


# Analytical development of whale satellite tagging data to inform critical knowledge gaps off the US West Coast

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**Oregon State University**



**Oregon State University**

**Marine Mammal  
Institute**



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# State of the Problem

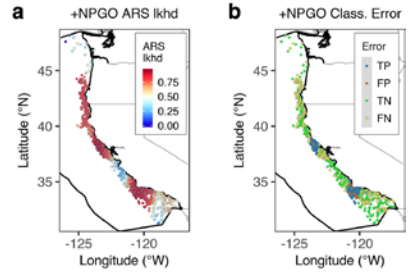
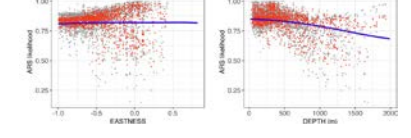
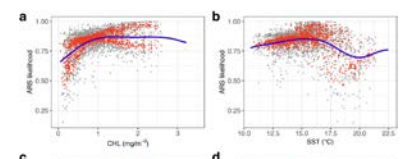
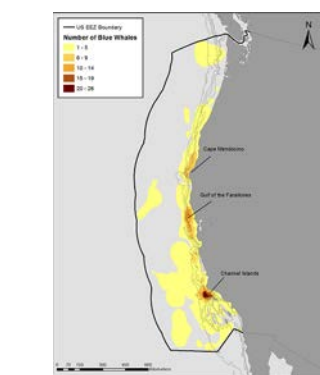
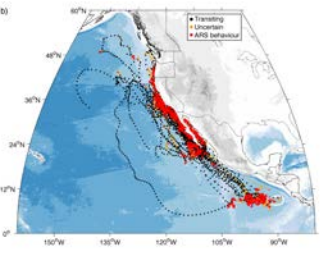
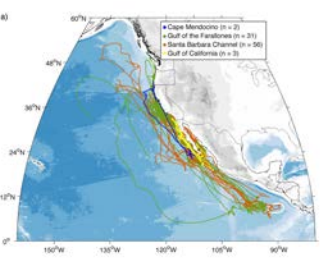
# Data Tagging

# Products

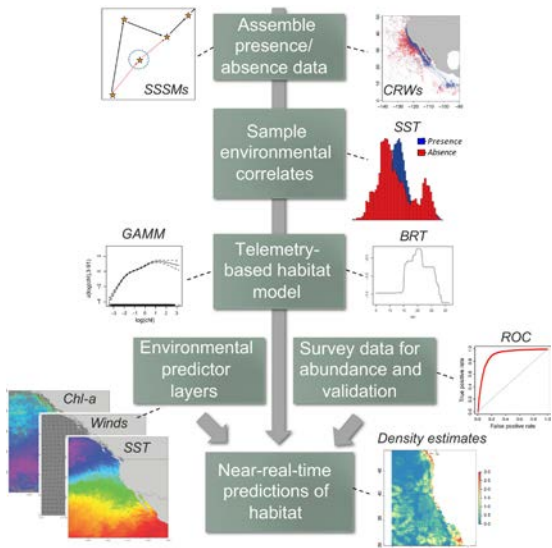
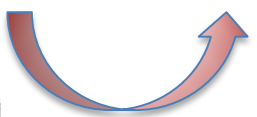
SDM  
Movement syndromes

# DST

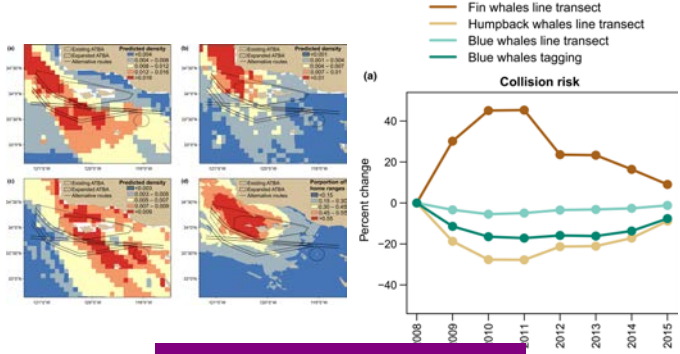
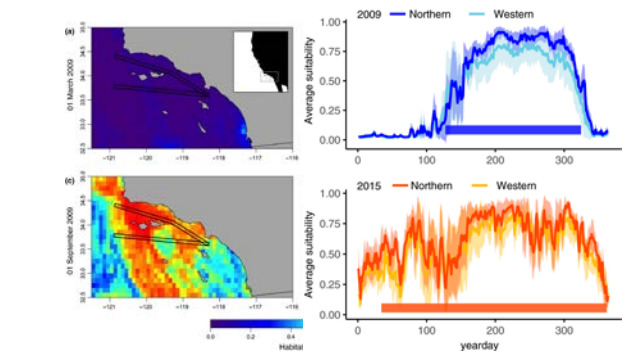
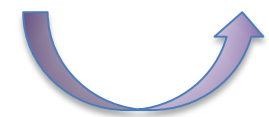
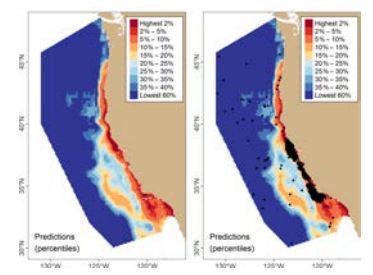
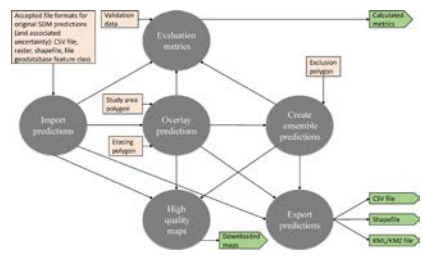
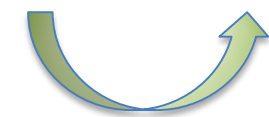
Risk assessment



Bailey et al. (2009)  
Irvine et al. (2014)  
Palacios et al. (2019)



