A comparison of two techniques for the rapid assessment of marine habitat complexity.

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SUMMARY

1. Monitoring and assessment of the status and distribution of marine seabed habitats is needed to support existing and emerging environmental policy commitments. Traditional monitoring of habitats and associated species using grabs and trawls is costly and labour intensive and might usefully be complemented by cheaper and more readily automated methods that can be used at higher frequencies and/or on larger spatial scales.
2. We develop and apply two methods to measure seabed habitat complexity and demonstrate how they can be used to describe impacts (e.g. fishing gear impacts) and monitor recovery. The first method relies on the analysis of deviations in a laser line projected on the seabed. The second method is based on the pixel value distribution in seabed photographs. We use both methods to quantify the complexity created by different substrates and habitat-forming species and to establish links between habitat complexity and faunal diversity (richness) and abundance.
3. The habitat complexity index calculated with the laser line method provided a reliable index of complexity across a range of habitat types, showing a monotonic increase with coarseness of the substratum and the abundance of sessile epifauna. Pixel value distributions in the photographs did not reflect the increase in complexity due to sessile epifauna but only reflected substratum differences.
4. Results suggested that the laser line method would be suitable for monitoring the effect of disturbance on habitats ranging from gravelly sands to rock, and their subsequent recovery. The photographic method would be better suited to assessing complexity and heterogeneity of the substratum. Both methods complement conventional biological sampling and can be used at higher frequencies and/or on larger spatial scales per unit cost.
5. The laser line method has considerable potential to support demands for frequent monitoring of seabed habitats and human impacts at a range of spatial scales. It is less costly and labour intensive than existing approaches and can be deployed from vessels of many sizes.

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