Nearshore Rockfish Surveys

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My Lens For This Talk

Stock Assessment Data:

For nearshore stock abundance is lacking

Abundance

+

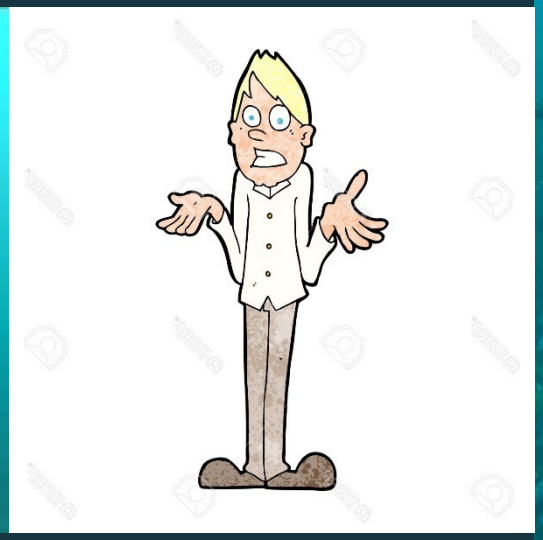
Biology

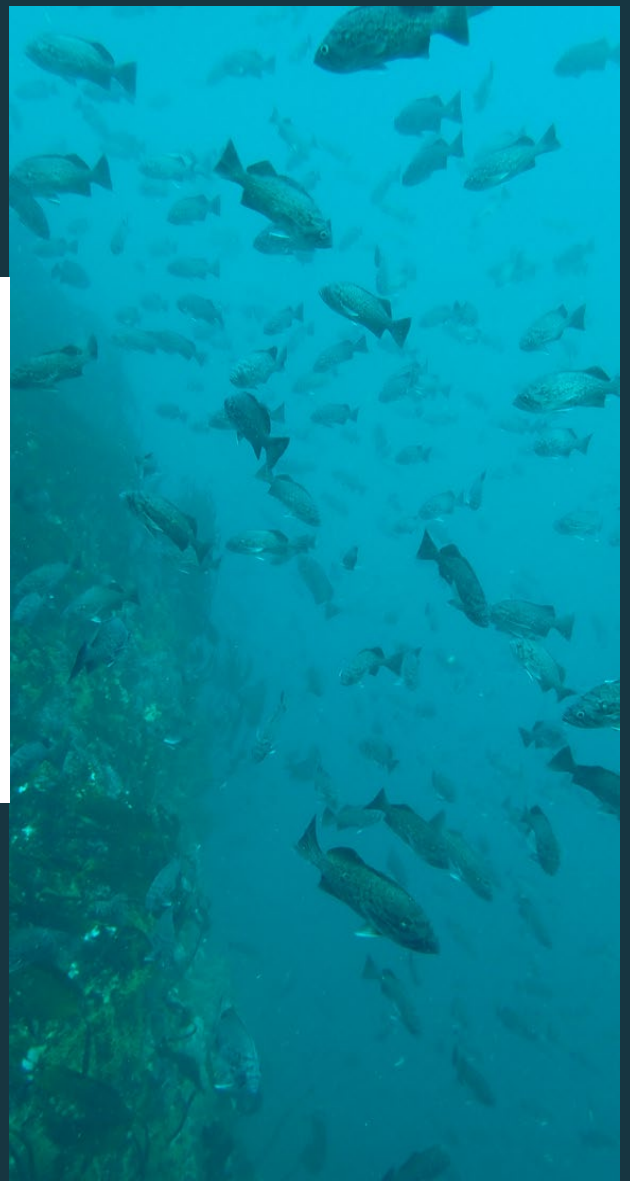
+

Catch

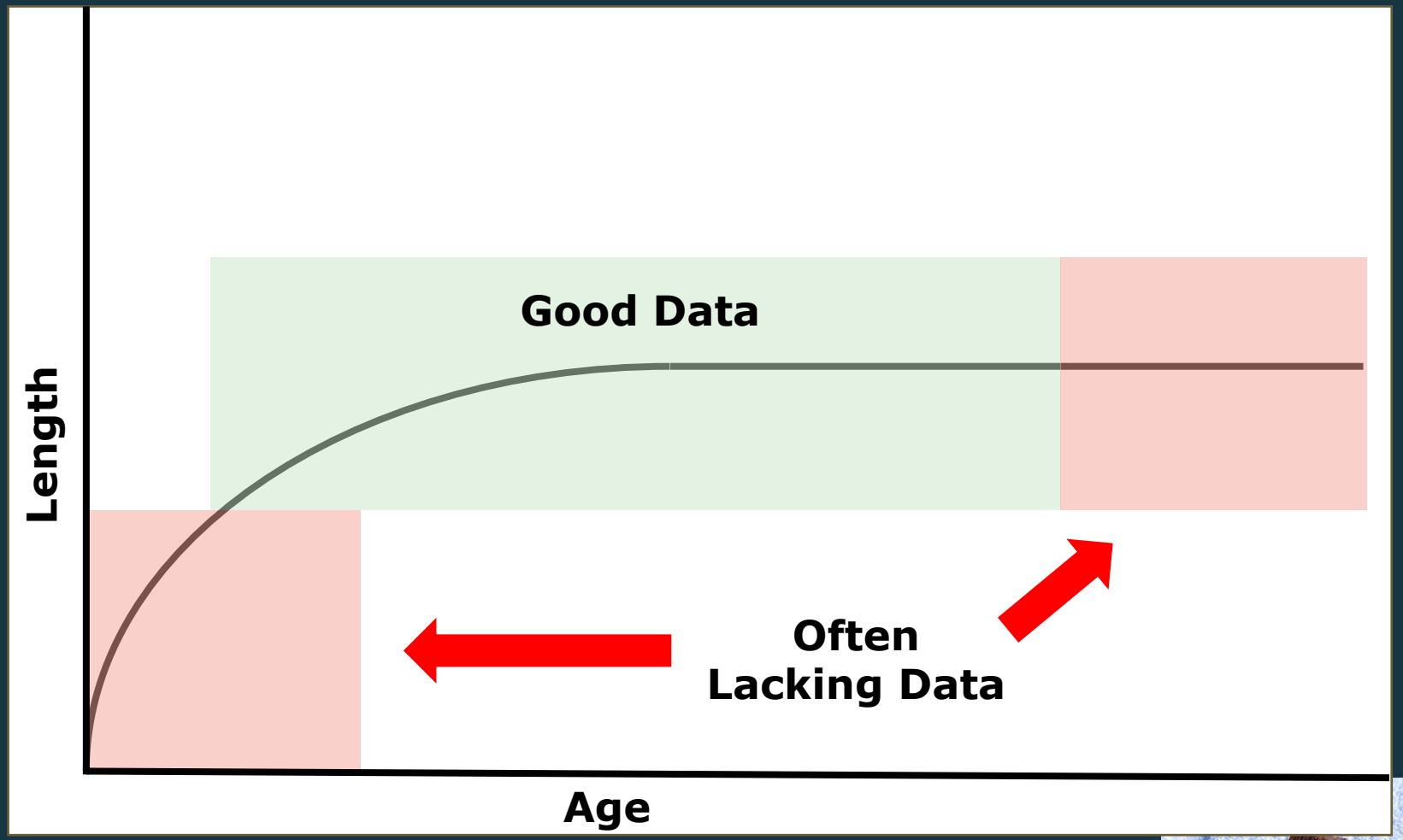
Stock Assessment Model

Stock Assessment Tales: Deacons





Stock Assessment Tales: Kelp Greenling



Considerations in design.

1. Plan for assessments

2. Affordable but good data

3. Data from other species

4. Data about ocean change

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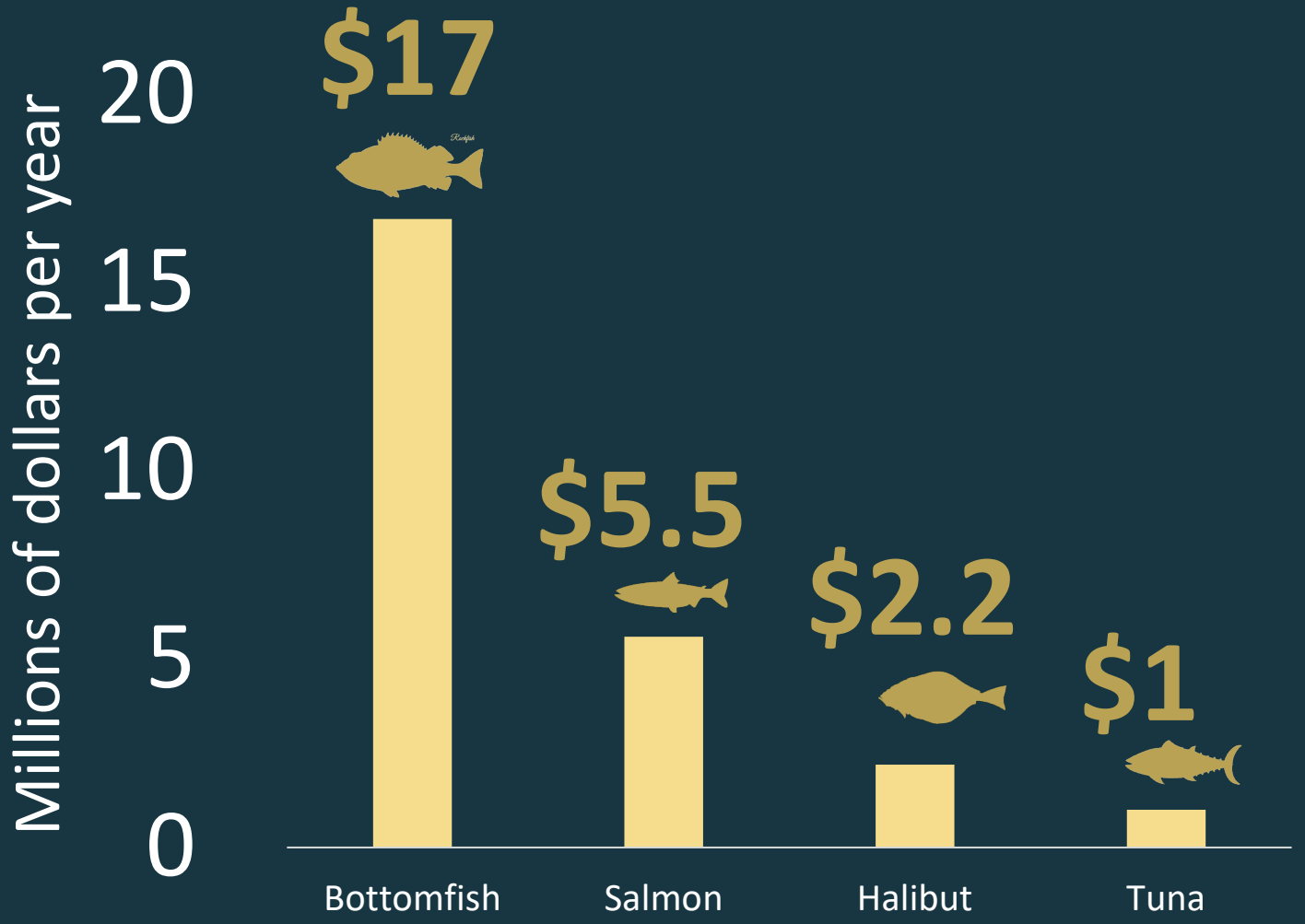
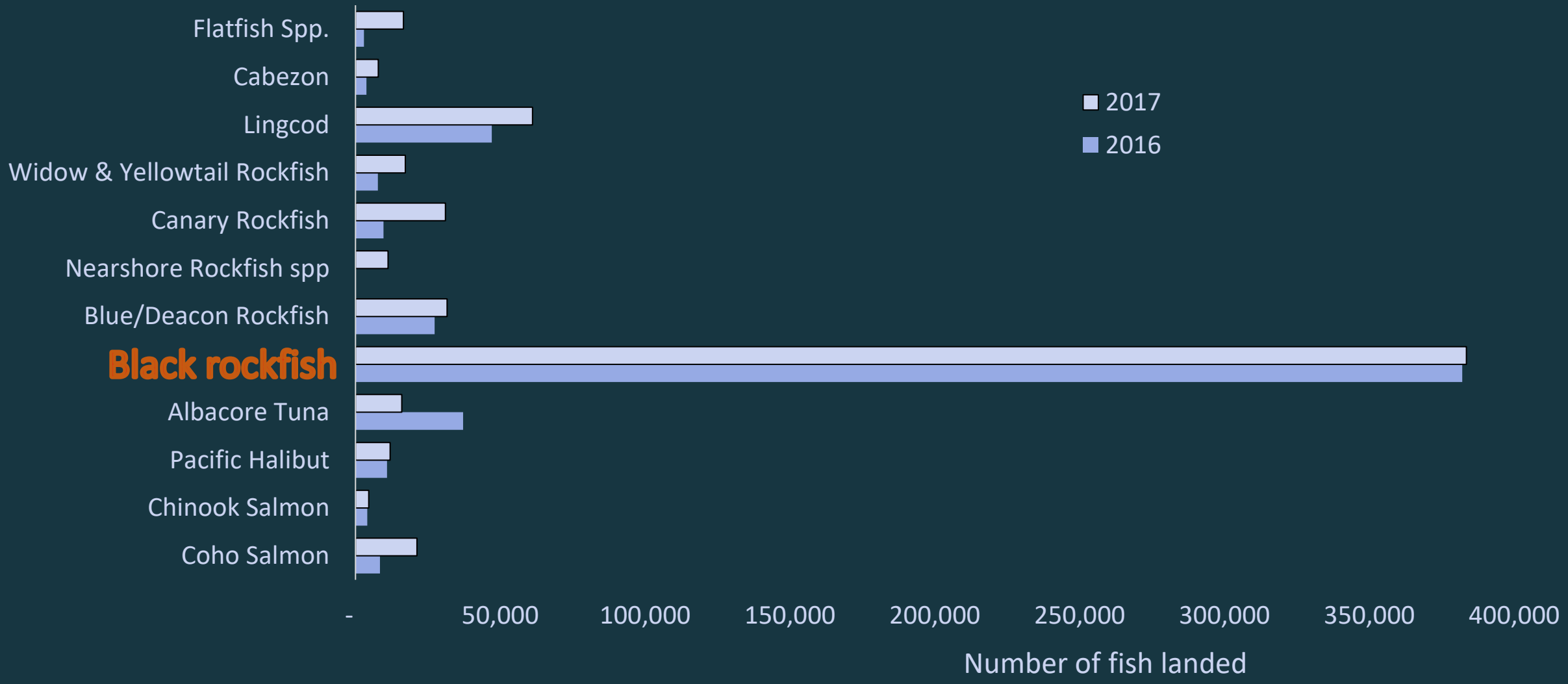
For recreational fisheries, bottomfish are an economic driver



