UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Washington, D.C. 20235

SEP 28 1987

MEMORANDUM FOR: Distribution*

FROM: F/CM2 - Austin R. Magill

SUBJECT: Secretarial Review of Revised Amendment 5 to the Spiny Lobster Fishery Management Plan of the Western Pacific Region (FMP)

The Western Pacific Fishery Management Council has submitted revised Amendment 5 to the FMP for Secretarial review. The proposed actions in the attached amendment establish a minimum legal size for the common slipper lobster, Scyllarides squammosus; require escape vent panels in all lobster traps; require fishermen to release any species of egg-bearing (berried) slipper lobster; revise the daily lobster catch report; revise permit application forms; eliminate the annual processor report; revise the trip processing and sales report; change the name from Spiny Lobster FMP to Crustacean FMP.

The amendment incorporates an environmental assessment and determination of impacts under Executive Order 12291 and the Regulatory Flexibility Act.

Please provide your review and comment by November 10, 1987. If you have any questions, please contact Paul Martenson (673-5272).

Attachment

*Distribution

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Revised Amendment 5

and

Environmental Assessment

to the

Spiny Lobster Fishery Management Plan

Western Pacific Region

September 1987

Western Pacific Regional Fishery Management Council

1164 Bishop Street, Room 1405

Honolulu, Hawaii 96813

(808) 523-1368

TABLE OF CONTENTS

Section		Page No.
1.0	**Preface**	1
1.1	Title and Location of Proposed Action	1
1.2	Proposed Actions	1
1.3	Responsible Agencies	1
1.4	Public Review and Comment	2
1.5	Relationship to Other Laws and Policies	2
1.6	List of Preparers	2
1.7	Acknowledgements	3
2.0	**Background**	4
3.0	**Proposed Actions**	6
3.1	List of Proposed Actions	6
3.2	Location of the Proposed Action	6
4.0	**Need For Amendment 5**	7
4.1	Establish a Minimum Tail Width for the Common Slipper Lobster, Scyllarides squammosus	7
4.2	Require Escape Vent Panels in All Lobster Traps	9
4.3	Require Fishermen to Release All Egg-Bearing Slipper Lobsters	11
4.4	Revise the Daily Lobster Catch Report	12
4.5	Revise Permit Application	12
4.6	Eliminate the Annual Processor Report	13
4.7	Revise Trip Processing and Sales Report	13
4.8	Change the Name from the Spiny Lobster FMP to the Crustacean FMP	14
5.0	Description of the Fishery	15
5.1	Description of the Habitat	18
5.2	Condition of the Habitat	19
6.0	**Status of Lobster Stocks and Magnuson Act Determinations for Slipper Lobster**	21
6.1	Spiny Lobster Stock Assessment from Research Cruise Data	21
6.2	Commercial Logbook Data and MSY for Spiny Lobster	23
6.3	MSY for Slipper Lobster	25
6.4	Optimum Yield (OY) for Slipper Lobster	25
6.5	Domestic Annual harvest (DAH)	26
6.6	Domestic Annual Processing (DAP)	26

TABLE OF CONTENTS
(Continued)

Section		Page No.
6.0	**Status of Lobster Stocks and Magnuson Act Determinations for Slipper Lobster (continued)**	
6.7	Total Allowable Foreign Fishing (TALFF)	26
6.8	Joint Venture Processing (JVP)	26
6.9	Probable Future Condition	26
7.0	**List of Proposed Actions and Alternatives**	28
7.1	Establish a Minimum Legal Size Tail Width of 5.6 cm for the Common Slipper Lobster, Scyllarides squammosus	28
7.2	Require Escape Vent Panels with 67 mm Circular Escape Vents in All Lobster Traps	28
7.3	Require Fishermen to Release Egg Bearing Females of Any Species of Slipper Lobster	28
7.4	Revise the Daily Lobster Catch Report	28
7.5	Revise the Permit Application Forms	28
7.6	Eliminate the Annual Processor Report	28
7.7	Revise the Trip Processing and Sales Report to Accurately Reflect Features of the Fishery	29
7.8	Change the Name of the FMP from the Spiny Lobster FMP to the Crustacean FMP	29
8.0	**Impacts of Alternatives**	30
8.1	Establish a Minimum Legal Size Tail Width of 5.6 cm for the Common Slipper Lobster, Scyllarides squammosus	30
	A. Impacts of Rejected Alternatives	30
	B. Impact of the Preferred Alternative	32
8.2	Require Escape Vent Panels in All Lobster Traps	33
	A. Impacts of Rejected Alternatives	33
	B. Impact of the Preferred Alternative	37
8.3	Require Fishermen to Release Egg Bearing Females of Any Species of Slipper Lobster	39
	A. Impacts of the Rejected Alternatives	39
	B. Impact of the Preferred Alternative	39
8.4	Revise the Daily Lobster Catch Report	39
	A. Impacts of Rejected Alternatives	39
	B. Impact of the Preferred Alternative	41

TABLE OF CONTENTS
(Continued)

Section		Page No.
8.0	**Impacts of Alternatives (Continued)**	
8.5	Revise the Permit Application	42
	A. Impacts of Rejected Alternatives	42
	B. Impact of the Preferred Alternative	44
8.6	Eliminate the Annual Processor Report	44
	A. Impacts of Rejected Alternatives	44
	B. Impact of the Preferred Alternative	45
8.7	Revise the Trip Processing and Sales Report	45
	A. Impacts of Rejected Alternatives	45
	B. Impact of the Preferred Alternative	45
8.8	Change the Name of the FMP from Spiny Lobster FMP to Crustacean FMP	45
	A. Impacts of Rejected Alternatives	45
	B. Impact of the Preferred Alternative	45
9.0	**Choice of Alternatives Based on the Objectives of the FMP/Enforceability**	47
9.1	Management Objectives	47
9.2	Protect Stock Productivity and Prevent Overfishing	47
9.3	Maintain or Enhance Economic Contribution	47
9.4	Collect Information	47
9.5	Prevent Unfavorable Impacts on Endangered and Threatened Species	48
9.6	Ease/Cost of Enforcement	48
10.0	**Relationship of Amendment 5 to Other Applicable Laws and Policies**	50
10.1	Costal Zone Consistency	50
10.2	Marine Mammal Protection Act	51
10.3	Endangered Species Act	51
10.4	National Environmental Policy Act - Environmental Assessment	52
10.5	Determination if Impacts Under Executive Order 12291 and the Regulatory Flexibility Act	52
10.6	Applicability of the Paperwork Reduction Act	53

TABLE OF CONTENTS
(Continued)

Section		Page No.
11.0	**Indigenous Fishing Rights**	55
12.0	**References**	56
13.0	**Appendix I. Forms**	58
14.0	**Appendix II. Regulations**	

LIST OF FIGURES

Figure		Page No.
1.	The Hawaiian Archipelago.....	6
2.	Measurement site for determining tail width of the common slipper lobster, Scyllarides squammosus	9
3.	Escape vent panels. Proposed configuration.....	10
4.	The two escape gap designs/configurations selected for at-sea field testing.....	35
5.	Single set of escape vents with specifications.....	38
6.	Placement of escape vents in trap.....	38

LIST OF TABLES

Table		Page No.
1.	Numbers of legal spiny and total slipper lobster harvested in the NWHI lobster Fishery from 1983-1986	7
2.	Annual total catch and catch per unit effort (CPUE) for slipper lobster in the NWHI	8
3.	Performance of traps with circular escape vents compared to traps without escape vents (controls) (expressed as a percent)	11
4.	Performance of traps with circular escape vents compared to traps without escape vents (controls) for spiny and slipper lobster combined (expressed as a percent)	11
5.	Estimated annual sales of spiny and slipper lobsters.....	16
6.	Catch per unit of effort (catch rate) for spiny lobster, Panulirus marginatus, and slipper lobster, Scyllarides sp., in the NWHI for 1983-1986	17
7.	Mean CPUE (lobster/trapnight) of all spiny lobster from wire traps	21
8.	Mean CPU (lobster/trapnight) for legal size spiny lobster.....	22
9.	Mean CPUE (lobster/trapnight) for sublegal size spiny lobster	22
10.	Female spawning stock biomass CPUE (kg/trapnight).....	23
11.	MSY and commercial landings from three research locations in the NWHI.....	24
12.	MSY and commercial landings for the NWHI lobster fishery ..	27
13.	Summary of the effects of minimum size tail width alternatives.....	32
14.	The performance of different sized circular escape vents for spiny and three possible minimum sizes for slipper lobster	36

LIST OF TABLES
(Continued)

Table		Page No.
15.	The performance of circular vented traps relative to non-vented control traps for the combined slipper and spiny lobster CPUE.....	36

APPENDIX I

Figure		Page No.
1.	Daily Lobster Catch Report form presently in use.....	I-1
2.	Revised Daily Lobster Catch Report.....	I-2
3.	Permit Application Form presently in use.....	I-3
4.	Revised Permit Application.....	I-4
5.	Annual Processor Report.....	I-5
6.	Original Trip Processing and Sales Report.....	I-6
7.	Lobster Report for Transshipment and Sales.....	I-7

1.0 Preface

1.1 Title and Location of Proposed Action

The actions described in **Amendment** 5 to the Spiny Lobster Fishery Management Plan (FMP) in the Western Pacific Region address the trap fishery for lobsters in the Exclusive Economic Zone (EEZ) surrounding the Hawaiian Islands. However, the commercial lobster fishery is confined almost exclusively to the waters of the Northwestern Hawaiian Islands (NWHI), that is, waters of the EEZ west of 161 degrees West longitude (Figure 1). The EEZ consists of Waters from the edge of Hawaii's territorial sea seaward to a distance of 200 nautical miles.

1.2 Proposed Actions

a. Establish a minimum legal size for the common slipper lobster, Scyllarides squammosus;

b. Require escape vent panels in all lobster traps;

c. Require fishermen to release any species of egg-bearing (berried) slipper lobster;

d. Revise the daily lobster catch report;

e. Revise permit application forms;

f. Eliminate the annual processor report;

g. Revise the trip processing and sales report;

h. Change the name from Spiny Lobster FMP to Crustacean FMP;

1.3 Responsible Agencies

The Western Pacific Regional Fishery Management Council (the Council) was established under the Magnuson Fishery Conservation and Management Act (MFCMA) of 1976, to develop fishery management plans (FMP's) for fisheries in the U.S. EEZ surrounding Hawaii, the territories of Guam and American Samoa, and all U.S. possessions in the Pacific Ocean. Once an FMP is approved by the Secretary of Commerce, it is implemented by Federal regulations. The regulations of the FMP are enforced by the National Marine Fisheries Service (NMFS) and the U.S. Coast Guard in cooperation with state and territorial agencies.

For further information contact:

Western Pacific Regional Fishery Management Council		Western Pacific Program Office National Marine Fisheries Service
1164 Bishop, Room 1405 Honolulu, Hawaii 96813 (808) 523-1368	or	2570 Dole Street Honolulu, Hawaii 96822-2396 (808) 955-8831

1.4 Public Review and Comment

The MFCMA requires the regional Councils to obtain public input and comment on proposed amendments to any FMP. The Council has presented the changes proposed in Amendment 5 at an informal public meeting, a public hearing, and Council meetings during the past eighteen months.

April 29, 1986	Public Information Meeting	Kewalo Basin, Honolulu, Hawaii
May 18, 1986	Public Hearing	Kewalo Basin, Honolulu, Hawaii

In addition, the Council has periodically updated all lobster permit holders (along with other fishermen who have expressed interest) on the issues contained in the proposed amendment and the rational behind selection of the favored alternative. In these mailings the Council has solicited comments and suggestions of interested individuals.

1.5 Relationship to Other Laws and Policies

This amendment to the Spiny Lobster FMP complies with the information and procedural requirements of the National Environmental Policy Act of 1969, the Regulatory Flexibility Act, Executive Order 12291, and other laws and directives. The original draft and final FMP's also function as draft and final Environmental Impact Statements (EIS's). Likewise, this amendment is intended to serve as the Environmental Assessment. This amendment assesses the administrative/enforcement impacts of the proposed regulatory changes and satisfies the Regulatory Impact Analysis requirement. This document contains all the information necessary under the several statutes and directives applicable to the planning process. A copy of the original FMP and its companion Source Document are available from the Council.

1.6 List of Preparers

This amendment has been prepared by:

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1.7 Acknowledgements

Commercial lobster fishermen and people involved in other aspects of the lobster industry have contributed greatly to the development of this amendment, particularly with respect to establishing a minimum legal size for slipper lobster and requiring escape vents in lobster traps. Fishermen assisted with escape vent design, and at-sea trials were conducted on a commercial lobster fishing vessel, the F/V Shaman. The Council wishes to acknowledge the productive cooperation of the members of the industry and fishing community.

2.0 Background

The Spiny Lobster FMP was implemented March 9, 1983. The FMP was established to regulate a trap fishery for spiny lobsters which is conducted almost exclusively in the waters of the Northwestern Hawaiian Islands (NWHI). The original conservation and management measures of the FMP included: 1) a permit requirement to fish for lobster in Federal waters, 2) filing of catch reports, 3) a traps-only fishing gear restriction, 4) a minimum legal size for spiny lobsters, defined in terms of carapace length (7.7 cm), 5) requirement that all "berried" females (ones bearing eggs) must be released, as well as 6) filing several forms designed to provide more extensive or detailed information for monitoring the fishery.

The first two FMP amendments addressed technical issues in the plan. Amendment 1 recognized the enforcement complications created by the FMP in the waters of Permit Area 1 (waters easterly of 161 degrees West longitude) which surround the Main Hawaiian Islands (MHI). Amendment 1 made lobster fishing regulations for the EEZ of Permit Area 1 consistent with those the State was already enforcing. Amendment 1 became effective December 20, 1983.

The second FMP amendment gave more flexibility to the configuration of trap funnels. Amendment 2 removed the 10.5 inch maximum as the greatest acceptable diagonal measurement of the outer funnel opening. It's intention was to continue to minimize the risk of harm to endangered Hawaiian monk seals while at the same time adopting more lenient gear restrictions. The impetus for Amendment 2 was that through the rigors of use, outer openings of trap funnels became distorted. Therefore, according to the original FMP, most of the traps in use by the fishery had become illegal.

Amendment 3 was the first amendment in response to developments within the fishery. When the fishery began, live or whole-frozen lobsters were the principal products. In 1983, vessels began processing lobsters at sea, and frozen tails prevailed as the primary product of the industry. This rendered the minimum legal size based on carapace length impractical. Amendment 3 replaced carapace length as the standard for determining legal sized spiny lobsters with tail width. Research indicated that lobsters with carapaces 7.7 cm in length have tails very close to 5.0 cm in width. Therefore, 5.0 cm was set as the minimum legal sized spiny lobster tail width. The amendment specified that tail widths must be measured as the straight line distance across the widest spot of the tail between the first and second abdominal spines.

The most recent amendment, Amendment 4, became effective in late March, 1987. Like Amendment 3, it was necessitated by developments within the fishery. It established regulations to ensure that the spiny lobster refuge areas created in the original FMP remained intact. The need for Amendment 4 only became evident as a result of the transition from a single-species fishery for spiny lobster to a multi-species fishery which targets slipper lobster too. Amendment 4 preserves the integrity of spiny lobster refuge areas by also making it illegal to fish for slipper lobster in designated refuge areas.

The proposed measures in Amendment 5 are also in response to developments in the fishery since the FMP was originally adopted. It consists of two distinct components: one regards the permit and reporting forms associated with the fishery, while the other addresses management measures for spiny and slipper lobster.