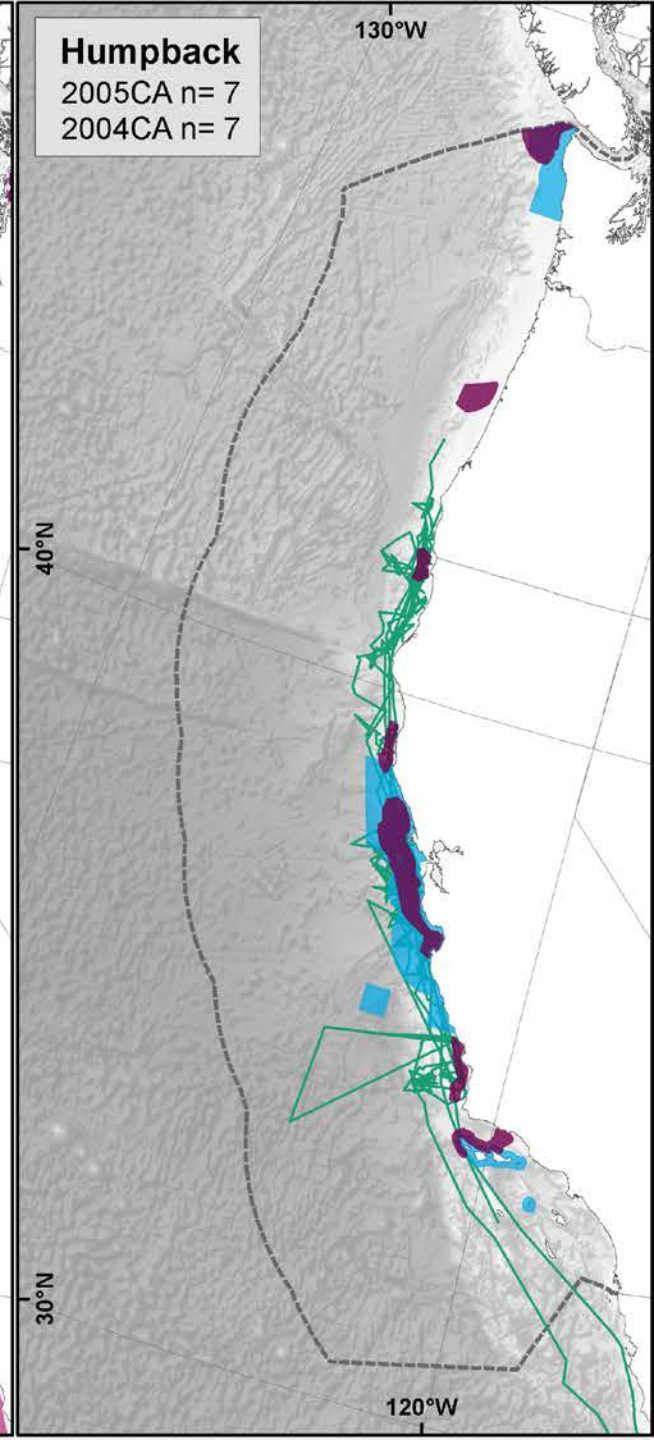
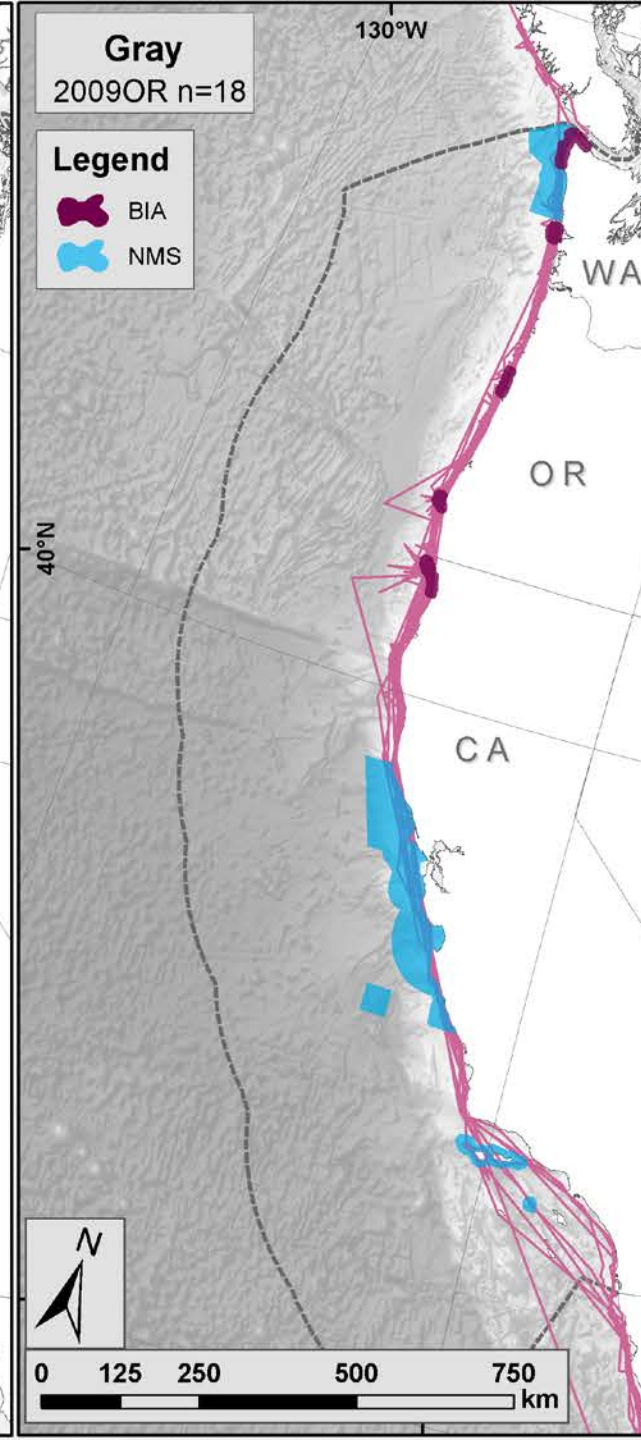
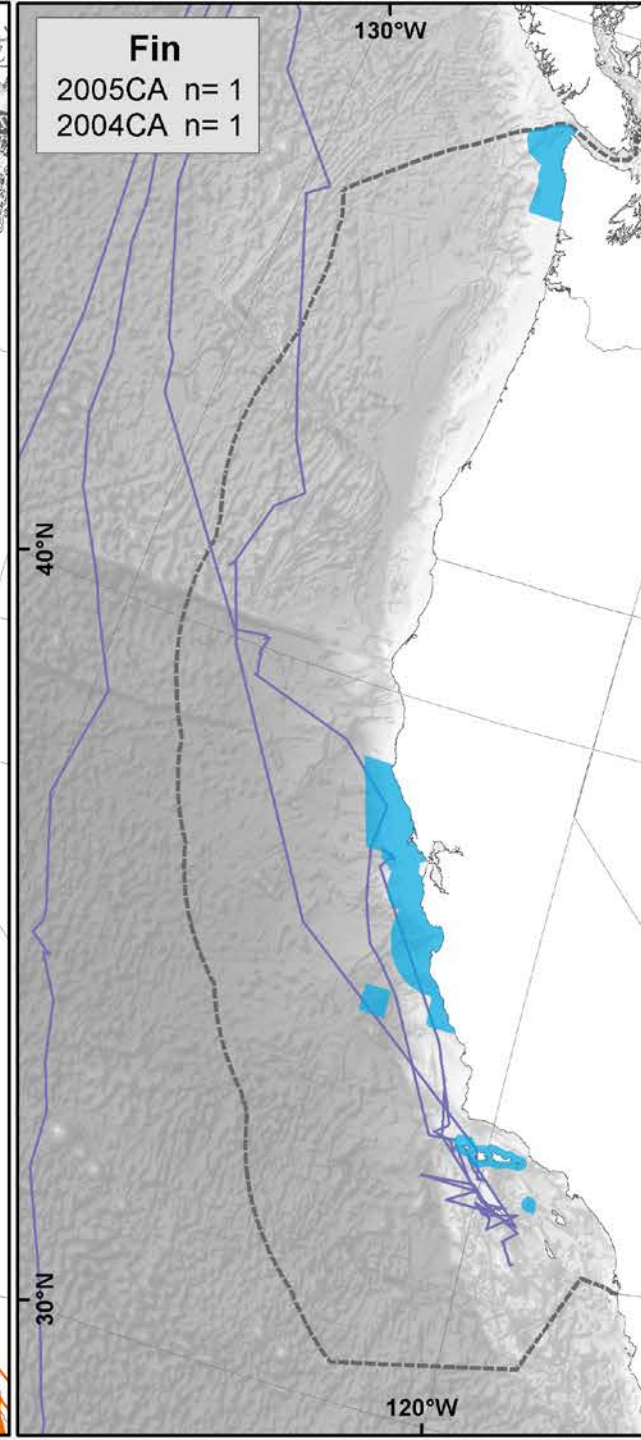
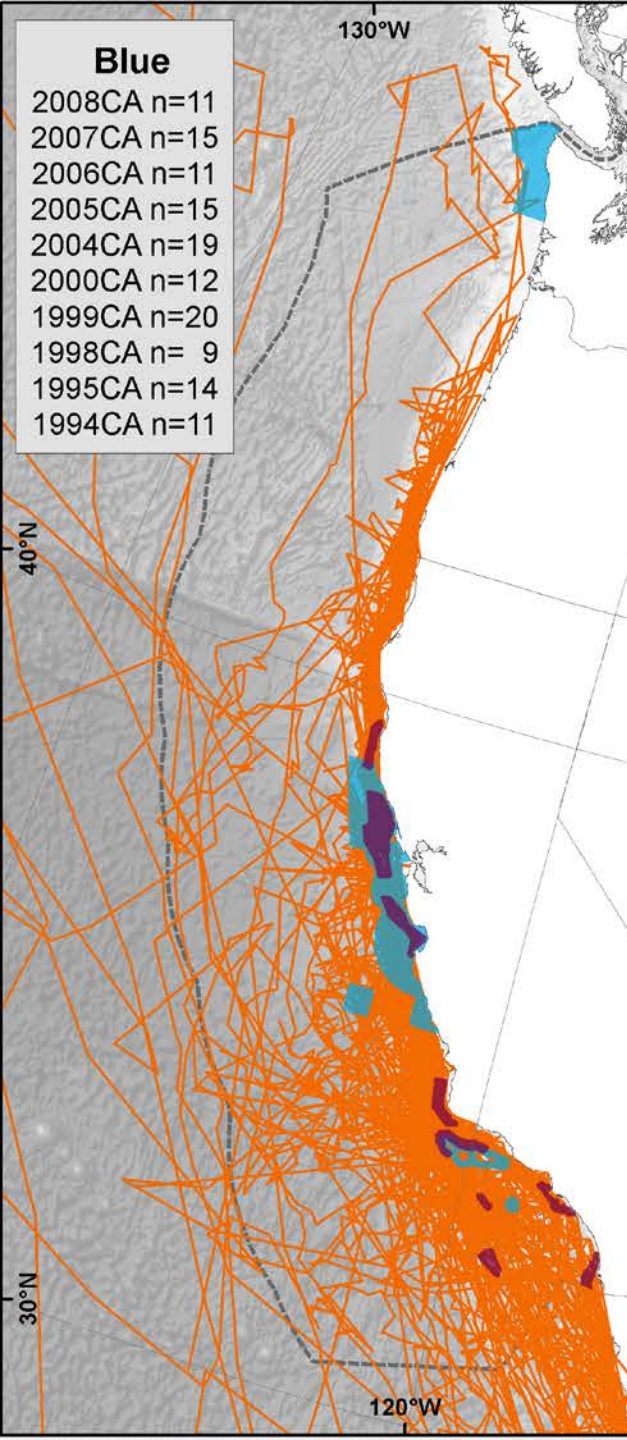
Hazen et al. (2016)  
Woodman et al. (2019)



