

Trawl – Gear description (fish & shrimp)

INSERT INSTRUCTOR Name

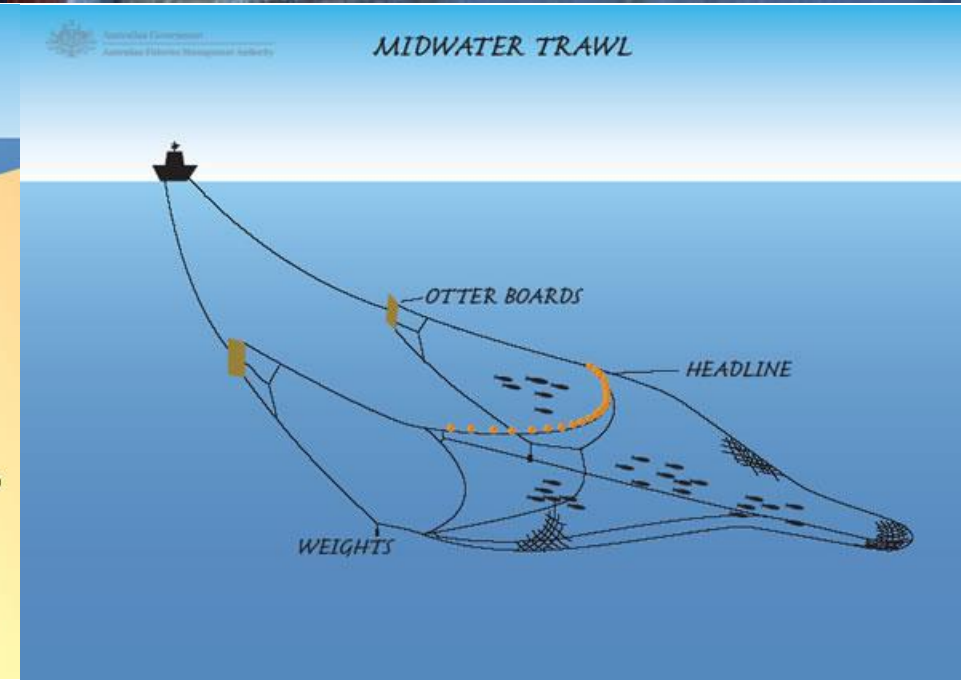
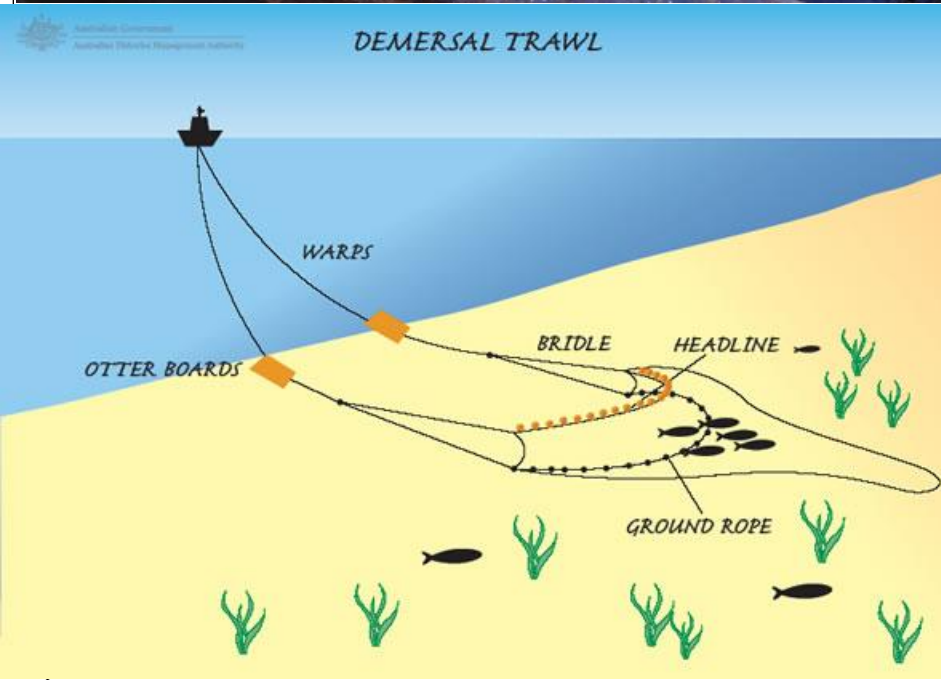


<http://www.safmc.net>



Joël Prado - FAO/FIIT

<http://www.whboat.com>



Introduction

- Fish & invertebrates
- Bottom (demersal) and midwater (pelagic)
- $\sim 50\%$ global catch

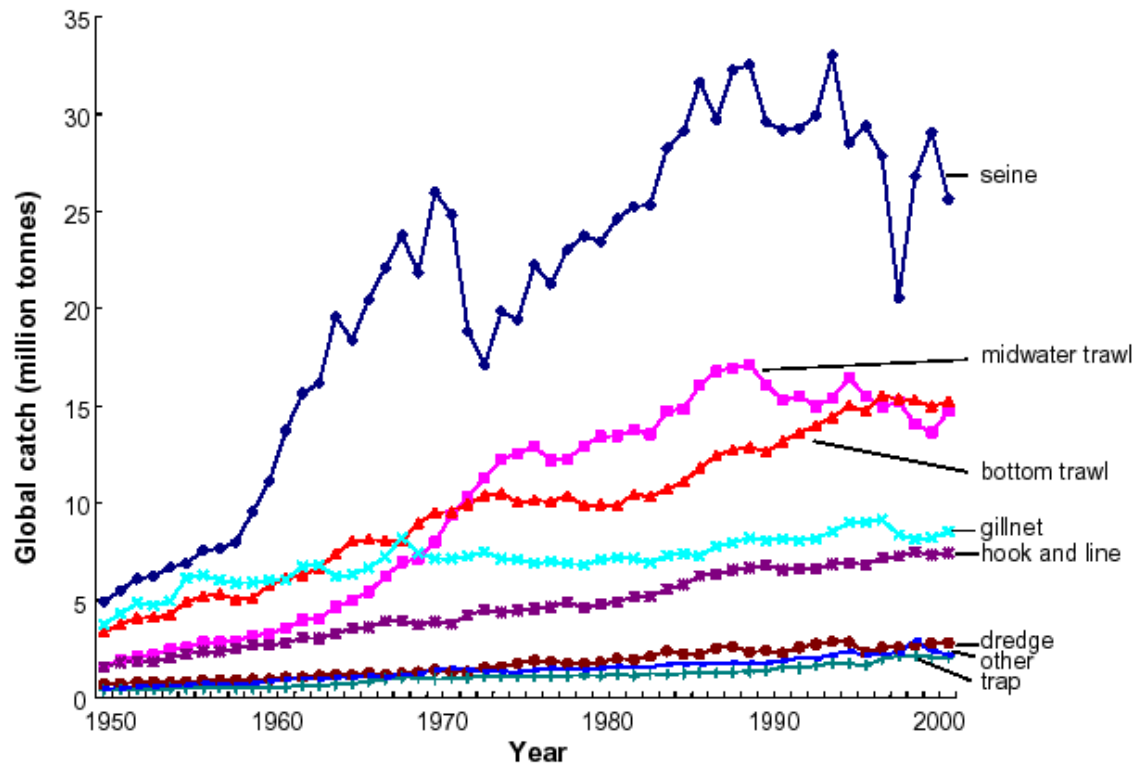


Figure 1. Annual global catch (million tonnes) taken by general fishing gear types

Watson et al. 2004

Introduction

- Fish & invertebrates
- Bottom (demersal) and midwater (pelagic)
- 50% global catch
- Active
- Cone-shaped net



<http://www.montereybayaquarium.org>

Introduction

- Fish & invertebrates
- Bottom (demersal) and midwater (pelagic)
- 50% global catch
- Active using cone-shaped net
- Small & large vessels



