

**APPENDIX D:
SUPPLEMENTARY MATERIAL FOR CHAPTER 3**

Derivation: $R_{\text{Average}}^2 = R_{\text{Total}}^2$

$$(1) R_{\text{Total}}^2 = \frac{SSM_{\text{Total}}}{SST_{\text{Total}}}$$

(2) \mathbf{Y} is an $n \times p$ matrix of response variables

(3) Each response is standardized such that $\text{var}(\mathbf{Y}_j) = 1$

$$(4) SST_{\text{Total}} = \sum_{j=1}^p SST_j = SST_1 + SST_2 + \dots + SST_p$$

$$(5) SST_j = \sum_{i=1}^n (y_{i,j} - \bar{y}_j)^2$$

(6) Recall that because each response is standardised:

$$\text{var}(\mathbf{Y}_j) = \frac{1}{n-1} * \sum_{i=1}^n (y_{i,j} - \bar{y}_j)^2 = 1$$

$$\sum_{i=1}^n (y_{i,j} - \bar{y}_j)^2 = n - 1 \quad \text{and so from (5):}$$

$$SST_j = n - 1$$

$$(7) SST_{\text{Total}} = \sum_{j=1}^p SST_j = p * (n - 1)$$

$$(8) SSM_{\text{Total}} = \sum_{j=1}^p SSM_j = SSM_1 + SSM_2 + \dots + SSM_p$$

Now:

$$(9) R_{\text{Average}}^2 = \frac{1}{p} * (R_1^2 + R_2^2 + \dots + R_p^2)$$

$$(10) R_{\text{Average}}^2 = \frac{1}{p} * \left(\frac{SSM_1}{SST_1} + \frac{SSM_2}{SST_2} + \dots + \frac{SSM_p}{SST_p} \right)$$

$$(11) R_{\text{Average}}^2 = \frac{1}{p} * \left(\frac{SSM_1}{(n-1)} + \frac{SSM_2}{(n-1)} + \dots + \frac{SSM_p}{(n-1)} \right)$$

$$(12) R_{\text{Average}}^2 = \frac{1}{p(n-1)} * (SSM_1 + SSM_2 + \dots + SSM_p)$$

$$(13) R_{\text{Average}}^2 = \frac{SSM_{\text{Total}}}{SST_{\text{Total}}} = R_{\text{Total}}^2$$

Supplementary Material

**Analysis of human and environmental pressures on the fish community
of the Grand Bank, Northwest Atlantic:
Best predictors before and after the biomass collapse**

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SUPPLEMENTARY TABLES

Table S.1: Predictors included in each of the top 50 Full zero delay models, and associated adjusted-R² and R². See below for abbreviation key.

