Observing Human Activities and Natural Disturbances

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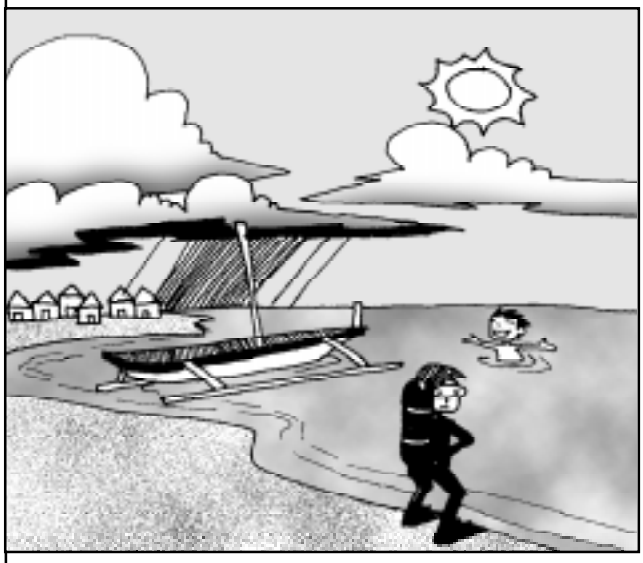


Definition

This procedure is simply one suggested way to quantify various human & natural variables that may be influencing the observed reef community. Other ways may be to simply (1) note presence or absence of various stresses or threats to the reef on a checklist or to just (2) jot down notes which catch the attention of the monitoring team.

Purpose

Human activities, whether beneficial or harmful, and natural disturbances (e.g. storms) are major influences on coral reefs. Noting down some of these may help us explain our observations of the reef environment and resources. Specifically, the observed changes in the reef community through time may be graphed parallel to the changes of relevant human and natural variables through the same time period. Refer to Chapter 4 (Drawing Up a Monitoring Plan) for a list of factors that tend to influence specific community elements.

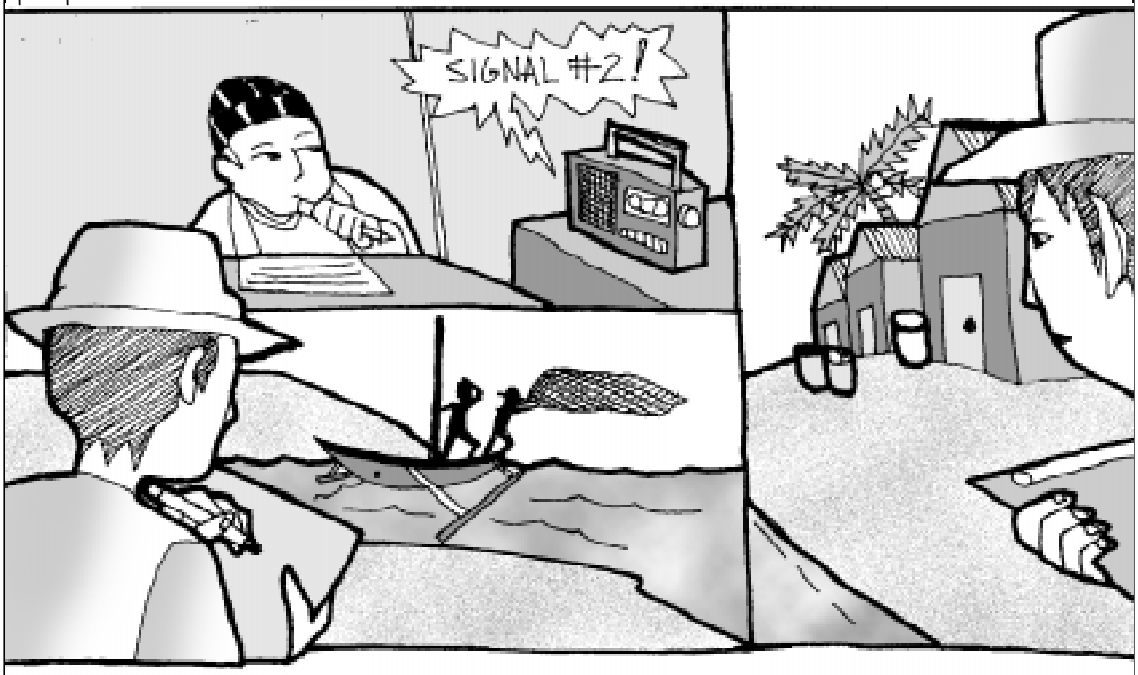
Requirements

- ❑ Data form
- ❑ Map of the area
- ❑ Resource person(s) / Key informant(s) familiar with the area
- ❑ Municipal ordinances and other laws relevant to the coastal area

Optional

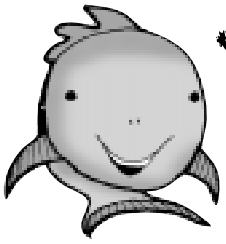
- ❑ Camera
- ❑ Binoculars

Go to the area of interest and fill out the boxes on the data form with the appropriate estimates. You may base these estimates on your own observations, interviews with key informants and/or through consensus among a group of people familiar with the area.



