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Some like it hot: using citizen science to identify marine bird hotspots in Puget Sound

Timothy Jones
University of Washington, timothy.t.jones@gmail.com

Scott F. Pearson
Washington (State). Department of Fish and Wildlife, Scott.Pearson@dfw.wa.gov

Julia Parrish
University of Washington, jparrish@uw.edu

Toby Ross
Seattle Audubon Society, United States, tobyr@seattleaudubon.org

Peter Hodum
University of Puget Sound, peter@oikonos.org

See next page for additional authors

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Speaker

Timothy Jones, Scott F. Pearson, Julia Parrish, Toby Ross, Peter Hodum, Eric John Ward, Jennifer Lang, and Adam Sedgley



Some like it hot:



Using citizen science to identify marine bird hotspots in Puget Sound

Timothy Jones¹, Julia Parrish¹, Scott Pearson², Peter Hodum⁴, Eric Ward⁵, Adam Sedgley⁶, Jennifer Lang³, Toby Ross³

¹ Univ. of Washington, ² Washington Dept. of Fish & Wildlife, ³ Seattle Audubon Society, ⁴ Univ. of Puget Sound, ⁵ Northwest Fisheries Science Ctr., ⁶ Conservation International







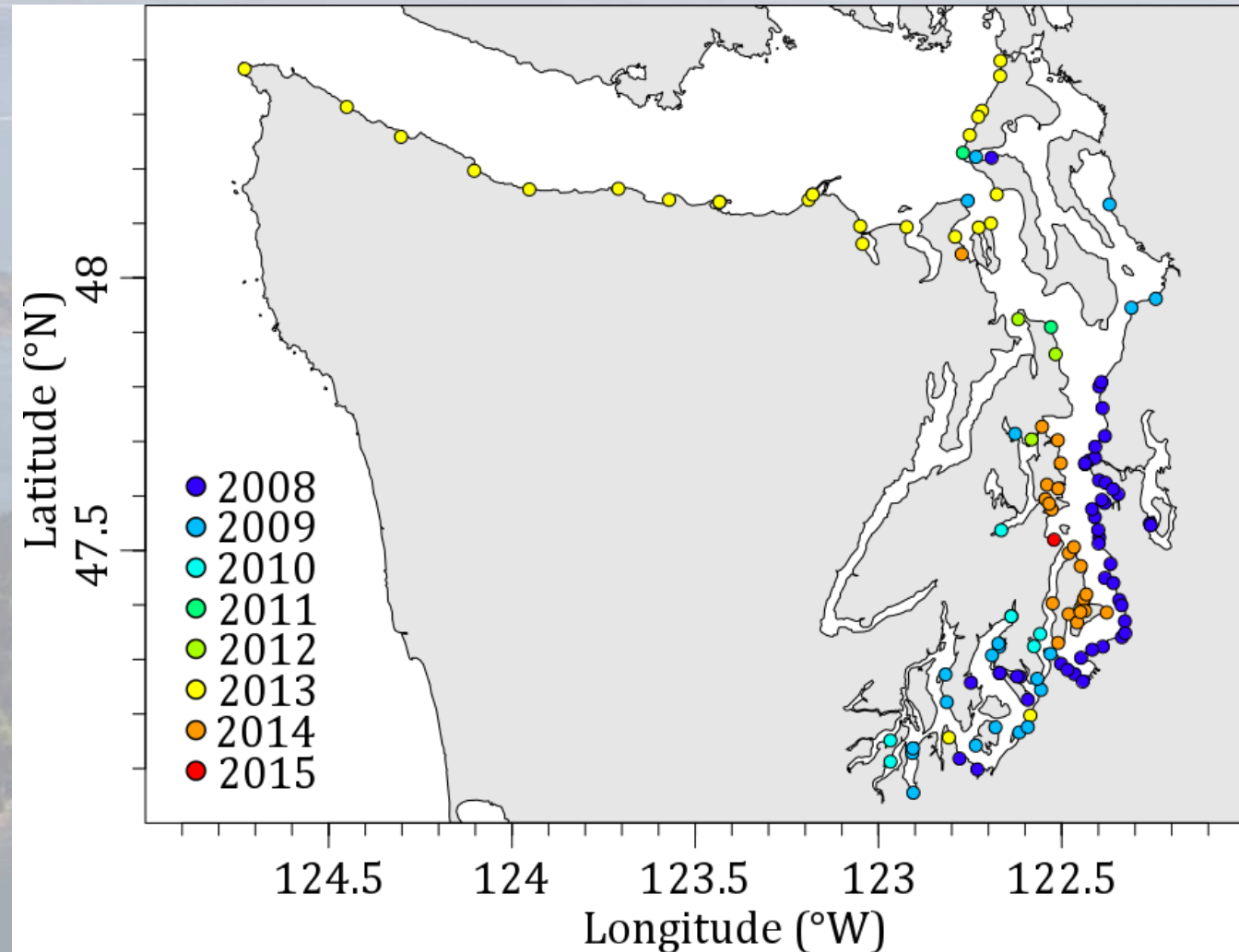
**PUGET SOUND ECOSYSTEM
MONITORING PROGRAM**

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Puget Sound Seabird Survey (PSSS)

Documenting nearshore habitat use by wintering seabirds

- Survey season: Oct - Apr
- 200+ volunteers
- 121 active sites
- ~4,800 acres nearshore habitat



PSSS: How it's done

- Teams of 2 - 5 surveyors
- Survey duration = 15 - 30 min
- All surveys conducted within 2 hours of high tide
- Identify and record all seabirds on the water within 300 m of shore
- Record survey conditions



Nearshore marine bird hotspot analyses

- Dr. Timothy Jones,
University of Washington
- Hotspot = particular sites that harbor a high number or occurrence of seabirds
- Developed a suite of techniques related to hotspot identification
 - Building on Ward et al. 2015

