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INTERNATIONAL PACIFIC HALIBUT COMMISSION

Annual Report
2004

Established by a Convention between
Canada and the United States of America

This report produced by IPHC staff
and Bob King
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PREFACE

The International Pacific Halibut Commission (IPHC) was established in 1923 by a convention between Canada and the United States for the preservation of the halibut (*Hippoglossus stenolepis*) fishery of the north Pacific Ocean and the Bering Sea. The convention was the first international agreement providing for the joint management of a marine resource. The Commission's authority was expanded by several subsequent conventions, the most recent being signed in 1953 and amended by the protocol of 1979.

Three IPHC Commissioners are appointed by the Governor General of Canada and three by the President of the United States. The commissioners appoint the director, who supervises the scientific and administrative staff. The scientific staff collects and analyzes the statistical and biological data needed to manage the halibut fishery. The IPHC headquarters and laboratory are located on the campus of the University of Washington in Seattle, Washington.

The Commission meets annually to review all regulatory proposals, including those made by the scientific staff and industry; specifically the Conference Board and the Processor Advisory Group. The measures recommended by the Commission are submitted to the two governments for approval. Upon approval the regulations are enforced by the appropriate agencies of both governments.

The IPHC publishes three serial publications: Annual Reports (U.S. ISSN 0074-7238), Scientific Reports—formerly known as Reports— (U.S. ISSN 0074-7246) and Technical Reports (U.S. ISSN 0579-3920). Until 1969, only the Report series was published; the numbers of that series have been continued with the Scientific Reports.

Unless otherwise indicated, all weights in this report are dressed weight (eviscerated, head-off). Round (live) weight may be calculated by dividing the dressed weight by 0.75.

Bob King

of Juneau, co-writer of this report, previously served as Press Secretary for Alaska Gov. Tony Knowles and as news director of Dillingham radio station KDLG where he was known for his reporting on commercial fishing in Bristol Bay and the Bering Sea. This is Mr. King's third time as co-producer of the IPHC Annual Report.

Thanks!

The Commissioners and Staff wish to thank all the agencies, industry, and individuals who helped us in our scientific investigations this year. A special thank you goes to: the Bering Sea NMFS/RACE division group in Seattle for saving us a spot on the survey; Greg Clapp, Terri Bonet, and Sue Bunten (AMR/DFO); Jessica Gharrett (NMFS/RAM); Dr. Robert Gerlach (ADEC); Carol Henry (WDFW rockfish sampling); WDFW and ODFW samplers who scanned sport-caught halibut in Washington and Oregon; the Makah and Quinault samplers who scanned halibut in the Area 2A tribal fisheries; and to all the processing plants who worked hard to accommodate our scan sampling efforts for the PIT tag program.

Table of Contents

2004 – A strong catch, strong market, healthy stocks

With halibut catches near record levels, a strong market and prices, and healthy indicators of stock assessment, 2004 was a good year for the halibut industry and the IPHC. The year began as Chairperson Dr. James Balsiger of the U.S. delegation gaveled in the Annual Meeting of the IPHC at Centennial Hall in Juneau, Alaska on January 19 with Dr. Richard Beamish of Canada serving as Vice-chair.

The IPHC met in Juneau in 2004. Photo by Lynn Mattes.

As always, a chief task at the Annual Meeting was to set commercial catch limits which totaled almost 74.7 million pounds in 2004. It was the highest catch limit in recent years, slightly more than the 74.4 million pounds of the previous two years. A complete breakdown of catch limits by regulatory area can be found in Appendix I of this report. There was also continued discussion of season length and opening dates.

Season extension and opening

Proponents of an extended halibut season suggest that it would put fresh fish on the market for a longer period of the year and head off anticipated competition from farmed halibut in the future.

There has been ample discussion in recent years over whether to extend the halibut season from its current 8½ months. Proponents suggest that a longer season would put fresh fish on the market for a longer period of the year and head off anticipated competition from farmed halibut in the future. The Commission conducted a broad discussion on the season extension issue at the Annual Meeting including a report on a joint agency–industry meeting that looked into the logistical issues that needed to be addressed to extend the halibut season.

It was generally agreed that a 10½ month season could be implemented with one-year's lead time but a 12-month season was significantly more difficult to implement. While the Commission is hesitant to take action without first seeing results regarding research on halibut migration, small fish interception, and safety issues, it is committed to revisiting this issue in future years.

A lengthy discussion ensued regarding the commercial fishery opening date. Not all fishers favored the March 1 opening and were joined by commissioners

who wanted to know what impact fishing activity during the first two weeks of March would have on migrating fish. Anecdotal evidence suggests there could be a size and condition difference of fish delivered in the first two weeks of March compared to later in the month so the staff agreed to analyze the harvest at the start of the season.

The idea of winter tagging was raised as a way to look at these impacts and Dr. Leaman agreed to put together some proposals for winter research projects that may help answer the questions of migration and fish quality.

Winter tagging projects may provide a method of finding out more about migrating halibut – a main concern of opponents to the extended season.

Conditional constant catch

A report was presented on the proposed Conditional Constant Catch (CCC) harvest policy and estimated CCC yields for 2004. The CCC harvest policy proposal, summarized in last year's Annual Report, was discussed at length and numerous concerns were raised over its use for making catch limit recommendations. It was generally agreed that CCC represents a large departure from current methods; that it is new and untested, and is not well understood by industry. The Commission supported further study of the CCC policy and agreed that a working group should be involved in evaluating it before any further action.

US Commissioners Jim Balsiger, Ralph Hoard and Philip Lestenkof hard at work in private session. Photo by Lynn Mattes.

Pribilof catch rates

The Commission agreed to an NPFMC proposal to allow Area 4C quota to be caught in Area 4D.

Declining catch rates around the Pribilof Islands in recent years prompted discussion this year. IPHC staff could not say there was a stock problem in Area 4C since it is part of the stock in the larger Area 4CDE and there are no indications of similar problems in the larger area. A proposal by the North Pacific Fishery Management Council (NPFMC or Council) to allow Area 4C quota to be harvested in Area 4D was discussed and since the boundaries for Area 4C exist at the request of the Council, for allocation but not conservation purposes, neither the staff nor the Commission had any objection.

A lid on bycatch

There has been a renewed commitment by the U.S. to address bycatch in many groundfish fisheries and also how to allocate prohibited species catch within those fisheries. There was some discussion of a floating cap option for

bycatch control of halibut although it was noted that there is a time lapse from when the juvenile halibut are seen as bycatch to when they recruit to the adult halibut stock a few years later. Dr. Leaman agreed to prepare a letter to the NPFMC encouraging the new rationalization process for bycatch and a shared burden among all gear sectors for a downturn in the stocks.

The Alaska Seafood Coalition proposed to retain trawl caught halibut in the Gulf of Alaska but the commissioners expressed concern that halibut was being singled out without consideration of other species. This program may also interfere with halibut bycatch reduction plans. The Commission agreed not to approve the proposal for 2004, but that they would consider a proposal next year as long as their concerns were addressed.

The Commission decided to send a letter to the NPFMC encouraging a shared burden among all gear types for a down turn in the halibut stocks.

Governor Murkowski and Director Leaman conversing during a reception at the Governor's House in Juneau. Photo by Lynn Mattes.

Keeping watch

Enforcement reports were presented by the U.S. Coast Guard (USCG), National Oceanic and Atmospheric Administration (NOAA) Office of Enforcement and the Canadian Department of Fisheries and Oceans (DFO). The USCG reported it could accommodate a longer season if the IPHC decided on it. While funding would remain the same, effort could be spread over a longer period of time if a decision was made to extend the season. Some patrols conducted from smaller vessels would not be possible during winter storms.

NOAA reported that a study conducted on contract with the IPHC to test the reliability of cameras as on-board monitors for bird avoidance device compliance has been completed and it has been concluded that the cameras can work. The DFO also noted that on-board cameras may be employed on board some vessels in lieu of observers next year.

On-board cameras may begin replacing observers in a trial capacity as early as 2005.

Sporting chances

The Commission reviewed pending actions by the NPFMC on a possible sport-charter individual quota program with the poundage eventually being transferable between sport and commercial users. Commissioners noted that there is not a mechanism in place to deal with undersize halibut in the transfers. Allocation issues were discussed by the Commission specifically in relation to the guideline harvest limits (GHL) for Alaska. The Alaska Department of Fish

and Game (ADF&G) noted that the state opposes a proposal for a minimum size limit on the charter fishery since the NPFMC did not deliberate that point during the GHL deliberations.

Financial footing

Funding level was uncertain this year in light of reprogramming of funds away from the IPHC and an unpassed federal budget in the U.S.

The U.S. State Department financial advisor reported on current funding status from the U.S., including $400K that was reprogrammed from the IPHC to keep other international fisheries commissions running last year. A total of just over $20 million was requested to fund all commissions in 2004 but lack of passage of a budget meant the government is operating under a continuing resolution based on the previous year's appropriations. Several possible outcomes were presented. Dr. Balsiger noted that NMFS may favor reprogramming commission funds in order to get all commissions funded, though not at requested levels.

The possibility of fishing more gear during the surveys or adding additional research projects as a method of generating additional funds was discussed, however it was noted that the Commission was criticized by industry in the past for doing just that. The Commission discussed the high cost and possible cancellation of the Area 2A setline survey in 2004 but agreed to send out the charter requests including Area 2A, recognizing that budget issues could force a cancellation later in the year.

Director's Report

This year saw the continued development of some innovative scientific programs at the Commission. In 2003, we initiated the program to tag fish throughout the range of the stock using PIT (passively integrated transponder) tags. These small tags are energized by scanners in the ports of landing and transmit their numbers to the scanner. We conducted a peer review of the design of the experiment in 2001 and the reviewers agreed with the Commission staff that a limited number of releases in a second year would make the experiment stronger statistically and might allow us to estimate the elusive rate of natural mortality in the stock. Natural mortality rate is almost impossible to estimate with precision in most fished stocks but the second year of releases may give us the best shot at it.

Director Bruce Leaman talks with Jay Hebert of the *F/V Lisa Marie* in Dutch Harbor, AK. Photo by Lara Hutton.

We tagged almost 24,000 fish with PIT tags in Areas 2B and 3A during 2004. While the analysis of the recoveries from 2003 releases has provided some confirmation of analytical assessment results in Areas 2B-3A, it has also raised a number of questions. We do not yet understand why we were able to obtain large fish for tagging in Area 3B but have not recovered them in the same proportion in which they were tagged. Similarly, we do not understand why recoveries in Area 4 are so low. At face value, the low recoveries in Area 4 would suggest large populations but the trends in both survey and commercial catch rates indicate strongly that stocks in this area are declining in abundance. The first year recoveries also show higher rates of movement among areas in the central Gulf of Alaska (about 10%), although movement rates off Canada are about what was expected based on conventional tagging. I had told the Commissioners before we began this experiment that we should expect some surprises and we certainly are seeing some. This experiment is designed to scan catches for PIT tag recoveries for a 3-5 yr period, so the next few years of recoveries will hopefully yield more clues to help us answer these questions.

We are also increasing our use of pop-up archival satellite (PAT) tags to understand stock movements over both seasonal and annual periods. Use of these tags allows us to gain information on movements in the absence of fisheries that could recover traditional or PIT tags. Information gained from the PAT tags will help us determine how a longer season might be feasible if it cannot be implemented in all areas. The tags will also provide understanding of fish movements associated with shorter-term temperature changes, such as seasonal extremes.

Last year the Commission staff proposed a new harvest strategy, in response to industry's request for less volatility in catch limits. The Conditional Constant Catch policy attempted to address both conservation and stability in catch limits. While some parts of the policy (threshold and limit reference points, variable harvest rates at lower stock sizes) were clearly supported by industry, the fixed upper limit on catches was not. In the absence of a clear conservation gain associated with this maximum harvest level, industry believed that simply sacrificing yield in exchange for stability was not beneficial. We worked together with industry in exploring all aspects of this proposed policy and agreed that the maximum harvest limit would not be implemented, but that we would apply the other features of this policy to provide additional stock protection. This was an important illustration of how the Commission and industry can work together to achieve joint goals.

Bruce M. Leaman
Executive Director

2004 Commercial Fishery

Hippo"goog"leus stenolepis

Type "halibut" into a search engine and you get somewhere in excess of 900,000 results. The sheer volume proves that halibut is making its mark in the world, and the commercial fishery is where it all starts for many.

This year was another strong one for the halibut fishery with a commercial harvest of 73,111,000 pounds, virtually identical to the revised catch of 73,141,000 pounds landed in 2003. The catch was just shy of the 74,665,400 pound quota and, reflecting the shift in area quotas, catches were somewhat higher in Southeast Alaska and the Gulf while generally lower in the west. At an average price of $3 (U.S.) per pound, the same as last year, the ex-vessel value of the fishery was just under $220 million.

The catch in 2004 was very close to the 2003 harvest with just over 73 million pounds caught.

Port sampler, Levy Boitor, samples the catch in Petersburg, Alaska. Photo by Lara Hutton.

Regulatory areas for 2004

Regulatory areas for the commercial halibut fishery have been unchanged since 1990:

Area 2A - all waters off the coast of the States of California, Oregon, and Washington.

Area 2B - all waters off the coast of British Columbia.

Area 2C - all waters off the coast of Alaska, south and east of Cape Spencer.

Area 3A - all waters between Cape Spencer and Cape Trinity, Kodiak Island.

Area 3B - all waters between Cape Trinity and a line extending southeast from Cape Lutke, Unimak Island.

Area 4A - all waters west of Area 3B and the Bering Sea closed area that are south of 56°20' N. and east of 172°00' W.

Area 4B - all waters in the Gulf of Alaska and the Bering Sea west of Area 4A and south of 56°20' N.

Area 4C - all waters in the Bering Sea north of Area 4A and the closed area that are east of longitude 171°00' W., south of latitude 58°00' N., and west of longitude 168°00' W.

IPHC regulatory area designations have changed little in the past several years.

Area 4D - all waters in the Bering Sea north of Areas 4A and 4B, north and west of Area 4C, and west of longitude 168°00' W.

Area 4E - all waters in the Bering Sea north and east of the closed area, east of Areas 4C and 4D, and south of 65°34' N.

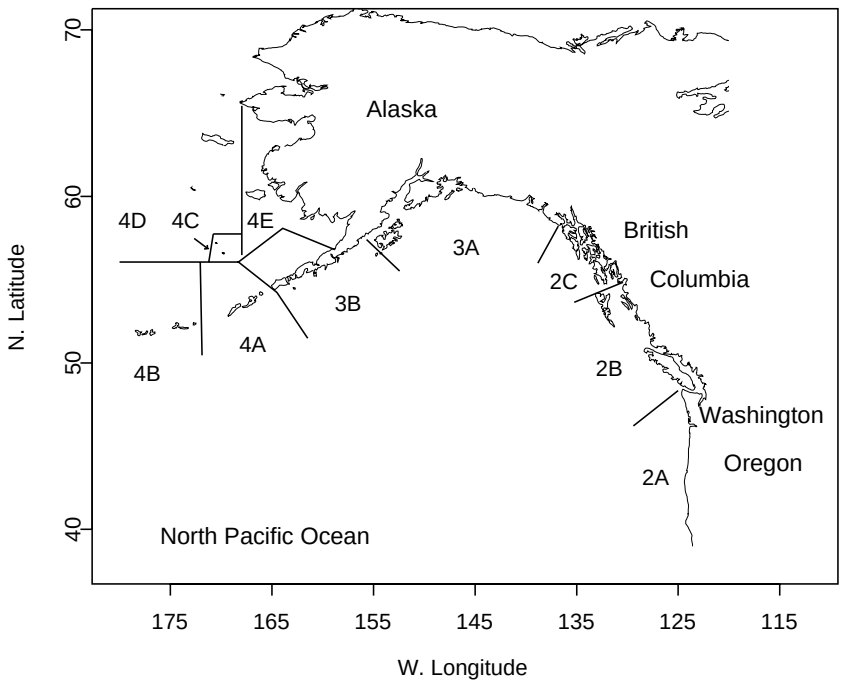


Figure 1. IPHC regulatory areas for 2004.

Rules and regs

Regulations for the 2004 fishery were adopted at the IPHC's 2004 Annual Meeting in Juneau, Alaska and were later approved by the Canadian and United States governments with one exception. As in past years, the Canadian government chose not to approve a regulation that prohibited the landing of live halibut caught in British Columbia waters.

Biologically-based catch limits were adopted by the IPHC for all individual regulatory areas and for Areas 4CDE combined. The 2004 season dates were adopted similar to those in 2003 although an agreement was made to open the fishery on a Sunday for marketing reasons. Commercial fisheries in Canada and Alaska all commenced at 12 noon local time on February 29 and closed at 12 noon local time on November 15. As required, the treaty Indian commercial fishery in Area 2A occurred during the same calendar period.

Canada tags every commercially landed halibut. Photo by Tracee Geernaert.

2004 saw a leap year fishery with most commercial seasons opening on February 29.

Area 2A licensing regulations have remained the same since 2000. All fishers had to choose between a commercial or sport charter license. Commercial fishers also had to choose to either retain halibut caught incidentally during the salmon troll fishery, or take part in the directed commercial halibut fishery south of Point Chehalis and/or retain halibut caught incidentally in the primary sablefish fishery north of Point Chehalis.

As in past years, fishers in Area 2A had to choose between a commercial and sport charter license.

In Area 2A, the non-treaty directed commercial fishery had 10-hour fishing periods from 8 a.m. to 6 p.m. scheduled for June 23, July 14, July 28, August 11, August 25, September 15, and September 29. Generally, the fishing season dates are set two weeks apart but the second fishing period was lagged a week to skip the 4th of July holiday. The fishery closed when the catch limit was taken.

The Commission approved several minor modifications to the tagged fish retention regulations: defining a tag as an external tag and clarifying that any fisher at any time can retain a halibut that has an IPHC tag attached. The Prohibited Species Donation Program was revised to allow the offal of halibut donated under this program to be used as fish meal and oil. Lastly, for the U.S. fishery, the requirement to mark setline buoys was revised to include a vessel's name along with state license or registration number, but not as the only marking.

Allocation issues

The IPHC does not make allocation decisions among user groups, leaving that responsibility to each government. Currently, both the United States and Canadian governments are working on allocation plans by regulatory area or smaller local areas.

