

Fishing effort in predicted coral habitat in the eastern Bering Sea

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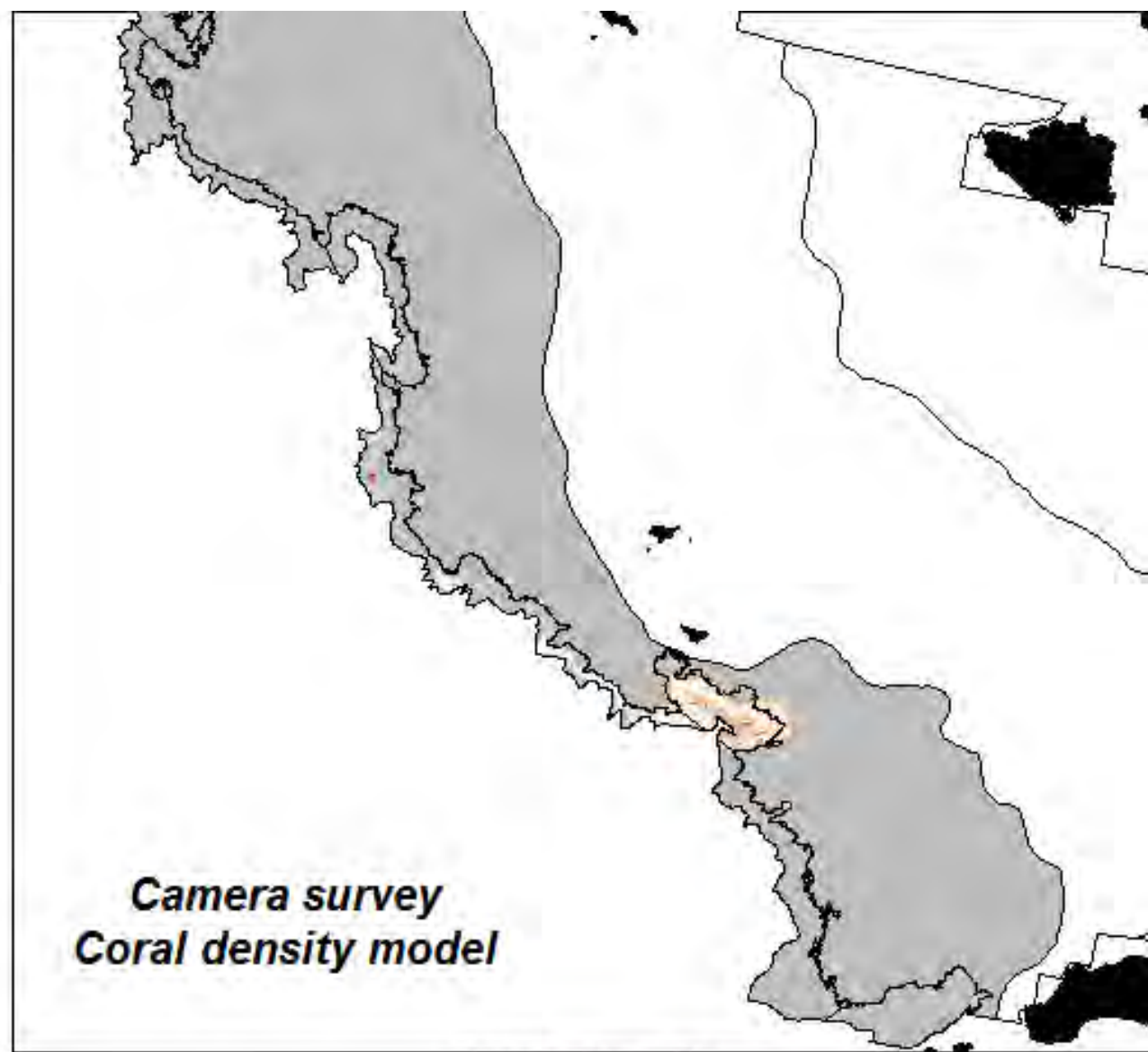
³ NMFS – Alaska Regional Office

NPFMC Meeting
Anchorage, AK
April 6, 2016

October 2015 NPFMC Request

1. Provide updated data on distribution of fishing in predicted coral habitat
 2. Annual updates of changes in frequency, composition and distribution of coral in bottom trawl survey
 3. Annual updates of trawl and fixed gear effort in coral habitat
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Background - Predicted coral habitat



Density (no./m²)

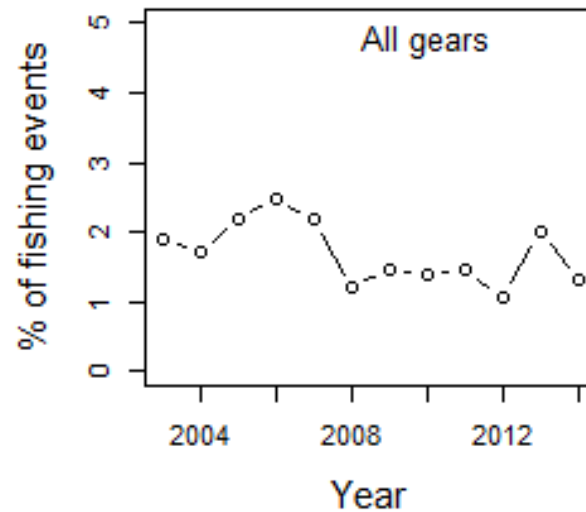
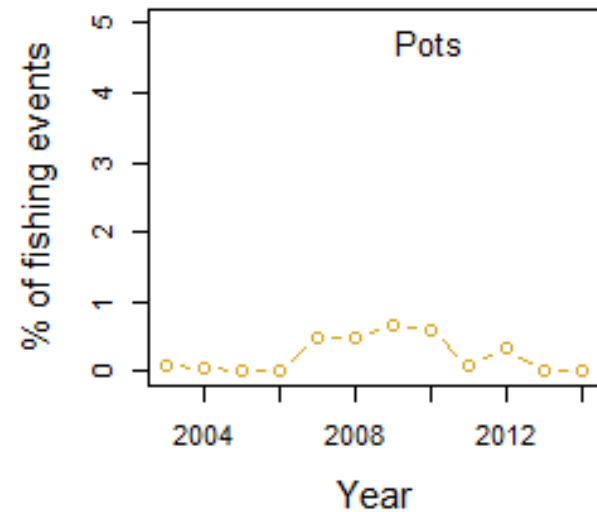
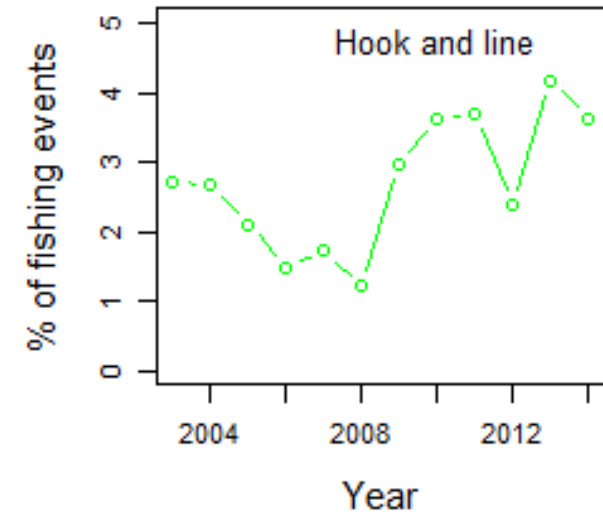
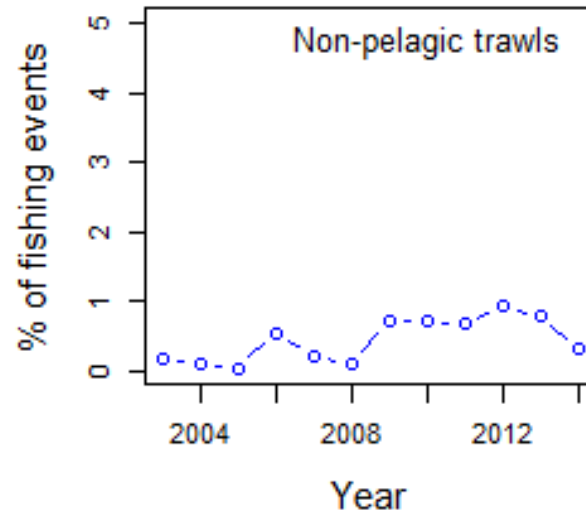
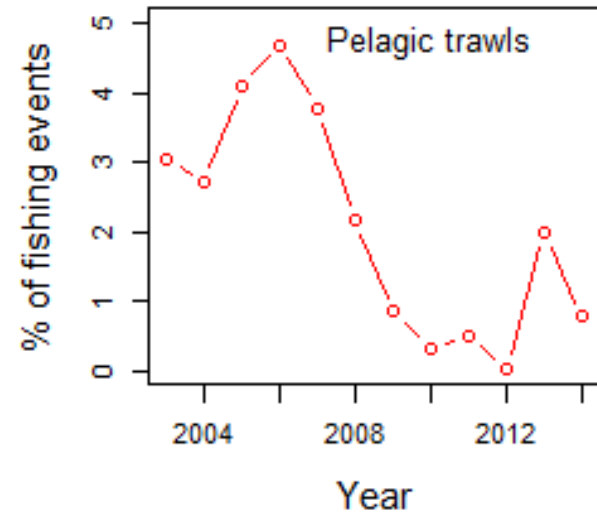


