Demersal Longline

Set & Haul Information and Catch Composition

INSERT presenter name here

http://www.worldwideseafoods.ca/fleet.html

Trinidad longliner, 2005, FAO Fisheries Technical Paper. No. 482

Data collection priorities

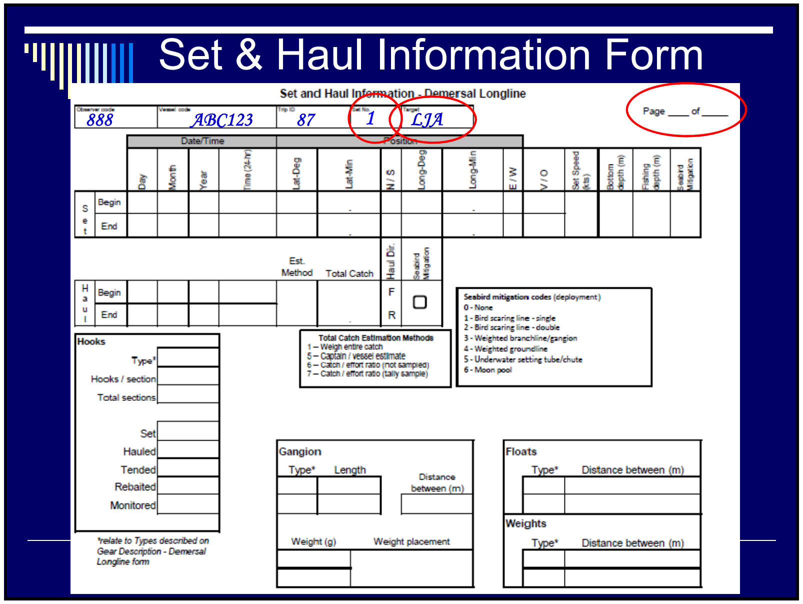
1. **Estimate effort for each gear deployment;**
2. **Identify every individual caught in subsample and estimate percent retained**;
3. Collect biological information on target and other identified species as requested;
4. Record all sightings and interactions with marine mammals and sea turtles;
5. **Record vessel and fishing gear characteristics.**

