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ANNUAL REPORT OF THE 1994 WESTERN PACIFIC LOBSTER FISHERY

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PREFACE

The Fishery Management Plan (FMP) for the western Pacific crustacean fisheries was prepared by the Western Pacific Regional Fishery Management Council (Council) and went into effect in 1983. Lobster permits are issued by the Regional Director (RD), Southwest Region, National Marine Fisheries Service (SWR, NMFS). These permits allow lobster fishing operations in the U.S. Exclusive Economic Zone (EEZ) from 3 to 200 nmi offshore American Samoa, Guam, Hawaii, the Northern Mariana Islands, and U.S. possessions in the western Pacific. The Fishery Management and Economics Program (FMEP) of the Honolulu Laboratory, Southwest Fisheries Science Center, NMFS, NOAA, collects biological and economic information exclusively from vessels permitted to fish in the Northwestern Hawaiian Islands (NWHI). All information presented in this report pertains only to NWHI since no Federally permitted lobster vessels fished in the main Hawaiian Islands (MHI), American Samoa, Guam, or the U.S. Pacific Island possessions.

In addition to the FMEP, other NMFS agencies contributed to this report: The Stock Assessment Program of the Honolulu Laboratory provided a summary of the biological research and quota assessment on the fishery, and Alvin Z. Katekaru of the SWR, Pacific Area Office, (PAO), NMFS, provided information on administrative activities. Bunny Lowman of the Council's staff prepared information on Council activities, and Southwest Enforcement (SWE), NMFS, furnished details on enforcement operations.

CONTENTS

	Page
Introduction	1
Recent Developments	1
Landings and Revenue	3
Fishing Effort	4
CPUE	4
Vessel Operations	5
Economic Information	5
Quota Information	6
Research	7
Biological Research	7
Endangered and Threatened Species Interactions	8
Western Pacific Regional Fishery Management Council (Council) Activities	8
Administrative Activities	10
Enforcement Activities	10
Acknowledgments	11
Citations	11
Tables	13
Figures	25

INTRODUCTION

The Northwestern Hawaiian Islands (NWHI) are an isolated range of islands, islets, banks, and reefs which extend 1,500 nmi northwest of the main Hawaiian islands from Nihoa Island to Kure Atoll (Fig. 1). The commercial lobster fishery has operated in the NWHI for almost 17 years, targeting primarily two species: spiny lobster, *Panulirus marginatus*, and common slipper lobster, *Scyllarides squammosus* (henceforth referred to as slipper lobster). Two other species--green spiny lobster, *P. pencillatus*, and ridgeback slipper lobster, *S. haanii*, are caught incidentally in low abundance.

This report details commercial lobster fishing activity in the Exclusive Economic Zone (EEZ) of the NWHI. Current catch, effort, and revenue statistics are based on federal logbook data and revenue reports. Statistics are presented for the main target species in tabular format, and brief summaries illustrate key points. Evaluations of current conditions of the fishery are also provided. This report concludes with separate sections on administrative and enforcement activities in the fishery.

RECENT DEVELOPMENTS

During the past 2 years, the NWHI lobster fishery has faced two major developments: a complete closure in 1993 and an emergency closure after the season opened in 1994. The 1993 closure was under the standing procedures of the FMP when the preseason estimate of catch rates in the fishery resulted in a zero quota. No trips were taken in 1993 although a small amount of live lobster was landed in January 1993 from trips initiated in 1992. The 1994 closure occurred when in-season reports of catch rates were less than those anticipated by the stock assessment, leading to an emergency closure 8 weeks into the fishery. The fishery remained closed for the remainder of 1994 and there is a minimal quota for 1995 with the fishery operating under an experimental permit system. The quota setting procedure is being evaluated by the NMFS and the Council during 1995 with a new quota system expected for the 1996 fishing season.

The fishery and environmental causes of the 1993 closure are discussed in Haight and Polovina (1992). In brief, stock assessment biologists believe that the spawning stock biomass at Maro Reef (a major bank in the NWHI lobster fishery) declined dramatically due to poor post-larval recruitment and subsequent fishing down of the remaining population in the years following 1986. The recruitment problem appears associated with a shift in oceanographic regime (higher sea level heights) which changed patterns of larvae lobster transport.

In 1994, the Stock Assessment Program, NMFS Honolulu Laboratory, used a dynamic production model to simulate the effect of the 1993 closure on the lobster population and to estimate a CPUE value for the start of the 1994 fishing season. Based on the model estimate of July 1994 CPUE, the preseason or initial quota forecast of 200,000 spiny and slipper lobsters combined was announced in the *Federal Register* (59 FR 6912) on February 14, 1994. In May 1994, the annual lobster assessment expedition conducted by the NOAA ship *Townsend Cromwell* to the NWHI found CPUE values at Necker Island and Maro Reef to be very close to those predicted by the dynamic production model. However, after the commercial lobster fishery opened on July 1, 1994, CPUE values during the first month based on call-in catch reports were below the model forecast CPUE and also fell below the FMP target CPUE level of 1.0 lobsters per trap-haul.

Although the FMP contains procedures for closing the fishery if the catch in the first month of fishing exceeds the final quota when it is calculated, NMFS decided to close the lobster fishery through emergency action because the actual catch (131,000 lobsters) during the months of July and August had substantially exceeded the final quota 21,000 lobsters (only 10% of the initial quota). As a result, the fishery was closed on August 25, 1994 on an emergency basis after less than 8 weeks of fishing.

During the 1994 lobster season, only 5 of the 15 permit holders fished (the fewest number of permittees who have participated in the fishery since the lobster FMP was implemented) with resulting landings and revenue also at the lowest level in the history of the FMP-regulated fishery. The other 10 permit holders decided to sit out the 1994 lobster season or participate in other fisheries primarily because of the low quota and shortened fishing season.

Following the 1994 season, the Council proposed Amendment 8 to the FMP for the Crustacean Fisheries of the Western Pacific Region. The amendment proposed three changes in the FMP: a framework approach to the annual quota system, revocation of the use-it-or-lose-it requirement for permit holders, and changes to various arrival notification procedures. However, some of the quota management-related provisions of Amendment 8 were not approved by NMFS (see Western Pacific Regional Fishery Management Council Activities section for further details).

Several concerns related to the quota management system were identified by NMFS and industry representatives alike as a result of the 1994 lobster season. The wide disparity between the initial quota (200,000 lobsters) and the final quota (21,000) lobsters) shows that the quota determination methods can be extremely susceptible to small changes in CPUE. The purpose of the initial quota was to provide an early indication or forecast of the expected quota so that fishermen could decide whether to

fish when the season opens in July. The excessive differences between the initial and final quota resulted in much skepticism about the usefulness of the preseason quota in the NWHI lobster FMP and caused much speculation about the outcome of the 1994 season if all 15 of the NWHI lobster permit holders had decided to fish.

The majority of the fishermen who participated in the 1994 lobster season as well as several non-participants felt that they should have been given the lower quota figure initially or given at least a more consistent figure so that they could have made better decisions. The order of magnitude higher quota tended to cause some operators to believe that the initial quota represented at least the minimum number of lobsters available for harvest. For most participants, drastically reducing the quota mid-season after so much time and effort had been expended to gear up to fish for lobster was very disappointing. In general, fishermen felt that they lost at least 3 to 4 months of fishing time which could have been used more profitably in another fishery.

At the close of the 1994 season, fishermen reported that slipper lobster stocks appeared much healthier than spiny lobster stocks and expressed interest in having separate quotas for slipper and spiny lobsters or perhaps separate quotas for designated banks and islands. Other concerns involved marketing difficulties, which for some operators were particularly troublesome because of the abbreviated season. More than half the participants resorted to consigning their product with brokers on the mainland and then having to wait for 3 months to realize any sales. A number of these issues are being considered in 1995 as the Council and NMFS review the quota system.

