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## Capturing Information on Vessels and Cetaceans: developing a passive monitoring system for Boundary Pass

Lauren McWhinnie

*Univ. of Victoria, Canada, lmcwhin@uvic.ca*

Patrick O'Hara

*Environment and Climate Change Canada, Canada, paddio@uvic.ca*

Gregory O'Hagan

*Univ. of Victoria, Canada, gregoryohagan@gmail.com*

Molly Fraser

*Univ. of Victoria, Canada, frasermd21@hotmail.com*

Sarah Berry

*Univ. of Victoria, Canada, berry.skb@gmail.com*

*See next page for additional authors*

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McWhinnie, Lauren; O'Hara, Patrick; O'Hagan, Gregory; Fraser, Molly; Berry, Sarah; Smallshaw, Leh; Serra-Sogas, Norma; and Canessa, Rosaline, "Capturing Information on Vessels and Cetaceans: developing a passive monitoring system for Boundary Pass" (2018). *Salish Sea Ecosystem Conference*. 430.  
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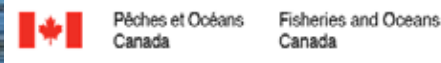
**Speaker**

Lauren McWhinnie, Patrick O'Hara, Gregory O'Hagan, Molly Fraser, Sarah Berry, Leh Smallshaw, Norma Serra-Sogas, and Rosaline Canessa

# Capturing Information on Vessels and Cetaceans: a passive monitoring system for Boundary Pass

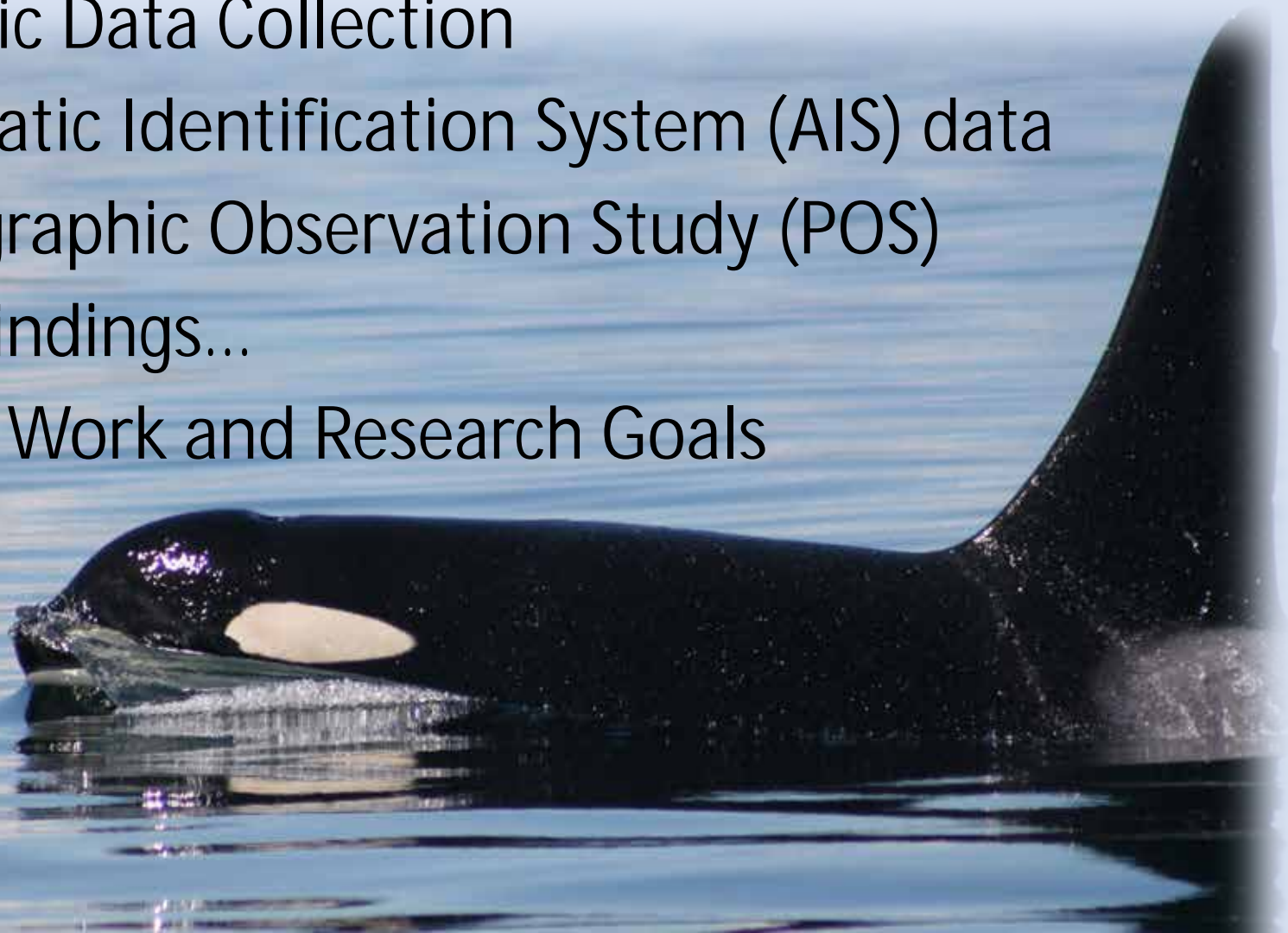


Dr. Lauren McWhinnie ([lmcwhin@uvic.ca](mailto:lmcwhin@uvic.ca)), Dr. Patrick O'Hara, Gregory O'Hagan, Sarah Berry, Ben Hendricks, Leh Smallshaw, Molly Fraser, Norma Serra-Sogas and Dr. Rosaline Canessa



