

*The following supplement accompanies the article*

## **Sea wrack delivery and accumulation on islands: factors that mediate marine nutrient permeability**

**Sara Wickham\*, Nancy Shackelford, Chris T. Darimont, Wiebe Nijland, Luba Y. Reshitnyk, John D. Reynolds, Brian M. Starzomski**

\*Corresponding author: sara.wickham@uwaterloo.ca

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### Supplementary Material

Table S1. List of island biogeographical characteristics as derived from island biogeography and subsidized island biogeography theory and used for clustering analysis. Results were used in all research performed as part of the 100 Islands Project, a collaborative investigation into the effects of marine subsidies on small, productive islands in context of Island Biogeography theory.

<b>Variable name</b>	<b>Units</b>	<b>Description</b>
Distance from mainland	km	Shortest linear distance from edge of island to mainland BC
Area	m <sup>2</sup>	Terrestrial area of island
Normalized perimeter to area (P:A) ratio (McGarigal 2015).	n/a	A normalized P:A where the complexity of a shape (i.e. island) is compared to a standard shape (square) which accounts for the size dependence displayed by calculating perimeter/area.
Exposure	Categorical	Score derived by proportion of each island's coastline that is within exposure categories: very protected (1), protected (2), semi-protected (3), semi-exposed (4), exposed (5), very-exposed (6).
Neighbouring land 500m	n/a	The percentage of area occupied by surrounding land masses within a 500 m distance of each island.

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Table S2. Results of Clustering Analysis.

<b>Cluster number</b>	<b>Number of Islands</b>	<b>Description</b>
1	134	high exposure, close to mainland, few neighbouring islands
2	264	low exposure, close to mainland
3	432	high exposure, far from mainland, few neighbouring islands
4	426	low exposure, far from mainland, many neighbouring islands
5	197	low exposure, very close to mainland, neighbouring many islands, low P:A

Table S3. Node names, island numbers, and island codes for the 101 islands that were surveyed for sea wrack along the Central Coast of British Columbia during the summers of 2015, 2016, and 2017.

<b>Node</b>	<b>Island</b>	<b>Island code</b>	<b>Node</b>	<b>Island</b>	<b>Island code</b>
Admiral	01	AD01	Penrose	06	PR06
Admiral	02	AD02	Penrose	07	PR07
Admiral	03	AD03	Penrose	08	PR08
Admiral	04	AD04	Penrose	09	PR09
Admiral	05	AD05	Penrose	10	PR10
Admiral	06	AD06	Penrose	11	PR11
Admiral	07	AD07	Penrose	12	PR12
Calvert	01	CV01	Penrose	13	PR13
Calvert	02	CV02	South Calvert	01	SC01
Calvert	03	CV03	South Calvert	02	SC02
Calvert	04	CV04	South Calvert	03	SC03
Calvert	05	CV05	South Calvert	04	SC04
Calvert	06	CV06	South Calvert	05	SC05
Calvert	07	CV07	South Calvert	06	SC06
Calvert	08	CV08	Stirling	01	ST01
Calvert	09	CV09	Stirling	02	ST02
Calvert	10	CV10	Stirling	03	ST03
Calvert	11	CV11	Stirling	05	ST05
Calvert	12	CV12	Stirling	07	ST07
Calvert	13	CV13	Stirling	08	ST08
Calvert	14	CV14	Stirling	09	ST09
Calvert	15	CV15	Stirling	10	ST10
Calvert	16	CV16	Stirling	12	ST12
Calvert	17	CV17	Stirling	14	ST14
Goose	01	GS01	Tribal	01	TB01
Goose	02	GS02	Tribal	02	TB02
Goose	03	GS03	Tribal	03	TB03
Goose	04	GS04	Tribal	04	TB04
Goose	05	GS05	Tribal	05	TB05
Goose	06	GS06	Tribal	06	TB06
Goose	07	GS07	Tribal	07	TB07
Goose	08	GS08	Tribal	08	TB08
Goose	09	GS09	Tribal	10	TB10
Goose	10	GS10	Tribal	12	TB12

Table S3. (continued) Node names, island numbers, and island codes for the 101 islands that were surveyed for sea wrack along the Central Coast of British Columbia during the summers of 2015, 2016, and 2017.

<b>Node</b>	<b>Island</b>	<b>Island code</b>	<b>Node</b>	<b>Island</b>	<b>Island code</b>
McMullin	01	MM01	Triquet	01	TQ01
McMullin	02	MM02	Triquet	02	TQ02
McMullin	03	MM03	Triquet	03	TQ03
McMullin	04	MM04	Triquet	04	TQ04
McMullin	05	MM05	Triquet	05	TQ05
McMullin	06	MM06	Triquet	06	TQ06
McMullin	07	MM07	Triquet	07	TQ07
McMullin	08	MM08	Triquet	08	TQ08
McMullin	09	MM09	Triquet	09	TQ09
McMullin	10	MM10	Triquet	10	TQ10
McMullin	11	MM11	Triquet	11	TQ11
Penrose	01	PR01	Triquet	12	TQ12
Penrose	02	PR02	Triquet	13	TQ13
Penrose	03	PR03	Triquet	15	TQ15
Penrose	04	PR04	Triquet	17	TQ17
Penrose	05	PR05	Triquet	18	TQ18
			Triquet	20	TQ20

Table S4. Species recorded in surveys from 455 sites across 101 islands and their percent contribution to the total biomass. % cont. denotes the percent contribution each functional group, genus, or species made to the total biomass.

<b>Spatial Surveys</b>		<b>Temporal Surveys</b>	
<b>Species</b>	<b>% cont.</b>	<b>Species</b>	<b>% cont.</b>
<i>Acrosiphonia</i> spp.	<1	<i>Acrosiphonia</i> spp.	<1
<i>Alaria marginata</i>	<1	<i>Ahnfeltia fastigiata</i>	<1
Articulated calcareous corallines	<1	<i>Ecklonia arborea</i>	<1
<i>Callithamnion</i> spp.	<1	<i>Callophyllis</i> spp.	<1
<i>Chondracanthus</i> spp. (bladed form)	<1	<i>Alaria marginata</i>	1
<i>Cladophora</i> spp.	<1	<i>Chondracanthus</i> spp. (bladed form)	<1
<i>Codium fragile</i>	<1	<i>Codium fragile</i>	1
<i>Costaria costata</i>	<1	<i>Codium setchellii</i>	<1
<i>Cryptopleura</i> spp.	<1	<i>Colpomenia</i> spp.	<1
<i>Cymathaere triplicata</i>	<1	<i>Constantinea sublifera</i>	<1
<i>Desmarestia</i> (cylindrical form)	<1	<i>Cryptopleura</i> spp.	<1

Table S4. (continued) Species recorded in surveys from 455 sites across 101 islands and their percent contribution to the total biomass. % cont. denotes the percent contribution each functional group, genus, or species made to the total biomass.

Spatial Surveys		Temporal Surveys	
Species	% cont.	Species	% cont.
<i>Desmarestia ligulata</i>	<1	<i>Stephanocystis</i> spp.	<1
<i>Egregia menziesii</i>	1	<i>Costaria costata</i>	<1
Filamentous reds	<1	<i>Desmarestia</i> (cylindrical form)	1
<i>Fucus distichus</i>	26	<i>Desmarestia ligulata</i>	1
<i>Halosaccion glandiforme</i>	<1	<i>Egregia menziesii</i>	1
<i>Laminaria setchellii</i>	<1	<i>Endocladia muricata</i>	<1
<i>Leathesia marina</i>	<1	<i>Fucus distichus</i>	8
<i>Lessoniopsis littoralis</i>	<1	Articulated calcareous corallines	<1
<i>Macrocystis pyrifera</i>	4	<i>Halosaccion glandiforme</i>	<1
<i>Mastocarpus</i> spp.	<1	<i>Gracilaria</i> spp.	<1
<i>Mazzaella</i> spp.	<1	<i>Laminaria setchellii</i>	1
<i>Microcladia</i> spp.	<1	<i>Leathesia marina</i>	<1
<i>Neorhodomela acuelata</i>	<1	<i>Lessoniopsis littoralis</i>	1
<i>Neorhodomela larix</i>	<1	<i>Mastocarpus</i> spp.	<1
<i>Neorhodomela oregana</i>	<1	<i>Macrocystis pyrifera</i>	8
<i>Nereocystis luetkeana</i>	2	<i>Mazzaella</i> spp.	<1
<i>Osmundea spectabilis</i>	<1	<i>Neorhodomela acuelata</i>	<1
<i>Phyllospadix</i> spp.	2	<i>Neorhodomela larix</i>	<1
<i>Pleurophycus gardneri</i>	<1	<i>Neorhodomela oregana</i>	<1
<i>Prionitis</i> spp.	<1	<i>Nereocystis luetkeana</i>	14
<i>Pterygophora californica</i>	10	<i>Osmundea spectabilis</i>	<1
<i>Ptilota</i> spp.	<1	<i>Palmaria</i> spp.	<1
<i>Pyropia</i> spp.	<1	<i>Phyllospadix</i> spp.	43
<i>Saccharina groenlandica</i>	<1	<i>Pleurophycus gardneri</i>	<1
<i>Saccharina latissima</i>	<1	<i>Prionitis</i> spp.	<1
<i>Saccharina sessilis</i>	<1	<i>Pterygophora californica</i>	7
<i>Sargassum muticum</i>	<1	<i>Ptilota</i> spp.	<1
<i>Ulva</i> spp.	<1	<i>Pyropia</i> spp.	<1
Unidentifiable brown kelps	3	<i>Saccharina groenlandica</i>	<1
Unidentifiable red seaweeds	<1	<i>Saccharina latissima</i>	<1
Unidentifiable seagrasses	4	<i>Saccharina sessilis</i>	<1
<i>Zostera marina</i>	40	<i>Scytosiphon</i> spp.	<1
		<i>Ulva</i> spp.	<1
		Unidentifiable brown kelps	8
		Unidentifiable red seaweeds	<1
		Unidentifiable seagrasses	<1
		<i>Zostera marina</i>	<1

