

### Prior to Sampling Day with Camp

#### *Google Earth*

1. Select a Marsh
2. Use Google Earth to acquire birds-eye image of the marsh, and to define coordinates of sampling locations. (Data Sheet **A**)

#### *Ground-Truthing*

1. Visit marsh with staff prior to the sampling day
2. Determine endpoints of transect, and record actual transect length (Data Sheet **B**)
  - a) *Mark endpoints and quadrats with wooden stakes*
3. Note any major physical features
4. Enter Results into electronic data sheet (this workbook).

### Sampling Day

1. Gather equipment before departure (Data Sheet **C**)
2. Take photo of site (Data Sheet **C**)
3. Observe site for 15 minutes (Data Sheet **D**)
4. Deploy the fish Traps (Data Sheet **E**)
5. Find Transect endpoint markers, and lay out transect tape
6. Record transect length & coordinates for endpoints (Data Sheet **F**)
7. Determine Elevation Measurement Points along transect (Data Sheet **F**)
8. Take elevation data at Elevation Points; Temperature & Salinity at Quadrats (Data Sheet **F**)
9. Record and measure any physical features encountered by the transect (Data Sheet **F**)
  - a) *Record salinity of any surface water encountered.*
10. Record Coordinates and Biotic factors at Quadrats (Data Sheets **G-I**)
  - a) *Record Panne size and surface water salinity found within 10 meters of each quadrat.*

### Reflection: Either Sampling Day, or Day After

1. Reflect on process, site & experience (Data Sheet **D: Side 2**) - Optional

### After Sampling - Submitting Data (Complete by September 5, 2015)

1. Enter your findings into the electronic data sheet. (*Hint: When in the Excel workbook, use the "Tab" key to move just to the fields that you need to enter.*)
2. Upload completed Excel file to the Wiggio folder designated for your camp.  
*Wiggio --> Summer on the Marsh --> Data Sheets & Submission --> [Your camp] --> Field Data*
  - a) *Name the file with your camp's name and the sampling date. (e.g. HarborDiscoveries-7-12-2015.xlsx)*
3. Upload your 5 best photos from the experience, into your Wiggio photo folder designated for your camp.  
Name photos as [camp]-[year]-1, [camp]-[year]-2, etc. (e.g. HarborDiscoveries-2015-1.jpg)  
*Wiggio --> Summer on the Marsh --> Data Sheets & Submission --> [Your camp] --> Photos - Experiential*
  - a) *Do the same for your site photo(s) and quadrat photos*
4. Scan and upload your camp's best reflections from Data Sheet D. Name as [camp]-Observation-[Date]\_1, [camp]-Observation-[Date]\_2, etc. (e.g. HarborDiscoveries-Observation-7-12-2015\_1.jpg)
5. Email the following folks to alert them you have uploaded your data:  
*Danny Badger (dbadger@neaq.org); Meagan Gonnee (mgonnee@whoi.edu); Sarah Bursky (sbursky@neaq.org)*

This page is a summary of the complete Sampling Protocol. Use this as a quick-reference guide, but refer to the complete Sampling Protocol for details

Submit Completed Data Files To:

Wiggio --> Summer on the Marsh --> Data Sheets Submission --> [Your Camp] --> Field Data

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# Summer on the Marsh

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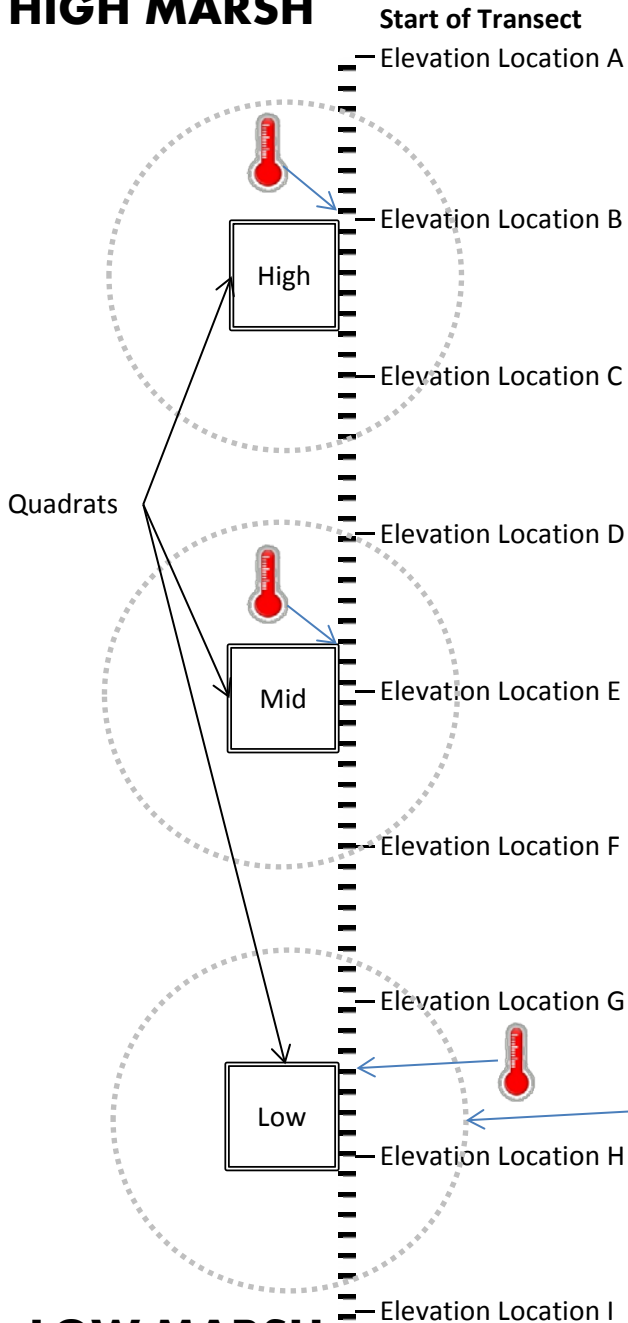
## Sampling Recipe

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Summer 2015



## HIGH MARSH

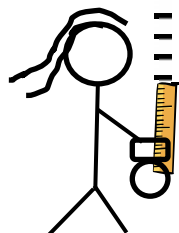


### In-The-Field TO DO List

- 1 Take photo of field site and record coordinates (Data Sheet C)
- 2 Do Quiet Site Observations (Data Sheet D)
- 3 Deploy Fish Trap (Data Sheet E)
- 4 Measure Elevation at each Elevation Location, and Salinity & Temperature at each Quadrat .  (Data Sheet F)
- 5 Record life found in Quadrats (Data Sheets G-I)
- 6 Record pannes found within 10 meters of Quadrats (Data Sheets G-I)
- 7 Record contents of fish trap (Data Sheet E)

*Area around quadrat in which to look for pannes (10 meter radius)*

## LOW MARSH



Elevation Location I  
Elevation Location J  
**End of Transect**



# Summer on the Marsh

# Data Sheet A

Camp Name: \_\_\_\_\_

Date: \_\_\_\_\_

Pre-sampling Google

Earth Exercises

## 1. Select location

To be done for each transect used.

**\* Without this information, your data cannot be used!**

Where is your study site?

### STUDY SITE

Date of the Image

Name of Salt Marsh\*

Find your marsh on Google Earth (GE). Draw your expected line transect (Instructions on Page 15 of the Sampling Protocol - SP). Record the Date of the Image and save the image as a KML file (Instructions on Page 18 of SP) in your Camp's Data Submission Folder.

Provide a descriptive name of your salt marsh (e.g. "Belle Isle Salt Marsh, Boston, MA")

### COORDINATES of Expected Transect Endpoints & Length\*

#### High Marsh

Latitude: N

Longitude: W

#### Low Marsh

Latitude: N

Longitude: W

Length of Transect  meters

Make sure you record your latitude and longitude in decimal degrees, like this:

Latitude 43.24812

Longitude -70.78115

Do NOT round the Lat / Long numbers. You will need all the digits given.

Record the length of your transect in meters.

### COORDINATES of Expected Quadrat Locations\*

#### High Marsh Quadrat

Latitude: N

Longitude: W

#### Mid Marsh Quadrat

Latitude: N

Longitude: W

#### Low Marsh Quadrat

Latitude: N

Longitude: W

# Summer on the Marsh

# Data Sheet A

## 2. Physical Features

**Feature 1 - Description:**

Intersects Transect

Feature crosses transect

About how far along the transect (from the High Marsh end) does the feature intersect the transect?