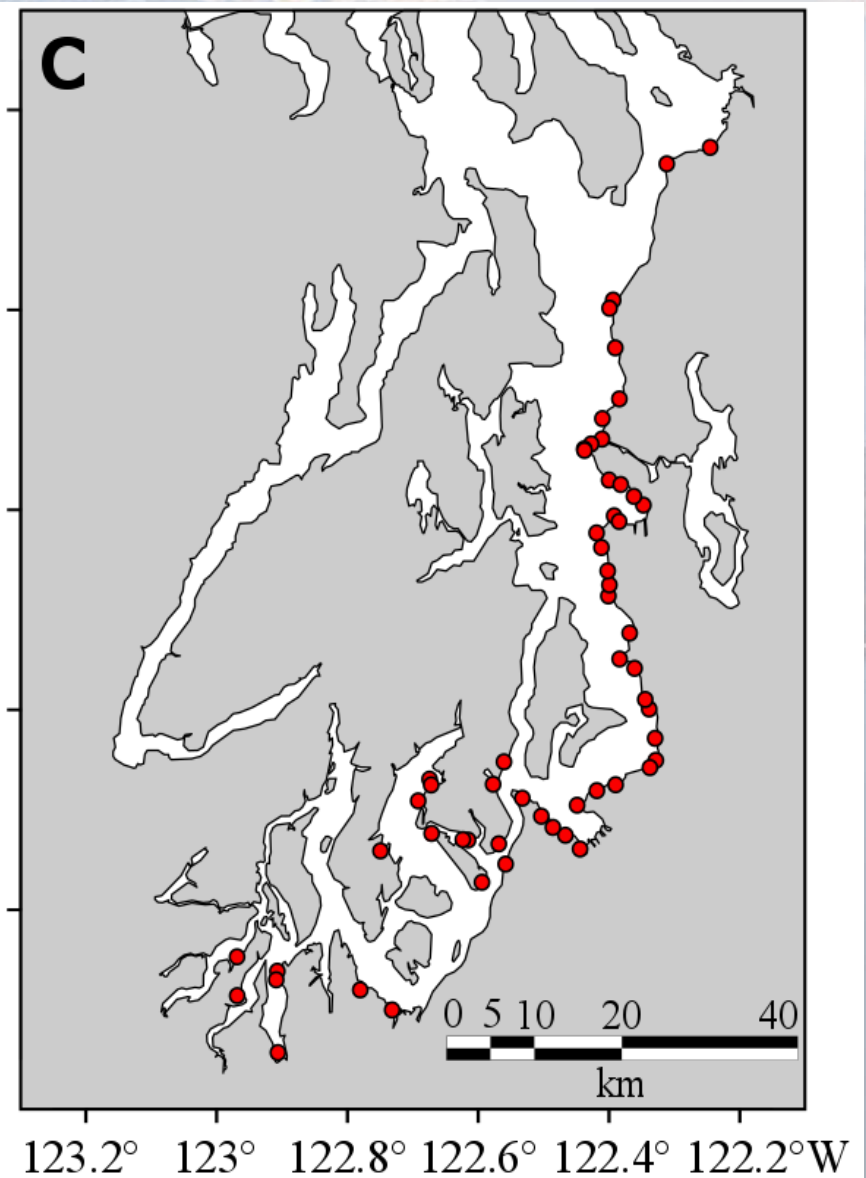
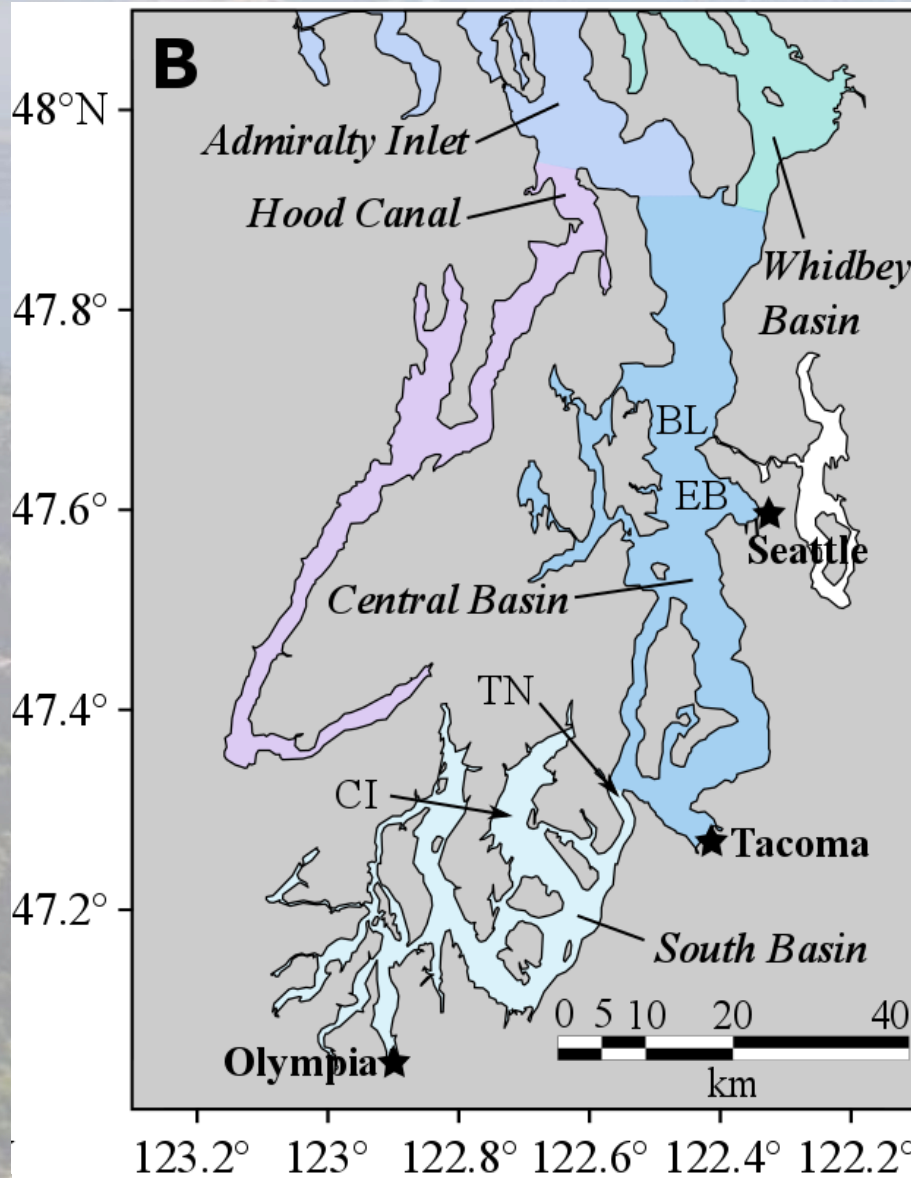


