

Supplemental figures and tables for:

Variation in Social Structure Among Multiple Stocks of Island-Associated Common Bottlenose Dolphins (*Tursiops truncatus*) in Hawaiian Waters

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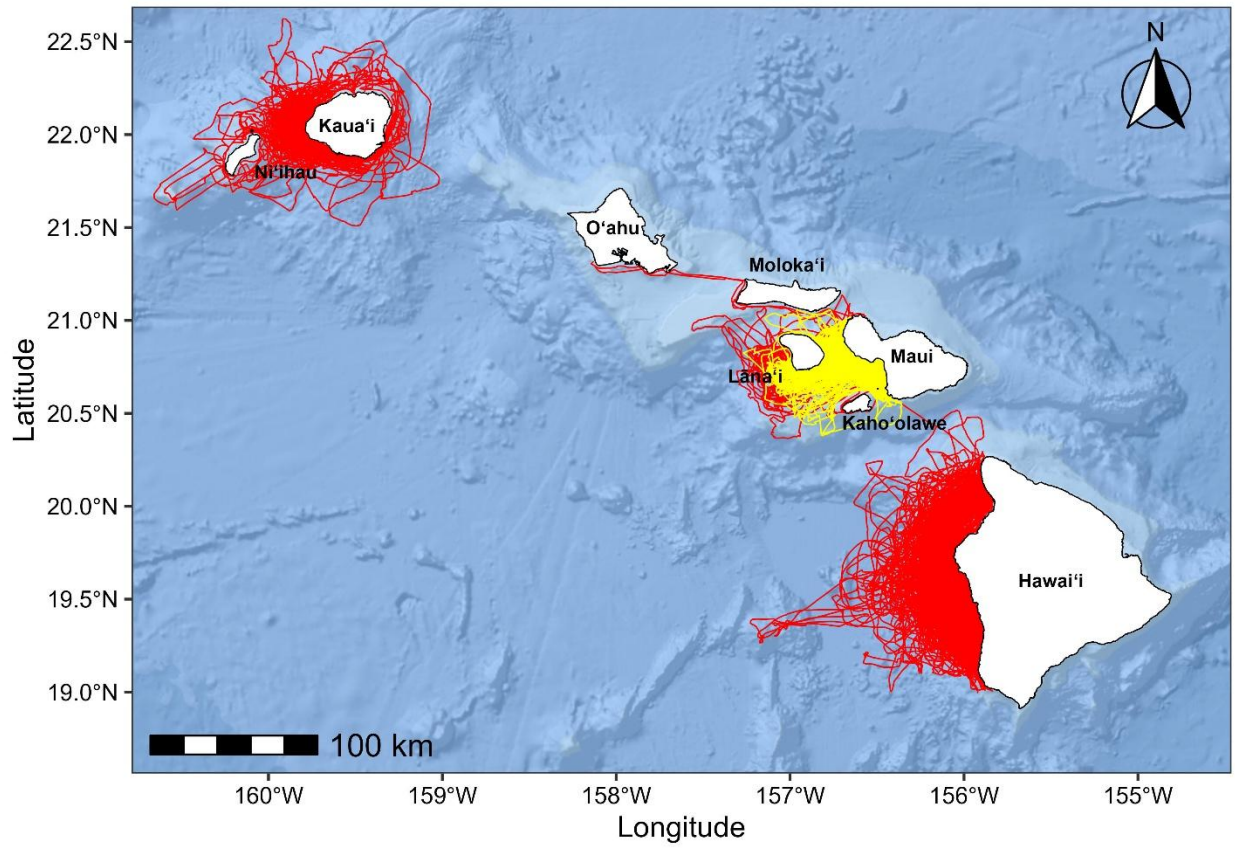


Figure A: Field effort track lines for Cascadia Research Collective (CRC, red, 2000–2020) and Pacific Whale Foundation (PWF, yellow, 2010–2020).

