Gorrell

Amendment 7

Fishery Management Plan for the

Crustacean Fisheries of the Western Pacific Region

(includes Environmental Assessment,
Regulatory Impact Review and
Proposed Regulations)

October 18, 1991

Western Pacific Regional Fishery Management Council
1164 Bishop Street, Suite 1405, Honolulu, Hawaii 96813

Telephone (808) 523-1368, (FTS) 551-1974
Fax (808) 526-0824

CONTENTS

page

1.0 INTRODUCTION 1
1.1 Responsible Agencies 1
1.2 Public Review and Comment 1
1.3 List of Preparers 2

2.0 EXISTING MANAGEMENT MEASURES 2

3.0 BACKGROUND AND NEED FOR ACTION 4
3.1 History and Performance of the NWHI Lobster fishery 4
3.2 Status of Lobster Stocks 4
3.3 Need for Action 5

4.0 PROPOSED ACTIONS AND IMPACTS 6
4.1 List of Proposed Actions 6
4.2 Analysis of Proposed Actions and Rejected Alternatives 8
1) Limited access 8
2) Adjustable, annual fleet harvest quota 16
3) Annual closed season 20
4.3 Monitoring of Proposed Actions and Possible Council Responses ... 21

5.0 RELATIONSHIP OF AMENDMENT 7 TO OTHER APPLICABLE LAWS AND POLICIES 21
5.1 Administrative Procedure Act 21
5.2 Coastal Zone Management Act 21
5.3 Executive Order 12291 (issuance of new rules) 22
5.4 Endangered Species Act 22
5.5 Marine Mammal Protection Act 22
5.6 National Environmental Policy Act 22
5.7 Paperwork Reduction Act 22
5.8 Regulatory Flexibility Act (see Section 7.0) 23
5.9 Executive Order 12612 (federalism) 23
5.10 Executive Order 12630 (takings implication) 23
5.11 Indigenous Peoples' Fishing Rights 24
5.12 Vessel Safety Considerations 24

6.0 ENVIRONMENTAL ASSESSMENT 24

7.0 REGULATORY IMPACT REVIEW 26

TABLES

page

1. Cost Profile: Revised Baseline 31
2. Cost Profile: $1.00 decline in price for whole lobster 32
3. Cost Profile: $0.50 decline in price of whole lobster 33
4. Cost Profile: Vessel not participating in alternative fishery during 6-mo closed lobster season 34
5. Cost Profile: Vessel participating in alternative fishery during 6-mo closed lobster season 35
6. Cost Profile: CPUE restored to 1.0 lobsters/trap-haul 36
7. Cost Profile: "Composite 1" ($1.00 price decline, 6-mo closed season, CPUE = 1.0, and fixed costs reduced) 37
8. Cost Profile: "Composite 2" ($1.00 price decline, 6-mo closed season, CPUE = 1.0, but no reduction in fixed costs) 38
9. Summary of potential economic impacts of regulations in proposed Amendment 7 39

APPENDICES

page

1. Annual report of the 1990 NWHI lobster fishery A-1
2. Status of NWHI Lobster Stocks, 1990 ..... B-1
3. Text of Proposed Regulations C-1

1.0 INTRODUCTION

1.1 Responsible Agencies

The Western Pacific Regional Fishery Management Council (Council or WPRFMC) was established by the Magnuson Fishery Conservation and Management Act to develop Fishery Management Plans (FMPs) for fisheries operating in the US Exclusive Economic Zone (EEZ) around American Samoa, Guam, Hawaii (including the Northwestern Hawaiian Islands), the Northern Mariana Islands, and other US possessions in the Pacific[1]. Once an FMP is approved by the Secretary of Commerce (Secretary), it is implemented by federal regulations which are enforced by the National Marine Fisheries Service (NMFS) and the US Coast Guard, in cooperation with state and territorial agencies.

For further information, contact:

Ms. Kitty M. Simonds
Executive Director
West. Pac. Fish. Mgmt. Council
1164 Bishop St. #1405
Honolulu, HI 96813
Telephone: (808) 523-1368
(FTS) 551-1974
Fax: (808) 526-0824

Mr. Alvin Z. Katekaru
Resource Management Specialist
NMFS Pacific Area Office
2570 Dole St.
Honolulu, HI 96822
Telephone: (808) 955-8831
(FTS) 551-2927
Fax: (808) 949-7400

1.2 Public Review and Comment

The Council elicits the help of commercial and recreational fishing interests, as well as other interested parties. This ensures that those who might be affected by new management measures have an opportunity to submit ideas and suggestions for potential actions by the Council, and to be involved in the decision-making process.

The actions proposed by this amendment were developed by the Council's Crustaceans Plan Team and the Hawaii lobster industry. An organized group of fishermen and marketing representatives (referred to at times as "Hui Ula", Hawaiian for lobster group) was instrumental in modifying the Plan Team's original recommendations into a unified industry proposal for submission to the Council. The Council's Crustaceans Advisory Panel and Scientific and Statistical Committee reviewed the proposal before submitting it to the Council, who then approved the various actions to be included in this amendment. A draft of the amendment was distributed for comments to fishermen and other interested parties in August, 1991. The final document is responsive to

---

[1] *Howland and Baker Islands, Jarvis Island, Johnston Atoll, Kingman Reef and Palmyra Island, and Wake Island.*

comments received, and the Council considered these comments at its August 21-22, 1991 public meeting in Kailua-Kona, Hawaii. The comments were incorporated into the amendment, which has been submitted to the Secretary for approval and implementation. The approval process will include publication of the proposed regulations for public review and comment. A draft of the regulations is included in Appendix 3 of this amendment.

1.3 List of Preparers

Amendment 7, the Environmental Assessment and the Regulatory Impact Review were prepared by:

Mr. Robert F. Harman, Staff Biologist
Western Pacific Regional Fishery Management Council, Honolulu, HI

Mr. Svein Fougner, Chief, Fisheries Management and Analysis Branch
NMFS Southwest Region, Terminal Island

Mr. Alvin Z. Katekaru, Resource Management Specialist
NMFS Southwest Region, Pacific Area Office, Honolulu, HI

Dr. Jeffrey J. Polovina, Fisheries Biologist and Acting Plan Team Chairman
NMFS Honolulu Laboratory, Honolulu, HI

Dr. Samuel G. Pooley, Industry Economist and Plan Team Member
NMFS Honolulu Laboratory, Honolulu, HI

with assistance from the rest of the Crustaceans Plan Team:

Dr. Terry J. Donaldson, Northern Mariana Islands Fish and Wildlife
Ms. Gretchen R. Grimm, Guam Aquatic and Wildlife Resources
Ms. Jo-Anne N. Kushima, Hawaii Aquatic Resources
Mr. D. Richard Phillips, Phillips Sales Co., Hawaii
Ms. Bonnie J. Ponwith, American Samoa Marine & Wildlife Resources
Ms. Timm Timoney, F/V LAYSAN, Hawaii

2.0 EXISTING MANAGEMENT MEASURES

The FMP for the Crustacean Fisheries of the Western Pacific Region was developed by the Council, and the final rule implementing its regulations was published by the NMFS at 48 FR 5562 on February 7, 1983. The FMP regulates fishing for spiny and slipper lobster in waters of the NWHI (50 CFR 681 Subpart B). The FMP also regulates fishing in the EEZ of the main Hawaiian Islands (50 CFR 681 Subpart C), even though most lobster fishing in the main Hawaiian Islands occurs in state, not

federal, waters. There are currently no regulations for EEZ waters around American Samoa and Guam because no substantial lobster fisheries exist there. Regulations for these latter two areas will be developed at the first indications of any significant fishery. The regulations for each stock are based on the principles of Optimum Yield (OY), i.e., management based on Maximum Sustainable Yield (MSY) as modified by relevant ecological, social and economic considerations. The regulations include the following measures:

a) To prevent overfishing (protect reproductive potential), minimum size limits, measured as tail width, are: spiny lobsters--5.0 cm, and slipper lobsters--5.6 cm. Minimum sizes for slipper and spiny lobsters were determined so that the spawning stock biomass per recruit (SSBR), when fishing mortality was equal to natural mortality, would be 50% of the SSBR in the absence of fishing.

   Recruitment overfishing is defined to be a level at which the spawning potential ratio, i.e., the spawning stock biomass produced on average by a post-larval recruit in a fished population vs. an unfished population, (measured for a specific fishing area) is 0.2 or below.

b) As further protection to recruitment, egg-bearing lobsters cannot be retained.

c) Commercial fishing gear is restricted to traps. To protect Hawaiian monk seals, the trap entrance must not exceed 6.5 inches in diameter.

d) To facilitate the escape of sublegal lobsters, every trap must have two escape panels, each with four circular, 67-mm diameter holes.

e) To provide relevant and timely fishery information for management purposes, fishermen are required to have a federal lobster fishing permit and to supply catch reports after each trip.

f) To protect lobster stocks and marine mammals in the NWHI, no commercial fishing is allowed (1) in waters shallower than 10 fm, (2) within lagoon waters, or (3) within 20 nm of Laysan Island. These refuges amount to about 16% of the total NWHI lobster habitat.

In response to indications that lobster stocks were approaching the level of overfishing defined in the FMP, the Secretary recently approved a request by the Council for emergency action to further protect lobster stocks in the NWHI. Published by the NMFS at 56 FR 21961 on May 13, 1991, the emergency action closed the NWHI lobster fishery from May 8 through August 12, 1991. At its May 15-16, 1991 meeting in Honolulu, the Council voted to extend the period of the emergency action an additional 90 days unless fishing catch and effort information indicated that the stocks had recovered sufficiently to warrant opening the fishery. The stocks did not appear

to recover during the first 90 days, so the Council asked the Secretary to extend the closure until November 12, 1991; this was done on July 30, 1991 (56 FR 36912).

3.0 BACKGROUND AND NEED FOR ACTION

3.1 History and Performance of the NWHI Lobster fishery

A detailed report, produced by the NMFS Honolulu Laboratory, on the history and 1990 performance of the NWHI lobster fishery is found in Appendix 1. Several trends are clear:

- After two years of relative stability in the fishery, landings, CPUE and revenues all declined in 1990.

- The volume of lobster landed fell to the lowest level since 1987, and CPUE was the lowest in the history of the fishery.

- In 1990, 356 t of spiny lobster and 75 t of slipper lobster were landed (total 431 t), respective decreases from 1989 of 38% and 19%.

- Effort in 1990 was about one million trap-hauls, a 10% increase over 1989. CPUE for the two species combined, however, was 0.66 (0.50 for legal spiny lobster and 0.16 for legal slipper lobster). This is a 37% decrease from 1989.

- The average size of spiny lobster tails (4-8 oz for 1990) continued to decrease, causing increasing concern among vessel operators.

- Fleet revenues for 1990 were $4.9 million, down 22% from 1989.

3.2 Status of Lobster Stocks

A detailed report, produced by the NMFS Honolulu Laboratory, on the status of NWHI lobster stocks for 1990 is found in Appendix 2. Analyses of commercial fishing logbooks and research sampling data produced several conclusions, including:

- Low recruitment to the fishery was observed at Maro Reef and the banks northwest of Maro, resulting in a decline in CPUE. Fishing effort thus intensified at Necker Island and Gardner Pinnacles, resulting in lobster stocks in those areas being fished down.

- The spawning stock biomass index, based on CPUE, estimates that the 1990 level was 22% of the pre-fishery level, an indication that a million trap-hauls may have been excessive since recruitment to the fishery was low.

- As of the end of 1990, there was no indication that recruitment at Maro Reef and more northwestern banks had improved.

- The 1990 spawning biomass was the lowest observed to date, and recruitment to the fishery from the 1990 spawning biomass will not be observed until 1993.

In 1991, lobster fishing continued in the NWHI until the fishery was closed by emergency action on May 8. Commercial fishing logbooks for the period January - April produced the following information on the health of the fishery:

- CPUE for the period, 0.63 legal lobsters/trap-haul, is the lowest recorded during the same period since 1984 (when such data started being recorded). By comparison, the CPUE for this period in 1990 was 0.84. The correlation between the CPUE for the first four months of the year and the CPUE for the entire year is 0.91, meaning that the CPUE from the first four months is a good indicator of the CPUE for the entire year.

- Although most of the fishing in 1991 was at Necker Island and Gardner Pinnacles, available data from Maro Reef[2] show that Maro has not recovered from the low 1990 CPUE.

- Recent research suggests that the population of spiny lobster may vary annually according to oceanographic conditions. Above-average sea surface height in the NWHI is hypothesized to indicate good recruitment of 3-yr-old lobsters into the fishery four years later (1-yr larval stage and three years of growth after settlement before reaching legal size), and vice-versa. This model forecasts poor recruitment to the fishery in 1991, and improved recruitment in 1992.

3.3 Need for Action

The 1990 spawning stock biomass of spiny and slipper lobsters in the NWHI was 22% of that in the late 1970s, prior to the development of the fishery. The Crustaceans FMP defines the threshold for recruitment overfishing at 20%. Thus, the 1990 status of spawning stock biomass may be at or near a level that causes a severe decline in recruitment. Based on the 1991 CPUE and the lack of any improvement in the catch rates at Maro Reef, the current spawning stock biomass is in danger of recruitment overfishing.

In response to this information, the Council asked the Secretary to close the fishery on an emergency basis, but this was only a temporary solution to conditions in the fishery. The fishery is still open-access, with no limits on effort or catch. High ex-

---

[2] *Fewer than three vessels provided data from Maro Reef so those data are confidential.*

vessel prices continue to drive fishermen to exploit a resource that is approaching threatened levels. Some effort or harvest limitations are needed immediately to protect the resource and the industry that depends on it. Various elements of a system that would establish limited access, an annual fleet harvest quota and a closed season are discussed below.

4.0 PROPOSED ACTIONS AND IMPACTS

4.1 List of Proposed Actions

All existing measures (e.g., size limits, closed areas, gear and reporting requirements, etc.) will remain in effect. The new measures are:

1) Establish a limited access system for the NWHI. This system will have several elements (see section 4.2.1):

   a) Limited access permits will be awarded to vessel owners based on the criteria below. The maximum number of permits (vessels allowed to operate in the NWHI fishery) will be 15.

   b) Permits will be issued to vessel owners meeting qualifying criteria based on historical and current participation in the fishery as follows, in decreasing order of priority (the initial permits will be issued to the person who owned the vessel at the time it made it's qualifying landings, i.e., in 1990 for most vessels):

      1. Vessels that participated in the NWHI fishery before August 8, 1985 and every year through 1990.

      2. Vessels that participated before August 8, 1985 and in 1990.

      3. Vessels that participated in 1990 only.

      4. If additional permits remain, vessel owners will be qualified on the basis of the most years participating in the NWHI fishery before 1985.

   c) Conditions for maintaining the limited access permit:

      1. Permit for a given year must be obtained before January 1.

      2. A permitted vessel must make a minimum of one qualifying lobster landing at a Hawaii port within a period of two

consecutive calendar years. A qualifying landing means an annual average of four lobster tails per trap normally fished. For example, a vessel that normally carries 1000 traps would have to land 4000 lobsters (or tails) in either 1992 or 1993 to qualify for a 1994 permit.

d) Guidelines for allowing new vessels to enter the fishery:

1. Highest priority is given to owners of vessels that made landings from the NWHI at some time from August 8, 1983 through 1990, and who were excluded from the fishery by implementation of the limited access system.

2. Decreasing priority, measured by a point scale, for:

- three points for each year, or partial year, after August 8, 1985 that a present owner of commercial fishing vessel was the captain of a NWHI lobster boat;

- two points for each year, or partial year, after August 8, 1985 that an owner was engaged in (1) commercial lobster trapping in the MHI or (2) non-lobster commercial fishing in the NWHI;

- one point for each year, or partial year, after August 8, 1985 that an owner was engaged in any other commercial fishing in the EEZ around Hawaii.

e) Maximum number of traps per vessel will be 1100 (an additional 100 unassembled traps may be carried as spares).

f) All traps must be brought back to port after each fishing trip, except in emergencies.

g) All traps and floats must be marked with the vessel's official number. In addition, the identifying markings on the vessel must be changed from the permit number to the vessel's official number.

h) If receiving vessels are used to move lobster from the fishing grounds, these vessels must provide copies of the logbooks maintained by the fishing vessel(s) which harvested the lobster.

i) Trip Processing and Sales reports will be modified to include information on lobster tail sizes, and Daily Lobster Catch Reports modified to include information on sea conditions

j) Limited access permits will be freely transferable, except that no one person, corporation, etc., can hold more than one permit at a time, except an owner with more than one qualifying vessel when the limited access system takes effect may hold a permit for each of these vessels until the permit is surrendered, transferred as a result of the sale of a vessel, or revoked as a penalty for violation of regulations.

2) Establish an adjustable, annual harvest quota for the fleet. When this quota is reached, fishing will cease until the opening of the fishery the following year. A target CPUE of 1.0 lobster/trap-haul will be used to determine the annual quota (see section 4.2.2).

3) Establish an annual closed season for the NWHI fishery from January 1 through June 30. Fishing can commence on July 1, and will end when the quota has been harvested (see Section 4.2.3).

4.2 Analysis of Proposed Actions and Rejected Alternatives

1) Limited access.

The Magnuson Act's §303(b)(6) requires the Council to discuss and take into account several items regarding the implementation of a limited access system. These are summarized briefly here, and discussed in more detail below.

Paragraphs (A) and (B) of §303(b)(6) deal with present and historical participation in, and dependence on, the fishery. The awarding of initial permits under the proposed limited access system will be made, with relatively equal weight, to 1) owners of vessels that developed the fishery and have stayed with it (historical participation and dependence, as well as present participation) and 2) vessels that have entered the fishery relatively recently and help make up the current core of the industry (present participation). See discussion in paragraph 1.b below.

Paragraph (C) of §303(b)(6) concerns fishery economics. The Council determined that a limit of 15 vessels will dampen the boom-and-bust cycle in fishery participation that might result from fluctuations in stock availability, reducing over-capitalization in the fishery and allowing vessels to operate efficiently. See Section 7.0 below for a discussion of the potential economic impacts of the proposed limited access system.

Paragraph (D) of §303(b)(6) requires discussion of the capability of vessels to participate in other fisheries. Some vessels will not qualify for initial limited access permits, but all of these are now fishing in other fisheries and will not be subject to displacement hardship. Vessels qualified to operate under the limited access system will not be able to fish for lobsters during the closure, so the Council modified, in the Pelagics FMP, the qualification criteria for eligibility in its moratorium for new participants in the Hawaii-based pelagic longline fishery. The Pelagics FMP now allows qualified lobster vessels to obtain a longline limited access permit, so that they have an alternative fishery to engage in. In addition, several lobster vessels also hold, or are qualified to hold, limited access permits under the Bottomfish and Seamount Groundfish FMP.

Paragraphs (E) and (F) require the Council to consider and make allowances in the proposed limited access system for social aspects of the fishery. In addition to initially awarding permits to vessels with historical and current dependence on the fishery, the system will allow individuals that have ties to the fishery (either by owning or being the captain of a vessel that once participated in it), but did not qualify for initial permits, to have the highest priority for permits when they become available (see discussion in paragraph 1.d below). A limit of 15 vessels and a fleet harvest quota also maintain the competitive nature of the fishery, a feature that the participants requested (see paragraphs 1.a and 2 below). The Council also decided that freely-transferable permits would be beneficial to the fishery (see paragraph 1.j below)

In addition to limiting access, the Council requested that a six-month annual closure of the NWHI fishery be implemented (see paragraph 3). Other Hawaii fisheries may be impacted by the proposed limited access and the seasonal closure, and the Council has taken these effects into account according to §303(a)(9) of the Magnuson Act.

a) Maximum number of permits (held by owners of vessels allowed to operate in the NWHI fishery) will be 15.

The success of regulating the annual fishing effort or catch is dependent on knowing the fishing potential of the fleet. The most precise way of obtaining this knowledge is to prescribe the fleet and vessel limitations, i.e., the number of boats allowed to fish and their individual fishing potential. A small number of boats of the size and fishing power currently in the fleet can quickly exert enough pressure on the stocks to exceed the target CPUE of 1.0 lobsters/trap-haul. The fleet size must allow vessels to conduct fishing in an efficient manner. About 30 vessels have participated in the fishery over its history, but no more than 14 have participated in any given year. Thus the optimal fleet is probably 10-15, depending on the fishing power of the individual vessels.

Determination of the actual fleet size by the Council is affected by a complex of factors of allocating fishing opportunities, but stated simply--a larger fleet means less opportunity per boat, but more boats with opportunity; a smaller fleet leads to the opposite. The Council considered both larger and smaller fleet sizes, and decided on 15 to allow those boats to operate efficiently, and with a minimal disruption to the recent level of participation (9-16 vessels per year (average of 13) have participated in the fishery since 1984). Establishing a fleet of more than 15 vessels would allow the fishery to operate at economically inefficient levels because an average boat's catch or effort would be insufficient to sustain their operation. A limit of 15 vessels maintains the competitive nature of the fishery, as desired by the participants, and dampens any boom-and-bust cycle in fishery participation that might result from fluctuations in stock availability.

b) Qualifying criteria for limited access permits will be based on historical and current participation in the fishery.

Eligibility criteria to be used for selecting vessels for participation in the fishery are based on the period 1983-90, inclusive, the period of federal regulation in the NWHI fishery. The Council will give priority to vessels that have the longest continuous participation, and considerable weight to those with current investment in the fishery. Permits will be issued to vessel owners meeting qualifying criteria as follows, in decreasing order of priority (the initial permits will be issued to the person who owned the vessel at the time it made it's qualifying landings, i.e., in 1990 for most vessels):

1. Vessels that participated in the NWHI fishery before August 8, 1985 and every year through 1990.
2. Vessels that participated before August 8, 1985 and in 1990.
3. Vessels that participated in 1990 only.
4. If additional permits remain, vessel owners will be qualified on the basis of the most years participating in the NWHI fishery before 1985.

The Council considered and rejected several alternative ranking criteria:

- Number of days fishing. This factor rewards continuous participation in the fishery, but is not equitable between full-time and part-time lobster boats (vessels that switch between fisheries or that fish less intensively). It also does not address whether recent participants should have greater or less priority than vessels

who participated early in the history of the fishery, but have since left.

- Number of fishing trips. This factor is more precise than using years of participation, and may reduce any negative impacts of a vessel taking some time off from the fishery. This factor rewards continuous participation in the fishery, but is not equitable between full-time and part-time lobster boats (vessels that switch between fisheries or that fish less intensively). It also does not address whether recent participants should have greater or less priority than vessels who participated early in the history of the fishery, but have since left.

- Years in the fishery. This factor rewards continuous participation in the fishery, but is not equitable between full-time and part-time lobster boats (vessels that switch between fisheries or that fish less intensively). It also does not address whether recent participants should have greater or less priority than vessels who participated early in the history of the fishery, but have since left.

- Number of lobsters landed. This factor does not reward continuous participation in the fishery. It gives an advantage to larger boats to boats that participated in the early years of the fishery, including those that may have since exited.

- Weighted participation factors (days, trips, lobsters landed, etc.). This rewards continuous participation in the fishery, and gives weight to vessels that have current investments in lobster boats and gear, and that are now contributing to the fishery. It gives more importance to performance elements of recent participation than past participation. For example, the number of fishing trips taken in 1990 would be assigned greater value than trips taken in 1986. This option was adopted by the Council, in part. Awarding of the initial permits will give considerable weight to recent (1990) participation in the fishery.

- Participation before August 8, 1985 (control date). This is the least desirable of the listed factors. It gives priority to early participants, but does not reward continuous participation in the fishery. Using the control date by itself produces a pool of unknown size, since the intent and condition of vessels which have exited the fishery are unknown. Creating an undetermined pool of potential participants, the intent of each being unknown, greatly reduces the ability of the managers to adjust effort to properly

protect the lobster stocks. Also, one-time participants who have left will acquire benefits under the limited access system (and some of those large vessels might actually be forced back into service), while some vessels now working in the fishery will be removed. In addition, using the control date does not address the issue of vessels that have changed owners since the control date.

c) Conditions for maintaining the limited access permit:

1. Permit for a given year must be obtained before January 1.

Most NMFS Southwest Region permits are issued on January 1, so administrative and related duties will be simplified.

2. A permitted vessel must make at least one qualifying lobster landing at a Hawaii port within a period of two consecutive calendar years. A qualifying landing means an annual average of four lobster tails per trap normally fished. For example, a vessel that normally carries 1000 traps must land 4000 lobsters (or tails) in either 1992 or 1993 to qualify for a 1994 permit.

A minimum of one trip in two consecutive years will not force a boat to continue fishing under poor conditions, thus reducing effort when catchability is low. This requirement will still require some effort to demonstrate an intent to be a participant in the fishery. In addition, some measure of fishing performance is necessary to assure that only dedicated lobster fishermen are allowed to remain in the fishery. A landing rate per trap is more equitable than total catch for all boat sizes.

d) Guidelines for allowing new vessels to enter the fishery:

New entrants must come from a waiting list maintained by the NMFS. When the Council decides that another vessel should be allowed into the fishery, the most qualified applicant(s) will be chosen based on the following ranking (ranking may be calculated from only one category).

1. Highest priority is given to owners of vessels that made landings from the NWHI at some time from August 8, 1983 through 1990, and who were excluded from the fishery by implementation of the limited access system.

2. Decreasing priority, measured by a point scale, for:

- three points for each year, or partial year, after August 8, 1985 that a present owner of commercial fishing vessel was the captain of a NWHI lobster boat;

- two points for each year, or partial year, after August 8, 1985 that an owner was engaged in (1) commercial lobster trapping in the MHI or (2) non-lobster commercial fishing in the NWHI;

- one point for each year, or partial year, after August 8, 1985 that an owner was engaged in any other commercial fishing in the EEZ around Hawaii.

