

INTERNATIONAL PACIFIC HALIBUT COMMISSION

**ESTABLISHED BY A CONVENTION BETWEEN
CANADA AND THE UNITED STATES OF AMERICA**

Technical Report No. 41

**Pacific halibut tag release programs
and tag release and recovery data,
1925 through 1998**

by

Stephen M. Kaimmer

**SEATTLE, WASHINGTON
2000**

The International Pacific Halibut Commission has three publications: Annual Reports (U.S. 0074-7238), Scientific Reports, and Technical Reports (U.S. ISSN 0579-3920). Until 1969, only one series was published (U.S. ISSN 0074-7426). The numbering of the original series has been continued with the Scientific Reports.

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INTERNATIONAL PACIFIC HALIBUT COMMISSION
P.O. BOX 95009
SEATTLE, WASHINGTON 98145-2009, U.S.A.

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Stephen M. Kaimmer

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Abstract

The International Pacific Halibut Commission has tagged and released over 385,000 Pacific Halibut since the first releases in 1925. Over 46,000 of these halibut have been subsequently recovered. Tags have been released throughout the range of the Pacific halibut, and during all seasons. Tagging goals have included determining the amount of migration between grounds and seasons (Banks Tagging), the extent of utilization of fish on different grounds (Coastwide Marking Program), and differences in survival of halibut discarded as bycatch. Information from all tag releases has been recorded, but only information on tags released since 1960 is stored in electronic form for computer data retrieval. Information on all tag recoveries is available for computer retrieval, along with the release information for those tags released prior to 1960 and subsequently recovered.

Pacific Halibut Tag Release Programs and Tag Release and Recovery Data, 1925 through 1998

Stephen M. Kaimmer

Introduction

The earliest vessel operations of the International Pacific Halibut Commission (IPHC) focused on tagging. The IPHC has tagged and released over 385,000 Pacific halibut (*Hippoglossus stenolepis*) since tagging programs were initiated in 1925. Halibut have been tagged throughout their range from northern California to the Bering Sea. Halibut for tagging have been captured by setline, trawl, sport, troll, and pot gear. Captures have been made during all seasons, although the majority of tags have been released during summer months on summer feeding grounds. Tag recoveries now total over 46,000.

Table 1 divides the releases and recoveries into their corresponding management areas (Figure 1). Most releases have occurred in the Gulf of Alaska (Areas 2C, 3A, and 3B) and in Canadian waters (Area 2B) reflecting the concentration of experiments to study interchange between these two regions. In all areas the highest number of tag recoveries occurs in the area of release but the recovery rate varies within each area, most likely a reflection of different tagging, fishing and port sampling effort. Recovery rates of releases from the more southern and eastern areas (Area 2) are higher overall than from the more westward areas (Areas 3 and 4).

Vessels using fixed-hook or “conventional” gear predominated in the early years of commission tagging (Figure 2). Hook-and-line gear is most effective at capturing adult-

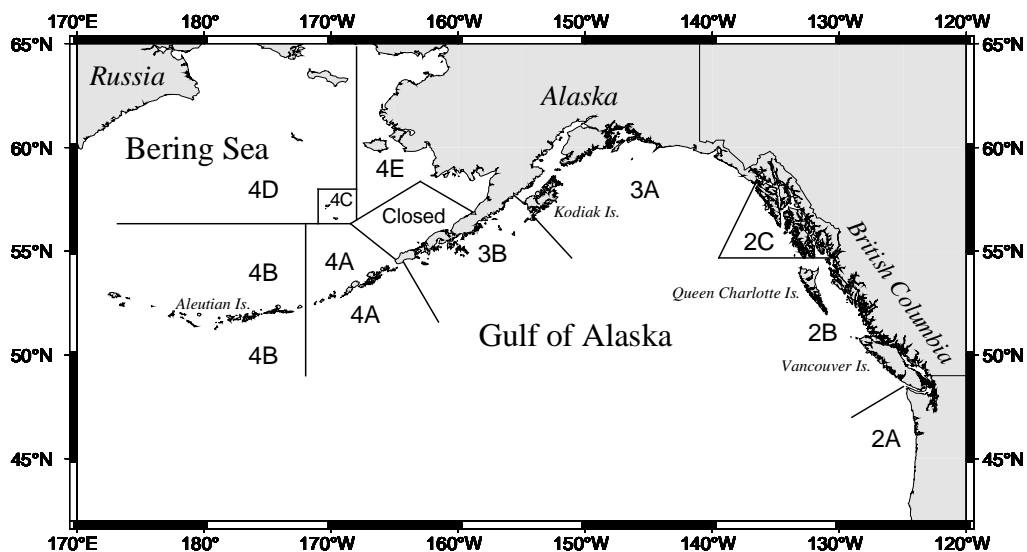


Figure 1. IPHC management areas.

Table 1. Number of releases and recoveries by IPHC management area through 1998.

Releases		Recoveries by Recovery Area							Total Recoveries	
Area released	Total releases	2A	2B	2C	3A	3B	4	Unknown		
2A	3,077	563	140	16	7			10	736	(24%)
2B	87,066	103	23,778	259	90	2	2	1,086	25,436	(29%)
2C	32,865	8	445	4,088	80	2	1	455	5,079	(16%)
3A	149,0	55	433	212	8,382	380	14	988	10,464	(7%)
3B	62,151	17	152	108	639	1,476	27	187	2,606	(4%)
4	51,192	21	118	117	408	142	1,351	183	2,340	(5%)
Total	385,383	767	25,066	4,800	9,606	2,002	1,395	2,909	46,661	(12%)

sized halibut, and has been the predominant gear used to tag fish for studies of adult distribution and migration and to determine relative utilization rates for adult halibut. Over 197,000 halibut have been tagged from setline gear captures. Trawl gear is more efficient at capturing smaller halibut, and has been used to investigate the distribution and life history of juvenile fish. Over 187,000 halibut have been tagged from trawl gear captures.

Fish from 10 to 222 centimeters in length have been tagged (Figure 3). The average length of setline releases has been 100 cm (± 27.6 cm S.D.) and of trawl releases 49 cm (± 19.5 cm S.D.).