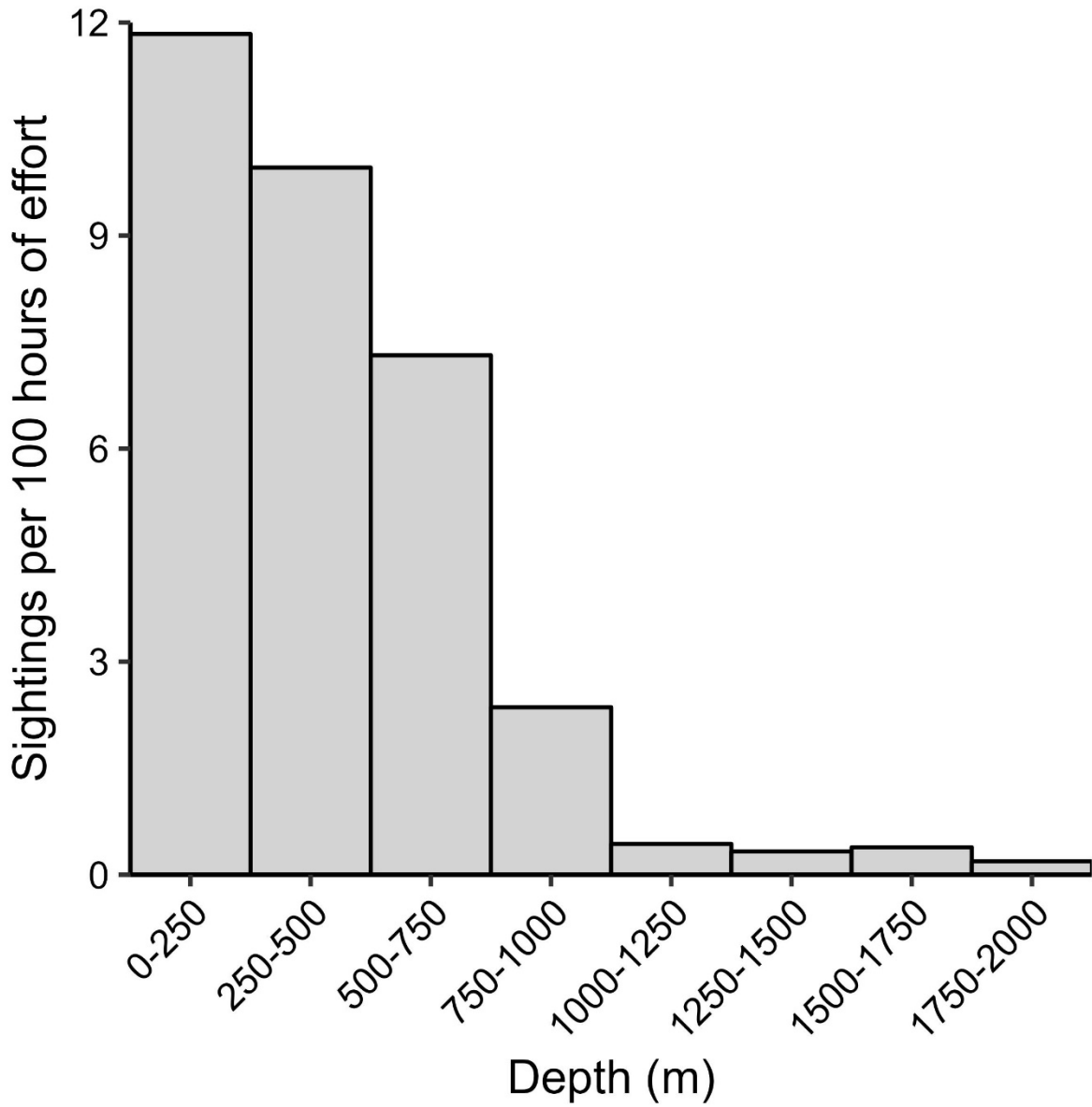


Figure B: Sighting rates per 100 h of effort by depth ranges off Kaua'i and Ni'ihau, Maui Nui and Hawai'i Island between 2000 and 2022 (Cascadia Research Collective).

