



Global Re-introduction Perspectives: 2013

Further case-studies from around the globe
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IUCN/SSC Re-introduction Specialist Group (RSG)





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Translocation of Hawaiian monk seals in the Hawaiian Archipelago and Johnston Atoll, USA

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Introduction

The Hawaiian monk seal (*Monachus schauinslandi*) is one of the world's most endangered marine mammals, numbering approximately 1,200 individuals and decreasing at a rate of about 3% per year. Hawaiian monk seals occur throughout the 2,600 km-long Hawaiian Archipelago, which consists of two regions: the main Hawaiian Islands (MHI, with eight primary high islands) and the Northwestern Hawaiian Islands (NWHI, made up of small coral islands, low-lying atolls, and steep basalt islands). Most monk seals reside in the remote NWHI, and a small population occurs in the MHI. There are rare and sporadic reports of seals visiting Johnston Atoll, approximately 800 km south of the Hawaiian Archipelago. Adult monk seals are approximately 220 cm in length and can weigh over 200 kg. They give birth, nurse, rest and molt on land and forage on a wide variety of prey on the sea floor, sometimes at depths exceeding 500 m. Identified threats include food limitation, shark predation, conspecific male aggression, entanglement in derelict marine debris, fishery interactions, and intentional killing by humans. The species is Critically Endangered under the IUCN, endangered under the U.S. Endangered Species Act, depleted under the U.S. Marine Mammal Protection Act, and listed on CITES Appendix I.

Goals

- Goal 1: Translocation to alleviate immediate risks of mortality, such as shark predation or conspecific male aggression.
- Goal 2: Translocation from area of lower to higher long-term survival probability (e.g., due to more favorable foraging conditions).



Hawaiian monk seal © Jon Brack

- Goal 3: Translocate aggressive male seals to mitigate injury and mortality of conspecifics.
- Goal 4: Translocate seals in human-populated areas to mitigate undesirable or dangerous human-seal interactions.

Success Indicators

- Indicator 1: Successful execution of translocations (capture, transport and release).
- Indicator 2: Acceptably low rate and distance of dispersal from release area.
- Indicator 3: Post-release survival effects are acceptable. That is, survival rate of translocated seals matches that of comparable individuals at the release site. Or, (depending on the goal of translocation) survival of translocated seals is improved relative to survival at the capture site.
- Indicator 4: Post-release foraging behavior and habitat use of translocated seals is similar to comparable seals at the release location.
- Indicator 5: Intended goals of translocations were achieved.

Project Summary

Feasibility: The Northwestern Hawaiian Islands (NWHI) and Main Hawaiian Islands (MHI) differ in nearly every aspect relevant to monk seal conservation (Baker *et al.*, 2011). The remote NWHI are part of the Papahānaumokuākea Marine National Monument, a vast marine-protected area where coral reefs and associated fish populations are considered robust and fishing and other *in situ* human impacts have been minimized. In contrast, the MHI are characterized by a large human population and nearshore marine ecosystems severely impacted by physical alteration, heavy fishing pressure, and pollution. Nevertheless, monk seals appear to be thriving in the MHI (Baker *et al.*, 2011), while the NWHI subpopulations in aggregate are declining, believed largely as a result of food limitation leading to low juvenile survival. MHI seals may enjoy relatively low intra-specific competition (because the number of seals is still small) and low inter-specific competition (because large predatory fish competitors have been greatly reduced by fishing). Johnston Atoll is very isolated and encloses four small, low-lying islets. It is considered part of the monk seal's range because seals naturally occur there, though only rarely and typically only singly.

In the NWHI, strict quarantine protocols minimize the risk of introducing invasive species to these fragile island ecosystems characterized by a high degree of endemism. At some sites, access is controlled to protect cultural resources and archaeological remains. In the MHI, social factors play a large role in monk seal translocations. Public attitudes toward monk seals are diverse. Undesirable seal interactions with people have motivated several seal relocations, and sensitivity to public sentiment is an important element of translocation decision-making.

Implementation: Translocation has been a tool for Hawaiian monk seal conservation for the past 30 years. A total of 259 seals were translocated during 1984 - 2009 (Baker *et al.*, 2011; Norris, 2013). Seals were transported from just a few kilometers within an island or atoll to over 2,000 km between subpopulations. Consequently, the cost and complexity of associated logistics varied greatly with

the scale of translocations. The NWHI are primarily accessible only by large seagoing vessels. The exception is Midway Atoll (previously also Kure Atoll and French Frigate Shoals), which aircraft may access. Within NWHI atolls, seals have been transported aboard small boats or carried by hand. In contrast, the MHI shorelines are largely accessible by some combination of aircraft, vessel and automobile, and these have all been used for translocations within the MHI.



Translocating a weaned monk seal pup from area of high shark predation © Monica Bond

Translocations between the MHI, NWHI and Johnston Atoll were accomplished using large vessels or aircraft.

Attention to disease transmission risk has varied over time and with the nature of translocations. Prior to the 2000s, no testing for disease exposure was conducted. Thereafter, potential variation in disease exposure among subpopulations has been assessed, and when seals were translocated among subpopulations, individuals were subject to health screening (Norris, 2013). Further, Schultz *et al.* (2011) found that the Hawaiian monk seal is comprised of a single panmictic population, so that there are no concerns regarding genetic consequences of translocations. Most seals had “hard releases” on land, in that they were simply let go on the beach. In 1990 - 1991, six weaned pups instead had a “soft release”, as they were held for 1 - 2 months in shoreline pens at Kure Atoll and offered live fish prior to release. For logistical reasons, 21 adult male seals were released from a ship in nearshore waters of the MHI in 1994 and 12 weaned pups were released from a small boat within 100 m of shore at Nihoa Island in 2008 - 2009.

