



Western Washington University
Western CEDAR

Salish Sea Ecosystem Conference

2018 Salish Sea Ecosystem Conference
(Seattle, Wash.)

Apr 6th, 11:00 AM - 11:15 AM

Quantifying marine vessel traffic from aerial surveys in the Salish Sea

Norma Serra-Sogas

Univ. of Victoria, Canada, normaserra@gmail.com

Patrick O'Hara

Environment and Climate Change Canada, Canada, Patrick.ohara@canada.ca

Rosaline Canessa

Univ. of Victoria, Canada, rosaline@uvic.ca

Lauren McWhinnie

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

Follow this and additional works at: <https://cedar.wvu.edu/ssec>



Part of the [Fresh Water Studies Commons](#), [Marine Biology Commons](#), [Natural Resources and Conservation Commons](#), and the [Terrestrial and Aquatic Ecology Commons](#)

Serra-Sogas, Norma; O'Hara, Patrick; Canessa, Rosaline; and McWhinnie, Lauren, "Quantifying marine vessel traffic from aerial surveys in the Salish Sea" (2018). *Salish Sea Ecosystem Conference*. 518.
<https://cedar.wvu.edu/ssec/2018ssec/allsessions/518>

This Event is brought to you for free and open access by the Conferences and Events at Western CEDAR. It has been accepted for inclusion in Salish Sea Ecosystem Conference by an authorized administrator of Western CEDAR. For more information, please contact westerncedar@wwu.edu.



Quantifying marine vessel traffic from aerial surveys in the Salish Sea

Presenters: Norma Serra, CORAL Group, Geography Department,
University of Victoria

Collaborators: Leh Smallshaw (UVic), Patrick O'Hara (ECCC, UVic),
Rosaline Canessa (Uvic), Lauren McWhinnie (UVic)

Salish Sea Ecosystem Conference
April 4-6, 2018



Acknowledgements

- National Aerial Surveillance Program – Pacific Crew
- Funding provided by:



- DFO



Pêches et Océans
Canada

Fisheries and Oceans
Canada

- MEOPAR



NEMES

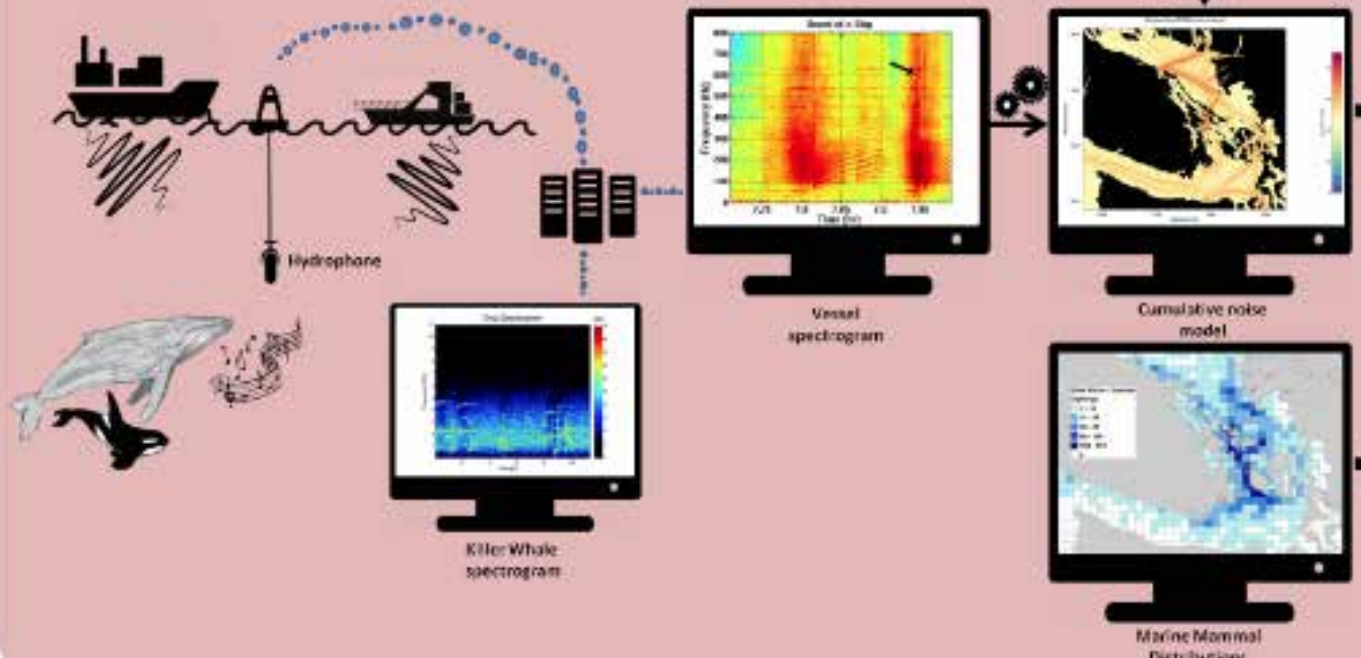
Noise Exposure to the Marine Environment from Ships

www.nemesproject.com

TRACKING VESSEL TRAFFIC & MODELLING



UNDERWATER ACOUSTICS & MODELLING



This picture is not complete!



