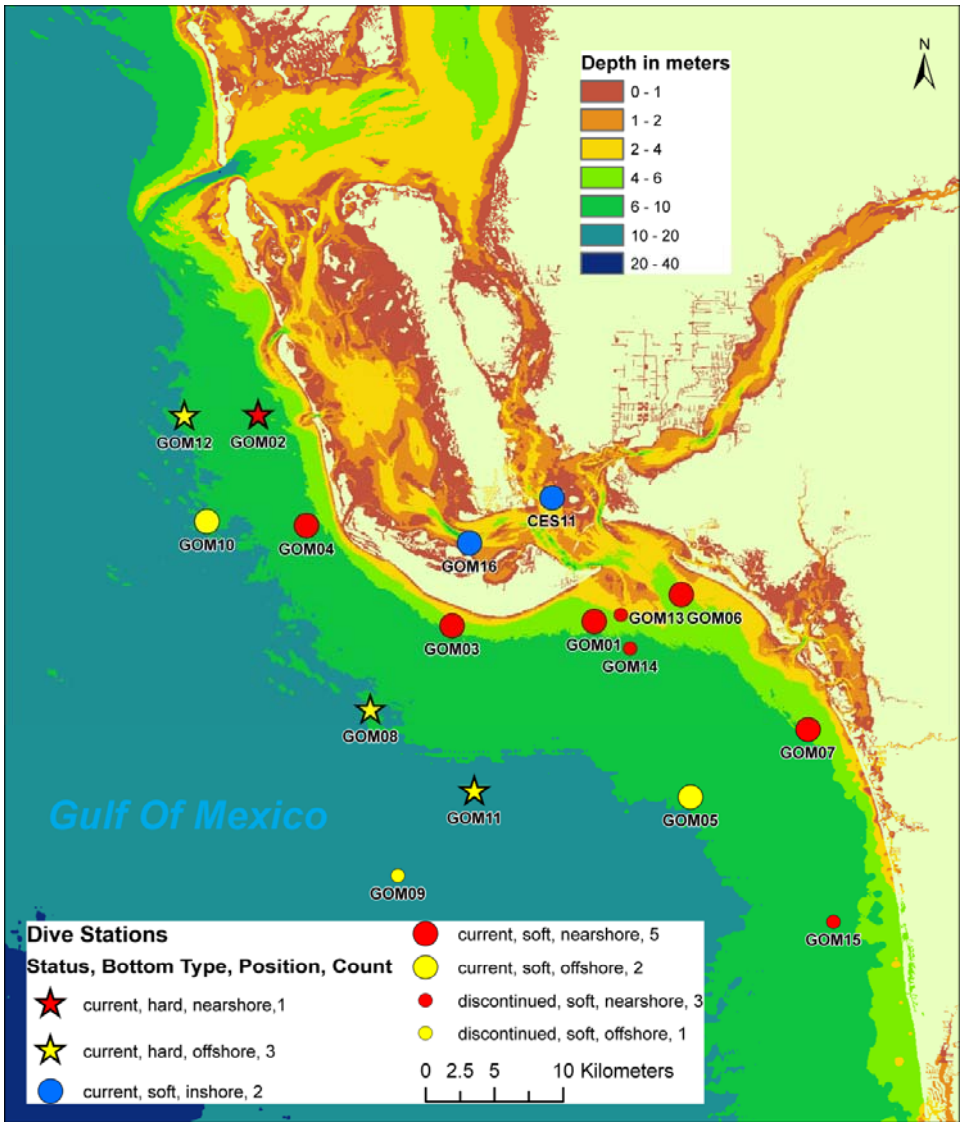

Fig.5.1. Map of the study area, Lee County, FL. The figure legend denotes the current and discontinued stations. Sampling began in June 2008 and continued bimonthly until July 2010. Station GOM09 was discontinued in November 2008. GOM12 was added in September 2008 and GOM16 was added in January 2009.

Fig. 5.2. Macroalgae were collected in quadrats along a belt transect by two SCUBA divers (n =20). Percent cover of macroalgae was estimated, then all of the algae within the 1 sq. meter quadrat was collected. Invertebrates and other epibenthic features were then enumerated. This image was taken by V. Roche, News-Press.

Fig. 5.3. Macroalgae was collected into mesh bags at random locations along a transect. Photo courtesy of V. Roche, News-Press

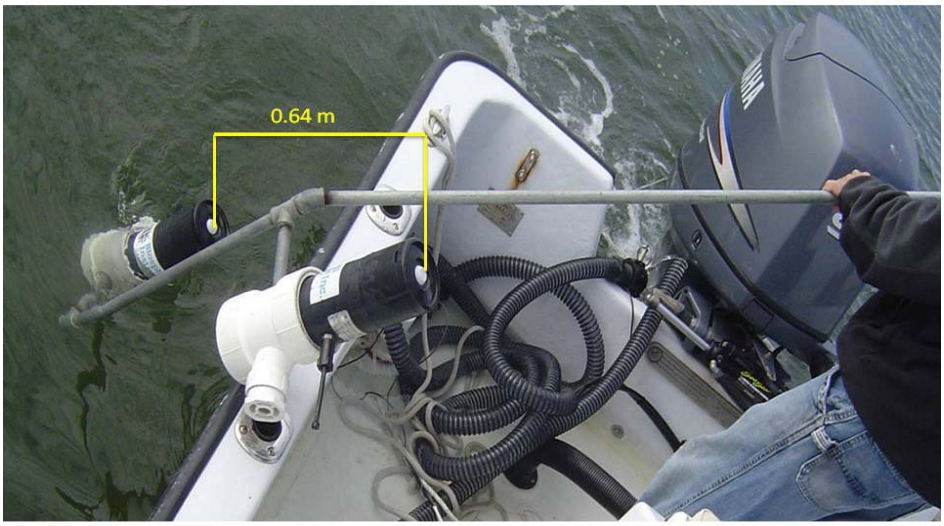

Fig 5.4. Light sensor deployment. Each sensor is mounted at 0.64 m depth intervals. Sensors are deployed underwater for 30 seconds, recording at 1Hz. Data is downloaded via PC upon return to lab, and % light at depth is calculated using raw irradiance values from the top and bottom sensors.

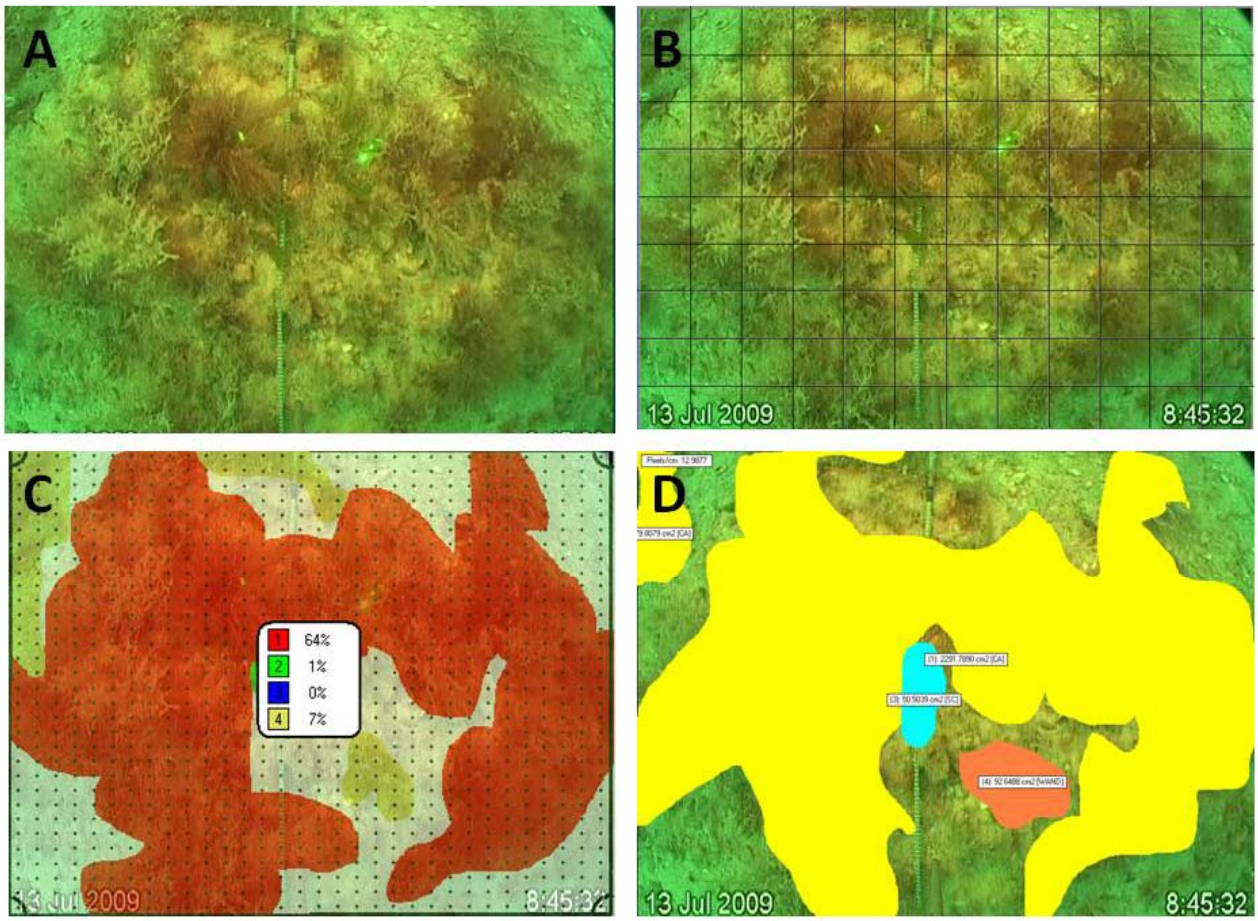

Figure 5.5. Methods for video transect analysis. (A) A raw frame grab from July 2009 using Pinnacle© software. (B) The presence/absence grid using COREL© software. (C) The point count method using Vidana©. Colors are applied by user, and overlay of points are superimposed. (D) The area analysis using laser calibration (15 cm, seen in A) and calculated area using CPCE©. Areas are outlined after calibration to laser scale, and area is calculated based on pixels per cm.

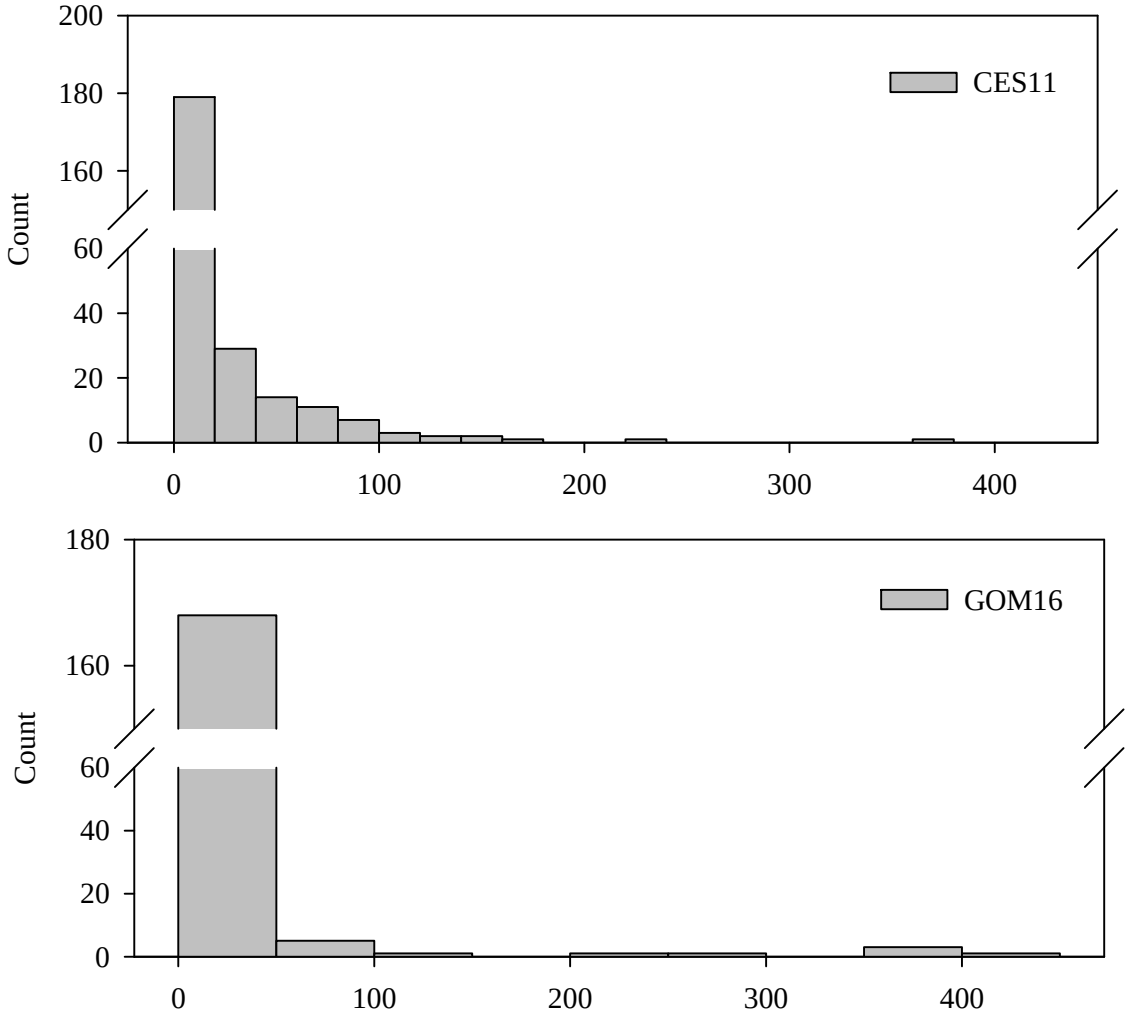

Fig. 5.6. Histogram containing number of quadrats (1 m^2) containing algae binned by the total fresh (wet) weight biomass (g FW m^{-2}). Upper; CES11. Lower; GOM16. These two stations were inshore, near the Sanibel causeway, and typically contained abundant macroalgae.

