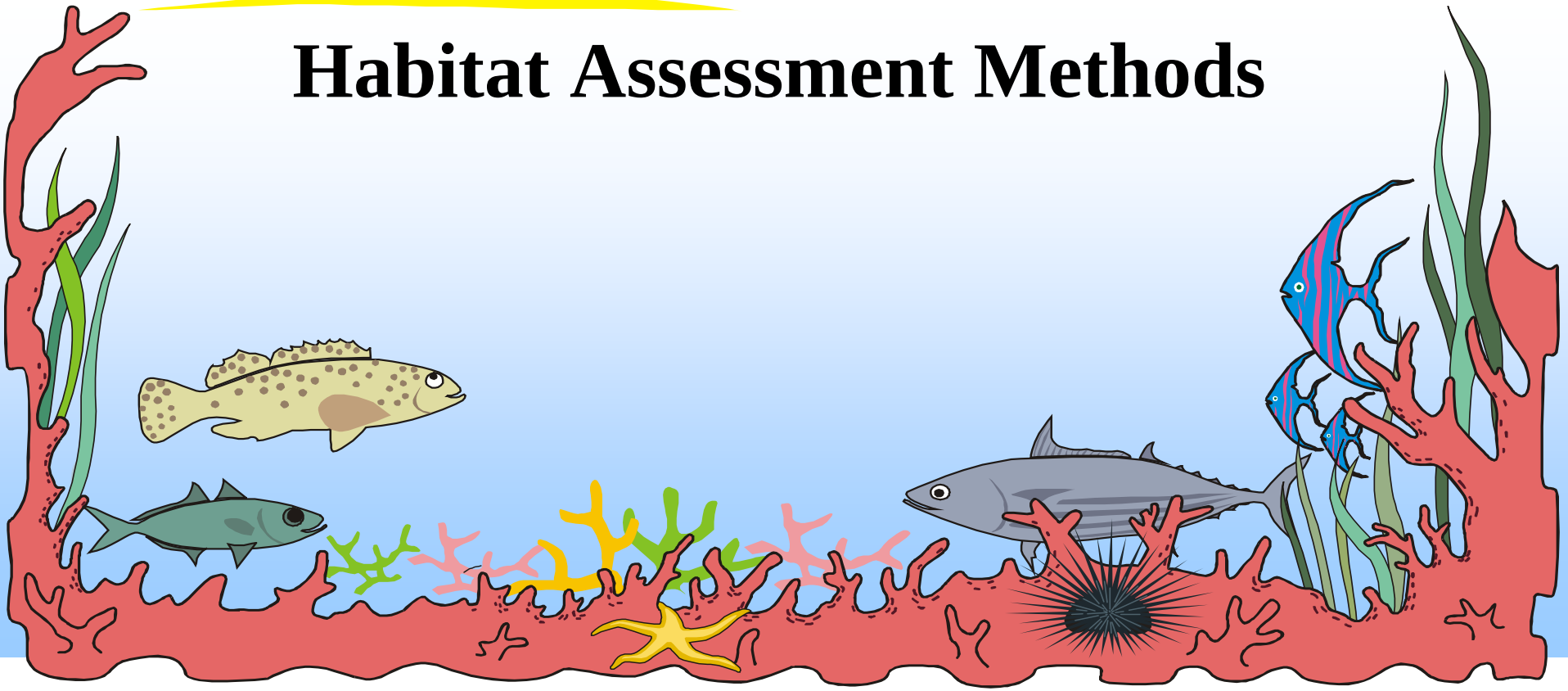
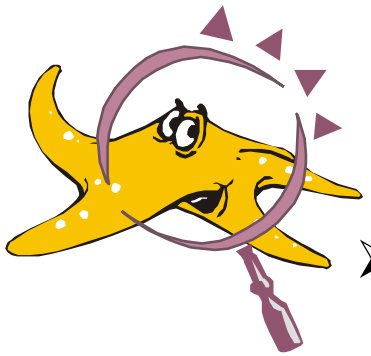
Lecture/Discussion #9:

Habitat Assessment Methods



USAID FROM THE AMERICAN PEOPLE

FISH PHILIPPINES
The Fisheries Improved for Sustainable Harvest Project

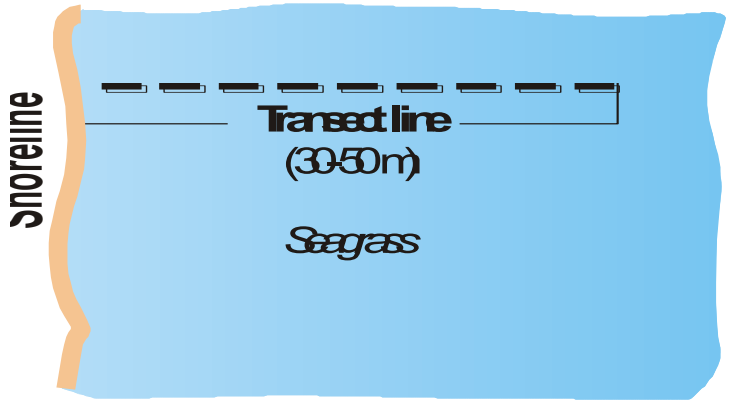


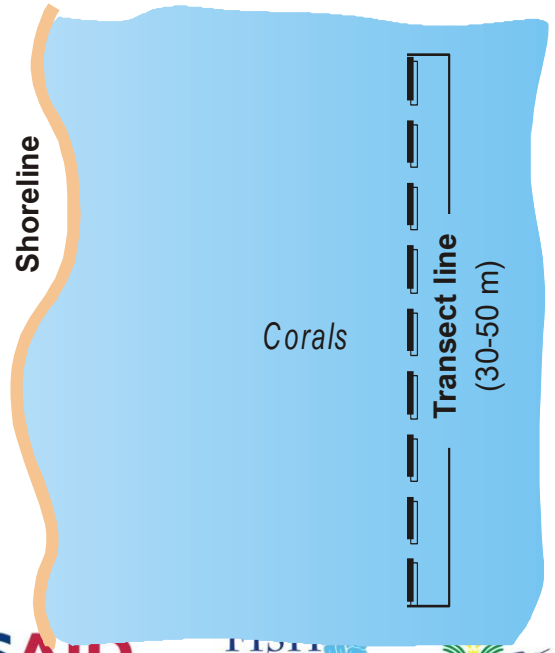
Key content points:

- Habitat assessment is a process designed to evaluate the condition and structure of environmental habitats, such as coral reefs, mangrove forests and seagrass beds.
- The PCRA looks into the current conditions and relative abundance of these coastal resources/ecosystems using a simplified scientific method that involves the use of transect lines and/or quadrats in the assessment process.
- In all 3 habitats, a transect will be utilized.
- Quadrats are effective tools to determine abundance/ condition of the assessed habitat in terms of percentage cover observed.
- Percentage cover of the assessed habitat is determined through actual observations using the habitat rating criteria.

Use of transect lines

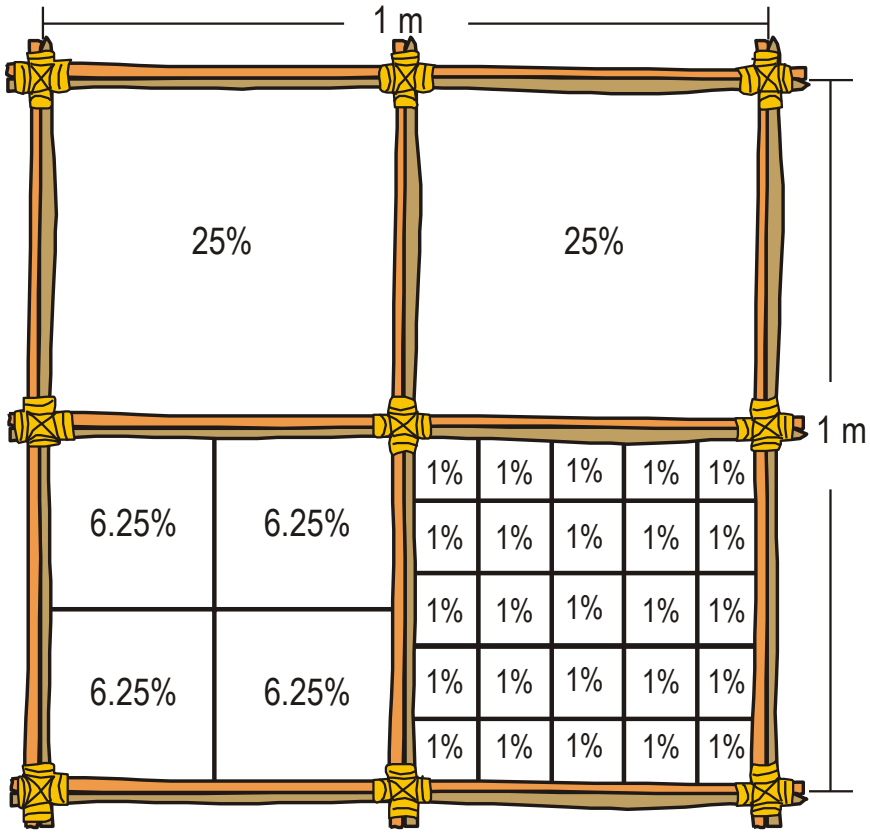
- The line may be an abaca rope, a nylon string or a fancy transect made of fiberglass. If it's not the commercial kind, calibrate the lines beforehand with one meter intervals.
- If the habitat starts beyond the shoreline, take note of the distance between the shoreline and where the habitat begins and start laying the transect line **perpendicular to the shoreline in the case of seagrasses**, and **parallel to the shoreline in case of corals**.
- To ensure that the transect will be straight, utilize landmarks as a guide or use the triangulation methods, a compass or even a GPS.





