REPORT OF THE TECHNICAL SUB-COMMITTEE
of the
INTERNATIONAL TRAWL FISHERY COMMITTEE
Appointed By
The Second Conference on Coordination
Of Fisheries Regulations Between
CANADA
and the
UNITED STATES

Minutes of the Eleventh Annual Meeting
July 22-24, 1970
San Francisco, California

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I. DISTRIBUTION OF MINUTES OF TECHNICAL SUB-COMMITTEE

Report of the Technical Sub-Committee of the International Trawl Fishery Committee appointed by the Second Conference on Coordination of Fisheries Regulations between Canada and the United States

DATE: July 22-24, 1970

PLACE: State Building, San Francisco, California

PARTICIPANTS:

CANADA		- C. R. Forrester - Chairman R. D. Humphreys M. P. Houghton (observer)
IPHC		- S. H. Hoag (observer)
UNITED STATES		
	Washington	- D. E. Kauffman G. S. DiDonato
	Oregon	- J. M. Meehan W. Hublou
	California	- T. Jow R. H. Parrish (observer) R. J. Nitsos (observer) L. F. Quirollo (observer) R. F. G. Heimann (observer)
	PMFC	- L. A. Verhoeven (observer)
	BCF	- H. A. Larkins (observer)

I. CALL TO ORDER

The eleventh annual meeting was called to order by Chairman C. R. Forrester at 1000 hours on July 22, 1970 under instructions set forth by the parent committee in 1959. The business of the meeting was guided by a prepared agenda which appears as Appendix A.

II. APPOINTMENT OF SECRETARY

R. J. Nitsos of California was appointed to act as recording secretary for the meeting.

III. APPROVAL OF AGENDA

Minor amendments were made to the tentative agenda which was circulated to the members prior to the meeting. The approved agenda appears as Appendix A.

IV. STATUS REPORTS

1. Total Catch and Effort for the 1969 Trawl Fishery

The 1969 otter trawl catch by Canadian and United States fishermen from the northeastern Pacific was 153.5 million lbs. This catch was an increase of 1.5% over the 151.3 million lbs landed in 1968 and 4.4% above the 10-year (1959-1968) average of 147.0 million lbs (Table 1). Total effort of 160,148 hours for 1969 increased 6.7% over the 150,066 hours for 1968.

The Alaskan catch in 1969 was negligible, amounting to less than 200,000 lbs. Washington, Oregon and California showed increases of 3.8%, 0.5% and 6.2% respectively over 1968. The California catch of 36.5 million lbs was the highest for the past 10 years. Catch by Canadian vessels in 1969 dropped about 5% below 1968 catches.

Substantial increases of about 7 million lbs each were reported for catches of Dover sole and rockfishes other than Pacific ocean perch. Pacific cod and lingcod catches were down approximately 7 and 5 million lbs respectively. Pacific ocean perch and Pacific cod were the leading roundfish species in that order while Dover sole dominated the flatfish landings.

2. Petrale Sole

a. Catch/Effort

The total Canadian and United States catch of petrale sole in 1969 was 6.7 million lbs, a decline of 4.3% from the 7.0 million lbs landed in 1968 and 20.2% from the 1959-68 average of 8.4 million lbs (Table 1).

Table 1. Otter trawl landings from the northeastern Pacific by Canadian and United States vessels in 1968, 1969, and mean for 1959-68 in thousands of pounds.

	Mean 1959-68	1968					1969				
		B.C.	Wash.	Ore.	Calif.	Total	B.C.	Wash.	Ore.	Calif.	Total
English sole	12,055	1,849	3,169	2,360	5,810	13,188	2,196	2,989	1,716	3,803	10,704
Rock sole	5,007	6,744	826	51	3	7,624	6,653	1,148	25	3	7,829
Petrale sole	8,424	813	1,575	1,653	2,943	6,984	351	1,608	1,835	2,867	6,661
Dover sole	15,716	231	1,526	4,325	8,526	14,608	855	1,850	5,554	12,919	21,178
Rex sole	2,678	19	19	1,075	1,929	3,042	107	12	1,215	2,253	3,587
Starry flounder	2,118	156	1,957	454	811	3,378	171	657	251	351	1,430
Other flatfish	1,916	429	48	215	1,229	1,921	403	77	506	1,004	1,990
Pacific cod	20,425	14,840	5,526	385	-	20,751	9,686	3,767	47	-	13,500
Lingcod	9,434	6,435	5,940	1,526	923	14,824	4,022	3,465	1,048	836	9,407
Sablefish	2,760	369	155	56	1,418	1,998	327	138	135	2,162	2,762
Pac. ocean perch	18,599	1,932	11,715	1,649	23	15,319	3,316	12,269	940	45	16,570
Other rockfish	21,571	719	10,255	4,253	7,841	23,068	1,003	17,141	5,101	7,571	30,816
Misc. species	1,092	426	80	31	365	902	199	91	4	304	598
Dogfish	1,723	65	-	2	-	67	2	-	Tr	3	5
Animal food	16,428	4,996	6,310	2,815	2,590	16,711	8,406	3,226	2,567	2,412	16,611
Reduction[1]	6,933	-	6,865	49	-	6,914	131	9,672	45	-	9,848
Total	146,998	40,023	55,966	20,899	34,411	151,299	37,827	58,110	21,025	36,533	153,495
% of Total Catch	-	26.4	37.0	13.8	22.8	100.0	24.6	37.9	13.7	23.8	100.0
Total Hours	NA[2]	29,352	46,083	24,456	50,175	150,066	33,234	51,784	25,692	49,438	160,148
Catch/hr - lbs	NA[2]	1,364	1,214	855	686	1,008	1,138	1,122	818	739	958

[1]Reduction pounds includes dogfish in Washington statistics.

[2]Not available due to incomplete data for some years.

Canada. The Canadian ~~and United States~~ catch of petrale from its southern and northern stock amounted to 351,000 lbs, a decline of 57% from the 813,000 lbs landed in 1968 and 64.9% below the 10-year (1959-68) average of 1.0 million lbs.

The southern stock catch of 122,000 lbs declined 51% from the 1968 landings, while the catch per hour of 57 lbs/hr was 15% less than 1968. The average length of male petrale sole in the catch remained about the same as in 1968, while that for females declined. Landings from the northern stock of 223,000 lbs were 60% lower than in 1968.

Washington. The Washington landings of petrale sole in 1969 were 1.6 million lbs, virtually the same as reported for 1968, but 38% below the 1959-68 mean of 2.6 million lbs. The southern stock areas of 3A, 3B and 3C accounted for 953,000 lbs or 59.3% of the total landings. Area 3C is the most important, accounting for 751,000 lbs. The Cape Flattery Spit area within Area 3C which is fished during February-April in depths of 170-200 fathoms continues to be the best producing area with the catch and CPUE above the means for the past 10 years.

Petrale sole landings from the northern stock (3D, 5A-5D) amounted to 652,000 lbs in 1969, down 28.7% from 1968 and 30.1% below the 1959-68 mean. Substantial declines continued in the Queen Charlotte Sound and Hecate Strait area summer inshore fisheries (Area 5A-5D). The Esteban Deep fishery (in Area 3D) was down 16.1% from 1968.

Oregon. Total petrale sole landings by Oregon trawlers in 1969 were 1.8 million lbs which was an 11.1% increase from 1968 and 4.1% below the 10-year mean. The principal catch areas were 2A to 3A. Catch/effort for Areas 1C through 3A was 281 lbs/hr, an increase of 31.5% from the 216 lbs/hr of 1968.

California. Petrale sole landings in California in 1969 were 2.9 million lbs, 3% below the 1968 landings. The majority of the catch

originated from Areas 1C and 1B where catches of 1.4 and 1.1 million lbs respectively were made. The balance of the catch came from Areas 1A and 2A; 203,000 and 138,000 lbs respectively.

b. Definition of Stocks

No new information on stock definition was available at this time. California is reviewing past tagging experiements and analyzing petrale taggings of 1962 and 1964 for stock definition purposes.

c. Winter Fishery

Winter landing restrictions on petrale sole in British Columbia were waived during the 1969-70 fishery. The 1969-70 winter fishery for petrale sole by Canadian trawlers, however, amounted to less than 90,000 lbs taken chiefly in deep water outside the Big Bank area off the west coast of Vancouver Island. The catch per unit effort at 199 lbs/hr was substantially higher than in the inshore summer fishery, and the fish were slightly larger. Unadjusted interview estimates from Washington trawlers account for 371,000 lbs of petrale landed from all areas between December 1969 and April 1970 inclusive. This is substantially lower than the previous two seasons. A strike by the union representing vessel crews during January and February may have influenced petrale sole landings. The winter fishery in California from November 1969 through January 1970 amounted to about 560,000 lbs, down somewhat from the 798,000 lbs landed during the 1968-69 winter fishery.

d. Summary

Petrale sole catches from the northern and southern stock off Canada and Washington are substantially below the level of the past 10 years. Catch rates for petrale sole in both areas were relatively low on the inshore grounds. The major production by Washington is during the winter-spring deep-water spawning period while Canadian production was mainly from its inshore summer fishery. Environmental studies carried out by Canada suggest there will be no improvement in the fishery for the next 5-8 years.

3. Lingcod

a. Catch/Effort (Area 3C)

The combined Canadian and United States catch of lingcod from all areas amounted to 9.4 million lbs in 1969, a decline of 36.4% from 1968, although it was about the same as the 1959-68 mean.

Canada. The total Canadian trawl catch of lingcod in 1969 was 4.0 million lbs, a decrease of 38% from the record 1968 catch of 6.4 million lbs, although 18% above the 10-year mean (1959-68) of 3.3 million lbs. Approximately 62% of the catch came from grounds off the west coast of Vancouver Island, with 1.4 million lbs from Area 3C and 1.1 million lbs from Area 3D. Landings from Area 3C declined 36% from 1968, but were still above the 1959-68 mean. Catch per unit effort in 1969 amounted to 630 lbs/hr which was only half the value for 1968.

Washington. Trawl landings of lingcod by Washington trawlers in 1969 amounted to 3.5 million lbs, a decrease of 41.7% from 1968 and 22.6% from the 1959-68 mean. The 1969 landings and CPUE from the major coastal fishing areas in Queen Charlotte Sound and off the lower west coast of Vancouver Island were down substantially from 1968 and the 1959-68 mean. Landings from the lower west coast of Vancouver Island (Area 3C) declined 36.1% from 1968 and 54% below the 1959-68 mean, and the CPUE from this area also declined from 1968 and 1959-68 mean by 40.6% and 19.9% respectively. Catches from the Queen Charlotte Sound area (Area 5A-5B) declined by 46.3% from 1968 but were 14.5% above the 1959-68 mean catch, the CPUE declined by 61.5% and 46.5% respectively from the 1968 and 1959-68 values.

Oregon. The total Oregon catch of lingcod amounted to 1.1 million lbs, a decline of 28.9% from 1968 but 35.1% above the 1959-68 mean. Over 85% of the catch came from Areas 2C, 3A and 3B.

California. The 1969 lingcod catch of 836,000 lbs by California trawlers was 9% below the 1968 catch and 3% below the 1959-68 mean. Lingcod remains an incidental species in trawler catches in California.

b. Stocks in Area 3C

Considerable discussion took place on the question of lingcod stocks in Area 3C. A summary of the discussion is given under Item VII(1), below.

4. Pacific Cod

a. Catch/Effort (Areas 3C, 5D)

Total landings of Pacific cod by Canadian and U.S. trawlers of 13.5 million lbs in 1969 was substantially below both the 1968 landings of 20.8 million lbs and the 10-year mean of 20.4 million lbs.

Canada. Landings of Pacific cod totaled 9.7 million lbs and were again the dominant item in the trawl catch. However this catch showed a decrease of 34% from 1968 and was 27% below the 1959-68 mean. The bulk of the catch (6.5 million lbs) was taken from Areas 5C and 5D (Hecate Strait).

Production of Pacific cod in 1970 is not expected to be high as no substantial recruitment is apparent in samples from northern Hecate Strait, historically the region of greatest abundance.

Washington. Pacific cod landings by Washington trawlers amounted to 3.8 million lbs in 1969, a decline of 31.8% from 1968 and 46.2% from the 1959-68 mean. Catches were down in all areas as was CPUE. No significant catch was made in Hecate Strait by Washington trawlers. In Puget Sound and Juan de Fuca Strait waters, Pacific cod landings of 1.6 million lbs showed a decline of 20.3% from 1968 although the CPUE remained virtually the same as in 1968 and 24.7% above the 1959-68 mean.

Oregon. Landings of Pacific cod remained incidental with 47,000 lbs landed. Of the total landed, 28,000 lbs were taken off Washington (Areas 3A-3B) and 19,000 lbs off Canada (Areas 3D, 5A, 5B).

California. No Pacific cod were caught off California in 1969.

5. Pacific Ocean Perch

a. Catch/Effort (Areas 3B to 5B)

The total coastwide landings of Pacific ocean perch by Canadian and U.S. trawlers was 16.6 million lbs in 1969, an increase of 8.5% from 1968 and a decrease of 10.8% from the 1959-68 mean of 18.6 million lbs.

Canada. Landings by Canadian trawlers in 1969 amounted to 3.3 million lbs, an increase of 42% from 1968 and more than twice the 1959-68 mean landings. The bulk of the catch was taken in Queen Charlotte Sound (Areas 5A and 5B). The catch per unit of effort in 1969 was 1,639 lbs/hr, a decline of 23% from 1968.

Washington. Total catch by Washington trawlers was 12.3 million lbs in 1969, an increase of 4.7% from 1968 and 6.5% from the 1959-68 mean. Queen Charlotte Sound (Areas 5A-5B) accounted for 90% of the total catch (11.0 million lbs), of this 8.0 million lbs were landed from the Goose Island grounds (Area 5B). The CPUE for the Goose Island grounds of 1,487 in 1969 declined 21.5% below the 1959-68 mean and was approximately one-half of the 1966 peak value of 2,903 lbs per hour. A decline in the CPUE also occurred on the Cape Scott grounds of 18.1% below the 1959-68 mean and 41.9% below the peak value of 1965.

Landings of Pacific ocean perch from other coastal areas (3B, 3C, 3D) remained at a low level during 1969. Based on catch and effort records obtained from the Washington trawl fleet it is evident that the Pacific ocean perch populations found along the northern Washington coast and west coast of Vancouver Island have been considerably reduced. These reduced populations did not attract any sustained fishing pressure in 1969.

Oregon. Landings of Pacific ocean perch totaled 0.9 million lbs in 1969; about 43% below the 1968 landings and 82.8% below the 10-year mean. The bulk of the catch (58.8%) came from Areas 2B and 2C. The remaining catch came primarily from Queen Charlotte Sound (Areas 5A and 5B). Catch per unit of effort for Areas 5A and 5B was 740 lbs per hour in 1969 compared to 1,095 lbs per hour in 1968. Catch per unit of effort from Areas 2B and 2C was 429 lbs per hour in 1969 compared to 337 lbs per hour in 1968.

California. Total landings of Pacific ocean perch in California in 1969 amounted to 45,000 lbs. The majority of the catch, 43,000 lbs, was caught in Area 1C.

6. English Sole

The total catch by Canadian and United States fishermen in 1969 was 10.7 million lbs, a decline of 18.9% from 1968 and 11.6% below the 1959-68 mean.

Canada. Landings of English sole in 1969 of 2.2 million lbs were 37% above the 1959-68 mean. The bulk of the catch (72%) was taken from the grounds in northern Hecate Strait chiefly during the spring months. This fishery is strongly dependent on fish newly recruited.

Washington. Trawl landings of English sole in Washington in 1969 totaled 3.9 million lbs, of which 0.9 million lbs were used for animal food. The food fish landings of 3.0 million lbs were 6.2% below 1968 and 21% below the 1959-68 mean. The major areas of production were the northern Washington coast (Area 3B) with landings of 1.2 million lbs and the inside waters of Juan de Fuca Strait and Puget Sound (Area 4A) with landings of 1.6 million lbs.

Oregon. English sole landings were 1.7 million lbs in 1969, down 27.3% from 1968 and 19.7% below the 1959-68 mean. Catch per unit of effort of 229 lbs per hour in 1969 was 21.6% below the 292 lbs per hour in 1968.

California. The 1969 English sole catch of 3.8 million lbs was 35% below the 1968 catch and 16% below the 1959-68 average. Effort on English sole grounds was below that of 1968 but not in proportion to the catch decline.

English sole abundance declined in 1969 compared to the previous two years in PMFC Areas 1B and 1C.

7. Dover Sole

The Dover sole accounted for the major increase in flatfish landings by Canadian and United States trawlers. Total landings were 21.2 million lbs, an increase of 45.2% over the 1968 landings of 14.6 million and 35% above the 1959-68 average of 15.7 million lbs.

Canada. Landings of Dover sole in 1969 of 855,000 lbs (with 68% taken from Area 5D) were more than three times the amount landed in 1968. Increased market demands were responsible for the increased landings.

Washington. Dover sole landings in 1969 amounted to 1.8 million lbs, a 21% increase over the 1968 landings although 12% below the 1959-68 average. The Goose Island grounds (Area 5B) and the northern Washington coast (Area 3B) accounted for approximately two-thirds of the total Washington production. Deep-water fishing on the Cape Flattery Spit and Esteban Deep grounds accounted for the remainder of the Dover sole landings. Good market demands have resulted in increased landings during the past two years.

Oregon. Landings of Dover sole increased to 5.6 million lbs in 1969; up 28.4% from the 1968 total and 25.8% from the 1959-68 average. Catch per unit of effort also increased to 479 lbs per hour in 1969 from 448 lbs per hour in 1968.

California. The 1969 Dover sole catch of 12.9 million lbs was a record catch; the previous high was the 11.7 million lbs landed in 1952.

The 1969 catch was 52% above the 1968 catch of 8.5 million and 46% above the 1959-68 average.

The majority of the catch was from PMFC Area 1C where 8.8 million lbs were caught. Landings from Areas 1B and 2A also increased significantly in 1969.

V. REVIEW OF DATA EXCHANGE PROCEDURES

1. Procedures of Current Exchanges of Data

a. Tagging Summaries

It was noted that the circulation of completed tagging experiments from all agencies, with California as the disseminating agency, has not been completed. This was first mentioned in the 1968 meeting. The question of the format of tag recovery sheets as mentioned in the 1968 meeting was also discussed. There were differences in interpretation on whether 365 day return summaries are to be used for completed and ongoing tagging experiments or just for completed ones. After some discussion it was recommended that:

i. Completed tagging summaries be reported on a 365 day out basis.

ii. Ongoing tagging experiments continue to be reported as being done by agencies on a calendar basis.

iii. In compliance with the 1968 meeting recommendation, circulation of completed tagging experiments should be carried out.

b. Status Reports

The question of inclusion of 5-year means as suggested in the 1969 meeting was discussed. Oregon and Washington indicated they had no data for 1954.

It was suggested that agencies should append to their summary of the 1970 fishery, historical tables of all available catch and effort statistics for their trawl fishery.

c. Data Series

Use of the PMFC Data Series by other agencies, primarily INPFC, was discussed. Under consideration is the compilation of future data into another

volume. The suggestion was made that a preface to the second volume should include mean data for the previous five years or that a series of years of Volume I be included to assure continuity.

2. Expansion of Data Exchange

a. Statistical Data Being Exchanged with Soviet Union

The exchange of data by the U.S.-U.S.S.R. at bilateral scientific meetings was discussed. To date, 1967 and 1968 data have been exchanged with the U.S.S.R.; the data are gross as to species separation, and the statistical areas are large. The data are available to all Technical Sub-Committee members.

Some biological data on hake and Pacific ocean perch are being exchanged between the U.S. and U.S.S.R.

b. Boundaries of International Statistical Areas

Considerable discussion took place on statistical subdivisions in the Gulf of Alaska. Members agreed that a general subdivision of the Gulf of Alaska should be as stated in the minutes of the 1969 meeting, i.e., Southeastern Alaska (PMFC Area 6) would encompass waters bounded on the south by the latitude of 54°40'N and on the west by the longitude of 147°W. PMFC Area 7 would encompass waters of the Gulf of Alaska west of the western boundary of PMFC Area 6. Within these general areas it was suggested that subdivisions should be in the same sub-units as INPFC areas. It was agreed that the Executive Director of PMFC would correspond with Alaska concerning changes in PMFC Area and that all changes would be handled through PMFC.

VI. REVIEW OF CURRENT AND PROPOSED RESEARCH

Canada. Groundfish staff of the Fisheries Research Board of Canada on the Pacific coast in 1969 consisted of two biologists, seven technicians, and one clerk. Two of the staff had as their primary responsibility the collection of samples from the commercial trawling operations. Other personnel were divided between two projects, the Near Seas Investigation and the Rockfish Investigation.

The Near Seas Investigation has the responsibility of maintaining watch on various stocks which support the trawl fishery in waters adjacent to British Columbia. A major portion of the work involves collection and analysis of data on catch and fishing effort. Routine sampling of various species at the main ports provide data which yield information on growth, mortality and recruitment in the various fisheries.

Vessel operations in 1969 were confined chiefly to collection of mature fish for laboratory studies on egg development.

Further observations on development of the flathead sole egg in various conditions of salinity and temperature were made in 1969 and results are being prepared for publication.

Age and growth studies are continuing on rock sole from northern British Columbia and on Pacific cod from all British Columbia waters. Otoliths are used in the case of rock sole and scales for Pacific cod.

