Apr 21st, 9:00 AM - Apr 22nd, 4:45 PM

A baseline of seasonal changes in the at sea distribution and abundance of marine birds near shipping lanes around southern Vancouver Island.

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Environment and Climate Change Canada | Environnement et Changement climatique Canada

Canada

Oiling threats to marine birds and their prey populations in the Salish Sea.

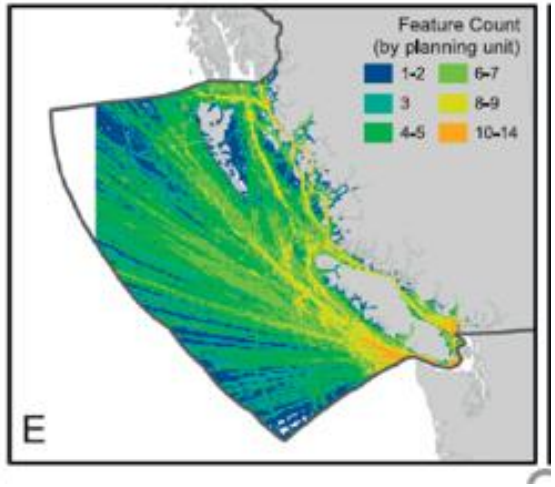
Authors: D.F. Bertram, P.D. O'Hara, A.M. King, C.L.K. Robinson, & K. Woo

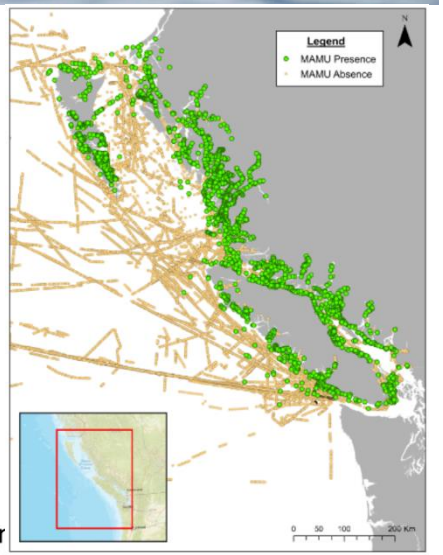
Date: 20 April 2020

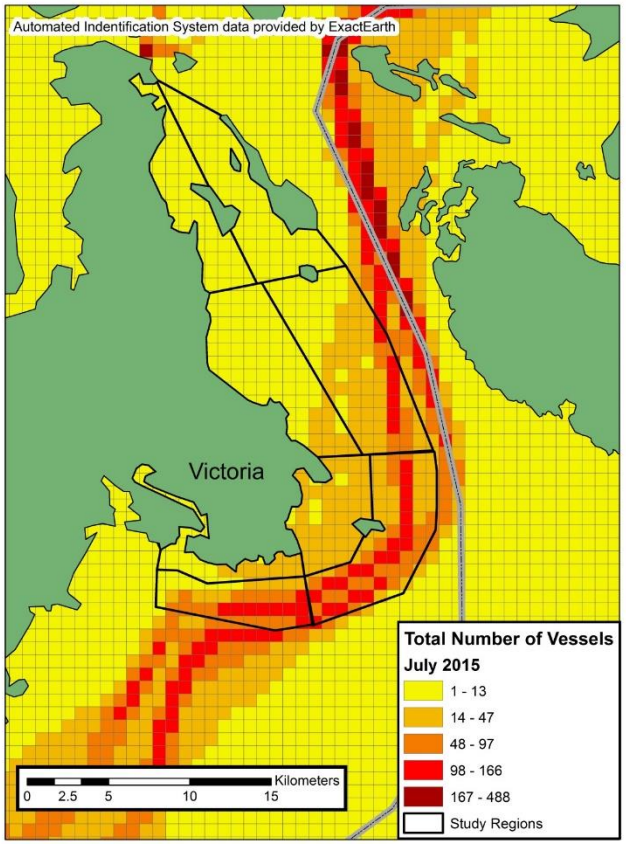
Venue: Virtual

Project: Quantification of oiling threats to marine birds and their prey habitats in BC

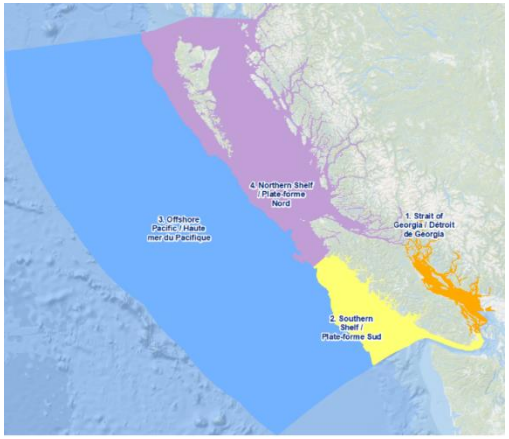
- Oil from vessels (risk estimation, eg,, Wong et al. 2018, Leiske et al. 2020)
- Scale: coast wide, and Salish Sea (2015-2019) studies.



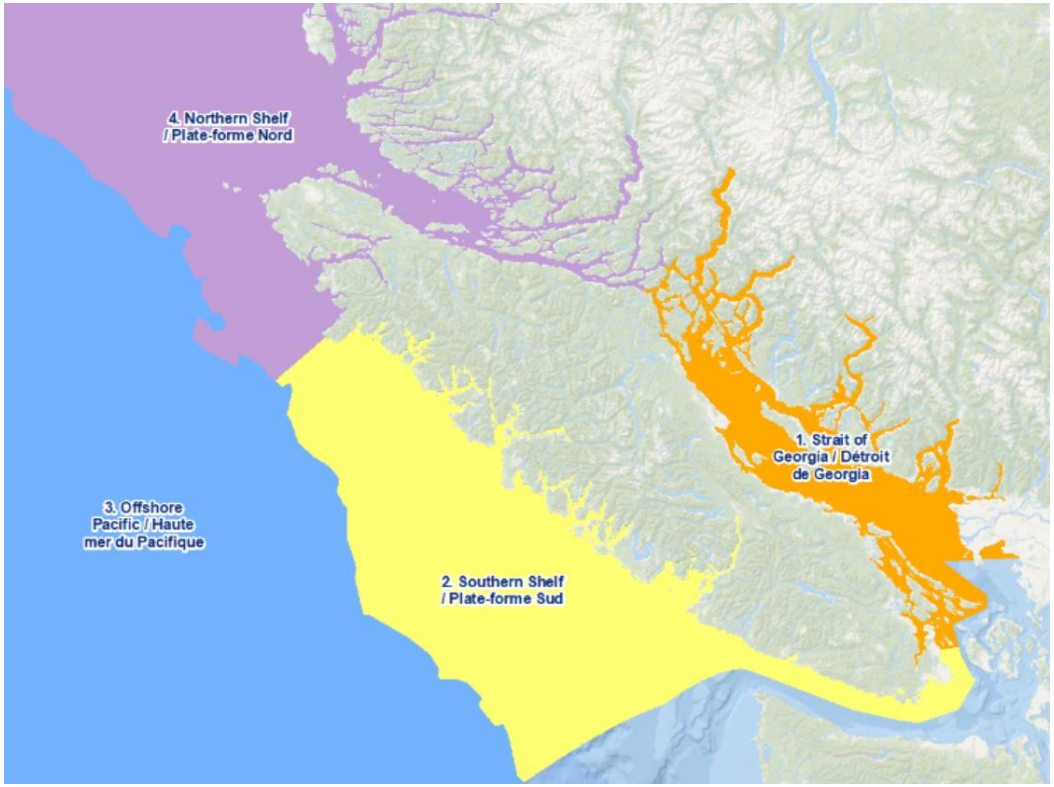




Marine Spatial Planning: DFO Pacific Marine Bioregions



BC coast



South Coast

TMX expansion: Expect 7 fold increase in tanker traffic

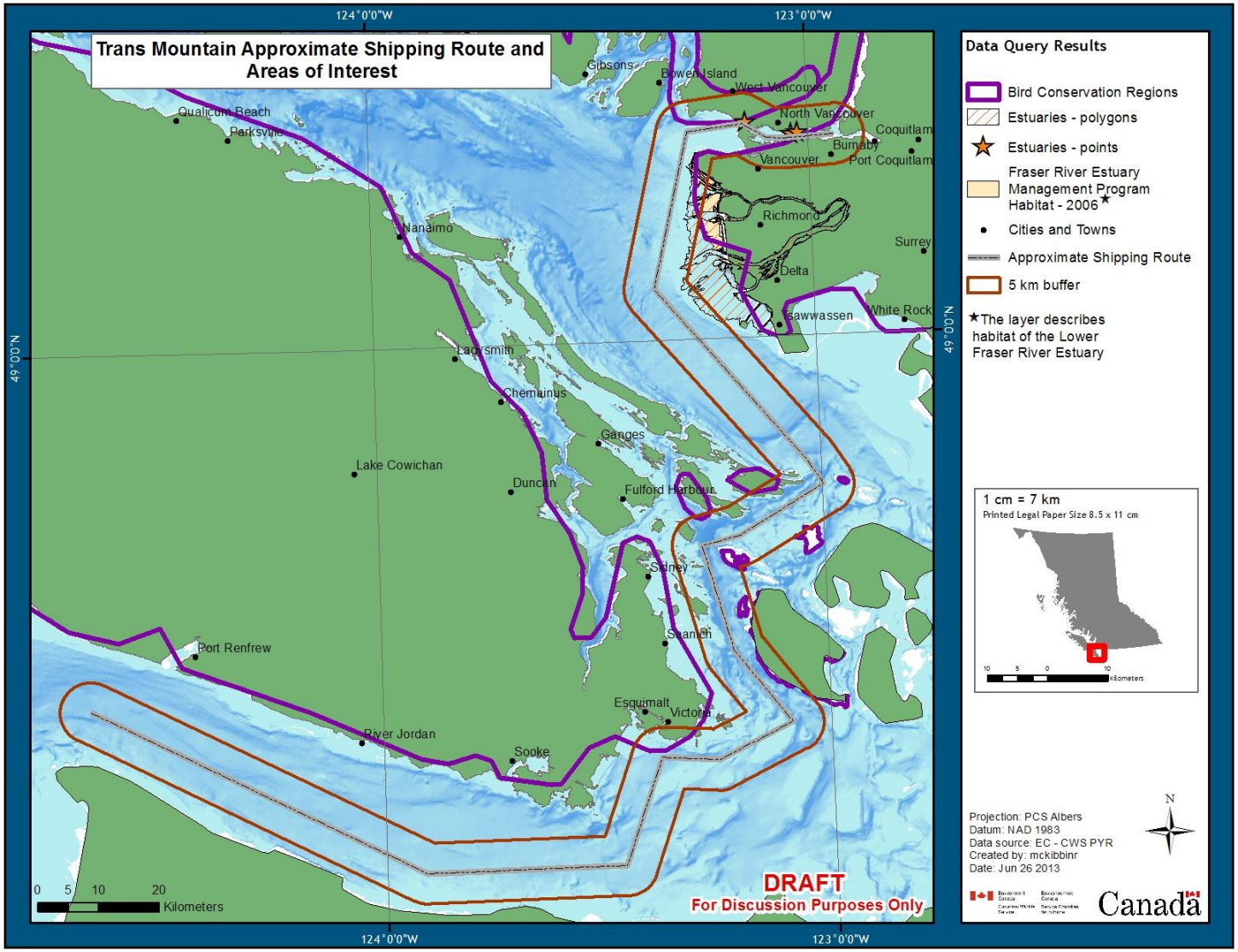
Prime Minister Justin Trudeau in Ottawa: "We are under no illusions that the decision we made today will be bitterly disputed by a number of people across the country who would rather we had made another decision."

