

Pacific Islands Fisheries Science Center  
Administrative Report H-04-03C

**FORAGING ECOLOGY OF HAWAIIAN MONK SEALS  
(*Monachus schauinslandi*) AT PEARL AND HERMES REEF,  
NORTHWESTERN HAWAIIAN ISLANDS: 1997-1998**

Brent S. Stewart, Ph.D., J.D.  
Senior Research Biologist

Hubbs-SeaWorld Research Institute  
2595 Ingraham Street  
San Diego, CA 92109

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**PREFACE**

This report has been sponsored by the Pacific Islands Fisheries Science Center and provides the results of recent research efforts to ascertain the habitat use and foraging ecology of Hawaiian monk seals in the Northwestern Hawaiian Islands (NWHI). This work is a part of a research project involving a synthesis of all data available on the foraging behavior of Hawaiian monk seals in the NWHI. Subsequent publications of these results will involve a more thorough comparative analysis and interpretation of variation in individual and colony behaviors relative to variation in biotic and abiotic characteristics of marine habitats throughout the NWHI marine ecosystem.

This report was funded by contract AB133F-03-CN-0008. Because this report was prepared by an independent investigator, its statements, findings, conclusions, and recommendation do not necessarily reflect the official views of the National Marine Fisheries Service, NOAA, U.S. Department of Commerce.

George A. Antonelis  
Marine Mammal Research Program  
Protected Species Division  
[Bud.Antonelis@noaa.gov](mailto:Bud.Antonelis@noaa.gov)  
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## 1. Introduction

The Hawaiian monk seal (*Monachus schauinslandi*) is endemic to the Hawaiian Islands Archipelago with principal colonies in the northwestern islands and reefs of the archipelago. Numbers of this species have declined about 11% annually since 1989, owing to low birth rates and poor survival of neonates and juveniles from a variety of known and unknown causes (e.g., Gilmartin and Eberhardt, 1995; Antonelis and Ragen, 1997). The species now numbers around 1,300 to 1,400.

The National Marine Fisheries Service (NOAA, Dept. of Commerce), the U.S. administrative agency charged with overseeing the conservation and management of marine mammals, has posited that reductions in various prey species or alteration of the important biotic and abiotic habitats of Hawaiian monk seals may be among the more important causative factors in the species' decline. Consequently, the National Marine Fisheries Service (SWFSC, Honolulu Laboratory) initiated a research program to test this hypothesis and to construct a regulatory and management regime that may better conserve Hawaiian monk seals while also promoting prudent and effective use of marine resources by human ventures.

As one part of that research program, twenty-four satellite linked transmitters were attached to Hawaiian monk seals at Pearl and Hermes Reef (PHR) from October 25 through November 2, 1997 (Appendix I). The objectives of the study were to:

- a. document the use of geographic and vertical foraging habitats by adult and juvenile monk seals near PHR using satellite-linked radio telemetry technology,
- b. evaluate the comparative performance of satellite-linked radio transmitters of various power outputs and physical design, and
- c. provide data on the foraging ecology of Hawaiian monk seals that breed at PHR (a stable or slight increasing colony) sufficient for comparison with patterns at other declining colonies (e.g., French Frigate Shoals).

## 2. Methods

A satellite linked-radio transmitter (PT = Platform Transmitter Terminal) was glued to the dorsal pelage of each of 6 juvenile (5 male, 1 female) and 18 adult (9 males, 9 females) Hawaiian monk seals at islands within PHR from 25 October through 2 November 1997. All PTTs attached to the adults were capable of recording and transmitting data on depth and duration of dives (in frequency histogram format; Appendix II); effective transmission power output was 400 W. The PTTs attached to juveniles had effective transmission power output of about 250 W.

Data on geographic and vertical movements of seals were collected, through the Argos Data Collection and Location Service (DCLS), either until the instruments failed or their batteries expired or until seals were recaptured and the instruments removed (Appendix III).

The Argos earth-orbiting satellite system and the Argos DCLS are described in detail elsewhere (e.g., Fancy *et al.*, 1988; Harris *et al.*, 1990; Stewart *et al.*, 1989; Stewart, 1997).

### 3. Results and Discussion

#### *Instrument performance and tracking duration*

Two of the 26 PTTs which were scheduled for deployment failed prior to deployment. Of the 24 PTTs that were deployed, 3 (24098, 24102, 24108) malfunctioned from apparently similar cause within 2-33 days of deployment; these 3 were recovered in February 1998 and confirmed to be non-functional. The antenna from one PTT (5421) sheared off at its base of insertion into the PTT housing 66 days after deployment. Contact was lost with 5 seals when the PTTs evidently fell off between 102 and 113 days after deployment (PTTs 5411, 5414, 24101, 24107, 24115 after 104 days, 102 days, 112 days, 108 days, and 113 days of tracking, respectively); one of those PTTs (24107) was later found on the beach at Grass Island. Another three PTTs were removed from juvenile seals in February 1998 because their batteries were expected to expire soon (5412, 5416, 5422).

#### *Foraging movements*

All but one seal foraged either within the fringing reef of PHR or just outside the reef along its northwestern bank (Fig. 1). Moreover, there appeared to be sexual and age-related geographic segregation throughout the monitoring period, though there was a small amount of overlap (Fig. 1). The dispersion of seals' foraging locations and the segregation appeared to be independent of the sites where seals were tagged. Juveniles foraged almost exclusively within the fringing reef of PHR and principally near Southeast Island and North Island (Figs. 1, 2, 3, 4). Adult males foraged mostly just inside the southern rim of the fringing reef and just outside the fringing reef along the northwestern rim (Figures 1, 2, 3, 4), though two adult males (24104, 24108) did range out to about 15 miles of the southeast corner of the fringing reef (Fig. 3). Adult females foraged mostly within the center of the atoll and near the atoll's southwestern opening (Figs. 1, 2, 3, 4).

#### *Diving patterns*

Most dives were to depths of 8-40 m, though there was a secondary mode at 100-120m (Fig. 5). The secondary mode was absent among the three juvenile seals monitored (Figs. 6, 7, 8). Seven of the adult males dove only to depths of 60 m or less (Figs. 9, 10, 11, 12, 13, 16, 17), two (seals 24104 and 24108) made a substantial number of dives to depths of 80-140 m (Figs. 14, 15), and a third mode at 252-552 m was distinguishable in the records of one of those (Fig. 15).

Seven of the adult females rarely dove deeper than 40m (Figs. 18 through 25), whereas one (seal 24112) made a number of dives to depths of 60-140 m (Fig. 26).

The diving patterns of adult males at PHR during the non-breeding season were similar to those reported earlier by DeLong *et al.* (1984) for males during the breeding season at Lisianski Island. They were also generally similar to those reported for adult males foraging around French Frigate Shoals (Siniff and Abernathy, 1998), though fewer of the males at PHR, compared with French Frigate Shoals, made dives deeper than 40 m. Diving patterns of adult females at PHR were similar to those, though generally shallower, of females at French Frigate Shoals (cf. Siniff and Abernathy, 1998).

Overall, seals at PHR appear to forage in relatively shallow waters within or just outside the atoll. Nonetheless, seals appear to segregate by age and sex when foraging within this small atoll. This contrasts with seals at French Frigate Shoals which generally dive deeper, travel greater distances from haulout sites to forage, and do appear to segregate while foraging.

#### **4. Conclusions and Recommendations**

The shallow diving patterns and limited movements of Hawaiian monk seals at PHR suggests that seals may forage predominately on demersal and epibenthic prey and on other fish, cephalopod and invertebrate prey that take refuge in fringing coral reefs. The apparent differences in foraging effort between seals at French Frigate Shoals, where the population is declining, and at PHR, where it is not, suggests that the abundance and distribution of prey resources differs at these two colonies. Simultaneous and complementary studies of foraging patterns of seals at several colonies of various status and of marine resources near each colony are needed to better understand nutrient dynamics in these island marine communities to ensure the viability of the Hawaiian monk seal generally, and to guide management strategies for common use of marine resources by human and non-human predators in the northwestern Hawaiian islands.

#### **5. Acknowledgments**

This study was a collaborative effort between the National Marine Fisheries Service, Honolulu Laboratory, and Hubbs-Sea World Research Institute. The transmitter deployment effort was supported by the NOAA ship *Townsend Cromwell*. M. Craig and R. Boland served as Chief Scientists during the cruise and M. Craig, M. Shaw, K. Raum-Suryan, and C. Monet assisted in all phases of instrument deployment. The contract to Hubbs-Sea World Research Institute was administered by Dr. G. Antonelis at the NMFS Honolulu Laboratory. Drs. G. Antonelis and T. Ragen constructed the initial study design and plans for field effort. The research was authorized under the U.S. Marine Mammal Protection Act (16 U.S.C. §1361 *et seq.*), Scientific Research Permit No. 848-1335.

## 6. Literature Cited

- Antonelis, G.A. and Ragen, T. 1997. Habitat conservation and the Hawaiian monk seal. Pp. 142-149. In: Pinniped populations, Eastern North Pacific: Status, trends and issues (G. Stone, J. Goebel, and S. Webster, eds.). Proceedings of a Symposium of the 127<sup>th</sup> Annual Meeting of the American Fisheries Society, Monterey, California.
- DeLong, R.L., Kooyman, G.L., Gilmartin, W.G. and Loughlin, T.R. 1984. Hawaiian monk seal diving behavior. *Acta Zool. Fennica* 172:129-131.
- Fancy, S.G., *et al.* 1988. Satellite telemetry: a new tool for wildlife research and management. United States Fish and Wildlife Service Resources Publication, 171:1-54.
- Gilmartin, W.G. and Eberhardt, L.L. 1995. Status of the Hawaiian monk seal (*Monachus schauinslandi*) population. *Canadian Journal of Zoology* 73:1185-1190.
- Harris, R.B., *et al.* 1990. Tracking wildlife by satellite: current systems and performance. United States Department of the Interior, Fish and Wildlife Service Technical Report 30:1-52.
- Siniff, D.B. and Abernathy, K. 1998. Investigations of Hawaiian monk seal, *Monachus schauinslandi*, pelagic habitat use: range and diving behavior. Final Report to NMFS/SWFSC, Saltonstall-Kennedy Grant No. NA67FD0058.
- Stewart, B.S., Leatherwood, S., Yochem, P.K. and Heide-Jorgensen, M.-P. 1989. Harbor seal tracking and telemetry by satellite. *Marine Mammal Science* 5:361-375.
- Stewart, B.S. 1997. Ontogeny of differential migration and sexual segregation in northern elephant seals. *Journal of Mammalogy* 78:1101-1116.

Figure 1. Foraging locations of Hawaiian monk seals at PHR.

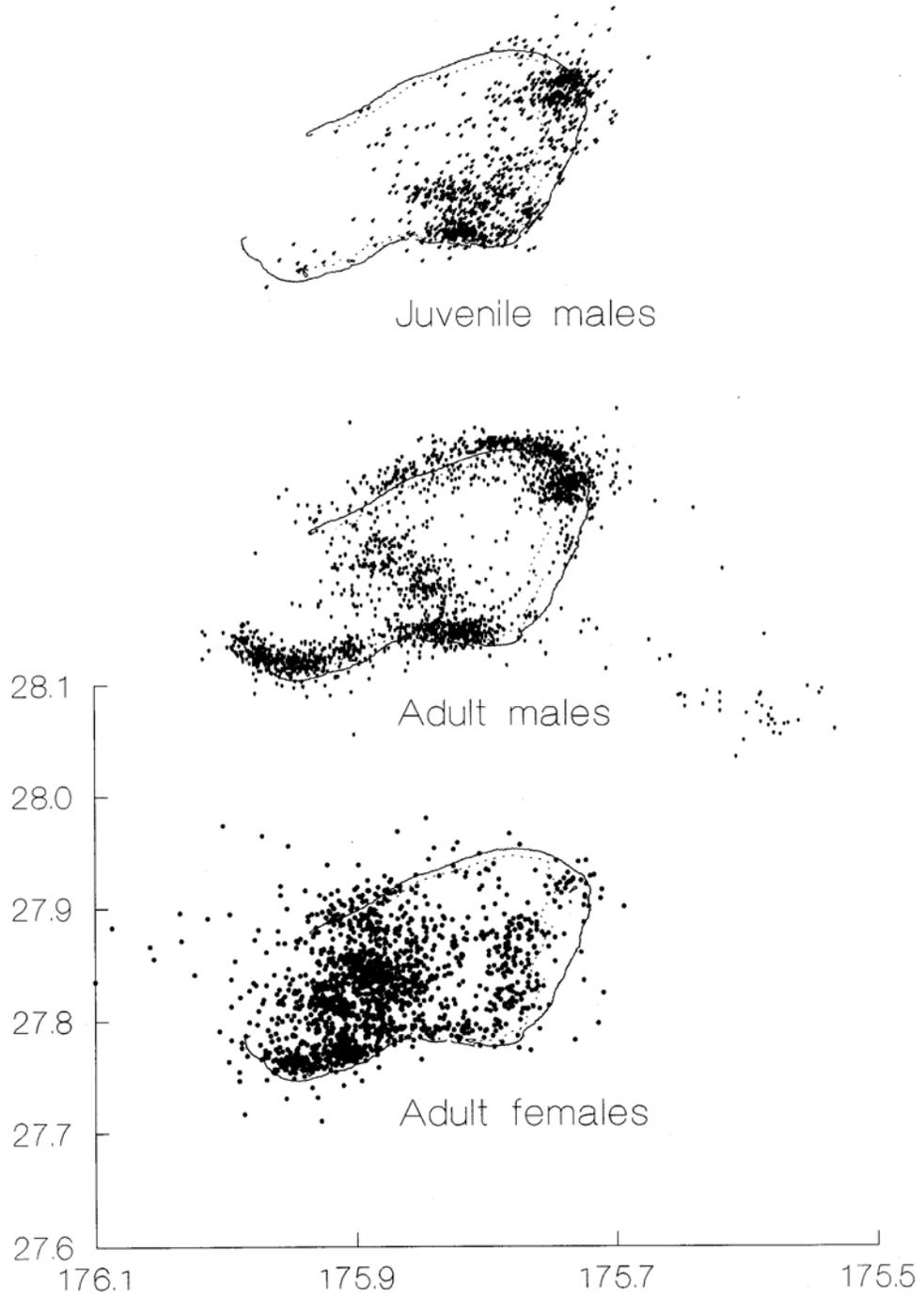


Figure 2. Foraging locations of individual Hawaiian monk seals at PHR.

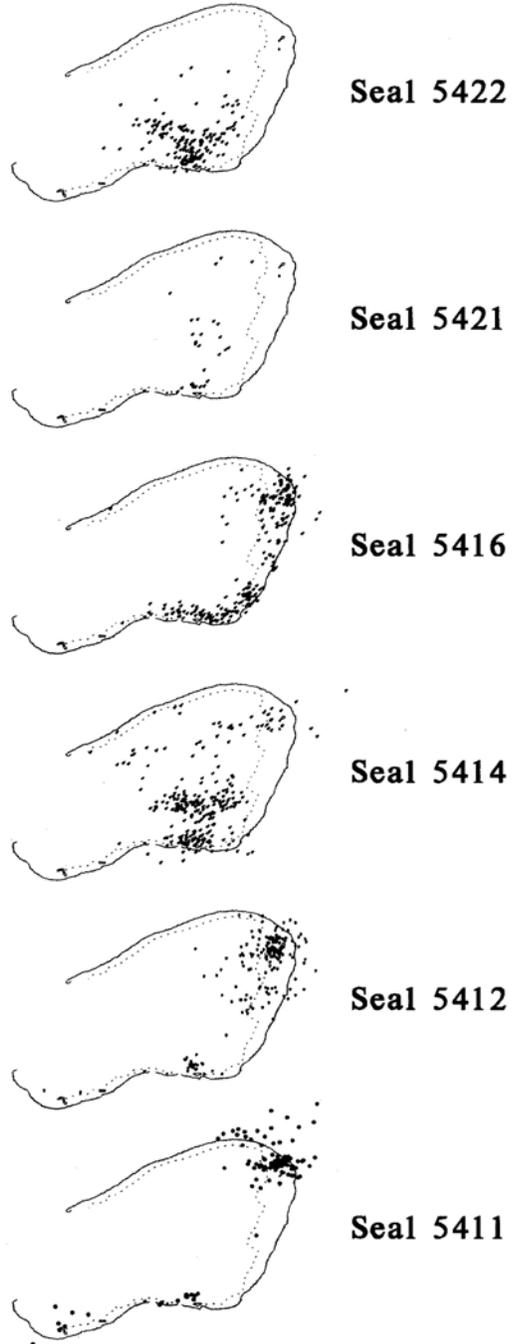


Figure 3. Foraging locations of individual Hawaiian monk seals at PHR.

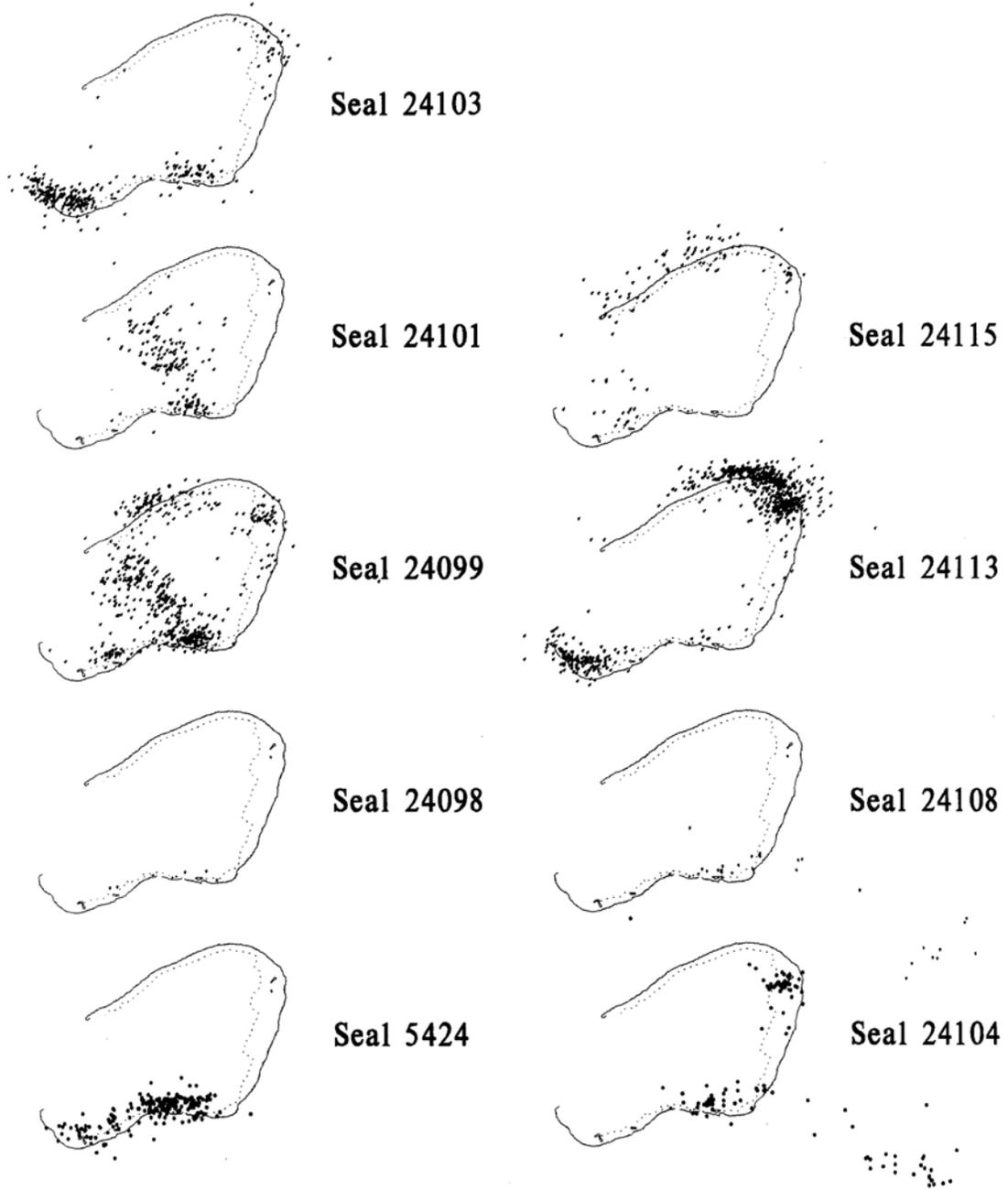


Figure 4. Foraging locations of individual Hawaiian monk seals at PHR.