Definitions

- **Grid Cell** – the FE model uses 5x5 km grids
- **Fishing event** – Single deployment/retrieval
(all gears)
- **Fishing effort** – Area fished = gear width x haul length (accounting for event overlap)
- **Bottom contact** – Seafloor area contacted = gear contact width x haul length (accounting for event overlap)

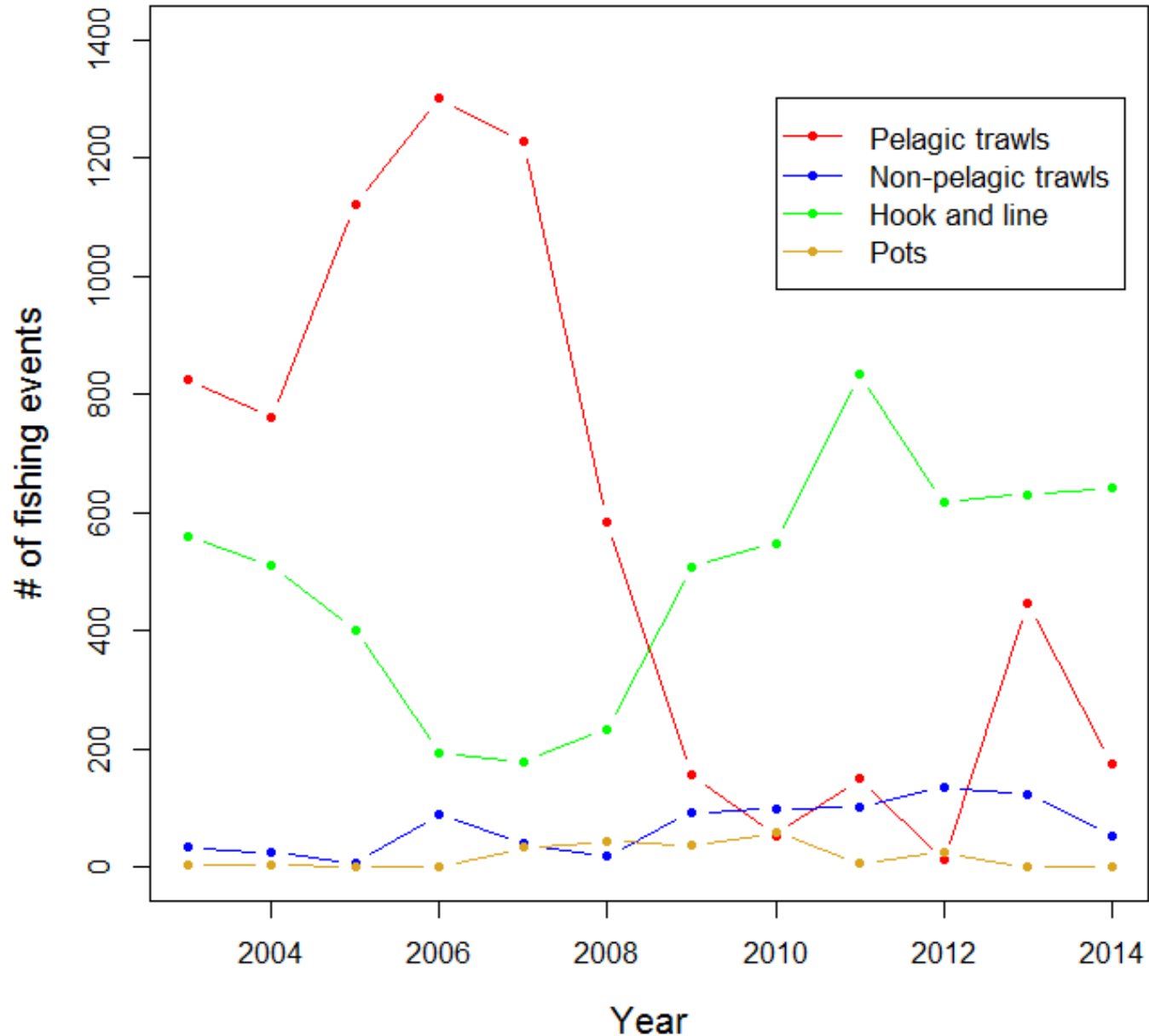
Distribution of Fishing in Predicted Coral Habitat