LANDINGS AND REVENUE

The total combined landings of legal lobsters in number, pounds (wet weight), and ex-vessel revenue during 1983-94 are shown in Table 1. NWHI fleet landings and revenue of spiny and slipper lobsters in pounds and metric tons (t) are presented in Table 2. (Tables 1 and 2 contain updates from Clarke and Pooley, 1988; Clarke, 1989; and Landgraf et al., 1990). Estimated landings, ex-vessel prices, and ex-vessel revenue by product type (frozen tails, frozen whole and live) are shown in Table 3. The long-term trend in annual landings is shown in Figure 2, and long-term revenue is shown in Figure 3.

During the July-August 1994 season, 131,000 legal spiny and slipper lobsters were landed, having a total estimated weight of 72 t and a total gross revenue of $837,000. No direct comparison can be made to 1993 because of the fishery closure that year, but during the same monthly (July-August) in 1992, approximately

220,800 legal lobsters (106 t) were landed at a value of $1.1 million.

FISHING EFFORT

Fishing effort in 1994 was the lowest since 1983 (Fig. 4). Out of the 15 vessels with limited entry lobster permits issued under the new management system in 1992, only 5 vessels fished. The average number of trap-hauls per fishing day for 1994 was 847, compared to 808 in 1992. Total effort in 1994 was 168,500 trap-hauls compared to 721,700 in 1992.

Effort was mainly concentrated on two banks--Gardner Pinnacles and Necker Island--and is reflected in the CPUE by area (Table 4). Annual fishing data collected from vessel logbooks indicate there were only 199 fishing days during 1994 because of the emergency closure of the fishery in August by the NMFS (the lowest in the history of the fishery (Table 5).

CPUE

Table 4 shows 1994 CPUE by area except for confidential data which is combined under "other" because fewer than three vessels fished in some areas.

Combined CPUE increased to 0.78 in 1994 compared to the 1992 showing of 0.59 but still failed to compete with the totals of the years prior to 1990 (Fig. 5). The CPUE for legal spiny lobster rose to 0.51 and increased slightly to 0.27 for legal slipper lobster (Table 4).

Commercial lobster fishing logbooks for the first month of the 1994 season indicated that CPUE was 0.50 for legal lobsters per trap-haul, the lowest recorded during that period since 1983 (when such data were first recorded). By comparison, the CPUE for the same period in 1991 and 1992 was 0.54 and 0.51, respectively.

Research survey information and commercial fishing logbook data have indicated that recruitment of lobster to the NWHI varies considerably between banks. Necker Island recruitment has remained fairly strong since 1985. Necker Island had a legal spiny lobster CPUE of 0.61 in 1994; higher than any of the other areas. Gardner Pinnacles followed with a CPUE of 0.43 and all other areas combined had a CPUE of 0.36 (Table 4). Historically, Maro Reef accounts for approximately 40% of the catch from the NWHI but has had comparatively low CPUE since 1990, although the number of legal slipper lobsters caught increased during 1994 to 0.95 compared to the 1992 showing of 0.65.

VESSEL OPERATIONS

Sea days analysis of the NWHI lobster fleet in 1994 is reported only in "unadjusted" modes (Table 6). In previous annual reports, adjusted data "annualized" trip activity was presented by deleting incomplete or experimental trips and by projecting partial year participation for individual vessels to a full year's activity. However, adjusted data were not included the past 3 years because of the fishery closures. Based on unadjusted data, the number of fishing days per vessel was lower for all classes of vessels for 1994 compared to previous years, primarily a result of the shortened fishing season. Operations for class I and III vessels that participated in the fishery are not included in the vessel operations figures because fewer than three vessels fished.[1]

Table 7 indicates entry and exit patterns of NWHI lobster vessels during 1990-94 (the period in which the fishery started to show dramatic declines in catch and effort) (Dollar et al., 1992).

ECONOMIC INFORMATION

In 1994, as in most of the previous years, frozen spiny lobster tails represented the predominate product of the NWHI lobster fishery and accounted for the largest source of income (71% of sales), whereas frozen slipper lobster tails were second, representing about 29%. Only a few live lobsters were landed (< 1%), and no frozen whole lobsters were sold. Landings of spiny tails in the 6-8 oz. range were the most prevalent and in the most demand, with the 8-10 oz. and 4-6 oz. sizes representing second and third place. Frozen spiny tails in the 4-6 oz. range and below category, however, seem to have more marketing obstacles because of increasing "cold water" imports of frozen tails in this size range at more competitive prices.

Changing market conditions greatly influence the price and salability of seafood products. During 1993 and early 1994 there was a significant shortage of frozen Hawaii lobster tails due to the fishery closure in 1993. Nonetheless, market conditions and prices in 1994 did not meet fishermen's expectations. Vessel operators anticipated prices beginning at $19.00 per pound for spiny lobster tails during the 1994 season since the peak price was $18.80 for this product in 1992. However, the peak price in 1994 reached only $16.50 (Fig. 6). Demand for 4-6 oz. and 6-8 oz. size tails was fairly strong, and the overall average price for spiny tails was $16.34 (up from $14.25 in 1992). To secure

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[1]Vessels were categorized into size, activity, and class by Clarke and Pooley (1988): classes I and I-S are the largest vessels.

this price and move their product, however, several vessel operators had to utilize consignment brokers on the U.S. mainland, thus substantially delaying payment. Operators also complained that there seemed to be little intra-industry cooperation in the promotion of Hawaii lobster products.

Brokers, on the other hand, said that the 1993 closure hurt the Hawaii lobster product both locally and in mainland U.S. markets since the lobsters are no longer available on a timely and consistent basis in the quantities and sizes preferred by restaurants and other retailers. Because of this, one broker decided to quit handling Hawaii lobster products. In general, almost everyone in the industry was unhappy with the impact of the seasonal and full-year closures on the market for Hawaii lobsters.

The market for Hawaiian slipper lobster tails was somewhat more predictable in 1994. Since there is only one closely competitive product (the Brazilian slipper lobster, *S. brasiliensis*), the effect of competitive products on Hawaiian slipper tail prices tends to be insignificant. All the vessels that fished found immediate markets at comparable prices upon landing. Ex-vessel prices tended to be about a dollar or so higher than the 1992 market (in the $9 per pound range) with the exception of a few vessels products that were sold for slightly higher prices. Slipper tails in the 4-6 oz. category, representing the largest number of Hawaii slipper lobster landings, were most in demand with the 6-8 oz. and 8-10 oz. categories ranking second and third.

QUOTA INFORMATION

The Stock Assessment Investigation of the Honolulu Laboratory is responsible for calculating the preliminary and final quota for the NWHI commercial lobster fishery. The average CPUE used to calculate the final quota for 1994 was based on catch rates in the commercial fishery during the first month of fishing in July 1994. The reported CPUE data from the five active vessels were weighted to adjust for the distribution of effort throughout NWHI. The weighted average CPUE of 0.91 was divided by the "catchability" coefficient to estimate a population of 1,241,600 legal lobsters. Because this population is less than that needed to maintain a target CPUE of 1.0 lobster/trap, the 1994 quota became 20,900 lobsters (Haight et al., 1995).

The initial catch quota for the 1995 NWHI lobster fishing season as determined by the Stock Assessment Investigation, using Amendment 7 quota procedures (Dollar, 1993), is 38,500 lobsters (legal spiny and slipper lobsters combined). The preliminary quota figure was submitted to the NMFS Southwest Region in January 1995 for evaluation and further action. Because of the

low number of lobsters available for harvest, the difficulty of closing the fishery to prevent exceeding a small quota, and other considerations, NMFS determined that the most effective management approach was to announce a zero initial and final quota and allow no open fishing season during 1995. However, the *Townsend Cromwell* will be conducting its annual NWHI lobster assessment survey from June 22-July 16, 1995 and NMFS has invited NWHI lobster permit holders to participate in a controlled, experimental fishing program during July 1995 for the purpose of improving stock assessment and helping to determine the 1996 quota.

