

# Observations of fish behavior in the vicinity of a selective flatfish trawl footrope using DIDSON imaging sonar



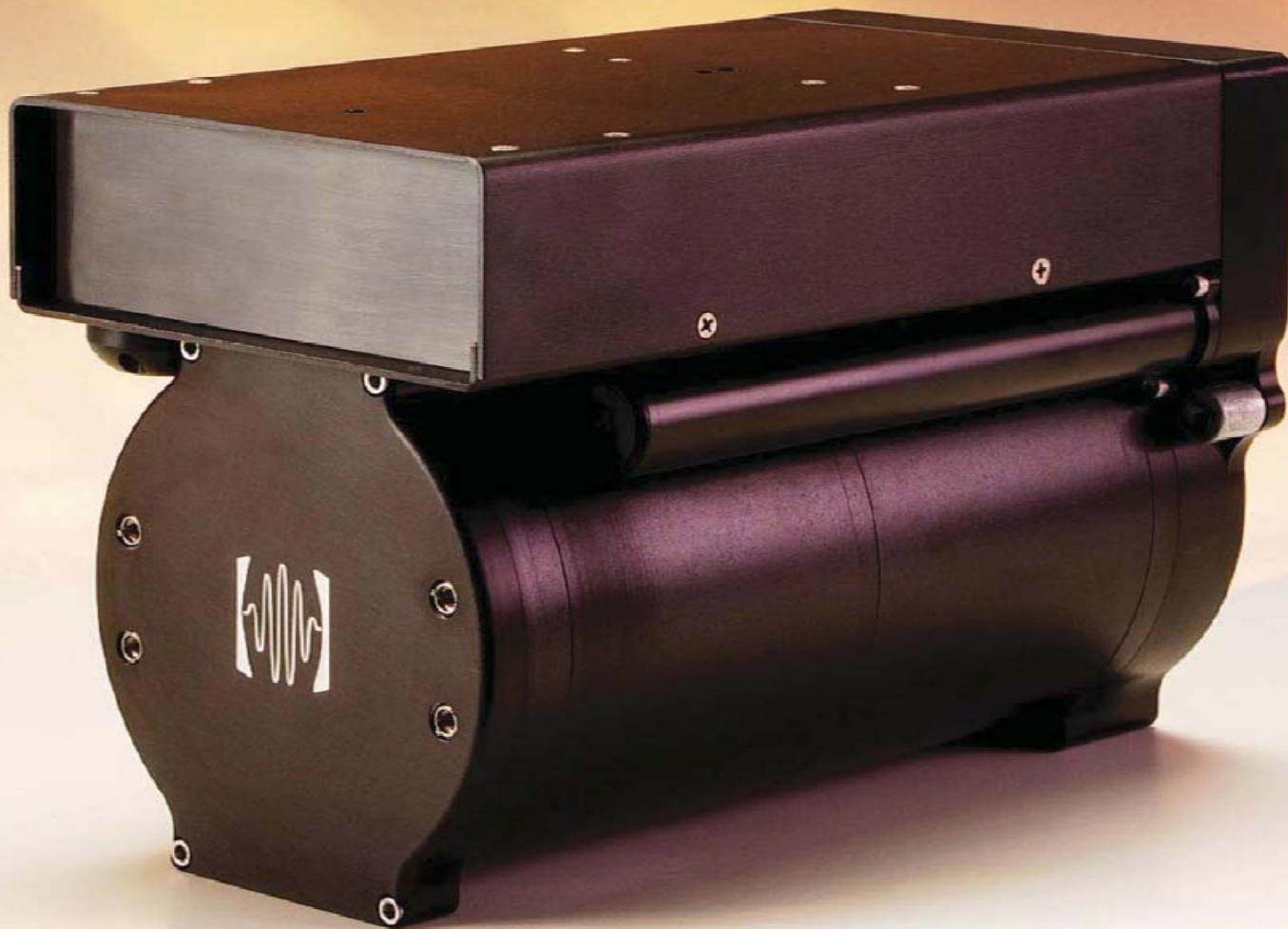
Keith M. Matteson  
Oregon Department of Fish & Wildlife