3.0 Proposed Actions

3.1 List of Proposed Actions

The actions of Amendment 5 to the Spiny Lobster FMP of the Western Pacific Region are as follows:

1. Establish a minimum legal size for the common slipper lobster, Scyllarides squammosus;

2. Require escape vent panels in all lobster traps;

3. Require fishermen to release egg-bearing (berried) females of any species of slipper lobster;

4. Revise the daily lobster catch report;

5. Revise the permit application form;

6. Eliminate the annual processor report;

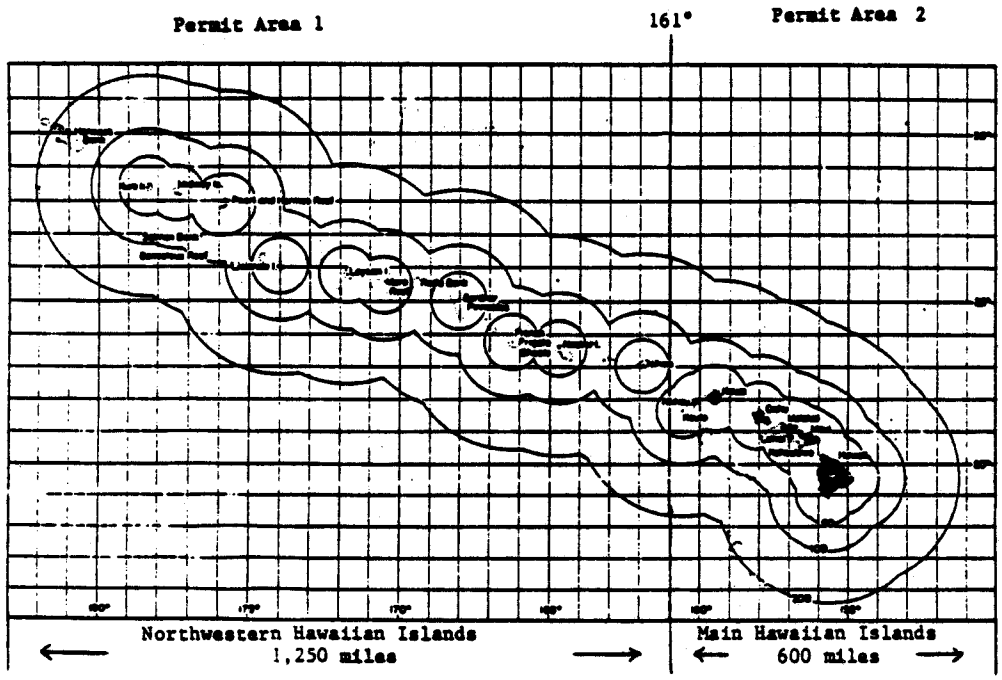
7. Revise the trip processing and sales report;

8. Change the name for Spiny Lobster FMP to Crustacean FMP;

3.2 Location of the Proposed Action

The proposed actions of this amendment would apply to the trap fishery for lobsters conducted in waters of the Exclusive Economic Zone (EEZ) that surround the Hawaiian islands archipelago. The EEZ consists of waters which extend seaward from the outer boundary of Hawaii's territorial sea to a distance of 200 nautical miles. However, the commercial lobster fishery is confined almost exclusively to the fishable waters of the Northwestern Hawaiian Islands (NWHI), that is, waters of the EEZ west of 161 degrees West longitude (Figure 1).

Figure 1. The Hawaiian Archipelago



4.0 Need For Amendment 5

4.1 Establish a Minimum Tail Width for the Common Slipper Lobster, Scyllarides squammosus

When the FMP was developed, the NWHI lobster fishery targeted spiny lobster (specifically, Panulirus marginatus) almost exclusively. At that time, slipper lobster was a commercially insignificant by-catch. Since the Spiny Lobster Fishery Management Plan (FMP) was implemented in March of 1983, the fishery has evolved into a multispecies one which targets slipper as well as spiny lobster. Over the past 3 years the catch of slipper lobster has increased sharply. In fact, slipper lobster accounted for more than 50 percent of the total number of lobsters harvested during the past two years, (Table 1). All but about 5 per cent of the slipper lobster catch is made up of the common slipper lobster, Scyllarides squammosus. Presently, any size of slipper lobster can be harvested.

One of the foundation principles of the Spiny Lobster FMP is to protect the reproductive capacity of the stock. In many fisheries, this includes the following:

1) finding out the size at which females first reproduce;

2) estimating how many first-reproductive size females existed in the unexploited stock; and

3) regulating the fishery so that the stocks contain at least half of the original number of first-reproductive sized females.

This type of management approach not only protects 50 percent of the spawning stock biomass, but also furnishes the Maximum Sustainable Yield for harvest annually.

Table 1. Numbers of legal spiny and total slipper lobster harvested in the NWHI lobster fishery from 1983 -1986 (Clarke et al. 1987)

Year	Legal Spiny	Total Slipper
1983	157,606	25,610
1984	667,292	284,815
1985	956,052	1,189,842
1986	896,407	1,237,527

The Honolulu Laboratory of the National Marine Fisheries Service has invested considerable research effort in determining the appropriate size for spiny lobster. A minimum legal size for spiny lobster was written into the original version of the FMP. That minimum size is presently expressed as a tail width measurement equal to 5.0 cm (the straight line distance across the widest spot on the tail between the first and second abdominal spines).

The proposed minimum legal size for the common slipper lobster (Scyllarides squammosus) is also based on the principal of protecting the reproductive capacity of the stocks while maximizing the sustainable annual yield. Scientific research indicates that first-reproductive size female slipper lobsters have tail widths of 5.6 cm (Crustacean Plan Monitoring Team Report - 7/22/86; results of data collected by observers aboard lobster vessels and analyzed by Dr. J. Polovina of the NMFS). Therefore, if 5.6 cm was set as the minimum legal size tail width, it would accomplish the same management objectives identified for spiny lobster. Specifically, 5.6 cm minimum legal tail width would protect 50 percent of the spawning stock biomass and make the maximum sustainable yield of slipper lobster available for harvest annually.

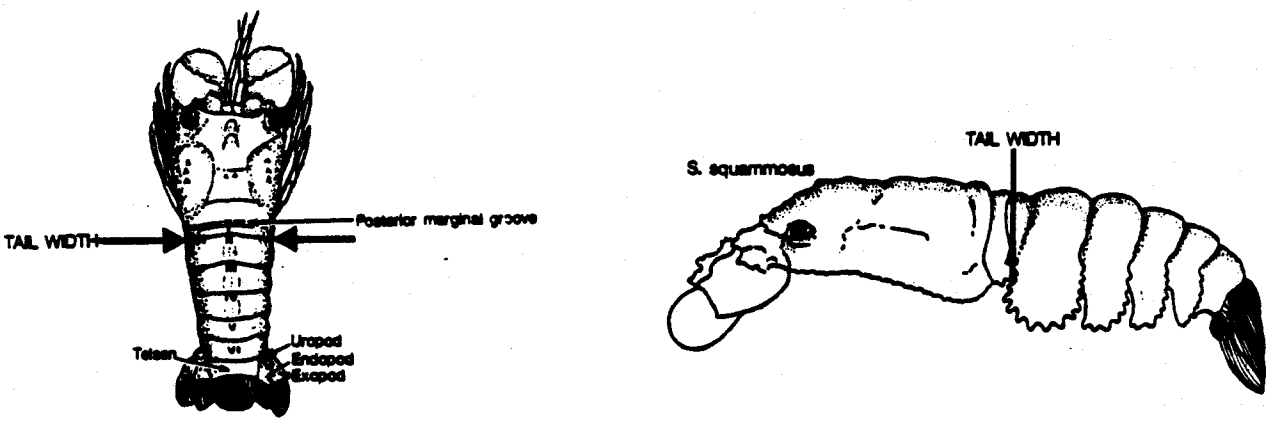
At present, there are no regulations governing the harvest of slipper lobster in the NWHI fishery. Any size slipper lobster can be retained. Scientists estimate that the Maximum Sustainable Yield of slipper lobster in NWHI is 600,000 lobsters. Catches of the past two years have greatly exceeded that number (Table 1). During 1986, catch rates for slipper lobsters declined (Table 2), and scientists believe this is because unexploited stocks are being fished down. The Crustacean Advisory Panel, the Crustacean Plan Monitoring Team, the Scientific and Statistical Committee, and the Council agree that allowing further catches of slipper lobster with tail widths less than 5.6 cm wide is contrary to ensuring continued success of the fishery.

The site designated for measurement to determine legal tail width would be the straight line distance across the tail measured at the widest spot between the first and second abdominal spines (Figure 2). This location is the same as the one required by the FMP for measuring spiny lobster. That site was chosen because it is not obscured or broken during processing or freezing, and thus it could be accurately measured and easily enforced.

Table 2. Annual total catch and catch per unit effort (CPUE) for slipper lobster in NWHI (Clarke et al. 1987).

Year	Total Slipper Catch	CPUE
1983	25,610	0.33
1984	284,815	0.75
1985	1,189,842	1.09
1986	1,237,527	0.85

Figure 2. Measurement site for determining tail width of the common slipper lobster, Scyllarides squammosus (Honda 1987).



Establishing a minimum legal size for slipper lobster will have some immediate economic impact on the fishery. To date the annual total catches of slipper lobster have included a percentage of animals with tail widths smaller than the proposed 5.6 cm minimum. Establishing a minimum size would initially reduce the annual slipper lobster landings by about 18 percent (Plan Monitoring Team Report 7/22/86). A 5.6 cm slipper lobster tail weighs approximately 3.5 ounces. The industry would no longer derive revenues from the sale of slipper lobster tails that weigh less than 3.5 ounces. For 1986, the loss in gross revenues would have been $413,000 (.18 x $2.296 million). These gross revenue losses would be divided among the 16 vessels that fished during 1986. However, this initial loss while making the transition to a minimum size regulation is best viewed as insurance paid for protecting the spawning stock and guaranteeing a stable, productive fishery in the future.

Economic research also supports the minimum legal size requirement. Recent work has revealed that the most lucrative markets for Hawaii slipper lobster exist for tails between 4 and 8 ounces (Samples and Gates 1987). The proposed minimum size regulation of 5.6 cm (equivalent to a 3.5 ounce tail) would not affect supplies of the most valuable tail sizes. Furthermore, small sized Hawaii slipper lobster tails (3 ounces or less) must compete with similar products from Asian countries which are available at a much lower price.

4.2 Require Escape Vent Panels in All Lobster Traps

A minimum legal size for spiny lobster was written in the FMP to protect the reproductive capacity of the stock. The same rational is behind the establishment of a minimum legal size for slipper lobster. Since the FMP was implemented fishermen have been required to throw back spiny lobsters below the minimum legal size. Releasing captured sublegals does not adequately fulfill its intended purpose. Scientific research and field observations of lobster fisheries throughout the world have conclusively revealed that captured and released sublegal lobsters suffer high mortality (Everson 1986, Gooding 1985, Brown and Caputi 1983, Lyons and Kennedy 1981). In the Florida fishery for spiny lobster Lyons and Kennedy (1981) found that

capture and release mortality of sublegal lobsters and the illegal capture of undersized lobster results in a 63 - 83 percent loss of legal sized lobsters available to the fishery. The biggest single contributing factor to the continued decline of lobster stocks targeted by the California fishery was retention of sublegal lobsters (Odemar et al. 1974). The primary reasons for capture and release mortality are handling, exposure, displacement, and predation. If a sublegal sized lobster dies, a loss to the fishery occurs on two levels: 1) the value of the lobster once it reaches legal size, and 2) the reproductive contribution of the animal.

The best solution to capture and release mortality of sublegals is to prevent the capture of sublegals in the first place. Lobster fisheries worldwide have successfully employed escape gaps to release sublegal sized animals. Traps with escape vents have also consistently produced increased per trap catches of legal sized lobsters (Kennedy 1983, Fogerty and Borden 1980, Odemar et al. 1974, Bowen 1963). One major obstacle to the implementation of escape vents in lobster traps in the NWHI was the multispecies nature of the fishery, and the fact that no minimum legal size existed for slipper lobster.

NMFS Honolulu Laboratory conducted escape vent trials with a range of minimum size tail widths for slipper lobster in mind, 5.2, 5.4, and 5.6 cm. The minimum legal size tail width for spiny lobsters is 5.0 cm. At-sea trials conducted aboard the F/V Shaman under the rigors of routine fishing conditions clearly indicated that circular escape vents performed better than rectangular ones (Polovina et al. 1987a). The proposed escape vent requirement calls for circular vents 67 mm in diameter (Figure 3). Escape panels with circular vents of this size were judged to produce the best combination of 1) escapement of sublegals and 2) retention of legal-sized spiny and slipper lobsters (Table 3).

Table 3 shows that traps with 67 mm circular escape vents caught 10 percent more legal spiny lobster but 10 per cent less legal slipper lobster than traps without escape vents. The traps allowed 83 percent of sublegal spiny and 93 percent of sublegal sized slipper lobster to escape. The 10 percent increase in the spiny catch very likely results because traps with escape vents are not crowded with sublegal sized lobster. Since spiny lobster are more valuable than slipper the increased spiny catch would more than account for the 10 percent loss of legal sized slipper lobster.

Figure 3.. Escape vent panels. Proposed configuration.

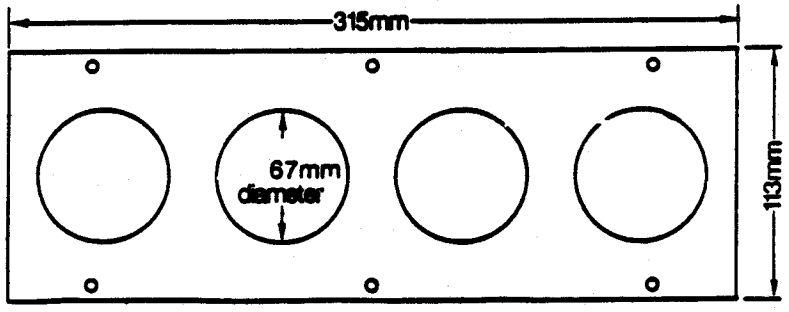


Table 3. Performance of traps with circular escape vents compared to traps without escape vents (controls) (expressed as a percent) (Polovina et al. 1987a).

	Escapement			
	Legal Sized Lobsters		Sublegal Sized Lobsters	
Vent Diameter (mm)	Spiny	Slipper	Spiny	Slipper
60	0	13	-30	20
62	15	7	-17	-32
65	15	4	-73	-56
67	10	-10	-83	-93

*Based on a minimum legal tail width of 5.6 cm.

Table 4 shows that when spiny and slipper lobster catches are considered together, for 67 mm vents, there is no loss in the number of legal lobster caught, but 88 percent of the sublegal lobsters are allowed to escape.

The use of traps with escape panels has positive economic impacts on the fishery. First of all, many of the undersized lobsters that are likely to die as a result of the present catch and release practice would survive and eventually be harvested as legal sized lobsters. Secondly, sublegals would be allowed to grow to a size where they could make a reproductive contribution to the stock before they were harvested.

4.3 Require Fishermen to Release All Egg-Bearing Slipper Lobsters

Just as for spiny lobster, egg-bearing or berried female slipper lobster must be released if trapped. Although mortality rates associated with capture and release procedures are a concern, at present it still seems prudent to release berried females. Those that survive may make a reproductive contribution to the stocks. This measure is consistent with present regulations for spiny lobster.

Table 5. Performance of traps with circular escape vents compared to traps without escape vents (controls) for spiny and slipper lobster combined (expressed as a percent) (Polovina et al. 1987a).

	Retention	Escapement
Vent Diameter (mm)	Legal Sized Lobsters	Sublegal Sized Lobsters
60	6.5	-25
62	11	-24.5
65	9.5	-64.5
67	0	-88

4.4 Revise the Daily Lobster Catch Report

Deletions: Two information blocks near the top of the form presently in use. One regards "Number of Traps", and the other asks for "Radio Call Sign".

These data are already included on the Commercial Lobster Fishing Permit Application.