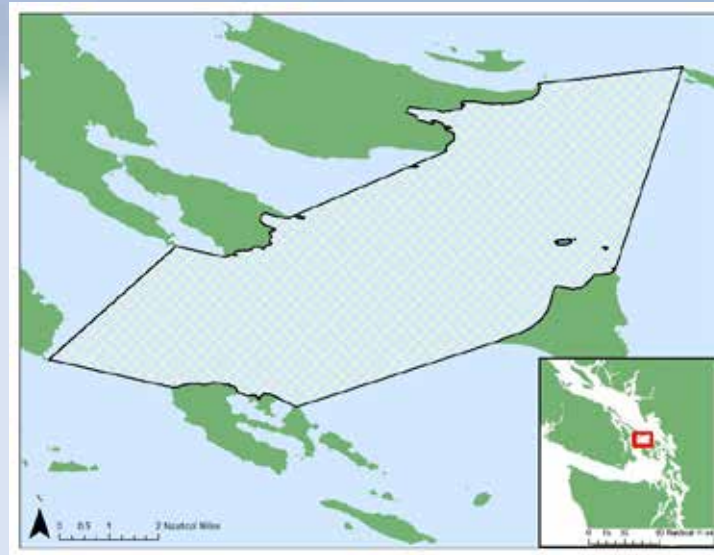
# Lecture Overview....

- Boundary Pass
- Acoustic Data Collection
- Automatic Identification System (AIS) data
- Photographic Observation Study (POS)
- Early Findings...
- Future Work and Research Goals



# Boundary Pass

Location:

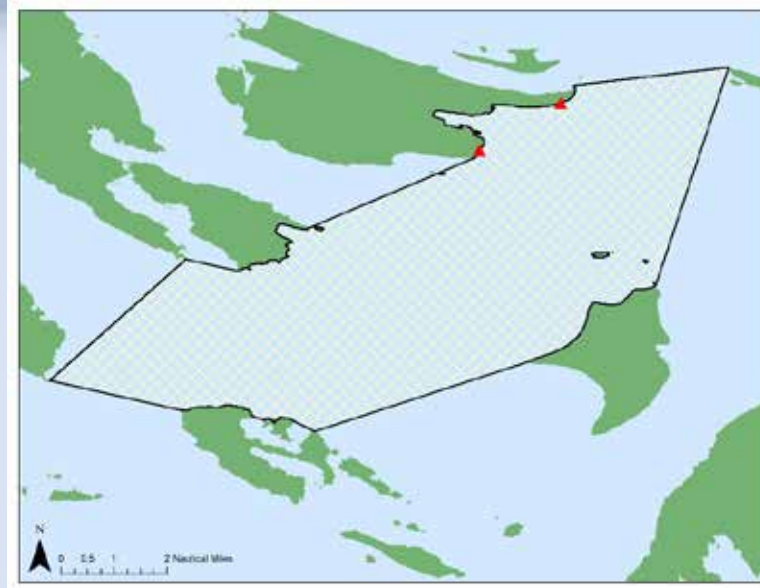


The Issue: This passage is a bottleneck for both cetaceans and vessels, as such there are significant concerns related to vessel disturbance, particularly from marine noise.

The Goal: Using passive data collection techniques, quantify the amount of vessel traffic (both AIS and non-AIS) and marine mammal presence within Boundary Pass.

# Acoustic Data Collection

Location:



**Monarch Head** - 48N 45' 45.997" 123W 05' 05.461" -20 m depth  
**East Point** – 48N 46' 49.501" 123W 03' 5.4" -27m depth

Type: icListen HF hydrophones by Ocean Sonics

Configuration: 128000 samples per sec – 10Hz-50kHz bandwidth  
24bit resolution – 48dB to 175 dB re 1 uPa