Many human and natural stresses and threats are not readily observable in the few days of formal field monitoring time per season. Organize a logbook where coastal watchers and/or marine protected area guards will regularly record such observations (e.g. violations of the sanctuary, fishing or tourism activities in the area, oil slicks, storms, etc.).

Photographs of the same areas taken once a year would also be very useful!

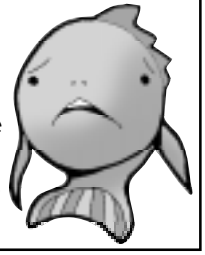


STRENGTHS

1. Quantified scores facilitate comparison of data sets from different areas
2. A checklist of things to observe lessens the possibility of missing important items to take note of.

LIMITATION

Unique features and/or the history of stress/management of the area may be missed.



Sample data from Port Barton Marine Park, San Vicente, Palawan

SITE DESCRIPTION AND DETAILS FORM

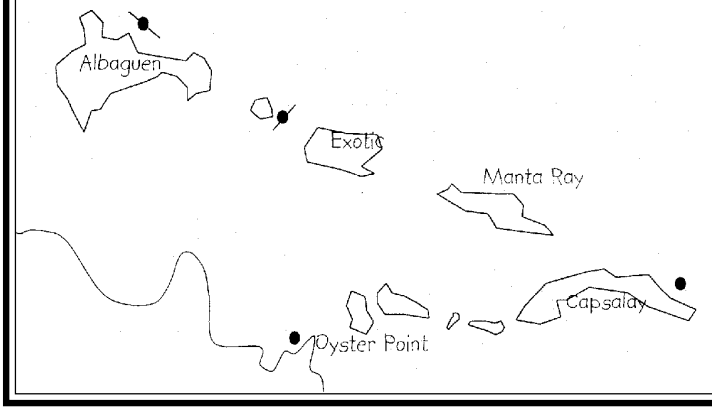
Form 2A

Site Name: Port Barton Marine Park	**Municipality & Province:** San Vicente, Palawan
Reason for choosing to monitor this site: It is a marine protected area	**Overall Documentor:** V. Bungabong

SURVEY/MONITORING SITE DETAILS

Transect No.	[Capsalay]	[Exotic]	[N. Albaguen]	[Oyster Pt.]	[Middle Reef]
Fish abundance observers	B. Francisco / H. Arceo	B. Francisco / H. Arceo	B. Francisco / H. Arceo	B. Francisco / H. Arceo	B. Francisco / H. Arceo
Benthic lifeforms observers	C. Calagui / V. Bungabong	C. Calagui / V. Bungabong	C. Calagui / V. Bungabong	C. Calagui / V. Bungabong	C. Calagui / V. Bungabong
Start date (mo/day/year)	5/7/99	5/7/99	5/7/99	5/7/99	5/8/99
Start time (am/pm)	9:40 AM	11:40 AM	2:10 PM	4:20 PM	12:45 PM
Latitude (e.g. 9°23.012')	10°27.547'	10°29.429'	10°30.301'	10°27.090'	10°27.054'
Longitude (e.g. 112°34.781')	119°10.987'	119°09.075'	119°08.423'	119°07.496'	119°07.487'
Transect orientation (e.g. N, NE, ...)					
Depth (in m)	6.0	4.5	4.5	6.0	6.0
Reef zone (e.g. fore slope, flat, etc.)	slope	slope	flat	slope	flat
Is the site sheltered or exposed?	sheltered	sheltered	sheltered	sheltered	exposed
Approx. steepness of site (angle of slope)	-25-30°	-10-15°	<10°	70°	<10°
Topographic complexity (in m)	medium	medium	medium	mod. high	mod. low
Horizontal visibility (in m by transect line)	10-15	10-15	10-15	10-15	10-15
Vertical visibility (in m by secchi depth)	5.0	4.5	4.5	6.0	6.0
End date (mo/day/year)	5/7/99	5/7/99	5/7/99	5/7/99	5/8/99
End time (am/pm)	10:20 AM	12:25 PM	3:10 PM	4:50 PM	1:25 PM
Weather	Sunny [X] Cloudy [ ] Rainy [ ] Windy [ ]				
Temperature: (not taken)	Air [ ] Water surface [ ] 3-m depth [ ] 10-m depth [ ]				