Additions: The common names of the three species of slipper lobster harvested in the fishery as well as a block for reporting by-catches of octopus and other species.

Reporting catches of each species of slipper lobster by category, identical to the way catches of spiny lobster are reported, is necessary in order to accomplish management and conservation goals for slipper lobster identical to the ones outlined for spiny lobster in the FMP. Reporting slipper lobster catches in this fashion allows biologists and managers to monitor the condition of slipper lobster stocks. At present most fishermen voluntarily list total catches of slipper lobster. However, that data does not yield information on the structure of the stocks. There is further discussion regarding this issue under Status of Stocks (Section 6.0)

The Annual Report on the 1986 Lobster Fishery of the Western Pacific Region (Clarke et al. 1987) confirmed reports that octopus is a significant by-catch of the fishery. The sale of octopus is another source of revenue to lobster fishermen. Knowledge of the amount harvested would assist to provide a more complete economic understanding of the fishery. Bottomfish are also taken as a by-catch, but to a lesser extent. Additionally, octopus is an important predator of lobsters, and information on its relative abundance on the commercial fishing grounds is potentially useful management information.

The wording "octopus and other species" was selected to make the FMP more responsive to unanticipated changes in the fishery. If marine species other than octopus become a significant by-catch of the fishery in the future, the present terminology will allow mandatory reporting without further amendment of the FMP.

The form in use now and the revised version are shown as Figures 1 and 2 of Appendix I.

4.5 Revise the Permit Application

The following additions regarding vessels are recommended for the Commercial Lobster Fishing Permit Application Form:

1. Gross registered tons
2. Registered length
3. Age of vessel

4. Vessel hold capacity

5. Refrigeration types and capacity

6. Types and amounts of fishing gear to be employed

7. Purchase price of vessel

8. Date of purchase.

This additional information will provide the means for a more reliable and comprehensive understanding of fleet composition. Knowledge of gross registered tonnage, registered length, age of vessel, purchase price, and date of purchase will depict **capital investment. Operating costs** can be gleaned by knowing purchase price, date of purchase, age of vessel, and types and amounts of different fishing gear to be employed. Gross registered tonnage, vessel hold capacity, refrigeration types and capacity, and types and amounts of fishing gear employed will provide a profile of vessel **operating constraints.**

An accurate characterization of capital investment, operating costs, and operating constraints would have aided management decision making in the past, and it will be essential in the future. The early years of fishing under the FMP were characterized by expansion. The small, initial fleet of vessels had only exploited a relatively small portion of the fishable lobster grounds in the NWHI. However, during 1985 and 1986, a much greater number of active vessels have harvested lobster from all of the fishable areas in the NWHI. The prospects of overcapitalization by the fleet are much greater now.

These additional data requirements will allow monitoring of economic features of the fishery. Furthermore, collecting these data during permit application procedures will diminish the need to survey permit holders to obtain similar information. Figures 3 and 4 of Appendix I illustrate the original and revised application forms.

4.6 Eliminate the Annual Processor Report

This form (Figure 5, Appendix I) requests information which is already collected as part of the Trip Processing and Sales Report (Figure 6, Appendix I). The Annual Processor Report was more useful before the fleet switched to at-sea processing and freezing. Now both forms report largely the same information and are filled out by the same people. Furthermore, in instances where lobster is processed at shoreside firms, collecting the mandated information is difficult. There is no existing system or law which requires up-to-date accurate listings of such firms that may process lobsters harvested under the FMP, so enforcement of this reporting requirement is difficult.

4.7 Revise Trip Processing and Sales Report

The revision to the Trip Processing and Sales Report simply consists of making separate blocks for slipper lobster, spiny lobster, octopus, and other

species, (Figure 7, Appendix I). The revised format is less confusing, for fishermen and managers, than the original design. Value of the two types of lobster differ considerably. The original form did not differentiate between types of lobster. Neither did it list specific commercially valuable incidental catch such as octopus. Reporting revenues for each type of lobster and amounts and revenues of incidental catch as distinct categories will help define the economic profile of the fishery in greater detail, and may help formulate future management decisions.

4.8 Change the Name from the Spiny Lobster FMP to the Crustacean FMP

When the FMP was initially developed only spiny lobster was targeted by the fishery. Since that time the fishery has changed. Both slipper lobster and spiny lobster are targeted. In fact, in 1985 and 1986, fishermen harvested substantially more slipper lobsters than spinys. The name Spiny Lobster is no longer accurate for the FMP.

Perhaps more importantly, the Western Pacific Regional Fishery Management Council intends to work the Spiny Lobster FMP into a framework FMP to decrease the cost of efficient management. Thus, there is a necessity to switch from specific FMP's to generic ones.

Furthermore, in the not too distant future, development of a trap fishery for deep-water shrimp may take place. It's likely that a great deal of the information necessary to manage that type of fishery is already contained within the present FMP. If a trap fishery for deep-water shrimp is included within the present FMP, the name Crustacean FMP would be even more appropriate.

5.0 Description of the Fishery

A trap fishery for spiny lobster, principally Panulirus marginatus, has existed in the NWHI for the past 10 years. In 1976, the National Marine Fisheries Service conducted test fishing operations that seemed to indicate that spiny lobster stocks in the Leeward islands could support a commercial lobster fishery. Over the next few years a small fleet of boats trapped spiny lobster in the nearer reaches of the NWHI, mainly around Nihoa and Necker Islands. The lobster catch was sold as live product, and marketing was directed at the local restaurant industry.

The Spiny Lobster FMP was developed over the 1980 - 1982 time interval, and the management measures included accurately addressed the nature of the fishery as it existed then. In keeping with the Magnuson Fishery Conservation and Management Act, one of the primary objectives of the FMP was to assure long-term, maximum productivity of spiny lobster stocks and to prevent biological over fishing. At that time the fishery harvested spiny lobster almost exclusively, and it was sold as either live or whole-frozen product. The Spiny Lobster FMP was implemented on March 9, 1983.

Through the years of 1980 - 1982, participation in the fishery varied considerably, and so did annual harvests. The number of boats fishing jumped from 3 in 1980 to 10 in 1981. Landings for 1981 set a record for the fishery, and the 780,000 pounds (whole weight) reported were more than double the former record harvest of the previous year (Table 5). However, during 1982, both participation in the fishery and landings tailed off dramatically.

The year 1983 was one of transition for the fishery. By then the active fleet had almost completely switched from an array of different trap designs to black plastic traps, which could be nested into tight stacks and stowed in a minimum amount of deck space. The plastic traps were also of a smaller mesh than the other traps used in the fishery. The new traps, combined with the knowledge that comes from experience, quickly stimulated fishermen to exploit slipper lobster (primarily Scyllarides squammosus) on a commercial scale. This marked the end of the single species nature of the NWHI lobster fishery. Since then, the NWHI lobster fleet has targeted both spiny and slipper lobster.

The other modification that took place in 1983 that significantly changed the fishery was a shift in product form. Frozen tails replaced whole lobsters (live or frozen) as the primary product of the fishery. A shift of market accompanied the shift in product form. Instead of marketing catches locally, fishermen sold most of their product to brokers on the U.S. mainland, and price was determined by the world market for frozen tails. For the past three years (1984-1986) frozen tails have comprised around 90 percent of spiny products and virtually 100 percent of slipper lobster products from the NWHI fishery (Table 5).

The year of 1983 also marked the beginning of several years of sustained growth within the fishery, both in terms of participation and production (Table 5). The active fleet grew from 4 to as many as 16 vessels. As the fleet expanded, it extended its range of operations. Fishing effort

Table 5. Estimated annual sales of spiny and slipper lobsters. Ex-vessel price is in dollars per pound and ex-vessel revenue is in dollars. Weight is in terms of whole animals as is ex-vessel price. (Clarke et al. 1987)

	Spiny lobster				Slipper lobster					
Year	Pounds (whole)	Metric tons	Price (whole $/lb)	Revenue	Pounds (whole)	Metric tons	Price (whole $/lb)	Revenue	No. of vessels	No. of trips
1977	72,000	30	2.90	209,000	--	--	--	--	5	14
1978	45,000	20	3.00	135,000	--	--	--	--	2	12
1979	100,000	50	3.20	320,000	--	--	--	--	2	6
1980	328,000	150	3.40	1,115,000	--	--	--	--	3	12
1981	780,000	350	3.50	2,730,000	--	--	--	--	10	25
1982	187,000	80	3.60	673,000	--	--	--	--	7	19
1983	[1]203,000	90	2.91	591,000	--	--	--	--	4	19
1984	[1]935,000	425	2.66	2,490,000	[2]220,000	100	1.64	361,000	11	38
1985	[1]1,438,000	654	2.94	4,227,000	[2]930,000	423	1.78	1,660,000	16	62
1986[3]	[1]1,146,000	521	3.23	3,701,000	[2]1,065,000	484	2.15	2,296,000	16	60

[1] Includes frozen tail weight expanded to represent whole weight (tail weight = 35.6% of whole weight).

[2] Includes frozen tail weight expanded to represent whole weight (tail weight = 33.3% of whole weight).

[3] Preliminary estimate.

was no longer concentrated on grounds in the nearer reaches of the NWHI. Vessels were taking longer trips, fishing more areas per trip, and extending operations to the distant reaches of the NWHI (Gates and Samples 1987). By the end of 1985, the fleet had exploited nearly all of the fishable areas within the NWHI. Now it's not uncommon for lobster boats to venture as far as 1000 - 1200 miles from Oahu on a single trip.

The production of the fishery has roughly mirrored the trend of vessel participation. The combined annual landings of spiny and slipper lobsters (expressed as whole weight) rose for 90 metric tons in 1983, to a peak of 1,077 metric tons in 1985, and dipped slightly to 1,005 metric tons in 1986.

Although production has largely reflected participation, other factors are particularly important, specifically, catch rates and the amount of fishing effort exerted (Table 6). Since the FMP was implemented in 1983, catch rates for spiny lobsters have steadily declined. Over the same period catch rates for slipper lobsters steadily increased before peaking in 1985, and declining slightly during 1986. The increases in production of the fishery, particularly for spiny lobster were maintained largely though intensification of fishing effort. Fishermen have increased the trap carrying capacity of their vessels, and they continue to fish more traps on a daily basis. Comparisons between 1985 and 1986 clearly illustrate the situation. In 1985 and 1986, 16 boats made roughly the same number of fishing trips; 62 in 1985, and 60 in 1986. Even so, there was a 33 percent increase in trap nights from 1.09 million to 1.45 million.

Since slipper lobster first became a remarkable component of this catch, annual slipper landings have increased dramatically (Table 2 and Table 5). In 1985 and 1986, in terms of numbers, slipper lobsters have comprised more than 55 percent of the annual landings. The higher catch rates and greater numbers of lobsters landed reflect the previously unexploited nature of the slipper stocks.

Table 6. Catch per unit of effort (catch rate) for spiny lobster, ***Panulirus marginatus***, and slipper lobster, Scyllarides sp., in the NWHI for 1983-1986 (Clarke et al. 1987).

Year	Number of Areas (Banks) Fished	Number of Trapnights	Catch Per Trapnight				
			Legal Spiny	Sub-legal Spiny	Berried Spiny	Total Spiny	Total Slipper
1983	3	76,857	2.05	0.66	0.13	2.84	0.33
1984	7	377,690	1.77	0.63	0.20	2.59	0.75
1985	14	1,089,462	0.88	0.32	0.12	1.31	1.09
1986	17	1,455,790	0.62	0.21	0.11	0.93	0.88

Source: Honolulu Laboratory, Southwest Fisheries Center, National Marine Fisheries Service. Data derived from FMP-required "Daily Lobster Catch Report" per Statistical Area.

Annual sales of lobster products were worth just under $600,000 the first year of fishing under the FMP. Since then, the value of the fishery has climbed steadily. In 1986, the NWHI lobster fishery generated nearly $6 million in revenues. That makes the NWHI lobster fishery either the first or second most valuable fishery in the state. Sales of spiny lobster products have always accounted for the greatest share of revenue from the fishery. Spiny lobsters comprise most of the total annual poundage and have greater market value than slipper lobster. Large slipper lobsters are an unfamiliar commodity among many buyers and a majority of consumers. Spiny lobster product sales contributed $3.7 million to last year's total, while slipper product sales made up the remainder of about $2.3 million.

Some commercially valuable incidental catch is taken by the lobster fleet, primarily octopus and bottomfish. Vessels may land several thousand pounds of octopus on a single trip which is saleable for between $.50 and $1.50 per pound. A much smaller amount of bottomfish is caught, and some of it is distributed among the crew. The total annual revenue from sales of incidental catch is estimated at less than $50 thousand.

Through the first few months of 1987 some changes in the fishery are evident, particularly in terms of the active fleet. Several of the larger vessels that were high producers have left the fishery, at least for the time being. Alternate fisheries in other regions have become more attractive. Fishermen from several other boats that are withdrawing from the fishery report that catch rates are too low. However, several newly permitted vessels have entered the fishery, and it's reported that more new arrivals are anticipated.

5.1 Description of the Habitat

Like spiny lobster, slipper lobster is distributed throughout the NWHI from Nihoa Island to Kure Atoll. Based on NMFS trap catches, the depth distribution for the common slipper lobster (Scyllarides squammosus) ranges from 13 to 181 m. and from 33 to 112 m. for the ridgeback slipper lobster (S. haanii). NMFS catch data indicate that the red, two-spined lobster (Panulirus marginatus) is distributed at depths from 4 to 84 m. (Uchida and Uchiyama 1986). The green, four-spined spiny lobster (Panulirus pencillatus) is very rare in commercial catches of lobster in the NWHI since it occurs mostly in shallow areas, primarily in wave-swept high energy zones immediately seaward of reef flats and rocky shores where fishing for lobster is prohibited by regulations. Since the depth distributions of spiny and slipper lobsters overlap, slipper and spiny lobsters are often caught together. However, concentrations of slipper lobster are generally found in deeper water than concentrations of spiny lobster.

Kona crab (Ranina ranina), included in the management unit of the Crustacean FMP, is also distributed in the NWHI from Nihoa Island to Kure Atoll. Catches on NMFS cruises indicate that kona crab inhabits sandy bottoms at depths from 24 to 115 m.

The amount of bottom area in the NWHI of the depth range suitable for lobster and kona crab habitat is about 3,500 nm^2, not including depths less

than 10 fathoms and within lagoon areas where fishing is prohibited (Department of Land and Natural Resources 1979). However, only some of this bottom area provides a habitat suitable for lobster, which are found in abundance only where shelter exists. Lobsters scavenge for food in the open at night and then retire at daylight to holes, cracks, crevices, coral or rock rubble, and caves where they often congregate in large numbers. Unlike the nocturnal lobsters, kona crabs apparently feed at any time that food is around. These denizens of sandy bottoms are adapted for movement and burrowing backwards into the sand. During the day they are mostly buried in the sand with only a small section of the front part of the body and eyes visible, waiting to snatch food particles or prey.

The amount and quality of the habitat for crustaceans found around each island and bank in the NWHI varies widely from island to island and from bank to bank. This variability shows up in observed differences in catch rates among the islands fished and in pronounced differences in the numbers of spiny and slipper lobster caught.

While some lobsters inhabit near-shore waters in the NWHI, most of them range into substantially greater depths, where almost all of the commercial fishing occurs in the NWHI. Lobsters inhabit coral reefs within atoll lagoons, as well as the reefs which fringe the outside of each of the NWHI, where they find shelter, food, and protection from predation and from fishing. Larvae of spiny and slipper lobsters are recruited to nearshore habitats which serve as nurseries. Seaward of the fringing reefs, where most lobster fishing occurs, the habitat for lobsters and kona crabs is confined to submarine terraces which are generally separated by rocky escarpments. The terraces are submerged ancient coastal plains, and the rocky escarpments mark ancient shorelines which were submerged either by land subsidence, eustatic sea level changes, or both.