This is a weighted ranking system that gives priority to people who were displaced from the fishery by the management actions of this amendment. Decreasing priority will be given to people who have had a decreasing level of interest and participation in the fishery or in the region.

e) Maximum number of traps per vessel = 1100 (with 100 unassembled traps as spares).

Capping the number of traps carried will prevent the possibility of overly large vessels from appearing in the fishery in the future. Large boats have participated in the past, using as many as 2000 traps. Operational expenses forced these boats out of the fishery, but if the number of traps is not capped, an opportunity still exists for large vessels to participate, especially given a half-year season and fleet harvest quota. (New technology might be developed that allows a vessel to employ many more traps than are now used.) This might lead to greater inequitable fishing opportunity among various sizes of vessels.

A cap of 1100 traps will not require a significant reduction in the number of traps by many boats. A cap of 1000 traps would have required a few of the larger boats to cut back as much as about 10% on the number of traps that they fish, provided that they are eligible to participate under the limited access plan. In addition to a cap, the Council discussed reducing the number of traps that all vessels carry (e.g., by a straight percentage). This would have forced some boats to operate inefficiently and was not adopted.

Some fishermen claimed that this action will be unenforceable, and that a "natural" cap on the number of traps that can be fished daily makes this action unnecessary. Enforcement agents, on the other hand, have stated that they could assure compliance, especially with the threat of mandatory observer coverage for vessels that have been accused of violating this regulation.

f) All traps must be brought back to port after each fishing trip, except in emergencies.

When a vessel returns to port for provisions and to off-load catch, a respite for the stocks is provided, and enforcement of the vessel limit on number of traps is facilitated. This measure also reduces gear loss while the traps are unattended, thereby reducing the potential for ghost fishing.

g) All traps and floats must be marked with the vessel's official number. In addition, the identifying markings on the vessel must be changed from the permit number to the vessel's official number.

These changes will facilitate enforcement and make gear and vessel marking consistent across fisheries. Marking traps and floats will help to identify stolen and derelict gear. Changing the vessel markings to official number follows the longline requirements of marking gear and vessels with official numbers, and will assist the pilots of enforcement aircraft during patrols.

h) If receiving vessels are used to move lobster from the fishing grounds, these vessels must submit copies of the catch logbooks maintained by the fishing vessel.

This will facilitate implementation and enforcement of the harvest quota (see below) and record-keeping for biological analyses. The vessel must submit duplicate copies of the fishing vessel's Daily Lobster Catch Report.

i) Trip Processing and Sales reports will be modified to include information on lobster tail sizes, and Daily Lobster Catch Reports modified to include information on sea conditions

Reporting tail sizes will add a valuable complement to the catch and effort information that is now provided by fishermen. Some data on tail sizes are now collected from marketing representatives, but such efforts are inconsistent. If tail sizes were reported on a regular basis by the processors (in most cases, but not all, the fishermen), more detailed

analyses could be used in addition to the biological models now used for stock assessment. This will allow superior management capabilities in that length-based cohort analyses could be used to set quotas based on more accurate estimates of lobster growth, mortality, recruitment and catchability.

Information on weather and sea conditions will allow scientists to better understand changes in CPUE. Weather influences fishing operations, so poor weather can lead to a reduction in CPUE. This change needs to be distinguished from reductions in CPUE due to changes in the abundance or catchability of lobster.

j) Limited access permits will be transferable, except that no one person, corporation, etc., can hold more than one permit.

The Council discussed the topic of transferability in depth. Some people feel that a permit to fish under the proposed system should be a privilege, not a right, and as such cannot be owned. This follows the precedent set by the Council in the bottomfish limited access plan. Others feel that a permit should be transferable only if it accompanies the vessel for which it was issued. On the other hand, if the permits were not transferable, some fishermen feel that their vessels will be worthless when they try to leave the fishery, since access to most other fisheries is rapidly becoming controlled. This is the view of the Council. The Council realizes that limiting access to fisheries does affect the potential value of vessels, and made allowances, in the FMP for pelagic fisheries, for lobster boats that were not otherwise eligible to participate in the Hawaii pelagic longline fishery to do so. This allows formerly full-time lobster boats to longline during the closed season for lobster.

Most vessels in the lobster fleet are owned by corporations. There has been concern raised that lobster permits might become consolidated if a person or persons were principal stockholders in several corporations. By prohibiting individuals from holding more than one permit, no monopolies are formed, and the opportunity to enter the fishery remains more equitable for all. The exception to this action is that if a person is eligible for more than one initial limited access permit at the time this plan takes effect, then s/he may keep multiple permits. If s/he sells a qualifying vessel, and does not replace it, the permit either goes with the vessel sold under an agreement with the new owner. If the new owner does not want the permit, it goes into a pool for the next eligible vessel.

Guidelines for transfer of lobster limited access permits:

- If the application for the limited access permit is filed by a partnership or corporation, the application must identify the names and addresses of all owners and their respective percentages of the partnership or corporation. Ownership of the permit is proportional to these percentages.

- If 50% or more of the ownership of the permit is passed to persons other than those listed on the permit application, the Regional Director must be notified of the change and provided copies of the appropriate documents (e.g., corporate records, USCG vessel documentation, etc.) validating the changes within 30 days.

- Permits may be transferred, but no one individual, partnership or corporation will be allowed to hold more than one permit, or fraction of permit, except for those owners who qualify initially for more than one permit. These owners will be allowed to replace their vessels and retain multiple permits. Layering of partnerships or corporations will not insulate a permit from this criterion.

- Upon transfer of a permit, the recipient must apply to the NMFS RD to have the permit issued in the new name. The recipient must provide satisfactory documentation of the transfer and of the corporate, partnership or individual ownership of the permit. The transferred permit is not valid until this process is completed.

2) Adjustable, annual fleet harvest quota, based on a target CPUE of 1.0 lobster/trap-haul.

The recent level of fishing pressure on the NWHI lobster stocks is not sustainable, and limited access, by itself, does not reduce fishing pressure on the stocks. Additional constraints on the fishery are needed, either in the form of effort (input) or harvest (output) limitations. The objective of this measure is to adjust the annual allowable catch to maintain the lobster stocks at a desired level. A target level of CPUE will be used for the NWHI lobster stock because it is readily obtained from commercial logbook data, and the CPUE level can be converted easily to exploitable population size. The CPUE that corresponds to the definition of overfishing in Amendment 6 to the FMP is about 0.5 lobsters/trap-haul. For management, however, a target CPUE level should be substantially higher than the overfishing threshold.

The Council discussed whether to 1) manage the fishery at an average level of MSY, or 2) manage the fishery so that fishing pressure is less than that at MSY levels to account for variability. The second approach is analogous to the "$F_{0.1}$" method used to manage some other fisheries. That method establishes a buffer around MSY to account for variability. The Council decided that a target CPUE level of 1.0, in combination with the other management actions proposed, will provide adequate protection to the stocks, and maintain and economically viable fishery.

After the target CPUE and fleet size were determined, the Council decided to follow the strategy of a fleet harvest quota to control the amount of lobster being taken from the stock. When the quota is reached, all fishing operations will cease for the year. A fleet quota also allows competition among participants, which is desirable to the NWHI lobster fleet. Operationally, this option is complicated and requires fishermen to report their catch periodically from the fishing grounds. This option may lead to an opening day rush to fish, with unclear impacts on the stocks. It gives an advantage to larger boats who can get to the grounds faster and stay there longer, and disadvantages smaller, less efficient boats. It may lead to inefficient operations, because some fishermen will have to return from the grounds before they wish to if the fleet quota is reached before the end of their trip, or they may be told not to depart on a trip after already gearing up to fish. Despite these weaknesses, the industry and Council favored this option much more than any other.

The quota will be determined by the formula

$$Quota_{(i)} = Catch_{(opt)} + [N_{(i)} - N_{(opt)}]$$

where $Quota_{(i)}$ is the fleet harvest quota for year "i", $Catch_{(opt)}$ is the sustainable catch assuming an appropriate CPUE, N_i is the estimated exploitable population at the start of the fishing season for year "i", and $N_{(opt)}$ is the lobster population that can be exploited on a sustained basis.

The fishing industry and the Council agreed that a CPUE of 1.0 lobsters per trap-haul is an appropriate target level for the NWHI. Based on logbook and research data through 1990, the Council estimates that if the sustainable population of legal lobsters in June of a given year is 1.4 million lobsters, then 960,000 lobsters can be harvested from July through December for an average of 1.0 lobsters/trap-haul, and the population by June of the following year will have recovered to 1.4 million. Thus, for the NWHI fishery $N_{(opt)}$ = 1.4 million lobsters, $Catch_{(opt)}$ = 960,000 lobsters, and the quota for year "i" will be estimated as

$$Quota_{(i)} = 960{,}000 + [N_{(i)} - 1.4 \times 10^6]$$

The formula states simply that if the exploitable population size in June of year "i" ($N_{(i)}$) is 1.4 million, then the quota will be 960,000 lobsters. If N_i is less than 1.4 million, then the quota will be 960,000 minus the difference between 1.4 million and $N_{(i)}$. If $N_{(i)}$ is greater than 1.4 million, the quota will be 960,000 plus the difference between $N_{(i)}$ and 1.4 million.

To determine $N_{(i)}$, the NMFS will estimate CPUE for year "i" ($CPUE_{(i)}$). They will then use an independently-derived constant of catchability (q, the fraction of the population caught by one unit of fishing effort) from historical commercial catch and effort data to estimate $N_{(i)}$ with the relationship

$$N_{(i)} = CPUE_{(i)} / q$$

Several approaches can be used to estimate $CPUE_{(i)}$. A pre-season survey using a research vessel and/or chartered fishing vessel, or $CPUE_{(i)}$ could be estimated during the first month of the fishing season from data sent from the fishing grounds by the entire fleet. The preferred alternative is to calculate the quota from $CPUE_{(i)}$ and $N_{(i)}$ based on previous years' CPUE and any results from research sampling that may be available. The quota might then be adjusted after the season begins, based on the first month of fishing. This in-season adjustment to attain the final quota estimate will account for any lobster recruitment or growth that has occurred during the six-month closed season immediately preceding the opening of the fishery. After this in-season adjustment is made, there will be no more changes to the quota for the year.

In some cases, adjustments to the quota formula may be required. First, the formula assumes that the $CPUE_{(i)}$ used to estimate $N_{(i)}$ is estimated from a systematic survey covering the entire exploitable population (i.e., all of the banks in the NWHI). In some years, however, fishing during the first month of the open season may be concentrated at only a few banks, so the resulting CPUE may not be a reliable measure of the relative population size. For example, if recruitment in a given year is known to be poor at some banks, fishermen will concentrate their effort at a few other banks. When the commercial CPUE during the first month of fishing is subsequently used to make an in-season adjustment to the harvest quota, the CPUE from those few banks may need to be modified to accurately reflect the relative abundance of the entire NWHI lobster population. Secondly, the quota formula assumes that recruitment to the fishery does not vary. If information becomes available that recruitment to the fishery may be aberrant (e.g., from surveys or commercial catch rates of sublegal lobsters), then the quota may need to be adjusted to account for this variation.

The Council discussed and rejected several alternative strategies to adjust allowable fishing levels (effort or catch) to maintain a target CPUE level:

- Establish a limited access system only.

  Limiting the number boats, alone, would be insufficient to protect the stocks. The effort or catch must be adjustable to provide the ability to react to changing conditions in the fishery.

- Assign an allowable number fishing days (or months) for the entire fleet.

  This option is an open fishing season, but is unrelated to spawning periodicity. Operationally, the NMFS would estimate the number of days it would take the participating fleet to reach effort levels that would lead to the target CPUE. This option can be easily administered and enforcement would be simple. Competition among vessel would be maintained, a feature important to most fishermen. It allows the participating fishermen to fish as hard as they want during the open season, with no other restrictions. This option may lead to an opening day rush to fish, and the impacts on the lobster stocks by this rush are unclear. This option may give an advantage to larger boats who can get to the grounds faster and stay there longer. The Council and industry decided that this option was less precise than a quota.

- Assign a number of allowable fishing days per vessel.

  This option is similar to the one above, but the allowable fishing time is partitioned, each vessel receiving a certain number of days to fish, which can be taken at any time throughout the year. This option is also a limit on effort, but it could spread fishing effort out over the course of the year, which may be better for the lobster stocks and markets than putting all of the effort on the grounds over a short time. It may be better for stock assessment because catch and effort information would be received throughout the year, rather than over the few months of an open season. Decisions by owners to repair vessels or participate in other fisheries would be simplified, since the need to rush to fish would be precluded. This option is operationally more demanding, but still fairly simple. An allowance for travel time would be needed, as well. It may disadvantage larger boats that need to fish harder to operate efficiently. Vessels that break down while fishing would still have their allowance of fishing opportunity. Again, the Council and industry favored the simpler and more precise quota system.

- Assign a catch quota for individual vessels (individual fishing quota or IFQ).

  This option is similar to the preferred option, but the allowable catch is partitioned, each vessel receiving a certain proportion of the total catch. This option allocates harvest opportunity among the fleet. Decisions to repair vessels or participate in other fisheries would not depend on rushing to the lobster grounds to fish. It is operationally difficult, especially regarding the initial allocation of quotas. Variable-share quotas, such as those assigning a quota based on historical performance (i.e., big boats get bigger share), are much more difficult to administer than straight-share quotas (everyone gets the same share). One way to use IFQs, and still retain an element of competition is to allocate straight shares for each vessel up to a certain proportion (for example 80%) of the total fleet quota. The remaining part (in this case 20%) of the quota would be open to any vessel(s) that could catch it. Decisions regarding transferring quotas must also be made, such as whether eligible fishermen can use another eligible fisherman's quota, or should that quota stay in the sea. Despite the popularity of IFQs elsewhere, the NWHI lobster fishermen dislike this option because it reduces competition, giving a perceived disadvantage to "better" fishermen. Further analyses are needed before this approach will be accepted by the industry. The Council intends to continue to evaluate this option for future consideration.

3) Annual closed season from January 1 through June 30.

The Council determined that additional protection for the lobster stocks is necessary, and the lobster industry favored a closed season. In order to be beneficial, a closed season should protect gravid females during their peak abundance (May-August), as well as the spawning biomass as it grows and matures prior to the peak in spawning activity (closed January-April). Thus, a closure to protect spawning females would have to run from January through August, leaving only a four-month open season. This action, with limited access and a fleet harvest quota will further insure the long-term health of the fishery.

The Council was concerned that a closure lasting through August would force smaller boats to fish during a time of the year when seas are rough enough to pose a threat to vessel safety. For this reason, the closed season was shortened to end on June 30, with the option for the NMFS Regional Director to adjust the closed season, after approval by the Council.

There is concern that a seasonal closure of this length will be detrimental to the Hawaiian lobster market. Industry representatives perceive difficulty in re-

establishing the product on the market each year. The effects of the seasonal closure on marketability cannot be determined, but some reduction in price and ex-vessel revenues are anticipated.

Lastly, another management alternative rejected by the Council was increasing the minimum tail size for harvested lobsters. Increasing the minimum size, alone, would be insufficient to protect the stocks. The effort or catch must be adjustable on an annual basis so that fishery managers can react to changing conditions in the fishery. Adjusting tail sizes every year would have a questionable impact on the stocks, and would be inefficient. Additionally, with the current status of stocks, in order to rebuild the fishery, a new minimum tail size would have to be so large that no fishery could be supported for some time.

4.3 Monitoring of Proposed Actions and Possible Council Responses

All NWHI lobster vessels are required to have a federal permit and provide completed logbooks to the NMFS after each fishing trip. The logbooks provide information on (among other things) catch, effort and fishing location. In addition, under the proposed actions, all vessels will be required to report their catch while at sea on a periodic basis (this will be decided on before the start of the season, and needs to remain flexible until the logistics are worked out) to the NMFS in Honolulu. Violators would face civil and criminal penalties under the Magnuson Act. If the logbook information shows that the conservation and management measures are inadequate to preserve the stocks, the actions proposed by this amendment are frameworked to allow the NMFS Regional Director to, after approval by the Council, adjust the number of permits issued under the limited access system, the length of the closed season, or quota and reporting requirements.

5.0 RELATIONSHIP OF AMENDMENT 7 TO OTHER APPLICABLE LAWS AND POLICIES

5.1 Administrative Procedure Act

The Council's proposed rule is published for public comment after the NMFS receives the amendment and regulations. At this time, the Secretary has not determined that the amendment is consistent with the national standards or other provisions of the Magnuson Act, and other applicable law. In making that determination, the Secretary will take into account the data, views and comments received during the comment period.

5.2 Coastal Zone Management Act

The Council has determined that this rule will be implemented in a manner that is consistent to the maximum extent practicable with the approved coastal zone

management program of Hawaii. This determination has been submitted for review by the responsible state agency under Section 307 of the Coastal Zone Management Act.

5.3 Executive Order 12291 (issuance of new rules)

The NOAA Administrator has determined that this proposed rule is not a "major rule" requiring a regulatory impact analysis. The proposed action will not have an affect on the economy of more than $100 million; there will be no major increase in costs or prices for consumers, individual industries or government agencies; and there will be no significant adverse effect on competition, employment, investment, productivity, or ability of US industries to compete with foreign enterprises.

5.4 Endangered Species Act

The Council has concluded that there will be no threat to the continued existence of any listed species, or habitat of those species, as a result of the actions contained in this amendment. The Council has submitted this determination to the NMFS for review under Section 7 of the Endangered Species Act.

5.5 Marine Mammal Protection Act

All Hawaii fisheries fall into Category 3 meaning that fishermen must report interactions with marine mammals, but are not required to obtain exemption certificates in order to fish. The Council has determined that reclassification of the NWHI lobster fishery is not necessary for the purposes of the proposed actions. The Council has submitted this determination to the NMFS for review under Section 114 of the Marine Mammal Protection Act.

5.6 National Environmental Policy Act (see Section 6.0)

The Council prepared an environmental assessment for this amendment. That assessment concluded that there will be no significant impact on the environment and, thus, is the basis for a Finding of No Significant Impact.

5.7 Paperwork Reduction Act

This proposed rule contains a collection of information requirement subject to the Paperwork Reduction Act (new information from permit applicants, change in the fishing logbooks, tail-size information from processors and at-sea reporting from vessel operators). A request to collect this information will be submitted to the Office of Management and Budget for approval.

Information requested from lobster permit applicants would be standardized as part of an effort by the NMFS to consolidate into one form the different permits for fisheries in the Western Pacific Region. The public reporting burden for this collection of information is estimated to average 15 minutes per application, including the time to review and complete the form, and return it to the NMFS. The standardized permit application form was approved by OMB in conjunction with the Southwest Region Family of Permit Forms (OMB No. 0648-0204).

The public burden for completing the new section on weather conditions in the fishing logbook is estimated to be 2 minutes per day. The public burden for completing the new section on tail sizes in the processing and sales report is estimated to be 30 minutes per trip (trips normally last 1.5 to 3 months). The public burden for making periodic at-sea reports of lobster catches to NMFS is estimated to be 5 minutes per report, including establishing communications and reporting the catch. This may be weekly, daily or otherwise (yet to be determined).

5.8 Regulatory Flexibility Act (see Section 7.0)

The NMFS and Council prepared a regulatory impact review which concludes that this rule will have minor economic impacts. The Council proposes that the General Counsel of the Department of Commerce can certify to the Small Business Administration that this proposed rule, if adopted, will not have a significant economic impact on a substantial number of small entities. Only a small percentage of the businesses would be affected and the costs of compliance, in terms of potential revenues lost, recordkeeping, the competitive position of these businesses relative to larger entities, and the ability of these businesses to remain in the market, are not significant. As a result, a regulatory flexibility analysis was not prepared.

5.9 Executive Order 12612 (federalism)

The Council has not identified any federalism issues relative to the action proposed in this amendment. The affected state has been closely involved in developing the proposed management measure, and the principal state officials responsible for fisheries management have not expressed federalism-related opposition to adoption of this amendment. In the view of the Council, therefore, preparation of a federalism assessment is not necessary.

5.10 Executive Order 12630 (takings implication)

The Council has determined that the actions proposed in this amendment will not significantly affect the use of any real or personal property.

5.11 Indigenous Peoples' Fishing Rights

There is no formal agreement between the US government and the indigenous people of the region (i.e., native Chamorros, Hawaiians and Samoans) that allocates preferential fishing rights to native people. The necessity and legal possibility of granting such rights are being investigated, however, and if indigenous people are awarded special considerations, the FMP may require revision. At present, Amendment 7 does not appear to affect any native Chamorro, Hawaiian or Samoan cultural or religious practices.

5.12 Vessel Safety Considerations

The Council identified vessel safety as an issue in the proposed actions. The Council was concerned that a closure lasting through August would force smaller boats to fish during a time of the year when seas are seasonally rough enough to pose a threat to vessel safety. For this reason, the closed season was shortened to end on June 30, with the provision for the NMFS Regional Director to adjust the closed season after approval by the Council. The Council has requested the US Coast Guard to review this amendment from the standpoint of vessel safety.

6.0 ENVIRONMENTAL ASSESSMENT

A. Purpose and Need for Action

A detailed description of the recent history of the fishery and the need for action is contained in Section 3 above and in Appendix 1. This Environmental Assessment has been prepared in accordance with the requirements of the National Environmental Policy Act to assess the potential for environmental impacts (including the human environment) that may result from Amendment 7 to the Crustaceans FMP. The proposed action is consistent with the goals and objectives of the FMP, National Standards of the MFCMA, and revised guidelines for the national standards (50 CFR Part 602). The proposed actions are deemed to be the preferred alternative.

B. Analysis of Impacts of the Preferred Alternative

1) The preferred alternative is expected to help prevent recruitment overfishing of the crustacean resources and, thus, help to ensure the long-term maintenance of the spawning stock.

2) The preferred alternative provides a safeguard against the potential for significant and irreversible damage to the ocean and coastal habitats. All fishing operations are subjected to stringent terms and conditions including, but not limited to, gear and area

restrictions, reporting requirements, etc. The lobster habitat is afforded full continued protection under the preferred alternative.

3) The preferred alternative is not expected to have any adverse impact upon public health or safety. The market for Hawaiian spiny and slipper lobsters has established high quality standards. The preferred alternative will be another method of preserving these standards.

4) The preferred alternative will not impact protected (endangered or threatened) species or marine mammals. Protected species are already afforded protection by gear requirements and closed areas, and the addition of a six-month closed season will magnify protection of these species.

5) The preferred alternative is not expected to generate controversy or have significant adverse social and economic effects. The Council intends to exercise the best informed judgement in preventing any lobster stocks from closely approaching or reaching an overfished state.

6) The preferred alternative will not have any effect upon flood plains and wetlands, or trails and rivers listed, or eligible for listing, on the National Trails and Nationwide Inventory of Rivers.

C. Agencies and Persons Consulted

The Council sent this draft amendment to the Coastal Zone Management offices and Natural Resources offices of American Samoa, Guam, Hawaii and the Northern Mariana Islands for review, as well as the US Coast Guard, Fish and Wildlife Service, lobster fishermen and industry representatives.

D. Finding of No Significant Impact

Based on the information contained in the environmental assessment, it is concluded that the action proposed by the FMP amendment will not have a significant effect on the human environment. Therefore, the preparation of an environmental impact statement is not required.

7.0 REGULATORY IMPACT REVIEW

SUMMARY OF PROPOSED ACTION:

The Council requests the Secretary of Commerce to approve, and publish regulations that implement, Amendment 7 to the FMP for crustaceans fisheries. The amendment would establish a limited access system, an annual closed season and an annual fleet harvest quota. This regulatory impact review has been prepared to evaluate the potential impacts of the proposed actions.

PURPOSE AND NEED FOR ACTION:

Several trends in the recent performance of the NWHI lobster fishery are clear (see Appendices 1 and 2):

After two years of relative stability in the fishery, landings, CPUE and revenues all declined in 1990. The volume of lobster landed fell to the lowest level since 1987, and CPUE was the lowest in the history of the fishery. In 1990, 356 t of spiny lobster and 75 t of slipper lobster were landed (total 431 t), respective decreases from 1989 of 38% and 19%. Effort in 1990 was about one million trap-hauls, a 10% increase over 1989. CPUE for the two species combined, however, was 0.66 (0.50 for legal spiny lobster and 0.16 for legal slipper lobster). This is a 37% decrease from 1989. The average size of spiny lobster tails (4-8 oz for 1990) continued to decrease, causing increasing concern among vessel operators. Fleet revenues for 1990 were $4.9 million, down 22% from 1989.

Analyses of commercial fishing logbooks and research sampling data produced several conclusions, including:

Low recruitment to the fishery was observed at Maro Reef and the banks northwest of Maro, resulting in a decline in CPUE. Fishing effort thus intensified at Necker Island and Gardner Pinnacles, resulting in lobster stocks in those areas being fished down. The spawning stock biomass index, based on CPUE, estimates that the 1990 level was 22% of the pre-fishery level, an indication that 1.2 million trap-hauls may have been excessive since recruitment to the fishery was low. As of the end of 1990, there was no indication that recruitment at Maro Reef and more northwestern banks had improved. The 1990 spawning biomass was the lowest observed to date, and recruitment to the fishery from the 1990 spawning biomass will not be observed until 1993. In 1991, lobster fishing continued in the NWHI until the fishery was closed by emergency action on May 8.

Commercial fishing logbooks for the period January - April produced the following information on the health of the fishery:

CPUE for the period, 0.63 legal lobsters/trap-haul, is the lowest recorded during the same period since 1984 (when such data started being recorded). By comparison, the CPUE for this period in 1990 was 0.84. The correlation between the CPUE for the first four months of the year and the CPUE for the entire year is 0.91, meaning that the CPUE from the first four months is a good indicator of the CPUE for the entire year. Although most of the fishing in 1991 was at Necker Island and Gardner Pinnacles, available data from Maro Reef show that Maro has not recovered from the low 1990 CPUE. Recent research suggests that the population of spiny lobster may vary annually according to oceanographic conditions. Above-average sea surface height in the NWHI is hypothesized to indicate good recruitment of 3-yr-old lobsters into the fishery four years later (1 yr larval stage and 3 yr of growth after settlement before reaching legal size), and vice-versa. This model forecasts poor recruitment to the fishery in 1991, and improved recruitment in 1992.

