

International Sustainable Development Studies Institute
สถาบันการศึกษาการพัฒนาที่ยั่งยืนนานาชาติ

Experiential Learning Workbook

Culture and Ecology of Coasts and
Islands

Fall Semester, 2021



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Coastal/Marine Plant and Animal Identification

During the time in the coastal and marine ecosystems of southern Thailand, we will encounter an amazing amount of biodiversity. By collecting detailed information on at least 10 unique species, you will acquire a more focused understanding of how a few species fit into the diverse ecologies of these areas. During field activities, whether snorkeling, surveying seagrasses, or scrambling through a mangrove, take the time to carefully observe the organisms around you. There should be ample time to swim or sit and record taxonomic and ecological information from a variety of living things. Combine your first-hand observations with available field guides, readings, and conversations with local people. This process will enhance your and the group's understanding of this organism's part in the greater ecosystem.

Complete 10 entries to the greatest degree possible. You may choose to do more, but 14 poorly described species do not substitute for 10 well described species. It will typically take multiple sources of information, and several revisits to complete each entry. Please cite when and where you saw each specimen and which sources you used for the ecological role and cultural significance categories.

YOU MUST OBSERVE EACH SPECIES YOU IDENTIFY IN THE FIELD.

Summarize your findings on the "Species List" for all observed species.

10 total described species must include:

3 well described plant/algae species (minimum)

3 well described invertebrate species (minimum)

3 well described vertebrate species (minimum)

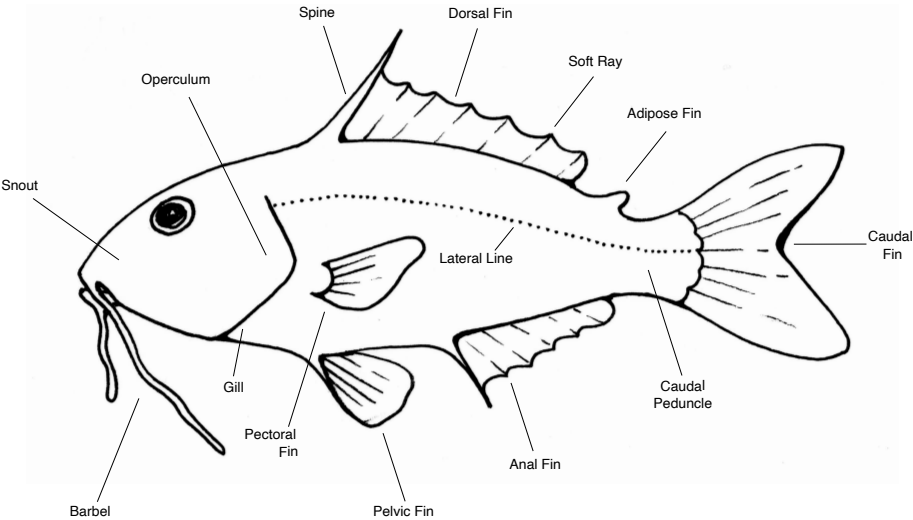
1 additional well described organisms of any category

Species Summary List

Species Summary List			
Species #	Species Name	Species Type	Environment
1		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
2		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
3		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
4		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
5		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
6		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
7		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
8		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
9		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
10		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
11		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
12		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
13		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	

Species Summary List			
Species #	Species Name	Species Type	Environment
14		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	
15		<input type="checkbox"/> Plant/algae <input type="checkbox"/> Invertebrate <input type="checkbox"/> Vertebrate	

General Fish Morphology and Description



Species 1 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 2 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 3 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 4 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 5 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 6 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 7 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 8 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 9 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 10 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 11 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 12 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 13 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 14 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Species 15 Information and Description

Common Name: _____

Scientific Name: _____

Thai Name: _____

Type of organism: ☐ plant ☐ algae ☐ invertebrate ☐ vertebrate
☐ sessile ☐ mobile

Sketch

Behavior/Habitat

Location(s) observed

Ecological Role

Cultural significance — if any (food/use/economic value/other)

Ocean Travel Log

Weather and tides play a crucial role in ocean ecosystems and for people who depend on the ocean for their livelihood. Whenever you are on the water it is important to be aware of the weather and tides. Both will effect your daily activities and schedule in the same way they effect coastal communities on a daily basis throughout the world.

