

2010

The effect marina design and recreational boating has on the spread of Non Indigenous Species

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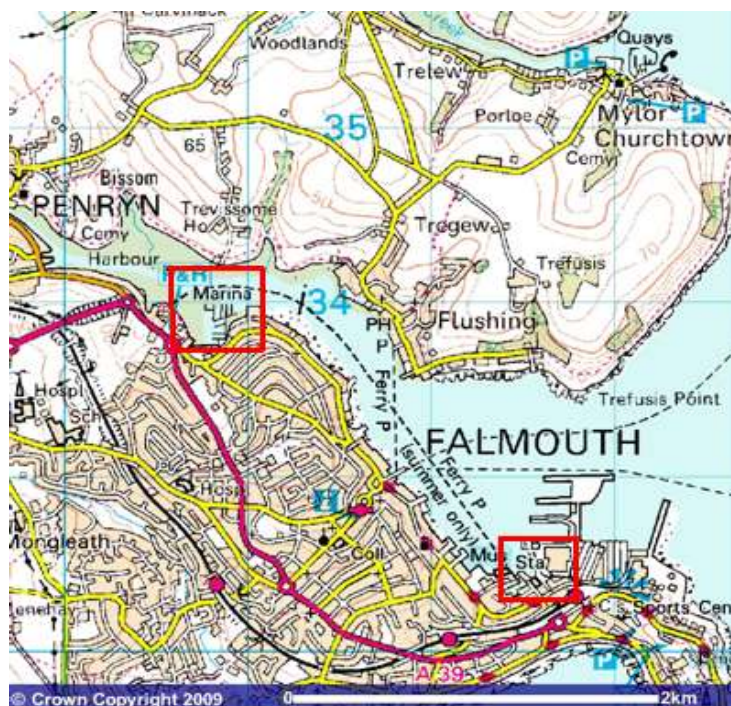
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Appendices

Appendix 1. Ordnance Survey map of sampling sites (Ordnance Survey 2009).



Premier marina on the left, Port Pendennis marina on the right

Appendix 2. A sheet representative of those used for recording the short term panels

	EA S		EA D		EB S		EB D		SA S		SA D		SB S		SB D	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Hydroid sp.																
Erect Bryozoan																
Botryllus																
Diplosoma																
Solitary ascidian																

EA = Exposed A

EB = Exposed B

SA = Sheltered A

SB = Sheltered B

S = Surface

D = Deep

1 = Side 1 (of panel)

2 = Side 2 (of panel)

Appendix 3. The prepared sheet used when recording the long term panels, any other species identified could be added during the process.

Date	Site	Position			
FAMILY	PHYLLUM	Side A Primary	Secondary	Side B Primary	Secondary
Sponges	Sycon ciliatum Scypha compressa Halichondria bowerbanki				
HYDROIDS	Tubularia sp. Plumularia setacea				
ANEMONES	Metridium senile				
BARNACLES	Elminius modestus				
BRYOZOANS	Bugula neritina Tricellaria inopinata Membranipora membranacea Celleporella hyalina Cryptosula pallasiana				
ASCIDIANS					
Colonial	Botryllus schlosseri Botrylloides violaceus Clavelina lepadiformis Diplosoma listerianum Diplosoma spongiforme Morchellium argus Perophora japonica				
Unitary	Styela clava Molgula socialis Ciona intestinalis Asciella aspersa Corella eumyota				
ANNELIDA	Sabella pavonina pomatostegus				

Appendix 4.

The raw cumulative data over all sampling periods (5 months) for total species found on short term panels.

	PR								PE								Total
	EA S	EA D	EB S	EB D	SA A	SA D	SB S	SB D	EA S	EA D	EA S	EA D	SA A	SA D	SB S		
Hydroid sp.	22	41	17	33	34	25	20	37	20	14	15	12	7	9	8	319	
Tubularia	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	4	
Erect Bryzoan	5	1	2	3	3	3	6	7	4	2	7	1	3	2	1	52	
Elminius	3	1	15	4	0	5	4	3	3	62	32	5	4	4	11	160	
Ascidian Solidary	3	6	4	10	10	5	8	17	5	9	3	8	0	2	11	111	
Ciona	0	0	0	0	0	0	0	0	0	5	0	3	6	15	10	45	
Botryllodies	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	
Botryllus	1	8	4	3	5	8	19	15	1	3	10	3	9	7	6	107	
Diplosoma	16	22	17	21	19	21	32	49	17	21	27	36	26	31	34	419	
Spirorbid	1	0	0	1	0	0	0	0	0	3	0	0	0	0	0	5	

Pr = Premier marina

Pe = Port Pendennis marina

EA = Exposed A

EB = Exposed B

SA = Sheltered A

SB = Sheltered B

S = Surface

D = Deep

Appendix 5.