Black rockfish dominate harvest



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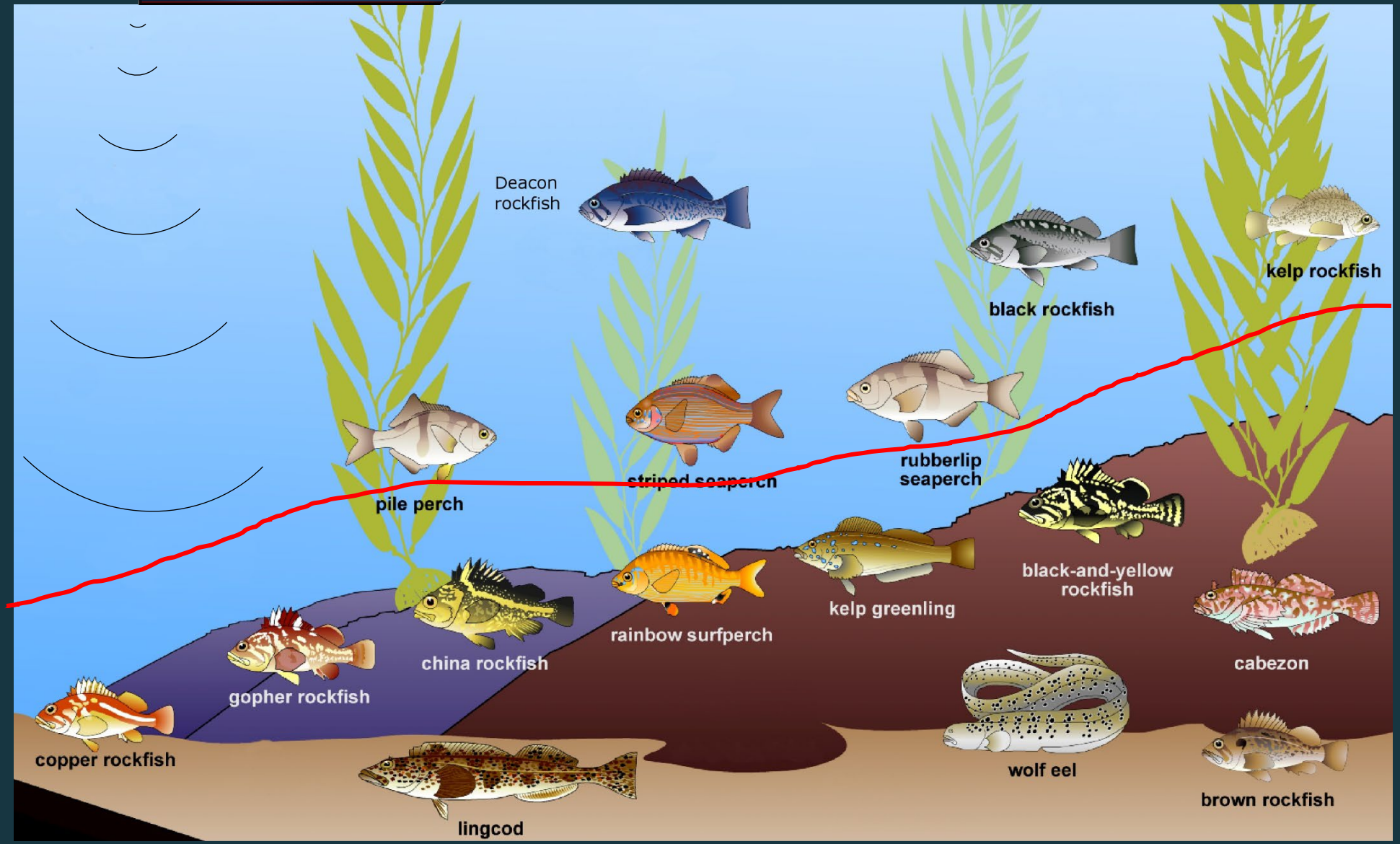
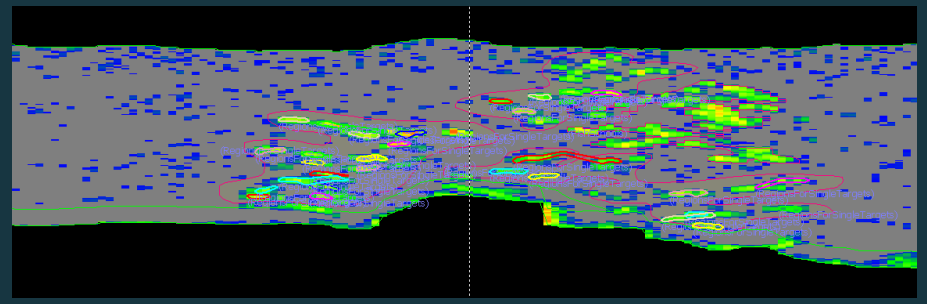
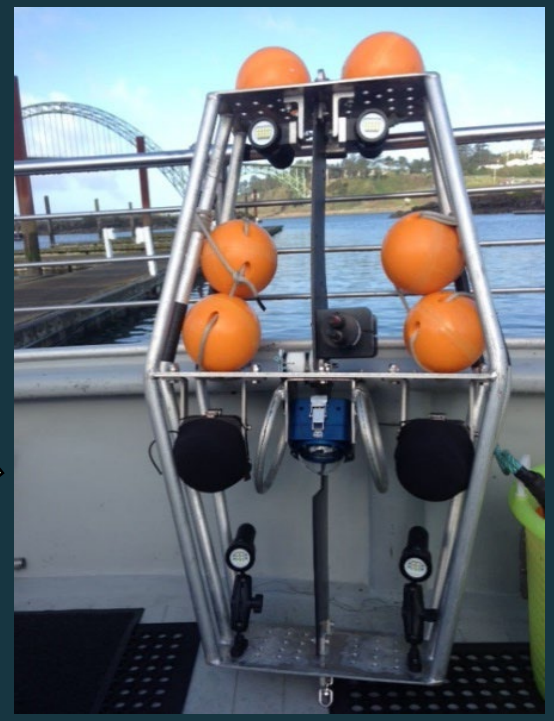
How do we count them?



How does it work?



Acoustics provide a value that can be turned into number of fish



Camera provides species proportions and lengths

Use known length relationships between rockfish and acoustics to estimate abundance

Hook and Line to provide age structures

Population Estimate!

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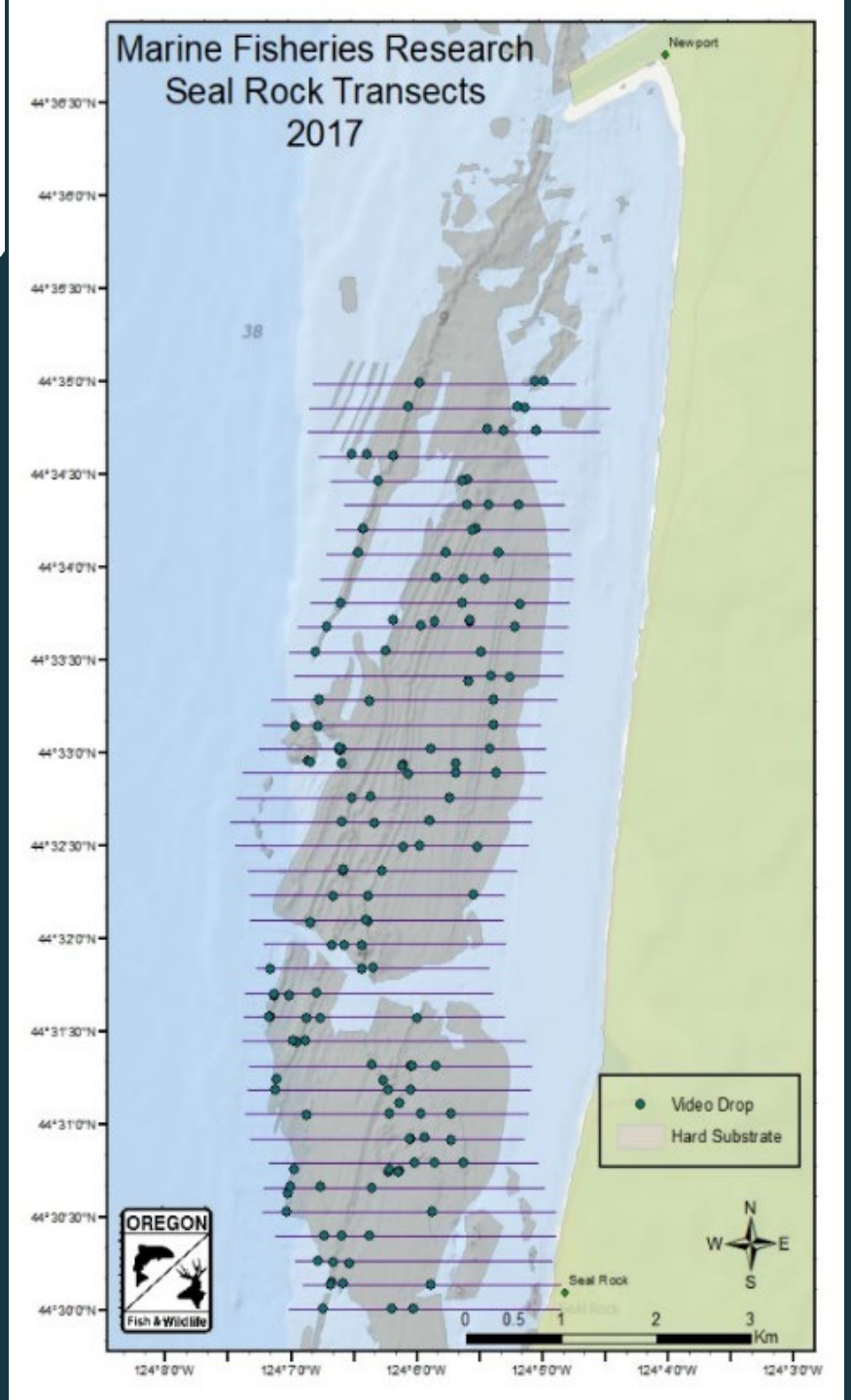

Stock Assessment Worry: Validate

- Fall 2017 Seal Rock
  - Chosen because of historic pit tag work
- 70 miles of acoustic transects collected
- 3 camera drops per transect
- Estimates matched!