W. Waldo Wakefield  
NOAA/NMFS/Northwest Fisheries Science Center

Robert W. Hannah  
Oregon Department of Fish & Wildlife

Steven J. Parker  
National Institute of Water and Atmospheric Research

# DIDSON – How it works



# Summer 2006 – first trial of DIDSON in a groundfish bottom-trawl

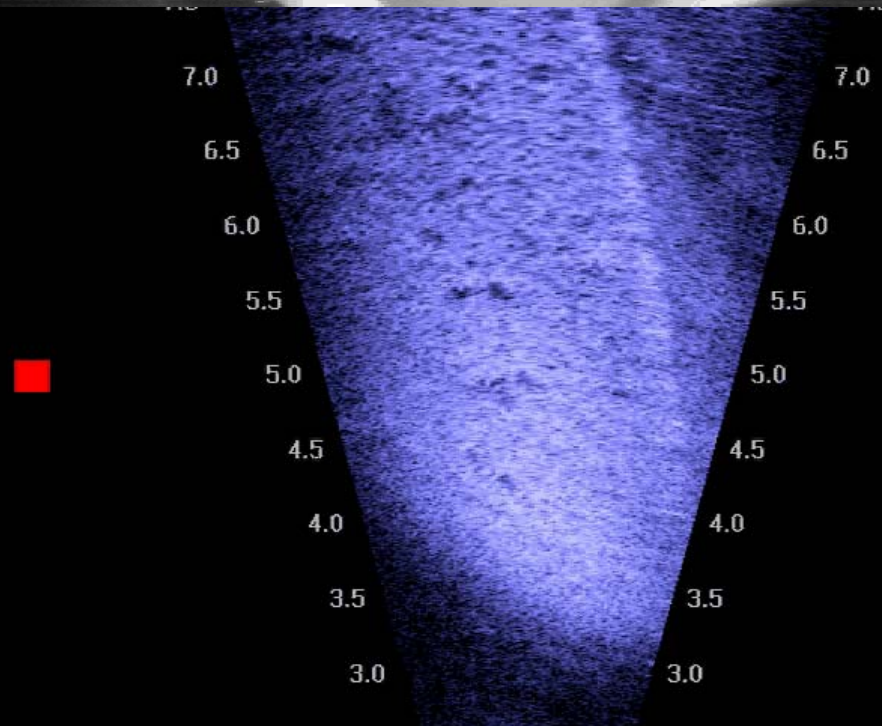
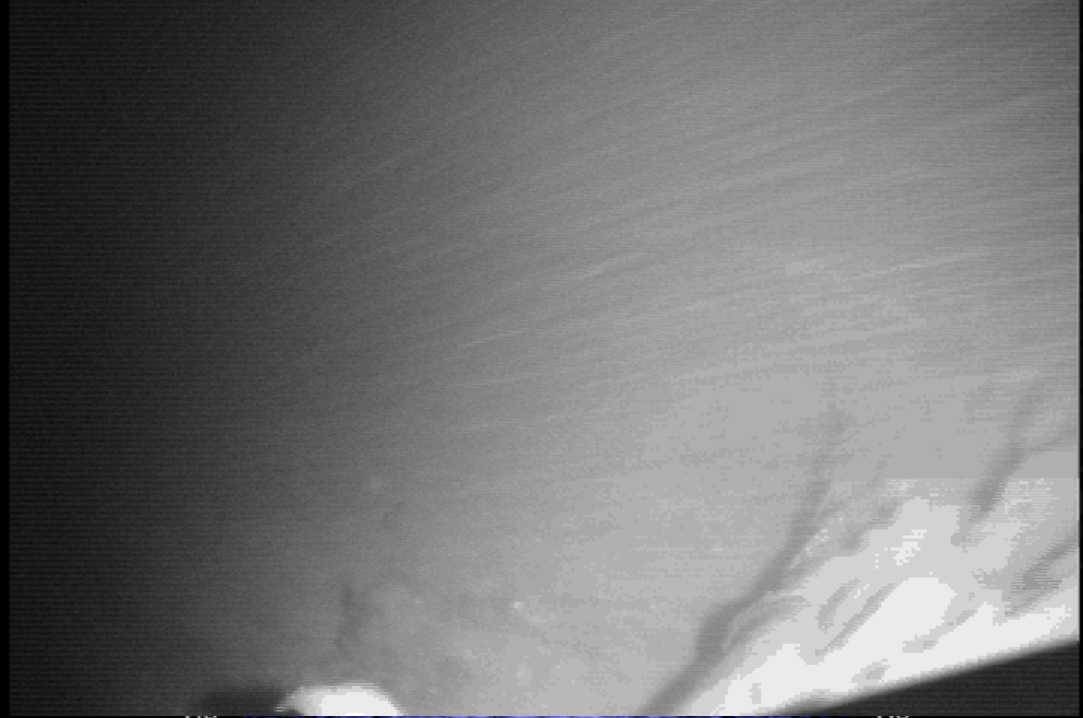
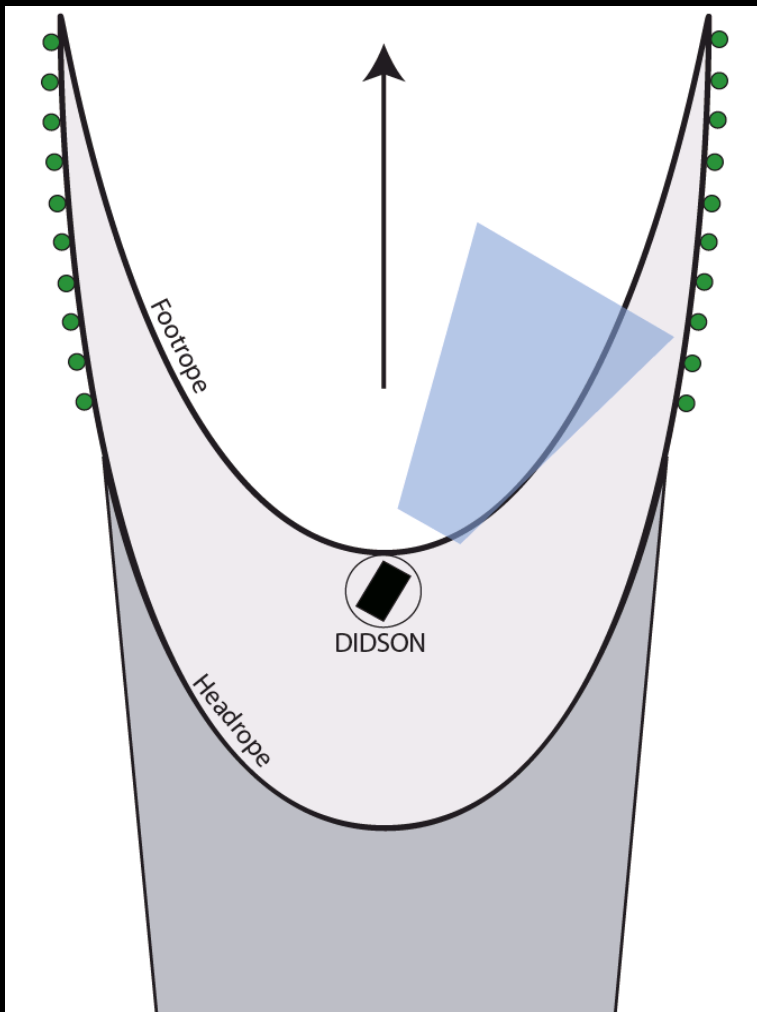


DIDSON

Video  
light

Video  
camera

Looking forward and to the right from the footrope center



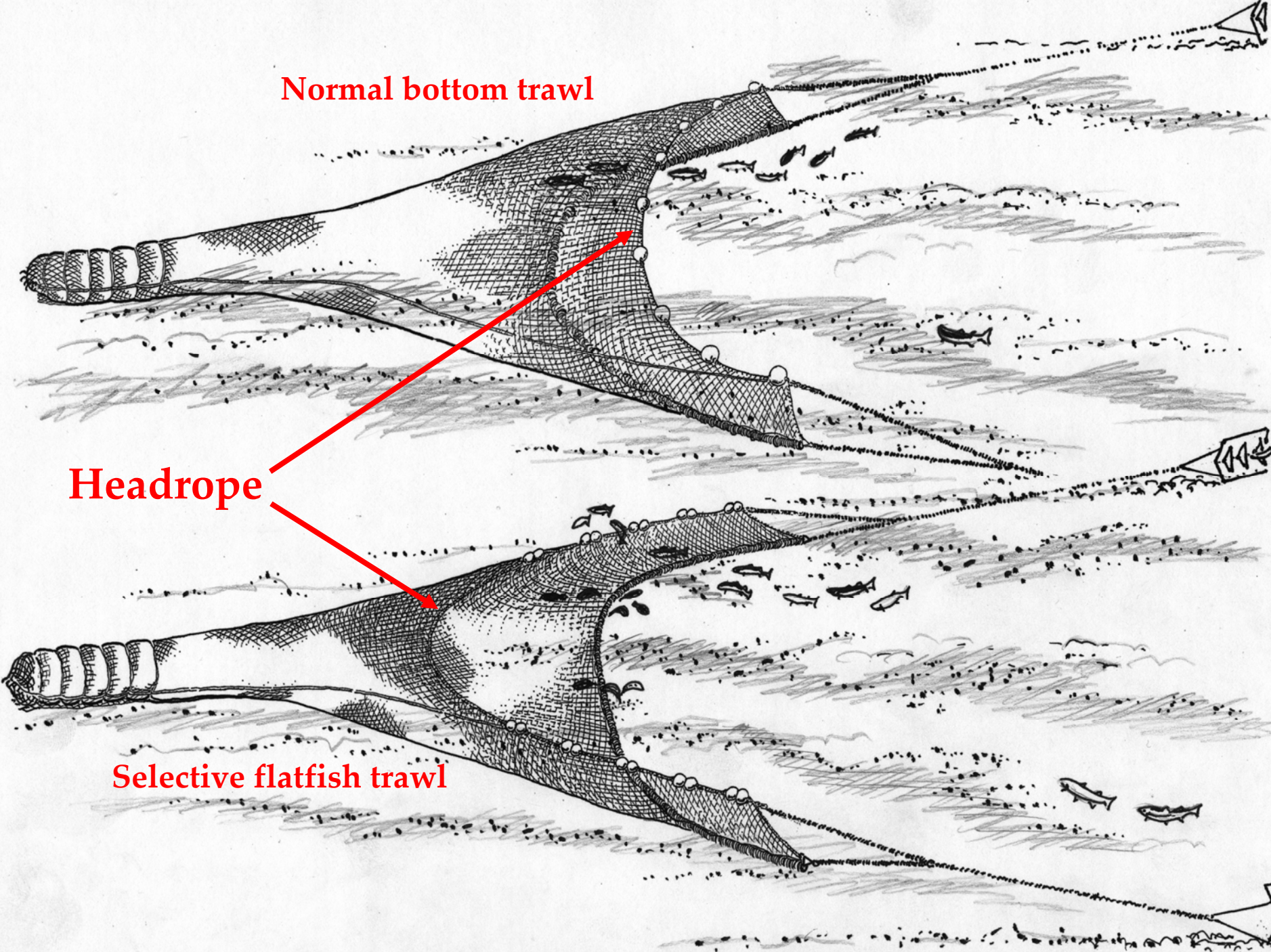
# Trawl observations 2006-07

- Fall 2006 – Ms Julie charter with several Didson observation goals
  - observations of herding along the wing suggesting diel differences in behavior along footrope
- Fall 2007 – continued study of herding behavior and tracking fish day and night