Test1

	SITE_SUM	Hab50	Hab100	Hab250	Hab500	Hab1000	Hab2000	Hab3000
SITE_SUM	1.0000000	0.3893816	0.3070472	0.3053970	0.3339776	0.3521014	0.4931936	0.4198320
Hab50	0.3893816	1.0000000	0.9217392	0.7819116	0.6591538	0.5988533	0.5287416	0.4512492
Hab100	0.3070472	0.9217392	1.0000000	0.8759181	0.7175282	0.6162432	0.5037669	0.4483449
Hab250	0.3053970	0.7819116	0.8759181	1.0000000	0.8639082	0.7090253	0.5509321	0.4681950
Hab500	0.3339776	0.6591538	0.7175282	0.8639082	1.0000000	0.8976411	0.6841745	0.5788394
Hab1000	0.3521014	0.5988533	0.6162432	0.7090253	0.8976411	1.0000000	0.8074636	0.6873189
<b>Hab2000</b>	<b>0.4931936</b>	0.5287416	0.5037669	0.5509321	0.6841745	0.8074636	1.0000000	0.9047099
Hab3000	0.4198320	0.4512492	0.4483449	0.4681950	0.5788394	0.6873189	0.9047099	1.0000000
Hab4000	0.3591351	0.4015398	0.3816776	0.3478099	0.4429129	0.5455718	0.8208930	0.9571675
Hab5000	0.3195874	0.3600031	0.3327473	0.2935077	0.4028720	0.5034580	0.7806965	0.9238044
Hab7500	0.2928390	0.3914022	0.3698117	0.3460604	0.4721326	0.5325643	0.7439549	0.8329457
	Hab4000	Hab5000	Hab7500					
SITE_SUM	0.3591351	0.3195874	0.2928390					
Hab50	0.4015398	0.3600031	0.3914022					
Hab100	0.3816776	0.3327473	0.3698117					
Hab250	0.3478099	0.2935077	0.3460604					
Hab500	0.4429129	0.4028720	0.4721326					
Hab1000	0.5455718	0.5034580	0.5325643					
Hab2000	0.8208930	0.7806965	0.7439549					
Hab3000	0.9571675	0.9238044	0.8329457					
Hab4000	1.0000000	0.9796122	0.8554305					
Hab5000	0.9796122	1.0000000	0.8888509					
Hab7500	0.8554305	0.8888509	1.0000000					

Test2

	SITE_SUM	Hab50	Hab100	Hab250	Hab500	Hab1000	Hab2000	Hab3000
SITE_SUM	1.0000000	0.3786119	0.3667517	0.3558609	0.4339857	0.5075943	0.5426729	0.5185125
Hab50	0.3786119	1.0000000	0.9164711	0.7536139	0.6609261	0.5384475	0.5049640	0.5026658
Hab100	0.3667517	0.9164711	1.0000000	0.8333143	0.6531133	0.5175173	0.4679162	0.4541688
Hab250	0.3558609	0.7536139	0.8333143	1.0000000	0.8296755	0.6483188	0.5402836	0.5156991
Hab500	0.4339857	0.6609261	0.6531133	0.8296755	1.0000000	0.8689349	0.7396700	0.7078428
Hab1000	0.5075943	0.5384475	0.5175173	0.6483188	0.8689349	1.0000000	0.8948935	0.8515572
<b>Hab2000</b>	<b>0.5426729</b>	0.5049640	0.4679162	0.5402836	0.7396700	0.8948935	1.0000000	0.9588359
Hab3000	0.5185125	0.5026658	0.4541688	0.5156991	0.7078428	0.8515572	0.9588359	1.0000000
Hab4000	0.4772392	0.4953090	0.4139046	0.4498003	0.6313951	0.7600960	0.8935254	0.9589439
Hab5000	0.4261467	0.4470355	0.3632463	0.3905619	0.5706562	0.7069099	0.8398332	0.9166552
Hab7500	0.4158568	0.4225440	0.3752472	0.4158997	0.6068676	0.7110463	0.8232438	0.8755522
	Hab4000	Hab5000	Hab7500					
SITE_SUM	0.4772392	0.4261467	0.4158568					
Hab50	0.4953090	0.4470355	0.4225440					
Hab100	0.4139046	0.3632463	0.3752472					
Hab250	0.4498003	0.3905619	0.4158997					
Hab500	0.6313951	0.5706562	0.6068676					
Hab1000	0.7600960	0.7069099	0.7110463					
Hab2000	0.8935254	0.8398332	0.8232438					
Hab3000	0.9589439	0.9166552	0.8755522					
Hab4000	1.0000000	0.9768670	0.9026938					
Hab5000	0.9768670	1.0000000	0.9358535					
Hab7500	0.9026938	0.9358535	1.0000000					

Test3

	SITE_SUM	Hab50	Hab100	Hab250	Hab500	Hab1000	Hab2000	Hab3000
SITE_SUM	1.0000000	0.3196897	0.2812696	0.2966219	0.2838984	0.2476603	0.3226734	0.3081098
Hab50	0.3196897	1.0000000	0.9387459	0.7785419	0.6030963	0.5062346	0.3829103	0.3398740
Hab100	0.2812696	0.9387459	1.0000000	0.8615422	0.6554095	0.5189919	0.3798260	0.3224002
Hab250	0.2966219	0.7785419	0.8615422	1.0000000	0.8273747	0.6164056	0.4687669	0.3801260
Hab500	0.2838984	0.6030963	0.6554095	0.8273747	1.0000000	0.8426883	0.6091689	0.5010261
Hab1000	0.2476603	0.5062346	0.5189919	0.6164056	0.8426883	1.0000000	0.7786139	0.6517132
Hab2000	0.3226734	0.3829103	0.3798260	0.4687669	0.6091689	0.7786139	1.0000000	0.9252325
Hab3000	0.3081098	0.3398740	0.3224002	0.3801260	0.5010261	0.6517132	0.9252325	1.0000000
Hab4000	0.3014326	0.3226643	0.2928053	0.3501590	0.4379358	0.5662766	0.8570897	0.9645245
Hab5000	0.2865149	0.3069136	0.2664754	0.3386089	0.4315464	0.5541871	0.8229668	0.9312959
<b>Hab7500</b>	<b>0.3573162</b>	0.2917787	0.3072132	0.3469875	0.4629861	0.5529525	0.7722876	0.8374100
	Hab4000	Hab5000	Hab7500					
SITE_SUM	0.3014326	0.2865149	0.3573162					
Hab50	0.3226643	0.3069136	0.2917787					
Hab100	0.2928053	0.2664754	0.3072132					
Hab250	0.3501590	0.3386089	0.3469875					
Hab500	0.4379358	0.4315464	0.4629861					

Hab1000	0.5662766	0.5541871	0.5529525
Hab2000	0.8570897	0.8229668	0.7722876
Hab3000	0.9645245	0.9312959	0.8374100
Hab4000	1.0000000	0.9808310	0.8609818
Hab5000	0.9808310	1.0000000	0.8754347
Hab7500	0.8609818	0.8754347	1.0000000

Test4

	SITE_SUM	Hab50	Hab100	Hab250	Hab500	Hab1000	Hab2000	Hab3000
SITE_SUM	1.0000000	0.2771041	0.2605606	0.3254799	0.3036666	0.3441109	0.4344588	0.4129877
Hab50	0.2771041	1.0000000	0.9273207	0.7600323	0.6621782	0.6130093	0.4637144	0.3987399
Hab100	0.2605606	0.9273207	1.0000000	0.8690695	0.7333093	0.6407921	0.4648305	0.3831863
Hab250	0.3254799	0.7600323	0.8690695	1.0000000	0.9209509	0.8004945	0.6033982	0.4880303
Hab500	0.3036666	0.6621782	0.7333093	0.9209509	1.0000000	0.9174197	0.7034623	0.5701530
Hab1000	0.3441109	0.6130093	0.6407921	0.8004945	0.9174197	1.0000000	0.8565017	0.7428983
<b>Hab2000</b>	<b>0.4344588</b>	0.4637144	0.4648305	0.6033982	0.7034623	0.8565017	1.0000000	0.9280288
Hab3000	0.4129877	0.3987399	0.3831863	0.4880303	0.5701530	0.7428983	0.9280288	1.0000000
Hab4000	0.4096435	0.3911791	0.3493309	0.4414175	0.5083228	0.6619142	0.8606421	0.9671407
Hab5000	0.3992833	0.3707411	0.3341374	0.4261819	0.4886049	0.6356436	0.8396160	0.9388779
Hab7500	0.3876642	0.3779940	0.3664125	0.4395571	0.5246046	0.6525769	0.8122632	0.8650279
	Hab4000	Hab5000	Hab7500					
SITE_SUM	0.4096435	0.3992833	0.3876642					
Hab50	0.3911791	0.3707411	0.3779940					
Hab100	0.3493309	0.3341374	0.3664125					
Hab250	0.4414175	0.4261819	0.4395571					
Hab500	0.5083228	0.4886049	0.5246046					
Hab1000	0.6619142	0.6356436	0.6525769					
Hab2000	0.8606421	0.8396160	0.8122632					
Hab3000	0.9671407	0.9388779	0.8650279					
Hab4000	1.0000000	0.9782418	0.8817280					
Hab5000	0.9782418	1.0000000	0.9120078					
Hab7500	0.8817280	0.9120078	1.0000000					