Stock Assessment Worry: Catchability

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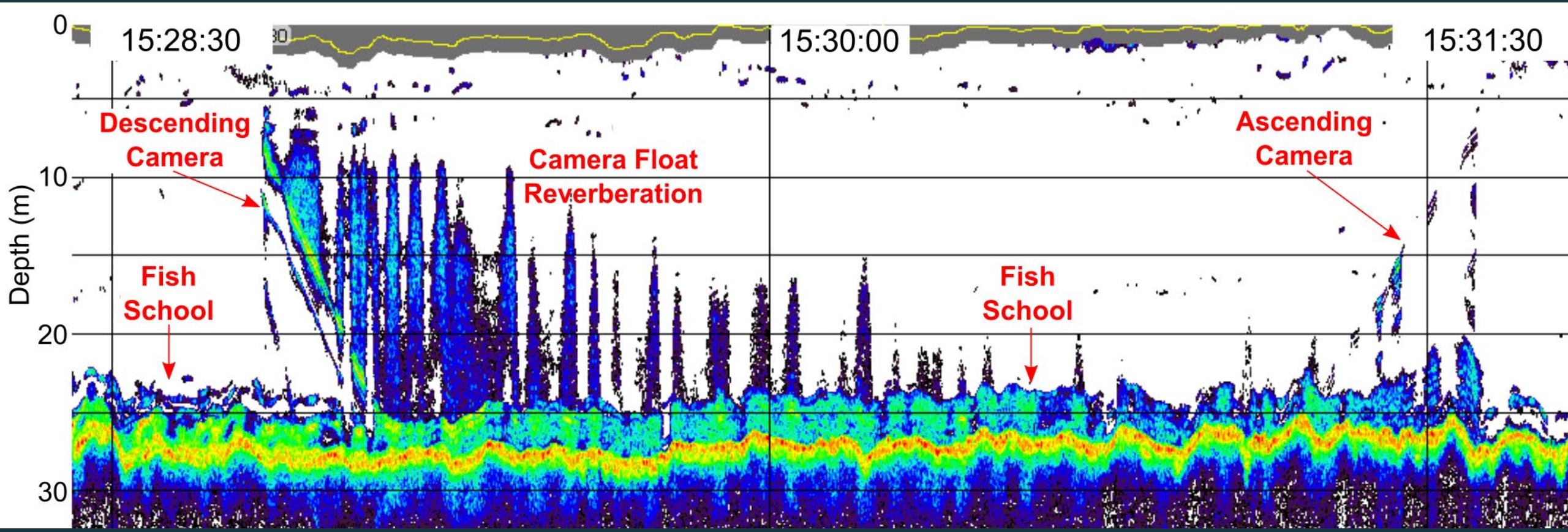
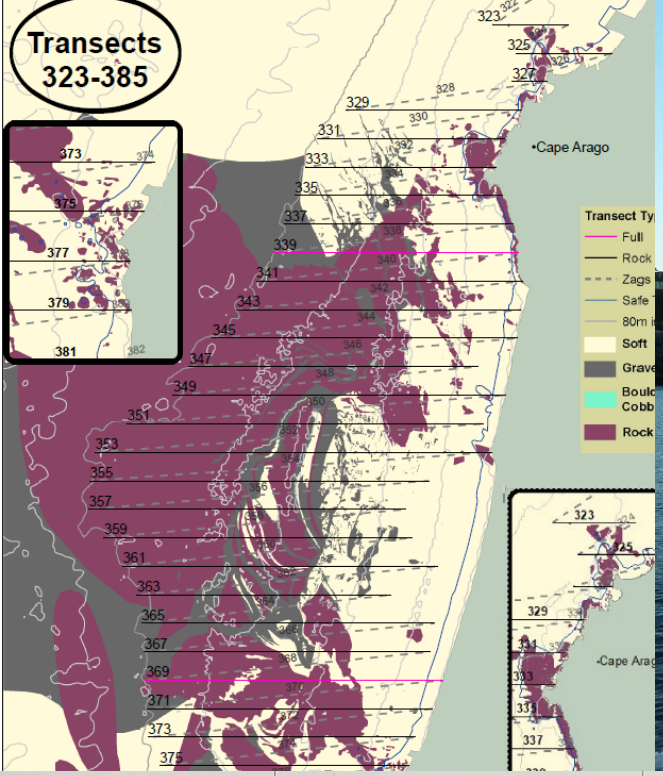
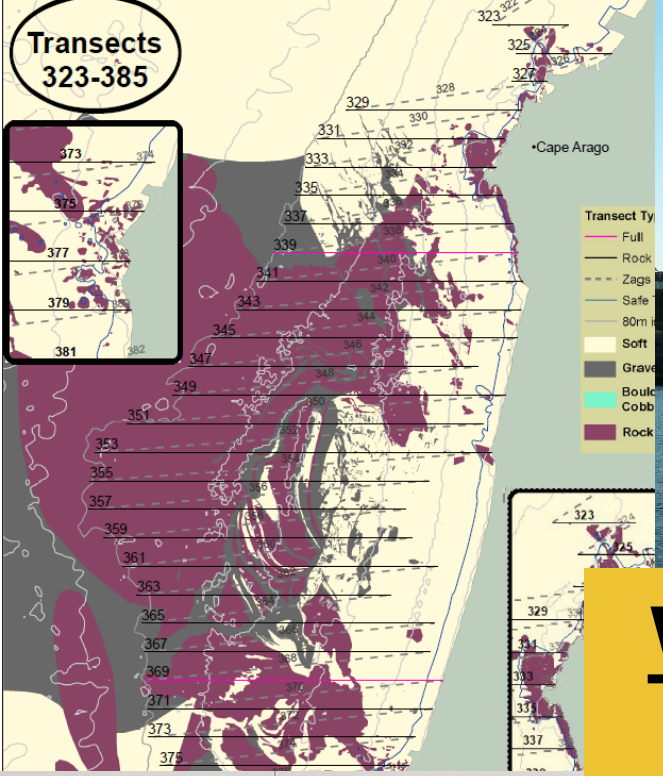
Echogram of camera deployed below 201 kHz transducer





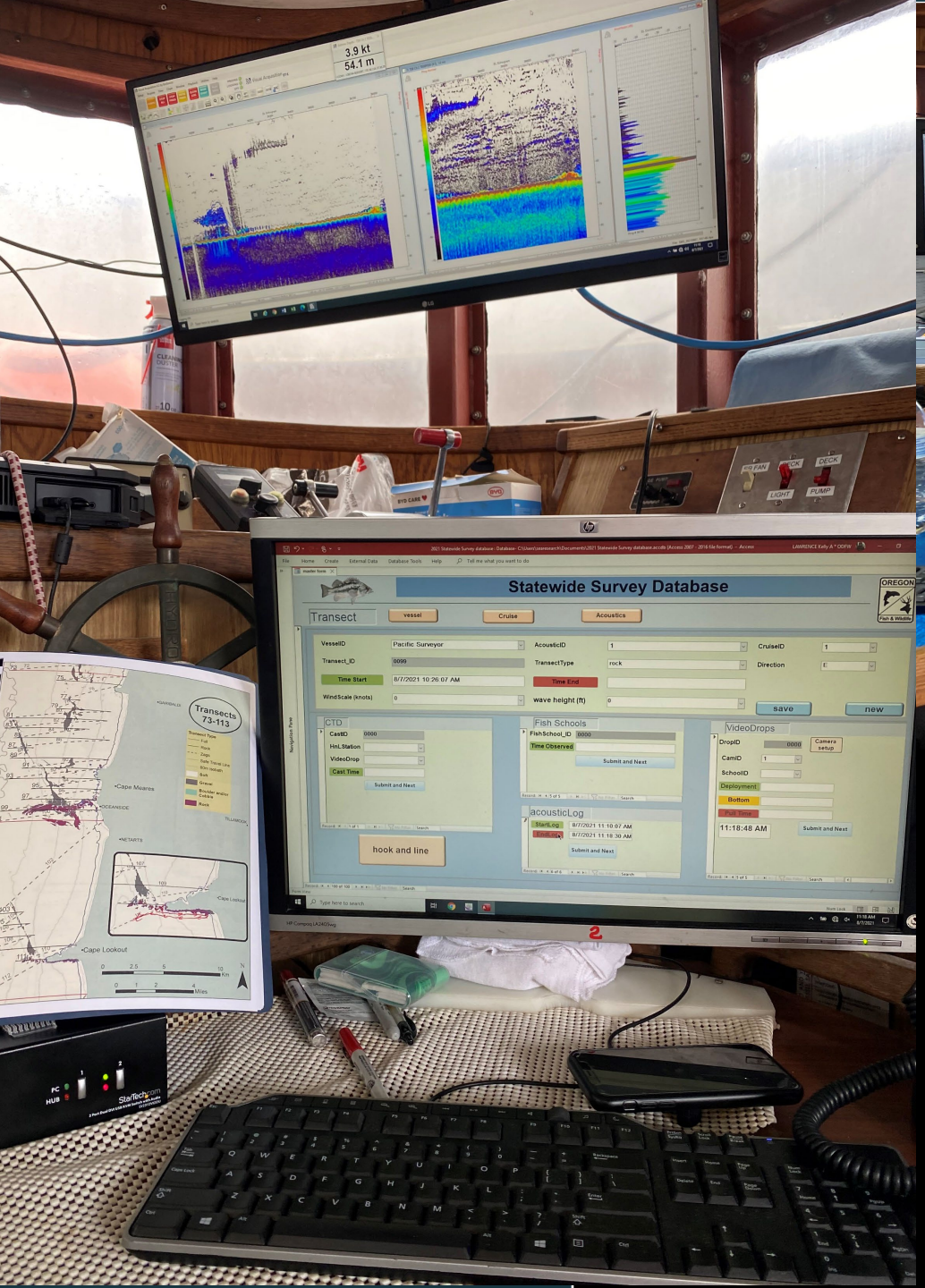
Surveying Oregon!



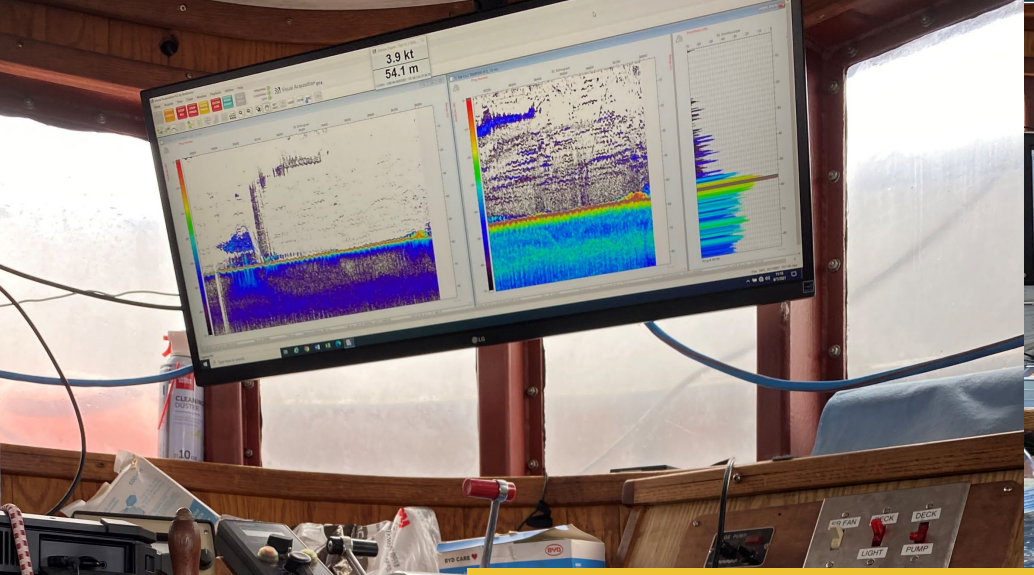
What Else Do You Gain?

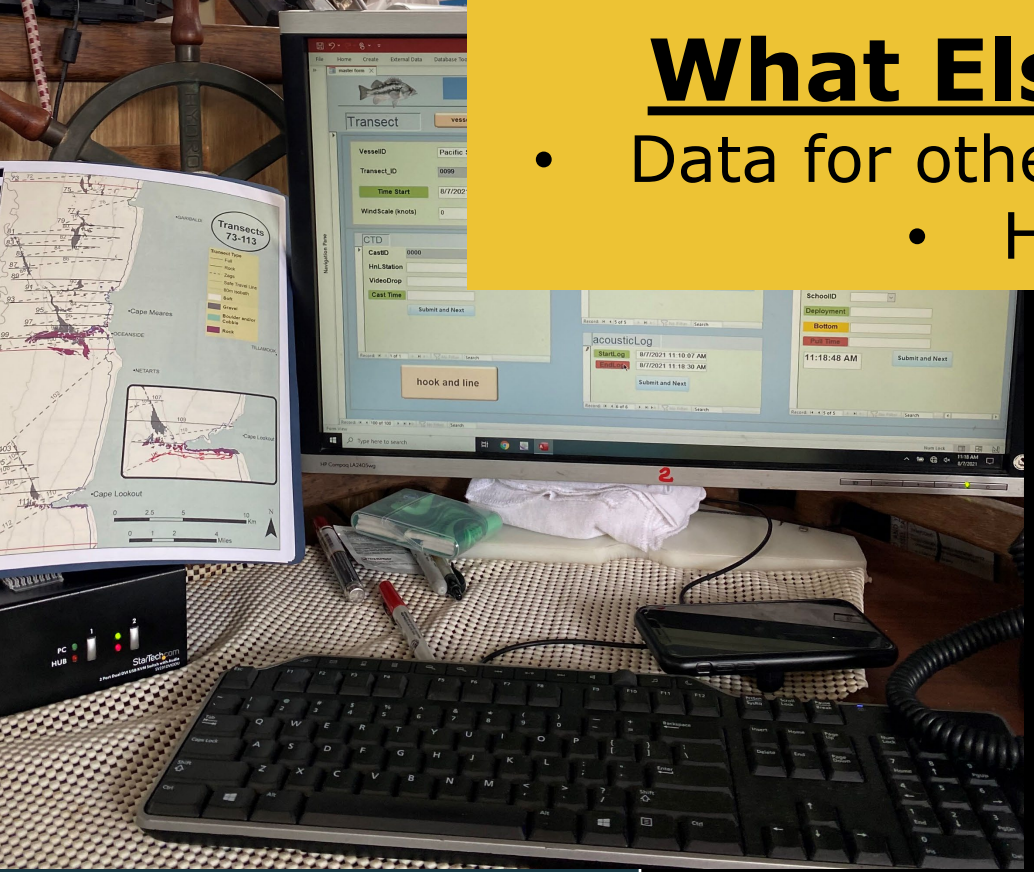
- Relationships along the coast
- Buy in from the fleet

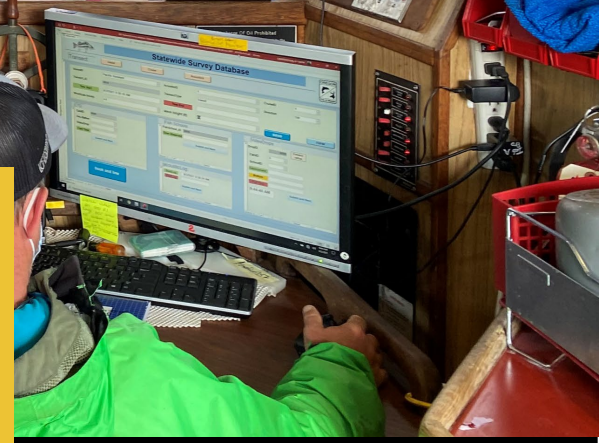
Surveying Oregon!



