

# Central Coast Trawl Impact and Recovery Project

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MBNMS Sanctuary Advisory Council Meeting  
19 August 2010

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of Marine Science and Policy



Institute for Applied Marine Ecology at CSU Monterey Bay



# Special thanks to:

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## Collaborators -

The Nature Conservancy  
Marine Applied Research and Exploration  
Monterey Bay National Marine Sanctuary  
Moss Landing Marine Labs  
NOAA Fisheries- Northwest Fisheries Science Center  
F/V Donna Kathleen  
F/V South Bay  
F/V Bonnie Marietta  
F/V Rita G

## Generous support from -

California Ocean Protection Council  
Private donations to the Nature Conservancy  
National Marine Sanctuary Program  
CSUMB Undergraduate Research Opportunities Center



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What do we know about the impacts of trawling to seafloor communities?

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How do we know this?

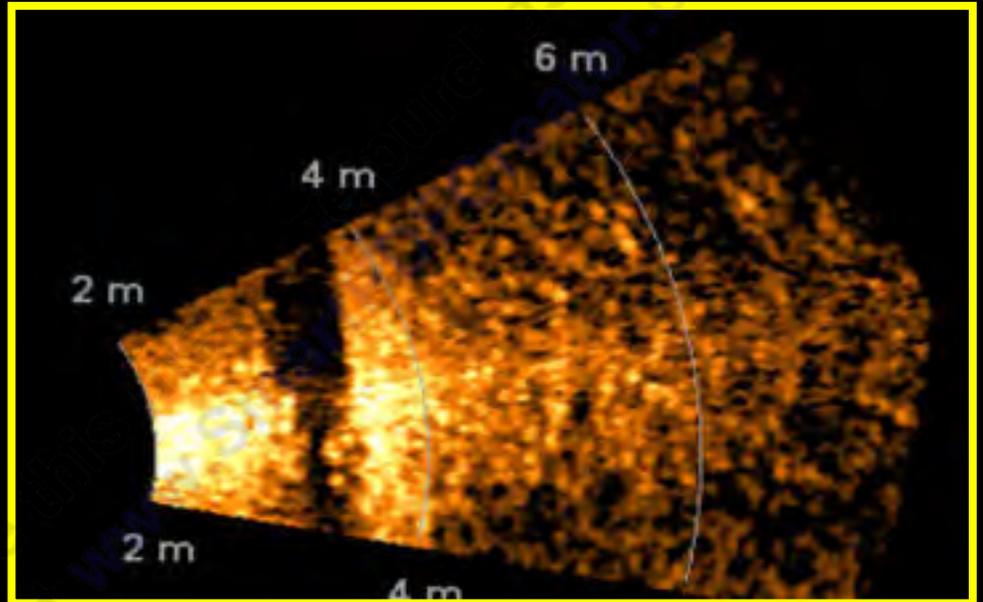
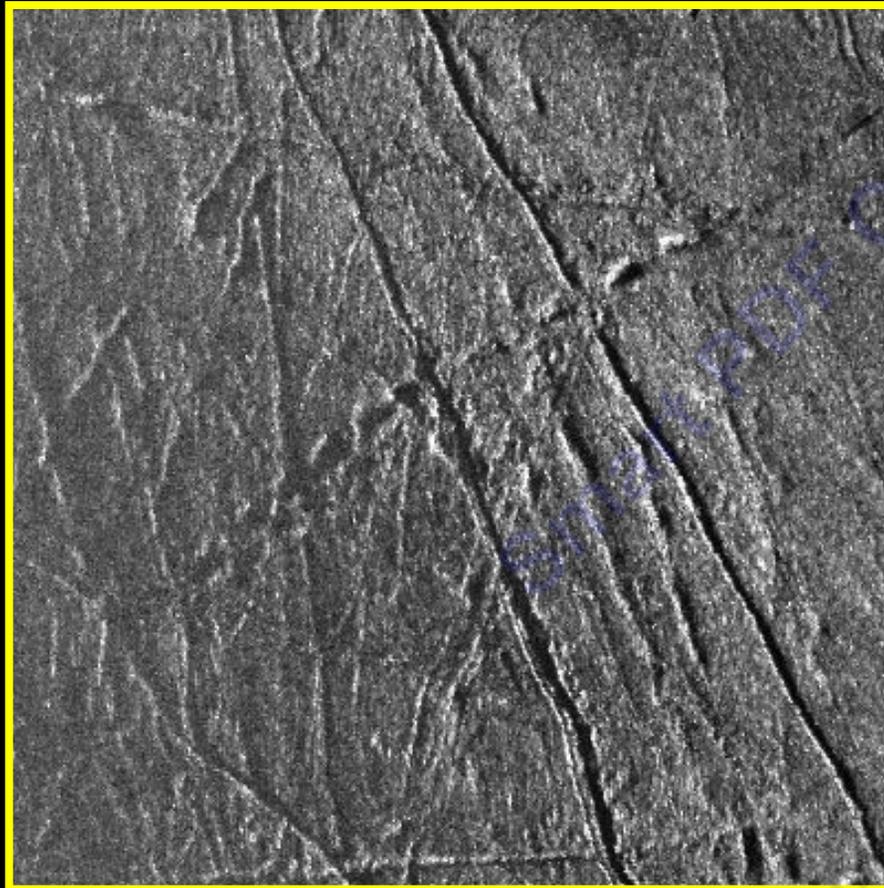
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What have we learned so far on the project off Morro Bay?

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# Trawling impacts seafloor communities



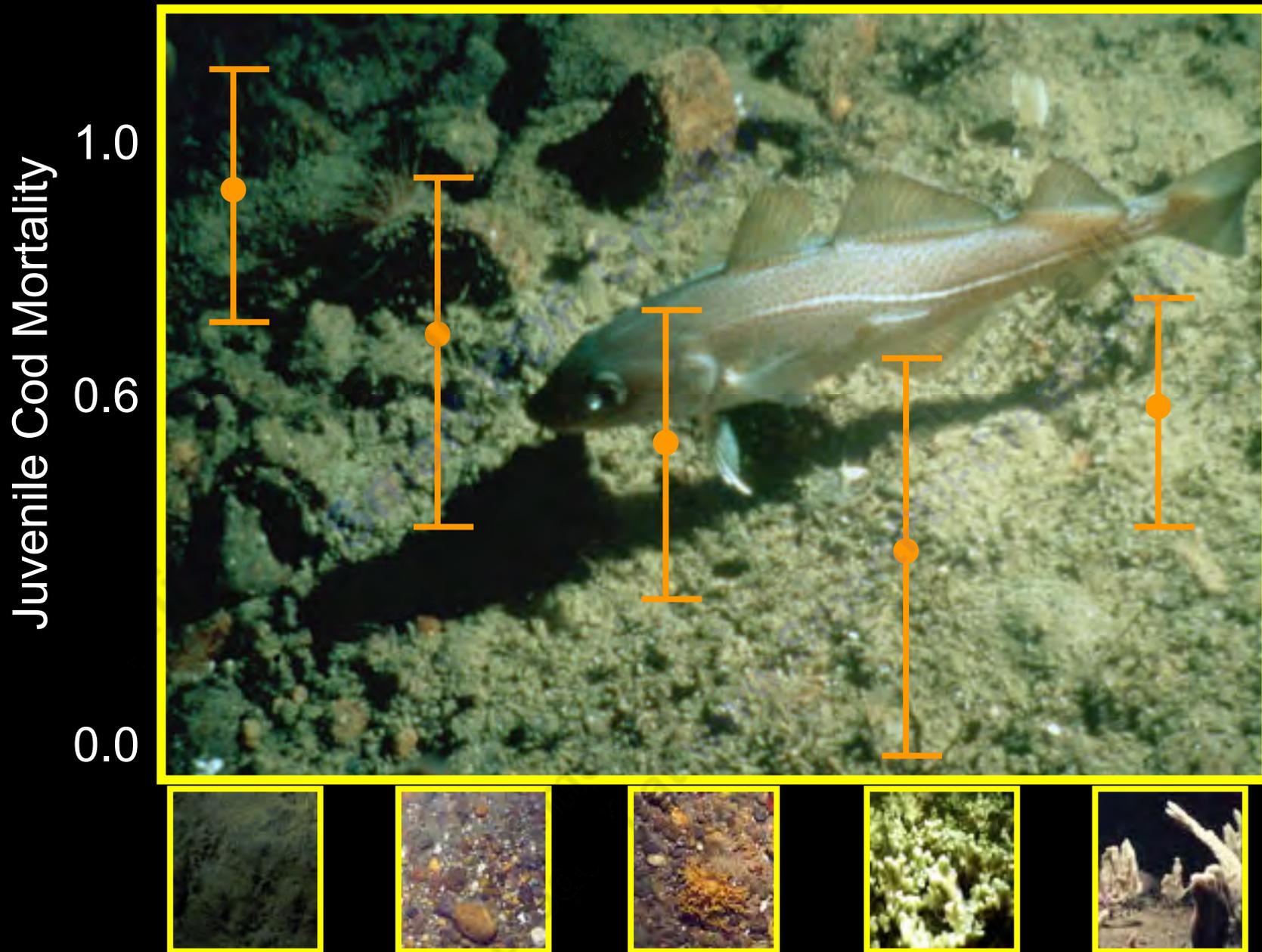
# Fish-Habitat Associations



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# Habitat, or the lack thereof, impacts fishes



Lindholm et al. (1999)

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What do we know about the impacts of trawling to seafloor communities?

