SOUTHWEST FISHERIES CENTER

NATIONAL MARINE FISHERIES SERVICE HONOLULU LABORATORY 2570 DOLE STREET HONOLULU, HAWAII 96822-2396

November 1992

FISHERY STATISTICS OF THE WESTERN PACIFIC

VOLUME VIII

Territory of American Samoa (1991)

Commonwealth of the Northern Mariana Islands (1991)

Territory of Guam (1991)

State of Hawaii (1991)

Compiled by

David C. Hamm, Michael M. C. Quach, and Robert S. Antonio

Honolulu Laboratory
Southwest Fisheries Science Center
National Marine Fisheries Service, NOAA
2570 Dole Street, Honolulu, Hawaii 96822-2396

ADMINISTRATIVE REPORT H-92-14

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NOT FOR PUBLICATION

PREFACE

In recent years, the demand for data and information concerning marine fisheries has greatly increased. To help meet these increased needs in the central and western Pacific areas, the National Marine Fisheries Service's Southwest Fisheries Center initiated the Western Pacific Fishery Information Network (WPACFIN), which assists Pacific island fisheries agencies in upgrading their data collecting, processing, and reporting capabilities. Several agencies are participating in this program: the National Marine Fisheries Service's Southwest Fisheries Center and its Honolulu Laboratory, and the Southwest Region and its Western Pacific Program Office, American Samoa's Department of Marine and Wildlife Resources, the Commonwealth of the Northern Mariana Islands' Division of Fish and Wildlife, Guam's Division of Aquatic and Wildlife Resources, Hawaii's Division of Aquatic Resources, and the Western Pacific Regional Fishery Management Council.

In 1982, these agencies formed a Fisheries Data Coordinating Committee (FDCC) and a FDCC Technical Subcommittee to help guide, coordinate, and monitor all of the many activities being undertaken by each agency to improve their systems. Significant progress has been made by all participating agencies, particularly in the areas of upgrading data collecting and processing systems.

As a major step in improving and coordinating the data reporting and distributing systems of the agencies, in May 1985, the FDCC agreed to begin producing a combined document reporting each island's major fisheries statistics. Production of the document would be the responsibility of the FDCC Technical Subcommittee and would be coordinated by the WPACFIN program manager. Each agency would supply required summaries, graphs, and text for its respective chapter of the report; WPACFIN would combine the chapters and distribute the document as part of the Administrative Report Series of the Southwest Fisheries Center.

This document is the seventh volume in the series "Fishery Statistics of the Western Pacific" and contains summaries of commercial and creel survey fishery landings data for 1991 for American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and Hawaii. The first seven volumes of this series contained similar reports for these areas for 1979 through 1990.

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BACKGROUND

This report has been compiled by governmental fisheries agencies of several islands in the central and western Pacific area in a cooperative and continuing effort to improve the availability and dissemination of fisheries information. The data contained herein have been collected, computerized, edited, and processed by agencies participating in the Western Pacific Fishery Information Network (WPACFIN), including American Samoa's Department of Marine and Wildlife Resources (DMWR), the Commonwealth of the Northern Mariana Islands' (CNMI) Division of Fish and Wildlife (DFW), Guam's Division of Aquatic and Wildlife Resources (DAWR), Hawaii's Division of Aquatic Resources (HDAR) and the Southwest Fisheries Center's (SWFC) Honolulu Laboratory, National Marine Fisheries Service (NMFS). The data summaries and graphs contained in this document were prepared by WPACFIN staff at the Honolulu Laboratory from data collected by WPACFIN or provided by these agencies. Data from DMWR, DFW, and DAWR were supplied on floppy diskettes in established WPACFIN data base formats, whereas data on the Guam commercial fisheries were collected on forms provided to fish wholesalers by WPACFIN. Data for Hawaii were provided by HDAR on computer tape. Once data from all of these agencies were put into the proper format on the central WPACFIN computer and appropriate edit and verification procedures completed, summary reports and files were produced using software developed specifically for this purpose. Graphs were produced using commercially available software and a lazerjet printer.

PROGRESS

In 1981, when WPACFIN began assisting agencies in improving their data collecting and processing systems, only the State of Hawaii had computerized processing. By mid-1982, fisheries offices in American Samoa, Guam, and the CNMI had implemented computerized processing on microcomputers supplied by WPACFIN. Since that time, these agencies have made many significant improvements to their data collecting systems and have established sound automated data processing systems. Most agencies can now provide fishery statistics to WPACFIN within 45 days of the date of collection. The HDAR has also improved its systems in recent years and has significantly reduced the lag time in data processing from about 2.5 years to less than 1 year. It has also improved the procedures used for editing, updating, and processing Hawaii's data. Implementation of additional planned improvements could reduce the lag time to about 6 months.

PRECAUTIONS

Data collecting and processing systems vary greatly among Pacific island fisheries agencies. Although much standardization has taken place and is continuing, there remain many unique

aspects of each island's systems based on local needs and capabilities. When using summaries contained in this report, especially if making comparisons, one should keep in mind the nature of the systems used to produce the data. For instance, Hawaii's data are based on mandatory monthly reporting by licensed commercial fishermen, CNMI's data are based on voluntary monthly reporting of fish buyers using government-provided invoices, Guam's data are from WPACFIN-sponsored voluntary reporting by major commercial dealers and DAWR-operated creel survey sampling and data expansion programs, and American Samoa's data are based on an integration of almost daily interviews of fishermen and a creel survey and data expansion program similar to Guam's. Each system has advantages and disadvantages, and the user should be aware of them when comparing or interpreting data.

The user should also be aware that species assemblages vary among island groups, as do cultural preferences and principal fishing techniques. Population size is of particular importance when making interpretations of the relative value and importance of the fisheries. To help the user make these value judgments, more detailed explanations of the data collecting and processing systems are provided in each island's section of this report.

CONTENTS

This document is divided into sections by island group. Each section contains reports on the monthly and annual landings by species or species groups for the commercial fleet. The sections for American Samoa and Guam also contain estimates of total catch and effort of all fisheries including recreational and subsistence fishing activities. These estimates and their associated confidence limits were generated by computer-based data expansion systems using sample fishery data collected by creel survey programs. Commercial landings for American Samoa were calculated based on information gathered during the offshore creel survey sampling program. Two sets of annual summaries are included for Hawaii, one each for commercial landings that were sold and not sold.

Definitions

In addition to the description of the systems and the monthly and annual reports, each section contains graphs of some of the summary fishery statistics of particular interest or importance to participating WPACFIN agencies. For purposes of graphical presentation of the data, several categories have been defined for each island's fisheries. Because of differences in reporting systems and capabilities among the islands, species contained within each category may vary, but all categories are documented in each island's section. Overlap exists among some of the categories used for different graphs. Categories used in the graphs include the following:

1. Fisheries Categories - These are combinations of species of similar ecological types, specifically, pelagic, bottom fish, reef fish, and "other." "Other" includes groups that generally traverse these categories, such as sharks and certain jacks, or are not typically included in these groups, such as mullet and milkfish.

2. Pelagic Management Unit Species (PMUS) - Defined in the Fishery Management Plan for pelagic species to include the billfishes, wahoo, mahimahi, and sharks.

3. Bottom Fish Management Unit Species (BMUS) - Defined as the species of initial importance in the Fishery Management Plan for bottom fish and seamount fisheries, including the major deepwater snapper, grouper, emperor, and certain jacks.

4. Tunas - Predominantly skipjack and yellowfin tunas in all areas, but also including most other tuna species and excluding wahoo.

5. Other Tunas - All tunas as defined above, but excluding skipjack and yellowfin tunas.

6. Billfish - Combination of all marlin, sailfish, spearfish, and swordfish species.

7. Other Methods - In the American Samoa and Guam sections, fishing methods other than trolling and bottom fishing are combined into this single "other" category for certain graphs.

Graphics

A minimum of four types of graphs are provided with each island's data. The chapters for American Samoa and Guam have an additional type of graphics on catch and effort from their creel survey data. Type I graphs present summary charts of the major species and species groups for 1991. Type II graphs are seasonality plots for the major species or species groups, showing the average weight landed during each month for all years combined. Type III graphs are based on annual summary statistics and help visualize the variability among years. Type IV graphs are plots of monthly landings of some of the major commercially important species and document fluctuations in landings of these species over the entire time series. Type V graphs are based on creel survey data and include plots of catch and effort by fishing method plus a combination of several of the types I-IV graphs.

I. Monthly graphs for each year's data including:

A. Major fisheries categories
B. Tunas, PMUS, and BMUS
C. Wahoo, mahimahi, and billfish
D. Skipjack, yellowfin, and other tunas

II. Plots of average monthly landings for:

A. Tunas, PMUS, and BMUS
B. Wahoo and mahimahi
C. Billfish species:
   1. Marlin and sailfish - American Samoa and CNMI
   2. Blue marlin, black marlin, and striped marlin - Hawaii
   3. Sailfish, shortbill spearfish, and swordfish - Hawaii
D. Skipjack, yellowfin, and other tunas
E. BMUS and the most important bottom fish species
   1. BMUS, ehu, and onaga - American Samoa
   2. BMUS, emperor, and grouper - CNMI and Guam
   3. BMUS, onaga, and opakapaka - Hawaii
   4. BMUS, ehu, and uku - Hawaii

III. Graphs of annual summary statistics for:

A. Major fisheries categories
B. Total commercial landings - pounds and dollars
C. Tunas, PMUS, and BMUS
D. Wahoo, mahimahi, and billfish
E. Skipjack, yellowfin, and other tunas

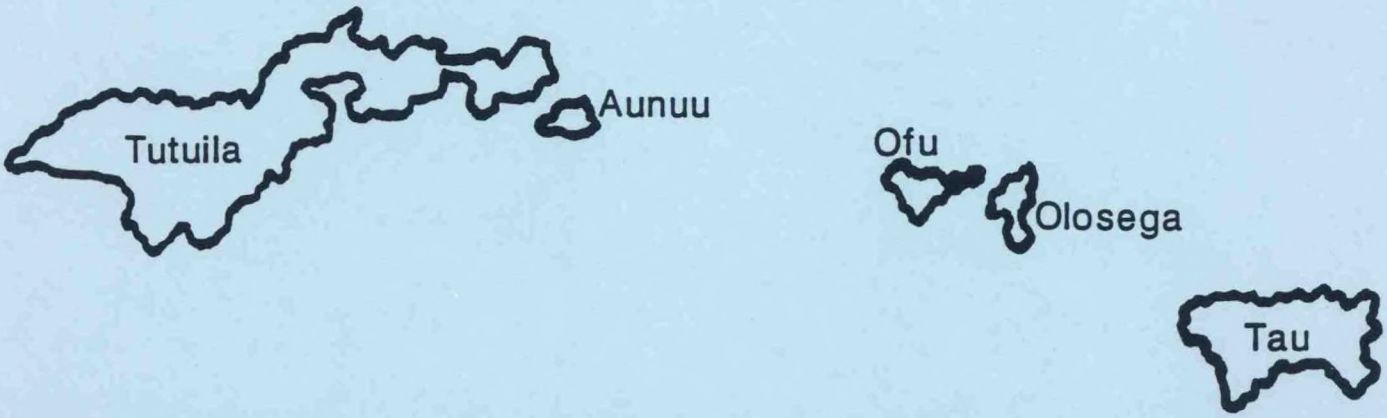
IV. Graphs of monthly landings over the entire time series for the following major species:

A. Wahoo - All four areas
B. Mahimahi - All four areas
C. Blue marlin - All four areas
D. Black marlin - Hawaii
E. Striped marlin - Hawaii
F. Sailfish - American Samoa, Guam, and Hawaii
G. Shortbill spearfish - Guam and Hawaii
H. Swordfish - Hawaii
I. Skipjack tuna - All four areas
J. Yellowfin tuna - All four areas
K. Opakapaka - Hawaii
L. Onaga - American Samoa and Hawaii
M. Uku - Hawaii
N. Ehu - American Samoa and Hawaii
O. Emperors - CNMI and Guam
P. Grouper - CNMI and Guam

V. Graphs of certain statistics generated by creel surveys for American Samoa and Guam

A. Offshore monthly catch by method

B. Offshore monthly effort by method
C. Offshore annual catch by method
D. Offshore annual effort by method



American Samoa

Fishery Statistics
1991

AMERICAN SAMOA 1991 FISHERY STATISTICS

Compiled by

American Samoa

Department of Marine and Wildlife Resources

and the

Western Pacific Fishery Information Network

November 1992

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AMERICAN SAMOA 1991 FISHERY STATISTICS

INTRODUCTION

American Samoa (approximately lat. 14° S, long. 170° W) is composed of the major island of Tutuila, where about 87% of the total population of 35,000 live; Aunu'u, a small island less than 1 mile off Tutuila's southeast shore; the Manu'a Islands of Ofu, Olesaga, and Ta'u, located about 105 km (65 miles) east of Tutuila and having about 4,300 residents; the uninhabited Rose Atoll, some 290 km (180 miles) east of Tutuila; and Swain's Island about 350 km (220 miles) north of Tutuila, where approximately 20 people live. The American Samoa Department of Marine and Wildlife Resources (DMWR), formerly the Office of Marine Resources, located in Pago Pago on Tutuila, has been collecting commercial fisheries data from the local fleet on Tutuila since the early 1970's and from the Manu'a Islands since 1983. Most data collected over the years have been from the commercial fleet, but beginning in October 1985, DMWR's data collection programs were modified to include data on recreational and subsistence fisheries as well.

The domestic fisheries of American Samoa are typically small boat, one-day fisheries. Although one domestic longliner operated for a few years, the majority of the fleet is composed of two types of 28- to 29-foot outboard engine powered catamarans called alias and manta cats. During 1991, 43 boats were sampled, 35 from Tutuila and 8 from the Manu'a Islands. Fishing is mostly done by trolling and bottom fishing methods, and the majority of the catch is sold locally, but some is exported to Hawaii. During 1991, on average, trips on boats from Tutuila had three-man crews, fished 9 hours, and caught a little over 172 pounds of fish.

DATA COLLECTING SYSTEM

The major method used by DMWR for obtaining catch statistics has always been interviewing fishermen at the end of their trips. Before October 1985, the DMWR data collectors kept records of as much commercial fishing activity as possible and routinely obtained interviews from fishermen as often as possible. This method of data collection provided accurate data on the commercial fleet for the trips where interviews were conducted, but was very labor intensive, did not cover all trips, and intentionally excluded the recreational and subsistence fisheries. Therefore, in October 1985, a new sampling program was implemented on Tutuila to provide better coverage and statistics for all boat-based fisheries. The new sampling methods were not implemented in the Manu'a Islands because the fishing fleet is centrally located and is small enough that statistics were being collected for nearly every trip.

The new sampling program for Tutuila was based on a survey design that had been used in Guam for about 4 years. This systematic, random sampling program stratifies sampling by type of day, either weekday or weekend-holiday. For the new program, DMWR staff normally sample 2 weekdays and 1 weekend-holiday per week. In addition, they obtain as many interviews as possible on their "off days" to maintain as much overall coverage of the fisheries as possible. During official survey days, counts of total participation are collected to facilitate expansion of the survey data to estimates of total catch and effort for Tutuila. Unless contrary information is available, a boat is assumed to be fishing if it is "out," as evidenced by its trailer at a boat ramp or being missing from its normal berthing area. Tutuila is divided into six areas, five of which are sampled. Presumably, fishing activity and success rate of boats in the non-sampled area are similar to those in the sampled areas. Further assumptions are that information given by the fishermen during the interview is accurate and that the fishermen interviewed are representative of the entire fishing population.

Survey data are collected in the field on interview log sheets and returned to the DMWR office for editing. The following information is collected for each interview:

* Date
* Type of day
* Time
* Boat name
  Captain or boat owner's name
* Method of fishing
* Disposition of catch
* Species caught
  Number of pieces for each species
* Weight in pounds for each species
  Price per pound for each species
  Area fished
* Home island
  Number of trips since last interview
* Total trip weight in pounds
  Total hours fished (trip length)
  Number of fishermen
  Number of gear used

It is not always possible for the interviewer to obtain information on all items listed. However, the ones marked with an asterisk (*) are considered essential for data expansion purposes. The "TIME" field is used to distinguish between interviews collected on survey days versus "off days." Only data collected on official survey days are used in the data expansion process. Identification and weight of each species are often not obtainable; in which case, a code for species groupings (e.g., miscellaneous bottom fish) is used.

DATA PROCESSING SYSTEM

Interview forms are returned to the office, edited, coded, and entered into computerized databases--the commercial landings database for data collected before October 1985, and the offshore creel survey database for data collected since then. Edit and summary reports are produced to help verify that the data were entered correctly. The creel survey databases are then translated into standard record formats to be used by the American Samoa Offshore Expansion System (ASOES), programmed by WPACFIN specifically for DMWR. As data are converted into ASOES formats, additional error checks are performed by the computer to make sure only valid information enters the expansion system. The ASOES is a menu-driven system that steps the user through a series of processes that summarize creel survey data to produce catch and effort expansion and species composition files and reports. Typically 1 month of data is processed at a time, although the system allows for processing broader time increments of data.

The expansion system generates estimates of daily catch, effort, and participation for each fishing method. These daily estimates are considered measurements of the Tutuila fisheries for that day. Average weekday and weekend-holiday estimates and their associated variances or confidence intervals are created from individual daily measurements. These are weighted by the number of each type of day in the month, or other timespan being expanded, and multiplied by proportionality constants that adjust for percent coverage to produce estimates of total catch, effort, and participation along with their confidence intervals. Percent species composition by weight is calculated from the sampled catch and used to create estimates of total landings by species by multiplying the sampled percent by the expanded estimated catch. All steps in the expansion process are stratified by fishing method. The ASOES produces reports and files of the final totals for all important catch and effort statistics. These files are later used to produce the reports contained in this document. On a quarterly basis, copies of the DMWR data bases are sent to the Honolulu Laboratory for updating the central WPACFIN files.

At the Honolulu Laboratory, the data are translated into different formats and transferred to the central computer for further editing, verification, and processing before generation of summary reports. Because DMWR changed their data collecting systems during 1985, new processing procedures were established by WPACFIN to standardize reports as much as possible to facilitate comparisons between years. Data collected before October 1985 were adjusted upward by the percent coverage to account for missed trips. The offshore creel survey data collected since October 1985 were expanded to estimates of total Tutuila landings using ASOES and then separated into commercial versus noncommercial landings (e.g., sold versus not sold). The expansion and separation algorithms stratify the data by fishing

method to improve the final estimates of landings by species. After the file of estimated commercial landings for Tutuila was created from the ASOES files, the adjusted commercial landings for Manu'a were added to it, thereby creating the commercial landings data base for American Samoa. Additionally, because price information was not obtained for all landings that were sold, the commercial data were edited to create price information when none was available. To accomplish this, a three-tiered editing system was designed to "create" price estimates based on the best information available. The edit system puts average price information in each record where it is missing, based on the following three levels of available information:

1. If price information is available for the same species in the same month, the weighted average price per pound is written into all records missing that information for that species and month.

2. If no price information is available for the same species and same month, the annual weighted average price for that species is written into records for that species and month.

3. If no price information is available for a species for the entire year, the program prompts the user for input and updates the file based on the response.

As data base records are updated, each is flagged to indicate which level of estimation was used for the price information. This makes it possible to easily exclude the "created" data, if desired, when doing economic analysis.

DATA REPORTING SYSTEM

After all editing, quality control, and other processing activities are completed on the central WPACFIN computer, monthly and annual commercial landings reports by species are generated. Each of the commercial landings reports contains the common name, weight in pounds, value in dollars, and the average price per pound of each species or species group. Each monthly report contains a subtotal for the sum of all species for that month, and the December report contains the December subtotal and the annual total. Annual reports contain the total estimated commercial landings for each species and for all species combined for the calendar year.

Estimated total landings reports are provided separately for Tutuila and Manu'a. Monthly and annual estimated total landings reports are provided for the Manu'a Islands. Two types of total landings reports are included from the creel survey data expansion system, ASOES, for Tutuila: catch and effort expansion reports and species composition reports. These reports were produced by using the expansion and species composition files

created by ASOES as input to utility programs developed by WPACFIN. The utility programs reorganize, format, and summarize data from ASOES files to improve the presentation of data and reduce the amount of space required to report the important statistics. Monthly and annual estimated total landings reports for 1991 include the expansion summary of catch and effort statistics by fishing method and the summary species composition reports for all methods combined.

Monthly expansion and species composition reports have matching totals for catch by fishing method since the monthly species composition reports are based on the expansion files. Annual expansion and species composition reports also have identical totals because the species reports were generated from the annual expansion files. However, the totals on the annual report will not equal the total obtained by adding all of the monthly files together because the annual expansion reports were generated by re-expanding the entire year's data together, thereby increasing the sample size significantly, and it is hoped, improving the annual estimates of percent species composition and of catch and effort and their associated coefficients of variation (CV's). The annual species composition report was created by calculating annual percentages of species composition by combining all sampling for the year and then multiplying these percentages by the annual expansion totals. This allows calculation of annual percent species composition based on greatly increased sample size.

Computer generated numbers and all totals in the reports are subject to rounding error. All catches are reported in pounds, and effort, in boat hours. In the offshore expansion reports, the boat counts by fishing method will not add to the total boat count when the same boat was used for more than one method on a single trip. In these cases, the boat is included in the count for each method used but included only once in the total count. A CV is included for each statistic in the expansion reports. The CV provides a measurement of the relative variation associated with the estimate preceding it and is calculated by dividing the standard error of the estimate by the estimate and multiplying by 100 and rounding to express the answer as a whole percentage. The larger the CV, the larger the relative variation in the data used to generate the estimate and, therefore, the less precise the estimate. An asterisk following a line means the number of samples collected for that method during that month were insufficient to properly calculate the CV. There must be at least two weekday and two weekend-holiday samples for each method to properly compute a standard error and, therefore, properly compute the CV. If an asterisk is present and the CV is greater than zero, then samples on either weekdays or weekend-holidays were sufficient to compute a standard error for that type of day but not for the other type of day. In this case, the CV provided in the report is for the type of day in which sample information met the minimum requirements for calculating CV. If an asterisk is present and the CV equals zero, then neither type of day had

sufficient number of samples to calculate CV. It follows then, anytime an asterisk is present for any of the fishing methods, the totals for the month are questionable.

In fisheries applications, calculation of catch per unit of effort (CPUE) may be done in several ways. In the ASOES expansion reports, average monthly CPUE is calculated by using the same type of algorithm as for the other expansion elements, and it has an associated CV. First, the average daily CPUE is calculated by dividing the total weight of the fish sampled for a day by the total number of hours fished to produce that catch. Next, the average weekday and weekend-holiday CPUE's are calculated by summing the average daily CPUE's for each type of day and then dividing by the number of survey days for each type of day. These averages are multiplied by the number of weekdays and weekend-holidays, respectively, in that month, then the products are summed and divided by the total number of days in the month to produce the average monthly CPUE for each fishing method. The average monthly CPUE could also be calculated by dividing the estimated monthly catch by the estimated monthly boat hours, but this would provide no indication of the variability of the CPUE and also essentially weight the average CPUE by the level of participation. Therefore, the CPUE provided in the monthly and annual expansion reports will not be equal to the catch divided by the effort as presented in those reports.

The following species, species groups, and abbreviations are used in the tables and graphs of American Samoa's data:

I. Pelagic Management Unit Species (PMUS)

Dolphin (mahimahi)
Blue marlin
Black marlin
Sailfish
Shortbill spearfish
Wahoo
Sharks

II. Bottom Fish Management Unit Species (BMUS)

Jacks (unclassified)
Black jack
Amberjack
Giant trevally
Bottom fish (unclassified)
Groupers (unclassified)
Blacktip grouper
Lunartail grouper
Snappers (unclassified)
Bluelined snapper
Gray jobfish (uku)
Deepwater bottom fish (unclassified)
Yellow opakapaka

II. Bottom Fish Management Unit Species (BMUS) (cont.)

Hawaiian opakapaka
Opakapaka
Gindai (flower snapper)
Yellowtail snapper
Lehi (silverjaw snapper)
Onaga (red or longtail snapper)
Ehu (red snapper)
Emperorfish (unclassified)
Ambon emperor
Redgill emperor

III. Billfish

Blue marlin
Black marlin
Sailfish
Shortbill spearfish

IV. Tunas

Tunas (unclassified)
Skipjack tuna
Yellowfin tuna
Dogtooth tuna
Albacore
Bigeye tuna
Kawakawa

V. Other Tuna

The above tuna species excluding skipjack and yellowfin tuna

VI. Fisheries Categories

A. Pelagics

All PMUS and tuna species plus the following:
- Troll fish (unclassified)
- Barracuda
- Rainbow runner

B. Bottom Fish

All BMUS plus the following:
- Bigeye trevally
- Bluefin trevally
- Goldspot trevally
- Trevally
- Whitemouth trevally
- Peacock grouper
- Flagtail grouper
- Tomato grouper

B. Bottom Fish (cont.)

Yellowspot grouper
Striped grouper
Spotted grouper
Small mouth grouper
Giant grouper
Rufous snapper
Blacktail snapper
Onespot snapper
Twinspot/red snapper
Humpback snapper
Blood snapper
Brown snapper
Bluelined gindai
Black snapper
Stone's snapper
Kusakar's snapper
Bigeye emperor
Goldenline bream
Longnose emperor
Bluelined bream
Orangespot emperor
Snake mackerel
Oilfish

C. Reef Fish

Reef fish (unclassified)
Mullet
Rabbitfish
Surgeonfish and tangs (unclassified)
Lined surgeon
Yelloweyed surgeon
Convict tang
Dussumier's surgeon
Spotted surgeon
Unicornfish
Squirrelfish (unclassified)
Berndt's soldierfish
Bigeye squirrelfish
Parrotfish
Terapon perch
Wrasse
Goatfish (unclassified)
Pink goatfish
Inshore groupers (unclassified)
Triggerfish
Butterflyfish
Porcupinefish
Inshore snappers (unclassified)

D. Other

Miscellaneous
Bigeye scad
Rays
Eels
Invertebrates (unclassified)
Crabs (unclassified)
Kona crab
Mangrove crab
Spiny lobster
Slipper lobster
Shrimp
Octopus
Squid
Clams
Turtle

INTERPRETATION OF STATISTICS

The user is reminded to pay heed to the precautions and assumptions identified earlier in this document, when making interpretations of or inferences from data reported in the tables and graphs. Remember also that neither the commercial landings summaries nor the creel summaries are based on a census of all the fishing activities, but on samples of those activities. One of the major factors in expanding the creel survey data into monthly and annual estimates is the use of proportionality constants to adjust for percent coverage of the surveys. The flexibility of the survey design allows for refinement of these constants as additional information is gained on the fishing activities. If the constants are improved upon, the basic survey data can be re-expanded to create better overall estimates. However, the variability and species composition would not be expected to change since these statistics are strictly based on the actual survey information collected from the fishermen. The estimates of total landings are considered to be conservative because the inshore fisheries are currently not included in DMWR's sampling programs. However, WPACFIN has developed the basic design for inshore sampling and data expansion systems, and DMWR plans to implement them when resources become available.

Table II.1.1

American Samoa 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	508	786	1.55
Black jack	493	884	1.79
Barracudas	351	526	1.50
Large barracuda	115	201	1.75
Small barracuda	787	1,380	1.75
Sharks	1,326	1,855	1.40
Eels	64	103	1.62
Groupers	303	511	1.69
Peacock grouper	378	568	1.50
Flagtail grouper	79	197	2.50
Tomato grouper	112	185	1.66
Yellowspot grouper	203	304	1.50
Giant grouper	54	81	1.50
Lunartail grouper	746	1,324	1.77
Blue lined snapper	2,417	4,119	1.70
Onespot snapper	50	81	1.62
Twinspot/red snapper	205	308	1.50
Humpback snapper	964	1,850	1.92
Gray jobfish	2,181	4,143	1.90
Hawaiian opakapaka	6	9	1.50
Opakapaka	553	839	1.52
Blue lined gindai	48	95	2.00
Gindai (flower snap)	118	237	2.00
Lehi (silverjaw)	236	446	1.89
Onaga (red snapper)	640	1,502	2.35
Ehu (red snapper)	972	2,435	2.51
Black snapper	24	35	1.50
Kusakar's snapper	639	1,247	1.95
Bigeye emperor	15	22	1.50
Goldenline bream	91	137	1.50
Emperors (misc)	97	145	1.50
Longnose emperor	1,290	2,091	1.62
Ambon emperor	497	745	1.50
Orangespot emperor	66	98	1.50
Redgill emperor	1,874	3,226	1.72
Snake mackerel	1	2	1.50
Rudderfish	35	53	1.50
Cardinalfish	16	24	1.50
Lined surgeon	364	546	1.50
Yellow eyed surgeon	25	37	1.50
Dussumier's surgeon	15	22	1.50
Unicornfish (misc)	175	280	1.60
Unicornfish	36	54	1.50
Squirrelfish	304	462	1.52
Saber squirrelfish	8	16	2.00

Table II.1.1 (Cont.)

Species	Pounds	Value	$/lb
Parrotfish	312	468	1.50
Sweepers	121	182	1.50
Triggerfish	2	2	1.50
Dolphin (mahimahi)	1,547	2,263	1.46
Blue marlin	2,912	4,369	1.50
Rainbow runner	59	100	1.70
Wahoo	547	531	0.97
Skipjack tuna	32,500	31,667	0.97
Dogtooth tuna	997	1,873	1.88
Albacore	1,477	3,692	2.50
Yellowfin tuna	30,127	62,399	2.07
Kawakawa	92	179	1.95
Crabs	68	110	1.61
Spiny lobster	601	1,652	2.75
** TOTAL **	90,840	143,695	1.58

Table II.1.2

American Samoa January 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Small barracuda	127	217	1.71
Groupers	28	45	1.59
Flagtail grouper	58	144	2.50
Tomato grouper	77	115	1.50
Lunartail grouper	192	342	1.78
Blue lined snapper	243	417	1.72
Humpback snapper	71	141	1.99
Gray jobfish	41	79	1.91
Black snapper	24	35	1.50
Emperors (misc)	74	111	1.50
Redgill emperor	201	344	1.71
Dolphin (mahimahi)	259	259	1.00
Rainbow runner	12	12	1.00
Wahoo	7	10	1.50
Skipjack tuna	4,550	4,511	0.99
Dogtooth tuna	10	15	1.50
Yellowfin tuna	5,074	7,242	1.43
** SUBTOTAL **	11,047	14,041	1.27

Table II.1.3

American Samoa February 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Small barracuda	18	36	2.00
Sharks	150	150	1.00
Lunartail grouper	18	36	2.00
Blue lined snapper	20	40	2.00
Gindai (flower snap)	28	56	2.00
Ehu (red snapper)	76	152	2.00
Dolphin (mahimahi)	200	200	1.00
Wahoo	24	36	1.50
Skipjack tuna	2,560	2,545	0.99
Dogtooth tuna	16	24	1.50
Yellowfin tuna	2,594	4,136	1.59
** SUBTOTAL **	5,704	7,411	1.29

Table II.1.4

American Samoa March 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	111	170	1.54
Small barracuda	105	179	1.71
Peacock grouper	60	90	1.50
Lunartail grouper	37	66	1.78
Blue lined snapper	332	571	1.72
Humpback snapper	33	50	1.50
Gray jobfish	193	369	1.91
Opakapaka	178	266	1.50
Onaga (red snapper)	287	718	2.50
Ehu (red snapper)	213	532	2.50
Ambon emperor	69	104	1.50
Squirrelfish	73	109	1.50
Dolphin (mahimahi)	103	257	2.50
Blue marlin	777	1,166	1.50
Skipjack tuna	3,671	3,646	0.99
Yellowfin tuna	2,573	6,185	2.40
** SUBTOTAL **	8,815	14,479	1.64

Table II.1.5

American Samoa April 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Barracudas	156	234	1.50
Small barracuda	57	86	1.50
Blue lined snapper	175	263	1.50
Onespot snapper	15	23	1.50
Humpback snapper	65	97	1.50
Gray jobfish	46	69	1.50
Opakapaka	99	149	1.50
Goldenline bream	13	20	1.50
Longnose emperor	30	50	1.65
Ambon emperor	240	360	1.50
Redgill emperor	76	114	1.50
Dolphin (mahimahi)	114	179	1.57
Blue marlin	1,257	1,885	1.50
Wahoo	173	154	0.89
Skipjack tuna	4,229	4,195	0.99
Dogtooth tuna	61	119	1.96
Yellowfin tuna	2,791	5,822	2.09
** SUBTOTAL **	9,599	13,819	1.43

Table II.1.6

American Samoa May 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Small barracuda	33	62	1.90
Groupers	36	58	1.59
Giant grouper	54	81	1.50
Lunartail grouper	14	27	1.90
Blue lined snapper	225	428	1.90
Gray jobfish	141	268	1.90
Onaga (red snapper)	174	406	2.34
Redgill emperor	302	573	1.90
Dolphin (mahimahi)	224	352	1.57
Wahoo	17	26	1.50
Skipjack tuna	814	810	1.00
Dogtooth tuna	46	89	1.96
Yellowfin tuna	2,185	4,619	2.11
** SUBTOTAL **	4,265	7,800	1.82

Table II.1.7

American Samoa June 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Black jack	84	148	1.75
Small barracuda	78	136	1.75
Sharks	650	975	1.50
Groupers	45	68	1.50
Tomato grouper	12	24	2.00
Lunartail grouper	16	30	1.87
Blue lined snapper	237	419	1.77
Onespot snapper	13	23	1.75
Gray jobfish	88	154	1.75
Gindai (flower snap)	12	24	2.00
Lehi (silverjaw)	49	85	1.75
Onaga (red snapper)	72	125	1.75
Ehu (red snapper)	28	56	2.00
Longnose emperor	123	216	1.75
Redgill emperor	237	415	1.75
Rudderfish	20	29	1.50
Lined surgeon	212	318	1.50
Yellow eyed surgeon	25	37	1.50
Dussumier's surgeon	15	22	1.50
Unicornfish	36	54	1.50
Squirrelfish	78	117	1.50
Parrotfish	145	217	1.50
Skipjack tuna	725	1,017	1.40
Dogtooth tuna	90	151	1.68
Albacore	130	325	2.50
Yellowfin tuna	394	591	1.50
Spiny lobster	112	309	2.75
** SUBTOTAL **	3,726	6,085	1.63

Table II.1.8

American Samoa July 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	70	108	1.54
Black jack	5	8	1.79
Large barracuda	65	114	1.75
Sharks	209	313	1.50
Blue lined snapper	22	33	1.50
Humpback snapper	15	22	1.50
Lehi (silverjaw)	34	64	1.88
Emperors (misc)	23	34	1.50
Dolphin (mahimahi)	49	77	1.57
Skipjack tuna	1,282	1,270	0.99
Dogtooth tuna	57	112	1.96
Albacore	1,201	3,002	2.50
Yellowfin tuna	238	533	2.24
** SUBTOTAL **	3,270	5,691	1.74

Table II.1.9

American Samoa August 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	141	217	1.54
Small barracuda	125	214	1.71
Eels	64	103	1.62
Groupers	25	39	1.59
Peacock grouper	218	327	1.50
Flagtail grouper	14	36	2.50
Lunartail grouper	68	120	1.78
Blue lined snapper	217	363	1.67
Onespot snapper	17	27	1.63
Humpback snapper	204	383	1.88
Gray jobfish	146	220	1.50
Opakapaka	24	36	1.50
Blue lined gindai	29	57	2.00
Gindai (flower snap)	21	43	2.00
Ehu (red snapper)	40	80	2.00
Longnose emperor	10	14	1.50
Ambon emperor	128	192	1.50
Orangespot emperor	66	98	1.50
Redgill emperor	153	229	1.50
Cardinalfish	16	24	1.50
Lined surgeon	152	228	1.50
Unicornfish (misc)	175	280	1.60
Squirrelfish	100	150	1.50
Parrotfish	167	250	1.50
Dolphin (mahimahi)	425	667	1.57
Wahoo	234	208	0.89
Skipjack tuna	3,974	3,066	0.77
Dogtooth tuna	101	169	1.67
Yellowfin tuna	1,293	2,537	1.96
Kawakawa	43	84	1.95
Crabs	68	110	1.61
Spiny lobster	488	1,342	2.75
** SUBTOTAL **	8,943	11,914	1.33

Table II.1.10

American Samoa September 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	9	18	2.00
Black jack	78	141	1.81
Small barracuda	141	261	1.85
Groupers	23	35	1.50
Tomato grouper	16	32	2.00
Lunartail grouper	72	116	1.60
Blue lined snapper	376	583	1.55
Humpback snapper	98	195	1.99
Gray jobfish	61	117	1.93
Hawaiian opakapaka	6	9	1.50
Opakapaka	171	256	1.50
Blue lined gindai	19	38	2.00
Gindai (flower snap)	36	72	2.00
Lehi (silverjaw)	14	28	2.00
Ehu (red snapper)	25	50	2.00
Bigeye emperor	15	22	1.50
Longnose emperor	560	840	1.50
Redgill emperor	190	285	1.50
Snake mackerel	1	2	1.50
Sweepers	121	182	1.50
Dolphin (mahimahi)	88	137	1.57
Rainbow runner	7	10	1.50
Wahoo	25	38	1.50
Skipjack tuna	1,380	1,380	1.00
Dogtooth tuna	29	44	1.50
Albacore	146	365	2.50
Yellowfin tuna	1,028	2,090	2.03
** SUBTOTAL **	4,733	7,344	1.55

Table II.1.11

American Samoa October 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	38	59	1.54
Black jack	81	144	1.79
Barracudas	87	130	1.50
Small barracuda	31	62	2.00
Sharks	318	417	1.31
Groupers	43	69	1.59
Peacock grouper	81	121	1.50
Tomato grouper	7	14	2.00
Lunartail grouper	187	337	1.80
Blue lined snapper	87	159	1.82
Twinspot/red snapper	106	159	1.50
Humpback snapper	162	243	1.50
Gray jobfish	463	695	1.50
Opakapaka	82	131	1.61
Gindai (flower snap)	21	42	2.00
Lehi (silverjaw)	45	85	1.88
Onaga (red snapper)	108	252	2.34
Ehu (red snapper)	358	927	2.59
Kusakar's snapper	530	1,033	1.95
Goldenline bream	78	117	1.50
Longnose emperor	223	368	1.65
Redgill emperor	188	322	1.71
Squirrelfish	46	73	1.61
Saber squirrelfish	8	16	2.00
Dolphin (mahimahi)	86	134	1.57
Wahoo	67	59	0.89
Skipjack tuna	2,361	2,344	0.99
Dogtooth tuna	286	429	1.50
Yellowfin tuna	1,217	2,489	2.05
Kawakawa	40	78	1.95
** SUBTOTAL **	7,433	11,509	1.54

Table II.1.12

American Samoa November 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	139	214	1.54
Black jack	246	443	1.80
Barracudas	108	161	1.50
Large barracuda	50	87	1.75
Small barracuda	72	126	1.75
Groupers	101	198	1.95
Peacock grouper	20	30	1.50
Flagtail grouper	7	17	2.50
Yellowspot grouper	203	304	1.50
Lunartail grouper	141	250	1.77
Blue lined snapper	482	844	1.75
Onespot snapper	5	9	1.63
Twinspot/red snapper	99	149	1.50
Humpback snapper	317	719	2.27
Gray jobfish	1,001	2,172	2.17
Lehi (silverjaw)	94	183	1.95
Ehu (red snapper)	232	638	2.75
Kusakar's snapper	110	214	1.95
Longnose emperor	344	602	1.75
Ambon emperor	60	89	1.50
Redgill emperor	527	944	1.79
Rudderfish	16	23	1.50
Squirrelfish	8	12	1.50
Triggerfish	2	2	1.50
Rainbow runner	40	78	1.95
Skipjack tuna	3,222	3,190	0.99
Dogtooth tuna	302	721	2.39
Yellowfin tuna	805	2,013	2.50
Kawakawa	9	17	1.95
** SUBTOTAL **	8,760	14,448	1.64

Table II.1.13

American Samoa December 1991 Estimated Commercial Landings

Species	Pounds	Value	$/lb
Blue marlin	878	1,317	1.50
Skipjack tuna	3,731	3,694	0.99
Yellowfin tuna	9,936	24,144	2.43
** SUBTOTAL **	14,545	29,155	2.00
** TOTAL **	90,840	143,695	1.58

Table II.2.1

American Samoa 1991 Manu'a Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	9	18	2.00
Black jack	9	18	2.00
Small barracuda	148	296	2.00
Sharks	270	270	1.00
Tomato grouper	35	70	2.00
Lunartail grouper	55	110	2.00
Blue lined snapper	119	239	2.00
Gray jobfish	14	28	2.00
Opakapaka	18	36	2.00
Blue lined gindai	48	95	2.00
Gindai (flower snap)	118	237	2.00
Lehi (silverjaw)	14	28	2.00
Ehu (red snapper)	192	384	2.00
Squirrelfish	10	20	2.00
Saber squirrelfish	8	16	2.00
Rainbow runner	12	12	1.00
Wahoo	73	109	1.50
Skipjack tuna	5,970	5,970	1.00
Dogtooth tuna	166	249	1.50
Yellowfin tuna	4,183	6,274	1.50
** TOTAL **	11,471	14,479	1.26

Table II.2.2

American Samoa January 1991 Manu'a Estimated Commercial Landings

Species	Pounds	Value	$/lb
Rainbow runner	12	12	1.00
Wahoo	7	10	1.50
Skipjack tuna	678	678	1.00
Dogtooth tuna	10	15	1.50
Yellowfin tuna	460	690	1.50
** SUBTOTAL **	1,167	1,405	1.20

Table II.2.3

American Samoa February 1991 Manu'a Estimated Commercial Landings

Species	Pounds	Value	$/lb
Small barracuda	18	36	2.00
Sharks	150	150	1.00
Lunartail grouper	18	36	2.00
Blue lined snapper	20	40	2.00
Gindai (flower snap)	28	56	2.00
Ehu (red snapper)	76	152	2.00
Wahoo	24	36	1.50
Skipjack tuna	1,090	1,090	1.00
Dogtooth tuna	16	24	1.50
Yellowfin tuna	844	1,266	1.50
** SUBTOTAL **	2,284	2,886	1.26

Table II.2.4

American Samoa March 1991 Manu'a Estimated Commercial Landings

Species	Pounds	Value	$/lb
Skipjack tuna	1,190	1,190	1.00
Yellowfin tuna	248	371	1.50
** SUBTOTAL **	1,438	1,561	1.08

Table II.2.5

American Samoa April 1991 Manu'a Estimated Commercial Landings

Species	Pounds	Value	$/lb
Skipjack tuna	780	780	1.00
Yellowfin tuna	582	873	1.50
** SUBTOTAL **	1,362	1,653	1.21

Table II.2.6

American Samoa May 1991 Manu'a Estimated Commercial Landings

Species	Pounds	Value	$/lb
Wahoo	17	26	1.50
Skipjack tuna	416	416	1.00
Yellowfin tuna	372	558	1.50
** SUBTOTAL **	805	1,000	1.24

Table II.2.7

American Samoa June 1991 Manu'a Estimated Commercial Landings

Species	Pounds	Value	$/lb
Tomato grouper	12	24	2.00
Lunartail grouper	8	16	2.00
Blue lined snapper	16	32	2.00
Gindai (flower snap)	12	24	2.00
Ehu (red snapper)	28	56	2.00
Skipjack tuna	337	337	1.00
Dogtooth tuna	25	38	1.50
Yellowfin tuna	394	591	1.50
** SUBTOTAL **	832	1,118	1.34

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No table is available for
the month of July.
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Table II.2.9

American Samoa August 1991 Manu'a Estimated Commercial Landings

Species	Pounds	Value	$/lb
Blue lined snapper	14	29	2.00
Blue lined gindai	29	57	2.00
Gindai (flower snap)	21	43	2.00
Ehu (red snapper)	40	80	2.00
Skipjack tuna	341	341	1.00
Dogtooth tuna	63	94	1.50
Yellowfin tuna	484	726	1.50
** SUBTOTAL **	993	1,371	1.38

Table II.2.10

American Samoa September 1991 Manu'a Estimated Commercial Landings

Species	Pounds	Value	$/lb
Jacks	9	18	2.00
Black jack	9	18	2.00
Small barracuda	99	198	2.00
Tomato grouper	16	32	2.00
Lunartail grouper	15	30	2.00
Blue lined snapper	37	74	2.00
Gray jobfish	14	28	2.00
Blue lined gindai	19	38	2.00
Gindai (flower snap)	36	72	2.00
Lehi (silverjaw)	14	28	2.00
Ehu (red snapper)	25	50	2.00
Wahoo	25	38	1.50
Skipjack tuna	458	458	1.00
Dogtooth tuna	29	44	1.50
Yellowfin tuna	479	719	1.50
** SUBTOTAL **	1,284	1,844	1.43

Table II.2.11

American Samoa October 1991 Manu'a Estimated Commercial Landings

Species	Pounds	Value	$/lb
Small barracuda	31	62	2.00
Sharks	120	120	1.00
Tomato grouper	7	14	2.00
Lunartail grouper	14	28	2.00
Blue lined snapper	32	64	2.00
Opakapaka	18	36	2.00
Gindai (flower snap)	21	42	2.00
Ehu (red snapper)	23	46	2.00
Squirrelfish	10	20	2.00
Saber squirrelfish	8	16	2.00
Skipjack tuna	680	680	1.00
Dogtooth tuna	23	35	1.50
Yellowfin tuna	320	480	1.50
** SUBTOTAL **	1,307	1,643	1.25
** TOTAL **	11,471	14,479	1.26

* * * * * * * * * * *
No tables are available for the
months of November and December.
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Figure II.1.1