Aims of the study

1. Determine which species display hotspot behavior
2. Identify hotspot locations
 - a. Classify locations as stable, seasonal or intermittent hotspots, as well as coldspots
3. Group species by hotspot location similarities



Study area and site selection



Species selection

Cormorants



Double-crested Cormorant
Pelagic Cormorant

Grebes



Horned Grebe
Red-necked Grebe
Western Grebe

Loons



Common
Loon

Alcids



Pigeon Guillemot
Rhinoceros Auklet

Scoters



Surf Scoter
White-winged Scoter

Ducks



Bufflehead
Common Goldeneye
Harlequin Duck

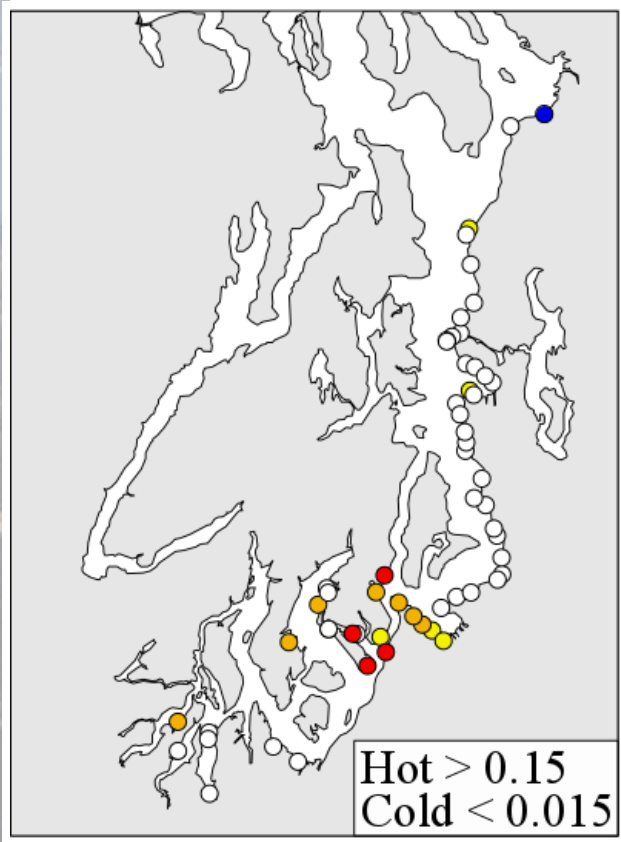
Gulls