Goal

Explore the utility of **aerial surveys** for collecting vessel traffic information in coastal waters

Objectives

1. Describe the **distribution and composition** of vessel traffic in the Salish Sea
2. Determine the proportion and composition of **AIS and non-AIS** vessels in the Salish Sea

The National Aerial Surveillance Program: Mandate and Capabilities



MSS 6000 Components



INMARSAT
ANTENNA

SURVEILLANCE

Canada

NASP
PNSA

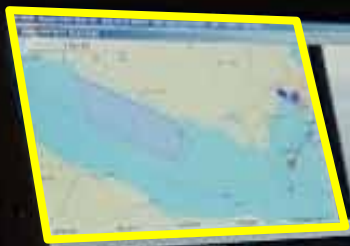
SLAR ANTENNA

AIS ANTENNA

MX-15

IR/UV SCANNER



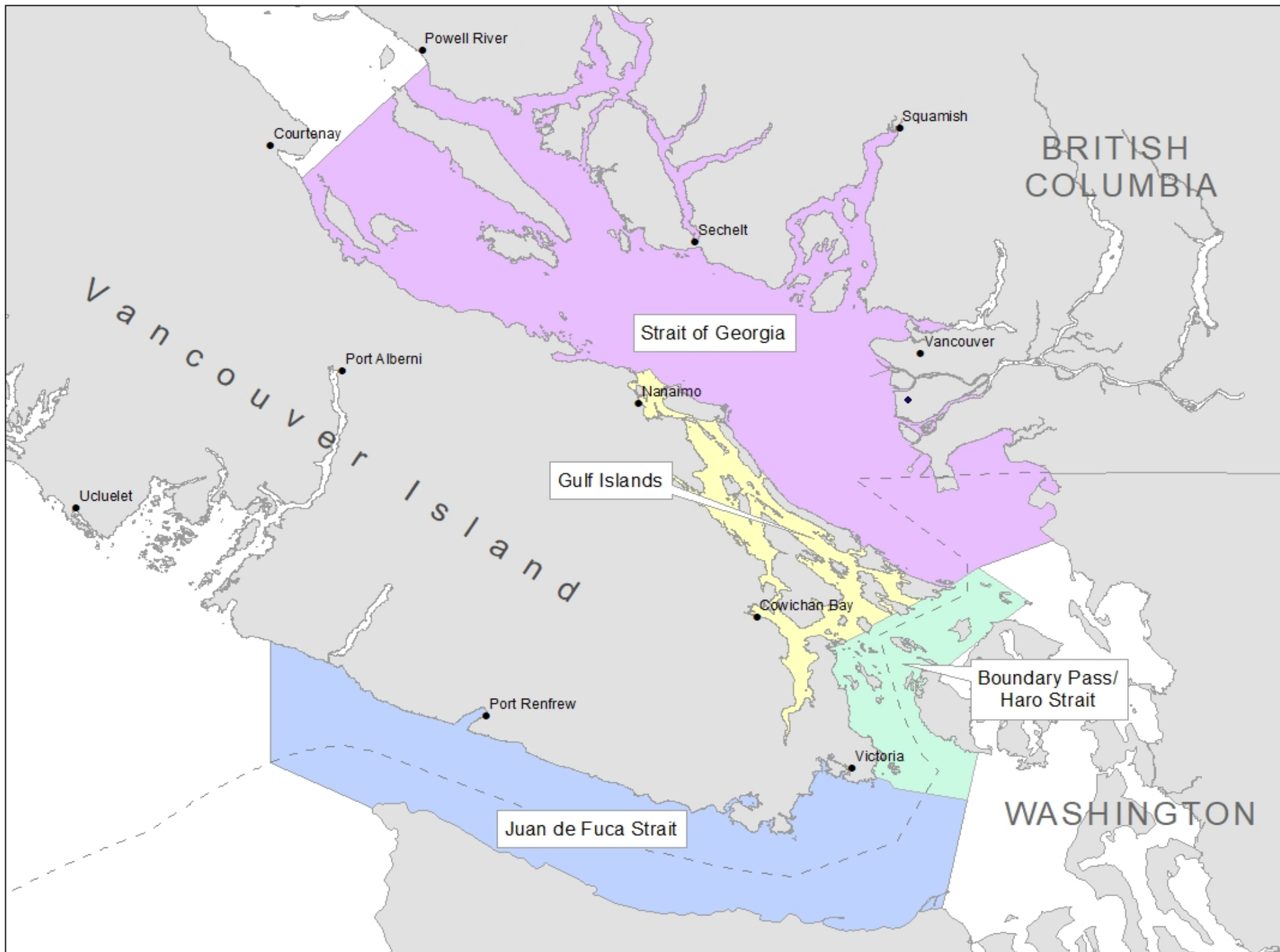


04750 0 0401-016
NOTE: CLR CLR 0475 00

0400-000 1-00-0

EMERGENCY
CALL 911 OR 1-800-387-4674
FOR MORE INFORMATION

Transport Canada



Data capturing methods

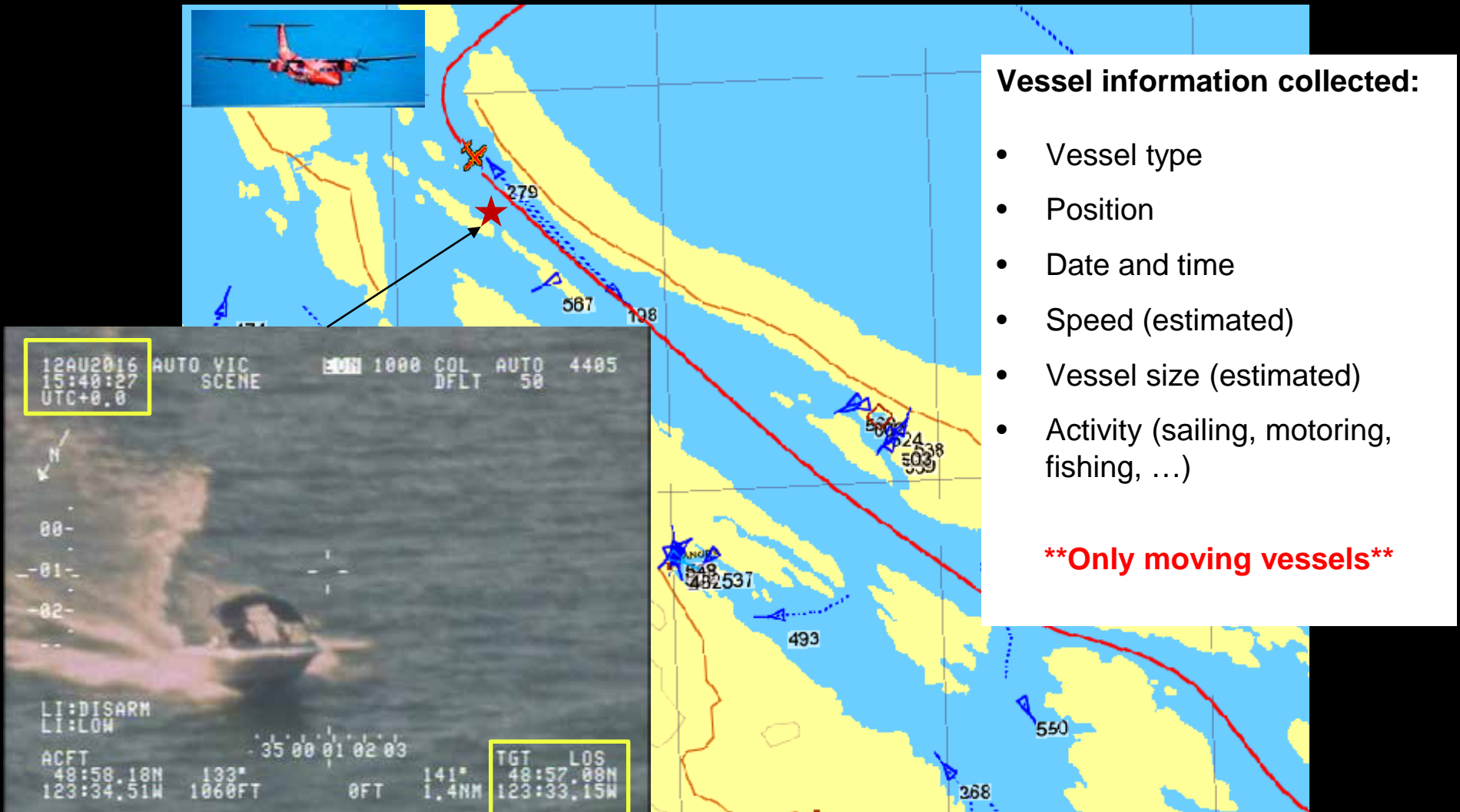
Step 1 – Extract vessel survey flightpath



NASP flight August 12, 2016

Data capturing methods

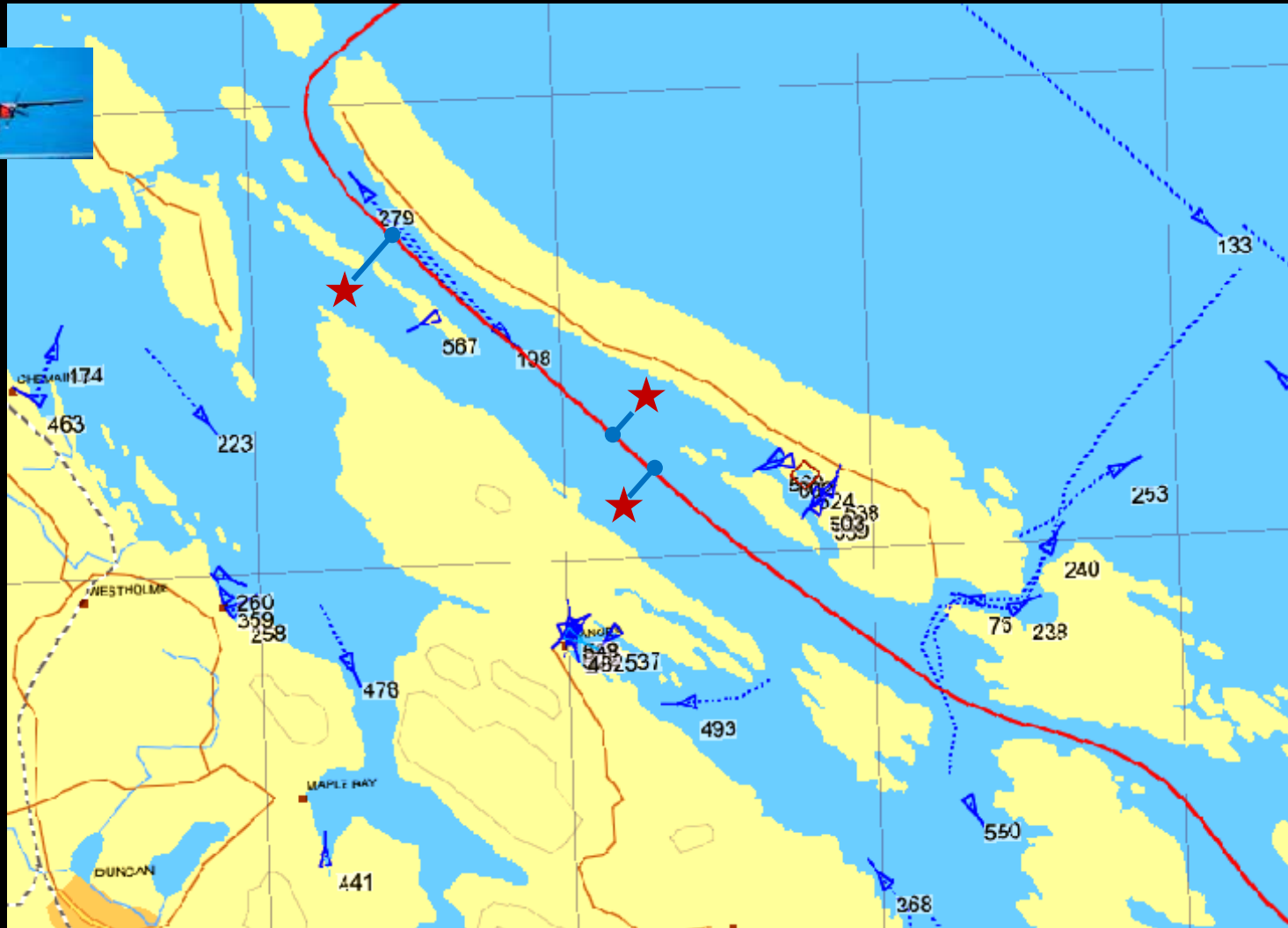
Step 2 – Plot vessels not transmitting AIS from video