- Annual Percent of EBS Fishing Events -

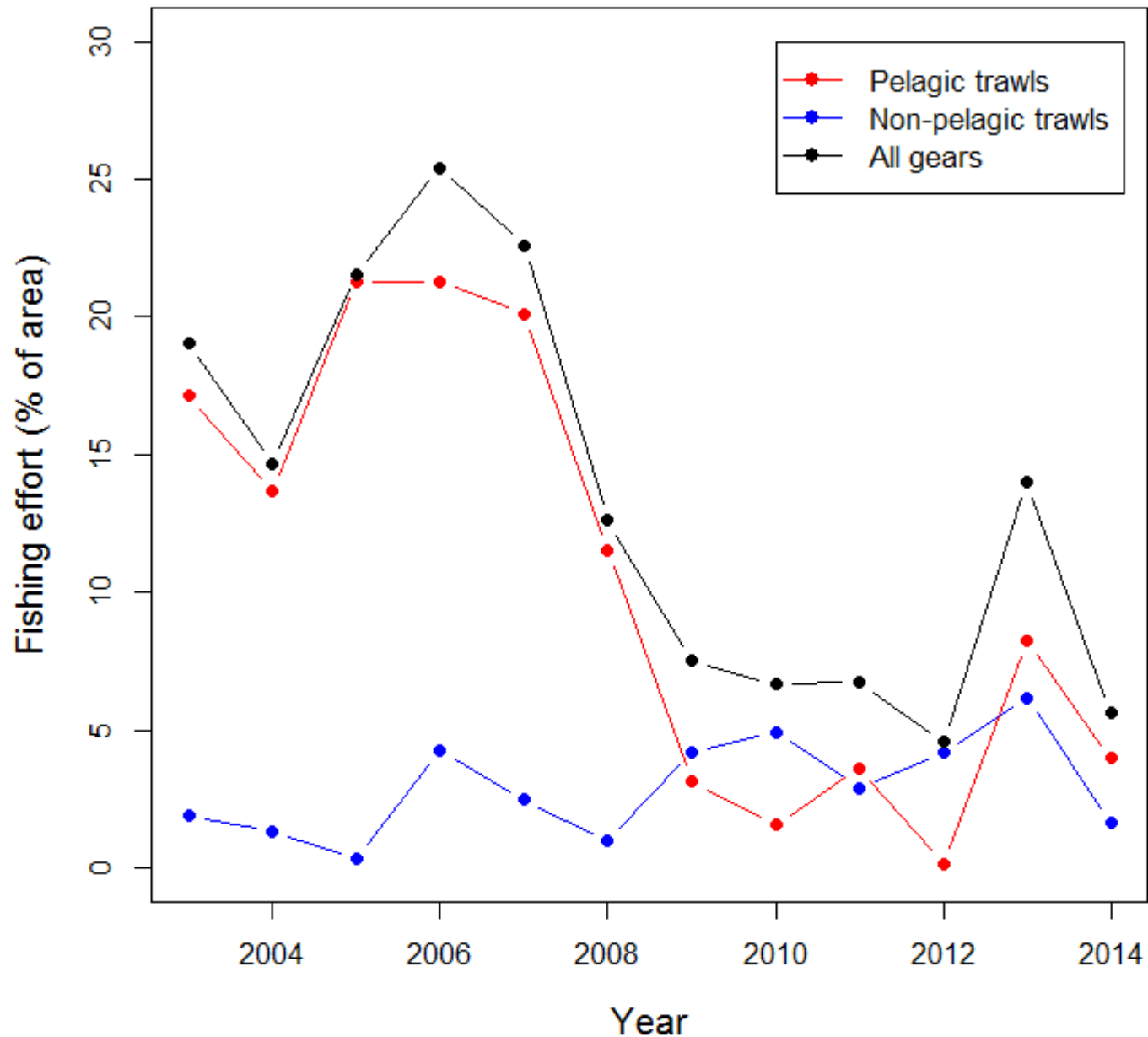


Distribution of Fishing in Predicted Coral Habitat

- Annual Fishing Events by Depth -

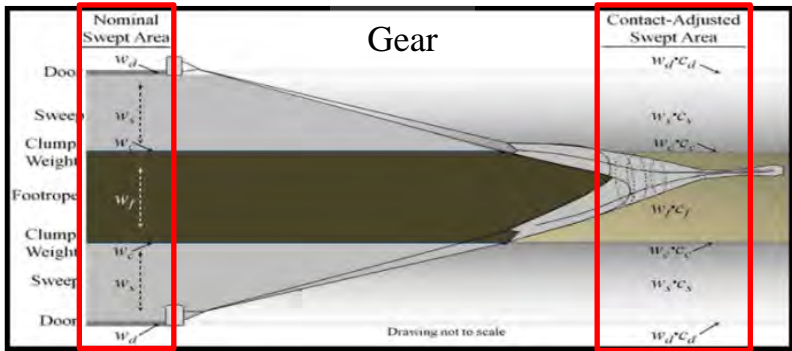


Distribution of Fishing in Predicted Coral Habitat - *Annual Fishing Effort*-

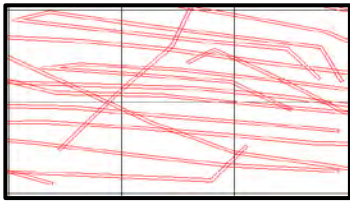


Bottom Contact

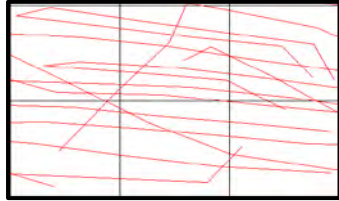
Gear Width and Contact



Fished Area

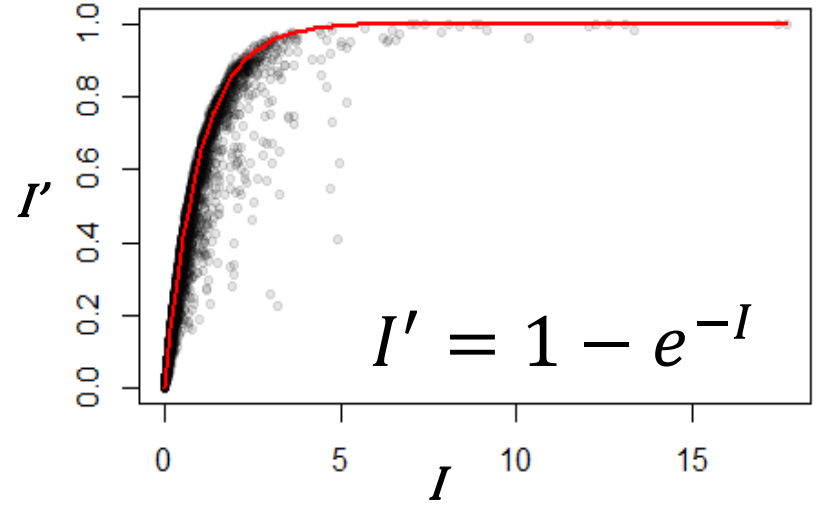


Contact Area



IV

Overlapping Events

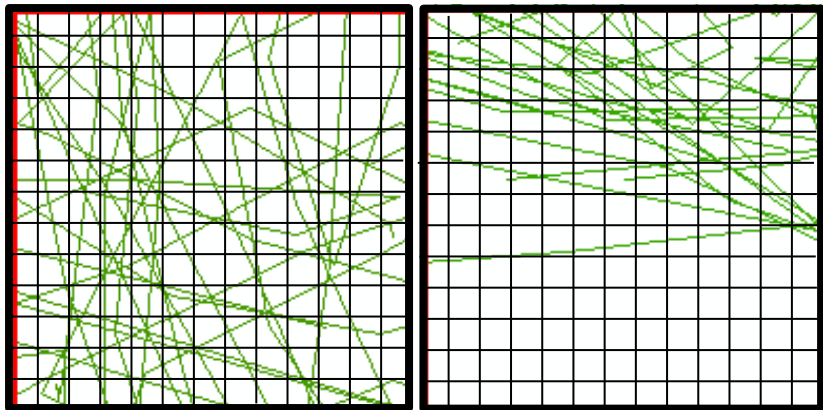


I = Sum contact area / grid cell area (25km^2)