Acoustic Sampling



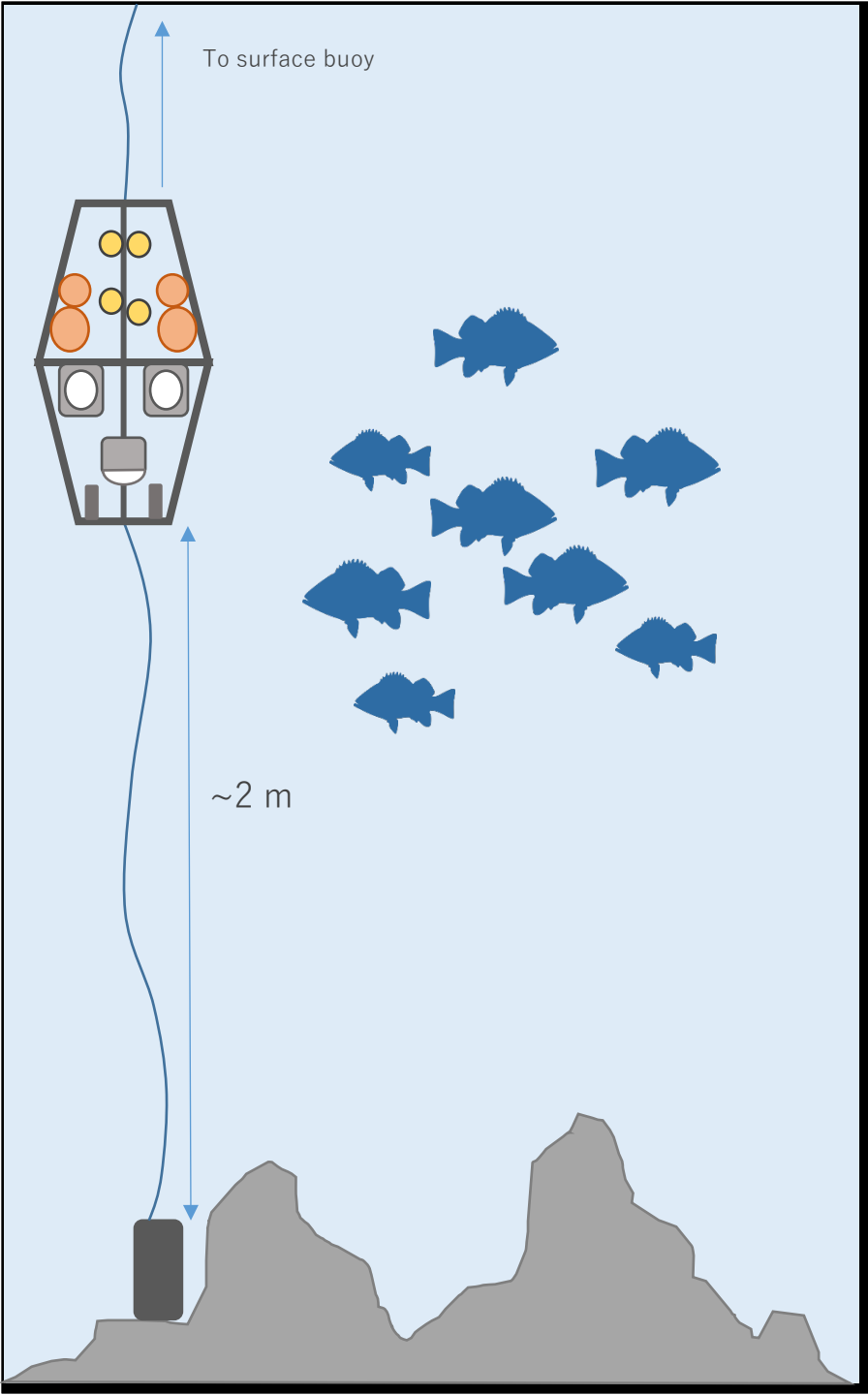


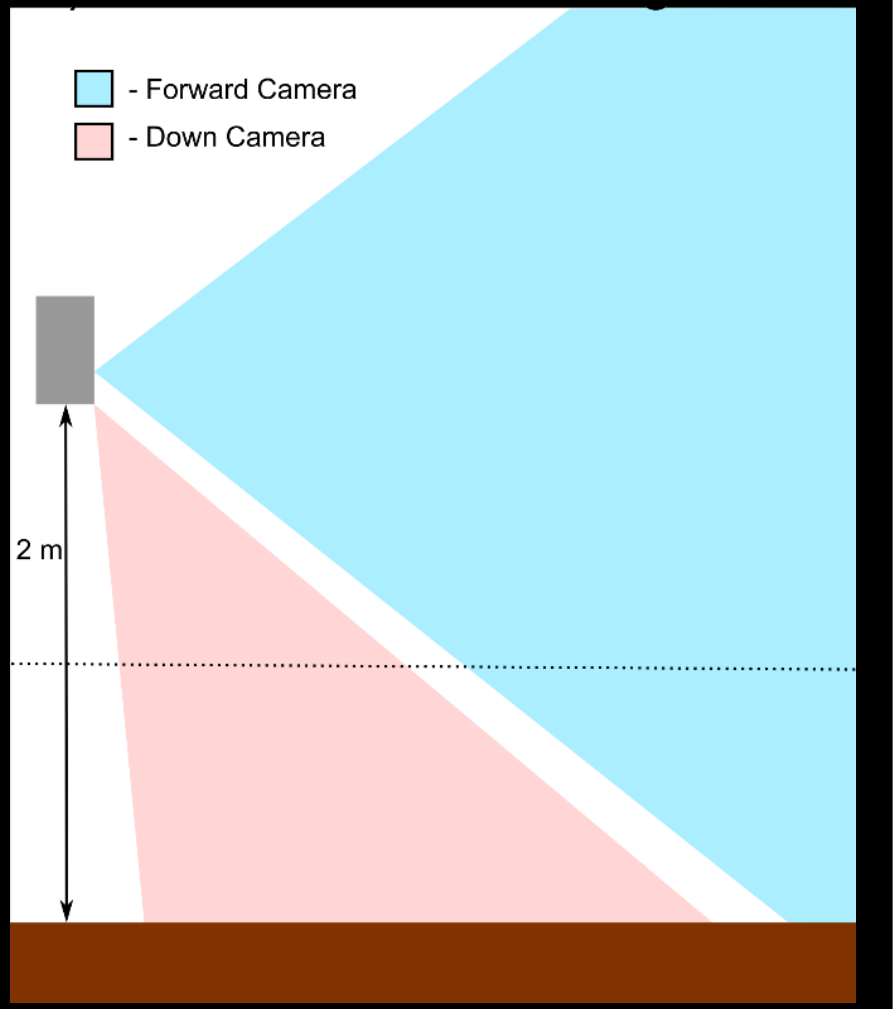


What Else Do You Gain?

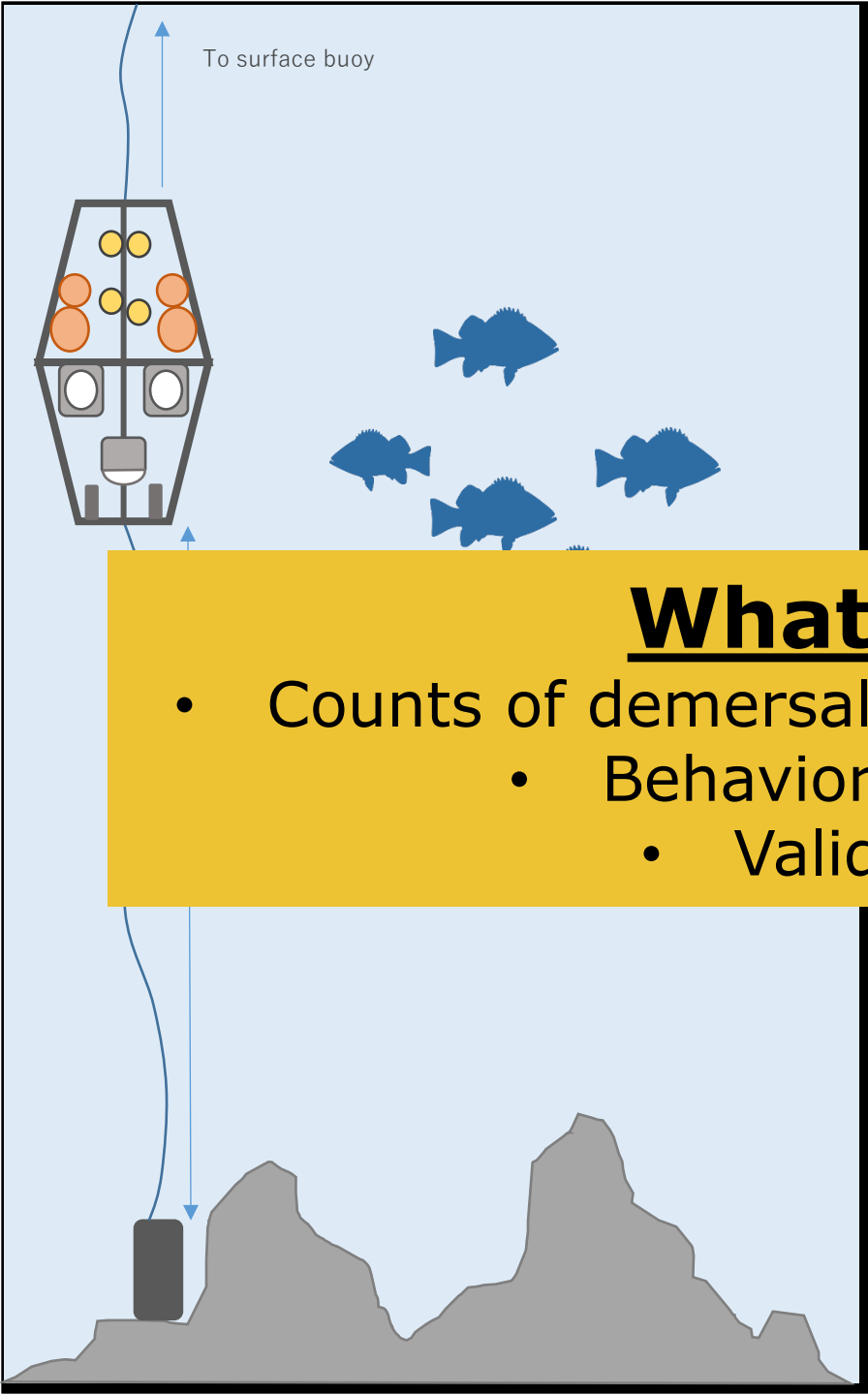
- Data for other species (e.g. forage fish)
- Habitat mapping