There are a least three well defined submarine terraces off the island of Oahu within the depth ranges inhabited by lobsters and kona crabs. Broken lines of reef rock outcrops or near vertical escarpments mark the borders of the terraces, which are generally aligned parallel to the present-day shoreline. Presumably, similar formations exist in the NWHI, although submarine reconnaissance surveys have not been made there. Reef rock outcrops on the terraces separate patches of coral rubble and channels of sand. The rocky outcrops and the boulder-strewn, near vertical escarpments are the principal habitats of lobster in deep waters during the day. At night, they leave the protection of their rocky homes to scavenge for food in the open. Kona crab, on the other hand, apparently always inhabit sandy bottoms.

Additional information on the habitat of lobster and kona crab is contained in the Source Document for the FMP.

5.2 Condition of the Habitat

The portion of the lobster and kona crab habitat laying in shallow nearshore waters and within atoll lagoons in the NWHI is pristine. Commercial fishing for lobster is prohibited within the 10-fathom contour and

within the atoll lagoons, Human-induced impacts on lobster are virtually non-existent because all of the NWHI, except for Midway Island, are included in a National or State of Hawaii wildlife refuge. Maintaining the pristine quality of the lobster habitat within lagoons, as well as on the seaward banks of reefs and islands, is very important since these shallow areas provide a refuge for breeding lobsters, and because larvae of lobsters are know to recruit to nearshore and lagoonal areas.

The habitat of lobsters in deeper waters seaward of the fringing reefs as nearly as pristine since it is not subject to any effects of industry or agricultural activity. It receives very little pollution except for small amounts of trash, mostly from fishing vessels. Most of the offshore areas where lobsters reside have been subject to rather intensive fishing effort. By the end of 1985, all of the fishable areas for lobster in the NWHI had been exploited to various degrees, and in 1986, the lobster fishing fleet which operated in the NWHI expended nearly a million and a half trap nights of fishing effort. While the fishing pressure has been intense, especially in recent years, there has been no probable negative impact on the habitat itself. Live coral is absent at depths where almost all of the commercial fishing for lobster occurs in the NWHI, so the coral reef environment is not damaged. Coral rubble and a small basalt rocks probably get rearranged in the process of setting retrieving strings of traps, but the effects are probably not detrimental.

All in all, there will be no changes in the habitat as a result of this amendment. In addition, there are no known or planned development activities that would adversely affect this habitat.

6.0 Status of Lobster Stocks and Magnuson Act Determinations for Slipper Lobster

The date used to determine the status of the lobster stocks in the NWHI comes from two sources: 1) standardized lobster assessment cruises by the NOAA R/V Townsend Cromwell and 2) logbook records of commercial fishermen.

There have been three lobster stock assessment cruises. The first cruise took place in 1977, when the fishery was in the infancy of its development. The data from that trip represents pre-exploitation information on the NWHI lobster stocks. The two other assessment cruises were carried out in 1985 and 1986. Scientists have evaluated the status of the stocks through time by comparing the data from all 3 cruises.

The assessment cruises have been standardized. Fishing operations have taken place at the same three locations during each cruise. The areas sampled are Necker Island, Maro Reef, and Laysan Island. Necker Island has the longest history of exploitation in the fishery while Maro Reef has been fished more intensively than any place in the NWHI since 1984. Waters within 20 nautical miles of Laysan Island are a designated refuge area, and no lobster fishing is allowed. The area around Laysan Island is used as a control area during stock assessments.

Although the style of traps used by the commercial fleet has changed several times, all of the scientific sampling has used the same style gear and methodology.

The information in this section was compiled primarily from the Status of the Stocks of Spiny and Slipper Lobsters in the Northwestern Hawaiian Islands, 1986 (Polovina et al. 1987b).

6.1 Spiny Lobster Stock Assessment from Research Cruise Data

Catch rates for all trappable spiny lobster in each of the three areas have declined over time (Table 7). At Necker Island and Maro Reef the decrease between the 1977 and 1986 catch rates has been significant. The present catch rates at Necker Island and Maro Reef are only 33 and 53 percent respectively of the levels recorded in 1977. Catch rates at Laysan Island during 1986 were calculated to be 56 percent of 1977 levels. Declining catch rates were noted for all three areas between 1985 and 1986, but none was statistically significant.

Table 7. Mean CPUE (lobsters/trapnight) of all spiny lobsters from wire traps. (SE=Standard error) (Polovina et al. 1987b).

Island/Bank	1977	1985	1986	1985/1977	SE	1986/1977	SE
Necker Island	6.30	2.52	2.08*	0.40	--	0.33	(0.03)
Maro Reef	3.29	2.07*	1.74*	0.63	(0.09)	0.53	(0.07)
Laysan Island	2.64	1.63	1.48	0.62	(0.36)	0.56	(0.24)

*Significantly less than the 1977 CPUE at the 5% level.

The total catch rate data from Necker Island and Maro Reef was analyzed further according to legal and sublegal sized spiny lobster. This task was undertaken to measure the relative abundances of legal and sublegal sized lobster in the population. Legal and sublegal sized lobster were differentiated on the basis of carapace length which was the original method defined in the FMP.

The catch rates of legal sized spiny lobsters at Necker Island and Maro Reef in 1986 were 22 and 49 percent respectively of the 1977 levels (Table 8). Just as was the case for catch rates of total lobster, declines in catch rates are noted between 1985 and 1986, but the differences are not statistically significant. Catch rates of sublegals have also trended downward (Table 9). The respective 1986 levels for Necker Island and Maro Reef are 48 and 85 percent of 1977 levels. Only the decline at Necker Island is significant.

Size at onset of sexual maturity is another indicator used to evaluate the status of the stocks. It is specifically defined as the size at which 50 percent of the population is sexually mature. The presence or absence of external eggs was recorded, along with its size, for each female lobster trapped. The seasonality component of reproduction was controlled for by restricting between year comparisons to data gathered during July and August. Therefore, the onset of sexual maturity among females can be considered as the size at which the ratio of egg-bearing females to total females is 50 percent.

Table 8. Mean CPUE (lobster/trapnight) for legal size spiny lobster. (SE=standard error) (Polovina et al. 1987b).

Island/Bank	1977	1985	1986	1985/1977	SE	1986/1977	SE
Necker Island	4.92	1.28	1.08*	0.26	--	0.22	(0.05)
Maro Reef	2.93	1.49*	1.44*	0.51	(0.11)	0.49	(0.07)

*Significantly less than the 1977 CPUE at 5% level.

Table 9. Mean CPUE (lobster/trapnight) for sublegal size spiny lobster. (SE=standard error) (Polovina et al. 1987b).

Island/Bank	1977	1985	1986	1985/1979	SE	1986/1977	SE
Necker Island	1.27	0.94	0.61*	0.74	--	0.48	(0.07)
Maro Reef	0.37	0.34	0.32	0.92	(0.14)	0.85	(0.16)

*Significantly less than the 1977 CPUE at the 5% level.

In 1977, it was estimated that, at Necker Island, 50 percent of the females were sexually mature at a carapace length of 6.6 cm, which was 67

percent of the asymptotic length of the Necker Island stocks. For stocks at Maro Reef, 7.6 cm carapace length was the size of first onset of sexual maturity. That length was 66 per cent of the asymptotic length for Maro Reef stocks. When the sizes at onset of sexual maturity within banks were compared for 1985 and 1986, no statistical differences were detected. Therefore, 1985 and 1986 data from the same banks were pooled. Based on pooled data the onset of sexual maturity for Necker Island stocks over 1985-1986 was a carapace length of 5.9 cm, or 57 percent of the asymptotic size. Maro Reef onset of sexual maturity was at a carapace length of 7.1 cm, which is 62 percent of the asymptotic size.

When the results of the 1985-1986 pooled data were compared with the 1977 results from the same locations, a statistically significant decline in size of onset of sexual maturity was revealed for stocks at Necker Island. Furthermore, in 1986, for large females the ratio of egg bearing females to total females reached a constant of .30. In 1977, the value was .20. These differences appear to demonstrate that the spiny lobster population at Necker Island is responding to fishing pressure. Animals are bearing eggs at a smaller size and a greater fraction of females in the population are bearing eggs at any one time.

Female spawning stock biomass for spiny lobster was computed based on estimates of onset of sexual maturity and catch rates, once catch rates had been converted from numbers to weight per trap night (Table 10). In 1986, the female spawning stock biomass at Necker Island was 36 percent of its 1977 level. At Maro Reef female spawning stock biomass had declined to 58 percent of 1977 levels. Both of these declines are statistically significant. Under the widely used logistic surplus production model, the MSY is achieved when the population has been reduced to 50 per cent of its unexploited level.

Table 10. Female spawning stock biomass CPUE (kg/trapnight). (SE=standard error) (Polovina et al. 1987b).

Island/Bank	1977	1985	1986	1985/1979	SE	1986/1977	SE
Necker Island	2.68	0.98	0.96	0.37	--	0.36*	(0.05)
Maro Reef	1.81	1.10	1.04	0.61*	(0.14)	0.58*	(0.16)
Laysan Island	1.53	1.36	1.32	0.89	(0.36)	0.86	(0.24)

*Significantly less than 1.0 at the 5% level.

6.2 Commercial Logbook Data and MSY for Spiny Lobster

The Honolulu Laboratory of the NMFS Southwest Center estimated the MSY for spiny Lobster at Necker Island, Maro Reef, and for the entire NWHI. Those estimates are listed in Table 11.

When MSY and spawning stock biomass are considered together it appears that the present yield level at Maro Reef may be sustainable. The spawning stock biomass is 58 percent of the level that existed in the unexploited stocks there. However, there may be some concern over the situation at Necker Island. Both commercial and research catch rates have declined markedly, but perhaps of even greater import is the fact that significantly fewer sublegals are harvested at Necker. Data supports the hypothesis that capture and release procedures practiced by the fishery is inducing mortality on the sublegal population. The decline in the CPUE of legal spiny lobster at Necker Island may be directly related to the decrease in the CPUE of sublegals in recent years. Scientists feel the use of escape gaps will reduce the mortality of sublegals brought about by capture and release, and potentially lead to increases in CPUE for legal sized spiny lobster.

Based on yield curves for Necker Island, Maro Reef, Laysan Island, and the entire NWHI, and the relative female spawning stock biomass levels at Necker Island and Maro Reef, scientists estimate that the MSY for spiny lobster in the NWHI is about 900,000 lobsters, or about the current annual production. In order to continue to achieve the present levels of production, scientists advise that escape vents be a priority management measure.

Table 11. MSY and commercial landings of spiny lobster from three research locations in the NWHI (Polovina et al. 1987b).

Location	Estimated MSY*
Necker Island	242,000
Maro Reef	360,000
The Entire NWHI	900,000

* in numbers of lobsters

The 1986 commercial landings are close to the estimated MSY at these areas.

Location	1986 Landings*
Necker Island	174,000
Maro Reef	350,000
The Entire NWHI	896,000

* in numbers of lobsters

6.3 MSY for Slipper Lobster

This amendment contains the first management measures which specifically address the slipper lobster component of the NWHI lobster fishery. As such, it is necessary to make certain determinations about the slipper lobster fishing as required by the Magnuson Act.

Estimates of the MSY for slipper lobster in the NWHI are more difficult to make than for spiny lobster since the harvests of slipper lobster are not in equilibrium with the stocks. Slipper lobsters have been intensely harvested only since 1985, and the harvests thus far represent a stock being initially fished down. Based on relationships between unexploited stocks and fishing mortality, the first estimate of MSY for slipper lobster in the NWHI is approximately one-half of the average annual landings for 1985 and 1986, or about 600,000 slipper lobster per year (Polovina et al. 1987b).

6.4 Optimum Yield (OY) for Slipper Lobster

The MFCMA defines Optimum Yield (OY) as the "amount of fish: (A) which will provide the greatest overall benefit to the Nation, with particular reference to food production and recreational opportunities; and (B) which is prescribed as such on the basis of Maximum Sustainable Yield (MSY) from such fishery, as modified by any relevant economic, social, or ecological factor" (Sec. 3(18)).

The Council outlined several relevant factors which influenced the relationship of OY to MSY for the spiny lobster component of the fishery. Those same factors apply to the determination of OY for slipper lobster as well. They are:

1. Protection of the reproductive capacity of the stock. A number of management measures are available to accomplish this: gear restrictions, size restrictions, and area closures.

2. Management measures should provide the basis for a productive and profitable fishery. This consideration may influence any minimum size selection.

3. Promote the protection and recovery of monk seals and leatherback green sea turtles.

4. The exploitation history of the stocks is an important factor in determinations of MSY and OY. In the early years of a fishery's development, and occasionally in stable established fisheries, annual harvests may exceed the estimated MSY by large margins without harming the stocks.

With all of the above factors in mind, and the NMFS' initial determination of MSY for slipper lobster in the NWHI, the Council has defined the OY for slipper lobster in the following non-numeric terms: OY for the slipper lobster fishery in the NWHI is the greatest catch of non-berried lobster above the minimum legal size, which can be taken each year from

waters of the EEZ in the NWHI where fishing for lobster is not prohibited. Each year, as part of the process of reviewing the previous year's fishing and assessing the need for regulatory adjustments, the Council will consider whether the OY for spiny and slipper lobster needs to be modified or quantified numerically.

The current best estimate of MSY for slipper lobster in the NWHI is 600,000 animals. Slipper lobster harvests in 1985 and 1986 have numbered approximately 1,200,000 animals. This wide margin between actual harvests and MSY is due to fishermen targeting previously unexploited stocks. Once the fishery has stabilized, it's likely that the values for OY and MSY will be quite close to each other.

6.5 Domestic Annual Harvest (DAH)

Vessels in the fishery possess the capacity to harvest the OY for slipper lobster. That is apparent from the amount of slipper lobster harvested during 1985 and 1986, and from the fact that the present harvest of slipper lobster is expected to decline to the MSY. Also, all of the areas in the NWHI that are charted have been fished already, and it is not likely that any new finds of slipper lobster would be substantial enough so that domestic harvesting capabilities will be exceeded. Therefore, DAH is estimated as equal to OY.

6.6 Domestic Annual Processing (DAP)

In the past two years, nearly all of the slipper lobster harvested in the NWHI was marketed in the form of frozen tails. Each fishing vessel processed its own catch at sea. Therefore, under the constraint of the proposed management measures for slipper lobster, DAP for slipper lobster is equal to the annual harvest.

6.7 Total Allowable Foreign Fishing (TALFF)

The domestic fishery has the capability and intent to harvest the entire optimum yield from the fishery. Therefore, the TALFF is zero.

6.8 Joint Venture Processing (JVP)

There is no harvesting capacity in excess of available onboard catcher vessels and shoreside processing capacity. Therefore, the amount of slipper lobster for JVP is zero.

6.9 Probable Future Condition

The combined MSY for slipper and spiny lobsters in the NWHI is 1.5 million lobsters annually. In 1986, the landings from the NWHI were 896,000 spiny lobsters and 1,238,000 slipper lobsters for a total of 2,134,000 lobsters (Table 12).

Based on research cruise and commercial fishery data, NMFS scientists predict that with the use of escape vents, the current level of annual

landings of around 900,000 spiny lobsters is sustainable. Slipper lobster stocks have only been heavily exploited for two years, and the current yields are not equilibrium yields. Once equilibrium conditions exist, the maximum sustainable yield for slipper lobster is estimated at 600,000 lobsters, or about one half of the 1986 landings.

Establishing a minimum size for slipper lobster and requiring escape vents on all traps are expected to benefit the long-term productive capacity of lobster stocks in the NWHI. Catches of slipper lobster are expected to decline to an equilibrium level and catches of spiny lobster will remain at an equilibrium level. The MSY and OY for the combined spiny and slipper lobster fishery of the NWHI will stay at about 1.5 million lobsters per year in the long run.