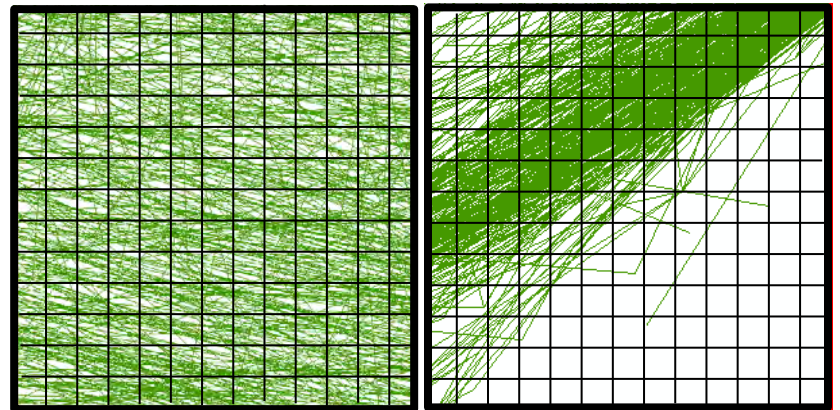
I' = Bottom contact proportion

Distribution and Scale

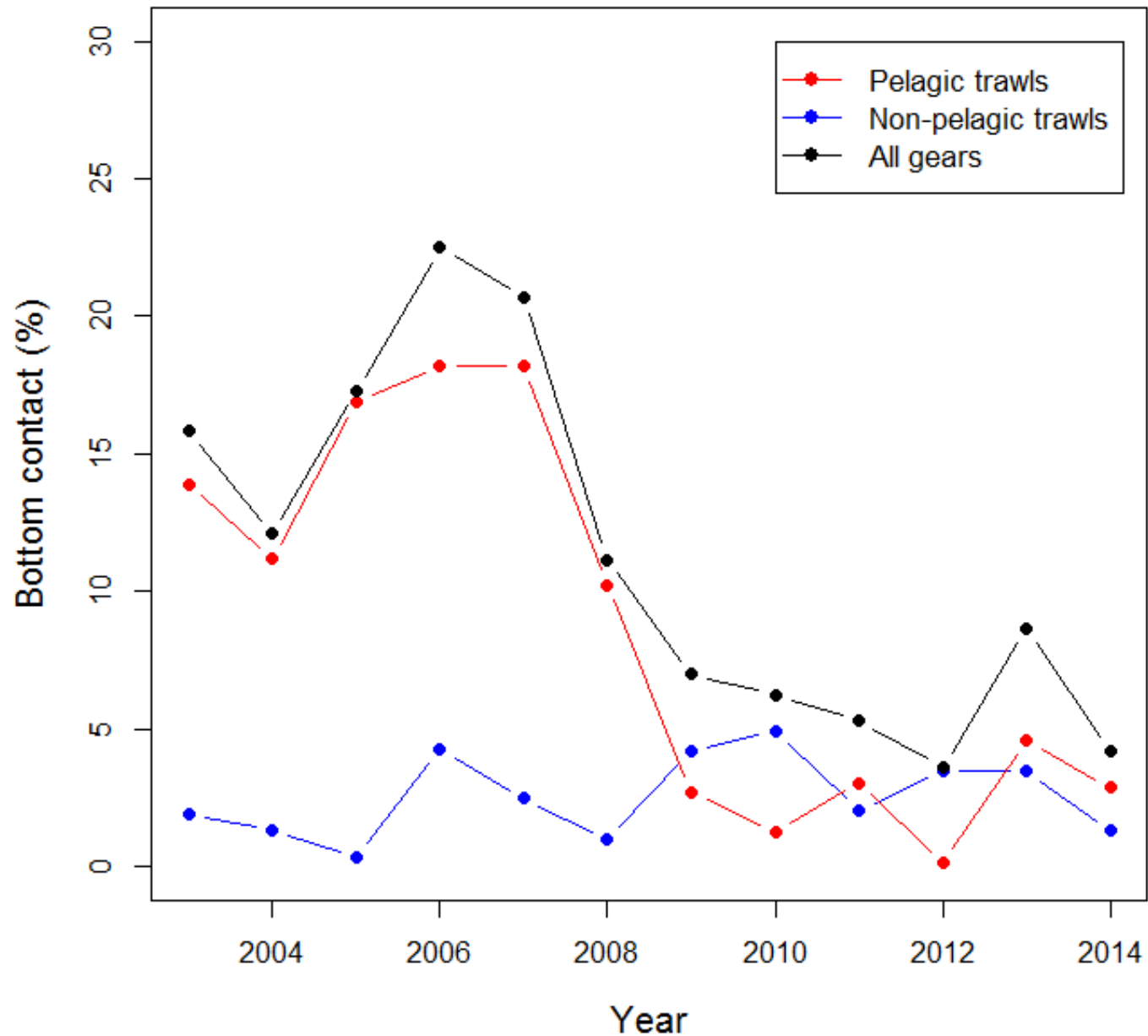
25% bottom contact



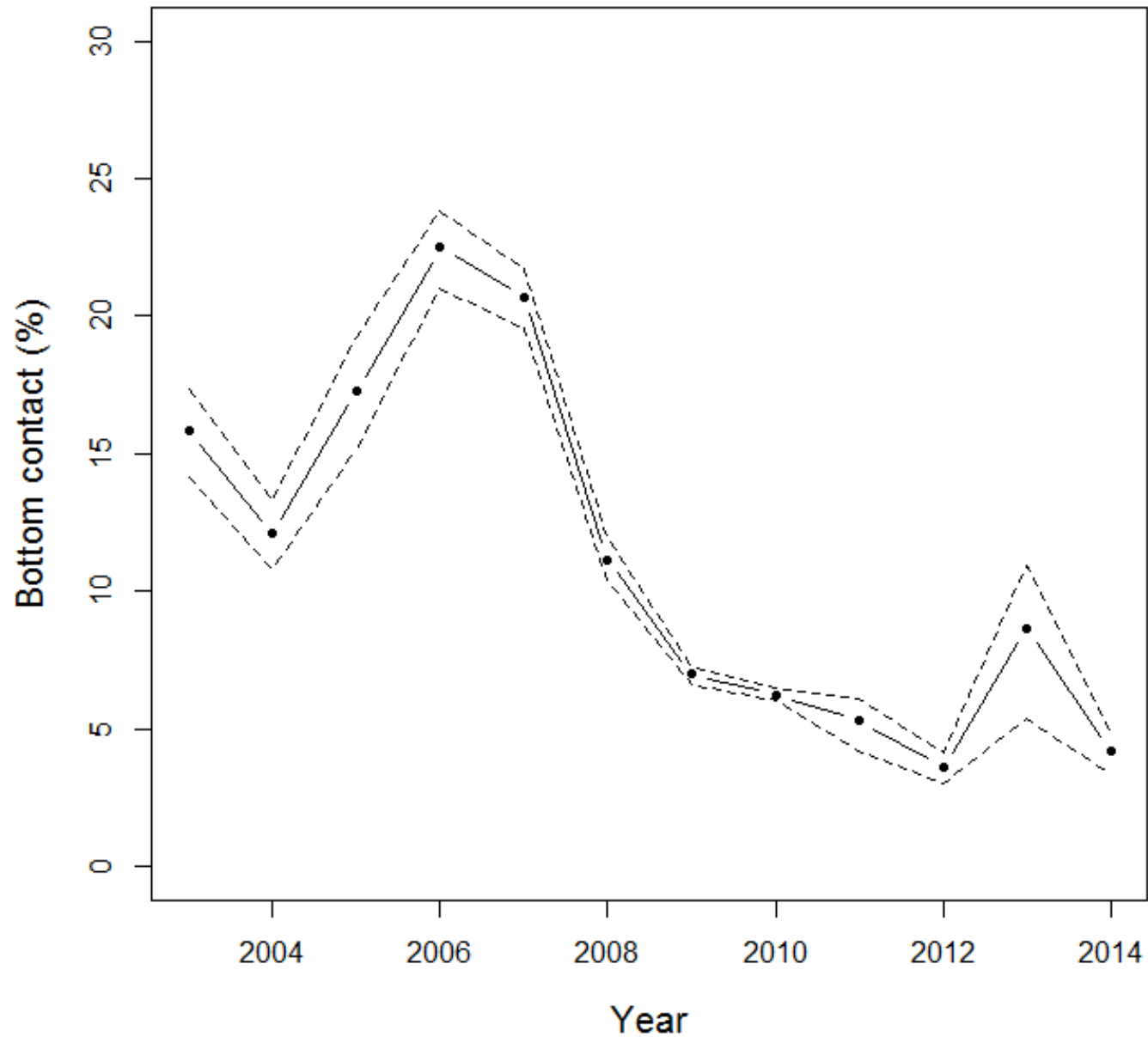
90% bottom contact



Distribution of Fishing in Predicted Coral Habitat - *Annual Bottom Contact* -



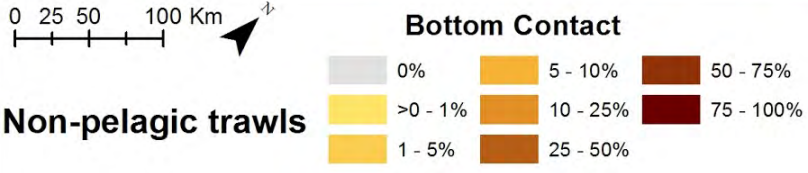
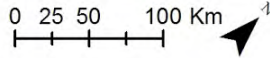
