Name:

<div align="center">

Homework
Trawl - Overview

</div>

Complete the blank Trawl Effort / Total catch form, attached logbook pages, Catch Composition form, length form and Miscellaneous Fish Identification form using the following information.

You board the Observer code: AB743, Vessel code: GAB234, Trip #42. Your vessel is fishing with four nets deployed on the port and starboard and is targeting shrimp on sandy bottom. Fishing depth and bottom depth are equal and there were no gear performance issues unless indicated otherwise.

You board the boat early in the afternoon (~1400) in Port Gentil (0° 43' 41" S, 008° 47' 47" E) on November 3, 2011.

You depart port at 0835 on November 4 and start fishing about two hours later. On the steam to the fishing grounds you and the Captain discuss the typical fishing. He says they make 4-6 hauls per day and they usually take at least one 6 hour sleep break at night. You decide that since there is a sleep break, you'll attempt to use Random Sample Table #1. You start the RST#1 on Haul 3.

Since this is your first trip on this vessel, you decide to watch the first 2 hauls and are able to collect all of the effort information yourself. The first haul started at 1043, the position was 0° 32' 25" S, 008° 43' 30" E and the starting bottom depth was 331m. The mate starts retrieving the gear at 1:15 pm, the end position was 0° 31' 42" S, 008° 43' 34" E, and the end depth was 354 m. Towing speed was consistently 2.3 knots and you use the mate tells you he doesn't make catch estimates. Since you did not sample for catch composition, you only record a retained weight estimate. They redeployed the net fairly quickly. The 2nd haul was put overboard at 1:42pm and was at fishing depth (350 m) by 1:52 pm. The start position was 0° 31' 30" S, 008° 44' 00" E.

You were able to be on deck to watch the sorting process. You learned that most shrimp and fish were retained. Boxes of shrimp weighed 2kg and the crew sorted the shrimp into 3 size categories – 8-12; 13-20; 21+. Ten boxes of shrimp fill one 'carton'. They also retained about 10 different species of fish and packed them into 25 kg bags. They separated the large croakers (*Pseudotolithus* spp.; Scianidae), the stingrays (Dasyatidae) and cuttlefish (*Sepia* spp.). The smaller croakers, threadfins (Polynemidae) and other fish were mixed together. You verified that there were 4 cartons (40 boxes) of shrimp and 7.5 bags of fish in Haul 1.

Haul 2 ended at 1725, 0° 29' 55" S, 008° 45' 06" E and 312 m. Unlike the mate, the captain made an estimate of 400 kg for the total catch. Haul 2 had the following retained box and bag counts:

Species	Boxes 8-12	Boxes 13-20	Boxes 21+	Bags
Shrimp	11	31	10	
Cuttlefish				1
Croakers				3
Stingray				1
Mixed fish (medium)				2
Mixed fish (small)				3

You used the time with the crew on deck to complete several of your species identification forms on fish you had not seen before. Details of one of the fish are as follows:

Royal threadfin (*Pentanemus quinquarius*)
- You did not collect a specimen but you did take photos.
- You did not cut open the fish; 24 cm (Fork length); 27 cm (total length); 0.25 kg
- You count 8 spines in the first dorsal fin and 1 spine plus 15 rays in the 2nd dorsal fin. There were also 3 spines & 30 rays in the anal fin.
- Silver fish with 5 long, thin detached rays (4 are longer than body). Base of anal fin much longer than base of second dorsal fin.
- Unable to count gill rakers without magnification.
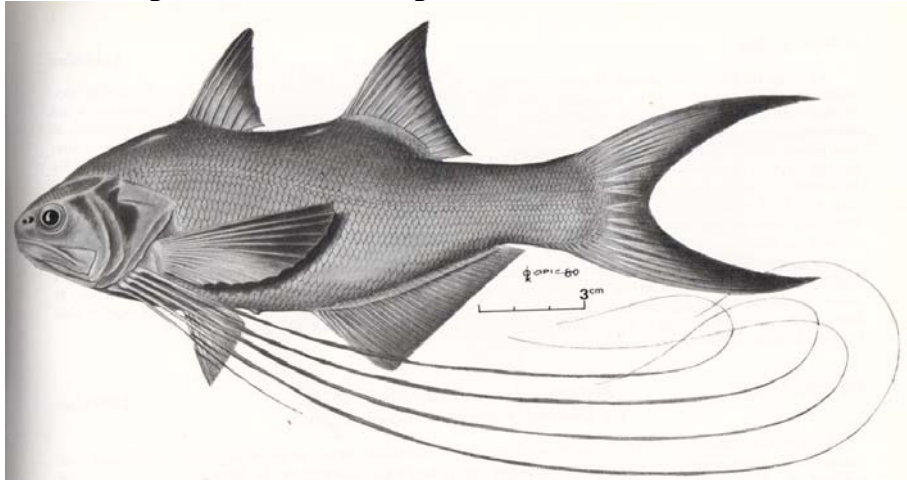
Image: Seret (1981)

On the third haul, you realize the output on the depth sounder output was set to feet rather than meters. You need to fix your previous depths. You ask the captain to change the output on the depth sounder from feet to meter units so that your remaining depths will be in meters. He agrees.