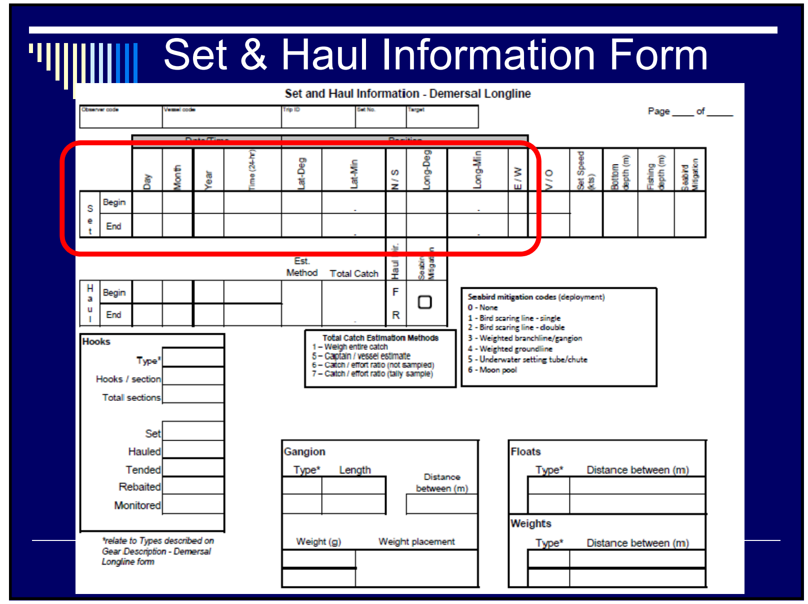
Objectives

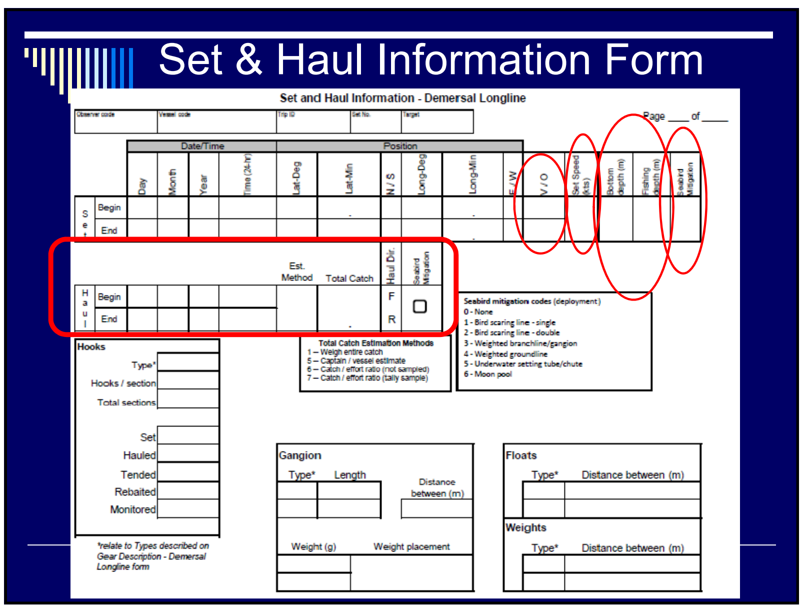
- List 8 elements on the Set & Haul Information form and describe how each is collected
- Define fishing effort
- Describe the catch composition sampling process
- List 3 pieces of equipment needed on deck
- Demonstrate ability to select and describe one random sampling procedure
- Demonstrate ability to complete the Set & Haul Information (incl. calculation of Total Catch) and Catch Composition forms

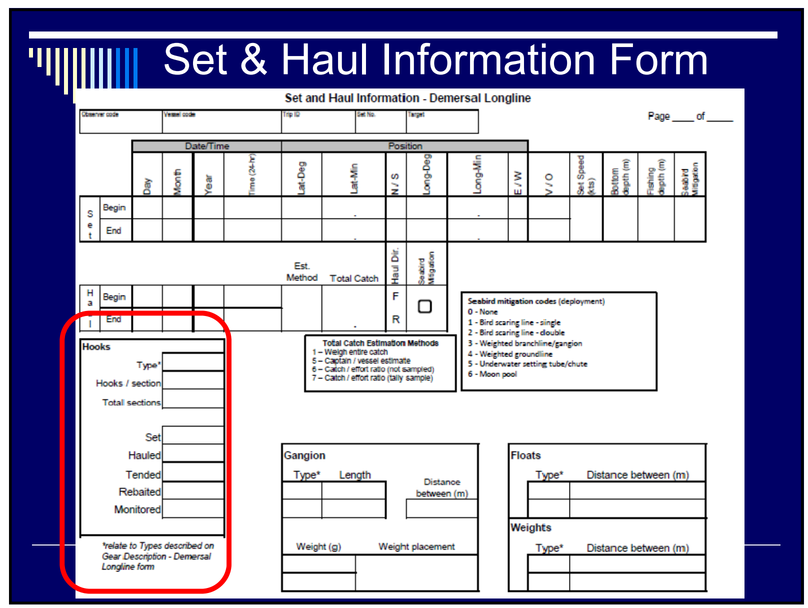
Set & Haul Information Form

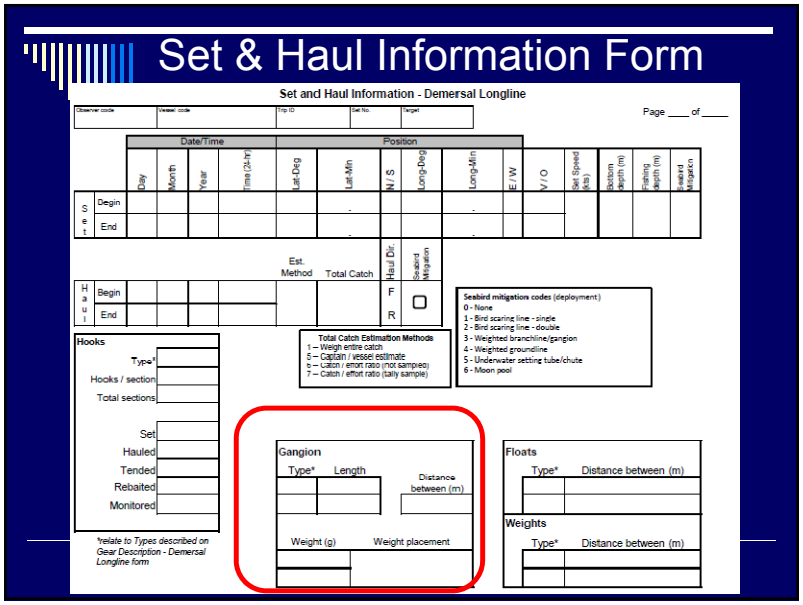
- 1 per set
- Fishing effort – time & amount of gear fished
- Catch per unit effort (CPUE)

