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Electrophysiological and behavioral measures of temporary threshold shift in a bottlenose dolphin (*Tursiops truncatus*)

James Finneran^a, Carolyn Schlundt^b, Brian Branstetter^a and Randall Dear^c

^aUS Navy Marine Mammal Program, Space and Naval Warfare Systems Center, 53560 Hull St., Code 71510, San Diego, CA 92152, USA

^bEDO Professional Services, 3276 Rosecrans St., San Diego, CA 92110, USA

^cScience Applications International Corporation, 4065 Hancock St., San Diego, CA 92110, USA

Auditory evoked potentials are being increasingly applied to more advanced studies of marine mammal hearing, such as frequency selectivity, temporal processing, and temporary threshold shift (TTS). In this study, both behavioral and electrophysiological techniques were used to measure TTS in a bottlenose dolphin exposed to 20-kHz tones. Behavioral hearing thresholds were estimated using a modified staircase procedure and a whistle response. Electrophysiological thresholds were assessed using the multiple auditory steady-state response. Evoked potential stimuli consisted of seven frequency-modulated tones having carrier frequencies from 10-70 kHz and unique modulation rates. Tones were simultaneously presented and the evoked response at each modulation rate independently tracked to test hearing at all seven frequencies simultaneously. The behavioral and evoked response data both showed frequency-dependent patterns of TTS, with the largest shifts at 30 kHz; however, TTS measured using evoked potentials (up to 40-45 dB) was always larger than that observed behaviorally (19-33 dB). This discrepancy may be the result of the evoked response input-output function, which can be represented as the sum of two processes, a low threshold, saturating process and a higher threshold linear process, that react and recover to fatigue at different rates.