The First Rehabilitation and Release of an Abandoned Endangered Hawaiian Monk Seal (*Monachus schauinslandi*) Pup in the Main Hawaiian Islands

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Abstract

In 2008, an endangered, male Hawaiian monk seal pup (KP2) was abandoned on the island of Kauai. After several unsuccessful attempts to reunite it with its mother, the seal pup was rescued and placed in captive rehabilitation by authorized National Marine Fisheries Service (NMFS) personnel. KP2 was 24-hours old, underweight, and appeared dehydrated. The Marine Mammal Center of California partnered with NMFS, providing veterinary consultation and experienced volunteers and staff to direct the care and husbandry. Initial challenges were determining the correct nutrition for a mother's milk substitute and to prompt KP2 to forage without aid. Challenges later focused on a mild, diffuse bilateral corneal edema. For the first time, empirical drug therapy for corneal edema was used on a Hawaiian monk seal, with careful monitoring for treatment side effects. The edema rapidly progressed in severity in both eyes, hypothesized to result from captive environmental factors. KP2 was moved to an ocean shoreline pen. Over the next two months, the ocular condition improved, and KP2 was instrumented with a satellite transmitter and radio tag. NMFS cleared the seal for release, and the release site was Kalaupapa, Molokai, chosen for its remoteness and limited human contact. This was the first response and rescue for a monk seal pup in the main Hawaiian Islands. KP2 provided invaluable information and management lessons, demonstrating that the capacity to rescue pre-weaned pups, provide captive care, and release back into the wild is essential for the adaptive management in future recovery efforts for Hawaiian monk seals.

Introduction


Mother's aggression toward pup and subsequent rescue.

May 1, 2008: A male Hawaiian monk seal pup (KP2) found on Kauai.
- Young female seal mom displayed aggression and abandoned KP2.
- On May 2nd, attempts were made to reunite KP2 with his mother.
- All reunion attempts were unsuccessful.

NMFS collected KP2 for captive care (NMFS Marine Mammal Health and Stranding Response permit # 932-1489-09).
- The U.S. Coast Guard (USCG) transported KP2 to the NMFS Kewalo Research Facility in Honolulu.
- Approximately 24-hours old, KP2 weighed 15.7 kilograms (kg) and appeared dehydrated.
- Broad-spectrum antibiotics were given for 10 days, minimizing infection risks.
- Subcutaneous and oral fluids were administered for rehydration.

The Marine Mammal Center (TMMC) immediately assumed the immense task of hand rearing this neonate pup, partnering with NMFS.
- TMMC provided veterinary consultation, experienced volunteers, and staff to direct daily feeding, care and husbandry for the 227 rehabilitation days.
- Oahu-based volunteer monk seal responders assisted with nighttime observations.

KP2 gained about 52 kg over his 7.5 months in human care.
- Determining the appropriate nutrition formula was an initial challenge.
- It was imperative that KP2 learn to forage independently.
- Previously established techniques for elephant and harbor seals were used to help KP2 transition to eat live *moi*, a local bait fish that Hawaiian monk seals are known to consume.


Left: KP2 consuming *tako* in his shoreline pen at U.S. MCBH

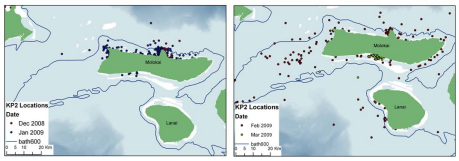
Right: shoreline pen with mandatory buffer pen.

On August 4,2008, a mild diffuse bilateral corneal edema was noted.
- A thorough diagnostic evaluation was conducted to determine the cause.
- Empirical drug therapy for common causes of corneal edema were attempted in logical order, with effects of treatment carefully monitored.
- The corneal edema rapidly progressed in severity.
- By the end of August, both eyes had moderate to severe corneal edema.

Thorough diagnostics evaluated eye swabs and blood serum for infectious diseases.
- All tests for pathogens were negative.
- It was hypothesized that the corneal edema could result from a combination of environmental factors in KP2's enclosure (i.e. bright reflected sunlight and water quality issues).
- To mitigate the potential environmental factors, KP2 was moved to a shoreline pen on a protected beach at the U.S. Marine Corps Base Hawaii at Kaneohe Bay, Oahu.

