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TITLE: Evidence of lasting impact of the Deepwater Horizon oil spill on a deep Gulf of Mexico coral community

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ABSTRACT:

Abstract A coral community 11 km southwest of the site of the Deepwater Horizon blowout at 1,370 m water depth was discovered 3.5 months after the well was capped on 3 November 2010. Gorgonian corals at the site were partially covered by a brown flocculent material (floc) that contained hydrocarbons fingerprinted to the oil spill. Here we quantify the visible changes to the corals at this site during five visits over 17 months by digitizing images of individual branches of each colony and categorizing their condition. Most of the floc visible in November 2010 was absent from the corals by the third visit in March 2011, and there was a decrease in the median proportions of the colonies showing obvious signs of impact after the first visit. During our second visit in 2010, about six weeks after the first, we documented the onset of hydroid colonization (a sign of coral deterioration) on impacted coral branches that increased over the remainder of the study. Hydroid colonization of impacted portions of coral colonies by the last visit in March 2012 correlated positively with the proportion of the colony covered by floc during the first two visits in late 2010. Similarly, apparent recovery of impacted portions of the coral by March 2012 correlated negatively with the proportion of the coral covered with floc in late 2010. A notable feature of the impact was its patchy nature, both within and among colonies, suggesting that the impacting agent was not homogeneously dispersed during initial contact with the corals. While the median level of obvious visible impact decreased over time, the onset of hydroid colonization and the probability of impacts that were not visually obvious suggest that future visits may reveal additional deterioration in the condition of these normally long-lived corals.

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