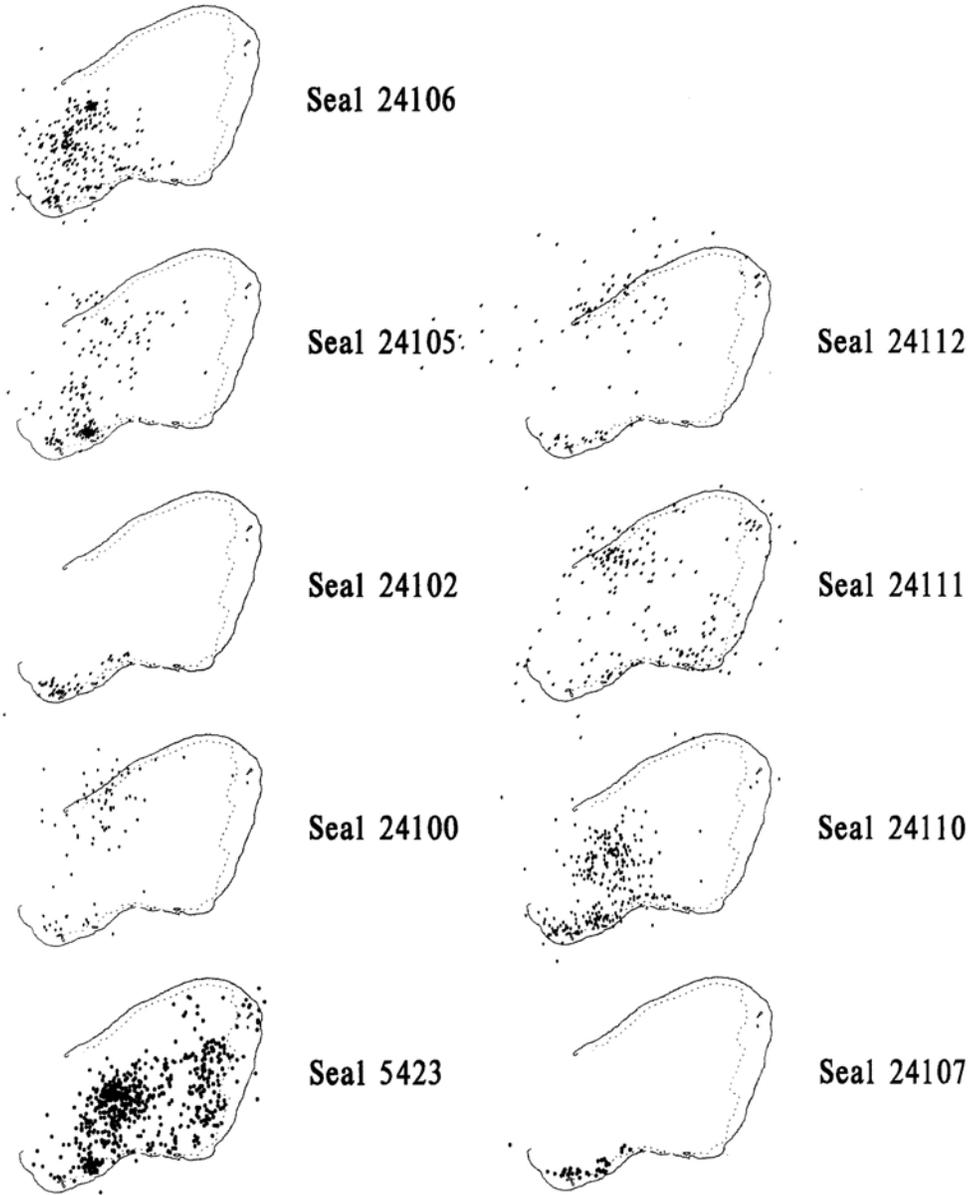


Figure 5. Depth of dives for all Hawaiian monk seals monitored at PHR.

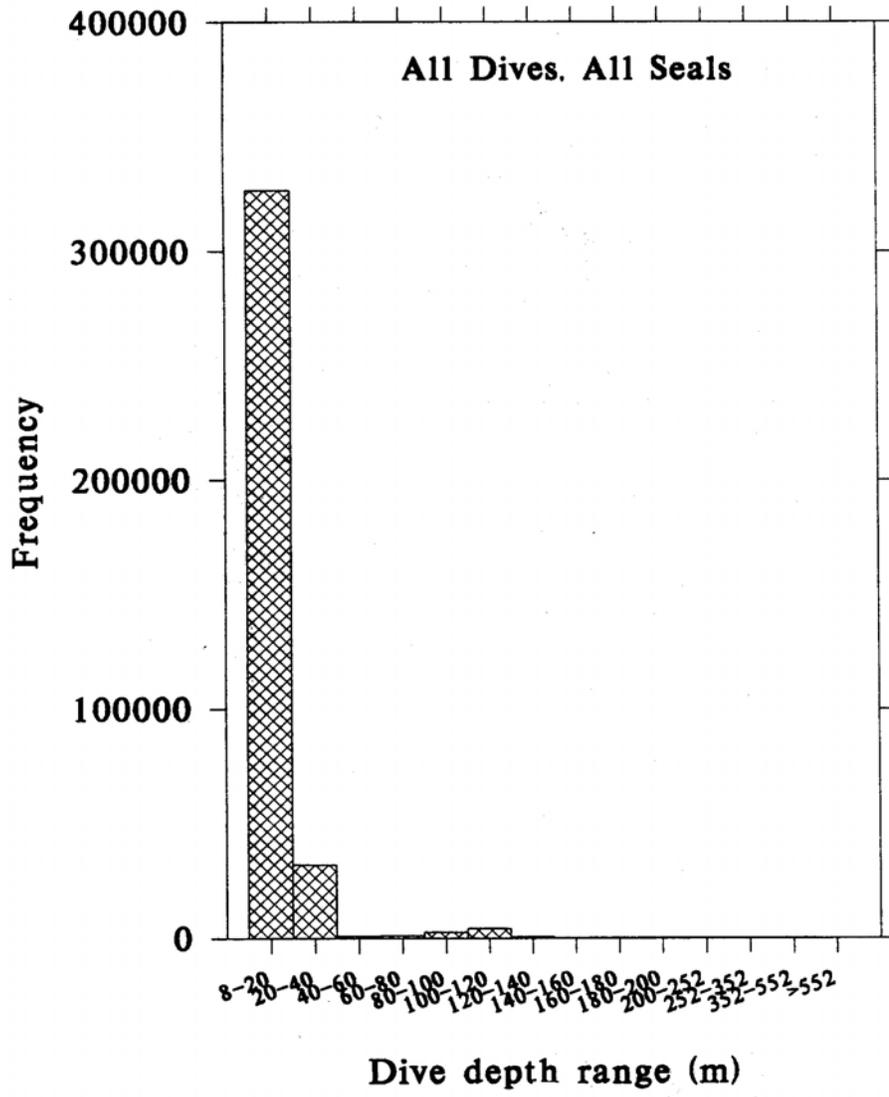


Figure 6. Depth of dives for seal 5416 (juvenile male) at PHR.

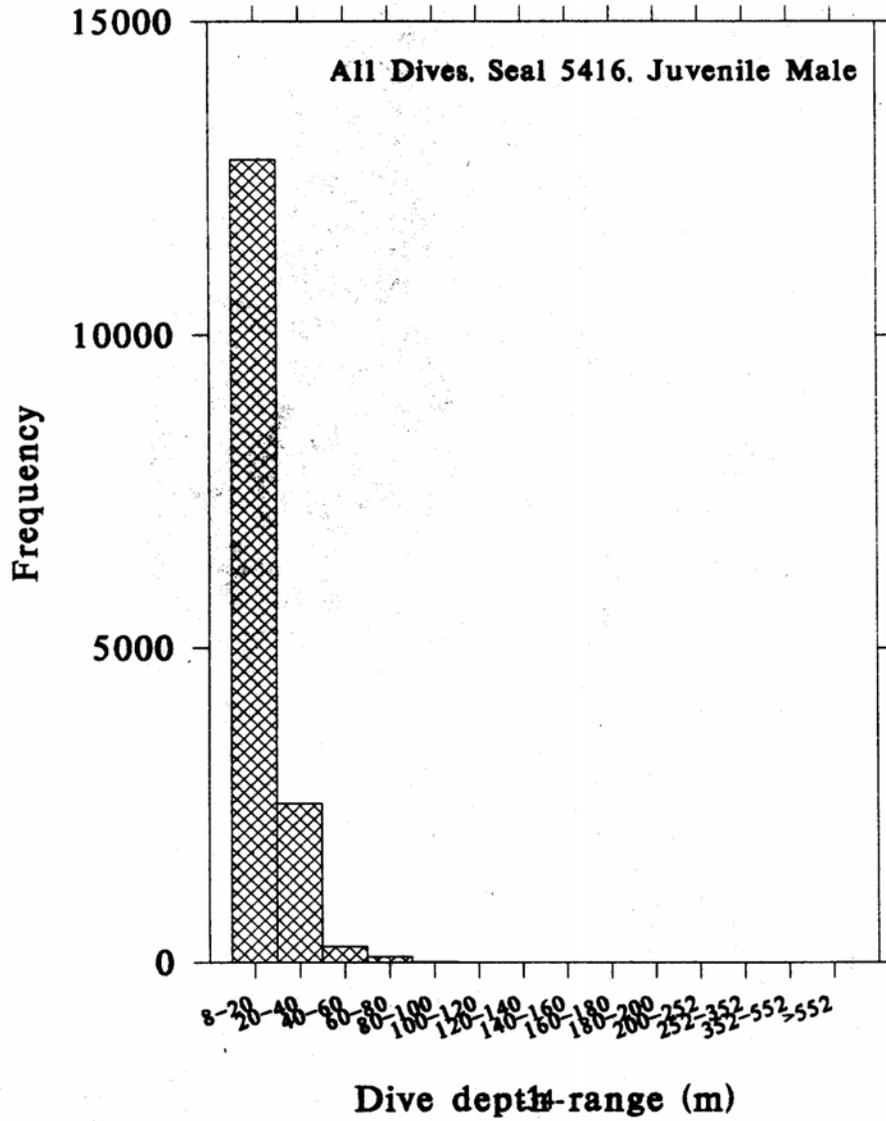


Figure 7. Depth of dives for seal 5421 (juvenile male) at PHR.

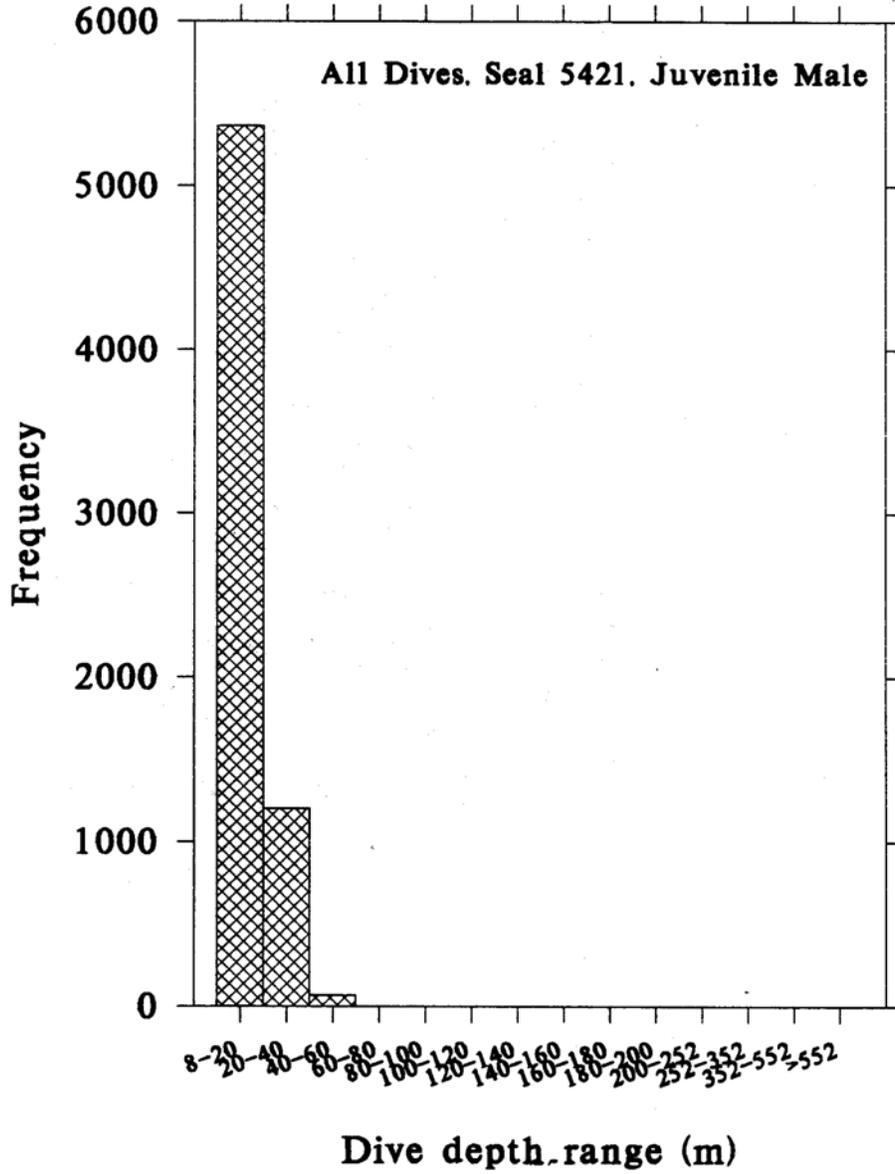


Figure 8. Depth of dives for seal 5422 (juvenile female) at PHR.

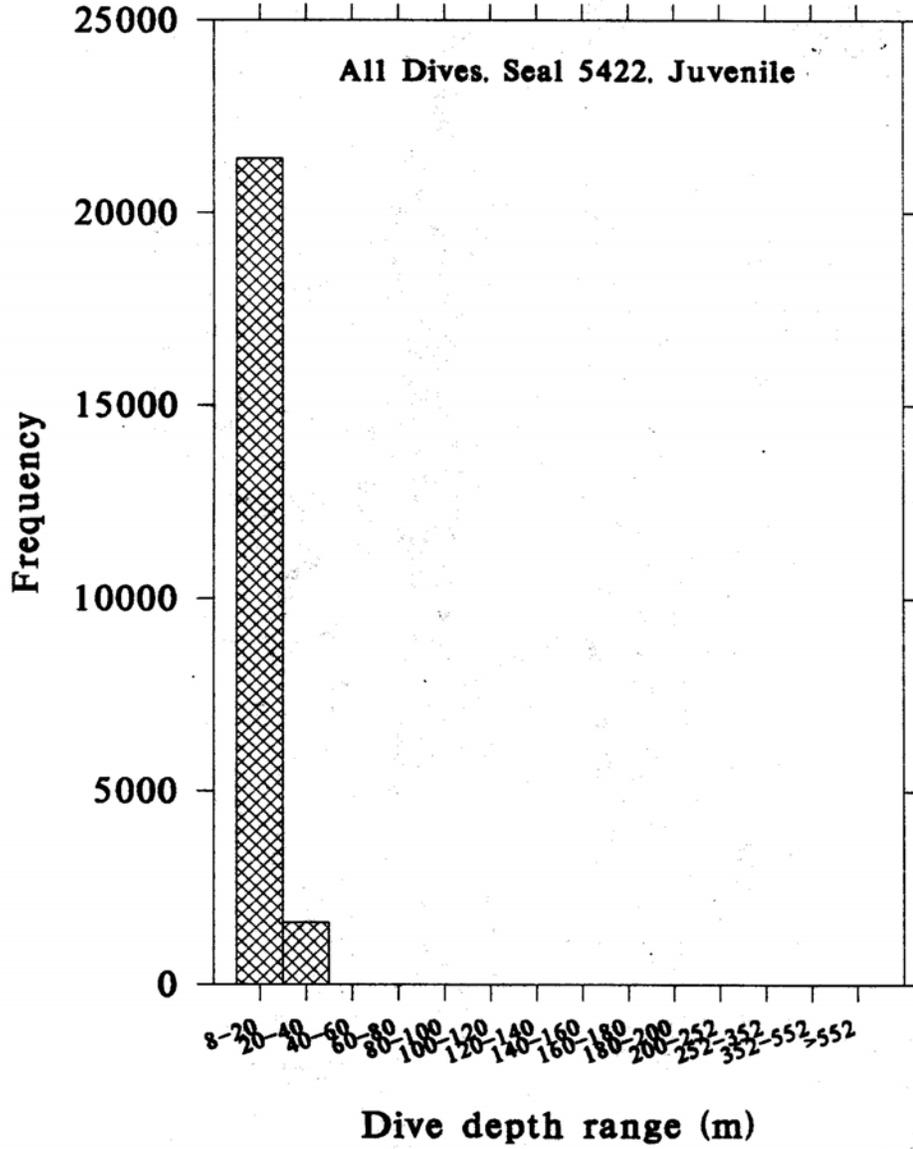


Figure 9. Depth of dives for seal 5424 (adult male) at PHR.

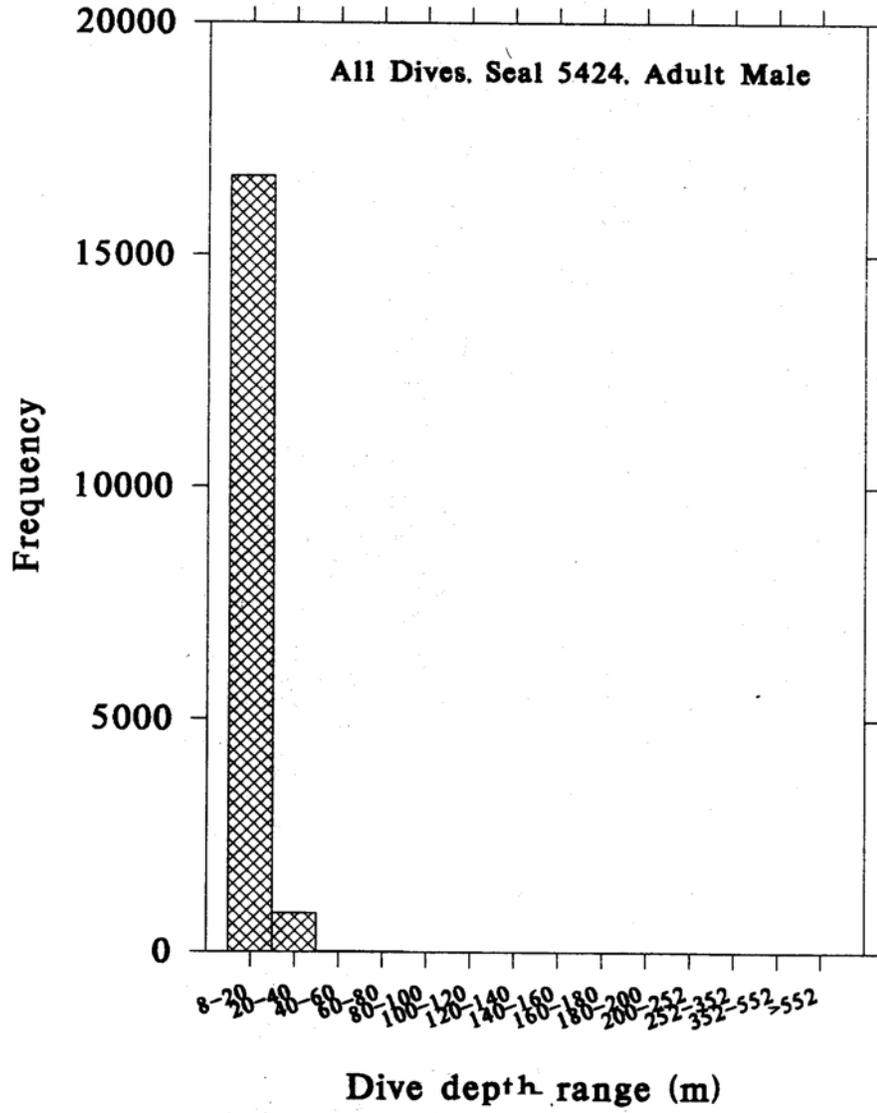


Figure 10. Depth of dives for seal 24098 (adult male) at PHR.

