



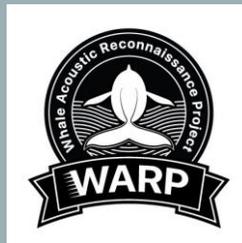
MOVEMENT AND DIVE BEHAVIOR DURING A LONG ASSOCIATION OF A HUMPBACK WHALE DYAD

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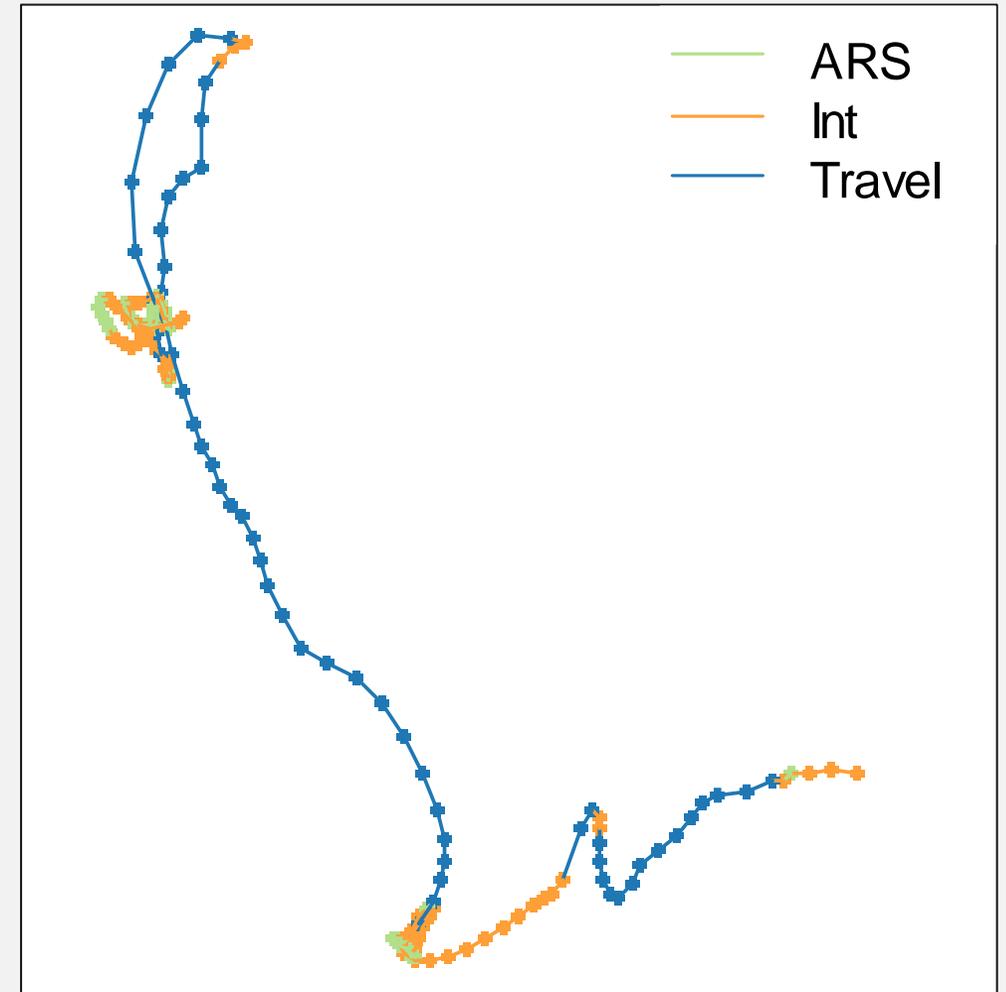
SATELLITE TAGGING OF HUMPBACK WHALES OFF KAUA'I

- Satellite tagged using Wildlife Computers SPLASH tags
- Tagged in March 2017, February 2018, and March 2019
- Tagged 19 whales
- Modeled movement behavior
 - Fit 1-hr interpolated tracks using correlated random walk (*crawl*)
 - Discrete-time HMMs based on step length and turning angle
- Dive behavior analyzed with GEE



