Supporting Information

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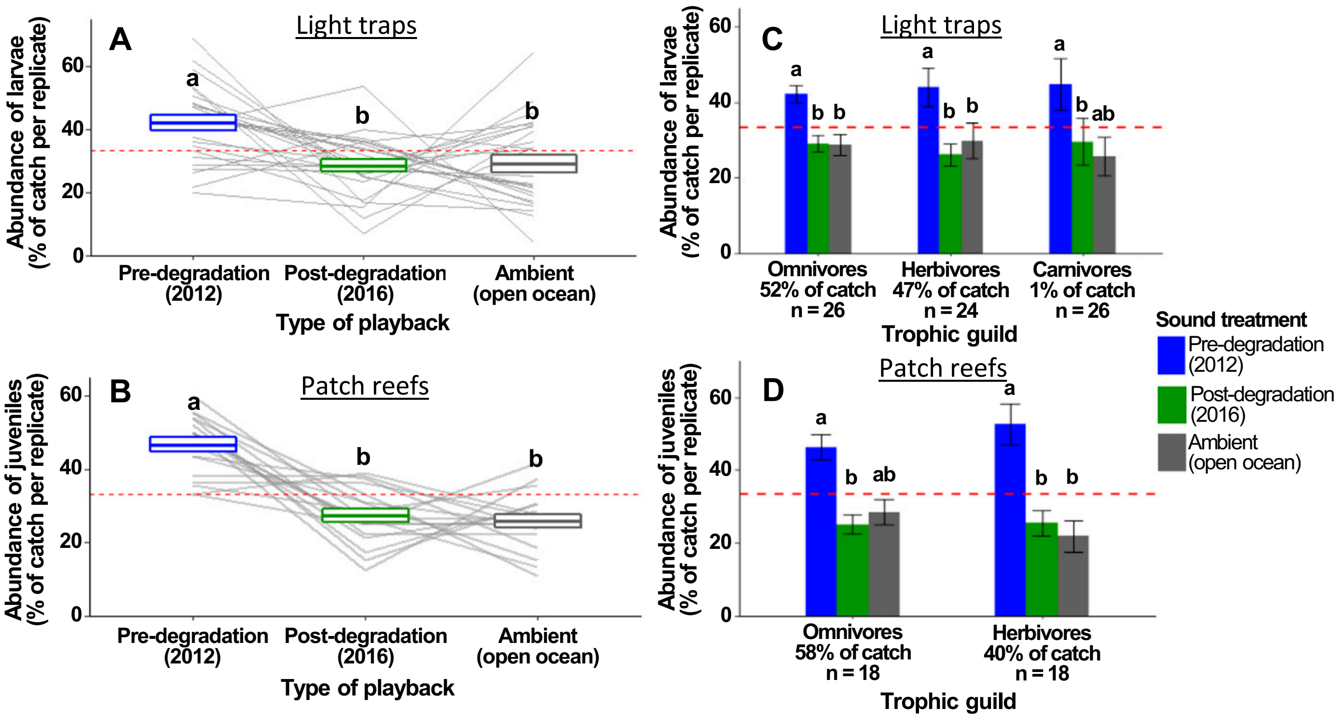

Fig. S1. Effects of sound treatment on total abundance of recruiting reef fish. (*A* and *B*) Percentage abundance of total fish collected from (*A*) light traps (n = 26) and (*B*) patch reefs (n = 18) associated with playback of predegradation reef sound, postdegradation reef sound, or ambient sound. Shown are results for each replicate (gray lines), overall mean ± SE (colored boxes), and the 33% ratio that would be predicted with no preference (red dashed lines). Mixed-effects models based on raw count data revealed significant differences in both experiments (Tables S1 and S2); different letters above boxplots represent significant differences in post hoc Tukey's HSD tests based on these models. (*C* and *D*) Percentage abundance of fish associated with predegradation, postdegradation, and ambient soundscape playback, split into trophic guilds with at least 50% frequency of occurrence. Graphs are constructed identically to *A* and *B*, with total abundance of each trophic guild as a percentage of the experiment's total catch, and number of experimental replicates analyzed (n), given on the x axis. The 33% ratio that would be predicted with no preference is shown by a red dashed line. For details of trophic guild classifications, see Dataset S1.