NASP flight August 12, 2016

Data capturing methods

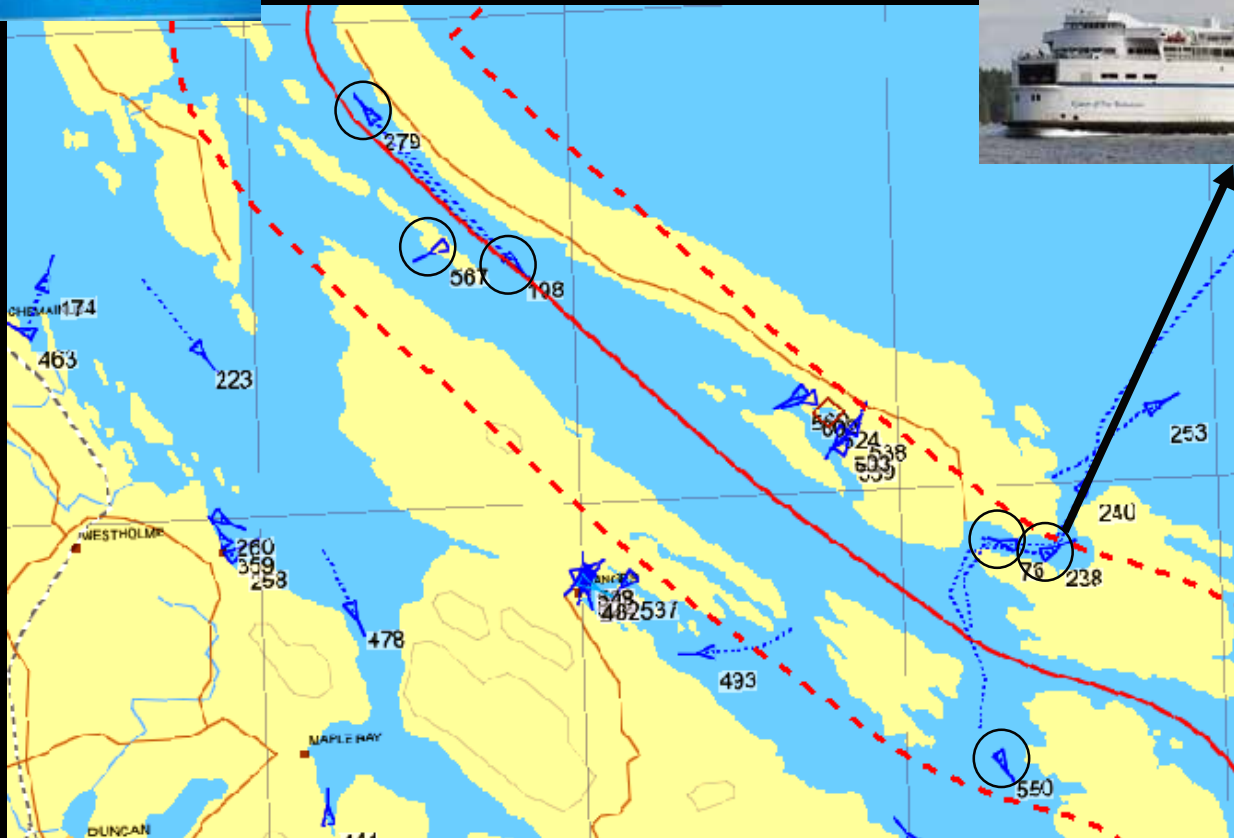
Step 3 – Quantification of surveillance effort based on distance sampling methods