Rank	Fishing Pressures				Environmental Pressures					n_Inds	total adjusted-R2	total-R2
	CC	pel	shell_land	MTI	nao	T0	S0	S150	tice			
1	CC	NA	NA	MTI	nao	T0	NA	S150	tice	6	0.604	0.689
2	CC	NA	shell_land	MTI	nao	T0	NA	S150	tice	7	0.604	0.703
3	CC	NA	shell_land	MTI	nao	T0	NA	NA	tice	6	0.593	0.680
4	CC	pel	shell_land	MTI	nao	T0	NA	S150	tice	8	0.591	0.708
5	CC	pel	NA	MTI	nao	T0	NA	S150	tice	7	0.591	0.693
6	CC	NA	NA	MTI	nao	T0	S0	S150	tice	7	0.590	0.692
7	CC	NA	shell_land	MTI	nao	T0	NA	S150	NA	6	0.589	0.677
8	CC	NA	NA	MTI	nao	T0	NA	NA	tice	5	0.589	0.663
9	CC	pel	shell_land	MTI	nao	T0	NA	NA	tice	7	0.589	0.691
10	CC	NA	shell_land	MTI	nao	T0	S0	S150	tice	8	0.588	0.706
11	CC	NA	NA	MTI	NA	T0	NA	S150	tice	5	0.588	0.661
12	CC	NA	shell_land	MTI	NA	T0	NA	S150	tice	6	0.587	0.675
13	CC	NA	NA	MTI	nao	T0	NA	S150	NA	5	0.585	0.659
14	CC	NA	shell_land	MTI	NA	T0	NA	S150	NA	5	0.585	0.659
15	CC	NA	shell_land	MTI	NA	T0	NA	NA	tice	5	0.583	0.658
16	CC	NA	NA	MTI	NA	T0	NA	S150	NA	4	0.582	0.642
17	CC	pel	NA	MTI	nao	T0	NA	NA	tice	6	0.581	0.671
18	CC	NA	NA	MTI	NA	T0	NA	NA	tice	4	0.580	0.640
19	CC	NA	shell_land	MTI	nao	T0	S0	NA	tice	7	0.579	0.684
20	CC	pel	shell_land	MTI	nao	T0	NA	S150	NA	7	0.577	0.683
21	CC	pel	shell_land	MTI	NA	T0	NA	NA	tice	6	0.576	0.667
22	CC	NA	NA	MTI	nao	T0	S0	NA	tice	6	0.575	0.666
23	CC	pel	NA	MTI	nao	T0	S0	S150	tice	8	0.575	0.696
24	CC	NA	shell_land	NA	nao	T0	NA	NA	tice	5	0.574	0.650
25	CC	pel	shell_land	MTI	nao	T0	S0	S150	tice	9	0.574	0.711
26	CC	pel	NA	MTI	NA	T0	NA	S150	tice	6	0.574	0.665
27	CC	pel	shell_land	MTI	NA	T0	NA	S150	tice	7	0.574	0.680
28	CC	pel	NA	MTI	nao	T0	NA	S150	NA	6	0.573	0.664
29	CC	pel	shell_land	MTI	NA	T0	NA	S150	NA	6	0.573	0.664
30	CC	pel	shell_land	MTI	nao	T0	S0	NA	tice	8	0.573	0.695
31	CC	NA	NA	MTI	NA	T0	S0	S150	tice	6	0.573	0.664
32	CC	NA	shell_land	MTI	nao	T0	S0	S150	NA	7	0.572	0.679
33	CC	pel	shell_land	NA	nao	T0	NA	NA	tice	6	0.571	0.663
34	CC	NA	shell_land	MTI	NA	T0	S0	S150	tice	7	0.571	0.678
35	CC	NA	shell_land	NA	nao	T0	NA	S150	tice	6	0.571	0.663
36	CC	NA	shell_land	MTI	nao	NA	NA	S150	tice	6	0.570	0.662
37	CC	pel	NA	MTI	NA	T0	NA	NA	tice	5	0.570	0.647
38	CC	NA	shell_land	MTI	NA	T0	NA	NA	NA	4	0.570	0.631
39	CC	NA	NA	MTI	nao	T0	S0	S150	NA	6	0.569	0.662
40	CC	pel	NA	MTI	NA	T0	NA	S150	NA	5	0.569	0.646
41	CC	NA	shell_land	MTI	NA	T0	S0	NA	tice	6	0.568	0.661
42	CC	NA	shell_land	MTI	NA	T0	S0	S150	NA	6	0.568	0.661
43	CC	NA	shell_land	NA	NA	T0	NA	NA	tice	4	0.567	0.629
44	CC	NA	shell_land	MTI	nao	NA	NA	S150	NA	5	0.567	0.644
45	CC	pel	shell_land	MTI	NA	T0	NA	NA	NA	5	0.566	0.644
46	CC	NA	NA	MTI	NA	T0	NA	NA	NA	3	0.566	0.612
47	CC	NA	NA	MTI	NA	T0	S0	S150	NA	5	0.566	0.643
48	CC	pel	NA	MTI	nao	T0	S0	NA	tice	7	0.566	0.674
49	CC	NA	shell_land	MTI	nao	T0	NA	NA	NA	5	0.565	0.643
50	CC	NA	NA	MTI	NA	T0	S0	NA	tice	5	0.565	0.643

0.550 - 0.599

0.600 - 0.649

CC = total landings; pel = pelagic landings; shell_land = shellfish landings; MTI = mean trophic index
nao = North Atlantic Oscillation; T0 = sea surface temperature; S0 = surface salinity; S150 = salinity at depth of 150 m; tice = Time_{tice} (timing of sea ice melt)
n_Inds = number of predictors included in the given model

Table S.2: Predictors included in each of the top 50 Before zero delay models, and associated adjusted-R² and R². See below for abbreviation key.

