Marine Habitat Restoration & Monitoring Lab: Oyster Sanctuaries

Background:

You and your team of divers are conducting the annual monitoring efforts of North Carolina's Oyster Sanctuaries. You've been tasked with diving down on two artificial reefs and collecting biological data. You will follow two sampling procedures to measure the performance of oysters at your two sites—one procedure is observational, using a gridded quadrat; the second procedure involves excavating oyster rock and measuring the oysters.

Goal: Determine the oyster density of your sites & evaluate the performance of the artificial oyster reefs.

Instructions:

You will investigate two different reefs. One site will be made of large material that cannot be brought up by scuba divers. This will be your observational site. You will use a gridded quadrat to determine percent area coverage at this location. The second reef your team will investigate is made up of material that divers can grab and bring up by hand. This will be your excavated site. For this site, your team will measure the oysters in your sample to determine oyster density and the population structure of the reef. Use the information from the reef description to help fill out your data sheets.

Observational Procedure:

1) Place the gridded quadrat over the shells.
2) Count the number of times two lines intersect over an oyster.
3) Record the number on your datasheet.
4) Multiply by 4 to get the percent coverage of oysters.

Excavational Procedure:

1) Put on gloves and handle oysters with care, they have sharp edges!
2) Measure the length of each oyster using the calipers to the nearest millimeter.
3) Read the measurement off to the data recorder. They will then mark a box on the histogram chart that corresponds to the length of the oyster. For example, one oyster is measured to be 48mm. The scribe will mark one box in the 46-50 bin. When another oyster of 47mm is called out, the scribe will mark another box, above the previous one marked for the 48mm oyster.
4) Count the number of oysters in total in your sample. This is your oyster density for the excavational site!

Questions:

1) Your team knows the oyster density at one of the sites, but not the other. Use the percent area coverages to help estimate what the oyster density is at your observational site.

Hint:

$$\frac{Oyster\ Density1}{Percent\ Coverage1} = \frac{Oyster\ Density2}{Percent\ Coverage2}$$

2) How do your sites compare to one another? Which one has a higher oyster density?

3) Discuss with your group what variables might have impacted these differences.

4) Compare your results with a neighboring group. What reefs did they dive on? How do your densities compare? What factors might influence oyster density on these reefs?

OS Monitoring Data Sheet

Divers:		Date:	

Observational Data			
Reef / Site #:		Material:	
Sample Depth (ft):		OS Depth (ft):	
	Intersects		**Percent cover**
Oyster	**x 4 =**		
Mussel	**x 4 =**		
Sedimentation	**1** = None	**2** = Light	
	3 = Moderate	**4** = Heavy	
Oyster Density (per m^2)			

Excavated Site			
Reef / Site #:		Material:	
Sample Depth (ft):		OS Depth (ft):	
	Intersects		**Percent cover**
Oyster	**x 4 =**		
Mussel	**x 4 =**		
Sedimentation	**1** = None	**2** = Light	
	3 = Moderate	**4** = Heavy	
Oyster Density (per m^2)			