One member of the Near Seas staff was in Japan on a 6-month scientific exchange visit. The purpose of the trip was to study Japanese techniques for rearing groundfish.

One G.B. REED rockfish cruise (GBR 69-3) was completed off southwest Vancouver Island during September 1969. Primary purpose was a study of ocean perch distribution and abundance. Material was again collected for the

biochemical studies of rockfish taxonomy which are conducted cooperatively with the Vancouver Station. A second G.B. REED cruise (GBR 70-1) was completed off British Columbia and southeastern Alaska during March-June 1970. Primary purpose was to determine spawning season for ocean perch off Southeast Alaska.

Laboratory studies consisted principally of otolith reading, data analysis, and report writing. All ocean perch otoliths collected aboard the G.B. REED during 1969 were read, and the results processed for analysis of growth, and age composition of catches. Substantial progress has been made in the analysis of ocean perch age determination and growth. S. "aleutianus-C" has been determined to be a new species (proposed name is Sebastes caenaematicus), and a manuscript has been submitted to the editor.

Washington. The Groundfish Investigation staff of the Washington Department of Fisheries consisted of seven biologists and three scientific aids during 1969. In addition the Department has a part-time research helper position filled by a University of Washington student and has the direct supervision of a PMFC sponsored scientific aide position funded by a PL 88-309 contract.

The groundfish staff contributed tags and tagging equipment to a University of Washington graduate fisheries class project of tagging dogfish in southern Puget Sound. Three tagging trips were completed and 4,229 dogfish were released. A deep water Dover sole tagging cruise off the Cape Flattery Spit was completed in April 1970. Three tagging cruises were completed in June, 1970 in Puget Sound and Swiftsure Bank. These were aimed primarily at tagging dogfish and petrale sole, and secondarily at English sole and Pacific cod.

Age reading of otoliths on a production basis for Pacific hake and Pacific ocean perch were continued at the Federal State cooperative groundfish age reading unit. Reading of petrale sole market samples and English sole interopercle

samples was also begun. Initial attempts to age starry flounder from interopercle samples were started but progress is slow.

A program of Pacific ocean perch biological cruises on two sampling stations off the northern Washington coast was continued with the completion of two cruises in 1969.

Pacific hake studies in Puget Sound are centred on analysis of catch/effort and market sample data. Acoustical surveys for standing stock estimates are made using an echo-integrator developed by the University of Washington Division of Marine Resources. Delineation of English sole stocks in Puget Sound is under way. Monthly one-day biological cruises were established in northern Puget Sound to monitor bottomfish populations in this important "inside" fishing area.

Daily coverage of trawl vessel landings at major ports continues along with market sampling of major trawl-caught species.

Development of a computer-oriented data storage and retrieval system for catch/effort data, biological samples and tagging records progressed considerably.

Oregon. The Trawl Investigation staff of the Oregon Fish Commission was increased during 1969 by the addition of one biologist. Total staff at the present time includes five biologists and two seasonal aids.

Three tagging trips were conducted during 1969 and early 1970. One trip was made to tag lingcod off the southern Washington coast while the remaining two were made for deep-water Dover sole tagging, although some yellowtail rockfish were tagged in shallow water on the last trip. Biological studies during the next year will be aimed at the completion of the Dover sole study with the completion of the following:

i. Aging study comparing scales, raw otoliths and burned otoliths.

ii. Results of 1969 deep-water survey will be compiled and distributed to fishermen.

iii. Yield isopleths will be calculated for stocks in Area 3A.

A tagging cruise for rex sole was completed in 1970 and gathered preliminary data which will be used for planning a survey of underutilized species.

California. The Bottomfish staff remained at five biologists, but the allotment of seasonal aid time in 1969 was increased from 6 to 10 months. A PL 88-309 Shellfish and Bottomfish Data Analysis Project staffed with three biologists, a clerk and a keypunch operator work closely with the Bottomfish staff.

Two Dover sole tagging cruises were completed in Area 1C, and these completed the series of cruises for the Area 1C Dover sole study. A short, 2-week, cruise last summer in southern California was undertaken to collect flatfish from unexploited stocks for age, growth, and mortality studies.

Age determinations for Dover, English, and petrale sole are continuing, as are growth studies for these species in Areas 1B and 1C.

Completed Dover and petrale sole tagging experiments are under analysis to determine migration and stock units.

Studies of the ecology, distribution and abundance of roundfish off central California (Area 1B) were continued. Monthly cruises aboard the R/V NAUTILUS and a cruise in May aboard the R/V N.B. SCOFIELD were completed.

The market sampling program was continued at all major ports with samples taken of Dover, English, and petrale sole, and landings for animal food.

The PL 88-309 project has spent a considerable amount of time on the Fort Bragg petrale study; emphasis has been on catch per unit of effort and fishing power of the Fort Bragg fleet.

Bureau of Commercial Fisheries (Pacific Northwest Region). During the past year, reorganization of federal fisheries activities has been taking place at three levels:

i. The pending move of BCF from the Department of Interior into the National Oceanic and Atmospheric Administration within the Department of Commerce.

ii. Reorganization within BCF to change from a discipline-oriented structure to one that is fishery-oriented.

iii. A merger of the Groundfish Investigation Program of the Seattle Biological Laboratory with the Seattle Exploratory Fishing and Gear Research Base with the new unit tentatively named "Marine Fisheries Base."

Qualitative and quantitative studies of the distribution, abundance, biology, and population features of both exploited and potentially valuable fish stocks are underway, with current emphasis on rockfish (particularly Pacific ocean perch), hake, and saury.

The gear research unit, consisting of electronic and mechanical engineers, biologists, behaviorists, and gear specialists, devotes its efforts toward the design of new or improved fishing gear and harvest systems.

Special studies being carried out are:

i. NSF sponsored assessment of Antarctic marine resources.

ii. AEC sponsored studies of the ecology of the Columbia River plume and adjacent water.

iii. Subtidal clam exploratory fishing and gear development.

iv. Evaluation of the effects of foreign fishing throughout the northeastern Pacific.

VII. REVIEW OF PROJECTS OF MUTUAL INTEREST

1. Action on 1969 Technical Sub-Committee Recommendations

a. Recommendation 1. A more detailed study of the lingcod fishery, particularly the PMFC Area 3C complex.

This recommendation primarily concerns the fisheries of Canada and Washington. A special report[1] on lingcod emphasizing some of the difficulties encountered in analysis of catch/effort and market sample data was submitted by the Washington State Department of Fisheries. It was noted that when catch and fishing effort data from individual fishing grounds within Area 3C were combined, the usefulness of these data in interpreting abundance trends for Area 3C as a whole is uncertain. In addition it appears that there is significant difference in size composition from the various grounds within Area 3C.

After discussion of reports given on lingcod it was concluded that the lingcod found in Area 3C are a complex of several sub-populations. Further work is required to delineate stocks, stock movements, age structure, and exploitation rates.

No further recommendation was deemed necessary at this time.

b. Recommendation 2. Updating of reports on status of sablefish fisheries - and determination of need for continuation of regulation where such now exists.

Special reports[2] were submitted by each state updating status of their respective sablefish fisheries. The reports were discussed and the following statements were made.

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[1] Special report on the Washington trawl fishery for lingcod, by G. Di Donato. Wash. State Dept. of Fisheries. 11 p.

[2] The California Sablefish Fishery for the Period 1953-1968 by R.H. Parrish. Calif. Dept. of Fish and Game 10 p.

The Status of the Oregon Sablefish Fishery, 1953-1969 by J.M. Meehan. Oregon Fish. Comm. 6 p.

Special Report on the Status of the Washington Sablefish Fisheries by G.S. Di Donato. Wash. State Dept. Fish. 14 p.

The Canadian and United States domestic sablefish fishery both trawl and setline is at a fairly low level. However in light of known Japanese longline activity throughout the Gulf of Alaska it is obvious that the U.S. and Canadian domestic fisheries are not fully exploiting sablefish stocks. There appears to be no biological basis for the size regulation now in effect in Canada, Washington and Oregon.

2. Hake

Washington reported that a catch of about 9 million lb of Pacific hake was landed by eight boats during the 1969-70 Puget Sound hake fishery. There will probably be no United States coastal fishery for Pacific hake during 1970. Both Oregon and California reported no hake fishery.

3. Other

Preparation of the groundfish bibliography which was originally scheduled to be included in PMFC Bulletin 7 was discussed. All members felt that it should be checked by all agencies present and published as soon as possible. Canada accepted responsibility for publishing the groundfish bibliography in either the Fisheries Research Boards Technical Report or manuscript report series.

California has a sablefish bibliography which is fairly complete, copies are available.

The BCF reported on a synopsis on Pacific ocean perch which is at the publishers and should be out this fall. It will be published in the Special Scientific report series.

VIII. INTERNATIONAL PROBLEMS

1. Status of Foreign Trawl Fisheries off the West Coast of Canada and the United States

Canada reported the 1969 fishing patterns by Japanese and Russian trawlers to be about the same as in the past year, with the Russian fleet of

BMRT's moving onto the Big Bank in July and August. Oregon reported sightings of foreign trawlers off the Oregon-Washington coasts were down 22-25% per month from the past year. It was felt the Soviets were catching Dover sole as some vessels have been reported to be on known Dover sole grounds. Soviet trawlers, normally absent after May off California, have remained through July this year. All agencies have reports of violations of their 12-mile limits.

Canada, Oregon and California have some type of surveillance on foreign fishing fleets. The BCF has a surveillance program using U.S. Coast Guard flights over Soviet fleet.

2. Recent Development in Fisheries Agreements

No change since last U.S.-U.S.S.R. fisheries agreement (2-year agreement) which comes up for renegotiation this coming winter. Discussion of the Canada-U.S. reciprocal fishing agreement and the differences in regulations between Canada, Washington, Oregon, and California disclosed that the rationale behind trawl regulations was needed.

3. Recommendations for Co-operative Programs

Considerable discussion took place on a recommendation that the Technical Sub-Committee should prepare for the parent committee a report on the status of groundfish stocks on the Pacific coast, particularly those subject to international harvest. Discussion, which evolved around the propriety, limits and possible quality of such a report, led to the following conclusions:

The Technical Sub-Committee recognizes the need for summary information on stock trends in species which are under exploitation by both domestic and foreign fisheries and urges early examination of available data and preparation of such summaries. The first stage suggested is the preparation of a special report on Pacific Ocean perch.

IX. CHANGES IN CURRENT TRAWL REGULATIONS

Current regulations for all agencies along with rationale for each are

X. OTHER BUSINESS

Distribution of minutes was discussed and list of recipients revised. See Appendix I for distribution list.

XI. RECOMMENDATIONS

1. Future Work

The Sub-Committee recommends:

a. That all agencies begin preparation of a special status report on Pacific ocean perch. Discussion of these special reports and procedures for integrating them into one Technical sub-committee report will be conducted by correspondence during the coming year.

2. Parent Committee

While no specific recommendations are made at this time, attention is called to the appended list of regulations and their rationale (Appendix B).

XII. SCHEDULE OF MEETINGS

1. Parent Committee Meeting

The International Trawl Committee will meet on Wednesday, November 18, 1970 in Palo Alto, California.

2. Twelfth Annual Meeting of the Technical Sub-Committee

The Technical Sub-Committee will meet in Vancouver, British Columbia, in late June 1971.

XIII. ELECTION OF CHAIRMAN

James M. Meehan, Oregon Fish Commission, was elected chairman for 1971.

XIV. ADJOURNMENT

The meeting was adjourned at 1200 on July 24, 1970.

AGENDA AS ADOPTED
TECHNICAL SUB-COMMITTEE OF THE
INTERNATIONAL TRAWL FISHERY COMMITTEE
SAN FRANCISCO, JULY 1970

12th ANNUAL MEETING

I. CALL TO ORDER

II. APPOINTMENT OF SECRETARY

III. APPROVAL OF AGENDA

IV. STATUS REPORTS

1. Total Catch and Effort for the 1969 Trawl Fishery
2. Petrale Sole
   a. Catch/Effort
   b. Definition of Stocks
   c. Winter Fishery
   d. Summary
3. Lingcod
   a. Catch/Effort (Area 3C)
   b. Stocks in Area 3C
4. Pacific Cod
   a. Catch/Effort (Areas 3C, 5D)
5. Pacific Ocean Perch
   a. Catch/Effort (Areas 3B to 5B)
6. English Sole
7. Dover Sole

V. REVIEW OF DATA EXCHANGE PROCEDURES

1. Procedures of Current Exchanges of Data
   a. Tagging Summaries
   b. Status Reports
   c. Data Series
2. Expansion of Data Exchange
   a. Statistical Data Being Exchanged with Soviet Union
   b. Boundaries of International Statistical Areas

VI. REVIEW OF CURRENT AND PROPOSED RESEARCH

1. Tagging
2. Biological Studies
3. Sampling Program
4. Special Projects (I.D.S. and U.S. PL 88-309)
5. Other Studies

VII. REVIEW OF PROJECTS OF MUTUAL INTEREST

1. Action on 1969 Technical Sub-Committee Recommendations
   a. Recommendation 1. A more detailed study of the lingcod fishery - particularly the 3C complex.
   b. Recommendation 2. Updating of reports on status of sablefish fisheries - and determination of need for continuation of regulation where such now exists.
2. Hake
3. Other

VIII. INTERNATIONAL PROBLEMS

1. Status of Foreign Trawl Fisheries off the West Coast of Canada and the United States
2. Recent Developments in Fisheries Agreements
3. Recommendations for Co-operative Programs

IX. CHANGES IN TRAWL REGULATIONS

X. OTHER BUSINESS

XI. RECOMMENDATIONS

1. Future Work
2. Parent Committee

XII. SCHEDULE OF MEETINGS

1. Parent Committee Meeting
2. Twelfth Annual Meeting of Technical Sub-Committee

XIII. ELECTION OF CHAIRMAN

XIV. ADJOURNMENT

APPENDIX B

SYNOPSIS OF OTTER TRAWL REGULATIONS AND THEIR RATIONALE

AS OF 1 JULY 1970

CALIFORNIA TRAWL REGULATIONS AND THEIR RATIONALE

1. CLOSURE OF FISHING BY AREA

(a) Use of trawl nets prohibited in waters less than 3 nautical miles from nearest point of land on mainland shore, including certain named bays.

Rationale: - The original intent of closure of certain areas within 3 miles was to protect small and immature flatfish at a time when small mesh was universally used. Later closures were enacted to minimize conflict among sport, crab, and trawl fisheries.

(b) Possession of trawl net prohibited from Santa Barbara - Ventura County line south to Mexican border. Permits may be issued by the Department to possess, only for the purpose of transportation.

Rationale: - To minimize competition between sport and trawl fishery in an area of marginal trawl productivity.

(c) Effective on ~~October 22,~~ November 23, 1970 are the following:

(i) Extends for two years trawl fishing with 5 1/2 inch mesh nets within 3 miles in waters not less than 25 fathoms but not less than one nautical mile from shore between Point Arguello and a line due south from El Capitan Point.

Rationale: - Regulation requested by industry; the larger mesh size (than required 4 1/2 inch) is that used by some trawlers in the area. Provides for exploitation of resources.

(ii) Trawling permitted for a period of two years to within one nautical mile of the mainland shore between Point Lobos and Point Sur.

Rationale: - Requested by industry; it provides for exploitation of bottomfish mainly rockfish.

2. MINIMUM SIZE LIMITS

No California halibut (Paralichthys californicus) which weigh less than 4 pounds in the round, or 3 1/2 pounds dressed head on, or less than 3 pounds dressed head off, may be taken, possessed, or sold. The holder of a commercial fishing license may possess during one day for non-commercial use not more than 30 pounds of halibut of such minimum weight if taken incidentally in commercial fishing.

Rationale: - The appropriate size for optimum yield is not known due to lack of data but the size limit is considered suitable for utilization and it is a size that provides for reproduction before exploitation. The non-commercial use of undersized fish permits use of incidentally caught fish that are otherwise wasted.

3. MISCELLANEOUS REGULATIONS

Otter or beam trawl operators must keep a daily log book and render the information to the Department. The required recording includes:

(i) Time and place of each haul, each trip.

(ii) Duration of haul and approximate composition of catch for each haul.

(iii) Time of trip.

(iv) Total landed weight by species.

Rationale: - To provide information needed for assessment of stock.

4. LEGAL DEFINITION OF MINIMUM MESH SIZE

No natural or synthetic webbing less than 4 1/2 in. may be possessed on boat.

Hog-ring bags or cod-ends shall have minimum mesh measurement not less than 6 in. when wet.

Double bags or cod-ends shall have individual meshes, coinciding knot for knot in each layer, not less than 4 1/2 in. in length.

Chafing gear allowed that shall not cover more than the last 120 meshes in length of net and bag combined and not more than the bottom one-half of the circumference of the net and bag.

Not more than 8 rib-lines may be attached to any type bag or cod-end.

Rationale: - To minimize the capture of small fish and particularly flatfish, of sizes not utilized by industry. The mesh size also provides, for species taken by California trawlers, a balance between gear efficiency and size selection of marketable fish.

5. LEGAL DEFINITION OF METHODS OF MEASUREMENT

Measured "by taking at least four meshes and measuring them inside the knots while they are simultaneously drawn closely together".

Hog Rings - "by taking at least four meshes and measuring them inside the wire, hog-rings while they are simultaneously drawn closely together," and "measured when wet between proximal wires, rings, etc."

Rationale - means of measurement of meshes.

APPENDIX B-4

OREGON GROUNDFISH REGULATIONS AND RATIONALE

Oregon Administrative Rules, Chapter 625.

1. APPLICABILITY OF REGULATION 10-350

(a) It is unlawful for any person to land, or have in possession any species of ocean food fish taken from the waters of this state or the Pacific Ocean except as authorized by statute or Fish Commission regulation.

Rationale: - Establish authority.

(b) As used in sections 10-350 through 10-360 the term "ocean food fish" does not include and does not apply to salmon, striped bass, trout, tuna or shellfish.

Rationale: - Definition of term.

2. SEASON 10-355

It is lawful to take ocean food fish for commercial purposes at any time except the taking of surfperch is prohibited between May 1 and July 15 of any year.

Rationale: - Protects surfperch during period they are carrying their eggs. Surfperch are live bearers and carry the fertilized eggs to hatching.

3. FISHING GEAR 10-358

The fishing gear authorized for the taking of ocean food fish for commercial purposes is:

(a) Trawl nets of any size mesh except:

(i) The taking of hake with trawl nets having a mesh size less than 2 1/2 inches is prohibited.

Rationale: - Required by the bi-lateral agreement with the U.S.S.R.

(ii) Having on board or unloading at a single landing an aggregate total of more than 250 Dover, English or petrale sole less than 11 inches in length is prohibited when such boat is using or has on board a trawl net with a single wall intermediate and/or cod-end of mesh less than 4 1/2 inches or a double wall cod-end or liner of mesh less than 5 inches or a hog-ring type cod-end of mesh less than 6 inches between hog-rings.

Rationale: - Protection of juvenile Dover, English and petrale sole from over exploitation with small mesh nets.

(b) Hand line, pole-and-line, or pole-reel-and-line, provided the line has not less than four (4) separate fish hooks attached, except tuna fish may be taken on commercial tuna boats by a pole and line having one or more fish hooks.

Rationale: - To distinguish commercial gear from sport gear (three hooks or less). The exception is for tuna "bait" boats, which traditionally use gear with one or two hooks.

(c) Long line.

(d) Pots or traps, except for salmon, steelhead, or halibut.

4. SIZE LIMITS 10-360

(a) There is no minimum legal size limit for ocean food fish taken for commercial purposes, except as provided in section 10-358 and subsection (b) of this section.

(b) It is unlawful to take for commercial purposes sablefish (black cod) less than 17 inches measured from the origin (front) of the first dorsal fin to the end of the tail, or 3 pounds dressed weight.

Rationale: - To maximize production by protecting juvenile fish.

5. DEFINITION OF A TRAWL NET, COD-END AND INTERMEDIATE SECTIONS 10-368

A trawl net is defined as a bag-shaped net of single wall construction, except as otherwise provided herein, composed of wings, body, intermediate and cod-end section, having floats along the upper edge of the mouth held open by otter boards, trawl doors, or a fixed beam frame commonly referred to as a "beam trawl". The cod-end section is the last 50 meshes of a trawl net. The intermediate section is the next 50 meshes forward of the cod-end section.

Rationale: - Definition for enforcement of sections 10-358 and 10-370.

6. TRAWL NET CONSTRUCTION REQUIREMENTS 10-370

It is unlawful to use:

(a) Any size chafing gear to protect the bottom of a single or double wall cod-end section which covers more than the bottom one-half of such cod-end section.

Rationale: - To provide an area of escapement for small fish through the top of the net.

(b) Hog-ring type cod-end sections constructed of manila, hemp fiber or other material greater than 3/8 inch in diameter.

Rationale: - This regulation together with 10-358 will provide an opening large enough to allow escapement of small English, Dover and petrale sole.

(c) A double wall cod-end section which does not, when hung and tied, have the knots of each layer coincide, knot for knot, for the full length of the double layer.

Rationale: - To provide an opening large enough for escapement of small fish.

