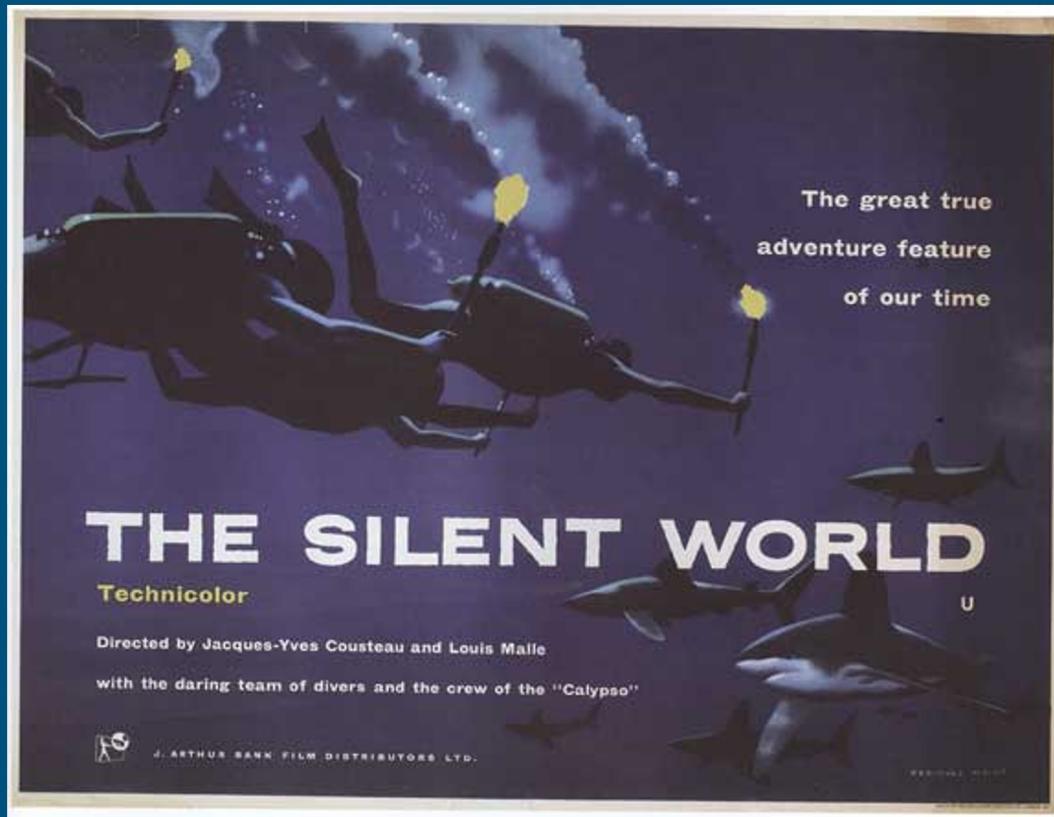


Chorusing Fish in the La Jolla Kelp Forest: 2015 - Present

Annette Brennan
Camille Pagniello
Jack Butler
Ana Širović

Fish Make Noise?



Fish Make Noise?

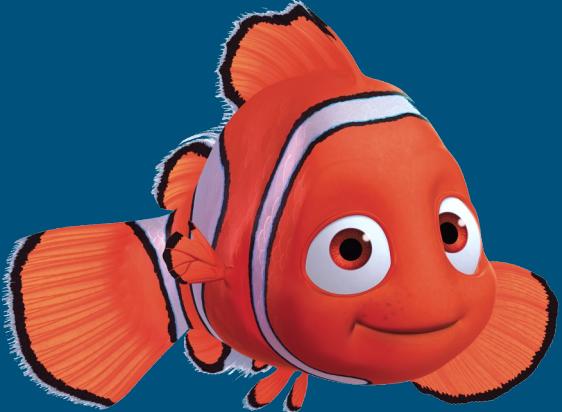


Fish Make Noise!!