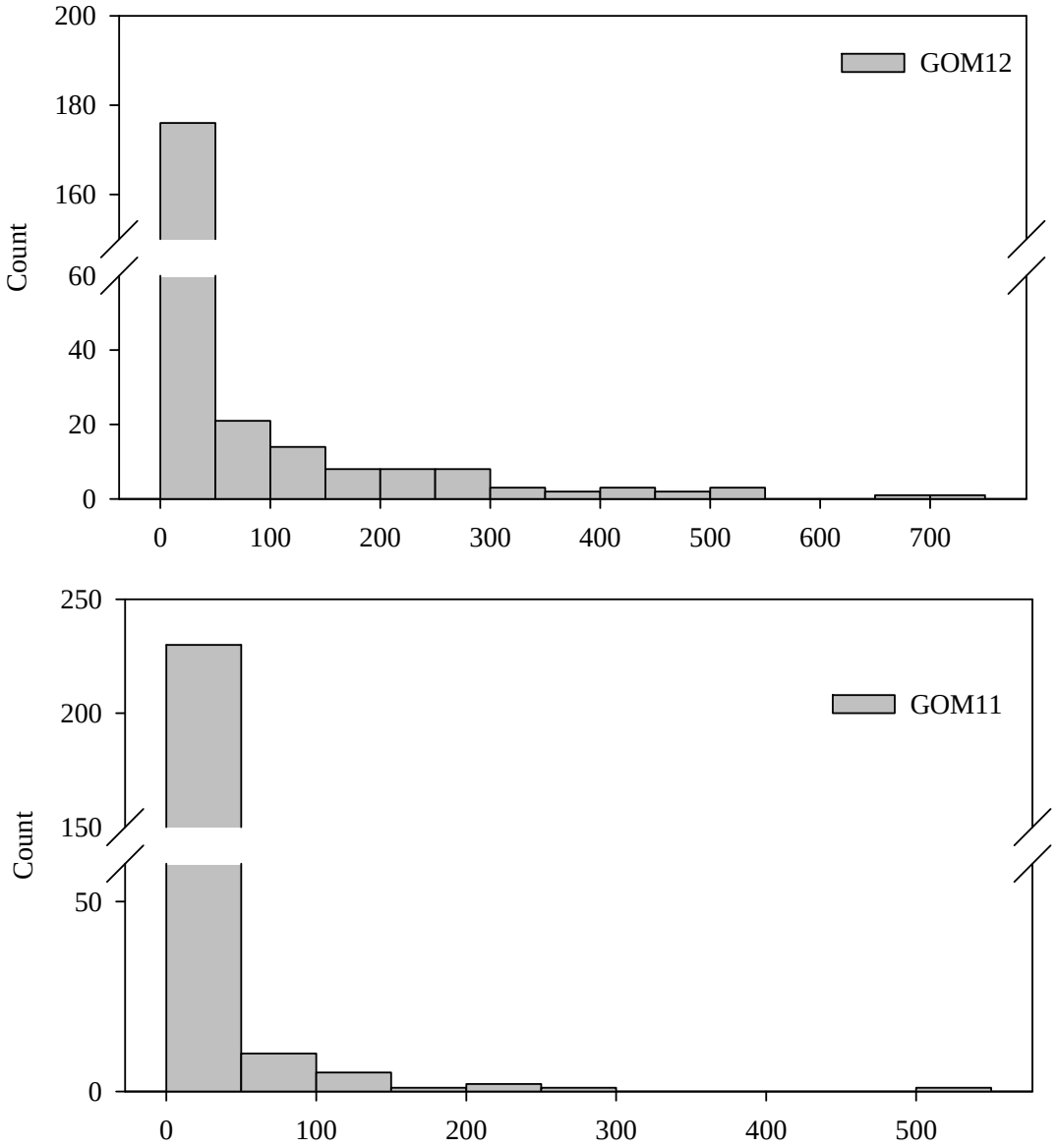

Fig. 5.7. Histograms containing the number of quadrats (1 m2) containing algae binned by the total fresh weight biomass. Upper; GOM12. Lower GOM11. These stations were offshore and contained natural limestone outcroppings with abundant macroalgae, corals and sponges.

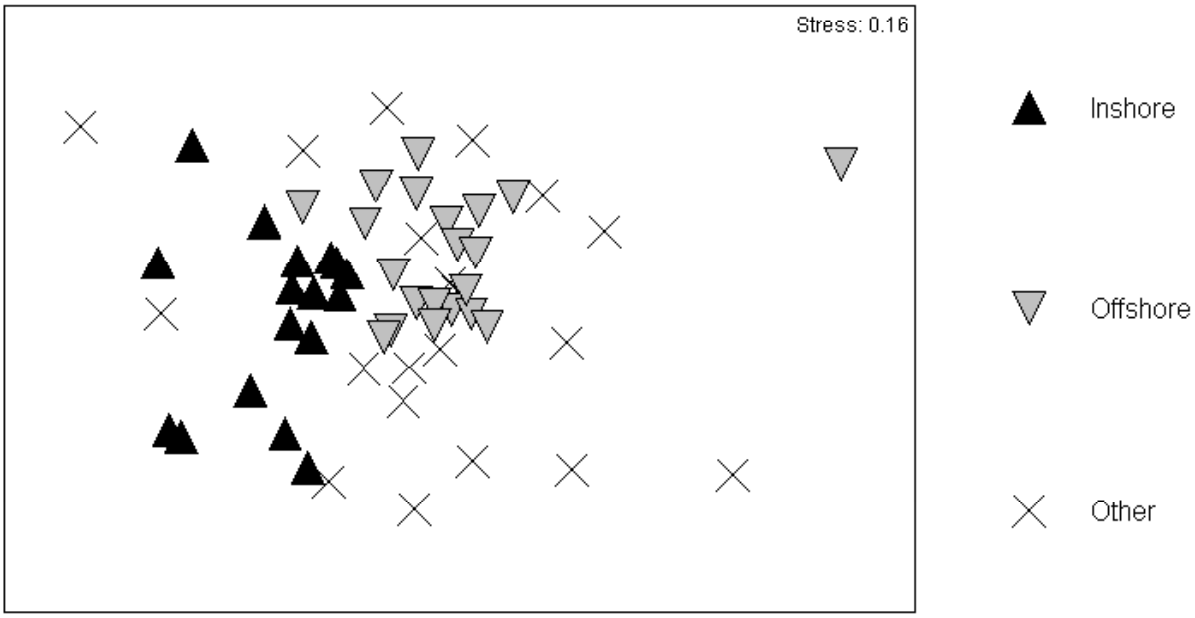

Fig. 5.8. Non-metric multidimensional scaling analysis (MDS) for macroalgal species found most often at offshore (live bottom; GOM11, GOM12), and inshore (Stations CES11 and GOM16) as well as others(Stations GOM01, GOM02, GOM03, GOM04, GOM05, GOM06, and GOM07, GOM10).

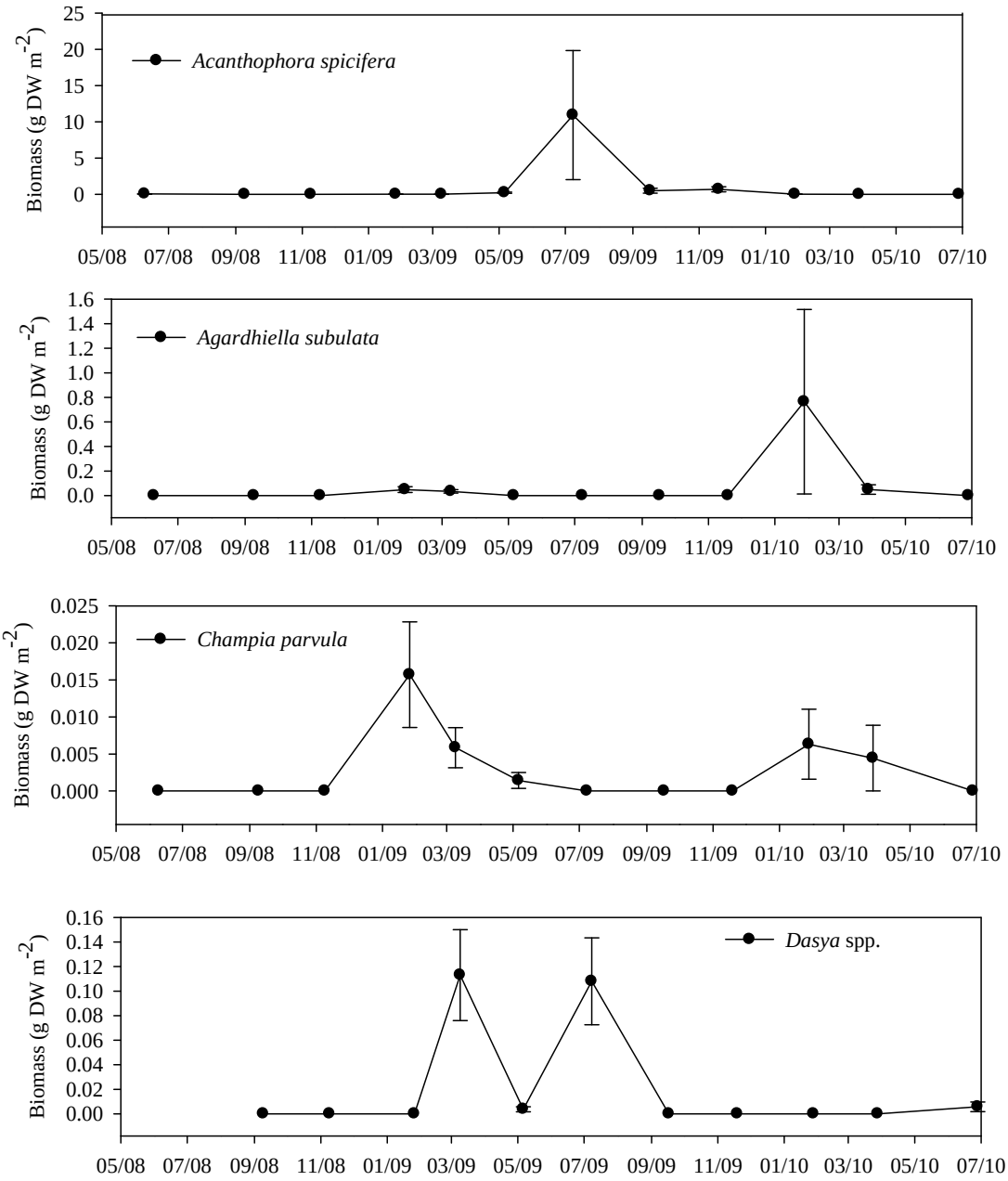

Fig. 5.9 Biomass (g DW m^{-2}) of key macroalgal species at CES11. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

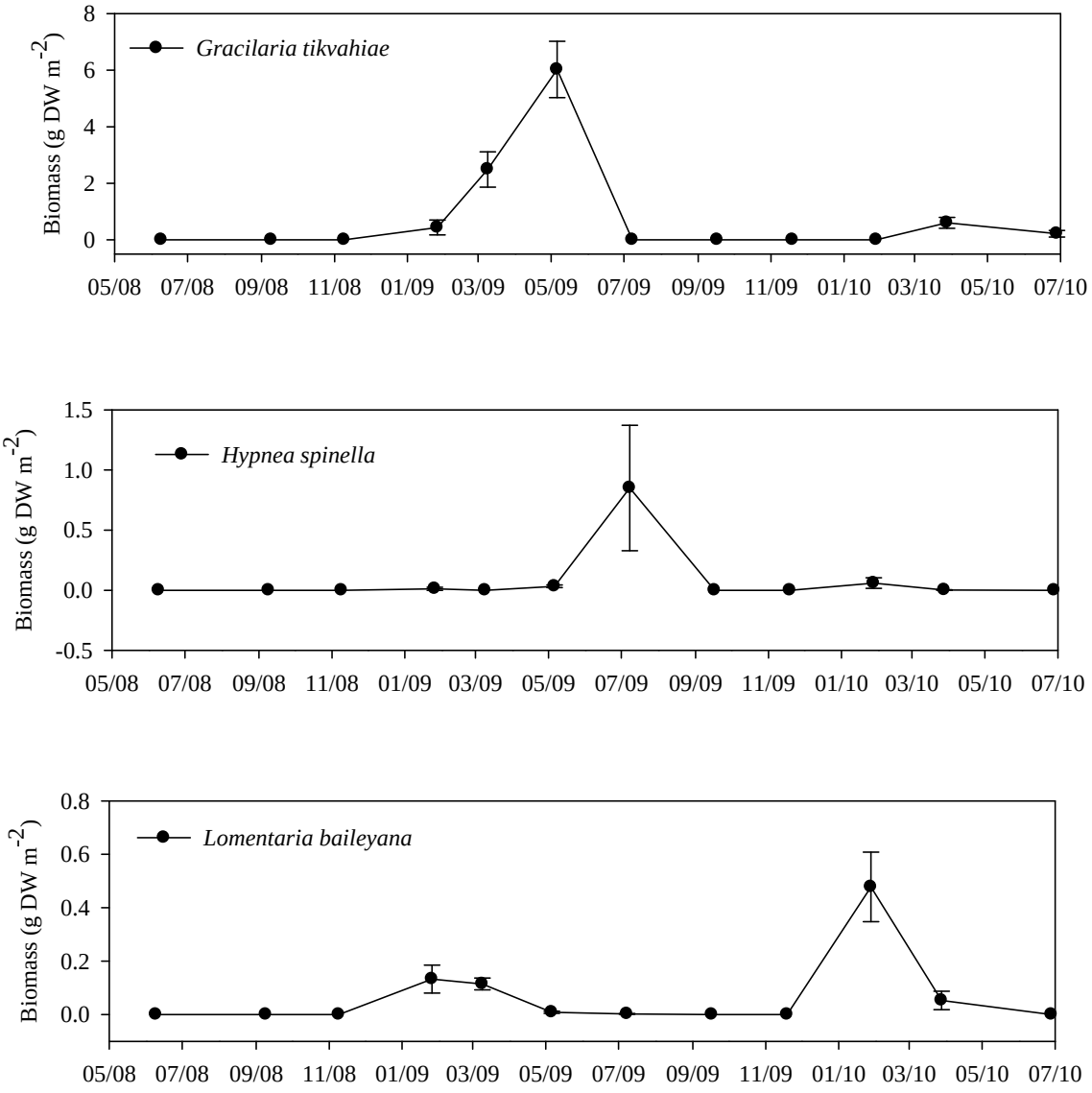

Fig. 5.10. Biomass (g DW m^{-2}) of key macroalgal species at CES11. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