Rank	Fishing Pressures				Environmental Pressures					n_Inds	total adjusted-R2	total-R2
	CC	pel	shell_land	MTI	nao	T0	S0	S150	tice			
1	CC	pel	shell_land	MTI	nao	T0	S0	S150	tice	9	0.938	0.994
2	CC	pel	shell_land	NA	nao	T0	S0	S150	tice	8	0.914	0.983
3	CC	pel	shell_land	NA	nao	T0	S0	S150	NA	7	0.877	0.963
4	CC	NA	shell_land	NA	nao	T0	S0	S150	tice	7	0.859	0.958
5	CC	pel	shell_land	MTI	nao	T0	S0	S150	NA	8	0.858	0.972
6	CC	NA	shell_land	MTI	nao	T0	S0	S150	tice	8	0.853	0.971
7	CC	NA	shell_land	NA	nao	T0	S0	S150	NA	6	0.836	0.934
8	CC	NA	shell_land	MTI	nao	T0	S0	S150	NA	7	0.829	0.949
9	CC	pel	shell_land	NA	nao	T0	NA	S150	NA	6	0.805	0.922
10	CC	NA	shell_land	NA	nao	T0	NA	S150	NA	5	0.791	0.896
11	CC	pel	shell_land	NA	nao	T0	S0	NA	NA	6	0.781	0.912
12	CC	NA	shell_land	MTI	nao	T0	NA	S150	NA	6	0.780	0.912
13	CC	pel	shell_land	MTI	nao	T0	NA	S150	NA	7	0.773	0.932
14	CC	pel	shell_land	NA	nao	T0	NA	S150	tice	7	0.771	0.931
15	CC	NA	shell_land	NA	nao	T0	S0	NA	NA	5	0.771	0.885
16	CC	NA	NA	NA	nao	T0	NA	S150	NA	4	0.753	0.852
17	CC	NA	shell_land	MTI	nao	T0	S0	NA	NA	6	0.753	0.901
18	CC	NA	shell_land	NA	nao	T0	NA	S150	tice	6	0.752	0.901
19	CC	pel	NA	NA	nao	T0	NA	S150	NA	5	0.750	0.875
20	CC	pel	shell_land	NA	nao	T0	S0	NA	tice	7	0.749	0.925
21	CC	pel	shell_land	MTI	nao	T0	S0	NA	NA	7	0.747	0.924
22	CC	NA	shell_land	NA	nao	T0	S0	NA	tice	6	0.747	0.899
23	CC	NA	NA	NA	nao	T0	S0	S150	NA	5	0.740	0.870
24	CC	pel	NA	NA	nao	T0	S0	S150	NA	6	0.735	0.894
25	NA	pel	shell_land	NA	nao	T0	S0	S150	NA	6	0.728	0.891
26	CC	NA	shell_land	MTI	nao	T0	NA	S150	tice	7	0.725	0.918
27	CC	NA	NA	NA	nao	T0	NA	S150	tice	5	0.723	0.861
28	CC	NA	shell_land	NA	nao	T0	NA	NA	NA	4	0.721	0.833
29	CC	NA	NA	MTI	nao	T0	NA	S150	NA	5	0.721	0.860
30	CC	pel	shell_land	NA	nao	NA	NA	S150	NA	5	0.720	0.860
31	CC	pel	shell_land	NA	nao	T0	NA	NA	NA	5	0.717	0.859
32	CC	pel	NA	MTI	nao	T0	NA	S150	NA	6	0.717	0.887
33	NA	pel	shell_land	NA	nao	T0	NA	S150	NA	5	0.716	0.858
34	CC	NA	shell_land	MTI	nao	T0	S0	NA	tice	7	0.714	0.914
35	CC	pel	shell_land	MTI	nao	T0	NA	S150	tice	8	0.712	0.942
36	CC	pel	NA	NA	nao	T0	NA	S150	tice	6	0.711	0.884
37	CC	NA	shell_land	MTI	nao	T0	NA	NA	NA	5	0.710	0.855
38	CC	pel	shell_land	MTI	nao	T0	S0	NA	tice	8	0.709	0.942
39	NA	pel	shell_land	NA	nao	T0	S0	S150	tice	7	0.703	0.911
40	CC	NA	shell_land	NA	nao	NA	NA	S150	NA	4	0.702	0.821
41	CC	NA	NA	MTI	nao	T0	S0	S150	NA	6	0.699	0.880
42	CC	pel	shell_land	MTI	nao	T0	NA	NA	NA	6	0.699	0.880
43	CC	NA	shell_land	NA	nao	T0	NA	NA	tice	5	0.699	0.849
44	CC	pel	shell_land	NA	nao	T0	NA	NA	tice	6	0.695	0.878
45	CC	pel	NA	NA	nao	NA	NA	S150	NA	4	0.691	0.815
46	CC	pel	shell_land	NA	nao	NA	S0	S150	NA	6	0.690	0.876
47	CC	pel	shell_land	NA	nao	NA	NA	NA	NA	4	0.689	0.813
48	CC	NA	NA	NA	nao	T0	S0	S150	tice	6	0.689	0.876
49	CC	pel	NA	MTI	nao	T0	S0	S150	NA	7	0.688	0.906
50	NA	NA	shell_land	NA	nao	T0	NA	S150	NA	4	0.687	0.812



CC = total landings; pel = pelagic landings; shell_land = shellfish landings; MTI = mean trophic index
nao = North Atlantic Oscillation; T0 = sea surface temperature; S0 = surface salinity; S150 = salinity at depth of 150 m; tice = Time_{tice} (timing of sea ice melt)
n_Inds = number of predictors included in the given model

Table S.3: Predictors included in each of the top 50 After zero delay models, and associated adjusted-R² and R². See below for abbreviation key.

