

The distribution of weedmats in the intertidal zone of the Ythan Estuary

Summary

This report examines the potential for using colour vertical aerial photography to map the location, distribution, extent and changes over time in weedmat coverage found in the Ythan estuary in North East Scotland.

Mapping of weedmats in the Ythan estuary has previously been undertaken by Dr Raffaelli and co-workers at the Zoology Department of the University of Aberdeen. He concluded that although fluctuating from year to year there appears to be a gradual trend towards an overall increase in the extent of weedmats over time.

Using Raffaelli's work as a reference, the objectives of the work described in this report are to: develop an up-to-date practical method to provide information about weedmat location and extent over time from aerial photographs; and to provide quantitative estimates of weedmat coverage for comparison with earlier studies.

Aerial photographs of the estuary are available for a variety of dates, but only four years were found to contain photos of a suitable quality, taken at the right time of year and at low tides. These four years of photos (1989, 1992, 1994 and 2000) were scanned into a computer. Image processing techniques were then used to join the photos together to make a series of mosaiced images. These were then used as the basis for visual interpretation and mapping of the location and extent of weedmats for each year of photography. These images were also input to a Geographical Information System (GIS), a map based system, which can be used to calculate quantitative estimates of the area covered by the weed mats in each year.

Although weedmats can easily be differentiated on colour aerial photography from a background of mud and sand, it was not possible to reliably separate individual macro-algal species from each other, or to distinguish weedmat densities (i.e. the amount of weed per unit area).

Estimates of the area of weedmats in the estuary reveal annual fluctuations and a gradual increase over time, a trend that is comparable with the previous findings of Raffaelli et al.

It is concluded that colour aerial photography can successfully be used to acquire location and coverage information about weedmats at different points in time. This is significantly aided through the use of a combination of digital image processing and the GIS software. However, the results from this study cannot be directly compared with previous studies as different methods were used.

Ideally, it is suggested that in the future large-scale colour aerial photography be collected for the estuary and obtained at times of the year when the weedmat growth is at its maximum. It is also recommended that repeat photography should be acquired at monthly intervals during the growing season and in successive years. This should be combined with fieldwork, which can be used to confirm the findings of the aerial photography. Other sources of remotely sensed data and map information could also be used to aid in the interpretation of the photos. This will help to calibrate the information and will help to ensure that changes in weedmat coverage and distribution over time can be more conclusively established.

(Full report available from the Ythan Project office.

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