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**Effects of surveillance towed array sensor system (SURTASS)
low frequency active sonar on fish**

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We investigated the effects of exposure to Low Frequency Active (LFA) sonar on rainbow trout (a hearing non-specialist related to several endangered salmonids) and channel catfish (a hearing specialist), using an element of the standard SURTASS LFA source array. We measured hearing sensitivity using auditory brainstem response, effects on inner ear structure using scanning electron microscopy, effects on non-auditory tissues using general pathology and histopathology, and behavioral effects with video monitoring. Exposure to 193 dB re 1 microPa (rms received level) in the LFA frequency band for 324 seconds resulted in a TTS of 20 dB at 400 Hz in rainbow trout, with less TTS at 100 and 200 Hz. TTS in catfish ranged from 6 to 12 dB at frequencies from 200 to 1000 Hz. Both species recovered from hearing loss in several days. Inner ears sensory tissues appeared unaffected by acoustic exposure. Gross pathology indicated no damage to non-auditory tissues, including the swim bladder. Both species showed consistent startle responses at sound onsets and changed their position relative to the sound source during exposures. There was no fish death attributable to sound exposure even up to four days post-exposure. [Work supported by Chief of Naval Operations.]