**Normal bottom trawl**

**Headrope**

**Selective flatfish trawl**



Oregon

Newport

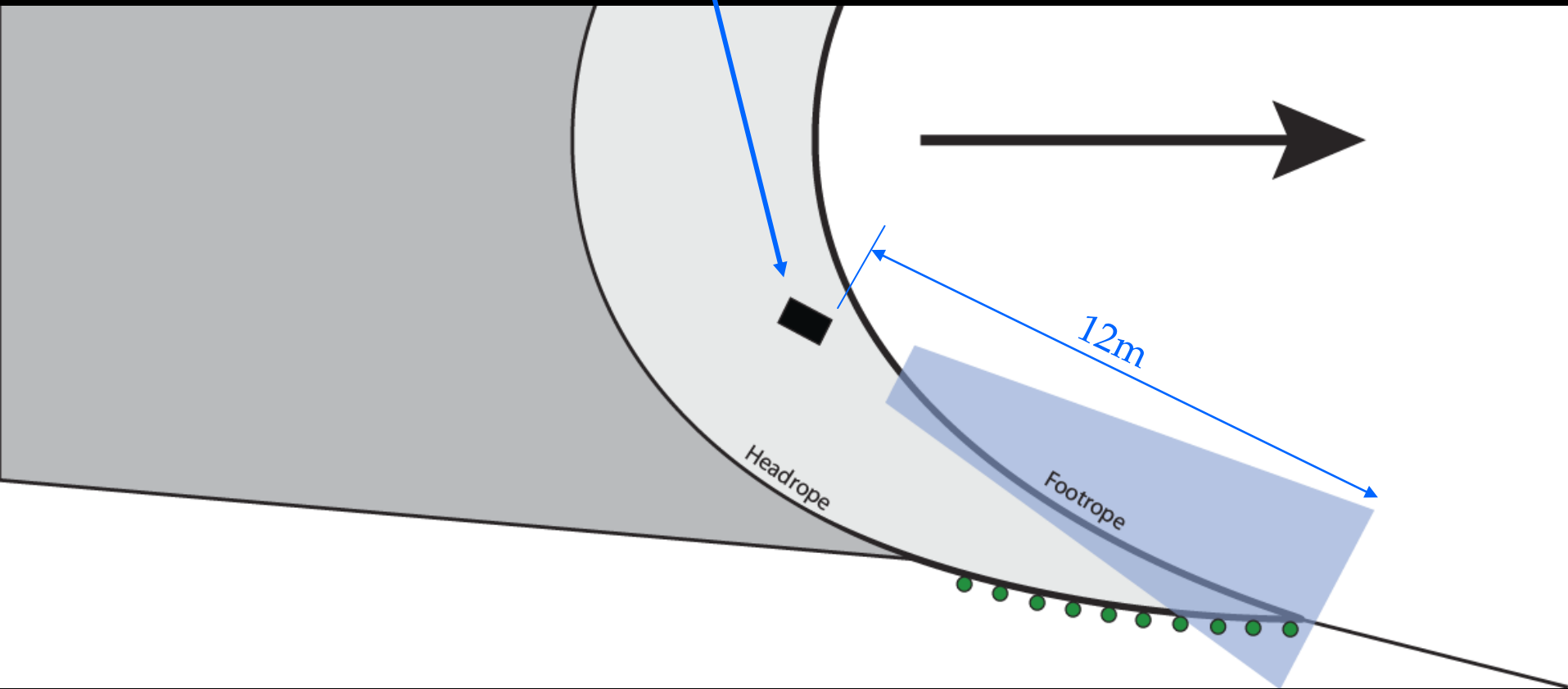
Heceta Bank

Coos Bay

Study Area



Didson





# Species Composition from Trawl Catch

Arrowtooth flounder

Longnose skate

Dover sole

Pacific hake\*

Spiny dogfish\*

Ratfish\*

Sablefish\*