The 1990 spawning stock biomass of spiny and slipper lobsters in the NWHI was 22% of that in the late 1970s, prior to the development of the fishery. The Crustaceans FMP defines the threshold for recruitment overfishing at 20%. Thus, the 1990 status of spawning stock biomass may be at or near a level that causes a severe decline in recruitment. Based on the 1991 CPUE and the lack of any improvement in the catch rates at Maro Reef, the current spawning stock biomass is in danger of recruitment overfishing.

MANAGEMENT OBJECTIVE:

Some effort or harvest limitations are needed immediately to protect the lobster resource and stabilize the industry that depends on it. The Council desires a system of limited access to reduce over-capitalization in the fleet, and an annual fleet harvest quota and closed season to preserve the lobster stocks.

PROPOSED ACTIONS AND ALTERNATIVES:

1) Limited access (see Section 4.1.1).

Determination of the actual fleet size by the Council is affected by a complex of multiple factors of allocating fishing opportunities, but stated simply--a larger fleet means less opportunity per boat, but more boats with opportunity; a smaller fleet leads to the opposite. The Council considered both larger and smaller fleet sizes, and decided on 15 to allow those boats to operate efficiently, and with a minimal disruption to the recent level of participation (9-16 vessels per year (average of 13) have participated in the fishery since 1984). Establishing a fleet of more than 15 vessels would allow the fishery to operate at economically inefficient levels because an individual boat's catch or effort would be insufficient to sustain their operation.

2) Adjustable annual fleet harvest quota (see Section 4.2.2).

A fleet harvest quota will control the amount of lobster being taken from the stock. It also allows competition among participants, which is very important to the NWHI lobster fleet.

Rejected Alternatives (see pages 18-19):

- No quota; limited access system only.

  Limiting the number boats, alone, would be insufficient to protect the stocks. The effort or catch must be adjustable to provide the ability to react to changing conditions in the fishery.

- Assign an allowable number fishing days (or months) for the entire fleet.

  This option is an open fishing season, but is unrelated to spawning periodicity. The Council and industry decided that this option was less precise than a quota.

- Assign a number of allowable fishing days per vessel.

  This option is similar to the one above, but the allowable fishing time is partitioned, each vessel receiving a certain number of days to fish, which can be taken at any time throughout the year. Again, the Council and industry favored the more precise quota system.

- Assign a catch quota for individual vessels (individual fishing quota or IFQ).

  This option is similar to the preferred option, but the allowable catch is partitioned, each vessel receiving a certain proportion of the total catch. This option allocates fishing opportunity among the fleet. Despite the popularity of IFQs elsewhere, the NWHI lobster fishermen dislike this option because it reduces competition, giving a perceived disadvantage to "better" fishermen. The Council intends to continue to evaluate this option for future consideration.

3) Annual closed season from January 1 through June 30 (see Section 4.2.3).

The Council determined that additional protection for the lobster stocks is necessary, and the lobster industry favored a closed season. In order to be advantageous, a closed season must protect gravid females during their peak abundance (May-August), as well as the growth and maturation of the spawning biomass as it approaches the peak (closed January-April). Thus, a closure to protect spawning females would have to run from January through August, leaving only a four-month open season. This

action, with limited access and a fleet harvest quota will further insure the long-term health of the fishery.

There is concern that a seasonal closure of this length will be detrimental to the Hawaiian lobster market. Industry representatives perceive difficulty in re-establishing the product on the market each year. The effects of the seasonal closure on marketability are unclear, but some reduction in price and ex-vessel revenues are anticipated.

ECONOMIC ANALYSIS OF PROPOSED ACTIONS:

To survey the potential impacts of the proposed actions, the baseline cost profile for the NWHI lobster fleet (Table 1) was revised. This profile considers an unweighted average of the three vessel classes and, thus, does not reflect changes in fleet composition which might occur because of the new regulations (at present, such changes cannot be predicted). The baseline profile is based on the fleet configuration, fishing effort, amount of gear and other information on the 1990 fishery presented in the annual report for the fishery (Appendix 1). Briefly, the baseline conditions for the fishery include a total harvest of 431 metric tons (356 t spiny and 75 t slipper); 14 vessels fishing for 1468 days and expending 1.18 million trap-hauls of effort; an average of 806 trap-hauls per day per vessel; average total revenue per vessel of $403,000 and total fleet revenues of $4.3 million. The methodology used in this analysis is similar to that developed in Clarke and Pooley[3].

The emergency closure in 1991, along with minimal fishing activity during the short mid-October to end-December opening (weather is frequently poor during this period, so the predicted level of fishing is limited), followed by a six-month closed season when this amendment takes effect, will affect the Honolulu market for Hawaii lobsters. The market for frozen tails and live animals might be depressed when the fishery reopens, resulting from competition from imports which will have filled the local market niche during the period of no or light fishing in the NWHI. Table 2 depicts the impact of a $1.00 decline in price of whole lobster (roughly equivalent to a decline from $15.34/lb for frozen tails to $12.37/lb). The potential impact of the long closure and attenuated 1991 season on the marketability of Hawaii lobsters is unclear. This uncertainty is compounded by other unforseen factors which may also affect prices. Nonetheless, some sort of price reduction should be anticipated. For comparison, Table 3 depicts the impact of a $0.50 decline in whole lobster price.

The impact of a 6-mo closed season on vessel revenue and income is reviewed in Tables 4 and 5. For these cost profiles, the open season is assumed to be 180 calendar

---

[3] *Clarke, R.P. and S.G. Pooley. 1988. An economic analysis of Northwestern Hawaiian Islands lobster fishing vessel performance. US Dept. Com., NOAA Tech. Memo. NMFS-SWFC-106. 46 p.*

days, including turn-around time. A vessel may 1) bear the entire cost of overhead on the 6-mo season by fishing only for lobster (Table 4), or 2) work the remainder of the year in a different fishery (Table 5).

If the combined influences of the closed season and harvest quota have the desired effect of increasing the CPUE for the fishery to 1.0 lobsters/trap-haul, we can review the impact of these increased catch rates on vessel operations (Table 6).

None of the above effects are likely to occur alone; there will be some impacts on the fishery by combinations of factors. Table 7 presents a composite impact cost profile (Composite 1), in which lobster price is reduced from the baseline value by $1.00, the open season is limited to 180 days, the catch rate is restored to 1.00 lobster per trap haul and the fixed costs are reduced. In the second composite cost profile (Composite 2, Table 8), all factors are held constant, except that fixed costs are not reduced like in Composite 1. The two composites probably most closely predict the economic situation in the fishery under the proposed management actions.

Table 1. Cost Profile: Revised Baseline -- 1990 income statement for normalized, unweighted average lobster vessel.

Revenue		$454,275
Fixed Costs		$249,524
Capital	$96,080	
Annual Repair	$38,234	
Vessel Insurance	$55,469	
Administrative	$13,214	
Other	$46,526	
Operating Costs		$264,480
Fuel & Oil	$46,869	
Bait	$30,986	
Handling	$15,119	
Provisions	$17,160	
Supplies	$4,396	
Gear	$19,481	
Other	$6,984	
Labor Income	$114,870	
Captain Bonus	$8,615	
Total Cost		$514,003
Net Revenue		**-$59,728**

Operating Characteristics:			
Investment	$805,887		
Trips	3.2	(277 days)	
Catch/Day (no.)	527	(0.65/trap-haul)	
Trip Days	182	(57/trip)	
Fishing Days	136	(42/trip)	
Crew Share	36.7%		
Crew	6.67		
Revenue	$454,275		
Product Price (per whole lb)	$5.15		
Total Catch (whole lb)	88,215		
Traps Hauled	109,871		(806/day)
Capital Factor	10.00%		
Depreciation Factor	6.67%		
Total Cost/Trap Haul	$4.68		
Revenue/Trap Haul	$4.13		
Price/Lobster	$6.31		
Labor + Captain Income	$123,485		
Total Income			**$63,757**

Table 2. Cost Profile: $1.00 decline in price for whole lobster -- 1990 income statement for normalized, unweighted average lobster vessel.

Revenue		$366,093
Fixed Costs		$249,524
	Capital	$96,080
	Annual Repair	$38,234
	Vessel Insurance	$55,469
	Administrative	$13,214
	Other	$46,526
Operating Costs		$229,721
	Fuel & Oil	$46,869
	Bait	$30,986
	Handling	$15,119
	Provisions	$17,160
	Supplies	$4,396
	Gear	$19,481
	Other	$6,984
	Labor Income	$82,536
	Captain Bonus	$6,190
Total Cost		$479,245
Net Revenue		**-$113,152**

Operating Characteristics:			
Investment	$805,887		
Trips	3.2	(277 days)	
Catch/Day (no.)	527	(0.65/trap-haul)	
Trip Days	182	(57/trip)	
Fishing Days	136	(42/trip)	
Crew Share	36.7%		
Crew	6.67		
Revenue	$366,093		
Product Price (per whole lb)	$4.15		
Tot. Catch (whole lb)	88,215		
Traps Hauled	109,871		(806/day)
Capital Factor	10.00%		
Depreciation Factor	6.67%		
Total Cost/Trap Haul	$4.36		
Revenue/Trap Haul	$3.33		
Price/Lobster	$5.09		
Labor + Captain Income	$88,726		
Total Income			**$24,426**

Table 3. Cost Profile: $0.50 decline in price of whole lobster -- 1990 income statement for normalized, unweighted average lobster vessel.

Revenue		$410,200
Fixed Costs		$249,524
Capital	$96,080	
Annual Repair	$38,234	
Vessel Insurance	$55,469	
Administrative	$13,214	
Other	$46,526	
Operating Costs		$247,107
Fuel & Oil	$46,869	
Bait	$30,986	
Handling	$15,119	
Provisions	$17,160	
Supplies	$4,396	
Gear	$19,481	
Other	$6,984	
Labor Income	$98,709	
Captain Bonus	$8,615	
Total Cost		$496,630
Net Revenue		**-$86,430**

Operating Characteristics:			
Investment	$805,887		
Trips	3.2	(277 days)	
Catch/Day (no.)	527	(0.65/trap-haul)	
Trip Days	182	(57/trip)	
Fishing Days	136	(42/trip)	
Crew Share	36.7%		
Crew	6.67		
Revenue	$410,200		
Product Price (per whole lb)	$4.65		
Tot. Catch (whole lb)		88,215	
Traps Hauled		109,871	(806/day)
Capital Factor		10.00%	
Depreciation Factor		6.67%	
Total Cost/Trap Haul		$4.52	
Revenue/Trap Haul		$3.73	
Price/Lobster		$5.70	
Labor + Captain Income		$106,112	
Total Income			**$19,682**

Table 4. Cost Profile: Vessel not participating in alternative fishery during 6-mo closed lobster season -- 1990 income statement for normalized, unweighted average lobster vessel.

Revenue		$353,325
Fixed Costs		$249,524
Capital	$96,080	
Annual Repair	$38,234	
Vessel Insurance	$55,469	
Administrative	$13,214	
Other	$46,526	
Operating Costs		$205,706
Fuel & Oil	$46,869	
Bait	$30,986	
Handling	$15,119	
Provisions	$17,160	
Supplies	$4,396	
Gear	$19,481	
Other	$6,984	
Labor Income	$89,343	
Captain Bonus	$6,701	
Total Cost		$455,230
Net Revenue		**-$101,905**

Operating Characteristics:			
Investment	$805,887		
Trips	2.5	(222 days)	
Catch/Day (no.)	527	(0.65/trap-haul)	
Trip Days	142	(57/trip)	
Fishing Days	106	(42/trip)	
Crew Share	36.7%		
Crew	6.67		
Revenue	$353,325		
Product Price (per whole lb)	$5.15		
Total Catch (whole lb)	68,612		
Traps Hauled	85,455		(806/day)
Capital Factor	10.00%		
Depreciation Factor	6.67%		
Total Cost/Trap Haul	$5.33		
Revenue/Trap Haul	$4.13		
Price/Lobster	$6.31		
Labor + Captain Income	$96,044		
Total Income			**-$5,861**

Table 5. Cost Profile: Vessel participating in alternative fishery during 6-mo closed lobster season -- 1990 income statement for normalized, unweighted average lobster vessel.

Revenue		$353,325
Fixed Costs		$202,549
Capital	$81,948	
Annual Repair	$30,051	
Vessel Insurance	$43,597	
Administrative	$10,386	
Other	$36,568	
Operating Costs		$205,706
Fuel & Oil	$36,454	
Bait	$24,100	
Handling	$11,759	
Provisions	$13,347	
Supplies	$3,419	
Gear	$15,152	
Other	$5,432	
Labor Income	$89,343	
Captain Bonus	$6,701	
Total Cost		$408,255
Net Revenue		-$54,930

Operating Characteristics:			
Investment	$805,887		
Trips	2.5	(222 days)	
Catch/Day (no.)	527	(0.65/trap-haul)	
Trip Days	142	(57/trip)	
Fishing Days	106	(42/trip)	
Crew Share	36.7%		
Crew	6.67		
Revenue	$353,325		
Product Price (per whole lb)	$5.15		
Total Catch (whole lb)	68,612		
Traps Hauled	85,455		(806/day)
Capital Factor	10.00%		
Depreciation Factor	6.67%		
Total Cost/Trap Haul	$4.68		
Revenue/Trap Haul	$4.13		
Price/Lobster	$6.31		
Labor + Captain Income	$96,044		
Total Income			$41,114

Table 6. Cost Profile: CPUE restored to 1.0 lobsters/trap-haul -- 1990 income statement for normalized, unweighted average lobster vessel.

Revenue		$694,146
Fixed Costs		$249,524
Capital	$96,080	
Annual Repair	$38,234	
Vessel Insurance	$55,469	
Administrative	$13,214	
Other	$46,526	
Operating Costs		$363,865
Fuel & Oil	$46,869	
Bait	$30,986	
Handling	$15,119	
Provisions	$17,160	
Supplies	$4,396	
Gear	$19,481	
Other	$6,984	
Labor Income	$199,895	
Captain Bonus	$14,992	
Total Cost		$613,389
Net Revenue		**$80,757**

Operating Characteristics:			
Investment	$805,887		
Trips	3.2	(277 days)	
Catch/Day (no.)	806	(1.0/trap-haul)	
Trip Days	182	(57/trip)	
Fishing Days	136	(42/trip)	
Crew Share	36.7%		
Crew	6.67		
Revenue	$694,146		
Product Price (per whole lb)	$5.15		
Total Catch (whole lb)	134,795		
Traps Hauled	109,871		(806/day)
Capital Factor	10.00%		
Depreciation Factor	6.67%		
Total cost/Trap Haul	$5.58		
Revenue/Trap Haul	$6.32		
Price/Lobster	$6.31		
Labor + Captain Income	$214,887		
Total Income			**$295,644**

Table 7. Cost Profile: "Composite 1" ($1.00 price decline, 6-mo closed season, CPUE = 1.0, and fixed costs reduced) -- 1990 income statement for normalized, unweighted average lobster vessel.

Revenue	$435,089
Fixed Costs	$202,549
Capital	$81,948
Annual Repair	$30,051
Vessel Insurance	$43,597
Administrative	$10,386
Other	$36,568
Operating Costs	$241,697
Fuel & Oil	$36,454
Bait	$24,100
Handling	$11,759
Provisions	$13,347
Supplies	$3,419
Gear	$15,152
Other	$5,432
Labor Income	$117,046
Captain Bonus	$8,778
Total Cost	$444,245
Net Revenue	**-$9,156**

Operating Characteristics:

Investment	$805,887		
Trips	2.5	(222 days)	
Catch/Day (no.)	806	(1.0/trap-haul)	
Trip Days	142	(57/trip)	
Fishing Days	106	(42/trip)	
Crew Share	36.7%		
Crew	6.67		
Revenue	$453,089		
Product Price (per whole lb)	$4.15		
Total Catch (whole lb)	104,841		
Traps Hauled	85,455		(806/day)
Capital Factor	10.00%		
Depreciation Factor	6.67%		
Total Cost/Trap Haul	$5.20		
Revenue/Trap Haul	$5.09		
Price/Lobster	$5.09		
Labor + Captain Income	$125,825		
Total Income			**$116,669**

Table 8. Cost Profile: "Composite 2" ($1.00 price decline, 6-mo closed season, CPUE = 1.0, but no reduction in fixed costs) -- 1990 income statement for normalized, unweighted average lobster vessel.

Revenue		$435,089
Fixed Costs		$249,524
Capital	$96,080	
Annual Repair	$38,234	
Vessel Insurance	$55,469	
Administrative	$13,214	
Other	$46,526	
Operating Costs		$241,697
Fuel & Oil	$36,454	
Bait	$24,100	
Handling	$11,759	
Provisions	$13,347	
Supplies	$3,419	
Gear	$15,152	
Other	$5,432	
Labor Income	$117,046	
Captain Bonus	$8,778	
Total Cost		$491,220
Net Revenue		**-$56,131**

Operating Characteristics:		
Investment	$805,887	
Trips	2.5	(222 days)
Catch/Day (no.)	806	(1.0/trap-haul)
Trip Days	142	(57/trip)
Fishing Days	106	(42/trip)
Crew Share	36.7%	
Crew	6.67	
Revenue	$435,089	
Product Price (per whole lb)	$4.15	
Total Catch (lb)	104,841	
Traps Hauled	85,455	(806/day)
Capital Factor	10.00%	
Depreciation Factor	6.67%	
Total Cost/Trap Haul	$5.75	
Revenue/Trap Haul	$5.09	
Price/Lobster	$5.09	
Labor + Captain Income	$125,825	
Total Income		**$69,694**

The potential economic impacts of the proposed management actions on lobster vessels are summarized in Table 1. These are shown in terms of changes in gross revenue and in total income (labor income, captain's bonus, and net revenue). The anticipated price declines and proposed closed season both, by themselves lead to declines in gross revenue and total income. Conversely, if the management actions restore the fleet CPUE to 1.0, then vessels can expect large increases in revenue and income, relative to the 1990 baseline. In practice, the situation in the fishery is expected to respond to several factors, and the cost profiles of the two composites predict declines in per-vessel gross revenue, but increases in total income.

Table 9. Summary of potential economic impacts of regulations in proposed Amendment 7 (annual, per-vessel, and based on change from Revised Baseline).

	Change in Gross Revenue ($)	Change in Total Income ($)
Cost Profile		
$1.00 Price Decline (Table 3)	- 88,200	- 88,200
$0.50 Price Decline (Table 4)	- 44,100	- 44,100
6-mo Season (full fixed costs, Table 5)	- 100,900	- 69,600
6-mo Season (prt. fixed costs, Table 6)	- 100,900	- 22,600
CPUE restored to 1.0 (Table 7)	+ 239,900	+ 231,900
"Composite 1" (Table 8)	- 19,200	+ 52,900
"Composite 2" (Table 9)	- 19,200	+ 5,900

APPENDIX 1. Annual report of the 1990 NWHI lobster fishery.

"Annual Report of the 1990 Western Pacific Lobster Fishery"

Administrative Report No. H-91-06

by

Kevin C. Landgraf

Honolulu Laboratory
Southwest Fisheries Science Center
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96822

Southwest Fisheries Science Center
Administrative Report H-91-06

ANNUAL REPORT OF THE 1990 WESTERN PACIFIC LOBSTER FISHERY

Kevin C. Landgraf

Honolulu Laboratory
Southwest Fisheries Science Center
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96822-2396

with contributions from

Southwest Region
Pacific Area Office
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96822-2396

Southwest Enforcement
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96850

and

Western Pacific Regional Fishery Management Council
Honolulu, Hawaii 96813

June 1991

NOT A PUBLICATION

PREFACE

The western Pacific lobster fishery is in its eighth season under the Crustacean Fishery Management Plan (FMP) which was enacted by the Western Pacific Regional Fishery Management Council (WPRFMC) in 1983. Regulating and monitoring the fishery are the responsibilities of the National Marine Fisheries Service (NMFS). The Fishery Management Research Program (FMRP) of the Honolulu Laboratory, Southwest Fisheries Science Center, NMFS, NOAA, collects technical information for analyses from vessels permitted to fish exclusively in the Northwestern Hawaiian Islands (NWHI) for 1990. Permits were not issued for any other areas.

In addition to the FMRP, other NMFS agencies contributed to this report: The Insular Resources Investigation of the Honolulu Laboratory provided a summary of the biological research and assessment on the fishery (Polovina 1991) and Alvin Z. Katekaru of the Southwest Region, Pacific Area Office, and Victor A. Honda of Southwest Enforcement prepared the information on administrative activities and enforcement. Robert F. Harman of the WPRFMC's staff prepared information on WPRFMC-related activities.

CONTENTS

	Page
Introduction	1
Recent Developments	1
Landings and Revenue	2
Fishing Effort	2
CPUE	3
Vessel Operations	3
Biological Assessment	4
Research	5
Biological Research	5
Economic Analysis	6
Endangered and Threatened Species Interactions	6
WPRFMC Activities	6
Administrative Activities	7
Enforcement Activities and Violations	7
Citations	8

INTRODUCTION

The Northwestern Hawaiian Islands (NWHI), an isolated range of islands, islets, banks, and reefs, extends 1,500 nmi northwest, from Nihoa Island to Kure Atoll (Fig. 1). The commercial lobster fishery has operated in the NWHI for 12 years, and its main target species--spiny lobster, *Panulirus marginatus*, and common slipper lobster, *Scyllarides squammosus*, henceforth referred to as slipper lobster--dominate commercially. A third species--ridgeback slipper lobster, *S. haanii*--is caught incidentally; a fourth species--Chinese slipper lobster, *Parribacus antarcticus*--is not commercially attractive.

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 logbook data and are constructed for the main target species in tabular format, along with brief summaries. Evaluations of the biological and economic conditions of the fishery also are provided. This report concludes with separate sections on administrative and enforcement activities in the fishery.

RECENT DEVELOPMENTS

The most predominant developments of the fishery for 1990 are the reduced catches, the dramatic increase in ex-vessel prices for spiny lobster, the decrease in catch per unit effort (CPUE; the number of legal lobsters per trap-haul), and the intensive increase in total fishing effort despite lower CPUE.

After 2 years of stability, landings and revenue declined in 1990. The total number of pounds landed fell to its lowest level since 1987 (Fig. 2), and CPUE was the lowest in history of the fishery (Fig. 3). Bank production for 1990 and yearly CPUE significantly declined at Maro Reef, whereas relative production at Gardner Pinnacles and Necker Island increased.

The decreasing tail size of spiny lobster (a lingering problem and a possible product of overfishing) continued to be a prime concern of vessel operators, with the majority of the product landed in the 4-8 oz tail range. With heavy effort over the last 2 years, the fishery is showing strain, and the Western Pacific Regional Fishery Management Council (WPRFMC) has proposed regulations to protect the future health of the fishery by closing the NWHI for significant periods until July 1992.

Fishing effort in trap-hauls is now at just over 1 million, second only to peak effort in 1986 and over 10% higher than in 1989 (Fig. 4). Fishing effort in number of trips and vessels

continued its recent growth trend. However, seven lobster vessels converted (on a part-time basis) from lobster fishing to longlining for tuna (e.g., *Thunnus* spp.) or broadbill swordfish, *Xiphias gladius*, at the end of 1990, and another converted to bottomfish fishing in the NWHI. However, most vessels are waiting to see whether the season will be open for a sufficient length of time before they resume lobster fishing in 1991.

Total industry ex-vessel revenue fell 22% from 1989 to 1990 (Fig. 5), despite a 44% increase in the average price of frozen spiny lobster tails during the past 2 years to just over $15/lb (tail weight) (Fig. 6). Slipper lobster prices also increased since 1989. Wholesalers reported strong demand for spiny lobster tails and moderate demand for slipper lobster throughout 1990. Prices for spiny lobster tails were lower at the beginning of the year and rose throughout the summer to over $15.50/lb for spiny lobster tails in late fall and winter. Fishermen continued to target spiny lobster because of the high price and caught slipper lobster only incidentally, continuing a trend set in the 1986 season. Catch composition is described in Figure 7.

LANDINGS AND REVENUE

In 1990, total landings of lobster equaled 949,000 lb or 431 metric tons (t) (wet weight), and ex-vessel revenue was $4.9 million (Table 1). Fourteen vessels landed lobster from 45 trips, a 36% increase in trips over 1989. Broken down by predominant product type or species targeted, the NWHI fleet landed 356 t of spiny lobster and 75 t of slipper lobster (Table 2): a 38% and 19% reduction in catches, respectively. The 1990 catches of spiny lobster resemble those in 1981, but because of the price increase in tails, 1990 revenue resembles 1985 levels. [Tables 1 and 2 contain revisions from Clarke et al. (1988), Clark (1989), and Landgraf et al. (1990).] Estimated landings, ex-vessel prices, and ex-vessel revenue by product type are in Table 3.

FISHING EFFORT

Fishing effort for 1990 was the second highest on record, surpassing the third highest year, 1989, by 10.4%, from 1.07 million to 1.18 million (Table 1). Fishermen reported a total of 1,468 fishing days in 1990 (Table 4) compared to 1,323 in 1989 (Table 5). The increase is because of the entry of three vessels into the fishery: One class I vessel fished only half the year and participated in other fisheries the other half; one class II vessel fished three-quarters of the season; and one class III

vessel fishing for the entire year (Table 6).[1] The average number of trap-hauls per reported fishing day for 1990 was 806, close to the 1989 average of 810. This slight decrease was primarily due to the exit in 1989 of the class I-S vessel, the largest in the fleet. Effort was concentrated on three banks--Gardner Pinnacles, Necker Island, and Maro Reef (Table 4)--and was reflected in the landings by area (Table 7).

