Hawaiian Monk Seal
(Monachus schauinslandi)

5-Year Review:
Summary and Evaluation

NMFS PIFSC Photo

National Marine Fisheries Service
Pacific Islands Regional Office
Honolulu, Hawaii

August 2007

5-YEAR REVIEW
Hawaiian monk seal / *Monachus schauinslandi*

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional or Headquarters Office: Pacific Islands Regional Office - Chris E. Yates, Assistant Regional Administrator for Protected Resources, (808) 944-2235

Cooperating Science Center(s) (NMFS only): Pacific Islands Fisheries Science Center – Bud Antonelis, Protected Species Division Chief, (808) 983-5710

1.2 Methodology used to complete the review:

This review was a team effort with the NMFS Office of Protected Resources, the Pacific Islands Regional Office, and the Pacific Islands Fisheries Science Center. The draft *Recovery Plan for the Hawaiian Monk Seal* was the primary document and resource for the information and data in this review.

1.3 Background:

1.3.1 FR Notice citation announcing initiation of this review: 72 FR 2650, January 22, 2007 - Endangered and Threatened Species: Initiation of a 5-Year Review of the Hawaiian Monk Seal

1.3.2 Listing history

Original Listing
FR notice: 41 FR 51611
Date listed: November 23, 1976
Entity listed: Species
Classification: Endangered

1.3.3 Associated rulemakings: On April 30, 1986, (51 FR 16047), critical habitat was designated. Critical habitat was extended on May 26, 1988 (53 FR 18988).

1.3.4 Review History:
This is the first, formal 5-Year Review for the Hawaiian Monk Seal.

1.3.5 Species' Recovery Priority Number at start of 5-year review: The Hawaiian monk seal has a recovery Priority Number of One, based on criteria in the Recovery Priority Guidelines (55 FR 24296, June 15, 1990), that describes a high magnitude of threats, high recovery potential, and the potential for economic

conflicts while implementing recovery actions. The magnitude of threats is considered to be high based on the rapid population decline that has persisted for over 20 years. Although our understanding of the most serious threat of food limitation is improving, the recovery potential is also high because the mitigation of other critical threats are known and in place. One such example is that the species' current core habitat in the NWHI is well-protected, and if foraging conditions improve, then recovery can be expected. In addition, the recovery potential can be considered high because the MHI represent a large amount of under-occupied habitat, which could support a larger population of seals if appropriate management actions were in place. Finally, economic conflicts exist with fishery interactions and entanglement threats to the monk seals.

1.3.6 Recovery Plan or Outline

Name of plan or outline: Recovery Plan for the Hawaiian Monk Seal (*Monachus schauinslandi*)
Date issued: August 2007
Dates of previous revisions, if applicable: 1983

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?

___X__Yes, go to section 2.1.2.
_____ No, go to section 2.2.

2.1.2 Is the species under review listed as a DPS?

____ ***Yes****, go to section 2.1.3.*
__X__ ***No****, go to section 2.1.4*

2.1.3 Was the DPS listed prior to 1996?

____ ***Yes****, give date and go to section 2.1.3.1.*
____ ***No****, go to section 2.1.4.*

2.1.3.1 Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?

____ ***Yes,*** *provide citation and go to section 2.1.4.*
____ ***No****, go to section 2.1.3.2.*

2.1.3.2 Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?

____ ***Yes****, discuss how it meets the DPS policy, and go to section 2.1.4.*
____ ***No****, discuss how it is not consistent with the DPS policy and consider the 5-year review completed. Go to section 2.4., Synthesis.*

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?

____ ***Yes****, provide citation(s) and a brief summary of the new information; explain how this new information affects our understanding of the species and/or the need to list as DPSs. This may be reflected in section 4.0, Recommendations for Future Actions. If the DPS listing remains valid, go to section 2.2, Recovery Criteria. If the new information indicates the DPS listing is no longer valid, consider the 5-year review completed, and go to section 2.4, Synthesis.*

__X__ ***No****, go to section 2.2., Recovery Criteria.*

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

__X__ ***Yes****, continue to section 2.2.2.*

____ ***No****, consider recommending development of a recovery plan or recovery criteria in section IV, Recommendations for Future Actions, and go to section 2.3., Updated Information and Current Species Status.*

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?

__X__ ***Yes,*** *go to section 2.2.2.2.*
____ ***No****, go to section 2.2.3, and note why these criteria do not reflect the best available information. Consider developing recommendations for revising recovery criteria in section 4.0.*

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and is there no new information to consider regarding existing or new threats)? *(Note: If it can be clearly articulated how recovery criteria address all current threats to the species, evaluating whether recovery and/or downlisting criteria have*

been met in section 2.2.3 may be sufficient to evaluate the species listing classification and no further analysis may be necessary.)