During the course you will be doing a lot of travel on the water. It is important to be engaged and observing your surroundings, the state of the ocean, wind, etc. as you travel.



You need to fill out **4 Ocean Travel Logs** in total.

Be sure to fill the logs out as completely as possible.

Draw a map of the area you traveled through.

Annotate the map of your travel with activities or other significant details (e.g. a dive site, fishing, etc.).

Ocean Travel Log 1

Date:	Type of boat:
Time start:	Time end:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:



MAP (Note direction of travel as well as any significant details/description)

Ocean Travel Log 2

Date:	Type of boat:
Time start:	Time end:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/> ↑ <input type="checkbox"/> ↓ <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

MAP (Note direction of travel as well as any significant details/description)

Ocean Travel Log 3

Date:	Type of boat:
Time start:	Time end:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

MAP (Note direction of travel as well as any significant details/description)

Ocean Travel Log 4

Date:	Type of boat:
Time start:	Time end:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/> ↑ <input type="checkbox"/> ↓ <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

MAP (Note direction of travel as well as any significant details/description)

Ecological Field Surveys

During this course you will be using ecological field survey methods in several different and distinct ecosystems.

Biodiversity survey: The purpose of the biodiversity survey is to learn about all of the diversity of life (vertebrates, invertebrate, etc.) in a specific area. The goal is to understand the **number of different** species in the designated area. The goal is to identify as many different species as possible in the area.

Community study: The purpose of a community study is to look in-depth at a **specific area** and note the species diversity as well as **map the species** within a bounded area. The goal is to identify and count the number of **different species** as well as the **numbers of individuals** of that species in the area.

Transect survey: A transect is a survey along a line in a designated area. The purpose of the transect is to understand **diversity, abundance, and distribution** along the transect line. The goal is to map out along the line, noting scale/distance in total, as well as where individuals cross or are immediately adjacent to the transect.

Zonation survey: The zonation survey is a **transect along a gradient** (e.g. salinity or water depth) to understand how species and diversity varies along the gradient in question. The goal is to map out along the line, noting scale/distance in total, as well as where individuals cross or are immediately adjacent to the transect.

There are three major ecosystems where you will be using these methods:

- Mangroves (including mudflats)
- Sea grasses
- Coral Reefs

Due to the experiential and field-based nature of this course, the types and locations of the surveys will depend in part on the wind, waves, and access to the specific ecosystems.

Some of the ecological field surveys will be conducted in multiple locations to allow for comparison and a deeper understanding of the ecological processes at work. For example, a community study on one side of an island with strong off shore currents may look different than a community study in the lee side of an island.

Biodiversity Surveys

Survey #1 Location: _____



Survey #2 Location: _____

Survey #3 Location: _____

Survey #4 Location: _____



Survey #5 Location: _____

Biodiversity Survey # 1

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

[illegible]

Biodiversity Survey # 2

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:



[illegible]

Biodiversity Survey # 3

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/> ↑ <input type="checkbox"/> ↓ <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:



[illegible]

Biodiversity Survey # 4

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

[illegible]

Biodiversity Survey # 5

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

[illegible]

Community Studies

Study #1 Location: _____

Study #2 Location: _____

Study #3 Location: _____

Study #4 Location: _____

Study #5 Location: _____



Community Study # 1

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/> ↑ <input type="checkbox"/> ↓ <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: _____ Min: _____	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full: _____