Darkblotched rockfish

Petrable sole

Lingcod\*

Slender sole

Rex sole

Splitnose rockfish

Greenstripe rockfish

Stripetail rockfish

*Atheresthes stomias*

*Raja rhina*

*Microstomus pacificus*

*Merluccius productus*

*Squalus acanthias*

*Hydrolagus colliei*

*Anoplopoma fimbria*

*Sebastes cramerii*

*Eopsetta jordani*

*Ophiodon elongatus*

*Lyopsetta exilis*

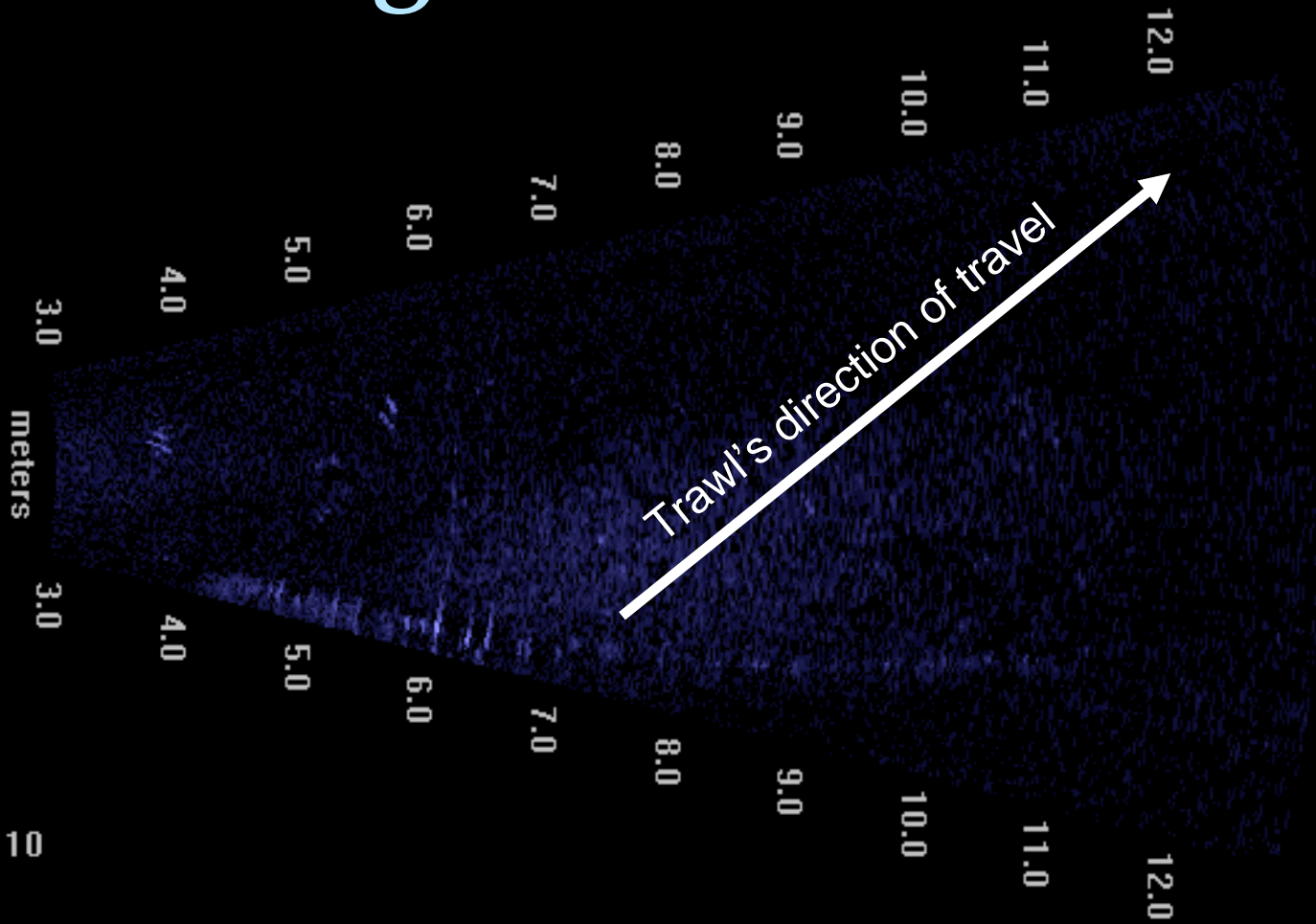
*Glyptocephalus zachirus*

*Sebastes diploproa*

*Sebastes elongatus*

*Sebastes saxicola*

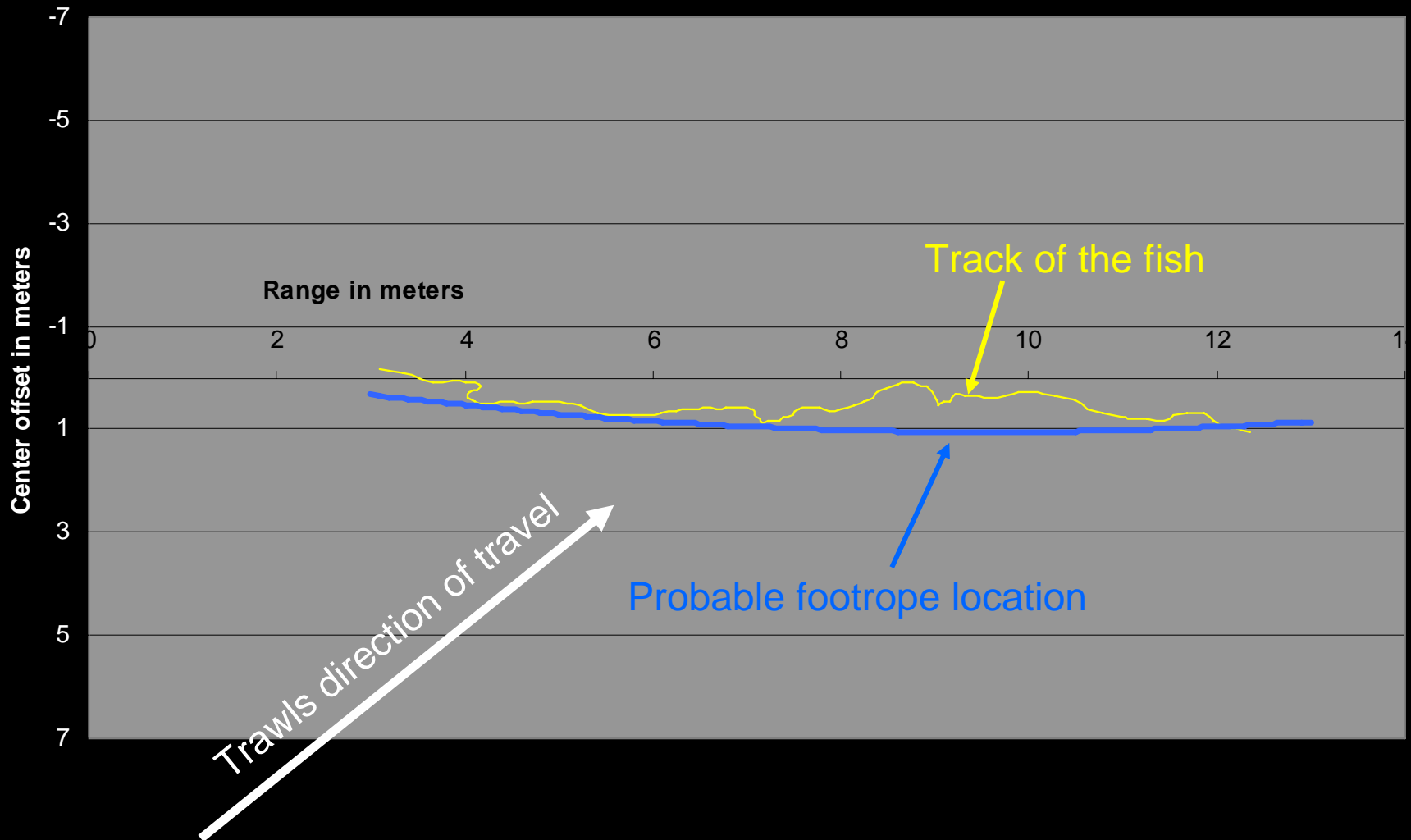
# Tracking fish with Didson



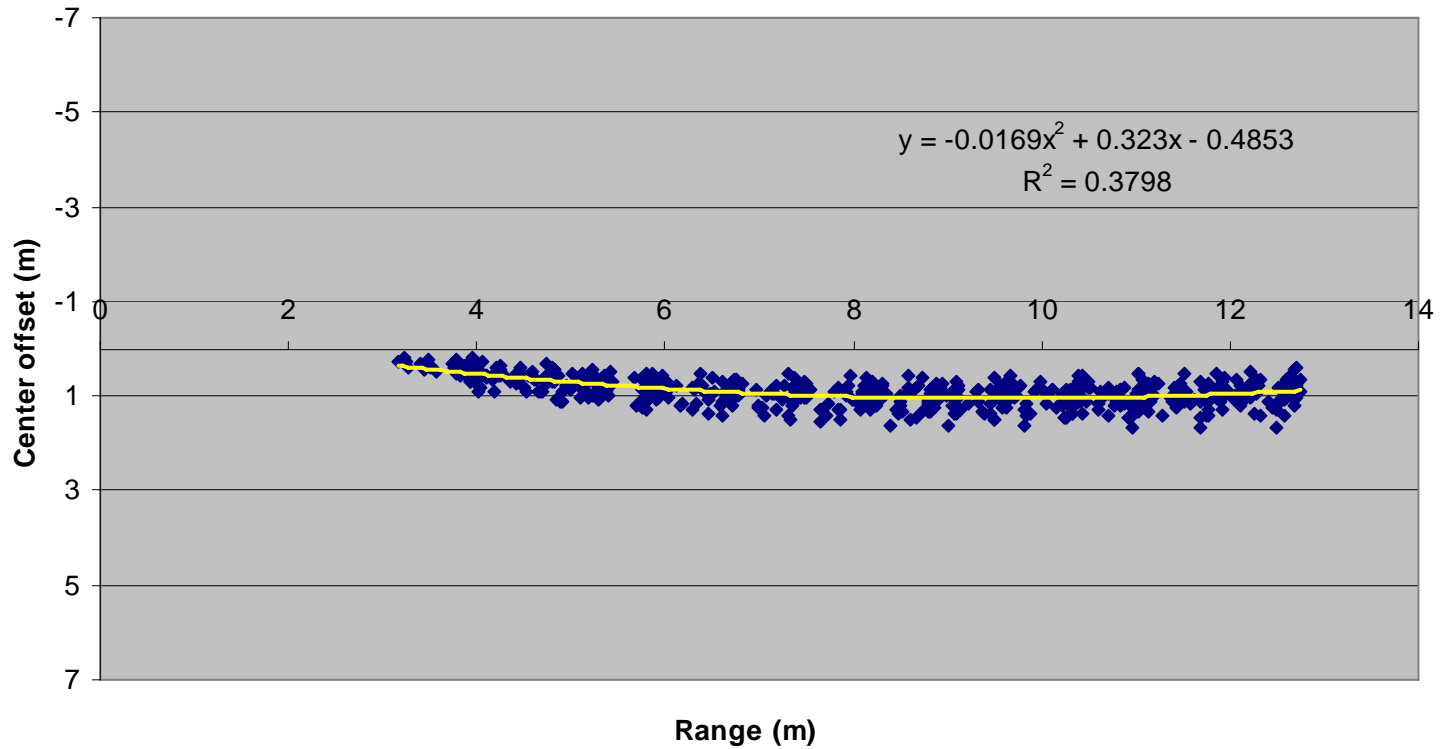
Track 2 of 10

13:02:17

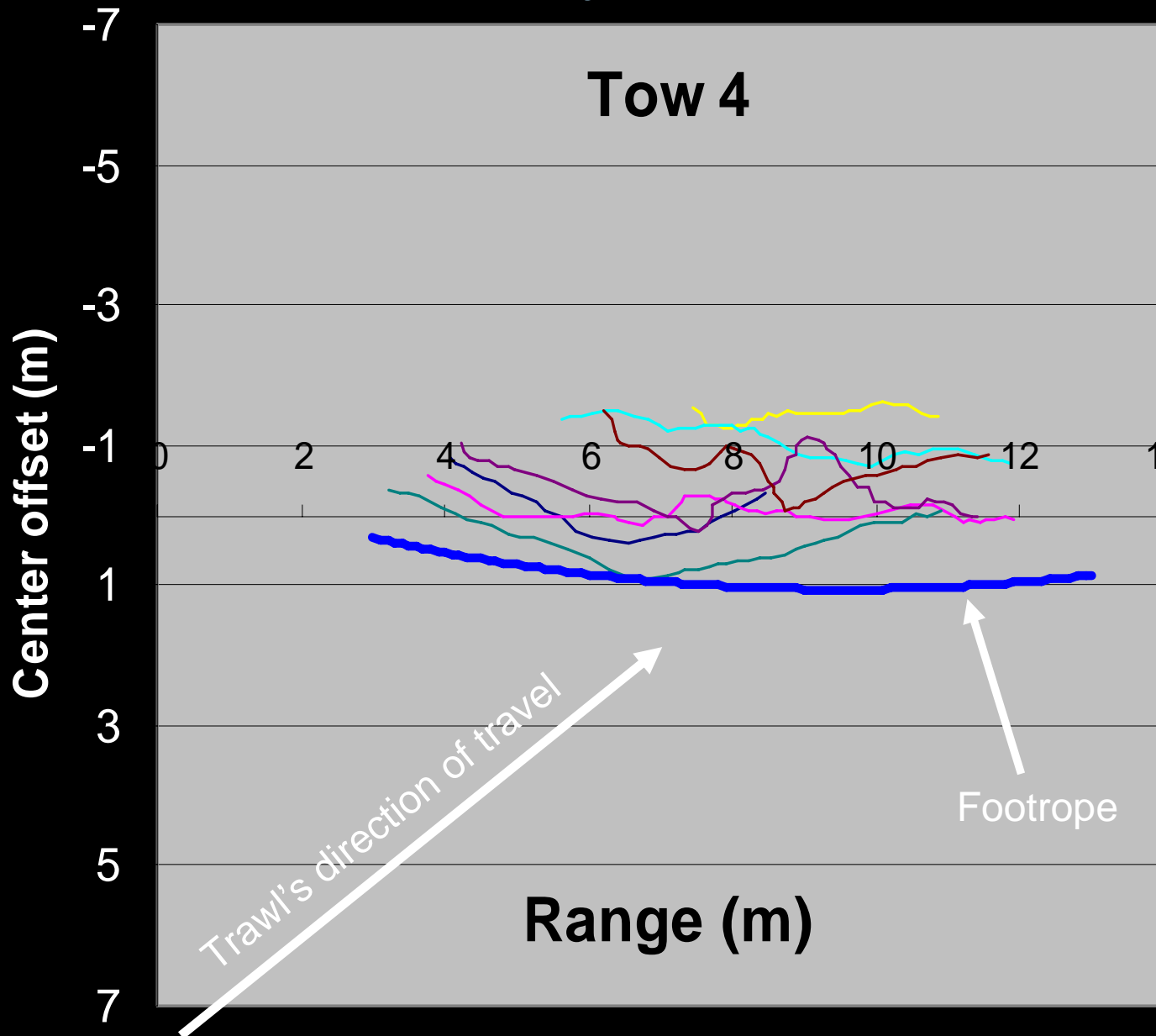