Sketch map or reef and coastline showing transect locations and other features



Coordinates from map [ ] or GPS [X]

If GPS, specify map datum: WGS 84

HUMAN ACTIVITIES & NATURAL DISTURBANCES FORM

Form 2B

A. FISHING	% or #	Notes
# fishing boats observed w/in 500 m	1	
# aquarium fishers w/in 500 m	0	
# invertebrate gleaners w/in 500 m	0	
# blasts heard during the dive	0	
% area used for mariculture w/in 500 m	1	near Oyster Point
B. POLLUTION	**% or #**	**Notes**
Distance to nearest pop. center (in km)		depends to which specific transect
Population of pop. center (in thousands)	4,000	
# factories per km of adjacent coast	0	
Distance to nearest river (in km)		depends to which specific transect
% farmed area of coastline	0	
% forested area of coastline	88%-90%	
# mines within sight	0	
# items of floating trash observed	1	plastic bottle
# items of trash observed underwater	1	old fish trap
# fish nets left as trash	5-10	at Black Coral
C. OTHER STRESSES & THREATS	**% or #**	**Notes**
# boats anchoring within 500 m	>4 boats	at Exotic Beach only; 5-6 picknickers or more per boat
# divers observed within 500 m	0	
# dive shops within 10 km	1	
Years since last typhoon (>100 kph)	<1	Typhoon Norming, 11 December 1998
# large ships within sight	0	
% of coast built-up with structures	1	Just at main village center
Years since last mass bleaching	1	April to May 1998
% bleached coral area	0	none now; already recovered
% diseased coral area	0	

MANAGEMENT OF AREA	**Is this a legally protected area?** Yes
Name of Marine Protected Area: Port Barton Marine Park (additional regulations have been proposed)	Organization responsible: Albaguen Fishermen's Association
Describe restrictions herein: No fishing or gathering of marine organisms and diving in core zones (Albaguen, Exotic, Manta Ray and Haines Reef)	
Ordinance No. & Year: Ordinance 1997-03, Jan. 6, 1999	Start date of protection by law: Jan. 6, 1999
Date boundaries were marked: April 26, 1999	Date patrols/enforcement began:
Coordinates of protected area boundaries: 119°8'13.03"E, 10°29'50.19"N Albaguen 119°9'5.62"E, 10°29'50.19"N Exotic 119°8'29.73"E, 10°30'19.48"N Haines Island	

Monitoring fish catch

Definition

Fish catch monitoring is the systematic collection of standardized information about fish catch, fishing gear, fishing effort/time, and fishing grounds.

Purpose

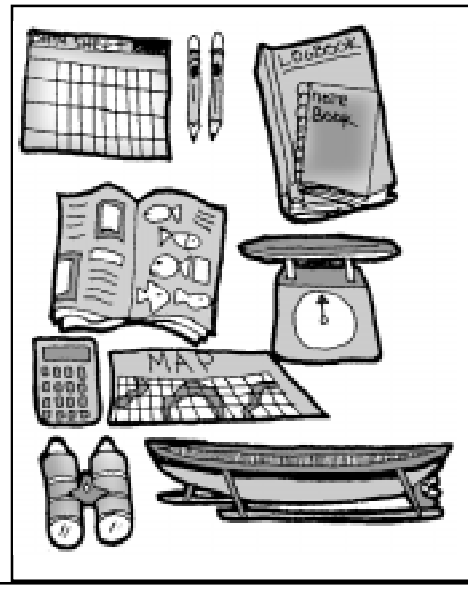
Catch data can be used to help determine if, when, and where fish catches are increasing or decreasing. These changes may be due to management practices (e.g. properly protected sanctuary vs. rampant illegal fishing) or natural causes.

