UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

September 16, 1996

Richard Lauber, Chairman
North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, Alaska 99501-2252

Report of the NMFS/RAM Division

- Status of Vessel Moratorium Program
- Status of Halibut/Sablefish IFQ Program

Dear Mr. Lauber:

This report will bring you and the Council up-to-date on implementation activities associated with the two limited access programs identified above. If, after reviewing this information, you still have questions, please let me know.

Vessel Moratorium Program

Issuance of Vessel Moratorium Qualifications (VMQs) to current owners of qualifying vessels, and Vessel Moratorium Permits (VMPs) with respect to those qualifying vessels, began last spring. Implementation of the program (which was somewhat delayed due to the government shut-down and other unavoidable circumstances) required establishing a database (the "Official NMFS Moratorium Record") that contained the names, fishing history (area, species and gear), and characteristics (Length Overall) of each qualifying vessel.

Applications for VMQs and VMPs from the vessels' current owners were matched against the Official Record; if the claims on the applications were supported with that information, the requested VMQ (and, if applied for, the VMP) was issued. If the claim was not supported, the applicant received an Initial Administrative Determination (IAD) from the RAM Division. Included with the IAD was an interim VMQ/VMP, which allowed the vessel to participate while additional work on the application was completed. Although interim MVPs allow the vessel to fish, interim VMQs are not transferable.

By its terms, the IAD provided applicants with 60 days, during which time they could either submit additional evidence to the RAM Division (thereby seeking reconsideration of the IAD), or simply appeal the IAD to the Office of Administrative Appeals. Failure to do either resulted in the revocation of the interim MVQ/MVP and (in most cases) issuance of MVQs and MVPs in accordance with the Official Record.

The tables below display the status of applications received for the Moratorium program (as of September 13, 1996):

Vessel Moratorium Qualifications Issued:	1,810
Interim Vessel Moratorium Qualifications Issued:	91
Total Moratorium Qualifications:	**1,901**

By the terms of the regulations, such Qualifications are fully transferable.

Vessel Moratorium Permits Issued:	1,767
Interim Vessel Moratorium Permits Issued:	91
Total Moratorium Permits	**1,858**

Initial Administrative Determinations, reconsiderations thereto, and appeals therefrom are displayed below:

IADs (Denials of all or Part of a Claim):	497
IADs Pending Action by Applicant:	28
IADs Reconsidered, Claim Approved:	228
IADs Appealed to Office of Admin. Appeals:	69

The majority of IADs appealed to the Office of Administrative Appeals resulted from an IAD that denied only part of an applicant's claims (i.e., the application was otherwise approved, but the Division could not verify a specific gear/species combination, vessel length, etc.). Reasons for appeals are set out below:

Species and gear endorsements:	20
Vessel Length Overall:	16
Vessel Ownership (qualification of applicant):	7
Vessel Qualification:	15
Multiple claims:	11

Of the 69 appeals from IADs, 3 have been settled or dismissed; the remainder are pending final determinations (during the pendency of the administrative adjudication process, interim MVQs and MVPs are issued to the applicant -- fishing activity is not interrupted).

There is no application deadline for the Moratorium program. As a result, it is unknown how many MVQs/MVPs may eventually be issued by the Division; however, we feel fairly confident that the vast majority of those who either need or want such permits have already made their claims.

Halibut/sablefish Individual Fishing Quota (IFQ) program

Notwithstanding some vexing start-up problems, the 1996 halibut and sablefish IFQ season has been going well. Below, we discuss the program from a variety of perspectives, including 1996 season start-up problems, 1996 fishing activity, QS/IFQ transfer activity, status of IFQ appeals, status of public contact with the Division, status of IFQ Research, and regulatory changes.

The 1996 IFQ Season -- Start-Up

As reported at the April, 1996, Council meeting, the RAM Division encountered a number of difficulties in preparing for the distribution of IFQ permits at the beginning of the year. Computer programming issues, greatly complicated by the calculation and allocation of 1995 overages and underages, had the staff scrambling for most of the month of February, and the first two weeks of March. In spite of these problems, it appears that no person who desired to participate in the March 15 opener was denied the opportunity as a result of late IFQ issuance.

Another early problem was the continuing failure of the electronic Transaction Terminals, used to make IFQ landings. As discussed below, a major inter-Divisional effort by the Alaska Region appears to have effectively addressed that problem.

1996 IFQ Fishing -- Rate of Harvest

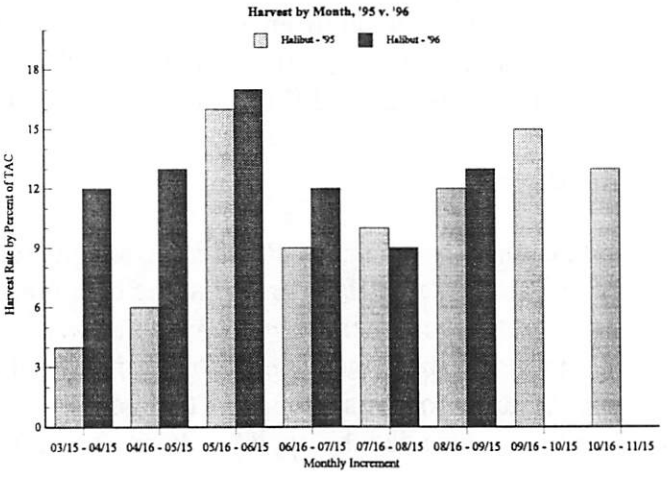
The 1996 season has been going smoothly. One significant change from 1995 has been the rate of harvest of IFQ halibut and sablefish. Without exception, in every regulatory area, IFQ holders have been harvesting the available TAC at a faster rate during 1996.

As of last week (September 11), only 24% of the state-wide halibut TAC remained to be harvested, and only 16% of the state-wide sablefish TAC remained to be harvested [as of last year at this time (September 12, 1995), the remaining statewide halibut TAC amounted to 41%, while the remaining statewide sablefish TAC amounted to 25%].

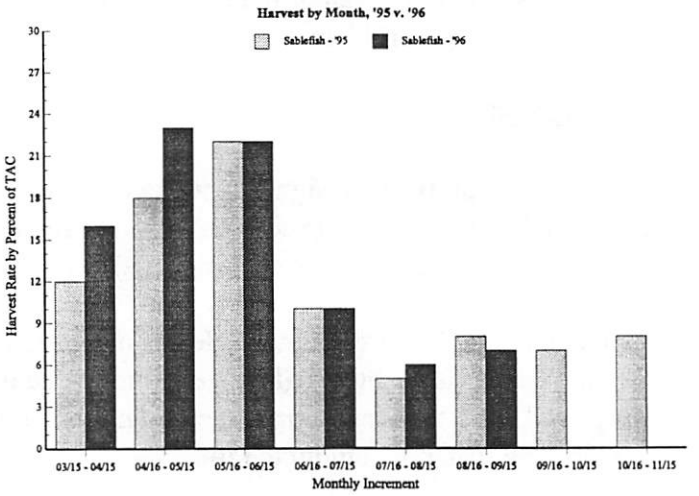
By area, the 1996 halibut TACs available for harvest range from 17% (90,500 pounds) in area 4D to 28% (550,000 pounds) in area 4B. Remaining sablefish TACs show greater variation, ranging from only 12% (1,434,000 pounds) in the Central Gulf to 35% (341,000 pounds) in the Aleutian Islands.

As noted, the rate of harvest has been considerably higher during 1996. The following tables (overleaf) display, by month and percent of TAC harvested, these relative harvest rates:

Halibut IFQ Harvest Rate



Sablefish IFQ Harvest Rate



Notes to Charts:

1. Charts display percentages of the IFQ halibut and sablefish TACs that were harvested in each monthy increment, commencing on March 15 of both years.
2. Harvest data are published weekly (not bi-monthly); therefore, percentages are estimated, and are derived, in some cases, from interpolation of data supplied for most proximate date of reporting.
3. 1995 Percentages will not sum to 100%; during 1995, only 87% of the IFQ halibut TAC, and 90% of the sablefish TAC was harvested.
4. Charts do not display Community Development Quota (CDQ) harvests.

1996 IFQ Fishing -- Ports of Landing

1996 IFQ Fishing -- Ports of Landing

The following tables show the "Top Five" ports of landing for IFQ halibut and sablefish during the 1996 season (through September 11), as well as landings outside of Alaska. They also show the percent of landings in each port as of the same time during 1995.

Halibut Landings by "Top Five" Ports, as of 9/11/96

Port	Vessel Landings	Pounds Landed	1996 Percent	1995 Percent
Kodiak	630	5,178,640	18.2	19.2
Homer	579	3,113,085	10.9	6.8
Seward	366	2,856,450	10.0	10.1
Dutch Hbr/Unalaska	251	2,514,043	8.8	10.5
Sitka	807	2,459,095	8.6	9.8
Total "Outside"	135	2,773,305	9.7	9.0

Sablefish Landings by "Top Five" Ports, as of 9/11/96

Port	Vessel Landings	Pounds Landed	1996 Percent	1995 Percent
Seward	342	7,484,024	25.2	25.1
Sitka	387	4,330,193	14.6	14.8
Kodiak	217	3,205,949	10.8	10.9
Dutch Hbr/Unalaska	198	3,181,568	10.7	11.4
Petersburg	85	1,592,495	5.4	4.2
Total "Outside"	70	1,804,990	6.1	3.8

Notes to Tables:

1. "Vessel Landings" include the number of landings by participating vessels reported by IFQ regulatory area. Each such landing may include harvests from more than one IFQ holder.
2. Halibut weights are reported in net (headed and gutted) pounds; sablefish weights are reported in round pounds.
3. Landings at different harbors in the same general location (e.g., Juneau, Doulas, and Auke Bay) have been combined to report landings to the main port (e.g., "Juneau").
4. Data are derived from initial data entry procedures and are preliminary; future review and editing may result in changes being made.

1996 IFQ Fishing -- Registered Buyers and Transaction Terminals

Under the IFQ regulations, deliveries of IFQ halibut and sablefish must be made to Registered Buyers, and Registered Buyer Permits (RBPs) are issued by the RAM Division. So far in 1996, the Division has issued 834 such permits. Well under one-half (294 unique number, including 275 with halibut landings and 126 with sablefish landings) of those Registered Buyers have actually recorded landings of halibut or sablefish during the current year. These data are similar to last year's, when there were far more RBPs than Registered Buyers with recorded landings. To this point, there is no clear explanation for this phenomena; however, because the RBP application process is simple, and the permits are free, it could be that a number of persons get the permit to have available "just in case" it may be needed.

Landings of IFQ halibut and sablefish must be made using electronic Transaction Terminals (supplied and programmed by NMFS). As noted above, the opening of the 1996 season saw almost universal failure of the devices, in spite of efforts between the end of 1995 and the beginning of the 1996 season to correct the problems. In response, Regional Administrator Steve Pennoyer appointed an inter-Divisional team of information management specialists (headed by Galen Tromble) to find out what was wrong, and to implement a solution.

After several weeks of work, it was determined that the programming of the terminals needed improvement (and that the devices simply would not be reliable in a few locations, as a result of substandard communications lines). Over the late spring and summer a major effort to reprogram and redeploy the transaction terminals has been undertaken. As a result, 235 (out of a total of 350) terminals have been "up-graded" to Version 3.1 software, and returned to the Registered Buyers for use. As of last week, over 80% of all IFQ landings were being made with the transaction terminals, and follow-up activities continue to insure that the remaining terminals are up-graded and all IFQ landings are reported using the devices.

This may be a good time to once again express the RAM Division's appreciation for the patience of those who have worked with us to see this problem laid to rest. The frustrations experienced by NMFS were significant; but not nearly as significant as those who, in good faith, have attempted to follow the regulations, only to discover that the mechanics of the process failed them. The patience of the industry in the face of such frustration has been greatly appreciated.

Transfer of QS and IFQ

As of September 11, 1996, the RAM Division had completed processing a total of 3,321 transactions involving the transfer of QS [by permanent QS transfer, transfer of IFQ only (lease), or "sweep-up"). By far the largest number of permanent QS transfers have been for the halibut fishery (2,367 halibut QS transfers v. 592 sablefish QS transfers), while the opposite is true of transfers of IFQ only (119 sablefish v. 82 halibut). As discussed below, there continues to be a net gain of QS transferred to Alaskans.

In the halibut fishery, 352 permanent QS transfers to Alaskans from non-Alaskans, and 335 permanent QS transfers from Alaskans to non-Alaskans, yielded a net gain of QS to Alaskans in the amount of 5,576,855 units. Transfer of halibut IFQ only (leases) during the 1995 season (and

through September 11, 1996) resulted in IFQ derived from an additional (net) 1,824,114 units of QS being transferred to Alaskans.

In the sablefish fishery, 114 permanent transfers to Alaskans from non-Alaskans, and 81 permanent transfers from Alaskans to non-Alaskans, yielded a net gain of QS to Alaskans in the amount of 5,607,204 units. Transfer of sablefish IFQ only (leases) during the 1995 season (and through September 11, 1996) resulted in IFQ derived from an additional (net) 8,906,964 units of sablefish QS being transferred to Alaskans.

> **Note:** The designation of a person as an "Alaskan" or a "non-Alaskan" is premised upon the addresses provided by the parties; the RAM Division makes no attempt to verify a person's legal residence.

Through September 11, 1996, there have been 76 sweep-ups of very small blocks of halibut QS and 31 sweep-ups of sablefish QS. The rate of QS consolidation by sweep-up is expected to increase when the new rule raising the sweep-up limits becomes operational.

New Entrants to the Fisheries

A feature of the IFQ program is that only those who received QS by initial issuance and those individuals who qualify as "IFQ Crew Members" (by demonstrating that they have served at least 150 days on the harvesting crew in any U.S. fishery) may receive unrestricted Catcher Vessel QS (i.e., Catcher Vessel QS that yields IFQ) by transfer. Those who have gained the status of eligibility to receive QS and IFQ by transfer are issued Transfer Eligibility Certificates (TECs).

As of September 11, 1996, the RAM Division had received and processed 1,206 applications for TECs from individuals who did not receive QS by initial issuance. Of the TECs issued, 913 (75.7%) were issued to Alaskans, while 293 (24.3%) were issued to non-Alaskans. Of those who received TECs, 551 (421 Alaskans and 130 non-Alaskans) actually received QS by transfer for the first time. The following table displays the total QS units received by such persons.

	Units of Halibut QS	**Units of Sablefish QS**
"Alaskans"	20,794,142	3,459,289
"non-Alaskans"	6,296,266	3,332,149

> **Note:** The designation of a person as an "Alaskan" or a "non-Alaskan" is premised upon the addresses provided by the parties; the RAM Division makes no attempt to verify a person's legal residence.

Status of Appeals of Initial Administrative Determinations

From late 1994 through mid-September, 1996, the RAM Division issued almost 1,700 Initial Administrative Determination (IADs) on applications for QS. Each IAD represented a denial, in whole or in part, of an applicant's claims before the Division. As of September 13, 1996, only 169 appeals of those IADs had been lodged with the Office of Administrative Appeals.

As to the disposition of those appeals, the Office of Administrative Appeals reports as follows:

Summary of IFQ Appeals by Activity:

Appeals settled or otherwise dismissed:	21
Final Decisions published:	58
Decisions Drafted (unpublished):	40
Appeals Pending:	50

Other Actions:

Decisions on Reconsideration:	4
Reconsiderations Pending:	2
Reconsiderations Denied:	3
Final Determinations Appealed to the District Court:	2

Nature of IFQ Appeals (by Category of Denial):

Basic Eligibility for QS:	47
Ownership/Lease Conflict:	38
Untimely Applications:	33
Additional Qualifying Pounds:	19
Successor-in-Interest:	13
Vessel Category Determination:	7
Legal Arguments:	5
Miscellaneous:	7

Public and Industry Contact

At the outset of IFQ program implementation, the Division committed to being as responsive as practicable to the industry and to the public. Although the sheer volume of communications has sometimes been overwhelming (we continue to receive an average of 3,000 calls/month on the "800" number), the effort has generally been well-received.

During 1966,the Division has undertaken direct communications with the industry in the following ways:

- Publication and distribution of ***The 1996 IFQ Season - A Report to the Fleet***, a document distributed to all IFQ holders and Registered Buyers when the 1996 IFQ was distributed;

- Attendance at workshops in Kodiak and Sitka, discussing the known data on changes to the distribution of harvest privileges under the IFQ program;

- Staffing a booth at Fish Expo in Kodiak (and plans to staff a similar booth at the Seattle Expo next week);

- Extensive use of the print and broadcast media to provide information on program changes (for instance, implementation of the "Buy-Up/Fish-Down" amendment);

- Preparation and distribution of an updated ***Report to the Fleet*** in mid-July, in which season activities and pending regulatory changes were discussed;

- Preparation and distribution of a ***Special Notice*** to all catcher-vessel QS holders, explaining the changes resulting from final approval of the "Buy-Up/Fish-Down" amendment; and,

- Continued publication and distribution (via the NMFS Bulletin Board, the Alaska Region's Internet Home Page, and facsimile) of weekly reports on allocations and harvest of IFQ/CDQ halibut and sablefish, ports of landing, and transfers of QS/IFQ.

Suggestions for improving on these efforts are always welcome.

IFQ Research Effort

Elsewhere on the agenda of the Council's Sitka meeting is a comprehensive report on a variety of research projects that have been undertaken to measure the performance of the IFQ progrm through the end of 1995. As noted, this was a cooperative, multi-agency, multi-governmental effort -- one which bodes well for continued examination of the long-range effects of the IFQ program.

Regulatory Changes

The Fish Management Division is reporting on the status of regulatory amendments that effect the IFQ program. Changes that have already been finalized are being implemented by the Division with few problems. In particular, and as mentioned, the "Fish-Down" amendment caused the Division to provide individual notice to all effected IFQ holders -- because the nature of the harvest privilege has been adjusted, the face of the IFQ permits in 1997 and in future years will likewise be adjusted.

The set of amendments known as "Omnibus II" became final on September 9; as a result, we have already completed transfers of QS/IFQ under the new "survivoship" authority; further, we are working on the necessary computer changes and procedures to fully implement the other changes (such as "Transfer of IFQ only" as opposed to lease, allowing for reporting of gear type when landings are made, etc.).