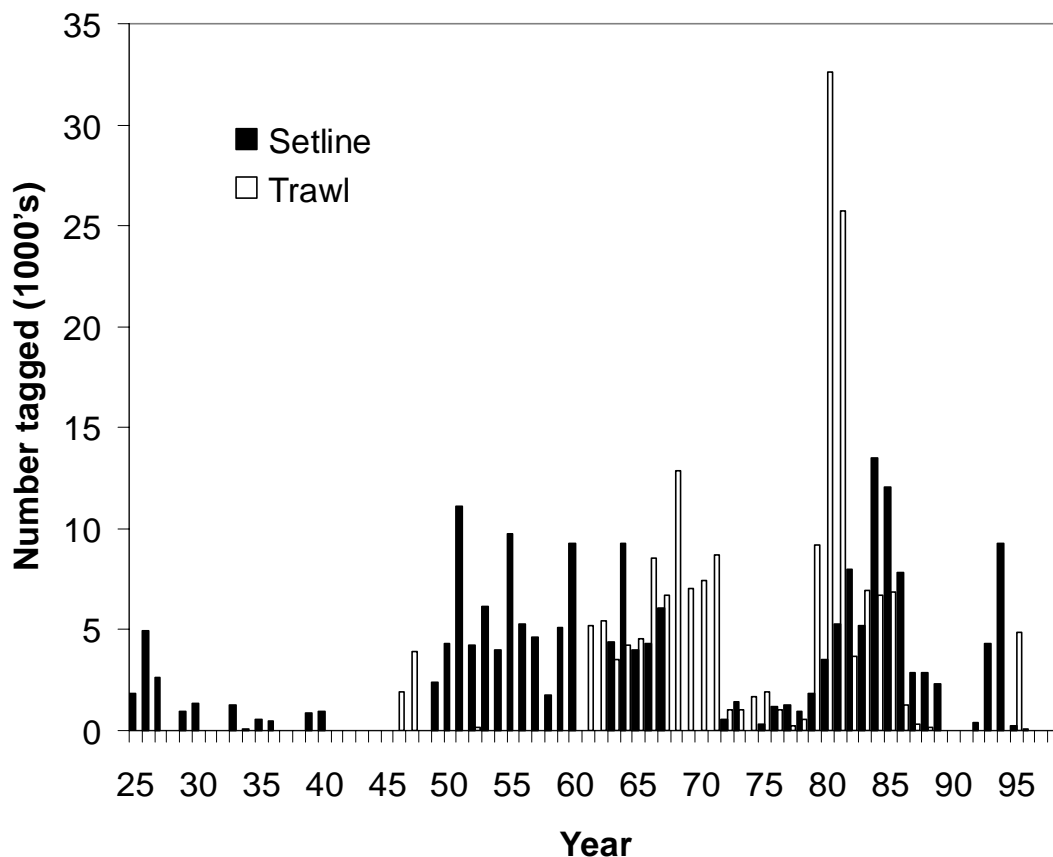
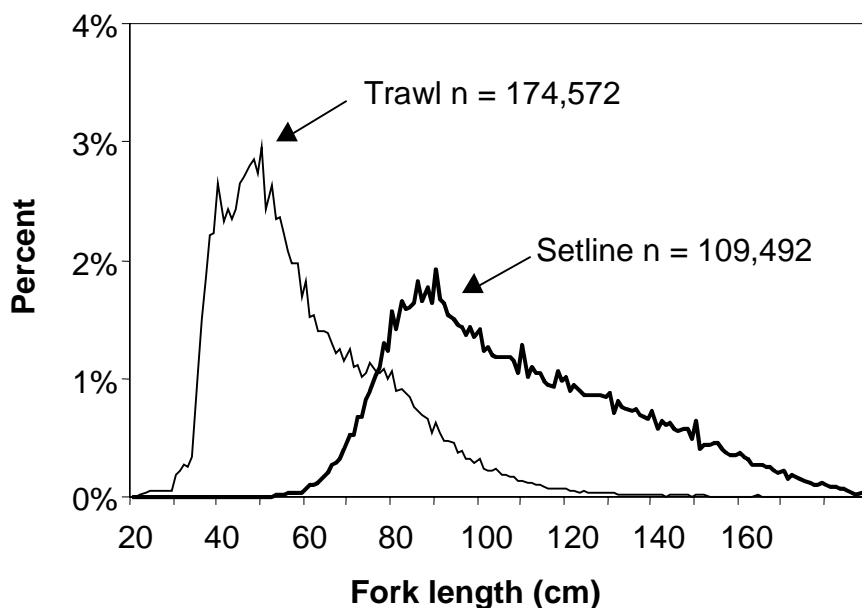


Figure 2. Numbers of halibut tagged by year and capture gear.

Figure 3. Length frequency of Pacific halibut tagged by length from setline and trawl captures, 1960 through 1998.



Thompson and Herrington (1930), Skud (1977), and more recently Trumble et al. (1990), have described the procedures and objectives of IPHC tagging. They describe results from tagging experiments, as well as the limitations or biases which must be considered when interpreting those results. Concerns over factors such as non-reporting, tag shedding, catchability, and release mortality have limited the usefulness of tagging data in assessing the condition of the resource and in managing the fishery. The determination of general patterns of migration and growth has had more success (Trumble et al. 1990). Estimating rates for migration and exploitation from the tagging has been of more limited value (Sullivan et al. 1993, Anganuzzi et al. 1994, Hilborn et al. 1995). These questions might best be addressed by tagging programs using internal tags, where tag shedding and non-reporting would be minimized.

The Commission has recently begun to reevaluate the data from its tagging programs. The purpose of this report is to document the IPHC tag release and recovery data, and describe the data storage structure. The amount and types of data collected are described, particularly since knowledge of their changes over time might be useful in selecting data sets with minimal limitations and biases. Tagging procedures are discussed as introductory material or when they update the content of Skud (1977) or Trumble et al. (1990).

Tagging procedures

Tag type and location

In almost all cases tags were placed on the head ensuring no damage occurred to the flesh. Halibut are processed white side up, so tag visibility for the fishers and plant workers should be greater on this side. However, tag loss from contact with the sea bottom was considered too great a possibility so nearly all halibut are tagged on the dark (eyed) side. The IPHC has used a number of tag types during the years of tagging (Table 2). The first tag used extensively for Pacific halibut was a metal strap (tag Types 1 and 2 in Table 2,

Figure 4) used originally to mark cattle (Thompson and Herrington 1930). It was chosen because of the large amount of opercular bone available on the fish, and because its single fastening point made attachment convenient. These tags were bent over the edge of the cheekbone. Strap tags were made of corrosion resistant monel and each was numbered individually. In comparison studies, strap tags were chosen over button tags after double-tagging showed the latter usually shed within three years (Thompson and Herrington 1930). The monel metal strap tag was also confirmed as superior to tattoos, body cavity tags, and dart tags in double-tag trials (Myhre 1966). Tattoos of India ink faded within 2 years. Internal tags, which were intended for recovery during processing of livers, were often thrown away as halibut are dressed at sea. Dart tags suffered high shedding loss.

Two sizes of strap tag were in general use, a larger tag (Type 1) for fish over about 80 cm, and a smaller tag (Type 2) used on smaller fish. After 1962, tag Type 1 was used on all sizes of fish through 1970, the last year of this tag's use.

As the technology improved, the Commission continued to test other tag types, including both large and small dart tags (Types 3 and 4, respectively) and loop wires (Type 6). The large Type 3 tags were used on all sizes of fish from 1959 through 1960. Starting in 1961 and through 1964, the smaller dart tags, Type 4, were used on trawl charters on fish primarily in the 30 to 50 cm range. During this same period, the larger Type 3 tags were used during trawl and setline tagging on all fish sizes. Loop wire tags were used between 1963 and 1967 on all fish sizes, during both trawl and setline tagging.

The IPHC made the decision to convert to wire "spaghetti" tags (Type 5 and Types A through G, Table 2, Figure 4) in the 1960s after double-tag experiments showed they had a lower shedding rate than the strap tags (Myhre 1966) and were more conspicuous. The strap tags were thought to undergo electrolysis which may have weakened the bend in the metal, but their higher tag loss was attributed more to tag contact with trawl nets. Spaghetti tags are constructed of polyethylene tubes covering nickel-silver wire that can be twisted easily into the cartilage around the opercular bone. Each tube is printed with the words "XXXX return to IPHC", where "XXXX" represents a unique number. The tag number

Table 2. IPHC tag types used 1925 through 1998.

Tag type code	Tag description	Tag used in		Total tags released ¹
		Experiment Numbers	Years	
1	Large strap	1-469	1925-1970	62,703
2	Small strap	1-245	1925-1962	9,407
3	Large dart	171-363	1959-1964	10,518
4	Small dart	203-351	1961-1964	7,065
5	Large Orange Wire	181-624	1960, 1965-1981	68,835
6	Loop wire	286-413	1963-1967	5,189
7	Lock on	542-859	1979-1995	540
8	Dennison	549-584	1979-1980	1,040
A	Large yellow wire	589-759	1980-1984	59,760
B	Small yellow wire	583-757	1980-1984	34,743
C	Large pink wire	747-863	1984-1996	56,047
D	Light orange wire	858 only	1995	4,852
E	Homer Derby orange wire ²	860 only	1996	50
F	Homer Derby orange wire ²	864 only	1997	76
G	Homer Derby orange wire ²	865 only	1998	67

¹Totals do not include almost 65,000 tag releases prior to 1960 which were recorded as tag Type 1 but which included both Type 1 and Type 2 tags.

²E, F, and G tags are same description but carry "XXXX" for year = 1996, 1997, or 1998



Figure 4. Strap and wire tags used by IPHC showing location of attachment on Pacific halibut. Fishers have tied a line on the fish to make it easier to identify during unloading.

and the color of the polyethylene tube identify each tag uniquely. Spaghetti tags are inserted between the opercular and preopercular bones on the dark-side cheek and twisted, creating a closed loop (Figure 4). Differences in various spaghetti tag types used from 1960 to the present are in tag size and color, with some improvements in the durability of the legend and more corrosion-resistant wire (Trumble et al. 1990).

