Why were saltmarsh fish and invertebrates so resilient to the Deepwater Horizon oil spill?

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There has been a disconnect in the documented impacts of the Deepwater Horizon oil spill in estuarine environments between individuals and populations. The spill left a clear signal of oil exposure in individuals across taxa, experiments have shown oil to be a stressor that leads to lethal and sublethal impacts, 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. Two hypotheses to explain this apparent paradox include a fishing moratorium following the spill and changes in predation pressure following high predator mortality events. Using food web models, we quantified both the direct (predator and fishing mortality) and indirect impacts (impacts that are propagated through multiple food web interactions) of changing fishing intensity and predator productivity. We found the direct impacts of the fishery closure are likely the most significant factor we tested to explain population resilience. Our ability to account for uncertainty in functional responses indicated that different predator responses to changing prey abundance can lead to either slightly negative or slightly positive responses for certain species. We emphasize that oil spills are one influence within a large socio-ecological system, and understanding oil spill impacts requires consideration of the impact of the oil spill on all aspects of this system, as well as accounting for the myriad other stressors acting simultaneously.