# Collaborative Research in the Rockfish Conservation Areas:
# Using a stereo video system to map distributions & measure lengths of species targeted in fisheries management

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## OBJECTIVES

- Collaborate with fishermen, NOAA, and conservation organizations to survey areas of the Trawl and Non-Trawl Rockfish Conservation Areas (RCA) along the central coast of California
- Map the distribution of abundant and overfished species
- Quantify size frequency and density of fish species within the RCAs
- Compare fish size and density between the north, central, and south regions of the central coast
- Study the utility and limitations of a stationary video lander as a survey tool for management
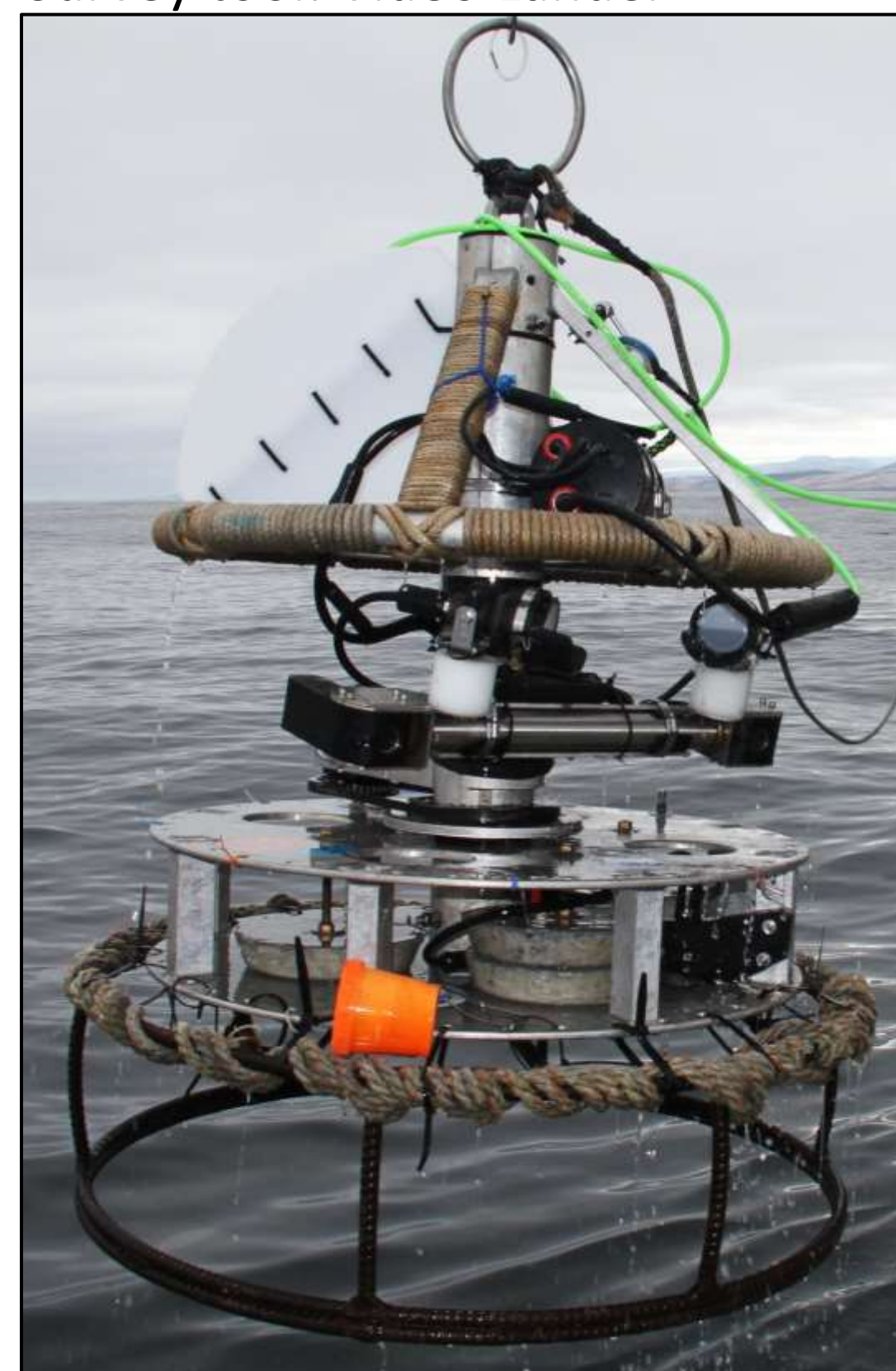
## METHODS