Test5

	SITE_SUM	Hab50	Hab100	Hab250	Hab500	Hab1000	Hab2000	Hab3000
SITE_SUM	1.0000000	0.1585207	0.1471018	0.1057498	0.1777416	0.2270897	0.3249127	0.2944530
Hab50	0.1585207	1.0000000	0.9213677	0.6997762	0.5880083	0.5029193	0.3608242	0.3342414
Hab100	0.1471018	0.9213677	1.0000000	0.8111600	0.6525632	0.5556049	0.4465853	0.4030327
Hab250	0.1057498	0.6997762	0.8111600	1.0000000	0.8549526	0.7260110	0.5792834	0.5408433
Hab500	0.1777416	0.5880083	0.6525632	0.8549526	1.0000000	0.9056700	0.7139977	0.6476907
Hab1000	0.2270897	0.5029193	0.5556049	0.7260110	0.9056700	1.0000000	0.8154084	0.7353359
<b>Hab2000</b>	<b>0.3249127</b>	0.3608242	0.4465853	0.5792834	0.7139977	0.8154084	1.0000000	0.9333209
Hab3000	0.2944530	0.3342414	0.4030327	0.5408433	0.6476907	0.7353359	0.9333209	1.0000000
Hab4000	0.2860690	0.3032421	0.3592281	0.4631831	0.5301022	0.6083865	0.8507882	0.9483585
Hab5000	0.2649516	0.3067409	0.3575213	0.4497567	0.5110988	0.5709048	0.8067679	0.9152059
Hab7500	0.2312889	0.3488733	0.4411760	0.5591064	0.6193926	0.6155737	0.7996627	0.8587720
	Hab4000	Hab5000	Hab7500					
SITE_SUM	0.2860690	0.2649516	0.2312889					
Hab50	0.3032421	0.3067409	0.3488733					
Hab100	0.3592281	0.3575213	0.4411760					
Hab250	0.4631831	0.4497567	0.5591064					
Hab500	0.5301022	0.5110988	0.6193926					
Hab1000	0.6083865	0.5709048	0.6155737					
Hab2000	0.8507882	0.8067679	0.7996627					
Hab3000	0.9483585	0.9152059	0.8587720					
Hab4000	1.0000000	0.9777243	0.8505817					
Hab5000	0.9777243	1.0000000	0.8844647					
Hab7500	0.8505817	0.8844647	1.0000000					

Test6

	SITE_SUM	Hab50	Hab100	Hab250	Hab500	Hab1000	Hab2000	Hab3000
SITE_SUM	1.0000000	0.2465349	0.2177733	0.2067234	0.2557872	0.2916862	0.3394216	0.3712761
Hab50	0.2465349	1.0000000	0.9197600	0.7222802	0.5809061	0.5538074	0.4264626	0.4061806
Hab100	0.2177733	0.9197600	1.0000000	0.8271707	0.6440324	0.5781578	0.4347555	0.4267027
Hab250	0.2067234	0.7222802	0.8271707	1.0000000	0.8832403	0.7351335	0.5503870	0.5350495
Hab500	0.2557872	0.5809061	0.6440324	0.8832403	1.0000000	0.8862886	0.6415962	0.5871947
Hab1000	0.2916862	0.5538074	0.5781578	0.7351335	0.8862886	1.0000000	0.7969997	0.7102790
Hab2000	0.3394216	0.4264626	0.4347555	0.5503870	0.6415962	0.7969997	1.0000000	0.9178158
Hab3000	0.3712761	0.4061806	0.4267027	0.5350495	0.5871947	0.7102790	0.9178158	1.0000000
<b>Hab4000</b>	<b>0.3786394</b>	0.4012073	0.4057138	0.4567250	0.4845199	0.5987777	0.8333658	0.9548664
Hab5000	0.3291096	0.3849517	0.3857737	0.4322485	0.4676342	0.5720269	0.8008425	0.9286376
Hab7500	0.3135117	0.4373277	0.4456814	0.4956536	0.5568422	0.6591631	0.8203922	0.8698723
	Hab4000	Hab5000	Hab7500					

SITE_SUM	0.3786394	0.3291096	0.3135117
Hab50	0.4012073	0.3849517	0.4373277
Hab100	0.4057138	0.3857737	0.4456814
Hab250	0.4567250	0.4322485	0.4956536
Hab500	0.4845199	0.4676342	0.5568422
Hab1000	0.5987777	0.5720269	0.6591631
Hab2000	0.8333658	0.8008425	0.8203922
Hab3000	0.9548664	0.9286376	0.8698723
Hab4000	1.0000000	0.9825021	0.8789428
Hab5000	0.9825021	1.0000000	0.9015045
Hab7500	0.8789428	0.9015045	1.0000000

Test7

	SITE_SUM	Hab50	Hab100	Hab250	Hab500	Hab1000	Hab2000	Hab3000
SITE_SUM	1.0000000	0.3106802	0.3156418	0.4182204	0.4668119	0.5233898	0.5932830	0.5786437
Hab50	0.3106802	1.0000000	0.9481908	0.7653908	0.6346595	0.5176238	0.4077648	0.3450465
Hab100	0.3156418	0.9481908	1.0000000	0.8460571	0.6686829	0.5470147	0.4494449	0.3715452
Hab250	0.4182204	0.7653908	0.8460571	1.0000000	0.8828289	0.7532756	0.6383758	0.5383394
Hab500	0.4668119	0.6346595	0.6686829	0.8828289	1.0000000	0.8899370	0.7545275	0.6797840
Hab1000	0.5233898	0.5176238	0.5470147	0.7532756	0.8899370	1.0000000	0.8827603	0.8130093
<b>Hab2000</b>	<b>0.5932830</b>	<b>0.4077648</b>	<b>0.4494449</b>	<b>0.6383758</b>	<b>0.7545275</b>	<b>0.8827603</b>	<b>1.0000000</b>	<b>0.9417342</b>
Hab3000	0.5786437	0.3450465	0.3715452	0.5383394	0.6797840	0.8130093	0.9417342	1.0000000
Hab4000	0.5529687	0.3360456	0.3429823	0.4808775	0.6071167	0.7303450	0.8834323	0.9685209
Hab5000	0.5383242	0.3322962	0.3375228	0.4713020	0.5855043	0.6917212	0.8480914	0.9318180
Hab7500	0.5439080	0.3295628	0.3554142	0.4891491	0.5899667	0.6819166	0.8244712	0.8747577
	Hab4000	Hab5000	Hab7500					
SITE_SUM	0.5529687	0.5383242	0.5439080					
Hab50	0.3360456	0.3322962	0.3295628					
Hab100	0.3429823	0.3375228	0.3554142					
Hab250	0.4808775	0.4713020	0.4891491					
Hab500	0.6071167	0.5855043	0.5899667					
Hab1000	0.7303450	0.6917212	0.6819166					
Hab2000	0.8834323	0.8480914	0.8244712					
Hab3000	0.9685209	0.9318180	0.8747577					
Hab4000	1.0000000	0.9762706	0.9030214					
Hab5000	0.9762706	1.0000000	0.9318999					
Hab7500	0.9030214	0.9318999	1.0000000					

Test8

	SITE_SUM	Hab50	Hab100	Hab250	Hab500	Hab1000	Hab2000	Hab3000
SITE_SUM	1.0000000	0.2560286	0.2678879	0.3364160	0.3944072	0.4340386	0.4357978	0.3738859
Hab50	0.2560286	1.0000000	0.9072667	0.6452045	0.4635944	0.4108011	0.3292169	0.2362916
Hab100	0.2678879	0.9072667	1.0000000	0.7755079	0.5658566	0.4609061	0.3996760	0.2995620
Hab250	0.3364160	0.6452045	0.7755079	1.0000000	0.8277793	0.6147273	0.5502807	0.4364490
Hab500	0.3944072	0.4635944	0.5658566	0.8277793	1.0000000	0.8350075	0.6819442	0.5626283
Hab1000	0.4340386	0.4108011	0.4609061	0.6147273	0.8350075	1.0000000	0.8589019	0.7521392
<b>Hab2000</b>	<b>0.4357978</b>	<b>0.3292169</b>	<b>0.3996760</b>	<b>0.5502807</b>	<b>0.6819442</b>	<b>0.8589019</b>	<b>1.0000000</b>	<b>0.9133033</b>
Hab3000	0.3738859	0.2362916	0.2995620	0.4364490	0.5626283	0.7521392	0.9133033	1.0000000
Hab4000	0.3407427	0.2032763	0.2550135	0.3677119	0.4642544	0.6424962	0.8391959	0.9681848
Hab5000	0.2965038	0.2122395	0.2595532	0.3693468	0.4539031	0.6356503	0.8225406	0.9499227
Hab7500	0.2406254	0.2459793	0.3065168	0.3901397	0.4881773	0.6469217	0.7663581	0.8597212
	Hab4000	Hab5000	Hab7500					
SITE_SUM	0.3407427	0.2965038	0.2406254					
Hab50	0.2032763	0.2122395	0.2459793					
Hab100	0.2550135	0.2595532	0.3065168					
Hab250	0.3677119	0.3693468	0.3901397					
Hab500	0.4642544	0.4539031	0.4881773					
Hab1000	0.6424962	0.6356503	0.6469217					
Hab2000	0.8391959	0.8225406	0.7663581					
Hab3000	0.9681848	0.9499227	0.8597212					
Hab4000	1.0000000	0.9876585	0.8797323					
Hab5000	0.9876585	1.0000000	0.9016418					
Hab7500	0.8797323	0.9016418	1.0000000					

Test9

	SITE_SUM	Hab50	Hab100	Hab250	Hab500	Hab1000	Hab2000	Hab3000
SITE_SUM	1.0000000	0.4421409	0.3989207	0.4096969	0.3844605	0.3956367	0.4267777	0.4552233
Hab50	0.4421409	1.0000000	0.9029703	0.7763420	0.6469127	0.5763096	0.5005821	0.4768077
Hab100	0.3989207	0.9029703	1.0000000	0.8722078	0.7009781	0.6243144	0.5412901	0.4824602
Hab250	0.4096969	0.7763420	0.8722078	1.0000000	0.8667713	0.7642267	0.6495849	0.5574454
Hab500	0.3844605	0.6469127	0.7009781	0.8667713	1.0000000	0.8996340	0.7316532	0.6062166
Hab1000	0.3956367	0.5763096	0.6243144	0.7642267	0.8996340	1.0000000	0.8858806	0.7662046
Hab2000	0.4267777	0.5005821	0.5412901	0.6495849	0.7316532	0.8858806	1.0000000	0.9377978