Post-release monitoring: Most seals are individually identifiable by applied tags, temporary pelage bleach marks, and photographic identification using natural markings. Post-release monitoring and program assessment largely relied on resighting translocated individuals over time and comparing their movement and survival to appropriate “control” seals. The following was reported by Baker *et al.* (2011) and Norris (2013). Recently weaned pups (with little or no at-sea foraging experience) exhibited high fidelity to release sites commensurate with that shown by untranslocated pups to their birth location. In contrast, juvenile and adult seals tended to stray from their release locations farther and sooner. Nevertheless, when 21 adult male seals were moved over 1,000 km from Laysan

Island (NWHI) to the MHI, they subsequently dispersed among the MHI; however, only one was observed to return to the NWHI. Translocated seals' survival rates were indistinguishable from those of comparable seals native to the release sites. Further, where comparisons could be made, seals translocated to improve their survival appeared to fare better than comparable seals remaining at their natal locations.

Detailed post-release telemetry tracking was conducted on 12 pups translocated from French Frigate Shoals to Nihoa Island (Norris, 2013). Similar post-release movement patterns, diving activity, and habitat use were observed for translocated and non-translocated monk seal pups at Nihoa Island and other sites in the Hawaiian Archipelago, indicating monk seal pups had normal foraging activity following translocation.

Major difficulties faced

- Once seals had become habituated to people, translocations within the MHI to mitigate their interactions with people typically failed. Habituated seals usually dispersed from relatively remote release sites (often repeatedly when relocated and released multiple times) and continued to seek out human contact. These cases tended to ultimately result in the seals being taken out of the MHI (to Johnston Atoll, the NWHI or permanent captivity) to address public and seal safety concerns.
- Adult males and a subadult male released at Johnston Atoll apparently did not persist there long post-release. Some may have died there, whereas others (fitted with satellite tracking devices) departed the atoll soon after release and were never resighted.
- Small sample sizes sometimes inhibited robust statistical inference.
- Post-release monitoring effort for many of the translocations conducted prior to the late 1990s was inadequate.
- Budgetary and logistic constraints limited post-release visual monitoring of the most recent (2008 - 2009) translocations to Nihoa Island. Available information suggested these translocated pups likely fared considerably better than those at their natal site, but perhaps not as well as native Nihoa Island pups. Imprecise survival estimates due to low monitoring effort hampered project evaluation.

Major lessons learned

- There is little risk to Hawaiian monk seals associated with the mechanics of capture, transport, and release. Of 259 seals translocated, only 3 (1.2%) died during translocation procedures, including 2 adult males and 1 weaned pup. One of the adults died while being restrained, while the second adult and the pup died while being held in temporary captivity. Cause of death in all 3 cases could not be determined. Capture stress, pre-existing conditions or both may have been involved. A wide variety of transportation methods may be safely employed, including carrying seals on foot, transporting in small boats, large ships and aboard aircraft. Whenever feasible, releasing translocated monk seals on land is preferred to a boat-based release, especially for young seals.

- Weaned pups are most amenable to translocation. They are robust to handling and transport, show high fidelity to release sites, and apparently survive as well as comparable native pups at the release location. Older seals also appear to exhibit favorable survival rates post-release (with the exception of those taken to Johnston Atoll) but tend to disperse sooner and more widely.



Hawaiian monk seal pup on research vessel with GPS telemetry instrument © Hung Tran

- Based on existing information, Johnston Atoll is not a viable release site for monk seals.
- Most intended goals of the translocations were consistently achieved. Notably, undesirable human-seal interactions can be successfully prevented through translocation of young seals (weaned pups) prior to habituation to humans. However, once seals have become habituated to people, translocation within the MHI is unlikely to resolve problem interactions.
- The 1994 translocation of 21 adult males to the MHI convincingly achieved the desired goal of reducing female seal mortality at Laysan Island (NWHI) (Johanos *et al.*, 2010). At that time, monk seals existed in low numbers and had rarely been seen by Hawaii residents. Scientists and managers failed to involve the public in decision-making, nor was there follow-up public education. Apparently as a result, some Hawaii residents believe that monk seals are not native to the MHI and do not belong there. Thus, while the immediate goal of the translocation project was achieved, this action also contributed to persistent animosity towards seals and a lack of support among some members of the public for monk seal conservation, even two decades hence.

Success of project

Highly Successful	Successful	Partially Successful	Failure
	√		

Reason(s) for success/failure:

- Monk seals are clearly robust animals and can readily withstand temporary handling and captivity. We believe the rarity of translocation-related mortality has also resulted from strict adherence to cautious handling and transport protocols.

- In the short term, pups undergo a post-weaning fast and remain relatively sedentary and mostly on shore for 1 to 2 months after weaning. Pups translocated during this period tend to stay put where released and slowly expand their range once they begin to forage. This behavior facilitates post-release monitoring and provides a measure of confidence that pups will not rapidly disperse from the habitat selected for release to perhaps less desirable habitat.
- In the long term, most monk seals translocated at all ages remained in the general region where they were released and did not return to their natal areas.
- “Hard” releases with no acclimation period work well for this species. Pups were typically released immediately on shore and older animals either on or near shore. This meant captive time was limited to that required for health screening and transport (which typically can be done simultaneously). Consequently, cost of captive care, risk of capture-related health complications and potential for human habituation were minimized.
- The long-term, detailed monk seal demographic database and the fact that most seals are individually identifiable both improve design of translocation actions and facilitate post-release monitoring.

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