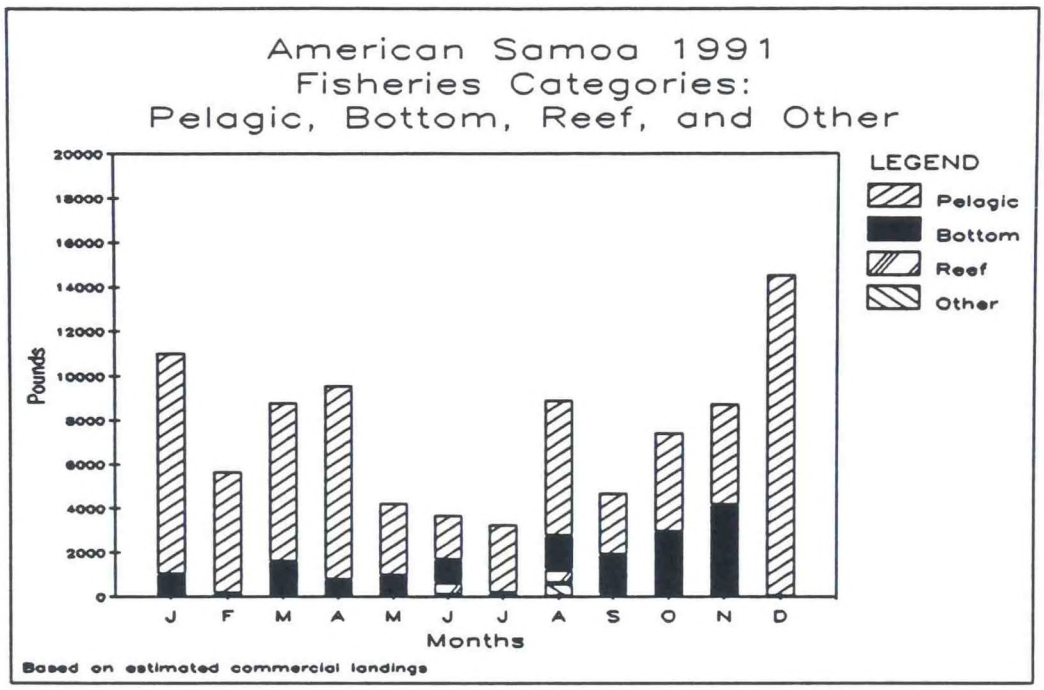


Figure II.1.2

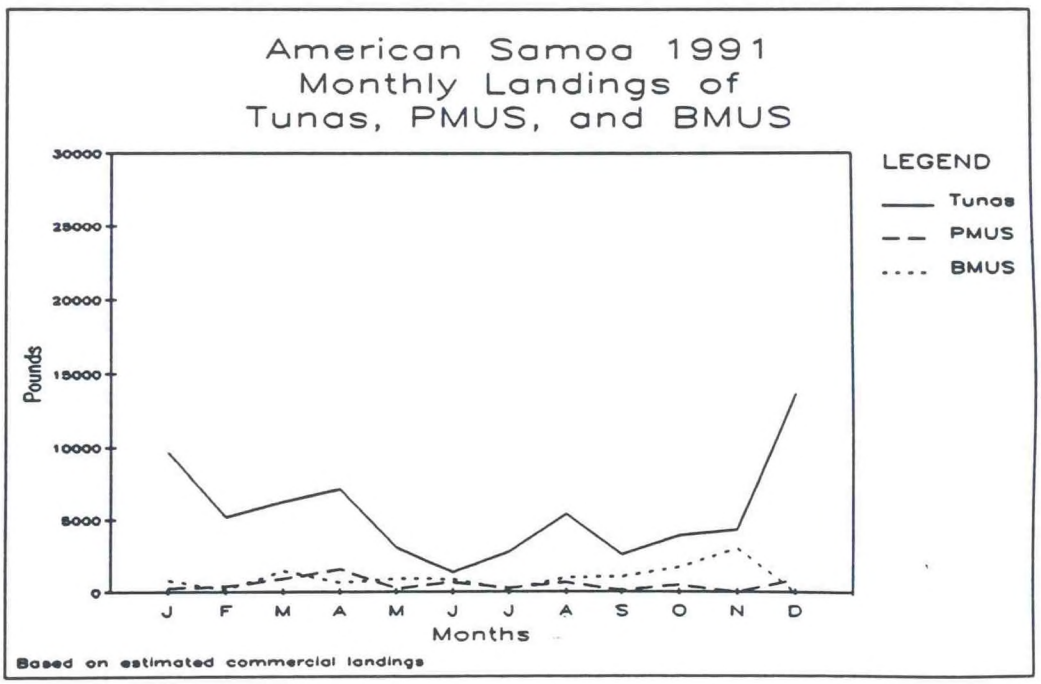


Figure II.1.3

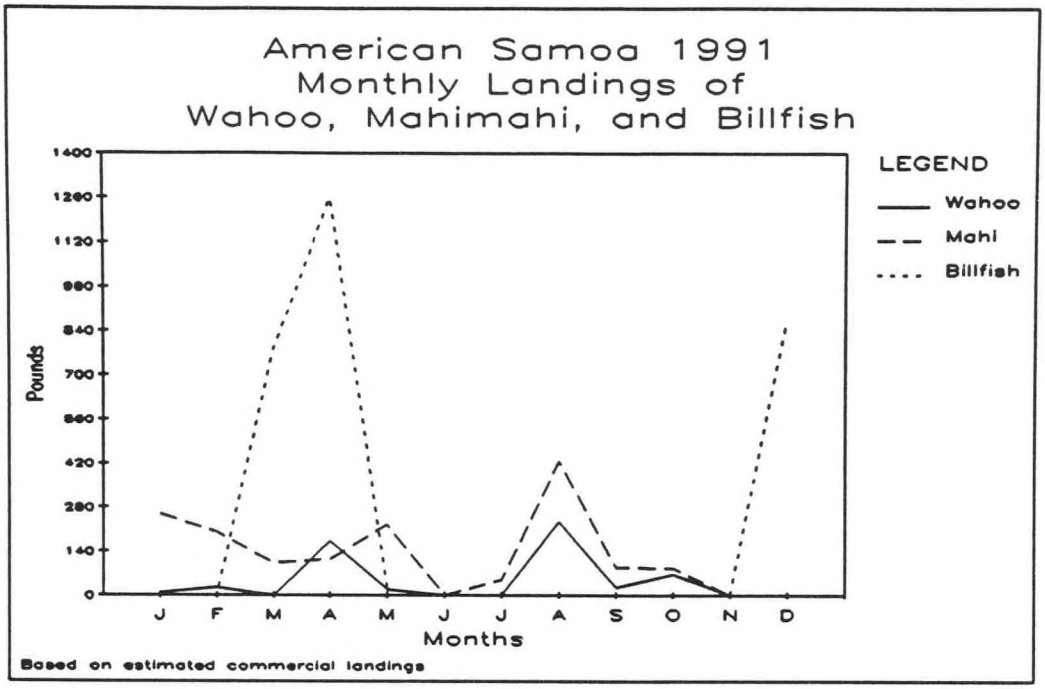


Figure II.1.4

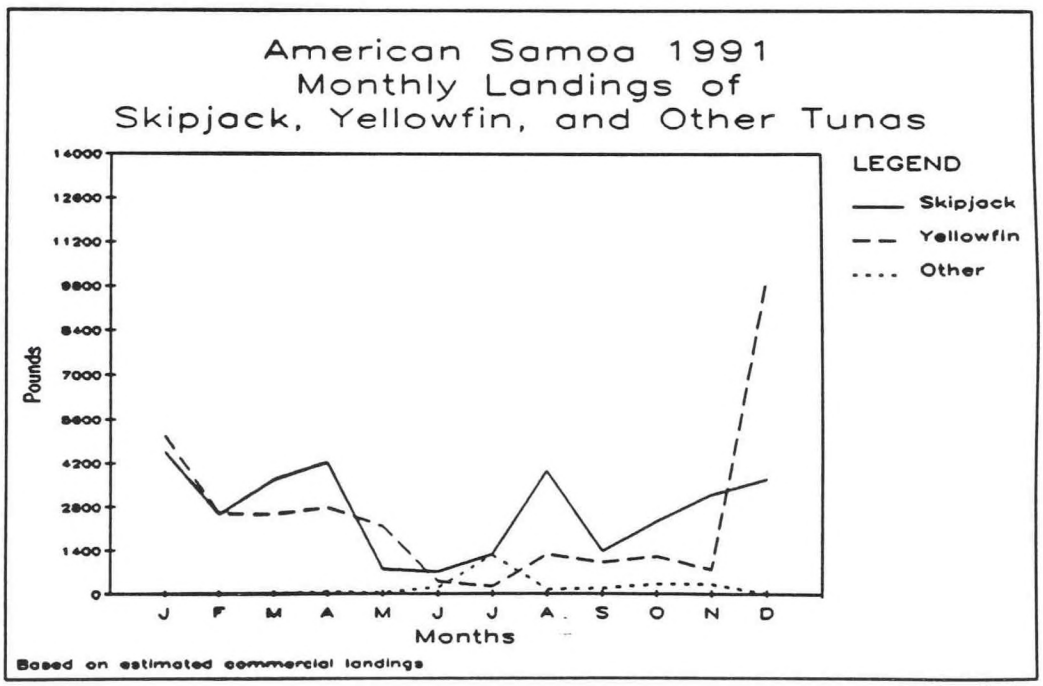


Figure II.2.1

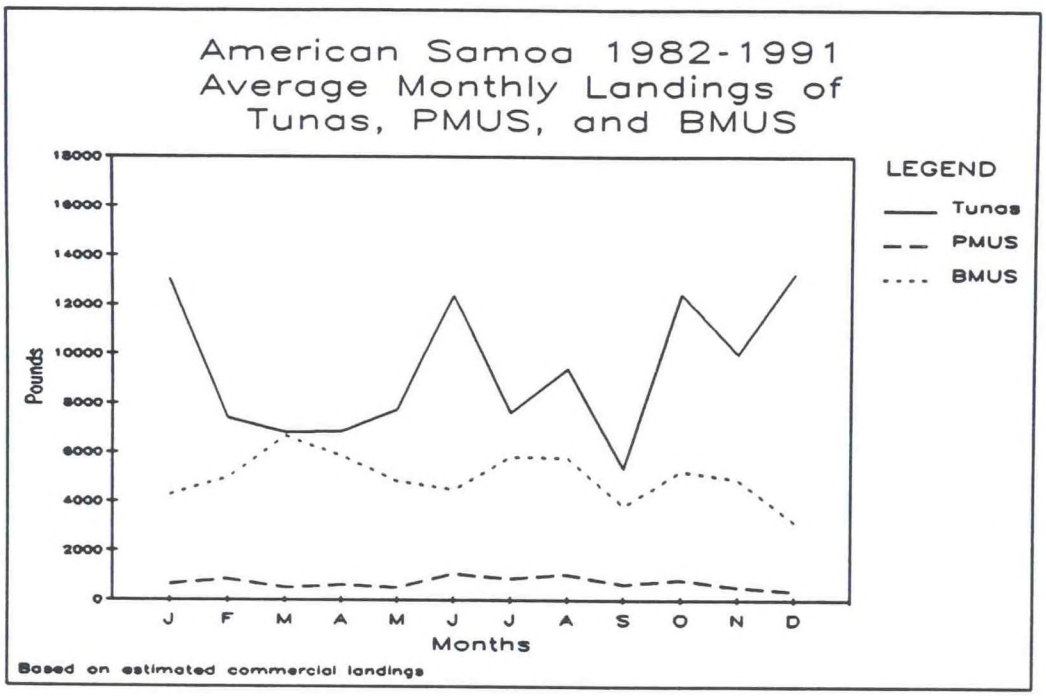


Figure II.2.2

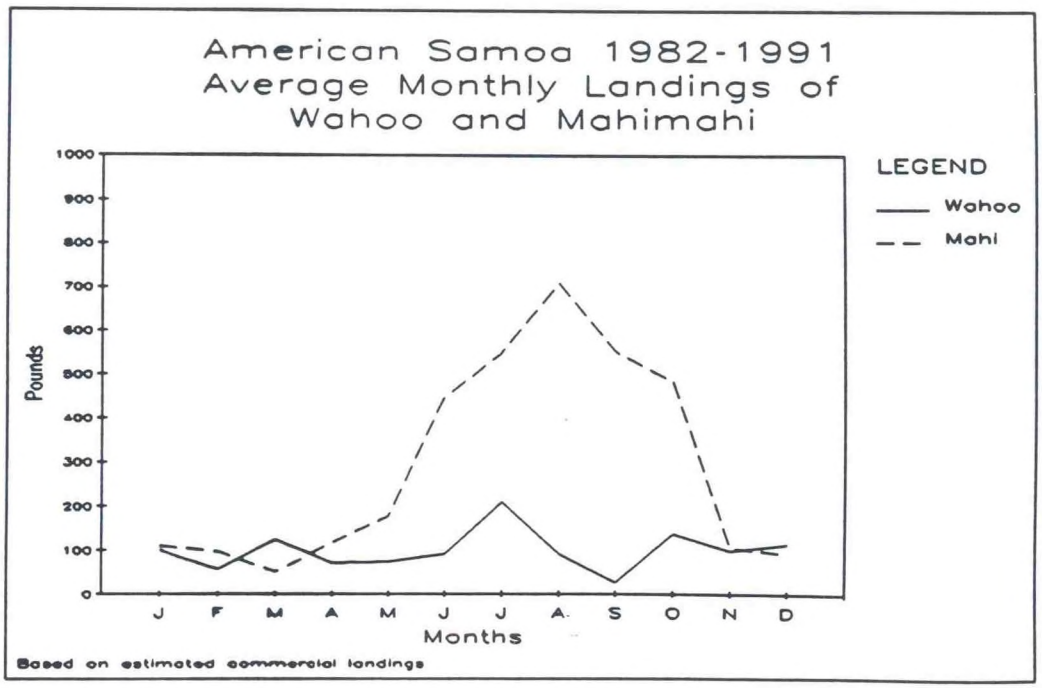


Figure II.2.3

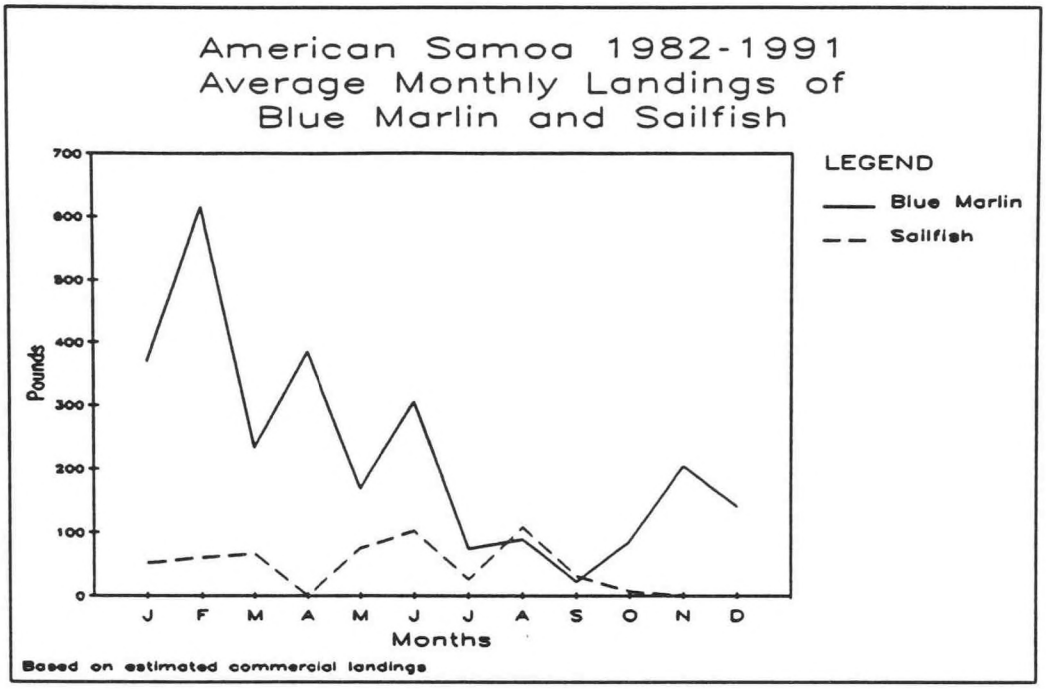


Figure II.2.4

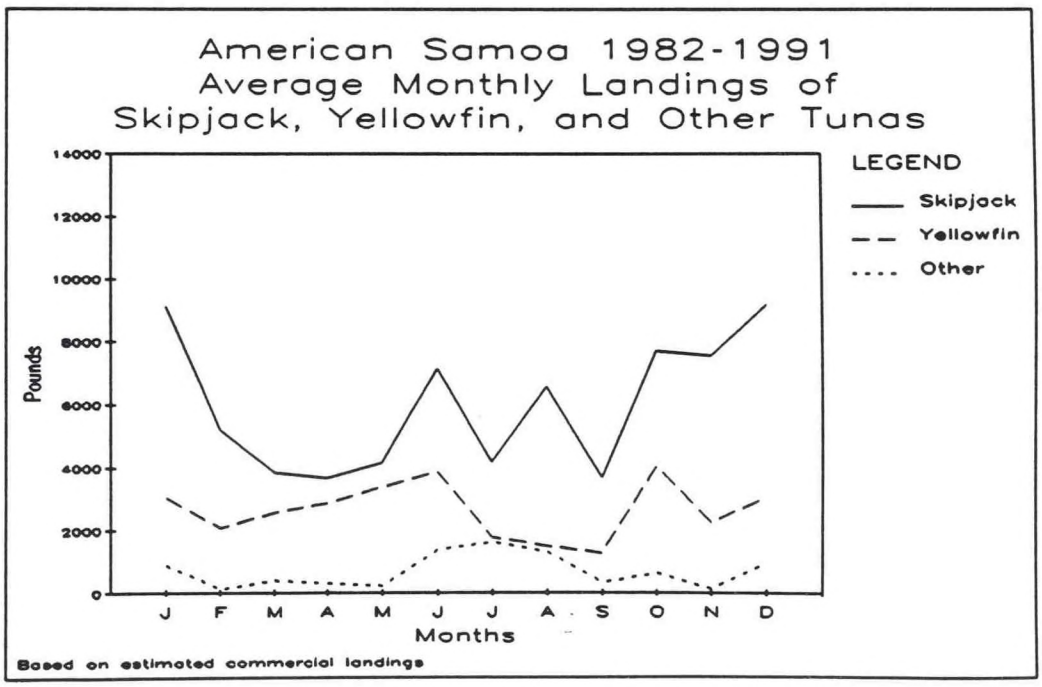


Figure II.2.5

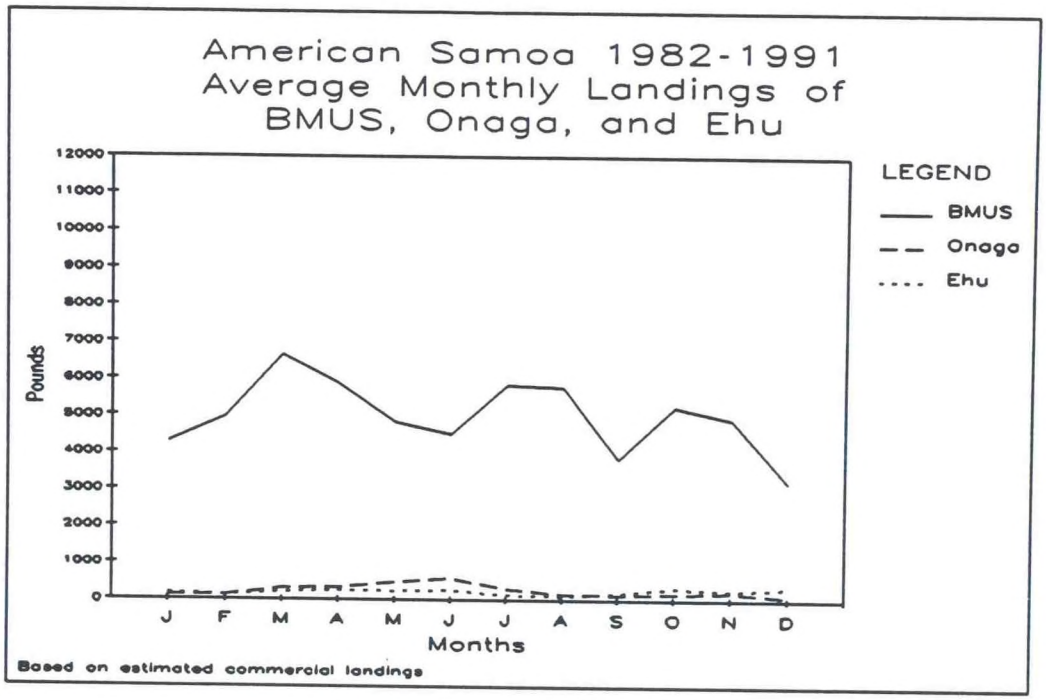


Figure II.3.1

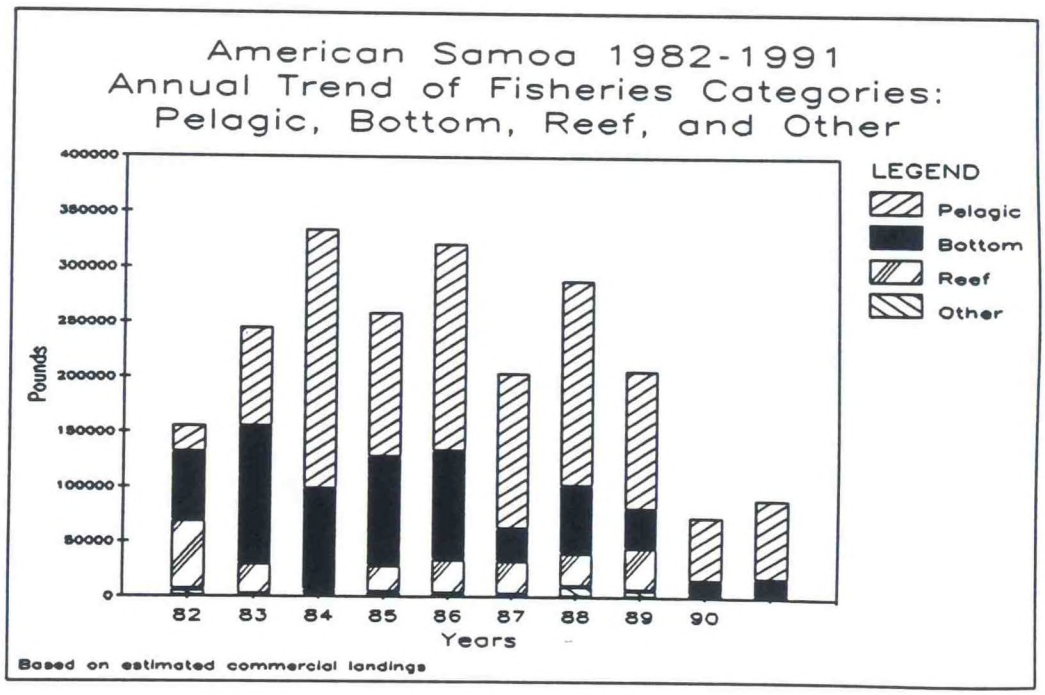


Figure II.3.2

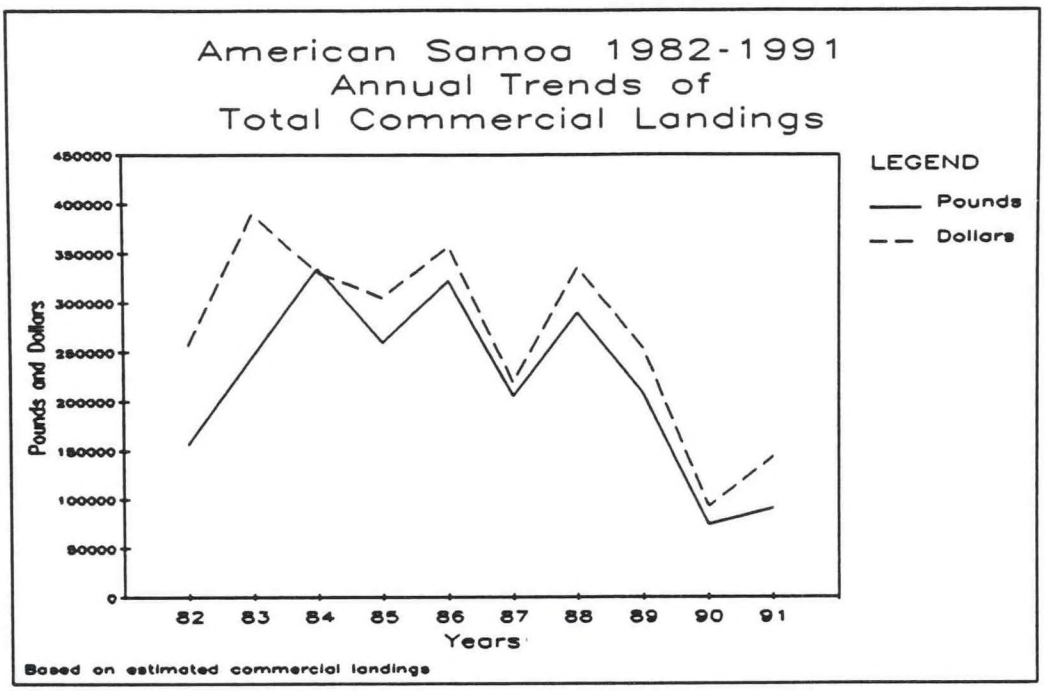


Figure II.3.3

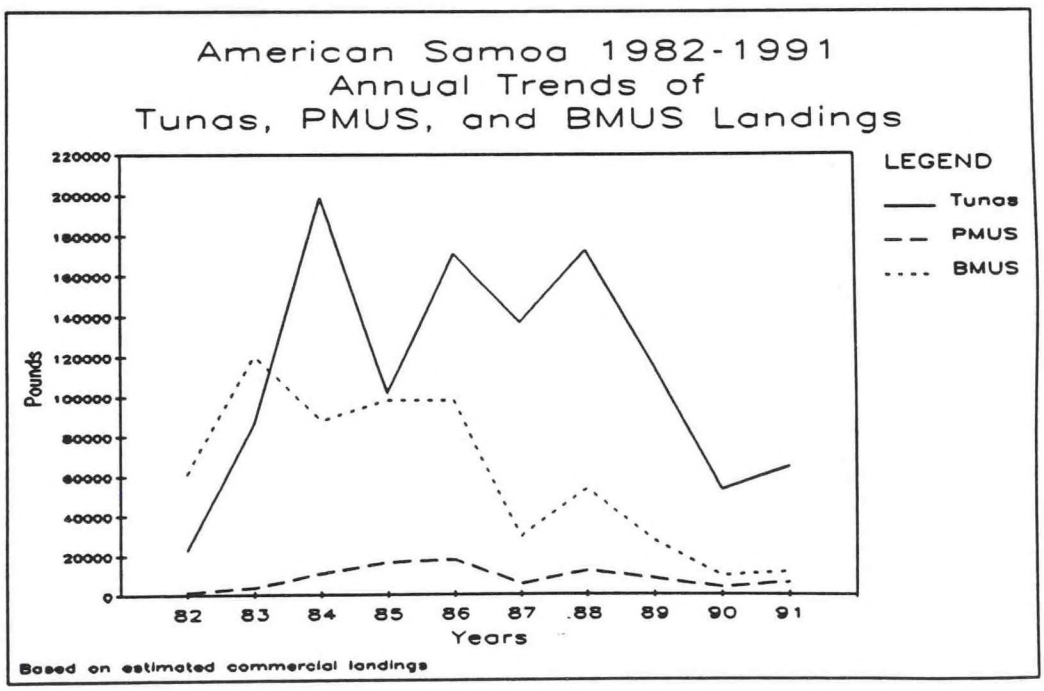


Figure II.3.4

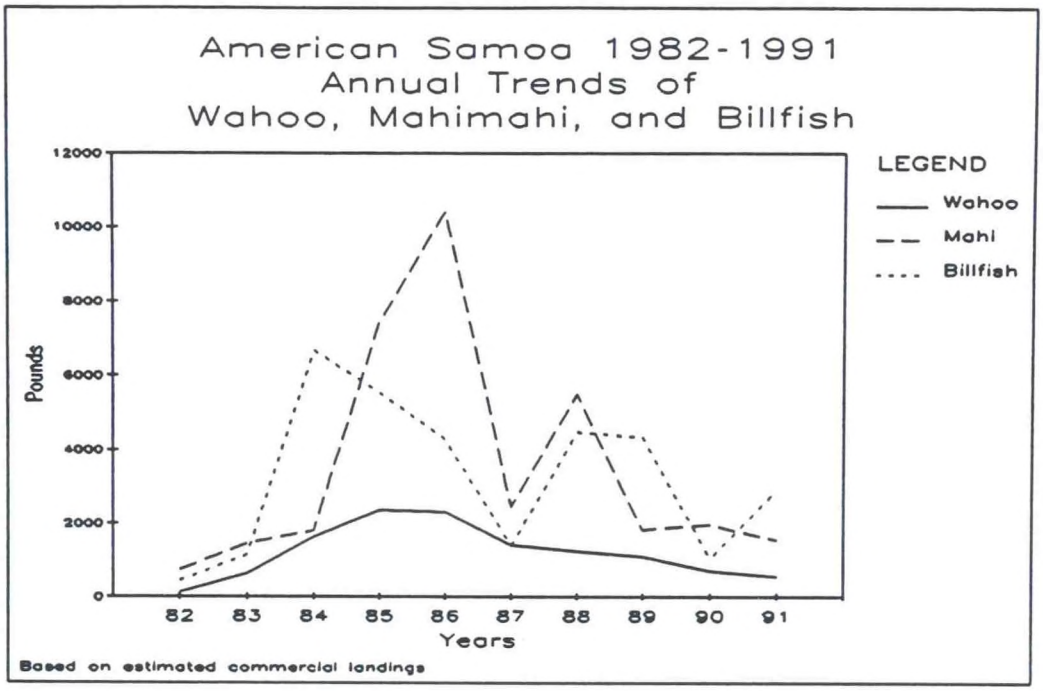


Figure II.3.5

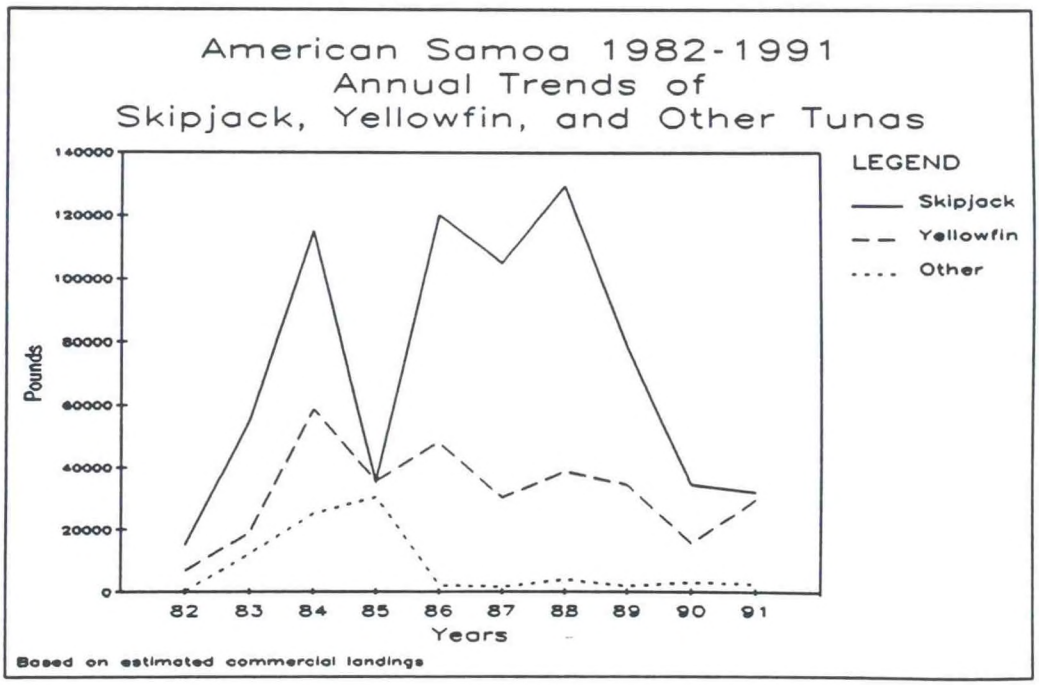
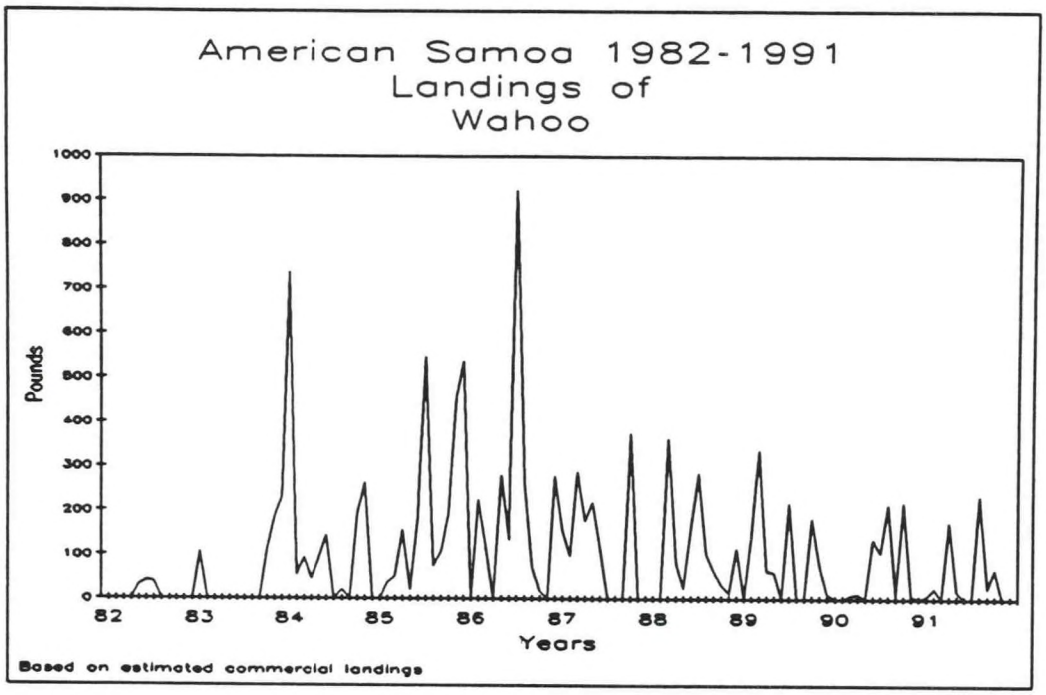


Figure II.4.1



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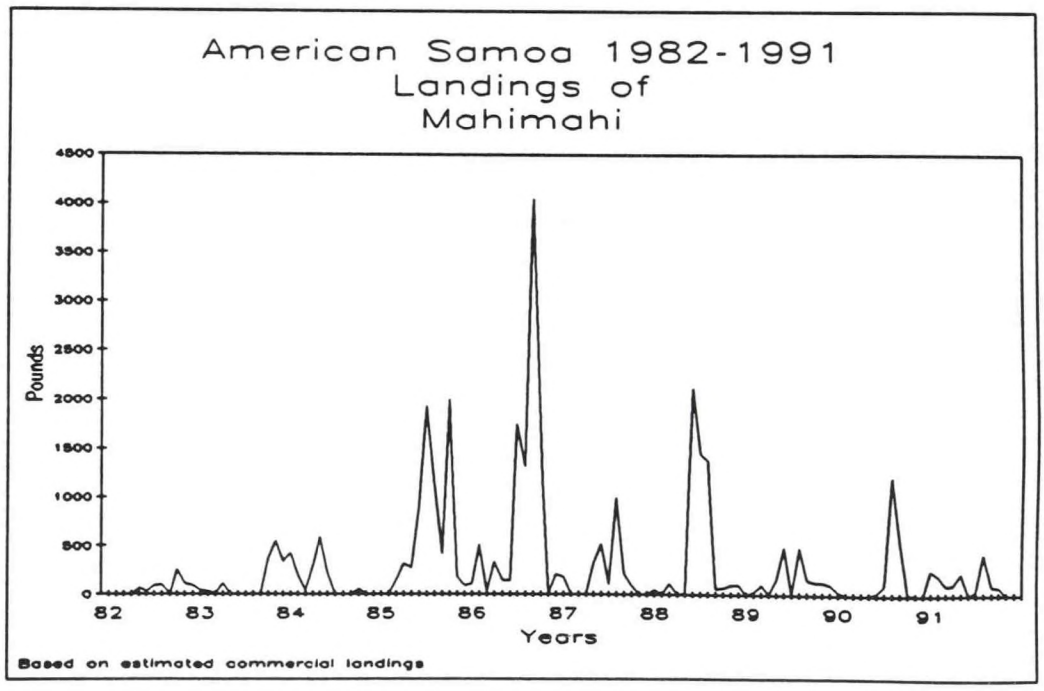

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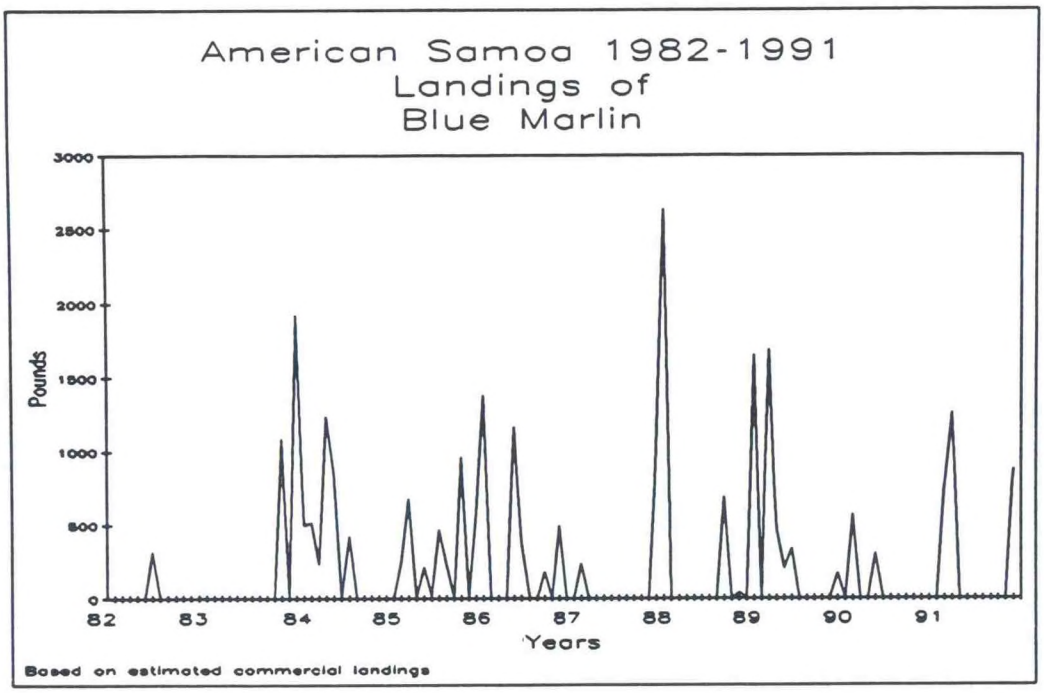
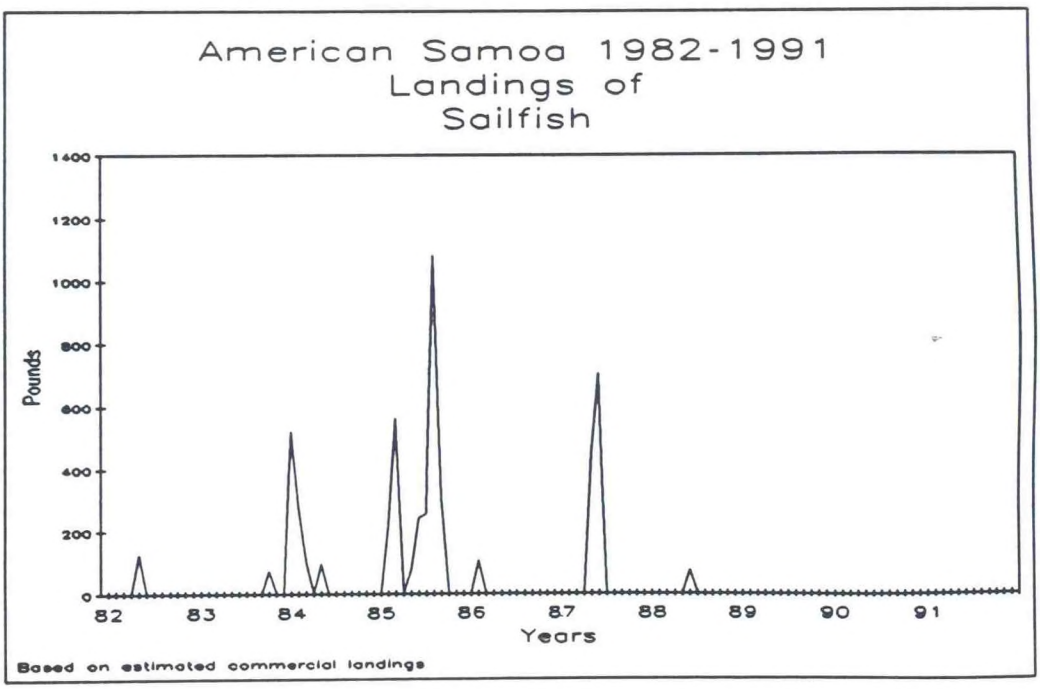


Figure II.4.4



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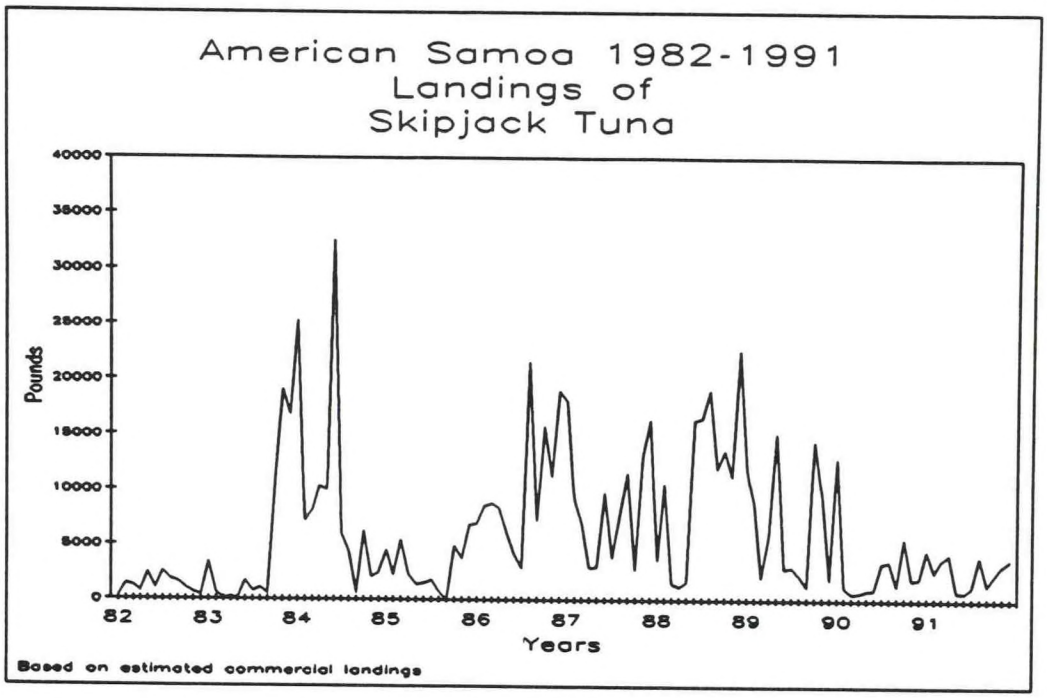
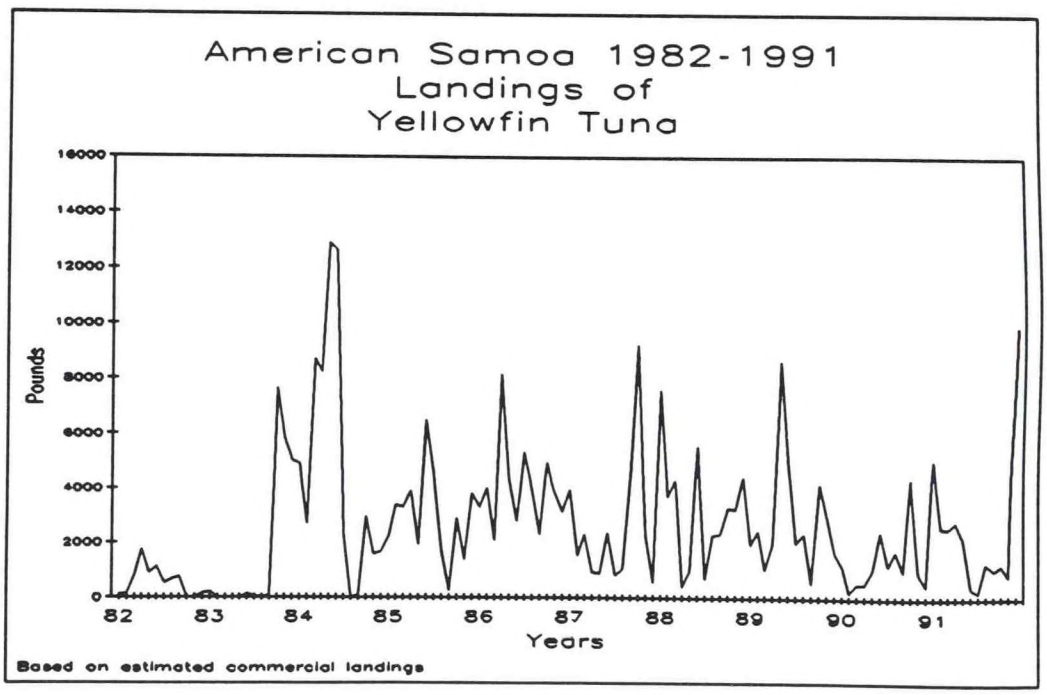


Figure II.4.6



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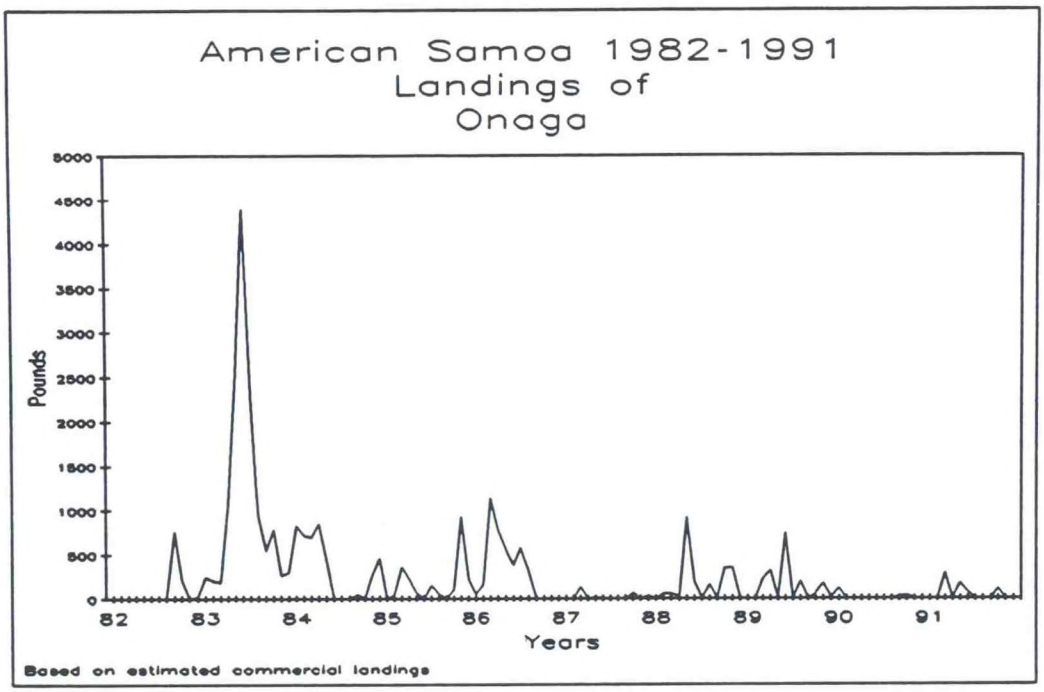


Figure II.4.8

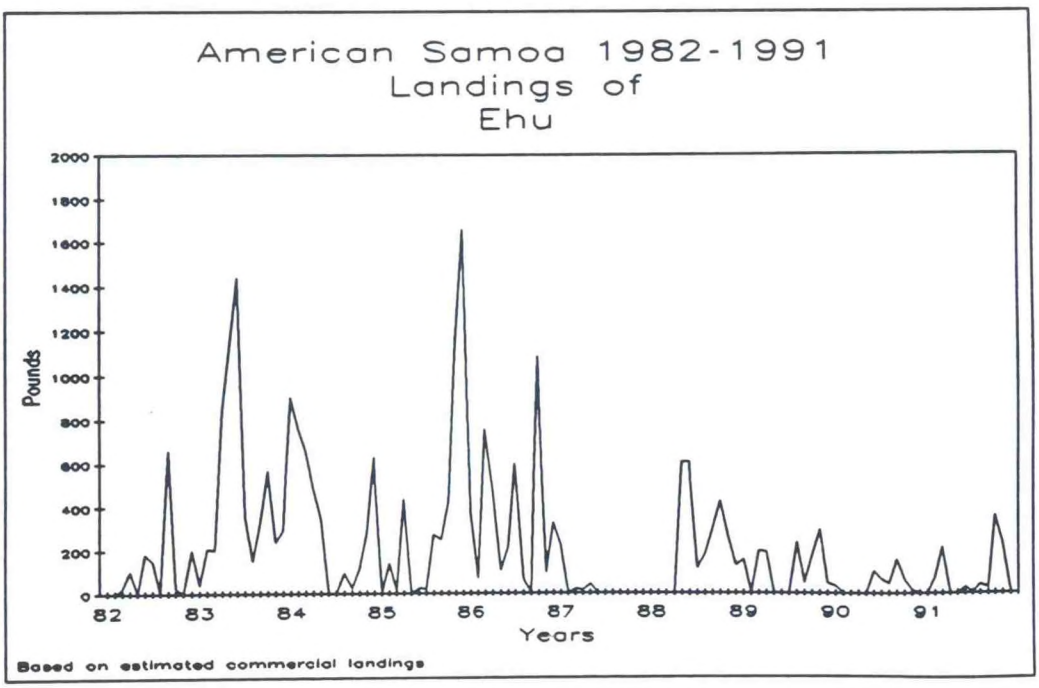


Table II.3.1

Tutuila 1991 Annual
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	CPUE	CV
Trolling	66615.6	12	3054.0	10	386.3	10	9396.4	11	1195.6	11	21.8	9
Bottom fish	12639.1	18	1618.1	19	105.9	17	4113.1	20	264.2	17	9.1	8
Troll-bottom	13563.6	22	811.4	19	62.3	19	2135.2	20	164.6	20	17.0	18
Spearing	2566.8	60	88.1	55	7.0	55	407.8	59	32.1	59	28.2	53
Long line	3419.2	41	166.0	49	21.0	47	332.0	49	41.9	47	24.9	6
Total:	98804.3	10	5737.6	9	573.2	9	16384.4	9	1678.9	9	19.1	7

Table II.3.2

Tutuila 1991 Annual
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	518.0	0.52	Black jack	552.6	0.56
Barracudas	479.3	0.49	Large barracuda	171.9	0.17
Small barracuda	796.5	0.81	Sharks	3001.0	3.04
Eels	71.7	0.07	Groupers	341.6	0.35
Peacock grouper	467.9	0.47	Flagtail grouper	84.8	0.09
Tomato grouper	84.8	0.09	Yellowspot grouper	199.7	0.20
Giant grouper	75.1	0.08	Lunartail grouper	912.4	0.92
Blue lined snapper	2456.0	2.49	Onespot snapper	48.3	0.05
Twinspot/red snapper	347.6	0.35	Humpback snapper	1074.6	1.09
Gray jobfish	2410.4	2.44	Hawaiian opakapaka	6.5	0.01
Opakapaka	563.2	0.57	Yellowtail snapper	2.9	0
Lehi (silverjaw)	242.4	0.25	Onaga (red snapper)	660.2	0.67
Ehu (red snapper)	922.7	0.93	Black snapper	26.1	0.03
Kusakar's snapper	885.5	0.90	Bigeye emperor	16.3	0.02
Goldenline bream	125.5	0.13	Emperors (misc)	325.6	0.33
Longnose emperor	1451.4	1.47	Ambon emperor	469.1	0.47
Orangespot emperor	67.2	0.07	Redgill emperor	2026.4	2.05
Snake mackerel	1.6	0	Rudderfish	36.8	0.04
Cardinalfish	16.6	0.02	Lined surgeon	404.9	0.41
Yellow eyed surgeon	27.2	0.03	Dussumier's surgeon	16.1	0.02
Unicornfish (misc)	197.1	0.20	Unicornfish	39.4	0.04
Squirrelfish	331.0	0.33	Saber squirrelfish	71.1	0.07
Parrotfish	355.7	0.36	Sweepers	135.3	0.14
Triggerfish	13.0	0.01	Dolphin (mahimahi)	1975.1	2.00
Blue marlin	6717.8	6.80	Rainbow runner	153.5	0.16
Wahoo	842.7	0.85	Skipjack tuna	37369.1	37.82
Dogtooth tuna	1059.1	1.07	Albacore	1720.8	1.74
Yellowfin tuna	24555.4	24.85	Kawakawa	129.3	0.13
Crabs	76.7	0.08	Spiny lobster	673.7	0.68
Total all species:	98804.3	100.00			

Table II.4.1

Tutuila January 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	CPUE	CV
Trolling	11804.9	31	397.8	25	51.8	23	1343.8	25	174.7	24	28.4	15
Bottom fish	1188.2	50	171.3	53	11.1	49	257.0	53	16.6	49	7.7	42*
Troll-bottom	1051.4	71	56.6	50	8.3	53	237.6	56	30.4	52	21.0	136*
Total:	14044.5	26	625.8	21	71.2	20	1838.5	22	221.7	22	26.5	14

Table II.4.2

Tutuila February 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	CPUE	CV
Trolling	5580.9	55	293.1	62	36.2	60	982.7	74	119.5	72	7.1	45
Total:	5580.9	55	293.1	62	36.2	60	982.7	74	119.5	72	6.5	43

Table II.4.3

Tutuila March 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	CPUE	CV
Trolling	10324.7	20	511.1	18	75.0	17	1706.3	20	243.1	19	20.5	13
Bottom fish	1800.7	84	145.8	84	8.3	84	437.5	84	25.0	84	12.3	0*
Troll-bottom	2719.2	72	100.0	54	8.3	54	250.0	55	20.8	55	27.2	106*
Total:	14844.7	22	756.9	17	91.7	14	2393.8	18	288.9	16	19.9	15

* Not enough data to properly compute Coefficient of Variation (CV).

Table II.4.4

Tutuila April 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	CPUE	CV
Trolling	8682.7	34	345.1	35	43.4	35	1095.5	34	138.2	35	8.2	41
Bottom fish	1006.8	60	200.3	73	7.4	60	732.2	79	22.7	65	5.5	173*
Total:	9689.6	33	545.5	37	44.9	32	1827.8	42	143.1	35	6.8	36

Table II.4.5

Tutuila May 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	CPUE	CV
Trolling	1729.6	56	119.4	42	14.5	44	329.3	44	39.8	46	2.5	52
Troll-bottom	1730.3	58	130.3	57	10.9	57	347.4	56	28.9	56	6.6	118*
Total:	3459.9	54	249.7	44	25.3	45	676.6	45	68.8	45	2.5	33

Table II.4.6

Tutuila June 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	CPUE	CV
Trolling	1566.8	36	206.6	37	25.0	38	593.4	38	71.7	39	1.6	28
Bottom fish	954.9	51	90.1	50	9.2	43	249.3	52	25.0	44	5.3	47
Troll-bottom	628.3	79	46.1	79	3.3	79	92.1	79	6.6	79	2.7	229*
Spearing	695.7	79	39.5	79	3.3	79	118.4	79	9.9	79	17.6	0*
Long line	789.5	79	26.3	79	3.3	79	52.6	79	6.6	79	30.0	0*
Total:	4635.2	22	408.6	24	44.1	26	1105.9	25	119.7	28	3.5	10

* Not enough data to properly compute Coefficient of Variation (CV).

Table II.4.7

Tutuila July 1991
Offshore Creel Survey Expansion Summary

Gear	catch	cv	boat hrs	cv	boat cnt	cv	prsn hrs	cv	prsn cnt	cv	CPUE	CV
Trolling	3282.9	53	122.0	52	19.4	50	360.6	57	55.7	55	3.4	30
Bottom fish	110.5	82	31.6	82	7.0	82	110.5	82	24.6	82	.5	66
Troll-bottom	284.1	74	35.4	74	2.9	74	70.7	74	5.9	74	1.3	251*
Long line	1770.2	63	107.2	69	13.5	66	214.3	69	26.9	66	13.8	142*
Total:	5447.7	52	296.1	55	42.8	55	756.2	58	113.1	59	2.8	7

Table II.4.8

Tutuila August 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	CPUE	CV
Trolling	4739.4	35	149.1	30	19.0	28	436.2	34	53.9	32	5.9	16
Bottom fish	876.8	57	108.6	58	6.4	55	325.7	58	19.3	55	1.8	61
Troll-bottom	1023.6	79	68.1	79	3.2	79	204.4	79	9.7	79	2.1	0*
Spearing	1601.4	76	41.2	76	3.2	76	247.4	76	19.0	76	19.4	145*
Total:	8241.2	35	367.1	32	31.9	27	1213.8	32	101.9	28	4.3	0

Table II.4.9

Tutuila September 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	CPUE	CV
Trolling	1961.9	36	192.2	32	26.6	33	618.0	32	88.7	35	1.5	0
Bottom fish	1945.7	44	159.7	46	14.8	47	351.9	47	32.5	47	3.2	48
Troll-bottom	7.4	82	8.9	82	3.0	82	17.7	82	5.9	82	.1	126
Long line	668.2	79	23.7	79	3.0	79	47.3	79	5.9	79	7.1	237*
Total:	4583.2	32	384.4	34	47.3	35	1034.9	33	133.1	34	1.6	0

* Not enough data to properly compute Coefficient of Variation (CV).

Table II.4.10

Tutuila October 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	CPUE	CV
Trolling	1547.3	28	233.2	41	23.7	36	586.1	41	60.6	37	1.7	0
Bottom fish	1432.7	44	210.8	46	10.4	42	726.0	47	36.4	42	1.5	43
Troll-bottom	3198.9	35	178.8	35	10.5	34	494.7	35	29.0	34	6.2	36
Total:	6178.8	24	622.7	28	44.6	26	1806.7	29	126.0	28	2.4	0

Table II.4.11

Tutuila November 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	CPUE	CV
Trolling	3687.7	80	96.6	59	10.8	63	355.8	58	39.4	62	1.5	0
Bottom fish	2863.1	35	428.7	40	25.6	34	796.9	36	50.3	33	2.1	25
Troll-bottom	2424.0	47	147.8	40	8.9	39	295.7	40	17.7	39	3.7	41
Total:	8974.8	39	673.2	34	41.4	29	1448.4	32	103.5	33	1.7	0

Table II.4.12

Tutuila December 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	CPUE	CV
Trolling	15913.5	35	471.5	38	44.4	37	1118.8	38	110.4	39	3.2	0
Total:	15913.5	35	471.5	38	44.4	37	1118.8	38	110.4	39	2.3	0

Table II.5.1

Tutuila January 1991
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Black jack	22.1	0.16	Barracudas	13.8	0.10
Small barracuda	243.2	1.73	Groupers	37.3	0.27
Flagtail grouper	53.9	0.38	Tomato grouper	71.8	0.51
Lunartail grouper	179.6	1.28	Blue lined snapper	331.6	2.36
Humpback snapper	81.5	0.58	Gray jobfish	38.7	0.28
Black snapper	22.1	0.16	Emperors (misc)	182.4	1.30
Redgill emperor	187.9	1.34	Saber squirrelfish	33.2	0.24
Dolphin (mahimahi)	261.0	1.86	Blue marlin	345.4	2.46
Rainbow runner	65.3	0.47	Skipjack tuna	7080.0	50.41
Yellowfin tuna	4782.7	34.05	Kawakawa	11.1	0.08
Total all species:	14044.5	100.00			

Table II.5.2

Tutuila February 1991
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Dolphin (mahimahi)	432.2	7.74	Blue marlin	890.7	15.96
Wahoo	194.3	3.48	Skipjack tuna	2008.1	35.98
Yellowfin tuna	2055.6	36.83			
Total all species:	5580.9	100.00			

Table II.5.3

Tutuila March 1991
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	134.6	0.91	Small barracuda	127.7	0.86
Sharks	958.3	6.46	Peacock grouper	73.3	0.49
Lunartail grouper	45.0	0.30	Blue lined snapper	403.8	2.72
Twinspot/red snapper	33.3	0.22	Humpback snapper	40.5	0.27
Gray jobfish	235.4	1.59	Opakapaka	216.2	1.46
Onaga (red snapper)	349.6	2.35	Ehu (red snapper)	258.7	1.74
Ambon emperor	84.2	0.57	Squirrelfish	88.3	0.60
Dolphin (mahimahi)	101.8	0.69	Blue marlin	3133.4	21.11
Rainbow runner	27.1	0.18	Skipjack tuna	5573.1	37.54
Yellowfin tuna	2960.1	19.94			
Total all species:	14844.7	100.00			

Table II.5.4

Tutuila April 1991
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Barracudas	164.3	1.70	Small barracuda	55.6	0.57
Blue lined snapper	170.6	1.76	Onespot snapper	14.8	0.15
Humpback snapper	63.0	0.65	Gray jobfish	44.5	0.46
Opakapaka	96.4	1.00	Goldenline bream	13.0	0.13
Longnose emperor	29.7	0.31	Ambon emperor	233.6	2.41
Redgill emperor	74.2	0.77	Dolphin (mahimahi)	122.2	1.26
Blue marlin	1955.8	20.18	Wahoo	185.4	1.91
Skipjack tuna	4471.7	46.15	Dogtooth tuna	59.3	0.61
Yellowfin tuna	1935.4	19.97			
Total all species:	9689.6	100.00			

Table II.5.5

Tutuila May 1991
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Small barracuda	32.6	0.94	Groupers	36.2	1.05
Giant grouper	54.3	1.57	Lunartail grouper	14.5	0.42
Blue lined snapper	225.1	6.50	Gray jobfish	141.1	4.08
Onaga (red snapper)	173.7	5.02	Redgill emperor	301.8	8.72
Dolphin (mahimahi)	224.3	6.48	Skipjack tuna	398.0	11.50
Dogtooth tuna	45.6	1.32	Yellowfin tuna	1812.8	52.39
Total all species:	3459.9	100.00			

Table II.5.6

Tutuila June 1991
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Black jack	84.1	1.82	Barracudas	76.8	1.66
Large barracuda	46.1	1.00	Small barracuda	78.9	1.70
Sharks	657.9	14.19	Groupers	46.1	0.99
Giant grouper	25.4	0.55	Lunartail grouper	93.6	2.02
Blue lined snapper	219.3	4.73	Onespot snapper	12.7	0.27
Twinspot/red snapper	9.5	0.21	Gray jobfish	144.3	3.11
Lehi (silverjaw)	49.3	1.06	Onaga (red snapper)	69.8	1.51
Emperors (misc)	85.1	1.83	Longnose emperor	120.6	2.60
Redgill emperor	300.6	6.48	Rudderfish	19.7	0.43
Lined surgeon	214.5	4.63	Yellow eyed surgeon	25.0	0.54
Dussumier's surgeon	14.8	0.32	Unicornfish	36.2	0.78
Squirrelfish	78.9	1.70	Saber squirrelfish	31.1	0.67
Parrotfish	146.7	3.17	Skipjack tuna	1585.3	34.20
Dogtooth tuna	117.3	2.53	Albacore	131.6	2.84
Spiny lobster	113.8	2.46			
TOTAL ALL SPECIES:	4635.2	100.00			

Table II.5.7

Tutuila July 1991
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	63.7	1.17	Black jack	4.1	0.08
Large barracuda	66.7	1.23	Sharks	936.3	17.19
Peacock grouper	19.3	0.35	Lunartail grouper	23.2	0.43
Blue lined snapper	29.2	0.54	Humpback snapper	16.7	0.31
Yellowtail snapper	3.2	0.06	Lehi (silverjaw)	30.7	0.56
Emperors (misc)	20.6	0.38	Ambon emperor	8.4	0.15
Squirrelfish	3.2	0.06	Parrotfish	8.8	0.16
Dolphin (mahimahi)	50.1	0.92	Skipjack tuna	2069.5	37.99
Dogtooth tuna	60.3	1.11	Albacore	1373.1	25.21
Yellowfin tuna	660.8	12.13			
Total all species:	5447.7	100.00			

Table II.5.8

Tutuila August 1991
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	140.9	1.71	Small barracuda	125.4	1.52
Sharks	170.3	2.07	Eels	63.4	0.77
Groupers	24.9	0.30	Peacock grouper	217.0	2.63
Flagtail grouper	14.4	0.17	Lunartail grouper	67.7	0.82
Blue lined snapper	204.2	2.48	Onespot snapper	16.6	0.20
Humpback snapper	204.8	2.49	Gray jobfish	147.6	1.79
Opakapaka	24.3	0.29	Longnose emperor	9.7	0.12
Ambon emperor	129.7	1.57	Orangespot emperor	65.8	0.80
Redgill emperor	154.7	1.88	Cardinalfish	16.3	0.20
Lined surgeon	151.6	1.84	Unicornfish (misc)	174.5	2.12
Squirrelfish	99.6	1.21	Parrotfish	166.2	2.02
Dolphin (mahimahi)	463.2	5.62	Wahoo	314.1	3.81
Skipjack tuna	3632.7	44.08	Dogtooth tuna	38.3	0.47
Yellowfin tuna	805.8	9.78	Kawakawa	42.8	0.52
Crabs	67.9	0.82	Spiny lobster	486.6	5.90
Total all species:	8241.2	100.00			

Table II.5.9

Tutuila September 1991
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Black jack	69.5	1.52	Small barracuda	42.9	0.94
Sharks	59.1	1.29	Groupers	23.7	0.52
Peacock grouper	8.9	0.19	Lunartail grouper	65.2	1.42
Blue lined snapper	343.7	7.50	Twinspot/red snapper	53.2	1.16
Humpback snapper	99.1	2.16	Gray jobfish	47.3	1.03
Hawaiian opakapaka	5.9	0.13	Opakapaka	173.0	3.77
Bigeye emperor	14.8	0.32	Longnose emperor	567.7	12.39
Redgill emperor	192.2	4.19	Snake mackerel	1.5	0.03
Sweepers	122.7	2.68	Triggerfish	10.3	0.23
Dolphin (mahimahi)	88.7	1.94	Rainbow runner	6.7	0.15
Wahoo	29.6	0.65	Skipjack tuna	1345.4	29.35
Dogtooth tuna	45.8	1.00	Albacore	147.8	3.23
Yellowfin tuna	1018.6	22.23			
Total all species:	4583.2	100.00			

Table II.5.10

Tutuila October 1991
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	45.3	0.73	Black jack	95.2	1.54
Barracudas	102.6	1.66	Sharks	231.5	3.75
Groupers	51.1	0.83	Peacock grouper	95.5	1.55
Lunartail grouper	205.5	3.33	Blue lined snapper	65.7	1.06
Twinspot/red snapper	125.2	2.03	Humpback snapper	191.8	3.10
Gray jobfish	549.7	8.90	Opakapaka	75.2	1.22
Lehi (silverjaw)	53.7	0.87	Onaga (red snapper)	127.3	2.06
Ehu (red snapper)	396.2	6.41	Kusakar's snapper	626.1	10.13
Goldenline bream	92.5	1.50	Longnose emperor	264.0	4.27
Redgill emperor	222.7	3.60	Squirrelfish	42.2	0.68
Dolphin (mahimahi)	99.6	1.61	Wahoo	77.6	1.26
Skipjack tuna	932.7	15.10	Dogtooth tuna	311.9	5.05
Yellowfin tuna	1050.3	17.00	Kawakawa	47.4	0.77
Total all species:	6178.8	100.00			

Table II.5.11

Tutuila November 1991
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Jacks	126.7	1.41	Black jack	225.7	2.52
Barracudas	96.1	1.07	Large barracuda	45.9	0.51
Small barracuda	66.2	0.74	Groupers	93.3	1.04
Peacock grouper	17.7	0.20	Flagtail grouper	6.1	0.07
Yellowspot grouper	187.4	2.09	Lunartail grouper	129.3	1.44
Blue lined snapper	441.0	4.91	Onespot snapper	4.9	0.05
Twinspot/red snapper	89.7	1.00	Humpback snapper	290.5	3.24
Gray jobfish	911.2	10.15	Lehi (silverjaw)	84.0	0.94
Ehu (red snapper)	214.2	2.39	Kusakar's snapper	97.9	1.09
Longnose emperor	314.6	3.51	Ambon emperor	53.2	0.59
Redgill emperor	484.1	5.39	Rudderfish	14.4	0.16
Squirrelfish	7.6	0.09	Triggerfish	1.5	0.02
Rainbow runner	35.5	0.40	Skipjack tuna	3936.0	43.86
Dogtooth tuna	273.6	3.05	Yellowfin tuna	718.5	8.01
Kawakawa	7.7	0.09			
Total all species:	8974.8	100.00			

Table II.5.12

Tutuila December 1991
Offshore Creel Survey Species Composition

Common Name	Total Pounds	% SP. Comp.	Common Name	Total Pounds	% SP. Comp.
Blue marlin	878.0	5.52	Skipjack tuna	4547.2	28.57
Yellowfin tuna	10488.3	65.91			
Total all species:	15913.5	100.00			