<b>Hab3000</b>	<b>0.4552233</b>	0.4768077	0.4824602	0.5574454	0.6062166	0.7662046	0.9377978	1.0000000
Hab4000	0.4467572	0.4429596	0.4223535	0.4577645	0.4899385	0.6481028	0.8517817	0.9536722
Hab5000	0.4407549	0.4531243	0.4289529	0.4691960	0.5118607	0.6355803	0.8197464	0.9179984
Hab7500	0.4164939	0.4469416	0.4551774	0.4899889	0.5687497	0.6576986	0.8137344	0.8503632
	Hab4000	Hab5000	Hab7500					
SITE_SUM	0.4467572	0.4407549	0.4164939					
Hab50	0.4429596	0.4531243	0.4469416					
Hab100	0.4223535	0.4289529	0.4551774					
Hab250	0.4577645	0.4691960	0.4899889					
Hab500	0.4899385	0.5118607	0.5687497					
Hab1000	0.6481028	0.6355803	0.6576986					
Hab2000	0.8517817	0.8197464	0.8137344					
Hab3000	0.9536722	0.9179984	0.8503632					
Hab4000	1.0000000	0.9657620	0.8532591					
Hab5000	0.9657620	1.0000000	0.8903070					
Hab7500	0.8532591	0.8903070	1.0000000					
Test10								
	SITE_SUM	Hab50	Hab100	Hab250	Hab500	Hab1000	Hab2000	Hab3000
SITE_SUM	1.0000000	0.3819239	0.4266013	0.4442783	0.3988446	0.3590420	0.4014711	0.4035750
Hab50	0.3819239	1.0000000	0.9377498	0.8224302	0.6893969	0.5769697	0.4577618	0.4195620
Hab100	0.4266013	0.9377498	1.0000000	0.8893249	0.7405941	0.6186499	0.4931293	0.4514611
<b>Hab250</b>	<b>0.4442783</b>	0.8224302	0.8893249	1.0000000	0.9086709	0.7807741	0.6352475	0.5808341
Hab500	0.3988446	0.6893969	0.7405941	0.9086709	1.0000000	0.9172637	0.7822862	0.7245605
Hab1000	0.3590420	0.5769697	0.6186499	0.7807741	0.9172637	1.0000000	0.9011221	0.8405881
Hab2000	0.4014711	0.4577618	0.4931293	0.6352475	0.7822862	0.9011221	1.0000000	0.9593879
Hab3000	0.4035750	0.4195620	0.4514611	0.5808341	0.7245605	0.8405881	0.9593879	1.0000000
Hab4000	0.3650306	0.3945275	0.4029763	0.5025743	0.6375278	0.7504590	0.8977258	0.9635884
Hab5000	0.3384056	0.3648289	0.3774543	0.4715568	0.5979430	0.6994503	0.8526955	0.9286160
Hab7500	0.3395569	0.3574601	0.3831975	0.4748509	0.6158602	0.6932704	0.8299341	0.8771833
	Hab4000	Hab5000	Hab7500					
SITE_SUM	0.3650306	0.3384056	0.3395569					
Hab50	0.3945275	0.3648289	0.3574601					
Hab100	0.4029763	0.3774543	0.3831975					
Hab250	0.5025743	0.4715568	0.4748509					
Hab500	0.6375278	0.5979430	0.6158602					
Hab1000	0.7504590	0.6994503	0.6932704					
Hab2000	0.8977258	0.8526955	0.8299341					
Hab3000	0.9635884	0.9286160	0.8771833					
Hab4000	1.0000000	0.9782056	0.9057117					
Hab5000	0.9782056	1.0000000	0.9429426					
Hab7500	0.9057117	0.9429426	1.0000000					

Figure S1. Results of Spearman's correlation analysis testing the relationship between donor habitat and wrack biomass accumulations. The test was performed ten times. Each test included a random sample of 100 sites. The extent of donor habitat with the strongest relationship to accumulated biomass in the most tests was used for subsequent analysis (from our analysis 2000m had the strongest relationship six out of ten times). Strongest correlations for each test are bolded SITE\_SUM is the summed dry biomass of *Fucus distichus*, *Zostera marina*, *Nereocystis leutkeana*, and *Macrocystis pyrifera*; Hab50 is the summed extent of kelp forests, eelgrass beds, and rocky intertidal shoreline within 50 meters of a site; Hab100 is the summed extent of kelp forests, eelgrass beds, and rocky intertidal shoreline within 100 meters of a site; Hab250 is the summed extent of kelp forests, eelgrass beds, and rocky intertidal shoreline within 250 meters of a site; Hab500 is the summed extent of kelp forests, eelgrass beds, and rocky intertidal shoreline within 500 meters of a site; Hab1000 is the summed extent of kelp forests, eelgrass beds, and rocky intertidal shoreline within 1000 meters of a site; Hab2000 is the summed extent of kelp forests, eelgrass beds, and rocky intertidal shoreline within 2000 meters of a site; Hab3000 is the summed extent of kelp forests, eelgrass beds, and rocky intertidal shoreline within 3000 meters of a site; Hab4000 is the summed extent of kelp forests, eelgrass beds, and rocky intertidal shoreline within 4000 meters of a site; Hab5000 is the summed extent of kelp forests, eelgrass beds, and rocky intertidal shoreline within 4000 meters of a site; Hab7500 is the summed extent of kelp forests, eelgrass beds, and rocky intertidal shoreline within 7500 meters of a site.

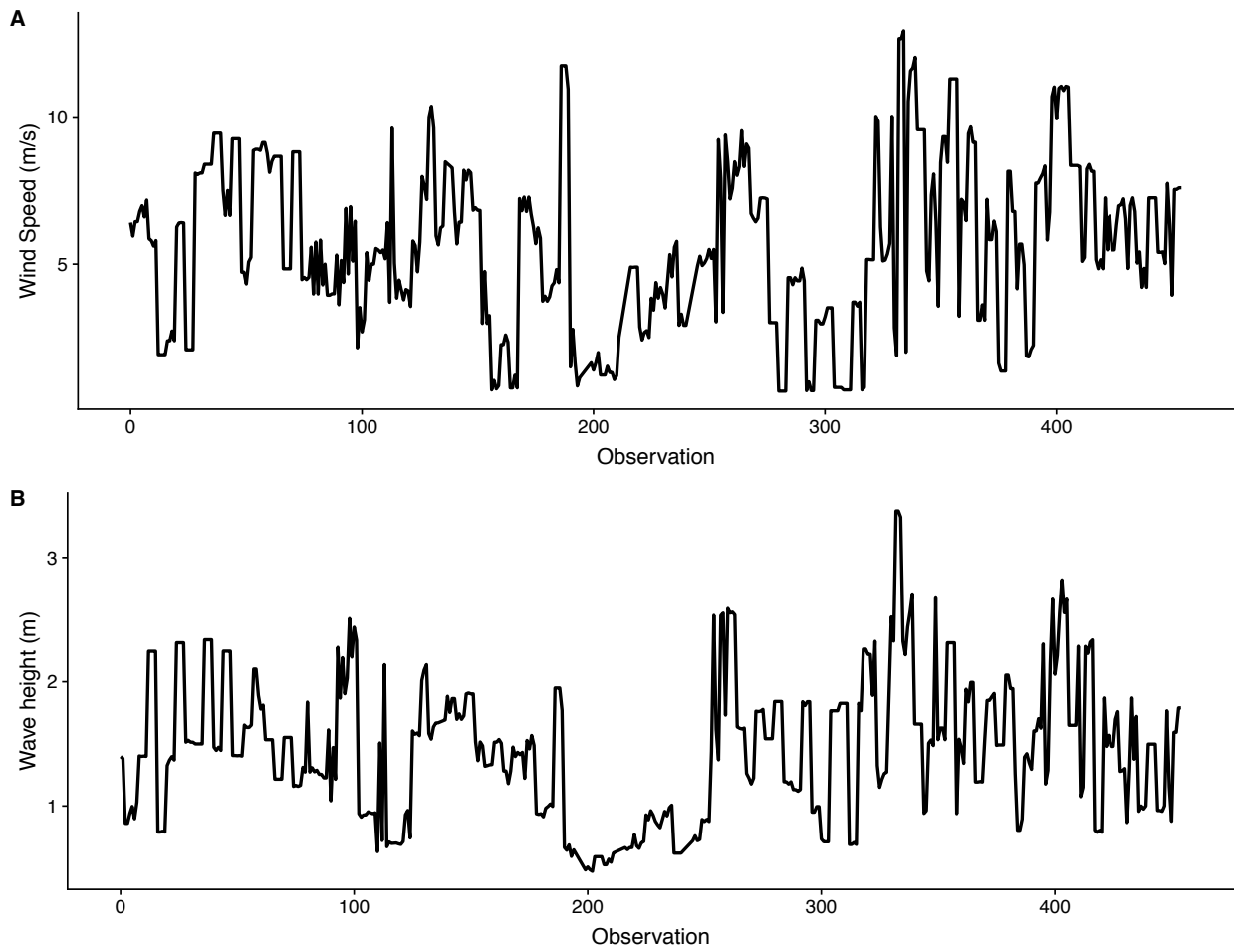


Figure S2. Average wind speed and wave height reported by Environment Canada’s “West Sea Otter Buoy” for the six hours before a site visit. These values were used to confirm evidence of storm event occurring. Environment Canada issues a “Strong wind warning” from 10-17 m/s, a “Gale force warning” from 18-24 m/s, and a “Storm force warning” from 25-32 m/s. Wave height over two meters is considered to be a large swell.