### Survey platform : F/V Donna Kathleen
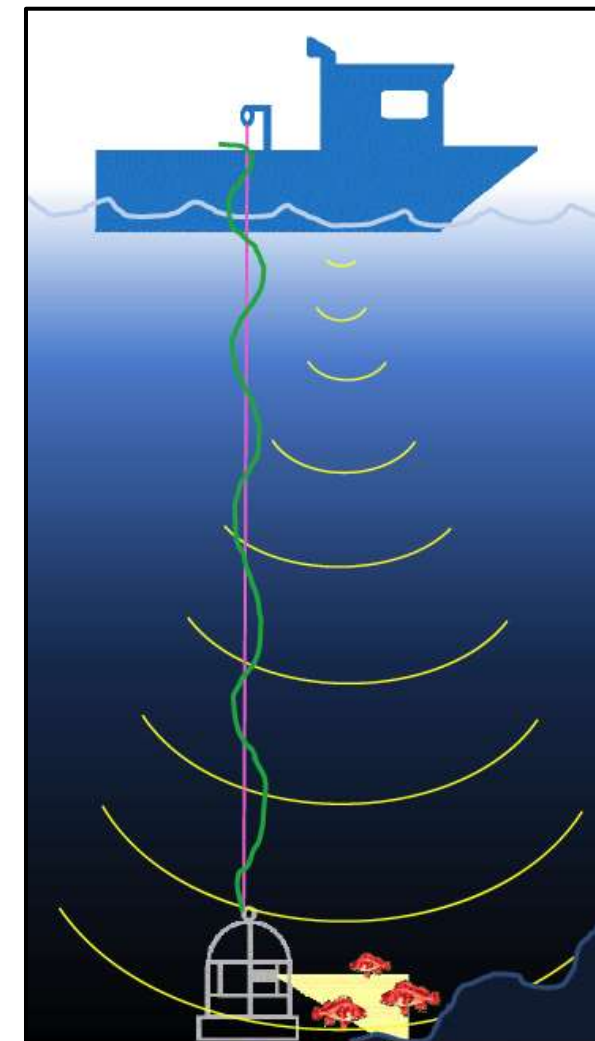


1) Identify reefs with echosounder and seafloor maps

2) Deploy lander and verify habitat using downward facing camera.

3) Conduct multiple drops in the area
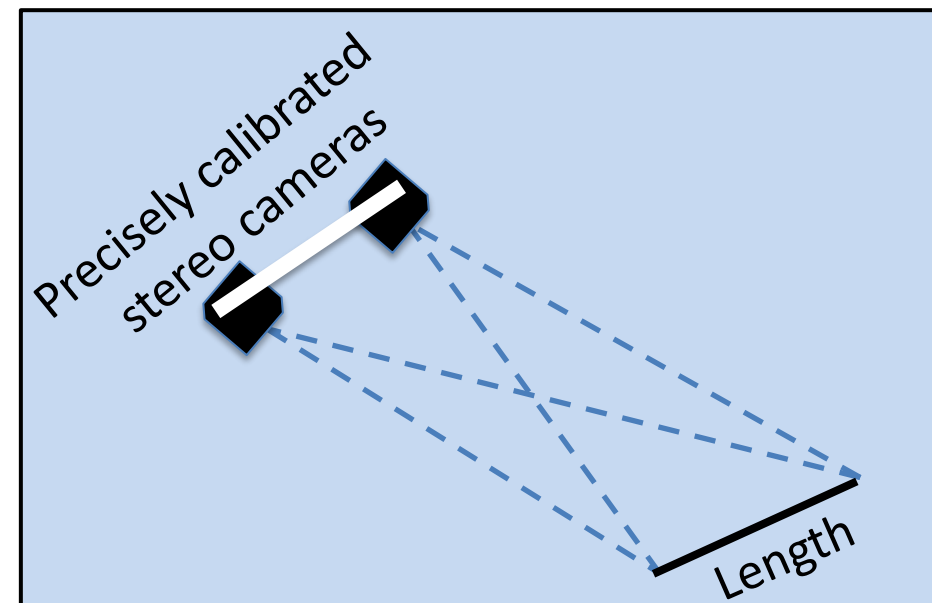
* 1 drop = 8 minutes and 8 complete rotations.