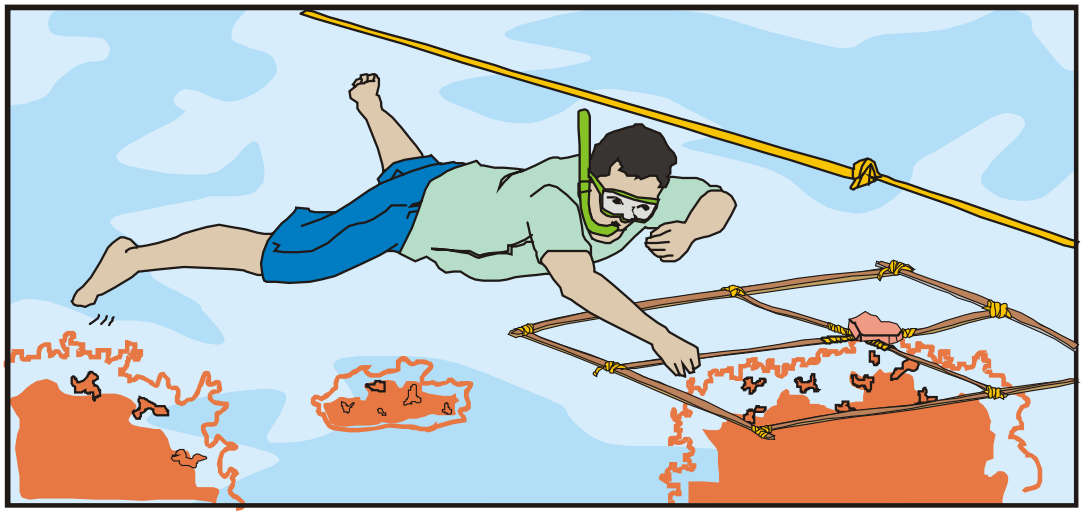
Use of quadrats

- A quadrat generally measures 1 m x 1 m. It may be made of aluminum or PVC pipes with smaller grids inside or simply of small tree branches or bamboo poles tied together.
- Placement of the quadrat follows the transect line and is laid down in pre-determined specific intervals.
- Quadrats are established every 10 meters along the transect line to serve as the representative samples of the assessed habitat.
- A 1 m x 1 m quadrat is divided into 4 subsquares for easy percentage cover estimation of the assessed coral or seagrass habitat.
- It is recommended that a suitable number of transect lines and quadrats be used to serve as samples of the assessed habitats.



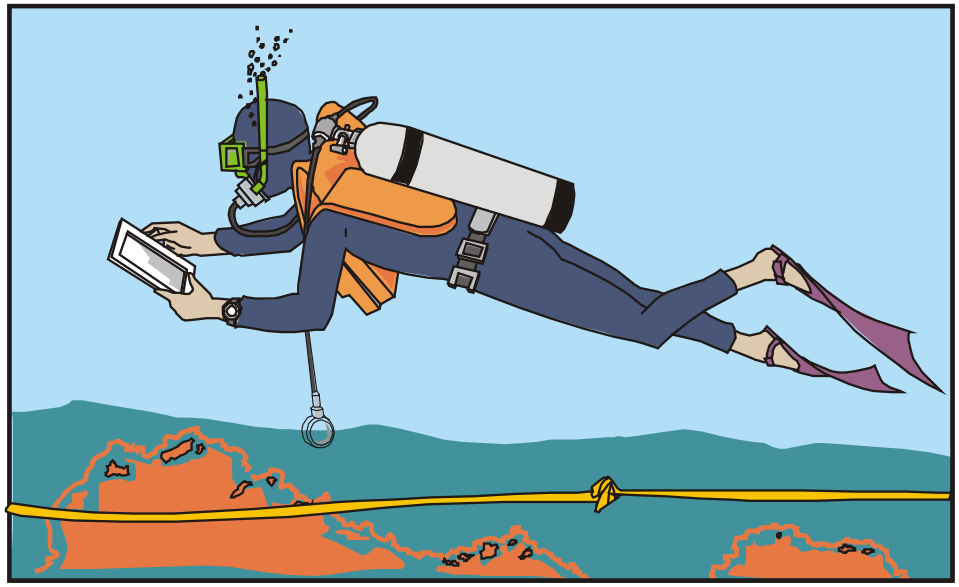
Assessment methods

1. Snorkel survey



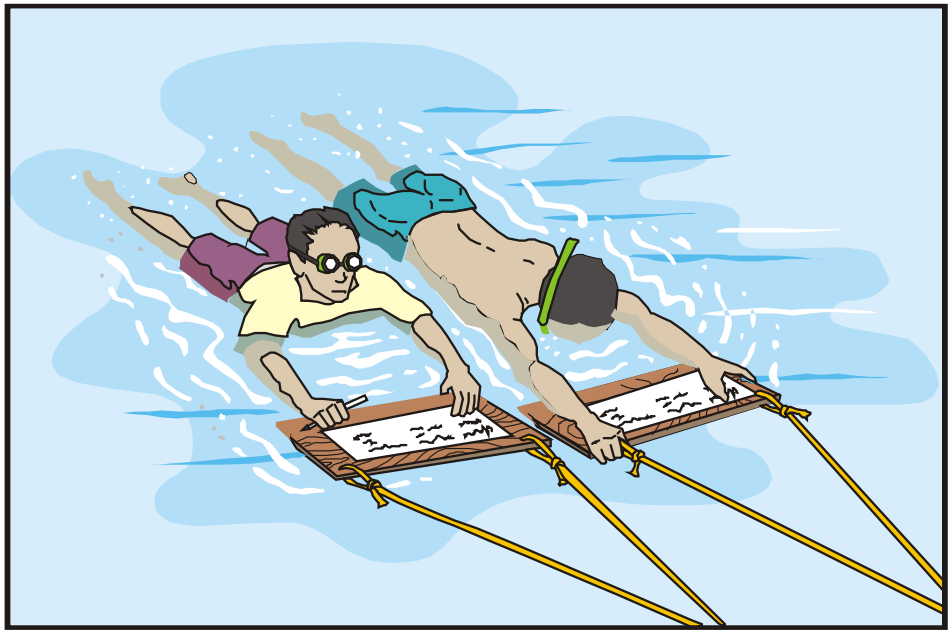
- Using snorkeling equipment or goggles, PCRA participants lay a transect line on the bottom part of the assessed area and record its depth.
- The snorkeler swims over the transect and estimates the percentage cover of the assessed habitat within 1 m on either side of the transect.
- May employ the use of quadrats which are laid down on the sea floor at specific intervals, following the transect line.

2. Point Intercept Method



- Used by more experienced researchers to precisely estimate and record the relative abundance of living and non-living things on the reef bottom observed within a defined area.
- A 50 m transect line is laid parallel to the shoreline and should be kept at the same depth.
- When using scuba, a 6-7 m depth is standard. Readings are taken every 25 cm along the line and entered into data sheets. Observations and recordings are taken from one end of the line to the other.

3. Manta Tow Method



- A manta tow survey is the observation of an underwater area of good visibility by a snorkeler who is being pulled by a small boat.
- Manta tow participants note their observations on the condition/abundance of the assessed habitat at specific intervals.
- Useful in generating a “big picture” of the area as the use of a boat allows the snorkeler to cover longer distances.

Coral habitat assessment

- The goal of the assessment is to measure coral cover percentages within the assessed area through observation and rational estimations of each habitat component.
- Percentage cover will not only refer to the living corals (hard and soft corals) but also the substrate (dead standing corals, coral rubble, hard rocky surface, sand).
- All data are then entered into a transect data form.

