Sustainable Ecosystem Restoration, LLC.

Deepwater Horizon Spill - Crude Oil Behavior

The release of crude oil from the Deepwater Horizon disaster has resulted in the continual release of approximately 210,000 gallons of crude oil each day. The crude oil will rise due to buoyancy, and undergo numerous changes before surfacing on the Gulf of Mexico. Figure 1. Depicts the plume behavior during its ascent, and illustrates how various components will segregate on its journey to the surface. Some of the oil components, particularly the volatile fractions such as benzene, toluene and xylene will dissolve into the seawater where potentially it could impact planktonic and larval organisms. Some fraction of the oil will result in very small particles, and when combined with other solids in the water column will result in neutrally or slightly negatively buoyant "droplets" that may get trapped at depth. The fate of this material is currently unknown as it may sink to the bottom or drift around at depth until some event (weather, current upwellng, storm activity) causes it to move toward the coastline.

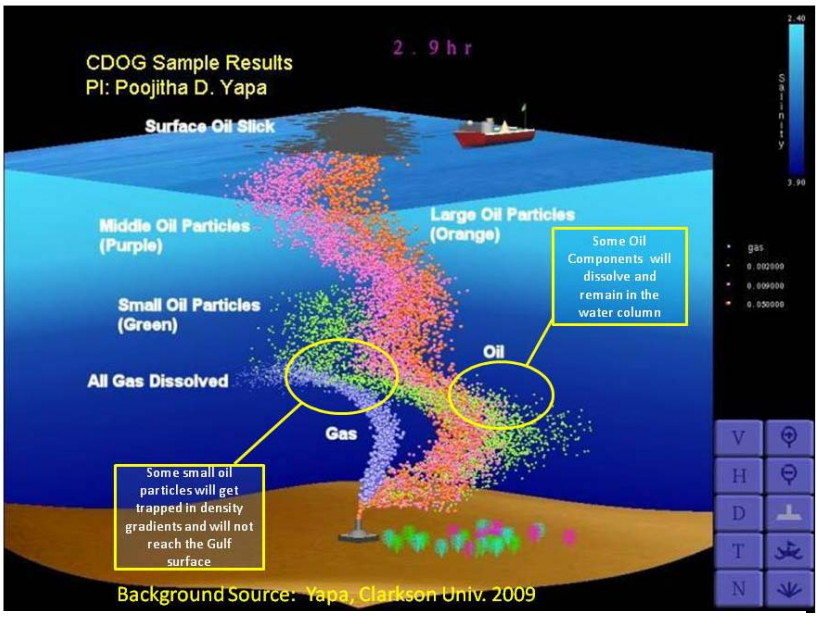

Figure 1. Behavior of a crude oil release from depth. Much of the oil may not immediately reach the surface, some fraction will dissolve, other smaller particles will emulsify and will mix with other particles, and become trapped or sink to the bottom.

Because of the crude oils composition, and because of the depth of release, the most probable material to reach the surface is an oil emulsion formed from heavier molecules trapping droplets of sweater, and forming the characteristic "mousse" appearance. This is what has already been experienced already impinging areas of the coast (Figure 2.).

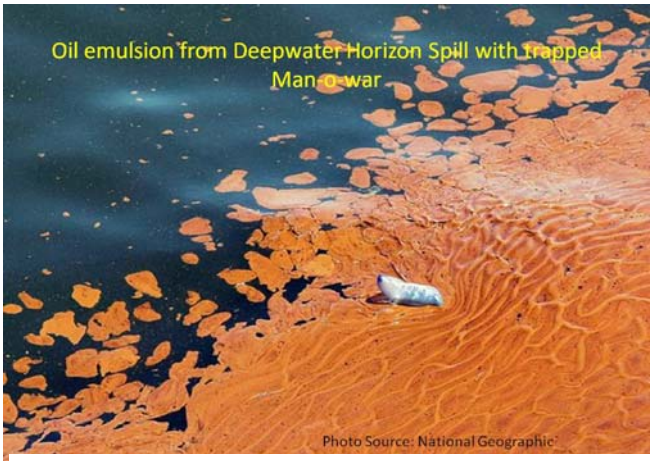

Figure 2. Crude Oil "mousse" observed along the Louisiana Coastline.

According to Dr. Ed Overton, LSU Professor, the tarry and mousse residues will not disperse easily, will not burn readily, and will not be degraded rapidly by microbial degradation. He also stated the tarry residues will be very sticky and nearly neutrally buoyant, will coat everything it contacts and be difficult to clean. Some of the residues could pick up sediments, become heavy and sink, coating some water bottoms, including oyster reefs, seagrasses and other benthic habitats.

Latest predictions by federal agencies such as NOAA continue to bring the oil spill plume deeper into coastal waters, especially in the areas around the mouth of the Mississippi River, including St. Bernard and Plaquemines Parishes in Louisiana. (Figure 3.). The probability that more coastal areas will be directly impacted increases with every day the oil releases continue form the uncontrolled Deep Horizon site. Thus it is likely fishermen, boaters and businesses near and around the impacted areas will be confronted with dealing with these residues. The U.S. Coast Guard, the USEPA and other agencies, including OSHA, have prepared documents describing safety precautions for dealing with residual oil. In addition, documents describing the clean-up procedures for coastal areas impacted by the spill are also available.

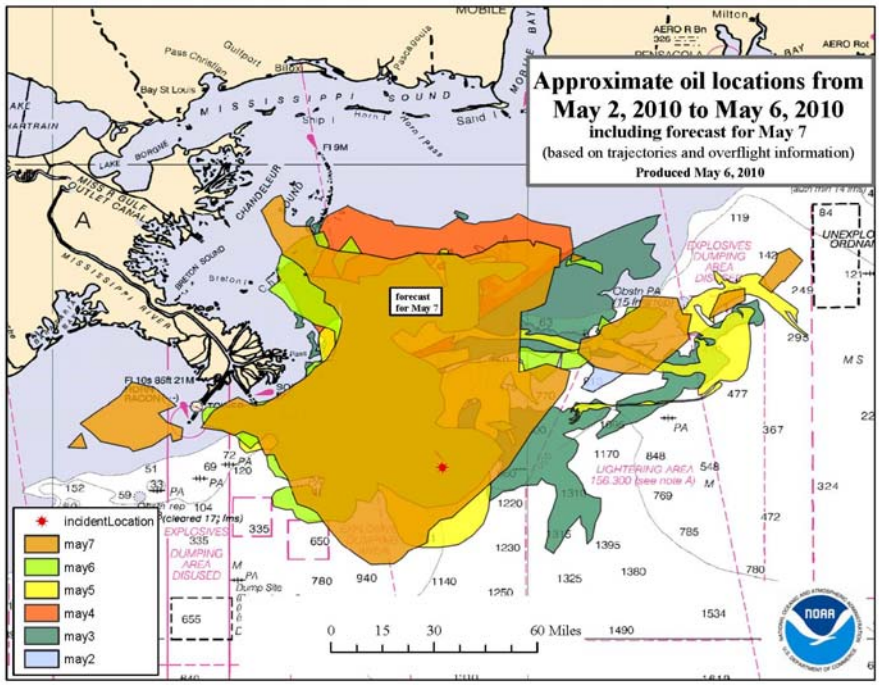

Figure 3. Cumulative Oil Trajectory from 5/5/2010.