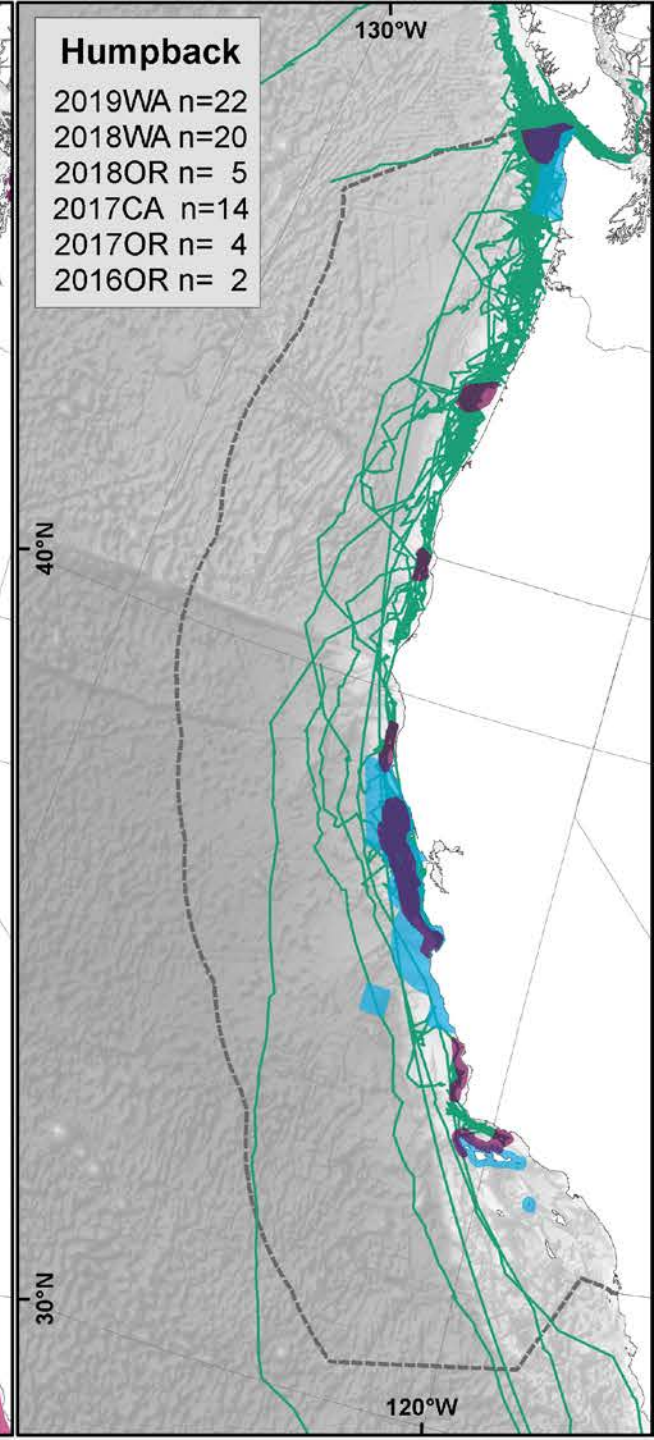
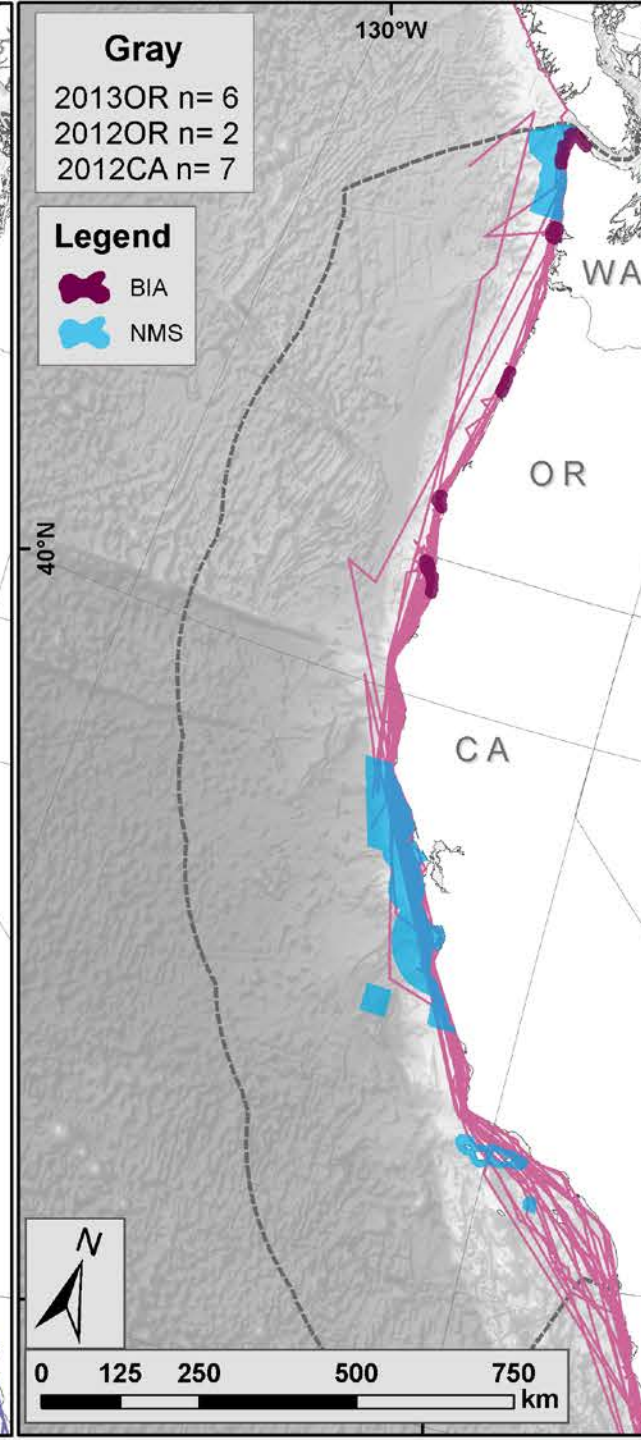
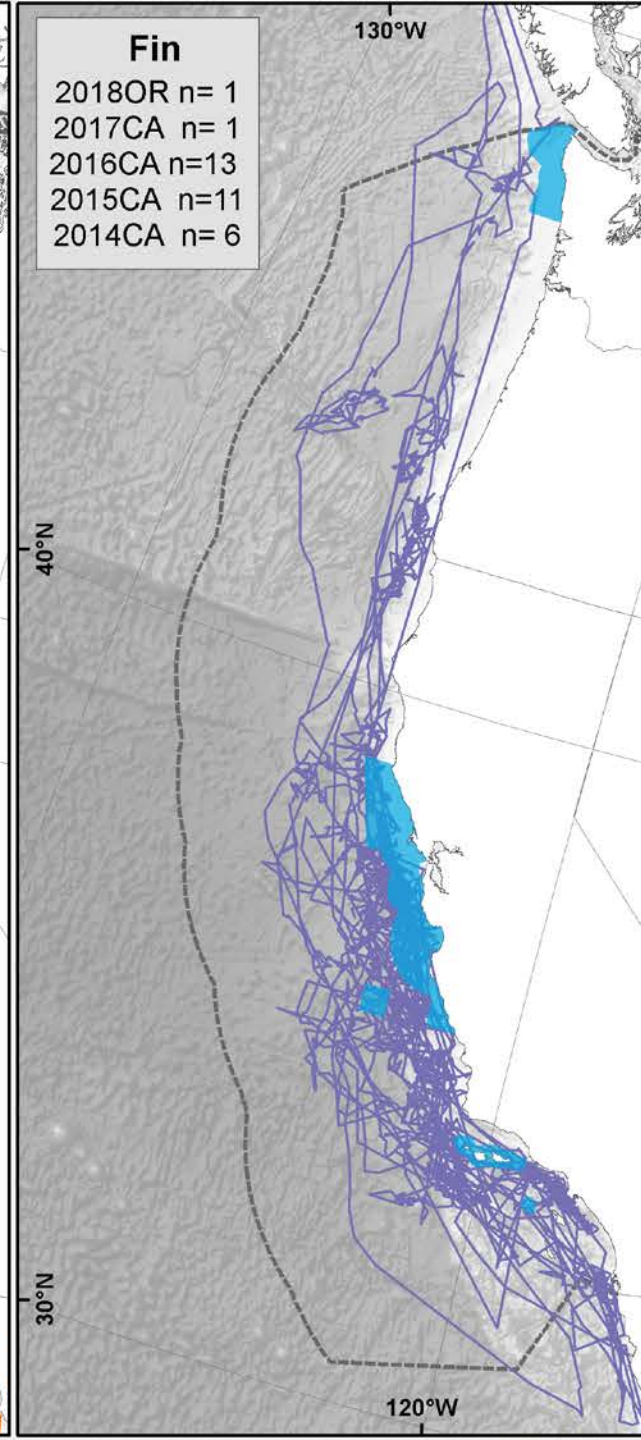
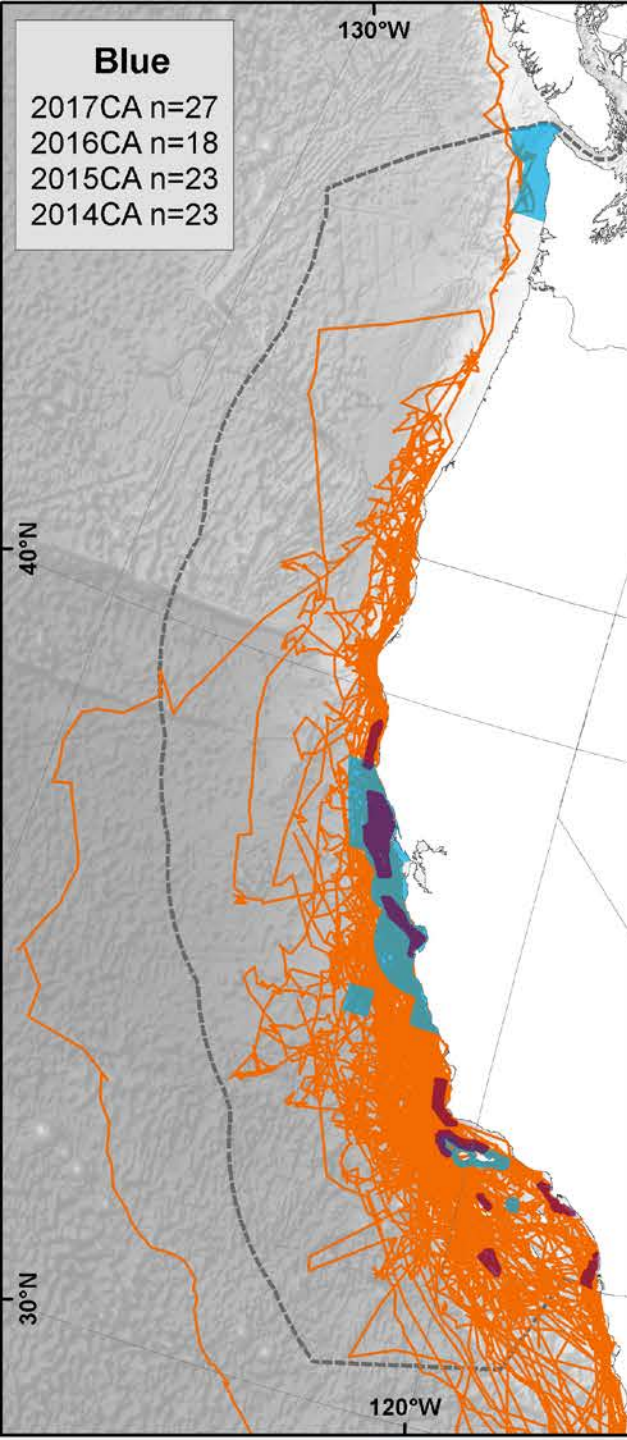
Abrahms et al. (2019)  
Redfern et al. (2019)

