

Adaptive Management of Monk Seals in the Main Hawaiian Islands

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The endangered Hawaiian monk seal population contains about 1,300 to 1,400 seals, most of which occur in the Northwestern Hawaiian Islands (NWHI). Increasing reports of monk seal sightings and births in the main Hawaiian Islands (MHI) since the mid-1990s indicates that seal numbers in this region may be growing (Baker and Johanos in review). Although higher numbers of monk seals would ultimately reduce the risk of extinction, their occurrence in the MHI also raises a suite of new challenges for enhancing recovery of the species.

There is a growing body of scientific knowledge on which to base management decisions for enhancing the recovery of monk seals. Research activities have focused on four general categories: population dynamics, biology, foraging ecology, and health/disease. Most of the available information has been collected in the NWHI, and although relatively little is known about seals in the MHI, inferences can be made from the available information to direct conservation and protection efforts. There is, however, an apparent need to improve our knowledge of the MHI monk seals in the four categories listed above. Additionally, the high probability of humans being able to observe monk seals ~~An the wild=~~represents a unique opportunity to use the monk seal as a focal point for educating the public about the importance of establishing a stronger stewardship ethic toward our marine resources. Interaction between monk seals, humans, their pets and other domestic or wild animals also represents significant management concerns (detailed in other background papers) and requires immediate and sometimes innovative actions.

Given the current status of the monk seal population in the MHI and the potential for both positive and negative interactions, a comprehensive management/research plan will be prepared for the conservation and protection of monk seals in this region. In order to initiate such a plan, we must rely on the available knowledge, learn from our previous efforts, and adjust or modify management and research approaches according to program objectives and new information acquired as the project proceeds. This is commonly referred to as Adaptive Resource Management (ARM). It provides a process for adjusting management in response to information provided through research and monitoring. Such an approach is designed to continually evaluate the efficacy of management actions whenever there is uncertainty about the outcome.

The type of adaptive management contemplated for the monk seal is referred to as passive adaptive management, whereby management decisions are always based on what will achieve

the greatest benefit to the resource (monk seals), and managers learn by doing over the life of the project. (This contrasts with active adaptive management, in which some management actions are conceived as experiments for the additional knowledge they will contribute). Whenever a situation arises that requires management oversight or intervention, the appropriate course of action will be determined according to the overarching goals of enhancing monk seal population growth while promoting public education and stewardship and minimizing risks to monk seals and all stakeholders. Undoubtedly, managers will learn a great deal in the early phases of this project and they will capitalize on that knowledge to refine protocols for future management responses. Therein lies the real key to successful adaptive management: systematic evaluation of the results of each management decision, so that management strategies are iteratively refined. Such an approach may be viewed as an experimental management program and if designed properly, can benefit all stakeholders.

1. Components of the Monk Seal Research and Management Plan in the Main Hawaiian Islands

Efforts to enhance recovery of the Hawaiian monk seal require the integration of research, management, and education. Research on monk seals in the MHI will be needed to identify the factors influencing population growth and, where feasible, to develop mitigation strategies. An active research plan is needed to monitor trends and evaluate management actions. Fundamental components of such a plan include the characterization of the population dynamics, biology, foraging ecology, and health/disease of monk seals in the MHI. Data on all these components are valuable for developing appropriate management policy specific to the MHI.

A key element of the management plan is the establishment of a closely linked monk seal sighting program that utilizes the resources of all stakeholders. The immediate benefits from such a network are twofold: collection of information on monk seal use of terrestrial habitat will provide a basis for evaluation of management actions, and the presence of a monk seals on beaches shared with humans will be used as an impromptu opportunity to educate the public about the importance of monk seals and the habitat in which they live. Each report of monk seal haulout events will be evaluated according to the potential risks and benefits, and a plan of action will be determined in accordance with predetermined protocols. These management protocols will be based on data acquired from the extensive research in the Northwestern Islands, input from interested parties (from this workshop and other forums), and attention to the legal framework that guides the recovery of this endangered species. The efficacy of every significant management action will be evaluated through a comprehensive monitoring program that includes both the sighting network described above and case-specific research.

2. Adaptive Management as it Applies to Monk Seal Management in the Main Hawaiian Islands

One of the tenets of ARM is that virtually all management actions are accompanied by an element of uncertainty. The extent of the uncertainty is inversely related to the knowledge base that applies to the current situation. That is, familiar situations are inherently less uncertain (and

less risky) than novel ones for which there is no precedence to help anticipate the outcome of a proposed management action. Initially, there will be considerable uncertainty surrounding monk seal management in the MHI. Many situations that may arise in the MHI (such as a monk seal female rearing a pup on a crowded beach) are fundamentally unlike any situation biologists working in the Northwestern Islands have previously confronted. But over time the active research and monitoring program will assemble the data, collective knowledge, and experience needed to make wise management decisions.

The applicability of ARM to monk seal management in the MHI is that the uncertainty surrounding many aspects of monk seal biology in the MHI must be acknowledged, but management must not be frozen until that uncertainty is eliminated. ARM recognizes that management is necessary and appropriate even in light of imperfect knowledge. Management policy will be developed using the best available information, actions will be undertaken where necessary, and a focused research and monitoring program will be in place to learn all that can be learned from the outcome. This type of approach to the management of monk seals in the MHI allows greater flexibility and creativity in resolving complex problems than would be the case if management were constrained by rigid decision trees and protocols. Ultimately, this approach benefits all of the stakeholders. Facilities for ongoing interaction with interested parties ensure that no individuals or groups are excluded from the decision-making process. Thus, there will be a feedback loop for modifying and maintaining the management action plan.

There are four primary components to achieve scientifically based adaptive management. Each must be incorporated into the management plan for monk seals in the main islands. The first is a clear statement of goals and objectives (both short-term and long-term) for the management of monk seals. These will be decided jointly by the agencies with designated management authority for monk seal recovery, with ample opportunity for input from interested parties and stakeholders. Certainly the core long-term goal is population recovery for the monk seal. There are, however, other important goals, foremost among them the acceptance of monk seals in the MHI by all affected stakeholders. Short-term objectives include such factors as reducing the risk of disease transmission to monk seals, people, and pets; minimizing risks to monk seals and people from undesirable interactions; and others. These goals and objectives will be identified and articulated using input from this workshop and other forums.

The second component of scientific adaptive management is the identification of all viable management options that may be exercised in any special circumstance. Again, these options will be decided upon with the involvement of all interested parties but must be consistent with the legal framework that guides monk seal recovery.

The next element in scientific adaptive management is a set of theories or hypotheses about how the monk seal population will react to different management strategies. In the scientific world, this is known as a model. Although biologists know a great deal about monk seal biology and behavior from the many years of work in the Northwestern Hawaiian Islands, there is (as mentioned above) considerable uncertainty about many aspects of the biology of monk seals that occupy the MHI. Here is where the focused research initiative comes into play.

Finally, for effective adaptive management of monk seals in the MHI, there must be a highly organized monitoring program that involves not only agency researchers but also the

cooperation of all other stakeholders, residents, and visitors. Sometimes the response to particular management strategies will be subtle, and it may require input from the entire community to assess whether monk seal management is moving in the direction prescribed by the stated goals and objectives.

ARM is an important technique that complements other more traditional wildlife conservation efforts. Here we detail the steps necessary to implement an adaptive plan for management of monk seals in the MHI (Fig. 1). The success of the plan will be dependent on the support required to run the program, the long-term commitment of key players to enhance monk seal recovery, and the creative use of this opportunity to benefit all stakeholders.

Figure 1: Flowchart for adaptive management of monk seals in the main Hawaiian Islands

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