

Marine reserve designation, trophic cascades and altered community dynamics

David O'Sullivan¹, Mark Emmerson^{1,2,3,*}

¹School of Biological, Earth and Environmental Sciences, University College Cork, The Cooperage, Distillery Fields, North Mall, Cork, Ireland

²Environmental Research Institute, University College Cork, Lee Road, Cork, Ireland

³School of Biological Sciences, Medical and Biological Centre, Queen's University Belfast, 97 Lisburn Road, Belfast BT9 7BL, Northern Ireland, UK

*Corresponding author. Email: m.emmerson@qub.ac.uk

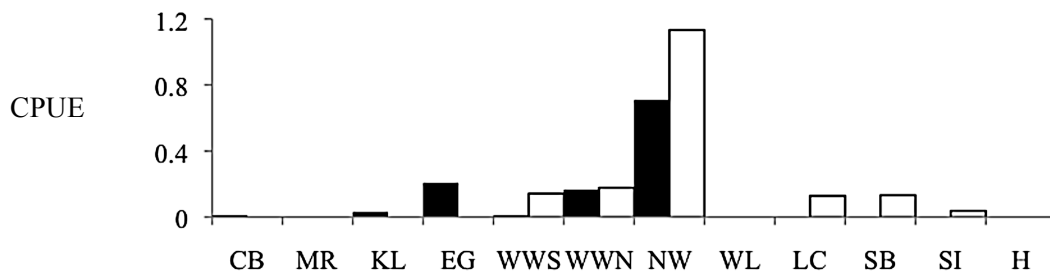
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Supplement. Data omitted from the main manuscript is reproduced here in the supplementary material to provide further information on ecosystem-wide changes in Lough Hyne. Historic (1963) and contemporary (2010) crab survey data are illustrated in Fig. 1 and historic (1962) and contemporary data (2010) on the density of the starfish *Asterias rubens* and *Asterina gibbosa* are provided in Fig. 2. We also provide comparable size frequency data for *Paracentrotus lividus* and *Gibbula cineraria* in Figs. 3 & 4. This data is limited to comparisons for which historic records exist in Muntz et al. (1965)

Table S1. Name, number and location of 12 sites sampled during 2010 survey of Lough Hyne Marine Reserve. Coordinates were taken using a handheld Garmin GPS. * denote survey at each site. ** only 1 prey species, *Paracentrotus lividus*, recorded. All sites are in the South Basin except where noted (NB = North Basin)

| Site no. | Name | Location | Prey | Crabs | Algae |
|----------|----------------------------|---------------------------|------|-------|-------|
| 1 | Codium Bay | 51°30.007' N 9°17.783' W | * | * | * |
| 2 | Mermaid Rock | 51°29.959' N 9°17.917' W | ** | * | * |
| 3 | Kitching Lab. | 51°29.920' N 9°18.028' W | ** | * | * |
| 4 | East Goleen | 51°29.881' N 9°18.142' W | * | * | * |
| 5 | Westwood South | 51°29.938' N 9°18.283' W | * | * | * |
| 6 | Westwood North (NB) | 51°30.060' N 9° 18.393' W | * | * | |
| 7 | North Wall (NB) | 51°30.361' N 9°18.314' W | * | * | |
| 8 | West Labhra (NB) | 51°30.070' N 9°18.135' W | * | * | |
| 9 | Labhra Cliff | 51°29.920' N 9°18.029' W | ** | * | * |
| 10 | Southwest Bay South Island | 51°30.053' N 9°18.027' W | ** | * | * |
| 11 | South South Island | 51°30.094' N 9°17.927' W | ** | * | * |
| 12 | Harbour | 51°30.010' N 9°17.728' W | * | * | * |