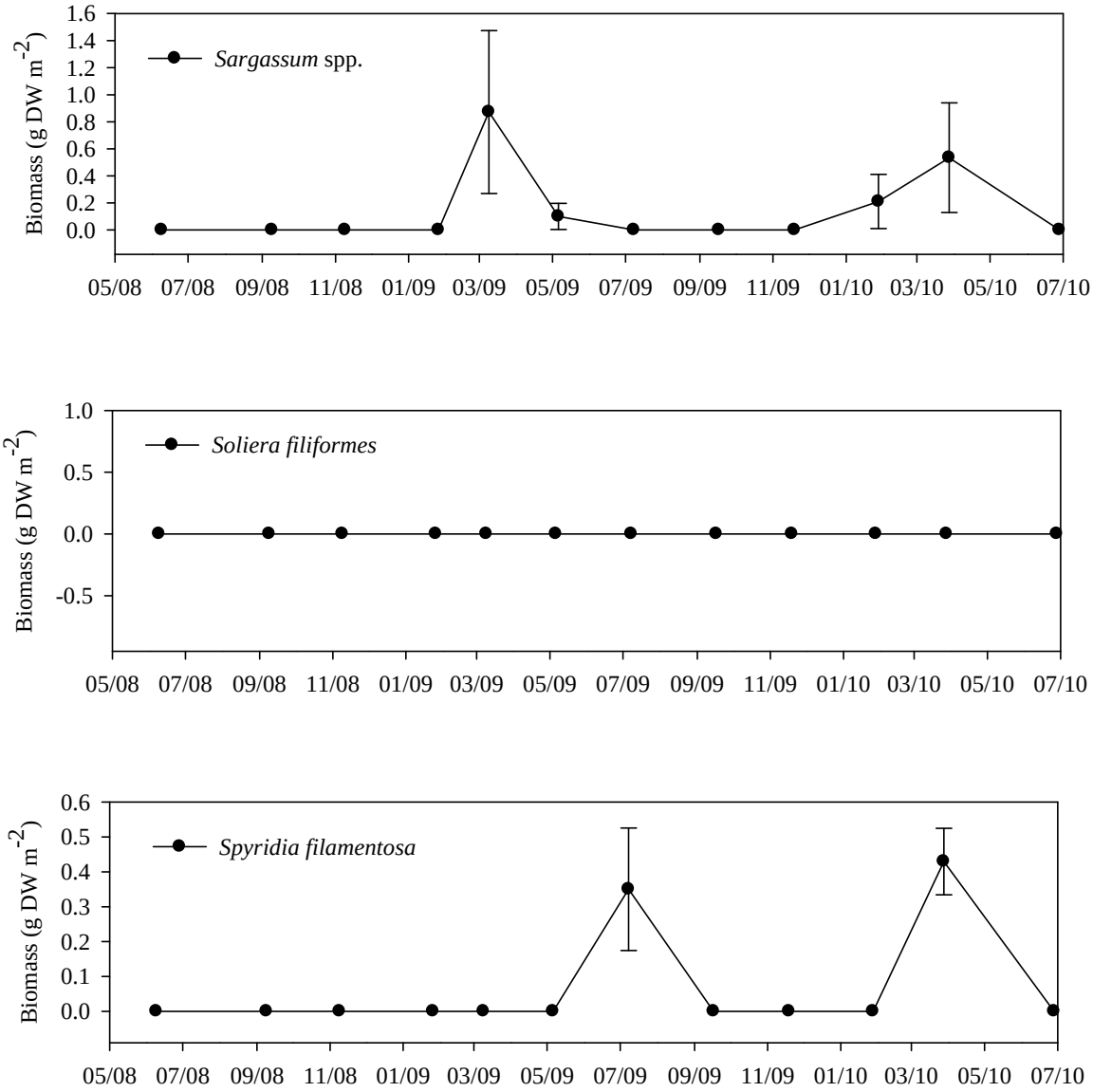

Fig. 5.11. Biomass (g DW m^{-2}) of a subset macroalgal species at CES11. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

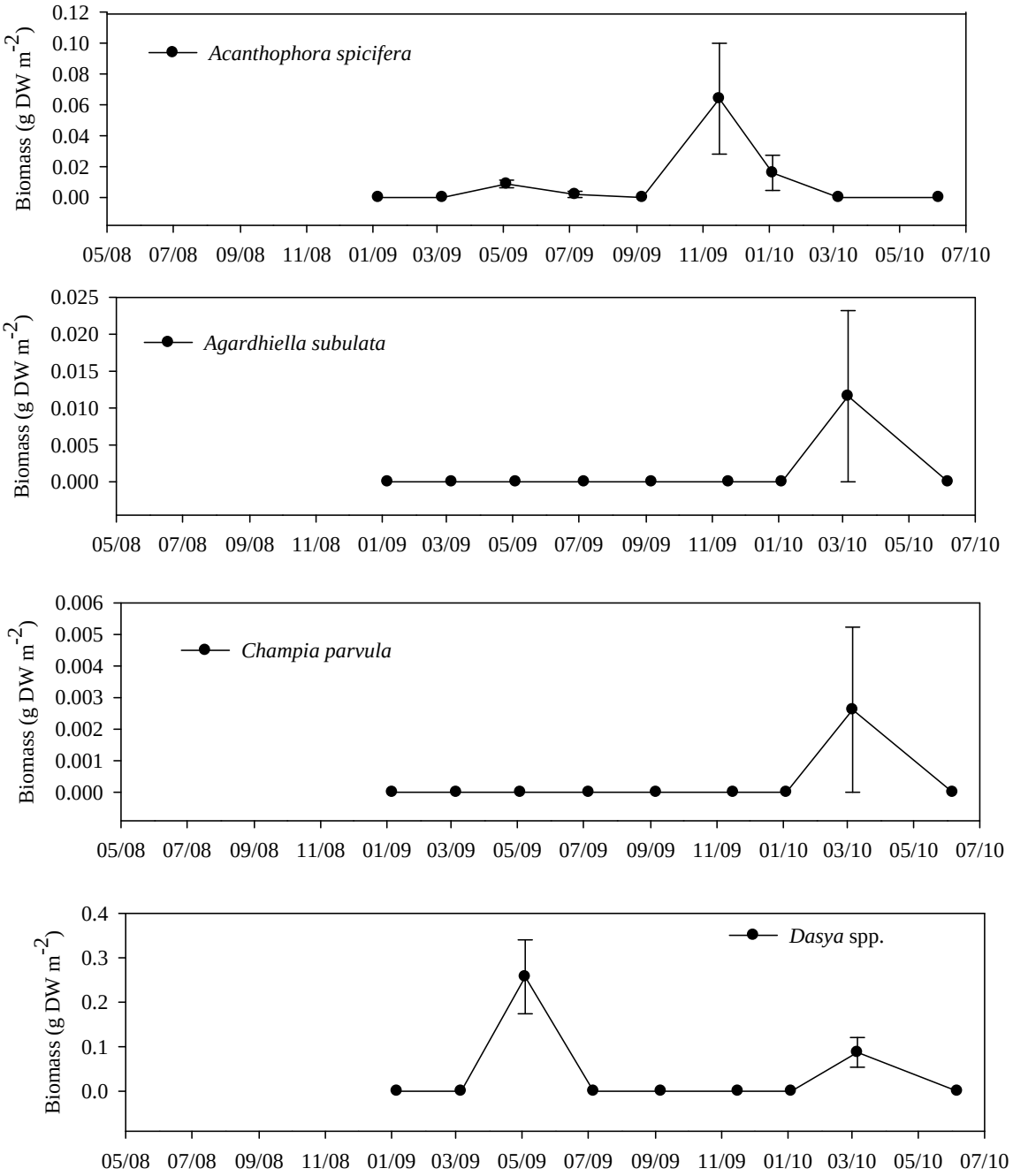

Fig. 5.12. Biomass (g DW m^{-2}) of a subset of macroalgal species at GOM16. GOM16 was added as a permanent station in January 2009 and samples were not collected in June, September, or November 2008. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

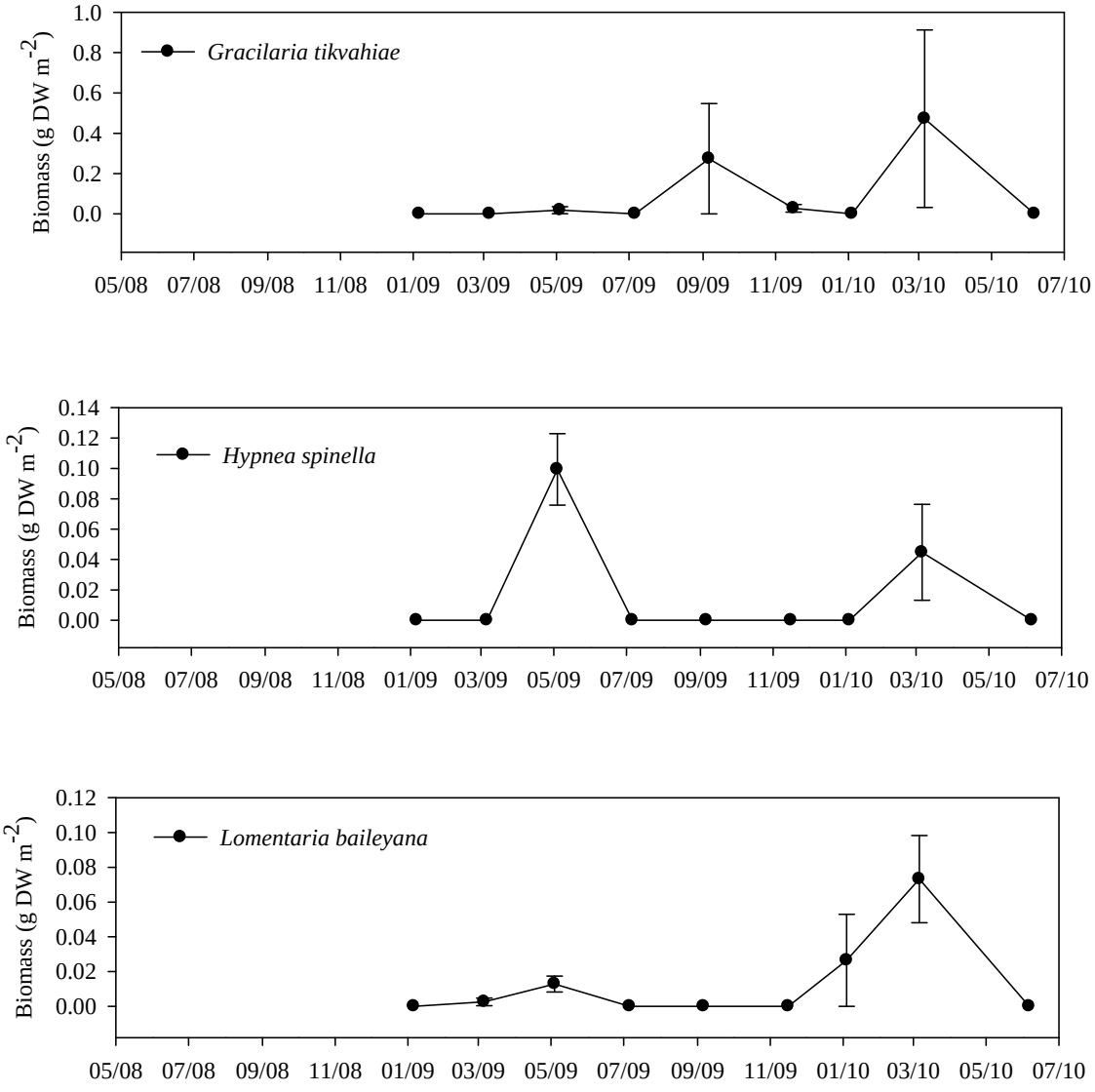

Fig. 5.13. Biomass (g DW m^{-2}) of a subset of macroalgal species at GOM16. GOM16 was added as a permanent station in January 2009 and samples were not collected in June, September, or November 2008. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

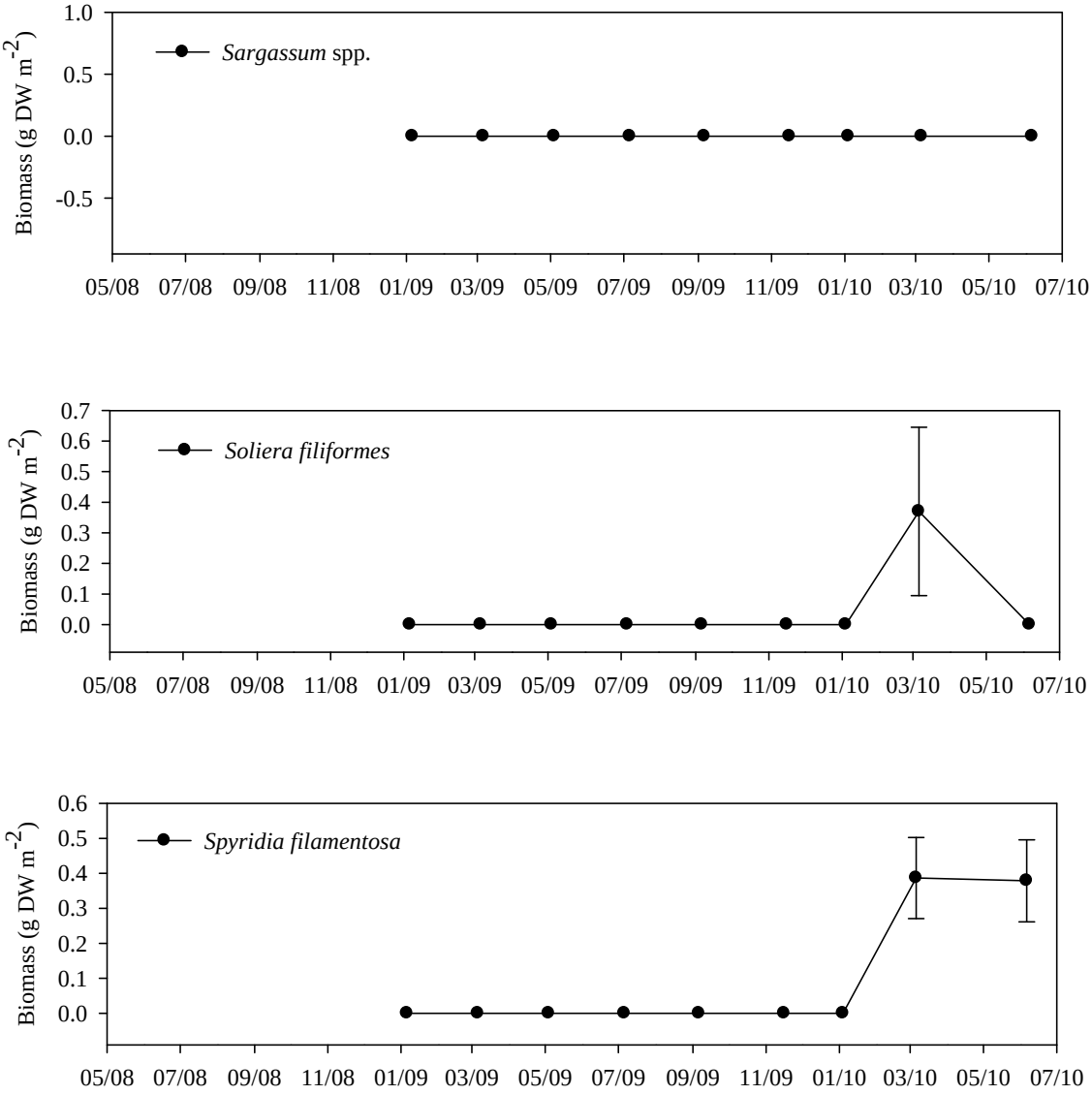

Fig. 5.14. Biomass (g DW m^{-2}) of a subset of macroalgal species at GOM16. GOM16 was added as a permanent station in January 2009 and samples were not collected in June, September, or November 2008. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