### 2013 Survey Distribution



| Geography | Lander Drops |
|---|---|
| North | 21 |
| Central | 254 |
| South | 75 |
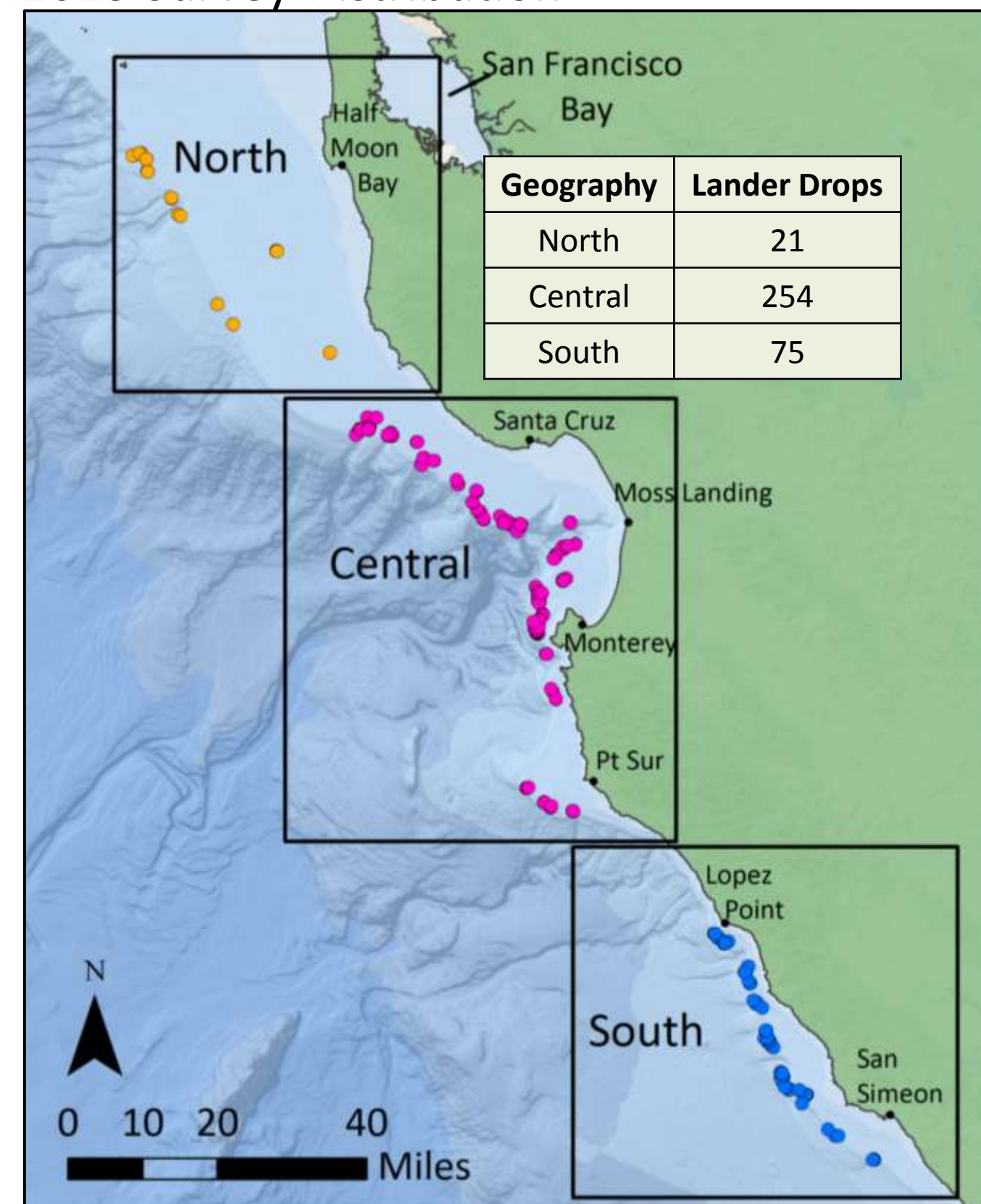
### Survey tool: Video Lander



### Video Analysis: SeaGIS



Error of measurements using SeaGIS software is at most 5% of total length (<1% when a fish is perpendicular to the cameras).

Area is calculated by using the 95% quantile of distance which species are observed as the measured radius. This is used to calculate area of the seafloor surveyed and fish densities.