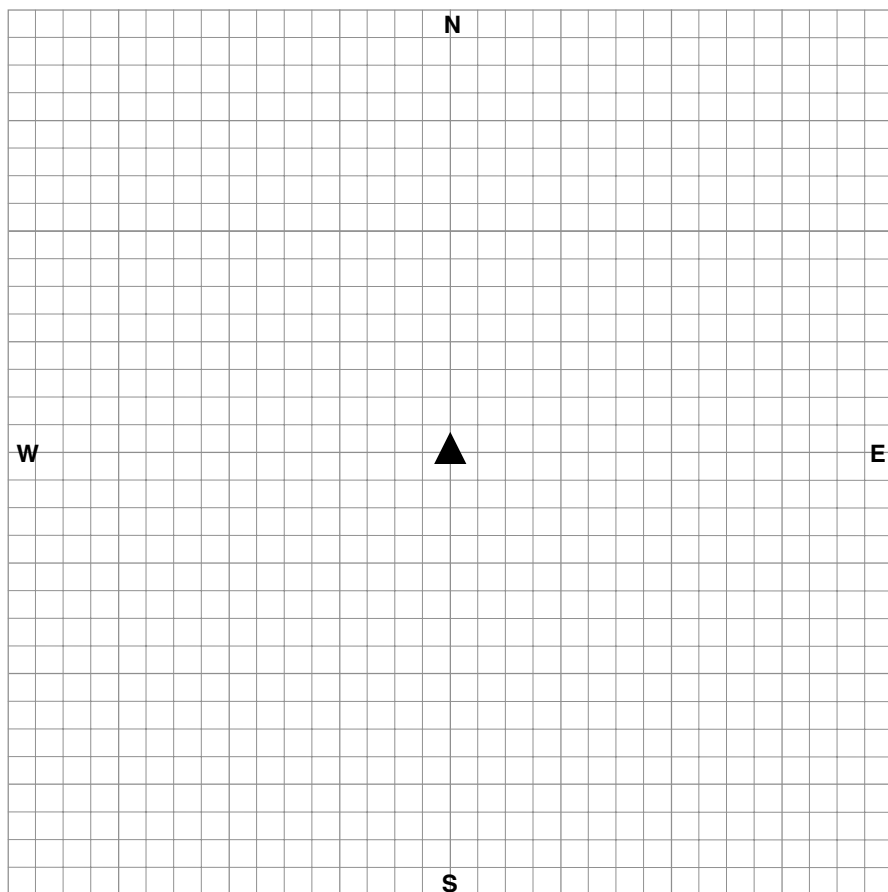
- Map and identify distribution of organisms within the area studied.
- Note the scale on your map (1 large square = 1 meter or 2 = 1 meter, etc.)
- Orient towards North at the top, and record the scale between the heavy grid lines.

A blank grid with a central black triangle pointing upwards. The grid is labeled with cardinal directions: 'N' at the top, 'S' at the bottom, 'W' on the left, and 'E' on the right. The grid lines are thin and light gray.



Community Study # 2

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

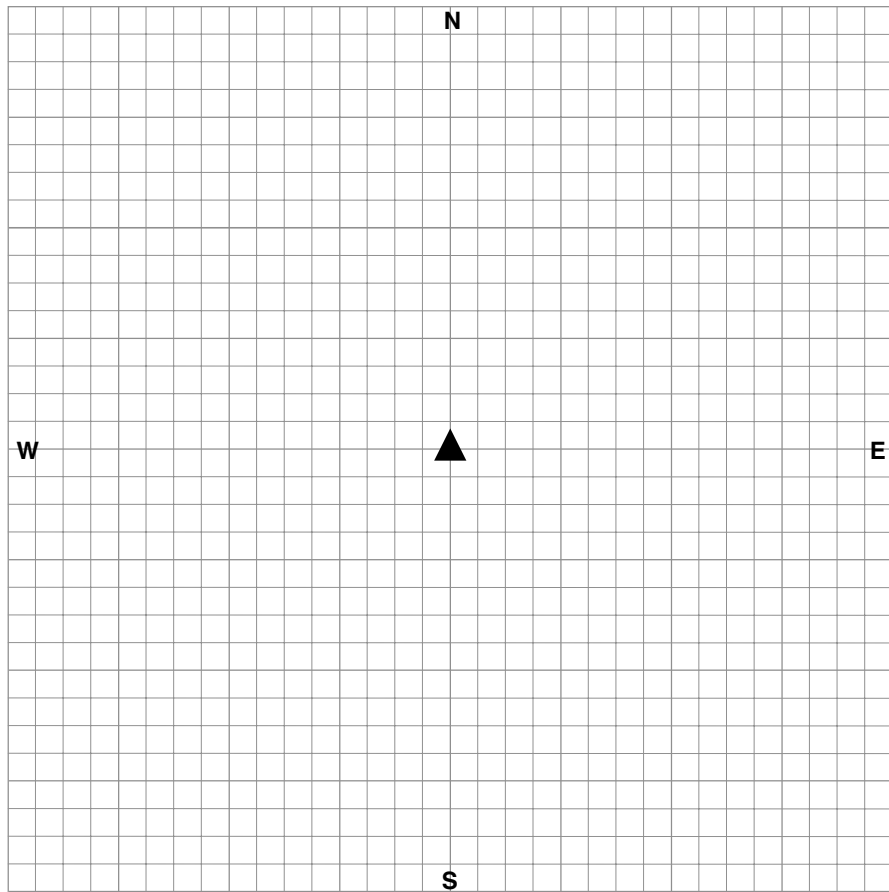
- Map and identify distribution of organisms within the area studied.
- Note the scale on your map (1 large square = 1 meter or 2 = 1 meter, etc.)
- Orient towards North at the top, and record the scale between the heavy grid lines.





