fishing pattern, catches and perceptions for only fishing trips met during the survey. Additional surveys recommended for Nonouti and other islands by Fisheries Assistants as part of data collection activities (weekly or twice a week) so that recent findings are comparable with baseline data.

- Fisheries Assistants stationed at outer islands need to undergo training on creel surveys to familiarize with survey materials and questionnaires presented on creel survey forms for producing information supportive for the development of management plans of reef and lagoon fish.

6.0 References

Kiareti, A., Beiateuea, T., Liu, R,. Teema, T., and Moore, B.(2013). Monitoring the Vulnerability and Adaptation of Coastal Fisheries to Climate Change: Abemama Atoll, Kiribati. Secretariat of the Pacific Community, Noumea, New Caledonia 63p.

Kaly, U., Gillett, P., Yeeting, B., Bertram, I., Moore, B. (2016). Creel and Market Survey: A manual for Pacific Island fisheries officers, Secretariat of the Pacific Community, Noumea, New Caledonia

Appendix 1

Creel survey data sheets

Creel survey carried out by: [Enter organisation / department]	***Serial / ID Number:***

Type of creel survey: (if stratifying)		
Province / Island:		
Survey Time (Month / Year):		Currency used:
Survey Site:		
Date of this replicate:		
Interviewers / surveyors names:	1.	2.

Latitude (DD):	Longitude (DD):

Slice C1 basic information on fishers

Lead Fisher's name:			
Date of Birth (DOB):		Gender:	
Address as Village / Town / City:			
Is the fisher with others?	Yes ☐ | No ☐		
→ (data on other fishers in the landing today)			
Number of fishers:			
Name of other fisher 1:		DOB:	Gender:
Other fisher 2:		DOB:	Gender:
Other fisher 3:		DOB:	Gender:
Other fisher 4:		DOB:	Gender:
→ (back to Lead Fisher)			

How often do you go fishing per month? /month	How many months a year do you fish (i.e. exclude closed months) months fished

What fishing methods do you usually use (not only this fishing trip)?	Method 1:
Method 2:	Method 3:
Method 4:	Method 5:

Where else do you land your fish? What other locations? List by priority		
Other location 1: (most often)		How often? /month
Other location 2:		How often? /month
Other location 3:		How often? /month
Other location 4: (least often)		How often? /month
Why do you go fishing?	Subsistence ☐ | Income ☐ | Both ☐ | Other ☐	
Please provide details:		
About how much of today's catch will be eaten at home / sold?	%	%

What would you expect as income from today's catch overall?	Value:
What is your eye-estimate of the total weight of the day's catch? (Estimated by you, not the fisher)	kg

C3 Species sizes and C4 Species weights

Species name	All sizes in the catch in **cm** | All weights in **kg** (Separate by comma. Repeat species in a new line if you need more space)									
	Sz	**Wt**	**Sz**	**Wt**	**Sz**	**Wt**	**Sz**	**Wt**	**Sz**	**Wt**
Lutjanus gibbus	12.5	0.3	23.2	0.7						

C3 Species sizes and C4 Species weights (cont.)

Species name	All sizes in the catch in **cm** | All weights in **kg** (Separate by comma. Repeat species in a new line if you need more space)									
	Sz	**Wt**	**Sz**	**Wt**	**Sz**	**Wt**	**Sz**	**Wt**	**Sz**	**Wt**
Lutjanus gibbus	12.5	0.3	23.2	0.7						

C5 Effort data for CPUE

How many hours spent fishing today? hrs

Fishing method / gears used for each species group (separate pelagic fish, reef fish, crabs, lobsters etc) and how much they cost the fisher to buy

Species group	Methods / gears used	No hours
e.g. Herbivores	*Spear fishing*	*4*
e.g. Carnivores	*Line fishing*	*2*
1.		
2.		
3.		
4.		

Did you have any gear losses during this fishing trip? What and how much to replace or repair?

Gear	What loss / damage?	Cost to replace / repair
1.		
2.		
3.		
4.		

Please list any other costs of **this fishing trip**. Include fuel, wages, ice, food, drink, any other items

Item	Purchase price:
1.	
2.	
3.	
4.	

What is the distance to the furthest site you fished in today?

Km

How many sites did you stop and fish in? Where are they?

Site	Location (on map, lat/long, or distance to each fishing ground)
1.	
2.	
3.	
4.	

What kind of boat used today?

Construction:	Wood ☐ | Fibreglass ☐ | Plastic ☐ | Steel ☐ | Concrete ☐
Type of boat:	Canoe ☐ | Dinghy ☐ | Banana boat ☐ | Other ☐

If "Other", What kind of boat?

How is the boat powered? Paddle ☐ | Sail ☐ | Inboard ☐ | Outboard: 2 stroke ☐ 4 Stroke ☐

Length (m):	Engine (hp):
What safety gear do you have onboard today? (tick all that apply)	Oars ☐ | Life jackets ☐ | Water ☐ | EPIRB ☐ | GPS ☐ | Flares ☐ | Bailer / Bilge ☐ | Extra fuel ☐

C6 Catch prices

Where will you use / sell **this** catch? Home ☐ | Market ☐ | Buyer domestic ☐ | Buyer export ☐

How are the items sold (units of sale) and what prices can you expect?

Item / group	Unit of sale	No. Per unit	Price / unit of sale	Price / item
1. Crabs	*String*	*5*	*$25 / string*	*$5/crab*
1.				
2.				
3.				
4.				

C7 Perceptions of fishers

How long have you been fishing?	years
How long have you been doing **this type** of fishing?	years
What **other types** of fishing have you done in the **past**?	
Do you do **other types** of fishing **now**? Yes ☐ | No ☐	Describe:
Are you fishing in the same **areas** as 5 years ago? Yes ☐ | No ☐	Please explain:
Are you catching the same **quantities** as 5 years ago? Yes ☐ | No ☐	Please explain:
Are you catching the same **size** as 5 years ago? Yes ☐ | No ☐	Please explain:
If catches are **different**, what has changed?	
Do you have any **concerns** about the resources?	

Appendix 2

BIOLOGICAL SAMPLING FORM														
SAMPLER NAME	COUNTRY	LOCATION		FISHER/VESSEL NAME		GEAR TYPE			DATE			PAGE /		
Latitude	Longitude	Site	Habitat	Fish ID	Species	Fork length (cm)	Total length (cm)	Weight (kg)	Sex	Maturity stage (I-VIII)	Gonad weight (g)	Otoliths (0, 1, 2)	Genetics (Y, N)	Comments
GENERAL COMMENTS:														