7. MEASURING MESH SIZE OF TRAWL NETS 10-375

The size of a mesh as applicable to any section of a trawl net shall be the average mesh size of not less than 5 consecutive meshes, measurements to be made to the nearest 1/4 inch by stretching the meshes taut and measuring the distance between the inside of one knot to the inside of the opposite vertical knot of one mesh, when the mesh is stretched vertically, wet or dry, by using a tension of ten pounds on any 3 consecutive meshes, then measuring the middle mesh of the 3 while under tension. No measurements shall be taken of meshes located:

(a) Less than 3 meshes from a junction of two sections of a net, and

(b) Less than 3 meshes from the posterior end of the cod-end section.

Rationale: - Provide techniques for enforcement of sections 10-358 and 10-370.

8. TRAWL BOAT LOG BOOK 10-380

The Fish Commission will provide a Trawl Boat Log Book to each licensed commercial fishing boat from which ocean food fish are taken by means of a trawl net, including a shrimp trawl net. The skipper of such boat shall be responsible for maintaining the log book in accordance with the instructions contained therein and shall, upon request of an authorized representative of the Fish Commission, permit examination and transcription from such log books. Information so received by the Commission shall be considered as confidential and subject to the provisions of ORS 508-545.

Rationale: - To provide catch and effort information needed for proper management of groundfish resource.

APPENDIX B-8

WASHINGTON OCEAN TRAWL REGULATIONS AND RATIONALE

1. OTTER-TRAWL DEFINITION

Otter-trawl gear shall be defined as a tapered, funnel-shaped net consisting of a forward, intermediate and cod-end section with floats along the upper edge of the mouth (headrope) and a weighted line (footrope) forming the lower edge thereof. Otter doors or boards are used to spread the mouth of the net horizontally as it is towed. Roller and bobbin gear on a rope attached to the footrope are used as aids to fishing rocky grounds. Telemetry gear consists of a precision net-depth indicating device attached to the door or footrope of the net giving a continuous indication of the position of the net in relation to the bottom or surface.

Double layer cod-ends shall be tied together in such a manner that the knots and meshes coincide the full length of the double layer. Meshes of hog-ring and rope-type chafing gear shall measure not less than seven inches. Chafing gear made of hides or canvas shall be of a size not greater than one-half the circumference of the cod-end.

Rationale: - This definition established in November, 1967 modifies previous wording which was very specific and restrictive in nature. The intent of the new definition is to be descriptive and allow relative freedom to fishermen in developing techniques for increased fishing efficiency without forsaking the small fish escapement factor of the mesh size in use.

2. MINIMUM MESH SIZE REQUIREMENTS

It shall be unlawful to use, operate or carry aboard any fishing vessel, bottomfish otter-trawl gear having meshes measuring less than three and one-half inches, except as follows:

(i) The otter-trawl net forward of the cod-end or bag section may contain meshes of any size greater than three inches. (Effective January, 1959.)

(ii) It shall be lawful to use otter-trawl nets .... having a minimum mesh size of two and one-half (2-1/2) inches for Pacific hake in the Pacific Ocean and coastal waters. (Effective June, 1969.)

Rationale: - 2(i). This regulation was enacted as a "temporary" measure to alleviate the dogfish gilling problem trawl fishermen complained about as excessive when using the 4 1/2 inch mesh nets formerly required. The 4 1/2 inch mesh requirement was enacted in Washington in January, 1955 based on gear selectivity studies on sole carried out in 1952, 1954 and 1955 by Pacific Coast state agencies following recommendation by the Pacific Marine Fisheries Commission. The 4 1/2 inch mesh minimized capture of flatfish principally English sole under 11.5 to 12 inches which is approximately the minimum acceptable foodfish market size.

Since 1959 the large-scale development of the Pacific Ocean perch fishery has resulted in most of the Washington boats using the minimum legal size in order to prevent excessive gilling and escapement of marketable sized fish of this species and unfortunately the dogfish abundance problem remains.

2(ii). This regulation was enacted to comply with Pacific hake minimum mesh size requirements contained in the January, 1969 U.S.-U.S.S.R. bilateral agreement concerning certain fishery problems in the northeast Pacific. The effect of this regulation was to raise the minimum mesh requirement from a two inch minimum implemented in November, 1967. The two inch minimum was used initially because developmental mid-water trawl nets having 2 to 2 1/2 inch mesh were most efficient in

capturing hake. Policy of the department was to allow the most efficient gear to be used in the developing hake fishery in order to encourage its growth until such time as conservation requirements necessitate modification.

3. SABLEFISH MINIMUM SIZE LIMIT

It shall be unlawful to take fish for or possess for commercial purposes any black cod (sablefish) of a length less than 17 inches measured from the origin (front) of the first dorsal fin to the end of the tail.

Rationale: - Regulation was put into effect July, 1955. The regulation was the result of Pacific Marine Fisheries Commission emphasis placed on sablefish during the early 1950's. It's objective was to discourage the future development of a trawl fishery for small sablefish and possibly reduce fishing intensity on sablefish found off the Washington and Oregon coasts.

The size limit has not improved the status of the commercial sablefish fisheries in Washington. Over-riding economic conditions, uncertainty on the composition of the stocks of sablefish off the coast and new information since implementation of the regulation indicating a much larger abundance than was formerly believed make this regulation of limited value on a biological or conservation basis.

BRITISH COLUMBIA TRAWL FISHERY REGULATIONS AND RATIONALE

1. CLOSURE OF FISHING BY SEASON

(a) During period December 20 to April 15 inclusive, no brill (petrale sole) may be taken except for incidental catch not exceeding 3,000 lbs per boat trip for a maximum of two boat trips per month (Sec. 71(4)).

Rationale: - Enacted to prevent over-exploitation of spawning stocks of petrale sole found in deep water during the winter months. Scientific studies (Ketchen and Forrester, 1966) suggested that during the period covered by the analysis (inception of the fishery to 1962) environmental factors had been more important than fishing in their effect on the stocks of petrale sole. As a result of these studies, seasonal closure regulations as applied to United States fishermen were removed. There has been no recent estimate of fishing mortality rates on the petrale sole stocks and it is not possible to say whether or not fishing or the environment has a more important effect. However, continued fishing on spawning concentrations of the stock, which now appears to be small in size, will delay stock build-up.

(b) During period December 1 to last day of February, no lingcod may be taken in the waters of the Strait of Georgia (Sec. 7(1)).

Rationale: - Enacted to prevent exploitation of spawning individuals and minimize marketing of fish in poor condition.

(c) Several varying closure periods are applied to local areas inside the Strait of Georgia.

Rationale: - To obtain optimum utilization of various species in various areas.

NOTE: Only 1(a) above likely to be of international concern.

2. CLOSURE OF FISHING BY AREA

(a) Regional Director may prohibit all trawl fishing in any area when deemed necessary to prevent adverse effects on groundfish populations (Sec. 71(2)).

Rationale: - Obvious.

(b) Numerous named areas in inside waters are closed entirely to trawl fishing.

Rationale: - Not of international concern. Domestic measure to minimize conflict of recreational and commercial interests.

3. SIZE LIMITS

(a) Lingcod - Minimum size 23" from point of nose to tip of tail (Sec. 7(3)).

- Minimum size 3 lb dressed head off (Sec. 7(3a)).

Rationale: - Enacted primarily for economic reasons. Fish smaller were not desirable for market. However, studies by Chatwin (1958) suggest that minimum size is close to that which will provide optimum yield. Chatwin's results apply to Strait of Georgia and require confirmation for offshore waters.

A tagging experiment conducted by Washington State (Reeves, 1966) suggests that in some years there can be substantial fishing mortality on some stocks of lingcod off the west coast of Vancouver Island, i.e., greater than any sustainable yield.

(b) Blackcod (sablefish) - Minimum size 2-1/2 lb dressed, head off (Sec. 7(4)).

Rationale: - Original regulation stated a minimum size of 5 lb dressed head on, and is believed to have been based on economic considerations (i.e., fish under the minimum size were not desirable for processing as a smoked product). Size limit lowered in 1948, 1957 and 1966 to remain in line with regulations in Washington State.

(c) Flatfish - Minimum size of 12" from tip of snout to tip of tail for lemon sole (English sole, Parophrys vetulus), rock sole (Lepidopsetta bilineata), brill (petrale sole, Eopsetta jordani), or starry flounder (Platichthys stellatus) (Sec. 71(4)).

Rationale: - Enacted during a period of increasing landings of fish for animal food (mink food) and increasing utilization of some of the above species for that purpose. Designed to prevent utilization at a size below the optimum for maximum sustainable yield.

4. MESH REGULATIONS

(a) Mesh size means the distance between the inside of diagonally opposite knots of any mesh as determined after the net has been immersed in water (Sec. 71(1b)).

(b) In waters outside the Strait of Georgia the mesh size cannot be less than 3.5" (Sec. 71(1a)).

(c) In the Strait of Georgia the mesh size shall be not less than

(i) manilla or sisal trawl - 4.75 inches

(ii) cotton trawl - 4.5 inches

(iii) trawl of synthetic fibres - 4.25 inches

in the final 50 meshes including codend (Sec. 71(1b)).

Rationale: - for (b) above, 3.5 inch mesh permitted to reduce gilling of dogfish and rockfish.

- for (c) above, various sized meshes in Strait of Georgia are designed to release undersized flatfish, i.e., prevent to some extent handling of fish not desirable (because of small size) for human consumption.

(d) No person shall use a double layer of mesh in the codend of a trawl unless the layers are tied or knitted together in such manner that the size of any mesh is not reduced by the layer attached to that mesh (Sec. 71(1c)).

Rationale: - Unless meshes are tied mesh for mesh, the regulations concerning mesh size would be meaningless because of overlap of meshes.

5. MISCELLANEOUS REGULATIONS

Scupper door required on vessels 40 ft or over in overall length catching fish (other than shrimp). Door opening must be not less than 36 inches wide and where multiple openings are required, no single opening shall be less than 12 inches wide (Sec. 71(3)).

Rationale: - To permit fast return to the sea of fish of a size unsuitable for market.

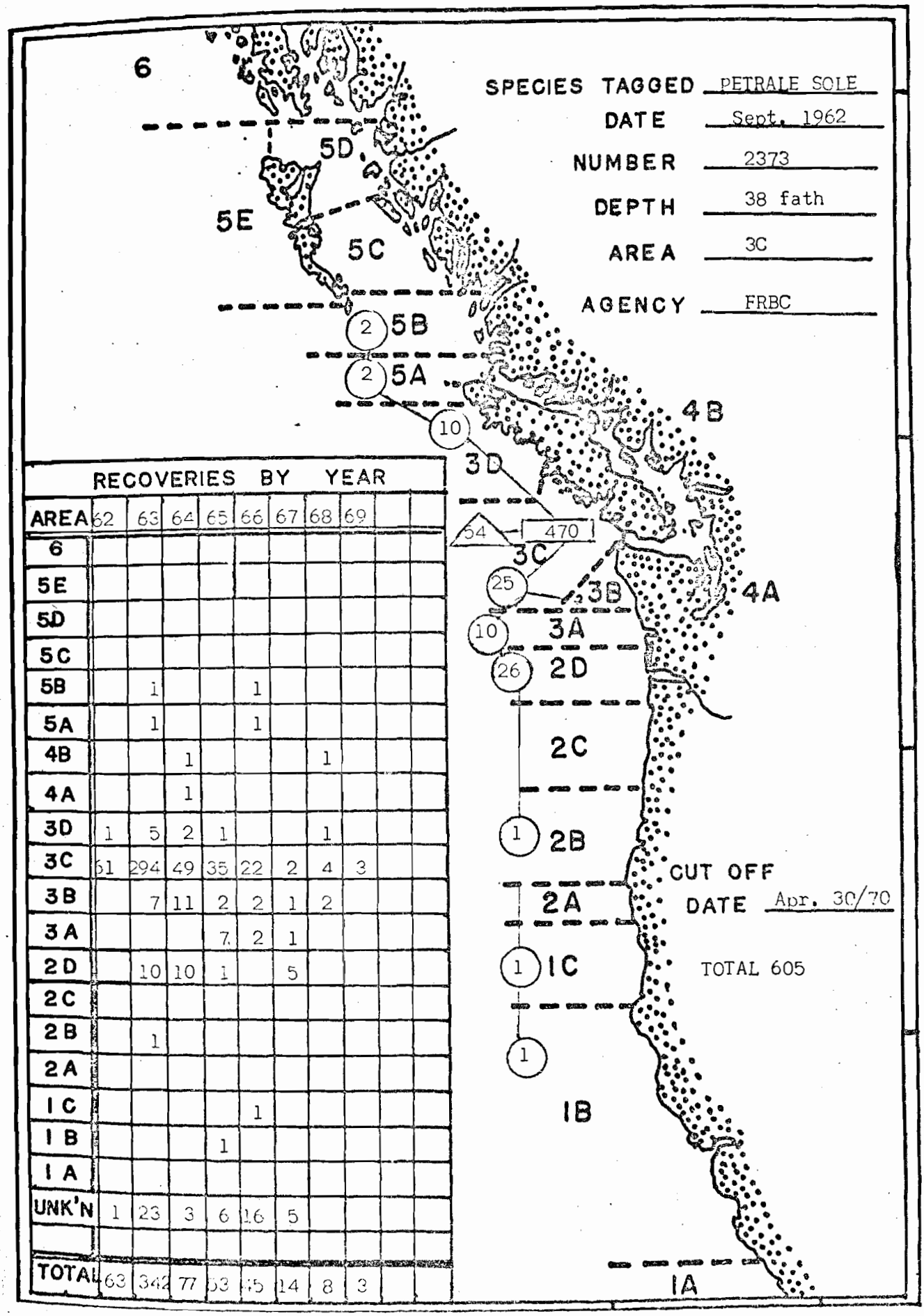
No restriction on utilization of legally caught legal-sized fish.

REFERENCES

Chatwin, B. M. 1958. Mortality rates and estimates of theoretical yield in relation to minimum commercial size of lingcod (Ophiodon elongatus) from the Strait of Georgia, British Columbia. J. Fish. Res. Bd. Canada, 15(5): 831-849.

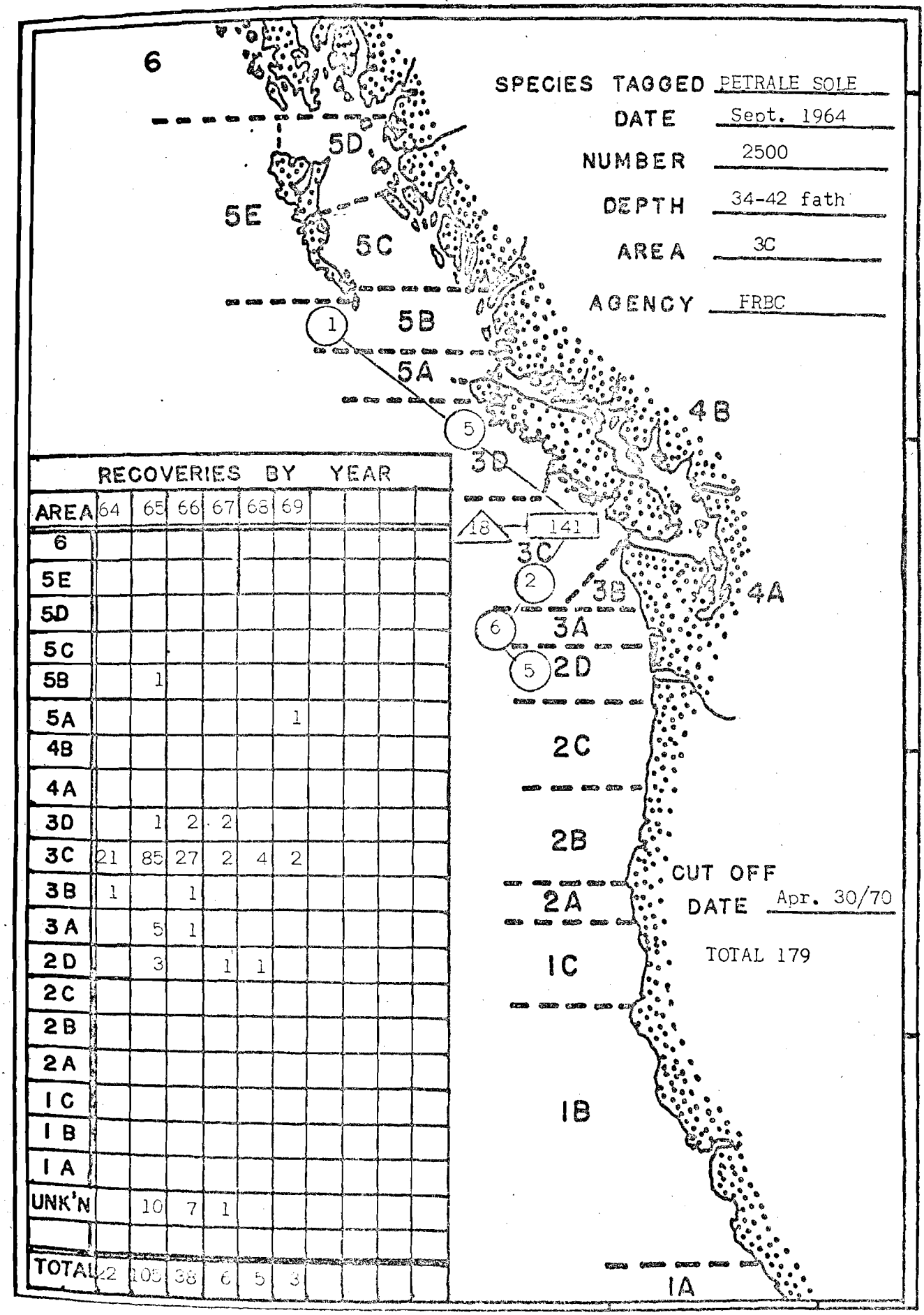
Ketchen, K. S., and C. R. Forrester. 1966. Population dynamics of the petrale sole, Eopsetta jordani, in waters off western Canada. Bull. Fish. Res. Bd. Canada, No. 153, 195 p.

Reeves, J. E. 1966. An estimate of survival, mortality, and of the number of lingcod (Ophiodon elongatus) off the southwest coast of Vancouver Island, British Columbia. Wash. Dept. Fish., Fish. Res. Papers, 2(4): 55-66.



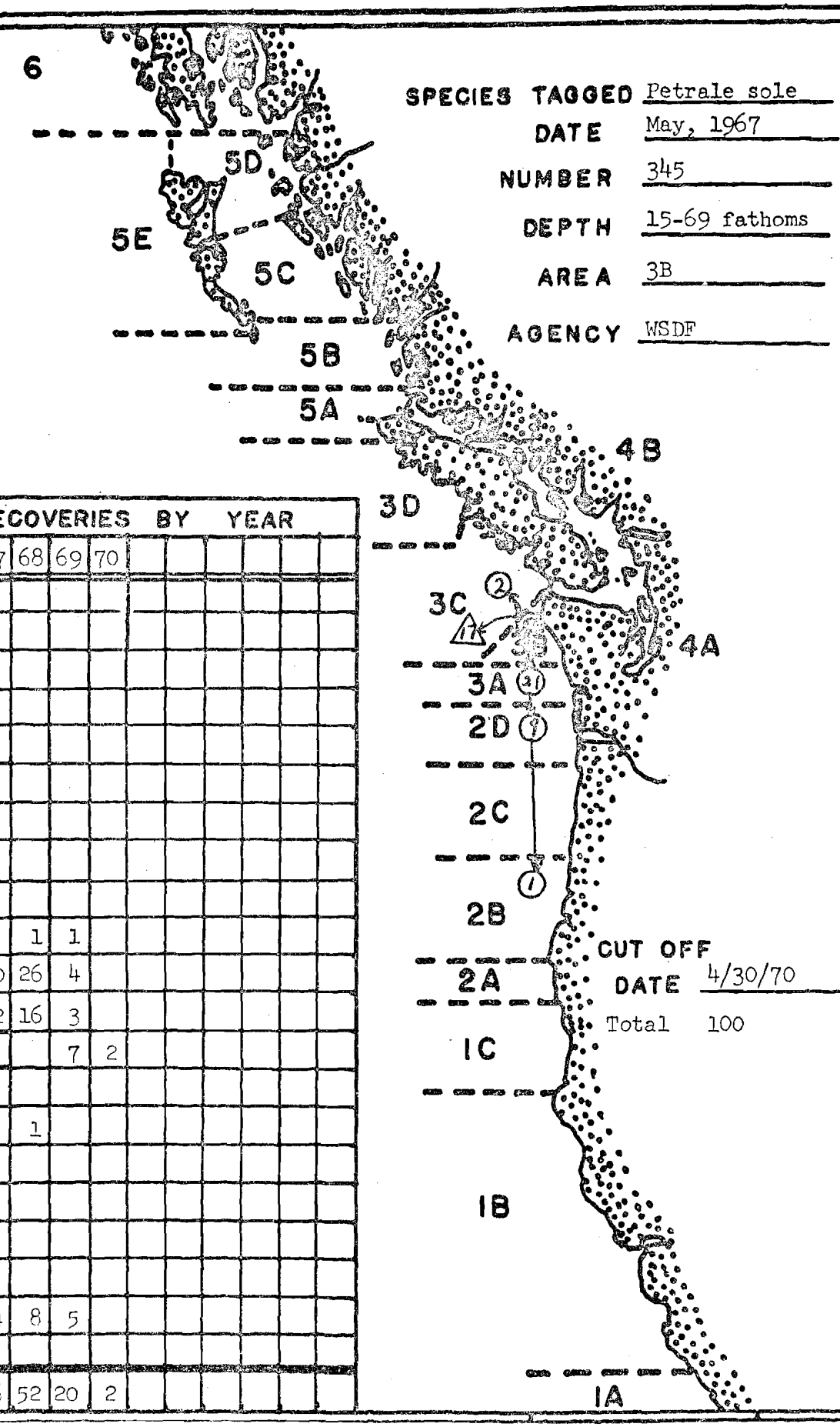
RECOVERIES BY YEAR

AREA	62	63	64	65	66	67	68	69		
6										
5E										
5D										
5C										
5B		1			1					
5A		1			1					
4B			1				1			
4A			1							
3D	1	5	2	1			1			
3C	61	294	49	35	22	2	4	3		
3B		7	11	2	2	1	2			
3A				7	2	1				
2D		10	10	1		5				
2C										
2B		1								
2A										
1C					1					
1B				1						
1A										
UNK'N	1	23	3	6	16	5				
TOTAL	63	342	77	53	45	14	8	3		



