

# Low oxygen in coastal waters impairs fish reproduction

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Low oxygen levels in coastal waters interfere with fish reproduction by disrupting the fishes' hormones, a marine scientist from The University of Texas at Austin Marine Science Institute has found.

Incidents of seasonal low levels of oxygen, known as hypoxia, have increased dramatically in coastal waters throughout the world over the past few decades, largely as a result of increased run-off from human agricultural and industrial activities. Hypoxia's long-term impact on marine animal populations is unknown.

Dr. Peter Thomas found that both male and female fish collected from seasonally hypoxic waters in Florida's Pensacola Bay estuaries had little ovarian and testicular growth, low egg and sperm production, and low levels of reproductive hormones during a time a year when they would normally be increasing in preparation for reproduction.

"This study provides the first clear evidence that a wild population of estuarine fish has experienced reproductive impairment through hypoxia," said Thomas, professor of marine science. "We rarely find such a dramatic reproductive impairment in both male and female fish collected from degraded environments, such as those contaminated with pollutants."

Thomas' research was published online this week in Proceedings of the Royal Society B.

Laboratory studies showed that hypoxia caused endocrine disruption through decreasing levels in the brain of a chemical important for brain function called serotonin. The decrease in serotonin was caused by a decrease in an enzyme that plays a role in the serotonin synthesis pathway.

Atlantic croaker is one of the most common inshore fish species along the coasts of the southeastern Atlantic Ocean and Gulf of Mexico, and Thomas said that the croaker is representative of many inshore fish.

“This study suggests that when persistent coastal hypoxia occurs, there is a potential long-term threat to fish populations and fishery resources,” said Thomas. “With worldwide increases in hypoxia, it’s something we must be concerned about, because so many people rely on fishing for their livelihood.”

Thomas’ future studies will aim to further elucidate the effects of hypoxia on fish endocrine and reproductive systems at the molecular level. He is also pursuing similar work on reproductive impairment in croaker from hypoxic waters surrounding the so-called “Dead Zone” off the coast of Louisiana, which is an area of almost no oxygen that this year covered 7,900 square miles.

Source: University of Texas at Austin

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