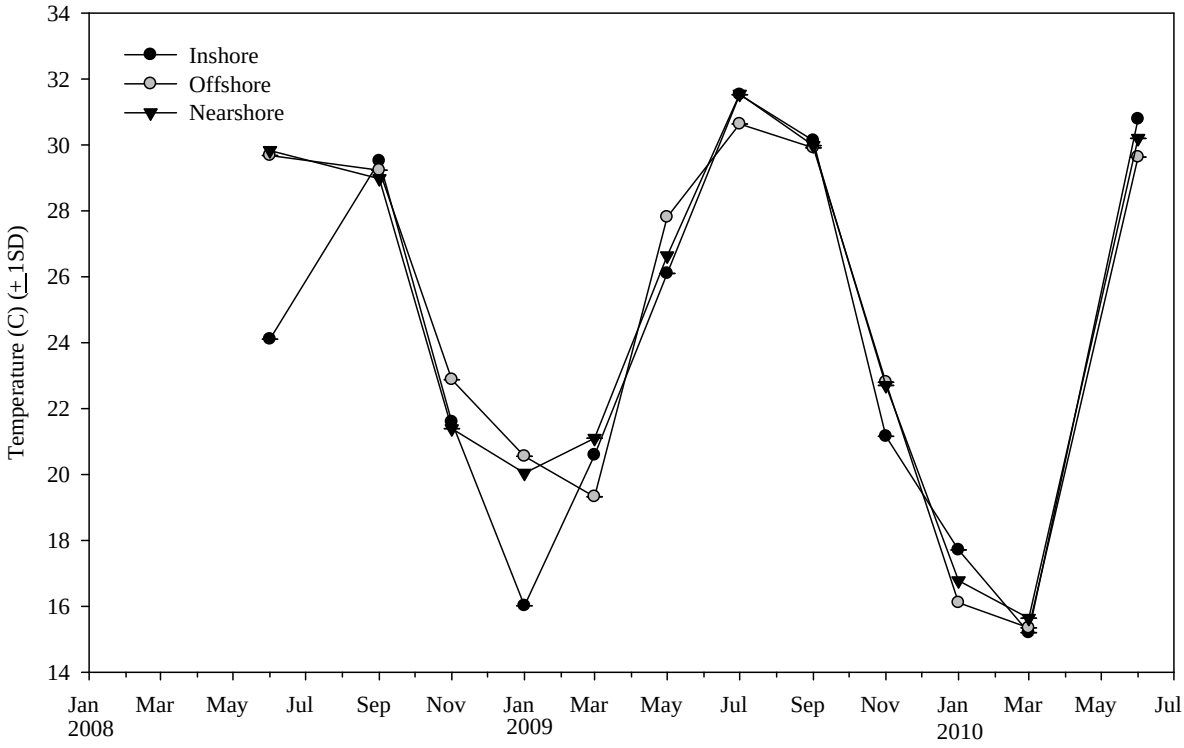

Fig. 5.15. Mean temperature in degrees C ± 1SD. Inshore sites include inshore (GOM16, CES11), nearshore (GOM01, GOM02, GOM03, GOM04, GOM06 and GOM07), and offshore (GOM05, GOM08, GOM10, GOM11, GOM12).

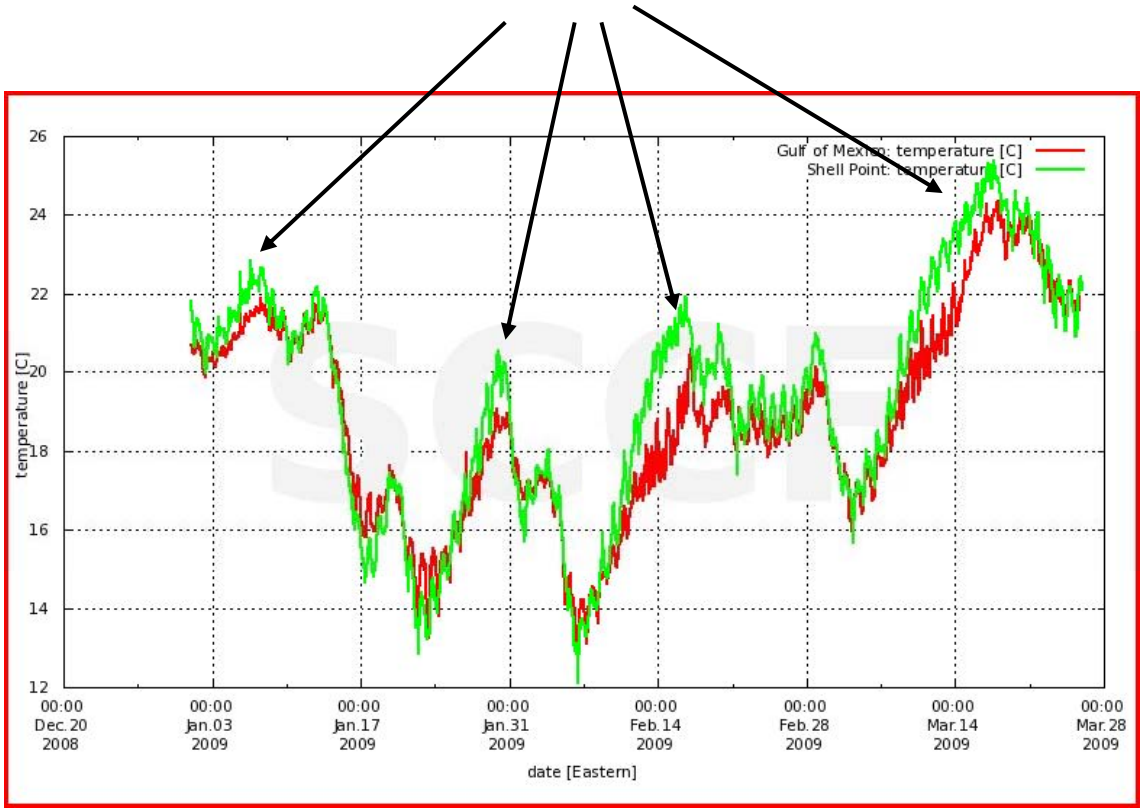

Fig. 5.16. Hourly temperature recordings as recorded by RECON from January 1, 2009 to March 25, 2009.

Fig. 5.17. Hourly temperature recordings as recorded by RECON from January 1, 2010 to March 25, 2010.

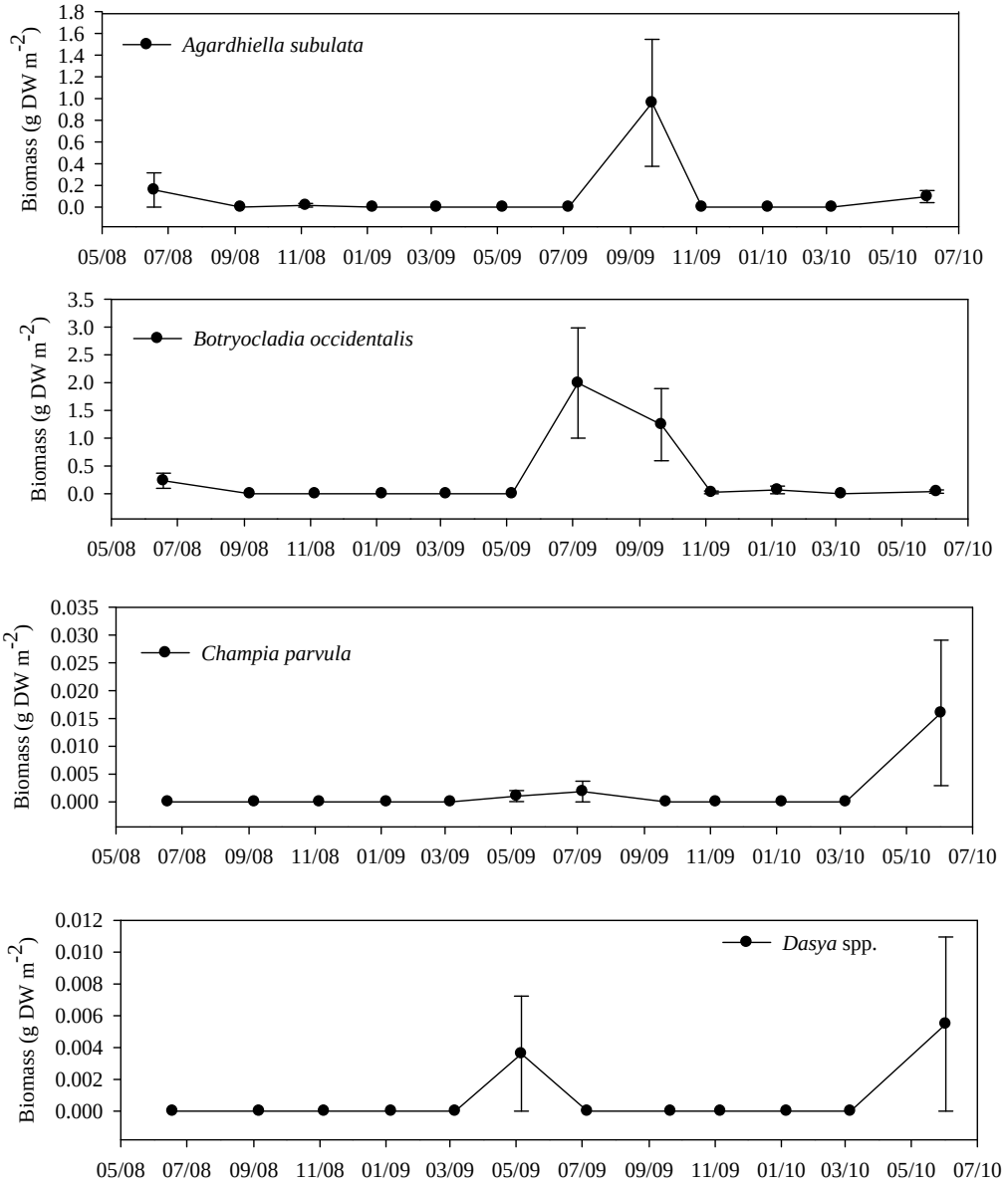

Fig. 5.18. Biomass (g DW m^{-2}) of a subset of macroalgal species at GOM11. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

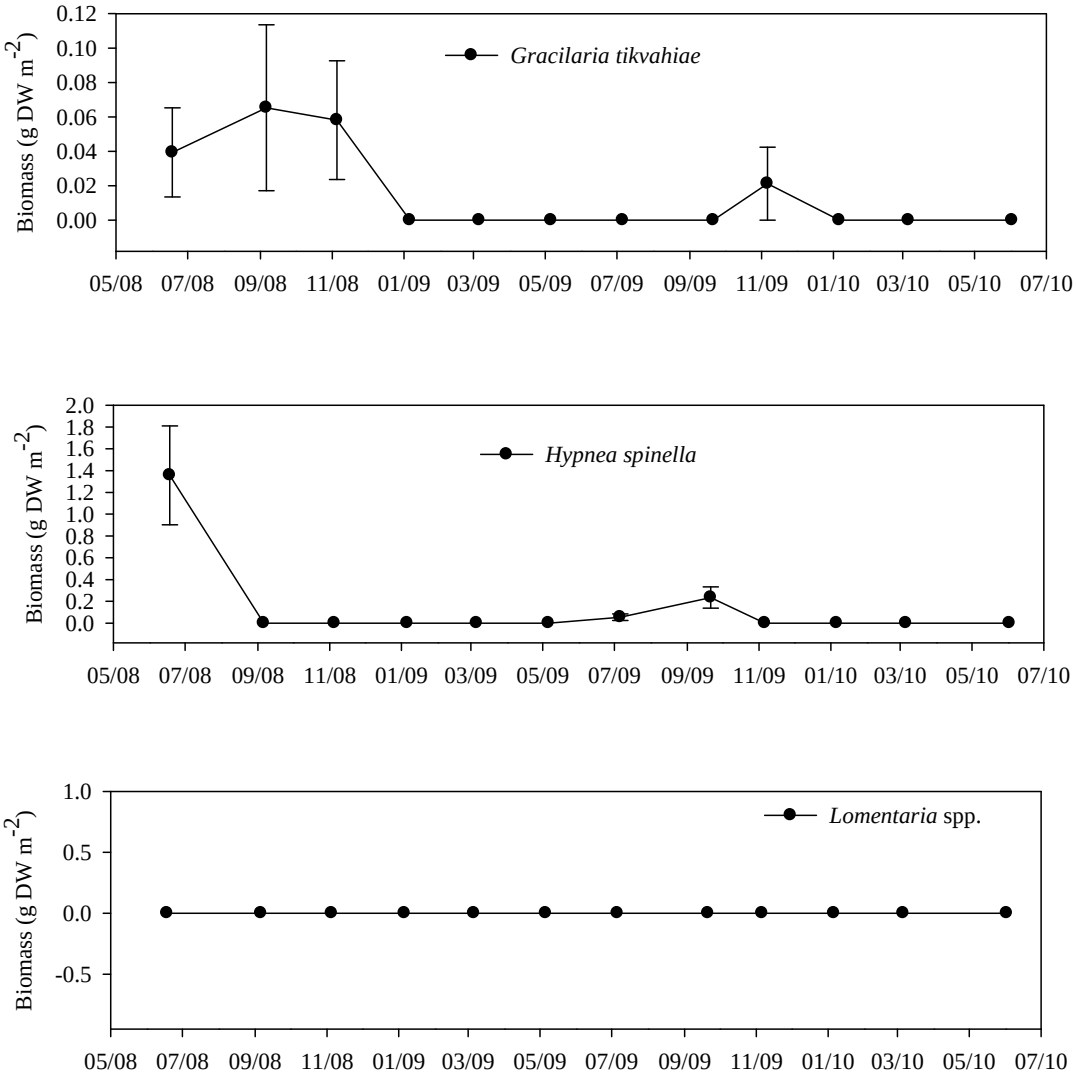

Fig. 5.19. Biomass (g DW m^{-2}) of a subset of macroalgal species at GOM11. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