Community Study # 3

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

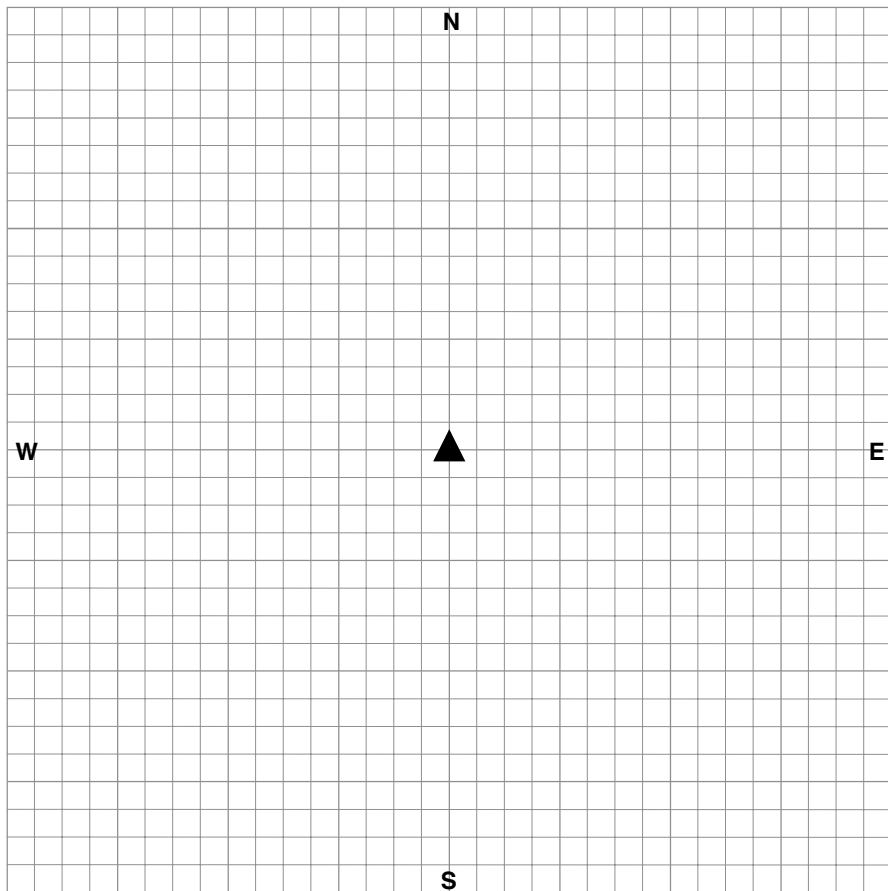
- Map and identify distribution of organisms within the area studied.
- Note the scale on your map (1 large square = 1 meter or 2 = 1 meter, etc.)
- Orient towards North at the top, and record the scale between the heavy grid lines.