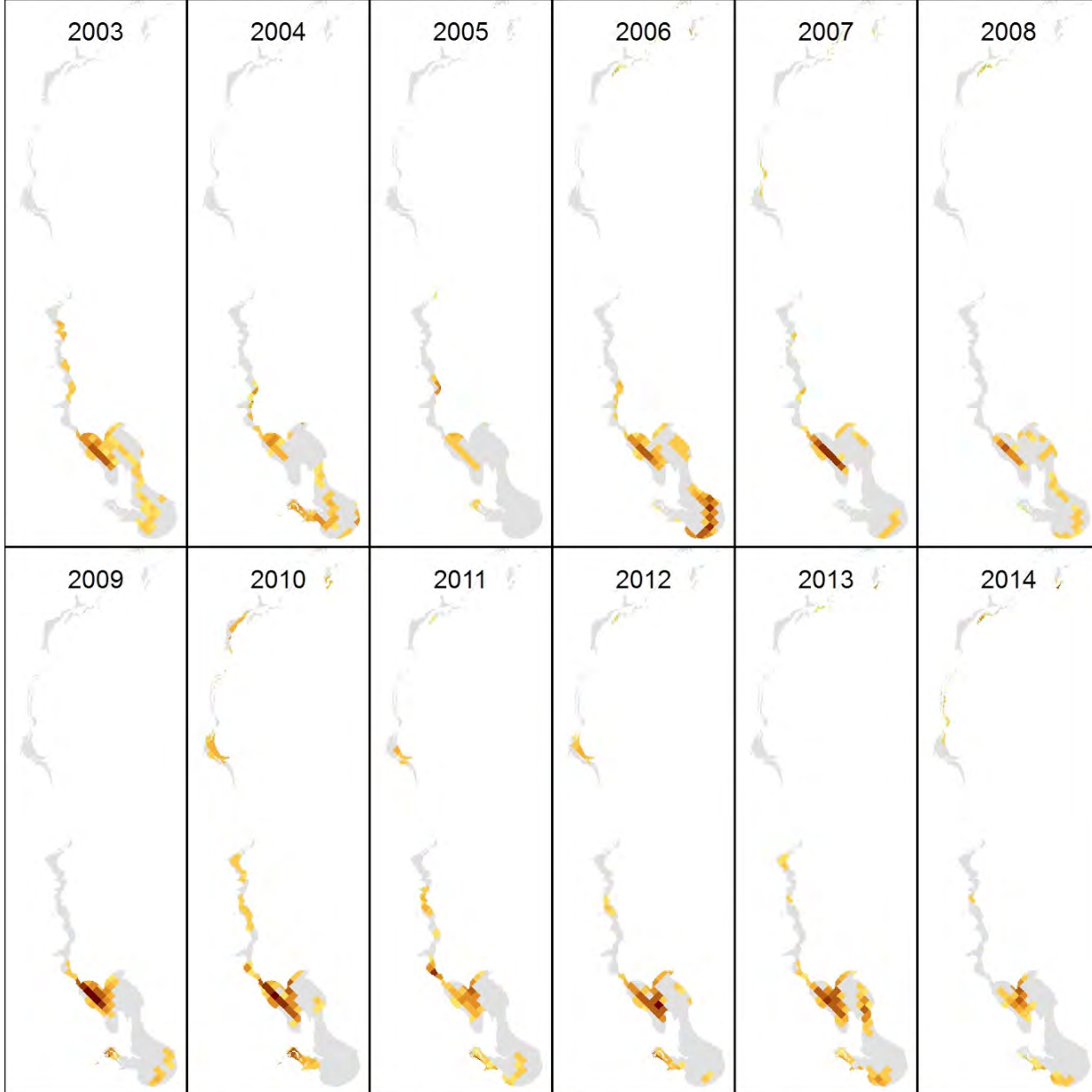
Distribution of Fishing in Predicted Coral Habitat - Seabed Contact Sensitivity Analysis -



Contact

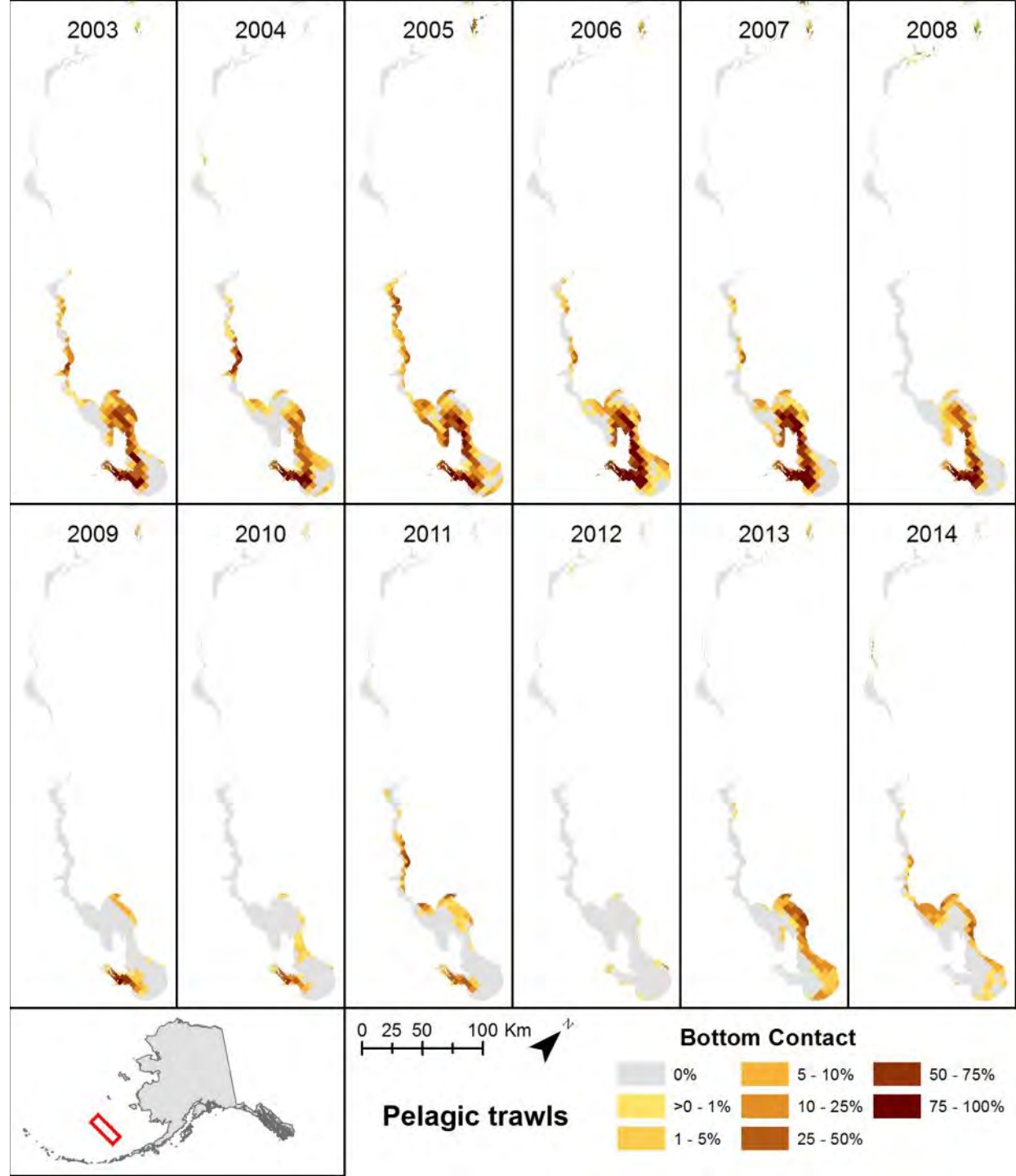
Non-Pelagic Trawls

- Sum of area of pelagic trawl contact/ grid cell area (25km²)



Contact Pelagic Trawls

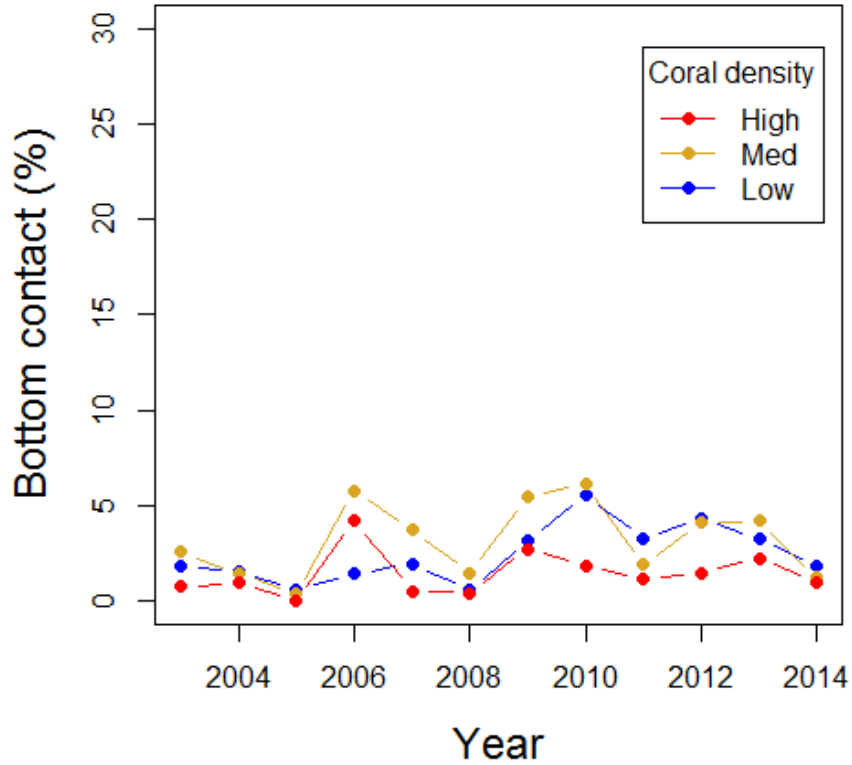
- Sum of area of pelagic trawl contact/ grid cell area (25km²)