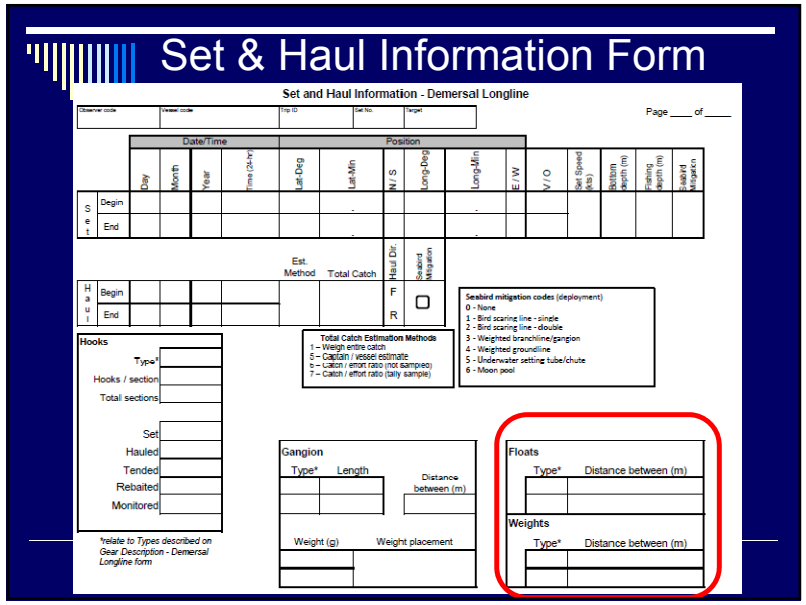

Set & Haul Information Form
Set and Haul Information - Demersal Longline
888
ABC123
87
1
LJA
Page ___ of ___
Date/Time
Position
Begin
End
Est. Method
Total Catch
Hooks
Gangion
Floats
Weights

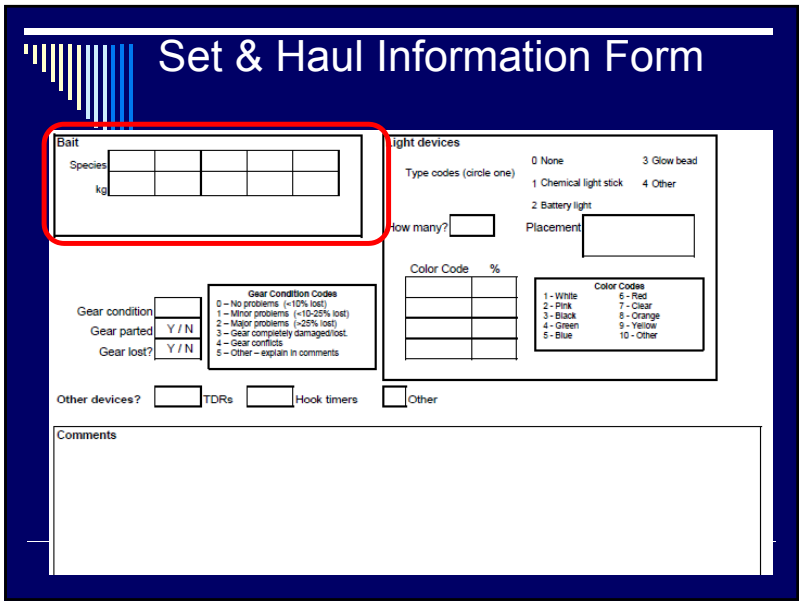

Set & Haul Information Form
Set and Haul Information - Demersal Longline
Page ___ of ___

