

# Chiixwaay Kaydts'id | Chaawsalii Damaan Tl'a Kingga

*Beach Watch/Protect*

## Monitoring Nearshore Small Vessel Traffic in Haida Territories

Kil Hltaanuwaay *Taylor Brown*, Council of the Haida Nation, Marine Planning

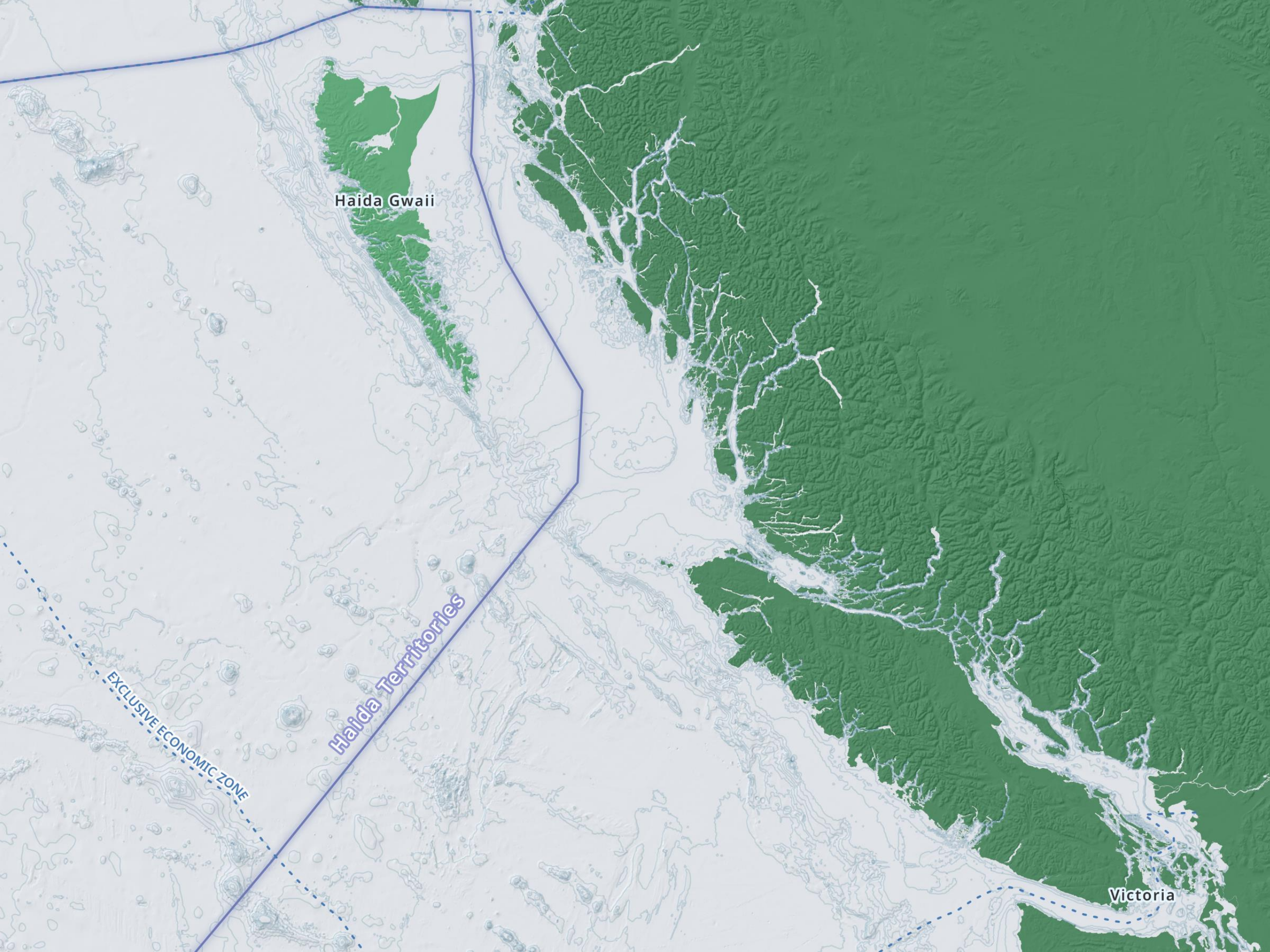
*Yury Bychkov*, LGL Limited

*Kelly Larkin*, Transport Canada, Enhanced Maritime Situational Awareness



**HAIDA NATION**



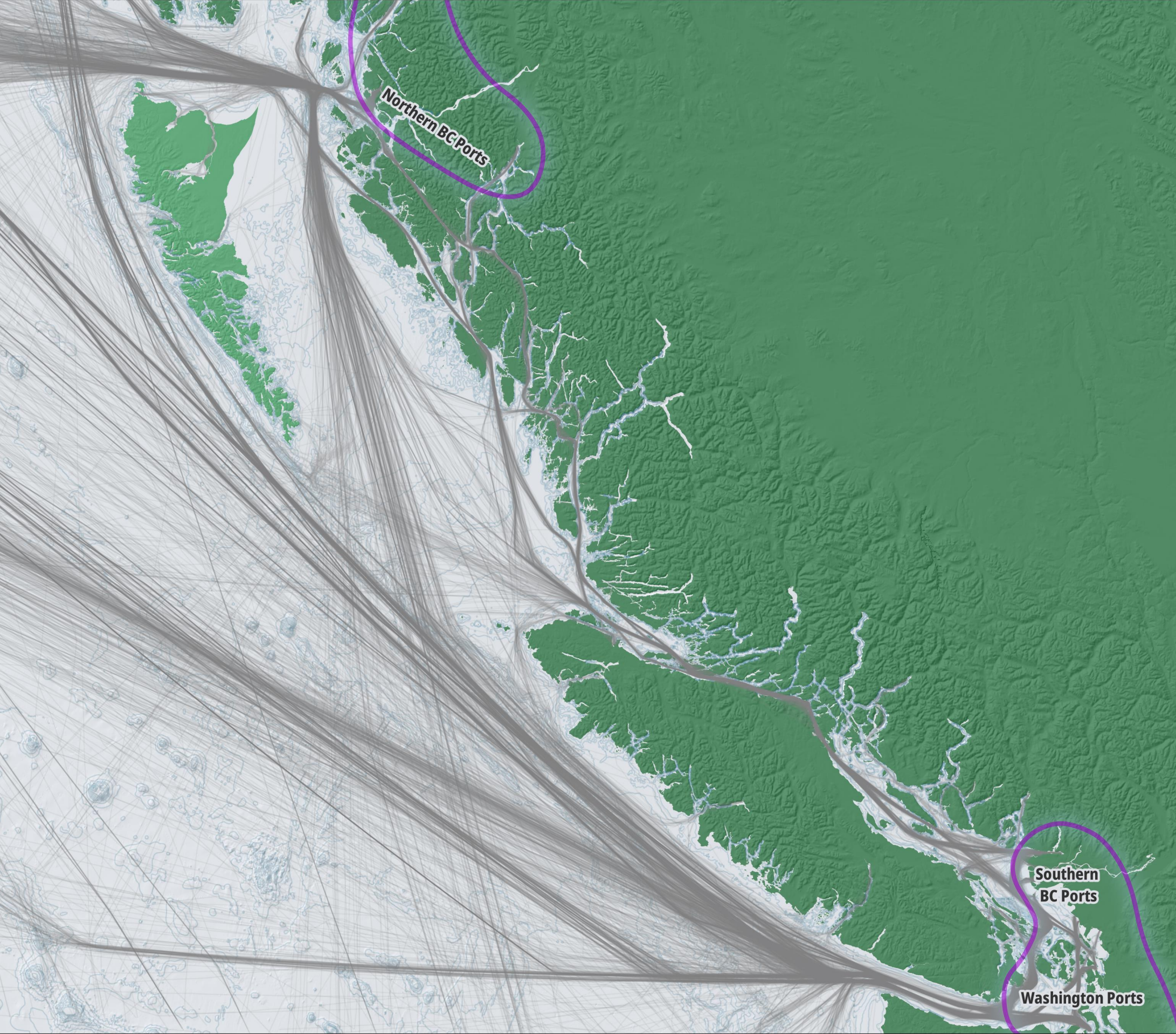


# Overview

- Background
- Vessel Traffic Monitoring on Haida Gwaii
- Enhanced Maritime Situational Awareness System
- 2021 Small Vessel Traffic Study
- Lessons Learned & Next Steps



