



Mean Proportion of Diet Composition by Weight: Skates/Rays Versus Pelagic Sharks

By Megumi Ragan

Does the mean proportion of diet composition by weight of west coast adult pelagic sharks have a lower mean proportion of diet composition by weight than that of west coast adult skates/rays?

$$H_0 = \mu_1 - \mu_2 = 0$$

$$H_a = \mu_1 - \mu_2 \neq 0$$



Data Set and Source

West coast fish, mammal, bird diets by Functional Group

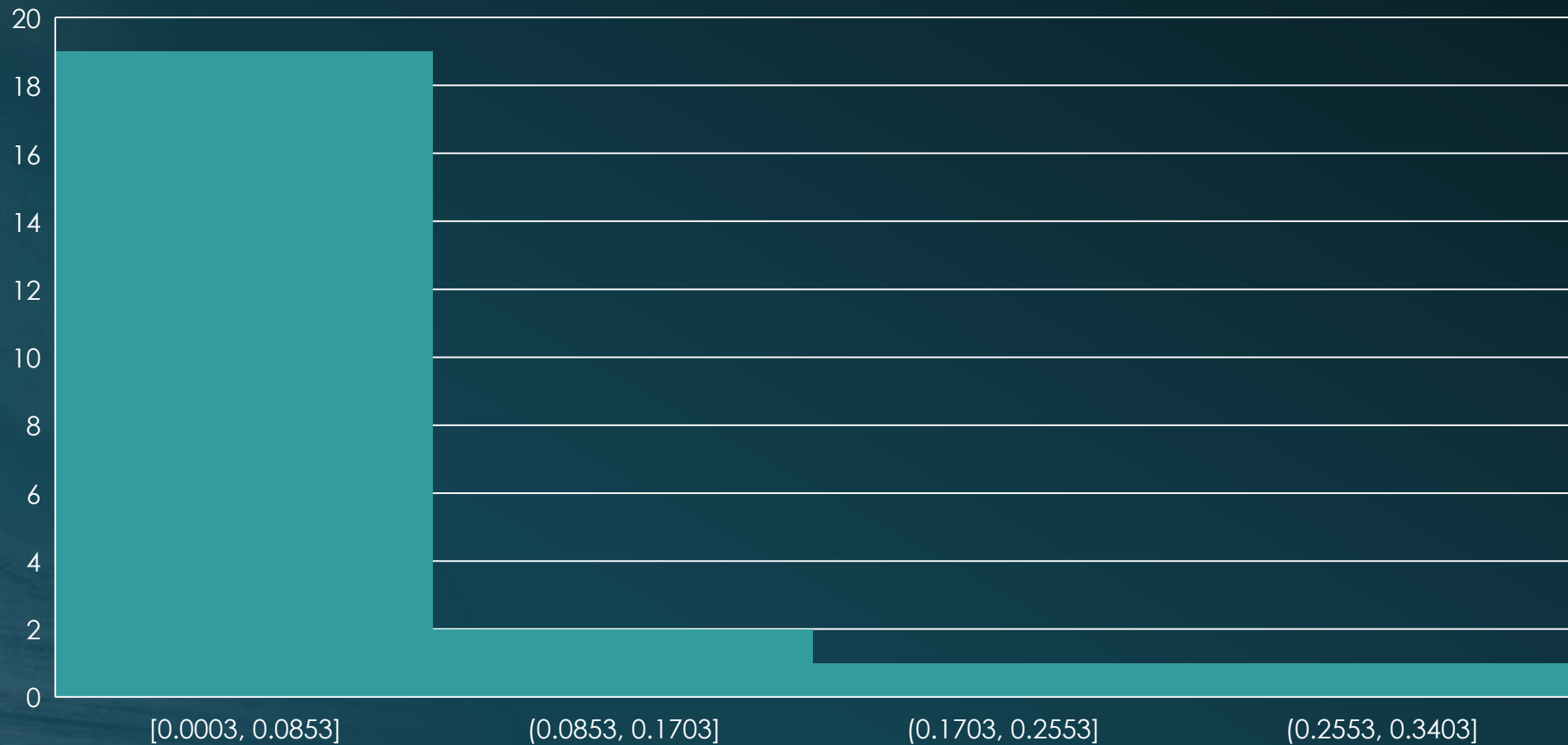
Pelagic sharks	Adult	Misc. nearshore fish	FDE	0.2246	Row 51 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Small flatfish	FDF	0.012	Row 53 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Deep large rockfish	FDO	0.0096	Row 55 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Midwater rockfish	FDS	0.0317	Row 57 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Pacific hake	FMM	0.1156	Row 59 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Sablefish	FMN	0.0049	Row 61 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Large planktivores	FPL	0.0359	Row 63 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Canary rockfish	FPO	0.0027	Row 65 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Small planktivores	FPS	0.2556	Row 67 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Salmon	FVB	0.0384	Row 69 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Large flatfish	FVD	0.1019	Row 71 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Migrating seabirds	FVO	0.0024	Row 73 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Large demersal predators	FVS	0.0322	Row 75 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Large pelagic predators	FVT	0.0089	Row 77 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Large demersal sharks	SHD	0.0089	Row 79 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Pelagic sharks	SHP	0.0088	Row 81 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Shallow large rockfish	SHR	0.0048	Row 83 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Skates and rays	SSK	0.0121	Row 85 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Pelagic sharks	Adult	Gelatinous zooplankton	ZG	0.0003	