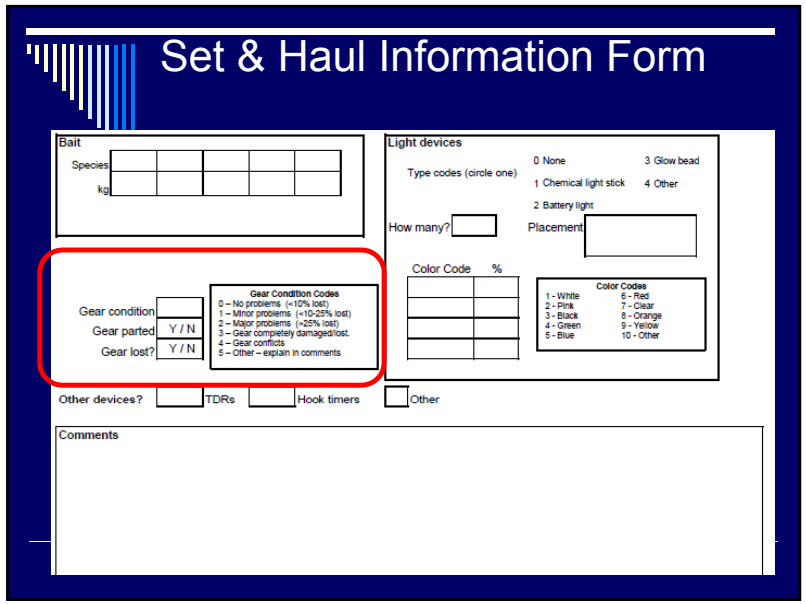

Set & Haul Information Form
Set and Haul Information - Demersal Longline
Page ___ of ___


Set & Haul Information Form
Set and Haul Information - Demersal Longline
Page ___ of ___


Set & Haul Information Form
Set and Haul Information - Demersal Longline
Observer code
Vessel code
Trip ID
Set No.
Target
Page ___ of ___
Date/Time
Position
Day
Month
Year
Time (24-hr)
Lat-Deg
Lat-Min
N / S
Long-Deg
Long-Min
E / W
V / O
Set Speed (kts)
Bottom depth (m)
Fishing depth (m)
Seabird Mitigation
Set
Begin
End
Haul
Est. Method
Total Catch
Haul Dir.
F
R
Seabird mitigation codes (deployment)
0 - None
1 - Bird scaring line - single
2 - Bird scaring line - double
3 - Weighted branchline/gangion
4 - Weighted groundline
5 - Underwater setting tube/chute
6 - Moon pool
Total Catch Estimation Methods
1 – Weigh entire catch
5 – Captain / vessel estimate
6 – Catch / effort ratio (not sampled)
7 – Catch / effort ratio (daily sample)
Hooks
Type*
Hooks / section
Total sections
Set
Hauled
Tended
Rebaited
Monitored
*relate to Types described on Gear Description - Demersal Longline form
Gangion
Type*
Length
Distance between (m)
Weight (g)
Weight placement
Floats
Type*
Distance between (m)
Weights
Type*
Distance between (m)


Set & Haul Information Form
Set and Haul Information - Demersal Longline
Page ___ of ___
Hooks
Gangion
Floats
Weights


Set & Haul Information Form
Bait
Species
kg
Light devices
Type codes (circle one)
0 None
1 Chemical light stick
2 Battery light
3 Glow bead
4 Other
How many?
Placement
Color Code
%
Color Codes
1 - White
2 - Pink
3 - Black
4 - Green
5 - Blue
6 - Red
7 - Clear
8 - Orange
9 - Yellow
10 - Other
Gear condition
Gear parted
Gear lost?
Y / N
Gear Condition Codes
0 – No problems (<10% lost)
1 – Minor problems (<10-25% lost)
2 – Major problems (>25% lost)
3 – Gear completely damaged/lost.
4 – Gear conflicts
5 – Other – explain in comments
Other devices?
TDRs
Hook timers
Other
Comments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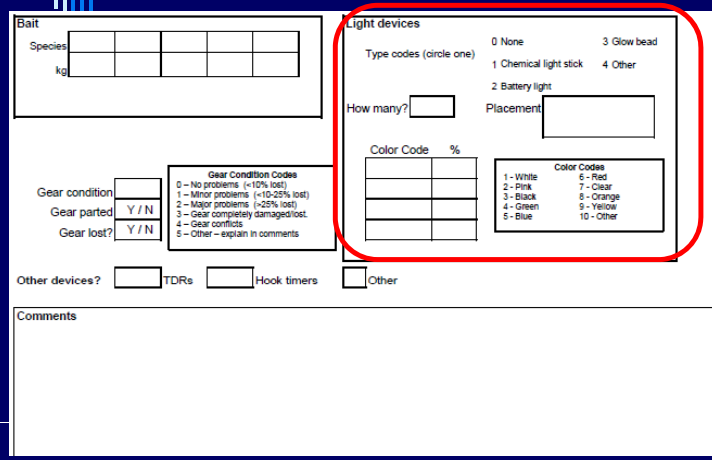
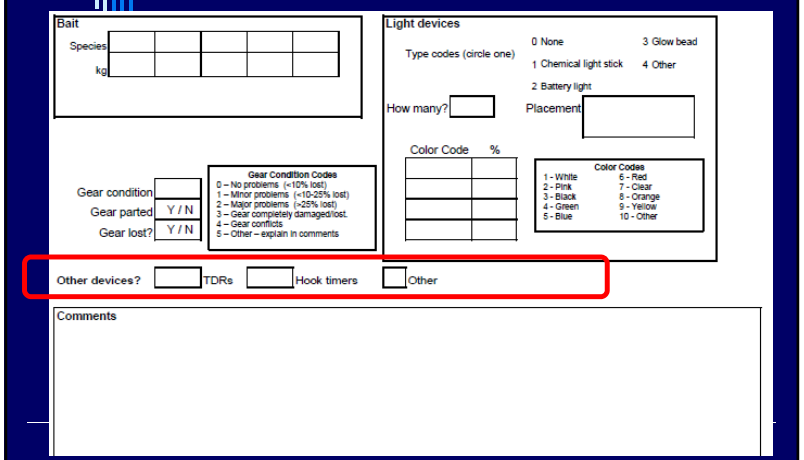
How many?
Placement
Color Code
%
Color Codes
Gear condition
Gear parted
Gear lost?
Y / N
Gear Condition Codes
Other devices?
TDRs
Hook timers
Other
Comments