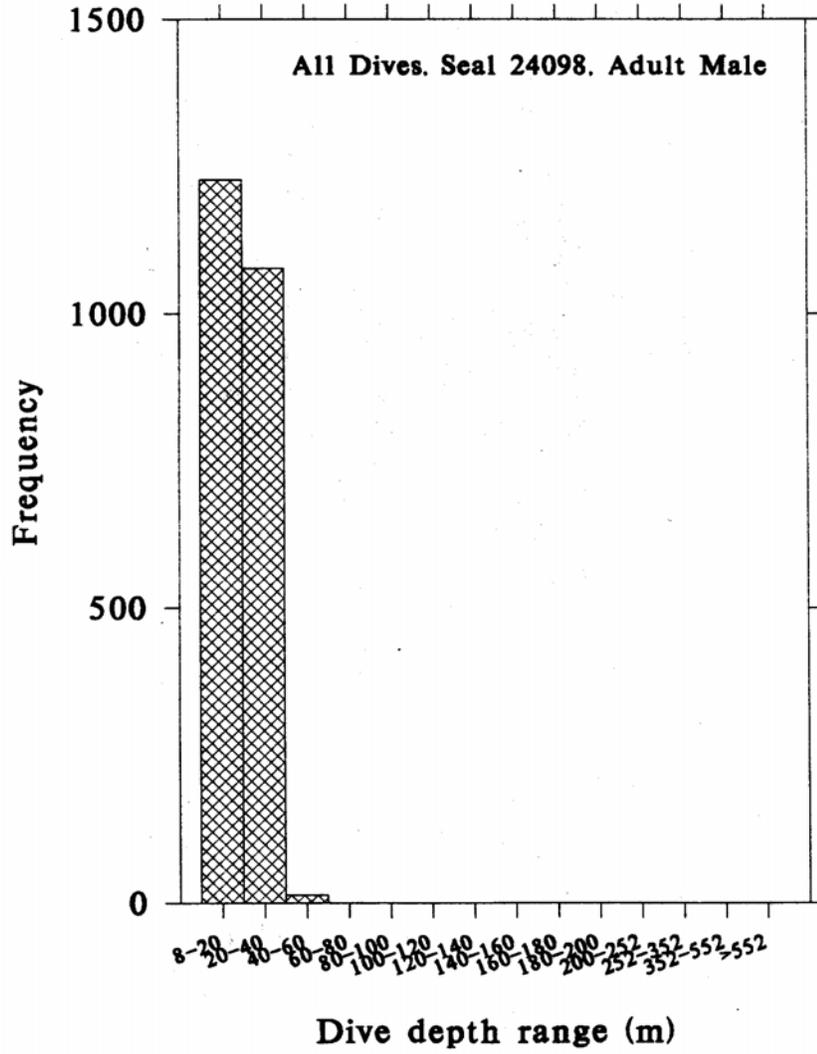


Figure 11. Depth of dives for seal 24099 (adult male) at PHR.

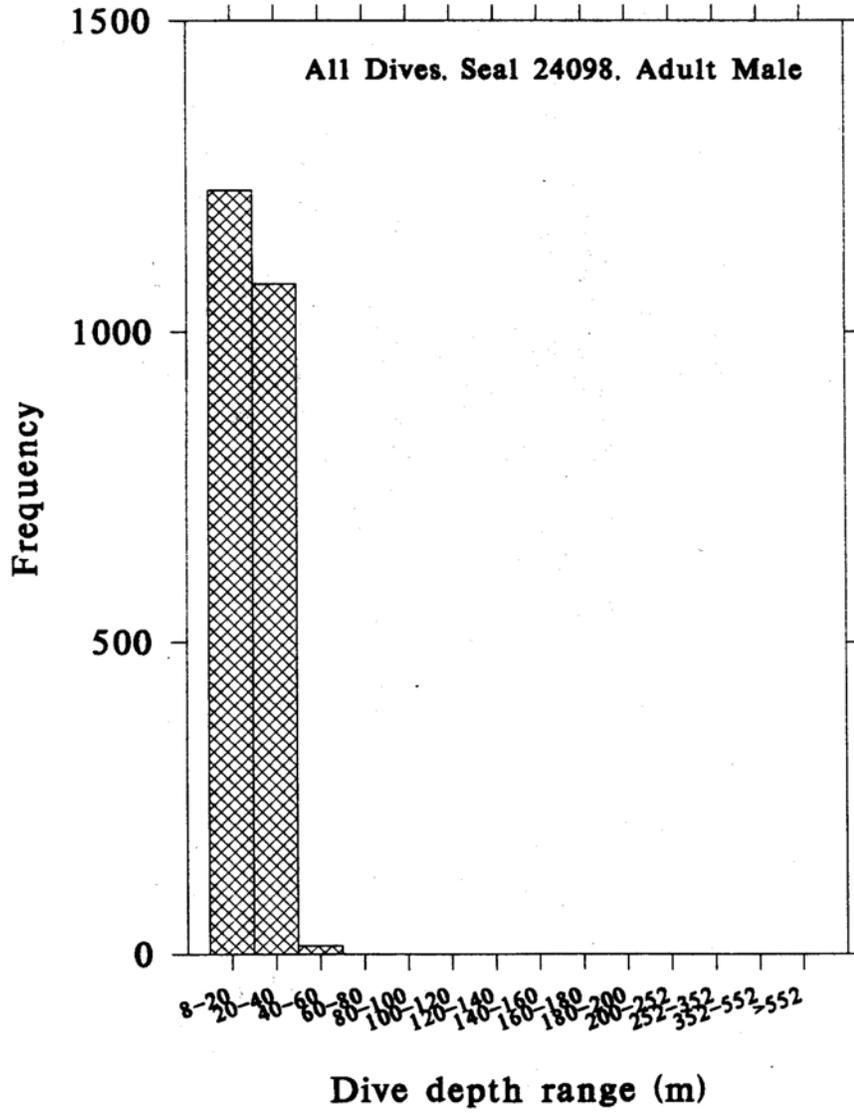


Figure 12. Depth of dives for seal 24101 (adult male) at PHR.

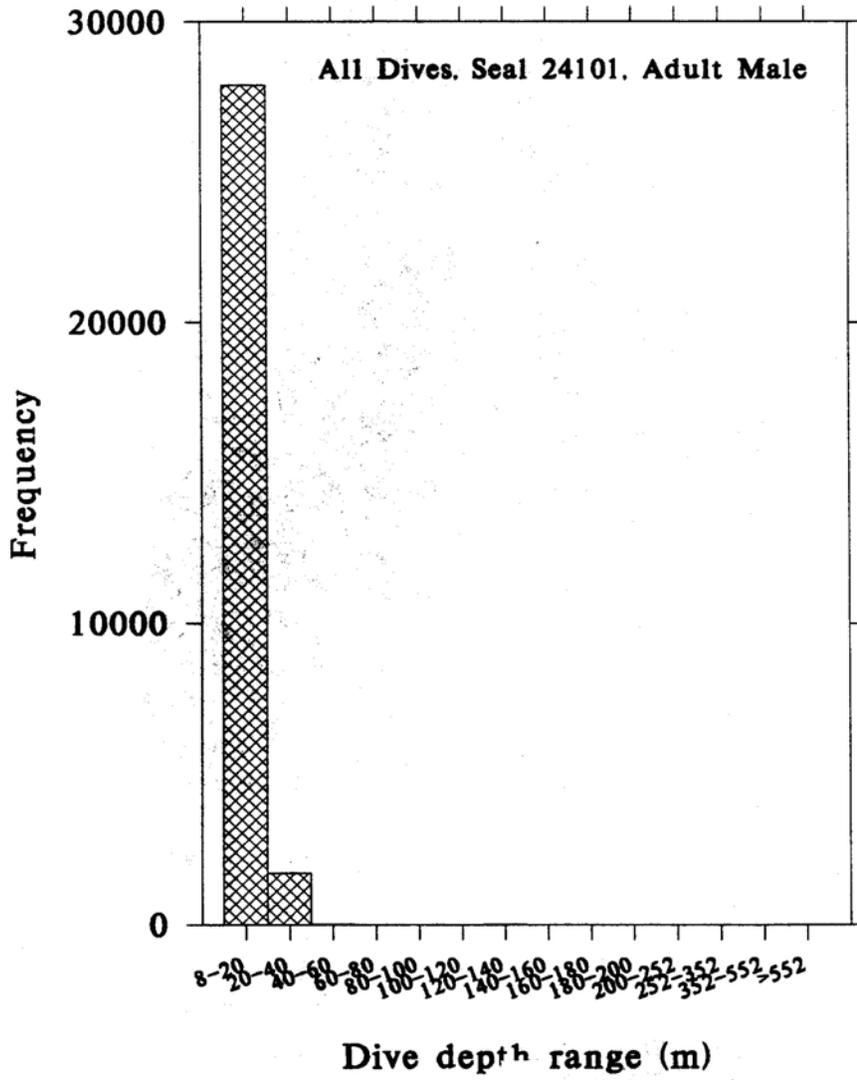


Figure 13. Depth of dives for seal 24103 (adult male) at PHR.

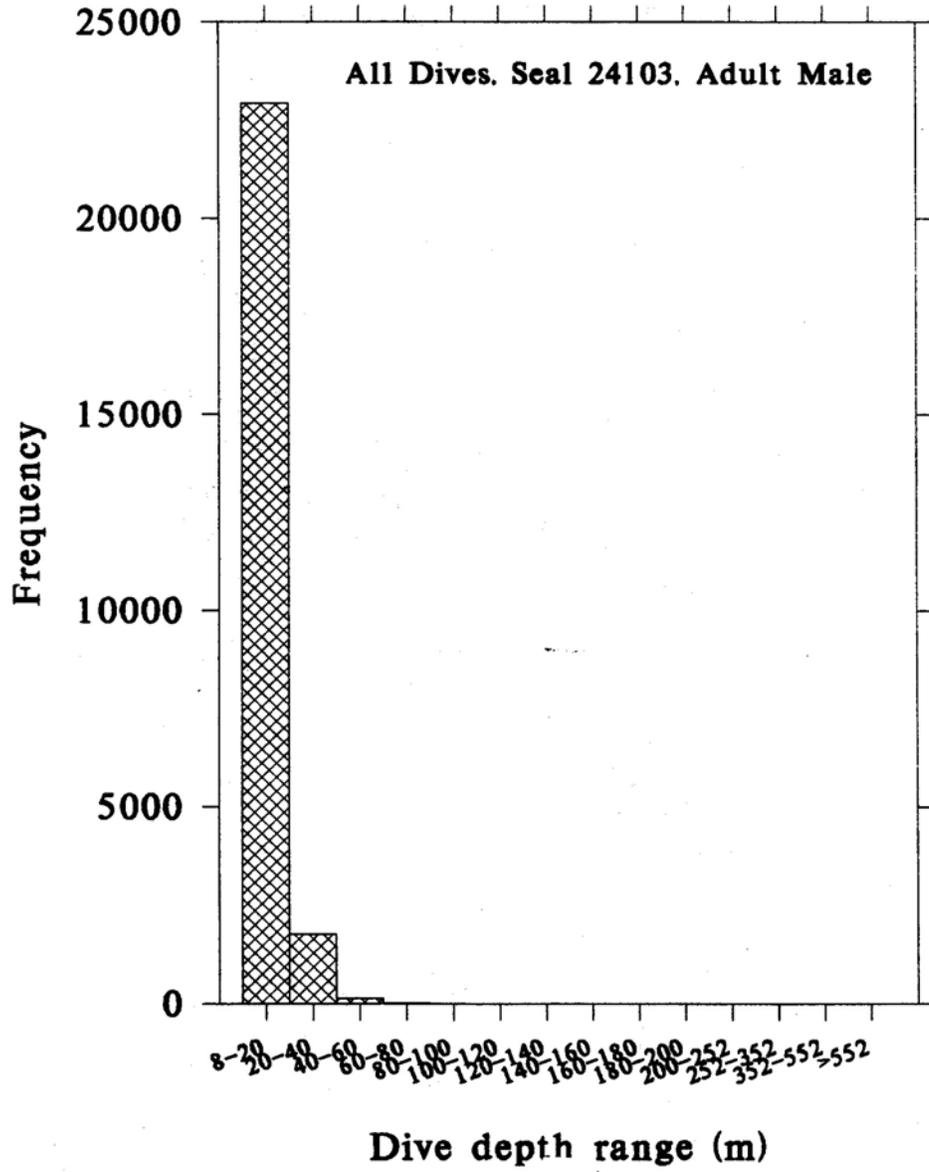


Figure 14. Depth of dives for seal 24104 (adult male) at PHR.

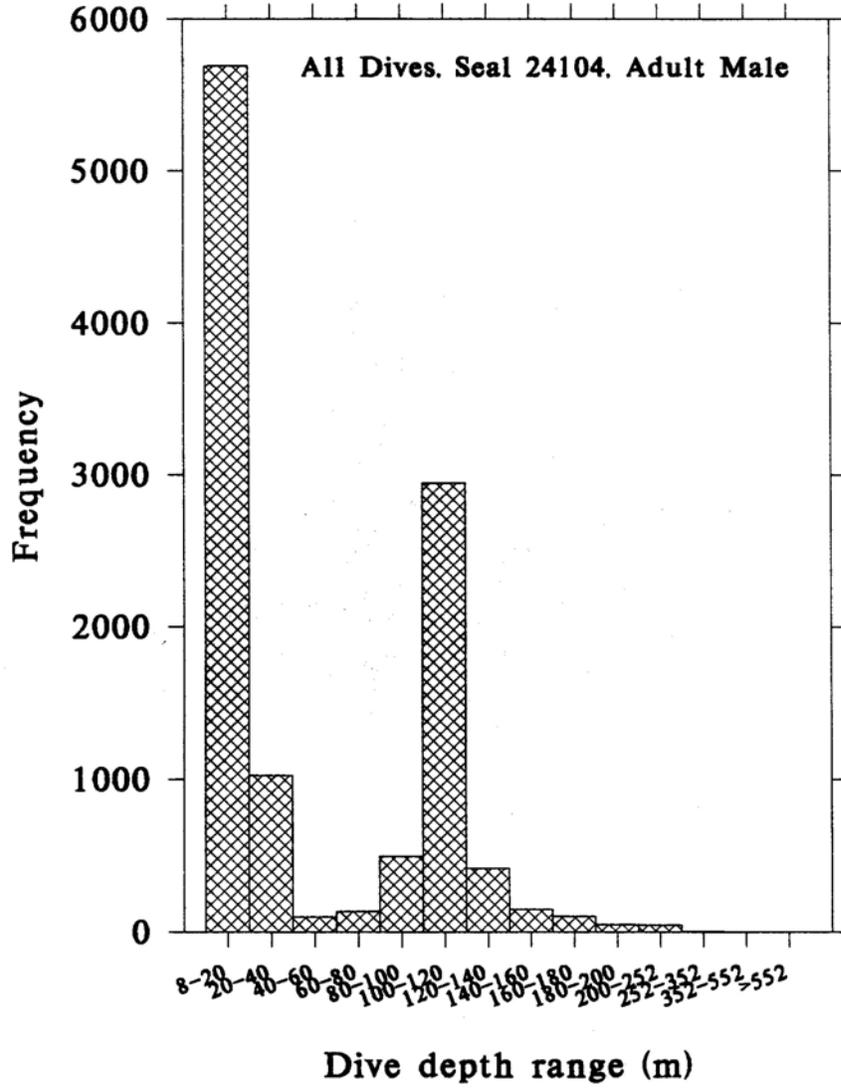


Figure 15. Depth of dives for seal 24108 (adult male) at PHR.

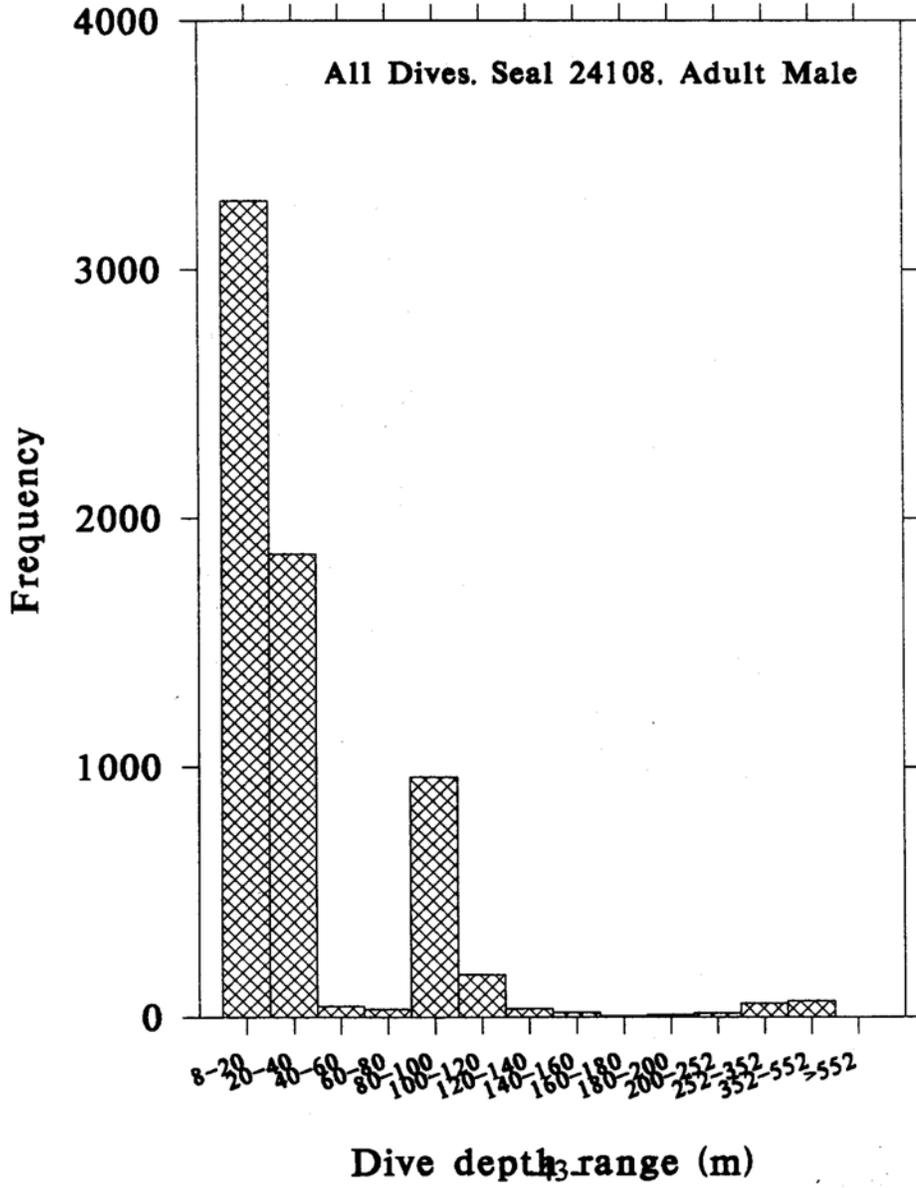


Figure 16. Depth of dives for seal 24113 (adult male) at PHR.