## RESULTS – Data from 350 Video Lander Drops in 2013

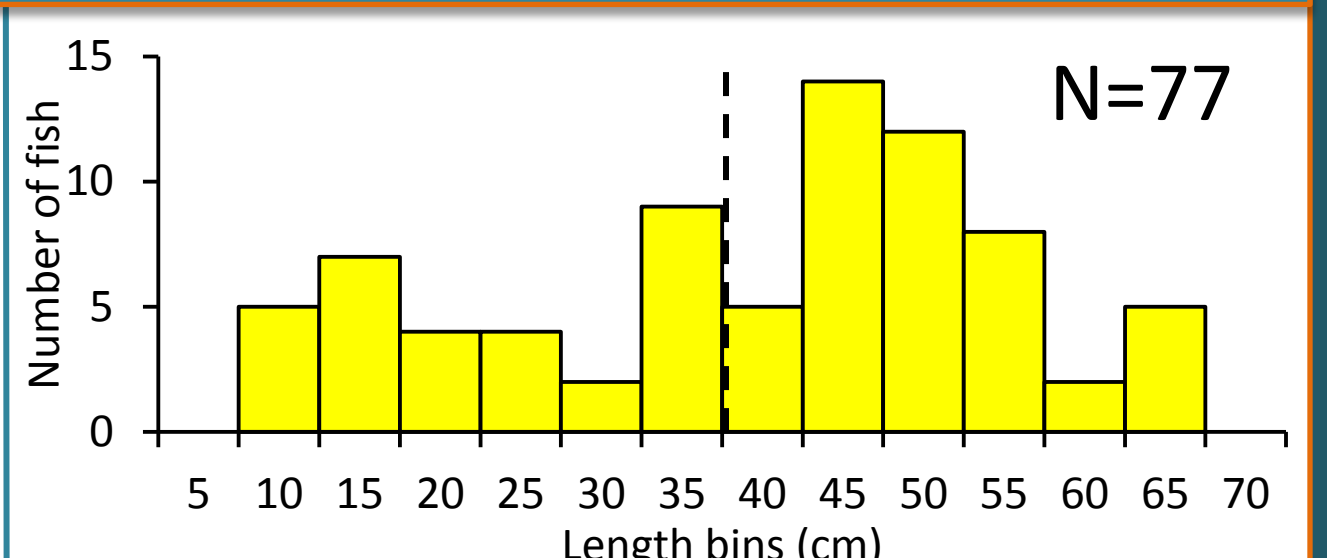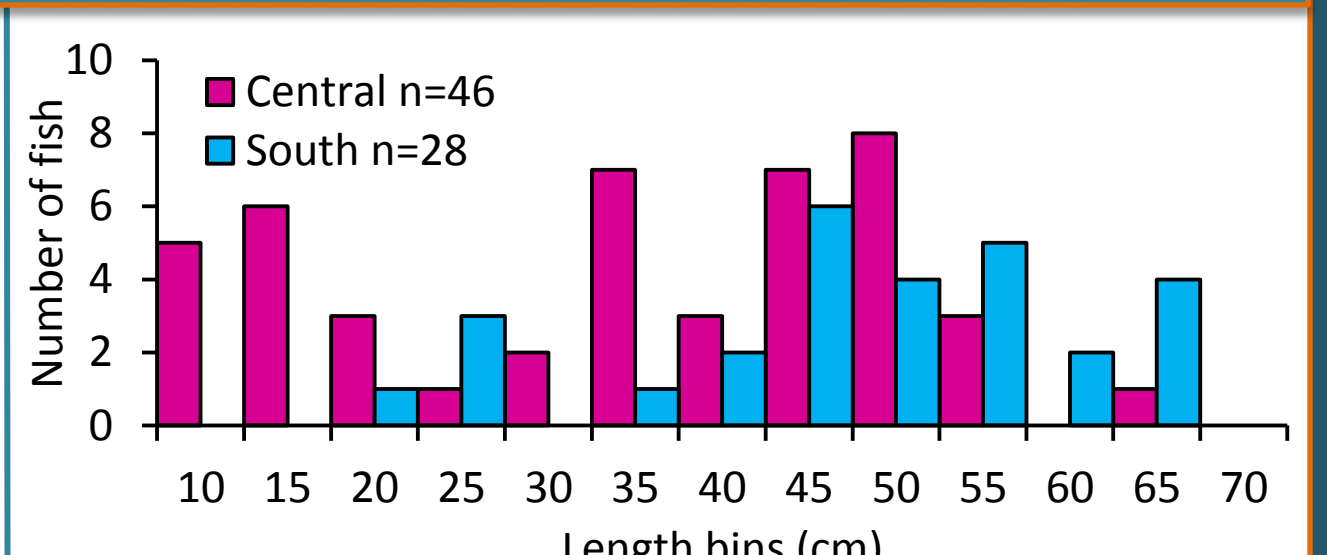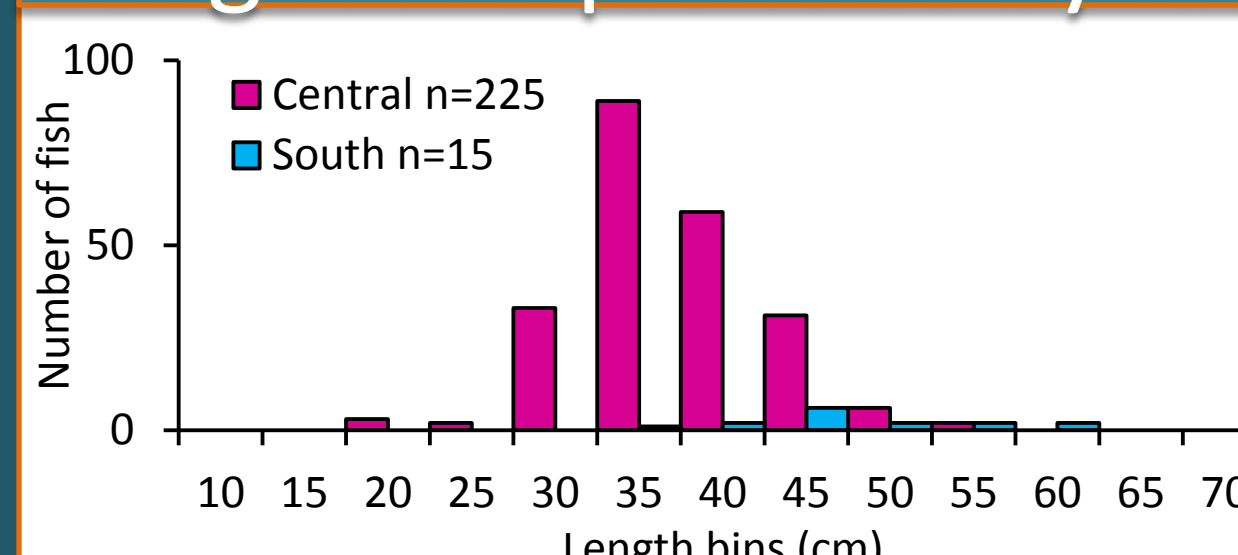| **Canary Rockfish** | **Vermilion Rockfish** | **Yelloweye Rockfish** |
|---|---|---|
| Present in 31% of lander drops in hard habitats | Present in 34% of lander drops in hard habitats | Present in 27% of lander drops in hard habitats |