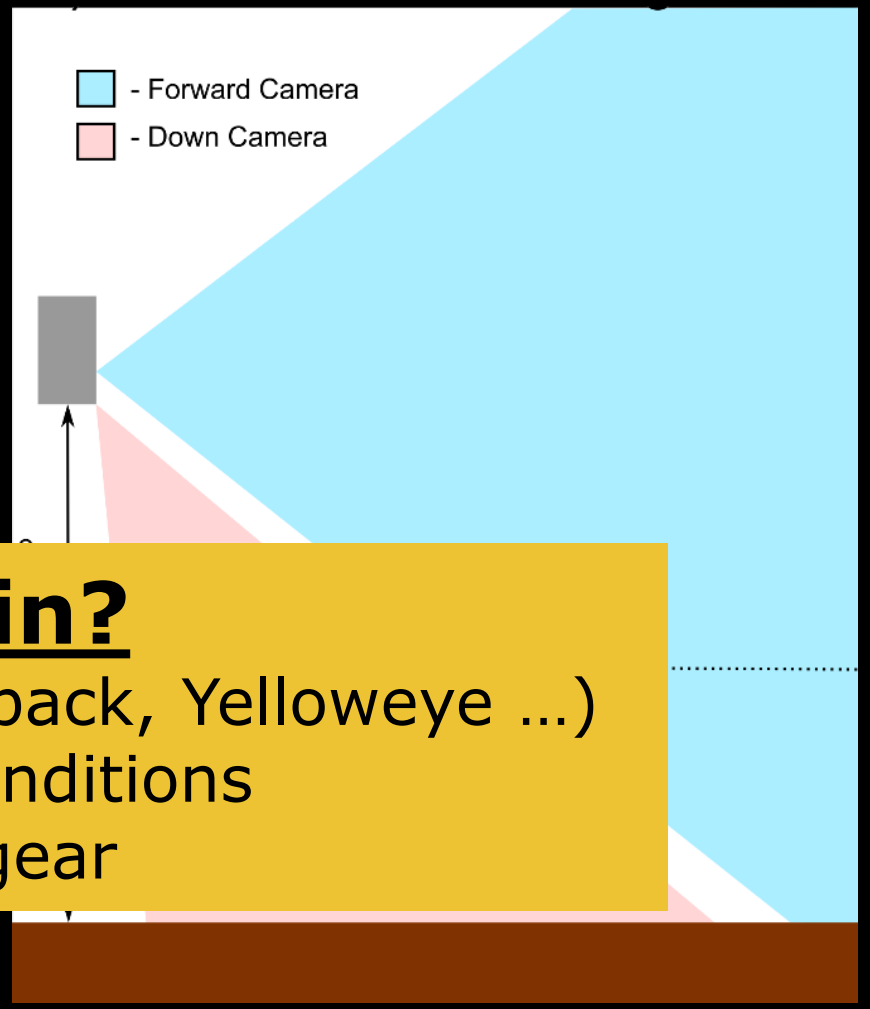
Acoustic Sampling





Camera Sampling

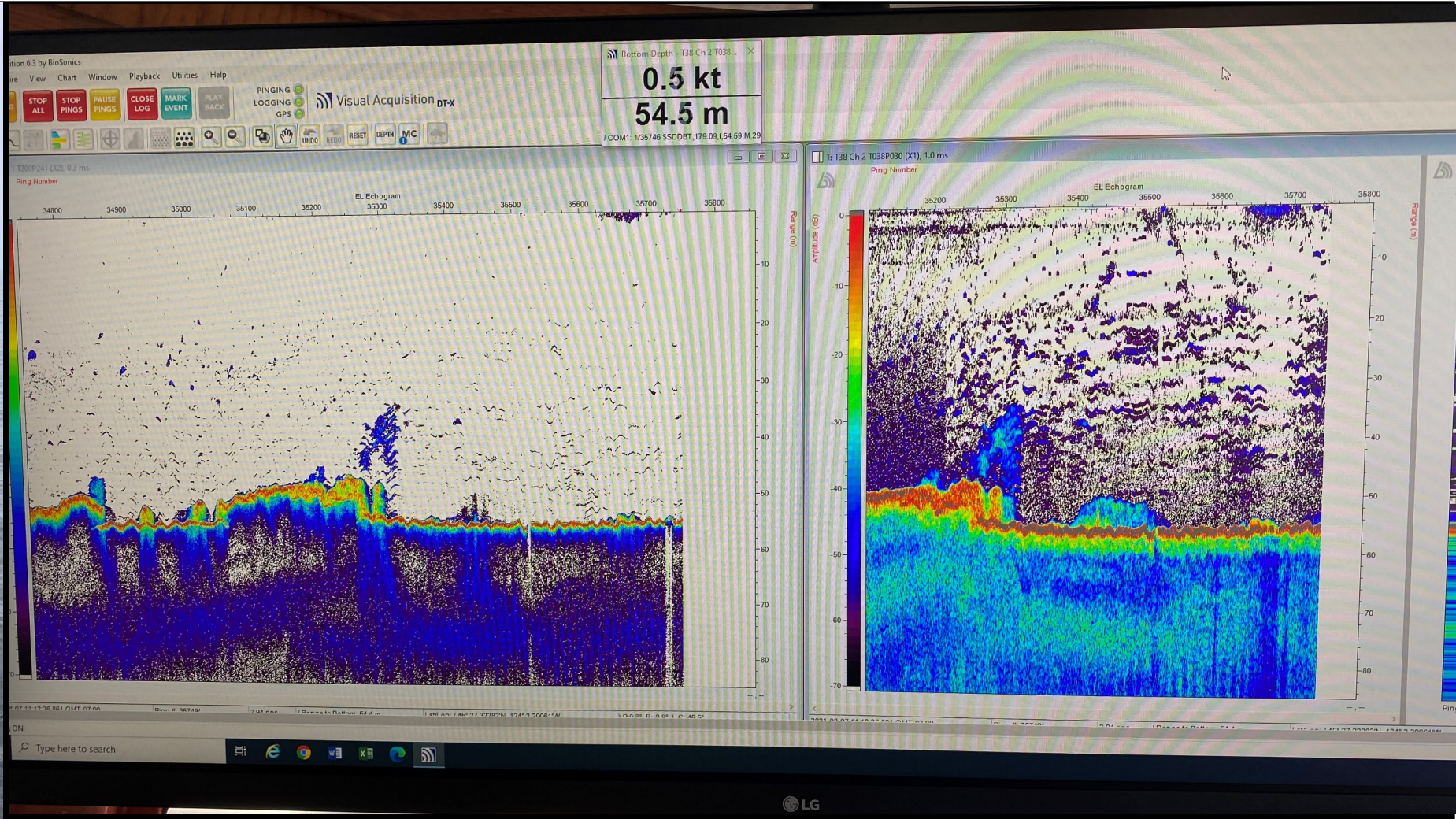




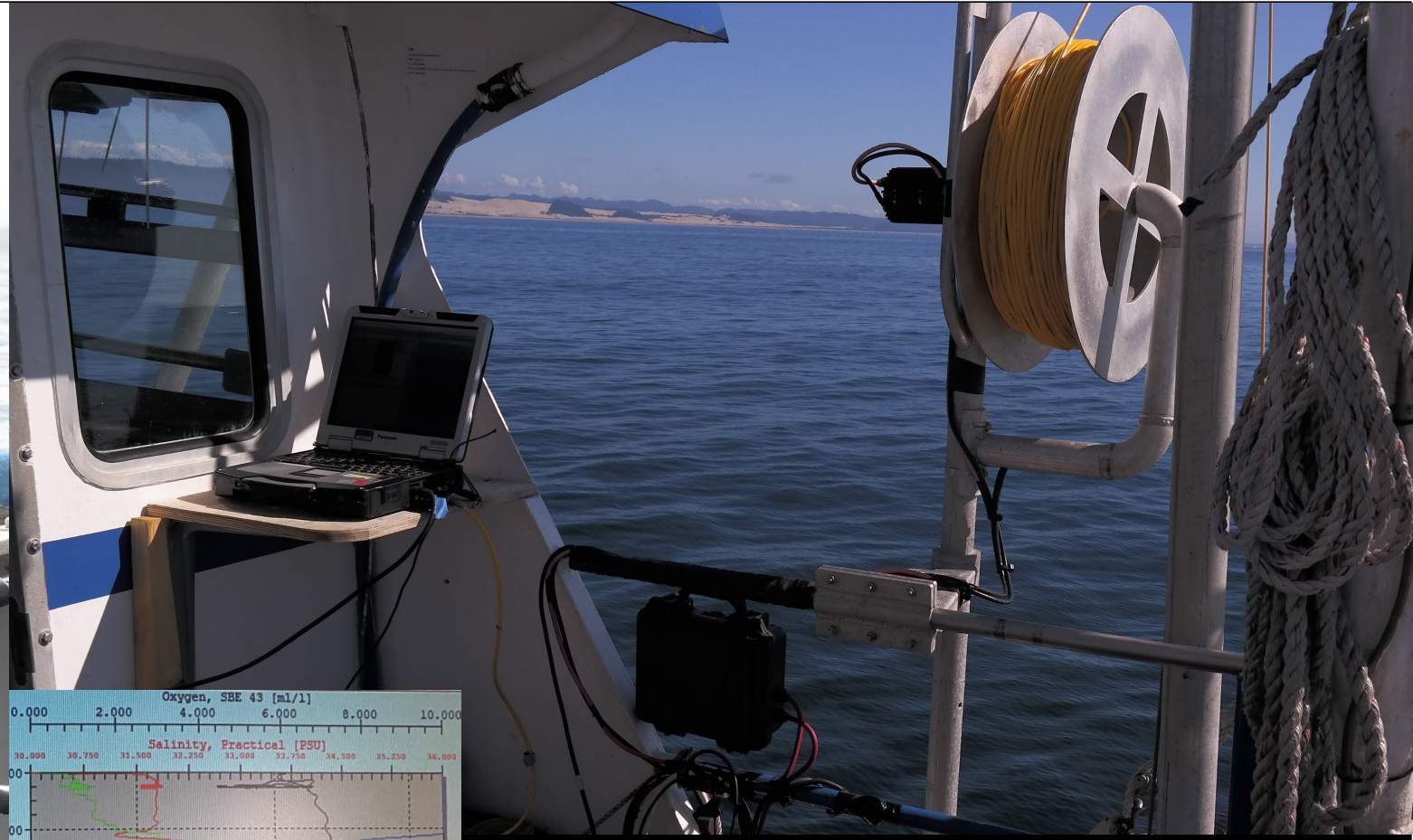
What Else Do You Gain?

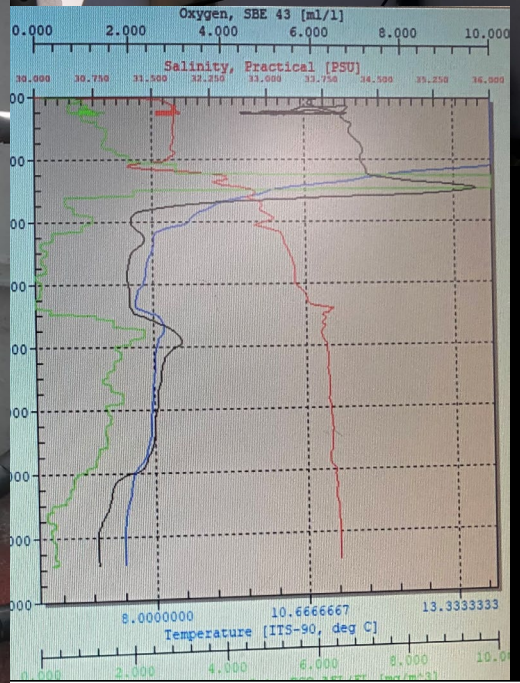
- Counts of demersal fish (e.g Lingcod, Quillback, Yelloweye …)
- Behavioral response to ocean conditions
- Validation of hook and line gear