Set & Haul Information Form



Set & Haul Information Form



Total Catch Estimation

- Total catch must be estimated for every set.
- Weigh entire catch (**method 1**)
- Captain / vessel estimate (**method 5**)
- Catch / effort ratio (**method 6**) - unsampled

$$\frac{\Sigma \text{ Sample weights from similar sets}}{\Sigma \text{ Tallied hooks from similar sets}} \times \text{Total hooks in unsampled set}$$

- Catch / effort ratio (**method 7**) – tally sample

$$\frac{\text{Sample weight (kg)}}{\text{Hooks in sample}} \times \text{Total hooks in set}$$

Set & Haul Information Form

- Questions on Set & Haul information?
- Practice exercise
  - Groups of 2

Catch Composition

- Multiple sets/day – how to choose?
- **Observer logbook**
- **Sets/day** **Random sample table (RST)**

1-2	None – Sample all sets
3-4	RST#1
5+	RST#2

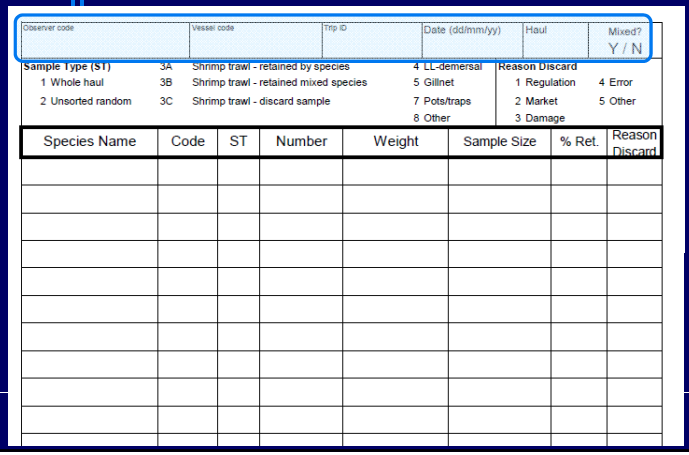
Catch Composition

- Tally sample (ST=4)
  - Count all individual species as they come out of water
  - Separate tally for discard/dropped
- How much to sample? **1/3 to ½ of hooks deployed**

Catch Composition

- Selecting gear for tally sample
  - Systematic spatial with random start ***Preferred**
  - Random spatial
  - Systematic temporal
  - Random temporal
- Catch along bottom can be highly variable

Catch Composition Form

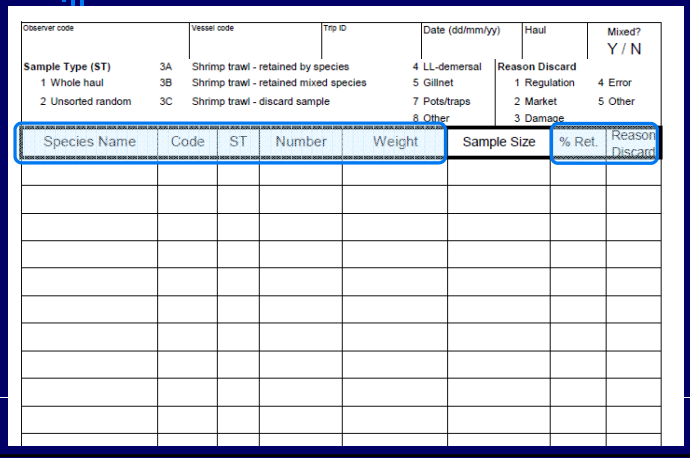


Observer code	Vessel code	Trip ID	Date (dd/mm/yy)	Haul	Mixed? Y / N

Sample Type (ST)				Reason Discard	
1 Whole haul	3A	Shrimp trawl - retained by species	4 LL-demersal	1 Regulation	4 Error
2 Unsorted random	3B	Shrimp trawl - retained mixed species	5 Gillnet	2 Market	5 Other
	3C	Shrimp trawl - discard sample	7 Pots/traps	3 Damage	
			8 Other		