Community Study # 4

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

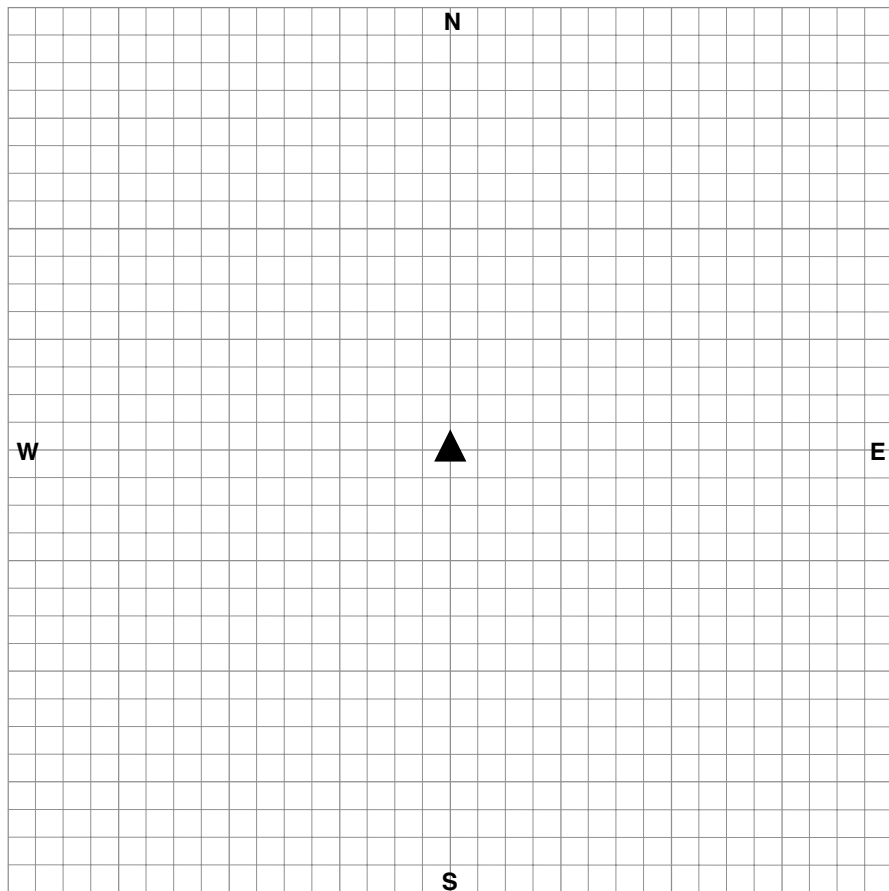
- Map and identify distribution of organisms within the area studied.
- Note the scale on your map (1 large square = 1 meter or 2 = 1 meter, etc.)
- Orient towards North at the top, and record the scale between the heavy grid lines.



Community Study # 5

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

- Map and identify distribution of organisms within the area studied.
- Note the scale on your map (1 large square = 1 meter or 2 = 1 meter, etc.)
- Orient towards North at the top, and record the scale between the heavy grid lines.



Transect Surveys

Survey #1 Location: _____

Survey #2 Location: _____

Survey #3 Location: _____

Survey #4 Location: _____

Transect Survey # 1

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/> ↑ <input type="checkbox"/> ↓ <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:



- Tally all organisms within one (1) meters of both sides of the transect line (e.g. 2 meters total width).
- Record the substrate directly below the transect line at the mark. If there is anything of note and/or intersecting the line, record (e.g. nets, dynamite fishing).

Transect Notes

Transect Survey

Meter	Substrate	Species (vertebrate, invertebrate, plants, etc)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
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Transect Survey # 2

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

- Tally all organisms within one (1) meters of both sides of the transect line (e.g. 2 meters total width).
- Record the substrate directly below the transect line at the mark. If there is anything of note and/or intersecting the line, record (e.g. nets, dynamite fishing).

Transect Notes

Transect Survey

Meter	Substrate	Species (vertebrate, invertebrate, plants, etc)
1		
2		
3		
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Transect Survey # 3

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/> ↑ <input type="checkbox"/> ↓ <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:



- Tally all organisms within one (1) meters of both sides of the transect line (e.g. 2 meters total width).
- Record the substrate directly below the transect line at the mark. If there is anything of note and/or intersecting the line, record (e.g. nets, dynamite fishing).

Transect Notes

Transect Survey

Meter	Substrate	Species (vertebrate, invertebrate, plants, etc)
1		
2		
3		
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Transect Survey # 4

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

- Tally all organisms within one (1) meters of both sides of the transect line (e.g. 2 meters total width).
- Record the substrate directly below the transect line at the mark. If there is anything of note and/or intersecting the line, record (e.g. nets, dynamite fishing).