In 2004, the IPHC adopted a combined sport and commercial catch limit for Area 2B that was to be allocated between the two user groups by the DFO. The allocation plan is the result of talks between the commercial and sport sectors that began in 2000 and concluded in October of 2003. From the 2004 combined limit of 13.8 million pounds, DFO initially allocated 88 percent of the total catch limit or 12,141,000 pounds to the commercial fishery. Late in the season there was a reallocation of 409,000 pounds from the recreational fleet to the commercial fleet, reflecting the difference between the 12 percent sport catch ceiling and the projected recreational catch. The combined catch of 13.5 million pounds for the commercial and sport fisheries was slightly under the 2004 catch limit.

For the first time in 2004, the Commission adopted a catch limit for Area 2B that encompassed both commercial and sport catch. DFO then allocated between the two user groups.

In Alaska, the NPFMC reviewed several different allocation programs for the sport charter fishery and ultimately adopted a program for managing the harvest by sport charter vessels in Areas 3A and 2C by instituting a GHL. The National Marine Fisheries Service (NMFS) implemented this program in September, 2003. The GHL was based on 125 percent of the average charter harvest in each area during the period of 1995 through 1999. Preliminary data suggests the GHL was not reached in 2004. If it were, NMFS would determine how to best reduce the sport charter harvest.

The NPFMC also approved an Individual Fishing Quota program for sport charter vessels. NMFS is currently working on the design of such a program which, if implemented, would replace the GHL.

The Pacific Fishery Management Council (PFMC) allocates halibut catch limits among user groups in Area 2A through a catch sharing plan. The players are three commercial fisheries, a treaty Indian fishery, and sport fisheries in nine subareas. In 2000, the courts ordered an adjustment in the halibut allocations through 2007 and, accordingly, after the allocation was applied to tribal (35 percent) and non-tribal (65 percent) users, an additional 25,000 pounds was transferred from non-tribal to tribal fisheries.

The total tribe commercial catch came within one percent of the 523,600 pound catch limit.

Limits, catches and seasons

Area 2A

Area 2A was managed to provide a total allowable catch of 1,480,000 pounds for all user groups and the total catch of 1.4 million pounds was slightly under that limit.

The Treaty Indian fishery was allocated 523,600 pounds for their commercial fishery and the Treaty tribes agreed on a new management plan in 2004 that included allocation to tribes or a group of tribes. In the tribal fishery, 75 percent of the commercial catch limit was allocated to the tribes or tribal groups and occurred between February 29 and July 30. The remaining 25 percent was open to all tribes with daily limits of 500 or 250 pounds. The total tribal commercial catch was within one percent of the catch limit.

Under the catch sharing plan, the limited entry longline sablefish fishery north of Point Chehalis received an allocation of 70,000 pounds, the same as last year but down from 88,389 pounds in 2002 due to a change in allocation between users by the PFMC. The season opened May 1 and closed on October 31. The catch was within eight percent of the catch limit.

The remaining non-treaty commercial catch limit was 297,029 pounds, with 252,475 pounds allocated to the directed fishery south of Point Chehalis and 44,554 pounds to the incidental catch in the salmon troll fishery.

The schooners *Northern* and *Grant* still work north Pacific waters after decades of service. IPHC photo archive.

In 2004, the IPHC issued 697 Area 2A vessel licenses: 344 licenses for the incidental commercial catch of halibut during the salmon troll fishery; 215 for the directed commercial fishery and the incidental halibut during sablefish fishery; and 138 for the sport charter fishery.

Regulations in Area 2A make it possible for salmon troll fishers to retain one halibut for every three chinook caught.

In the incidental commercial halibut fishery conducted during the salmon troll season, the allowable catch ratio was one halibut per three chinook, and an "extra" one halibut regardless of ratio, but the total trip number of incidental halibut landed per vessel could not exceed 35. The ratio of allowable halibut to chinook is unchanged since 2000. The incidental commercial halibut fishery during the salmon season opened on May 1 and closed on July 28 north of Florence, Oregon and closed on July 29 south of Florence, coinciding with the salmon troll season. The halibut catch was eight percent, or 3,400 pounds, over the catch limit.

The directed commercial fishery consisted of four 10-hour fishing periods with fishing period limits. The fishing period limits were high during the first two openings, as much as 7,000 pounds for the largest class of vessels, but the limits dropped to a maximum of 2,000-2,500 pounds for the last two openings. The total directed commercial catch was 10 percent, or 26,500 pounds, under the catch limit (Appendix II, Table 1).

Area 2C Metlakatla fishery

The Metlakatla tribal community is authorized by the United States to conduct a commercial halibut fishery within the Annette Islands Reserve. Fourteen, 48-hour fishing periods took place between April 16 and October 17 and produced a catch of almost 90,000 pounds which was included in the Area

2C commercial catch (Appendix II, Table 2). The catch was slightly more than last year's catch of 82,000 pounds but below the high of 126,000 pounds in 1996. Additionally, there was a small amount of halibut caught incidentally to the salmon fishery.

Quota share fisheries

Area 2B

Area 2B commercial fishers received 12.55 million pounds (roughly 91%) of the commercial/sport combined catch limit.

As previously mentioned, IPHC adopted a combined sport and commercial catch limit of 13.8 million pounds for Area 2B which was allocated to the user groups by the DFO. The total catch limit for the commercial fleet was 12.55 million pounds with an additional 140,000 pounds available from the 2003 underage/overage program. From the catch limit, each vessel was given a specific allocation of halibut, or IVQ, calculated by the DFO. The Area 2B catch of 12.087 million pounds was within four percent of the catch limit.

Halibut lie in state awaiting icing in the hold of the *F/V Heritage*. Photo by Rob Ames.

When the IVQ program was implemented in 1991, 435 vessels received quota shares divided into two shares or blocks. Beginning in 1993, blocks could be transferred with the condition that no vessel could fish more than four blocks. With such transfers, the fleet size decreased to about 280 vessels from 1995 to 1998. In 1999, vessel owners were permitted to make unlimited permanent or temporary reallocation of halibut IVQ, subject to minimum and maximum holdings. Since 1999, the number of active vessels has varied from year to year, ranging between a high of 257 in 1999 to a low of 214 vessels in 2002. There were 218 vessels fishing in 2004. Just over nine million pounds or 71 percent of the catch limit was transferred among vessels, with 384,351 pounds transferred permanently.

The Native Communal Commercial Fishing Program had 19 active vessels in 2004, up from 17 in 2003. Total landings from 85 separate deliveries amounted to 503,803 pounds, which is slightly more than in 2003.

Several small sub-areas in Area 2B were closed to halibut fishing to protect non-halibut species and to improve access to food fish for the First Nations' communities.

Alaska

The halibut and sablefish IFQ fisheries have been in effect in Alaska since 1995. NMFS initially allocated halibut quota share to recipients by IPHC regulatory area. Transfers were permitted with restrictions on the amount of quota a person could hold and could be fished per vessel. In December 2004, NMFS reported that 3,332 persons held quota shares, down from the 4,830 persons at the start of the program.

Only 55 percent of the catch limit in Area 4C was caught.

The total 2004 catch from the IFQ halibut fishery for the waters off of Alaska was 59.1 million pounds - four percent under the catch limit. For Areas 2C, 3A, 3B, and 4A, the commercial catches were within two to three percent of the catch limits and Area 4B's catch was within five percent of the limit. Since 2002, the IFQ regulations have allowed 4D CDQ to be taken in Area 4E. This is not a biological concern because Areas 4CDE are managed as a single stock. The combined Area 4DE catch was six percent under the combined limit. Area 4C around the Pribilof Islands again fell substantially short of the catch limit, with only 55 percent of the catch limit taken. Since the implementation of the quota share fishery, the Area 4C harvest has always been well below its catch limit prompting speculation about local depletion or changing environmental conditions that may affect local abundance or catchability.

Landing patterns and highlights

Homer was once again the top halibut port with over 10.6 million pounds of halibut landed in 2004, about 18 percent of Alaska's commercial catch. Kodiak and Seward followed as the second and third ranking ports respectively, each moving between 12 and 14 percent of the Alaska catch. In Southeast Alaska, Sitka received 3.7 million pounds, Juneau 3.3 million pounds, and Petersburg 3.0 million pounds. Only 2.7 percent of Alaska's catch was landed outside of the state.

Homer was the top halibut port in the U.S. receiving about 18 percent of the Alaska commercial landings. Port Hardy and Prince Rupert/Port Edward each received about 40 percent of the commercial landings in B.C.

In British Columbia, Port Hardy and Prince Rupert/Port Edward, each received about 40 percent of the Area 2B commercial landings and Vancouver ranked a distant third. Several small ports including Bella Coola, Campbell River, Comox, Port McNeill, and Sooke that received fewer than three deliveries in 2003 received no deliveries in 2004.

Quota share landings were spread over nine months of the year. May was the busiest month for Alaska landings as it has been for the last four years, amounting to 17.2 percent of the total catch, slightly more than the previous year. In B.C., March was the busiest month for poundage accounting for 17.6 percent of the overall catch, also slightly more than last year.

The landing of live halibut from Area 2B was again allowed by DFO but landings of live halibut in 2004 totaled only 13,600 pounds, down from 14,941 pounds in 2003 and well off the peak of 103,000 pounds in 1999. Six vessels made a total of 17 landings with live halibut and no halibut were penned.

Electronic reporting in Alaska

Electronic reporting of Alaskan halibut and groundfish catch information will likely be implemented by the beginning of 2006.

Since 2002, IPHC, ADF&G, and NMFS have worked with the Pacific States Marine Fisheries Commission (PSMFC) to develop a cooperative interagency electronic fishery information collection and management program for Alaska. The project has included a needs assessment, technology demonstrator, and several interagency meetings to review progress and discuss a Memorandum of Understanding for implementing the program. The initial goal was to develop a program for reporting groundfish and halibut landings but in 2003, the scope was broadened to include Bering Sea and Aleutian Island (BSAI) crab. In 2004, the interagency steering committee worked with the contractor hired by the PSMFC to design an electronic reporting system for BSAI crab that would be implemented as that fishery was being rationalized in August 2005. Electronic reporting of statewide groundfish and halibut data will follow and likely be implemented by the beginning of 2006.

Commercial catch sampling

The primary objective of port sampling is to get a representative look at total commercial halibut removals. To accomplish this, random sampling techniques are applied and an equal proportion of the catch is sampled within each regulatory area over the entire season, using prescribed sampling rates for each area. Catch samplers also copy fishing logs and fish ticket weights whenever possible and collect tags.

Skipper of the *F/V Star Wars II*, Rob Tournier, gets ready to retrieve the gear. Photo by Tracee Geernaert.

To meet U.S. sampling objectives, the ports of Homer, Kodiak, Seward, Juneau, Sitka, Petersburg, and Bellingham were staffed throughout the entire season. Dutch Harbor was staffed from May until the end of the season and St. Paul was staffed during the Area 4C CDQ fishery in June, July, and August. Otolith and length samples came within target ranges for

each regulatory area except for the western Aleutian Area 4B which was well below the target. This was due mainly to the limited poundage delivered from this area and conflicts that occurred when a large volume of halibut was landed in Dutch Harbor from multiple regulatory areas. Adjustments will be made to ensure that this shortfall does not occur again.

IPHC samplers copied 4,182 Alaskan logs from ports where the IPHC has a presence, and another 651 logs for Alaskan landings in other ports. Samplers sometimes collect logs from other locations when they encounter transient halibut vessels in their ports.

In Canada, IPHC samplers were in place throughout the season in Prince Rupert, Port Hardy, and Vancouver, where 88 percent of the Area 2B catch was landed. They collected 2,089 otoliths, in excess of their goal of 1000-2,000 otoliths. This represents over a third of the area's poundage. Canadian samplers collected 890 logs in their ports and 81 US logs were obtained in Bellingham by the local sampler.

Weighing fish in Port Hardy, B.C. IPHC photo archive.

Treaty Indian managers worked cooperatively with the IPHC to sample the Area 2A-1 catch. A total of 681 fish were sampled in the tribal fishery falling slightly above the target of 650 otoliths. The IPHC plans to continue to work with the Treaty Indian managers to reach the otolith target in 2005 as this cooperative effort works well. The Area 2A non-treaty commercial sampling was conducted in Newport, Oregon and Bellingham, Washington where sampling targets were met and surpassed, with 657 fish sampled. To ensure this, multiple commercial openings were sampled with multiple samplers, a strategy that has substantially improved Area 2A non-treaty commercial fishery sampling efforts.

Samplers collected 243 wire tags of which 229 were from the double-tagging project carried out in the autumn of 2003.

U.S. and Canadian samplers also collected 243 wire tags of which 229 were from the double-tagging project carried out in the autumn of 2003. In Port Hardy alone, 152 tags were recovered from the double-tagging project. Tag data collected dockside includes fork length, otoliths and location of the recovery.

Age distribution of the commercial halibut catch

In general, the average age of halibut samples collected decreased from 2003 in all areas except Areas 3 and 4C. The average age from all areas

Overall, the average age of commercially caught halibut dropped one year from 2003, and the average fork length was 2.3 cm shorter.

There were more four- and five-year-olds in the commercial catch in 2004 than in recent years.

combined decreased by one year in 2004 relative to 2003, but overall average age in 2004 was still 0.9 years older than in 1995.

Average size (measured fork length) of sampled halibut increased in Area 3A in 2004 but decreased in all other areas. Average fork length for all areas combined decreased by 2.3 cm from 2003.

The 1994 year class or 10-year-olds accounted for the largest proportion in numbers of the overall commercial catch, 13 percent in 2004. The next most abundant year classes were 1995, 1988, and 1987, accounting for 12 percent, nine percent, and nine percent of the catch, respectively. Ten-year-olds were the most abundant age class in Regulatory Areas 2C, 4A, 4B, and 4D, and the second most abundant in Areas 2A, 2B, and 4C. Nine-year-olds from the 1995 year class made up the most abundant age class in Regulatory Areas 2A, 2B, and 4C, while 17-year-olds from the 1987 year class were the most abundant in Area 3.

The youngest and oldest halibut in the 2004 commercial samples were determined to be four and 48 years old, respectively. There were nine four-year-olds; one captured in Area 2A measuring 85 cm, and eight from Area 2B that measured between 83 and 99 cm. The 48-year-old was captured in Area 4A and had a fork length of 142 cm. The largest halibut in the 2004 commercial samples was a 200-cm fish from Area 2C, which was determined to be 21 years old.

There were larger numbers of four- and five-year-olds in the commercial catch in 2004 than in recent years. Four- and five-year-olds comprised 0.63 percent of the sampled catch in numbers in 2004, compared to only 0.14 percent in 2003.

The Sport Fishery

Hanks' Hefty Halibut

At first, Don Hanks thought he snagged the bottom with his bait as he fished off Perl Island near the entrance to Cook Inlet in late June. Actually, the veterinarian from Sparks, Nevada had just hooked into the richest payout in Alaska's longest running halibut derby.

Hanks thought he had snagged when his line went taught but when 60 yards of line suddenly peeled off his reel, he knew he had hooked into a monster. Charter boat skipper Tony Arsenault had just told his clients that they had just 10 minutes left in the day when Hanks hooked into the big one. While it took 25 minutes to land the halibut, the extra time was well spent.

Once on board, Hanks' halibut measured 96 inches and tipped the scales at 352.6 pounds, almost 18 pounds more than the eventual derby runner up. And thanks to a record sale of over 18,500 Homer Jackpot Halibut Derby tickets, Hanks' catch was worth a whopping $51,298. Hanks had fished in Alaska for 12 seasons running but had never caught anything larger than 100 pounds. He says he plans to use his winnings for even more fishing trips in the future. Arsenault, who's been running charter boats out of Homer since 1991, pocketed $4,664 just for being the lucky skipper.

Hanks fished Alaska for 12 seasons but had never caught anything larger than 100 pounds until his 353-pounder took top prize in the Homer Halibut Derby.

Homer, Alaska still yields some of the finest sport halibut fishing in the world. Photo by Tracee Geernaert.

Derbies are fun and not just for the lucky fisher who lands the big one. For the rest of us, sport fishing is a chance to spend time with family and friends, enjoy the outdoors, and take home some halibut for the freezer. No wonder sport fishing for halibut attracts growing crowds and is setting catch records throughout the north Pacific which increasingly makes it an issue for the IPHC. In all, sport fishers landed just over 8.9 million pounds of Pacific halibut in 2004, slightly less than the previous year's revised catch of 9,348,000 pounds which was an all time record for the sport fishery.

Rules of play

Sport fishing regulations in Alaska and British Columbia remained the same as those that were in effect in 2003. Allocative regulations for sport and other fisheries were included in a Catch Sharing Plan for Area 2A which was recommended by the PFMC. The sport fishery in Area 2A was divided into several subareas within which seasons were managed by catch limits. Charter vessels were required to obtain a license from the IPHC and declare whether they intended to operate as a sport charter or commercial vessel. Some minor modifications were implemented in-season for management purposes and to protect certain species of rockfish.

Calculating the catch

The 2004 harvest estimates for the various subareas of Area 2A were provided by the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW) from in-season creel census estimates and a post-season phone survey of users in the Washington Inside Waters (WIW). The Area 2B harvest estimate was provided by the Canadian DFO and was adjusted to include Canadian fish landed in Washington.

The ADF&G typically provides harvest estimates for the current year based on a creel survey in Area 2C and port sampling in Area 3A and updates catch figures for the previous year (current figures can be found in Appendix III). Harvest estimates for Area 2C are based on the Statewide Harvest Survey (SWHS) and in-season creel survey estimates for Ketchikan, Juneau, and Sitka. The Area 3A estimate for 2004 is based on a projection of harvests during the most recent five years, excluding Prince William Sound, where independent harvest estimates are available. Harvest estimates for Areas 3B and 4 are based on a projection of the 1999-2003 harvest estimated from the SWHS and converted to pounds based on the average weight from Kodiak, the nearest sampled port.

Washington and Oregon anglers landed a record halibut sport catch in 2004, even though the harvest fell well below its quota as some cast their lures instead toward an abundance of salmon and Albacore.

