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## When will spill be cleaned up? Maybe never

By CURTIS MORGAN  
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After more than three months, BP appears finally to have gotten a firm grasp on its runaway Deepwater Horizon well. Now the big question in the Gulf of Mexico is how, and if, an environmental mess of unprecedented scope can be cleaned up.

Only last week did federal spill managers begin discussing with state and parish leaders in Louisiana, the hardest hit state, how to set the standards for declaring the nation's largest offshore oil spill officially mopped up.

"How do we get to the inevitable question of how clean is clean?" said retired Coast Guard Adm. Thad Allen, the Obama administration's point man on the spill.

Many scientists and environmentalists believe there won't be a quick or easy answer.

"We've never dealt with this before, the complication of this much oil coming from the deep sea and being hit heavily with chemical dispersants," said Ron Kendall, director of the Institute of Environmental and Human Health at Texas Tech University. "We have conducted the largest environmental toxicology experiment in the history of this country in the Gulf of Mexico."

There are some signs the experiment may not have the cataclysmic long-term ripple effects originally feared. Conditions have clearly - and dramatically - improved in the Gulf in the two weeks since BP capped its well.

A massive slick once the size of Florida has shrunk faster than anyone expected. The Coast Guard reported blue water over the Deepwater Horizon site last week and so little floating oil that skimming vessels were burning more fuel motoring around the Gulf than they were finding.

Though incomplete, initial field surveys found less than 400 acres of oiled Louisiana marsh, with most oil collected along the outer fringes. Gov. Bobby Jindal even reopened some bayou waters to commercial fishing on Friday.

Terry Hazen, a microbial ecologist at the Lawrence Berkeley National Lab in California, credited the Gulf's self-healing powers. Unlike the nutrient-lean waters of Alaska, still suffering lingering effects from the Exxon Valdez spill two decades ago, the Gulf teems with bacteria that eat oil and gas leaking from natural deep-sea seeps.

"Petroleum is one of the easiest toxic compounds to degrade," said Hazen. "People forget it's a biological substance. It's been down there a long time, but it has been sequestered in an environment when it can't biodegrade."

In the warm, wave-churned, microbe-rich Gulf, nature alone might already have consumed 30 to 50 percent of the oil. A tropical system stronger than meek Bonnie could further disperse the oil, speeding the process even more.

Yet even combining natural forces with months of burning, skimming and siphoning, the most optimistic estimates suggest tens of millions of gallons remain in the Gulf. It could be soaked into unsurveyed marshes, adrift in countless gobs too small and scattered to show up in satellite images or - most concerning - still be under the surface of the water.

Much of what remains will likely be difficult, or impossible, to capture or clean up.

"The sheer volume of oil that's out there has to mean there will be some very significant impacts," said Jane Lubchenco, administrator of the National Oceanic and Atmospheric Administration, which has a team calculating an "oil budget" intended to narrow down how much crude remains unaccounted for and where it might be.

Rocky Kistner of the Natural Resources Defense Council found plenty in plain and ugly sight during a 10-mile trip last week along the Louisiana delta into Barataria Bay.

Kistner, who mans the Gulf Resource Center that NRDC set up in the delta fishing village of Buras, documented the mess on his blog to counter perceptions the Gulf was clean again, a spin he dismissed as "deception by dispersal."

While BP and federal managers were stressing how hard it had become to find enough oil to skim, Kistner was motoring with a local fisherman through big, mostly lifeless pockets of what resembled "spongy orange cake batter" that put out an overpowering odor "like being stuck in a gas station with all the pump nozzles pointing at your face."

Local shrimpers, he said, worry BP's heavy use of chemical dispersants, sanctioned by the federal government as a trade-off to keep oil from fragile marshes and off vulnerable sea birds, instead has left it to settle into their fishing grounds, out of sight and mind.

"You start trawling shrimp boats through that stuff, you're setting yourself up with a big mess," Kistner said. "That's going to start this whole chain reaction."

Many scientists share the concerns. They say dispersants and submerged oil are X-factors complicating cleanup and making the prospects of a quick Gulf recovery uncertain.

BP's blownout well poured 10 to 20 times the volume of oil into the Gulf of Mexico that the Exxon Valdez spilled into Prince William Sound in Alaska. BP added another 1.8 million gallons of Corexit, a dispersant federal environmental regulators acknowledge can kill or disrupt reproduction in everything from plankton to fish.

The oil giant's submersible robots pumped three-quarters of a million gallons of the dispersant directly into the flow at the sea-floor, a technique never tried or tested before. Scientists suspect the dispersant contributed to the creation of the massive plumes discovered extending as far as 142 miles in one direction from the blown-out well and 42 miles in another.

"That's really the big, big issue," said Susan Shaw, director of the Marine Environmental Research Institute in Maine. "Once you have got that dispersed oil, there is no way to clean it."

The concentrations, ranging from 0.5 to 0.75 parts per million near the well to trace levels farther away fall below the 1 part per million mark considered toxic for marine life. But biologists warn that exposure, particularly over time, could harm or disrupt reproduction for some marine life, particularly for plankton and larvae that form the base of the marine food chain.

Shaw, among a group of scientists who formally urged the federal government to halt dispersant use, believes the combination of oil and chemicals would be more toxic than either alone - with solvents helping oil penetrate cells.

Robert Weisberg, a professor of oceanography at the University of South Florida, whose analysis of currents helped direct colleagues to the plumes, said it could take years, and generations of fish, for scientists to assess the spill's full impacts.

For now, he said, it's only a guess how much oil may be down there and whether it's harmless or harmful.

"We are operating out of ignorance," he said. "It may be no threat whatsoever or it may be a serious threat. The concentrations are low but we're talking about a very large area."

Federal cleanup commanders stress that they're committed to capturing every barrel possible - and getting BP to pay for it. With slicks harder to find at sea, they're shifting local boats from skimming to tarball patrols, a job Allen predicted would continue for at least four to six weeks.

Oceanographer Hans Graber, director of the University of Miami's satellite sensing facility, expects oil problems to persist long after the last skimmer has docked and the last boom is picked up, decontaminated and packed away.

"It's probably a fair guess to say we're looking at years, if not tens of years, for all of this stuff to eventually come to the surface" he said.

(Curtis Morgan is a reporter for The Miami Herald.)