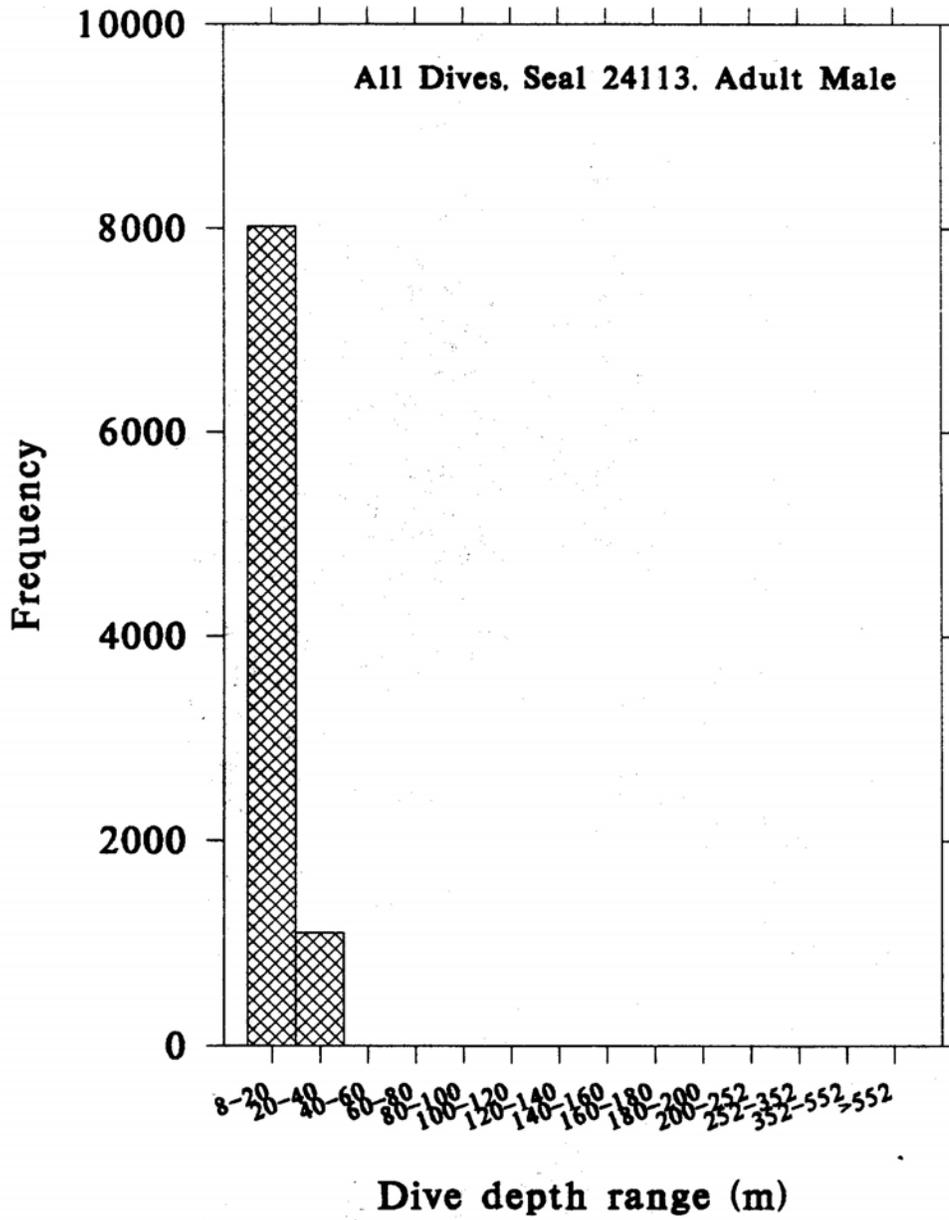


Figure 17. Depth of dives for seal 24115 (adult male) at PHR.

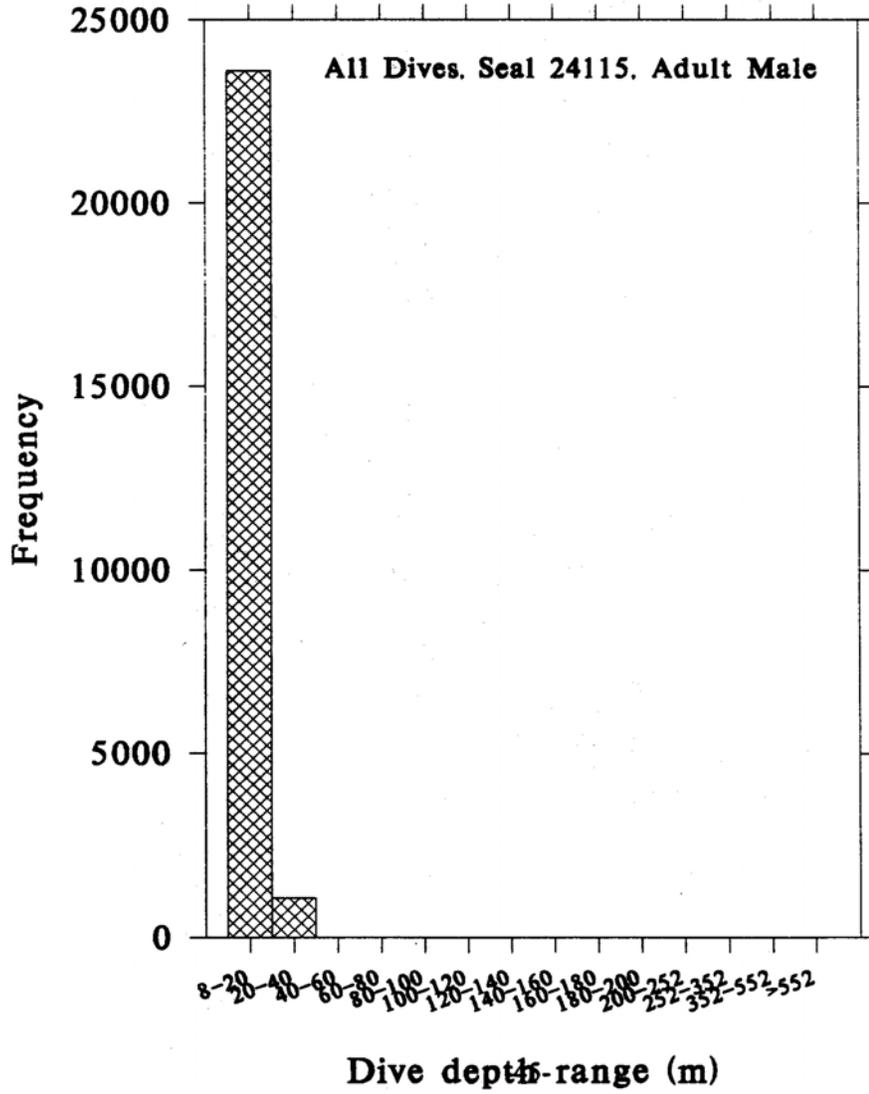


Figure 18. Depth of dives for seal 5423 (adult female) at PHR.

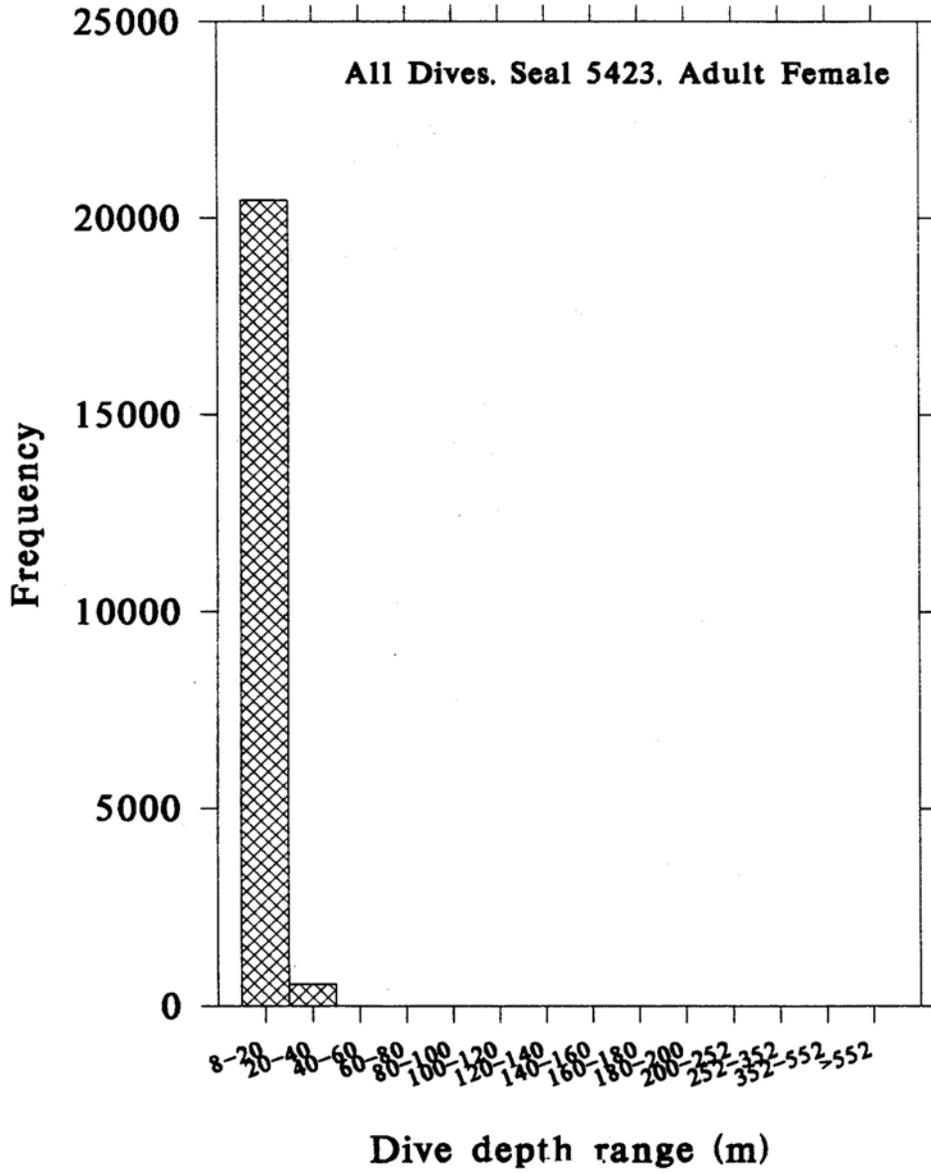


Figure 19. Depth of dives for seal 24100 (adult female) at PHR.

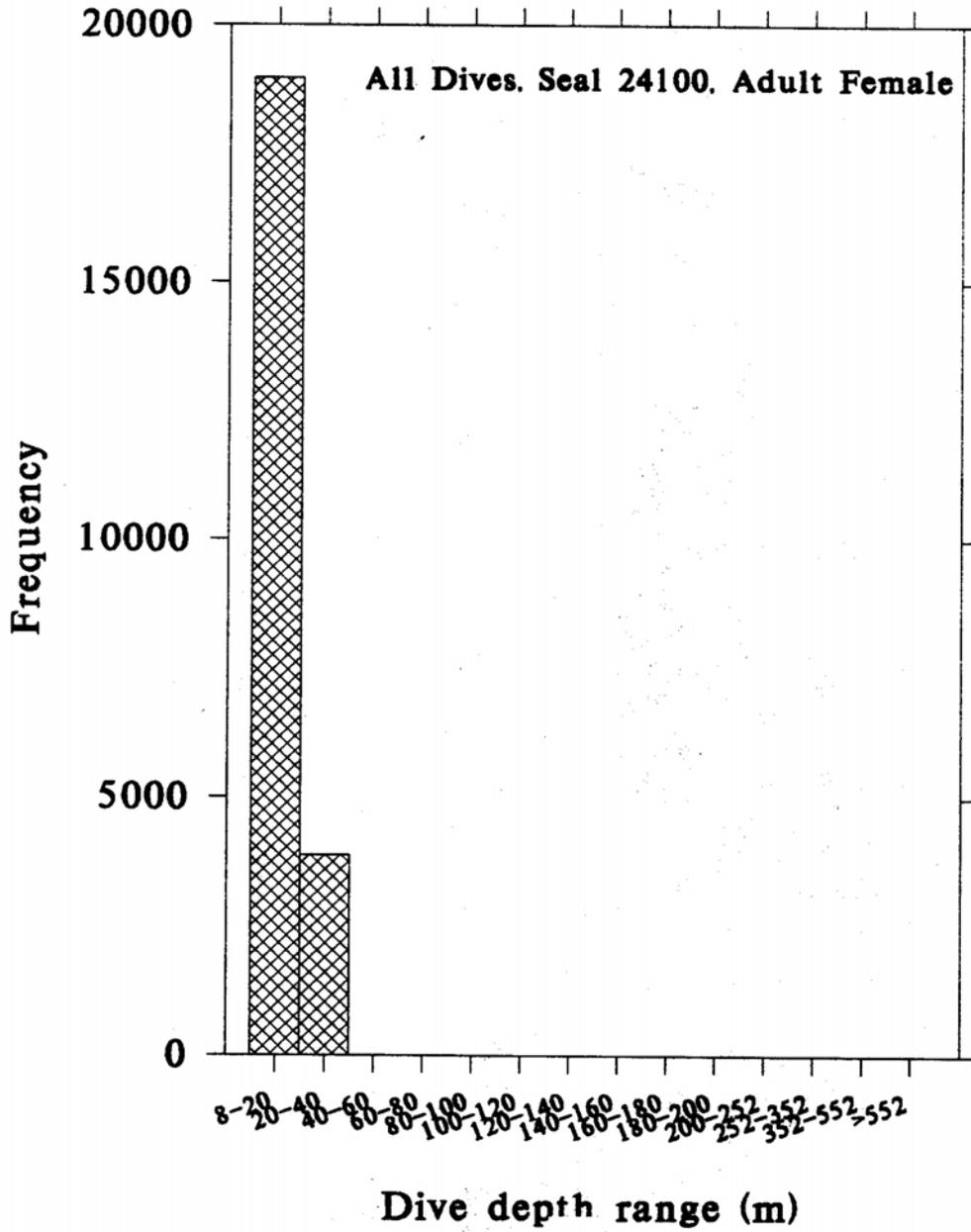


Figure 20. Depth of dives for seal 24102 (adult female) at PHR.

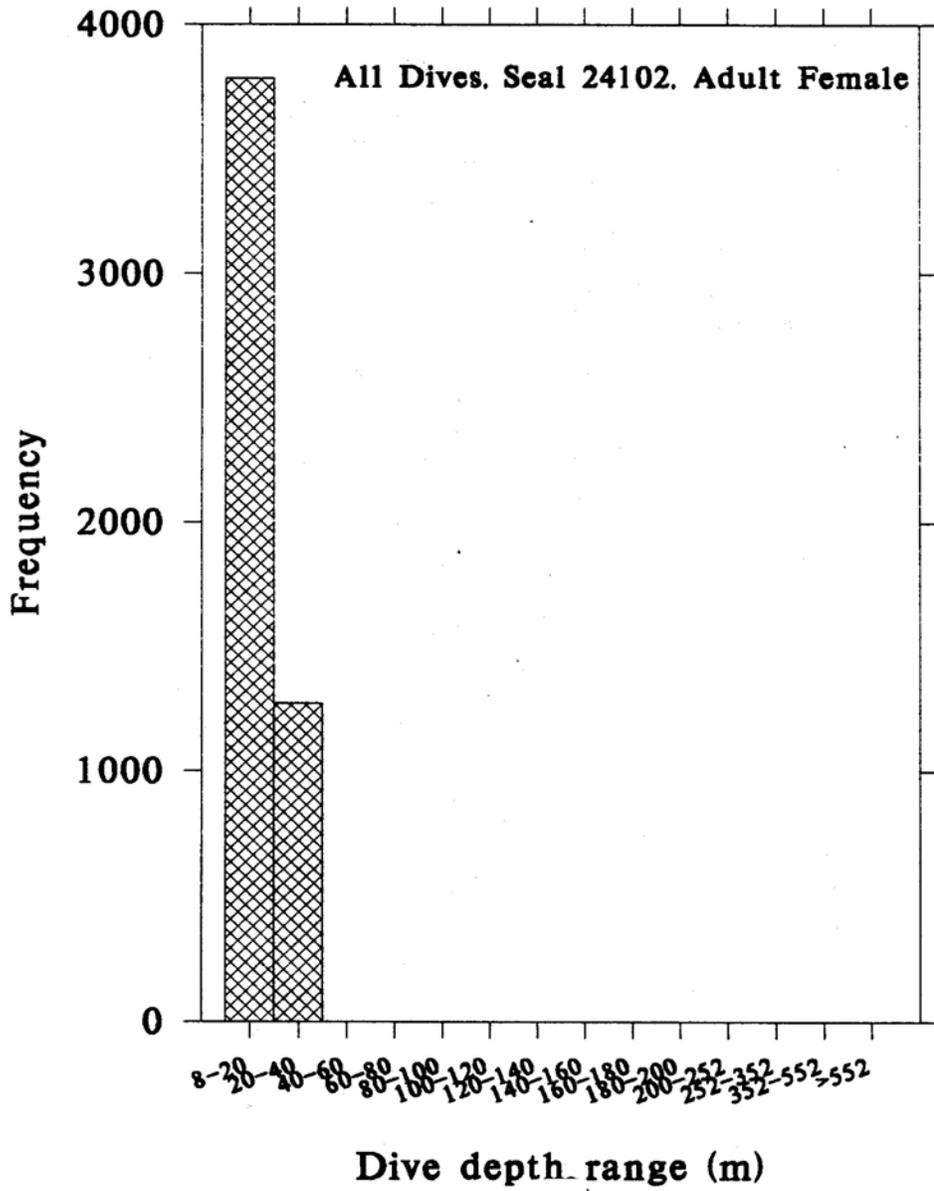


Figure 21. Depth of dives for seal 24105 (adult female) at PHR.