Tallying the take

Area 2A

The estimated harvest from Area 2A in 2004 was 486,778 pounds, the largest sport catch for that area on record even though it fell about 15 percent under its limit. Much of the harvest came from the Washington North Coast fishery which closed with an estimated catch of 124,229 pounds, within 3,000 pounds of its quota. The South Coast fishery centered in Westport topped its quota by about 1,300 pounds with an estimated catch of 62,853 pounds. As in 2002, the WIW season has staggered season openings so fishing east of Low point opened three weeks earlier than the area to the west, although each were open for 58 days. The harvest estimate for WIW was 49,577 pounds, less than two-thirds of the catch limit. The Columbia River area produced a sport catch of 14,761 pounds, about 500 pounds over its quota, despite far fewer fishing days than in previous years. Fishers from Ilwaco previously accounted for most

of the Columbia River effort but there was considerable interest from Oregon fishers this year as well. As in previous years, a high proportion of the catch was sampled to provide accurate weight information and averages ranged from 21.6 pounds off the North Coast to 18.6 pounds in the south.

As it did the previous year, the Oregon sport halibut harvest in 2004 fell under its overall quota even though fishing time was extended for several days in August, September, and October. An abundance of salmon again diverted anglers' attention and many turned to Albacore later in the season. The nearshore fishery went well under its quota, landing just nine percent of the allowable harvest. Overall, the combined Oregon sport halibut harvest of 235,788 pounds was about 55,000 pounds under its quota. Average weights were 20 pounds in 2004, nearly the same as in 2003.

British Columbia anglers appear to have set a catch record there with an estimated harvest of almost 1.4 million pounds.

Area 2B

British Columbia also set a catch record in 2004, producing an estimated catch of 1.373 million pounds of halibut, well above the previous record of 1.260 million pounds set in 2002 and the 1.218 million landed last year. The 2004 projected harvest was based on catch data from 1999 to 2003 and then expanded into pounds.

The revised catch for 2003 was provided to the Commission by the DFO. Since average weight information was lacking from British Columbia waters, average weights from adjacent areas were used to expand the catch into total pounds. The catch in the northern region was expanded by an average weight from the Ketchikan area and the catch in the southern region was expanded by the average weight from the Neah Bay, Washington catch. The Commission will use average weights from British Columbia waters when they become available.

Washington anglers caught 9,277 halibut in Canadian waters in 2004 and landed them in Neah Bay, somewhat fewer than the previous year but comparable to the number harvested in 2002. Using an average weight of 21.6 pounds, the estimated harvest was 200,662 pounds.

Area 2C

The 2004 projected harvest in southeast Alaska is estimated to be 2.306 million pounds, just under last year's revised harvest of 2.258 million pounds which set a record for Area 2C. The numbers of fish harvested were identified by SWHS area and were converted to net weight using the average weight from each respective user group. The average weight estimated at 19.6 pounds in 2004 was up from last year's 18.9 pounds.

Area 3A

The Area 3A projected harvest for 2004 was 4.743 million pounds, somewhat less than the updated 2003 harvest of 5.427 million pounds. As in Area 2C, the 2004 catch estimate will be updated when SWHS numbers become available. The Area 3A harvest was also estimated for each user group based on the SWHS and average weights collected from the primary recreational ports including Yakutat, Whittier, Valdez, Seward, Homer, Deep Creek, Anchor Point,

and Kodiak. Care was taken to account for harvests by the charter, private, and military recreation camps. Preliminary indications suggest the overall average weight for the Gulf of Alaska in 2004 was 16.8 pounds, down from 19.3 pounds in 2003.

There may be something to the fish tales. Charter operators claim that average weights in Dutch Harbor are much higher than estimated.

Areas 3B and 4

As elsewhere in Alaska, SWHS numbers are not yet available for Areas 3B and 4 for 2004 so an estimate of the sport catch was made of 9,000 pounds for the western Gulf and 15,000 pounds in the Bering Sea/Aleutians. These will be updated when survey data become available. The 3B catch is the same as last year but the Area 4 catch was only half that of 2003. Part of the decrease is due to a drop in average weight of sport catches from Kodiak Island, the nearest sample available, from 23.1 pounds to 19.6 pounds. This may or may not reflect actual catches out west. If you talk to charter operators or skim through the sport fishing magazines you'll learn that average weights are much higher in Dutch Harbor. Fish tales are just anecdotal but the harvest in Areas 3B and 4 may well be higher than reported.

WASTAGE IN THE 2004 PACIFIC HALIBUT FISHERY

"My fish! They stole my fish!"

Ray Bolanos of Kenmore, Washington had just returned from a successful halibut charter out of Seldovia in late June when he went to pick up his checked baggage at SeaTac airport and found his cooler was empty. Forty pounds of individually wrapped and frozen halibut fillets were missing. "My fish," he yelled. "They stole my fish!"

At first, Bolanos suspected airline baggage handlers or even TSA agents were to blame for taking his prized catch while his flight was delayed in Anchorage. Airport officials, however, were skeptical. While pilfering might occasionally occur, they suggested it's just not that easy to pocket 40 pounds of frozen flatfish.

The missing halibut was a mystery until baggage handlers in Anchorage began asking each other, "What's that smell?"

The two were at odds over the missing halibut when baggage handlers in Anchorage began asking each other, "What's that smell?" There, strewn beneath a new baggage conveyor belt, was what they described as a "ton of rotting fish." Well, 40 pounds at least. The offending fish were tossed and a couple of cans of Lysol were needed to kill the stench.

Bolanos' story had a happy ending. After the conveyor incident gained national media attention, the charter operator in Seldovia offered to replace his missing catch and the airlines agreed to ship it to Seattle for free. "Oh, my goodness gracious," Bolanos told the *Anchorage Daily News*. "That's great."

Killer Whale tooth marks on halibut brought aboard the *F/V Kema Sue*. Photo by Kelly Ames.

While the loss of 40 pounds of halibut on an airline conveyor belt is a shame, it's not actually what the IPHC would classify as waste. Regardless of its ultimate fate, Bolanos' halibut was counted as removed from the biomass as a sport catch. Wastage currently accounts for halibut mortality from commercial halibut fishing. It primarily refers to the mortality of sublegal halibut that are returned to the sea or legal-sized halibut that are caught by lost or abandoned commercial fishing gear. Some day in the future, the IPHC may account for the wastage of halibut from sport fishing, or account for those halibut that are not kept or may die from hooking injuries.

In 2004, the amount of waste of legal-sized halibut due to lost or abandoned gear is estimated at 199,000 pounds, down from a revised 214,000 pounds in 2003.

In 2004, the amount of waste of legal-sized halibut due to lost or abandoned gear is estimated at 199,000 pounds, down from a revised 214,000 pounds in 2003. It is the lowest such wastage in 20 years and a mere fraction of the fish taken by lost gear during the derby days prior to quota share fisheries. However, the preliminary estimate of sublegal-sized halibut killed during the commercial fishery was up in 2004, to 2,099,000 pounds, from a revised 1,781,000 pounds in 2003. The mortality of discarded sublegal-sized halibut is reported so there is a record of the amount although it is not included with other removals in the 2004 stock assessment tables. Instead, this removal is accounted for when setting the exploitation rate.

Getting to the numbers

Wastage from lost or abandoned gear

Information on the amount of gear lost or abandoned in the halibut longline fishery is collected through logbook interviews and from fishing logs received in the mail. Fishery-wide estimates are then extrapolated and applied to the total catch. While gear types vary considerably as to the length of skates, and hook size and spacing, the data are standardized before being used in calculations. Some log data cannot be standardized due to missing information or because the gear fishes differently and are not used in the calculation of effective skates. With the IFQ fishery in Alaska and the Area 2A incidental catch during the sablefish longline fishery, there are mixed halibut and sablefish trips as well as trips which target sablefish and land incidentally-caught halibut. Sablefish gear is considered a non-standard halibut gear that fishes differently, and therefore is not included in the calculation.

Wastage is calculated from the ratio of effective skates lost to effective skates hauled and multiplied by total catch. The calculation is performed using both fixed hook and snap gear in all areas. The Area 2A catch includes the non-treaty directed commercial catch, treaty commercial catch, and incidental catch during the longline sablefish fishery. For 2004, the ratios of effective skates lost to effective skates hauled by regulatory area are as follows: Area 2A = 0.0; Area 2B = 0.003; Area 2C = 0.003; Area 3A = 0.003; Area 3B = 0.001; and Area 4 = 0.004. Since the implementation of the quota share fisheries in 1995, the ratios have fluctuated slightly between years, but are still lower than they were during the derby fisheries. No lost gear was reported in Area 2A, therefore, no wastage is being reported for that area in 2004.

Discard mortality of sublegal halibut

The IPHC's annual Standardized Stock Assessment (SSA) survey provides a base from which to estimate the discard mortality of sublegal halibut and the calculation is adjusted to reflect real world conditions. The current method used to estimate sublegal catch by the commercial fleet is to calculate the sublegal/legal ratio from the grid survey stations in each area that represent the highest one-third of the legal catch weight. Prior to 2000, ratios were calculated using data from all grid stations but this was changed because survey vessels tend to catch more sublegal fish than the average commercial boat.

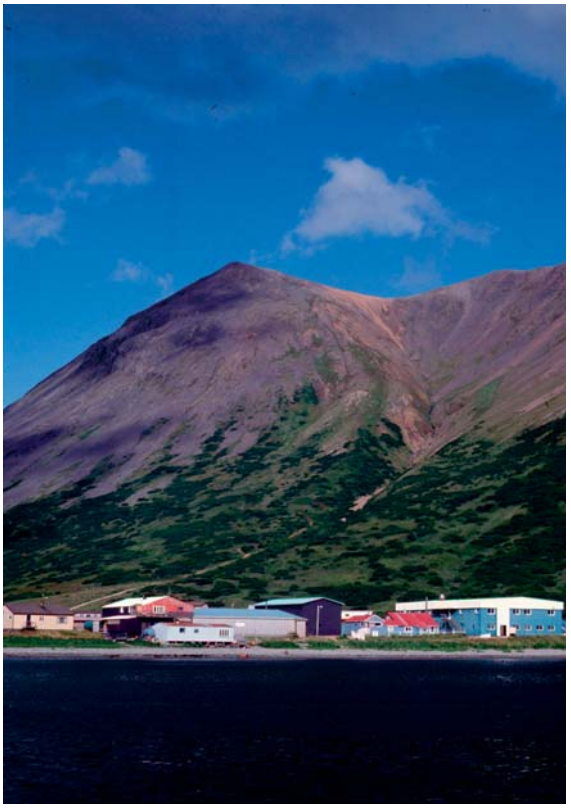
Based on the 2004 grid survey, the ratios of sublegal to legal pounds are: Area 2A = 0.08; Area 2B = 0.15; Area 2C = 0.17; Area 3A = 0.17; Area 3B = 0.29; and Area 4 = 0.09. These adjusted ratios are 56 to 84 percent of the ratios resulting from calculations using all stations. Compared to the previous year, the 2004 ratios of sublegal to legal pounds were similar in most areas, with an increase in Area 2C and a decrease in Area 2A. The discard mortality rate that has been used since 1995 is 16 percent for all areas. This rate was originally based on the bycatch discard mortality observations in the Bering Sea/Aleutians sablefish hook and line fishery, where the pace is similar to that of the quota fisheries. Observer data from the 1996 and 1997 sablefish IFQ fishery also found a 16 percent discard mortality rate, and the same discard mortality rate has been used in the Canadian IVQ fishery since 1991.

To calculate the pounds of sublegal-sized halibut in the commercial fishery, the ratios of sublegal halibut from the surveys were multiplied by the commercial catch in each regulatory area. The resulting poundage was then multiplied by the discard mortality rate of 16 percent to obtain the estimated poundage of sublegal-sized halibut killed in the commercial fishery.

Wastage fluctuates slightly from year to year, but is consistently lower than during the derby days.

Personal Use

One of the biggest changes on the books this year didn't actually occur in 2004 and it might not actually be a change at all. A new method of estimating subsistence catches in Alaska produced some dramatic results, showing the subsistence catch was more than twice what was previously thought. The change, however, is not an actual increase in the catch but instead is due to a more comprehensive method of reporting subsistence harvests. Also, the data are for 2003 and given the 1-year lag in reporting Alaska subsistence catches, the estimate will be carried over for 2004 until revised numbers are available.



King Cove, Alaska. IPHC photo archive.

Beginning in 2003, the subsistence fishery in Alaska was formally recognized, and a survey system was put into place to better account for the removals.

In addition to the subsistence fishery in Alaska, personal use includes the sanctioned First Nations food fish fishery in Canada, ceremonial and subsistence (C&S) removals in the Area 2A treaty Indian fishery, and sublegal halibut retained in Areas 4D and 4E. It does not include commercial or sport caught halibut. Since implementation of the quota share programs in Alaska and Canada, any so-called "take-home fish" is counted as part of the catcher's quota. Overall, personal use harvests were estimated at 1,382,800 pounds in 2003.

Reported harvests by area

Alaska

A new subsistence fishery for halibut was created for Alaska in 2003, formalizing a harvest that was already taking place in most areas. The program uses regulations different from both the sport and commercial fisheries and also requires a survey of subsistence users to better determine the annual harvest. Prior to 2003, estimates of personal use were based on infrequent household interviews and postal surveys. The revised survey conducted by the ADF&G Subsistence Division mailed surveys to all 11,635 Alaskans who registered for the fishery in 2003. Sixty-five percent of surveys were returned and the results were eye opening.

The survey indicated that while fewer than half of the permit holders fished in 2003, they caught a total of 1,041,500 pounds (net weight) of halibut. This is substantially higher than estimates previously used by IPHC (444,000 pounds in 2002), but again, this does not necessarily mean that subsistence harvests have increased, rather it means that harvests are greater than previously believed. This is due to the improved reporting of actual catches, as well as the more generous nature of the new subsistence regulations compared to the previous personal use regulations.

The survey found that almost 60 percent of the Alaska subsistence harvest, 628,000 pounds, came from the southeast Alaska (Area 2C). That's up from estimates of 170,000 pounds in past years. Likewise, the estimate for the Area 3A fishery in the central Gulf was 279,600 pounds, compared to previous estimates of just 74,000 pounds. The Bering Sea/Aleutians areas totaled 105,900 pounds, or roughly 10 percent of the coast-wide harvest. Communities within Area 4E, which includes Bristol Bay, the Yukon Kuskokwim Delta and Norton Sound, accounted for half of the harvest in the Bering Sea/Aleutian areas.

A large portion, about 60 percent, of the Alaska subsistence harvest comes from southeast.

The IPHC previously added the amount of sublegal halibut retained in the Area 4D/4E CDQ fishery to its estimates of personal use. Since fishers that retained sublegal halibut as part of their CDQ harvest were not required to register for the subsistence fishery, those catches were again added to the subsistence harvest figures.

British Columbia

The primary source of unreported personal use halibut in British Columbia is the First Nations food fish fishery, which is estimated by DFO at 300,000 pounds. IPHC receives some logbook and landing data for this harvest but those data do not represent the complete 300,000 pounds.

IPHC receives some logbook and landing data for the First Nations food fish fishery in B.C., but they do not represent all removals.

Washington, Oregon, and California

The treaty Indian C&S allocation is included in the PFMC Area 2A Catch Sharing Plan that includes commercial fisheries, sport fisheries, and treaty Indian fisheries operating off northwest Washington. For 2003, the treaty Indian ceremonial & subsistence fishery was allocated 27,000 pounds. State regulations require that personal use fish from the halibut fisheries be recorded on the fish tickets. Any personal use removals from the directed commercial fishery are included in the commercial catch, consistent with the procedure used in the quota share fisheries.

Retention of sublegal halibut in the Area 4D/4E CDQ fishery

The IPHC has allowed the retention of sublegal halibut for personal use in CDQ fisheries in Area 4E since 1998. In 2002, the exemption was extended to operations in Area 4D but limited to vessels that land all of their catch in either of the two areas. With the development of Alaskan subsistence fishing regulations, the IPHC will review whether the exemption is still needed.

Overall sublegal landings in Areas 4D and 4E in 2004 totaled 16,188 pounds, up 13 percent from the previous year. As in the past, reports were received from three organizations: Coastal Villages Regional Fund (CVRF), Bristol Bay Economic Development Corp. (BBEDC), and Norton Sound Economic Development Corp. (NSEDC).

Bristol Bay Economic Development Corp.

BBEDC fishers fill out a log which includes the lengths of any retained sublegal halibut and those lengths are converted to weights from the IPHC length/weight table. BBEDC reported that 30 of 33 fishers turned in their sublegal halibut report and estimates were made for non-reporting fishers. Overall, 515 halibut were retained for a total of 4,826 pounds, down 24 percent from the previous year. The fish averaged 9.4 pounds, and 88 percent were 28 to 31 inches in length. BBEDC vessels landed halibut in Togiak and Dillingham, and it was reported the fish were traditionally dried and smoked, and generally shared among community members.

Sublegal-sized halibut are retained in some small fisheries in the Bering Sea. In 2004, this catch totalled a little over 16,000 pounds.

Coastal Villages Regional Fund

Coastal Villages Seafoods facilities in six locations weigh undersize halibut during offloads and separate tallies are kept of the poundage of sublegal halibut retained by each harvester. In 2004, plants in Chefornak, Hooper Bay, Kipnuk, Mekoryuk, Toksook Bay, and Tununak recorded sublegal halibut during May 21 through August 9 but no halibut were landed in Quinhagak. Overall, CVRF reported 7,120 pounds being landed, a 41 percent increase from 2003. A total of 831 halibut were recorded, for an average weight of 8.6 pounds. As in previous years, most of the halibut – almost 70 percent – were landed at Toksook Bay and Mekoryuk.

Norton Sound Economic Development Corp.

NSEDC required their vessels to offload all halibut, legal and sublegal. The sublegal halibut were weighed then returned to the vessel. NSEDC had landings from July 18 through October 8 and reported 531 sublegal halibut weighing 4,242 pounds net (head-off), and average weight of 8.0 pounds. The catch is up 43 percent from the previous year but comparable to landings in 2002. As in past years, NSEDC fish were landed in only one port. As they say, there's no place like Nome.