# Vessel Traffic Overview for Haida Gwaii







## Vessel Traffic Monitoring Initiatives on Haida Gwaii

- Haida Fisheries Program: Creel Surveys
- Reconciliation Framework Agreement for Bioregional
  - Establishing a Safe Distance Offshore
    - Voluntary Protection Zone for the west coast of Haida Gwaii
- Haida Gwaii Marine Awareness Project (HGMAP)
  - Enhanced Maritime Situational Awareness System (EMSA)





# Enhanced Maritime Situational Awareness

## *EMSA support to Council of the Haida Nation*

### *maritime situational awareness*

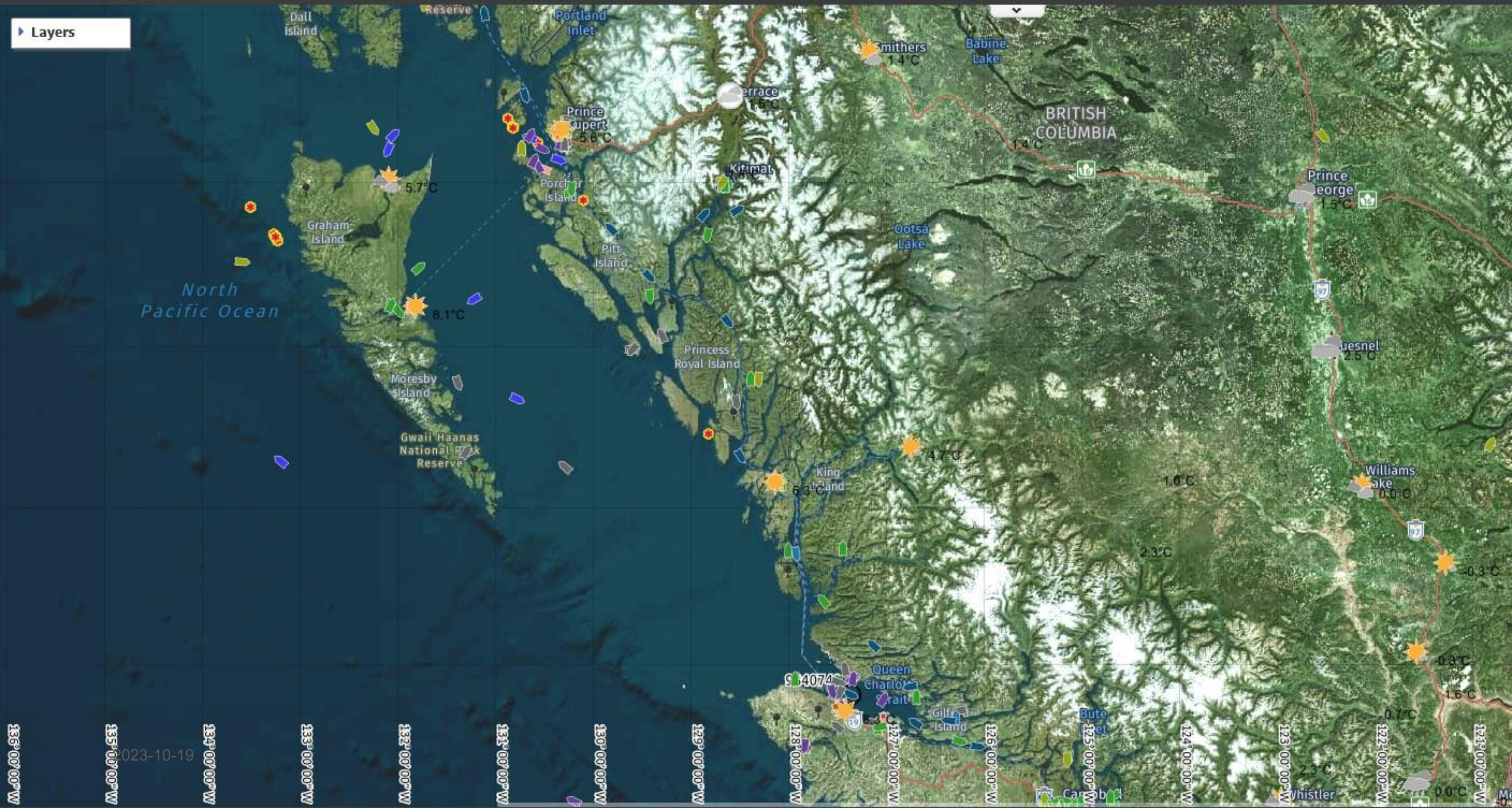
Kelly Larkin, Regional Program Manager  
Transport Canada (Pacific Region)





