

Vocal behavior in spotted seals (*Phoca largha*)

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Captive studies can inform passive acoustic monitoring efforts by describing fundamental features of species-typical vocalizations emitted by known individuals. These include acoustic parameters as well as developmental, seasonal, and sex-based patterns in vocal behavior. Here, two male spotted seals were studied in captivity from age 3 months through 8 years. Vocal behavior was scored daily and opportunistically recorded. The production of underwater calls emerged with presumed sexual maturity (age 4). To evaluate vocal repertoire and fine-scale temporal patterns of sound production in adult seals, an underwater acoustic recorder was continuously deployed with these seals at age 7-8 years. The spotted seals produced a variety of underwater calls—including roars, knocks, and moans—with dominant energy below 1 kHz. There was a marked annual peak in vocal activity in spring, prior to the yearly molt. This period coincided with increased aggressive behavior and musky odor indicative of heightened reproductive activity. These results from developing male spotted seals, obtained in the absence of conspecific females, confirm the production of recognizable, stereotypic underwater calls associated with the breeding season. These findings can be used to inform the use of autonomous acoustic recorders to track the presence and movements of free-ranging seals in remote habitats.