

# Using a FlowCAM to analyze zooplankton samples from the Gulf of the Farallones

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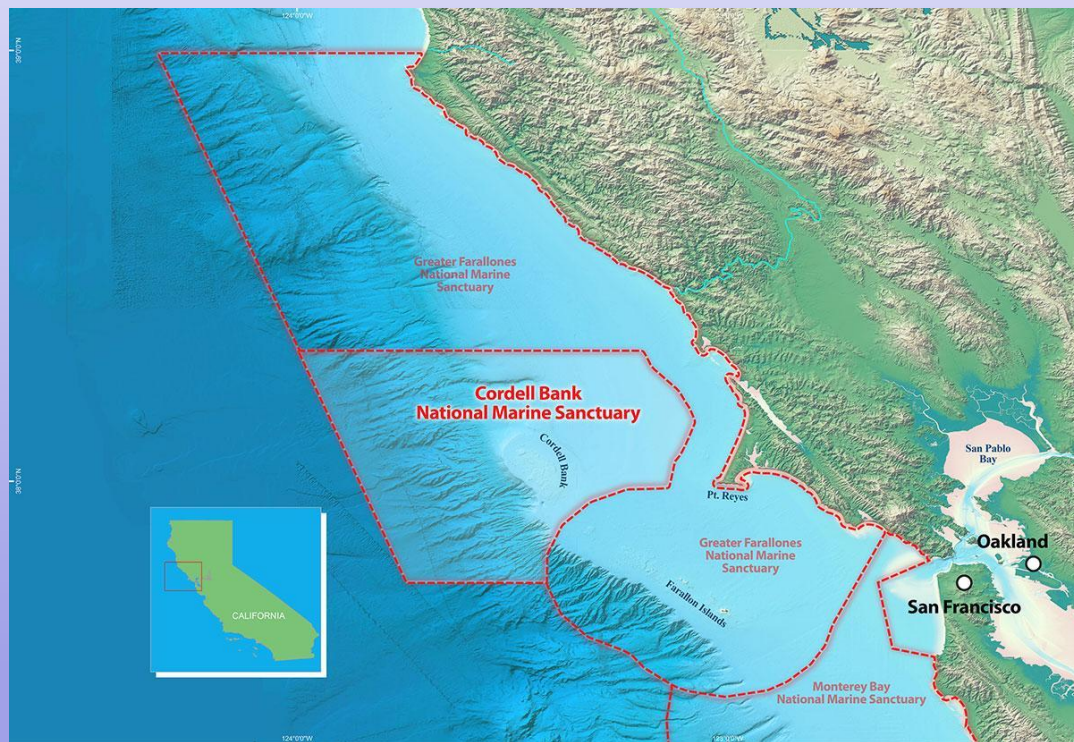
# Overview