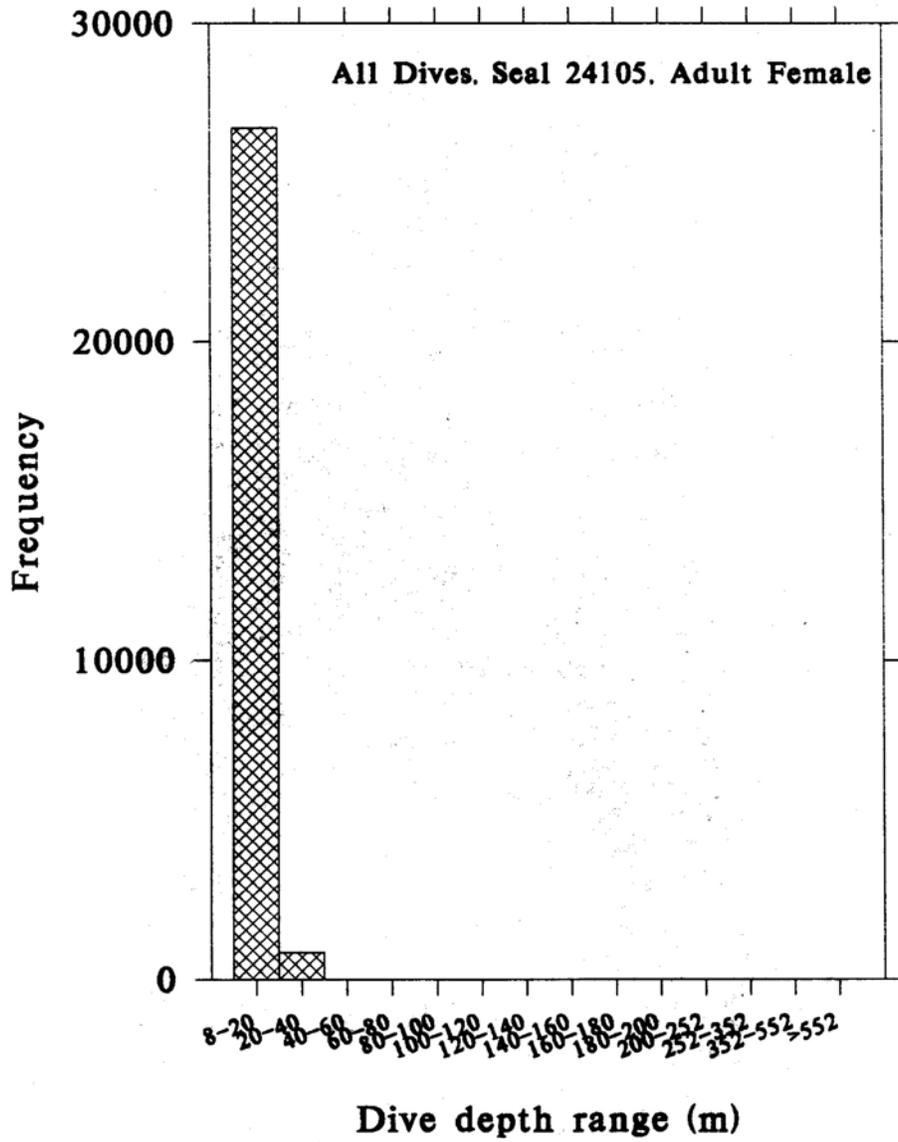


Figure 22. Depth of dives for seal 24106 (adult female) at PHR.

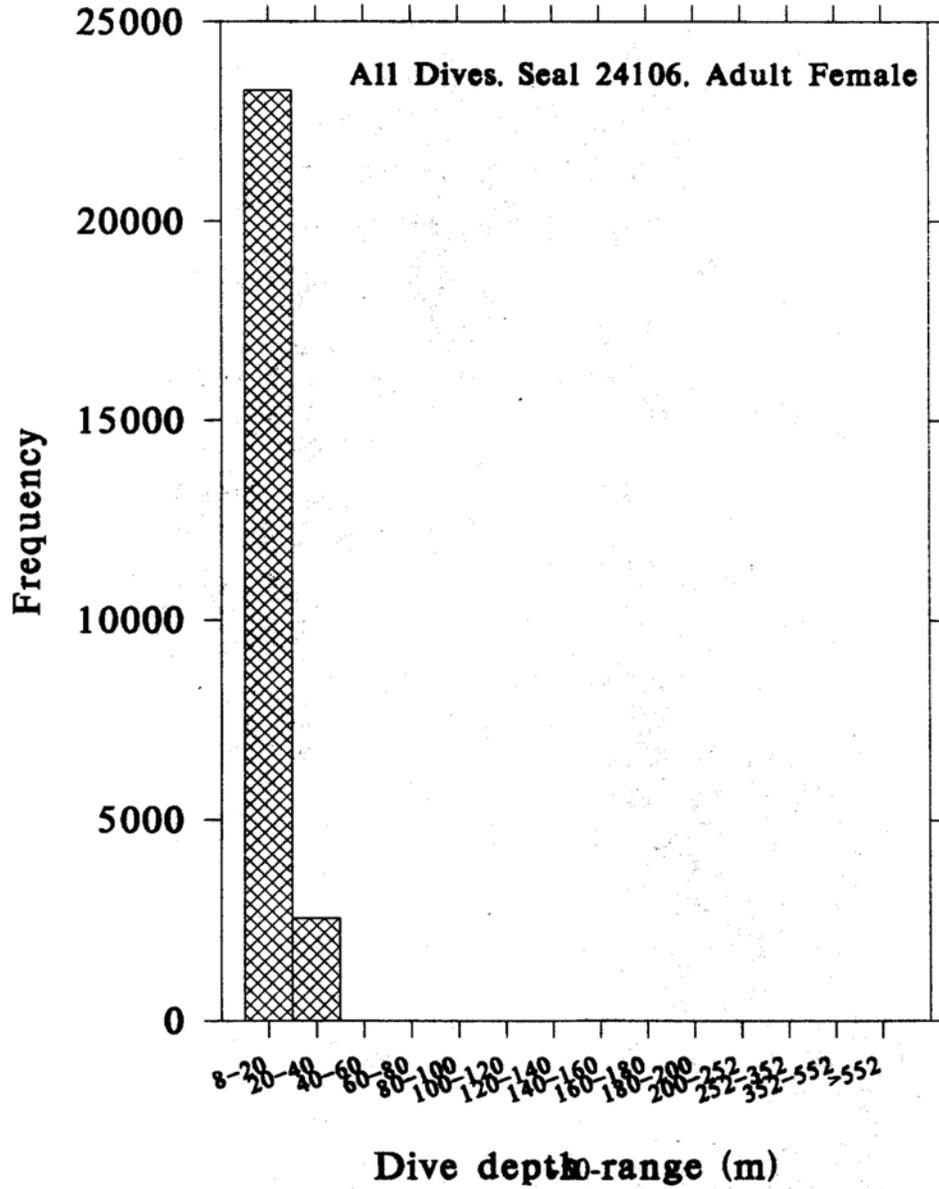


Figure 23. Depth of dives for seal 24107 (adult female) at PHR.

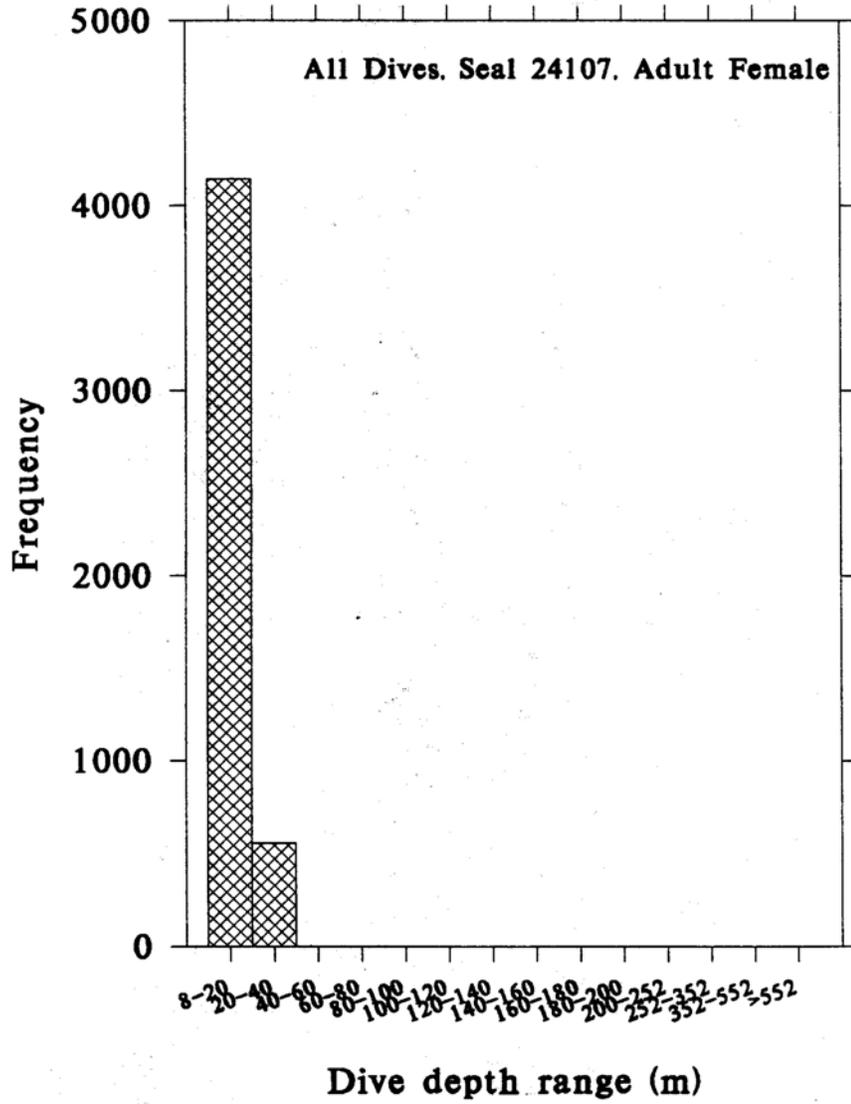


Figure 24. Depth of dives for seal 24110 (adult female) at PHR.

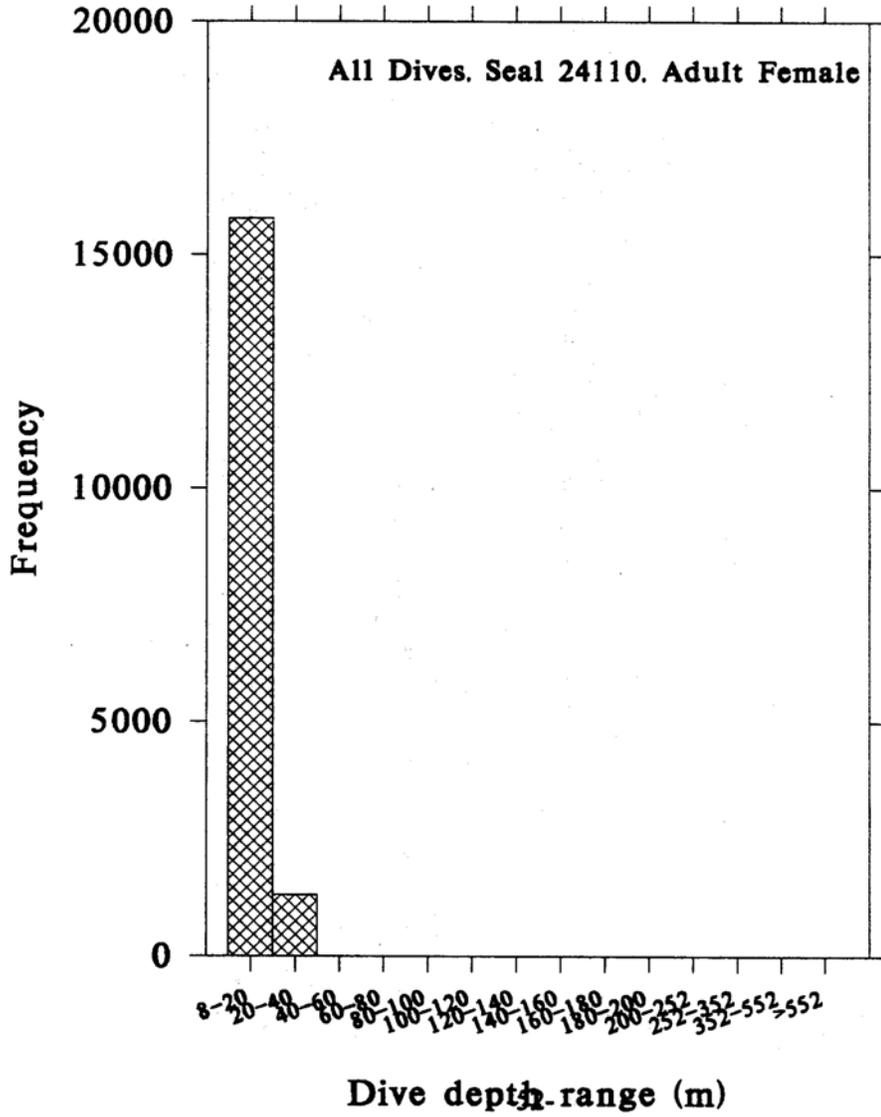


Figure 25. Depth of dives for seal 24111 (adult female) at PHR.

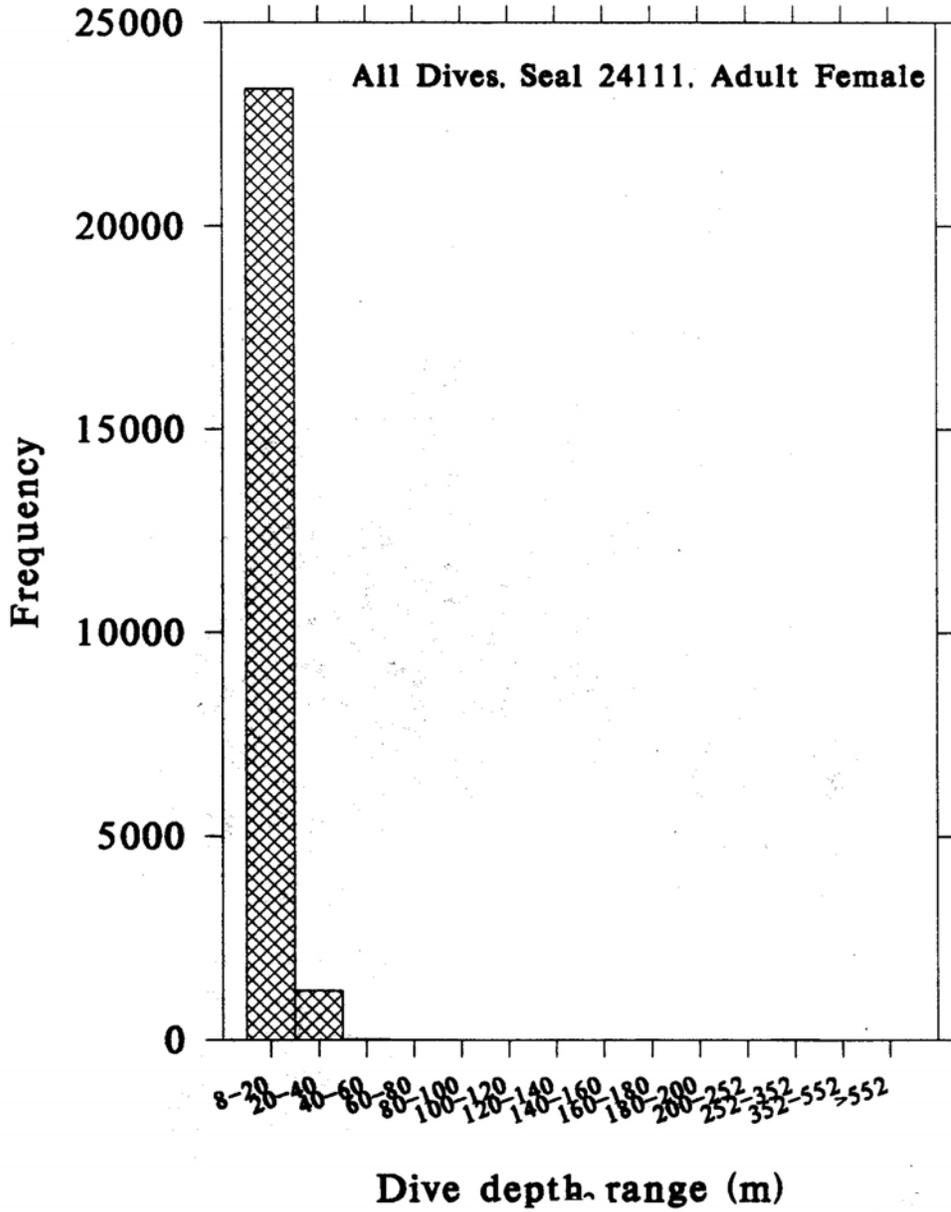
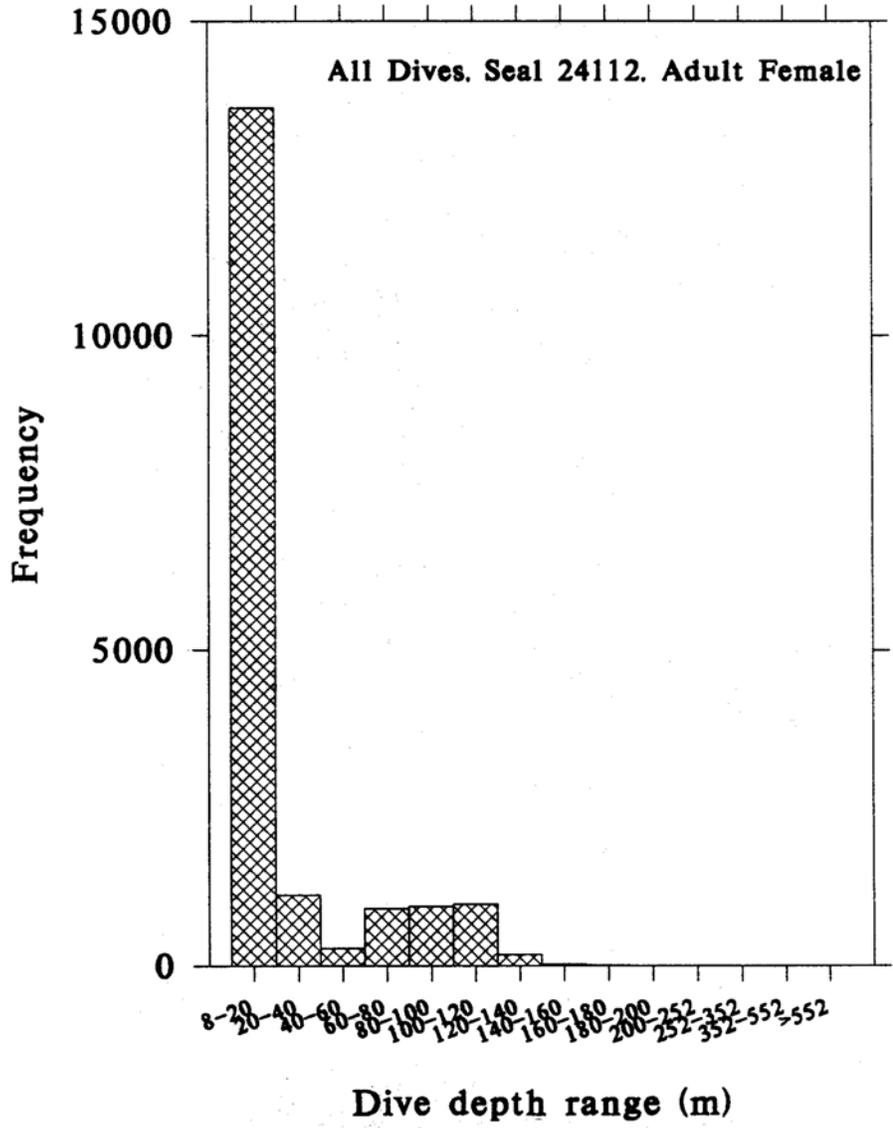


Figure 26. Depth of dives for seal 24112 (adult female) at PHR.