<http://laterallineco.com/blog/2008/11/04/>

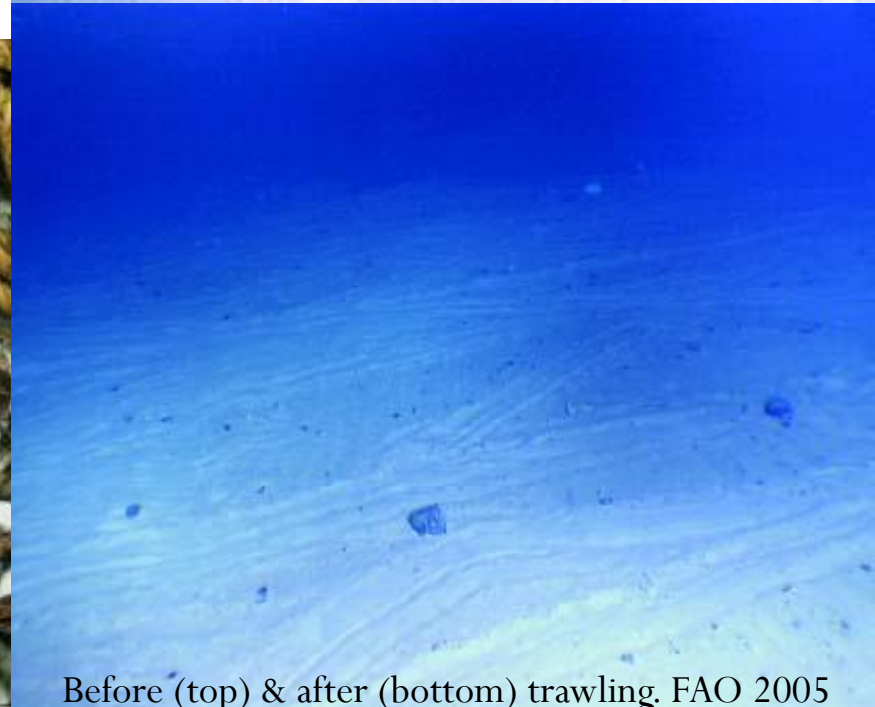
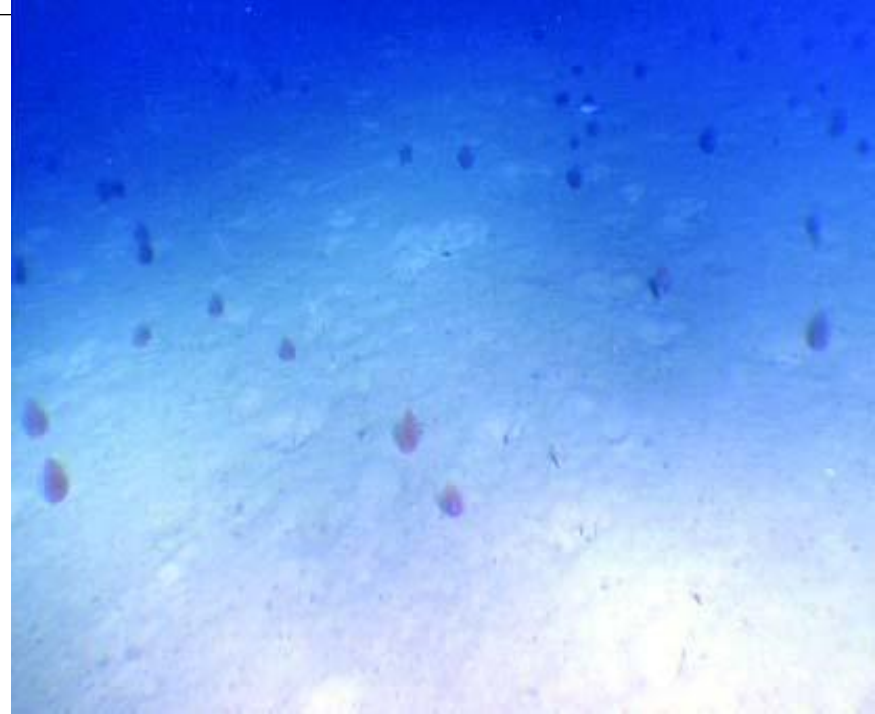


NOAA Fisheries

Introduction - Impacts

- Bycatch
 - Juvenile fish in shrimp trawl
 - Protected species
- Bottom habitat

Shrimp fishing bycatch (Madagascar) <http://www.ird.fr/>



Before (top) & after (bottom) trawling. FAO 2005

Objectives

- Describe how trawl gear works
- List 4 components of a trawl and describe 2 pieces of specialized equipment
- Demonstrate ability to complete the gear description form

Sampling Priorities

1. Collect information on fishing effort
2. Randomly sample catch for catch composition
3. **Record gear characteristics**
4. Collect length-frequency data on target and non-target catch

Trawl configurations

- Varies by target & fish behavior
- **Beam trawl** / otter trawl / pair



<http://www.scotland.gov.uk/>



<http://www.qc.dfo-mpo.gc.ca/>



Griffiths:

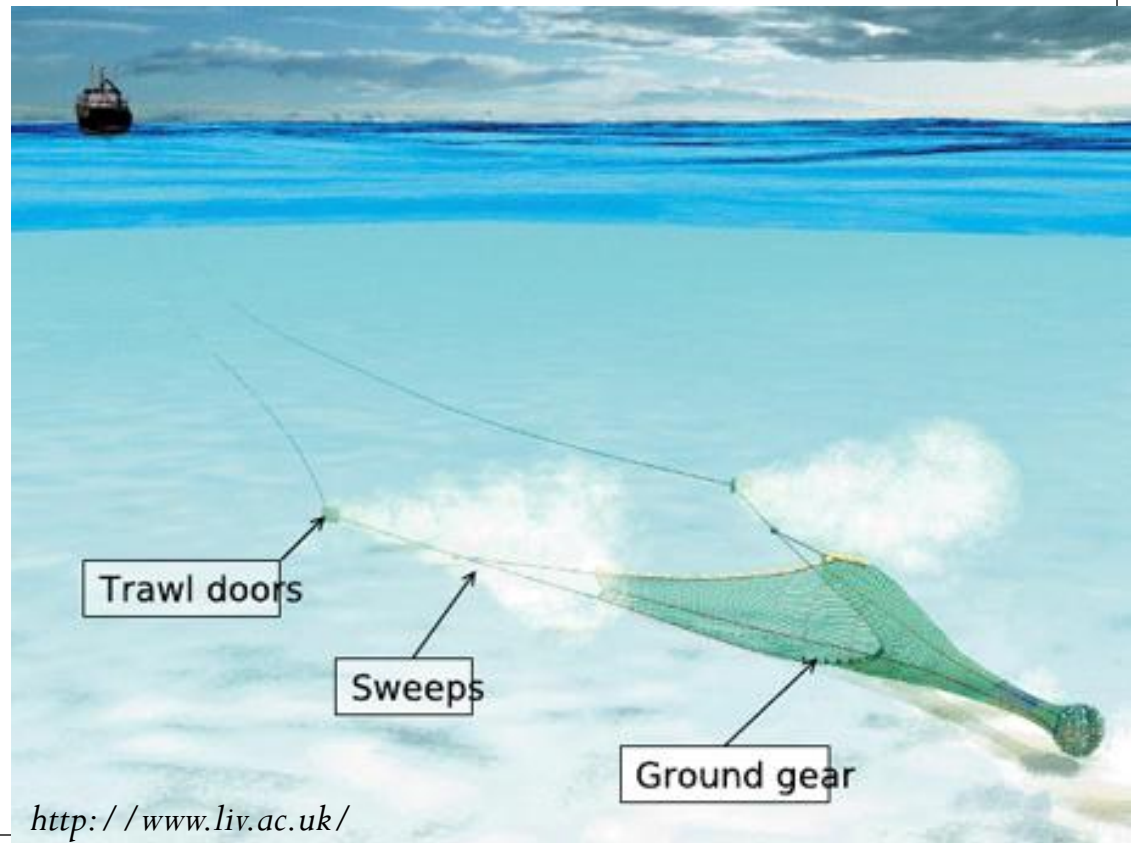
<http://www.sanctuarysimon.org/>

Trawl configurations

- Varies by target & fish behavior
- Beam trawl / **otter trawl** ([animation](http://www.dantrawl.com) from <http://www.dantrawl.com>) / pair



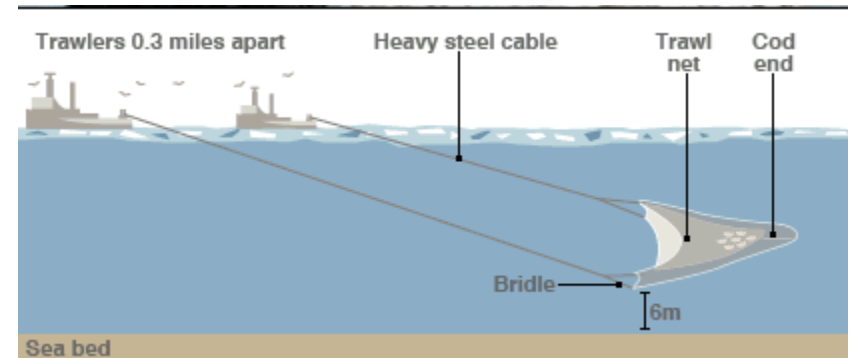
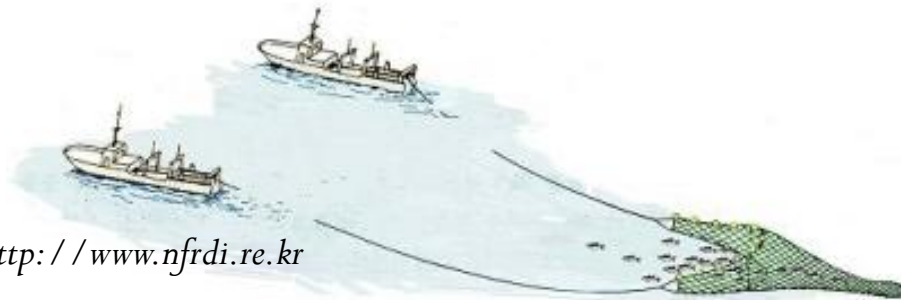
<http://www.crimond.com/bison.htm>