Table 12. MSY and commercial landings for the NWHI lobster fishery (Polovina et al. 1987b).

Estimated MSY for NWHI lobster Fishery		
Spiny Lobsters	Slipper Lobsters	Total
900,000	600,000	1,500,000

Annual Landings for NWHI Lobster Fishery - 1986		
Spiny Lobsters	Slipper Lobsters	Total
896,000	1,238,000	2,134,000

7.0 List of Proposed Actions and Alternatives

7.1 Establish a Minimum Legal Size Tail Width of 5.6 cm for the Common Slipper Lobster, Scyllarides squammosus.

a. No action

b. Establish an alternative minimum size

1. Select a smaller size than the recommended 5.6 cm tail width

2. Select a larger size than the recommended 5.6 cm tail width

7.2 Require Escape Vent Panels with 67 mm Circular Escape Vents in All Lobster Traps

a. No action

b. Require escape panels of an alternative size or configuration

7.3 Require Fishermen to Release Egg Bearing Females of Any Species of Slipper Lobster

a. No action

b. Only require fishermen to release berried females of Scyllarides squammosus

7.4 Revise the Daily Lobster Catch Report

a. No actions

b. Delete the redundant information blocks and require fishermen to list slipper lobster catches in a single category

c. Delete redundant information blocks, require fishermen to report slipper lobster catches in a single category, and require more detailed reporting of by-catch

d. Delete redundant information blocks, require fishermen to report catches of slipper lobster by species in distinct categories, and require more detailed reporting of by-catch

7.5 Revise the Permit Application Form

a. No action

7.6 Eliminate the Annual Processor Report

a. No action

7.7 Revise the Trip Processing and Sales Report to Accurately Reflect Features of the Fishery

a. No action

7.8 Change the Name of the FMP from the Spiny Lobster FMP to the Crustacean FMP

a. No action

8.0 Impacts of Alternatives

8.1 Establish a Minimum Legal Size Tail Width of 5.6 cm for the Common Slipper Lobster, Scyllarides squammosus.

A. Impact of Rejected Alternatives

1. No action

The No action alternative ensures overfishing and threatens the stability of the stocks. Landings of slipper lobster have increased sharply since 1983. In each of the past two years the fishery has landed approximately 1.2 million lobsters. NMFS scientists have estimated the MSY for slipper lobster stocks in the entire NWHI at about 600,000 lobsters, which is half the level of current harvest. The large landings of 1985 and 1986 are attributed to fishing down a previously unexploited stock.

In 1986, based on fishermen's voluntary catch reports, NMFS scientists calculated that 18 percent of the reported slipper lobster catch was comprised of lobsters below reproductive size. For the last year, the total was roughly 223,000 lobsters. At present, because of the fishing down process, any effects that harvests of pre-reproductive lobsters have had on the stocks are to a large degree undetectable. The annual sustained yield is directly affected by the size of the reproductive population in the stocks. Unabated harvests of prereproductive lobsters will jeopardize the future yields of the fishery.

Sales revenues of pre-reproductive size slipper lobsters in 1986 were calculated at $413,000 (.18 x $2.296 million total slipper revenues). The No action alternative would permit fishermen to realize revenue from small slippers. However, in the long run, since fishermen are harvesting lobsters before they are capable of making a reproductive contribution to the fishery, the No action will produce long term negative impacts on total fishery revenues.

2. Establish an alternative minimum legal size tail width for slipper lobsters rather than the recommended tail width of 5.6 cm

a. Establish a tail width smaller than 5.6 cm as the minimum legal size

Surplus yield models predict that the maximum sustainable yield of a fishery is realized when spawning stock biomass is at 50 percent of its pre-exploitation level. That is the principal guideline for the selection of the minimum size legal tail width for S. squammosus. Measurements and analyses conducted by the NMFS revealed that the size of onset of sexual maturity for female common slipper lobster is a tail width of 5.6 cm. That tail width provides protection for 47 percent of the spawning stock biomass, and in theory maintains annual production of the fishery at near its maximum level. A smaller size legal tail width would reduce the biomass of spawning stock protected from the fishery. The impact of the smaller legal size would be to

decrease the sustainable yield of the stocks to a level below the theoretical maximum.

A minimum legal size tail width of 5.6 cm will reduce the annual slipper lobster catch by approximately 18 per cent, and revenues will decrease by roughly a similar percentage (see No Action discussion). Last year the loss of revenues would have amounted to $413,000. If a smaller minimum size was established it would decrease immediate revenue losses. However, that decision will likely compromise the sustainable yield of the fishery and would decrease revenues over the long term.

A tail width of 5.6 cm corresponds with a tail weight of 3.5 ounces. Economic research has shown that the most valuable size range of tails is between 4 and 8 ounces. Furthermore, slipper lobster tails under 3.5 ounces that end up in U.S. markets primarily originate in India and Southeast Asia. In those countries, labor and production costs are substantially less than those of the NWHI lobster fleet, and that fact is reflected in the prices. Under 4 ounce tail sizes from India and Southeast Asia ranged from $3.48-$5.50 per pound. For 1986, Hawaii slipper lobster sold for between $4.75 and 8.00 per pound, with an average price of $6.45 per pound. A survey of mainland buyers revealed that although Hawaii slipper lobster products were of superior quality, at sizes less than 4 ounces buyers did not consider the quality difference worth the increased price.

b. Select a larger size than the recommended 5.6 cm tail width

Selecting a minimum legal size tail width larger than 5.6 cm appears to be contrary to biological and economic evidence. Research has shown that a tail width of 5.6 cm will provide protection for 47 percent of the spawning stock biomass. At the same time, it will make the maximum amount of biomass available for harvesting by the fishery on a sustainable basis. It has already been noted that slipper lobster harvests of the past two years have been double the estimated MSY of the NWHI. As harvests and yield of the stocks approach equilibrium conditions, fishermen will already be facing decreased harvests. To afford stocks greater protection than warranted from the biological evidence is likely to place undue economic burdens on fishermen.

A decision to select a large minimum size may increase the burden on fishermen from another economic standpoint, depending on what size was selected. The most valuable size range of slipper lobsters is between 4 and 8 ounces. A 5.6 cm tail width permits fishermen to harvest lobsters with 3.5 ounce tails. That tail size is just below the lower limit of the most valuable size range. However, tails in the 3.5 - 4 ounce size range command good prices and are easily marketed. The largest minimum size that would still permit fishermen to harvest the complete range of most valuable tails is 5.8 cm, which is equivalent to a 3.9 ounce tail.

B: Impact of the Preferred Alternatives

1. Establish a minimum legal size tail width of 5.6 cm for the common slipper lobster, Scyllarides squammosus

A minimum legal tail width of 5.6 cm would promote stock conservation, prevent over fishing, and maximize the biomass available to the fishery on an annual basis. Continued unregulated harvest is likely to de-stabilize the fishery in the future.

As pointed out earlier, research by scientists at the NMFS revealed that the size of onset of sexual maturity for Scyllarides squammosus corresponds to a tail with of 5.6 cm. It was concluded that a minimum tail width of 5.6 cm would allow the fishery to reduce the spawning stock to 47 percent of its pre-exploitation levels. That amount is in keeping with the 50 percent figure that theory predicts would maintain sustainable yield at its maximum level.

The immediate economic impact on the fishery of setting 5.6 cm as the minimum legal tail width would be an 18 percent decrease in annual revenues. The regulation would have reduced 1986 revenue by $413,000. However, if harvest of small-sized slippers continues to the point of over fishing, the loss of fishery revenues will likely be substantially higher. The $413,000 immediate loss is best viewed as an insurance premium to insure future harvests (Table 13).

Marketing research supports the 5.6 cm minimum legal tail width. Recall that a tail 5.6 cm wide weighs 3.5 ounces. Research revealed that better quality, but higher priced slipper lobster tails under 4 ounces had difficulty competing with lower-priced slipper lobster products of the same size that are produced in India or Southeast Asia. Buyers are willing to pay premium prices for Hawaii slipper lobster products in the most desirable size range, that is tails between 4 and 8 ounces.

Escape vent research was evaluated with respect to the established minimum legal tail width of 5.0 cm for spiny lobsters and a range of sizes for slipper lobsters (see discussion on escape vents). A circular, 67 mm

Table 13. Summary of the effects of minimum size tail width alternatives.

	Biological		Economical	
	Short Term	Long Term	Short Term	Long Term
< 5.6 cm	--	--	+	--
= 5.6 cm	+	+	--	+
> 5.6 cm	+	+	-- --	+

diameter escape vent was assessed to function most favorably. If 5.6 cm was the legal minimum for slipper lobster, then that size escape vent permitted 88 percent of the undersized lobsters of both kinds to escape with no loss in combined legal catches (see escape vent discussion).

8.2 Require Escape Vent Panels in All Lobster Traps

A. Impacts of Rejected Alternatives

1. No action

A minimum legal size for spiny lobster was written into the FMP to protect the reproductive capacity of the stocks. That same rationale is behind establishing a minimum legal size for slipper lobster. Presently, fishermen throw undersized lobsters back after traps are opened onboard the vessel. Research worldwide has indicated that significant mortality is associated with capture and release procedures used for sublegals (Section 4.2).

Four primary causal factors have been identified with capture and release mortality: 1) exposure, 2) handling, 3) displacement, and 4) predation. Thus, the intent of the minimum size regulation, protection of the reproductive capacity of the stocks, is only partially fulfilled. If sublegal sized lobsters die from capture and release, the fishery not only loses the value of the individual lobsters, but also the reproductive contribution that lobster would make to the stocks. During the 78/79 season of the Australian lobster fishery, after figuring in natural mortality, it was determined that capture and release procedures resulted in an 11.4 percent mortality rate among sublegals. That was calculated to represent a revenue loss to the fishery, in terms of future harvest potential, of A$6.4 million (Brown and Caputi 1983). Investigation into the specific components of capture and release mortality, such as displacement and exposure, have recorded mortality rates ranging from 15 to 24 percent (Gooding 1985, Lyons and Kennedy 1980). In the NWHI Gooding (1985) made observations on predation of released lobsters. He found that large schools of Caranx ignobilis preyed voraciously on released lobsters, whether they were released at the surface, midwater or on the bottom.

In 1986, there were 310,000 sublegal spiny lobsters caught and released in the NWHI fishery. If only 20 percent of these sublegals die as a result of catch and release (which is in keeping with studies elsewhere), that would amount of 62,000 lobsters. If escape gaps work effectively, and 80 percent of the 62,000 lobsters that would otherwise die reach legal size and are captured by the fishery, at a price $5.00/lobster, the fishery would realize additional revenue of $248,000 annually.

The 1986 report on the Status of the Stocks prepared by the NMFS gives evidence from both research cruises and commercial logbook data of a significant decrease in the number of sublegal spiny lobsters harvested at Necker Island. Scientists have concluded that the data seems to confirm that, just as in other lobster fisheries, capture and release procedures are inducing substantial mortality in the population of sublegals.

The no action alternative will permit continued mortality of sublegals via capture and release procedures. The mortality that results is a waste of resources, biologically and economically. Choosing this alternative is contrary to managing the resources for conservation and productivity.

2. Require escape gaps of a different size and configuration than recommended

Escape gap research has been ongoing since 1984. Trials with a variety of different shapes and sizes were conducted in observation tanks at the NMFS Kewalo Basin facility. At that time emphasis was on spiny lobster. The situation became complicated because of the dramatic increase in landings of slipper lobster, for which no size regulations existed. However, the NMFS anticipated the need for management and selected a range of potential minimum sizes for slipper lobster (based on the same tenets as spiny regulations). Escape gap experiments were continued, and performance was assessed in terms of escapement of sublegal lobsters. Rectangular and circular designed escape vents produced promising results (Figure 4).

Both types of escape vents were selected for field analysis. In rigorous at-sea testing aboard a commercial lobster fishing vessel each size and style escape vent panels were fished at least 1800 trap nights. Three possible minimum size tail widths of slipper lobster were considered; 5.2, 5.4, and 5.6 cm. Spiny minimum size is set at a tail width of 5.0 cm. Escape gap performance was evaluated by the percent decrease in capture of sublegals, and percent change in capture of legal sized lobsters as compared to non-vented control traps. In other words, the best escape gap would be one which permitted the largest percentage of sublegals to escape and simultaneously retained at least as many legal sized lobsters as non-vented control traps. Based on those criteria, the circular escape vents performed superior to rectangular vents. However, the choice between different sizes of circular vents was not as clear cut (Table 14). There are some trade-offs between escapement of sublegals and retention of legal sized lobsters.

Table 15 shows the performance of different diameter circular escape vents relative to non-vented control traps for **combined** slipper and spiny lobster CPUE. The recommended escape vent size of 67 mm diameter produced no net decrease in retention of legal sized lobsters (for a slipper legal size of 5.6 cm) and an 88 per cent escapement of sublegals. That included a 10 per cent increase in the number of legal sized spiny lobsters. Other combinations were judged less desirable. Alternate combinations would produce greater escapement of sublegals, but also less net retention of legal sized lobsters. If a size was selected that maximized net retention of legal sized lobsters, then escapement would be reduced.

Figure 4. The two escape gap design/configurations selected for at-sea field testing.

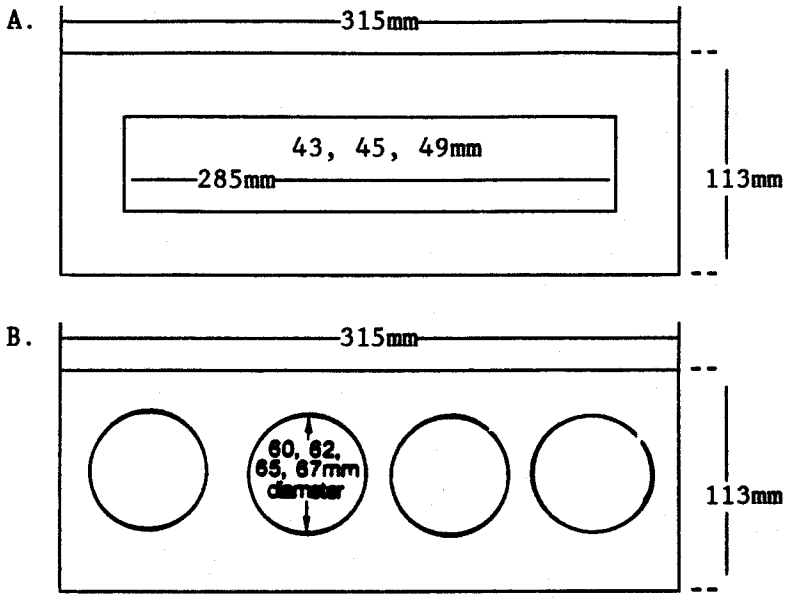


Table 14. The performance of different sized circular escape vents for spiny and three possible minimum sizes of slipper lobster (Polovina et al. 1987b).

Vent Diameter (mm)	Legal Spiny Lobster	Sublegal Spiny Lobster
60	0	-30
62	15	-17
65	15	-73
67	10	-83
	Legal Slipper Lobster	Sublegal Slipper Lobster
	TW - 5.6 cm	TW - 5.6 cm
60	13	-20
62	7	-32
65	4	-56
67	-10	-93
	TW - 5.4 cm	TW - 5.2 cm
60	13	-27
62	5	-39
65	3	-67
67	-17	-97
	TW - 5.2 cm	TW - 5.2 cm
60	9	-30
62	6	-55
65	0	-82
67	-23	-100

Table 15. The performance of circular vented traps relative to non-vented control traps for the combined slipper and spiny lobster CPUE. Values in this Table are an average of the slipper and spiny values from Table 14 (values expressed as percent Polovina et al. 1987b).