There is no doubt that additional amendments to the program will present new challenges in the future. The Division is committed to full implementation of those changes, and to fully inform the fleet of the changes when they occur.

Conclusion

This reports constitutes but a summary of the many elements of Moratorium and IFQ program implementation and management. If I've left anything out, or if you have questions about anything herein, please let me know.

Sincerely,

Phil Smith, Chief
Restricted Access
Management (RAM) Division

P. Smith: 9/15/96
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ENFORCEMENT REPORT FOR THE PERIOD 6/7/96 THROUGH 9/12/96

National Marine Fisheries Service
Alaska Enforcement Division

During the reporting period a total of 305 cases were opened. NMFS Alaska Enforcement Division (AED) initiated 280 of these cases.

Further action was also taken on 253 pending cases during the reporting period. Eleven investigations were closed as unfounded, eight investigations were closed due to lack of evidence, one investigation was closed due to lack of AED resources, and five investigations were dismissed for other reasons. Eleven cases were referred to other Divisions or other agencies and one case was suspended. Thirty-four cases were handled with written warnings and 32 cases were handled with summary settlement payments totaling $27,209 and forfeited proceeds of $38,812. A total of 122 cases were settled through voluntary abandonment of forfeited proceeds and property valued at $124,950. Seven cases were referred to NOAA General Counsel. General Counsel issued 17 Notices of Violation assessing a total of $97,500 in penalties, and settled 5 cases for a total of $8,950 in penalties.

IFQ PROGRAM

The 1996 IFQ season is poised for the sprint to the finish. The summer salmon season is complete and focus is likely to return to halibut and sablefish. A review of landing information reveals that approximately 75% to 80% of all landings are conducted using transaction terminals. This rate may be approaching the total capability of what the system can handle. This is based upon a variety of electronic limitations of the telephone system in remote western Alaska and other remote locations. Further evaluation continues and final reporting will be added to the 1996 IFQ evaluation report.

NMFS law enforcement personnel, along with other federal and State of Alaska personnel, will be staffing a cooperative informational booth at Fish Expo in Seattle. We encourage the public to stop by and visit with our people. We are available to listen to suggestions and field questions.

MAJOR HALIBUT CASE SETTLES

In the NMFS Enforcement Report for the June council meeting, it was reported that a major investigation was conducted regarding the F/Vs Alexandria C and the Sabrina C and their owners Ken Christiansen and Carl Christiansen. The following excerpt recounts the alleged violations:

"..... the F/V Alexandria C was seized on March 21, 1996 by NMFS enforcement

personnel in Kodiak, AK. for fraud and false statements stemming from illegal halibut fishing during the September 1994 opening for Pacific Halibut. Ken Christiansen, owner/operator of the F/V Alexandria C fished during the last open access trip limit opening in September of 1994. The 56 foot Alexandria C had a trip limit of 20,000 lbs. The government's complaint alleges that Ken Christiansen caught 28,659 lbs of halibut but transferred 8,018 lbs to his father, Carl Christiansen's vessel the Sabrina C. Evidence gathered in the investigation indicates the Sabrina C suffered an equipment failure which prevented it from fishing during the September opening. The alleged illegal activity was further aggravated directly by Ken Christensen attempting to hide his activities. ..."

An agreement in principle has been reached for a global settlement in this case for $100,000.

AGENDA B-5
Supplemental
SEPTEMBER 1996

DEPARTMENT OF HEALTH & HUMAN SERVICES

PUBLIC HEALTH SERVICE

National Institute for Occupational Safety and Health (NIOSH)
Division of Safety Research
Alaska Field Station
4230 University Drive, Suite 310
Anchorage, Alaska 99508
Phone: 907-271-2382
Fax: 907-271-2390

September 9, 1996

Donna Parker
Alaska Department of Commerce
and Economic Development
PO Box 110804
Juneau, AK 99811

Dear Ms. Parker:

I am writing in regards to a conversation I had with Dr. Gunnar Knapp with the University of Alaska Anchorage. We discussed the need for research in the area of IFQs and their relationship to safety. Our office has data on all occupational fatalities that have occurred in Alaska since 1990 including those in the commercial fishing industry. Dr. Knapp thought it was important that I share with you our findings regarding the halibut fishery.

From 1991 through 1994, there were six fatal events resulting in 11 fatalities in the halibut fishery in Alaska. All of these incidents were vessel related, which means the vessel either capsized, sank, or is missing. All of the vessels in these fatal events were reportedly in rough seas. There have been no fatalities in the halibut fishery in 1995 or 1996, nor were there any in 1990.

The National Institute for Occupational Safety and Health (NIOSH) established an office in Alaska after identifying Alaska as the highest-risk state in the U.S. for job-related traumatic fatalities. We conduct research primarily in the high risk industries, namely commercial fishing, air transport and logging. I have enclosed an article we published in the Nov/Dec 1995 issue of Public Health Reports regarding the progress the commercial fishing industry has made in the safety field.

The second article enclosed was published by Mr. Ron Perkins, Director of the Community Injury Prevention Program, Alaska Native Health Service in Anchorage. This paper shows that marine safety training is effective. The article focused on only one training group, the Alaska Marine Safety Education Association (AMSEA).

I hope this information is helpful to you. If you have any further questions, I can be reached at 271-2382.

Sincerely,

Jennifer M. Lincoln
Occupational Safety and Health Specialist

Evaluation of An Alaskan Marine Safety Training Program

Ron Perkins, MPH

Mr. Perkins is the Director of the Community Injury Prevention Program, Alaska Native Health Service, Anchorage, Alaska.

SYNOPSIS

THE ALASKA MARINE Safety Education Association provides commercial fishermen with an intensive 18–24-hour course addressing emergency preparedness, emergency response, and survival training. This study is a retrospective evaluation of the effectiveness of the course in reducing drownings and hypothermia deaths among commercial fishermen from January 1, 1991, to December 31, 1994.

None of the 114 fishermen who died during the study period were graduated from the course, and none of the 64 vessels on which a death occurred had an course-trained person on board.

A broken weld in the hull, a malfunctioning pump system, a leaking hatch cover, a man overboard, an engine fire, or any number of other disasters can occur quickly and unexpectedly at sea. Alaska's commercial fishing industry has the highest occupational fatality rate in the United States. Nearly 25 percent of all U.S. commercial fishing fatalities occur in Alaska, twice the number of the second highest State (Louisiana) (*1*). An average of 40 boats go down off the coast of Alaska each year, with an annual average of 28 lives lost.

Alaskan fishing crews work year-round in extremely hazardous conditions. Imagine working in a factory where the floor is covered with water or ice and is constantly moving. Imagine a work environment in which not all of the heavy equipment is anchored down and you have to wear heavy, bulky clothing. And if a fire, flood, or other disaster strikes, it is impossible to escape by running outside. Commercial fishing in Alaska is a very dangerous occupation.

The Congress passed the "Commercial Fishing Industry Vessel Safety Act of 1988" to address the industry's safety deficiencies. The Act established standards for survival gear, safety equipment, fire fighting equipment, distress signals, alarms, and first aid training for personnel on fishing vessels. Under the Act, each boat's crew is required to have a trained person conduct monthly emergency safety drills.

This retrospective study was designed to determine whether the Alaska Marine Safety Education Association's (AMSEA) safety training sessions, which meet the requirements of the 1988 Act, are effective in reducing drownings and hypothermia deaths of commercial fishermen. AMSEA's training is

Tearsheet requests to Ron Perkins: tel. 907-273-0102; fax 907-271-4734; e-mail <rperkins@corcom.com>.

modeled on the International Maritime Organization's (IMO) Personal Survival Module.

Methods

AMSEA's Marine Survival Equipment, Procedures, and Drills Course addresses emergency preparedness, survival training, vessel stability and loading, and the procedure for conducting safety drills. The participants in the 20-hour course are taught how to abandon ship, fight fires, use distress signals, make distress calls, launch survival craft, don survival suits, recover people from the water, and other skills. Requiring safety and survival equipment is valuable, but people must practice using the equipment prior to an emergency for maximum effectiveness.

Nearly all of the course participants were either skippers or crew members on commercial fishing vessels. The course is taught by AMSEA trained instructors.

A cumulative total of 1,518 people were trained by AMSEA as Drill Instructors from January 1, 1991, to December 31, 1994; this number represents only three percent of the total number of fishermen registered in 1994 (*2*).

Our study period was from January 1, 1991, to December 31, 1994. The United States Coast Guard database was used to identify vessels that were either involved in drownings or required rescues during the study period. The database lists vessel name, date of incident, victims, survivors, and a brief description of the incident. We used information from incident investigations conducted by the National Institute for Occupational Safety and Health (NIOSH)—Alaska Activity—and from a newspaper clipping service to cross-check for accuracy and to find additional names for victims and survivors. A survivor was defined as a person who was rescued from a boat in distress, either by the Coast Guard or by another vessel. Every effort was made to identify the 116 unidentified survivors from Coast Guard reports, NIOSH investigations, and newspaper accounts.

The names of victims and survivors were then compared with a list of AMSEA Drill Instructor Course graduates. The dates of the vessel loss and of the course graduation were compared, with people who took the course after losing their boat excluded.

Victims and survivors who could not be identified by name were not included in the study. Lost vessels that were unoccupied were also excluded.

Table 1 shows a two by two table created using the number of deaths, the number of survivors, and whether or not they were AMSEA trained. The Fisher exact 2-tailed test was used to determine the probability that the difference is survivability was random.

Results

The U.S. Coast Guard reported a total of 159 vessel incidents in Alaska during the four-year study period. None of the 114 documented deaths were of AMSEA Drill Instructor Course graduates ($P = 0.034$). There were 343 survivors, of whom 227 (66 percent) were identified by name. Of the identified survivors, 10 were AMSEA graduates from eight different vessels. Only the survivors who were AMSEA graduates were counted as "saves," although there was an average of three additional (non-AMSEA trained) persons on each of the eight vessels.

Death toll in Alaska vessel incidents among AMSEA[1] and non-AMSEA graduates 1991–94

Year	Vessels	Incidents	Deaths	Identified Survivors	AMSEA	Non-AMSEA
1991	17,580	47	41	44	2	0
1992	17,194	45	42	41	1	0
1993	16,276	26	21	45	1	0
1994	16,192	41	10	97	6	0
Totals		159	114	227	[2]10	0

[1]Alaska Marine Safety Education Association.
[2]Only the survivors who were AMSEA graduates were counted as "saves," although there was an average of three additional (non-AMSEA trained) persons on each of the eight vessels.

One person's knowledge of life raft deployment, distress signal use, or emergency response could easily save an entire vessel and crew. We identified 64 vessels on which at least one death occurred during the study period and an additional 86 vessels with at least one identified survivor and no deaths.

Eight of the 86 "at least one survivor vessels" and none of the 64 "at least one death vessels" had an AMSEA-trained person on board ($P = 0.021$).

Discussion

It is apparent that the AMSEA training course is having an effect in reducing drownings among commercial fishermen.

According to the crews from two vessels not counted in this study, practicing the emergency drills described in the AMSEA manual had saved their lives. Several AMSEA graduates have noted that their knowledge and preparedness actually prevented the need to call the Coast Guard for help.

One possible confounding variable, beyond the scope of this study, is whether people who chose to take the AMSEA course had unique characteristics that made them different from other commercial fishermen. In other words, were "safety conscious" people more likely to take the course?

Other drill instructor courses are considerably shorter (eight hours) and use very few hands-on exercises. Additional evaluations are needed to determine the effectiveness of these abbreviated courses.

References

1. National Traumatic Occupational Fatality database. 1980–1989. National Institute of Occupational Safety and Health. Morgantown, WV, 1992.
2. Fish and game licensing. Alaska Department of Revenue, Juneau, October 1994.

George A. Conway MD, MPH
Jennifer M. Lincoln

Preventing Deaths in Alaska's Fishing Industry

One of the last decade's great regional public health success stories is the sharp decline of deaths in Alaska's commercial fishing industry.

During the 1970s and 1980s, commercial fishing boomed in Alaska. By the mid-1980s, commercial fishing-related deaths were the dominant contributor to Alaska's very high occupational fatality rate *(1)*. Nationally, these hazards captured the attention of Congress, which enacted the Commercial Fishing Industry Vessel Safety Act of 1988 (CFIVSA, P.L. 100-424). Intensive surveillance in Alaska began with the U.S. Coast Guard (USCG) Main Casualty Data Base *(2)* and collaborative death certificate review by Federal agencies and the Alaska Departments of Labor and Health and Social Services during the 1990s.

During 1990–1994, 118 commercial fishers and 22 fish processors died while working in Alaska. One hundred-one of these fishers drowned. Of the 118 deceased fishers, 73 died due to vessels sinking or capsizing. Twenty-two fishers, only one of whom was wearing a personal floatation device (PFD), died from falls overboard. This constitutes a fatality rate of 140 per 100,000 per year *(3)* or 20 times the overall U.S. occupational fatality rate.

Our analysis of USCG statistics *(4)* shows impressive progress: the case-fatality rate dropped from 24 percent in 1991 to 2 percent in 1994, while the number of vessels lost remained relatively constant, as has the number of people on board at risk. This progress has occurred primarily in the post-event phase, by fishers using immersion suits and life rafts to stay afloat and warm until being located via emergency position indicating radio beacons. The CFIVSA requirements for these items were implemented between 1990–1993. These regulations also require that masters of each vessel ensure that monthly safety drills are conducted describing the use of safety equipment. Those conducting the safety drills must be trained in the proper procedures. The Alaska Marine Safety Education Association has played a major role in preparing fishers to meet these needs.

Although it is tempting to declare victory, we should resist the inclination. Twenty-five to 45 vessels sink and approximately 100 persons require rescue annually from cold Alaskan waters. Successful rescue is expensive and remains dependent on the expertly-trained staff of the USCG search-and-rescue operations and subject to the vagaries of the seas and the weather. Mortality also persists largely unabated for man overboard (MOB) events.

The critical etiologic factors that must be addressed for primary prevention efforts are compromised vessel stability and falls overboard. Capsizing events are generally preventable since vessel stability is measurable and predictable. By design enhancements such as retrofitting of sponsons (flotation projections) and careful attention to loading and environmental factors, vessels can be less susceptible to capsizing or sinking due to sudden changes in weather.

Falls overboard are risky because PFDs are not routinely used on deck. Although USCG regulations require vessels be equipped with at least one USCG-approved PFD or immersion suit for each person on board, the PFD is not required to be worn. Fishers wearing PFDs on deck would be an appropriate intervention for MOB drownings.

The substantial progress made in Alaska's most hazardous industry through the thoughtful application of the public health model and incorporation of new technologies and comprehensive training should encourage others to try similar approaches to injury problems elsewhere.

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PRELIMINARY ASSESSMENT OF THE HALIBUT AND SABLEFISH IFQ PROGRAMS IN TERMS OF NINE POTENTIAL CONSERVATION EFFECTS

Prepared by

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EXECUTIVE SUMMARY

During the development of the IFQ programs for the fixed gear halibut and sablefish fisheries off Alaska and subsequent to their implementation, a number of potential effects were identified. They include the following nine types of potential conservation effects:

1. fishing mortality from lost/abandoned gear
2. halibut and sablefish bycatch and discards in other fixed gear fisheries (including halibut discards in the fixed gear sablefish fishery)
3. groundfish discards in halibut and sablefish fisheries (including sablefish discards in the halibut fishery)
4. high-grading of halibut and sablefish in the IFQ fisheries and discards of sublegal halibut in the halibut fishery
5. under-reporting of landings
6. exceeding TACs
7. pressure to increase TACs
8. spatial and temporal distributions of catch
9. CPUE data and its effects on stock assessments

The purpose of this report is to provide a preliminary assessment of the halibut and sablefish IFQ programs in terms of these nine conservation effects. There are several reasons why only a preliminary assessment is possible at this time. They include the following: 1) the immediate effects of an IFQ program will not necessarily be indicative of the long term effects; 2) some of the effects may not be measurable for several years; 3) comparisons of pre and post-IFQ conditions are only possible when data are available for both periods; 4) although the effects of the IFQ programs are the differences between what happened with the IFQ program and what would have happened without it, the current assessment is based on comparisons of pre and post-IFQ condition; and 5) limited staff resources were available. More complete assessments will be made in the future.

The assessments that are being completed for the Canadian halibut and sablefish individual vessel quota (IVQ) programs, which have been in place for several years, will complement this preliminary assessment. However, differences between the U.S. and Canadian programs and fisheries have to be considered to determine which of the Canadian experiences are expected to occur in the fisheries off Alaska.

Differences between the Alaska IFQ fisheries and other Alaska fisheries, as well as differences between these IFQ programs and the programs that would be developed for other Alaska fisheries, should be considered to determine the extent to which the assessments of the effects of the halibut and sablefish IFQ programs can be used to project the effects for significantly different fisheries and IFQ programs.

The preliminary assessments for the halibut and sablefish fisheries are summarized below for each of nine potential conservation effects.

1. Fishing mortality from lost/abandoned gear

Halibut: The IPHC annually estimates halibut fishing mortality from lost/abandoned halibut gear. The estimates indicate that this mortality dropped significantly for the Alaska fishery in 1995 (277,000 pounds in 1995 compared to 1,219,000 pounds in 1994) and is now down to the level shown in the last several years in the Canadian fishery.

Sablefish: Neither historical nor current estimates of this source of fishing mortality are available for the sablefish fishery. Therefore, this effect was not assessed for the sablefish fishery.

2. Halibut and sablefish bycatch and discards in other fixed gear fisheries (including halibut discards in the fixed gear sablefish fishery)

Halibut: Estimates of halibut catch rates in the fixed gear groundfish fisheries are available from the Observer Program; however, estimates of halibut discards are not available and, because halibut can now be retained in these fisheries, it can be difficult to differentiate between halibut catch and bycatch. Due to the latter problem, the method that had been used to estimate halibut bycatch in the fixed gear sablefish fishery is no longer applicable. The development of comparable estimates for 1994 and 1995 was further hindered by the difficulty in determining the IFQ halibut and sablefish landed in each fishing trip. Although the rough estimates of halibut bycatch that were made for the BSAI and GOA fixed gear sablefish fisheries were substantially less than the estimates for 1994 (about 150 metric tons (mt) in 1995 compared to about 860 mt in 1994), it is not known how much of the difference was due to estimation errors. It has not yet been determined if the discard mortality rate for halibut in the sablefish fixed gear fisheries changed in 1995.