### Density and Distribution
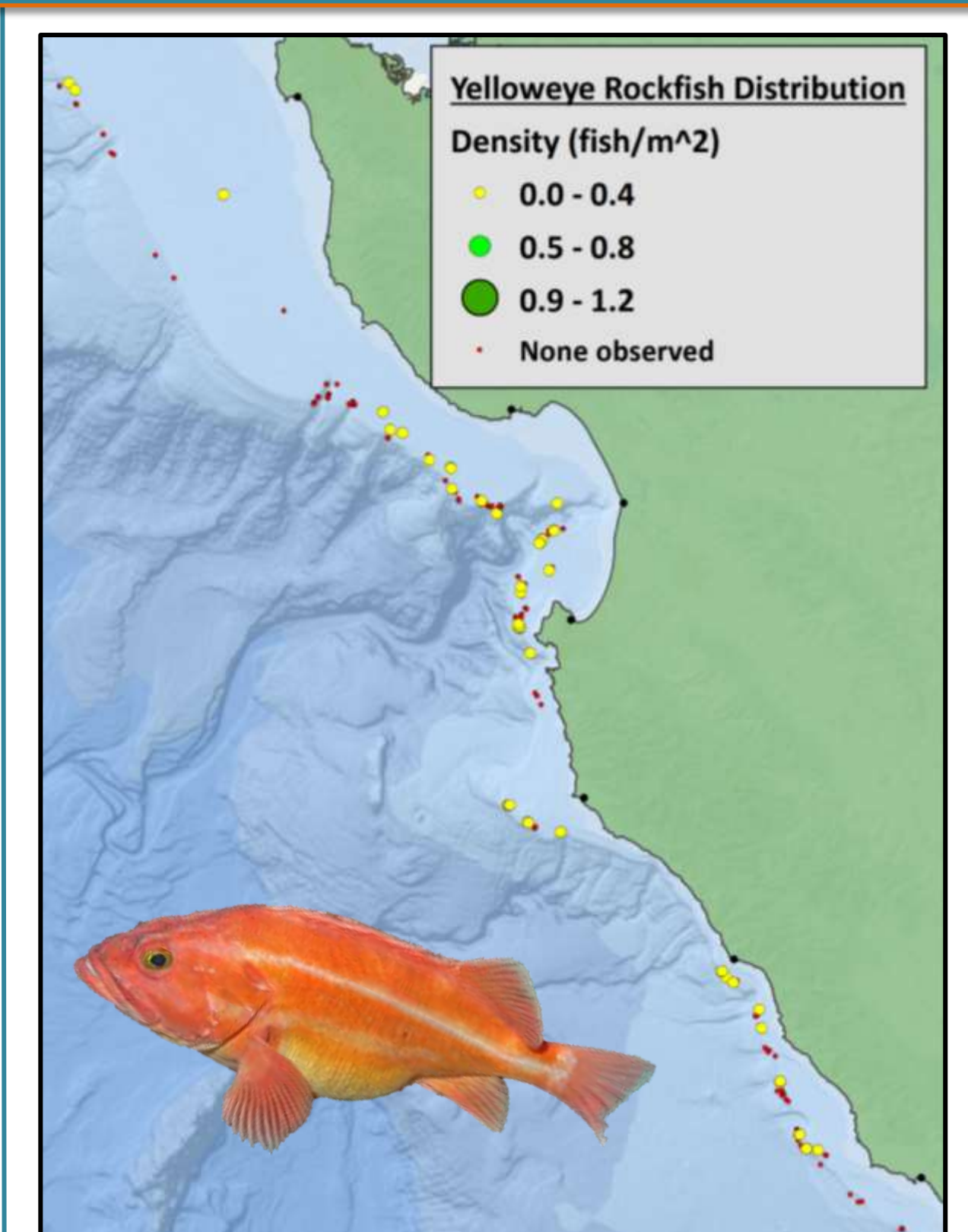