## 7. Appendices

### 7.1. Appendix I. Setup protocols for satellite-linked time depth recorders.

#### 1. Unit number: 97-611. ARGOS geolocation id = 5416 Unit identifier = ms97611975416.

Time (GMT) is 03:26:31.47.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> v  
 Battery voltage under light load = 6.045 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 6.014 Volts.  
 SL-TDR> va3  
 Battery voltage under light load = 6.014 Volts.  
 Battery voltage under light load = 6.045 Volts.  
 Battery voltage under light load = 6.045 Volts.  
 SL-TDR> a3  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = -4  
 SL-TDR> o  
 Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
 SL-TDR>  
 SL-TDR> e  
 It is strongly recommended that you log the following information to a disk file so that you have a permanent copy of this setup. In PROCMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a filename, a suggested name is 97-611.SET  
 After you have entered a filename, press return to continue.  
 SLTDR version: 3.14a  
 F6020E140404000F01001FFD810A0100  
 00010100000101000000000000010100  
 00010100000000005025010050400000  
 0139372D363131FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 FA0000000000000000000000000000  
 0000000000000000000000004070200A1  
 050A0F14191E23282D323F588AFF000E  
 020406080A0C0E101214191E28FF000E

050A0F14191E23282D323F588AFF000E  
 30030E61000102037EFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFF054A26FF  
 6D733937363131393735343136FFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4 meters  
 Software version 3.14a. Unit number: 97-611. ARGOS geolocation id = 5416  
 Unit identifier = ms97611975416. Unit started at 03:25:01 on 23/10/97  
 Time (GMT) is 03:26:50.08. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4 meters  
 SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:40.50 / 01:25.50  
 SLTDR will use on-land interval after 10 consecutive dry transmissions  
 SLTDR will suspend transmissions after 4 hours "hauled-out".  
 "Haul-out" ends  
 after SLTDR is "wet" for 4 successive at-sea transmission intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't accumulate) = 250  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,17-18  
 Upper limits of maximum-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 Upper limits of dive-duration histogram bins are:  
 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h  
 Unit is ready for deployment, disconnect cable and go for it...

**2. Unit number: 97-612. ARGOS geolocation id = 5421 Unit identifier = ms97612975421.**

Time (GMT) is 03:21:40.10.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> v  
 Battery voltage under light load = 5.983 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 5.983 Volts.  
 SL-TDR> a3  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 SL-TDR> o  
 Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
 SL-TDR> e  
 It is strongly recommended that you log the following information to a disk file so that you have a permanent copy of this setup. In PROCOMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a filename, a suggested name is 97-612.SET  
 After you have entered a filename, press return to continue.  
 SLTDR version: 3.14a  
 82020E140404000F01001FFD7F0A0100  
 00010100000101000000000000010100  
 0001010000000000024010000390000  
 0139372D363132FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 FA0000000000000000000000000000  
 00000000000000000000000407020015  
 050A0F14191E23282D323F588AFF000E  
 020406080A0C0E101214191E28FF000E  
 050A0F14191E23282D323F588AFF000E  
 30030E610001020371FFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFF054B6AFF  
 6D733937363132393735343231FFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4 meters  
 Software version 3.14a. Unit number: 97-612. ARGOS geolocation id = 5421

Unit identifier = ms97612975421. Unit started at 22:09:46 on 21/10/97  
 Time (GMT) is 03:22:10.24. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4 meters  
 SLTDR uses 1-sec / ¼-sec wakeups when shallower than 40 / 12 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:39.00 / 01:24.00  
 SLTDR will use on-land interval after 10 consecutive dry transmissions  
 SLTDR will suspend transmissions after 4 hours "hauled-out".  
 "Haul-out" ends  
 after SLTDR is "wet" for 4 successive at-sea transmission intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't accumulate) = 250  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,17-18  
 Upper limits of maximum-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 Upper limits of dive-duration histogram bins are:  
 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h

Unit is ready for deployment, disconnect cable and go for it...

**3. Unit number: 97-613. ARGOS geolocation id = 5422 Unit identifier = ms97613975422.**

Time (GMT) is 03:19:13.58.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> v  
 Battery voltage under light load = 5.890 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 5.890 Volts.  
 SL-TDR> a3  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 SL-TDR> o  
 Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
 SL-TDR> e  
 It is strongly recommended that you log the following information to a disk file so that you have a permanent copy of this setup. In PROCOMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a filename, a suggested name is 97-613.SET  
 After you have entered a filename, press return to continue.  
 SLTDR version: 3.14a  
 5E020E140404000F01001FFD7E0A0100  
 00010100000101000000000000010100  
 00010100000000005024010050390000  
 0139372D363133FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 FA000000000000000000000000000000  
 000000000000000000000000040702003A  
 050A0F14191E23282D323F588AFF000E  
 020406080A0C0E101214191E28FF000E  
 050A0F14191E23282D323F588AFF000E  
 30030E610001020375FFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFF054B9FFF  
 6D733937363133393735343232FFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4 meters  
 Software version 3.14a. Unit number: 97-613. ARGOS geolocation id = 5422

Unit identifier = ms97613975422. Unit started at 22:06:04 on 21/10/97  
 Time (GMT) is 03:19:57.93. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4 meters  
 SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:39.50 / 01:24.50  
 SLTDR will use on-land interval after 10 consecutive dry transmissions  
 SLTDR will suspend transmissions after 4 hours "hailed-out".  
 "Haul-out" ends  
 after SLTDR is "wet" for 4 successive at-sea transmission intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't accumulate) = 250  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,17-18  
 Upper limits of maximum-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 Upper limits of dive-duration histogram bins are:  
 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h  
 Unit is ready for deployment, disconnect cable and go for it...

**4. Unit number: 97-591. ARGOS  
geolocation id = 5423 Unit identifier =  
ms97591975423**

Time (GMT) is 04:52:17.62.  
SL-TDR> d  
Date (GMT) is 23 October 1997  
SL-TDR> o  
Do you wish to allow any unused portion of your daily  
transmission allowance  
to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on  
a  
month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded  
into  
each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt  
water may  
exist in discrete layers? [n]  
SL-TDR> e

It is strongly recommended that you log the following information  
to a disk  
file so that you have a permanent copy of this setup. In  
PROCOMM you do this  
by pressing the ALT-F1 key combination. You will then be  
prompted for a  
filename, a suggested name is 97-591.SET  
After you have entered a filename, press return to continue.

SLTDR version: 3.14a  
C0020E140404003C01001FFD7F0A0100  
00010100000101000000000000010100  
00000101000000000030010000450000  
0139372D353931FF000A0400000A0400  
000A0400000001000000010000000100  
000A0A03010001000100020000000000  
F4010000000000000000000000000000  
00000000000000000000000407020056  
050A0F14191E23282D323F588AFF000E  
020406080A0C0E101214191E28FF000E  
050A0F14191E23282D323F588AFF000E  
30030E610001020380FFFFFFFFFFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFF054BCCF  
6D733937353931393735343233FFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked  
Time-Depth Recorder.  
Unit measures depth from 0 to 980 meters with a resolution of 4  
meters  
Software version 3.14a. Unit number: 97-591. ARGOS  
geolocation id = 5423  
Unit identifier = ms97591975423. Unit started at 20:18:44 on  
21/10/97  
Time (GMT) is 04:52:27.60. Date (GMT) is 23 October 1997  
Shallowest depth to be considered a "dive" = 8 meters  
Deepest depth for accumulating surface-timelines (0=dry only) = 4  
meters  
SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12  
meters

Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
Transmission intervals (at-sea / on-land) = 00:45.00 / 01:30.00  
SLTDR will use on-land interval after 10 consecutive dry  
transmissions  
SLTDR will suspend transmissions after 4 hours "hauled-out".  
"Haul-out" ends  
after SLTDR is "wet" for 4 successive at-sea transmission  
intervals  
Transmissions will be duty cycled with 1 day on and 0 days off  
Daily allowance (1-message transmissions; unused xmits don't  
accumulate) = 500  
STATUS will be transmitted every 20 messages.  
Blocks of Time-Lines will be transmitted every 48 messages.  
Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
Upper limits of maximum-depth histogram bins are:  
20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
meters  
Upper limits of dive-duration histogram bins are:  
2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
Upper limits of time-at-depth histogram bins are:  
20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
meters  
\*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
Type D to archive depth readings, H to archive histograms: h  
  
Unit is ready for deployment, disconnect cable and go for it...

**5. Unit number: 97-592. ARGOS geolocation id = 5424, Unit identifier = ms97592975424.**

SL-TDR> o  
Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
SL-TDR> e

It is strongly recommended that you log the following information to a disk

file so that you have a permanent copy of this setup. In PROCOMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a

filename, a suggested name is 97-592.SET  
After you have entered a filename, press return to continue.

SLTDR version: 3.14a  
48020E140404003C01001FFD7F0A0100  
00010100000101000000000000010100  
00000101000000000031010000460000  
0139372D353932FF000A0400000A0400  
000A0400000001000000010000000100  
000A0A03010001000100020000000000  
F4010000000000000000000000000000  
0000000000000000000000407020086  
050A0F14191E23282D323F588AFF000E  
020406080A0C0E101214191E28FF000E  
050A0F14191E2328323F588A8CFF000E  
30030E610001020380FFFFFFFFFFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFF054C37FF  
6D733937353932393735343234FFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

**Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.**

Unit measures depth from 0 to 980 meters with a resolution of 4 meters

Software version 3.14a. Unit number: 97-592. ARGOS geolocation id = 5424

Unit identifier = ms97592975424. Unit started at 20:55:58 on 21/10/97

Time (GMT) is 04:34:10.04. Date (GMT) is 23 October 1997

Shallowest depth to be considered a "dive" = 8 meters

Deepest depth for accumulating surface-timelines (0=dry only) = 4 meters

SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12 meters

Local time [0-23 hours] corresponding to 00h UT (GMT): 14

Transmission intervals (at-sea / on-land) = 00:46.00 / 01:31.00

SLTDR will use on-land interval after 10 consecutive dry transmissions

SLTDR will suspend transmissions after 4 hours "hailed-out". "Haul-out" ends

after SLTDR is "wet" for 4 successive at-sea transmission intervals

Transmissions will be duty cycled with 1 day on and 0 days off  
Daily allowance (1-message transmissions; unused xmits don't accumulate) = 500

STATUS will be transmitted every 20 messages.

Blocks of Time-Lines will be transmitted every 48 messages.

Hours when SLTDR transmits: 01-02,05-06,13-14,18-19

Upper limits of maximum-depth histogram bins are:

20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters

Upper limits of dive-duration histogram bins are:

2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes

Upper limits of time-at-depth histogram bins are:

20, 40, 60, 80, 100, 120, 140, 160, 200, 252, 352, 552, 560, ∞ meters

\*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y

Type D to archive depth readings, H to archive histograms: h

Unit is ready for deployment, disconnect cable and go for it...

**6. Unit number: 97-593. ARGOS geolocation id = 24098 Unit identifier = ms975939724098**

Time (GMT) is 04:39:17.33.  
SL-TDR> d  
Date (GMT) is 23 October 1997  
SL-TDR> v  
Battery voltage under light load = 7.136 Volts.  
SL-TDR> v  
Battery voltage under light load = 7.136 Volts.  
SL-TDR> a3  
S.W. Resistance = 255, Depth (m) = 0  
S.W. Resistance = 255, Depth (m) = 0  
S.W. Resistance = 255, Depth (m) = -4  
SL-TDR> o  
Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
SL-TDR> e

It is strongly recommended that you log the following information to a disk file so that you have a permanent copy of this setup. In PROCOMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a filename, a suggested name is 97-593.SET  
After you have entered a filename, press return to continue.  
SLTDR version: 3.14a

```
32020E140404003C010020FD7D0A0100
00010100000101000000000000010100
000001010000000000032010000470000
0139372D353933FF000A0400000A0400
000A0400000001000000010000000100
000A0A0301000100010002000000000000
F401000000000000000000000000000000
00000000000000000000000004070200F4
050A0F14191E23282D323F588AFF000E
020406080A0C0E101214191E28FF000E
050A0F14191E23282D323F588AFF000E
30030E61000102038BFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFF0788A3FF
6D73393735393339373234303938FFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
```

Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.  
Unit measures depth from 0 to 980 meters with a resolution of 4 meters  
Software version 3.14a. Unit number: 97-593. ARGOS geolocation id = 24098

Unit identifier = ms975939724098. Unit started at 20:44:04 on 21/10/97  
Time (GMT) is 04:39:56.62. Date (GMT) is 23 October 1997  
Shallowest depth to be considered a "dive" = 8 meters  
Deepest depth for accumulating surface-timelines (0=dry only) = 4 meters  
SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12 meters  
Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
Transmission intervals (at-sea / on-land) = 00:47.00 / 01:32.00  
SLTDR will use on-land interval after 10 consecutive dry transmissions  
SLTDR will suspend transmissions after 4 hours "hauled-out".  
"Haul-out" ends  
after SLTDR is "wet" for 4 successive at-sea transmission intervals  
Transmissions will be duty cycled with 1 day on and 0 days off  
Daily allowance (1-message transmissions; unused xmits don't accumulate) = 500  
STATUS will be transmitted every 20 messages.  
Blocks of Time-Lines will be transmitted every 48 messages.  
Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
Upper limits of maximum-depth histogram bins are:  
20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
Upper limits of dive-duration histogram bins are:  
2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
Upper limits of time-at-depth histogram bins are:  
20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
\*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
Type D to archive depth readings, H to archive histograms: h

Unit is ready for deployment, disconnect cable and go for it...

**7. Unit number: 97-642. ARGOS geolocation id = 24099 Unit identifier = ms976429724099.**

Time (GMT) is 04:21:32.60.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> v  
 Battery voltage under light load = 7.130 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 7.099 Volts.  
 SL-TDR> a3  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 SL-TDR> o  
 Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
 SL-TDR> e  
 It is strongly recommended that you log the following information to a disk file so that you have a permanent copy of this setup. In PROCOMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a filename, a suggested name is 97-642.SET  
 After you have entered a filename, press return to continue.  
 SLTDR version: 3.14a  
 E4020E140404003C01001FFD810A0100  
 00010100000101000000000000010100  
 0000010100000000033010000480000  
 0139372D363432FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 F4010000000000000000000000000000  
 0000000000000000000000004070200B6  
 050A0F14191E23282D323F588AFF000E  
 020406080A0C0E101214191E28FF000E  
 050A0F14191E23282D323F588AFF000E  
 30030E610001020380FFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFF0788F0FF  
 6D73393736343239373234303939FFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4 meters  
 Software version 3.14a. Unit number: 97-642. ARGOS geolocation id = 24099

Unit identifier = ms976429724099. Unit started at 20:32:49 on 21/10/97  
 Time (GMT) is 04:22:21.61. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4 meters  
 SLTDR uses 1-sec / ¼-sec wakeups when shallower than 40 / 12 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:48.00 / 01:33.00  
 SLTDR will use on-land interval after 10 consecutive dry transmissions  
 SLTDR will suspend transmissions after 4 hours "hauled-out".  
 "Haul-out" ends  
 after SLTDR is "wet" for 4 successive at-sea transmission intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't accumulate) = 500  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
 Upper limits of maximum-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 Upper limits of dive-duration histogram bins are:  
 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h  
 Unit is ready for deployment, disconnect cable and go for it...

**8. Unit number: 97-595. ARGOS  
geolocation id = 24100 Unit identifier =  
ms975959724100**

Time (GMT) is 04:28:26.01.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> v  
 Battery voltage under light load = 7.168 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 7.136 Volts.  
 SL-TDR> a3  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 SL-TDR> o  
 Do you wish to allow any unused portion of your daily  
 transmission allowance  
 to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on  
 a  
 month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded  
 into  
 each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt  
 water may  
 exist in discrete layers? [n]  
 SL-TDR> e  
 It is strongly recommended that you log the following information  
 to a disk  
 file so that you have a permanent copy of this setup. In  
 PROCOMM you do this  
 by pressing the ALT-F1 key combination. You will then be  
 prompted for a  
 filename, a suggested name is 97-595.SET  
 After you have entered a filename, press return to continue.  
 SLTDR version: 3.14a  
 32020E140404003C010020FD7D0A0100  
 00010100000101000000000000010100  
 0000010100000000034010000490000  
 0139372D353935FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 F4010000000000000000000000000000  
 0000000000000000000000004070200A5  
 050A0F14191E23282D323F588AFF000E  
 020406080A0C0E101214191E28FF000E  
 050A0F14191E23282D323F588AFF000E  
 30030E61000102036AFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFF07891AFF  
 6D73393735393539373234313030FFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked  
 Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4  
 meters  
 Software version 3.14a. Unit number: 97-595. ARGOS  
 geolocation id = 24100

Unit identifier = ms975959724100. Unit started at 20:27:14 on  
 21/10/97  
 Time (GMT) is 04:28:57.17. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4  
 meters  
 SLTDR uses 1-sec / ¼-sec wakeups when shallower than 40 / 12  
 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:49.00 / 01:34.00  
 SLTDR will use on-land interval after 10 consecutive dry  
 transmissions  
 SLTDR will suspend transmissions after 4 hours "hauled-out".  
 "Haul-out" ends  
 after SLTDR is "wet" for 4 successive at-sea transmission  
 intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't  
 accumulate) = 500  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
 Upper limits of maximum-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
 meters  
 Upper limits of dive-duration histogram bins are:  
 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
 meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h

Unit is ready for deployment, disconnect cable and go for it...

**9. Unit number: 97-596. ARGOS geolocation id = 24101 Unit identifier = ms975969724101**

Time (GMT) is 03:59:29.50.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> v  
 Battery voltage under light load = 7.099 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 7.068 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 7.099 Volts.

SL-TDR> o  
 Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
 SL-TDR> o  
 Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
 SL-TDR>  
 SL-TDR> e  
 It is strongly recommended that you log the following information to a disk file so that you have a permanent copy of this setup. In PROCOMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a filename, a suggested name is 97-596.SET  
 After you have entered a filename, press return to continue.  
 SLTDR version: 3.14a  
 76020E140404003C01001FFD800A0100  
 00010100000101000000000000010100  
 00000101000000000035010000500000  
 0139372D353936FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 F4010000000000000000000000000000

```
0000000000000000000000000407020068
050A0F14191E23282D323F588AFF000E
020406080A0C0E101214191E28FF000E
050A0F14191E23282D323F588AFF000E
30030E61000102036BFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
6D73393735393639373234313031FFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
```

Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4 meters  
 Software version 3.14a. Unit number: 97-596. ARGOS geolocation id = 24101  
 Unit identifier = ms975969724101. Unit started at 03:59:47 on 23/10/97  
 Time (GMT) is 03:59:57.98. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4 meters  
 SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:50.00 / 01:35.00  
 SLTDR will use on-land interval after 10 consecutive dry transmissions  
 SLTDR will suspend transmissions after 4 hours "hauled-out". "Haul-out" ends  
 after SLTDR is "wet" for 4 successive at-sea transmission intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't accumulate) = 500  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
 Upper limits of maximum-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 Upper limits of dive-duration histogram bins are:  
 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h  
 Unit is ready for deployment, disconnect cable and go for it...

**10. Unit number: 97-597. ARGOS geolocation id = 24102 Unit identifier = ms975979724102.**

Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
 SL-TDR> t  
 Time (GMT) is 04:26:22.97.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> v  
 Battery voltage under light load = 7.130 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 7.099 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 7.099 Volts.  
 SL-TDR> a3  
 S.W. Resistance = 255, Depth (m) = 0  
 SL-TDR> e  
 It is strongly recommended that you log the following information to a disk file so that you have a permanent copy of this setup. In PROCOMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a filename, a suggested name is 97-597.SET  
 After you have entered a filename, press return to continue.  
 SLTDR version: 3.14a  
 FE020E140404003C01001FFD800A0100  
 00010100000101000000000000010100  
 00000101000000000029010000440000  
 0139372D353937FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 F4010000000000000000000000000000  
 0000000000000000000000004070200F5  
 050A0F14191E23282D323F588AFF000E  
 020406080A0C0E101214191E28FF000E  
 050A0F14191E23282D323F588AFF000E  
 30030E610001020380FFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFF0789BCFF  
 6D73393735393739373234313032FFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4

meters  
 Software version 3.14a. Unit number: 97-597. ARGOS geolocation id = 24102  
 Unit identifier = ms975979724102. Unit started at 21:13:27 on 21/10/97  
 Time (GMT) is 04:26:36.24. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4 meters  
 SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:44.00 / 01:29.00  
 SLTDR will use on-land interval after 10 consecutive dry transmissions  
 SLTDR will suspend transmissions after 4 hours "hailed-out".  
 "Haul-out" ends  
 after SLTDR is "wet" for 4 successive at-sea transmission intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't accumulate) = 500  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
 Upper limits of maximum-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 Upper limits of dive-duration histogram bins are:  
 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h  
 Unit is ready for deployment, disconnect cable and go for it...