TOPP (PIs: Block, Costa, Bograd) | WhaleWatch (PI: Bailey) | WhaleWatch 2.0 (PI: Hazen)

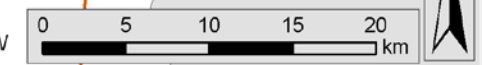
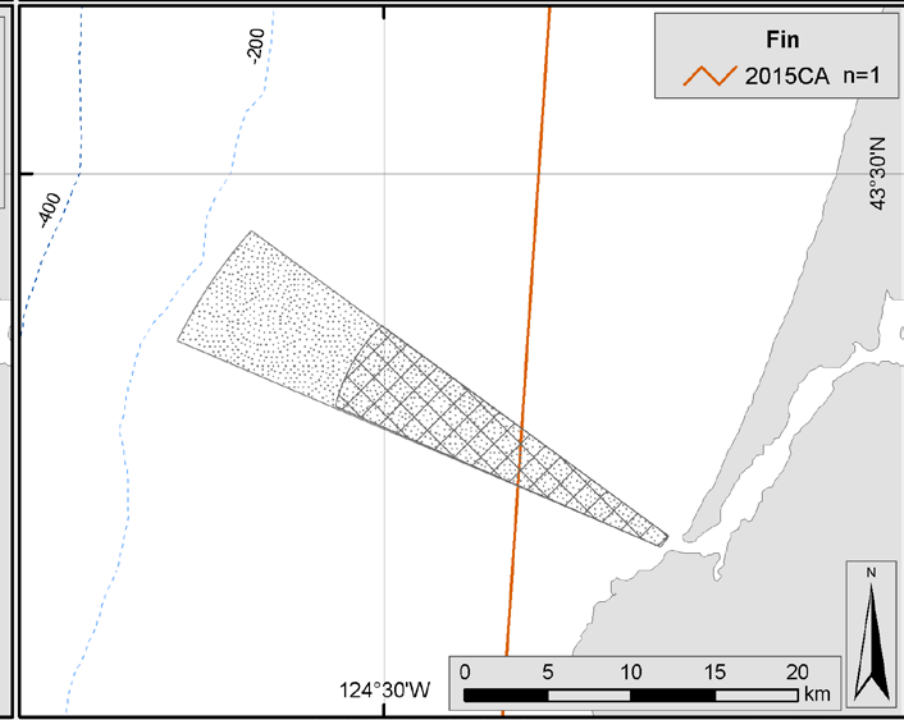
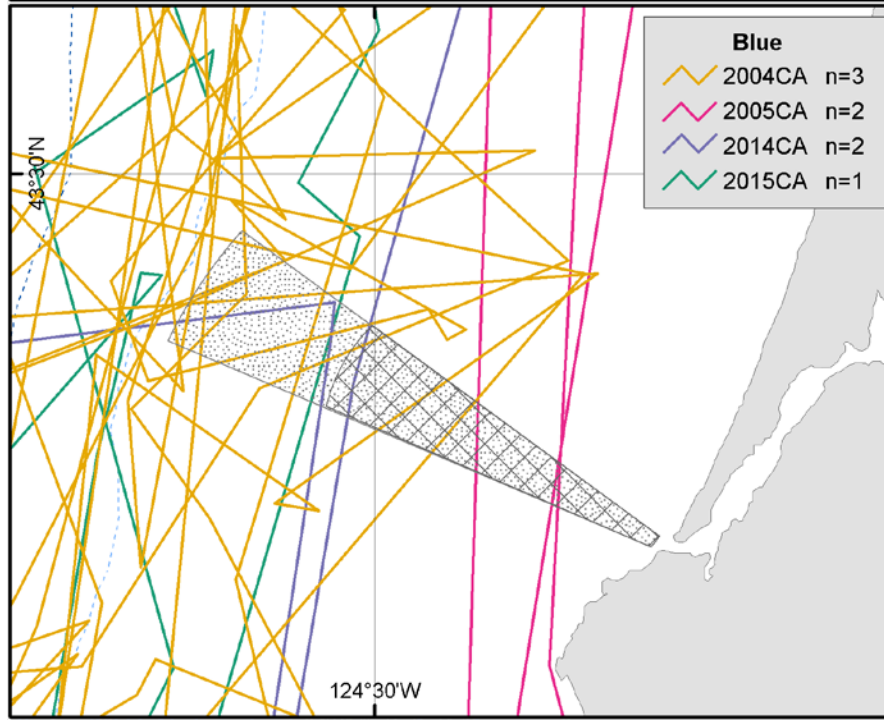
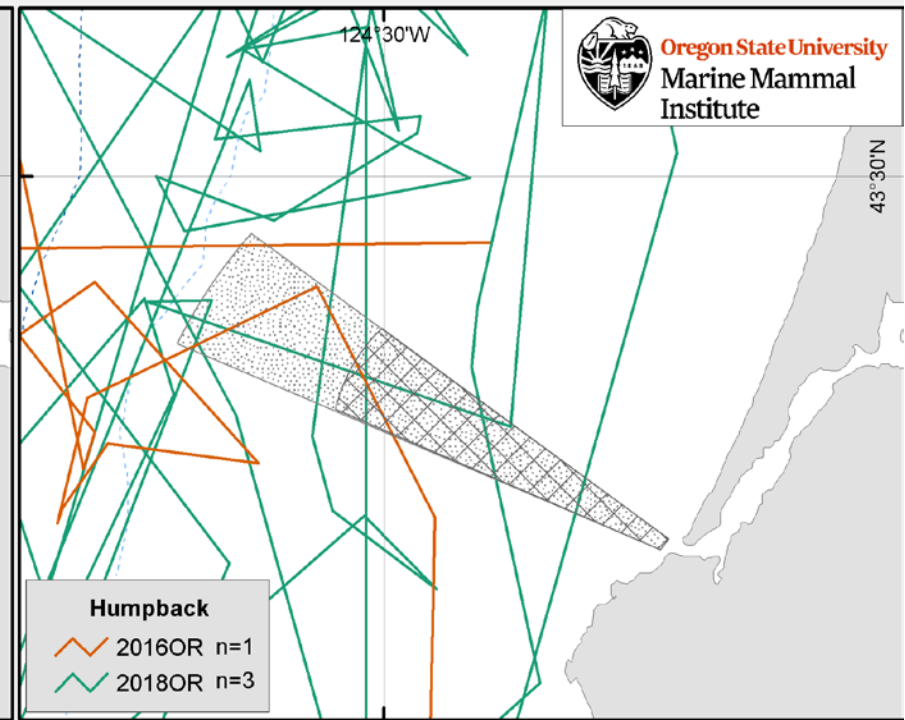
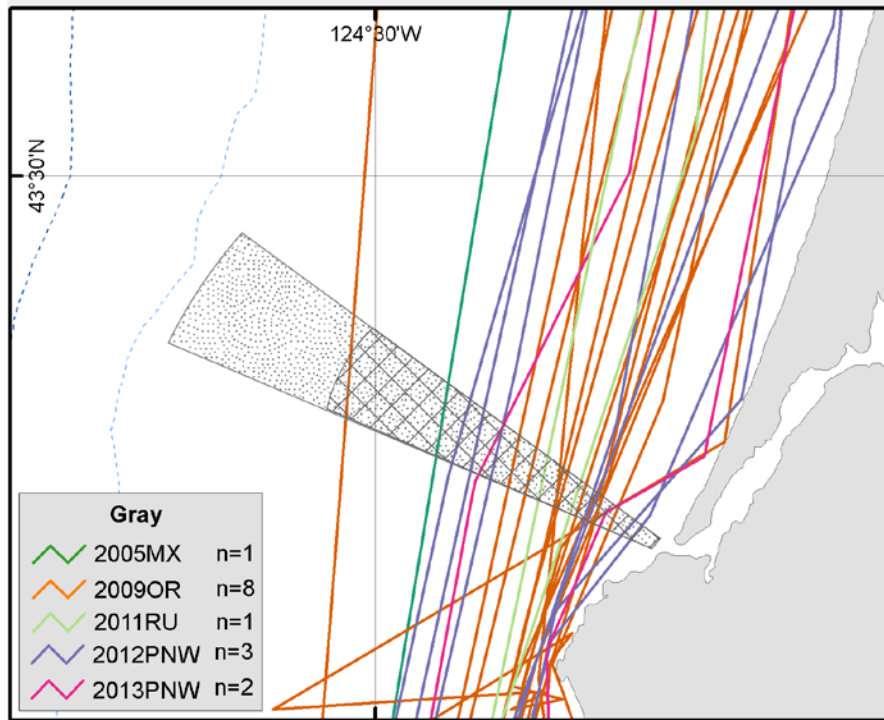