Sablefish: In the BSAI, the amounts of sablefish caught or discarded in non-sablefish hook and line groundfish fisheries were comparable to those taken annually from 1991-94. However, the discard rates for sablefish were substantially higher in 1995. In the GOA, sablefish bycatch in non-sablefish hook and line fisheries accounts for a relatively small part of the total hook and line catch of sablefish and it is difficult to identify clear differences in sablefish bycatch or discards between 1995 and the previous four years.

3. Groundfish discards in halibut and sablefish fisheries (including sablefish discards in the halibut fishery)

Halibut: Insufficient data on groundfish discards in the halibut fishery are available to make a comparison between 1994 and 1995.

Sablefish: In the BSAI hook and line sablefish fishery, the catch, discards, and discard rate for non-sablefish groundfish were all higher in 1995 than in any of the previous four years. However, in the GOA, there was no discernable difference between 1995 and the previous years.

4. High-grading of halibut and sablefish in the IFQ fisheries and discards of sublegal halibut in the halibut fishery

Halibut: Mortality due to high-grading, though talked about anecdotally, has not been scientifically observed or documented. Therefore, no comparison could be made. The examination of size-composition data in Canadian halibut landings has been inconclusive concerning the likely extent of high-grading. It is too early to tell what effect there may be in U.S. waters at this time.

Discard mortality of sublegal sized halibut is computed by IPHC based on the ratio of legal sized halibut catch to total halibut catch in stock assessment surveys. This method of estimation does not provide a direct method of comparing the 1994 and 1995 mortality of sublegal halibut in the halibut fishery. It has not been determined if the discard mortality rate for sublegal halibut has changed.

Sablefish: High-grading sablefish or halibut is prohibited under the IFQ programs; therefore, accurate estimates are not available. Anecdotal information indicates that high-grading has occurred but it does not indicate how widespread this practice is. Size-composition data has not been used to address this issue.

5. Under-reporting of landings

Halibut: Comparisons between RAM data and IPHC commercial fish ticket data indicate either that under-reporting is minimal or that similar falsification occurs for both types of landings reports. NMFS Enforcement has stated that a review of overtly and covertly gathered intelligence leads them to believe that compliance overall was good in 1995 for both halibut and sablefish.

Sablefish: A comparison of blend estimates of total and retained catch and RAM estimates of retained catch resulted in some discrepancies. The sources of the discrepancies have not been determined. The stock assessment methodology that is used can assist in identify any occurrences of substantial under-reporting, but not immediately. The stock assessments have identified years (e.g. 1987 and 1990) in which there appears to have been substantial under-reporting of total catch. In those two years, poor estimates of discarded catch may explain the apparent discrepancies.

6. Exceeding TACs

Halibut: Prior to 1995, halibut catches off Alaska periodically have been above and below the overall quota for Alaska. In 1995, less than 90 percent of the quota was taken. It is too soon to determine the extent to which the IFQ program will change the pattern of the differences between the quotas and catch. The IFQ experience in Canada indicates that the differences will tend to decrease.

Sablefish: Prior to 1995, the sablefish TACs for some years and areas were exceeded substantially but in other years and areas they were not used fully. None of the sablefish TACs were used fully in 1995. It is too early to determine how effective the IFQ program will be either in preventing TACs from being exceeded or in assuring that they are used fully.

7. Pressure to increase TACs

Halibut and Sablefish: No additional pressure to increase TACs has been identified.

8. Spatial and temporal distributions of catch

Halibut: Analysis of changes in fishing behavior in Gulf of Alaska and off Canada indicates that fishers are changing grounds and time of fishing.

Sablefish: The comparison of the 1994 and 1995 sablefish fish fisheries with respect to the spatial and temporal distribution of catch has not been completed.

9. CPUE data and its effects on stock assessments

Halibut: Catch per unit of effort (CPUE) is a critical variable in halibut stock assessments; therefore, the effects of the IFQ program on fisherman behavior and the resulting effects on CPUE need to be adjusted for. It is too early to tell what effect this may have had on CPUE values for Alaska. However, an analysis of British Columbia effort over the nine year period between 1986 and 1994 indicates that while the movement of vessels by season and area was significant in terms of interaction with annual effort indexes, the CPUE values computed from seasonal and area weighted effort data was not discernibly different (2-6%) in overall trend from the conventional effort-weighted estimates (Sullivan and Rebert 1996, ms in prep.).

Sablefish: Survey CPUE, but not fishery CPUE, is a critical variable in the assessment of the sablefish stocks; therefore, any IFQ induced changes in the fishery CPUE would not be expected to affect the stock assessment. The use of fishery CPUE data in the stock assessment is being planned. Changes in sablefish fishery CPUE will be analyzed to improve the fishery CPUE data that will be available for stock assessments.

INTRODUCTION

During the development of the IFQ programs for the fixed gear halibut and sablefish fisheries off Alaska and subsequent to their implementation, a number of potential effects were identified. They include the following nine types of potential conservation effects:

1. fishing mortality from lost/abandoned gear
2. halibut and sablefish bycatch and discards in other fixed gear fisheries (including halibut discards in the fixed gear sablefish fishery)
3. groundfish discards in halibut and sablefish fisheries (including sablefish discards in the halibut fishery)
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The purpose of this report is to provide a preliminary assessment of the halibut and sablefish IFQ programs in terms of these nine conservation effects. There are several reasons why only a preliminary assessment is possible at this time. They include the following: 1) the immediate effects of an IFQ program will not necessarily be indicative of the long term effects; 2) some of the effects may not be measurable for several years; 3) comparisons of pre and post-IFQ conditions are only possible when data are available for both periods; 4) although the effects of the IFQ programs are the differences between what happened with the IFQ program and what would have happened without it, the current assessment is based on comparisons of pre and post-IFQ condition; and 5) limited staff resources were available. More complete assessments will be made in the future.

The assessments that are being completed for the Canadian halibut and sablefish individual vessel quota (IVQ) programs, which have been in place for several years, will complement this preliminary assessment. However, differences between the U.S. and Canadian programs and fisheries have to be considered to determine which of the Canadian experiences are expected to occur in the fisheries off Alaska.

Differences between the Alaska IFQ fisheries and other Alaska fisheries, as well as differences between these IFQ programs and the programs that would be developed for other Alaska fisheries, should be considered to determine the extent to which the assessments of the effects of the halibut and sablefish IFQ programs can be used to project the effects for significantly different fisheries and IFQ programs.

The preliminary assessments for the halibut and sablefish fisheries are presented below in two separate sections.

HALIBUT

IPHC staff annually provide an assessment on stock status of Pacific halibut. The procedure used for determining stock status utilizes catch per unit effort, catch at age, length at age, and weight at age data from the commercial fisheries and IPHC surveys. The algorithm used to estimate stock abundance is currently undergoing extensive revision to account for changes in halibut size at age and associated changes in catchability. A constant exploitation rate strategy is used to set catch limits and manage the stock. Currently a 30% constant exploitation yield (CEY) is applied to halibut abundance estimates to determine the total allowable removals. Deductions for sport catch, wastage, personal use, and bycatch removals are then applied to derive the staff recommended setline CEY, otherwise known as the recommended total allowable catch (TAC). Estimates of population abundance can be sensitive to changes occurring in the prosecution and management of the fishery. Given the recent implementation of an individual fishery quota (IFQ) program for halibut and sablefish in Alaska, a careful monitoring of catch statistics and abundance indexes is in order.

1. Halibut fishing mortality from lost/abandoned gear

Information on fishing mortality from lost or abandoned gear in the halibut longline fishery has been compiled from IPHC logbook statistics since 1985. The data is collected during the logbook interviews or is received from mailed in fishing logs. Gear types vary considerably as to the length of skates, hook size, and hook spacing but the data are standardized to a unit representing a 600 meter line with circle hooks attached every 6 meters. It is only this standardized gear that is used in subsequent calculations. Some logbook data are not used in the calculation of effective skates as it cannot be standardized because there are missing data or the gear fishes differently (e.g. autoline).

With the new IFQ fishery in Alaska, there were mixed halibut and sablefish trips as well as trips which target sablefish and landed halibut. This change in fishing pattern did affect the effective skate data available as sablefish gear is currently considered a non-standard halibut gear. However, over 90% of boats that caught halibut say they were targeting on halibut.

The wastage (i.e., halibut removals due to lost halibut gear) is calculated by the ratio of effective skates lost to effective skates hauled. The calculation is done using fixed hook gear in Alaska and snap gear in Area 2B. In Area 3B, there was a small total number of effective skates available and the information likely reflected mainly the large-boat fleet as there were no

port samplers in King Cove in 1995. Therefore, the Area 3A lost to hauled effective skate ratio was used for Area 3B. The wastage from lost or abandoned gear by regulatory area for the years 1991 to 1995 are shown in Table 1.

The amount of wastage from lost halibut gear in Alaska dropped significantly from 1994 to 1995. In 1994, wastage for the Alaskan regulatory areas represented from 1 to 3% of the total removals whereas in 1995 it represented less than 1%. The drop in wastage may reflect improved fishing practices during the IFQ fishery implemented in 1995. An argument for this is the effective skate ratio for Alaska is now similar to the Canadian ratio.

2. Halibut bycatch and discards in other fixed gear fisheries, including the fixed gear sablefish fisheries

Regarding halibut and sablefish bycatch in Canadian fixed gear fisheries, our understanding is that most of the sablefish caught in British Columbia is taken with pot-gear where the survivorship of halibut is assumed to be high. However, neither pot fishing nor hook-and-line fishing is currently monitored to any great extent with observers in the Canadian fleet and so the data needed to assess the level of mortality is lacking. In the Alaskan halibut fleet, catch and effort statistics are being collected by the IPHC from halibut and sablefish trips where at least some halibut was caught and landed. Samplers ask how much of both species were landed, set location, and an identification of species targeted. This information is used to map out targeting areas, but there is no information on prior discard rates relative to current landing and discard rates, so no assessment of loss or gain can be made based on this information.

Estimates of halibut catch rates in the fixed gear groundfish fisheries are available from the Observer Program; however, estimates of halibut discards are not available and, because halibut can now be retained in these fisheries, it can be difficult to differentiate between halibut catch and bycatch. Due to the latter problem, the method that had been used to estimate halibut bycatch in the fixed gear sablefish fishery is no longer applicable. The development of comparable estimates for 1994 and 1995 was further hindered by the difficulty in determining the IFQ halibut and sablefish landed in each fishing trip. Although the rough estimates of halibut bycatch that were made for the BSAI and GOA fixed gear sablefish fisheries were substantially less than the estimates for 1994 (about 150 metric tons (mt) in 1995 compared to about 860 mt in 1994), it is not known how much of the difference was due to estimation errors. It has not yet been determined if the discard mortality rate for halibut in the sablefish fixed gear fisheries changed in 1995; therefore, the rough estimate of halibut bycatch mortality in 1995 is based on the 1994 discard mortality rates.

Although comparable estimates have not been made for the other fixed gear groundfish fisheries, substantially smaller reduction in halibut bycatch mortality are expected to have occurred in those fisheries. This is due to the limited amount of halibut IFQ available to the freezer longline vessels that participate in the BSAI cod fishery and due to the much lower levels of halibut bycatch in the other fixed gear fisheries.

3. Groundfish discards in the halibut fishery

It is difficult to assess what the level of groundfish discarding is in the halibut fishery. IPHC surveys do collect some information on other species landed in addition to halibut landed, but some adjustment would have to be made to distinguish the groundfish discarded from groundfish kept and sold. This might be accomplished by examining groundfish landing information, however, that information is not stored in any IPHC databases at present.

4. High-grading of halibut and discards of sublegal halibut in the halibut fishery

In the U.S. IFQ program, it is illegal to discarding legal-sized fish from a vessel when IFQ within the area is still available. However, there have been many anecdotal remarks suggesting high-grading of either small or large halibut to meet price and demand. IPHC does not have estimates of how frequently this occurs. The IPHC does record the amount of legal-sized halibut discarded once an IFQ has been reached. This mortality is reflected as part of the wastage component in biomass assessment and quota setting.

Some fishers also are said to target differentially on grounds where the abundance of certain size-classes landed can be controlled. However, examinations of size-composition data in Canadian halibut landings have been inconclusive on this point. It is to too early to tell what effect there may be in U.S. waters at this time.

Estimates of sublegal sized halibut discarded in the halibut fishery are included in the wastage calculations made annually by IPHC staff. The estimates of sublegal sized halibut caught in the commercial fishery is derived from the proportion in poundage of sublegal to legal sized halibut caught during the IPHC systematic setline surveys. This method of estimation does not provide a direct method of comparing the 1994 and 1995 mortality of sublegal halibut in the halibut fishery. The 1995 ratio of sublegal to legal for Areas 2A, 2B, and 3A were from the 1995 surveys and for Areas 2C, 3B, and 4 were from setline surveys between 1989 and 1994. The ratios used for the 1995 calculation by area are: Area 2A = .17; 2B = .11; 2C = .06; 3A = .14; 3B = .10; Area 4 = .05. In 1996, the IPHC will be conducting surveys in all areas of Alaska, except in Area 4.

The discard mortality rate used in 1995 was 16 percent for all areas. This is based on the bycatch discard mortality observations of 1992 to 1993 in the Bering Sea/Aleutians sablefish hook and line fishery where the pace is similar to the quota fisheries. This discard mortality rate has been used since 1991 for the Canadian IVQ fishery but 25 percent was used for the 1994 and 1993 United States fisheries. The 25 percent was used as it is the discard mortality rate observed in the Gulf of Alaska sablefish fishery from 1992 to 1993. The observer data from the 1995 sablefish fishery is not fully available at this time and therefore was not used.

One factor that could have an effect on the discard mortality rate of both discarded legal and sublegal sized halibut is the use of automated hook strippers, known as crucifiers. With the implementation of the IFQ fisheries, the IPHC legalized the use of crucifiers in the halibut fishery as they were legal to use in the sablefish fishery. The regulations were also broadened to require the careful release of all halibut that is not retained. However, anecdotal information

suggests crucifiers are being used on halibut not retained. It was assumed that with the slower pace of the quota fisheries, fishers could take the time needed to carefully release halibut not retained. The IPHC will attempt to monitor any anecdotal information and possibly in the future evaluate previous hook injuries to halibut caught on the setline surveys.

5. Under-reporting of halibut landings

NMFS Enforcement has stated that a review of overtly and covertly gathered intelligence leads them to believe that compliance overall was good in 1995 for both halibut and sablefish. The Commission staff attempted to compare the IPHC fish ticket database to the RAM card swipe/landing record database. The comparison was done on several levels to ensure the IFQ program was accurately accounting for all landings. At the level of regulatory area, the two database are within 1% by weight as shown in Table 2.

When comparing the systems at a finer resolution, by vessel landing record, it was noted that in both databases, there were occasions when the retained weight was omitted, different deductions were taken for heads, or ice and slime, or deductions were taken twice on the RAM database compared the fish ticket record. The original goal was to compare the two systems by fish ticket number. Unfortunately, in the RAM database the fish ticket number was incomplete on 45% the records. A comparison was made of the remaining 55% of the landing records, where the records could be matched by fish ticket number. Of the match records, which represented 64% of the catch, 90% of the records were within 2% by weight.

It appears that some of the differences can also be accounted for by the lack of understanding of what and how to enter the data. The RAM landing records are the responsibility of the registered buyer. Also, there was and still is, confusion in what deduction should be used to obtain the net weight of halibut. To solve the first problem more education of the system is necessary and is occurring in 1996. The deduction issue is still a problem in 1996, as a standard deduction is not enforced. The RAM database does take a 10% deduction for heads but some processors accounted for ice and slime before that entry occurs, while other processors did not. This is a concern for the Commission staff and it appears to be a concern for some in industry.

6. Exceeding halibut TACs

Over the five year period shown (Table 3) the total commercial removals have periodically been over or under the total catch limit. This occurs because concern is expressed at the Annual Meeting for the previous years underage or overage which affects the following years management. Generally, if an overage occurs one year, the following year's approach to management is more conservative, and consequently fishing period limits are set more conservatively.

Although individual catch limits are set for Areas 3A and 3B, the regulations from 1991 to 1994 stipulated that both areas should close when the combined catch limit was attained. The same was true for Areas 4A and 4B. Therefore, it is the combined catches and catch limits for these areas that are shown in Tables 3 and 4.

In 1992, the Canadian IVQ program implemented an underage/overage plan by vessel quota. The Canadian Department of Fisheries worked closely with the Commission staff to initiate the plan which has enabled the fleet to catch close to the catch limit.

7. Pressure to increase halibut TACs

The IPHC consists of six Commissioners, a Director, and the staff. Annually the Commission staff presents information on the halibut stocks and makes recommendations for the following fishing year. The Commissioners review the staff recommendations, and also receive input from industry, and the Conference Board. The Conference Board is an advisory panel of commercial and sport fishers and vessel owners from both countries. The Conference Board was created by the Commission in 1931 to receive recommendations from the industry (IPHC Technical Report 22). In 1995, a Processor Advisory Group (PAG) was recognized by the Commission as a way to receive input from the processing segment of the industry. After considering the industry and staff recommendations, the Commissioners adopt regulations and catch limits which are then submitted to the two governments. After acceptance by the governments, the recommendations become fishing regulations for the following year.

Table 4 illustrates the proposed commercial catch limits by the Commission staff and the Conference Board as well as the accepted catch limits for the year from 1991 to 1995.

Unfortunately, the catch figures of Table 4 do not reflect the complex decision making process of the Conference Board or Commissioners. It is possible to incorrectly draw inferences about the process from the limited amount of information provided in Table 4. For example, in 1991 the Conference Board wanted to raise the Area 2B catch limit to compensate the fleet for quota reductions due to bycatch. Their suggestion was to take the total Area 2B CEY of 10.64 million pounds and exempt Area 2B commercial fishers from bycatch and wastage reduction so that they could benefit from any saving due to bycatch management. Also, the Conference Board felt little was known about the Area 4D, and the fleet in the previous year moved to new areas and found good fishing. The Commissioners felt the reasoning was not appropriate in these cases, and therefore accepted the staff recommendations. The figures do show that in the past the industry has not just wanted to increase the catch limits above the staff recommendations but in some case recommended lower catch limits. The table also illustrates the Commissioners have not always followed the staff or the industry recommendations across the board.

