

## Drilling Noise References

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Abstract: Recordings of sounds underwater and in air, and of iceborne vibrations, were obtained at Northstar Island, an artificial gravel island in the Beaufort Sea near Prudhoe Bay (Alaska). The aim was to document the levels, characteristics, and range dependence of sounds and vibrations produced by drilling and oil production during the winter, when the island was surrounded by shore-fast ice. Drilling produced the highest underwater broadband (10-10,000 Hz) levels (maximum= 124 dB re: 1 microPa at 1 km), and mainly affected [700-1400](#) Hz frequencies. In contrast, drilling did not increase broadband levels in air or ice relative to levels during other island activities. Production did not increase broadband levels for any of the sensors. In all media, broadband levels decreased by approximately 20 dB/tenfold change in distance. Background levels underwater were reached by 9.4 km during drilling and 3-4 km without. In the air and ice, background levels were reached 5-10 km and 2-10 km from Northstar, respectively, depending on the wind but irrespective of drilling. A comparison of the recorded sounds with harbor and ringed seal audiograms showed that Northstar sounds were probably audible to seals, at least intermittently, out to approximately 1.5 km in water and approximately 5 km in air.

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