Meter

Within 10m of Quadrat

High  Mid  Low

**Feature 2 - Description:**

Intersects Transect

Feature crosses transect

About how far along the transect (from the High Marsh end) does the feature intersect the transect?

Meter

Within 10m of Quadrat

High  Mid  Low

**Feature 3 - Description:**

Intersects Transect

Feature crosses transect

About how far along the transect (from the High Marsh end) does the feature intersect the transect?

Meter

Within 10m of Quadrat

High  Mid  Low

**Feature 4 - Description:**

Intersects Transect

Feature crosses transect

About how far along the transect (from the High Marsh end) does the feature intersect the transect?

Meter

Within 10m of Quadrat

High  Mid  Low

Are there any physical features you note in the GE imagery that intersect the sample transect, or are within a 10-m radius of the quadrats (e.g. wrack line, boulders, access routes, pannes, ditches, creeks, etc)? If so, record what it is. This will help to identify and provide talking points around any changes in the marsh between the time that the GE image was taken, and your visit to the marsh.

Make a checkmark to indicate whether the feature is within 10 meters of a quadrat (specify the quadrat), or if it intersects the transect. (some may do both!) For any that intersects the transect line, estimate how far from the high-end of the transect line the intersection occurs.

# Summer on the Marsh

# Data Sheet B

Ground-Truthing

Camp Name: \_\_\_\_\_

Date: \_\_\_\_\_

## 1. Equipment List

These are the items you should gather before you venture to your field site to ground-truth, which is to be done prior to when you take campers to the field to do the sampling.

- Hammer or Mallet
- 5 Wooden Stakes or Wire Clothes Hanger to Mark Positions
- Transect Tape (≥ 100m)
- Printout of the Google Earth Image
- Binoculars
- Data Sheet A (completed)
- Pencils/Pens
- GPS Unit (Set to Decimal Degrees)
- Clipboard(s)
- Walkie Talkies
- Field Guides

## 2. Sample Site

You are to locate, in the field, the coordinates you identified from Google Earth (Data Sheet A). Place a marker (wooden stake) at the endpoints of your transect, and where each quadrat should be. If you need to change the location you derived from Google Earth imagery, based on what you find as you explore your site, make note of the nature of, and reason for, the change.

### COORDINATES of Transect Endpoints & Length

#### High Marsh

Latitude: N

Longitude: W

Relocated versus GE-based coordinates?

If relocated, briefly describe why...

#### Low Marsh

Latitude: N

Longitude: W

Relocated versus GE-based coordinates?

If relocated, briefly describe why...

Length of Transect (m)  meters

Make sure you record your latitude and longitude in decimal degrees, like this:

Latitude 43.24812  
Longitude -70.78115

Do NOT round the Lat / Long numbers. You will need all the digits given.

If the coordinates differ from what you have on Data Sheet A, mark the box for each location that was changed, and describe why. (Possible reasons for relocation include: 1) Creek or Ditch where the location was planned. 2) Based on vegetation identified on the ground, the boundaries of the Low, Mid, and High zones are significantly different than what was assessed via Google Earth (GE).

Record the actual measured length of your transect in meters.

\*\*\*INSERT A WOODEN STAKE AT EACH LOCATION to aid in finding locations with the campers

## 2. Sample Site

(Continued)

### COORDINATES of Quadrat Locations

#### High Marsh Quadrat

Latitude: N

Longitude: W

Relocated versus GE-based coordinates

If relocated, briefly describe why...

#### Mid Marsh Quadrat

Latitude: N

Longitude: W

Relocated versus GE-based coordinates

If relocated, briefly describe why...

#### Low Marsh Quadrat

Latitude: N

Longitude: W

Relocated versus GE-based coordinates

If relocated, briefly describe why...

Make sure you record your latitude and longitude in decimal degrees, like this:

Latitude 43.24812

Longitude -70.78115

Do NOT round the Lat / Long numbers. You will need all the digits given.

If the coordinates differ from what you have on Data Sheet A, mark the box for each location that was changed, and describe why. (Possible reasons for relocation include: 1) Creek or Ditch where the location was planned. 2) Based on vegetation identified on the ground, the boundaries of the Low, Mid, and High zones are significantly different than what was assessed via Google Earth (GE).

Record the actual measured length of your transect in meters.

\*\*\*INSERT A WOODEN STAKE AT EACH LOCATION to aid in finding locations with the campers

## 2. Notes

Use this space to describe any notes to help guide sampling day activities (marsh access, spots which might be challenging to navigate along the line transect, how long it takes to walk the line transect, animal markings and birds to look for, etc.)

# Summer on the Marsh

# Data Sheet B

## 3. Physical Features

### COORDINATES of major physical features

Feature 1 - Description:

Intersects Transect

Feature lies crosses transect

About how far along the transect (from the High Marsh end) does the feature intersect the transect?

Meters

Within 10m of Quadrat

High  Mid  Low

Present in GE Image

Feature 2 - Description:

Intersects Transect

Feature lies crosses transect

About how far along the transect (from the High Marsh end) does the feature intersect the transect?

Meters

Within 10m of Quadrat

High  Mid  Low

Present in GE Image

Feature 3 - Description:

Intersects Transect

Feature lies crosses transect

About how far along the transect (from the High Marsh end) does the feature intersect the transect?

Meters

Within 10m of Quadrat

High  Mid  Low

Present in GE Image

Feature 4 - Description:

Intersects Transect

Feature lies crosses transect

About how far along the transect (from the High Marsh end) does the feature intersect the transect?

Meters

Within 10m of Quadrat

High  Mid  Low

Present in GE Image

Look for physical features (creeks, pannes, boulders, etc) that crosses the transect line, or is within 10 meters of each quadrat location (it can do both!). When you find a feature, label what that feature is, and put a checkmark to show where you found it. If this feature showed up in your examination of the Google Earth imagery, check the box to indicate that consistency.

For example, if you find a feature during ground-truthing that did not appear in Google Earth, the "Present in GE Image" box should not be checked.

If the feature crosses the transect, write in where the feature is first encountered, in meters from the start of the transect (the high marsh end).

Features may include wrack line, pannes, ditches, creeks and boulders.

# Summer on the Marsh

# Data Sheet C

*Equipment & General Site*

Camp Name: \_\_\_\_\_  
 Date: \_\_\_\_\_ (mm/dd/yyyy)  
 Time Sampling Started: \_\_\_\_\_ (hh:mm)  
 Time of Nearest Low Tide: \_\_\_\_\_ (hh:mm)  
 Time of Next High Tide: \_\_\_\_\_ (hh:mm)  
 Time Sampling Concluded: \_\_\_\_\_ (hh:mm)

## 1. Equipment List

These are the items you should gather before you venture to your field site for sampling.

- |   |  |
|---|--|
| <input type="checkbox"/> Hammer or Mallet                               | <input type="checkbox"/> Pencils/Pens                                      |
| <input type="checkbox"/> Refractometers (2)                             | <input type="checkbox"/> GPS Unit (Set to Decimal Degrees)                 |
| <input type="checkbox"/> Camera   | <input type="checkbox"/> Clipboards (6 or more)                            |
| <input type="checkbox"/> Thermometer                                    | <input type="checkbox"/> Walkie Talkies                                    |
| <input type="checkbox"/> Transect Tape (≥ 100m)                         | <input type="checkbox"/> Compasses (3)                                     |
| <input type="checkbox"/> 1 m <sup>2</sup> PVC quadrats (3)              | <input type="checkbox"/> Insect Sweep Net                                  |
| <input type="checkbox"/> Sippers  | <input type="checkbox"/> Hand lens   |
| <input type="checkbox"/> Hand sight level mounted on 1m PVC             | <input type="checkbox"/> Buckets   |
| <input type="checkbox"/> 2 m PVC pipe with collar                       | <input type="checkbox"/> Ziploc bags                                       |
| <input type="checkbox"/> Fish trap(s)                                   | <input type="checkbox"/> Field guides (plants, fish, birds, animal tracks) |
| <input type="checkbox"/> Printout of the Google Earth Image             | <input type="checkbox"/> Fresh water                                       |
| <input type="checkbox"/> Binoculars                                     | <input type="checkbox"/> Container and forceps for insects                 |
| <input type="checkbox"/> Data Sheet A & B (Completed)                   | <input type="checkbox"/> Coffee Filters                                    |
| <input type="checkbox"/> Data Sheet C, D, E, F, G, H, I (Not Completed) | <input type="checkbox"/> Sipper Hole Driver Rod                            |
| <input type="checkbox"/> Measuring Tape (Metric)                        | <input type="checkbox"/> Extra Batteries                                   |
| <input type="checkbox"/> Hot Dog for Fish Trap                          |  |

## 2. The Field Site

Help us know what your field site looks and feels like.

