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HAWAIIAN MONK SEAL REPRODUCTION AND INJURIES ON LISIANSKI ISLAND, 1982

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**U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Center**

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ABSTRACT

Data on the Hawaiian monk seal, Monachus schauinslandi, including pup production, pupping locations, and injuries at Lisianski Island in 1982 are presented. Twenty-eight pups were born, of which 26 survived to weaning. Of the observed births, 75% occurred on the east side of the island. Average nursing period for 14 mother-pup pairs was 37.4 days. One exchange of pups was observed. Ten seals were injured while personnel were present on the island. Four of these injuries were attributable to attacks by adult male seals.

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INTRODUCTION

A study of the endangered Hawaiian monk seal, Monachus schauinslandi, was conducted by personnel from the National Marine Fisheries Service (NMFS), Southwest Fisheries Center Honolulu Laboratory, on Lisianski Island from 17 March to 14 September and 26 October to 22 November 1982. This report summarizes reproductive and injury data collected during the 1982 field season on Lisianski Island. Other monk seal studies conducted concurrently by NMFS researchers at Lisianski Island are reported elsewhere (Schlexer 1984; Stone 1984; Johanos;¹ Henderson and Johanos²).

Comprehensive reproductive and injury data have not been collected on Lisianski Island in the past, and pup production has never been precisely determined before the current study. Surveys that include pup totals were made periodically since 1951 (summarized in Clapp and Wirtz 1975; Johnson et al. 1982), but data collected before 1980 were obtained during short visits or aerial surveys. Pups were not individually identified, and the number reported was a minimum reflecting the highest pup beach count. In 1980, a field camp was established on Lisianski Island from 4 May to 11 June, during which individual parturient females and pups were identified by natural markings and location. At least 22 pups were born that year (DeLong³). The 1980 field camp did not extend to the end of the pupping season, however, and it is likely that more pups were born after the camp disbanded.

AREA AND METHODS

Area

Lisianski Island (lat. 26°02'N, long. 174°00'W) is a low coral-sand island within the Hawaiian Archipelago, located approximately 925 nmi northwest of Honolulu. The geology, vegetation, and history of Lisianski Island is described in detail by Clapp and Wirtz (1975).

The perimeter of Lisianski Island was divided into 49 sectors of nearly equal size for the purpose of defining location in data collection (Fig. 1).

¹Johanos, T. C. 1984. Hawaiian monk seal association patterns on Lisianski Island: 1982 pilot study results. U.S. Dep. Commer., NOAA Admin. Report. H-84-18, 12 p.

²Henderson, J. R. and T. C. Johanos. Effects of tagging on weaned Hawaiian monk seal pups. Manuscr. in prep. Southwest Fish. Cent., Honolulu Lab., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96812.

³R. L. DeLong. Northwest and Alaska Fish. Cent., Natl. Mar. Fish. Serv., NOAA, Seattle, WA 98115, pers. commun. June 1986.