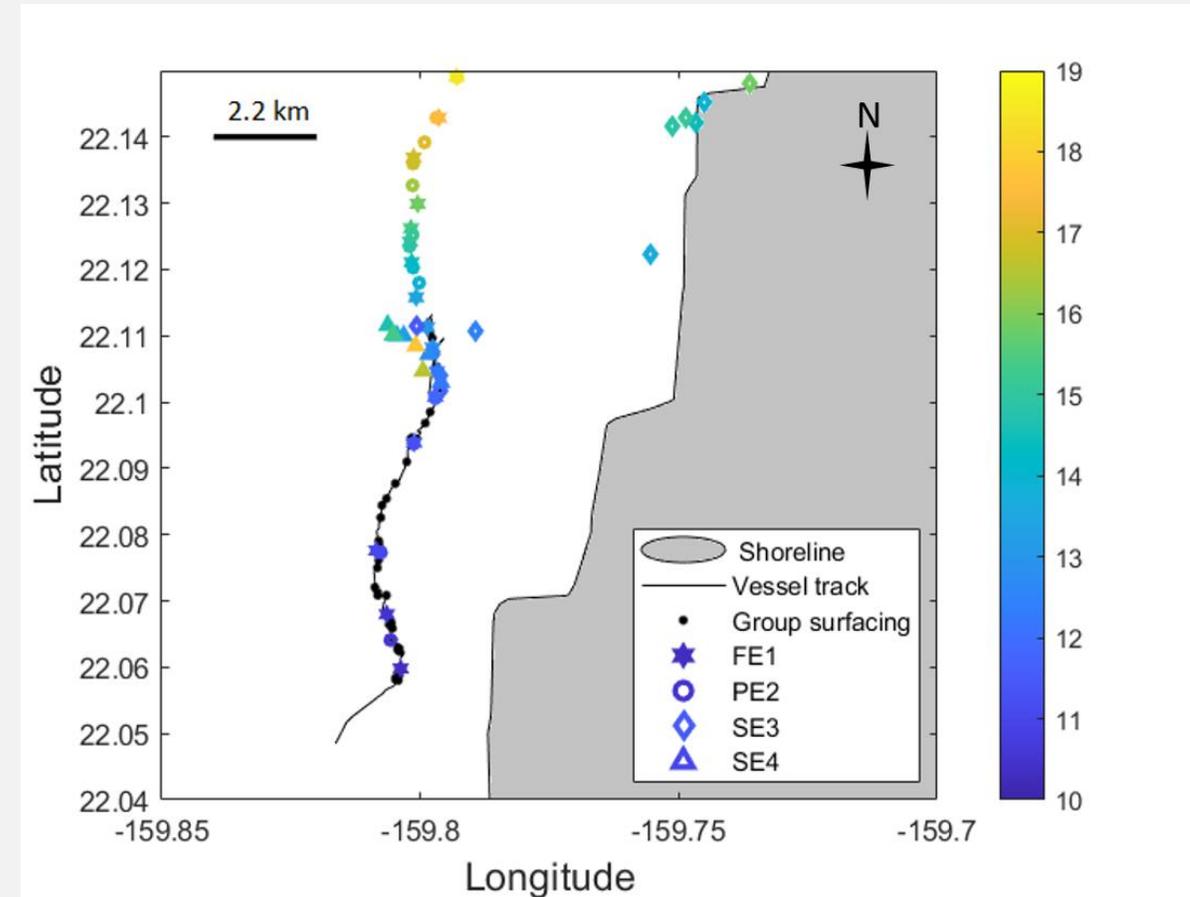
MOVEMENT BEHAVIOR MODELS

- Modeled movement behavior along satellite-tag tracks
- Area restricted search (ARS)
 - slow speed, lots of turning
 - Possibly indicated social behavior
- Directed travel
 - Fast speed, few turns
 - Moving between islands, starting migration
- Intermediate behavior
 - Transition between ARS and travel