### SITE PHOTO

Check this box once you have taken the best wide-angle photo you can



Take a photo that helps everyone see where you are doing your study. No faces. Just the scene, please.

### LOCATION OF STUDY SITE PHOTO

Latitude: N   
 Longitude: W

RECORD LOCATION IN "DECIMAL DEGREES !!!"

Record the GPS location from where you take your photo, which should be the site from which your 15 minutes of quiet observations are made (Data Sheet D).

Make sure you record the latitude and longitude in decimal degrees, like this:  
 Latitude 42.4854°  
 Longitude -70.75431°



# Summer on the Marsh

## Data Sheet D

*Site Observations*

Camp Name: \_\_\_\_\_

Team member names: \_\_\_\_\_

Date: \_\_\_\_\_

### 1. Quiet Observations: PRE

**Do BEFORE your Study!**

We want to observe what the marsh is all about before we enter the sample area and disturb the natural behavior of any parts of the ecosystem. Take 15 minutes in quiet observation. Look and listen for any signs of life, and to soak in where you are! Share what you're experiencing...

<p><b>Write a poem about the marsh...</b></p>	<p><b>Draw a picture...</b></p>
<p><b>What sounds do you hear?</b></p>	<p><b>What animals and other things do you think you see?</b></p>

# Summer on the Marsh

## Data Sheet **D**

*Site Observations*

Camp Name: \_\_\_\_\_  
Team member names: \_\_\_\_\_  
Date: \_\_\_\_\_

### 1. Quiet Observations: POST

**Do AFTER your Study!**

OPTIONAL: Now that you have explored the marsh, take some time to reflect on the marsh around you once again. Share your thoughts below!

<p><b>Write a poem about the marsh...</b></p>	<p><b>Draw a picture...</b></p>
<p><b>What sounds do you hear?</b></p>	<p><b>What animals and other things do you think you see?</b></p>

# Summer on the Marsh

## Data Sheet **E**

Fish Trap

Camp Name: \_\_\_\_\_  
 Team member names: \_\_\_\_\_  
 Date: \_\_\_\_\_

### 1. Location & Time

LOCATION OF FISH TRAP RECORD LOCATION IN "DECIMAL DEGREES !!"

Latitude: N  °  
 Longitude: W  °

Record the coordinates of where the fish trap is deployed. Be sure to use decimal degrees.

E.g. N 40.24563°; W -70.58547°

#### FISHING TIME

Time fish trap was deployed:  hh:mm  
 Time fish trap was retrieved:  hh:mm  
 How long did the trap "fish"?  hh:mm

Record the time on a 24 hour clock (For example, 3:00PM should be recorded as 15:00)

Calculate how long the trap was in the water.

### 2. Trap Content Analysis

WHAT KIND OF ANIMALS HAVE YOU FOUND IN THE TRAP?

X	Common Name	Scientific Name	# in Trap
<input type="checkbox"/>	Mummichog	<i>Fundulus heteroclitus</i>	
<input type="checkbox"/>	Spotfin killifish	<i>Fundulus luciae</i>	
<input type="checkbox"/>	Striped killifish	<i>Fundulus majalis</i>	
<input type="checkbox"/>	Killifish (not-specific)	<i>Fundulus spp.</i>	
<input type="checkbox"/>	Threespine stickleback	<i>Gasterosteus aculeatus</i>	
<input type="checkbox"/>	European green crab	<i>Carcinus maenas</i>	
<input type="checkbox"/>	Asian shore crab	<i>Hemigrapsus sanguineus</i>	
<input type="checkbox"/>	Blue crab	<i>Callinectes sapidus</i>	
<input type="checkbox"/>	Common spider crab	<i>Libinia emarginata</i>	
<input type="checkbox"/>	Rock crab	<i>Cancer irroratus</i>	
<input type="checkbox"/>	Sheep head minnow	<i>Cyprinodon variegatus</i>	
<input type="checkbox"/>	Pipefish	<i>Sygnathus fuscus</i>	
<input type="checkbox"/>	Purple marsh crab	<i>Sesarma reticulatum</i>	
<input type="checkbox"/>			
<input type="checkbox"/>			

## 2. Fish Trap Field Notes

Did you encounter any challenges, or observe anything you would like to let the world know about your fish trap? If there were any fish that could not be identified, photograph them, and write a note about it here!

Notes

# Summer on the Marsh

## Data Sheet **E**

Fish Trap

Camp Name: \_\_\_\_\_  
 Team member names: \_\_\_\_\_  
 Date: \_\_\_\_\_

### 1. Location & Time

LOCATION OF FISH TRAP RECORD LOCATION IN "DECIMAL DEGREES !!"

That means, it should look like this:

Latitude: N  °  
 Longitude: W  °



N 42.25486°  
 W -70.35846°

#### FISHING TIME

Time fish trap was deployed:  hh:mm  
 Time fish trap was retrieved:  hh:mm  
 How long did the trap "fish"?  hh:mm

Record the time on a 24 hour clock (For example, 3:00PM should be recorded as 15:00)

### 2. Trap Content Analysis

WHAT KIND OF ANIMALS HAVE YOU FOUND IN THE TRAP?

<input checked="" type="checkbox"/>	Common Name	Scientific Name	# in Trap
<input type="checkbox"/>	Mummichog	<i>Fundulus heteroclitus</i>	
<input type="checkbox"/>	Spotfin killifish	<i>Fundulus luciae</i>	
<input type="checkbox"/>	Striped killifish	<i>Fundulus majalis</i>	
<input type="checkbox"/>	Killifish (not-specific)	<i>Fundulus spp.</i>	
<input type="checkbox"/>	Threespine stickleback	<i>Gasterosteus aculeatus</i>	
<input type="checkbox"/>	European green crab	<i>Carcinus maenas</i>	
<input type="checkbox"/>	Asian shore crab	<i>Hemigrapsus sanguineus</i>	
<input type="checkbox"/>	Blue crab	<i>Callinectes sapidus</i>	
<input type="checkbox"/>	Common spider crab	<i>Libinia emarginata</i>	
<input type="checkbox"/>	Rock crab	<i>Cancer irroratus</i>	
<input type="checkbox"/>	Sheep head minnow	<i>Cyprinodon variegatus</i>	
<input type="checkbox"/>	Pipefish	<i>Sygnathus fuscus</i>	
<input type="checkbox"/>	Purple marsh crab	<i>Sesarma reticulatum</i>	
<input type="checkbox"/>			
<input type="checkbox"/>			

# CAMPER DATA SHEET

## 2. Fish Trap Field Notes

Did you encounter any challenges, or observe anything you would like to let the world know about your fish trap? If there were any fish that could not be identified, photograph them, and write a note about it here!

Notes

# Summer on the Marsh

# Data Sheet F

The Abiotic - Transect Team

Camp Name: \_\_\_\_\_  
 Team Member Names: \_\_\_\_\_  
 Date: \_\_\_\_\_

## 1. Where is the Transect

*Record Lat/Long in "Decimal Degrees!"  
 That means, it should look like this: N 42.25486°*

Your counselors have already visited your field site to mark the location of the study using wooden stakes, or some other device, as markers. They recorded the Latitude and Longitude (the "coordinates") on Data Sheet B. Your first job is to find the Transect endpoints (if the counselors don't remember, you can use your GPS unit and the location entered in Data Sheet B, to help find the markers). When you find the stake and figure out the location of the start ("High Marsh") and end ("Low Marsh") points of your transect, write the coordinates you read on your GPS.

ALL LATITUDES AND LONGITUDES SHOULD BE RECORDED IN THE "DECIMAL DEGREE" FORMAT.

**Do Not** round the coordinate numbers given by your GPS. Every digit matters, and removing one digit will harm the data.