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**How do we know this?**

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What have we learned so far on the project off Morro Bay?

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Auster and Langton (1999)

Engel and Kvitek (1998)

Auster et al. (1996)

Kaiser et al. (2008)

Collie et al. (2000)

Lindholm et al. (2008)

Thrush et al. (2009)

Thrush et al. (2009)

Auster (1998)

Watling and Norse (1998)

Hall (1999)

Dayton et al. (1995)

Kaiser et al. (2002)

Lindholm et al. (2004)

Hixon and Tissot (2007)

Jennings and Kaiser (1998)

# West Coast of US

Hixon and Tissot (2007)

Friedlander et al. (1999)

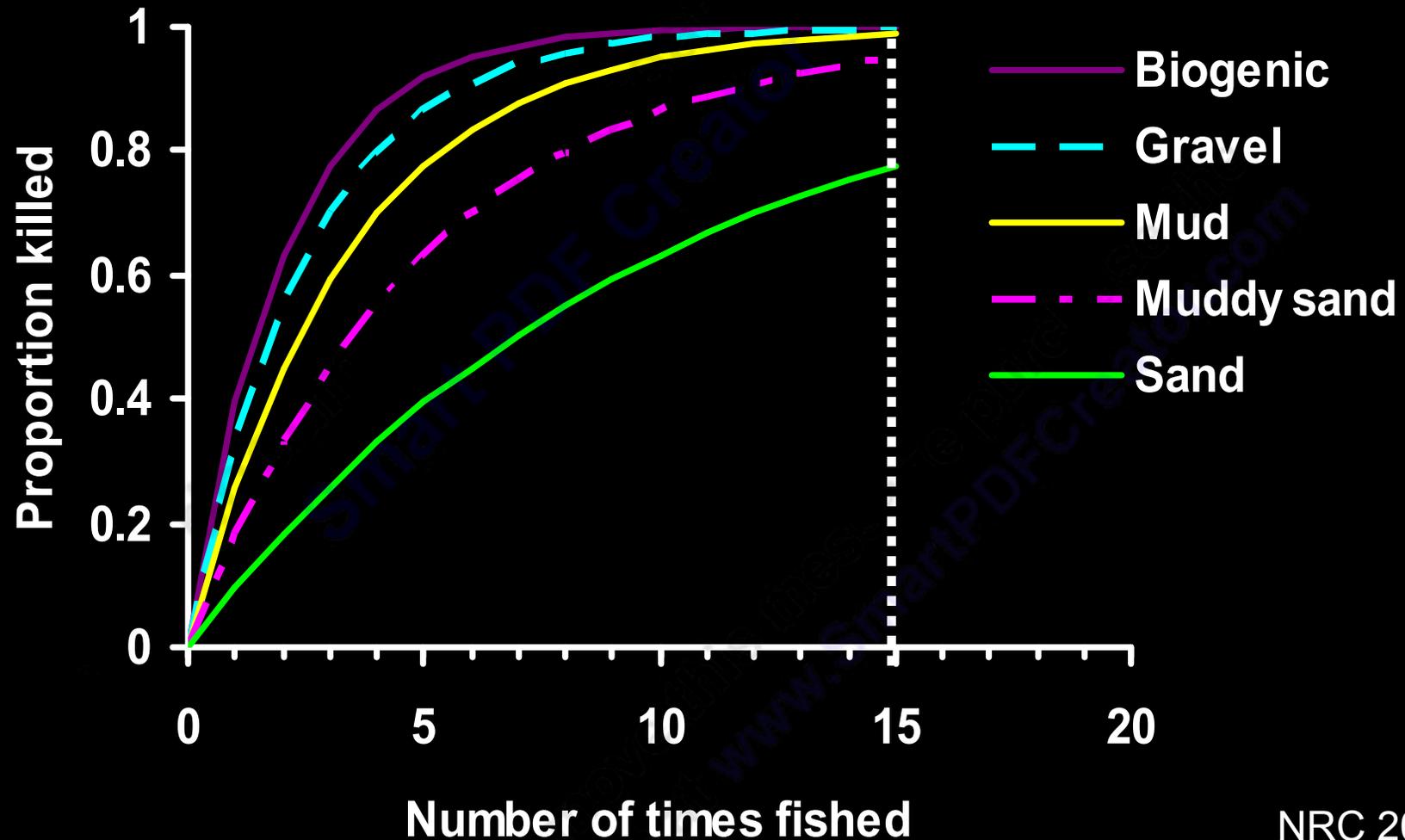
Lindholm et al. (2008)

de Marginac et al. (2009)

Engel and Kvitek (1998)



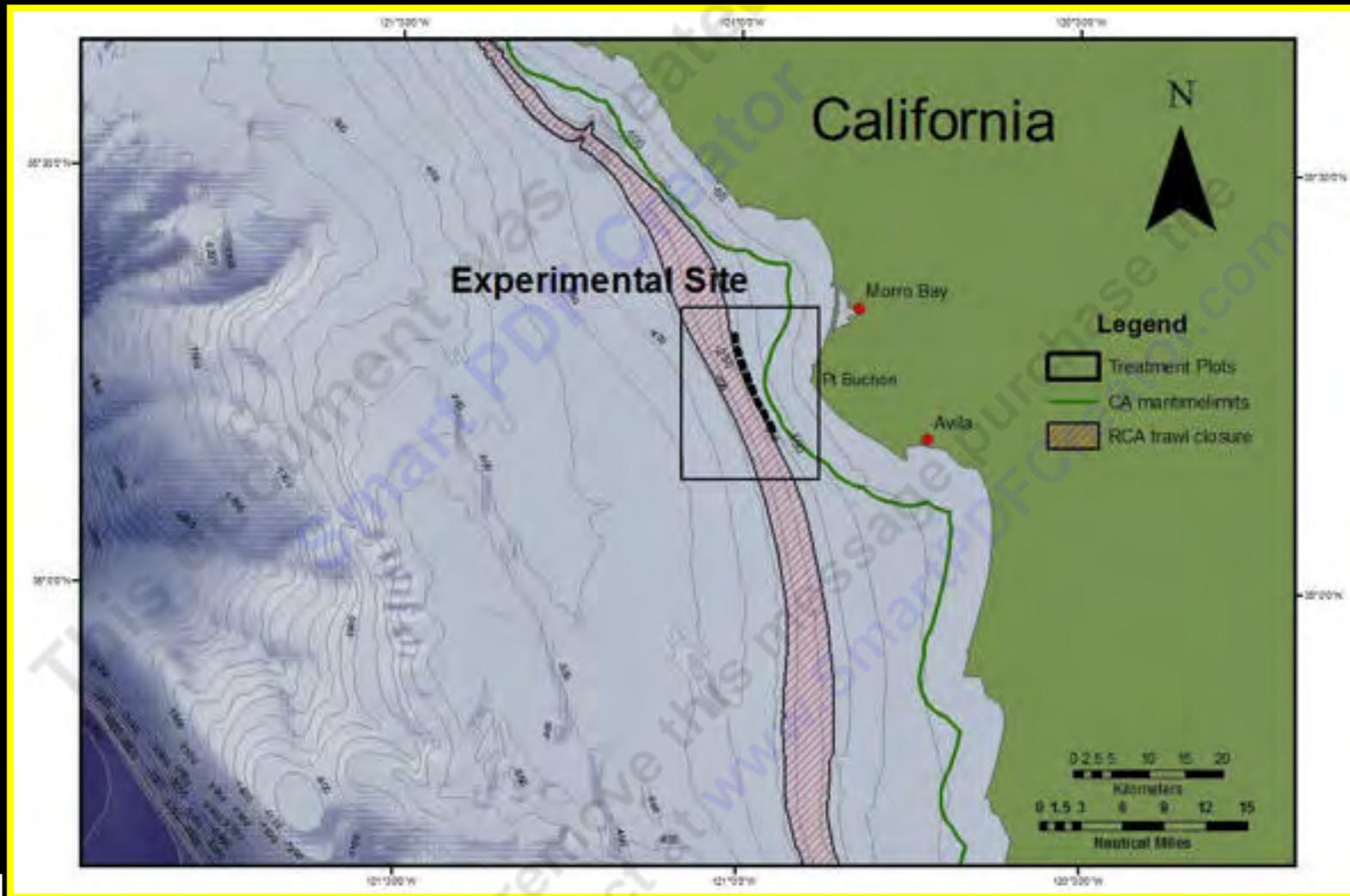
# Many questions remain



NRC 2002



# Central Coast Trawl Impact & Recovery Study



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Site prospecting  
cruise with ROV