# Background: Why EMSA?

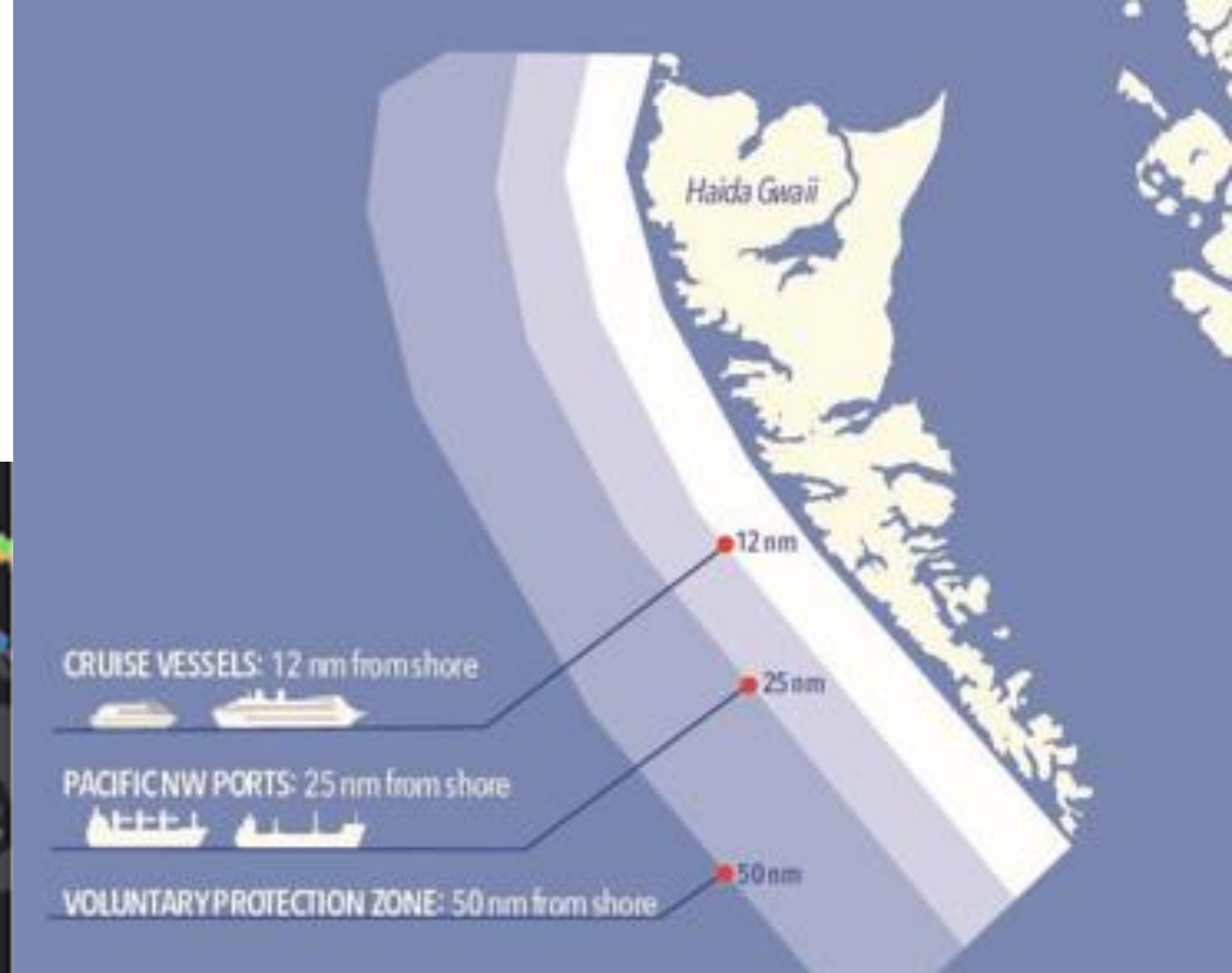
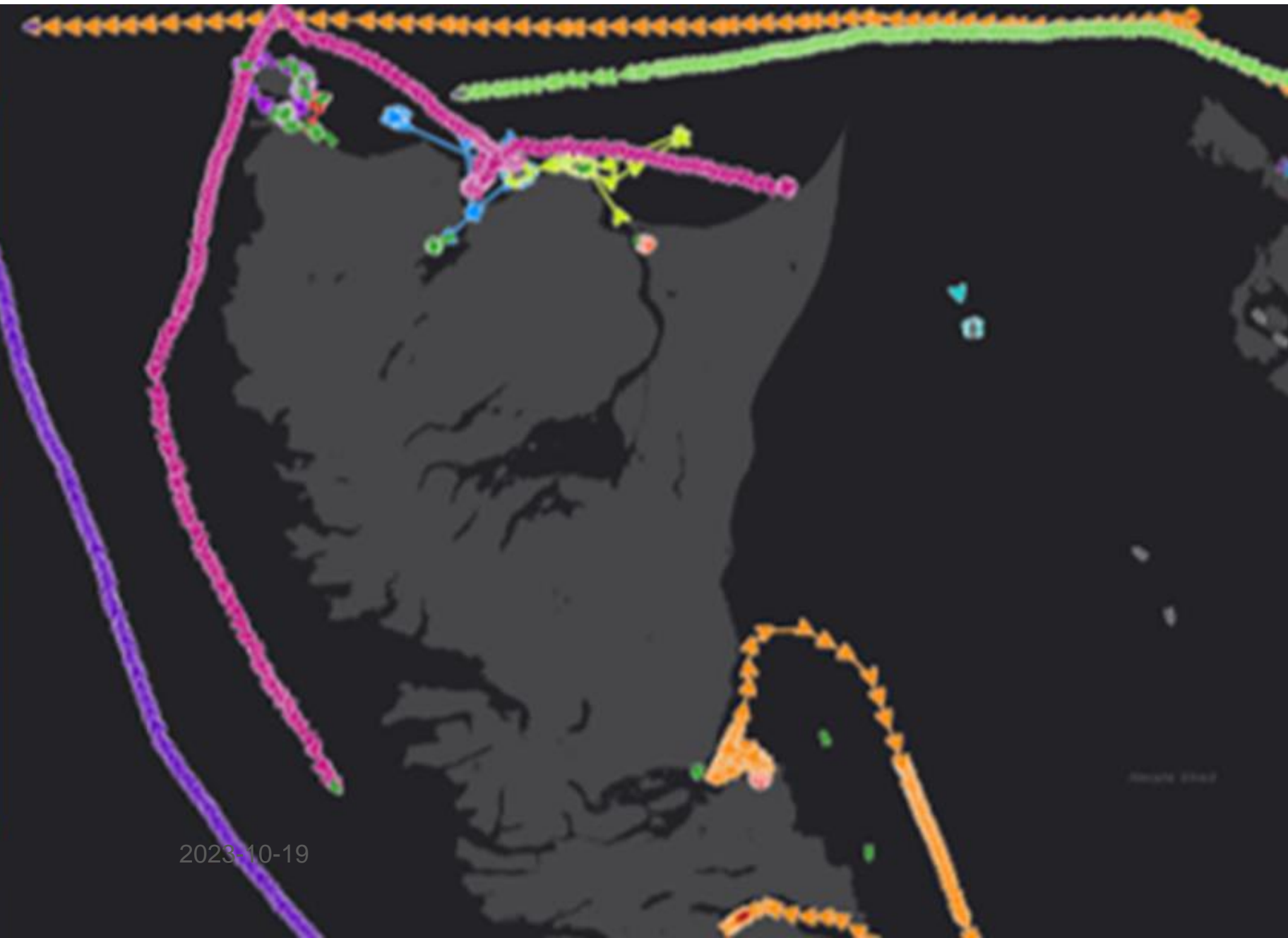