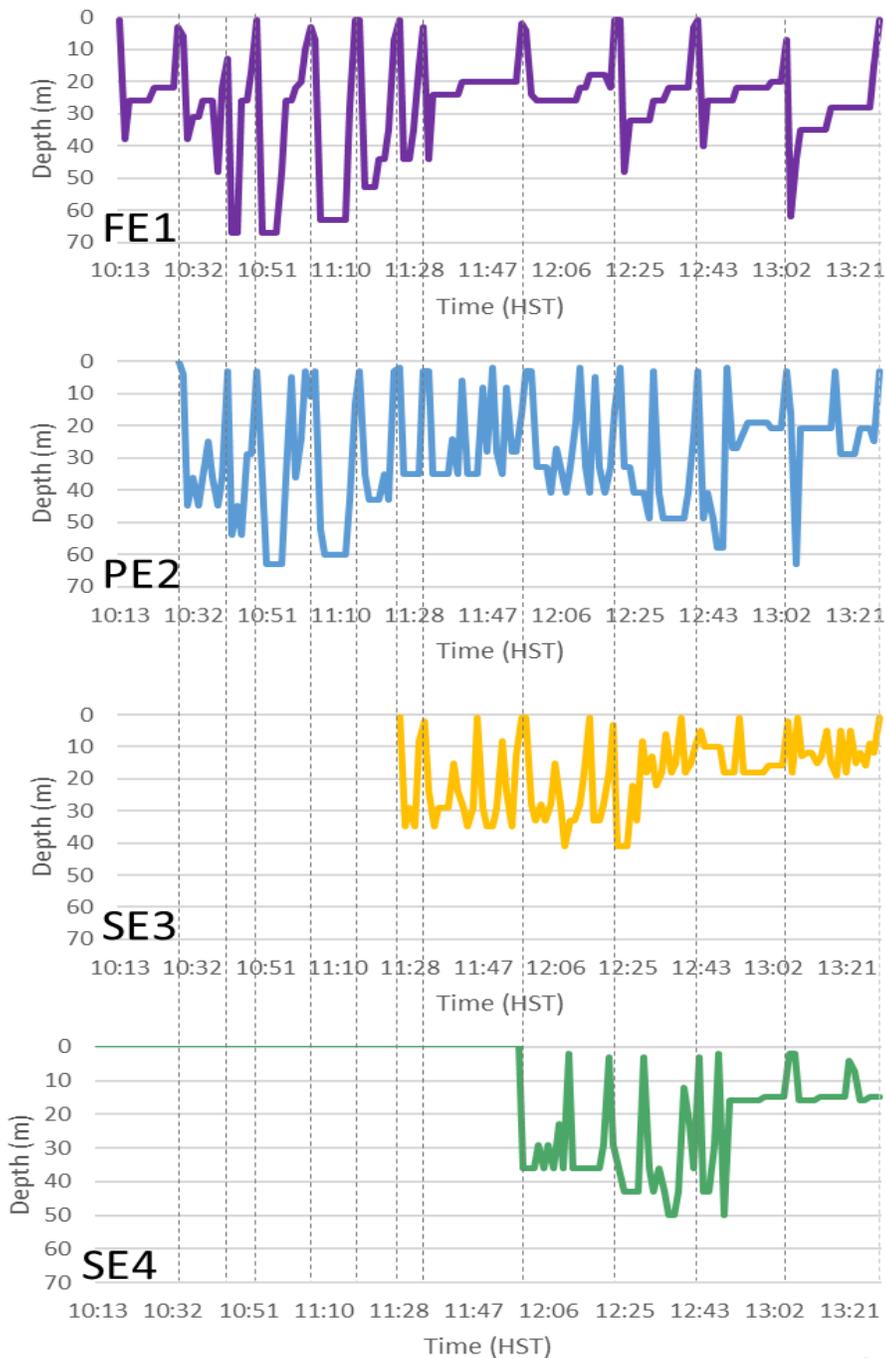


COMPETITIVE GROUP BEHAVIOR

- Initially encountered four whales, joined by three additional secondary (2°) escorts
- Tagged female first, then primary escort (1°), then two original 2° escorts
- Group was slowing moving north, then stopped and female became stationary
- Two 2° escorts challenged 1° escort
 - failed then left group
- Eventually all 2° escorts left, became dyad