Glaucous-winged Gull
Mew Gull

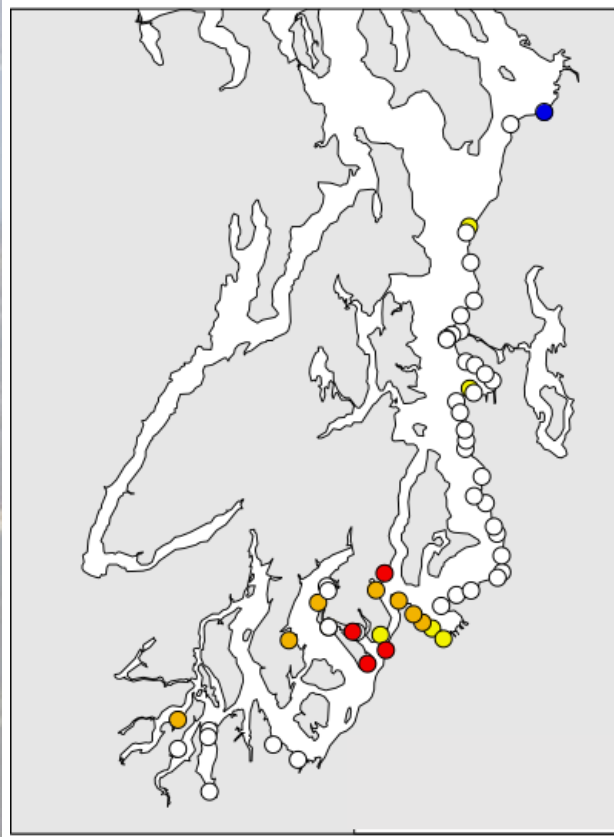
Hotspot Typologies

Uniform

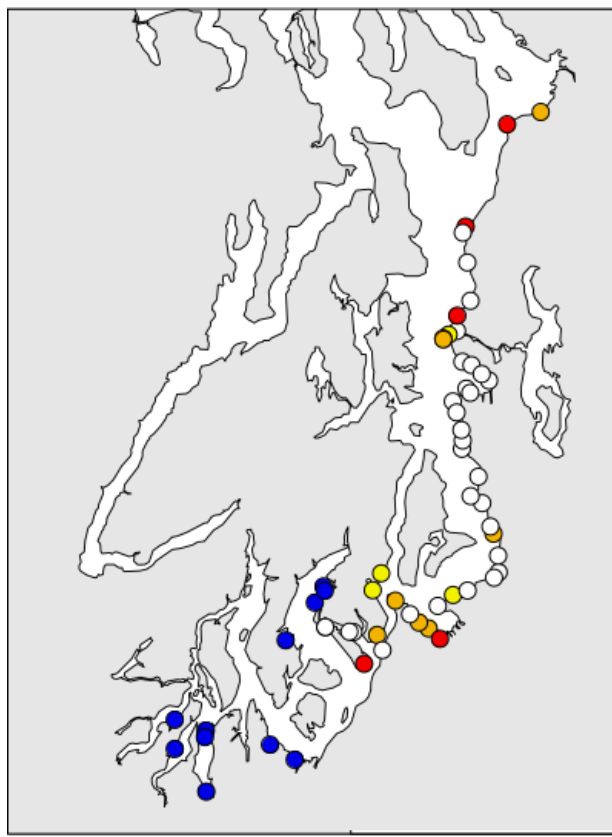


Hotspot Typologies

Uniform

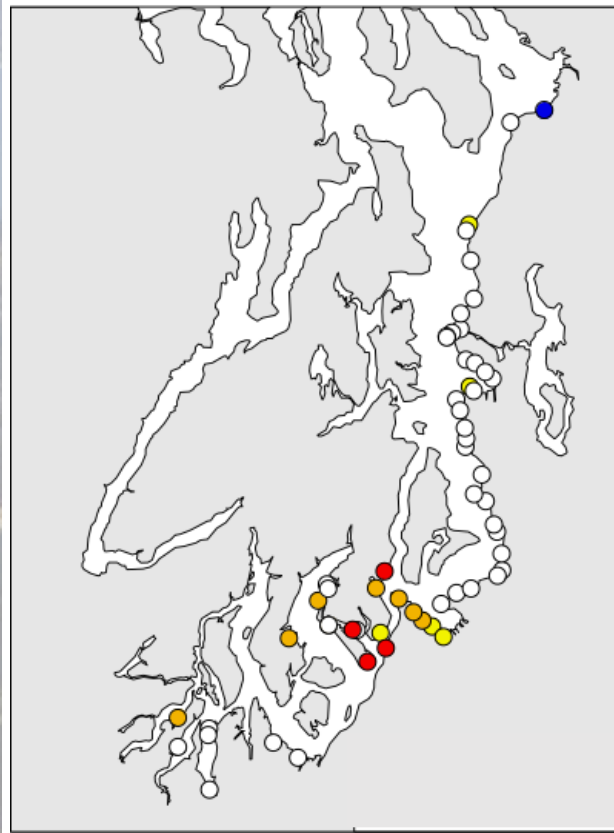


Abundance

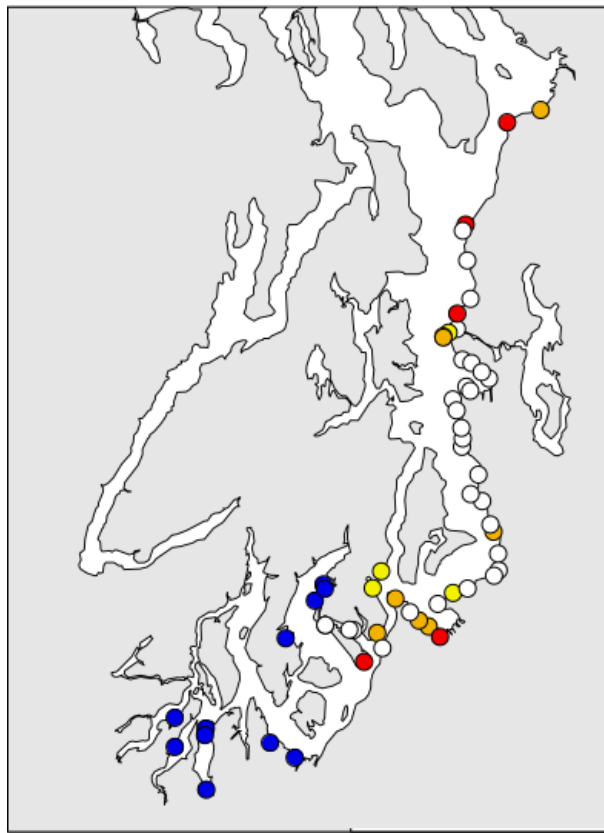


Hotspot Typologies