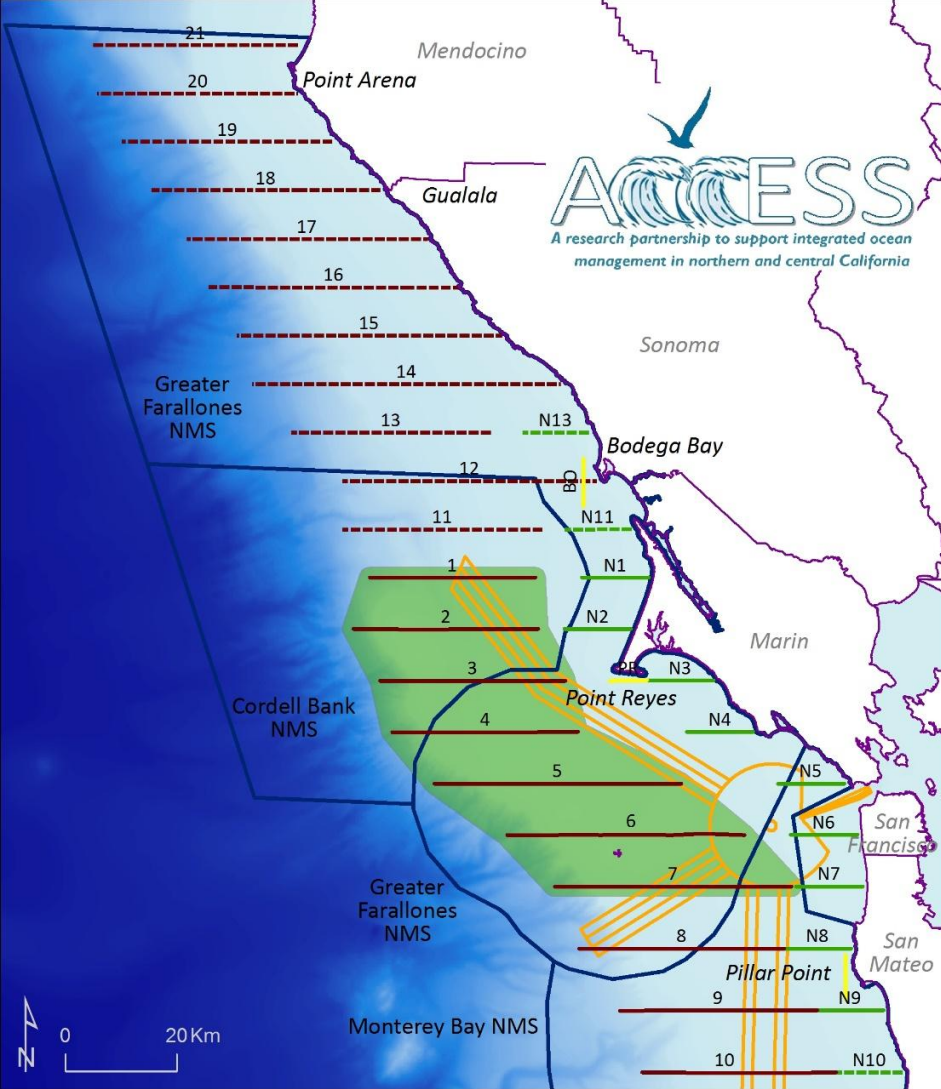
- **Goal:** develop protocol for use of FlowCAM on zooplankton samples
- *Is this a viable alternative to traditional methods?*
- Collaboration between Point Blue and SFSU
- June 2021-present



# ACCESS- Applied California Current Ecosystem Studies

- Program started in 2004
- Goals:
  1. Preventing whale ship strikes
  2. Reducing entanglements
  3. Protecting wildlife hotspots
  4. **Developing ecosystem indicators**
  5. Tracking ocean acidification