Rank	Fishing Pressures				Environmental Pressures					n_Inds	total adjusted-R ²	total-R ²
	CC	pel	shell_land	MTI	nao	T0	S0	S150	tice			
1	CC	pel	shell_land	MTI	nao	T0	S0	NA	tice	8	0.565	0.770
2	CC	pel	shell_land	MTI	nao	T0	S0	S150	tice	9	0.540	0.784
3	CC	pel	shell_land	MTI	nao	T0	NA	NA	tice	7	0.535	0.726
4	NA	pel	shell_land	MTI	nao	T0	S0	NA	tice	7	0.530	0.724
5	CC	pel	shell_land	MTI	NA	T0	NA	NA	tice	6	0.520	0.689
6	NA	pel	shell_land	MTI	nao	T0	S0	S150	tice	8	0.508	0.740
7	CC	pel	shell_land	MTI	NA	T0	S0	NA	tice	7	0.496	0.704
8	CC	pel	shell_land	MTI	nao	T0	S0	NA	NA	7	0.494	0.702
9	CC	pel	shell_land	MTI	nao	T0	NA	S150	tice	8	0.487	0.728
10	CC	pel	shell_land	MTI	nao	NA	S0	NA	tice	7	0.484	0.696
11	CC	pel	shell_land	MTI	nao	NA	S0	S150	tice	8	0.483	0.726
12	CC	pel	shell_land	MTI	NA	T0	NA	S150	tice	7	0.480	0.694
13	NA	pel	shell_land	MTI	nao	T0	S0	NA	NA	6	0.478	0.662
14	CC	pel	shell_land	MTI	nao	T0	S0	S150	NA	8	0.470	0.719
15	NA	pel	shell_land	MTI	NA	T0	S0	NA	tice	6	0.470	0.657
16	CC	pel	shell_land	MTI	nao	T0	NA	NA	NA	6	0.465	0.654
17	NA	pel	shell_land	MTI	nao	T0	NA	NA	tice	6	0.463	0.653
18	NA	pel	shell_land	MTI	nao	NA	S0	NA	tice	6	0.460	0.650
19	NA	pel	shell_land	MTI	nao	NA	S0	S150	tice	7	0.459	0.682
20	NA	pel	shell_land	MTI	NA	T0	NA	NA	tice	5	0.457	0.617
21	CC	NA	shell_land	MTI	nao	T0	S0	NA	tice	7	0.457	0.681
22	NA	pel	shell_land	MTI	nao	T0	S0	S150	NA	7	0.457	0.681
23	CC	pel	shell_land	MTI	nao	NA	S0	NA	NA	6	0.456	0.648
24	CC	pel	shell_land	MTI	nao	NA	S0	S150	NA	7	0.452	0.678
25	CC	pel	shell_land	MTI	nao	NA	NA	NA	tice	6	0.451	0.645
26	CC	pel	shell_land	MTI	NA	T0	NA	NA	NA	5	0.449	0.611
27	CC	pel	shell_land	MTI	NA	T0	S0	S150	tice	8	0.448	0.708
28	NA	pel	shell_land	MTI	nao	NA	S0	NA	NA	5	0.447	0.609
29	CC	pel	shell_land	MTI	NA	NA	NA	NA	tice	5	0.447	0.609
30	NA	pel	shell_land	MTI	nao	NA	S0	S150	NA	6	0.445	0.641
31	CC	pel	shell_land	MTI	NA	NA	NA	S150	tice	6	0.444	0.640
32	CC	NA	shell_land	MTI	nao	T0	NA	NA	tice	6	0.443	0.640
33	CC	pel	shell_land	MTI	nao	NA	NA	S150	tice	7	0.440	0.671
34	CC	NA	shell_land	MTI	NA	T0	NA	NA	tice	5	0.438	0.603
35	CC	pel	shell_land	MTI	NA	NA	S0	NA	tice	6	0.435	0.634
36	CC	pel	shell_land	MTI	nao	NA	NA	NA	NA	5	0.430	0.598
37	CC	pel	shell_land	MTI	NA	T0	NA	S150	NA	6	0.430	0.631
38	CC	pel	shell_land	MTI	nao	T0	NA	S150	NA	7	0.426	0.662
39	CC	pel	NA	MTI	nao	T0	NA	NA	tice	6	0.425	0.628
40	CC	pel	NA	MTI	NA	T0	NA	NA	tice	5	0.424	0.594
41	NA	pel	shell_land	MTI	NA	T0	S0	S150	tice	7	0.424	0.661
42	CC	pel	shell_land	MTI	NA	NA	NA	S150	NA	5	0.419	0.590
43	NA	pel	shell_land	MTI	NA	T0	NA	NA	NA	4	0.418	0.555
44	CC	NA	shell_land	MTI	nao	T0	S0	S150	tice	8	0.417	0.691
45	CC	pel	shell_land	MTI	nao	NA	NA	S150	NA	6	0.417	0.623
46	CC	pel	shell_land	MTI	NA	NA	NA	NA	NA	4	0.417	0.554
47	NA	pel	shell_land	MTI	NA	NA	S0	NA	tice	5	0.416	0.588
48	NA	pel	shell_land	MTI	NA	T0	NA	S150	tice	6	0.416	0.622
49	CC	pel	shell_land	MTI	NA	NA	S0	S150	tice	7	0.415	0.656
50	NA	pel	shell_land	MTI	nao	T0	NA	S150	tice	7	0.414	0.655

