

ELEPHANT SEAL VOCALIZATIONS

Field Work From Año Nuevo

Vocalization performs an important role for many species and can convey information from one animal to another. It allows rapid and energy saving ("good") behavioral choices to be made by individual animals.

Recent studies and fieldwork performed at Año Nuevo have revealed some insights into the acoustical behavior of the Northern Elephant Seal. Researchers are working to understand the social function of the male vocalizations and whether these acoustical signals are consistent and reliable over time.

Male elephant seals compete for mating opportunities and communication in this situation allows an animal to make the choice to compete or retreat. The vocalizations are acoustical signals that identify the sender's identity and possibly, the degree of threat they pose.

A playback experiment was devised to determine the role of sound in male on male conflicts by playing the sound of one male back to another. Ten male e-seals were chosen. On separate occasions, each had a high-ranking male vocalization and a low ranking vocalization played towards it by a loudspeaker. The results were that higher ranked males charged towards the sound of low ranking males and low ranking males retreated from the recorded vocalization of a higher-ranking male.

Recorded sounds of Año Nuevo males played to males at Piedras Blancas elicited no or very little response. These males were highly unlikely to have known each other. The researchers determined that this confirmed that males learn and remember the sounds of other males in their own location.

The researchers found that males produce low frequency pulsed vocalizations that vary in rhythm depending on the individual animal. These sounds often start and end with a small acoustic flourish. Each animal has a unique signature call which does not vary.

Females have threat calls, as well as a different sound they use with their pup. Female calls are dominated by a lower frequency, with a less consistent pulse. The pup has a vocalization that has more high frequency notes, which are produced in bursts. The threatening calls for all e-seals are harsh while the attraction calls are more tonal.

Calls on land need to be loud in order to overcome ambient noise, especially that of the wind and surf. The peak loudness has been recorded at 126 dB, which is among the loudest of mammal sounds on land. Adult male e-seals produce the loudest sounds. E-seal hearing on land is compromised by their adaptation to diving. They do not hear low and distant sounds as well as humans, but can hear a higher range of frequencies than we can. They can sense each other through ground vibrations over a short range.

The Año Nuevo study revealed some important characteristics about male e-seal sound and behavior:

- The calls are relevant to other males; in successive years, a male has the same call. Each male has his own particular call. Each male has a calling posture; it may lie

down, be at 45 degrees, or sit upright. Young males may have more variation in their call than older males.

- The sound is made in the throat, larynx and chest, and resonates in the nasal chamber but it is not produced in the nasal chamber. The role of the proboscis in the amplification of sound is uncertain. An animal with its proboscis ripped off was still able to vocalize.
- The call does not change with behavioral context.
- Fights are more likely to happen upon first arrival and during estrus. Males do not repeat fights with the same individuals during the season. A fight will establish a dominance hierarchy. The call serves as a reminder and saves energy of fighting again. Conserving energy is very important. Vocalization allows that energy conservation.
- Males face each other directly for maximum impact of vocalization; however, some calls are broadcast generally.
- The sound produced, characterized by loudness, length or number of pulses, is no indication of the animal's rank in the colony or the actual size of the individual.
- Alpha males can remain so for an entire season. Displacement is more likely to occur early in the season. A male usurped was seen to return as an alpha in the following year. Three males were observed returning as alphas for 3 successive years and one for 4.
- Of 1100 monitored male-on-male interactions: 83% involved vocalizations only, 20% were asserted with no vocalization, 5% resulted in a body-to-body interaction, and less than 2% resulted in a full on fight. Researchers note that even when males look sleepy, they are keeping a watchful eye on others.
- Win or lose, the voice remains the same. The acoustical display of each animal does not vary.
- They will sometimes continue to vocalize during a fight, leaving themselves open and vulnerable to their opponent. Often, their opponent will take the opportunity to slam the calling individual while he is in the vocalization stance.
- Sound as a mediator of conflict is very significant. Fighting is expensive energetically and can be lethal, as observed during the study when canines punctured a skull and a proboscis was torn off (although this did not affect vocalization). Acoustic signaling means conserving energy and the system favors this energy conservation.

Taken from lectures on fieldwork at Año Nuevo. Colleen Reichmuth, Caroline Casey, and others. This summary is based on a report by Trevlyn Williams and several other volunteer docents at Año Nuevo, and supplied to FES by Ranger Mike Merritt.