Trans Mountain pipeline approved

Trudeau says no to Northern Gateway project, OKs Line 3 expansion

March 2016

TMX Expansion Project: Route and Areas of Interest



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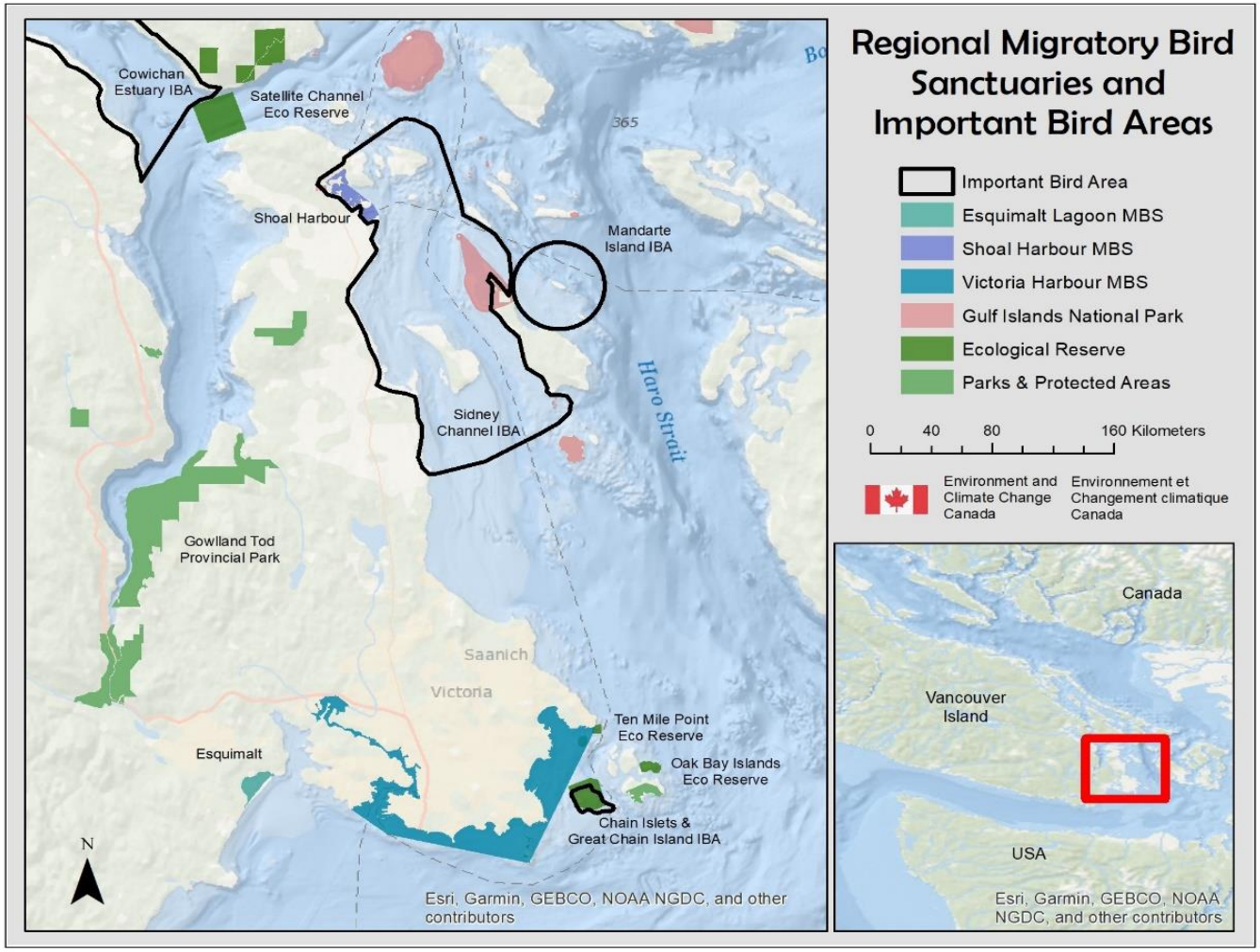
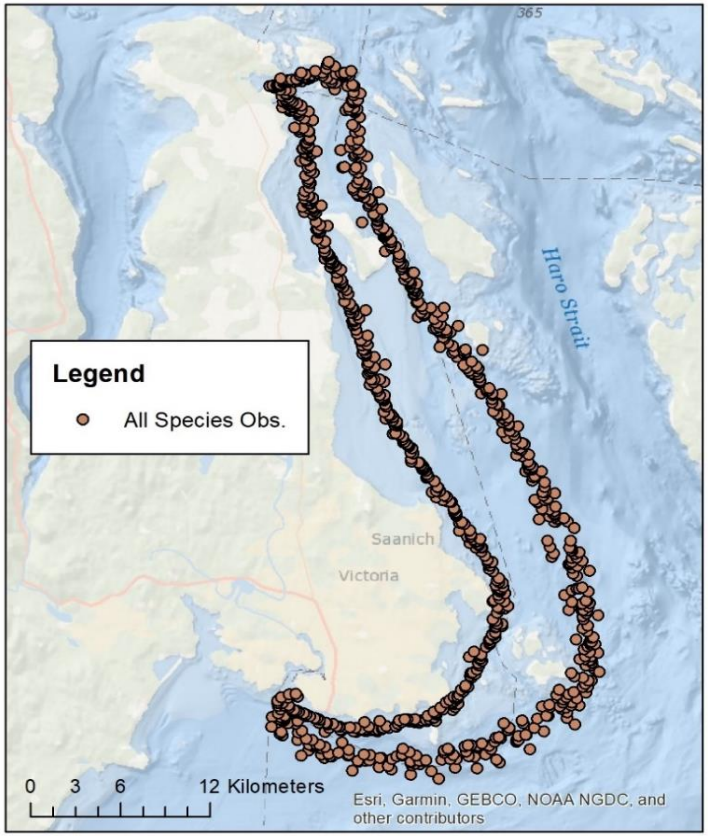
Study area conservation designations

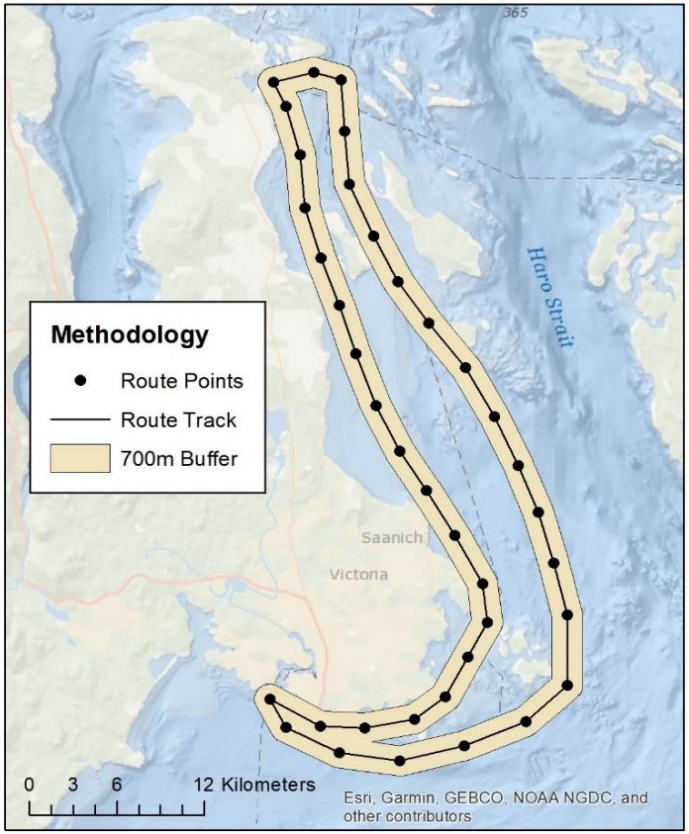


Marine bird survey methods

- *FV* Misty Lady, Captain Bruce Evans
- Sidney to Victoria (inside) and return (outside), 8hrs max.
- Bird Observer (Bertram, Maftei, Halpin)
- 200 m on starboard side of vessel
- All species counted
- Locations recorded at 10 minute intervals
- Year round time series
- Nov 2015 - Dec 2019
- 46 cruises

Survey route, segment centroids, and “zone” of bird count data.





Family Alcidae: wing-driven pursuit divers for *forage fish* and *zooplankton*

- RHAU (Rhinoceros Auklet), local nesting in WA
- COMU (Common Murre, big colonies in Oregon & Alaska)
- MAMU (Marbled Murrelet) forest nesting, small numbers on southern VI.
- PIGU (Pigeon Guillemot) local nesting
- ANMU (Ancient Murrelet) nest exclusively in Haida Gwaii

RHAU: Rhinoceros Auklet

- Oftens feeds Pacific Sand Lance to young
- Major breeding colony (72,000) on Protection Island, WA.

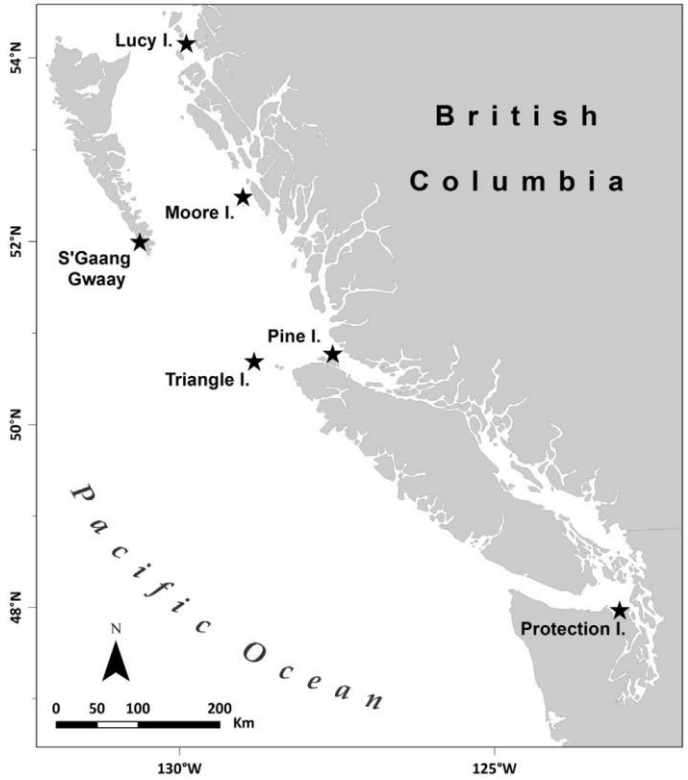


Fig. from Hipfner et al 2018

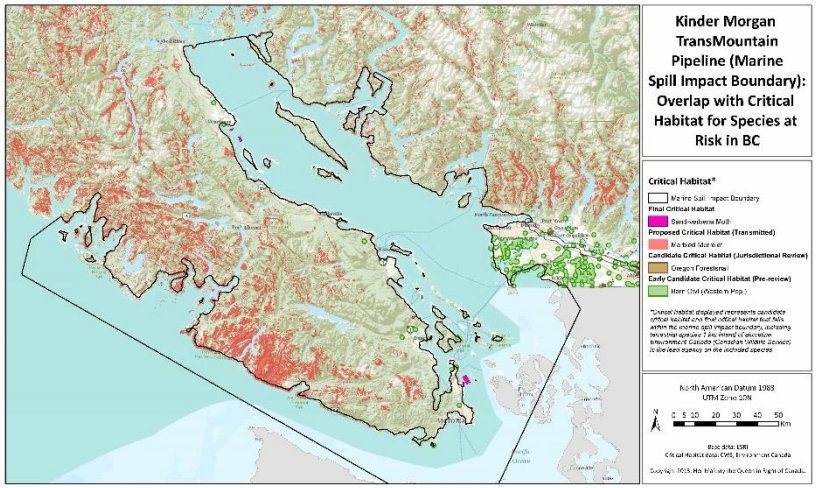
COMU: Common Murre

- Breeds mostly outside of BC
- Dads feed young post fledging
- Eat PSL and herring – ball formation instigators