0.400 - 0.449
0.450 - 0.499
0.500 - 0.549
0.550 - 0.599

CC = total landings; pel = pelagic landings; shell_land = shellfish landings; MTI = mean trophic index
nao = North Atlantic Oscillation; T0 = sea surface temperature; S0 = surface salinity; S150 = salinity at depth of 150 m; tice = Time_{Ice} (timing of sea ice melt)
n_Inds = number of predictors included in the given model

Table S.4: Predictors included in each of the top 50 Before Avg1 models, and associated adjusted-R² and R². See below for abbreviation key.

Rank	Fishing Pressures				Environmental Pressures					n_Inds	total adjusted-R2	total-R2
	CC	pel	shell_land	MTI	nao	T0	S0	S150	tice			
1	CC	pel	shell_land	MTI	nao	T0	S0	S150	tice	9	0.959	0.996
2	CC	pel	shell_land	MTI	NA	T0	S0	S150	tice	8	0.899	0.980
3	CC	NA	shell_land	MTI	nao	T0	S0	S150	tice	8	0.889	0.978
4	NA	pel	shell_land	MTI	NA	T0	S0	S150	tice	7	0.887	0.966
5	CC	pel	NA	MTI	nao	T0	S0	S150	tice	8	0.880	0.976
6	CC	NA	shell_land	MTI	NA	T0	S0	S150	tice	7	0.876	0.963
7	NA	NA	shell_land	MTI	NA	T0	S0	S150	tice	6	0.873	0.949
8	CC	pel	NA	MTI	NA	T0	S0	S150	tice	7	0.871	0.961
9	NA	pel	shell_land	NA	NA	T0	S0	S150	tice	6	0.869	0.948
10	NA	pel	shell_land	NA	nao	T0	S0	S150	tice	7	0.861	0.958
11	NA	pel	shell_land	MTI	nao	T0	S0	S150	tice	8	0.857	0.971
12	NA	NA	shell_land	NA	nao	T0	S0	S150	tice	6	0.857	0.943
13	CC	pel	shell_land	NA	NA	T0	S0	S150	tice	7	0.853	0.956
14	CC	NA	shell_land	NA	nao	T0	S0	S150	tice	7	0.853	0.956
15	CC	pel	shell_land	NA	nao	T0	S0	S150	tice	8	0.852	0.970
16	NA	NA	shell_land	MTI	nao	T0	S0	S150	tice	7	0.850	0.955
17	CC	NA	NA	MTI	NA	T0	S0	S150	tice	6	0.847	0.939
18	CC	NA	NA	MTI	nao	T0	S0	S150	tice	7	0.841	0.952
19	CC	pel	NA	NA	nao	T0	S0	S150	tice	7	0.839	0.952
20	CC	pel	NA	MTI	nao	T0	S0	NA	NA	6	0.838	0.935
21	CC	pel	NA	NA	NA	T0	S0	S150	tice	6	0.837	0.935
22	CC	NA	NA	NA	nao	T0	S0	S150	tice	6	0.835	0.934
23	NA	pel	NA	MTI	nao	T0	S0	S150	tice	7	0.831	0.949
24	CC	NA	NA	MTI	nao	T0	S0	NA	NA	5	0.824	0.912
25	NA	pel	shell_land	MTI	NA	T0	S0	S150	NA	6	0.821	0.929
26	NA	pel	shell_land	NA	NA	T0	S0	S150	NA	5	0.820	0.910
27	CC	pel	shell_land	MTI	nao	T0	S0	NA	NA	7	0.820	0.946
28	CC	NA	shell_land	MTI	nao	T0	S0	NA	NA	6	0.818	0.927
29	NA	NA	NA	MTI	nao	T0	S0	S150	tice	6	0.817	0.927
30	CC	pel	NA	MTI	nao	T0	S0	S150	NA	7	0.813	0.944
31	CC	NA	NA	NA	nao	T0	S0	S150	NA	5	0.812	0.906
32	CC	NA	shell_land	NA	NA	T0	S0	S150	tice	6	0.811	0.925
33	CC	pel	NA	NA	NA	T0	S0	S150	NA	5	0.809	0.904
34	CC	pel	NA	NA	nao	T0	S0	S150	NA	6	0.809	0.924
35	CC	NA	shell_land	NA	nao	T0	S0	S150	NA	6	0.809	0.923
36	CC	pel	NA	MTI	NA	T0	S0	S150	NA	6	0.807	0.923
37	CC	pel	NA	MTI	nao	T0	S0	NA	tice	7	0.806	0.942
38	CC	NA	NA	NA	NA	T0	S0	S150	tice	5	0.802	0.901
39	NA	pel	NA	MTI	NA	T0	S0	S150	tice	6	0.802	0.921
40	NA	pel	shell_land	NA	nao	T0	S0	S150	NA	6	0.799	0.920
41	CC	NA	shell_land	MTI	nao	T0	S0	NA	tice	7	0.799	0.940
42	CC	NA	NA	MTI	nao	T0	S0	S150	NA	6	0.797	0.919
43	CC	NA	NA	MTI	nao	T0	S0	NA	tice	6	0.794	0.918
44	CC	NA	shell_land	MTI	nao	T0	S0	S150	NA	7	0.793	0.938
45	NA	pel	shell_land	MTI	nao	T0	S0	S150	NA	7	0.792	0.938
46	NA	NA	shell_land	MTI	NA	T0	S0	S150	NA	5	0.791	0.896
47	CC	pel	shell_land	MTI	nao	T0	S0	NA	tice	8	0.789	0.958
48	NA	NA	shell_land	NA	NA	T0	S0	S150	tice	5	0.787	0.893
49	CC	pel	shell_land	NA	NA	T0	S0	S150	NA	6	0.786	0.915
50	NA	pel	NA	MTI	nao	T0	S0	S150	NA	6	0.786	0.914