### COORDINATES of Transect Endpoints

High Marsh End

Low Marsh End

N	<input type="text"/>
W	<input type="text"/>

N	<input type="text"/>
W	<input type="text"/>

### LENGTH OF TRANSECT

meters

Stretch the transect tape between the Low and High Tide endpoints. Be sure to make the tape as straight as possible, and that it is lying flat on the ground. The tape should intersect the stakes marking where the High, Mid and Low Marsh quadrats are supposed to go.

You need to record the length shown on the transect tape between the Transect Endpoints

0 Meters should be at the High Marsh end.

## 2. Sampling Points

Some measurements are done at each quadrat. But elevation is done at 10 points along the transect at locations called "Elevation Points." There will be a sample point at the start and endpoint of the transect, meaning there will be 8 other equally-spaced sample points between these points. Below, calculate how far you need to travel between each measurement of elevation.

**ELEVATION POINTS**

Transect Length (meters)  ÷ 9 =

Distance Between Elevation Points (meters)

High Marsh - Transect EndPoint

Low Marsh - EndPoint

Complete the equation, taking the length of the transect, and dividing it by 9. (We divide by nine because from the starting point, we will go this length 9 times before we get to the endpoint. Feel free to use this space to write out an equation if needed! The answer is the Distance between Elevation Points!

Enter THIS number, HERE

Enter the value of B here: \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_

Distance Between Elevation Points: \_\_\_\_\_ Value for Point C

For each of the Elevation Points, add the Distance Between Elevation Points to the value for the previous Elevation Point, and enter the value into the appropriate blank space above.



## 2. Sampling Points Continued

A salt marsh is not flat. Understanding where a marsh dips or rises, helps to uncover the effect we will see as sea levels rise due to global climate change.

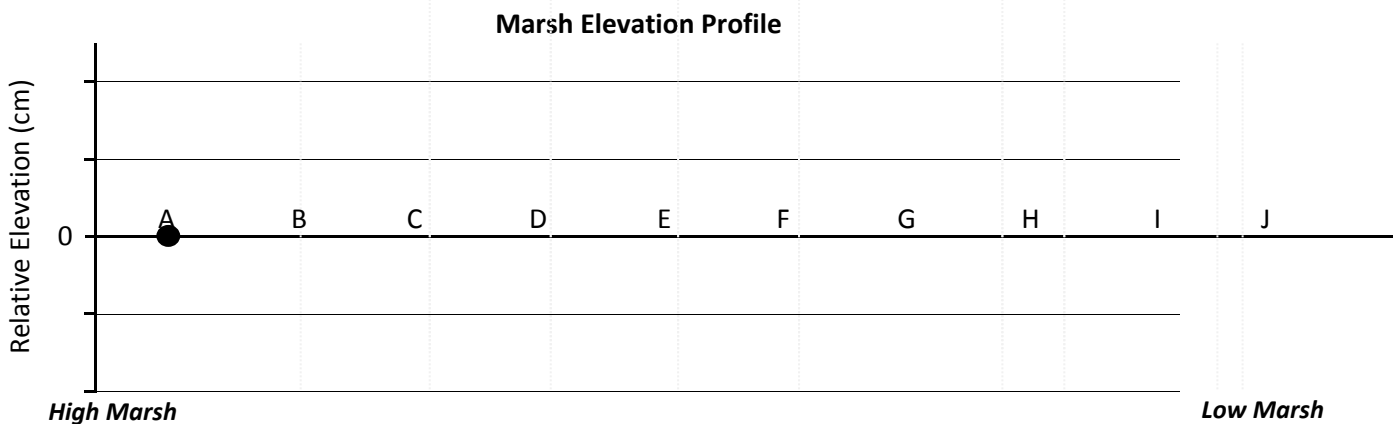
### ELEVATION

Between Elevation Points (locations determined on Page 2), we need to measure the change in elevation. Record these findings here, and then complete the Marsh Profile.

	Measurement on Staff (cm)	Relative Elevation (cm)
Elevation Point A	0	0
Elevation Point B		
Elevation Point C		
Elevation Point D		
Elevation Point E		
Elevation Point F		
Elevation Point G		
Elevation Point H		
Elevation Point I		
Elevation Point J		

Relative Elevation is found by taking the Relative Elevation from the previous Elevation Point, and subtract the current measurement on the staff.

Plot the Relative Elevations with Dots for each elevation point, and connect them with a line, so Elevation Points A and B are connected by a line, and Elevation Points B and C are connected by a line.



## 2. Sampling Points Continued

The marsh is like a sponge, with lots of water soaked up in it. We want to describe that water and the physical environment of the marsh.

### PORE WATER SALINITY

At each Quadrat, measure the salinity of the water in the marsh. You will measure the "pore water" extracted with "sippers" at each Quadrat.

### TEMPERATURE

Take three temperature measurements at each Quadrat location, and check the box if the precise spot of measurement has vegetation growing on the surface.

Be certain that the thermometer is clean and dry between sampling points. When making a reading, wait **1 minute** for a stable reading.

	Pore Salinity			Temperature (°C)			Vegetation Present? <small>Make an "X" if there is vegetation</small>
	Salinity (ppt)	Depth (cm) Water was drawn from (15 / 30 / 45 cm)	Put an "x" if <u>no</u> water could be drawn	Air	Surface	Subsurface	
High Marsh Quadrat	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Mid Marsh Quadrat	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Low Marsh Quadrat	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

# Summer on the Marsh

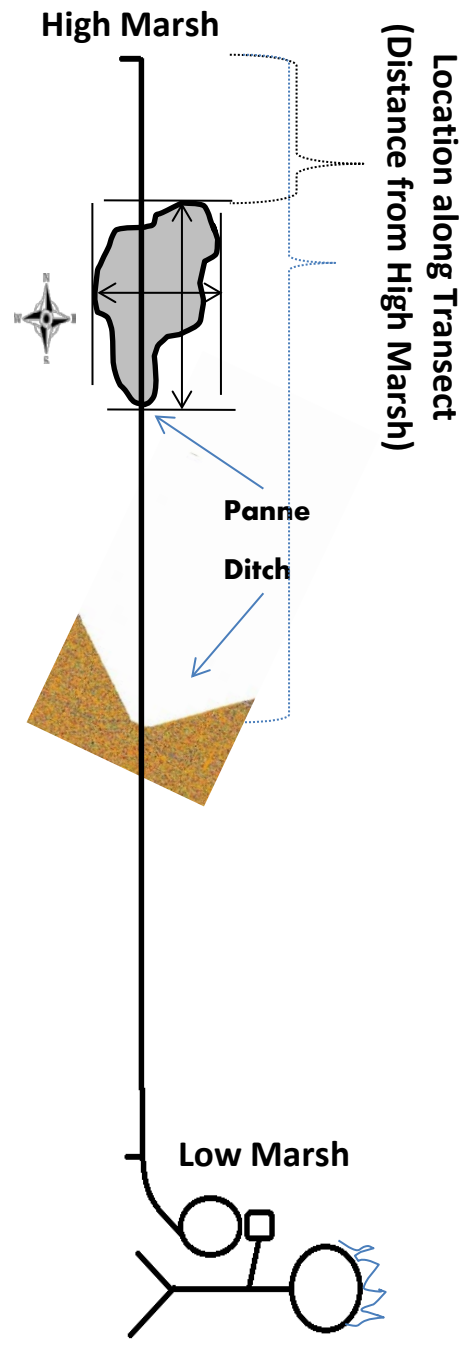
# Data Sheet F

## 3. Physical Features

*Only things that INTERSECT the transect!*

COORDINATES of major physical features

Feature 1 - Description:	<input type="text"/>
Location along the Transect:	<input type="text"/> meters
Greatest N/S Distance:	<input type="text"/> meters
Greatest E/W Distance:	<input type="text"/> meters
If Panne or Creek: Surface Water Salinity:	<input type="text"/> ppt
<hr/>	
Feature 2 - Description:	<input type="text"/>
Location along the Transect:	<input type="text"/> meters
Greatest N/S Distance:	<input type="text"/> meters
Greatest E/W Distance:	<input type="text"/> meters
If Panne or Creek: Surface Water Salinity:	<input type="text"/> ppt
<hr/>	
Feature 3 - Description:	<input type="text"/>
Location along the Transect:	<input type="text"/> meters
Greatest N/S Distance:	<input type="text"/> meters
Greatest E/W Distance:	<input type="text"/> meters
If Panne or Creek: Surface Water Salinity:	<input type="text"/> ppt
<hr/>	
Feature 4 - Description:	<input type="text"/>
Location along the Transect:	<input type="text"/> meters
Greatest N/S Distance:	<input type="text"/> meters
Greatest E/W Distance:	<input type="text"/> meters
If Panne or Creek: Surface Water Salinity:	<input type="text"/> ppt



