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Further Reading:

Hynes, S., Chen, W., Vondolia, K. Armstrong, C., O'Connor, E. (2021). Valuing the Ecosystem Service Benefits from Kelp Forest Restoration: A Choice Experiment, *Ecological Economics*, 179, 106833. https://doi.org/10.1016/j.ecolecon.2020.106833

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Read More About: Read more about the Socio-Economic Marine Research Unit here.

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Valuation of marine ecosystem restoration activity could lead to more efficient marine planning

Ecosystem restoration implies policies that focus on remediating environmental degradation. In this research, the welfare impacts of restoring Norwegian kelp forests to areas where they once were dominant but which now lie barren are estimated using the discrete choice modelling approach. The research also examined if direct contact with the marine environment through recreation influences respondents' willingness to pay to restore the kelp ecosystem. Recognising the ecosystem services provided by kelp forest restoration, quantifying them and finally valuing the benefits to society from the additional level of services provided enables policy makers to take such values into account when assessing policies which may affect kelp forest habitats, and can also assist decision makers to decide on which restoration projects should be prioritised.

Research Findings

The results from the analysis indicate a positive and significant marginal societal willingness to pay for the ecosystem services associated with kelp forest restoration. This result is consistent with prior studies that have valued other types of ecosystem restoration activities. Respondents placed a higher value on a high level of species biodiversity relative to all other attributes (nurseries for juvenile commercial fish, size of area to be restored), with the result consistent across various model specifications. Being an active water-user is a positive and significant predictor of an individual's preference for larger areas of kelp forest restoration and for high juvenile fish abundance. The results demonstrated significant unobserved preference heterogeneity amongst the Norwegian population for the attributes associated with kelp forest restoration with the highest variation also associated with the biodiversity attribute.

Policy Implications

Economic valuation of marine ecosystem services can provide a comprehensive picture in terms of restoration policy efficiency and economic trade-offs between alternative marine environment investments in general and marine restoration scenarios in particular. While the value of some of the ecosystem services provided by kelp forest restoration, such as increased fish populations, are somewhat easier to measure as they have established market prices, many of the benefits from such restoration, such as carbon sequestration, increased biodiversity and possible recreation opportunities, are not generally traded in markets and therefore do not generally command a price. Without incorporating these non-market values into the decision-making processes, these benefits may be ignored and decisions made that are not in fact in the interest of society. The results suggest that in order to maximise the benefit value to society planners may want to restore kelp over larger distances of coastline with several smaller restoration projects, in order to secure species that are more comfortable in different coastal regions, rather than a single large restoration area in one place. Alternatively, near large urban centres, or where a marine area is expected to see a high frequency of use by recreationalists, a better strategy may be to restore the largest area possible in the one place.