



# MARINE MAMMAL COMMISSION

8 December 2011

Mr. P. Michael Payne, Chief  
Permits, Conservation, and Education Division  
Office of Protected Resources  
National Marine Fisheries Service  
1315 East-West Highway  
Silver Spring, MD 20910

Re: Request for Amendment, Permit Application No. 14334  
(Alaska SeaLife Center)

Dear Mr. Payne:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the above-referenced permit amendment request with regard to the goals, policies, and requirements of the Marine Mammal Protection Act. The Commission provides the following recommendation and rationale.

## **RECOMMENDATION**

The Marine Mammal Commission recommends that the National Marine Fisheries Service amend Permit No. 14334 as requested, provided that it conditions the permit to require researchers conducting studies at the Center to consult with its husbandry staff prior to any research procedures to ensure the sea lions have not been exhibiting signs of stress (e.g., decreased activity, loss of appetite).

## **RATIONALE**

Permit No. 14334 authorizes the Alaska SeaLife Center to take by harassment up to five captive adult Steller sea lions, including one male and four females. The purpose of the taking is to study the reproductive physiology of individuals from the eastern population and the survival, growth, and physiology of up to six captive-bred offspring of the captive animals. The permit also authorizes the attachment of biotelemetry instruments to the captive animals to develop and validate methods for monitoring wild Steller sea lions. In addition, the authorized research includes investigation of stress responses, endocrine and immune system function, and seasonal variations in normal biological parameters such as body mass and composition. The permit authorizes the unintentional death of four animals during the five-year duration of the permit.

The Alaska SeaLife Center is requesting seven changes to the permit, including—

- (1) adding a respiratory stimulant drug to be administered prior to anesthesia to mitigate breath holding and decreased heart rate,
- (2) using additional fecal markers (berries, rice, food coloring, and sesame seeds) to identify individual fecal samples for hormone analysis,

- (3) administering deuterium oxide via a gastric tube followed by serial blood sampling to assess energy transfer from mother to pup during nursing and reproductive costs of the mother,
- (4) increasing the number of pups/juveniles authorized for research from six to nine,
- (5) adding two additional transfers of offspring,
- (6) adding a second male (currently a juvenile at the Center) for breeding purposes, and
- (7) adding a separate take table for the aging sea lions and adding two additional age-related mortalities for those sea lions for the duration of the permit.

The Commission considers all these requests to be reasonable, based on the Center's explanations, which are summarized as follows.

### **Administering atropine**

When anesthetized with isoflurane, some of the Center's sea lions have been holding their breath and experiencing slow heart rates. The Center searched the sea lions' records to identify factors that could have pre-disposed the animals to bradycardia, but timing of those episodes did not appear to be related to age or exposure to isoflurane. Breath-holding can be minimized by manual or mechanical ventilation and, despite the Center's findings, it also may be minimized by decreasing the concentration and duration of isoflurane. In addition, bradycardia in humans may result from aging and various cardiovascular problems. The Center is continuing to evaluate data from past procedures and putting mechanisms in place to better understand the cardiovascular function of its sea lions. In addition, it is using light sedation rather than fully anesthetizing sea lions during procedures, which may help minimize the effects from repeated anesthesia. Nevertheless, to avoid anesthetic emergencies, the Center's veterinarians have requested permission to administer atropine prior to anesthetics to avoid slow and variable heart rates.

### **Identifying fecal samples from individuals**

As part of this study, the Center must be able to identify fecal samples from each individual animal when the three females and one male are housed together during breeding season. The Center uses the fecal samples to monitor hormonal cycles, which vary—at least to a degree—by individual. The Center is requesting to use additional fecal markers (i.e., food coloring, berries, rice, and sesame seeds) to identify each sea lion's fecal samples.