<http://www.liv.ac.uk/>

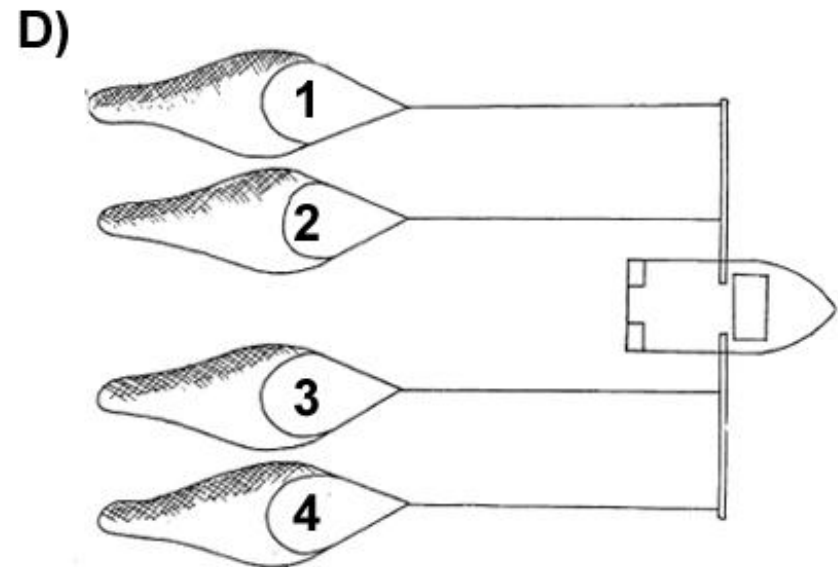
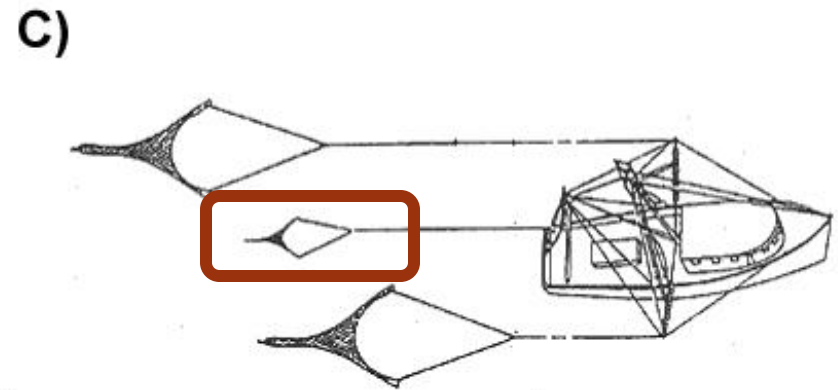
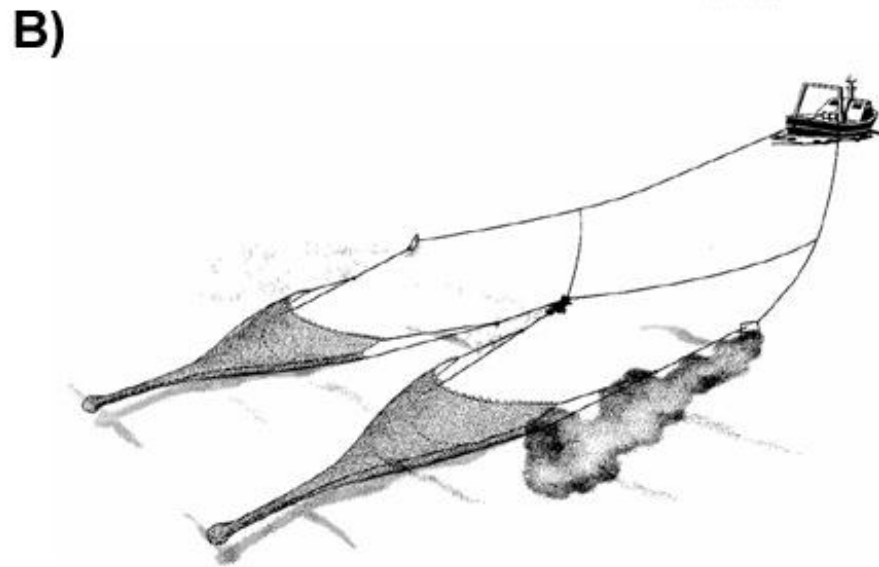
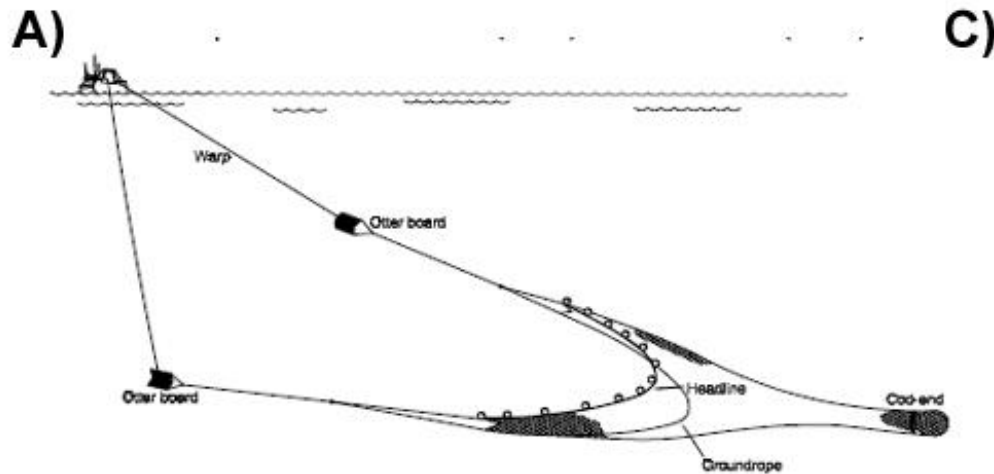
Trawl configurations

- Varies by target & fish behavior
- Beam trawl / otter trawl / **pair** (2 vessels)



Photos: <http://www.boatdesign.net/forums/open-discussion/beam-trawl-query-17413.html>

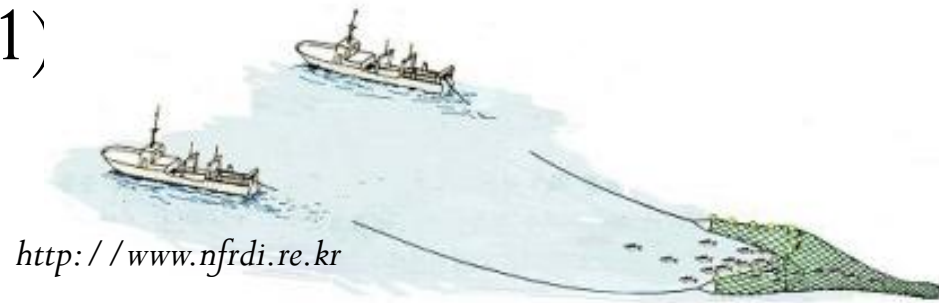
Trawl configurations



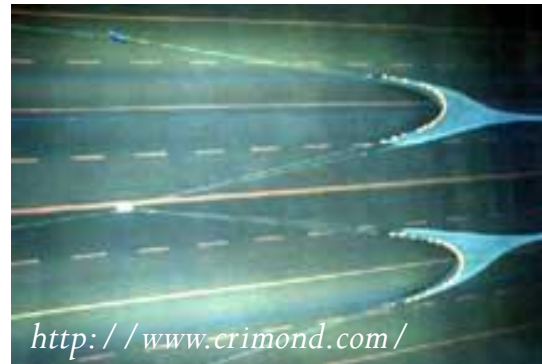
Trawl configurations

- Confusing terminology (#1)