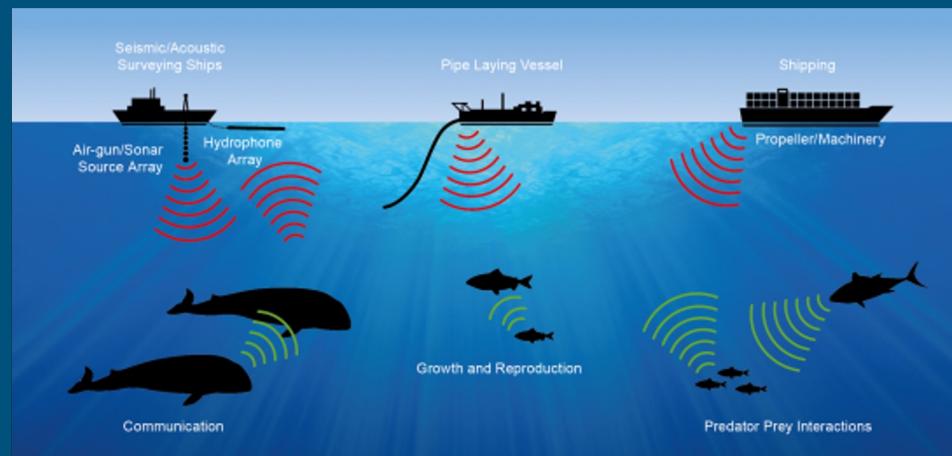
Unspecialized sounds

Active Sounds

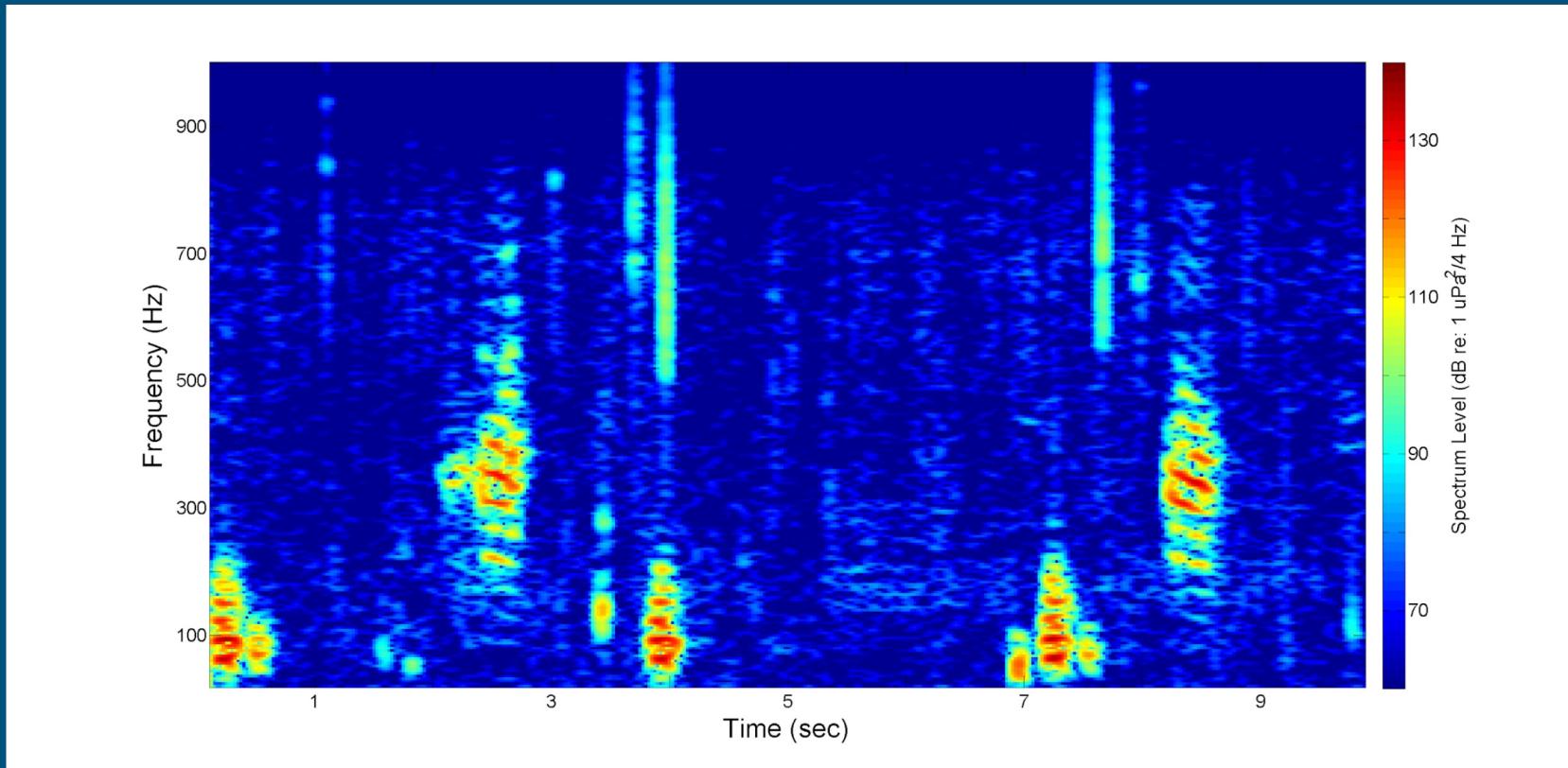
- Stridulation
- Stringing
- Drumming



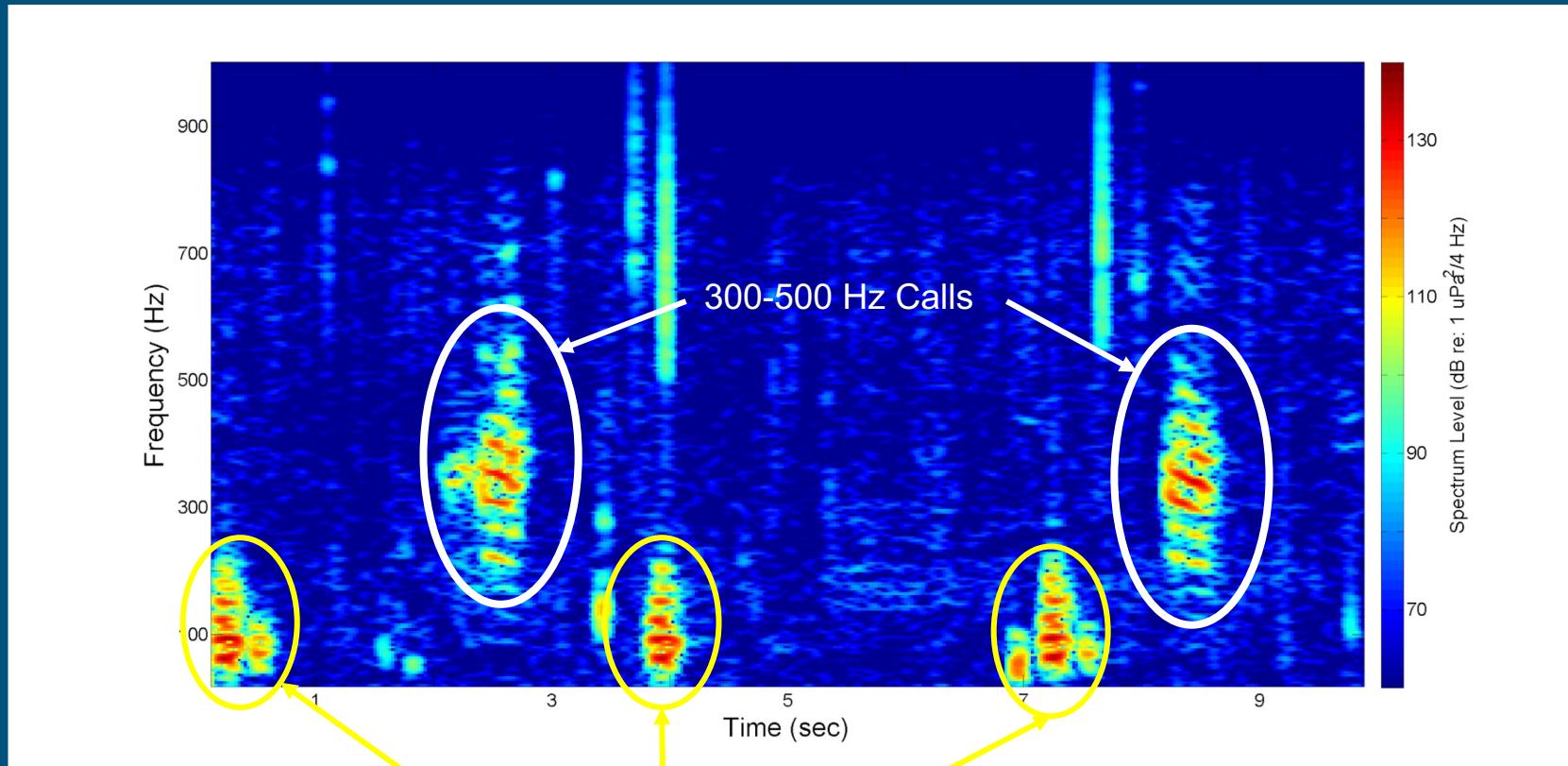
Using Passive Acoustics to Monitor Species and Ecosystem Health



2 Different Fish Calls

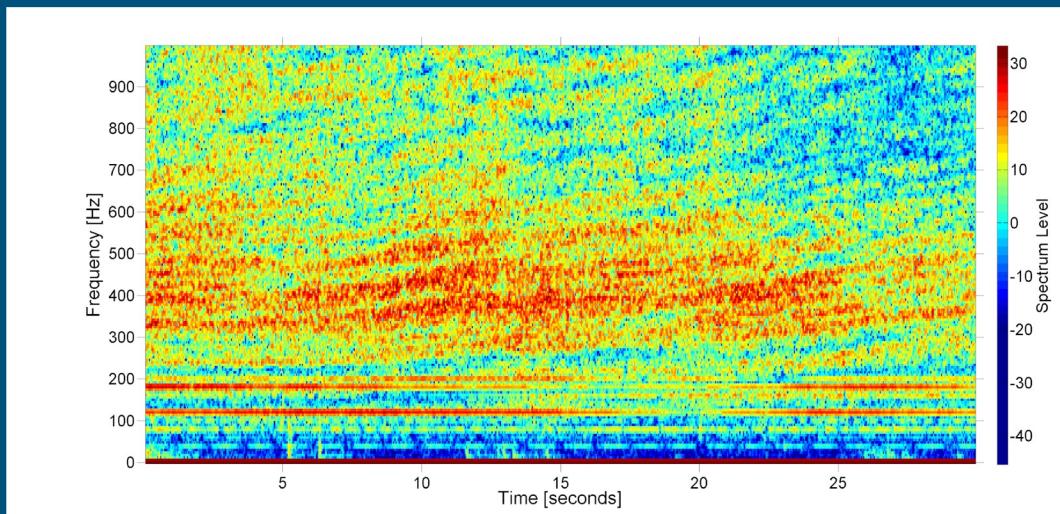
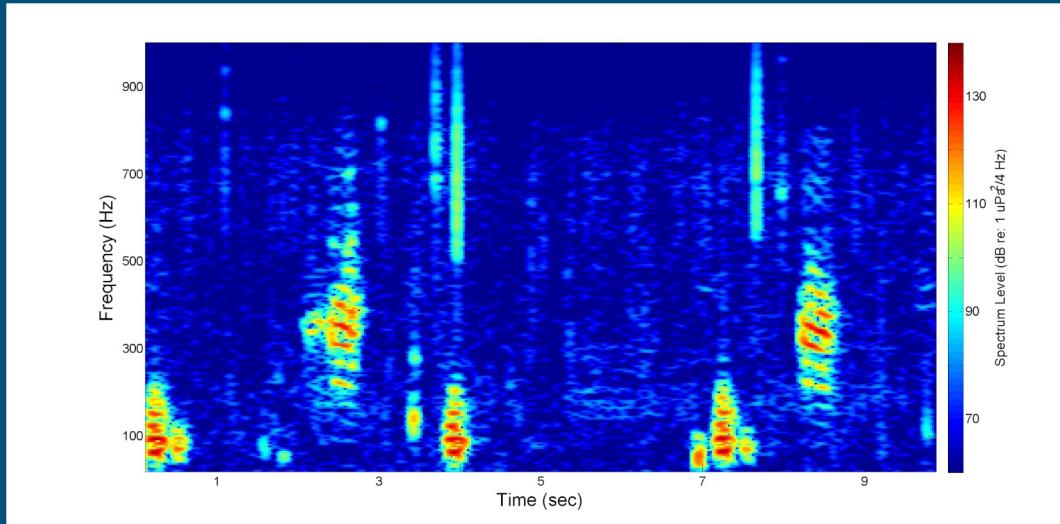


2 Different Fish Calls



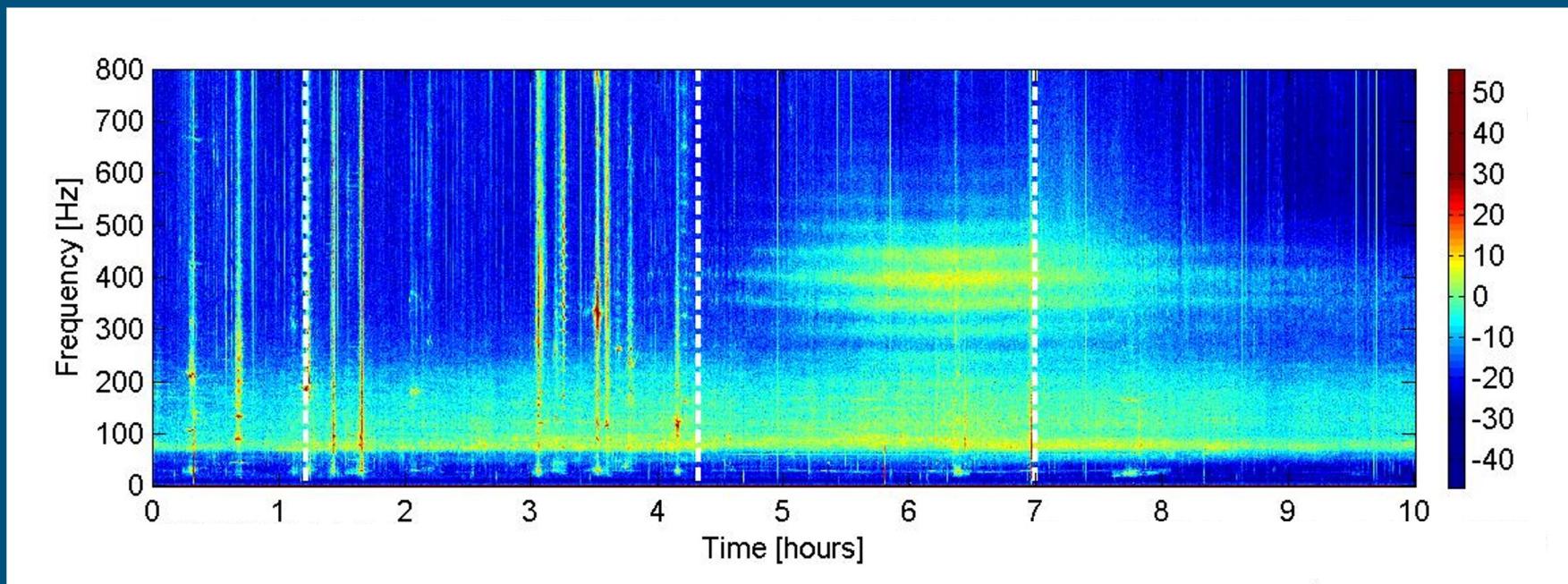
100 Hz Calls

Masking and its Effects on Effort



Chorusing

Chorus: When individual fish calls were so abundant they were no longer decipherable



Objective

Existing Data

What are the trends of these calls?