RESEARCH

Biological Research[2]

The NMFS Honolulu Laboratory collected fishery independent information on the biology and relative population size of lobster in the NWHI during annual research surveys 1983-88 and 1990-94. Research on lobster trapping conducted by the *Townsend Cromwell* provided data on species composition, length frequency, sexual development, and CPUE at quadrants standardized temporally, spatially, and by gear type at several locations in the NWHI. In 1994, research trapping was conducted at standardized quadrants at Maro Reef and Necker Island during May 8-28, 1994. Additional exploratory trapping for juvenile lobsters was conducted from small boats in the shallow lagoon at Maro Reef, continuing a time series of data collection which began in 1993.

At Necker Island, juvenile spiny lobster (< age 3) appear to occupy the same habitat as the adults, which increases the probability of juveniles being caught in the commercial fishery. At Maro Reef, juvenile lobster appear to utilize shallow reef areas. In 1993, an area of high juvenile abundance was located during exploratory research trapping in the shallows of Maro Reef. In 1994, the same lagoonal areas were fished, and the area of high juvenile abundance was extensively surveyed. Of the shallow lagoon areas trapped in 1994, only the northwest reef spur site exhibited high juvenile CPUE values. It appears that the juvenile lobster are associated with the north portion of the reef spur and are more abundant in shallow waters next to the spur. The deeper station to the south of the spur had relatively low CPUE values compared to the shallow water stations.

A significant reduction in research CPUE values for all spiny lobster age classes at Maro Reef was first observed in 1990. The depressed CPUE continued from 1991 through 1994. This

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[2]This section is excerpted directly from Haight, Dinardo, and Wetherall (1995)

trend has persisted despite significant reductions in commercial fishing effort at Maro Reef during 1991-92 and 1994 and a fishery closure in 1993. A similar trend was seen at Laysan Island, 70 nmi to the northwest, an area which has been closed to commercial harvest since the beginning of the commercial fishery. Reductions in CPUE of age-2 to age-4 spiny lobster were first observed at Laysan Island in 1991, consistent with the declines seen at Maro Reef. In contrast, recruitment of age-2 lobster to Necker Island, 360 nmi to the southeast of Maro Reef, remained fairly constant throughout the time series. Recent research indicates recruitment of spiny lobster to Maro Reef is correlated with the strength of the subtropical countercurrent, suggesting that meso-scale oceanographic features may impact the transport or survival of lobster larvae during their 11-12 month pelagic larval cycle. Continued stable recruitment of spiny lobster to Necker Island suggests that the lower southeast end of the NWHI is not linked to the same recruitment process as the northwest end of the archipelago (Haight, 1995). Since spiny lobsters are the primary target of the NWHI commercial lobster fishery, the main focus of the biological research has been to study this species. However, since there has been increasing interest in initiating a fishery with separate quotas for slipper lobsters, biological research on this species will possibly be conducted in the near future.

ENDANGERED AND THREATENED SPECIES INTERACTIONS

Summaries of interactions with endangered and threatened species in the NWHI lobster fishery are based on information received from the daily lobster catch reports and are outlined in Table 8.

It should be noted that these data are unedited and that fishermen most likely see greater numbers of protected species than are indicated in the catch reports. Most often, sightings of protected species are not reported by fishermen who do not want to take the time to record them due to typically busy fishing conditions. Either no interactions occurred, or perhaps fishermen did not want to report any incidental interaction with protected species for fear of being prosecuted by NMFS. Consequently, the numbers of sightings or interactions shown are not necessarily an accurate indicator of the actual number of encounters between fishermen and protected species. The degree to which sightings of or interactions with protected species are not reported or underreported is unknown.

WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL (COUNCIL) ACTIVITIES

The Council is the policy-making organization for the management of fisheries in the EEZ around American Samoa, Guam,

Hawaii, the Northern Mariana Islands, and other U.S. island possessions in the Pacific. The Council prepares and modifies Fishery Management Plans (FMPs) for domestic and foreign fishing in the region based on advice from scientific and industry advisors as well as input from the general public. Regulations are administered by the National Marine Fisheries Service, and are enforced jointly by agents of the U.S. Coast Guard and National Marine Fisheries Service. In addition, the Hawaii Division of Conservation and Resources Enforcement and the Hawaii State Marine Patrol provide assistance in enforcing FMP regulations under a cooperative agreement between the State and NMFS. The FMP for crustaceans (primarily lobsters) was implemented in 1983 and has been amended 8 times as conditions in the fishery have changed.

Amendment 8 was submitted to the Secretary of the Department of Commerce to review in July 1994. The changes to the limited entry program and quota management system proposed in Amendment 8 were recommended during a 1993 review of the operational details of the fishery under limited entry and quota management. Provisions included elimination of the landing requirement for limited entry permit renewal, and establishment of framework procedure for considering modification to the quota management (i.e., adjustments to the target CPUE or allowing some level of fishing when the initial quota was zero). The Council decided to remove the landing requirement since it forces fishermen to participate in the fishery at least every other year, even if the stocks can support only a very limited annual quota. The framework procedures were proposed to improve the Council's ability to respond to changing conditions and use the best scientific information available. Amendment 8 also proposed modifying notification and reporting procedures to improve data collection, as well as enforcement and administration.

In October 1994, the NMFS Southwest Regional Director informed the Council that Amendment 8 had been partially disapproved. Approved provisions included the elimination of the landing requirement and modifications to the notification and reporting procedures. The final rule implementing these measures was published in the *Federal Register* on November 10, 1994, and became effective on December 12, 1994.

Neither of the proposed framework provisions were approved. The regional director cited the recent decrease in recruitment and the Council's decision to review the quota system as reasons why the provisions were neither necessary nor appropriate for management of the fishery. The Council disagreed with this decision.

The Council initiated a review of the quota management system following the August closure of the 1994 fishery. Since implementation of the quota management in 1992, the fishery has experienced highly variable quotas, seasonal closures, and

differences between initial and final quotas. This situation has resulted in severe marketing difficulties and has diminished the usefulness of an initial quota as a preseason planning tool for fishermen. The 1994 season also illustrated the sensitivity of the quota formula to small changes in catch rates and raised concerns about the impacts of a small number of vessels participating in the lobster fishery on final quota calculations.

On October 27, 1994, a technical panel of scientists met in Hawaii with members of the Crustaceans Plan Team and the Advisory Sub-panel to review the existing quota management system and to discuss alternatives to identified concerns. The review panel identified two possible alternatives to the present quota-setting procedures and recommended a series of analyses to evaluate the trade-off between alternatives. In addition, the review panel suggested ways to test the validity of underlying assumptions and results of the stock assessment model. The Plan Team and Advisory Sub-panel concurred with the review panel's recommendations, which were presented to the Council on November 9. At that time, the Council requested that the NMFS Honolulu Laboratory, with assistance as needed, conduct the recommended analyses. Based on the results of this evaluation, the Council in all likelihood will propose modifications to the quota management system in 1995.

ADMINISTRATIVE ACTIVITIES

The Regional Director, SWR, issued the maximum of 15 NWHI limited entry permits to vessel owners for the 1994 lobster season (Table 9). Three new permit holders acquired their permits via the permit transfer process allowed under the FMP. Twelve permit holders initially received their permits in 1992 when the limited entry program was established.

During July, the first month of fishing, the PAO, coordinated with the Honolulu Laboratory all lobster catch and effort data reported by vessel operators at sea. PAO received a total of 21 call-in reports which were received in a predetermined format (Fig. 7). The reports were forwarded to the Honolulu Laboratory for use in calculating the final quota for the 1994 season according to the FMP quota formula.

ENFORCEMENT ACTIVITIES

In coordination with the United States Coast Guard (USCG) Office of Law Enforcement in Honolulu, numerous aerial and vessel patrols were conducted in the NWHI before, during, and after the 1994 lobster season. These patrols were scheduled to ensure that lobster fishermen were complying with the closed season and closed area requirements. In addition, these patrols and boarding efforts concentrated on retention of egg-bearing female

lobsters and log book requirements. Several of these patrols were conducted by USCG vessels home-ported other than in Honolulu. Back-to-back patrols used 110-foot and 378-foot Coast Guard cutters from Honolulu.