- Pair trawl – 2 vessels

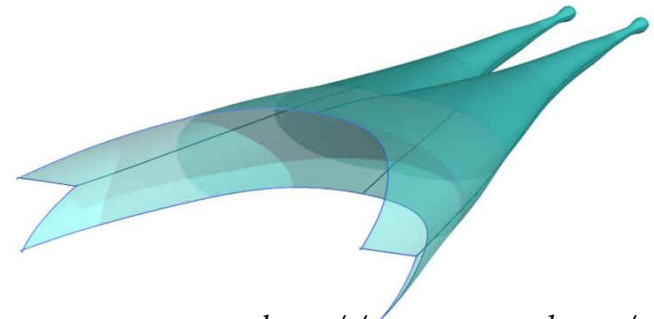


- Twin trawl – 2 nets



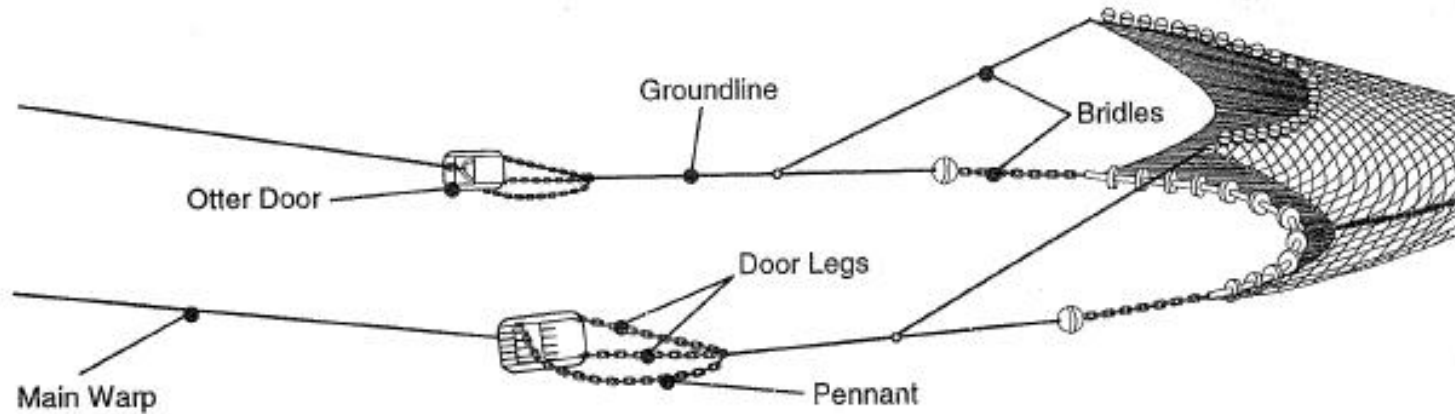
DUPLEX SHRIMP TRAWL
perspective view

- Duplex (separator) trawl –
2 codends

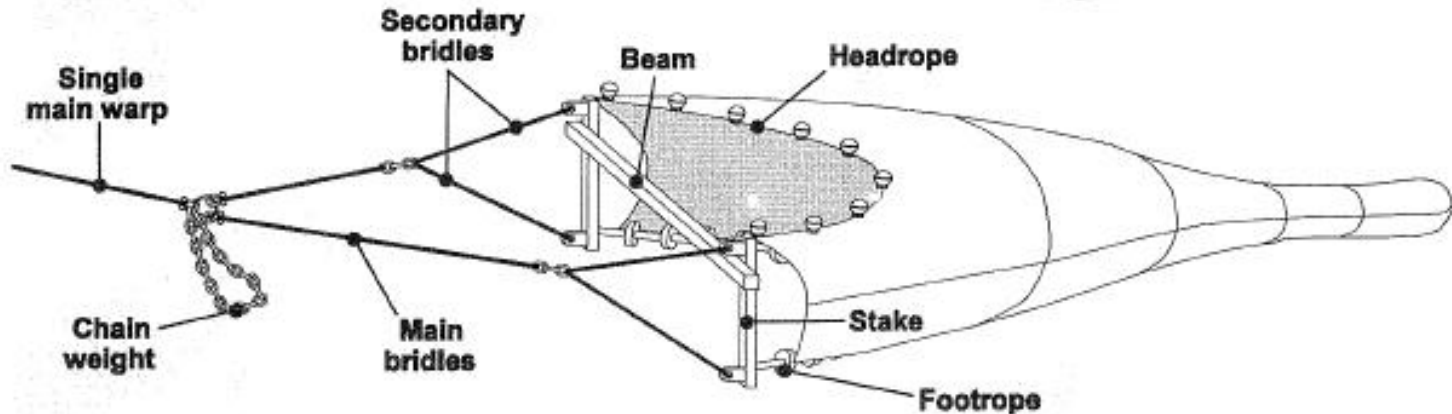


Net components (Manual Fig.6-2)

A) Otter Trawl

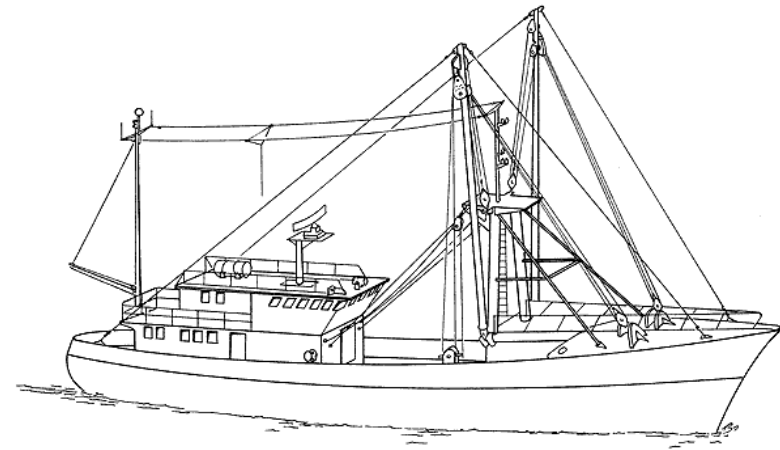


B) Beam Trawl



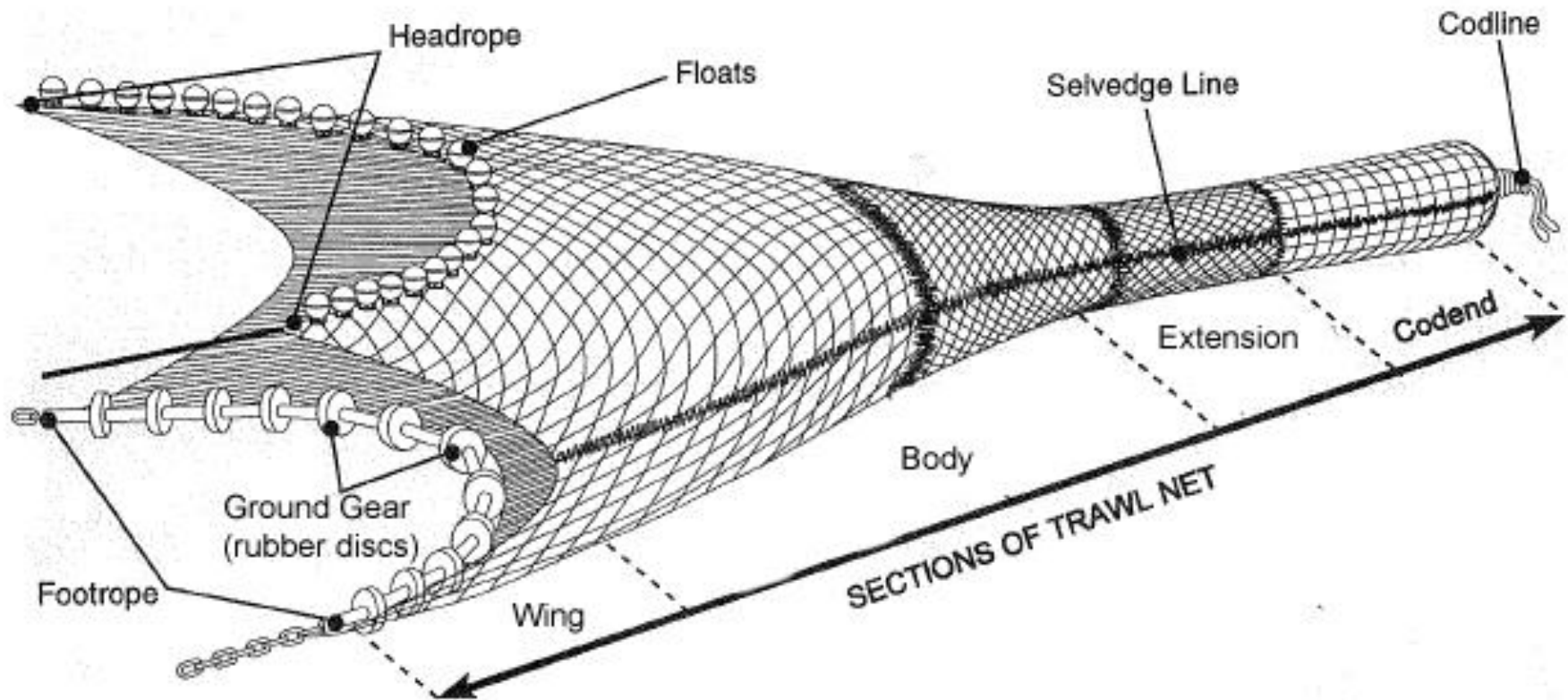
Trawl configurations

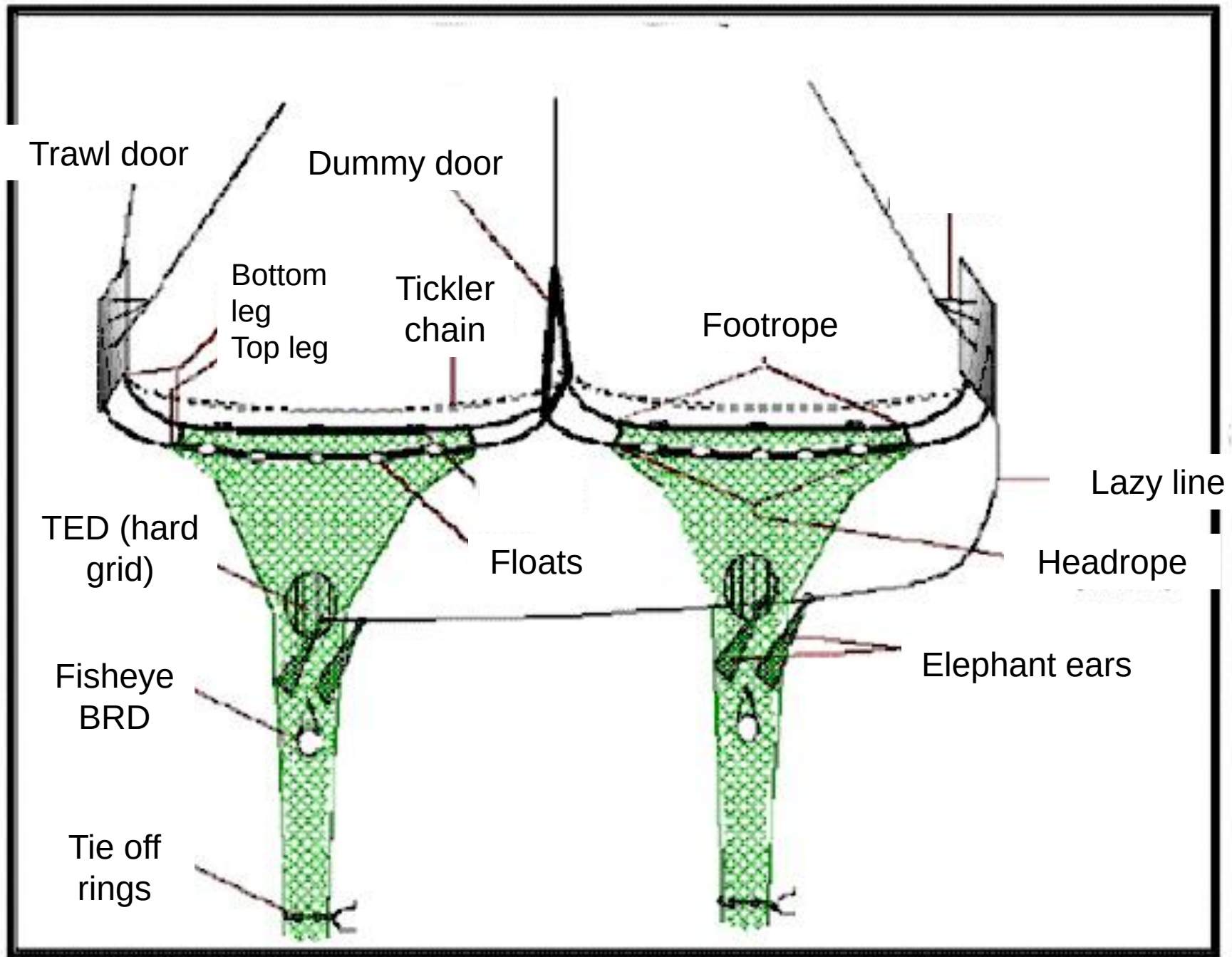
- Confusing terminology (#2)
- Beam trawler —vessels which deploy nets from abeam; also outrigger trawler
- Beam trawl — type of net



