

Handling Risks and Disease Considerations of Hawaiian Monk Seals in the Main Hawaiian Islands

**Robert C. Braun DVM MS
Kaneohe, Hawaii**

We present general information on the issues concerning seal handling and the potential of disease transmission between Hawaiian monk seals, humans, and other terrestrial animals in the main Hawaiian Islands (MHI).

The Hawaiian monk seal population has a long history of decline, but overall numbers have been relatively stable since 1993. While some subpopulations have increased, other subpopulations have declined. The frequency of reported births, beach sightings, and haulout events suggest that Hawaiian monk seal numbers in the MHI may be increasing. While this abundance of Hawaiian monk seals is advantageous for the recovery of this unique and important endangered species, greater numbers of monk seals in the MHI also represent potential risks, some of which are not common to the Northwestern Hawaiian Islands (NWHI) where most monk seals are found. Intervention (e.g., capture, handling, treatment) to improve survival and the greater chance of interaction with people, their pets, livestock, and wild and feral animals require special consideration when establishing conservation plans to enhance recovery and minimize threats to population growth.

1. Risks associated with capture, handling, transporting, and sedating Hawaiian monk seals

Proper handling is an essential part of wildlife management programs, and associated risks must be carefully evaluated. Under the appropriate circumstances, intervention to enhance survival must be integrated into the recovery planning process for endangered species.

Specialized equipment (e.g., capture nets), transport containers, and handling techniques have been developed during decades of handling to ensure that monk seals are not harmed during capture and restraint. The ongoing discussion and review of seal handling have led to the considerations for reduction and mitigation of physical stresses listed below.

Capture, handling, and translocation can be stressful for any animal, and the monk seal is no exception. However, through hundreds of various handling events, discussion, and review by experts in the field of wildlife conservation, safe handling protocols for Hawaiian monk seals have greatly reduced the potential for injury to seals. Seals at greatest risk are the old, very young, pregnant, suckling, molting, and those which are physically compromised. Preexisting health problems may be difficult or impossible to determine prior to restraint/handling; and thus, all seals are carefully evaluated before initiating any type of handling procedure.

In addition to assessing a seal's physical condition before handling, researchers also consider environmental factors that could have a profound influence on the seal while the work

is being performed. Handling seals on flat sand beaches is preferred because hard surfaces can cause skin abrasions, and steep banks or mounds of sand cause pressure on internal organs. To avoid overheating, seals are handled during relatively cool periods (i.e., early and late in the day or on rainy/cloudy/cool days) because they have an insulating blubber layer, dark skin, and pelage that predispose them to thermal stress. Researchers cool seals by keeping them wet, shaded, and in a breeze.

Reducing the time seals are handled or restrained also reduces the possibility of thermal stress. If restraint is expected to last longer than a few minutes, sedation is a proven safe and effective technique for protecting monk seals from problems associated with prolonged handling. Anesthesia is rarely needed and is reserved for invasive procedures requiring complete physical control of an animal. Vital signs (e.g., heart and breath rate) are monitored during all handling procedures to ensure immediate action is taken in case of a life-threatening situation.

Monk seal social and behavioral considerations must also be evaluated when handling and/or transporting monk seals. Mitigating factors impeding monk seal recovery must be considered in relationship to possible risks that might result in changes in haul out site selection, maternal care of suckling pups, and social interaction with other monk seals. The influence of predators, exhaustion from long foraging trips, and possible interactions with aggressive seals must also be considered. Similarly, when translocating and releasing seals, attention must be given to potential interactions between people, pets, and other domestic and wild animals occurring at the location. Careful monitoring of seals after handling and translocation is essential for evaluating the seal's acclimation and welfare, mitigating unforeseen problems, and adding to our knowledge of successful potential conservation actions.

A recent study on the effects of handling monk seals found no deleterious effects to seals from capture, restraint, collection of sample, and attachment of instruments. Similarly no influences were detected in monk seal movement between sites, condition, or survival from such handling activities. (Baker and Johanos, 2002).

2. Potential for human injury and disease transmission from Hawaiian monk seals

The old adage among veterinarians “anything with teeth bites” is true for wild monk seals. They can weigh up to 200 lbs at weaning and attain an adult body mass of more than 700 lbs. Although limited to awkward “inch worm” and rolling movements on land, they are extremely fast and agile in water, even shallow water. Like most wild animals when frightened, threatened, protecting their young, or accidentally acclimated to people, seals have the potential to injure humans. However, monk seals are not otherwise aggressive toward people, and no special precautions are necessary to prevent human injury other than common sense and the reasonable practices as established in wildlife viewing guidelines.