Carcinus maenas



Necora puber

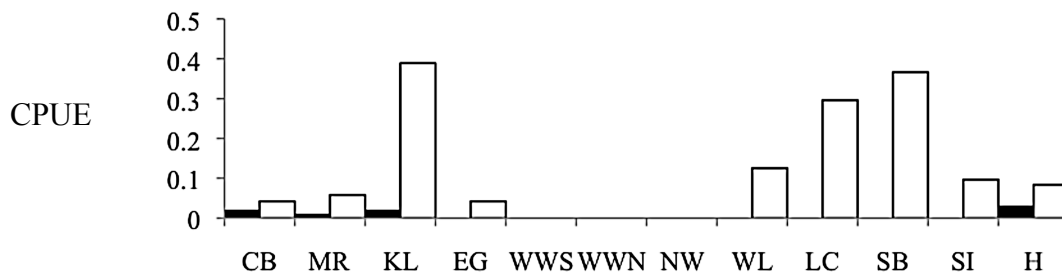
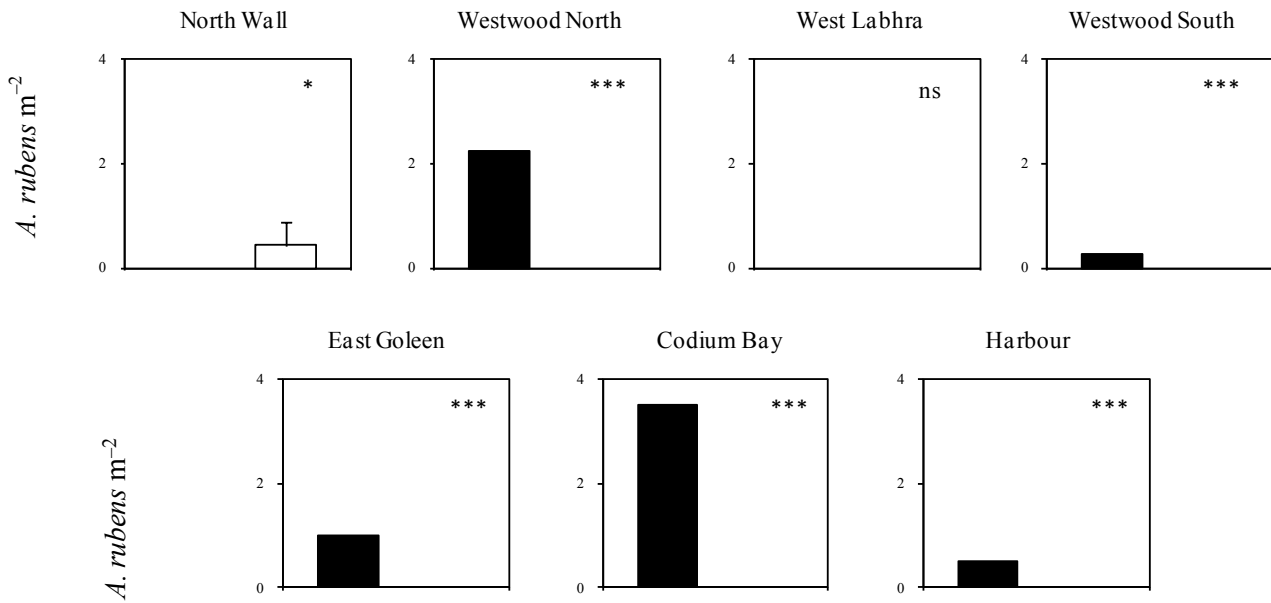


Fig. S1. (a) *Carcinus maenas* and (b) *Necora puber*. CPUE at each of 12 sites surveyed in 1963 (in black) and 2010 (in white). The mean CPUE for *N. puber* increased significantly ($p < 0.05$). See Fig. 1 in the main paper for site names