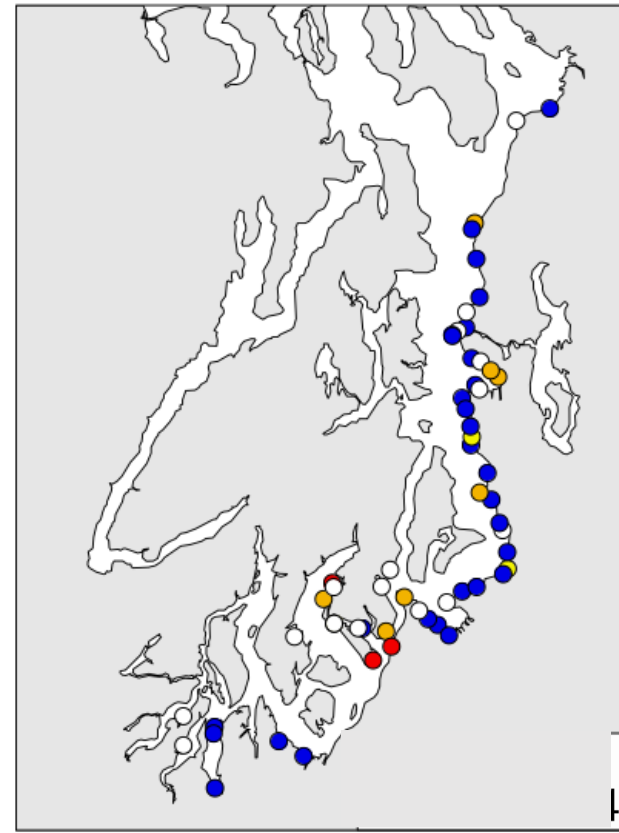
Uniform



Abundance



General

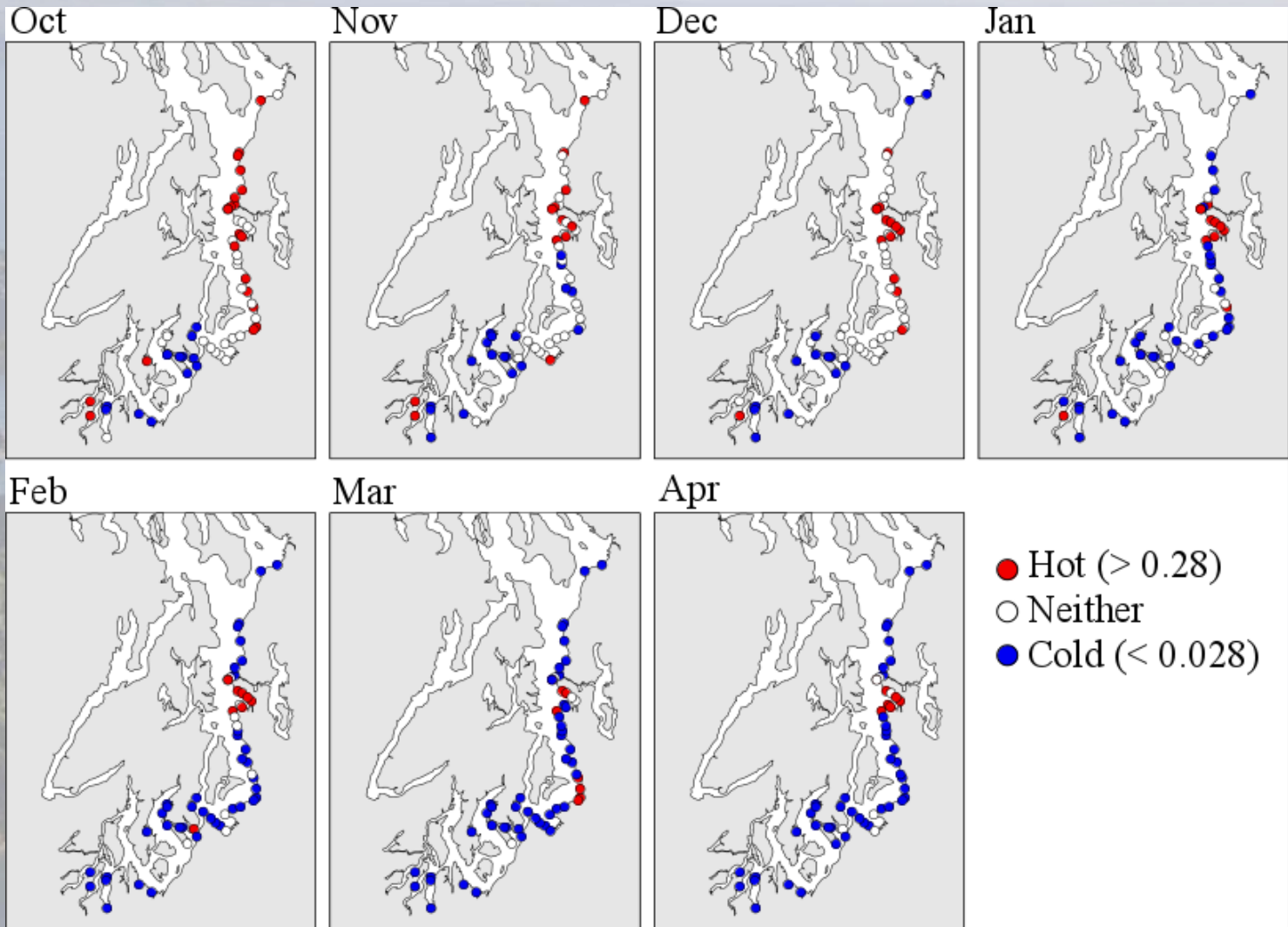


Hotspot Typologies

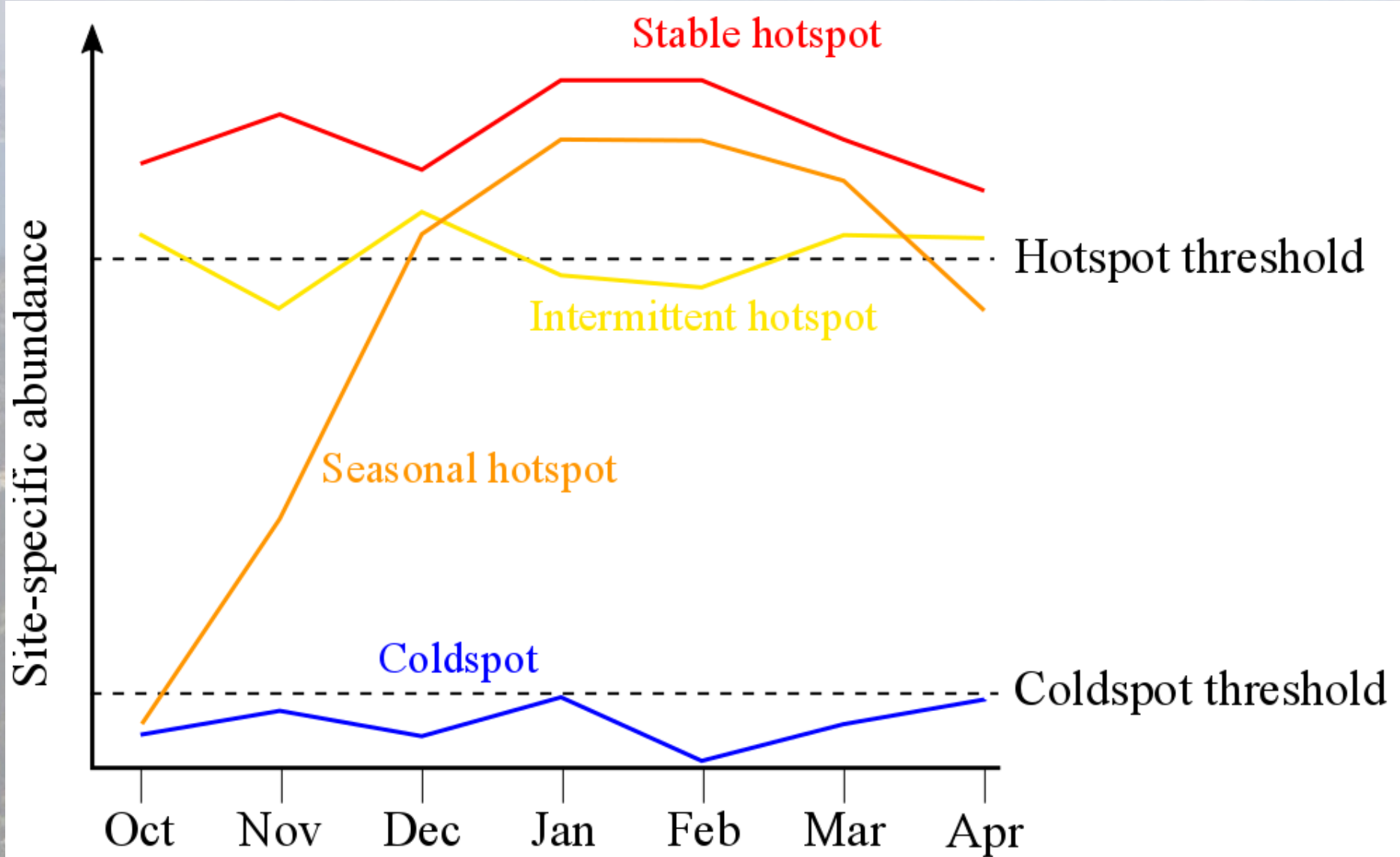
Seasonal



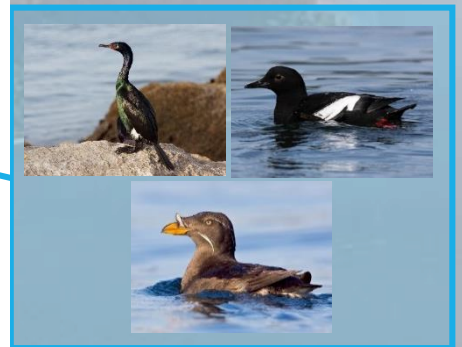
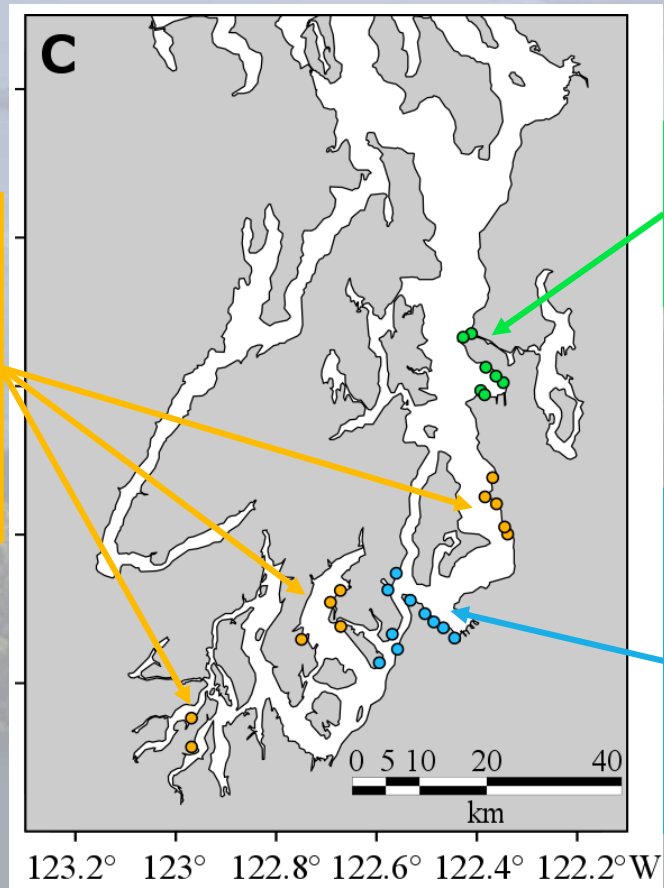
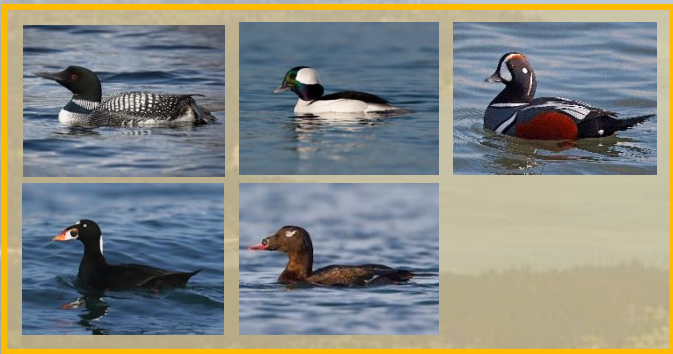
Western Grebe



