Hydrodynamic effects on grazing strength in seagrass ecosystems

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The loss of marine ecosystems through nutrient pollution is a worldwide problem. Among the factors influencing ecosystem susceptibility to nutrient enrichment, is the diversity and abundance of herbivores. Recent results draw a contradictory picture about the role of these grazer communities in different seagrass ecosystems. Our research examines weather other impacts, such as different hydrodynamic interactions, influences the relevance of mesograzer in ameliorating impacts resulting from nutrient pollution. To answer this question we conducted field experiments in sheltered and exposed seagrass habitats and in different seasons. Our results showed that epiphytic biomass could increase strongly with nutrient enrichment, but grazer could control growth of epiphytic algae on seagrass leaves and prevent negative eutrophication effects. Hydrodynamic conditions and seasonal effects modified the outcomes between the increase in epiphytic biomass and the control through mesograzer. During autumn we did not observe any strong effects, neither in the effect of nutrient enrichment nor in the top-down control. In contrast during summer, nutrient enrichment led to a strong increase in epiphytic biomass in treatments without grazers. At sheltered sites grazer were able to control epiphytic growth, yet not at exposed sites. Our research provides new insight into processes that modify the response of epiphytes to eutrophication and the potential grazing effects in ameliorating these effects.

Collecting ground data for remote sensing in mangroves

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Wading through mangroves and mud is never easy, and is often hampered by large tidal movement, dense vegetation, the risk of crocodile attack, the accessibility of the most appropriate study site and field costs. Remote sensing methods can have important roles in the beginning of a field study as well as later, including site selection of homogenous sites. Employing navigation aids such as PC tablet or a PDA are essential on the ground, for finding the right path to the homogenous site. Remote sensing provides managers with the means to determine which sites are appropriate to ground truth and to reduce the number of visits to the field needed to understand the condition of the mangrove vegetation. An important aspect of the collection of ground data for remote sensing is identifying measurable on ground key habitat characteristics of mangroves that can be strongly correlated with the variability in satellite imagery. The collection of ground truth canopy cover estimates from regional mangrove areas in Western Australia in the same season as the imagery capture is essential to develop a robust mangrove index that will give an indication of mangrove condition over time. Ground truthing canopy cover of homogenous sites is a widely used terrestrial measurement of vegetation to determine vegetation condition that can successfully be applied to the mangrove environment. In May 2009 a funded NRM Project (073007) through Department of Fisheries and supported by the Department of Environment and Conservation (DEC) investigated several methods of measuring canopy cover in the Burrup mangroves. This study aimed to determine which reading was the most accurate, the easiest to learn and the most time effective. These methods included the use of a densitometer, a canopy cover key and photographing the canopy to extract the percentage that was not sky. The most appropriate method was determined by undertaking a regression analysis with spectral values for each homogenous site. The best regression equations were applied to the satellite image and validated with additional ground truth points to test which canopy cover measurement performed best. Validation determined that the canopy cover estimated using the canopy cover key and the eye were the most consistent method. The use of the camera to photograph the canopy also produced good results and had potential with a refined technique. As a result of this study, current mangrove monitoring programs at the DEC collect canopy cover measurements using both the canopy cover key and canopy photos estimates as a standard method when ground truthing satellite imagery.

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