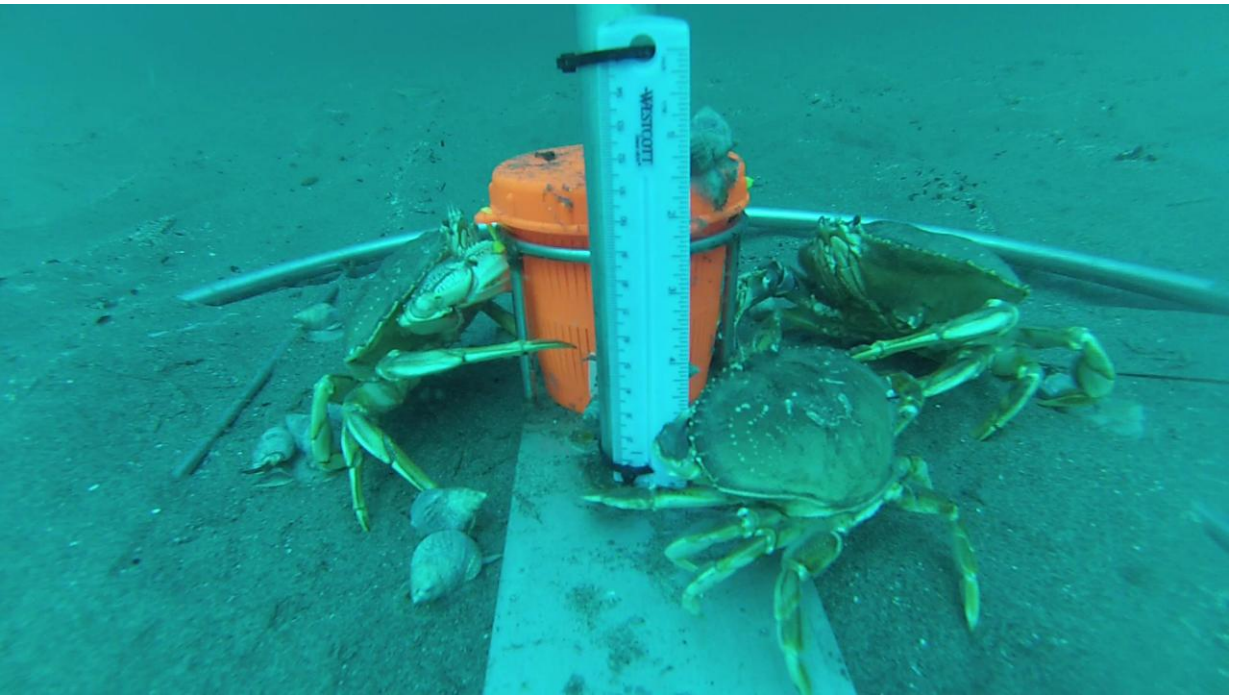
Mouth of the Columbia River Benthic Impact Study



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OSU Oregon State University

MCR
Science-policy
Workshop
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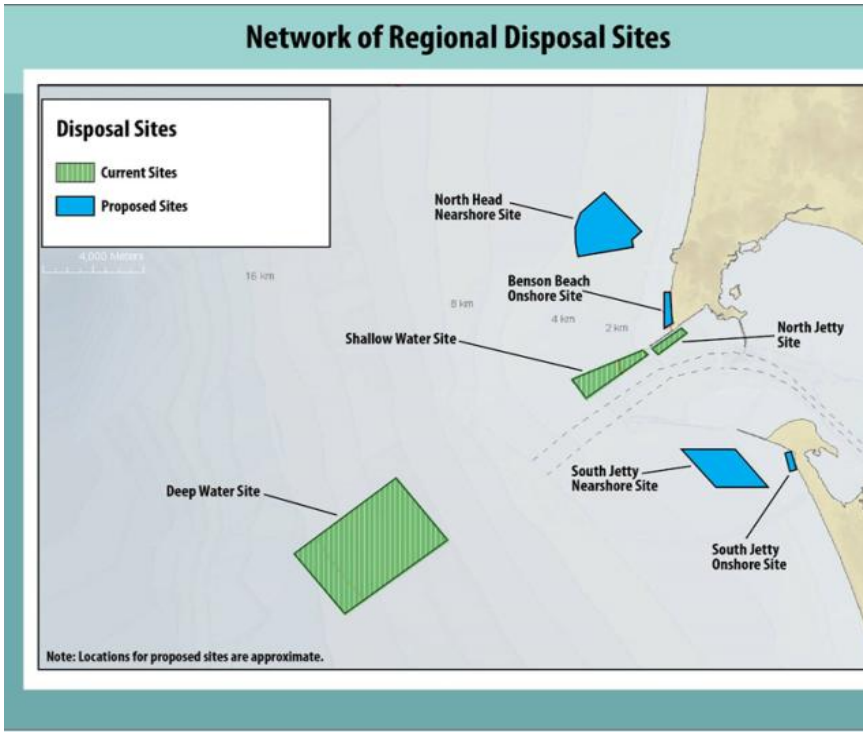
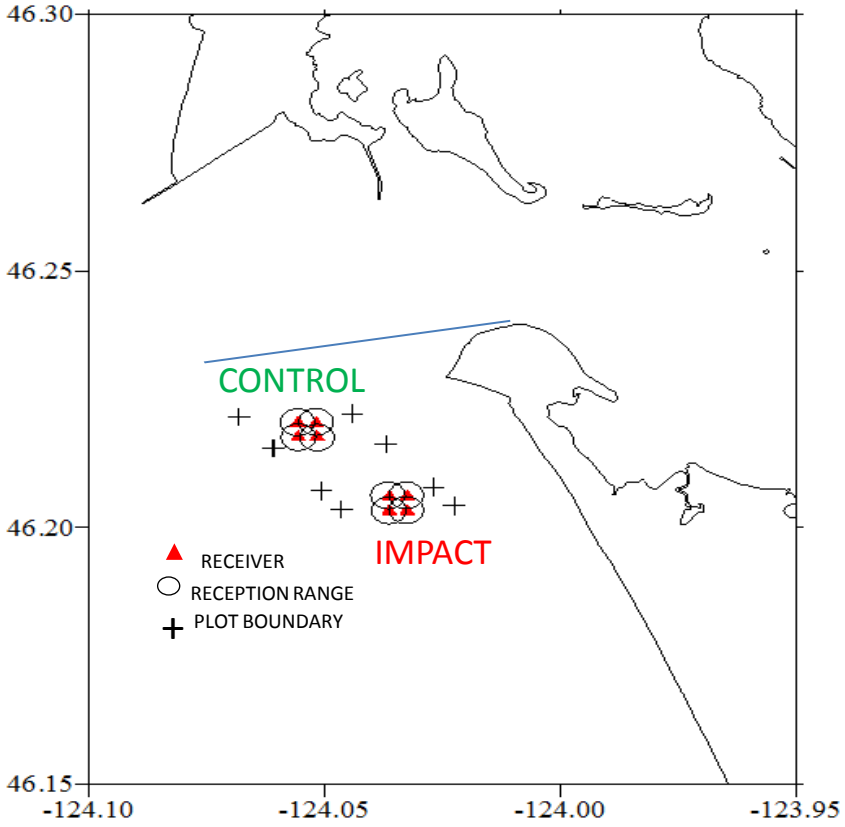
Ilwaco, WA
3 May 2016

Scope:

Investigate effects of sediment deposition events on benthic communities

Experimental approach using multiple techniques





Experimental Design:

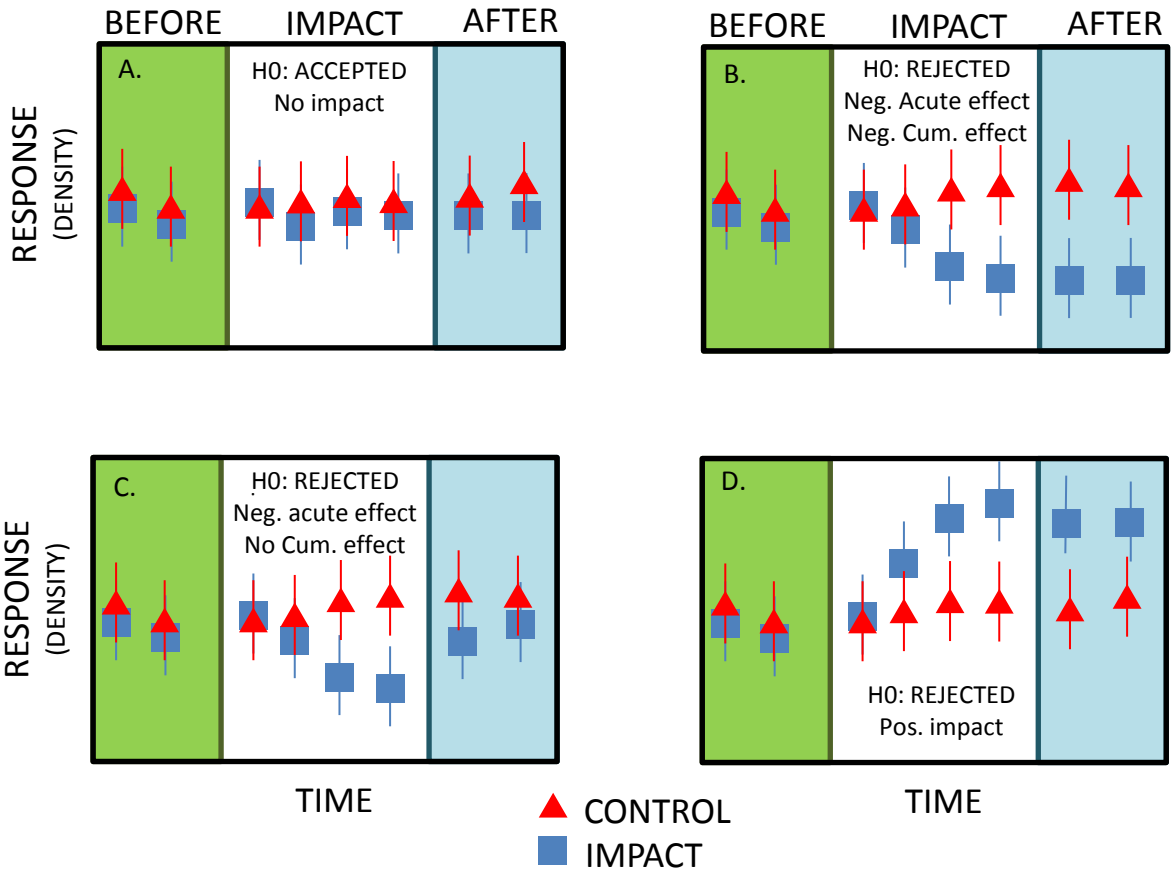
Before-Impact-After Design

-Response variable x Treatment x Period

-Treatment = Impact vrs Control // Period = Before, During, After disposal

-Acute effect: during deposition period; Cumulative effect: persist after deposition

-Null hypothesis: No difference in RV between treatment and period



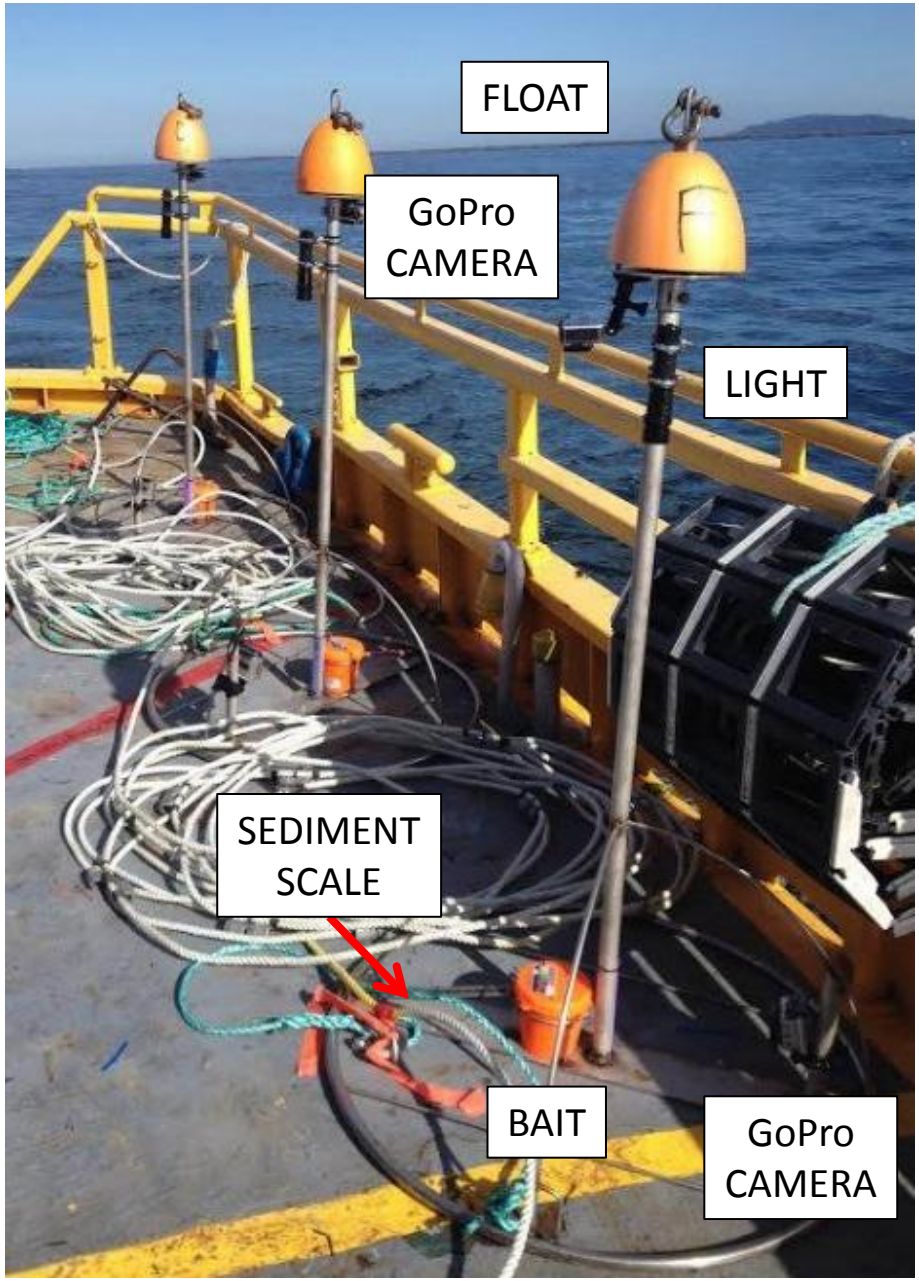
VIDEO AND ACOUSTIC TELEMETRY TECHNIQUES

1. <u>CamPod</u>
Used to measure acute effects of disposal including sediment depth & Impact on fauna

2. <u>Acoustic Tracking</u>
Used to measure acute & cumulative impacts on crabs

3. <u>Benthic video sled</u>
Used to compare invertebrate and fish abundances in different habitats