Asterias rubens



Asterina gibbosa

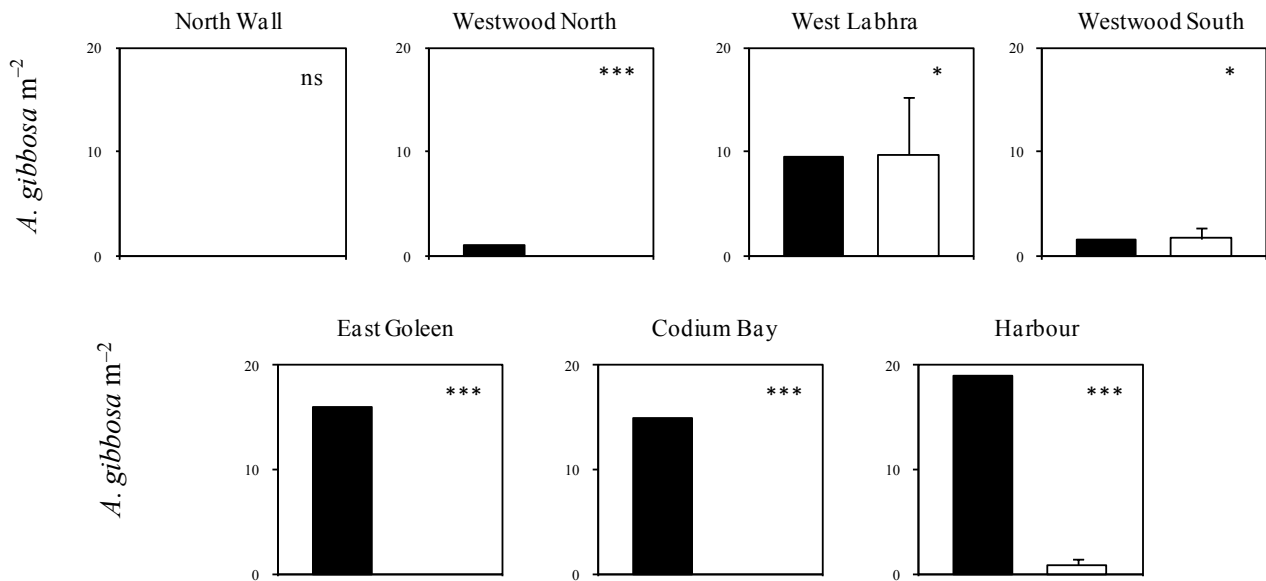


Fig. S2. (a) *Asterias rubens* and (b) *Asterina gibbosa*. Density at 7 sites in Lough Hyne Marine Reserve in 1963 (black bars) and 2010 (white bars, with SE). A paired Wilcoxon signed-rank test was used to test for changes in the density of both species at each site between 1963 and 2010. Asterisks denote the degree of significance in the difference (*, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.005$; ns, not significant)

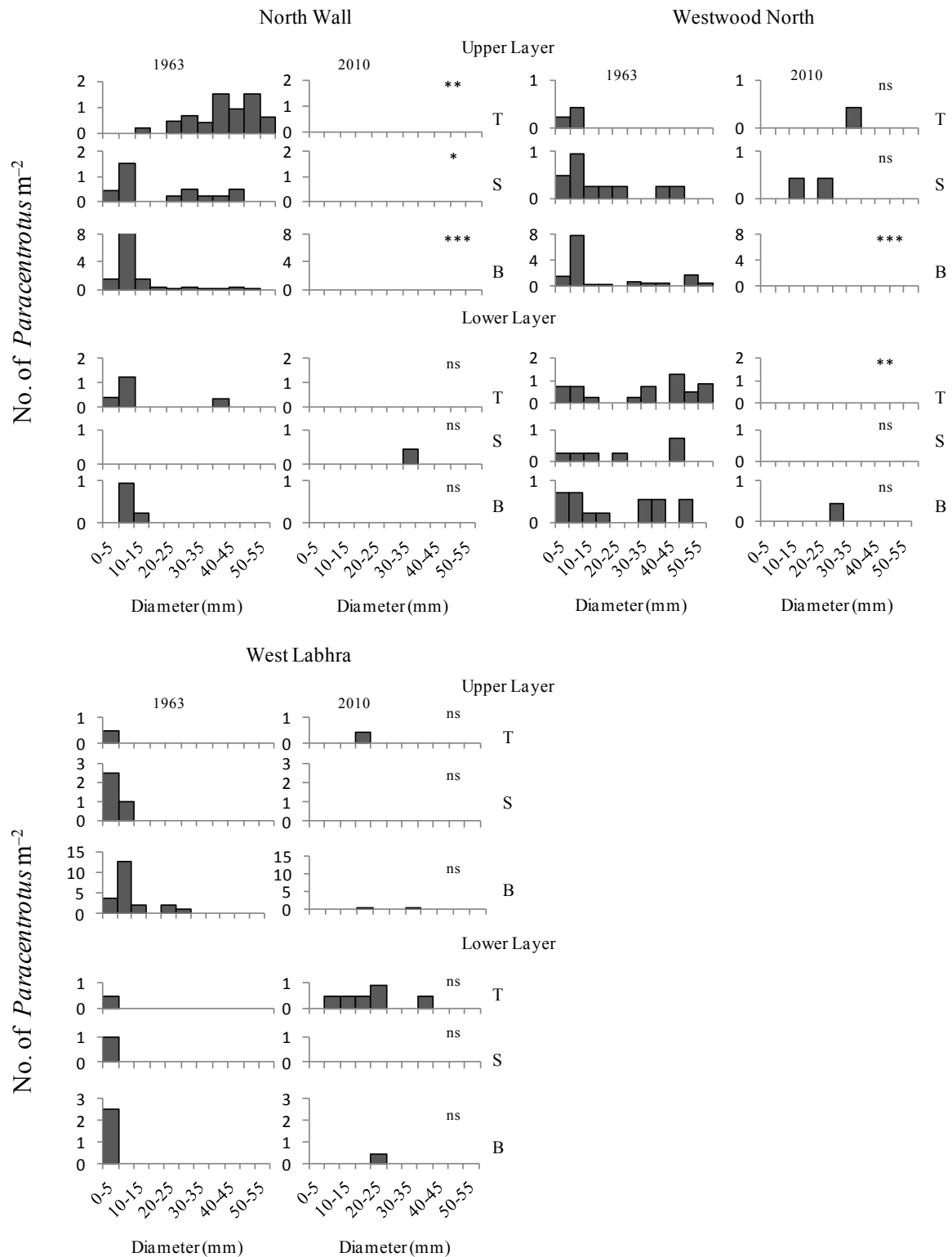


Fig. S3. *Paracentrotus lividus*. Size and frequency histograms at 3 sites within Lough Hyne sampled in 1963 and 2010. Specimens were recorded on the tops (T), sides (S) and bottoms (B) of Upper and Lower Layer boulders in the sublittoral zone. The Kolmogorov-Smirnov test was used to test for differences in the size classes at each aspect between 1963 and 2010. Asterisks denote the degree of significance (*, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.005$; ns, not significant)