Calibration: 0.1Hz to 200kHz



Pêches et Océans  
Canada

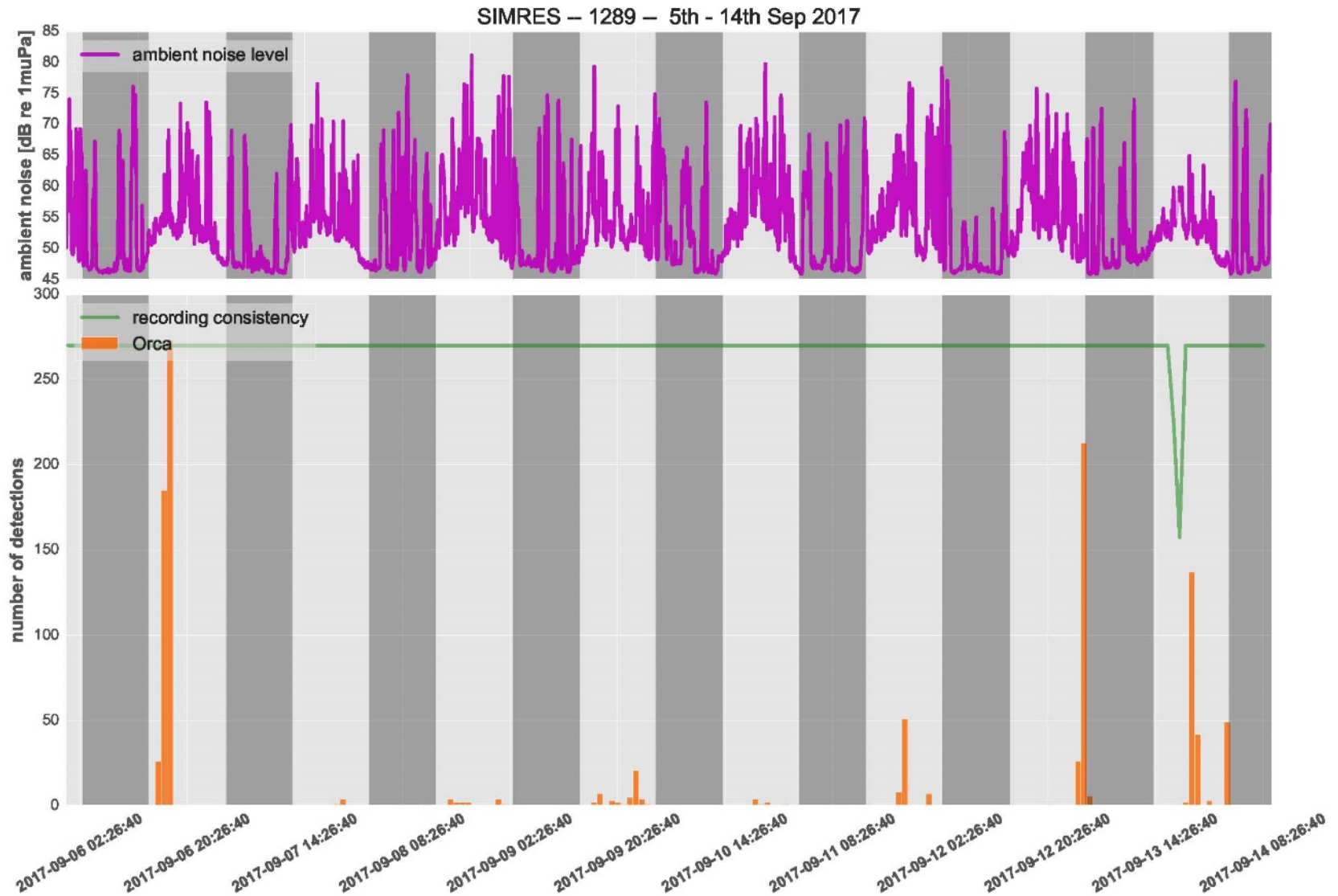
Fisheries and Oceans  
Canada

**JASCO**  
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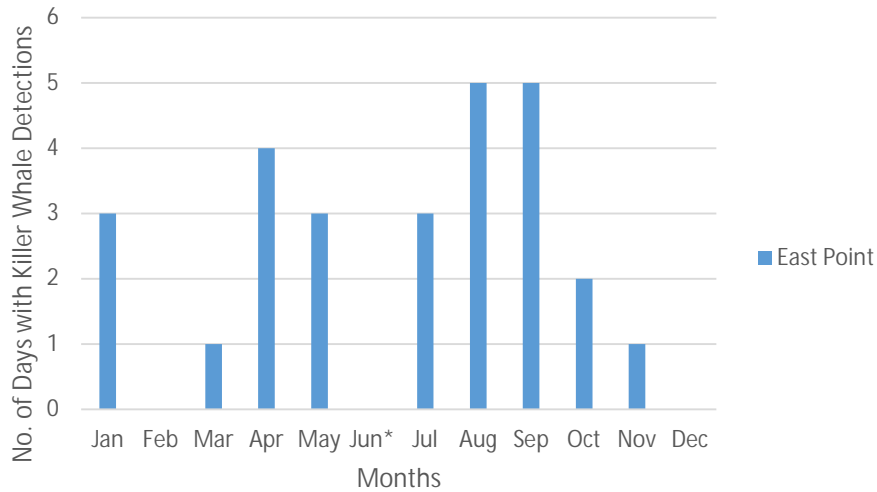