Camera Sampling

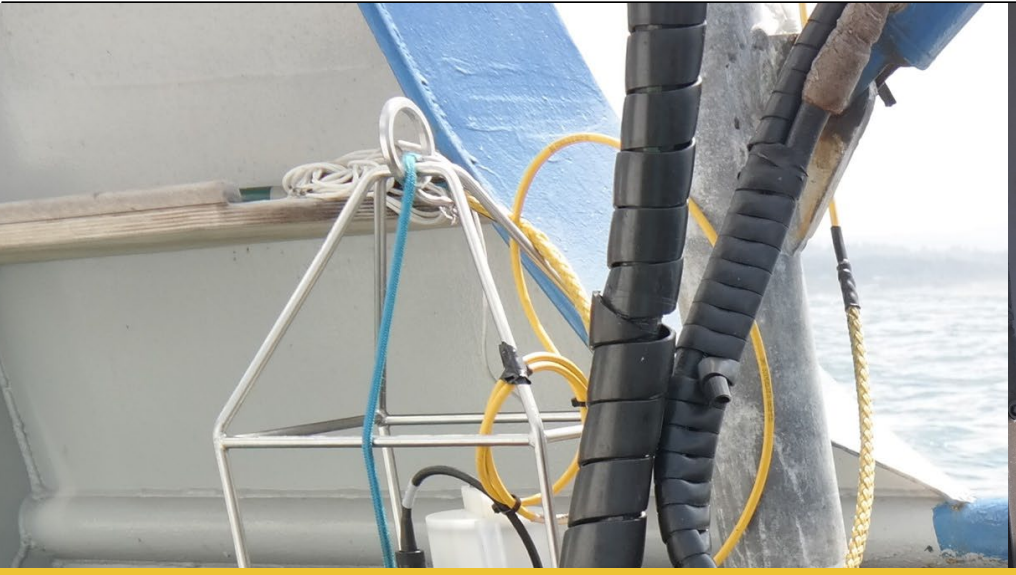


Sampling Procedure



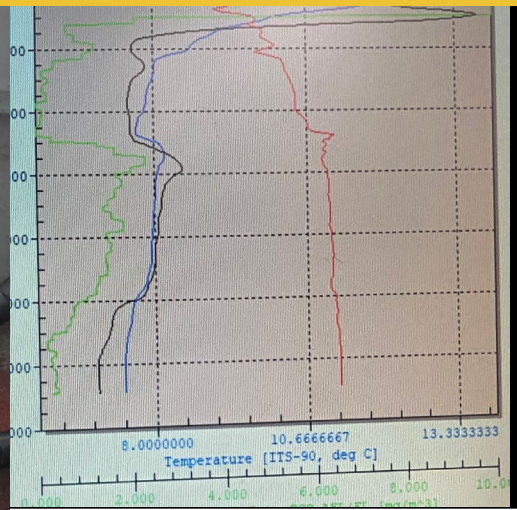


CTD Sampling

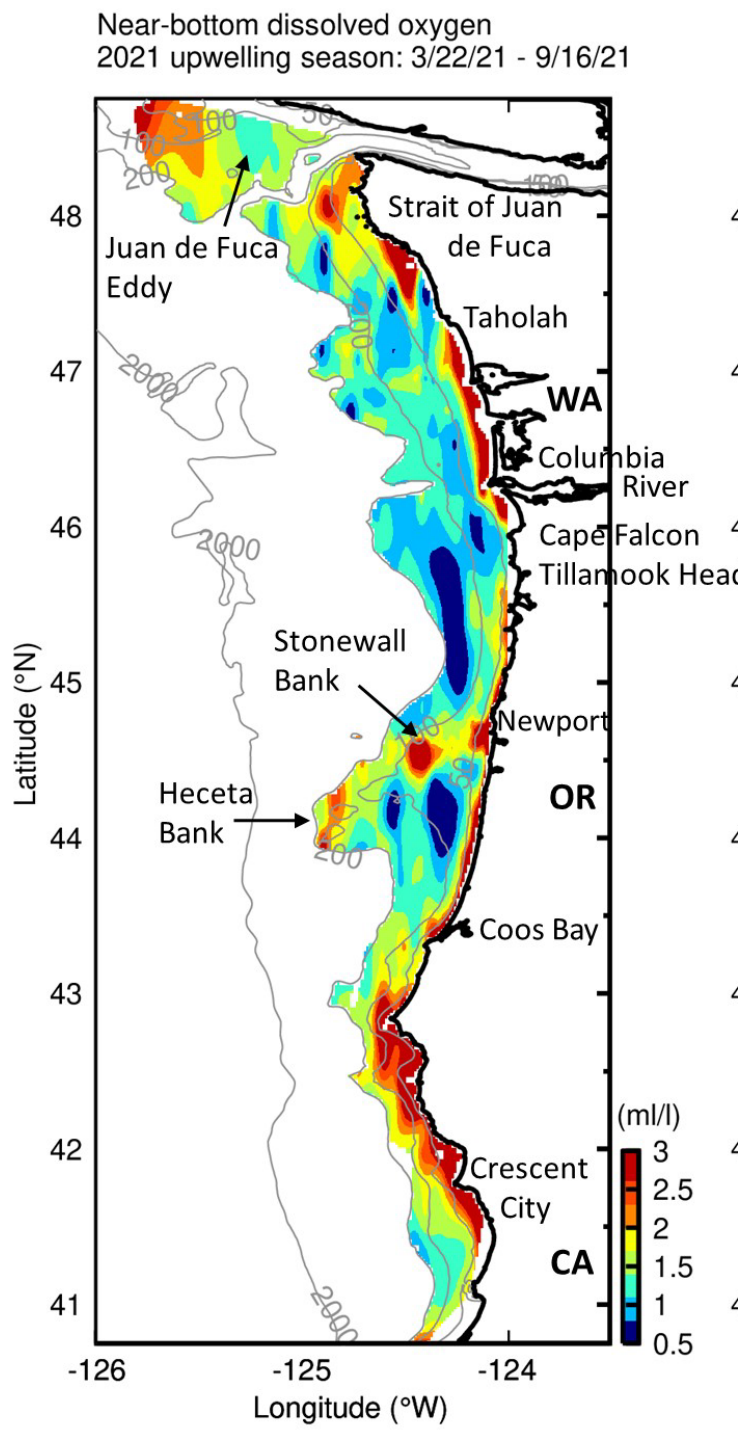


What Else Do You Gain?

- Maps of ocean conditions in nearshore
- Ability to correct indices of abundance
- Ability to understand how animals are responding



CTD

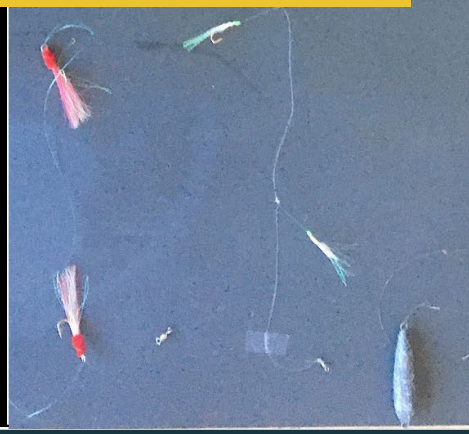


Hook and line sampling

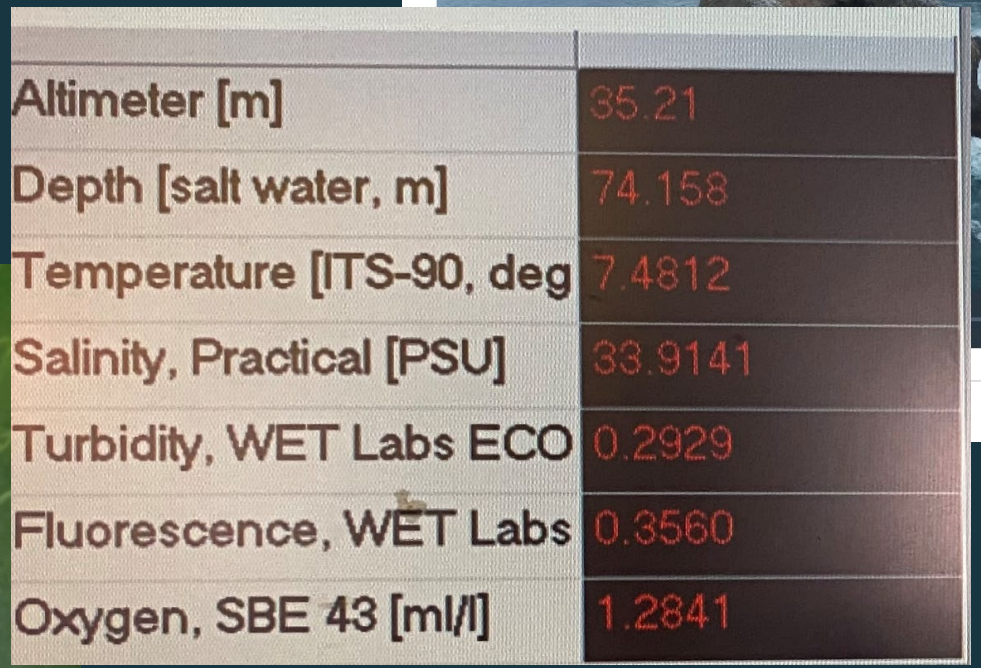
What Else Do You Gain?

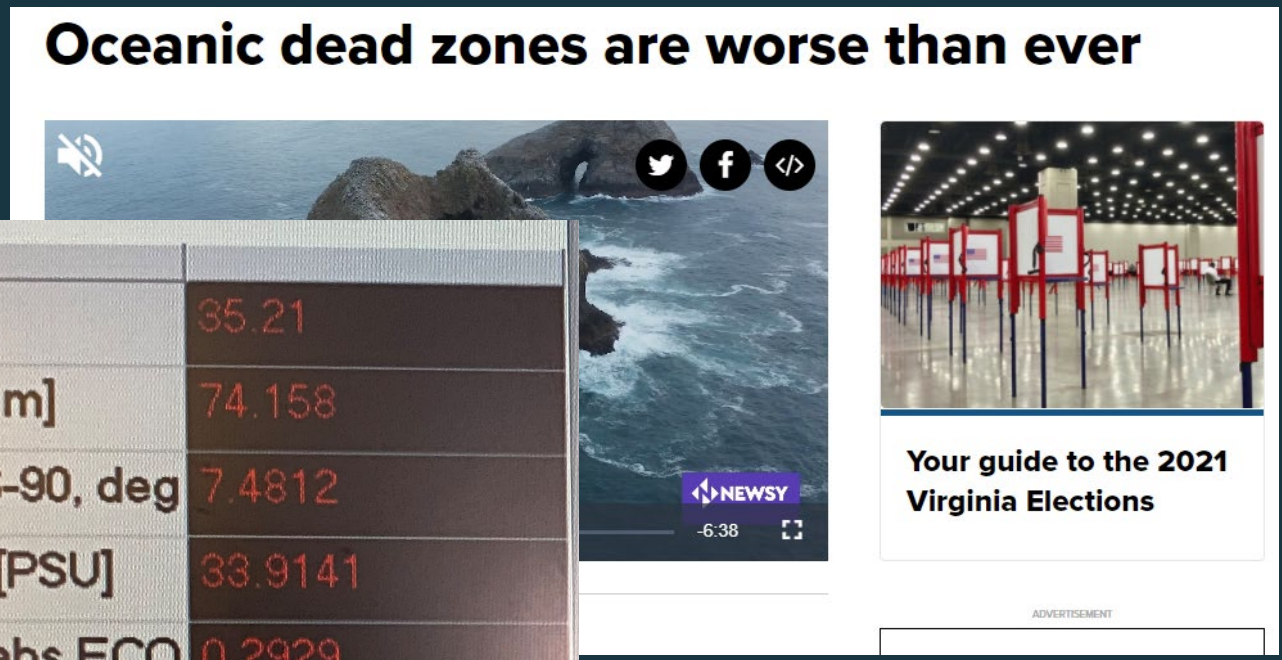
- Indices of abundance for demersal (e.g. Lingcod, Quillback, Yelloweye)
- Diet data
- Population genetics
- Maturity data

Hook and line sampling



Hypoxia: Difficulties and Novelties…



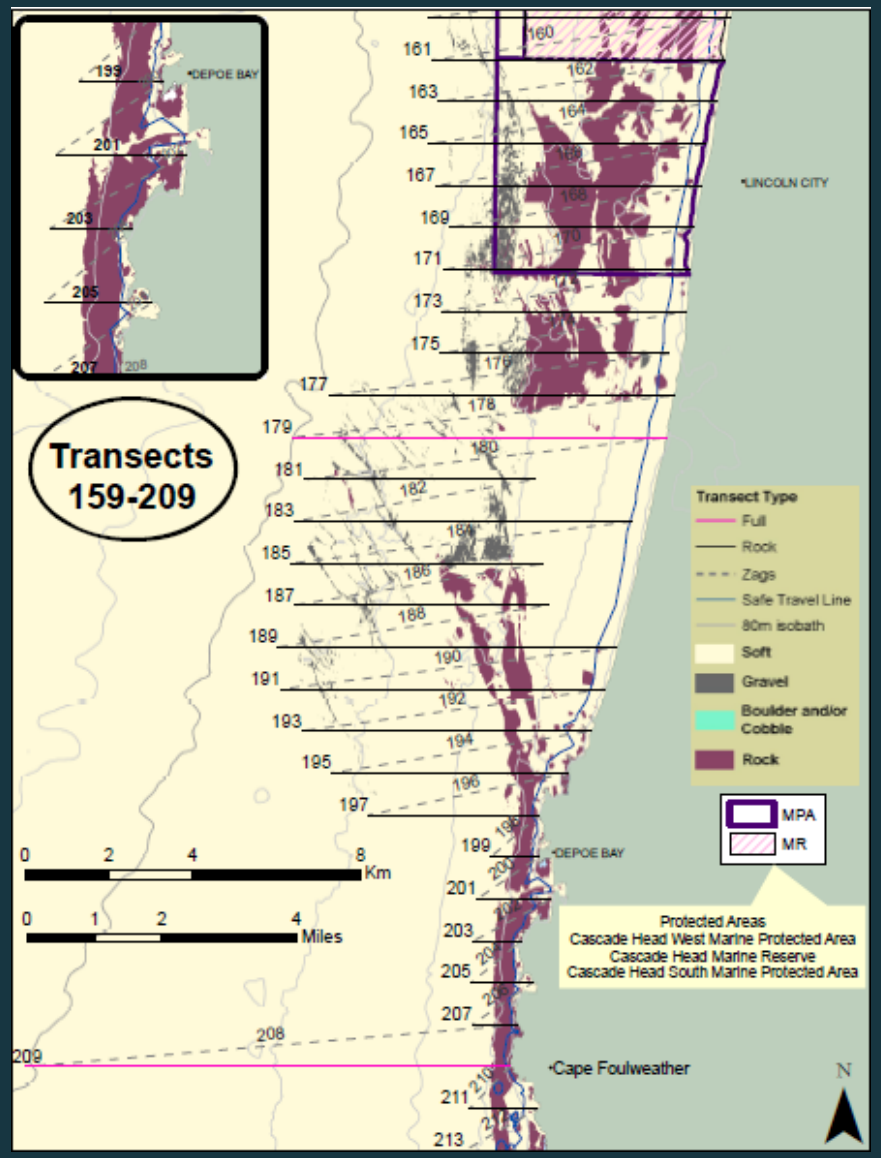


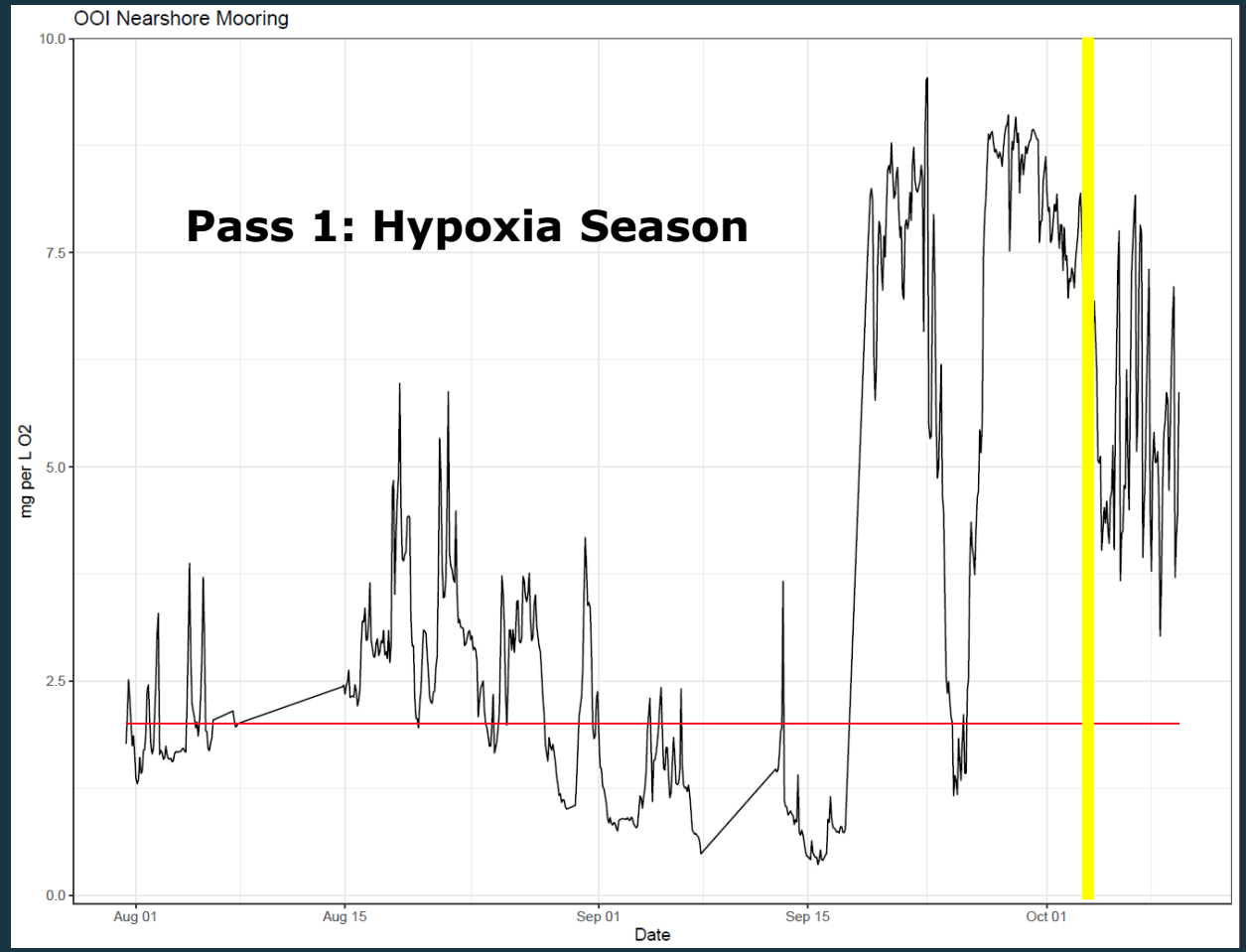
Environment | Local News | Northwest | Science | Weather