Beam trawler with beam trawls;
<http://www.ilvo.vlaanderen.be>

Net components (Manual Fig.6-3)





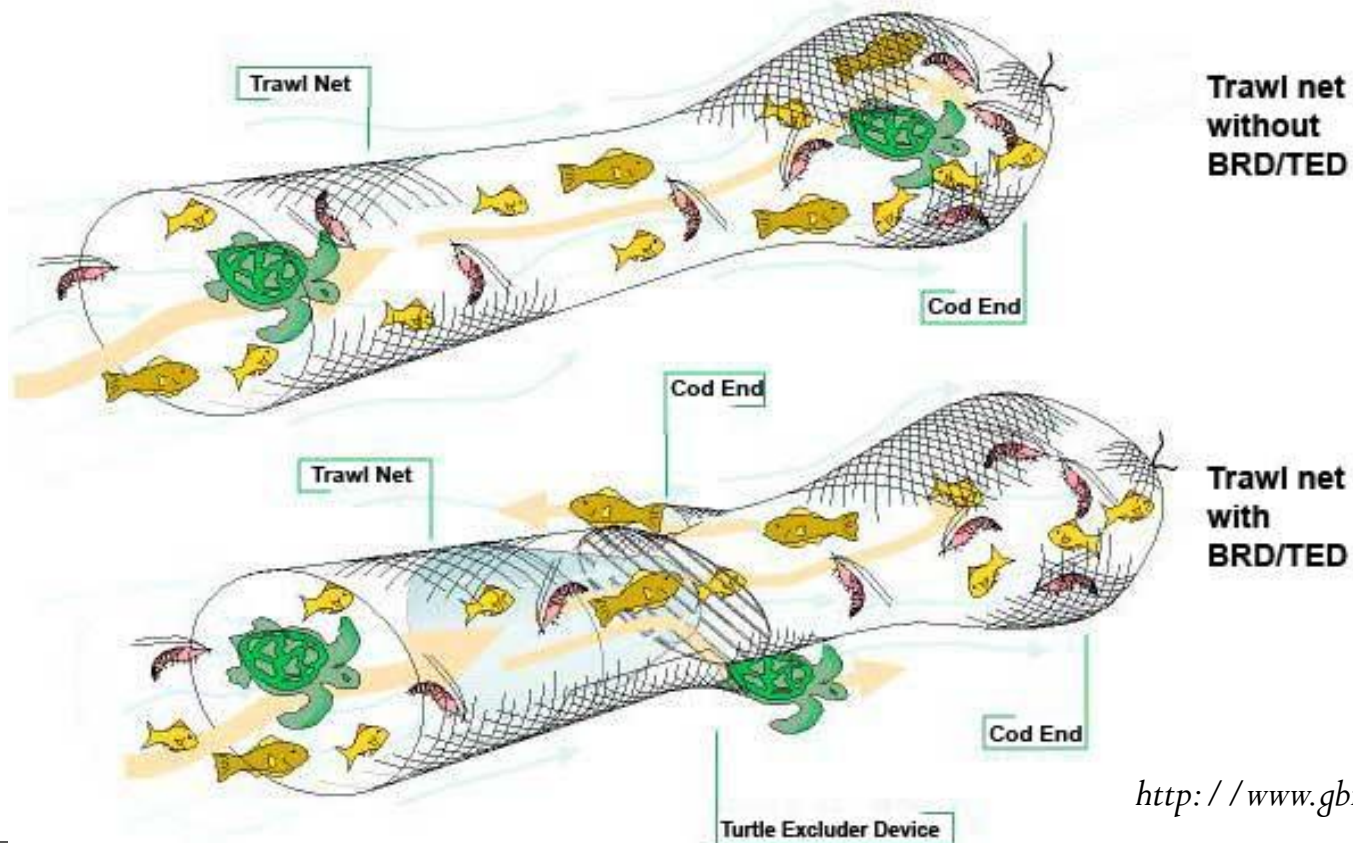
Gear Deployment & Retrieval

- Video - [hauling](#)



Bycatch reduction

- Bycatch reduction device (BRD)
 - Junk fish excluder (JTED)
 - Turtle excluder device (TED)



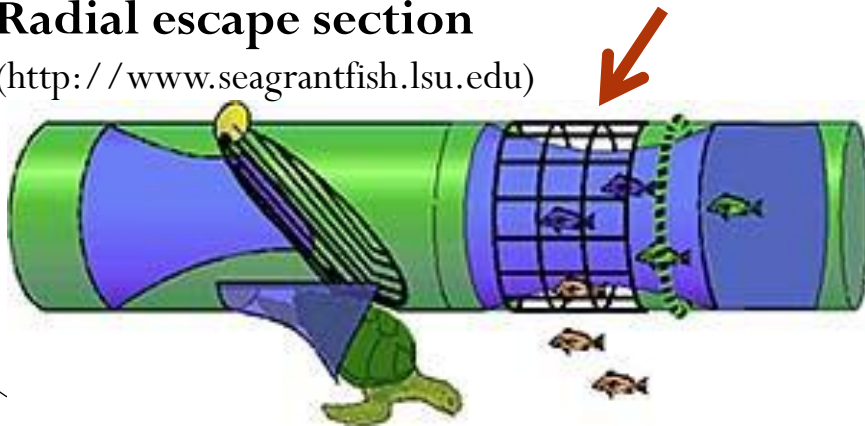
Bycatch reduction

- Bycatch reduction device (BRD)
- Junk fish excluder (JTED)

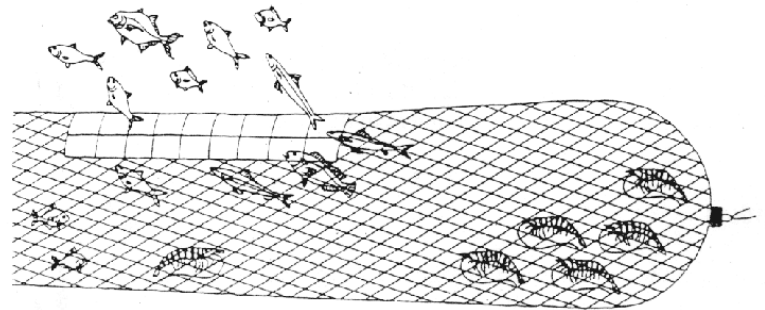
Fish eye (<http://www.seagrantfish.lsu.edu>)



Radial escape section
(<http://www.seagrantfish.lsu.edu>)



Square mesh window (FAO)



**Square mesh
codend**

(<http://bayjournal.com.au>)



Bycatch reduction

- Bycatch reduction device (BRD)
 - Junk fish excluder (JTED)
 - Turtle excluder (TED [video](http://www.euroturtle.org))

