

# Linkages between environmental, social, and economic effects of marine renewable energy

Jacob McGrath, Mikaela Freeman, Deborah Rose  
Pacific Northwest National Laboratory, Washington

To understand the full effects of marine renewable energy (MRE), we investigate how the environmental effects of MRE projects relate to social and economic effects.

MRE provides opportunities for coastal, island, and remote communities to gain energy independence and produce reliable energy.

Uncertainties and concerns of adverse socioeconomic and environmental effects, which can be interdependent, continue to slow permitting and deployment timelines.

The OES-Environmental initiative, a collaborative of 16 countries, works to increase understanding of the environmental effects of MRE. To fully account for the effects of MRE, OES-Environmental is exploring the social and economic effects, including through the development of resources such as:

- Chapter 4 of OES-Environmental's 2024 *State of the Science* report, which provides an overview of the socioeconomic effects of MRE
- Marine Energy Social and Economic Data Collection Toolkit, which supports inclusion of communities in the MRE development process by providing easy access to information on social and economic data collection methods and examples.

## OVERVIEW

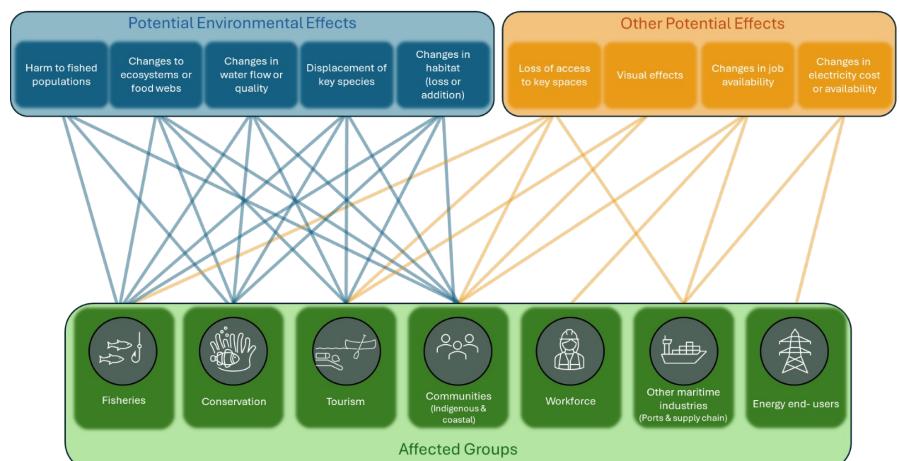


Fig. 1: Key social, economic, and environmental effects and affected groups as identified in Chapter 4 of OES-Environmental's 2024 *State of the Science* report. Social and economic effects of MRE are shown by the lines in the figure, with mechanisms of effect at the top and potentially affected groups at the bottom. Blue lines indicate an environmentally linked socioeconomic effect, and orange lines indicate a non-environmental socioeconomic effect.



## ONGOING WORK

To further investigate the linked socioeconomic-environmental effects of MRE, OES-Environmental has developed an international working group to:

- Identify indicators for measuring the effects of environmental linkages
- Explore how social and economic effects connected to environmental effects change depending on the scale and type of MRE deployment
- Assess the influence of environmental linkages on decision-making and regulatory requirements
- Create a set of recommendations for assessing or measuring linked socioeconomic and environmental effects



## LEARN MORE

Social and Economic Effects of MRE: Short Science Summary



Social and Economic Data Collection Toolkit