NASP flight August 12, 2016

Data capturing methods

Step 4 – Extracting information on vessels transmitting AIS



AIS vessel information:

- Position
- MMSI number
- Vessel class and size
- Date and time
- Speed and course
- Activity

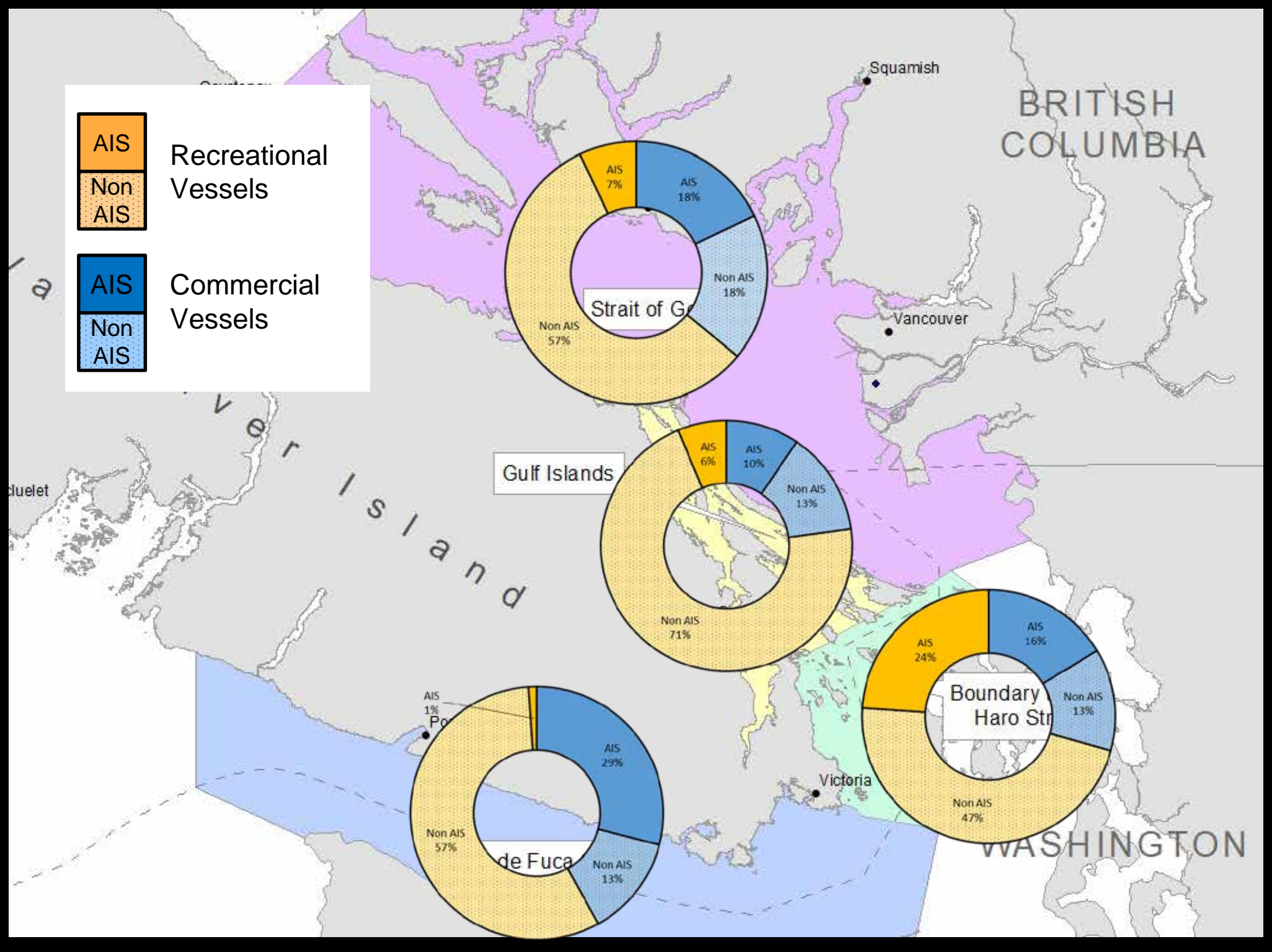
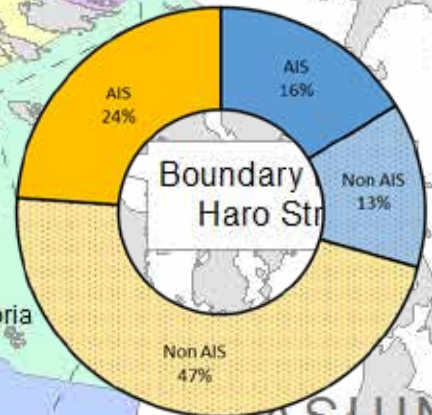
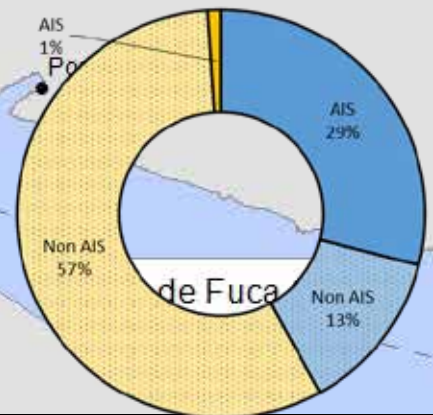
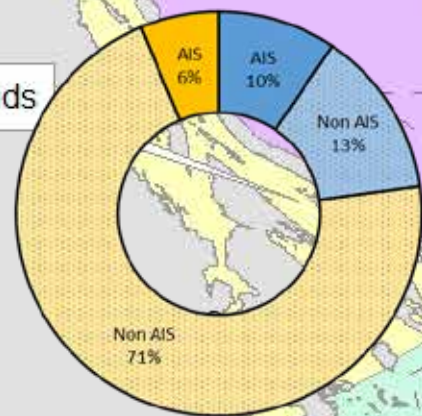
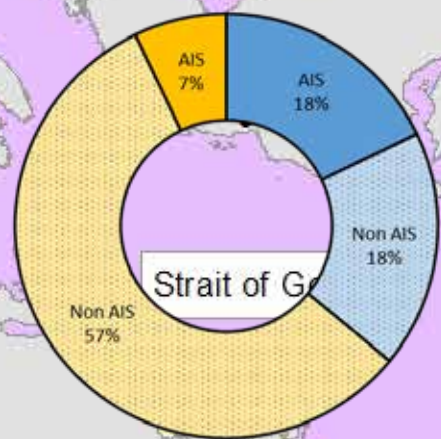
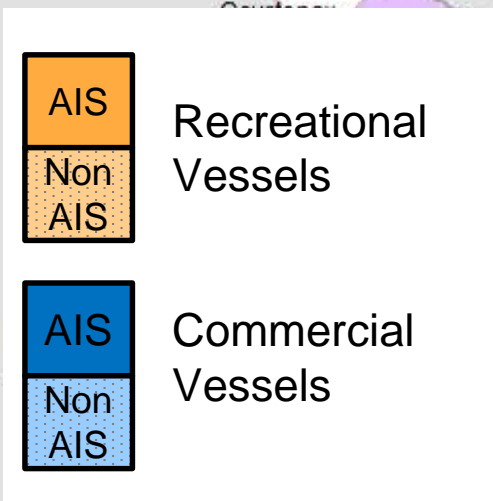
****Only for moving AIS vessels****