Figure II.5.1

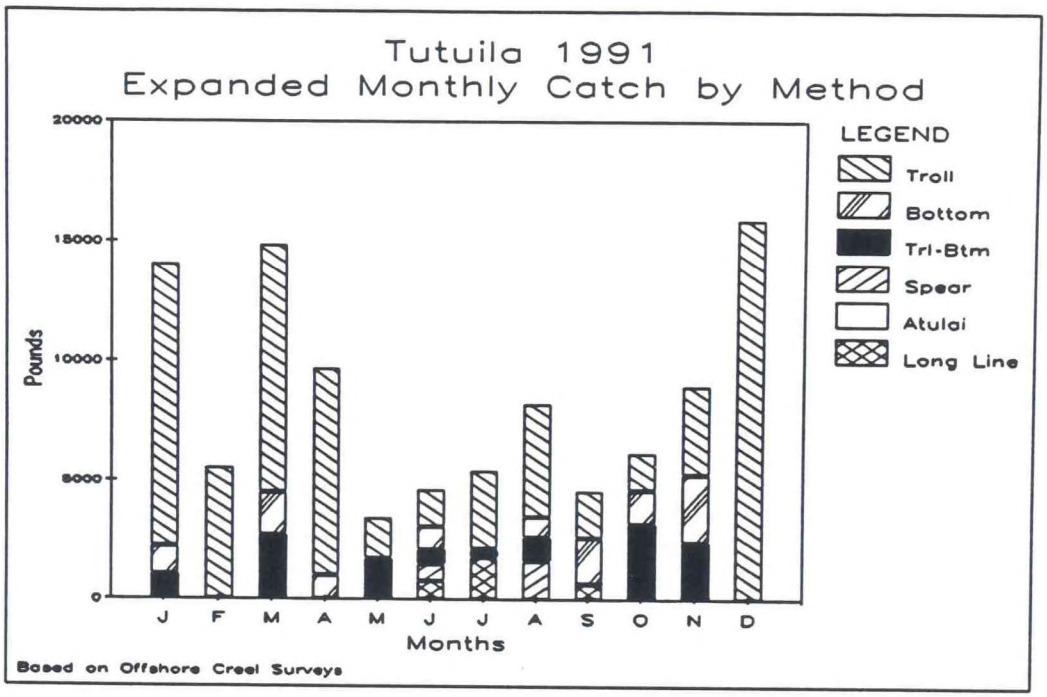


Figure II.5.2

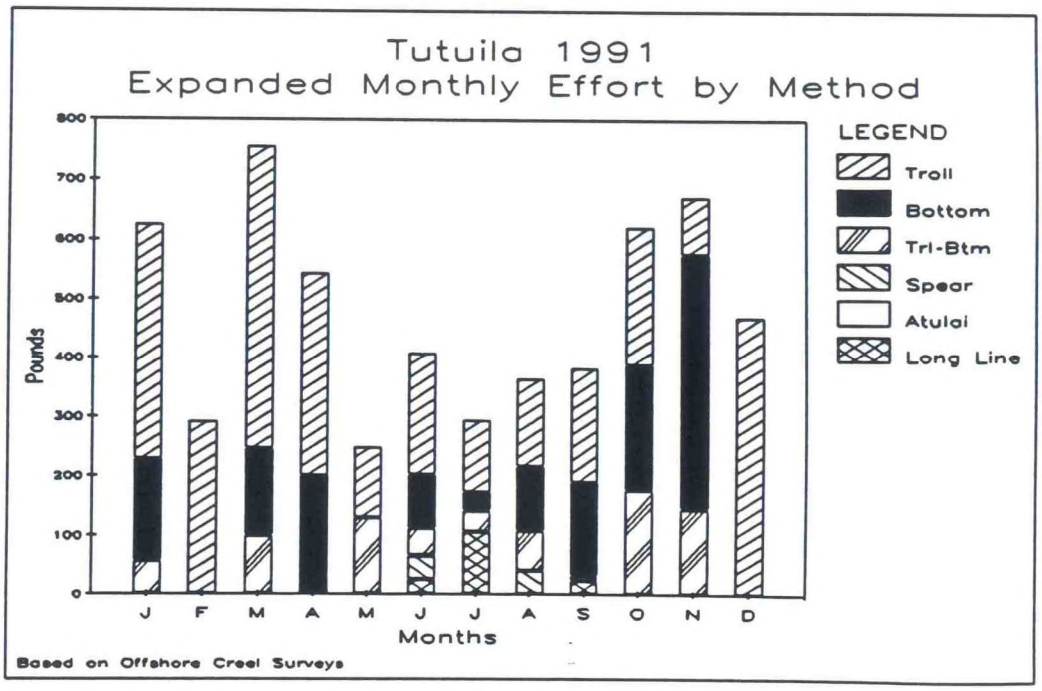
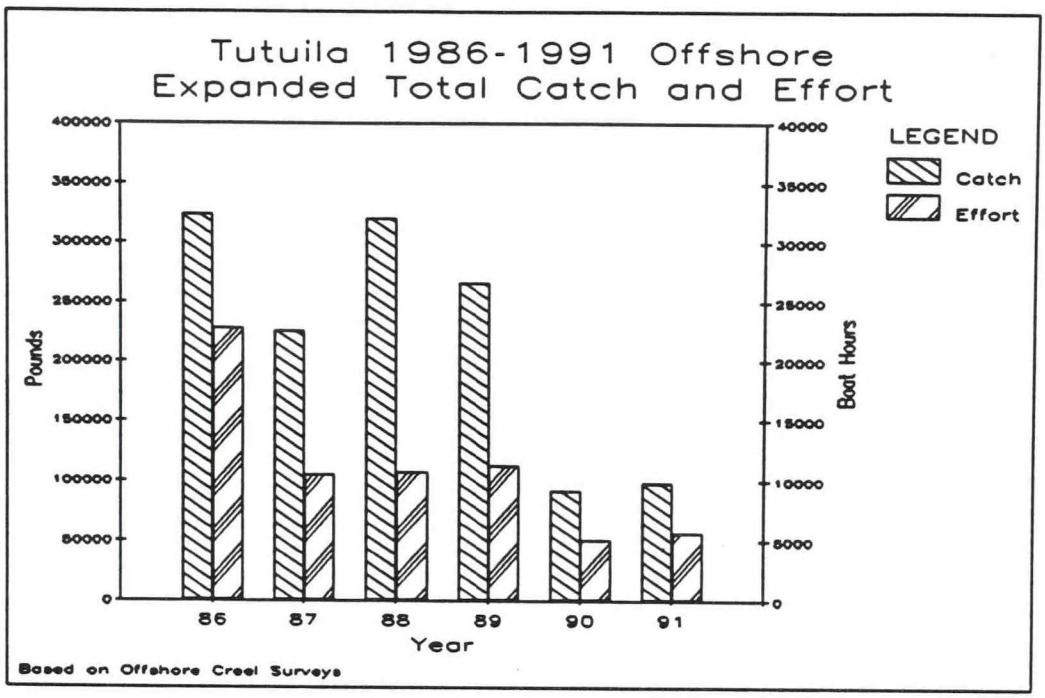
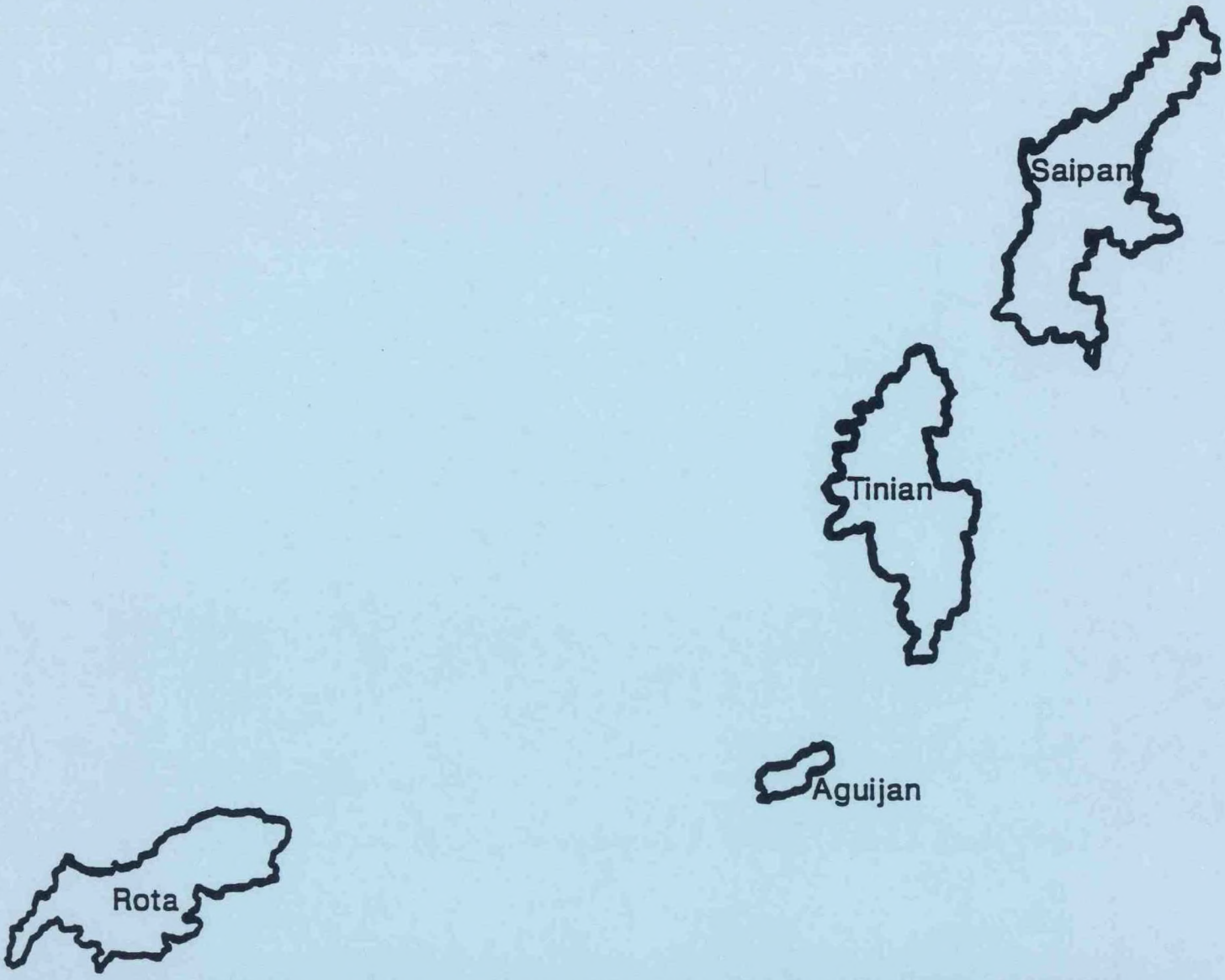


Figure II.5.3


Tutuila 1986-1991 Offshore
Expanded Total Catch and Effort
LEGEND
Catch
Effort
Pounds
Boat Hours
400000
380000
300000
250000
200000
150000
100000
50000
0
40000
35000
30000
25000
20000
15000
10000
5000
0
86
87
88
89
90
91
Year
Based on Offshore Creel Surveys



Commonwealth of the Northern Mariana Islands

Fishery Statistics 1991

COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS
1991 FISHERY STATISTICS

Compiled by

Division of Fish and Wildlife

and the

Western Pacific Fishery Information Network

November 1992

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COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS
1991 FISHERY STATISTICS

INTRODUCTION

The Commonwealth of the Northern Mariana Islands (CNMI) comprises a string of islands located at about long. 145° E and extending northward from about lat. 14 to 21° N. About 99% of the approximately 21,000 inhabitants of the CNMI live on the three main islands, Saipan (87%), Rota (7%), and Tinian (5%). The Division of Fish and Wildlife (DFW) has been collecting fishery statistics on the commercial fishing fleet of Saipan since the mid-1970's. In 1983, DFW also began collecting information on vessels transshipping tuna out of Tinian. Significant improvements to the data collecting and processing systems were made in 1982 when microcomputer hardware, software, and training were provided by the WPACFIN program.

The major domestic commercial fishery of the CNMI is a small boat, one-day troll fishery. Most of the boats are 12- to 24-foot outboard-powered, runabout-type vessels; however, a few larger boats are also used. In the past few years, there has been a fairly rapid increase in the number of boats in the CNMI, about 70% of which are used in the commercial fisheries. Although trolling is by far the most common fishing method, many boats are also used for bottom fishing and reef fishing activities. Reef fish are an important component of the local diet and are a significant portion of the total commercial catch. Additionally, an increasing amount of reef fish is being imported from other Pacific islands to meet the local demand. In recent years, several larger boats have started fishing more intensively for bottom fish around the islands north of Saipan. The vast majority of the domestic catch is consumed locally, but there have been some exports of fish to Guam and Hawaii.

Beginning in 1983, fishing vessels from several nations began using the Tinian harbor as a port to off-load tuna catches to large transshipment vessels. In 1991, transshipments out of Tinian totaled nearly 68,000 metric tons, of which 68% were made by 18 U.S. registered purse seiners.

DATA COLLECTING SYSTEM

The principal method used by DFW to collect domestic commercial fisheries data is a dealer invoicing system, sometimes referred to as a "trip ticket" system. The DFW provides numbered two-part invoices to all purchasers of fresh fishery products, including hotels, restaurants, stores, fish markets, and roadside vendors. Dealers complete an invoice each time they purchase fish directly from fishermen. They keep one copy for their records and provide one copy to DFW. Some advantages of this

method of data collection are that it is relatively inexpensive to implement and maintain, nearly complete coverage of the commercial fisheries is fairly easy to accomplish, and DFW can provide feedback to dealers and fishermen to ensure data accuracy and continued cooperation. Disadvantages include a dependence on non-DFW personnel to identify the catch and record the data, the types of data that can be collected are somewhat restricted, education and cooperation of all fish purchasers are required, and only the fish that are actually sold to dealers are recorded and a potentially important portion of the total landings is unrecorded. Since 1982, DFW has tried to minimize these disadvantages as much as possible by maintaining a close working relationship with dealers, by educating and adding new dealers to their list as they enter the business, and by implementing a creel survey to help estimate total catch, including recreational and subsistence catch.

The current system collects data from dealers on the island of Saipan, where DFW estimates over 90% of all CNMI commercial landings are made. The DFW further estimates that the proportion of total commercial landings that is recorded in the data base for Saipan since 1983 is over 90%.

Information collected for each commercial purchase of fish from the fishermen includes the following:

Date
Buyer's name (dealer)
Seller's name (fisherman)
Species
Weight (pounds)
Price per pound
Value
Invoice number

All of these data elements are collected for all purchases of fishery products; however, species identification is frequently made only to a group level, especially for reef fish.

DATA PROCESSING SYSTEM

At the beginning of each month, a DFW employee visits each of the dealers on Saipan to obtain the previous month's invoices, resolve problems, and answer any questions the dealer may have. The invoices are returned to the office for an initial visual edit during the coding process, and are then entered into the "Purchase" data base on the microcomputer. After the records are entered, reports are generated to help verify that all data were entered correctly. On a quarterly basis, copies of the data base are sent to the Honolulu Laboratory, where the data are transferred to the central computer for additional editing and verification before generation of summary reports. These reports

and databases are then ready for use by qualified WPACFIN participants.

DATA REPORTING SYSTEM

After all editing and quality control activities have been accomplished, monthly and annual summary reports by species are generated. Each of the following reports for 1991 contains information on the pounds, value and the average price per pound. Each monthly report contains a subtotal for the sum of all species for that month, and the December report also includes the annual total. Annual reports contain the total landings for each species and the total recorded landings for all species for the calendar year.

The following species, species groups, and abbreviations are used in the tables and graphs of CNMI's data:

I. Pelagic Management Unit Species (PMUS)

Dolphin (mahimahi)
Marlin
Shortbill spearfish
Sailfish
Wahoo
Sharks

II. Bottomfish Management Unit Species (BMUS)

Jacks (unclassified, but excluding bigeye scad)
Bottom fish (unclassified)
Ehu (red snapper)
Gindai (flower snapper)
Grouper (unclassified)
Kalikali (pink snapper)
Lehi (silverjaw snapper)
Onaga (red or longtail snapper)
Opakapaka (pink snapper)
Uku (gray snapper)
Emperorfish

III. Billfish

Marlin (probably all blue marlin but could also include the rarely landed striped and black marlin)
Shortbill spearfish
Sailfish

IV. Tunas

Tunas (unclassified)
Skipjack tuna
Yellowfin tuna
Dogtooth tuna

V. Other Tuna

The above tunas excluding skipjack and yellowfin tuna

VI. Fisheries Categories

A. Pelagics

All PMUS and tuna species plus the following:
Troll fish (unclassified)
Barracuda
Rainbow runner

B. Bottom Fish

Same as BMUS

C. Reef Fish

Reef fish (unclassified)
Giant wrasse
Rabbitfish (hitting, hitting feda, menahac, and sesjun)
Rudderfish
Squirrelfish
Parrotfish
Snapper
Surgeonfish
Unicornfish
Goatfish

D. Other

Miscellaneous
Bigeye scad
Mullet
Eels
Milkfish
Invertebrates (unclassified)
Crabs (unclassified)
Coconut crab
Lobster
Shrimp
Octopus
Squid
Turtle
Seaweeds
Imported

Table III.1.1

CNMI 1991 Commercial Landings

Species	Pounds	Value	$/lb
Assorted	240	493	2.05
Bigeye scad (atulai)	499	918	1.84
Jacks	140	286	2.04
Mullet	629	1,140	1.81
Bottom fish	3,437	9,082	2.64
Grouper	504	1,462	2.90
Onaga (red snapper)	140	682	4.87
Opakapaka (pink snp)	503	1,765	3.51
Reef fish	93,821	165,466	1.76
Rabbitfish (hitting)	3,086	6,950	2.25
Rudderfish (guilli)	1,055	2,239	2.12
Emperor (mafute)	969	2,841	2.93
Squirrelfish	49	146	3.01
Parrotfish	3,849	9,157	2.38
Surgeonfish	279	538	1.93
Unicornfish	600	1,122	1.87
Goatfish	886	2,009	2.27
Troll fish	16,315	24,807	1.52
Barracuda	54	111	2.06
Dolphin (mahimahi)	27,005	50,657	1.88
Marlin	1,320	2,223	1.68
Sailfish	105	263	2.50
Rainbow runner	168	419	2.50
Wahoo	1,217	3,161	2.60
Tunas	3	5	1.50
Skipjack tuna	92,642	160,956	1.74
Dogtooth tuna	1,653	3,727	2.25
Yellowfin tuna	10,433	24,701	2.37
Lobster	3,156	15,915	5.04
Octopus	18	53	2.90
Shrimp (saltwater)	44	308	7.00
** TOTAL **	264,819	493,601	1.86

Table III.1.2

CNMI January 1991 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	44	88	2.00
Mullet	48	132	2.75
Bottom fish	145	413	2.85
Reef fish	10,707	17,266	1.61
Rabbitfish (hitting)	653	1,488	2.28
Emperor (mafute)	193	578	3.00
Parrotfish	478	985	2.06
Barracuda	35	70	2.00
Dolphin (mahimahi)	7,149	13,936	1.95
Wahoo	401	1,217	3.03
Skipjack tuna	3,793	6,503	1.71
Dogtooth tuna	374	945	2.53
Yellowfin tuna	557	1,266	2.27
** SUBTOTAL **	24,577	44,888	1.83

Table III.1.3

CNMI February 1991 Commercial Landings

Species	Pounds	Value	$/lb
Mullet	52	130	2.50
Bottom fish	925	2,547	2.75
Opakapaka (pink snp)	77	269	3.50
Reef fish	8,212	13,757	1.68
Rabbitfish (hitting)	165	366	2.23
Emperor (mafute)	199	558	2.81
Parrotfish	96	295	3.07
Surgeonfish	17	34	2.00
Unicornfish	8	19	2.35
Goatfish	227	556	2.45
Troll fish	295	516	1.75
Dolphin (mahimahi)	9,704	16,759	1.73
Wahoo	61	153	2.50
Skipjack tuna	1,464	2,997	2.05
Yellowfin tuna	162	380	2.35
Lobster	8	28	3.50
** SUBTOTAL **	21,671	39,362	1.82

Table III.1.4

CNMI March 1991 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	295	443	1.50
Mullet	463	741	1.60
Bottom fish	72	216	3.00
Grouper	22	77	3.50
Reef fish	7,170	12,955	1.81
Rabbitfish (hitting)	302	618	2.05
Emperor (mafute)	133	459	3.45
Squirrelfish	19	65	3.50
Parrotfish	183	485	2.65
Troll fish	238	356	1.50
Dolphin (mahimahi)	6,323	10,614	1.68
Wahoo	77	200	2.58
Skipjack tuna	2,374	4,654	1.96
Yellowfin tuna	231	520	2.25
** SUBTOTAL **	17,900	32,403	1.81

Table III.1.5

CNMI April 1991 Commercial Landings

Species	Pounds	Value	$/lb
Mullet	19	43	2.26
Bottom fish	481	1,160	2.41
Grouper	64	188	2.92
Opakapaka (pink snp)	85	319	3.75
Reef fish	8,678	16,335	1.88
Rabbitfish (hitting)	451	1,024	2.27
Rudderfish (guilli)	52	121	2.33
Emperor (mafute)	375	1,028	2.74
Parrotfish	58	159	2.76
Unicornfish	24	56	2.35
Goatfish	457	1,031	2.26
Troll fish	1,260	1,890	1.50
Dolphin (mahimahi)	2,127	4,163	1.96
Wahoo	175	390	2.23
Skipjack tuna	9,957	17,067	1.71
Dogtooth tuna	118	245	2.08
Yellowfin tuna	550	1,256	2.28
Lobster	286	1,144	4.00
** SUBTOTAL **	25,217	47,619	1.89

Table III.1.6

CNMI May 1991 Commercial Landings

Species	Pounds	Value	$/lb
Mullet	47	94	2.00
Bottom fish	248	634	2.55
Grouper	186	531	2.86
Reef fish	4,481	7,217	1.61
Rabbitfish (hitting)	135	382	2.84
Emperor (mafute)	44	143	3.24
Parrotfish	128	439	3.42
Troll fish	294	368	1.25
Dolphin (mahimahi)	364	788	2.16
Marlin	66	116	1.75
Sailfish	105	263	2.50
Wahoo	30	68	2.25
Skipjack tuna	6,592	12,028	1.82
Dogtooth tuna	882	1,909	2.16
Yellowfin tuna	1,322	3,280	2.48
Lobster	24	168	7.00
** SUBTOTAL **	14,947	28,426	1.90

Table III.1.7

CNMI June 1991 Commercial Landings

Species	Pounds	Value	$/lb
Assorted	215	430	2.00
Bottom fish	409	927	2.27
Grouper	20	57	2.85
Onaga (red snapper)	22	110	5.00
Opakapaka (pink snp)	69	223	3.23
Reef fish	11,918	21,390	1.79
Rabbitfish (hitting)	186	470	2.53
Rudderfish (guilli)	87	196	2.25
Parrotfish	238	630	2.65
Goatfish	45	120	2.70
Troll fish	241	286	1.19
Dolphin (mahimahi)	46	92	2.00
Marlin	107	214	2.00
Skipjack tuna	13,866	21,753	1.57
Dogtooth tuna	86	172	2.00
Yellowfin tuna	1,534	3,582	2.34
Lobster	926	4,182	4.52
Shrimp (saltwater)	44	308	7.00
** SUBTOTAL **	30,058	55,142	1.83

Table III.1.8

CNMI July 1991 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	45	101	2.25
Bottom fish	408	986	2.42
Grouper	33	93	2.85
Onaga (red snapper)	118	572	4.84
Opakapaka (pink snp)	123	459	3.74
Reef fish	10,901	19,121	1.75
Rabbitfish (hitting)	95	249	2.63
Parrotfish	657	1,496	2.28
Surgeonfish	40	60	1.50
Unicornfish	50	135	2.70
Goatfish	46	124	2.70
Troll fish	176	237	1.35
Marlin	115	144	1.25
Skipjack tuna	10,030	16,434	1.64
Yellowfin tuna	486	892	1.83
Lobster	634	2,894	4.57
** SUBTOTAL **	23,956	43,996	1.84

Table III.1.9

CNMI August 1991 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	77	172	2.25
Bottom fish	37	222	6.00
Opakapaka (pink snp)	127	443	3.50
Reef fish	5,690	11,203	1.97
Rabbitfish (hitting)	22	68	3.14
Squirrelfish	30	81	2.70
Parrotfish	103	280	2.71
Unicornfish	20	54	2.70
Goatfish	111	178	1.60
Troll fish	497	746	1.50
Marlin	494	731	1.48
Wahoo	102	250	2.45
Skipjack tuna	6,694	12,063	1.80
Yellowfin tuna	297	717	2.42
Lobster	691	4,270	6.18
Octopus	7	27	4.00
** SUBTOTAL **	14,998	31,504	2.10

Table III.1.10

CNMI September 1991 Commercial Landings

Species	Pounds	Value	$/lb
Bottom fish	205	545	2.66
Grouper	81	239	2.94
Reef fish	5,346	10,066	1.88
Rabbitfish (hitting)	119	279	2.34
Parrotfish	172	524	3.04
Unicornfish	460	736	1.60
Troll fish	90	180	2.00
Marlin	267	569	2.13
Wahoo	46	115	2.50
Skipjack tuna	14,015	23,058	1.65
Yellowfin tuna	1,505	3,514	2.33
Lobster	342	2,358	6.90
** SUBTOTAL **	22,648	42,182	1.86

Table III.1.11

CNMI October 1991 Commercial Landings

Species	Pounds	Value	$/lb
Bottom fish	204	612	3.00
Grouper	97	276	2.83
Reef fish	7,360	13,450	1.83
Rabbitfish (hitting)	465	766	1.65
Emperor (mafute)	16	49	3.17
Parrotfish	126	414	3.28
Troll fish	363	545	1.50
Dolphin (mahimahi)	36	90	2.50
Marlin	228	386	1.69
Rainbow runner	150	375	2.50
Wahoo	107	244	2.28
Skipjack tuna	10,210	17,885	1.75
Yellowfin tuna	809	1,975	2.44
Lobster	182	648	3.56
Octopus	11	26	2.25
** SUBTOTAL **	20,366	37,741	1.85

Table III.1.12

CNMI November 1991 Commercial Landings

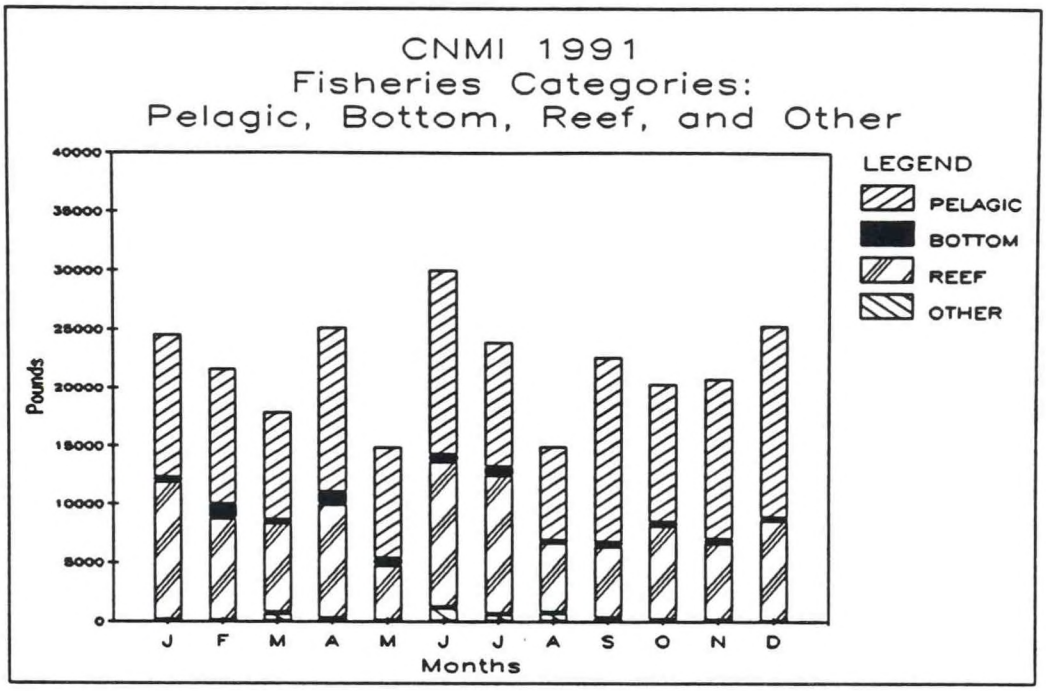
Species	Pounds	Value	$/lb
Assorted	25	63	2.50
Bigeye scad (atulai)	38	114	3.00
Jacks	132	264	2.00
Bottom fish	160	410	2.57
Reef fish	5,058	8,346	1.65
Rabbitfish (hitting)	163	391	2.40
Rudderfish (guilli)	136	306	2.25
Emperor (mafute)	6	17	3.00
Parrotfish	1,092	2,321	2.13
Surgeonfish	103	206	2.00
Unicornfish	38	122	3.18
Troll fish	5,978	9,303	1.56
Barracuda	5	20	4.00
Dolphin (mahimahi)	317	2,052	6.48
Marlin	43	65	1.50
Wahoo	108	269	2.50
Skipjack tuna	6,277	12,372	1.97
Dogtooth tuna	55	110	2.00
Yellowfin tuna	995	2,390	2.40
Lobster	40	140	3.53
** SUBTOTAL **	20,765	39,279	1.89

Table III.1.13

CNMI December 1991 Commercial Landings

Species	Pounds	Value	$/lb
Jacks	8	22	2.75
Bottom fish	144	410	2.85
Opakapaka (pink snp)	24	53	2.25
Reef fish	8,300	14,360	1.73
Rabbitfish (hitting)	331	849	2.56
Rudderfish (guilli)	780	1,616	2.07
Emperor (mafute)	5	10	2.00
Parrotfish	518	1,129	2.18
Surgeonfish	119	238	2.00
Troll fish	6,884	10,381	1.51
Barracuda	14	21	1.50
Dolphin (mahimahi)	939	2,163	2.31
Rainbow runner	18	44	2.46
Wahoo	110	257	2.34
Tunas	3	5	1.50
Skipjack tuna	7,371	14,143	1.92
Dogtooth tuna	139	346	2.50
Yellowfin tuna	1,986	4,929	2.48
Lobster	24	84	3.50
** SUBTOTAL **	27,716	51,059	1.84
** TOTAL **	264,819	493,601	1.86

Figure III.1.1



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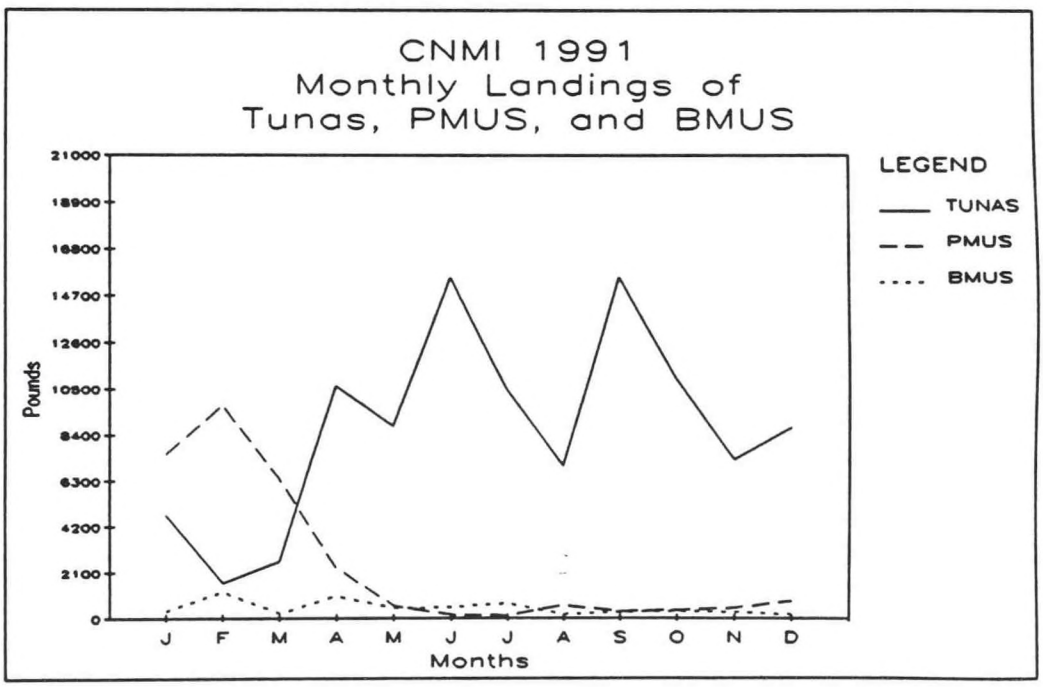

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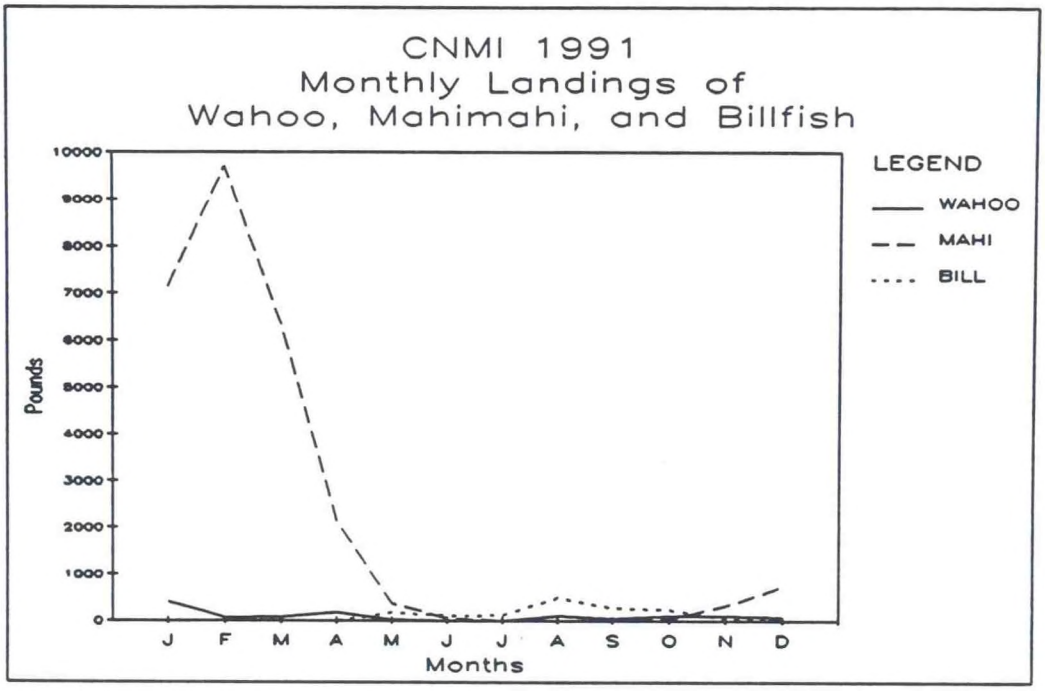

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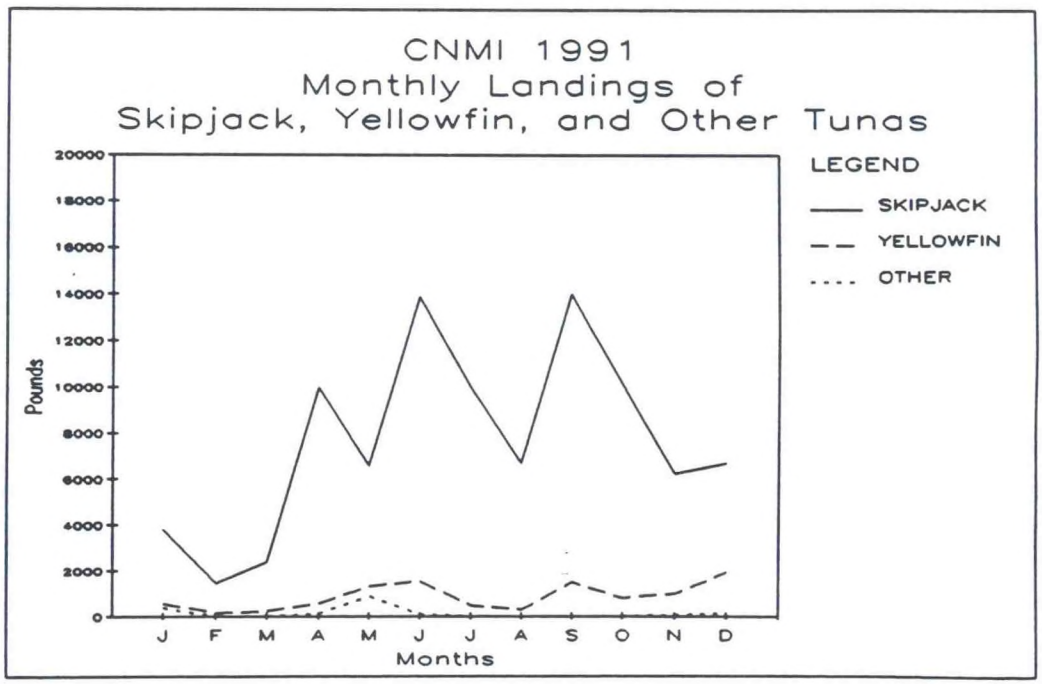

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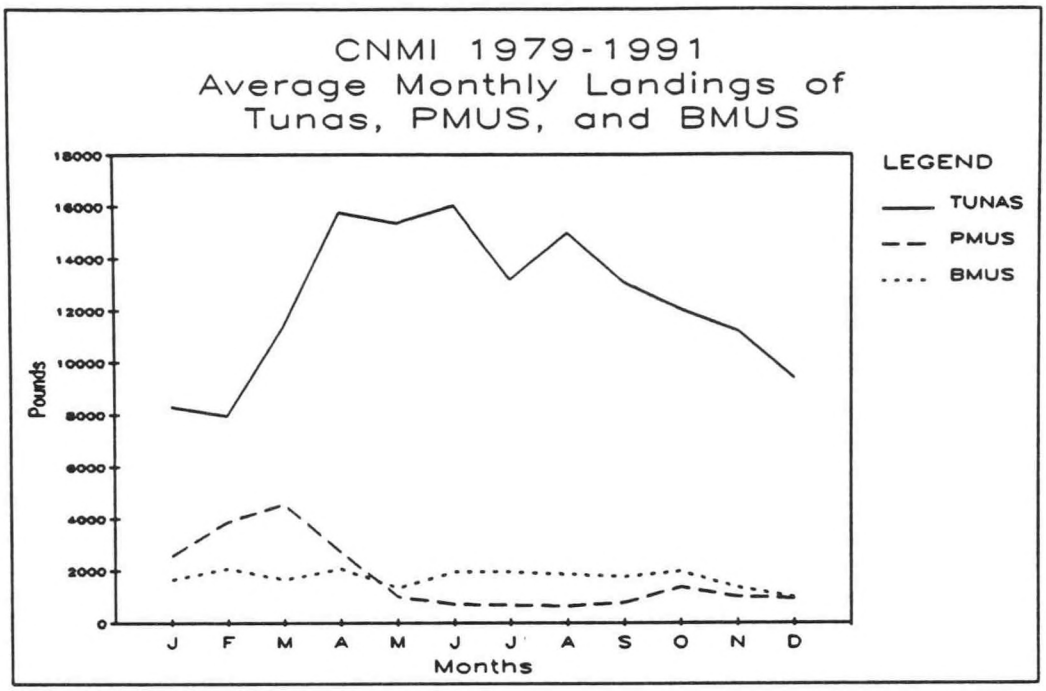

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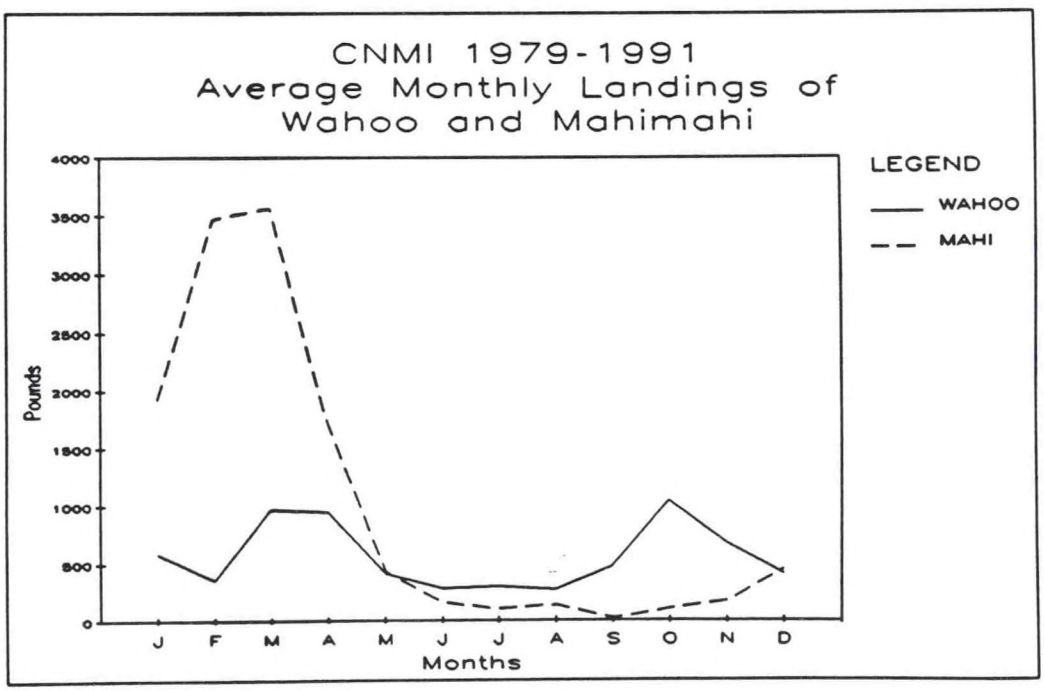

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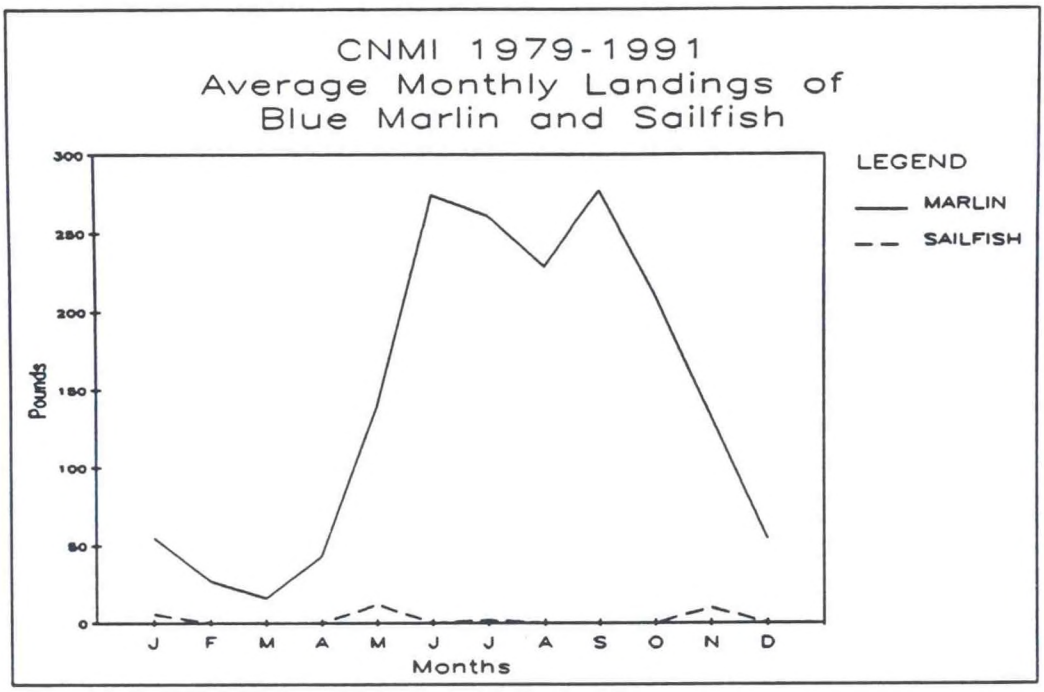

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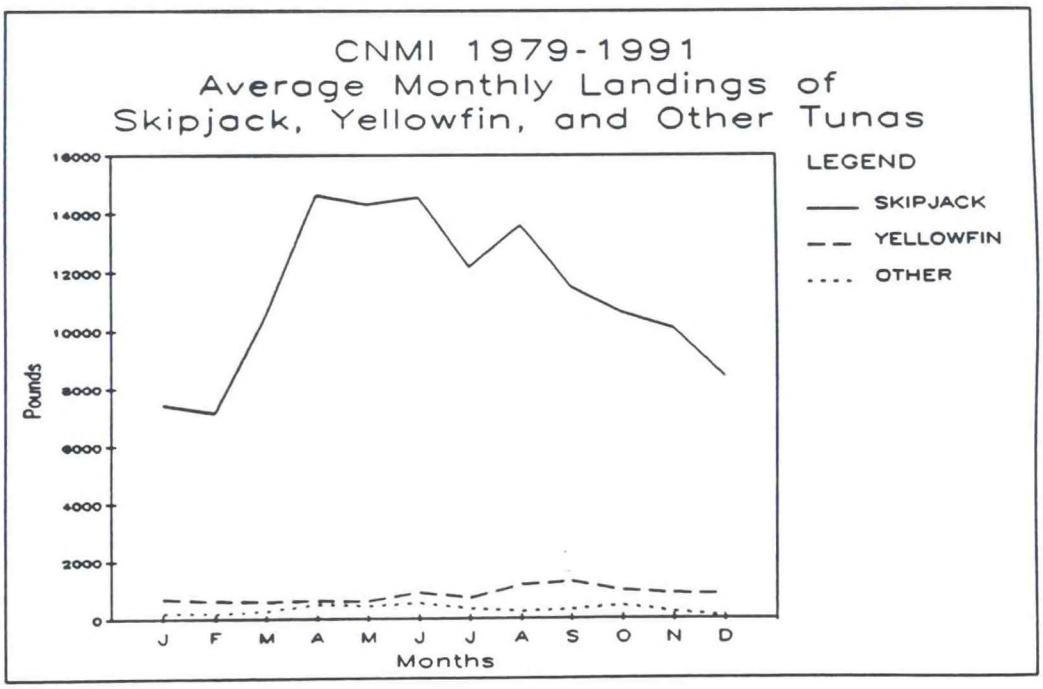

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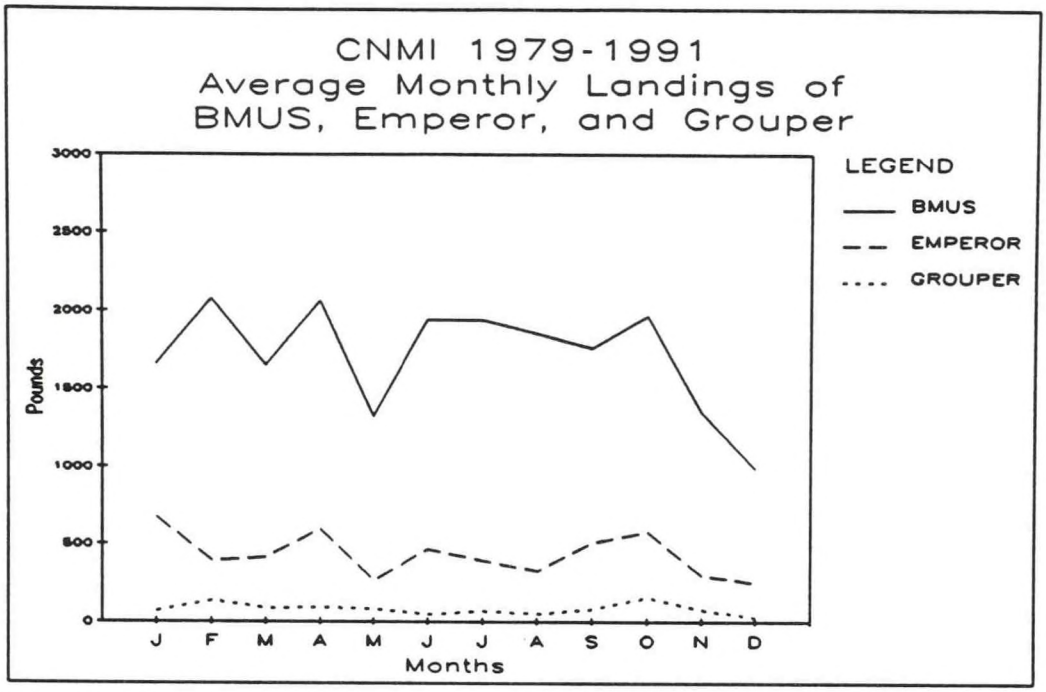

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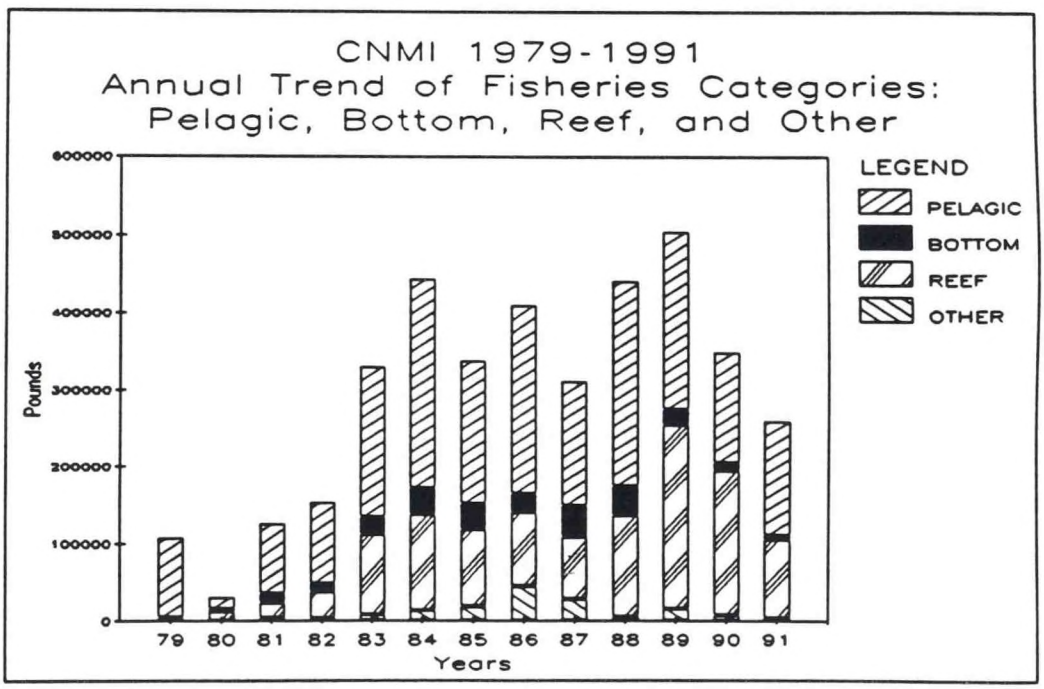

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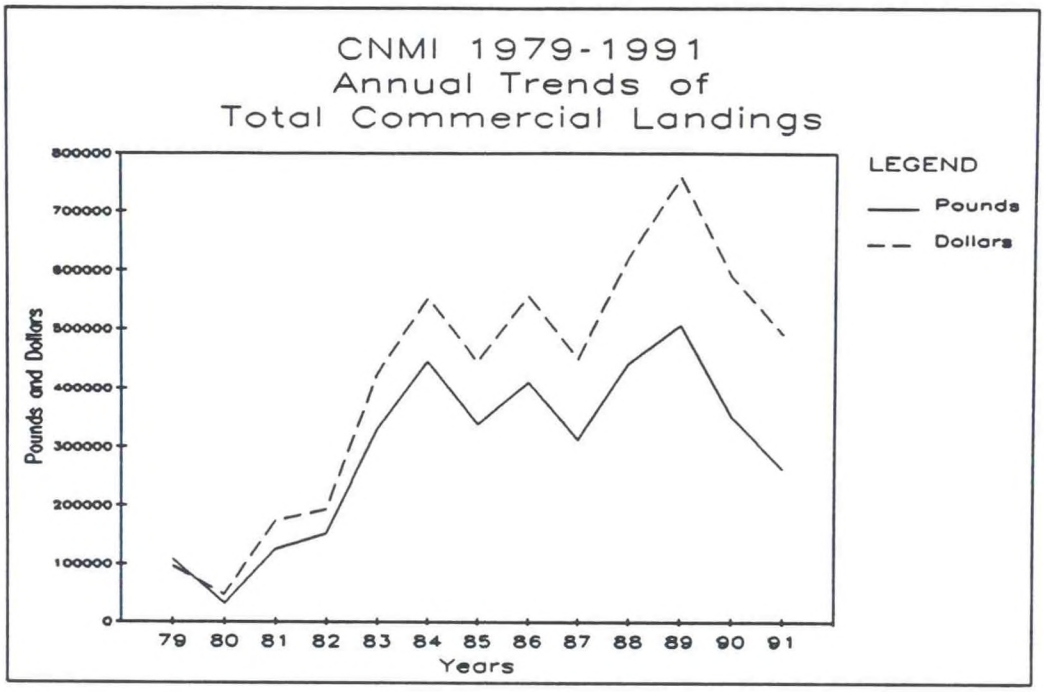

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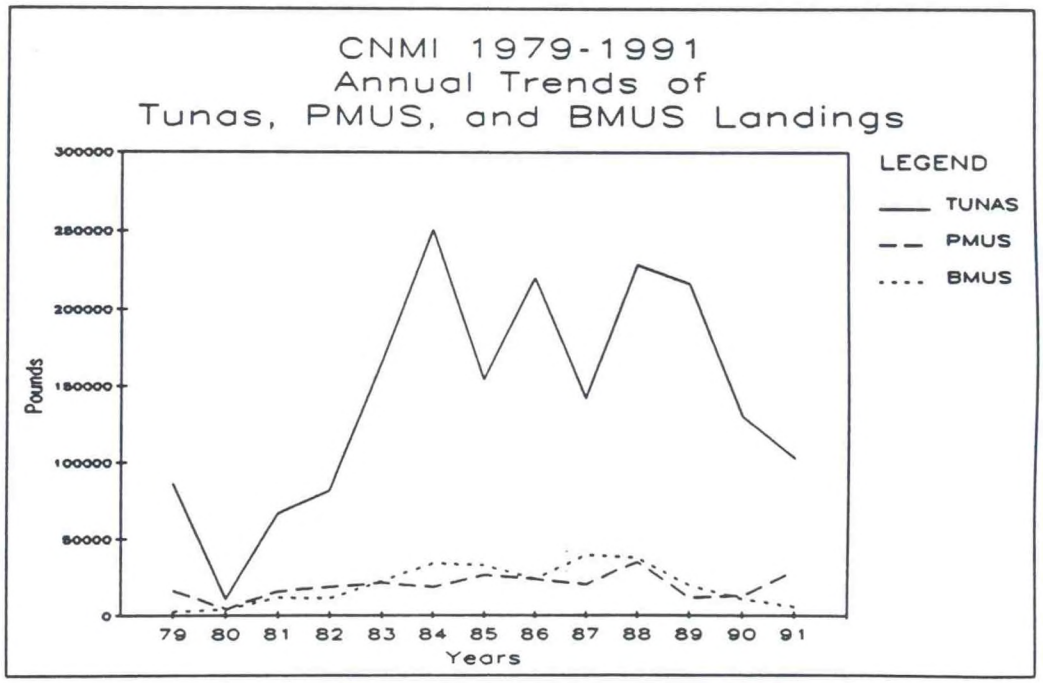

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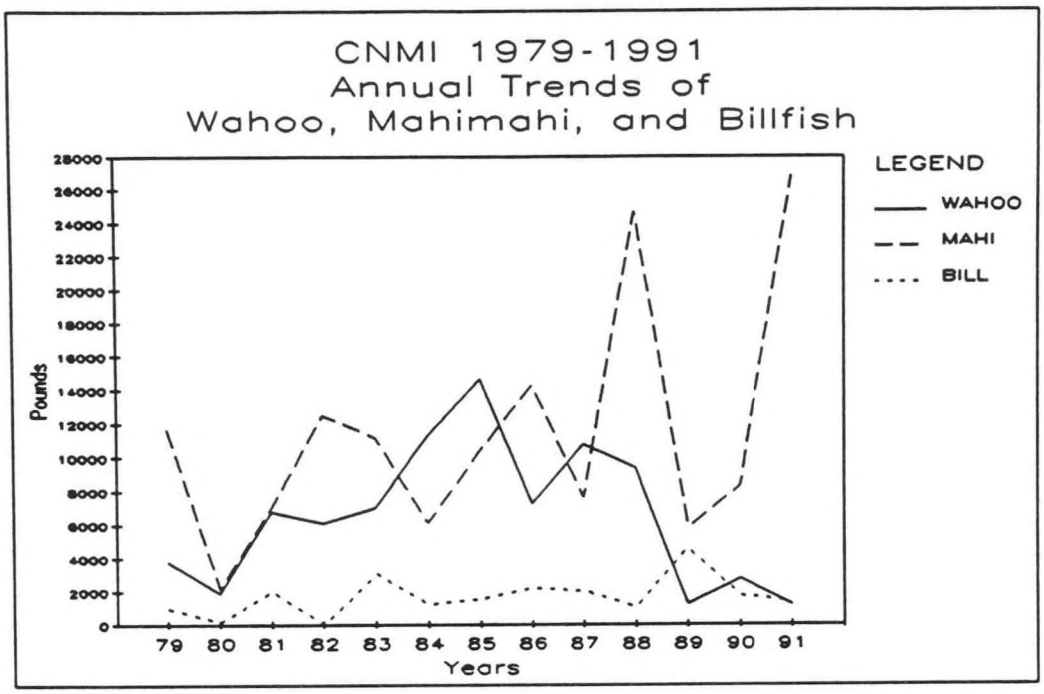

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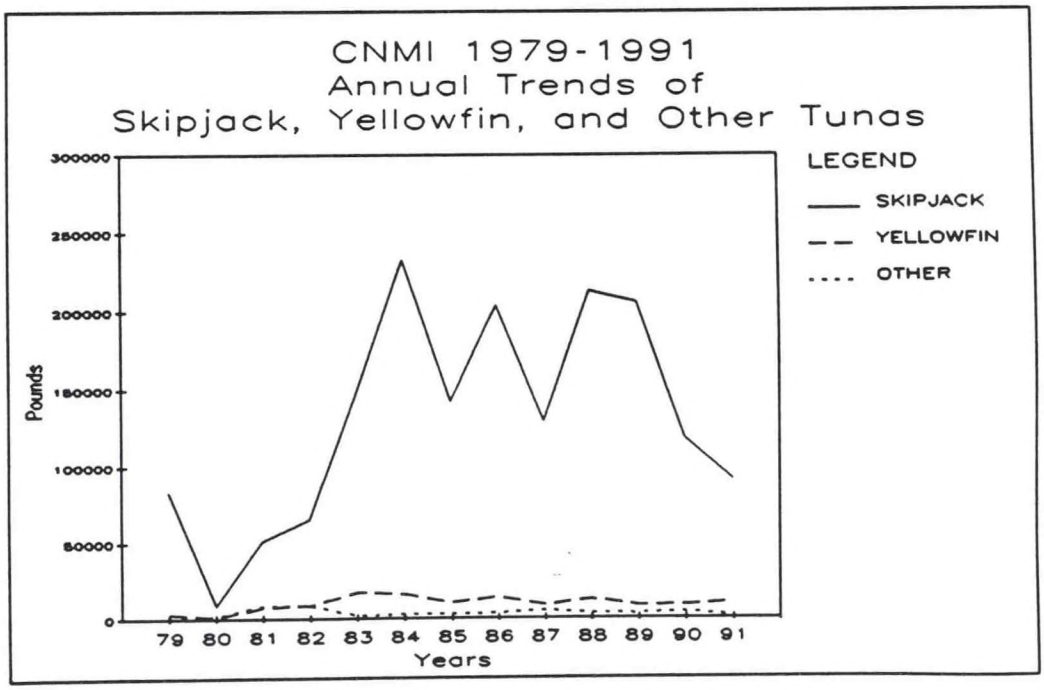