Large orange spaghetti tags (tag Type 5) were first tested in 1960, then were placed in general use from 1965 through 1981. Although used initially on small fish less than 70 cm in length, starting in 1969 they were used on all sizes of fish. This coincided with the phasing out of strap tags by the end of 1970. Large yellow spaghetti tags (tag Type A) were in general use on all sizes of fish from 1980 through 1984. Small yellow spaghetti tags (tag Type B) were in general use on trawl surveys only from 1980 through 1984. Large pink spaghetti tags (tag Type C) were in general use on all surveys during 1984 through 1996. Light orange spaghetti tags (tag Type D) were used in 1995 only, on a trawl mortality charter, on all sizes of fish. “Homer Derby” orange spaghetti tags (tag Types E, F, and G) were used during 1996, 1997, and 1998 for fishing derby tagging.

Lock On tags were used generally during trawl charters in 1979 and 1984, and then between 1984 and 1995 for tagging fish during fishing derbies in Homer, Alaska. Only 540 tags of this type have been released. Dennison tags, tag Type 8, were used during 1979 and 1980 only on trawl surveys.

Tagging platforms

For the first 35 years of halibut tagging the IPHC chartered commercial longline vessels almost exclusively. Standard longlines consist of 1500 or 1800 foot weighted main lines called skates, each of which has a number of hooks attached to it by shorter, thinner lines called gangions. The normal 4 to 24 hour soaking time typical of longlining was shortened during tagging operations to obtain fish in as strong and vigorous condition as possible. The fish were also handled more carefully and tagged only after being assessed suitable

for tagging. In the actual tagging procedure, the fishers removed the hook, the scientific staff measured the fish, and then applied a uniquely numbered tag. The fish was then released quickly over the side of the vessel. To aid in the speed of tagging, a measuring cradle was constructed, first of wood and more recently of aluminum. The cradle was designed to fit the convex undersurface of the fish and prevent the fish from being damaged during boat movement.

Beginning in 1946, research trawl gear was used in the tagging and release program. Chartered trawlers usually were typical Pacific seine-type vessels with work space aft, and a stern mounted drum. The standard research gear was a 400-mesh eastern trawl. After retrieval of the trawl codend, the halibut were placed into a deck-level holding tank. As soon as possible, they were tagged and released using the same method as on the longline vessels. Trawl tow times were shortened from the commercial standards to prevent damage to the halibut and allow for healthy fish for tagging.

In more recent years, tagged halibut have been released from vessels using troll or pot gear.

Tag recovery

The IPHC initiated an intensive port sampling program early in its history to collect fishery and biological data and to recover tags from fishermen (Gilroy et al. 1995). This program is still in place today. Port samplers attempt to obtain the following information for each tagged fish: the tag, both otoliths, fish length, the exact location and depth caught, vessel name, and finder's name and address. After the information is processed, the IPHC sends the finder a letter with the release information for the tag.

A reward is given for each tag returned, providing a tangible incentive for fishermen to retain and turn in tags. Initially, a straight monetary reward was given for each tag. While the reward program has undergone several modifications over the years (Trumble et al. 1990) the most successful program is the current one where a baseball cap is given for each returned tag. Each hat is embroidered with a halibut "tag reward logo" patch and the color varies from year to year. The other reward option is five dollars but presently over 85 percent of the tag rewards are baseball caps. The program is so successful that many agencies have adopted similar programs.

Goals of IPHC tagging experiments

Beginning in 1925, the tag investigations were designed to answer questions of primary importance to regulation. These include studies of migration, utilization, age, growth, and maturity. Table 3 summarizes tag release and recoveries by tagging purpose, tagging project name, and years of release. By far, the greatest number of tag releases (87%) has been for the purpose of stock assessment. Fewer numbers of tags have been released for bycatch and survival studies (9%), gear design studies (~1%) and tagging incidental to other studies (~4%).

Initially, the most important question for stock assessment was to determine the amount of migration between fishing banks (Thompson and Herrington 1930). These Banks Tagging operations (described as "migration" studies by Trumble et al. 1990) released as many tags as possible so that returns of those tags would yield information on migrations between grounds and seasons, by both small and large halibut, and to determine the inter-relationships of the halibut on various parts of the coast (Tables 4 through 7). This early tagging was done according to the season of the fishery in each place: summer on the southern grounds, during winter on the banks along the eastern side of the Gulf of Alaska, and during the

Table 3. IPHC tag release and recoveries by tagging purpose and tagging project through 1998.

	Years	Releases	Recoveries	% Recoveries
Stock Assessment Studies				
Banks tagging	1925 to 1992	59,799	8,637	14.4%
Coastwide marking program	1946 to 1968	86,642	18,202	21.0%
Gulf groundfish trawl survey	1961 to 1963	7,219	133	1.8%
Setline grid	1963 to 1966	10,698	1,395	13.0%
Trawl recruitment series	1963 to 1986	121,657	4,290	3.5%
Setline grids	1976 to 1986	42,160	6,507	15.4%
Japan Cooperative research	1983 to 1984	954	45	4.7%
US Cooperative research	1956 to 1987	3,799	119	3.1%
USSR Cooperative research	1975 to 1978	521	6	1.2%
Total	1925 to 1992	333,449	39,334	11.8%
Bycatch and Survival				
Troll bycatch and survival	1950 to 1972	512	176	34.4%
Domestic trawler observer program	1962 to 1971	11,588	2,523	21.8%
Trawl/setline size and survival comparison	1966	2,347	786	33.5%
Trawl bycatch and survival	1969 to 1995	5,846	220	3.8%
Foreign trawl catch comparison	1970 to 1971	153	1	0.7%
Crab pot survival	1980	185	16	8.6%
Hook stripper study	1986	2,099	170	8.1%
Multiple recapture by trawlers	1988	174	18	10.3%
Oil spill impact	1989	219	24	11.0%
Careful release from cod style hooks	1993 to 1994	13,096	861	6.6%
Total	1950 to 1995	36,219	4,795	13.2%
Gear Design				
Tagging mortality	1958	222	3	1.4%
Grid/spot tagging comparison	1966	1,804	615	34.1%
Tag design	1979	202	44	21.8%
Total	1958 to 1979	2,228	662	29.7%
Miscellaneous Tagging and Tagging Incidental to Other Studies				
Hand-lined fish during grid survey	1961	52	2	3.8%
Gear and vessel effectiveness	1962	1,113	31	2.8%
Hook spacing	1972 to 1985	4,364	745	17.1%
Snap conventional gear study	1982	1,448	149	10.3%
J/Circle hook comparison	1983	528	81	15.3%
Setline catchability study	1983 to 1987	3,814	617	16.2%
Tag release for fishing derby	1984 to 1998	1,764	205	11.6%
Depletion fishing experiment	1987	168	15	8.9%
Hook size study	1988	77	8	10.4%
Incidental to movie production	1988	159	17	10.7%
Total	1961 to 1998	13,487	1,870	13.9%
Grand total	1925 to 1998	385,383	46,661	12.1%

Table 4. Tagged halibut released from 1925 through 1940 by the Banks Tagging Program, by year and IPHC regulatory area.

Area	Year										
	1925	1926	1927	1929	1930	1933	1934	1935	1936	1939	1940
Banks Tagging Program											
2A											
2B	1,490	1,855			708	430		594	464	856	19
2C	361	1,357			4						814
3A		1,748	2,605			823	101				113
3B				928							
4					681						
Total	1,851	4,960	2,605	928	1,393	1,253	101	594	464	856	946

spring on the far western banks. Tags were distributed mainly on major fishing banks and spawning grounds, as identified by interviews with commercial fishers.

The next goal of tagging studies was to determine utilization rates between components of the halibut stock. Starting in 1946, and continuing for over 20 years, these Coastwide Marking Program operations (described as “fishery and natural mortality” studies by Trumble et al. 1990) tagged fish on important fishing grounds to determine whether stocks were being utilized equally across areas (Tables 5 and 6). Halibut were tagged at different seasons on important fishing banks in IPHC Areas 2 and 3. The primary goal was to determine the degree to which different parts of the stocks were contributing to the fishery during the then-short seasons, and to permit quantitative estimates of the rates of fishing and natural mortality. These two programs, Banks Tagging and the Coastwide Marking Program, account for 38% of all tags released by the IPHC.

Table 5. Tagged halibut released from 1946 through 1956 by the Banks Tagging Program and the Coastwide Marking Program, by year and IPHC regulatory area.