The raw cumulative data over the 5 month sampling period for total Non Indigenous Species

	EA S	EA D	EB S	EB D	SA A	SA D	SB S	SB D	EA S	EA D	EA S	EA D	SA A	SA D	SB S	SB D	Total
Erect Bryzoan	5	1	2	3	3	3	6	7	4	2	7	1	3	2	1	2	52
Elminius	3	1	15	4	0	5	4	3	3	62	32	5	4	4	11	4	160
Botryllodies	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3

	EA S	EA D	EB S	EB D	SA A	SA D	SB S	SB D	EA S	EA D	EA S	EA D	SA A	SA D	SB S	SB D	Total
Erect Bryzoan	5	1	2	3	3	3	6	7	4	2	7	1	3	2	1	2	52
Elminius	3	1	15	4	0	5	4	3	3	62	32	5	4	4	11	4	160
Botryllodies	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3

Pr = Premier marina

Pe = Port Pendennis marina

EA = Exposed A

EB = Exposed B

SA = Sheltered A

SB = Sheltered B

S = Surface

D = Deep

Appendix 6.

The raw cumulative data of species assemblages, over the 5 month sampling period across long term panels. Premier marina this page, Pendennis marina overleaf.

Premier marina

SPECIES	PR										TOTAL
	SA		SB		EA		EB		TOTAL		
	S	D	S	D	S	D	S	D			
Sycon ciliatum		0	0	0	1	0	3	8	3.5	15.5	
Hydroid sp.		4	0	11	0	0	0	0	0	15	
Obelia longissima		45	0	35	3	5	7	12	10	117	
Elminius modestus		1	17	2	28	16	31	27	23	145	
Bugula neritina		0	38	18	44	2	2	3	0	107	

Appendix 7.

The similarity matrix used as a basis for all multivariate analysis of long term panels.

	Pr 1	Pr 2	Pr 3	Pr 4	Pr 5	Pr 6	Pr 7	Pr 8
	54.842							
Pr 2	165							
	76.605	71.194						
Pr 3	668	176						
	58.223	82.279	68.752					
Pr 4	32	185	464					
	57.060	68.098	60.547	68.233				
Pr 5	862	332	924	281				
	61.825	71.027	65.078	71.234	61.072			
Pr 6	55	164	855	505	368			
	61.409	64.899	70.065	71.821	71.497	73.539		
Pr 7	42	352	108	993	917	022		
	54.918	66.167	53.919	67.002	74.172	69.129	77.761	
Pr 8	793	683	653	036	818	71	199	
	44.568	59.495	53.436	50.053	53.355	55.243	49.043	51.492
Pe 1	133	184	575	814	772	934	534	111
	35.286	49.778	37.815	37.548	38.247	49.075	34.828	47.519
Pe 2	497	036	752	466	989	662	096	82
	47.268	60.709	57.884	53.639	50.657	53.389	52.684	49.758
Pe 3	274	901	439	379	893	421	942	825
	16.378	39.921	20.943	27.409	22.393	37.531	21.861	33.501
Pe 4	792	69	873	815	196	109	327	42
	48.978	63.034	52.673	51.561	52.143	50.341	51.165	51.982
Pe 5	225	513	577	999	687	841	932	566
	43.893	59.009	51.262	47.578	46.782	53.039	46.955	54.725
Pe 6	888	968	403	707	409	215	302	487
	49.451	71.189	60.880	62.337	54.673	61.516	57.286	61.502
Pe 7	053	194	89	554	217	396	334	179
	23.922	34.322	27.789	28.962	23.429	33.494	25.190	27.893
Pe 8	459	413	068	921	392	421	557	523

	Pe 1	Pe 2	Pe 3	Pe 4	Pe 5	Pe 6	Pe 7
Pr 2							
Pr 3							
Pr 4							
Pr 5							
Pr 6							
Pr 7							
Pr 8							
Pe 1							
	60.4148						
Pe 2	14						
	76.3507	67.4356					
Pe 3	53	47					

	41.4472	71.2283	47.0059					
Pe 4	43	74	9					
	63.3584	75.1399	68.4853	54.7428				
Pe 5	84	75	22	21				
	76.9499	82.8422	81.2487	61.0626	77.2713			
Pe 6	25	83	58	07	19			
	69.1931	69.2459	80.7220	55.0284	71.1267	75.9004		
Pe 7	77	13	16	36	63	64		
	42.8825	71.2610	56.9040	81.6662	54.5496	60.9442	54.4741	
Pe 8	79	1	66	11	26	29	78	