Low oxygen levels along Pacific Northwest coast a 'silent' climate change crisis

Sep. 28, 2021 at 6:00 am

Response:
Redo 135 of central coast transects





Survey 1

44 Sea days

595 Transects

3570 Km covered

Survey 2

10 Sea days

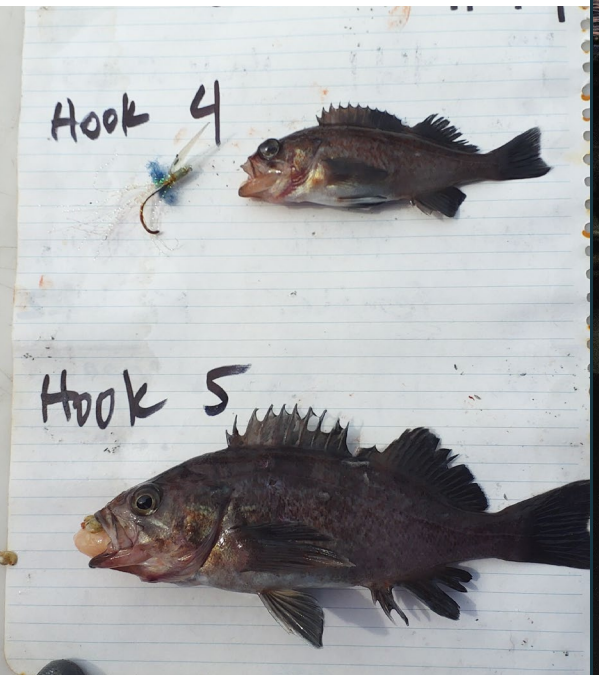
136 Transects

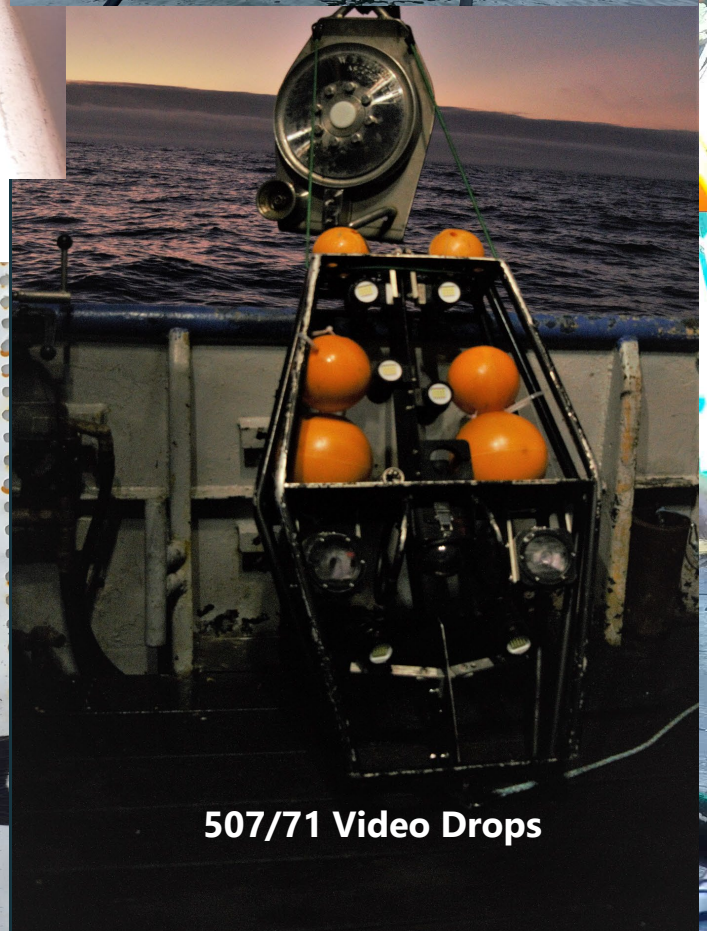
~1000 Km covered

229/52 CTD Casts

48/7 Fishing Stations

580/199 Fish Caught





507/71 Video Drops

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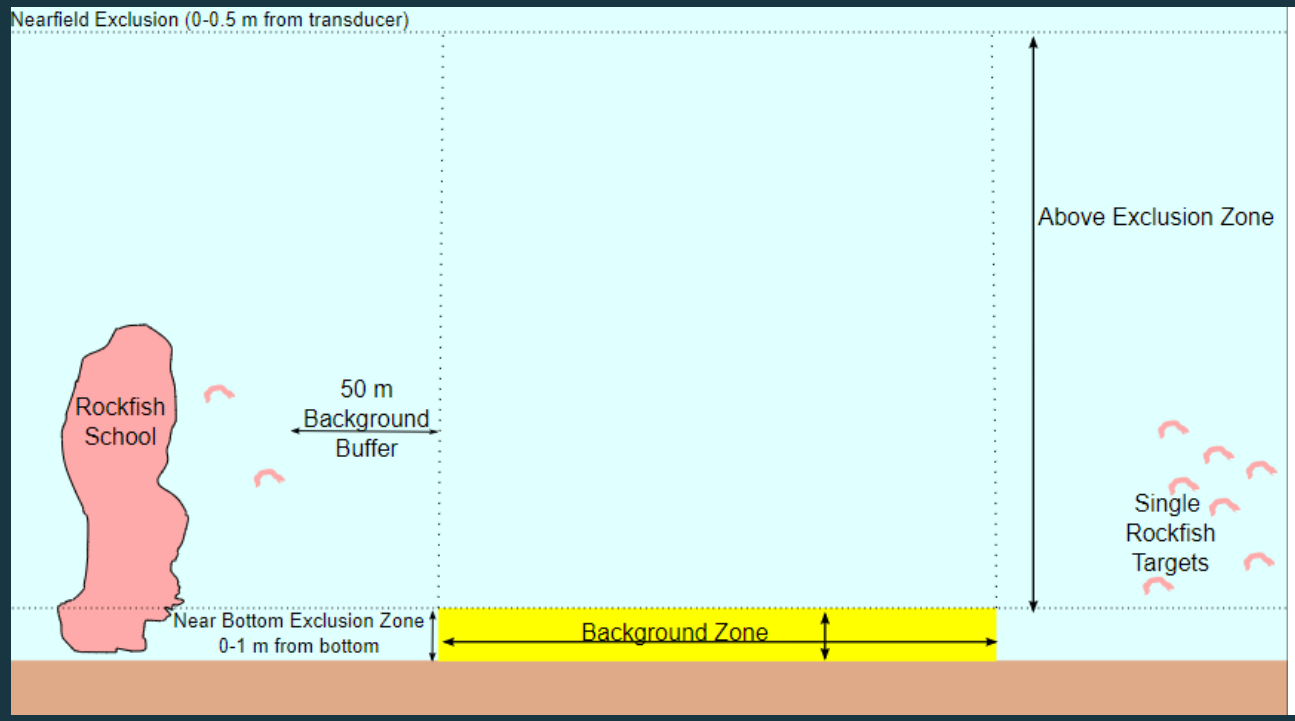
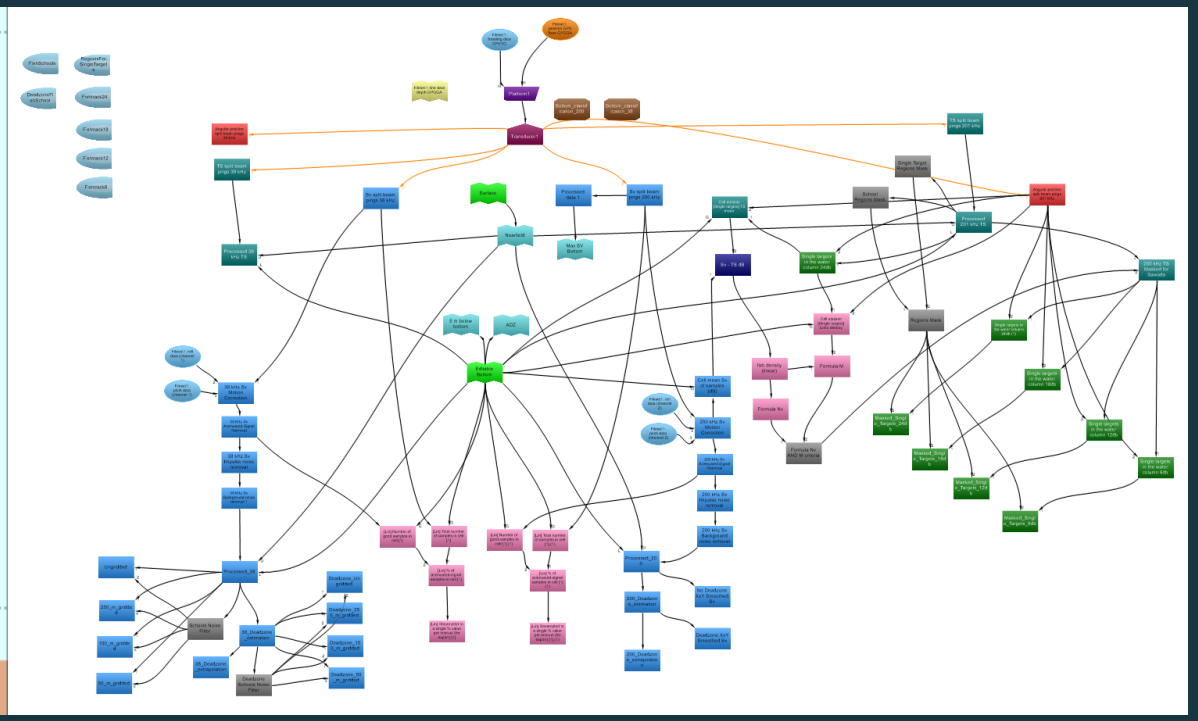
Lots of AI already implemented!



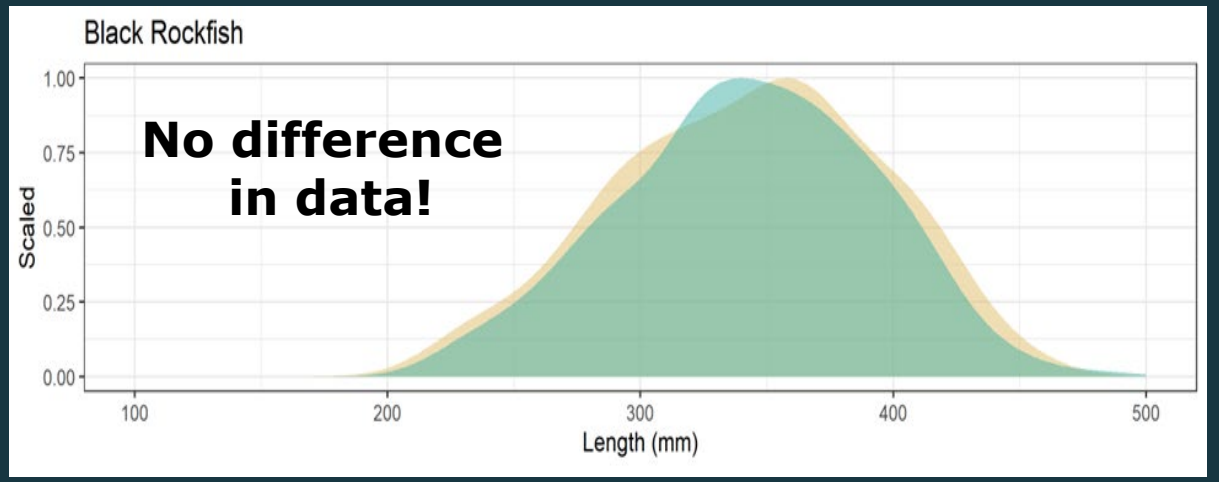


Next time we are going to run forage fish at same time. Time commitment ~1 day staff time.

Keep track of time when processing data!