Point intercept method

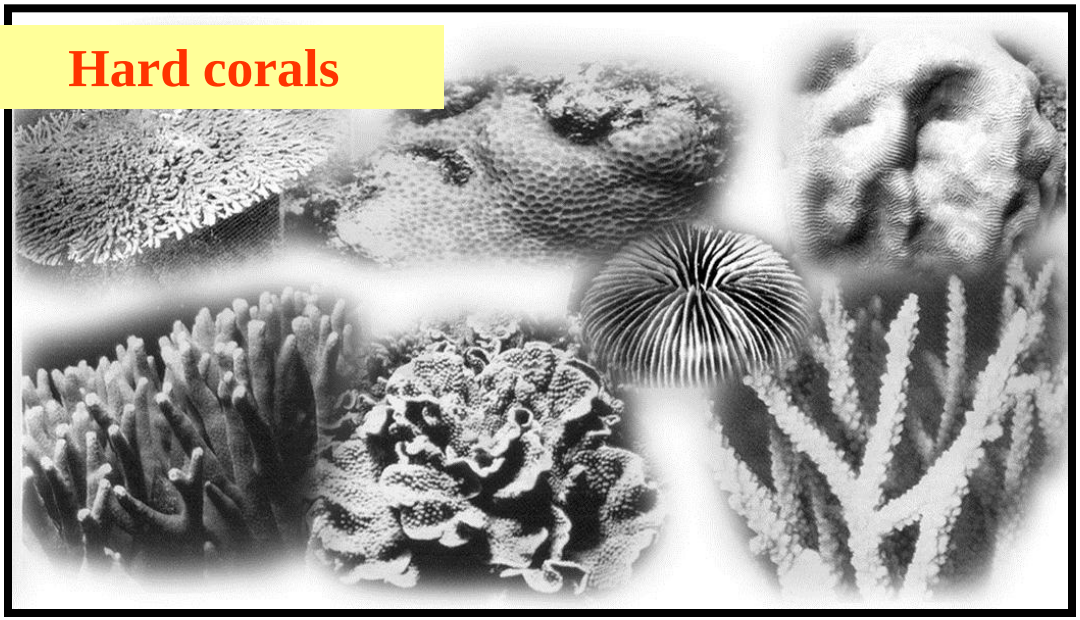
Manta tow method

Snorkel survey

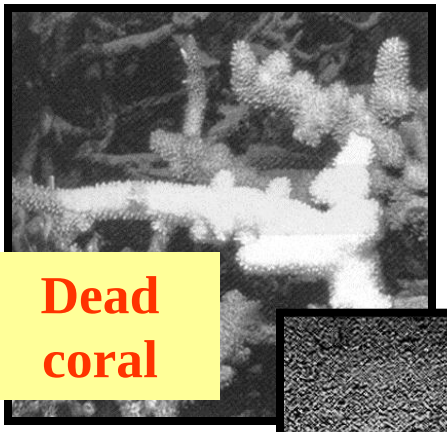
Coral reef habitat components/substrates

- **Live Hard Coral (LHC)** – coverage of stony or hard corals on the bottom or part of the bottom
- **Live Soft Coral (LSC)** – coverage of soft corals attached to the bottom
- **Dead Standing Coral (DSC)** – recently killed coral still attached and recognizable at the bottom in original upright position
- **Coral Rubble (CR)** – coverage of loose broken fragments of stony corals or coralline algae on the bottom, with a diameter greater than 1 cm
- **Hard Rocky Surface (HRS)** – consolidated hard bottom or large blocks of hard reef material not attached to bottom or easily moved around
- **Sand/Silt (S)**