### **Assessing energy transfer from mother to pup**

Estimating the energy costs of reproduction is one of the main objectives of the Center's captive research program. The Center is proposing to administer deuterium oxide to pups via gastric intubation to measure metabolic rates in the pup. Metabolic rates can be used to estimate energetic transfer from mother to pup and, thus, energetic costs incurred by the female. This study would involve serial blood sampling, but the total number of blood draws per year would not exceed the total allowed in the existing permit. It also should be noted that the Center would retain the option of administering deuterium oxide intramuscularly to pups to assess their body condition. However, at any given time or during any given sampling period, deuterium oxide would be administered by

only one of those methods, not both.

### **Increasing sample size of pups**

The Center designed its captive research program to include two adult female sea lions that would be bred for three consecutive years to produce up to six pups. Years two and three are particularly important because, if all goes according to plan, the females would be nursing pups and supporting a fetus at the same time and thus experience reproductive stresses similar to those incurred by sea lions in the wild. However, the Center currently has three females that could be used in its breeding program, and therefore it has the capacity to produce up to nine pups during the three-year period. For that reason, the Center is requesting that it be allowed to increase the sample size of pups from six to nine.

### **Adding two transfers of sea lions**

The Center is authorized to transfer six sea lions in conjunction with this program, including two adult females and four offspring. It has used four of those transfers for adult animals and is requesting two additional transfers to bring the offspring number back to four. Those additional transfers would allow the Center to increase sample size by working with cooperative facilities.

### **Adding a second male**

In addition, the Center has requested to add a second male (currently a juvenile) for breeding purposes, primarily because of the advancing age of its current male. Once this male is adult age, he would be housed with the other male and females as a breeding population. Until that time, he would be housed separately from the adult females during the breeding season.

### **Adding a separate take table for aging sea lions**

Finally, two of the Center's sea lions are more than 17 years of age. As such, procedures for those sea lions would be decreased from 12 to 4 health exams per year and invasive procedures would be eliminated (see Table 8 of the application). Because those sea lions are advancing in age, the Center is requesting two age-related mortalities. The Commission understands that the sea lions are at increased risk because of their age. For that reason, and because they are being held under a research permit currently, the Commission agrees that it is appropriate to add two additional age-related mortalities.

### **Using seals in multiple studies**

Finally, in its review of this amendment request, the Commission noted changes in the Center's research protocols intended to reduce the impact of multiple studies on the same captive animals. In the past, the Commission has raised questions regarding the possible skewing of research results by using the same subjects in multiple studies. For example, it is possible that stress from multiple handlings and procedures might alter reproductive physiology and skew the results of the

Mr. P. Michael Payne  
8 December 2011  
Page 4

Center's reproductive study. The Center's original application indicated that the subject animals would be used "in a variety of research [studies]...many of which are minimally invasive or voluntary in nature; yet all, whether invasive or not, are combined to the maximum extent possible during monthly health assessment exams in order to minimize impact on the animals."

To address the Commission's concern, the Center reviewed its science program, refocused its research on hypothesis-driven studies, limited the number of times that research animals are sampled under anesthesia (once every 30 days), and limited the duration of sampling procedures to one hour. Virtually all of the sampling is by collection of blood, feces, and mucous. The Center allows instrumentation during those procedures, but the instrumentation must occur during regular sampling—no additional periods of sedation are allowed. These changes address the Commission's concern about potential skewing of scientific results and excessive sampling. However, symptoms of stress may be subtle and may not be apparent to the researchers performing the procedures. The husbandry staff and attending veterinarian monitor individuals on a daily basis, know the long-term health trends of individuals, and could alert the researchers to evidence of stress. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service amend Permit No. 14334 as requested, provided that it conditions the permit to require researchers conducting studies at the Center to consult with its husbandry staff prior to any research procedures to ensure the sea lions have not been exhibiting signs of stress (e.g., decreased activity, loss of appetite).

Please contact me if you have any questions concerning the Commission's recommendation.

Sincerely,



Timothy J. Ragen, Ph.D.  
Executive Director