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SEP 2008

# Central Coast Trawl Impact & Recovery Study

Seafloor microhabitats (including topography and sessile invertebrates)



Still  
Camera

Paired  
Lasers

Video  
Cameras

TNC's ROV *Beagle*



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Baseline data  
collection with  
ROV & Grab

Site prospecting  
cruise with ROV

SEP 2008

SEP 2009

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# Central Coast Trawl Impact & Recovery Study



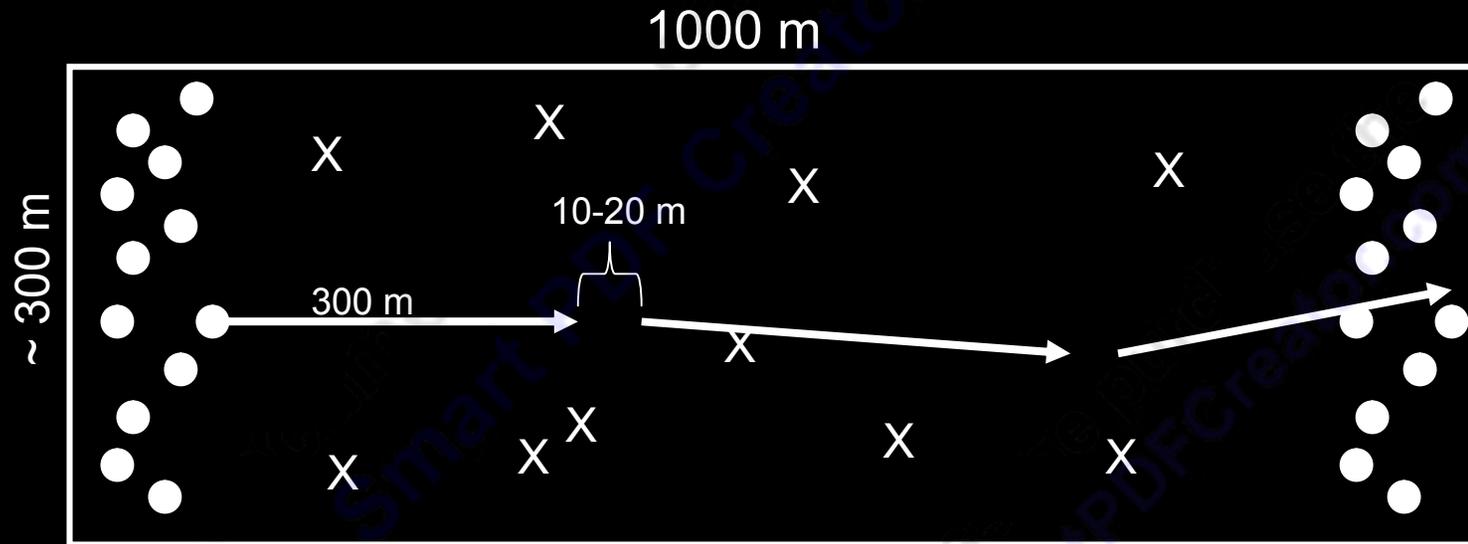
Infaunal invertebrates and  
sediment grain size



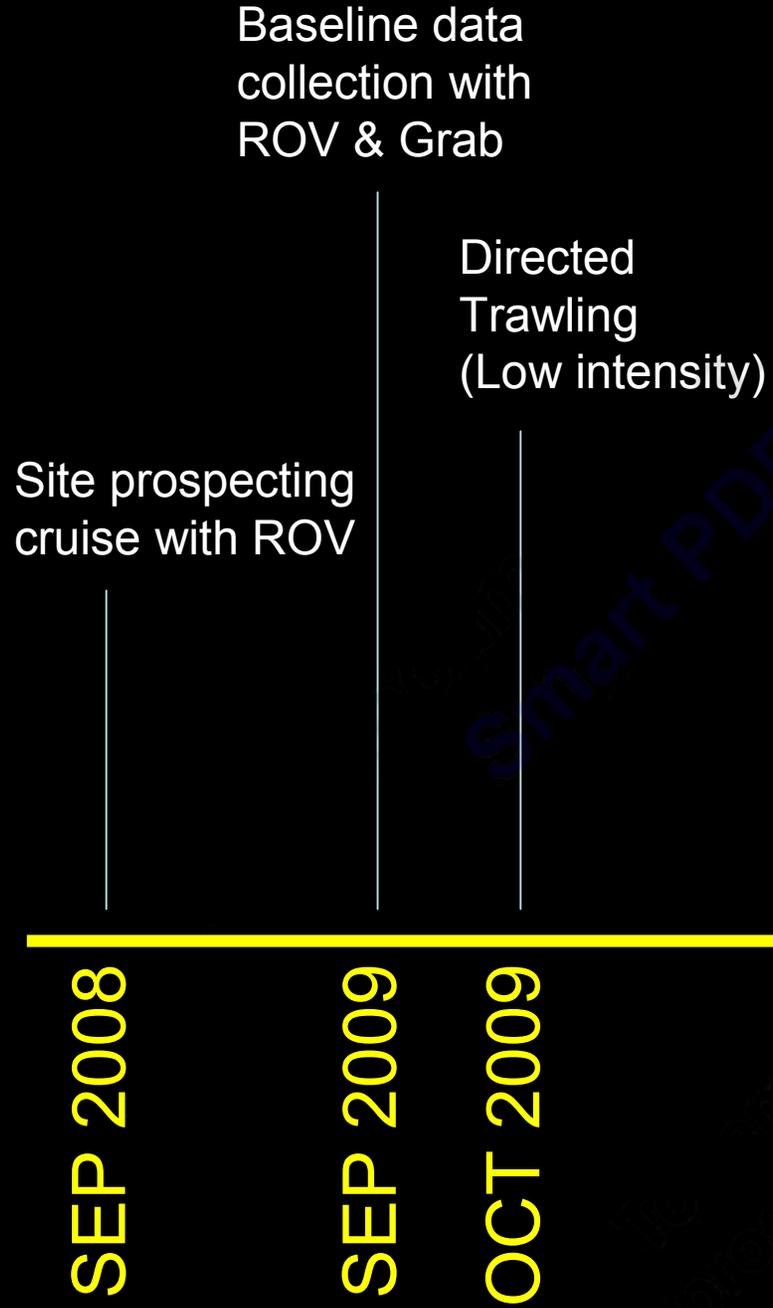
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# Eight study plots – four trawled and four controls – all at similar water depths (160 – 180 m)



- Randomized ROV Transect Start Points
- ROV Transect (300m)
- X Randomized Grab Stations



