ESTIMATED AUDITORY BANDWIDTHS FOR MARINE MAMMALS AND FISH

Functional Hearing Group	Generalized Functional Hearing Frequency Range*
Low-frequency Cetaceans	
Baleen whales	7 Hz to 35 kHz
Mid-frequency Cetaceans	
Dolphins, toothed whales, beaked whales, bottlenose whales	150 Hz to 160 kHz
High-frequency Cetaceans	
True porpoises	275 Hz to 160 kHz
Phocid Pinnipeds in water	
True seals	50 Hz to 86 kHz
Otariid Pinnipeds in water	
Sea lions and fur seals	60 Hz to 39 kHz
Pinnipeds in air (haul outs)	
Phocids and Otariids	75 Hz to 30 kHz**
Fish	
	20 Hz to 1000 Hz***

The dominant frequencies from pile driving (impact or vibratory) are typically below 1,000 Hz. Thus, pile driving sounds are in the mid- to low-frequency range.

1 Hz = 0.001 kHz
1 kHz =- 1000 Hz

*Unless otherwise noted, source of estimated hearing ranges is NMFS (2016). Southall et al. (2007) designated these "functional hearing groups" for marine mammals and estimated the lower and upper frequencies of functional hearing of these groups. In general, animals are less sensitive to sounds at the outer edge of their functional range and most sensitive to sounds of frequencies within a smaller range somewhere in the middle of their functional hearing range (73 FR 60836).

**These ranges are essentially based on data for phocid seals, which have the broadest auditory bandwidths of the pinnipeds (Southall et al. 2007).

***Hastings and Popper (2005)