Photo: James Clowater

MAMU: Marbled Murrelet, *Threatened,* under SARA

- Forest nesting habitat (in red)
- Force PSL to “ball up”



Summer: Photo, Mark Cunnington

Winter: Photo Luke Halpin

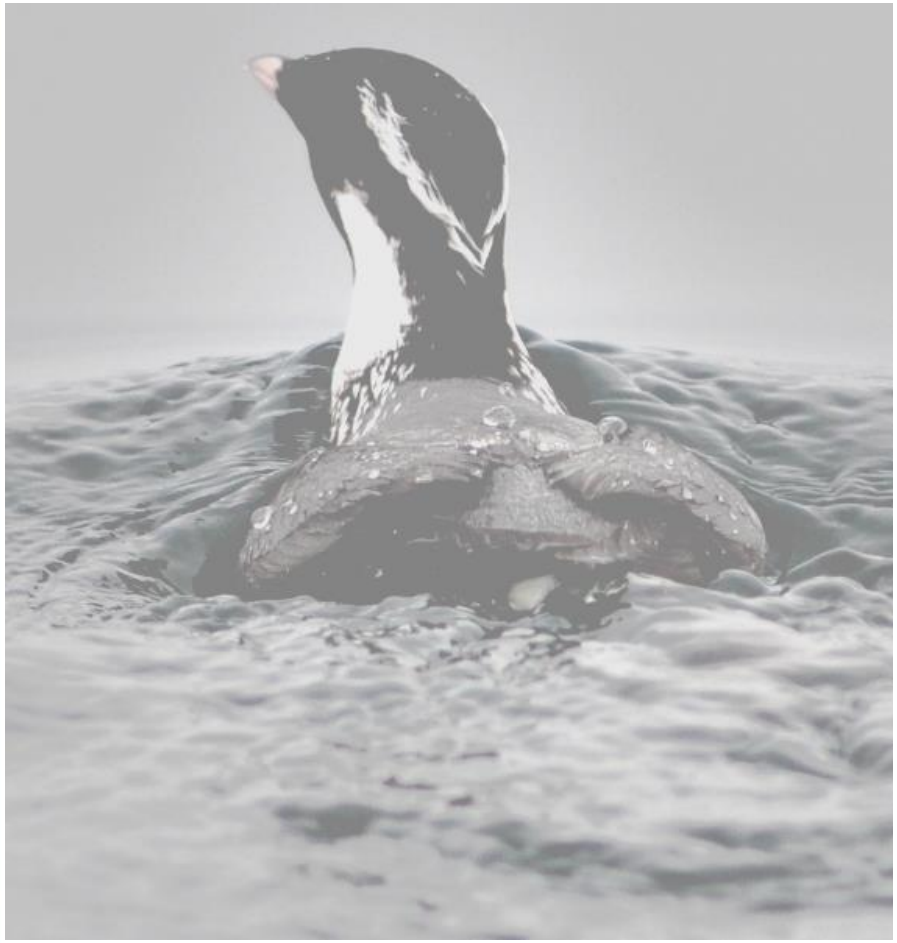
PIGU: Pigeon Guillemot

- Fish eater, schooling, and benthic species
- Broad breeding distribution, including locally

Summer Photo:
Kristin Charleton

Fall / winter Photo:
Luke Halpin

ANMU: Ancient Murrelet, *Special Concern* under SARA



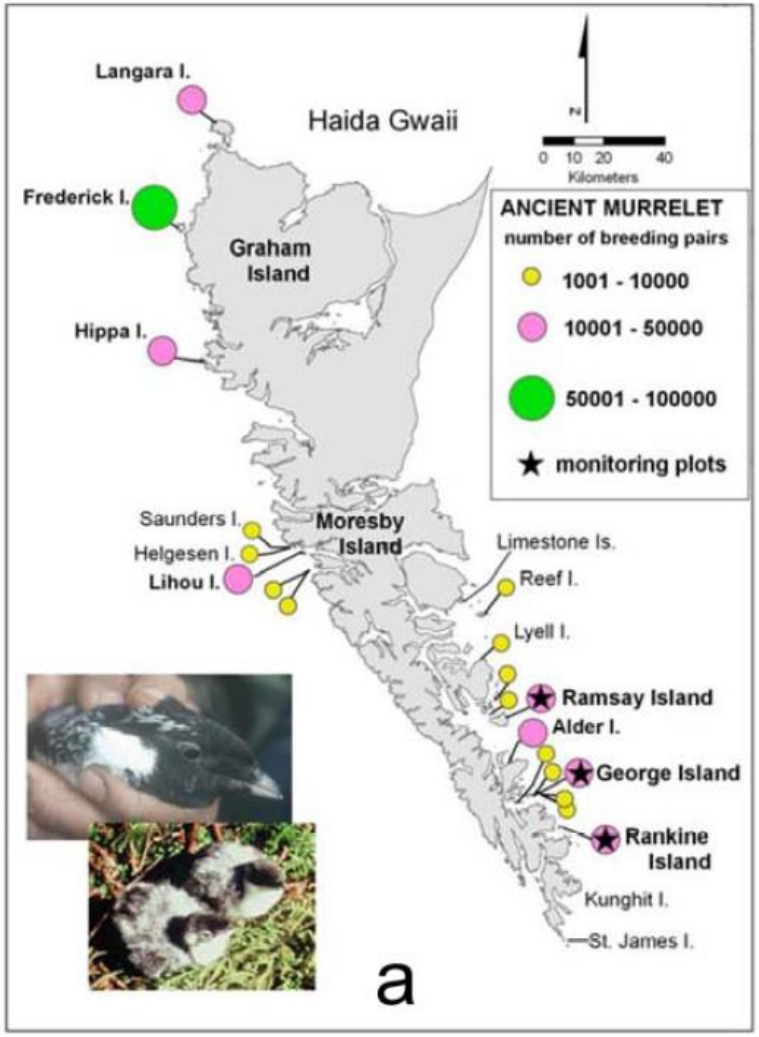


Fig. from Rodway and Lemon 2011

Laskeek Bay CONSERVATION SOCIETY

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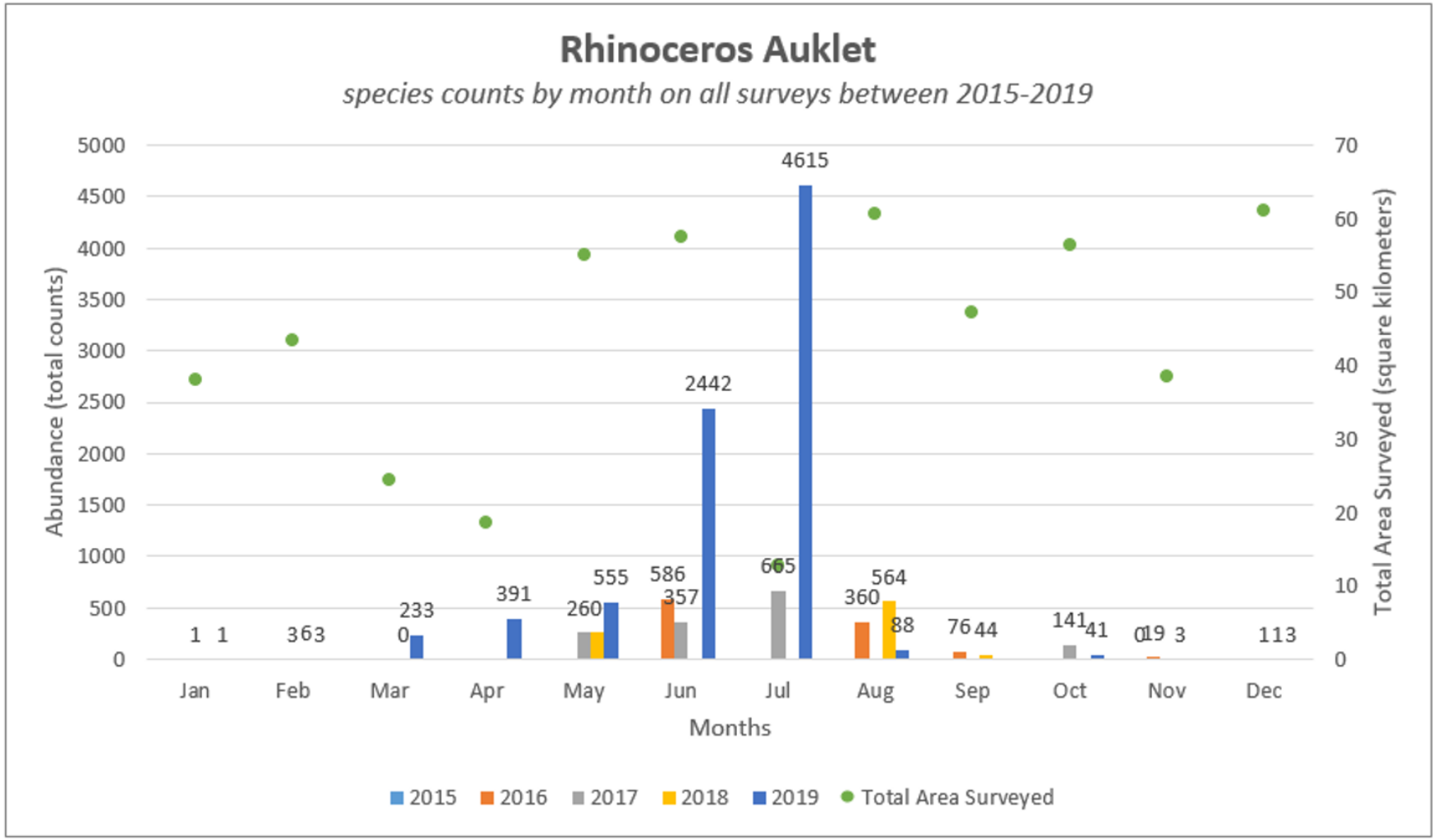
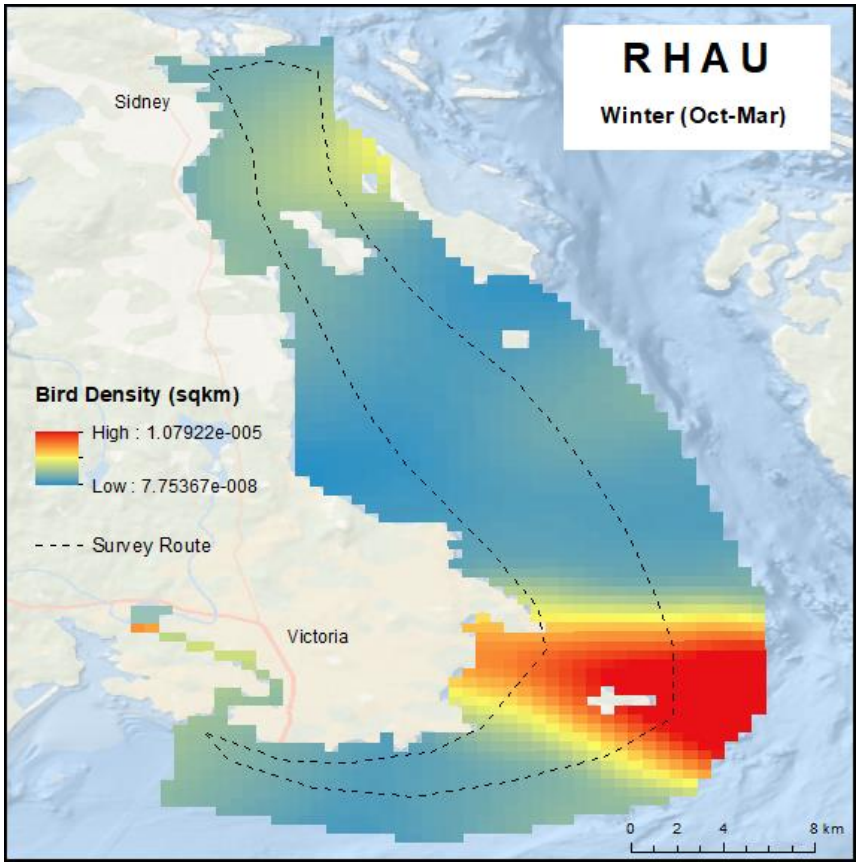
KDEs to show spatial patterns