Hard corals

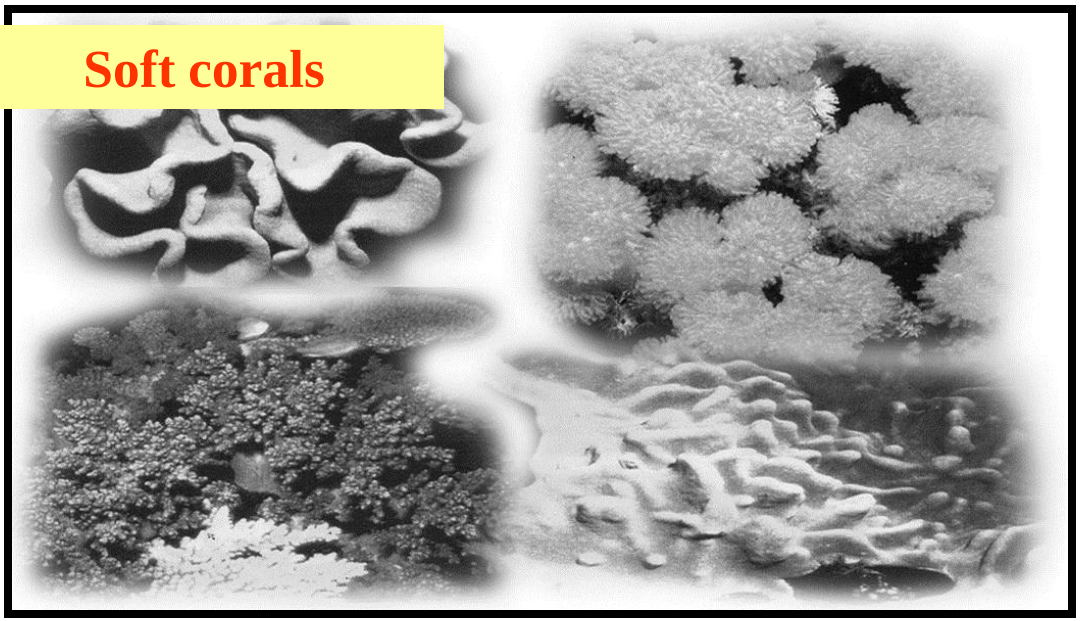


Dead coral

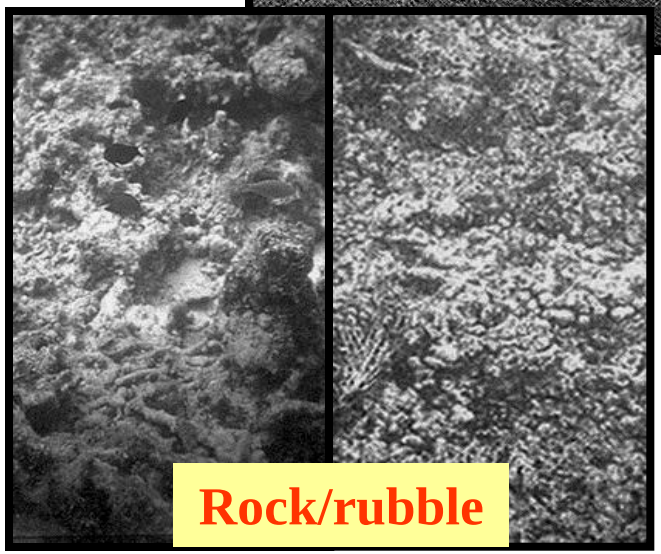


Sand/ silt

Soft corals



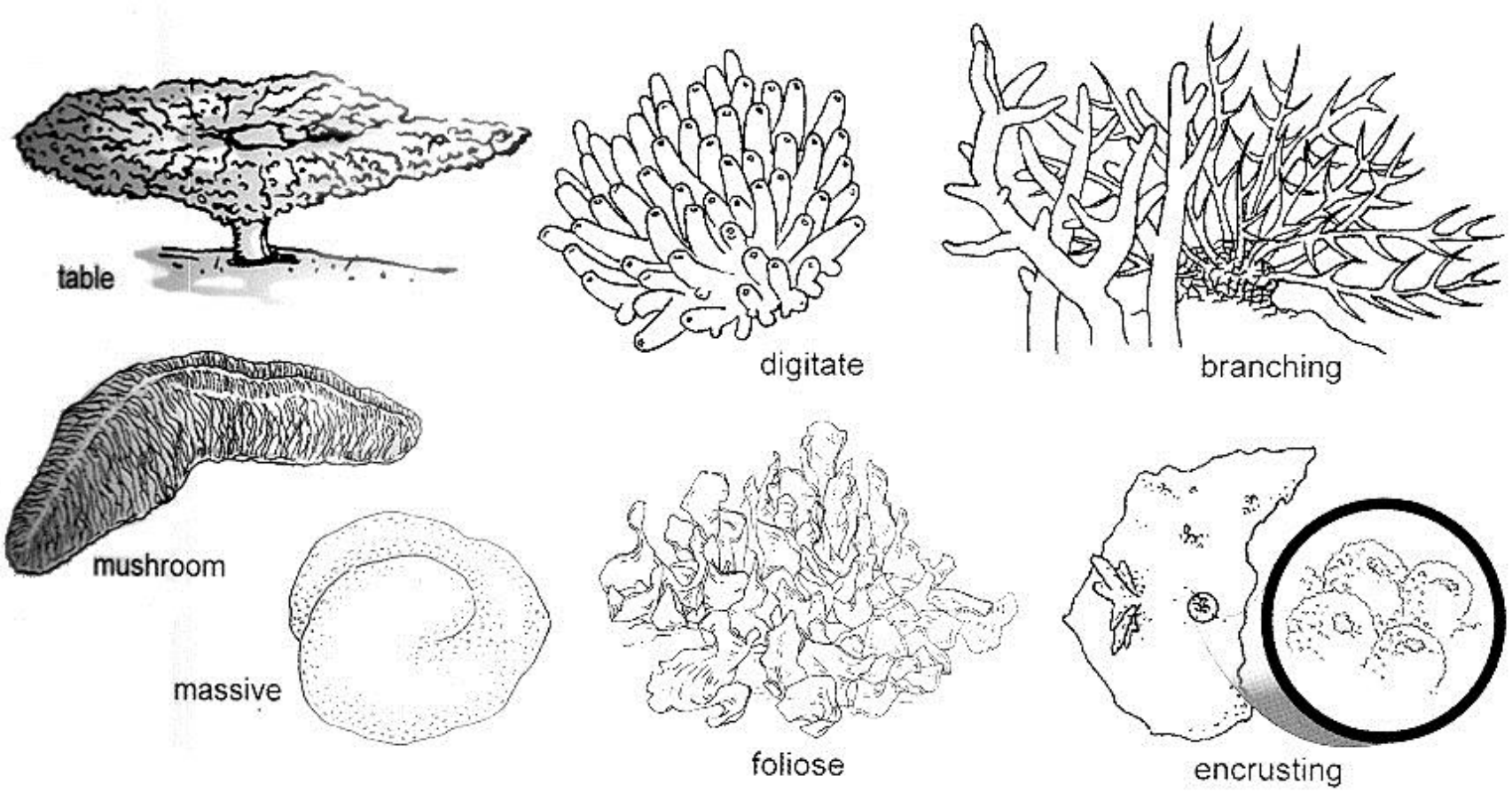
Rock/rubble

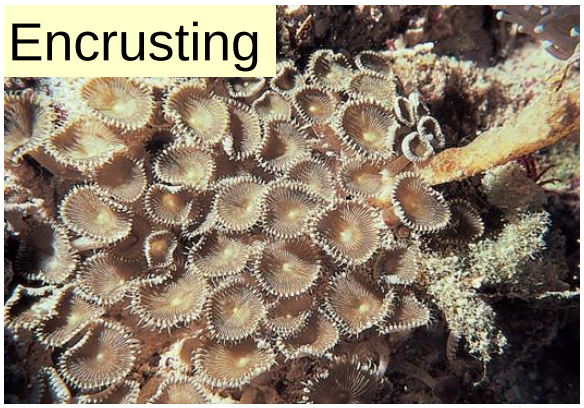


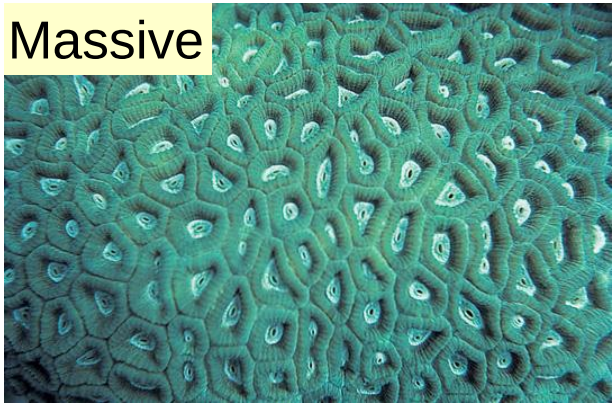
USAID FROM THE AMERICAN PEOPLE

FISH PHILIPPINES
The Fisheries Improved for Sustainable Harvest Project

Coral life forms

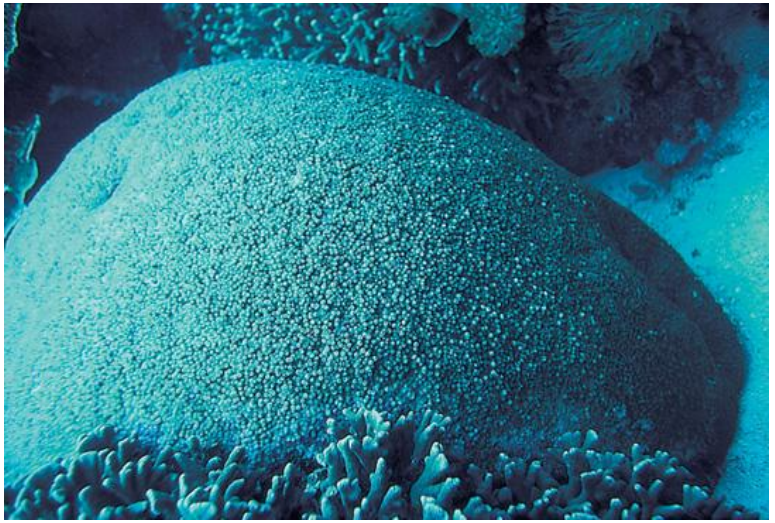






- **Branching** – at least two degrees branch
- **Encrusting** – major portion attached to substratum as a laminar plate
- **Foliose** – coral attached at one or more points, leaf-like or plate-like appearance
- **Massive** – solid boulder or mound
- **Sub-massive** – tends to form small columns, knobs or wedgesplate
- **Mushroom** – solitary, unattached or free-living corals

Acropora palifera Columnar branching coral



***Astreopora* sp.** Starflower coral

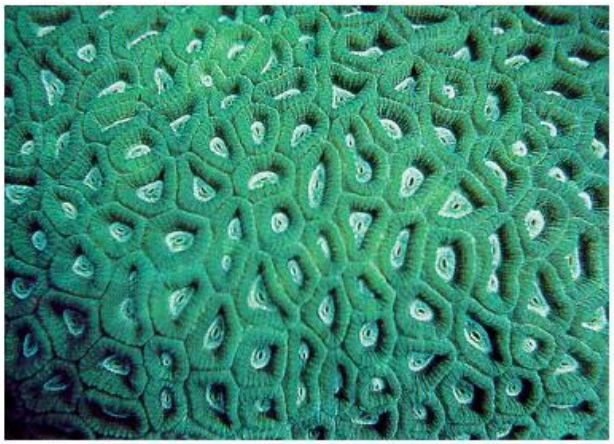
***Acropora* sp.** Table coral

***Acropora* sp.** Tubular branching coral

Source: Philippine Coral Reefs: A Natural History Guide (White 2001)

USAID FROM THE AMERICAN PEOPLE
FISH PHILIPPINES
The Fisheries Improved for Sustainable Harvest Project

Oulophyllia crispa Intermediar valley coral



***Favia* sp.** Knob coral

Cycloseris patelliformis Hermit coral

Platygyra lamellina Lesser valley coral

***Leptoria* sp.** Least valley coral

***Fungia* sp.** Mushroom coral

Source: Philippine Coral Reefs: A Natural History Guide (White 2001)

USAID FROM THE AMERICAN PEOPLE
FISH PHILIPPINES
The Fisheries Improved for Sustainable Harvest Project

Heliofungia actiniformis Anemone mushroom coral

Galaxea fascicularis Octopus coral

***Symphillia* sp.** Sinuous cup coral

Lobophillia costata Lobed cup coral

Mycedium elephantotus Chinese lettuce coral

Archelia horrescens Octopus coral

Source: Philippine Coral Reefs: A Natural History Guide (White 2001)

USAID FROM THE AMERICAN PEOPLE
FISH PHILIPPINES
The Fisheries Improved for Sustainable Harvest Project

Coral reef habitat assessment forms

CORAL REEF HABITAT ASSESSMENT TRANSECT DATA

Date:_____ Location:_____

Transect No.	Quadrat No.	LHC	LSC	DSC	CR	HRS	S	Total	Other Observations

MANTA TOW DATA FORM

Site name:_____ Date:_____

Tow No.	Location	Hard Coral	Soft Coral	Dead Standing Coral	Coral Rubble	Hard Rock Surface	Sand	Total

POINT INTERCEPT METHOD DATA FORM

Site Name: _____ Municipality/Province: _____ Date: _____

Observer: _____ Transect No. _____ Depth: _____

Benthic lifeforms/Coral reef components	Number of sampling points found	Estimated percentage cover
Live Hard Coral		
Live Soft Coral		
White Dead Coral		
Dead Coral with Algae		
Turf Algae		
Fleshy microalgae		
Coralline algae		
Sponges		
Other animals		
Seagrass		
Rubble		
Rock		
Sand/silt		

Seagrass habitat assessment

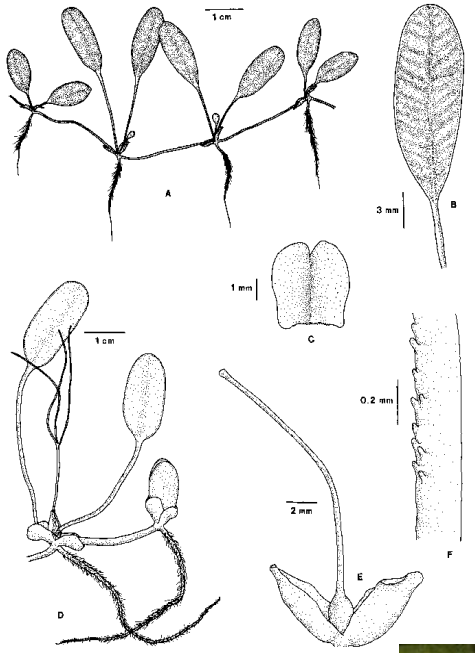
- Seagrass habitat assessment is highly similar to coral reef assessment and the quadrat size used is 1 x 1 m. The transects and quadrats are laid where the seagrass habitat begins, and end where the observed habitat ends. Intervals between transects and between quadrats are determined by the size and expanse of the habitat.
- PCRA for seagrass generally employs the snorkel method.
- Participants must be familiar with the various seagrass species as species identification is an important component of the PCRA.
- The Philippine has 16 known species of seagrass, the second highest in the world to Australia's 23.