- Diel
- Spatial
- Annual

Field Work

Where is the chorus being made?

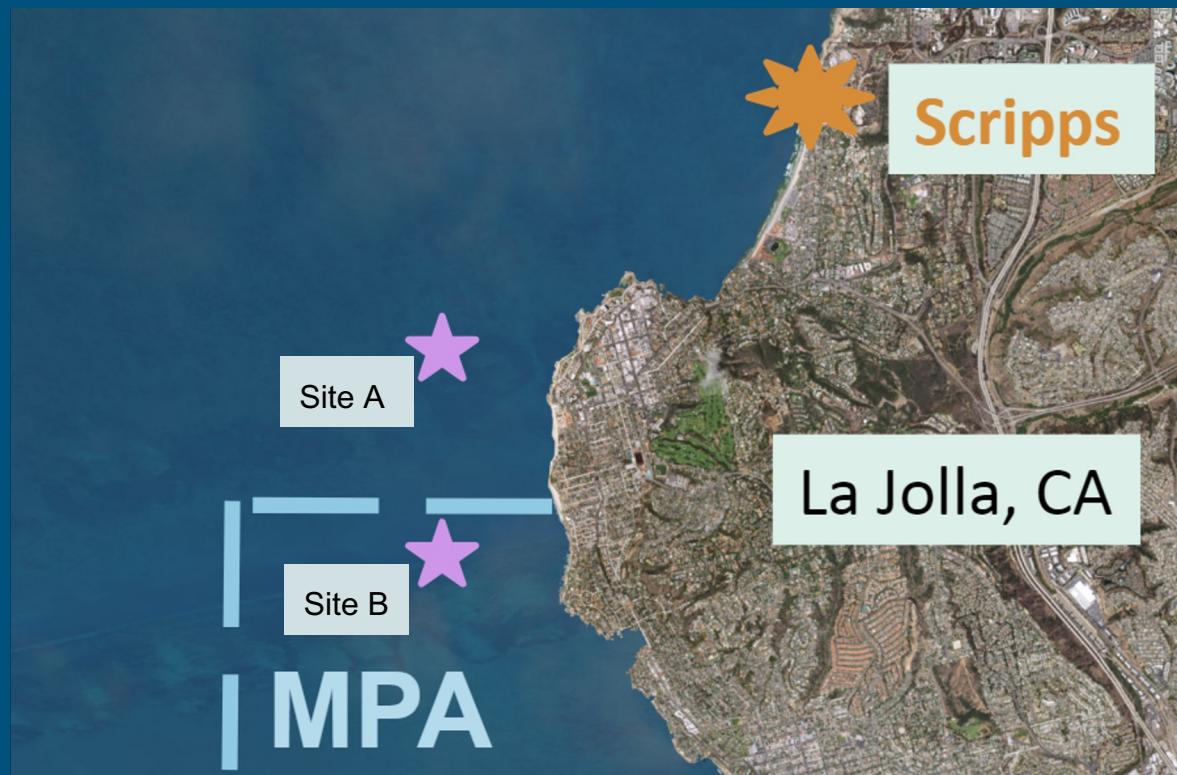
Who is making the chorus?

