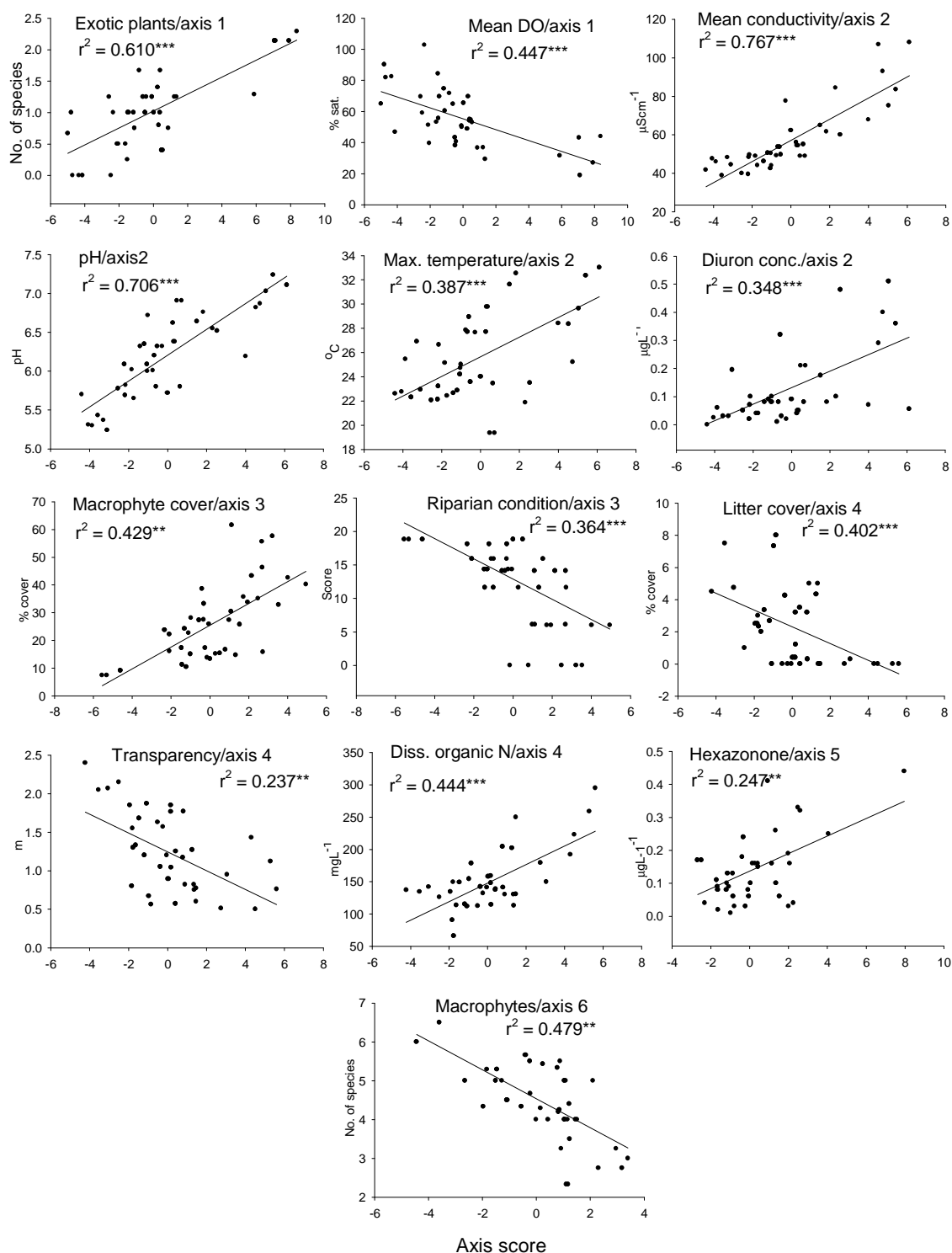# Supplementary Material

Fig. S1. Regressions of major environmental variables with PCA axes. Proportion of variance explained by each axis was: Axis 1, 25.1%; 2, 16.6%; 3, 10.5%; 4, 8.5%; 5, 7.3%; 6. 7.0%. For each regression r^2 values are shown; P values indicated by ** $P < 0.01$, *** $P < 0.001$.
