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# Training California sea lions to record whale behavior using a rehabilitating California gray whale calf

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**Abstract**

The goals of the SLEWTH (Sea Lions Exploring Whales and Their Habitats) project were to train California sea lions to carry a harness with attached video camera and swim alongside whales, thus recording their underwater behaviors. The sea lions had been trained to wear a harness with attached video camera housing, enter and exit the ocean from vessels or shore, swim alongside a moving vessel, and recognize verbal commands from an underwater speaker. These sea lions also were trained to swim alongside a replicate of a whale being pulled by a vessel, and would swim alongside captive dolphins as the first approximation of swimming abeam of whales in the wild. The presence of JJ at SeaWorld provided a unique opportunity and the next logical step for desensitizing the trained sea lions to the presence of a large cetacean in a controlled setting. The two sea lions were transported to SeaWorld of San Diego, and during a 3-week period slowly introduced into JJ's tank, moved stepwise closer to JJ, and eventually trained to swim in close proximity (within 0.5 m) to JJ. We never observed any significant changes in JJ's behavior (either interest or disturbance) when the sea lions were in visual contact with JJ. The brief study demonstrated that the California sea lions could be transported a long distance, while maintaining their trained behaviors, desensitized to the presence of a captive large cetacean, and perhaps familiarized JJ with a species she would encounter in the wild after release. We believe this experience at SeaWorld displayed the potential of training sea lions to carry instruments for monitoring the underwater behaviors and movements of free-ranging whales.

Key words: California sea lion, gray whale, rehabilitation, train, video camera.

## Introduction

Since 1991, we have been training California sea lions (*Zalophus californianus*) to record behaviors of free-ranging whales. That project (SLEWTH, Sea Lions Exploring Whales and Their Habitats), was founded to develop a new method of observing and recording whale behavior under water. Whales are difficult to locate and observe because they spend up to 95% of their time submerged and mostly out-of-view, often at depths of 30 m or more (Watkins *et al.*, 1981; Harvey & Mate, 1984; Mate & Harvey, 1984). Consequently, we developed a plan to train California sea lions to carry video cameras and approach whales closely to document their natural migratory and foraging behaviors along the California coast. California sea lions are relatively easy to train for these and other tasks (e.g., Evans & Harmon, 1968; Hall, 1970; Irvine, 1970; Barton, 1977) and often encounter and interact with large baleen whales (e.g., California gray whales, humpback whales, blue whales, minke whales) along the west coast of North America.

We trained two California sea lions, Beaver (a 16-year-old male from the US Navy's Marine Mammal Program) and Sake (an 8-year-old rehabilitated female transferred from SeaWorld of San Diego), to carry cameras and return to us on cue after short periods of ranging along the coast of central California (Fig. 1). The general training program involved basic husbandry behaviors (e.g., physical exams, ability to draw blood and stomach fluids, movement onto scales for weighing, entry into cages), behaviors designed for open-ocean work (e.g., entry and exit from boats, swimming alongside a vessel, recognizing verbal commands from an underwater speaker), and a series of training steps leading to recording the underwater behavior of free-ranging whales. We trained the sea lions to wear a harness designed to hold a camera housing and radio transmitter. The video camera could be oriented: (1) forward to record images in front of the sea lion, (2) at a 45°-angle to record objects slightly to the side, and (3) at a 90°-angle to record objects alongside the swimming sea lion.

We used a step-wise plan to train the sea lions to approach and swim along-side the whales. First, the animals were trained to swim along the edge of the

**Figure 1.** A California sea lion (Beaver) equipped with a harness and video camera while performing ocean training exercises in Monterey, California.

pool following the movements of the trainers. Then, a model whale was developed and introduced as a training tool. The whale model had a target pole attached to the side, where the sea lion was asked to place its nose. By pulling the whale model through the water, the sea lion learned to swim alongside the model at a precise distance. Finally, the target pole was removed and the sea lion simply patterned the model's movements. Dolphins swimming in a pool were then used to make the first approximation to patterning a live animal. There were numerous intermediary steps, but this formed the basis of the training process.

Some of our first experiences with exposure of the sea lions to free-ranging whales indicated that the sea lions might be frightened by the whales. For example, when Beaver suddenly encountered one humpback whale, he became agitated then jumped out of the water into our boat nearby. Consequently, we recognized the value of the opportunity to desensitize[1] the sea lions to a large whale during the rehabilitation of JJ under controlled conditions. The Animal Care Staff of SeaWorld of San Diego also thought that the controlled exposure of JJ to California sea lions, which she would likely regularly encounter once returned to the Pacific Ocean, would be enriching to JJ during her rehabilitation. We briefly describe here the results of our efforts to: (1) desensitize the sea lions to the presence and movements of a live gray whale and to new environments; (2) obtain recordings of JJ's underwater behavior using the instrumentation carried by the sea lions; and (3) familiarize JJ with a common Pacific Ocean marine mammal that she likely would encounter once returned to the ocean.

[1]Densitization is defined as the relatively persistent waning of a response as a result of repeated stimulation (Thorpe, 1956). The process is helpful when preparing an animal for accepting novel stimuli and for operating in a novel environment with confidence and comfort.