MaxN: Count highest number of each species in one frame

MeanCount: Count all fish in multiple random frame and average

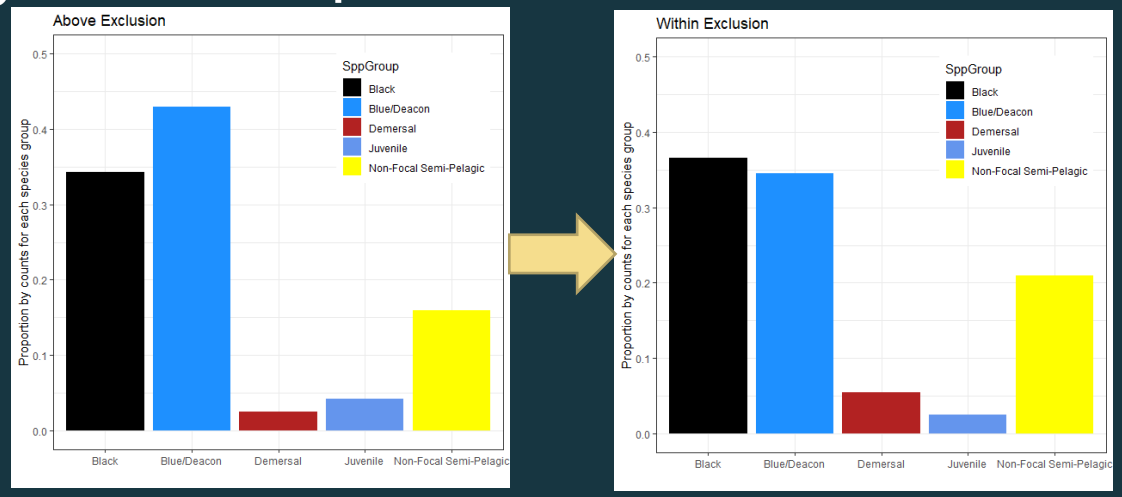


MaxN 2x longer to process!

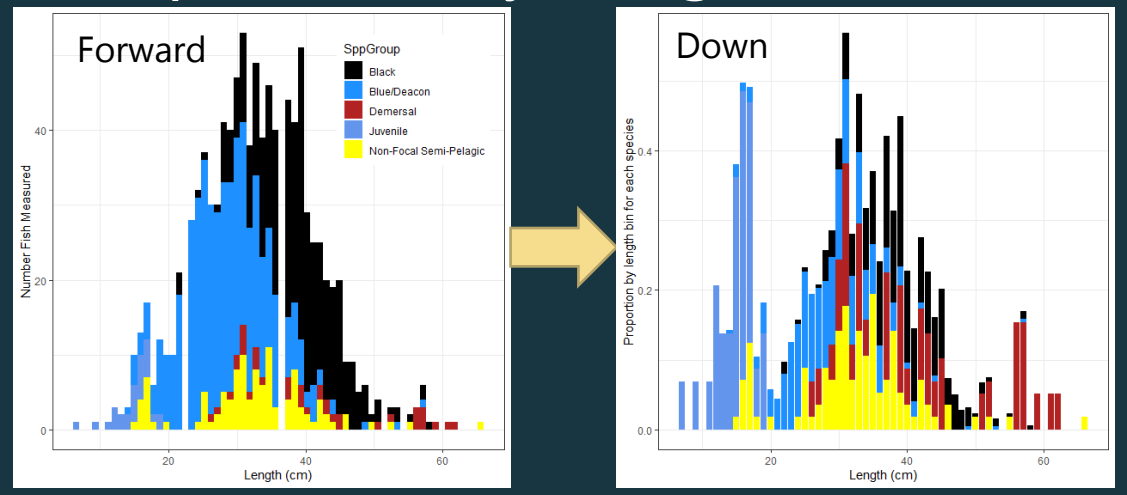
Plan for posterity: Write software!

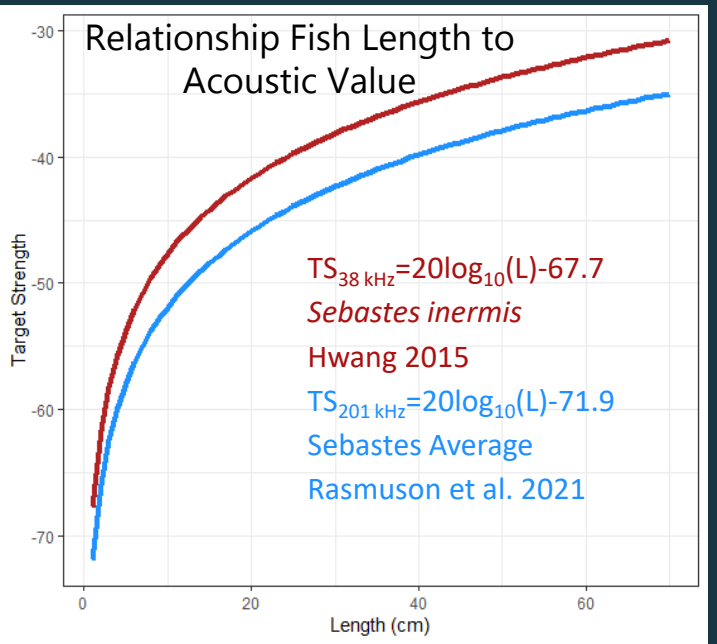
Marine Resources

Proportions Counted



Proportions By Length In Video





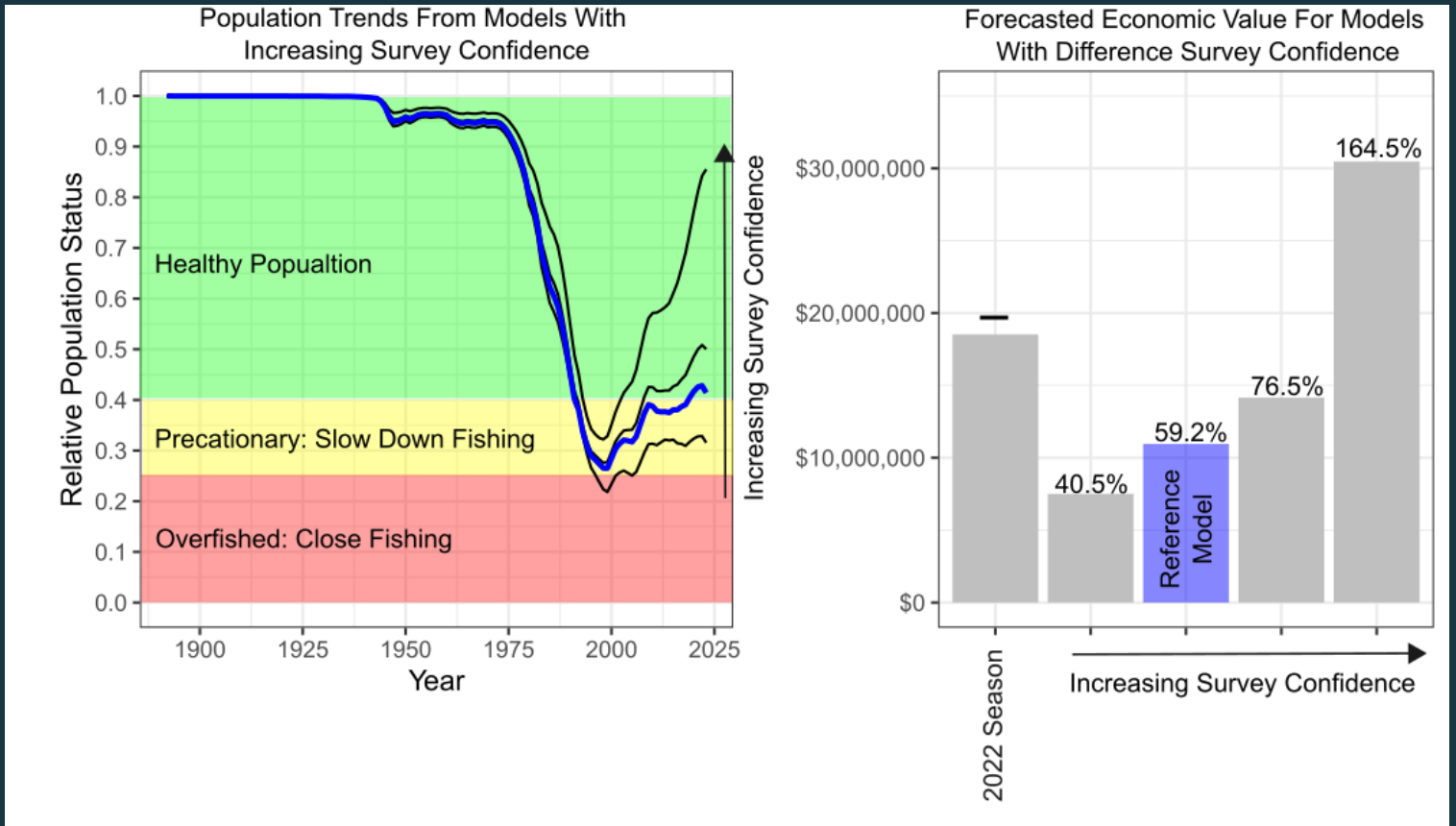
The Equations:

- $\sigma_{bs,L} = 10^{(\frac{TS_{L,f}}{10})}$
- $\overline{\sigma_{bs}} = \sum_{L,g}(P_{L,g} * \sigma_{bs,L})$
- $P_{L,g} = \frac{NCamFish_{L,g}}{\sum NCamFish_g}$
- $P_g = \frac{NCamFish_g}{\sum NCamFish}$

Survey data used in 2021 stock assessments

- Developed prediction of number of fish in Oregon
- Used in current stock assessment
- Kept us above precautionary

Region	Number of Fish
North	3,295,261
Central	101,550
South	9,598,649
Combined Regions	12,995,459



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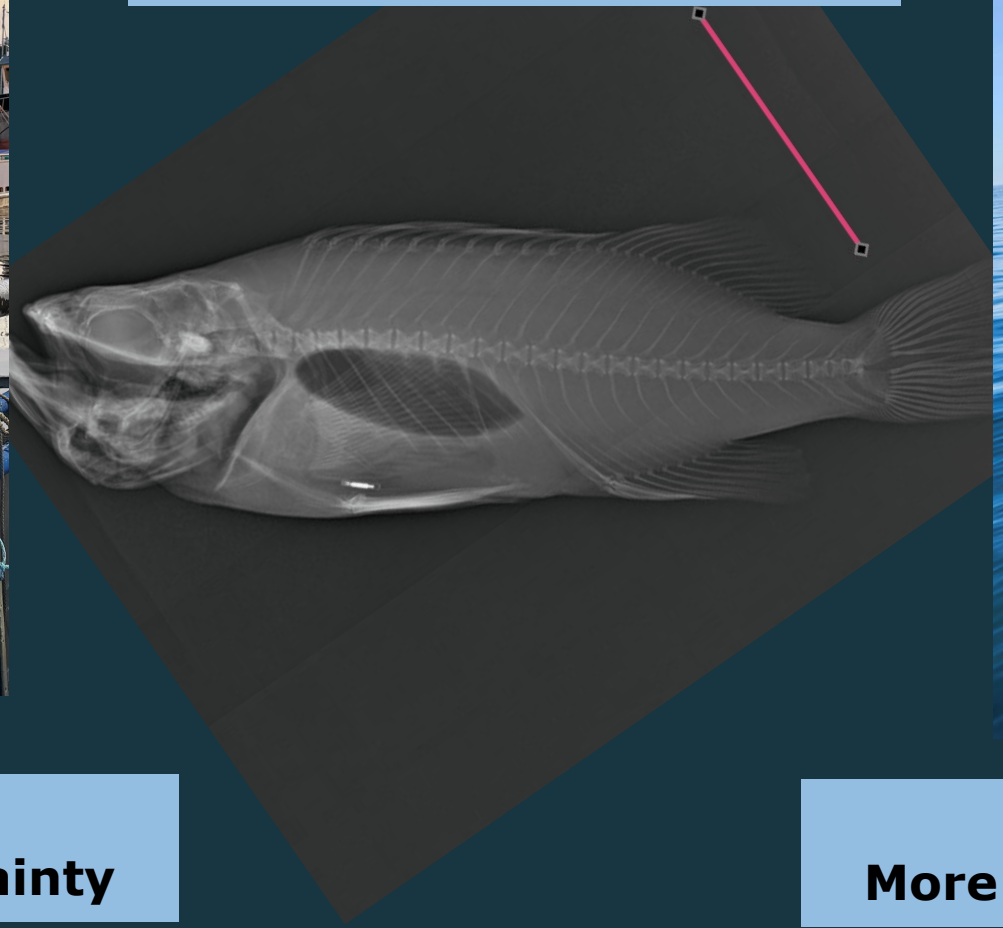
Where are we going next.
Finding efficiencies and reducing uncertainty

X-Ray Rockfish (Local TS relationship): Less uncertainty



New transducer: Better data less uncertainty

Jigging Machines: More fishing, less scientists/crew

Takeaways and Recommendations

- Think about stock assessment hangups
- Try to get data for lots of species
- When designing keep track of time
- Design things to work on available boats and work in most conditions
- Use technology but be wary (simple to build = simple to fix)
- Design for posterity

What is my pie in the sky?

Mexico to Canada nearshore survey:

- Same methods
- Single indices of abundance

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Thank you!

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SCAN ME

https://experience.arcgis.com/experience/f26c6463c4c54f25a25139eca4fc80c7/page/Overview/