# Researchers find fish 'yells' to be heard over human made noise

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Blacktail Shiner (Cyprinella venusta). Credit: 'those other fish' blog

(Phys.org) —A pair of researchers in the Department of Fisheries and Allied Aquacultures at Auburn University in Alabama has found that one type of fish responds to environmental noise by increasing the volume of its own calls. In their paper published in the journal *Behavioral Ecology*, Daniel Holt and Carol Johnston describe a study they undertook that involved recording blacktail shiners trying to communicate over artificially induced noise in a tank of water in their lab.

Many studies have been conducted over the years to learn more about how underwater sounds impact dolphins, whales and other sea mammals,

but little has been done find out how fish in freshwater lakes and streams respond to man-made sounds, particularly fish that emit noises themselves as part of their own behavioral patterns. It's been noted that fish are exposed to a wide variety of noises, from boats and other water craft, to semi-trailer trucks rumbling over bridges. Very little is known, however, about the impact of all that noise on those fish that live in noisy environments. Holt and Johnston theorized that in order to survive, fish likely adapt by adopting behavior similar to that of people when put in a noisy room—they stand closer together to talk, repeat themselves a lot, or simply talk louder. To learn more, they focused on the blacktail shiner, a small fish that is known to use two vocalizations: one, a sort of purring sound made by males to entice females, and the other a popping sound to ward off other males.

The researchers captured several specimens and brought them back to their lab. There they immersed them in water tanks outfitted with speakers. They recorded the fish in action without any added sound, then turned on some white noise to see how the fish would react. As it turned out, the shiners chose the most obvious behavioral change, they turned up the volume—but not by much—thus it was unclear how effective it was. The duo are now studying fish in their native environment to see if they can figure out how living in a noisy environment is impacting them, and if there are things we humans should be doing to help them out considering that fish provide the main source of protein for over a billion people.

**More information:** Evidence of the Lombard effect in fishes, *Behavioral Ecology* (2014). DOI: 10.1093/beheco/aru028

**Abstract**
Noise can be problematic for acoustically communicating organisms due to the masking effect it has on acoustic signals. Rapid expansion of human populations, accompanied by noise that comes with

industrialization and motorized transportation, poses a threat for many acoustically communicating species. Although a significant amount of effort has been made exploring the responses of organisms inhabiting marine and terrestrial environments to elevated noise levels, relatively little has been directed toward organisms inhabiting small, lotic, freshwater systems. The aim of this study was to determine what effect elevated noise levels have on acoustic signals and inter-fish distance during sound production in the Blacktail Shiner, Cyprinella venusta. We hypothesized, based on the behaviors of other vocal organisms, that C. venusta would compensate for elevated noise levels by decreasing distance between sender and receiver, increasing signal amplitude (Lombard effect), or by changing temporal patterns to increase call redundancy. Using an experimental approach, we found that C. venusta altered several acoustic components under noisy conditions. Most notably, spectral levels of acoustic signals were increased in background noise, indicating presence of the Lombard effect in fishes. Inter-fish distance was typically not different between noisy and quiet conditions, although one circumstance did show a significantly smaller inter-fish distance under noisy conditions.