Incidental Catch of Pacific Halibut

When bycatch bites back…

Along with its usual information on halibut stock abundance and health, one of the more interesting sidelights to 2004's Standardized Stock Assessment survey were sharks. Sharks are not uncommon as bycatch in halibut fishing, especially in the more southern waters. Most are smaller dogfish or sleeper sharks but this year there was a sharp increase in blue sharks off the Washington, Oregon and BC coasts, and even one as far north as Sitka. But consider the case when bycatch bit back…

Mark Sappington was skippering his charter boat out of Yakutat in September with six happy clients on board. One was reeling in a good-sized halibut, what seemed to be a 60-pounder, and had just brought it to the surface when the fish abruptly took off. "It was obvious it wasn't going on its own power," Sappington told the *Daily Sitka Sentinel*.

Sorting the trawl catch. IPHC photo archive.

The halibut had just been brought to the surface when it abruptly took off. "It was obvious it wasn't going on its own power."

When the line suddenly went limp, the halibut, or what was left of it, was reeled in. The once 50-inch fish had an 18-inch gash ripped out of its mid section. A large shark had just helped itself to an easy meal and after acquiring a taste for halibut it circled Sappington's boat three times and even took a bite at the vessel's aluminum swim step.

Using the vessel's 30-foot length as a guide, Sappington estimated its length at 20 feet. "It was definitely a Great White," he said as he made halibut tacos from what little was left of the fish. In this case at least, the catch of the day was the one that got away.

Bycatch refers to any non-target species that are caught while fishing and a main concern for the IPHC is when halibut are the species being inadvertently caught. Regulations require that halibut bycatch be returned to the sea with no additional injury but some fish inevitably die from being caught and handled. This incidental mortality is significant, second only to commercial fishing as a removal from the halibut biomass.

Halibut bycatch is slowly but steadily decreasing.

The good news is that halibut bycatch is slowly but steadily decreasing. The preliminary estimate of bycatch mortality in 2004 is 12.44 million pounds, down from 12.8 million pounds in 2003 and the lowest since 1987.

Sources of bycatch estimates

Bycatch estimates are based on observer data for most fisheries and research data for other fisheries.

For most fisheries, the IPHC relies upon bycatch estimates supplied by observer programs overseen by NMFS. In the few cases where direct observations are unavailable, research survey information is used to generate estimates of bycatch. Estimates of bycatch off Alaska for 2004 were based on bycatch reported from fishing conducted through mid-November and projections for fishing through the remainder of the year.

Bycatch mortality in crab pot and shrimp trawl fisheries off Alaska is estimated by IPHC staff from previous studies and is based on bycatch rates observed on research surveys because direct fishery observations are lacking.

The amount of information varies for fisheries conducted off British Columbia. For the trawl fishery, bycatch is managed with an individual bycatch quota program instituted in 1996 by Canada's DFO. Fishery observers sample the catch on each bottom trawler, collecting data to estimate bycatch. Bycatch mortality in other fisheries, such as the shrimp trawl, sablefish pot, and rockfish hook-&-line fisheries, is largely unknown but is believed to be relatively low.

Halibut bycatch in the domestic groundfish trawl fishery operating in Area 2A is estimated from information collected by at-sea observers. Bycatch rates are derived from the observer data, and applied to commercial fishery effort from logbooks. Shrimp trawl fishery bycatch estimates are provided by ODFW staff from examinations of halibut bycatch during gear experiments. The estimates are considered rough approximations given the limited amount of data available, but appear reasonable and are updated every few years. Bycatch in the hook-&-line fishery has been determined through comparisons with the Alaskan sablefish fishery.

Discard mortality rates and assumptions

Discard mortality rates, or DMRs, are used to determine the fraction of the estimated bycatch that dies when returned to the sea, and varies by fishery and area. Where observers are used for fishery sampling, DMRs are calculated from data collected on the release viability or injury of halibut. For areas without observers, DMRs are based on the similarity to other fisheries where data are available.

Observer data are used to estimate DMRs in the groundfish fishery off Alaska, in the trawl fishery in BC, and in the Alaskan scallop fishery. In Area 2B, observers monitoring the Canadian trawl fishery examine each halibut to determine survival. Data collected by observers in the state-managed Alaskan scallop fishery indicates a 50 percent discard mortality rate.

Data to determine DMRs for most other fisheries are not available, so assumptions are made based on similar fisheries where DMRs are known. For Area 2A, the domestic groundfish trawl and shrimp trawls are assumed to have a 50 percent mortality rate, whereas the unobserved hook-&-line fishery for sablefish is assumed to have a DMR of 25 percent. The midwater fishery for whiting is assumed to have a DMR of 75 percent based on the large catches of whiting typical of this type of fishery.

Bycatch mortality by regulatory area

A brief history

Halibut bycatch mortality was relatively small until the 1960s, when the sudden development of the foreign trawl fisheries off the North American coast caused bycatch to increase rapidly to a peak of 21 million pounds in 1965, not including the Japanese directed fishery in the Bering Sea. During the late 1970s and early 1980s, bycatch dropped as foreign fishing off Alaska came under increasing control and reached a low of 7.2 million pounds in 1985, the lowest level since the IPHC began its bycatch monitoring nearly 25 years earlier. As the U.S. groundfish fishery grew off the coast of Alaska in the late 1980s, bycatch mortality increased again and peaked at 20.3 million pounds in 1992 but has since declined. The preliminary estimate for halibut bycatch in 2004 is a total of 12.44 million pounds, a three percent decrease from 2002 and down 39 percent from the peak in 1992. Most of the decrease is attributed to the introduction of Individual Fishing Quotas in the Alaskan sablefish fishery, the Careful Release program for the Alaskan hook-&-line fishery, and Individual Vessel Bycatch Quotas in the Canadian trawl fishery.

Sea sampler, Andy Vatter, displays a Giant Wrymouth, (*Delolepis gigantean*) aboard the *F/V Free to Wander*. Photo by Robert Tobin.

Declining trawl effort and a vessel buy-back program will likely reduce bycatch in Area 2A but the full impact won't be known for years.

Area 2

Bycatch mortality in Area 2 in 2004 was estimated at 1.12 million pounds, up about three percent from 2003 but below the average of 1.43 million pounds recorded since 1995. The primary sources for bycatch mortality in Area 2 are the groundfish trawl fisheries in 2A and 2B, and the crab and shrimp fisheries in 2C. The 2004 estimate includes a rollover of the previous year's data for bycatch in the groundfish trawl and shrimp trawl fisheries and will be updated when actual estimates for 2004 are obtained in 2005. Trawl fishery effort has been declining over the past few years in Area 2A and will likely decline further due to large area closures instituted by the PFMC and a recently approved vessel buy-back program but the impact on bycatch won't be known for several years.

In Area 2B, trawl fishery bycatch was estimated at 260,000 pounds, virtually unchanged from 2003 and just slightly above the average of 230,000 pounds since the Individual Bycatch Quota program began in 1996.

In Area 2C, crab pot fishing and shrimp trawling occur in various locations and harvests have held steady over the years. These fisheries have not been reviewed since the early 1990s, but we are assuming mortality has been relatively unchanged since then.

Bycatch increased in the central Gulf and decreased in the western Gulf, reflecting changes in fishing patterns.

Area 3

Bycatch mortality in Area 3 was estimated at 4.83 million pounds in 2004, a two percent decrease from 2003 but above the 10-year average of 4.5 million pounds. The groundfish fishery continued to be affected by fishery closures inside sea lion critical habitat, which forced vessels to fish in less productive areas and ultimately reduced effort. Bycatch mortality increased 13 percent in Area 3A but decreased 29 percent in Area 3B primarily reflecting changes in fishing effort in the two areas. In Area 3A, trawl mortality continued to climb to 2.95 million pounds in 2004, almost double the level in 2002, but in Area 3B, trawl fishery bycatch declined 39 percent from 2003 to 800,000 pounds.

Halibut often are caught inadvertently in tows targeting other species. Photo by Hilary Emberton.

Mortality was lower for trawl fisheries, due in part to lower quotas for Pacific cod and area closures to protect Steller sea lions.

Area 4

Bycatch mortality in Area 4 decreased five percent in 2003, to 6.5 million pounds, the lowest level seen since 1987. Total mortality was lower for trawl fisheries, due in part to lower quotas for Pacific cod and area closures to protect Steller sea lions. Longline bycatch was unchanged and longliners were not closed by the halibut bycatch limit. Halibut mortality in the pot fishery for cod dropped to 6,000 pounds, the lowest seen since the inception of the fishery in the early 1990s. The Community Development Quota (CDQ) fishery targeted more on pollock than cod and resulted in about 168,000 pounds of bycatch mortality, less than in 1999 when the CDQ fishery focused more on cod.

The Bering Sea Prohibited Species Donation Program

Since 1998, some halibut bycatch from the Bering Sea has been allowed to be retained for distribution to Seattle area food banks. Although limited to shore-based trawl catcher vessels that land in Dutch Harbor, there is neither a limitation

on the amount of pounds that can be donated nor a requirement that the halibut bycatch originate from any specific fishery. NMFS and IPHC staff conducted a review of the program in 2000 and it was extended with a requirement that it be reviewed every three years. Another review was scheduled for 2003 but never completed. Accordingly, IPHC staff will examine the program in the coming year to fulfill this requirement.

Results for 2004

Two Dutch Harbor processors, UniSea and Alyeska, participated in the 2004 program and reported 15,890 pounds of frozen, headed & gutted halibut. The amount is the second lowest total since the program began and compares to a revised 18,406 pounds of bycatch donated to the program in 2003.

The 2004 program halibut were delivered to SeaFreeze in Seattle with shipping donated by Western Pioneer. The fish were processed into steaks, sleeved, and repackaged for delivery to regional food banks and represented over 50,000 meals. SeaFreeze's Quality Assurance manager reported that the fish donated were generally of excellent quality. Any substandard fish were discarded at the time of processing but no significant discards were noted. Recipients of the processed halibut included Food Lifeline in Seattle.

Two Dutch Harbor processors donated over 15,800 pounds of halibut bycatch which represented over 50,000 meals for Washington area food banks.

Assessment of the Pacific Halibut Stock

DeWitt Gilbert, editor of former industry trade journal *Pacific Fisherman* and perhaps best known for writing "Mighty Oregon," the University of Oregon Ducks' fight song, penned a piece of doggerel in 1932 with the optimistic title, "Halibut is Looking Up."

> Don't argue with this flounder fish,
> Who is so toothsome when he's fried;
> In spite of hope and sounder wish,
> He cannot see the other side.

If flatfish can't see the other side, as DeWitt Gilbert famously observed, IPHC scientists go to extraordinary lengths to make sure they can. Each year the IPHC staff uses all the available data from the commercial fishery and scientific surveys to assess the abundance and potential yield of Pacific halibut. Exploitable biomass in most regulatory areas is estimated by fitting a detailed population model to the assessment data from that area and the outlying Areas 2A and 4CDE are estimated by applying a survey-based estimate of relative abundance to the analytical estimate of biomass in an adjoining area.

Just as hauling in a monster halibut takes a team effort, so does the halibut stock assessment. IPHC photo archive.

A target level for all removals is calculated by applying a fixed harvest rate to the estimate of exploitable biomass. This is called the "constant exploitation yield" or CEY for an area.

A biological target level for total removals is calculated by applying a fixed harvest rate to the estimate of exploitable biomass. This target level is called the "constant exploitation yield" or CEY for that area and the corresponding target level for directed fisheries is called the fishery CEY. It comprises the commercial setline catch in all areas plus the sport catch in Areas 2A and 2B and is calculated by subtracting from an estimate of all unallocated removals – bycatch, wastage, fish taken for personal use, and the sport catch in Alaska.

Staff recommendations for catch limits in each area are based on the estimates of fishery CEY but may be higher or lower depending on a number of statistical, biological, and policy considerations. Likewise, the Commission's final quota decisions are based on the staff's recommendations but may be higher or lower.

Evolution of assessment methods

Beginning in 1982, halibut stock assessment relied on a simple age-structured model fitted to commercial catch data, called CAGEAN. In the late 1980s, however, halibut growth rates declined dramatically in Alaska and CAGEAN began to seriously underestimate abundance. Essentially, it interpreted lower catches as an indication of lower abundance but the real cause was lower selectivity at each age, associated with slower growth rates.

IPHC staff sought to remedy this problem in 1995 with a model that made selectivity a function of length and accounted for the observed variations in growth. When fitted to data from Area 2B and Area 3A, however, this model suggested that selectivity was not wholly determined by size but also on behavioral patterns that are more related to age. The age of sexual maturity, for instance, remained virtually the same despite the decrease in growth.

Early assessment models underestimated abundance when halibut growth rates declined, interpreting lower catches as an indication of abundance when the real cause was lower selectivity.

To accommodate that, the model was fitted with both length- and age-specific selectivities. Both seemed to perform better than the old CAGEAN formula but while the two fits produced similar estimates of abundance in Areas 2B and 2C, the two estimates were substantially different in 3A.

The assessment formula was simplified in 2000 as a purely age-structured model which retained the option of basing selectivity on observed length at age. It showed a dramatic retrospective pattern for Area 3A in the 2002 assessment. Treating selectivity as length-specific rather than age-specific largely eliminated the pattern and provided further evidence that setline selectivity is, after all, determined mainly by size rather than age.

Another anomaly of the 3A fit in 2002 was an unexpectedly large number of older fish, those twenty years and over. This was due to an increase in the number of otoliths read by the more accurate break-and-burn method. Surface readings of otoliths tend to understate the age of older fish and as more break-and-burn readings have been done, the number of older fish in the catches increased. The poor fit at these ages indicated a need to go back to the drawing board.

Another problem emerged when more accurate "break and burn" aging of otoliths indicated a lot more older fish, those 20 years and over, than previously believed.

An entirely new model was written for the 2003 assessment that based both commercial and survey selectivity on mean length at age in survey catches. Because females are larger than males, population predictions were done separately for each. This model achieved very good fits to the sex-specific observations and good retrospective performance. It also produced somewhat higher estimates of average recruitment and recruitment variability. With this model, it was possible for the first time to do standalone assessments of abundance in Areas 3B, 4A, and 4B using data going back to 1996.

Features of the 2004 assessment

Two tweaks were made to the 2004 assessment and neither had a significant effect on estimates of abundance. First, both the 2004 PIT tag recoveries and a reanalysis of earlier wire tag data indicated that commercial selectivity is not always asymptotic; rather it seemed more dome-shaped in Area 2B and ramp-shaped in Area 3A. Fitting the assessment model with free-form survey

selectivity produced a similar result and presented no other problems so it was used in the assessment.

The second minor change was to allow sex-specific values for survey and commercial catchabilities in the Area 3A assessment, where the numbers of males were generally in excess of predictions. Males were estimated to be about twice as catchable as females of the same size in Area 3A; even so, these males are estimated to have quite low fishing mortality rates because they are so small.

Analytical estimates of abundance and CEY

Like last year, this year's model fits are generally good and recent retrospective performance is satisfactory. Changes in stock biomass from the beginning of 2004 to the beginning of 2005 as estimated within this year's assessment are all five percent or less except in Area 4B, where there was an estimated 20 percent decrease. Some of the estimates of stock biomass have changed much more than five percent from last year's assessment because the addition of the 2004 data revised last year's estimate of biomass at the beginning of 2004, in most cases downward.

It is downward revisions of last year's estimates that mainly account for the reduction of estimated coastwide exploitable biomass from 431 million pounds to 395.

	2004 biomass 2003 assessment	2004 biomass 2004 assessment	2005 biomass 2004 assessment
Area 2A	8.5	7.9	7.0
Area 2B	65	61	58
Area 2C	80	65	66
Area 3A	146	154	146
Area 3B	65	54	56
Area 4A	21	20	20
Area 4B	15	12	10
Area 4CDE	30	28	32
Total	431	402	395

It is these downward revisions of last year's estimates that mainly account for the reduction of estimated coastwide exploitable biomass from 431 million pounds to 395. Female spawning biomass remains far above the minimum that occurred in the mid 1970s.

Exploitable biomass in Alaska is calculated with a fixed set of length-specific commercial selectivities that increase from zero at 80 cm and level off above 120 cm. In Area 2B the locally estimated selectivities are used because they are substantially higher than the values estimated for the Alaska areas.

Exploitable biomass in Area 2A is calculated as a proportion of the Area 2B estimate: the ratio of each Area's survey CPUE weighted by bottom areas. The idea is that survey CPUE is an index of density and multiplying it by the total bottom area gives an index of total biomass. The proportion this year is 12 percent, down from 13 percent last year as a result of updated CPUE

Dr. William Clark condenses complex stock assessment modeling into plain talk at the Annual Meeting. Photo by Lynn Mattes.

values. Likewise, exploitable biomass in Area 4CDE is calculated as 160 percent of the Area 4A biomass, up from 142 percent last year.

Total CEY is calculated by applying a harvest rate of 22.5 percent in Areas 2A, 2B, 2C, and 3A, and 20 percent in Areas 3B and 4. Last year the target harvest rate for Areas 2 and 3 was 25 percent pending a reanalysis of harvest policy using the new estimates of length-specific commercial selectivity.

Preliminary estimates based on 2004 PIT tag recoveries

Preliminary estimates of harvest rate based on PIT tag recoveries yielded some interesting results.

As part of the 2003 setline survey, the IPHC released some 44,000 halibut injected with Passive Integrated Transponder or PIT tags. The primary purpose of this massive project was to estimate the harvest rate of fully selected halibut by the commercial fishery, but it also permits estimates of length-specific selectivity schedules and rates of migration between areas.

Recoveries of tagged fish released in 2003 indicate harvest rates similar to those estimated by the stock assessment in Areas 2B and 2C, much lower in Area 3A, and almost nil in Areas 3B and 4. There was little migration out of Area 2B, but elsewhere 10-20 percent of legal-sized fish moved from the area of release to another area.

Raw data

Of the almost 44,000 legal-sized fish released in 2003, a total of 383 were recovered from commercial landings in 2004. The great majority of recoveries were made in the area of release but there was some movement among areas.

Recovery rates were expected to vary with length and they did, but not exactly the way we expected.

Recovery rates were expected to vary with length and they did, but not exactly the way we expected. We generally assumed that vulnerability to capture, or selectivity, is an asymptotic function of length, meaning that it increases with length up to some point and then levels off. In Areas 2B and 2C, however, recovery rates increased with length up to about 110 cm and then declined. In Area 3A, recovery rates increased with length over the entire length range. The most surprising pattern was in Areas 3B and 4, where recovery rates were highest among small fish and very few large fish were recovered.