Requirements

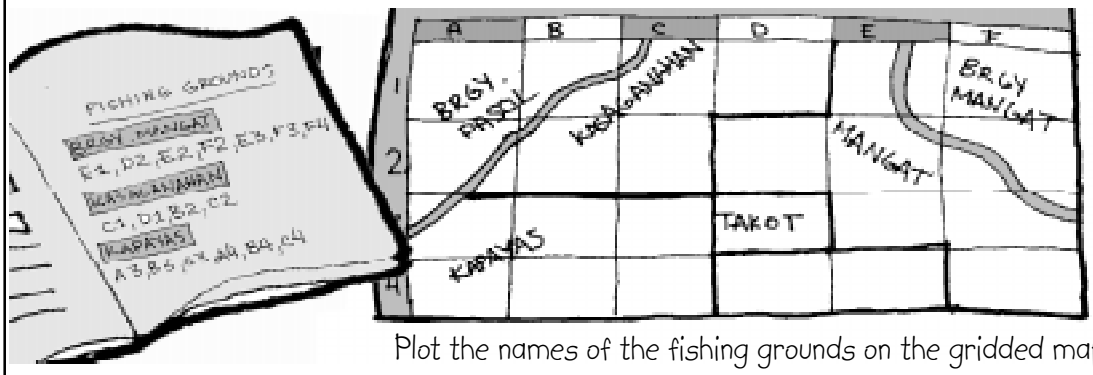
- ❑ Data forms and pencils
- ❑ Logbook or notebook
- ❑ Fish identification materials (picture book)
- ❑ Resource map (with grids, habitats, and use zones marked)
- ❑ Weighing scale preferably that which can measure from 0.1 to 10 kg (or whatever is available or used locally for measurement)
- ❑ Calculator

Optional

- ❑ Binoculars & boat (depending on the distance of the fishing grounds from the shore)

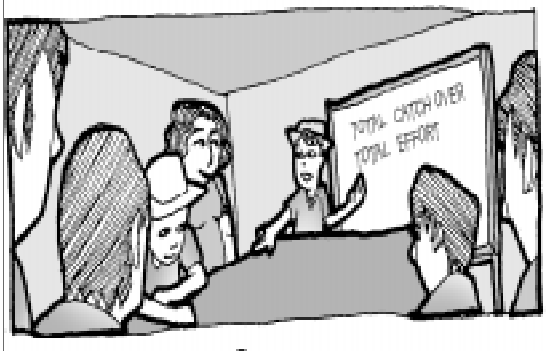


1 List in a logbook or notebook a) the locations of fishing grounds, b) the different types of fishing gear, and c) the fishes of interest to the area or to the group of fishers. These lists will be used as the standard lists for data entry and analysis.



Plot the names of the fishing grounds on the gridded map.

2 Discuss the concepts of 'Catch per unit Effort', 'Total Fishing Effort', 'Total Catch' and look at sample catch monitoring outputs.



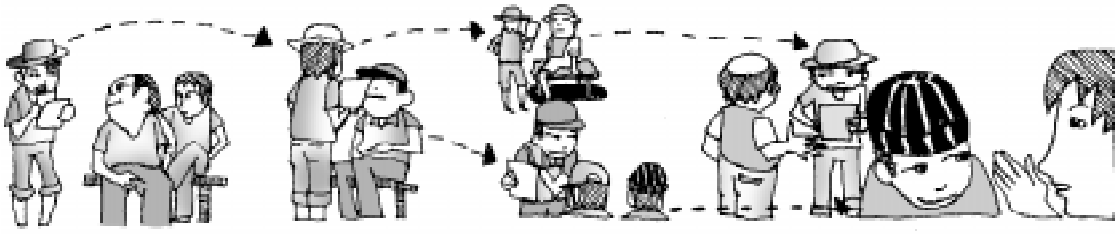
3 Fill out the gear survey form (Form 6A). Multiply the number of people using each gear type by the typical effort per person to get an estimate of the Total Fishing Effort of the village.

For some gear types, it may sometimes be more useful to use the number of gear units (e.g.traps) rather than time as the measurement of fishing effort.

4 Plan how to get data to compute Catch per unit Effort per gear type.

Catch per unit Effort = $\frac{\text{total catch}}{\text{total person-hours or total units of gear}}$.

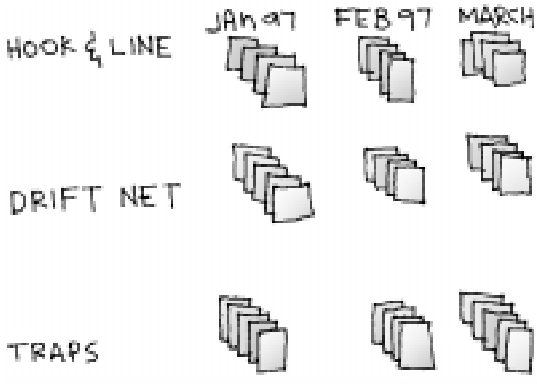
The data may be gathered by:



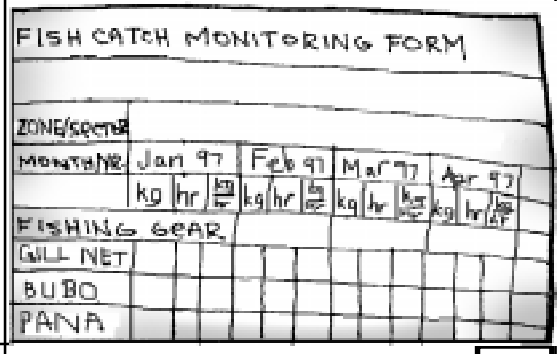
a. A team member collecting catch information (Form 6B) once a week, or...

b. many individual fishers voluntarily recording their own catches 5 times per month & submitting their forms (Form 6C) every month.

