

the abundance of *Sargassum* at the surface.⁴⁵ Experiments were conducted that demonstrated that exposure to oil and, particularly, to chemically dispersed oil caused *Sargassum* to sink a trend particularly pronounced for one of the two species, *Sargassum muticum*. Dissolved oxygen levels around the *Sargassum* also dropped, more so when the oil was chemically dispersed. In addition to any toxic effects, sinking of an important habitat and stress induced by lowered dissolved oxygen likely resulted in actual harm to the plants and animals associated with floating *Sargassum* that came into contact with floating oil. While the harm to populations of animals associated with *Sargassum* was not directly measured, the investigators conducted simple calculations to demonstrate that the effects on sea turtle hatchlings and juveniles could contribute to year-class failure. Follow-up aerial surveys in 2011 and 2012 documented a four-fold increase in *Sargassum* abundance over 2010 levels, suggesting that while the impact of the Macondo well blowout on this important habitat was particularly acute, it might not have been long-lasting.

Sea turtles suffered substantial mortalities and unusually high rates of stranding that have continued through at least 2013. Five species of sea turtles occur in the northern Gulf of Mexico.



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High Oilier Ingestion and Mortality Turtle collections far exceeded historical records of turtle strandings (washed ashore or found floating dead or in a weakened condition) during the period in which there was abundant floating oil (Figure 5).

Sea Turtles Figure 5. Monthly sea turtle strandings in 2010 compared to long-term averages (compiled by Doug Miller of the National Wildlife Federation using Sea Turtle Stranding and Salvage Network data).

In 2011-2013 approximately 500 turtle strandings per year were observed from Alabama to the upper Texas coast (Table 1), a five-fold increase above the historical rate.⁴⁶ Possible reasons for the increased strandings under investigation include fishing activities that result in bycatch, biotoxins from harmful algal blooms, and impacts from the Macondo well blowout.

⁴⁵ Parsons SP, Hernandez FJ, Gordon SH, DeRuiter JM, Free CM (2013) Novel pathways for injury from offshore oil spills: direct, sublethal and indirect effects of the Deepwater Horizon oil spill on pelagic *Sargassum* communities. *PLoS One* 8(7):e69822.

⁴⁶ National Marine Fisheries Service (2013) Sea Turtle Strandings in the Gulf of Mexico. NOAA Fisheries Office of Protected Resources, 2014, <http://www.nmfs.noaa.gov/pdf/Appeals/turtlestrandingreport2013.pdf>