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MacEwan University study shows rising carbon dioxide levels lead to anxiety in fish

Edmonton – A new research study has demonstrated that human-produced carbon dioxide is being absorbed by earth’s oceans and it is leading to higher anxiety levels in fish.

MacEwan University neurobiologist, Dr. Trevor Hamilton, along with co-author Martin Tresguerres, a marine biologist at Scripps Institution of Oceanography at UC San Diego, recently published their findings in the journal Proceedings of the Royal Society B: Biological Sciences.

The study combined marine physiology, neuroscience, pharmacology and behavioral psychology. In addition to Tresguerres and Hamilton, Adam Holcombe, a MacEwan University student, co-authored the study.

The researchers used a camera-based tracking software system that compared two groups of rockfish in ocean-like conditions. One group was in normal seawater and the other in water with elevated acidity levels. Using a known test for measuring anxiety in fish, the study found that the fish in acidified water were substantially more anxious and stressed than those in regular seawater. In fact, it took a full twelve days after moving the fish from acidified to regular conditions for their anxiety levels to return to normal.

“These results are thought-provoking,” said Martin Tresguerres, “because they reveal a potential negative effect of ocean acidification on fish behavior.” Given that juvenile rockfish live in lively environments, this is cause for concern.

“Behavioral neuroscience in fish is a relatively unexplored field,” said Dr. Hamilton, “but we know that fish are capable of many complicated cognitive tasks of learning and memory. Increased anxiety in rockfish could have a detrimental impact on many aspects of their daily functioning.”

The research was supported by The National Science Foundation, UC San Diego Academic Senate, Scripps Institution of Oceanography, The Alfred P. Sloan Foundation, MacEwan Research Office: Arts and Science, and the Student Enrichment Fund.