Logging Existing Data

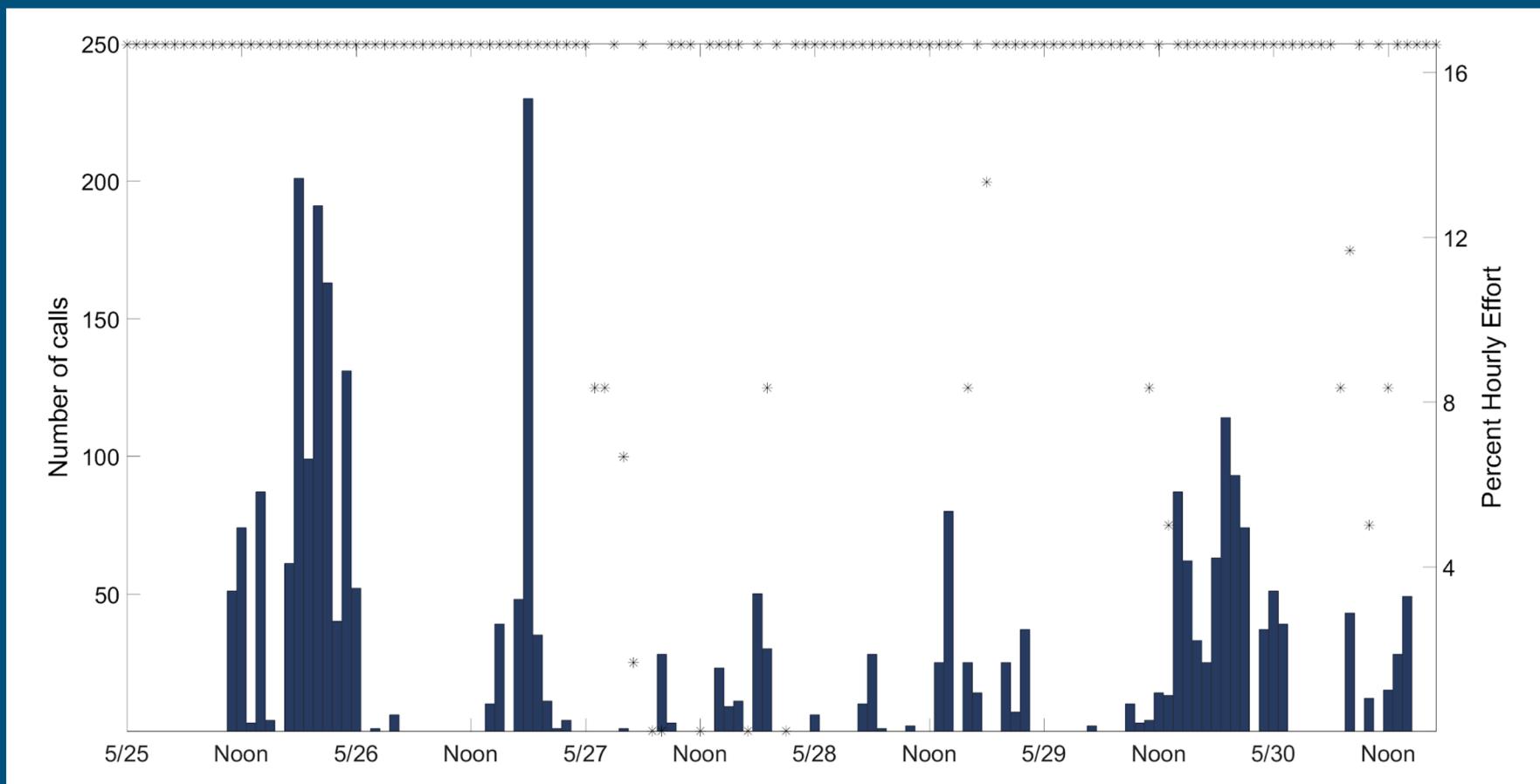
May 2015: 5 Days Each - Site A & B

May 2016: 15 Days Site B

May 2017: 16 Days Site B

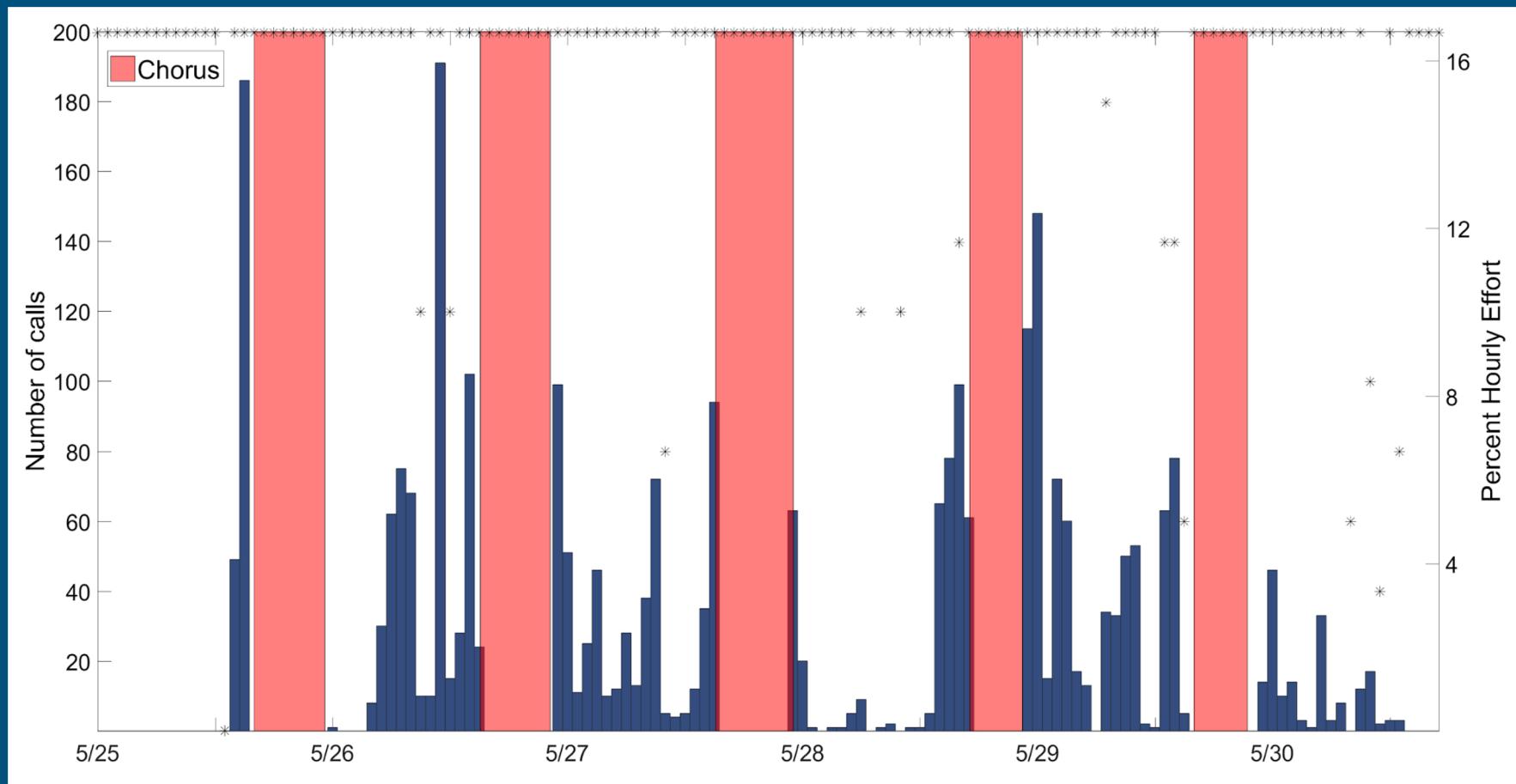


100 Hz Call, 2015, Site A



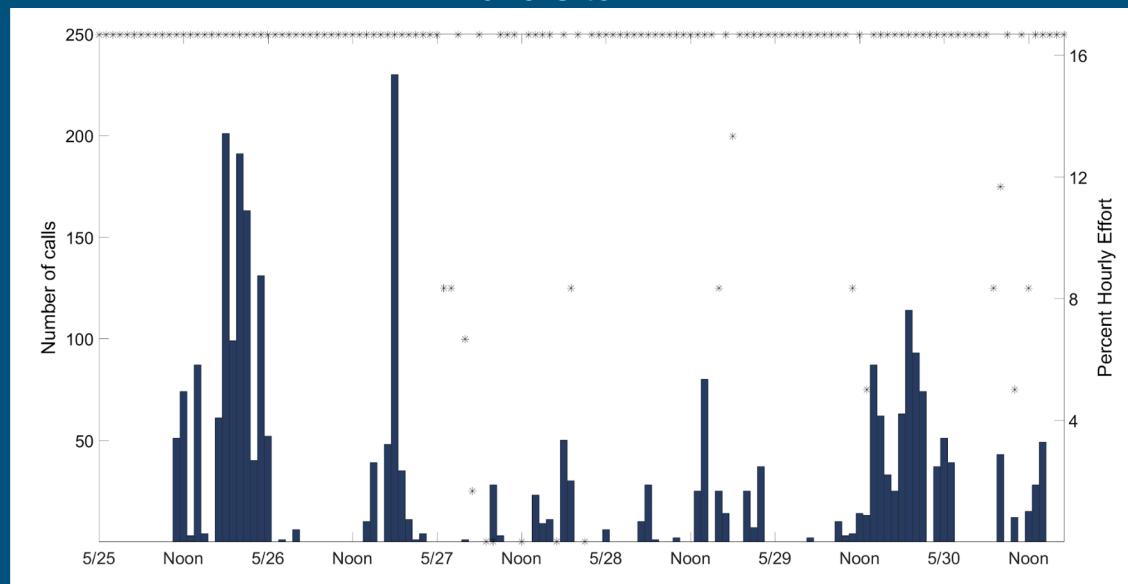
Diel Trend: 100 Hz Call

2015 Site B

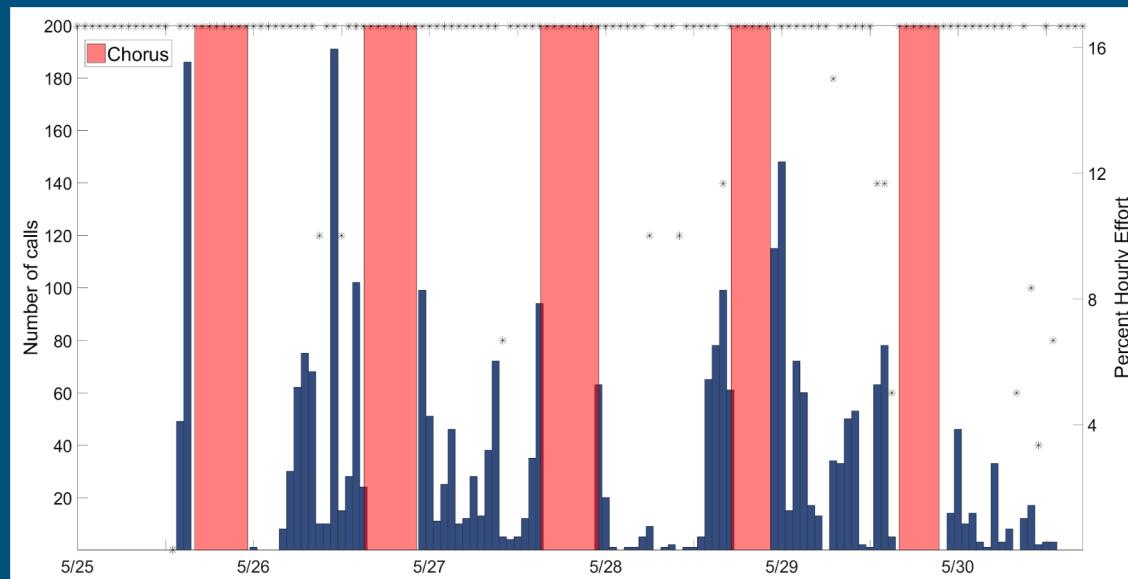


Spatial Trend: 100 Hz Call 2015

2015 Site A

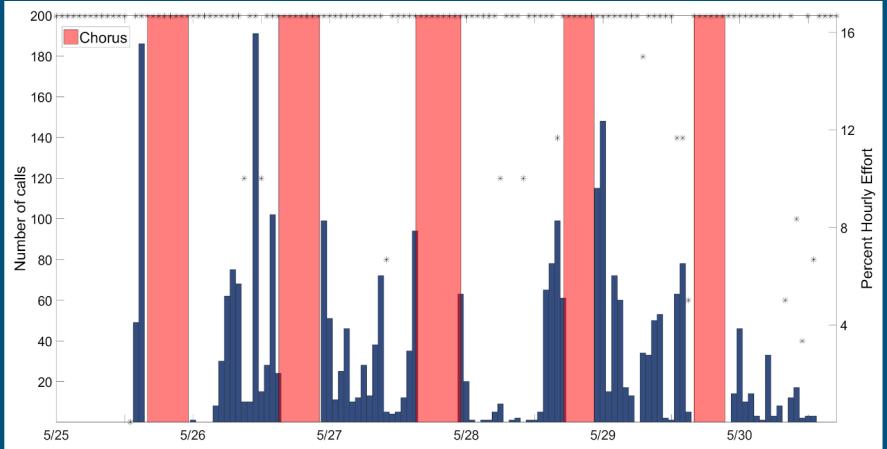


2015 Site B

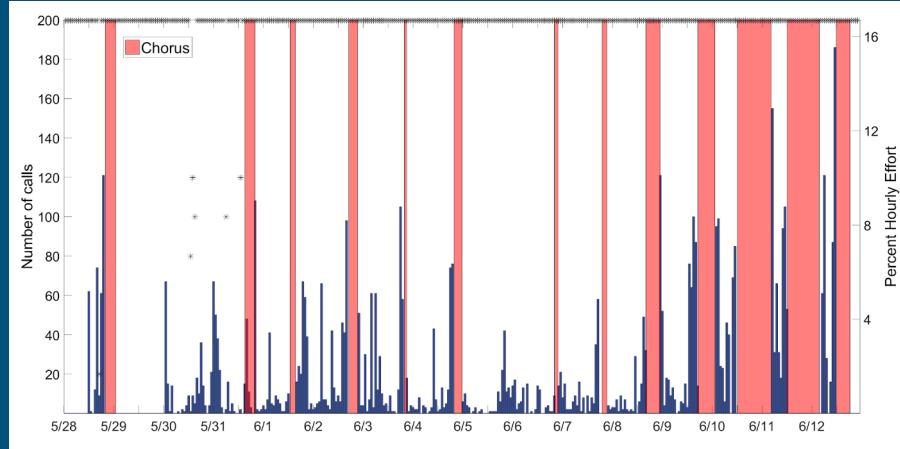


Annual Trend: 100 Hz Call Site B

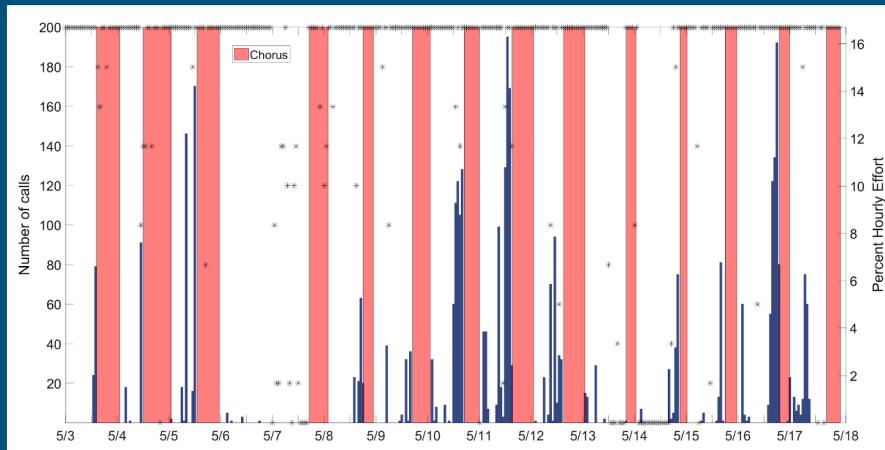