NASP flight August 12, 2016

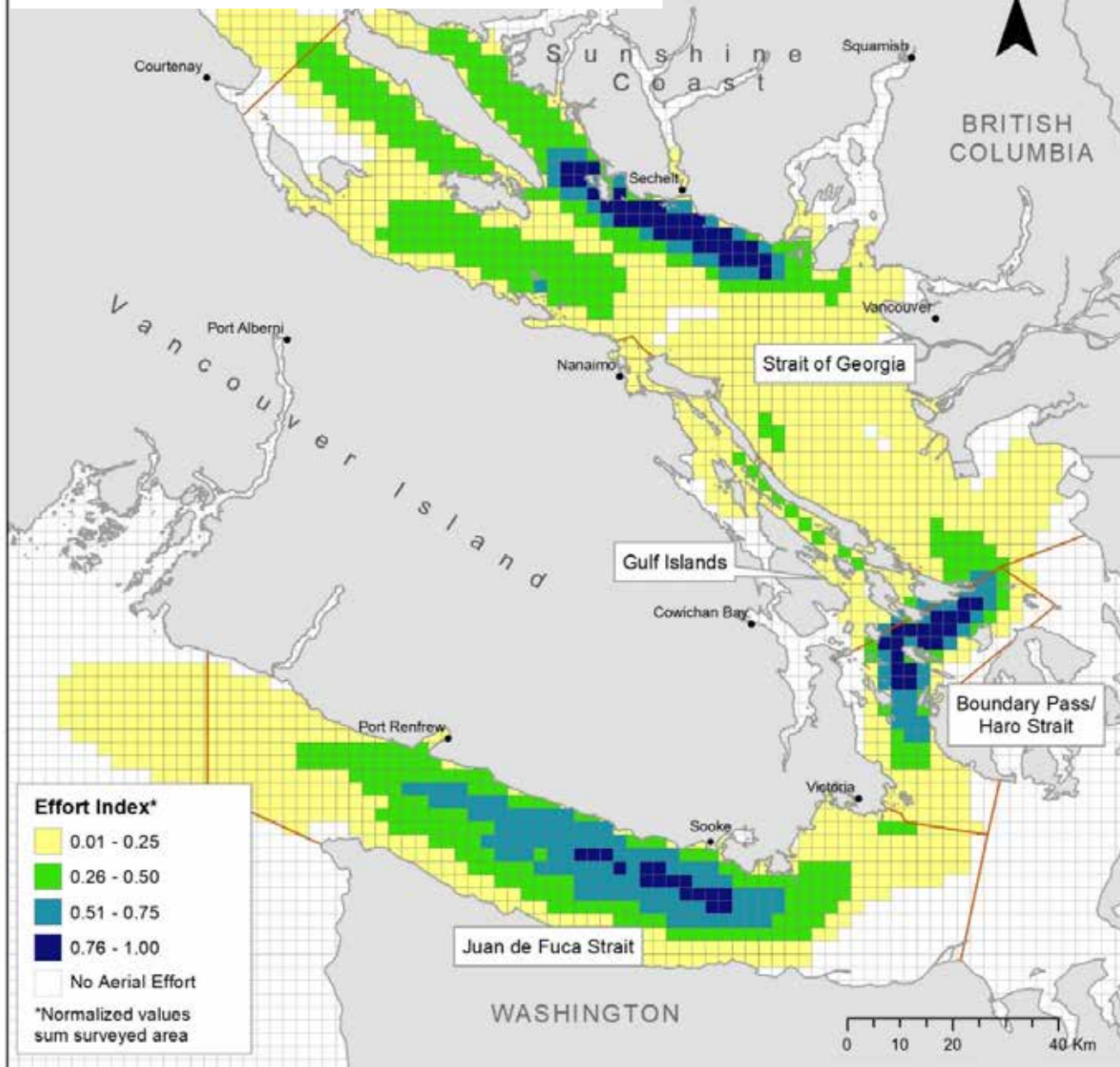
Results

- Vessels surveys: August 2015 to December 2017 (Total 74)
- 419 non-AIS vessel sighted
- 184 AIS vessel data captured

