



The lost legacy of the last great oil spill

Some ecosystems bounced back after the 1979 Ixtoc I oil spill, but research quickly withered.

The well blew out, the blowout preventer failed, and the drilling rig caught fire and eventually sank. Oil gushed into the Gulf of Mexico at a staggering rate from the damaged riser that had attached the platform to the well. Nobody knew what to do, although engineers tried various measures to stem the flow, including a containment dome. Chemical dispersants to break up the oil were applied at one of the highest rates in history. Some of the oil was trapped well below the Gulf's surface, with undetermined effects. It seemed as though the spill might drag on forever.

Call it disaster déjà vu. This all-too-familiar description refers not to the ongoing Deepwater Horizon oil spill, but to an episode three decades earlier and about 1,000 kilometres south, at an exploratory oil well known as Ixtoc I, operated by Mexico's national petroleum company Petróleos Mexicanos (PEMEX). Between 3 June 1979, the date of the blowout, and 23 March 1980, when Ixtoc I was finally capped, it spewed some 475,000 tonnes of oil into waters northwest of Ciudad

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del Carmen on Mexico's Yucatán Peninsula.

Researchers who are struggling to determine the long-term environmental effects of Deepwater Horizon have begun asking what helpful lessons Ixtoc I offers. "I think it has taken a little while for the research community to rediscover it," says Arne Jernelöv, a Vienna-based environmental biochemist with the Institute for Futures Studies in Stockholm, who studied the Ixtoc I spill for the United Nations

(A. Jernelöv and O. Lindén *AMBIO* 10, 299–306; 1981). "But by and large now I think it has."

Yet answers are scarce. Because funding for studies of the spill's impact dried up soon after the spill did, experts view Ixtoc I as a missed opportunity. "The research was stopped," says Wes Tunnell, associate director of the Harte Research Institute at Texas A&M University–Corpus Christi. "That was the real crime of that spill."

Since the Deepwater Horizon blowout, Tunnell, who studied Mexico's coastal habitats extensively just after the Ixtoc I spill, has been inundated with questions about that spill and

its long-term effects — questions he couldn't answer. "I decided I needed to go back," he says. So, with support from the Harte Institute and a small foundation grant, he has revisited two of the areas that were most heavily damaged by the spill. His mission was to collect samples of any oil that might remain, and to interview local fishermen about their experiences during and after the spill.

Human history

In some cases, their memories now constitute the only available data about the effects of the Ixtoc I spill, because little has been published on the disaster since the first few years after it happened. A Mexican-government-sponsored conference took place in 1982, but a promised proceedings volume comprising papers presented there never appeared. The Harte Institute has since posted some of those papers on its website (go.nature.com/rvwUwI).

Last week, during Tunnell's most recent trip, the first stop was a rocky limestone shoreline near the town of Champotón on the Yucatán's western coast. Thirty years ago, he recalls, the

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DEBATE GROWS OVER OIL DISPERSANT
Chemical may be finding its way up the food chain.
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Vast quantities of dispersants were sprayed onto oil escaping from the Ixtoc I well.

tide pools here were thick with oil. Development and road building have changed the shoreline significantly since then. Nevertheless, Tunnell and two colleagues quickly found a 40-centimetre-wide patch of tar above the tideline. “That stuff is pretty tough,” says Tunnell. “That’s why they put it on the highway.”

After scraping off the top layer, the researchers found that the tar still glistened. “It’s still like new,” says Tunnell’s co-worker Julio Sánchez Chávez, a fisheries biologist at the Autonomous University of Campeche in Mexico. Another colleague will be analysing the samples collected to see whether they exhibit the chemical signatures of oil from the Ixtoc I well.

No fishing

It is unlikely that the oil is having any significant ecological effects after weathering away for so long, but the residue is a reminder of what the region experienced when oil first came ashore. Thirty years ago, most fishing villages were so isolated that locals knew little about the disaster playing out just a few kilometres away. Many believed Ixtoc I was a fairly small spill, although it was among the largest in the planet’s history.

But the effects were soon apparent. Carlos Castillo, now 78, was an avid skin diver at the time who used a speargun to catch fish for his small restaurant. Before Ixtoc I, he could catch 30 kilograms of grouper, snapper or snook in two hours, he says. But during the spill, his mask became oily, and he developed health problems. Eventually, he couldn’t find anything to catch because fish were dying or leaving for cleaner waters. “I told my wife, ‘Sorry, we have



to buy fish.” They began serving freshwater fish or fish trucked in from other regions.

The spill years were devastating for fishermen, many of whom had nowhere else to turn for income or food, but fisheries recovered faster than most researchers expected. Chávez says that Campeche shrimp-catch records, for instance, suggest that within two years fishermen were pulling in normal hauls again. Locals say that fish catches improved substantially within three to five years. Tunnell points out that the Gulf may have been healthier and more resilient then, so it’s difficult to say whether species in the northern Gulf will rebound as quickly from the current spill. But the curtailment of commercial fishing owing to fears over contaminated seafood may hasten the recovery of exploited species.

In some parts of Campeche, however, there are ominous signs that not all ecosystems fared as well. After leaving Champotón, Tunnell and his colleagues travelled about 125 kilometres north to the tiny village of Isla Arena, to look for oil among mangrove trees. A few kilometres from the village, the team found patches of what looked like highly weathered oil. Then Chávez called out, “Hey Wes, there’s a stinky one over here.”

The 2-metre by 1-metre mat of tar smelled distinctly of asphalt.

More disturbing is the absence of oysters around Isla Arena, where they were once so abundant that local fishermen say they could chop off a mangrove branch and pluck off enough of the molluscs to feed their families. The oysters never returned after Ixtoc I, according to the fishermen, and there is no research to explain why. “As far as I know, this is one of the least-studied ecosystems in Mexico,” says Tunnell. He says that he’s intrigued by the oyster story and hopes to do follow-up research on the topic.

So far, Tunnell says, Ixtoc I’s main lesson for those responding to the current spill is that sandy beaches and rocky shores can recover relatively quickly, but that more productive ecosystems such as mangrove swamps or salt marshes — the closest analogue to mangroves in the northern Gulf — retain oil indefinitely. They may take decades to regain their health.

Jernelöv says that other features of Ixtoc I may foreshadow what the coming months and years could hold. For example, although the water depth at Ixtoc I was just 50 metres, compared with 1,500 metres for the current

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spill, it too generated subsurface oil plumes. That oil made its way around the Gulf, and at one point some beaches in Texas took an unexpected oil hit after it mixed with surface waters close to shore. “You didn’t see anything and then all of a sudden you had oil on the beaches,” Jernelöv says.

In broader terms, Tunnell, Jernelöv and other researchers familiar with Ixtoc I agree that its most important lesson is to continue studying the Deepwater Horizon spill and its impact — especially after the oil stops flowing and the world’s attention turns elsewhere — so as not to be caught short next time.

Steve Murawski, chief science adviser for the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service, says that he and others have lamented the lack of Ixtoc I data as they have worked to respond to Deepwater Horizon. But he says that he hopes the mistakes of 30 years ago will not be repeated, and that “the number of regrets will be relatively modest when we start writing the history of this one”.

As for the fishermen near the Ixtoc I site, they are well aware of the new disaster unfolding to the north. Many fear that the oil will come their way, and they sympathize with those already affected. “To me, it’s a problem for humanity,” says Castillo.

Mark Schroppe



Oil from Ixtoc I can still be found on coastal rocks 30 years after the spill.

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