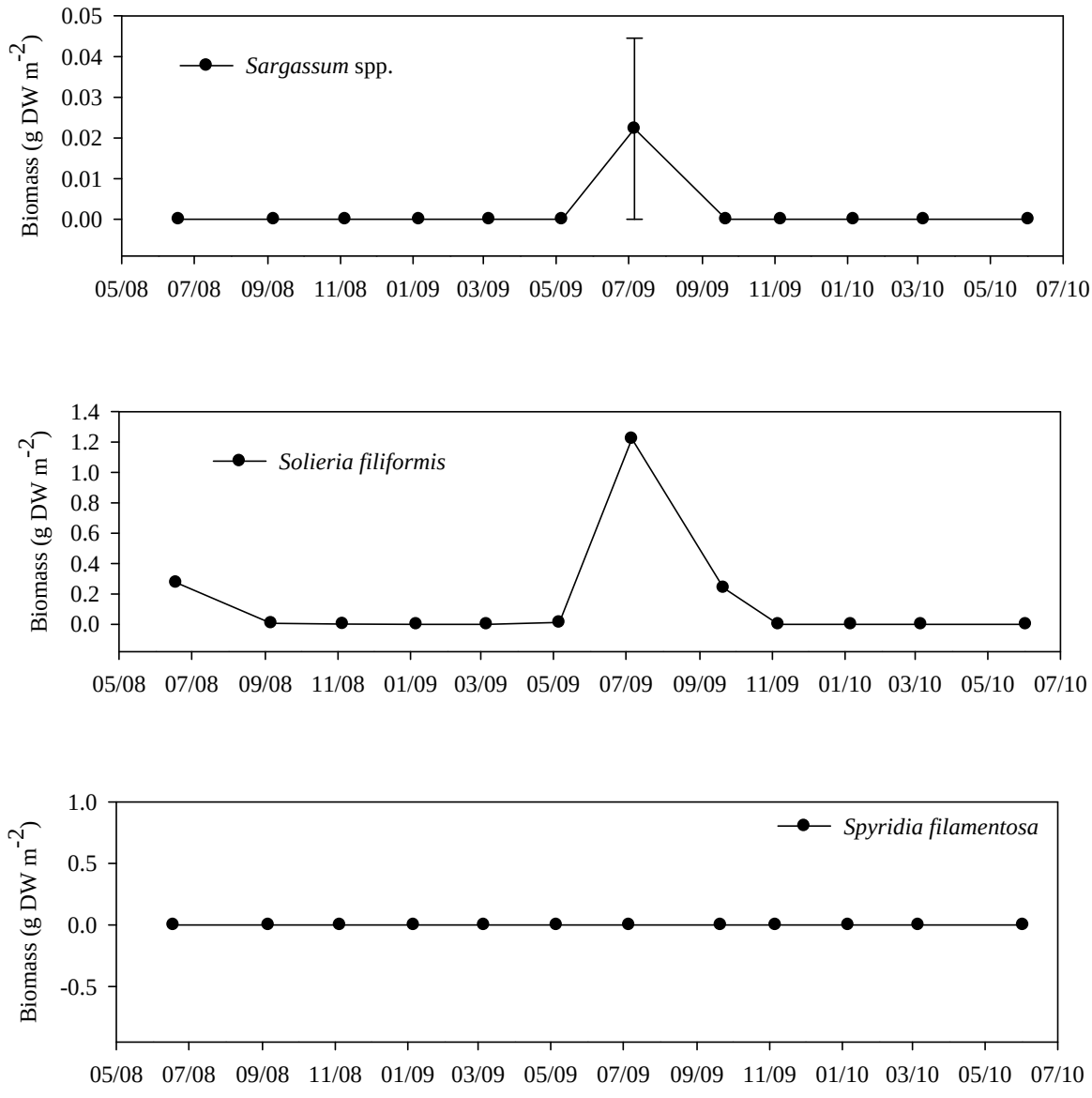

Fig. 5.20 Biomass (g DW m^{-2}) of a subset of macroalgal species at GOM11. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

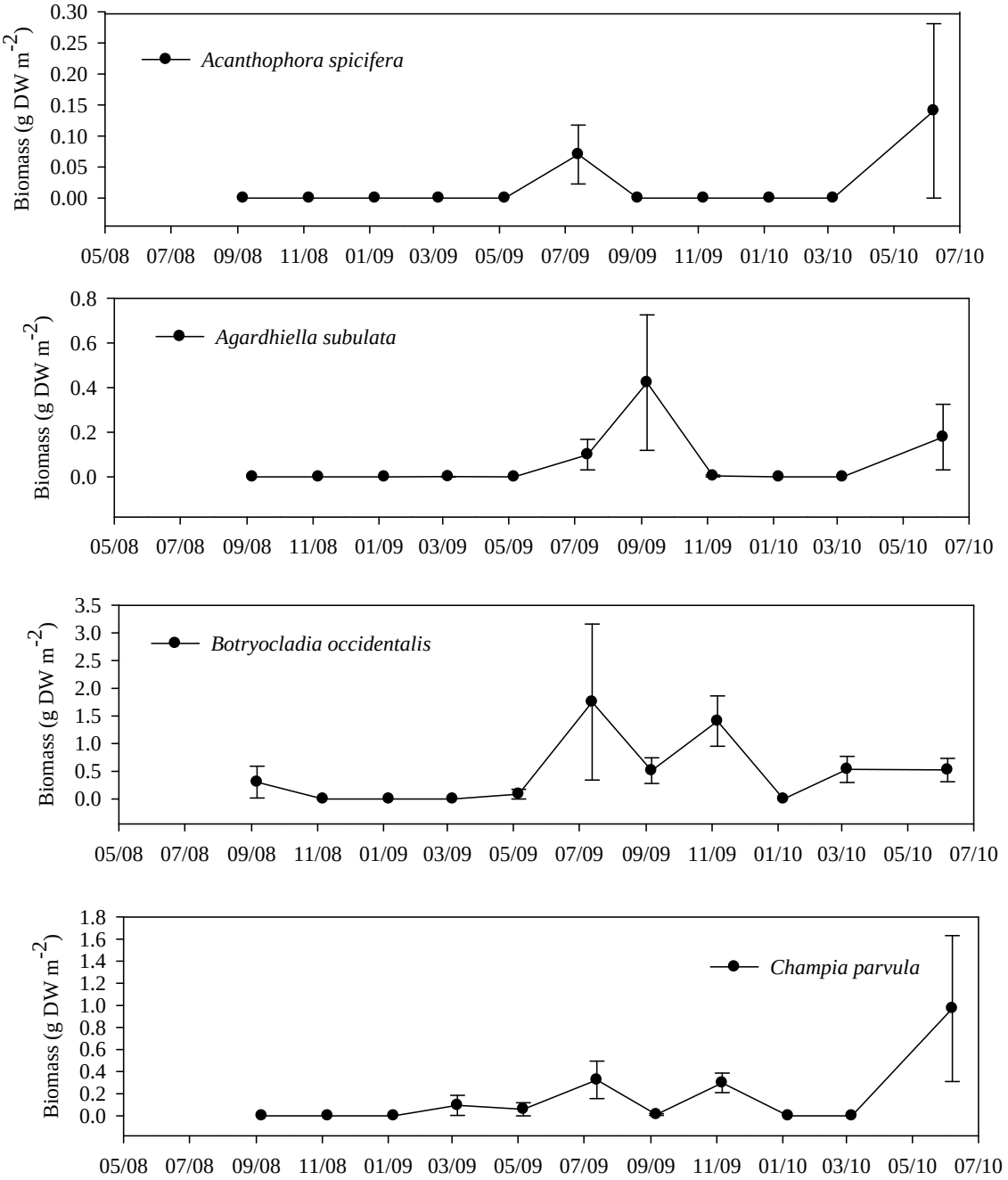

Fig. 5.21. Biomass (g DW m^{-2}) of a subset of macroalgal species at GOM12. GOM12 was not chosen as a permanent station until Sept. 2008 and samples were not collected in June 2008. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

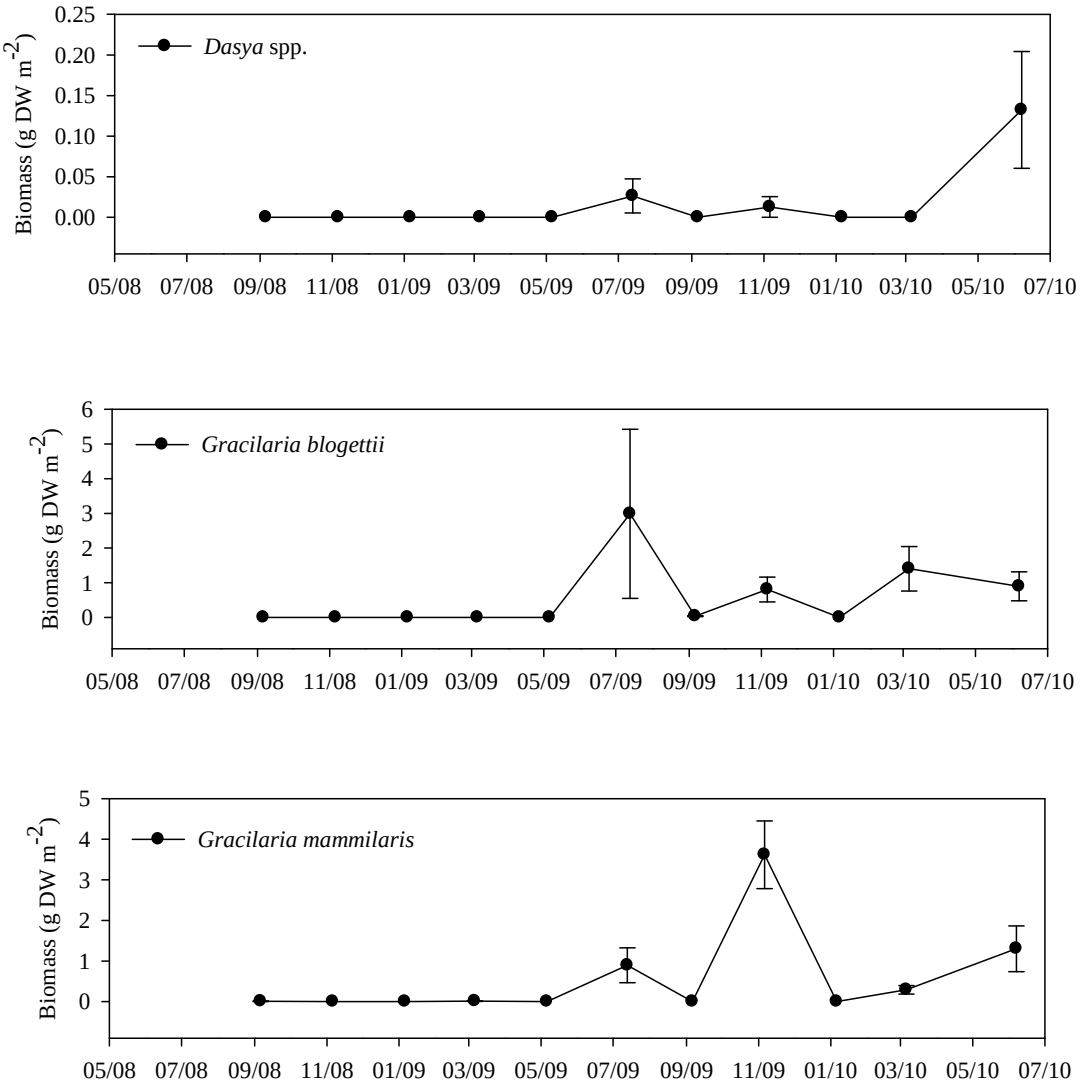

Fig. 5.22. Biomass (g DW m^{-2}) of a subset of macroalgal species at GOM12. GOM12 was not chosen as a permanent station until Sept. 2008 and samples were not collected in June 2008. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