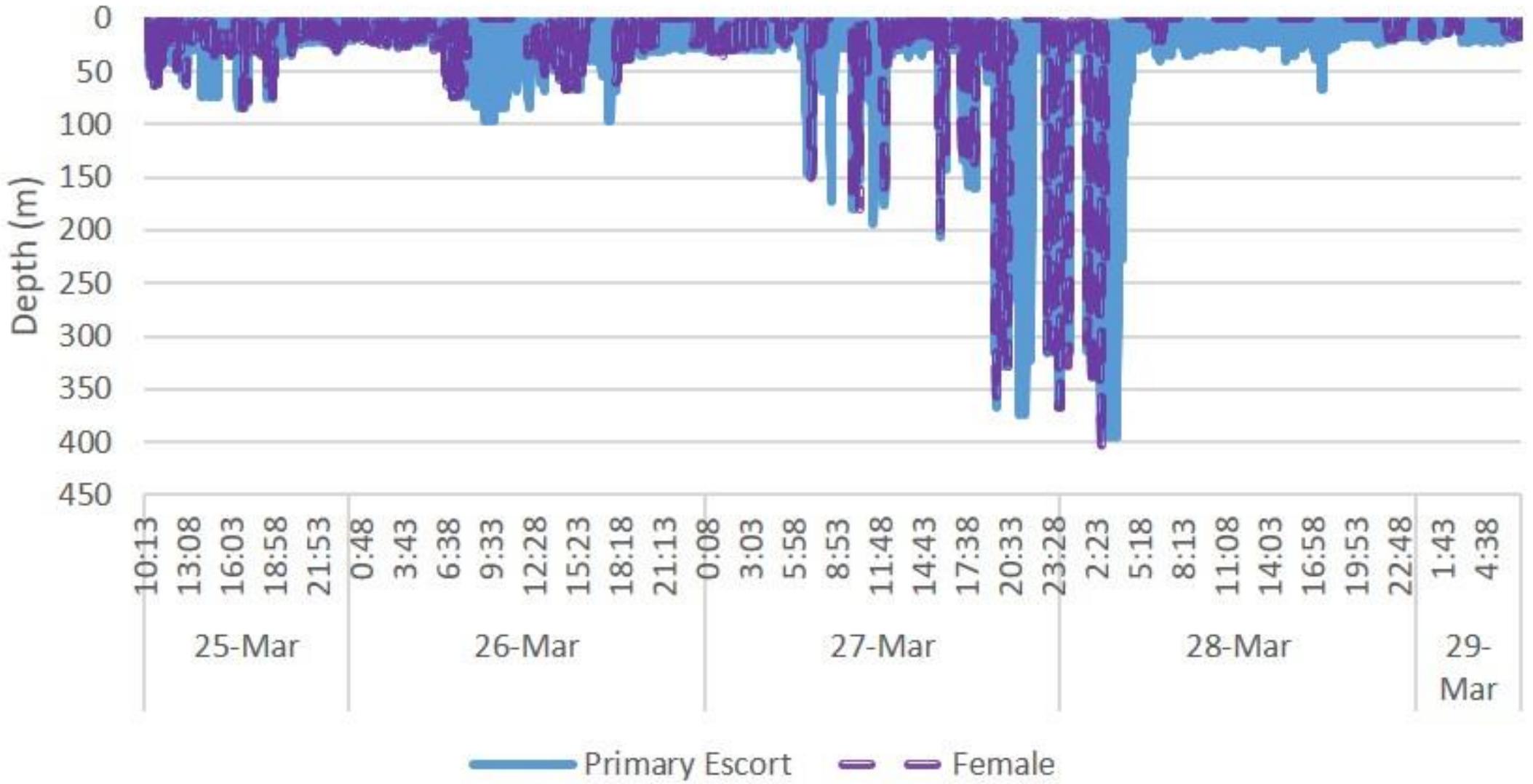