# Early Findings...Hydrophones

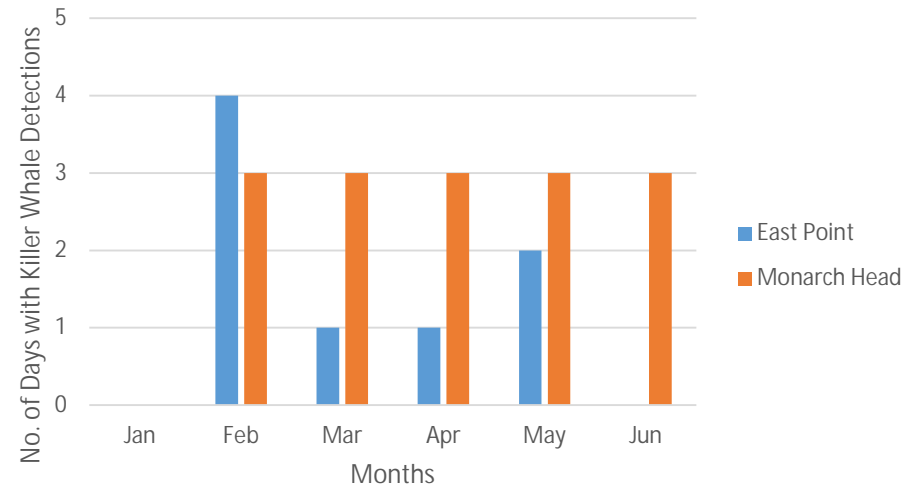


# Early Findings...Hydrophones

Killer Whale Detections 2016

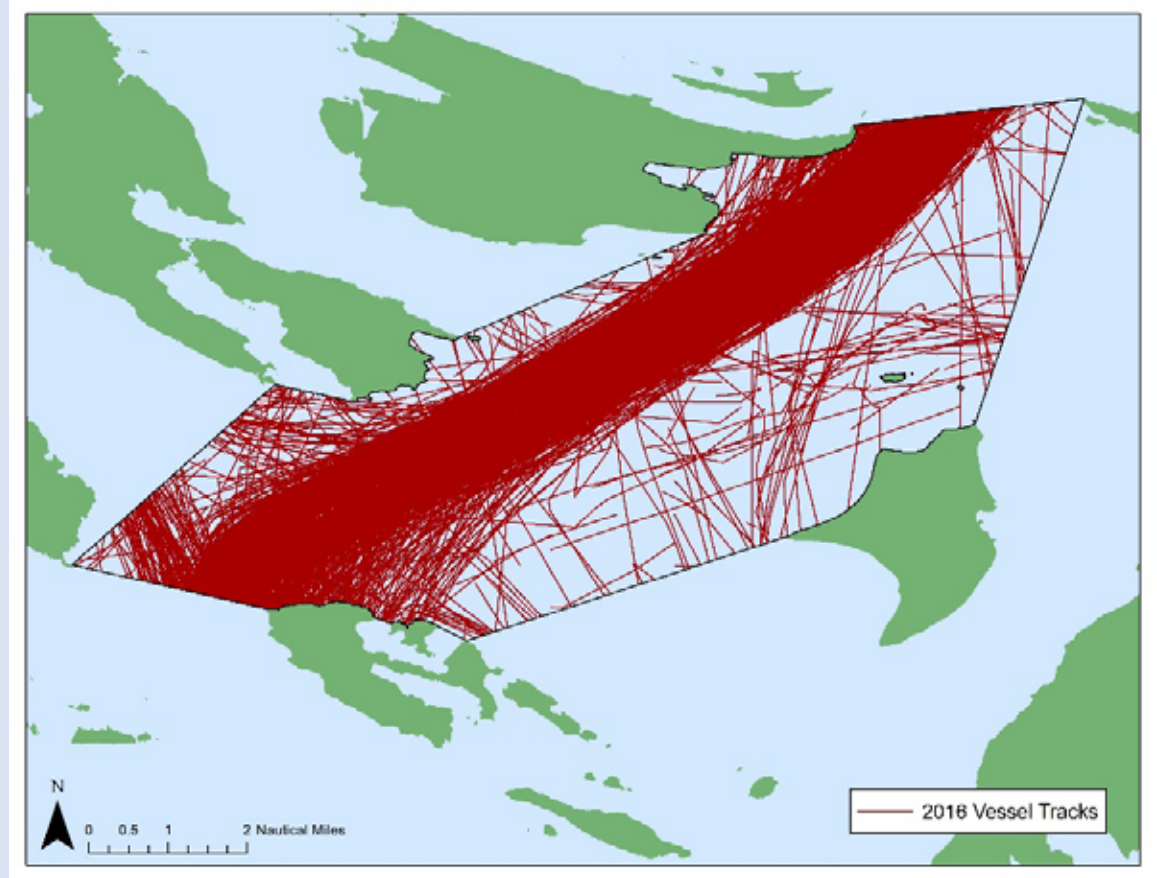
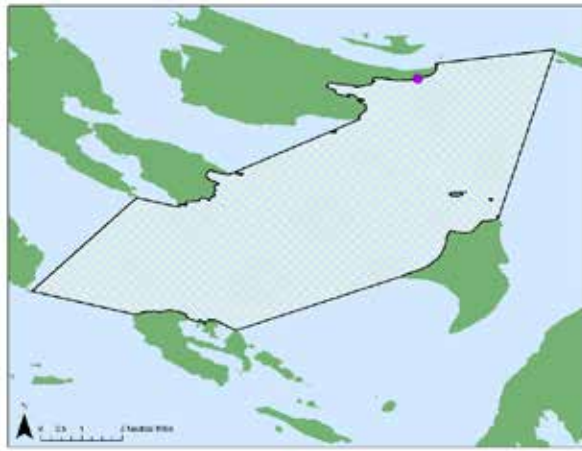