NMFS agents accompanied the majority of the aerial patrols and one cutter patrol. USCG and NMFS agents documented only one violation of lobster regulations--using properly marked traps. This excellent compliance record is also due to acknowledgment by limited entry fishermen of the importance of this resource as well as their accountability toward this fishery.

The purpose of the patrol, other than to ensure compliance with the lobster regulations, was a mutual learning experience on all aspects of the lobster fishing operations. All five of the participating lobster vessels were inspected on the grounds for trap compliance, logging and permit requirements, and USCG regulations with special attention focusing on the handling or release of sublegal and berried lobsters.

The careless handling of berried and undersized lobsters during harvest operations or release was monitored by a Honolulu NMFS agent who accompanied a cutter patrol. The NMFS agent also provided considerable training for the USCG personnel who continually patrolled the NWHI lobster fishing grounds, boarding lobster vessels for inspection.

Because all permitted lobster vessels were using the gauges designed and provided by Honolulu enforcement, no problems with inaccurate gauges were documented.

Catch and effort logging was enforced both at sea and during dockside inspection. All five of the Federally permitted lobster vessels were boarded at sea--some several times. Many were reboarded at dockside when they returned. Boarding teams at sea and in Honolulu reported that all logs inspected complied with logging requirements. Vessel arrival notification was reported by all vessels upon arrival in Honolulu. However, because of time constraints, reported logbook catch data and the actual number of lobsters landed were not verified.

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TABLES

Table 1.--Annual landings (number and pounds), ex-vessel revenues (US$), fishing effort (trap-hauls, vessels, and trips), catch-per-unit-effort (CPUE; number of legal lobsters per trap-haul), and prices (US$/lobster) of slipper and spiny lobsters combined from the Northwestern Hawaiian Islands, 1983-94. Data are from vessel logbooks and revenue reports.

Year	Landings		Revenue[b] ($)	Trap-hauls (No.)	Vessels (No.)	Trips (No.)	Combined legal CPUE[c]	Price/ lobster
	No.	Pounds[a]						
1983[d]	234,700	203,000	591,000	84,870	4	19	2.77	2.52
1984	872,400	1,017,000	2,624,000	363,000	11	38	2.40	3.01
1985	1,812,700	2,368,000	5,887,000	983,062	16	62	1.80	3.21
1986	1,787,400	2,202,000	3,982,000	1,352,580	16	60	1.32	3.35
1987	737,800	969,000	3,988,000	804,723	11	38	0.92	5.41
1988	1,057,600	1,405,000	5,000,000	845,200	9	28	1.25	4.73
1989	1,160,250	1,470,000	6,291,000	1,071,538	11	33	1.08	5.42
1990	774,300	949,000	4,887,000	1,182,485	14	45	0.66	6.31
1991	166,700	183,000	1,028,000	296,648	9	21	0.56	6.16
1992[e]	424,400	466,000	2,093,000	721,682	12	28	0.59	4.93
1993	----------FISHERY CLOSED----------							
1994	131,000	159,000	837,000	168,498	5	5	0.78	6.38

[a]Includes the weight of frozen lobster tails expanded to represent whole weight (spiny lobster tail weight = 35.6% of whole weight; slipper lobster tail weight = 33.3% of whole weight).
[b]Revenue is reported on a per-trip basis. Some trips overlap years; revenue for those trips is pro-rated to each year.
[c]Legal CPUE for slipper lobster before 1988 is calculated as 0.72 multiplied by the number of retained slipper lobster.
[d]The 1983 annual values were estimated from logbook returns from the latter 9 months of the year.
[e]A few live lobsters were landed in January 1993 from fishing completed during December 1992.

Table 2.--Estimated landings, ex-vessel prices (US$/lb), and ex-vessel revenues (US$) of spiny and slipper lobsters landed from the Northwestern Hawaiian Islands, 1983-94. Data are from vessel logbooks and revenue reports.

	Spiny lobster				Slipper lobster			
Year	Pounds[a]	Metric tons	Price ($/lb)	Revenue ($)	Pounds[b]	Metric tons	Price ($/lb)	Revenue ($)
1983	203,000	92	2.91	591,000	--[c]	--[c]	--[c]	--[c]
1984	935,000	424	2.66	2,490,000	82,000	37	1.63	134,000
1985	1,438,000	652	2.94	4,227,000	930,000	423	1.78	1,660,000
1986	1,149,000	521	3.23	3,710,000	1,053,000	479	2.16	2,272,000
1987	530,000	241	4.67	2,479,000	439,000	200	3.44	1,509,000
1988	1,218,000	553	3.66	4,453,000	186,000	85	3.12	581,000
1989	1,266,000	574	4.44	5,624,000	203,000	93	3.28	667,000
1990	784,000	356	5.51	4,319,000	165,000	75	3.43	567,000
1991	150,000	68	6.06	911,000	33,000	15	3.54	117,000
1992	318,000	144	5.20	1,654,000	148,000	69	2.96	439,000
1993	----------FISHERY CLOSED----------							
1994	113,000	51	5.92	670,000	46,000	21	3.65	166,000

[a]Includes frozen lobster tails expanded to represent whole weight (tail weight = 35.6% of whole weight).
[b]Includes frozen lobster tails expanded to represent whole weight (tail weight = 33.3% of whole weight).
[c]Data for slipper lobster not available for 1983.

Table 3.--Estimated landings, ex-vessel price (US$/1b), and ex-vessel revenue (US$), by product type, from the Northwestern Hawaiian Islands, 1990-94. Data are from vessel revenue reports; dash indicates the data are not available or are confidential and therefore, excluded.

			Spiny lobster				Slipper lobster					
Year	Product	Type	Pounds	Metric tons	Price ($)	Revenue ($)	Pounds	Metric tons	Price ($)	Revenue ($)	Vessels (No.)	Trips (No.)
1990	Live		57,900	26	7.27	421,300	6,000	3	6.66	41,000	6	16
	Frozen	Whole	500	--[a]	8.00	4,000	--	--	--	--	--	--
	Frozen	Tail	258,300	117	15.07	3,894,000	53,200	24	9.94	526,800	14	43
1991	Live		5,900	3	8.02	47,400	2,500	1	7.63	19,200	4	11
	Frozen	Whole	350	--[a]	10.49	3,700	--	--	--	--	--	--
	Frozen	Tails	51,300	23	16.77	859,900	10,000	5	9.61	97,900	9	14
1992	Live		10,100	5	9.77	98,700	2,100	--[a]	9.62	20,500	4	10
	Frozen	Whole	--	--[a]	--	--	--	--	--	--	--	--
	Frozen	Tails	110,000	50	14.19	1,554,200	50,500	23	8.66	437,500	11	23
1993	----------FISHERY CLOSED----------											
1994	Live		--	--[a]	--	--	--	--	--	--	--	--
	Frozen	Whole	--	--	--	--	--	--	--	--	--	--
	Frozen	Tails	40,100	18	16.68	668,900	15,200	7	10.90	166,400	5	5

[a]Less than 1 metric ton landed.

Table 4.--Annual fishing effort (days fished and trap-hauls) and catch-per-unit-effort (CPUE; number of lobsters per trap-haul) for spiny and slipper lobsters in the Northwestern Hawaiian Islands, 1994. Data are from vessel logbooks.