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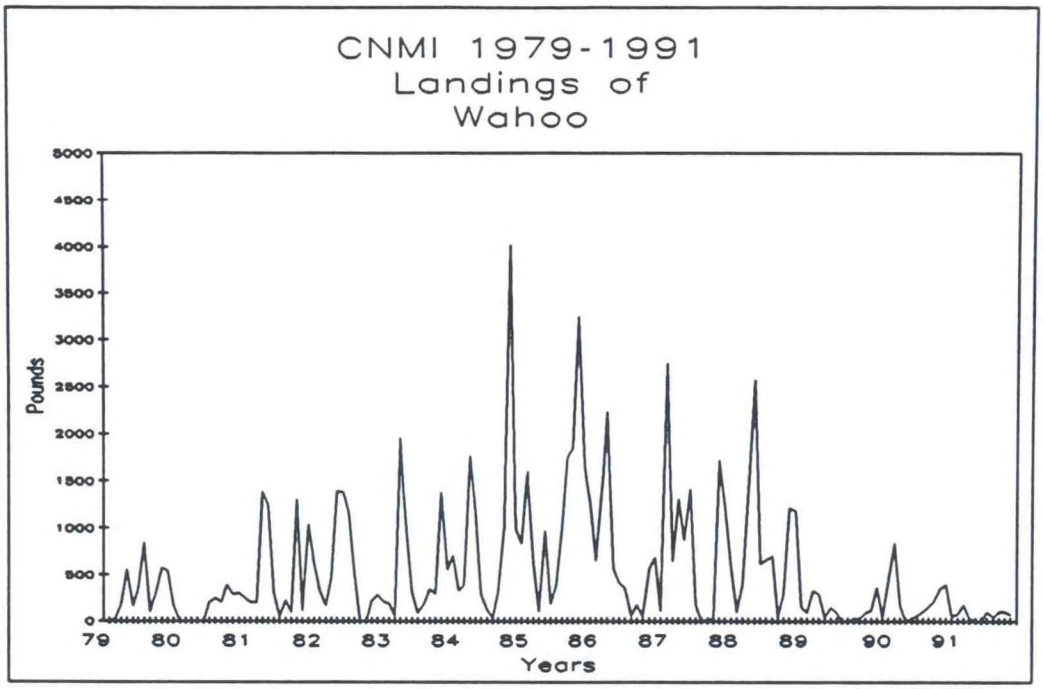

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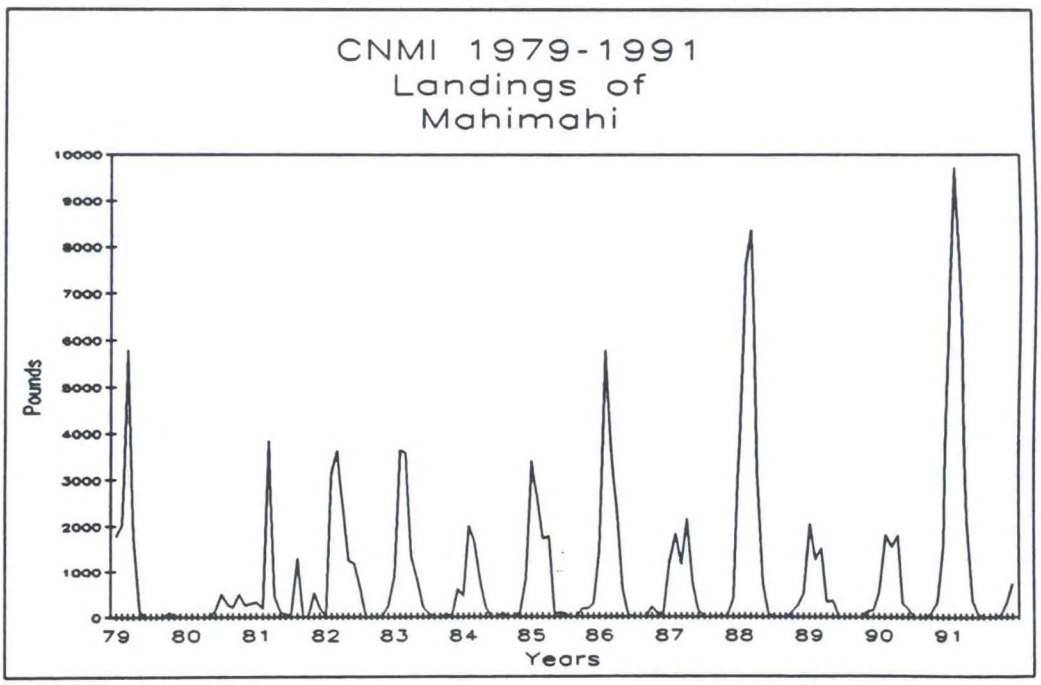

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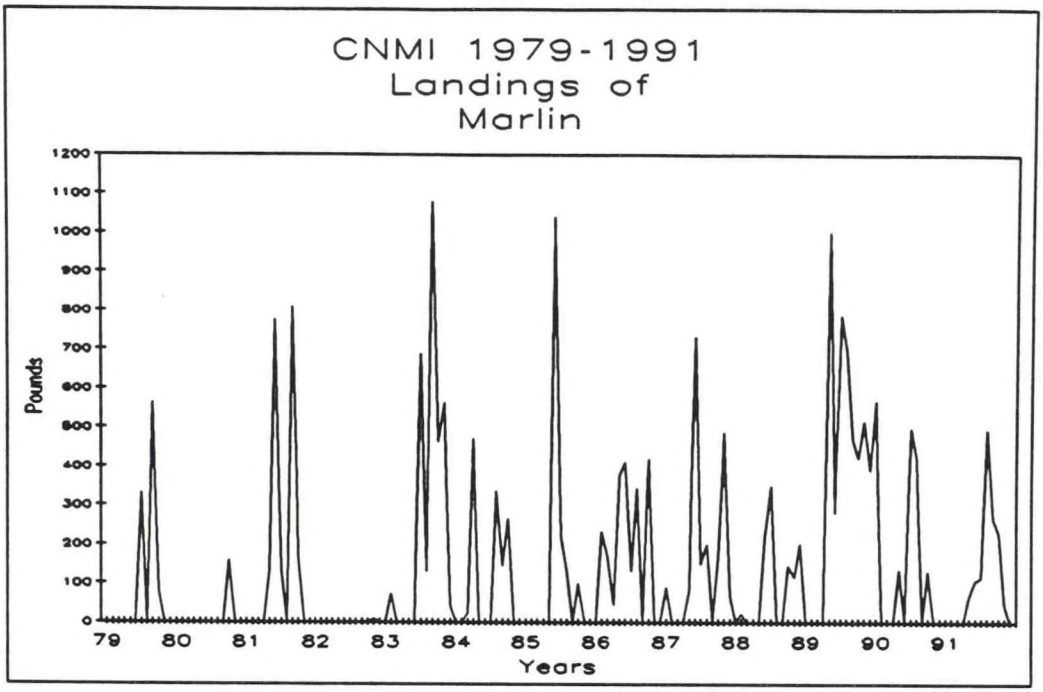

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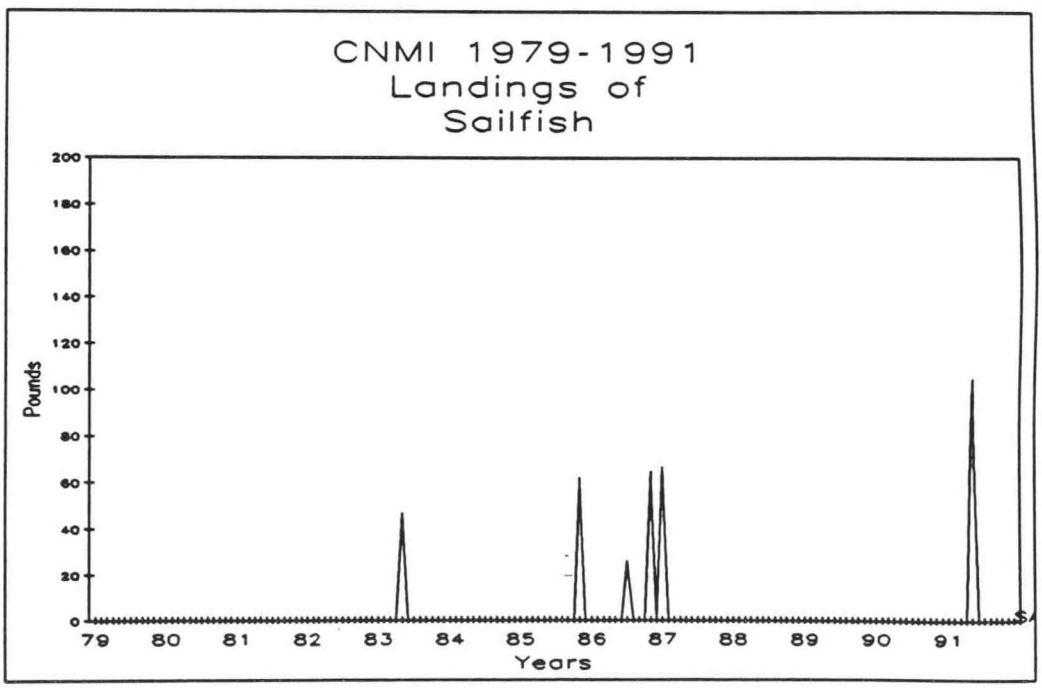

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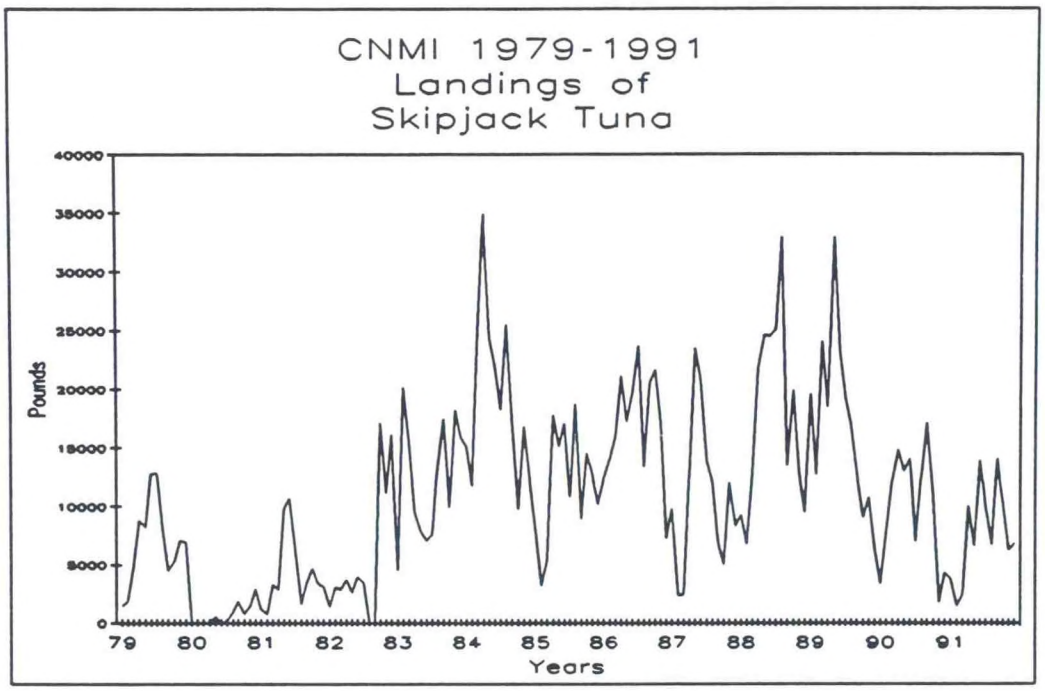

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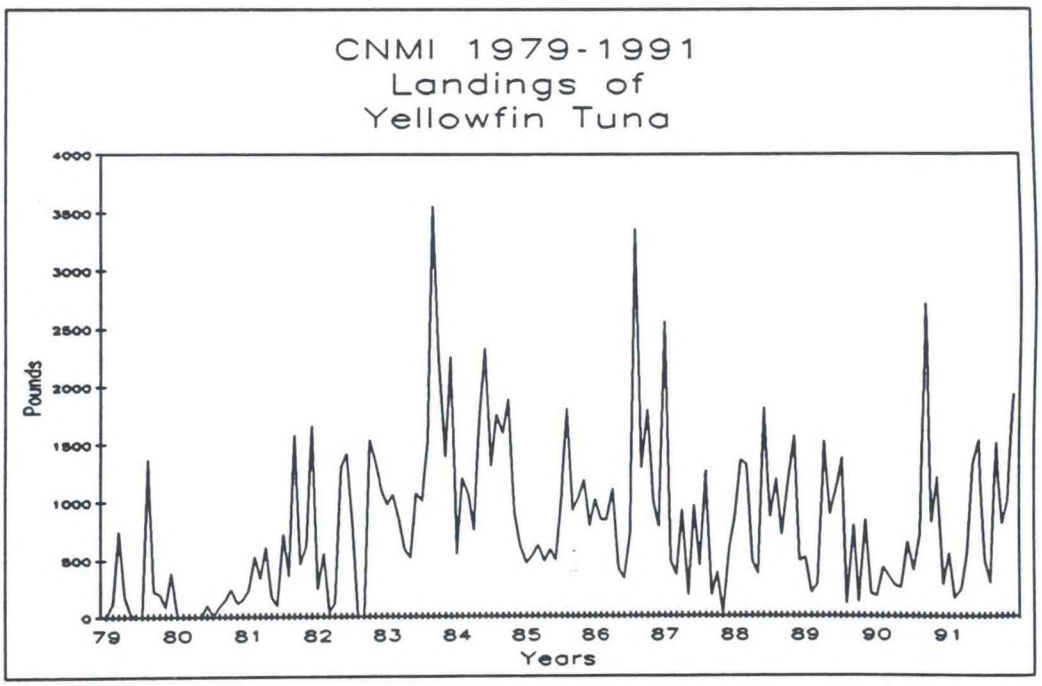

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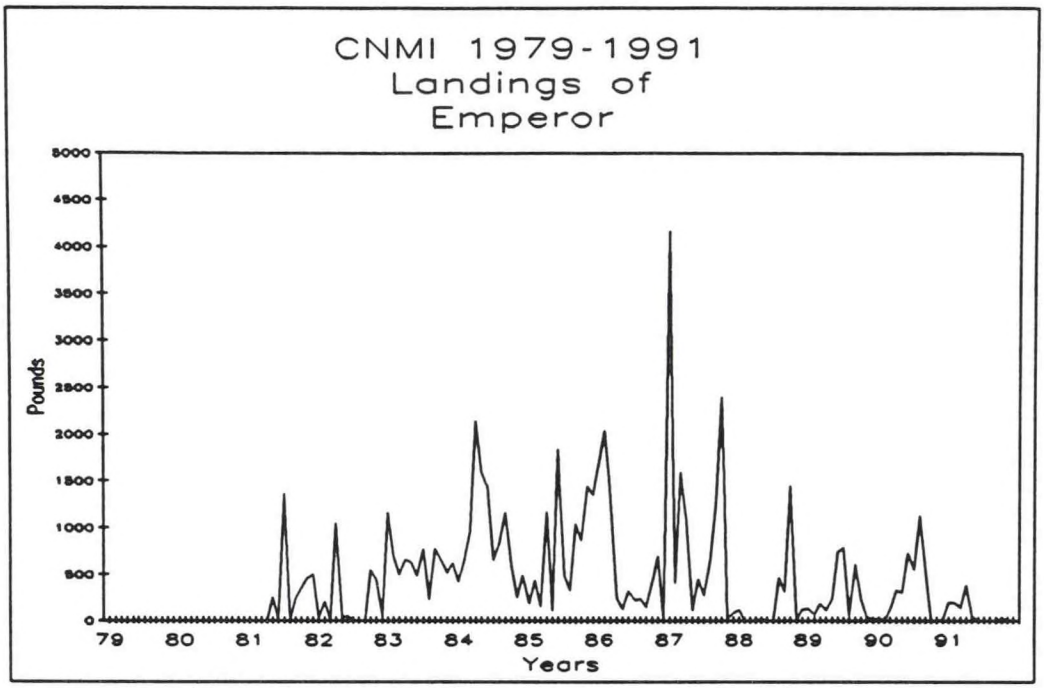

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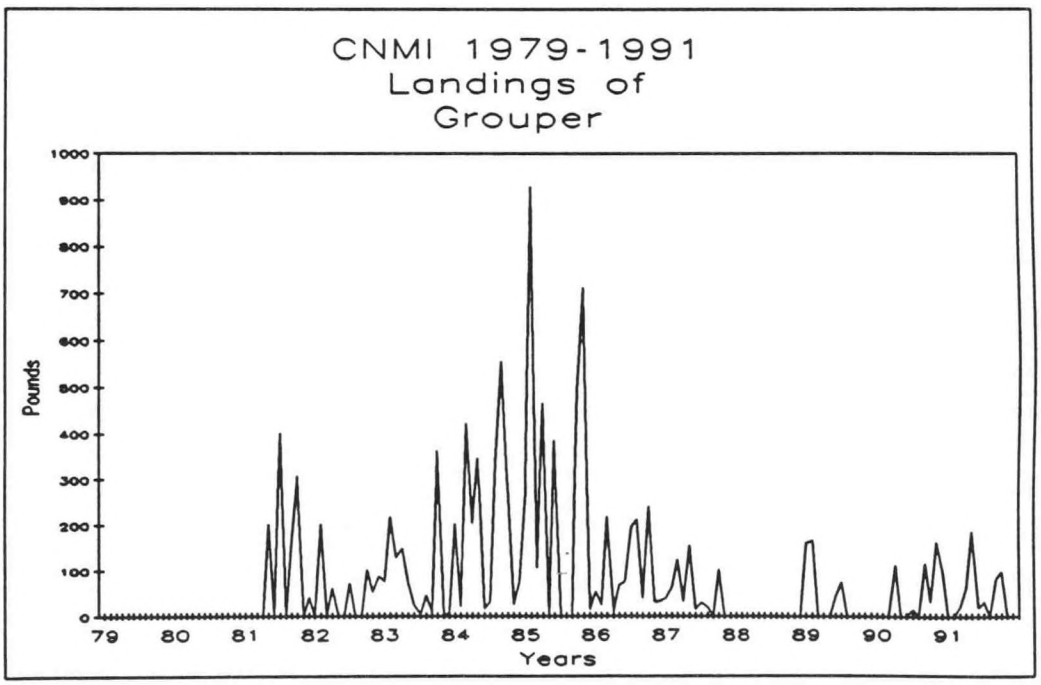

Territory of Guam

Fishery Statistics 1991

GUAM 1991 FISHERY STATISTICS

Compiled by

Guam Division of Aquatic and Wildlife Resources

and the

Western Pacific Fishery Information Network

November 1992

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GUAM 1991 FISHERY STATISTICS

INTRODUCTION

The Territory of Guam (lat. 13.4° N and long. 144.4° E) is the southernmost, largest, and most populous island in the Mariana Archipelago. All of the islands in the chain north of Guam belong to the Commonwealth of the Northern Mariana Islands. Guam is located about 6,000 km (3,700 mi) west-southwest of Honolulu, 2,500 km (1,550 mi) south-southeast of Tokyo, and 2,600 km (1,600 mi) east of Manila. Guam is about 48 km (30 mi) long, varies from 6 to 14 km (4 to 9 mi) wide, and has an estimated land area of 554 km^2 (214 mi^2) and a population of about 120,000.

Fishing activities on Guam can be divided into two basic categories: offshore and inshore fishing. Offshore fishing typically involves small boat (12 to 48 feet), 1 to 2-day trolling and bottom fishing trips that usually originate from one of the three principal harbors located on the west coast and southern tip of the island. In recent years, the sportfishing charter boat industry has increased significantly. Inshore fishing is typically conducted without the use of a boat and consists mostly of nearshore casting, netting, and spearfishing. The Guam Department of Agriculture's Division of Aquatic and Wildlife Resources (DAWR) has been conducting offshore and inshore creel surveys since the early 1970's. Beginning in 1982, DAWR began modifying its data collecting and processing systems to improve estimates of catch and effort by improving sampling techniques and by incorporating the use of microcomputers to expand the survey data. The WPACFIN provided microcomputers and training and worked with DAWR staff and a contractor to redesign the sampling program. In 1982, WPACFIN also began working with local fish wholesalers to obtain information on the commercial landings of Guam. It is from these two sources, DAWR and wholesalers, that the original data for the statistics presented in this report have come. Volumes of this report series typically include statistics of both offshore and inshore fisheries. However, due to several typhoons that interrupted normal data processing activities at DAWR, only the offshore data for 1991 were available for inclusion in this volume. The inshore statistics for 1991 will be reported in the next volume, along with the 1992 data.

DATA COLLECTING SYSTEMS

The Guam data collecting systems are divided into two distinctly different systems, one for collecting commercial landings information and one for collecting total landings information through creel surveys.

Commercial Landings

Fish entering the commercial market in Guam come from three sources, full-time commercial fishermen, part-time commercial fishermen, and subsistence or recreational fishermen who frequently sell portions of their catch. No licenses are required to sell fish in Guam, nor are there any reporting requirements for those selling fish. Before 1979, there was no central place to sell fish, so fishermen had to develop their own markets and peddle their own fish after each trip. The Guam Fishermen's Coop was established, via some government funding, in Agana in July 1979. The Coop subsequently became the central distribution center for fresh local fish. In 1982, WPACFIN began working with the Coop to improve their invoicing system and obtain data on all fish purchases. A cooperative system was established whereby the Coop would use the forms and coding schemes designed by WPACFIN and would supply copies of all invoices to WPACFIN for entering into computer format. In return, WPACFIN would provide the Coop with document quality control and computer generated summary statistics. All purchase data back to July 1979 also were coded and computerized.

Data from two other fish wholesalers were collected beginning in 1983 and continued until early 1987 by which time both had left the business. One other major fish wholesaler and several other important retailers who make purchases directly from fishermen have begun operating since then, and are providing data to WPACFIN by using the invoices given to them through DAWR. A law is being developed that will require reporting by dealers and fishermen, but until it is implemented, the commercial landings data collection system will remain a voluntary system. Therefore, the reported commercial data do not reflect the true commercial fisheries. All tables and figures of commercial landings information included in this report are provided with the consent of the participating dealers.

Data collected on commercial forms include

- Date
- Fisherman code
- Number of fishermen
- Hours fished
- Area fished
- Species caught
- Number of pieces caught
- Pounds caught
- Price per pound

Creel Surveys

The DAWR has the responsibility to monitor and protect the wildlife and marine resources of Guam. To this end, it began conducting creel surveys in the early 1970's. By systematic, random interviewing of fishermen, DAWR developed a means of

estimating total catch and effort by fishing method for the inshore and offshore fisheries. Sampling methodologies were frequently modified in the early years to incorporate new information and insights gained during the surveys. Aerial surveys were conducted for several years to help improve estimates of percent coverage. The basic survey methodology was fairly well established by 1979. All data processing was done by hand.

In the 1970's, an annual fishing derby was organized on Guam by groups of local fishermen. This 3-day tournament soon became a highly successful event, with much participation by local recreational and commercial fishermen. The DAWR began collecting census information on the Annual Guam International Fishing Derby activities as a means of obtaining additional catch and effort information. Although the significance of these data is minor compared to the creel surveys, summaries of derby results are included in this document as a point of interest.

In 1982, WPACFIN hired a contractor to work with DAWR staff to improve the statistical validity of the creel surveys and to establish mathematical algorithms to expand the sample data to estimate total catch and effort with confidence intervals. Consequently, DAWR further improved its sampling methodologies based on the contractor's recommendations, such as adding surveys to better estimate total participation. The WPACFIN developed computer processing systems to automate the data handling and expansion activities. The system design is flexible enough to allow for continued improvements as additional information, insight, and funding are gained. It is essential for the user to understand the basic sampling design and some of the assumptions made for the offshore and inshore surveys to facilitate proper interpretation of the resultant statistics.

The DAWR's fishermen interviews, also called creel surveys, are divided into two separate, major surveys, offshore and inshore. Both are based on a systematic, random sampling of the fisheries; field sampling and interviews are done on a specific number of randomly selected weekdays and weekend-holidays each month. Both surveys are stratified by weekday and weekend-holiday sampling and, begining in 1988, were conducted on 4 days per month. Both include two subsurveys, one for counting and estimating total participation and one for actually interviewing fishermen for catch and effort information. Both are based on the assumptions that the information given by the fishermen is accurate and the fishermen interviewed are representative of the entire fishing population.

Offshore Creel

Most offshore fishing trips originate from one of four harbors on Guam. Apra Harbor is the largest of these harbors, serves military and commercial shipping activities, and is considered one of the best natural harbors in the western

Pacific. It ranks fourth among the harbors as points of origination for offshore fishing trips. Cocos Lagoon on Guam's southern tip is the second largest protected harbor and ranks third as a launching area for offshore fishing trips. Agat Marina, located between Apra Harbor and Cocos Lagoon, is a man-made harbor, and began operation in 1989. Because of its excellent ramps and mooring facilities, it has quickly become a very popular launching area and now ranks second among Guam's facilities. Only its relative remoteness from the most populated areas keeps it from becoming the most heavily used port. The Agana Boat Basin, centrally located on the west coast of Guam in the capitol of Agana, is the smallest of the four harbors but is the busiest launching area for offshore fishing trips and has the majority of the charter boat fleet. Historically, the DAWR conducted all interviewing of offshore fishermen at the Agana Boat Basin, but has recently begun obtaining interviews from other sites as well.

Concurrent with interviewing fishermen returning from trips, a participation survey is conducted to obtain counts of boating activity for the entire island. For estimating total participation for a survey day, unless contrary information is available, a boat is assumed to be fishing if it is "out," as evidenced by its trailer at a boat ramp or being missing from its normal berthing area. A further assumption is made that the fishing activity and success rate of fishermen originating at the sites where interviews are conducted are not statistically different from those of fishermen leaving from other areas on the island. The basic premise of the offshore sampling program is that the combined interviews collected on each survey day are sufficient to estimate the average catch and effort for each fishing method used during that day. Therefore, each survey day represents a measurement of the offshore fisheries. Data collected during the participation portion of the offshore creel survey are limited to boat count by launching area, whereas data collected during interviews include the following:

* Date (year, month, day)
* Type day (weekday or weekend-holiday)
* Fishing method
* Interview time
  Area fished
  Boat number
* Number of fishermen
* Number of gear units
* Hours fished per gear
  Total count for all species combined
  Type total count
* Total weight for all species combined
  Type total weight
  Total number of species
  Type total number of species
Total count for each species
  Type count for each species

Total weight for each species
Type total weight for each species
Species name (or species group)
Length for an individual fish
Type individual length
Weight for an individual fish
Type individual weight
Bait used (up to three different types)
Wind direction and speed
Weather conditions
Cloud cover
Lunar day
Percent of catch kept
Percent of catch sold to the Coop
Percent of catch sold elsewhere

It is not always possible for the interviewer to obtain information on all items listed. However, those marked with an asterisk (*) are essential to the data expansion process for estimating total catch and effort. Those marked with a pound or number sign (#) are essential to estimating the percent species composition of the catch. The "type" elements (e.g., type individual length) identify the kind of measurements, i.e., either actual, estimated, or calculated.

Inshore Creel Survey

Eventhough the 1991 inshore creel survey data were not available for inclusion in this report, the following description of methodology is included to document the full scope of data collecting activities conducted by the DAWR staff. The 1991 data will be reported in the next volume of this report series.

Fielding the inshore creel survey is considerably more complex and troublesome than the offshore survey for several reasons. For instance, fishing activities originate from and occur over a large portion of the coastline, making participation counts and fishermen interviews much more difficult to obtain. Additionally, it is more difficult to obtain interviews for completed fishing trips because the interviewer must survey many miles of coastline where fishermen may quickly terminate their activities at any time. The turnover rate of fishermen during the sampling period is a difficult factor for which to adjust. Tidal stage and moon phase also influence inshore fishing much more than offshore fishing. Nighttime and seasonal pulse fishing are also major considerations for the inshore fisheries. In October 1984, DAWR began additional survey efforts to help quantify the nighttime and seasonal inshore fisheries.

Notwithstanding these complexities and problems, the basic designs of the offshore and inshore surveys are very similar in that they both have participation counts and creel interviews. Two of the significant differences between the offshore and inshore surveys are that the inshore participation counts are

made by fishing method as well as by location, and that interview information is combined to form averages of catch and effort for a much larger time period (month, quarter, year) than a single day as in the offshore survey. Therefore, daily measurements of the inshore fisheries are based on island-wide participation counts for a survey day by using averages for the catch information based on user-specified, flexible time periods, typically quarterly and annual averages. This modification of the expansion algorithm was required for DAWR to physically complete an inshore survey with limited manpower. Participation counts for essentially the entire island can be obtained during a single sample day, but adequate creel interviews for all methods for the entire island cannot be obtained with the manpower available. Additionally, the surveyable portions of the coastline are divided into three regions to facilitate statistically sound sampling of fishermen. Data for the day and night surveys are processed and expanded separately. Data on the seasonal fisheries for juvenile rabbitfish and bigeye scad are collected at irregular intervals when the fisheries are active. Information collected during the inshore participation surveys includes:

* Date (year, month, day)
* Type day (weekday or weekend-holiday)
* Location fished
  Time sighted
* Method used
* Number of persons
* Number of gear units
  Reef zone fished
  Weather and water conditions
  Tidal stage

Information collected during the inshore interviews includes:

* Date (year, month, day)
* Type day (weekday or weekend-holiday)
* Fishing method
* Interview time
* Location
  Reef zone fished
* Number of fishermen
* Number of gear units
* Actual hours fished per gear
* Estimated trip time
  Total count for all species combined
  Type total count
* Total weight for all species combined
  Type total weight
  Total number of species
Total count for each species
  Type count for each species
Total weight for each species
  Type total weight for each species

Species name (or species group)
Length for an individual fish
Type individual length
Weight for an individual fish
Type individual weight
Bait
Wind direction
Wind speed
Weather conditions
Cloud cover
Surf
Tidal stage
Swell direction

As in the offshore survey, the interviewer cannot always obtain information on all items listed. Those marked with an asterisk are essential to the data expansion process for estimating total catch and effort. Those marked with a pound or number sign are essential to estimating the percent species composition of the catch. The "type" elements (e.g., type individual length) identify the kind of measurements, i.e., either actual, estimated, or calculated.

DATA PROCESSING SYSTEMS

The Guam data processing systems are divided into two separate and distinctly different systems, one for processing the commercial landings data and one for processing the DAWR creel survey data.

Commercial Landings

The processing system for the commercial landings data collected from the fish dealers is fairly straightforward. A purchase form is completed by the dealer each time fish are purchased from a fisherman. Catches are divided into categories for weighing by species or species group, and where practicable, number of pieces is recorded. Preferably, coding and initial quality control of the forms are done by Coop or DAWR personnel before they are shipped to WPACFIN for computer processing; however, these activities must sometimes be done by WPACFIN staff. Data are entered into a computer and loaded into central WPACFIN data bases, where edit reports are generated and used to locate and correct any errors in the data base. Once all edits, verifications, and corrections are made, summary reports are generated. Standard reports available include total monthly and annual landings by species, total landings by fisherman, and landings by fisherman by species. Purchase forms are returned to the dealers along with summary reports and graphs for their use.

Creel Surveys

The processing systems for the creel surveys are much more complex than those for the commercial landings data. The basic data handling and processing systems for the inshore and offshore surveys are the same. Data forms completed in the field during the participation and creel surveys are returned to the office and edited for completeness and legibility before the data are entered into structured computer data bases by using commercially available data base management software. Edit and summary reports are produced to verify the quality of the data, and any errors are corrected in the data bases. Data bases are then translated into standard record formats, which are readable by the data processing and expansion systems programmed by WPACFIN specifically for the offshore and inshore surveys. As data are converted into the Guam Offshore Expansion System (GOES) and the Guam Inshore Expansion System (GIES), additional error checks are performed by the computer to ensure only valid information enters the expansion systems. Errors are flagged and printed to facilitate correction. The GOES and GIES are menu-driven systems that step the user through a series of processes that summarize creel survey and participation data to produce catch and effort expansion and species composition files and reports. Although the GOES and GIES allow processing data for whatever time increment the user specifies, typically 1 month of data is processed at a time for the offshore surveys, and 3-month or annual data are combined for the inshore surveys. The DAWR and WPACFIN staffs are currently working on replacing the original data base and data expansion systems with better systems operating in a more modern hardware and software environment.

Generally speaking, the expansion algorithms for the offshore and inshore surveys are very similar. Estimates of total catch, effort, and participation for each fishing method are generated from information collected during the participation and creel surveys. The GOES uses same-day catch and effort averages to expand the participation counts, whereas the GIES uses user-specified, time period catch and effort averages to expand the daily participation counts. Inshore day and night surveys are treated identically but separately. The daily estimates are considered measurements of the fisheries for that day. Average weekday and weekend-holiday estimates and their associated variances or confidence intervals are created from individual daily measurements. These are weighted by the number of each type of day in the month, or other timespan, and multiplied by proportionality constants to adjust for percent coverage to produce estimates of total catch, effort, and participation along with their confidence intervals. All steps in the expansion process are stratified by fishing method. The expansion systems produce several detailed summary reports and a summary expansion data file containing the final totals for all important catch and effort statistics. This summary expansion file is later used to produce the types of reports contained in this document.

Estimates of species composition of the expanded catch are obtained for each method by multiplying the calculated percent species composition of the surveyed catch by the expanded total catch. Percent species composition by fishing method is obtained from the sampled catch based on the average individual weight and the total number of individuals recorded for that species. The average size of each species is obtained by one of three methods, depending on the availability of data in the data base. If total weight and count information are available, the average size per individual is calculated by dividing the total weight by the total count. If total weight and count information are not available but individual weight measurements for a species are available, the average size per individual is calculated by dividing the sum of all individual weights by the total number of individuals weighed. If neither of these methods can be used because no size information is available in the data base, the user is asked to input the species' average size, which is then multiplied by its total count to estimate total sampled catch of that species. Therefore, percent species composition is calculated by dividing the estimated sampled weight of the species by the estimated total sampled weight of all species combined. The species composition programs produce summary reports for immediate reference and summary data files for later use by reporting and summarizing software for generating the types of reports contained in this document.

Catch, effort, and participation data collected during the seasonal fisheries for bigeye scad and juvenile rabbitfish are processed by hand. Interview records are scarce, so hand tabulations and expansions are made to produce ballpark estimates of catch.

DATA REPORTING SYSTEMS

The Guam data reporting systems are divided into two separate systems, one for reporting on the commercial landings data and one for reporting the results of the creel survey.

Commercial Landings

After completing all editing and quality control activities for the commercial landings data, monthly and annual summary reports by species are generated. The commercial landings reports section of this document includes monthly and annual reports for 1991. Each table contains information on the pounds, value and the average price per pound for each species or species group. Each monthly report contains a subtotal for the sum of all species combined for that month, and the December report also includes the annual total. Annual reports contain the total landings for each species and the total recorded landings for all species for the calendar year.

Included with the commercial landings summary reports are graphs of some of the important statistics. The following groupings of species, species categories, and abbreviations are used in the tables and graphs for Guam's commercial landings:

I. Pelagic Management Unit Species (PMUS)

Mahimahi (dolphinfish)
Marlin (probably all blue but possibly striped or black)
Shortbill spearfish
Sailfish
Wahoo
Sharks

II. Bottom Fish Management Unit Species (BMUS)

Jacks (unclassified but excluding bigeye scad)
Bottom fish (unclassified)
Ehu (red snapper)
Gindai (flower snapper)
Grouper
Kalekale (pink snapper)
Lehi (silverjaw snapper)
Onaga (red or longtail snapper)
Opakapaka (pink snapper)
Uku (gray snapper)
Emperorfish

III. Billfish

Marlin (probably all blue but possibly striped or black)
Shortbill spearfish
Sailfish

IV. Tunas

Tunas (unclassified)
Skipjack tuna
Yellowfin tuna
Dogtooth or white tuna
Kawakawa

V. Other Tuna

All the above tunas excluding skipjack and yellowfin tunas.

VI. Fisheries Categories

A. Pelagic Species

All PMUS and tuna species plus the following:
Troll fish (unclassified)
Barracuda
Rainbow runner

B. Bottom Fish

Same as the BMUS

C. Reef Fish

Reef fish (unclassified)
Giant wrasse
Rabbitfish
Rudderfish
Squirrelfish
Parrotfish
Snapper
Surgeonfish
Unicornfish
Goatfish

D. Other

Miscellaneous (unclassified)
Bigeye scad
Mullet
Eels
Milkfish
Invertebrates (unclassified)
Crabs (unclassified)
Coconut crab
Lobster
Shrimp
Octopus
Squid
Seaweeds
Imported

Creel Surveys

As stated previously, no inshore creel survey data are being included in this volume.

Two general types of reports are included in this document from the DAWR creel surveys, catch and effort expansion reports and species composition reports. These reports are produced by using the expansion and species composition files created by the GOES as input to a series of utility programs developed by WPACFIN. The utility programs reorganize, format, and summarize data from the GOES files to improve the presentation of the data and reduce the amount of space required to report the important statistics. Two of the most significant space saving improvements are the combining of many species into species groups, usually to the family level, and the combining of lesser used fishing methods into a single category. The original offshore and inshore species composition files contained about 300 different species categories, which were reduced to about 90

categories. For instance, 22 species of squirrelfish and 20 species of wrasse were reduced to just the 2 family groupings. All significant or important species retain their individual identity and are reported separately in the tables. In the original offshore species composition files, catches were reported for nine fishing methods; however, only two methods, trolling and bottom fishing, were significant as they generally accounted for over 97% of the catch. Therefore, reports of offshore species composition were reduced to just three method categories, trolling, bottom fishing, and other. Expansion reports for the offshore surveys include estimates of total catch and effort for each method recorded.

Monthly and annual catch and effort expansion reports and species composition reports are presented for the offshore fisheries for 1991. Monthly expansion and species composition reports have matching totals for catch by fishing method since the monthly species composition reports are based on the expansion files. Annual expansion and species composition reports also have identical totals because the species reports were generated from the annual expansion files. However, the totals on the annual reports will not equal those obtained by adding all of the monthly files together because the annual expansion reports were generated by re-expanding the entire year's data together, thereby increasing the sample size significantly, and it is hoped, improving the annual estimates of percent species composition and of catch and effort and their associated coefficients of variation (CV's). This also makes expansion possible for months in which sampling was insufficient or nonexistent. The annual species composition reports were created by calculating annual percentages of species composition by combining all sampling for the year and then multiplying these percentages by the annual expansion totals. This allows calculation of percent species composition based on greatly increased sample size.

Computer generated numbers and all totals in the reports are subject to rounding error. All catches are reported in pounds, and effort in hours. Boat counts by fishing method will not add to the total boat count when the same boat was used for more than one method on a single trip. In these cases, the boat is included in the count for each method used but included only once in the total boat count. A separate CV is included for each statistic reported in the offshore expansion reports. The CV provides a measurement of the relative variation associated with the estimate preceding it and is calculated by dividing the standard error of the estimate by the estimate and multiplying by 100 and rounding to express the answer as a whole percentage. The larger the CV, the larger the relative variation in the data used to generate the estimate and, therefore, the less precise the estimate. An asterisk following a line means the number of samples collected for that method during that month were insufficient to properly calculate the CV. There must be at least two weekday and two weekend-holiday samples for each method

to properly compute a standard error and, therefore, properly compute the CV. If an asterisk is present and the CV is greater than zero, then samples on either the weekdays or the weekend-holidays were sufficient to compute a standard error for that type of day but not for the other type of day. In this case, the CV provided in the report is for the type of day in which sample information met the minimum requirements for calculating CV. If an asterisk is present and the CV equals zero, then neither day had sufficient number of samples to calculate CV. It follows then, anytime an asterisk is present for any of the methods, the totals for the month are questionable.

In the offshore expansion reports, average monthly catch per unit of effort (CPUE) is calculated by using the same type of algorithm as for the other expansion elements, and it has an associated CV. First, the average daily CPUE is calculated by dividing the total weight of the fish sampled for a day by the total number of hours fished to produce that catch. Next, the average weekday and weekend-holiday CPUE's are calculated by summing the average daily CPUE's for each type of day and then dividing by the number of survey days for each type of day. These averages are multiplied by the number of weekdays and weekend-holidays, respectively, in that month, then the products are summed and divided by the total number of days in the month to produce the average monthly CPUE for each offshore fishing method. The average monthly offshore CPUE could also be calculated by dividing the estimated monthly catch by the estimated monthly boat hours, but this would provide no indication of the variability of the CPUE and also essentially weight the average CPUE by the level of participation.

Offshore species composition reports provide estimated landings and percent species composition for each species or species group for the two major offshore fishing methods, trolling and bottom fishing; a total for all other methods combined; and an overall total for all methods.

The reports for the 1991 Annual Guam International Fishing Derby include derby and species totals by day for a variety of catch and effort statistics. Four major pelagic species are targeted during the derby, including billfish (primary blue marlin), yellowfin tuna, mahimahi, and wahoo. Other species such as skipjack tuna, rainbow runner, and barracuda are caught incidentally, but sometimes in substantial quantities.

INTERPRETATION OF STATISTICS

The user is reminded again to pay heed to the precautions and assumptions identified earlier in this document, when making interpretations of or inferences from data reported in the tables and graphs. Remember also that neither the commercial landings summaries nor the creel summaries are based on a census of all

the fishing activities, but on samples of those activities. Commercial landings reports are believed to include a high percentage of the actual commercial landings made on Guam. The creel survey expansion reports are based on surveys of the offshore fisheries conducted 4 times per month. One of the major factors in expanding the survey data into monthly and annual estimates is the use of proportionality constants to adjust for percent coverage of the surveys. The flexibility of the survey design allows for refinement of these constants as additional information is gained on Guam's fishing activities. If the constants are improved upon, the basic survey data can be re-expanded to create better overall estimates. However, the variability and species composition would not be expected to change since these statistics are strictly based on the actual survey information collected from the fishermen.

Table IV.1.1

Guam 1991 Commercial Landings

Species	Pounds	Value	$/lb
Assorted	30.50	91.50	3.00
Miscellaneous	653.00	1,793.75	2.75
Bigeye scad (atulai)	3,471.00	9,015.35	2.60
Jacks	1,208.00	2,844.38	2.35
Mullet	276.50	824.14	2.98
Bottom fish	2,316.00	6,006.30	2.59
Ehu (red snapper)	301.00	965.25	3.21
Gindai (flower snap)	276.00	862.76	3.13
Grouper	1,059.50	2,802.27	2.64
Kalikali (pink snap)	300.50	879.16	2.93
Lehi (silverjaw)	222.50	680.87	3.06
Onaga (red snapper)	450.50	2,309.00	5.13
Opakapaka (pink snp)	511.00	1,635.49	3.20
Uku (gray snapper)	387.00	1,008.76	2.61
Reef fish	3,067.50	8,385.81	2.73
Wrasse	210.00	499.50	2.38
Rabbitfish (hitting)	26.00	71.50	2.75
Rabbitfish (sesjun)	8.50	24.75	2.91
Rudderfish (guilli)	32.00	94.25	2.95
Emperor (mafute)	1,586.75	4,192.64	2.64
Squirrelfish	115.50	344.75	2.98
Parrotfish	3,649.50	10,865.25	2.98
Snapper	403.50	1,175.75	2.91
Surgeonfish	19.50	58.50	3.00
Unicornfish	2,063.00	6,176.00	2.99
Goatfish	100.00	266.00	2.66
Troll fish	16.50	39.50	2.39
Barracuda	662.50	1,355.87	2.05
Mahimahi (Dolphin)	114,284.05	168,786.06	1.48
Marlin	27,113.30	24,420.70	0.90
Spearfish	110.00	177.50	1.61
Sailfish	1,093.50	1,488.87	1.36
Rainbow runner	1,252.00	2,782.73	2.22
Wahoo	30,687.75	71,603.68	2.33
Skipjack tuna	22,990.00	27,283.37	1.19
Dogtooth tuna	1,581.50	3,385.37	2.14
Yellowfin tuna	28,700.95	68,341.63	2.38
Kawakawa	64.50	87.14	1.35
Lobster	49.00	268.00	5.47
Octopus	26.00	76.00	2.92
Squid	1.50	4.50	3.00
Imported	75,438.60	174,904.99	2.32
** TOTAL **	326,816.40	608,879.59	1.86

Table IV.1.2

Guam January 1991 Commercial Landings

Species	Pounds	Value	$/lb
Jacks	7.00	17.50	2.50
Bottom fish	216.00	594.00	2.75
Grouper	76.50	229.50	3.00
Onaga (red snapper)	8.00	40.00	5.00
Reef fish	67.00	184.25	2.75
Rabbitfish (sesjun)	1.50	3.75	2.50
Parrotfish	103.00	257.50	2.50
Snapper	4.00	10.00	2.50
Unicornfish	18.00	45.00	2.50
Barracuda	35.50	79.87	2.25
Mahimahi (Dolphin)	17,607.50	35,555.38	2.02
Marlin	484.50	702.88	1.45
Spearfish	42.00	75.50	1.80
Rainbow runner	44.50	114.12	2.56
Wahoo	1,550.50	3,878.88	2.50
Skipjack tuna	1,261.00	2,056.50	1.63
Dogtooth tuna	82.75	190.18	2.30
Yellowfin tuna	2,395.00	6,164.98	2.57
Kawakawa	1.50	2.63	1.75
Imported	1,607.98	6,487.47	4.03
** SUBTOTAL **	25,613.73	56,689.89	2.21

Table IV.1.3

Guam February 1991 Commercial Landings

Species	Pounds	Value	$/lb
Jacks	6.50	16.25	2.50
Bottom fish	10.00	27.50	2.75
Grouper	178.00	477.00	2.68
Onaga (red snapper)	17.50	87.50	5.00
Rudderfish (guilli)	3.50	8.75	2.50
Emperor (mafute)	38.00	95.00	2.50
Parrotfish	19.00	47.50	2.50
Barracuda	41.00	81.50	1.99
Mahimahi (Dolphin)	28,855.50	45,017.49	1.56
Marlin	327.00	490.50	1.50
Sailfish	22.00	33.00	1.50
Rainbow runner	12.50	25.00	2.00
Wahoo	2,181.50	5,652.35	2.59
Skipjack tuna	1,369.50	2,218.14	1.62
Dogtooth tuna	146.00	337.75	2.31
Yellowfin tuna	2,350.00	6,012.25	2.56
Imported	4,955.07	20,600.17	4.16
** SUBTOTAL **	40,532.57	81,227.65	2.00

Table IV.1.4

Guam March 1991 Commercial Landings

Species	Pounds	Value	$/lb
Jacks	33.50	67.00	2.00
Reef fish	153.00	420.74	2.75
Barracuda	35.00	74.25	2.12
Mahimahi (Dolphin)	29,227.50	37,574.08	1.29
Marlin	718.50	994.00	1.38
Spearfish	53.00	79.50	1.50
Sailfish	65.00	84.00	1.29
Wahoo	5,512.50	12,936.73	2.35
Skipjack tuna	1,249.50	1,843.92	1.48
Dogtooth tuna	180.50	365.50	2.02
Yellowfin tuna	872.00	2,155.12	2.47
Imported	6,424.30	13,229.33	2.06
** SUBTOTAL **	44,524.30	69,824.17	1.57

Table IV.1.5

Guam April 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	23.50	70.50	3.00
Bigeye scad (atulai)	90.00	225.00	2.50
Jacks	41.00	87.50	2.13
Bottom fish	14.00	35.00	2.50
Gindai (flower snap)	31.50	94.50	3.00
Grouper	140.00	420.00	3.00
Kalikali (pink snap)	38.00	95.00	2.50
Onaga (red snapper)	7.00	35.00	5.00
Reef fish	947.00	2,656.85	2.81
Rabbitfish (sesjun)	7.00	21.00	3.00
Emperor (mafute)	137.50	343.75	2.50
Parrotfish	677.50	2,032.50	3.00
Snapper	71.00	213.00	3.00
Surgeonfish	10.50	31.50	3.00
Unicornfish	129.00	387.00	3.00
Barracuda	61.00	117.75	1.93
Mahimahi (Dolphin)	24,496.05	26,973.57	1.10
Marlin	1,667.00	2,324.80	1.39
Sailfish	275.50	390.50	1.42
Wahoo	3,266.10	7,372.83	2.26
Skipjack tuna	1,960.50	2,670.11	1.36
Dogtooth tuna	89.25	175.56	1.97
Yellowfin tuna	1,842.20	3,665.44	1.99
Lobster	15.50	93.00	6.00
Imported	4,888.75	10,201.12	2.09
** SUBTOTAL **	40,926.35	60,732.78	1.48

Table IV.1.6

Guam May 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	34.00	102.00	3.00
Bigeye scad (atulai)	614.50	1,536.25	2.50
Jacks	7.00	17.50	2.50
Bottom fish	42.00	107.37	2.56
Gindai (flower snap)	2.00	6.50	3.25
Grouper	36.50	107.63	2.95
Opakapaka (pink snp)	16.00	52.00	3.25
Uku (gray snapper)	18.50	46.25	2.50
Reef fish	104.00	282.25	2.71
Emperor (mafute)	169.50	424.37	2.50
Parrotfish	179.00	537.00	3.00
Snapper	5.50	16.50	3.00
Unicornfish	132.00	396.00	3.00
Goatfish	26.50	79.50	3.00
Barracuda	109.50	220.00	2.01
Mahimahi (Dolphin)	8,960.00	12,803.37	1.43
Marlin	3,701.80	3,864.50	1.04
Spearfish	15.00	22.50	1.50
Sailfish	249.00	342.50	1.38
Rainbow runner	28.50	61.00	2.14
Wahoo	1,480.00	3,392.87	2.29
Skipjack tuna	4,044.00	3,697.48	0.91
Dogtooth tuna	14.50	29.00	2.00
Yellowfin tuna	2,455.50	5,583.23	2.27
Imported	7,462.00	14,365.65	1.93
** SUBTOTAL **	29,906.80	48,093.22	1.61

Table IV.1.7

Guam June 1991 Commercial Landings

Species	Pounds	Value	$/lb
Jacks	152.50	358.75	2.35
Mullet	7.00	21.00	3.00
Bottom fish	364.00	945.63	2.60
Ehu (red snapper)	6.50	21.12	3.25
Gindai (flower snap)	9.00	28.38	3.15
Grouper	102.50	303.38	2.96
Kalikali (pink snap)	6.00	16.50	2.75
Onaga (red snapper)	26.00	156.00	6.00
Opakapaka (pink snp)	6.00	19.25	3.21
Uku (gray snapper)	100.50	268.26	2.67
Reef fish	352.50	909.58	2.58
Wrasse	171.00	387.50	2.27
Rudderfish (guilli)	28.50	85.50	3.00
Emperor (mafute)	361.50	937.87	2.59
Squirrelfish	7.00	19.25	2.75
Parrotfish	422.50	1,245.25	2.95
Snapper	135.00	404.62	3.00
Surgeonfish	9.00	27.00	3.00
Unicornfish	35.00	105.00	3.00
Goatfish	59.00	149.50	2.53
Barracuda	24.50	55.12	2.25
Mahimahi (Dolphin)	871.50	1,771.37	2.03
Marlin	6,026.10	3,896.75	0.65
Sailfish	187.00	200.00	1.07
Rainbow runner	117.00	281.25	2.40
Wahoo	779.00	1,930.12	2.48
Skipjack tuna	2,368.50	1,757.00	0.74
Dogtooth tuna	75.00	141.00	1.88
Yellowfin tuna	3,514.50	7,193.99	2.05
Lobster	23.00	112.00	4.87
Octopus	14.50	43.50	3.00
Imported	6,792.00	12,130.25	1.79
** SUBTOTAL **	23,153.60	35,921.69	1.55

Table IV.1.8

Guam July 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	197.00	462.00	2.35
Bigeye scad (atulai)	640.00	1,600.00	2.50
Jacks	183.00	432.00	2.36
Mullet	23.00	71.50	3.11
Bottom fish	377.00	942.76	2.50
Ehu (red snapper)	109.00	353.75	3.25
Gindai (flower snap)	116.50	363.25	3.12
Grouper	226.00	424.75	1.88
Kalikali (pink snap)	47.50	142.50	3.00
Lehi (silverjaw)	35.50	112.37	3.17
Onaga (red snapper)	254.50	1,272.50	5.00
Opakapaka (pink snp)	219.00	707.75	3.23
Uku (gray snapper)	87.50	223.13	2.55
Reef fish	389.50	1,052.50	2.70
Emperor (mafute)	184.50	499.88	2.71
Squirrelfish	108.50	325.50	3.00
Parrotfish	399.00	1,197.00	3.00
Snapper	109.00	301.75	2.77
Unicornfish	112.50	337.50	3.00
Goatfish	1.50	4.50	3.00
Troll fish	13.00	32.50	2.50
Barracuda	42.50	76.63	1.80
Mahimahi (Dolphin)	19.50	48.75	2.50
Marlin	3,106.00	1,653.50	0.53
Sailfish	71.50	92.37	1.29
Rainbow runner	323.50	684.89	2.12
Wahoo	650.00	1,722.50	2.65
Skipjack tuna	1,174.00	1,133.49	0.97
Dogtooth tuna	71.50	146.50	2.05
Yellowfin tuna	3,619.00	8,871.02	2.45
Lobster	7.50	45.00	6.00
Octopus	2.00	6.00	3.00
Imported	6,851.00	12,019.75	1.75
** SUBTOTAL **	19,771.00	37,359.79	1.89

Table IV.1.9

Guam August 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	149.00	429.75	2.88
Bigeye scad (atulai)	684.50	1,853.10	2.71
Jacks	341.50	862.62	2.53
Mullet	154.00	437.76	2.84
Bottom fish	671.50	1,651.51	2.46
Ehu (red snapper)	70.00	230.25	3.29
Gindai (flower snap)	46.50	141.00	3.03
Grouper	75.00	219.13	2.92
Kalikali (pink snap)	146.00	433.41	2.97
Lehi (silverjaw)	71.00	213.00	3.00
Onaga (red snapper)	10.50	52.50	5.00
Opakapaka (pink snp)	160.50	503.87	3.14
Uku (gray snapper)	102.00	265.75	2.61
Reef fish	404.00	1,063.37	2.63
Wrasse	39.00	112.00	2.87
Emperor (mafute)	363.00	981.88	2.70
Parrotfish	501.00	1,503.00	3.00
Snapper	41.00	115.88	2.83
Unicornfish	557.50	1,668.50	2.99
Goatfish	6.00	15.00	2.50
Barracuda	103.00	195.25	1.90
Mahimahi (Dolphin)	113.50	283.75	2.50
Marlin	2,643.90	1,946.15	0.74
Sailfish	60.00	60.00	1.00
Rainbow runner	305.50	673.26	2.20
Wahoo	1,897.00	4,978.40	2.62
Skipjack tuna	1,699.00	2,011.71	1.18
Dogtooth tuna	294.50	620.12	2.11
Yellowfin tuna	1,860.75	4,622.57	2.48
Kawakawa	18.50	23.13	1.25
Lobster	3.00	18.00	6.00
Octopus	9.50	26.50	2.79
Imported	7,758.00	13,977.25	1.80
** SUBTOTAL **	21,359.65	42,189.37	1.98

Table IV.1.10

Guam September 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	36.00	99.00	2.75
Bigeye scad (atulai)	524.00	1,371.87	2.62
Jacks	198.00	452.00	2.28
Bottom fish	175.50	470.39	2.68
Ehu (red snapper)	85.00	276.25	3.25
Gindai (flower snap)	30.00	97.50	3.25
Grouper	32.00	96.00	3.00
Onaga (red snapper)	96.50	482.50	5.00
Opakapaka (pink snp)	20.00	65.00	3.25
Uku (gray snapper)	23.50	64.62	2.75
Reef fish	215.50	609.51	2.83
Emperor (mafute)	85.25	228.37	2.68
Parrotfish	273.00	819.00	3.00
Unicornfish	234.50	703.50	3.00
Troll fish	3.50	7.00	2.00
Barracuda	66.50	134.75	2.03
Mahimahi (Dolphin)	224.00	416.00	1.86
Marlin	2,954.50	1,764.75	0.60
Rainbow runner	184.75	391.56	2.12
Wahoo	2,023.00	5,217.89	2.58
Skipjack tuna	2,379.50	2,640.43	1.11
Dogtooth tuna	305.00	692.13	2.27
Yellowfin tuna	3,164.50	7,586.51	2.40
Kawakawa	21.50	26.88	1.25
Imported	7,772.00	19,540.30	2.51
** SUBTOTAL **	21,127.50	44,253.71	2.09

Table IV.1.11

Guam October 1991 Commercial Landings

Species	Pounds	Value	$/lb
Assorted	30.50	91.50	3.00
Miscellaneous	104.50	303.50	2.90
Bigeye scad (atulai)	266.50	637.50	2.39
Jacks	169.50	374.13	2.21
Mullet	44.50	137.88	3.10
Bottom fish	214.50	594.38	2.77
Ehu (red snapper)	30.50	83.88	2.75
Gindai (flower snap)	14.00	45.50	3.25
Kalikali (pink snap)	52.00	156.00	3.00
Lehi (silverjaw)	111.50	340.87	3.06
Opakapaka (pink snp)	41.50	131.62	3.17
Reef fish	175.00	489.76	2.80
Emperor (mafute)	50.00	137.51	2.75
Parrotfish	226.50	679.50	3.00
Snapper	38.00	114.00	3.00
Unicornfish	356.00	1,068.00	3.00
Barracuda	53.00	119.75	2.26
Mahimahi (Dolphin)	157.50	429.89	2.73
Marlin	2,643.50	2,898.12	1.10
Sailfish	95.50	150.50	1.58
Rainbow runner	176.00	405.51	2.30
Wahoo	1,966.50	5,122.41	2.60
Skipjack tuna	1,277.00	1,758.03	1.38
Dogtooth tuna	144.50	348.63	2.41
Yellowfin tuna	1,004.00	2,321.88	2.31
Kawakawa	14.00	21.00	1.50
Imported	7,755.50	19,979.10	2.58
** SUBTOTAL **	17,212.00	38,940.35	2.26