CPUE

The decline in legal CPUE is probably the most significant factor of the 1990 fishery. The number of combined legal lobsters caught per trap-haul was the lowest since monitoring of the fishery began. The lowest CPUE prior to 1990 was 1987 (0.92), but the fishery recovered in both 1988 (1.25) and 1989 (1.08) (Fig. 3); however, all are below the record effort year, 1986 (1.32). The combined CPUE for legal lobster fell to 0.66 in 1990, 0.50 for legal spiny lobster and 0.16 for legal slipper lobster (Table 4). This 37% plunge in combined CPUE is likely due to the high level of effort (4 million trap-hauls) since 1987, the majority of which is in the areas already intensely fished. Table 4 presents the CPUE figures by area for 1990.

The CPUE for all areas except Nihoa fell substantially in 1990 for legal spiny lobster. As a whole, CPUE for confidential areas (i.e., fishing areas that had few vessels, so data are pooled) dropped, but individually, the decline was more dramatic averaging 70% for each bank. Necker Island, the fishery leader, had a legal spiny lobster CPUE of 0.89 in 1988 and 0.95 in 1989 and led all banks with 0.54 in 1990. Gardner Pinnacles followed with a CPUE of 0.52, and Maro Reef was third with 0.41. Legal slipper lobster CPUE was highest for the other fishing areas at 0.55. Slipper lobster appeared to be a bycatch in 1990, with no real targeting. The total number of slipper lobster caught dropped 16%. Legal spiny and slipper lobster CPUE fell 43% and 23% from 1989. Total spiny lobster CPUE fell from 1.38 in 1989 to 1.05, and total slipper lobster CPUE was 0.26. For 1990 the monthly spiny lobster CPUE reached its highest point in April, was fairly steady through July, and tapered off the rest of the year (Fig. 8).

VESSEL OPERATIONS

Sea days analysis of the NWHI lobster fleet in 1990 is reported in unadjusted and adjusted modes (Table 8). Adjusted data annualize trip activity by deleting incomplete or

---

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

experimental trips and by taking vessel participation for part of a year and projecting it for the entire year. Based on these data, the number of fishing days per vessel was lower for class II and class III vessels for 1990 compared to 1989. Fishing days per vessel for classes I and I-S combined experienced a decline in 1990 with the departure of the only class I-S vessel in 1989. Adjusted fleet class configuration shows three class I, six class II, and four class III vessels active in 1990. One class I vessel that participated in the fishery is not included in the vessel operations figures because it conducted only one experimental trip with insignificant landings.

BIOLOGICAL ASSESSMENT

The CPUE was the lowest since the inception of the fishery in the late 1970s. Analyses of commercial logbooks and research conducted on the NOAA ship *Townsend Cromwell* provided the following conclusions (Polovina 1991):

(1) Low recruitment to the fishery was observed at Maro Reef and banks to the northwest, resulting in a decline in CPUE. Thus, most fishing effort was directed at Necker Island and Gardner Pinnacles, resulting in those populations being fished down.

(2) The spawning biomass index, based on CPUE, estimates that the 1990 level is 22% of the pre-fishery level. This is an indication that 1.2 million trap-hauls may have been excessive because of low fishery recruitment. It should be remembered that the 1990 spawning biomass is the lowest yet observed, and the recruitment to the fishery from the 1990 spawning biomass will not be observed until 1993.

(3) As of November 1990, there was no indication that recruitment at Maro Reef and other northwestern banks had improved.

(4) While a maximum sustainable yield (MSY) of 1 million lobsters with 1 million trap-hauls still appears appropriate, 1990 has shown that this is a long-term average, and considerable year-to-year variation can occur. To protect the population in poor years, management must be able to regulate annual catch or effort.

(5) Two actions were proposed to protect the current spawning biomass and promote the recovery of the annual CPUE to the 0.9-1.0 range in 1991: These actions include (a) closing the fishery from January through August to protect the spawning population both before and during the spawning period and (b) limiting annual fishing effort to 200,000 trap-hauls, which can be adjusted upward to 400,000 trap-

hauls if recruitment to the fishery at Maro Reef appears normal.

While the reasons for low recruitment to the banks in the northwestern portion of the archipelago are not known, there could have been an unusually strong movement of cold water from the northwest which transports lobster phyllosomes along the chain from west to east. This shift in larval abundance would appear as a drop in recruitment to the fishery 4 years later at Maro Reef and a corresponding increase in recruitment to the fishery at Necker Island.

RESEARCH

Biological Research

Mortality of spiny and slipper lobsters due to ghostfishing was examined in a number of tests by Parrish and Kazama (In review) in 1990. A string of eight unbaited, single-chamber plastic traps was deployed at 40-m (120-ft) depth off the island of Oahu, and monitored periodically by scuba during a 6-month period in 1990. The traps were stable and remained intact despite adverse oceanic conditions (strong currents and ground swell). The ability of lobsters to exit was tested in field and laboratory tests of traps stocked with Hawaiian spiny and slipper lobsters. Numerous entries and exits of lobsters were recorded. Both species exited similarly, with laboratory and field results indicating no significant difference in exit patterns. In all cases, lobsters exited within 23 days in a pattern of exponential decline. The data suggest that little direct mortality of lobster is due to an inability of the two species of lobster to exit traps; consequently, ghostfishing by these black plastic traps is not considered a problem for slipper and spiny lobsters (Parrish and Kazama In review).

Over a 3-year period, the Insular Resources Investigation of the Honolulu Laboratory conducted systematic trawl surveys around the Hawaiian Archipelago, collecting lobster phyllosomes via the *Townsend Cromwell*. Surrounding waters of Oahu, Necker Island, Maro Reef, Lisianski Island, and Midway Island have been examined out to 120 nmi north and south of each bank's 100-fm contour to record the abundance and distribution of larvae. Sea-surface current movements are presently being monitored through a series of satellite drift buoys deployed by the *Townsend Cromwell* in the waters around Necker Island and Maro Reef. Seasonal changes in abundance and distribution of larvae will continue to be explored with a similar follow-up trawl survey scheduled for September 1991 (F. Parrish, pers. commun., January 1991).

Economic Analysis

Economic performance in the NWHI lobster fishery in 1990 was relatively poor, particularly in light of the substantial increase in ex-vessel prices for lobsters. Table 9 provides a breakdown of vessel costs for an unweighted average of the three vessel classes (Clarke and Pooley 1988). Estimated fleet-wide net revenue (gross revenue less all expenses) was -$0.2 million, and fleet-wide total income (net revenue plus labor income) was only $1.1 million, the lowest estimate in 5 years (Table 10). Some vessels continued to do well, but the overall industry-wide impact of declining catch rates was clear.

ENDANGERED AND THREATENED SPECIES INTERACTIONS

Interactions with endangered and threatened species were observed over a wide range by lobster fishermen but not to the extent observed by longliners. All observations appear to be incidental and nonthreatening (Table 11).

WPRFMC ACTIVITIES

The WPRFMC directed its staff and Crustacean Plan Monitoring Team to work with National Marine Fisheries Service (NMFS) in developing an amendment to define recruitment overfishing for the NWHI lobster stocks in accordance with revised guidelines for National Standards 1 and 2 of the Magnuson Fishery Conservation and Management Act. The WPRFMC submitted amendment 6 to NMFS in September 1990, and the Secretary of Commerce approved it in February 1991.

In response to concerns voiced by fishermen that CPUE and average tail size of NWHI lobsters were decreasing, the WPRFMC began examining the need for further management action to protect the fishery. The WPRFMC fielded a mail survey of all lobster boat owners and captains to see whether the industry perceived a need for management action restricting entry to the fishery, limiting participant fishing activity, or both measures. Nearly all of the respondents believed that some form of restrictions was needed. In addition, the NMFS provided information on trends in tail sizes, as well as results of a summer research cruise to the NWHI. The research results indicated that a recruitment failure had occurred on at least one of the fishing banks (Maro Reef) and that fishing effort had increased accordingly at the other banks (especially at Necker Island). All of this information indicated that the condition of the NWHI lobster stock was deteriorating and immediate action was needed to protect it.

The fishing industry, WPRFMC staff, Crustacean Plan Monitoring Team, Crustacean Advisory Panel, and NMFS staff met

several times to begin developing recommendations for methods to manage the fishery. The Crustacean Plan Monitoring Team's recommendations, and an industry response to them, were presented to the WPRFMC and its Scientific and Statistical Committee in February 1991. The WPRFMC voted to recommend an emergency closure of the fishery in 1991, which would be in effect for 90 days and could be extended, if necessary, for another 90 days. During this closure, the WPRFMC and NMFS would work to develop a plan to limit entry and reduce fishing activity in the NWHI. The WPRFMC approved several elements of the plan, including limiting the fleet to 15 vessels and imposing a fleet-wide catch quota and an annual closed season from 1 January through 30 June.

ADMINISTRATIVE ACTIVITIES

The Southwest Region, Pacific Area Office, NMFS, issued 22 permits for commercial lobster fishing in the WPRFMC's Western Pacific Region during 1990. All of the permits issued were for area 1, the NWHI EEZ. Two permits were issued to new entrants to the fishery; five previously permitted vessels dropped out of the fishery. No permit applications were received for area 2 (main Hawaiian Islands) nor permit area 3 (American Samoa and Guam).

The carrying capacity of the 14 active vessels as reported on the permits was 15,380 traps, a net increase of 2,998 (24%) over the previous year. The average carrying capacity of active vessels in 1990 was 1,099 traps (Table 12).

ENFORCEMENT ACTIVITIES AND VIOLATIONS

On 27 occasions in 1990, NMFS Southwest Enforcement agents inspected returning lobster vessels that off-loaded their catches in Honolulu. Agents are aware of one landing of lobster other than in Honolulu. One violation requiring formal documentation was observed; it involved lobster fishing without a permit and failure to notify officials 24 hours before arrival.

The 1991 goal for NMFS Southwest Enforcement is to have complete coverage of returning lobster vessels, even though compliance by vessel captains and owners of existing regulations in this highly regulated fishery appears adequate. Enforcement coverage of returning vessels more than doubled 1989 inspections.

The high price and low catch rates have produced reports to Southwest Enforcement that some vessels are stripping eggs from the female lobsters. These allegations are being investigated.

CITATIONS

Clarke, R. P.
1989. Annual report of the 1988 western Pacific lobster fishery. Southwest Fish. Cent. Honolulu Lab., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Southwest Fish. Cent. Admin. Rep. H-89-5, 28 p.

Clarke, R. P., S. G. Pooley.
1988. An economic analysis of Northwestern Hawaiian Islands lobster fishing vessel performance. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-SWFC-106, 46 p.

Clarke, R. P., S. S. Yoshimoto.
1990. Application of the Leslie model to commerical catch and effort of the slipper lobster, *Scyllarides squammosus*, fishery in the Northwestern Hawaiian Islands. Mar. Fish. Rev. 52(2):1-7.

Clarke, R. P., S. G. Pooley, P. A. Milone, and H. E. Witham.
1988. Annual report of the 1987 western Pacific lobster fishery. Southwest Fish. Cent. Honolulu Lab., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Southwest Fish. Cent. Admin. Rep. H-88-5, 48 p

Landgraf, K. C., S. G. Pooley, and R. P. Clarke.
1990. Annual report of the 1989 western Pacific lobster fishery. Southwest Fish. Cent. Honolulu Lab., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Southwest Fish. Cent. Admin. Rep. H-90-6, 30 p.

Parrish, F. A., and T. K. Kazama.
In review. Evaluation of ghost fishing in the Hawaiian lobster fishery. Honolulu Lab., Southwest Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396.

Polovina, J. J.
1991. Status of lobster stocks in the Northwestern Hawaiian Islands, 1990. Southwest Fish. Cent. Honolulu Lab., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Southwest Fish. Cent. Admin. Rep. H-91-04, 16 p.

Table 1.--Annual landings (number and pounds), ex-vessel revenues (US$), fishing effort (trap-hauls, vessels, and trips), catch per unit effort (CPUE; number of legal lobster per trap-haul), and prices (US$/lobster) of slipper and spiny lobsters from the Northwestern Hawaiian Islands, 1977-90. Data are from vessel logbooks and revenue reports.

Year	Landings		Revenue ($)	Trap-haul (No.)	Vessels (No.)	Trips (No.)	Combined legal CPUE[b]	Price/lobster
	No.	Pounds[a]						
1977	--	72,000	209,000	--	5	14	--	--
1978	--	45,000	135,000	--	2	12	--	--
1979	--	100,000	320,000	--	2	6	--	--
1980	--	328,000	1,114,000	--	3	12	--	--
1981	--	780,000	2,730,000	--	10	25	--	--
1982	148,214	187,000	673,000	47,738[c]	7	19	3.10	4.54
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	1,160,253	1,470,000	6,291,000	1,071,538	11	33	1.08	5.42
1990	774,336	949,000	4,887,000	1,182,485	14	45	0.66	6.31

[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]Legal CPUE for slipper lobster before 1988 is calculated as 0.72 multiplied by the number of retained slipper lobster.
[c]Estimate is from Clarke and Yoshimoto (1990).
[d]The 1983 annual values were estimated from logbook returns from the latter 9 months of the year.

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, 1977-90. 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 ($/lb)	Revenue ($)
1977	72,000	30	2.90	209,000	--	--	--	--
1978	45,000	20	3.00	135,000	--	--	--	--
1979	100,000	50	3.20	320,000	--	--	--	--
1980	328,000	150	3.40	1,115,000	--	--	--	--
1981	780,000	350	3.50	2,730,000	--	--	--	--
1982	187,000	80	3.60	673,000	--	--	--	--
1983	203,000	90	2.91	591,000	--	--	--	--
1984	935,000	425	2.66	2,490,000	82,000	37	1.63	134,000
1985	1,438,000	654	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	576	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

[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).

Table 3.--Estimated landings, ex-vessel price (US$/lb), and ex-vessel revenue (US$), by product type, from the Northwestern Hawaiian Islands, 1977-90. Data are from vessel logbook and revenue reports.

			Spiny lobster				Slipper lobster				
Year	Product	Type	Pounds	Metric tons	Price ($)	Revenue ($)	Pounds	Metric tons	Price ($)	Revenue ($)	Vessels (No.)	Trips (No.)
1977	Live		72,000	33	2.90	208,000	--	--	--	--	5	14
1978	Live		45,000	20	3.00	135,000	--	--	--	--	2	12
1979	Live		100,000	45	3.20	320,000	--	--	--		2	6
1980	--		--	--	--	--	--	--	--	--	--	--
1981	--		--	--	--	--	--	--	--	--	--	--
1982	--		--	--	--	--	--	--	--	--	--	--
1983[a]	Live		25,000	11	4.46	111,600	--	--	--	--	4	12
	Frozen	Whole	15	0	4.00	60	--	--	--	--	1	1
	Frozen	Tails	51,400	23	7.41	380,800	--	--	--	--	2	7
1984	Live		36,500	17	4.70	171,700	--	--	--	--	7	9
	Frozen	Whole	3,500	2	3.98	13,800	100	--[b]	3.00	400	3	6
	Frozen	Tails	318,600	145	7.23	2,304,500	27,300	12	4.94	134,000	10	31
1985	Live		35,200	16	4.71	165,800	30	--[b]	3.90	100	7	21
	Frozen	Whole	2,800	1	4.08	12,800	600	--[b]	2.73	1,600	3	8
	Frozen	Tails	498,000	226	8.13	4,050,000	310,000	141	5.35	1,660,000	15	56
1986	Live		8,200	8	5.10	92,880	100	--[b]	5.25	600	6	16
	Frozen	Whole	15,500	7	3.84	59,500	3,600	2	2.45	8,700	6	9
	Frozen	Tails	397,000	180	8.96	3,558,000	350,000	159	6.47	2,263,000	16	56

Table 3.--Continued.

Year	Product	Type	Spiny lobster Pounds	Spiny lobster Metric tons	Spiny lobster Price ($)	Spiny lobster Revenue ($)	Slipper lobster Pounds	Slipper lobster Metric tons	Slipper lobster Price ($)	Slipper lobster Revenue ($)	Slipper lobster Vessels (No.)	Slipper lobster Trips (No.)
1987	Live		12,400	6	6.50	80,900	5,500	3	7.29	40,400	3	9
	Frozen	Whole	800	--[b]	5.78	4,600	1,800	1	3.96	7,100	3	3
	Frozen	Tails	183,200	83	13.00	2,383,000	143,000	65	10.16	1,452,000	10	37
1988[c]	Live		6,000	3	7.51	44,900	4,400	2	7.64	34,100	4	8
	Frozen	Whole	1,400	--[b]	4.00	5,500	--	--	--	--	3	3
	Live	Tails	431,000	196	10.24	4,402,200	60,500	28	9.04	547,000	9	28
1989	Live		24,000	11	7.62	188,300	14,500	7	7.03	102,000	4	9
	Frozen	Whole	2,200	1	5.00	11,100	--	--	--	--	--	--
	Frozen	Tails	441,300	200	12.29	5,424,600	62,900	29	8.98	565,000	11	33
1990	Live		57,900	26	7.27	421,300	6,000	3	6.66	41,000	6	16
	Frozen	Whole	500	--[b]	8.00	4,000	--	--	--	--	--	--
	Frozen	Tail	258,300	117	15.07	3,894,000	53,200	24	9.94	526,800	14	43

[a]April through December 1983.
[b]Less than 1 metric ton landed.
[c]Revised from 1987 annual report.

Table 4.--Annual fishing effort (days fished and trap-hauls) and catch per unit effort (CPUE; number of lobster per trap-haul) for spiny and slipper lobsters in the Northwestern Hawaiian Islands, 1990. Data are from vessel logbooks and revenue reports.

Area	Days fished (No.)	Trap-hauls (No.)	Catch per unit effort							
			Spiny lobster				Slipper lobster			
			Legal	Sublegal	Berried	Total	Legal	Sublegal	Berried	Total
Nihoa	15	5,450	0.20	0.01	0.17	0.38	0.16	0.02	0.02	0.26
Necker	592	425,406	0.54	0.63	0.17	1.35	0.12	0.02	0.02	0.17
French Frigate Shoals	11	6,882	0.17	0.23	0.16	0.56	0.41	0.13	0.37	0.91
St.Rogatien	9	3,370	0.12	0.04	0.02	0.18	0.13	0.03	0.01	0.18
Gardner Pinnacles	558	492,019	0.52	0.35	0.19	1.06	0.08	0.03	0.02	0.13
Maro Reef	237	211,186	0.41	0.10	0.06	0.57	0.31	0.15	0.19	0.65
Other*	46	38,172	0.34	0.02	0.02	0.38	0.55	0.05	0.06	0.65
Total	1,468	1,182,485	0.50	0.39	0.15	1.05	0.16	0.05	0.06	0.26

*Includes Brooks Bank, Raita Bank, Northampton Seamount, Pioneer Bank, Lisianski Island, Pearl and Hermes Reef, Midway Island, and Kure Atoll.

Table 5.--Annual fishing effort in number of vessels and trips, number of reported fishing days, estimated annual adjusted fishing day, and trap-hauls for active vessels in the Hawaiian lobster fishery in 1982-90.

Year	Vessels (No.)	Trips (No.)	Total fishing days	Fishing days/ per vessel[a]	Trap-hauls
1982	7	19	--	--	47,738[b]
1983	4	19	279	--	84,870
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

[a]Unadjusted annualized fishing days for total fleet configuration are from Table 8.
[b]Estimated from Clarke and Yoshimoto (1990).

Table 6.--Entry and exit patterns of individual lobster fishing vessels in the Northwestern Hawaiian Islands, 1983-90. Vessels are coded for purposes of confidentiality. Xs indicate fishing in a particular quarter; ellipses indicate vessels that changed class. Data are from vessel logbooks.

Vessel code	1983				1984				1985				1986				1987				1988				1989				1990			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Class I-S																																
U																							X	X		X	X	X				
Class I																																
A					X	X	X	X	X	X	X	X																				
C							X		X	X	X	X	X	X	X	X											X	X	X	X	X	X
CC							X		X	X	X	X	X	X	X	X															X	X
N											X	X																				
V												X	X	X	X	X																
E													X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
W														X																		
X														X	X	X	X															
AA														X	X	X																
J																		X	X	X											X	X
Class II																																
S	X	X	X	X	X	X	X	X	X	X	X	X																				
F	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X	X
D								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X
Z																		X	X	X	X	X	X	X								
O																							X	X	X	X	X	X	X	X	X	X
K																											X		X	X	X	X
T																							X	X	X	X	X			X	X	X
FF																															X	X

Table 6.--Continued.

Vessel code	1983				1984				1985				1986				1987				1988				1989				1990			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Class III																																
R	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
L	X					X																										
BB					X																											
B							X																									
I							X		X	X	X	X	X	X	X	X	X	X	X	X	X		X			.	.	.				
M								X	X	X	X	X	X	X	X	X																
P								X	X	X	X	X	X																			
Y									X																							
EE									X	X	X	X	X	X	X	X	X	X														
G								..		X																						
DD											X	X																				
O													X	X	X		X	X	X	X	X	.	.	.	.	.	.	.				
Q																			X	X	X	X	X	X		X	X	X		X	X	X
H																										X	X	X		X	X	X
GG																														X	X	X

Table 7.--Annual fishing effort (vessel and trips) and catch (number) of spiny and slipper lobsters, by area, in the Northwestern Hawaiian Islands, 1990. Data are from vessel logbooks and revenue reports.

Area	Vessels (No.)	Trips (No.)	Catch (No.)							
			Spiny lobster				Slipper lobster			
			Legal	Sublegal	Berried	Total	Legal	Sublegal	Berried	Total
Nihoa	3	5	1,071	74	916	2,061	870	94	428	1,392
Necker Island	12	29	231,278	268,754	73,168	573,200	52,306	9,348	8,690	70,344
French Frigate Shoals	4	5	1,179	1,584	1,098	3,863	2,811	893	2,567	6,271
St. Rogatien Bank	5	6	390	149	59	598	455	117	46	608
Gardner Pinnacles	10	21	256,633	172,857	92,645	522,135	40,284	12,931	11,192	64,407
Maro Reef	7	11	87,025	20,073	12,411	119,509	66,079	30,763	41,056	137,898
Other*	11	12	13,092	927	923	14,942	20,873	1,743	3,220	25,836
Total	14	45	590,688	464,418	181,220	1,236,306	183,668	55,889	67,199	306,756

*Includes Brooks Bank, Rita Bank, Northhampton Bank, Lisianski Island, Pioneer Bank, Pearl and Hermes Reef, Midway Island, and Kure Atoll.

Table 8.--Annualized mean number of vessels, trips, and sea days, by vessel class, for the lobster fleet in the Northwestern Hawaiian Islands, 1990. Unadjusted figures include incomplete trips; adjusted figures are on an annualized basis. Standard deviations are in parentheses; data are from vessel logbooks.

Vessels		Trips	Sea	Mean number of sea days by activity						
Class	No.	(No.)	days	Fishing	Traveling	Running	Weather	Breakdown	Rest/deck work	Missing
Unadjusted										
I	3	9	145.0 (59.2)	109.0 (59.2)	5.7 (0.6)	20.0 (7.8)	6.0 (7.9)	0.7 (2.1)	1.7 (2.1)	2.0 (0.0)
II	6	20	167.0 (24.1)	125.5 (24.1)	4.7 (5.0)	23.3 (5.8)	6.8 (8.6)	3.0 (4.2)	1.2 (0.8)	2.5 (1.8)
III	4	14	116.0 (10.5)	84.3 (10.5)	2.8 (1.9)	22.5 (2.9)	3.0 (4.8)	2.3 (1.5)	0.5 (0.6)	0.8 (1.0)
Total fleet	13	43	146.2 (37.1)	109.0 (28.9)	4.3 (3.6)	22.3 (5.3)	5.5 (7.1)	2.2 (3.0)	1.1 (1.1)	1.8 (1.5)
Adjusted										
I	3	12	189.7 (38.2)	143.0 (38.2)	8.3 (3.2)	26.3 (5.1)	6.3 (7.8)	1.0 (1.0)	1.7 (2.1)	3.0 (1.0)
II	6	23	197.3 (35.7)	149.3 (35.7)	5.3 (5.6)	27.2 (5.2)	8.0(11.2)	3.2 (4.3)	1.5 (0.8)	2.8 (1.6)
III	4	19	154.5 (14.0)	112.0 (14.0)	3.8 (2.6)	30.0 (4.2)	4.3 (6.7)	2.8 (2.1)	0.5 (0.6)	1.3 (1.5)
Total fleet	13	54	182.4 (34.8)	136.4 (32.0)	5.5 (4.4)	27.8 (4.7)	6.5 (8.7)	2.5 (3.1)	1.2 (1.2)	2.4 (1.6)

Table 9.--Income statement for the average lobster fishing vessel in the Northwestern Hawaiian Islands, 1990.[a] All three vessel classes are combined in an unweighted average of annualized production. (Columns may not sum because of rounding.)

Revenue ($)	403,001	
Fixed costs ($)	249,524	
Capital	96,080	
Annual repair	38,234	
Insurance	55,469	
Administrative	13,214	
Other	46,526	
Operating costs ($)	245,339	
Fuel and oil	46,381	
Bait	30,592	
Handling	18,321	
Provisions	16,981	
Supplies	4,340	
Gear	19,233	
Other	6,912	
Labor income	95,422	
Captain's bonus	7,157	
Total cost ($)	494,862	
Net revenue ($)	-91,861	
Operating characteristics (unweighted average)		
Investment ($)	805,887	
Trips No.	4.2	
Catch (lb) per day	255	
Trip days (No.)	181	
Fishing days (No.)	135	
Crew share (%)	36.7	
Crew (No.)	6.67	
		Per trap-haul
Revenue ($)	403,001	$3.65
Product price ($) per pound	11.75	
Total catch (lb)	34,308	0.31
Traps hauled (No.)	110,282	819
Capital factor (%)	10.00	
Depreciation factor (%)	6.67	

[a]Data were compiled using 1986 baseline values updated to 1990 and adjusted for inflation and operating characteristics (see Clarke and Pooley (1988) for methodology).

