Map tracks human footprint on world's oceans

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Human activities, including fishing, pollution and shipping, have left no ocean region completely untouched and have had a strong impact on about 40 per cent of the world's marine ecosystems, a group of researchers said.

Using data tracking 17 different types of human impact, the team of researchers from the United States, Canada and Britain produced a global map of human impact. Each square kilometre of ocean was assigned a single value, ranging from very low to very high impact.

The research, which appears in Friday's issue of the journal Science, found the most affected regions are those susceptible to multiple activities. Coastal regions in heavily populated areas, for example, would feel the impact of fishing, shipping, pollution, and agricultural and industrial runoff from land use, among other activities.

The most heavily affected environments or ecosystems are the continental shelves, rocky reefs, coral reefs, seagrass beds and seamounts (a mountain rising from the sea floor), the researchers found.

"Large areas of high-predicted impact occur in the North and Norwegian seas, South and East China seas, eastern Caribbean, North American Eastern Seaboard, Mediterranean, Persian Gulf, Bering Sea, and the waters around Sri Lanka," the researchers wrote.

A global map shows the overall impact that 17 different human activities are having on marine ecosystems. Dark red areas are the most affected regions, while light blue represents the least altered areas. (B.S Halpern/Science)

Although no region was completely untouched, about four per cent of the ocean areas were relatively pristine, the authors said. The majority of these areas was found near the Arctic and Antarctic poles, they said, because seasonal or permanent ice limits human access.
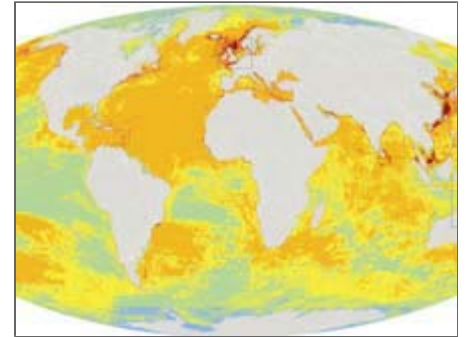
"In general, small human population and coastal watershed size predict light human impact, but do not ensure it, as shipping, fishing and climate change affect even remote locations," they wrote.

The researchers hope the map will help inform both regional and global efforts at conservation, letting governments and researchers know all of the potential causes of issues before designing a policy.

"Our approach provides a structured framework for quantifying the ecological tradeoffs associated with different human uses of marine ecosystems and for identifying locations and strategies to minimize ecological impact and maintain sustainable use," they wrote.

"In some places, such strategies can benefit both humans and ecosystems, for example, using shellfish aquaculture both to provide food and improve water quality."

Most of the researchers working with the data models were from the United States, though Reg Watson, a senior research fellow at the University of British Columbia's Fisheries Centre, also contributed to the report.