# Trawling Activities

Year 1: Trawled 2x

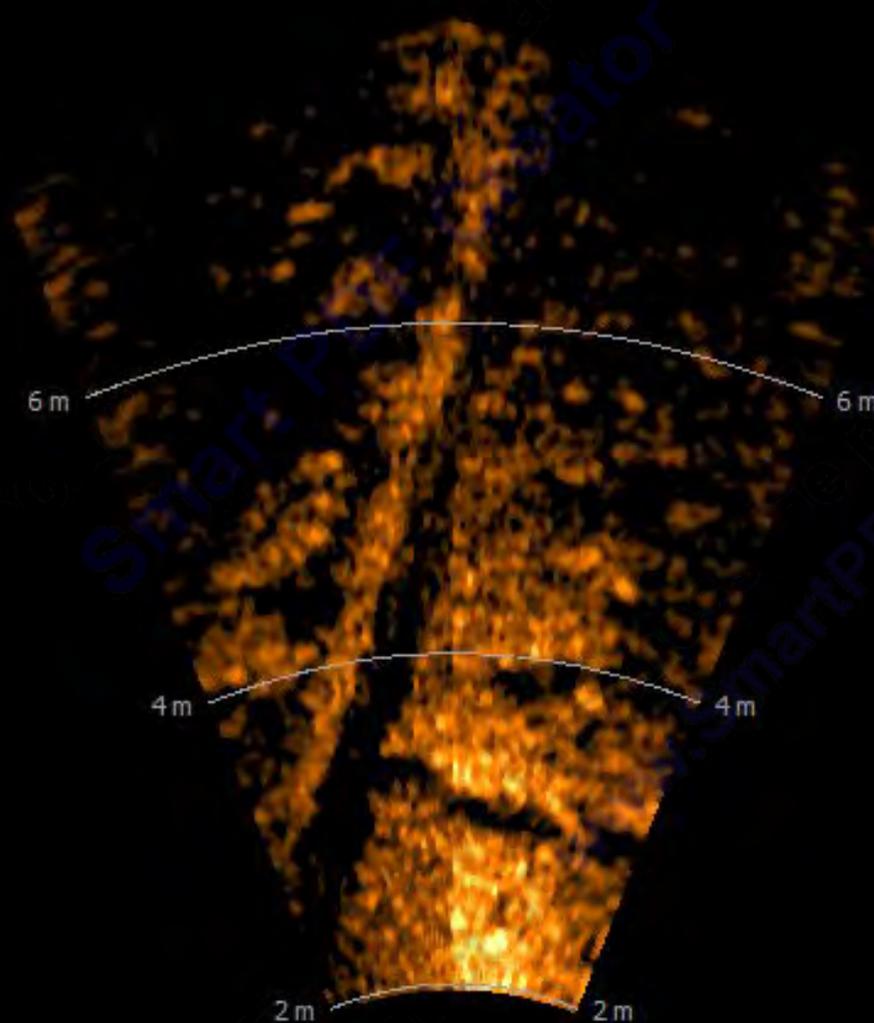


Experimental Plots

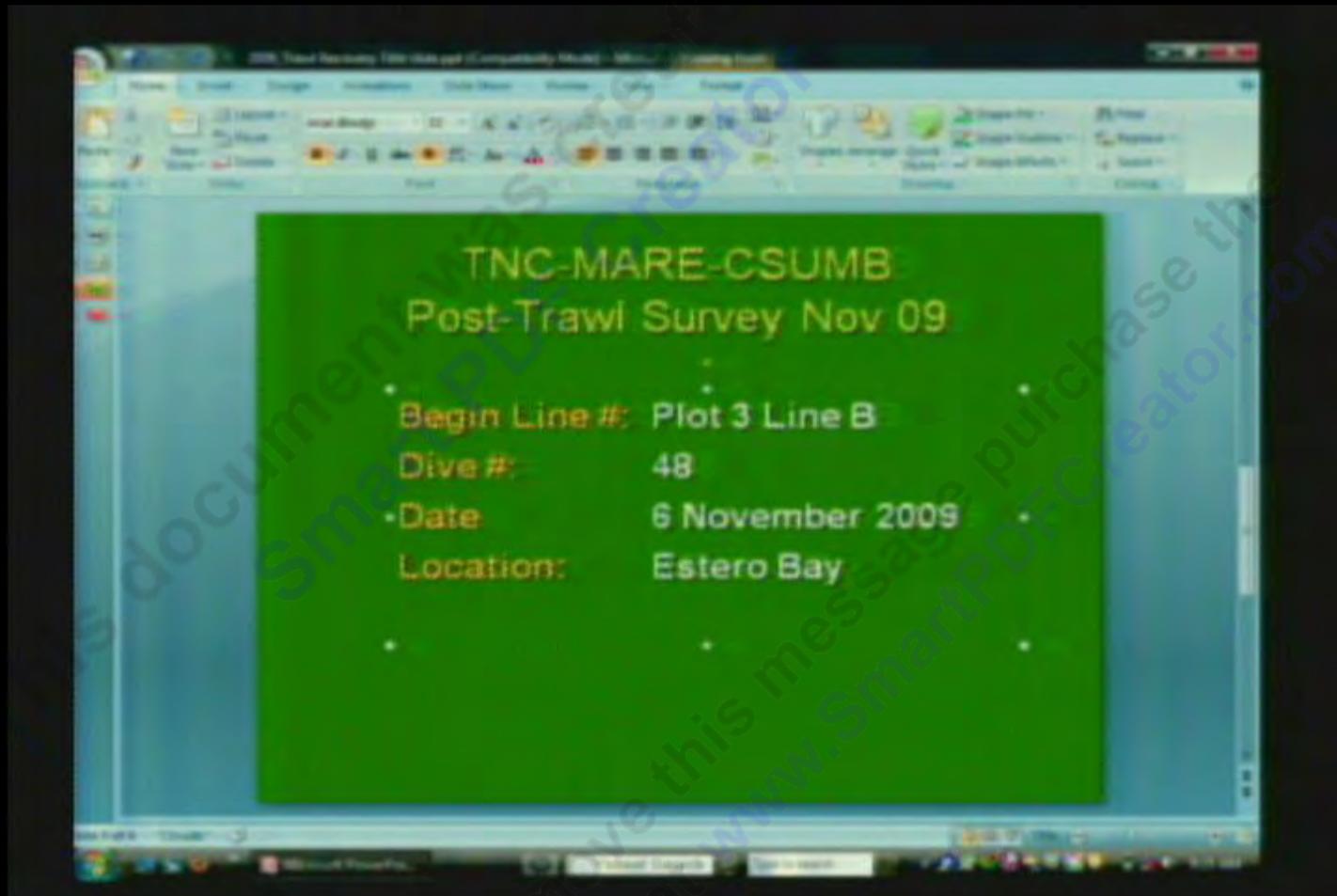


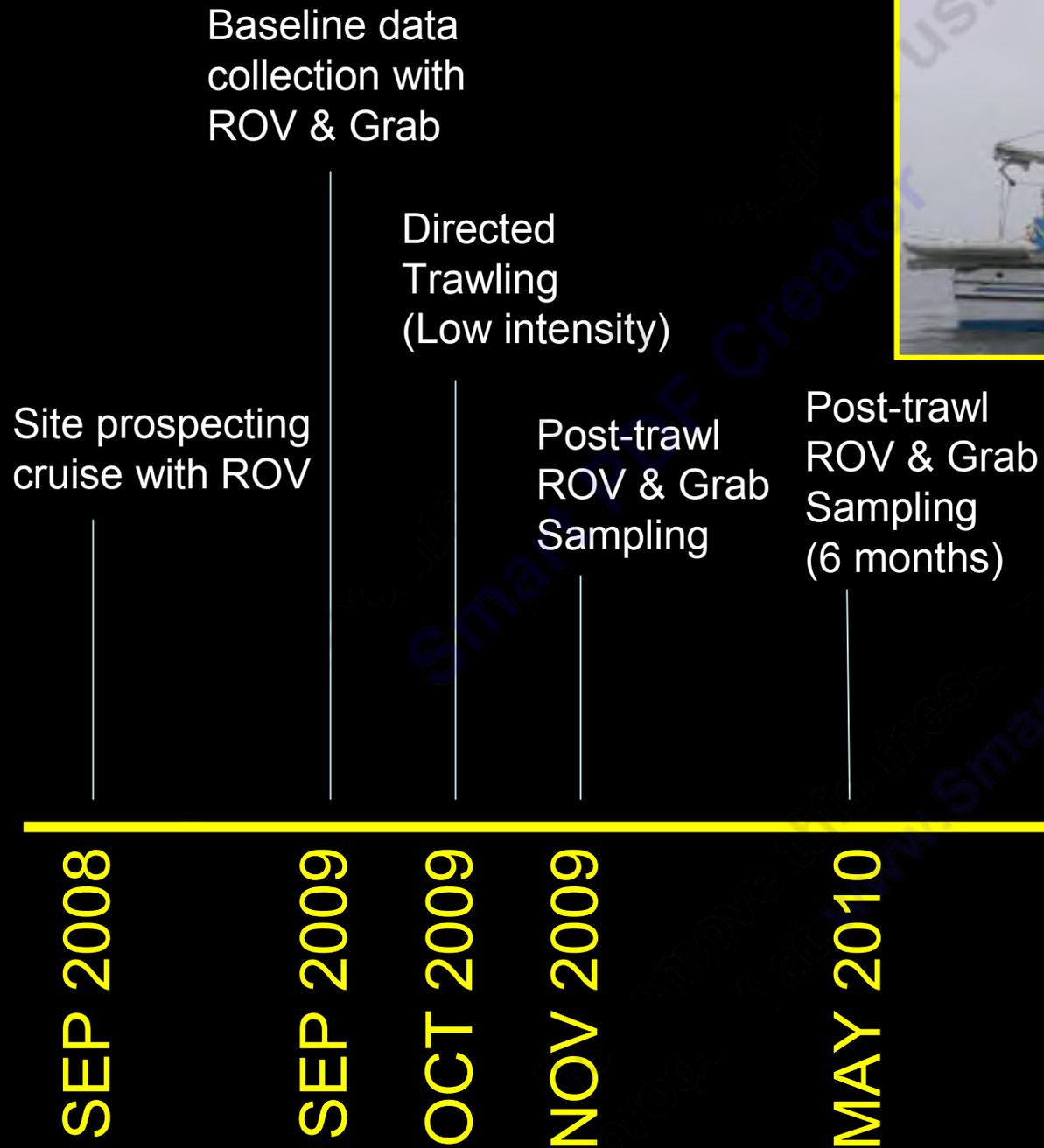
Approximately 2 hours per tow

# Trawling Activities- ROV sonar imagery



# Trawling Activities- ROV video imagery





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How do we know this?