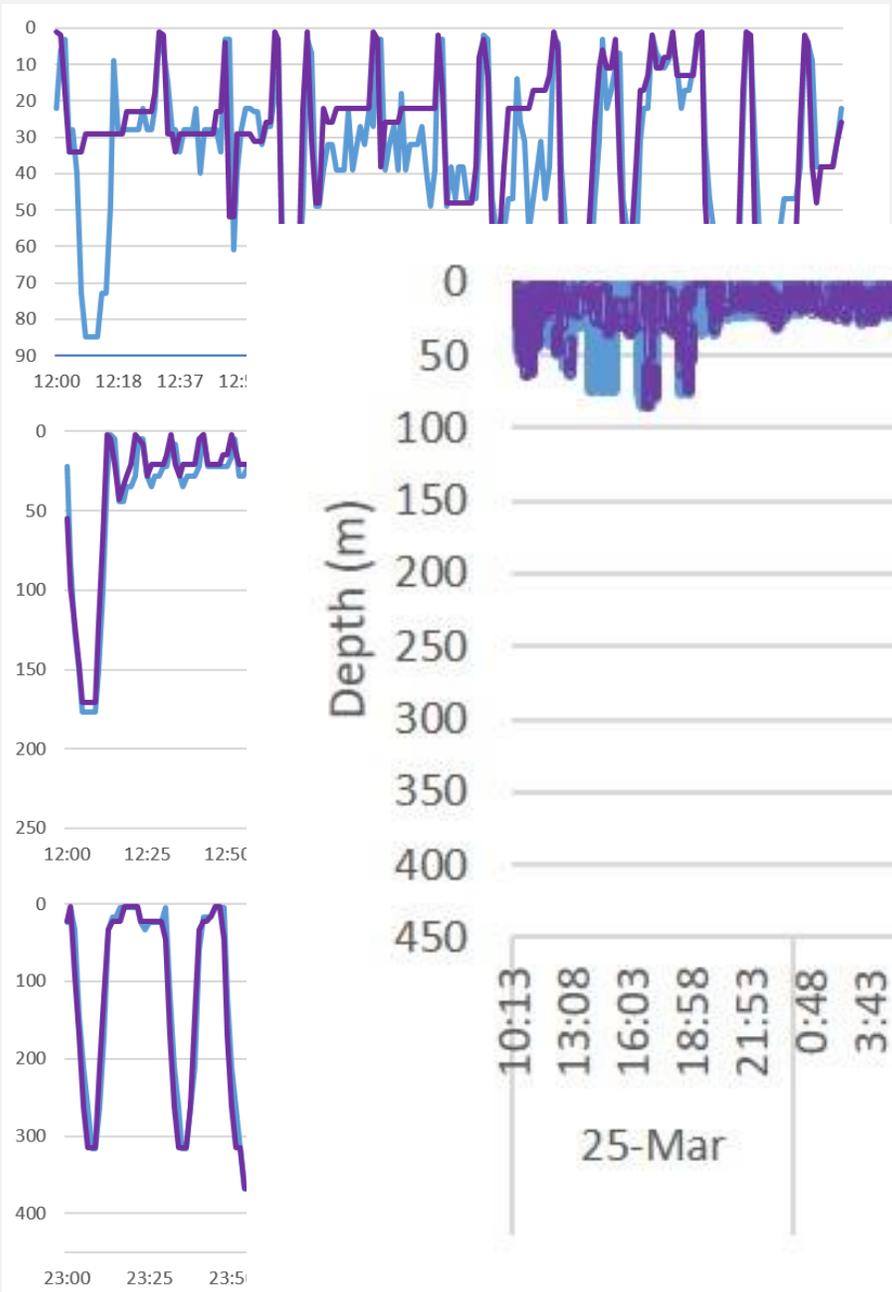