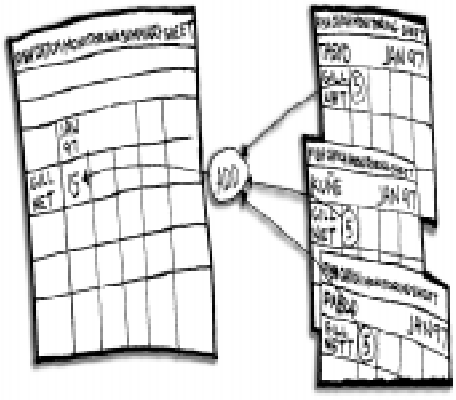
5 Collect all forms and sort according to gear type and month.



6 List down zone/sector and month year on the upper portion of the Summary Form and write the gear types on the left side of the Summary Form.



7 Compute the Total Catch per gear type per month for the data sample.



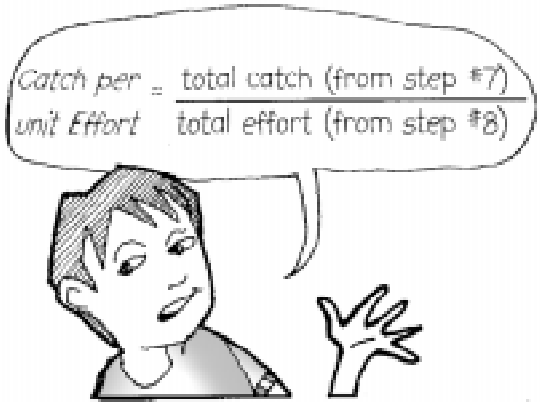
8 Compute Total Effort per gear type per month for the data sample.

Total Effort = total # of units of gear

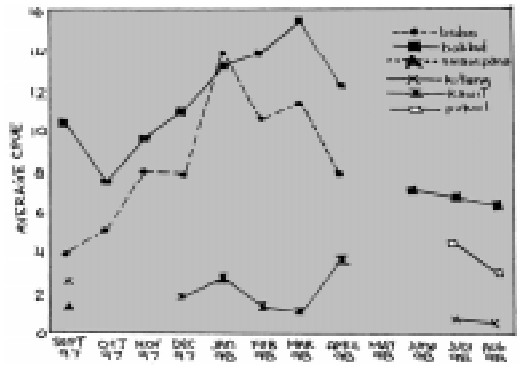
- or -

Total Effort = # of fishers x time spent fishing

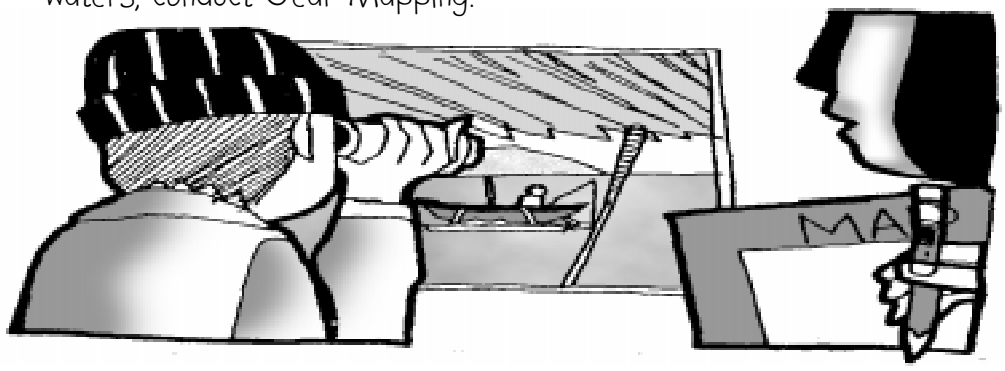
9 Compute Catch per unit Effort (CPUE) for each gear type per month.



10 Using the gear, catch and effort data, plot Catch per unit Effort per gear type through months from the data in the Summary Form.