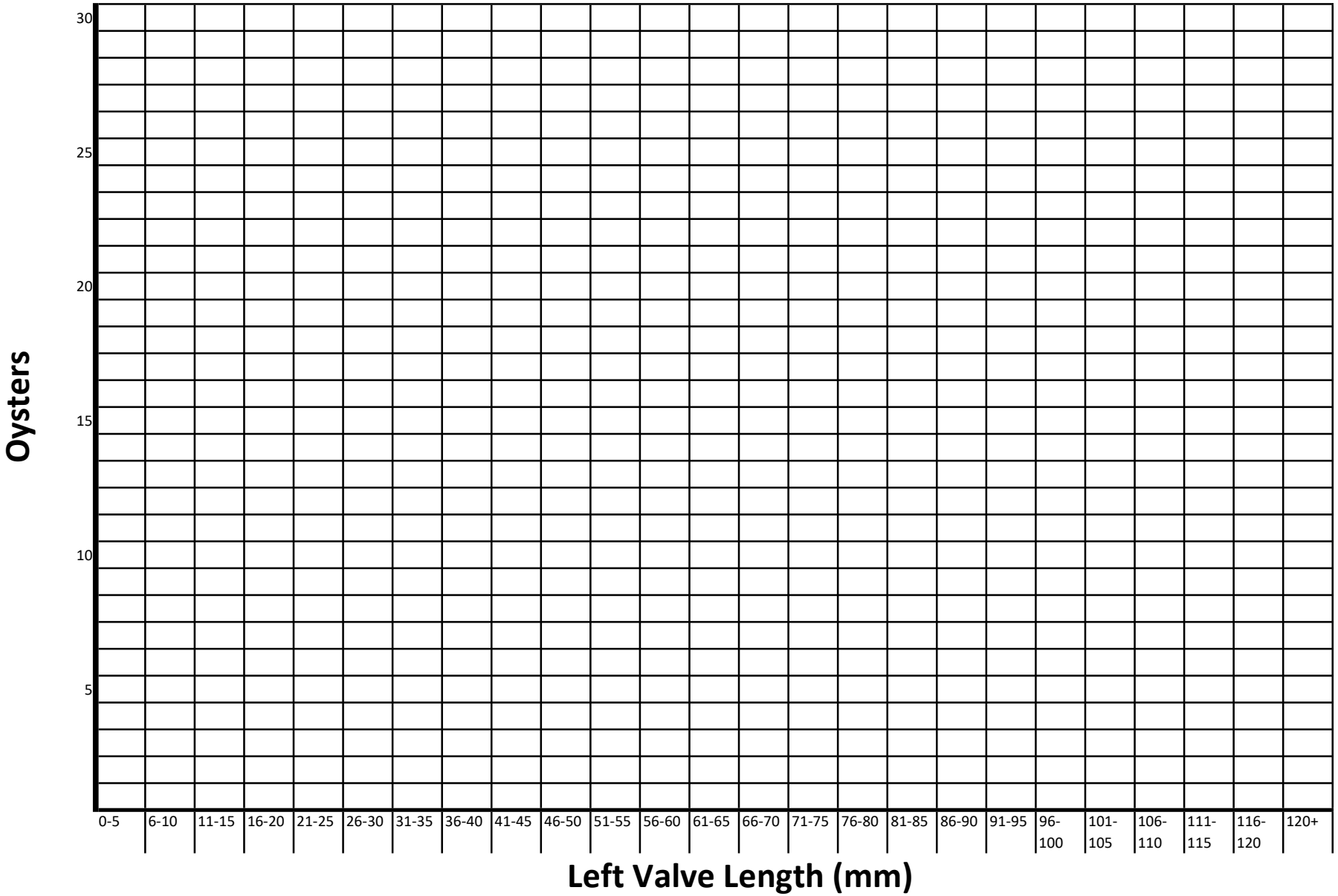
OS Monitoring- Excavation Data Sheet - 2023

Divers		Reef / Site #		Date	

Percent Cover				Sediment	Boring Sponge	Material Type	Sample Depth	OS Depth
	Nodes	*4	= %					
Oyster		*4		1 - None 2 - Light 3 - Moderate 4 - Heavy	1-Absent 2-Boring 3-Encrusting 4-Massive			
Mussel		*4						

Oyster Lengths (mm)																	
#	LVH	#	LVH	#	LVH	#	LVH	#	LVH	#	LVH	#	LVH	#	LVH	#	LVH
1		29		57		85		113		141		169		197		225	
2		30		58		86		114		142		170		198		226	
3		31		59		87		115		143		171		199		227	
4		32		60		88		116		144		172		200		228	
5		33		61		89		117		145		173		201		229	
6		34		62		90		118		146		174		202		230	
7		35		63		91		119		147		175		203		231	
8		36		64		92		120		148		176		204		232	
9		37		65		93		121		149		177		205		233	
10		38		66		94		122		150		178		206		234	
11		39		67		95		123		151		179		207		235	
12		40		68		96		124		152		180		208		236	
13		41		69		97		125		153		181		209		237	
14		42		70		98		126		154		182		210		238	
15		43		71		99		127		155		183		211		239	
16		44		72		100		128		156		184		212		240	
17		45		73		101		129		157		185		213		241	
18		46		74		102		130		158		186		214		242	
19		47		75		103		131		159		187		215		243	
20		48		76		104		132		160		188		216		244	
21		49		77		105		133		161		189		217		245	
22		50		78		106		134		162		190		218		246	
23		51		79		107		135		163		191		219		247	
24		52		80		108		136		164		192		220		248	
25		53		81		109		137		165		193		221		249	
26		54		82		110		138		166		194		222		250	
27		55		83		111		139		167		195		223		251	
28		56		84		112		140		168		196		224		252	