Row 87 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Deposit feeders	BD	0.0639	Row 346 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Benthic herbivorous graze	BG	0.0112	Row 348 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Megazoobenthos	BML	0.0177	Row 350 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Shallow macrozoobenthos	BMS	0.0456	Row 352 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Cephalopods	CEP	0.0444	Row 354 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Deep vertical migrators	FBP	0.0391	Row 356 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Shallow small rockfish	FDB	0.0828	Row 358 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Juv. shallow small rockfish	FDBJuv	0.0034	Row 360 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Juv. deep small rockfish	FDCJuv	0.0276	Row 362 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Deep misc. fish	FDD	0.0704	Row 364 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Misc. nearshore fish	FDE	0.0032	Row 366 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Small flatfish	FDF	0.1659	Row 368 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Juv. deep large rockfish	FDOJuv	0.0048	Row 370 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Juv. midwater rockfish	FDOJuv	0.0173	Row 372 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Pacific hake	FMM	0.0431	Row 374 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Sablefish	FMN	0.0002	Row 376 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Juv. canary rockfish	FPOJuv	0.0035	Row 378 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Small planktivores	FPS	0.0018	Row 380 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Shrimp	PWN	0.2956	Row 382 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Juv. shallow demersal sha	SHBJuv	0.0009	Row 384 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Juv. shallow large rockfish	SHRJuv	0.0042	Row 386 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group
Skates and rays	Adult	Large zooplankton	ZL	0.0534	Row 388 of Accessed https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group