Table IV.1.12

Guam November 1991 Commercial Landings

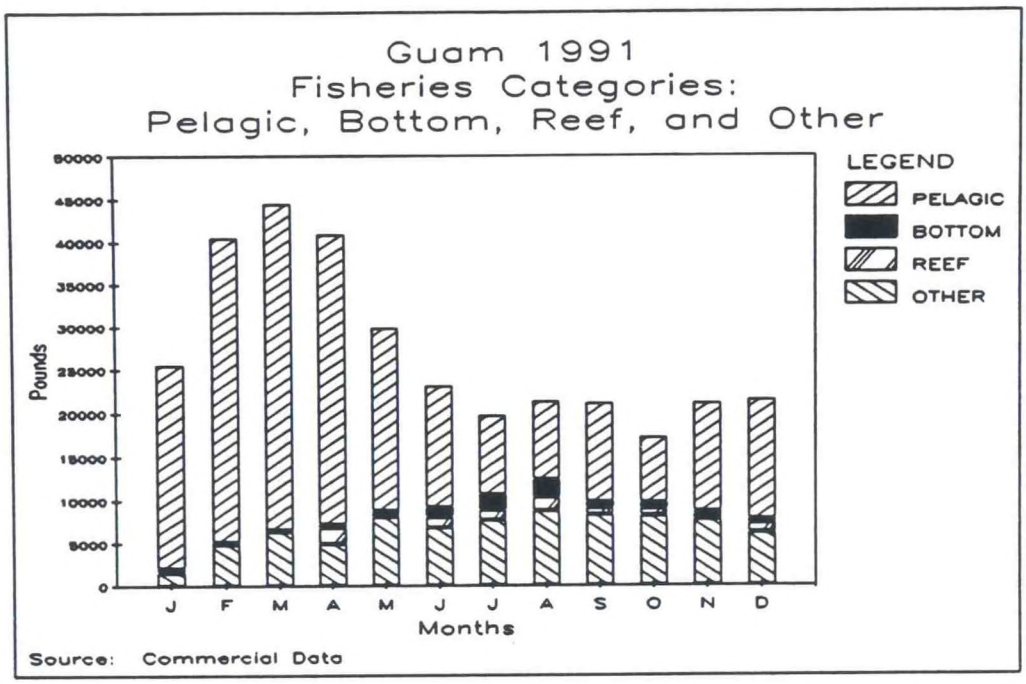
Species	Pounds	Value	$/lb
Miscellaneous	109.00	327.00	3.00
Bigeye scad (atulai)	577.50	1,588.13	2.75
Jacks	48.00	112.25	2.34
Bottom fish	163.50	463.50	2.83
Grouper	4.50	13.50	3.00
Reef fish	117.00	323.75	2.77
Emperor (mafute)	97.50	268.13	2.75
Parrotfish	312.00	936.00	3.00
Unicornfish	155.00	465.00	3.00
Barracuda	39.50	84.87	2.15
Mahimahi (Dolphin)	742.00	1,861.40	2.51
Marlin	1,906.00	2,031.00	1.07
Rainbow runner	7.50	19.63	2.62
Wahoo	5,400.00	11,358.25	2.10
Skipjack tuna	2,399.50	3,107.27	1.29
Dogtooth tuna	88.50	160.00	1.81
Yellowfin tuna	1,897.50	4,633.14	2.44
Kawakawa	9.00	13.50	1.50
Imported	7,073.00	17,523.10	2.48
** SUBTOTAL **	21,146.50	45,289.42	2.14

Table IV.1.13

Guam December 1991 Commercial Landings

Species	Pounds	Value	$/lb
Bigeye scad (atulai)	74.00	203.50	2.75
Jacks	20.50	46.88	2.29
Mullet	48.00	156.00	3.25
Bottom fish	68.00	174.26	2.56
Gindai (flower snap)	26.50	86.13	3.25
Grouper	188.50	511.38	2.71
Kalikali (pink snap)	11.00	35.75	3.25
Lehi (silverjaw)	4.50	14.63	3.25
Onaga (red snapper)	30.50	183.00	6.00
Opakapaka (pink snp)	48.00	156.00	3.25
Uku (gray snapper)	55.00	140.75	2.56
Reef fish	143.00	393.25	2.75
Rabbitfish (hitting)	26.00	71.50	2.75
Emperor (mafute)	100.00	275.88	2.76
Parrotfish	537.00	1,611.00	3.00
Unicornfish	333.50	1,000.50	3.00
Goatfish	7.00	17.50	2.50
Barracuda	51.50	116.13	2.25
Mahimahi (Dolphin)	3,009.50	6,051.01	2.01
Marlin	934.50	1,853.75	1.98
Sailfish	68.00	136.00	2.00
Rainbow runner	52.25	126.51	2.42
Wahoo	3,981.65	8,040.45	2.02
Skipjack tuna	1,808.00	2,389.29	1.32
Dogtooth tuna	89.50	179.00	2.00
Yellowfin tuna	3,726.00	9,531.50	2.56
Squid	1.50	4.50	3.00
Imported	6,099.00	14,851.50	2.44
** SUBTOTAL **	21,542.40	48,357.55	2.24
** TOTAL **	326,816.40	608,879.59	1.86

Figure IV.1.1



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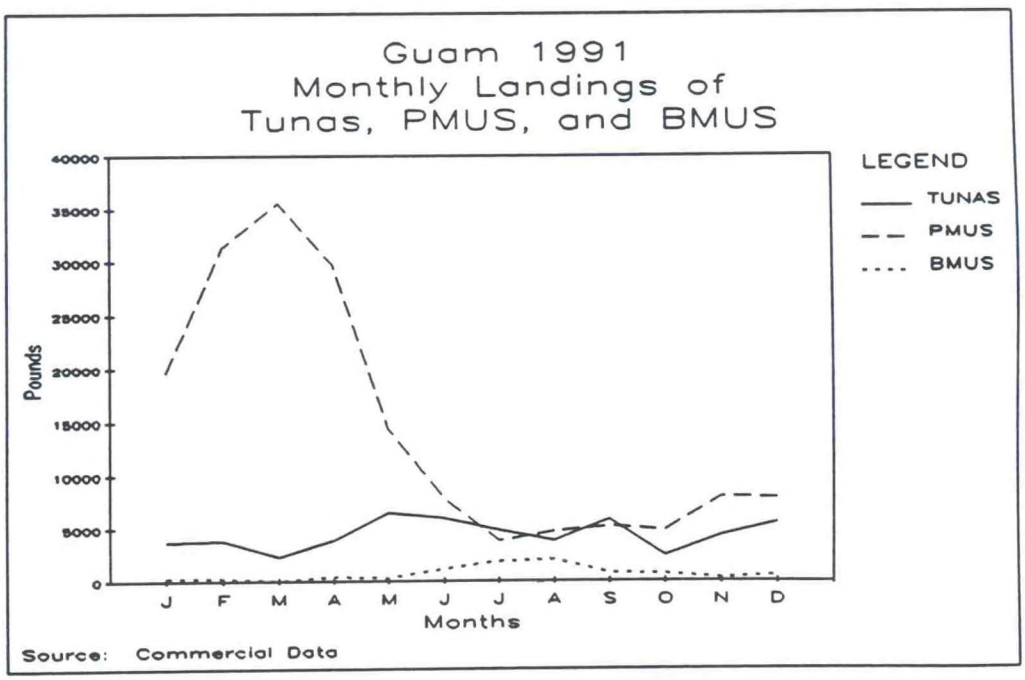


Figure IV.1.3

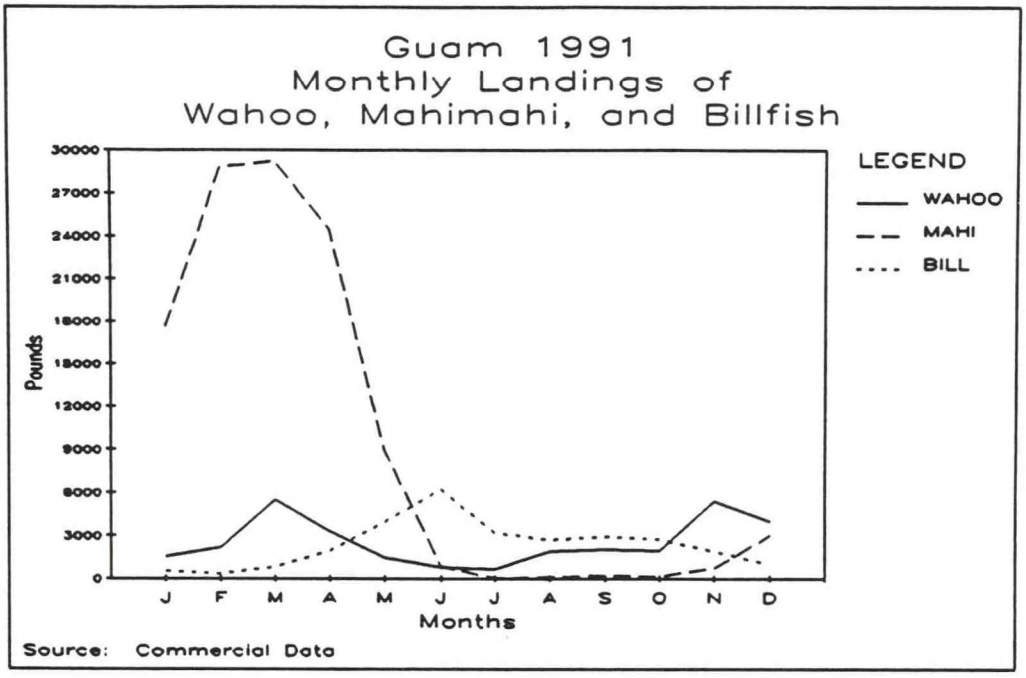
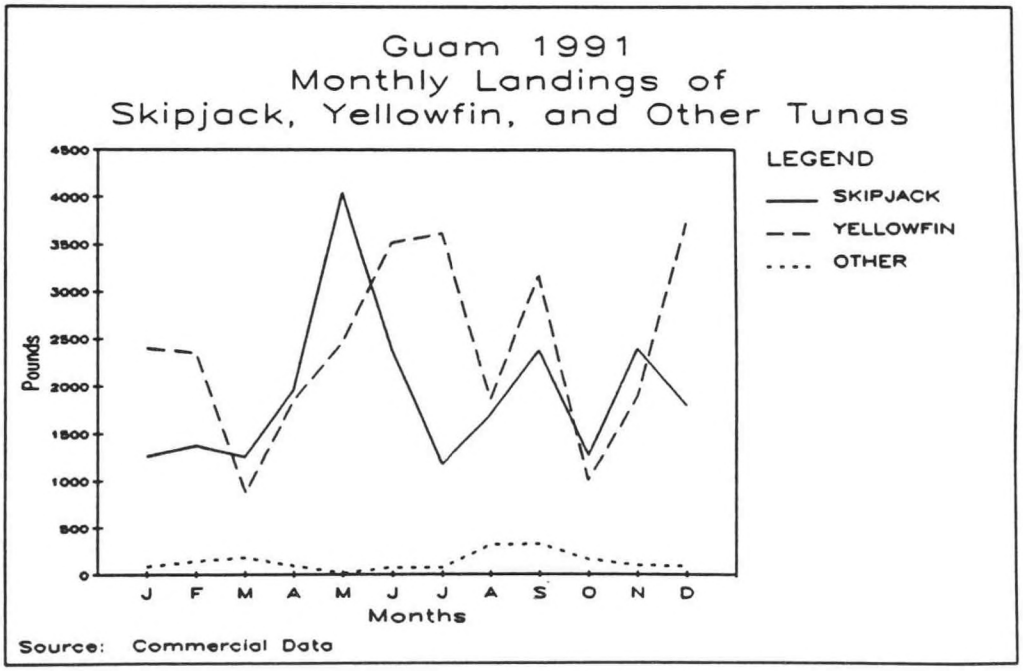


Figure IV.1.4



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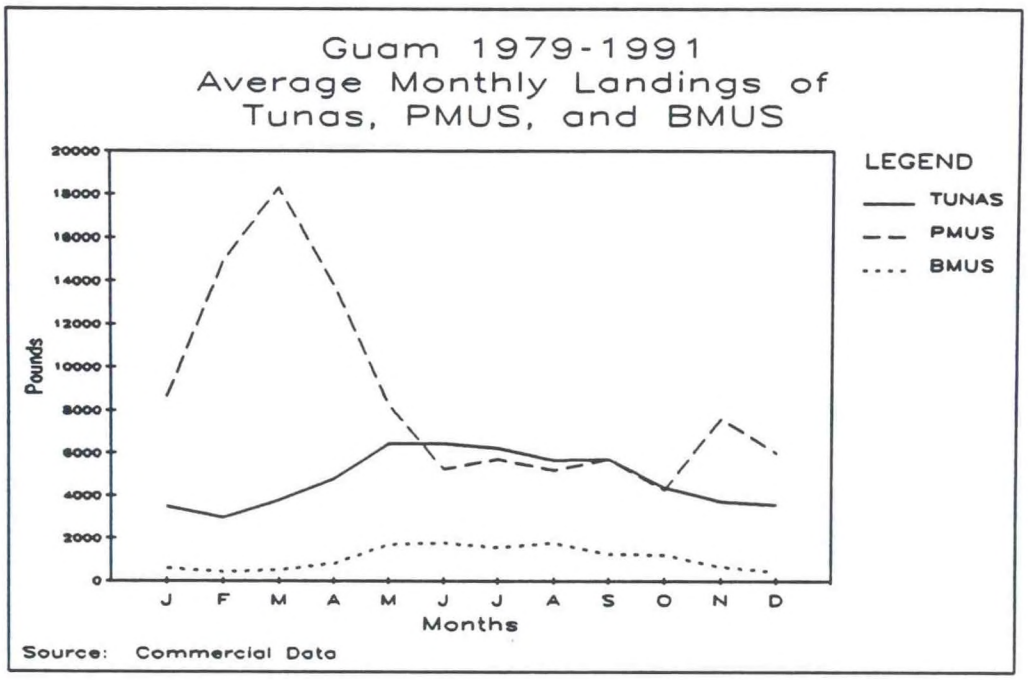
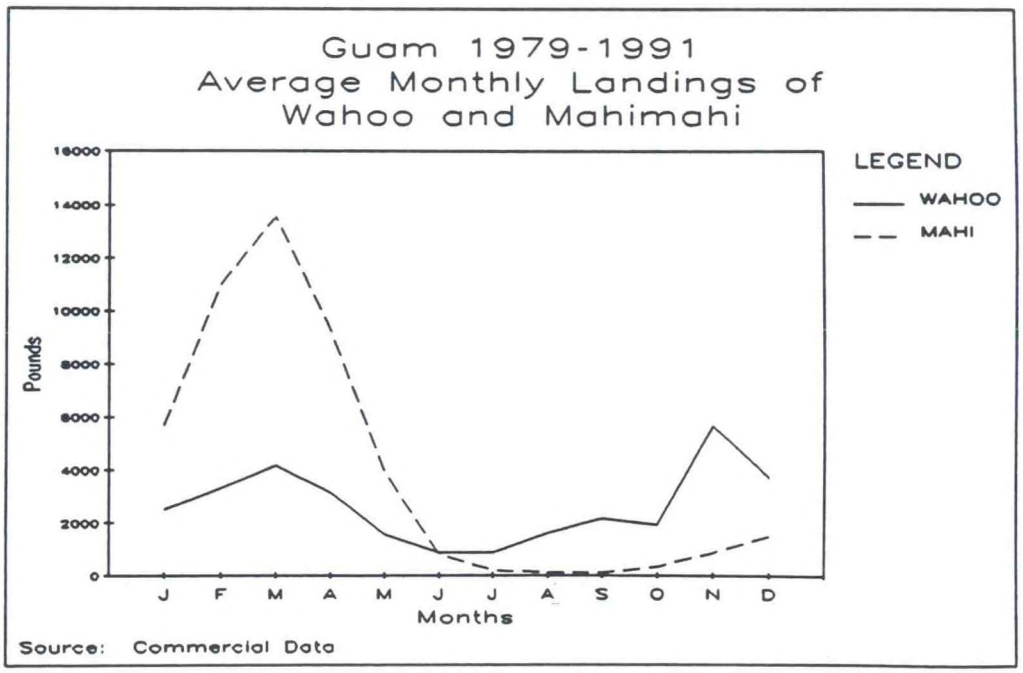


Figure IV.2.2



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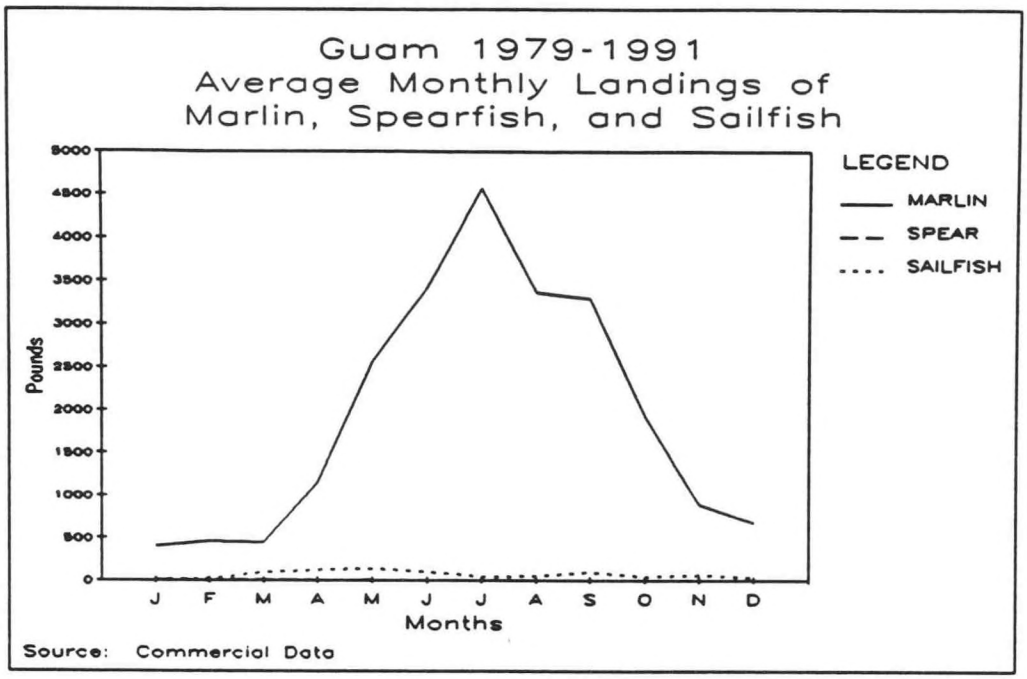

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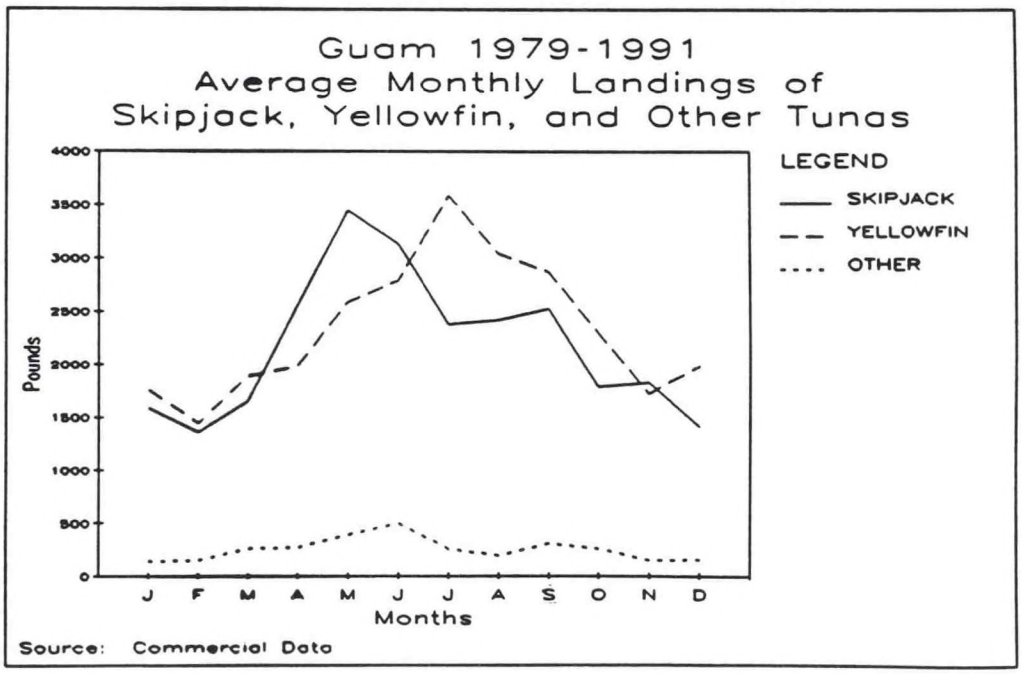


Figure IV.2.5

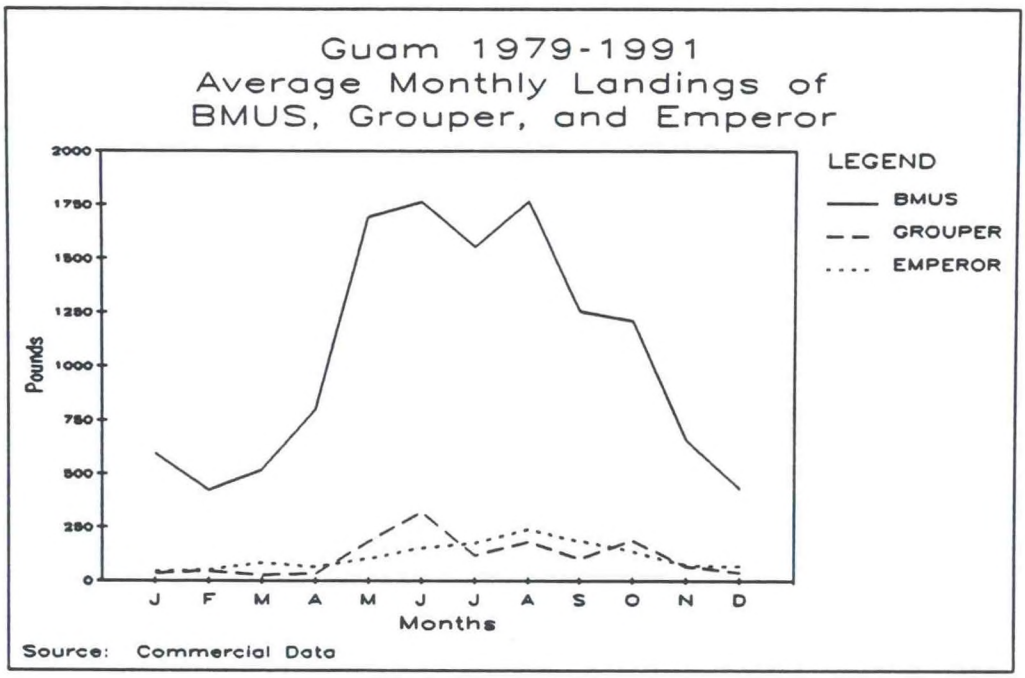
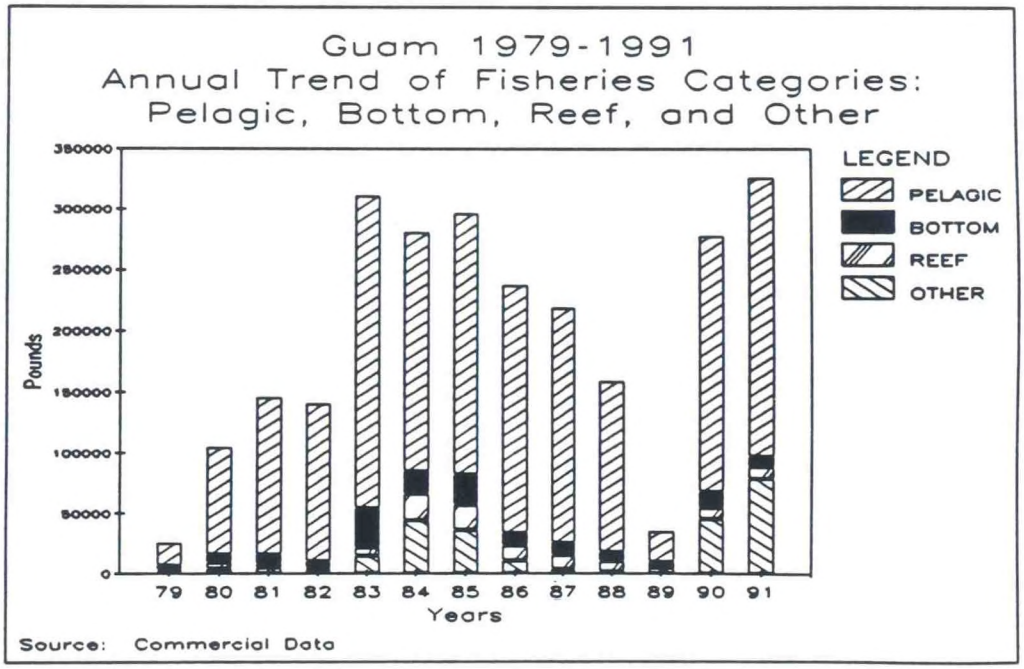


Figure IV.3.1



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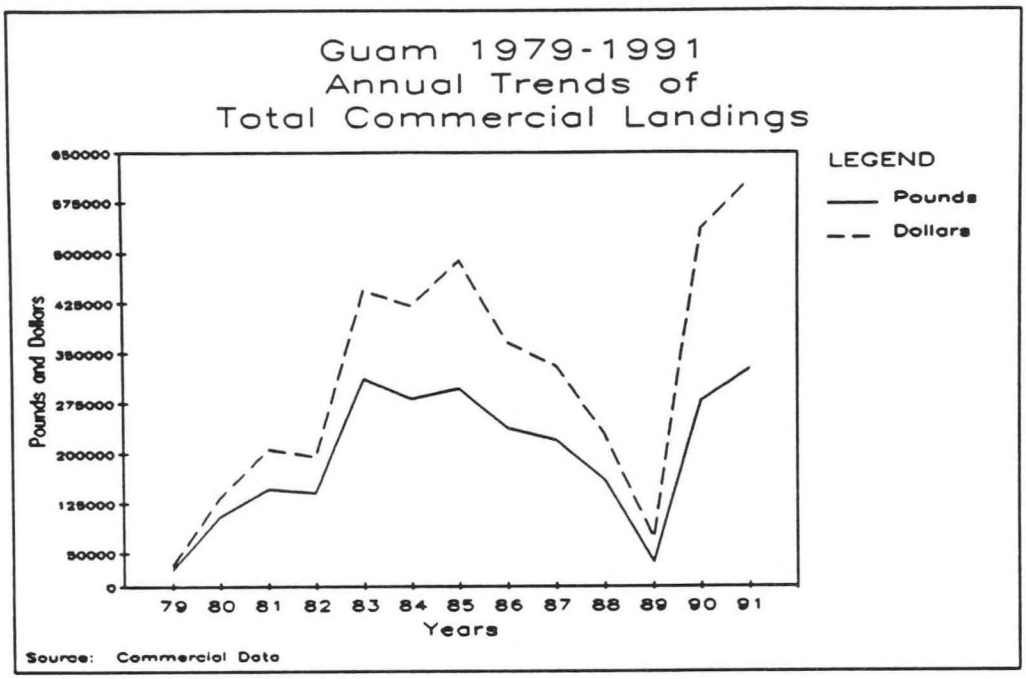

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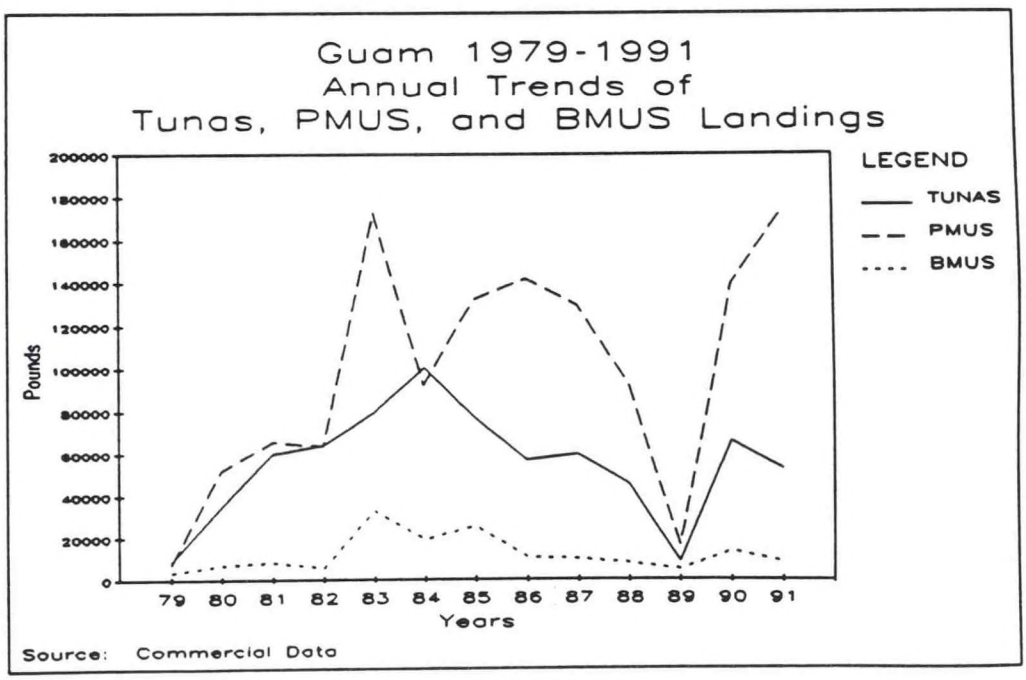

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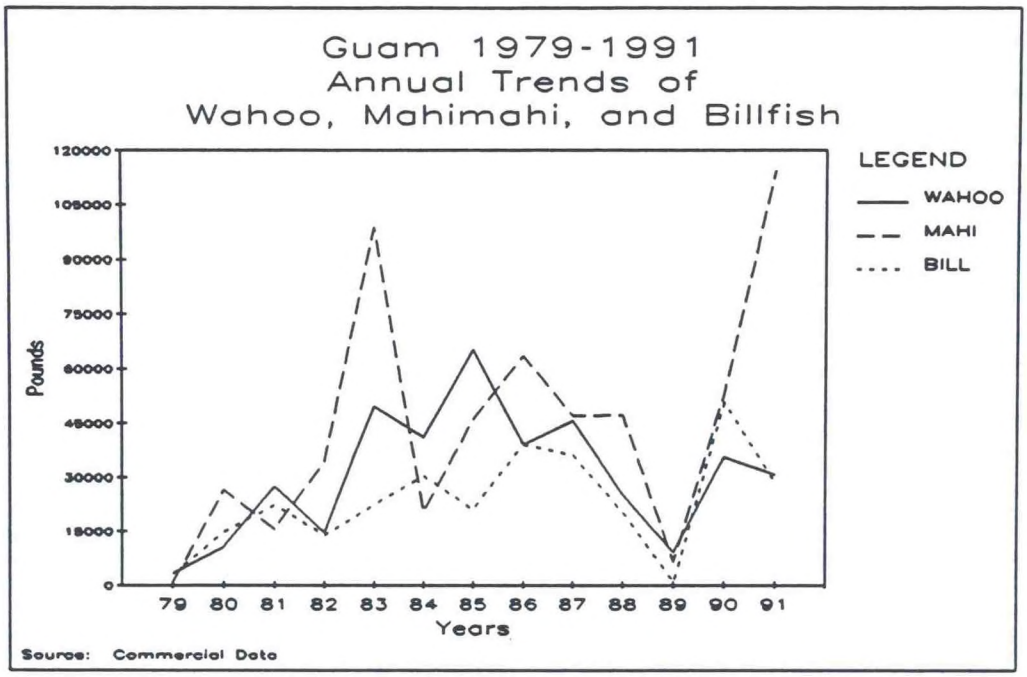

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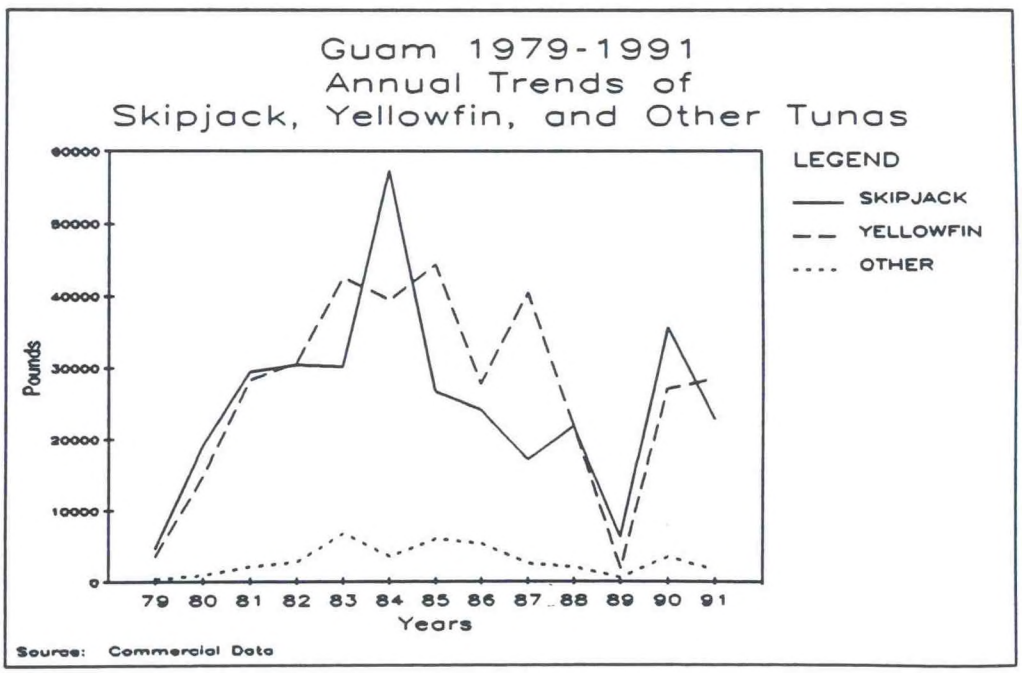
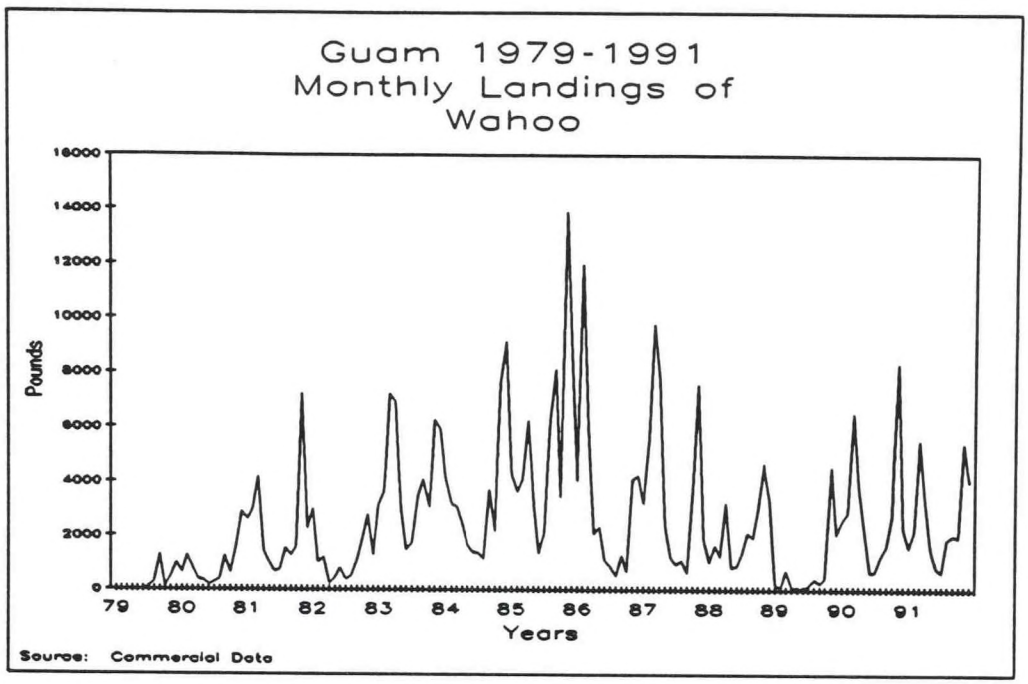


Figure IV.4.1



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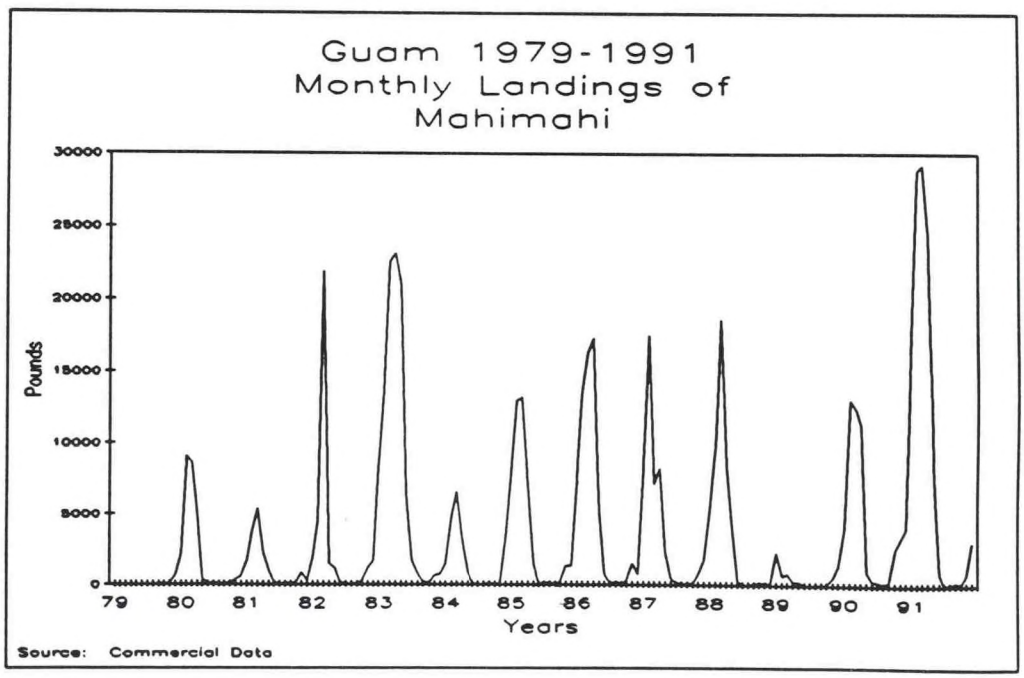

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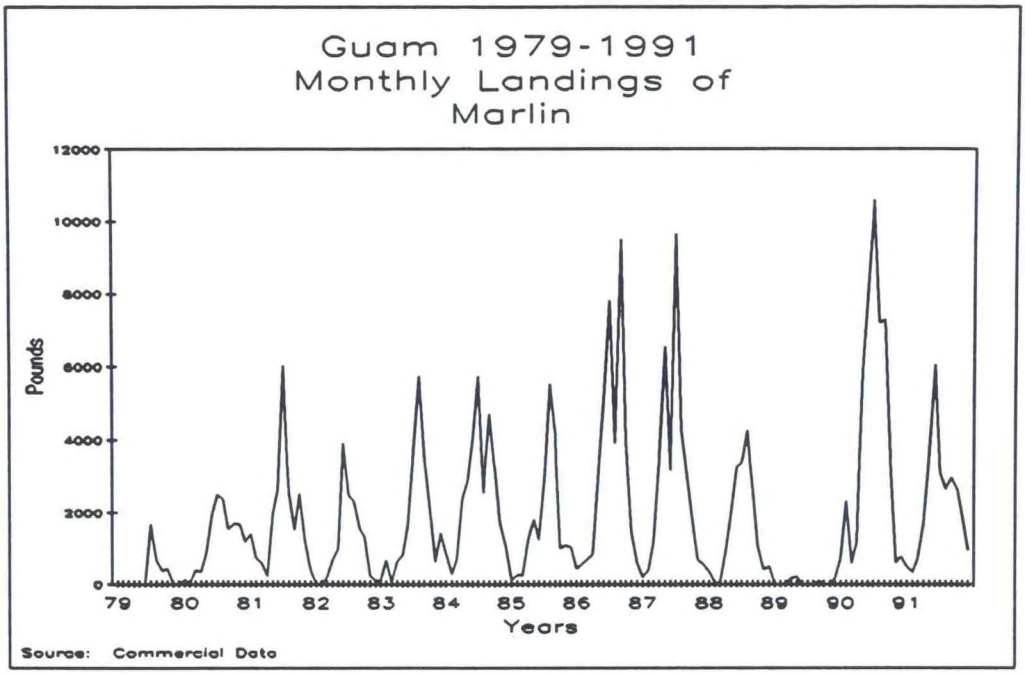

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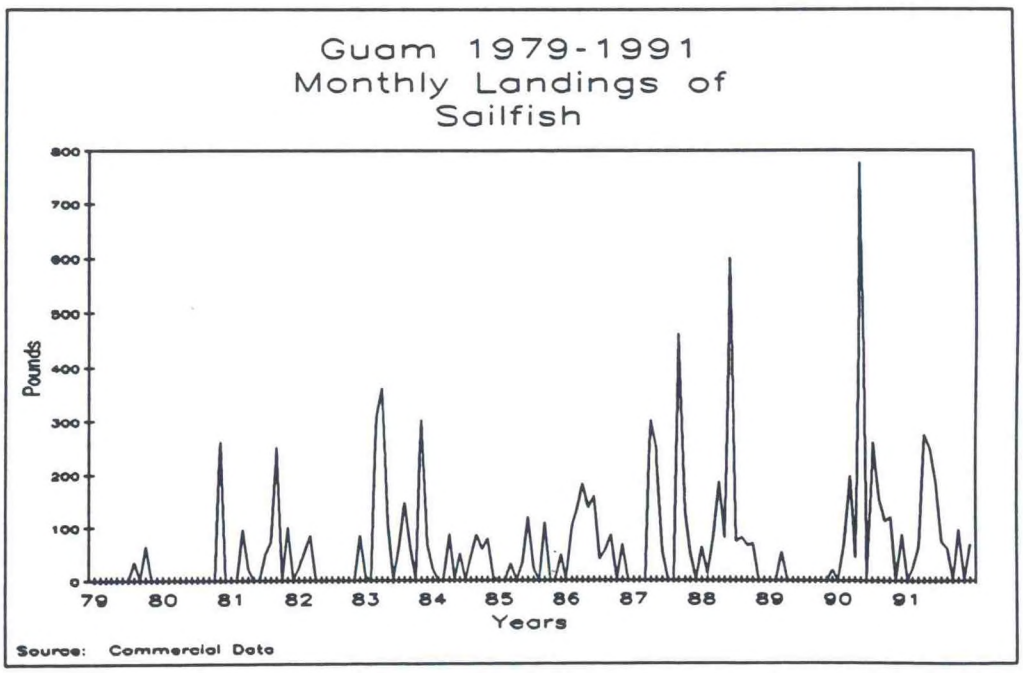

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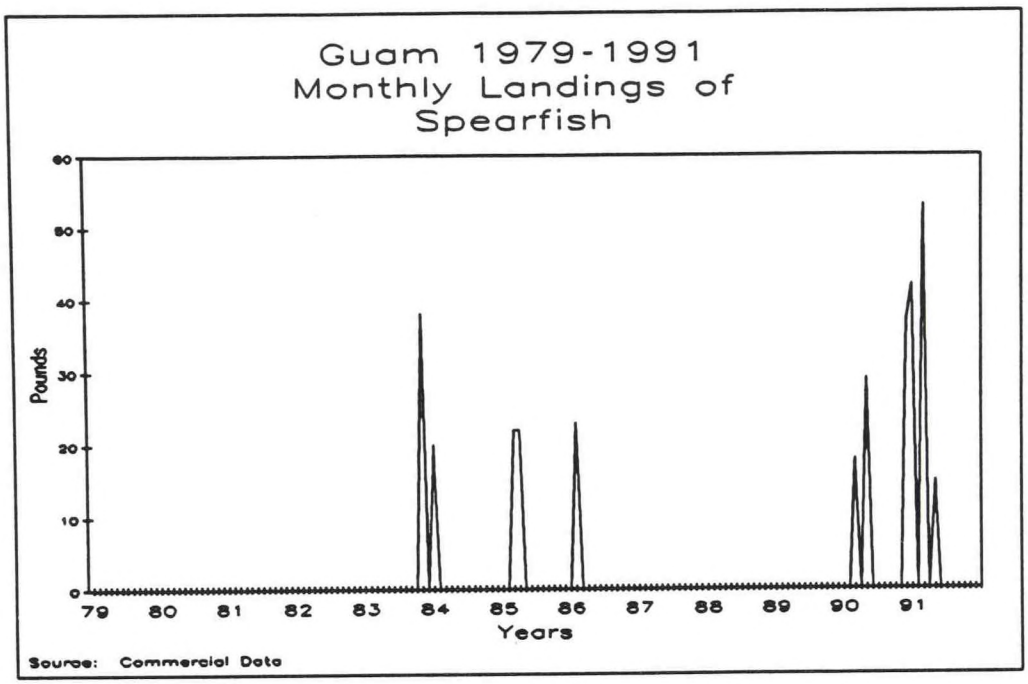

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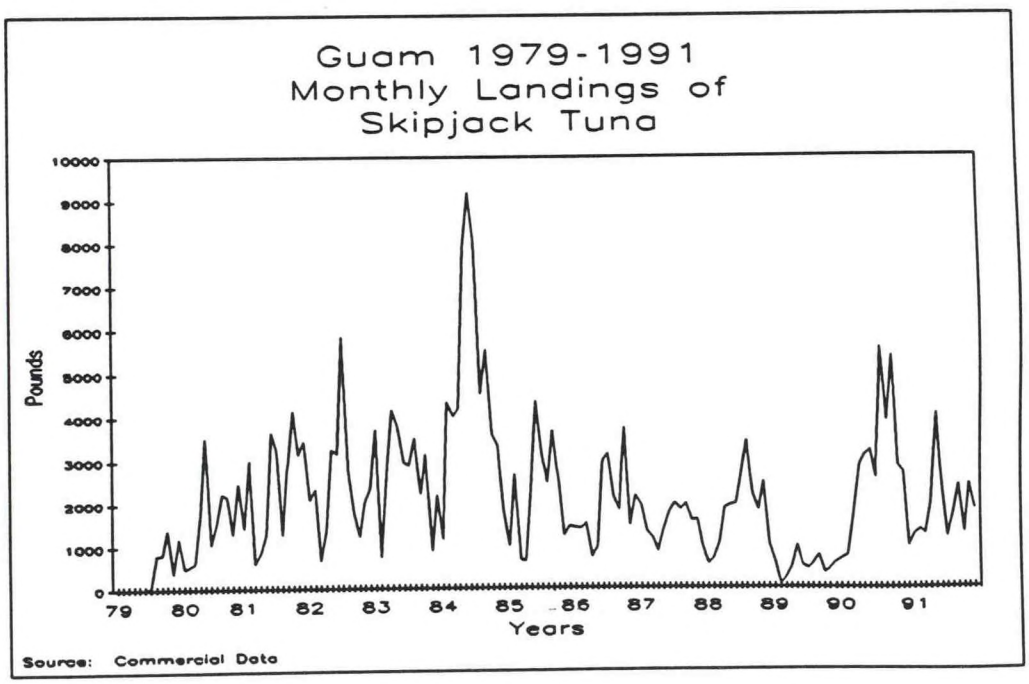

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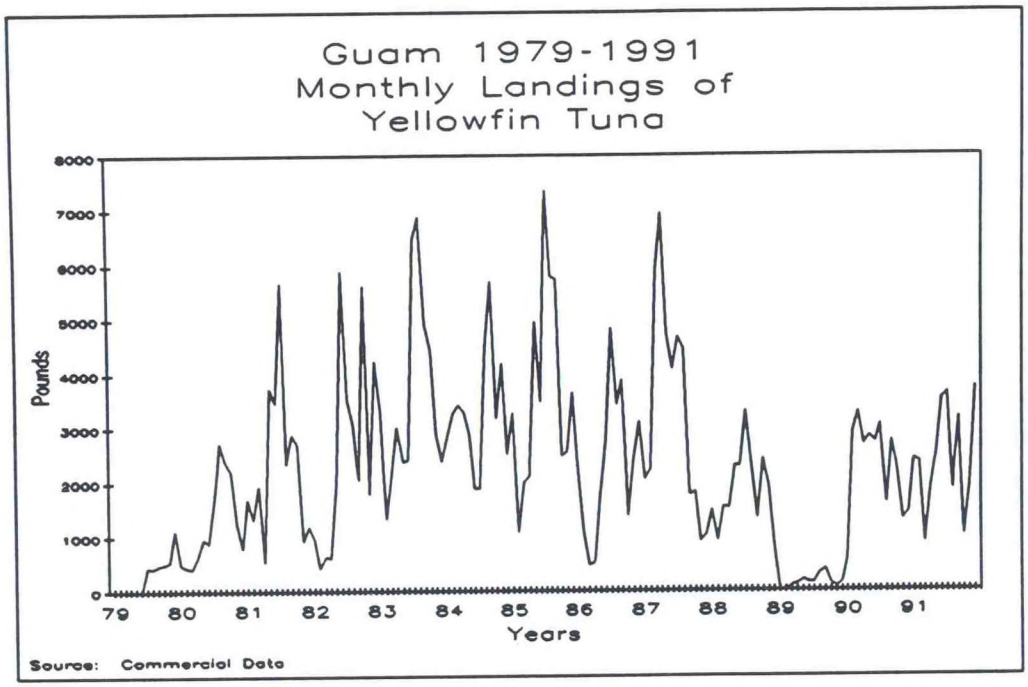

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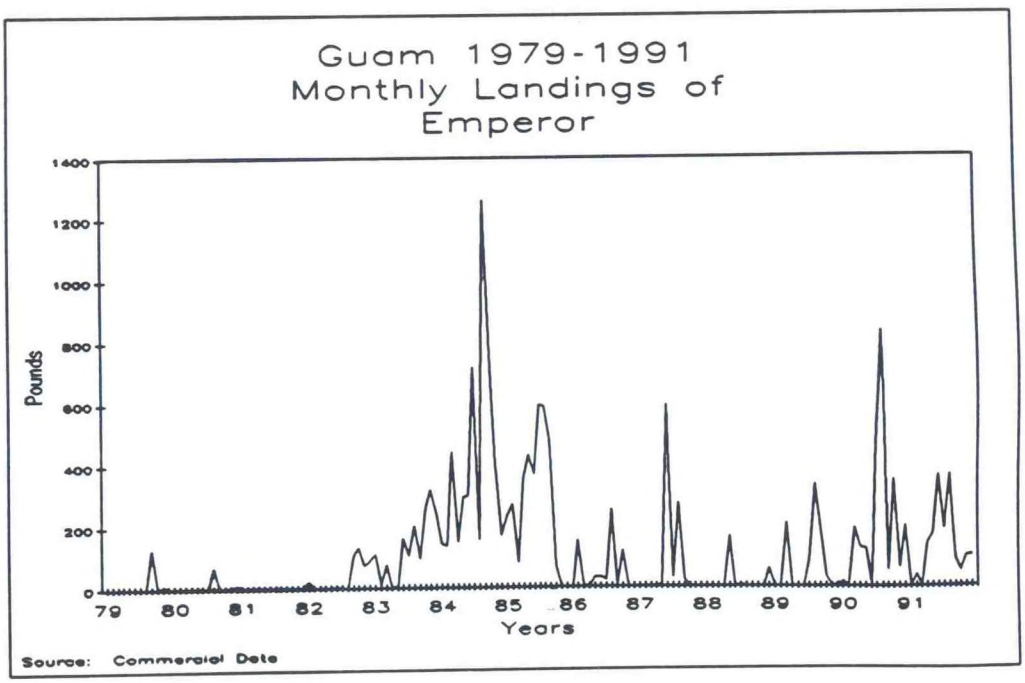


Figure IV.4.9

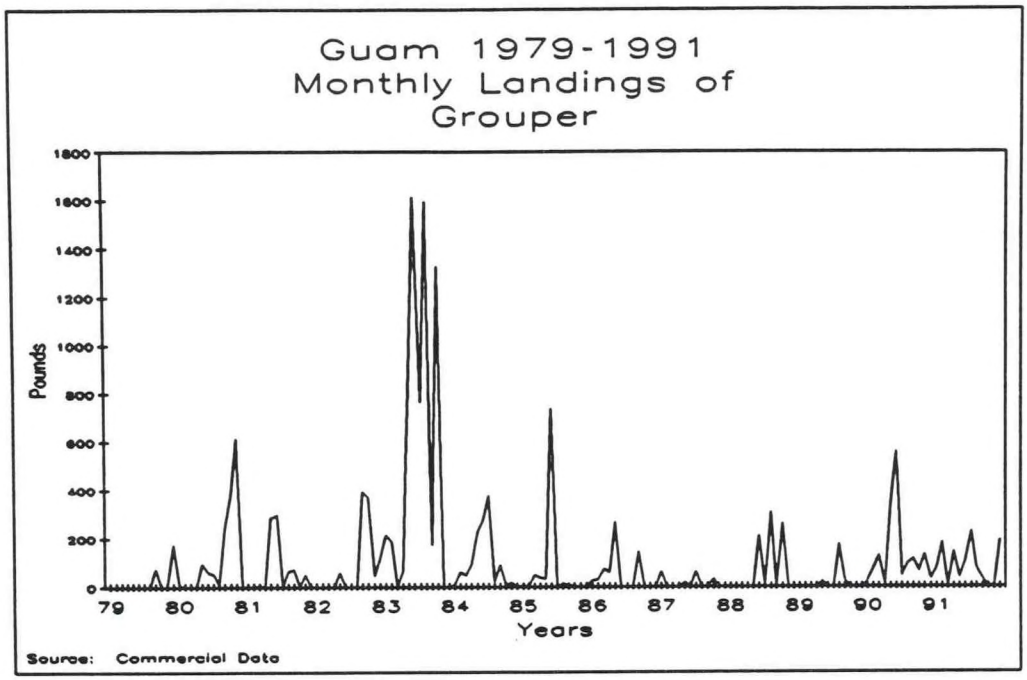

Guam 1979-1991
Monthly Landings of
Grouper
Pounds
1800
1600
1400
1200
1000
800
600
400
200
0
79
80
81
82
83
84
85
86
87
88
89
90
91
Years
Source: Commercial Data

Table IV.2.1

Guam DAWR 1991 Annual
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	807550.1	12	55378.3	6	12536.1	5	245699.4	6	57364.4	6	14.9	13
Bottom fish	51899.0	23	9558.5	17	2475.1	12	28363.0	16	7545.7	13	5.1	15
Atulai jig	25759.6	46	2301.1	35	505.9	35	6327.4	34	1439.6	35	7.4	20
Spear mix	1704.4	89	36.7	89	9.2	89	110.2	89	27.5	89	46.4	0
Spear snorkel	13100.6	29	1235.3	30	569.5	29	3768.7	27	1798.5	27	11.8	28
Spear scuba	23295.9	36	585.1	27	483.0	25	1926.8	27	1527.1	25	31.6	32
Long line	0	0	0	0	0	0	0	0	0	0	0	0
Ika shibi	0	0	0	0	0	0	0	0	0	0	0	0
Other	20109.0	54	1672.0	31	465.4	33	4777.5	31	1329.9	34	9.2	55
Total:	943418.5	11	70767.0	6	15288.7	6	290973.1	6	65994.8	6	14.2	13

Table IV.2.2

Guam DAWR Annual 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Sharks	11365.2	1.20	7147.0	0.89	1365.7	2.63	2852.4	3.40
Milkfish	55.0	0.01	0	0	0	0	55.0	0.07
Bearfish	30.8	0	0	0	30.8	0.06	0	0
Needlefish	88.3	0.01	0	0	31.4	0.06	56.8	0.07
Squirrelfish	864.1	0.09	0	0	324.0	0.62	540.1	0.64
Scorpionfish	53.9	0.01	0	0	53.9	0.10	0	0
Grouper	8871.3	0.94	0	0	6290.2	12.12	2581.1	3.07
Bigeyes	84.8	0.01	0	0	0	0	84.8	0.10
Jacks	5056.3	0.54	76.9	0.01	2814.0	5.42	2165.4	2.58
Rainbow runner	2477.0	0.26	2047.8	0.25	429.2	0.83	0	0
Bigeye scad (akule)	27411.7	2.91	0	0	78.0	0.15	27333.7	32.55
Mahimahi (dolphinfish)	406061.1	43.04	405916.5	50.27	144.6	0.28	0	0
Snappers	5102.9	0.54	148.9	0.02	2152.2	4.15	2801.8	3.34
Lehi (silvermouth)	2989.9	0.32	0	0	2989.9	5.76	0	0
Uku (jobfish)	1485.7	0.16	0	0	1485.7	2.86	0	0
Ehu (pink snapper)	2216.2	0.23	0	0	2216.2	4.27	0	0
Blue lined snapper	1265.5	0.13	0	0	1231.8	2.37	33.7	0.04
Yellowtail kalikali	5036.4	0.53	0	0	5036.4	9.70	0	0
Opakapaka (pink snap)	908.4	0.10	0	0	908.4	1.75	0	0
Yelloweye opakapaka	1193.2	0.13	0	0	1193.2	2.30	0	0
Kalikali (pink snapper)	258.6	0.03	0	0	258.6	0.50	0	0
Gindai (flower snapper)	2526.1	0.27	0	0	2526.1	4.87	0	0
Fusilier	27.2	0	0	0	0	0	27.2	0.03
Moharra	782.3	0.08	0	0	0	0	782.3	0.93
Sweetlips	520.4	0.06	0	0	0	0	520.4	0.62
Emperors	15425.8	1.64	0	0	14288.1	27.53	1137.7	1.35
Goatfish	2146.8	0.23	0	0	909.1	1.75	1237.7	1.47
Sweepers	16.6	0	0	0	0	0	16.6	0.02
Rudderfish	753.9	0.08	0	0	0	0	753.9	0.90
Batfish	89.5	0.01	0	0	0	0	89.5	0.11
Hawkfish	19.3	0	0	0	0	0	19.3	0.02
Mullet	3204.7	0.34	0	0	0	0	3204.7	3.82
Barracuda	2151.8	0.23	1002.6	0.12	404.1	0.78	745.1	0.89
Wrasse	4303.7	0.46	0	0	924.0	1.78	3379.7	4.02
Parrotfish	15286.6	1.62	0	0	0	0	15286.6	18.20
Surgeonfish and tangs	7181.4	0.76	0	0	150.5	0.29	7030.8	8.37
Rabbitfish	407.4	0.04	0	0	0	0	407.4	0.49
Tunas	32.7	0	0	0	32.7	0.06	0	0
Wahoo	70814.8	7.51	70618.0	8.74	196.8	0.38	0	0
Kawakawa	2725.7	0.29	2676.5	0.33	49.2	0.09	0	0
Dogtooth tuna	2099.2	0.22	2099.2	0.26	0	0	0	0
Skipjack tuna	134477.8	14.25	134477.8	16.65	0	0	0	0
Yellowfin tuna	46912.5	4.97	46767.2	5.79	145.3	0.28	0	0
Sailfish	2021.0	0.21	2021.0	0.25	0	0	0	0
Blue marlin	131307.3	13.92	131307.3	16.26	0	0	0	0
Shortbill spearfish	1244.3	0.13	1244.3	0.15	0	0	0	0
Triggerfish	616.7	0.07	0	0	547.4	1.05	69.4	0.08
Filefish	187.8	0.02	0	0	0	0	187.8	0.22
Tripletooth puffers	57.7	0.01	0	0	57.7	0.11	0	0
Smooth puffers	127.1	0.01	0	0	0	0	127.1	0.15
Assorted bottom fish	423.4	0.04	0	0	423.4	0.82	0	0
Shallow bottom fish	2796.9	0.30	0	0	1724.9	3.32	1072.0	1.28
Deep bottom fish	115.5	0.01	0	0	115.5	0.22	0	0
Assorted reef fish	5187.1	0.55	0	0	370.0	0.71	4817.2	5.74
Mollusks	1691.1	0.18	0	0	0	0	1691.1	2.01
Squid	21.2	0	0	0	0	0	21.2	0.03
Octopus	616.3	0.07	0	0	0	0	616.3	0.73
Spiny lobsters	2116.9	0.22	0	0	0	0	2116.9	2.52
Slipper lobsters	54.0	0.01	0	0	0	0	54.0	0.06
Crabs	52.5	0.01	0	0	0	0	52.5	0.06
Total all species:	943419.5	100.00	807551.0	85.60	51899.0	5.50	83969.5	8.90