These unexpected patterns prompted a re-analysis of marking experiments carried out by the Commission using external tags. While not usable for estimating exploitation rates, these data can be used to estimate selectivity and they in fact showed patterns in Areas 2 and 3A quite similar to what we are seeing in the 2004 PIT tag recoveries. There are few historical marking data from Areas 3B and 4, but they tend to show a pattern similar to Area 3A, with selectivity ramping up based on length.

Comparison with analytical estimates of harvest rates

The annual stock assessment also estimates harvest rates as a function of length so these can be compared directly with the mark-recapture estimates. In Areas 2B and 2C both the level of harvest rates and the pattern of variation with length are similar to the assessment. In Area 3A, the pattern is similar but the mark-recapture level is only about half the assessment level, indicating about twice the abundance. In Areas 3B and 4, the harvest levels estimated from the tag recaptures is next to nil while the assessment shows harvest rates similar to the other areas.

The role of fishing in the decline of CPUE in Area 4C

Bering Sea Area 4C was established in 1986 at the request of the NPFMC to create fishing opportunities for villagers on the Pribilof Islands. At first, the local fishery appeared to be moderately successful but over the past several years the commercial CPUE has steadily dropped. This drop is consistent for both fixed hook and snap gear, and amounts to a more than 70 percent decline over the past 10 years.

The possible reasons for the decline have sparked speculation and fingers have been pointed at local depletion, an increase in water temperatures, high levels of trawl bycatch, and the impact of fishing pressure itself. To examine the latter, the IPHC looked at commercial catch and bycatch removals, calculated changes in effort, and examined data on the size and age composition of catches.

Since 2002 even increased effort hasn't attained the catch levels of the previous years in Area 4C.

Total removals from Area 4C have increased greatly over the past 10 years while CPUE has steadily declined. Catches increased initially as catch limits and fishing effort increased, offsetting the decline in CPUE but since 2002 even increased effort hasn't attained the catch levels of the previous years. In fisheries parlance, this pattern of increasing effort and decreasing CPUE is called a “one way trip.”

A basic model can be fitted to CPUE and effort data to provide an estimate of maximum sustained yield (MSY), effort levels needed to achieve MSY, and the maximum rate of exploitation. Such a model for Area 4C generates an MSY of about 1.5 million pounds but this estimate is highly unreliable. It has been widely demonstrated that “one way trip” exploitation histories generate poorly determined estimates. This model also assumes a closed population and IPHC tagging data indicates that Area 4C is part of a larger management unit – Area 4CDE.

While we cannot estimate productivity within Area 4C itself, we can make reasoned conclusions about the impact of fishing on the decline in the area's CPUE. Commercial fishing is highly concentrated around the two Pribilof Islands and the level of fishing effort has increased steadily for 15 years. Additional mortality comes from the groundfish fisheries that operate in surrounding waters. Groundfishers' use of trawl gear and cod hooks target smaller halibut than those taken by the commercial fleet so while the commercial fishery targets the legal-sized halibut, the bycatch fisheries are impacting the sublegal populations and reducing future recruitment to the commercial fishery.

Clearly, reducing bycatch mortality in the groundfish fishery would allow more halibut to enter the commercial fishery.

Clearly, reducing bycatch mortality in the groundfish fishery would allow more halibut to enter the commercial fishery. The large 1987 year class has passed through the fishery and there doesn't appear to be a dominant year class following in its wake.

The conclusion is that the level of removals seen the past several years in Area 4C is not sustainable. To fit a more reliable fisheries model, a more variable exploitation history is required. Little can be learned from increasing effort in Area 4C, but a great deal can potentially be learned by reducing effort and observing how the abundance of fish in Area 4C responds. In particular, the resulting change in CPUE would help determine the sustainable levels for this area. Because of the low CPUE, quotas would have to be reduced substantially and held low for a period of time, in order to reduce effort.

Besides fishing, environmental change can influence CPUE by altering distribution patterns and impacting recruitment. The IPHC is looking into the role of the environment in Area 4C and results will be reported as they emerge, but even if the findings were that environmental factors were also responsible for reducing the number of halibut, the resulting management advice – to reduce effort – would be the same.

St. Paul, Alaska. IPHC photo archive.

Halibut is Looking Up

The SSA is conducted with standardized methods, bait, and gear, and provides an important comparison with data collected from the commercial fishery.

The lowly hippoglossus keeps
His eyes forever on the top;
And even when he soundly sleeps
He ne'er permits his gaze to drop.

For fate degreed he spend his days
Serenely swimming on the bottom,
But gave to him this upward gaze;
His meals, the easier to spot 'em.

DeWitt Gilbert, 1932

If halibut are forever looking up, the IPHC casts its eyes downward each year to survey the strength of this bottom dwelling resource. It's called the standardized stock assessment survey, or SSA, and has been conducted since 1963, with the exception of 1987 to 1992. The idea is to get catch information and biological data that are independent of the commercial fishery. The commercial fishery presents a broad sampling of the stock but fishing effort varies in its gear composition and distribution. The SSA provides an important comparison with data collected from the commercial fishery and is conducted with standardized methods, bait, and gear during the summer. The survey also

A big halibut always pumps up the adrenalin, as the crew of the *F/V Clyde* can attest. Photo by Ivan Loyola.

provides a platform to collect biological data to monitor changes in biomass, growth, and mortality in adult and sub-adult components of the population, as well as oceanographic information. Even records of non-target species caught during the survey provide insight into bait competition and are helpful for the assessment, management, and avoidance of bycatch species.

Maintaining the standard

For SSA operations in 2004, thirteen commercial longline vessels, seven Canadian and six U.S., were chartered by the IPHC. A total of 69 trips were made covering 663 charter-days, and successfully surveying 27 separate regions from Oregon to the island of Attu in the Aleutian Islands. All but one of the 1,233 planned stations was completed and 98 percent were considered successful for stock assessment purposes.

Approximately 1,090,433 pounds of halibut, 76,982 pounds of Pacific cod, and 58,720 pounds of rockfish were caught and landed during the SSA. Compared to the 2003 survey, halibut catch per unit effort increased in IPHC Regulatory Areas 2A, 2B and 3A and decreased in all others. In addition to collecting stock assessment data, IPHC samplers tagged 23,437 halibut with PIT tags in Areas 2B and 3A.

Standardized survey gear consists of fixed-hook, 1,800-foot skates with 16/0 circle hooks spaced 18 feet apart and baited with a quarter pound of No. 2 semi-bright chum salmon.

Survey design and procedures

The survey station design and most sampling protocols were the same as the past two years. The 2004 survey design encompassed all offshore waters from Oregon to the Aleutian Islands and along the continental shelf in the northeast Bering Sea. These areas were divided into 27 separate regions with stations located at the intersections of a 10 nmi by 10 nmi square grid along the depth range occupied by Pacific halibut. Each region required 18 to 36 charter days to complete.

In 2004 survey vessels in Areas 2B and 3A were also used as a platform for applying and releasing tags in proportion to halibut abundance. All other regions were surveyed without deploying PIT tags.

Standard survey gear consisted of fixed-hook, 1,800-foot skates with 16/0 circle hooks spaced 18 feet apart. In Areas 2B and 3A, eight skates were fished at each station; the first three hauled were dedicated to PIT tagging operations. In all other regions, six skates were fished at each station. All hooks were baited with the same size piece (0.25 to 0.33 lb.) of chum salmon.

Each vessel set one to four stations daily. To let the gear soak a minimum of five hours before hauling, setting commenced at first light. Soaking gear at night was avoided whenever possible and data from soaks longer than 24 hours were not used. Data from sets were also not used for stock assessment if pre-set limits for lost gear, snarls, predation, or setting off station were exceeded.

While the gear was being set, IPHC samplers recorded the exact number of hooks per skate and any bait lost. During gear retrieval on PIT tagging skates (Areas 2B and 3A only), the first three skates were the focus of the tagging experiment. All viable halibut caught on these skates, were measured, examined for prior hooking injuries, injected with a PIT tag, scanned, and released.

Among the data collected are species ID observations on the first 20 hooks of each skate.

Nonviable legal-sized halibut were processed like other survey fish, and retained for sale.

After the first three skates were aboard, the remaining skates were sampled following the regular survey protocols. On these skates, 20 consecutive hooks were monitored and the hook status, such as the species present on the hook, returning bait, broken gangion, etc., was recorded. Samplers targeted the first 20 consecutive hooks of the skate for this sample but sometimes in areas with high catch rates the need to process fish from previous skates affected where in the hook sequence the sample was taken.

IPHC sea-samplers and the crew of the *F/V Viking Joy* are treated to a visit by Luna in Gold River, British Columbia. Photo by Don "Louie" Savard.

The fork lengths of all halibut landed from survey stations were recorded to the nearest centimeter and converted to weight using a standard formula. The vessel crew dressed all legal-sized halibut and then passed them to an IPHC sampler for sex and maturity determination. Samplers collected otoliths from a random sample for age determination. The sex and maturity of sublegal halibut were recorded only if the fish were randomly selected for otolith collection; the rest were merely measured and released alive.

At the conclusion of hauling, samplers recorded the presence and abundance of seabirds within 50 meters of the vessel's stern. Seabird occurrence data will be used to determine variation in the abundance of seabirds.

Standardized bait

All SSA bait is No. 2 semi-bright, headed and gutted, individually quick-frozen chum salmon. IPHC secured bait preseason when lower-cost chums were available and began arranging bait purchases for the 2004 survey in August 2003. By December 157,000 pounds of bait had been secured from US suppliers and 138,082 pounds from Canadian sources for a total 295,082 pounds. A final purchase of 16,000 pounds from a US supplier was completed in-season for logistical reasons.

Footing the bills

All legal-sized halibut as well as legal-sized nonviable halibut from the PIT tagging skates were retained by survey vessels and sold to offset costs of the

survey program. Survey vessels also retained rockfish and Pacific cod landed as bycatch since they are generally dead or dying upon landing. Revenue from sale of these species is shared between the survey vessel and the agency responsible for management of those species. Fish sales were distributed among buyers and ports. Obtaining fair market value was a main consideration but sales were awarded to buyers based on other factors to assure distribution of sales among as many qualified buyers as possible.

Most vessel contracts provided a lump sum payment plus 10 percent of the halibut proceeds and half of the proceeds from allowable bycatch. Two vessels worked under special cost-sharing arrangements that helped offset survey costs for the Washington, Oregon, and remote Aleutian regions, which are very expensive.

The IPHC completed its 12th consecutive year of stock assessment surveys. Photo by Lara Hutton.

Piggybacking projects

The SSA presents an opportunity to collect information on halibut biology and to conduct other experiments not associated with halibut stock assessment. In 2004, all halibut were also examined for prior hook injuries and the presence of amphipods, chiefly sand fleas. In addition, several other special projects were conducted during the SSA, including:

Special projects conducted during the SSA included a check for environmental contaminants, sleeper shark stock ID, and quality control for PIT tag scanning, among others.

- As part of a study on the development of female halibut, nearly 240 ovary pairs in differing stages of sexual maturity were collected during this year's winter and summer surveys and analysis will occur in 2005.

- IPHC samplers collected halibut flesh samples as part of an ongoing study of environmental contaminants in Alaska fish being conducted by the Alaska Department of Environmental Conservation.

- Pacific sleeper shark tissue samples were collected to study genetic variability for the purposes of stock identification.

- All survey vessels operating in Canada carried a third sampler under contract to the DFO in the second year of extensive bycatch sampling. These individuals recorded hook by hook data and collected age, sex, and maturity data of rockfish and sablefish.

- A study investigating whether species richness and diversity correlates with bottom temperature and depth was conducted in surveys near the edge of the continental shelf off British Columbia and the Aleutian Islands.

- A water column profiler, which measures temperature, depth, and salinity, was deployed in the Semidi region but had to be returned to Seattle to repair a faulty reset switch. The unit was later redeployed in the Shelikof and Seward areas but because of lost time, only 14 profiles were obtained this year.

- As part of the quality control for scanning commercial offloads for PIT tags, several survey vessels placed PIT tags in the retained catch. These fish were then scanned by shore-based IPHC scan samplers for detection.

Results

Catch per unit effort

In 2004, survey CPUE increased in Areas 2A, 2B, and 3A, and decreased in all other areas.

In 2004, all legal-sized fish captured on all effective sets (both PIT and non-PIT destined fish) were incorporated into the catch per unit effort or CPUE calculations. Average CPUE, expressed as pounds per skate, is calculated by dividing the net weight of legal-sized halibut by the number of standardized skates hauled for each station and averaging these for each area.

In 2004, CPUE increased in Areas 2A, 2B and 3A compared to the 2003 results. All other regulatory areas saw CPUE drop compared to the 2003 results. The largest gains in CPUE were seen in Area 2A (up 23 percent) while the biggest drop was in Area 4B (down 32 percent). Downward trends have been seen in Areas 3B and 4A for the last six years and in Area 4B for the last five. The commercial CPUE has had a similar trend in those areas over the past four years.

The distribution of sub-legal and legal-sized halibut by depth was consistent with previous surveys, showing higher abundance of sub-legal fish in shallow waters, and a wide variation in depth range for legal-size fish.

Bycatch

Approximately 118 separate species of fish and invertebrates were caught as bycatch during the 2004 survey.

Approximately 118 separate species of fish and invertebrates were caught as bycatch during the 2004 survey. The most common bycatch in Areas 2A and 2C was sablefish but in Areas 2B and 3A, sharks, mainly dogfish, were the most numerous. The most frequent bycatch in Areas 3B and 4A was Pacific cod. Yellow Irish Lord sculpin was the largest component in Area 4B while skates dominated the bycatch in Area 4D.

Among sharks caught, dogfish were the largest component in Areas 2A, 2B, 2C, and 3A while sleeper sharks dominated the shark category in Areas 3B and 4A. Survey vessels encountered far more blue sharks in 2004 than they did in 2003. Encounters in Area 2A were up 60 percent, and Area 2B saw a 650 percent increase. One blue shark was even caught off Sitka.

Two unidentified gulls were caught in Area 3A despite the use of bird avoidance lines. No marine mammals were caught in 2004.

Otolith collection

The otolith collection goal for the 2004 survey was 2,000 otoliths per regulatory area, with a minimum target of 1,500. This was achieved in all areas except Areas 2A and 4D. This is common in Area 2A despite effectively sampling all fish caught, while the catch in Area 4D dropped considerably in 2004, thereby affecting the number of otoliths obtained. Unfortunately due to collection and lab errors, some otoliths were lost or unusable, resulting in a lower sampling percentage in Area 4B.

Age distribution of halibut in the 2004 SSA

The 1995 year class (9-year-olds) accounted for the largest proportion in numbers of survey-sampled halibut for both sexes for the SSA as a whole in 2004. The next most abundant year classes were 1994 and 1996 (10- and 8-year olds), respectively.

Nine-year-olds were the most abundant age class for female halibut sampled in Regulatory Areas 2, 3, 4A, and 4B. The second and third most abundant age classes for sampled females were 10- and 8-year-olds, respectively.

The *F/V Free to Wander* transits to its next station while on survey. Photo by Tracee Geernaert

The 1995 year class was the most abundant in the survey, while the 1994 year class was the most abundant in the commercial fishery.

The 1995 year class was the largest for male halibut from Areas 2, 3B, 4A, and 4B. Nine-year-olds were the most abundant age class for males overall. The second and third most abundant age classes for sampled males were 10- and 17-year-olds, respectively.

The youngest and oldest halibut in the 2004 setline survey samples were determined to be four and 49 years old, respectively. There were 27 four-year-olds: 10 males measuring between 46 and 75 cm, and 17 females measuring between 45 and 79 cm. There was a single 49-year-old: a male from Area 4A with a fork length of 119 cm.

The median length of all halibut caught on survey stations in 2004 was 84.5 cm. The largest median lengths were found in Areas 4B (94.5 cm) and 4D (97.5 cm).

The largest halibut in the 2004 setline survey otolith collection was a 215-cm female from Area 4B, which was determined to be 31 years old. The smallest halibut sampled were 45 cm in length. There were three 45-cm fish, two from

Area 4A aged at four and six years, and one from Area 4B aged five years.

To test agreement between ages determined by different readers for the same otoliths, paired or 'quality control' readings were made for 1,257 of the otoliths collected in the 2004 setline surveys. Agreement within one year was 83 percent.

Sex ratio of the catch

The sex ratio for mature halibut from the survey catches showed considerable variation among areas, ranging from 36.2 percent to 71.8 percent females, but this is consistent with previous years' results. Individual statistical areas showed even greater variation, ranging from 12 to 100 percent female. In general, the regions to the west of the central Gulf of Alaska, Areas 3B, 4A, and 4B, had lower percentages of females in the catch. These areas also have had the lowest historical exploitation rates. Area 2A had the highest percentage of females in the catch. Most female halibut caught during the summer months when surveys are conducted are in the ripening stage and are expected to spawn in the fall and winter.

Generally, the areas out west such as Areas 3B, 4A, and 4B had lower percentages of females in the catch than other areas. Area 2A had the largest percentage.

Future work

The IPHC plans to continue standardized stock assessment surveys into the foreseeable future but these operations are dependent upon the ability of the project to remain self-funding. Although the surveys are designed to fulfill scientific needs, we have selected station densities and fishing effort so that our ability to conduct the surveys can withstand some variation in price or CPUE. However, if prices or CPUE drop significantly in the future, the IPHC will need to find alternate sources of funding to collect these important data. Conversely, if the Commission receives additional government funding for such research, the amount of halibut sold from the surveys will be reviewed.

Oddities keep things interesting for the IPHC sea-samplers aboard the *F/V Heritage*. Photo by Rob Ames.

For 2005, we plan to conduct a study in Area 3A that will look at the effects of hook size and hook spacing on CPUE.

Prior hook injuries: Results from the 2004 SSA survey

In the mid-1990s, halibut fishers began to notice increasing rates of injuries to the mouth and jaw of halibut. Caused by previous captures, these are known as prior hooking injuries, or PHI, and are primarily observed on the jaw but may also occur on the eye and eye socket. Although groundfish and halibut longline fishers in Alaska are required to practice careful release techniques for all halibut returned to the sea, it was suspected that either the regulations were not being observed by all fishers, or that even the careful release procedures were inflicting more damage than expected. The SSA survey provides a means to examine geographic and size trends in PHI across the entire range of halibut from the northeast Pacific to the Bering Sea; records have been collected since 1997.