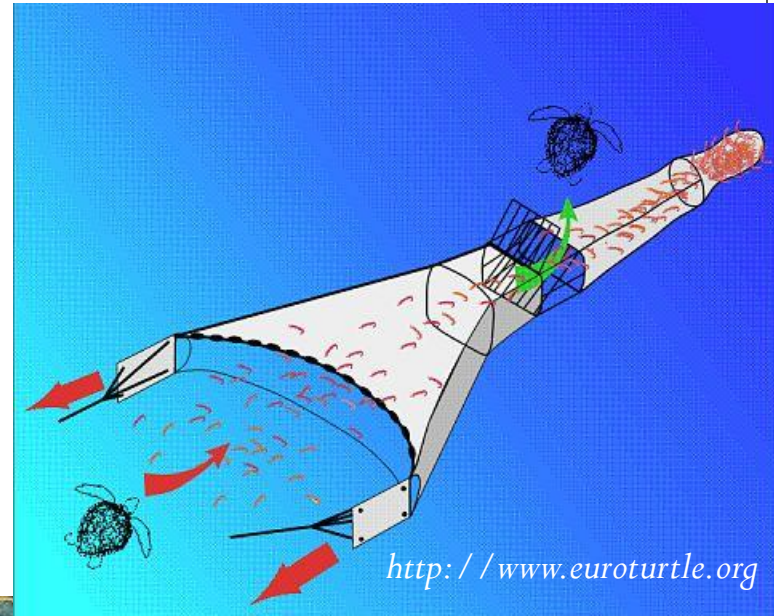
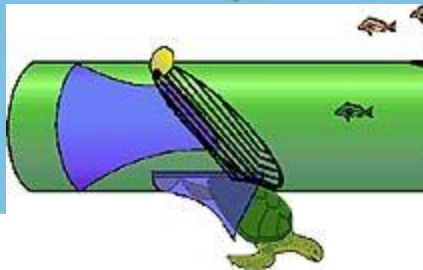
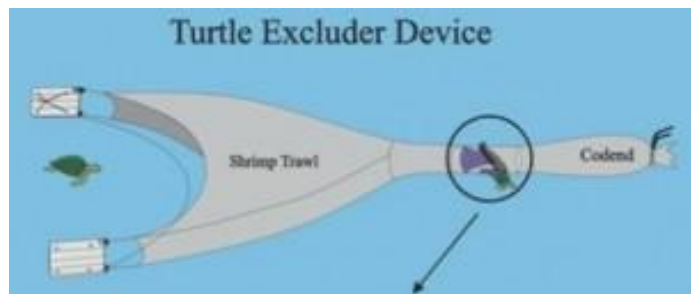
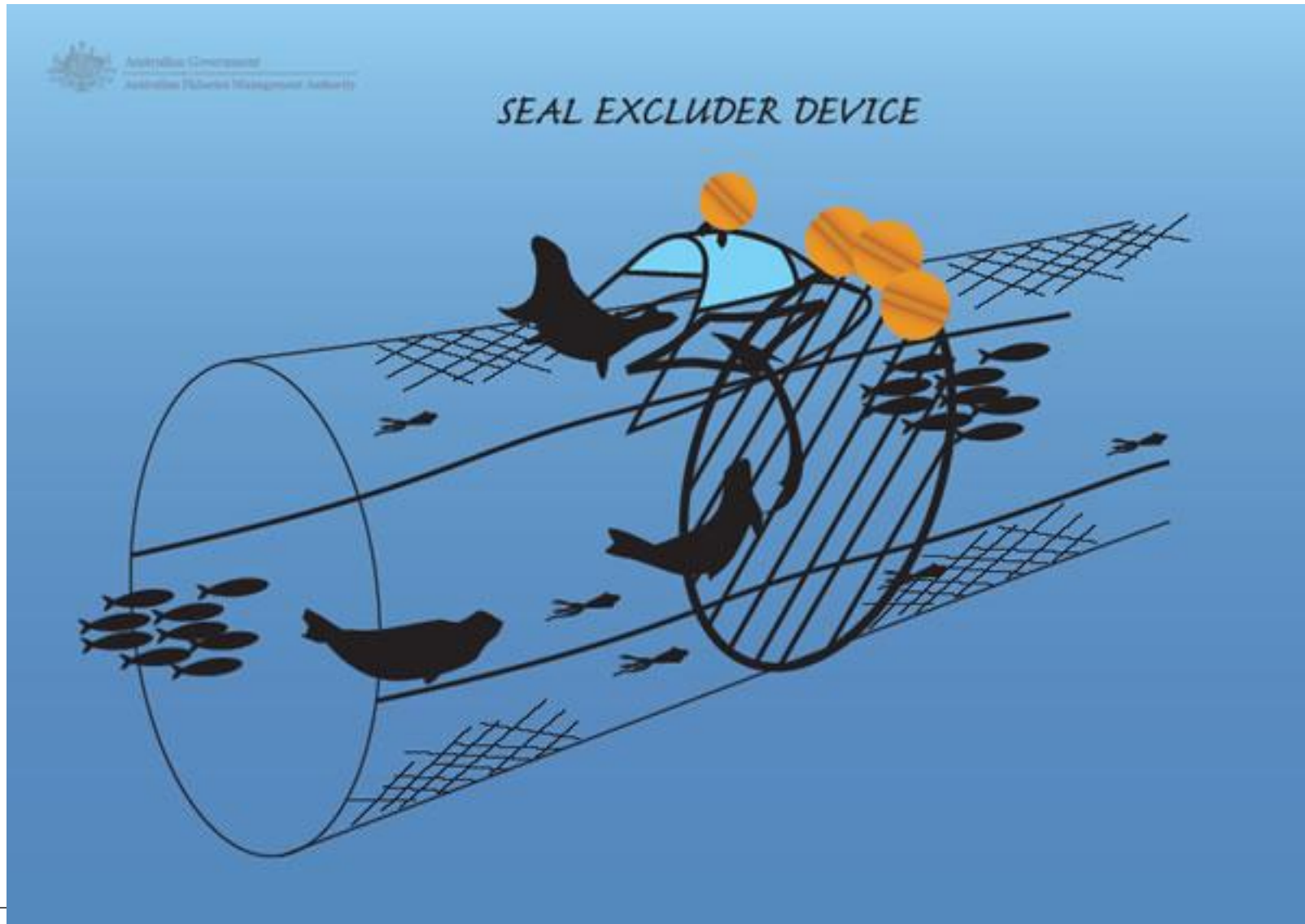


Photo: Mike Gerner, AFMA

Bycatch reduction



Gear Description - Finfish

Gear Description - Finfish Trawl

Page ____ of ____

Observer code		Vessel code		Trip ID	
Net type (check one):		Midwater	Bottom	Net #:	
Configuration (check one):		Otter trawl	Beam trawl	Other	
Net deployment position (check one):		Stern	Port	Stbd	
Net Manufacturer / design name:					
Otter Trawl					
Doors - Main			Doors - Dummy		
Material:	Aluminum / Steel / Wood / Other		Material:	Aluminum / Steel / Wood / Other	
Length (m)	Height (m)		Length (m)	Height (m)	
Weight (kg)	Type	Square / Oval / V / Other	Weight (kg)	Type	Square / Oval / V / Other
	Length (m)	Diameter (mm)	Material	Other	
Door legs - top					
Door legs - bottom					
Penant					
Groundline					
Bridle (top leg)					
Bridle (bottom leg)					

Gear Description - Finfish

Gear Description - Finfish Trawl

Page ____ of ____

Observer code			Vessel code			Trip ID		
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Net type (check one):	☐ Midwater	☐ Bottom		Net #:	
Configuration (check one):	☐ Otter trawl	☐ Beam trawl	☐ Other _____		
Net deployment position (check one):	☐ Stern	☐ Port	☐ Stbd		

Net Manufacturer / design name: _____

Otter Trawl							
Doors - Main				Doors - Dummy			
Material:	Aluminum / Steel / Wood / Other _____			Material:	Aluminum / Steel / Wood / Other _____		
Length (m)		Height (m)		Length (m)		Height (m)	
Weight (kg)		Type	Square / Oval / V / Other	Weight (kg)		Type	Square / Oval / V / Other

	Length (m)	Diameter (mm)	Material	Other
Door legs - top				
Door legs - bottom				
Penant				
Groundline				
Bridle (top leg)				
Bridle (bottom leg)				

<http://www.net-sys.com/>



<http://www.crimond.com/>



<http://dnr.louisiana.gov/>



www.morgere.fr/



Gear Description - Finfish

Gear Description - Finfish Trawl

Page ____ of ____

Observer code			Vessel code			Trip ID		
Net type (check one):		Midwater		Bottom		Net #:		
Configuration (check one):		Otter trawl		Beam trawl		Other _____		
Net deployment position (check one):		Stern		Port		Stbd		
Net Manufacturer / design name: _____								
Otter Trawl								
Doors - Main				Doors - Dummy				
Material:	Aluminum / Steel / Wood / Other _____			Material:	Aluminum / Steel / Wood / Other _____			
Length (m)		Height (m)		Length (m)		Height (m)		
Weight (kg)		Type	Square / Oval / V / Other	Weight (kg)		Type	Square / Oval / V / Other	
	Length (m)	Diameter (mm)	Material	Other				
Door legs - top								
Door legs - bottom								
Penant								
Groundline								
Bridle (top leg)								
Bridle (bottom leg)								

Gear Description - Finfish

Beam Trawl				
	Length (m)	Weight (kg)	Material	Other
Beam				
Stake				

	Length (m)	Diameter (mm)	Material	Other
Bridle (main)				
Bridle (secondary-top)				
Bridle (secondary-bottom)				
Chain weight				Weight:

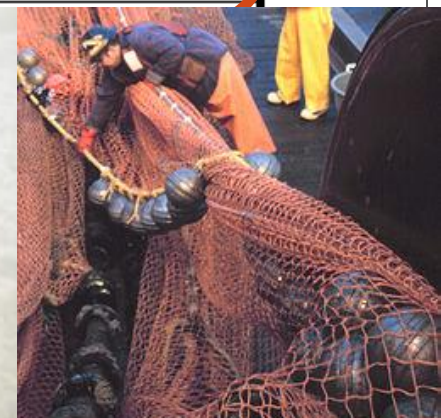
Otter and Beam Trawl				
	Length (m)	Diam (mm)	Material	Other
Warp				
3rd wire				
Head rope				# floats:
Foot rope				
Selvedge line				
Tickler chain				Weight:
Other				

Gear Description - Finfish

Gear Description - Finfish Trawl

Page ____ of ____

	Width (cm)	Diam (cm)	Material	Other
Metal bobbins				How many?
Metal spacers				How many?
Rubber discs				How many?
Rubber spacer				How many?
Other				



Gear Description - Finfish

Gear Description - Finfish Trawl

Page ____ of ____

	Width (cm)	Diam (cm)	Material	Other
Metal bobbins				How many?
Metal spacers				How many?
Rubber discs				How many?
Rubber spacer				How many?
Other				

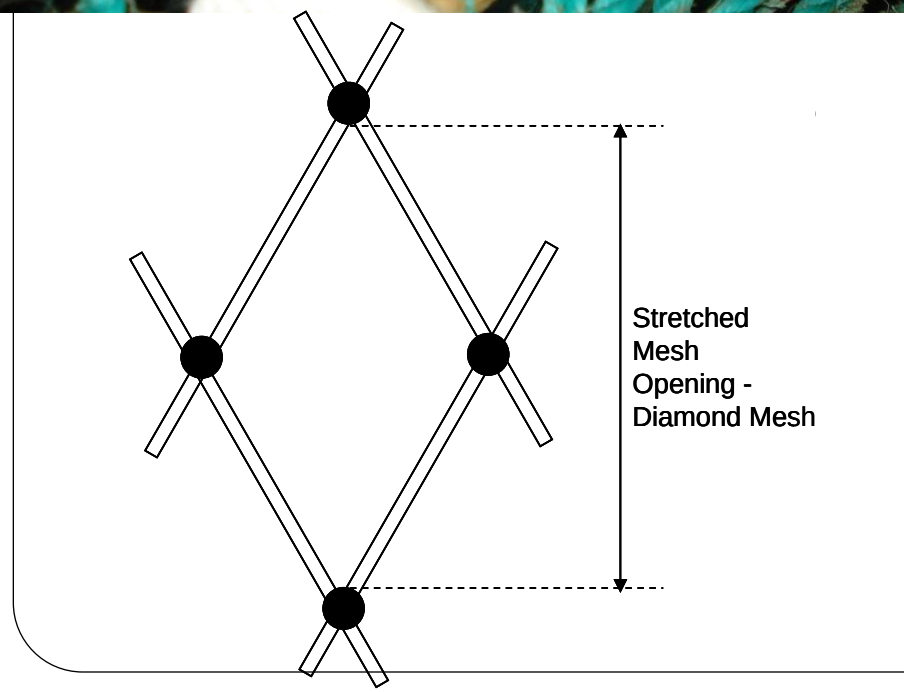
Net Characteristics

Total length (m):		Mouth width:				Mouth height:	
	Material	Diam. (mm)	Mesh open (cm)	W / D	# meshes long	# meshes around	Other
Wing			.				
Trawl body			.				
Extension			.				
Codend			.				◇ / □
Other							
Other							

Other rigging present? Check all that apply.