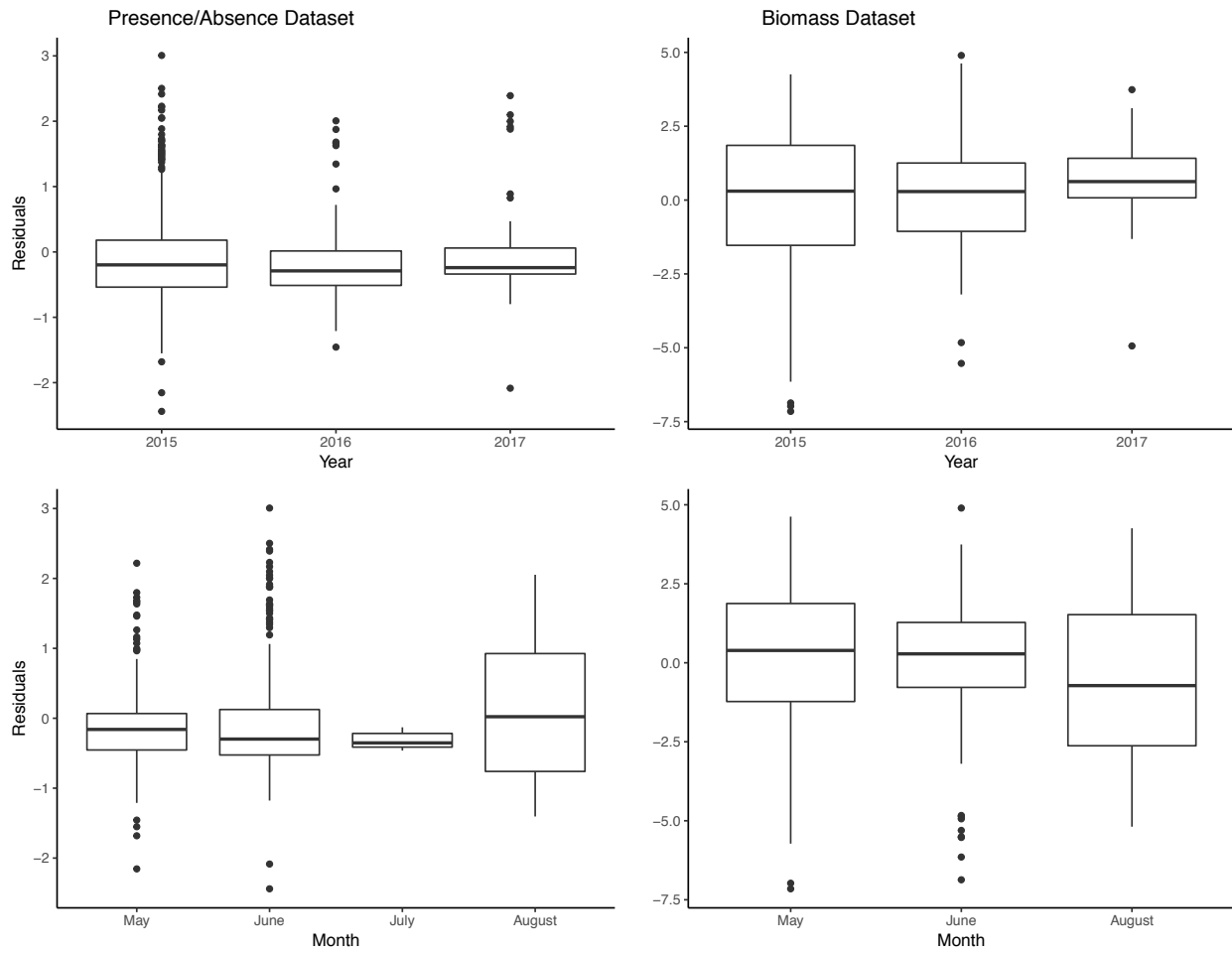


Figure S3. Residuals of the top models from both the presence/absence and biomass datasets. Residuals were plotted to examine if we violated independence in the linear models. No violations were detected.

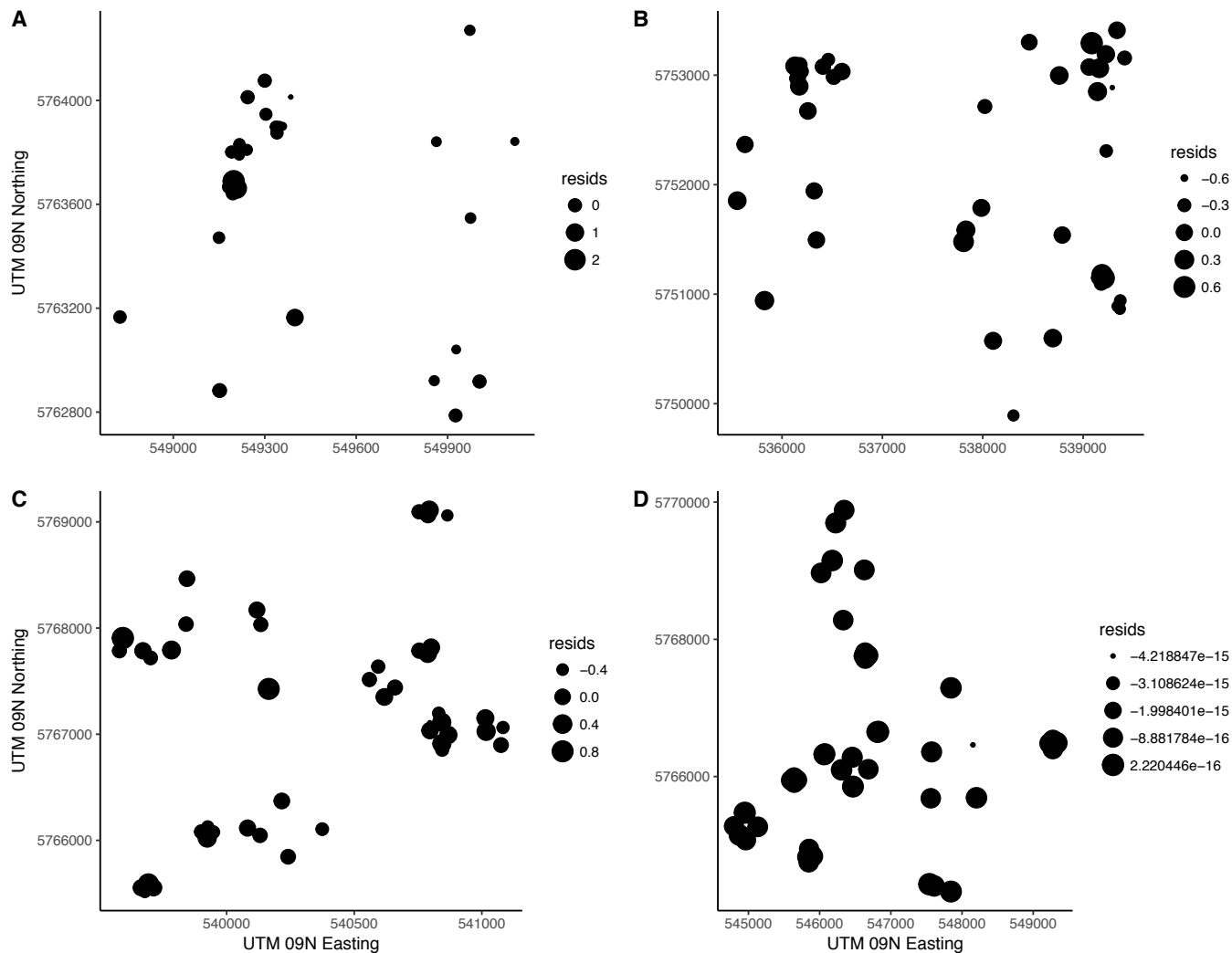


Figure S4. Bubble plot of residuals from the top model for the presence/absence dataset (sites = 455, islands = 101) mapped against their spatial coordinates to check for any patterns that may indicate spatial correlation issues. None were detected. A - Admiral node, B - Goose node, C - McMullin node, D - Tribal node.