Table IV.3.1

GUAM DAWR JANUARY 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
Trolling	80980.0	14	4759.5	1	1202.5	10	23873.4	5	6119.7	15	17.9	24
Bottom fish	375.0	90	80.0	90	43.6	90	159.9	90	87.2	90	4.7	0*
Spear scuba	44.1	95	16.7	95	33.4	95	50.1	95	100.1	95	2.6	0*
Other	78.9	95	41.7	95	11.1	95	41.7	95	11.1	95	1.9	0*
Total:	81478.1	13	4897.8	1	1233.3	6	24125.1	5	6187.5	13	17.4	22

Table IV.3.2

GUAM DAWR FEBRUARY 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
TROLLING	89359.4	36	4304.3	33	962.1	27	16587.9	31	3741.4	27	29.4	45
BOTTOM FISH	471.3	16	185.9	35	84.9	7	501.2	49	208.6	10	3.2	75*
SPEAR SNORKEL	61.2	88	5.6	88	5.6	88	16.7	88	16.7	88	11.0	0*
OTHER	245.0	88	55.6	88	11.1	88	166.7	88	33.3	88	4.4	0*
TOTAL:	90136.9	36	4551.3	30	974.1	26	17272.4	29	3757.1	27	29.2	45

Table IV.3.3

GUAM DAWR MARCH 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
TROLLING	160443.2	35	5028.7	27	1132.5	15	20814.9	9	4956.7	5	30.4	8
BOTTOM FISH	1210.3	74	169.2	66	71.7	69	603.8	75	207.5	68	7.3	0*
SPEAR SNORKEL	654.7	95	116.9	95	46.8	95	350.8	95	140.3	95	5.6	0*
OTHER	9630.0	95	233.8	95	46.8	95	701.5	95	140.3	95	41.2	0*
TOTAL:	171938.2	39	5548.7	32	1223.6	22	22471.0	13	5190.0	5	29.4	8

* Not enough data to properly compute Coefficient of Variation (CV)

Table IV.3.4

GUAM DAWR APRIL 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
TROLLING	67479.3	2	3841.2	6	933.6	2	19487.4	14	4722.2	10	17.4	10
BOTTOM FISH	920.1	29	217.1	21	60.3	5	516.3	4	149.2	13	4.1	15*
SPEAR SNORKEL	1944.6	23	127.8	1	46.8	7	383.5	1	140.5	7	15.2	38*
SPEAR SCUBA	2286.2	95	81.2	95	20.3	95	324.9	95	81.2	95	28.1	0*
OTHER	943.3	87	95.3	87	19.1	87	286.0	87	57.2	87	9.9	0*
TOTAL:	73573.4	5	4362.6	3	1026.5	2	20998.1	11	5067.1	7	16.9	13

Table IV.3.5

GUAM DAWR MAY 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
TROLLING	63198.3	40	4331.4	28	1051.9	26	19290.6	25	4698.5	23	12.4	29
BOTTOM FISH	1915.2	32	752.4	31	230.8	32	2888.8	13	879.6	21	2.6	0*
ATULAI JIG	6443.0	91	470.1	70	78.3	66	1093.3	67	192.6	65	10.7	0*
SPEAR SNORKEL	2202.6	80	158.2	68	83.6	65	456.2	71	241.6	68	10.7	4*
SPEAR SCUBA	2736.1	83	60.6	68	37.2	75	223.3	67	134.7	74	39.3	0*
OTHER	4853.0	95	282.1	95	56.4	95	846.2	95	169.2	95	17.2	0*
TOTAL:	81348.3	47	6054.8	35	1325.9	35	24798.3	29	5641.2	30	11.4	33

Table IV.3.6

GUAM DAWR JUNE 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
TROLLING	51532.0	30	5718.9	17	1285.8	11	24643.6	13	5581.8	7	8.4	24
BOTTOM FISH	5315.0	20	938.1	22	222.6	22	3042.1	31	730.5	31	4.8	28
SPEAR SNORKEL	3061.8	65	181.2	63	59.7	53	621.6	63	199.6	50	16.1	54*
SPEAR SCUBA	13456.3	40	195.9	25	162.2	15	622.5	36	502.9	25	59.2	45
TOTAL:	73365.1	25	7034.2	18	1528.0	12	28929.8	16	6390.0	9	9.8	9

* Not enough data to properly compute Coefficient of Variation (CV)

Table IV.3.7

GUAM DAWR JULY 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
TROLLING	51630.0	12	5520.2	6	1156.8	2	22668.6	5	4822.0	10	9.5	7
BOTTOM FISH	9414.0	15	1647.7	24	396.9	6	4372.3	11	1114.2	7	6.2	14
ATULAI JIG	718.0	89	176.4	30	46.2	25	371.8	5	99.2	1	3.0	141*
SPEAR MIX	1718.8	89	37.0	89	9.3	89	111.1	89	27.8	89	46.4	0*
SPEAR SNORKEL	2894.1	78	459.5	68	190.8	69	1226.7	59	497.5	53	9.5	133*
SPEAR SCUBA	4414.1	80	178.2	36	166.4	29	541.4	36	510.3	29	18.2	120*
OTHER	2449.8	95	301.2	95	86.1	95	602.5	95	172.1	95	8.1	0*
TOTAL:	73238.8	4	8320.3	0	1799.3	9	29894.3	6	6546.2	15	8.9	6

Table IV.3.8

GUAM DAWR AUGUST 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
TROLLING	37890.7	22	3106.5	33	895.2	42	11154.3	36	3301.4	42	13.7	18
BOTTOM FISH	16986.1	62	1736.9	56	413.2	43	5398.6	59	1274.9	52	7.7	15
ATULAI JIG	9900.1	86	883.7	77	217.8	72	2576.7	68	679.8	65	9.0	0*
SPEAR SNORKEL	176.5	88	55.1	88	55.1	88	303.2	88	303.2	88	3.2	0*
SPEAR SCUBA	280.3	88	9.2	88	9.2	88	18.5	88	18.5	88	30.3	0*
OTHER	0	0	4.6	88	9.2	88	18.5	88	37.0	88	0	0*
TOTAL:	65233.8	40	5796.2	45	1204.6	46	19469.8	46	4441.2	45	12.9	14

Table IV.3.9

GUAM DAWR SEPTEMBER 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
TROLLING	75208.2	23	5354.2	7	1284.9	7	28986.5	12	6938.3	11	13.7	19
BOTTOM FISH	2987.3	16	910.7	24	244.7	11	2679.0	20	729.8	10	4.1	36
ATULAI JIG	1649.0	50	333.9	31	68.6	6	1152.7	50	213.5	18	4.5	38*
OTHER	136.0	89	347.8	65	163.3	73	1214.7	65	535.7	70	.4	0*
TOTAL:	79980.5	21	6946.5	5	1639.6	16	34032.9	10	8125.8	19	11.0	25

* Not enough data to properly compute Coefficient of Variation (CV)

Table IV.3.10

GUAM DAWR OCTOBER 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
TROLLING	16404.0	28	2462.5	11	556.3	16	12539.5	22	2914.4	28	6.7	27
BOTTOM FISH	2428.0	64	1208.9	76	207.6	59	2626.4	75	452.7	58	2.9	52*
SPEAR SNORKEL	1823.5	95	103.9	95	69.3	95	311.7	95	207.8	95	17.5	0*
SPEAR SCUBA	161.5	95	35.1	95	35.1	95	140.2	95	140.2	95	4.6	0*
OTHER	883.0	70	236.1	57	35.0	18	666.0	66	83.8	1	9.6	134*
TOTAL:	21699.9	34	4046.5	19	820.1	20	16283.8	20	3571.8	24	5.1	43

Table IV.3.11

GUAM DAWR NOVEMBER 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
TROLLING	41964.4	38	3297.3	17	733.9	13	17296.9	9	3891.6	8	11.1	43
BOTTOM FISH	5182.9	71	734.7	41	165.4	36	2228.1	49	491.6	46	5.8	142*
ATULAI JIG	7378.0	95	452.0	81	93.3	86	1093.3	83	228.7	87	9.8	0*
OTHER	196.8	90	27.5	90	18.3	90	96.1	90	64.1	90	7.2	0*
TOTAL:	54722.1	48	4511.4	26	968.6	21	20714.4	17	4489.7	12	9.8	45

Table IV.3.12

GUAM DAWR DECEMBER 1991
Offshore Creel Survey Expansion Summary

Gear	Catch	CV	Boat Hrs	CV	Boat Cnt	CV	Prsn Hrs	CV	Prsn Cnt	CV	Cpue	CV
TROLLING	49889.8	5	5378.9	7	1209.3	3	22043.5	15	4943.9	10	8.5	8
BOTTOM FISH	4457.3	35	798.8	22	302.3	14	2838.4	24	1138.1	33	5.5	35*
SPEAR SCUBA	116.0	90	18.9	90	26.6	90	47.3	90	66.6	90	6.1	0*
TOTAL:	54463.1	4	6196.6	4	1373.2	4	24929.3	15	5720.9	15	8.0	8

* Not enough data to properly compute Coefficient of Variation (CV)

Table IV.4.1

GUAM DAWR JANUARY 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Sharks	64.1	0.08	0	0	64.1	17.09	0	0
Grouper	57.7	0.07	0	0	57.7	15.38	0	0
Rainbow runner	90.2	0.11	90.2	0.11	0	0	0	0
Mahimahi (dolphinfish)	68428.5	83.98	68428.5	84.50	0	0	0	0
Uku (jobfish)	19.2	0.02	0	0	19.2	5.13	0	0
Emperors	234.0	0.29	0	0	234.0	62.39	0	0
Parrotfish	44.1	0.05	0	0	0	0	44.1	35.88
Surgeonfish and tangs	78.9	0.10	0	0	0	0	78.9	64.12
Wahoo	7255.8	8.91	7255.8	8.96	0	0	0	0
Kawakawa	176.9	0.22	176.9	0.22	0	0	0	0
Dogtooth tuna	833.9	1.02	833.9	1.03	0	0	0	0
Skipjack tuna	1277.9	1.57	1277.9	1.58	0	0	0	0
Yellowfin tuna	2375.3	2.92	2375.3	2.93	0	0	0	0
Sailfish	541.5	0.66	541.5	0.67	0	0	0	0
Total all species:	81478.1	100.00	80980.0	99.39	375.0	0.46	123.0	0.15

Table IV.4.2

GUAM DAWR FEBRUARY 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Needlefish	8.0	0.01	0	0	8.0	1.69	0	0
Jacks	13.3	0.01	0	0	13.3	2.82	0	0
Mahimahi (dolphinfish)	73409.1	81.44	73409.1	82.15	0	0	0	0
Snappers	7.2	0.01	0	0	7.2	1.52	0	0
Lehi (silvermouth)	12.8	0.01	0	0	12.8	2.71	0	0
Yellowtail kalikali	17.5	0.02	0	0	17.5	3.72	0	0
Emperors	380.1	0.42	0	0	380.1	80.65	0	0
Goatfish	24.5	0.03	0	0	24.5	5.19	0	0
Barracuda	93.6	0.10	93.6	0.10	0	0	0	0
Wrasse	8.0	0.01	0	0	8.0	1.69	0	0
Wahoo	3959.6	4.39	3959.6	4.43	0	0	0	0
Kawakawa	73.3	0.08	73.3	0.08	0	0	0	0
Dogtooth tuna	480.2	0.53	480.2	0.54	0	0	0	0
Skipjack tuna	6151.0	6.82	6151.0	6.88	0	0	0	0
Yellowfin tuna	4663.6	5.17	4663.6	5.22	0	0	0	0
Shortbill spearfish	529.0	0.59	529.0	0.59	0	0	0	0
Shallow bottom fish	122.5	0.14	0	0	0	0	122.5	40.00
Assorted reef fish	183.7	0.20	0	0	0	0	183.7	60.00
Total all species:	90136.9	100.00	89359.4	99.14	471.3	0.52	306.2	0.34

Table IV.4.3

GUAM DAWR MARCH 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Sharks	5508.1	3.20	2893.8	1.80	0	0	2614.3	25.42
Grouper	113.7	0.07	0	0	87.1	7.20	26.5	0.26
Bigeyes	52.3	0.03	0	0	0	0	52.3	0.51
Jacks	211.5	0.12	0	0	138.3	11.42	73.2	0.71
Mahimahi (dolphinfish)	137493.0	79.97	137493.0	85.70	0	0	0	0
Snappers	735.9	0.43	0	0	77.1	6.37	658.8	6.41
Lehi (silvermouth)	144.5	0.08	0	0	144.5	11.94	0	0
Blue lined snapper	75.4	0.04	0	0	75.4	6.23	0	0
Yellowtail kalikali	88.4	0.05	0	0	88.4	7.30	0	0
Gindai (flower snapper)	5.9	0	0	0	5.9	0.48	0	0
Moharra	460.1	0.27	0	0	0	0	460.1	4.47
Emperors	1035.1	0.60	0	0	480.9	39.73	554.2	5.39
Goatfish	766.7	0.45	0	0	80.9	6.68	685.9	6.67
Rudderfish	19.7	0.01	0	0	0	0	19.7	0.19
Mullet	4705.7	2.74	0	0	0	0	4705.7	45.75
Wrasse	23.6	0.01	0	0	0	0	23.6	0.23
Parrotfish	230.6	0.13	0	0	0	0	230.6	2.24
Surgeonfish and tangs	76.7	0.04	0	0	0	0	76.7	0.75
Rabbitfish	103.2	0.06	0	0	0	0	103.2	1.00
Wahoo	4523.3	2.63	4523.3	2.82	0	0	0	0
Kawakawa	102.4	0.06	102.4	0.06	0	0	0	0
Dogtooth tuna	204.8	0.12	204.8	0.13	0	0	0	0
Skipjack tuna	5872.2	3.42	5872.2	3.66	0	0	0	0
Yellowfin tuna	6085.9	3.54	6085.9	3.79	0	0	0	0
Blue marlin	2448.6	1.42	2448.6	1.53	0	0	0	0
Shortbill spearfish	819.2	0.48	819.2	0.51	0	0	0	0
Triggerfish	31.8	0.02	0	0	31.8	2.63	0	0
Total all species:	171938.2	100.00	160443.2	93.31	1210.3	0.70	10284.7	5.98

Table IV.4.4

GUAM DAWR APRIL 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Squirrelfish	97.1	0.13	0	0	13.6	1.48	83.5	1.61
Grouper	330.9	0.45	0	0	111.6	12.13	219.3	4.24
Bigeyes	10.2	0.01	0	0	0	0	10.2	0.20
Jacks	363.0	0.49	0	0	155.9	16.94	207.1	4.00
Mahimahi (dolphinfish)	56815.1	77.22	56815.1	84.20	0	0	0	0
Snappers	371.2	0.50	0	0	2.5	0.27	368.7	7.13
Lehi (silvermouth)	42.1	0.06	0	0	42.1	4.57	0	0
Ehu (pink snapper)	90.1	0.12	0	0	90.1	9.79	0	0
Blue lined snapper	40.8	0.06	0	0	40.8	4.44	0	0
Yellowtail kalikali	5.9	0.01	0	0	5.9	0.65	0	0
Yelloweye opakapaka	123.7	0.17	0	0	123.7	13.45	0	0
Kalikali (pink snapper)	58.2	0.08	0	0	58.2	6.32	0	0
Gindai (flower snapper)	4.9	0.01	0	0	4.9	0.54	0	0
Moharra	315.3	0.43	0	0	0	0	315.3	6.09
Sweetlips	54.2	0.07	0	0	0	0	54.2	1.05
Emperors	382.5	0.52	0	0	243.5	26.47	139.0	2.69
Goatfish	113.8	0.15	0	0	0	0	113.8	2.20
Sweepers	16.3	0.02	0	0	0	0	16.3	0.31
Rudderfish	47.8	0.06	0	0	0	0	47.8	0.92
Hawkfish	8.1	0.01	0	0	0	0	8.1	0.16
Barracuda	27.2	0.04	0	0	27.2	2.96	0	0
Wrasse	266.5	0.36	0	0	0	0	266.5	5.15
Parrotfish	2250.4	3.06	0	0	0	0	2250.4	43.49
Surgeonfish and tangs	593.1	0.81	0	0	0	0	593.1	11.46
Rabbitfish	84.8	0.12	0	0	0	0	84.8	1.64
Wahoo	2698.4	3.67	2698.4	4.00	0	0	0	0
Kawakawa	93.0	0.13	93.0	0.14	0	0	0	0
Skipjack tuna	5078.6	6.90	5078.6	7.53	0	0	0	0
Yellowfin tuna	597.1	0.81	597.1	0.88	0	0	0	0
Sailfish	1014.0	1.38	1014.0	1.50	0	0	0	0
Blue marlin	1183.0	1.61	1183.0	1.75	0	0	0	0
Triggerfish	48.6	0.07	0	0	0	0	48.6	0.94
Filefish	184.4	0.25	0	0	0	0	184.4	3.56
Octopus	162.7	0.22	0	0	0	0	162.7	3.15
Total all species:	73573.4	100.00	67479.3	91.72	920.1	1.25	5174.0	7.03

Table IV.4.5

GUAM DAWR MAY 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Sharks	2071.1	2.55	1991.8	3.15	79.4	4.15	0	0
Squirrelfish	262.4	0.32	0	0	14.3	0.75	248.1	1.53
Grouper	695.9	0.86	0	0	432.6	22.59	263.3	1.62
Bigeyes	53.1	0.07	0	0	0	0	53.1	0.33
Jacks	315.3	0.39	59.8	0.09	18.5	0.97	237.0	1.46
Rainbow runner	134.6	0.17	134.6	0.21	0	0	0	0
Bigeye scad (akule)	6106.2	7.51	0	0	0	0	6106.2	37.61
Mahimahi (dolphinfish)	25809.3	31.73	25809.3	40.84	0	0	0	0
Snappers	842.1	1.04	10.8	0.02	10.7	0.56	820.6	5.05
Uku (jobfish)	31.8	0.04	0	0	31.8	1.66	0	0
Ehu (pink snapper)	39.7	0.05	0	0	39.7	2.07	0	0
Blue lined snapper	4.2	0.01	0	0	4.2	0.22	0	0
Gindai (flower snapper)	17.2	0.02	0	0	17.2	0.90	0	0
Moharra	185.3	0.23	0	0	0	0	185.3	1.14
Emperors	808.1	0.99	0	0	747.9	39.05	60.3	0.37
Goatfish	273.2	0.34	0	0	17.5	0.91	255.8	1.58
Rudderfish	127.2	0.16	0	0	0	0	127.2	0.78
Barracuda	336.8	0.41	0	0	0	0	336.8	2.07
Wrasse	841.7	1.03	0	0	0	0	841.7	5.18
Parrotfish	4455.7	5.48	0	0	0	0	4455.7	27.45
Surgeonfish and tangs	746.3	0.92	0	0	0	0	746.3	4.60
Rabbitfish	102.0	0.13	0	0	0	0	102.0	0.63
Wahoo	2468.2	3.03	2468.2	3.91	0	0	0	0
Kawakawa	75.4	0.09	75.4	0.12	0	0	0	0
Skipjack tuna	19885.2	24.44	19885.2	31.46	0	0	0	0
Yellowfin tuna	3902.8	4.80	3902.8	6.18	0	0	0	0
Blue marlin	8860.6	10.89	8860.6	14.02	0	0	0	0
Triggerfish	51.6	0.06	0	0	51.6	2.69	0	0
Shallow bottom fish	370.5	0.46	0	0	370.5	19.35	0	0
Deep bottom fish	79.4	0.10	0	0	79.4	4.15	0	0
Assorted reef fish	861.4	1.06	0	0	0	0	861.4	5.31
Octopus	45.6	0.06	0	0	0	0	45.6	0.28
Spiny lobsters	403.6	0.50	0	0	0	0	403.6	2.49
Slipper lobsters	20.9	0.03	0	0	0	0	20.9	0.13
Crabs	63.9	0.08	0	0	0	0	63.9	0.39
Total all species:	81348.3	100.00	63198.3	77.69	1915.2	2.35	16234.7	19.96

Table IV.4.6

GUAM DAWR JUNE 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Sharks	1249.4	1.70	1136.7	2.21	112.7	2.12	0	0
Squirrelfish	86.5	0.12	0	0	34.0	0.64	52.5	0.32
Grouper	1828.1	2.49	0	0	768.1	14.45	1059.9	6.42
Jacks	389.3	0.53	0	0	156.8	2.95	232.5	1.41
Rainbow runner	537.0	0.73	275.5	0.53	261.5	4.92	0	0
Mahimahi (dolphinfish)	2634.9	3.59	2485.1	4.82	149.8	2.82	0	0
Snappers	627.4	0.86	0	0	25.7	0.48	601.8	3.64
Lehi (silvermouth)	57.5	0.08	0	0	57.5	1.08	0	0
Uku (jobfish)	119.9	0.16	0	0	119.9	2.26	0	0
Ehu (pink snapper)	216.5	0.30	0	0	216.5	4.07	0	0
Blue lined snapper	43.2	0.06	0	0	43.2	0.81	0	0
Yellowtail kalikali	275.3	0.38	0	0	275.3	5.18	0	0
Gindai (flower snapper)	196.4	0.27	0	0	196.4	3.70	0	0
Fusilier	26.4	0.04	0	0	0	0	26.4	0.16
Sweetlips	416.3	0.57	0	0	0	0	416.3	2.52
Emperors	2823.9	3.85	0	0	2540.2	47.79	283.7	1.72
Goatfish	322.6	0.44	0	0	47.0	0.88	275.6	1.67
Rudderfish	290.6	0.40	0	0	0	0	290.6	1.76
Hawkfish	5.4	0.01	0	0	0	0	5.4	0.03
Mullet	108.1	0.15	0	0	0	0	108.1	0.65
Barracuda	298.4	0.41	298.4	0.58	0	0	0	0
Wrasse	2587.3	3.53	0	0	45.3	0.85	2542.0	15.39
Parrotfish	5351.2	7.29	0	0	0	0	5351.2	32.40
Surgeonfish and tangs	2399.2	3.27	0	0	76.7	1.44	2322.5	14.06
Rabbitfish	101.8	0.14	0	0	0	0	101.8	0.62
Tunas	20.4	0.03	0	0	20.4	0.38	0	0
Wahoo	6143.7	8.37	6143.7	11.92	0	0	0	0
Kawakawa	51.1	0.07	51.1	0.10	0	0	0	0
Dogtooth tuna	264.3	0.36	264.3	0.51	0	0	0	0
Skipjack tuna	18223.6	24.84	18223.6	35.36	0	0	0	0
Yellowfin tuna	7058.7	9.62	7058.7	13.70	0	0	0	0
Blue marlin	15595.0	21.26	15595.0	30.26	0	0	0	0
Shallow bottom fish	167.9	0.23	0	0	167.9	3.16	0	0
Assorted reef fish	1420.8	1.94	0	0	0	0	1420.8	8.60
Mollusks	41.2	0.06	0	0	0	0	41.2	0.25
Squid	16.5	0.02	0	0	0	0	16.5	0.10
Octopus	64.6	0.09	0	0	0	0	64.6	0.39
Spiny lobsters	1304.9	1.78	0	0	0	0	1304.9	7.90
Total all species:	73365.1	100.00	51532.0	70.24	5315.0	7.24	16518.1	22.51

Table IV.4.7

GUAM DAWR JULY 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Sharks	1965.4	2.32	53.6	0.08	890.7	9.46	1021.0	8.37
Milkfish	34.7	0.04	0	0	0	0	34.7	0.28
Needlefish	52.1	0.06	0	0	0	0	52.1	0.43
Squirrelfish	210.2	0.25	0	0	77.1	0.82	133.1	1.09
Scorpionfish	53.7	0.06	0	0	53.7	0.57	0	0
Grouper	1664.8	1.97	0	0	932.3	9.90	732.5	6.01
Bigeyes	11.8	0.01	0	0	0	0	11.8	0.10
Jacks	781.1	0.92	19.8	0.03	328.1	3.49	433.2	3.55
Rainbow runner	743.8	0.88	743.8	1.18	0	0	0	0
Bigeye scad (akule)	629.1	0.74	0	0	0	0	629.1	5.16
Mahimahi (dolphinfish)	526.8	0.62	526.8	0.83	0	0	0	0
Snappers	969.2	1.14	131.8	0.21	214.6	2.28	622.8	5.11
Lehi (silvermouth)	458.6	0.54	0	0	458.6	4.87	0	0
Uku (jobfish)	462.4	0.55	0	0	462.4	4.91	0	0
Ehu (pink snapper)	191.1	0.23	0	0	191.1	2.03	0	0
Blue lined snapper	87.9	0.10	0	0	87.9	0.93	0	0
Yellowtail kalikali	1245.0	1.47	0	0	1245.0	13.22	0	0
Opakapaka (pink snap)	153.5	0.18	0	0	153.5	1.63	0	0
Yelloweye opakapaka	371.9	0.44	0	0	371.9	3.95	0	0
Gindai (flower snapper)	850.1	1.00	0	0	850.1	9.03	0	0
Moharra	13.2	0.02	0	0	0	0	13.2	0.11
Sweetlips	37.9	0.04	0	0	0	0	37.9	0.31
Emperors	2706.3	3.19	0	0	2358.6	25.05	347.7	2.85
Goatfish	555.0	0.66	0	0	335.6	3.56	219.4	1.80
Rudderfish	226.8	0.27	0	0	0	0	226.8	1.86
Batfish	88.5	0.10	0	0	0	0	88.5	0.73
Mullet	348.1	0.41	0	0	0	0	348.1	2.85
Barracuda	399.7	0.47	226.3	0.36	79.3	0.84	94.1	0.77
Wrasse	110.6	0.13	0	0	73.7	0.78	36.9	0.30
Parrotfish	3092.7	3.65	0	0	0	0	3092.7	25.36
Surgeonfish and tangs	1588.2	1.87	0	0	0	0	1588.2	13.02
Rabbitfish	62.8	0.07	0	0	0	0	62.8	0.52
Wahoo	2113.5	2.49	2113.5	3.35	0	0	0	0
Kawakawa	182.7	0.22	182.7	0.29	0	0	0	0
Dogtooth tuna	34.6	0.04	34.6	0.05	0	0	0	0
Skipjack tuna	17898.5	21.13	17898.5	28.36	0	0	0	0
Yellowfin tuna	9758.5	11.52	9758.5	15.46	0	0	0	0
Blue marlin	31415.8	37.08	31415.8	49.78	0	0	0	0
Triggerfish	106.5	0.13	0	0	96.3	1.02	10.2	0.08
Smooth puffers	195.2	0.23	0	0	0	0	195.2	1.60
Shallow bottom fish	153.5	0.18	0	0	153.5	1.63	0	0
Mollusks	1498.5	1.77	0	0	0	0	1498.5	12.29
Squid	4.6	0.01	0	0	0	0	4.6	0.04
Octopus	385.8	0.46	0	0	0	0	385.8	3.16
Spiny lobsters	242.1	0.29	0	0	0	0	242.1	1.99
Slipper lobsters	31.9	0.04	0	0	0	0	31.9	0.26
Total all species:	84714.7	100.00	63105.9	74.49	9414.0	11.11	12194.8	14.40

Table IV.4.8

GUAM DAWR AUGUST 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Bearfish	33.3	0.05	0	0	33.3	0.20	0	0
Squirrelfish	10.2	0.02	0	0	0	0	10.2	0.10
Grouper	2123.0	3.25	0	0	2077.7	12.23	45.3	0.44
Jacks	1338.0	2.05	0	0	1014.3	5.97	323.8	3.13
Rainbow runner	218.6	0.34	218.6	0.58	0	0	0	0
Bigeye scad (akule)	9485.3	14.54	0	0	0	0	9485.3	91.58
Mahimahi (dolphinfish)	606.0	0.93	606.0	1.60	0	0	0	0
Snappers	1817.0	2.79	0	0	1767.3	10.40	49.7	0.48
Lehi (silvermouth)	2096.2	3.21	0	0	2096.2	12.34	0	0
Uku (jobfish)	621.8	0.95	0	0	621.8	3.66	0	0
Ehu (pink snapper)	1426.6	2.19	0	0	1426.6	8.40	0	0
Blue lined snapper	908.0	1.39	0	0	816.9	4.81	91.1	0.88
Yellowtail kalikali	1358.4	2.08	0	0	1358.4	8.00	0	0
Opakapaka (pink snap)	815.2	1.25	0	0	815.2	4.80	0	0
Yelloweye opakapaka	447.1	0.69	0	0	447.1	2.63	0	0
Kalikali (pink snapper)	166.4	0.26	0	0	166.4	0.98	0	0
Gindai (flower snapper)	811.4	1.24	0	0	811.4	4.78	0	0
Emperors	2700.1	4.14	0	0	2700.1	15.90	0	0
Goatfish	75.7	0.12	0	0	75.7	0.45	0	0
Barracuda	371.0	0.57	127.0	0.34	244.0	1.44	0	0
Wrasse	101.1	0.15	0	0	101.1	0.59	0	0
Surgeonfish and tangs	389.0	0.60	0	0	37.4	0.22	351.6	3.39
Wahoo	1186.1	1.82	1186.1	3.13	0	0	0	0
Kawakawa	484.8	0.74	484.8	1.28	0	0	0	0
Skipjack tuna	7858.6	12.05	7858.6	20.74	0	0	0	0
Yellowfin tuna	4006.7	6.14	3749.4	9.90	257.3	1.51	0	0
Blue marlin	23660.2	36.27	23660.2	62.44	0	0	0	0
Triggerfish	43.3	0.07	0	0	43.3	0.25	0	0
Tripletooth puffers	62.4	0.10	0	0	62.4	0.37	0	0
Shallow bottom fish	12.5	0.02	0	0	12.5	0.07	0	0
Total all species:	65233.8	100.00	37890.7	58.08	16986.1	26.04	10356.9	15.88

Table IV.4.9

GUAM DAWR SEPTEMBER 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Squirrelfish	5.7	0.01	0	0	3.6	0.12	2.1	0.12
Grouper	231.3	0.29	0	0	231.3	7.74	0	0
Jacks	145.0	0.18	0	0	145.0	4.85	0	0
Bigeye scad (akule)	1813.2	2.27	0	0	53.4	1.79	1759.8	98.59
Mahimahi (dolphinfish)	1609.0	2.01	1609.0	2.14	0	0	0	0
Lehi (silvermouth)	165.5	0.21	0	0	165.5	5.54	0	0
Uku (jobfish)	120.1	0.15	0	0	120.1	4.02	0	0
Ehu (pink snapper)	71.2	0.09	0	0	71.2	2.38	0	0
Blue lined snapper	42.7	0.05	0	0	42.7	1.43	0	0
Yellowtail kalikali	380.7	0.48	0	0	380.7	12.75	0	0
Yelloweye opakapaka	192.2	0.24	0	0	192.2	6.43	0	0
Kalikali (pink snapper)	16.5	0.02	0	0	16.5	0.55	0	0
Gindai (flower snapper)	110.8	0.14	0	0	110.8	3.71	0	0
Emperors	888.7	1.11	0	0	888.7	29.75	0	0
Goatfish	97.9	0.12	0	0	97.9	3.28	0	0
Barracuda	17.8	0.02	0	0	0	0	17.8	1.00
Wrasse	68.5	0.09	0	0	68.5	2.29	0	0
Surgeonfish and tangs	24.9	0.03	0	0	24.9	0.83	0	0
Wahoo	4435.5	5.55	4435.5	5.90	0	0	0	0
Kawakawa	596.4	0.75	596.4	0.79	0	0	0	0
Skipjack tuna	19434.9	24.30	19434.9	25.84	0	0	0	0
Yellowfin tuna	447.3	0.56	447.3	0.59	0	0	0	0
Blue marlin	48685.2	60.87	48685.2	64.73	0	0	0	0
Triggerfish	63.2	0.08	0	0	63.2	2.11	0	0
Shallow bottom fish	311.4	0.39	0	0	311.4	10.42	0	0
Mollusks	5.2	0.01	0	0	0	0	5.2	0.29
Total all species:	79980.5	100.00	75208.2	94.03	2987.3	3.74	1785.0	2.23

Table IV.4.10

GUAM DAWR OCTOBER 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Needlefish	2.1	0.01	0	0	2.1	0.09	0	0
Squirrelfish	62.0	0.29	0	0	0	0	62.0	2.16
Grouper	615.3	2.84	0	0	545.1	22.45	70.2	2.45
Jacks	130.2	0.60	130.2	0.79	0	0	0	0
Rainbow runner	303.7	1.40	303.7	1.85	0	0	0	0
Bigeye scad (akule)	909.2	4.19	0	0	26.3	1.08	883.0	30.79
Mahimahi (dolphinfish)	289.3	1.33	289.3	1.76	0	0	0	0
Snappers	24.9	0.11	0	0	24.9	1.02	0	0
Ehu (pink snapper)	33.2	0.15	0	0	33.2	1.37	0	0
Blue lined snapper	84.6	0.39	0	0	84.6	3.48	0	0
Yellowtail kalikali	385.5	1.78	0	0	385.5	15.88	0	0
Yelloweye opakapaka	33.2	0.15	0	0	33.2	1.37	0	0
Gindai (flower snapper)	94.1	0.43	0	0	94.1	3.88	0	0
Emperors	885.2	4.08	0	0	871.3	35.89	13.9	0.49
Goatfish	46.4	0.21	0	0	46.4	1.91	0	0
Wrasse	21.1	0.10	0	0	21.1	0.87	0	0
Parrotfish	179.5	0.83	0	0	0	0	179.5	6.26
Surgeonfish and tangs	1309.7	6.04	0	0	0	0	1309.7	45.67
Rabbitfish	33.8	0.16	0	0	0	0	33.8	1.18
Wahoo	2048.9	9.44	2048.9	12.49	0	0	0	0
Kawakawa	1018.9	4.70	966.9	5.89	52.0	2.14	0	0
Skipjack tuna	7882.4	36.32	7882.4	48.05	0	0	0	0
Yellowfin tuna	540.0	2.49	540.0	3.29	0	0	0	0
Blue marlin	4242.5	19.55	4242.5	25.86	0	0	0	0
Triggerfish	208.4	0.96	0	0	208.4	8.58	0	0
Octopus	122.1	0.56	0	0	0	0	122.1	4.26
Spiny lobsters	162.7	0.75	0	0	0	0	162.7	5.67
Slipper lobsters	11.6	0.05	0	0	0	0	11.6	0.41
Crabs	19.4	0.09	0	0	0	0	19.4	0.68
Total all species:	21699.9	100.00	16404.0	75.59	2428.0	11.19	2868.0	13.22

Table IV.4.11

GUAM DAWR NOVEMBER 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Squirrelfish	117.0	0.21	0	0	117.0	2.26	0	0
Grouper	382.3	0.70	0	0	382.3	7.38	0	0
Jacks	741.7	1.36	0	0	741.7	14.31	0	0
Rainbow runner	140.1	0.26	140.1	0.33	0	0	0	0
Bigeye scad (akule)	7495.9	13.70	0	0	0	0	7495.9	98.96
Mahimahi (dolphinfish)	3454.6	6.31	3454.6	8.23	0	0	0	0
Snappers	100.4	0.18	0	0	100.4	1.94	0	0
Lehi (silvermouth)	121.4	0.22	0	0	121.4	2.34	0	0
Uku (jobfish)	97.9	0.18	0	0	97.9	1.89	0	0
Ehu (pink snapper)	84.7	0.15	0	0	84.7	1.63	0	0
Blue lined snapper	12.7	0.02	0	0	12.7	0.25	0	0
Yellowtail kalikali	1605.7	2.93	0	0	1605.7	30.98	0	0
Yelloweye opakapaka	21.5	0.04	0	0	21.5	0.42	0	0
Gindai (flower snapper)	433.2	0.79	0	0	433.2	8.36	0	0
Emperors	117.0	0.21	0	0	117.0	2.26	0	0
Goatfish	10.8	0.02	0	0	10.8	0.21	0	0
Barracuda	357.8	0.65	294.1	0.70	63.6	1.23	0	0
Wrasse	7.3	0.01	0	0	7.3	0.14	0	0
Surgeonfish and tangs	15.7	0.03	0	0	15.7	0.30	0	0
Wahoo	24770.6	45.27	24770.6	59.03	0	0	0	0
Kawakawa	172.7	0.32	172.7	0.41	0	0	0	0
Skipjack tuna	9000.7	16.45	9000.7	21.45	0	0	0	0
Yellowfin tuna	2030.8	3.71	2030.8	4.84	0	0	0	0
Blue marlin	2100.8	3.84	2100.8	5.01	0	0	0	0
Triggerfish	9.8	0.02	0	0	9.8	0.19	0	0
Shallow bottom fish	1077.0	1.97	0	0	1077.0	20.78	0	0
Assorted reef fish	242.1	0.44	0	0	163.2	3.15	78.9	1.04
Total all species:	54722.1	100.00	41964.4	76.69	5182.9	9.47	7574.8	13.84

Table IV.4.12

GUAM DAWR DECEMBER 1991
Offshore Creel Survey Species Composition

Common Name	Total All Gears	% All Gears	Trolling	% This Gear	Bottom	% This Gear	Other	% This Gear
Squirrelfish	110.7	0.20	0	0	110.7	2.48	0	0
Grouper	551.3	1.01	0	0	551.3	12.37	0	0
Jacks	623.4	1.14	0	0	623.4	13.99	0	0
Rainbow runner	75.5	0.14	75.5	0.15	0	0	0	0
Mahimahi (dolphinfish)	15472.4	28.41	15472.4	31.01	0	0	0	0
Snappers	111.3	0.20	0	0	111.3	2.50	0	0
Lehi (silvermouth)	61.5	0.11	0	0	61.5	1.38	0	0
Uku (jobfish)	5.6	0.01	0	0	5.6	0.13	0	0
Blue lined snapper	63.7	0.12	0	0	63.7	1.43	0	0
Yellowtail kalikali	33.5	0.06	0	0	33.5	0.75	0	0
Gindai (flower snapper)	67.1	0.12	0	0	67.1	1.51	0	0
Emperors	1445.3	2.65	0	0	1445.3	32.42	0	0
Goatfish	171.6	0.32	0	0	171.6	3.85	0	0
Rudderfish	71.9	0.13	0	0	0	0	71.9	62.03
Wrasse	261.1	0.48	0	0	261.1	5.86	0	0
Wahoo	15528.7	28.51	15276.3	30.62	252.4	5.66	0	0
Kawakawa	84.6	0.16	84.6	0.17	0	0	0	0
Dogtooth tuna	199.4	0.37	199.4	0.40	0	0	0	0
Skipjack tuna	12043.6	22.11	12043.6	24.14	0	0	0	0
Yellowfin tuna	2791.8	5.13	2791.8	5.60	0	0	0	0
Blue marlin	3946.0	7.25	3946.0	7.91	0	0	0	0
Triggerfish	83.9	0.15	0	0	83.9	1.88	0	0
Assorted bottom fish	615.0	1.13	0	0	615.0	13.80	0	0
Assorted reef fish	44.0	0.08	0	0	0	0	44.0	37.97
Total all species:	54463.1	100.00	49889.8	91.60	4457.3	8.18	116.0	0.21

Table IV.5.1

1991 Guam International Fishing Derby
Summary Reports

prepared by
Guam Division of Aquatic and Wildlife Resources

Derby totals

	Day 1 Jul 19	Day 2 Jul 20	Day 3 Jul 21	Derby Totals
Number of boats	68.0	66.0	63.0	197.0
Number of fishermen	202.0	186.0	198.0	586.0
Avg. men per boat	2.8	2.7	3.0	2.8
Number of lines fished	299.0	293.0	282.0	874.0
Avg. lines per boat	4.2	4.3	4.2	4.2
Boat hours	717.2	649.4	602.3	1968.9
Fished hours	674.2	629.9	572.2	1876.3
Avg. boat trip length	10.1	9.6	9.0	9.6
Avg. time spent fishing	9.5	9.3	8.6	9.1
Fishermen hours	1913.4	1719.7	1689.7	5322.8
Line hours	2836.4	2714.9	2406.0	7957.3
Number of fish landed	175.0	133.0	103.0	411.0
Pounds landed*	4424.9	3707.5	3342.3	11474.7
Avg. catch per boat day	65.1	56.2	53.1	140.0
Avg. catch per boat hour	6.2	5.7	5.5	5.8
Avg. catch per man hour	2.3	2.2	2.0	2.2
Avg. catch per line hour	1.6	1.4	1.4	1.4

Species totals

	Day 1 - Jul 21			Day 2 - Jul 20			Day 3 - Jul 21			TOTAL		
Species	Number Caught	total wt-lbs	avg. wt.	Number Caught	total wt-lbs	avg. wt.	Number Caught	total wt-lbs	avg. wt.	Number Caught	total wt-lbs	avg. wt.
Blue marlin	23	2453.8	106.7	19	2253.6	118.6	19	2133.2	112.3	61	6840.6	112.1
Yellowfin tuna	56	1275.5	22.8	25	715.7	28.6	21	498.5	23.7	102	2489.7	24.4
Wahoo	9	147.7	16.4	17	279.0	16.4	14	271.6	19.4	40	698.3	17.4
Mahimahi	6	130.9	21.8	3	85.2	28.4	2	21.5	10.8	11	237.6	21.6
Skipjack tuna	51	298.7	5.9	9	132.3	15.3	27	258.0	9.6	87	700.1	8.1
Kawakawa	6	24.9	4.2	0	0	0	6	19.0	3.4	12	43.9	3.8
Dogtooth tuna	2	17.8	7.5	0	0	0	1	16.8	15.0	3	34.6	10.0
Shark	0	0	0	1	37.1	30.0	1	15.5	13.9	2	53.6	22.0
Rainbow runnner	15	37.3	2.4	56	179.9	5.0	6	13.7	2.4	77	230.9	3.0
Barracuda	6	38.5	6.5	4	24.7	6.7	7	83.4	12.4	17	146.6	9.1
Totals	174	4425.1	25.4	134	3707.5	27.7	104	3342.4	32.1	412	11475.0	27.9

*Includes incidental catch.

Figure IV.5.1

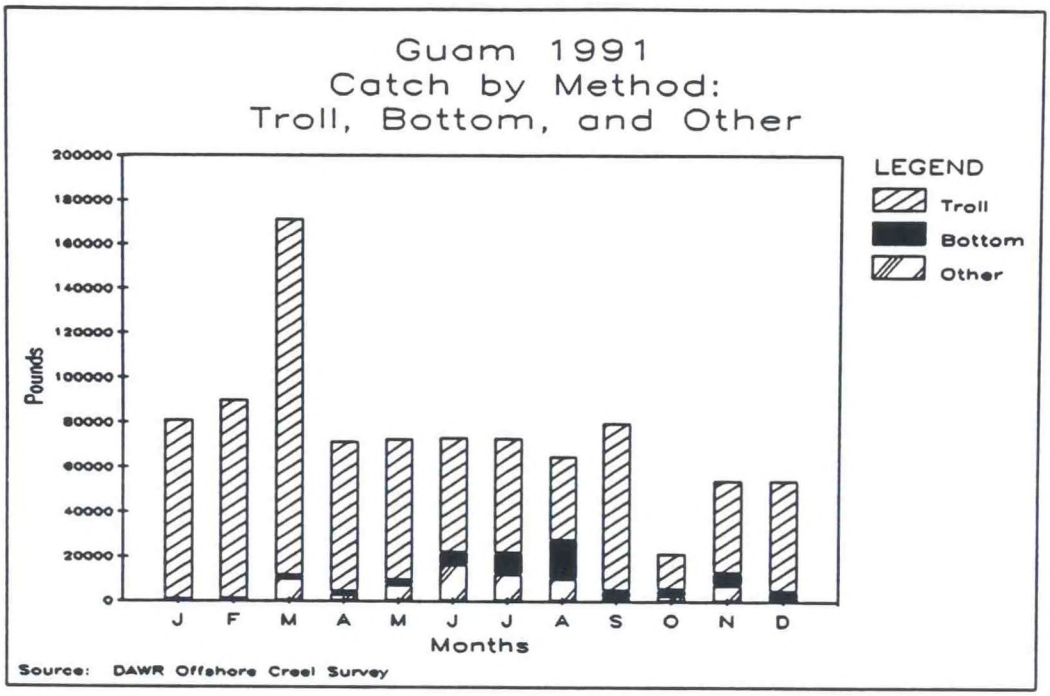


Figure IV.5.2

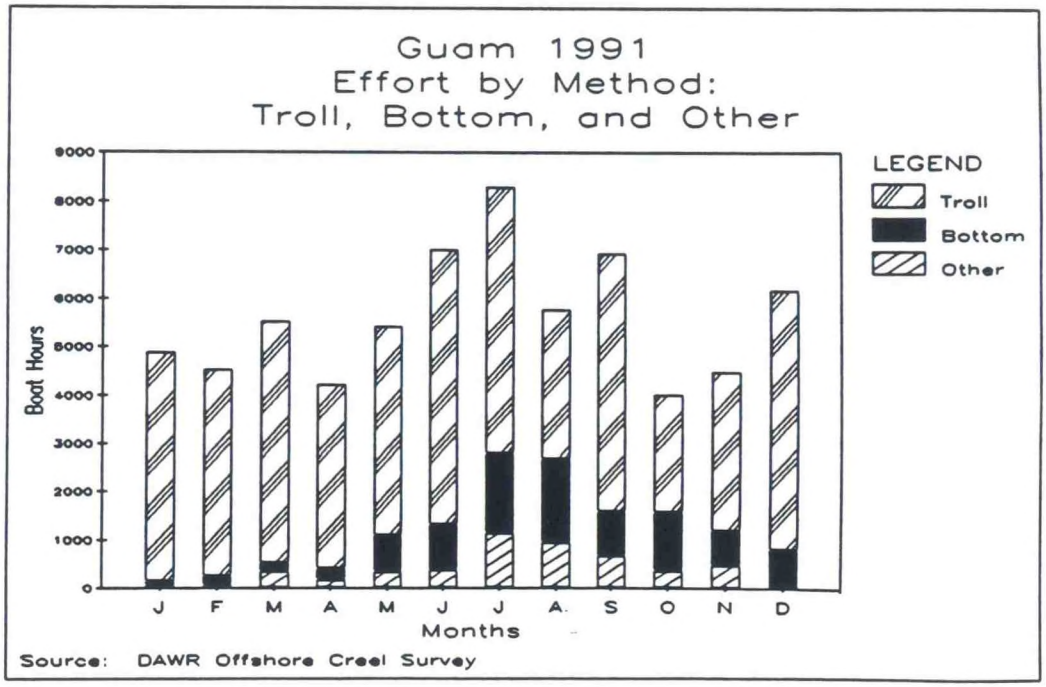


Figure IV.6.1

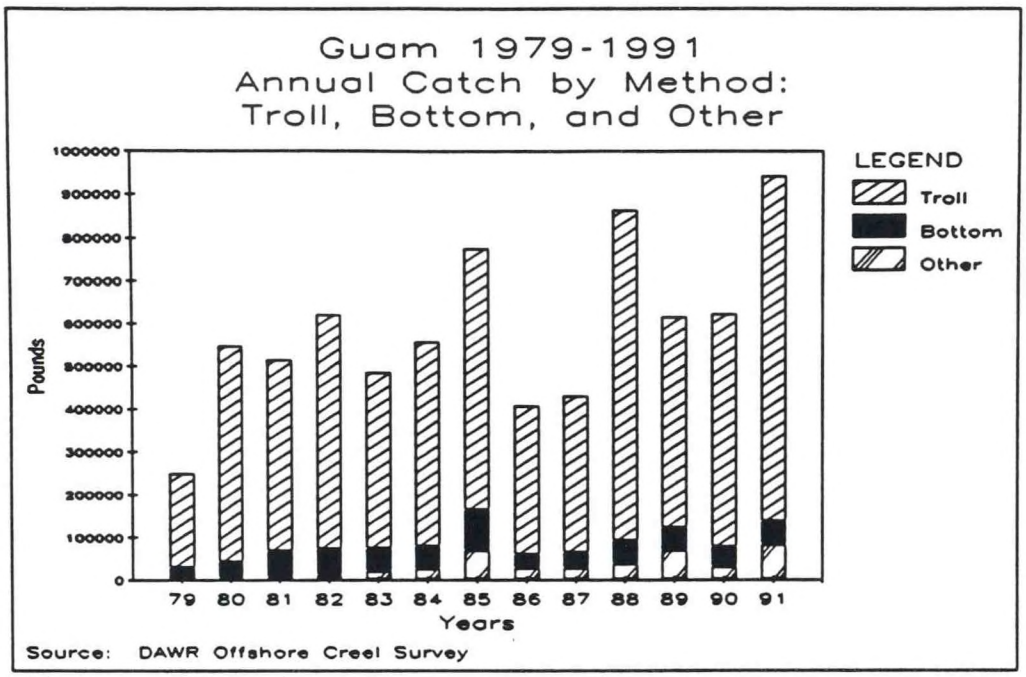
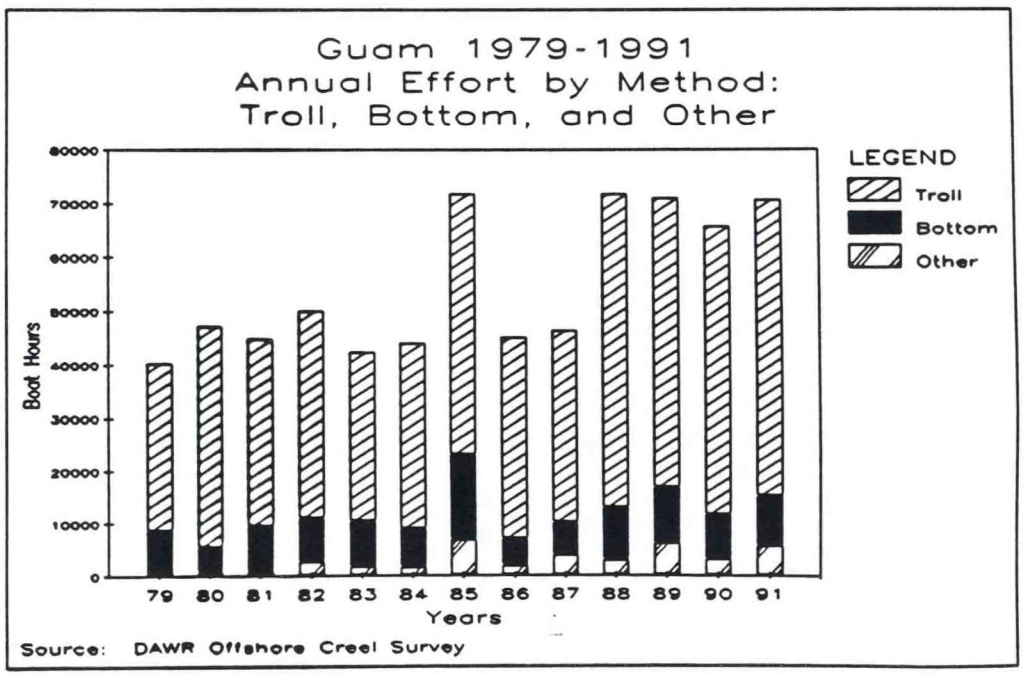
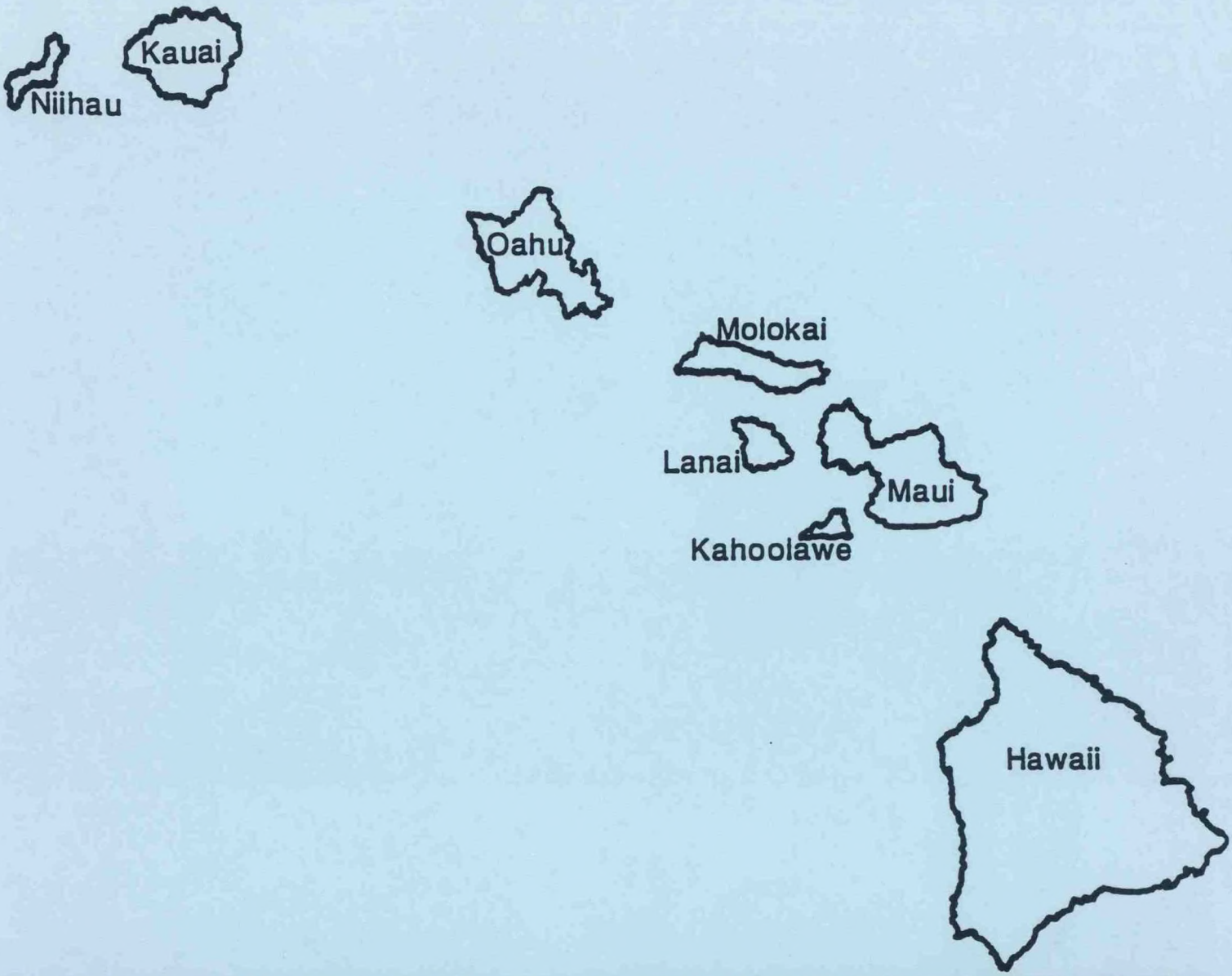


Figure IV.6.2





State of Hawaii

Fishery Statistics 1991

STATE OF HAWAII 1991 FISHERY STATISTICS

Compiled by

Division of Aquatic Resources

and the

Western Pacific Fishery Information Network

NOVEMBER 1992

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STATE OF HAWAII 1991 FISHERY STATISTICS

INTRODUCTION

The Hawaiian Archipelago stretches northwestward over 1,500 miles, from about lat. 19° N and long. 155° W to about lat. 28° N and long. 178° W. The seven main Hawaiian Islands--Hawaii, Maui, Lanai, Molokai, Oahu, Kauai, and Niihau--comprise over 99% of the total land area and have virtually all of the State's population of approximately 1 million residents. Over half of the State's commercial fish catch is landed on Oahu and about a third on Hawaii. The Department of Land and Natural Resources' Division of Aquatic Resources (DAR) has been collecting statistics on the commercial fisheries of Hawaii for over 40 years.

The fisheries of the State of Hawaii are quite diverse and vary from hand harvesting algae to large vessel fisheries, such as longlining and lobster fishing. The major fisheries include tuna fishing using several methods, lobster trapping, hook-and-line bottom fishing for the grouper-snapper-jack complex, net fishing for such species as the bigeye scad, and trolling for such pelagic species as marlin, wahoo, and mahimahi. Of the approximately 15,000 vessels in Hawaii, about 80% are pleasure boats, 10% commercial fishing or charter boats, and the remainder are registered in other categories. The pleasure category includes boats used for recreational, subsistence, and part-time commercial fishing as well as boats not typically used for fishing such as sailboats. To fish commercially (i.e., sell catches or provide charter fishing services) in Hawaii requires purchase of a commercial marine fishing license. There are currently about 2,700 licensed commercial fishermen required to submit monthly reports to DAR. Substantial subsistence and recreational fisheries, which are primarily small boat, one-day fisheries, also exist. Summary data provided in this document were created from reports submitted to DAR by licensed commercial fishermen as of September 1992.

DATA COLLECTING SYSTEM

The major data collecting system used by DAR is based on a State law that requires commercial fishermen to report their catches on a monthly basis. Several different data collection forms are used because of the diversity of fishing methods and a desire to obtain specific information on some of these methods. The vast majority of commercial fishermen use the standard C-3 Fish Catch Report, which is submitted each month and requires the following information for each trip taken:

Fisherman's name and commercial license number
Boat's name and its registration number
Date

Area or buoy fished
Type of gear used
Species caught
Number caught
Pounds caught
Pounds sold
Value of sales
Port of landing

The other forms used to report commercial catches are for specific fisheries including the C-4 Aku Catch Report for the pole-and-line or bait-boat fishery for skipjack tuna, the C-5 Flagline Catch Report for the longline fishery for tunas and other pelagic species, and the Pond Operator's Monthly Fish Report for operators of saltwater fish ponds. All of the forms request basic catch and revenue information by species, plus additional fishery-specific information such as effort and bait.