__X__ ***Yes****, go to section 2.2.3.*
____ ***No****, go to section 2.2.3, and note which factors do not have corresponding criteria. Consider developing recommendations for revising recovery criteria in section 4.0.*

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information (*for threats-related recovery criteria, please note which of the 5 listing factors are addressed by that criterion. If any of the 5-listing factors are not relevant to this species, please note that here*)**:**

Biological Downlisting Criteria
None of the biological criteria has been met.

1. Aggregate numbers exceed 2,900 total individuals in the NWHI;
2. At least 5 of the 6 main sub-populations in the NWHI are above 100 individuals, and the MHI population is above 500;
3. Survivorship of females in each subpopulation in the NWHI and MHI is high enough that, in conjunction with the birth rates in each subpopulation, the calculated population growth rate for each subpopulation is not negative.

Threat-based Downlisting Criteria
Threat-based criteria for Factor A has been only partially met with the establishment of the Papahanaumokuakea Marine National Monument (PMNM) but food limitation in the NHWI and human disturbance in the MHI continues; criteria for Factor B1, B2, and B3 have been met at this time but will need to be reevaluated at the time of downlisting; criteria for Factor C1, C2, C3, and C4 have not been met; criteria for Factor D has not been fully met; and criteria for Factors E1 and E2 have not been fully met.

The following are identified as **threats** to the recovery of the Hawaiian monk seal. Each threat corresponds to an **ESA Listing Factor**: A-The present or threatened destruction, modification, or curtailment of its habitat or range; B-Overutilization for commercial, recreational, scientific, or educational purposes; C-Disease or predation; D-The inadequacy of existing regulatory mechanisms; E-Other natural or man-made factors affecting its continued existence. The **mechanism** of each threat either directly reduces the survivorship of monk seals, indirectly reduces survivorship, or a combination of both. The **most vulnerable age-classes** are listed for each threat, as well as the **frequency** of each threat's occurrence. The **certainty** of the threat's impact is rated as high is there is strong certainty that the issue is a threat to monk seals and low if it is not certain that it is a serious threat. This information is used as evidence to rank the **relative impact** of the threats as Crucial, Serious or Moderate. Finally, the **potential for mitigation** is evaluated and ranked as low, medium or high.

Threat	ESA Listing Factor	Mechanism	Most Vulnerable Age-Class	Frequency of Threat Occurring	Certainty of Impact	Relative Impact to Recovery	Potential for Mitigation
Food limitation	A	Direct	Pups & Juveniles	High	High	Crucial	Low (in field) High (captive care)
Entanglement	E	Direct	Pups & Juveniles	High	High	Crucial	Medium
Shark Predation	C	Direct	Pups	High	High	Crucial	Medium
Infectious Disease	C	Direct	All Age-classes	Low	Low	Serious	Low
Habitat Loss	A	Indirect	All Age-classes	High	High	Serious	Low
Fishery Interaction	D	Direct & Indirect	All Age-classes	Medium	High	Serious	Medium
Male Aggression	E	Direct	Immature & Adult Females	Low	High	Serious	Medium
Human Interaction	B	Direct	All Age-classes	Medium	High	Serious	Medium
Biotoxins	E	Direct	All Age-classes	Low	Low	Moderate	Low
Vessel Groundings	A	Indirect	All Age-classes	Low	Low	Moderate	High
Contaminants	A	Direct & Indirect	All Age-classes	Low	Low	Moderate	Low

Factor A. Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

Criteria: Measures are in place to manage human factors affecting food limitations, habitat loss and contaminants in the NWHIs. Management measures are also in place to a) minimize human disturbance of monk seals that haul-out on beaches in the MHI, and b) protect major monk seal haul-out habitat in the MHI.

Hawaiian monk seal juvenile survival has declined most dramatically with significantly smaller pup and juvenile sizes, consistent signs of food limitation. In recent years, low juvenile survival, in part due to food limitation, has been evident at all NWHI subpopulations. Targeted research is urgently needed to explicitly link survival to prey abundance, foraging behavior, diet and juvenile condition. There continues to be a critical need for strategic foraging ecology research program linked to monk seal demography. Because most of the monk seal population occurs in the NWHI, this crucial threat continues to be of highest concern.