CC = total landings; pel = pelagic landings; shell_land = shellfish landings; MTI = mean trophic index

nao = North Atlantic Oscillation; T0 = sea surface temperature; S0 = surface salinity; S150 = salinity at depth of 150 m; tice = Time_{ice} (timing of sea ice melt)

n_Inds = number of predictors included in the given model

Table S.5: Predictors included in each of the top 50 After Avg1 models, and associated adjusted-R² and R². See below for abbreviation key.

Rank	Fishing Pressures				Environmental Pressures					n_Inds	total adjusted-R2	total-R2
	CC	pel	shell_land	MTI	nao	T0	S0	S150	tice			
1	CC	pel	shell_land	MTI	NA	NA	S0	S150	tice	7	0.535	0.726
2	CC	pel	shell_land	MTI	NA	NA	NA	S150	tice	6	0.533	0.698
3	CC	pel	shell_land	MTI	NA	NA	NA	S150	NA	5	0.531	0.669
4	CC	pel	shell_land	MTI	nao	NA	NA	S150	tice	7	0.527	0.722
5	NA	pel	shell_land	MTI	NA	NA	S0	S150	tice	6	0.525	0.693
6	CC	pel	shell_land	MTI	nao	NA	NA	S150	NA	6	0.521	0.690
7	CC	pel	shell_land	MTI	NA	NA	S0	S150	NA	6	0.520	0.690
8	CC	pel	shell_land	MTI	NA	T0	S0	S150	tice	8	0.520	0.746
9	CC	pel	shell_land	MTI	NA	T0	NA	S150	tice	7	0.519	0.717
10	CC	pel	shell_land	MTI	NA	T0	NA	S150	NA	6	0.517	0.687
11	CC	pel	shell_land	MTI	nao	NA	S0	S150	tice	8	0.516	0.744
12	CC	pel	shell_land	MTI	nao	NA	S0	S150	NA	7	0.514	0.714
13	NA	pel	shell_land	MTI	NA	NA	S0	S150	NA	5	0.512	0.656
14	CC	pel	shell_land	MTI	nao	T0	NA	S150	tice	8	0.511	0.741
15	NA	pel	shell_land	MTI	NA	T0	S0	S150	tice	7	0.511	0.712
16	NA	NA	shell_land	MTI	NA	NA	S0	S150	tice	5	0.508	0.652
17	CC	pel	shell_land	MTI	NA	T0	S0	S150	NA	7	0.504	0.708
18	CC	NA	shell_land	MTI	NA	NA	S0	S150	tice	6	0.503	0.679
19	CC	pel	shell_land	MTI	nao	T0	NA	S150	NA	7	0.503	0.707
20	NA	pel	shell_land	MTI	nao	NA	S0	NA	tice	6	0.500	0.677
21	NA	pel	NA	MTI	nao	T0	S0	NA	tice	6	0.500	0.677
22	NA	pel	NA	MTI	nao	NA	S0	NA	tice	5	0.500	0.647