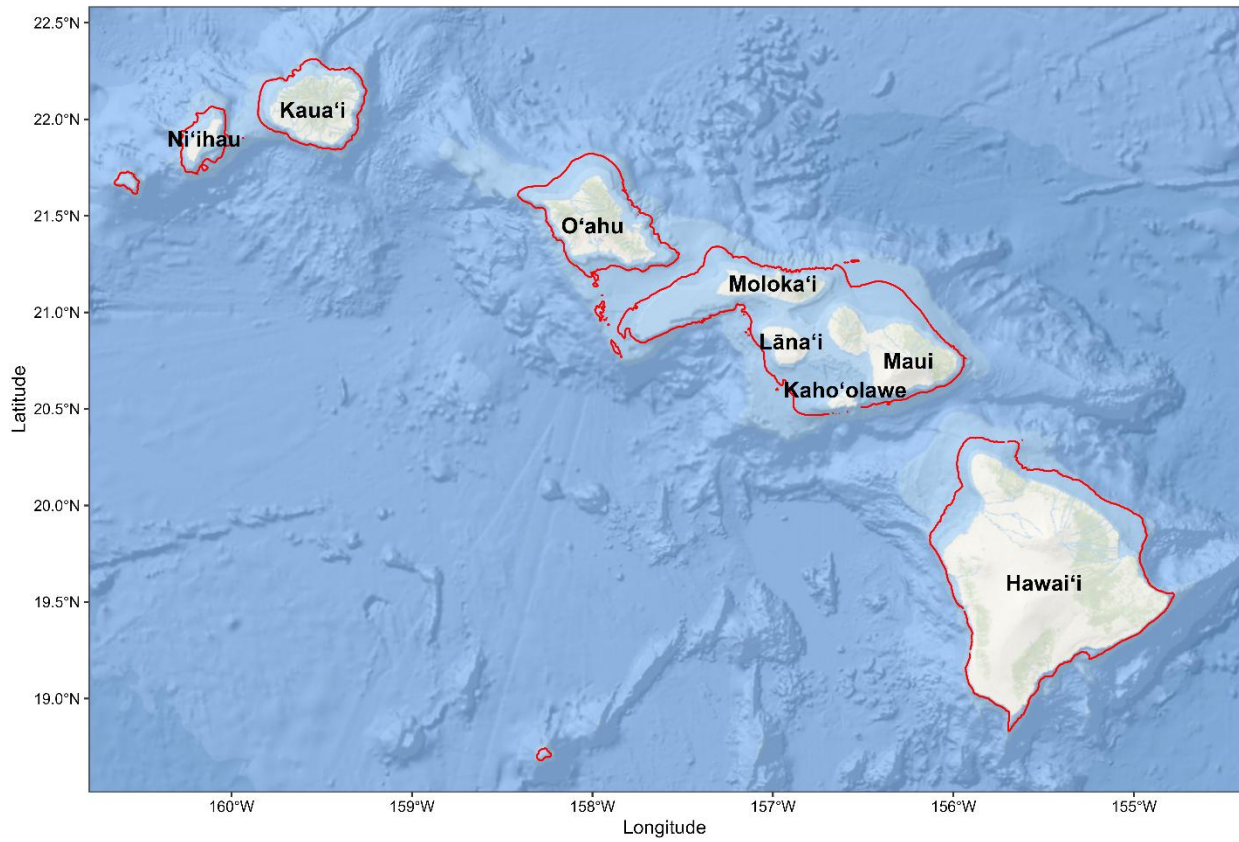


Figure C: The Main Hawaiian Islands (500 m depth contour in red).