2015



2016

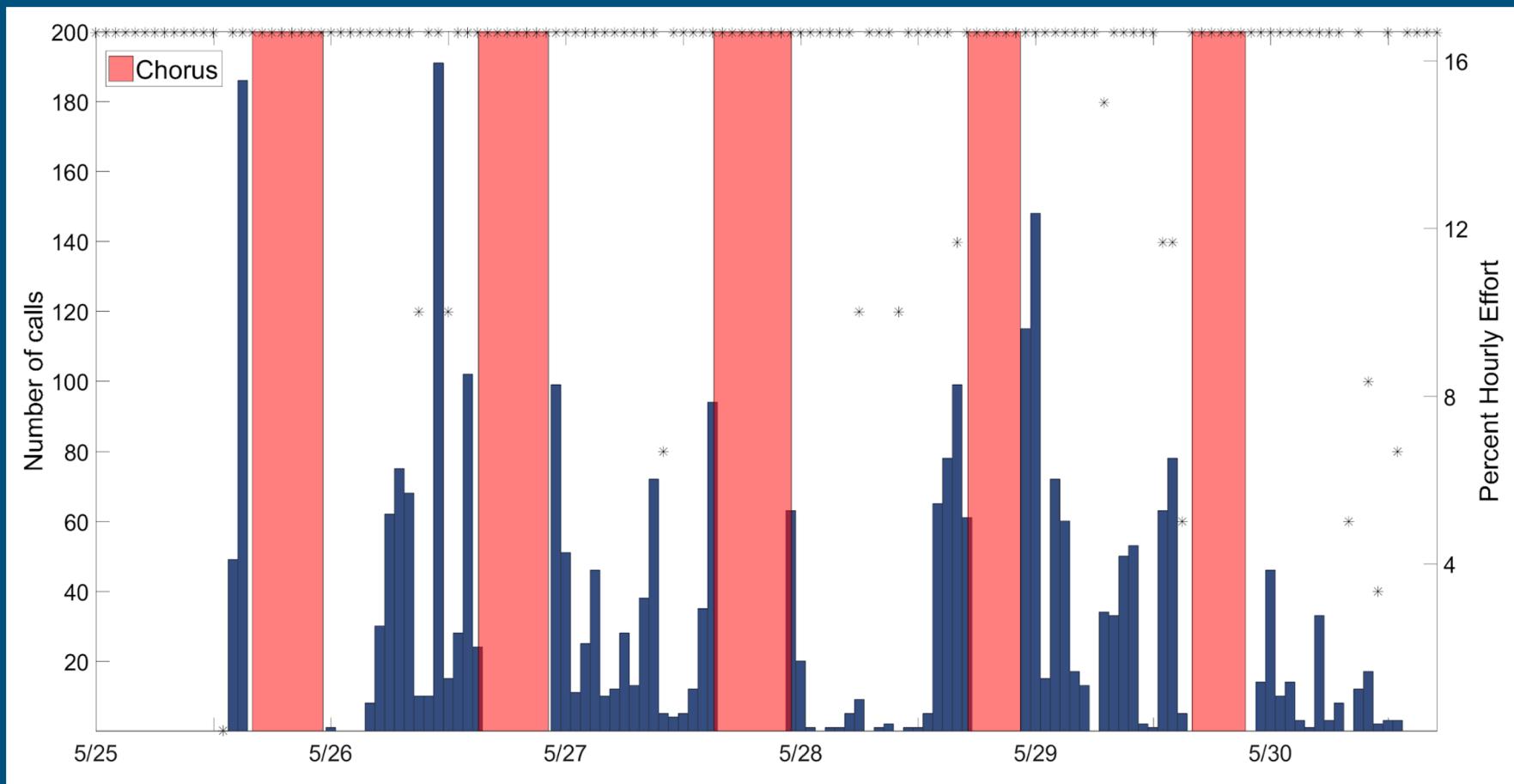


2017



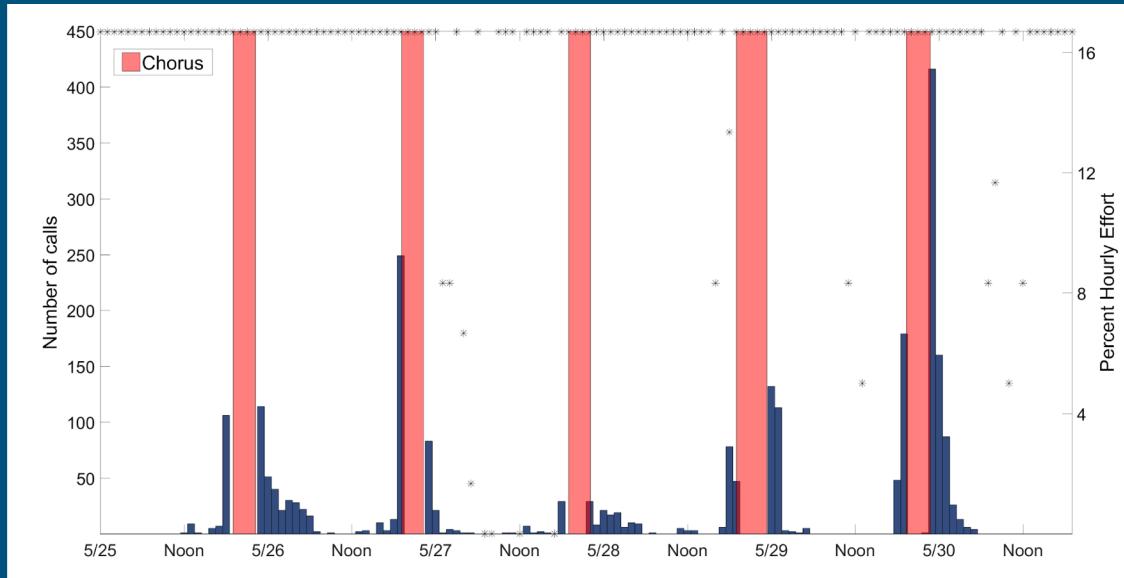
Diel Trend: 300-500 Hz Call

2015 Site A

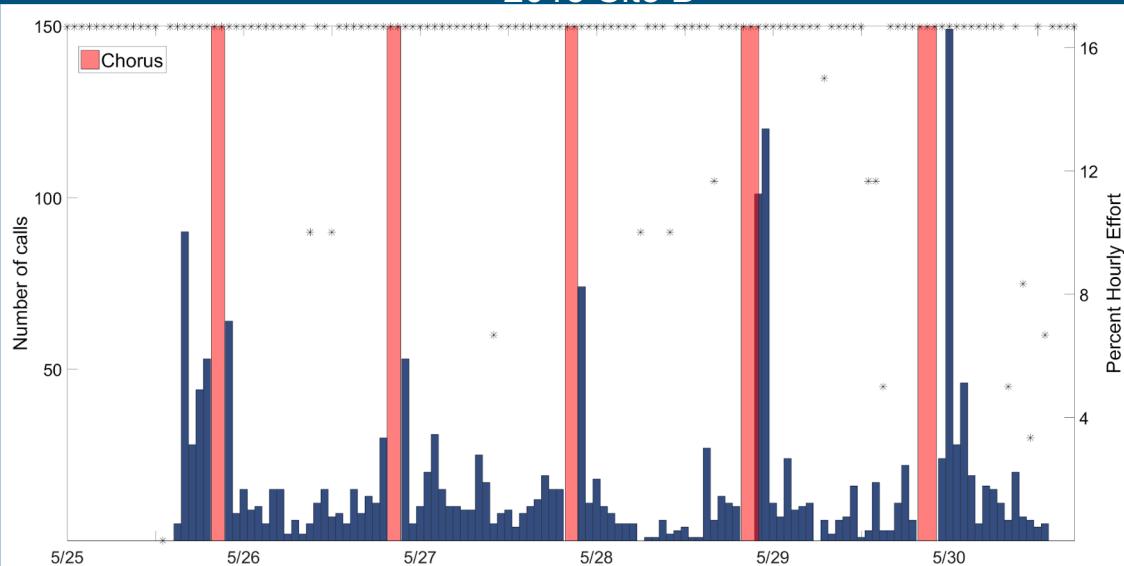


Spatial Trend: 300-500 Hz Call 2015

2015 Site A

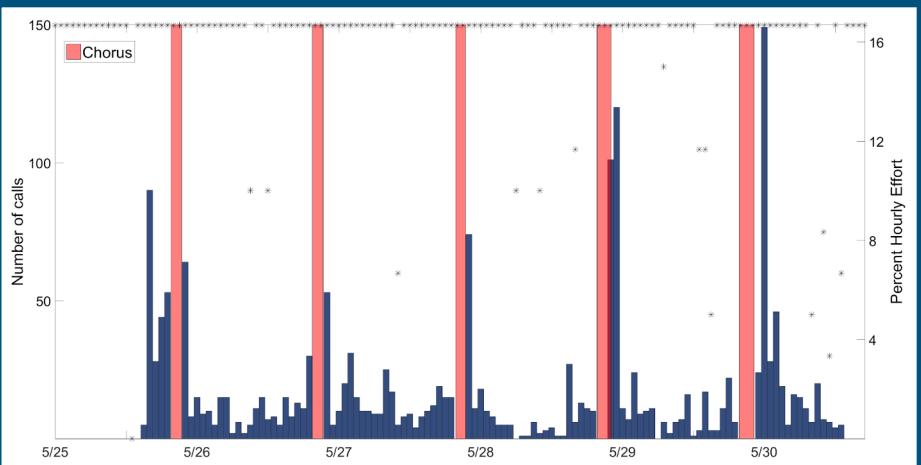


2015 Site B

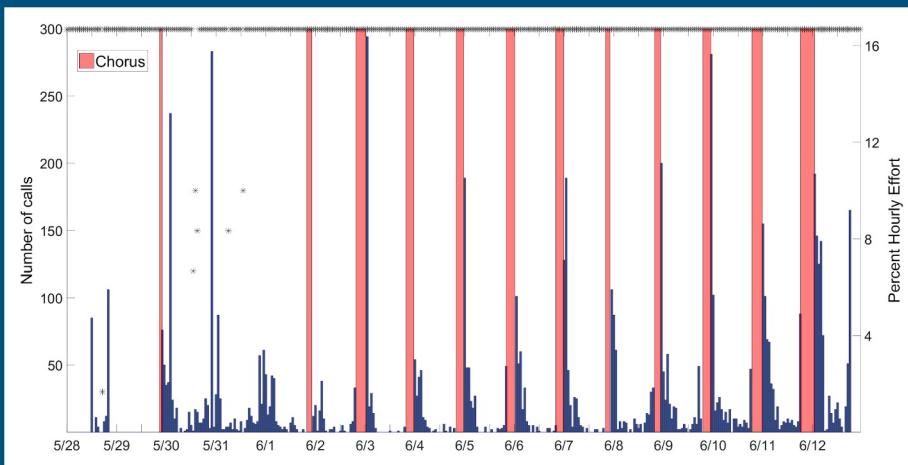


Annual Trend: 300-500 Hz Call Site B

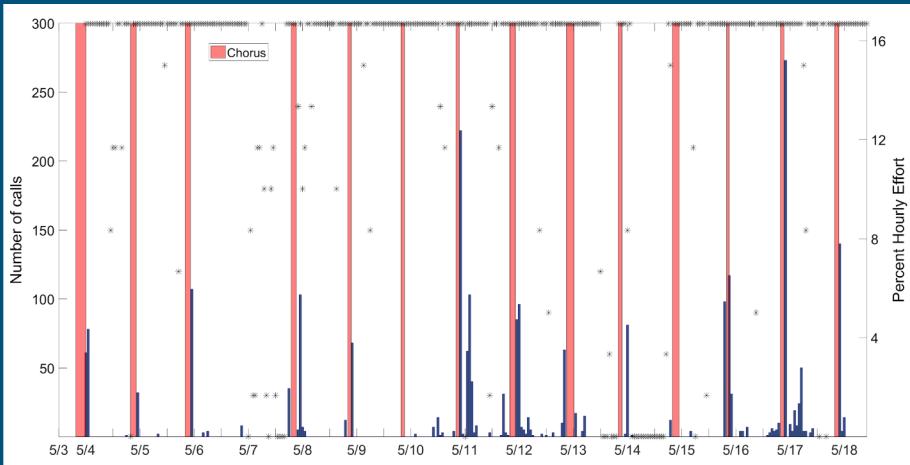
2015 Site B



2016 Site B



2017 Site B



Conclusions...

100 Hz Call

Diel

- Call abundance increases at night