CamPod

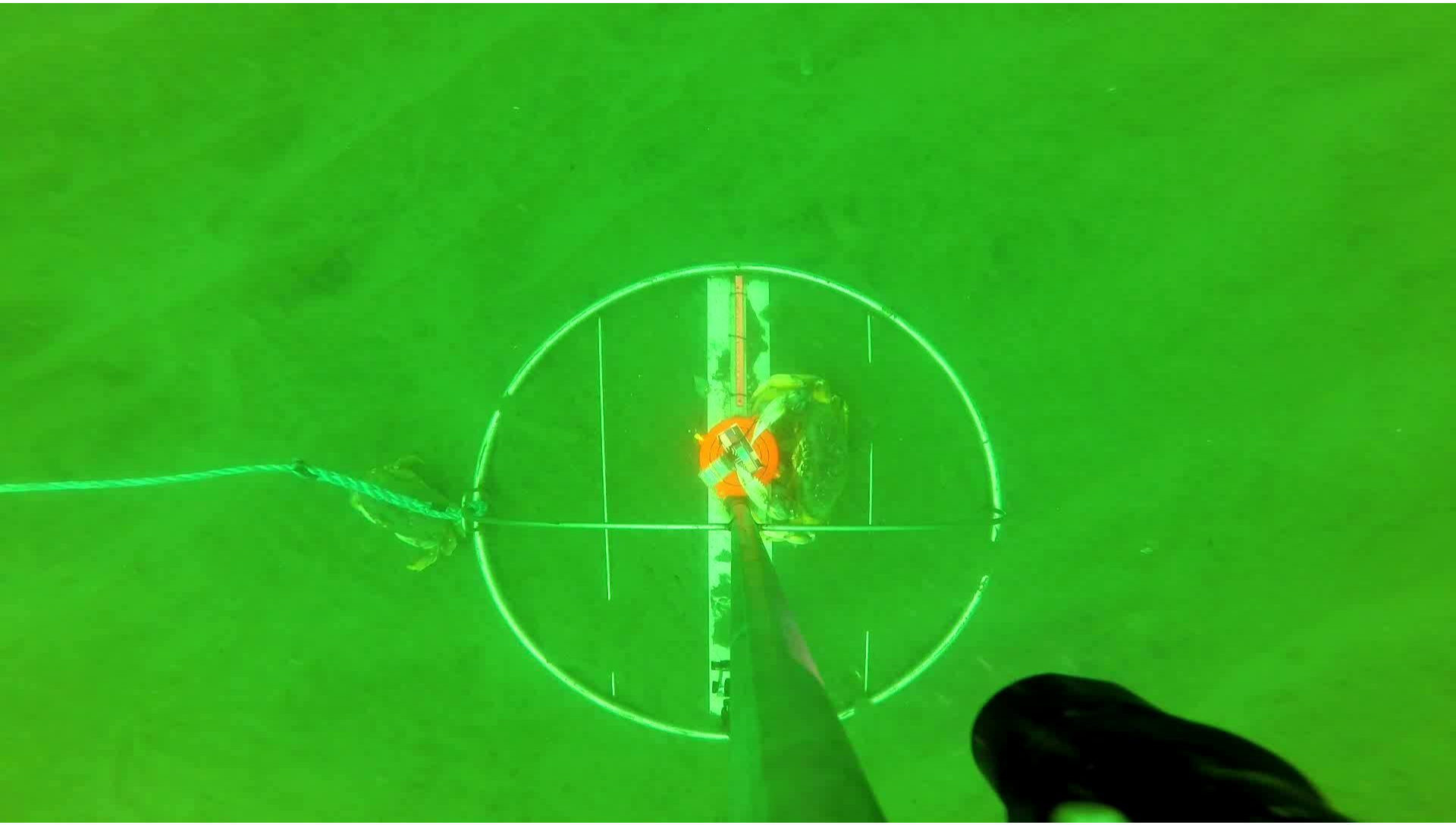


CamPod Arrays

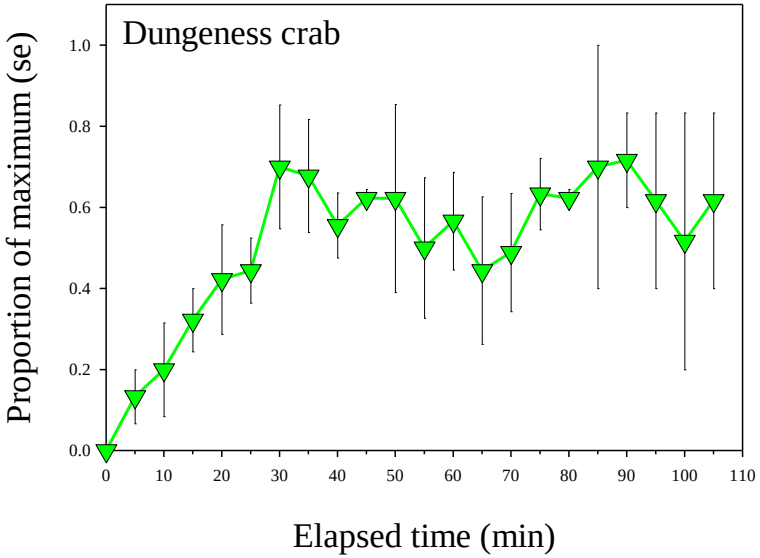
CamPod daisy chain

Sediment Deposition Event

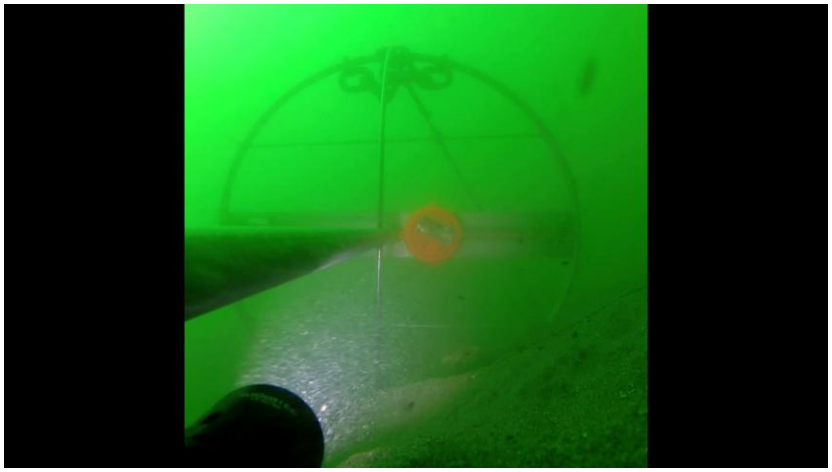
CamPod: Deposition event (16x)