Seagrass habitat assessment form

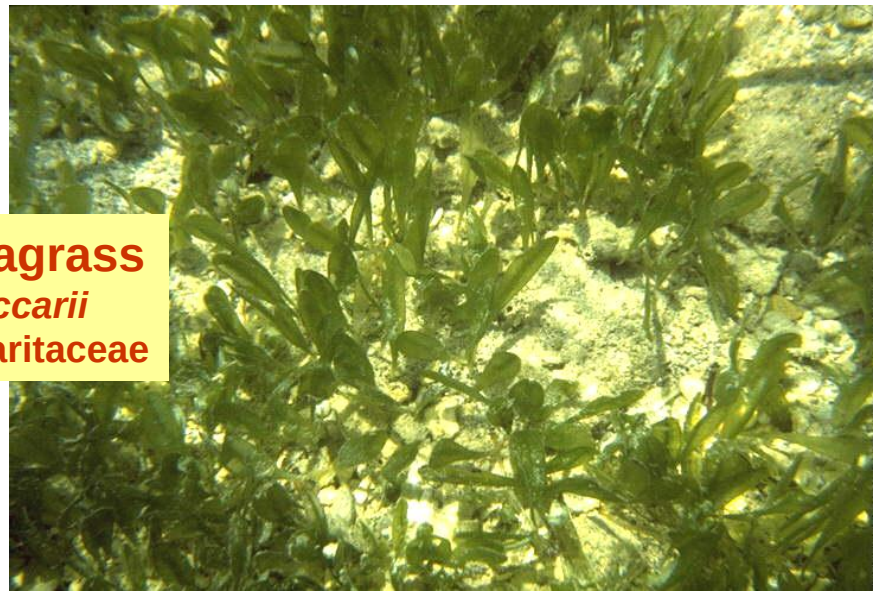
SEAGRASS HABITAT ASSESSMENT
TRANSECT DATA

Date: _____ Location/Area covered: _____

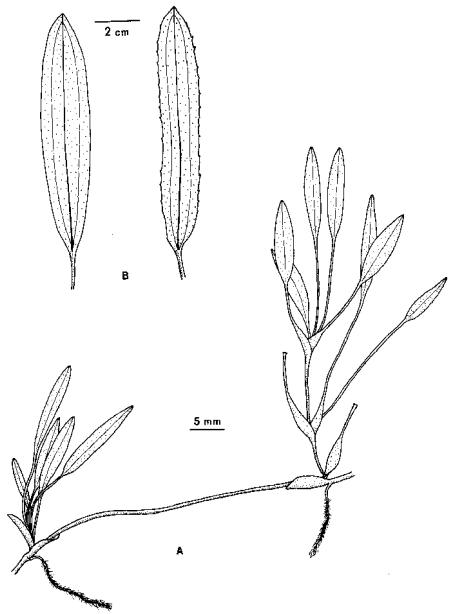
Transect No.	Quadrat No.	Species	% cover	Substrate	Other Observations

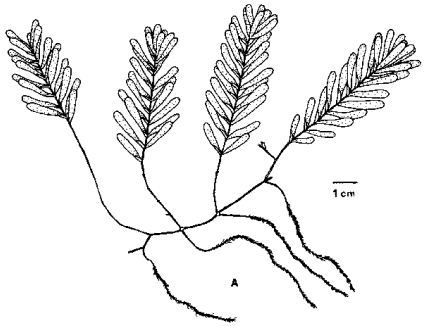


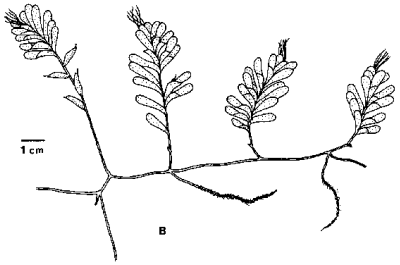
Spoon seagrass
Halophila ovalis
Family Hydrocharitaceae



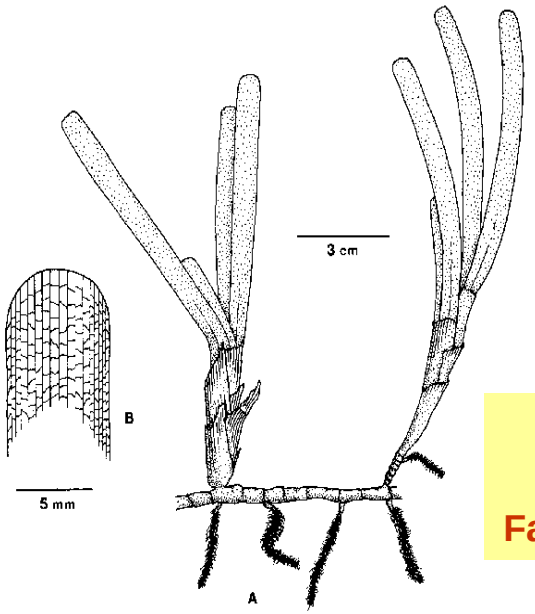
Beccari's seagrass
Halophila beccarii
Family Hydrocharitaceae







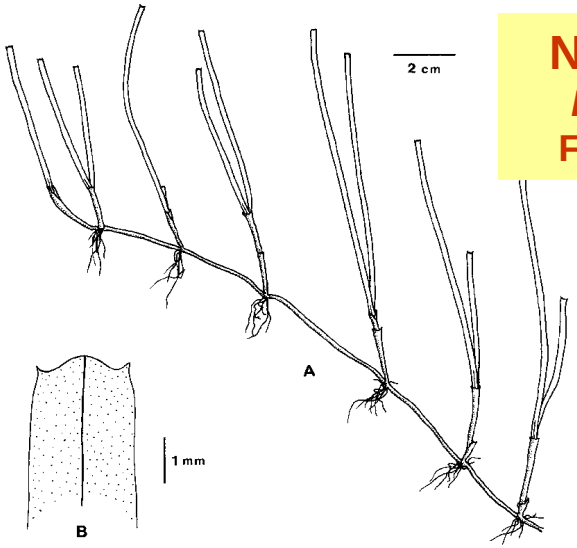
Fern seagrass
Halophila spinulosa
Family Hydrocharitaceae



Sickle seagrass
Thalassia hemprichii
Family Hydrocharitaceae

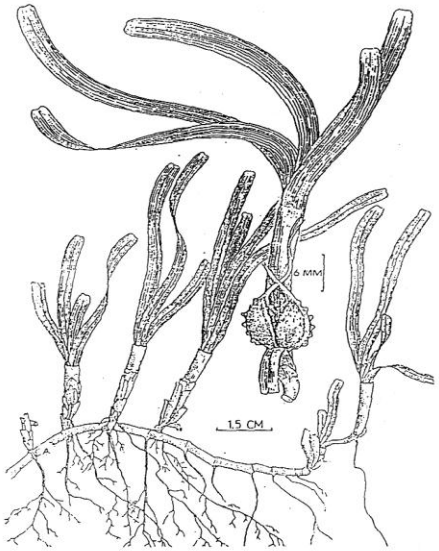
USAID FROM THE AMERICAN PEOPLE

FISH PHILIPPINES
The Fisheries Improved for Sustainable Harvest Project



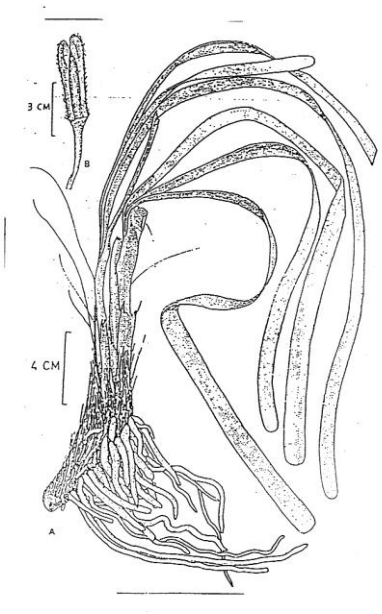
Needle seagrass
Halodule uninervis
Family Cymodoceae