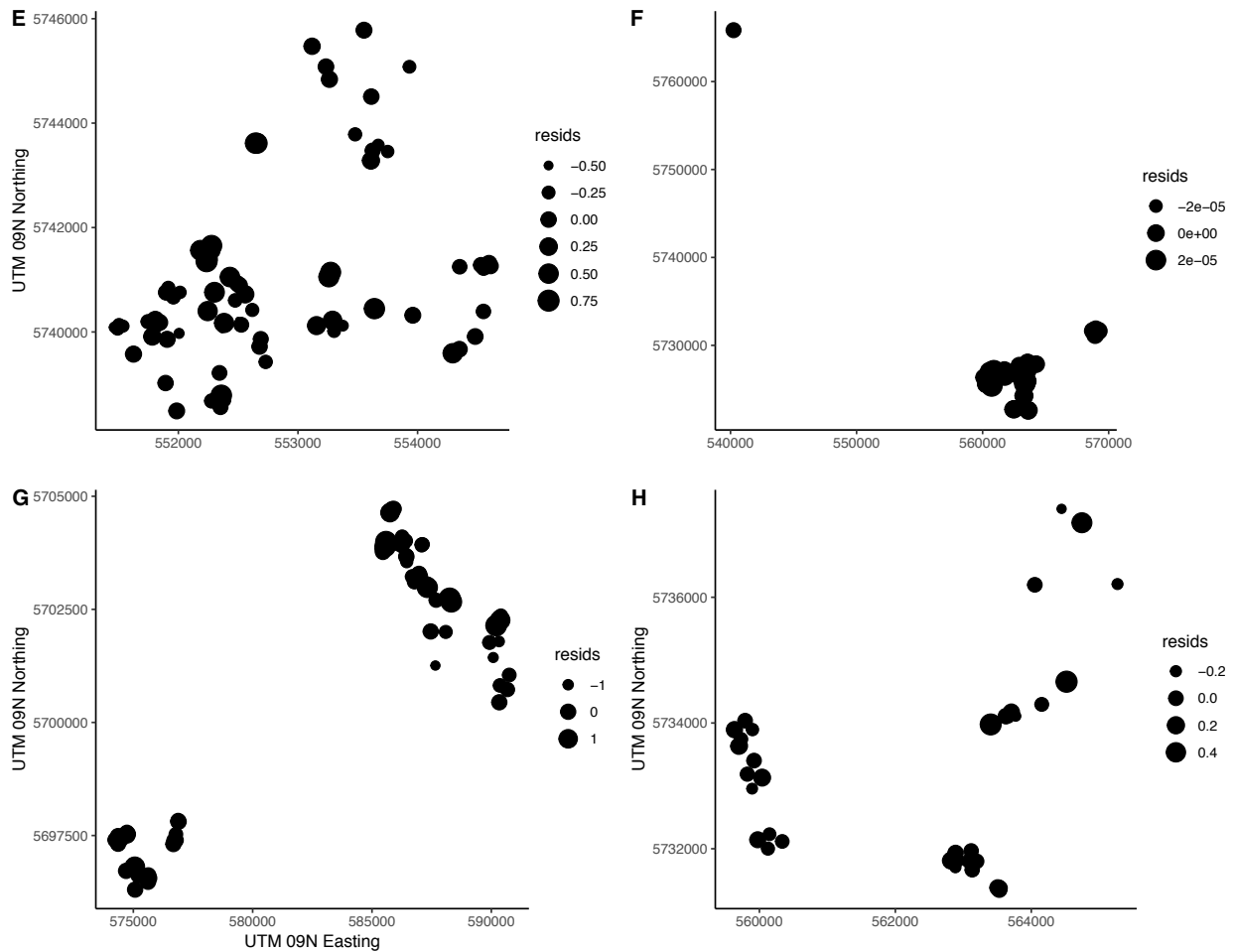


Figure S5. Bubble plot of residuals from the top model for the presence/absence dataset (sites = 455, islands = 101) mapped against their spatial coordinates to check for any patterns that may indicate spatial correlation issues. None were detected. E – Triquet node, F – Calvert node, G – Penrose and South Calvert nodes, H – Stirling node.

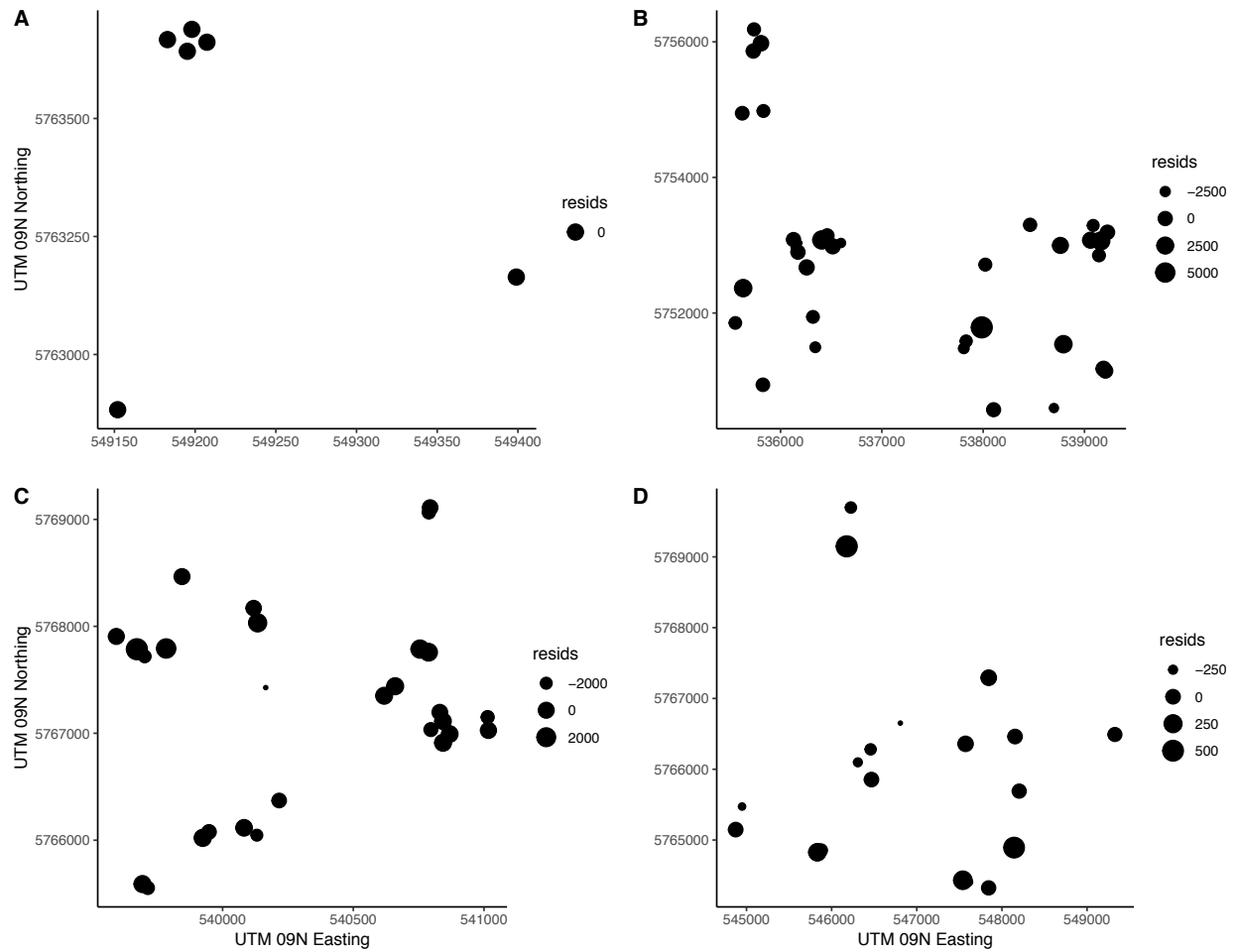


Figure S6. Bubble plot of residuals from the top model for the biomass dataset (sites = 178, islands = 65) mapped against their spatial coordinates to check for any patterns that may indicate spatial correlation issues. None were detected. A - Admiral node, B – Goose node, C – McMullin node, D – Tribal node.

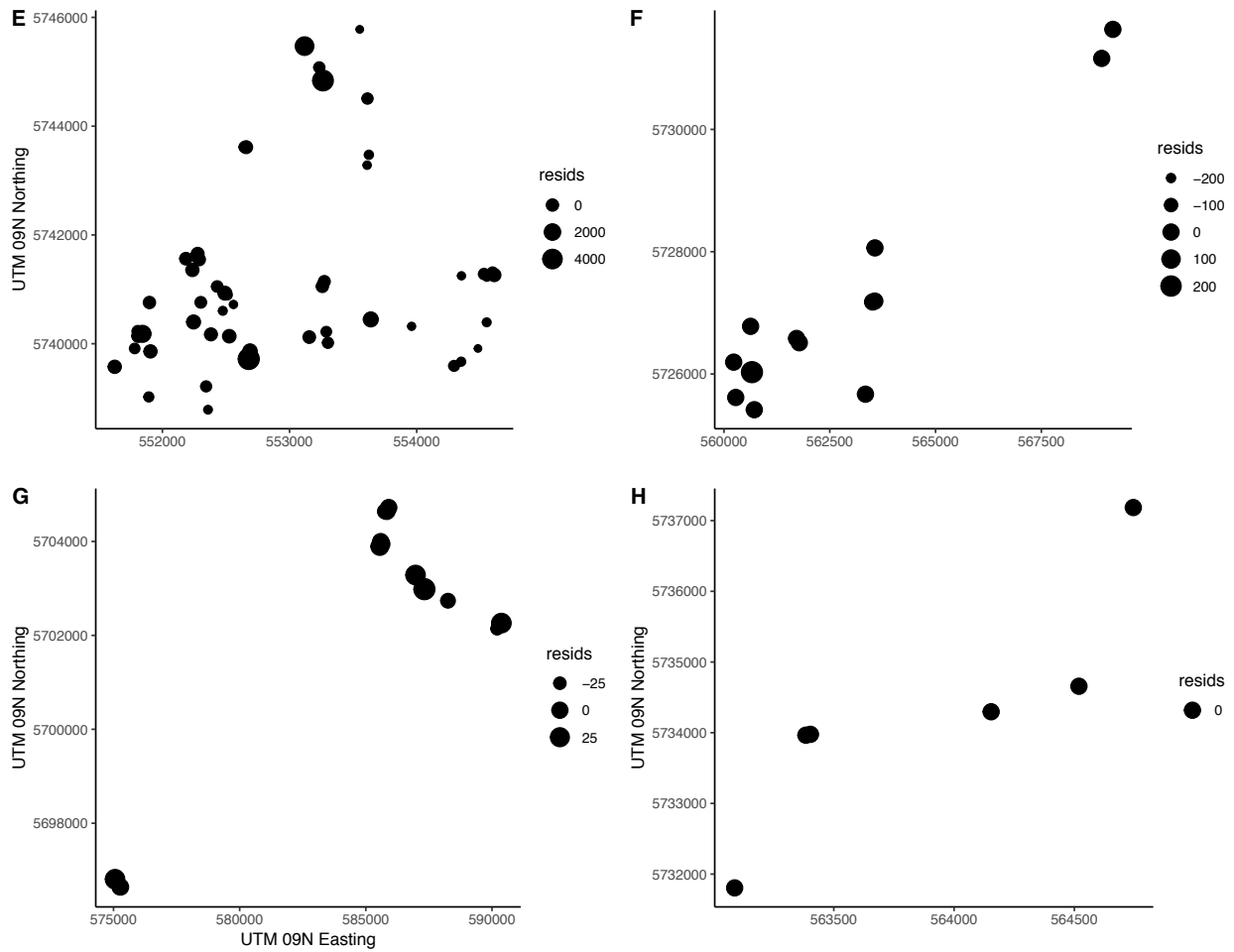


Figure S7. Bubble plot of residuals from the top model for the biomass dataset (sites = 178, islands = 65) mapped against their spatial coordinates to check for any patterns that may indicate spatial correlation issues. None were detected. E – Triquet node, F – Calvert node, G – Penrose and South Calvert nodes, H – Stirling node.