2023-10-19



# EMSA for vessel tracking



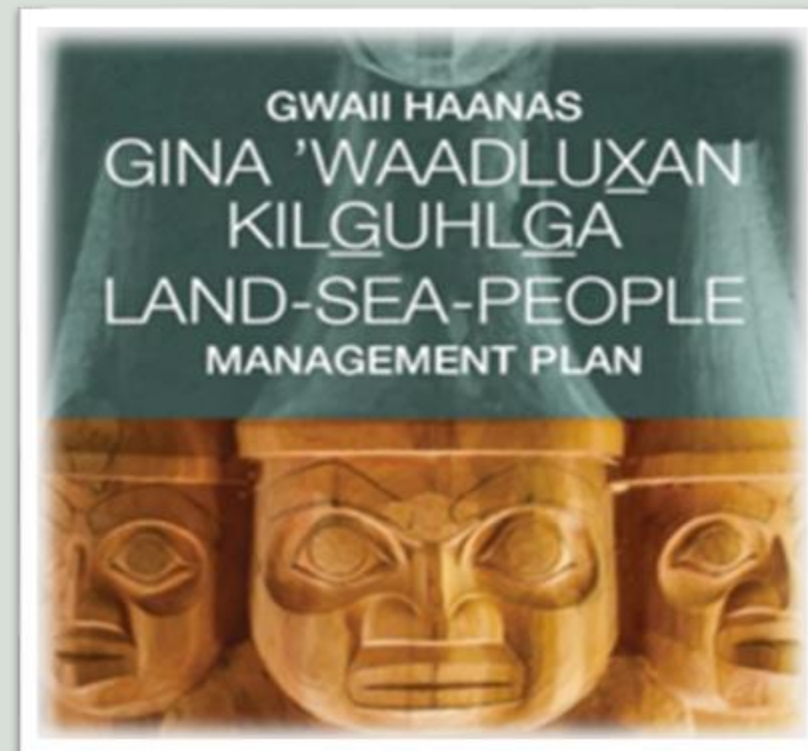




# No AIS...then what?



# Research Objectives



CHN Marine Planning Initiative	Research Objective
Marine Invasive Species Monitoring & Management	<ul style="list-style-type: none"> <li>a. Determine density of traffic at each of the study areas</li> <li>b. Determine vessel duration of presence and time of day</li> <li>c. Determine if vessels are transiting between multiple sites</li> </ul>
Recreational Fishing	<ul style="list-style-type: none"> <li>a. Determine the number of recreational fishing boats within the study area</li> <li>b. Determine when commercial recreational fishing boats (i.e. Lodge vessels) are on and off the water.</li> </ul>
Haida Gwaii Marine Awareness Project	<ul style="list-style-type: none"> <li>a. Determine the proportion of AIS equipped and non-AIS equipped small vessels.</li> <li>b. Improve overall understanding of traffic patterns around Haida Gwaii.</li> </ul>