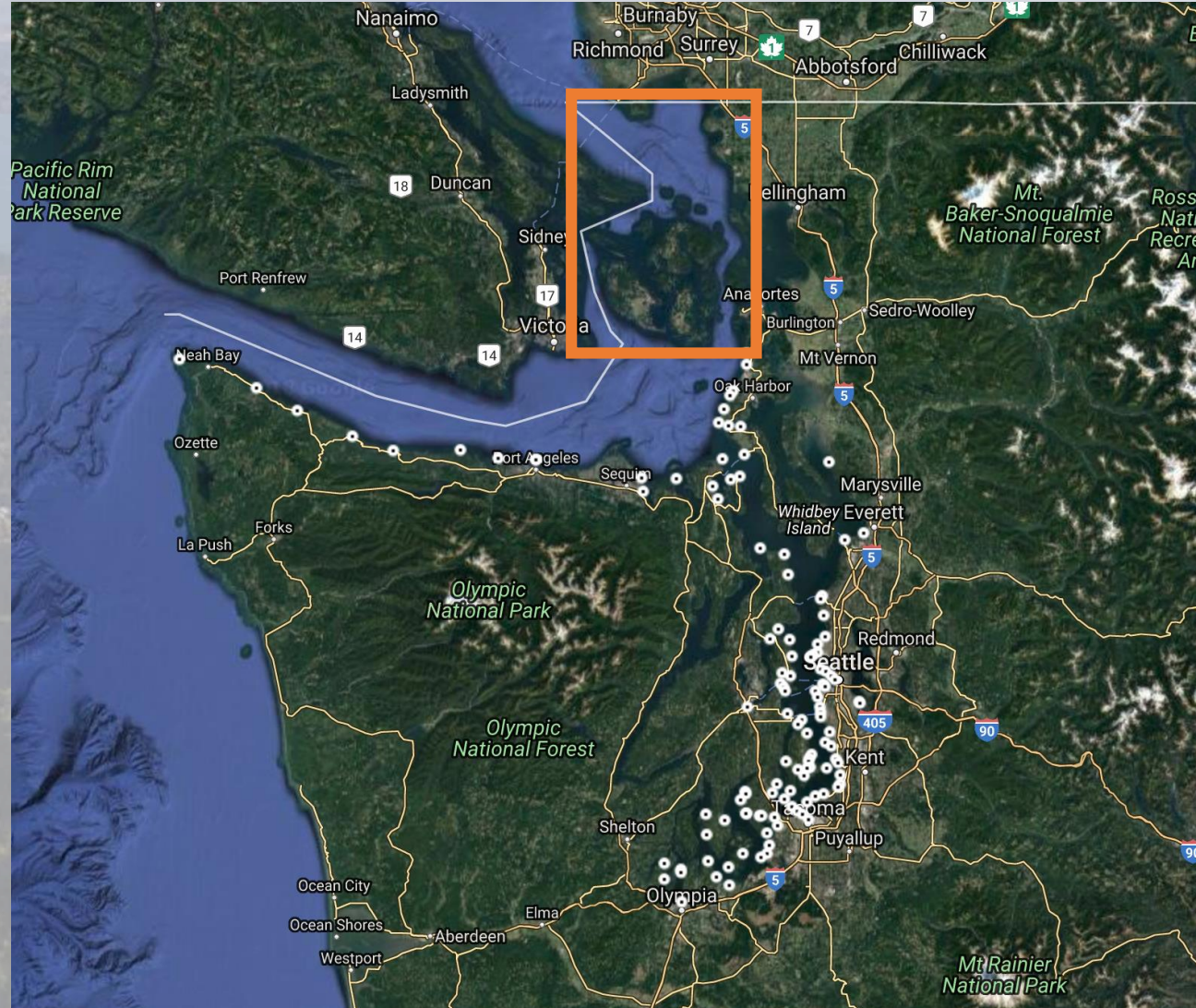
Classifying hotspots



Grouping species based on hotspot locations



Looking ahead: *Project expansion and analysis opportunities*



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Thank you!

Jennifer Lang

Conservation Science Coordinator
Seattle Audubon Society
jenniferl@seattleaudubon.org



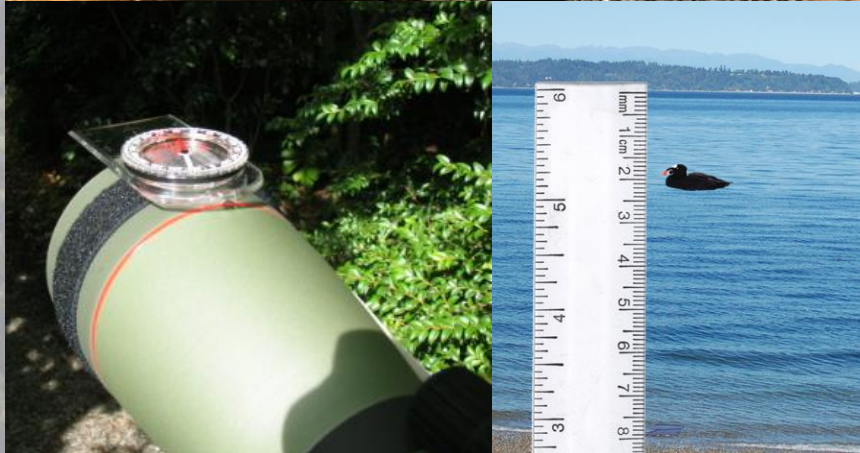
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Distance sampling