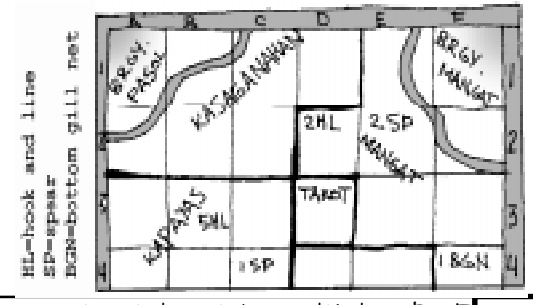
Most of the time, fishing grounds are not exclusive to particular communities. To get a better estimate of the total catch for the village waters, conduct Gear Mapping.



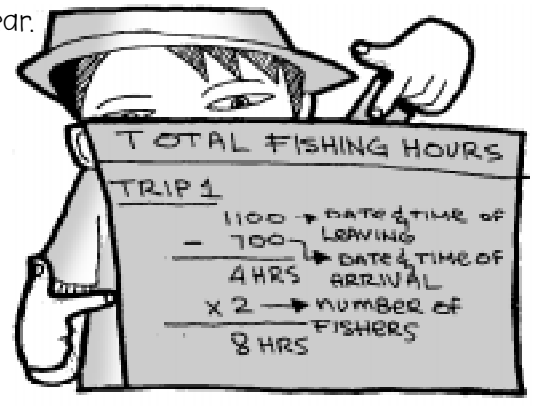
Gear mapping may be used by more advanced communities.

11 Based on the Gear Survey Form, get the peak hours per gear type.

12 From these peak hours select one hour with the most gear types to observe the village waters. Write how many fishers are seen using what gear type per grid box.



13 Compute the Total Effort in village waters by multipying the observed number of fishers per gear type by the typical number of hours spent using that gear.



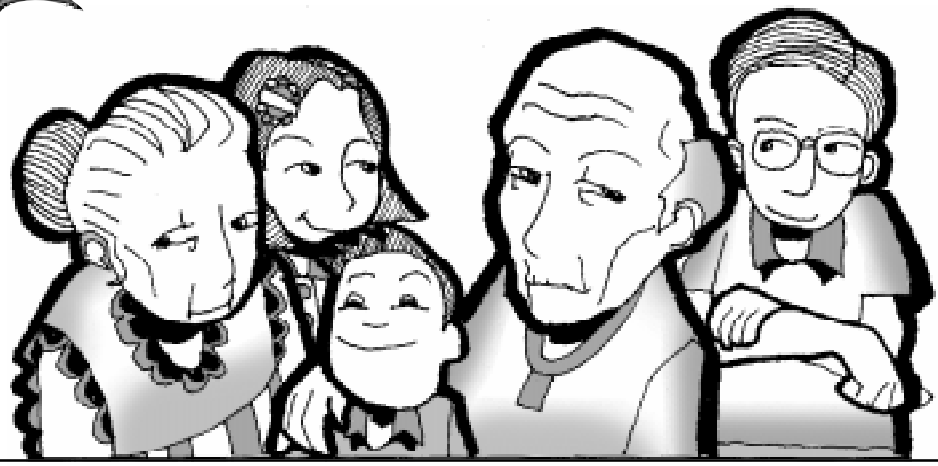
14 To get Total Catch, multiply CPUE (from Step 9) with Total Effort (from Step 3 or Step 13).

CPUE (Step 9) × Total Effort in village waters (Step 13) = TOTAL CATCH in village waters

CPUE (Step 9) × Total Effort of village (Step 3) = TOTAL CATCH of village fishers

STRENGTH

Nearly anyone can be involved and help.



LIMITATIONS

1. Some fishers may not want to cooperate because of misconceptions about the objectives of the monitoring and/or selfish interests. This may bias the results.

It may be difficult to locate the fishing grounds on maps (due to their distance from shore, the lack of landmarks, and/or the lack of maps).

A lot of data may be needed before trends are revealed.

Sample Gear Survey Form with data from Poblacion 13, Tingloy, Batangas

GEAR SURVEY FORM

Form 6A

Site Name: Poblacion 13 **Municipality & Province:** Tingloy, Batangas

Date (month/day/year): 7/14/97

Type of fishing gear	# of persons in village using gear type	# of motor boats using gear type	Typical # of persons per boat	Months when gear is typically used	Hours when gear is typically used	Fishing grounds (use grid letter in map)	Where is catch sold (which market)	Type(s) of fish usually caught	# of persons from whom information was collected
hook and line	12	0	1	All year	0700-1800	G	Pob. 13 market	groupers, coral breams, rainbow runner	4
gillnet	8	1	6-7	All year	1900-2230	G, H, M, N, O, P	Pob. 13 market	fusiliers, needlefish, mackerel	4
push net (*sakag*)	4	2	2	May-July	0700-1800	G, H, M	Pob. 13 market	herring fry	4
traps	3	0	2-3	All year	24 hr	G	Pob. 13 market	grouper, damselfish, *sea bream*, triggerfish	4

FISH CATCH MONITORING FORM FOR DATA COLLECTION TEAMS

Form 6B

Name: Patricio Semante **Village/Barangay:** Lomboy, Calape, Bohol

Collect catch data once per week. Be sure to record the trip even if nothing was caught (record '0' in the weight).