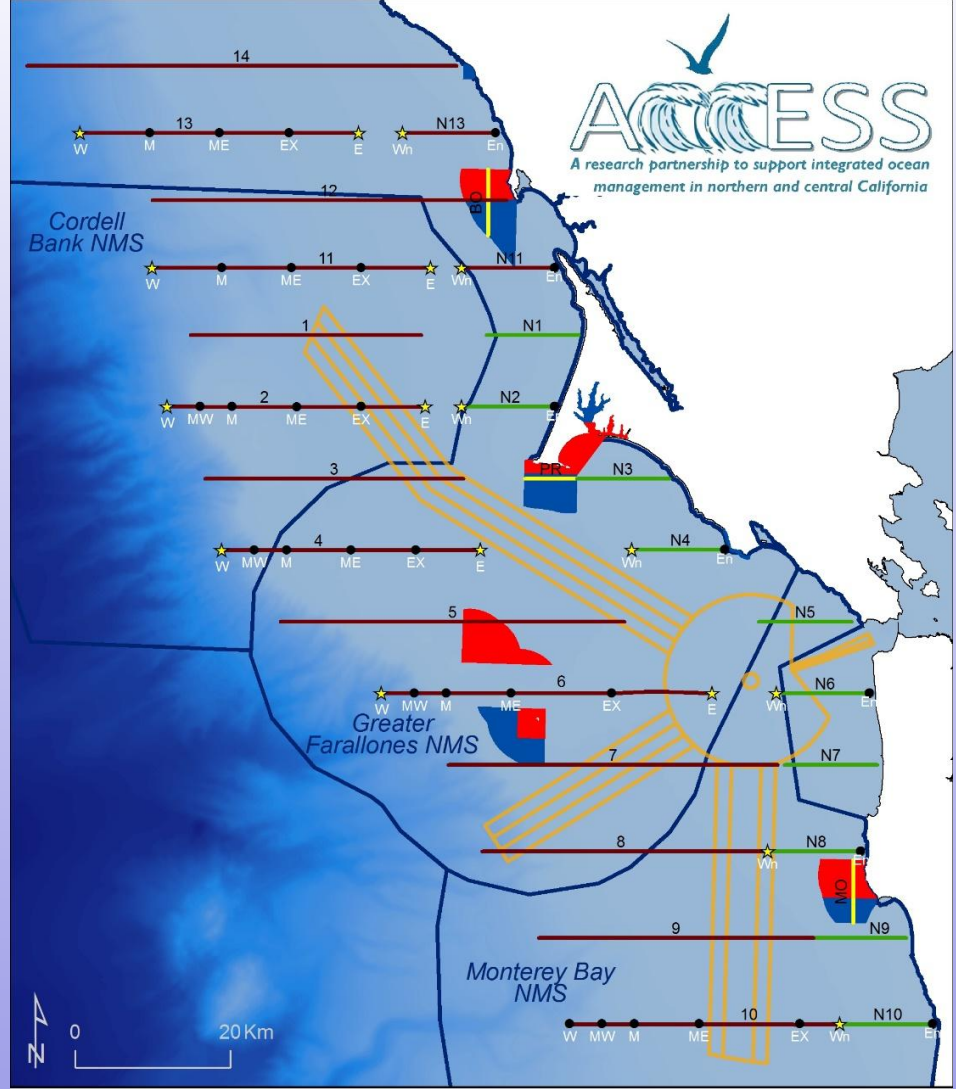


### Original and Expansion Area ACCESS Transect Lines

- Offshore Transect, Original
- - - Offshore Transect, Expansion
- Nearshore Transect, Original
- - - Nearshore Transect, Expansion
- Limited Survey Transect
- NMS Boundaries
- Shipping Lanes
- Baseline Study Area

### Applied California Current Ecosystem Studies (ACCESS)

For more information please visit [www.accessoceans.org](http://www.accessoceans.org) or contact Jaime Jahncke at [jjahncke@pointblue.org](mailto:jjahncke@pointblue.org)



### Offshore and Nearshore Transect Lines and Sampling Stations

- Offshore Transects
- Nearshore Transects
- Limited Survey Transects
- Shipping Lanes
- ★/● CTD/Phyto/Zoop Station
- CA MPA - SMCA
- CA MPA - SMR
- NMS Boundaries

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# ACCESS Cruises



**Tucker Trawl**



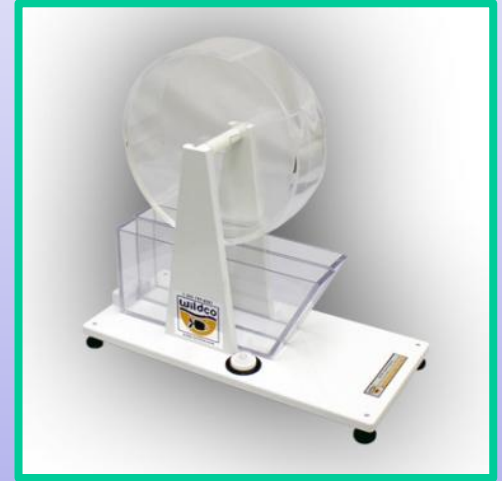
**Hoop Net**



# Standard zooplankton collection/processing



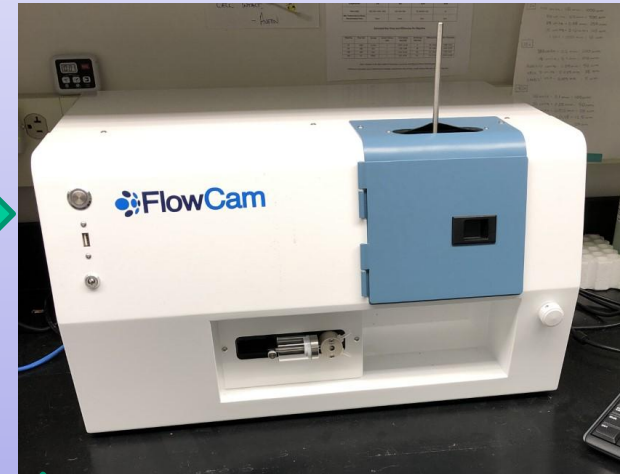
333 um mesh  
upper 50m  
10 minute tow



Copepod taxonomic data



# FlowCAM- New Method?



Pictures for ID



Measurements of each particle

# FlowCAM



# Project Plan- Outset (June 2021)

1. Develop, test, and finalize protocol for processing zooplankton samples with FlowCAM
2. Process samples
3. Preliminary ID/Counts
4. Test FlowCAM software ability to filter/ID particles