Area	1946	1947	1949	1950	1951	1952	1953	1954	1955	1956
Banks Tagging Program										
2A										
2B										
2C										
3A										
3B		50								
4		308				192		29		
Total	0	358	0	0	0	192	0	29	0	0
Coastwide Marking Program										
2A				23						
2B	1,887	3,543	1,144	585	4,762	2,615	5,131		7,127	
2C					3,688	250	1,059		1,400	
3A			1,272	316	2,244	1,390		3,747	1,242	588
3B				3,414	436			255		1,491
4										3,193
Total	1,887	3,543	2,416	4,338	11,130	4,255	6,190	4,002	9,679	5,272

A trawl groundfish study in the Gulf of Alaska and a setline grid survey of the entire Pacific Coast were conducted in the early 1960s (Table 3). A trawl recruitment survey conducted from 1963 to 1986 (Best 1969, Best 1977, Best and Hardman 1982, Myhre 1969) and setline grid surveys conducted from 1976 to 1986 (Hoag et al. 1980) were based on these earlier surveys.

The 1961 to 1963 Gulf of Alaska groundfish trawl survey extended initially from the northeastern end of Kodiak Island to Unimak Pass, a distance of 550 miles along the coast, and included about 40,000 square miles of shelf area. During 1962, the survey grounds were expanded to include the area between the eastern end of Kodiak Island and Cape Spencer, Alaska, adding another 480 miles of coastline and about 25,000 square miles of shelf area. A regular pattern of more than 900 sampling stations was established on parallel north-south lines 15 minutes of longitude apart. Along these lines, the stations were located six minutes of latitude apart from shore to the 100-fathom line, with two additional stations,

Table 6. Tagged halibut released from 1957 through 1968 by the Banks Tagging Program and the Coastwide Marking Program, by year and IPHC regulatory area.

Area	1957	1958	1959	1960	1963	1964	1965	1966	1967	1968
Banks Tagging Program										
2A								182		
2B								210		
2C										
3A										
3B						59				
4						3,133			6,107	
Total	0	0	0	0	0	3,192	0	392	6,107	0
Coastwide Marking Program										
2A										
2B				5,325						
2C		1,530		3,969						9,470
3A	3,626									
3B	1,045				240	601				
4			5,148		1,101	670	1,115			
Total	4,671	1,530	5,148	9,294	1,341	1,271	1,115	0	0	9,470

Table 7. Tagged halibut released from 1973 through 1992 by the Banks Tagging Program, by year and IPHC regulatory area.

Area	1973	1976	1979	1980	1981	1982	1984	1987	1988	1989	1992
Banks Tagging Program											
2A										2,118	
2B	1,176			19	328	137			2,652		
2C			1,002	1,317	22						428
3A	295			223	13,533						
3B				619	5,544	1802					
4		700					1,497	166			
Total	1,471	700	1,002	2,178	19,247	1,939	1,497	166	2,652	2,118	428

Table 8. Tagged halibut released from 1963 through 1974 by the Trawl Recruitment Series, by year and IPHC regulatory area.

Area	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Trawl Recruitment Series												
2A												
2B			684						2,465			
2C	136	928	408	323	565	423	10		70			136
3A	1,145	1,514	1,364	1,915	1,461	1,509	1,193	724	1,453		1,003	1,145
3B	879	1,012	924	2,672	2,559	512	1,21	983	2,092	1,038		879
4	1,383		1,089	1,725	894	316	477	2,606	2,461			1,383
Total	3,543	3,454	4,469	6,635	5,479	2,760	2,901	4,313	8,541	1,038	1,003	3,543

one at 140 fathoms and one at 250 fathoms. During this survey, viable halibut, which were not required for other studies, were tagged and released. The survey region was sampled during three periods of the year to obtain information about the seasonal distribution and availability of halibut and other species to trawling operations. Two of these periods of sampling, from May to August (Round 1) and from August to December (Round 2), were completed in 1961. During Round 3 (January to May, 1962), sampling was concentrated on four major sectors that were known to possess considerable trawlable bottom and where catches of halibut had been made in previous rounds. After completion of these three seasonal rounds, the survey expansion took place. An additional three seasonal rounds (May to August, August to December, and January to May) were fished in the expanded area, and the survey was completed in 1963.

The “Trawl Recruitment Series” was conducted from 1963 through 1986 to index the abundance of juvenile halibut in the Bering Sea and Gulf of Alaska and accounted for over 120,000 released tags (Tables 8 and 9). The program was designed to give an estimate of the abundance of each appearing year class and relate this to its subsequent recruitment into the commercial fishery. Tags were released from this series every year from 1963 to 1986. The survey area and gear were standardized to using modified commercial trawls at selected locations along the coast from Cape Spencer to the Shumagin Islands. Halibut were sorted from the catch as soon as brought on deck and were held in a live-tank with running seawater until tagging. Peak trawl tagging occurred in 1980 and 1981 with the release of more than 67,000 tagged fish.

The 1963-1966 setline grid survey released over 10,000 tags. Fish were caught from a grid of about 1,000 predetermined stations, similar to that used during the 1961-1963 trawl survey. This tagging covered much of the northeast Pacific Ocean from northern California to the Bering Sea. The tagging from this operation was designed to aid in resolving the differences in mortality rates estimated previously by tagging studies and those estimated by other means.

The 1976-1986 setline grids were conducted on three different grid areas in British Columbia (Area 2B), southeastern Alaska (Area 2C), and the eastern Gulf of Alaska (Area 3A) (Table 10). Almost 40,000 tagged fish were released from these grids. The Kodiak grid was fished in all years 1976 through 1986 and the Charlotte grid in all years except 1979. In 1982, a modified grid of stations was developed in southeastern Alaska, which was fished from 1982 through 1986. The grid survey was discontinued following the 1986 work. When the survey was restarted with a somewhat different station grid pattern in 1993, tagging was no longer part of the program.

Table 9. Tagged halibut released from 1975 through 1986 by the Trawl Recruitment Series, by year and IPHC regulatory area.

Area	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Trawl Recruitment Series												
2A												
2B		513						116	93	1,096		
2C					206	2	2	11	9	133	64	110
3A	1,956				6,494	25,327	2,970	1,112	3,195	2,486	853	635
3B			1		2,111	6,802	3,716	817	956	1,586	595	409
4		499	204	335	170	485	3343	781	99	285	5,156	146
Total	1,956	1,012	205	335	8,981	32,616	10,031	2,837	4,352	5,586	6,668	1,300

Since 1950, bycatch and survival tagging studies have compared return rates between two or more groups of releases to estimate differences in survival of those groups. Hence, releases of tagged halibut occurred from trawl hauls with large numbers of King crab (*Paralithodes camtschaticus*), from crab pots or salmon trollers, or the more recent studies where halibut have been tagged after release from hooks by different careful and not-so-careful release methods.

Table 10. Number of tags released from the 1976 through 1986 setline grid surveys by IPHC regulatory area.

Year	Area			Total tags released
	2B	2C	3A	
1976	337	-	137	474
1977	256	-	1,010	1,266
1978	360	-	569	929
1979	-	-	823	823
1980	425	-	891	1,316
1981	123	-	827	950
1982	419	1,395	1,658	3,472
1983	430	1,703	1,214	3,347
1984	1,618	3,548	6,867	12,033
1985	1,199	2,242	4,757	8,198
1986	780	1,967	2,965	5,712
All years	5,947	10,855	21,718	38,520

number associated with the fish. Experiments are kept separate and identified using an experiment number. Several hundred or thousand tagged fish may be associated with each experiment number. Tag release information for each fish is entered from the setline or trawl data sheets that are completed during the experiment. Each tag fish has the following information entered:

- tag number/tag type
- release month/day/year
- release stat area/release lat/long
- release fork length (cm)

Added to all of the above purposes for releasing tags is tagging of opportunity. Over the years, IPHC staff have released tags as part of general life history investigations. These tags added information on individual migration or growth.

Tag data storage

Tag release recovery file

Tagging release and recovery information is stored in a computer database. While there are a number of data tables that are relevant to the tag data, one table actually stores the tag release and recovery information on a tag by tag basis. This is the Tag_rel_rec, or "Tag release recovery" table. Each fish has a unique record keyed on the tag

release sex (after 1987)
release injury code/condition code (after 1960).