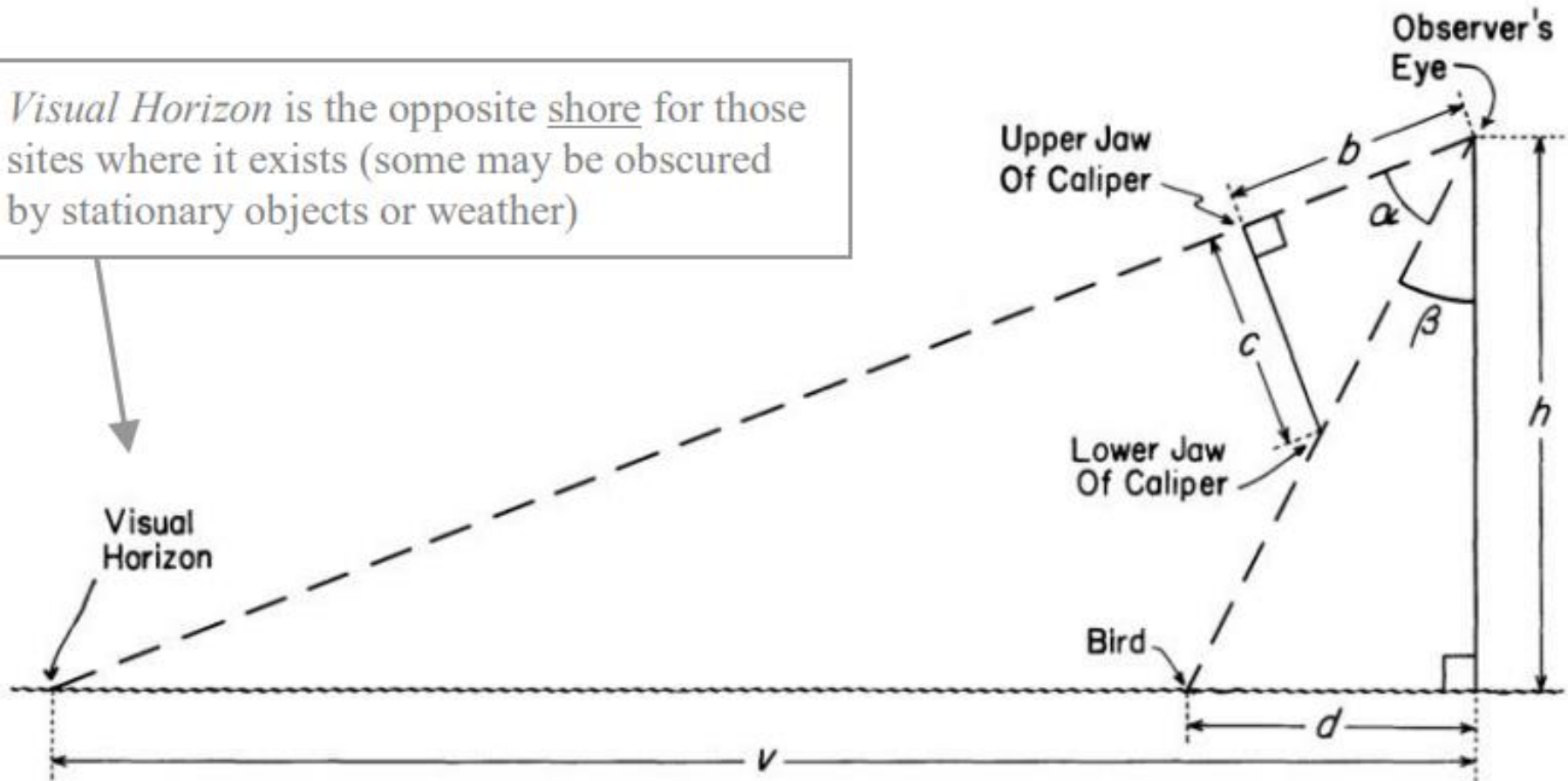


- Bearing and distance are recorded for each bird on the water
 - Distance: # mm the bird is from visual horizon
- Distance of each bird is triangulated using:
 - Distance between observer & visual horizon in line with the bird's bearing
 - Eye height & arm length of data collector



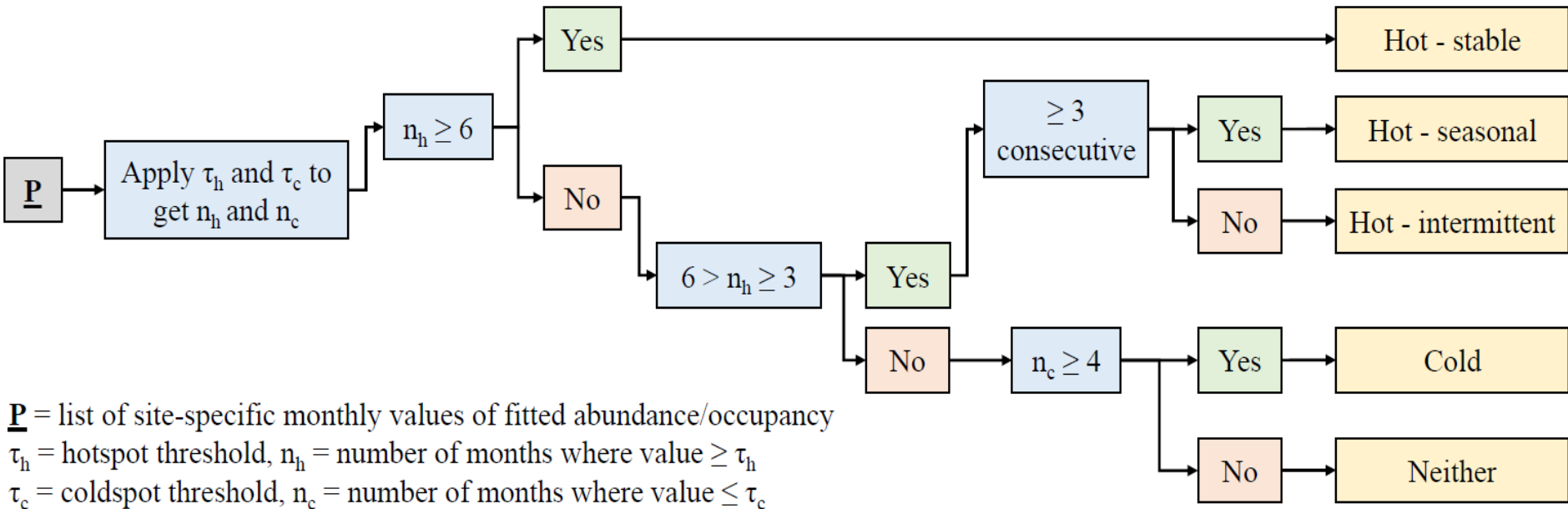
Distance sampling

Visual Horizon is the opposite shore for those sites where it exists (some may be obscured by stationary objects or weather)



SOURCE: Heinemann, D. (1991). A Range Finder for Pelagic Bird Censusing The Journal of Wildlife Management, Vol. 45, No. 2. April 1981, pp. 489-493

Classification decision tree



PSSS Data Potential

- Evaluate QAQC, exploring bias
- Improve aerial survey models for nearshore habitat
- Evaluate areas of different seabird aggregations
- Explore new collaborations