Vent Diameter (mm)	Legal Sized Lobsters	Sublegal Sized Lobsters
60	6.5	-25
62	11	-24.5
65	9.5	-64.
67	0	88

B. Impact of the Preferred Alternative

1. Required escape vent panels of the specific size and configuration recommended in all lobster traps.

The recommended escape vent panels consist of sets of 4 circular holes 67 mm in diameter with centers 82 mm apart. The lowest part of any opening must not be more than 85 mm above the floor of the trap (Figure 5). It's further recommended that each trap have two escape panels placed opposite each other (Figure 6). Based on at-sea trials conducted by the NMFS, escape vents panels this size and configuration were judged by the Council's Crustacean Plan Monitoring Team and Scientific and Statistical Committee the most compatible with management goals and needs of the fishery.

If slipper lobster minimum legal size is set at 5.6 cm tail width then the 67 mm circular escape vents permitted the greatest combined escapement of sublegals with no loss in retention of legal sized spiny and slipper lobster, The combined escapement of sublegals was 88 percent. The 5.6 cm minimum legal size satisfies the biological based management criteria for slipper lobster. The smaller sizes, that is 5.2 and 5.4 cm, provide less protection for slipper lobster spawning stock, and if combined escapement is maximized then the combined catch is compromised.

The zero reduction in retention as compared to non-vented control traps is actually the combination of a 10 percent increase in capture of spiny lobster coupled with a 10 percent reduction in the capture of legal slipper lobster (5.6 cm tail width). It's speculated that the increased catch rates of legal sized spiny lobster is due to escapement of sublegals and less crowding in traps. Escape panels are not as effective in retaining legal slipper lobster, thus the decrease in catch. The reduction in slipper catch rates is thought to occur simply because the different body morphology of slipper lobster renders the vents less effective. At any rate, economically the trade off between spinys and slippers is a plus for fishermen. In 1986, the average price for spiny lobster was $2.50 per pound higher than the average price for slipper.

With respect to the $6 million in ex-vessel revenues generated by a fleet of 16 vessels in 1986, escape gap conversion costs are not a burden. Manufacturers have stated that individual panels for outfitting existing traps will be available for $1.25/panel. Since two panels will be required per traps, it will cost $2.50 to make each old trap legal. The most effort-intensive vessels in the fleet only fish about 1000 traps a day. If they carry 1200 traps (200 to cover gear losses), the direct cost of complying with the escape vent regulation would only equal $2400. A manufacturer also stated that once traps with built-in escape vents are available, the unit price won't exceed the price of the traps currently in use, which don't have escape vents.

Fishermen have estimated that it will take 3-5 days for a crew of 4-5 to install 2 escape panels in each of 1000 traps. Labor costs associated with outfitting traps with escape panels, that is the opportunity cost of the crew's labor, is dependent on the time of the year. Crew wages are based

on shares of catch, and although he crew receives room and board while a vessel is in port, they are not paid wages. Historically the fleet avoids fishing during the last months of winter and early spring because storms and rough sea conditions prevail in the NWHI. This time interval is used for routine vessel maintenance and repairing fishing gear. Crews that perform maintenance and gear repair chores during these months are not sacrificing wage earning fishing time, so the labor costs for installing escape panels would be zero because opportunity costs are zero. If escape panels were installed during times when vessels and crew could otherwise be fishing, then the opportunity costs per crewman per day would be about $200, approximately the wages he could make for a day's fishing. Five crewmen x 5 days x $200/day/crewman = $5,000, which is the opportunity cost of installing escape panels when the weather is good, and the boat could be fishing.

The regulations of this amendment are designed to become effective after the onset of the bad-weather winter months when opportunity labor costs for crew are near zero. Gradual phase-in programs were considered, byu the single winter month date prevailed not only because of the near zero opportunity costs, but also because enforcement would be less complicated and less costly, and the benefits of the management policy would be conferred to lobster resources as soon as possible.

Figure 5. Single set of escape vents with specifications

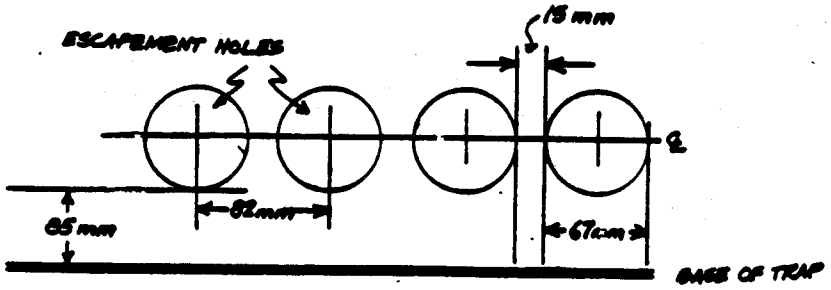
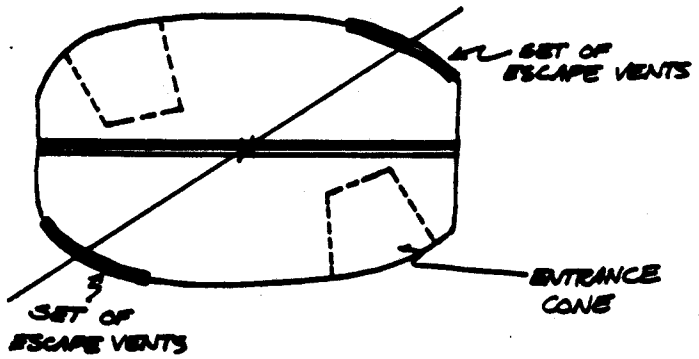


Figure 6. Placement of escape vents in trap



8.3 Require Fishermen to Release Egg Bearing Females of any Species of Slipper Lobster

A. Impacts of Rejected Alternatives

1. No action

This option conflicts with the management objectives for lobster resources in the NWHI. Protection of 50 percent of the spawning stock of slipper lobster, as with spiny lobster, is the purpose for setting a minimum legal size. Berried females are likely to make a reproductive contribution to the stocks.

2. Only restrict harvest of berried females of Scyllarides squammosus

Three species of slipper lobster are harvested in the NWHI. This alternative creates a potential enforcement problem, particularly when lobsters are tailed at-sea. It would however, reinforce the proposed regulations aimed at protecting the spawning stocks of common slipper lobster.

B. Impact of the Preferred Alternative

1. Require fishermen to release egg-bearing females of all species of slipper lobsters

This alternative reinforces the management regulations which aim to protect spawning stocks of Scyllarides squammosus. At the same time, it negates any potential enforcement problems that may arise otherwise. Furthermore, other species of slippers do contribute to total annual slipper landings, and may contribute more in the future.

8.4 Revise the Daily Lobster Catch Report

A. Impacts of Rejected Alternatives

1. No action

Spiny lobster is the only lobster catch that the FMP requires fishermen to report. Spiny catches are broken into four categories: 1) number of legals, 2) number of sublegals, 3) number of berried females, and 4) total number of lobsters harvested. These reports also record effort and are completed daily by fishing area. The information is used to infer the status of lobster stocks as well as the status of the fishery. Slipper lobster has accounted for more than 50 percent of lobster landed each of the past two years. To present, the status of slipper stocks is based on data gathered on two NMFS research cruises and voluntarily submitted data from fishermen. Generally, data submitted by fishermen only list the total number of slipper. No action means that the assessment of slipper lobster stocks will continue to be based on short sampling intervals and voluntary submission of lumped data. The No action alternative greatly hinders attaining management goals

of the FMP. If the NWHI lobster fishery harvested slipper lobster at the time the FMP was developed, the FMP would have required reporting of slipper lobster catches in the same fashion required for spiny lobster.

2. Delete the redundant information blocks and require fishermen to list slipper lobster catches in a single category.

This alternative is a degree better than the no action alternative, but still falls short. Elimination of the redundant information blocks "Radio Call Sign" and "Number of Traps" which appear near the top of the form would have no impact. It would end needless duplication of that information though.

A requirement that fishermen report catches of slipper lobster assures scientists and managers of a source of data that will help monitor stocks. This type of data is presently submitted by fishermen on a voluntary basis only. Scientists will face determining the status of the stocks based solely on data collected during research cruises, which are generally of short duration. Furthermore, research cruises concentrate fishing effort only on three fishing grounds, and although the lobsters in the NWHI apparently are of the same stock, considerable variations exist between populations from different islands/banks. Logbook information necessarily records statistics from every area fished throughout the course of the year. That enables scientists to infer not only the status of the stocks, but also detect population differences between a wide range of sites and changes within a population at the same location through time.

If data on catches of slipper lobster are reported in a single category important available information will be lost. No information will be gathered on berried females, which helps determine the reproductive potential of the stocks, or on the abundance of sublegal sized lobsters within a population (this amendment includes a provision to set a minimum legal size for slipper lobster). In 1986, logbook data confirmed cruise data that the abundance of sublegal sized spiny lobsters around Necker Island had decreased significantly. Biologists believe that change has come about because of heavy fishing pressure and the mortality rates associated with capture and release of sublegals. The conclusion, which was based on both data sets, produced a recommendation of escape vents as a priority management measure. This example illustrates the value of separating catch data into discreet reporting categories.

This alternative does not include reporting incidental catch beyond what already exists. The impact of that can not be fully surmised. However, the industry harvest substantial amounts of octopus and bottomfish annually. There is more discussion under the Preferred Alternative section.

3. Delete redundant information blocks, require fishermen to report slipper lobster catches in a single category, and require more detailed reporting of by-catch

Most of the impact of this alternative was discussed in the preceding section. The difference between the two is that this one requires more detailed reporting of by-catch. The Report of the Fishery for 1986 indicated that substantial amounts of octopus and bottomfish are incidentally harvested by the fishery. Ex-vessel value of this incidental catch is estimated at close to $50,000. Thousands of pounds of octopus are harvested on a single trip. At last year's prices, octopus sold for between $.50 and $1.50 per pound. In the future, depending upon marketing efforts and demand, octopus could command substantially higher prices and generate more revenue for fishermen. Monitoring catch of commercially or potentially commercially important incidental catches promotes a more complete picture of the fishery's economics.

Monitoring of incidental catch, particularly octopus, also has beneficial management implications. Octopus prey on crustaceans. The knowledge of its relative abundance on lobster fishing grounds is potentially useful management information.

The suggested wording of the incidental catch data is "octopus and other species". That phrase is non-restrictive and accommodates required reporting of other kinds of incidental catch in the future if necessary. This particular wording makes it possible to mandate reporting without going through a lengthy and costly amendment process.

B. Impact of the Preferred Alternative

1. Delete redundant information blocks, require fishermen to report catches of slipper lobster by species in distinct categories, and require more detailed reporting of by-catch

This combination of changes to the Daily Lobster Catch Report eliminate redundant information, provide detailed information to assess the status of slipper lobster stocks, and enough information to evaluate incidental catch in terms of economics and management.

The required reporting of slipper lobster would be by species and by category (Figure 2, Appendix I). Three different species of slipper lobster are harvested by the fishery: Scyllarides squammosus, the common slipper lobster, which comprises 95 percent of the commercial catch; Scyllarides haanii, the ridgeback slipper, which makes up about 5 percent of annual landings; and Parribacus antarcticus, the Chinese slipper, which is harvested incidentally. The reporting categories are contingent upon approval of this amendment, which proposes establishment of a minimum legal size for common slipper lobster, and non-retention of any berried female slippers. That provision would permit categorizing slipper lobster catches into legal, sublegal, berried females, and total number of lobster categories - the same reporting categories in place for spiny lobster.

The history of slipper harvests in the NWHI, combined with the fact that no management regulations presently exist, seem compelling reasons to require catch reporting in the fashion recommended. Before 1983, when the FMP was implemented, slipper lobster catches were insignificant in terms of numbers and value, therefore, management measures for slipper were not incorporated into the original FMP. The situation has changed dramatically since then. Slipper lobster, primarily Scyllarides squammosus, has accounted for greater than 50 percent of the lobsters harvested during both 1985 and 1986. In 1986, 1,238,000 slipper lobsters were harvested compared to 896,000 legal spiny lobsters. Up to now, slipper catches, in terms of numbers and catch rates, have been considered representative of unexploited stocks being fished down. NMFS scientists have estimated, based on the information currently available, that for the NWHI, a maximum yield of 600,000 slipper lobster may be sustainable. Catches of the past two years have been approximately double that figure. Even so, catch rates for slipper lobsters declined for the first time during 1986 (1985 CPUE was 1.09. In 1986 CPUE was 0.85)

The reporting format proposed is identical to the one in use for spiny lobster. To reiterate, if slipper lobsters were harvested by the fishery while the FMP was developed, it's likely that this reporting scheme would already exit. The NWHI lobster fishery generated $6 million in revenue in 1986. Sales of slipper lobster accounted for $2.3 million. The stability of the fishery, and optimizing yield in accordance with the mandates of the MFCMA, depends on the accurate assessment of target stocks. Reporting slipper catch by species, category, and location will directly result in more accurate predictions of MSY.

The inclusion of ridgeback and Chinese slippers is justified on the one hand because it precludes the present situation from repeating itself. Furthermore, the relative abundance of one species may be linked to the relative abundances of the other two. Data on catches of all three might reveal interspecific relationships that could motivate management decisions in the future.

8.5 Revise the Permit Application

A. Impacts of Rejected Alternatives

1. No action

The present permit application would continue to be used under this alternative. That permit application was designed during the early stages of the fishery, and the fishery has evolved considerably since that time. The information requested on the original application has not adequately fulfilled its intended purpose. That information which describes a vessel's physical characteristics have not satisfactorily represented fishing power. "Engine Horsepower" is the only presently requested information which might reliably describe the physical characteristics and the fishing power of the vessel. Other categories such as "Hold Capacity", "Processing Capacity", and "Number of Traps" were designed to round out the characterization of the vessel, and help understand the vessel's fishing power.

Past records indicate that "Hold Capacity" and "Processing Capacity" represent subjective estimates, particularly since vessels must secure permits before fishing. These are anticipated values. The "Number of Traps" declaration is useful because it affords some idea of a vessel's trap carrying capacity. However, circumstances have motivated fishermen to inflate that figure so that "Number of Traps" is not an accurate indicator of fishing power. In 1985, limited entry was discussed for the NWHI lobster fishery. A 90 day moratorium on issuance of new permits was instituted, and effort restrictions were considered for vessels that already had permits. The restriction that seemed most likely was an effort ceiling equal to the number of traps listed on a vessel's permit application. Fishermen padded the "Number of Traps" figure to insure themselves of a margin of safety if the measure every came to pass.

With the present form neither the physical or economic characteristics of the fleet are clearly depicted, and confident estimates are exceedingly difficult to make. The fishery has developed since the plan was approved to the point that all of the exploitable fishing grounds have been fished. Fleet profiles need to be as accurate as possible to decrease instability in the fishery that could result from decisions based on inadequate information.

2. Revise the permit application without requiring vessel purchase information

Under this alternative the permit application would include additional information in two categories; vessel information and fishing information. The additional vessel information is 1) gross registered tons, 2) registered length of vessel, 3) fuel capacity, and 4) age of vessel. The fishing information consists of 1) total vessel fish hold capacity (in a different format than currently reported), 2) type of refrigeration capacity, and 3) type and number of fishing gear. Taken together, this information will allow an accurate characterization of the fleet, and subsequently a more reliable depiction of fishing power than the no action alternative. The physical vessel characteristics requested are generally known/readily available and are generally unguarded bits of information.

This alternative would not require vessel purchase information, specifically, 1) purchase price of vessel and 2) date of purchase. Information on the lobster stocks is obtained via research cruises conducted by the NMFS and through Daily Lobster Catch Reports. The revised permit application (under this alternative) will provide information on the fleet and its fishing power. However, information on capital investments of the fleet will be lacking. There is pressure mounting now to consider fitting the NWHI lobster fishery with a limited entry scheme. Fishermen point to declining catch rates and high costs and state that in spite of receiving higher prices for their catch, it is becoming increasingly difficult to make a living in the fishery.