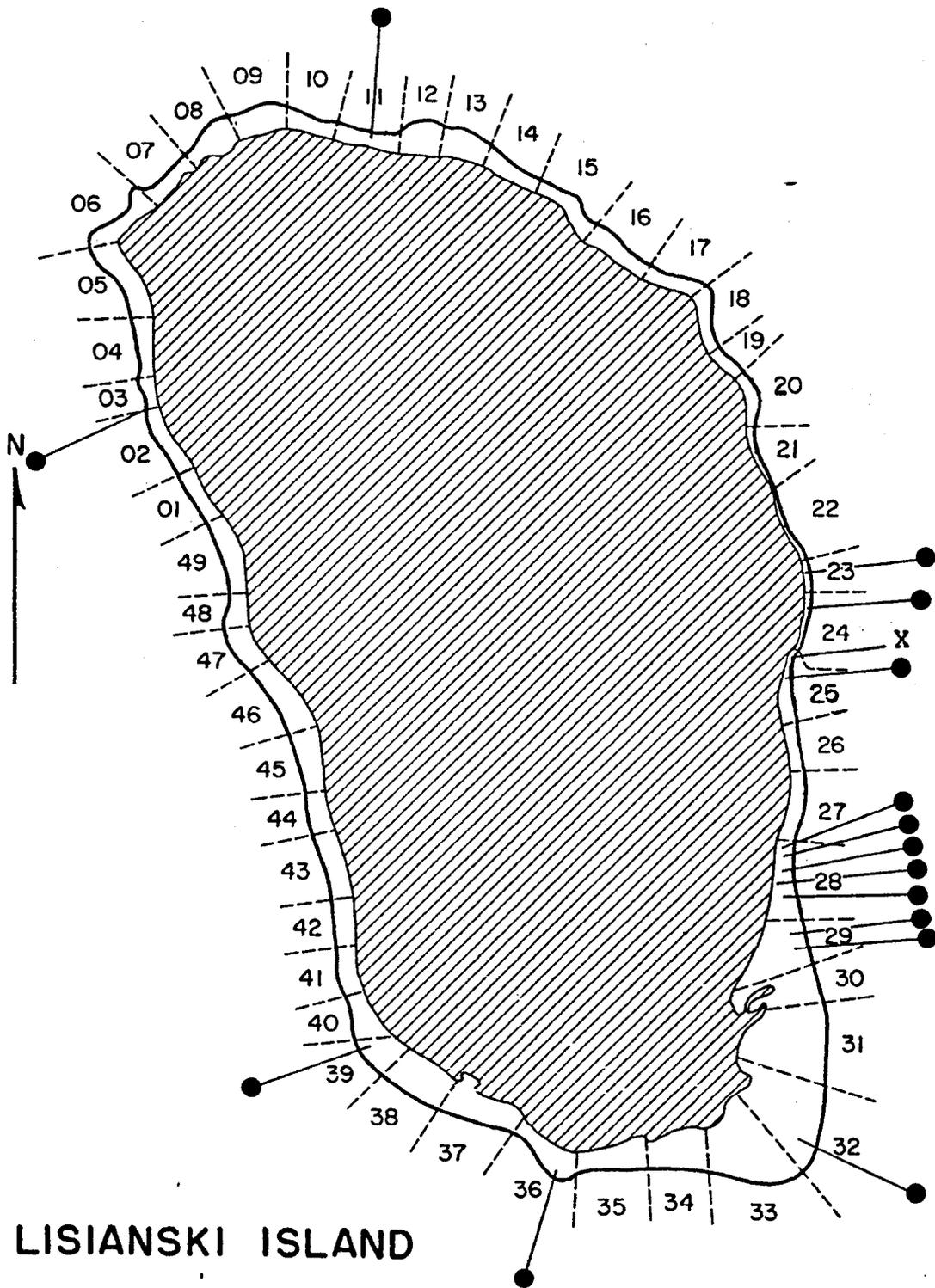


Figure 1.--Map of Lisianski Island showing 49 sectors, known pupping sites, and the location of a mummified pup carcass, 1982 (● = pupping site, X = location of the carcass).

Bleach and Scar Identification

All individuals in the Lisianski population were identified in 1982 by either natural markings or applied bleach marks. Identified animals and methods used are the same as reported by Stone (1984). His identification numbers, however, have been prefixed with the letter "G" in this report.

Marking and Tagging Pups

Pups were bleach-marked as soon as possible postweaning, and 50% of the weaned pups were also tagged. Pup tagging, measurements, and the protocol for determining which pups received tags are described in Henderson and Johanos (footnote 2).

Daily Monitoring

The perimeter of Lisianski Island was walked at least four times daily from 21 March to 13 September and 26 October to 22 November except for single circuits on 3 days (footnote 2). Data were collected by Doris J. Alcorn, C. Edward Bowlby, John R. Henderson, Thea C. Johanos, Fredrick V. Schlexer, and H. Sheridan Stone. In addition to collecting data for studies reported elsewhere, observers also monitored noteworthy events such as births, weanings, and the appearance and progress of injuries.