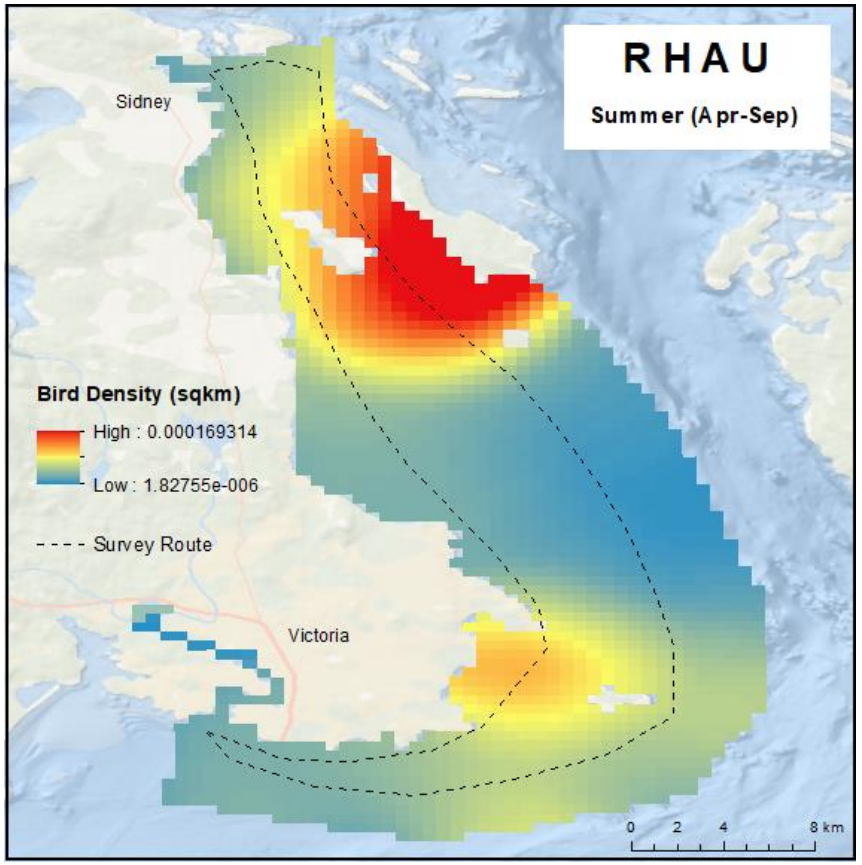
- CSV dataset converted into a shapefile via centroid (midpoint of 10min segments) coordinates in ArcMap
- Raster for counts of each species (5) on each survey (46)
- Raster for survey effort (area, km^2) on each survey
- Pool individual survey data from all years
- Raster math, stacked species / stacked effort
- Winter = October – March; Summer = April - September
- KDEs by species corrected for survey effort (km^2)
- KDE *colours are relative within a figure not* between
- A detection of 1 bird in the winter looks like a hot spot!
- KDEs have not yet been trimmed to reflect the 700m strip to which the estimates apply!