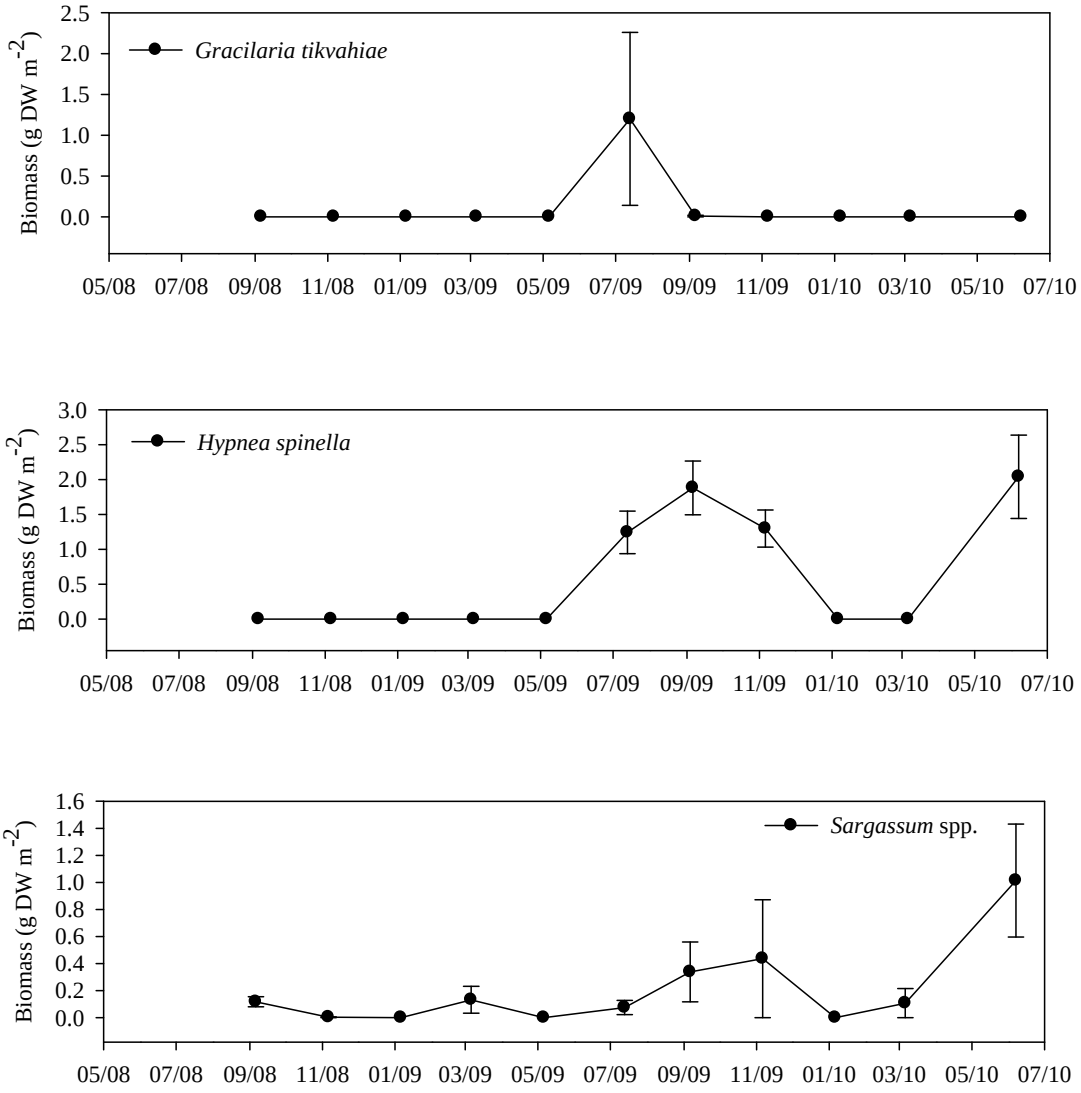

Fig. 5.23. Biomass (g DW m^{-2}) of a subset of macroalgal species at GOM12. GOM12 was not chosen as a permanent station until Sept. 2008 and samples were not collected in June 2008. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

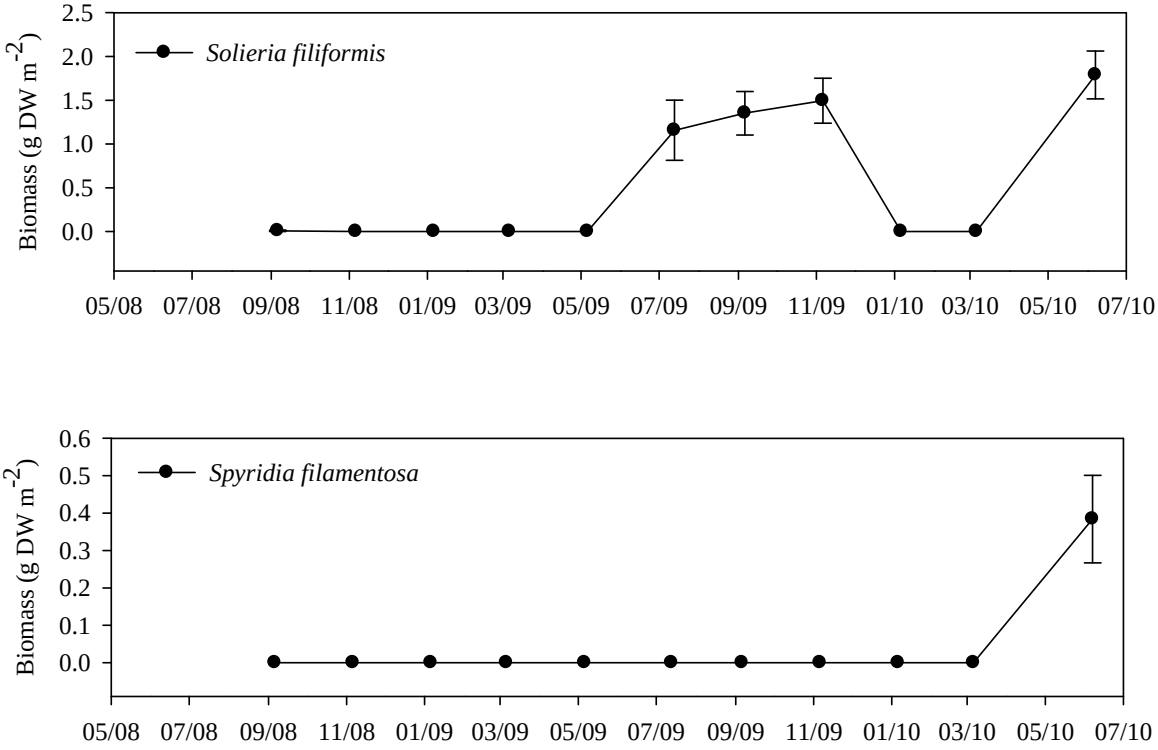

Fig. 5.24. Biomass (g DW m^{-2}) of a subset of macroalgal species at GOM12. GOM12 was not chosen as a permanent station until Sept. 2008 and samples were not collected in June 2008. Note differences in scale on the X-axis. Sampling size was 20 random quadrats per station except June 2008, where n = 30.

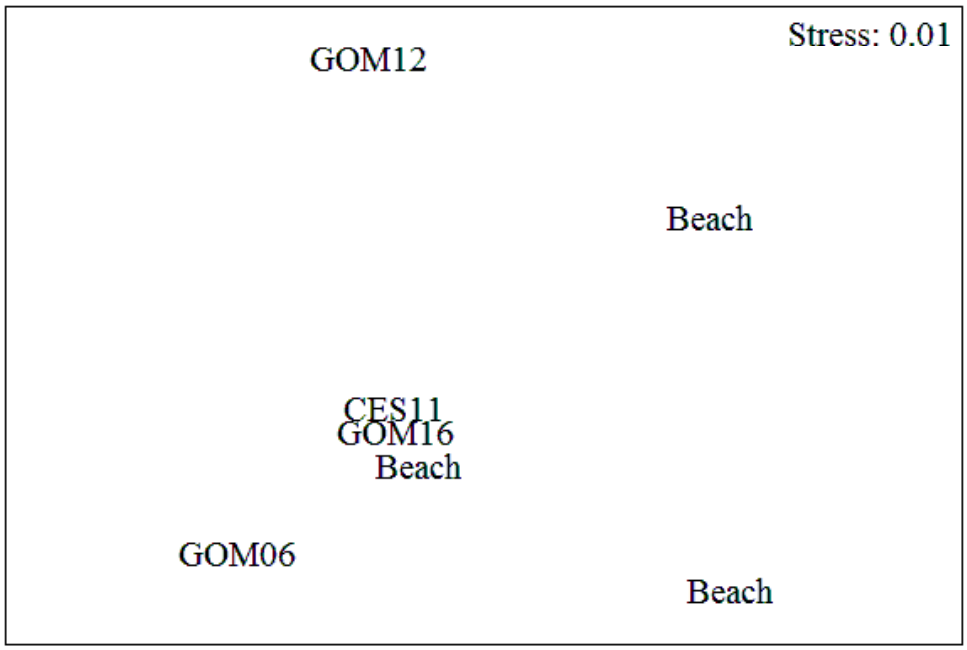

Fig. 5.25. Non-metric multidimensional scaling analysis (MDS) for species found during the March 2010 beach stranding at Fort Myers Beach. Samples collected from the beach, and from sites nearshore-GOM06, inshore-CES11 and GOM16, and offshore GOM12. Analysis used presence/absence indicators by species rather than biomass estimates, as beaches were not quantitatively sampled.

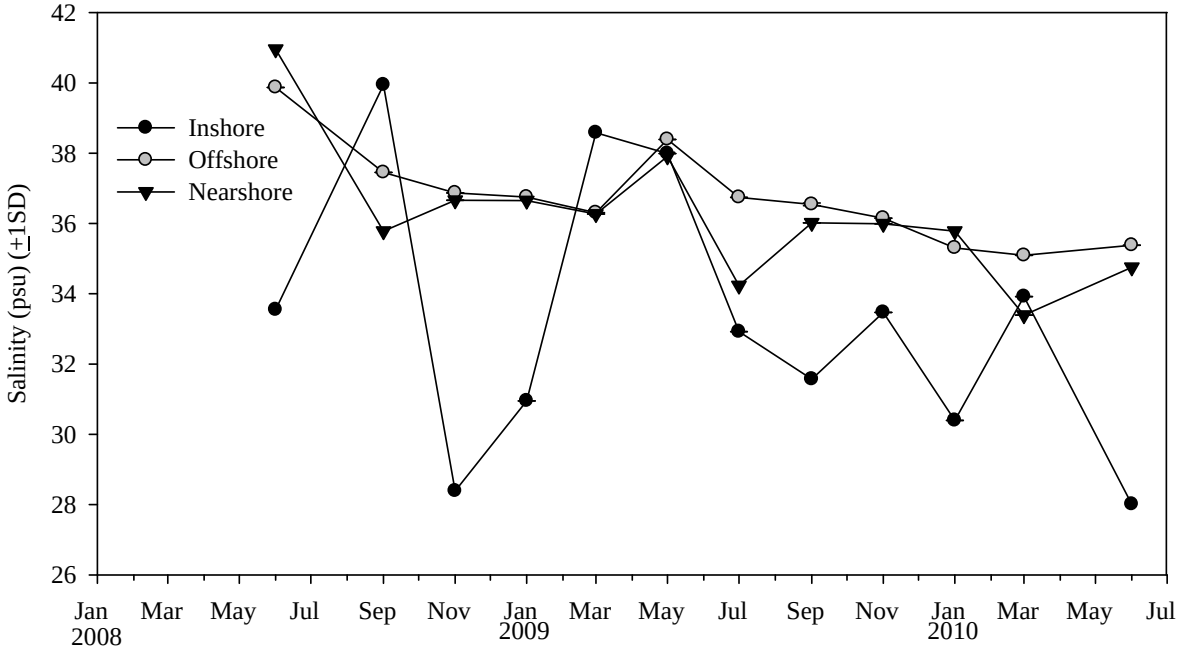

Fig. 5.26. Mean salinity in practical salinity units (psu) ± 1SD. Inshore sites include inshore (GOM16, CES11), nearshore (GOM01, GOM02, GOM03, GOM04, GOM06 and GOM07), and offshore (GOM05, GOM08, GOM10, GOM11, GOM12).

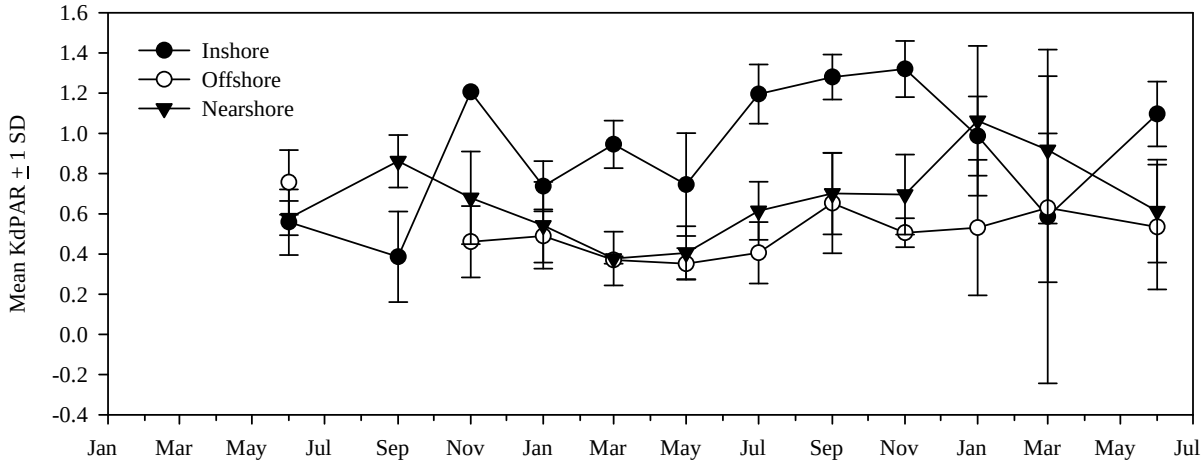

Fig. 5.27. Average KdPAR values as recorded by calibrated 2π light sensors (Biospherical, CA) during the study period. Stations are then grouped into offshore (Stations GOM05, GOM08, GOM09, GOM10, GOM11, GOM12), inshore (Stations CES11 and GOM16) and nearshore (Stations GOM01, GOM02, GOM03, GOM04, GOM06, and GOM07). GOM12 was not added as a permanent station in September 2008 and GOM16 was added in January 2009.