When the tag is recovered, the following information is then added:

recovery month/day/year
recovery stat area/release lat/long
recovery fork length (cm)
recovery sex
recovery gear type
recovery otolith index no/age
report year

Tag data prior to 1960 include most of the above information but only if the tag was recovered. Data were transcribed onto punch cards from the original ledger when the tag was returned and all the information was entered into the computer. After 1960 the data are complete except for minor errors caused when statistical area boundaries were moved.

A separate temporary storage table is created every year to generate tag letters that are sent to fishermen who return tags. This table also includes: vessel name, recovery port, recovery state and country, finder's name and address and type of reward requested.

Information relevant to the tagging operation is also stored in other related tables, specifically in the setline and trawl systems. Through linking, data on tagged fish can then be matched to any other field entered on the other systems. For example the setline system can be used to retrieve the set time and depth for tagging experiments and specific fish. Other tables hold descriptive information applicable to fields in the tag release recovery table which are common to other tables, including gear type (gr), injury code (inj), IPHC regulatory area (reg) and statistical area (stt), and sex (sex).

Tag experiment summary file

A tag experiment summary table allows biologists to quickly access tagging experiment details. This table contains the following information for years 1926 to present:

experiment number
year
initial month of experiment
final month of experiment
tagging season
IPHC regulatory area of release
IPHC statistical area of release
geographical location of release
geographical region of release
vessel name and type (charter, observer)
release type (spot tagging, grid tagging, other)
gear type
tag type
number of releases
number of recoveries
tagging purpose
tagging project name
remarks/comments

The tag experiment summary file summarizes the information in the tag release recovery file and adds information on general location, tagging program name and tagging purpose, and numbers of releases and recoveries. Data are updated annually once all tags have been received and processed from the previous year. As of the end of 1998, the tag experiment summary file has almost 2600 rows of information for almost 900 tagging experiments. This information is summarized in the Appendix, which has summary information on year, experiment number, general location, project name, number of tags released and recovered (through the end of 1998), and tagging purpose. IPHC summary records are inaccurate with regard to tag Types 1 and 2, and all strap tag releases prior to 1961 are coded in the Tag Experiment Summary table as Type 1.

Tag data summary

To the end of the 1998 recovery year, there have been 385,383 tag releases and 46,661 tag recoveries (Table 11). For the most part, all tagged halibut had release length and location recorded, and the type of gear on which the fish was initially caught. For tags released prior to about 1960, the release information was entered into the computer-retrievable database only as tagged fish were recovered. Since about 1960, release information is available on all fish which were tagged and released. In some instances, length information was not recorded. Fork length is entered as zero (“0”) when release length was unknown.

Most recoveries have year and location of recovery. IPHC statistical area is available for over 43,000 recoveries. Recovery fork length is available for just over 36,000 tag recoveries. Sex is seldom determined when tags are recovered, and has been collected for just under 9,000 tag recoveries, with about equal numbers of male and female fish. Age at recovery is available for just over 26,000 tag recoveries. Recovery age ranges from 2 to 31 years of age.

Secondary tags

Secondary tags were used in a number of experiments where two tag types were being compared. The use of secondary tags is summarized in Table 12.

Condition codes

Prior to 1960, fish that were tagged should be assumed to be in good or excellent condition and the 16,446 entries in the tag database for release-recoveries prior to 1961 have no release condition information associated with the tag. Between 1960 and 1965,

Table 11. Tag recovery data summary (tags recovered through year-end, 1998).

Data description	Number	Percent of total recovered
All tags released	385,383	-
All tags recovered	46,661	-
With year of recovery	46,585	100%
With recovery Latitude and Longitude	43,752	94%
With recovery length	36,191	78%
With sex	9,333	5%
With age	26,345	57%

Table 12. Secondary tag types used during IPHC tagging.

Secondary tag type	Experiment numbers	Primary tag type							Total
		1	2	3	4	5	6	7	
3	180-363	3,883	1,158	1,131			307		6,479
4	249 only				8				8
5	181-469	10,416	543						10,959
6	286-477	722		56		329			1,107
8	542-558					543		29	572
Total		15,021	1,701	1,187	8	872	307	29	19,125

the use of condition codes was generally phased in, with the result that the over 93 percent of the tags released after 1965 had condition codes associated with the individual tag releases. Almost 22 percent of the condition codes given subsequent to 1965 were for conditions less than excellent. As a general rule, especially when considering tags released prior to 1965, fish with condition code equals “blank” or null should be considered to be in good or excellent condition.

Starting in 1960, the Commission began using an “Excellent-Average-Poor” set of criteria to differentiate condition of released fish tagged in the Coastwide Marking Program. For the most part, fish were still selected for good condition, but on release swimming characteristics or lack of vitality in the water could be used as a downgrading factor. It appears that codes were generally applied only when fish were NOT excellent. Condition was noted when fish were in poor “P” or average “A” condition. A small number of excellent codes “E” were also entered. By the tagging operations in 1964, most fish were given a condition code on release. “D” was used on a trawl tagging experiment when the tagged fish were assumed to be dead. During the 1961-1962 Gulf of Alaska groundfish survey, inclusion of condition code was extremely variable, with 28% overall. Similarly, the tagging on the Bering Sea flats in 1963 had only occasional use of condition codes. During the 1963-1966 setline grid, no codes were used in 1963, and almost 100% of releases were coded in 1964-1966 (75% overall). During the 1965 tagging on the Bering Sea flats and the 1967 Bering Sea migration study tagging condition codes were used in almost all cases. During the 1978-1986 setline grids, almost 100% were coded (98% overall). The releases that studied hook removal methods in 1987 and 1993-94 used condition codes almost 100% of the time.

Since 1993, some releases have been coded with “1-2-3” to correspond to conditions of Excellent, Poor, and Dead. These condition codes refer to condition descriptions developed by IPHC for use by NMFS observers, and are based on a number of inspection criteria which include presence or absence of bleeding, hooking or hook removal or gaff injuries, or sand flea predation (Williams and Wilderbuer 1995).

Data limitations and biases

The usefulness of the IPHC tag data depends on the user’s application. On the simplest level, it is quite easy to look at a group of releases and chart their recovery times and locations to get trends in fish movements. Similarly, individual growth in length can be determined by subtracting release length from recovery length. A time scale on growth can be determined by calculating days at liberty. There are a number of questions that must be addressed before using the tag data for any specific purpose. The possibility of differing recovery fishing effort, port sampler coverage, or reporting rates between areas

must be considered when comparing tag return rates across areas. Season and area of tag release could also affect recovery probability. For recovery periods spanning more than one or two years, the effect of growth must be considered on the size selectivity of the recovery gear. Pooling recoveries from more than one recovery gear type adds complications to many types of analyses. Models based on tag releases and recoveries must include assumptions regarding these factors, as well as randomness of both tagging and recovery, and effects of both immigration and emigration into and out of the recovery or release area during the course of the experiment (Sullivan et al. 1993, Anganuzzi et al. 1994, Hilborn et al. 1995). Tag types have been chosen over the years to increase tag visibility (reporting) while reducing tag degradation (tag shedding). While it might be reasonable to pool releases from the varieties of spaghetti tag, demonstrated differences in tag recovery rates between spaghetti and strap tags would make pooling these tag types difficult.

A number of release programs with standardized capture gear have released large numbers of tagged fish over relatively short periods of time. Choosing trawl releases gives a pool of smaller fish than choosing setline releases. Releases from survival or mortality studies should be avoided unless one is able to make corrections to recovery probability based on release condition.

The Tag Experiment Summary file can be used to initially screen tag data to determine whether there are sets of data that meet release criteria while having reasonable numbers of recoveries.

Acknowledgements

I am particularly grateful to Ian MacGregor, Tracee Geernaert, and Aaron Ranta. As the stewards of the IPHC tag data, their attention to detail, and their comments and suggestions, have been invaluable in the preparation of this report.

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Appendix . Tagging location, tag project name, number of tags released, number of tags recovered through the end of 1997, and tagging purpose by year and experiment number.