The overall incidence of prior hook injuries was found to have decreased slightly since 2003 but remain very high in Areas 4A, 4B, and 4D.

All halibut captured on IPHC survey skates in 2004 were examined for the presence of PHI and any injury was rated based on its severity. This sample totaled approximately 91,000 halibut, substantially more than the 73,000 examined the previous year. The increase is due to change in survey design which allowed the examination of six skates, rather than five, in many of the areas. Of those sampled in 2004, 5,348 halibut were found to have a prior injury. PHI rates ranged from a low of 4.1 percent in Area 4A-Aleutians to a high of 22.7 percent in Area 4D. Other high PHI rates were found in Areas 2A, 9.3 percent; 4A-Bering Sea, 11.2 percent; and 4B, 9.3 percent.

The incidence of PHI among sublegal halibut increased by approximately a half percentage point, to 3.0 percent. Sublegal PHI levels increased in Areas 2A, 2B, 3B, 4A-Aleutians, 4B, and 4D; were unchanged in Areas 2C and 3A; and decreased in Area 4A-Bering Sea. The highest occurrences of sublegal PHI were again seen in Areas 2B, 5.4 percent; 4A-Bering Sea, 6.3 percent, and 4D, 13.7 percent.

While PHI rates have fluctuated in all areas, they appear to be more consistent in Areas 2 and 3, and have been near historic high levels in recent years in the Bering Sea Areas 4A and 4D. The pattern of injuries is similar to that seen in previous years, with the exception of a higher proportion of moderate and severe injuries in Areas 4A-Aleutians and a much higher proportion of the same in Area 4D.

In general, a PHI rate of five percent is very common, and the rate is often higher. Since we started collecting PHI data, rates in the Gulf of Alaska typically have ranged from four to eight percent, and have not exceeded 10 percent. On a more finite scale, PHI rates are much higher; certain survey stations find PHI rates exceeding 25%, such as the Seward Gully as well as stations off the Washington and British Columbia coasts. In the Bering Sea regions, overall values have recently been eight percent or more and have exceeded 20 percent in Area 4D for the past three years. Survey stations in the Bering Sea edge, in particular, show a high rate of PHI. Other locations of noticeably high PHI include eastern Yakutat in Area 3A; the northern and some inside areas of Area 2C; inside areas of Area 2B; and the southern Washington/northern Oregon coast in Area 2A. A high rate of severe injury occurs in Area 4D.

While the overall incidence of halibut PHI has decreased it remains at an increased level in the Bering Sea areas and Areas 2A and 2B. The high PHI

rates observed on IPHC surveys in the Bering Sea and Aleutians reflect the interception of sublegal halibut by the Pacific cod groundfish fisheries in those areas.

While the relative injury distributions by area shown have stayed relatively stable for the past few years in most areas, the data indicates that the relative severity of the injuries in Area 4 have increased from 2003, with over half the injuries observed during our 2004 surveys falling into the moderate or severe categories, up from 25 to 35 percent the previous year.

Studies have shown that moderate and severe injuries often kill the fish, and that fish that do survive either stop growing or grow at a much slower rate.

PHI occurrence rates among sublegal halibut tend to be about half that of all halibut caught, which suggests the infliction of these injuries does not happen just to smaller sized halibut but that injuries continue to accumulate as the fish survive year to year.

This hooking event caused a torn cheek. IPHC photo archive.

The impact of PHI goes beyond the injured halibut that are observed. Studies have shown that moderate and severe injuries often kill the fish, and that fish that do survive either stop growing or grow at a much slower rate.

Halibut mortality from PHI is a function of both incidence and severity. Our data indicate that many of the halibut caught in Area 4 are receiving less-than-careful handling when being released, particularly in the last few years. This behavior is likely a function of many factors, including the high pace of fishing for other species combined with a lack of care for the halibut resource, and may have been made worse in recent years by a race for catches prior to anticipated gear quota allocations in the Bering Sea. Careful handling of bycatch halibut is unlikely to improve without direct individual incentives for such behavior. Education efforts made in the last decade at best seem to have only stabilized the rates of hooking injury and only in the central Gulf. Continued progress in reducing halibut PHI will require the cooperation of all fishers and perhaps more individualized accounting as a disincentive.

Cruise report for the 2004 NMFS Bering Sea trawl survey

In 2004 the IPHC participated in the NMFS annual Bering Sea shelf trawl survey for the seventh straight year. The survey was a continuation of a series which began in 1975 and has continued annually since 1979.

Two vessels participated, each staffed with six scientists, including an IPHC biologist whose main objectives were to collect Pacific halibut data and assist the NMFS staff in attaining their survey goals for other species.

The survey spanned a geographic region from the eastern Bering Sea continental shelf from inner Bristol Bay to the shelf break, and between Unimak Pass to north of St. Matthew Island and took place during the months of June and July.

Survey design

The survey consisted of approximately 380 stations positioned on a 20 nmi x 20 nmi grid along the continental shelf in the Bering Sea, in depths to 200 m. In the past, the survey was restricted to depths greater than 30 meters but several near-shore stations were added in 2000 to obtain better data on yellowfin sole populations. Around St. Matthew and the Pribilof Islands, grid block corners were also sampled to better assess blue king crab concentrations. Halibut were sampled at all but the crab stations.

IPHC and NMFS personnel sort the catch on a NMFS trawl groundfish survey. Photo by Hilary Emberton.

More than 1500 halibut were caught and sampled during the NMFS Bering Sea survey this year.

On average, four to six tows were conducted daily and totaled 78 tows on the first leg, and 75 and 53 tows on the second and third legs, respectively. A total of 1,526 halibut were sampled: 948 on leg one, 450 on leg two, and 128 on leg three. This represents a substantial increase in the number of halibut captured compared to last year's survey.

The trawl survey includes the Bering Sea flats; an area that the IPHC setline survey does not cover.

Standard survey practice calls for the sampling of all halibut for length, otoliths, gender, maturity, and prior hooking injuries. Of the sampled fish, the gender and maturity of each sampled fish was identified and otoliths were collected from each fish measuring 30 cm or greater. Those measuring less than 30 cm in length were packaged and sent to the IPHC office in Seattle as part of an elemental fingerprinting experiment.

Results

All halibut caught on the survey were measured for length. Estimates of relative abundance were derived by expanding the survey catches from the area swept by the trawl to the total survey area but these are not adjusted for size-specific selectivity of trawl gear. Halibut are vulnerable to the trawl from about 20-100 cm, but a significant portion of the commercial-sized population exceeds 100 cm.

In most years, the trawl survey provides the only glimpse the IPHC gets of size classes that are not yet vulnerable to longline gear.

Total abundance as estimated by the trawl survey peaked in 1991 at 67 million halibut. In 2002, estimated abundance was at its lowest point in recent years at just 32 million halibut, but appears to have bounced back to about 66 million halibut in 2004.

Since the Bering Sea shelf survey is conducted annually, it is possible to observe particular size and age classes traveling through the juvenile population. In 2000, a group of very small halibut, 10-19 cm, were visible at the edge of the abundance curve and were identified as 2-year-olds from the 1998 year class. For the past three years, that age class has made a respectable showing making up 30 percent, 22 percent, and 21 percent, respectively, of the total catch. In 2004, the 20-29 cm halibut showed strongly. Aging on the otoliths collected this year will tell whether this most recent surge is made up of two or three year olds, or perhaps both.

Acknowledgements

Survey operations often involve long, demanding days that are spread over a large geographic range and endure a wide variety of weather conditions. In 2004, the IPHC chartered thirteen commercial longline vessels, seven Canadian and six US, for the SSA grid survey operations. Our thanks to the skippers and crews of the participating vessels: the *F/V Blackhawk, F/V Bold Pursuit, F/V Clyde, F/V Free to Wander, F/V Heritage, F/V Kristiana, F/V Pacific Sun, F/V Pender Isle, F/V Predator, F/V Prosperity, F/V Proud Venture, F/V Star Wars II*, and *F/V Waterfall*. Additionally, IPHC samplers worked aboard the trawlers *F/V Arcturus* and *F/V Aldebaran* in the NMFS trawl survey.

Remembering an energetic spirit

The IPHC notes with sadness the loss of Russell Pierce, a crewmember on the *F/V Bold Pursuit*, who died suddenly while participating in the 2004 survey. Russell was involved with IPHC surveys for many years and we will miss his energy and enthusiasm. We extend our condolences to his family and loved ones, and our gratitude to the vessel's crew, our field samplers, and to the US Coast Guard for their efforts that day.

Russell Pierce (right) chops bait while entertaining the crew. Photo by Ayala Knott.

Almanac 2004

23,973	– Number of halibut tagged with PIT tags in 2004
43,999	– Number of halibut tagged with PIT tags in 2003
1,229,487	– Number of halibut scanned for PIT tags in 2004
463	– Total number of PIT tag recoveries in 2004
509	– Total number of PIT tags recovered from 2003 tagging operation in 2003 and 2004
1.16	– Percent of recoveries from 2003 tagging
18	– Diameter, in inches, of bite taken from a sports caught halibut off Yakutat by a Great White shark.
84.5	– Median length in cm of all halibut caught on survey stations
84.6	– Length in inches (215 cm) of the largest halibut caught in the 2004 SSA
331.9	– Estimated round weight of the same, in pounds.
352.5	– Weight in pounds of Don Hank's 96-inch winning Homer Derby halibut
16.8	– Average weight, in pounds, of sports-caught halibut in Area 3A
51,298	– Value, in $US, of top prize in the 2004 Homer Jackpot Halibut Derby
145.48	– Value per pound, in $US, of Hank's winning derby halibut
3.03	– Average price, in $US, received for landed SSA halibut
1,090,433	– Pounds of halibut landed during 2004 SSA
76,982	– Pounds of Pacific cod caught incidentally
58,720	– Pounds of rockfish caught incidentally
311,082	– Pounds of #2 chum salmon used as bait
91,000	– Approximate number of halibut examined for PHI during the 2004 SSA
5,348	– Number of examined halibut found to have a prior hook injury
4,462	– Number of halibut fishing logs collected from all ports
1,526	– Number of halibut sampled during the 2004 NMFS trawl Survey
650	– Percent increase in blue shark bycatch in Area 2B compared to the previous years' SSA
155,555	– Pounds of halibut delivered to food banks since inception of Prohibited Species Donation program in 1998
66,000,000	– Estimated number of Bering Sea halibut based on the NMFS trawl survey
395,000,000	– Total exploitable halibut biomass based on the 2004 SSA, in pounds.

IPHC Research

How Halibut Grow

Page Doctor Thompson, if you please,
And let the doc be told
Fish grow not only in the seas,
But also in the hold.

For halibut at fishing time,
The vessel on the grounds,
Will all be chix and twenties prime,
With none o'er thirty pounds.

But when these fish are taken out,
And put upon the scales
The chix are forties, thereabout,
And the mediums are whales.

Page Doctor Thompson, if you please,
And ask the doctor nice,
Why fish grow slowly in the seas,
But rapidly in ice?

Attributed to DeWitt Gilbert, November 1935

DeWitt Gilbert's little piece of doggerel, seemingly of a fisher caught under-reporting his catch, a common ruse to avoid trip limits of the 1930s, underscores the danger of relying on anecdotal information. Fortunately, the IPHC takes pride in its history of scientific inquiries from its first director, Dr. William F. Thompson, to the present.

That history continued in 2004 with continued work on PIT tagging of halibut, the largest single tagging operation in the 81-year history of the Commission, as well as research into the decline in catches near the Pribilof Islands, the classification of maturity of female halibut, and determining whether trace elements in halibut earbones, or otoliths, can be used to trace them back to their place of birth.

Since 1925, over 450,000 halibut have been tagged and more than 47,000 of these have been recovered.

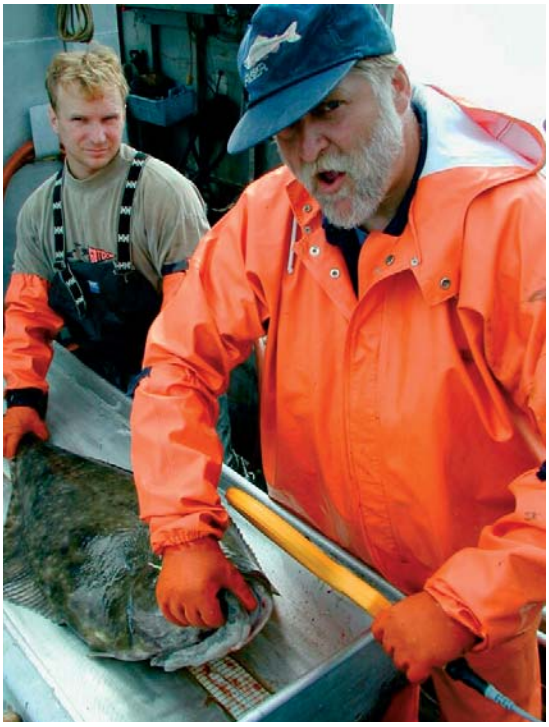
Tagging in 2004

Since the IPHC began tagging halibut in 1925, over 450,000 tagged halibut have been released and more than 47,000 of these have been recovered. Halibut are tagged to study migration, utilization, age, growth, and mortality. In 2004, the IPHC completed the second year of the PIT tag experiment. Also this year, 14 tags from non-PIT tag experiments were recovered; two of these recoveries

were from projects completed in the 1980s. The farthest distance traveled by a tagged fish was from a release off Kodiak Island that turned up in Queen Charlotte Sound. Recovery rates for these non-PIT tagging studies vary from three percent to 47 percent.

PIT tagging continues

The IPHC released a total of 23,437 PIT tags on the setline survey in 2004, following up on the successful experiment conducted in 2003 in which almost 44,000 PIT tags were released. A PIT tag is an integrated circuit chip and antenna coil encapsulated in glass and is about the size of a grain of rice. Each tag has a unique alphanumeric code that can be transmitted and read when the tag is energized by an electronic scanner.



Staff member, Steve Kaimmer, and sea sampler, Rob Ames, use a scanner to make sure the tag is properly placed. IPHC photo archive.

The object of the original experiment was to provide the IPHC with unbiased estimates of exploitation rates independent from the assessment model and also provide information on migration. The objective of this years' experiment was to provide information to estimate annual natural mortality by releasing tags in two areas in consecutive years and comparing recovery rates. Once again, the assessment survey proved to be an invaluable platform from which to release PIT tags across a broad area.

Tagging procedures and results

PIT tagging in 2004 was limited to Areas 2B and 3A, where tag recovery rates are generally the highest. Eight skates were fished on each survey station in these two areas compared to six in all other areas, with tagging occurring on the first three skates hauled. The vessels and sea samplers employed the same tagging procedures and hardware that were used in 2003. All fish destined to be tagged were carefully brought aboard with minimal injury. Each fish was prescanned to check for the existence of a previously implanted PIT tag. If the fish was not already carrying a tag, the PIT tag was implanted in the white side of the head on the opercular plate, just below the preopercular groove, using a hypodermic needle and then scanned with the stick reader to stream the tag number to the recording device. After being tagged, the fish was measured for length, assessed for prior hook injuries, and then released.

If the fish was not already carrying a tag, the PIT tag was implanted in the white side of the head on the opercular plate,

PIT scan supervisor, Joan Forsberg, and IPHC employee, Laura Mitchell, scan halibut in a Bellingham, Washington fish plant. Photo by Tracee Geernaert.

The smallest fish tagged was 44 cm; the largest was 214 cm, both in Area 3A.

Releases totaled 3,086 in Area 2B and 20,351 in Area 3A, for a total of 23,437 tags. As in 2003, the 2004 tags were released in proportion to abundance throughout the survey area. In Area 2B, tag releases were greatest in the Charlotte region, followed closely by St. James. In Area 3A, the Albatross region had the highest number of tags released, 4,489 releases, followed by the Portlock and Gore Point regions. The proportion not tagged was 4.5 percent, which was similar to the rate of 5.0 percent observed in the larger 2003 project.

In Area 2B, 46 percent of the fish were sublegal, whereas 34 percent were sublegal in Area 3A. The smallest fish tagged was 44 cm; the largest was 214 cm, both in Area 3A.

The goal was to scan at least 25 percent of the halibut landings in each regulatory area.

Portside sampling for PIT tags

Portside scanning protocols that were developed in 2002 were used again in 2004 along with the same scanning equipment that was selected in earlier tests. Scanning took place in major ports with the goal of scanning at least 25 percent of the coastwide halibut landings by regulatory area. Samplers were instructed to scan as many fish as possible in their port on their scheduled workdays.

The equipment used was the handheld Allflex-Boulder ISO Compatible RF/ID Portable Reader, or “Boulder” reader. When tags are detected the Boulder sounds a “beep,” the LCD screen lights up to display the tag number and it saves the number in its memory. Because of background noise and glare in the plants, samplers occasionally miss the beep or the display on the LCD screen so they double check the memory at the end of every sample even if no tags were observed during scanning. In 2003, 10 PIT tags that were not noticed during

scanning were discovered in memory and at least 15 tags were recovered from memory in 2004.

As in 2003, IPHC hired seasonal employees for Alaska, while BC ports were sampled under a contract with Archipelago Marine Research (AMR). In Alaska and British Columbia, scan samplers were deployed in the same ports staffed by IPHC port samplers, with the addition of Ucluelet and Tofino in BC. Sampled ports received a major portion of the commercial catch.

The start of portside commercial scan sampling was concurrent with the start of the fishing season, with sampling beginning March 1 in the Alaskan ports of Petersburg, Sitka, Juneau, Seward, Homer, Kodiak, and Dutch Harbor, and in the BC ports of Port Hardy, Vancouver, Prince Rupert, Ucluelet, and Tofino. Sampling in these ports was continuous through November 15 with the exception of southeast Alaska. Southeast halibut landings are relatively low in July and August so samplers there were either deployed on survey vessels or took leave. Saint Paul was staffed between June 20 and August 16 when most landings occur in the Pribilofs.

Scan sampling in Area 2A was expanded in 2004 to include the Washington tribal commercial and sport fisheries, which were not sampled in 2003 because the fisheries had closed by the time tagging began in 2A. The Washington tribal commercial fishery was sampled in the ports of Neah Bay, Taholah, and Bellingham by Makah Fisheries Management, Quinault Fisheries, and IPHC staff, respectively. Non-tribal commercial scan sampling in Area 2A took place in Newport, Oregon for all four fishing periods that occurred between late June and mid-August. Halibut landed as incidental catch in the Washington sablefish fishery were sampled in Bellingham from May through October.