There is no data available to evaluate the present claims. Even if the situation is not as dire as fishermen describe, it clearly points out the need for baseline capital investment information before a critical situation occurs. The vessel purchase information requested would be valuable in

assessing the fishery in terms of overcapitalization. Without it a thorough understanding of the fishery is not possible.

B. Impacts of the Preferred Alternative

1. Revise the permit application and include vessel purchase information

The benefits of this alternative are threefold: 1) a reliable, accurate characterization of the fleet will result; 2) fishing power can be estimated with a greater degree of confidence; and 3) the capital investment information will promote a clearer understanding of whether or not the fishery is overcapitalized.

The preferred alternative would produce a more comprehensive understanding of the fishery, and more detailed resolution of the fishery is desirable at the present stage of its development. As mentioned in discussion of the rejected alternatives, the lobster fleet has fished all of the exploitable areas in the NWHI. Before the end of 1985, the fishery was still expanding, prospecting new areas and extending its range. During the expansion years detailed information on the fleet was not nearly as critical, because management measures did not have to be so precise. In the years ahead, management measures must be tailored more exactly, and this can only be accomplished in a responsible timely manner if sufficient baseline information exists. The preferred alternative initiates gathering of essential data to address the task.

8.6 Eliminate the Annual Processor Report

A. Impacts of the Rejected Alternative

1. No action

Processors would continue to fill out and file this report. The report was more worthwhile in the early stages of the fishery. Lobster was marketed live for the local restaurant trade. In the early 1980's product forms were mixed. Catch was marketed either live or whole frozen. Product was processed, sized and packaged at shoreside plants. However, in 1983, the fishery switched to frozen lobster tails as its primary product form. By 1985, 91 percent of the spiny lobster harvested and virtually 100 per cent of the slipper lobster catch was marketed as frozen tails. The shift in product forms was accompanied by a shift in processing practices. The fleet shifted to at-sea processing. Vessels marketed their catches directly to mostly mainland buyers. In most instances final processing and repacking was done on the mainland. This transition in processing and marketing has made the Annual Processor Report redundant. Vessels already must file Lobster Processing and Trip Sales Reports (revisions of which are suggested in this amendment) which essentially record the same information, originate from the same sources, and are sent to the same agency.

In instances where catch is processed and repackaged at local facilities its difficult to enforce compliance with this particular reporting

regulation. There is no monitoring system to maintain an accurate listing of plants that process NWHI lobster products locally.

B. Impact of the Preferred Alternative

1. Eliminate the Annual Trip Processing Report

This alternative will eliminate redundant information and reduce paperwork. The monitoring and compliance problem that now exists with shoreside plants will be solved.

8.7 Revise the Trip Processing and Sales Report

A. Impacts of Rejected Alternatives

1. No action

The report does not segregate spiny and slipper lobster, nor does it list commercially valuable by-catch, specifically octopus. It's format reflects the on land processing practice which no longer exists. Furthermore, the present format is confusing.

B. Impact of the Preferred Alternative

1. Revise the form as recommended, and rename the form the lobster report for transshipment and sales.

The revised form separates the major commercially harvested species and provides detailed breakdown by product type, amount, and revenue. It accomplishes the same task outlined for the original version, but incorporates the changes which have occurred within the fishery since the FMP. The proposed reporting style will allow mangers to understand the economics of the fishery more thoroughly.

8.8 Change the Name of the FMP from Spiny Lobster FMP to Crustacean FMP

A. Impact of the Rejected Alternatives

1. No action

The specificity of the name is misleading and inaccurate. Slipper lobster accounts for over half of the lobster harvested by the fishery. Also, in the future, the possibility exists that a deep water shrimp fishery may develop. If that happens, and management of that fishery comes under the Spiny Lobster FMP, that name will become even more inappropriate.

B. Impact of the Preferred Alternative

1. Change the name to Crustacean FMP

First of all, this name is not misleading. Furthermore, crustaceans is a more generic term. One of the Council's milestones is to revise the Spiny

Lobster FMP into a Framework Plan. Thus, the generic Framework Plan that will result can accommodate management of other crustaceans species, such as deep water shrimp or Kona crab. The net effect will be more efficient, more responsive and less costly management.

9.0 Choice of Alternatives Based on the Objectives of the FMP / Enforceability

The preferred alternatives for each of the changes proposed in this amendment were selected on the basis how closely they were aligned with the four objectives outlined in the FMP.

9.1 Management Objectives

The management objectives outlined by the FMP are as follows:

1. To assure the long-term productivity of spiny lobster stocks to prevent biological overfishing;

2. To promote an efficient and continuous contribution of the NWHI spiny lobster resources to the United States economy;

3. To collect and analyze biological and economic information about the NWHI lobster fisheries in an attempt to improve the basis for management and conservation into the future; and

4. To prevent unfavorable impacts of the fishery on the Hawaiian monk seal and other threatened and endangered species.

9.2 Protect Stock Productivity and Prevent Overfishing

This amendment recognizes the importance of slipper lobster to the NWHI fishery and incorporates management measures which target stock protection and prevention of overfishing. The minimum legal size tail width for slipper mirrors measures already in place for spiny lobster, and it's based on the same biological rationale. It's aim is stable long term productivity from slipper lobster stocks. The escape vent requirement will produce beneficial results for both spiny and slipper lobster, Escape vents will decrease capture and release mortality among sublegal lobster. More abundant vigorous sublegal populations will lead to greater reproductive contributions to stocks in future years.

The alternatives discussed with regard to these two management measures compromise the desired results of the preferred alternative.

9.3 Maintain or Enhance Economic Contribution

Maintaining the status quo, that is taking no action in the case of a minimum size for slipper lobster or the issue of escape gaps, would produce short term economic dividends. But the gains would likely be short lived. As for the minimum size for slipper lobster goes, if unabated harvest of small slipper lobster is permitted to continue, then revenues would not decrease by the estimated 18 percent discussed earlier. However, maintaining that portion of the annual revenue is only realized by sacrificing the reproductive capacity of the spawning stock. A policy of short term economic gains may jeopardize the long term future of the fishery, which depends on an

adequate reproductive population to provide the necessary number of recruits to eventually replace those lobsters harvested by the fishery.

Both the short and long term economic effects of the escape vent management measure are positive. Escape vents, of the particular size and configuration recommended, will increase catches of legal sized spiny lobster by 10 percent. Because of the relative values of spiny and slipper lobster, the additional spiny catch will offset the 10 percent decrease in catches of legal sized slipper lobster.

9.4 Collect Information

Several information collection measures are contained within this amendment. Those additions to the Daily Lobster Catch Report regarding slipper lobster are important for monitoring the status of the stocks. The information requested is in keeping with the goals of the MFCMA. The tasks of responsible management is easier to carry out if a thorough knowledge of the population dynamics of the stocks exist. Fishermen are in the best position to provide the data necessary to assess the stocks over the widest possible range.

The other information collections proposed in this amendment are refinements of already existing requests. The changes put forth acknowledge the development of the fishery. Those developments have rendered many of the data categories inaccurate. The revisions restore the usefulness of the data collections to serve their original intent - to aid understanding the fishery from as many perspectives as necessary to optimize the effects of any management decision.

9.5 Prevent Unfavorable Impacts on Endangered and Threatened Species

The preferred alternatives of this amendment's management measure will impact positively on the threatened Hawaiian monk sea, Monachus schauinslandi. The management measures for slipper lobster should increase food resources for monk seals. Otherwise, none of the elements of Amendment 5 is apt to create any changes in the existing effects created by the fishery.

9.6 Ease/Cost of Enforcement

The management measures proposed by this amendment will not appreciably add to the present enforcement burdens. As for the minimum size for slipper lobster the same procedures already in place for monitoring catches of spiny lobster can be applied, and catches of both types of lobster can be monitored on a single visit. Enforcement of the escape vent requirement should also be uncomplicated. Officers can inspect traps of vessels upon return from the fishing grounds. Vessels are required to announce their arrival 24 hours prior to arriving dockside. There are no additional reporting forms proposed in the amendment. Therefore, the enforcement burdens will not significantly differ from ones which already exist.

The preferred alternatives of Amendment 5 work cohesively to reinforce the four objectives outlined in the FMP without creating significant new enforcement burdens.

10.0 Relationship of Amendment 5 to Other Applicable Laws and Policies

10.1 Coastal Zone Consistency

Section 307(c)(1) of the Federal Coastal Zone Management Act of 1972 (CZMA) require that all Federal activities which directly affect the coastal zone be consistent with approved State coastal zone management programs to the maximum extent practicable. Amendment 5 will create some differences between State and Federal regulations for lobster fishing in the NWHI.

First of all, an inconsistency already exists regarding slipper lobster. Prior to Amendment 5, no Federal regulations existed regarding slipper lobster. Fishermen could retain any size slipper lobster, so long as it was caught in Federal waters. The Hawaii Revised Statutes (188-40) establish a one pound (whole lobster) minimum for slipper lobster from State waters. The State's one pound minimum legal size is considerably more conservative than the 5.6 cm tail width proposed for Federal waters. A slipper lobster with a tail width of 5.6 cm weighs roughly .66 of a pound. The selection of 5.6 cm as the legal tail width is based on substantial data. That size was judged optimal for affording the necessary level of protection of the spawning stock and simultaneously making the maximum amount of biomass available for harvest by the fishery. Although some differences still exist between the State and Federal minimum sizes, the two measures are much closer than in the past.

A difference will also exist concerning escape gaps. Escape vents will be required in lobster traps used to fish in Federal waters. The State does not have a similar requirement. However, conclusions of escape gap research conducted by the NMFS Honolulu Laboratory were only reported in February of this year. The Council acted quickly in requiring escape vents in response to the evidence from NMFS research. Amendment 5 was prepared within a couple of months after results were made known. The decision on escape gap configuration and size was inextricably linked to the minimum size for slipper lobsters. If the State acts to institute escape vents it must either produce its own research for its established minimum size for slipper lobsters, or amend the established minimum size to conform with Federal regulations and simply adopt the Federal escape gap configuration requirement.

The State has an entirely different set of procedures that must be followed before changes can occur, particularly if regulations are statutory. Therefore, even though the Council and the State attempt to establish complementary management measures, the timing of such changes is practically never synchronized.

The Council has reviewed Amendment 5 and found the management measures it contains regarding the lobster fishery in the NWHI to be consistent to the maximum extent practicable with Hawaii's approved Coastal Zone Management Program.

10.2 Marine Mammal Protection Act

The Hawaiian monk seal, Monachus schauinslandi, is accorded special consideration by the FMP which regulates lobster fishing in the NWHI. Although other marine mammals are regularly sighted throughout the NWHI, the source document for the original FMP concluded that the fishery imposes the greatest risk to monk seals. The Endangered Species Act Section 7 consultation noted that the lobster fishery would potentially impact monk seal stocks via disturbance, incidental mortality, and reduction of known food resources. The consultation concluded that the actual degree of risk the fishery would have on monk seal stocks was unknown, but that a managed fishery was preferable to the no action alternative. The consultation further suggested utilizing the fishery for data collection.

The FMP addressed the issue of monk seal stock disturbance by creating permanent area closures. Fishing for spiny lobster was prohibited landward of the 10 fathom contour and in lagoonal waters throughout the NWHI, and within 20 nautical miles of Laysan Island which is an important breeding area. Amendment 4 to the FMP made those same regulations applicable to fishing for slipper lobsters, which closed an unintended legal loophole, and maintained the integrity of the closed areas.

The potential for incidental mortality helped formulate the regulations for trap entry funnel openings. Amendment 2 refined the allowable dimensions, and now the regulations state that the inner opening of the funnel must not exceed 6.5 inches across the greatest diagonal. The regulation was put in place to reduce the possibility of monk seals becoming caught in traps. The figure of 6.5 inches was agreed upon after measuring a number of monk seal skulls.

Monk seals are thought to feed opportunistically. The contribution that lobsters make to seal diets is not well known, The Section 7 consultation concluded that if lobsters become scarce prey items seals could adapt by shifting to other prey items.

In the four years of fishing under the FMP, and 3 million trapnights of effort, just one monk seal mortality has occurred. That was in 1986, when an immature male apparently became entangled gear lines and drowned.

The management measures in Amendment 5, minimum legal size for slipper lobster and the escape gap requirement, are unlikely to impose a threat to monk seal populations. Certainly a minimum legal size for slipper lobsters will not adversely affect monk seals. It may have a positive impact. More lobsters will be available for predation. Escape vents will enhance that positive impact. Most sublegal lobsters will remain on the bottom, and not face the stress and mortality associated with capture and release.

10.3 Endangered Species Act

The green sea turtle, Chelonia mydas, a threatened species, breeds throughout the NWHI. The Section 7 consultation on the original FMP described possible turtle-fishery interactions based on evidence from similar

fisheries elsewhere. Displacement and incidental mortality were listed as possibilities. No lobster fishery related turtle mortalities have been reported since the FMP was implemented. Based on present data its difficult to evaluate whether displacement is occurring. More turtles were sighted by fishermen in 1986 than any previous year. Its unlikely that the management measures proposed in this amendment will create any further impact on turtle populations then the FMP may already impose.

Section 10.2 incorporates pertinent discussion of Hawaiian monk seals, Monachus schauinslandi.

10.4 National Environmental Policy Act - Environmental Assessment

The need for this amendment, the actions proposed, and the impacts of those actions are discussed in Sections 4, 7, and 8.

The proposed amendment is not a major action, and it will not have significant impact on the marine or human environment of the NWHI. The proposed amendment is a refinement of the original FMP regulations. The actions included will help confer stability on the fishery and maintain production at an optimum level. The proposed action will not result in impacts significantly different in context or intensity from those described in the Environmental Impact Statement (EIS) published with the initial regulations implementing the approved FMP. The preparation of a formal EIS is not required for this amendment by Section 102(2)(c)(c) of the National Environmental Policy Act.

Mitigating Measures Related to the Proposed Actions:
None

Unavoidable Adverse Effects:
None

Relationship Between Local Short-term uses of the Resources and Enhancement of Long-term Productivity:
The management measures of this amendment will enhance long-term human and resource productivity. The minimum size regulation for slipper lobsters and the requirement of escape gaps will promote the maintenance of sufficient and healthy reproductive lobster stocks well into the future.

Irreversible and Irretrievable Commitment of Resources:
None

10.5 Determination of Impacts Under Executive Order 12291 and the Regulatory Flexibility Act

The actions proposed in this amendment are not viewed as major. None of the changes, or all of them together, will result in an annual effect on the economy of $100 million or more. The entire fishery, based on ex-vessel prices, was worth $6 million in 1986. Neither will the proposed changes lead to an increase in costs or prices to consumers. The range of sizes of

slipper lobster that could no longer be harvested in the NWHI lobster fishery are abundantly supplied to world and U.S. markets less expensively from a variety of sources.

The proposed changes, however, will have an adverse economic effect on the small business entities involved, which in this case are the lobster vessels. Data indicates that, based on the 1986 size frequency distribution of the catch, that a 5.6 cm legal tail width for slipper lobster would reduce the annual landings of slipper lobster by 18 percent. That would have meant a decrease of $413,000 in 1986 slipper lobster revenues. When those losses are divided among the 16 vessels that were active last year, it amounts to a loss of $25,812 per vessel. These losses must be evaluated in connection with the long term gains to the industry. The combination of minimum legal size and escape vents which perform efficiently will promote stable harvests of slipper lobster in the future. Presently, the 18 percent of the stock that will be lost never makes a reproductive contribution to the stocks. If present harvesting practices persist, spawning stock may be depleted to a level to where the viability of the entire fishery is threatened. Therefore, even though an immediate adverse economic impact will result from this amendment, it should be viewed as an insurance premium necessary to guarantee a fishery for years to come.