Table 10.--Income estimate for the lobster fleet in the North western Hawaiian Islands, 1986-90. Values (in US$ millions) are estimated from annualized earnings per vessel class, adjusted to actual gross revenue.

	US$ (in millions)				
	1986	1987	1988	1989	1990
Gross revenue	6.0	4.0	5.0	6.3	4.9
Net revenue	-0.2	0.4	1.2	0.9	-0.2
Labor income	1.7	1.1	1.4	1.8	1.3
Total income	1.5	1.5	2.6	2.7	1.1

Table 11.--Reported sightings of or interactions with endangered or threatened species by the lobster fleet in the Northwestern Hawaiian Islands, 1990. Data are from the vessel logbooks.

Area	No. of sightings by No. of individuals	
	One individual	Two individuals
Monk seals observed in statistical area		
Gardner Pinnacles	10	
Kure Atoll	2	
Maro Reef	2	
Necker Island	23	1
Monk seals observed in vicinity of fishing gear		
Gardner Pinnacles	3	
Maro Reef	1	
Necker Island	5	
Turtles observed in statistical area		
Kure Atoll	1	
Maro Reef	4	
Necker Island	4	

Table 12.--Permit and vessel activity in the lobster fishery in the Northwestern Hawaiian Islands, 1983-90, as reported on the permit applications to the Southwest Region, National Marine Fisheries Service.

Year	Permits Issued (No.)	Trap (No.)	Carrying capacity of active vessels[a] (No. of traps)	
			Total	Average
1983	14	4	1,200	300
1984	19	11	5,240	476
1985	45	16	12,250	703
1986	54	16	13,580	849
1987	41	11	9,150	832
1988	26	9	9,420	1,047
1989	17	11	12,382	1,126
1990	22	14	15,380	1,099

[a]*Aleutian Spray*, *Archer*, *Betty N*, *Bounty*, *Cornucopia*, *Dominis*, *Haida*, *Laysan*, *Liberty*, *Lusty*, *Marie M*, *Miss Jessico*, *Sea Spray*, *Shaman*

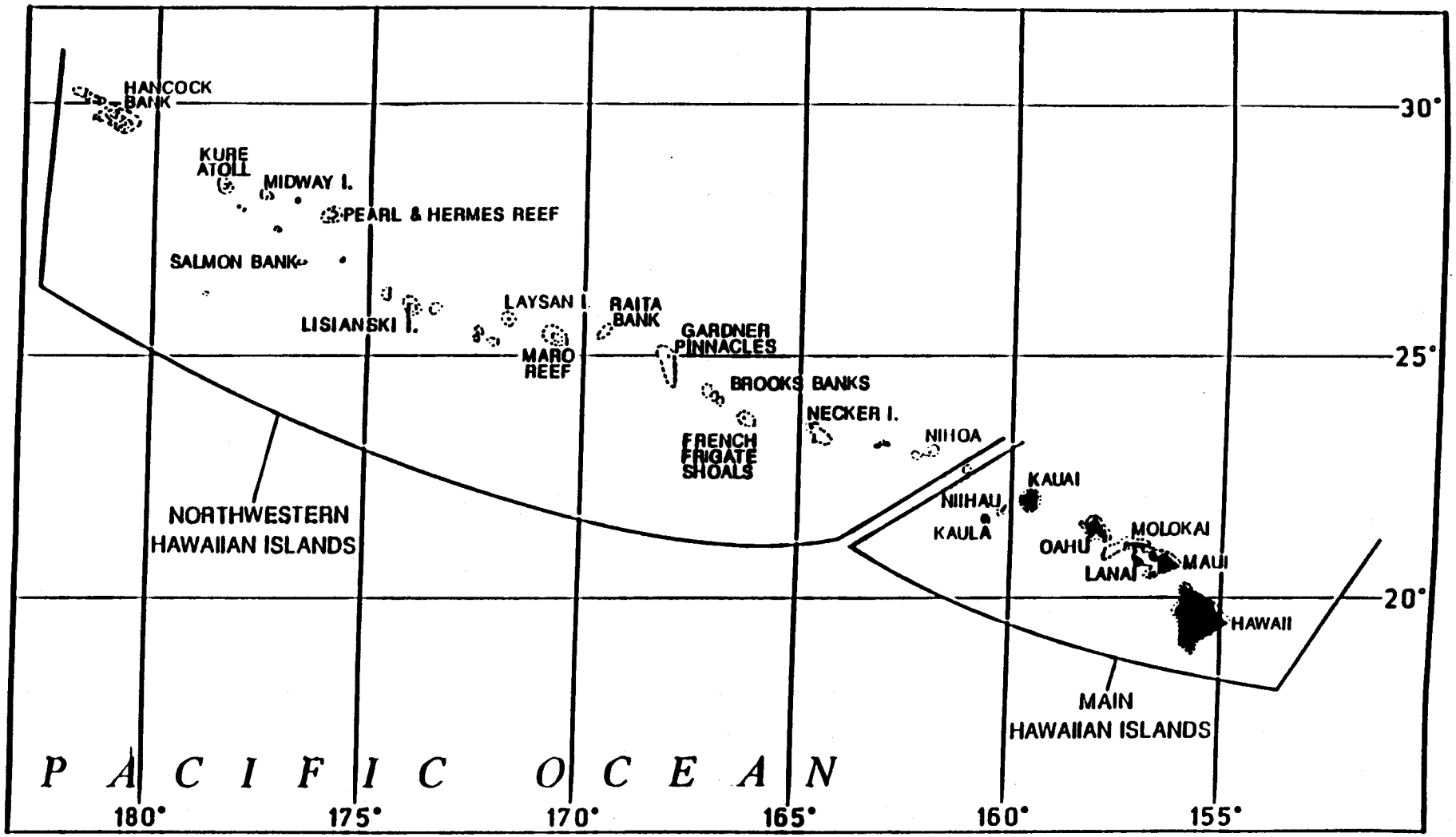


Figure 1.--Map of the Northwestern Hawaiian Islands (permit area 1) and the main Hawaiian Islands (permit area 2).

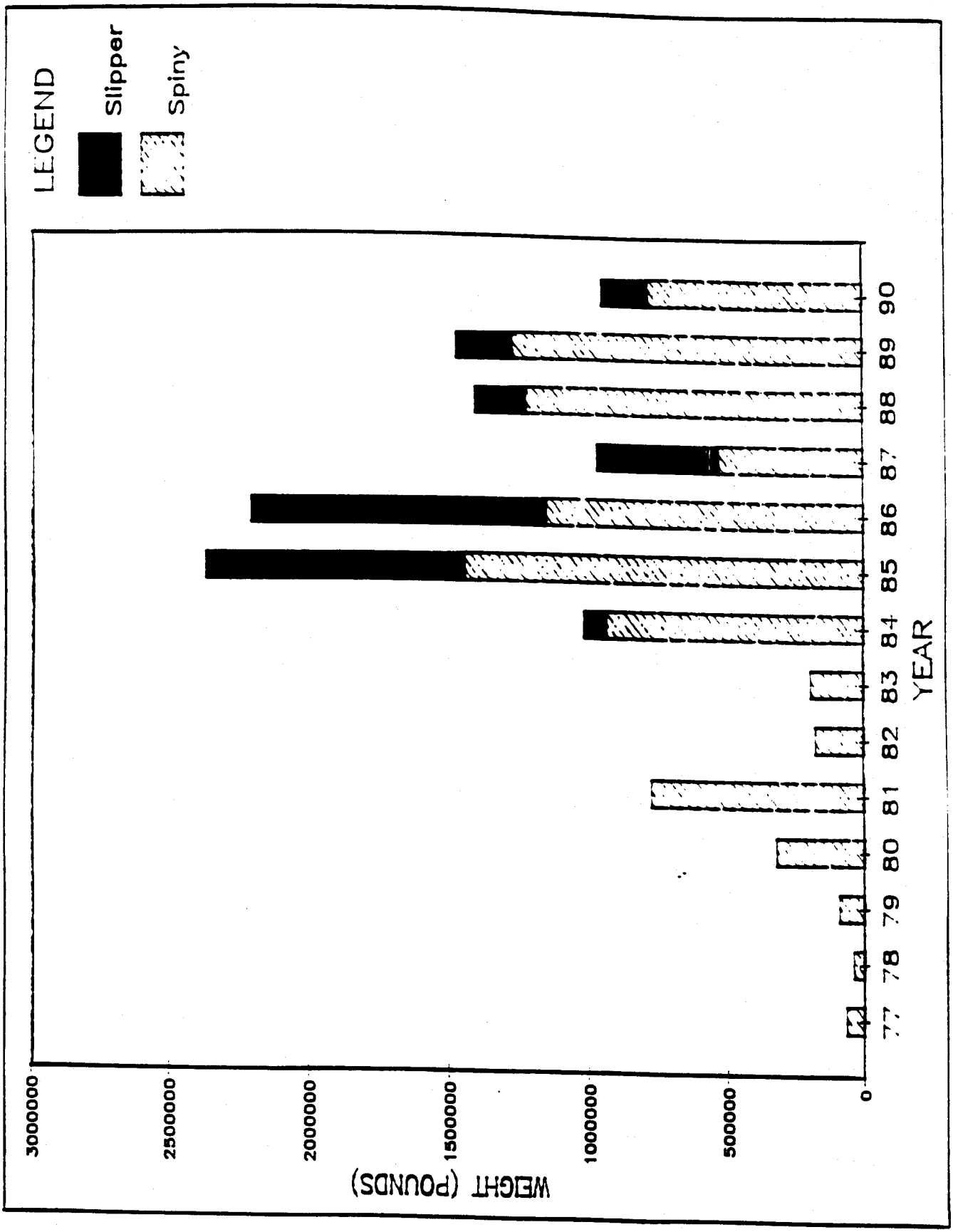


Figure 2.--Estimated annual landings (wet weight) of spiny and slipper lobsters in the Northwestern Hawaiian Islands, 1977-90.

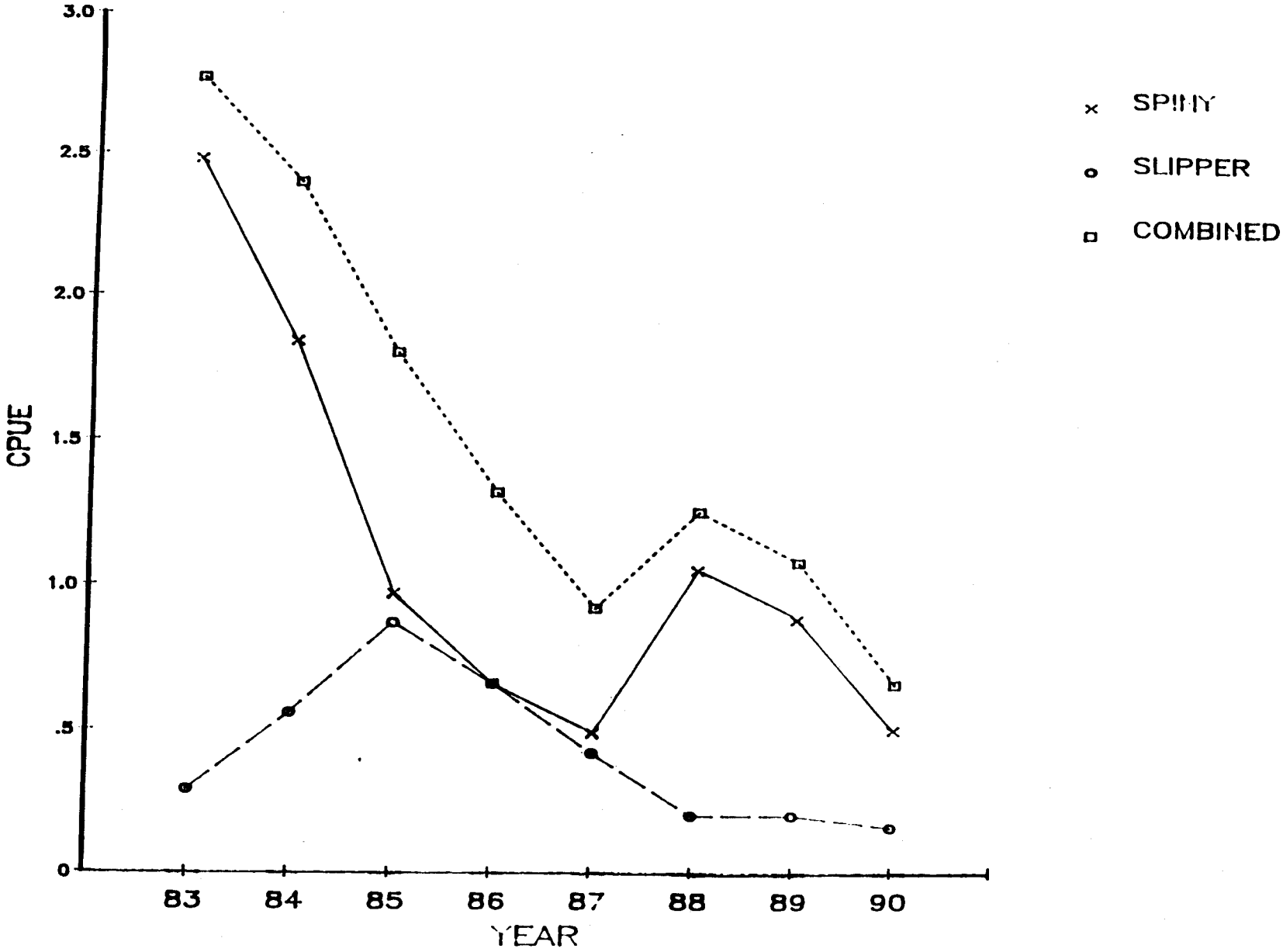


Figure 3.--Catch per unit effort (CPUE) for spiny and slipper lobsters from the Northwestern Hawaiian Islands, 1983-90. (CPUE for slipper lobster is calculated as 0.72 multiplied by the number retained before 1988.)

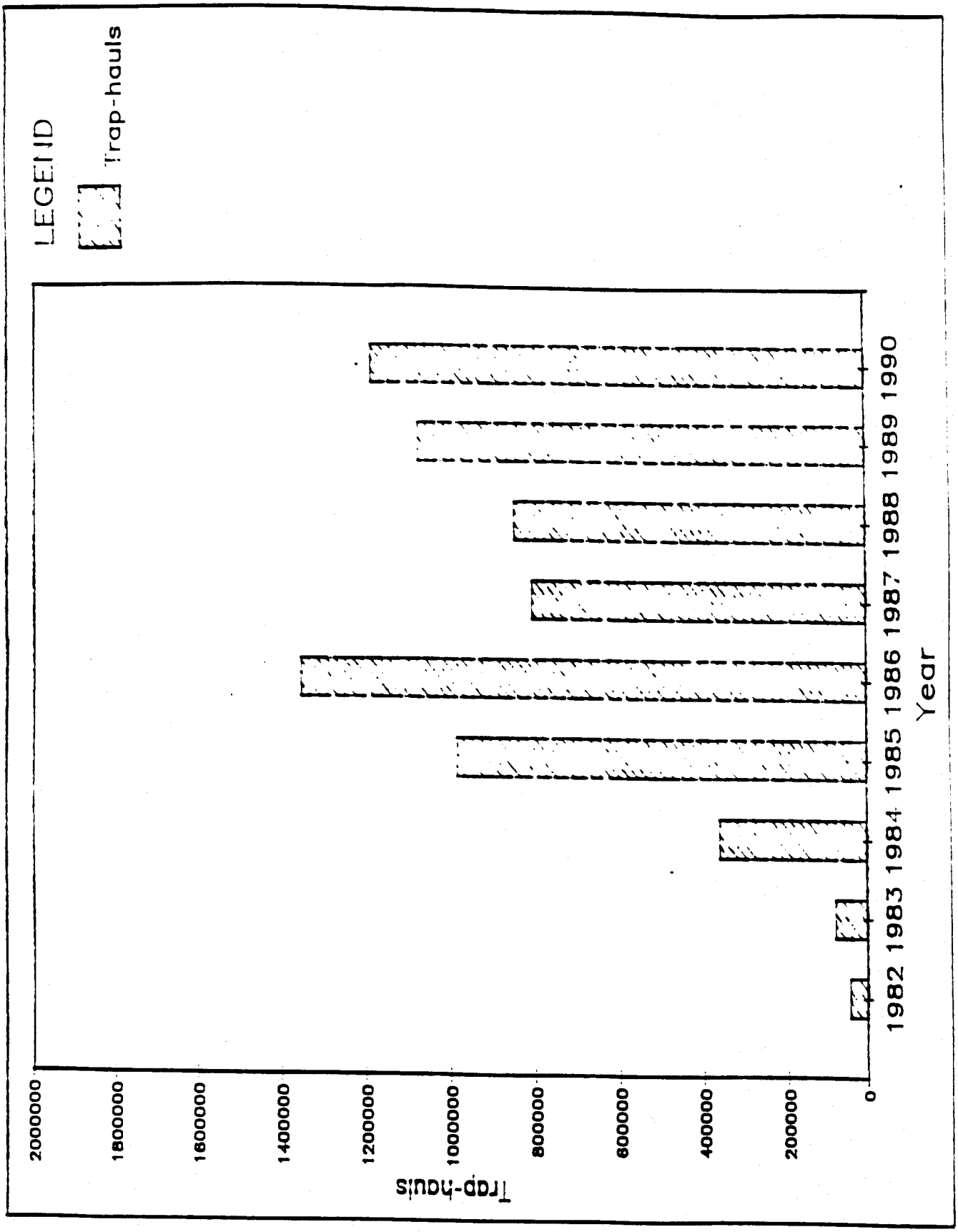


Figure 4.--Fishing effort (trap-hauls) by the lobster fleet in the Northwestern Hawaiian Islands, 1983-90.

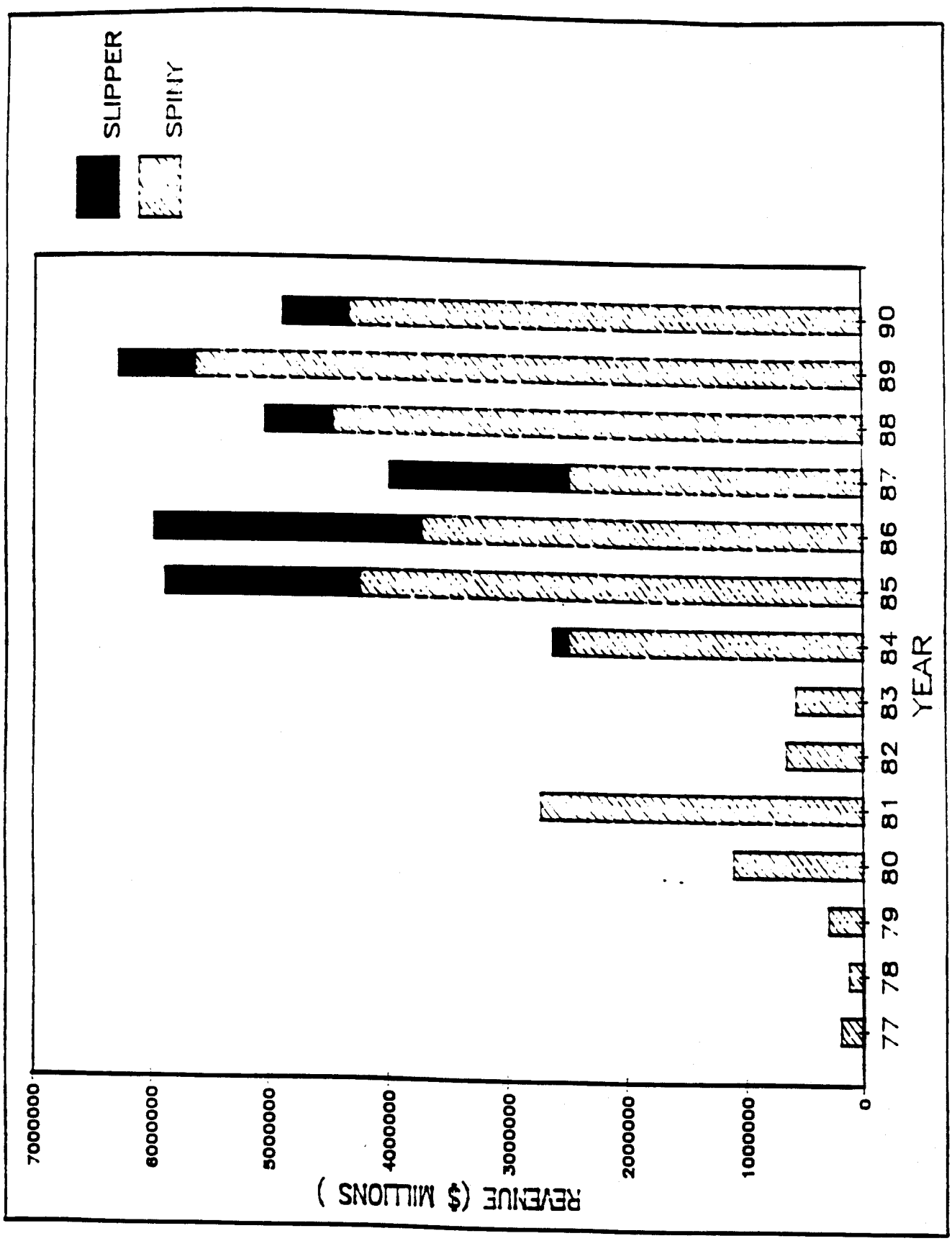


Figure 5.--Ex-vessel revenue for spiny and slipper lobsters from the Northwestern Hawaiian Islands, 1977-90.

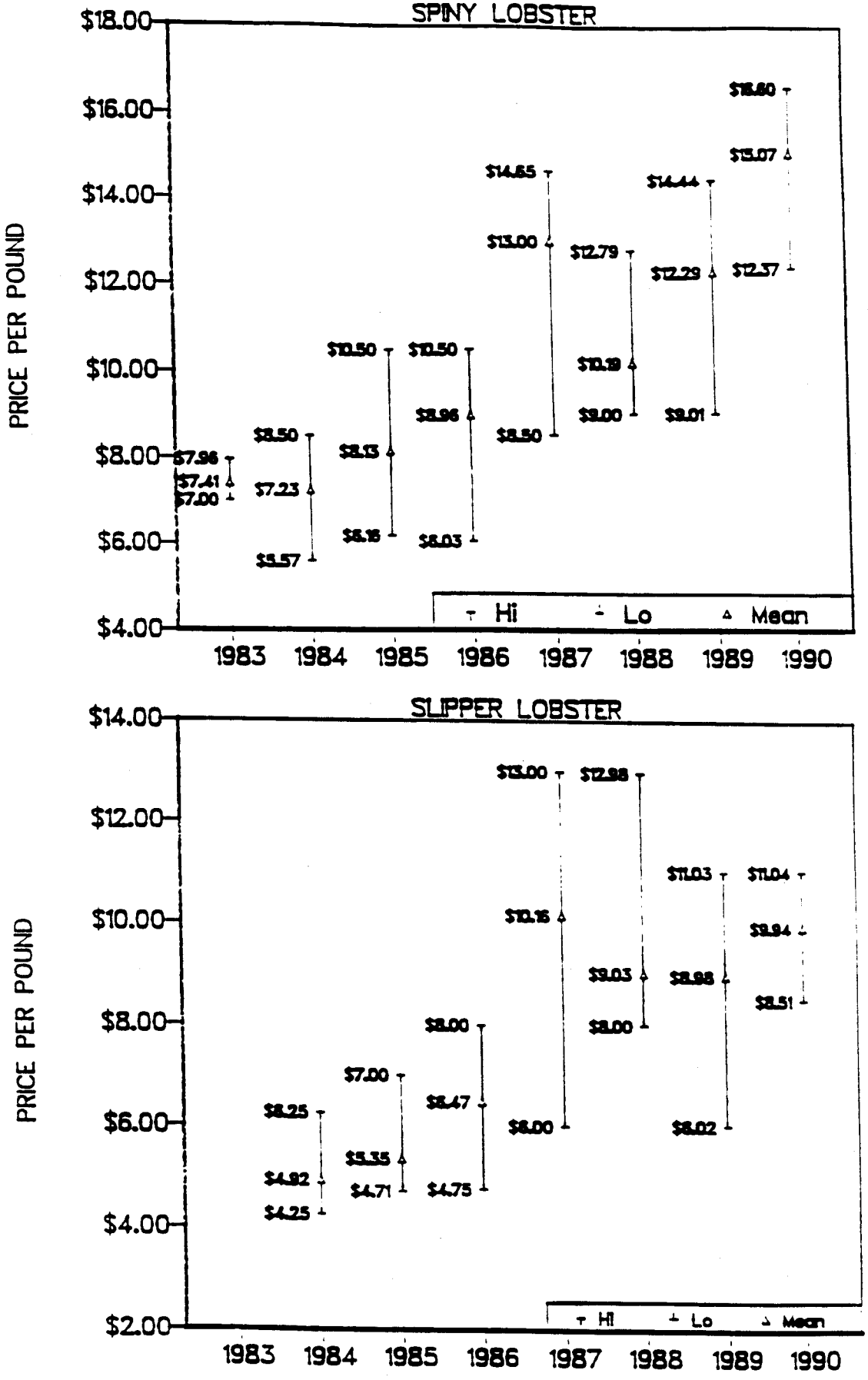


Figure 6.--Low, mean, and high ex-vessel prices of frozen spiny and slipper lobster tails from the Northwestern Hawaiian Islands, 1983-90.

