Investigating the Applications and Limitations of a TV Show as a Data Source to Evaluate Temporal Patterns of Biodiversity

Supplementary Material 3 – Appendix S3: Figures and Tables

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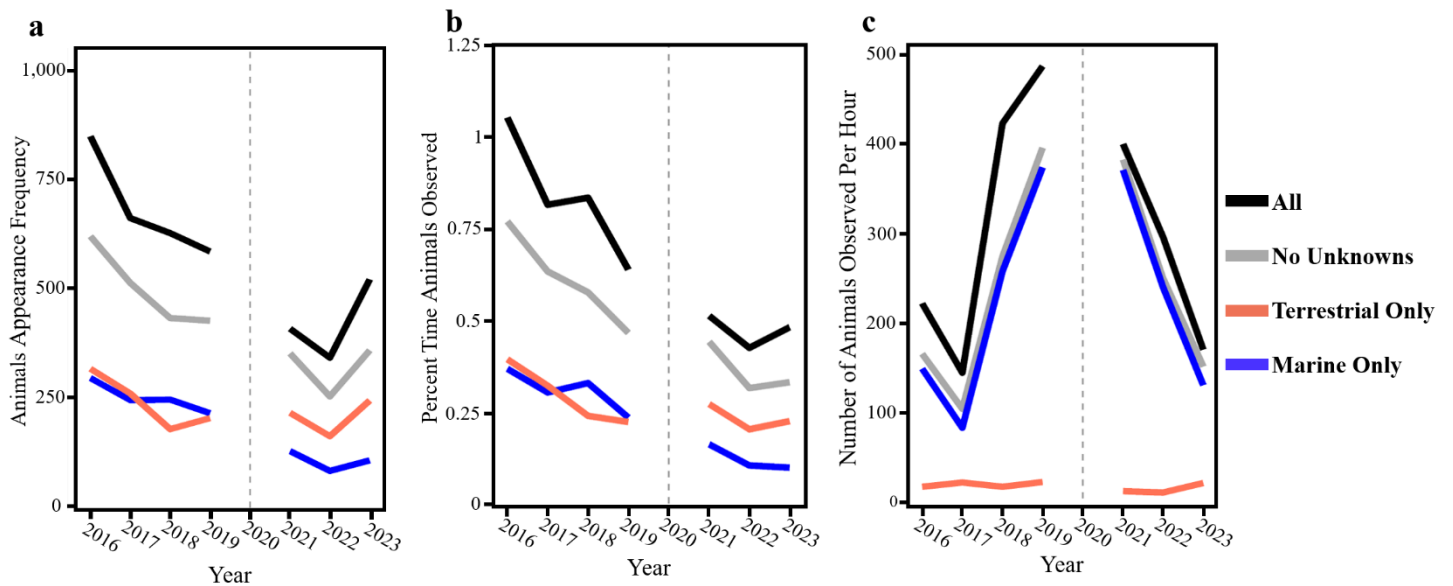
Date:
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Figures