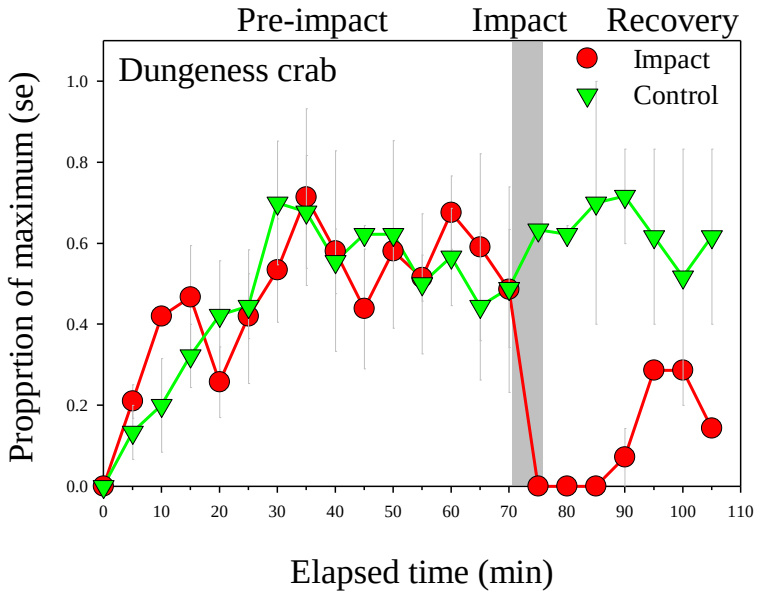


CamPod: Results

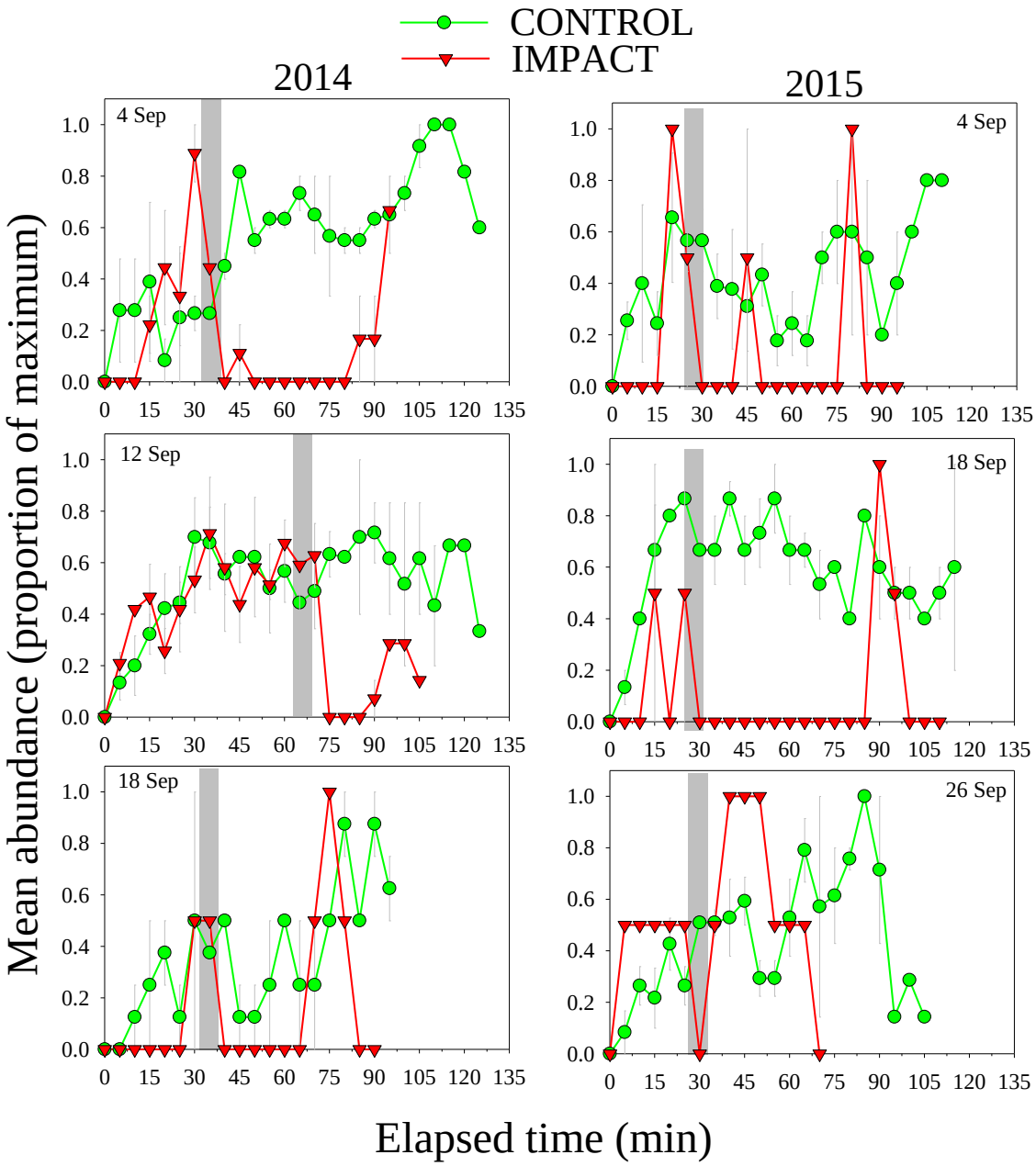


CamPod: Results





CamPod: Results



- Deposition levels were minimal but velocities of the sediment plume were substantial.

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- Observations indicate crabs flee from sediment plume but get enveloped.

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- Crabs were displaced by the plume but returned within 30 min

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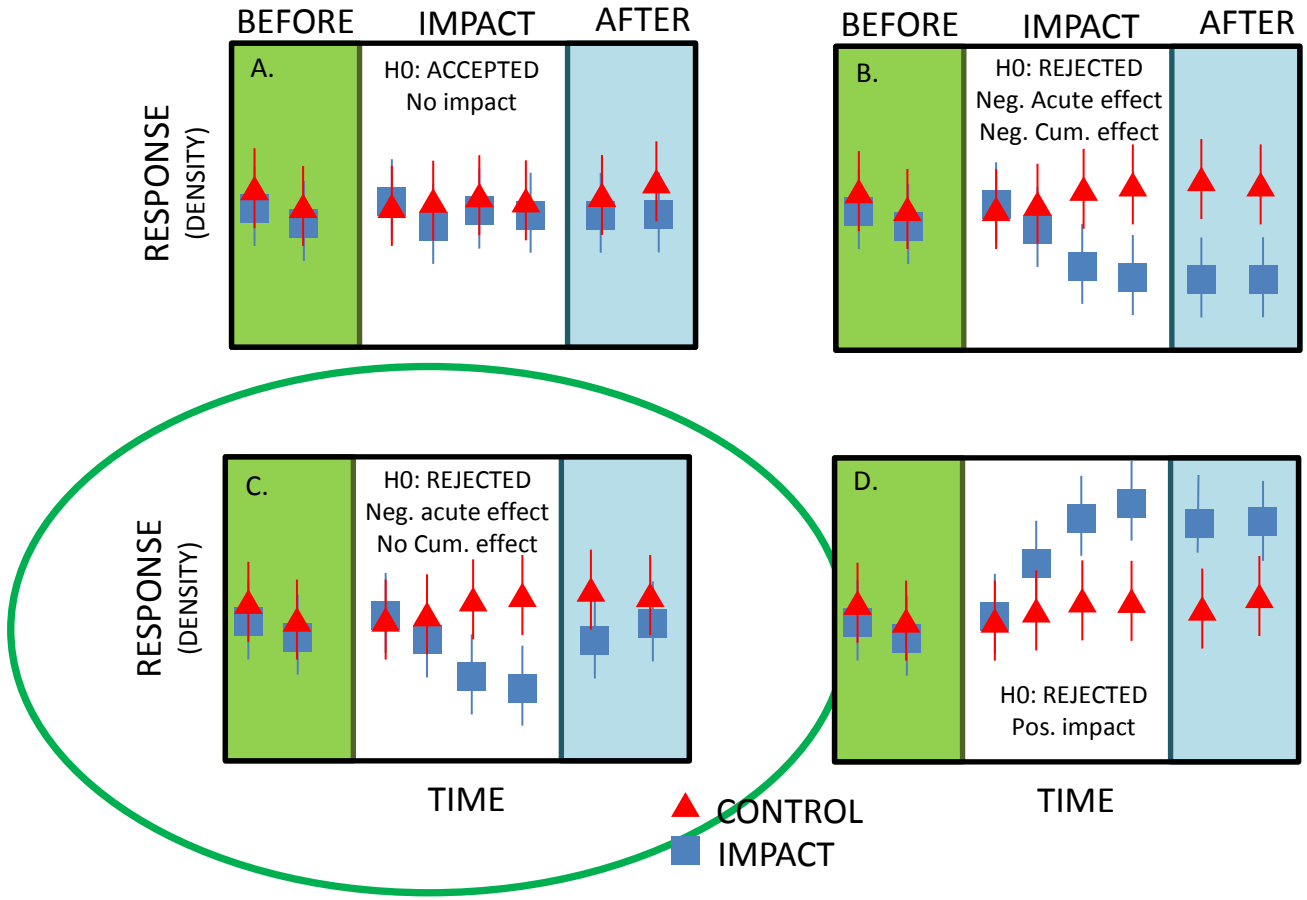
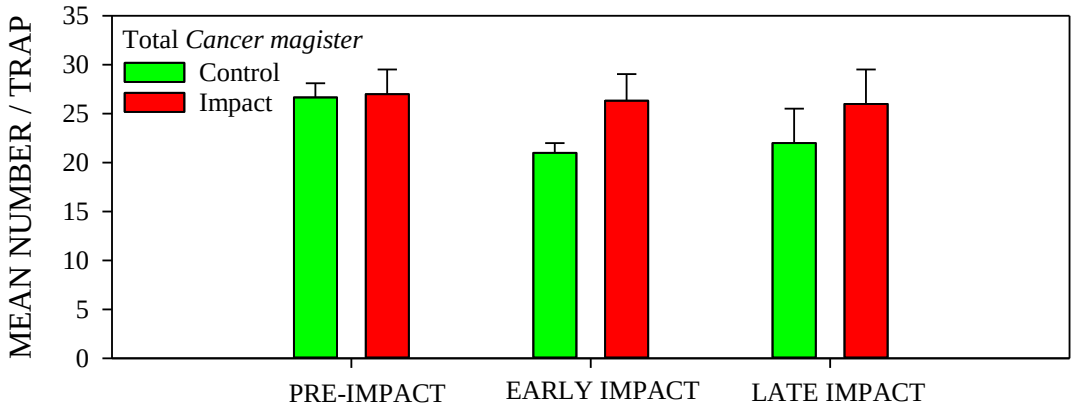
Experimental Design:

Results
-CamPod: Crab abundance: Negative acute effect, No cumulative effect
-Crab Pots:
-Acoustic Tags:



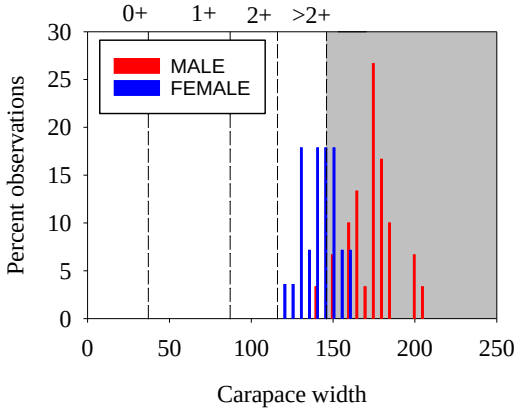
Crab Pot: Results

CRAB ABUNDANCE

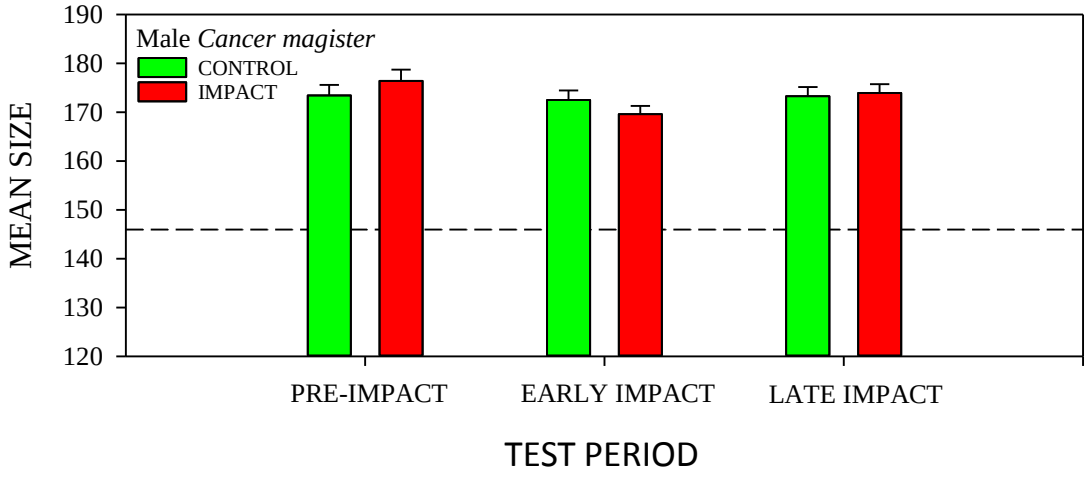


SIZE-FREQUENCY

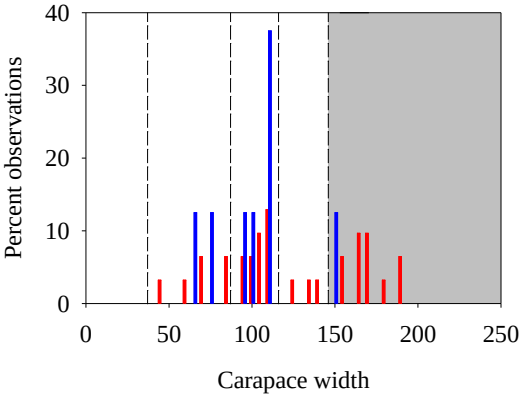
SJS



MALE CRAB SIZE

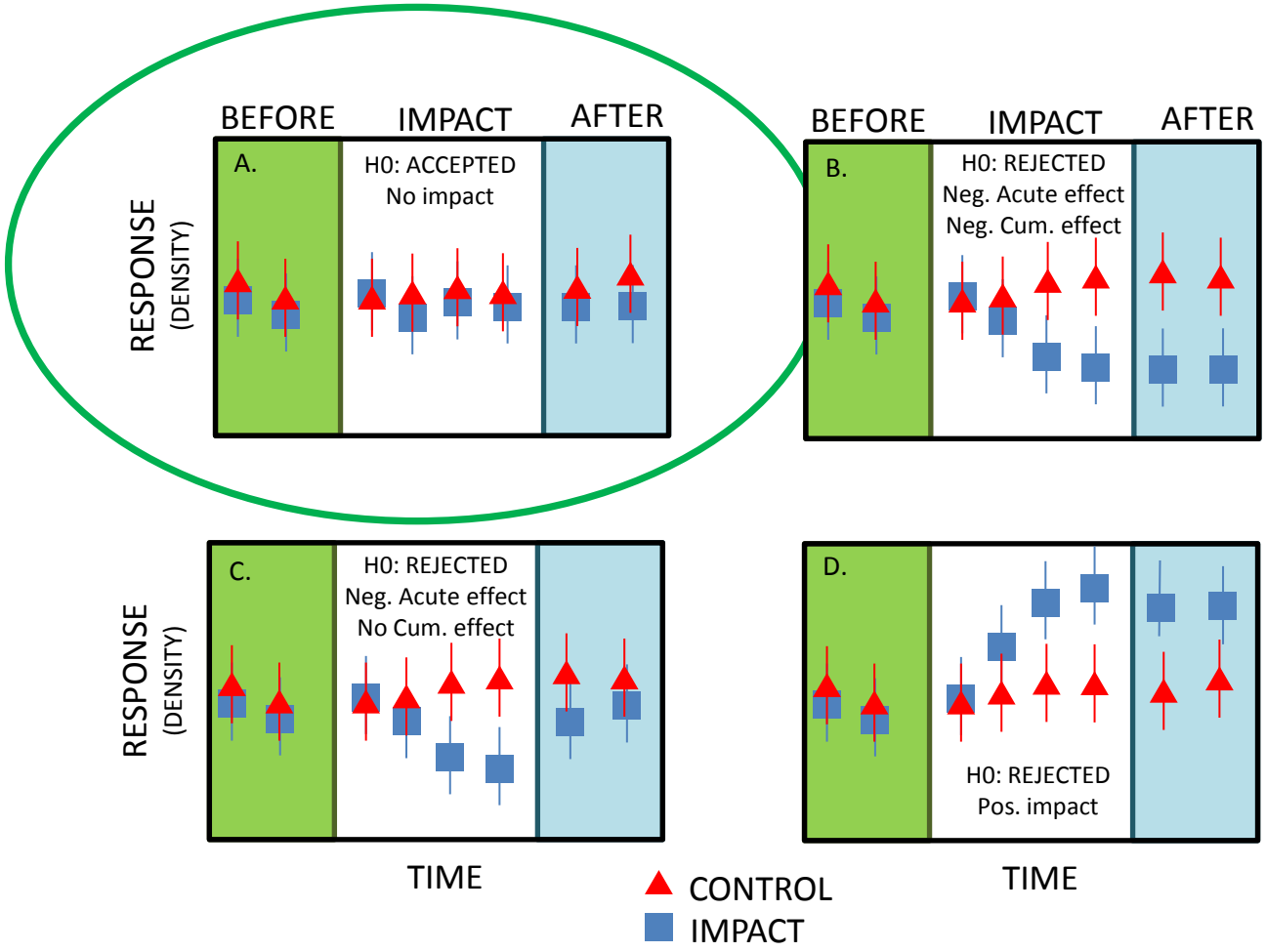


ESTUARY



Experimental Design:

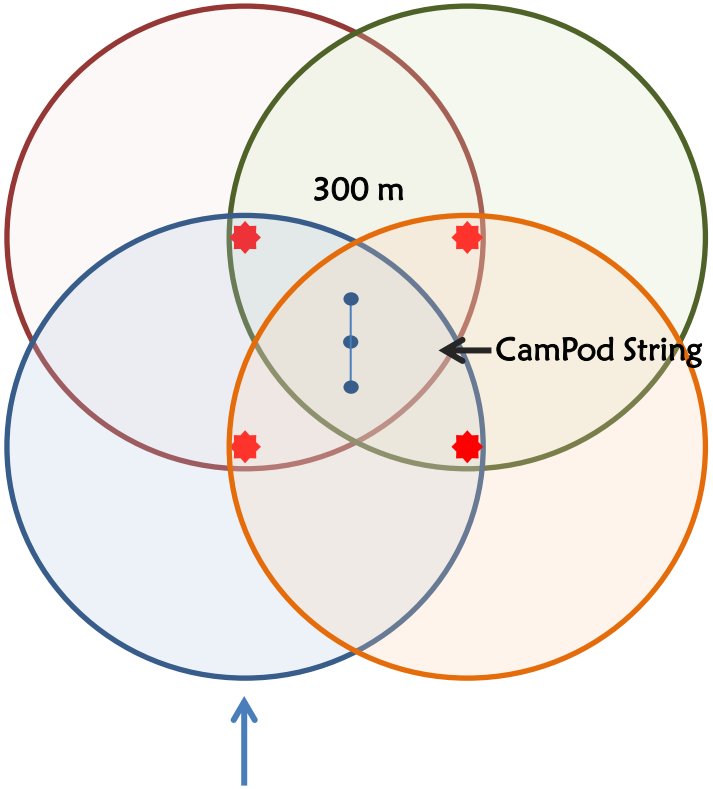
Results
-CamPod: Crab abundance: Negative acute effect, No cumulative effect
-Crab Pots: Crab abundance & size: No impact effect
-Acoustic Tags:

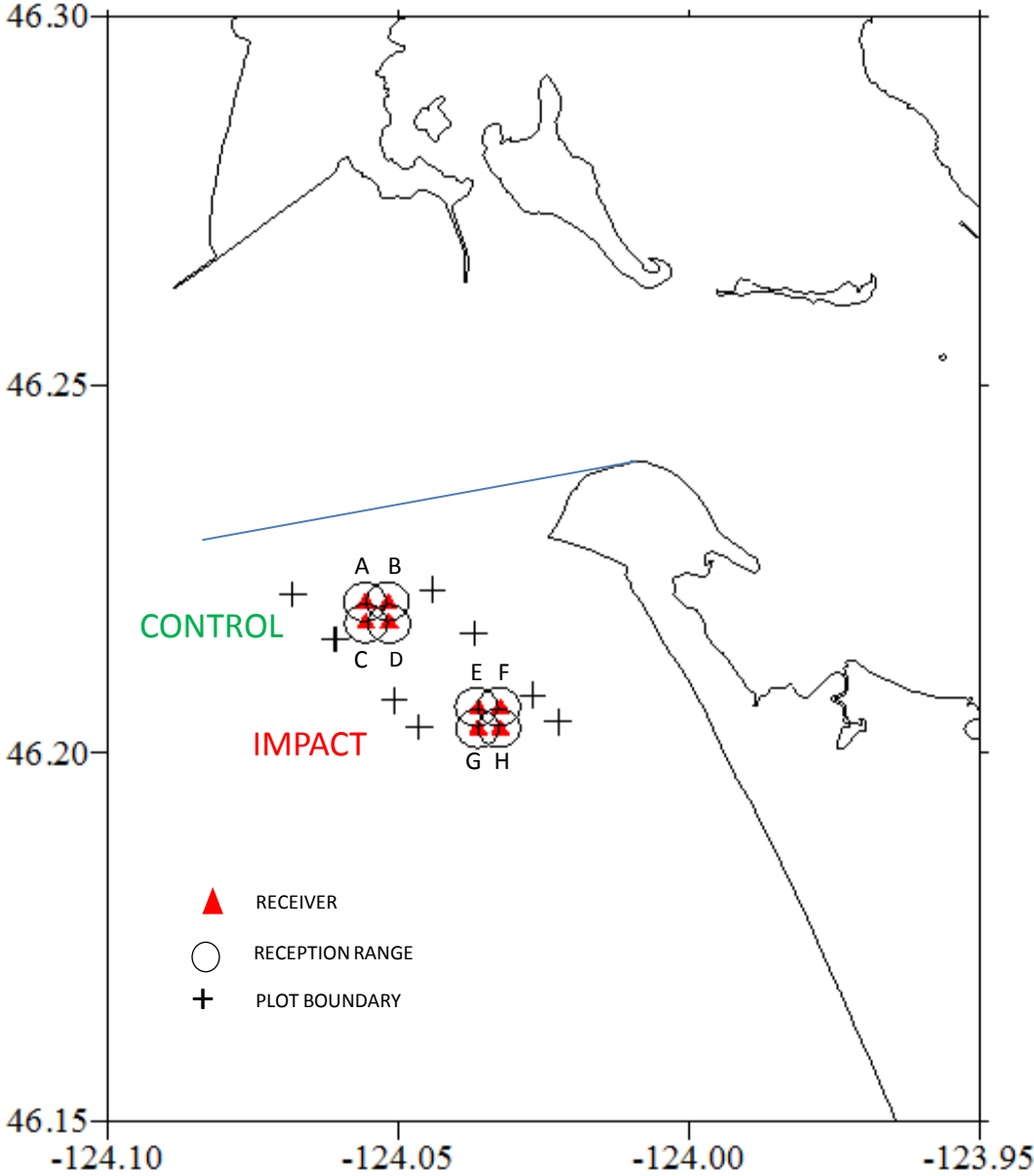


Acoustic Node Array

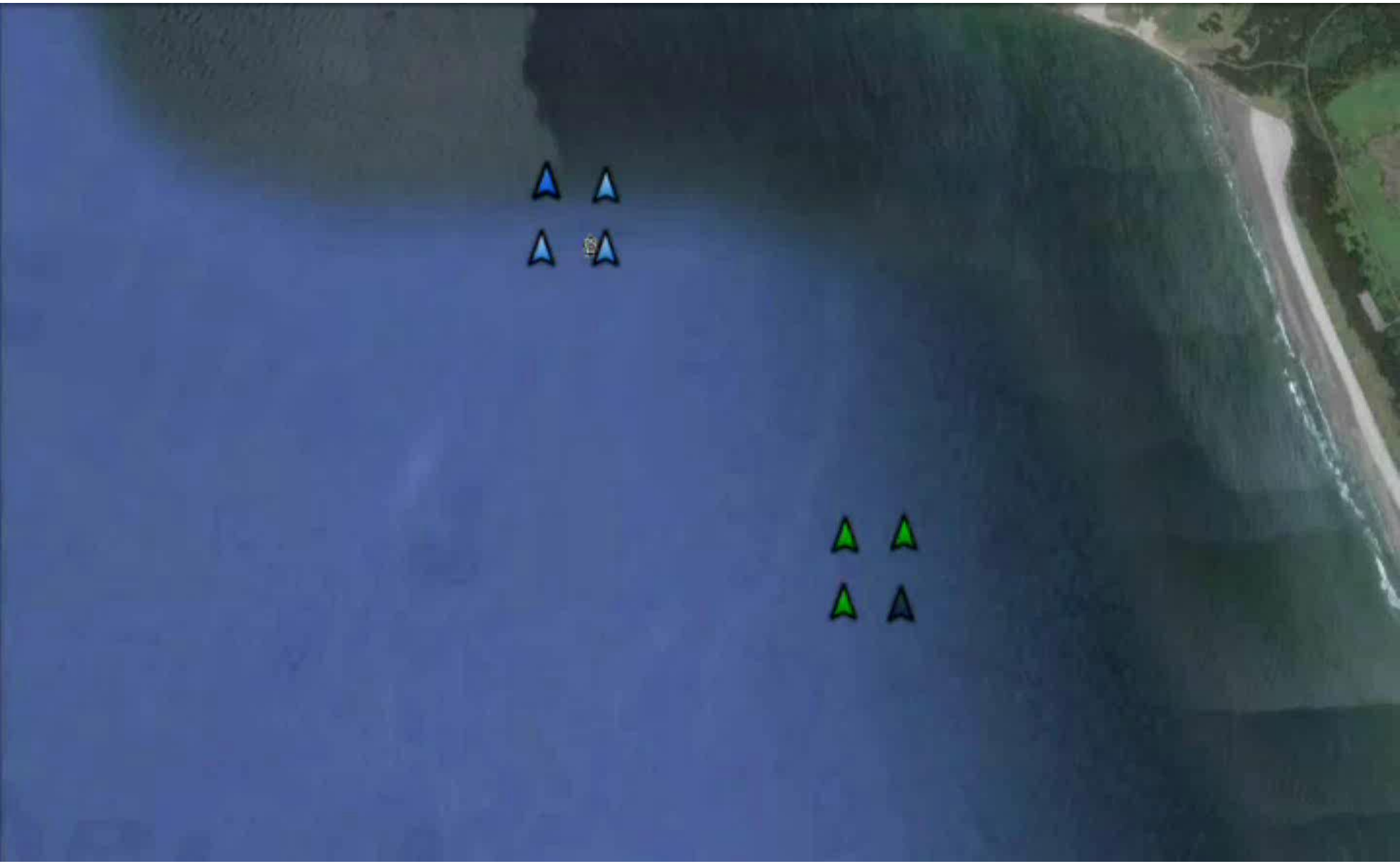
RECEIVER

TAGGED CRABS

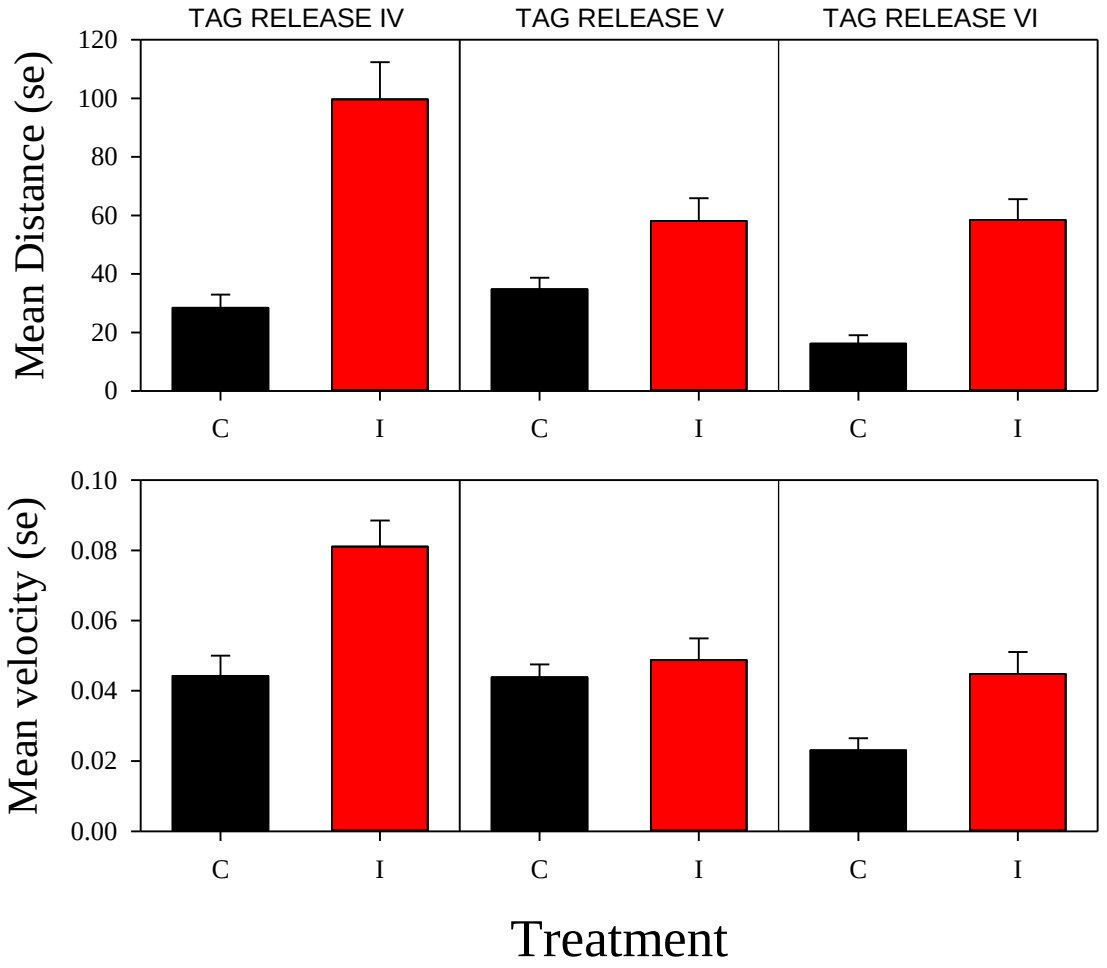




Movement of tagged crabs