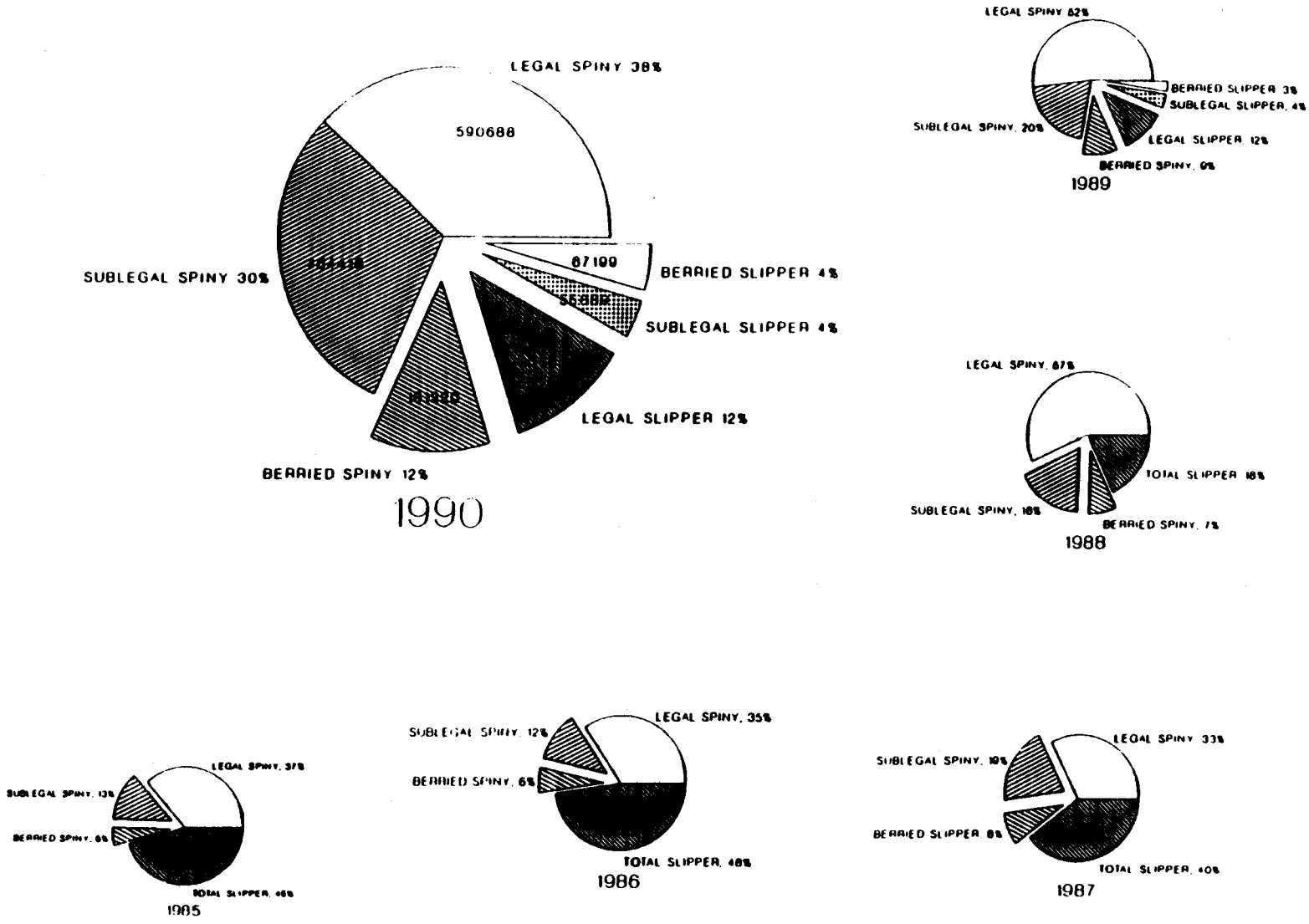
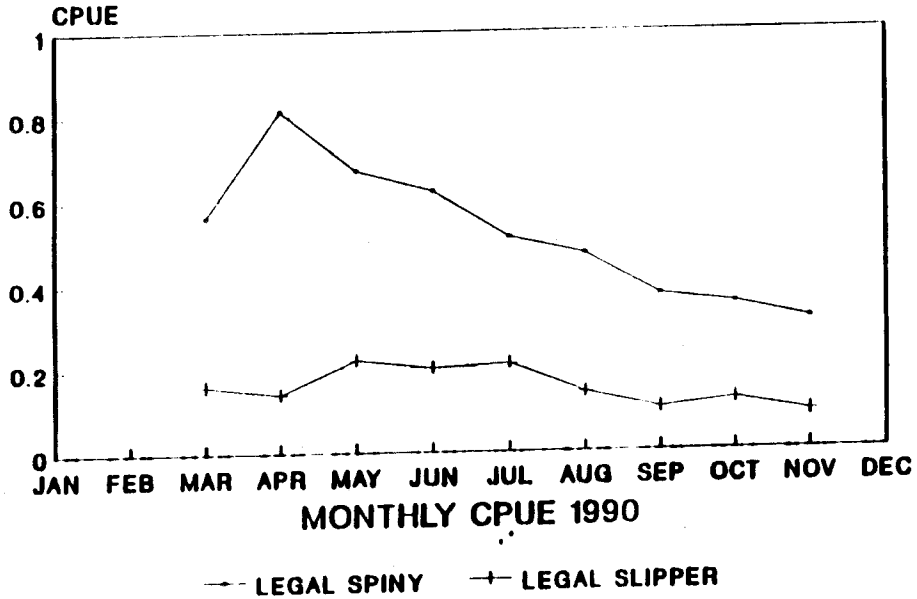
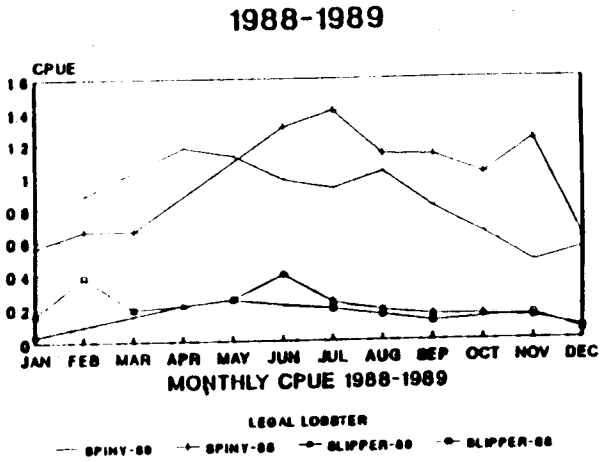


Figure 7.--Composition of catches of spiny and slipper lobsters from the Northwestern Hawaiian Islands, 1985-90.





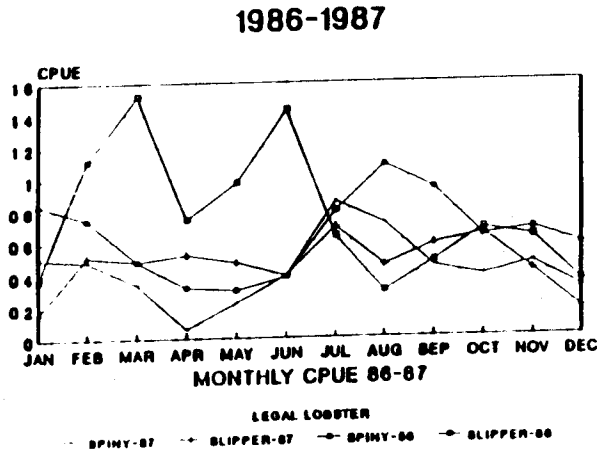


Figure 8.--Monthly catch per unit effort for spiny and slipper lobsters from the Northwestern Hawaiian Islands, 1986-90.

APPENDIX 2. Status of NWHI Lobster Stocks, 1990.

"Status of Lobster Stocks in the Northwestern Hawaiian Islands, 1990"

Administrative Report No. H-91-04

by

Jeffrey J. Polovina

Honolulu Laboratory
Southwest Fisheries Science Center
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96822

Southwest Fisheries Science Center
Administrative Report H-91-04

STATUS OF LOBSTER STOCKS IN THE NORTHWESTERN HAWAIIAN ISLANDS, 1990

Jeffrey J. Polovina
Honolulu Laboratory, Southwest Fisheries Science Center
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96822-2396

March 1991

NOT FOR PUBLICATION

ABSTRACT

In 1990, fishing effort in the lobster fishery in the Northwestern Hawaiian Islands (NWHI) was almost 1.2 million trap-hauls, resulting in landings of about 184,000 slipper lobster, *Scyllarides squammosus*, and 591,000 spiny lobster, *Panulirus marginatus*, for a catch per unit effort (CPUE) of 0.66 lobster/trap-haul. This is the lowest annual CPUE since the inception of the fishery in the late 1970s. Analyses of commercial logbooks and research sampling data conclude the following:

(1) Low recruitment to the fishery was observed at Maro Reef and northwestern banks, resulting in a decline in CPUE. Thus, most fishing effort was directed at Necker Island and Gardner Pinnacles, resulting in those populations being fished down.

(2) The spawning biomass index based on CPUE estimates the 1990 level is 22% of the pre-fishery level, an indication that 1.2 million trap-hauls may have been excessive since recruitment to the fishery was low. It should be remembered that the 1990 spawning biomass is the lowest yet observed and the recruitment to the fishery from the 1990 spawning biomass will not be observed until 1993.

(3) As of November 1990, there was no indication that recruitment at Maro Reef and other northwestern banks has improved.

(4) While a maximum sustainable yield (MSY) of 1 million lobsters with 1 million trap-hauls still appears appropriate, 1990 has shown that this is a long-term average, and considerable year-to-year variation can occur. To protect the population in poor years, management must be able to regulate annual catch or effort.

(5) Two actions can protect the current spawning biomass and promote the recovery of the annual CPUE to the 0.9-1.0 range in 1991: (a) close the fishery from January through August to protect the spawning population both before and during the spawning period; and (b) limit annual fishing effort to 200,000 trap-hauls, which can be adjusted upward to 400,000 trap-hauls if recruitment to the fishery at Maro Reef appears normal.

INTRODUCTION

This is the sixth annual report on the status of lobster stocks in the NWHI (see, for example, Polovina 1990). This report uses research data as well as catch and effort data from the logbooks of commercial fishermen to describe spatial and temporal variation in abundance of slipper lobster, *Scyllarides squammosus*, and spiny lobster, *Panulirus marginatus*, and to estimate optimum exploitation levels.

MODELS

Two mathematical models are fit to the catch and effort data to estimate biological parameters needed for stock assessment. The first is the Fox surplus production model which expresses catch (C) as a function of fishing effort (E), catchability (q), unexploited biomass (K), and the intrinsic rate of population increase (r):

$$C = qKEe^{-qE/r}.$$

The relationship between catch and effort described by this model is an equilibrium relationship. Given the rapid annual changes in effort in the lobster fishery, it is not appropriate to fit this model to annual catch and effort data. Instead, the dynamic Fox production model, derived in Clarke et al. (in preparation), should be used. The dynamic model expresses annual CPUE in year $t+1$ as a function of CPUE in the previous year and effort in years t and $t+1$ as

$$ln(CPUE_{t+1}) = A + B*ln(CPUE_t) + C*(E_t + E_{t+1});$$

where A, B, and C are constants which are functions of parameters q, K, and r.

The second model, termed the CPUE model, expresses monthly CPUE ($CPUE_t$) as a function of CPUE in the same month of the previous year $CPUE_{t-12}$, cumulative effort over the 12-month period from month $t-11$ to t (E_t), annual instantaneous natural mortality (M), annual recruitment to the fishery (R), and catchability (q) as

$$CPUE_t = Re^{-M/2}e^{-qE_t/2} + CPUE_{t-12}e^{-M - qE_t}.$$

The CPUE model differs from the production model approach in that it assumes constant recruitment; therefore, the differences between the model and data may identify monthly changes in recruitment, catchability, or both. This model also estimates natural mortality which is needed for the spawning potential ratio estimation.

CATCH AND EFFORT DATA

Species-specific CPUE cannot be computed because commercial logbooks report only total lobster fishing effort rather than distinguishing between fishing effort targeting slipper and spiny lobsters. In 1990, effort was almost 1.2 million trap-hauls, a 10% increase over 1989, while total CPUE for both species was 0.66 lobster/trap-haul, a 39% decrease from 1989 (Table 1). Since 1988, the landings in the fishery have been dominated by spiny lobster, and this trend continued in 1990 when spiny lobster accounted for 76% of the landings (Table 1).

The observed shift in fishing effort from Maro Reef to Necker Island and Gardner Pinnacles in 1989 continued in 1990, resulting in a dramatic decrease in catch and effort from Maro Reef and an equally dramatic increase from Necker Island and Gardner Pinnacles (Fig. 1). The dynamic Fox production model fit to the 1983-90 catch and effort data for the entire NWHI estimates $q = 9 \times 10^{-7}$, an MSY of 900,000 lobsters with fishing effort of 740,000 trap-hauls and resulting CPUE of 1.22 lobster/trap-haul (Fig. 1). By comparison, the same model with 1983-89 data estimated MSY at 1 million lobsters with fishing effort of 1 million trap-hauls and a CPUE of 1.0 (Polovina 1990). As discussed later, there are indications that 1990 recruitment was particularly low, because of factors other than fishing effort. Hence, the MSY estimate of 1 million lobsters with 1 million trap-hauls may be more representative of the long-term level.

Monthly catch and effort data from logbooks show that CPUE has remained low since the last quarter of 1989 (Fig. 2). The CPUE model estimates $q = 1.0 \times 10^{-6}$ and M = 0.7/year and 1990 fishing mortality as 1.2/year. The monthly CPUE model shows that the general decline in CPUE since 1984 can be explained by fishing effort, but there is considerable within- and between-year variation around the model's CPUE estimates. The differences between the actual monthly CPUE and the model's CPUE estimate are called the residuals in Figure 2 and represent monthly changes in catchability, recruitment to the fishery, or both. The monthly CPUE remains below the level estimated by the model from late 1989 through 1990. The CPUE data do not indicate whether this decline was due to a change in catchability, to cold water (as probably was the case in 1987), or to a decline in recruitment. However, from the size-frequency data presented in the next section, recruitment to the fishery apparently declined in 1990.

Although the dynamic Fox and the CPUE models are based on different assumptions, estimates of their common parameter (q) are very similar, and their estimated equilibrium catch and effort curves also are similar (Fig. 1) up to an effort level of 1 million trap-hauls when the difference in stock-recruitment assumptions becomes important.

SIZE-FREQUENCY DATA

The NOAA ship, *Townsend Cromwell*, conducted research trapping at Necker Island and Maro Reef from 23 June to 19 July 1990. This represents the fourth year of systematic sampling at the same sites and with the same type of traps and bait. The size frequency of the lobsters collected was converted to age-frequency data from an estimated growth curve (Polovina and Moffitt 1989), and the CPUE was computed for each age class (Fig. 3A and 3B). Sampling was conducted during the summers of 1986-88 and 1990. At Necker Island during 1986-88, CPUE was highest for 3-yr-olds, the age at which lobsters reach the minimum harvestable tail width size. In 1990, the CPUE for 3-yr-olds was substantially lower than in earlier years and lower than the CPUE for 2-yr-olds (Fig. 3A). This change is attributed to the heavy fishing pressure at Necker Island in 1989-90 (Fig. 1). The high CPUE for 2-yr-olds indicates that recruitment to the fishery is still good. At Maro Reef, the 1990 CPUE of all trappable age classes was very low (Fig. 3B). Since fishing effort at Maro Reef was relatively low in 1989-90, the 1990 age-frequency provides evidence that recruitment to the fishery was very low at Maro Reef in late 1989 through June 1990. Tail weight-frequency data from commercial vessels at Necker Island and Maro Reef for 1989-90 show results similar to the research data (Fig. 4A and 4B). Again, CPUE at Necker Island declined for most tail size classes from August 1989 to June 1990, but the persistence in the abundance of the 4-6-oz tails indicates that although the population has been reduced because of heavy fishing, recruitment to the fishery is still good. The CPUE of all tail-weight classes at Maro Reef declined substantially in 1989-90. Given the relatively light fishing effort at Maro Reef during this period, the decline in the CPUE of 4- to 6- and 6- to 8-oz tails is consistent with low recruitment. Low CPUE at Maro Reef through the end of 1990 indicates that recruitment to the fishery remained low all year. Other banks north of Maro Reef also have experienced very poor recruitment to the harvestable population, suggesting that the recruitment failure was the result of an oceanographic event impacting the northwestern portion of the archipelago.

While the reason for the low recruitment to banks in the northwestern portion of the archipelago is not known, an interesting correlation is observed between sea surface temperature from a NOAA buoy near Nihoa Bank and the ratio of spiny lobster landings from Maro Reef to Necker Island four years later (Fig. 5). Perhaps an unusually strong movement of cold water from the northwest transports larvae along the chain from west to east. This shift in larval abundance would appear as a drop in recruitment to the fishery for years later at Maro Reef and a corresponding increase in recruitment to the fishery at Necker Island.

SPAWNING STOCK BIOMASS

The spawning potential ratio (SPR), based on the spawning stock biomass per recruit approach, is used as the measure of reproductive potential in amendment 6 to the Crustacean Fishery Management Plan. This amendment defines the lobster population to be recruitment overfished when SPR is less than or equal to 0.20. Given the parameter estimates of M = 0.7/yr, and K = 0.3/yr, fishing effort of 1.18 million trap-hauls in 1990 results in an SPR of 0.40. This estimate is based on fishing effort and indicates that the current level of fishing may not be excessive in a year with average recruitment to the fishery. The SPR approach does not consider the current CPUE which reflects recruitment variation.

An index of the spawning stock biomass based on CPUE (kg/trap-haul), can be estimated from the research sampling at Necker Island and Maro Reef (Table 2). The ratio of this 1990 to 1977 index is an estimate of the current spawning population relative to the pre-exploitation spawning population. This ratio is 0.27 at Necker Island and 0.17 at Maro Reef, for an average of 0.22.

The difference between the two approaches and their results is important. The SPR approach says that 1.2 million trap-hauls will not, on average, result in recruitment overfishing. This approach does not address year to year variation. The CPUE approach indicates that the spawning biomass has been reduced by low recruitment to a level that might result in continued low recruitment.

Given the low level of the CPUE index and the fact that recruitment to the fishery from the 1990 spawning biomass will not be observed until 1993, it is prudent to reduce fishing effort in 1991 to permit the recovery of the population. Given the current low level of spawning biomass, it also would be prudent to protect the spawners before and during spawning. A closure of the fishery from January through August 1991 would afford such protection.

The Fox and CPUE models are used to estimate the 1991 CPUE from 1990 catch and effort as a function of 1991 effort based on the important assumption that 1991 is an average year with regard to the level of recruitment to the fishery (Fig. 6). The CPUE model predicts more rapid recovery than the Fox model. It is estimated that an annual effort of 400,000 trap hauls would result in a 1991 CPUE in the range of 0.9 (Fox dynamic model) to 1.0 (CPUE model) (Fig. 6). It is important to note that as of November 1990 recruitment to the fishery at Maro Reef and other northwestern banks had not improved. If Necker Island and Gardner Pinnacles represent the main sources for recruitment to the fishery, a limit for total fishing effort of 200,000 trap-hauls is advised. Since there is no evidence from catch and

effort data through 1990 supporting a return to normal recruitment to the fishery at Maro Reef, it would be prudent to limit the 1991 fishing effort to ≤200,000 trap-hauls, which could be raised to 400,000 trap-hauls should a research cruise planned for June 1991 find good recruitment to the fishery at Maro Reef.

CITATIONS

Clarke, R. P., S. S. Yoshimoto, and S. G. Pooley.
In Preparation. A comparison of bioeconomic models of the Northwestern Hawaiian Islands lobster fishery. Pacific Area Office, National Marine Fisheries Service, NOAA, 2570 Dole Street, Honolulu, HI 96822-2396.

Polovina, J.,J., and R. B. Moffitt.
1989. Status of lobster stocks in the Northwestern Hawaiian Islands, 1988. Honolulu Lab, Southwest Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, 2570 Dole St., Honolulu, HI 96822-2396. Southwest Fish. Cent. Admin. Rep. H-89-3, 10 p.

Polovina, J. J.
1990. Status of lobster stocks in the Northwestern Hawaiian Islands, 1989. Honolulu Lab, Southwest Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, 2570 Dole St., Honolulu, HI 96822-2396. Southwest Fish. Cent. Admin. Rep. H-90-02, 11 p.

Table 1.--Annual landings of spiny and slipper lobsters (in 1000's), trapping effort (in 1,000's trap-hauls), and the percentage of lobster in the landings, 1983-90[a].

Year	Spiny lobster	Slipper lobster[b]	Total lobsters	Trapping effort	CPUE	Percent spiny lobster
1983[c]	158	18	176	64	2.75	0.90
1984	677	207	884	371	2.38	0.78
1985	1,022	900	1,902	1,041	1.83	0.57
1986	843	851	1,694	1,293	1.31	0.54
1987	393	352	745	806	0.92	0.57
1988	888	174	1,062	840	1.26	0.84
1989	944	222	1,166	1,069	1.09	0.81
1990	591	187	777	1,182	0.66	0.76

[a]Data are provided to the National Marine Fisheries Service as required by the Crustacean Fishery Management Plan of the Western Pacific Regional Fishery Management Council and are compiled by the Fishery Management Research Program, Honolulu Laboratory.

[b]Slipper lobster landings for 1984-87 are 72% of those reported, so they are comparable to landings subsequent to 1987 when a minimum size allowed the retention of about 72% of the catch.

[c]April-December 1983.

Table 2.--An index of female spawning stock biomass (kilogram/trap-night) for spiny lobster.

	Index by year					
Location	1977	1986	1987	1988	1990	1990/1977
Necker Island	2.45	0.86	0.83	1.24	0.65	0.27
Maro Reef	2.14	1.26	1.74	1.71	0.36	0.17

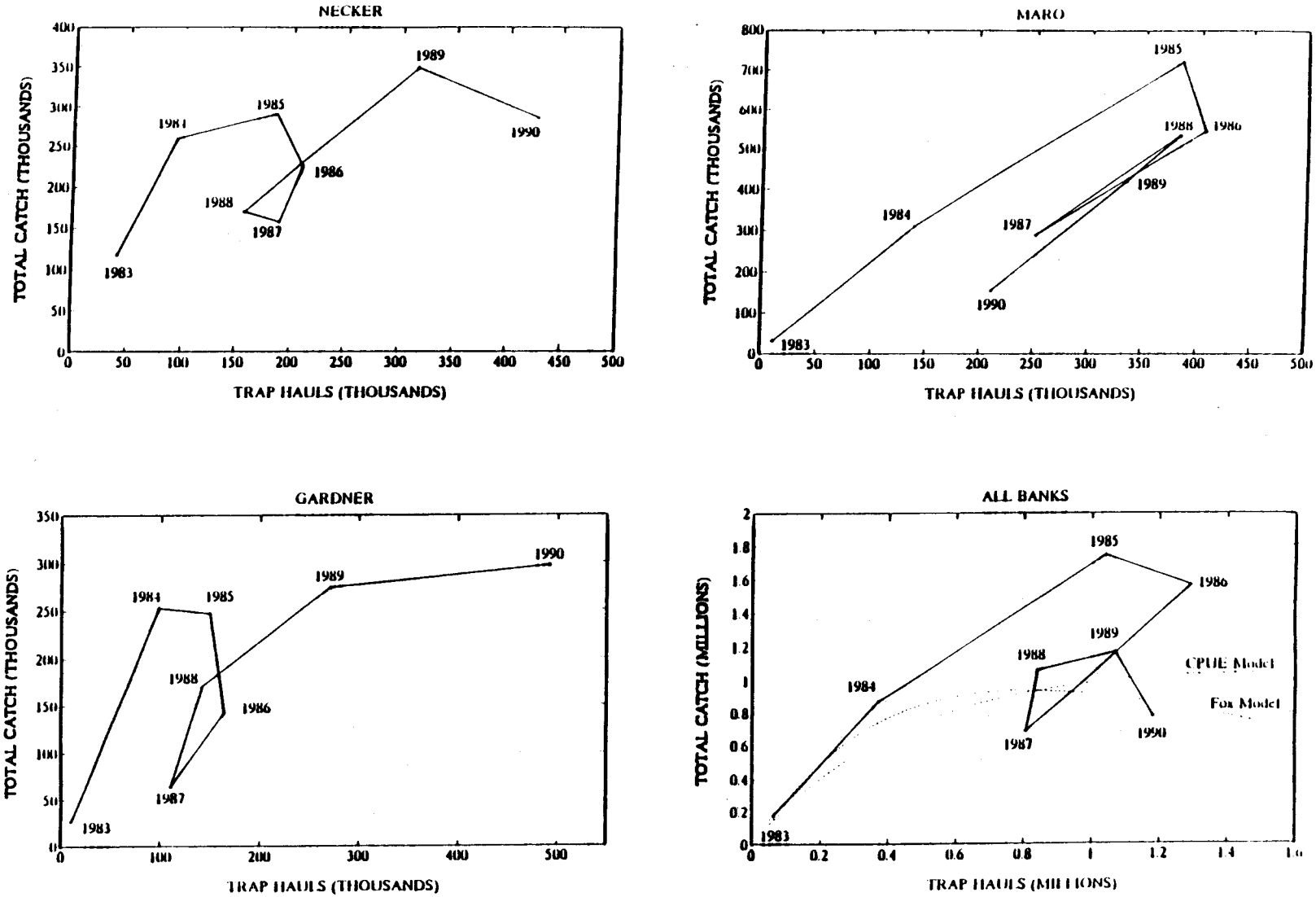


Figure 1.--Catch and effort, based on commercial logbooks, for spiny and slipper lobsters from Necker Island, Gardner Pinnacles, Maro Reef, all Northwestern Hawaiian Islands banks combined, 1983-90. Equilibrium catch and effort curves for the Fox production model and the catch per unit effort (CPUE) model are shown with the catch and effort for all banks.