RHAU: present during breeding season

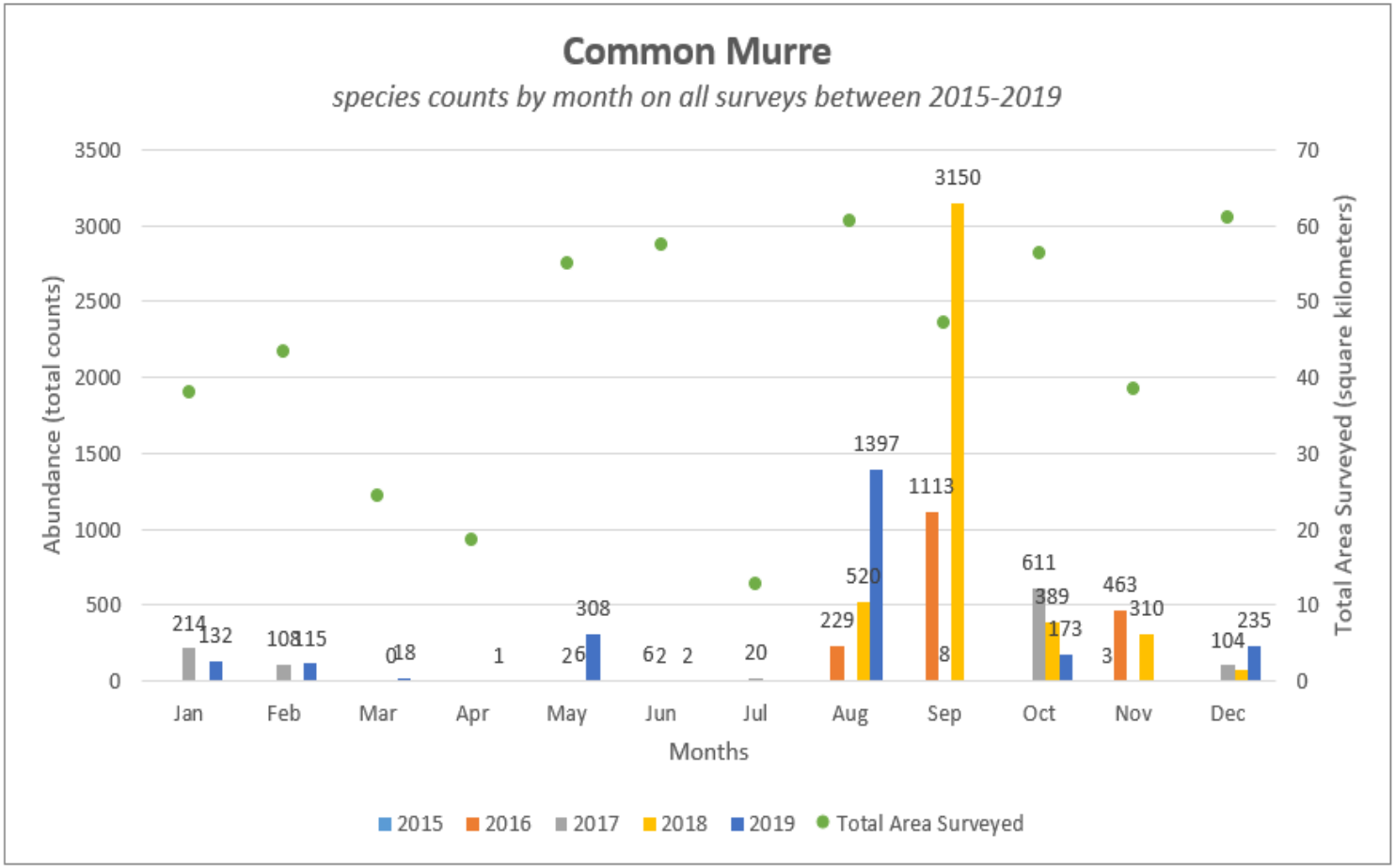


RHAU: Winter in Juan de Fuca, Summer in Sidney Channel IBA

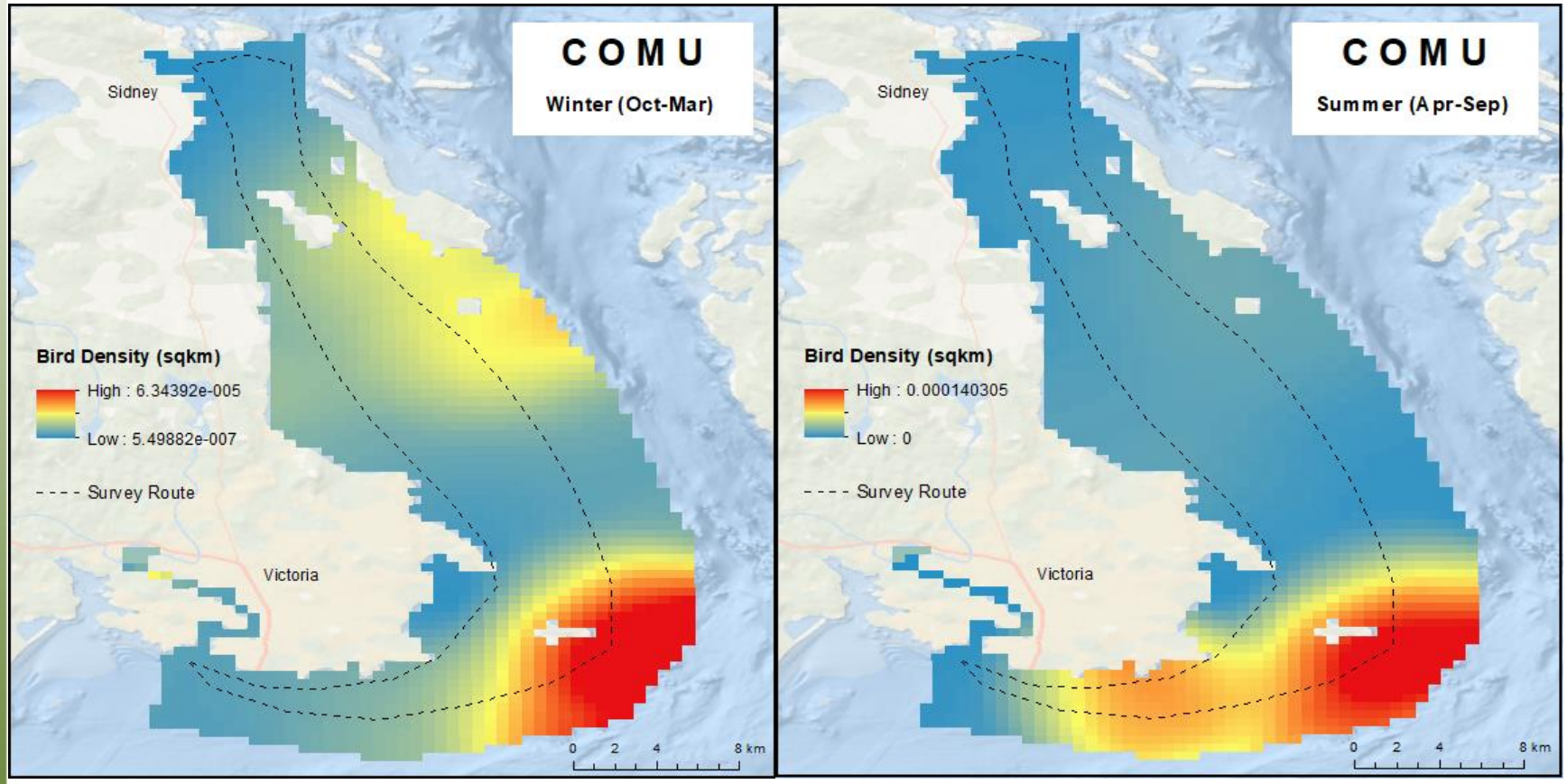




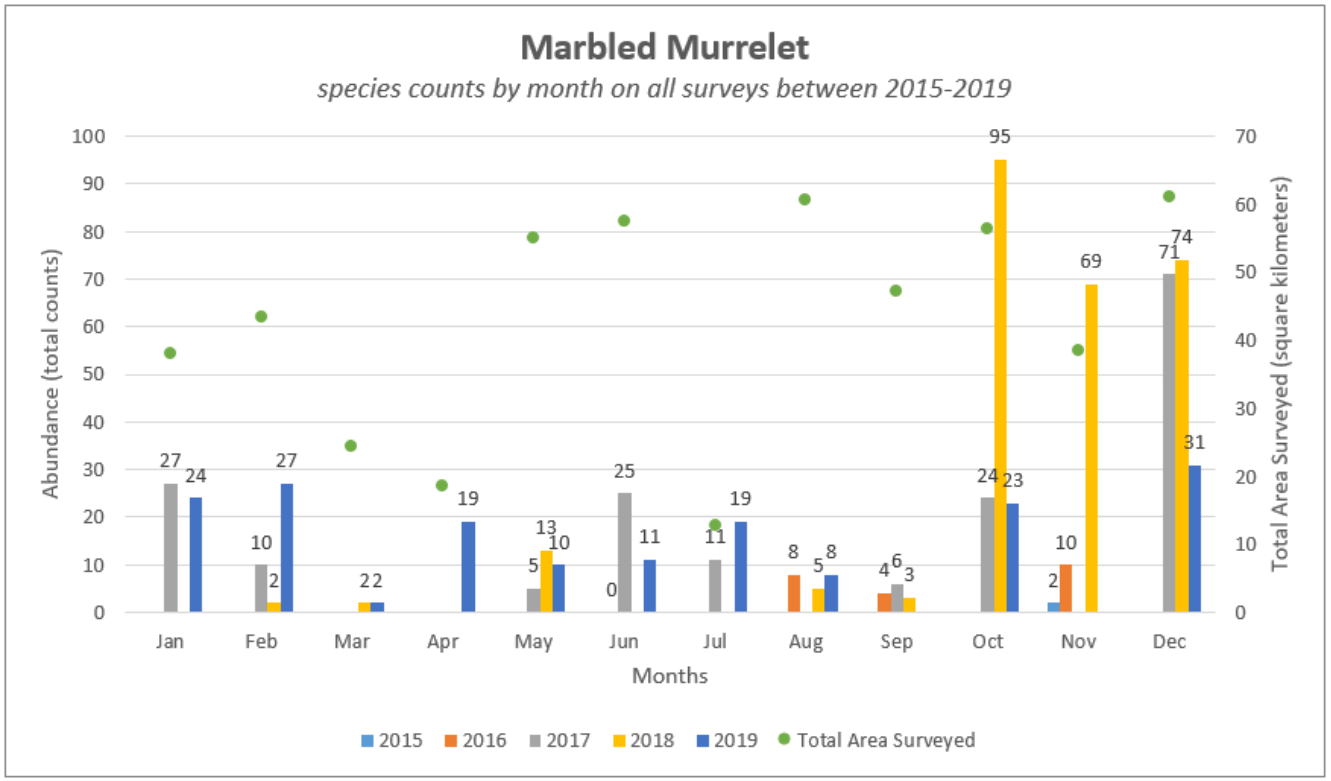
COMU: abundant late summer / fall, arrival post breeding



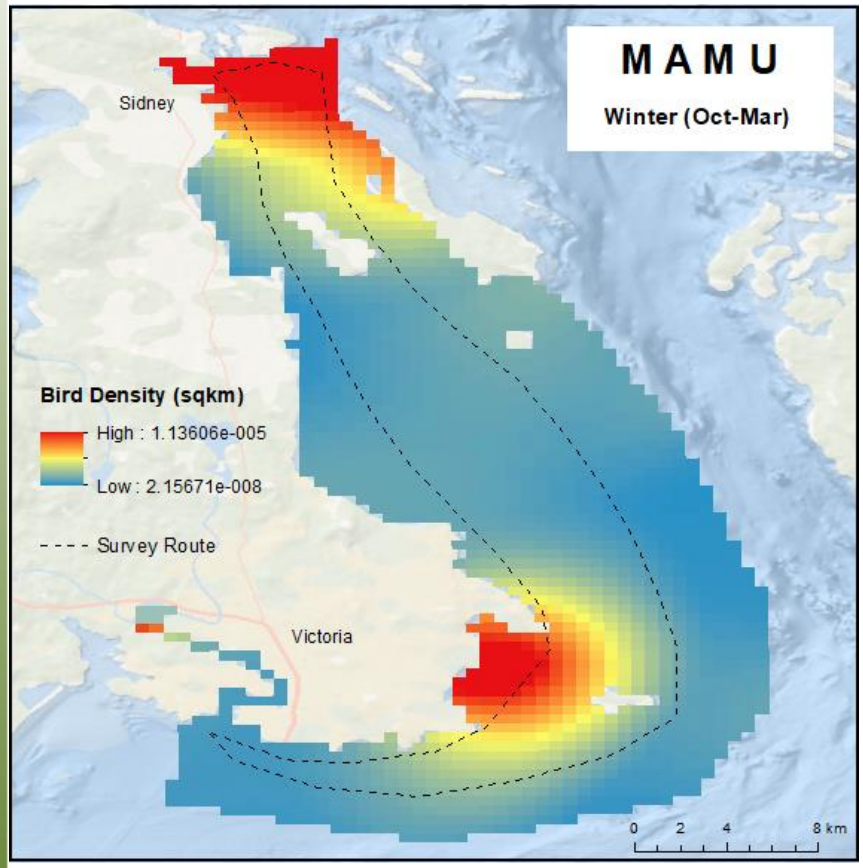
COMU: Most common Juan de Fuca St.

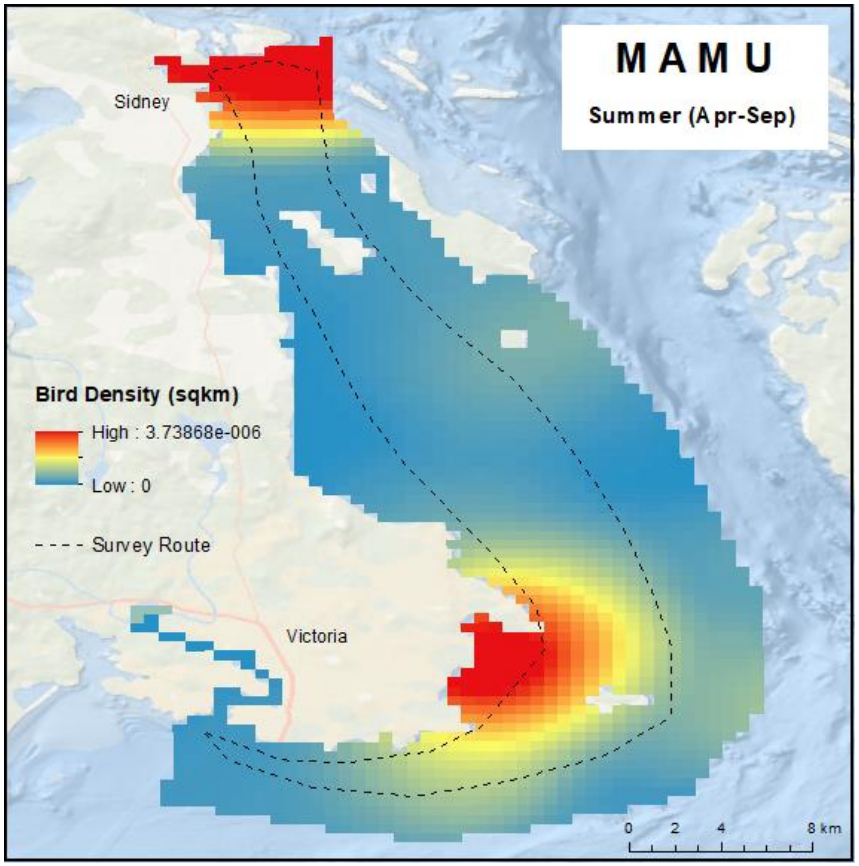


MAMU: Year round presence

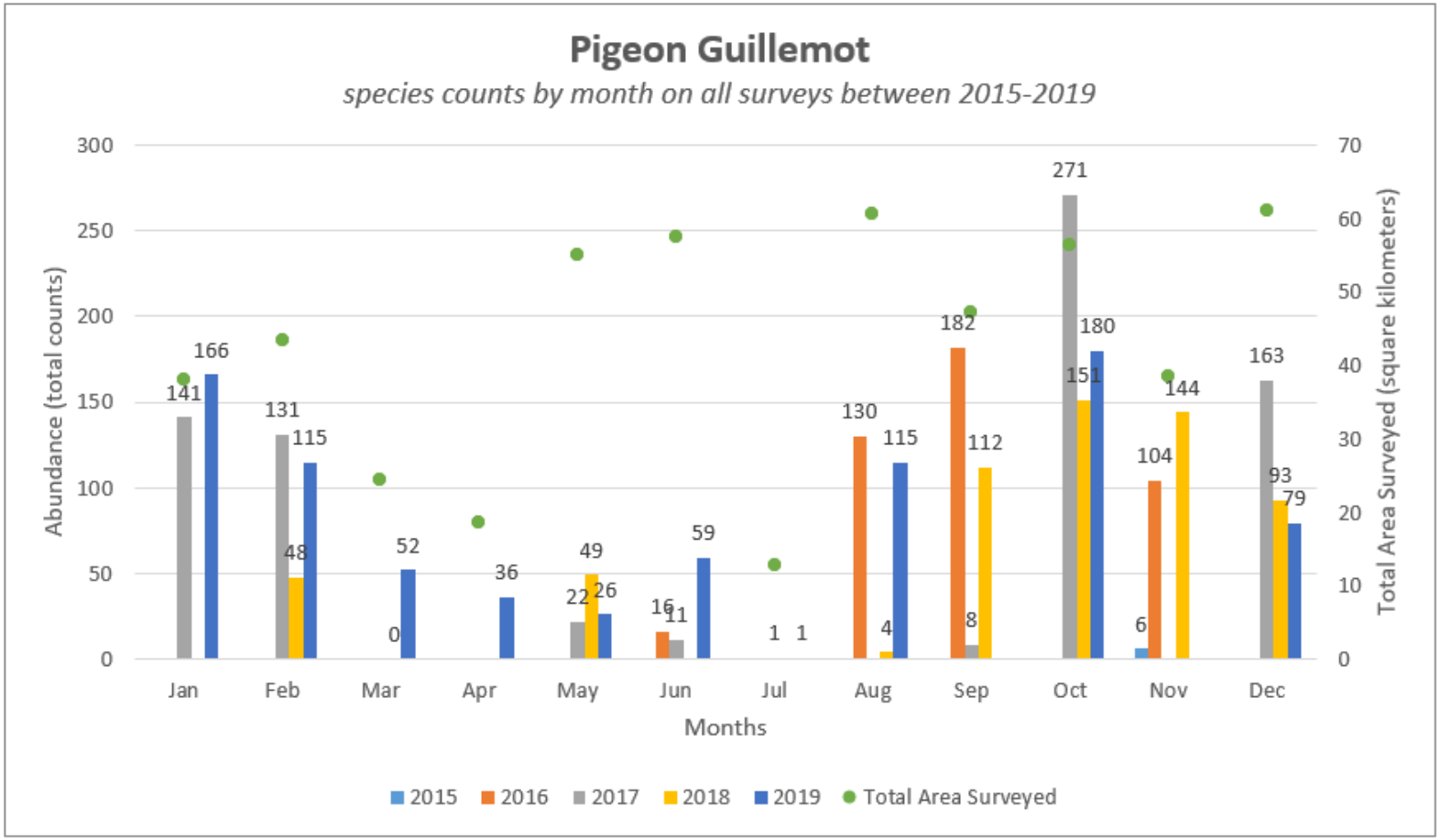


MAMU: segregation, Coal Island and Ten Mile Point 'hot spots'