# Transform the track data



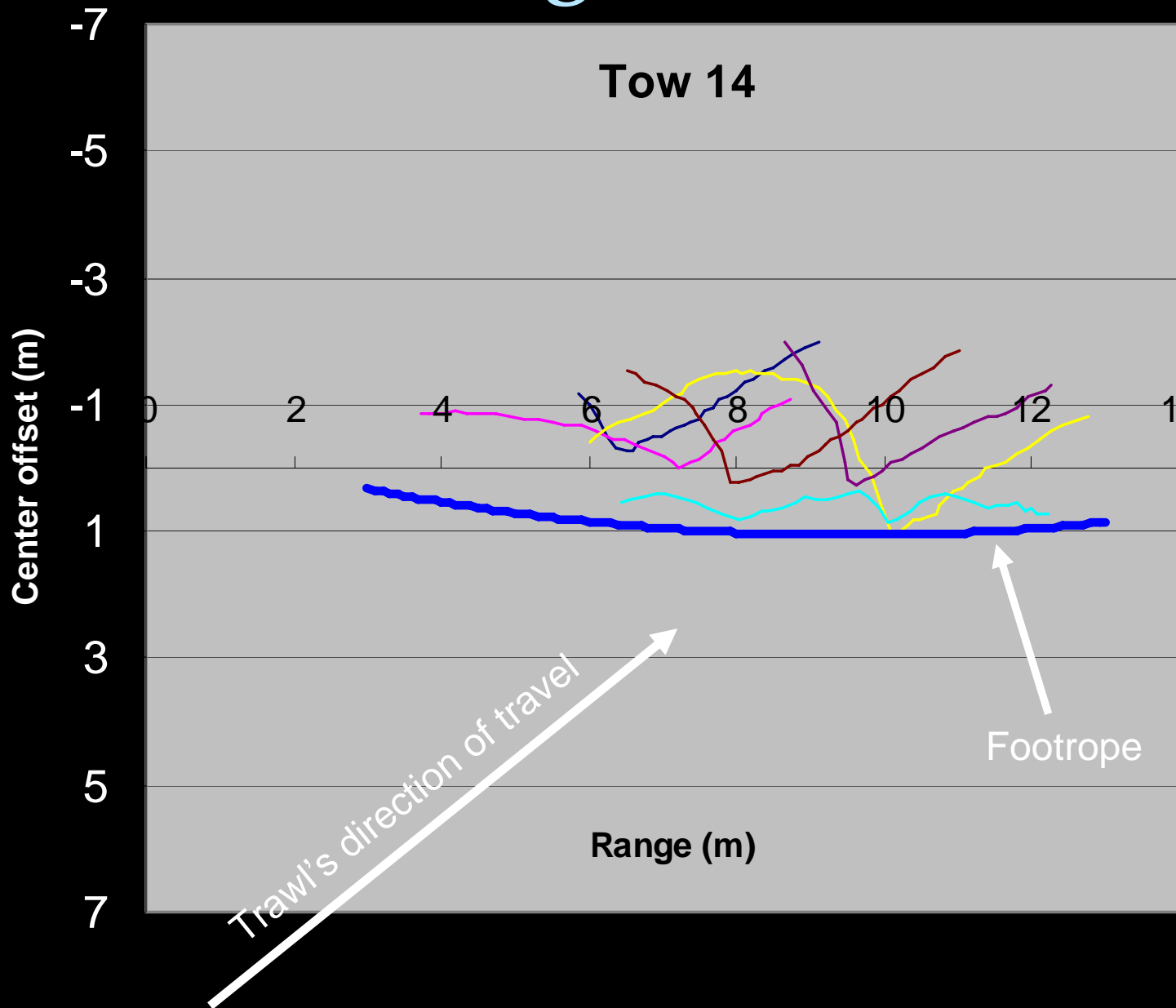
# Footrope location



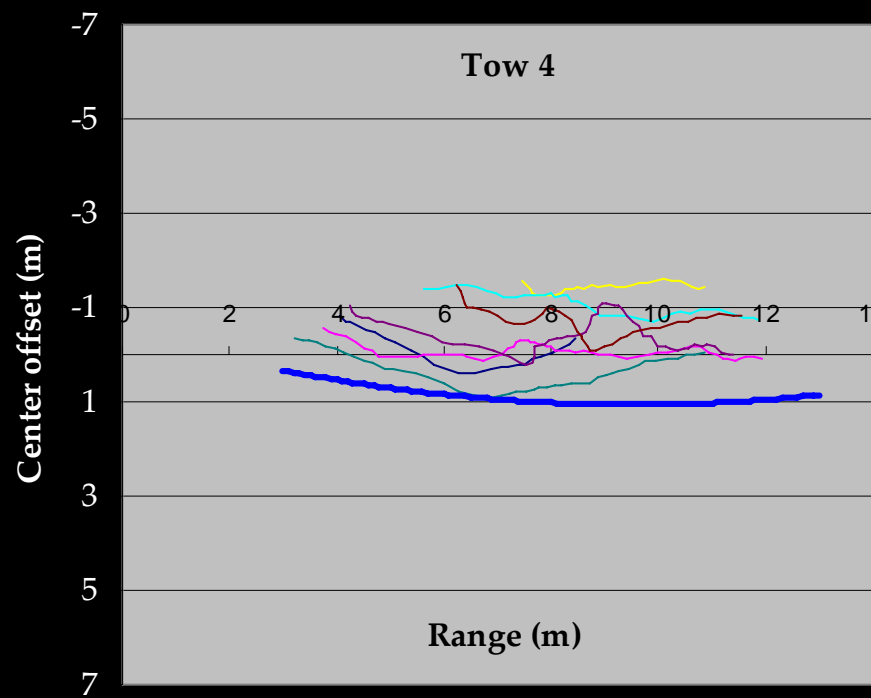
# Day tows



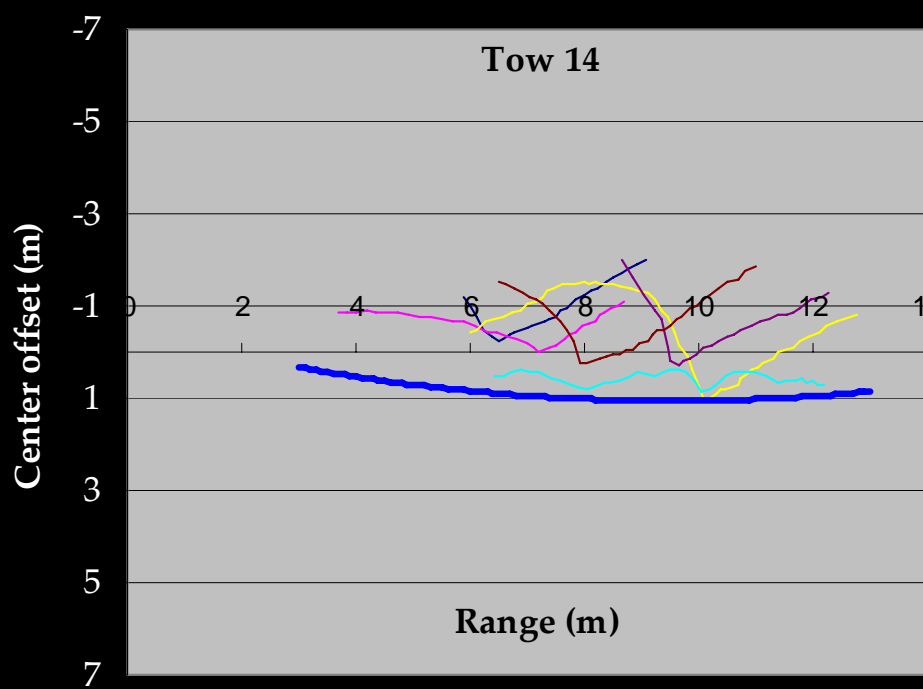
# Night tows



# Day



# Night

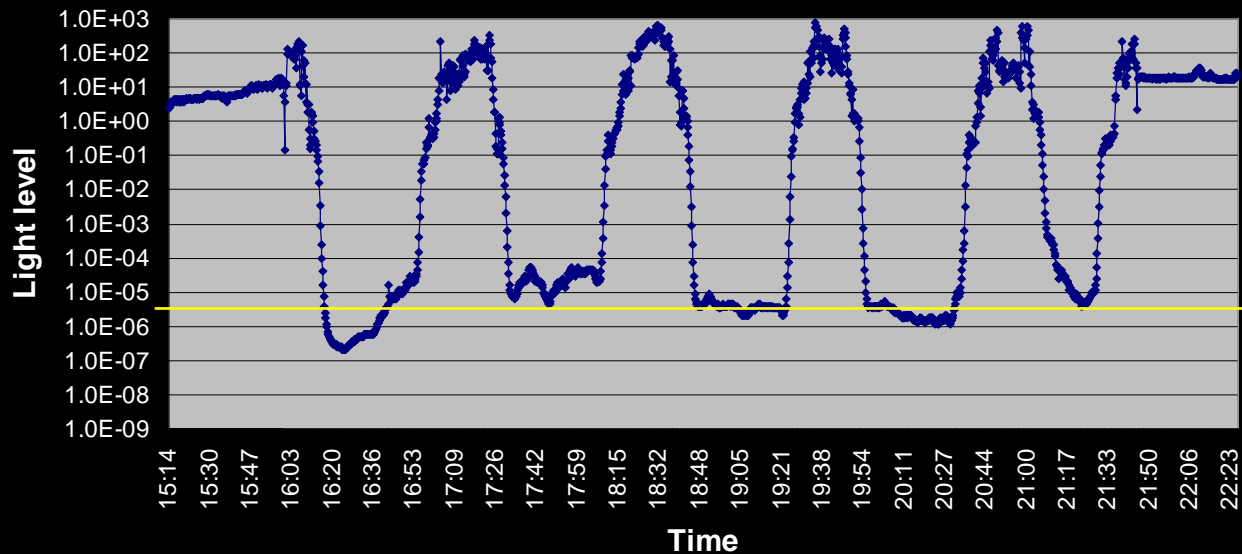




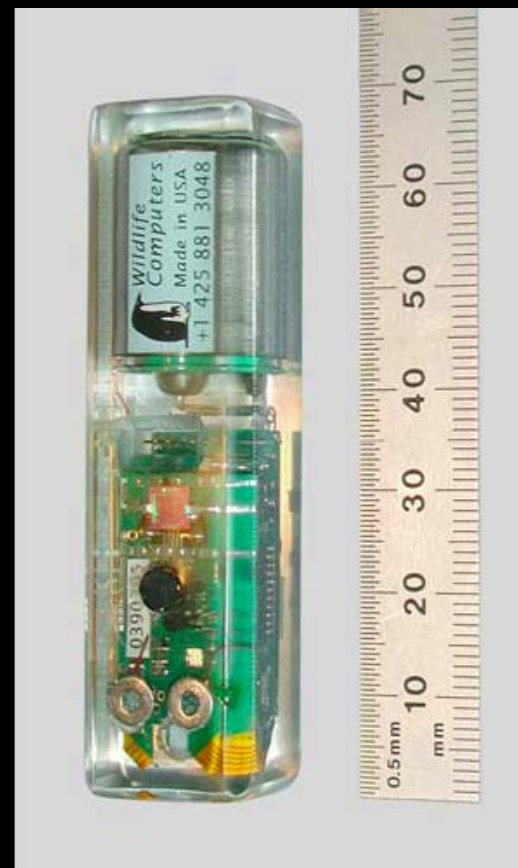