☐	Chaffing gear	☐	Vert.Streng.Strap	☐	Lazy line	☐	Other:
☐	Elephant ears	☐	Horiz.Streng.Strap	☐		☐	Other:
☐		☐	Splitting Strap				

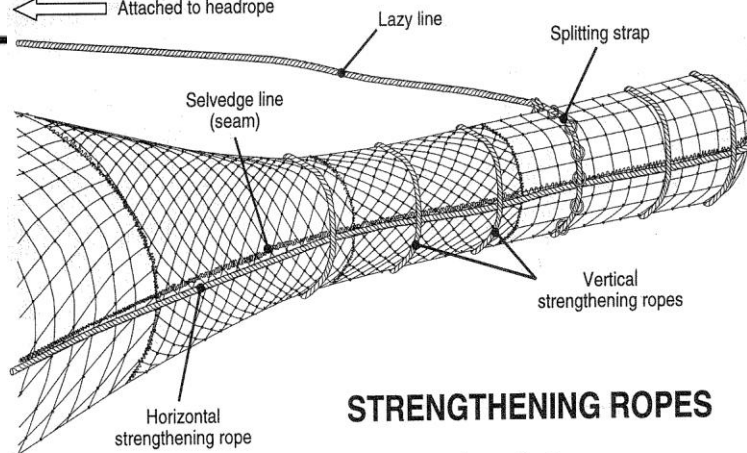
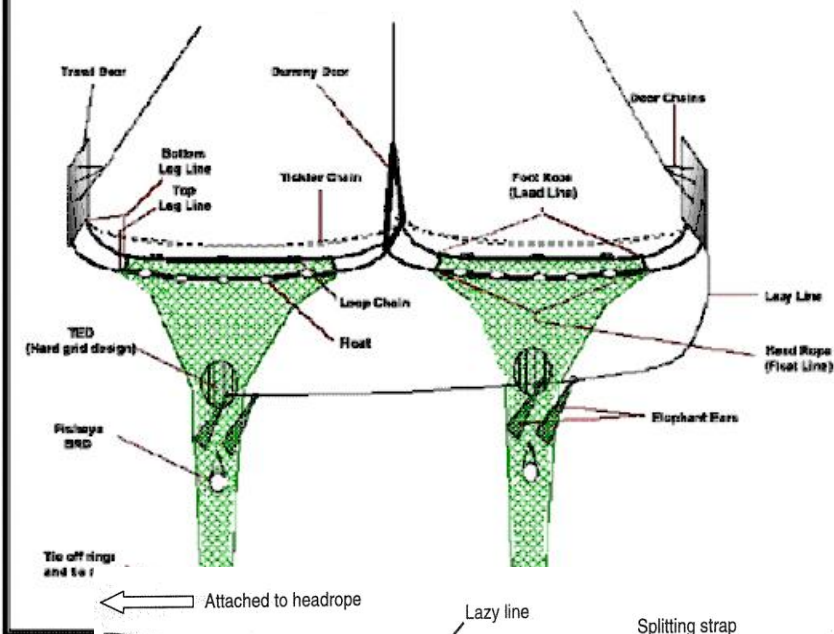
Photos? Y / N



on - Finfish

tion - Finfish Trawl

Page ____ of ____



STRENGTHENING ROPES

Horizontal strengthening ropes are also referred to as *lastridge* ropes.



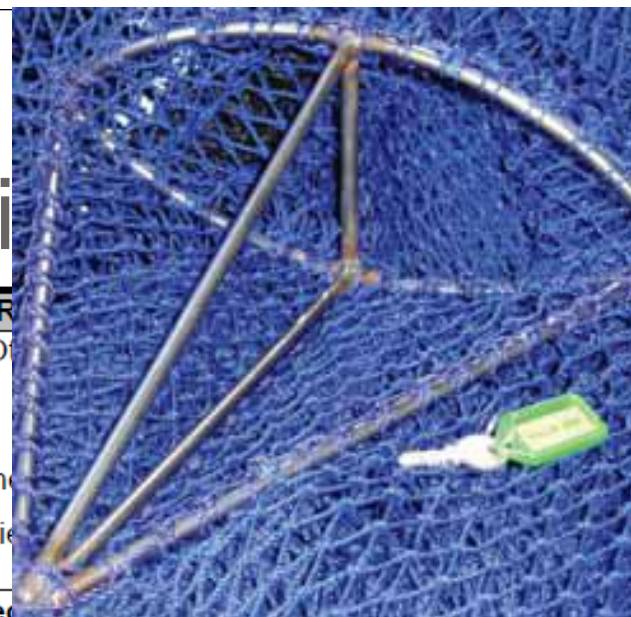
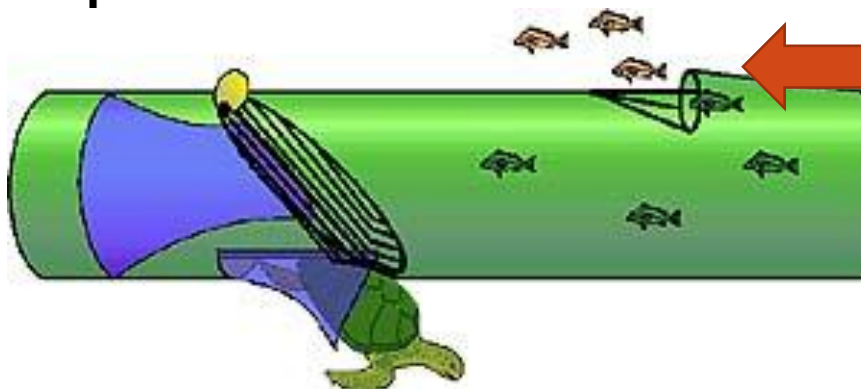
Other rigging present? Check all that apply.

Chaffing gear	Vert.Streng.Strap	Lazy line	Other:
Elephant ears	Horiz.Streng.Strap		Other:
	Splitting Strap		

Photos? Y / N

Gear Description - Finfish

Bycatch Reduction Device (BRD)					
Type:	☒ Fisheye	☐ Square-mesh window	☐ Other		
	☐ Radial escape section	☐ Square-mesh codend			
Funnel	☐ Yes	Distance of escape opening from head of net			
	☐ No	Distance of escape opening from tail of net			
Fisheye	Offset	☐	☐	Radial escape section	
Opening (cm)	Width	☐	Height	☐	Opening (cm) Width
Shape					Length
☐ Oval	☐ Diamond	If not all the way around			
☐ Square	☐ Halfmoon				
☐ Rectangle	☐ Triangle				
☐ Other:					
Square-mesh window					
Opening (cm)		Width			
BRD notes/drawing					



Gear Description - Finfish

Bycatch Reduction Device (BRD)			
Type:	☐ Fisheye	☐ Square-mesh window	☐ Other:
	☒ Radial escape section	☐ Square-mesh codend	



Images from Eayrs (2007)

Escape opening from headrope:

Escape opening from tie off rings:

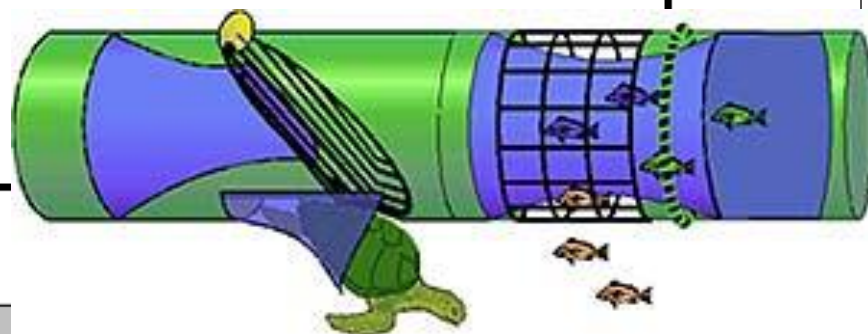
Radial escape section

Opening (cm) Width Height
Length

If not all the way around, #openings

Square-mesh window

Opening (cm) Width Height



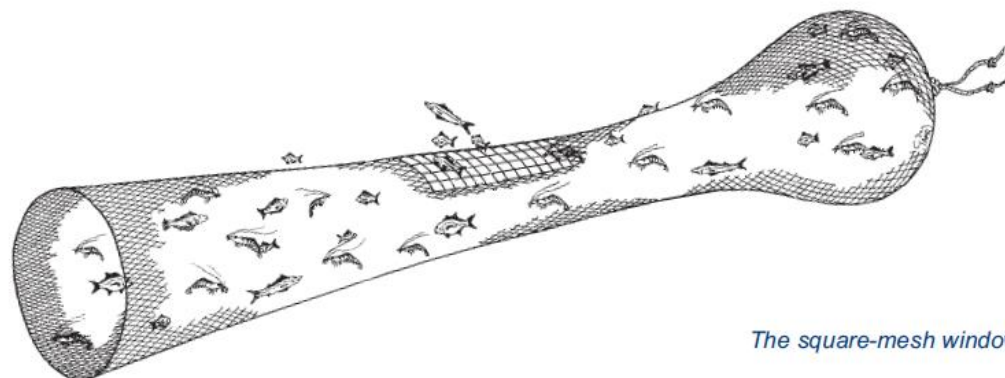
Gear Description - Finfish

Bycatch Reduction Device			
Type:	☐ Fisheye	☒ Square-mesh window	
	☐ Radial escape section	☐ Square-mesh codend	
Funnel	☐ Yes	Distance of escape opening	
	☐ No	Distance of escape opening	
Fisheye	Offset		
Opening (cm)	Width	Height	
Shape			
☐ Oval	☐ Diamond		
☐ Square	☐ Halfmoon		
☐ Rectangle	☐ Triangle		
☐ Other:			
BRD notes/drawing			
Comments:			