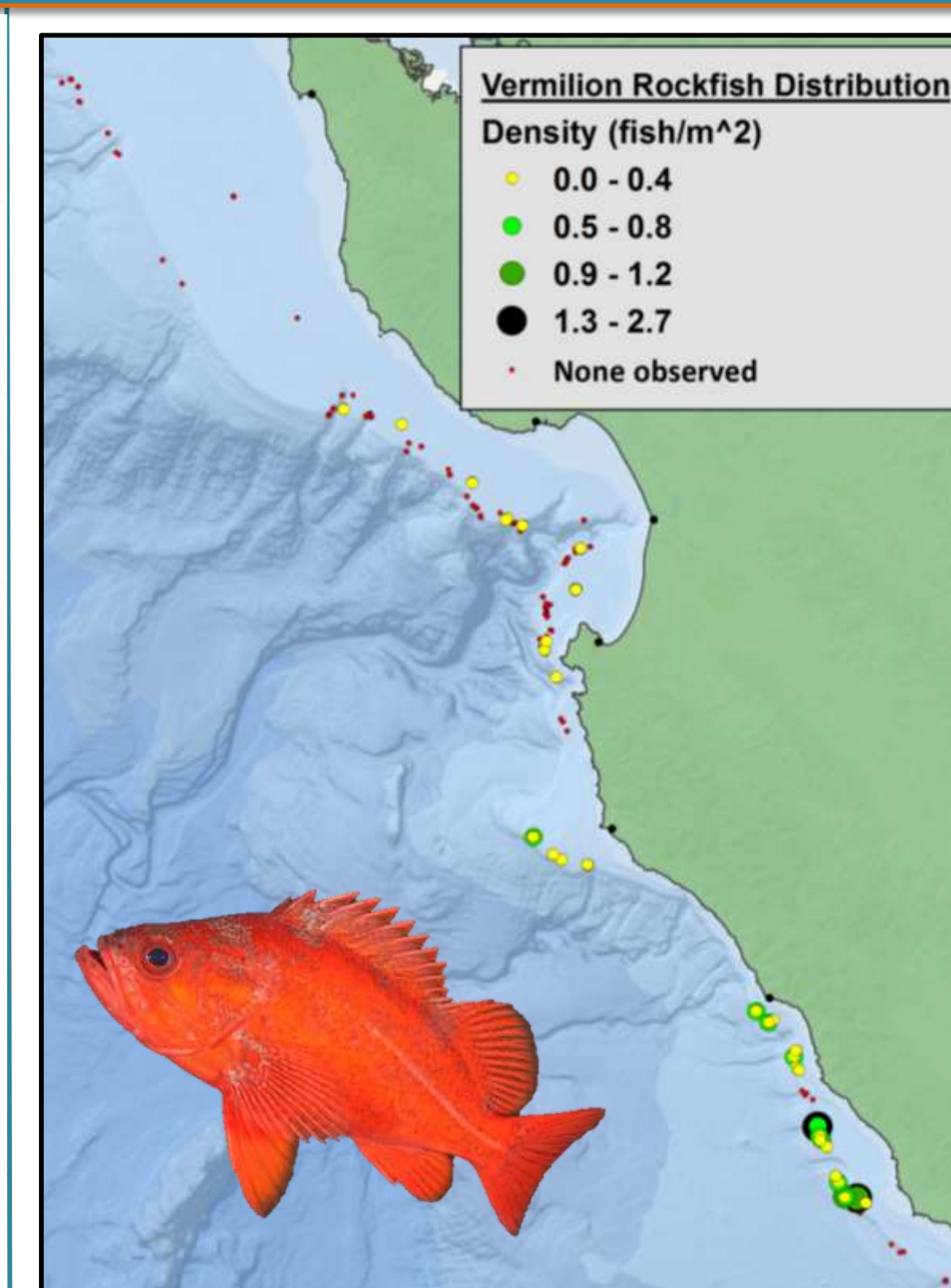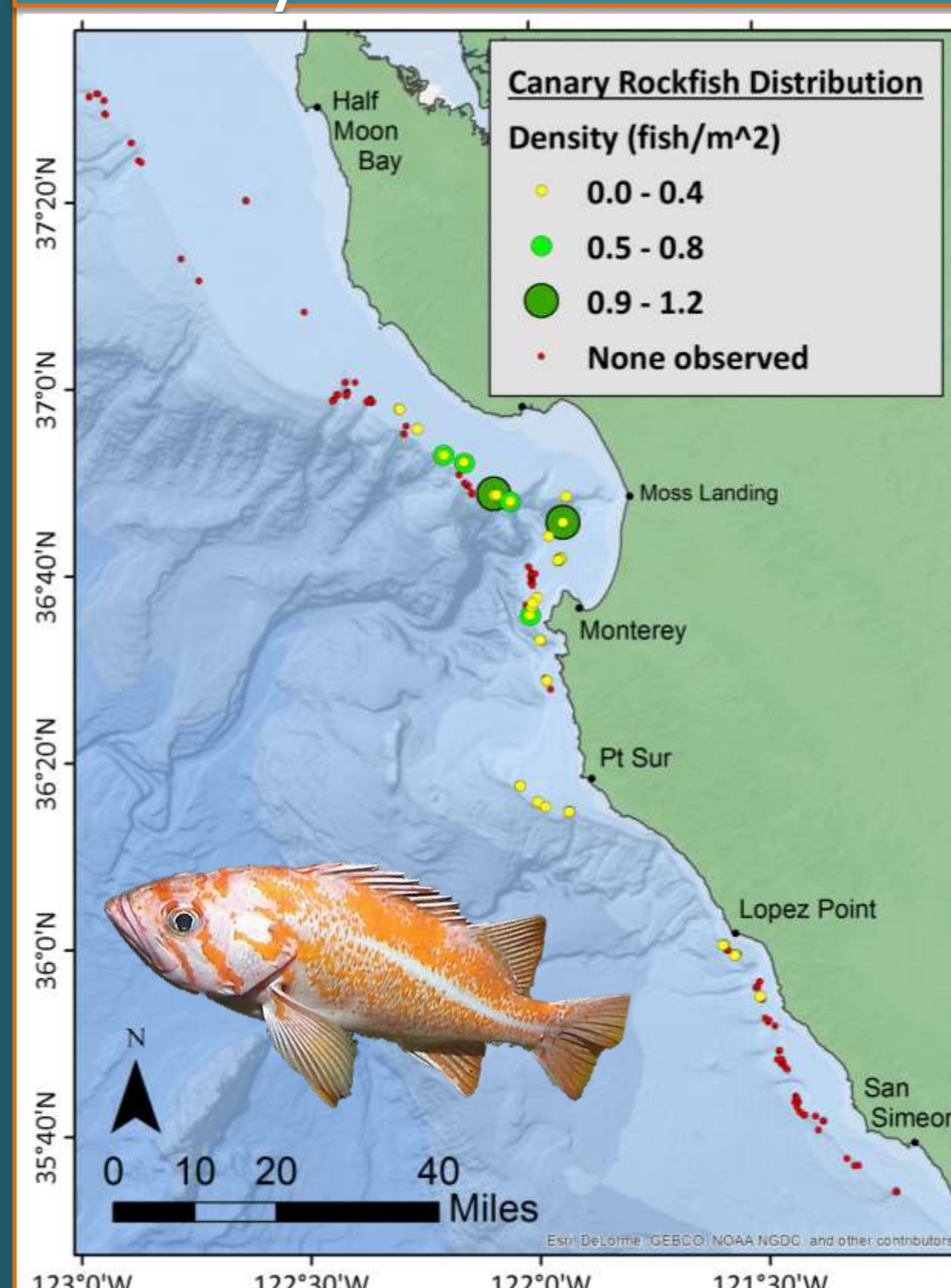