Area	Days fished (No.)	Trap-hauls (No.)	Catch-per-unit-effort							
			Spiny lobster				Slipper lobster			
			Legal	Sublegal	Berried	Total	Legal	Sublegal	Berried	Total
Necker	102	80,708	0.61	0.39	0.27	1.28	0.21	0.03	0.03	0.27
Gardner Pinnacles	69	69,259	0.43	0.40	0.22	1.04	0.18	0.20	0.08	0.46
Other[a]	28	18,531	0.36	0.10	0.09	0.55	0.89	0.59	0.17	1.65
Total	199	168,498	0.51	0.36	0.23	1.10	0.27	0.16	0.07	0.50

[a]Includes totals when less than three vessels fished for other Northwestern Hawaiian islands banks, reefs or shoals.

Table 5.--Annual fishing effort for active vessels in the NWHI lobster fishery, 1983-94. Fishing days per vessel for 1983-90 are adjusted (see Table 6). Data are from vessel logbooks.

Year	Vessels	Trips	Fishing days	Fishing days/ per vessel	Trap-hauls
1983	4	19	279	--	84,870[a]
1984	11	38	822	--	363,000
1985	16	62	1,653	--	983,062
1986	16	80	2,166	--	1,352,580
1987	11	38	1,217	120	804,723
1988	9	28	1,617	139	845,200
1989	11	33	1,323	120	1,071,538
1990	14	45	1,468	109	1,182,485
1991	9	21	432	48[b]	296,648
1992	12	28	893	74	721,682
1993	----------FISHERY CLOSED----------				
1994	5	5	199	40	168,498

[a]Estimated from Clarke and Yoshimoto (1990).
[b]Fishing days/per vessel for 1991-92 and 1994 are unadjusted because of the fishery closures during portions of those years.

Table 6.--Number of vessels, trips, and sea days, by vessel class, for the lobster fleet in the Northwestern Hawaiian Islands, 1994. Adjusted figures, which correct for vessels fishing less than full time and for incomplete trips, are not used for 1994 because the fishery was closed for part of the year. Standard deviations are in parentheses; data are from vessel logbooks. Dashes indicate that the data are not available or are confidential and therefore, excluded.

Vessels		Trips	Sea	Mean number of sea days by activity per vessel						
Class	No.	(No.)	days	Fishing	Traveling	Running	Weather	Breakdown	Rest/deck work	Missing
				Unadjusted						
I	-	-	--	--	--	--	--	--	--	--
II	4	4	53.5 (6.1)	38.8 (6.1)	8.5 (2.4)	7.8 (9.3)	6.0 (2.4)	0.0 (0.0)	0.3 (0.5)	0.0 (0.0)
III	-	-	--	--	--	--	--	--	--	--
Total fleet	5	5	53.4 (5.3)	39.8 (7.8)	7.8 (2.6)	7.0 (8.2)	4.8 (3.4)	1.2 (2.7)	2.8 (5.7)	0.6 (1.3)

Table 7.--Entry and exit paradigms of permitted lobster fishing vessels in the Northwestern Hawaiian Islands (NWHI), 1990-94. Vessels are coded for purposes of confidentiality. Data are from vessel logbooks and shoreside monitoring.

Vessel code	1990	1991	1992[b]	1993[c]	1994[d]
A	F	O	F	O	O
B	F	F/L	F	L	L/F
C	F	F/L	F	L	L
D	F	F/O	O/F	I	I/F
E	F	F/O	O	O	O/F[e]
F	F	L/X[a]	--	--	--
G	F	L/F	F	L/O	O
H	F	F/B	F	I/T	I
I	F	I/F	F	I/S	S
J	L	L/O	O	O	O
K	F	L	L/F	L	L
L	F	F/O	F	L	L/F
M	F	O	O/F[2]	O	O
N	F	B/F	F	B	B
O	F	O	O	O/L	L/F

KEY: F = fished for lobster in the NWHI; X = fished for lobster in the main Hawaiian islands; L = longlined in Hawaii (HI); I = idle in HI; O = fished outside HI (mainland or other countries); B = bottom-fished in HI; S = fished for shrimp in HI; T = transshipped shark fins from foreign vessels operating outside HI Exclusive Economic Zone. Two entries indicate vessels engaged in two types of activities during the year (e.g., O/F indicates that the vessel fished outside of HI for the first part of the year and fished for lobster the latter part).

[a]This vessel sank in November 1991.
[b]Emergency closures were initiated in June through October 1991 and April 10 through June 30, 1992. The NWHI lobster vessel limited entry (LE) program and quota was implemented on April 27, 1992. A final rule to Amendment 7 was issued in March 1992 to establish an annual closed season January 1-June 30. The LE program allows a maximum of 15 vessel permits to be effective at any time (permits are transferable).
[c]The NWHI lobster fishery was closed in 1993.
[d]The NWHI lobster fishery opened for 2 months during July-August 1994.
[e]Original vessel's permit transferred to replacement vessel in 1994.

Table 8.--Reported sightings of or interactions with endangered or threatened species by the lobster fleet in the Northwestern Hawaiian Islands, 1994. Data are from the vessel logbooks.

Area	No. of sightings by No. of animals	
	One animal	Two animals
Monk seals observed in statistical area		
Gardner Pinnacles	0	0
Necker Island	7	0
Other[a]	0	0
Monk seals observed in vicinity of fishing gear		
Gardner Pinnacles	0	0
Necker Island	1	0
Other	0	0
Monk seals observed preying on released lobsters		
Gardner Pinnacles	0	0
Necker Island	1	0
Other	0	0
Turtles observed in statistical area		
Gardner Pinnacles	0	0
Necker Island	0	0
Other	0	0

[a]Includes totals for less than three vessels that fished at other Northwestern Hawaiian islands, banks, reefs, or shoals.

Table 9.--Fishing vessels with limited entry permits for the 1994 Northwestern Hawaiian Islands lobster fishery.*

Vessel	Permit holder	Fished in 1994
Aleutian Spray	K. Knutsen/D. Gunn	No
Archer	Jerry Ray	Yes
Betty N	Gengo Nabeshima	No
Bounty	Pacific Seafoods, Inc.	Yes
Fortuna	Blue Hawaii Enterprise, Inc.	No
Liberty	Yochum Trust	No
Lusty	Lusty Voyages, Inc.	No
Magic Dragon	Dragon Fishing Co., Inc.	No
Marie M	Marie M. Corp.	No
Miss Jessico	Pacific Seafoods, Inc.	Yes
Pacific Pride	Pacific Seafoods, Inc.	Yes
Petite One	Ka'upu, Ltd.	No
Sea Spray	Parker Seafoods, Inc.	Yes
No vessel	DGA, Inc.	N/A
No vessel	Jack Johnson	N/A

*For the 1994 fishing season, the National Marine Fisheries Service issued the maximum of 15 Northwestern Hawaiian Islands lobster limited entry permits. There were three new permit holders: Blue Hawaii Enterprise, Jack Johnson, and Ka'upu Ltd., who acquired permits through the transfer process. One permit holder, Pacific Seafoods Inc., transferred its permit to a replacement vessel, *Pacific Pride*, which it owned.