Zoonotic diseases are those that have the potential for transmission between humans and animals. There are many well-known zoonotic diseases of dogs and cats such as the rabies virus and the single-celled protozoan *Toxoplasma*, that can cause complications during humans during

pregnancy. Some diseases are emerging and others are reemerging. A current example is the West Nile Virus spread by birds and insects. Hookworms and roundworms, both parasitic diseases, were of great concern on the beaches in the late 50s and early 60s. During the last 20 years, scientists and veterinarians have learned much about the diseases of marine mammals. Recent epidemiological surveys of monk seals in the NWHI have tested for evidence of exposure to diseases that are known to occur in pinnipeds. Many definitive serological tests for marine mammals and specifically for monk seals are in varying stages of development. Tests for presence of disease or exposure to disease in other common terrestrial species and humans have some but often limited utility in understanding specific health implications for monk seals. However, these ongoing studies suggest that Hawaiian monk seals could be the carrier of zoonotic diseases that could be transmitted to humans. Specific and accurate tests for those potential pathogens in seals are currently being developed and evaluated. Over the decades of human-monk seal interaction, among fisherman, beachgoers and researchers studying monk seals throughout the Hawaiian Archipelago, I have found no published reports of related human disease and only a few reports of monk seal related bite injuries.

Understanding the limited evidence of human injury and disease transmitted to humans by monk seals is an appropriate beginning to discuss the potential for disease transmission. Parasitic and infectious diseases are the two types of zoonotic diseases that may have the greatest risk for humans. Monk seals, like most wild animals, have several forms of parasites and are often heavily infected with two or three types of worms. Several new species of worms have been identified in monk seals, but the specific life cycle, vectors, and pathogenicity as well as the potential for causing human disease remain unknown. Parasites of these same groups in other species have been associated with human infections.

Ongoing epidemiological studies of monk seals in the NWHI have found antibodies to two potential bacterial pathogens (*Chlamydia sp.* and *Brucella sp.*) that have caused disease in humans in other unrelated circumstances. Using tests not specific for monk seals may not accurately reflect specific antibodies to these potential pathogens, but positive titers to these bacteria have been found in the NWHI monk seal populations. No disease or pathology in monk seals or humans has been linked to these antibody tests. It can be speculated that the potential for human exposure to these pathogens, as well as other potential diseases, are orders of magnitude higher from other people, pets, livestock, and feral animals. Again common sense and reasonable practices for watching wildlife, such as keeping safe distances from seals, will minimize any potential for disease transmission from monk seals to the public.

3. Potential transmission of disease from pets, livestock, feral, and wild animals to Hawaiian monk seals

In the last decade we have learned much about endemic diseases of marine mammals and specifically for monk seals in the NWHI. We have also learned about the origin of disease and the potential risk of disease reservoirs in terrestrial and avian species. For example, the Associated Press recently reported a California study on endangered sea otters infected with *Toxoplasma sp.* apparently from human wastewater systems. In Northern Europe, a 1998 die-off of thousands of seals in Northern Europe and a current epidemic appears to have resulted

from a distemper virus thought to be canine in origin. For the last few years the thousands of California sea lions have been infected with *Leptospira sp.* bacteria, most commonly spread to people and animals from the urine of infected livestock and rodents. From 1997 to 1999 the State of Hawaii Department of Health confirmed 176 human Leptospirosis cases, 52 of which were on Kauai. There are repeated reports of seals swimming in the estuarial areas of streams with the potential for harboring these bacteria. Thus, the threat of Hawaiian monk seal exposure to endemic diseases of people, terrestrial, and avian species is significant. Plans have been developed for a health and disease survey of monk seals in the MHI next fall, and procedures are in place to appropriately sample stranded, entangled, and sick seals.

Risks of exposure to monk seals from endemic diseases are difficult to quantify because most of these diseases are not reportable, and no organization compiles the rate of occurrence. When considering reportable diseases, serological evidence (e.g., antibody titers) is not necessarily an indication of disease, and the etiology of animal morbidity and mortality is frequently not determined. Thus, there is little and often no objective data on the prevalence of pathogens to quantify the risk of diseases, which can be anticipated to present the greatest risk for monk seals in the MHI.