Figure 1. (a) The frequency in which animals appeared on the screen for both seasons filmed within the same year. This is count of appearances, not the abundance of the animals on the screen. (b) The percentage of screen time animals were observed for both seasons in the same year. (c) The mean number of animals observed per one hour of screen time. Please note the omission of 2020 in the figures. This was done to not obscure the trends in the way they were viewed.
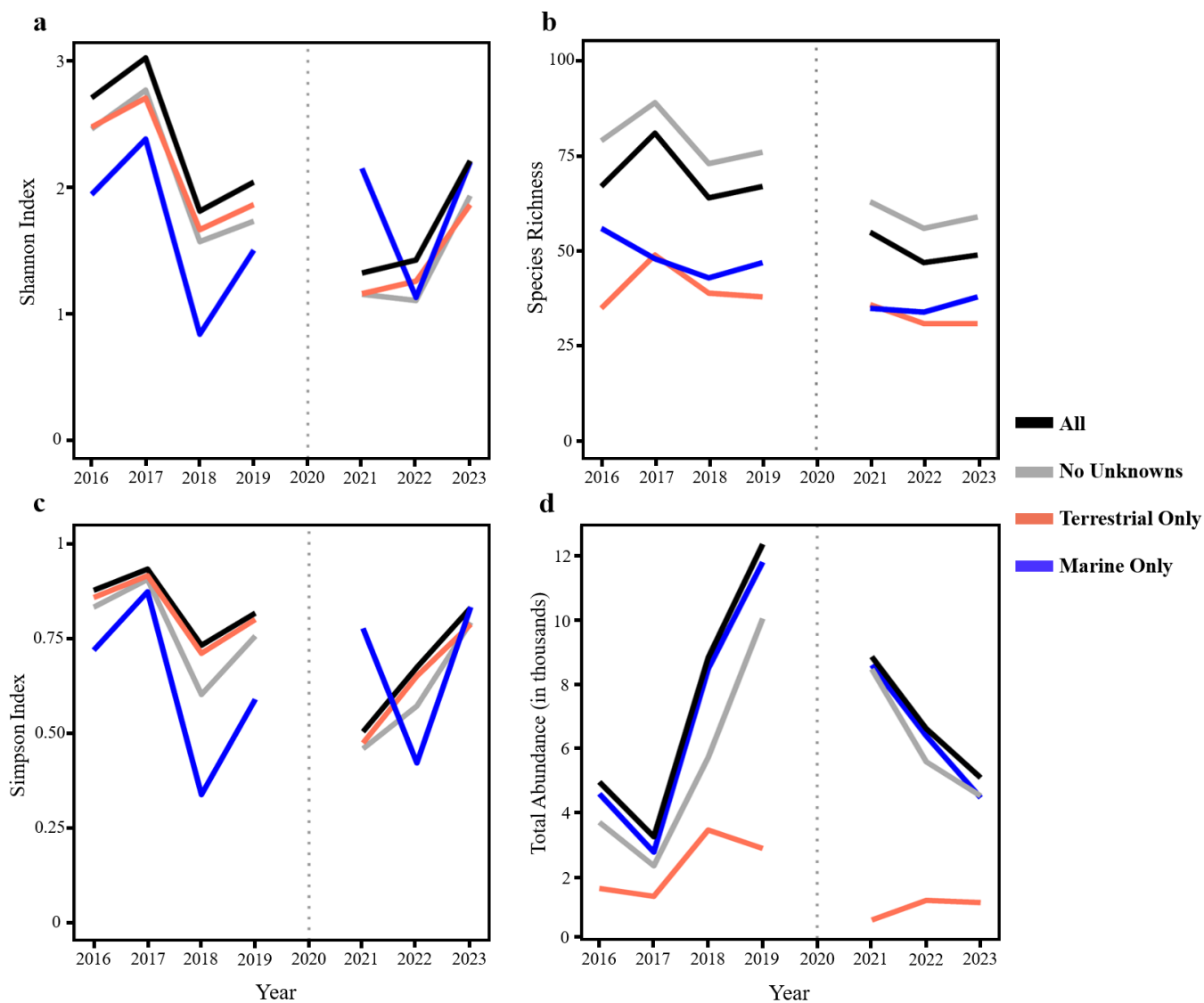
Figure 2. (a) Shannon index, (b) species richness, (c) Simpson diversity index, and (d) total abundance for all animals, all but unknown animals, terrestrial animals only, and marine animals only. Grouping these separately provides insight into variation in these metrics based on the environment and identification of these animals. Please note the omission of 2020 in the figures.