DIVE BEHAVIOR OF COMPETITIVE GROUP



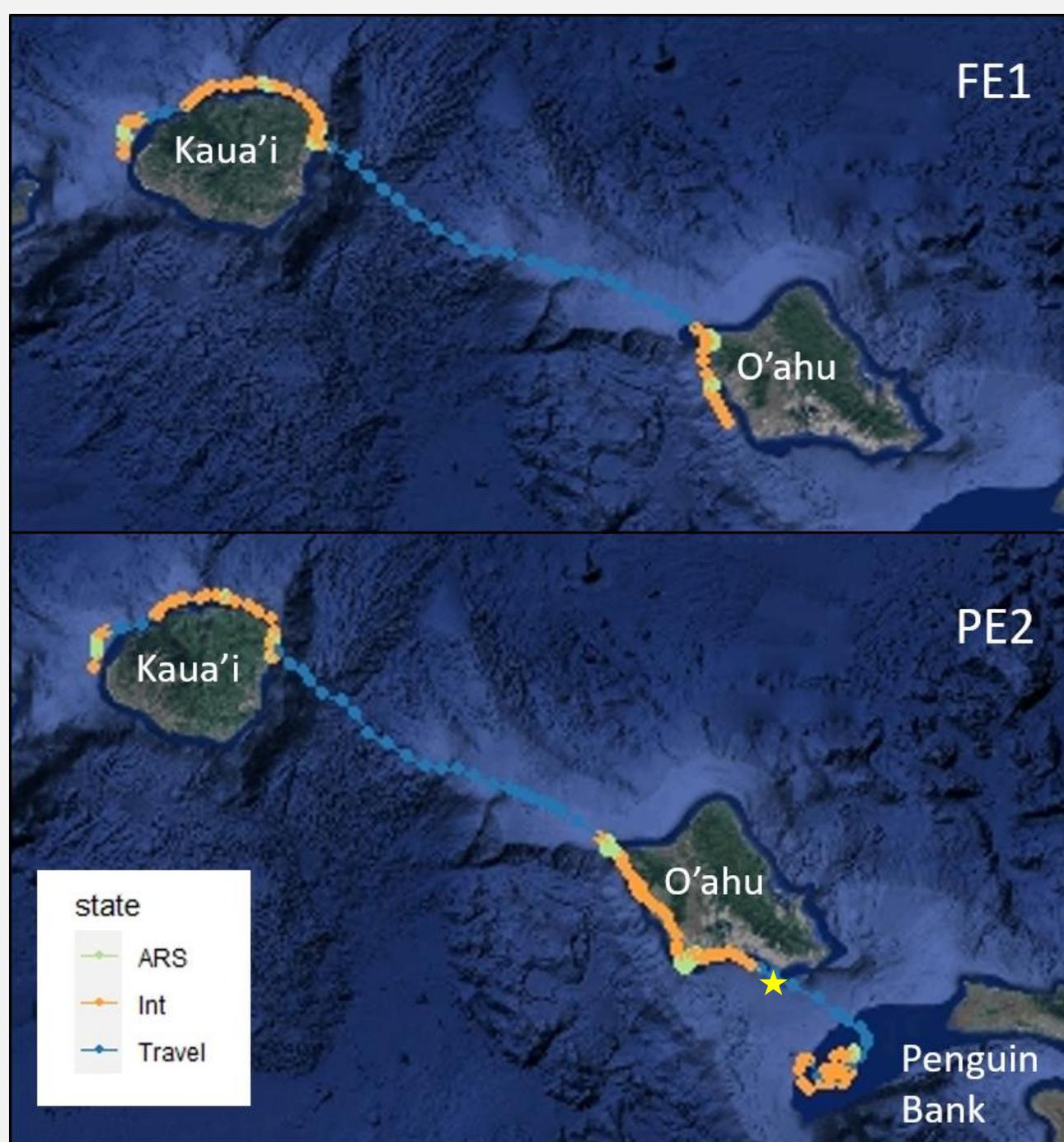
- All males surfaced whenever female surfaced
 - Also surfaced on their own while she dove
- 1^o escort dives synchronized with female
 - Then synchronized with challenging 2^o escorts while chasing them away
 - Returned to female, dives became synchronous again once they were a dyad

DIVE BEHAVIOR OF DYAD



MOVEMENT BEHAVIOR OF DYAD

- Movement behavior also aligned for 4 days
 - ARS/Intermediate states near islands
 - Directed travel when moving between islands
- Periods of ARS when dives were less synchronized
- Still photographed together off O'ahu!
 - ★ Atlantis Cruises, photo in HappyWhale



SUMMARY

- Longest continuous record of a male-female humpback whale pair on breeding grounds
- Detailed information on dive behavior during competitive group and as dyad
 - Observed strong synchrony in dive behavior between pair
 - Change in 1^o escort's dive behavior during competitive group
- Movement behavior provides insight into behavior on and off breeding grounds
 - Strong synchrony in dyad
 - ARS as indicator of social/competitive behavior?
 - All whales transition to directed travel between islands/seamounts, periods of ARS near islands

THANK YOU!