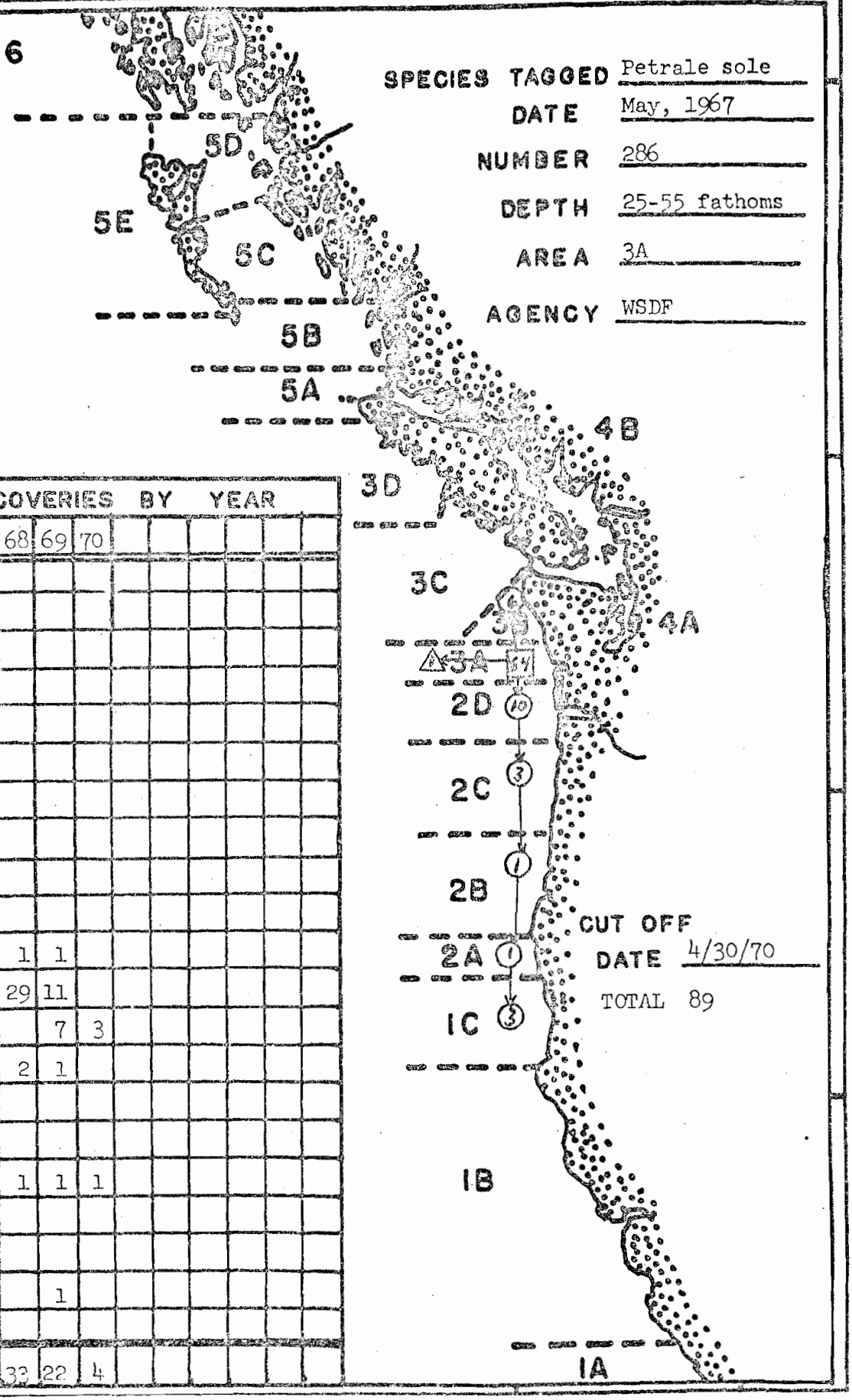
RECOVERIES BY YEAR

AREA	64	65	66	67	68	69				
6										
5E										
5D										
5C										
5B		1								
5A						1				
4B										
4A										
3D		1	2	2						
3C	21	85	27	2	4	2				
3B	1		1							
3A		5	1							
2D		3		1	1					
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N		10	7	1						
TOTAL	22	105	38	6	5	3				



RECOVERIES BY YEAR

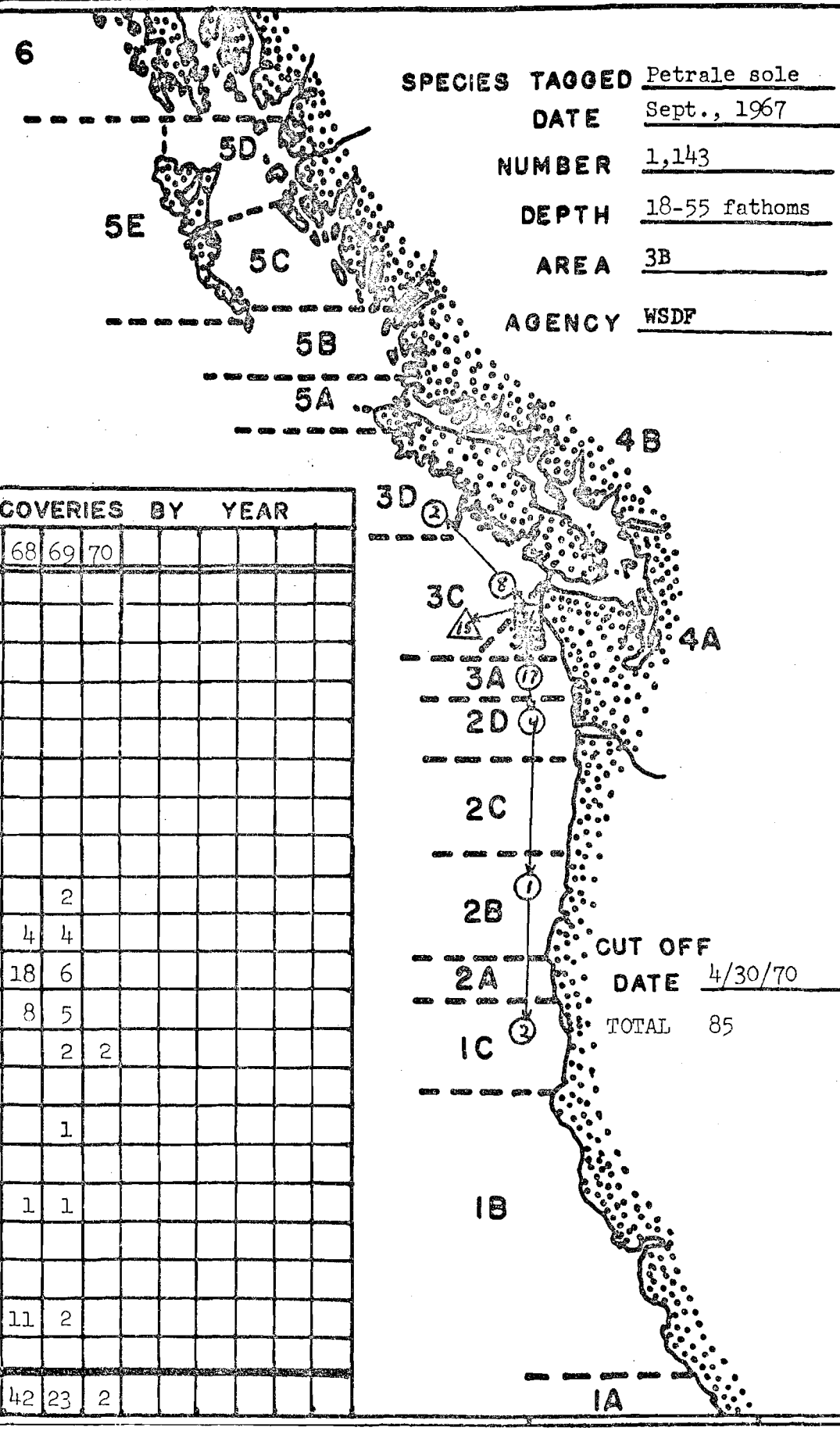
AREA	67	68	69	70
6				
5E				
5D				
5C				
5B				
5A				
4B				
4A				
3D				
3C		1	1	
3B	20	26	4	
3A	2	16	3	
2D			7	2
2C				
2B		1		
2A				
1C				
1B				
1A				
UNK'N	4	8	5	
TOTAL	26	52	20	2



SPECIES TAGGED Petrale sole
DATE May, 1967
NUMBER 286
DEPTH 25-55 fathoms
AREA 3A
AGENCY WSDF

RECOVERIES BY YEAR

AREA	67	68	69	70
6				
5E				
5D				
5C				
5B				
5A				
4B				
4A				
3D				
3C				
3B	4	1	1	
3A	24	29	11	
2D			7	3
2C		2	1	
2B	1			
2A	1			
1C		1	1	1
1B				
1A				
UNK'N			1	
TOTAL	30	33	22	4



SPECIES TAGGED Petrale sole

DATE Sept., 1967

NUMBER 1,143

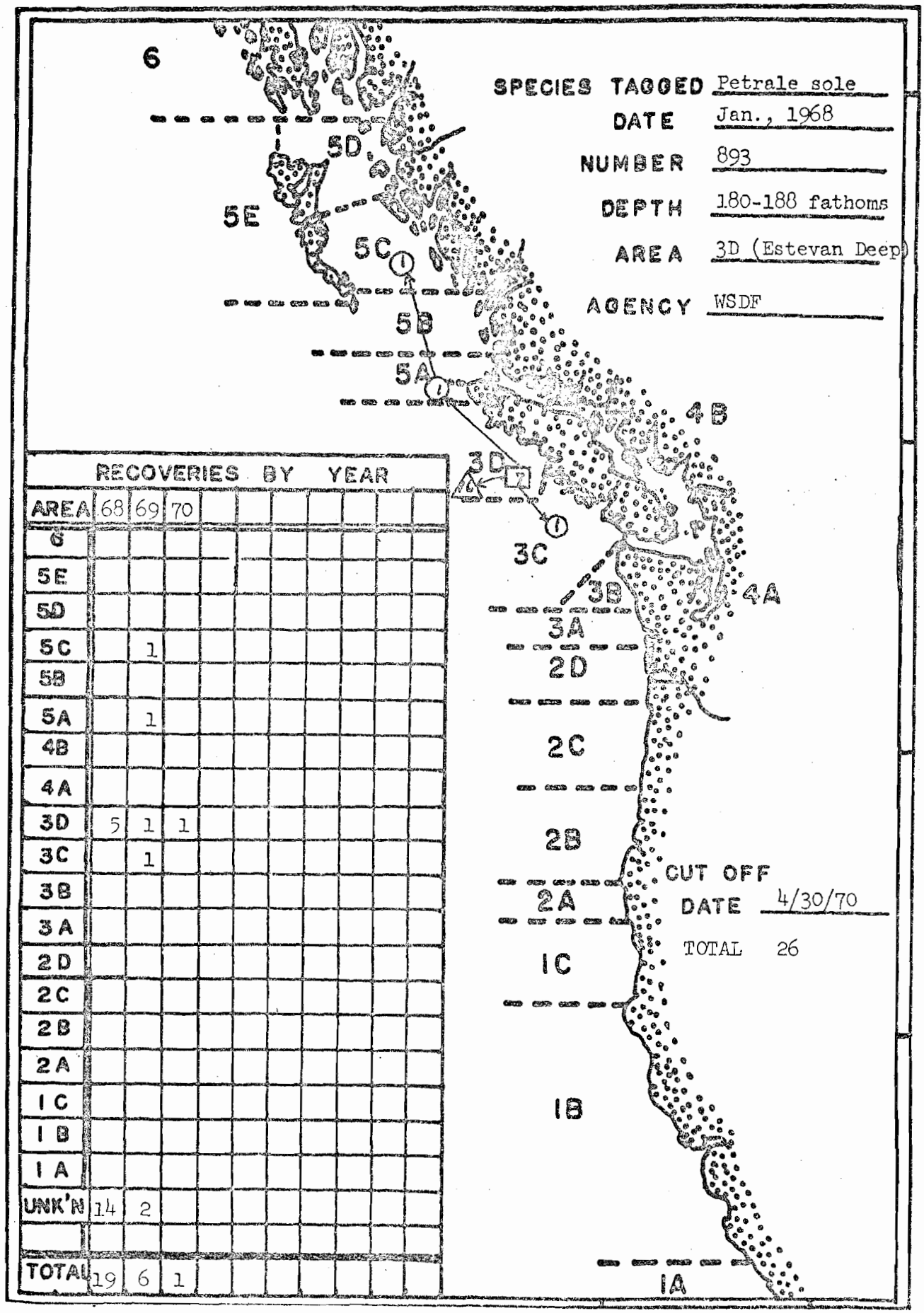
DEPTH 18-55 fathoms

AREA 3B

AGENCY WSDF

RECOVERIES BY YEAR

AREA	67	68	69	70
6				
5E				
5D				
5C				
5B				
5A				
4B				
4A				
3D			2	
3C		4	4	
3B	12	18	6	
3A	4	8	5	
2D			2	2
2C				
2B			1	
2A				
1C		1	1	
1B				
1A				
UNK'N	2	11	2	
TOTAL	18	42	23	2



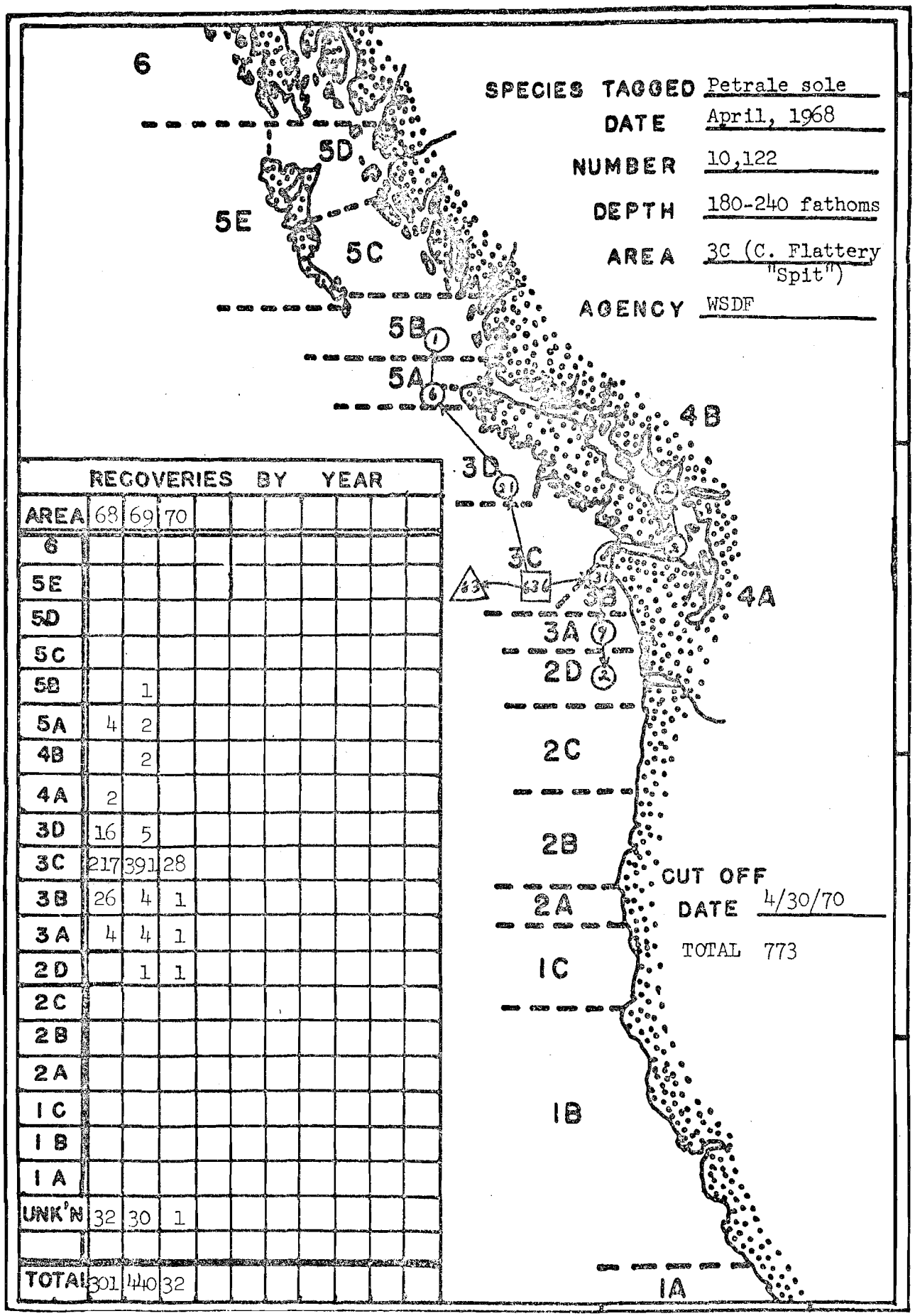
SPECIES TAGGED Petrale sole
DATE Jan., 1968
NUMBER 893
DEPTH 180-188 fathoms
AREA 3D (Estevan Deep)
AGENCY WSDF

RECOVERIES BY YEAR

AREA	68	69	70
6			
5E			
5D			
5C		1	
5B			
5A		1	
4B			
4A			
3D	5	1	1
3C		1	
3B			
3A			
2D			
2C			
2B			
2A			
1C			
1B			
1A			
UNK'N	14	2	
TOTAL	19	6	1

CUT OFF DATE 4/30/70

TOTAL 26



SPECIES TAGGED Petrale sole

DATE April, 1968

NUMBER 10,122

DEPTH 180-240 fathoms

AREA 3C (C. Flattery "Spit")