Square-mesh window

Opening (cm) Width Height



The square-mesh window

Gear Description - Shrimp

Gear Description - Shrimp Trawl

Page ____ of ____

Observer code			Vessel code			Trip ID					
Total # nets:			Vessel configuration: <input style="width: 50px;" type="checkbox"/> Outrigger			5 Try net Location:					
Net # / position (check one or more if nets are identical)											
1	Port - outside		3	Stbd - inside							
2	Port - inside		4	Stbd - outside							
Net Manufacturer / design name:											

Material: **D)**

Length (m)

Weight (kg)

Bottom

Mod /

e / Oval / V

Other

Gear Description - Shrimp

Gear Description - Shrimp Trawl

Page ____ of ____

Observer code	Vessel code	Trip ID
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Total # nets:		Vessel configuration:		Outrigger	
Net # / position (check one or more if nets are identical)					
1	Port - outside	3	Stbd - inside	5	Try net Location:
2	Port - inside	4	Stbd - outside		
Net Manufacturer / design name:					
Doors - Main			Doors - Dummy		
Material:	Aluminum / Steel / Wood / Other:		Material:	Aluminum / Steel / Wood / Other:	
Length (m)		Width (m)		Length (m)	
Weight (kg)		Type	Square / Oval / V / Other	Weight (kg)	
		Type	Square / Oval / V / Other		
	Length (m)	Diameter (mm)	Material	Other	
Bridle (door chain)					
Top leg line					
Bottom leg line					
Top leg line-dummy					
Bottom leg line - dummy					
Warp					
Head rope				# floats:	
Foot rope					
Tickler chain				Weight:	
Loop chain					

Gear Description - Shrimp

Net Characteristics							
Total length (m):		Mouth width:			Mouth height:		
	Material	Diameter (mm)	Mesh open (cm)	W / D	# meshes horiz	# meshes vert	Hanging ratio
Wing			.				
Trawl body			.				
Extension			.				
Codend			.				
Other							
Other							
Other rigging present? Check all that apply.							
☐	Elephant ears	☐	Choke rings	☐	Lazy line	☐	Other:
☐	Chafing gear	☐		☐		☐	Other:
Comments:							

Gear Description - Shrimp

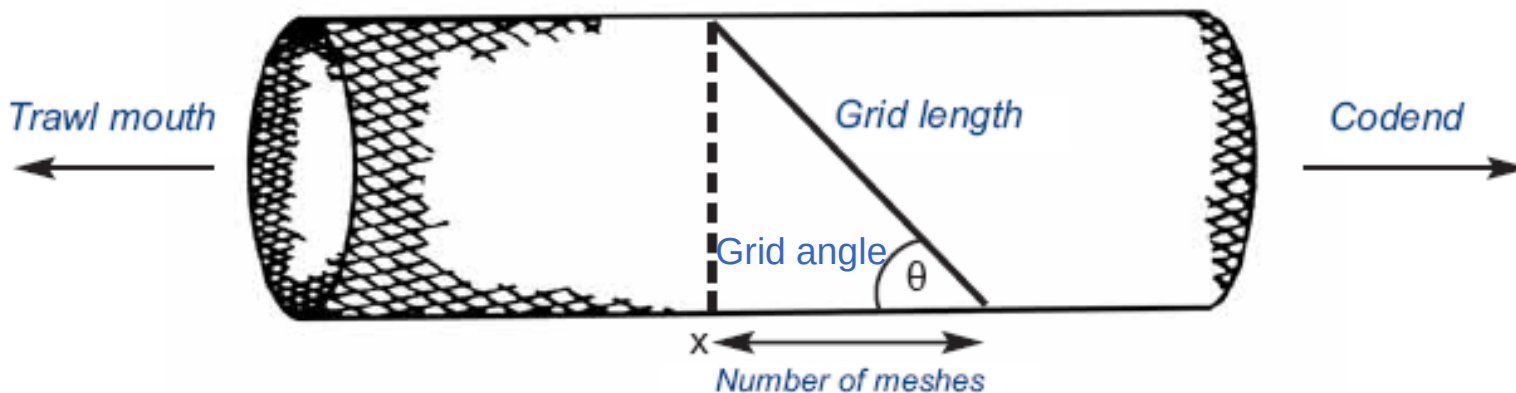
Gear Description - Shrimp Trawl

Page ____ of ____

Bycatch Reduction Device (BRD)					
Type:		☐ Fisheye	☐ Square-mesh window	☐ Other:	
☐ Radial escape section		☐ Square-mesh codend			
Funnel	☐ Yes	Distance of escape opening from headrope:			m
	☐ No	Distance of escape opening from tie off rings:			m
Fisheye		Offset		Radial escape section	
Opening (cm)	Width		Height		
Shape		Length			
☐ Oval	☐ Diamond	If not all the way around, #openings			
☐ Square	☐ Halfmoon				
☐ Rectangle	☐ Triangle				
☐ Other:					
		Square-mesh window			
		Opening (cm)	Width		Height
BRD notes/drawing					

Gear Description - Shrimp

Turtle Excluder Device (TED)			
Name:		Type: Hard / Soft	
Opening: Top / Bottom	Funnel	Yes / No	Flap Yes / No
Material:		Shape Rectangle / Oval / Other:	
Angle (°):	Design Curved bar / Straight bar / Other:		
Dimensions		Distance of TED from headrope: m	
Length: cm	# TED Floats:		
Width: cm	Float material Sponge / Foam / Plastic / Other:		
Bar Spacing: cm	Float shape Round / Cylinder / Bullet / Ellipsoid		
TED notes/drawing			



Activity

- Handout
- Groups of 2 or 3
- 10 minutes

Gear Description - Finfish

Gear Description - Finfish Trawl

Page ____ of ____

Observer code PS345		Vessel code LIB 9997		Trip ID 7	
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Net type (check one):	Midwater ☒	Bottom ☒	Net #:		1
Configuration (check one):	☒ Otter trawl	Beam trawl	Other _____		
Net deployment position (check one):	☒ Stern	Port	Stbd		
Net Manufacturer / design name: Crimond nova demersal					
Otter Trawl					
Doors - Main			Doors - Dummy		
Material:	Aluminum ☒ Steel Wood / Other _____	Material:	Aluminum / Steel / Wood / Other _____		
Length (m)	2.4	Height (m)	2.0	Length (m)	Height (m)
Weight (kg)	1000	Type	Square ☒ Oval / V / Other	Weight (kg)	Type
	Length (m)	Diameter (mm)	Material	Other	
Door legs - top	4.03	12	chain		
Door legs - bottom	3.5	12	chain		
Penant	4.4	12	chain		
Groundline	6	20	wire cable		
Bridle (top leg)	7.2	15	wire cable		
Bridle (bottom leg)	6	15	wire cable		

Gear Description - Finfish

Beam Trawl				
	Length (m)	Weight (kg)	Material	Other
Beam				
Stake				
	Length (m)	Diameter (mm)	Material	Other
Bridle (main)				
Bridle (secondary-top)				
Bridle (secondary-bottom)				
Chain weight				Weight:
Otter and Beam Trawl				
	Length (m)	Diam (mm)	Material	Other
Warp	400	25	steel cable	
3rd wire				
Head rope	52	20	nylon	# floats: 18
Foot rope	60	22	weighted synthetic	
Selvedge line	11	60	Dyneema	
Tickler chain	60	10	chain (steel)	Weight: 100kg
Other				

Gear Description - Finfish

Gear Description - Finfish Trawl

Page ____ of ____

	Width (cm)	Diam (cm)	Material	Other
Metal bobbins				How many?
Metal spacers				How many?
Rubber discs	8	25	rubber	How many? 15
Rubber spacer	15	10	rubber	How many? 32
Other				

Net Characteristics

Total length (m):		Mouth width:				Mouth height:	
	Material	Diam. (mm)	Mesh open (cm)	W / D	# meshes long	# meshes around	Other
Wing	Polyethelene	3.5	15.0		25	100	
Trawl body	Polyethelene	3.5	12.0		30	65	
Extension			.				
Codend	Polyethelene	3.5	8.25		110	76	☒ ☐
Other							
Other							

Other rigging present? Check all that apply.

☒ Chaffing gear	☒ Vert. Streng. Strap		Lazy line		Other:
☐ Elephant ears	☐ Horiz. Streng. Strap				Other:
	☐ Splitting Strap				

Photos? Y / ☒ N

Summary

- Describe how trawl gear works
- List 4 components of a trawl
- Describe 2 pieces of specialized equipment