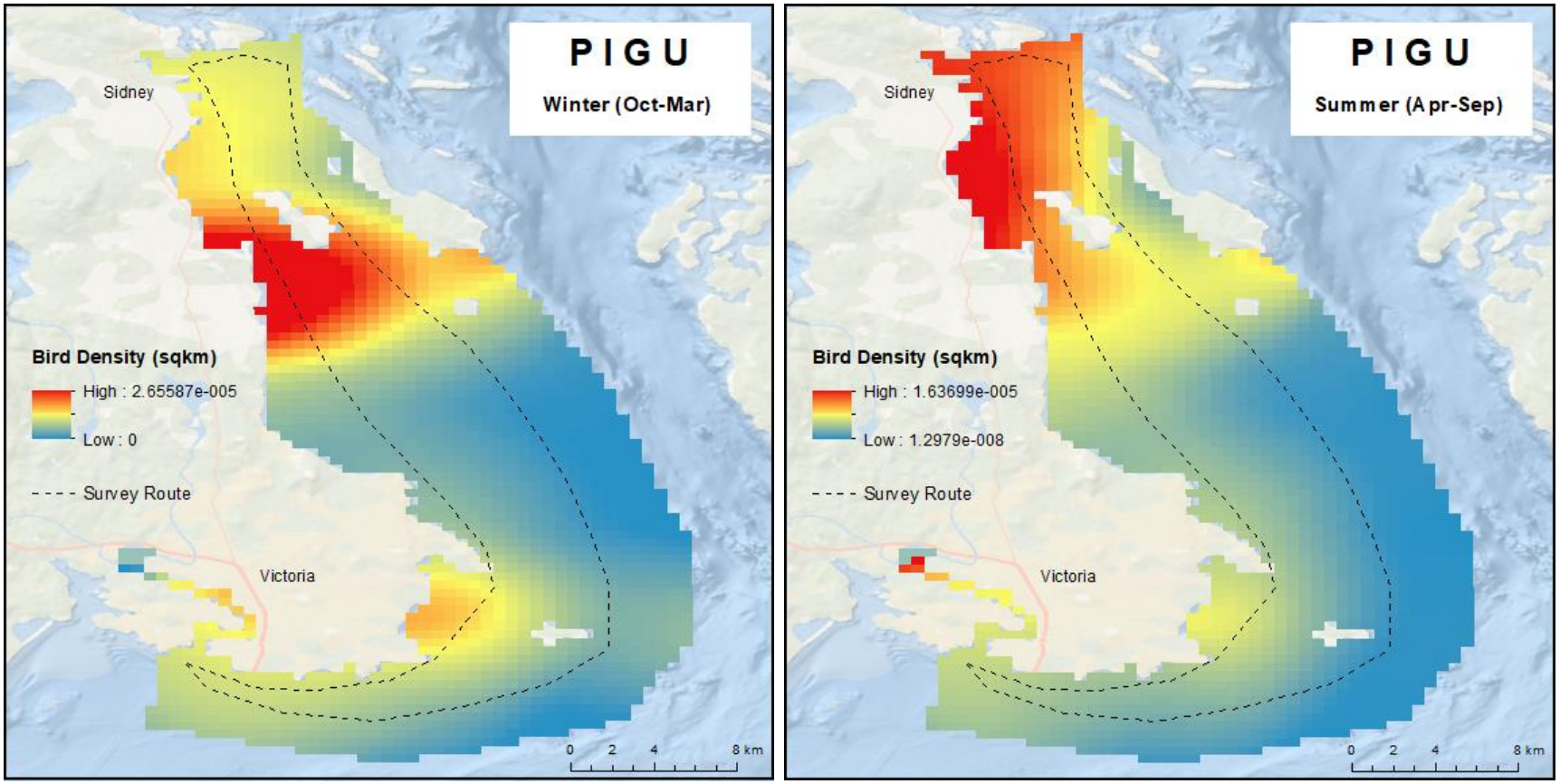




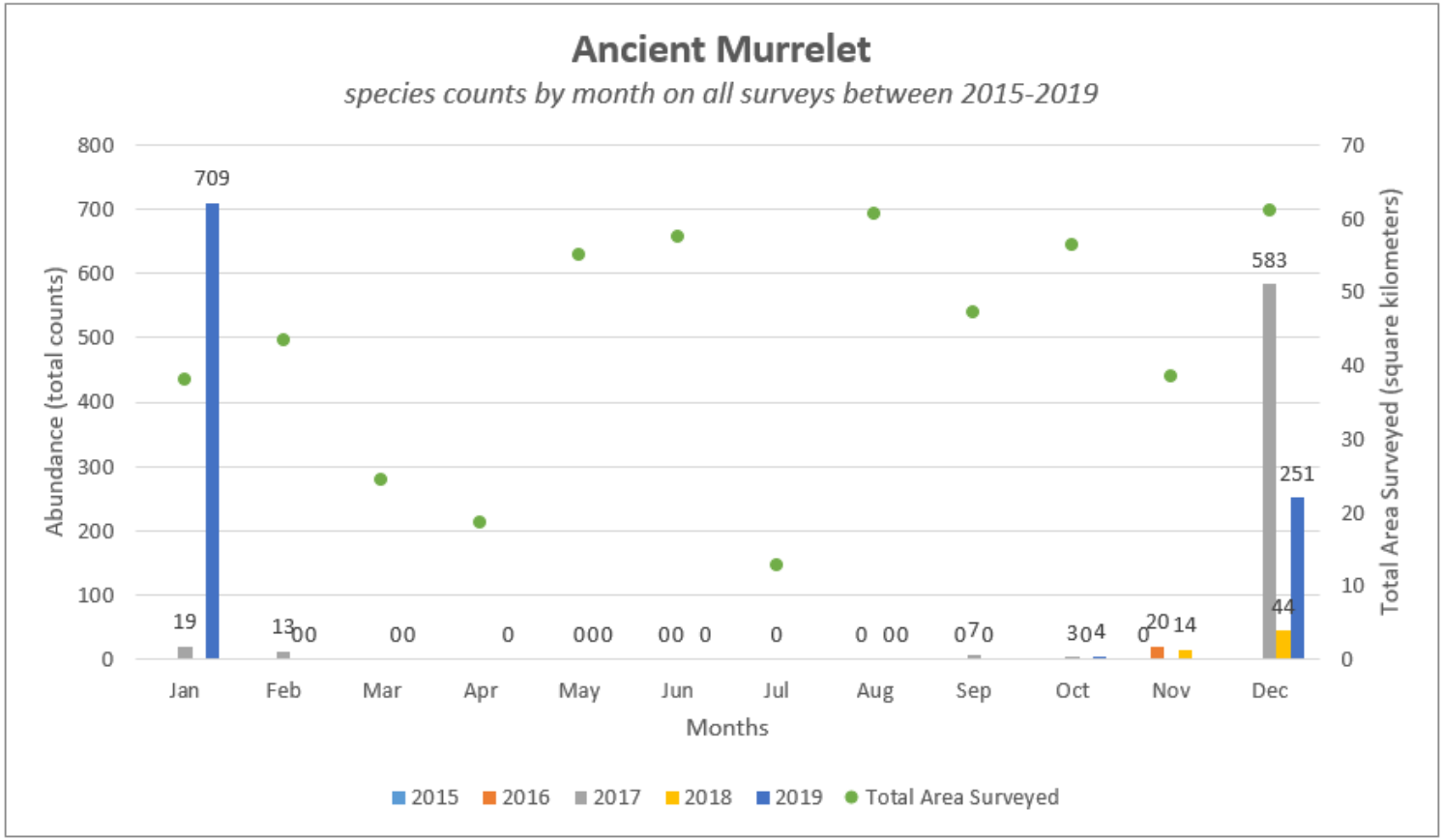
PIGU: Year round, swell in numbers late summer / fall