Movement results



Crab survival

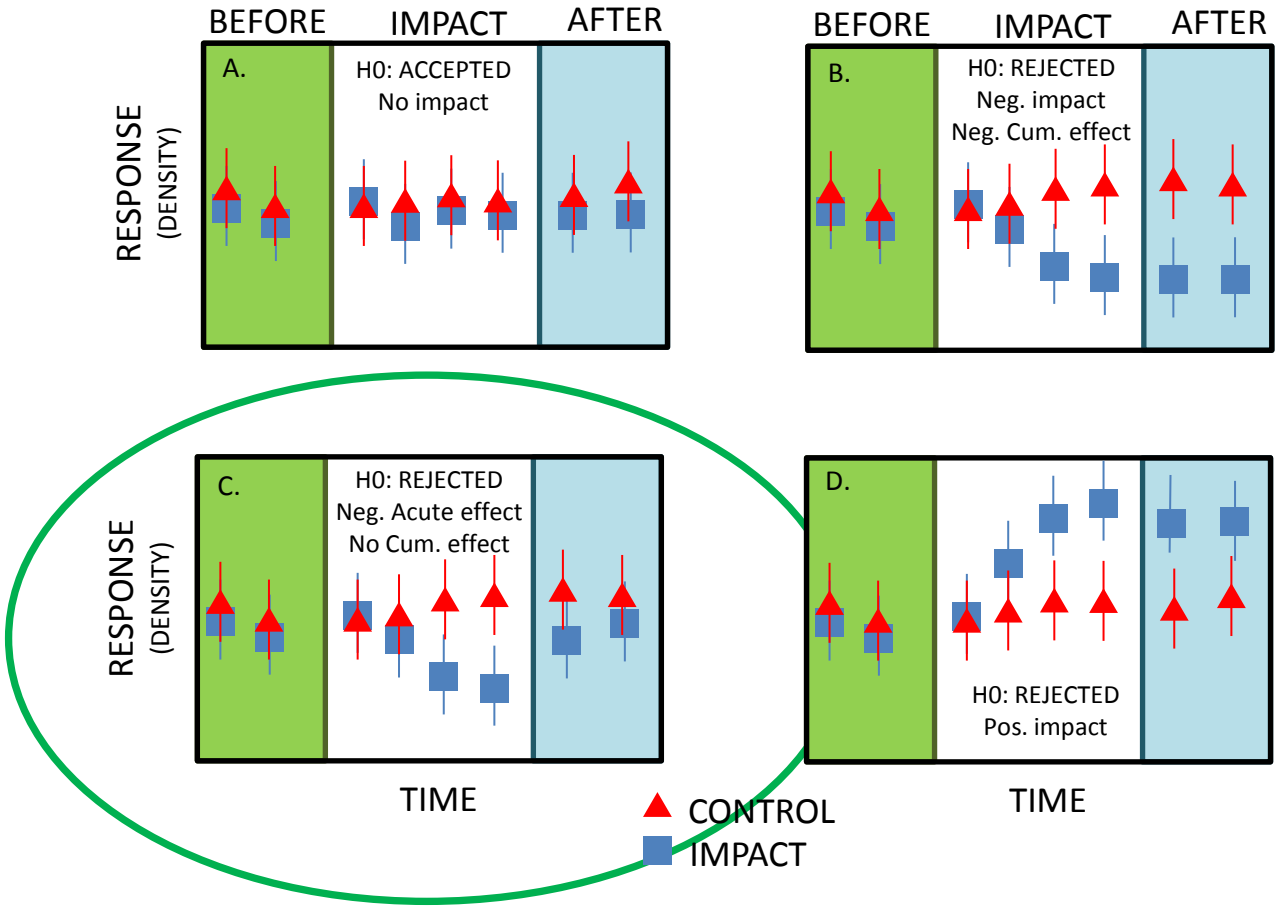
Experimental Design:

Results

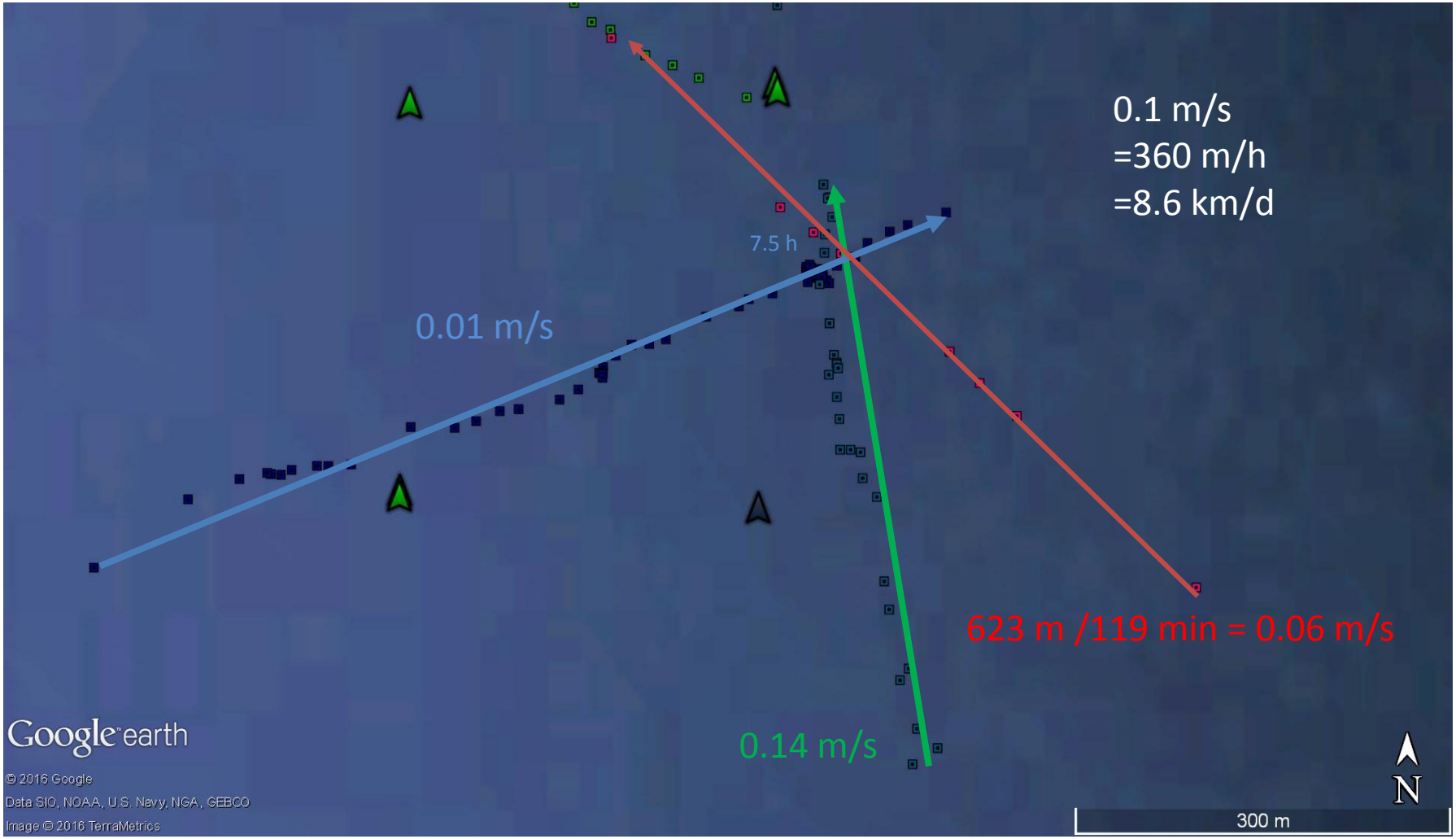
-CamPod: Crab abundance: Negative acute effect, No cumulative effect