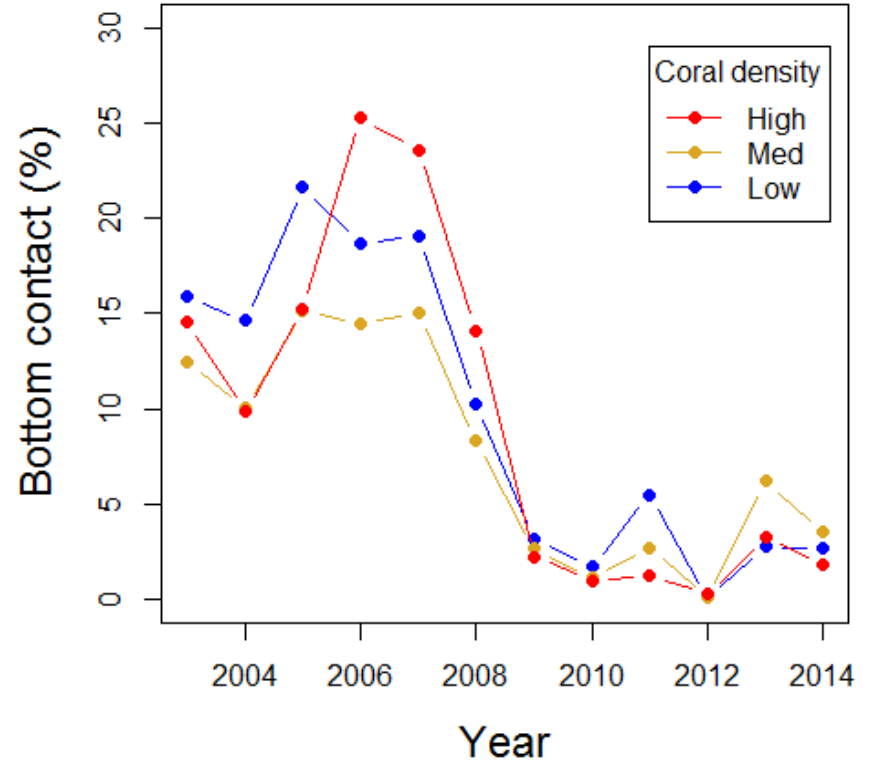
Contact by Coral Density

Sum of seabed contact/ grid cell area (25km²)

Non-pelagic Trawl



Pelagic Trawl



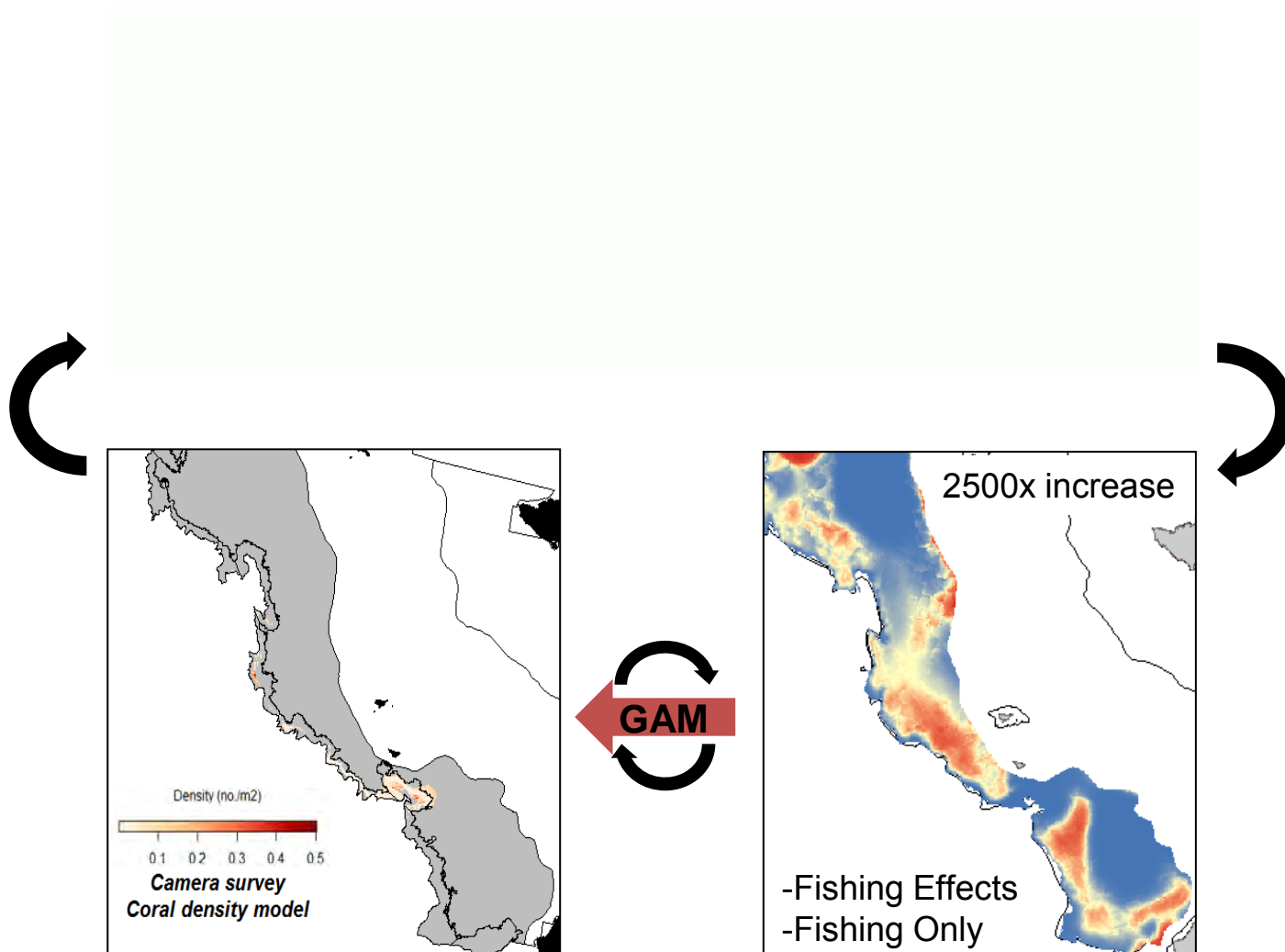
Summary

- Fishing effort in 2003-2014
 - 0% – 6% of coral habitat for non-pelagic trawl gear
 - 0% - 21% of coral habitat for pelagic trawl gear
 - 5% - 25 of coral habitat for all gears combined
 - Has decreased in recent years (since 2008)
- Bottom contact in 2003-2014
 - 0% - 4% of coral habitat for non-pelagic trawl gear
 - 0% - 18% of coral habitat for pelagic trawl gear
 - 4% - 22% of coral habitat for all gears combined
 - Has decreased in recent years (since 2008)
- Most fishing in coral habitat has occurred in and around Pribilof Canyon
- Fishing events occurred at all depths in predicted coral habitat

- Future Work -

Expansion and Validation of the Essential Fish Habitat Fishing Effects Model

John Olson, Bradley Harris, Scott Smeltz, Suresh Sethi, Craig Rose and Chris Rooper