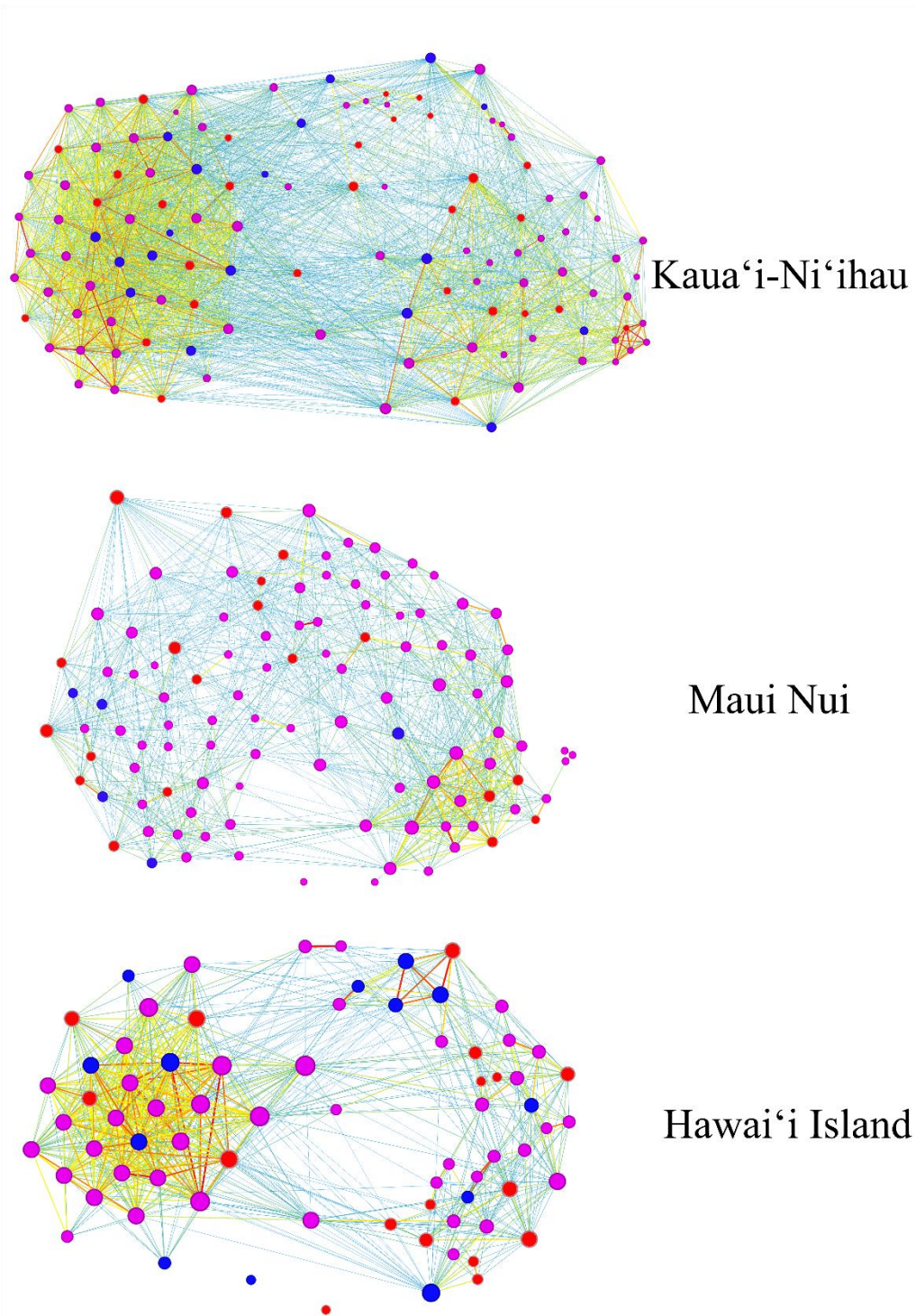


Figure D: Social networks of the three Hawaiian stocks of common bottlenose dolphins considered in this study for each sex (male = blue, female = red, unknown = purple). Node size increases with number of associates (degree). Edge color ranges from blue to red with increasing HWIs. Networks are restricted to adults seen at least three times.

TABLE A Summary of data used after applying restrictions.

Stock	# Encounters By Distinctiveness			# Encounters By Photo Quality			Total Encounters	IDs Seen \geq 2 Times*	IDs Seen \geq 3 Times*
	2	3	4	2	3	4			
<i>Kaua 'i-Ni 'ihau</i>	170	219	485	9	38	827	874	142 (5.51 \pm 3.24)	118 (6.3 \pm 3.08)
<i>Maui Nui</i>	215	315	495	132	439	454	1025	148 (6.25 \pm 5.36)	108 (7.82 \pm 5.5)
<i>Hawai 'i Island</i>	145	183	436	6	43	715	764	114** (5.56 \pm 4.21)	74 (7.49 \pm 4.1)

* Mean (\pm SD) Number of Sightings per Individual are represented in brackets.

** Two of the individuals seen more than twice off Hawai 'i Island were not connected to the main body of the social network and were thus removed from the analysis.

TABLE B Number of individuals seen at least twice for each common bottlenose dolphin stock in Hawaiian waters.

Stock	#recaptures	#individuals
<i>Kaua'i-Ni'ihau</i>	2	24
	3	28
	4	15
	5	18
	6	14
	7	4
	8	8
	9	7
	10	8
	11	7
	12	5
	13	3
	14	1
	<i>Maui Nui</i>	2
3		23
4		16
5		8
6		9
7		3
8		9
9		7
10		8
11		7
12		5
13		3
15	1	
16	1	

	17	1
	19	1
	20	1
	21	1
	22	1
	41	1
	2	40
	3	14
	4	6
	5	9
	6	11
	7	6
	8	2
	9	5
<i>Hawai'i Island</i>	10	3
	11	3
	12	4
	13	4
	14	2
	15	2
	16	1
	17	1
	20	1

TABLE C Metrics calculated from the social networks for individuals seen at least five times.