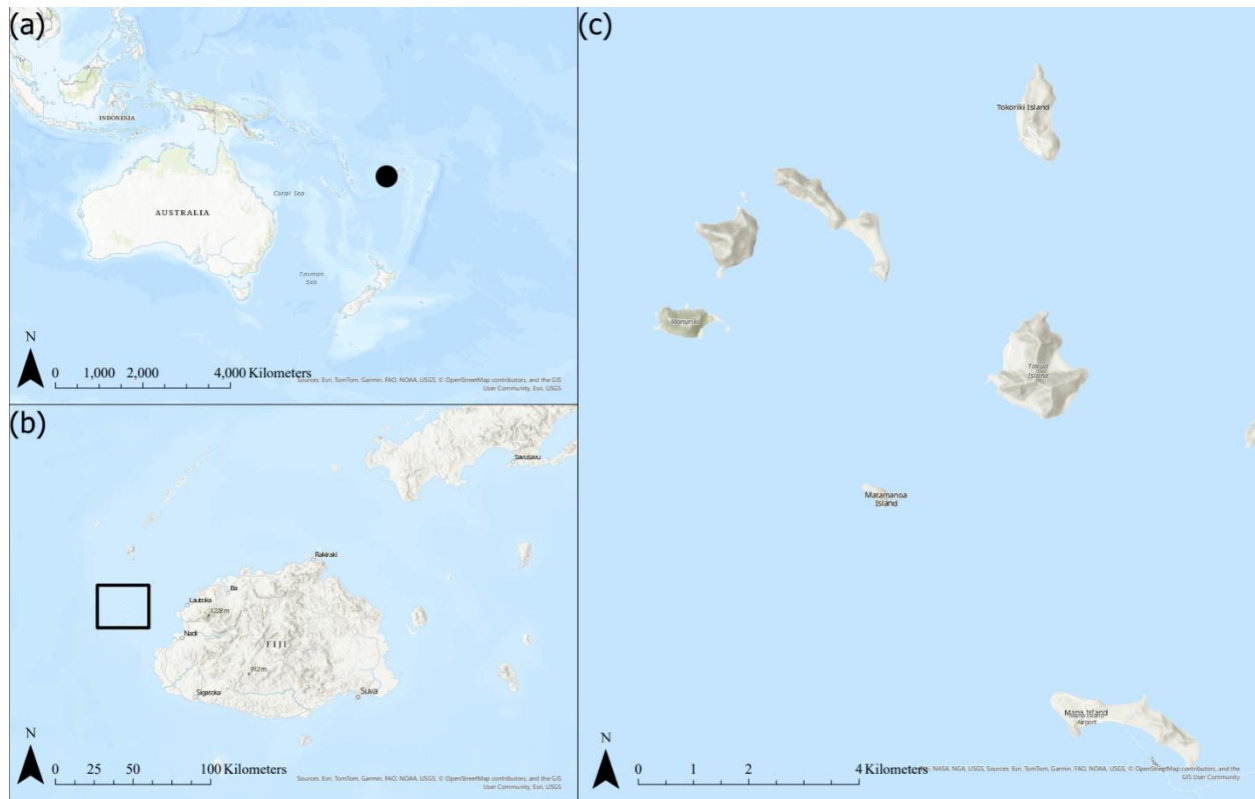
Figure S1. (a) Map of the Pacific Ocean/Oceania region with Fiji indicated by the black dot. (b) The Mamanuca Islands, within the black box, are off the west coast of Viti Levu. (c) The most common filming locations within the Mananuca Islands, at approximately 17.673º S, 177.107º E.
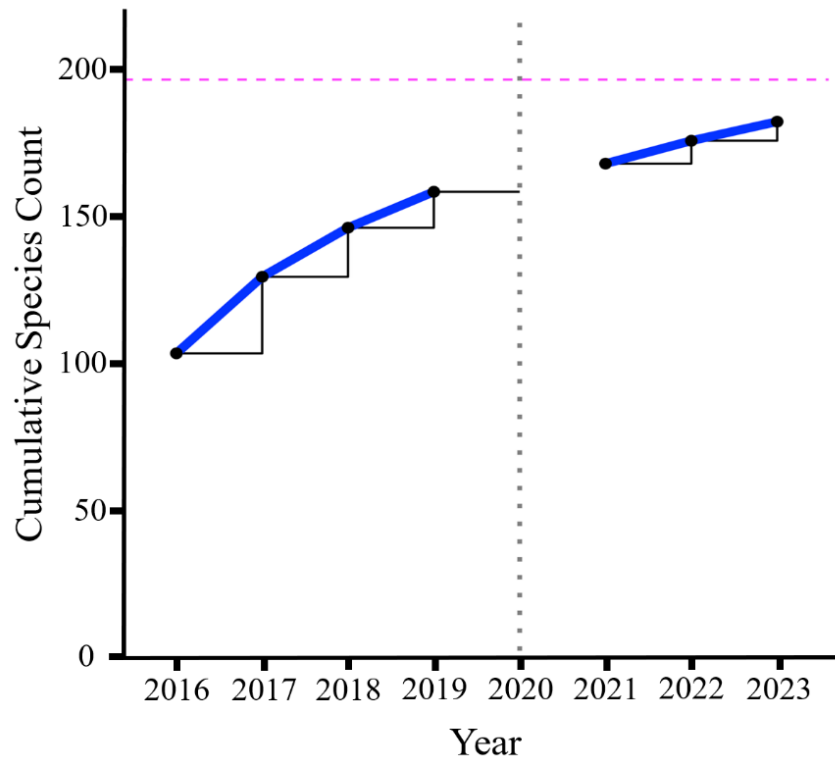
Figure S2. Accumulation curve for cumulative taxa counts for each year of filming for those that could be identified down to the family, genus, or species level. The black line is the cumulative taxon count displayed stepwise while the blue line is linear connecting each point by year. The pink line represents the theoretical asymptote of the estimated maximum number of unique taxa from this data source (n=198) if editing and footage collection methods continue to be similar. Please note the omission of 2020 in the figure.