Recent loss of terrestrial habitat remains an issue of concern in the NWHI, especially since all of the observed NWHI habitat use by monk seals in the NWHI falls within 200 km of islands and atolls. In addition, monk seals are known to forage on benthic areas in the NWHI to at least 500 m in depth. Thus, the habitat and range extend a significant distance from the occupied islands and involve relatively deep benthic areas. In June 2006, the NWHI Papahanaumokuakea Marine National Monument (PMNM) (71 FR 51134, August 29, 2006) was established. The boundary of the PMNM includes approximately 140,000 square miles of emergent and submerged lands and waters of the NWHI, providing protection for the Hawaiian monk seals' marine habitat via fishing prohibitions and regulations. As stated earlier, the PMNM provides the highest form of national, marine environmental protection for the Hawaiian monk seals' NWHI marine habitat. However, whether this protection is sufficient to manage food limitation is unclear.

Most beaches in the MHI that likely are used by Hawaiian monk seals historically are now used to varying degrees by people for recreational purposes. Reoccupation of the MHI by Hawaiian monk seals will depend in large part on the effectiveness of efforts to (1) protect seals from people and animals using popular recreational beaches in the MHI and (2) ensure that monk seals are able to use beaches where human access is more limited.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Criteria:

1. Procedures, including data collection and analyses, are in place to evaluate and ensure that scientific research on Hawaiian monk seals, including their observation, handling, and instrumentation, will not cause significant adverse impacts on monk seal survival, behavior, or population growth.

2. Procedures are in place to ensure that any proposed NWHI operations that may increase seal disturbance or threaten survival will be reviewed and carefully scrutinized, and that all applicable laws protecting monk seals and their habitat have been used and enforced.
3. Management and permitting measures are in place to ensure that people, including scientists and research teams, visiting the Midway Islands or any other atoll in NWHI do not disturb monk seals or restrict their haul-out habitat in ways that could adversely affect monk seal survival, behavior, or population growth.

Based on the best available and most current information, the overutilization for commercial, recreational, scientific or educational purposes is determined to not be a current or potential threat to the recovery of the Hawaiian monk seal. Any proposed NWHI operations that may increase seal disturbance or threaten survival, such as nearshore ship traffic, beach use, noise, unnecessary research or any other way negative effect on the marine or terrestrial habitat of the monk seal, will continue to be scrutinized carefully to ensure that the recovery of the monk seal population is not hampered by the activity. To accomplish this, all applicable laws protecting monk seals and their habitat will continue to be enforced. An example of such NWHI activities is the future recreational and visitor activities at the Midway Islands, the impacts of which will be monitored and addressed as they relate to the recovery of Hawaiian monk seals.

Research to date has found no detectable effects of handling and instrumentation on Hawaiian monk seal survival or movement away from the NWHI subpopulation where they were tagged, but the potential for cumulative impacts are possible especially for monk seals that are handled multiple times during their lifetime. Steps are currently taken and will continue to ensure that monk seal observation, handling, and instrumentation have negligible impacts on animals and population growth.

Factor C. Disease or Predation

Criteria:

1. Credible measures for minimizing the probability of introduction of diseases to any of the NWHI subpopulations, or the spread of diseases from the MHI to the NWHI, or importation of diseases that are not yet present in Hawaii are in place.
2. Contingency plans are in place to respond to a disease outbreak or introduction should this occur.
3. Research measures are in place to monitor population size, vital rates, and possible disease outbreaks or disease introductions, in all the subpopulations.
4. Management measures are in place to minimize shark predation and are demonstrably effective at maintaining predation sources at low enough levels to be consistent with continued meeting of the birth rate and survivorship criterion.

The concern about the presence of diseases in monk seal populations is serious and based on past mortality events in the NWHI. Recent MHI monk seal deaths have heightened concern about monk seal exposure to diseases that they have not previously encountered, such as leptospirosis, toxoplasmosis, and West Nile virus. Infectious diseases in

Hawaiian monk seals could result from: contact with terrestrial domestic, feral and wild animals, humans or their fomites; stress causing activation of sub-clinical previously undetected disease; and exposure of monk seals to marine mammals infected with an agent, or exposure to infected vectors such as mosquitoes. The lack of antibodies in monk seals to these diseases makes them extremely vulnerable to potential infection. While the frequency of disease outbreaks may be rare, their potential devastating effects, should they spread throughout the population, makes infectious diseases a serious threat.

There has been a significant increase in shark predation on monk seal pups, and shark-related injuries and mortalities of pre-weaned pups at French Frigate Shoals (NWHI) have been conspicuously higher that at other sites. Sharks are known to injure and kill Hawaiian monk seals, and monk seal remains have been found in the stomachs of tiger sharks and Galapagos sharks. This remains a crucial threat and an ongoing source of mortality for Hawaiian monk seals in the NWHI.