### Length Frequencies – Are we seeing adults and sub-adults?

— Wyllie Echeverria 1987 (50% maturity)



N=240 (Canary)  N=426 (Vermilion)  N=77 (Yelloweye)
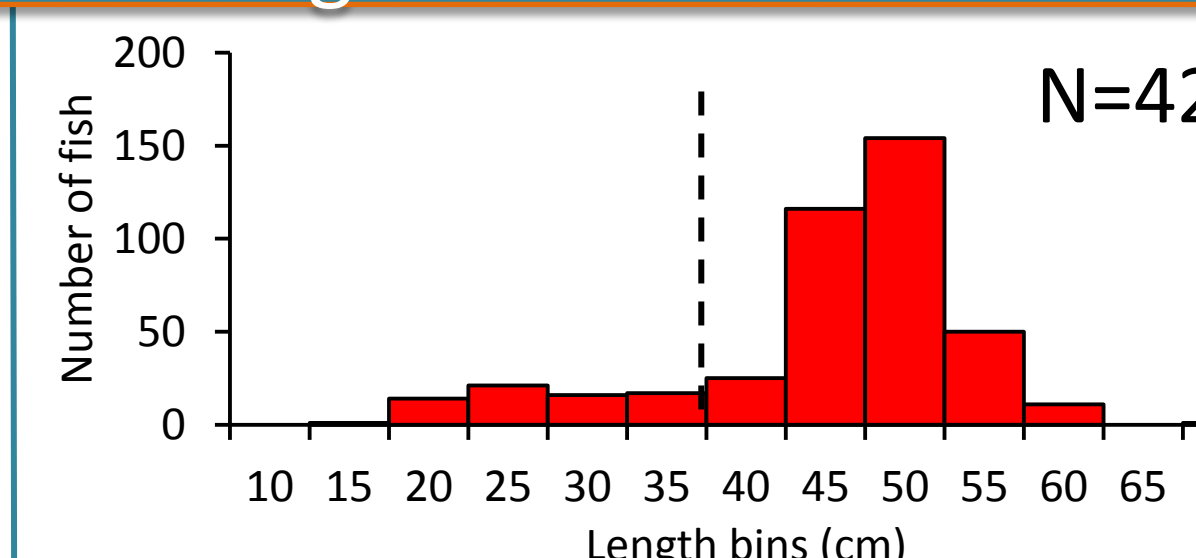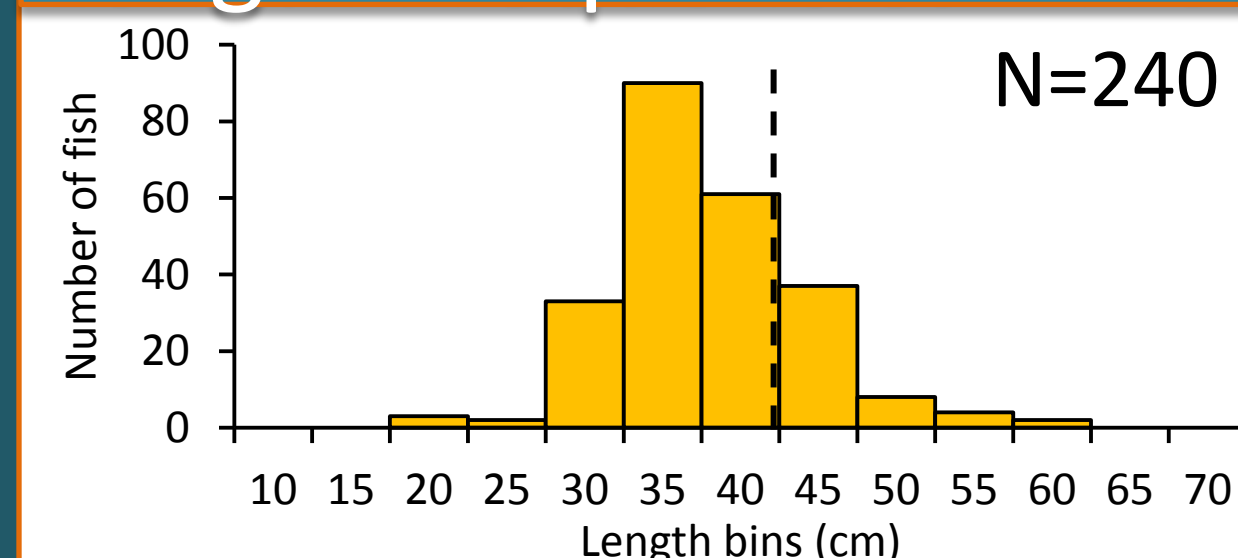
### Length Frequencies by latitude – Is there a relationship between latitude & size class?