Type of fishing gear	# Fishers in boat	Fishing ground (use grid letter in the map)	Time & date of departure	Time & date of arrival	Number of gear units	Use one line per kind of fish. Use more than one line per fishing trip if needed.	
						Kind of fish caught	Weight (kg)
corral	1	B4	9/5/97 7:00 AM	9/5/97 8:00 AM	1	rabbitfish	0.8
corral	1	B4	9/6/97 6:00 AM	9/6/97 7:00 AM	1	rabbitfish	1
corral	1	B4	9/7/97 6:00 AM	9/7/97 7:00 AM	1	rabbitfish	0.5
corral	1	B5	10/24/97 7:00 AM	10/24/97 8:00 AM	1	catfish	0.5
						rabbitfish	4.5
corral	1	B4	10/24/97 7:00 AM	10/24/97 8:00 AM	1	rabbitfish	2.5
						mojarra	0.5
corral	1	B4	10/25/97 7:00 AM	10/25/97 8:00 AM	1	rabbitfish	0.5
						mojarra	0.5
double net	2	C2	9/16/97 11:00 AM	9/16/97 5:00 PM	1	rabbitfish	3
double net	2	B5	9/17/97 1:00 PM	9/17/97 5:00 PM	1	parrotfish	3
double net	2	B5	9/18/97 4:00 PM	9/18/97 5:00 PM	1	parrotfish	2
						rabbitfish	1
double net	3	C3	10/24/97 9:00 AM	10/24/97 4:00 PM	1	rabbitfish	2
double net	2	C3	10/24/97 1:00 PM	10/24/97 5:00 PM	1	rabbitfish	5
double net	2	C3	10/27/97 7:00 AM	10/27/97 1:00 PM	1	rabbitfish	2
spear	1	B2	9/1/97 3:00 PM	9/1/97 4:00 PM	1	parrotfish	1
						unicornfish	2
spear	1	D3	9/15/97 12:00 AM	9/15/97 5:00 AM	1	octopus	1.1
spear	1	C6	9/16/97 2:00 AM	9/16/97 5:00 AM	1	octopus	2
spear	1	C6	9/19/97 7:00 PM	9/19/97 12:00 PM	1	octopus	1
						assorted fish	2
spear	1	C2	10/24/97 9:00 AM	10/24/97 11:00 AM	1	rabbitfish	1.5
						grouper	0.5
spear	1	C2	10/26/97 7:00 AM	10/26/97 8:00 AM	1	parrotfish	1
spear	1	B2	10/30/97 2:00 PM	10/30/97 3:00 PM	1	unicornfish	2.5

Sample data for Fish Catch Monitoring in Lomboy, Calape, Bohol

Sample Fish Catch Monitoring Form with data from Lomboy, Calape, Bohol

FISH CATCH MONITORING FORM FOR INDIVIDUAL FISHERS

Form 6C

Site/Village/Barangay: Lomboy | **Month & Year/Buwan at Taon:** Nov. 1997

List down at least 5 fishing days per month (e.g. once a week). Be sure to record the trip even if nothing was caught (record '0' in the weight). Magtala ng hindi bababa sa limang araw ng pangingisda sa bawat buwan. Siguraduhin na magtala pa rin kahit walang nahuli sa paglaot [magtala pa rin ng '0' sa timbang (kilos)].