-Crab Pots: Crab abundance: No impact effect

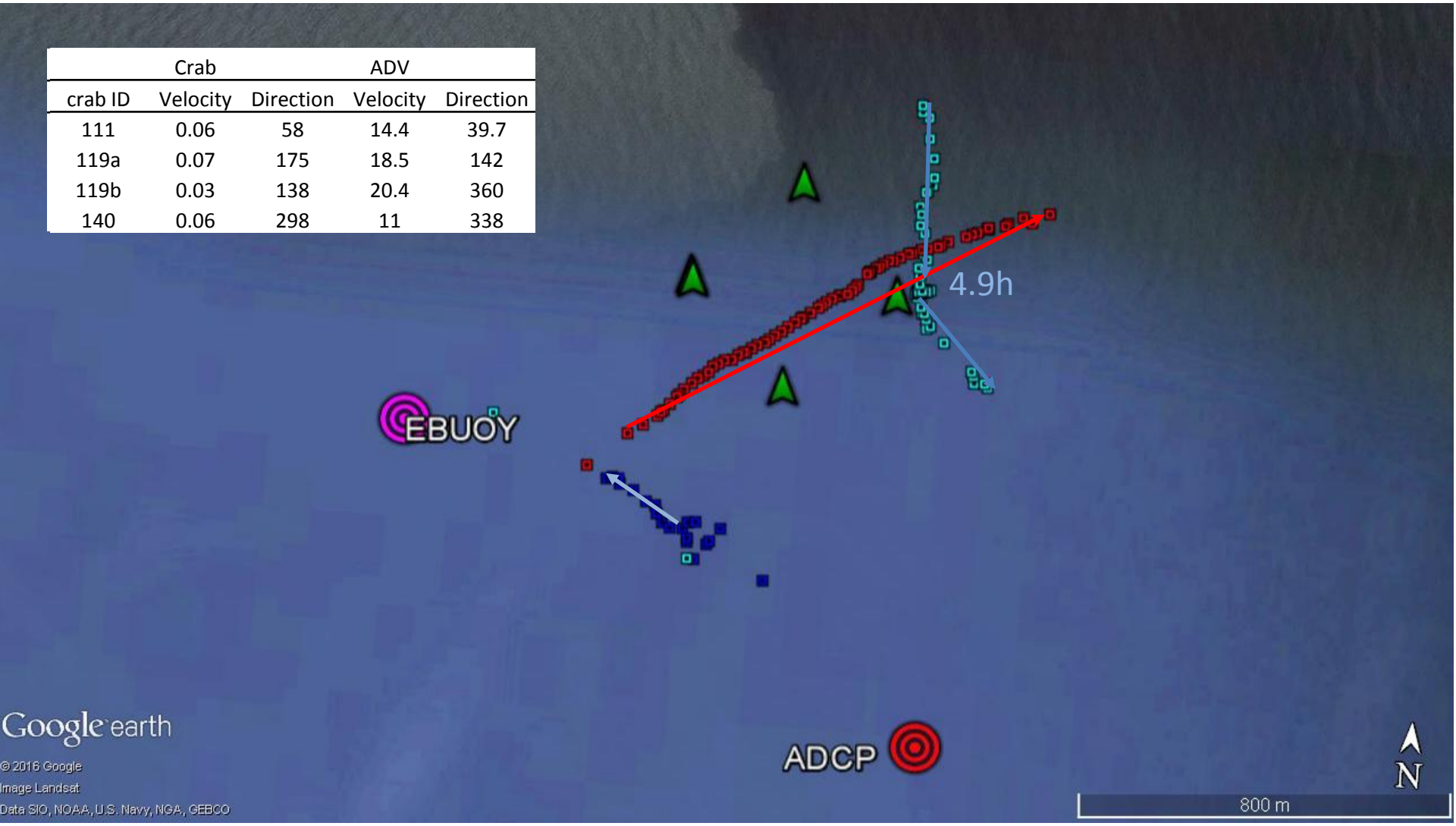
-Acoustic Tags: Negative acute effect, No cumulative effect?



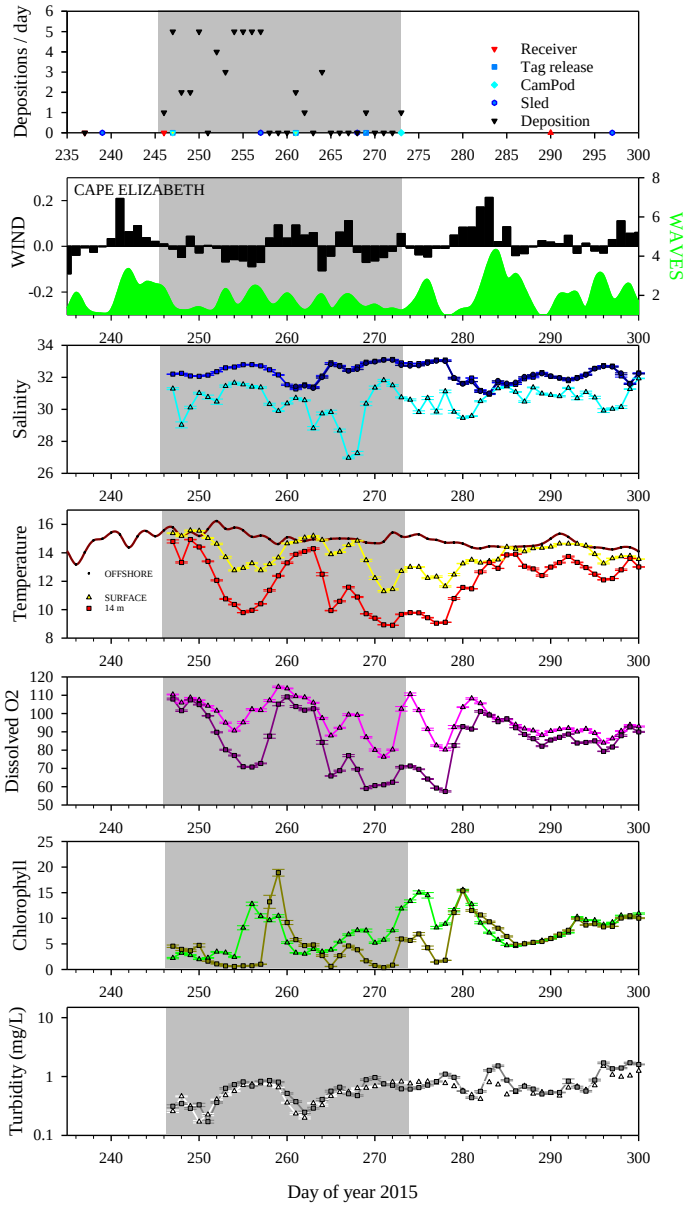
Measurement metrics



	Crab		ADV	
crab ID	Velocity	Direction	Velocity	Direction
111	0.06	58	14.4	39.7
119a	0.07	175	18.5	142
119b	0.03	138	20.4	360
140	0.06	298	11	338



Environmental Buoy Data



<u>Summary of CamPod, crab pot, and acoustic data:</u>

- Conducted Control-impact experiments to investigate sediment deposition on crab.

- No differences in mean abundance or size from crab pot surveys.

- Both video and acoustic techniques show there are acute effects.

- CamPods: no burial, and crabs return within ~ 1/2 hour.

- Acoustic data reveal that crabs are highly motile and exhibit directed motions. Acute survival appears high and limited data indicates survival for weeks to months after tagging.

- Primary unknown is the cumulative effects of Deposition. Plan to test with a larger acoustic array.

Acknowledgements:

- ODFW & WDFW
- CORPS / EPA
- CRCFA
- Oregon Dungeness Crab Commission
- LCSG

Stephanie Fields
"Briny" Brian Kelly
Capt Tim Stentz
Chris Jacoben
Drony Joe" Aga
Michael Wilkin & MERTS/CMO

More videos on YouTube at "fishOOhead"