AGENCY WSDF

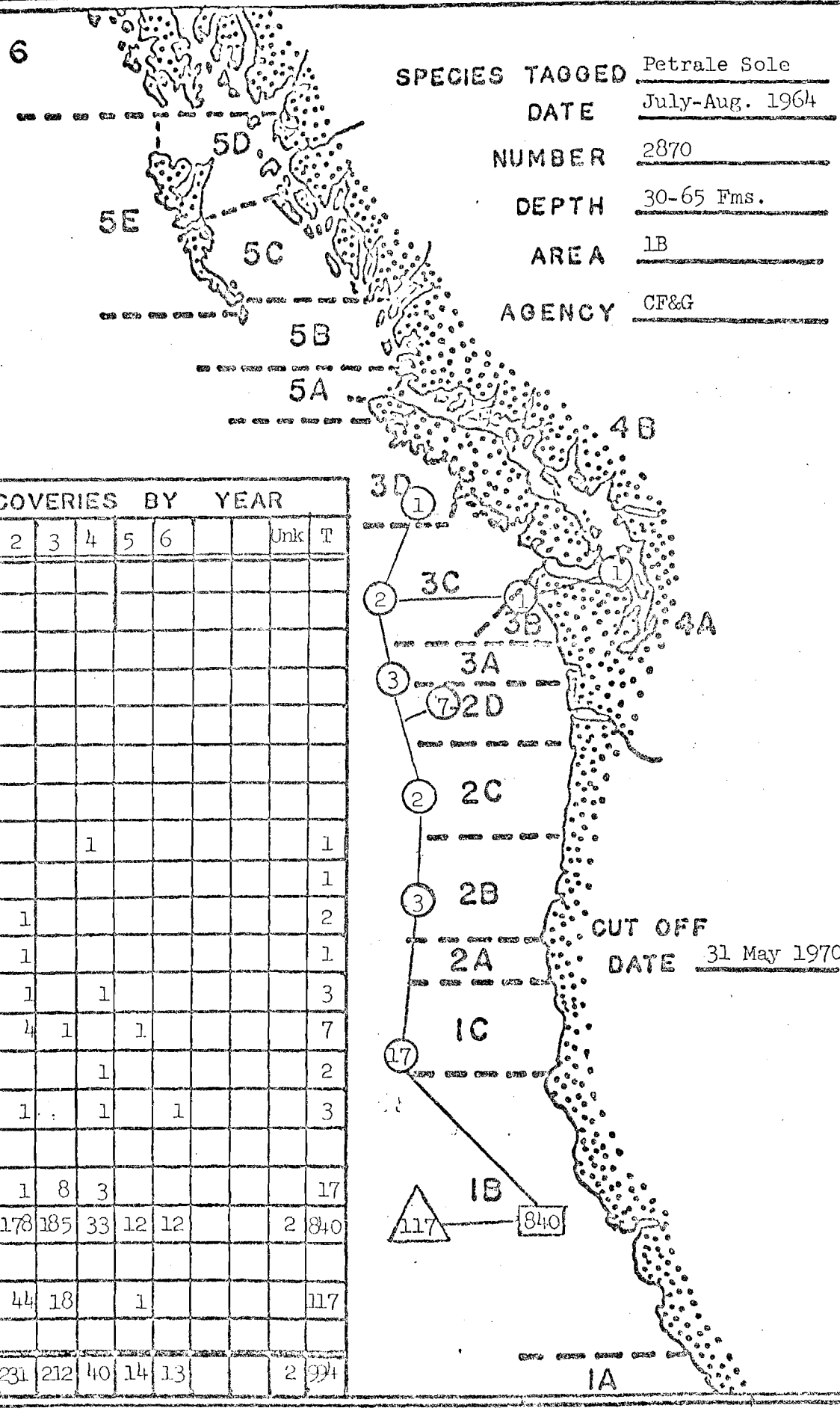
CUT OFF DATE 4/30/70

TOTAL 773

RECOVERIES BY YEAR

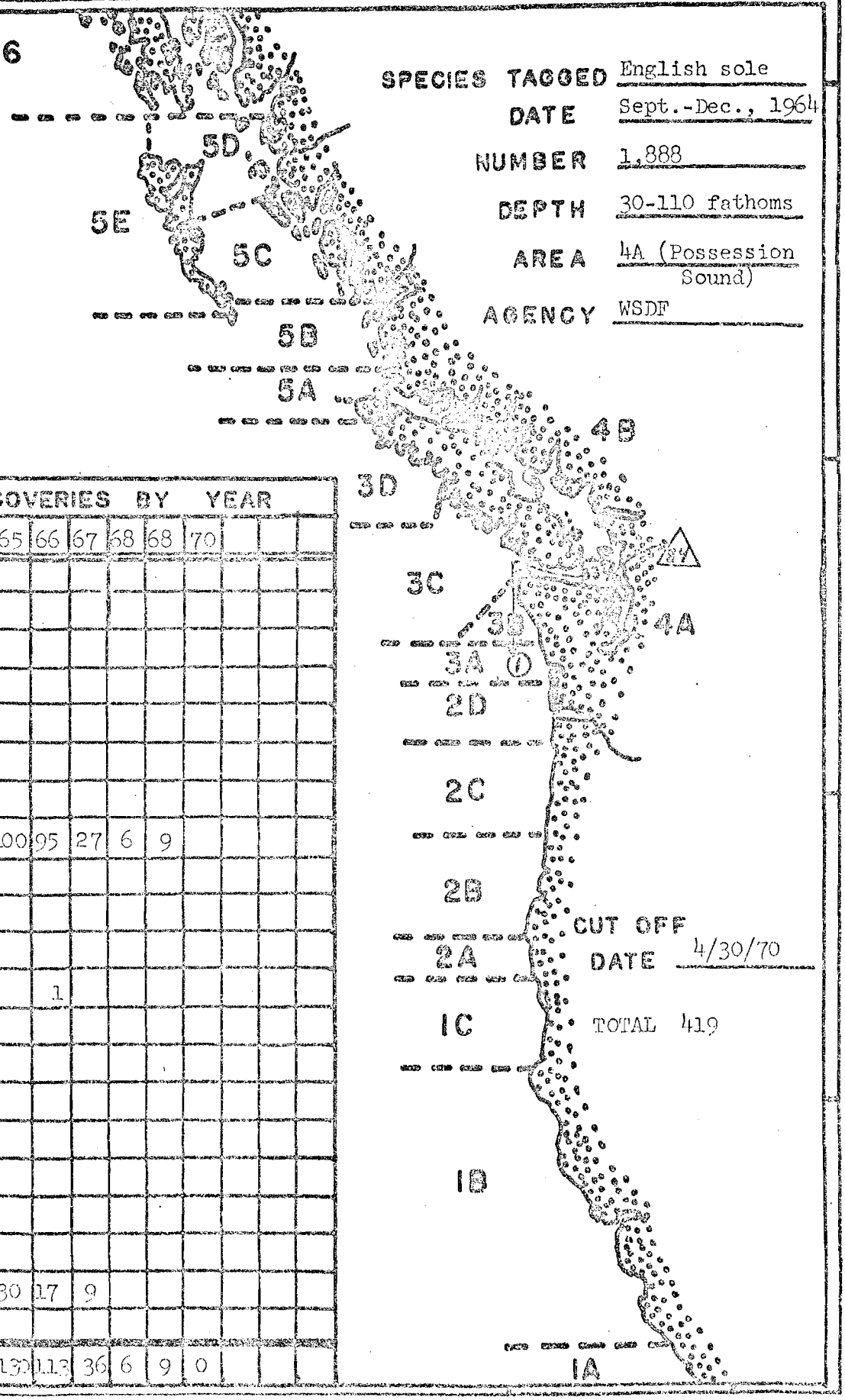
AREA	68	69	70
6			
5E			
5D			
5C			
5B		1	
5A	4	2	
4B		2	
4A	2		
3D	16	5	
3C	217	391	28
3B	26	4	1
3A	4	4	1
2D		1	1
2C			
2B			
2A			
1C			
1B			
1A			
UNK'N	32	30	1
TOTAL	301	440	32

SPECIES TAGGED: Petrale Sole
DATE: July-Aug. 1964
NUMBER: 2870
DEPTH: 30-65 Fms.
AREA: 1B
AGENCY: CF&G



RECOVERIES BY YEAR

AREA	1	2	3	4	5	6			Unk	T
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A				1						1
3D	1									1
3C	1	1								2
3B		1								1
3A	1	1		1						3
2D	1	4	1		1					7
2C	1			1						2
2B		1		1		1				3
2A										
1C	5	1	8	3						17
1B	418	178	185	33	12	12			2	840
1A										
UNK'N	54	44	18		1					117
TOTAL	482	231	212	40	14	13			2	994



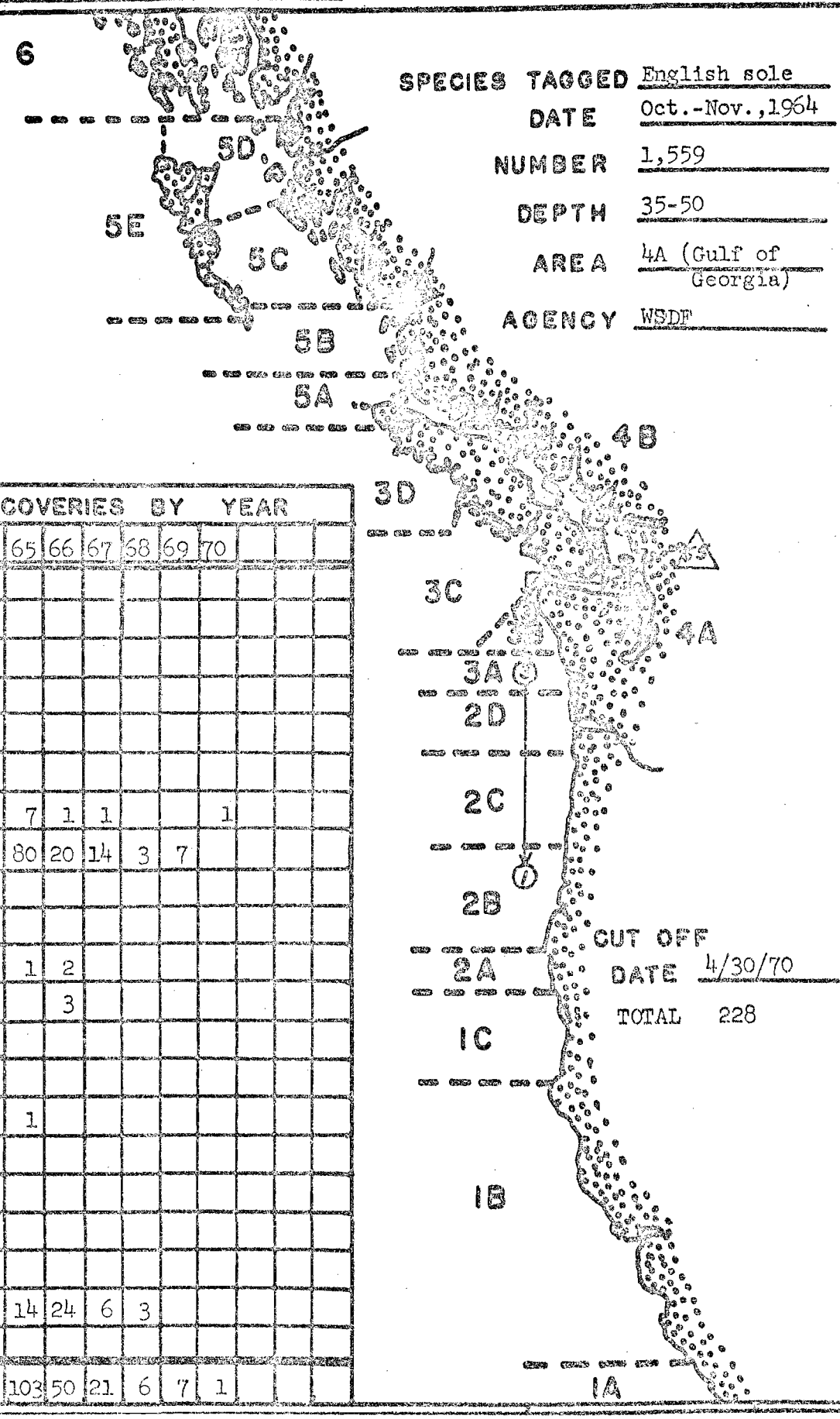
SPECIES TAGGED: English sole
DATE: Sept.-Dec., 1964
NUMBER: 1,888
DEPTH: 30-110 fathoms
AREA: 4A (Possession Sound)
AGENCY: WSDF

RECOVERIES BY YEAR

AREA	64	65	66	67	68	68	70			
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A	97	100	95	27	6	9				
3D										
3C										
3B										
3A			1							
2D										
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N	28	30	17	9						
TOTAL	125	130	113	36	6	9	0			

CUT OFF DATE: 4/30/70

TOTAL 419

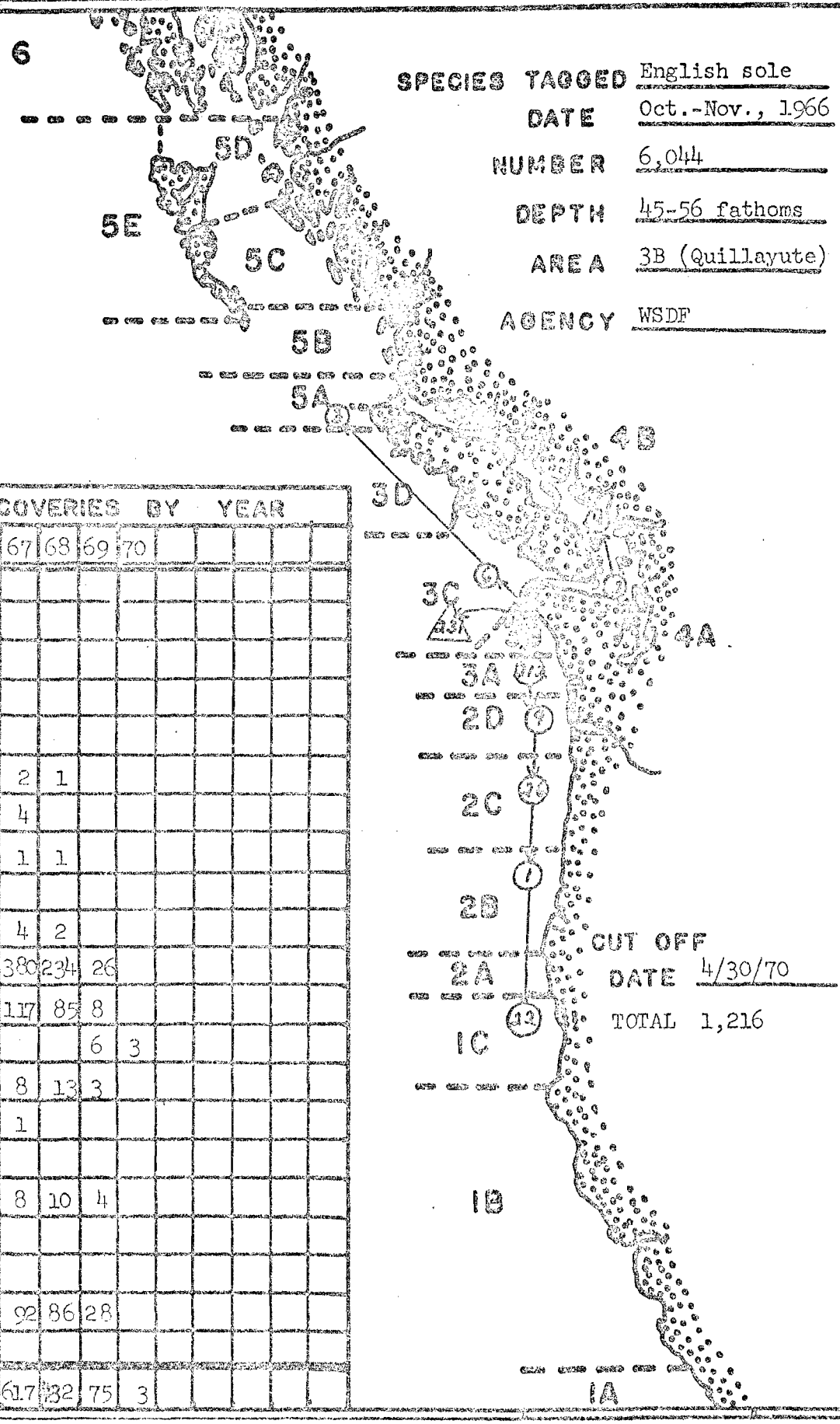


SPECIES TAGGED: English sole
DATE: Oct.-Nov., 1964
NUMBER: 1,559
DEPTH: 35-50
AREA: 4A (Gulf of Georgia)
AGENCY: WSDF

CUT OFF DATE: 4/30/70
TOTAL: 228

RECOVERIES BY YEAR

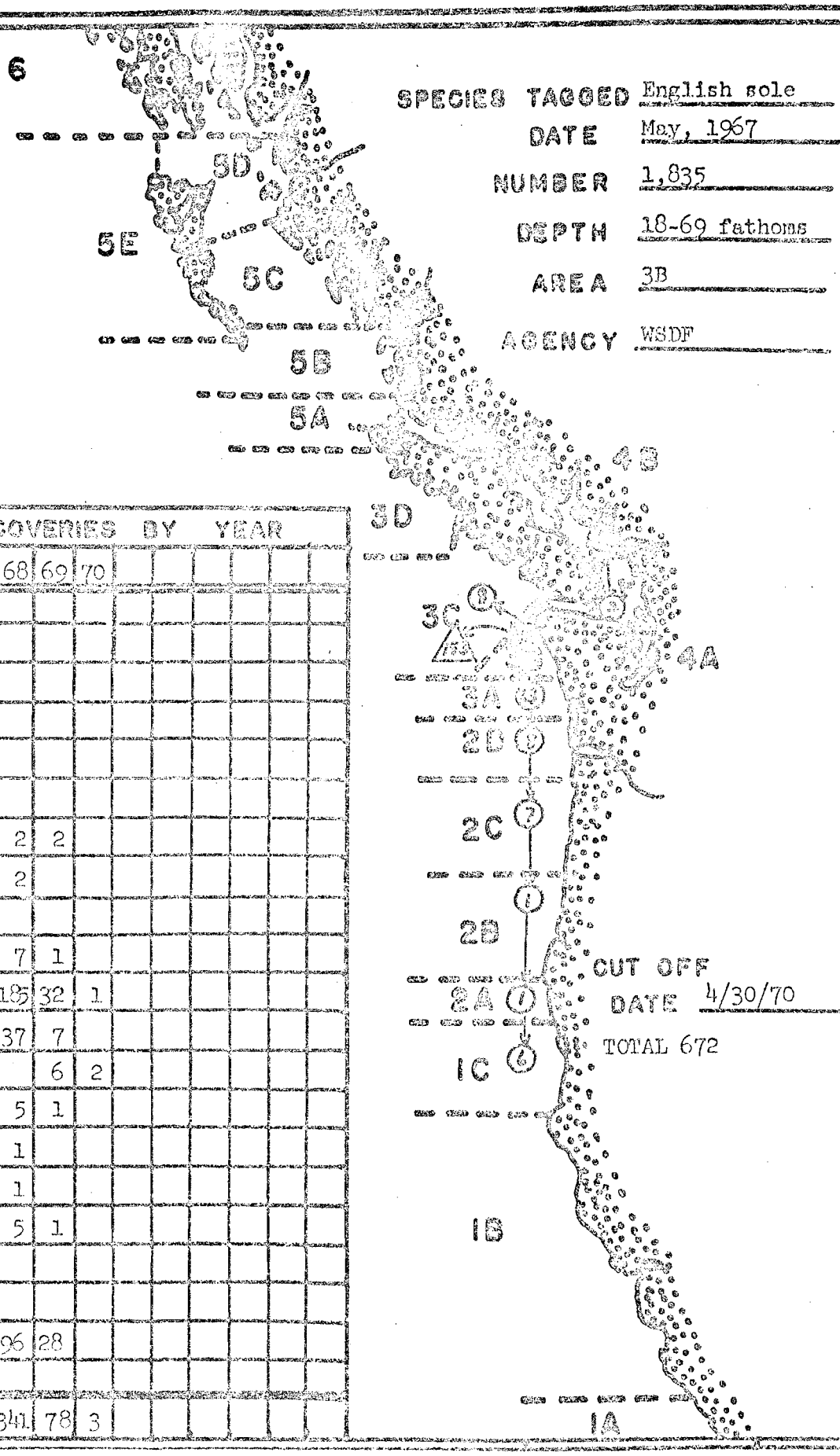
AREA	64	65	66	67	68	69	70
6							
5E							
5D							
5C							
5B							
5A							
4B	3	7	1	1			1
4A	29	80	20	14	3	7	
3D							
3C							
3B		1	2				
3A			3				
2D							
2C							
2B		1					
2A							
1C							
1B							
1A							
UNK'N	8	14	24	6	3		
TOTAL	40	103	50	21	6	7	1



SPECIES TAGGED: English sole
DATE: Oct.-Nov., 1966
NUMBER: 6,044
DEPTH: 45-56 fathoms
AREA: 3B (Quillayute)
AGENCY: WSDF

RECOVERIES BY YEAR

AREA	66	67	68	69	70
6					
5E					
5D					
5C					
5B					
5A		2	1		
4B		4			
4A		1	1		
3D					
3C		4	2		
3B	60	380	234	26	
3A	2	117	85	8	
2D				6	3
2C	2	8	13	3	
2B		1			
2A					
1C		8	10	4	
1B					
1A					
UNK'N	25	92	86	28	
TOTAL	89	617	432	75	3



SPECIES TAGGED English sole

DATE May, 1967

NUMBER 1,835

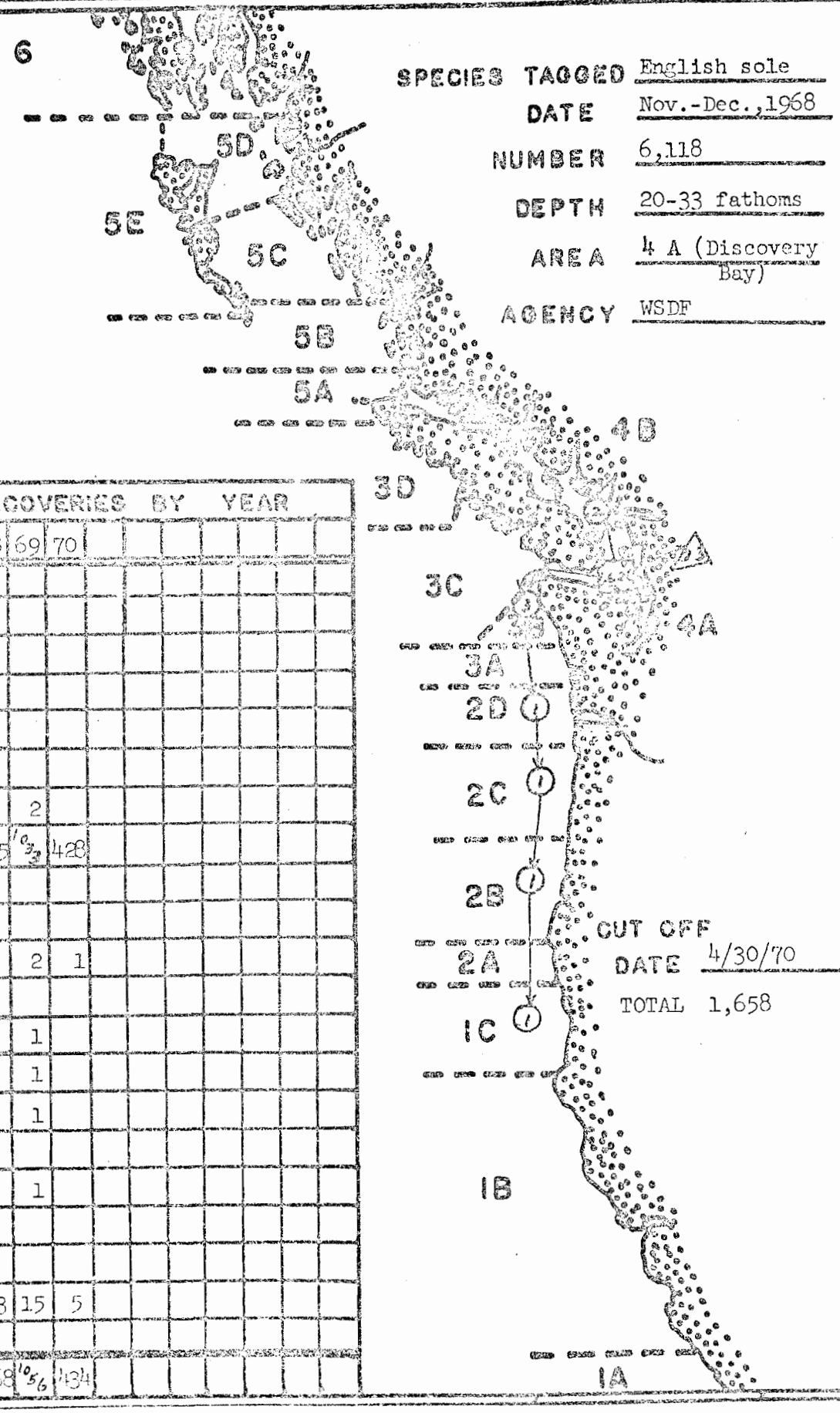
DEPTH 18-69 fathoms

AREA 3B

AGENCY WSDF

RECOVERIES BY YEAR

AREA	67	68	69	70
6				
5E				
5D				
5C				
5B				
5A				
4B		2	2	
4A		2		
3D				
3C		7	1	
3B	201	185	32	1
3A	19	37	7	
2D			6	2
2C	1	5	1	
2B		1		
2A		1		
1C		5	1	
1B				
1A				
UNK'N	29	96	28	
TOTAL	250	341	78	3