Annually the stock assessment and management of the halibut fishery is reviewed and improvements are made. Occasionally, changes are made that would significantly affect the catch limits one-way or another and would, therefore, have a large impact on the fleet. In some cases, phasing-in the significant changes occurred if it was felt that there would not be a detrimental effect to the halibut stock. The phasing-in can occur if there is uncertainty about the modifications or for socioeconomic reasons. A recommendation to changed a CEY of 35%, used from 1987 to 1992, to the current CEY of 30% was made in 1993. While the 1993 staff recommendation was a 30% CEY, (as shown here) the staff presented management scenarios for levels of 30%, 33%, and 35%. The Commissioner's used both 33% and 30% levels in determining the final catch limits (30% for 3A, 3B, 4A, 4E, and 33% for 4B, 4C, 4D). The

staff recommendation of 30% was fully endorsed in 1994 and 1995.

To conclude, prior to the IFQ program as well as after the implementation of the IFQ program, many factors are considered and will always be considered when setting catch limits.

8. Spatial and temporal distributions of halibut catch

An analysis of logbook data from Pacific halibut fisheries in the Gulf of Alaska (Sullivan and Rebert 1996, ms in prep.) indicates that the distribution of effort changed in location and by season. Figure 1 shows IPHC 60 nautical mile statistical areas and the corresponding IPHC regulatory areas (2B - British Columbia, 2C - Southeast Alaska, 3A - Central Gulf of Alaska, and 3B - Gulf Area West of Kodiak Island). Note that the statistical areas are numbered sequentially by tens along the seaward edge of the coast. Statistical areas numbers increase by one as they proceed shorewards (as shown for the inside waters of British Columbia). Note that inside areas exist throughout the Gulf of Alaska (e.g. near the Kenai peninsula and Kodiak Island), but are not labeled due to lack of space.

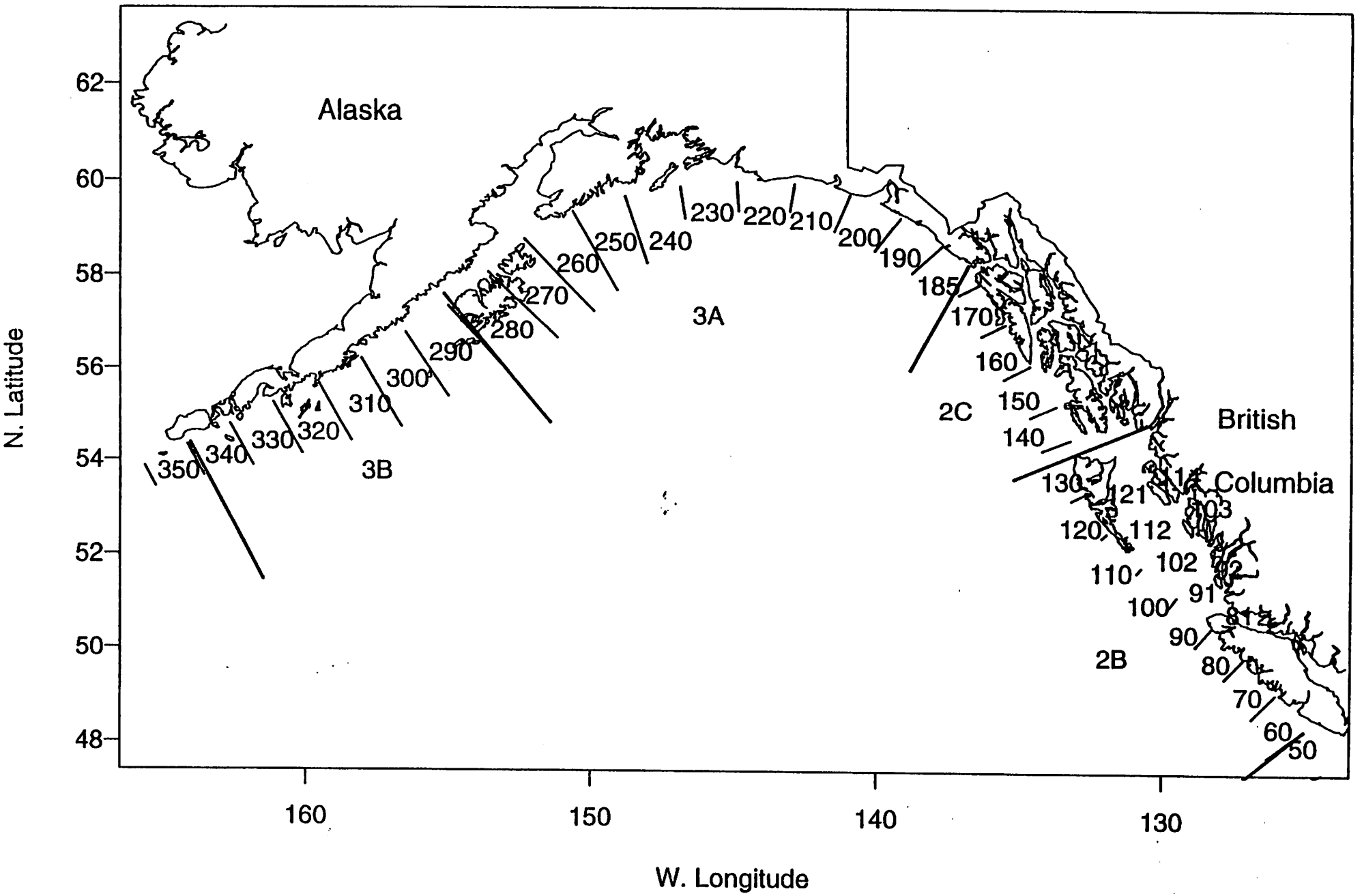
An examination of the change in area-by-area effort between 1994 and 1995 can be seen in Figures 2. Effort is measured in effective skates, a standardized unit that is used to represent different types of gear and is equivalent to 600 meters of line with circle hooks place every 6 meters. Effort distribution by year for British Columbia (Area 2B), which has had an IVQ program in place in since 1991, is provided for reference. While the effort overall in U.S. fisheries was lower in 1995 (due in part to a reduction in catch limit), a change in the distribution of effort between inside and outside waters can be seen. Note the observable change in Area 2C between the outside area 160 and inside areas 161, 162, and 163; between 170 and 171; in 3A between 250-260 and 261. Also note that there appears to be a shift in Area 3B effort to statistical area 290 near the 3A-3B boundary close to Kodiak.

The motivation for change in location or season of fishing is based upon a number of things including local differences in CPUE (which tends to be higher in outside waters as compared to inside waters), as well as distance to port, presence of other bait competitive species, and the level of competition for grounds from other fishing vessels. One would expect that such shifts in effort between areas and seasons would change the CPUE values computed for each regulatory area. It is too early to tell what effect this may have had on CPUE values for the Gulf of Alaska. However, an analysis of British Columbia effort over the nine year period between 1986 through 1994 indicates that while the movement of vessels by season and area was significant in terms of interaction with annual effort indexes, the CPUE values computed from seasonal and area weighted effort data was not discernibly different (2-6%) in overall trend from the conventional effort-weighted estimates (Sullivan and Rebert 1996, ms in prep.).

9. Halibut CPUE data and its effects on halibut stock assessments

This effect was discussed with the preceding effect. Future work by IPHC staff will address the magnitude and effect of local area depletion.

IPHC Statistical Areas



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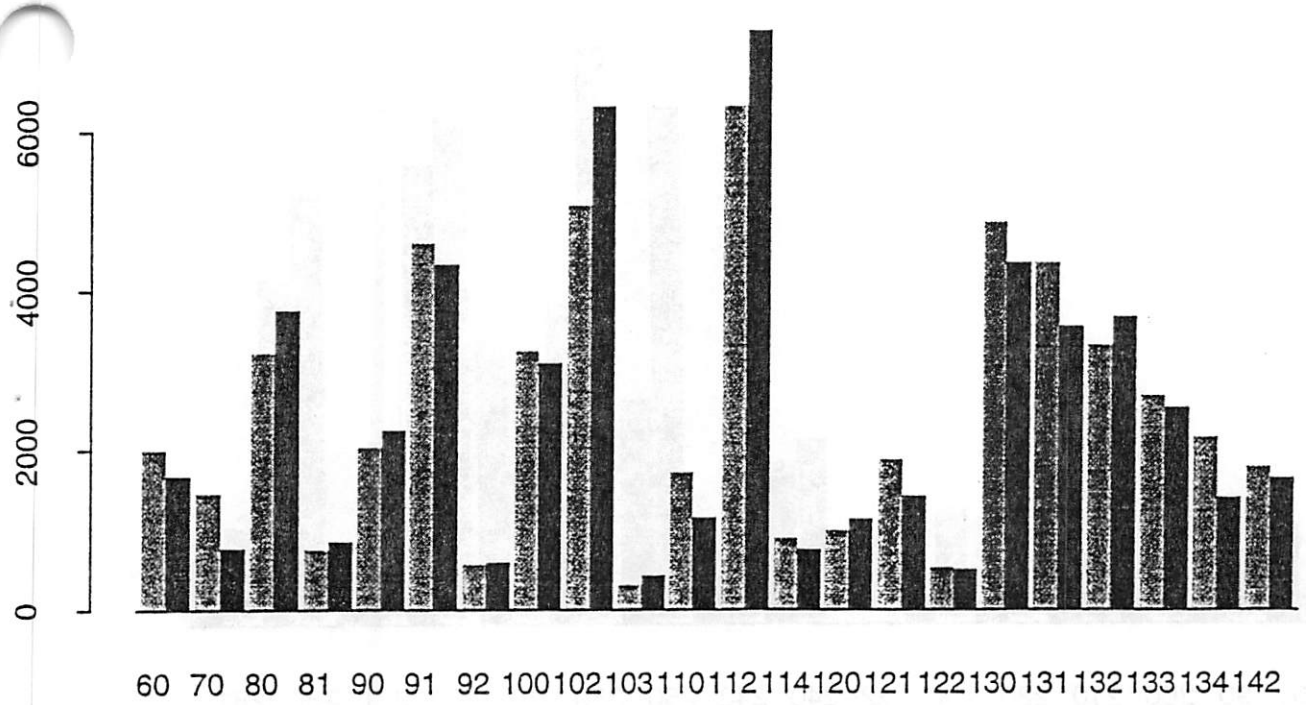

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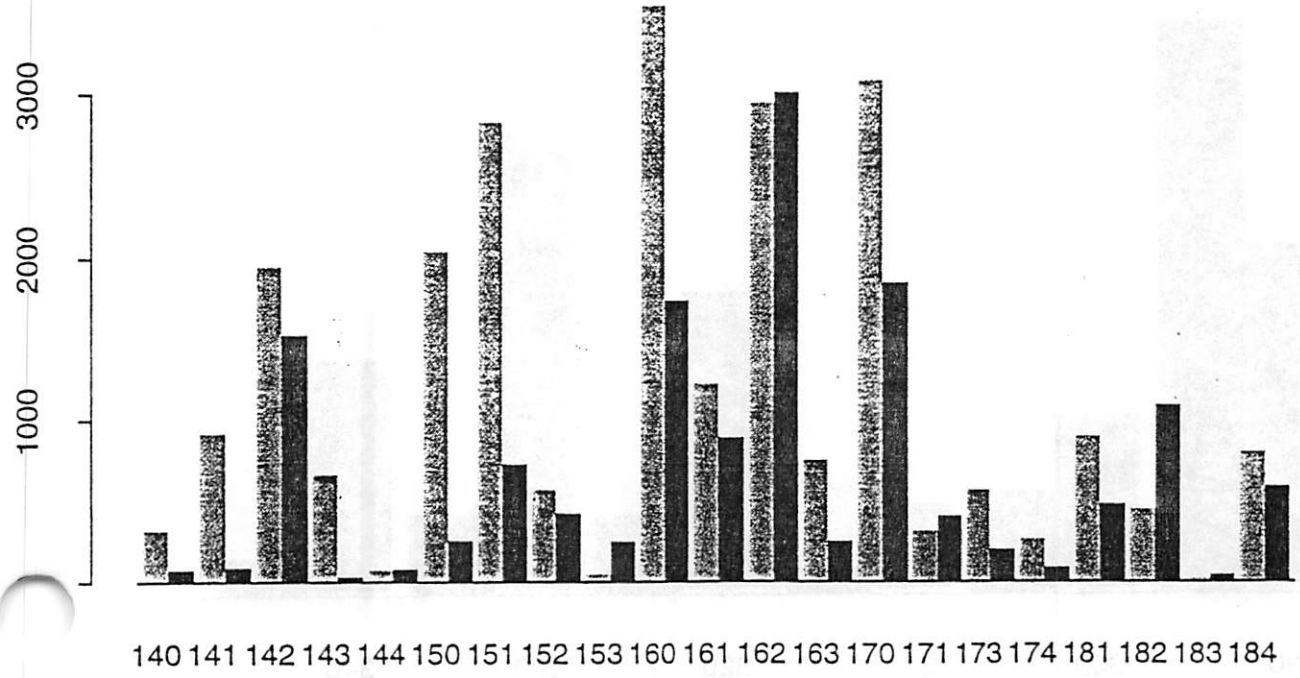

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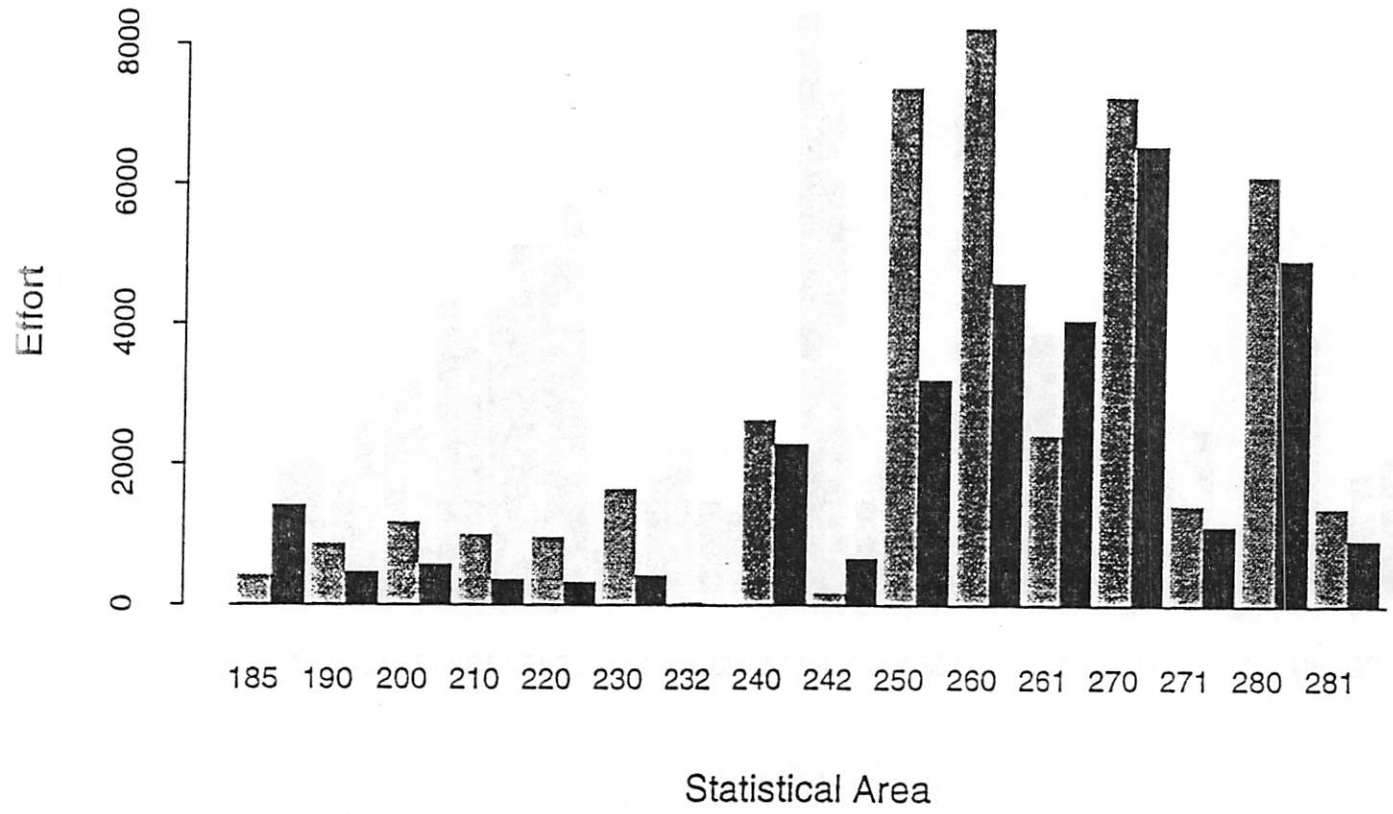

