**Table S1.** Model comparison for analysis of the site survey dataranking the 10 best generalized linear mixed models (GLMM) plus the null model for each response variable. AICc = Akaike Information Criterion for small sample sizes. All models included the random effect = (1|Year/Site), site nested in year. Other covariates: green = green urchin density, Temp = ocean temperature, HFish = herbivorous fish biomass, Upwelling Area = area of nearest upwelling or productive region, Pencil = pencil urchin density, ENSO = El Niño Southern Oscillation. Bold indicates best model. ΔAICc = difference between the AICc of a particular model compared to the lowest AICc observed.

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| --- | --- | --- | --- |
| **Response variable** | **Model** | **d.f.** | **ΔAICc** |
| *Ulva* spp. biomass | NULL: Biomass ~ Intercept  | 21 | 36.9 |
| Biomass ~ Intercept + Green  |  32 | 32.8 |
| Biomass ~ Intercept + Green + Temp  | 41 | 2.9 |
| Biomass ~ Intercept + Temp  | 32 | 11.9 |
| Biomass ~ Intercept + HFish  |  | 33.3 |
| Biomass ~ Intercept + HFish + Temp  |  | 12.3 |
| Biomass ~ Intercept + HFish + Green  |  | 23.0 |
| **Biomass ~ Intercept + HFish + Green + Temp**  |  | **0.0** |
| Biomass ~ Intercept + HFish + Green + Temp + Upwelling Area  |  | 1.4 |
| Biomass ~ Intercept + HFish + Green + Temp + Pencil  |  | 1.5 |
| Biomass ~ Intercept + HFish + Green + Temp + Pencil + Upwelling Area  |  | 2.6 |
| Macroalgal Biomass (without *Ulva* spp.) | NULL: Biomass ~ Intercept  |  | 14.9 |
| **Biomass ~ Intercept + Temp**  |  | **0.0** |
| Biomass ~ Intercept + ENSO  |  | 3.0 |
| Biomass ~ Intercept + Green  |  | 3.0 |
| Biomass ~ Intercept + Temp + Pencil  |  | 1.9 |
| Biomass ~ Intercept + Temp + Green  |  | 1.8 |
| Biomass ~ Intercept + Temp + ENSO  |  | 2.0 |
| Biomass ~ Intercept + Temp + Upwelling Area  |  | 5.1 |
| Biomass ~ Intercept + Temp + Green + Upwelling Area  |  | 2.0 |
| Biomass ~ Intercept + Temp + Green + Upwelling Area + Pencil  |  | 4.5 |
| Biomass ~ Intercept + Temp + Green + Upwelling Area + ENSO  |  | 3.1 |