Ribbon seagrass
Cymodocea rotundata
Family Cymodoceacea



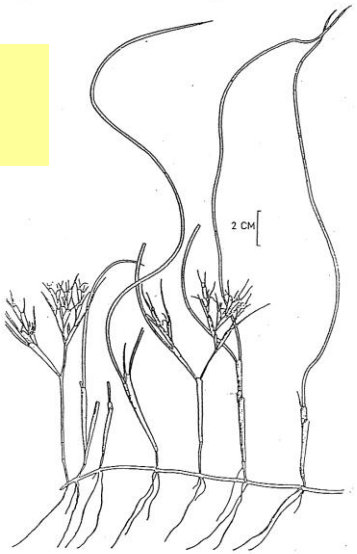
USAID FROM THE AMERICAN PEOPLE

FISH PHILIPPINES
The Fisheries Improved for Sustainable Harvest Project



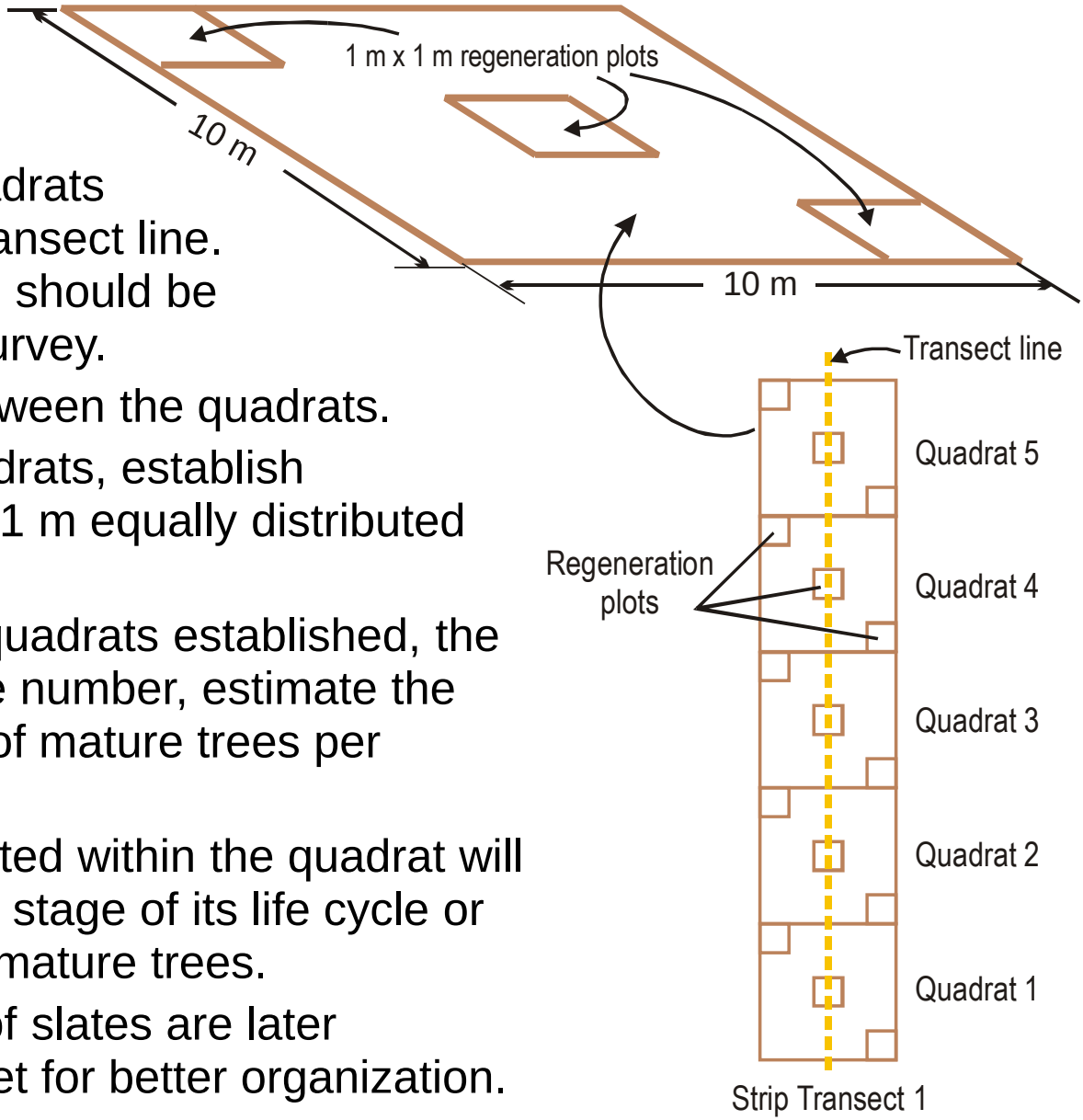
Eel seagrass
Enhalus acoroides

Syringodium isoetifolium

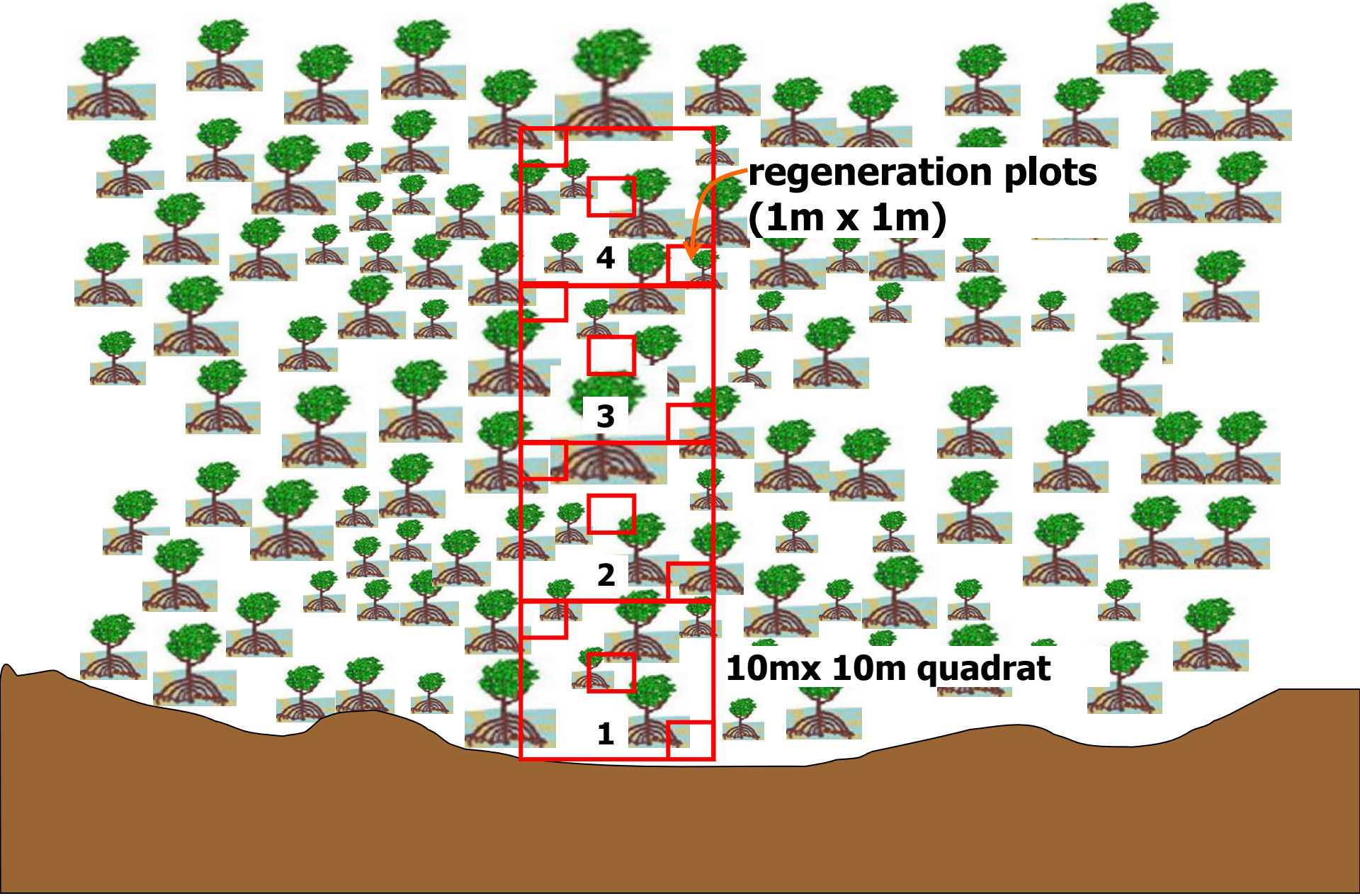



Mangrove habitat assessment

- In mangroves, the area of investigation is 10% of the total mangrove forest. Transect lines and quadrats will be used.
- In mangrove assessment, the percent crown cover, number of regeneration per square meter, average height of trees and number of species observed are calculated/estimated.
- Longer transects and larger quadrats are called for. Transect lines may run from 20-100 m, depending on the size or expanse of the mangrove habitat. Quadrats measuring 10 x 10 meters are also called for.
- Each transect should extend seaward or perpendicular to the shoreline and should start where the mangrove habitat starts, and ends, where the habitat ends.



- A series of 10 m x 10 m quadrats are established along the transect line. The position of the quadrats should be consistent throughout the survey.
- There will be no interval between the quadrats.
- Within the 10 m x 10 m quadrats, establish 3 smaller quadrats of 1 m x 1 m equally distributed as regeneration plots.
- With the strip transect and quadrats established, the PCRA participants count the number, estimate the height and crown diameter of mature trees per species in each quadrat.
- Each kind of mangrove located within the quadrat will be counted according to the stage of its life cycle or age: seedling, sapling, and mature trees.
- Data recorded on waterproof slates are later transcribed onto a data sheet for better organization.