Area 2A is the only regulatory area where scanning is done on sport catch, since a relatively large portion, 39 percent of the quota, is allocated to the sport fishery. As in 2003, scanning was conducted in the Oregon ports of Newport, Depoe Bay, and Garibaldi by ODFW staff, however scanning occurred over a longer period in 2004 (May 1 through October 31). Scanning of the Washington sport fishery was conducted by WDFW staff in the ports of Ilwaco, Westport, La Push, and Neah Bay between May 1 and July 25.

Scanning rates were greater than 25 percent in all areas with an average of 43 percent.

Scanning results

The second year and first full season of the PIT scan sampling program went smoothly with continued good cooperation from processors. Altogether, 1,229,487 halibut were scanned between February 29 and November 15. Scanning rates were calculated by dividing the estimated pounds scanned by landed weight for each regulatory area. Scanning rates were greater than 25 percent in all areas, with an overall average of 43 percent. Estimated pounds scanned was calculated for each area by multiplying the pieces scanned for that area by the average weight of halibut in the 2004 commercial catch for that area. Average weights by regulatory area for the 2004 commercial catch were estimated from commercial catch samples.

Sixty-three percent of scanned halibut were scanned ‘head-on’ or whole. We detected 506 PIT tags were detected over the season: 422 were releases from the primary experiment conducted on the 2003 setline survey; 39 were recoveries from pilot studies, demonstration charter, or double-tag experiments;

and 45 were recoveries of tags released in 2004. Of the 422 primary experiment tags recovered in 2004, 39 were recovered during the setline surveys and will be treated separately in the analysis of the primary PIT tag experiment.

May was the busiest month for scanning for all ports combined. In terms of numbers scanned, March was the busiest month for Area 2, May was the busiest month for Area 3, June was the busiest month for Area 4B, and July was the busiest month for Areas 4A, 4C, and 4D. The months with the most fish scanned corresponded to the months with most pounds landed in Regulatory Areas 2A, 2B, and 3, but not for the other regulatory areas.

The portside scanning program is scheduled to continue through 2006 and scanning protocol and sampling rates will remain the same in 2005.

Thermal habitat preferences of Pacific halibut and the potential influence on a local fishery

There has been much speculation about the causes of the decline in catch rates around the Pribilofs, including whether changes in water temperature are related with changes in the catch.

Halibut catches around the Pribilof Islands Area 4C have steadily declined in recent years, with 2003 harvests amounting to less than 45 percent of the combined CDQ and IFQ quotas. This has resulted in much speculation about the possible causes, including the possibility of local depletion. In addition to local harvest, changing environmental conditions might also be a factor determining either local abundance or catchability. In particular, water temperature may influence the movement and migration patterns in nearshore waters, and changes in the temperature might be correlated with changes in catch.

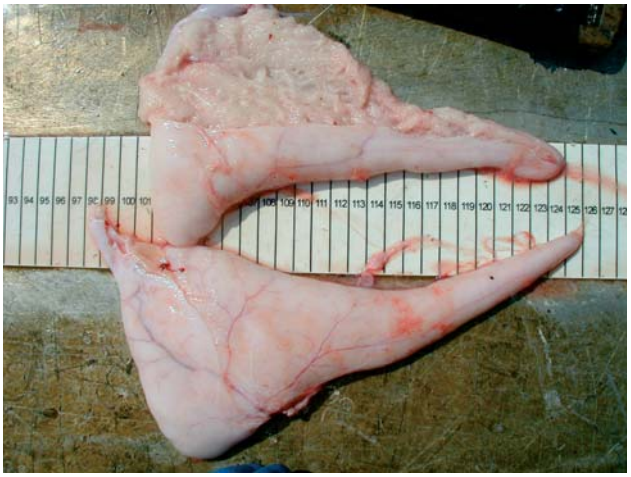
The WaDar is used on surveys and in the Pribilof Islands to monitor bottom temperature. The device is attached to an anchor and thrown over with the gear. IPHC photo archive.

In 2002, a pilot study was initiated to determine the feasibility of deploying temperature loggers on commercial gear, in order to monitor the temperatures experienced by the fleet and correlate temperature and catch. In 2003, the study was expanded with financial assistance from the North Pacific Research Board. Data were obtained from a total of 114 apparent longline sets conducted during 2002 and from 266 apparent sets in 2003; loggers were deployed throughout the 2004 commercial season, but data have not been fully processed. The 2002-

03 data clearly demonstrate the seasonal warming trend, with highest bottom temperatures generally occurring in early September. Maximum daily bottom temperatures appear to have increased between 2002 and 2003, with 2003 temperatures roughly 0.50-0.75° C (0.90-1.35° F) higher than 2002.

Analysis of halibut gonad staging

In recent years, anomalies in the maturity classification of female halibut have been apparent during the stock assessment surveys. Because this plays a critical role in harvest rate evaluations and is used to calculate female spawning biomass, it was decided to investigate gonadal staging more closely. In 2004, during winter and summer surveys, female gonads in four stages of development were collected from three different regions. Nearly 240 gonad pairs have been collected and multiple sites from each sample will be analyzed in 2004. The long-term objectives are to establish an annual timeline of gonadal development for female halibut, from the immature stage, and to establish a spawning schedule, geographically, from south to north, within the range of halibut.



Ovaries were collected for a maturation study in 2004. Photo by Chris Clarke.

The classification of female halibut's maturity plays a critical role in evaluating harvest rates and calculating spawning biomass so it was decided to investigate gonad staging more closely.

Using otolith chemistry to determine halibut nursery origin

Work continued in 2004 on a study to determine whether the chemical composition of halibut earbones, or otoliths, can be used to ascertain the nursery origin of adult halibut and movement of juveniles. Eastern Pacific halibut are believed to stay in nursery grounds located throughout the Gulf of Alaska and southeast Bering Sea for approximately two years after which they migrate to the adult fishing grounds. Little is known, however, about how far juveniles migrate or whether individual fishing grounds are supplied by specific nursery areas or are populated by a complex mixture of individuals reared throughout the geographic range.

To answer these questions, researchers have tried to determine whether the accumulation of these trace elements in the halibut's otoliths can be used as an Otolith Elemental Fingerprint or OEF that can trace them back to a specific nursery area.

Since this project began, three years were spent collecting juvenile halibut from dozens of locations from British Columbia through to the Bering Sea, in order to assess whether the otoliths retain detectable levels of trace metals that might be used to determine spatial and temporal variability in OEFs. The majority of halibut collected were received from outside agencies as bycatch during groundfish and shrimp assessment surveys. A few were received from other researchers working in Alaska waters and from the IPHC's own efforts in Southeast Alaska.

For the spatial comparison, the concentration of 14 isotopes representing 12 elements was examined, with promising results. There is strong evidence that halibut do retain distinct elemental signatures within their otoliths and a preliminary analysis suggests that these OEFs may be distinct enough to distinguish fish at regional scales. However, the data included potentially troubling biases and these issues need to be addressed as the research progresses.

A handling study was conducted to determine whether shifts might have occurred due to length of time the fish were held frozen and how quickly they were thawed prior to dissection. No directional shifts were detected for five different freeze-length treatments that included 29, 53, 77, 101, and 129 days; or three thaw-length treatments that included 1, 24, and 72 hours.

Using a small otter trawl, sampling was conducted with the main objectives of collecting early juvenile halibut (age-0 and age-1) for use in the OEF study and to locate and establish nursery sites for future study.

Cruise report for 2003-04 southeast Alaska juvenile Pacific halibut collection charters

As part of the otolith chemistry study, two 50' salmon seine vessels (*F/V Andy Sea* and *F/V Heron*) were chartered during the summers of 2003 and 2004 to conduct trawl sampling of juvenile halibut in southeast Alaska. Using a small otter trawl, sampling was conducted with the main objectives of collecting early juvenile halibut (age-0 and age-1) for use in the OEF study and to locate and establish nursery sites for future study. Sampling was conducted over a geographic range that encompassed both inside waters and a coastal site, all at roughly the same latitude, and sampling at two sites was repeated over the course of two years to allow for interannual comparison of otolith chemistry.

Three general areas were visited in Frederick Sound: Cape Fanshaw, Pybus Bay, and Herring Bay. A coastal site was established in Shelikof Bay, on Kruzof Island. Early juvenile halibut were captured at all sites visited in both years. However, catch rates varied substantially among individual sites as well as among sampling periods within sites, and sites also varied with respect to the ease with which they could be fished.

Fanshaw Bay in eastern Frederick Sound proved to be the easiest site to work, with consistently high catch rates of age-1 halibut. From the limited number of samples collected, it appears that age-1 halibut from Frederick Sound are generally smaller than their coastal counterparts. Water temperatures recorded during trawling operations suggest that Frederick Sound is typically 1-2 degrees (Celsius) cooler than the coastal site during summer months.

Cruise report for 2004 winter charters

Three longline vessels (*F/V Free to Wander, F/V Nopsa*, and *F/V Kema Sue*) were chartered during January and February of 2004 to conduct sampling operations in the Gulf of Alaska and southeast Bering Sea at three locations: the Queen Charlotte Islands of British Columbia, Portlock Bank east of Kodiak, and the Misty Moon ground in the southeast Bering Sea. The primary objective of the charters was to obtain tissue samples from mature fish for use in a future study of population structure. In addition, otoliths were collected in order to age the fish, and for use in a chemical analysis of spawning site fidelity, and ovaries were collected from a subsample of the females to examine maturity schedules and egg development during spawning season. Mature fish were successfully captured and sampled at all sites, with males captured at higher rates than females. Fin clips were taken from a total of 100 mature males and 63 mature females at Queen Charlotte, 100 males and 63 females at Portlock, and 101 males and 56 females at Misty Moon. Female size distribution was larger than male size distribution in all regions.

The primary objective of the charters was to obtain tissue samples from mature fish for use in a future study of population structure.

The *F/V Free To Wander* conducted special winter operations for the IPHC. Photo by Tracee Geernaert.

APPENDICES

The tables in Appendix I provide catch information for the 2004 commercial and tribal fisheries. The areas specified are the IPHC Regulatory Areas, depicted in Figure 1 of this report. Appendix II shows the fishing period limits used during the 2004 seasons, and Appendix III reports on the most current sport fishing statistics.

All of the weights used are dressed (eviscerated), head off. Round weight can be calculated by dividing the dressed weight by a factor of 0.75.

Appendix I.

Table 1. The 2004 total removals of Pacific halibut by regulatory area (thousands of pounds, net weight).

Table 2. Commercial catch (including IPHC research catch) and catch limits of Pacific halibut by IPHC regulatory area (thousands of pounds, net weight), 1996 - 2004.

Table 3. The total catch (thousands of pounds, net weight) from the 2004 commercial fishery, including IPHC research catch, of Pacific halibut by regulatory area and month.

Table 4. Number of vessels and catch (thousands of pounds, net weight) of Pacific halibut by vessel length class in the 2004 commercial fishery a) for Area 2B, Alaska, and the Alaskan regulatory areas, and b) Area 2A commercial fisheries not including the treaty Indian commercial fishery.

Table 5. Commercial fishing periods, number of fishing days, catch limit, commercial, research, and total catch (thousands of pounds, net weight) by regulatory area for the 2004 Pacific halibut commercial fishery.

Table 6. Commercial landings (thousands of pounds, net weight) of Pacific halibut by port, country of origin and IPHC research catch for 2004.

Table 7. Commercial halibut fishery catch (thousands of pounds, net weight) in 2004 by country, statistical area, and regulatory area.

Appendix II.

Table 1. The fishing period limits (net weight) by vessel class used in the 2004 directed commercial fishery in Area 2A.

Table 2. Metlakatla community fishing periods, number of vessels, and halibut catch (net weight), 2004.

Appendix III.

Appendix I.

Table 1. The 2004 removals of Pacific halibut by regulatory area (thousands of pounds, net weight).

Area	2A	2B	2C	3A	3B	4	Total
Commercial[1]	884	12,162	10,233	25,168	15,460	9,204	73,111
Sport	487	1,373	2,306	4,743	9	15	8,933
Bycatch Mortality:							
Legal-sized fish	367	140	149	1,520	393	2,725	5,294
Sublegal-sized fish	136	121	205	2,084	837	3,764	7,147
Personal Use[2]	19[3]	300	628	280	28	122[4]	1,377
Wastage:							
Legal-sized fish	0	31	76	15	40	37	199
Sublegal-sized fish	4	299	274	675	716	131	2,099
Total	1,897	14,426	13,871	34,485	17,483	15,998	98,160

[1] Commercial catch includes IPHC research catch.
[2] Includes revised estimates for the 2003 subsistence harvest in Alaska.
[3] Treaty Indian ceremonial and subsistence harvest authorized in the Catch Sharing Plan.
[4] Includes 16,188 pounds of sublegal halibut retained in the 2004 Area 4DE Community Development Quota fishery.

Appendix I.

Table 2. Commercial catch (including IPHC research catch) and catch limits of Pacific halibut by IPHC regulatory area (in thousands of pounds, net weight), 1996 - 2004.

Reg. Area	Commercial Catch[1]								
	1996	1997	1998	1999	2000[2]	2001	2002	2003[2]	2004
2A[3]	296	413	460	450	482	680	851	819	884
2B	9,545	12,420	13,172	12,705	10,811	10,288	12,074	11,789	12,162
2C	8,872	9,920	10,196	10,143	8,445	8,403	8,602	8,410	10,233
3A	19,693	24,628	25,698	25,316	19,288	21,541	23,131	22,748	25,168
3B	3,662	9,072	11,161	13,835	15,413	16,336	17,313	17,231	15,460
4A	1,699	2,907	3,418	4,369	5,155	5,015	5,091	5,024	3,562
4B	2,069	3,318	2,901	3,571	4,692	4,466	4,080	3,863	2,719
4C	680	1,117	1,256	1,762	1,737	1,647	1,210	886	954
4D	706	1,152	1,308	1,891	1,931	1,844[4]	1,753[4]	1,965[4]	1,655[4]
4E	120	251	188	264	351	479[4]	555[4]	415[4]	314[4]
Total	47,342	65,198	69,758	74,306	68,305	70,699	74,660	73,141	73,111

Reg. Area	Commercial Catch Limits[5]								
	1996	1997	1998	1999	2000	2001	2002	2003	2004
2A[3]	275	374.2	440.9	412.5	468.1	681.4	817.9	817.9	890.4
2B	9,520	12,500	13,000	12,100	10,600	10,510	11,750	11,750	12,550
2C	9,000	10,000	10,500	10,490	8,400	8,780	8,500	8,500	10,500
3A	20,000	25,000	26,000	24,670	18,310	21,890	22,630	22,630	25,060
3B	3,700	9,000	11,000	13,370	15,030	16,530	17,130	17,130	15,600
4A	1,950	2,940	3,500	4,240	4,970	4,970	4,970	4,970	3,470
4B	2,310	3,480	3,500	3,980	4,910	4,910	4,180	4,180	2,810
4C	770	1,160	1,590	2,030	2,030	2,030	2,030	2,030	1,720
4D	770	1,160	1,590	2,030	2,030	2,030	2,030	2,030	1,720
4E	120	260	320	390	390	390	390	390	345
Total	48,415	65,874.2	71,440.9	73,712.6	67,138.1	72,721.4	74,427.9	74,427.9	74,665.4

[1] Commercial catch includes IPHC research catch and in Area 2C, the Metlakatla fishery catch.
[2] Poundage figures have been updated from previous publications.
[3] Does not include treaty Indian ceremonial and subsistence fish.
[4] Areas 4D CDQ could be fished in Area 4E by NMFS enforcement waiver (2001) and IFQ regulation (since 2002).
[5] Additional carryover from the underage/overage plan for the QS programs not included.

Appendix I.

Table 3. The total catch (thousands of pounds, net weight) from the 2004 commercial fishery, including IPHC research catch, of Pacific halibut by regulatory area and month.

Reg. Area	Feb./Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Total
2A	215	135	122	173	166	43	24	6	-	884
2B	2,131	1,531	1,348	866	1,196	1,518	1,431	1,355	786	12,162
2C	1,265	1,597	1,819	1,468	1,162	1,096	732	811	283	10,233
3A	3,563	3,386	4,609	3,329	2,289	3,052	2,324	1,970	646	25,168
3B	623	1,135	3,120	2,919	2,527	2,507	1,535	744	350	15,460
4A	26	21	357	536	1,017	880	467	216	42	3,562
4B	53	29	214	462	596	837	421	64	43	2,719
4C	-	-	-	245	341	170	116	76	6	954
4D	-	18	-	86	628	706	196	21	-	1,655
4E	-	-	34	110	80	49	37	4	-	314
Alaska Total	5,530	6,186	10,153	9,155	8,638	9,297	5,828	3,906	1,370	60,063
Grand Total	7,876	7,852	11,623	10,194	10,002	10,858	7,283	5,267	2,156	73,111

Appendix I.

Table 4a. Number of vessels and catch (thousands of pounds, net weight) of Pacific halibut by vessel length class in the 2004 commercial fishery, including IPHC research catch, for Area 2B, Alaska, and the Alaskan regulatory areas.

	Area 2B		Alaska	
Overall Vessel Length	**No. of Vessels**	**Catch (000's lbs.)**	**No. of Vessels**	**Catch (000's lbs.)**
Unk. Length	29	402	70	272
0 to 25 ft.	0	0	196	338
26 to 30 ft.[1]	-	-	124	760
31 to 35 ft.[1]	9	115	254	5,569
36 to 40 ft.	55	1,819	199	3,124
41 to 45 ft.	61	2,870	175	4,590
46 to 50 ft.	25	2,026	152	6,377
51 to 55 ft.	28	2,006	74	4,093
56 + ft.	34	2,924	279	34,942
Total	241	12,162	1,523	60,065

	Area 2C		Area 3A	
Overall Vessel Length	**No. of Vessels**	**Catch (000's lbs.)**	**No. of Vessels**	**Catch (000's lbs.)**
Unk. Length	55	193	11	56
0 to 25 ft.	60	115	33	114
26 to 30 ft.	50	337	25	138
31 to 35 ft.	110	1,314	105	2,260
36 to 40 ft.	114	1,182	90	1,417
41 to 45 ft.	92	1,448	105	2,252
46 to 50 ft.	92	1,906	85	2,917
51 to 55 ft.	42	1,141	39	1,708
56 + ft.	104	2,597	210	14,306
Total	719	10,233	703	25,168

	Area 3B		Area 4	
Overall Vessel Length	**No. of Vessels**	**Catch (000's lbs.)**	**No. of Vessels**	**Catch (000's lbs.)**
Unk. Length[2]	-	-	3	6
0 to 25 ft.[2]	4	17	104	110
26 to 30 ft.	0	0	51	285
31 to 35 ft.	34	960	55	1,034
36 to 40 ft.	26	444	6	82
41 to 45 ft.	31	744	6	145
46 to 50 ft.	33	1,186	9	368
51 to 55 ft.	24	902	5	342
56 + ft.	153	11,207	80	6,832
Total	305	15,460	319	9,204

Appendix I.