# Methods: Site Selection

## CHN Marine Planning Initiative

### Site Selection Criteria

Marine Invasive Species Monitoring & Management

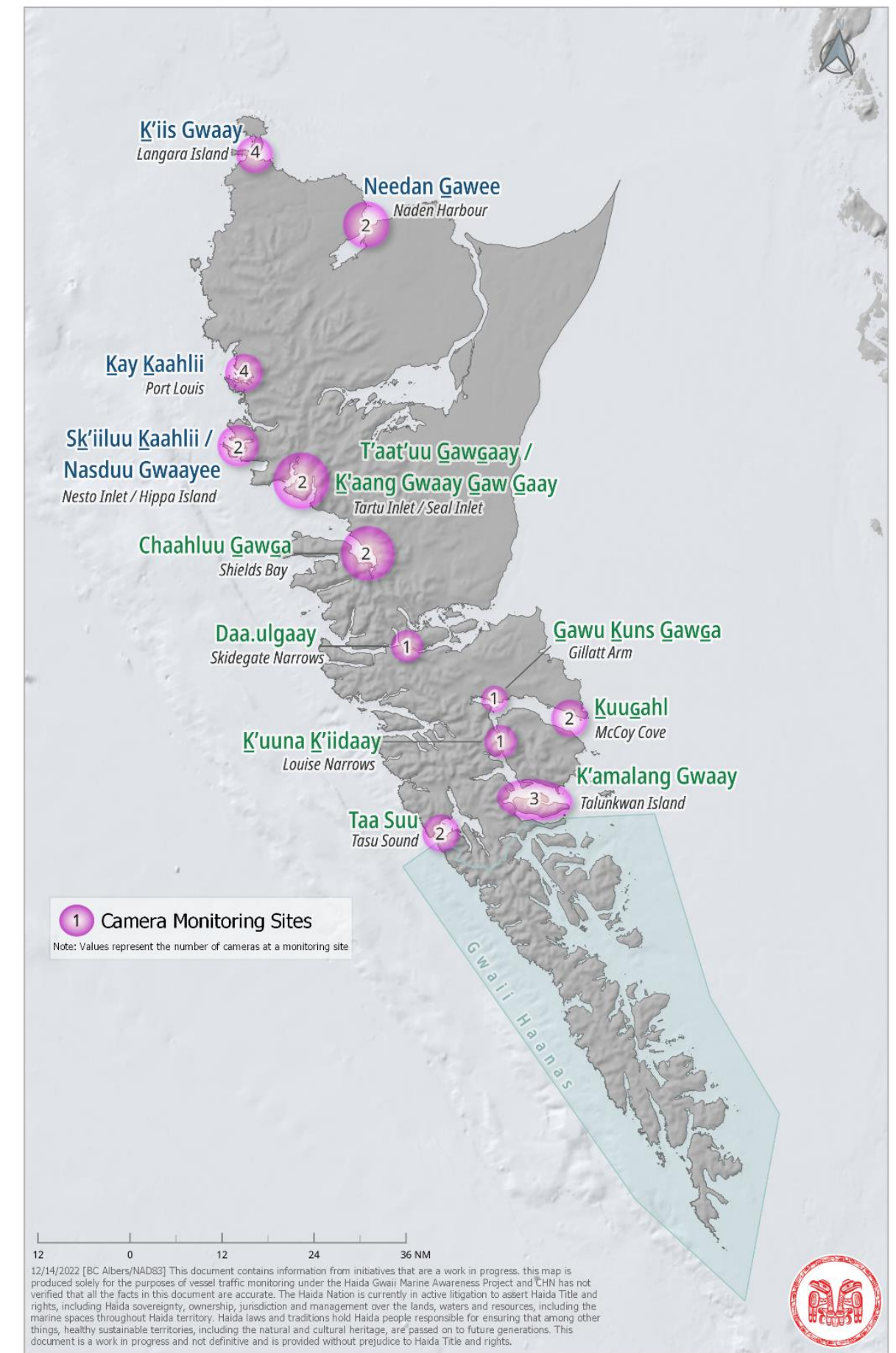
- a. Identified Invasive Species Risk

Recreational Fishing

- a. Creel Survey Locations
- b. Presence of Recreational Fishing Lodges

Haida Gwaii Marine Awareness Project