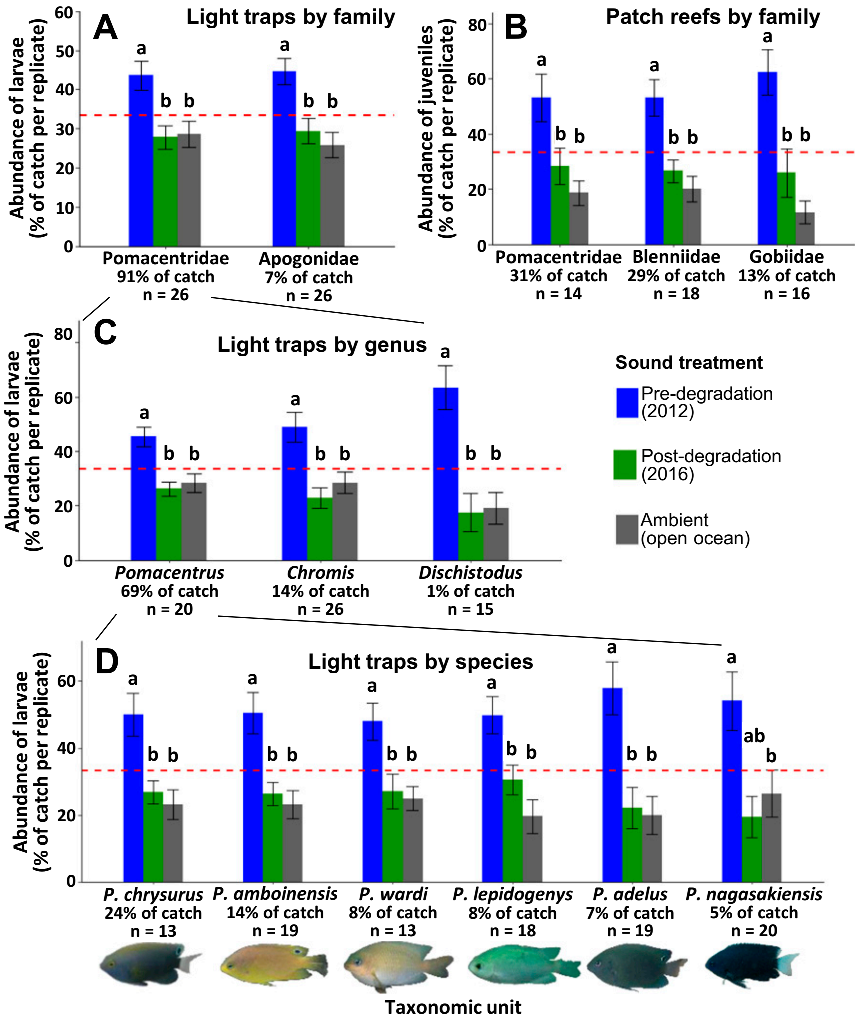

Fig. S2. Effects of sound treatment at different taxonomic levels. Mean ± SE percentage abundance of fish associated with predegradation, postdegradation, and ambient soundscape playbacks, split into taxonomic groups with at least 50% frequency of occurrence. Shown are (*A*) families in light traps, (*B*) families on patch reefs, (*C*) genera in light traps, and (*D*) species in light traps, with total abundance as a percentage of the experiment's total catch and number of experimental replicates analyzed (*n*) given on the *x* axis. The 33% ratio that would be predicted with no preference is shown by red dashed lines. All triplicate sets of bars showed significant differences in mixed-effects models based on raw count data; different letters above bars represent significant differences in post hoc Tukey's HSD tests based on these models (see Tables S1 and S2).