Species Name	Code	ST	Number	Weight	Sample Size	% Ret.	Reason Discard

Catch Composition Form



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Sample Type (ST)
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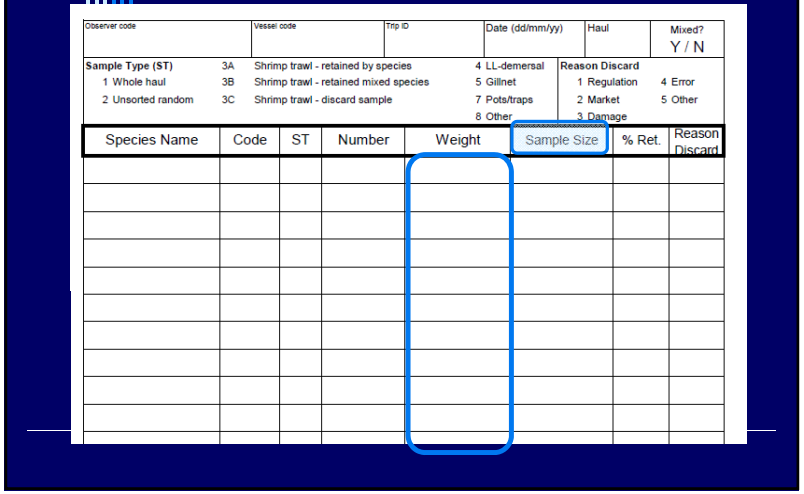
5 Gillnet
7 Pots/traps
8 Other

Reason Discard
1 Regulation
2 Market
3 Damage
4 Error
5 Other

Species Name	Code	ST	Number	Weight	Sample Size	% Ret.	Reason Discard

Catch Composition Form



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4 LL-demersal
5 Gillnet
7 Pots/traps
8 Other

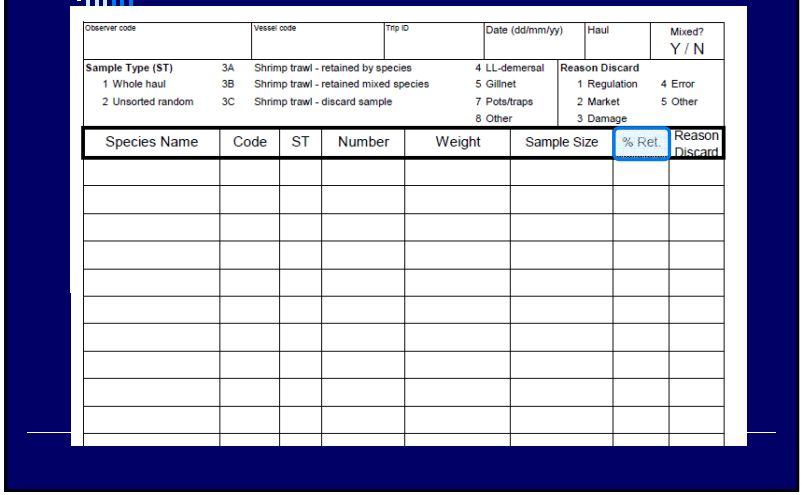
Reason Discard
1 Regulation
2 Market
3 Damage
4 Error
5 Other

Species Name	Code	ST	Number	Weight	Sample Size	% Ret.	Reason Discard

Catch Composition Form

- Weights
  - Actual
  - Average weight * total count
  - Estimate

Catch Composition Form



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Reason Discard
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3 Damage
4 Error
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Species Name	Code	ST	Number	Weight	Sample Size	% Ret.	Reason Discard

Catch Composition Form

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			8 Other		

Species Name	Code	ST	Number	Weight	Sample Size	% Ret.	Reason Discard

Activity

- Questions on catch composition sampling / random sampling or the form?
- Activity #2
  - Groups of 2
  - Assigned a sample type
  - Design how you will sample a set with 12 gear units of 50 hooks
  - Tally sample & complete Catch Comp form

Tally Sampling Activity

Key to "symbols"

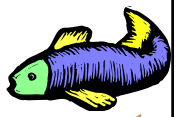
Shark 

Stingray 

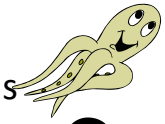
Flatfish 

Empty hook 

Flying fish 

Purple body 

Redfish 

Octopus 

Snail 

Starfish 

Tally Sampling Activity

Key to "symbols"

Dropped 

Activity

- Did you have any trouble keeping up with the tally?
- What were your total catch estimates?
- How does it compare to actual total weight of 816.49 kg?
- Why do you think there are differences?