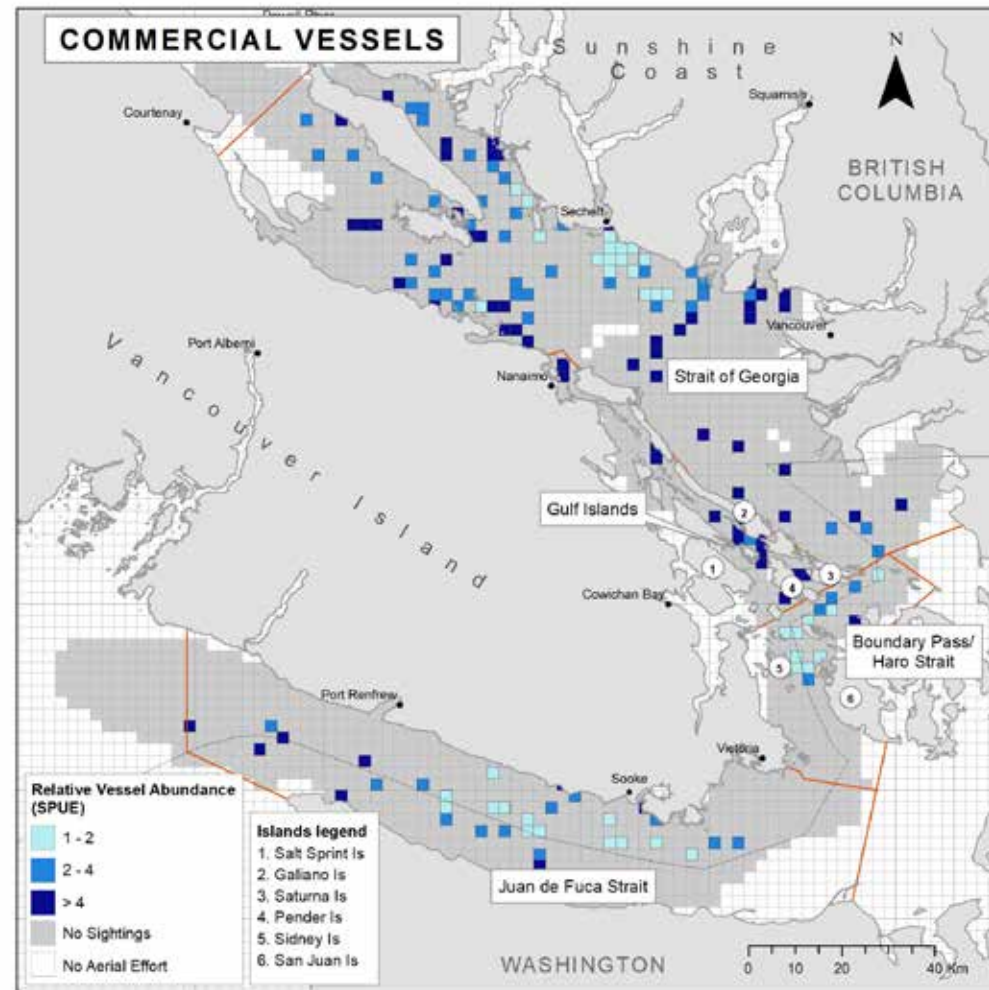
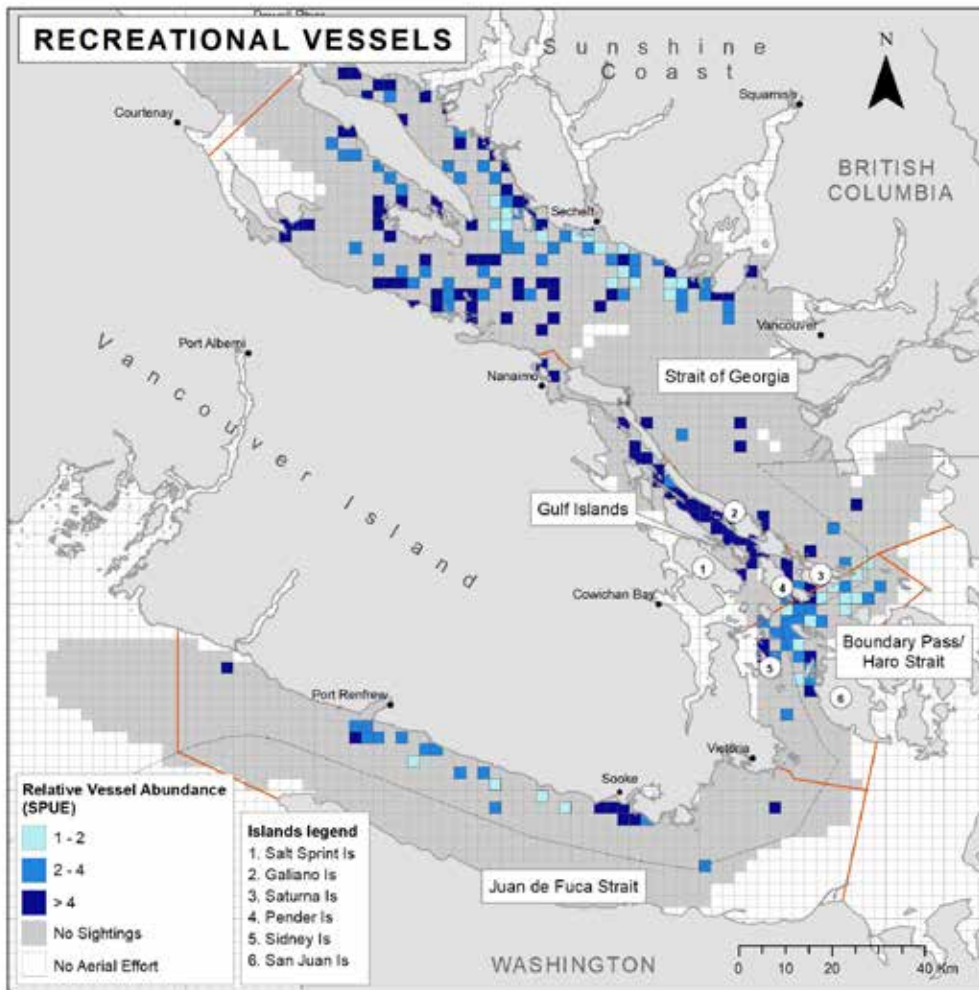