Year(s)	Experiment No(s).	Location	Project Name	Tags Released	Tags Recovered	Purpose
1925	1-7	Summer setline Charlotte and Southeastern	Banks tagging	1,851	704	Tagging on fishing grounds to determine stock composition and migrations
1926	8-15	Summer setline Southeastern	Banks tagging	3,212	1239	as previously described
1926	16	Fall winter setline Yakutat	Banks tagging	1,748	377	as previously described, on spawning grounds
1927	17-20	Fall winter setline Kodiak and Yakutat	Banks tagging	2,605	560	as previously described, on spawning grounds
1929	21-22	Spring setline Shumagin	Banks tagging	928	151	as previously described
1930	23-25	Spring setline British Columbia	Banks tagging	712	331	as previously described
1930	26-27	Spring summer setline Bering Sea and Shumagin	Banks tagging	681	69	as previously described, includes "Makushin Bay" experiment
1933	28-32	Winter spring setline Charlotte, Yakutat and Kodiak	Banks tagging	1,253	275	as previously described
1934	33-34	Winter setline Yakutat and Seward Gully	Banks tagging	101	8	as previously described
1935	35-36	Spring summer setline Charlotte	Banks tagging	594	287	as previously described, "Cape Scott and Goose Island" experiments
1936	37-38	Spring setline Charlotte	Banks tagging	464	176	as previously described, continuation of "Cape Scott and Goose Island experiments
1939, 1940	39-40	Winter setline Charlotte	Banks tagging	875	192	as previously described, mostly on winter spawning grounds
1940	41-44	Mostly winter setline Southeastern	Banks tagging	927	116	as previously described
1946	45 - 49	Mostly summer trawl Charlotte between Cape Scott and Dixon Entrance	Coastwide marking program (pilot)	1,887	278	To determine whether stocks were being utilized equally between grounds in Area 2. Released from charter investigating trawl bycatch.
1947	50 - 54	As above	Coastwide marking program	3,543	849	as previously described

Appendix. (continued)

Year(s)	Experiment No(s).	Location	Project Name	Tags Released	Tags Recovered	Purpose
1947	55	Summer trawl Bering Sea by observers	Banks tagging	358	6	Tagging of opportunity to see the Bering Sea grounds, 'Flats' experiment.
1949	56 - 60	Summer and early fall setline on Portlock and Albatross Banks, grounds west of Kodiak Island, and northern Hecate Strait	Coastwide marking program	2,416	388	Beginning of a broad marking program on important banks in Area 2 and 3 at different times of year, to determine the degree to which their stocks are contributing to the fishery during the 'present' short season. as previously described
1950	61 - 69	As above	Coastwide marking program	4,338	226	as previously described
1950	70	Fall troll in Area 2C by observers	Troll bycatch and survival	26	3	Observer on commercial salmon trollers
1951	71 - 84	As above	Coastwide marking program	11,130	2,655	as previously described
1952	85 - 99	As above	Coastwide marking program	4,255	825	as previously described
1952	100	Spring summer trawl Bering Sea flats	Banks tagging	192	0	Observer on crab trawler
1953	101 -121	Spring summer setline Area 2	Coastwide marking program	6,190	1,698	as previously described
1954	122	Summer fall trawl Bering Sea flats	Banks tagging	29	1	Observer on crab trawler. Low survival, probably associated with high King crab catches in trawls
1954	123 - 131	Summer fall setline on Portlock, Albatross, and Yakutat	Coastwide marking program	4,002	587	Spring summer experiment, continuation of the above
1955	132 - 144	Fall and winter setline in northern BC, Southeastern Alaska, and Yakutat	Coastwide marking program	9,769	2,754	as previously described
1956	145, 148	Spring, summer and fall setline near Shumagin Island and Unalaska Island	Coastwide marking program	1,231	81	as previously described
1956	146, 147, 149-152	Spring summer setline Bering Sea	Coastwide marking program	3,543	360	Exploratory fishing in the Bering Sea, discovery of the "Polaris" grounds

Appendix. (continued)

Year(s)	Experiment No(s).	Location	Project Name	Tags Released	Tags Recovered	Purpose
1956	153 - 154	Fall winter setline on "W" and Yakutat spawning grounds	Coastwide marking program	588	89	as previously described
1957	155 - 156	Winter setline on Yakutat spawning grounds	Coastwide marking program	504	63	as previously described
1957	157 - 164	Summer fall setline between Cape Clear and the Semidi Islands, including Cook Inlet and Shelikof Strait	Coastwide marking program	4,167	397	as previously described
1956	165	Fall trawl observer in Southeastern	US Cooperative research	6	1	Incidental tagging during Bureau of Commercial Fisheries (U.S.) trawl survey
1958	166 - 169	Spring setline in Southeastern Alaska	Coastwide marking program	1,530	430	as previously described
1958	170	Spring summer setline in Kodiak	Tagging mortality study	222	3	To determine tagging mortality
1959	171 - 179	Spring summer setline in the Bering Sea	Coastwide marking program	5,148	267	as previously described
1960	180 - 200	Spring and summer setline in Charlotte and Southeastern	Coastwide marking program	9,294	2,463	as previously described, includes some double tagging to estimate tag shedding
1961	201, 217 - 225	Summer and fall trawl in eastern Area 3	US Cooperative research	829	23	Incidental tagging during Bureau of Commercial Fisheries (U.S.) trawl survey
1961	202 - 215	Summer, fall and winter trawl in western Gulf of Alaska, Kodiak Is. to Unimak pass	61-63 Gulf groundfish survey	4,308	68	Groundfish trawl grid survey conducted by IPHC at request of U.S. government; Exp 215 tags are caught by handline.
1961	216	Summer trawl in Bering Sea	US Cooperative research	116	1	Incidental tagging during Bureau of Commercial Fisheries (U.S.) trawl survey.
1961	226 - 230	Fall trawl off Kodiak, Cape St Elias, and Shelikof Bay, with exploratory fishing at other locations	Trawl recruitment series	n/a	n/a	Small fish trawl survey (data problems, experiments are not in database)

Appendix. (continued)

Year(s)	Experiment No(s).	Location	Project Name	Tags Released	Tags Recovered	Purpose
1962	231- 241, 250 – 257, 259 - 263	Winter, spring, summer and fall trawl in Area 3	61-63 Gulf groundfish survey	2,859	51	as previously described
1962	242 - 245	Summer fall trawl in Vancouver and Charlotte	Domestic trawler observer program	840	163	Observers on commercial trawlers
1962	246–249, 266- 273	Spring, summer, fall trawl in Southeastern, Kodiak, and Yakutat	US Cooperative research	635	25	Incidental tagging during Bureau of Commercial Fisheries (U.S.) trawl survey
1962	258	Summer fall trawl in Yakutat	Gear and vessel effectiveness	1,113	31	Incidental tagging
1962	264-265	Fall trawl Kodiak	Trawl recruitment series	n/a	n/a	Data problems, not in database
1962	274	Winter setline Yakutat to Seward Gully	61-63 Gulf groundfish survey	14	0	as previously described
1963	275 - 278	Continuation of winter setline from 1962 and spring setline in Kodiak	61-63 Gulf groundfish survey	90	16	Longline survey
1963	279 - 282	Winter spring Yakutat and Kodiak trawl	Trawl recruitment series	108	0	Small fish trawl survey
1963	283 - 285	Summer trawl in Area 2	Domestic trawler observer program	303	95	Observers on commercial trawlers
1963	286 - 293	Summer setline in Kodiak region	63-66 setline grid	2,615	360	Grid charter
1963	294 - 298	Summer tagging on southeastern Bering Sea flats	Trawl recruitment series (Bering Sea pilot)	1,383	9	Combined setline and trawl operation on grid stations
1963	299 - 310	Summer tagging in Shelikof Bay to Shumagin Island	Trawl recruitment series	2,052	12	Small fish migration and recruitment, Exp. 299 not in database
1963	311 - 315	Winter setline in Bering Sea and western Alaska Peninsula Shumagin Island to Unimak Pass	Coastwide marking program	1,341	103	as previously described

Appendix. (continued)