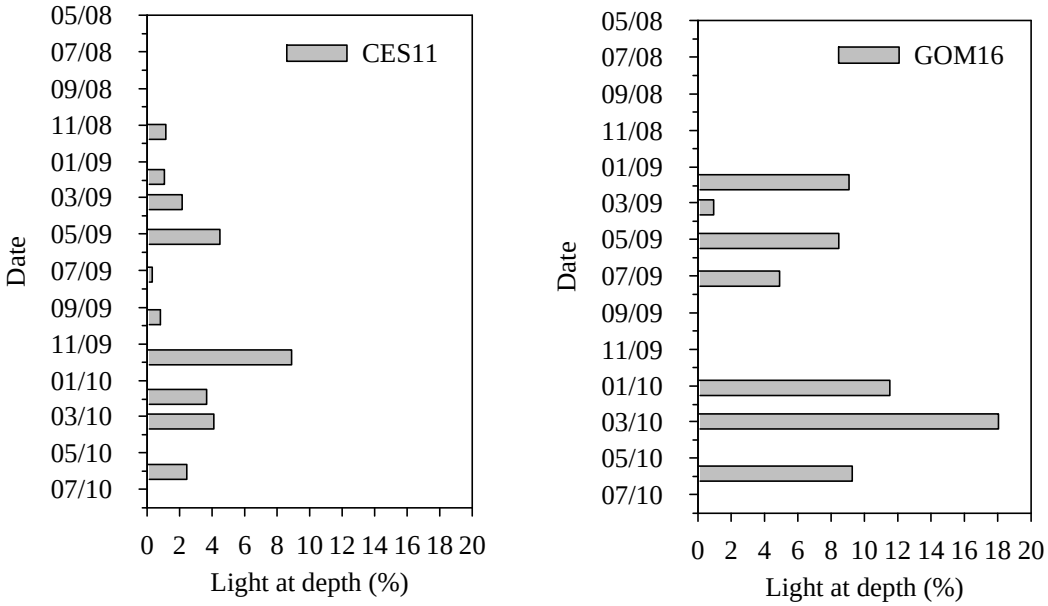

Fig. 5.28. Percent of surface irradiance at CES11 and GOM16. Irradiances were measured at each station during the sampling event to calculate KdPAR, which was used to calculate the percent of surface irradiance at the seafloor.

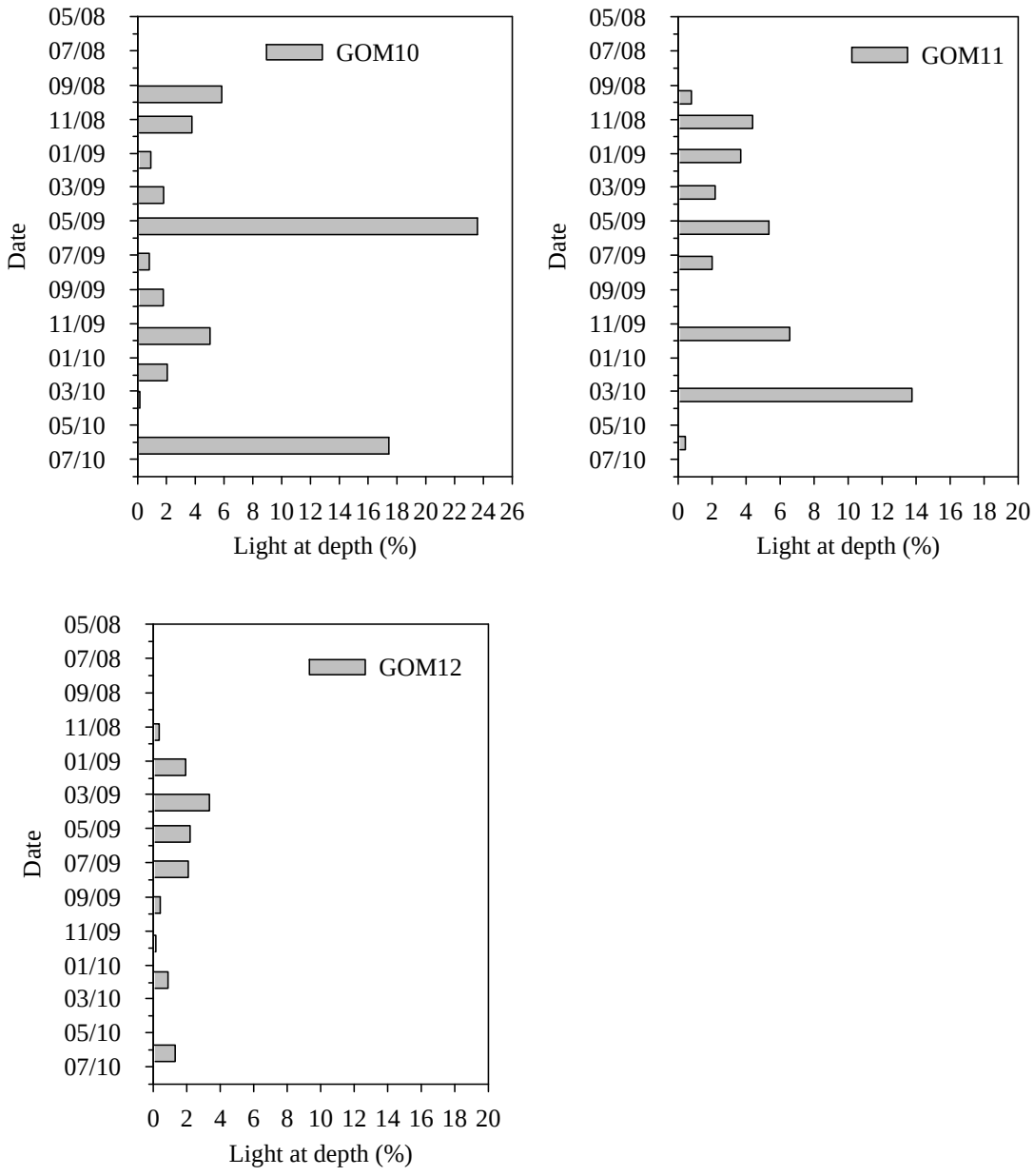

Fig. 5.29. Percent of surface irradiance at GOM10, GOM11, and GOM12. Irradiances were measured at each station during the sampling event to calculate KdPAR, which was used to calculate the percent of surface irradiance at the seafloor.

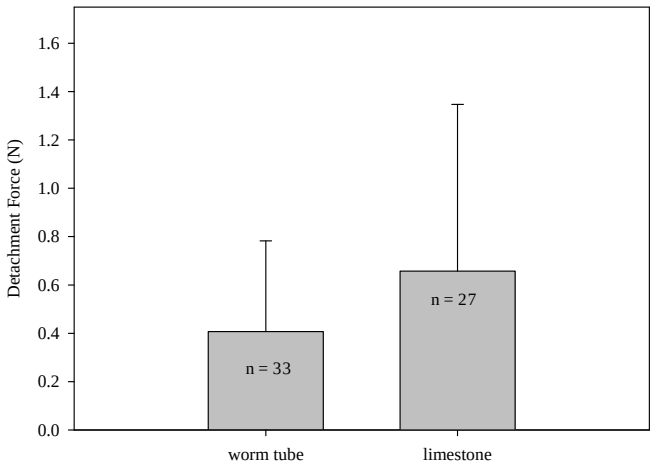

Fig. 5.30. Mean detachment force for dislodging macroalgal holdfasts from worm tubes (*Diapatra cuprea*) and limestone.

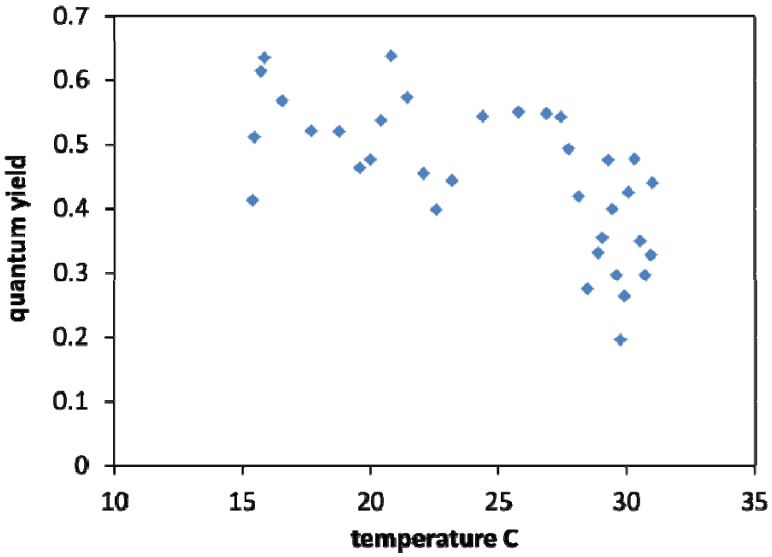

Fig. 5.31. Comparison of bottom temperature values and corresponding quantum yield values of algae present when temperature readings were taken. The regression results were significant, with an intercept of 0.775, a slope of -0.013, an $r^2 = 0.42$, and a $p < 0.0001$.

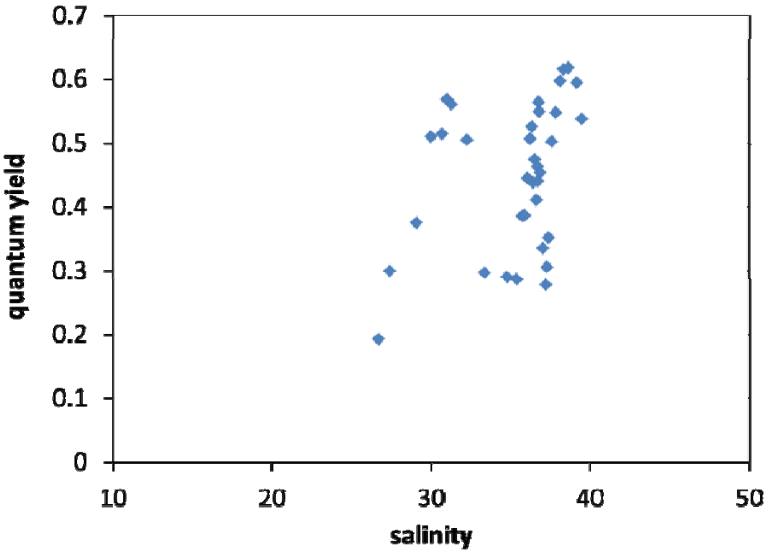

Fig. 5.32. Comparison of bottom salinity values and corresponding quantum yield values of algae present when salinity readings were taken. The regression results were significant, with an intercept of 0.16, a slope of 0.008, an $r^2 = 0.20$, and a $p = 0.03$.

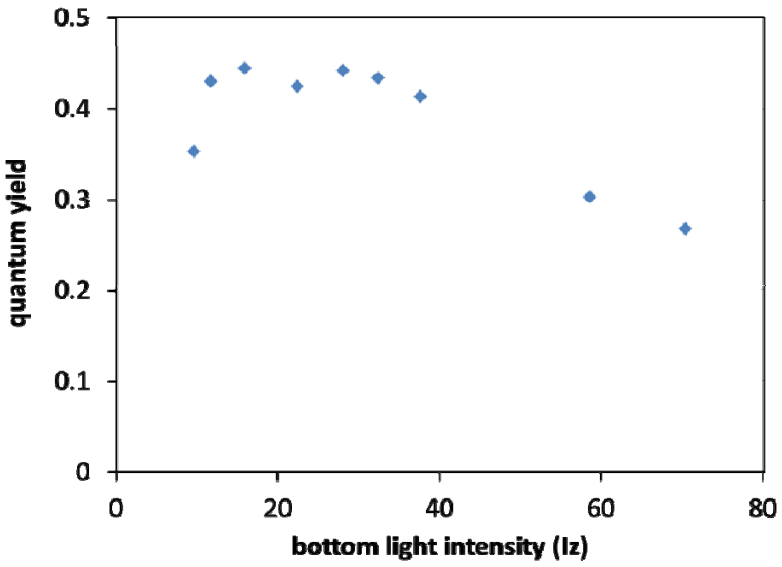

Fig. 5.33. Comparison of monthly-averaged bottom light intensity readings (I_z) and corresponding monthly-averaged quantum yield values. The regression results were significant, with an intercept of 0.465, a slope of -0.002, an $r^2 = 0.56$, and a $p = 0.02$.

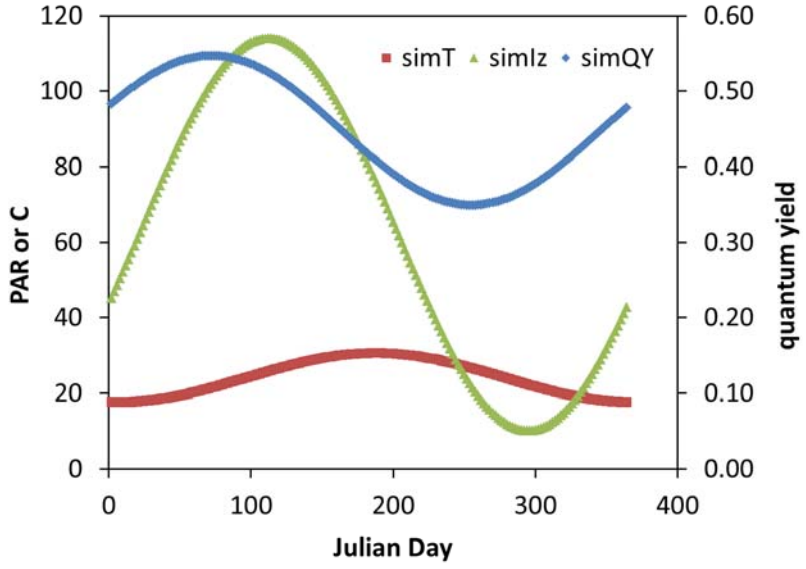

Fig. 5.34. Simulations of seasonal changes in temperature (simT), bottom light intensity (simIz), and quantum yield (simQY) over the course of one year (365 Julian days). PAR refers to photosynthetically active radiation (measured in µE/m^2/s).

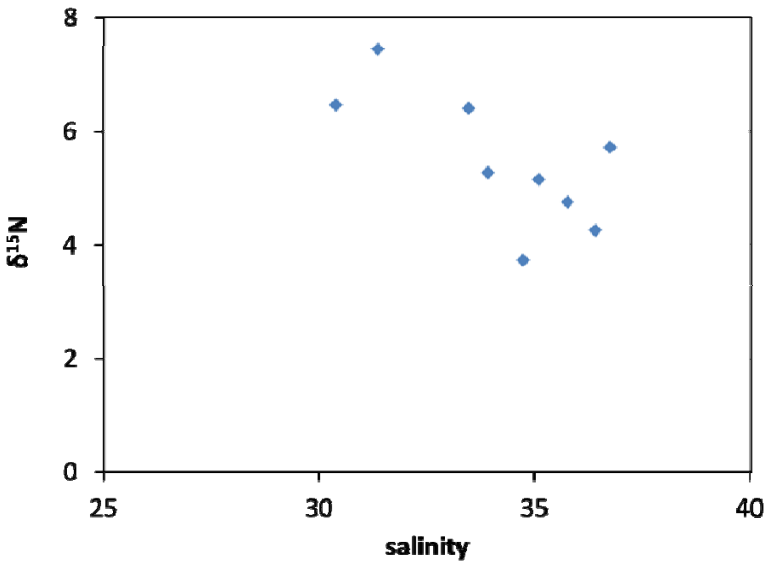

Fig. 5.35. Station salinity versus the average $\delta^{15}N$ for the algae collected at the time salinity was measured. The negative relationship is significant ($p = 0.03$) with a slope of -0.38 and an r^2 value of 0.50.