Table 4b. Number of vessels and catch (thousands of pounds, net weight) of Pacific halibut by vessel length class in the 2004 Area 2A commercial fishery, not including the treaty Indian commercial fishery

	Area 2A Directed Commercial	
Overall Vessel Length	**No. of Vessels**	**Catch (000's lbs.)**
Unk. Length	0	0.0
0 to 25 ft.[1]	7	1.1
26 to 30 ft.[1]	-	-
31 to 35 ft.[2]	-	-
36 to 40 ft.[2]	20	34.0
41 to 45 ft.	25	53.0
46 to 50 ft.	13	22.0
51 to 55 ft.	8	16.0
56 + ft.	21	114.0
Total	94	240.1

	Area 2A			
	Incidental Commercial (Salmon)		**Incidental Commercial (Sablefish)**	
Overall Vessel Length	**No. of Vessels**	**Catch (000's lbs.)**	**No. of Vessels**	**Catch (000's lbs.)**
Unk. Length[3]	-	-	0	0.0
0 to 25 ft.[3]	8	1.7	0	0.0
26 to 30 ft.	11	2.7	0	0.0
31 to 35 ft.	22	1.9	0	0.0
36 to 40 ft.	40	6.7	4	5.3
41 to 45 ft.	37	20.3	9	18.4
46 to 50 ft.	28	12.0	5	10.6
51 to 55 ft.[4]	8	1.6	-	-
56 + ft.[4]	6	1.0	12	40.8
Total	160	47.9	30	75.1

[1] Vessels 31 to 35 ft. in the 2A Directed Commercial fishery were combined with 36 to 40 ft. vessels
[2] Vessels 26 to 30 ft. in the 2A Directed Commercial fishery were combined with 0 to 25 ft. vessels
[3] Vessels of unknown length were combined with 0 to 25 ft. vessels in the Incidental Commercial (salmon) fishery
[4] Vessels 51 to 55 ft. in the Incidental Commercial (Sablefish) fishery were combined with 56+ ft. vessels

Table 5. Commercial fishing periods, number of fishing days, catch limit, commercial, research and total catch (thousands of pounds, net weight) by regulatory area for the 2004 Pacific halibut commercial fishery.

Area	Fishing Period	No. of Days	Catch Limit	Catch		
				Commercial	Research	Total
2A treaty Indian	2/29 – 7/30	152		335		
	Restricted: 3/21 – 4/30	40		170		
	Restricted: 8/11-12; 8/17-20 8/30-9/1; 9/6-8	8		16		
treaty Indian total			523.6	521		521
2A Commercial Incidental in Salmon fishery	May 1 – July 28/29	89-90	44.6	48		48
Incidental in Sablefish fishery	May 1- Oct 31	184	70.0	75		75
Directed	June 23[1]	10-hrs		96		
	July 14[1]	"		88		
	July 28[1]	"		27		
	August 11[1]	"		15		
Commercial total			252.5	226	14	240
2A Total			**890.4**	**870**	**14**	**884**
2B	**2/29 – 11/15**	**260**	**12,550[2]**	**12,087[3]**	**75**	**12,162**
2C	2/29 – 11/15	260	10,500[4]	10,116[5]	117	10,233
3A	2/29 – 11/15	260	25,060[4]	24,717	451	25,168
3B	2/29 – 11/15	260	15,600[4]	15,180	280	15,460
4A	2/29 – 11/15	260	3,470[4]	3,473	89	3,562
4B	2/29 – 11/15	260	2,810[4]	2,683	36	2,719
4C	2/29 – 11/15	260	1,720[4]	954		954
4D	2/29 – 11/15	260	1,720[4]	1,621[6]	34	1,655
4E	2/29 – 11/15	260	345	314[6]		314
Alaska Total			**61,225**	**59,058**	**1,007**	**60,065**
Total			**75,665.4**	**72,015**	**1,096**	**73,111**

[1] Fishing period limits by vessel class.

[2] Includes two allocations to commercial fleet of 12,141,000 and 409,000 pounds; an additional 140,000 pounds available as carryover from 2003.

[3] Includes the pounds that were landed by Native communal commercial licenses (F licenses).

[4] Additional net carryover pounds (thousands) from the underage/overage program were 2C = 159; 3A = 136; 3B = 84; 4A = 63; 4B = 91; 4C = 91 and for 4D a negative balance of 10,380.

[5] Includes 89,931 pounds taken by Metlakatla Indians during additional fishing within reservation waters.

[6] Areas 4D and 4E CDQ can be fished in either area regardless of quota share designation NMFS enforcement waiver.

Appendix I.

Table 6. Commercial landings (thousands of pounds, net weight) of Pacific halibut by port, country of origin, and IPHC research catch for 2004.

Port Region	Canada	United States	IPHC Research	Grand Total
CA & OR	-	258	6	264
Seattle	-	26	-	26
Bellingham	-	1,630	-	1,630
Misc. Washington	-	612	8	620
Vancouver	910	-	-	910
Port Hardy	4,804	-	64	4,868
Misc. Southern BC	807	-	3	810
Prince Rupert & Port Ed.	4,917	-	79	4,996
Misc. Northern BC	649	-	-	649
Ketchikan, Craig, Metlakatla	-	1,034	8	1,042
Petersburg, Kake	-	2,974	-	2,974
Juneau	-	3,270	32	3,302
Sitka	-	3,664	54	3,718
Hoonah, Excursion, Pelican	-	2,108	15	2,123
Misc. Southeast AK	-	1,342	-	1,342
Cordova	-	1,522	-	1,522
Seward	-	6,992	258	7,250
Homer	-	10,662	54	10,716
Kenai	-	270	-	270
Kodiak	-	8,350	122	8,472
Misc. Central AK	-	7,194	197	7,391
Akutan & Dutch Harbor	-	5,282	173	5,455
Bering Sea	-	2,738	23	2,761
Grand Total	**12,087**	**59,928**	**1,096**	**73,111**

Table 7. Commercial halibut fishery catch (thousands of pounds, net weight) in 2004 by country, statistical area, and regulatory area.

Stat Area Group	Catch			Reg. Area	Catch for Reg. Area
	Commercial	Research	Total		
00-03	224	4	228	2A	884
04	157	2	159		
05	489	8	497		
06	256	3	259	2B	12,162
07	359	1	360		
08	463	2	465		
09 - I	325	7	332		
09 - O	267	5	272		
10 - I	1,965	19	1,984		
10 - O	1,071	1	1,072		
11 - I	1,824	23	1,847		
11 - O	339	-	339		
12 - I	339	3	342		
12 - O	222	-	222		
13 - I	3,600	8	3,608		
13 - O	1,057	3	1,060		

Table 7. continued

Stat Area Group	Catch			Regulatory Area	Catch for Reg. Area
	Commercial	Research	Total		
14 - I	398	14	412	2C	10,233
14 - O	375	12	387		
15 - I	981	18	999		
15 - O	772	25	797		
16 - I	2,350	10	2,360		
16 - O	1,766	17	1,783		
17 - I	629	7	636		
17 - O	632	7	639		
18S - I	1,306	3	1,309		
18S - O	907	4	911		
18W	1,684	7	1,691	3A	25,168
19	1,420	22	1,442		
20	1,018	23	1,041		
21	1,106	15	1,121		
22	1,011	14	1,025		
23	1,089	20	1,109		
24	4,882	43	4,925		
25	3,545	70	3,615		
26	3,937	116	4,053		
27	3,308	61	3,369		
28	1,717	60	1,777		
29	5,275	55	5,330	3B	15,460
30	3,384	72	3,456		
31	1,683	54	1,737		
32	2,684	49	2,733		
33	1,598	33	1,631		
34	556	17	573		
35	362	13	375	4	9,204
36	565	4	569		
37	37	5	42		
38	493	11	504		
39	56	2	58		
40	718	-	718		
41	68	2	70		
42+	551	22	573		
Bering Sea	6,195	100	6,295		
Grand Total	**72,015**	**1,096**	**73,111**		**73,111**

Appendix II.

Table 1. The fishing period limits (net weight) by vessel class used in the 2004 directed commercial fishery in Area 2A.

Vessel Class		Fishing Periods (pounds)			
Letter	Feet	June 23	July 14	July 28	August 11
A	0-25	590	590	210	200
B	26-30	735	735	265	210
C	31-35	1,175	1,175	420	335
D	36-40	3,240	3,240	1,160	925
E	42-45	3,485	3,485	1,245	995
F	46-50	4,170	4,170	1,490	1,190
G	51-55	4,655	4,655	1,665	1,330
H	56+	7,000	7,000	2,500	2,000

Table 2. Metlakatla community fishing periods, number of vessels, and halibut catch (net weight), 2004.

Fishing Period Dates	Number Of Vessels	Catch (Pounds)
April 16 – 18	9	3,870
April 30 - May 2	3	548
May 14 – 16	14	4,853
May 28 – 30	14	6,207
June 11 – 13	12	4,659
June 25 – 27	17	13,434
July 9 – 11	19	14,747
July 23 – 25	20	13,647
August 6 – 8	17	6,626
August 20 – 22	16	10,967
September 3 – 5	12	7,303
September 17 – 19	7	2,080
October 1 – 3	3	591
October 15 – 17	0	0
Incidental catch	7	178
14 Fishing Periods		89,931

Appendix III.

Table 1. Fishing dates, opportunity, size limits, and bag limits for the 2004 Pacific halibut sport fishery.

Area	Fishing dates	Fishing days	Days open	Size limit	Bag limit
2A					
WA Inside Waters (east of Low Point)	May 6 –July 24	58	5 (Thur-Mon)	None	1
WA Inside Waters (Low Point to Sekiu River)	May 27-Aug 14	58	5 (Thur-Mon)	None	1
WA North Coast (Sekiu River to Queets River)	May 11-20	8	5 (Tues-Sat)	None	1
	May 29	1	Sat	None	1
	June 15-19	5	5 (Tues-Sat)	None	1
WA South Coast (all depths; Queets River to Leadbetter Point)	May 2-July 1	45	5 (Sun-Thur)	None	1
	July 2-3	2	7	None	1
Columbia River (Leadbetter Point to Cape Falcon)	May 1-July 25	86	7	First @ 32”	1
OR Central Coast (Spring, all depths; Cape Falcon to Humbug Mt.)	May 13-15	3	3 (Th-Sat)	First @ 32”	1
	May 20-22	3	3 (Th-Sat)	First @ 32”	1
	May 27-29	3	3 (Th-Sat)	First @ 32”	1
	June 10-12	3	3 (Th-Sat)	First @ 32”	1
	June 25-26	2	2 (Fri-Sat)	First @ 32”	1
	July 10	1	Sat	First @ 32”	1
	July 24	1	Sat	First @ 32”	1
OR Central Coast (Sum./Fall, all depths; C. Falcon to Humbug Mt.)	August 6-7	2	2 (Fri-Sat)	First @ 32”	1
	August 20-21	2	2 (Fri-Sat)	First @ 32”	1
	Sept 3-4	2	2 (Fri-Sat)	First @ 32”	1
	Sept 17-18	2	2 (Fri-Sat)	First @ 32”	1
	Sept 24-26	3	3 (Fri-Sun)	≥ 32”	2
	Oct 1-3	3	3 (Fri-Sun)	≥32”	2
	Oct 8-10	3	3 (Fri-Sun)	≥32”	2
	Oct 15-17	3	3 (Fri-Sun)	≥32”	2
	Oct 22-24	3	3 (Fri-Sun)	≥32”	2
	Oct 29-31	3	3 (Fri-Sun)	≥32”	2
OR Coast (<40 fathoms; Cape Falcon to Humbug Mt.)	May 1-Sept 21	144	7	First @ 32”	1
	Sept 22-Oct 31	40	7	≥32”	2
OR/CA (south of Humbug Mt.)	May 1-Oct 31	194	7	First @ 32”	1
2B, 2C, 3 and 4	Feb 1-Dec 31	335	7	No	2

Appendix III.

Table 2. 2004 harvest allocations and catch estimates (pounds, net weight) by subarea within Regulatory Area 2A.

Subarea	Allocation	Catch estimate	Over/under
WA Inside Waters	76,220	49,577	-26,643
WA North Coast	126,857	124,229	-2,628
WA South Coast	61,565	62,823	+1,258
Columbia River	14,241	14,761	+520
OR Central Coast (all depths)	194,703	186,209	-8,494
OR Coast	64,901	38,640	-26,661
OR Coast (<40 fathoms)	22,574	2,028	-20,546
OR/CA (south of Humbug Mt.)	8,911	8,911	0

Table 3. Estimated harvest by sport fishers (millions of pounds, net weight) by IPHC regulatory area, 1977-2004.

Year	Area 2A	Area 2B	Area 2C	Area 3A	Area 3B	Area 4	Total
1977	0.013	0.008	0.072	0.196			0.289
1978	0.010	0.004	0.082	0.282			0.378
1979	0.015	0.009	0.174	0.365			0.563
1980	0.019	0.006	0.332	0.488			0.845
1981	0.019	0.012	0.318	0.751		0.012	1.112
1982	0.050	0.033	0.489	0.716		0.011	1.299
1983	0.063	0.052	0.553	0.945		0.003	1.616
1984	0.118	0.062	0.621	1.026		0.013	1.840
1985	0.193	0.262	0.682	1.210		0.008	2.355
1986	0.333	0.186	0.730	1.908		0.020	3.177
1987	0.446	0.264	0.780	1.989		0.030	3.509
1988	0.249	0.252	1.076	3.264		0.036	4.877
1989	0.327	0.318	1.559	3.005		0.024	5.233
1990	0.197	0.381	1.330	3.638		0.040	5.586
1991	0.158	0.292	1.654	4.264	0.014	0.127	6.509
1992	0.250	0.290	1.668	3.899	0.029	0.043	6.179
1993	0.246	0.328	1.811	5.265	0.018	0.057	7.725
1994	0.186	0.328	2.001	4.487	0.021	0.042	7.065
1995	0.236	0.887	1.759	4.511	0.022	0.055	7.470
1996	0.229	0.887	2.129	4.740	0.021	0.077	8.084
1997	0.355	0.887	2.172	5.514	0.028	0.069	9.025
1998	0.383	0.887	2.501	4.702	0.017	0.096	8.585
1999	0.338	0.859	1.843	4.228	0.017	0.094	7.379
2000	0.344	1.021	2.258	5.305	0.015	0.073	9.017
2001	0.446	1.015	1.925	4.675	0.016	0.029	8.106
2002	0.399	1.260	2.090	4.202	0.013	0.048	8.011
2003	0.404	1.218	2.258	5.427	0.009	0.031	9.348
2004[1]	0.487	1.373	2.306	4.743	0.009	0.015	8.933

[1] Only Area 2A is current; all other areas are projected harvests.

PUBLICATIONS

The IPHC publishes three serial publications - Annual reports, Scientific reports, and Technical Reports - and also prepares and distributes regulation pamphlets and information bulletins. Items produced during 2004 by the Commission and staff are shown below and a list of all Commission publications is shown on the following pages. In addition, a listing of articles published by the Commission staff in outside journals is available on our website at www.iphc.washington.edu.

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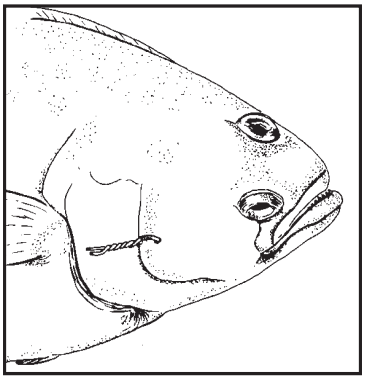
TAGGED HALIBUT

The INTERNATIONAL PACIFIC HALIBUT COMMISSION attaches plastic-coated wire tags to the cheek on the dark side of the halibut, as in the diagram below. **Fishermen should retain all tagged halibut, regardless of gear type used, time of year caught, or size of the halibut.**



REWARD

$5.00 or a baseball cap with tag reward logo will be paid for the return of each tag.

The IPHC also pays a reward for the return of Halibut Sport Tags:

1. A plastic-tipped dart tag inserted into the back just below the dorsal fin.
2. A metal-tipped tag inserted into the flesh behind the head.

WHEN YOU CATCH A TAGGED HALIBUT:

1. Record tag numbers, date, location and depth .
2. Leave the tag on the fish until landed.
3. If possible, mark the fish with a gangion or flagging tape around the tail.

WHEN YOU LAND A TAGGED HALIBUT:

1. Report fish to a Commission representative or government officer

   or

2. Forward tags to address below and enclose recovery information (see above), your name, address, boat name, gear, fish length, and, if possible, the ear bones. Tags should be completely removed from the fish. Plastic-tipped and metal-tipped tags may need to be cut out of the fish.

FINDER WILL BE ADVISED OF MIGRATION AND GROWTH OF THE FISH.

International Pacific Halibut Commission
P.O. Box 95009
Seattle, WA 98145-2009
Phone: (206) 634-1838

DOUBLE REWARD!

In September 2003, the IPHC released more than 2,600 halibut with both a highly visible two-toned orange wire tag and an embedded PIT tag. This project was necessary to assess the retention and durability of the PIT tags. If you find one of these fish, do not remove the wire tag. Instead, deliver the entire head to an IPHC sampler or contact the IPHC office.

The IPHC will reward two tag hats or $10 for all two-toned orange tags left on the fish for scanning. If the tag is removed, the usual reward of one hat or $5 will apply.