Transect Notes

Transect Survey

Meter	Substrate	Species (vertebrate, invertebrate, plants, etc)
1		
2		
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Zonation Surveys

Survey #1 Location: _____

Survey #2 Location: _____

Survey #3 Location: _____

Survey #4 Location: _____

Mangrove Channel Study

Through this study you will gain first hand insight into the ways abiotic and biotic conditions vary within mangrove ecosystems by comparing how abiotic and biotic factors change with distance from the coastline. Observations will be compared between sites to obtain a general impression of how conditions and communities can vary within mangroves depending on location and microenvironment.

Study Locations

Mouth: The opening of the mangrove to the ocean



Mid-Channel: Where the channel is 8-10 meters across

Narrow Channel: Where the channel is less than 4 meters across

Directions

Snorkel in the channel and near the roots of the mangroves, looking carefully for juvenile fish and invertebrates. Visibility may be poor, but observe as much as you can. Use dive slates to collect observations.

Mangrove Mouth

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

What is the substrate (bottom) like? Describe.

Describe if there is leaf litter present. Are there signs of herbivory or observable decomposition? Can you observe what is eating the leaf litter?

Do you see any invertebrates? What species / size / location?



Do you see any fish or other vertebrates? What species / size / location?

Using the field guides, identify and list the predominant tree species at this location.

How dense is the tree canopy cover in this location? Does much light reaches the water?

How does this compare to the other two locations?

Mangrove Mid-Channel

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

What is the substrate (bottom) like? Describe.

Describe if there is leaf litter present. Are there signs of herbivory or observable decomposition? Can you observe what is eating the leaf litter?

Do you see any invertebrates? What species / size / location?

Do you see any fish or other vertebrates? What species / size / location?

Using the field guides, identify and list the predominant tree species at this location.

How dense is the tree canopy cover in this location? Does much light reaches the water?

How does this compare to the other two locations?

Mangrove Narrow Channel

Date:	Site Name:
Coordinates:	Time of day:
Current Direction: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Strong	Weather: <input type="checkbox"/> Clear <input type="checkbox"/> Overcast <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain
Wave Height: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High	Wind: <input type="checkbox"/> Calm <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> High
Tide <input type="checkbox"/> ↑ <input type="checkbox"/> ↓ <input type="checkbox"/> Low <input type="checkbox"/> Mid <input type="checkbox"/> High Max: Min:	Moon <input type="checkbox"/> Waxing <input type="checkbox"/> Waning <input type="checkbox"/> Full <input type="checkbox"/> New Days until full:

What is the substrate (bottom) like? Describe.

Describe if there is leaf litter present. Are there signs of herbivory or observable decomposition? Can you observe what is eating the leaf litter?

Do you see any invertebrates? What species / size / location?

Do you see any fish or other vertebrates? What species / size / location?

Using the field guides, identify and list the predominant tree species at this location.

How dense is the tree canopy cover in this location? Does much light reaches the water?

How does this compare to the other two locations?

Mangrove Channel Study: Synthesis

Identify and write down one difference between the 3 zones and hypothesize a source of this difference.

How does this shape the ecosystem?

In the space below, sketch the three zones and annotate to highlight differences between them.

Marine Life Discussion with Community

This activity is designed to help you learn more how local people use the local environment to help fulfill their needs, including how their relationship to the surrounding environment has or has not changed over time.

Prepare questions to learn about the following issues, and record answers in your field journals:

1. What do community members collect from the marine environment, and from where? Mangroves, sea grass, reef, deeper water?
2. What tools do they use to catch/collect from these environments?
3. What time of day? What season / time of year?
4. How have things changed over time? What is it like now? What was it like when they were young?
5. Have the size and diversity of fish, for example, changed compared to now and when they were young?
6. For each thing collected, is this for family/personal use, or is it sold?
7. Who in the family does this? Is it everyone, mostly men, mostly women, depends on who is available?
8. Does the community manage access to these resources? If so, how? Are there any rules or traditions around collecting/catching in the marine or coastal environment?

Add your own questions to this list.