Ecosystem Considerations Reporting

- Currently reported – Fishing effort data for EBS

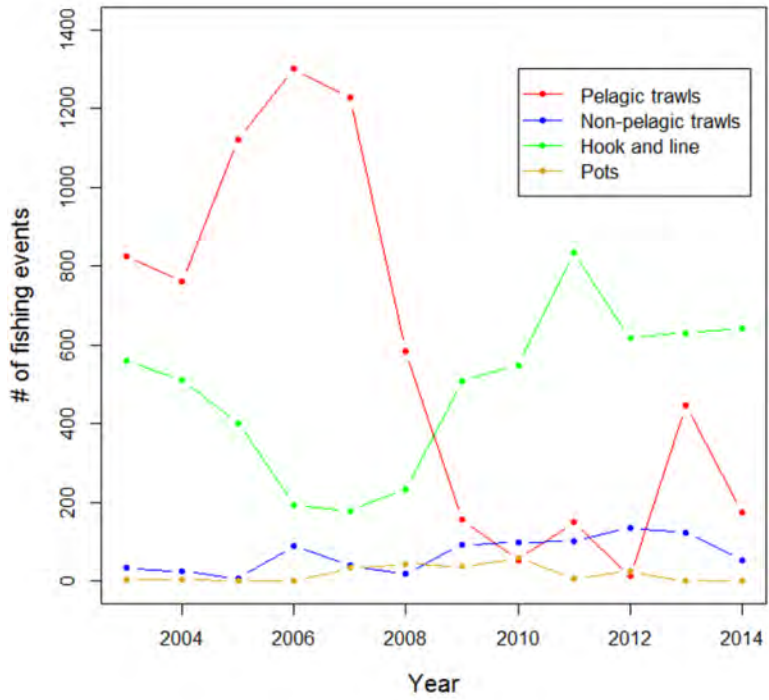
Example



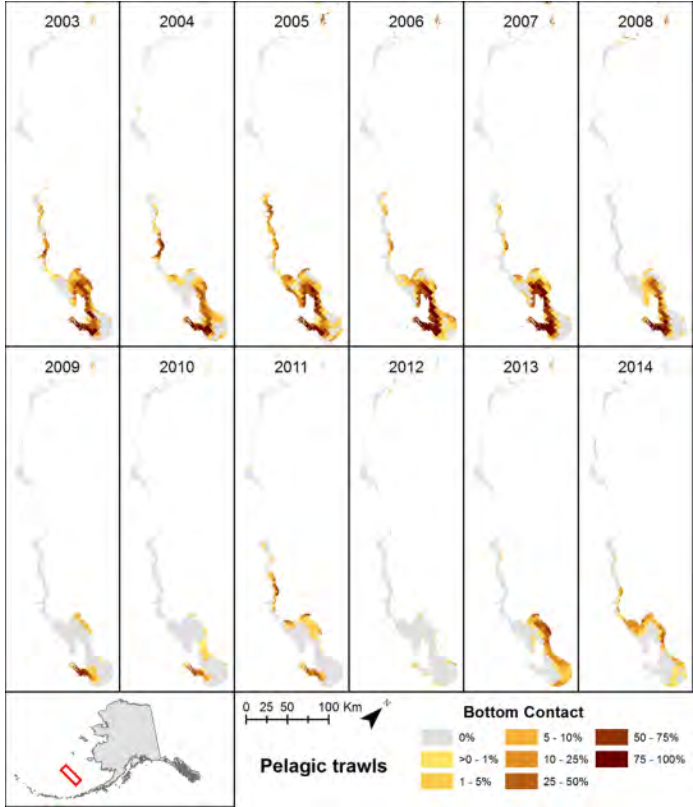
Figure 123: Observed pelagic trawl fishing effort in 2014 relative to the 2005-2014 average in the Dering Sea. Anomalies calculated as (estimated effort for 2014 - average effort from 2005-2014)/stdev(effort from 2005-2014).

Potential New EBS Coral Fishing Effort Indicators

Time series of events by gear



Time series of spatial pattern of bottom contact

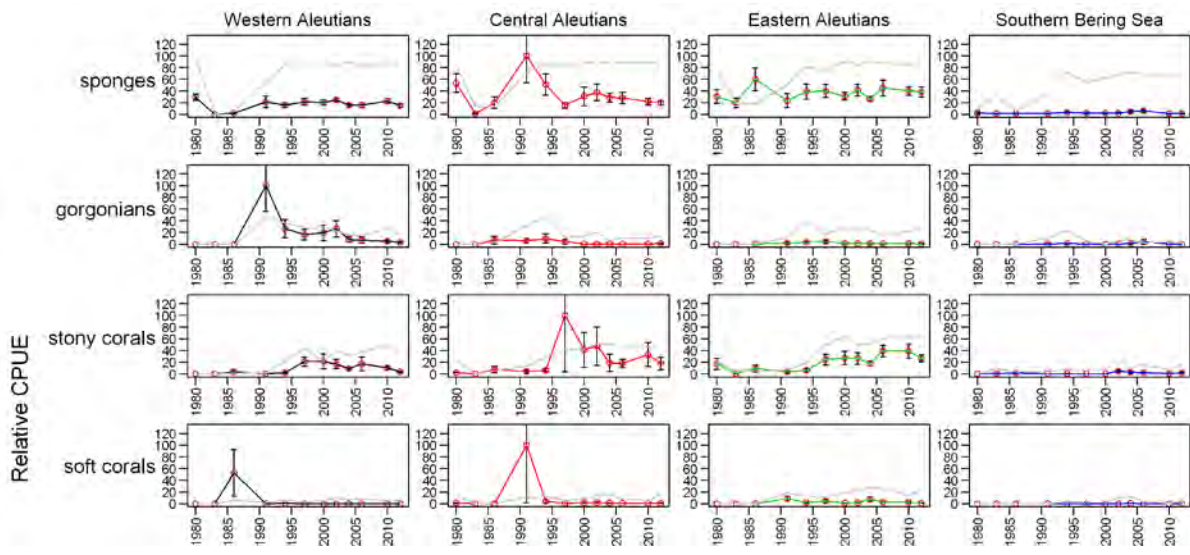


Ecosystem Considerations Reporting

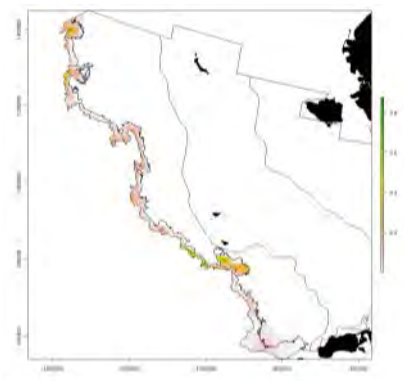
- Currently reported – CPUE for some species in EBS