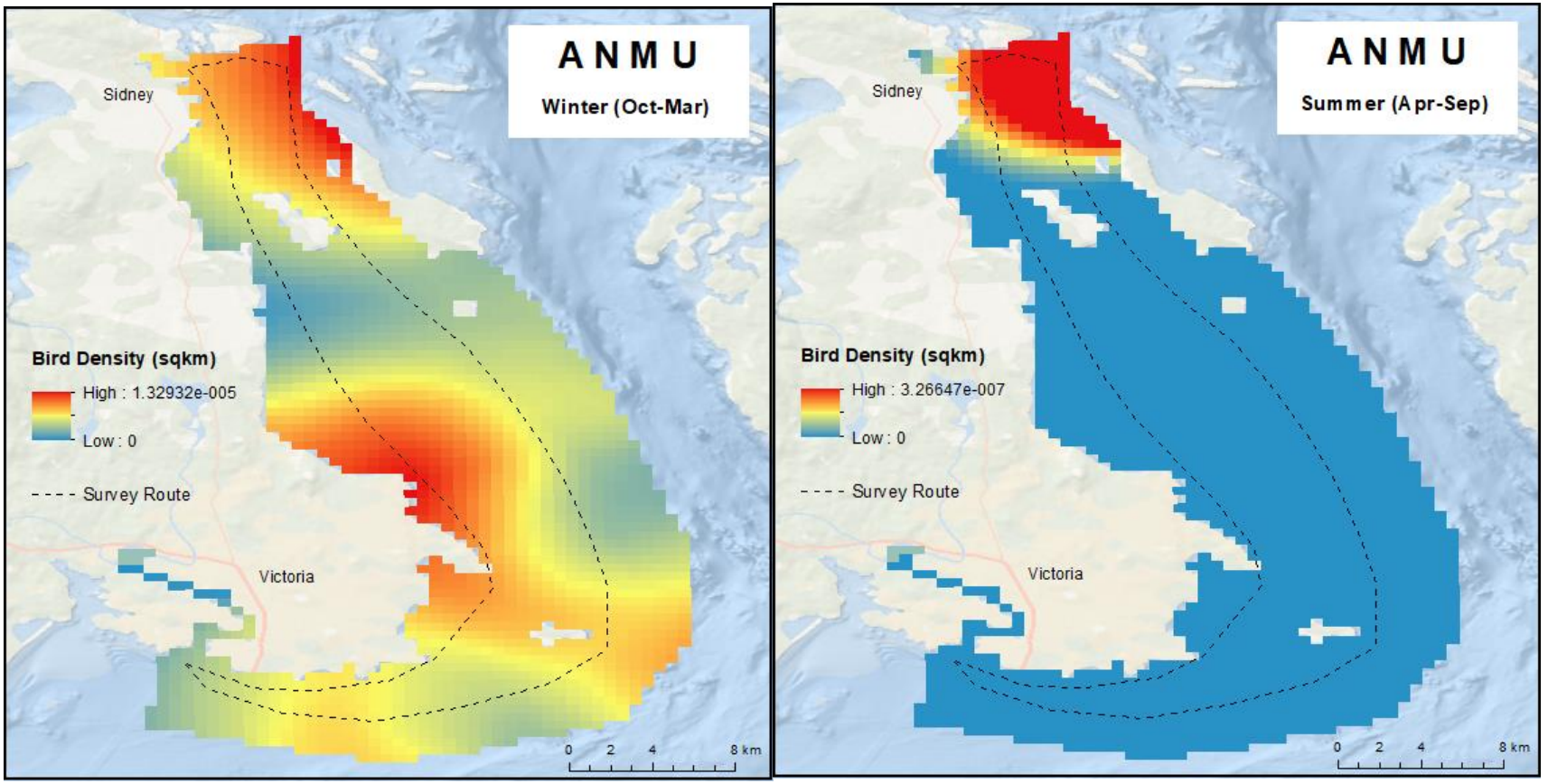
PIGU: Sidney Channel IBA, Oak Bay



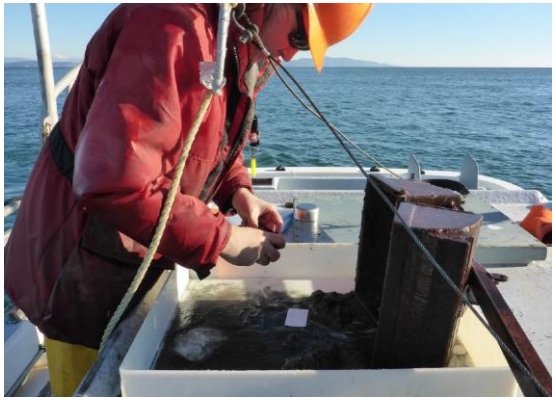
ANMU: Winter visitor only

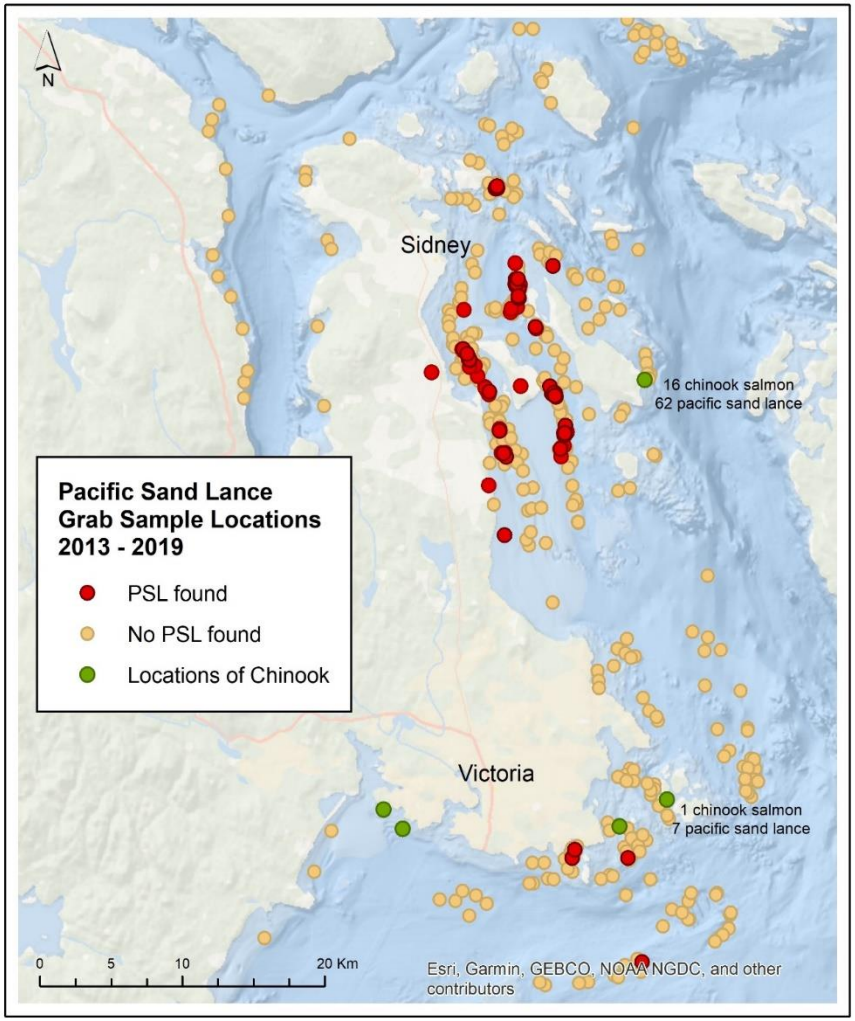


ANMU: Sidney Channel IBA, Victoria

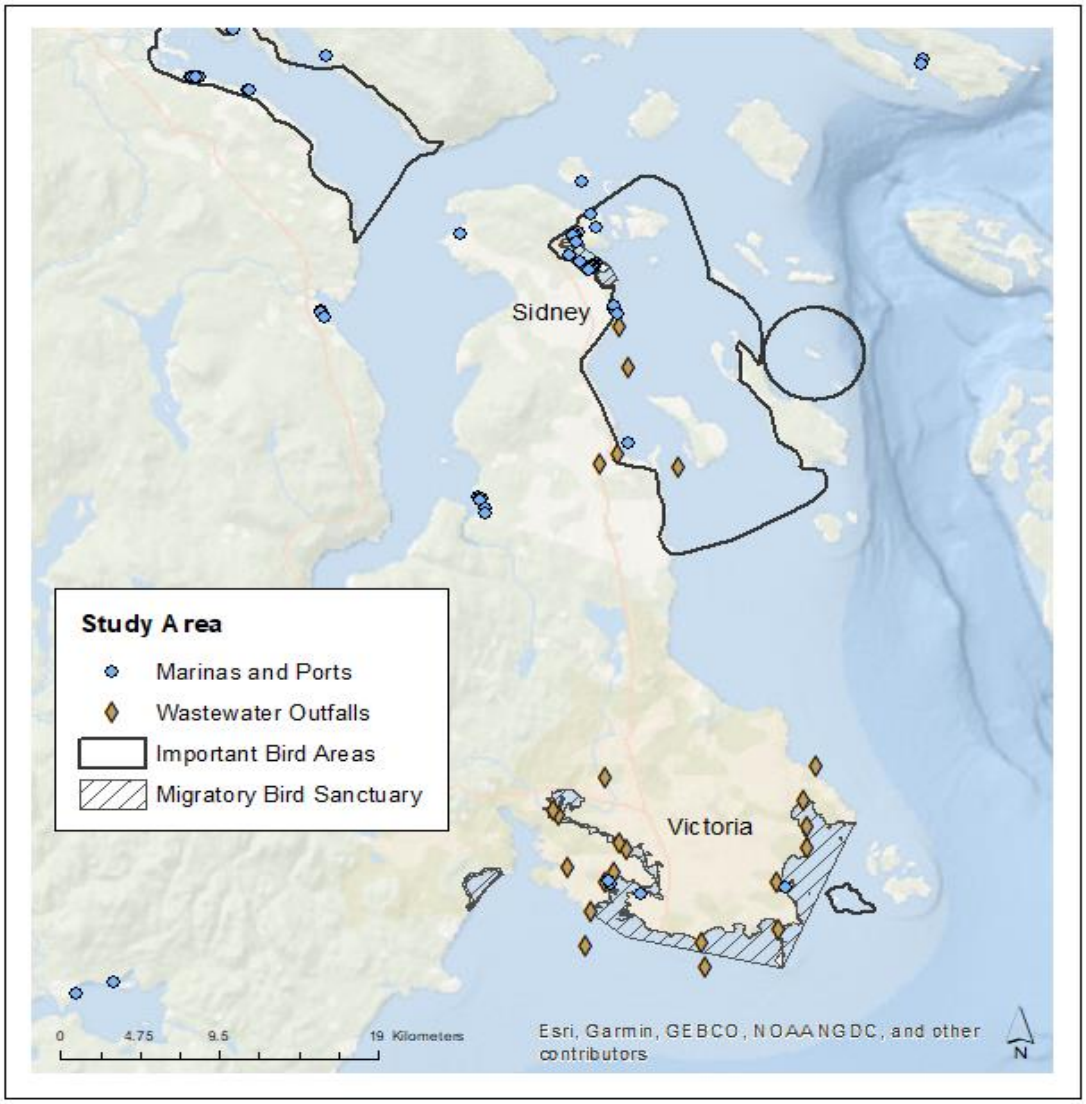


Pacific Sand Lance (PSL) subtidal habitat in Sidney Ch. IBA, Victoria MBS

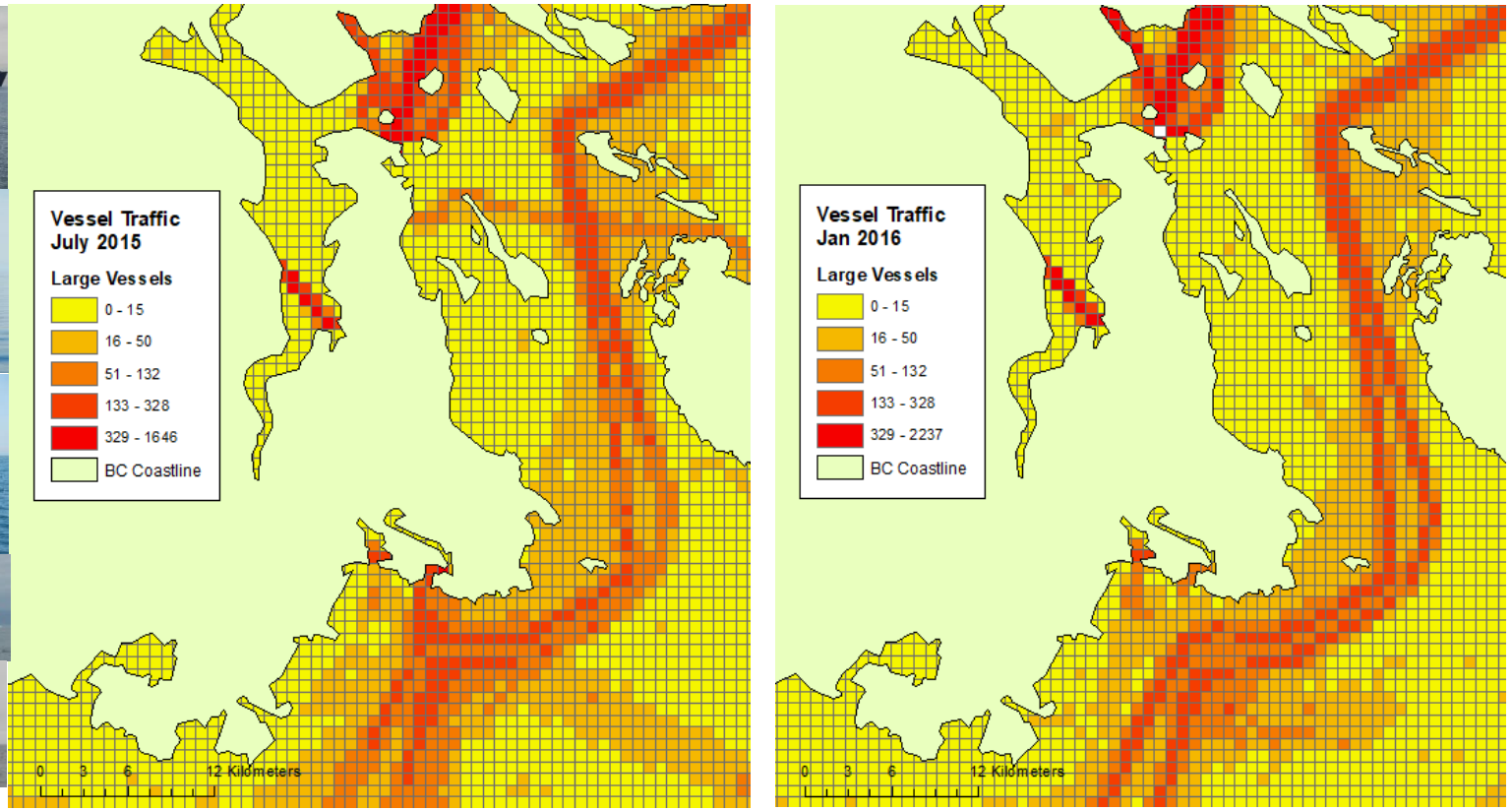




Potential sources of oil: marinas, ports and wastewater outfalls in IBA and MBS.