Team/Reef Name:



Site 1

Today, your team is diving at Little Creek. This site is made up of Reef Balls and it is an observational dive. You'll bring the gridded quadrat with you as you investigate to collect percent area coverage of oysters. Your team dives down into the murky waters of Pamlico Sound. Luckily, you can find the Reef Ball easily. The depth of your sample is 18 feet, whereas the bottom of the Sanctuary is 20 feet. As you count the oysters in the gridded quadrat, you notice there is a heavy layer of sedimentation covering the reef ball. You also record the amount of mussels spotted in your grid—at 4 intersects there are mussels.

Site 2

After a successful first dive, your team moves over to Swan Island. The site is an excavation dive, and your team will be bringing up marl rock with oysters. The overall depth of Swan Island is shallower, at 14 feet. As your team dives down to the site at 10 feet, you notice the visibility is slightly better here. Using your gridded quadrat, you record the percent coverage of oysters and mussels. There are 20 intersects for oysters, and 2 for mussels. At this site, the sedimentation is considerably lighter than compared to your first dive.

Site 3

Today, your team is diving at Long Shoal. This site is made up of Reef Balls and it is an observational dive. You'll bring the gridded quadrat with you as you investigate to collect percent area coverage of oysters. Your team dives down into the murky waters of Pamlico Sound. Luckily, you can find the Reef Ball easily. The depth of your sample is 13 feet, whereas the bottom of the Sanctuary is 15 feet. As you count the oysters in the gridded quadrat, you notice there is a moderate layer of sedimentation covering the reef ball. You also record the amount of mussels spotted in your grid—at 10 intersects there are mussels.

Site 4

After a successful first dive, your team moves over to Crab Hole. The site is an excavation dive, and your team will be bringing up marl rock with oysters. The overall depth of Crab Hole is 12 feet. As your team dives down to the site at 9 feet, you notice the visibility is slightly better here. Using your gridded quadrat, you record the percent coverage of oysters and mussels. There are 24 intersects for oysters, and 1 for mussels. At this site, the sedimentation is nonexistent compared to your first dive.

Site 5

Today, your team is diving at Pea Island. This site is made up of Consolidated Concrete and it is an observational dive. You'll bring the gridded quadrat with you as you investigate to collect percent area coverage of oysters. Your team dives down into the murky waters of Pamlico Sound. Luckily, you can find the concrete easily. The depth of your sample is 13 feet, whereas the bottom of the Sanctuary is 16 feet. As you count the oysters in the gridded quadrat, you notice there is a light layer of sedimentation covering the reef ball. You also record the amount of mussels spotted in your grid—at 2 intersects there are mussels.

Site 6

After a successful first dive, your team moves over to Gibbs Shoal. The site is an excavation dive, and your team will be bringing up crushed concrete with oysters. The overall depth of Gibbs Shoal is 12 feet. As your team dives down to the site at 9 feet, you notice the visibility is slightly better here. Using your gridded quadrat, you record the percent coverage of oysters and mussels. There are 14 intersects for oysters, and 10 for mussels. At this site, the sedimentation is considerably lighter than compared to your first dive.

Site 7

Today, your team is diving at West Bay. This site is made up of consolidated concrete and it is an observational dive. You'll bring the gridded quadrat with you as you investigate to collect percent area coverage of oysters. Your team dives down into the murky waters of Pamlico Sound. Luckily, you can find the concrete easily. The depth of your sample is 6 feet, whereas the bottom of the Sanctuary is 7 feet. As you count the oysters in the gridded quadrat, you notice there is a moderate layer of sedimentation on the material. You also record the amount of mussels spotted in your grid—at 11 intersects there are mussels.

Site 8

After a successful first dive, your team moves over to Cedar Island. The site is an excavation dive, and your team will be bringing up marl rock with oysters. The overall depth of Cedar Island is 14 feet. As your team dives down to the site at 10 feet, you notice the visibility is slightly better here. Using your gridded quadrat, you record the percent coverage of oysters and mussels. There are 20 intersects for oysters, and 2 for mussels. At this site, the sedimentation is considerably lighter than compared to your first dive.