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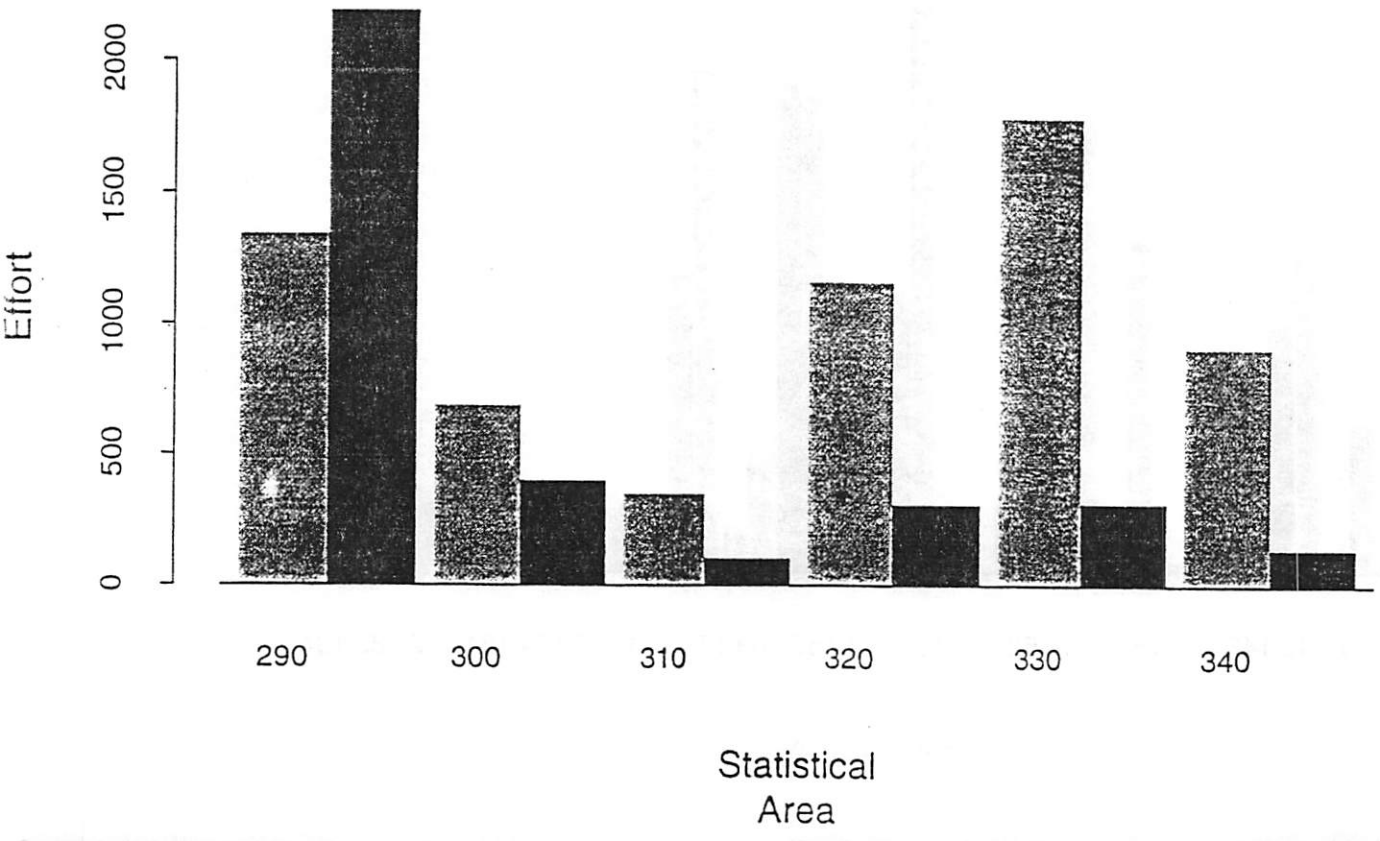


Table 1. Estimate of the halibut killed (000's of pounds) by lost and abandoned longline gear in the commercial halibut fishery by regulatory area and year, 1991 to 1995.

	Regulatory Area					
YEAR	2B	2C	3A	3B	4	TOTAL
1991	72	347	1,143	418	245	2,225
1992	53	245	643	181	126	1,248
1993	96	192	341	63	113	805
1994	69	228	845	39	107	1,288
1995	58	63	146	26	42	335

Table 2. Total IFQ and CDQ catch (000's pounds) in the IPHC fish ticket database and the NMFS-RAM database by IPHC Regulatory Area.

IPHC Regulatory Area	IPHC Fish Ticket Data	RAM-NMFS Landing Data	Difference between the systems	Difference as a percent of IPHC totals
2C	7,766	7,788	+ 22	+ 0.3 %
3A	18,132	17,974	- 158	- 0.9 %
3B	3,117	3,172	+ 55	+ 1.8 %
4A	1,617	1,584	- 33	- 2.0 %
4B	1,680	1,648	- 32	- 1.9 %
4C	668	689	+ 21	+ 3.1 %
4D	643	661	+ 18	+ 2.8 %
4E	127	126	- 1	- 0.8 %
Area 4 total	4,735	4,708	- 27	- 0.6 %
Total	33,750	33,642	- 108	-0.3 %

Table 3. Commercial catch and commercial catch limits (000's of pounds) of Pacific halibut by regulatory area and year, 1991 to 1995.

	1991		1992		1993		1994		1995	
Regulatory Areas	Catch	Catch Limit	Catch	Catch Limit	Catch	Catch Limit	Catch	Catch Limit	Catch	Catch Limit
2B[1]	7,191	7,400	7,626	8,000	10,628	10,500	9,911	10,042	9,625	9,651
2C	8,687	7,400	9,819	10,000	11,290	10,000	10,379	11,000	7,766	9,000
3A/3B	34,860	35,400	35,402	35,400	30,593	27,200	28,704	30,000	21,459	23,700
4A/4B	3,768	3,400	5,016	4,600	4,523	4,320	3,820	3,900	3,297	4,260
4C	678	600	793	800	831	800	715	700	668	770
4D	1,437	600	727	800	837	800	711	700	643	770
4E	104	100	72	130	64	120	120	100	127	120
Area 4	5,987	4,700	6,608	6,330	6,255	6,040	5,466	5,400	4,735	5,920
Total	56,725	54,900	59,455	59,730	58,766	53,740	54,360	56,442	43,585	48,271

[1] The carryover from the Canadian IVQ program included; 42,000 pounds in 1994 and 131,000 pounds in 1995.

Table 4. The commercial halibut fishery catch limits (000's of pounds) proposed by the conference board and IPHC staff, and catch limits set by Commissioners by regulatory area and year, 1991 to 1995.

Year	1991			1992			1993		
Regulatory Areas	Conference Board	IPHC Staff	Catch Limit	Conference Board	IPHC Staff	Catch Limit	Conference Board	IPHC Staff	Catch Limit
2B	10,640	7,400	7,400	8,000	8,300	8,000	10,500	9,810	10,500
2C	7,400	7,400	7,400	10,000	12,600	10,000	10,000	10,410	10,000
3A/3B	35,400	35,400	35,400	35,400	35,800	35,400	28,500	27,200	27,200
4A/4B	3,400	3,400	3,400	4,600	4,600	4,600	4,320	4,040	4,420
4C	600	600	600	1,000	800	800	900	700	800
4D	750	600	600	1,000	800	800	900	700	800
4E	100	100	100	130	100	130	120	120	120
Total 4	4,850	4,700	4,700	6,730	6,300	6,330	6,240	5,560	6,140
Total	58,290	54,900	54,900	60,130	63,000	59,730	55,240	59,980	53,740

Year	1994			1995		
Regulatory Areas	Conference Board	IPHC Staff	Catch Limit	Conference Board	IPHC Staff	Catch Limit
2B[1]	10,500	9,500	10,000	9,520	8,500	9,520
2C	11,000	12,000	11,000	9,000	8,500	9,000
3A/3B	30,000	30,000	30,000	23,700	23,700	23,700
4A/4B	3,900	3,900	3,900	4,000	3,600	4,260
4C	800	700	700	800	500	770
4D	1,000	700	700	1,200	1,500	770
4E	120	100	100	200	300	120
Total 4	5,820	5,400	5,400	6,200	5,900	5,920
Total	57,300	56,900	56,400	48,420	46,600	48,140

[1] The carryover from the 1994 and 1995 Canadian IVQ is not included.

SABLEFISH

1. Sablefish fishing mortality from lost/abandoned gear

There is no information that would allow for estimating the amount of gear losses in the sablefish fishery for 1995 and prior. The Alaska Department of Fish and Game has only collected anecdotal information from the inside waters Chatham Strait sablefish fishery. This anecdotal information is considered very subjective and not applicable to the outside fishery situations.

However, it would be reasonable to assume that the IFQ fishery would result in a reduction of fishing both during inclement weather conditions and in congested areas and time. This would reduce the amount of gear losses.

The National Marine Fisheries Service has logbook data that could be a source of information on gear losses. However, this information is not in an electronic database format which could be easily accessed and analyzed at this time.

2. Sablefish bycatch and discards in other fixed gear fisheries

1991-95 blend estimates of sablefish catch, discards, bycatch rates, and discard rates for the BSAI and GOA hook and line fisheries that do not target sablefish are presented in Table 5. In the BSAI, the amounts of sablefish caught or discarded in non-sablefish hook and line groundfish fisheries were comparable to those taken annually from 1991-94. However, the discard rates for sablefish were substantially higher in 1995. In the GOA, sablefish bycatch in non-sablefish hook and line fisheries accounts for a relatively small part of the total hook and line catch of sablefish and it is difficult to identify clear differences in sablefish bycatch or discards between 1995 and the previous four years.

3. Groundfish discards in the sablefish fisheries

1991-95 blend estimates of groundfish catch and discards in the BSAI and GOA hook and line sablefish fisheries are presented in Table 6. In the BSAI hook and line sablefish fishery, the catch, discards, and discard rate for non-sablefish groundfish were all higher in 1995 than in any of the previous four years. However, in the GOA, there was no discernable difference between 1995 and the previous years.

4. High-grading of sablefish

High-grading sablefish or halibut is prohibited under the IFQ programs; therefore, accurate estimates are not available. Anecdotal information indicates that high-grading has occurred but it does not indicate how widespread this practice is. Size-composition data has not been used to address this issue.

5. Under-reporting of sablefish landings

The current stock assessment methodology being applied to Alaskan sablefish utilizes a modification of the Schnute (1985) delay-difference equation in Stock Reduction Analysis (Kimura 1985). This application was modified to explicitly track estimates of exploitable biomass (from the longline survey) and provide estimates of recruitment each year (R_i) (Fujioka, 1989). The model assumes no survey measurement error and assigns all variability to recruitment variability. The analysis assumes all sources of population change can be accounted for by fishing and natural mortality, and growth and recruitment; however, the model occasionally computed negative recruitment when population decreases were greater than could be accounted for by natural mortality and reported catch. Estimates of declines of such magnitude may result from either unreported fishing mortality, underestimated natural mortality, an improper expansion of relative abundance to absolute abundance, random errors in relative abundance measurements, or emigration.

The foreign sablefish fishery ended after 1984 and was replaced by the domestic fishery. While the foreign fishery has had observer coverage since 1977, the domestic observer program was not implemented until 1990. Thus, domestic catches prior to 1990 were unobserved and catch data were based on a combination of the vessels' and processors' reported catch. The unobserved domestic reported catch was also principally landed catch, thus significant information on discards was lacking. Large unexplained declines in sablefish abundance occurred in 1987 and 1990 (Fujioka 1995, Fig. 4.3), with the largest decline (30%) in 1990. While we cannot determine the magnitude or establish a direct impact of unreported mortality, it was a likely factor, especially prior to the implementation of the domestic observer program. Although the domestic observer program is in place, it does not provide complete coverage of the sablefish fleet. The unobserved portion of the fleet is now largely small boats not subject to 100% coverage requirements. While the existence of unreported catches still cannot be ruled out, it is not as likely that significant amounts could be involved. There have not been the large unexplained abundance drops since 1990.

It should be noted that given the several sources of variability noted above, we are not able to separate out what portion, if any, of the unaccounted for population declines might be due to under-reported catch. However, in a relative sense, the impact on the assessment of unreported catch was likely greater prior to 1990 than it is now.

The 1995 blend estimates of total and retained sablefish catch in the fixed gear fisheries and the RAM estimate of retained catch are approximately 1,600 mt, 1,400 mt, and 1,600 mt, respectively. The comparable estimates for the hook and line fisheries in the GOA are approximately 18,600 mt, 18,200 mt, and 17,200. Although the sources of the discrepancies have not been determined, they are expected to include the low levels of observer coverage for the fixed gear fisheries.

NMFS Enforcement has stated that a review of overtly and covertly gathered intelligence leads them to believe that compliance overall was good in 1995 for both halibut and sablefish.

6. Exceeding sablefish TACs

Comparisons of recent annual sablefish hook and line catches relative to the TACs are given for the Gulf of Alaska and the Bering Sea/Aleutian Islands (Tables 7 and 8). In the Gulf of Alaska, catches exceeded the TACs in the West Yakutat area in 1992 and 1993, and in 1991 and 1993 in the East Yakutat/Southeast area. In the Central Gulf, the TAC was exceeded in 1993. Total Allowable Catch levels have not been achieved in the Western Gulf in recent years. In 1995, catches from all areas of the Gulf remained below the TACs. The longline closures in the Gulf, that resulted from the longline halibut PSC limits being taken, explain some of the underages prior to 1995. With the implementation of the IFQ program, the IFQ sablefish fishery was exempted from such closures.

In the Bering Sea, the 1994 catch exceeded the TAC; the 1995 catch was at the TAC level (Table 8). In the Aleutian Islands, the 1993 catch slightly exceeded the TAC level, but in 1994 and 1995, the catches were 77 and 76 percent, respectively.

There are at least two reasons why the differences between the TACs and reported catches in 1995 probably are not indicative of what they will be as the IFQ program mature. First, the IFQ program is being modified to help ensure that the IFQs and therefore the fixed gear sablefish TACs will be utilized more fully in the future. Second, over time the transfers of IFQs are expected to decrease the amount of IFQ that is not used.

7. Pressure to increase sablefish TACs

Sablefish assessment scientists perceived little or no pressure to increase TAC's during the setting of the 1995 and 1996 ABC's, nor undue resistance to the 22% decrease recommended in the 1996 ABC. From 1991 to 1996 the Plan Teams' recommended ABCs were those recommended by the stock assessment scientists; these ABCs were accepted by the Council and TACs were set equal to the ABCs. The setting of the sablefish TAC's has been relatively free of industry criticism since the conclusion of the foreign fishery, with the only significant criticism since then, occurring during the setting of the 1986 and 1987 ABC's. In the resource assessment document for the 1987 ABC's, the Plan Team responded to specific comments from the trawl industry suggesting that the 1987 recommended ABC was too low. That concern has not been expressed again.

While there has been increased scrutiny of the assessment, this may have been prompted by the recommended decrease, rather than by the change to IFQ management. The increased scrutiny has resulted in increased efforts to better understand the current methodology and to comment on how improvements might be made in the future, especially in measurement of abundance trends and understanding recruitment. The analysis of logbook data has been specifically requested. The other comments expressed concern about the level of research resources supporting sablefish assessment and expressions of industry providing support of research programs.

8. Spatial and temporal distributions of sablefish catch

The spatial and temporal distributions of observed sablefish longline catches in 1993 and 1994 show concentrated effort along the 200m depth contour line (Figures 3 and 4). The data shown represent observed and sampled sablefish sets in which sablefish comprised the largest percentage (by weight) of the groundfish species composition. The data plotted represent the following percentages of the total (retained and discarded) sablefish catches:

Percent of total sablefish hook and line catch represented by observed hook and line sablefish target catches in the Bering Sea and Aleutian Islands. (Data plotted in Fig. 3)

Management Area	1993	1994	1995
Bering Sea	2	1	
Aleutian Islands	22	17	

Percent of total sablefish hook and line catch represented by observed hook and line sablefish target catches in the Gulf of Alaska. (Data plotted in Fig. 4).

Management Area	1993	1994	1995
Western Gulf	37	23	
Central	16	12	
West Yakutat	19	5	
East Yakutat/SEO	1	<1	

1995 observer data are now available but have not yet been used to generate estimates for 1995.

Figures 3 and 4 illustrate Aleutian Island and Gulf of Alaska data only. The Bering Sea data is very minimal; coverage was less than 5 percent, and not considered informative. The data shown in the charts represent less than 25% of the total sablefish hook and line catches by year and area, except for the 1993 Western Gulf of Alaska data. Thus, caution must be used in interpreting the data. If this data is to be considered representative of the directed hook and line sablefish fishery, one must assume that the small percentage of sets observed are generally representative of the time and areas fished by the unobserved fishery, and that observed vessels fish in the same manner as unobserved vessels. Because of the low level of observer coverage for the sablefish fishery, this data is of limited use for distinguishing changes in fishing patterns because it is not possible to distinguish areas where fishing did not occur as opposed to being unobserved.

The 1993 and 1994 Aleutian Islands data show fishing occurring year-round and throughout the Aleutian chain (Fig. 3). The greatest concentration of observed hauls occurred in quarters 2 and 3 in 1993 (Fig. 3 c and e) and in quarters 2 and 4 in 1994 (Fig. 3 d and h). Notable areas where observed sets caught more than 1 mt occurred north and south of the chain from Atka Island to the Delarof Islands along the 200m contour (Fig. 3 c, d, e, and h). Additionally, there were notable catches southwest of Kiska Island during the second quarter of 1993 (Fig. 3 c), and in Sequam Pass in the fourth quarter of 1994 (Fig. 3 h).

Gulf of Alaska data are only available for the second quarter of 1993 and 1994 as the hook and line sablefish fishery opened April 15 and TACs were generally reached by the end of June. There was considerably more observed effort in 1993 relative to 1994 (Fig. 4), despite the larger TAC in 1994 (25,500 mt compared to 20,900 mt in 1993). Fishing occurred along the 200m contour from West Yakutat through the Shumagin area. The East Yakutat/Southeast Outside fisheries are basically small boat fisheries for which there is minimal observer coverage. Fishing also occurred in Shelikof Strait in both years. There were a few observed sets offshore in 1993, presumably on seamounts. No particularly notable fishing areas could be discerned, however there were no observed sets which caught more than 10 mt in the Western Gulf in either year.

9. Sablefish CPUE data and its effects on sablefish stock assessments

Survey CPUE, but not fishery CPUE, is a critical variable in the assessment of the sablefish stocks; therefore, any IFQ induced changes in the fishery CPUE would not be expected to affect the stock assessment. The use of fishery CPUE data in the stock assessment is being planned. Changes in sablefish fishery CPUE will be analyzed to improve the fishery CPUE data that will be available for stock assessments.

The sablefish target catch data described above are plotted as CPUE values in units of kilograms per hook. The patterns described above are generally evident with the CPUE data (Figs. 5 and 6). In the Aleutian Islands, the greatest concentration of observed hauls overall and hauls with CPUE greater than 0.3 kg/hook occurred in quarters 2 and 3 in 1993 (Fig. 5 c and e) and in quarters 2 and 4 in 1994 (Fig. 5 d and h). Notable areas where observed sets caught more than 0.3 kg/hook occurred north and south of the chain from Atka Island to the Delarof Islands along the 200m contour (Fig. 3 c, d, e, and h). Additionally, there were notable catches southwest and southeast of Kiska Island during the second quarter of 1993 (Fig. 5 c); the catch data showed only significant catches southwest of Kiska (Fig. 3 c). The catch data also showed significant catches in Sequam Pass in the fourth quarter of 1994 (Fig. 3 h), which were shown to be catches with lower (<0.3 kg/hook) CPUE values.