Commercial collectors of tropical marine fish are required to have an aquarium permit in addition to their commercial marine license and are required to report monthly on the C-6 Aquarium Fish Catch Report. However, the aquarium fish catch is not included in the statistics provided in this document.

Some of the advantages of a mandatory fisherman-reporting system are its relative efficiency, low cost, the potential for excellent percent coverage, and the amount of information that can be collected directly from the fishermen. The major disadvantage is that it places the responsibility for accurate data recording and timely data submission on the fishermen. The assumption is made, therefore, that the data submitted by the fishermen are complete and accurate. The DAR is continuing its efforts to improve the quality of data and decrease the time delays in receiving and processing the data. No real measurement is available for what percent of the total commercial catch is actually reported to DAR, but estimates have ranged from about 10% to over 99%, depending on the species and fishery. The overall percent coverage was probably over 75% in 1991.

DATA PROCESSING SYSTEM

When the various data reporting forms are received by DAR, they undergo a series of coding and editing procedures before being sent out for keypunching. Forms that fail the initial editing by DAR staff are returned to the fishermen for correction and resubmission. Notices are sent to fishermen who fall more than a few months behind in the submission of their reports. Once the data are keypunched, computer generated reports are used by DAR staff to verify and correct errors in the database. When the database is considered to be reasonably complete and error free, it is ready for production of a variety of summary catch reports.

Since this system is based on submission of data from fishermen, late reporting has always been a problem. The DAR has tried to include as much information as possible in its published monthly and annual reports. Before about 1982, statistics from fishermen's reports received after the generation of the computerized monthly summary reports were hand tallied and added to the final version of the reports before they were published. However, because of processing restrictions or complications, the original databases were not updated. Since 1982, additional editing and data correction procedures were implemented, making database updates possible. The DAR has made significant progress recently in reducing late reporting by fishermen and the time lag before data are available. Data presented in this report series for 1979-86 were based on published monthly DAR reports and differ from final annual data base totals by some small percent (refer to Volumes I and III for details). Beginning with 1987, data were processed directly from the final annual detailed databases from DAR.

DATA REPORTING SYSTEM

Recorded in DAR's monthly landings reports are more than 150 marine species and species groups, many of which are insignificant in the total catch. To help reduce the volume of this document and improve the usability of the tables, WPACFIN staff combined some of the less important species, reorganized the order of presentation, created a new species coding system, and translated all records in the database. The new coding system has 100 species and species groups based on flexible ecological and phylogenetic criteria. All of the commercially important pelagic and bottom fish species or unique species groups have individual codes and are reported separately. Marine pond catches are included in the species totals, but are less than 0.4% of the total landings for each year.

The monthly and annual reports included in this document contain the common name, weight in pounds, value rounded to the nearest dollar, and the average price per pound for each species. Also included are separate annual reports for commercial fishermen's landings that were not sold. Each monthly report contains a subtotal for the sum of all species for that month, and the December report contains the December subtotal and the annual total. Annual reports contain the total landings for each species and the total recorded landings for all species combined for the calendar year.

Four graphs of monthly landings are presented for 1991, and 26 trend and seasonality graphs, based on 1979-91 data, are also provided. The following species, species groups, and abbreviations are used in the tables and graphs of Hawaii's fishery statistics:

I. Pelagic Management Unit Species (PMUS)

Dolphin (mahimahi)	Wahoo
Blue marlin	Black marlin
Striped marlin	Shortbill spearfish
Sailfish	Swordfish
Sharks	

II. Bottomfish Management Unit Species (BMUS)

Deep water jacks (misc.)	Amberjack
Pig-lipped ulua (jack)	White ulua
Giant sea bass	Bluelined snapper
Ehu (red snapper)	Gindai (flower snapper)
Kalikali (pink snapper)	Lehi (silverjaw snapper)
Onaga (long tailed snapper)	Opakapaka (pink snapper)
Uku (gray snapper)	

III. Billfish

Billfish (misc.)	Blue marlin
Black marlin	Striped marlin
Shortbill spearfish	Sailfish
Swordfish	

IV. Tunas

Tunas (misc.)	Skipjack tuna
Yellowfin tuna	Albacore
Bigeye tuna	Kawakawa
Dogtooth tuna	

V. Other Tunas

All of the previous tunas excluding skipjack and yellowfin tuna

VI. Fisheries Categories

A. Pelagics

All PMUS and tuna species plus the following:

Rainbow runner	Barracuda
Japanese mackerel	Frigate tuna
Ocean sunfish	Ocean moonfish

B. Bottom Fish

All BMUS plus the following:

- Blue crevally
- Paapaa ulua
- Porgy
- Dobe ulua (jack)
- Blue spot grouper

C. Reef Fish

- Reef jacks (misc.)
- Trumpetfish
- Mountain bass
- Cardinalfish
- Rudderfish
- Damselfish
- Tilapia
- Parrotfish
- Surgeonfish-tangs
- Triggerfish
- Pufferfish
- Squirrelfish
- Scorpionfish
- Bigeyes
- Goatfish
- Butterflyfish
- Hawkfish
- Wrasse
- Gobies
- Flounders
- Filefish

D. Other

- Miscellaneous
- Eels
- Mackerel scad (opelu)
- Anchovy
- Bonefish
- Milkfish
- Needlefish
- Threadfin
- Pomfret
- Freshwater fish
- Slipper lobster
- Shrimp (freshwater)
- Octopus
- Limpets (saltwater)
- Clams
- Precious corals
- Sea cucumbers
- Algae
- Rays
- Bigeye scad (akule)
- Leatherback
- Ten pounder
- Herring-sardine
- Flyingfish
- Halfbeaks
- Mullet
- Snake mackerel
- Spiny lobster
- Crabs
- Shrimp (saltwater)
- Squid
- Limpets (freshwater)
- Stoney corals
- Sea urchins
- Sea turtles

Table V.1.1

Hawaii 1991 Annual Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	18,380	33,400	1.82
Sharks	128,197	99,083	0.77
Eels	301	236	0.78
Alfonsin	85	292	3.44
Armorhead	31	126	4.06
Bigeye scad (akule)	548,351	969,320	1.77
Mackerel scad	359,218	570,205	1.59
Leatherback	310	346	1.12
Ten pounder	1,762	1,629	0.92
Bonefish	9,931	9,548	0.96
Milkfish	3,274	5,811	1.77
Flying fish	10	3	0.31
Needlefish	62	93	1.50
Halfbeaks	51	134	2.63
Threadfin	1,559	7,781	4.99
Mullet	5,291	14,128	2.67
Pomfret	52,207	79,708	1.53
Snake mackerel	110,974	209,512	1.89
Jacks (misc)	49,425	82,494	1.67
Amberjack	1,454	1,404	0.97
Blue crevally	4,145	6,984	1.68
Pig-lipped ulua	64,708	101,016	1.56
Dobe ulua	71	107	1.50
Paapaa ulua	4,602	8,174	1.78
White ulua	12,142	18,398	1.52
Black ulua	494	695	1.41
Giant sea bass	65,321	175,595	2.69
Blue spot grouper	614	1,563	2.54
Snappers	2,309	7,801	3.38
Blue lined snapper	59,572	41,905	0.70
Ehu (red snapper)	45,530	158,840	3.49
Gindai (flower snapper)	6,549	18,683	2.85
Kalekale (pink snapper)	22,456	48,171	2.15
Lehi (silverjaw)	11,933	37,175	3.12
Onaga (red snapper)	124,772	632,208	5.07
Opakapaka (pink snapper)	206,909	870,743	4.21
Uku (gray snapper)	145,493	457,408	3.14
Porgy	1,693	4,318	2.55
Reef jacks	31	43	1.37
Squirrelfish	30,464	90,697	2.98
Trumpetfish	110	126	1.14
Scorpionfish	4,679	16,925	3.62
Mountain bass	2,414	5,886	2.44
Bigeyes	4,313	9,139	2.12

Table V.1.1 (Cont.)

Species	Pounds	Value	$/lb
Cardinalfish	17	19	1.09
Goatfish	48,139	128,877	2.68
Rudderfish	10,253	7,359	0.72
Butterflyfish	5	5	0.90
Damselfish	931	1,645	1.77
Hawkfish	479	839	1.75
Tilapia	18,967	12,710	0.67
Wrasse	7,495	18,129	2.42
Parrotfish	23,874	48,147	2.02
Surgeon/tangs	54,404	62,866	1.16
Flounders	168	361	2.15
Triggerfish	134	82	0.61
Filefish	637	1,266	1.99
Rainbow runner	4,705	6,862	1.46
Mahimahi (dolphin)	1,177,373	1,978,059	1.68
Barracudas	14,959	16,567	1.11
Wahoo	413,418	1,007,993	2.44
Tunas	2,064	8,914	4.32
Skipjack tuna	2,624,206	3,442,089	1.31
Yellowfin tuna	3,397,204	7,652,053	2.25
Albacore	688,895	851,496	1.24
Bigeye tuna	3,073,653	11,015,903	3.58
Kawakawa	12,217	16,454	1.35
Frigate tuna	467	594	1.27
Broadbill swordfish	6,856,468	20,112,962	2.93
Blue marlin	1,180,212	959,751	0.81
Black marlin	34,244	30,323	0.89
Striped marlin	1,257,793	1,286,552	1.02
Shortnose spearfish	179,960	165,834	0.92
Sailfish	13,606	11,878	0.87
Ocean moonfish	186,355	205,906	1.10
Spiny lobster	32,224	420,973	13.06
Slipper lobster	15,976	191,534	11.99
Crabs	50,963	224,100	4.40
Shrimp (freshwater)	1,700	5,500	3.24
Shrimp (saltwater)	8,091	34,018	4.20
Octopus	10,053	26,584	2.64
Squid	6,148	11,595	1.89
Limpets (saltwater)	4,952	17,699	3.57
Precious corals	2,250	35,080	15.59
Sea cucumbers	176	1,236	7.02
Algae	8,467	33,644	3.97
** TOTAL **	23,536,499	54,852,305	2.33

Table V.1.2

Hawaii 1991 Annual Commercial Landings (not sold)

Species	Pounds
Miscellaneous	796
Sharks	34,306
Rays	170
Eels	29
Bigeye scad (akule)	34,462
Mackerel scad	15,315
Leatherback	169
Ten pounder	58
Bonefish	681
Milkfish	26
Flying fish	6
Needlefish	32
Threadfin	231
Mullet	865
Pomfret	187
Snake mackerel	268
Jacks (misc)	11,666
Amberjack	10,808
Blue crevally	1,675
Pig-lipped ulua	70
Dobe ulua	82
Paapaa ulua	178
White ulua	918
Black ulua	2
Giant sea bass	1,614
Blue spot grouper	27
Snappers	374
Blue lined snapper	7,037
Ehu (red snapper)	3,817
Gindai (flower snapper)	511
Kalekale (pink snapper)	2,968
Lehi (silverjaw)	756
Onaga (red snapper)	3,903
Opakapaka (pink snapper)	5,866
Uku (gray snapper)	5,992
Porgy	329
Reef jacks	4
Squirrelfish	2,907
Trumpetfish	7
Scorpionfish	309
Mountain bass	491
Bigeyes	543
Cardinalfish	3
Goatfish	4,864

Table V.1.2 (Cont.)

Species	Pounds
Rudderfish	1,473
Damselfish	141
Hawkfish	58
Tilapia	982
Wrasse	1,821
Parrotfish	1,669
Surgeon/tangs	6,728
Triggerfish	651
Filefish	70
Rainbow runner	497
Mahimahi (dolphin)	70,670
Barracudas	1,376
Wahoo	36,885
Tunas	378
Skipjack tuna	125,812
Yellowfin tuna	126,479
Albacore	10,879
Bigeye tuna	32,012
Kawakawa	6,469
Frigate tuna	195
Billfish	40
Broadbill swordfish	159,655
Blue marlin	119,168
Black marlin	794
Striped marlin	24,927
Shortnose spearfish	11,031
Sailfish	1,352
Ocean moonfish	124
Spiny lobster	718
Slipper lobster	69
Crabs	4,606
Shrimp (saltwater)	10
Octopus	4,932
Squid	1,043
Limpets (saltwater)	1,415
Precious corals	55
Algae	1,063
** TOTAL **	911,569

Table V.1.3

Hawaii January 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	3,339	5,265	1.58
Sharks	16,745	9,895	0.59
Eels	49	28	0.58
Alfonsin	17	51	3.00
Bigeye scad (akule)	34,452	67,662	1.96
Mackerel scad	12,726	23,264	1.83
Leatherback	15	15	1.01
Ten pounder	69	69	0.99
Bonefish	2,485	2,575	1.04
Milkfish	288	707	2.45
Needlefish	16	23	1.45
Threadfin	61	312	5.11
Mullet	67	162	2.41
Pomfret	5,641	7,294	1.29
Snake mackerel	8,922	6,306	0.71
Jacks (misc)	11,382	20,047	1.76
Amberjack	531	525	0.99
Blue crevally	663	1,269	1.91
Pig-lipped ulua	12,358	19,253	1.56
Paapaa ulua	1,807	2,972	1.64
White ulua	2,658	5,905	2.22
Black ulua	250	346	1.38
Giant sea bass	5,870	16,935	2.88
Blue spot grouper	29	89	3.08
Snappers	127	420	3.30
Blue lined snapper	3,780	3,856	1.02
Ehu (red snapper)	4,295	14,677	3.42
Gindai (flower snapper)	634	1,516	2.39
Kalekale (pink snapper)	3,140	6,302	2.01
Lehi (silverjaw)	2,194	7,088	3.23
Onaga (red snapper)	17,654	82,252	4.66
Opakapaka (pink snapper)	28,287	114,301	4.04
Uku (gray snapper)	15,257	48,232	3.16
Porgy	103	216	2.10
Squirrelfish	3,853	11,298	2.93
Trumpetfish	2	1	0.51
Scorpionfish	319	1,176	3.69
Mountain bass	252	609	2.42
Bigeyes	475	1,010	2.13
Goatfish	5,677	21,225	3.74
Rudderfish	851	881	1.04
Damselfish	58	96	1.65

Table V.1.3 (Cont.)

Species	Pounds	Value	$/lb
Hawkfish	93	148	1.59
Tilapia	1,368	952	0.70
Wrasse	1,403	3,512	2.50
Parrotfish	3,339	6,973	2.09
Surgeon/tangs	3,274	4,106	1.25
Triggerfish	38	8	0.20
Filefish	174	375	2.15
Rainbow runner	464	720	1.55
Mahimahi (dolphin)	31,793	67,011	2.11
Barracudas	748	1,348	1.80
Wahoo	8,313	30,632	3.68
Tunas	74	122	1.65
Skipjack tuna	28,753	41,827	1.45
Yellowfin tuna	205,883	498,153	2.42
Albacore	50,459	76,433	1.51
Bigeye tuna	556,381	1,823,036	3.28
Kawakawa	3,025	3,791	1.25
Frigate tuna	101	114	1.13
Broadbill swordfish	316,975	1,153,314	3.64
Blue marlin	34,051	30,974	0.91
Black marlin	753	447	0.59
Striped marlin	131,367	140,626	1.07
Shortnose spearfish	14,061	12,135	0.86
Sailfish	41	23	0.55
Ocean moonfish	14,232	19,431	1.37
Spiny lobster	2,041	27,583	13.51
Slipper lobster	80	723	9.03
Crabs	5,152	24,867	4.83
Shrimp (saltwater)	7,961	33,918	4.26
Octopus	551	1,325	2.40
Squid	417	528	1.27
Limpets (saltwater)	421	1,450	3.44
Algae	767	4,242	5.53
** SUBTOTAL **	1,631,951	4,516,967	2.77

Table V.1.4

Hawaii February 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,452	2,702	1.86
Sharks	14,953	12,423	0.83
Eels	57	39	0.68
Bigeye scad (akule)	34,223	66,691	1.95
Mackerel scad	10,574	19,218	1.82
Leatherback	8	10	1.19
Ten pounder	272	262	0.96
Bonefish	318	315	0.99
Milkfish	556	883	1.59
Needlefish	17	29	1.69
Halfbeaks	51	134	2.63
Threadfin	242	1,199	4.95
Mullet	110	295	2.68
Pomfret	9,277	10,087	1.09
Snake mackerel	5,809	6,341	1.09
Jacks (misc)	4,667	8,069	1.73
Amberjack	219	219	1.00
Blue crevally	424	695	1.64
Pig-lipped ulua	8,946	14,369	1.61
Dobe ulua	69	104	1.50
Paapaa ulua	1,092	1,649	1.51
White ulua	2,100	2,771	1.32
Black ulua	36	53	1.47
Giant sea bass	12,900	21,711	1.68
Blue spot grouper	23	78	3.39
Snappers	218	723	3.32
Blue lined snapper	5,765	4,405	0.76
Ehu (red snapper)	3,723	13,695	3.68
Gindai (flower snapper)	493	1,392	2.82
Kalekale (pink snapper)	1,180	2,567	2.18
Lehi (silverjaw)	1,720	4,981	2.90
Onaga (red snapper)	12,516	55,750	4.45
Opakapaka (pink snapper)	22,307	84,567	3.79
Uku (gray snapper)	11,588	35,109	3.03
Porgy	54	171	3.17
Reef jacks	19	10	0.50
Squirrelfish	2,483	7,743	3.12
Trumpetfish	44	30	0.68
Scorpionfish	269	993	3.69
Mountain bass	231	564	2.44
Bigeyes	400	773	1.93
Goatfish	7,593	25,161	3.31

Table V.1.4 (Cont.)

Species	Pounds	Value	$/lb
Rudderfish	938	892	0.95
Butterflyfish	5	5	0.90
Damselfish	91	168	1.85
Hawkfish	59	90	1.53
Tilapia	949	627	0.66
Wrasse	948	2,064	2.18
Parrotfish	2,455	6,136	2.50
Surgeon/tangs	3,902	4,810	1.23
Triggerfish	27	9	0.34
Filefish	143	275	1.92
Rainbow runner	314	440	1.40
Mahimahi (dolphin)	71,383	131,710	1.85
Barracudas	873	1,392	1.60
Wahoo	10,323	40,297	3.90
Tunas	7	10	1.39
Skipjack tuna	23,018	29,721	1.29
Yellowfin tuna	211,514	516,783	2.44
Albacore	21,400	38,074	1.78
Bigeye tuna	451,575	1,467,414	3.25
Kawakawa	1,667	2,380	1.43
Frigate tuna	29	44	1.50
Broadbill swordfish	302,895	1,132,198	3.74
Blue marlin	35,899	37,493	1.04
Black marlin	1,540	1,551	1.01
Striped marlin	116,812	127,303	1.09
Shortnose spearfish	16,632	13,649	0.82
Sailfish	187	148	0.79
Ocean moonfish	21,205	22,909	1.08
Spiny lobster	3,802	58,098	15.28
Slipper lobster	569	5,004	8.79
Crabs	3,296	17,517	5.31
Octopus	486	1,214	2.50
Squid	567	578	1.02
Limpets (saltwater)	336	1,252	3.73
Precious corals	200	3,000	15.00
Algae	581	2,696	4.64
** SUBTOTAL **	1,485,625	4,076,929	2.74

Table V.1.5

Hawaii March 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,747	3,409	1.95
Sharks	15,536	13,508	0.87
Eels	36	23	0.65
Bigeye scad (akule)	81,941	137,587	1.68
Mackerel scad	16,961	29,543	1.74
Ten pounder	433	412	0.95
Bonefish	166	163	0.98
Milkfish	285	584	2.05
Needlefish	13	20	1.50
Threadfin	182	920	5.06
Mullet	351	943	2.69
Pomfret	8,757	15,170	1.73
Snake mackerel	6,284	14,396	2.29
Jacks (misc)	3,876	6,708	1.73
Amberjack	119	119	1.00
Blue crevally	132	310	2.35
Pig-lipped ulua	3,870	7,782	2.01
Paapaa ulua	74	337	4.56
White ulua	153	396	2.59
Black ulua	10	20	2.00
Giant sea bass	4,403	14,149	3.21
Blue spot grouper	84	242	2.88
Snappers	65	208	3.20
Blue lined snapper	4,980	2,884	0.58
Ehu (red snapper)	1,486	6,399	4.31
Gindai (flower snapper)	240	854	3.56
Kalekale (pink snapper)	829	2,385	2.88
Lehi (silverjaw)	491	1,675	3.41
Onaga (red snapper)	10,236	46,707	4.56
Opakapaka (pink snapper)	9,536	42,251	4.43
Uku (gray snapper)	6,598	24,350	3.69
Porgy	40	91	2.27
Squirrelfish	1,244	4,139	3.33
Scorpionfish	102	403	3.95
Mountain bass	163	439	2.69
Bigeyes	277	587	2.12
Goatfish	4,633	10,785	2.33
Rudderfish	518	574	1.11
Damselfish	21	38	1.79
Hawkfish	12	12	1.02
Tilapia	1,236	786	0.64
Wrasse	329	720	2.19

Table V.1.5 (Cont.)

Species	Pounds	Value	$/lb
Parrotfish	1,007	1,581	1.57
Surgeon/tangs	3,428	4,516	1.32
Flounders	131	327	2.49
Filefish	59	114	1.92
Rainbow runner	290	459	1.58
Mahimahi (dolphin)	68,089	134,884	1.98
Barracudas	768	1,135	1.48
Wahoo	21,560	71,067	3.30
Tunas	42	75	1.79
Skipjack tuna	35,499	56,982	1.61
Yellowfin tuna	133,069	407,895	3.07
Albacore	20,384	41,320	2.03
Bigeye tuna	243,390	943,507	3.88
Kawakawa	1,137	1,683	1.48
Frigate tuna	38	67	1.76
Broadbill swordfish	742,515	2,063,311	2.78
Blue marlin	42,852	54,750	1.28
Black marlin	2,149	2,819	1.31
Striped marlin	77,628	142,635	1.84
Shortnose spearfish	14,179	22,700	1.60
Sailfish	160	218	1.36
Ocean moonfish	15,782	23,026	1.46
Spiny lobster	9,279	136,229	14.68
Slipper lobster	1,859	17,296	9.30
Crabs	2,391	14,088	5.89
Octopus	135	461	3.41
Limpets (saltwater)	105	356	3.39
Sea cucumbers	7	49	7.00
Algae	421	1,966	4.67
** SUBTOTAL **	1,626,802	4,538,543	2.79

Table V.1.6

Hawaii April 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,596	3,245	2.03
Sharks	11,287	10,946	0.97
Eels	82	64	0.78
Alfonsin	7	14	2.00
Bigeye scad (akule)	57,087	105,008	1.84
Mackerel scad	27,464	48,218	1.76
Leatherback	21	24	1.16
Ten pounder	205	200	0.97
Bonefish	198	213	1.08
Milkfish	191	290	1.52
Threadfin	257	1,187	4.62
Mullet	329	983	2.99
Pomfret	6,719	10,594	1.58
Snake mackerel	8,333	14,691	1.76
Jacks (misc)	3,901	6,920	1.77
Amberjack	210	182	0.86
Blue crevally	479	720	1.50
Pig-lipped ulua	5,031	8,170	1.62
Paapaa ulua	115	255	2.21
White ulua	1,419	2,055	1.45
Black ulua	14	28	2.00
Giant sea bass	3,645	12,467	3.42
Blue spot grouper	112	309	2.76
Snappers	145	763	5.26
Blue lined snapper	5,402	3,146	0.58
Ehu (red snapper)	1,721	8,645	5.02
Gindai (flower snapper)	233	888	3.81
Kalekale (pink snapper)	748	2,180	2.91
Lehi (silverjaw)	603	2,127	3.53
Onaga (red snapper)	3,745	25,572	6.83
Opakapaka (pink snapper)	9,276	44,602	4.81
Uku (gray snapper)	14,333	51,516	3.59
Porgy	155	248	1.60
Reef jacks	8	21	2.63
Squirrelfish	2,837	8,904	3.14
Scorpionfish	180	987	5.48
Mountain bass	432	1,067	2.47
Bigeyes	324	618	1.91
Cardinalfish	3	6	2.00
Goatfish	3,091	6,435	2.08
Rudderfish	370	355	0.96
Damselfish	12	21	1.76

Table V.1.6 (Cont.)

Species	Pounds	Value	$/lb
Hawkfish	20	31	1.53
Tilapia	1,126	730	0.65
Wrasse	433	1,035	2.39
Parrotfish	1,160	2,258	1.95
Surgeon/tangs	2,496	2,967	1.19
Triggerfish	2	0	0.08
Filefish	73	130	1.78
Rainbow runner	277	443	1.60
Mahimahi (dolphin)	146,194	220,118	1.51
Barracudas	1,453	1,860	1.28
Wahoo	56,683	118,171	2.08
Tunas	38	66	1.74
Skipjack tuna	146,227	267,807	1.83
Yellowfin tuna	206,941	613,430	2.96
Albacore	42,611	74,879	1.76
Bigeye tuna	175,528	776,411	4.42
Kawakawa	910	1,594	1.75
Broadbill swordfish	1,464,939	3,324,852	2.27
Blue marlin	88,911	89,734	1.01
Black marlin	3,021	3,640	1.20
Striped marlin	106,813	144,643	1.35
Shortnose spearfish	26,626	22,818	0.86
Sailfish	112	115	1.03
Ocean moonfish	15,997	20,377	1.27
Spiny lobster	4,900	45,430	9.27
Slipper lobster	9,822	132,428	13.48
Crabs	6,262	27,905	4.46
Octopus	174	452	2.60
Squid	33	72	2.18
Limpets (saltwater)	654	2,450	3.75
Precious corals	808	12,876	15.94
Algae	634	3,463	5.46
** SUBTOTAL **	2,684,198	6,298,066	2.35

Table V.1.7

Hawaii May 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,889	3,182	1.68
Sharks	8,546	6,861	0.80
Eels	12	6	0.50
Alfonsin	5	5	0.90
Bigeye scad (akule)	63,636	107,148	1.68
Mackerel scad	19,713	33,213	1.68
Leatherback	71	82	1.15
Ten pounder	229	188	0.82
Bonefish	364	374	1.03
Milkfish	470	810	1.72
Needlefish	2	3	1.25
Threadfin	305	1,545	5.07
Mullet	273	778	2.85
Pomfret	1,857	2,872	1.55
Snake mackerel	9,213	17,548	1.90
Jacks (misc)	4,909	6,488	1.32
Amberjack	54	52	0.96
Blue crevally	1,051	1,601	1.52
Pig-lipped ulua	7,090	10,186	1.44
Paapaa ulua	139	231	1.66
White ulua	1,326	1,230	0.93
Black ulua	59	67	1.14
Giant sea bass	5,964	15,958	2.68
Blue spot grouper	119	299	2.51
Snappers	186	748	4.02
Blue lined snapper	2,621	1,928	0.74
Ehu (red snapper)	2,979	11,347	3.81
Gindai (flower snapper)	417	1,357	3.25
Kalekale (pink snapper)	1,151	1,917	1.67
Lehi (silverjaw)	395	1,268	3.21
Onaga (red snapper)	4,438	31,749	7.15
Opakapaka (pink snapper)	8,390	39,191	4.67
Uku (gray snapper)	23,507	61,892	2.63
Porgy	166	321	1.94
Reef jacks	4	12	3.00
Squirrelfish	3,284	10,528	3.21
Trumpetfish	40	80	2.01
Scorpionfish	521	1,869	3.59
Mountain bass	399	771	1.93
Bigeyes	328	766	2.34
Goatfish	4,538	10,180	2.24
Rudderfish	1,645	1,218	0.74

Table V.1.7 (Cont.)

Species	Pounds	Value	$/lb
Damselfish	164	295	1.80
Hawkfish	49	91	1.86
Tilapia	741	540	0.73
Wrasse	438	885	2.02
Parrotfish	2,520	5,049	2.00
Surgeon/tangs	5,545	5,838	1.05
Triggerfish	23	27	1.18
Filefish	47	74	1.57
Rainbow runner	372	486	1.31
Mahimahi (dolphin)	144,648	223,974	1.55
Barracudas	2,940	1,512	0.51
Wahoo	63,510	108,143	1.70
Tunas	297	639	2.15
Skipjack tuna	311,433	402,363	1.29
Yellowfin tuna	340,892	852,951	2.50
Albacore	74,596	71,654	0.96
Bigeye tuna	187,331	625,723	3.34
Kawakawa	1,139	1,475	1.30
Frigate tuna	28	27	0.95
Broadbill swordfish	1,033,383	3,016,098	2.92
Blue marlin	118,527	81,161	0.68
Black marlin	7,822	7,182	0.92
Striped marlin	194,777	135,576	0.70
Shortnose spearfish	27,147	15,904	0.59
Sailfish	267	90	0.34
Ocean moonfish	6,917	9,158	1.32
Spiny lobster	2,147	28,111	13.09
Slipper lobster	202	2,020	10.00
Crabs	1,008	3,879	3.85
Octopus	140	274	1.96
Squid	12	23	1.95
Limpets (saltwater)	550	2,091	3.80
Precious corals	1,242	19,204	15.46
Sea cucumbers	20	59	2.93
Algae	1,032	6,095	5.91
** SUBTOTAL **	2,714,211	6,016,539	2.22

Table V.1.8

Hawaii June 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	2,993	5,594	1.87
Sharks	11,454	10,419	0.91
Eels	42	42	1.00
Bigeye scad (akule)	39,177	65,924	1.68
Mackerel scad	16,109	27,844	1.73
Leatherback	50	51	1.01
Ten pounder	156	153	0.98
Bonefish	296	350	1.18
Milkfish	180	314	1.75
Flying fish	8	2	0.20
Threadfin	1	4	3.75
Mullet	223	608	2.73
Pomfret	1,726	3,067	1.78
Snake mackerel	6,515	13,187	2.02
Jacks (misc)	2,901	4,483	1.55
Amberjack	35	24	0.69
Blue crevally	184	296	1.61
Pig-lipped ulua	5,888	9,424	1.60
Paapaa ulua	172	468	2.72
White ulua	1,015	1,103	1.09
Black ulua	74	80	1.08
Giant sea bass	3,814	12,183	3.19
Blue spot grouper	41	103	2.52
Snappers	241	785	3.26
Blue lined snapper	4,612	3,137	0.68
Ehu (red snapper)	2,028	9,174	4.52
Gindai (flower snapper)	576	1,780	3.09
Kalekale (pink snapper)	608	1,454	2.39
Lehi (silverjaw)	193	603	3.12
Onaga (red snapper)	6,728	38,595	5.74
Opakapaka (pink snapper)	7,711	35,738	4.63
Uku (gray snapper)	15,556	50,411	3.24
Porgy	249	528	2.12
Squirrelfish	1,887	5,836	3.09
Scorpionfish	267	1,063	3.98
Mountain bass	147	316	2.15
Bigeyes	381	797	2.09
Goatfish	3,421	6,528	1.91
Rudderfish	293	310	1.06
Damselfish	73	134	1.84
Hawkfish	20	29	1.45
Tilapia	589	452	0.77

Table V.1.8 (Cont.)

Species	Pounds	Value	$/lb
Wrasse	403	1,165	2.89
Parrotfish	1,945	3,735	1.92
Surgeon/tangs	4,017	3,832	0.95
Flounders	10	11	1.08
Filefish	13	25	1.92
Rainbow runner	136	312	2.30
Mahimahi (dolphin)	34,135	94,694	2.77
Barracudas	1,740	1,618	0.93
Wahoo	45,478	95,312	2.10
Tunas	1	1	0.75
Skipjack tuna	439,280	509,947	1.16
Yellowfin tuna	476,126	938,690	1.97
Albacore	66,807	67,113	1.00
Bigeye tuna	130,755	362,417	2.77
Kawakawa	407	498	1.22
Frigate tuna	66	99	1.50
Broadbill swordfish	864,543	2,599,695	3.01
Blue marlin	131,739	71,710	0.54
Black marlin	3,858	1,900	0.49
Striped marlin	199,023	114,450	0.58
Shortnose spearfish	17,532	13,022	0.74
Sailfish	612	450	0.74
Ocean moonfish	6,861	8,047	1.17
Crabs	341	1,165	3.42
Octopus	399	989	2.48
Squid	174	516	2.97
Limpets (saltwater)	297	1,060	3.57
Sea cucumbers	20	140	7.00
Algae	193	812	4.21
** SUBTOTAL **	2,565,545	5,206,817	2.03

Table V.1.9

Hawaii July 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	905	1,932	2.13
Sharks	12,746	9,068	0.71
Eels	11	21	1.91
Alfonsin	7	20	2.86
Bigeye scad (akule)	35,526	61,228	1.72
Mackerel scad	24,004	40,470	1.69
Leatherback	5	8	1.50
Ten pounder	4	11	2.84
Bonefish	1,738	1,372	0.79
Milkfish	289	490	1.69
Flying fish	1	1	0.50
Mullet	166	450	2.71
Pomfret	1,032	2,361	2.29
Snake mackerel	11,564	25,852	2.24
Jacks (misc)	3,454	6,001	1.74
Amberjack	36	29	0.81
Blue crevally	539	923	1.71
Pig-lipped ulua	2,934	4,587	1.56
Paapaa ulua	108	186	1.72
White ulua	260	448	1.72
Giant sea bass	8,103	24,602	3.04
Blue spot grouper	114	277	2.43
Snappers	438	1,451	3.31
Blue lined snapper	5,703	3,138	0.55
Ehu (red snapper)	10,793	29,166	2.70
Gindai (flower snapper)	1,535	3,739	2.44
Kalekale (pink snapper)	3,194	5,787	1.81
Lehi (silverjaw)	550	1,435	2.61
Onaga (red snapper)	9,597	49,528	5.16
Opakapaka (pink snapper)	9,675	44,969	4.65
Uku (gray snapper)	18,325	57,174	3.12
Porgy	77	264	3.43
Squirrelfish	2,205	6,314	2.86
Scorpionfish	760	2,391	3.15
Mountain bass	265	617	2.33
Bigeyes	342	794	2.32
Goatfish	2,715	5,587	2.06
Rudderfish	2,298	1,045	0.45
Damselfish	79	137	1.73
Hawkfish	47	79	1.68
Tilapia	1,583	930	0.59
Wrasse	308	652	2.12

Table V.1.9 (Cont.)

Species	Pounds	Value	$/lb
Parrotfish	1,487	2,736	1.84
Surgeon/tangs	3,490	4,065	1.16
Filefish	3	5	1.50
Rainbow runner	472	739	1.57
Mahimahi (dolphin)	49,998	111,309	2.23
Barracudas	2,037	1,633	0.80
Wahoo	56,119	125,710	2.24
Tunas	356	424	1.19
Skipjack tuna	399,425	416,228	1.04
Yellowfin tuna	632,265	1,065,500	1.69
Albacore	79,953	85,543	1.07
Bigeye tuna	142,624	347,345	2.44
Kawakawa	458	513	1.12
Frigate tuna	49	52	1.07
Broadbill swordfish	678,466	1,819,211	2.68
Blue marlin	144,269	93,832	0.65
Black marlin	3,789	3,222	0.85
Striped marlin	75,531	58,682	0.78
Shortnose spearfish	12,847	11,212	0.87
Sailfish	941	920	0.98
Ocean moonfish	3,179	5,971	1.88
Crabs	362	1,552	4.29
Octopus	591	1,511	2.56
Squid	276	992	3.59
Limpets (saltwater)	650	2,360	3.63
Algae	609	1,978	3.25
** SUBTOTAL **	2,464,281	4,558,779	1.85

Table V.1.10

Hawaii August 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	1,152	1,977	1.72
Sharks	6,201	6,276	1.01
Eels	4	8	2.00
Armorhead	26	118	4.53
Bigeye scad (akule)	27,566	56,376	2.05
Mackerel scad	35,675	61,076	1.71
Leatherback	40	44	1.10
Ten pounder	46	29	0.64
Bonefish	510	611	1.20
Milkfish	517	919	1.78
Mullet	95	260	2.73
Pomfret	1,530	3,442	2.25
Snake mackerel	17,612	38,997	2.21
Jacks (misc)	2,178	3,194	1.47
Blue crevally	51	54	1.06
Pig-lipped ulua	6,332	8,553	1.35
Paapaa ulua	87	169	1.94
White ulua	1,437	1,865	1.30
Giant sea bass	6,064	13,750	2.27
Blue spot grouper	25	8	0.32
Snappers	123	375	3.05
Blue lined snapper	5,126	3,514	0.69
Ehu (red snapper)	4,770	15,013	3.15
Gindai (flower snapper)	676	2,076	3.07
Kalekale (pink snapper)	1,271	2,689	2.12
Lehi (silverjaw)	320	1,114	3.48
Onaga (red snapper)	14,187	75,653	5.33
Opakapaka (pink snapper)	20,404	95,914	4.70
Uku (gray snapper)	8,322	28,998	3.48
Porgy	124	315	2.54
Squirrelfish	2,222	6,333	2.85
Scorpionfish	409	1,652	4.04
Mountain bass	117	351	3.00
Bigeyes	342	754	2.21
Cardinalfish	2	3	1.25
Goatfish	2,362	5,551	2.35
Rudderfish	1,131	643	0.57
Damselfish	28	46	1.66
Hawkfish	31	39	1.27
Tilapia	2,244	1,343	0.60
Wrasse	417	1,163	2.79
Parrotfish	1,695	3,373	1.99

Table V.1.10 (Cont.)

Species	Pounds	Value	$/lb
Surgeon/tangs	8,637	9,558	1.11
Flounders	5	5	1.00
Triggerfish	5	1	0.10
Filefish	3	8	2.50
Rainbow runner	403	509	1.26
Mahimahi (dolphin)	158,799	249,053	1.57
Barracudas	730	1,022	1.40
Wahoo	39,491	101,967	2.58
Tunas	283	429	1.52
Skipjack tuna	331,370	414,507	1.25
Yellowfin tuna	478,876	950,141	1.98
Albacore	75,968	85,457	1.12
Bigeye tuna	167,690	487,828	2.91
Kawakawa	371	458	1.23
Frigate tuna	107	135	1.26
Broadbill swordfish	447,248	1,397,667	3.13
Blue marlin	140,681	134,696	0.96
Black marlin	4,075	3,495	0.86
Striped marlin	19,468	26,454	1.36
Shortnose spearfish	5,107	7,816	1.53
Sailfish	736	894	1.21
Ocean moonfish	4,327	5,815	1.34
Crabs	4,991	18,392	3.68
Shrimp (freshwater)	300	900	3.00
Octopus	1,348	3,709	2.75
Squid	291	631	2.17
Limpets (saltwater)	161	598	3.71
Sea cucumbers	29	202	6.95
Algae	936	3,930	4.20
** SUBTOTAL **	2,065,907	4,350,910	2.11

Table V.1.11

Hawaii September 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	838	1,403	1.67
Sharks	6,372	3,903	0.61
Bigeye scad (akule)	23,624	47,436	2.01
Mackerel scad	61,423	90,582	1.47
Leatherback	5	6	1.20
Ten pounder	59	49	0.83
Bonefish	392	454	1.16
Milkfish	63	96	1.53
Threadfin	199	1,128	5.67
Mullet	480	1,269	2.64
Pomfret	572	1,346	2.35
Snake mackerel	7,122	15,898	2.23
Jacks (misc)	2,202	3,664	1.66
Amberjack	96	43	0.45
Blue crevally	39	65	1.67
Pig-lipped ulua	2,693	4,316	1.60
Paapaa ulua	405	710	1.75
White ulua	86	135	1.57
Black ulua	51	101	1.98
Giant sea bass	3,551	10,571	2.98
Blue spot grouper	12	18	1.50
Snappers	160	437	2.73
Blue lined snapper	5,999	5,446	0.91
Ehu (red snapper)	5,203	17,926	3.45
Gindai (flower snapper)	838	2,413	2.88
Kalekale (pink snapper)	2,420	4,959	2.05
Lehi (silverjaw)	1,401	4,482	3.20
Onaga (red snapper)	9,809	49,922	5.09
Opakapaka (pink snapper)	17,680	74,305	4.20
Uku (gray snapper)	4,802	17,801	3.71
Porgy	92	241	2.62
Squirrelfish	3,383	9,494	2.81
Trumpetfish	16	10	0.60
Scorpionfish	542	1,591	2.94
Mountain bass	63	167	2.65
Bigeyes	413	857	2.07
Cardinalfish	2	3	1.25
Goatfish	2,476	6,519	2.63
Rudderfish	1,767	931	0.53
Damselfish	108	164	1.52
Hawkfish	29	67	2.32
Tilapia	2,331	1,400	0.60

Table V.1.11 (Cont.)

Species	Pounds	Value	$/lb
Wrasse	704	2,355	3.35
Parrotfish	1,348	2,666	1.98
Surgeon/tangs	4,387	5,867	1.34
Triggerfish	39	37	0.96
Filefish	3	6	2.07
Rainbow runner	595	749	1.26
Mahimahi (dolphin)	154,299	218,555	1.42
Barracudas	1,225	1,563	1.28
Wahoo	26,399	76,773	2.91
Skipjack tuna	271,893	435,464	1.60
Yellowfin tuna	175,033	455,836	2.60
Albacore	66,851	80,066	1.20
Bigeye tuna	130,444	475,338	3.64
Kawakawa	1,295	1,782	1.38
Frigate tuna	16	20	1.23
Broadbill swordfish	180,756	606,875	3.36
Blue marlin	130,155	114,109	0.88
Black marlin	4,766	3,446	0.72
Striped marlin	36,606	48,975	1.34
Shortnose spearfish	5,649	8,134	1.44
Sailfish	4,028	4,402	1.09
Ocean moonfish	7,294	10,271	1.41
Spiny lobster	768	5,500	7.16
Slipper lobster	541	5,374	9.93
Crabs	7,883	34,290	4.35
Octopus	2,029	5,519	2.72
Squid	2,215	3,895	1.76
Limpets (saltwater)	178	726	4.08
Algae	928	2,670	2.88
** SUBTOTAL **	1,388,145	2,993,587	2.16

Table V.1.12

Hawaii October 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	909	1,456	1.60
Sharks	5,417	3,888	0.72
Alfonsin	13	39	3.02
Bigeye scad (akule)	40,482	65,705	1.62
Mackerel scad	55,138	78,954	1.43
Leatherback	34	42	1.23
Ten pounder	127	108	0.85
Bonefish	999	1,154	1.15
Milkfish	117	166	1.42
Flying fish	1	1	1.00
Needlefish	4	1	0.26
Threadfin	65	339	5.22
Mullet	401	1,138	2.84
Pomfret	4,772	8,088	1.69
Snake mackerel	7,746	17,285	2.23
Jacks (misc)	5,007	8,040	1.61
Amberjack	33	31	0.94
Blue crevally	361	648	1.79
Pig-lipped ulua	1,054	1,631	1.55
Paapaa ulua	231	477	2.06
White ulua	479	590	1.23
Giant sea bass	4,749	13,888	2.92
Blue spot grouper	27	68	2.53
Snappers	319	711	2.23
Blue lined snapper	6,857	3,887	0.57
Ehu (red snapper)	3,346	11,666	3.49
Gindai (flower snapper)	403	1,052	2.61
Kalekale (pink snapper)	3,754	7,543	2.01
Lehi (silverjaw)	1,672	5,169	3.09
Onaga (red snapper)	16,016	66,604	4.16
Opakapaka (pink snapper)	26,506	101,066	3.81
Uku (gray snapper)	7,853	23,559	3.00
Porgy	263	841	3.20
Squirrelfish	3,574	10,062	2.82
Scorpionfish	625	2,194	3.51
Mountain bass	85	222	2.61
Bigeyes	318	686	2.16
Goatfish	5,095	13,064	2.56
Rudderfish	188	165	0.88
Damselfish	128	228	1.78
Hawkfish	32	56	1.74
Tilapia	1,978	1,157	0.59

Table V.1.12 (Cont.)

Species	Pounds	Value	$/lb
Wrasse	1,179	2,882	2.44
Parrotfish	3,568	7,140	2.00
Surgeon/tangs	6,868	7,404	1.08
Flounders	7	6	0.89
Filefish	21	27	1.30
Rainbow runner	732	1,099	1.50
Mahimahi (dolphin)	130,978	228,516	1.74
Barracudas	1,502	2,085	1.39
Wahoo	28,535	86,388	3.03
Tunas	87	80	0.92
Skipjack tuna	271,931	345,620	1.27
Yellowfin tuna	147,604	366,048	2.48
Albacore	40,280	73,646	1.83
Bigeye tuna	256,535	859,177	3.35
Kawakawa	583	803	1.38
Frigate tuna	27	32	1.19
Broadbill swordfish	141,211	461,868	3.27
Blue marlin	131,598	88,836	0.68
Black marlin	941	932	0.99
Striped marlin	130,483	109,297	0.84
Shortnose spearfish	13,122	12,291	0.94
Sailfish	3,939	2,236	0.57
Ocean moonfish	38,594	34,489	0.89
Spiny lobster	1,869	12,843	6.87
Slipper lobster	2,294	22,852	9.96
Crabs	7,689	32,256	4.20
Shrimp (freshwater)	400	1,600	4.00
Octopus	1,547	4,273	2.76
Squid	1,446	2,892	2.00
Limpets (saltwater)	720	2,248	3.12
Sea cucumbers	18	126	7.00
Algae	924	2,221	2.40
** SUBTOTAL **	1,574,410	3,225,883	2.05

Table V.1.13

Hawaii November 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	847	1,672	1.97
Sharks	10,361	6,586	0.64
Eels	8	5	0.59
Alfonsin	19	77	4.04
Armorhead	5	8	1.60
Bigeye scad (akule)	58,178	93,083	1.60
Mackerel scad	44,132	63,142	1.43
Leatherback	39	42	1.08
Ten pounder	93	79	0.85
Bonefish	1,987	1,445	0.73
Milkfish	160	280	1.75
Threadfin	152	640	4.21
Mullet	2,791	7,229	2.59
Pomfret	5,332	8,044	1.51
Snake mackerel	11,092	26,352	2.38
Jacks (misc)	3,099	5,312	1.71
Amberjack	52	104	1.99
Blue crevally	209	370	1.77
Pig-lipped ulua	6,886	10,267	1.49
Paapaa ulua	285	455	1.60
White ulua	1,015	1,458	1.44
Giant sea bass	3,346	9,892	2.96
Blue spot grouper	20	48	2.41
Snappers	124	499	4.03
Blue lined snapper	5,453	3,679	0.67
Ehu (red snapper)	2,123	7,796	3.67
Gindai (flower snapper)	301	926	3.08
Kalekale (pink snapper)	1,940	4,079	2.10
Lehi (silverjaw)	1,132	3,127	2.76
Onaga (red snapper)	9,490	45,756	4.82
Opakapaka (pink snapper)	21,029	74,774	3.56
Uku (gray snapper)	6,484	18,046	2.78
Porgy	285	827	2.90
Squirrelfish	2,180	6,200	2.84
Scorpionfish	405	1,517	3.75
Mountain bass	228	670	2.94
Bigeyes	369	750	2.03
Goatfish	3,358	9,398	2.80
Rudderfish	153	181	1.18
Damselfish	94	191	2.03
Hawkfish	45	104	2.32
Tilapia	1,943	1,313	0.68

Table V.1.13 (Cont.)

Species	Pounds	Value	$/lb
Wrasse	549	945	1.72
Parrotfish	1,914	3,685	1.93
Surgeon/tangs	3,001	3,386	1.13
Flounders	6	5	0.88
Filefish	36	78	2.18
Rainbow runner	245	339	1.38
Mahimahi (dolphin)	127,023	184,549	1.45
Barracudas	638	936	1.47
Wahoo	32,562	81,771	2.51
Tunas	74	216	2.91
Skipjack tuna	195,152	299,290	1.53
Yellowfin tuna	190,077	469,338	2.47
Albacore	71,586	76,758	1.07
Bigeye tuna	283,202	1,072,772	3.79
Kawakawa	604	619	1.03
Broadbill swordfish	249,488	890,172	3.57
Blue marlin	123,124	89,928	0.73
Black marlin	1,329	1,187	0.89
Striped marlin	91,046	99,286	1.09
Shortnose spearfish	13,192	11,623	0.88
Sailfish	2,191	1,935	0.88
Ocean moonfish	22,310	20,700	0.93
Spiny lobster	3,548	42,388	11.95
Slipper lobster	240	2,151	8.96
Crabs	6,621	27,474	4.15
Shrimp (saltwater)	130	100	0.77
Octopus	1,626	4,297	2.64
Squid	525	682	1.30
Limpets (saltwater)	328	1,267	3.86
Sea cucumbers	62	485	7.83
Algae	632	1,428	2.26
** SUBTOTAL **	1,630,305	3,806,211	2.33

Table V.1.14

Hawaii December 1991 Commercial Landings

Species	Pounds	Value	$/lb
Miscellaneous	713	1,562	2.19
Sharks	8,579	5,312	0.62
Alfonsin	17	87	5.10
Bigeye scad (akule)	52,459	95,473	1.82
Mackerel scad	35,299	54,681	1.55
Leatherback	22	23	1.06
Ten pounder	69	70	1.02
Bonefish	478	521	1.09
Milkfish	158	272	1.72
Needlefish	10	18	1.80
Threadfin	95	507	5.34
Mullet	5	14	2.75
Pomfret	4,992	7,343	1.47
Snake mackerel	10,762	12,660	1.18
Jacks (misc)	1,849	3,568	1.93
Amberjack	69	76	1.10
Blue crevally	13	33	2.50
Pig-lipped ulua	1,626	2,480	1.53
Dobe ulua	2	3	1.58
Paapaa ulua	87	266	3.06
White ulua	194	443	2.28
Giant sea bass	2,912	9,489	3.26
Blue spot grouper	8	23	2.91
Snappers	163	681	4.18
Blue lined snapper	3,274	2,885	0.88
Ehu (red snapper)	3,063	13,336	4.35
Gindai (flower snapper)	203	691	3.40
Kalekale (pink snapper)	2,221	6,308	2.84
Lehi (silverjaw)	1,262	4,106	3.25
Onaga (red snapper)	10,356	64,119	6.19
Opakapaka (pink snapper)	26,108	119,066	4.56
Uku (gray snapper)	12,868	40,318	3.13
Porgy	85	255	3.00
Squirrelfish	1,312	3,845	2.93
Trumpetfish	8	5	0.62
Scorpionfish	280	1,088	3.89
Mountain bass	32	94	2.95
Bigeyes	344	747	2.17
Cardinalfish	10	8	0.75
Goatfish	3,180	8,444	2.66
Rudderfish	101	163	1.62
Damselfish	75	127	1.70

Table V.1.14 (Cont.)