Killer Whale Detections 2017

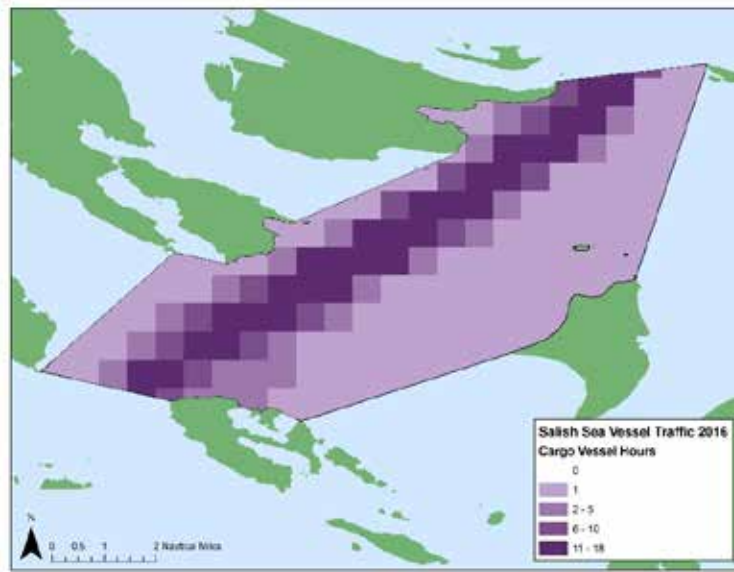
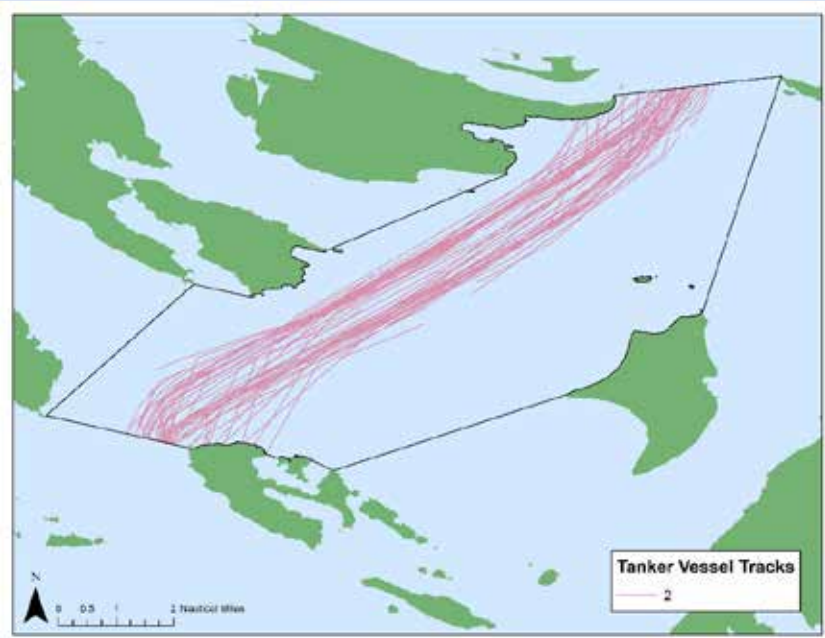
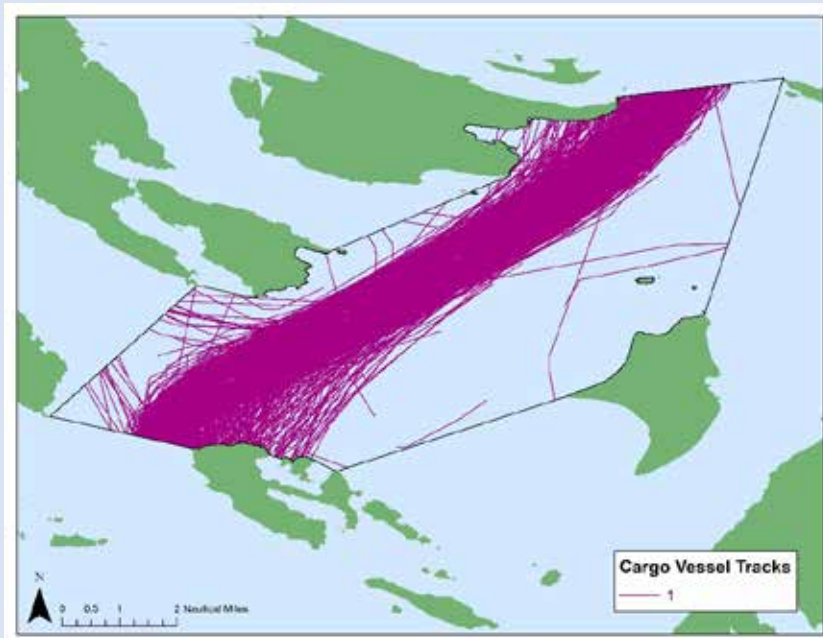




# Automatic Identification System (AIS) Data



# Early Findings...AIS



# Photographic Observation Study (POS)

- Single board Raspberry Pi 3 Linux CPU.
- Canon DSLR controlled by a Python script.
- Writing data to external HDD.
- Automatic restart to combat power outages.
- Enclosed in a weather proof box.
- Burst of three photos every minute during daylight hours.