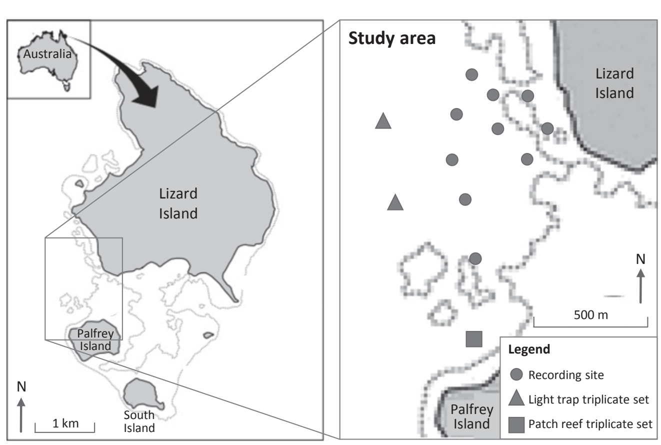

Fig. S3. Map of the study site at Lizard Island, Australia. Locations and layouts of the 10 recording sites (circles), two experimental light-trap sites (triangles), and one experimental patch-reef site (square) are shown. Adapted from ref. 32.

Table S1. Outputs from Linear Mixed Models and Generalized Linear Mixed Models investigating abundance and diversity of presettlement fishes collected in light traps associated with playback of predegradation reef sound, postdegradation reef sound, or ambient sound