In contrast to the immediate revenue losses produced by minimum size regulations, the escape vent requirement will promote increases in industry revenue, however the impact will be more gradual. In section 8.2 A.1. a scenario of the economic benefits of escape vents is presented based on the 1986 landings of sublegal spiny lobsters only. Those calculations indicate that the fishery would realize an additional $248,000 as a consequence.

10.6 Applicability of the Paperwork Reduction Act

This amendment will change the reporting requirements established in the original FMP. The changes are all connected to the evolution of the fishery since the FMP was implemented. The Daily Lobster Catch Report will include reporting of slipper lobster by species in several categories. That follows directly from the minimum legal size regulation that this amendment will establish. The reporting of slipper lobster is complementary to the reporting requirements for spiny lobsters established in the original FMP. The spiny reporting was designed to facilitate the objectives of the FMP in keeping with the goals of the MFCMA. Slipper lobster have comprised greater than 50 percent of the fishery's landings each of the past two years, and at present reporting of slipper (lumped into a single category) is done on an entirely voluntary basis. The new reporting requirements are essential for monitoring the fishery and assessing slipper lobster stocks. By-catch of octopus is taken in commercial quantities; thousands of pounds are landed on a single trip. Octopus are the most substantial by-catch of the industry. Presently, the industry is the only source of data to evaluate the commercial importance/potential of octopus, and figure the contribution octopus makes to the fishery.

The Commercial Lobster Permit Application was revised. Several additional blanks were added. Most of the new blanks request information on

the physical characteristics of the vessel to enable accurate vessel and fleet profiles which includes assessing fleet fishing power. The original permit application intended to serve this need, but time demonstrated it to be unreliable. There are two new blanks which detail purchase price of the vessel and date of purchase. This information is essential to evaluate the economic vitality of the fleet. It negates the need to interview fishermen or depend on unreliable data each time the productivity of the fishery is assessed in terms of costs and revenues. Management decisions may result directly as a result of these types of costs/earnings evaluations.

Finally, the Annual Processor Report has been eliminated, and the Lobster Processing and Sales Trip Report has been revised into the Lobster Report for Transshipment and Sales. The Lobster Report Transshipment and Sales reflect the changes in the fishery with respect to product form and species harvested.

Therefore, the net effect of this amendment is a reduction in the number of forms presently required under the FMP. In essence, the action this amendment revises a number of forms which are presently used and eliminates one which is no longer necessary. Therefore, the amendment will reduce the number of forms mandated by the FMP.

10.7 Consideration of Vessel Safety Issues

The Coast Guard was asked to evaluate this amendment to the FMP regarding the safety of fishing vessels. The Coast Guard concluded that Amendment 5 will not affect the safety of vessels engaged in the fishery. As such, no adjustments in the amendment are necessary.

11.0 Indigenous Fishing Rights

Unlike native Americans in the continental United States who signed treaties and agreements that allocated native fishing rights in a formal legal manner, the indigenous people of Hawaii signed no such treaties. Traditional Hawaiian society was significantly affected in the quarter century prior to Hawaii's annexation to the United States in 1900. However, when the Organic Act which brought about the political integration of Hawaii into the U.S. system were written, no formal language was included regarding allocation of fishing resources or fishing rights. In recent years interested groups have initiated investigations into the possibility of extending traditional land and water rights to present day activities, including commercial fisheries. That work is ongoing, and the outcome with respect to fisheries is unknown. It appears that this amendment to the lobster FMP will not affect any native Hawaii, Samoan, or Chamarro cultural or religious practice under the prevailing circumstance.

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APPENDIX I

DAILY LOBSTER CATCH REPORT PER STATISTICAL AREA

NAME OF VESSEL: _____ LOBSTER PERMIT NO.: _____

SIZE OF CREW: _____ RADIO CALL SIGN: _____

NUMBER OF TRAPS: _____ STATISTICAL AREA OF FISHING: _____

SET GEAR: Date _____ Time (begin): _____ No. of Traps _____

HAUL GEAR: Date _____ Time (finished): _____ No. of Traps _____

SPECIES	NO. OF LEGALS	NO. OF SUBLEGALS	NO. OF BERRIED	TOTAL NO.	REMARKS
Spiny Lobster (red/two-spined)					
Spiny Lobster (green/four spined)					
Slipper Lobster					
Kona Crab					
Others:					

Endangered Species observations (write numbers in pertinent blocks):

	Monk Seal		Turtle
Observed in statistical area			
Observed in vicinity of gear			
Interfering with fishing operations			
Preying on released lobsters			
Entangled and released alive			
Entangled and released dead			

Comments: _____

LOGGED BY: _____ DATE: _____
(Signature)

Figure 1. Daily Lobster Catch Report presently in use.

APPENDIX I

DAILY LOBSTER CATCH REPORT PER STATISTICAL AREA

NAME OF VESSEL:_____ LOBSTER PERMIT NO.:_____

SIZE OF CREW:_____ STATISTICAL AREA OF FISHING:_____

SET GEAR: Date:_____ Time (begin):_____ No. of Traps:_____

HAUL GEAR: Date:_____ Time (finished):_____ No. of Traps:_____

SPECIES	NO. OF LEGALS	NO. OF SUBLEGALS	NO. OF BERRIED	TOTAL NO.	REMARKS
Spiny Lobster (red/two-spined)					
Spiny Lobster (green/four spined)					
Slipper Lobster (common slipper)					
Slipper Lobster (ridgeback slipper)					
Slipper Lobster (Chinese slipper)					
Kona Crab					
Octopus					

Endangered Species observations (write numbers in pertinent blocks):

	Monk Seal		Turtle
Observed in statistical area_____			
Observed in vicinity of gear_____			
Interfering with fishing operations_____			
Preying on released lobsters_____			
Entangled and released alive_____			
Entangled and released dead_____			

Comments:_____

LOGGED BY:_____ DATE:_____
(Signature)

(Recommended form - 2/12/86)

Figure 2. Revised Daily Lobster Catch Report.

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

FOR OFFICE USE ONLY
Date Application Received
Permit Number Assigned

COMMERCIAL LOBSTER FISHING PERMIT APPLICATION

(APPLICANT INFORMATION)

(1) Name of Applicant (Last,First,Middle)

(2) Name of Vessel Owner (Last,First, Middle) | Telephone Number

(3) Mailing Address of Vessel Owner | City and State | Zip Code

(4) Operator's Name (Last,First,Middle) | Telephone Number

(5) Mailing Address of Operator | City and State | Telephone Number

(PERMIT INFORMATION)

(6) Permit Area Applicant Wishes to Fish: (Mark only one box)
(7) Northwest Hawaiian Islands ☐
(8) Main Hawaiian Islands, Guam, American Samoa ☐

(9) Type of Application · (10) New Permit ☐ (11) Renewal Permit ☐

(12) Prior Permit Number: | Expiration Date of Permit:

(VESSEL INFORMATION)

(13) Vessel Name | (14) Official Vessel Number

(15) Radio Call Sign | (16) Home Port | (17) Engine Horsepower

(FISHING INFORMATION)

(18) Vessel Fish Hold Capacity (In Tons)

HOLD #1_____ HOLD #2_____ HOLD #3_____ TOTAL_____

(19) Processing Capacity:

(20) Type of Lobster Fishing Gear:

(21) Quantity of Lobster Fishing Gear:

APPLICANT'S SIGNATURE_____ DATE_____

SUBMIT THIS COPY TO REGIONAL DIRECTOR

Figure 3. Permit Application form presently in use.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

COMMERCIAL LOBSTER FISHING PERMIT APPLICATION

Date Application Received

Permit Number Assigned

(APPLICANT INFORMATION - PLEASE PRINT)

(1) Name of Applicant (Last, First, Middle)

(2) Name of Vessel Owner (Last, First, Middle) | Telephone Number

(3) Mailing Address of Vessel Owner | City and State | Zip Code

(4) Operator's Name (Last, First, Middle) | Telephone Number

(5) Mailing Address of Operator | City and State | Zip Code

(PERMIT INFORMATION - PLEASE PRINT)

(6) Permit Area Applicant Wishes to Fish: (SELECT ONE ONLY)
a. Permit Area #1
1. Northwestern Hawaiian Islands ☐
b. Permit Area #2
1. Main Hawaiian Islands ☐
2. Guam ☐
3. American Samoa ☐

(7) Type of Application:
a. New Permit - ☐
b. Renewal - ☐

(8) Prior Permit Number:

(9) Expiration Date of Permit:

(VESSEL INFORMATION - PLEASE PRINT)

(10) Vessel Name: | (11) Official Number: | (12) Radio Call Sign: | (13) Home Port:

(14) Gross Registered Tons: | (15) Registered Length of Vessel: | (16) Fuel Capacity: | (17) Purchase Price of Vessel:

(18) Purchase Date of Vessel: | (19) Age of Vessel:

(FISHING INFORMATION - PLEASE PRINT)

(20) Vessel Fish Hold Capacity: (IN TONS)

(21) Type of Refrigeration Capacity: (IN TONS)
a. Ice - ____
b. On Board Ice Plant - ____
c. Plate Freeze - ____
d. Blast Freeze - ____
e. Other (specify): - ____

(22) Type and Number of Fishing Gear:
a. Handline - ☐
b. Traps - ☐
c. Bottom longline - ☐
d. Other (specify):- ☐ _____

APPLICANT'S SIGNATURE: _____ DATE: _____

SUBMIT THIS COPY TO THE REGIONAL DIRECTOR

(Recommended form - 2/12/86)

Figure 4. Revised Permit Application.

ANNUAL PROCESSOR REPORT

PROCESSOR (PLANT OR VESSEL NAME) LOBSTER PERMIT NUMBER

PROCESSOR'S MAILING ADDRESS

Street	City	State	Zip Code

SPECIES	(1) Source	(2) Weight	(3) Numbers	(4) Processing Method	(5) Final Product
SPINY LOBSTER (Red/Two-spined)					
SPINY LOBSTER (Green/Four-spined)					
SLIPPER LOBSTER					

(6) PROCESSING CAPACITY:

Submitted by: _____ Date: _____
(Signature) (Month, Day, Year)

Figure 5. Annual Processor Report

LOBSTER PROCESSING AND SALES TRIP REPORT **№ 1355**

VESSEL_____ PERMIT NO._____ DATE OF LANDING_____ PORT OF LANDING_____

		FROZEN WHOLE (Number or Pounds)	FROZEN TAILS (Number or Pounds)
PROCESSING	PROCESSED AT SEA		
	PROCESSED ON LAND		

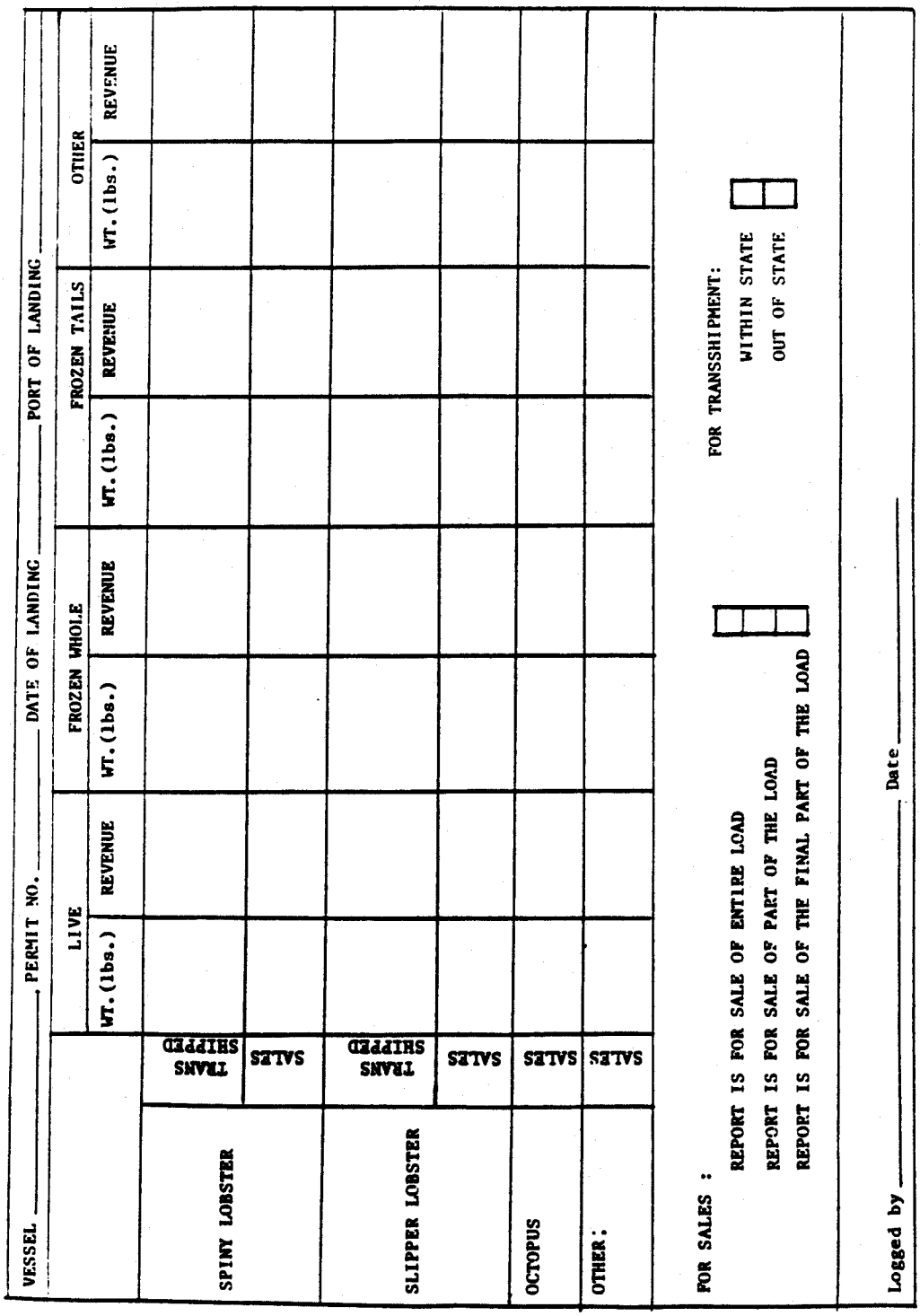
SALES If any lobsters are not sold within 72 hours of landing, the fisherman shall submit a supplemental report providing the sales information within 72 hours of each subsequent sale.	LIVE		FROZEN WHOLE		FROZEN TAILS	
	Weight	Total Revenue	Weight	Total Revenue	Weight	Total Revenue

SALES OF LOBSTER BY-PRODUCTS

COMMENTS:

LOGGED BY:_____ DATE:_____
(Signature)

Figure 6. Original Trip Processing and Sales Report.



LOBSTER REPORT FOR TRANSSHIPMENT AND SALES

VESSEL _____ PERMIT NO. _____ DATE OF LANDING _____ PORT OF LANDING _____

		LIVE		FROZEN WHOLE		FROZEN TAILS		OTHER	
		WT.(lbs.)	REVENUE	WT.(lbs.)	REVENUE	WT.(lbs.)	REVENUE	WT.(lbs.)	REVENUE
SPINY LOBSTER	TRANS SHIPPED								
	SALES								
SLIPPER LOBSTER	TRANS SHIPPED								
	SALES								
OCTOPUS	SALES								
OTHER:	SALES								

FOR SALES :

REPORT IS FOR SALE OF ENTIRE LOAD ☐

REPORT IS FOR SALE OF PART OF THE LOAD ☐

REPORT IS FOR SALE OF THE FINAL PART OF THE LOAD ☐

FOR TRANSSHIPMENT:

WITHIN STATE ☐

OUT OF STATE ☐

Logged by _____ Date _____

Figure 7. Lobster Report for Transshipment and Sales.

Replaces Trip Processing and Sales Report.