Year(s)	Experiment No(s).	Location	Project Name	Tags Released	Tags Recovered	Purpose
1964	316 - 319	Winter Bering Sea setline	Coastwide marking program	1,271	102	as previously described
1964	320, 333-335, 339-341	Trawl California to Hecate Strait	Domestic trawler observer program	785	177	Observers on commercial trawlers
1964	321 - 332	Summer tagging in Shelikof Strait, Shumagin Islands	63-66 setline grid	4,813	518	as previously described
1964	336-338, 352-363	Summer fall setline in Bering Sea	Banks tagging	3,192	182	as previously described, west of Pribilof Islands and along Aleutian chain
1964	342-351	Trawl tags Sitka to Chirikof Island	Trawl recruitment series	3,454	32	Small fish migration and recruitment
1965	364-377	Summer setline grid Hecate Strait - Dixon Entrance, Shumagin Is - Umnak Is	63-66 setline grid	2,723	357	as previously described
1965	378-379, 384, 388	Trawl tagging Hecate Strait to Chirikof Island	Trawl recruitment series	3,376	281	Small fish migration and recruitment
1965	380-383	Trawl-setline grid in Bering Sea	Trawl recruitment series	1,093	9	Trawl and setline
1965	385-387, 392	Trawl tagging Cape Flattery to mid-Hecate Strait	Domestic trawler observer program	276	56	Observers on commercial trawlers
1965	389-391	Summer setline in Bering Sea	Coastwide marking program	1,115	54	as previously described
1966	393-394	Setline/trawl charter in Hecate Strait	Trawl bycatch and survival	2,347	786	Mortality and size composition study, comparison of trawl and setline size and survival
1966	395	Summer trawl Bering Sea	Trawl recruitment series	1,624	5	Small fish migration and recruitment
1966	396-397	Summer longline grid in Area 2	63-66 setline grid	547	160	as previously described
1966	398, 406-407	Summer/fall trawling in Area 3	Trawl recruitment series	5,011	142	Small fish migration and recruitment
1966	399-400	Trawl tagging in Area 2	Domestic trawler observer program	1,182	266	Observers on commercial trawlers

Appendix. (continued)

Year(s)	Experiment No(s).	Location	Project Name	Tags Released	Tags Recovered	Purpose
1966	401-405	Summer setline in Area 2, Oregon to Dixon Entrance	Grid/ spot tagging comparison	1,804	615	Setline grid
1966	408-410	Summer fall setline Area 2A and 2B	Banks tagging	392	82	West coast area 2A
1967	411-412, 424-425, 428	Fall trawl in Area 2	Domestic trawler observer program	1,241	325	Observers on commercial trawlers
1967	413-414, 426-427	Summer/fall trawl in Area 3 and Bering Sea	Trawl recruitment series	5,479	83	Small fish migration and recruitment
1967	415-423, 429	Summer setline in Bering Sea and Aleutians	Banks tagging	6,107	350	as previously described
1968	430-431, 440	Summer/fall trawl in Areas 2, 3 and Bering Sea	Trawl recruitment series	2,760	85	Small fish migration and recruitment
1968	432, 439, 441	Summer-fall trawl in Area 2	Domestic trawler observer program	662	52	Observers on commercial trawlers
1968	433-438	Spring-summer trawl in Area 2	Coastwide marking program	9,470	3,533	as previously described
1969	442-448, 452-460, 463	Trawl tagging in Area 2	Domestic trawler observer program	3,171	762	Observers on commercial trawlers
1969	449-450	Summer/fall trawl in Area 3 and Bering Sea	Trawl recruitment series	2,901	40	Small fish migration and recruitment
1969	451, 461-462	Summer trawl in Area 2	Trawl bycatch survival	994	125	Charter
1970	464	Spring trawl in Bering Sea	Foreign trawl catch comparison	88	1	Spot trawling, incidental catch study
1970	465-471, 474-478	Trawl summer tagging in Area 2	Domestic trawler observer program	3,024	609	Observers on commercial trawlers
1970	472-473	Summer/fall trawl in Area 3 and Bering Sea	Trawl recruitment series	4,313	63	Small fish migration and recruitment
1971	479	Trawl summer tagging in Area 2	Domestic trawler observer program	104	8	Observers on commercial trawlers
1971	480, 482, 484, 485, 487	Summer/fall trawl in Area 3 and Bering Sea	Trawl recruitment series	8,541	556	Small fish migration and recruitment

Appendix. (continued)

Year(s)	Experiment No(s).	Location	Project Name	Tags Released	Tags Recovered	Purpose
1971	481	Summer trawl Bering Sea	Foreign trawl catch comparison	65	0	Incidental tagging
1971	483, 486	Tagging from salmon trollers in area 2	Troll bycatch and survival	465	171	Observer on commercial salmon trollers
1972	488-489, 492	Spring to Fall setline tagging in Areas 2,3 and 4	Incidental to hook spacing study	535	34	Spot tagging
1972	490	Troll summer tagging in Area 2	Troll bycatch and survival	21	2	Observer on commercial salmon trollers
1972	491	Trawl summer tagging in Unimak Bight	Trawl recruitment series	1,038	5	Small fish migration and recruitment
1973	493-495	Spring setline Triangle Island	Banks Tagging	1,023	210	Spawning stock experiment
1973	496	Summer trawl in Kodiak region	Trawl recruitment series	1,003	4	Spot tagging in "Marmot 'flats'" grounds
1973	497-498	Winter setline near Cape Chiniak	Banks tagging	448	32	Spawning stock experiment
1974	499	Summer trawl near Cape Chiniak	Trawl recruitment series	1,642	29	Spot tagging
1975	500	Summer trawl near Cape Fairweather	Trawl recruitment series	1,956	32	Spot tagging
1975	501	Trawl releases in western Bering Sea	Cooperative research	323	3	Cooperative research with Japanese or USSR research trawler
1976	502-504	Trawl releases Bering Sea and British Columbia	Trawl recruitment series	1,012	117	Small fish migration and recruitment
1976	505-510, 513-515	Setline summer releases Kodiak and Hecate	76-86 setline grid	474	57	Setline stock assessment grid
1976	511-512	Setline summer Bering Sea	Banks tagging	700	44	"Bering Sea 'flats'"
1977	516-517	Summer trawl Bering Sea	Trawl recruitment series	205	1	Small fish migration and recruitment
1977	518-527	Fall setline Southeastern Alaska and British Columbia	76-86 setline grid	1,266	134	as previously described

Appendix. (continued)

Year(s)	Experiment No(s).	Location	Project Name	Tags Released	Tags Recovered	Purpose
1978	528	Summer trawl Bering Sea	Trawl recruitment series	335	7	Small fish migration and recruitment
1978	529-538, 540	Summer setline Kodiak and Charlotte	76-86 setline grid	929	91	as previously described
1978	539	Summer trawl Kodiak-Shumagin	Cooperative research	198	3	Cooperative research with Japanese or USSR research trawler
1979	541	Winter setline Cape Bartolome spawning	Banks Tagging	1,002	118	Spawning stock experiment
1979	542	Spring trawl Hecate Strait	Gear study	202	44	Tag type experiment
1979	543-546	Summer setline Kodiak	76-86 setline grid	823	54	as previously described
1979	547-553	Summer fall trawl Bering Sea to SE Alaska	Trawl recruitment series	8,981	256	Small fish migration and recruitment
1980	554-558	Winter setline SE Alaska spawning	Banks Tagging	1,540	164	Spawning stock experiment
1980	559-578	Summer setline Kodiak and Charlotte	76-86 setline grid	1,316	200	as previously described
1980	579-587	Summer trawl Bering Sea to SE Alaska	Trawl recruitment series	5,402	180	Small fish migration and recruitment
1980	588-597	Summer trawl western Gulf of Alaska	Trawl recruitment series	27,214	834	Intensive Small fish tagging
1980	598	Summer crab pot Yakutat	Crab pot bycatch and survival	185	16	Survival study
1980	599 - 601	Fall winter setline western Gulf of Alaska and British Columbia	Banks Tagging	638	21	Spawning stock experiment
1981	602	winter setline British Columbia	Banks Tagging	59	15	Spawning stock experiment
1981	603-604	Winter trawl Bering Sea	US Cooperative	237	4	Cooperative research with U.S research trawler
1981	605-613	Summer fall setline Kodiak and Charlotte	76-86 setline grid	1,294	149	as previously described
1981	614-623	Summer trawl Gulf of Alaska	Banks tagging	15,462	437	Recruitment study

Appendix. (continued)