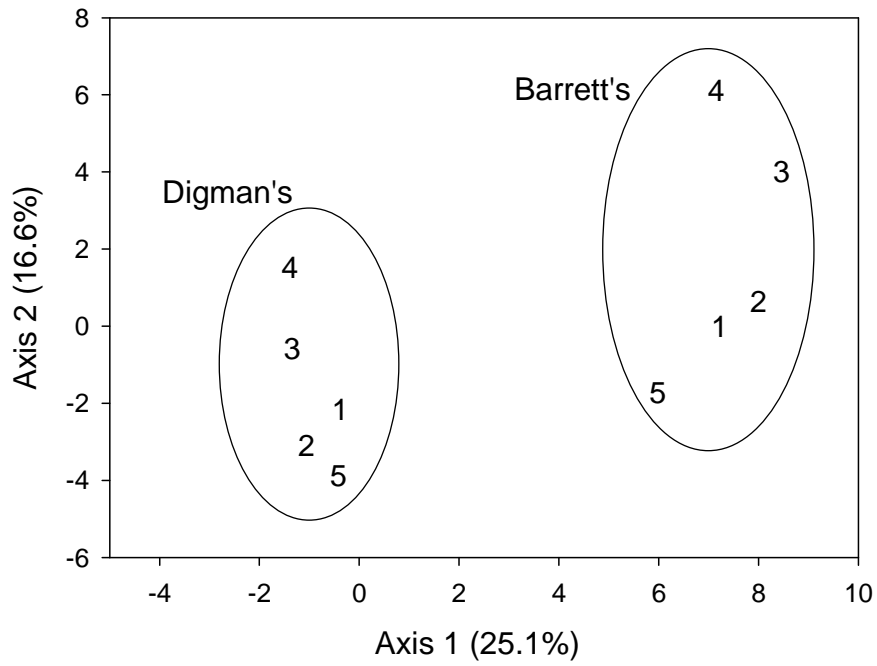
Fig. S2. Temporal trajectories of biophysical variables at two lagoons based on same Principal Component Analysis as Fig A1. Axes 1 and 2 presented, and percent of variance explained by each axis is shown. Symbols represent sampling times (1, May 2008; 2, July 2008; 3, September 2008; 4, November 2008; 5, May 2009).
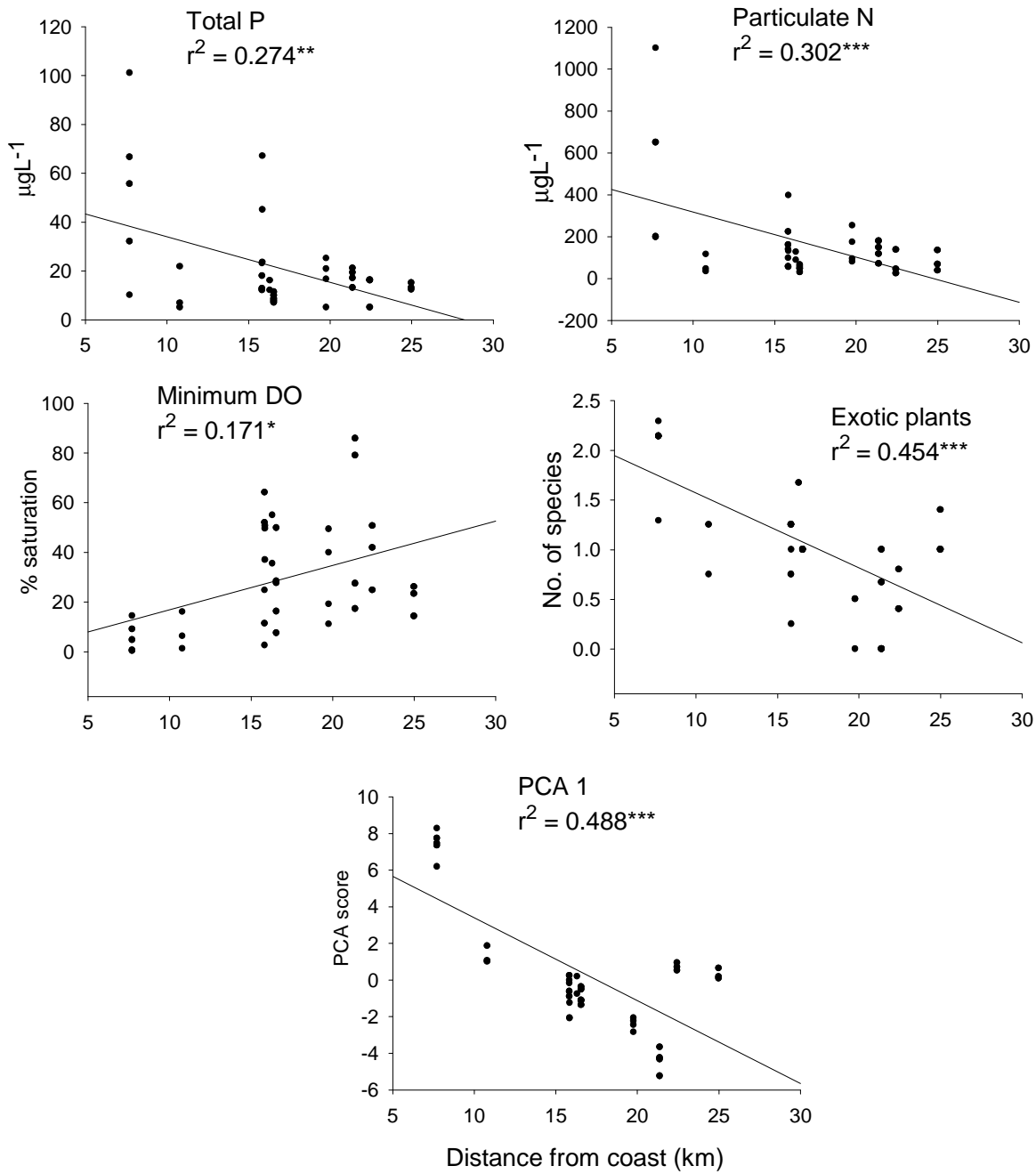
Fig. S3. Regressions between selected variables and distance from the coast; r^2 values for each regression are shown; P values indicated by * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