# Project Plan- Outcome (Dec 2021)

1. Develop, test, and finalize protocol for processing zooplankton samples with FlowCAM
2. Process samples
- ~~3. Preliminary ID/Counts~~
- ~~4. Test FlowCAM software ability to filter/ID particles~~

# Progress made

- Developed workable SOP for zooplankton <math><1000\mu\text{m}</math>
- Clarified many aspects of FlowCAM function
- Performed some imaging of provided samples

# Obstacles

## Hardware problems



### **Syringe pump-**

- inconsistent flow rate and volume
- Common site of plankton build-up

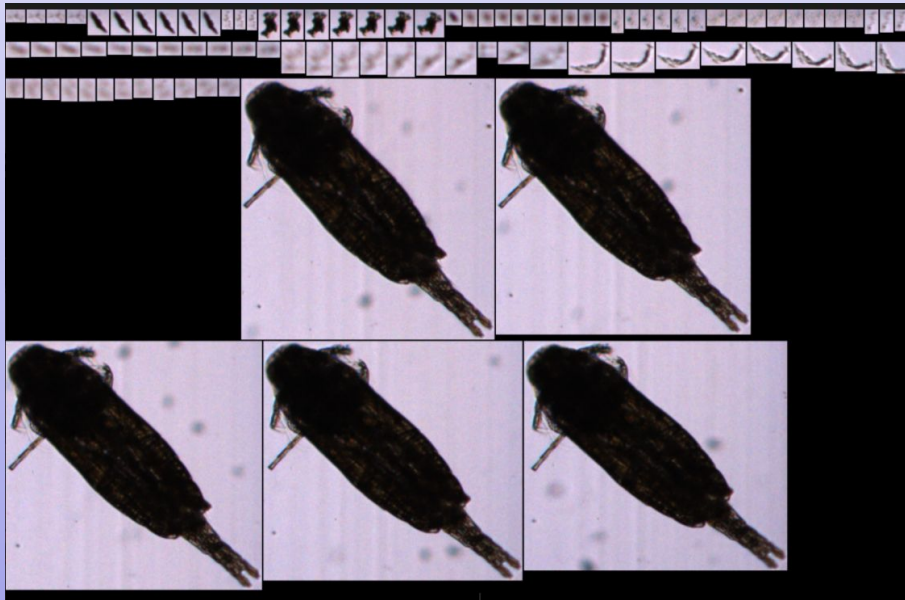
# Obstacles- Particle size and shape

- Long, narrow organisms slip through sieve
- Organisms clump together
- Complex shapes
- Large organisms



# Obstacles- Flow Rate

Too Slow (<7.5 ml/min)



Duplicate images  
Poor orientation

Too Fast (>7.5 ml/min)



Cropped images  
Missed particles

# Obstacles- Image Quality



# Future Work

- More sample processing
- Large organism imaging
- Test FlowCAM statistical filters
- Troubleshooting





# Thank you!

- **Point Blue:**

- Meredith Elliott
- Jaime Jahncke

- **SFSU Kimmerer Lab:**

- Wim Kimmerer
- Anne Slaughter
- Toni Ignoffo
- Michelle Jungbluth

- Moira Galbraith

(Institute of Ocean Sciences)

- Kris Daigle (Fluid Imaging)

- Joe Agosto (SFSU IT)



SAN FRANCISCO  
STATE UNIVERSITY



Point Blue  
Conservation  
Science

 **FlowCam**<sup>®</sup>  
Yokogawa Fluid Imaging Technologies, Inc.

Questions? Contact: [cnorton1@mail.sfsu.edu](mailto:cnorton1@mail.sfsu.edu)