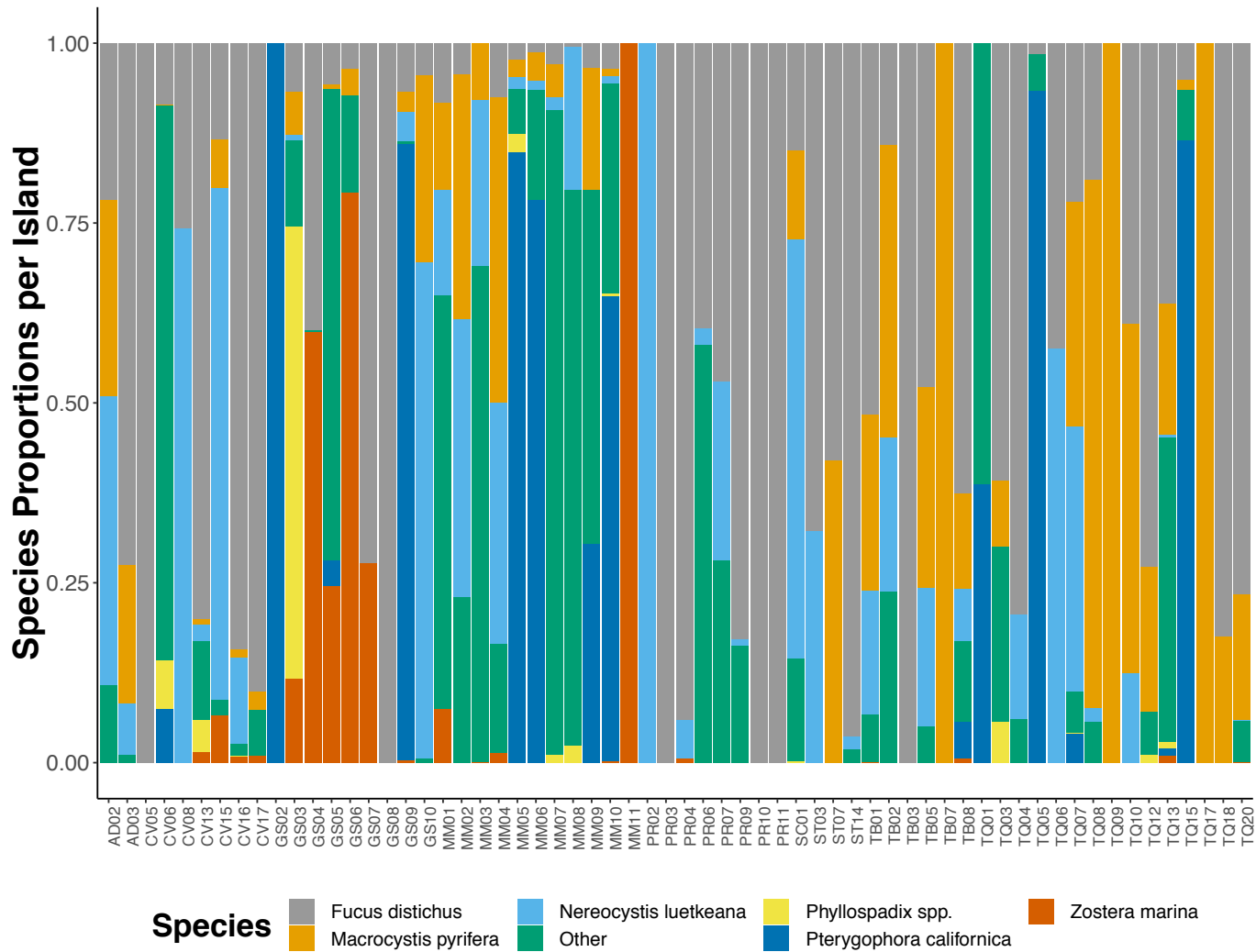


Figure S8. Proportion of species for each island, showing the six dominant species seen throughout the study area. Other is the combined total of all other species recorded in that node. Proportions are calculated from summed dry biomass. Islands with no bar displayed had zero biomass recorded for all sites. See Supplement Table S3 for island node and number abbreviations.



cumulative contributions of most influential species:

\$AD\_CV

FUC\_W NER.LUE\_W  
0.5498533 0.7453983

\$AD\_GS

ZOS\_W FUC\_W MAC.INT\_W UNK.SEA\_W  
0.3031202 0.5212139 0.6387332 0.7194916

\$AD\_MM

UNK.BK\_W PTE.CAL\_W MAC.INT\_W NER.LUE\_W  
0.2582908 0.4985247 0.6413447 0.7675584

\$AD\_PR

FUC\_W MAC.INT\_W  
0.5904327 0.7596027

\$AD\_SC

FUC\_W NER.LUE\_W  
0.4152032 0.7200189

\$AD\_ST

FUC\_W MAC.INT\_W  
0.6340192 0.8328321

\$AD\_TB

FUC\_W MAC.INT\_W  
0.4690549 0.7398715

\$AD\_TQ

FUC\_W MAC.INT\_W PTE.CAL\_W  
0.4310748 0.6751868 0.7836644

\$CV\_GS

ZOS\_W FUC\_W MAC.INT\_W UNK.SEA\_W NER.LUE\_W  
0.2950109 0.5288822 0.6147509 0.6930027 0.7708968

\$CV\_MM

UNK.BK\_W PTE.CAL\_W FUC\_W NER.LUE\_W  
0.2519128 0.4868687 0.6302131 0.7662022

\$CV\_PR

FUC\_W NER.LUE\_W  
0.6131836 0.6131836

\$CV\_SC

FUC\_W NER.LUE\_W  
0.4428683 0.7779232

\$CV\_ST

FUC\_W NER.LUE\_W  
0.6517546 0.8308881

\$CV\_TB

FUC\_W MAC.INT\_W NER.LUE\_W  
0.4801487 0.6765090 0.8320008

\$CV\_TQ  
     FUC\_W MAC.INT\_W PTE.CAL\_W  
 0.4433602 0.6318765 0.7374219

\$GS\_MM  
     ZOS\_W PTE.CAL\_W UNK.BK\_W FUC\_W MAC.INT\_W  
 0.2008750 0.3836428 0.5502428 0.6557053 0.7557262

\$GS\_PR  
     ZOS\_W FUC\_W MAC.INT\_W UNK.SEA\_W  
 0.3200797 0.5304930 0.6247189 0.7118076

\$GS\_SC  
     ZOS\_W FUC\_W MAC.INT\_W NER.LUE\_W UNK.SEA\_W  
 0.3152984 0.4877290 0.5879215 0.6865005 0.7705205

\$GS\_ST  
     ZOS\_W FUC\_W MAC.INT\_W UNK.SEA\_W  
 0.3264979 0.5385067 0.6370985 0.7241509

\$GS\_TB  
     ZOS\_W FUC\_W MAC.INT\_W NER.LUE\_W  
 0.2613902 0.4992472 0.6400376 0.7112499

\$GS\_TQ  
     FUC\_W ZOS\_W MAC.INT\_W PTE.CAL\_W  
 0.2473102 0.4784584 0.6233729 0.7255544

\$MM\_PR  
     UNK.BK\_W PTE.CAL\_W NER.LUE\_W MAC.INT\_W  
 0.2775276 0.5333948 0.6509080 0.7665967

\$MM\_SC  
     UNK.BK\_W PTE.CAL\_W NER.LUE\_W MAC.INT\_W  
 0.2742235 0.5284590 0.6924081 0.8164598

\$MM\_ST  
     UNK.BK\_W PTE.CAL\_W MAC.INT\_W NER.LUE\_W  
 0.2841697 0.5469166 0.6684802 0.7846100

\$MM\_TB  
     PTE.CAL\_W UNK.BK\_W FUC\_W MAC.INT\_W  
 0.2185565 0.4345398 0.6028154 0.7677577

\$MM\_TQ  
     PTE.CAL\_W FUC\_W UNK.BK\_W MAC.INT\_W  
 0.2314145 0.4239004 0.6141817 0.7791976

\$PR\_SC  
     FUC\_W NER.LUE\_W  
 0.4500016 0.7725405

\$PR\_ST  
     FUC\_W  
 0.78543

\$PR\_TB  
     FUC\_W MAC.INT\_W

0.4873165 0.7194927

\$PR\_TQ

FUC\_W MAC.INT\_W PTE.CAL\_W  
0.4433052 0.6571541 0.7756295

\$SC\_ST

FUC\_W NER.LUE\_W  
0.4843147 0.8263777

\$SC\_TB

FUC\_W MAC.INT\_W NER.LUE\_W  
0.3952837 0.6401836 0.8502354

\$SC\_TQ

FUC\_W MAC.INT\_W NER.LUE\_W  
0.3786632 0.5999622 0.7213412

\$ST\_TB

FUC\_W MAC.INT\_W  
0.5039853 0.7551483

\$ST\_TQ

FUC\_W MAC.INT\_W PTE.CAL\_W  
0.4544501 0.6795830 0.8021687

\$TB\_TQ

FUC\_W MAC.INT\_W PTE.CAL\_W  
0.4149495 0.6675452 0.7746185

Figure S9. Results from similarity percentages analysis (SIMPER) for the most influential species on dissimilarities between sites (from the spatial data). FUC = *Fucus distichus*, NER.LUE = *Nereocystis luetkeana*, UNK.BK = Unidentifiable brown kelps, PTE.CAL = *Pterygophora californica*, MAC.INT = *Macrocystis pyrifera*, ZOS = *Zostera spp*, UNK.SEA = Unidentifiable seaweed.