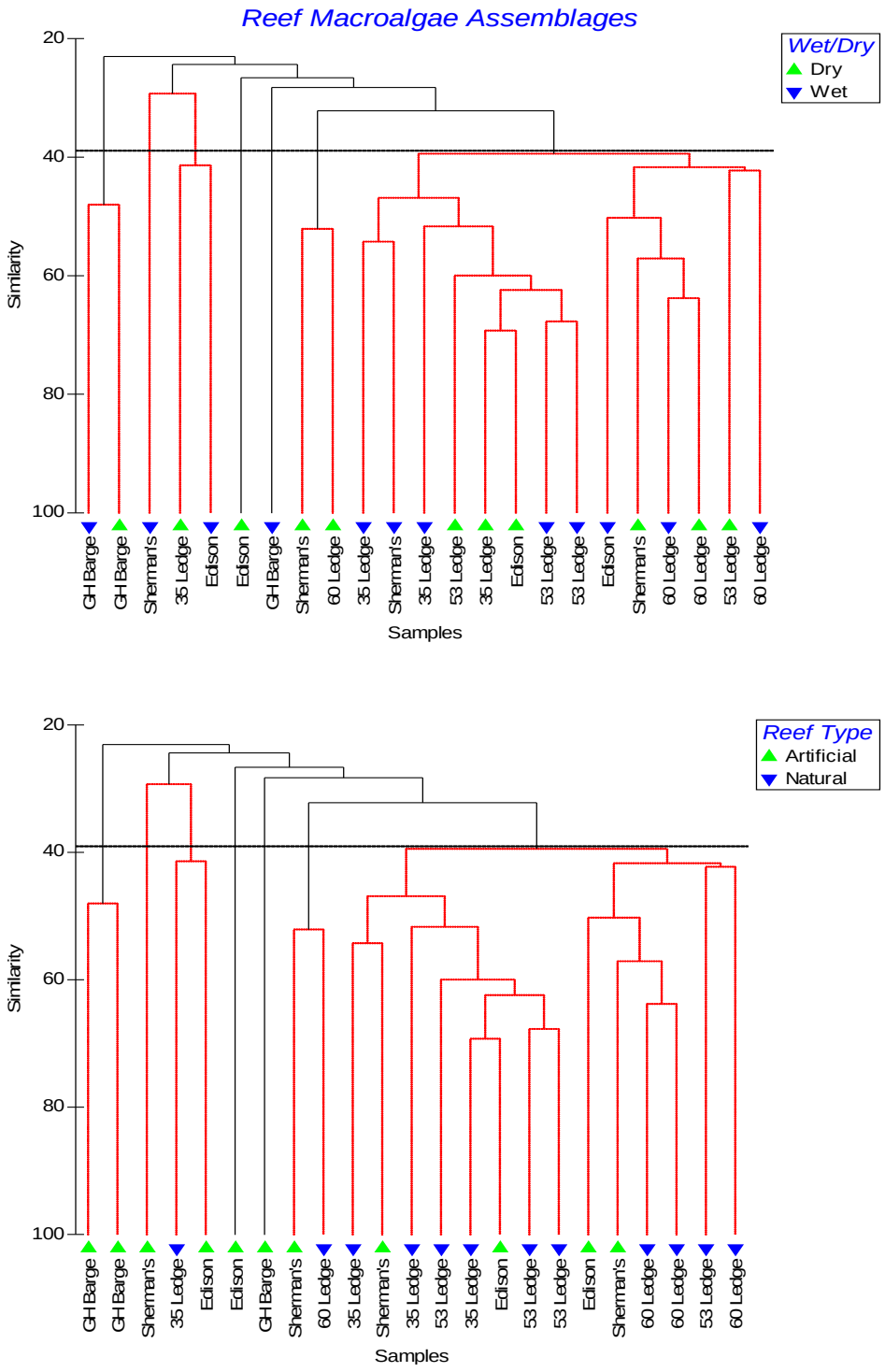

Fig. 5.36. Cluster diagram illustrating significantly different groupings of sites as black lines with those connected by red lines not significantly different. Figure labeled by site and wet or dry season (top) and by reef type (bottom). Note outliers and scattered low-similarity of artificial reef sites and sample events.

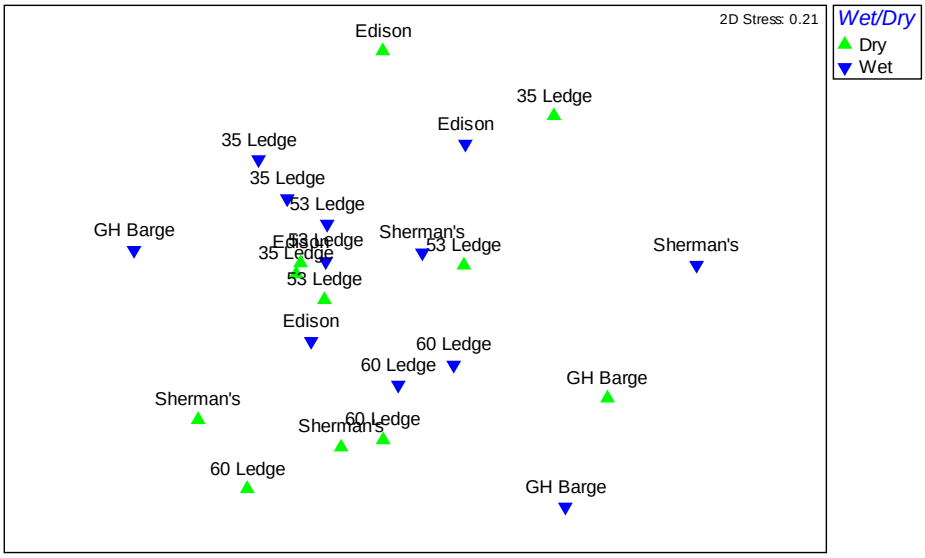

Fig. 5.37. Non-metric multidimensional scaling ordination of all sites and sampling events labeled by site and wet/dry season. The 2D stress value of 0.21 indicates a potentially useful ordination but caution should be used in interpreting results.

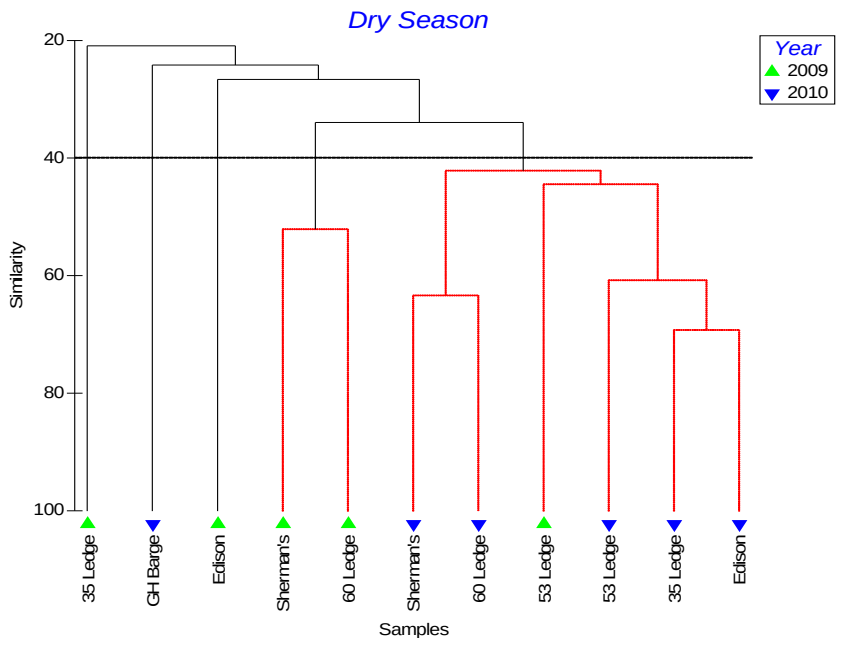

Fig. 5.38. Hierarchical clustering based on Bray-Curtis Similarity of all dry season algae assemblages events. Five significant groups are identified by black lines with those connected in red as not significantly different from each other. Slice added at 40% similarity to illustrate groupings and for overlay on MDS ordination.

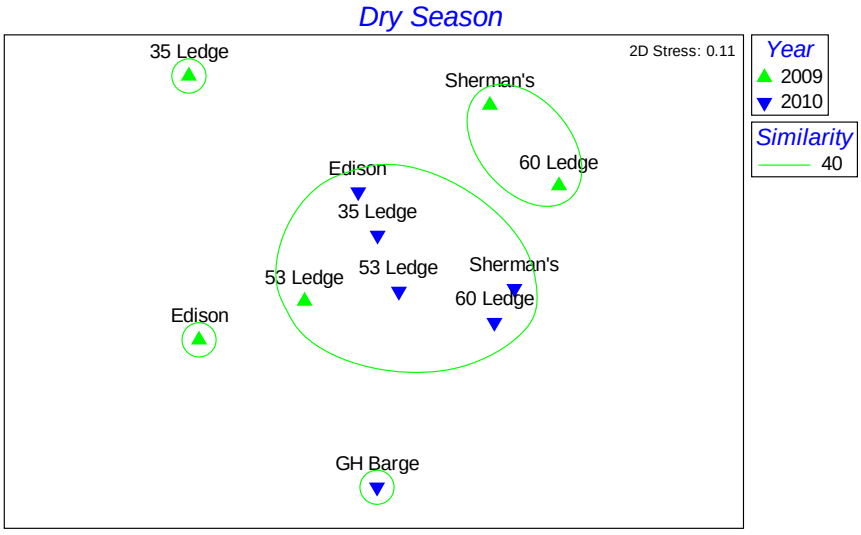

Fig. 5.39. MDS ordination of dry season algae assemblages labeled by site and year. Significant groupings are identified by overlay at 40% similarity. Note outliers consist of artificial reefs with greater dissimilarity expressed as scatter among the 2009 samples. The 2D stress value of 0.11 indicates a good ordination with little prospect of misinterpretation of the results.

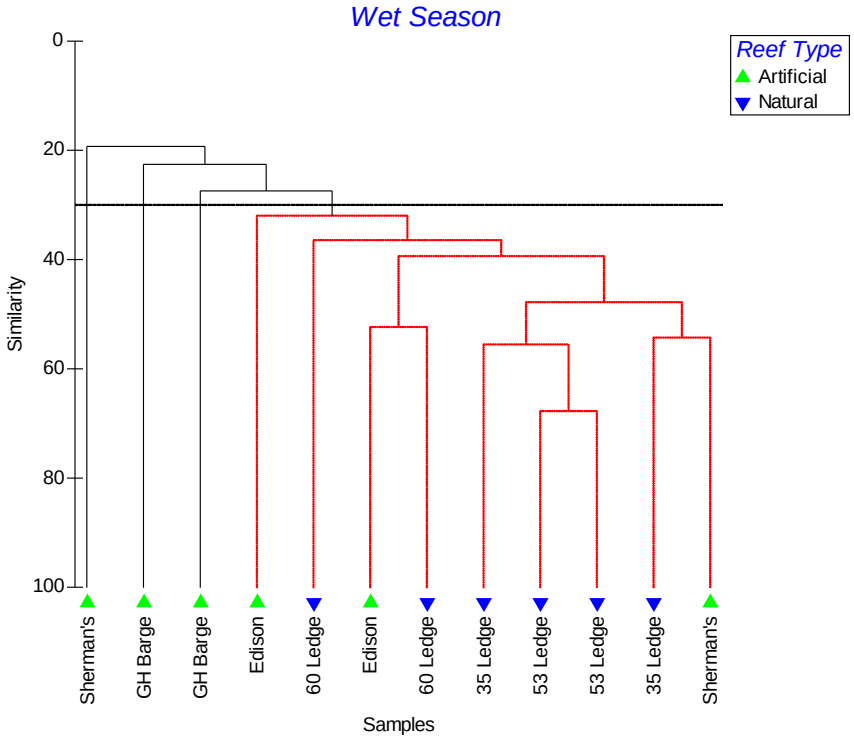

Fig. 5.40. Hierarchical clustering based on Bray-Curtis Similarity of all dry season algae assemblages events. Four significant groups are identified by black lines with those connected in red as not significantly different from each other. Slice added at 30% similarity to illustrate groupings and for overlay on MDS ordination.

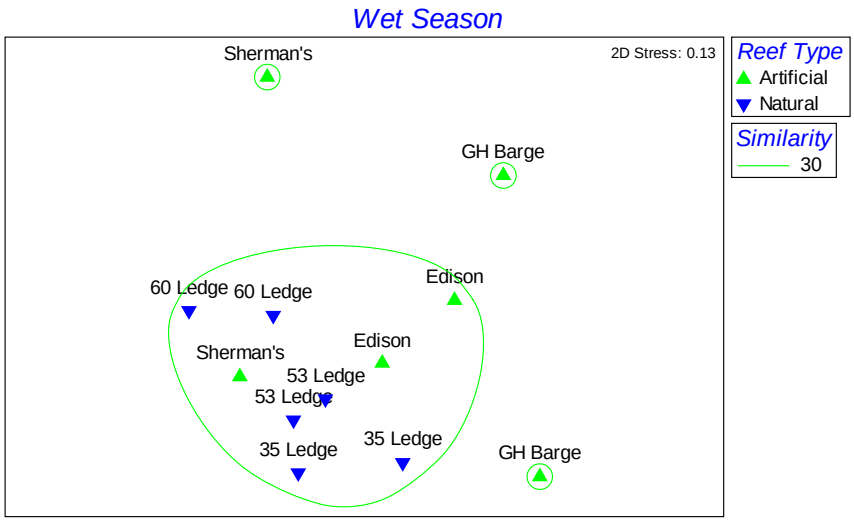

Fig. 5.41. MDS ordination of dry season algae assemblages labeled by site and year. Significant groupings are identified by overlay at 30% similarity. Scatter reflects the dissimilarity between significant groups and influence of wet season influence on algal community structure. The 2D stress value of 0.13 indicates a good ordination with little prospect of misinterpretation of the results.