Tables

Table 1. Counts of all individual animals identified down to genus or species level. Individuals that could not be identified to the genus or species level are enumerated in the "count unidentified" column. The amount of time (in seconds) for each screen classification category and sub-category is provided for each animal by the type of footage captured.

Animal Category	Number of Taxa Identified	Count Identified	Count Unidentified	Total Screen Time (sec)	Transition Time (sec)	Interaction Time (sec)	Hunting Time (sec)	Background of Focus Time (sec)	Theme Song Time (sec)
Amphibians	**2**	**6**		**15**	**15**				
Frogs	1	2		3	3				
Toads	1	4		12	12				
Birds	**31**	**1,559**	**523**	**640**	**595**			**42**	**3**
Birds of Prey	2	10		21	21				
Foraging or Shore Birds	29	1,549	523	619	574			42	3
Fishes	**84**	**37,023**	**6,047**	**968**	**856**	**29**	**67**	**6**	**10**
Rays	2	18		49	37		10		2
Reef Fishes	76	36,857	6039	738	653	29	44	6	6
Sharks	6	148	8	181	166		13		2
Invertebrates	**46**	**753**	**2,986**	**1,481**	**585**	**159**	**122**	**615**	
Ants			1,431	92	68	12	2	10	
Bees/Wasps	1	304	238	18	17			1	
Beetles			3	7	5	2			
Butterflies/Moths	6	9	51	83	21	11		51	
Crabs	9	261	56	263	230	12	21		
Flies/Gnats/Dragonfly	2	61	434	143	30	34		79	
Jellyfish	1	2		5	5				
Lobsters	1	2		6	3		3		
Octopus/Cuttlefish	2	11		66	34		32		
Other Bugs	10	34	3	132	48	78	5	1	
Sea Stars	1	2		3	2		1		
Shellfish or Barnacles	1	2	24	22			22		
Spiders	11	62	6	121	117	1		3	
Unknown Flying			739	483	4	9		470	
Worms	1	3	1	37	1		36		
Mammals	**9**	**687**	**1**	**433**	**392**	**2**	**36**	**1**	**2**
Bats	1	557		259	256			1	2
Dolphins	2	69	1	48	48				
Goats	1	21		44	8		36		
Rats	1	15		24	22	2			
Whales	4	25		58	58				
Reptiles	**10**	**273**	**4**	**480**	**450**	**25**		**4**	**1**
Lizards	7	79	2	147	141	2		4	
Snakes	2	151	2	305	295	10			
Turtles	1	43		28	14	13			1
TOTAL	**182**	**40,301**	**9,561**	**4,017**	**2,893**	**215**	**225**	**668**	**16**

Table 2. Top five most abundant taxa identified to the genus level for each of the broader animal groupings. Where possible, taxonomically related species were grouped at the genus or family level (e.g. terns).