- a. Vessel Traffic Densities (AIS)
- b. Anchorage Locations





# Methods: Data Collection





# Methods: Data Processing

MACHINE LEARNING



MODEL SELECTION

YOLOv5

PRE-TRAINING



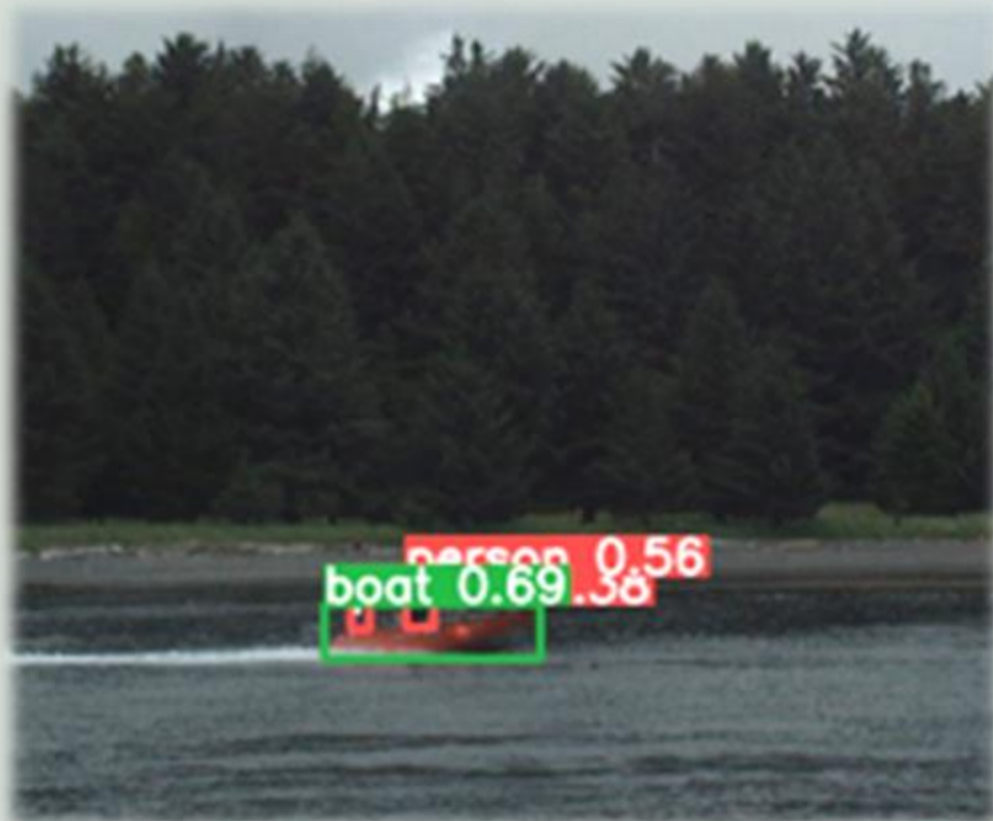
MORE TRAINING

Training Data  
297,581  
images



Post-processing

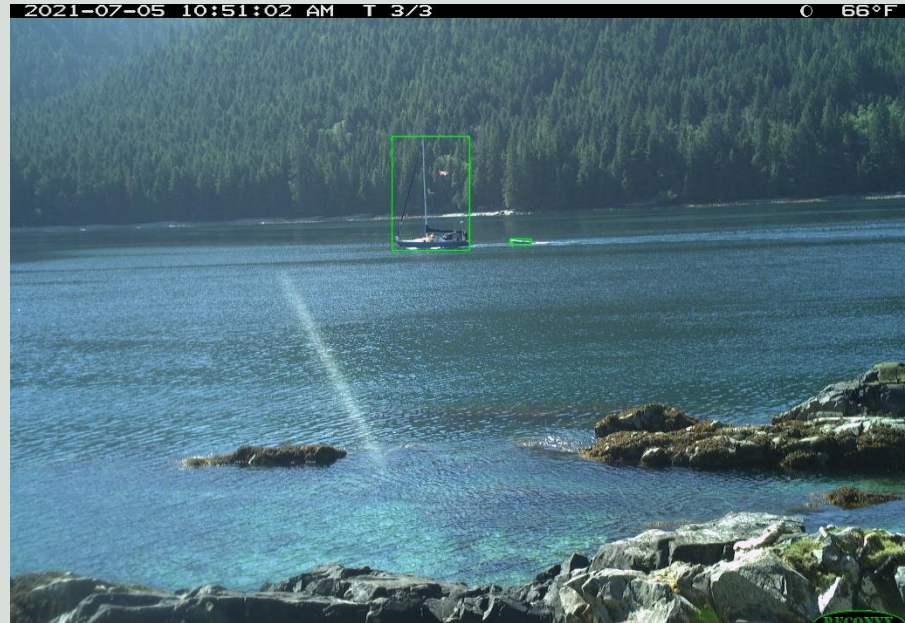