Factor D. Inadequacy of Existing Regulatory Mechanisms

Criteria: Measures are in place to manage fishery interactions and are demonstrably effective at reducing these threats and maintaining fishery-related sources of mortality or stress at decreasing or low levels that are consistent with continued meeting of the birth rate and survivorship criterion.

The principle, direct fishery interaction threat currently facing monk seals are MHI recreational fisheries, particularly gillnets and shore-cast gear, which are managed by the State of Hawaii and known to cause monk seal mortalities. Two monk seals drowned in recreational gillnets on Oahu within the past year. Gillnets will still be used in other areas, and enforcement of the new regulations will be important to ensure that the threat is actually reduced. There is a continuing need for intervention for Hawaiian monk seals in the MHI to remove embedded hooks from recreational fishing; however this effort does not remedy the interaction problem itself. More management measures and enforcement of those measures are needed to ensure that this serious threat is reduced.

Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence

Criteria:

1. Management measures are in place to control male aggression, entanglement, biotoxins, and other sources of human-caused mortality or stress. These measures are demonstrably effective at maintaining these threats at low enough levels to be consistent with continued meeting of the birth rate and survivorship criterion.
2. The causes of the anthropogenic threats to the species are clearly identified and are well-enough understood to be controlled or mitigated, and any newly identified threats are controlled adequately before downlisting.

Other sources of natural or manmade factors, including male aggression, entanglement and biotoxins, should be reduced prior to downlisiting. The primary cause of adult female mortality affecting the recovery potential in the monk seal population during the

1980s and early 1990s was injury and often death of female monk seals caused by multiple male aggression, or "mobbing" attacks. While this trend tends to be episodic, it is usually limited in geographic area at any given time. The methods for mitigating it have been successful, but this is still considered a serious threat to Hawaiian monk seals.

Marine debris and derelict fishing gear have been well documented to entangle monk seals, and monk seals have one of the highest documented entanglement rates of any pinniped species. Marine debris and derelict fishing gear are chronic forms of pollution that continue to affect the NWHI. This remains a crucial threat especially since the number of monk seals found entangled has not changed nor has there been a reduction in the accumulation rates of marine debris in NWHI.

Biotoxins such as ciguatera can cause mortality in phocids, but its role in mortality of monk seals was implicated and not confirmed, remaining unclear due to the lack of assays for testing tissues and the lack of epidemiological data on the distribution of toxin in monk seal prey. This continues to be a moderate threat with possible localized impacts, but is not considered to be a serious or immediate cause of concern.

2.3 Updated Information and Current Species Status

The 2007 Recovery Plan for the Hawaiian Monk Seal describes the best available and most current information on Hawaiian monk seal biology, habitat, and threats. This information is reflected in the recovery criteria taken from the Recovery Plan and used in Section 2.2 of this 5-year review. Please refer to the Recovery Plan for a full discussion of updated information and current species status under the ESA, including an analysis of ESA section 4(a)(1) listing factors.

2.4 Synthesis

The Hawaiian monk seal population is in a decline and only around 1200 monk seals remain. Modeling predicts the species' population will fall below 1000 animals in the next five years. Like the extinct Caribbean monk seal and the critically endangered Mediterranean monk seal, the Hawaiian monk seal is headed to extinction if urgent action is not taken. For more than two decades, great effort has been made to manage, study, and recover the Hawaiian monk seal. However, actions to date have not been sufficient to result in a recovering population. The species status would undoubtedly have been worse but for these actions. Nonetheless, significant threats face this species:

- Very low survival of juveniles and sub-adults due to starvation (believed to be principally related to food limitation)
- Entanglement in marine debris has and continues to result in significant levels of mortality.
- Predation of juvenile seals by Galapagos sharks has significantly increased.
- Human interactions have the potential for negative impact in the MHI, including recreational fishery interactions, mother-pup disturbance on popular beaches, and exposure to disease
- Hawaiian monk seal haul-out and pupping beaches are being lost to erosion in the NWHI, and monk seal prey resources in the NWHI may have been reduced as a result of climate cycles and other factors.
- Potential disease outbreaks could have a devastating effect due to small population size and limited geographic range.