Amphibians			Birds			Fish		
Common Name	Scientific Name	Count	Common Name	Scientific Name	Count	Common Name	Scientific Name	Count
Cane Toad	*Rhinella marina*	4	Wedge-tailed Shearwater	*Ardenna pacifica*	864	Fiji Sardinella	*Sardinella fijiensis*	17,080
Fiji Tree Frog	*Platymantis vitiensis*	2	All Terns	*Thalasseus bergii/Sterna sumatrana/Gygis alba/ Onychoprion fuscatus*	248	Anchovies	*Encrasicholina spp.*	7,641
-			All Boobies	*Sula sula/ Sula leucogaster*	139	Indian Mackerel	*Rastrelliger kanagurta*	5,648
-			Black Noddy	*Anous minutus*	117	Snappers and Fusiliers	*Caesio spp./Pterocaesio spp./Lutjanus spp./ Macolor spp.*	3,594
-			Pacific Reef Heron	*Egretta sacra*	101	Chromis	*Chromis spp.*	766
Invertebrates			**Mammals**			**Reptiles**		
Oriental Paper Wasp	*Polistes olivaceus*	304	Flying Fox	*Pteropus spp.*	557	Pacific Tree Boa	*Candoia bibroni*	136
Tawny Hermit Crab	*Coenobita rugosus*	83	Spinner Dolphin	*Stenella longirostris*	52	Fijian Iguana	*Brachylophus spp.*	55
Smooth-handed Ghost Crab	*Ocypode cordimanus*	73	Goat	*Capra aegragrus hircus*	21	Hawksbill Sea Turtle	*Eretmochelys imbricata*	43
Mottled Lightfoot Crab	*Grapsus albolineatus*	65	Bottlenose Dolphin	*Tursiops spp.*	17	Yellow-lipped Sea Krait	*Laticauda colubrina*	15
Fiji Muscidae Fly	*Dichaetomyia spp.*	34	Polynesian Rat	*Rattus exulans*	15	All Skinks	*Emoia spp.*	12

Table 3. Linear model results for Shannon and Simpson diversity indices, species richness, and abundance for each episode, season, and season-pair. Further, the results were grouped by (a) all animals, (b) all but unknown, (c) terrestrial only animals, and (d) marine animals only.

(a) All Animals

Measurement	Intercept	Slope	R^2
Shannon			
By Episode	2.63	0.00	0.01
Season	5.30	-0.08	0.32
Year	2.88	-0.19	0.41
Simpson			
By Episode	0.39	0.00	0.00
Season	0.39	0.00	0.00
Year	0.859	-0.03	0.22
Richness			
By Episode	7.26	-0.01	0.07
Season	7.26	-0.01	0.07
Year	81.57	-4.78	0.76
Abundance			
By Episode	163.65	0.51	0.00
Season	163.65	0.51	0.01
Year	6102.10	255.30	0.03

(b) All But Unknown

Measurement	Intercept	Slope	R^2
Shannon			
By Episode	2.74	0.00	0.01
Season	1.99	-0.05	0.12
Year	2.60	-0.19	0.42
Simpson			
By Episode	0.32	0.00	0.02
Season	0.82	-0.01	0.16
Year	0.83	-0.03	0.19
Richness			
By Episode	7.86	-0.02	0.11
Season	51.51	-1.68	0.63
Year	81.57	-4.78	0.76
Abundance			
By Episode	178.74	0.57	0.01
Season	2006.30	115.60	0.05
Year	4052.90	423.40	0.11