Subjectively and qualitatively, the three infectious diseases endemic to the MHI considered to have the highest risk for the Hawaiian monk seal population are distemper viruses, *Leptospira sp.*, and *Brucella sp.* Fortunately, distemper virus in Hawaii is rarely diagnosed in domestic pets, and current animal quarantine regulations present a significant barrier to further introduction. These regulations are subject to change and can be expected to allow increased risk with time. Leptosirosis is endemic and widespread. Public awareness and state monitoring are also helpful. Unlike other gregarious pinniped populations affected with *Leptospira*, Hawaiian monk seals are mostly solitary, reducing the potential for the spread of this deadly disease from seal to seal. The potential for *Brucella* bacteria to infect monk seals is real, and there is reason to believe that Hawaiian monk seals may already have an endemic marine strain of this bacterium. Techniques for diagnosis of *Brucella* in monk seals and other pinnipeds are being developed and may be available in the near future. The potential for *Brucella* to affect the survival of the species is unclear, but its insidious cause of reproductive failure in other species is cause for concern. Some other diseases of concern and interest to monitor are West Nile Virus, dengue Fever, heartworms, toxoplasmosis, parvoviruses, adenoviruses, influenza, and corona viruses.

Many other potential diseases can threaten monk seals. As stated previously, diseases are constantly emerging and reemerging, and endemic diseases in terrestrial, avian, and other marine mammal species could threaten monk seals. To understand, manage, and mitigate disease threats of monk seals, we must develop baseline data, continue to utilize the most appropriate diagnostic procedures for this species, and maintain dialog with veterinarians, State of Hawaii Departments of Agriculture and Health, and other stakeholders. Vigilant and timely response to stranded, entangled, sick, and dead monk seals will aid in our understanding of the role of disease in the recovery of this species.

References

- Aguirre, A.A., J.S. Reif, and G. A. Antonelis. 1999. Hawaiian monk seal epidemiology plan: health assessment and disease status studies. U.S. Department of Commerce, NOAA Technical Report NMFS NWFSC-280. 63 pp.
- Aguirre, A.A. 2002. Health assessment and disease status studies of the Hawaiian monk seal (*Monachus schauinslandi*). National Marine Fisheries Service Center Administrative Report H-00-01 (unpublished). 44 pp. Available from SWFSC, Honolulu Laboratory, 2570 Dole Street, Honolulu, HI 96822.
- Baker, J.D., and T.C. Johanos. 2002. Effects of research handling on the endangered Hawaiian monk seal. *Marine Mammal Science* 18:500-512.
- Banish, L.D., and W.G. Gilmartin. 1988. Hematology and serum chemistry of the young Hawaiian monk seal (*Monachus schauinslandi*). *Journal of Wildlife Diseases* 24:225-230.
- Dierauf, L.A., and F. Gulland. 2001. CRC Handbook of Marine Mammal Medicine, Second Edition. CRC Press, Boca Raton, FL.
- Dailey, M.D., R.V. Santangelo, and W.G. Gilmartin. 1988. A coprological survey of helminth parasites of the Hawaiian monk seal from the Northwestern Hawaiian Islands. *Marine Mammal Science* 4:125-131.
- Dailey, M. D. 2002. In Review. *Heterophyopsis Hawaiiensis* from the Hawaiian monk seal.
- Gilmartin, W.G., E. Jacobson, W. Karesh, and M. Woodford. 1993. Working group report: monitoring, investigation, and surveillance of disease in free-ranging wildlife. *Journal of Zoo and Wildlife Medicine* 24:389-393.
- Gulland, F.M.D. 1999. Leptospirosis in marine mammals. Pages 469-471 in M.E. Fowler and R.E. Miller, eds. *Zoo & Wild Animal Medicine Current Therapy* 4. W. B. Saunders, Philadelphia, PA.
- Gulland, F.M.D., L.J. Lowenstine, J.M. Lapointe, T. Spraker, and D.P. King. 1997. Herpesvirus infection in stranded Pacific harbor seals of coastal California. *Journal of Wildlife Diseases* 33:450-458.
- Jahans, K.L., G. Foster, and E.S. Broughton. 1997. The characterization of *Brucella* strains isolated from marine mammals. *Veterinary Microbiology* 57:373-382.
- Whittow, G.C., and G.H. Balazs. 1979. Parasitic ulceration of the stomach in a Hawaiian monk seal (*Monachus schauinslandi*). *‘Elepaio* 38:83-84.