Due to low juvenile survival and an ageing, breeding female population, there will not be sufficient replacement of breeding females and birth rates subsequently will decline. This underscores the irony of past and current efforts to reduce these threats in that initial success may only slow a process of decline and even further actions will be required to reverse the decline and prevent the extinction of this species. Recovery of the Hawaiian monk seal depends upon a range of comprehensive actions detailed in this Recovery Plan, as well as the full participation and support of all federal, state and private stakeholders. These actions should be pursued aggressively to prevent the extinction of this species, and funding decisions should give highest priority to actions that will contribute directly to mitigating impacts and sources of mortality that reduce survival rates of Hawaiian monk seals, particularly females and juveniles. Therefore, the recommended classification for Hawaiian monk seals is to remain the same as Endangered.

3.0 RESULTS

3.1 Recommended Classification:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist (*Indicate reasons for delisting per 50 CFR 424.11):*
____ *Extinction*
____ *Recovery*
____ *Original data for classification in error*
__X__ No change is needed

3.2 New Recovery Priority Number: No change

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

While recommendations within the 2007 Recovery Plan for the Hawaiian Monk Seal are many and detailed, there are four key actions required to alter the trajectory of the Hawaiian monk seal population and to move the species towards recovery:

1. Improve the survivorship of females, particularly juveniles, in sub-populations of the NWHI. To do this requires the following:
   - maintaining and enhancing existing protection and conservation of habitat and prey base;
   - targeting research to better understand the factors that result in poor juvenile survival;
   - intervening where appropriate to ensure higher survival of juvenile and adult females;
   - continuing actions to protect females from individual and multiple male aggression and to prevent excessive shark predation; and
   - continuing actions to remove marine debris and reduce mortality of seals due to entanglement.

2. Maintain the extensive field presence during the breeding season in the NWHI. Field presence is critical not just to the monitoring and research efforts, but also to carry out the active management and conservation of Hawaiian monk seal sub-populations in these areas.

3. Ensure the continued natural growth of the Hawaiian monk seal in the MHI by reducing threats including interactions with recreational fisheries, disturbance of mother-pup pairs, disturbance of hauled out seals, and exposure to human and domestic animal diseases. This should be accomplished with coordination of all federal, state, local and non-government parties, volunteer networks, and increased outreach and education in order to develop a culture of co-existence between humans and seals in the MHI.

4. Reduce the probability of the introduction of infectious diseases into the Hawaiian monk seal population.

5.0 REFERENCES

- National Marine Fisheries Service. 2007. Recovery Plan for the Hawaiian Monk Seal (*Monachus schauinslandi*). National Marine Fisheries Service, Silver Spring, MD. 165 pp.
- Gilmartin. W. G. 1983. Recovery plan for the Hawaiian monk seal, *Monachus schauinslandi*. In cooperation with the Hawaiian Monk Seal Recovery Team. U.S. Dep. Commer. NOAA, NMFS Tech. Rep., 29 p. + tables, appendix.
- Gilmartin, W. G., and D. J. Alcorn. 1987. A plan to address the Hawaiian monk seal adult male "mobbing" problem. U.S. Dep. Commer., NOAA, NMFS, Southwest Fish. Sci. Cent. Rep. H-87-12, 24 p
- Gilmartin, W. G. 1990. Hawaiian monk seal work plan, fiscal years 1991-1993. U.S. Dep. Commer., NOAA, NMFS, Southwest Fish. Sci. Cent. Rep. H-90-14, 43 p.
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- Gilmartin, W. G. 1993b. Hawaiian monk seal work plan, fiscal years 1994-1996. U.S. Dep. Commer., NOAA, NMFS, Southwest Fish. Sci. Cent. Rep. H-93-16, 83 p.
- Gilmartin, W.G., and G.A. Antonelis. 1998. Recommended recovery actions for the Hawaiian monk seal population at Midway Island. NOAA-TM-NMFS-SWFC-253.

NATIONAL MARINE FISHERIES SERVICE
5-YEAR REVIEW
Monachus schauinslandi

Current Classification: Endangered

Recommendation resulting from the 5-Year Review

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
_X__ No change is needed

Review Conducted By: National Marine Fisheries Service
Pacific Islands Regional Office

REGIONAL OFFICE APPROVAL:

Lead Regional Administrator, NOAA Fisheries

Approve: William T Hogarth Date: 07/25/07

The Lead Region must ensure that other Regions within the range of the species have been provided adequate opportunity to review and comment prior to the review's completion. Written concurrence from other regions is required.

Cooperating Regional Administrator, NOAA Fisheries

_____Concur _____ Do Not Concur

Signature_____ Date_____

HEADQUARTERS APPROVAL:

Assistant Administrator, NOAA Fisheries

__✓__Concur _____ Do Not Concur

Signature Earl Comstock Date 8/8/07