Since you were out on deck after haul 2 and the vessel steamed about 30 minutes before deploying the gear again, the captain records the effort information for haul 3 as follows: start time=1800, position=0° 30' 46" S, 008° 48' 7" E, depth =64m. You are in the wheelhouse when he starts retrieving and you record the following: end time=2242, position=0° 29' 33" S, 008° 49' 10" E, depth=59m. You have decided to make an attempt at sampling this haul.

Haul 3 had the following retained box and bag counts and you also took a few average weight samples:

Species	Boxes 8-12	Boxes 13-20	Boxes 21+	Bags	Individuals #	Individuals Wt	Average wt
Shrimp	18				32	6.1 kg	0.190625
Shrimp		23			49	6.0 kg	0.1224490
Shrimp			4		28	2.05	0.073215
Cuttlefish					4	1.8 kg	
Croakers/ cassava fish				3	20	34.5 kg	
Stingray					7	3.7	
Mixed fish (medium)				2			
Mixed fish				3			

2

(small)							

You are able to look at one bag of medium and one bag of small mixed fish for composition.

Species	#	Weight
Mixed (medium) - 1 of 2		
Pseudotolithus spp	22	10.3
Pomadasys jubelini	20	8.7
Dentex spp	13	6
Mixed (small) - 1 of 3		
Pseudotolithus spp	48	9.3
Pomadasys jubelini	22	7
Dentex spp	16	3.4
Polynemidae	96	5.4

There were only 3 baskets of discard so you decide to weigh it all – 20.4, 18.9, 19.1 kg. You randomly select 1 of a basket for catch composition of the discards. You also took an average weight sample for Polynemidae (40 individuals at 1.2 kg).

Discard- 1 of 3 baskets	#	Weight	Reason for discard
snail	2	1.7	Market
snail (smaller)	24	1.3	Market
Bivalve	34	0.68	Market
Cynoponticus ferox	1	0.33	Market
Pomadasys jubelini	47	5.64	Market
Polynemidae		2.85	Market
fish unid	29	7.25	Market
plastic		0.75	n/a

The vessel is finished fishing for the night & will resume in the morning. You ask the mate to record the effort information for the gear deployment of haul 4 and to wake you up 30 minutes before he decides to haul. Haul 4 deployment information is as follows: start time=0445 (Nov 5), position=0° 29' 13" S, 008° 49' 30" E, depth =58m. You get a wake up call around 7a.m. You grab a cup of coffee and head to the wheelhouse to see where you are. You record the gear retrieval information: end time=0732, position=0° 28' 50" S, 008° 52' 30" E, depth =41m

Haul 4 had the following retained box and bag counts and average weights:

Species	Boxes 8-12	Boxes 13-20	Boxes 21+	Bags	Individuals #	Individuals Wt (kg)	Average wt (kg)
Shrimp	23				28	5.9	0.210714
Shrimp		34			51	6.0	0.117647
Shrimp			8		31	2.0	0.064516
Cuttlefish				1	47		
Croakers				2	18	25.5 kg	
Stingray					3	1.5	
Mixed fish (medium)				4			
Mixed fish (small)				5			

You are able to look at one bag of medium and bag of small mixed fish for composition.

Species	#	Weight
Mixed (medium) - 1 of 4		
Pseudotolithus spp	31	12.5
Pomadasys jubelini	25	10.2
Dentex spp	3	2.1
Mixed (small) - 1 of 5		
Pseudotolithus spp	67	14.3
Pomadasys jubelini	11	2.2
Dentex spp	5	1.2
Galeoides decadactylus	45	2.9
Pentanemus quinquaris	48	4.4

There were only 5 baskets of discard so you decide to weigh it all as well – 19.3, 18.8, 19.0, 18.9, 19.1 kg. You randomly select 1 of a basket for catch composition of the discards. You also took an average weight sample for *G. decadactylus* (35 individuals at 1.25 kg).