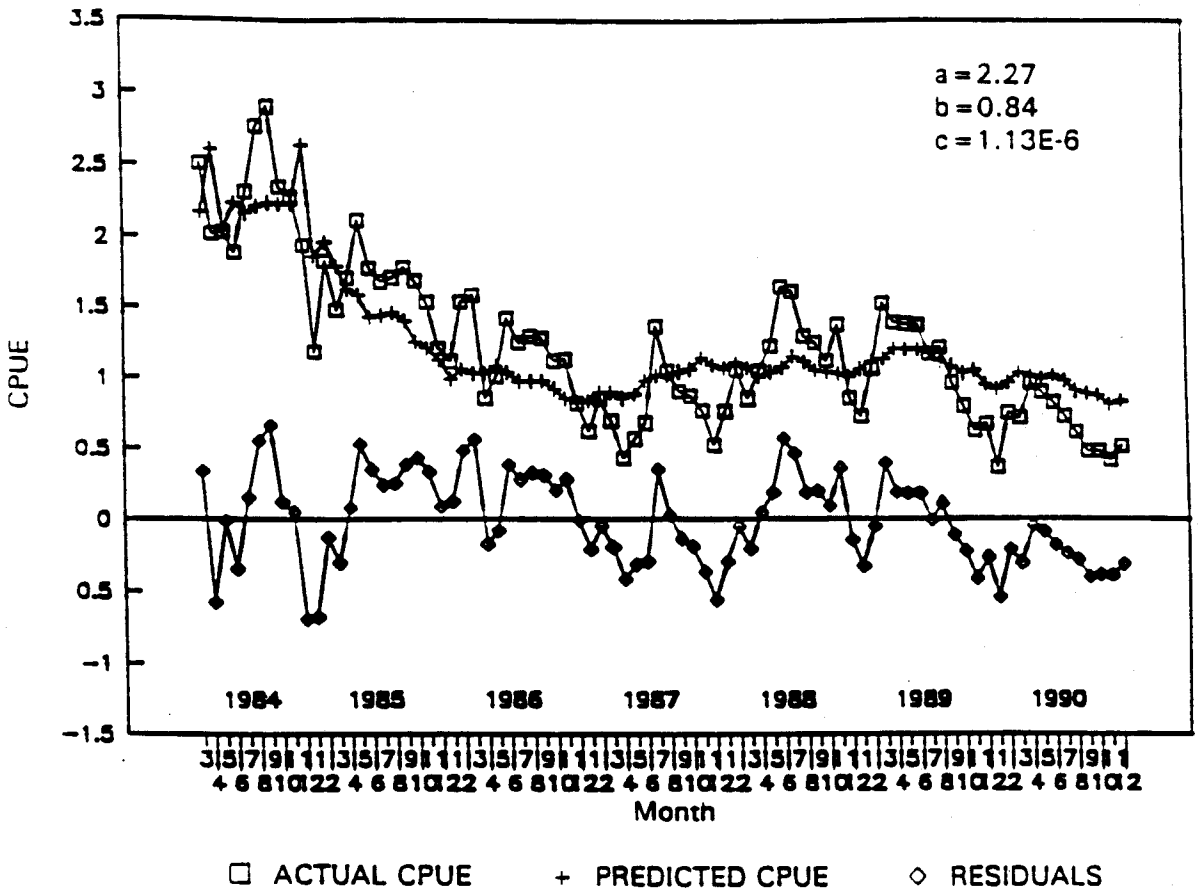


Figure 2.--Monthly catch per unit effort (CPUE) and fit of CPUE model for spiny and slipper lobsters based on commercial logbooks, for all Northwestern Hawaiian Island banks, 1984-90. The residuals are the differences between the actual and predicted CPUE values.

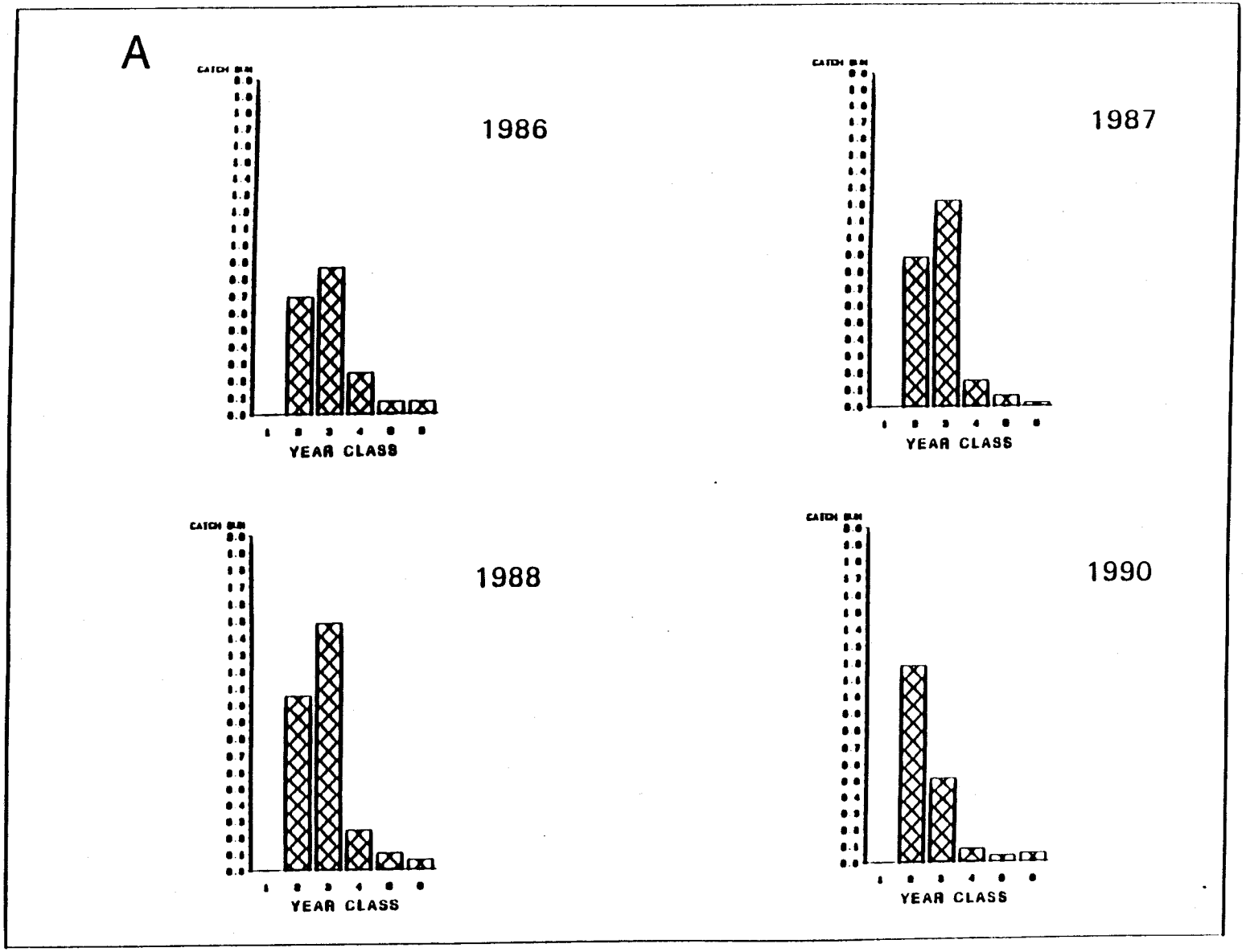


Figure 3.--Age-frequency distributions of spiny lobster, based on research sampling 1986-88 and 1990. (A) Necker Island.

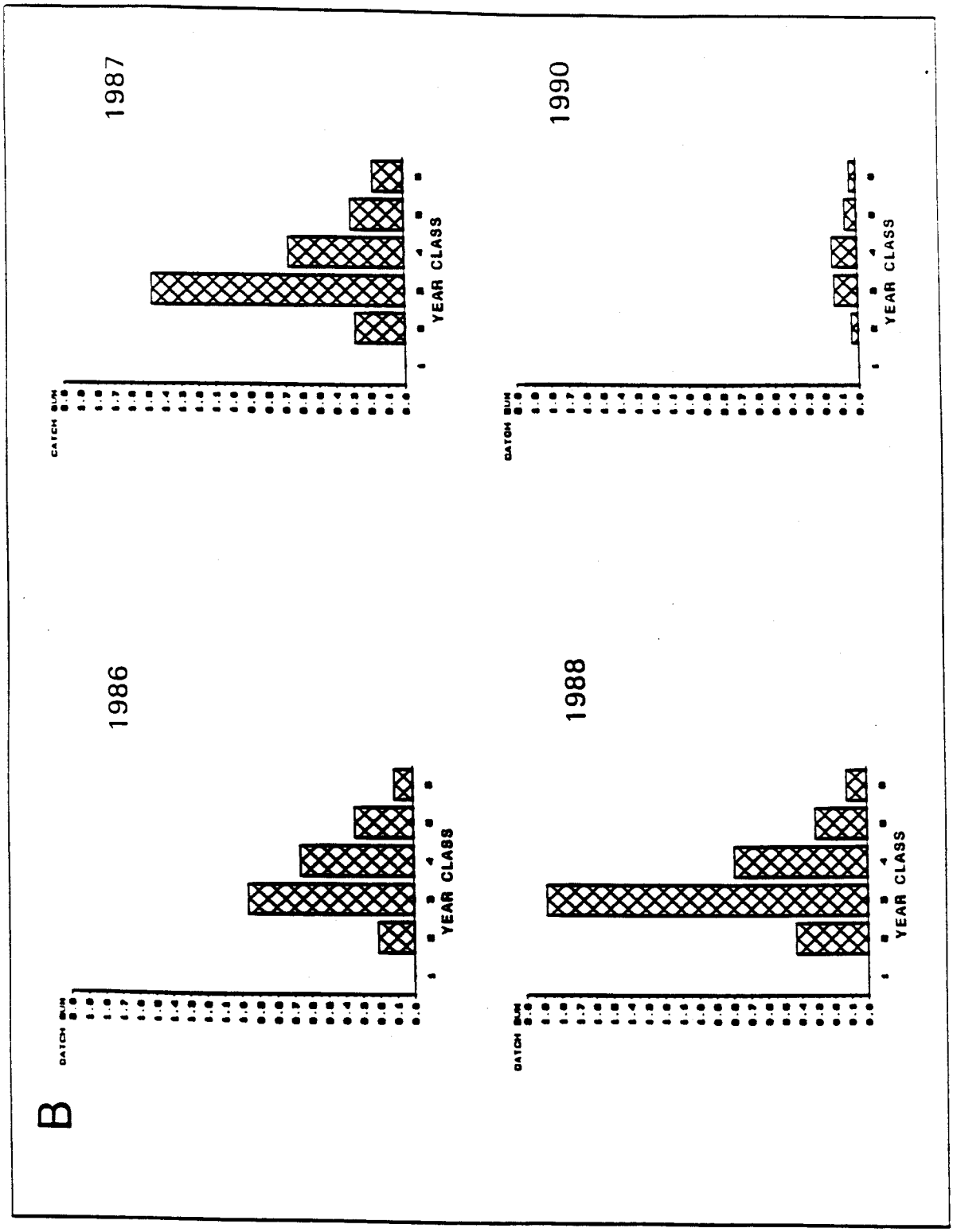


Figure 3.--Continued. (B) Maro Reef

A

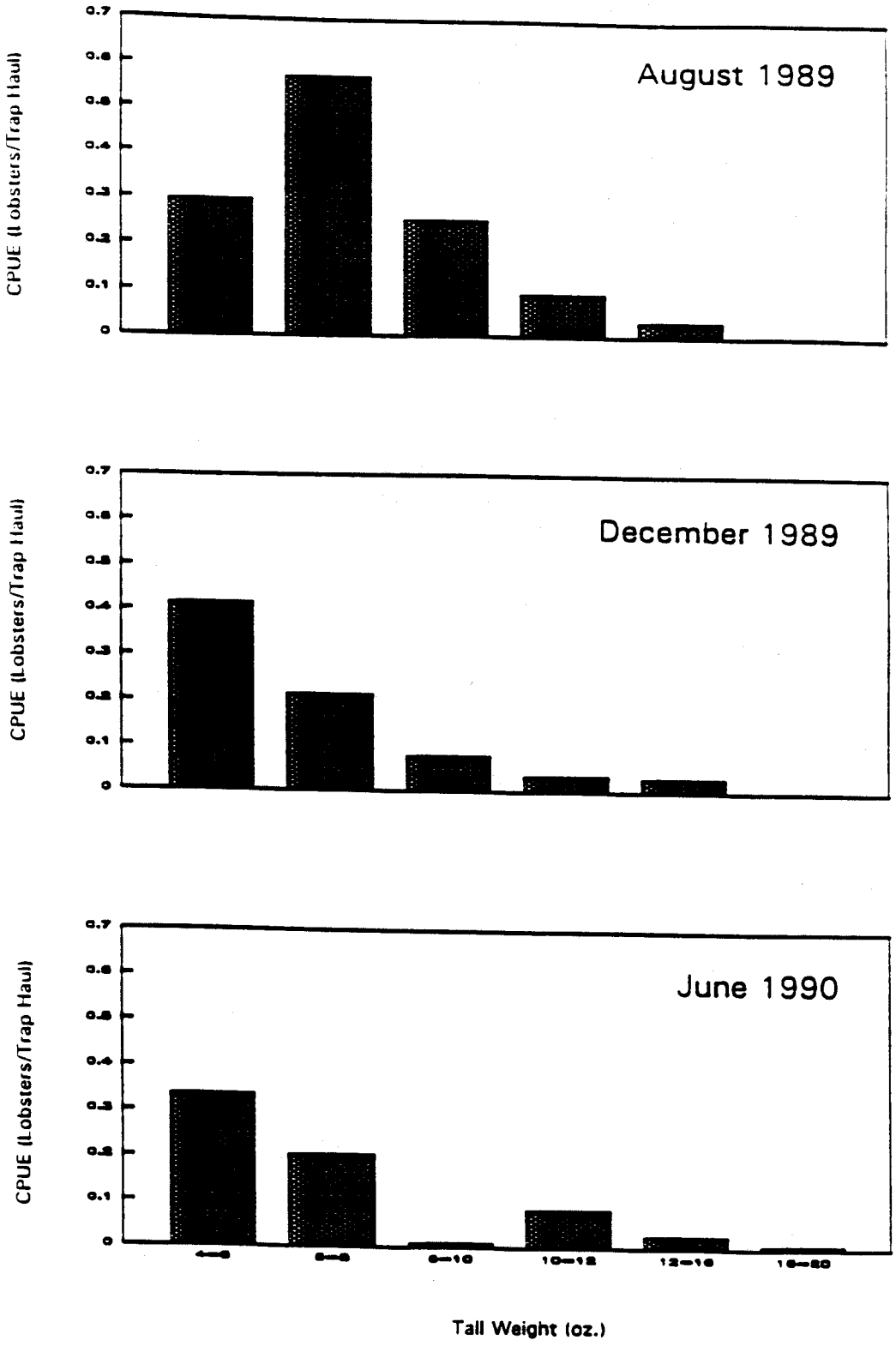


Figure 4.--Tail weight-frequency distributions from commercial vessels 1989-90. (A) Necker Island.

B

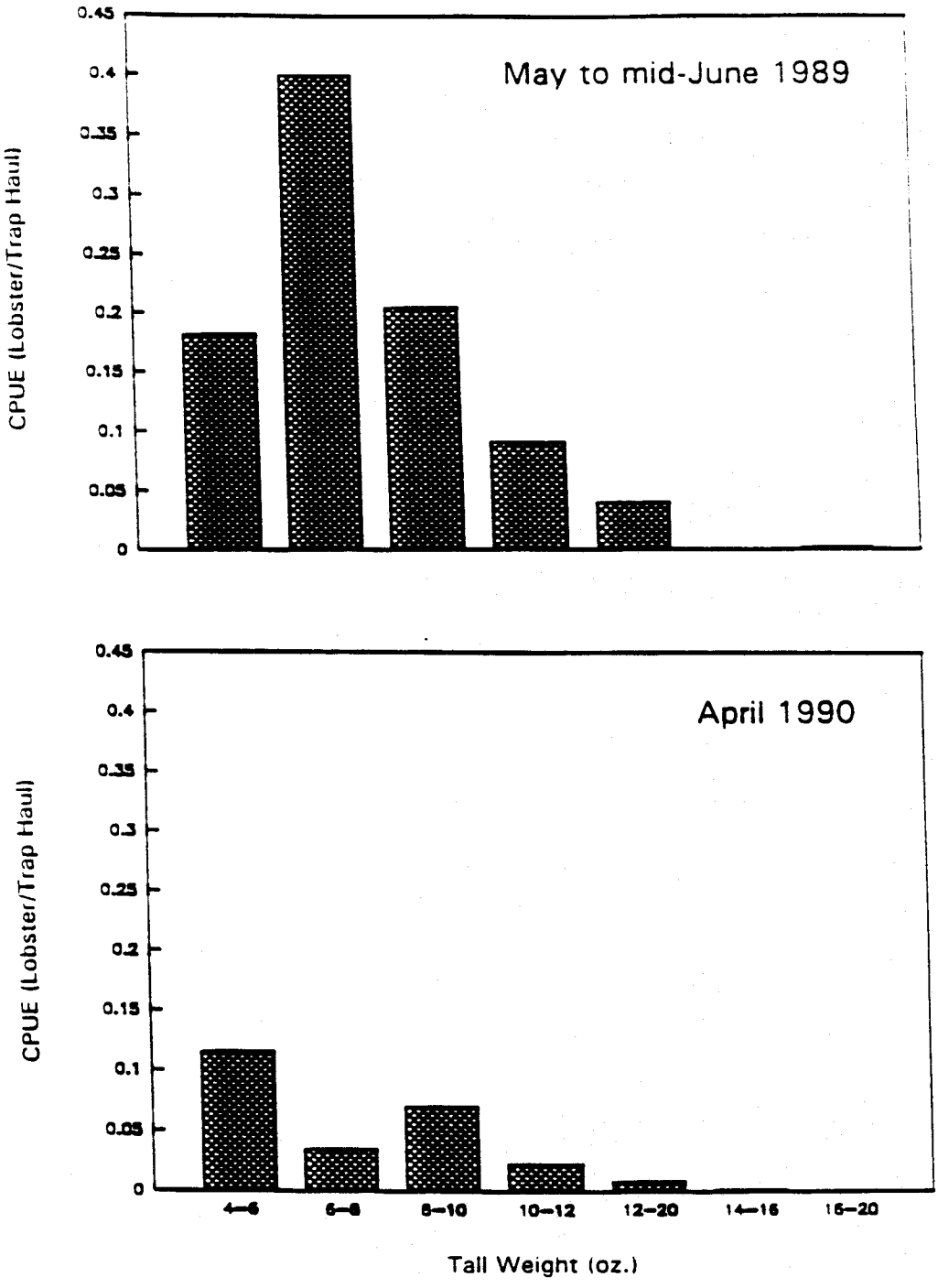


Figure 4.--Continued. (B) Maro Reef.

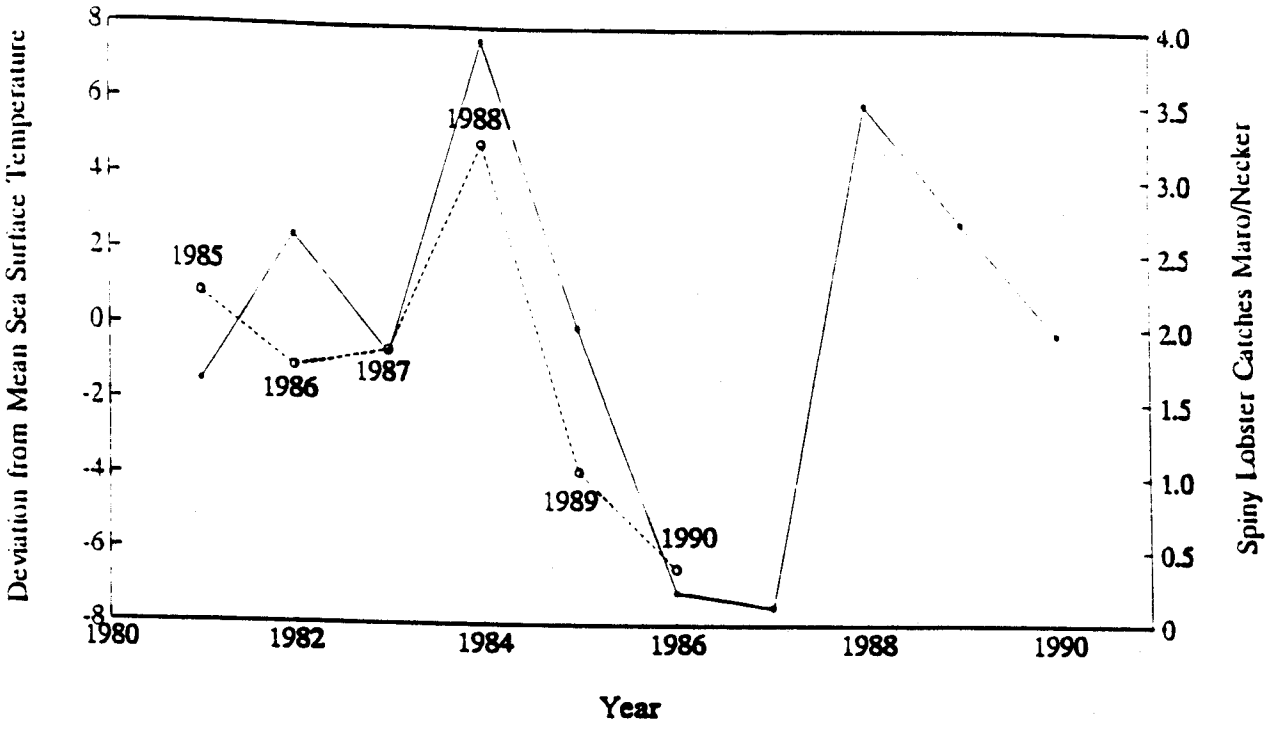


Figure 5.--Annual sea surface temperature anomaly and ratio of spiny lobster catches at Maro Reef to spiny lobster catches at Necker Island lagged 4 years. Broken line indicates spiny lobster catches Maro/Necker; solid line indicates deviation from mean sea surface temperature.

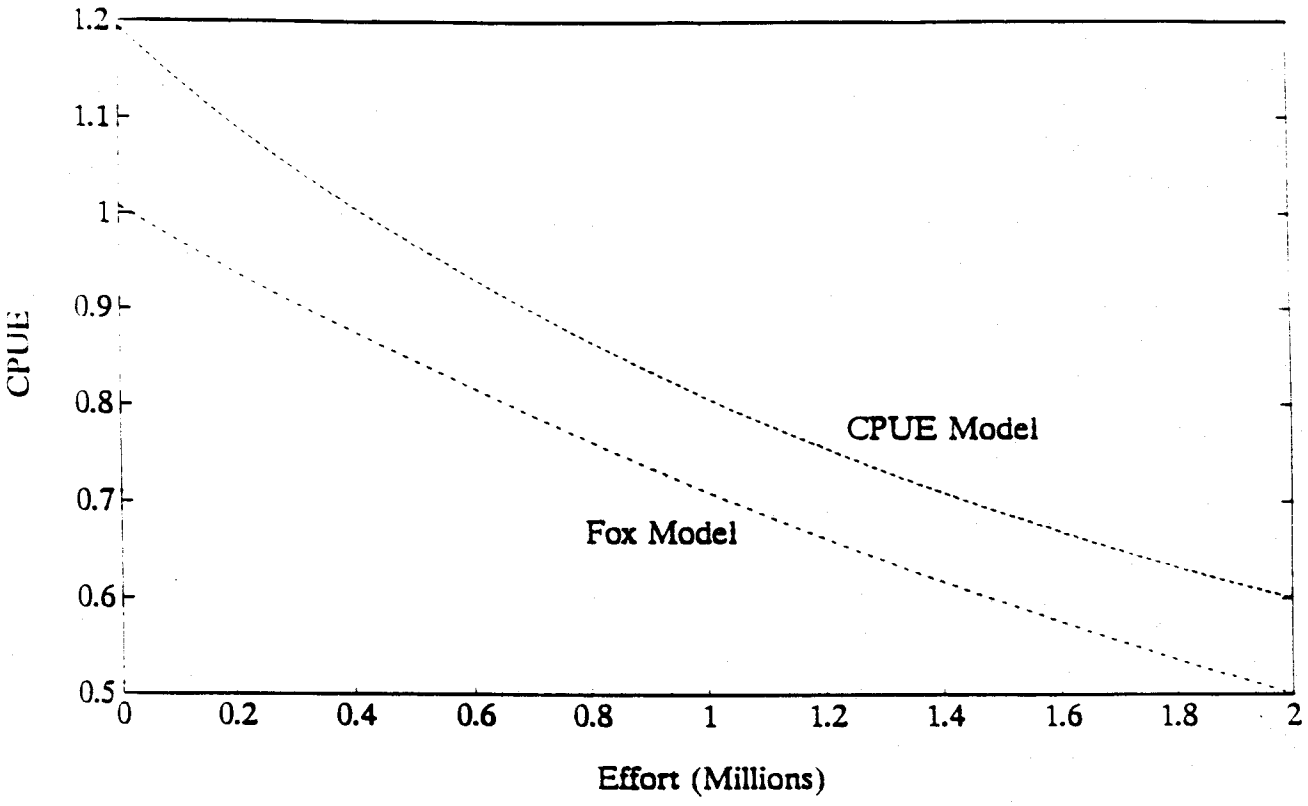


Figure 6.--Forecast of 1991 annual catch per unit effort (CPUE) as a function of 1991 fishing effort from the CPUE and Fox dynamic models, based on 1990 CPUE and fishing effort.

APPENDIX 3. Text of Proposed Regulations.

Billing Code: 3510-22

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 681

[Docket No.]