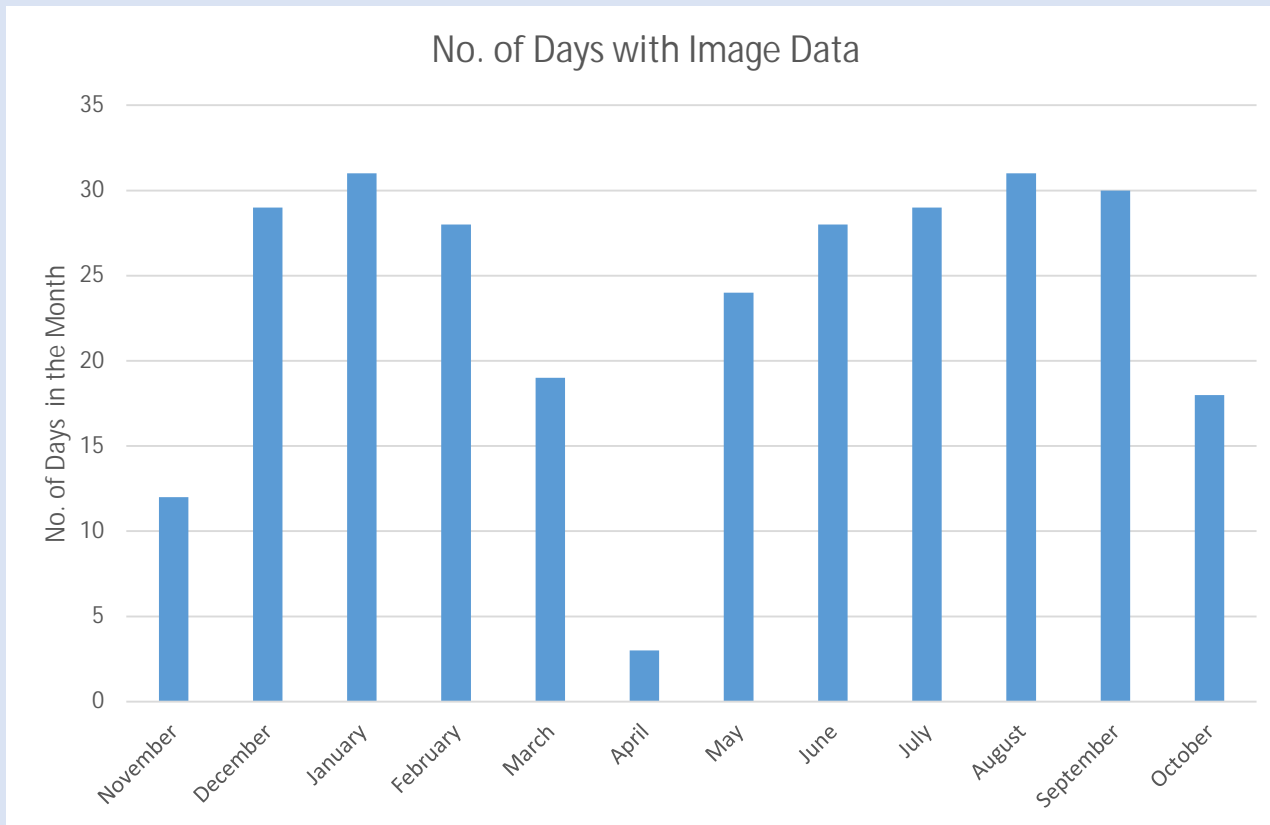








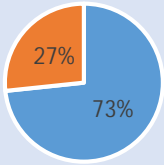
# Early Findings...POS



# Small Vessels Traffic

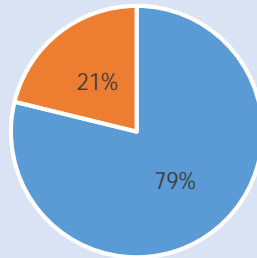
## November \*

■ # of AIS vessels  
■ # of Non-AIS vessels



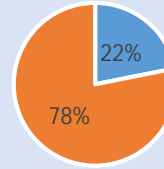
## February

■ # of AIS vessels ■ # of Non-AIS vessels



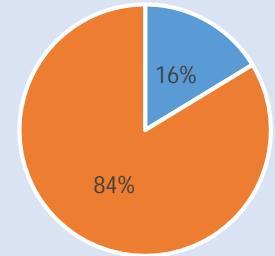
## May \*

■ # of AIS vessels  
■ # of Non-AIS vessels



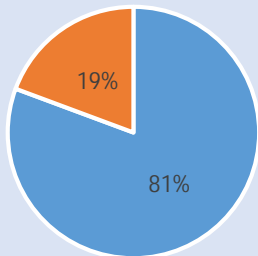
## August

■ # of AIS vessels ■ # of Non-AIS vessels



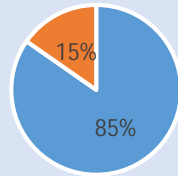
## December

■ # of AIS vessels ■ # of Non-AIS vessels



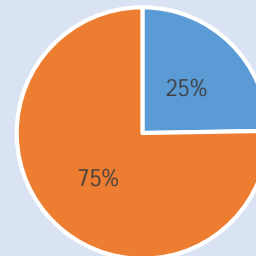
## March \*

■ # of AIS vessels  
■ # of Non-AIS vessels