- Chorus 6-12 hr

Spatial

- Site A had no chorusing

Annual

- Consistently chorusing, though length of chorus varies

300-500 Hz Call

Diel

- Call abundance increases at night
- Chorus ~3 hr

Spatial

- Similar diel periodicity throughout

Annual

- Similar diel periodicity throughout

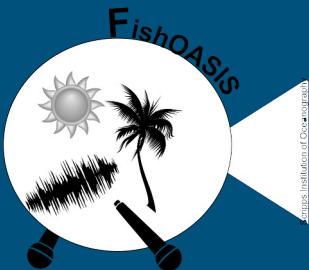
Observations Thus Far

White Seabass (*Atractoscion nobilis*)
100 Hz call

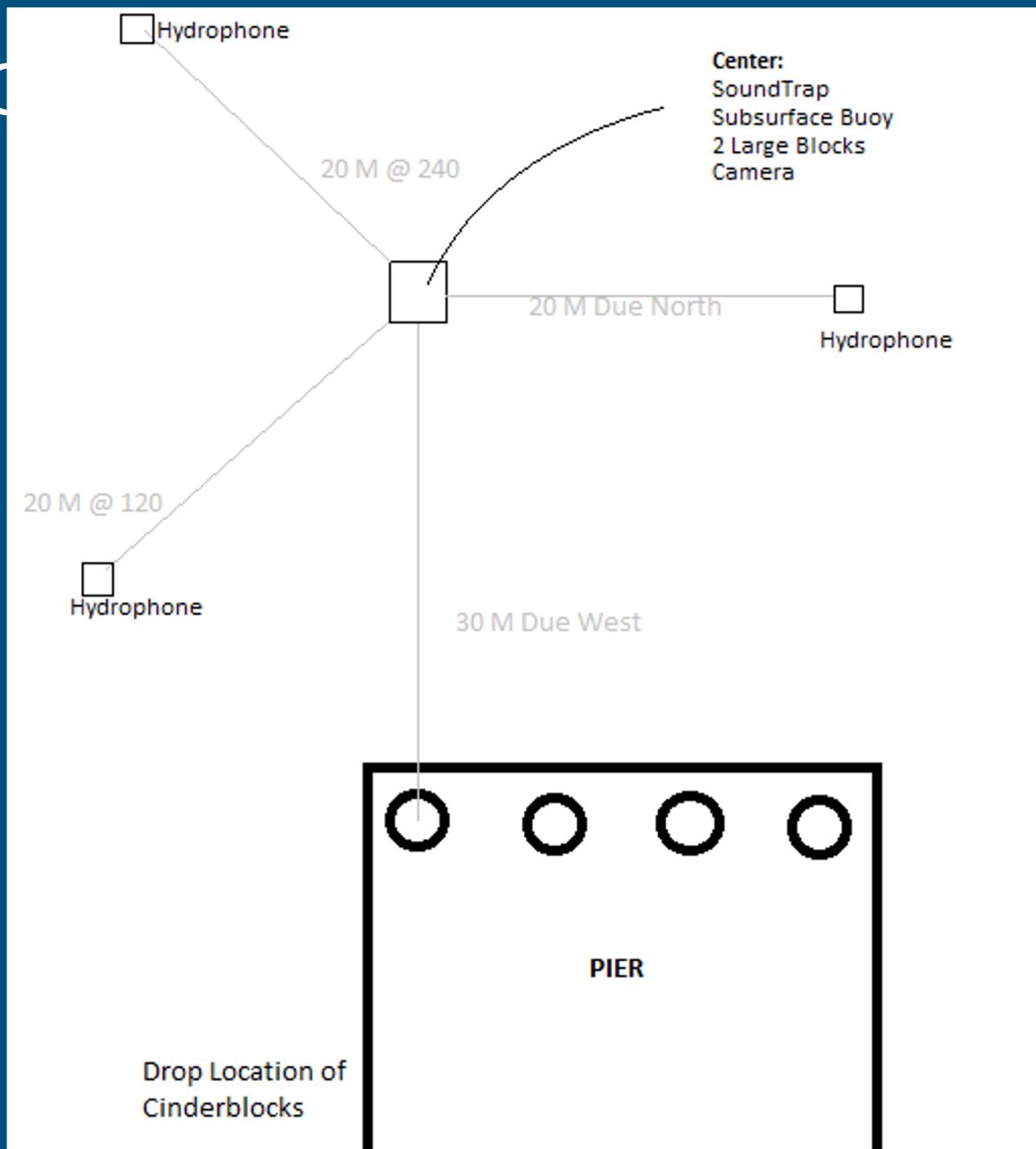


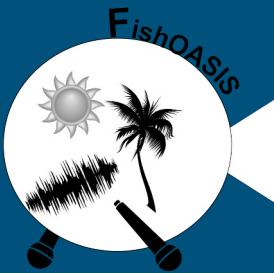
Barred Sand Bass (*Paralabrax nebulifer*)
300-500 Hz call