Manual Review







SN1  
2021-05-20 21:14:00 T 1/3 7°C



TH1  
2021-07-05 10:51:02 AM T 3/3 66°F



A1  
2021-08-23 11:27:00 T 13°C



SN1  
2021-06-06 07:04:02 T 3/3 9°C



TH1  
2021-06-03 8:57:00 PM T 1/3 55°F



A1  
2021-05-13 5:22:01 AM T 2/3 44°F



A2



PL4

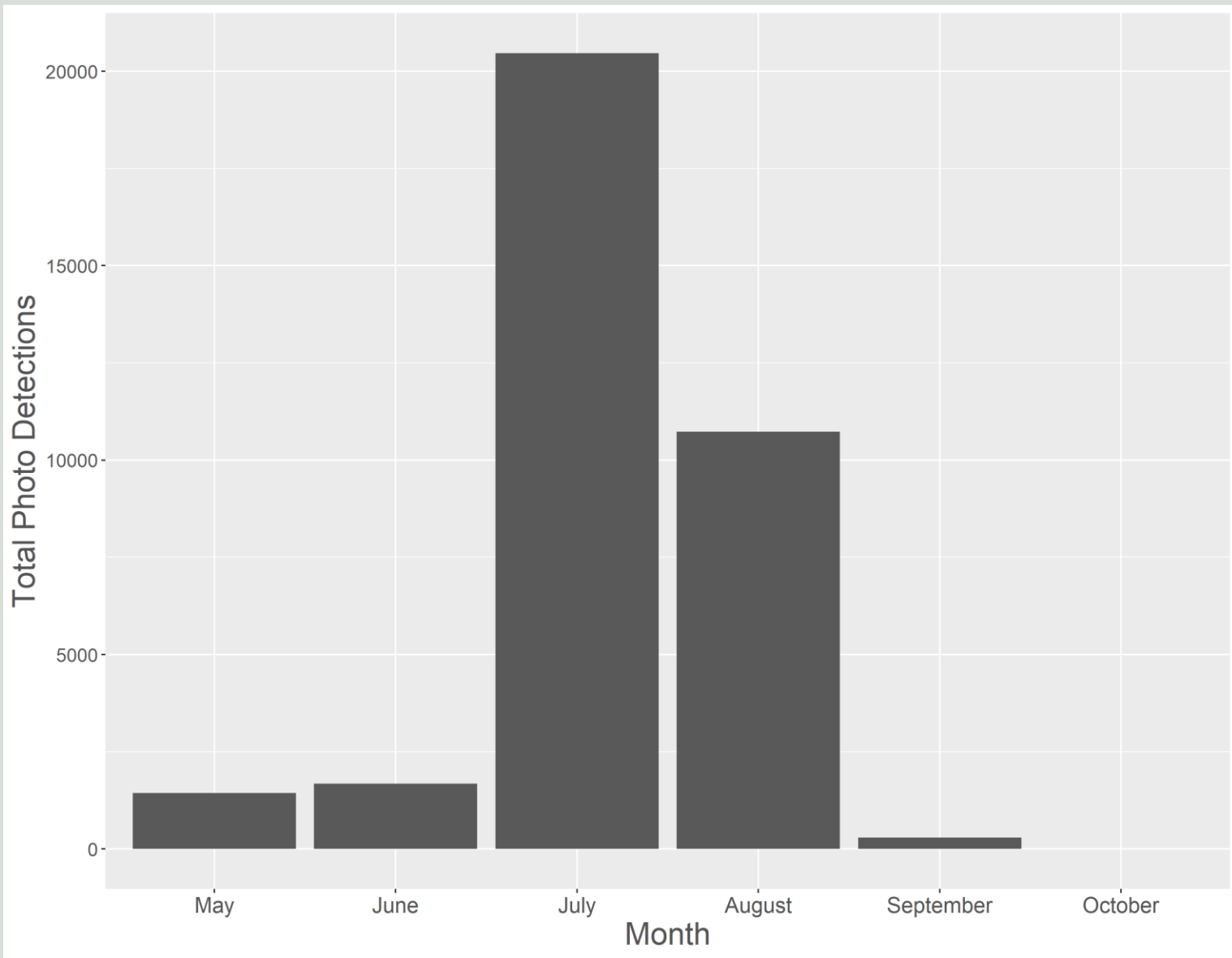
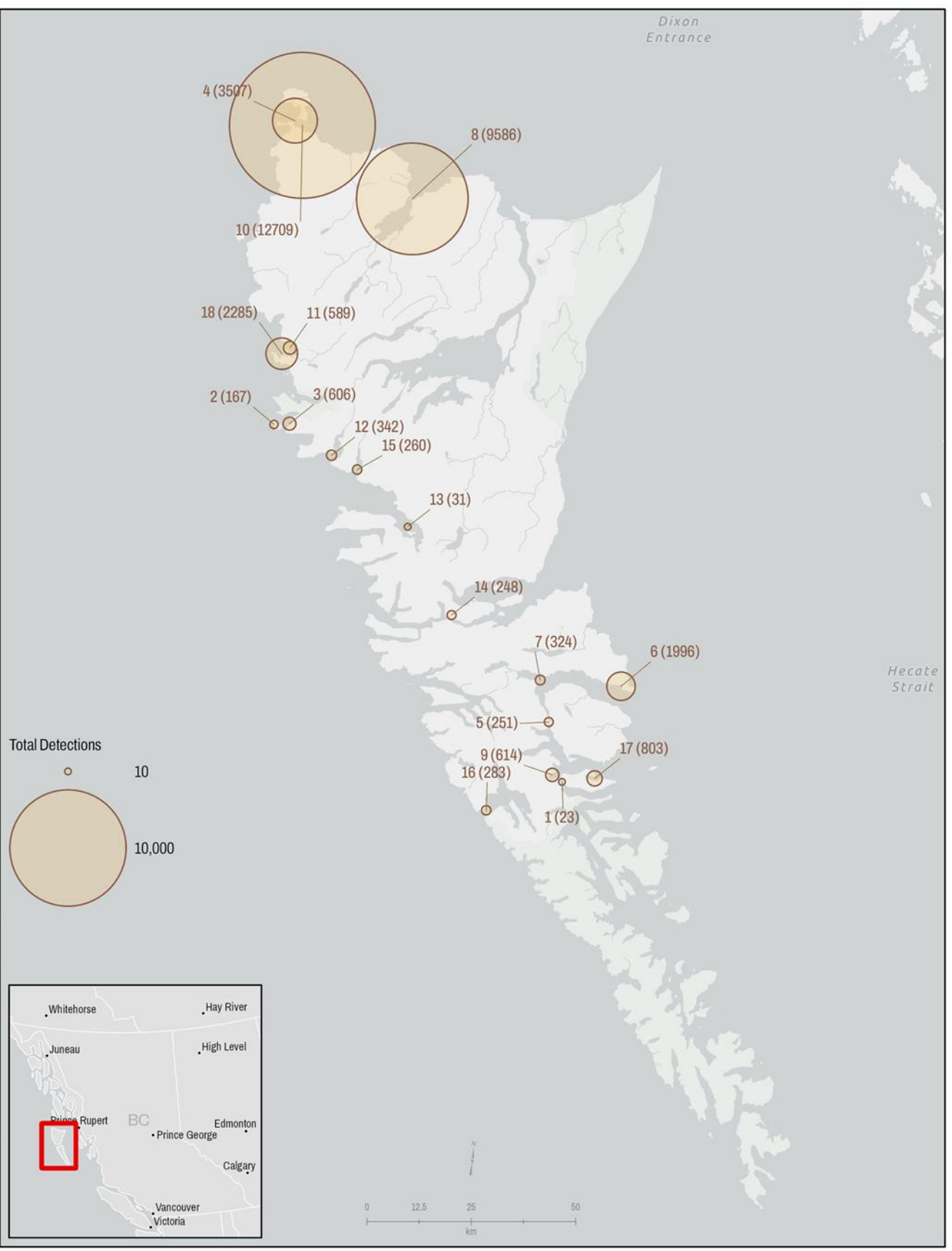