SPECIES TAGGED English sole

DATE Nov.-Dec.,1968

NUMBER 6,118

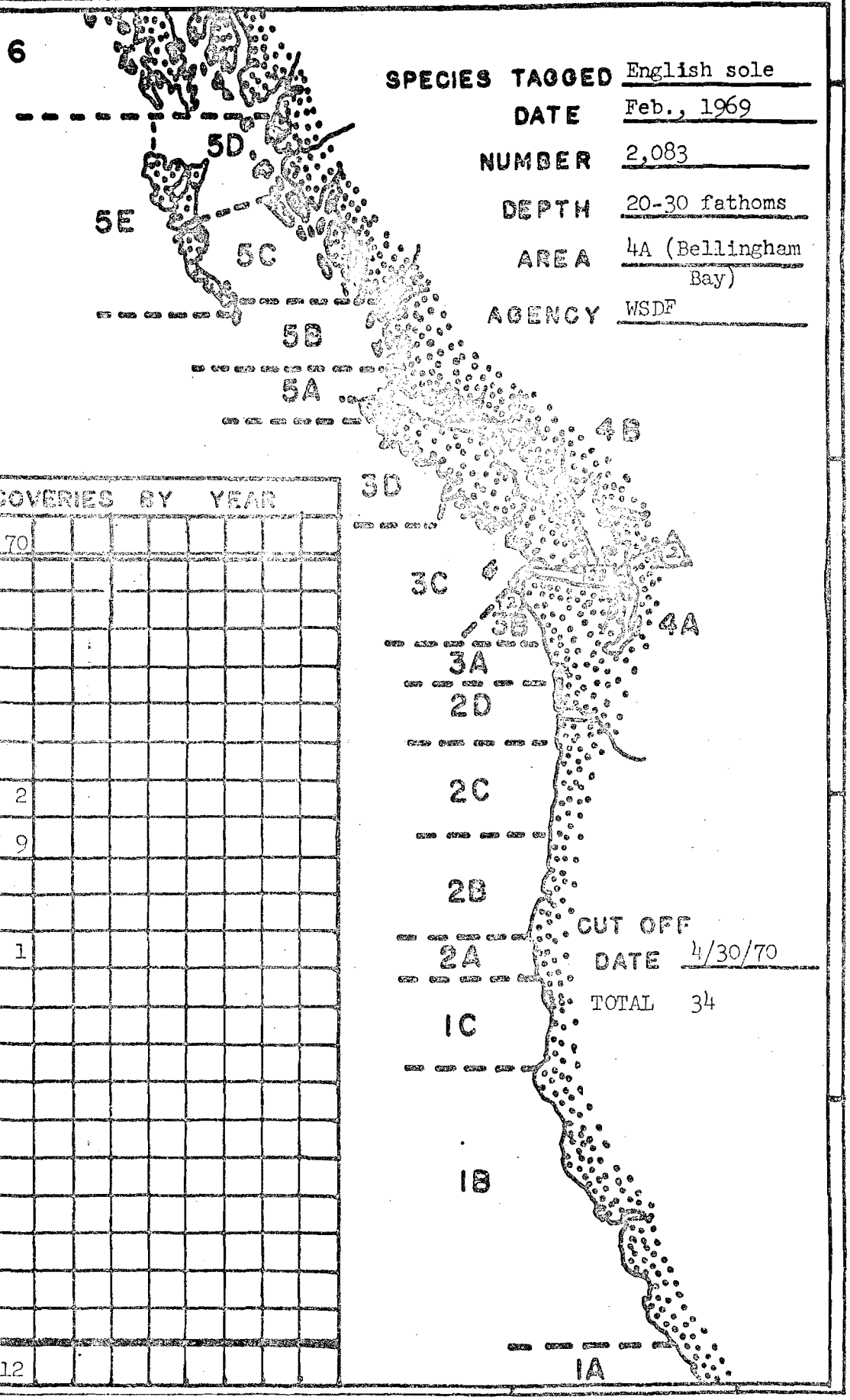
DEPTH 20-33 fathoms

AREA 4 A (Discovery Bay)

AGENCY WSDF

RECOVERIES BY YEAR

AREA	68	69	70
6			
5E			
5D			
5C			
5B			
5A			
4B		2	
4A	165	103	428
3D			
3C			
3B		2	1
3A			
2D		1	
2C		1	
2B		1	
2A			
1C		1	
1B			
1A			
UNK'N	3	15	5
TOTAL	168	105	434



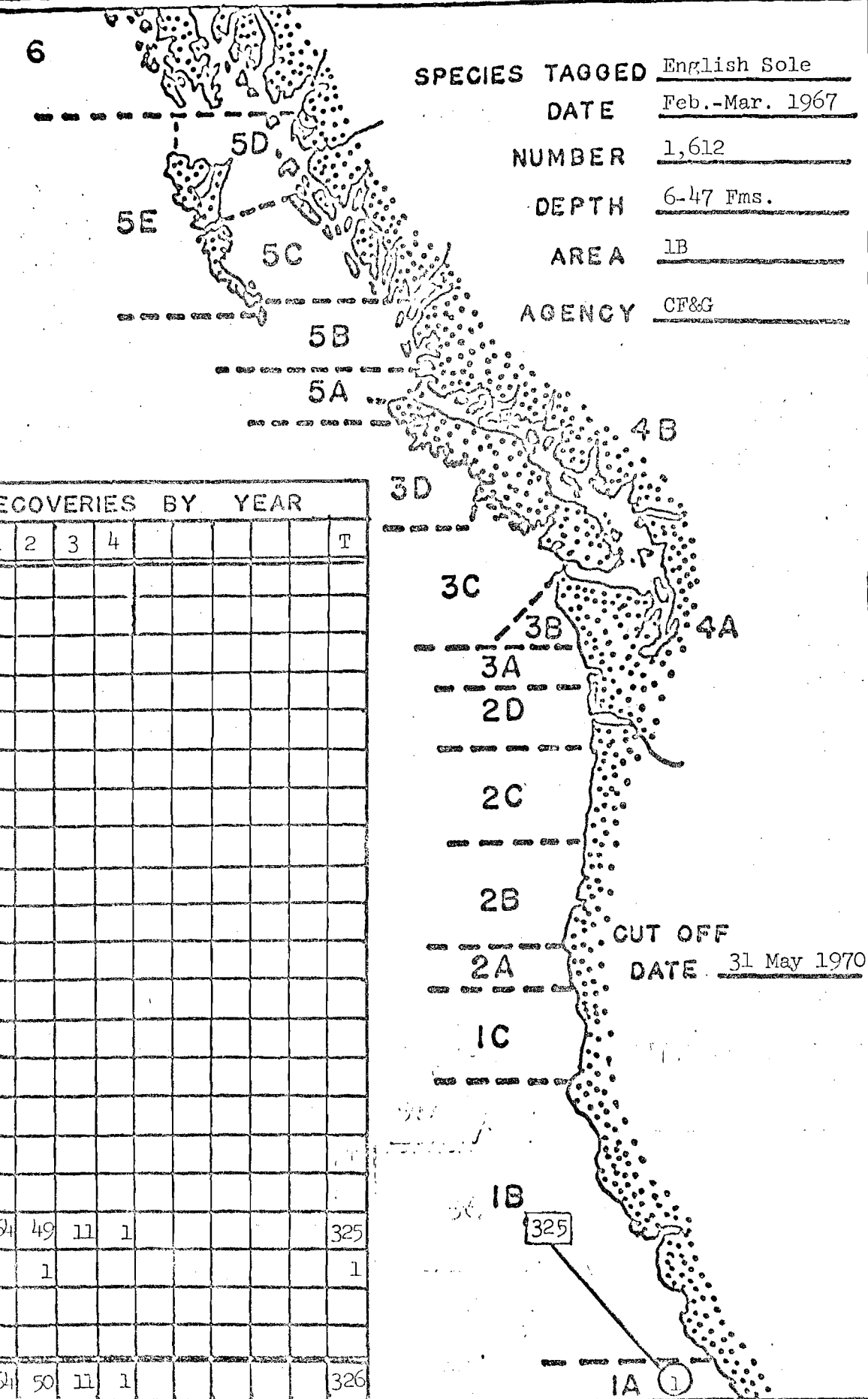
SPECIES TAGGED: English sole
DATE: Feb., 1969
NUMBER: 2,083
DEPTH: 20-30 fathoms
AREA: 4A (Bellingham Bay)
AGENCY: WSDF

RECOVERIES BY YEAR

AREA	69	70
6		
5E		
5D		
5C		
5B		
5A		
4B		2
4A	19	9
3D		
3C		
3B	1	1
3A		
2D		
2C		
2B		
2A		
1C		
1B		
1A		
UNK'N	2	
TOTAL	22	12

CUT OFF DATE 4/30/70

TOTAL 34

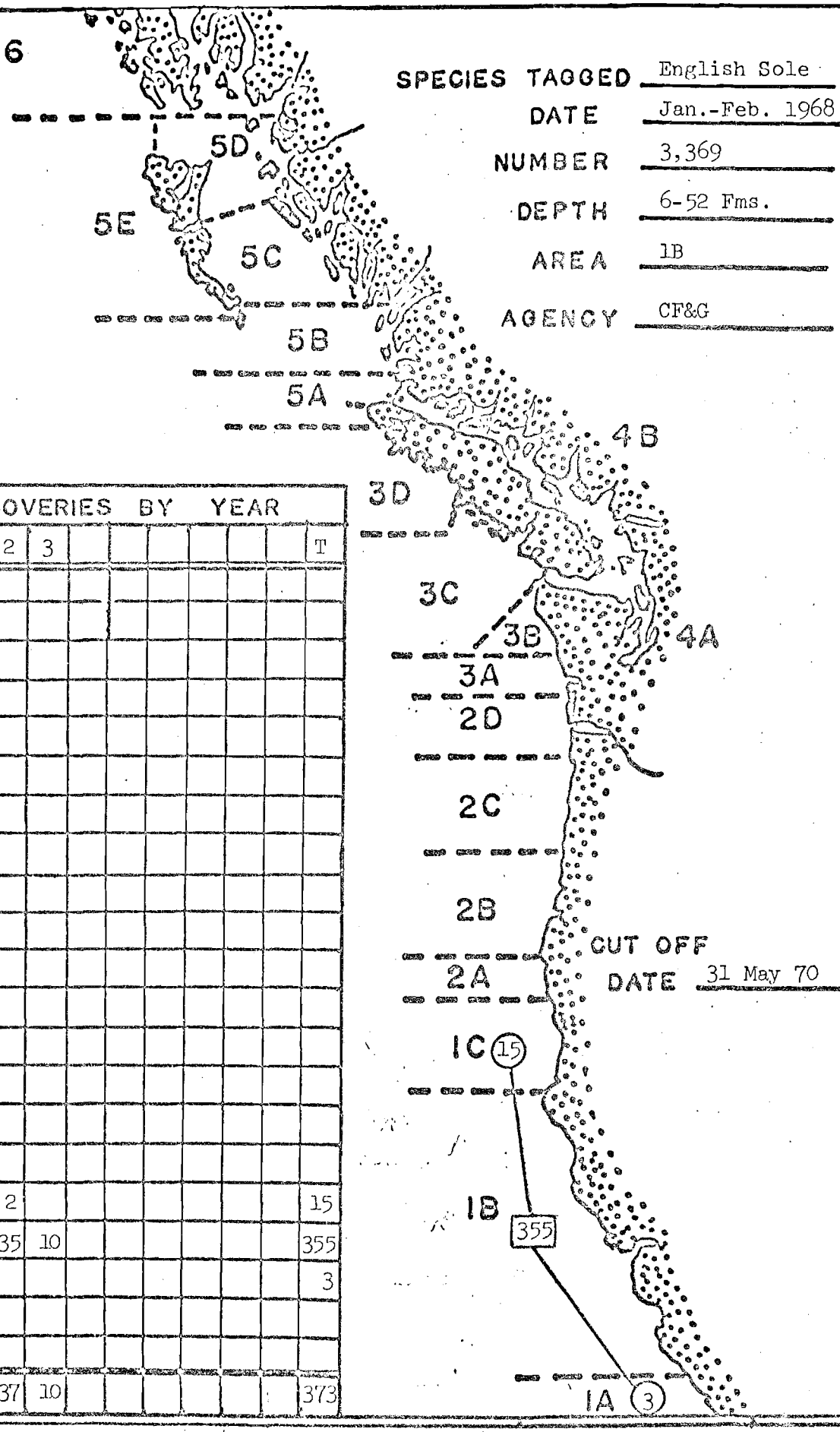


SPECIES TAGGED: English Sole
DATE: Feb.-Mar. 1967
NUMBER: 1,612
DEPTH: 6-47 Fms.
AREA: 1B
AGENCY: CF&G

RECOVERIES BY YEAR

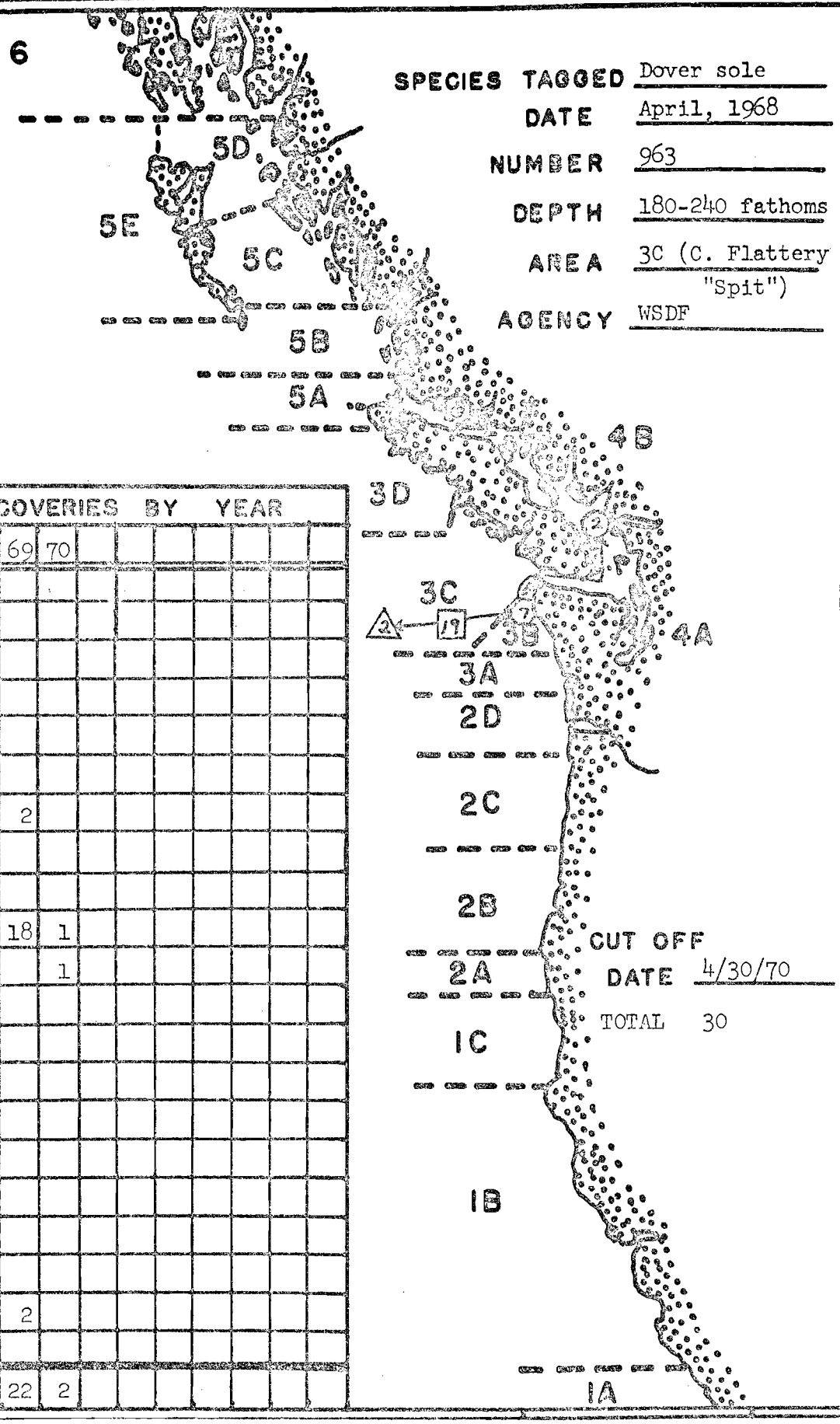
AREA	1	2	3	4						T
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A										
3D										
3C										
3B										
3A										
2D										
2C										
2B										
2A										
1C										
1B	264	49	11	1						325
1A		1								1
UNK'N										
TOTAL	264	50	11	1						326

SPECIES TAGGED: English Sole
DATE: Jan.-Feb. 1968
NUMBER: 3,369
DEPTH: 6-52 Fms.
AREA: 1B
AGENCY: CF&G



RECOVERIES BY YEAR

AREA	1	2	3							T
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A										
3D										
3C										
3B										
3A										
2D										
2C										
2B										
2A										
1C	13	2								15
1B	210	135	10							355
1A	3									3
UNK'N										
TOTAL	226	137	10							373

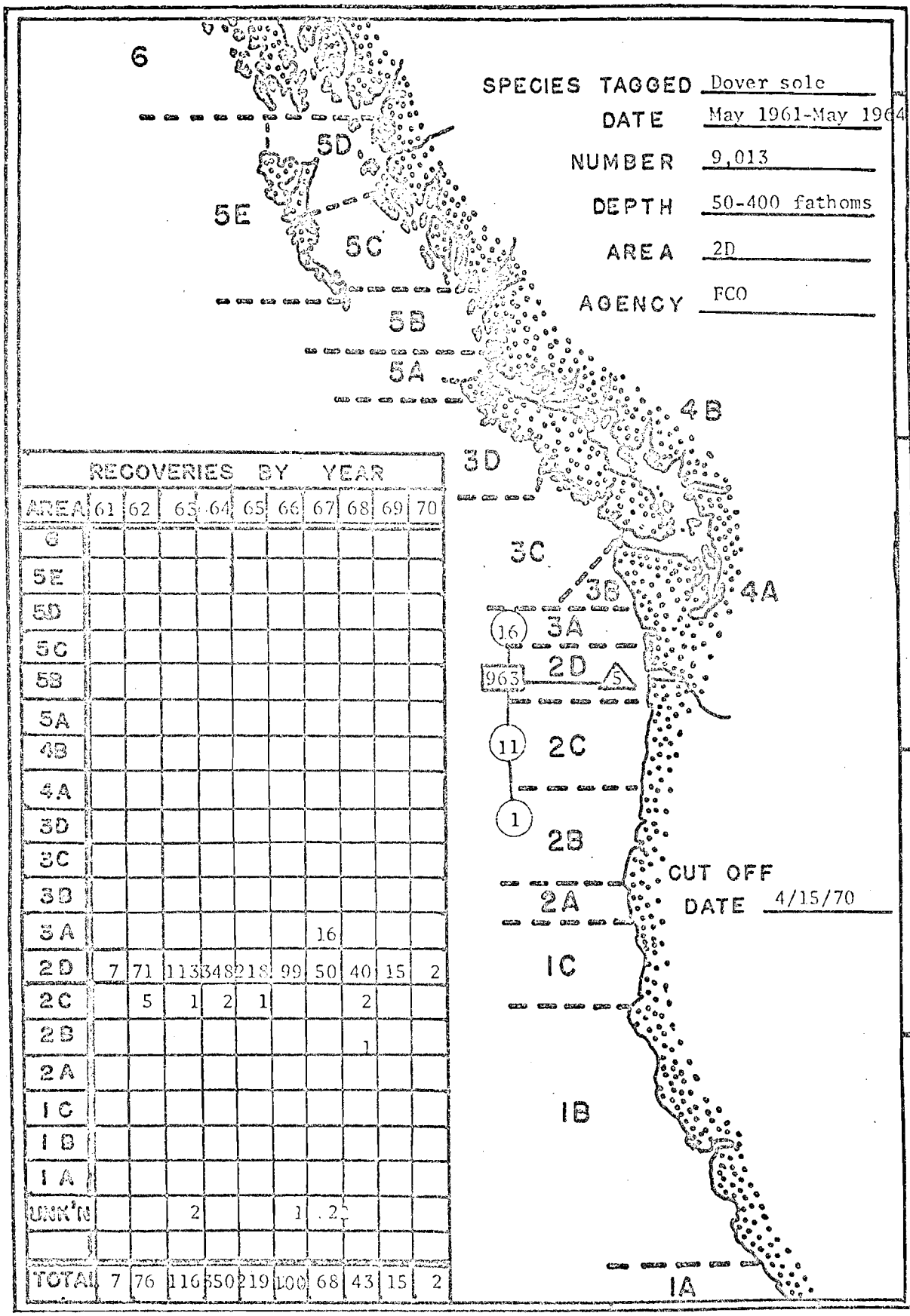


SPECIES TAGGED: Dover sole
DATE: April, 1968
NUMBER: 963
DEPTH: 180-240 fathoms
AREA: 3C (C. Flattery "Spit")
AGENCY: WSDF