Discard- 1 of 5 baskets	#	Weight	Reason for discard
Polychaete	3	0.2	Market
snail (smaller)	30	1.0	Market
Bivalve	20	0.4	Market
Cynoponticus ferox	2	0.5	Market
Pomadasys jubelini	37	4.2	Market
Galeoides decadactylus		5.8	Market
fish unid	29	6.3	Market
plastic		0.6	n/a

The captain recorded Haul 5 deployment information as follows: start time=0800, position=0° 28' 45" S, 008° 52' 25" E, depth =41m. You record the gear retrieval information: end time=1120, position=0° 28' 2" S, 008° 50' 10" E, depth =55m

Haul 5 had the following retained box and bag counts and average weights:

Species	**Boxes 8-12**	**Boxes 13-20**	**Boxes 21+**	**Bags**	**Indivi-duals #**	**Indivi-duals Wt (kg)**	**Average wt (kg)**
Shrimp	20				25	6.0	0.24
Shrimp		39			58	6.0	0.103448
Shrimp			10		27	1.95	0.72222
Cuttlefish				0.5	20		
Croakers				1	23	25.0 kg	
Stingray					1	1.2	
Mixed fish (medium)				4			
Mixed fish (small)				4			

You are able to look at one bag of medium and bag of small mixed fish for composition.

Species	#	Weight
Mixed (medium) - 1 of 4		
Pseudotolithus spp	28	13.2

Pomadasys jubelini	22	9.9
Dentex spp	2	1.9
Mixed (small) - 1 of 4		
Pseudotolithus spp	83	15.9
Pomadasys jubelini	6	1.1
Dentex spp	3	0.7
Galeoides decadactylus	33	3.2
Pentanemus quinquaris	42	4.1

There were 7 baskets of discard & you weigh four to get an average basket weight – 19.1, 18.75, 19.2, 18.9 kg. You randomly select 1 of a basket for catch composition of the discards. You also took an average weight sample for *G. decadactylus* (40 individuals at 1.3 kg).

Discard- 1 of 7 baskets	#	Weight	Reason for discard
Polychaete	1	0.02	Market
snail (smaller)	38	1.2	Market
Hermit crab	28	0.5	Market
Selene dorsalis	1	0.5	Market
Pomadasys jubelini	31	2.6	Market
Galeoides decadactylus		4.8	Market
fish unid	73	9.2	Market
plastic		0.45	n/a

You were also able to measure *Pseudotolithus* spp from the main retained fish sample and from each of the mixed species bags. For lengths, you identified these to species. Record each sample type separately (eventually, we'll add another field to accommodate different samples).

Species	ST=3A	ST=3B (medium)	ST=3B (small)
P. elongates – Male	31 – 1	20-1	
	33-1	22-1	
	35-2	25-1	
	36-1		
P. elongates – Female	34-1	22-2	
	37-1	26-1	
	42-1	29-1	
P. elongates – Indeterminate		21-1	12-2
			13-1
			14-3
			15-1
			17-1

Haul 6 is an "off" haul according to the random sample table. You use this time to complete your paperwork for the last 4 hauls. You've gotten a little behind. You use the effort/catch ration method using 'similar' hauls (#4 & 5) to calculate the Total Catch Estimate. Haul 6 is towed a little slower (~2.1 knots) due to the weather picking up. You are able to record the deployment information: start time=1155, position=0° 28' 7" S, 008° 50' 17" E, depth =41m. You also record the gear retrieval information: end time=1120, position=0° 28' 38" S, 008° 52' 36" E, depth =44m.

Random Sample Table #1							
Date	Haul #	Samp?	Notes	Date	Haul #	Samp?	Notes
		Y				Y	
		Y				Y	
		Y				Y	
		N				N	
		Y				Y	
		Y				Y	
		N				Y	

Haul #: Total catch WT:	Total Weight Calculation
Density Calculation	
Haul #: Total catch WT:	Total Weight Calculation
Density Calculation	
Haul #: Total catch WT:	Total Weight Calculation
Density Calculation	

	Total Weight Calculation
Haul #: Total catch WT: Density Calculation	
Haul #: Total catch WT: Density Calculation	Total Weight Calculation
Haul #: Total catch WT: Density Calculation	Total Weight Calculation

| Observer code | | | | | | Vessel code | | | | | | | Trip ID | | | | | | | |

Haul	Total nets	Gear Perf	Sampled?	Target	Substrate		Date/Time				Position						Depth, bottom (m)	Depth, fishing (m)	V / O	Speed (knots)	Retained catch (mt)	Total Catch Est. (mt)	Method
							Day	Month	Year	Time (24-hr)	Lat-Deg	Lat-Min	Lat-N/S	Long-Deg	Long-Min	Long-E/W							
						Start						.			.								
						End						.			.								
						Start						.			.								
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						End						.			.								