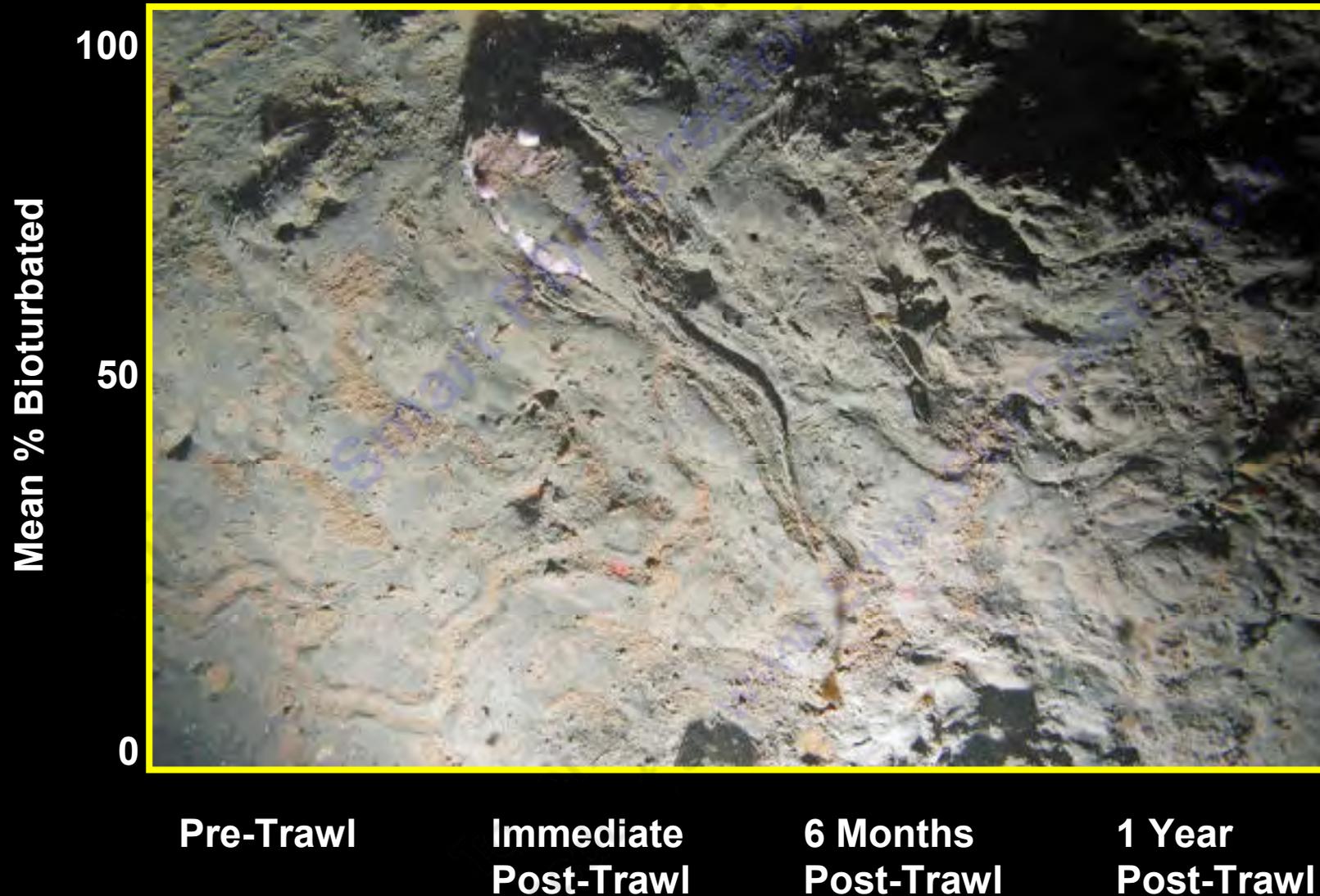
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What have we learned so far on the project off Morro Bay?

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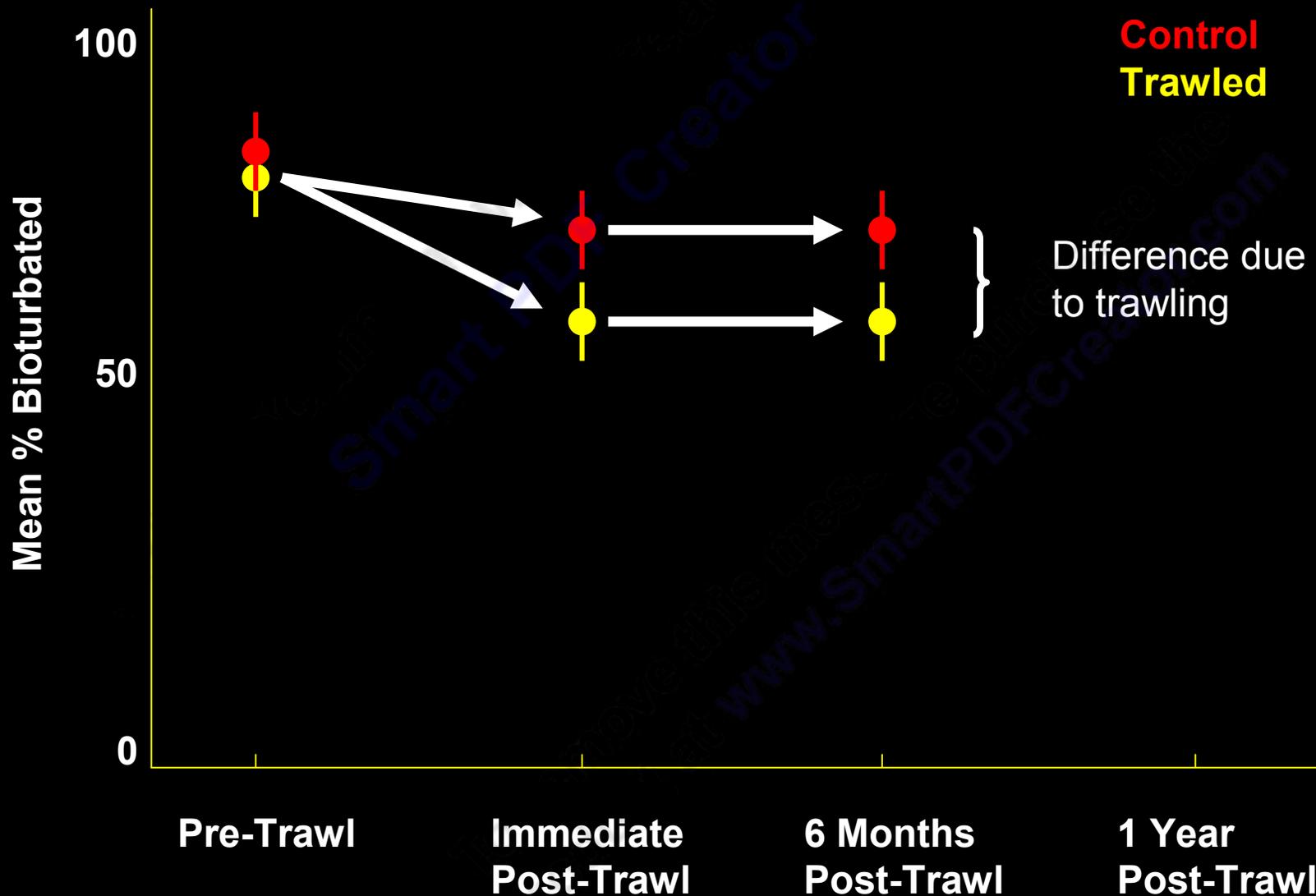