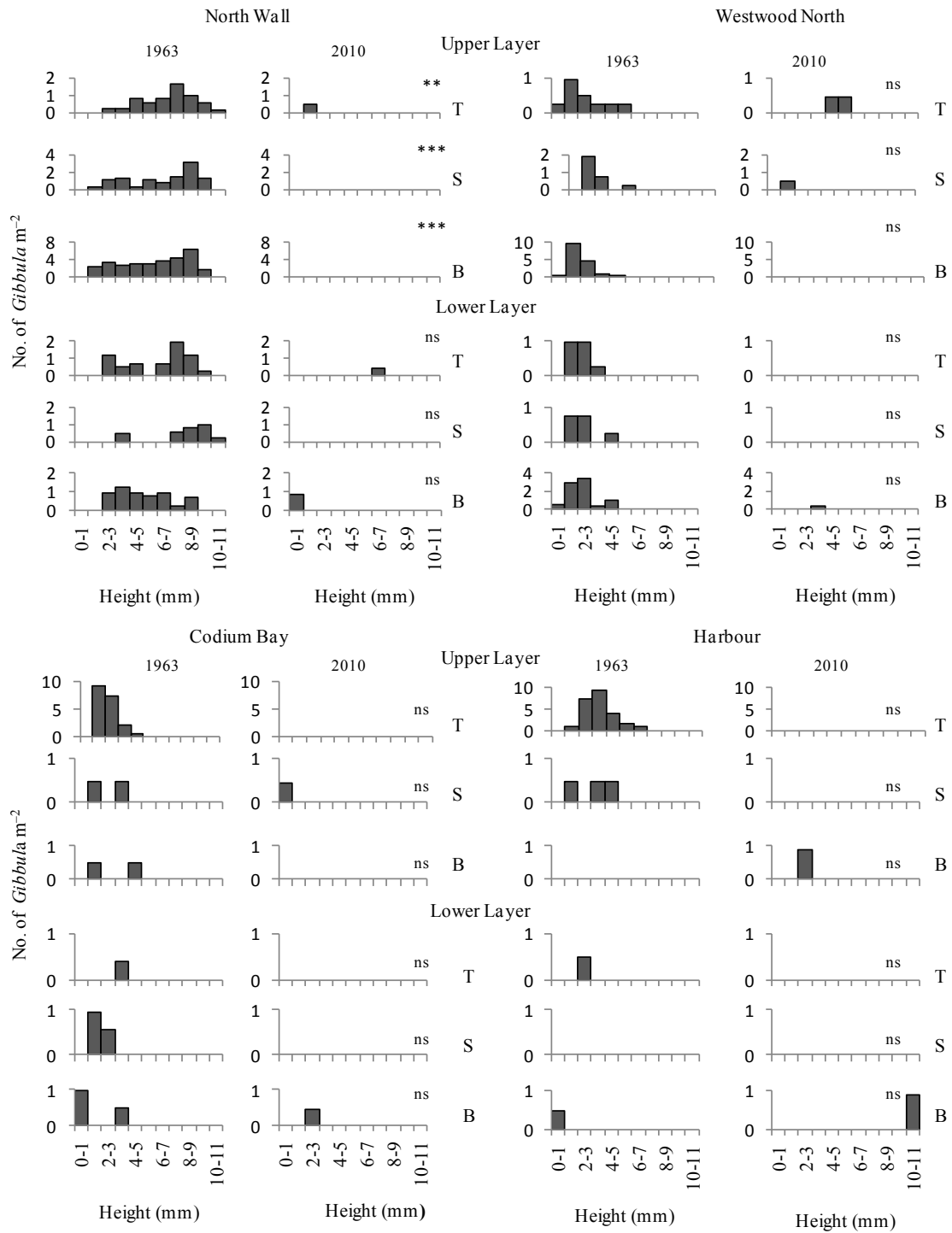


Fig. S4. *Gibbula cineraria*. Size and frequency histograms from 4 sites sampled in 1963 and 2010. Specimens were recorded on the tops (T), sides (S) and bottoms (B) of Upper and Lower Layer boulders. The Kolmogorov-Smirnov test was used to test for differences in the size classes at each aspect between 1963 and 2010. Asterisks denote the degree of significance (*, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.005$; ns, not significant)