**11. Unit number: 97-598. ARGOS geolocation id = 24103 Unit identifier = ms975989724103.**

Time (GMT) is 04:59:43.15.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> v  
 Battery voltage under light load = 7.068 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 7.068 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 7.068 Volts.  
 SL-TDR> a3  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 SL-TDR> o  
 Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
 SL-TDR> e  
 It is strongly recommended that you log the following information to a disk file so that you have a permanent copy of this setup. In PROCOMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a filename, a suggested name is 97-598.SET  
 After you have entered a filename, press return to continue.

SLTDR version: 3.14a  
 62020E140404003C01001FFD800A0100  
 00010100000101000000000000010100  
 0000010100000000028010000430000  
 0139372D353938FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 F4010000000000000000000000000000  
 0000000000000000000000004070200C6  
 050A0F14191E23282D323F588AFF000E  
 020406080A0C0E101214191E28FF000E  
 050A0F14191E23282D323F588AFF000E  
 30030E61000102037BFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFF0789EFFF  
 6D73393735393839373234313033FFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4 meters

Software version 3.14a. Unit number: 97-598. ARGOS geolocation id = 24103 Unit identifier = ms975989724103. Unit started at 20:13:46 on 21/10/97  
 Time (GMT) is 05:11:04.22. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4 meters  
 SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:43.00 / 01:28.00  
 SLTDR will use on-land interval after 10 consecutive dry transmissions  
 SLTDR will suspend transmissions after 4 hours "hauled-out". "Haul-out" ends after SLTDR is "wet" for 4 successive at-sea transmission intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't accumulate) = 500  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
 Upper limits of maximum-depth histogram bins are: 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 Upper limits of dive-duration histogram bins are: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are: 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h  
 Unit is ready for deployment, disconnect cable and go for it...

**12. Unit number: 97-599. ARGOS  
geolocation id = 24104, Unit identifier =  
ms975999724104.**

Time (GMT) is 04:50:15.48.

SL-TDR> d

Date (GMT) is 23 October 1997

SL-TDR> o

Do you wish to allow any unused portion of your daily  
transmission allowance

to be added to the next day's allowance? [n]

Do you wish to be able to set the daily transmission allowance on  
a

month-by-month basis? [n]

Enter number (0/6/10/14) of depth histogram bins: [14]

Enter number (0/6/10/14) of duration histogram bins: [14]

Enter number (0/6/10/14) of time-at-depth histogram bins: [14]

How many histograms or timeline messages should be encoded  
into

each transmission (1/2) [1]

Will the instrument be deployed in an area where fresh and salt  
water may

exist in discrete layers? [n]

SL-TDR> e

It is strongly recommended that you log the following information  
to a disk

file so that you have a permanent copy of this setup. In

PROCOMM you do this

by pressing the ALT-F1 key combination. You will then be  
prompted for a

filename, a suggested name is 97-599.SET

After you have entered a filename, press return to continue.

SLTDR version: 3.14a

F2020E140404003C01001FFD800A0100

00010100000101000000000000010100

00000101000000000027010000420000

0139372D353939FF000A0400000A0400

000A04000000100000010000000100

000A0A03010001000100020000000000

F40100000000000000000000000000

000000000000000000000407020073

050A0F14191E23282D323F588AFF000E

020406080A0C0E101214191E28FF000E

050A0F14191E23282D323F588AFF000E

30030E610001020380FFFFFFFFFFFFFFF

FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

FFFFFFFFFFFFFFFFFFFFFFFFF078A3BFF

6D73393735393939373234313034FFFF

FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked  
Time-Depth Recorder.

Unit measures depth from 0 to 980 meters with a resolution of 4  
meters

Software version 3.14a. Unit number: 97-599. ARGOS

geolocation id = 24104

Unit identifier = ms975999724104. Unit started at 20:29:55 on  
21/10/97

Time (GMT) is 04:50:50.57. Date (GMT) is 23 October 1997

Shallowest depth to be considered a "dive" = 8 meters

Deepest depth for accumulating surface-timelines (0=dry only) = 4  
meters

SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12  
meters

Local time [0-23 hours] corresponding to 00h UT (GMT): 14

Transmission intervals (at-sea / on-land) = 00:42.00 / 01:27.00  
SLTDR will use on-land interval after 10 consecutive dry  
transmissions

SLTDR will suspend transmissions after 4 hours "hailed-out".  
"Haul-out" ends

after SLTDR is "wet" for 4 successive at-sea transmission  
intervals

Transmissions will be duty cycled with 1 day on and 0 days off  
Daily allowance (1-message transmissions; unused xmits don't  
accumulate) = 500

STATUS will be transmitted every 20 messages.

Blocks of Time-Lines will be transmitted every 48 messages.

Hours when SLTDR transmits: 01-02,05-06,13-14,18-19

Upper limits of maximum-depth histogram bins are:

20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
meters

Upper limits of dive-duration histogram bins are:

2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes

Upper limits of time-at-depth histogram bins are:

20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
meters

\*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y

Type D to archive depth readings, H to archive histograms: h

Unit is ready for deployment, disconnect cable and go for it...

**13. Unit number: 97-600. ARGOS geolocation id = 24105 Unit identifier = ms976009724105.**

Time (GMT) is 04:43:37.00.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> v  
 Battery voltage under light load = 7.130 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 7.130 Volts.  
 SL-TDR> a3  
 S.W. Resistance = 255, Depth (m) = 4  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 SL-TDR> o  
 Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
 SL-TDR> e  
 It is strongly recommended that you log the following information to a disk file so that you have a permanent copy of this setup. In PROCOMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a filename, a suggested name is 97-600.SET  
 After you have entered a filename, press return to continue.  
 SLTDR version: 3.14a  
 B8020E140404003C01001FFD800A0100  
 00010100000101000000000000010100  
 0000010100000000026010000410000  
 0139372D363030FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 F4010000000000000000000000000000  
 000000000000000000000000407020049  
 050A0F14191E23282D323F588AFF000E  
 020406080A0C0E101214191E28FF000E  
 050A0F14191E23282D323F588AFF000E  
 30030E6100010203A0FFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFF078A68FF  
 6D73393736303039373234313035FFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4 meters  
 Software version 3.14a. Unit number: 97-600. ARGOS geolocation id = 24105

Unit identifier = ms976009724105. Unit started at 20:37:34 on 21/10/97  
 Time (GMT) is 04:43:50.43. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4 meters  
 SLTDR uses 1-sec / ¼-sec wakeups when shallower than 40 / 12 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:41.00 / 01:26.00  
 SLTDR will use on-land interval after 10 consecutive dry transmissions  
 SLTDR will suspend transmissions after 4 hours "hauled-out".  
 "Haul-out" ends  
 after SLTDR is "wet" for 4 successive at-sea transmission intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't accumulate) = 500  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
 Upper limits of maximum-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 Upper limits of dive-duration histogram bins are:  
 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h

Unit is ready for deployment, disconnect cable and go for it...

**14. Unit number: 97-601. ARGOS geolocation id = 24106 Unit identifier = ms976019724106.**

Time (GMT) is 03:56:12.90.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> v  
 Battery voltage under light load = 7.130 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 7.099 Volts.  
 SL-TDR> a3  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 SL-TDR> o  
 Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
 SL-TDR> e  
 It is strongly recommended that you log the following information to a disk file so that you have a permanent copy of this setup. In PROCOMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a filename, a suggested name is 97-601.SET  
 After you have entered a filename, press return to continue.  
 SLTDR version: 3.14a  
 16020E140404003C01001FFD800A0100  
 00010100000101000000000000010100  
 0000010100000000025010000400000  
 0139372D363031FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 F4010000000000000000000000000000  
 000000000000000000000000407020030  
 050A0F14191E23282D323F588AFF000E  
 020406080A0C0E101214191E28FF000E  
 050A0F14191E23282D323F588AFF000E  
 30030E610001020383FFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFF078A9DFE  
 6D73393736303139373234313036FFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4 meters  
 Software version 3.14a.  
 Unit started at 20:25:21 on 21/10/97

Time (GMT) is 03:56:36.45. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4 meters  
 SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:40.00 / 01:25.00  
 SLTDR will use on-land interval after 10 consecutive dry transmissions  
 SLTDR will suspend transmissions after 4 hours "hailed-out".  
 "Haul-out" ends  
 after SLTDR is "wet" for 4 successive at-sea transmission intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't accumulate) = 500  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
 Upper limits of maximum-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 Upper limits of dive-duration histogram bins are:  
 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h  
 Unit is ready for deployment, disconnect cable and go for it...

**15. Unit number: 97-602. ARGOS  
geolocation id = 24107 Unit identifier =  
ms976029724107.**

Time (GMT) is 04:07:06.73.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> v  
 Battery voltage under light load = 6.975 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 6.975 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 6.975 Volts.  
 SL-TDR> a3  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 S.W. Resistance = 255, Depth (m) = 0  
 SL-TDR> o  
 Do you wish to allow any unused portion of your daily  
 transmission allowance  
 to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on  
 amonth-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded  
 into  
 each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt  
 water may  
 exist in discrete layers? [n]  
 SL-TDR> e  
 It is strongly recommended that you log the following information  
 to a disk  
 file so that you have a permanent copy of this setup. In  
 PROCOMM you do this  
 by pressing the ALT-F1 key combination. You will then be  
 prompted for a  
 filename, a suggested name is 97-602.SET  
 After you have entered a filename, press return to continue.  
 SLTDR version: 3.14a  
 D6020E140404003C01001FFD7F0A0100  
 00010100000101000000000000010100  
 00000101000000005031010050460000  
 0139372D363032FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 F4010000000000000000000000000000  
 00000000000000000000000407020045  
 050A0F14191E23282D323F588AFF000E  
 020406080A0C0E101214191E28FF000E  
 050A0F14191E23282D323F588AFF000E  
 30030E610001020389FFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFF078ACEFF  
 6D73393736303239373234313037FFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked  
 Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4  
 meters  
 Software version 3.14a. Unit number: 97-602. ARGOS

geolocation id = 24107  
 Unit identifier = ms976029724107. Unit started at 20:36:30 on  
 21/10/97  
 Time (GMT) is 04:07:20.80. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4  
 meters  
 SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12  
 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:46.50 / 01:31.50  
 SLTDR will use on-land interval after 10 consecutive dry  
 transmissions  
 SLTDR will suspend transmissions after 4 hours "hailed-out".  
 "Haul-out" ends  
 after SLTDR is "wet" for 4 successive at-sea transmission  
 intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't  
 accumulate) = 500  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
 Upper limits of maximum-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
 meters  
 Upper limits of dive-duration histogram bins are:  
 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
 meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h  
 Unit is ready for deployment, disconnect cable and go for it...

**16. Unit number: 97-603. ARGOS  
geolocation id = 24108 Unit identifier =  
ms976039724108**

Time (GMT) is 04:01:51.60.  
SL-TDR> d  
Date (GMT) is 23 October 1997  
SL-TDR> o  
Do you wish to allow any unused portion of your daily  
transmission allowance  
to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on  
a  
month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded  
into  
each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt  
water may  
exist in discrete layers? [n]

SL-TDR> e  
It is strongly recommended that you log the following information  
to a disk  
file so that you have a permanent copy of this setup. In  
PROCOMM you do this  
by pressing the ALT-F1 key combination. You will then be  
prompted for a  
filename, a suggested name is 97-603.SET  
After you have entered a filename, press return to continue.

SLTDR version: 3.14a  
16020E140404003C01001FFD7E0A0100  
00010100000101000000000000010100  
00000101000000005032010005470000  
0139372D363033FF000A0400000A0400  
000A0400000001000000010000000100  
000A0A03010001000100020000000000  
F4010000000000000000000000000000  
0000000000000000000000040702002E  
050A0F14191E23282D323F588AFF000E  
020406080A0C0E101214191E28FF000E  
050A0F14191E23282D323F588AFF000E  
30030E610001020390FFFFFFFFFFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFF078B24FF  
6D73393736303339373234313038FFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked  
Time-Depth Recorder.

Unit measures depth from 0 to 980 meters with a resolution of 4  
meters  
Software version 3.14a. Unit number: 97-603. ARGOS  
geolocation id = 24108  
Unit identifier = ms976039724108. Unit started at 21:19:24 on  
21/10/97  
Time (GMT) is 04:02:18.03. Date (GMT) is 23 October 1997  
Shallowest depth to be considered a "dive" = 8 meters  
Deepest depth for accumulating surface-timelines (0=dry only) = 4  
meters  
SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12  
meters

Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
Transmission intervals (at-sea / on-land) = 00:47.05 / 01:32.50  
SLTDR will use on-land interval after 10 consecutive dry  
transmissions  
SLTDR will suspend transmissions after 4 hours "hailed-out".  
"Haul-out" ends  
after SLTDR is "wet" for 4 successive at-sea transmission  
intervals  
Transmissions will be duty cycled with 1 day on and 0 days off  
Daily allowance (1-message transmissions; unused xmits don't  
accumulate) = 500  
STATUS will be transmitted every 20 messages.  
Blocks of Time-Lines will be transmitted every 48 messages.  
Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
Upper limits of maximum-depth histogram bins are:  
20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
meters  
Upper limits of dive-duration histogram bins are:  
2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
Upper limits of time-at-depth histogram bins are:  
20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
meters  
\*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
Type D to archive depth readings, H to archive histograms: h

Unit is ready for deployment, disconnect cable and go for it...

**17. Unit number: 97-605. ARGOS  
geolocation id = 24110 Unit identifier =  
ms976059724110.**

Time (GMT) is 03:45:21.14.  
SL-TDR> d  
Date (GMT) is 23 October 1997  
SL-TDR> v  
Battery voltage under light load = 7.006 Volts.  
SL-TDR> v  
Battery voltage under light load = 6.975 Volts.  
SL-TDR> v  
Battery voltage under light load = 6.975 Volts.  
SL-TDR> a3  
S.W. Resistance = 255, Depth (m) = 4  
S.W. Resistance = 255, Depth (m) = 4  
S.W. Resistance = 255, Depth (m) = 4  
SL-TDR> t  
Time (GMT) is 03:46:59.46.  
SL-TDR> d  
Date (GMT) is 23 October 1997  
SL-TDR> v  
Battery voltage under light load = 6.975 Volts.  
SL-TDR> v  
Battery voltage under light load = 6.975 Volts.  
SL-TDR> v  
Battery voltage under light load = 6.975 Volts.  
SL-TDR> a3  
S.W. Resistance = 255, Depth (m) = 4  
S.W. Resistance = 255, Depth (m) = 0  
S.W. Resistance = 255, Depth (m) = 4  
S.W. Resistance = 255, Depth (m) = 0  
SL-TDR> o  
Do you wish to allow any unused portion of your daily  
transmission allowance  
to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a  
month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into  
each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt  
water may  
exist in discrete layers? [n]  
SL-TDR> e  
It is strongly recommended that you log the following information  
to a disk  
file so that you have a permanent copy of this setup. In  
PROCOMM you do this  
by pressing the ALT-F1 key combination. You will then be  
prompted for a  
filename, a suggested name is 97-605.SET  
After you have entered a filename, press return to continue.  
SLTDR version: 3.14a  
4E020E140404003C01001FFD7E0A0100  
00010100000101000000000000010100  
00000101000000005034010050490000  
0139372D363035FF000A0400000A0400  
000A0400000001000000010000000100  
000A0A03010001000100020000000000

F4010000000000000000000000000000  
0000000000000000000000000407020094  
050A0F14191E23282D323F588AFF000E  
020406080A0C0E101214191E28FF000E  
050A0F14191E23282D323F588AFF000E  
30030E610001020380FFFFFFFFFFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFF078B82FF  
6D73393736303539373234313130FFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked  
Time-Depth Recorder.  
Unit measures depth from 0 to 980 meters with a resolution of 4  
meters  
Software version 3.14a. Unit number: 97-605. ARGOS  
geolocation id = 24110  
Unit identifier = ms976059724110. Unit started at 20:22:32 on  
21/10/97  
Time (GMT) is 03:47:42.14. Date (GMT) is 23 October 1997  
Shallowest depth to be considered a "dive" = 8 meters  
Deepest depth for accumulating surface-timelines (0=dry only) = 4  
meters  
SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12  
meters  
Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
Transmission intervals (at-sea / on-land) = 00:49.50 / 01:34.50  
SLTDR will use on-land interval after 10 consecutive dry  
transmissions  
SLTDR will suspend transmissions after 4 hours "hailed-out".  
"Haul-out" ends  
after SLTDR is "wet" for 4 successive at-sea transmission  
intervals  
Transmissions will be duty cycled with 1 day on and 0 days off  
Daily allowance (1-message transmissions; unused xmits don't  
accumulate) = 500  
STATUS will be transmitted every 20 messages.  
Blocks of Time-Lines will be transmitted every 48 messages.  
Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
Upper limits of maximum-depth histogram bins are:  
20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
meters  
Upper limits of dive-duration histogram bins are:  
2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
Upper limits of time-at-depth histogram bins are:  
20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
meters  
\*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
Type D to archive depth readings, H to archive histograms: h  
  
Unit is ready for deployment, disconnect cable and go for it...

**18. Unit number: 97-606. ARGOS  
geolocation id = 24111 Unit identifier =  
ms976069724111**

Time (GMT) is 04:41:45.72.  
SL-TDR> d  
Date (GMT) is 23 October 1997  
SL-TDR> v  
Battery voltage under light load = 7.099 Volts.  
SL-TDR> v  
Battery voltage under light load = 7.099 Volts.  
SL-TDR> a  
Conversion intervals:  
  
1 = 0.1s, 2 = 0.5s, 3 = 1s, 4 = 5s, 5 = 10s, 6 = 30s, 7 = 60s  
Enter interval number:  
SL-TDR> a3  
S.W. Resistance = 255, Depth (m) = 0  
S.W. Resistance = 255, Depth (m) = 0  
S.W. Resistance = 255, Depth (m) = 0  
SL-TDR> o  
Do you wish to allow any unused portion of your daily  
transmission allowance  
to be added to the next day's allowance? [n]  
Do you wish to be able to set the daily transmission allowance on  
a  
month-by-month basis? [n]  
Enter number (0/6/10/14) of depth histogram bins: [14]  
Enter number (0/6/10/14) of duration histogram bins: [14]  
Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
How many histograms or timeline messages should be encoded  
into  
each transmission (1/2) [1]  
Will the instrument be deployed in an area where fresh and salt  
water may  
exist in discrete layers? [n]  
SL-TDR> e  
It is strongly recommended that you log the following information  
to a disk  
file so that you have a permanent copy of this setup. In  
PROCOMM you do this  
by pressing the ALT-F1 key combination. You will then be  
prompted for a  
filename, a suggested name is 97-606.SET  
After you have entered a filename, press return to continue.  
SLTDR version: 3.14a  
A8020E140404003C01001FFD800A0100  
00010100000101000000000000010100  
00000101000000005035010050500000  
0139372D363036FF000A0400000A0400  
000A0400000001000000010000000100  
000A0A03010001000100020000000000  
F4010000000000000000000000000000  
00000000000000000000000040702003D  
050A0F14191E23282D323F588AFF000E  
020406080A0C0E101214191E28FF000E  
050A0F14191E23282D323F588AFF000E  
30030E61000102037BFFFFFFFFFFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFF078BD1FF  
6D73393736303639373234313131FFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked

Time-Depth Recorder.  
Unit measures depth from 0 to 980 meters with a resolution of 4  
meters  
Software version 3.14a. Unit number: 97-606. ARGOS  
geolocation id = 24111  
Unit identifier = ms976069724111. Unit started at 20:54:27 on  
21/10/97  
Time (GMT) is 04:42:04.66. Date (GMT) is 23 October 1997  
Shallowest depth to be considered a "dive" = 8 meters  
Deepest depth for accumulating surface-timelines (0=dry only) = 4  
meters  
SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12  
meters  
Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
Transmission intervals (at-sea / on-land) = 00:50.50 / 01:35.50  
SLTDR will use on-land interval after 10 consecutive dry  
transmissions  
SLTDR will suspend transmissions after 4 hours "hailed-out".  
"Haul-out" ends  
after SLTDR is "wet" for 4 successive at-sea transmission  
intervals  
Transmissions will be duty cycled with 1 day on and 0 days off  
Daily allowance (1-message transmissions; unused xmits don't  
accumulate) = 500  
STATUS will be transmitted every 20 messages.  
Blocks of Time-Lines will be transmitted every 48 messages.  
Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
Upper limits of maximum-depth histogram bins are:  
20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
meters  
Upper limits of dive-duration histogram bins are:  
2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
Upper limits of time-at-depth histogram bins are:  
20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
meters  
\*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
Type D to archive depth readings, H to archive histograms: h  
  
Unit is ready for deployment, disconnect cable and go for it...