# Seafloor Microhabitats – Bioturbation Trawled 2x



# Seafloor Microhabitats – Bioturbation

## Trawled 2x



# Seafloor Microhabitats – Small (<10 cm) Sessile Epifauna

Mean Density Per Square Meter



Pre-Trawl

Immediate  
Post-Trawl

6 Months  
Post-Trawl

1 Year  
Post-Trawl

# Seafloor Microhabitats – Large (>10 cm) Sessile Epifauna

Mean Density Per Square Meter



Pre-Trawl

Immediate  
Post-Trawl

6 Months  
Post-Trawl

1 Year  
Post-Trawl

# Mobile Invertebrates (Trawled 2x)



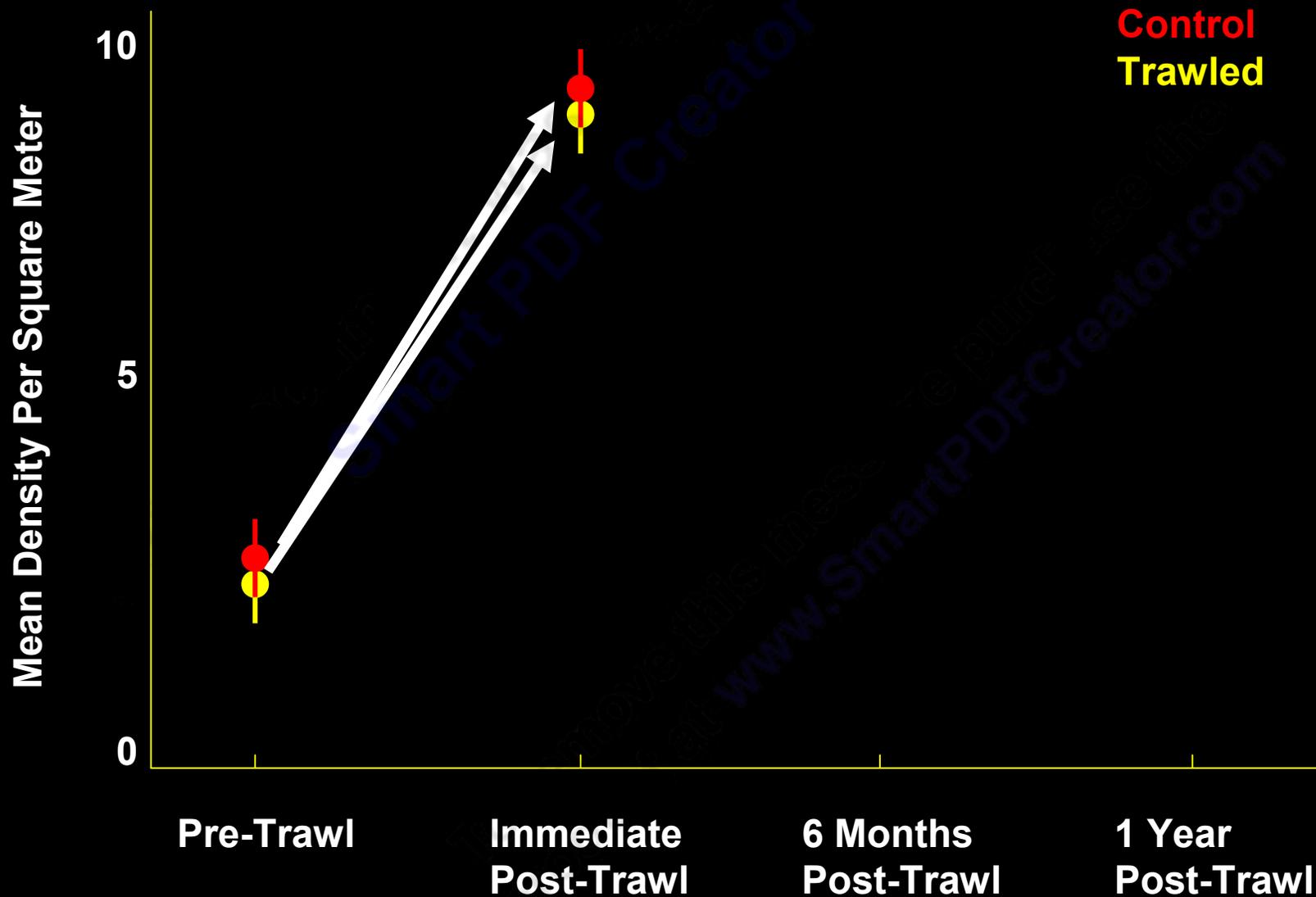
Pre-Trawl

Immediate  
Post-Trawl

6 Months  
Post-Trawl

1 Year  
Post-Trawl

# Mobile Invertebrates (Trawled 2x)



# Summary

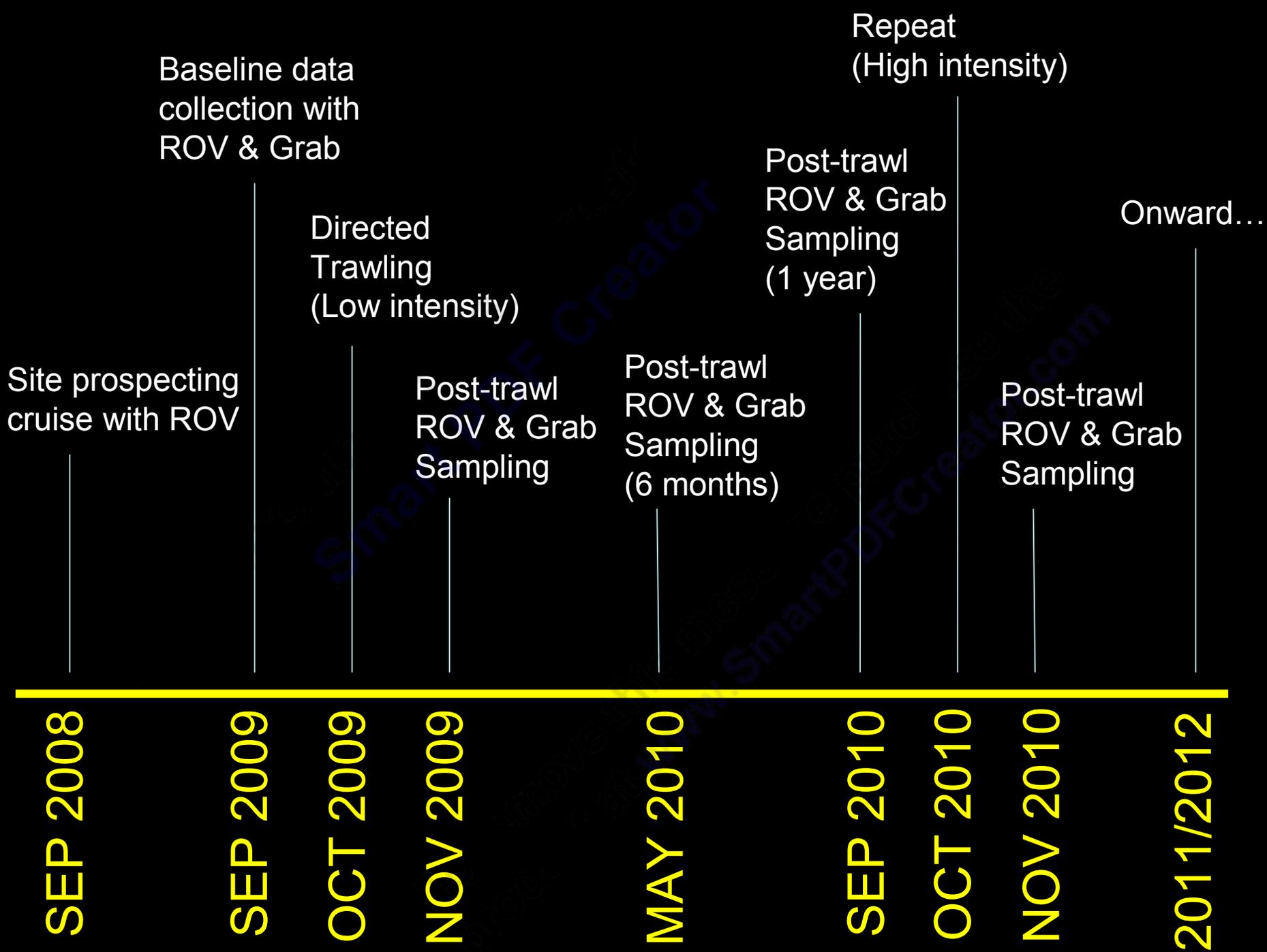
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To-date, we have found differences between trawled and control plots under relatively low effort (2x)

Questions remain as to...

- 1) How the community looks after 1-year post-trawling
- 2) How the community looks after higher levels of trawling effort (5x in Year 2)