Seedling – up to 1m height and a trunk size less than 4cm in diameter

Sapling – greater than 1m height and a trunk size of 4cm in diameter

Mature tree – greater than 1m height and a trunk size greater than 4cm in diameter

Seedling

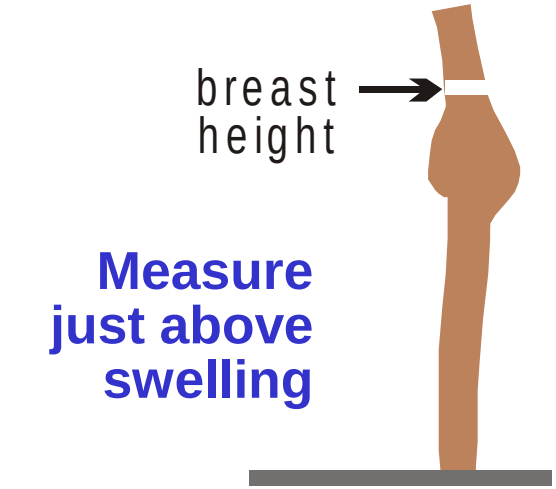
Sapling

Mature tree

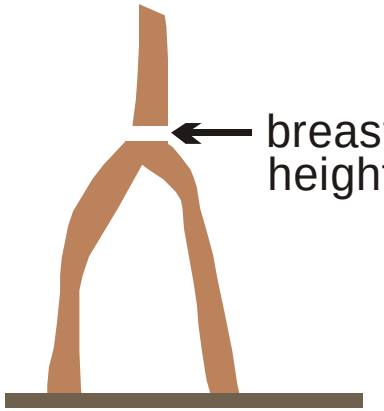
USAID FROM THE AMERICAN PEOPLE

FISH PHILIPPINES The Fisheries Improved for Sustainable Harvest Project

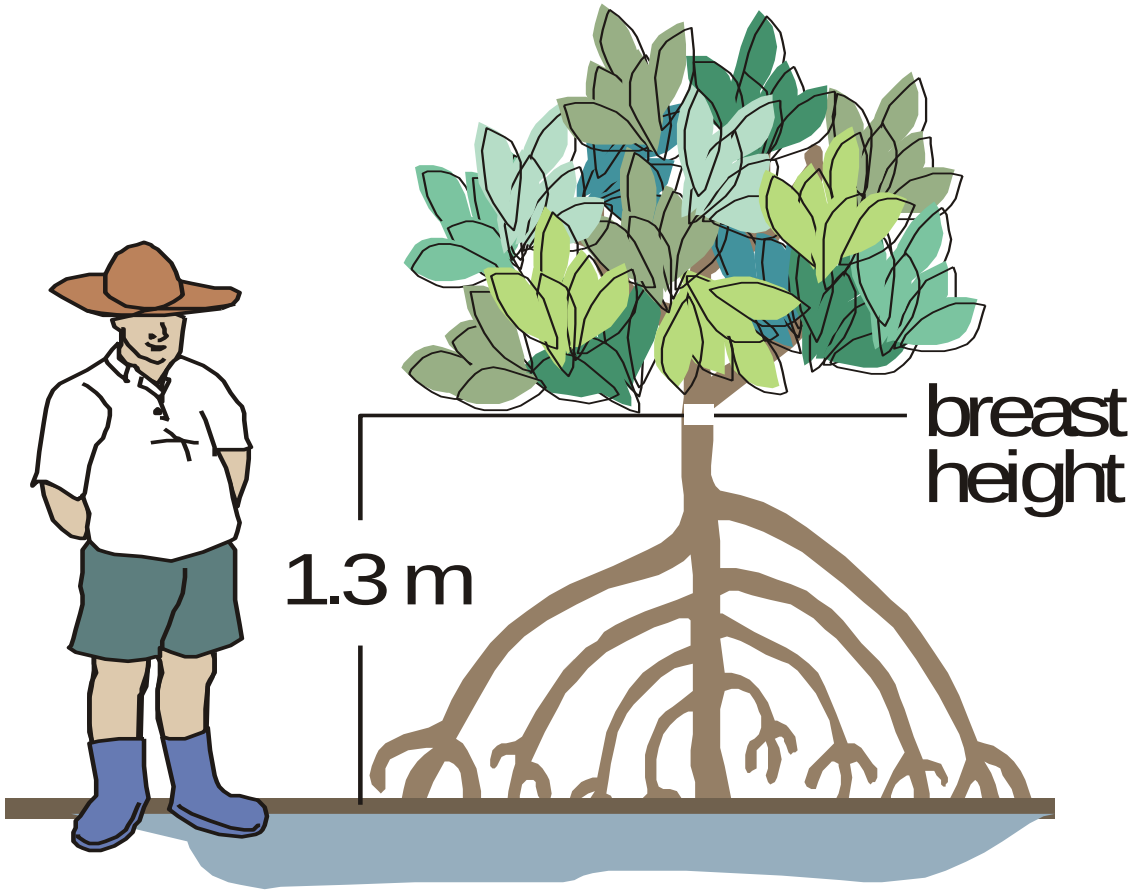
If the growth of mangroves is irregular, determine breast height by any of the following:



Measure just above swelling



Measure above irregular growth



Mangrove habitat assessment and regeneration data sheets

DATA SHEET FOR MANGROVE ASSESSMENT

Transect No. _____ Location _____

Recorder: _____ Site Barangay

Date _____ Municipality Province

Quadrat No.	Tree No.	Substrate	SPECIES	Total Ht. (m)	Crown diameter (2 readings)	OBSERVATIONS (disturbance, threats, uses, cuttings, garbage, fauna)