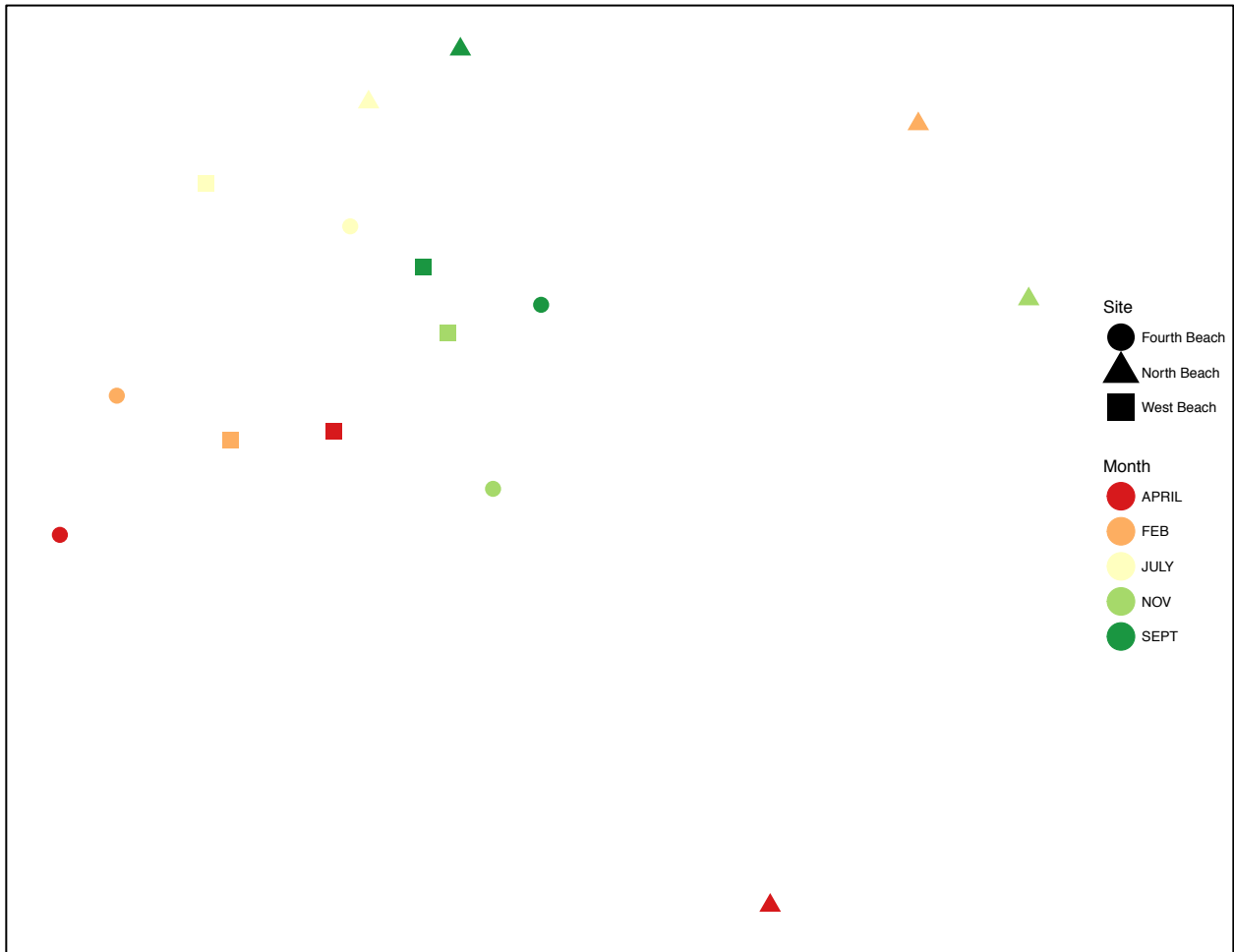


Figure S10. Wrack species composition among three different sites and throughout five different months (NMDS ordination). Stress = 0.12.

Fourth Beach\_North Beach  
 PHY    NER.LUE      UNK.BK            FUC  
 0.4427955 0.5779957 0.6903339 0.7773377

Fourth Beach\_West Beach  
 PHY    NER.LUE      UNK.BK      MAC.INT  
 0.3815503 0.5157184 0.6269417 0.7352643

North Beach\_West Beach  
 PHY    NER.LUE      MAC.INT            FUC  
 0.2582436 0.4791348 0.6607349 0.7473772

Figure S11. Results from similarity percentages analysis (SIMPER) for the most influential species on similarities between sites (from the temporal data). FUC = *Fucus distichus*, NER.LUE = *Nereocystis luetkeana*, UNK.BK = Unidentifiable brown kelps, PHY = *Phyllospadix* spp., MAC.INT = *Macrocystis pyrifera*.

APRIL_FEB					
	PHY	NER.LUE	PTE.CAL	UNK.BK	
	0.3239517	0.5651997	0.6953094	0.8132855	
APRIL_JULY					
	FUC	PHY	UNK.BK	MAC.INT	NER.LUE
	0.1993053	0.3820819	0.5351546	0.6620293	0.7487430
APRIL_NOV					
	PHY	NER.LUE	UNK.BK		
	0.4225081	0.6573931	0.7834557		
APRIL_SEPT					
	PHY	UNK.BK	NER.LUE	MAC.INT	
	0.2516059	0.4470207	0.6108728	0.7570158	
FEB_JULY					
	PHY	NER.LUE	PTE.CAL	FUC	
	0.3207653	0.5107384	0.6370126	0.7172475	
FEB_NOV					
	PHY	NER.LUE	PTE.CAL		
	0.4278513	0.6257951	0.7555644		
FEB_SEPT					
	PHY	NER.LUE	PTE.CAL		
	0.3554897	0.6001086	0.7405947		
JULY_NOV					
	PHY	FUC	NER.LUE		
	0.4203072	0.5744571	0.7250968		
JULY_SEPT					
	FUC	NER.LUE	MAC.INT	PHY	DES.LIG
	0.2689970	0.4360706	0.5900019	0.6733492	0.7430870
NOV_SEPT					
	PHY	NER.LUE			
	0.5114044	0.7585423			

Figure S12. Results from similarity percentages analysis (SIMPER) for the most influential species on similarities between months (from the temporal data). FUC = *Fucus distichus.*, NER.LUE = *Nereocystis luetkeana*, PTE.CAL = *Pterygophora californica*, UNK.BK = Unidentifiable brown kelps, PHY = *Phyllospadix* spp., MAC.INT = *Macrocystis pyrifera*, DES.LIG = *Desmarestia ligulata*.

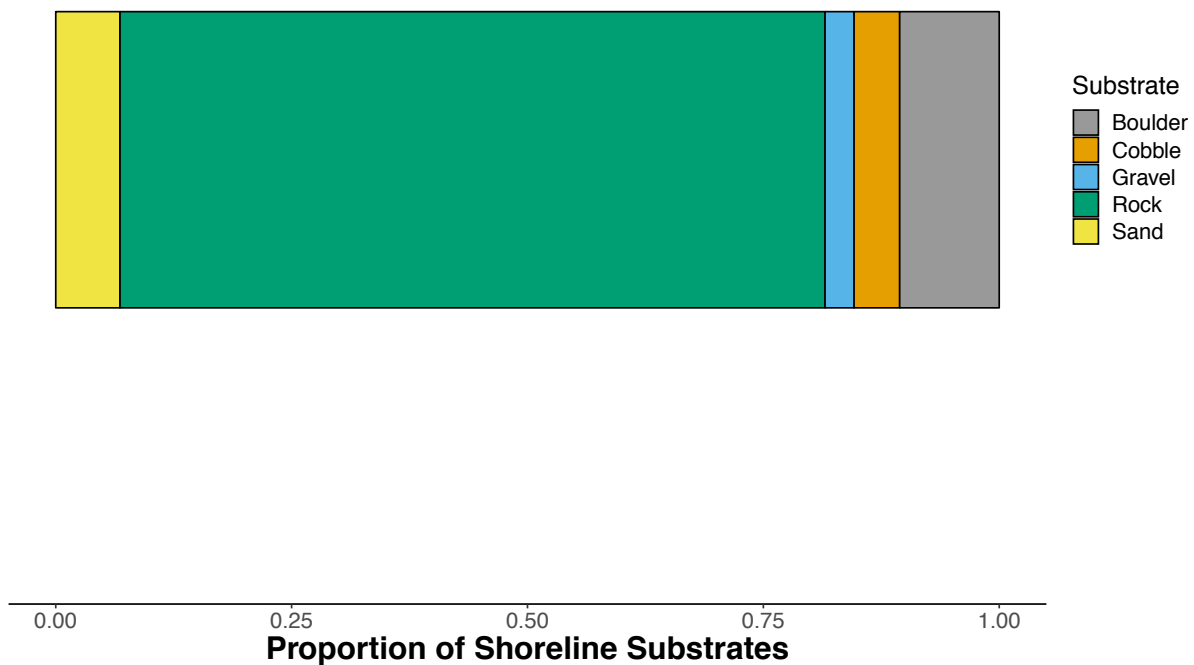


Figure S13. A bar plot depicting the proportion of sites ( $n = 455$ ) with shoreline substrates that were classified with sand ( $n = 31$ ), gravel ( $n = 14$ ), cobble ( $n = 22$ ), boulder ( $n = 48$ ), or rock ( $n = 340$ ) substrate.