FIGURES

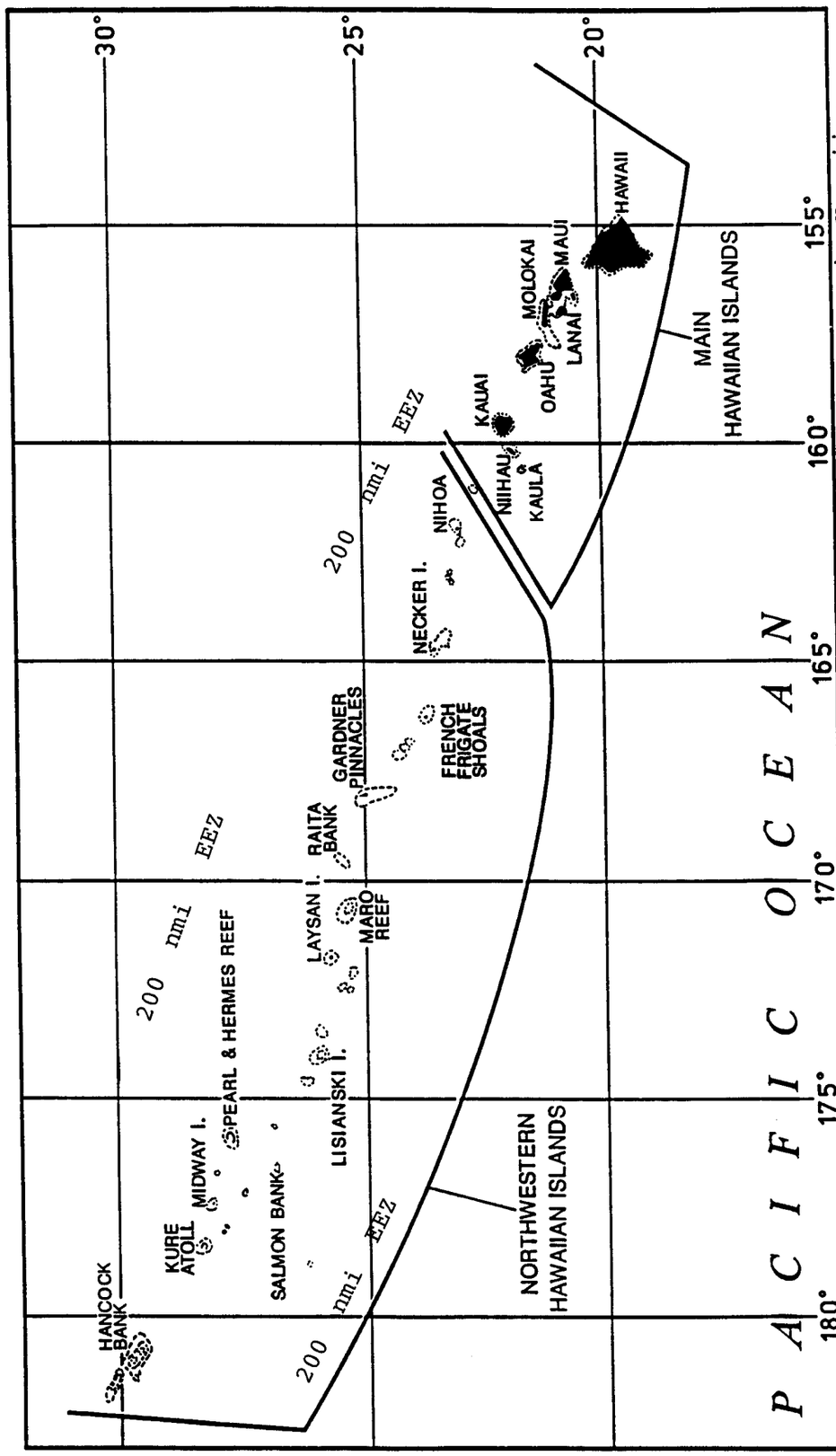


Figure 1.--Map of the Northwestern Hawaiian Islands (permit area 1), the main Hawaiian Islands (permit area 2) and the 200 nmi Exclusive Economic Zone (EEZ).

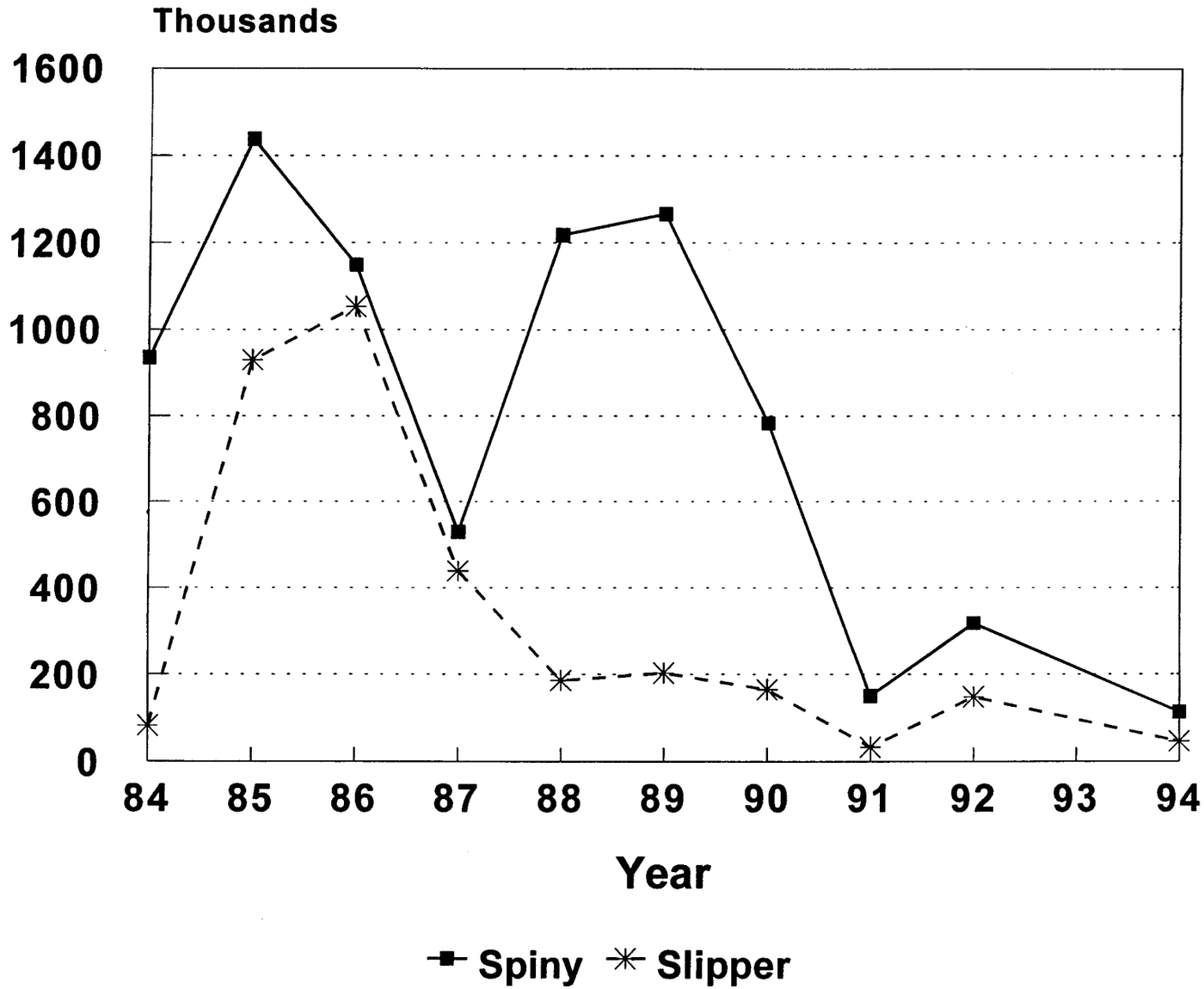


Figure 2.--Estimated annual landings (wet weight) of spiny and slipper lobsters in the Northwestern Hawaiian Islands 1984-94.

