

3.4 Oyster Health

Evaluation will be done throughout random stations- using the point set method of the quantitative underwater ecological surveying techniques and samples collected. Sampling will occur twice a year for five years.

3.4.1 Analytical Testing Results

During the oil spill of 2010 the oysters were tested to NOAA standard testing instead of the State of Florida criteria. The State criteria was extremely low, all analytical tests showed no detection of any oil contamination, yet oysters (and fish) were still dying off. Samples of pure crude oil was found on Deadman's Island, reported and sent to lab for testing. FDEP collected the organic matter around the crude oil sample. The NOAA test results were the only testing methods showing there was above the max range of chemical compounds in the diesel range. This means chemical compounds of crude oil compounds were found in the tissue of the fish and oysters instead of the basic PAH from boat pollution.



Figure 12: A picture of oil, from the 2010 Deep Water Horizon oil spill event, found at Deadman's Island.

2015 was the first year since early 2010, the reefs had a majority of minimum market size oyster (3-5 inches). In 2010, oysters were tested for basic PAH and no results were found. A sample of submerged oil found was halved with the FDEP laboratories and scat team. This sample was a pure sample of crude oil. The FDEP results came back as no detection. The certified petroleum laboratories results were 100% crude with a profile of MC252. This was the first realization the State criteria of normal PAH was too low in the detection of crude oil in organisms. NOAA Laboratories were contacted along with BP certified labs to discuss these tests. These particular tests were able to show why fish and oysters were dying off. The fish and crabs died off much quicker than the oysters in 2010. Oysters cannot process PAH so these were considered as “windows to the health of bay”. Naturally, we can't say the oil spill killed off the fish and oysters, but there was much oil in the bay, the city of Gulf Breeze and Coastwatchers were constantly locating and reporting oil washed up on Deadman's Island. At the time, these new tests showed petroleum hydrocarbons in the diesel range in the tissue of oysters and fish. The fish died off in 2010 and the oysters completely died off in 2011. These tests are now used as “post baseline” test and should be used as a primary monitoring tissue test. Not only does this test show the lighter compounds which are volatile, and in some cases, less significant, but the tests show heavier compounds which can penetrate the lipid fat layer and show an effect on human health. The same collection method was performed for the 2015 tests. These tests show small levels of primary PAH, which indicates pollution from anthropogenic stressors and the levels were relatively

small. There was no detection of the carcinogen compounds in the 2015 samples as were detected in 2010 during the oil spill. What this shows is the recovery from the oil spill has finally occurred, and the oyster male to female ratio has come back into balance with more growth and less observed die-offs.

The carcinogen compounds found within the tissues of oysters during 2010, were fluoranthene, which is a Group 3 carcinogen, naphthalene which is a Group 2B carcinogen and known to damage or destroy red blood cells and phenanthrene, a Group 1 carcinogen (Fig. 13). Phenanthrene is not listed as hazardous to humans under Clean Water Act, but the rate of exposure is unknown. Pyrene, which is toxic to liver, blood, and kidneys was also found. The exposure rates to toxins were estimated from May 2010 to the sample date of the oysters. In the earlier stages of the oil spill (August 2010) when the die off and sick fish were first seen, the same chemicals were found but also chrysene. Some of these chemicals occur naturally in the environment, and can be detected in lab controls but there is a certain detection limit which is acceptable. These levels were above the detection limit and some of these numbers increased with time. The 2015 oyster tissue analysis showed no detection of any of these levels.

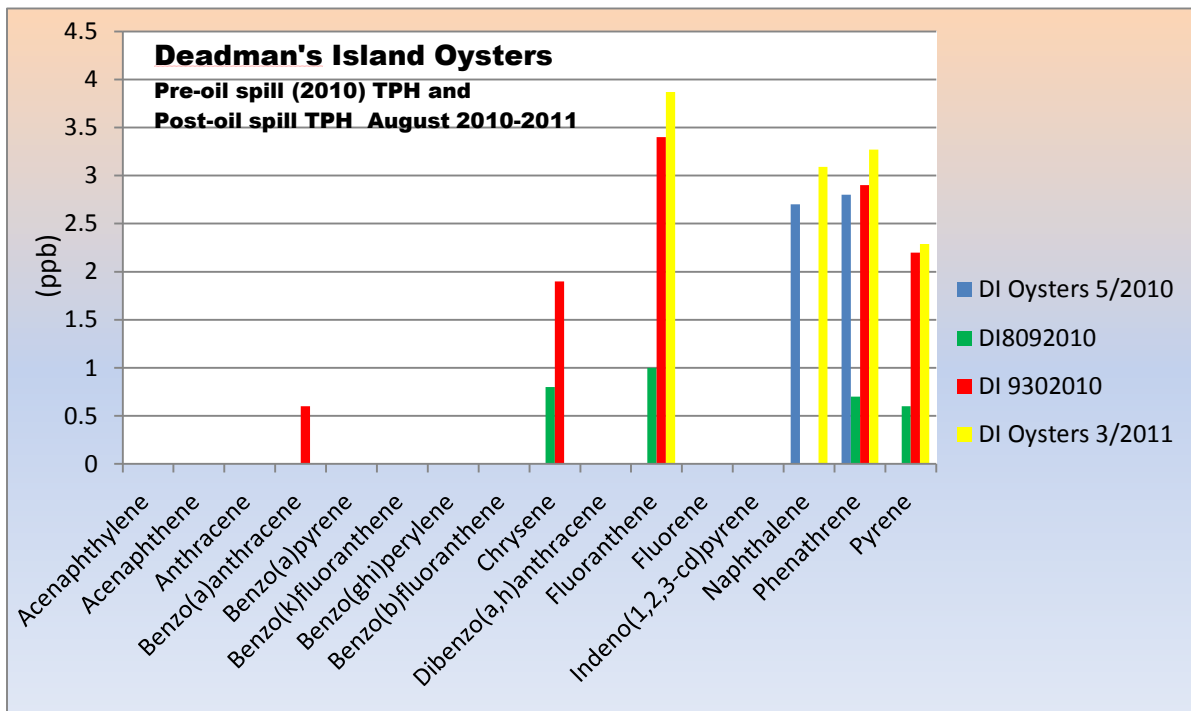


Figure 13: Carcinogenic compounds seen in the oysters of Deadman's Island during the DWH oil spill event. Recent 2015 Total Petroleum Hydrocarbons (TPH) tests show no sign detection of the harmful compounds in the new oysters.