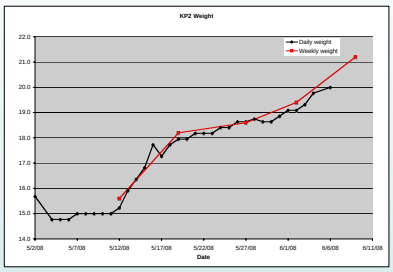
The shoreline pen ranged from 1 - 3.5 feet in depth depending on tides.
- KP2 acclimated quickly to his new environment.
- The ocular condition improved during next 2 months.
- He was tracking, catching and consuming live fish, crabs, and an occasional octopus (*tako*) in addition to his daily ration of dead herring.
- The various live prey prepared KP2 for "pre-release" by providing environmental enrichment and supplemental nutrition.

Above: Picture of KP2. Below: Tracking of KP2 post release from December 2008 to March 2009. For December he stayed at Kalaupapa and Molokai's North Shore, January he explored further afield, February he really began to explore and in March his time was at Kaunakakai.



KP2 care

- Location: fiberglass pool for 4 months and a shoreline pen at U.S. MCBH for 3.5 months
- Around-the-clock care by staff and volunteers
- Dilute fish mash adapted from common pinniped formula's
- First teeth erupted at 25-26 days
- Swim time, depth, and access to water was slowly increased and carefully monitored
- Live fish useful for enrichment for a solitary animal.



Above: Graph of KP2's weight increase. Below: Table with date, girth, length, and weight from 2 post-release captures.

Date	Weight (pounds/kg)	Girth (cm)
Exit physical 23 November, 08	150 #, 68 kg	N/A
3 month physical 5 March, 09	98.5 #, 44.7 kg	86.5
6 month physical 12 June, 09	127 #, 57.7 kg	102.5

KP2 Eye Issues

KP2's corneal edema was most likely caused by multiple environmental factors (ie. reflective light, access to water, water quality etc.) that disrupted the delicate balance protecting the layers of the cornea and associated tear film. This theory is supported by the lack of detection of infectious agents or evidence of exposure to infectious agents and the gradual onset with progression in one environment (rehabilitation enclosure/pool), with regression of lesions in natural environment (shoreline pen).

Release considerations

Before KP2's release into the wild, NMFS ensured that:
- The eye condition improved.
- KP2 posed no "disease transfer" threat to the wild population.
- Compliance with NOAA/NMFS Marine Mammal Health and Stranding Response Marine Mammal Release Guidelines.

To ensure his eye condition was not infectious, additional tests included ocular ultrasound.
- Many agencies and experts examined the results.
- NMFS cleared KP2 for release.
- On December 16, 2008, the USCG transported KP2 to a remote area on the island of Molokai.

The release site was selected on the basis of:
- Regular usage by other monk seals, providing opportunities for KP2 to socialize
- Potentially reducing the likelihood of KP2 interacting with humans

KP2 was instrumented with a small satellite-linked, time-depth recorder and a VHF tag.

Monitoring and Management

As of July 2009, KP2 is thriving in the wild.
- All signs currently point to a successful reintroduction to the wild.
- KP2 will be captured in 3-month intervals over the next year for medical examinations, ensuring health status and gathering baseline information for future cases.
- He is demonstrating signs of conditioning to humans, mostly likely resulting from his captive rearing and provisioning in the wild by well meaning fisherman.
- Displacement techniques have been used to counter condition his behavior of hauling out on the Pier of Kaunakakai
- Currently it appears that he may have to be placed in a local Aquarium because of his friendly behavior.


KP2's habituation and conditioning to people on Molokai.

Importance of this Case for Honk Seal Recovery

The capacity to rescue pre-weaned pups, care for them in captivity and release them back to the wild population is a high priority and will contribute to the recovery of the Hawaiian monk seal.
- Every seal is considered vital to the population and recovery potential of this endangered species.
- Invaluable lessons were learned about caring for pre-weaned pups, contributing to the monitoring and adaptive management of the species.

Management actions and research in the main Hawaiian Islands have provided valuable insights by:
- Responding to pups born on popular beaches
- Improving the ability to relocate seals
- Evaluating threats of exotic diseases

In the future, NMFS and its partners will continue to focus on critical recovery actions, with the ultimate goal of salvaging reproductive potential and recovering the Hawaiian monk seal.

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