Notes

# Summer on the Marsh

# Data Sheet F

*The Abiotic - Transect Team*

Camp Name: \_\_\_\_\_  
Team Member Names: \_\_\_\_\_  
Date: \_\_\_\_\_

## 1. Where is the Transect

*Record Lat/Long in "Decimal Degrees!"  
That means, it should look like this: N 42.25486°*

### COORDINATES of Transect Endpoints & Length

High Marsh End

Low Marsh End

N

N

W

W

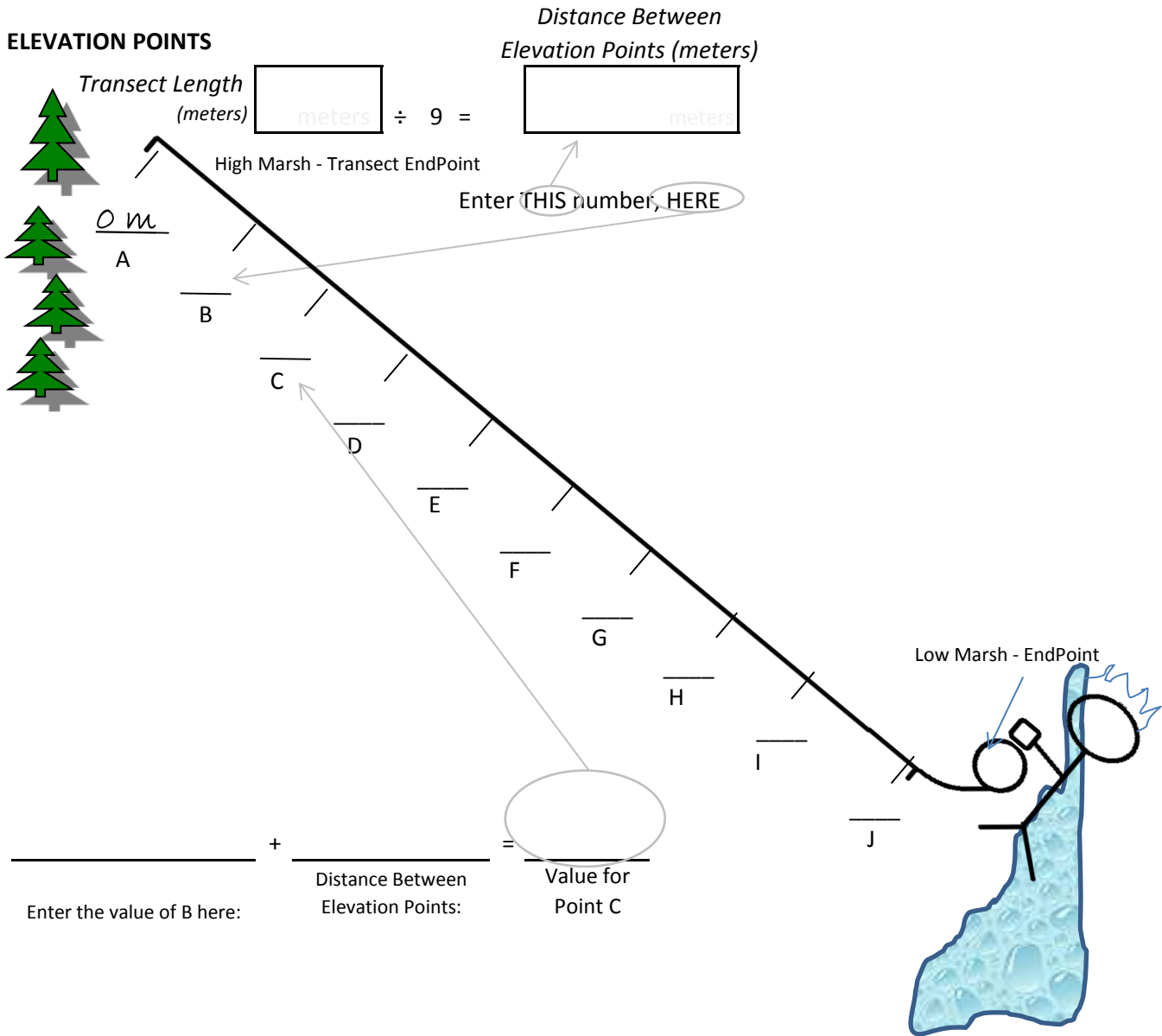
### LENGTH OF TRANSECT (meters)

meters

# CAMPER DATA SHEET

## 2. Sampling Points

Some measurements are done at each quadrat. But elevation is done at 10 points along the transect!  
Below, calculate how far you need to travel between each measurement of elevation.



For each of the Elevation Points, add the Distance Between Elevation Points to the value for the previous Elevation Point, and enter the value into the appropriate blank space above.

# CAMPER DATA SHEET

## 2. Sampling Points *Continued*

A salt marsh is not flat. Understanding where a marsh dips or rises, helps to uncover the effect we will see as sea levels rise due to global climate change.

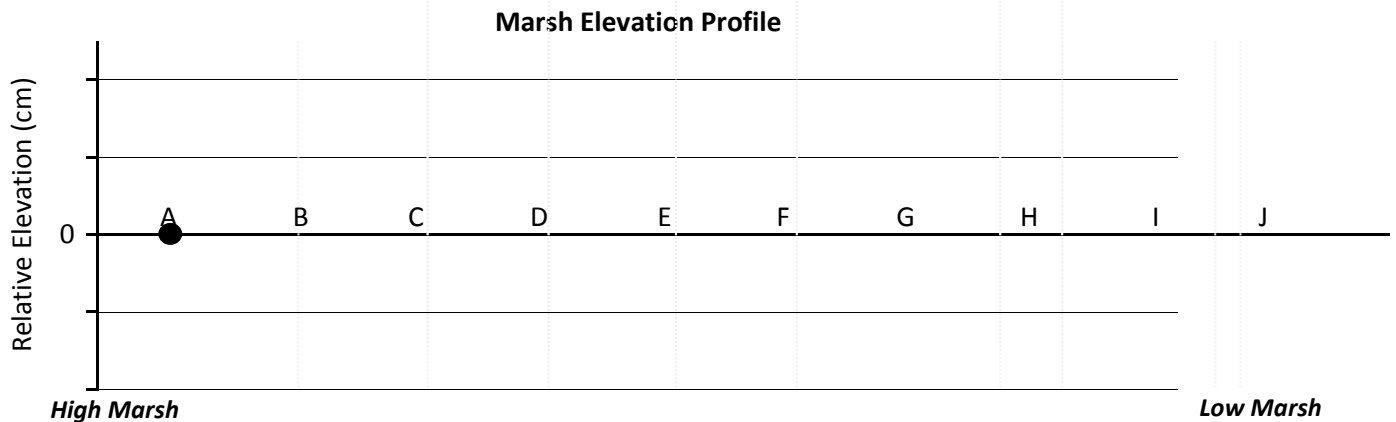
### ELEVATION

*Between Elevation Points (locations determined on Page 2), we need to measure the change in elevation. Record these findings here, and then complete the Marsh Profile.*

	Measurement on Staff (cm)	Relative Elevation (cm)
Elevation Point A	0	0
Elevation Point B		
Elevation Point C		
Elevation Point D		
Elevation Point E		
Elevation Point F		
Elevation Point G		
Elevation Point H		
Elevation Point I		
Elevation Point J		

*Relative Elevation is found by taking the Relative Elevation from the previous Elevation Point, and subtract the current measurement on the staff.*

*Plot the Relative Elevations with Dots for each elevation point, and connect them with a line, so Elevation Points A and B are connected by a line, and Elevation Points B and C are connected by a line.*



# CAMPER DATA SHEET

## 2. Sampling Points *Continued*

The marsh is like a sponge, with lots of water soaked up in it. We want to describe that water and the physical environment of the marsh.