Kaplan, Isaac; 06/30/2017. NOAA Fisheries Northwest Fisheries Science Center. West Coast fish, mammal, and bird species diets: West coast fish, mammal, bird diets by Functional Group (https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group)

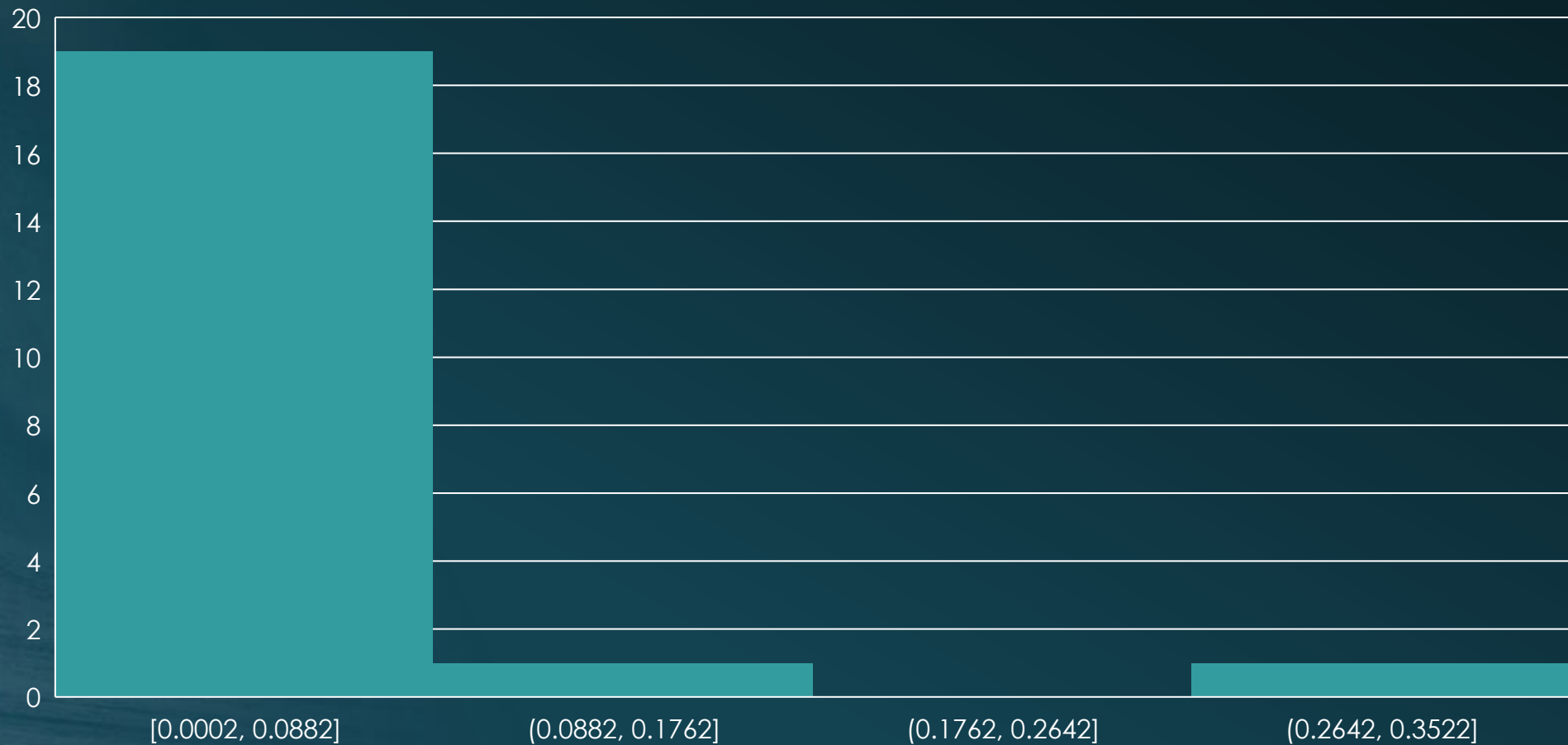
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Kaplan, Isaac; 06/30/2017. NOAA Fisheries Northwest Fisheries Science Center. West Coast fish, mammal, and bird species diets: West coast fish, mammal, bird diets by Functional Group (https://www.webapps.nwfsc.noaa.gov/apex/parrdata/inventory/tables/table/west_coast_fish_mammal_bird_diets_by_functional_group)