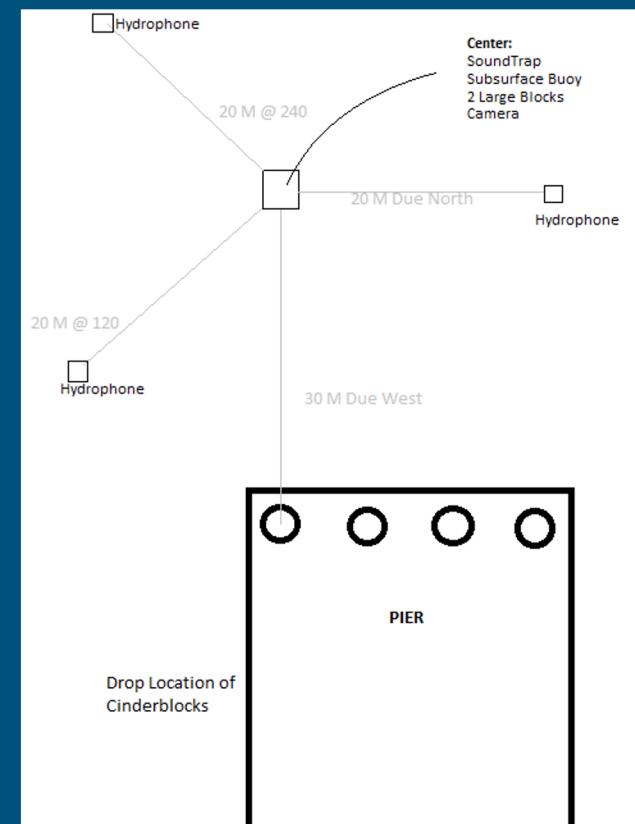


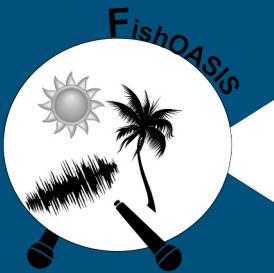
Add a C



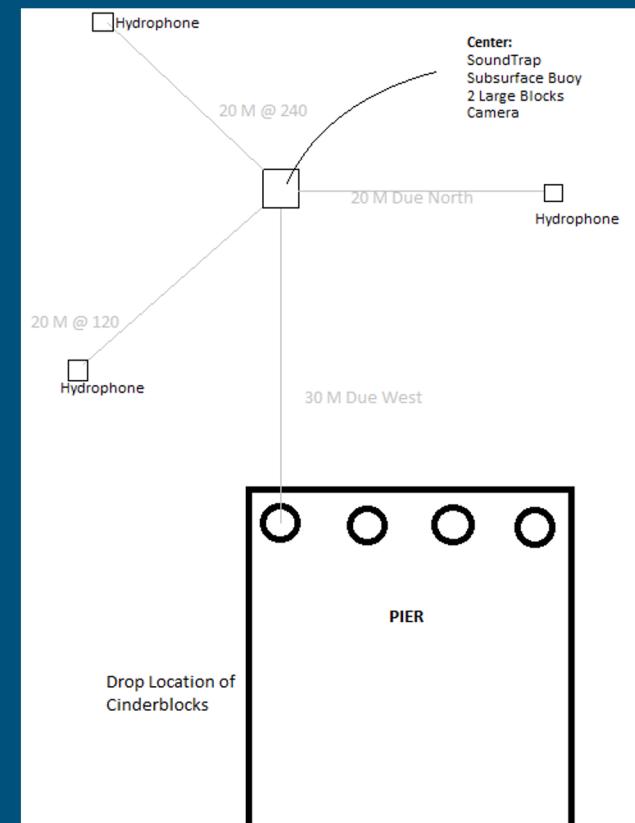
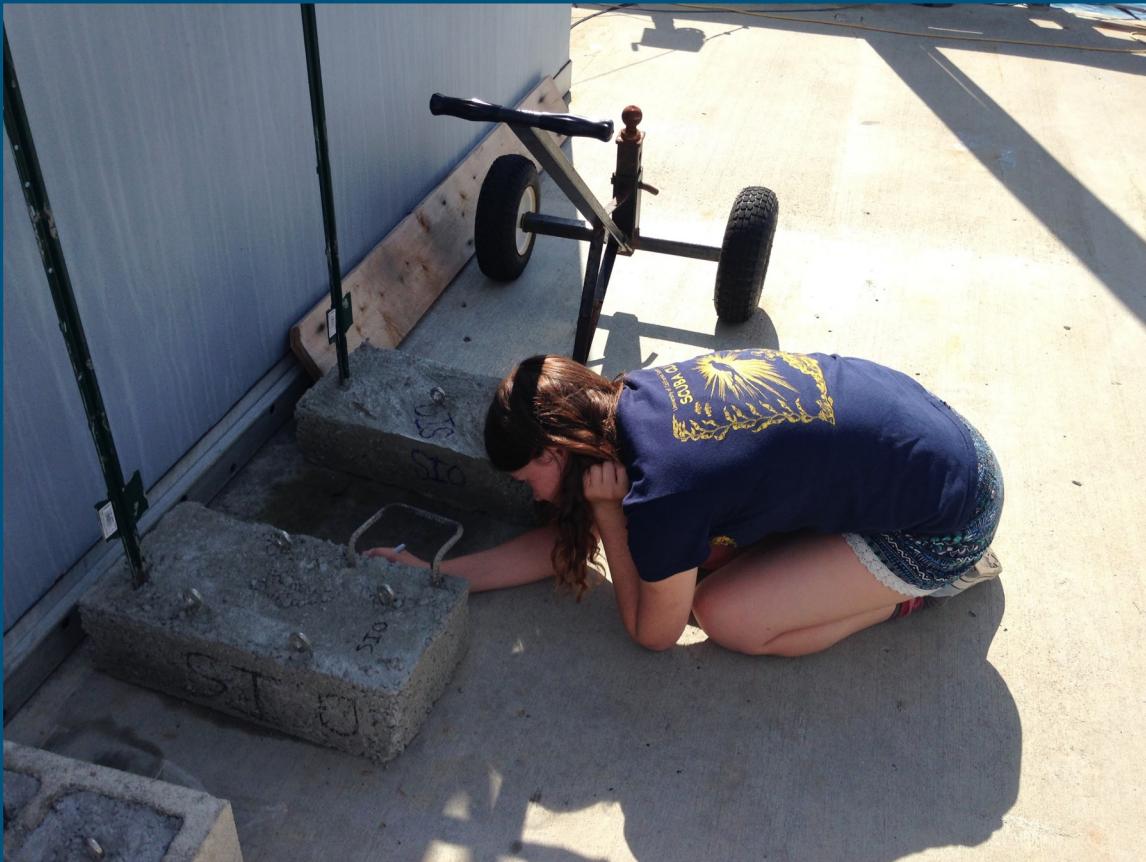


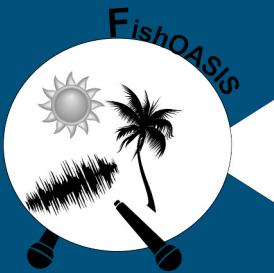
Add a Camera



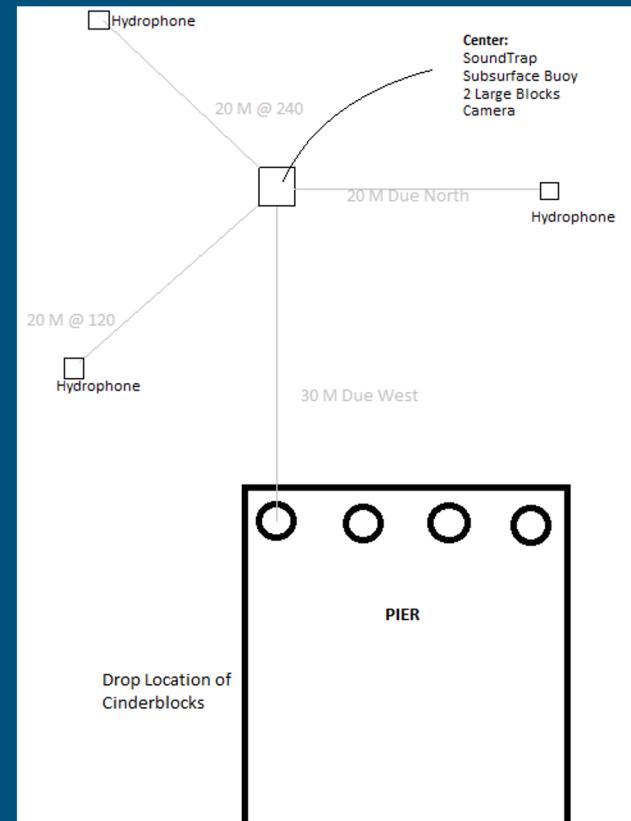


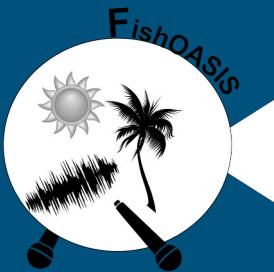
Add a Camera





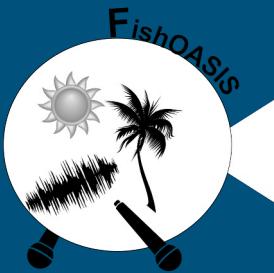
Add a Camera



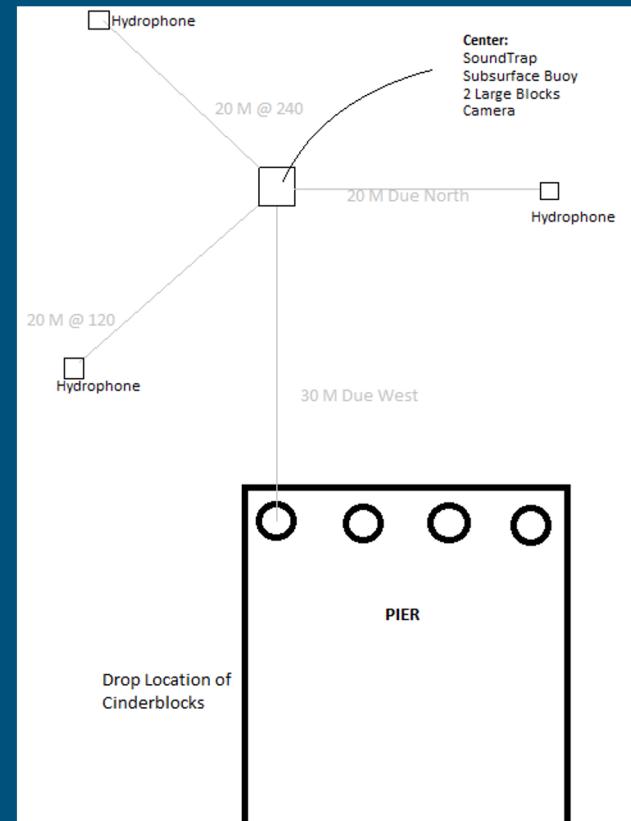
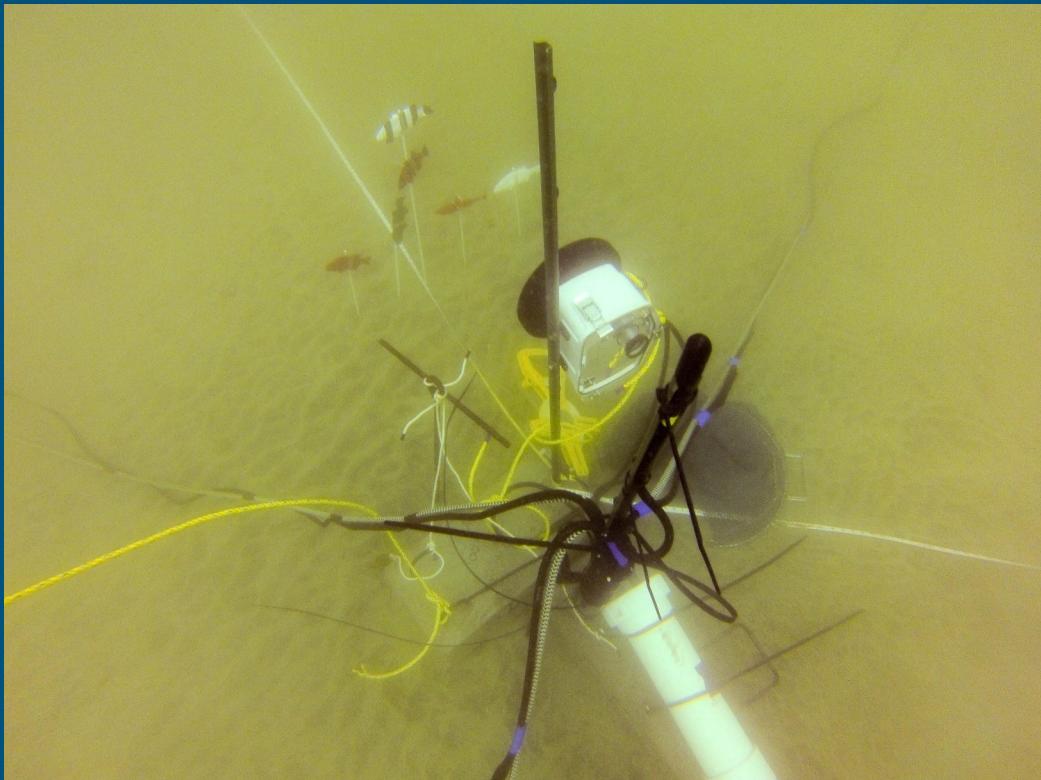