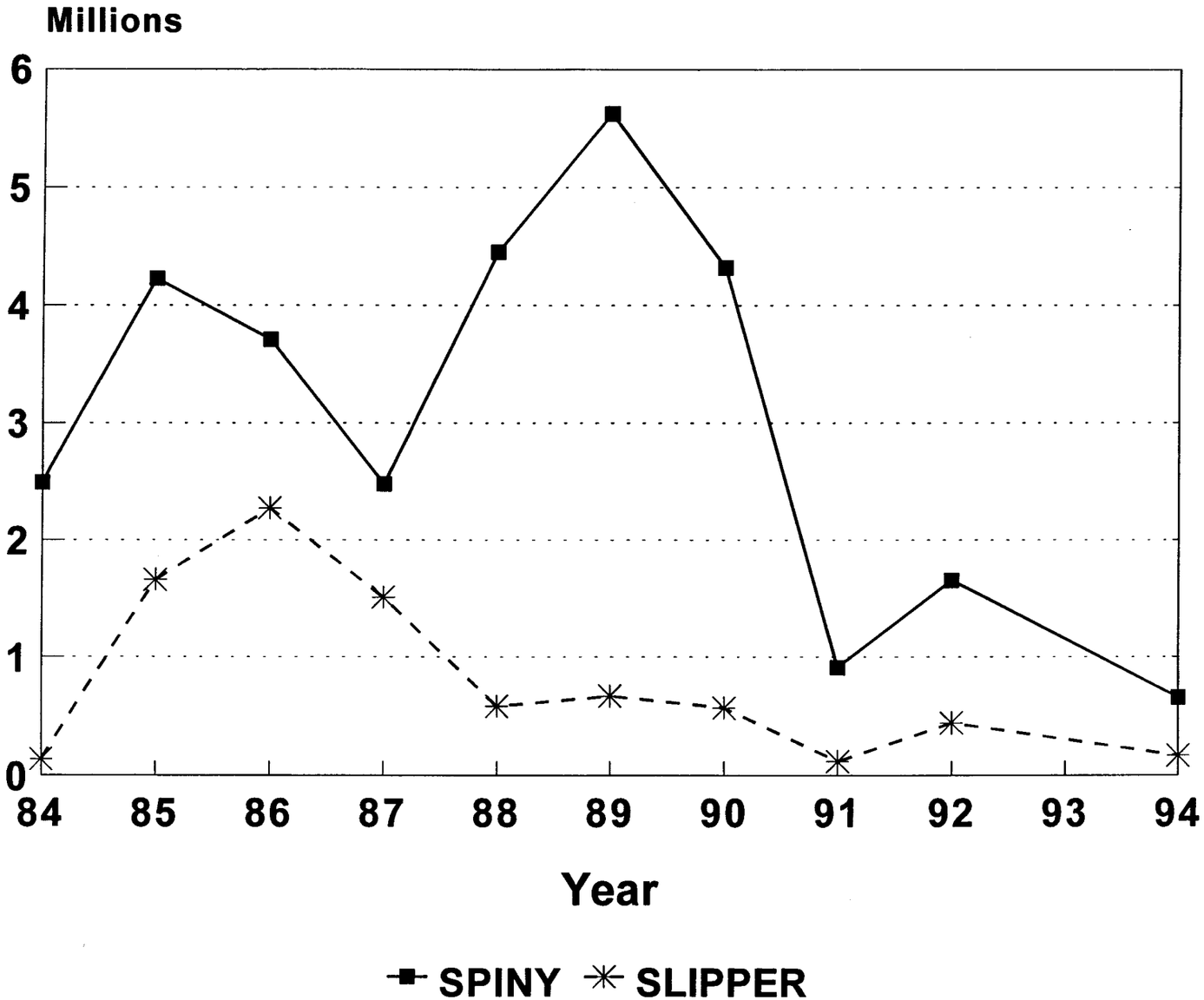


Figure 3.--Ex-vessel revenue for spiny and slipper lobsters from the Northwestern Hawaiian Islands, 1984-94.

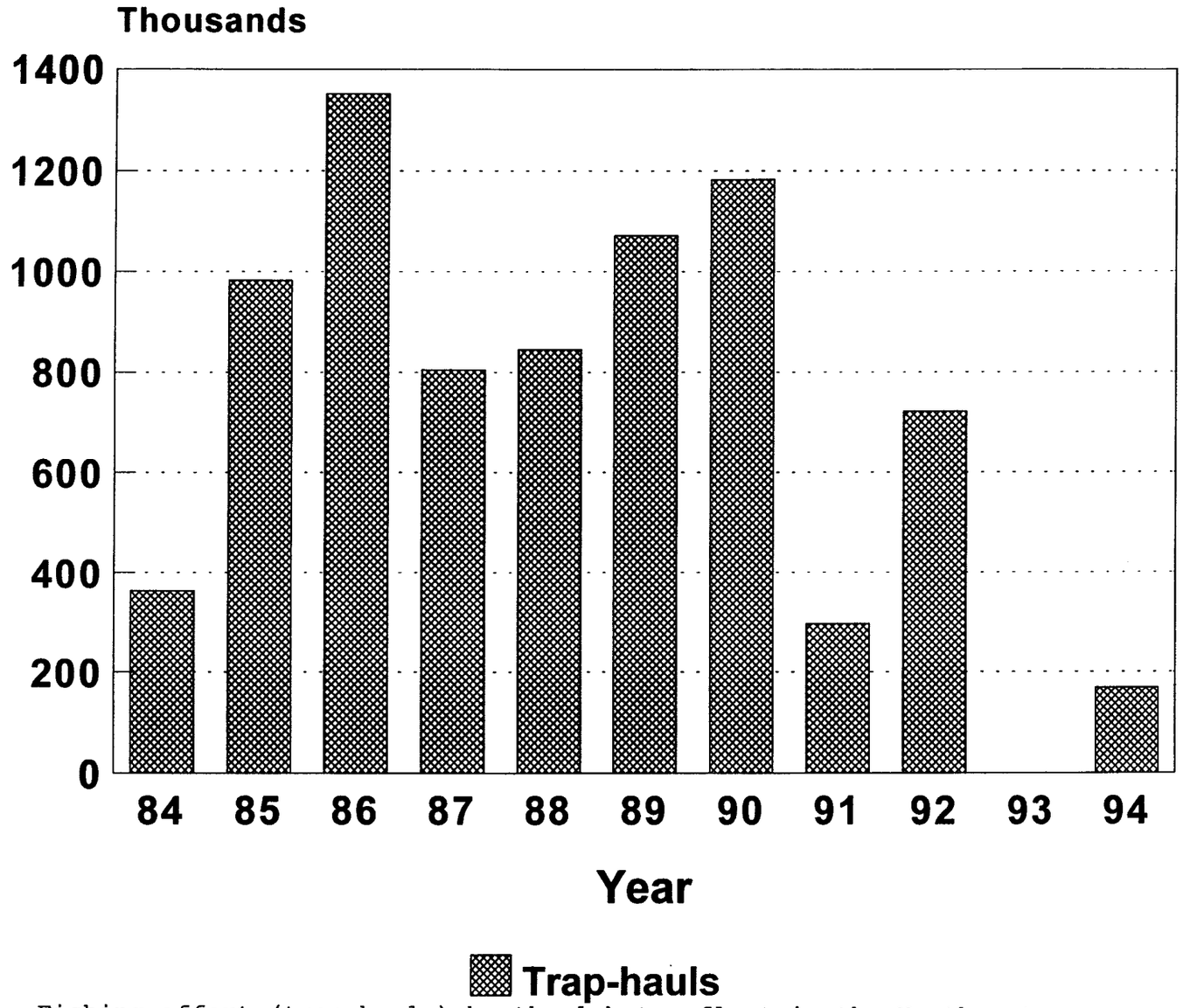


Figure 4.--Fishing effort (trap-hauls) by the lobster fleet in the Northwestern Hawaiian Islands, 1984-94.