**19. Unit number: 97-607. ARGOS geolocation id = 24112 Unit identifier = ms976079724112.**

Time (GMT) is 04:48:13.22.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> v  
 Battery voltage under light load = 7.161 Volts.  
 SL-TDR> v  
 Battery voltage under light load = 7.161 Volts.  
 SL-TDR> a3  
 S.W. Resistance = 255, Depth (m) = -4  
 S.W. Resistance = 255, Depth (m) = -4  
 S.W. Resistance = 255, Depth (m) = 0  
 SL-TDR> o  
 Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]  
 SL-TDR> e  
 It is strongly recommended that you log the following information to a disk file so that you have a permanent copy of this setup. In PROCOMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a filename, a suggested name is 97-607.SET  
 After you have entered a filename, press return to continue.  
 SLTDR version: 3.14a  
 6A020E140404003C01001FFD800A0100  
 00010100000101000000000000010100  
 00000101000000005029010050440000  
 0139372D363037FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 F4010000000000000000000000000000  
 000000000000000000000000407020032  
 050A0F14191E23282D323F588AFF000E  
 020406080A0C0E101214191E28FF000E  
 050A0F14191E23282D323F588AFF000E  
 30030E610001020341FFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFF078C2AFF  
 6D73393736303739373234313132FFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4 meters  
 Software version 3.14a. Unit number: 97-607. ARGOS geolocation id = 24112

Unit identifier = ms976079724112. Unit started at 20:39:59 on 21/10/97  
 Time (GMT) is 04:48:30.22. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4 meters  
 SLTDR uses 1-sec / ¼-sec wakeups when shallower than 40 / 12 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:44.50 / 01:29.50  
 SLTDR will use on-land interval after 10 consecutive dry transmissions  
 SLTDR will suspend transmissions after 4 hours "hauled-out".  
 "Haul-out" ends  
 after SLTDR is "wet" for 4 successive at-sea transmission intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't accumulate) = 500  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
 Upper limits of maximum-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 Upper limits of dive-duration histogram bins are:  
 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h

Unit is ready for deployment, disconnect cable and go for it...

**20. Unit number: 97-608. ARGOS  
geolocation id = 24113 Unit identifier =  
ms976089724113.**

Time (GMT) is 04:31:10.66.  
SL-TDR> d  
Date (GMT) is 23 October 1997  
SL-TDR> v  
Battery voltage under light load = 6.930 Volts.  
SL-TDR> v  
Battery voltage under light load = 6.930 Volts.  
SL-TDR> v  
Battery voltage under light load = 6.930 Volts.  
SL-TDR> a3  
S.W. Resistance = 255, Depth (m) = 4  
S.W. Resistance = 255, Depth (m) = 4  
S.W. Resistance = 255, Depth (m) = 0  
SL-TDR> o  
Do you wish to allow any unused portion of your daily  
transmission allowance  
to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a  
month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded  
into  
each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt  
water may  
exist in discrete layers? [n]  
SL-TDR> e  
It is strongly recommended that you log the following information  
to a disk  
file so that you have a permanent copy of this setup. In  
PROCOMM you do this  
by pressing the ALT-F1 key combination. You will then be  
prompted for a  
filename, a suggested name is 97-608.SET  
After you have entered a filename, press return to continue.  
SLTDR version: 3.14a  
56020E140404003C01001EFD810A0100  
00010100000101000000000000010100  
00000101000000005028010050430000  
0139372D363038FF000A0400000A0400  
000A0400000001000000010000000100  
000A0A03010001000100020000000000  
F4010000000000000000000000000000  
00000000000000000000000040702009D  
050A0F14191E23282D323F588AFF000E  
020406080A0C0E101214191E28FF000E  
050A0F14191E23282D323F588AFF000E  
30030E610001020386FFFFFFFFFFFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFF078C79FF  
6D73393736303839373234313133FFFF  
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked  
Time-Depth Recorder.  
Unit measures depth from 0 to 980 meters with a resolution of 4  
meters

Software version 3.14a. Unit number: 97-608. ARGOS  
geolocation id = 24113  
Unit identifier = ms976089724113. Unit started at 20:34:37 on  
21/10/97  
Time (GMT) is 04:31:24.07. Date (GMT) is 23 October 1997  
Shallowest depth to be considered a "dive" = 8 meters  
Deepest depth for accumulating surface-timelines (0=dry only) = 4  
meters  
SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12  
meters  
Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
Transmission intervals (at-sea / on-land) = 00:43.50 / 01:28.50  
SLTDR will use on-land interval after 10 consecutive dry  
transmissions  
SLTDR will suspend transmissions after 4 hours "hauled-out".  
"Haul-out" ends  
after SLTDR is "wet" for 4 successive at-sea transmission  
intervals  
Transmissions will be duty cycled with 1 day on and 0 days off  
Daily allowance (1-message transmissions; unused xmits don't  
accumulate) = 500  
STATUS will be transmitted every 20 messages.  
Blocks of Time-Lines will be transmitted every 48 messages.  
Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
Upper limits of maximum-depth histogram bins are:  
20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
meters  
Upper limits of dive-duration histogram bins are:  
2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
Upper limits of time-at-depth histogram bins are:  
20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞  
meters  
\*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
Type D to archive depth readings, H to archive histograms: h  
  
Unit is ready for deployment, disconnect cable and go for it...

**21. Unit number: 97-610. ARGOS geolocation id = 24115 Unit identifier = ms976109724115**

Time (GMT) is 03:50:36.68.  
 SL-TDR> c  
 Unrecognizable command.  
 SL-TDR> d  
 Date (GMT) is 23 October 1997  
 SL-TDR> o  
 Do you wish to allow any unused portion of your daily transmission allowance to be added to the next day's allowance? [n]  
 Do you wish to be able to set the daily transmission allowance on a month-by-month basis? [n]  
 Enter number (0/6/10/14) of depth histogram bins: [14]  
 Enter number (0/6/10/14) of duration histogram bins: [14]  
 Enter number (0/6/10/14) of time-at-depth histogram bins: [14]  
 How many histograms or timeline messages should be encoded into each transmission (1/2) [1]  
 Will the instrument be deployed in an area where fresh and salt water may exist in discrete layers? [n]

SL-TDR> e  
 It is strongly recommended that you log the following information to a disk file so that you have a permanent copy of this setup. In PROCMM you do this by pressing the ALT-F1 key combination. You will then be prompted for a filename, a suggested name is 97-610.SET  
 After you have entered a filename, press return to continue.  
 SLTDR version: 3.14a  
 C8020E140404003C01001FFD800A0100  
 00010100000101000000000000010100  
 00000101000000005026010050410000  
 0139372D363130FF000A0400000A0400  
 000A0400000001000000010000000100  
 000A0A03010001000100020000000000  
 F4010000000000000000000000000000  
 000000000000000000000000407020053  
 050A0F14191E23282D323F588AFF000E  
 020406080A0C0E101214191E28FF000E  
 050A0F14191E23282D323F588AFF000E  
 30030E61000102037AFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF  
 FFFFFFFFFFFFFFFFFFFFFFFF078CDFFF  
 6D73393736313039373234313135FFFF  
 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

Quarter-Watt, Microprocessor-controlled Satellite-linked Time-Depth Recorder.  
 Unit measures depth from 0 to 980 meters with a resolution of 4 meters  
 Software version 3.14a. Unit number: 97-610. ARGOS geolocation id = 24115  
 Unit identifier = ms976109724115. Unit started at 20:51:54 on 21/10/97  
 Time (GMT) is 03:51:44.92. Date (GMT) is 23 October 1997  
 Shallowest depth to be considered a "dive" = 8 meters  
 Deepest depth for accumulating surface-timelines (0=dry only) = 4

meters  
 SLTDR uses 1-sec / 1/4-sec wakeups when shallower than 40 / 12 meters  
 Local time [0-23 hours] corresponding to 00h UT (GMT): 14  
 Transmission intervals (at-sea / on-land) = 00:41.50 / 01:26.50  
 SLTDR will use on-land interval after 10 consecutive dry transmissions  
 SLTDR will suspend transmissions after 4 hours "hauled-out".  
 "Haul-out" ends  
 after SLTDR is "wet" for 4 successive at-sea transmission intervals  
 Transmissions will be duty cycled with 1 day on and 0 days off  
 Daily allowance (1-message transmissions; unused xmits don't accumulate) = 500  
 STATUS will be transmitted every 20 messages.  
 Blocks of Time-Lines will be transmitted every 48 messages.  
 Hours when SLTDR transmits: 01-02,05-06,13-14,18-19  
 Upper limits of maximum-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 Upper limits of dive-duration histogram bins are:  
 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 25, 30, 40, ∞ minutes  
 Upper limits of time-at-depth histogram bins are:  
 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 252, 352, 552, ∞ meters  
 \*\*\*\* Check these parameters carefully \*\*\*\*. Ready to deploy? y  
 Type D to archive depth readings, H to archive histograms: h

Unit is ready for deployment, disconnect cable and go for it...

**7.2. Appendix II. Vital information for seals equipped with satellite-linked radio transmitters at PHR in 1997.**

Table 7.3.a.

PTT ID	Seal I.D.	Tag left	Tag right	Sex	Age (years)
5411	BC25	C25	C26	M	2
5412	BC39	C39	C040	M	2
5414	BC31	C31	C32	M	2
5416	BP33	P33	P34	M	1
5421	BC51	C51	C52	M	2
5422	BC05	C05	C06	F	2
5423	B1AS	1AS	1AT	F	15 <sup>a</sup>
5424	BA11	A61	A62	M	14
24098	B5AW	5AW	5AX	M	15 <sup>a</sup>
24099	BF32	F76	F77	M	9
24100	BK07	K47	K48 & K07	F	12
24101	BN71	N92 & N71	N91 & N70	M	10
24102	B2AG	2AG	2AH	F	9
24103	B1AE	1AE	1AF	M	15 <sup>a</sup>
24104	BA19	A70	A71	M	14
24105	B5BA	5BA	5BB	F	12 <sup>a</sup>
24106	B6AE	6AE	6AF	F	15 <sup>a</sup>
24107	BL34	L34 & L75	L41 & L76	F	11
24108	BF24	F78 & F96	F79	M	9
24110	B1AY	1AY	1AZ	F	15 <sup>a</sup>
24111	B6AA	6AA	6AB	F	15 <sup>a</sup>
24112	B2AY	2AY	2AA	F	12-18 <sup>a</sup>
24113	B3AC	3AC	3AD	M	15 <sup>a</sup>
24115	BN48	N48 & N87	N49 & N86	M	10

<sup>a</sup>Estimate; actual age between 12 and 18 years (M. Craig, pers. comm.; in litt. 27 April 1998).

TABLE 7.3.b.

PTT I.D. SDR I.D.	PTT System #	Tran. Freq.	PTT	PTT Mfr. Power (W)	Date PTT Deployed	Location PTT Deployed (ddmmyy)	Tracking period end
5411	395376A	164.374		250	Telonics	S.E. ISLAND	8 Feb 98
5412	408464A	164.214		250	Telonics	LITTLE N. IS	7 Feb 98
5414	414643A	164.682		250	Telonics	S.E. ISLAND	5 Feb 98
5416		164.874		250	WC <sup>1</sup>	S.E. ISLAND	23 Feb 98
5421		164.964		250	WC	S.E. ISLAND	6 Jan 98
5422		164.903		250	WC	S.E. ISLAND	18 Feb 98
5423		164.434		400	WC	S.E. ISLAND	>30 Mar 98
5424		164.714		400	WC	GRASS ISLAND	>30 Mar 98
24098		164.943		400	WC	S.E. ISLAND	28 Oct 98
24099	Post-deployment Failure	164.296		400	WC	S.E. ISLAND	>30 Mar 98
24100		164.657		400	WC	GRASS ISLAND	>30 Mar 98
24101		164.892		400	WC	S.E. ISLAND	15 Feb 98
24102		164.393		400	WC	SEAL-KITTERY	18 Nov 98
24103	Post-deployment Failure	164.813		400	WC	SEAL-KITTERY	>29 Mar 98
24104		164.853		400	WC	S.E. ISLAND	17 Feb 98
24105		164.792		400	WC	GRASS ISLAND	>30 Mar 98
24106		164.454		400	WC	GRASS ISLAND	>30 Mar 98
24107		164.923		400	WC	GRASS ISLAND	12 Feb 98
24108	Post-deployment Failure	164.113		400	WC	S.E. ISLAND	3 Dec 98
24109	Pre-Deployment Failure			400	WC		
24110		164.753		400	WC	GRASS ISLAND	>30 Mar 98
24111		164.323		400	WC	GRASS ISLAND	>30 Mar 98
24112		164.674		400	WC	SEAL-KITTERY	>30 Mar 98
24113		164.313		400	WC	SEAL-KITTERY	>30 Mar 98
24114	Pre-Deployment Failure			400	WC		
24115		164.734		400	WC	SEAL-KITTERY	18 Feb 98

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<sup>1</sup>Wildlife Computers, Woodinville WA.

Table 7.3.c.<sup>2</sup>

PTT I.D.	Seal I.D.	Sex	Age (years)	Std. Length (cm) <sup>3</sup>	Ax. Girth (cm) <sup>1</sup>	Date PTT deployed	Resighting/recovery measurements (cm)	Date (ddmmyy)
							Std. Length	Ax. Girth
5411 <sup>4</sup>	BC25	M	2	166.5	100	271097		
5412 <sup>5</sup>	BC39	M	2	157	95	021197	156	102
5414 <sup>6</sup>	BC31	M	2	146.5	103.5	261097		
5416 <sup>7</sup>	BP33	M	1	155	102	301097	159	97
5421 <sup>8</sup>	BC51	M	2	148	94	261097	157.5	98
5422 <sup>9</sup>	BC05	F	2	158.5	96	281097	161	101
5423 <sup>10</sup>	B1AS	F	15	215.5	140	301097		

<sup>2</sup>Recovery and Feb. 98 resighting information collected by M. Craig, NMFS/SWFSC, Honolulu Laboratory.

<sup>3</sup>Measurements at deployment.

<sup>4</sup>Seal seen on 21 Feb 98. PTT and hose clamp missing, all mesh still attached.

<sup>5</sup>PTT retrieved from seal on 21 Feb 98 at North Island.

<sup>6</sup>Seal seen on 21 Feb. 98. PTT and hose clamp gone, all mesh still attached.

<sup>7</sup>PTT retrieved from seal on 21 Feb. 98 at North Island.

<sup>8</sup>PTT retrieved from seal on 21 Feb 98 at S.E. Island.

<sup>9</sup>PTT retrieved from seal on 17 Feb 98 at S.E. Island.

<sup>10</sup>Seal seen at Grass Island on 16 Feb 98; PTT still attached.

Table 7.3.c.(continued)<sup>1</sup>

PTT I.D.	Seal I.D.	Sex	Age (years)	Std. Length (cm) <sup>2</sup>	Ax. Girth (cm) <sup>1</sup>	Date PTT deployed	Resighting/recovery measurements (cm)	
							Std. Length	Ax. Girth
5424 <sup>11</sup>	BA11	M	14	213	138	271097		
24098 <sup>12</sup>	B5AW	M	15	211	139	261097	213.5	152
24099 <sup>13</sup>	BF32	M	9	204	120	251097		
24100 <sup>14</sup>	BK07	F	12	225.5	154	011197		
24101 <sup>15</sup>	BN71	M	10	192.5	133.5	261097		
24102 <sup>16</sup>	B2AG	F	9	206	129	011197	196.5	136
24103 <sup>17</sup>	B1AE	M	15	205	132.5	281097		

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<sup>11</sup>Seal seen at Seal-Kittery on 16 Feb 98; PTT still attached.

<sup>12</sup>PTT retrieved from seal on 20 Feb 98 at S. E. Island.

<sup>13</sup>Seal seen at Little North Island on 21 Feb 98; PTT still attached.

<sup>14</sup>Seal seen at Grass Island on 23 Feb 98; PTT still attached.

<sup>15</sup>Seal seen on 22 Feb 98 at Grass Island; PTT missing and most mesh gone. Small area where hair missing.

<sup>16</sup>PTT retrieved from seal on 16 Feb 98 at Grass Island.

<sup>17</sup>Seal seen on 16 Feb 98 at Seal-Kittery; PTT still attached.

Table 7.3.c.(continued)<sup>1</sup>

PTT I.D.	Seal I.D.	Sex	Age (years)	Std. Length (cm) <sup>2</sup>	Ax. Girth (cm) <sup>1</sup>	Date PTT deployed	Resighting/recovery measurements (cm)	Date (ddmmyy)
							Std. Length	Ax. Girth
24104 <sup>18</sup>	BA19	M	14	207	141	311097	203	151.5
24105 <sup>19</sup>	B5BA	F	12	212.5	138.5	261097		
24106 <sup>20</sup>	B6AE	F	15	218.5	137	011197		
24107 <sup>21</sup>	BL34	F	11	212	139	271097		
24108 <sup>22</sup>	BF24	M	9	207.5	122	301097	206	132
24110 <sup>23</sup>	B1AY	F	15	213	126	271097		
24111 <sup>24</sup>	B6AA	F	15	223.5	142.5	011197		

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<sup>18</sup>PTT retrieved from seal on 17 Feb 98 at S. E. Island

<sup>19</sup>Seal seen on 16 Feb 98 at Grass Island; PTT still attached.

<sup>20</sup>Seal seen on 16 Feb 98 at Grass Island; PTT still attached.

<sup>21</sup>Seal seen on 16 Feb 98 at Seal Kittery Island; PTT not attached but found with mesh at Grass Island.

<sup>22</sup>PTT retrieved from seal on 19 Feb 98 at S.E. Island.

<sup>23</sup>Seal seen on 16 Feb 98 at Grass Island; PTT still attached.

<sup>24</sup>Seal seen on 19 Feb 98 at Grass Island; PTT still attached.

Table 7.3.c.(continued)<sup>1</sup>

PTT I.D.	Seal I.D.	Sex	Age (years)	Std. Length (cm) <sup>2</sup>	Ax. Girth (cm) <sup>1</sup>	Date PTT deployed	Resighting/recovery measurements (cm)	Date (mmddy)
							Std. Length	Ax. Girth
24112 <sup>25</sup>	B2AY	F	12-18	217.5	127.5	281097		
24113 <sup>26</sup>	B3AC	M	15	206.5	129.5	281097		
24115 <sup>27</sup>	BN48	M	10	207	123	281097		

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<sup>25</sup>Seal seen on 19 Feb 98 at Grass Island; PTT still attached.

<sup>26</sup>Seal seen on 16 Feb 98 at Seal-Kittery; PTT still attached.

<sup>27</sup>Seal seen on 15 Feb 98 at S.E. Island; PTT and all mesh gone but hair not damaged.