September 13, 2010

Gulf May Avoid Direst Predictions After Oil Spill

By LESLIE KAUFMAN and SHAILA DEWAN

NEW ORLEANS — Marsh grasses matted by oil are still a common sight on the gulf coast here, but so are green shoots springing up beneath them.

In nearby bird colonies, carcasses are still being discovered, but they number in the thousands, not the tens of thousands that have died in other oil spills.

And at the mouth of the Mississippi River, the zone of severely oxygen-depleted water that forms every summer has reappeared, but its size does not seem to have been affected by the Deepwater Horizon spill.

How much damage resulted from almost five million barrels of oil pouring into the Gulf of Mexico is still being toted up in laboratories and government offices. It will be some time before the government releases its formal assessment of the effects — one that will define the scope of environmental restoration required by BP, Deepwater Horizon's operator, and other companies.

Separately, scientists are arguing heatedly about how fast a large plume of dispersed oil more than a half-mile below the surface of the gulf is breaking down and how great a threat it poses to sea life.

Yet as the weeks pass, evidence is increasing that through a combination of luck (a fortunate shift in ocean currents that kept much of the oil away from shore) and ecological circumstance (the relatively warm waters that increased the breakdown rate of the oil), the gulf region appears to have escaped the direst predictions of the spring.

While its findings were disputed by some, the National Oceanic and Atmospheric Administration reported several weeks ago that the oil was breaking down anc rapidly, probably limiting future damage from the spill.

And preliminary reports from scientists studying the effects on marshes, wildl

itself suggest that the damage already done by the spill may also be significantly less than was feared — less, in fact, than the destruction from the much smaller Exxon Valdez spill in Alaska in 1989.

The scientists caution that much remains unknown, and that oil spills can have subtle effects that last for decades. Layers of oil are being found buried beneath the surface, both onshore and deep at sea. In blog posts from a research vessel in the gulf, Samantha Joye, a professor of marine sciences at the University of Georgia, reports that she observed a layer several centimeters thick on the sea floor, 16 miles from the wellhead, that she says was not a result of natural seepage.

But many scientists still say they are cautiously optimistic.

"Based on what I have seen so far, it could have been a lot worse," said Lisa DiPinto, acting chief of NOAA's marine debris division.

Perhaps no images evoked more heartbreak than those of the creatures inadvertently caught in the slick's path: brown pelicans so covered with reddish oil that they could not lift their wings, sea turtles haplessly beached.

At the height of the spill, crates of birds arrived daily at a rehabilitation center in Fort Jackson, La.

Now the center is much quieter. On an August day, only about a dozen birds were brought in for rescue. But on the same day volunteers recovered more than twice as many dead birds, said Cathy Rezabeck, the spokeswoman for the Houma Joint Information Center run by BP and the government.

A similar pattern is being seen around the Gulf Coast, with the number of dead birds far exceeding the number of live ones being collected. Scientists attribute the rising death toll partly to the end of the nesting season — they can now go into the bird colonies to collect carcasses. They also believe fledglings have finally left the safety of their nests and are encountering residual oil.

Still, the numbers of oiled birds collected dead or alive — in the mid-7,000s as of Sept. 1 — is small compared with the avian toll of the Exxon Valdez. Carcasses of more than 35,000 birds were found immediately after that spill; 250,000 were believed to have died.

For the BP spill, said Melanie Driscoll, director of bird conservation for the Audubon's Louisiana Coastal Initiative, "the final number will be in the thousands, not the tens of thousands." Ms. Driscoll cited several reasons, including warmer temperatures, which make it easier for birds to

regulate their body temperatures, and the inability of much of the oil to penetrate the marshes.

Assuming that the food chain remains healthy — and this remains a major question for scientists — even threatened birds like the brown pelican will come back, she said.

The spill also raised alarms about Kemp's ridley sea turtles. Some 600 were stranded, more than seven times the usual number found from May to August, and 56 dead ones were collected, a majority with no visible signs of oil, suggesting they may have been killed by shrimpers. Rescuers scooped up hundreds of living, heavily oiled turtles from mats of sargassum seaweed where they congregate and feed.

Since mid-July, however, rescuers have found the sargassum mats not blackened but clean and teeming with food, and with them, turtles free of oil or so lightly oiled that they could be cleaned and released on the spot, said Dr. Brian Stacy, an NOAA veterinarian.

"I personally didn't anticipate such a dramatic change so quickly," he said.

Leland Hales, an environmental scientist inspecting marshy areas where oil had previously been seen, says much the same thing. Mr. Hales, who inspects previously oiled sites for BP, travels by boat to coordinates near Terrebonne Parish where his notes mention things like "10-by-10 yards oiled grass on the southeast" of an island of nesting terns.

In many cases, there is no longer anything to see. Oil has washed away, leaving grass that appears healthy. "I would have expected rapid die-off," Mr. Hales said, "but that's not what's out there."

The federal government estimated last month that half the oil leaked into the gulf had evaporated or otherwise been removed, leaving one quarter of it dissolved into tiny droplets and another quarter visible in forms like surface sheen and tar balls. The figures are controversial, and some scientists say they are vastly underestimated.