		Record catch per fishing trip				
		1	**2**	**3**	**4**	**5**
Date & time of leaving Petsa at oras ng paglabas		11/02/97 10:00 PM	11/08/97 7:00 PM	11/19/97 10:00 PM	11/24/97 3:00 AM	11/27/97 1:00 AM
Fishing gear Uri ng pamamalakaya		spear w/ light	spear w/ light	spear w/ light	spear w/ light	spear w/ light
# Fishers in boat Bilang ng tao sa bangka		1	1	1	1	1
Fishing ground (use grid letter on map) Lugar na pinangisdaan		B3	B3	B3	D2	B3, D2
Weather condition, tide and sea state Kumusta ang panahon, hunas/taob at alon		sunny calm	sunny calm	sunny calm	cloudy rough	sunny calm
Date & time of return Petsa at oras ng pagbalik		11/03/97 3:00 AM	11/08/97 10:00 PM	11/20/97 3:00 AM	11/24/97 6:00 AM	11/27/97 6:00 AM
CATCH Huli	**Kinds of fish caught** Mga uri ng nahuli	**Weight** Timbang	**Weight** Timbang	**Weight** Timbang	**Weight** Timbang	**Weight** Timbang
	octopus	5.5		2		
	parrotfish		3	1	1.5	1
	rabbitfish					2
TOTAL CATCH (kilograms) Pangkalahatang huli (kilos)		5.5	3	3	1.5	3

Circle each date that you went out to fish. Bilugan ang bawat petsa na ikaw ay nangisda.

1 ②③④⑤ 6 ⑦⑧⑨ ⑩ ⑪ ⑫ 13 ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ 20 ㉑ ㉒ ㉓ ㉔ ㉕ 26 ㉗ ㉘ ㉙ 30 31

FISH CATCH MONITORING SUMMARY FORM

Form 6D

Site Name: Camanga **Municipality & Province:** Salcedo, Eastern Samar

Zone/Sector:

Month & Year:	Sep. 1997			Oct. 1997			Nov. 1997			Dec. 1997			Jan. 1998		
	Total kg	Total gear unit-days or fishing-hours	kg/unit effort	Total kg	Total gear unit-days or fishing-hours	kg/unit effort	Total kg	Total gear unit-days or fishing-hours	kg/unit effort	Total kg	Total gear unit-days or fishing-hours	kg/unit effort	Total kg	Total gear unit-days or fishing-hours	kg/unit effort
Fishing Gear															
traps	438.5	109	4.0	522.5	100	5.2	825	101	8.2	694	86	8.1	668	48	13.9
corral	305	30	10.2	326	43	7.6	505	52	9.7	682	62	11.0	1215	92	13.2
spear	45.8	28	1.6												
longline	100	35	2.9												
hook & line										27	14	1.9	22	8	2.8

Sample Fish Catch Monitoring Summary Form with data from Camanga, Salcedo, Samar

Trainer's Tips for Chapter 9

Catch monitoring is quite laborious so there should be a well-defined need for these detailed data. If only general information on the local fisheries is needed, only some or other participatory methods (e.g. group discussions with key informants) may be more appropriate.

Take special time and effort to make sure that trainees understand the implications of the catch per unit effort equation. By knowing 2 out of the 3 variables, the 3rd variable may be estimated. For example, to estimate the total catch (which in practice can almost never be actually observed), you can multiply the catch per unit effort by your estimate of the total effort.

Warning on local names
Many different fish species/fishing grounds/fishing gear may be referred to by the same local name. Many different local names may also refer to the same species, area or gear. When using local names, make sure that the local names are distinct for each of the different objects you want to distinguish by adding an adjective/modifier to the local name.

CPUE, total catch, and total effort may be summarized (not only through time) but also by each of the grids on the fishing grounds. This way you can determine if catches near the fishery reserve are increasing more quickly than catches away from the reserve.

Fishers from other areas may fish in the area being monitored while local fishers may fish outside the area of interest.

Fish length monitoring
It may sometimes be useful to monitor the average lengths of certain fish species prized by fishers.

- Ask the team to select a few indicator or representative fish species to monitor.
- Demonstrate to the volunteers how to measure fish in the standard way (from the tip of the snout to the peduncle of the tail).
- Once per week, measure the lengths of a random sample of 10-20 individuals (from various batches of fishes caught) of the species being monitored. The average length (through time) of the fish species being monitored can also be plotted on the billboard.
- Groupers (*Plectropomus, Cephalopholis*), parrotfishes (*Scarus*), snappers (*Lutjanus*), and/or jacks (*Caranx*) might be possible fishes to measure when monitoring coral reef reserves.

The team must decide beforehand which of the following measurements of effort they are interested in (those marked with * are preferred):

a) * both the number of gear units (e.g. fish traps) & the time spent fishing or
b) only the time spent fishing is to be recorded
and
a) * the total time spent fishing or
b) the total time spent fishing and traveling to the fishing area
... and record data accordingly.

Review Questions

1. If our marine fishery reserve is managed properly, what do you expect will happen to the fish catch near the reserve? How might fishers who now fish in far waters benefit in the future?
2. Since we cannot collect data on all the catch taken from the village waters, what data can we use to estimate the total catch of the village waters?