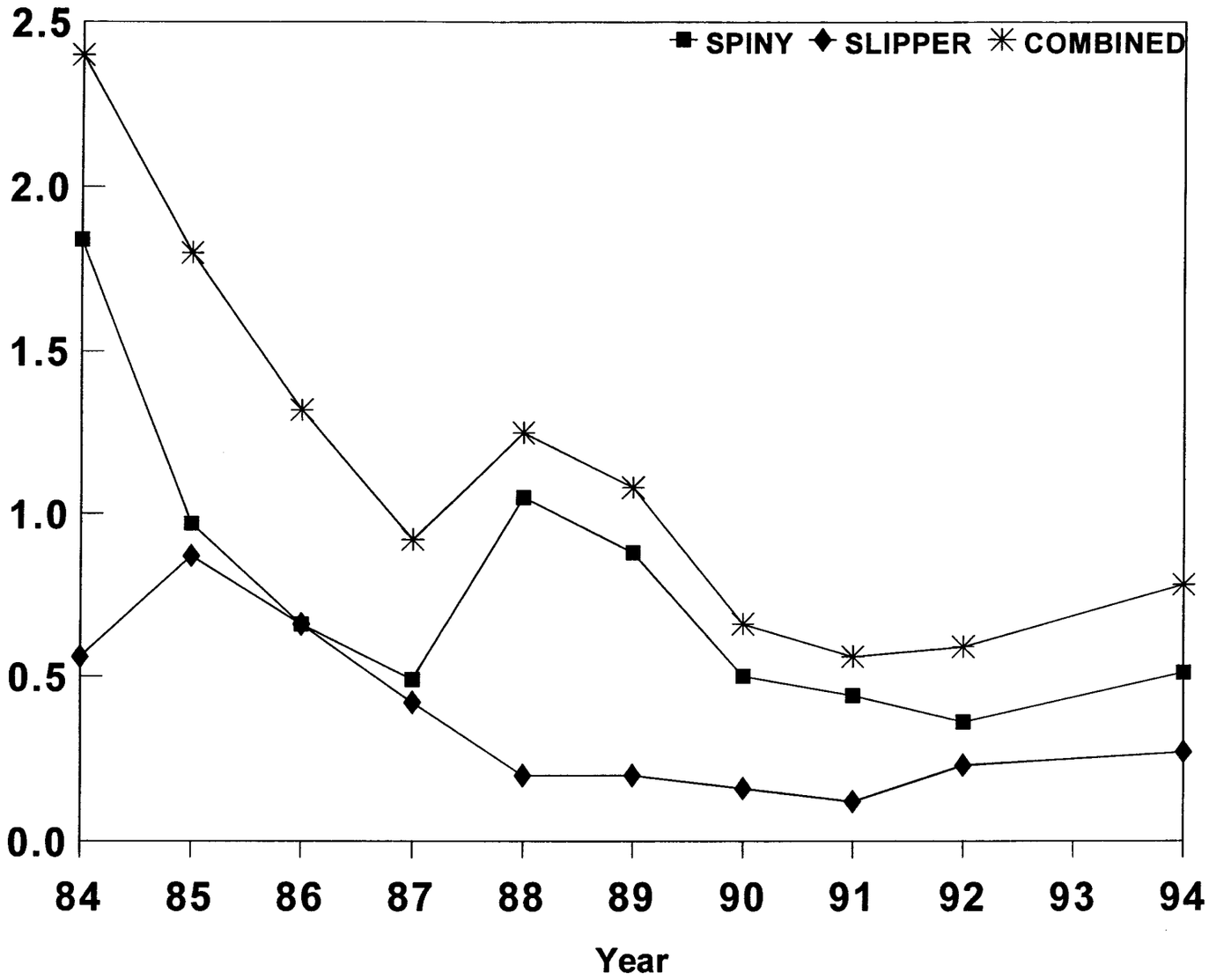
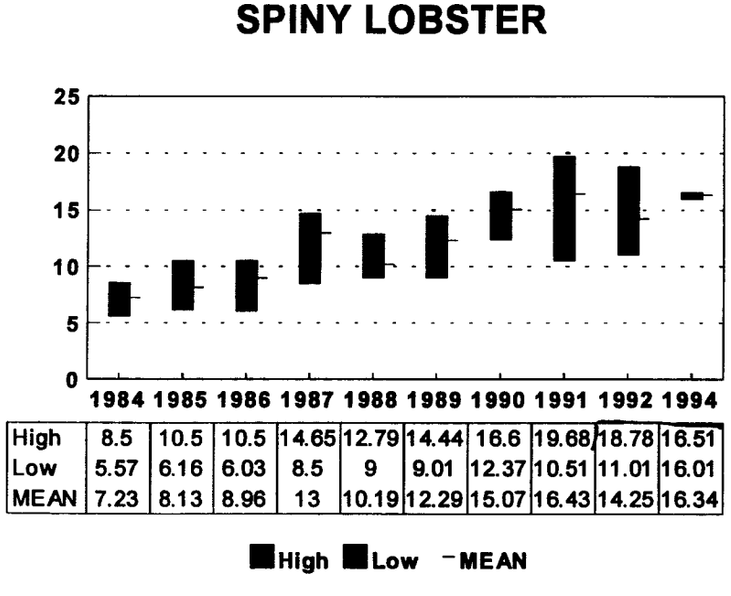


Figure 5.--Catch-per-unit-effort (CPUE) for spiny and slipper lobsters from the Northwestern Hawaiian Islands, 1984-94. (CPUE for slipper lobster is calculated as 0.72 multiplied by the number retained before 1988).



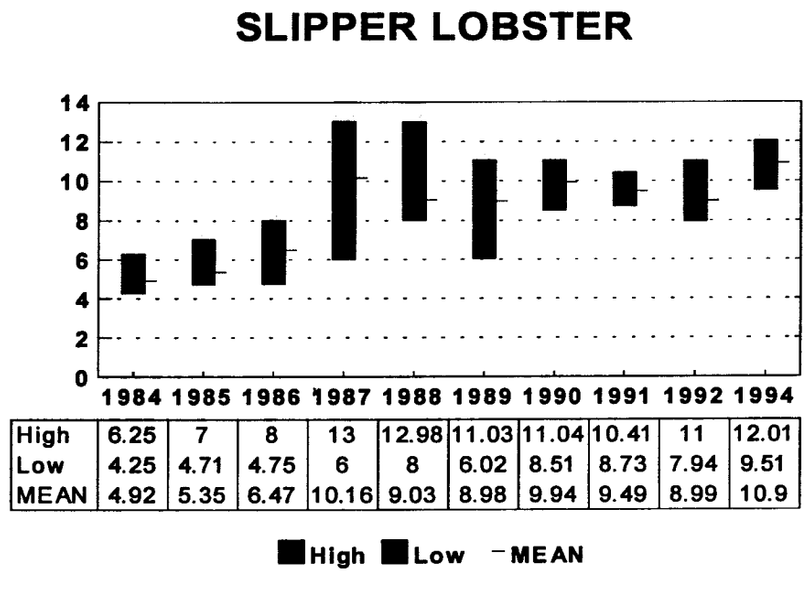


Figure 6.--Low, mean, and high ex-vessel prices of frozen spiny and slipper lobster tails from the Northwestern Hawaiian Islands, 1984-94.

Fisheries Management/Operations
Pacific Area Office, Southwest Region
National Marine Fisheries Service

1994 NWHI LOBSTER CATCH/EFFORT DATA CALL-IN SHEET

PHONE IN THE FOLLOWING INFORMATION ([redacted] BLOCKS) EACH WEEK TO:

(808) 973-2939 Georgia Matsukawa or Al Katekaru

AREA FISHED (ISLAND/BANK):_____

Please Use a Separate Sheet for each Area Fished

Trap Haul Day Month/Day	Number of Traps Hauled	Number of Spiny Lobsters Kept	Number of Slipper Lobsters Kept
Mon. /			
Tues. /			
Wed. /			
Thurs. /			
Fri. /			
Sat. /			
Sun. /			
TOTAL:			
Week No. (See Below):			
Vessel Code Name:			
Caller's Name:			

*** July and August Schedule for Call-In Reports to NMFS ***

Week No.	Period Fished: Mon. through Sun.	Report to NMFS No Later Than Tues:	Check Here: √
1	July 1 through 3	July 5	
2	July 4 through 10	July 12	
3	July 11 through 17	July 19	
4	July 18 through 24	July 26	
5	July 25 through 31	August 2	
The schedule below is subject to change depending on fishing effort and the total amount of lobsters harvested during July.			
6	August 1 through 7	August 9	
7	August 8 through 14	August 16	
8	August 15 through 21	August 23	
9	August 22 through 28	August 30	

Figure 7.--1994 Northwestern Hawaiian Islands Catch/Effort Data Call-in Sheet