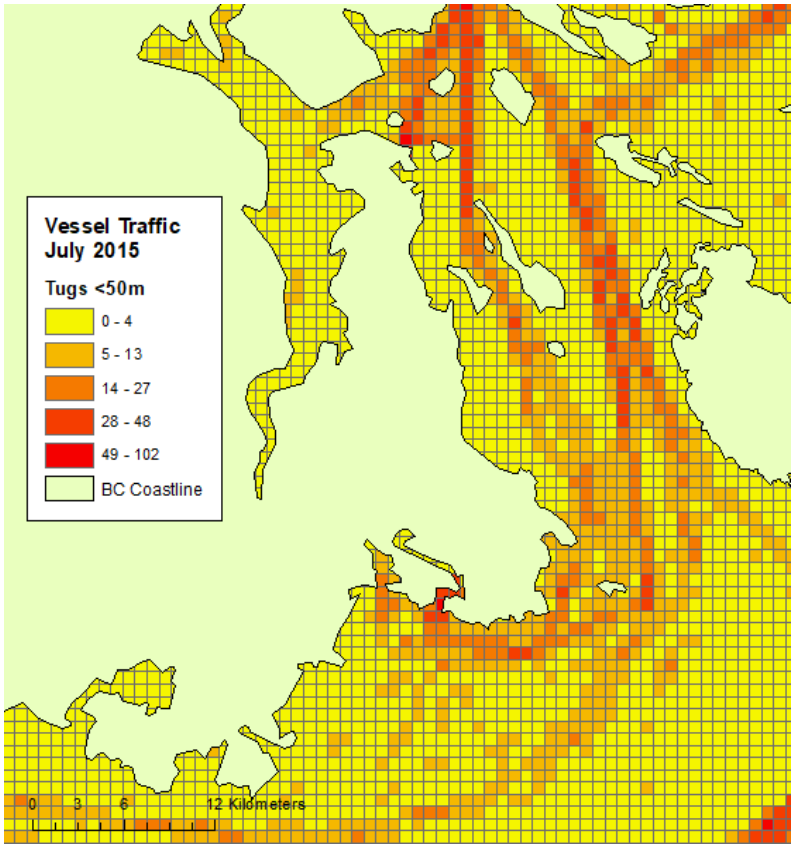


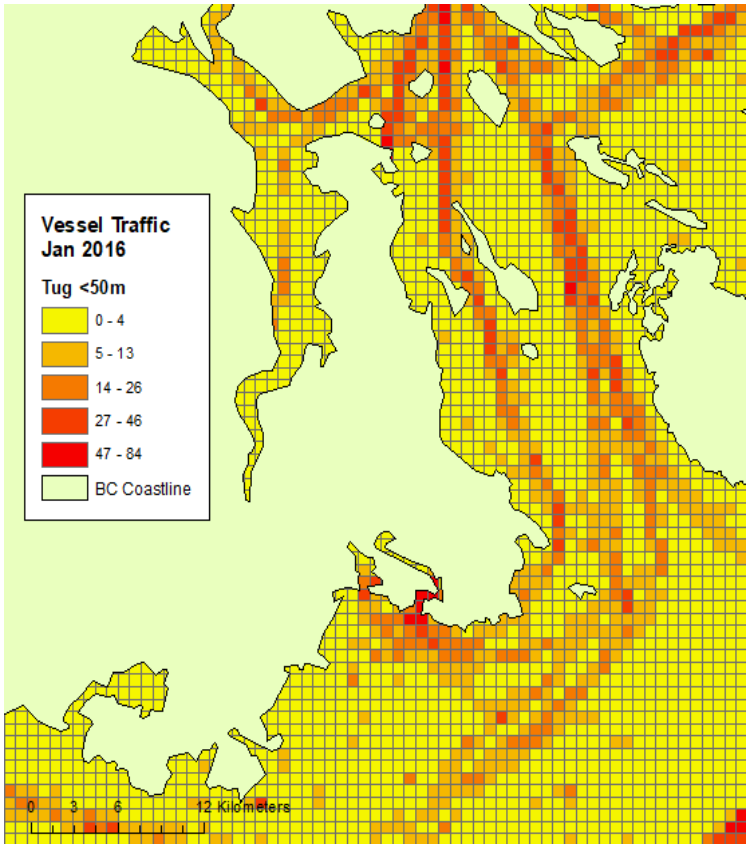
Large vessel traffic: summer = winter



Large vessel traffic includes: Ferries, Passenger ships, Container Ships, Bulk Carriers, Crude Oil Tankers, Reefers, Chemical Products Carriers, Vehicle Carriers, Tankers, Naval Vessels, High Speed Ferries, and Other

Tug boat traffic: summer = winter





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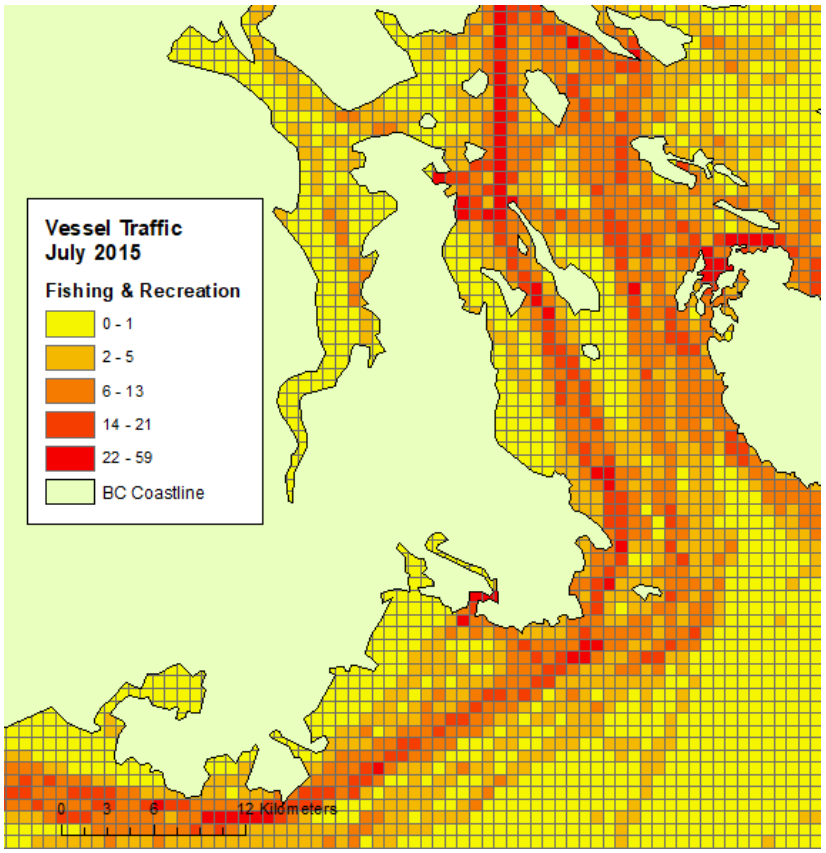
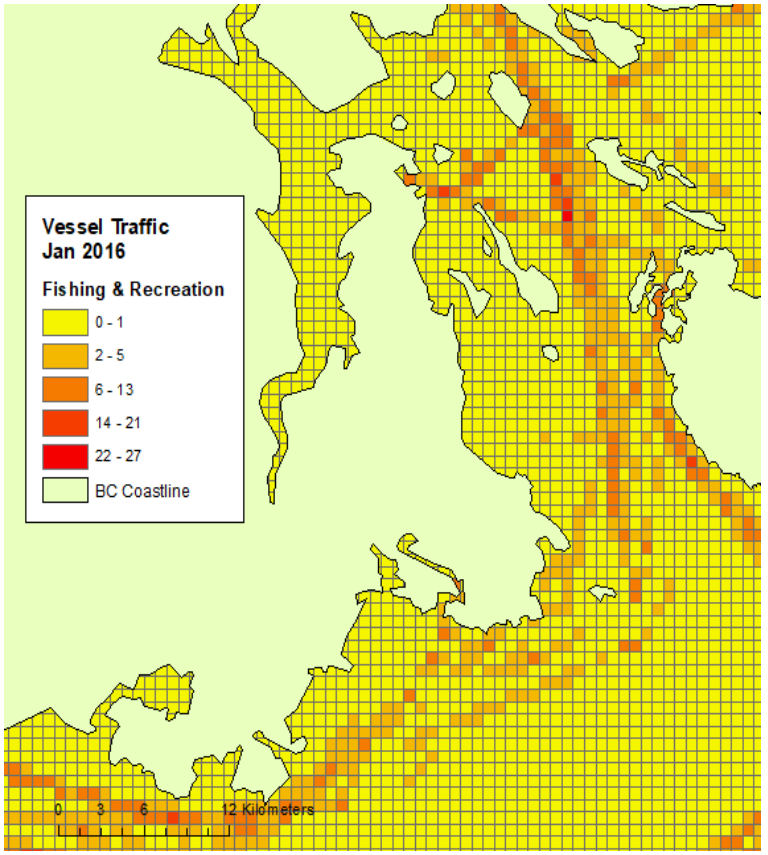
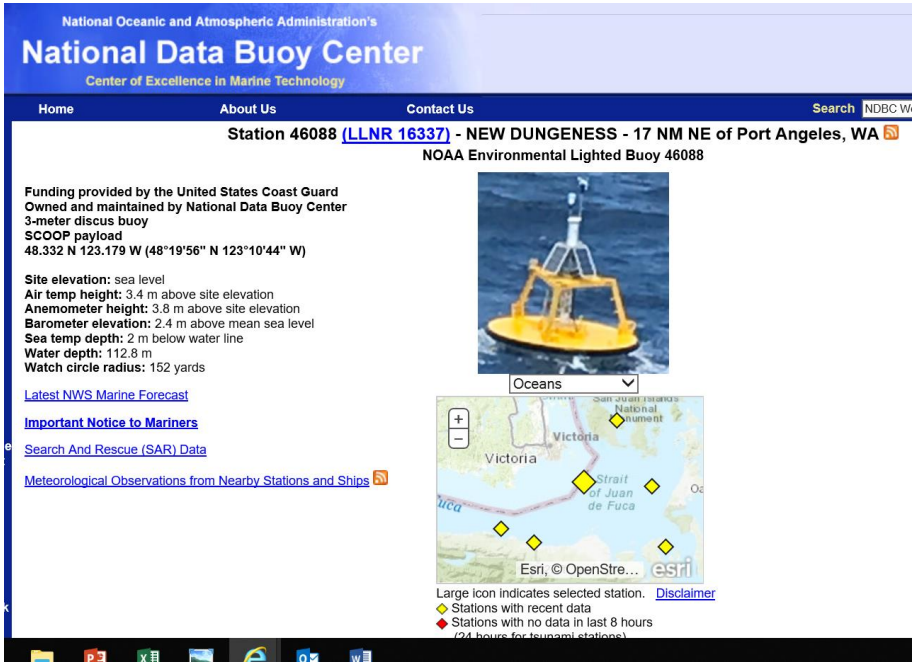
Recreational Vessels: summer > winter





Next steps: Seasonal Oil movement by winds

- Strait of Juan de Fuca weather buoy (NOAA)
- Winds SE in winter
- Winds NW in Summer



https://www.ndbc.noaa.gov/station_page.php?station=46088

Conclusions

- MAMU – year round (segregated, Coal and Oak Bay)
- RHAU – breeding season (Protection & Smith Island)
- COMU – infux in the late summer/early fall
- PIGU – year round, swell of migrants (Farallones?) in fall
- ANMU winter visitor only
- PSL – subtidal habitat primarily in Sidney Channel IBA
- *High risk of oiling* to birds and fish prey populations and habitats from extensive vessel traffic, marinas & ports

Acknowledgements

- ECCC CWS SARR Unit funds to KW
- ECCC S&T WRD funds to DFB
- SeaDoc Society Grant to CLKR & DFB
- Captain Bruce Evans, *FV* Misty Lady
- Deborah Faust, database support
- Mark Maftei, Luke Halpin, bird observers
- Leon McCartney, data entry and GIS support