CUT OFF DATE: 4/30/70
TOTAL: 30

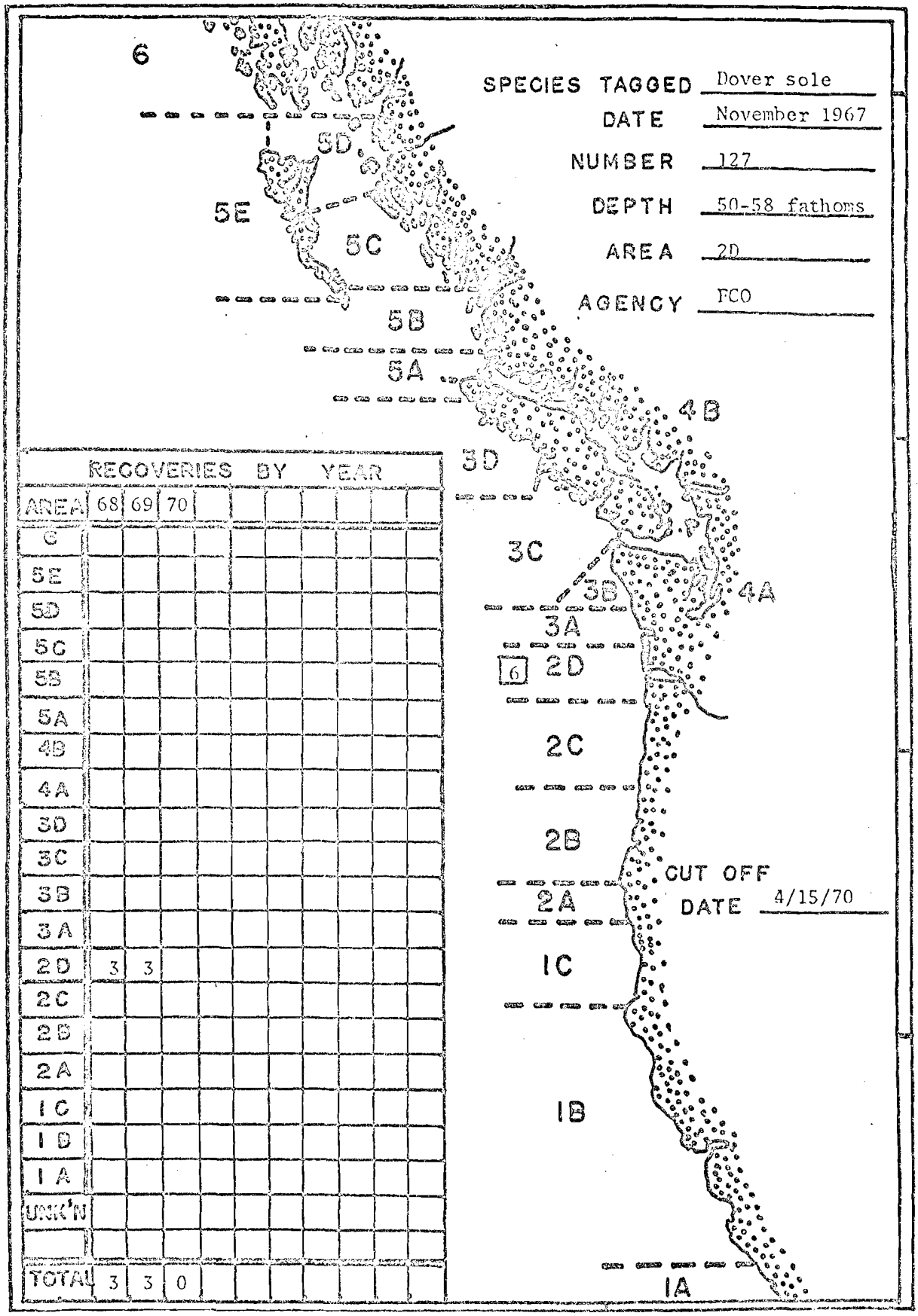
RECOVERIES BY YEAR

AREA	68	69	70
6			
5E			
5D			
5C			
5B			
5A			
4B		2	
4A			
3D			
3C		18	1
3B	6		1
3A			
2D			
2C			
2B			
2A			
1C			
1B			
1A			
UNK'N		2	
TOTAL	6	22	2



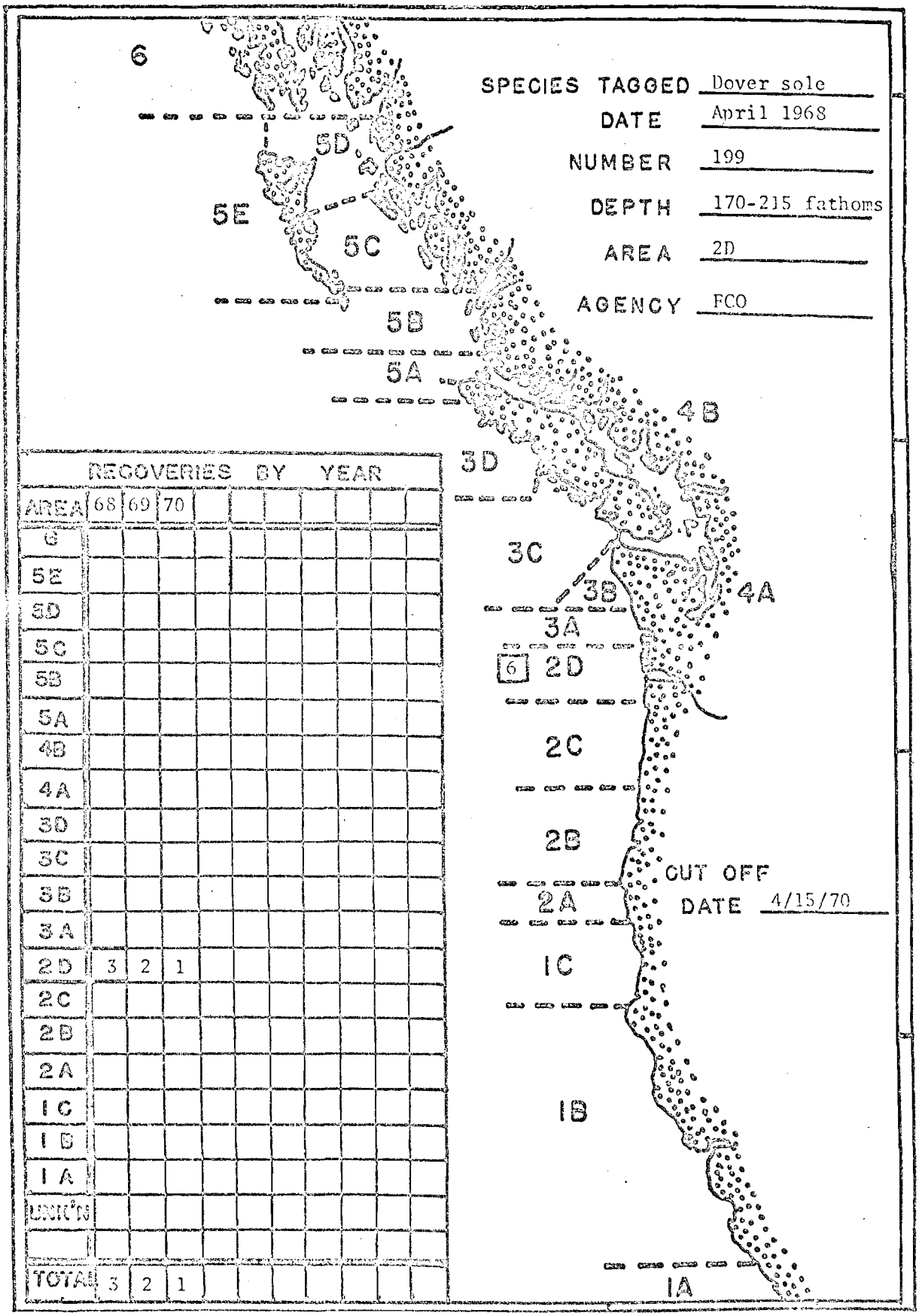
RECOVERIES BY YEAR

AREA	61	62	63	64	65	66	67	68	69	70
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A										
3D										
3C										
3B										
3A							16			
2D	7	71	113	348	218	99	50	40	15	2
2C		5	1	2	1			2		
2B								1		
2A										
1C										
1B										
1A										
UNK'N			2			1	2			
TOTAL	7	76	116	350	219	100	68	43	15	2

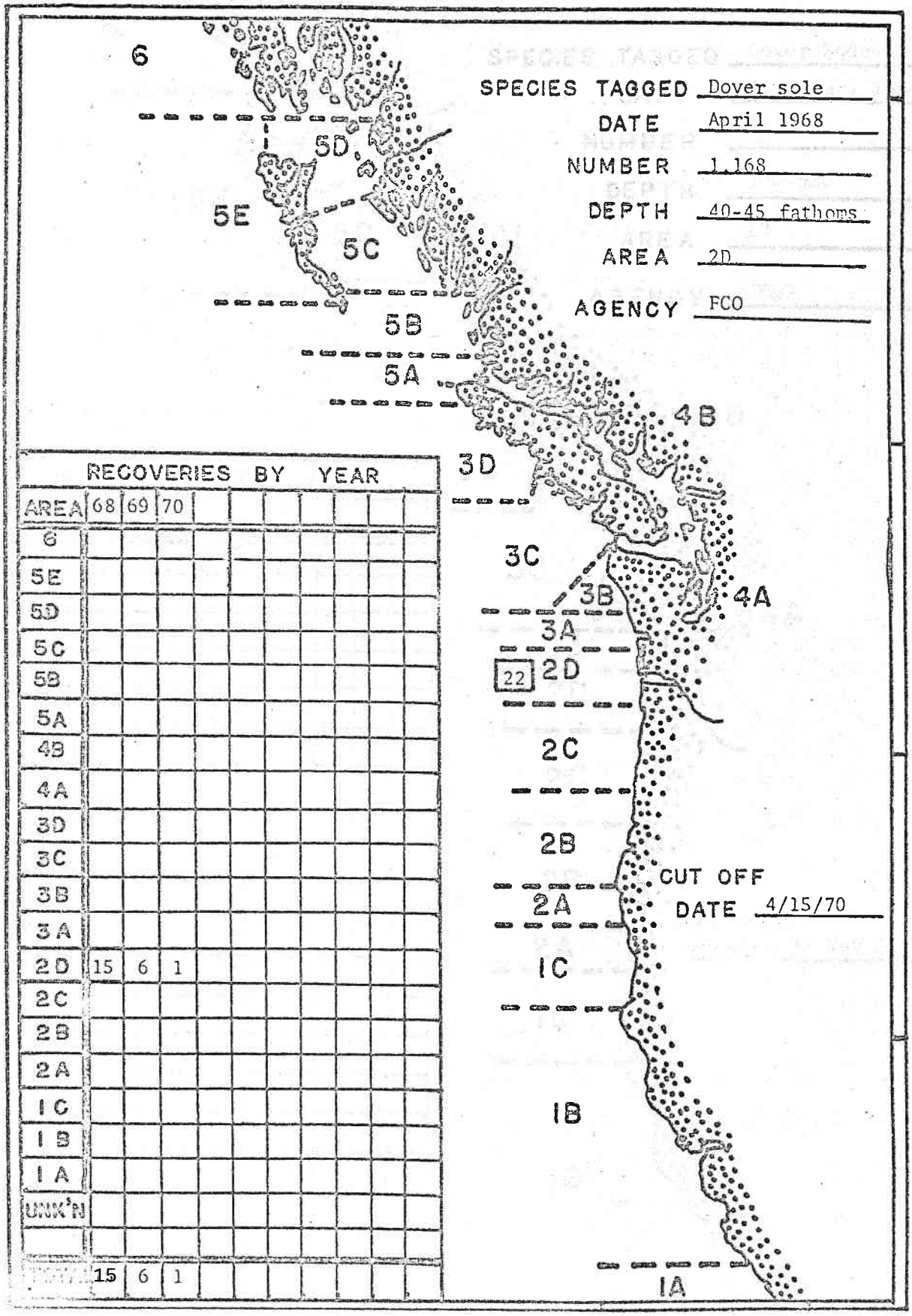


RECOVERIES BY YEAR

AREA	68	69	70								
C											
5E											
5D											
5C											
5B											
5A											
4B											
4A											
3D											
3C											
3B											
3A											
2D	3	3									
2C											
2B											
2A											
1C											
1B											
1A											
UNK'N											
TOTAL	3	3	0								

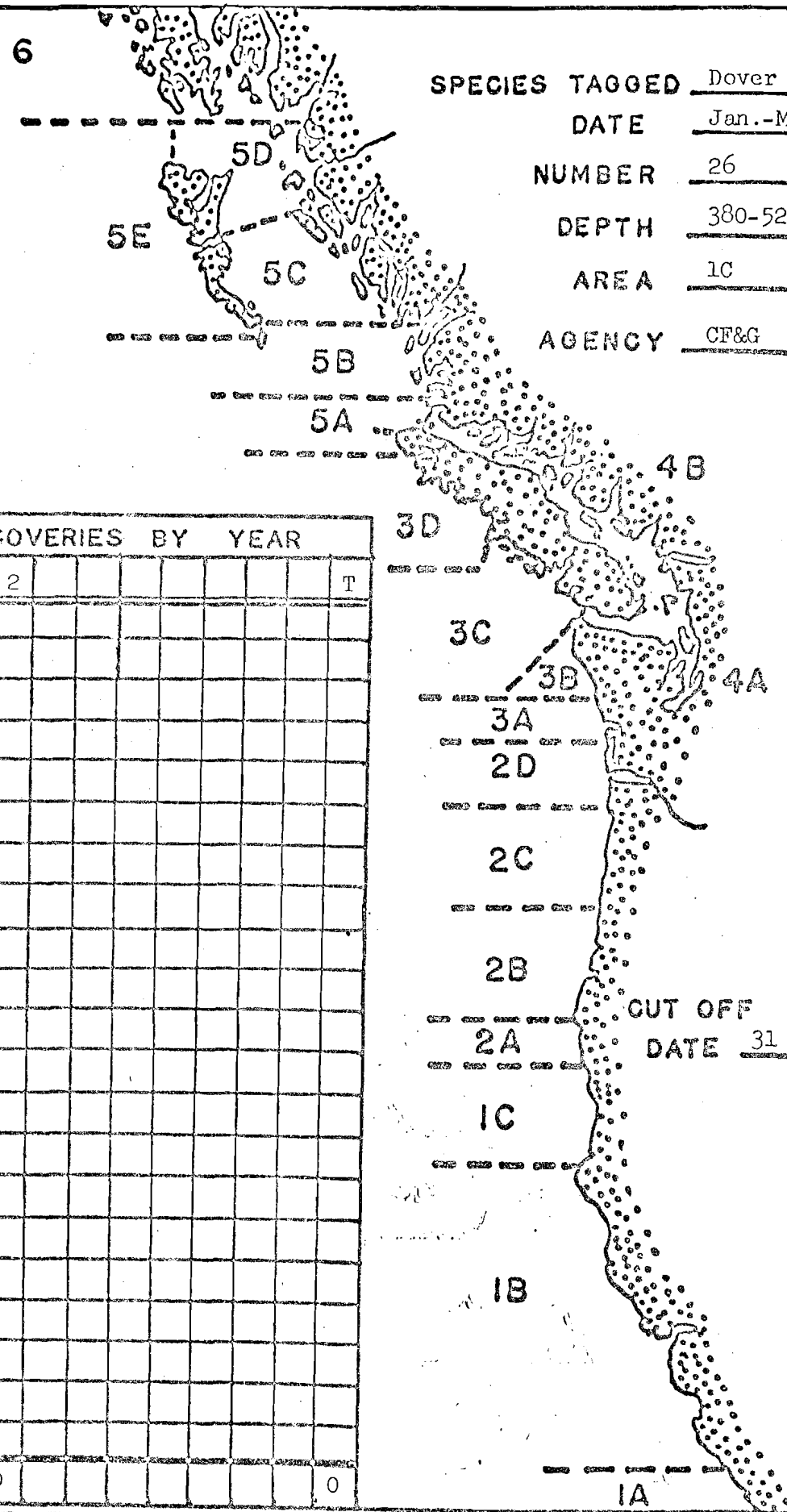


RECOVERIES BY YEAR											
AREA	68	69	70								
6											
5E											
5D											
5C											
5B											
5A											
4B											
4A											
3D											
3C											
3B											
3A											
2D	3	2	1								
2C											
2B											
2A											
1C											
1B											
1A											
UNK'N											
TOTAL	3	2	1								



RECOVERIES BY YEAR

AREA	68	69	70
6			
5E			
5D			
5C			
5B			
5A			
4B			
4A			
3D			
3C			
3B			
3A			
2D	15	6	1
2C			
2B			
2A			
1C			
1B			
1A			
UNK'N			
TOTAL	15	6	1



SPECIES TAGGED Dover Sole

DATE Jan.-Mar. 1969

NUMBER 26

DEPTH 380-520

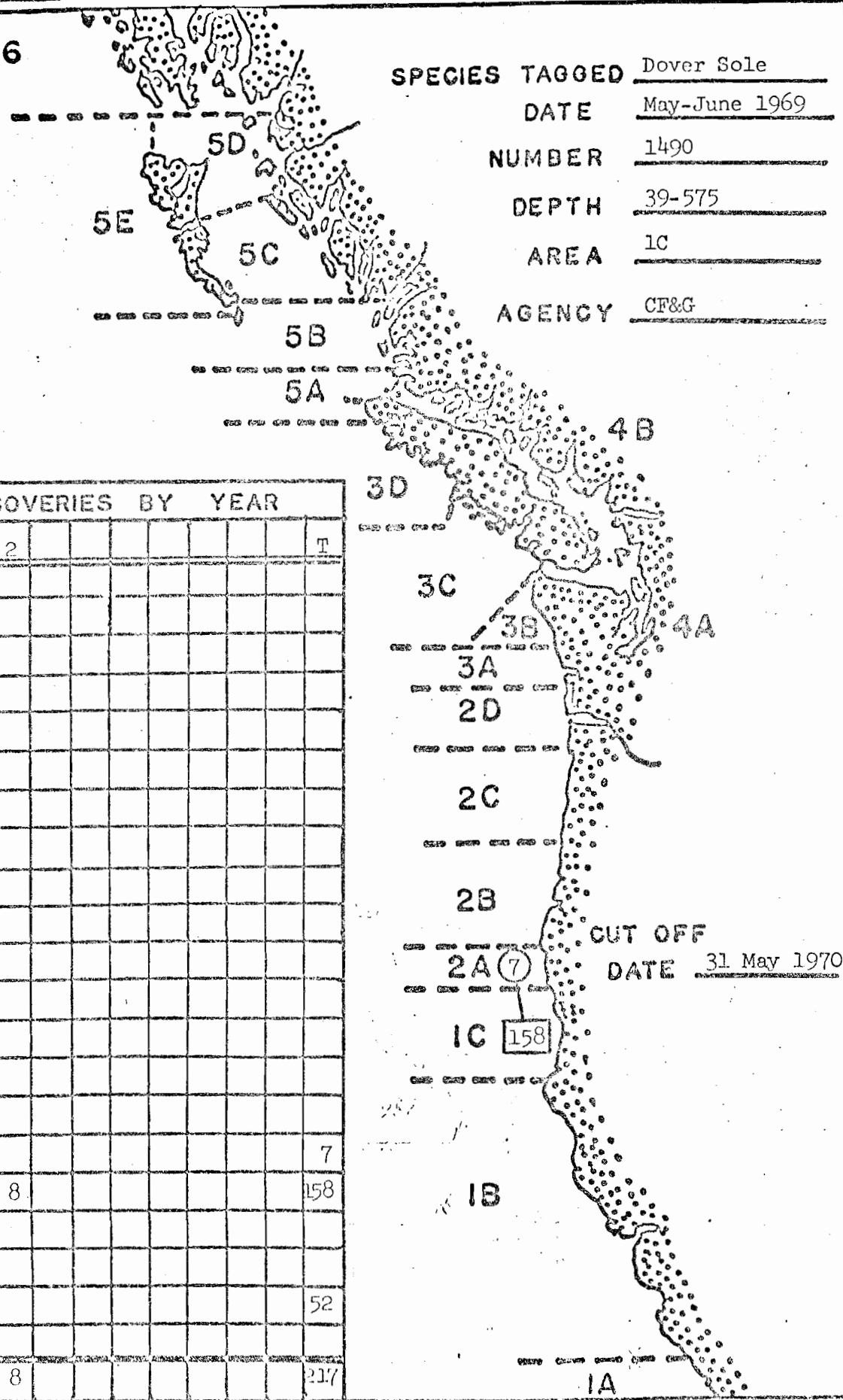
AREA 1C

AGENCY CF&G

CUT OFF DATE 31 May 1970

RECOVERIES BY YEAR

AREA	1	2								T
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A										
3D										
3C										
3B										
3A										
2D										
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N										
TOTAL	0	0								0