VESSEL SURVEY EFFORT



Relative Abundance of Recreational and Commercial Vessels



What we learnt from this study...

About **vessel traffic** in the Salish Sea:

- 70% of vessel traffic in surveyed areas does **not carry AIS**
- **Distribution of Non AIS vessels vary** depending on the sub-region.
- **65%** of vessel traffic in surveyed areas is from **recreational boating**.



What we learnt from this study...

About **NASP and aerial surveys** for collecting vessel traffic information:

- **Excellent and unique** platform to learn about the amount of vessel traffic not captured by AIS (i.e. small vessel traffic)
- Provide very **detailed and accurate** picture of the type of vessels in the area and their activities
- Initial data collection protocols need to be adapted for collecting information in **busy vessel traffic areas**.

Next steps...

- Test different data collection protocols to capture vessel traffic information in areas with many small vessels
- Use this information to obtain a more accurate picture of cumulative underwater noise levels in the Salish Sea



Thank you



Vessel traffic monitoring systems

- **Cooperative or Reporting systems**

For example:

- AIS
- VMS
- LRIT

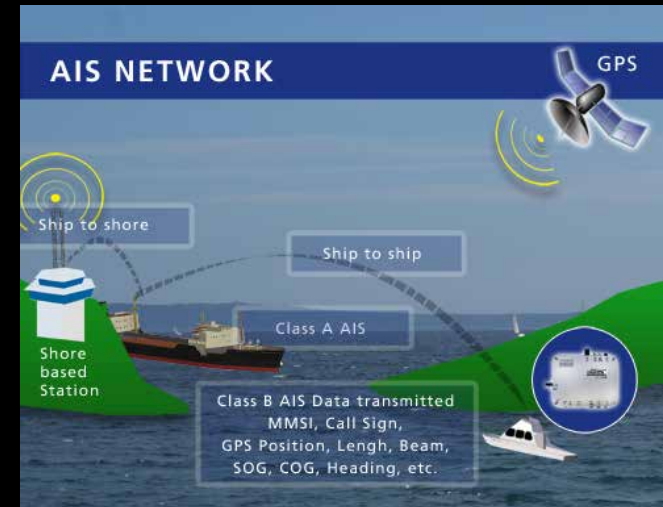


Image source: <https://www.easyais.com/en/ais-information/what-is-ais/>

- **Non-Cooperative or Observation Systems.**

For example:

- Radar
- Satellite imagery (SAR, Optical)
- Aerial Surveys

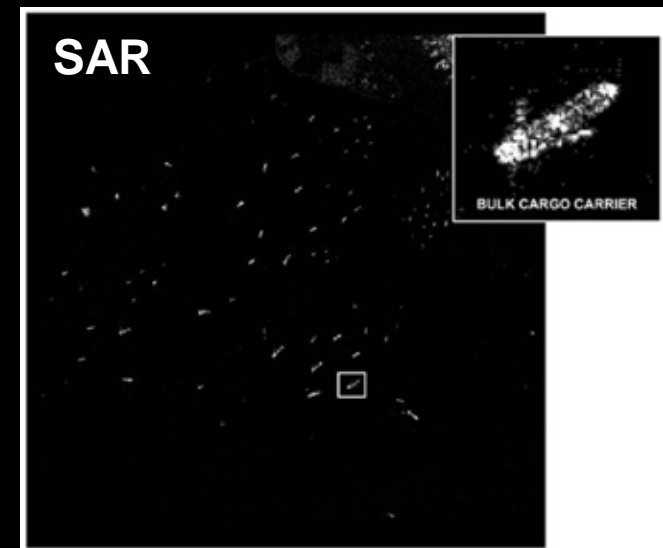


Image source: www.strategypage.com/military_photos/radar.asp