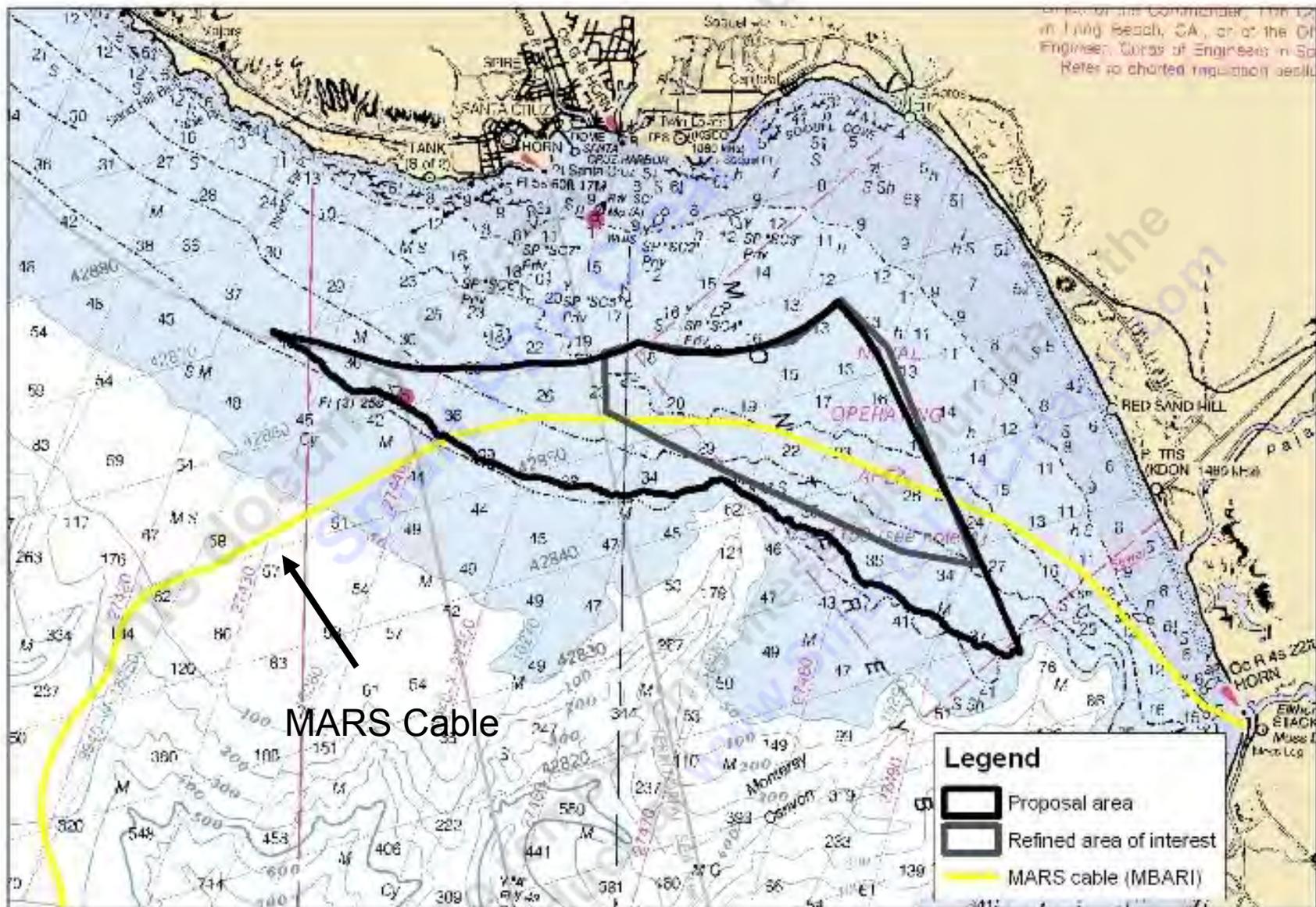


# Monterey Halibut Grounds

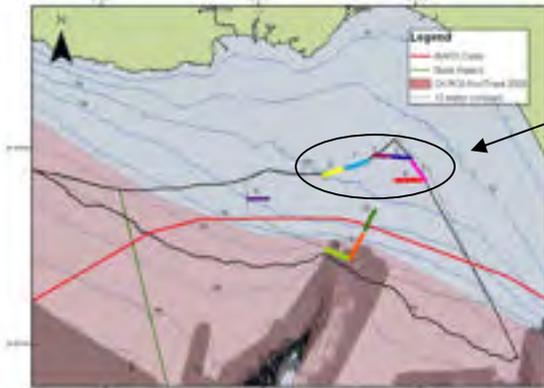
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May 2010

