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DISASTERS - US

Study: San Francisco Bay oil spill damaged herring

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SAN FRANCISCO – The cargo ship accident that dumped tens of thousands of gallons of thick, tarry ship fuel into San Francisco Bay caused lasting damage to the region's once-plentiful schools of Pacific herring, the bay's only commercially fished species, according to a study released Monday.

Herring embryos collected from shorelines left coated in oil starting about 3 months after the November 2007 Cosco Busan spill suffered from unusually high death rates and a range of ailments and deformities associated with exposure to the chemicals in crude oil, the study found.

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"The majority of embryos in samples from oiled sites were dead on examination in the laboratory," wrote the study's authors, who were led by John Incardona, a toxicologist with the fisheries division of the [National Oceanic and Atmospheric Administration](#).

By 2010, death rates had returned to normal, but the embryos continued to show heart defects that are a common symptom in herring of oil exposure.

The bay's Pacific herring are the largest coastal population in the continental U.S. and a key element of the bay's complex food web, according to the study, which was published online by the Proceedings of the [National Academy of Sciences](#).

The spill that resulted from the massive cargo ship striking one of the pillars of the San Francisco-Oakland Bay Bridge in heavy fog killed more than 6,800 birds and closed beaches to swimmers for weeks.

In 2009, California regulators cancelled the bay's herring fishing season, which typically begins in January. The state said the herring populations in the bay had reached an all-time low, with the causes ranging from drought to pollution from the oil spill.

The north-central San Francisco Bay shorelines left coated in oil and littered with sticky tarballs are one of the historic spawning grounds for the bay's herring. Only about half the oil along those shores was recovered, and an unknown amount remained submerged near the water's edge, the study said.

The study's authors knew from herring harmed in Alaska's [Exxon Valdez](#) oil spill in 1989 that those same fish in San Francisco Bay would likely be threatened. Unlike the Valdez spill, which sent hundreds of thousands of barrels of crude oil spilling into [Prince William](#) Sound, the Cosco Busan leaked bunker fuel,



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a mix of diesel and fuel oil left over from the crude oil refining process.

Embryos exposed to chemicals in crude oil suffer from a range of maladies, from heart problems and deformities to swelling and cancer. Similar symptoms were seen in embryos collected for the San Francisco Bay study.

The problems did not seem to be caused naturally or by other pollution in the bay, the study's authors wrote. They said the only common feature of three sites where the embryos were collected was that they were exposed to oil.

Jonathan Maul, a toxicologist with The Institute of Environmental and Human Health at Texas Tech University who was not involved in the study, said the researchers faced difficulty in showing that the toxins came from the Cosco Busan's bunker fuel and not other sources in the environment. He said the study should encourage scientists to look further into the toxic effects of oil contamination.

"Overall I believe it is a valuable study and should garner attention toward impacts to early life stages of fisheries," Maul said.

Because the chemical levels found in the embryos didn't seem high enough to cause the high death rate, the study concluded that exposure to sunlight played a part in making the spill more deadly.

"One or more of these unidentified chemicals likely interacted with natural sunlight in the intertidal zone to kill herring embryos," the study said.

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