Gear performance codes:
1. No problem
2. Door- and warp-related problems
3. Net not fishing (bogged, obstructed, bag untied, torn, etc)
4. Net lost
5. Other

Target:
S – Shrimp   **F** – Fish
Substrate:
M – Mud   **S** – Sand
R – Rocky   **C** – Corals
CM – Corals & mud
CMS – Corals, mud & sand

Total Catch method:
1. Weigh entire catch
2. Weigh subsample & extrapolate to total count (basket, cartoon)
3. Volumetric estimate: Bin or codend
4. Catch / effort ratio
5. Captain / Vessel estimate
9. Other   10. Unable to obtain Total Catch estimate

Catch Composition

Observer code		Vessel code		Trip ID		Date (dd/mm/yy)		Haul		Mixed? Y / N

Sample Type (ST)

1 Whole haul	3A Trawl - retained by species	4 LL-demersal	**Reason Discard**
2 Unsorted random	3B Trawl - retained mixed species	5 Gillnet	1 Regulation 4 Error
	3C Trawl - discard sample	7 Pots/traps	2 Market 5 Other
		8 Other	3 Damage

Species Name	Species Code	ST	Number Individuals	Weight (kg)	Sample Size	% Ret.	Reason Discard

Catch Composition

Species Name	Species Code	ST	Number Individuals	Weight (kg)	Sample Size	% Ret.	Reason Discard

Notes / Calculations		Total weight	
	3A		
	3B		
	3C		
	Total Catch Est		

Catch Composition

Observer code		Vessel code		Trip ID		Date (dd/mm/yy)		Haul		Mixed? Y / N

Sample Type (ST)

1 Whole haul	3A	Trawl - retained by species		4 LL-demersal	**Reason Discard**	
2 Unsorted random	3B	Trawl - retained mixed species		5 Gillnet	1 Regulation	4 Error
	3C	Trawl - discard sample		7 Pots/traps	2 Market	5 Other
				8 Other	3 Damage	

Species Name	Species Code	ST	Number Individuals	Weight (kg)	Sample Size	% Ret.	Reason Discard

Catch Composition

Species Name	Species Code	ST	Number Individuals	Weight (kg)	Sample Size	% Ret.	Reason Discard

Notes / Calculations		
		Total weight
	3A	
	3B	
	3C	
	Total Catch Est	

Catch Composition

Observer code		Vessel code		Trip ID		Date (dd/mm/yy)		Haul		Mixed? Y / N

Sample Type (ST)

1 Whole haul	3A	Trawl - retained by species		4 LL-demersal	**Reason Discard**	
2 Unsorted random	3B	Trawl - retained mixed species		5 Gillnet	1 Regulation	4 Error
	3C	Trawl - discard sample		7 Pots/traps	2 Market	5 Other
				8 Other	3 Damage	

Species Name	Species Code	ST	Number Individuals	Weight (kg)	Sample Size	% Ret.	Reason Discard

Catch Composition

Species Name	Species Code	ST	Number Individuals	Weight (kg)	Sample Size	% Ret.	Reason Discard

Notes / Calculations

	Total weight
3A	
3B	
3C	
Total Catch Est	

Misc. Fish Species Description

Observer code:_____ Vessel Code: _____ Trip ID: _____

Common name / code: _____

Haul:_____   Specimen collected? **Y / N**   Total length (cm):_____ Fork length (cm):_____

Date:_____   Photos? **Y / N**   Weight (kg):_____

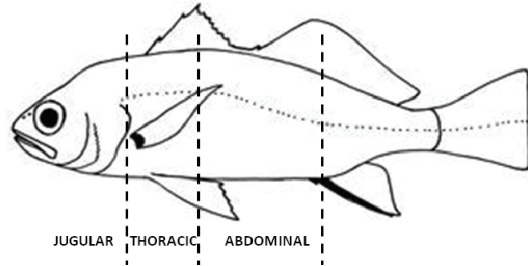Sex: **M / F / I / U**

Check box for presence/absence   **Present**   **Absent**

	Present	Absent
Adipose fin		
Pelvic fins		
Chin barbel		

	How many?	Spines	Rays
Dorsal fins			
Anal			

	Upper	Lower
Gill rakers		

Pelvic fin position (circle one)

JUGULAR   THORACIC   ABDOMINAL

Describe color :_____

Draw the animal and include the following:
1. Shape of dorsal fin –fill in spine heights
2. Caudal fin shape
3. Pectoral fin shape
4. Anal fin shape

5. Pelvic fin position
6. Lateral line(s)
7. Position of any spines, cirri, barbells, etc.

Additional field characteristics used to identify this species:

Fish / Invertebrate Length Frequencies

Observer code			Vessel code			Trip ID			Date (dd/mm/yy)			Haul / set	

Species Name	Code	Sex	Mat.	LType	KPC	Length	#	Length	#	Length	#	Length	#	Length	#

Comments:

Sex:
M - Male
F - Female
I - Indeterminate
U - Unknown

Common length types (record as number & letter combination):

01 - Fork	11 - Disc width	S - Straight
02 - Total	34 - Carapace length (lobster)	C - Curved
03 - Standard	37 - Carapace length (crab)	
05 - Lower jaw to fork	38 - Carapace width (crab)	

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