Crustacean Fisheries of the Western Pacific Region

AGENCY: National Marine Fisheries Service (NMFS), NOAA, Commerce

ACTION: Proposed Rule -- Northwestern Hawaiian Islands Lobster Fishery: Limited Access, Harvest Quota and Closed Season

SUMMARY: The Secretary of Commerce (Secretary) issues this proposed rule to implement Amendment 7 to the Fishery Management Plan (FMP) for the Crustacean Fisheries of the Western Pacific Region. The 1990 spawning stock biomass of spiny and slipper lobsters in the NWHI was 22% of that in the late 1970s, prior to the development of the fishery. The Crustaceans FMP defines the threshold for recruitment overfishing at 20%. Thus, the 1990 status of spawning stock biomass may be at or near a level that causes a severe decline in recruitment. Based on the 1991 CPUE and the lack of any improvement in the catch rates at Maro Reef, the current spawning stock biomass is in danger of recruitment overfishing. In response to this information, the Council closed the fishery on an emergency basis (see 56 FR 21961), but this was only a temporary solution to conditions in the fishery. The fishery is still open-access, with no limits on effort or catch. High ex-vessel prices continue to drive fishermen to exploit a resource that is approaching threatened levels. Some effort or harvest limitations are needed immediately to protect the resource and the industry that depends on it. This proposed rule would establish a limited access system, an annual fleet harvest quota and a closed season.

DATES: Written comments must be received by [insert date 30 days after date of filing at the Office of the FEDERAL REGISTER].

ADDRESSES: Copies of Amendment 7, which includes an environmental assessment and regulatory impact review, may be obtained from, and comments should be addressed to, Kitty M. Simonds, Executive Director, Western Pacific Regional Fishery Management Council, 1164 Bishop St., Suite 1405, Honolulu, HI 96813, or E. Charles Fullerton, Director, NMFS Southwest Region, 300 South Ferry St., Terminal Island, CA 90731.

FOR FURTHER INFORMATION CONTACT: Kitty M. Simonds, Western Pacific Regional Fishery Management Council, Honolulu, HI, (808) 523-1358, or Alvin Z. Katekaru, Pacific Area Office, NMFS Southwest Region, Honolulu, HI, (808) 955-8831.

SUPPLEMENTARY INFORMATION:

Several recent trends in the Northwestern Hawaiian Islands lobster fishery are clear. After two years of relative stability in the fishery, landings, CPUE and revenues all declined in 1990. The volume of lobster landed fell to the lowest level since 1987, and CPUE was the lowest in the history of the fishery. In 1990, 356 t of spiny lobster and 75 t of slipper lobster were landed (total 431 t), respective decreases from 1989 of 38% and 19%. Effort in 1990 was about one million trap-hauls, a 10% increase over 1989. CPUE for the two species combined, however, was 0.66 (0.50 for legal spiny lobster and 0.16 for legal slipper lobster). This is a 37% decrease from 1989. The average size of spiny lobster tails (4-8 oz for 1990) continued to decrease, causing increasing concern among vessel operators. Fleet revenues for 1990 were $4.9 million, down 22% from 1989.

Analyses of commercial fishing logbooks and research sampling data produced several conclusions. Low recruitment to the fishery was observed at Maro Reef and the banks northwest of Maro, resulting in a decline in CPUE. Fishing effort thus intensified at Necker Island and Gardner Pinnacles, resulting in lobster stocks in those areas being fished down. The spawning stock biomass index, based on CPUE, estimates that the 1990 level was 22% of the pre-fishery level, an indication that a million trap-hauls may have been excessive since recruitment to the fishery was low. As of the end of 1990, there was no indication that recruitment at Maro Reef and more northwestern banks had improved. The 1990 spawning biomass was the lowest observed to date, and recruitment to the fishery from the 1990 spawning biomass will not be observed until 1993. In 1991, lobster fishing continued in the NWHI until the fishery was closed by emergency action on May 8. Commercial fishing logbooks for the period January - April produced the following information on the health of the fishery: CPUE for the period, 0.63 legal lobsters/trap-haul, is the lowest recorded during the same period since 1984 (when such data started being recorded). By comparison, the CPUE for this period in 1990 was 0.84. The correlation between the CPUE for the first four months of the year and the CPUE for the entire year is 0.91, meaning that

the CPUE from the first four months is a good indicator of the CPUE for the entire year.

Although most of the fishing in 1991 was at Necker Island and Gardner Pinnacles, available data from Maro Reef show that Maro has not recovered from the low 1990 CPUE. Recent research suggests that the population of spiny lobster may vary annually according to oceanographic conditions. Above-average sea surface height in the NWHI is hypothesized to indicate good recruitment of 3-yr-old lobsters into the fishery four years later (1 yr larval stage and 3 yr of growth after settlement before reaching legal size), and vice-versa. This model forecasts poor recruitment to the fishery in 1991, and improved recruitment in 1992.

The 1990 spawning stock biomass of spiny and slipper lobsters in the NWHI was 22% of that in the late 1970s, prior to the development of the fishery. The Crustaceans FMP defines the threshold for recruitment overfishing at 20%. Thus, the 1990 status of spawning stock biomass may be at or near a level that causes a severe decline in recruitment. Based on the 1991 CPUE and the lack of any improvement in the catch rates at Maro Reef, the current spawning stock biomass is in danger of recruitment overfishing.

In response to this information, the Council closed the fishery on an emergency basis (see 56 FR 21961 and 56 FR 36912), but this was only a temporary solution to conditions in the fishery. The fishery is still open-access, with no limits on effort or catch. High ex-vessel prices continue to drive fishermen to exploit a resource that is approaching threatened levels. Some effort or harvest limitations are needed immediately to protect the resource and the industry that depends on it. The proposed regulations would establish a limited access system, an annual fleet harvest quota and a closed season.

The Council has discussed and taken into account several items regarding the implementation of a limited access system for this fishery. First is the historical and current participation in, and dependence on, the fishery. The awarding of initial permits under the system will be made, with relatively equal weight, to 1) owners of vessels that developed the fishery and have stayed with it and 2) vessels that have entered the fishery relatively recently and help make up the current core of the industry.

Regarding fishery economics, the Council determined that a limit of 15 vessels will dampen the boom-and-bust cycle in fishery participation that might result from fluctuations in stock availability, reducing over-capitalization in the fishery and allowing vessels to operate efficiently. The Council considered and made allowances in the system for social components of the fishery. In addition to initially awarding permits to vessels with historical and current dependence on the fishery, the system allows individuals that have ties to the fishery, either by owning or being the captain

of a vessel that once participated in it, to have the highest priority for permits when they become available. A limit of 15 vessels also maintains the competitive nature of the fishery, a feature that the participants requested.

In addition to limiting access, the Council requested that a six-month annual closure of the NWHI fishery be implemented. The objective of the closed season is to protect gravid females during their peak abundance (closed May-August), as well as the spawning biomass as it grows and matures prior to the peak in spawning activity (closed January-April). Because vessels operating under the limited access system for lobster will not be able to fish for lobsters during the closure, the Council modified the qualification criteria for eligibility in its moratorium for new participants in the Hawaii-based pelagic longline fishery. The Pelagics FMP allows qualified lobster vessels to obtain a longline limited access permit, so that they have an alternative fishery to engage in. In addition, several lobster vessels also hold or are qualified to hold limited access permits under the Bottomfish and Seamount Groundfish FMP.

Finally, so that the output of the fleet could be fine-tuned to protect the lobster stocks and stabilize the industry that depends on them, the Council will establish a fleet harvest quota. The quota can be adjusted each year to account for fluctuation in stock abundance due to fishing pressure or environmental changes. These three elements -- limited access, fleet harvest quota and six-month closed season -- will insure the long-term health of the fishery.

CLASSIFICATION:

Section 304(a)(1)(C)(ii) of the Magnuson Act, as amended by Pub.L. 97-453, requires the Secretary of Commerce (Secretary) to publish regulations proposed by a Council within 30 days of receipt of the amendment and regulations. At this time, the Secretary has not determined that the amendment is consistent with the national standards, other provisions of the Magnuson Act, and other applicable law. The Secretary, in making that determination, will take into account the data, views and comments received during the comment period.

The Council prepared an environmental assessment for this amendment that concluded that there will be no significant impact on the environment, and contained a Finding of No Significant Impact.

The NOAA Administrator has determined that this proposed rule is not a "major rule" requiring a regulatory impact analysis under Executive Order 12291. That is, the proposed action will not have an affect on the economy of more than $100 million, there will be no major increase in costs or prices for consumers, individual industries or government agencies, and there will be no significant adverse effect on competition, employment, investment, productivity, or ability of US industries to compete with foreign enterprises.

This proposed rule is exempt from the procedures of E.O. 12291 under §8(a)(2) of that order. Deadlines imposed under the Magnuson Act, as amended by Pub.L. 97-453, require the Secretary to publish this proposed rule 30 days after its receipt. The proposed rule is being reported to the Director, Office of Management and Budget, with an explanation of why it is not possible to follow procedures of the order.

The General Counsel of the Department of Commerce certified to the Small Business Administration that this proposed rule, if adopted, will not have a significant economic impact on a substantial number of small entities. Only a small percentage of the businesses would be affected and the costs of compliance, in terms of potential revenues lost, recordkeeping, the competitive position of these businesses relative to larger entities, and the ability of these businesses to remain in the market, are not significant. As a result, a regulatory flexibility analysis was not prepared. The Council prepared a regulatory impact review, which may be obtained from the Council at the address listed above.

This rule contains a collection of information requirement subject to the Paperwork Reduction Act. One requirement, the permit application process, has been approved. A request to collect the additional information has been submitted to the Office of Management and Budget for approval.

A collection of information requirement under the permit system is proposed under this rule. Information requested from lobster permit applicants would be standardized as part of an effort by the NMFS to consolidate into one form the different permits for fisheries in the Western Pacific Region. The public reporting burden for this collection of information is estimated to average 15 minutes per application, including the time to review and complete the form, and return it to the NMFS. The standardized permit application form was approved by OMB in conjunction with the Southwest Region Family of Permit Forms (OMB No. 0648-0204).

The public burden for completing the new section on weather conditions in the fishing logbook is estimated to be 2 minutes per day. The public burden for completing the new section on tail sizes in the processing and sales report is estimated to be 30 minutes per trip (trips normally last 1.5 to 3 months). The public burden for making periodic at-sea reports of lobster catches to NMFS is estimated to be 5 minutes per report, including establishing communications and reporting the catch. This may be weekly, daily or otherwise (yet to be determined).

The Council determined that this rule will be implemented in a manner that is consistent to the maximum extent practicable with the approved coastal zone management program of Hawaii. This determination has been submitted for review by the responsible state agency under Section 307 of the Coastal Zone Management Act.

List of Subjects in 50 CFR Part 681

Fisheries, Fishing, Reporting and Recordkeeping Requirements.

Dated:

For the reasons set out in the preamble, 50 CFR 681 is amended as follows:

PART 681 - WESTERN PACIFIC CRUSTACEAN FISHERIES

1. The authority citation for part 681 continues to read as follows:

Authority: 16 USC 1801 et seq.

* * * * *

2. Effective from 0001 hours local time on [insert date of publication in the FEDERAL REGISTER], in §681.2 the following definitions are added to read as follows:

Fleet Harvest Quota means the total allowable number of legal-sized lobsters that may be taken by all permitted vessels combined in a calendar year. Initial Quota refers to the fleet harvest quota calculated from previous years' catch and effort information, and published in February. Final Quota means the quota calculated from a given year's catch and effort information (in-season adjustment), and published after fishing begins in any year.

* * * * *

Owner, as used in this part, means a person who is identified as the current owner of the vessel as described in the Certificate of Documentation (Form CG-1270) issued by the US Coast Guard for a documented vessel or in a registration certificate issued by a state or territory or the US Coast Guard for an undocumented vessel.

Pacific Area Office means the Pacific Area Office, Southwest Region, National Marine Fisheries Service, 2570 Dole Street, Honolulu, Hawaii, 96822.

* * * * *

Receiving Vessel means a vessel of the United States of America that may or may not have lobster fishing gear on board and is used to land the lobster catch from a different fishing vessel.

* * * * *

3. Effective from 0001 hours local time on [insert date of publication in the FEDERAL REGISTER], in §681.4, paragraphs (a)(1), (b), (d), and (f) through (h) are revised to read as follows:

681.4 Permits.

(a) General.

(1) Any vessel of the United States engaged in commercial fishing for lobsters in Permit Area 2 or Permit Area 3 must have a permit issued under this section.

* * *

(b) Applications.

(1) An application for a permit under this section must be submitted to the Pacific Area Office by the vessel owner or a designee of the owner at least 15 days before the date the applicant desires to have the permit be effective.

(2) Each application must be submitted on an appropriate form obtained from the Pacific Area Office and contain at least the following information:

(i) Type of application; whether the application is for a new permit or a renewal; and what permit area it is for;
(ii) Owner's name, social security number, mailing address, and telephone numbers (business and home);
(iii) Name of the partnership or corporation, if the vessel is owned by such an entity;
(iv) Primary operator's name, social security number, mailing address, and telephone numbers (business and home);
(v) Relief operator's name;
(vi) Name of the vessel;
(vii) Official number of the vessel;
(viii) Radio call sign of the vessel;
(ix) Principal port of the vessel;
(x) Length of the vessel;
(xi) Engine horsepower;
(xii) Approximate fish hold capacity;
(xiii) Number of crew;
(xiv) Construction date;
(xv) Date vessel purchased;
(xvi) Purchase price;

(xvii) Type and amount of fishing gear carried on board the vessel;
(xviii) Position of the applicant in the corporation, if the vessel is owned by such an entity;
(xix) Signature of the applicant;
(xx) Date of signature.

* * * * *

(d) Change in application information. Any change in the information specified in paragraph (b)(2) of this section must be reported to the Pacific Area Office at least 10 days before the effective date of the change. Failure to report such changes may result in termination of the permit.

(e) Issuance.

(1) Within 15 days after receipt of a properly completed application, the Regional Director will determine whether to issue a permit.

(2) If an incomplete or improperly completed permit application is submitted, the Regional Director will notify the applicant in writing of the deficiency. If the applicant fails to correct the deficiency within 15 days following the date of notification, the application will be considered abandoned.

(f) Expiration. Permits issued under this section expire at 2400 hours local time on December 31 following the effective date of the permit.

(g) Renewal. An application for renewal of a permit must be submitted to the Pacific Area Office in the same manner as described in paragraph (b) of this section.

(h) Alteration. Any permit that has been altered, erased, or mutilated is invalid.

* * * * *

4. Effective from 0001 hours local time on [insert date of publication in the FEDERAL REGISTER], in §681.5 old paragraph (b)(2)(ix) is re-numbered as

(b)(2)(x) and new paragraphs (b)(2)(ix) and (c)(3)(v) are added to read as follows:

§681.5. Recordkeeping and Reporting.

(b) Daily Lobster Catch Report.

(b)(2) * * *

(ix) General condition of sea surface per day fished.

(c) Trip Processing and Sales Report.

(c)(3) * * *

(v) Number of lobsters, by tail size class, by species.

* * * * *

5. Effective from 0001 hours local time on **[insert date of publication in the FEDERAL REGISTER]**, in §681.5 new paragraph (d) is added to read as follows:

§681.5. Recordkeeping and Reporting.

(c) * * *

(d) Transshipment. If any vessel, other than the fishing vessel, is used to transship lobsters from the fishing vessel to port, then the receiving vessel must:

(1) Within 72 hours of each landing, submit to the Regional Director duplicate copies of the NMFS Daily Lobster Catch Report that were completed by the fishing vessel from which the lobster were received.

* * * * *

6. Effective from 0001 hours local time on **[insert date of publication in the FEDERAL REGISTER]**, in §681.6 paragraphs (a), (b) and (c), the word "permit" is replaced by the word "official".

* * * * *

7. Effective from 0001 hours local time on [insert date of publication in the FEDERAL REGISTER], in §681.7 new paragraphs (b)(1)(iii), (b)(1)(iv), (b)(7) and (b)(8) are added to read as follows:

§681.7. Prohibitions.

(b)(1) * * *

(iii) During closed seasons, as specified in §681.29.

(iv) In excess of the fleet harvest quota, as specified in §681.31.

(b)(6) * * *

(7) Possess on a fishing vessel any gear (trap) for the fishing or taking of lobsters during closed seasons, as specified in §681.29.

(8) Fail to report catches as specified in §681.31.

* * * * *

8. Effective from 0001 hours local time on [insert date of publication in the FEDERAL REGISTER], in §681.24 new paragraphs (d), (e), (f) and (g) are added to read as follows:

§681.24. Gear Restrictions.

(a) * * *

(d) No vessel may carry or fish with more than 1100 assembled lobster traps. An additional maximum of 100 unassembled traps may be carried on board as spares to be used only if a portion of the allowable 1100 traps are lost or damaged beyond use.

(e) The Regional Director may, after approval by the Council, change the allowable number of traps per vessel, as specified in paragraph (d) of this section.

(f) No vessel may leave any trap on the fishing grounds, except in the event of an emergency, in which case the vessel operator must notify the NMFS Law Enforcement office of the location and amount of gear within 24 hours after the vessel reaches port.

(g) The vessel's official number must be permanently affixed to all traps and floats used by that vessel.

* * * * *

9. Effective from 0001 hours local time on [insert date of publication in the FEDERAL REGISTER], §681.30 through §681.35 are re-numbered as §681.40 through §681.45, respectively.

* * * * *

10. Effective from 0001 hours local time on [insert date of publication in the FEDERAL REGISTER], new §681.29 is added to read as follows:

§681.29. Closed Season.

(a) Lobster fishing is not allowed in Permit Area 1 during the months of January through June, inclusive.

(b) The Regional Director may, after approval by the Council, change the period of the closed season.

* * * * *

11. Effective from 0001 hours local time on [insert date of publication in the FEDERAL REGISTER], new §681.30 is added to read as follows:

§681.30. Limited Access Management Program.

(a) Limited Access Permits. General Requirements.

(1) The vessel of the United States engaged in commercial fishing for lobster in Permit Area 1 must have a permit issued under this section.

(2) A limited access permit is valid for fishing only in Permit Area 1 as defined in §681.2.

(3) An application for a permit under this section must be submitted to the Pacific Area Office by the vessel owner or a designee of the owner on the form used for a permit under paragraph (b)(2) of §681.4. In addition, each application must be accompanied by a supplementary

information sheet obtained from the Pacific Area Office and contain the following information:

(i) the qualification criterion that the applicant believes he or she meets for issuance of a limited access permit; and

(ii) the names and mailing addresses of all owners and their respective percentage of ownership in the partnership or corporation, if the application is submitted on behalf of a partnership or corporation.

(4) The maximum number of limited access permits that can be valid at any time under this section is 15. The Regional Director may, however, after approval by the Council, change the maximum number of permits to be issued.

(5) No fee is required for a limited access permit.

(6) Any change in the information specified in the application form for a limited access permit must be reported to the Pacific Area Office at least 10 days before the effective date of the change. Failure to report such changes may result in termination of the permit.

(7) If an incomplete or improperly completed application form is submitted, the Regional Director will notify the applicant in writing of the deficiency. If the applicant fails to correct the deficiency within 15 days following the notification, the application will be considered abandoned.

(8) A limited access permit expires at 2400 hours local time on December 31 following the effective date of the permit.

(9) A limited access permit that has been altered, erased, or mutilated is invalid.

(10) A limited access permit may be issued to replace a lost or mutilated permit. An application for a replacement permit is not considered a new application.

(11) A limited access permit must be on board the vessel at all times and is subject to inspection upon request of any authorized officer.

(12) Procedures governing limited access permit sanctions and denials are found at subpart D of 15 CFR part 904.

(b) Issuance of initial limited access permits.

(1) An application for an initial limited access permit must be submitted to the Pacific Area Office by the vessel owner or a designee of the owner in the same manner as described in (a)(3) of this section and within 90 days of the effective date of the limited access management program, i.e., [insert date **90 days after date of publication in the FEDERAL REGISTER**].

(2) The Regional Director will issue an initial limited access permit based on the following eligibility criteria. Permits will be issued to the most recent owner of the vessel at the time it made the qualifying landing. Priority will be given, in descending order, to the owner of a vessel that had made at least one landing of lobsters from Permit Area 1:

(i) before August 8, 1985, and during every calendar year from 1985 through 1990; or
(ii) before August 8, 1985, and during the calendar year 1990; or;
(iv) during 1990 only.

(3) If the number of initial limited entry permits issued under (b)(2)(i) of this section is fewer than 15, then the available initial permits will be issued based upon a point system as follows, until the number of active permits reaches 15. Permits will be issued to the most recent owner of the vessel at the time it made the qualifying landing.

(i) One point shall be assigned for each calendar year **prior** to 1985 that the applicant can document making a landing of lobsters from Permit Area 1.
(ii) The remaining initial permits shall be awarded to applicants in descending order starting with applicants with the largest number of points according to (b)(3)(i) of this section. If two or more applicants have the same number of points and there are insufficient permits for all such applicants, the Regional Director shall award the permits through a lottery.

(c) Renewal of limited access permits.

(1) An application for renewal of a limited access permit must be submitted to the Pacific Area Office by the vessel owner or designee of the owner in the same manner as described in (a)(3) of this section and by January 1 of the year covered by the permit.

(2) The Regional Director will renew a limited access permit for a given year if the owner can document that the permitted vessel had 1) landed the equivalent of at least four lobsters for each trap normally used, calculated over one calendar year, and 2) that those landings were made during one of the two consecutive years previous to the given year.

(d) Transfer or sale of limited access permits.

(1) Permits may be transferred or sold, but no one individual, partnership or corporation will be allowed to hold more than one permit or partial permit, except owners who qualify initially for more than one permit. Layering of partnerships or corporations shall not insulate a permit from this criterion.

(2) If 50% or more of the ownership of a limited access permit is passed to persons other than those listed on the permit application, the Pacific Area Office must be notified of the change in writing and provided copies of the appropriate documents validating the changes within 30 days.

(3) Upon the transfer or sale of a permit, an application must be submitted by the owner or designee of the owner to the Pacific Area Office in the same manner as described in (a)(3) of this section. The transferred permit is not valid until this process is completed.

(e) Replacement of limited access permit.

(1) An owner of a permitted vessel may, without limitation, transfer his or her limited access permit to another vessel provided that the replacement vessel is put into service within 12 months after the owner declares to the Regional Director intent to make the transfer of the permit.

(f) Issuance of new limited access permits.

(1) The Regional Director may issue new limited access permits under this section when fewer than 15 vessel owners hold active permits.

(2) When the Regional Director has determined that new limited entry permits may be issued, a notice shall be placed in the Federal Register, and other means will be used to notify prospective applicants of the opportunity to obtain permits under the limited access management program.

(3) An application for a new limited access permit issued must be filed within 90 days following the publication in the Federal Register of a notice to prospective applicants.

(4) Each application for a new limited access permit must be submitted to the Pacific Area Office by the vessel owner or designee of owner in the same manner as described in (a)(3) of this section.

(5) The Regional Director will issue new limited access permits to:

(i) Owners of vessels that had made any landing of lobster from the NWHI during the period from 1983 through 1990, who were excluded from the fishery by implementation of the limited access system. If there are insufficient permits for all such applicants, the new permits shall be awarded by the Regional Director through a lottery; and

(ii) In descending order of priority to owners who have accumulated the largest number of points based on the following point system:

(1) three points shall be assigned for each calendar year after August 8, 1985 that the applicant was the captain of a vessel that made landings of lobster from the NWHI; and

(2) two points shall be assigned for each calendar year after August 8, 1985 that the applicant was engaged in either commercial lobster

trapping in Permit Area 2, or non-lobster commercial fishing in Permit Area 1; and

(3) one point shall be assigned for each calendar year after August 8, 1985 that the applicant was engaged in any other commercial fishing in the EEZ surrounding the Hawaiian Archipelago.

(c) If two or more owners have the same number of points and there are insufficient permits for all such owners, the Regional Director shall award the permits through a lottery.

(6) A holder of a new limited access permit must own at least a 50 percent share in the vessel that the permit would cover, and only one permit will be assigned to any vessel.

* * * * *

12. Effective from 0001 hours local time on **[insert date of publication in the FEDERAL REGISTER]**, new §681.31 is added to read as follows:

§681.31. Fleet Harvest Quota Management Program.

(1) Fleet Harvest Quota. General Requirements.

(a) The quota for a calendar year shall:

(i) apply to the total catch of legal lobsters, as specified in §681.21 and §681.22, by all permitted vessels; and

(ii) be a number of lobsters, and include all species of lobsters and product forms (e.g., alive and dead, whole and tails).

(2) Supplementary Requirement for Initial Quota.

(a) The Regional Director shall use information in commercial fishing logbooks from previous years to estimate the initial quota, and may also use information from research sampling to refine the quota.

(b) The Assistant Administrator shall place a notice indicating the initial quota, by February 15, in the Federal Register

and shall use other means to notify permit holders of the initial quota for the year.

(3) Supplementary Requirements for Final Quota.

(a) Each vessel fishing during the open season shall report its lobster catch at sea to the NMFS in Honolulu. The Regional Director shall notify permit holders of the reporting method, schedule and logistics, at least 30 days prior to the opening of the fishing season.

(b) The Regional Director shall use the catch information provided per (3)(a) during July (or the first month of the open season) to develop the final fleet harvest quota.

(c) If no fishing is conducted during July (or the first month of the open season), then the final quota shall equal the initial quota.

(d) The Assistant Administrator shall place a notice indicating the final quota, by August 15 (or within 45 days after the season opens), in the Federal Register and shall use other means to notify permit holders of the final quota for the year.

(e) If the total reported catch has exceeded the estimated final quota by the date (August 15, or within 45 days after the season opens)) that the final quota is published, all lobster fishing in Permit Area 1 must cease immediately. Otherwise fishing may continue until the fleet harvest quota has been caught.