(c) Terrestrial Animals Only

Measurement	Intercept	Slope	R^2
Shannon			
By Episode	2.15	0.00	0.02
Season	5.17	-0.02	0.02
Year	2.79	-0.13	0.24
Simpson			
By Episode	0.32	0.00	0.00
Season	0.78	0.00	0.02
Year	0.92	-0.03	0.19
Richness			
By Episode	4.23	-0.01	0.05
Season	25.42	-1.02	0.53
Year	42.14	-3.17	0.82
Abundance			
By Episode	30.31	0.04	0.00
Season	367.65	8.65	0.01
Year	706.01	39.79	0.08

(d) Marine Animals Only

Measurement	Intercept	Slope	R^2
Shannon			
By Episode	1.98	0.00	0.00
Season	1.59	-0.04	0.13
Year	2.23	-0.18	0.53
Simpson			
By Episode	0.52	0.00	0.11
Season	0.61	0.00	0.01
Year	0.79	-0.03	0.22
Richness			
By Episode	5.85	-0.01	0.05
Season	34.30	-0.80	0.36
Year	50.28	-1.67	0.35
Abundance			
By Episode	175.05	2.24	0.01
Season	1794.41	114.80	0.05
Year	3643.05	417.10	0.11

Table 4. Linear model results for all identified taxa that had an R^2 value greater than the pre-determined threshold of 0.5. Linear model results include the total number of individuals observed, the number of years out of the 7 years reviewed the species was observed, as well as the linear model intercept, slope, and R^2 value.

Common Name	Scientific Name	n	# Years Appears	Intercept/ Slope	R^2	Common Name	Scientific Name	n	# Years Appears	Intercept/ Slope	R^2
Giant Asian Mantis	*Hierodula patellifera*	6	3	4.35/-0.64	0.96	Kelp Gull	*Larus dominicanus*	18	3	29.07/-4.07	0.78
Great Eggfly	*Hypolimnas bolina*	4	3	0.47/0.21	0.96	Damselfish	*Pomacentrus spp.*	78	4	48.2/-7.65	0.78
Black Noddy	*Anous minutus*	117	3	-65/19.5	0.95	Common Myna	*Acridotheres tristis*	5	3	3.67/-0.5	0.75
Swamp Harrier	*Circus approximans*	4	3	0.34/0.26	0.94	Giant Trevally	*Caranx ignobilis*	37	3	-18.67/15.5	0.75
Common House Gecko	*Hemidactylus frenatus*	9	5	3.49/-0.40	0.90	Wolf Spider	*Zoica spp.*	9	3	6/-1.5	0.75
Hawksbill Sea Turtle	*Eretmochelys imbricata*	43	3	-8.53/8.57	0.89	Whitetip Reef Shark	*Triaenodon obesus*	42	6	16.42/-2.57	0.69
Golden Damselfish	*Amblyglyphidodon aureus*	12	3	12.57/-3.21	0.89	Tawny Hermit Crab	*Coenobita rugosus*	83	6	41.3/-7.91	0.68
Bicolor Chromis	*Pycnochromis margaritifer*	18	3	19.35/-3.64	0.83	Pacific Tree Boa	*Candoia bibroni*	136	7	30.28/-2.71	0.64
Northern Silver Orbweaver	*Leucauge gramulata*	8	3	-3/1.21	0.79	Snapper	*Lutjanus spp.*	13	4	8.65/-1.35	0.6
Wedge-Tailed Shearwater	*Ardenna pacifica*	864	4	134.5/32.6	0.79	Banana Fusilier	*Pterocaesio pisang*	78	4	29.67/-2.90	0.57

Table S1. The season numbers, cumulative run time of the show in hours (hrs), number of animals observed, and the total amount of time animals were observed on screen by filming year in seconds (sec). The cumulative total across all years is presented in the final row.

Filming Year	Season #	Total Run Time (hrs)	Total Number of Animals Observed	Time Animals on Screen (sec)
2016	33/34	22.30	4,946	850
2017	35/36	22.45	3,236	664
2018	37/38	20.83	8,811	630
2019	39/40	25.35	12,349	588
2021	41/42	22.11	8,845	413
2022	43/44	22.32	6,602	347
2023	45/46	29.87	5,073	525
7 years	**14 seasons**	**165.23**	**49,862**	**4,017**

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