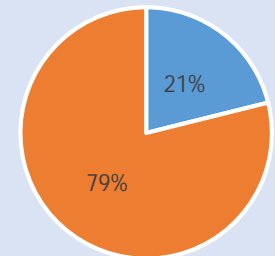
## June

■ # of AIS vessels ■ # of Non-AIS vessels



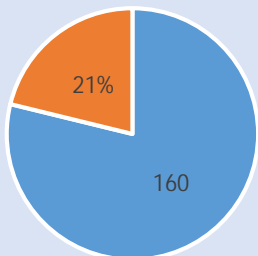
## September

■ # of AIS vessels ■ # of Non-AIS vessels



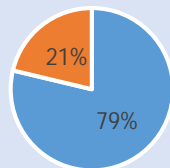
## January

■ # of AIS vessels ■ # of Non-AIS vessels



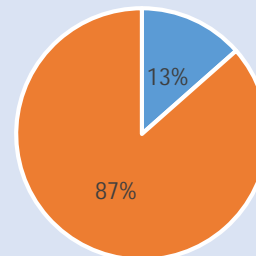
## April \*

■ # of AIS vessels  
■ # of Non-AIS vessels



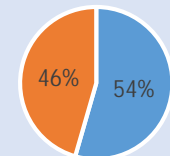
## July

■ # of AIS vessels ■ # of Non-AIS vessels



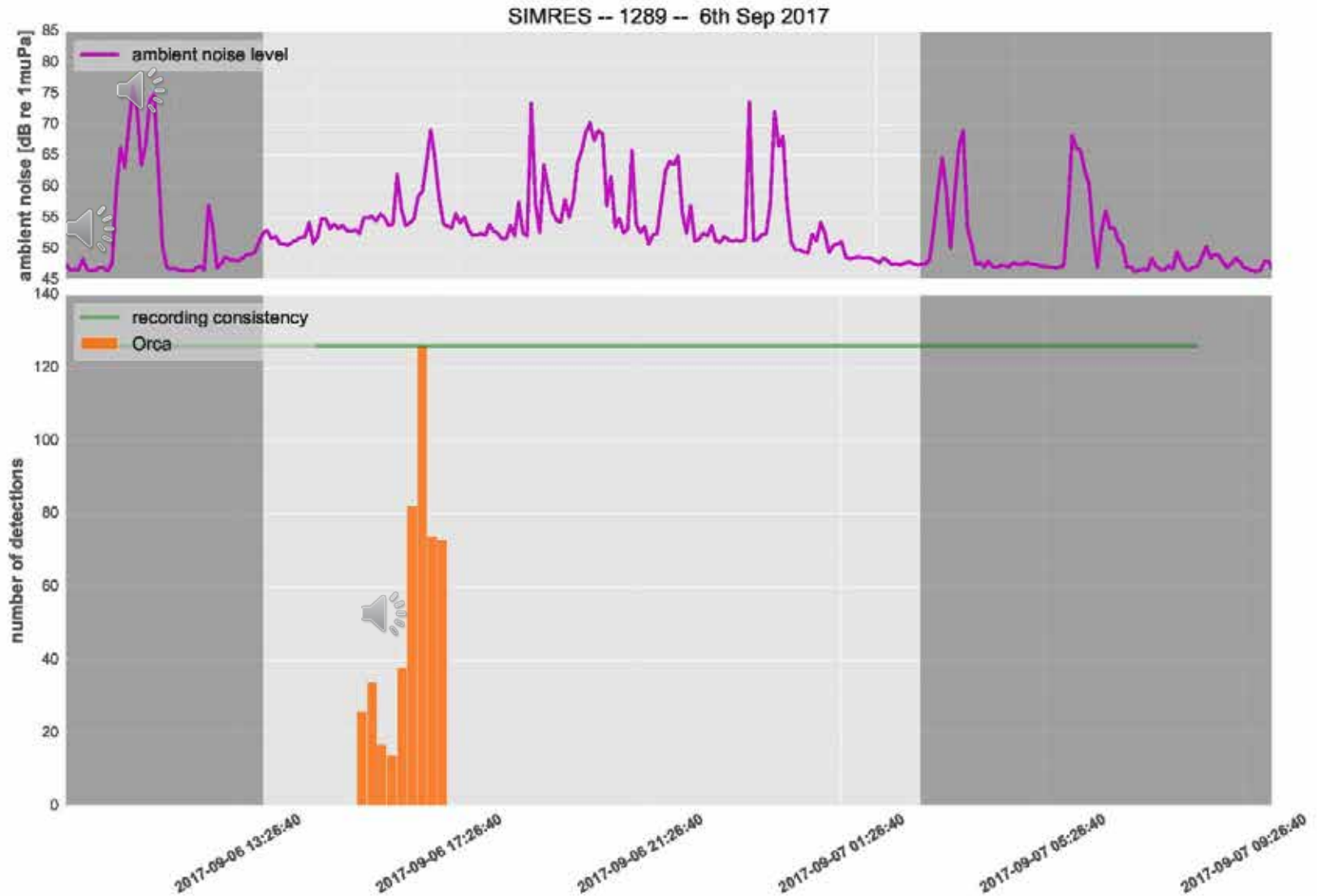
## October \*

■ # of AIS vessels  
■ # of Non-AIS vessels





# Coupling of the Camera and Hydrophone Data



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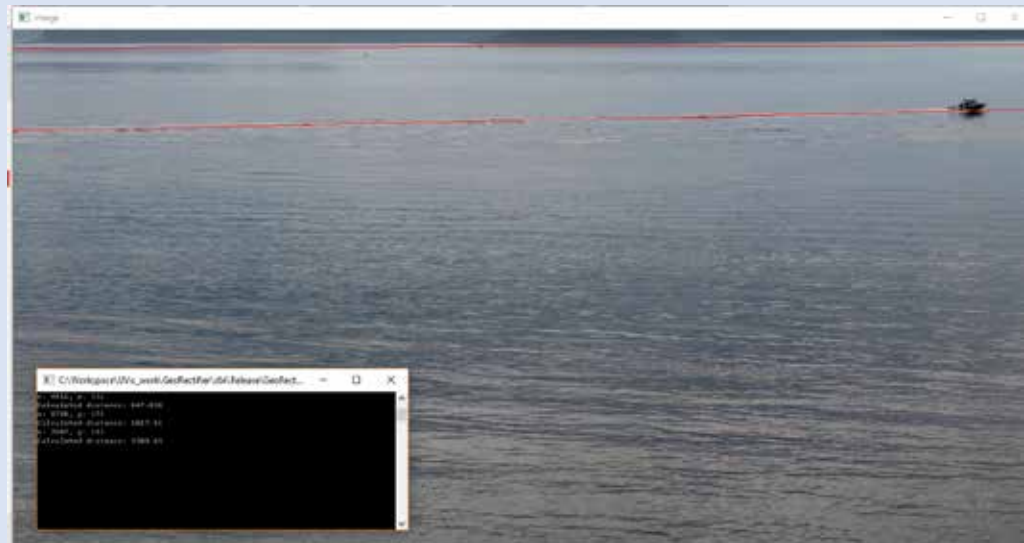