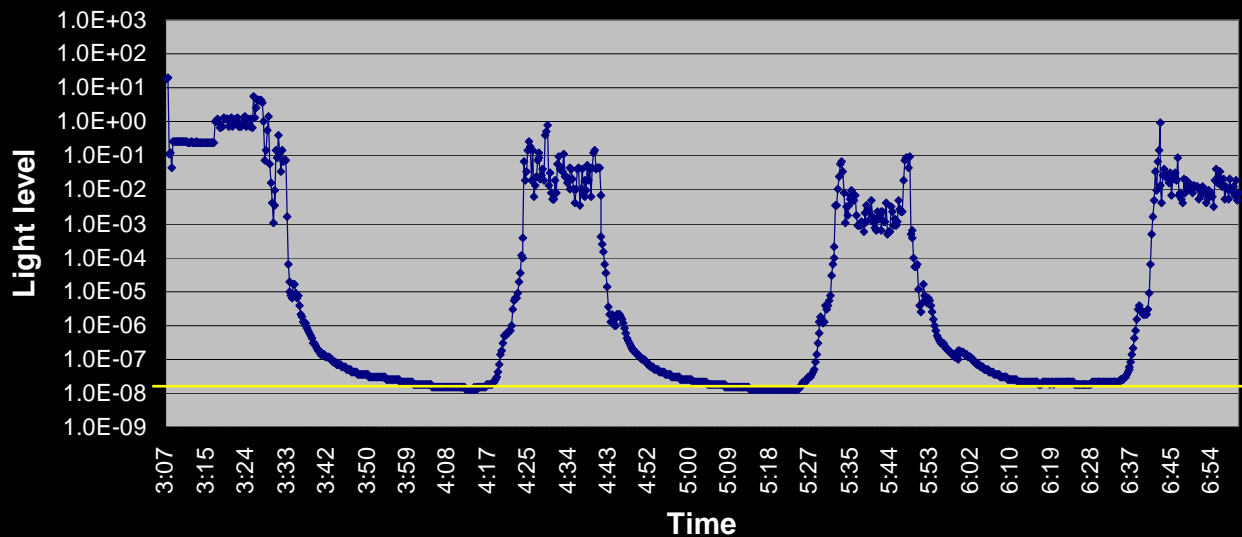
Light meter at center of headrope  
looking upward



## Daytime tows 9-13, Oct. 4, 2006



## Night tows 14-16, Oct. 6, 2007

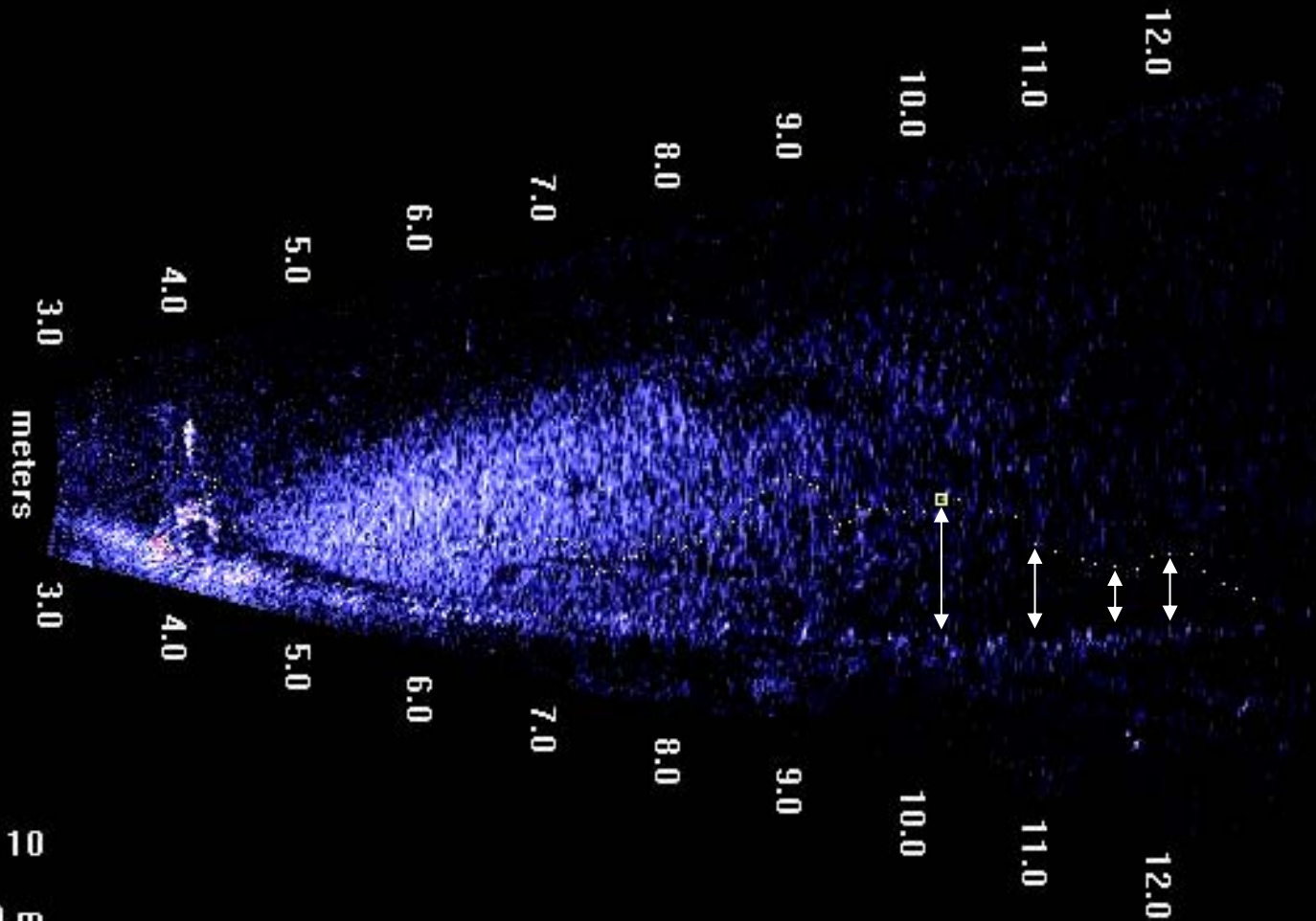


# “Angular” “Straight”

Day	15	95
Night	41	17

Chi-square results suggest shape is not independent of day-vs.-night;  $P < .001$