23	NA	pel	shell_land	MTI	nao	NA	S0	S150	tice	7	0.499	0.705
24	NA	pel	shell_land	MTI	NA	NA	S0	NA	tice	5	0.498	0.646
25	NA	pel	shell_land	MTI	NA	T0	S0	NA	tice	6	0.498	0.675
26	NA	pel	shell_land	MTI	NA	T0	S0	S150	NA	6	0.497	0.675
27	CC	pel	shell_land	MTI	nao	T0	S0	S150	tice	9	0.497	0.763
28	NA	pel	shell_land	MTI	nao	NA	S0	S150	NA	6	0.496	0.674
29	CC	NA	shell_land	MTI	NA	NA	NA	S150	tice	5	0.496	0.644
30	NA	NA	shell_land	MTI	NA	T0	S0	S150	tice	6	0.495	0.673
31	CC	pel	shell_land	MTI	nao	T0	S0	S150	NA	8	0.492	0.731
32	NA	pel	NA	MTI	NA	NA	S0	S150	tice	5	0.491	0.641
33	NA	pel	shell_land	MTI	nao	T0	S0	NA	tice	7	0.491	0.701
34	CC	NA	shell_land	MTI	NA	T0	S0	S150	tice	7	0.489	0.700
35	NA	pel	NA	MTI	NA	T0	S0	S150	tice	6	0.488	0.669
36	CC	pel	NA	MTI	NA	NA	NA	S150	tice	5	0.488	0.639
37	CC	pel	NA	MTI	nao	NA	NA	S150	tice	6	0.486	0.667
38	CC	pel	NA	MTI	nao	T0	S0	NA	tice	7	0.486	0.698
39	CC	pel	shell_land	MTI	NA	T0	S0	NA	tice	7	0.485	0.697
40	CC	pel	NA	MTI	NA	T0	NA	S150	tice	6	0.485	0.666
41	CC	pel	shell_land	MTI	nao	NA	S0	NA	tice	7	0.484	0.697
42	CC	pel	NA	MTI	nao	NA	S0	NA	tice	6	0.484	0.666
43	CC	pel	shell_land	MTI	NA	NA	S0	NA	tice	6	0.484	0.666
44	CC	pel	NA	MTI	nao	T0	NA	S150	tice	7	0.484	0.696
45	CC	NA	shell_land	MTI	NA	T0	NA	S150	tice	6	0.482	0.665
46	CC	NA	shell_land	MTI	nao	NA	NA	S150	tice	6	0.481	0.664
47	NA	NA	shell_land	MTI	nao	NA	S0	S150	tice	6	0.481	0.664
48	NA	pel	shell_land	MTI	nao	T0	S0	S150	tice	8	0.480	0.725
49	CC	pel	NA	MTI	NA	NA	S0	S150	tice	6	0.478	0.662
50	CC	NA	shell_land	MTI	nao	NA	S0	S150	tice	7	0.476	0.692

CC = total landings; pel = pelagic landings; shell_land = shellfish landings; MTI = mean trophic index
nao = North Atlantic Oscillation; T0 = sea surface temperature; S0 = surface salinity; S150 = salinity at depth of 150 m; tice = Time_{tice} (timing of sea ice melt)
n_Inds = number of predictors included in the given model

