TESTING AND EVALUATING THE EFFICIENCY OF LOW-COST METHODS IN SEAGRASS MAPPING

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Abstract
The health and conservation of seagrass is irrefutably of great importance to the health of marine biodiversity. Its distribution is in a steady decline and there is a lack of studies and gaps which exist in cheap, easy and effective methods. Therefore, we aim to test and evaluate the efficiency of kayak-based surveys on the distribution of *Posidonia oceanica*. In conclusion, the most sufficient method to map the seagrass is to use a Go-Pro and Lowrance Elite-4 sonar on a two-person kayak.

Keywords: Posidonia, Mapping, Instruments and techniques, Aegean Sea

Seagrasses are one of the richest and most valuable coastal ecosystems on the planet, supporting a range of keystone and ecologically important marine species [1]. Therefore, its conservation is highly needed but how can we conserve something if we don't know its spatial distribution? The need for seagrass mapping is vital since knowledge of its known distribution is not on a satisfactory level; this is creating a conservation effort difficult and inefficient. There are many different approaches for sea grass mapping (e.g., direct and indirect; optical remote sensing and acoustic remote sensing, [2], but mostly they are rather expensive and additional knowledge gaps exist in cheap, easy and effective methods. Thus, this work sets out to test out two methods with different aims and to develop a cheap, easy and efficient means of reviewing and mapping the seagrass via using a two-person kayak. The methods used were conducted using optical remote sensing and acoustic remote sensing with kayak in the Mesokampos bay in Samos island, Greece.

The aim of the first study was to map the extent and coverage of *Posidonia oceanica*. Surveys were conducted using a two person kayak; the GPS device and compass were used to navigate the kayak parallel to shore through the study area. The surveys were conducted by moving through the 250m grid, visually assessing the *P. oceanica* percentage coverage for each square in the center of each grid cell. The coverage was recorded by studying the sea floor with the bathyscope and the depth was measured using the Echofish 300 sonar device. With the sonar transects it was able to map the areas and define the size of the patches of *P. oceanica* (Figure 1).

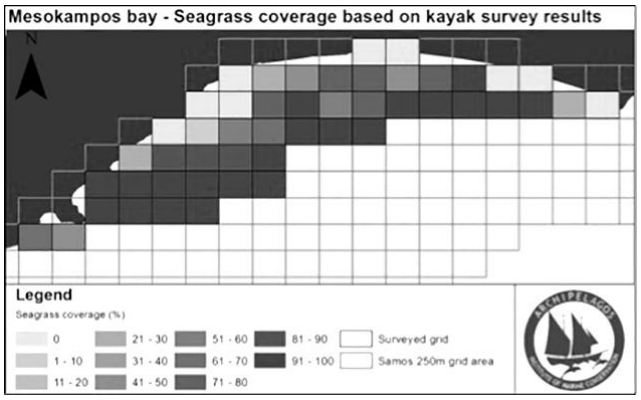

Fig. 1. Seagrass coverage map in the Samos create by the results of 1º methodology.

The second method was developed as a sequel of the first one and with the aim to also map the damage to *P. oceanica* that were caused by illegal trawling. Surveys were conducted using a two person kayak with a GoPro camera fitted into a case to help it glide through the water that could be adjusted height wise depending on the depth of the sea bed. A Lowrance Elite-4 sonar attached to the underside of the kayak stated the depth required to set the camera at, provided the GPS positioning, co-ordinates of the start and end points of the transect to enable easy navigation and observed the presence of seagrass by changes in the structure of the seabed. Beside mapping the seagrass, in most sonar images of the seagrass patches it was also possible to define the damage of illegal trawlers (Figure 2).

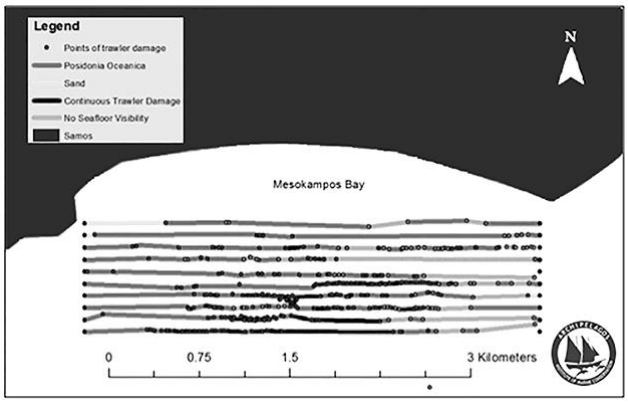

Fig. 2. Seagrass coverage map in the Samos create by the results of 2º methodology.

The first methodology was effective for measuring the seagrass coverage in the shallow waters(0-15m), even with the limitation of the equipment. As for the second methodology, it was more successful in displaying the extent of P. oceanica in the Mesokampos Bay since it was a follow-up of the first one. Also, areas of greater depth were able to be mapped and the trawling damage in the patches can be detected. Therefore, by using a two-person kayak with a Go-Pro camera and Lowrance Elite-4 sonar proved to be an effective low cost method which can give sufficient results in mapping the extent of the seagrass and ultimately help for its conservation. However, limitations within this study did exist, these include: limited visibility of the seabed along some transects; bad weather conditions forcing surveys to be conducted in sheltered bays; and the type of the sonar and camera with a live feed screen.

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