Summary

- List the elements on the Set and Haul Information form and describe how each is collected
- How is fishing effort defined?
- What are four ways to collect a random sample?
- Describe the catch composition sampling process for demersal longlining
- What gear is needed on deck for catch composition sampling

Information for Set & Haul Form [Activity #1]

Show all calculations in the comments section

Your observer code is Z007 and you are aboard the f/v Rainy Days (code SLE005). This is trip 24, set 75. The captain tells you the target is for sharks.

The first hook goes in the water at 5:30 a.m. on October 12, 2010. You record the start set position from the GPS as 10 º 27.32N and 8º 22.998 W. Setting speed was 6.2 knots and gear was set ~3 meters above bottom which averaged 34.6m.

You used the vessel's logbook for the end set and begin/end haul. The information is as follows.
End set: 6:30 a.m on the same day at 10 º 47.88N and 8º 12.000 W.

Begin haul: October 12, 3:19 p.m., End haul: 6:45 p.m. You tally sampled the haul (total sample weight was 1,395.67 kg and you subsampled 20 sections. You did not observer any set mitigation but the vessel used a boom w/ heavy line to protect the hauling area from seabirds. The haul was in reverse.

The captain told you there were 50 sections deployed. Upon gear retrieval, you subsampled 10 sections and counted all of the hooks as follows: 58, 58, 59, 61, 60, 57, 60, 60, 61, 63. No hooks were tended, rebaited or lost.

You measured 30 gangions which were spaced 1.0 m apart.

0.4m	0.41	0.39	0.41	0.4	0.41
0.41	0.41	0.38	0.39	0.38	0.4
0.4	0.41	0.41	0.39	0.38	0.39
0.38	0.39	0.39	0.41	0.4	0.41
0.38	0.4	0.4	0.41	0.41	0.38

No weights were added to the gangion or floats added to groundline.

Weights were added to the groundline at 5.25 kg per 100m.

There were no problems hauling the gear and no gear was lost. No additional devices were added to the set. The crew used 300 kg of squid for bait. They did not attach any lights or other gear.

Set and Haul Information - Demersal Longline

Observer code	Vessel code	Trip ID	Set No.	Target

		Date/Time				Position										
		Day	Month	Year	Time (24-hr)	Lat-Deg	Lat-Min	N / S	Long-Deg	Long-Min	E / W	V / O	Set Speed (kts)	Bottom depth (m)	Fishing depth (m)	Seabird Mitigation
Set	Begin						.			.						
	End						.			.						

						Est. Method	Total Catch	Haul Dir.	Seabird Mitigation
Haul	Begin							F	☐
	End						.	R	

Total Catch Estimation Methods
1 – Weigh entire catch
5 – Captain / vessel estimate
6 – Catch / effort ratio (not sampled)
7 – Catch / effort ratio (tally sample)
9 – Other – explain in comments

Seabird mitigation codes (deployment)
0 - None
1 - Bird scaring line - single
2 - Bird scaring line - double
3 - Weighted branchline/gangion
4 - Weighted groundline
5 - Underwater setting tube/chute
6 - Moon pool
10 - Other - explain in comments

Hooks

Type*	
Hooks / section	
Total sections	
Set	
Hauled	
Tended	
Rebaited	
Monitored	

**relate to Types described on Gear Description - Demersal Longline form*

Gangion

Type*	Length	Distance between (m)

Weight (g)	Weight placement

Floats

Type*	Distance between (m)

Weights

Type*	Distance between (m)

Bait

Species					
kg					

Light devices

Type codes (circle one)

0 None
1 Chemical light stick
2 Battery light
3 Glow bead
4 Other

How many? ____ Placement ____

Color Code	%

Color Codes

1 - White	6 - Red
2 - Pink	7 - Clear
3 - Black	8 - Orange
4 - Green	9 - Yellow
5 - Blue	10 - Other

Gear condition ____
Gear parted Y / N
Gear lost? Y / N

Gear Condition Codes

0 – No problems (<10% lost)
1 – Minor problems (<10-25% lost)
2 – Major problems (>25% lost)
3 – Gear completely damaged/lost.
4 – Gear conflicts
5 – Other – explain in comments

Other devices? ____ TDRs ____ Hook timers ____ Other

Comments

Activity Handout – Demersal Longline – Sampling [Activity #2]

Name(s)

What you need: pencil, blank Catch Composition form, sample description form to describe sampling procedures, calculator

Gather in groups of two.