Gulf of Alaska CPUE data show the same pattern (or lack of) as the catch data (Fig. 6). It is interesting to note that while the catches shown in Shelikof Strait fell into the lower catch categories (<10 mt), one of the observed sets actually produced a high CPUE (>1.0 kg/hook). Although the catch data also showed a lack of higher catches in the Western Gulf, the area did produce some high CPUE values in both years.

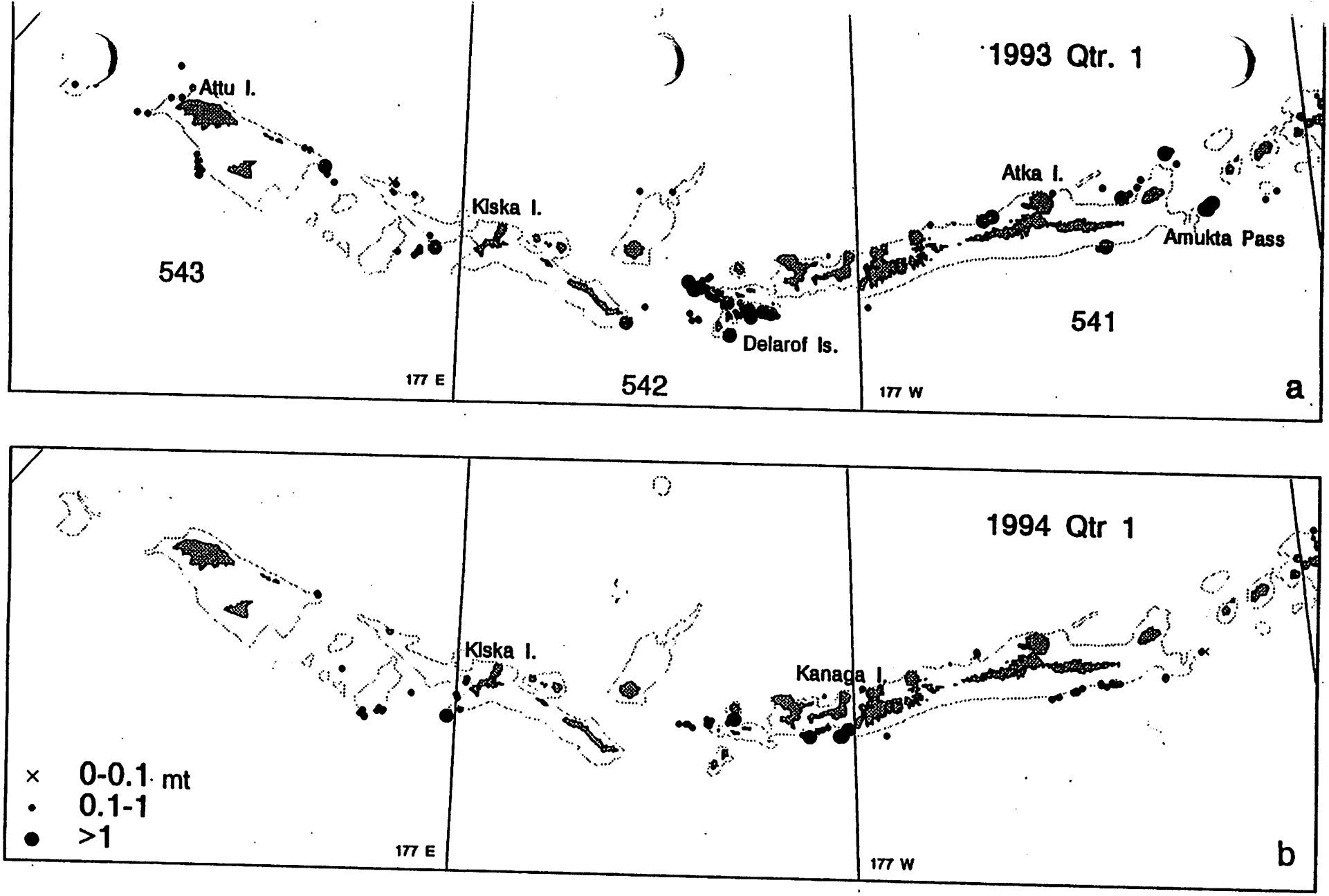


Figure 3. Locations of observed and sampled sablefish sets in the Aleutian Islands in the first quarters of 1993 and 1994.

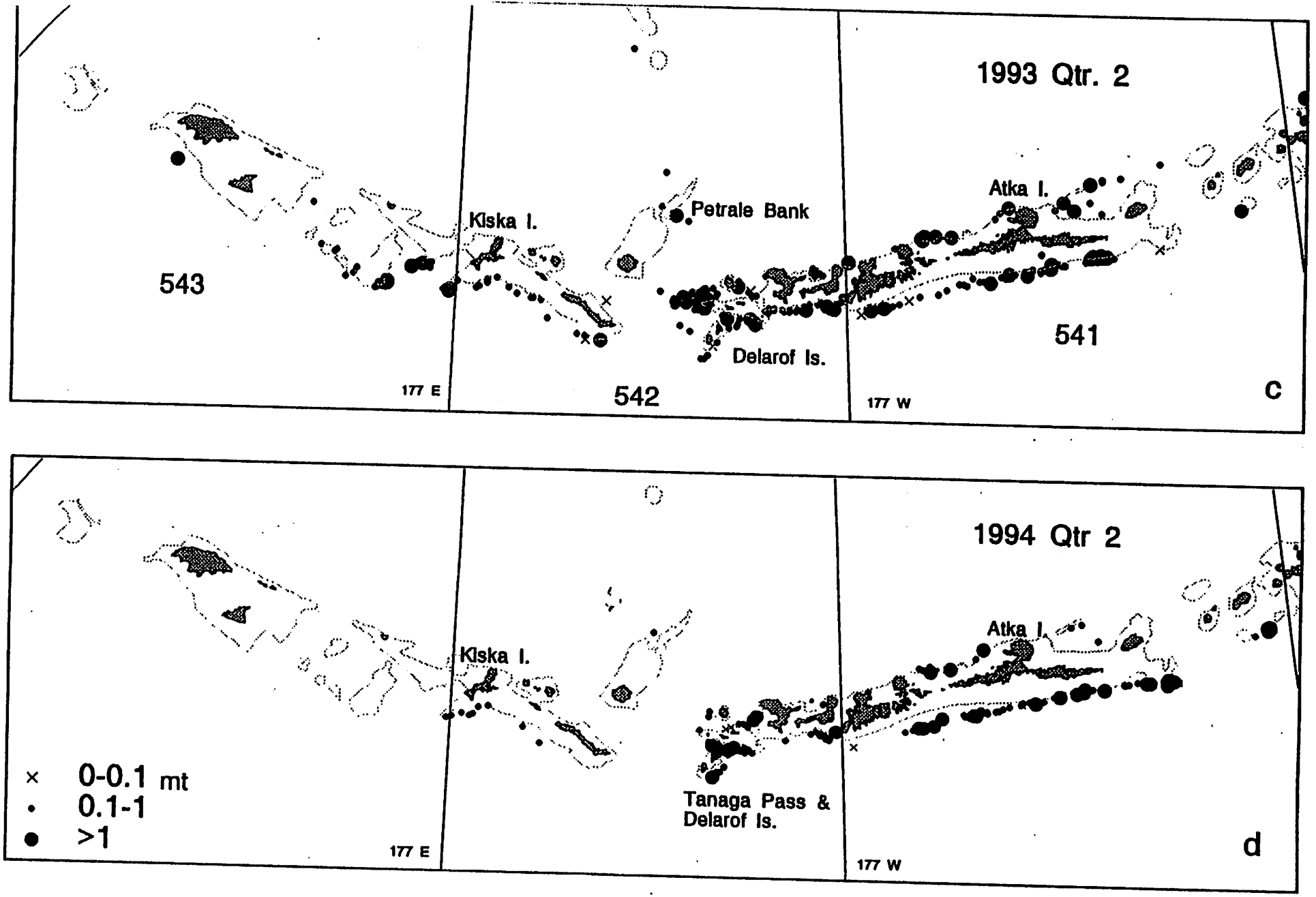


Figure 3. cont. Locations of observed and sampled sablefish sets in the Aleutian Islands in the second quarters of 1993 and 1994.

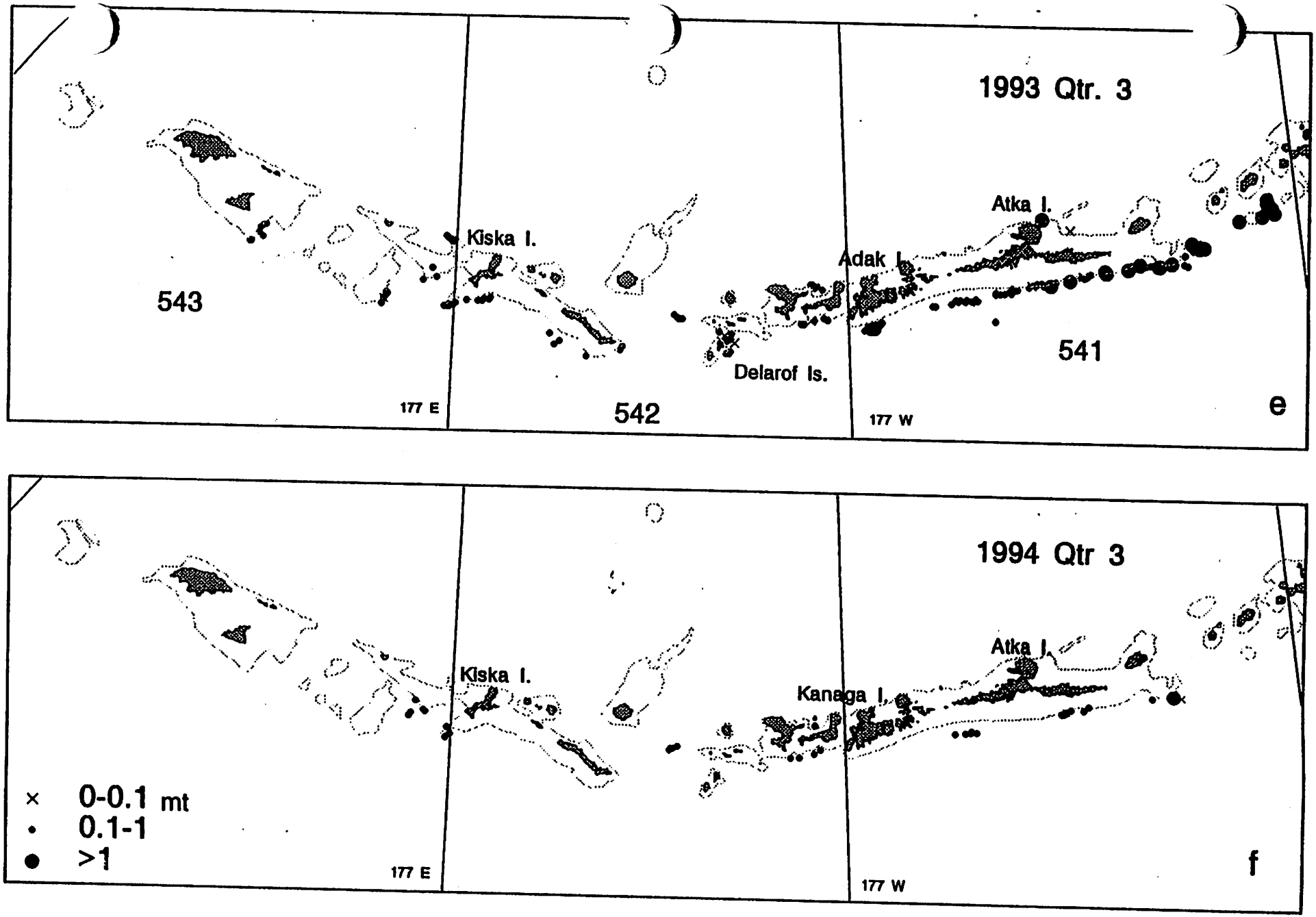


Figure 3. cont. Locations of observed and sampled sablefish sets in the Aleutian Islands in the third quarters of 1993 and 1994.

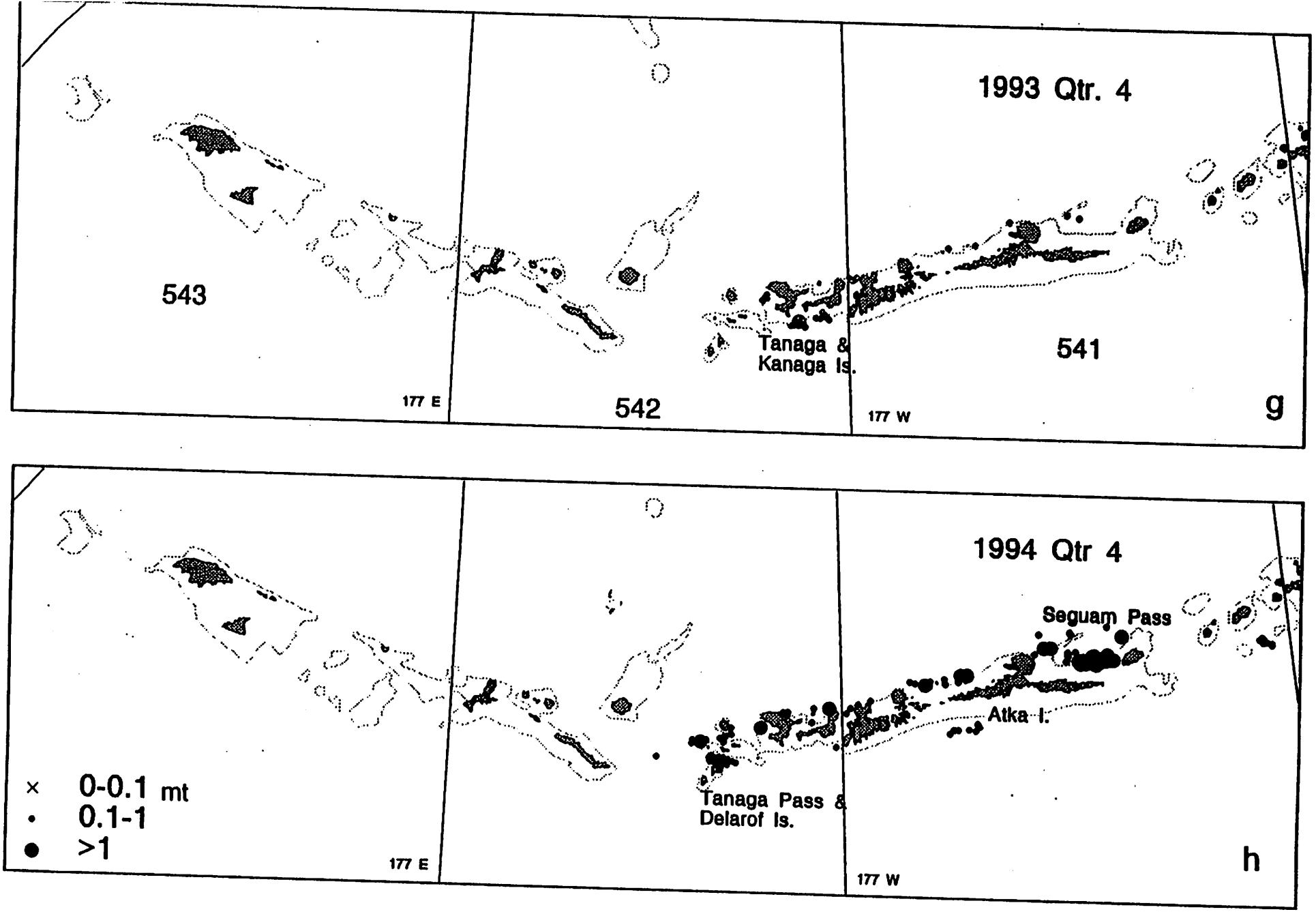
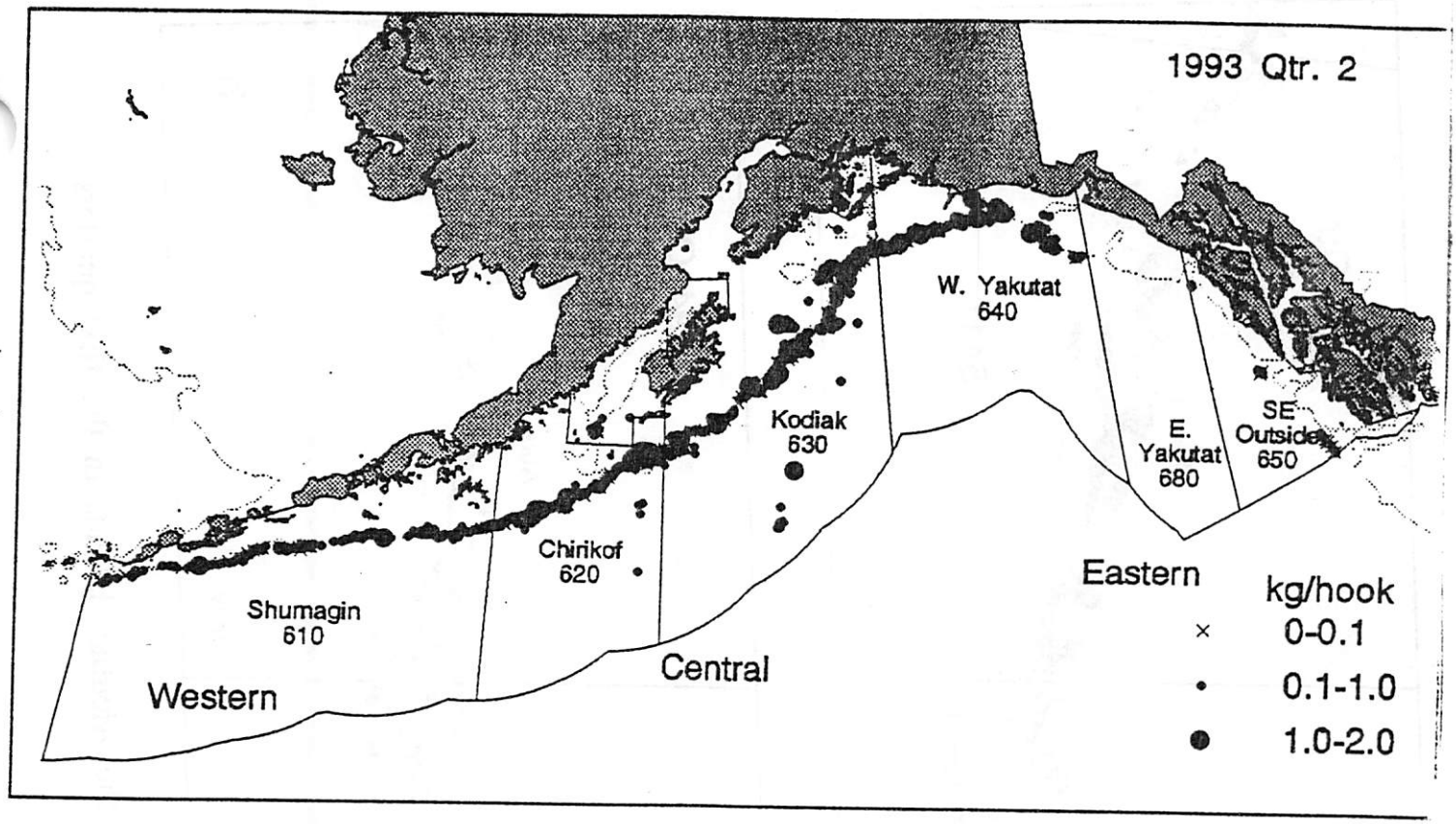


Figure 3. cont. Locations of observed and sampled sablefish sets in the Aleutian Islands in the fourth quarters of 1993 and 1994.