# Measuring fish-tracks



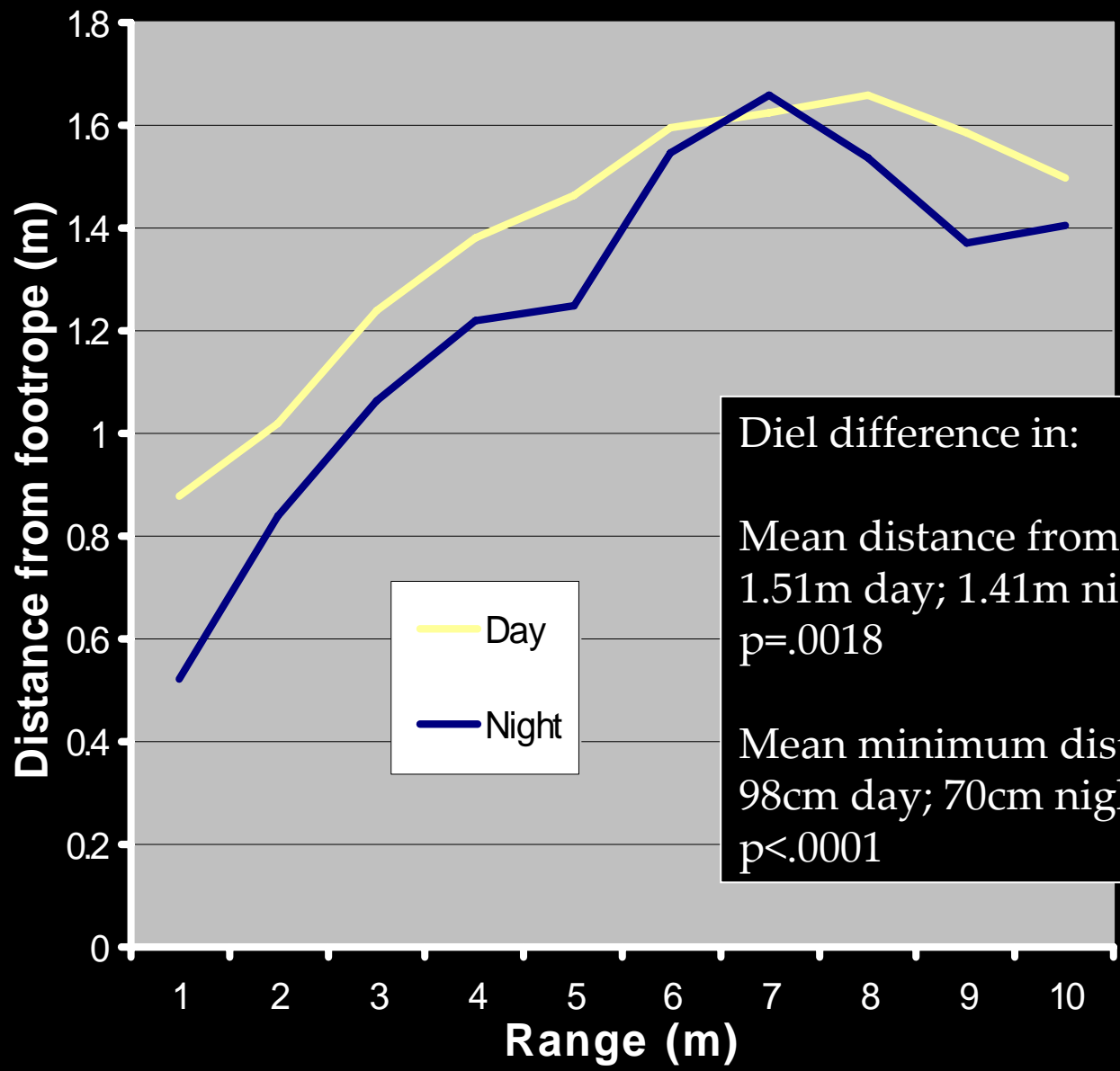
Track 2 of 10

Range 9.89 m

Bearing 1.6 deg

13:02:24

# Mean distance from footrope, day vs night tows



Diel difference in:  
Mean distance from footrope:  
1.51m day; 1.41m night  
 $p=.0018$   
Mean minimum distance:  
98cm day; 70cm night  
 $p<.0001$

# “Conclusions”

- Day-Night differences were observed in fish response to a bottom trawl footrope
- Fish seemed to parallel footrope during day, reacted suddenly to it at night

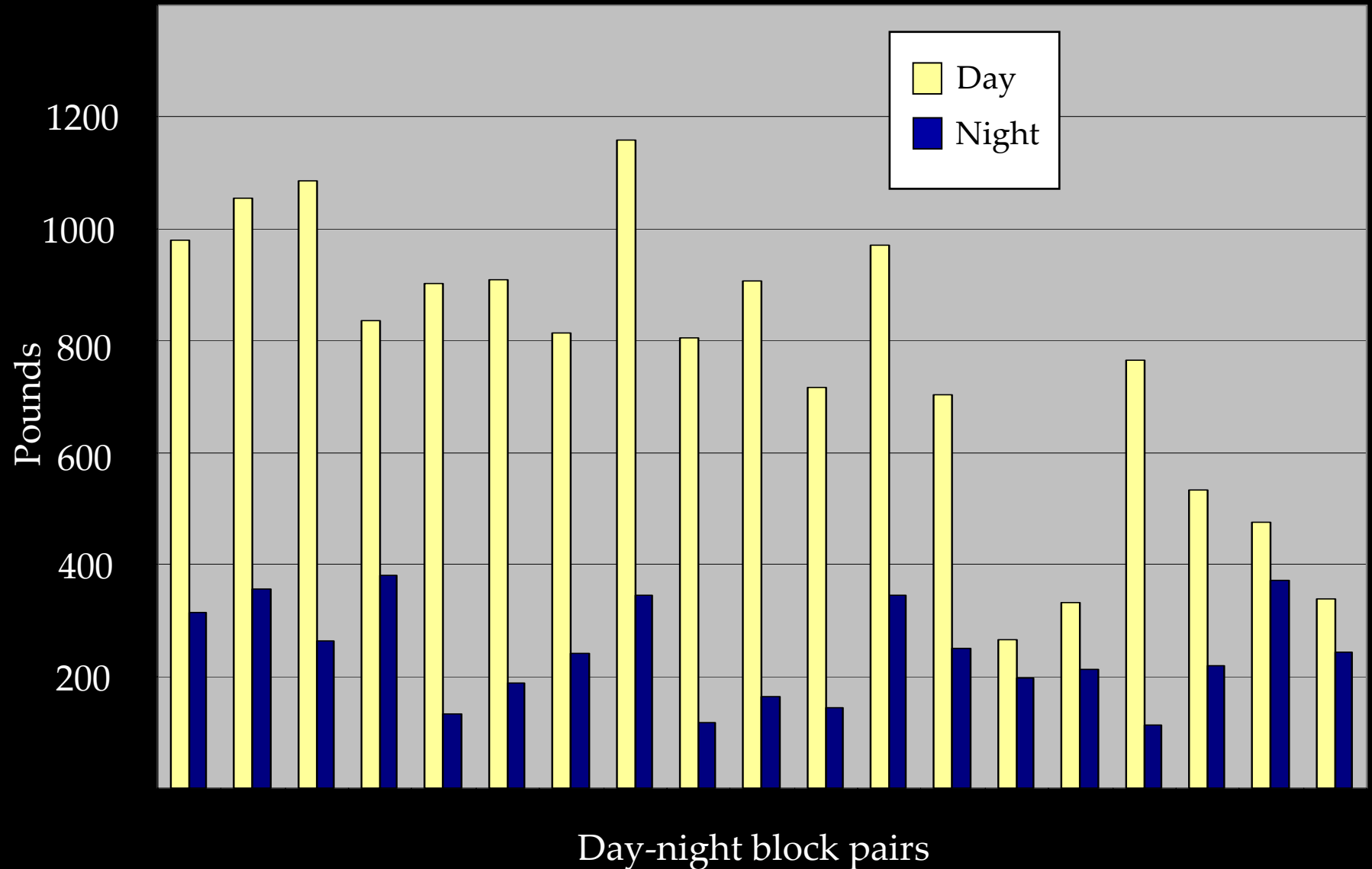
# Concerns

- Light level may affect catch rates/selectivity
- Implications for management:
  - Design of gear for bycatch reduction
  - Alter temporal fishing patterns with light level
- Implications for science:
  - Measure light levels during survey/sampling
  - Start tows at appropriate times
  - Awareness of particulates and changing cloud cover

# Fall 2007 work

- September 2007, Ms. Julie
- 6 days of day-night comparison tows
- Light meters on net and topside
- 19 day-night pairs
- Analysis is underway

# Catch by block, fall 2007





# Acknowledgements

- Rex Leach, John Leach and the crew of the F/V Miss Julie
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