Fixed effect (sound treatment)	Effect sizes ± SE	Post hoc comparison	Tukey's HSD *p*
Total abundance (*GLMM:* χ^2 *= 12.283, df = 2, p = 0.002*)			
Predegradation	0.384 ± 0.131	**Predegradation vs. Postdegradation**	**0.007**
Postdegradation	−0.004 ± 0.131	**Predegradation vs. Ambient**	**0.009**
Intercept (ambient)	4.807 ± 0.326	Postdegradation vs. Ambient	**0.999**
Random effects: Date 1.610 ± 1.269; Track ID <0.001 ± <0.001; Site ID 0.003 ± 0.057; Trap ID in site ID <0.001 ± <0.001			
Omnivore abundance (*GLMM:* χ^2 *= 12.011, df = 2, p = 0.002*)			
Predegradation	0.393 ± 0.131	**Predegradation vs. Postdegradation**	**0.011**
Postdegradation	0.019 ± 0.132	**Predegradation vs. Ambient**	**0.007**
Intercept (ambient)	4.477 ± 0.256	Postdegradation vs. Ambient	0.988
Random effects: Date 0.938 ± 0.969; Track ID <0.001 ± <0.001; Site ID <0.001 ± 0.031; Trap ID in site ID <0.001 ± <0.001			
Herbivore abundance (*GLMM:* χ^2 *= 10.053, df = 2, p = 0.007*)			
Predegradation	0.458 ± 0.163	**Predegradation vs. Postdegradation**	**0.021**
Postdegradation	0.037 ± 0.161	**Predegradation vs. Ambient**	**0.014**
Intercept (ambient)	2.762 ± 0.621	Postdegradation vs. Ambient	0.972
Random effects: Date 4.866 ± 2.206; Track ID 0.063 ± 0.252; Site ID 0.098 ± 0.312; Trap ID in site ID <0.001 ± <0.001			
Carnivore abundance (*GLMM:* χ^2 *= 6.810, df = 2, p = 0.033*)			
Predegradation	0.409 ± 0.216	**Predegradation vs. Postdegradation**	**0.037**
Postdegradation	−0.151 ± 0.237	Predegradation vs. Ambient	0.139
Intercept (ambient)	0.528 ± 0.309	Postdegradation vs. Ambient	0.801
Random effects: Date 0.991 ± 0.995; Track ID <0.001 ± <0.001; Site ID 0.003 ± 0.057; Trap ID in site ID 0.019 ± 0.138			
Pomacentridae abundance (*GLMM:* χ^2 *= 11.353, df = 2, p = 0.003*)			
Predegradation	0.382 ± 0.134	**Predegradation vs. Postdegradation**	**0.011**
Postdegradation	−0.006 ± 0.134	**Predegradation vs. Ambient**	**0.012**
Intercept (ambient)	4.296 ± 0.412	Postdegradation vs. Ambient	0.999
Random effects Date 2.605 ± 1.614; Track ID <0.001 ± <0.001; Site ID 0.030 ± 0.172; Trap ID in site ID <0.001 ± 0.018			
Apogonidae abundance (*GLMM:* χ^2 *= 19.121, df = 2, p < 0.001*)			
Predegradation	0.585 ± 0.142	**Predegradation vs. Postdegradation**	**0.006**
Postdegradation	0.158 ± 0.144	**Predegradation vs. Ambient**	**<0.001**
Intercept (ambient)	2.643 ± 0.182	Postdegradation vs. Ambient	0.518
Random effects Date 0.196 ± 0.443; Track ID <0.001 ± <0.001; Site ID 0.018 ± 0.135; Trap ID in site ID 0.010 ± 0.100			
Pomacentrus spp. abundance (*GLMM:* χ^2 *= 12.404, df = 2, p = 0.002*)			
Predegradation	0.422 ± 0.146	**Predegradation vs. Postdegradation**	**0.019**
Postdegradation	0.166 ± 0.146	**Predegradation vs. Ambient**	**0.003**
Intercept (ambient)	2.782 ± 0.423	Postdegradation vs. Ambient	0.928
Random effects: Date 2.238 ± 1.496; Track ID <0.001 ± <0.001; Site ID 0.009 ± 0.096; Trap ID in site ID 0.014 ± 0.118			
Chromis spp. abundance (*GLMM:* χ^2 *= 28.414, df = 2, p < 0.001*)			
Predegradation	0.435 ± 0.113	**Predegradation vs. Postdegradation**	**<0.001**
Postdegradation	−0.155 ± 0.112	**Predegradation vs. Ambient**	**<0.001**
Intercept (ambient)	2.950 ± 0.356	Postdegradation vs. Ambient	0.352
Random effects: Date 1.688 ± 1.299; Track ID 0.107 ± 0.327; Site ID <0.001 ± <0.001; Trap ID in site ID 0.021 ± 0.146			
Dischistodus spp. abundance (*GLMM:* χ^2 *= 12.582, df = 2, p = 0.002*)			
Predegradation	0.946 ± 0.304	**Predegradation vs. Postdegradation**	**0.016**
Postdegradation	0.144 ± 0.331	**Predegradation vs. Ambient**	**0.005**
Intercept (ambient)	−0.340 ± 0.695	Postdegradation vs. Ambient	0.901
Random effects Date 1.135 ± 1.066; Track ID 1.101 ± 1.053; Site ID <0.001 ± <0.001; Trap ID in site ID 0.104 ± 0.322			
P. chrysurus abundance (*GLMM:* χ^2 *= 20.622, df = 2, p < 0.001*)			
Predegradation	0.729 ± 0.163	**Predegradation vs. Postdegradation**	**0.011**
Postdegradation	0.269 ± 0.154	**Predegradation vs. Ambient**	**<0.001**
Intercept (ambient)	3.147 ± 0.726	Postdegradation vs. Ambient	0.190
Random effects: Date 2.909 ± 1.706; Track ID 0.262 ± 0.512; Site ID 0.207 ± 0.455; Trap ID in site ID 0.030 ± 0.172			
P. amboinensis abundance (*GLMM:* χ^2 *= 17.021, df = 2, p < 0.001*)			
Predegradation	0.440 ± 0.107	**Predegradation vs. Postdegradation**	**0.047**
Postdegradation	0.178 ± 0.111	**Predegradation vs. Ambient**	**<0.001**
Intercept (ambient)	1.895 ± 0.465	Postdegradation vs. Ambient	0.245
Random effects: Date 2.785 ± 1.669; Track ID 0.006 ± 0.075; Site ID <0.001 ± <0.001; Trap ID in site ID 0.021 ± <0.144			
P. wardi abundance (*GLMM:* χ^2 *= 21.440, df = 2, p < 0.001*)			
Predegradation	0.730 ± 0.166	**Predegradation vs. Postdegradation**	**0.005**
Postdegradation	0.229 ± 0.160	**Predegradation vs. Ambient**	**<0.001**
Intercept (ambient)	2.623 ± 0.651	Postdegradation vs. Ambient	0.325
Random effects: Date 4.035 ± 2.009; Track ID 0.003 ± 0.056; Site ID <0.001 ± <0.001; Trap ID in site ID <0.001 ± <0.001			