Species	Pounds	Value	$/lb
Hawkfish	42	93	2.21
Tilapia	2,879	2,480	0.86
Wrasse	384	751	1.96
Parrotfish	1,436	2,814	1.96
Surgeon/tangs	5,359	6,518	1.22
Flounders	9	7	0.83
Filefish	62	150	2.42
Rainbow runner	405	567	1.40
Mahimahi (dolphin)	60,034	113,686	1.89
Barracudas	305	462	1.51
Wahoo	24,445	71,761	2.94
Tunas	805	6,853	8.51
Skipjack tuna	170,225	222,335	1.31
Yellowfin tuna	198,924	517,288	2.60
Albacore	78,000	80,553	1.03
Bigeye tuna	348,198	1,774,936	5.10
Kawakawa	621	858	1.38
Frigate tuna	6	6	0.92
Broadbill swordfish	434,049	1,647,701	3.80
Blue marlin	58,406	72,528	1.24
Black marlin	201	503	2.50
Striped marlin	78,239	138,624	1.77
Shortnose spearfish	13,866	14,530	1.05
Sailfish	392	448	1.14
Ocean moonfish	29,657	25,713	0.87
Spiny lobster	3,870	64,793	16.74
Slipper lobster	369	3,686	9.99
Crabs	4,967	20,715	4.17
Shrimp (freshwater)	1,000	3,000	3.00
Octopus	1,027	2,560	2.49
Squid	192	786	4.10
Limpets (saltwater)	552	1,842	3.34
Sea cucumbers	20	176	8.78
Algae	810	2,144	2.65
** SUBTOTAL **	1,705,119	5,263,073	3.09
** TOTAL **	23,536,499	54,852,305	2.33

Figure V.1.1

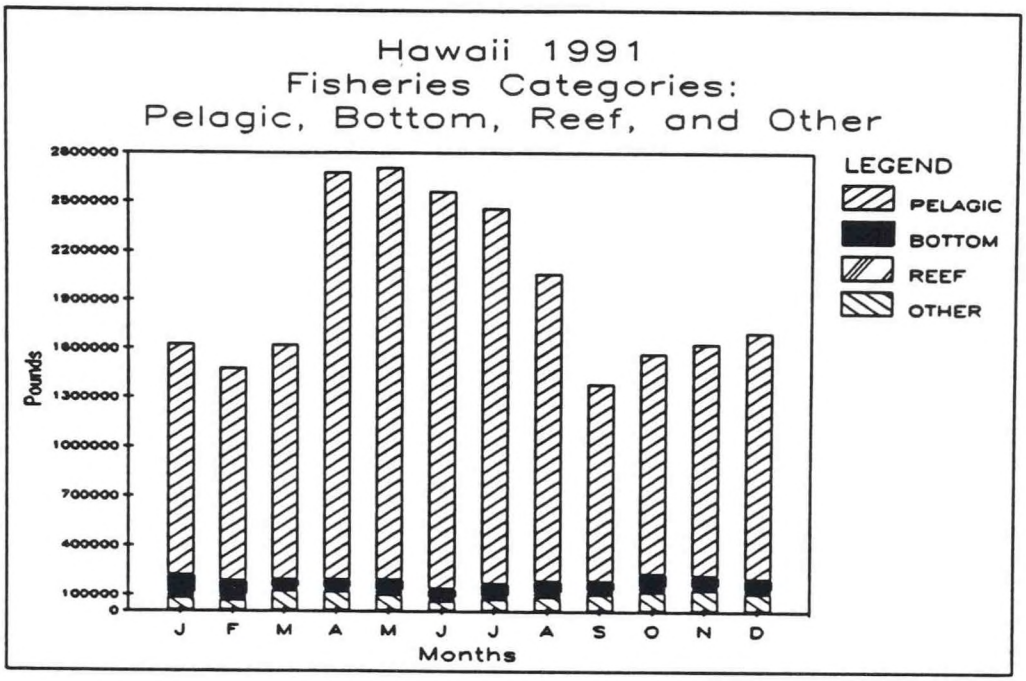


Figure V.1.2

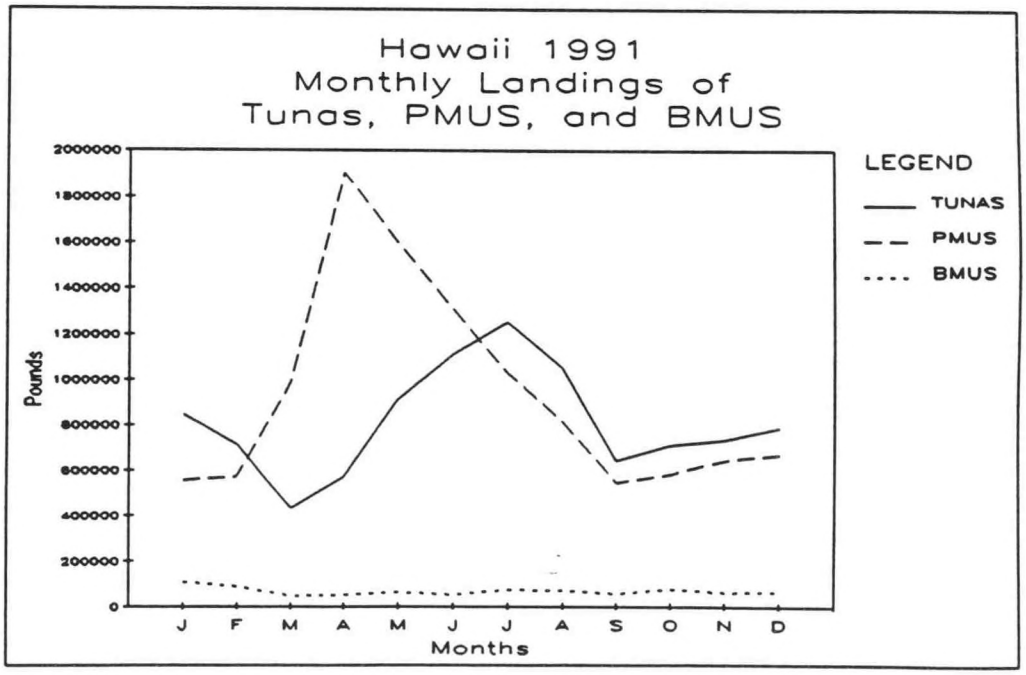


Figure V.1.3

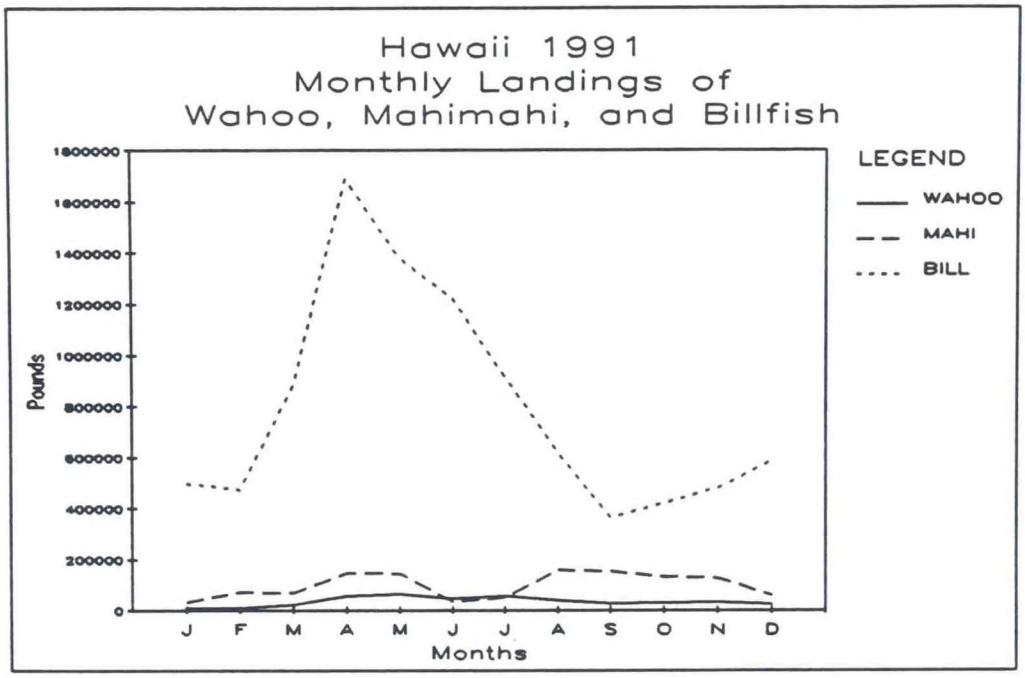
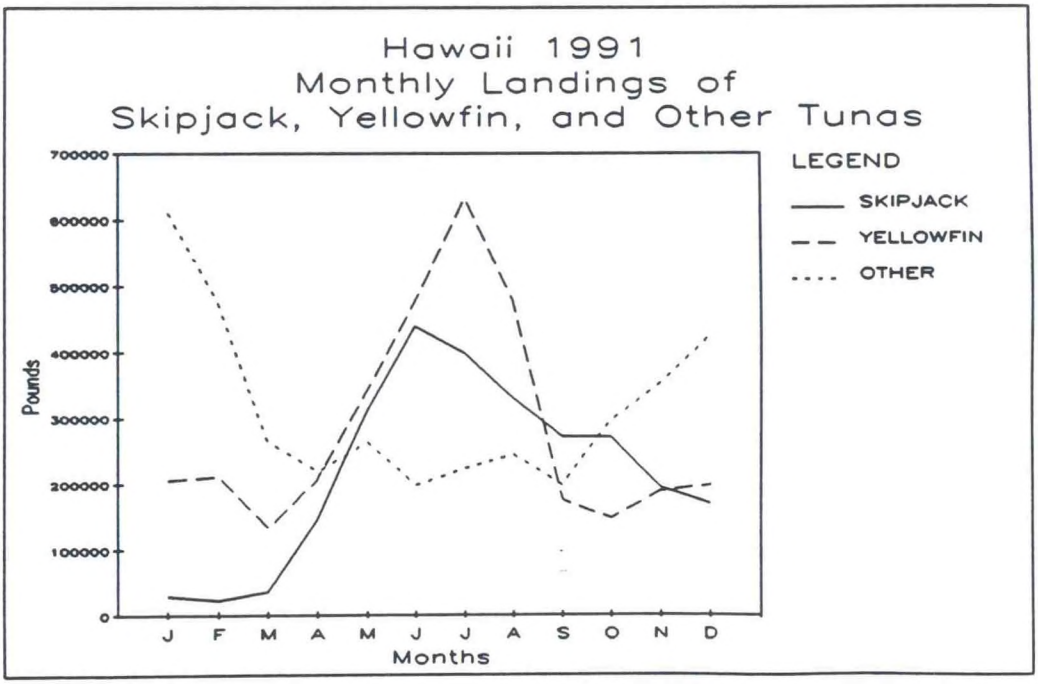


Figure V.1.4



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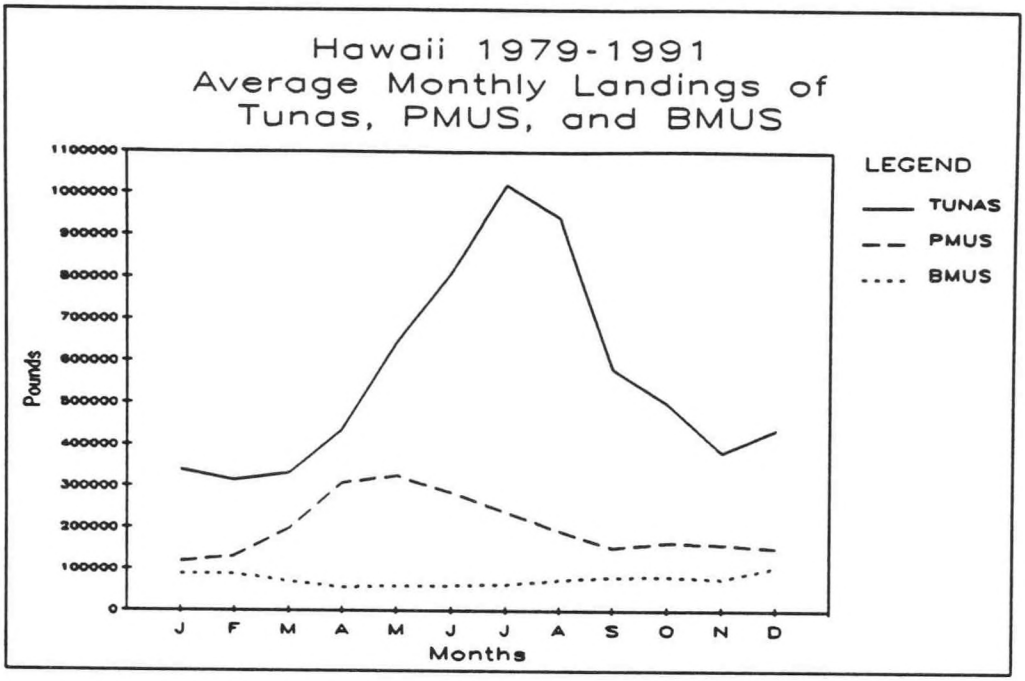

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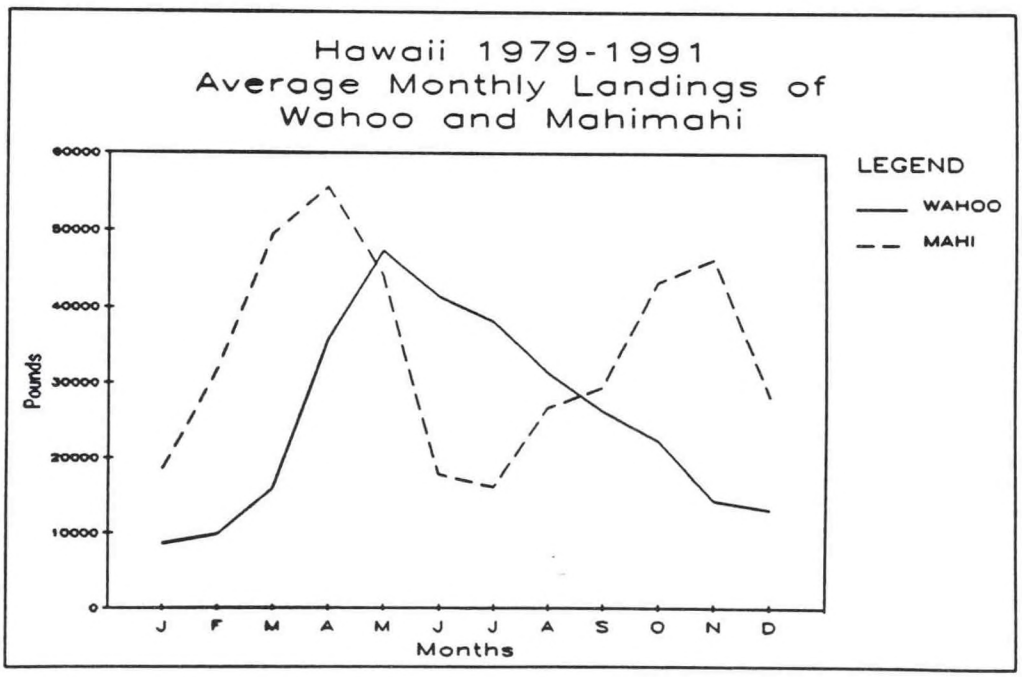

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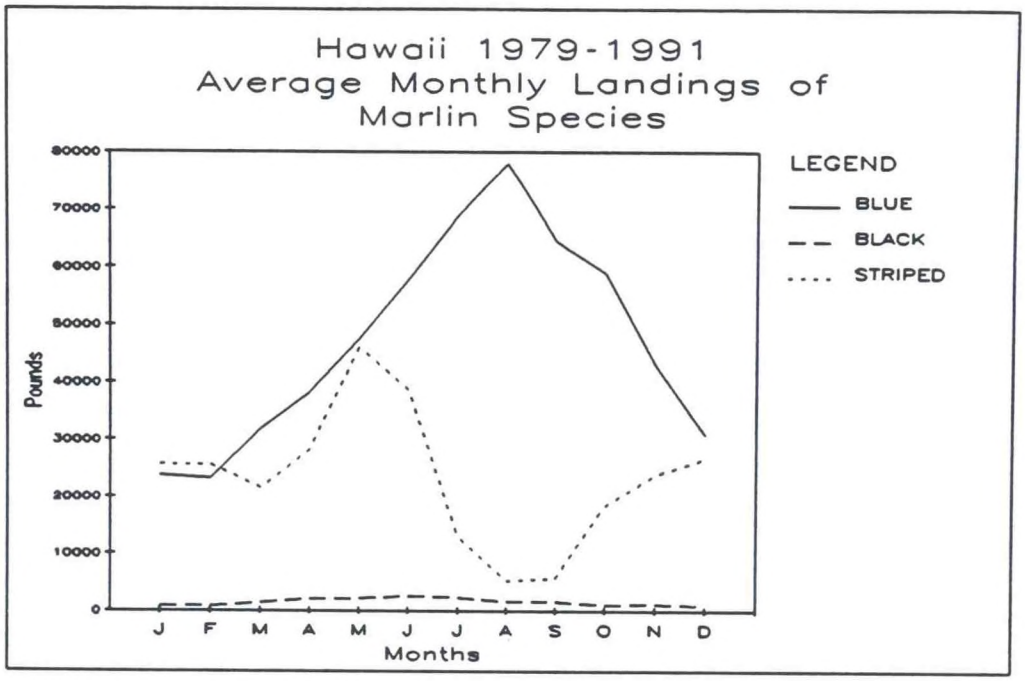

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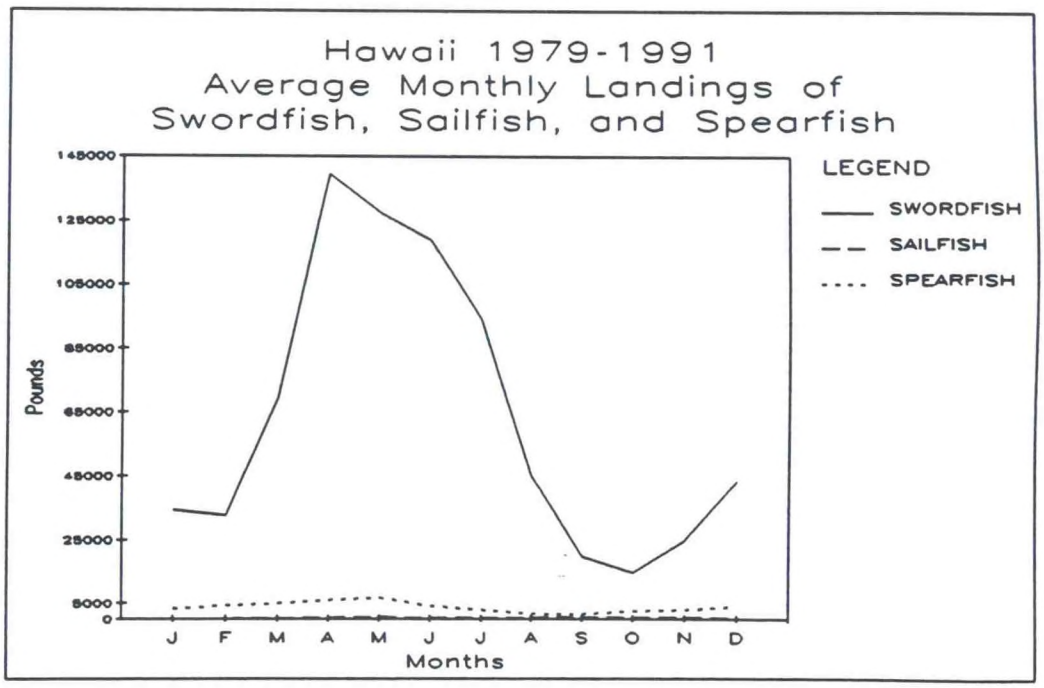

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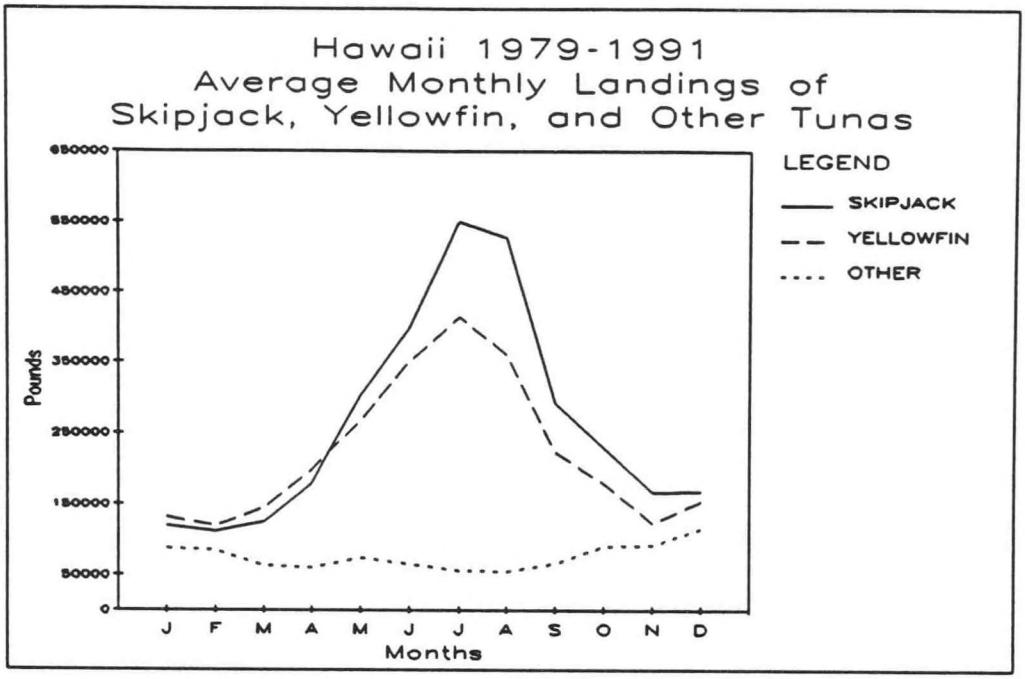

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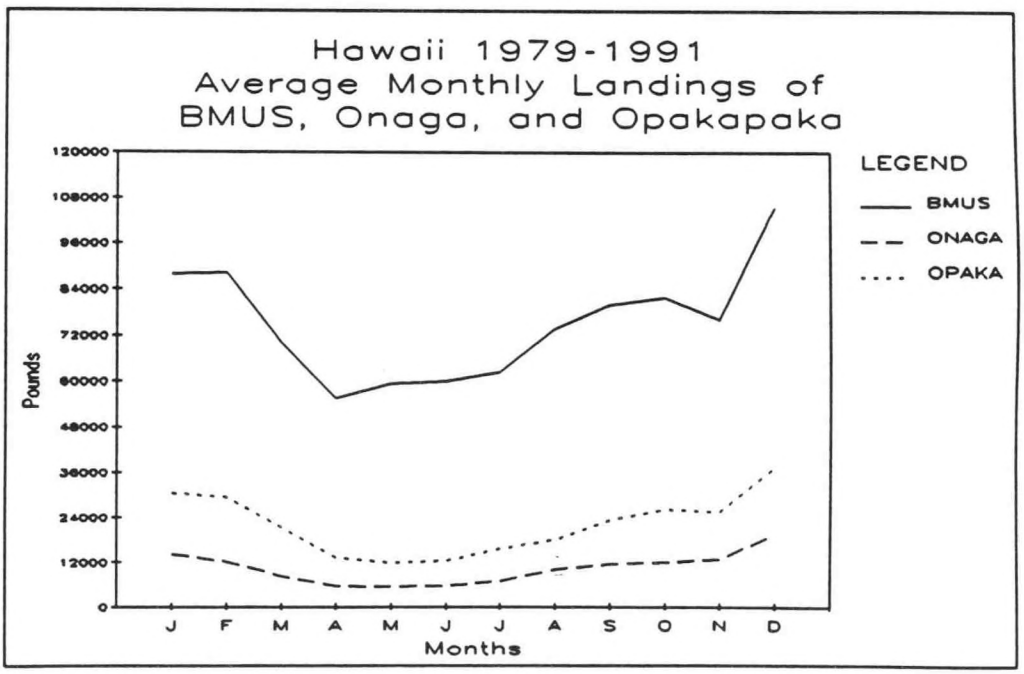

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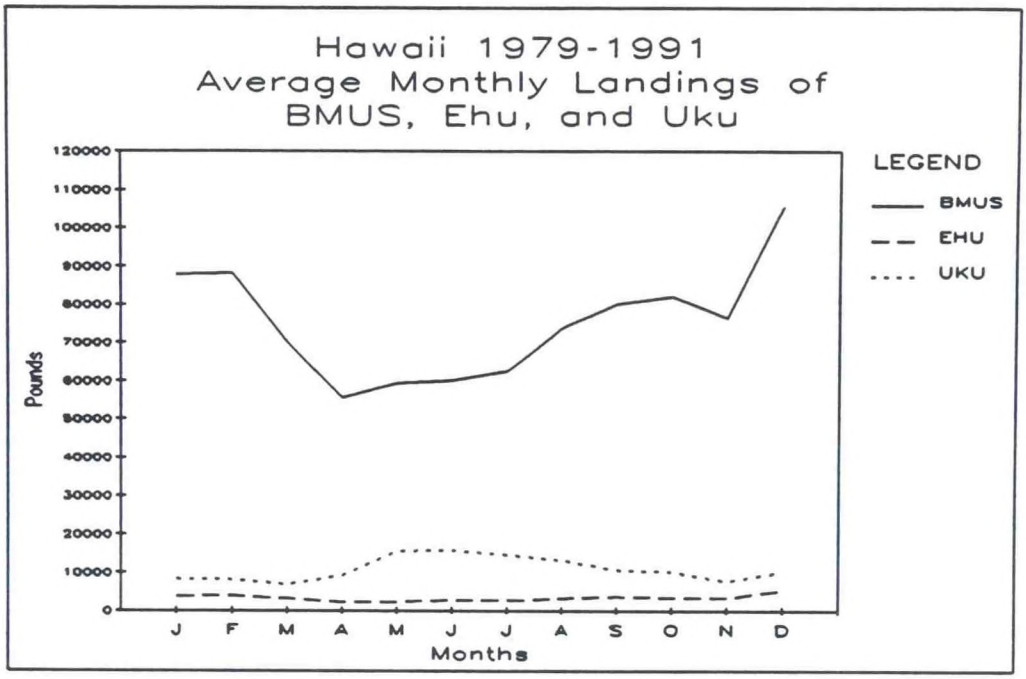
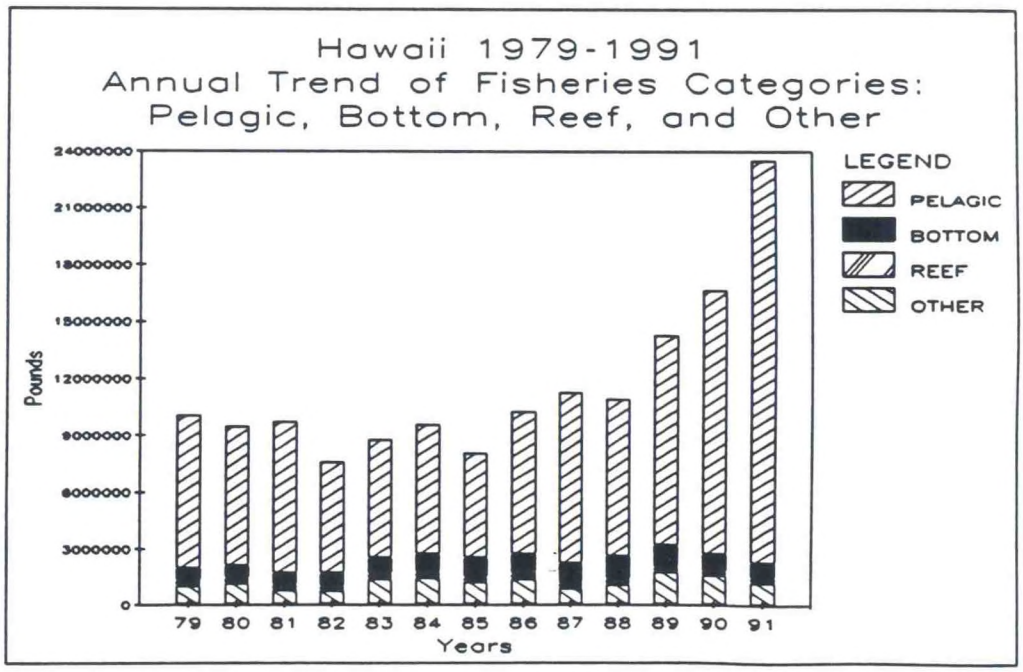


Figure V.3.1



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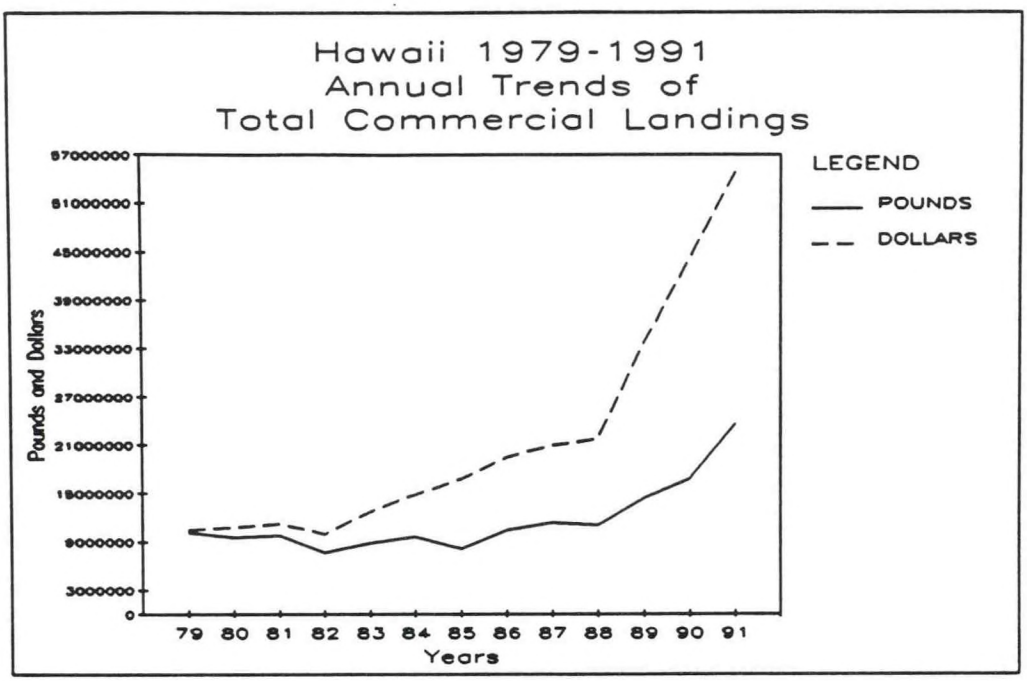

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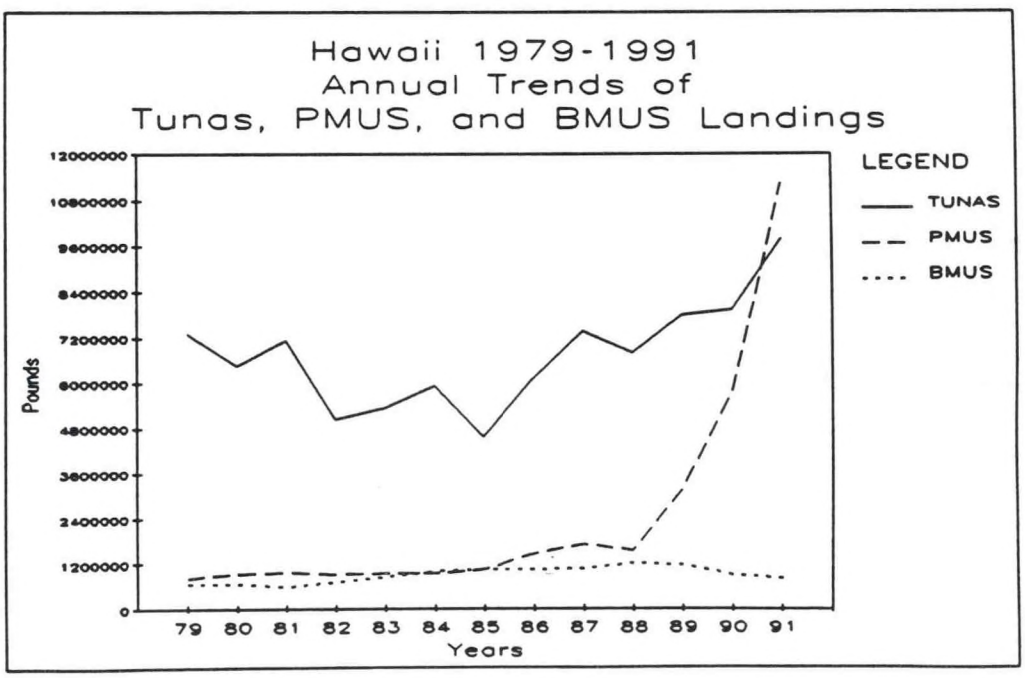

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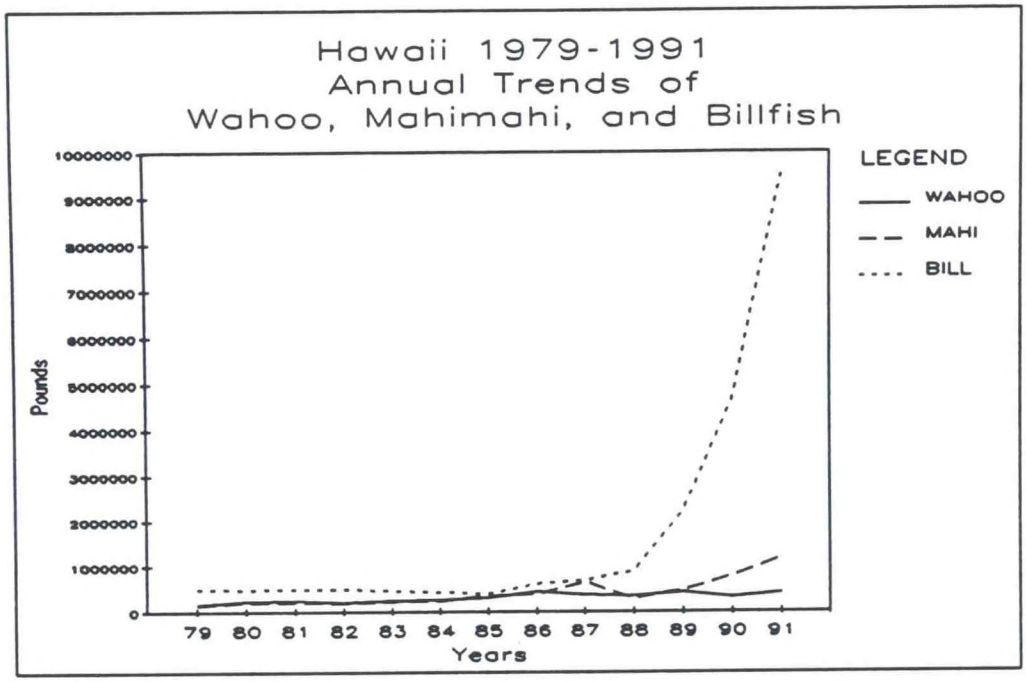

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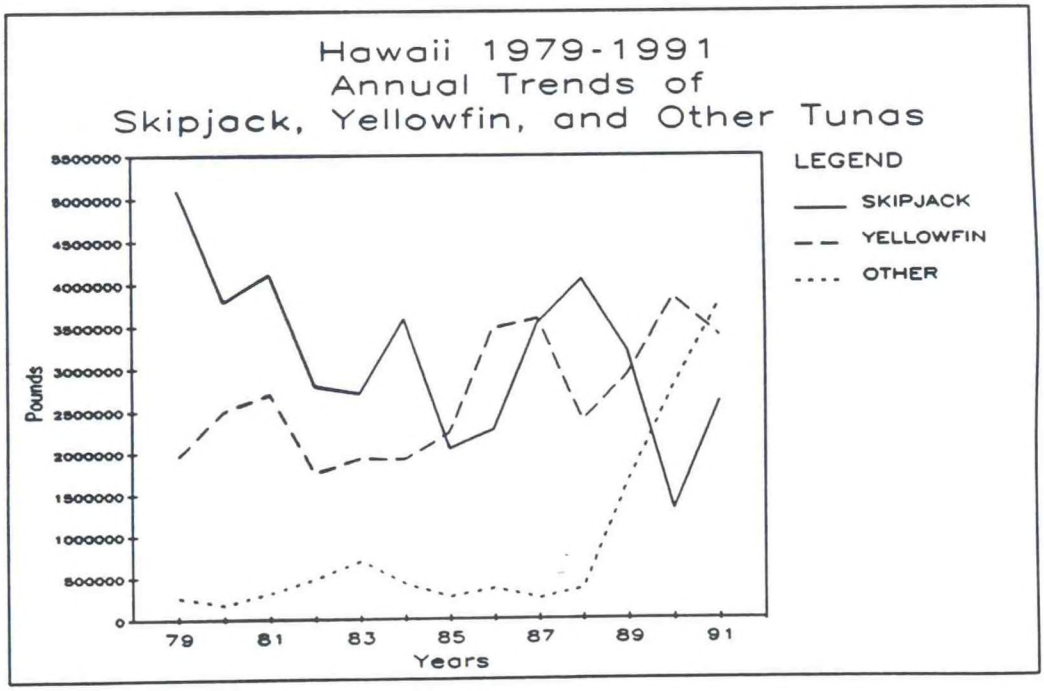

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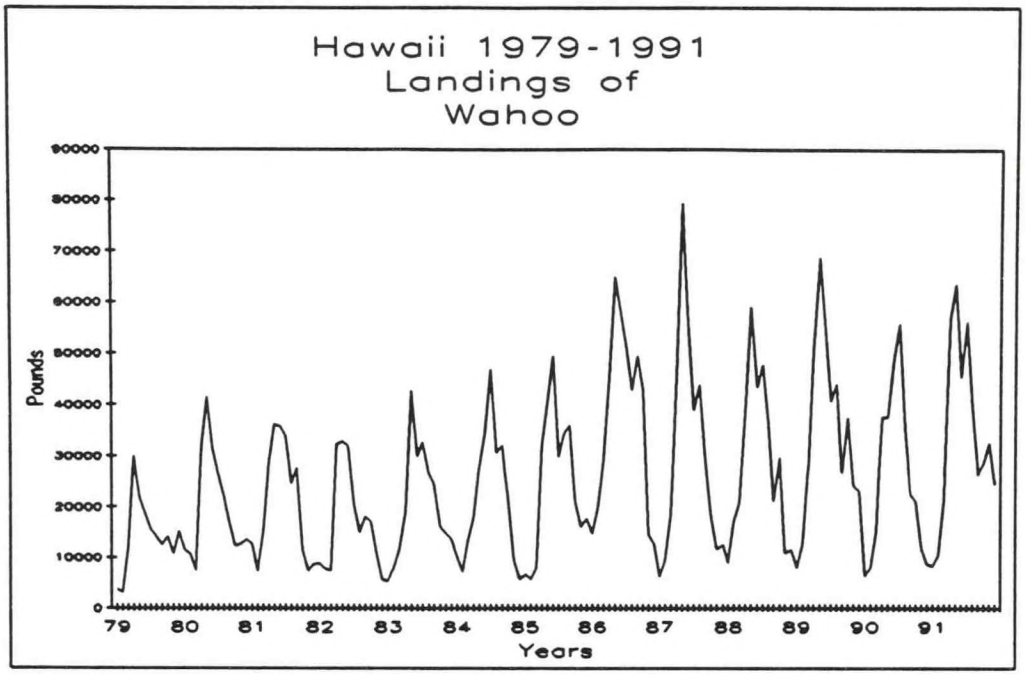

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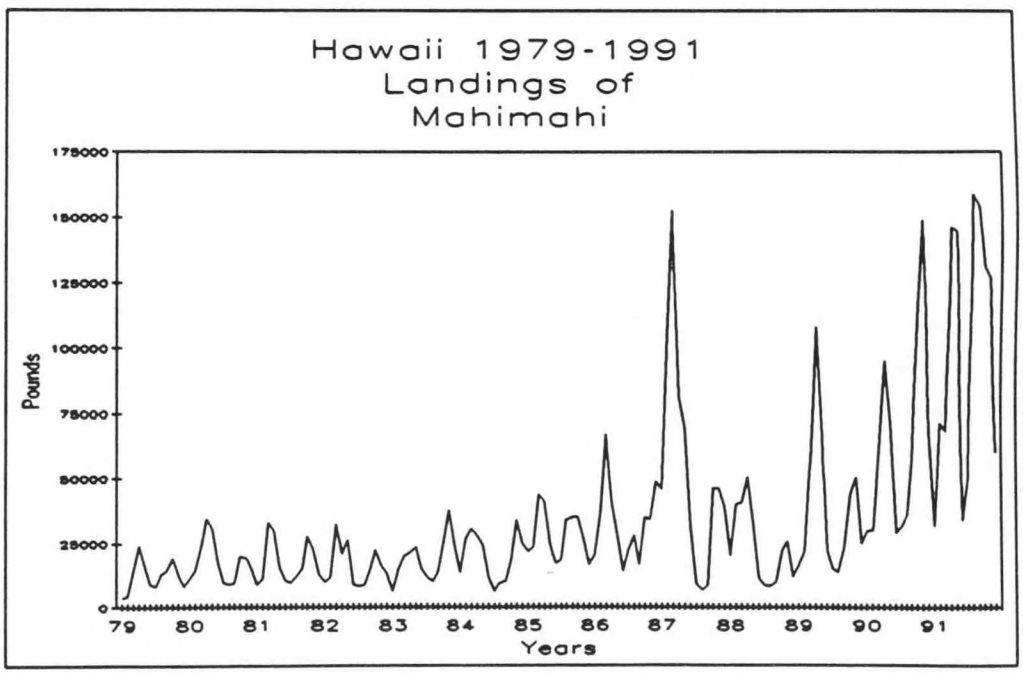

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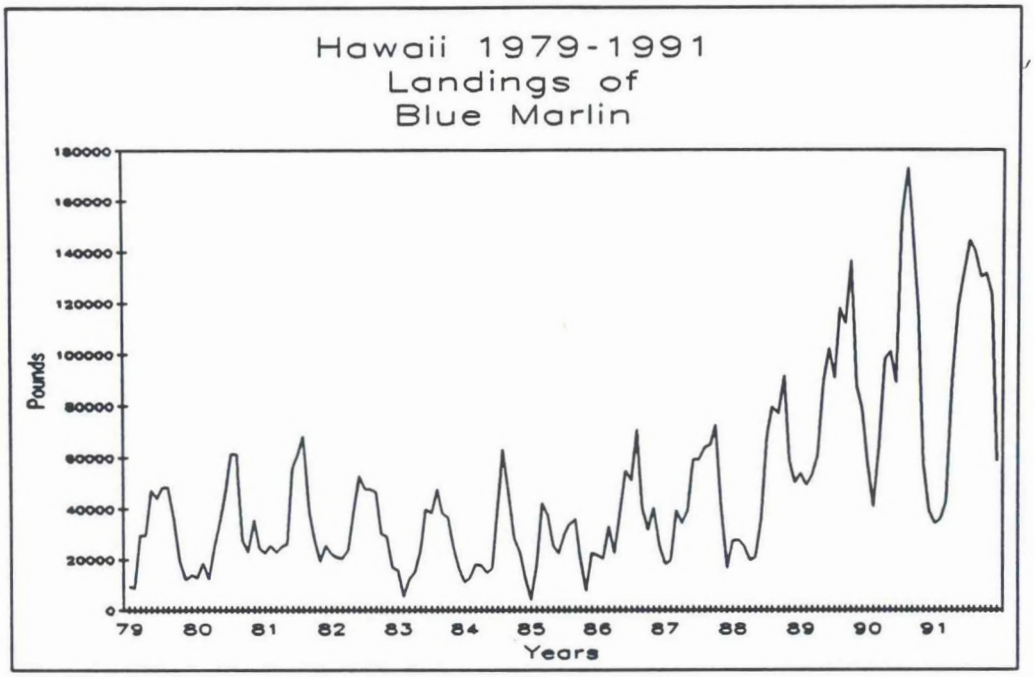

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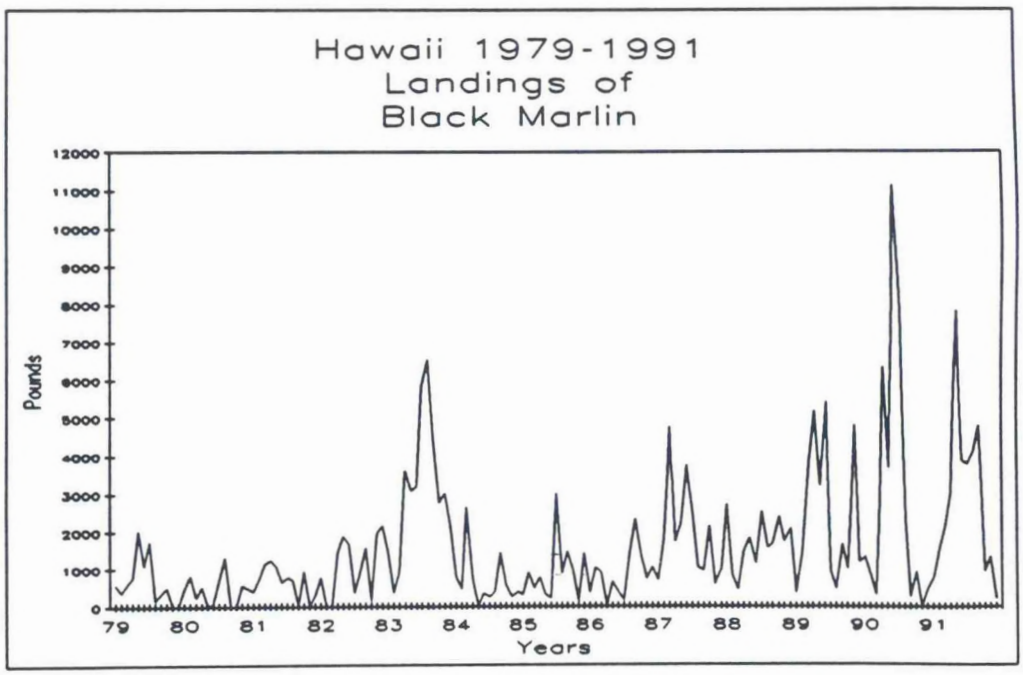

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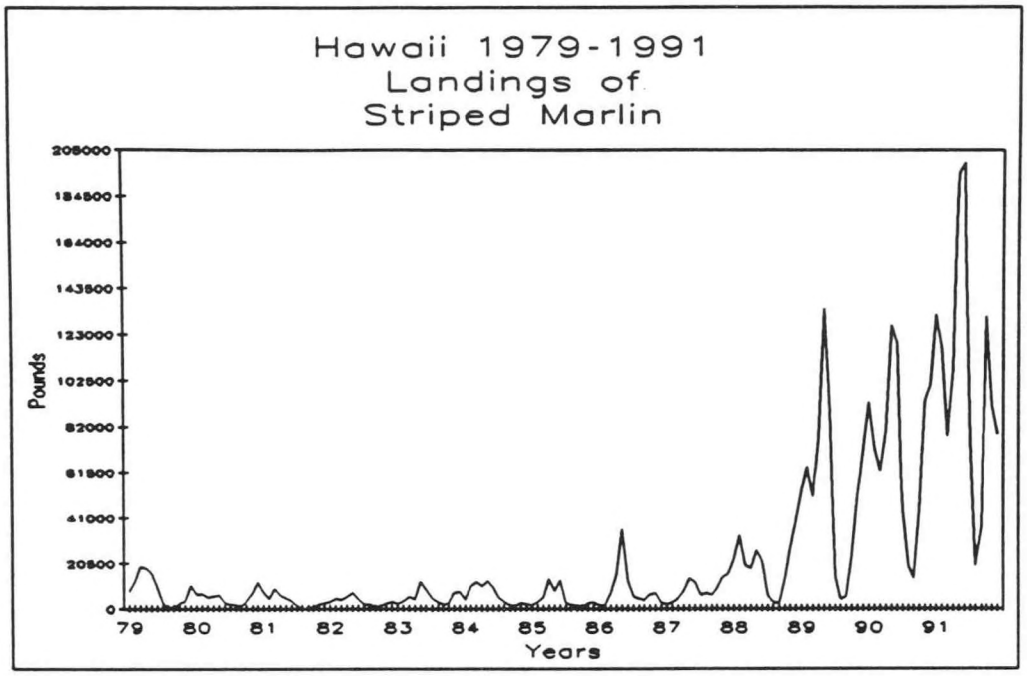

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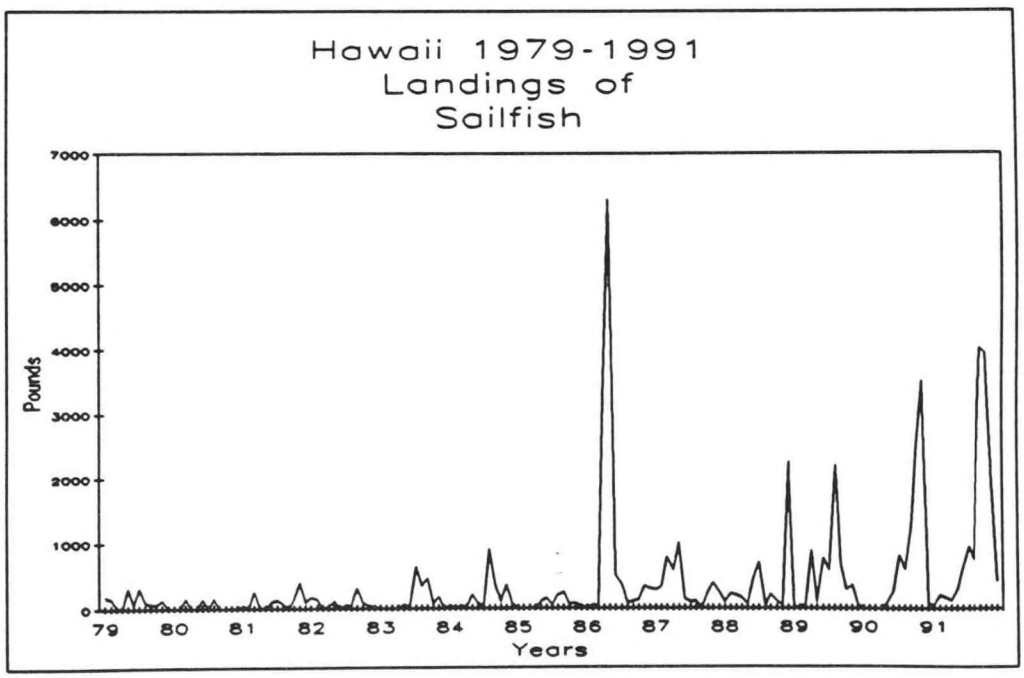

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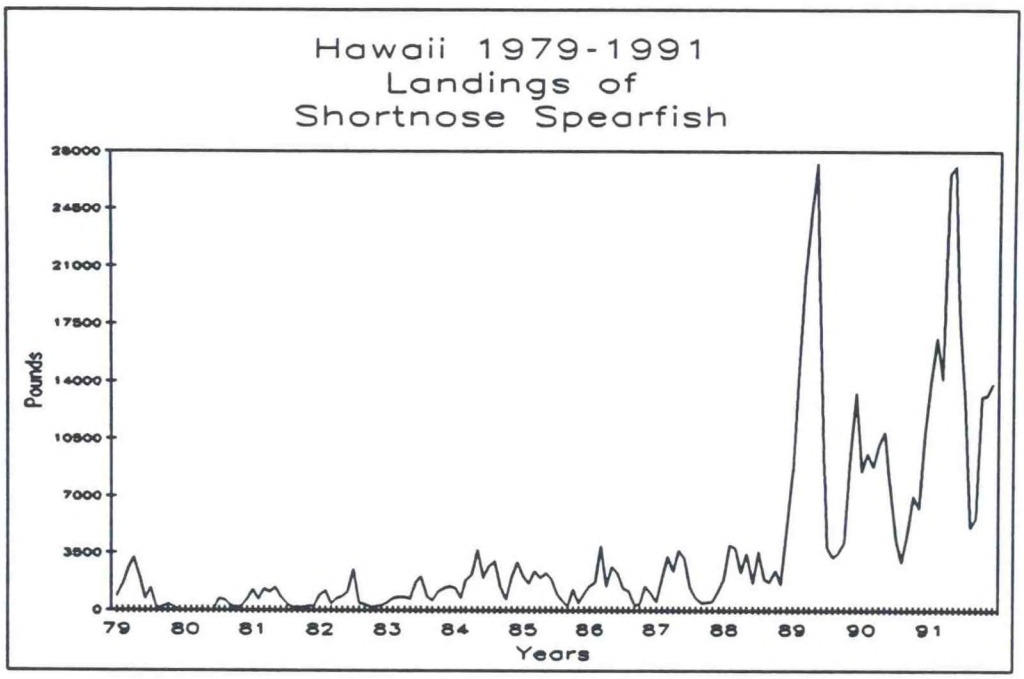

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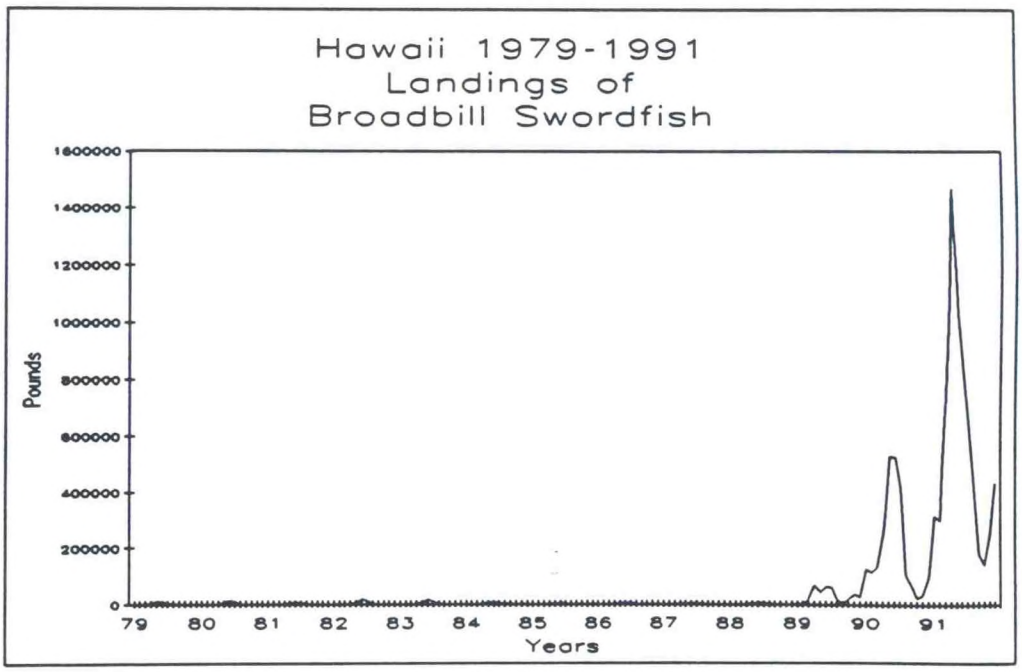

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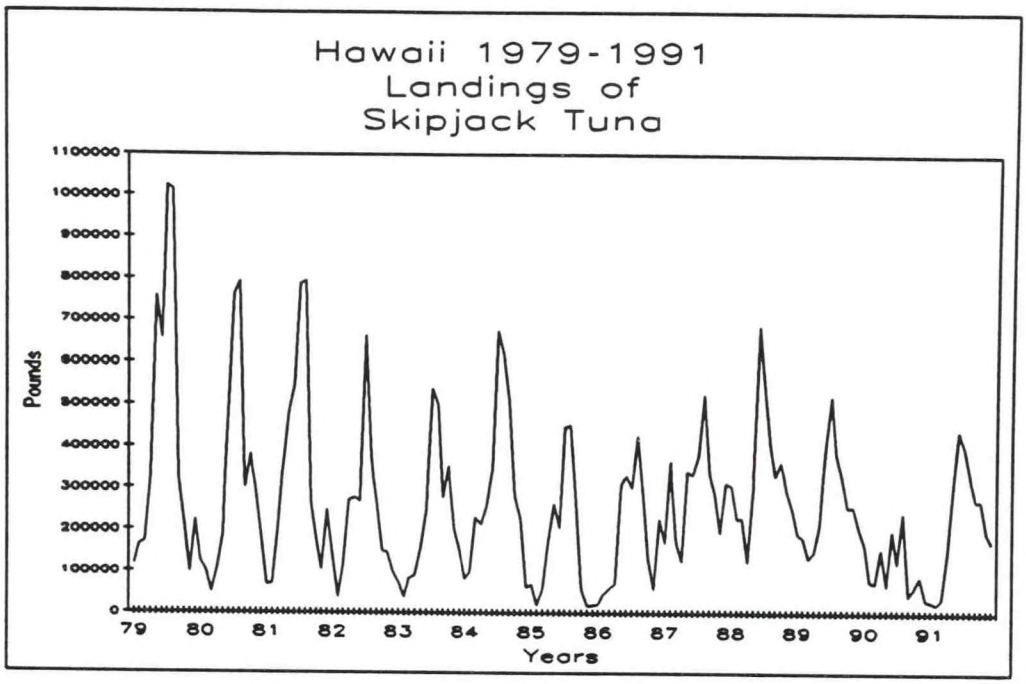

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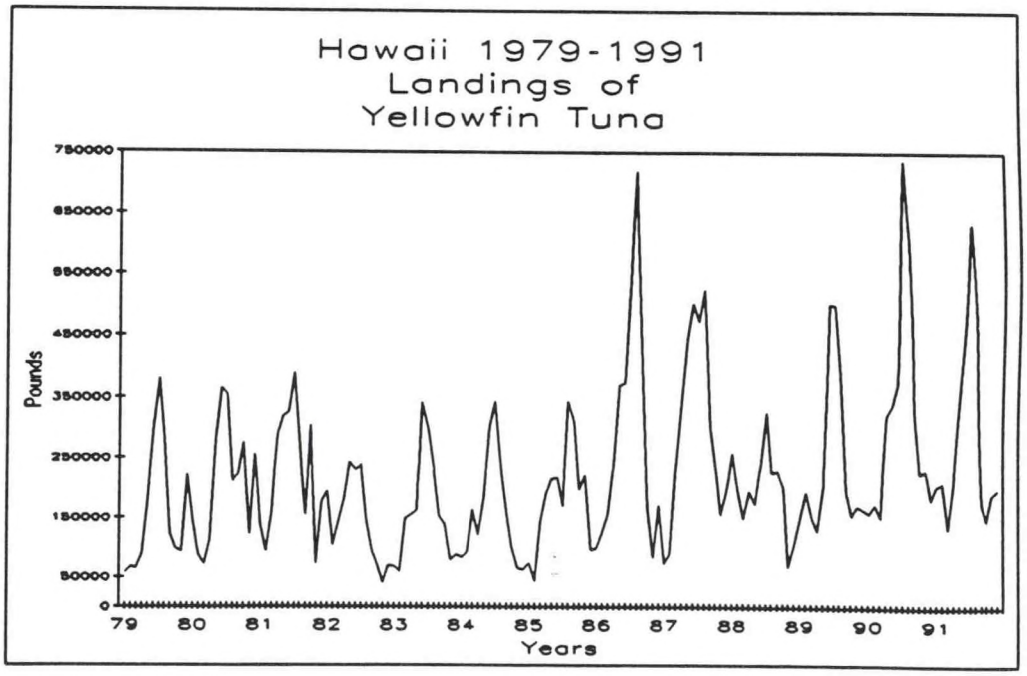

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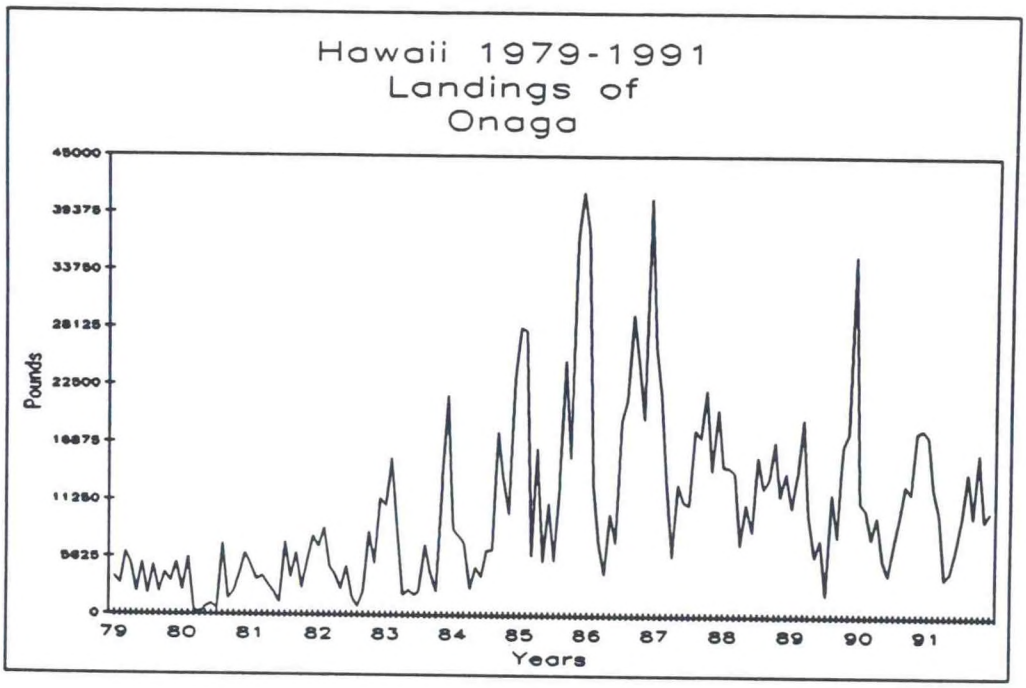

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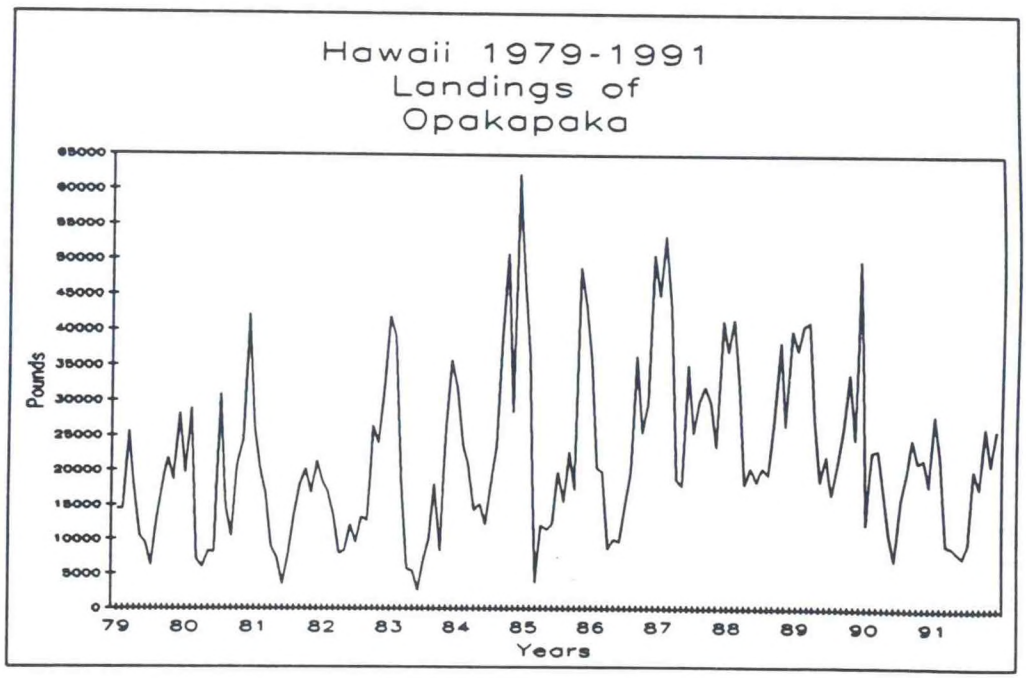

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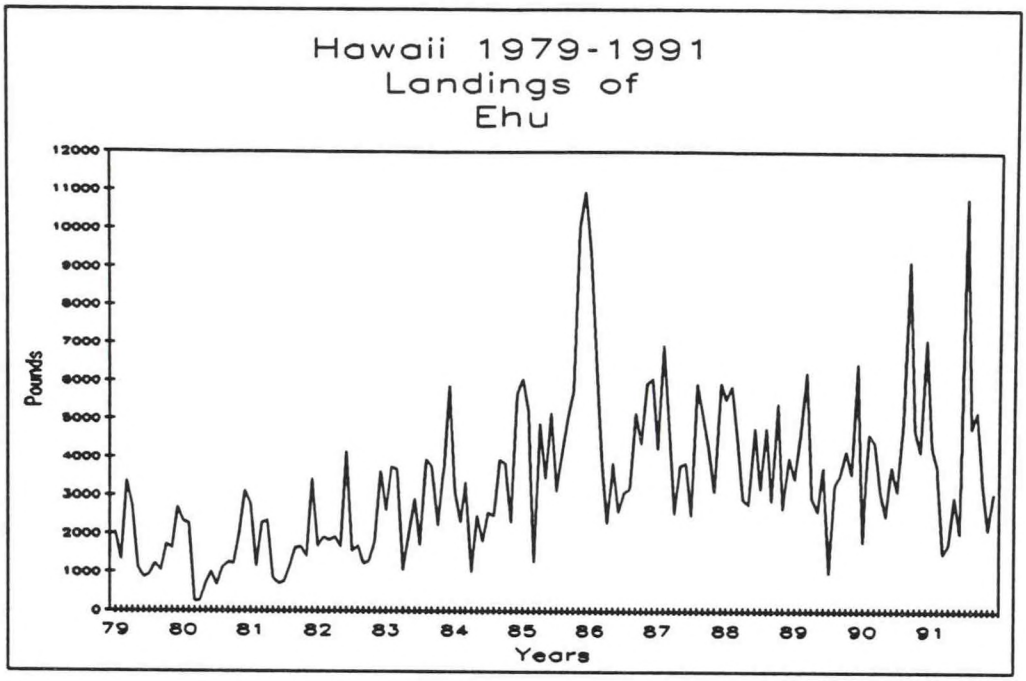

Figure V.4.14