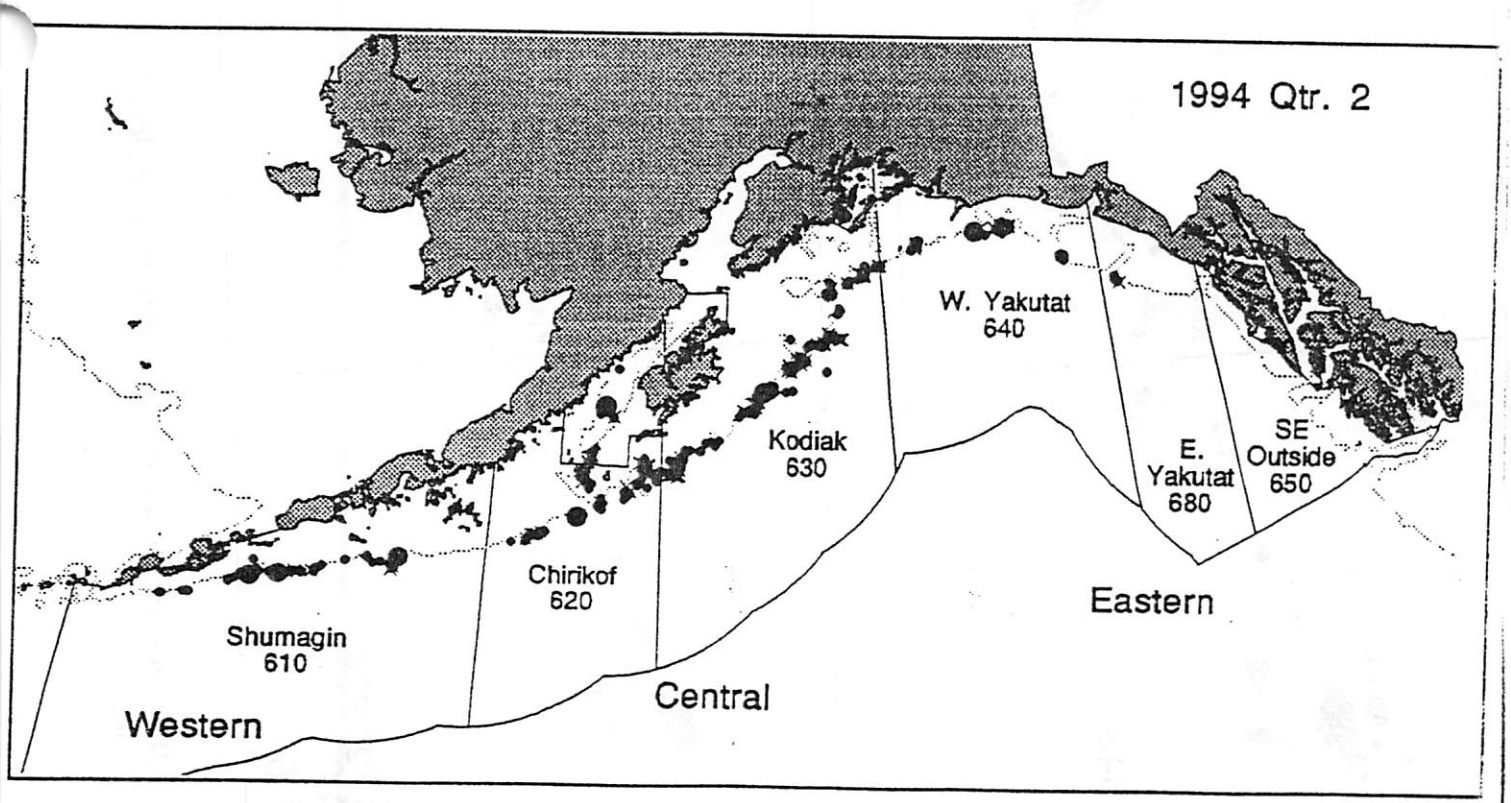


Figure 4. Locations of observed and sampled sablefish sets in the Gulf of Alaska in the second quarters of 1993 and 1994.

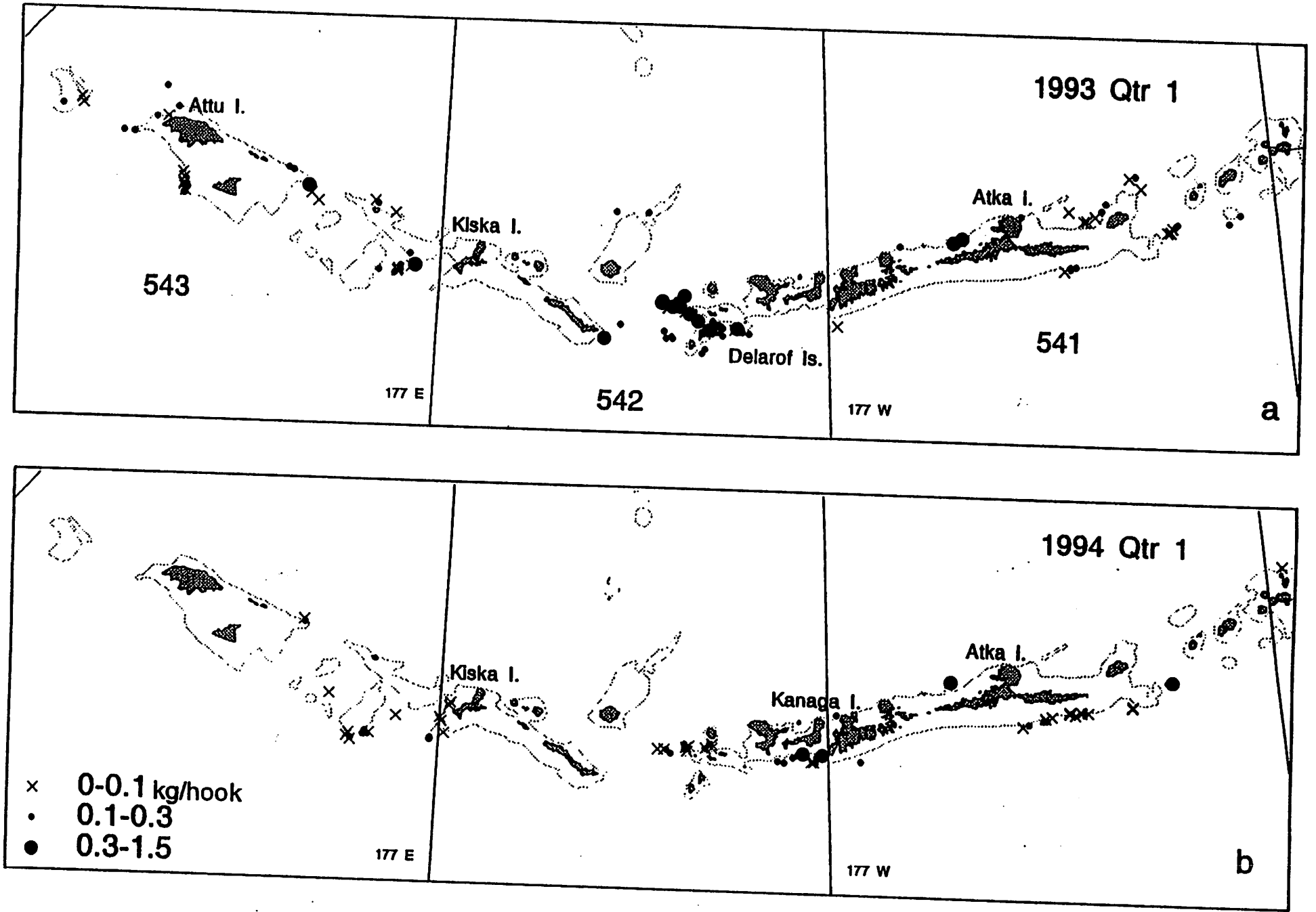


Figure 5. Locations of observed and sampled sablefish sets in the Aleutian Islands in the first quarters of 1993 and 1994.

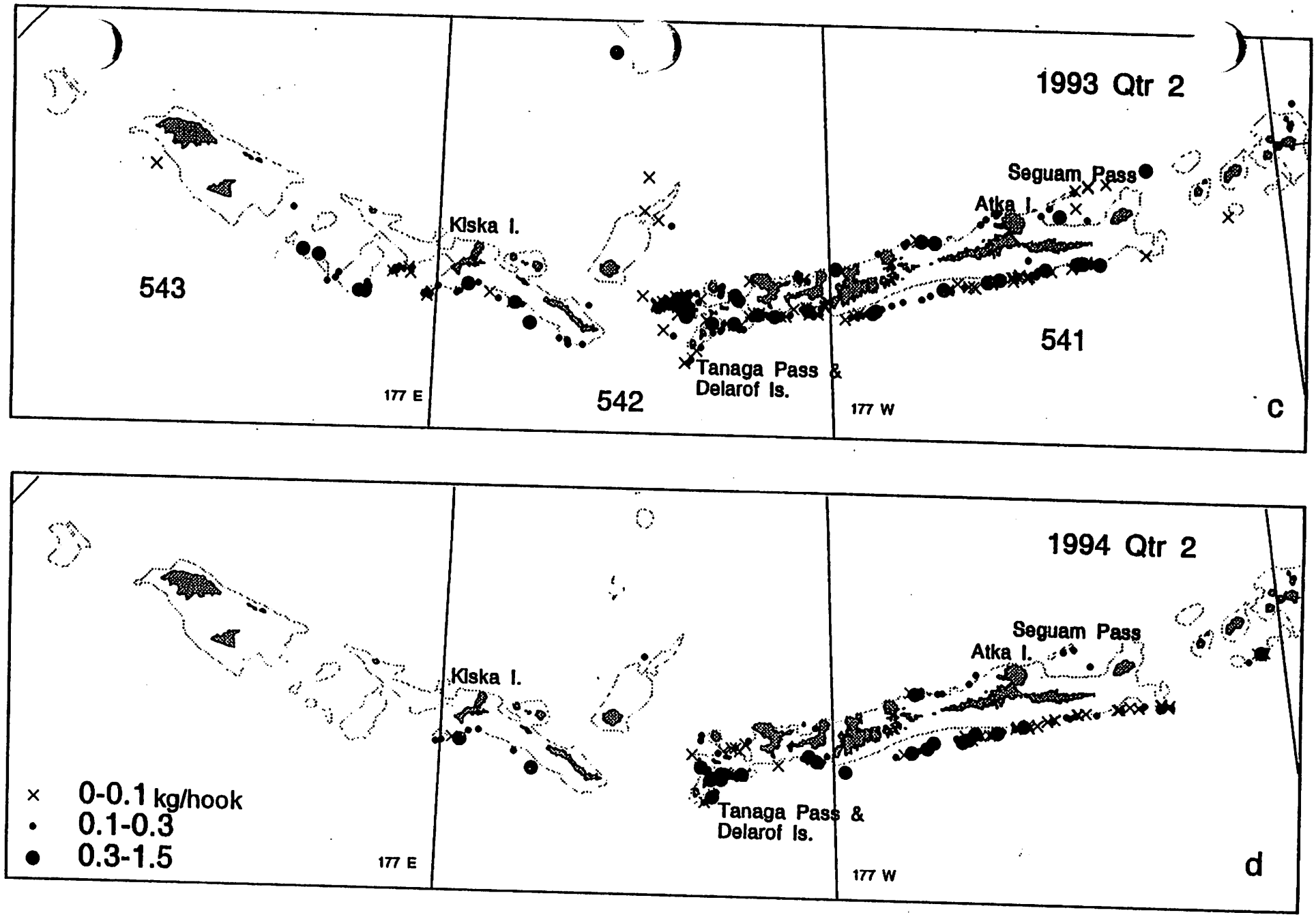


Figure 5. cont. Locations of observed and sampled sablefish sets in the Aleutian Islands in the second quarters of 1993 and 1994.

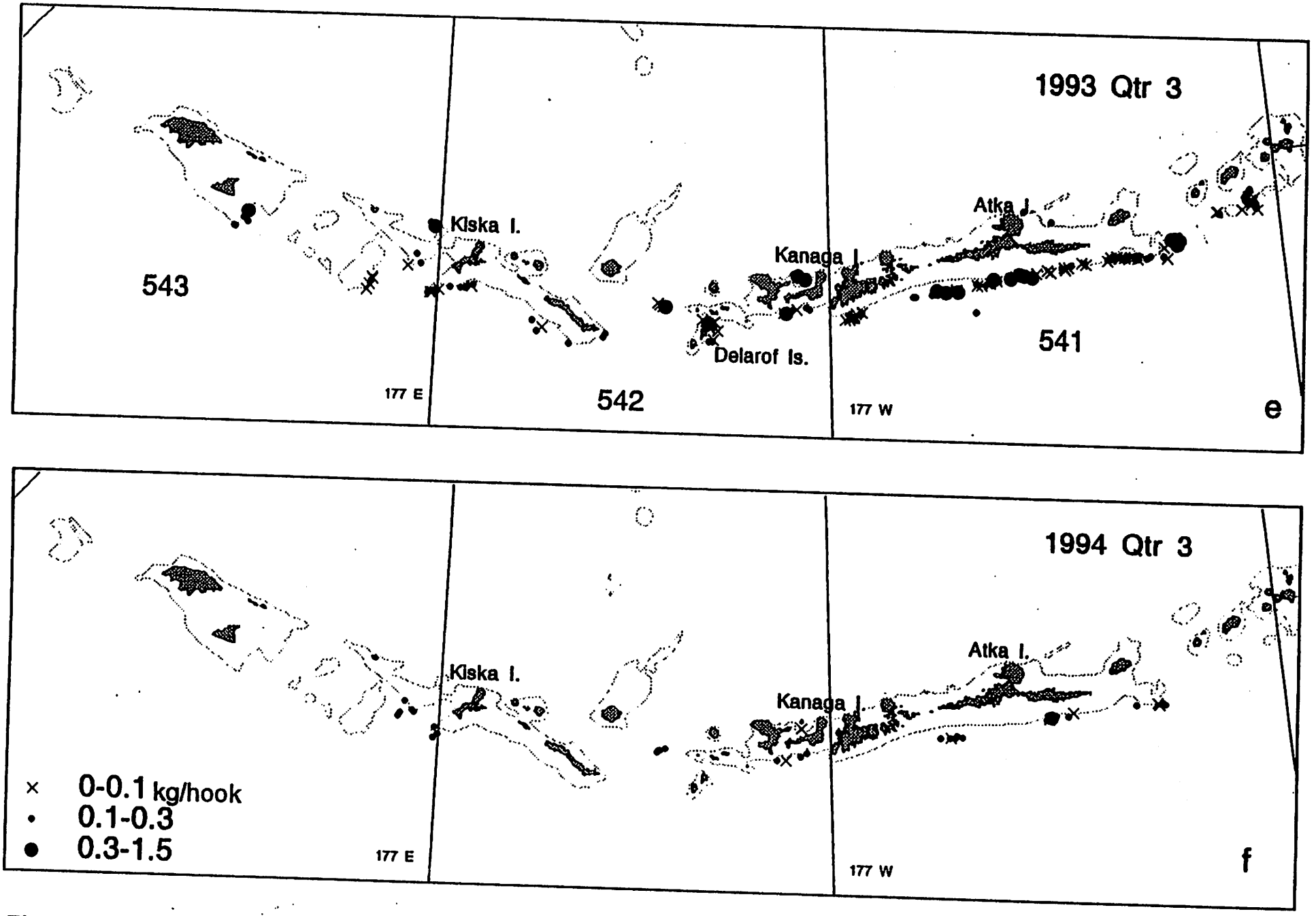


Figure 5. cont. Locations of observed and sampled sablefish sets in the Aleutian Islands in the third quarters of 1993 and 1994.