Table S1. Cont.

Fixed effect (sound treatment)	Effect sizes ± SE	Post hoc comparison	Tukey's HSD *p*
P. lepidogenys abundance (*GLMM:* χ^2 *= 38.997, df = 2, p < 0.001*)			
Predegradation	0.876 ± 0.145	**Predegradation vs. Postdegradation**	**0.049**
Postdegradation	0.549 ± 0.144	**Predegradation vs. Ambient**	**<0.001**
Intercept (ambient)	0.968 ± 0.487	**Postdegradation vs. Ambient**	**<0.001**
Random effects: Date 1.811 ± 1.346; Track ID 0.155 ± 0.394; Site ID 0.010 ± 0.100; Trap ID in site ID 0.049 ± 0.221			
P. adelus abundance (*GLMM:* χ^2 *= 34.590, df = 2, p < 0.001*)			
Predegradation	1.033 ± 0.182	**Predegradation vs. Postdegradation**	**0.001**
Postdegradation	0.399 ± 0.192	**Predegradation vs. Ambient**	**<0.001**
Intercept (ambient)	0.765 ± 0.851	Postdegradation vs. Ambient	0.100
Random effects: Date 3.583 ± 1.893; Track ID 0.373 ± 0.611; Site ID 0.592 ± 0.763; Trap ID in site ID 0.230 ± 0.480			
P. nagasakiensis abundance (*GLMM:* χ^2 *= 6.712, df = 2, p = 0.035*)			
Predegradation	0.607 ± 0.246	Predegradation vs. Postdegradation	0.146
Postdegradation	0.162 ± 0.234	**Predegradation vs. Ambient**	**0.036**
Intercept (ambient)	0.590 ± 0.722	Postdegradation vs. Ambient	0.759
Random effects: Date 4.726 ± 2.174; Track ID 0.091 ± 0.302; Site ID 0.140 ± 0.374; Trap ID in site ID 0.090 ± 0.301			
Exponential Shannon–Weiner diversity index (*LMM:* χ^2 *= 1.245, df = 2, p = 0.537*)			
Predegradation	0.026 ± 0.058	Post hoc tests not applied, as	
Postdegradation	0.065 ± 0.058	there was no significant effect	
Intercept (ambient)	0.511 ± 0.087	of sound treatment	
Random effects: Date 0.095 ± 0.308; Track ID <0.001 ± <0.001; Site ID <0.001 ± <0.001; Trap ID in site ID 0.001 ± 0.033			

Effect sizes are relative to the ambient-sound treatment (intercept); variance ± SD is provided for random terms. Significant (*P* < 0.05) models and post hoc comparisons are displayed in bold.