TH1



# Findings

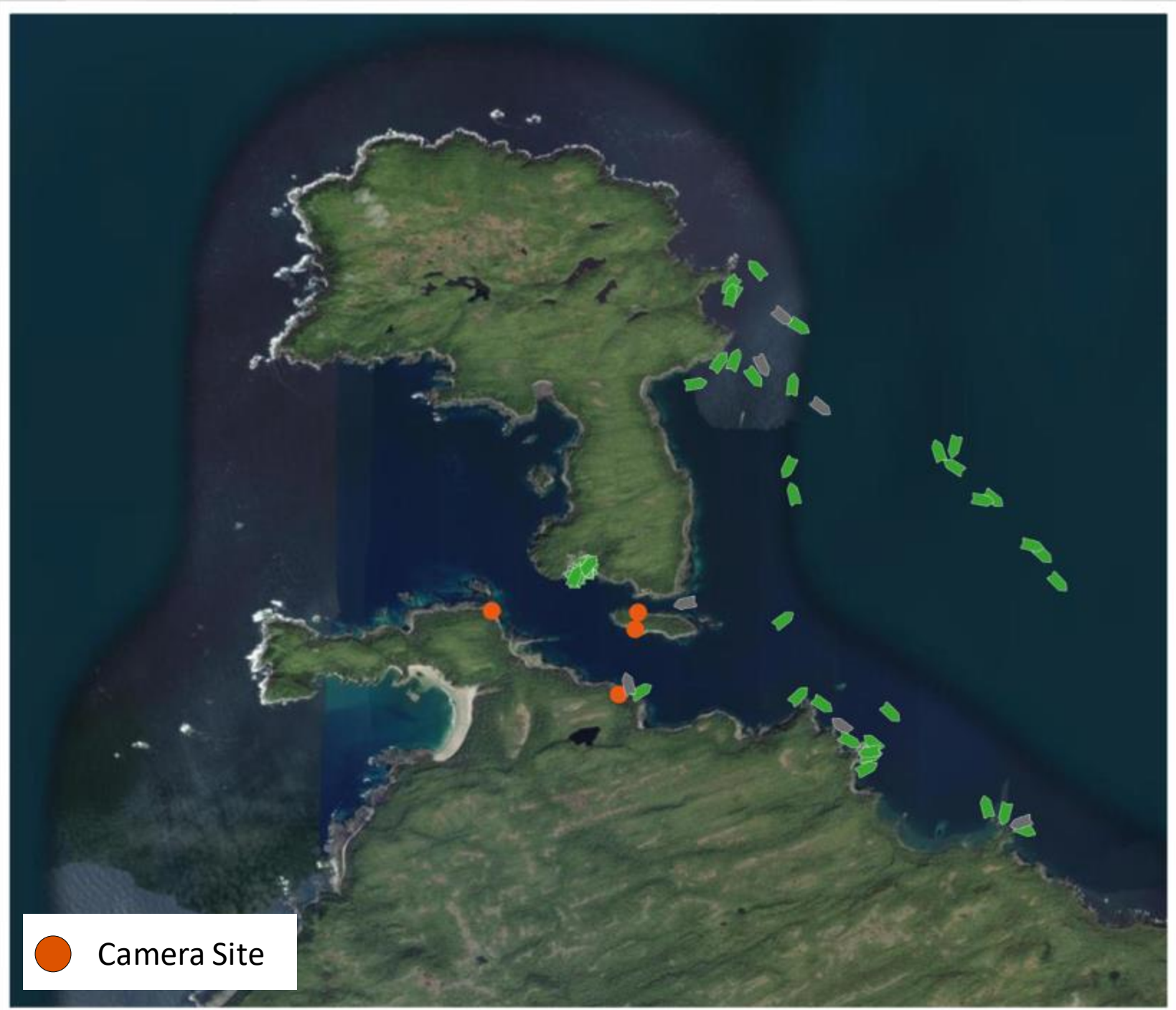
5,496,107 photos → 34,624 contained a vessel





# Findings

AIS -Equipped Vessels  
Geofence Events by Month

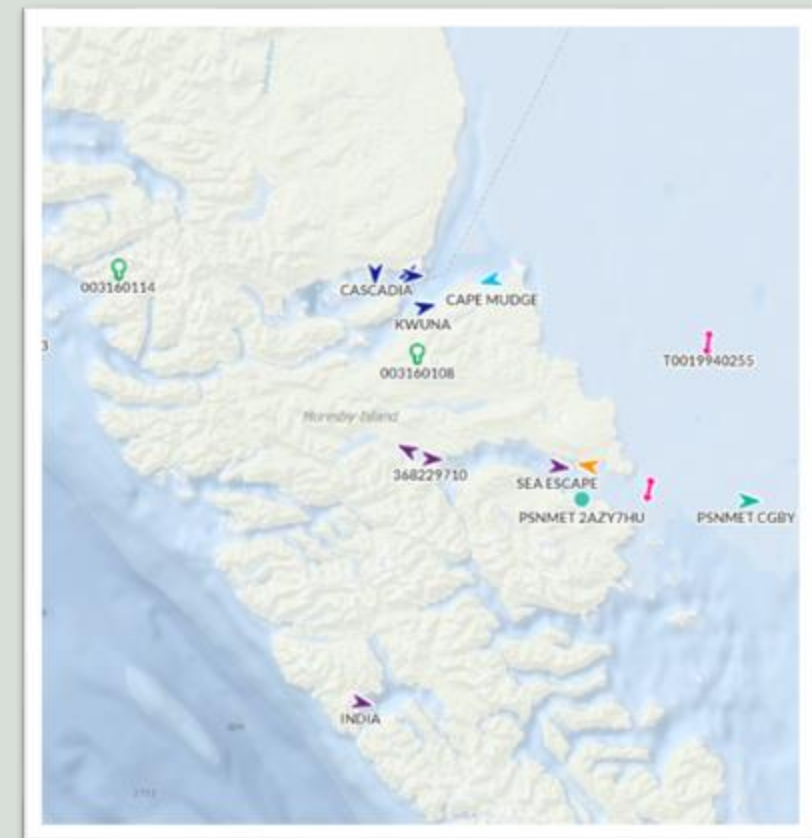




# Recommendations & Next Steps

## Recommendations:

1. Refine machine learning to identify unique vessels from specific identifiers and vessel type. **(Underway)**
2. Ensure camera placement is optimal to ensure maximum extent is captured, false positives are minimized and settings are appropriate.
3. Share lessons learned from study to help inform related monitoring and planning initiatives on Haida Gwaii.





Haawa | Haw'aa | Thank you

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