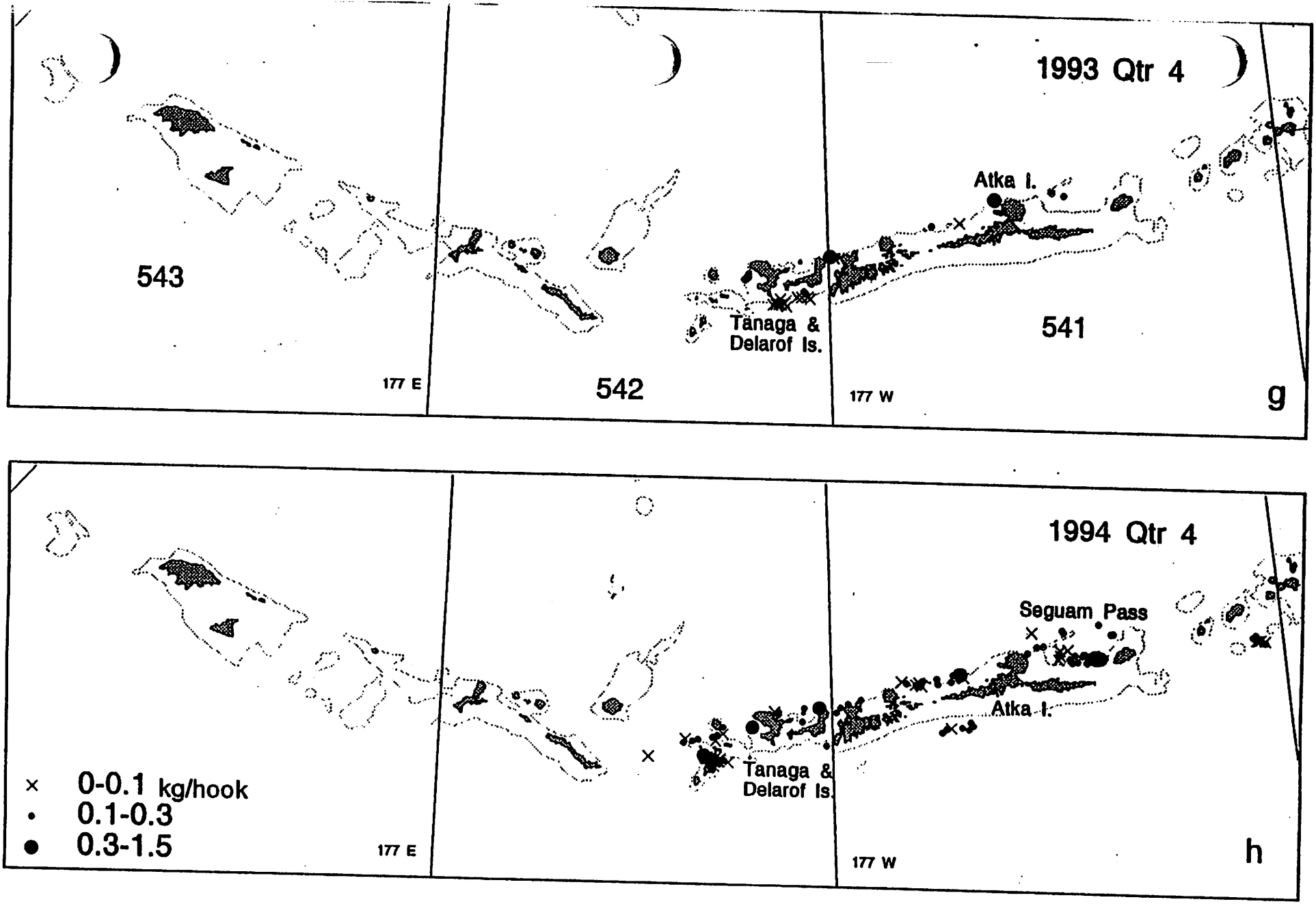
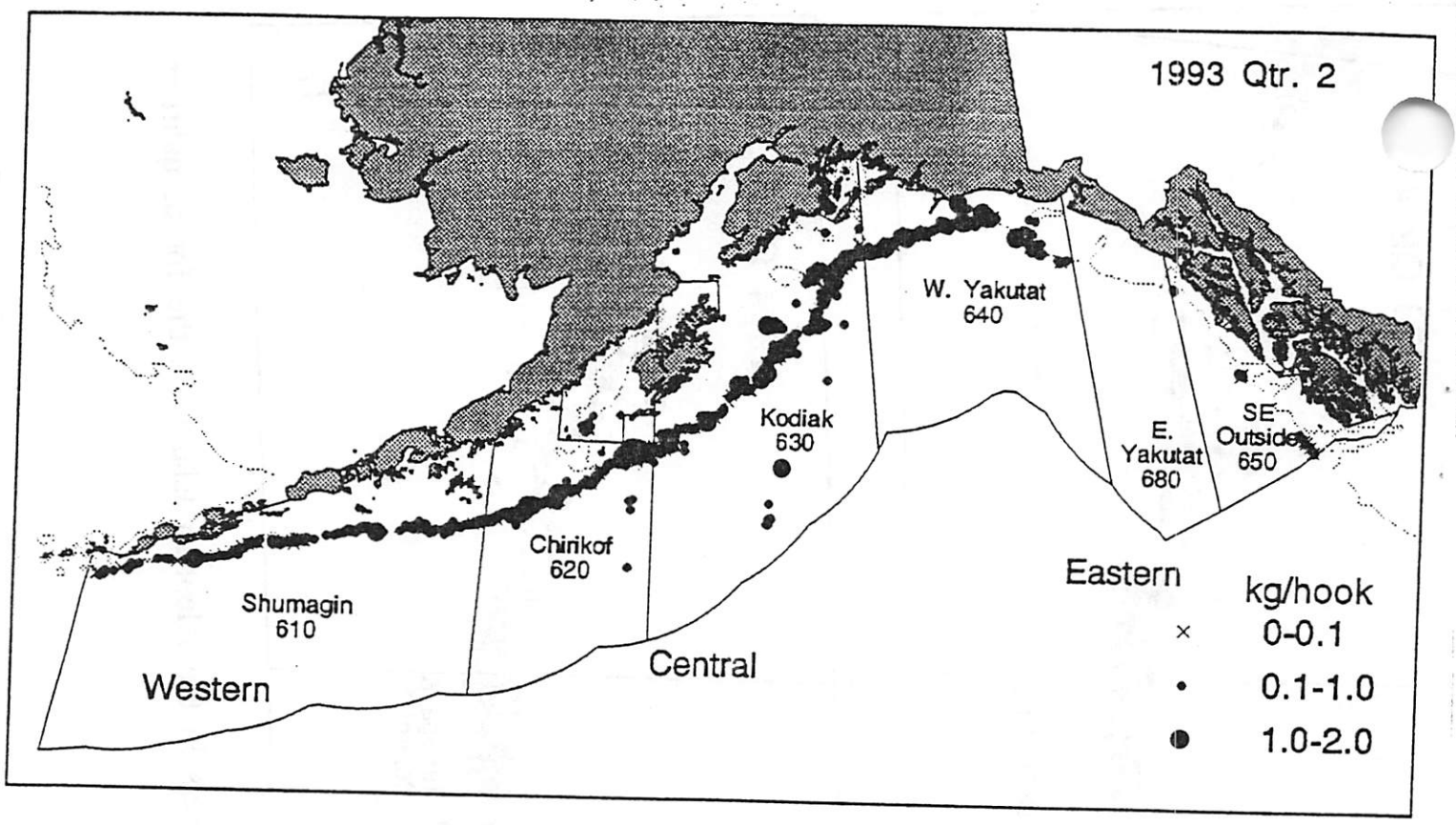


Figure 5. cont. Locations of observed and sampled sablefish sets in the Aleutian Islands in the fourth quarters of 1993 and 1994.



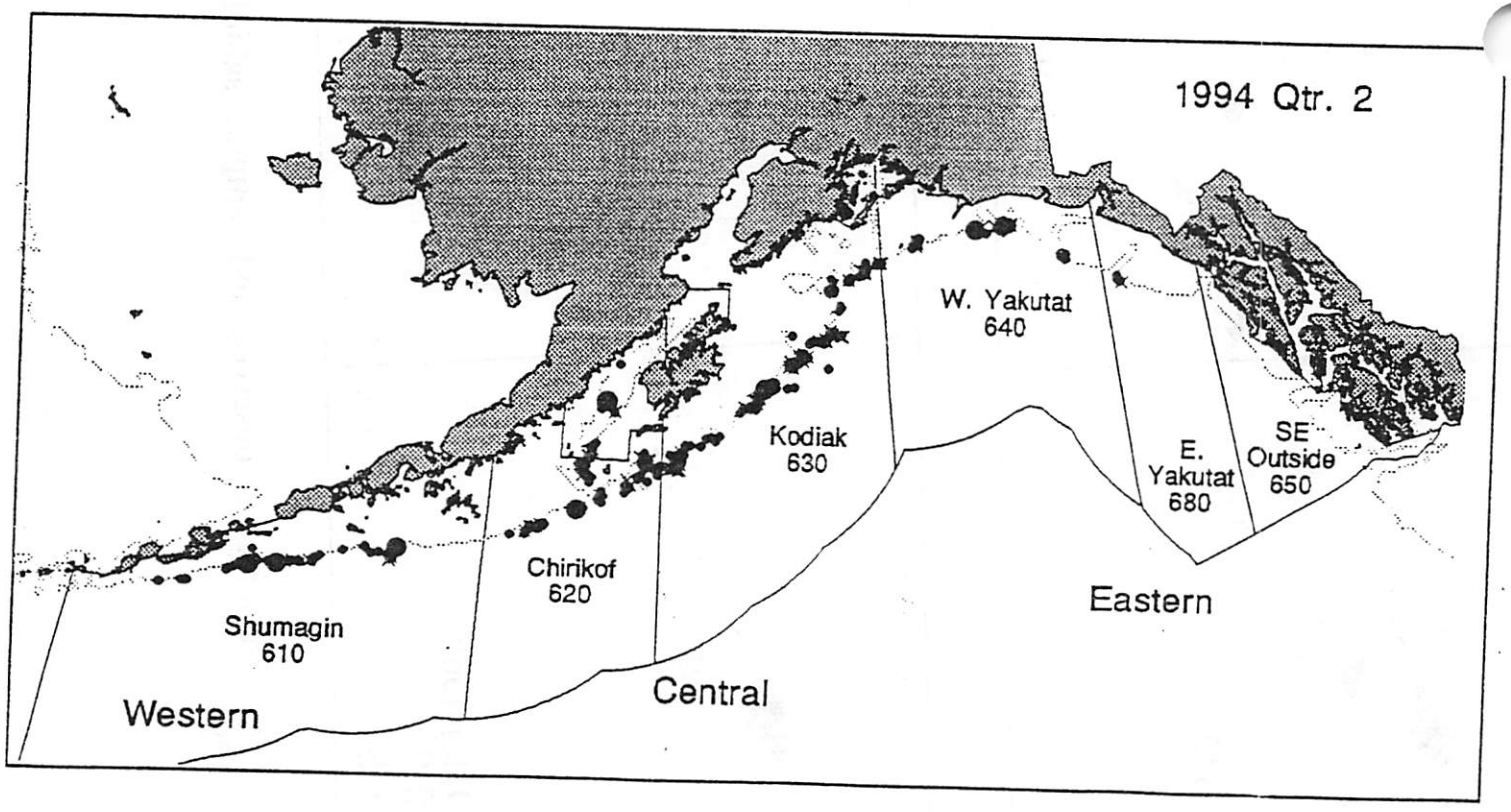


Figure 6. Locations of observed and sampled sablefish sets in the Gulf of Alaska in the second quarters of 1993 and 1994.

Table 5. Sablefish bycatch and discards in the Alaska hook and line groundfish fishery by area, and target fishery, 1991-95 (metric tons, round weight).

	Sablefish bycatch	Sablefish discards	Bycatch rate	Discard rate
Bering Sea and Aleutian Islands				
Hook & line				
Pacific cod				
1991	343	13	0%	4%
1992	179	20	0%	11%
1993	74	12	0%	16%
1994	112	8	0%	7%
1995	49	16	0%	34%
Turbot				
1991	-	-	28%	0%
1992	28	0	21%	1%
1993	582	10	7%	2%
1994	146	3	9%	2%
1995	245	122	8%	50%
Rockfish				
1991	9	4	30%	50%
1993	22	2	14%	8%
1994	2	0	14%	1%
1995	8	3	9%	34%
Gulf of Alaska				
Hook & line				
Pacific cod				
1991	24	2	0%	8%
1992	138	81	1%	59%
1993	30	4	0%	13%
1994	17	1	0%	4%
1995	40	8	0%	21%
Rockfish				
1991	33	1	3%	3%
1992	44	10	4%	22%
1993	39	13	5%	32%
1994	31	4	3%	14%
1995	2	0	0%	20%

Source: Blend data.

Table 6. Species composition and discards in the Alaska hook and line sablefish fishery by area, 1991-95 (metric tons, round weight).

	Pollock	Sable fish	Pacific cod	Arrow tooth	Flathd. sole	Rock sole	Turbot	Yellow fin	Flat other	Rock fish	Atka mack.	Other	Total
Sablefish													
Hook & line													
Bering Sea and Aleutian Islands													
Metric tons													
1991	8	2,492	268	128	-	-	1,101	-	14	189	0	50	4,250
1992	1	1,807	139	268	-	-	1,445	-	6	288	-	146	4,101
1993	0	1,970	30	178	-	-	1,077	-	22	379	-	180	3,836
1994	0	1,602	21	231	-	-	2,305	-	1	253	-	135	4,549
1995	4	1,329	1,317	290	0	0	1,651	-	0	249	-	331	5,171
Species Composition													
1991	0%	59%	6%	3%	-	0%	26%	-	0%	4%	0%	1%	100%
1992	0%	44%	3%	7%	0%	-	35%	-	0%	7%	-	4%	100%
1993	0%	51%	1%	5%	0%	0%	28%	-	1%	10%	0%	5%	100%
1994	0%	35%	0%	5%	0%	0%	51%	0%	0%	6%	0%	3%	100%
1995	0%	26%	25%	6%	0%	0%	32%	-	0%	5%	0%	6%	100%
Discards													
1991	3	5	9	104	-	-	1,005	-	14	20	0	50	1,209
1992	1	19	100	265	-	-	1,256	-	6	71	-	144	1,862
1993	0	23	15	177	-	-	848	-	22	109	-	176	1,370
1994	0	23	11	231	-	-	2,122	-	1	29	-	135	2,551
1995	4	12	1,279	289	0	0	1,495	-	0	85	-	331	3,495
Discard Rates													
1991	44%	0%	3%	81%	-	100%	91%	-	100%	10%	100%	100%	28%
1992	100%	1%	72%	99%	100%	-	87%	-	99%	25%	-	99%	45%
1993	100%	1%	50%	100%	100%	100%	79%	-	100%	29%	100%	98%	36%
1994	100%	1%	52%	100%	100%	0%	92%	100%	100%	11%	100%	100%	56%
1995	100%	1%	97%	100%	100%	100%	91%	-	100%	34%	100%	100%	68%

Table 6.--Continued.

	Pollock	Sable fish	Pacific cod	Arrow tooth	Flathd. sole	Flat deep	Flat shallow	Rock fish	Atka mack.	Other	Total
Sablefish											
Hook & line											
Gulf of Alaska											
Metric tons											
1991	3	20,465	286	205	-	37	2	738	-	152	21,888
1992	13	20,477	510	1,266	3	3,237	2	1,707	-	815	28,029
1993	2	22,255	668	1,741	1	1,089	3	1,526	-	1,105	28,389
1994	2	20,066	265	844	1	28	0	1,600	-	403	23,209
1995	2	18,538	259	962	2	79	11	1,291	-	363	21,507
Species Composition											
1991	0%	93%	1%	1%	0%	0%	0%	3%	0%	1%	100%
1992	0%	73%	2%	5%	0%	12%	0%	6%	0%	3%	100%
1993	0%	78%	2%	6%	0%	4%	0%	5%	-	4%	100%
1994	0%	86%	1%	4%	0%	0%	0%	7%	-	2%	100%
1995	0%	86%	1%	4%	0%	0%	0%	6%	-	2%	100%
Discards											
1991	3	31	175	204	-	37	2	115	-	152	720
1992	13	287	335	1,259	3	3,217	2	620	-	813	6,550
1993	2	361	484	1,707	0	1,087	3	657	-	1,087	5,389
1994	2	197	207	830	1	27	0	930	-	399	2,592
1995	2	424	144	961	2	75	11	418	-	351	2,389
Discard Rates											
1991	100%	0%	61%	100%	100%	99%	100%	16%	100%	100%	3%
1992	100%	1%	66%	99%	100%	99%	100%	36%	100%	100%	23%
1993	98%	2%	73%	98%	88%	100%	100%	43%	-	98%	19%
1994	100%	1%	78%	98%	100%	99%	100%	58%	-	99%	11%
1995	100%	2%	56%	100%	100%	96%	96%	32%	-	97%	11%

Source: Blend data.

Table 7. Gulf of Alaska sablefish catch and total allowable catch (TAC) for hook and line gear, 1991 to 1995

Eastern Gulf of Alaska

West Yakutat (640)

Year	Catch	TAC	%TAC Taken
1991	3,856	4,050	95
1992	3,955	3,740	106
1993	4,319	3,638	119
1994	4,224	4,608	92
1995	**3,591**	**3,895**	**92**

East Yakutat/Southeast Outside (650)

Year	Catch	TAC	%TAC Taken
1991	5,737	4,950	116
1992	4,713	4,990	94
1993	5,267	5,158	102
1994	6,719	6,783	99
1995	**5,317**	**5,890**	**90**

Central Gulf of Alaska (620 & 630)

Year	Catch	TAC	%TAC Taken
1991	9,241	10,575	87
1992	8,047	9,570	84
1993	9,988	7,688	130
1994	7,518	8,976	84
1995	**5,808**	**6,880**	**84**

Western Gulf of Alaska (610)

Year	Catch	TAC	%TAC Taken
1991	1,658	2,925	57
1992	2,143	2,500	86
1993	687	1,624	42
1994	451	1,832	25
1995	**1,668**	**2,080**	**80**

Table 8. Bering Sea and Aleutian Islands sablefish catch and total allowable catch (TAC) for hook and line gear,1991 to 1995

Bering Sea

Year	Catch	TAC	%TAC Taken
1993	643	638	101
1994	320	270	119
1995	**638**	**640**	**100**

Aleutian Islands

Year	Catch	TAC	%TAC Taken
1993	2,008	1,950	103
1994	1,613	2,100	77
1995	**1,000**	**1,320**	**76**

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