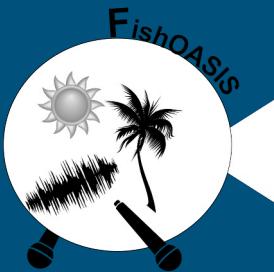
Add a Camera



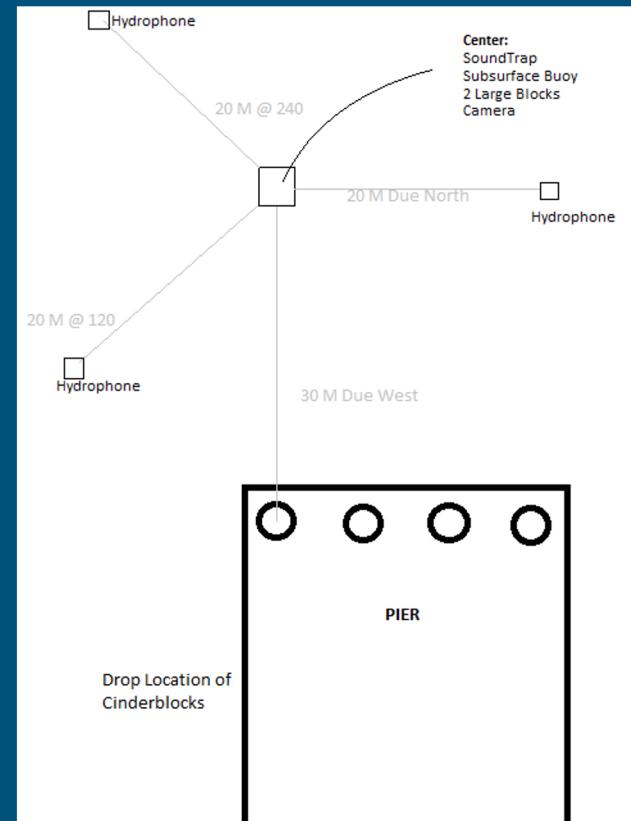
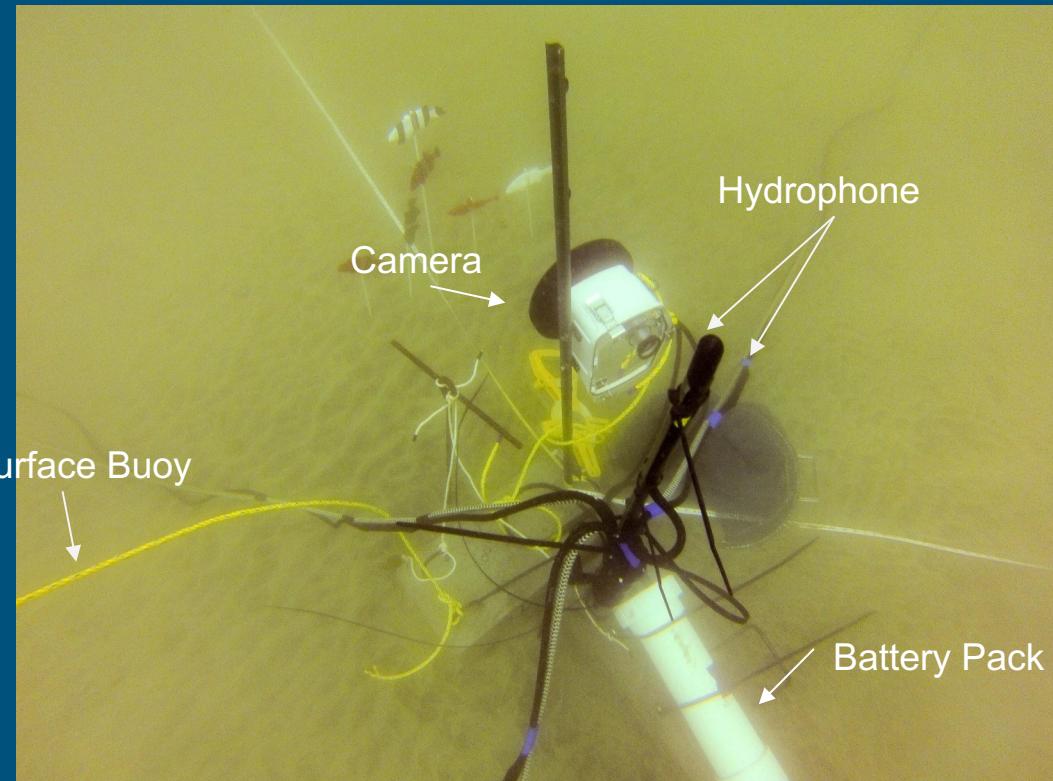


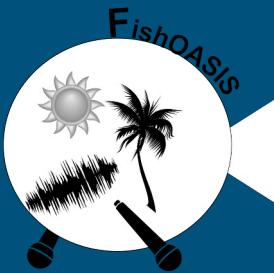
Add a Camera





Add a Camera





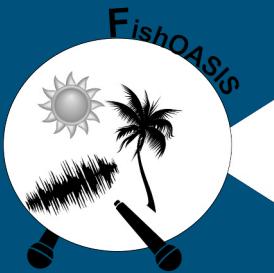
Add a Camera





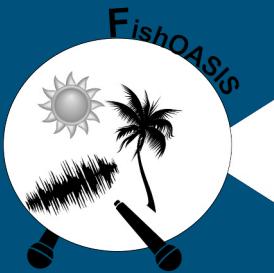
FishOASIS





FishOASIS





FishOASIS



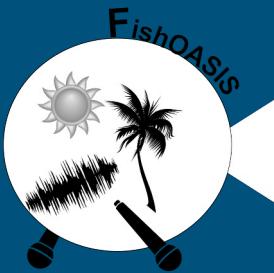
Male Sheephead



Kelp Bass



Schooling Fish



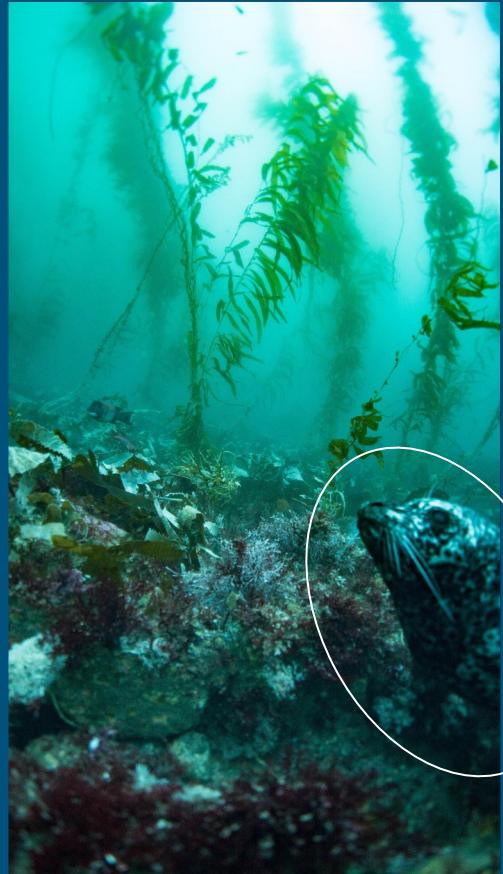
FishOASIS



Male Sheephead



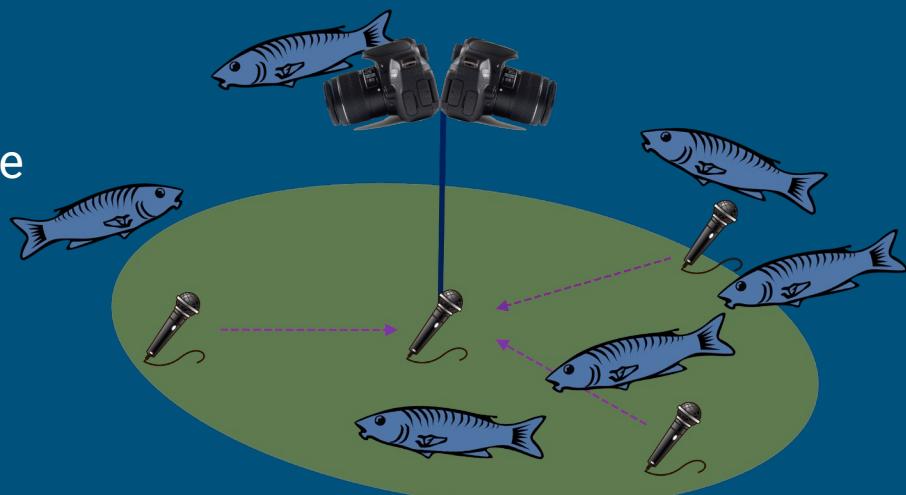
Schooling Fish



Harbor Seal

Future Work

- Redeploy/Recover at FishOasis
- Continue looking at other season's log files
- Use 360° camera system to identify the chorusing fish



Acknowledgements

Marine Bioacoustics Lab

- Jack Butler, Ana Širović, Camille Pagniello

Scientific Diving Program

- Christian McDonald, Rich Walsh

MPL Intern Program

- Eva Friedlander, Bev Kennedy, Sienna Thomas
- All the other interns - I'll miss you!