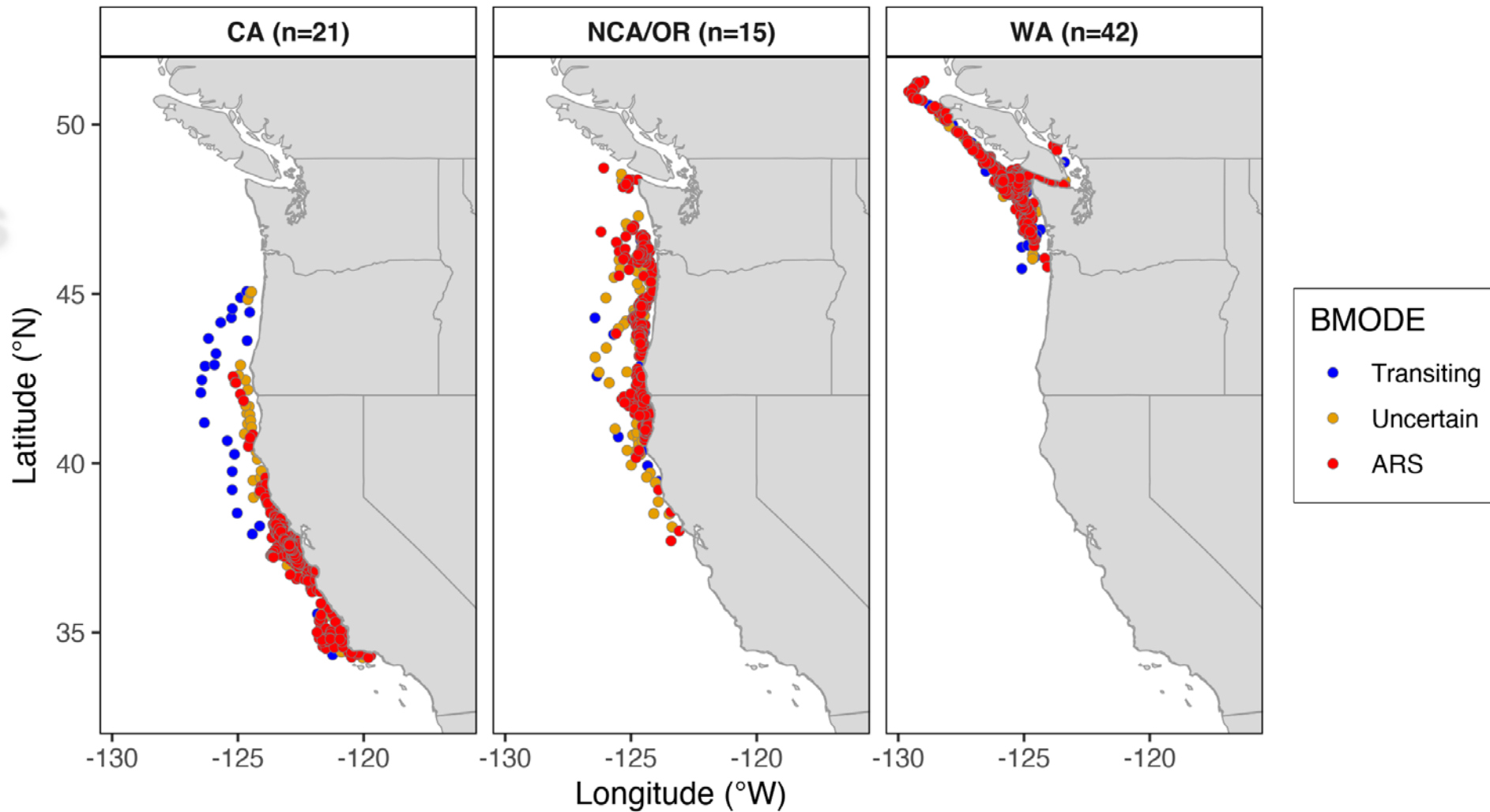


# Movement behavior & ecological relationships

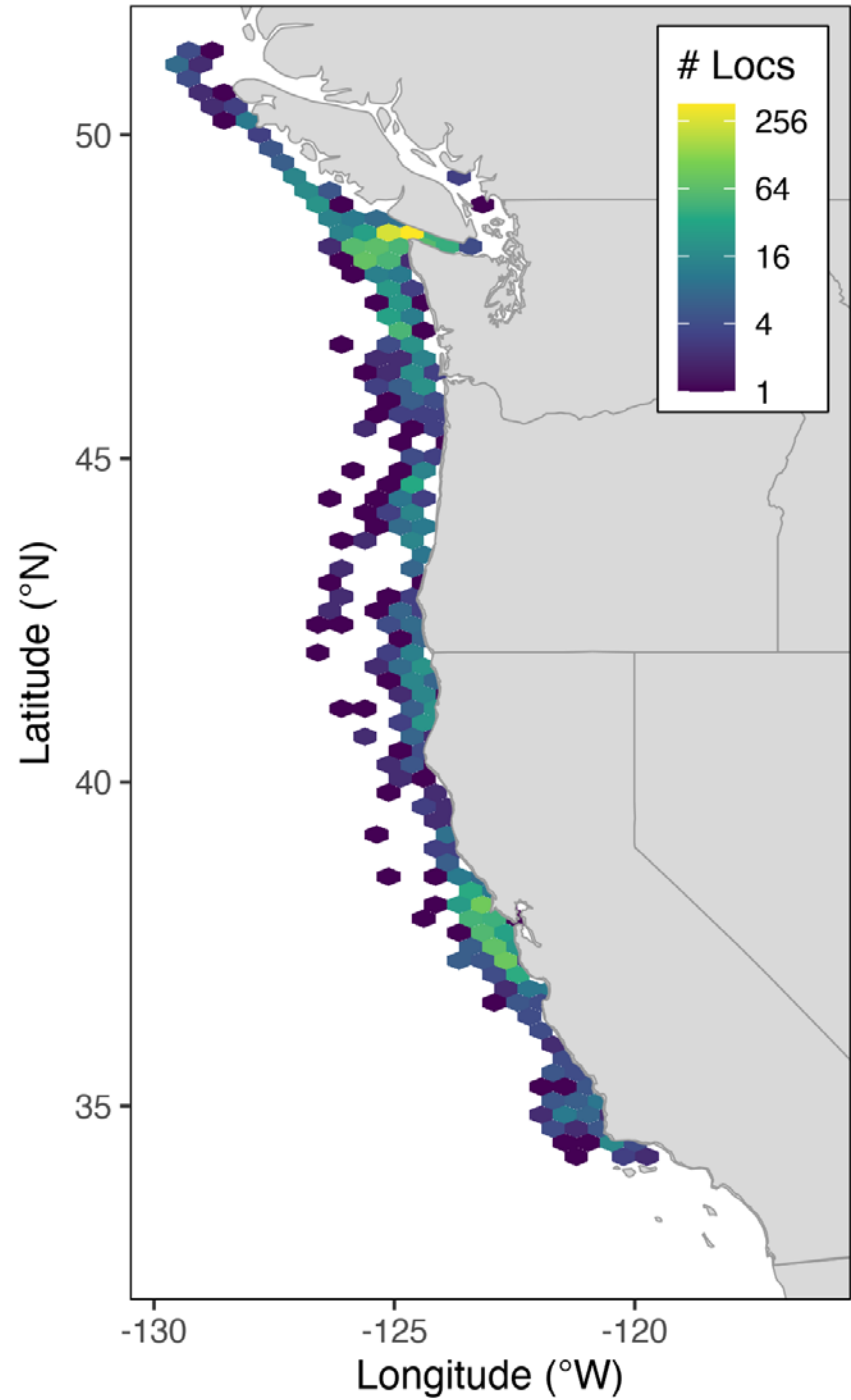
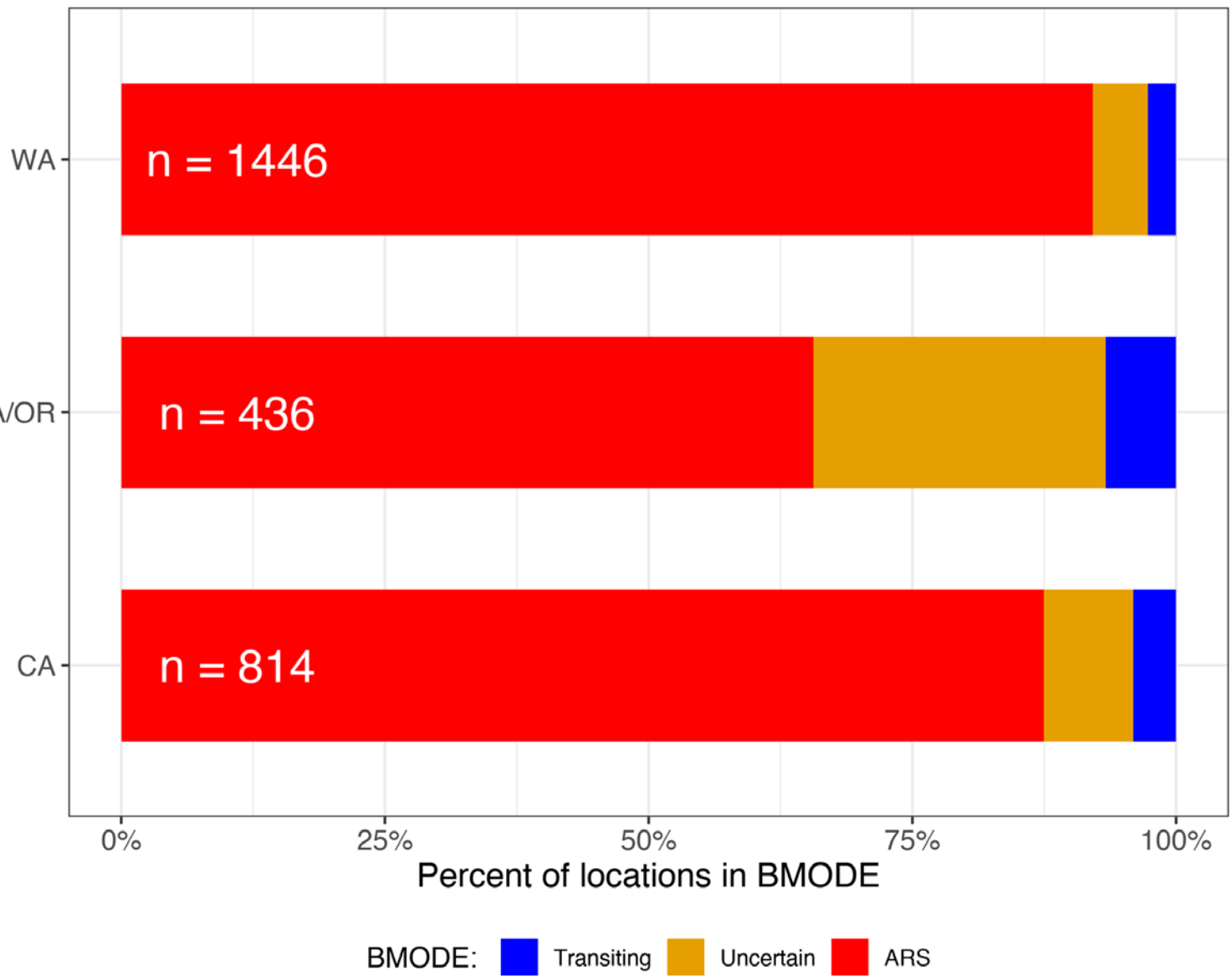
Total tracks: 78