Table S2. Outputs from Linear Mixed Models investigating abundance and diversity of fishes settling on patch reefs associated with playback of predegradation reef sound, postdegradation reef sound, or ambient sound

Fixed effect (sound treatment)	Effect size ± SE	Post hoc comparison	Tukey's HSD *p*
Total abundance (χ^2 = 28.957, df = 2, p < 0.001)			
Predegradation	2.833 ± 0.477	**Predegradation vs. Postdegradation**	**<0.001**
Postdegradation	0.167 ± 0.477	**Predegradation vs. Ambient**	**<0.001**
Intercept (ambient)	3.722 ± 0.408	Postdegradation vs. Ambient	0.935
Random effects: Date 0.951 ± 0.975; Track ID <0.001 ± <0.001; Reef ID <0.001 ± <0.001			
Omnivore abundance (χ^2 = 8.499, df = 2, p = 0.014)			
Predegradation	1.056 ± 0.468	**Predegradation vs. Postdegradation**	**0.009**
Postdegradation	−0.333 ± 0.468	Predegradation vs. Ambient	0.063
Intercept (ambient)	2.556 ± 0371	Postdegradation vs. Ambient	0.757
Random effects: Date 0.504 ± 0.710; Track ID <0.001 ± <0.001; Reef ID <0.001 ± <0.001			
Herbivore abundance (χ^2 = 13.854, df = 2, p = 0.001)			
Predegradation	1.333 ± 0.351	**Predegradation vs. Postdegradation**	**0.007**
Postdegradation	0.278 ± 0.351	**Predegradation vs. Ambient**	**<0.001**
Intercept (ambient)	1.357 ± 0.330	Postdegradation vs. Ambient	0.708
Random effects: Date <0.001 ± <0.001; Track ID 0.186 ± 0.431; Reef ID 0.008 ± 0.088			
Pomacentridae abundance (χ^2 = 7.115, df = 2, p = 0.029)			
Predegradation	1.214 ± 0.493	**Predegradation vs. Postdegradation**	**0.036**
Postdegradation	<0.001 ± 0.493	**Predegradation vs. Ambient**	**0.037**
Intercept (ambient)	1.500 ± 0.481	Postdegradation vs. Ambient	1.000
Random effects: Date 1.536 ± 1.239; Track ID <0.001 ± <0.001; Reef ID <0.001 ± <0.001			
Blenniidae abundance (χ^2 = 16.922, df = 2, p < 0.001)			
Predegradation	1.204 ± 0.272	**Predegradation vs. Postdegradation**	**0.004**
Postdegradation	0.344 ± 0.271	**Predegradation vs. Ambient**	**<0.001**
Intercept (ambient)	0.857 ± 0.332	Postdegradation vs. Ambient	0.412
Random effects: Date <0.001 ± <0.001; Track ID 0.222 ± 0.471; Reef ID 0.071 ± 0.266			
Gobiidae abundance (χ^2 = 18.078, df = 2, p < 0.001)			
Predegradation	0.938 ± 0.208	**Predegradation vs. Postdegradation**	**<0.001**
Postdegradation	0.125 ± 0.208	**Predegradation vs. Ambient**	**<0.001**
Intercept (ambient)	0.375 ± 0.158	Postdegradation vs. Ambient	0.819
Random effects: Date 0.055 ± 0.234; Track ID <0.001 ± <0.001; Reef ID <0.001 ± <0.001			
Exponential Shannon–Weiner diversity index (χ^2 = 4.045, df = 2, p = 0.132)			
Predegradation	0.571 ± 0.295	Post hoc tests not applied,	
Postdegradation	0.109 ± 0.295	as there was no significant	
Intercept (ambient)	2.425 ± 0.296	effect of sound treatment	
Random effects: Date <0.001 ± <0.001; Track ID 0.102 ± 0.319; Reef ID 0.058 ± 0.240			

Effect sizes are relative to the ambient-sound treatment (intercept); variance ± SD is provided for random terms. Significant (P < 0.05) models and post hoc comparisons are displayed in bold.

Other Supporting Information Files

Dataset S1 (PDF)