RESULTS AND DISCUSSION

Reproduction

Pup Production and Survival

At least 28 pups were born in 1982; 16 males, 11 females, and one of undetermined sex (Stone 1984). Pup survival was fairly high; 24 of 28 pups (86%) were still observed regularly in November 1982. Two pups (G049 and G051) died at or near birth, one pup (G021) died when about 5 months old, and another pup (G023) was last seen on September 8 when about 7 months old (Stone 1984). The latter pup has not been subsequently resighted at any location within the Northwestern Hawaiian Islands, and is presumed dead. Further details on the mortalities and disappearance are presented in Stone (1984).

Time and Location of Births

At least 13 pups were born before the field season began; 3 weaned pups, 9 nursing pups, and part of a mummified pup carcass were present when observers arrived on 17 March. The carcass consisted of only a few bones and scraps of black natal pelage. The last pup was born on 21 June (Table 1).

Figure 1 depicts the locations of the 15 births which occurred after 17 March and the location at which the mummified carcass was found. Assuming the carcass was located at or near the birth location, 12 of 16 births (75%) occurred on the east side of the island (sectors 17-32).

Table 1.--Summary of Lisianski Island pups, 1982
(F = female, M = male, Sec = sector, ID = identification).

ID No.	Green tag		Sex	Date tagged	Measurements at tagging (cm)		Birth		Weaning		Nursing period (days)	Mother ID
	Left	Right			Girth	Length	Date	Sec	Date	Sec		
G000	--	--	M	--	--	--	--	--	--	--	--	--
G001	--	--	M	--	--	--	--	--	3/26	20	--	--
G002	--	--	M	--	--	--	--	--	3/28	24	--	GA33
G003	--	--	F	--	--	--	--	--	4/11	25	--	GA37
G004	--	--	M	--	--	--	--	--	4/19	25	--	GA38
G005	--	--	M	--	--	--	--	--	4/26	20	--	GA35
G006	--	--	M	--	--	--	4/12	23	5/21	26	35	GA29
G007	--	--	F	--	--	--	4/13	11	5/16	11	33	GA42
G008	--	--	F	--	--	--	4/23	28	6/03	28	41	G105
G009	--	--	F	--	--	--	5/03	36	6/07	40	35	G103
G010	--	--	M	--	--	--	5/08	29	6/18	28	41	GA55
G011	--	--	M	--	--	--	5/19	32	6/25	33	37	GA44
G012	--	--	F	--	--	--	6/21	28	7/26	28	35	GA79
G021*	021	022	M	3/23	91.0	125.0	--	--	--	--	--	--
G023	023	024	M	3/23	105.0	130.0	--	--	--	--	--	--
G025	025	†046	F	3/30	110.0	130.0	--	--	3/29	11	--	--
G027	027	028	F	4/04	100.0	125.0	--	--	4/02	21	--	GA34
G029	029	030	M	4/21	108.0	133.0	--	--	4/20	27	--	GA36
G031	031	032	M	5/01	119.0	141.0	--	--	4/29	20	--	GA01
G033	033	034	F	5/10	112.0	136.0	3/28	24	5/02	25	39	GA12
G035	035	036	F	5/29	102.0	148.0	4/20	39	5/26	41	36	G104
G037	037	038	M	5/29	103.0	126.0	4/20	28	5/27	28	37	G102
G039	039	040	M	6/09	101.0	131.0	4/29	29	6/07	28	39	GA61
G041	041	042	M	6/21	98.0	130.0	5/13	28	6/20	28	38	G101
G043	043	044	F	6/30	96.0	138.0	5/17	28	6/29	28	43	G131
G047	047	048	F	7/05	98.5	124.0	5/31	25	7/04	25	34	GA16
G049‡	--	--	M	--	--	--	4/21	2-3	--	--	--	GA20
G051§	--	--	U	--	--	--	--	--	--	--	--	--

*Found dead 19 June 1982.

†Lost original tag 026, retagged with tag 046 on 27 August 1982.

‡Perinatal pup mortality.

§Pup mortality before 17 March 1982.

Pup Exchange and Resumption of Nursing in "Weaned" Pups

A weaned pup briefly resumed nursing on a foster mother and the foster mother later exchanged natural pups with another female. A chronology of the events surrounding these circumstances follows.

On 28 March adult female GA12 gave birth to a female pup (G033) in sector 24. Two days after parturition, she started nursing a "weaned pup" (G002) along with her natural pup; dual nursing continued for 2 days (Alcorn and Henderson 1984).