Total locs: 2,696

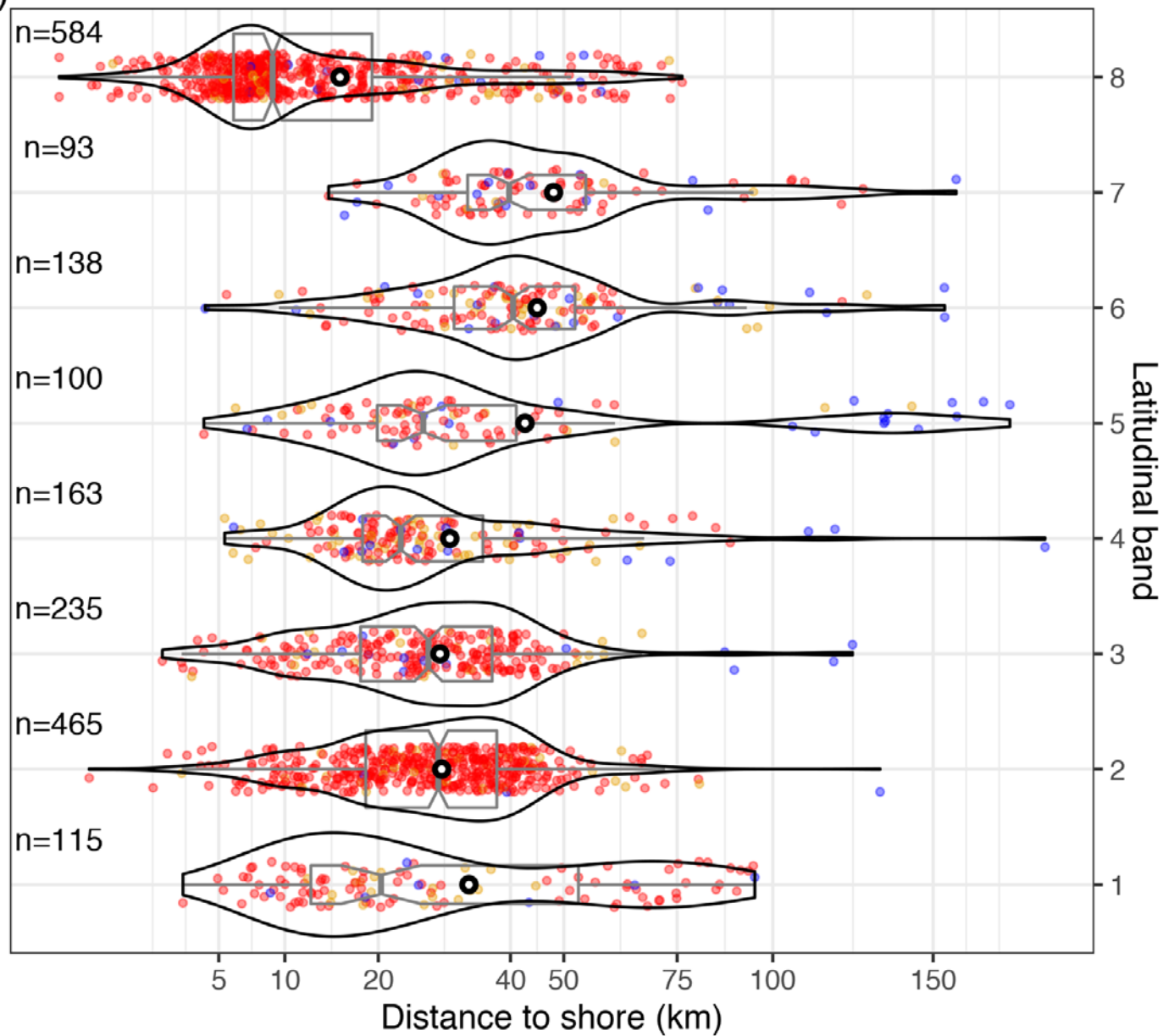
BMODE	Percent
Transiting	3.8%
Uncertain	9.8%
ARS	86.4%



Tagging region

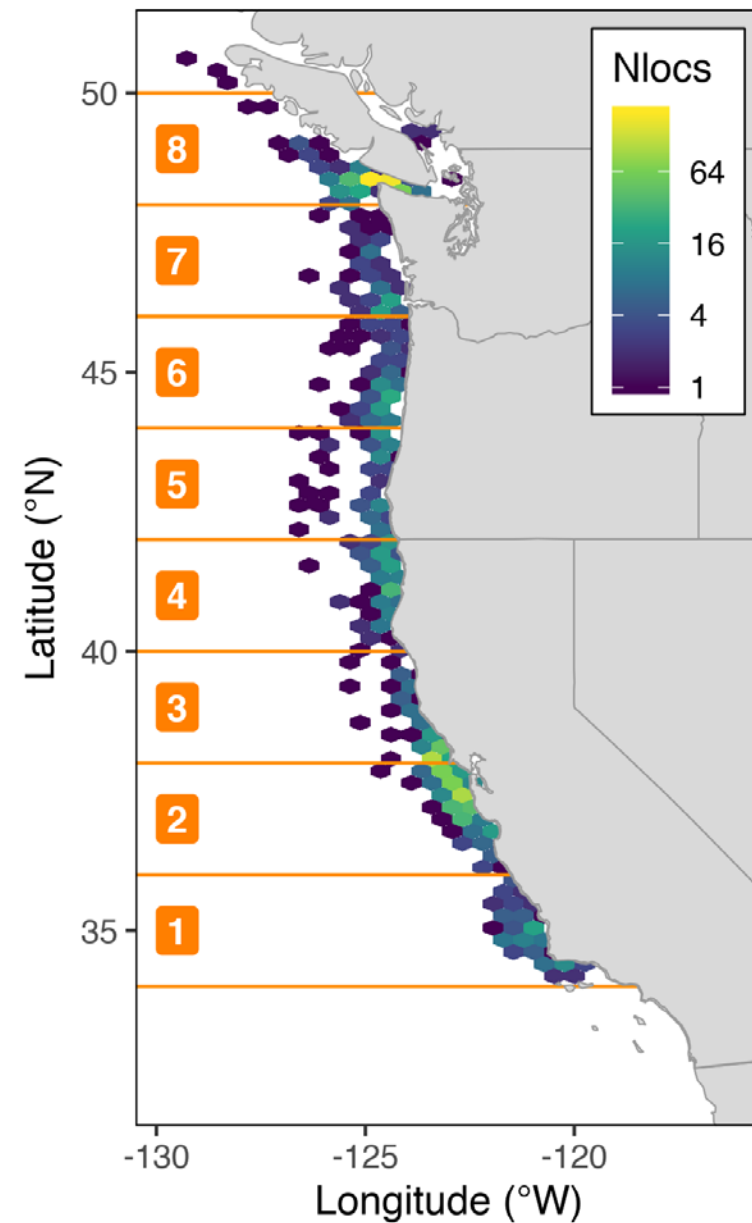


(a)