SUPPLEMENTARY FIGURES

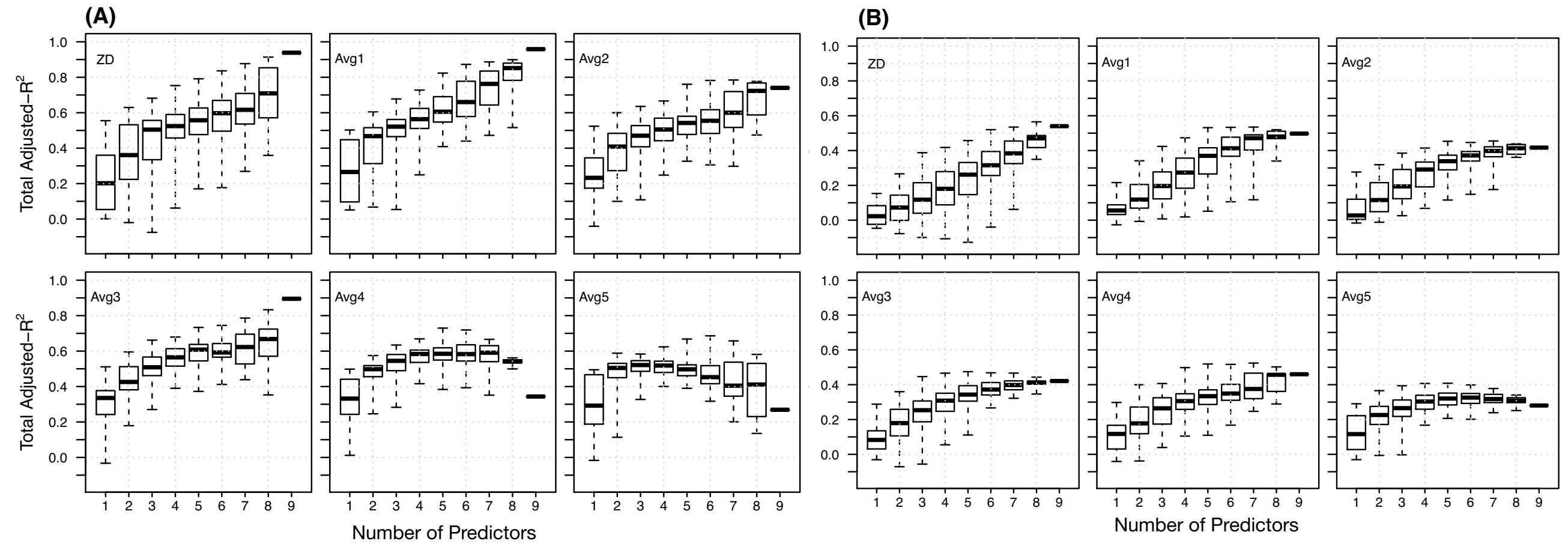


Figure S.1: Average predictors- The range of total adjusted- R^2 for a given number of predictors all delayed by the same k for (a) Before and (b) After the collapse.

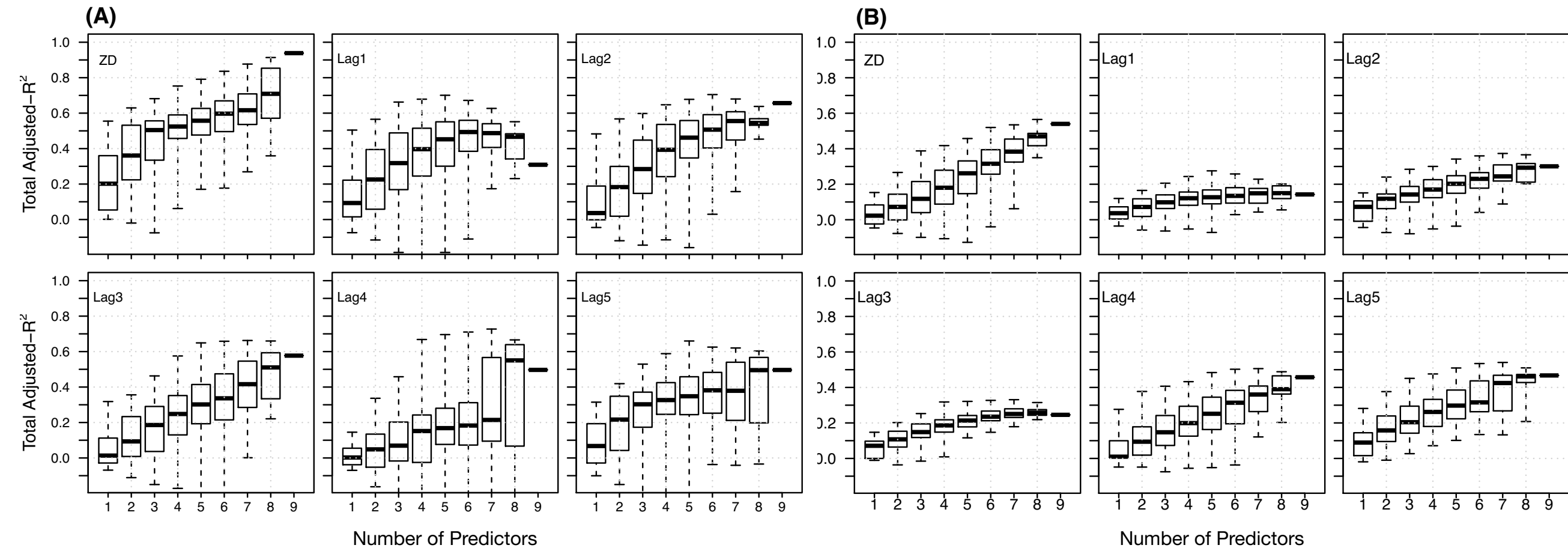


Figure S.2: Lag predictors- The range of total adjusted- R^2 for a given number of predictors all delayed by the same k for (a) Before and (b) After the collapse.