### PORE WATER SALINITY

*At each Quadrat, measure the salinity of the water in the marsh. You will measure the "pore water" extracted with "sippers" at each Quadrat.*

### TEMPERATURE

*Take three temperature measurements at each Quadrat location, and check the box if the precise spot of measurement has vegetation growin on the surface.*

*Be certain that the thermometer is clean and dry between sampling points. When making a reading, wait **1 minute** for a stable reading.*

	Pore Salinity			Temperature (°C)			Vegetation Present? <small>Make an "X" if there is vegetation</small>
	Salinity (ppt)	Depth (cm) Water was drawn from (15 / 30 / 45 cm)	Put an "x" if no water could be drawn	Air	Surface	Subsurface	
High Marsh Quadrat	<input type="text"/>	<input type="text"/>	<input style="border: 1px dashed black;" type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input style="border: 1px dashed black;" type="text"/>
Mid Marsh Quadrat	<input type="text"/>	<input type="text"/>	<input style="border: 1px dashed black;" type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input style="border: 1px dashed black;" type="text"/>
Low Marsh Quadrat	<input type="text"/>	<input type="text"/>	<input style="border: 1px dashed black;" type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input style="border: 1px dashed black;" type="text"/>

# Summer on the Marsh

# Data Sheet **F**

## 3. Physical Features

*Only things that INTERSECT the transect!*

COORDINATES of major physical features

Feature 1 - Description:

Location along the Transect:  meters

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

If Panne or Creek: Surface Water Salinity:  ppt

Feature 2 - Description:

Location along the Transect:  meters

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

If Panne or Creek: Surface Water Salinity:  ppt

Feature 3 - Description:

Location along the Transect:  meters

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

If Panne or Creek: Surface Water Salinity:  ppt

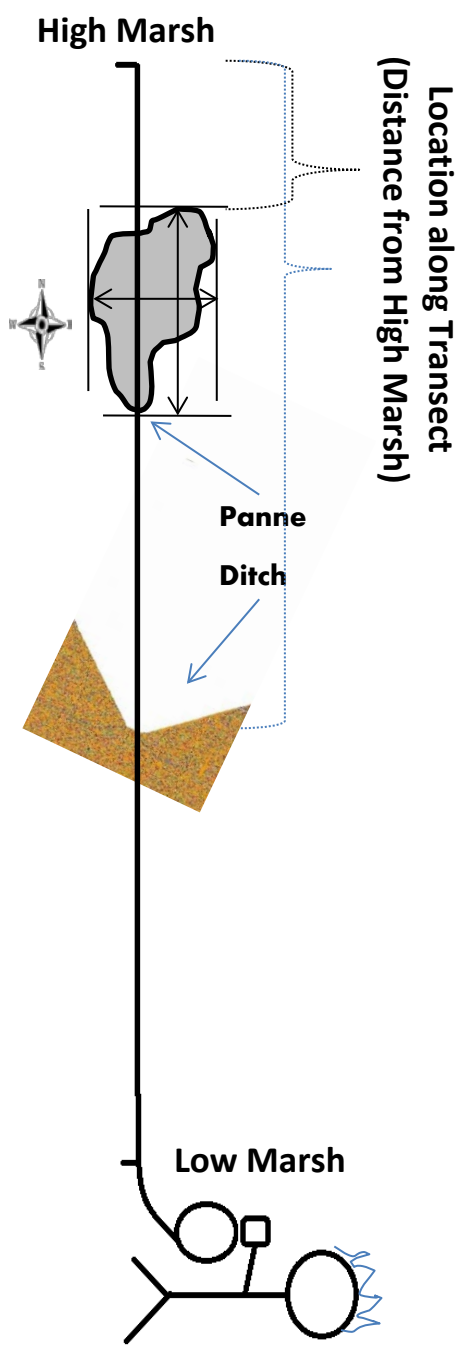
Feature 4 - Description:

Location along the Transect:  meters

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

If Panne or Creek: Surface Water Salinity:  ppt



Notes



# Summer on the Marsh

# Data Sheet G - I

*The Biotic - Quadrat Team(s)*

Camp Name: \_\_\_\_\_  
 Team Member Names: \_\_\_\_\_  
 Date: \_\_\_\_\_

## 1. Where is the Quadrat?

Someone from your camp has visited your field site to mark the location of the transect, using wooden stakes as markers. Once the transect has been laid down, you should find the locations for the quadrats (also marked with wooden stakes), with one quadrat in the middle of the High Marsh zone, the Mid Marsh zone, and the Low Marsh zone. When you figure out the location of the quadrat you are to study, record the coordinates you read on your GPS.

### COORDINATES of Quadrat

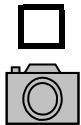
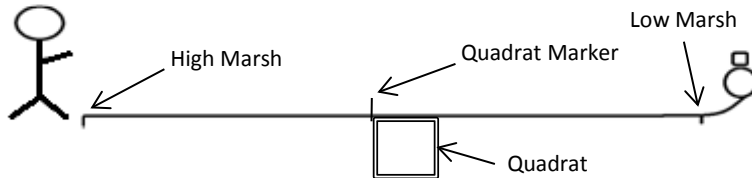
N   
 W

Record in  
 "Decimal Degrees!!"

## 2. Deploying the Quadrats

Our "Quadrats" are squares with 1 meter sides, that we lay down on the marsh. We will then look closely at the life inside that square. This allows us to get an estimate of what the entire marsh ecosystem is like.

### LAYING DOWN THE QUADRAT



Check this box once you have photographed the quadrat from above (a "bird's-eye view")

Assemble your quadrat. Face towards the Low Marsh end of the transect, and place the quadrat on the ground to the right of the transect tape, with the left-hand corner of the quadrat that is closest to you, laying just to the right of the stake that is marking the quadrat location (the stake should not lie inside the quadrat).

Photograph the quadrat BEFORE any sampling activities within the quadrat. Be careful to not cast a shadow!

### 3. Plant Community



The foundation of the salt marsh comes from its plant community.

#### PERCENT COVER & CANOPY HEIGHT

**% Cover:** If any of the plant species below occupy more than 25% of the area of the quadrat, then check the box noting that it is a dominant species. Then estimate the % Cover for that species. If a listed species does not cover more than 25% of the quadrat, then do not record anything for that species. If there are dominant species present that are not listed below, add their info into the blank spaces. Note that the percentages CAN add up to more than 100% coverage, when summed across species. It's similar to the idea of in a forest, the ground can be 100% covered by the canopy of trees; but then the ivy along the ground also covers 60% of the ground.

**Canopy Height:** Measure and record the height (cm) of three of the tallest individual plants of each dominant species. **OPTIONAL:** You may calculate the average of those three plants, if you would like, but it is not required.

Percent Cover provides an idea of what the dominant species of plant is in an area. Look around, and you'll notice areas of your habitat where one plant is found more than any or most others. Move your gaze a little bit away, and you may find that another kind of plant entirely is now the one plant seeming to "dominate" the area.

Dominant?	Genus	species	% Cover	Plant Height (cm)			Average Height
				Plant 1	Plant 2	Plant 3	
<input type="checkbox"/>	Spartina	patens	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	Spartina	alterniflora	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	Distichlis	spicata	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>			<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>			<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Total % Cover =			<input type="text"/>				

### 4. Animal Community



Salt marshes are home to a large array of species. The more species in a marsh, the greater is its "Species Richness"

#### SPECIES RICHNESS

If you see any of the following animals inside your quadrat, put a check next to that species below...

- |  |   |
|--|---|
| <input type="checkbox"/> Green Crab ( <i>Carcinus maenas</i> )   | <input type="checkbox"/> Common periwinkles ( <i>Littorina littorea</i> ) |
| <input type="checkbox"/> Fiddler Crabs ( <i>Uca pugnax</i> , <i>Uca pugilator</i> , <i>Uca Minax</i> ) | <input type="checkbox"/> Blue Mussels ( <i>Mytilus edulis</i> )           |
| <input type="checkbox"/> Coffee Bean Snails ( <i>Melampus bidentatus</i> )                             | <input type="checkbox"/> Ribbed Mussels ( <i>Geukensia demissus</i> )     |

Notes? If you saw any other species of animals, record them here!