Table S1. Macroinvertebrate taxa of Tully-Murray lagoons.

Occurrence shown by proportion of samples and number of sites (lagoons); ordered by number of sites then frequency of occurrence. N = total number of samples or sites.

Class/ Order	Family	% of samples (N = 189)	No. of sites (N = 10)
Diptera	Chironomidae	99.5	10
Decapoda	Atyidae	97.9	10
Hemiptera	Corixidae	61.4	10
Ostracoda		56.6	10
Zygoptera	Coenagrionidae	55.6	10
Diptera	Ceratopogonidae	53.4	10
Acarina		46.0	10
Epiproctophora		36.5	10
Epiproctophora	Hemicorduliidae/Urothemistidae/Libellulidae	35.4	10
Trichoptera	Leptoceridae	33.9	10
Cladocera		31.7	10
Oligochaeta		29.1	10
Lepidoptera	Pyralidae	20.1	10
Hemiptera	Notonectidae	49.2	9
Ephemeroptera	Baetidae	43.4	9
Ephemeroptera	Caenidae	27.0	9
Diptera	Culicidae	24.9	9
Copepoda		19.6	9
Coleoptera	Hydrophilidae	15.9	9
Hemiptera	Pleidae	13.8	9
Gastropoda	Planorbidae 1	30.2	8
Epiproctophora	Lindeniidae	16.9	8
Hemiptera	Veliidae	12.7	8
Hemiptera	Nepidae	11.6	8
Hemiptera	Mesoveliidae	10.1	8
Coleoptera	Dytiscidae	8.5	8
Hemiptera	Hebridae	7.9	8
Trichoptera	Calamoceratidae	29.6	7
Trichoptera	Leptoceridae – *Triplectides*	23.3	7
Hemiptera	Gerridae	17.5	7
Trichoptera	Ecnomidae	14.8	7
Hemiptera	Naucoridae	13.2	7
Arachnida	Pisauridae	11.1	7
Trichoptera	Hydroptilidae 1	9.5	7
Coleoptera	Hydraenidae	9.0	7
Bryozoa		14.8	6
Zygoptera	Protoneuridae	10.1	6
Nematoda		9.5	6
Neuroptera	Sisyridae	9.0	6
Epiproctophora	Macromiidae	8.5	6
Coleoptera	Scirtidae	6.3	6
Hirudinea		5.8	6
Gastropoda	Planorbidae 2	4.2	6
Decapoda	Palaemonidae	15.9	5
Coleoptera	Elmidae	15.3	5
Zygoptera	Isosticidae	11.6	5
Coleoptera	Haliplidae	6.3	5
Trichoptera	Hydroptilidae 2	6.3	5
Bivalvia	Sphaeriidae	5.8	5
Bivalvia	Corbiculidae	3.2	4
Turbellaria		2.6	4
Diptera	Chaoboridae	10.1	3
Hemiptera	Belastomatidae	5.8	3
Ephemeroptera	Leptophlebiidae	4.8	3
Epiproctophora	Aeshnidae	4.2	3
Trichoptera	Dipseudopsidae	3.7	3

Coleoptera	Curculionidae	3.2	3
Trichoptera	Hydroptilidae 3	2.6	3
Gastropoda	Planorbidae 3	2.1	3
Gastropoda	Planorbidae 4	2.1	3
Gastropoda	Ancylidae	1.6	3
Gastropoda	indet.	14.8	2
Epiproctophora	Gomphidae	3.7	2
Coleoptera	Gyrinidae	2.1	2
Collembola		1.6	2
Diptera	Dolichopodidae	1.6	2
Trichoptera	Hydroptilidae 4	1.1	2
Diptera	Tipulidae	1.1	2
Gastropoda	Lymnaeidae	4.2	1
Coleoptera	Lampyridae	0.5	1
Diptera	Psychodidae	0.5	1

Table S2. Summary of pairwise differences in macroinvertebrate assemblages between months (*a*) and lagoons (*b*), indicated by PERMANOVA. Bottom left of tables is the *t* statistic; top right is the value of *P*: * $P < 0.05$, ** $P < 0.01$.

(*a*)

(*b*)

Month	May 2008	July 2008	Sept 2008	Nov 2008	May 2009
May 2008		0.059	0.045*	0.071	0.007**
July 2008	1.753		0.034*	0.081	0.051
September 2008	1.447	2.185		0.111	0.021*
November 2008	1.690	2.580	1.500		0.033*
May 2009	1.801	1.998	1.724	2.353	

Lagoon	1	2	3	4	5	6	7	8	9	10
1 Barrett's		0.030*	0.021*	0.018*	0.022*	0.119	0.327	0.176	0.254	0.198
2 Kyambul	2.463		0.029*	0.030*	0.067	0.124	0.179	0.104	0.207	0.127
3 Selby's	2.529	2.648		0.008**	0.026*	0.139	0.452	0.223	0.191	0.092
4 Digman's	2.898	2.629	2.718		0.024*	0.067	0.309	0.119	0.187	0.082
5 Zamora's	3.306	2.607	3.250	3.539		0.070	0.185	0.091	0.201	0.100
6 Bunta	2.107	2.102	1.717	2.584	2.995		0.322	0.100	0.038*	0.099
7 Racconello's	1.229	1.644	1.020	1.274	1.487	1.226		0.281	0.313	0.167
8 Carroll's	1.723	2.233	1.520	2.031	2.406	2.008	1.370		0.320	0.109
9 Digman's 3	1.841	2.068	2.306	2.133	2.431	3.446	1.438	1.791		0.251
10 Boongara	1.451	1.771	1.867	2.203	2.065	2.089	1.631	1.974	1.724	

Table S3. Correlations (*r*) of abundance of common taxa with NMDS axis scores.