West Coast Adult Pelagic Shark Diet Data

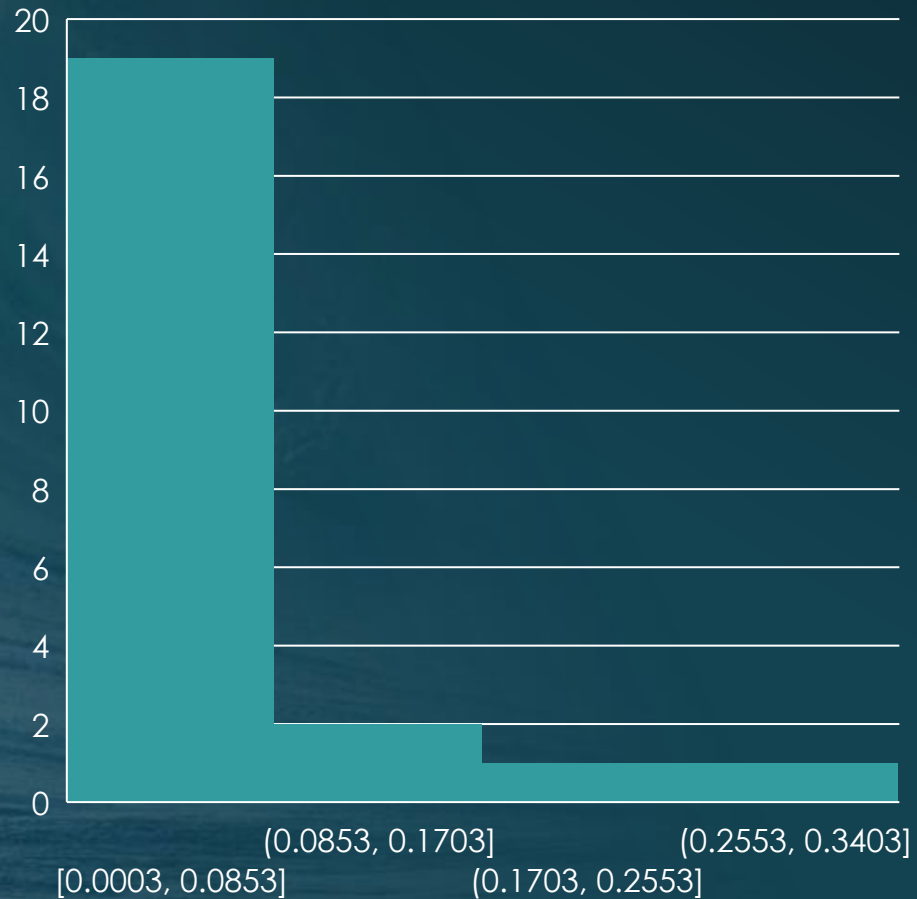


West Coast Adult Skates/Rays Diet Data

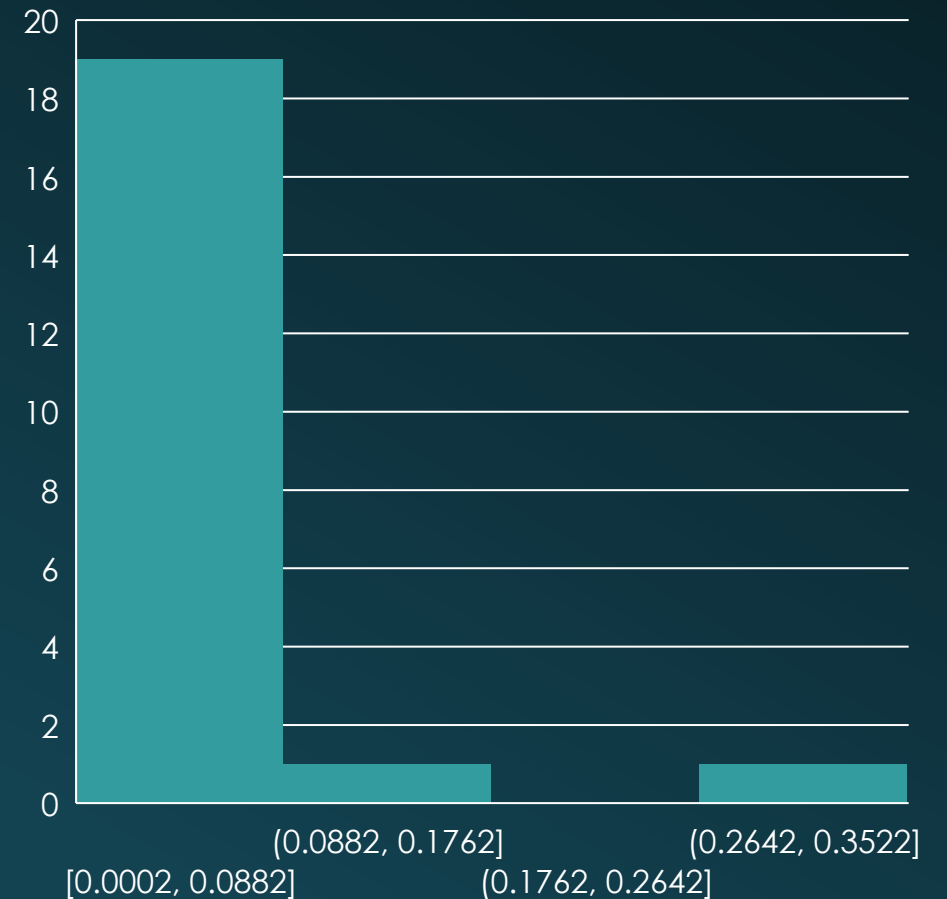


Comparing the Data

West Coast Adult Pelagic Sharks



West Coast Adult Skates/Rays



Interpreting the Confidence Interval

Adult Skates/Ray			
0.0456		COUNT	21.00
0.0444		MEAN	0.05
0.0828		STANDARD DEVIATION	0.07
0.0276		STANDARD ERROR	0.02
0.0032			
0.1659		Confidence Interval	95%
0.0048		Level of Significance	0.05
0.0173			
0.0431		CONFIDENCE INTERVAL	
0.0002		t-critical	2.086
0.0112		Lower Limit	0.016019866
0.0018		Upper Limit	0.078884896
0.0177			
0.0639			
0.0391			
0.0034			
0.2956			
0.0009			
0.0042			
0.0704			
0.0534			

Adult Pelagic Shark			
0.0043		COUNT	23.00
0.0037		MEAN	0.04
0.0545		STANDARD DEVIATION	0.07
0.0262		STANDARD ERROR	0.01
0.2246			
0.012		Confidence Interval	95%
0.0096		Level of Significance	0.05
0.0317			
0.1156		CONFIDENCE INTERVAL	
0.0049		t-critical	2.074
0.0359		Lower Limit	0.013572727
0.2556		Upper Limit	0.073383795
0.0384			
0.1019			
0.0024			
0.0322			
0.0089			
0.0089			
0.0048			
0.0121			
0.0003			
0.0088			
0.0027			

Hypothesis Results

<i>Adult Skates/Rays</i>	<i>Adult Pelagic Shark</i>				
0.0456	0.0043	SAMPLE 1: COUNT	21.00	SAMPLE 2: COUNT	23.00
0.0444	0.0037	SAMPLE 1: MEAN	0.05	SAMPLE 2: MEAN	0.04