Stock	<i>n</i>	Modularity	Density	Degree Centralization	Betweenness Centralization
<i>Kaua'i-Ni'ihau</i>	75	0.236	0.542	0.274	0.027
<i>Maui Nui</i>	69	0.325	0.287	0.334	0.085
<i>Hawai'i Island</i>	54	0.28	0.439	0.259	0.072

TABLE D Results of permutation test for preferred/avoided associations on all animals seen at least five times. The tests assessed the number of times the test statistics from the real network were higher than those from the permuted networks. P values below $\alpha = 0.05$ indicated a statistically significant difference. Significant p -values of the mean test statistic indicate that short-term associations are significantly different from random. Significant p -values of SD and/or CV indicate that long-term associations are significantly different from random. Significant p values of Group Size SD indicate significant differences in gregariousness (some individuals have more associates than average) compared to permuted networks.

Stock	n	Test Statistic	Real	Random Mean	Real>Random	p
<i>Kaua'i-Ni'ihau</i>	75	Mean	0.163	0.163	29,884/30,000	0.9961
		SD	0.2	0.18	30,000/30,000	<0.0001
		CV	1.219	1.107	29,999/30,000	<0.0001
		Group Size SD	5.389	4.831	29,999/30,000	<0.0001
<i>Maui Nui</i>	69	Mean	0.051	0.051	17,270/30,000	0.5757
		SD	0.112	0.107	30,000/30,000	<0.0001
		CV	2.194	2.091	30,000/30,000	<0.0001
		Group Size SD	1.801	1.768	28,911/30,000	0.0363
<i>Hawai'i Island</i>	54	Mean	0.145	0.146	1,469/30,000	0.049
		SD	0.208	0.196	30,000/30,000	<0.0001
		CV	1.432	1.342	30,000/30,000	<0.0001
		Group Size SD	4.652	4.388	29,965/30,000	0.0012

TABLE E Results of Mantel tests assessing whether individuals in the three stocks tend to associate with animals from their own social cluster (within-cluster associations) more than with animals from other social clusters (between-cluster associations). The tests include only adult animals seen at least three times. Positive t values indicate that animals tend to interact with members of their own clusters more than with members of other clusters.

Stock	t	p	Permutation p	Matrix Correlation
<i>Kaua'i-Ni'ihau</i>	26.736	<0.0001	<0.0001	0.5797
<i>Maui Nui</i>	37.715	<0.0001	<0.0001	0.5759
<i>Hawai'i Island</i>	24.583	<0.0001	<0.0001	0.7048

TABLE F Mean, maximum and sum HWI (standard deviation in brackets) for each common bottlenose dolphin stock for each sex.

Only adults seen at least three times were included.

Stock	<i>n</i>	Class	Mean HWI (<i>SD</i>)	Max HWI (<i>SD</i>)	Sum HWI (<i>SD</i>)
<i>Kaua‘i-Ni‘ihau</i>	18M	Females	0.11 (0.06)	0.58 (0.14)	14.08 (6.44)
		Males	0.15 (0.07)	0.67 (0.14)	18.11 (7.95)
	29F	Female-Female	0.10 (0.04)	0.47 (0.11)	3.88 (1.20)
		Male-Male	0.18 (0.09)	0.55 (0.18)	4.10 (1.61)
		Female-Male	0.15 (0.06)	0.58 (0.15)	4.23 (1.81)
		Male-Female	0.15 (0.09)	0.50 (0.15)	2.62 (1.57)
<i>Maui Nui</i>	5M	Females	0.04 (0.02)	0.51 (0.15)	5.73 (2.41)
		Males	0.03 (0.01)	0.45 (0.19)	4.63 (1.04)
	19F	Female-Female	0.06 (0.02)	0.36 (0.12)	2.02 (0.40)
		Male-Male	0.06 (0.04)	0.11 (0.06)	1.25 (0.16)
		Female-Male	0.05 (0.03)	0.35 (0.23)	1.03 (0.51)
		Male-Female	0.05 (0.06)	0.17 (0.18)	0.27 (0.30)
<i>Hawai‘i Island</i>	13M	Females	0.07 (0.06)	0.50 (0.19)	5.92 (4.13)
		Males	0.09 (0.07)	0.60 (0.27)	7.47 (4.86)
	17F	Female-Female	0.06 (0.03)	0.37 (0.14)	1.90 (0.46)
		Male-Male	0.09 (0.07)	0.44 (0.32)	2.05 (0.85)
		Female-Male	0.07 (0.04)	0.46 (0.22)	1.18 (0.62)
		Male-Female	0.07 (0.06)	0.32 (0.23)	0.90 (0.83)