But according to NOAA's figures, the BP spill oiled far less coastline than the Exxon Valdez spill. As of Aug. 31, NOAA had surveyed 1,796 miles of Louisiana coast and found 35 miles of shoreline to be heavily oiled, 71 miles to be moderately oiled and 115 miles to be lightly oiled. By contrast, the Exxon Valdez spill contaminated 1,300 miles of shoreline, about 200 miles of it heavily or moderately oiled, according to the Exxon Valdez Oil Spill Trustee Council.

Of the oil that did reach shore in the gulf, most has remained at the fringe of the dense marshes. That is largely good news for hundreds of thousands of acres of wilderness inside the fringe.

"The huge expanses of marshes that occur interiorly to the shoreline have been spared," said

Irving A. Mendelssohn, a professor of oceanography and coastal plant ecology at Louisiana State University.

Mr. Hales and other scientists say that even the oiled part of the marsh appears to be recovering.

Mark Kulp, an associate professor of coastal geology at the University of New Orleans, who also does research for a contractor for BP, says his observations of vegetation, from Spartina grasses to black mangrove forests, reveal a surprising rebirth. "There are places that I've seen where the stalks were laid over with oil and there is now new vegetation coming up through," he said. "It is a pervasive thing."

Marshes and wetlands are particularly sensitive to oil. If it enters the soil, it can kill grasses and their roots, leading to erosion. In some spills, including the Exxon Valdez, residual oil has been found in marshes decades later. Dr. Kulp suggests that will not be true for the gulf. "One thing working in our favor is the nature of the substrate," he said, referring to the marsh bottom. "It is made dominantly of muddy sediment and is relatively impenetrable."

Others are less sanguine. John W. Day Jr., a retired professor of oceanography and coastal sciences at Louisiana State, has worked with a private firm that developed a complex sensor for aerial detection of oil and gas. Its measurements show that plants in the marsh interior which appear healthy are, in fact, stressed and will probably soon die. Dr. DiPinto of NOAA is also concerned. She said that marsh creatures that dig burrows, like crabs, may eventually bring oil deeper into the soils.

And Wilma Subra, a chemist who provides technical assistance to the Louisiana Environmental Action Network and who has found substantial residual oil in marshes and estuaries near the mouth of the Mississippi River, the Atchafalaya River and Terrebonne Bay, said: "The government and BP continue to say it is very much improved out there, but there is still a lot of oil. Any fisherman could tell you that."

Ms. Subra said the government needs to do more to assess the situation. "I am not saying their people in the field are not doing a good job, but there is a lot we are hearing about from fishermen and seeing ourselves that is not being investigated," she said. "I've seen a lot of heavily oiled areas where the vegetation is not coming back."

The spill's greatest scientific challenge may be understanding how the oil is interacting with the undersea environment. The oil was released 5,000 feet beneath the water's surface and then treated with an unprecedented volume of chemical dispersants. Some enormous fraction — how much is disputed — formed at least one great undersea plume of microscopic droplets.

Oil, which is toxic, poses a threat to wildlife, especially if continually ingested over time, though so far all seafood samples tested by the Food and Drug Administration have been ruled safe.

Still, scientists at Tulane University and the University of Southern Mississippi have reported finding tiny droplets of oil on blue crab larvae. The droplets have not been ingested but are lodged under the carapace, and seem to disappear when the larvae molt, said Harriet Perry, a biologist at Southern Mississippi. That suggests the droplets might affect animals that prey on the larvae more than the crabs themselves.

Scientists also worried that the plumes would severely deplete oxygen levels in the gulf because of a population explosion in oil-eating bacteria.

Low oxygen levels are already an acute concern. Every summer, agricultural runoff from the Mississippi stimulates the bacteria population, producing a "dead zone" the size of New Jersey, stretching from the mouth of the Mississippi River west to Galveston, Tex. The zone is so oxygen-depleted that it supports no life. Scientists, relying on data that did not include the oil spill, estimated in May that the zone would be somewhat larger this year.

But so far, there is little evidence of severe oxygen depletion outside the predicted zone. NOAA has taken more than 2,000 samples to measure oxygen levels, drawing water from the surface to the bottom within a radius of about 60 miles of the well site, said Steve Murawski, chief science adviser to NOAA's National Marine Fisheries Program. They have found oxygen depression, but not levels too low to support fish, he said.

More recent findings, by Department of Energy scientists at the Lawrence Berkeley National Laboratory, suggest that the plume has already largely dispersed or degraded, though other scientists vigorously dispute that claim. The scientists at Lawrence were working under a grant from the EnergyBiosciences Institute at the University of California, Berkeley, which was financed several years ago by a 10-year, $500 million grant from BP.

Terry Hazen, a microbiologist and the head of the ecology department at the laboratory, said oxygen levels may have remained high because the droplets in the plume were so diffuse.

Dr. Hazen said a small part of him was disappointed that the plume had become undetectable, because it could no longer be studied.

"But that's just the scientist in me," he said. "The ecologist and environmentalist is glad that it's gone — it was an ecological disaster."