0.0828	0.0545	SAMPLE 1: STANDARD DEVIATION	0.07	SAMPLE 2: STANDARD DEVIATION	0.07
0.0276	0.0262	SAMPLE 1: STANDARD ERROR	0.02	SAMPLE 2: STANDARD ERROR	0.01
0.0032	0.2246				
0.1659	0.012	Confidence Interval	95%		
0.0048	0.0096	Level of Significance	0.05		
0.0173	0.0317				
0.0431	0.1156	HYPOTHESIS TEST RESULTS			
0.0002	0.0049	t-statistic	0.1905		
0.0112	0.0359	p-value (1-tail)	0.4254		
0.0018	0.2556	p-value (2-tails)	0.8508		
0.0177	0.0384				
0.0639	0.1019				
0.0391	0.0024				
0.0034	0.0322				
0.2956	0.0089				
0.0009	0.0089				
0.0042	0.0048				
0.0704	0.0121				
0.0534	0.0003				
	0.0088				
	0.0027				

Conclusion

At a 5% significance, there is not enough evidence to support the claim that there is a difference in mean proportion of diet composition of adult west coast pelagic sharks compared to west coast rays/skates.

This is because $P > \alpha$
 $42\% > 5\%$

$$0.05 - 0.04 = 0.01$$

$$H_0 = \mu_1 - \mu_2 = 0$$

$$H_a = \mu_1 - \mu_2 \neq 0$$

Adult Skates/Rays	Adult Pelagic Shark				
0.0456	0.0043	SAMPLE 1: COUNT	21.00	SAMPLE 2: COUNT	23.00
0.0444	0.0037	SAMPLE 1: MEAN	0.05	SAMPLE 2: MEAN	0.04
0.0828	0.0545	SAMPLE 1: STANDARD DEVIATION	0.07	SAMPLE 2: STANDARD DEVIATION	0.07
0.0276	0.0262	SAMPLE 1: STANDARD ERROR	0.02	SAMPLE 2: STANDARD ERROR	0.01
0.0032	0.2246				
0.1659	0.012	Confidence Interval	95%		
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