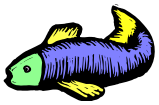
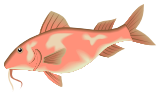
For this activity, you will complete the Catch Composition form, complete the sampling description form and calculate a Total Catch estimate. You will be handed card with the proportion to sample as well as the sample frame to use (e.g. Spatial Systematic, Spatial Random, Temporal systematic & Temporal Random).

Here's what you know in advance:
Observer code: **K95969** Vessel code: **CTR987** Trip ID: **44** Set No: **19**
The set has 12 gear units. Each gear unit has 50 hooks. Each gear unit takes ~ 1 minute and 40 seconds to haul. Rotate tally positions at the end of the 6th gear unit.

Tally all species in your sample (which will appear on the screen) and use the average weights in the key below to fill in the individual sample weights and total sample weight. Only the fish and sharks are retained. Protected species were discarded fur to regulations and all other species were discarded because no one would buy them. Use the following actual species & weights for the purpose of filling out the Catch composition form.

Shark (Alopias spp – thresher shark unid)	10 @ 64.75 kg	Purple body [*Balistes carolinensis* – Grey triggerfish]	45 @ 96.5kg
Stingray (Dasyatis pastinaca – Common stingray)	24 @ 22.87 kg	Redfish [*Arius heudeloti* – smoothmouth sea catfish]	50 @ 145.13 kg
Flatfish [Cynoglossidae – tonguefish unid]	35 @ 28.46	Octopus unid	12 @ 9.5 kg
		Snail unid	20 @ 3.9 kg
Flying fish (Parexocoetus brachypterus - Sailfin flyingfish)	27 @ 18.75	Starfish	15 @ 7.23 kg

Take 10 minutes to decide how you will sample & get ready to start tallying. There is a sample tally sheet on the next page with the symbols that you will see. Also, there will be a symbol like this,  , for individuals that are dropped.

Shark 	Purple body 
Stingray 	 Redfish
Flatfish 	Octopus 
Empty hook 	Snail 
Flying fish 	Starfish 

Calculate the total catch estimate using your tally sample.

Sampling Description
Briefly describe the flow of fish:

_____

_____

_____

_____

_____

Please describe each element of your sample design at each level of sampling.
1. Haul-level Sampling:

Population:_____

Haul selection: _____

_____

2. Within Haul Composition Sampling:

Population: _____

Sampling Frame Type (spatial, temporal, other) and Units (include typical size of sample unit):

_____

_____

_____

Expected number (range) of sampling units in population: _____

_____

Random numbers generated by: __

Sampling Method: _____

_____

_____

_____

_____

Describe any factors that affected your random sample (e.g. sorting, limited access, etc.):

_____

_____

_____

_____

_____

_____

3. Sexed Length Samples / Sub-set samples for species ID / Average weight:

Population:_____

Sampling Frame Type (spatial, temporal, other) and Units (include typical size of sample unit):

_____

_____

Expected number (range) of sampling units in population:

_____

_____

Random numbers generated by: _____

Sampling Method: _____

_____

_____

Describe any factors that affected your random sample (e.g. sorting, limited access, etc.):

_____

_____

_____

4. Specimen Samples (age, maturity, sexed length-weight, etc.):

Population: _____

Sampling Frame Type (spatial, temporal, other) and Units (include typical size of sample unit):

_____

_____

Expected number (range) of sampling units in population: _____

_____

Random numbers generated by: _____

Sampling Method: _____

_____

_____

Describe any factors that affected your random sample (e.g. sorting, limited access, etc.):

_____

_____

_____

Catch Composition

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

Sample Type (ST)
1 Whole haul
2 Unsorted random
3A Shrimp trawl - retained by species
3B Shrimp trawl - retained mixed species
3C Shrimp trawl - discard sample
4 LL-demersal
5 Gillnet
7 Pots/traps
8 Other

Reason Discard
1 Regulation
2 Market
3 Damage
4 Error
5 Other

Species Name	Code	ST	Number	Weight	Sample Size	% Ret.	Reason Discard

Catch Composition

Species Name	Code	ST	Number	Weight	Sample Size	% Ret.	Reason Discard

Notes / Calculations

	Total weight
3A	
3B	
3C	