Why were saltmarsh species assemblages so resilient to the Deepwater Horizon oil spill?

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The Deepwater Horizon oil spill released approximately 210 million gallons of oil into the Gulf of Mexico. There was a clear signal of oil exposure in individuals across taxa, experiments have shown oil to be a stressor that leads to physiological responses, and there were changes observed in lower trophic level communities. Combined, this indicates a strong potential for population declines of commercially and recreationally valuable fishes and aquatic invertebrates. However, there has been little evidence of such declines, and in some cases, brief increases were observed. Several hypotheses have been proposed to explain this apparent paradox. Two possibilities include a fishing moratorium following the spill and changes in predation pressure following predator die offs. Using food web models, we quantified how much species would be expected to increase given only a fishing moratorium or predator die off. Predicted increases of a magnitude much greater than observations indicate evidence for population-level impacts of oil mortality. Food web resilience to oil spills is not unique to the Deepwater Horizon, and this work tests possible mechanisms for such phenomena. We emphasize that oil spills are one influence within a large socio-ecological system, and understanding oil spill impacts requires consideration of this complexity.

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