## Materials and Methods

We transported the two sea lions by truck to San Diego from Moss Landing, California on 3 January 1998 and completed the work at SeaWorld on 24 January 1998. All of the work was conducted at the large pool complex where JJ was kept (see Bruehler *et al*., 2001; Wisdom *et al*., 2001). We allowed the sea lions to acclimate to the new surroundings for two days after their arrival. On the third day, one sea lion (Beaver) was outfitted with a harness and tether, transported to JJ's pool, and allowed to swim up to 3 m away from us. That and the next several training sessions were mostly used to get the sea lions familiar with the pool, rather than introducing them to JJ. Because JJ spent most of her time in a far alcove of the pool, we do not think that she or the sea lions were aware of each other during those first sessions. We increased the length of the tether to 16 m on the second day of training, which allowed more mobility, but still permitted quick

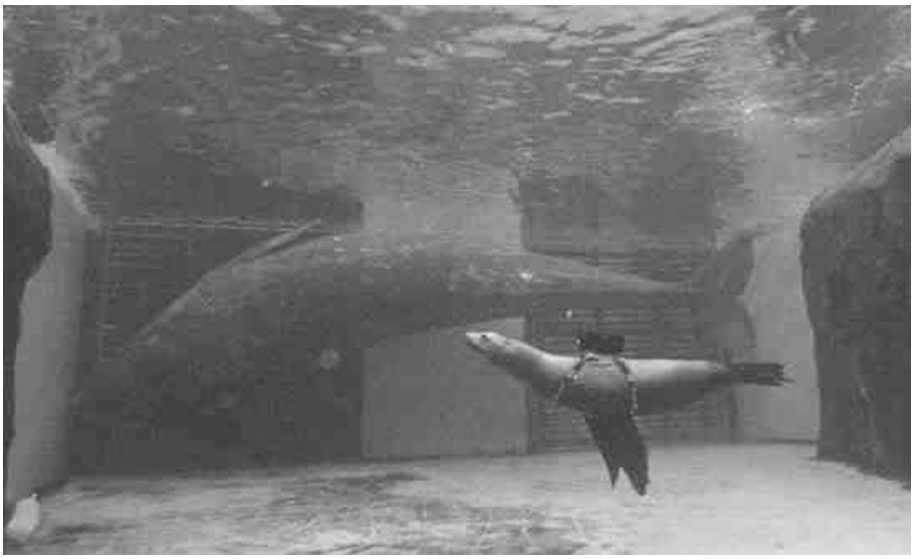

**Figure 2.** Underwater photograph of a California sea lion (Beaver) with harness and attached camera alongside a rehabilitating California gray whale calf (JJ) at SeaWorld of San Diego.

retrieval, if necessary. On the third day, we allowed Beaver, un-tethered, to range further across and to the bottom of the pool, but JJ was never able to see him and he never got closer than 25 m to her.

On the ninth day of training, Beaver swam near JJ's flukes, but neither animal reacted to the other. After that, both sea lions were encouraged to swim progressively closer to JJ. They then regularly swam past JJ as they targeted on objects on the bottom of the pool and stationed within 1–2 m of her (Fig. 2). On occasion, divers were present in the pool to remove any uneaten food offered to JJ, and the sea lions sometimes were briefly distracted by the food debris or the divers. On the 15th day of training, Sake swam to within 0.5 m of JJ, but we did not notice any obvious response by either animal to the other. By the end of the trials, both sea lions stationed within 1-2 m of JJ's side and head for 1–2 min (Fig. 3).

## Results

Overall, the sea lions and JJ had visual contact with each other on sixteen occasions. We never detected any significant interest in or adverse reaction by JJ to the sea lions. This was despite occasional direct contact of the sea lions' noses with JJ's side, a behavior that we had trained the sea lions to do for open-ocean studies. On rare occasions, JJ moved her flukes or briefly watched the sea lions, usually when they were swimming rapidly or jumping out of the water nearby. By the end of the trials, we had successfully trained both sea lions to comfortably approach JJ and orient towards her for several minutes so that the cameras were able to monitor her behavior. The sea lions were able to directly locate JJ from approximately 25 m away without any directional cues from us. They apparently became comfortable enough around JJ to approach and attempt to interact with her spontaneously.

## Discussion

The brief study was useful for demonstrating that the sea lions could successfully be transported long distances and then introduced into a new environment without disrupting their trained performance routines. Our training techniques appeared capable of maintaining the trained behaviors despite the abrupt shift of the sea lions to a novel environment with many distractions. To help with the adjustment, we introduced the sea lions to the pool on a haphazard schedule, and mixed the duration and types of behaviors in each training session. This helped reduce sensitization and keep good control of the sea lions. We also took them often to a familiar location (e.g., cage or truck) to minimize their anxiety.

We desensitized the sea lions to a California gray whale by trained exposures to JJ during these three weeks, and we think this was a valuable experience for the sea lions to facilitate our open-ocean studies (Fig.4). The exposure also could have contributed to enrichment of JJ's rehabilitation by familiarizing

**Figure 3.** Photograph made from a video camera worn by a California sea lion (Sake) while performing a stationing behavior for the recording of gray whale calf (JJ) behavior at SeaWorld of San Diego.

**Figure 4.** Trained California sea lion (Sake) stationing next to a humpback whale in the Pacific Ocean off Moss Landing, California.

her, with minimum disruptions, to animals she would likely often encounter once returned to the Pacific Ocean. We do believe however, that these exposures might have been more enlightening if they had occurred earlier when JJ was more active (*cf*. Wisdom *et al*., 2001).

One directly relevant outcome of the mutual exposure of these sea lions and JJ was the possibility that we might dispatch the sea lions to monitor JJ's behavior and well-being once she was returned to the Pacific Ocean, with electronic monitoring instruments attached (see Stewart *et al.*, 2001). Consequently, we planned to release Beaver and Sake at Monterey once JJ was determined to have reached the area. The experience at SeaWorld displayed the potential utility of trained sea lions to carry instruments for monitoring the underwater behaviors and movements of free-ranging whales. We think that this developing technique for underwater recording was advanced substantially by the opportunity to expose the sea lions to a California gray whale under excellent, controlled settings.

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