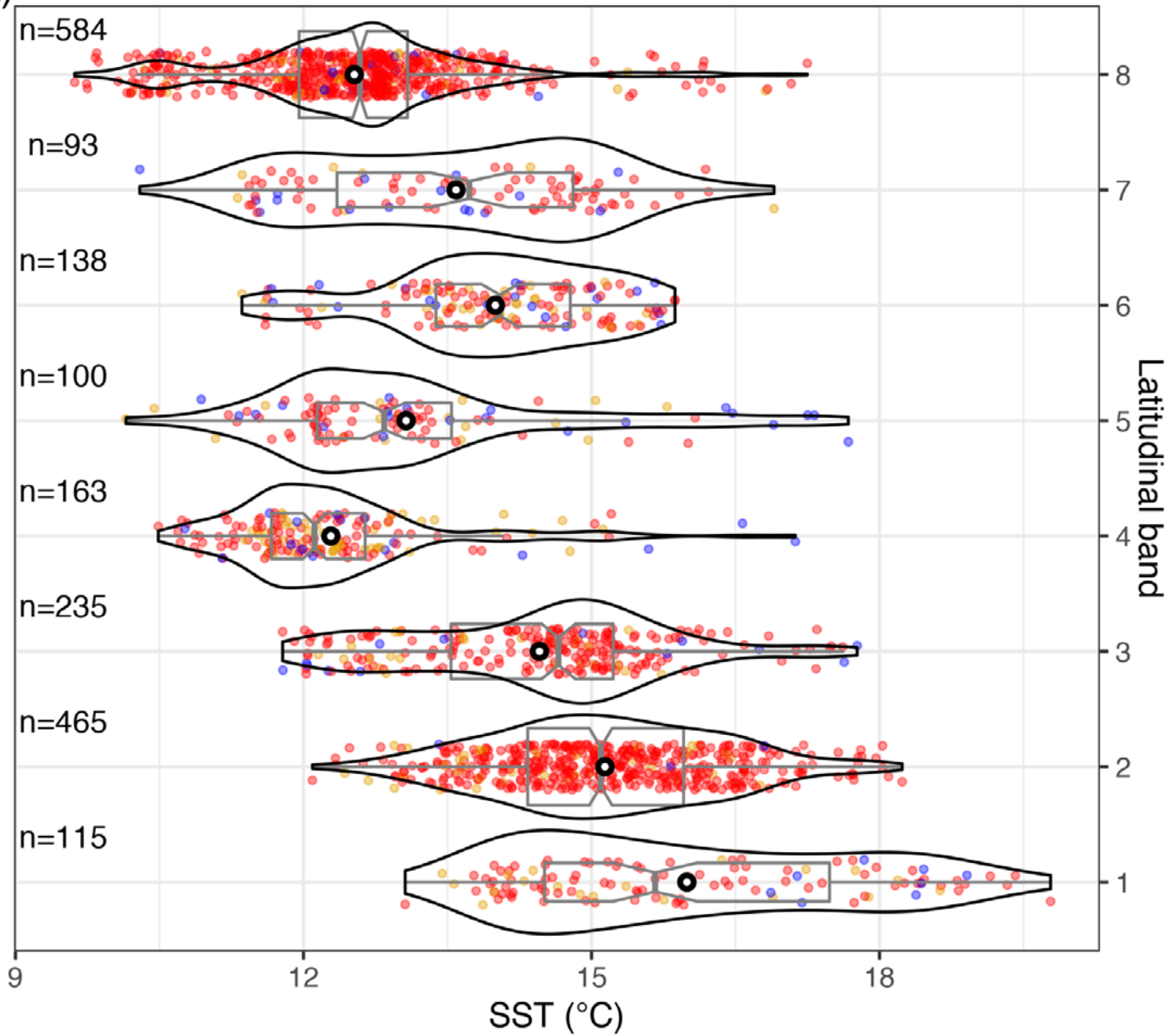
BMODE    ● Transiting    ● Uncertain    ● ARS

(b)



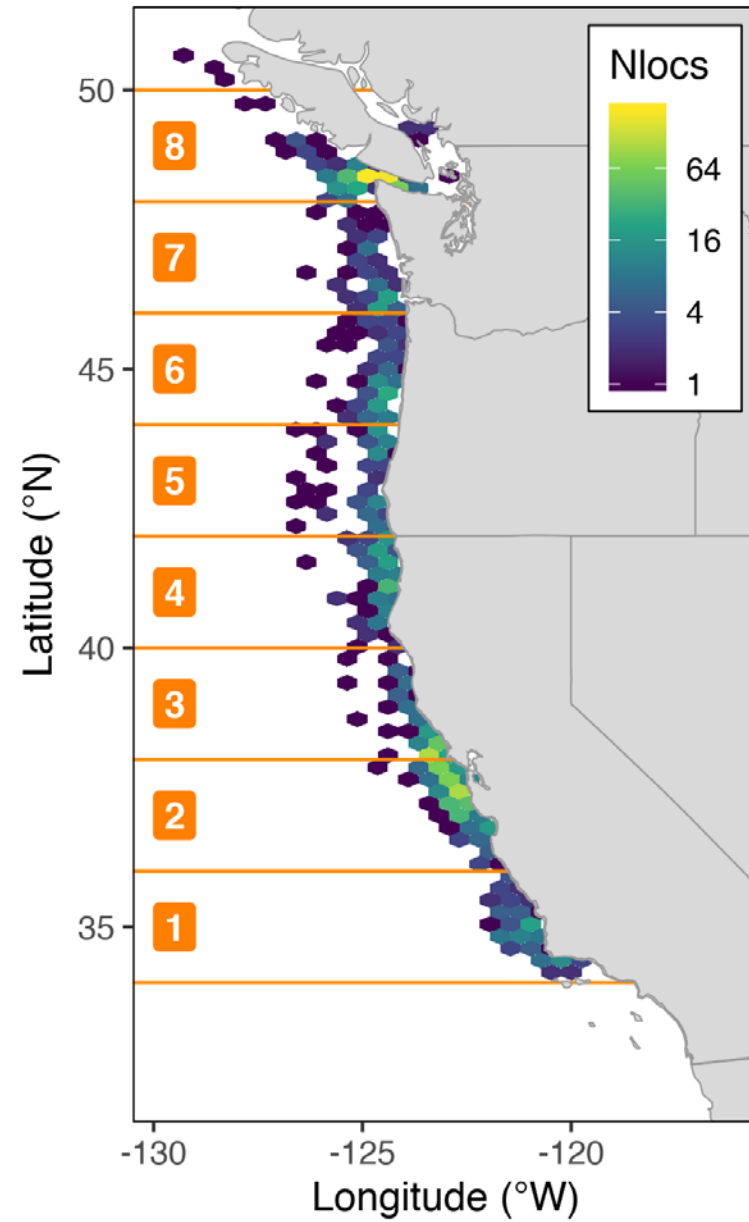


(a)

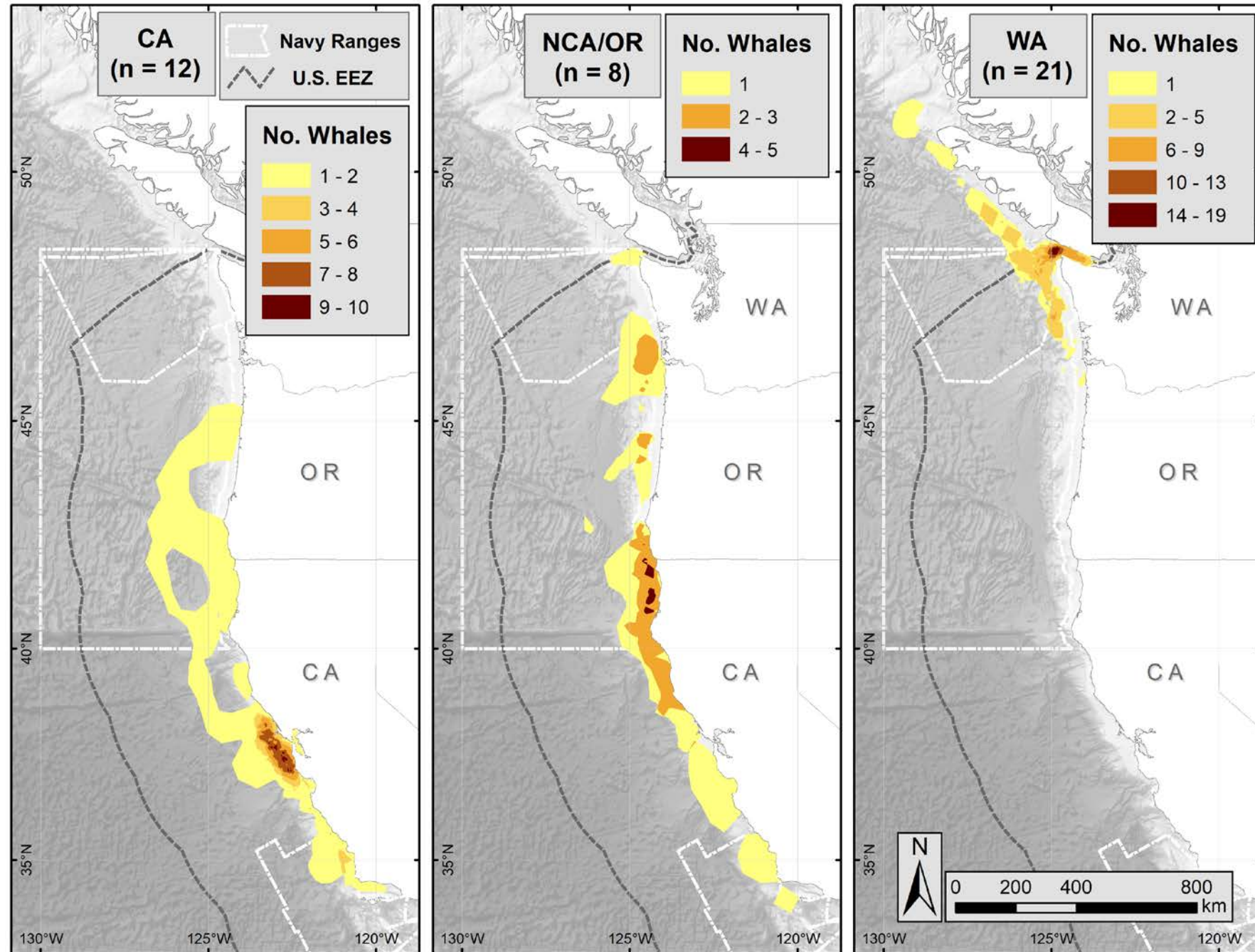


BMODE    ● Transiting    ● Uncertain    ● ARS

(b)

