

VERSATILE SIGNALING BY FEMALE HARBOR SEALS (*PHOCA VITULINA*) DURING THE PUP ATTENDANCE PERIOD

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The communicative behavior of adult female harbor seals has received little attention because they do not produce pup attraction calls. The most common signals emitted by female harbor seals are growls and foreflipper waves while hauled out. It has been suggested that on occasion, females signal 'danger' to their pups by slapping the water's surface with their foreflipper, but the evidence for this is scanty. During the lactation periods between 1997 to 1999, we observed the behavior of Pacific harbor seals (*P.v. richardsi*) at Moss Cove, Point Lobos State Reserve, in Carmel, California. Continuous aerial and underwater audio and overhead video were recorded near a small haul out area during 417 hours of observation. During this time, individually identified adult females exhibited several distinct communicative behaviors. The following behaviors were observed in at least one and up to four individuals: 1) two different females without their pups approached and directed vigorous foreflipper splashes at pups that were hauled out on rocks near the water's surface; 2) four individuals sharply slapped the surface of the water which attracted the attention of their own pups, who immediately returned to their mothers; 3) in one instance a female that was temporarily separated from her pup emitted an atypical aerial vocalization (a high pitched 'moan') while swimming through and scanning the study area; and 4) two females swimming with their pups produced underwater vocalizations ('growls') when approached by unattended pups. From these observations we conclude that: 1) signals

having different sonic, tactile, and visual components are used by females to attract the attention of their pups; 2) females exhibit actions that are considered typical of male aquatic displays; and 3) such signaling can be contrasted to highly stereotypic vocal signals produced by otariid females during the period of pup attendance.