N = 58, stress = 0.163. Proportion of variance (%) explained by each axis is indicated. *P* values are: **P* < 0.05, ** *P* < 0.01, *** P < 0.001. Sorted to maximise contrasts within axes, by most to least important axis (3-2-1). Only taxa with *P* < 0.05 shown.

	Axis 1 (17.4%)	Axis 2 (26.0%)	Axis 3 (35.3%)
Calamoceratidae	0.308*	0.345**	0.667***
Notonectidae	-0.466***	0.249	0.602***
Triplectides	0.007	0.410**	0.550***
Leptoceridae 1	-0.119	0.127	0.409**
Ostracoda	0.005	0.716***	0.177
Oligochaeta	0.074	0.716***	-0.052
Acarina	0.064	0.695***	-0.072
Zygoptera indet.	0.405**	0.669***	0.012
Elmidae	-0.079	0.460***	0.165
Caenidae	-0.013	0.428***	-0.194
Hydraenidae	0.007	0.348**	-0.07
Ecnomidae	0.271*	0.287*	0.124
Atyidae	-0.345**	0.280*	0.069
Chironomidae	0.572***	-0.105	0.158
Amerianna	0.427***	-0.185	0.046
Coenagrionidae	0.118	0.04	-0.26*
Naucoridae	-0.269*	-0.111	-0.23
Protoneuridae	-0.361**	0.013	-0.067
Gerridae	-0.444***	0.208	-0.018
Hemicorduliidae/Urothemistidae/ Libellulidae	0.405**	-0.298*	-0.014
Hydroptilidae	-0.078	0.274*	-0.385**
Corixidae	-0.283*	-0.192	-0.408**
Pyralidae	-0.368**	0.198	-0.466***
Ceratopogonidae	-0.075	0.213	-0.468***
Culicidae	-0.299**	0.124	-0.599***
Pleidae	-0.031	0.303*	-0.621***
Baetidae	-0.2	0.125	-0.773***

Table S4. Correlations (*r*) of environmental variables with NMDS axis scores.
N = 58, stress = 0.163. Proportion of variance (%) explained by each axis is indicated; *P* values are: **P <*
0.05, ** *P <* 0.01, *** P < 0.001.. Sorted as Table A3.

	Axis 1 (17.4%)	Axis 2 (26.0%)	Axis 3 (35.3%)
Depth, max.	0.198	-0.111	0.463***
pH, mean	-0.201	0.542***	0.134
pH, min.	-0.173	0.499***	0.159
pH, max.	-0.188	0.496***	0.172
Temperature, mean	0.007	0.391**	-0.122
Temperature, min.	0.029	0.383**	-0.099
Temperature, max.	-0.058	0.371**	-0.131
Litter cover	-0.165	0.347**	0.211
Atrazine	-0.178	0.309*	0.020
Distance to river mouth	-0.265*	0.306*	-0.082
DO, max.	-0.322*	0.122	-0.239
Deatrazine	-0.326*	0.229	0.009
DO, mean	-0.328*	0.108	-0.132
Elevation	-0.351**	0.034	-0.085
Hexazinone	-0.378**	0.007	0.059
Diss. inorganic N	-0.390**	-0.013	0.140
Diuron	-0.474***	0.090	-0.137
Distance to river	0.126	-0.277*	0.003
Plant sp. richness	0.050	-0.291*	-0.224
Exotic plant sp. richness	0.145	-0.360**	-0.031
Native plant sp. richness	-0.025	-0.064	-0.268*
Plant cover	-0.035	-0.146	-0.299*
Native plant cover	-0.051	-0.201	-0.356**