## 5. Pannes

### Within 10 Meters of the Quadrat

**COORDINATES of pannes**

Panne 1

Lat	Long
-----	------

Greatest N/S Distance:

	meters
--	--------

Greatest E/W Distance:

	meters
--	--------

Surface Water Salinity:

	ppt
--	-----

Panne 2

Lat	Long
-----	------

Greatest N/S Distance:

	meters
--	--------

Greatest E/W Distance:

	meters
--	--------

Surface Water Salinity:

	ppt
--	-----

Panne 3

Lat	Long
-----	------

Greatest N/S Distance:

	meters
--	--------

Greatest E/W Distance:

	meters
--	--------

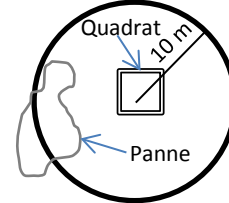
Surface Water Salinity:

	ppt
--	-----

Notes. What should we know about these pannes?

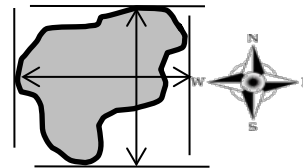
(For example: Dry / Sandy / Full of crab holes / No plants)

Using a tape measurer to help figure out how far to go, explore the area within 10 meters of your quadrat. Record the Lat/Long of the panne's northern-most edge, IN DECIMAL DEGREES!!



Find any pannes (an area with little or no live vegetation) in the 10 meter radius.

Use a measuring tape to measure (in meters) the greatest North-South, and the greatest East-West distance that the feature covers. (See Illustration below).



Finally, use a refractometer to measure the salinity of any standing water you find in the panne.

## 6. Insect Community

- Optional -



There is a lot of animal life that you don't notice! Insects are one of the most important components of a healthy salt marsh.

**Insect Abundance**

Insect Type	# Caught
ants	
beetles	
flies	
grasshoppers	
mosquitos	
leaf hoppers	
spiders	
centipedes	
Total Number of Insects Collected	

Using a sweep net, make 4 sweeps at waist height through the vegetation next to each quadrat. Separate them into the major insect types, and count the number of individuals of each type you have caught. If you find insects that do not fit into one of the listed categories, add a category in the blank lines.

Even though spiders and centipedes are not "true insects," they should still be counted.

# Summer on the Marsh

# Data Sheet G

The Biotic - Quadrat Team(s)  
**HIGH MARSH**

Camp Name: \_\_\_\_\_  
 Team Member Names: \_\_\_\_\_  
 Date: \_\_\_\_\_

## 1. Where is the Quadrat?

Record Lat/Long in "Decimal Degrees!"  
That means, it should look like this: N 42.25486°

### COORDINATES of Quadrat

Latitude:

N

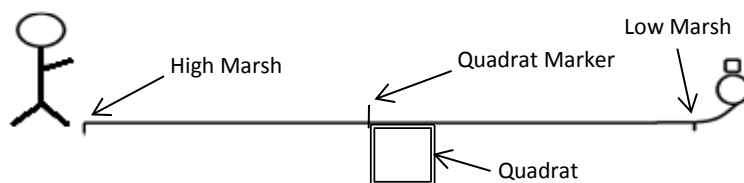
<-- DECIMAL DEGREES!!!

Longitude:

W

<-- DECIMAL DEGREES!!!

## 2. Deploying the Quadrats



Check this box once you have photographed the quadrat from above (a "bird's-eye view")

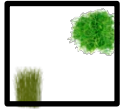
### 3. Plant Community



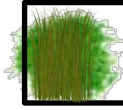
The foundation of the salt marsh comes from it's plant community.

#### PERCENT COVER & CANOPY HEIGHT

% Cover : How much of the quadrat is covered by each plant species?  
It is a "dominant" species if it covers more than 25% of the quadrat.



← Each species cover less than 25%.  
Therefore, neither is "Dominant."



↑ Both species cover about 60%. Both are "Dominant". Note that one grows taller than the other, so can both occupy the same area.

Canopy Height: Measure and record the height (cm) of three of the tallest individual plants of each dominant species. OPTIONAL: You may calculate the average of those three plants, if you would like.

Dominant?

	<u>Genus</u>	<u>species</u>	<u>% Cover</u>	<u>Plant Height (cm)</u>			<u>Average Height</u>
				Plant 1	Plant 2	Plant 3	
<input type="checkbox"/>	Spartina	patens					
<input type="checkbox"/>	Spartina	alterniflora					
<input type="checkbox"/>	Distichlis	spicata					
<input type="checkbox"/>							
<input type="checkbox"/>							
<input type="checkbox"/>							
<input type="checkbox"/>							
Total % Cover =							

### 4. Animal Community



Salt marshes are home to a large array of species. The more species in a marsh, the greater is its "Species Richness"

#### SPECIES RICHNESS

If you see any of the following animals inside your quadrat, put a check next to that species below...

- |  |   |
|--|---|
| <input type="checkbox"/> Green Crab ( <i>Carcinus maenas</i> )   | <input type="checkbox"/> Common periwinkles ( <i>Littorina littorea</i> ) |
| <input type="checkbox"/> Fiddler Crabs ( <i>Uca pugnax</i> , <i>Uca pugilator</i> , <i>Uca Minax</i> ) | <input type="checkbox"/> Blue Mussels ( <i>Mytilus edulis</i> )           |
| <input type="checkbox"/> Coffee Bean Snails ( <i>Melampus bidentatus</i> )                             | <input type="checkbox"/> Ribbed Mussels ( <i>Geukensia demissus</i> )     |

Notes? If you saw any other species of animals, record them here!

5. Pannes

Within 10 Meters of the Quadrat

Panne 1

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

Surface Water Salinity:  ppt

GPS Coordinates (Decimal Degrees!)

Lat

Long

Remember - Decimal Degrees Looks like this: N 42.25486°

Panne 2

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

Surface Water Salinity:  ppt

Lat

Long

Remember - Decimal Degrees Looks like this: N 42.25486°

Panne 3

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

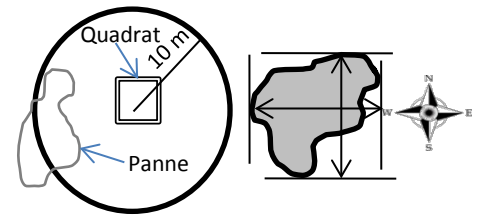
Surface Water Salinity:  ppt

Lat

Long

Notes. What should we know about these pannes?

(For example: Dry / Sandy / Full of crab holes / No plants)



6. Insect Community

- Optional -



There is a lot of animal life that you don't notice! Insects are one of the most important components of a healthy salt marsh. What did you catch in your bug net?

Insect Abundance

Insect Type	# Caught	Insect Type	# Caught
ants	<input type="text"/>	leaf hoppers	<input type="text"/>
beetles	<input type="text"/>	spiders	<input type="text"/>
flies	<input type="text"/>	centipedes	<input type="text"/>
grasshoppers	<input type="text"/>		<input type="text"/>
mosquitos	<input type="text"/>		<input type="text"/>

Total Number of Insects Collected

# Summer on the Marsh

## Data Sheet H

Camp Name: \_\_\_\_\_  
 Team Member Names: \_\_\_\_\_  
 Date: \_\_\_\_\_

The Biotic - Quadrat Team(s)  
**MID MARSH**

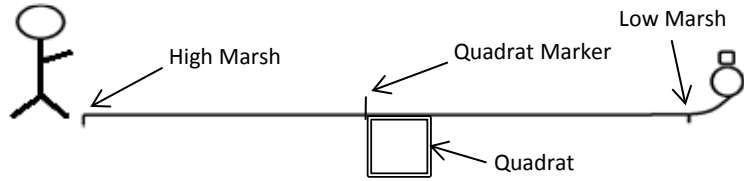
### 1. Where is the Quadrat?

Record Lat/Long in "Decimal Degrees!"  
 That means, it should look like this: N 42.25486°

#### COORDINATES of Quadrat

Latitude: N  ° <-- DECIMAL DEGREES!!!  
 Longitude: W  ° <-- DECIMAL DEGREES!!!

### 2. Deploying the Quadrats



Check this box once you have photographed the quadrat from above (a "bird's-eye view")

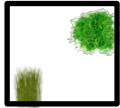
### 3. Plant Community



The foundation of the salt marsh comes from it's plant community.

#### PERCENT COVER & CANOPY HEIGHT

% Cover : How much of the quadrat is covered by each plant species?  
It is a "dominant" species if it covers more than 25% of the quadrat.



← Each species cover less than 25%.  
Therefore, neither is "Dominant."



Both species cover about 60%. Both are "Dominant". Note that one grows taller than the other, so can both occupy the same area.