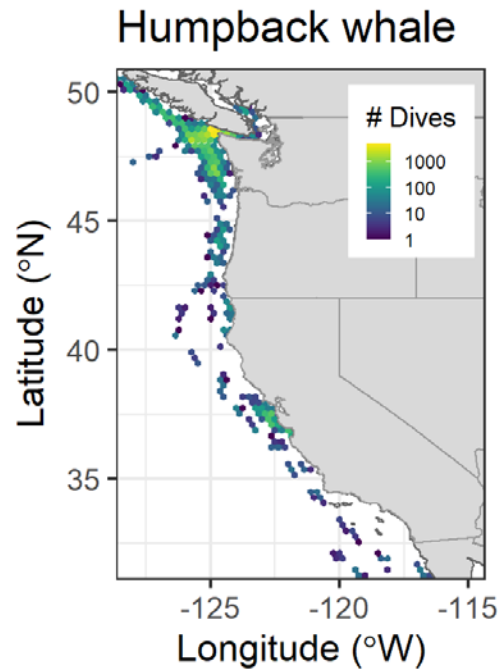
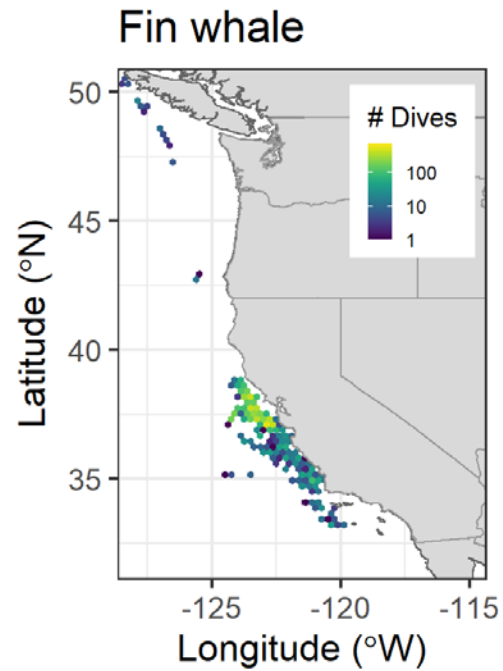
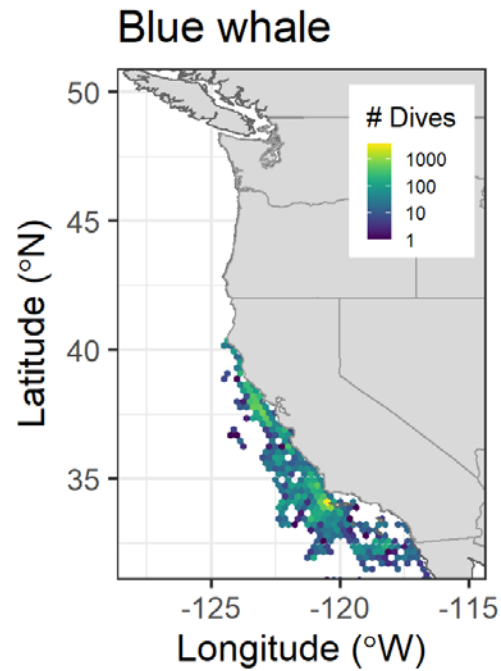
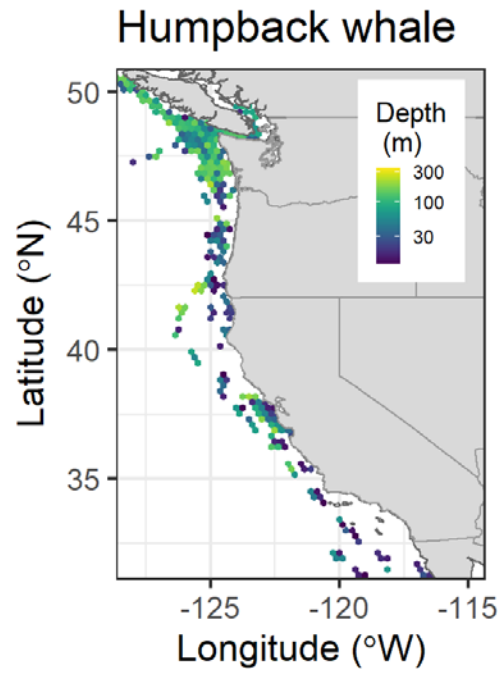
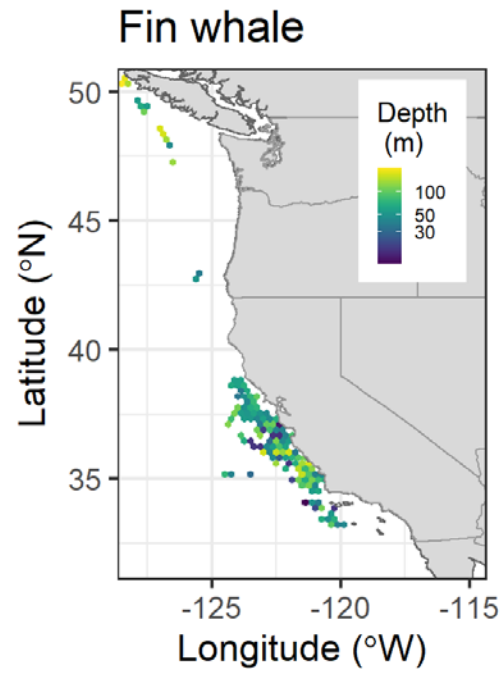
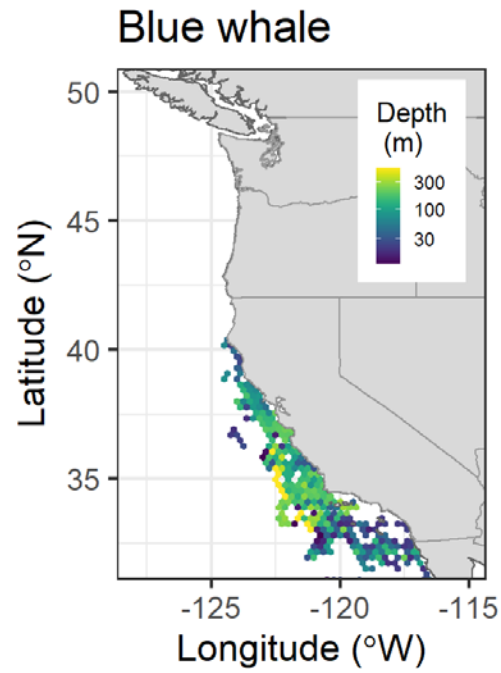


# Home range overlap





# Diving behavior!



1. What does your research focused on monitoring marine species help us understand?

The spatially explicit scales and patterns of movements and distribution of baleen whales off the West Coast

2. What is the scope/scale/temporal and spatial resolution?

Spatial: 10s-100s-1000s km

Temporal: daily-weekly-monthly

3. What are the limitations in what we can learn from your research or monitoring in general?

Logistical: We cannot tag all the animals all the time

Financial: Annual field tagging operations. Analysis and publication. → Slow process

Biological: population dynamics are quite complex (DPS/subpopulations, sex differences)

4a. Can this research serve as an index of marine life migration?

Yes! Tagging data is well-suited to answer the migration question in relation to oceanographic conditions (e.g., blue and fin whales 1994-2017).

4b. Can this research inform the relative whale distribution during a specific time period?

Yes, we have developed density SDMs from tagging data

5. What are the opportunities and barriers for applying this research to management?

Opportunities: Our West-Coast-wide tagging datasets present a unique opportunity to fill critical knowledge gaps.

Barriers: Funding and time – we need to analyze and publish the data so that we can make the products available.



# Acknowledgments

- NMFS Permit Nos. 841 (years 1993-1998), 369-1440 (1999-2004), 369-1757 (2005-2013), 14856 (2013-2018), and 21585 (2019-2023).
- OSU IACUC Permit Nos. 2284 (years 1999-2002), 2715 (2002-2005), 3158 (2005-2008), 3657 (2008-2011), 4118 (2011-2014), 4495 (2014-2016), 4884 (2016-2019), and 2019-0045 (2019-2022).
- Funding: U.S. Navy Pacific Fleet Commander, Pacific Life Foundation, Makana Aloha Foundation, and private donors to OSU/MMI Endowed Fund.
- NAVFAC Pacific, HDR, Inc., and CESU for project/contract management
- The DM tag (RDW-665) was developed in partnership with Telonics, Inc.
- Makah Tribe Fisheries Management (Jonathan Scordino)
- Ladd Irvine, Barb Lagerquist, Craig Hayslip, Tomás Follet, and Martha Winsor for fieldwork and analytical support. Kathy Minta, Mark Wilke, and Minda Stiles at the MMI for logistical and administrative support.