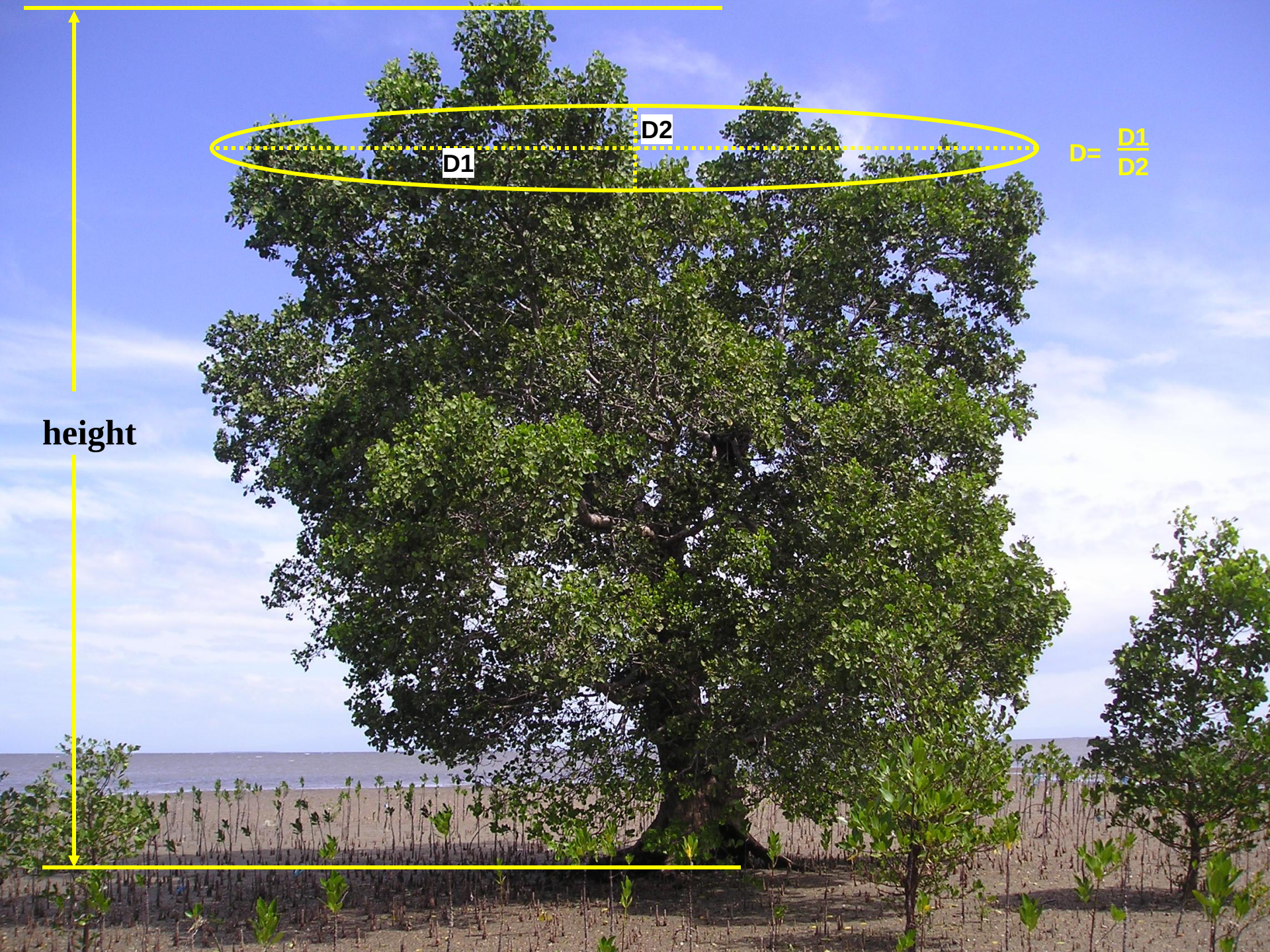
DATA SHEET FOR MANGROVE REGENERATION

Transect No. _____ Location _____

Recorder: _____ Site Barangay

Date _____ Municipality Province

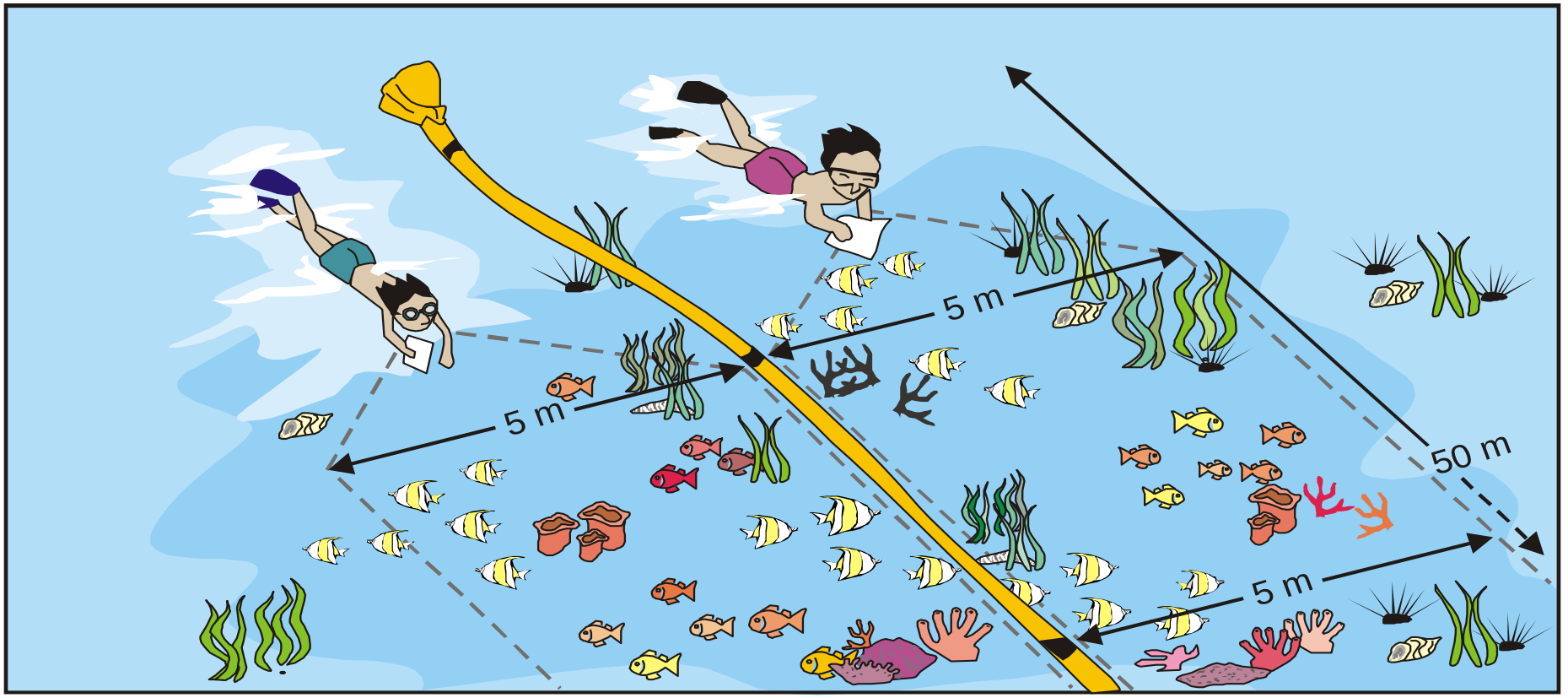
Quadrat No.	Plot No.	SPECIES	Count	REMARKS (ave. height, status, etc.)
1	1 2 3			
2	1 2 3			

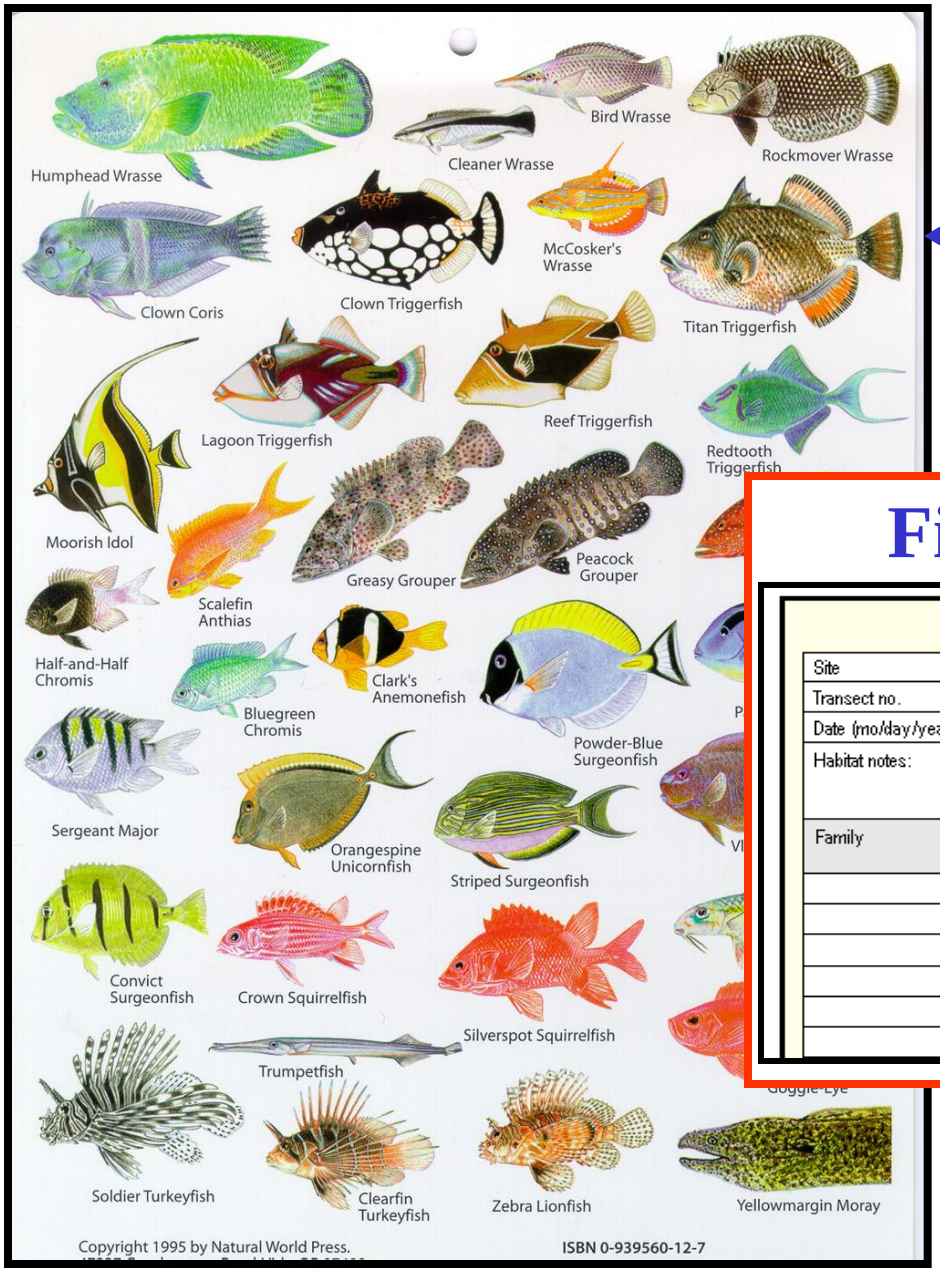

D2
D1
D= D1/D2
height

Fish visual census

- Fish visual census is the identification and counting of fishes observed within a defined area.
- It is used to estimate the variety, numbers and even sizes of common, easily-seen, easily-identified fishes in areas of good visibility. This information may reflect the health of the fish stocks within the surveyed area.
- Participants must be familiar with the various reef fishes. Where possible, a laminated fish identification guide should be prepared for participants' reference during the conduct of the fish visual census.
- Faster moving fishes are counted before the slower moving fishes. Each transect covers an area of 500 m^2.

- Starting at one end of the line, each observer floats on each side of the transect line while observing 5 m to his/her side of the transect and forward to the next 5-m mark. Both observers swim to and stop every 5 m along the line to record the counts of fish per size class until the transect is completed.
- Total counts are then transcribed onto the data form.





Laminated fish identification guide sample

Fish abundance data form

FISH ABUNDANCE DATA FORM

Site		Municipality and Province			
Transect no.	Depth (m):	Coordinates:			
Date (mo/day/year):	Time:	Left observer:	Right observer:		
Habitat notes:		Horizontal visibility:	Angle of slope:	Transect orientation (NEW/S):	

Family	Species	Record number of fishes per size class			
		1-10 cm	11-20 cm	21-30 cm	Specify sizes for >30 cm

USAID FROM THE AMERICAN PEOPLE

FISH PHILIPPINES
The Fisheries Improved for Sustainable Harvest Project