Canopy Height: Measure and record the height (cm) of three of the tallest individual plants of each dominant species. OPTIONAL: You may calculate the average of those three plants, if you would like.

Dominant?

	<u>Genus</u>	<u>species</u>	<u>% Cover</u>
<input type="checkbox"/>	<i>Spartina</i>	<i>patens</i>	
<input type="checkbox"/>	<i>Spartina</i>	<i>alterniflora</i>	
<input type="checkbox"/>	<i>Distichlis</i>	<i>spicata</i>	
<input type="checkbox"/>			
<input type="checkbox"/>			
<input type="checkbox"/>			
<input type="checkbox"/>			
<input type="checkbox"/>			
Total % Cover =			

#### Plant Height (cm)

<u>Plant 1</u>	<u>Plant 2</u>	<u>Plant 3</u>	<u>Average Height</u>

### 4. Animal Community



Salt marshes are home to a large array of species. The more species in a marsh, the greater is its "Species Richness"

#### SPECIES RICHNESS

If you see any of the following animals inside your quadrat, put a check next to that species below...

- |  |   |
|--|---|
| <input type="checkbox"/> Green Crab ( <i>Carcinus maenas</i> )   | <input type="checkbox"/> Common periwinkles ( <i>Littorina littorea</i> ) |
| <input type="checkbox"/> Fiddler Crabs ( <i>Uca pugnax</i> , <i>Uca pugilator</i> , <i>Uca Minax</i> ) | <input type="checkbox"/> Blue Mussels ( <i>Mytilus edulis</i> )           |
| <input type="checkbox"/> Coffee Bean Snails ( <i>Melampus bidentatus</i> )                             | <input type="checkbox"/> Ribbed Mussels ( <i>Geukensia demissus</i> )     |

Notes? If you saw any other species of animals, record them here!



### 5. Pannes

### Within 10 Meters of the Quadrat

Panne 1

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

Surface Water Salinity:  ppt

GPS Coordinates (Decimal Degrees!)

Lat

Long

*Remember - Decimal Degrees Looks like this: N 42.25486°*

Panne 2

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

Surface Water Salinity:  ppt

Lat

Long

*Remember - Decimal Degrees Looks like this: N 42.25486°*

Panne 3

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

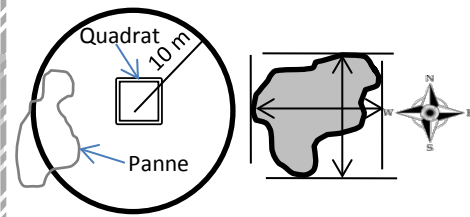
Surface Water Salinity:  ppt

Lat

Long

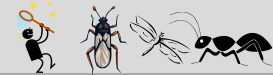
Notes. What should we know about these pannes?

*(For example: Dry / Sandy / Full of crab holes / No plants)*



### 6. Insect Community

- Optional -



There is a lot of animal life that you don't notice! Insects are one of the most important components of a healthy salt marsh. What did you catch in your bug net?

#### Insect Abundance

Insect Type	# Caught	Insect Type	# Caught
ants	<input type="text"/>	leaf hoppers	<input type="text"/>
beetles	<input type="text"/>	spiders	<input type="text"/>
flies	<input type="text"/>	centipedes	<input type="text"/>
grasshoppers	<input type="text"/>		<input type="text"/>
mosquitos	<input type="text"/>		<input type="text"/>
Total Number of Insects Collected		<input type="text"/>	

# Summer on the Marsh

## Data Sheet I

The Biotic - Quadrat Team(s)  
**LOW MARSH**

Camp Name: \_\_\_\_\_  
Team Member Names: \_\_\_\_\_  
Date: \_\_\_\_\_

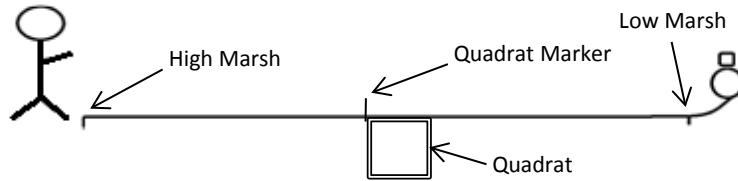
### 1. Where is the Quadrat?

Record Lat/Long in "Decimal Degrees!"  
That means, it should look like this: N 42.25486°

#### COORDINATES of Quadrat

Latitude: N  ° <-- DECIMAL DEGREES!!!  
Longitude: W  ° <-- DECIMAL DEGREES!!!

### 2. Deploying the Quadrats



Check this box once you have photographed the quadrat from above (a "bird's-eye view")

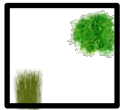
### 3. Plant Community



The foundation of the salt marsh comes from it's plant community.

#### PERCENT COVER & CANOPY HEIGHT

% Cover : How much of the quadrat is covered by each plant species?  
It is a "dominant" species if it covers more than 25% of the quadrat.



← Each species cover less than 25%.  
Therefore, neither is "Dominant."



↑ Both species cover about 60%. Both are "Dominant". Note that one grows taller than the other, so can both occupy the

Canopy Height: Measure and record the height (cm) of three of the tallest individual plants of each dominant species. OPTIONAL: You may calculate the average of those three plants, if you would like.

Dominant?

	<u>Genus</u>	<u>species</u>	<u>% Cover</u>
<input type="checkbox"/>	<i>Spartina</i>	<i>patens</i>	
<input type="checkbox"/>	<i>Spartina</i>	<i>alterniflora</i>	
<input type="checkbox"/>	<i>Distichlis</i>	<i>spicata</i>	
<input type="checkbox"/>			
<input type="checkbox"/>			
<input type="checkbox"/>			
<input type="checkbox"/>			
<input type="checkbox"/>			
Total % Cover =			

#### Plant Height (cm)

<u>Plant 1</u>	<u>Plant 2</u>	<u>Plant 3</u>	<u>Average Height</u>

### 4. Animal Community



Salt marshes are home to a large array of species. The more species in a marsh, the greater is its "Species Richness"

#### SPECIES RICHNESS

If you see any of the following animals inside your quadrat, put a check next to that species below...

- |  |   |
|--|---|
| <input type="checkbox"/> Green Crab ( <i>Carcinus maenas</i> )   | <input type="checkbox"/> Common periwinkles ( <i>Littorina littorea</i> ) |
| <input type="checkbox"/> Fiddler Crabs ( <i>Uca pugnax</i> , <i>Uca pugilator</i> , <i>Uca Minax</i> ) | <input type="checkbox"/> Blue Mussels ( <i>Mytilus edulis</i> )           |
| <input type="checkbox"/> Coffee Bean Snails ( <i>Melampus bidentatus</i> )                             | <input type="checkbox"/> Ribbed Mussels ( <i>Geukensia demissus</i> )     |

Notes? If you saw any other species of animals, record them here!

5. Pannes

Within 10 Meters of the Quadrat

Panne 1

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

Surface Water Salinity:  ppt

GPS Coordinates (Decimal Degrees!)

Lat

Long

Remember - Decimal Degrees Looks like this: N 42.25486°

Panne 2

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

Surface Water Salinity:  ppt

Lat

Long

Remember - Decimal Degrees Looks like this: N 42.25486°

Panne 3

Greatest N/S Distance:  meters

Greatest E/W Distance:  meters

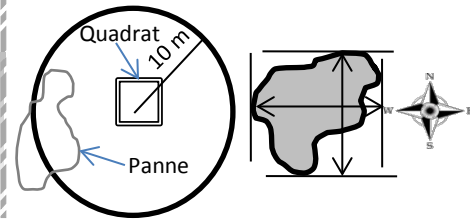
Surface Water Salinity:  ppt

Lat

Long

Notes. What should we know about these pannes?

(For example: Dry / Sandy / Full of crab holes / No plants)



6. Insect Community

- Optional -



There is a lot of animal life that you don't notice! Insects are one of the most important components of a healthy salt marsh. What did you catch in your bug net?

Insect Abundance

Insect Type	# Caught	Insect Type	# Caught
ants	<input type="text"/>	leaf hoppers	<input type="text"/>
beetles	<input type="text"/>	spiders	<input type="text"/>
flies	<input type="text"/>	centipedes	<input type="text"/>
grasshoppers	<input type="text"/>		<input type="text"/>
mosquitos	<input type="text"/>		<input type="text"/>
Total Number of Insects Collected		<input type="text"/>	