Canary: Central n=225, South n=15
Vermilion: Central n=77, South n=349
Yelloweye: Central n=46, South n=28
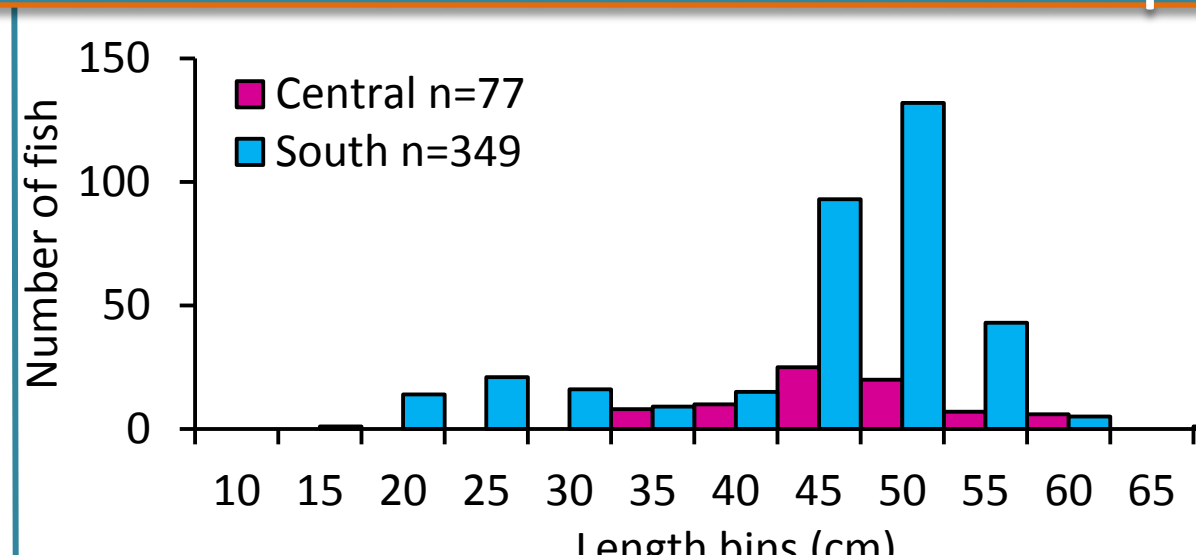
### Length Frequencies in the Trawl RCA – Are there bigger fish inside?

| | In | Out |
|---|---|---|
| n | 44 | 196 |
| mean length | 40 cm | 38 cm |
| longest fish | 62 cm | 57 cm |
| mean depth | 96 m | 100 m |
| depth range | 90 m - 131 m | 75 m - 212 m |

* p < 0.05

Whiskers drawn to the furthest point within 1.5 x IQR from the box

| | In | Out |
|---|---|---|
| n | 121 | 305 |
| mean length | 48 cm | 44 cm |
| longest fish | 57 cm | 70 cm |
| mean depth | 120 m | 98 m |
| depth range | 92 m - 238 m | 75 m - 165 m |

| | In | Out |
|---|---|---|
| n | 22 | 55 |
| mean length | 41 | 39 |
| longest fish | 64 | 66 |
| mean depth | 126 m | 103 m |
| depth range | 93 m - 196 m | 75 m - 135 m |



## DISCUSSION & NEXT STEPS

- The video lander enables us to count and measure species on rocky reefs 50-250m deep via non-extractive methods.
- Limitations to conducting surveys include high current speeds, high wind speeds, and large swells.
- Addition of wide-angle *GoPro* camera provides additional information for species IDs and use in outreach.
- 573 drops from 2014 will be analyzed and added to the data set. Future analyses include:
  - Comparisons of species compositions and densities with ROV transects conducted at the same locations.
  - Comparisons of fishing catch and lander observations at the same locations.