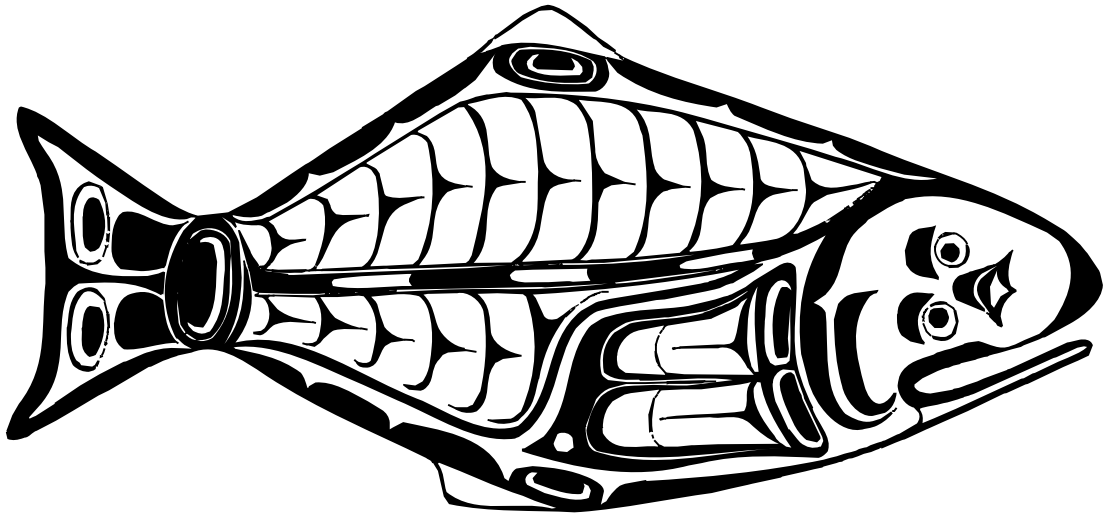
Year(s)	Experiment No(s).	Location	Project Name	Tags Released	Tags Recovered	Purpose
1981	624-630	Spring summer trawl Bering Sea to SE Alaska	Trawl recruitment series	10,031	278	Small fish migration and recruitment
1981	631-635	Fall winter setline British Columbia and Gulf of Alaska	Banks Tagging	3,906	354	Spawning stock experiment
1982	636-640	winter setline British Columbia and Gulf of Alaska	Banks tagging	1,939	133	Continuation of Spawning stock experiment
1982	641-647, 651-660, 667-672	Summer fall setline Kodiak, Southeastern, Charlotte	76-86 setline grid	4,016	510	as previously described
1982	648-650, 661-666	Summer setline Kodiak, Charlotte snap gear	76-86 setline grid	1,448	149	Snap gear fished alongside conventional during 76-86 setline grid to compare gear efficiencies
1982	673-676	Summer fall setline trawl Area 2	Setline catchability study	1,429	308	Incidental to trawl setline comparison
1982	677-683	Summer trawl Bering Sea to SE Alaska	Trawl recruitment series	2,837	74	Small fish migration and recruitment
1983	684-703	Spring summer setline Kodiak, Southeastern, and Charlotte	76-86 setline grid	3,735	719	as previously described
1983	704-706	Spring setline Kodiak snap gear setline	76-86 setline grid	928	167	Snap gear fished alongside conventional gear
1983	707, 727-730	Summer, fall, winter trawl Bering Sea	Cooperative research	1,302	58	Cooperative research with U.S. and Japanese or USSR research trawlers
1983	708 - 712	Spring trawl Charlotte	Setline catchability study	1,277	229	Incidental to gear study
1983	713-722	Spring summer trawl Bering Sea to Charlotte	Trawl recruitment series	4,352	161	Small fish migration and recruitment
1983	723-726	Fall setline in Kodiak and Charlotte	J/Circle hook comparison	528	81	Incidental to gear study
1984	731-750, 765-768	Spring summer setline Kodiak, Southeastern, and Charlotte	76-86 setline grid	12,040	1,926	as previously described
1984	751	Summer setline Pribilof Island	Banks tagging	1,497	67	Pribilof stock assessment
1984	752, 770	Summer fall trawl Bering Sea	Cooperative research	1,142	39	Cooperative research with U.S. and Japanese or USSR research trawlers

Appendix. (continued)

Year(s)	Experiment No(s).	Location	Project Name	Tags Released	Tags Recovered	Purpose
1984	753-764	Spring summer trawl Bering Sea to Charlotte	Trawl recruitment series	5,586	410	Small fish migration and recruitment
1984	769	Spring sport releases Kodiak	Miscellaneous	5	1	Fishing derby
1985	771-772, 802	Summer and fall setline Charlotte and Kodiak	Hook spacing study	3,829	711	Incidental to gear study
1985	773 - 792	Spring summer setline S.E. Alaska, British Columbia, Kodiak	76-86 setline grid	8,198	1,302	as previously described
1985	793-800	Summer trawl Bering Sea to Charlotte	Trawl recruitment series	6,668	547	Small fish migration and recruitment
1985	801	Winter trawl Bering Sea	U.S. Cooperative	199	5	Cooperative research with U.S research trawler
1986	803	Spring sport Homer	Miscellaneous	25	2	Fishing derby
1986	804-809	Summer trawl Bering Sea to SE Alaska	Trawl recruitment series	1,300	38	Small fish migration and recruitment
1986	810-829	Spring summer setline S.E. Alaska, British Columbia, Kodiak	76-86 setline grid	5,712	890	as previously described
1986	830	Fall setline Kodiak	Setline bycatch survival	2,099	170	Hook stripper study
1987	831-834	Summer setline Charlotte	Setline catchability study	2,537	388	Incidental to gear study
1987	835	Summer setline inner Bering Sea	Banks tagging	166	2	Incidental to inner Bering Sea assessment
1987	836	Summer setline Kodiak	Depletion fishing experiment	168	15	Incidental to continuous fishing study
1987	837	Summer trawl Bering Sea	U.S. Cooperative	287	8	Cooperative research with U.S research trawler
1987	838	Spring sport Oregon	Miscellaneous	40	11	Fishing derby
1988	839-840	Spring summer setline Charlotte "Sitka Spot"	Banks tagging	2,652	1,254	Intensive small spot fishing study
1988	841-842	Summer setline Kodiak	Miscellaneous	159	17	Incidental to movie production
1988	843	Summer trawl Kodiak	Multiple recapture study	174	18	To determine whether the same fish are recaptured by trawlers

Appendix. (continued)

Year(s)	Experiment No(s).	Location	Project Name	Tags Released	Tags Recovered	Purpose
1988	844	Summer setline Yakutat	Hook size study	77	8	Incidental to gear study
1988	845	Spring sport releases, Homer	Miscellaneous	36	4	Fishing derby
1989	846	Spring setline Prince William Sound	Survival after oil spill	219	24	Oil spill impact study
1989	847	Spring sport releases, Homer	Miscellaneous	35	5	Fishing derby
1989	848	Spring setline, Oregon	Banks tagging	2,118	617	Special assessment and double-tagging
1990	849	Spring sport releases, Homer	Miscellaneous	38	6	Fishing derby
1991	850	Spring sport releases, Homer	Miscellaneous	38	5	Fishing derby
1992	851	Spring sport releases, Homer	Miscellaneous	44	12	Fishing derby
1992	852	Summer setline Glacier Bay 2C	Banks tagging	428	73	Special local movement study
1993	853	Spring sport releases, Homer	Miscellaneous	48	10	Fishing derby
1993	854	Spring setline Kodiak	Careful release from cod style hooks	3,800	219	Blackcod gear hook removal mortality
31 1993	857	Summer sport release, Glacier Bay	Miscellaneous	540	65	Local migration study
1994	855	Spring sport releases, Homer	Miscellaneous	46	12	Local migration study
1994	856	Summer setline, Kodiak	Careful release from cod style hooks	9,296	642	Blackcod gear hook removal mortality
1995	858	Spring trawl Kodiak	Trawl bycatch survival	4,852	95	Survival of halibut trawl discard
1995	859	Spring sport releases, Homer	Miscellaneous	52	17	Fishing derby
1995	862	Spring sport releases, Glacier Bay	Miscellaneous	251	23	Local migration study
1996	860	Spring sport releases, Homer	Miscellaneous	50	6	Fishing derby
1996	863	Spring sport releases, Glacier Bay	Miscellaneous	108	4	Local migration study
1997	861	Spring sport releases, Homer	Miscellaneous	265	22	Fishing derby
1997	864	Spring sport releases, Homer	Miscellaneous	76	0	Fishing derby
1998	865	Spring sport releases, Homer	Miscellaneous	67	0	Fishing derby



HALIBUT CREST - adapted from designs used by Tlingit, Tsimshian and Haida Indians