On 12 April adult female GA29 gave birth to a male pup (G006) at the northern boundary of sector 23, approximately 75 m north of the GA12-pup pair. The GA29-G006 pair gradually moved south over a period of two weeks, and were adjacent to the GA12-G033 pair from 27-29 April. The exchange

occurred on 27-28 April, although it was not directly observed. Because the pups were of opposite sex, the exchange was detected several days later when the sexes of the pups were checked. On 28 April one of us (JRH) noted that the pup suckling on GA12 (actually GA29's pup G006) appeared to be "grossly underdeveloped" compared to the pup suckling on GA29 (GA12's pup G033). After 29 April, GA29 and pup G033 continued to gradually move south, around a rock promontory into sector 25, where they remained.

On 2 May female GA12 departed, effectively "weaning" GA29's 21-day old pup G006. This pup actively "suckled" on the nipples and penile aperture of two previously weaned pups after the departure of GA12.

At 0940 on 6 May pup G006 was seen to have moved south of the rock promontory into sector 25 and was actively pursuing GA29 (his natural mother), soliciting nursing. By 1000 GA29 accepted and nursed her own male pup, while the female pup G033 (of GA12), which she had been nursing since 27 or 28 April, attempted to suckle another weaned pup. The adult GA29 threatened and vocalized towards GA12's pup, and defended her natural pup (G006) against an approaching adult male. Female GA29 continued to nurse her own pup until 21 May, when she departed and the pup was weaned.

Pup exchanges are not uncommon (Johnson and Johnson 1978, 1981), and may result in premature weaning of underdeveloped pups (and extra nursing for their counterparts) if the pups involved are of widely disparate ages. This exchange is noteworthy in that the prematurely weaned pup was able to reunite with its natural mother, displace its larger counterpart, and nurse for 15 additional days. Total nursing times are as follows:

Adult female GA12: nursed 35 days (including 2 pups for 2 days).
 Adult female GA29: nursed 39 days.
 Pup G006: suckled 35 days.
 Pup G033: suckled 39 days.

Nursing Duration

Complete nursing duration was observed for 14 mother-pup pairs in 1982. Average nursing duration was 37.4 days and ranged from 33 to 43 days.

Injuries

Injuries which occurred while personnel were on the island are listed in Table 2. Ten seals were injured: four received dorsal wounds probably inflicted by adult male seals, two received shark bites, one seal was injured on the rear flipper by the bite of another seal, and three seals sustained injuries of unknown cause. All dorsal wounds were incurred by adult females. None of these 10 wounds resulted in death.

An eleventh injured seal, a subadult female, was present on the island when the field party arrived. She had a severe dorsal injury which probably resulted in her death (Stone 1984).

Table 2.--Monk seal injuries at Lisianski Island, 1982 (A = adult, S = subadult, W = weaned pup; F = female, M = male; P = probable cause, K = known cause).

Date 1982	Size class	Sex	ID	Description of Injury	P/K	Cause
4/08	A	M	--	Hind flipper, tear in webbing and puncture	K	Seal
4/14	A	F	GA20	Posterodorsal; 30 X 30 cm	P	Adult male
4/26	A	F	GA62	Mid-dorsal wound with 15-20 cm diameter abscess	P	Adult male
5/25	A	F	GA18	Dorsal, dimensions unknown	P	Adult male
5/29	W	F	G035	Lost claw and terminal phalanx of 4th digit, right foreflipper	--	Unknown
6/21	S	F	GS17	Partially blinded by injury to left eye; eyeball pushed into head and socket damaged	--	Unknown
6/30	A	M	GA95 ¹	Partial amputation of right hind flipper; phalanges missing; right hip lacerations	P	Shark
7/--	A	F	GA77	Dorsal, dimensions unknown	P	Adult male
7/13	W	M	G002	3-4 small (2 cm) scrapes on left head and neck	--	Unknown
7/17	A	M	GA17	Cookie-cutter bite, right ventral abdomen, 5-10 cm diameter	P	Shark

¹See Stone (1984) for injury details.

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