# Historical area of interest to trawl fishery



Monterey Bay Halibut Grounds  
May 2010 ROV Survey

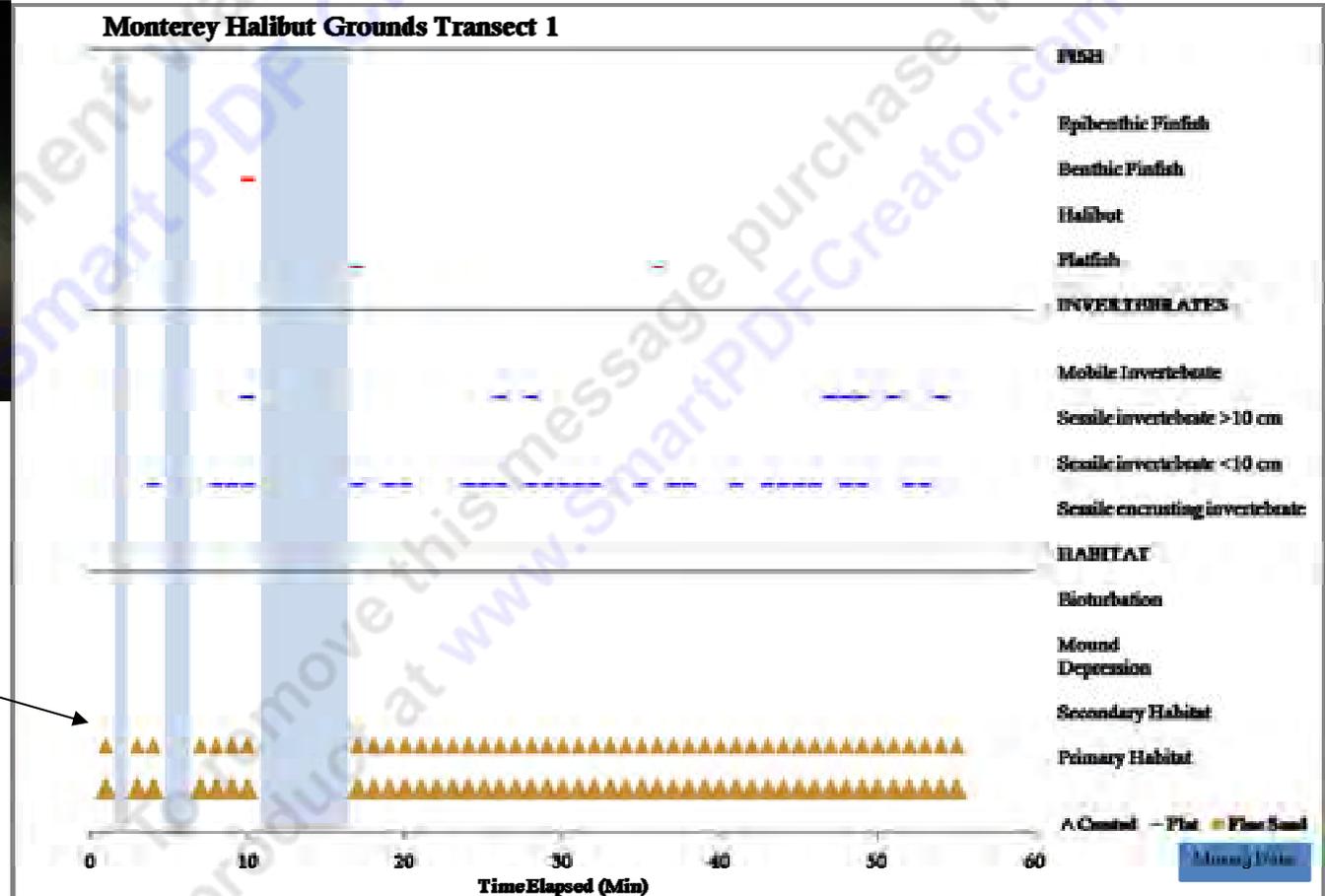


Transects 1,2,3,4,6 & 7: 20 – 30 m water depth

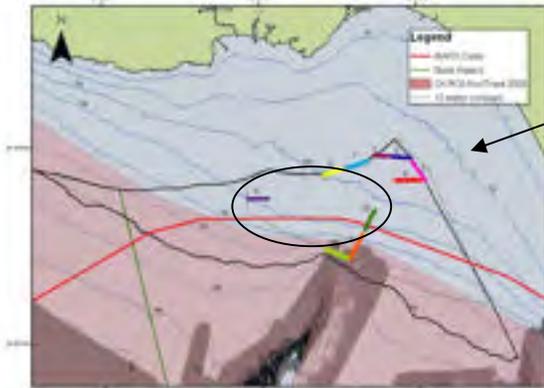


10 cm bedforms,  
no biogenic structure

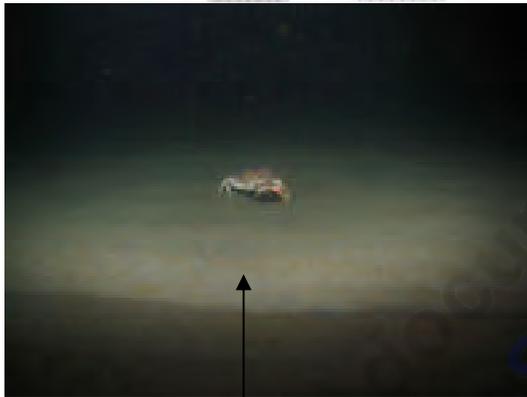
Monterey Halibut Grounds Transect 1



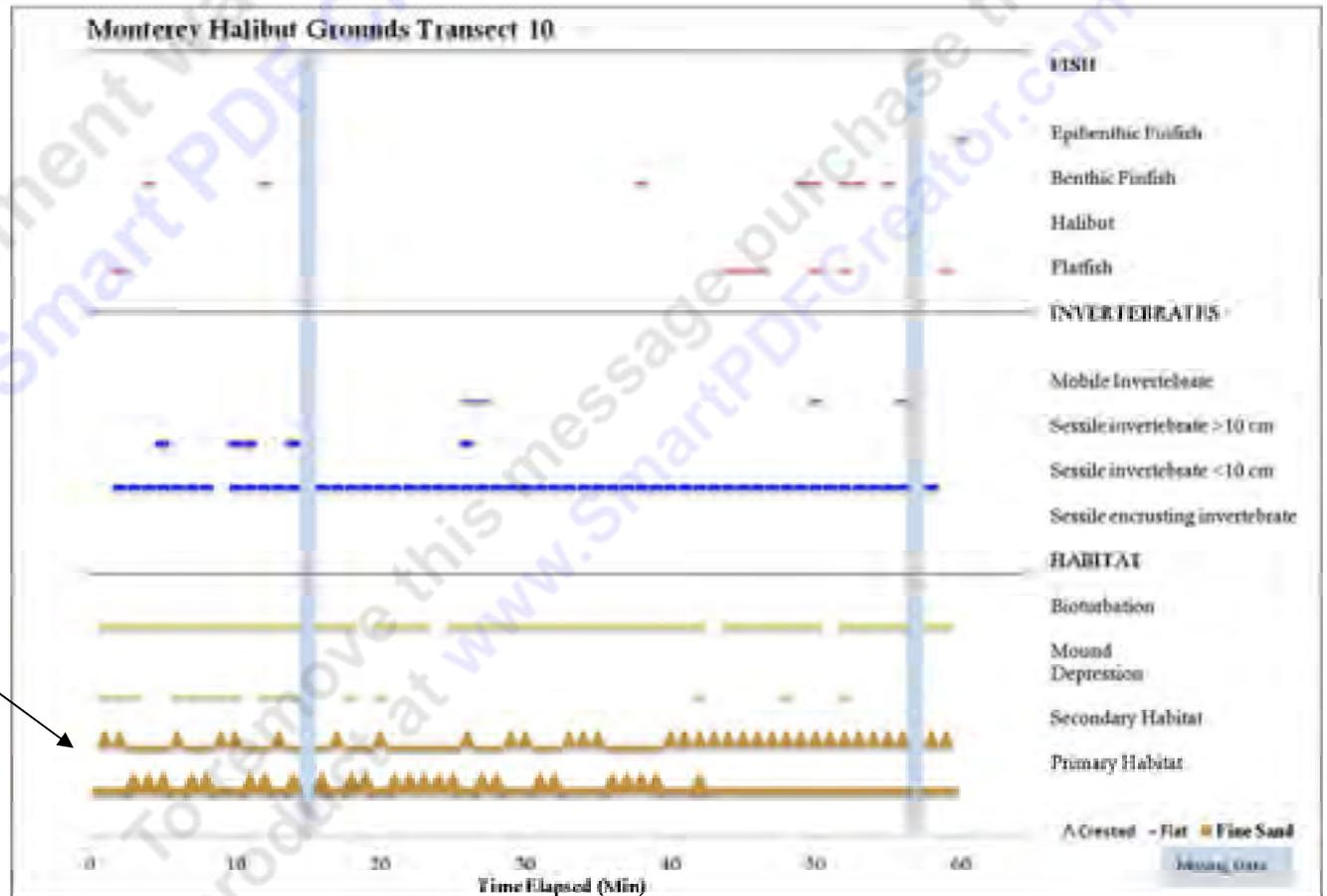
Monterey Bay Halibut Grounds  
May 2010 ROV Survey



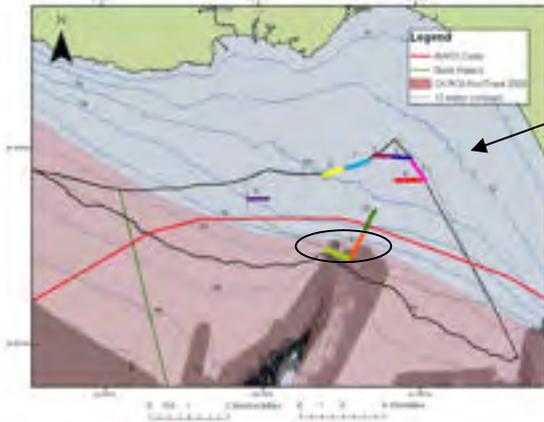
Transects 5 & 10: 30 - 40 m water depth



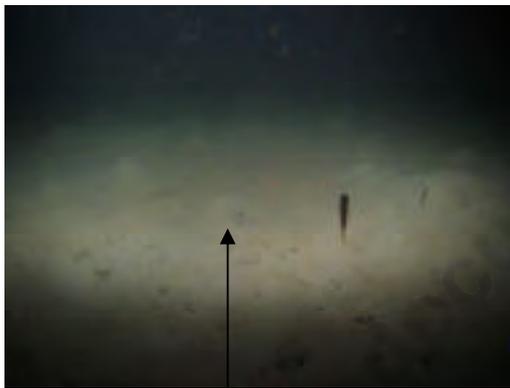
Bedforms  
still present,  
but less  
dominant



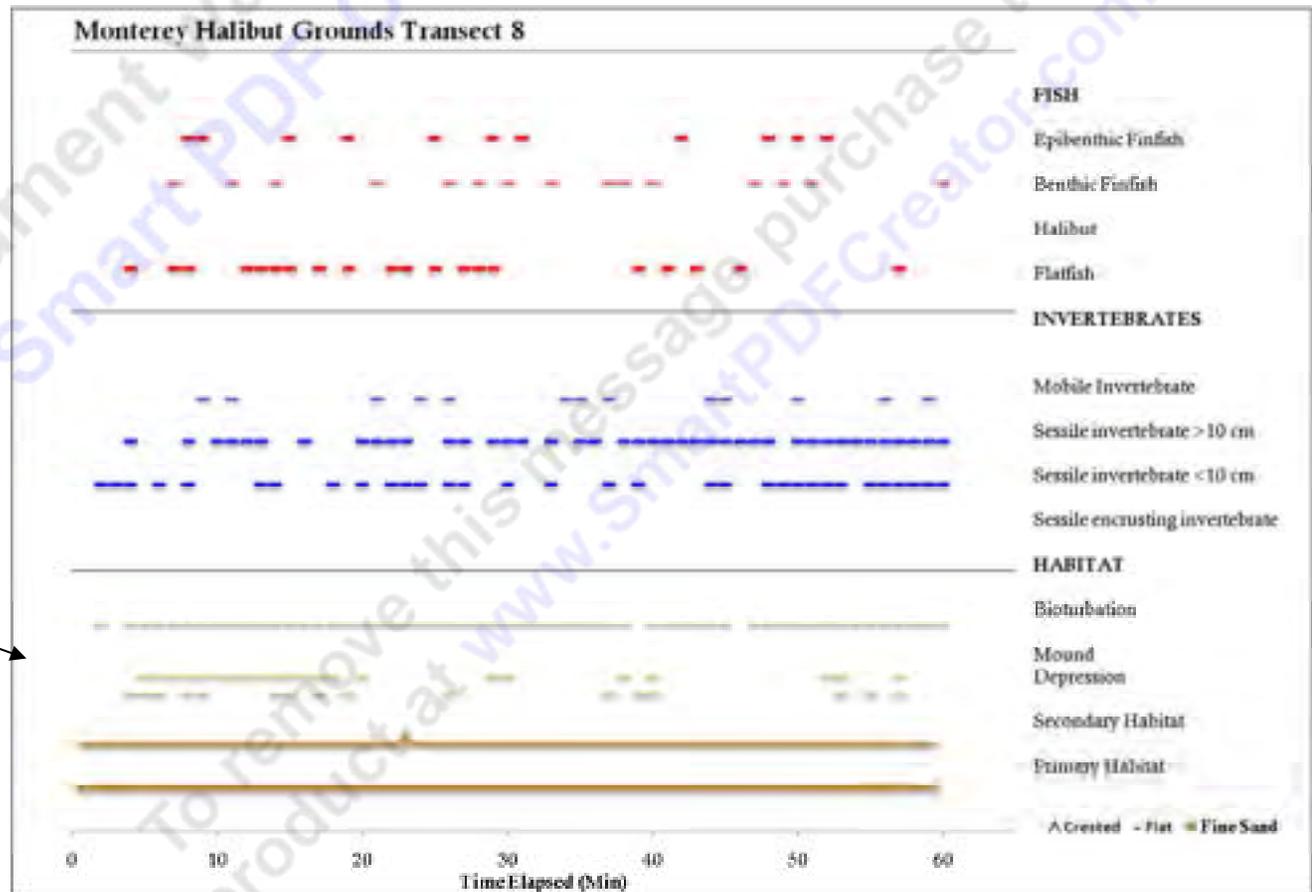
Monterey Bay Halibut Grounds  
May 2010 ROV Survey



Transects 8 & 9: 40 - 70 m water depth



Bedforms gone,  
biogenic structure  
prevalent





**Any questions?**