# Coupling of the Camera and Hydrophone Data

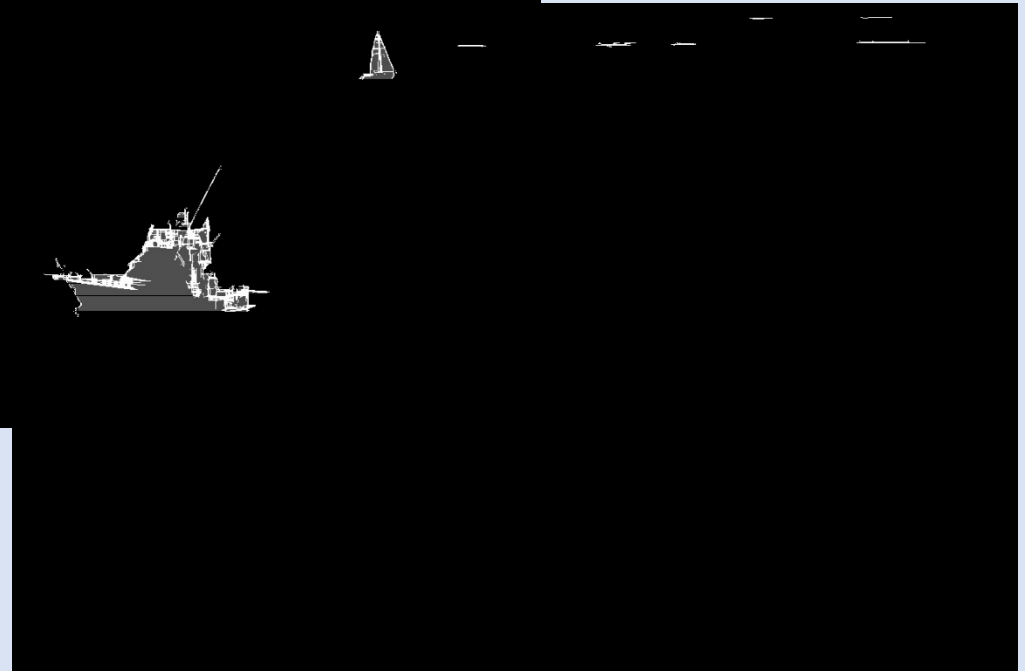
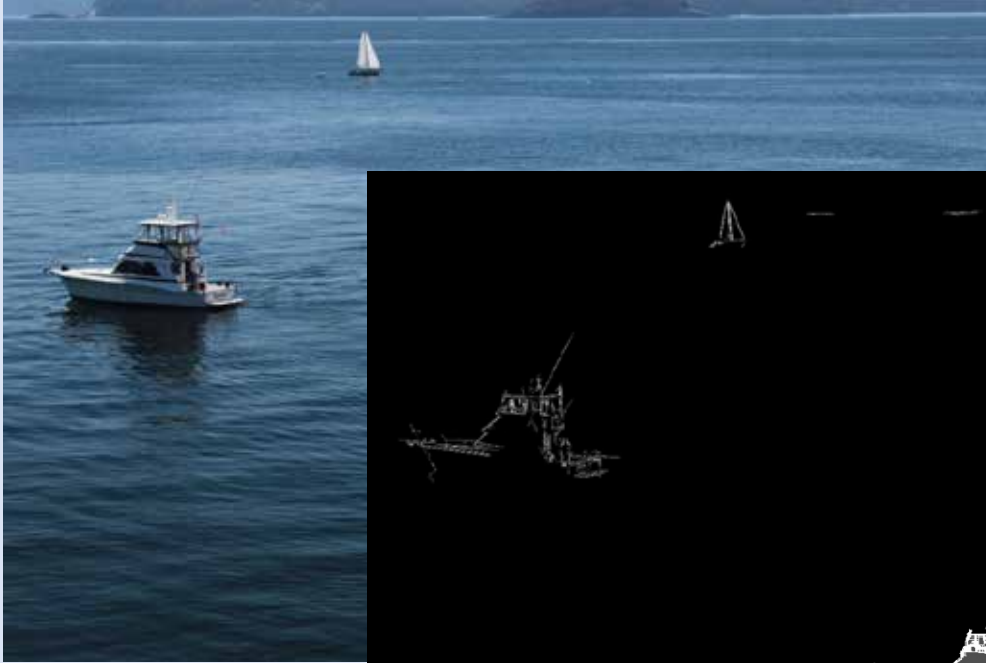


# Future Work and Research Goals

- Coupling the hydrophone, camera and AIS data
- Addition of video, night vision and infrared sensors
- AIS speed assessment
- Development of vessel auto-detection software



# Automatic Identification Software



Many thanks again to all our amazing collaborators

Thank You for listening!

Any Questions?