Potential New EBS Coral Habitat Indicators

Time series of coral CPUE and FO by gear

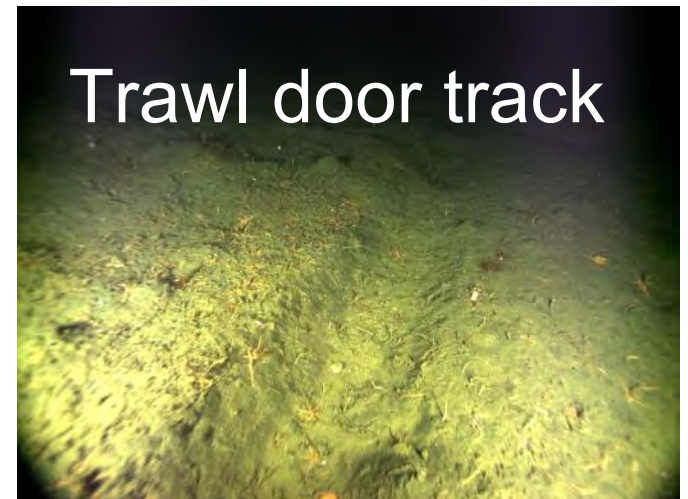
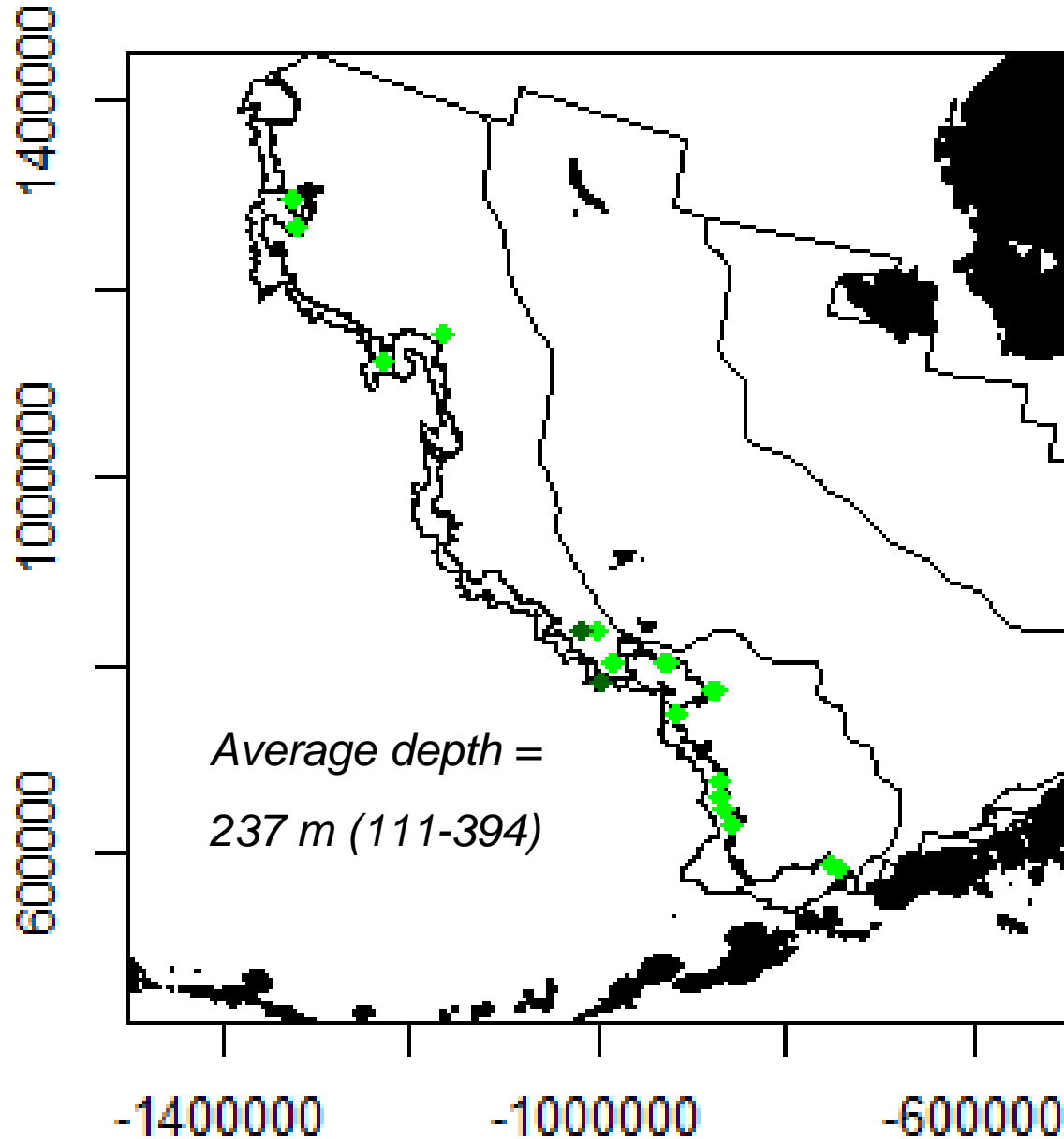


Time series of spatial patterns in coral catch

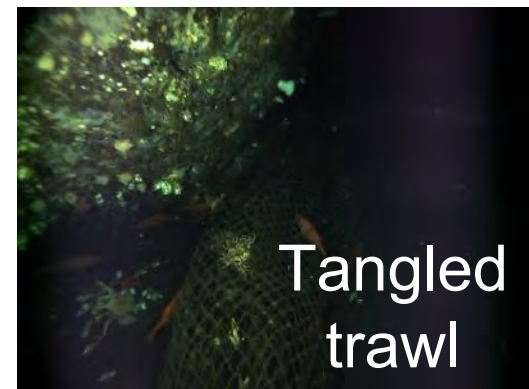
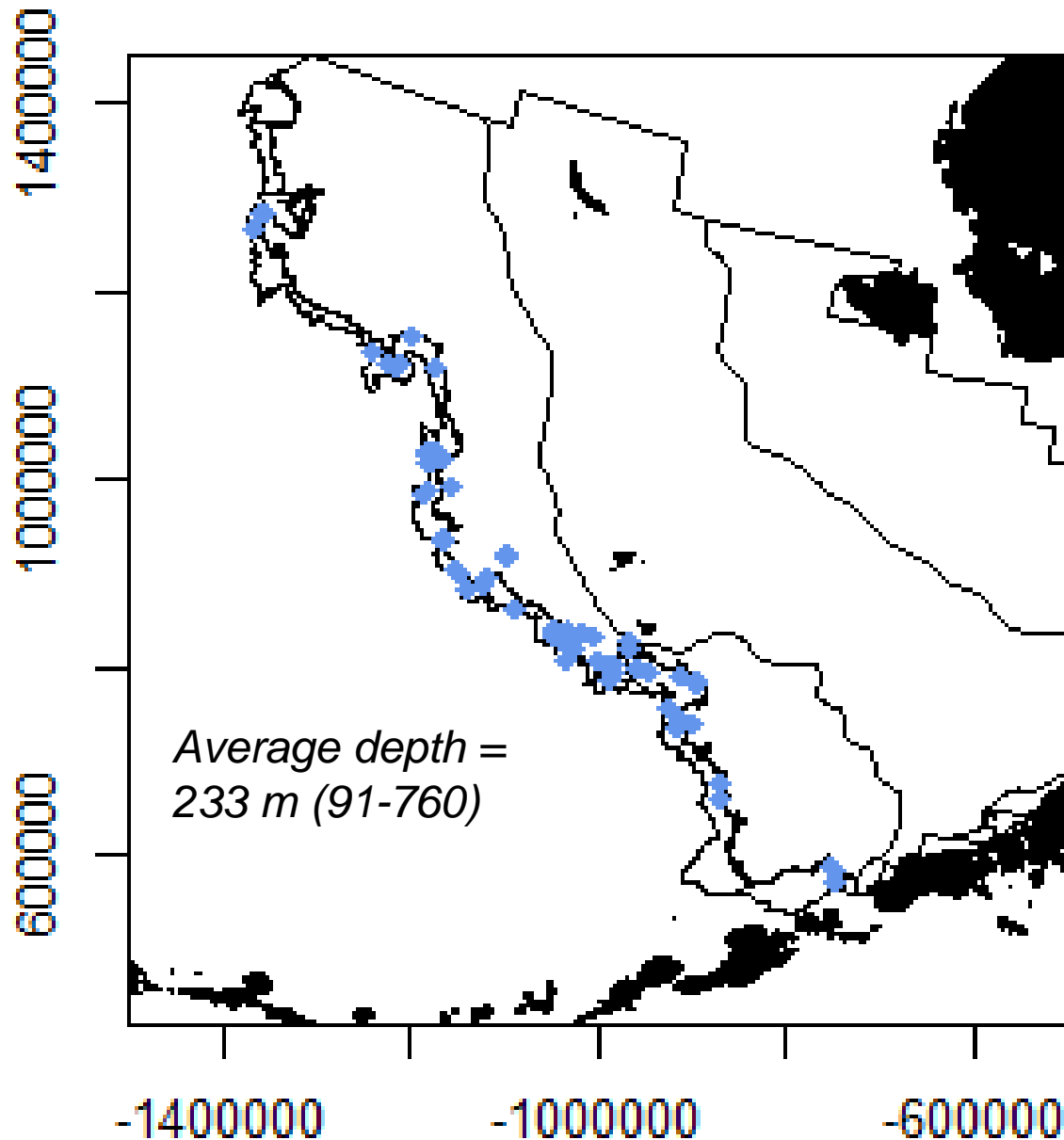


EXTRAS

Trawl net or tracks (n = 21 transects)



Damaged invertebrates (n = 68 transects)



Reality check – Intersection of camera observations and trawl tracks/invertebrate damage and CIA trawl paths

Tracks observed in camera transects - 2014	Camera transects that intersected tracks in CIA data 2010-2014
19	20 (11 NPT, 11 PTR)

Of the 5 intersecting tracks where whips or pens were present, 3 had damaged whips or pens

Only 4 of the 20 intersecting tracks had evidence of fishing activity (tracks or damage)