SPECIES TAGGED Dover Sole

DATE May-June 1969

NUMBER 1490

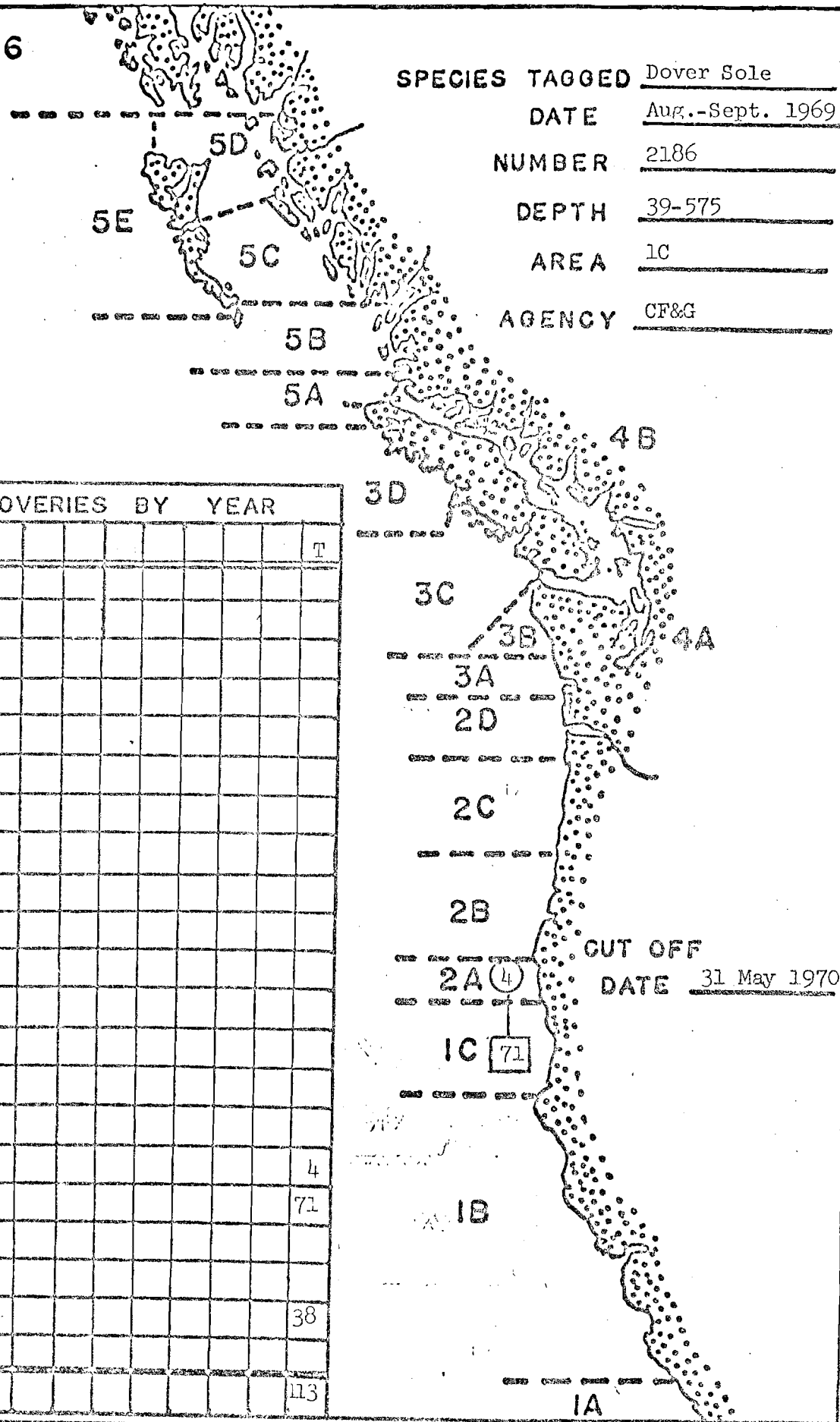
DEPTH 39-575

AREA 1C

AGENCY CF&G

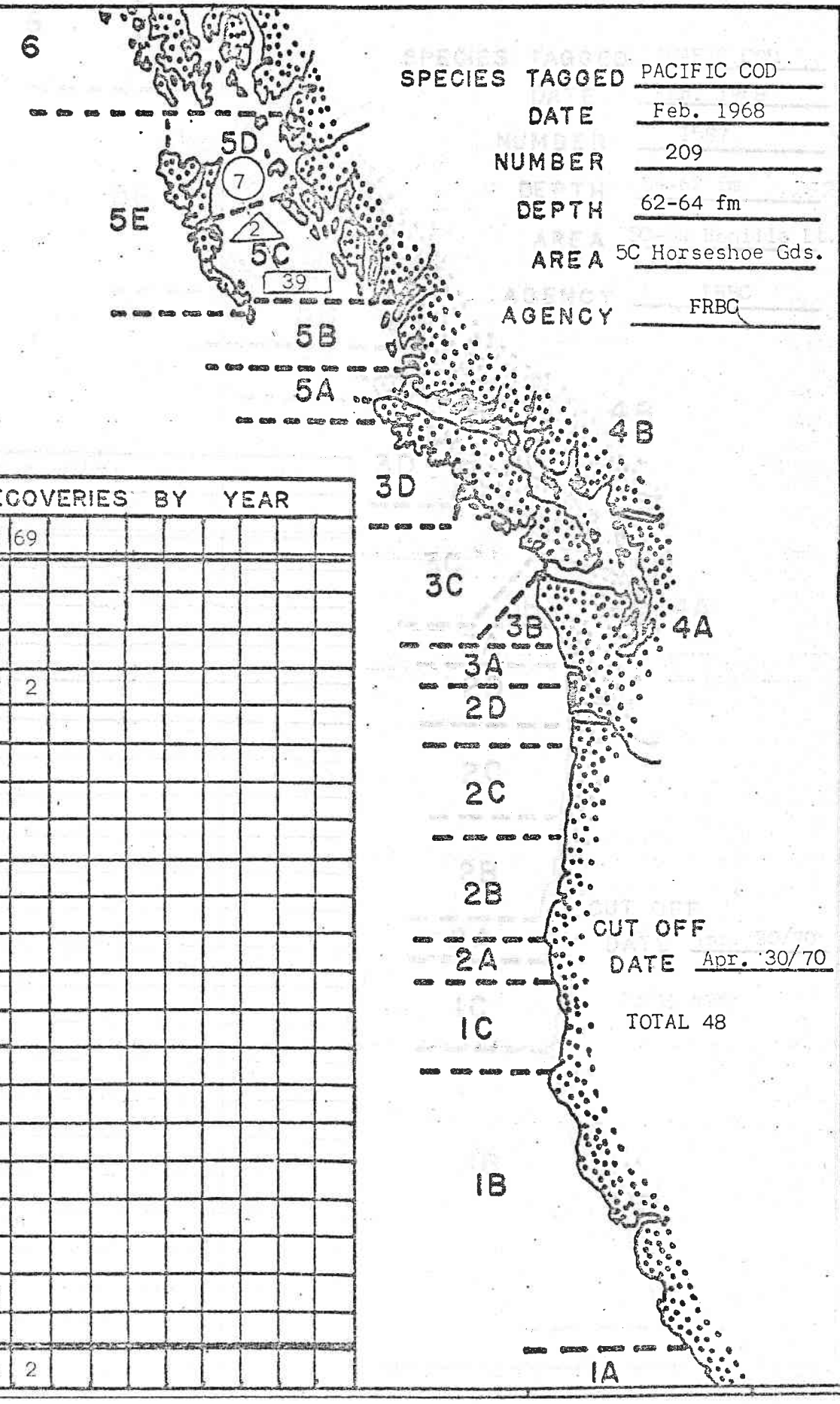
RECOVERIES BY YEAR

AREA	1	2								T
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A										
3D										
3C										
3B										
3A										
2D										
2C										
2B										
2A	7									7
1C	150	8								158
1B										
1A										
UNK'N	52									52
TOTAL	209	8								217



RECOVERIES BY YEAR

AREA	1									T
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A										
3D										
3C										
3B										
3A										
2D										
2C										
2B										
2A	4									4
1C	71									71
1B										
1A										
UNK'N	38									38
TOTAL	113									113



SPECIES TAGGED PACIFIC COD

DATE Feb. 1968

NUMBER 209

DEPTH 62-64 fm

AREA 5C Horseshoe Gds.

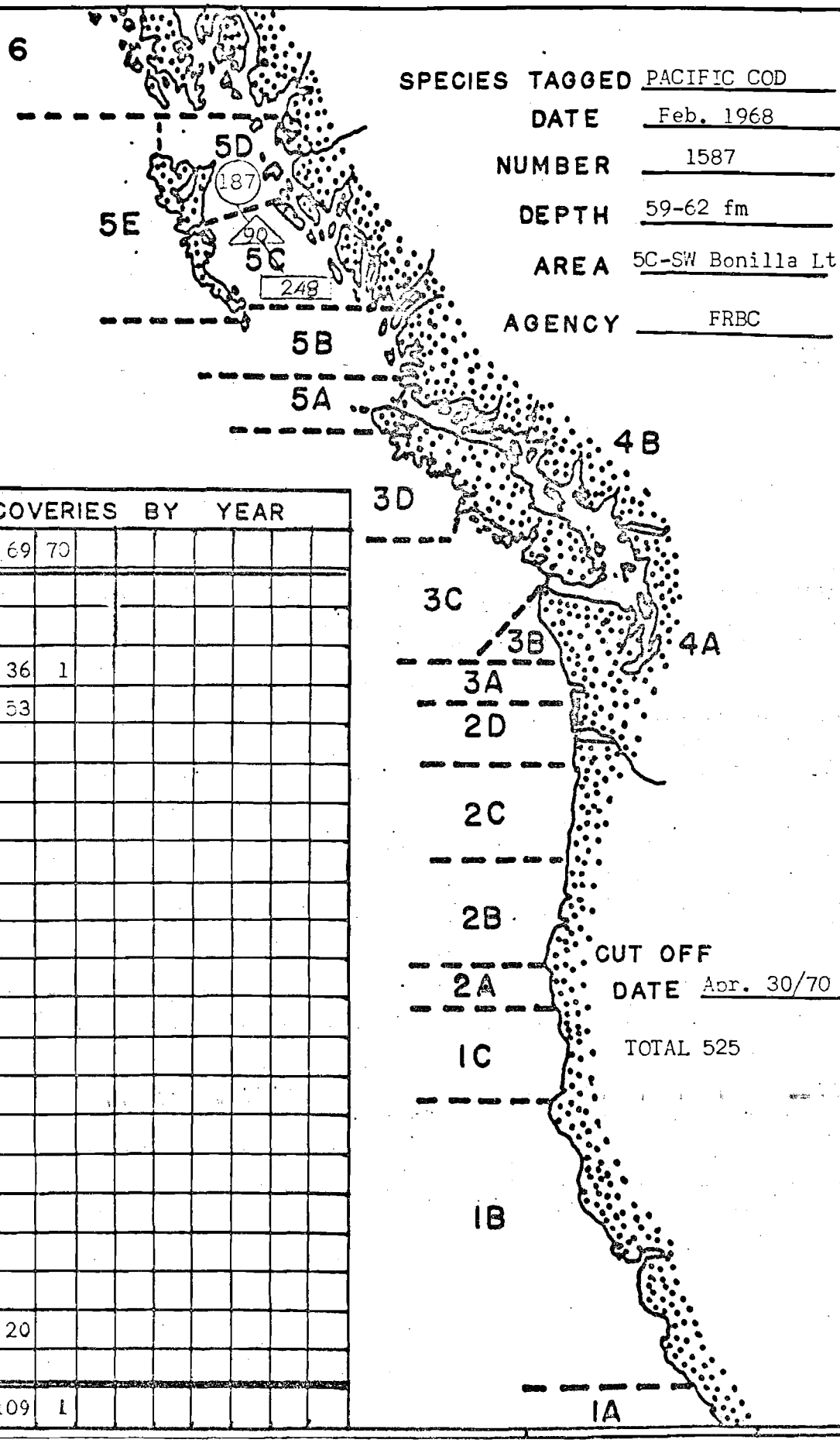
AGENCY FRBC

CUT OFF DATE Apr. 30/70

TOTAL 48

RECOVERIES BY YEAR

AREA	68	69
6		
5E		
5D	7	
5C	37	2
5B		
5A		
4B		
4A		
3D		
3C		
3B		
3A		
2D		
2C		
2B		
2A		
1C		
1B		
1A		
UNK'N	2	
TOTAL	46	2

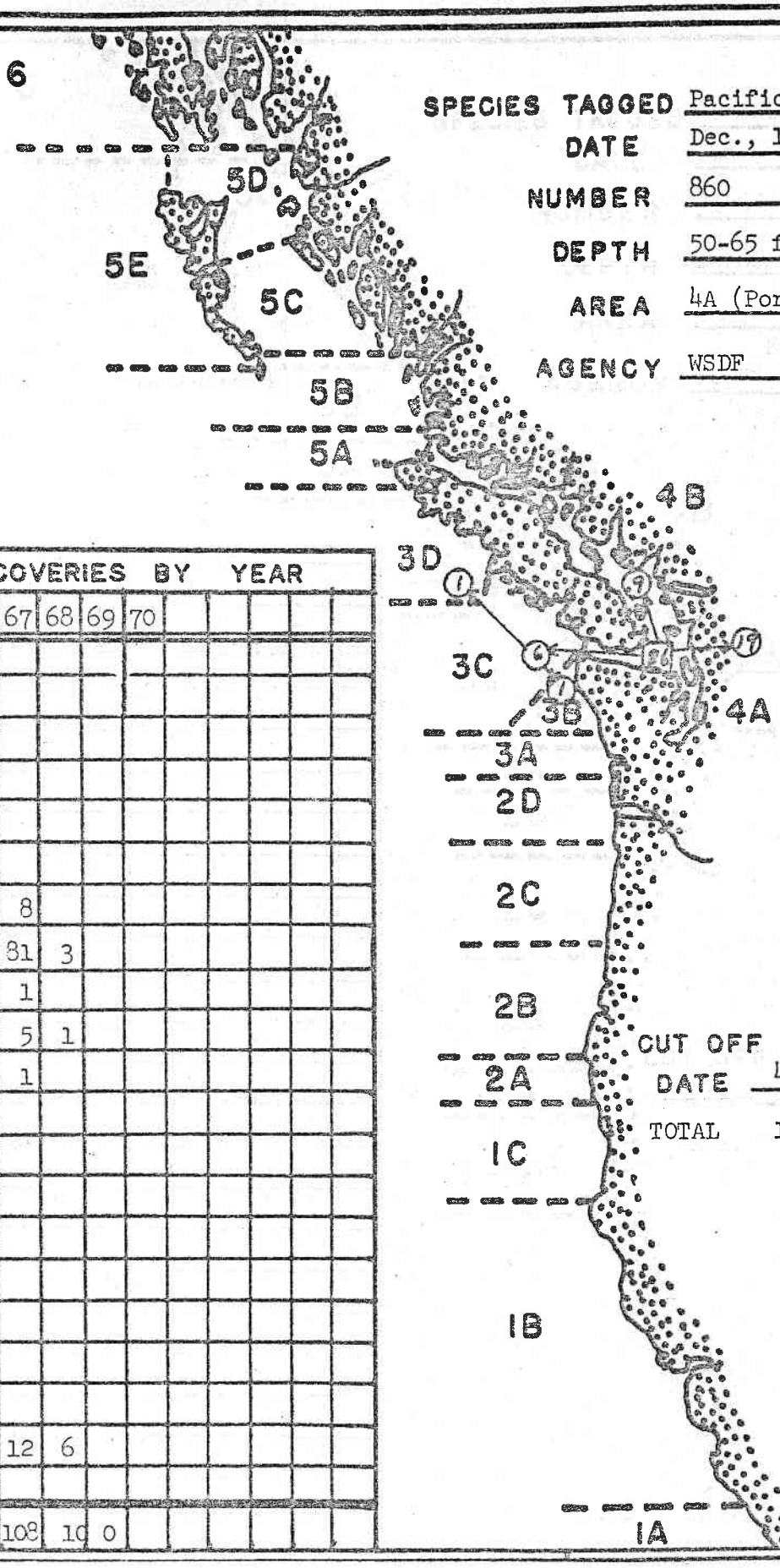


SPECIES TAGGED PACIFIC COD
DATE Feb. 1968
NUMBER 1587
DEPTH 59-62 fm
AREA 5C-SW Bonilla Lt.
AGENCY FRBC

RECOVERIES BY YEAR

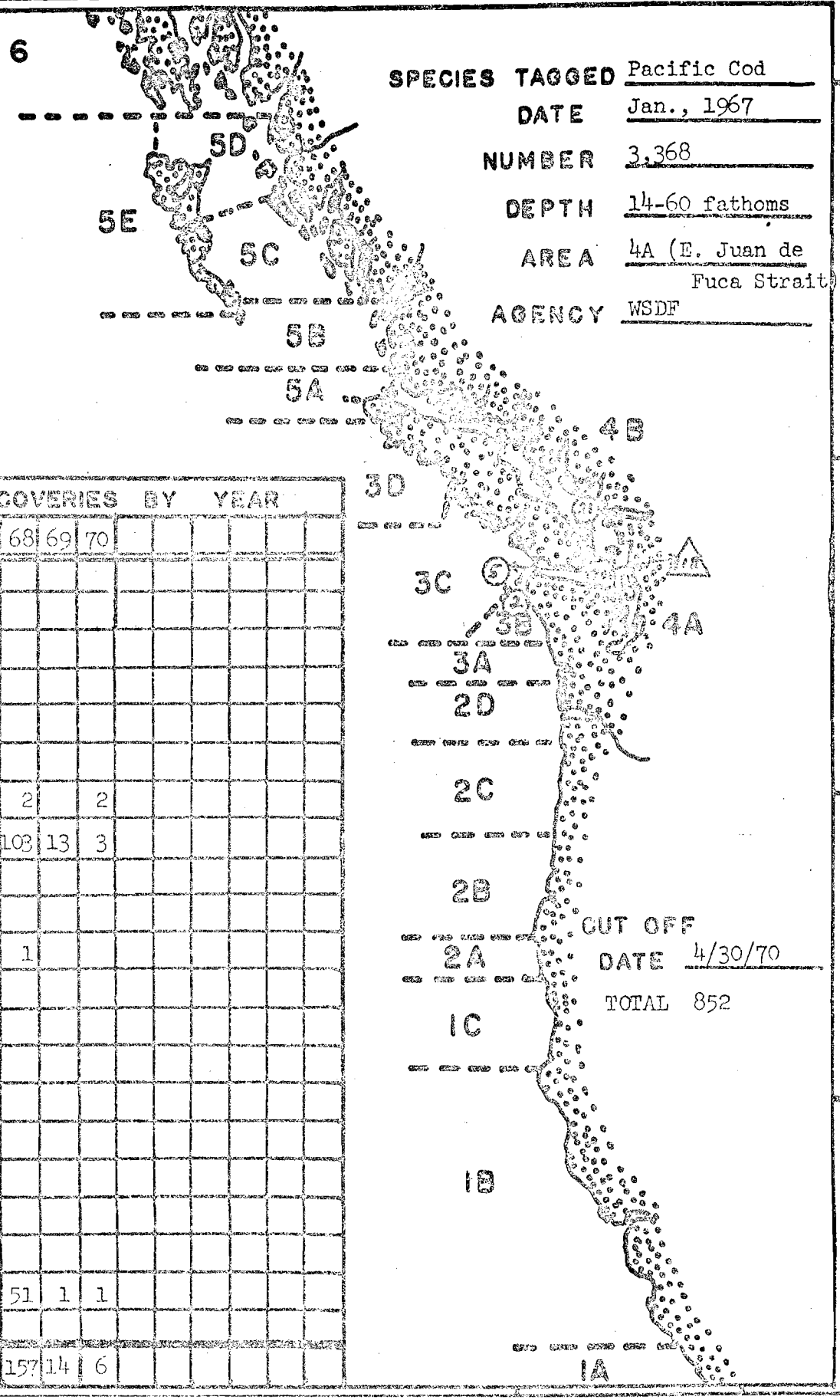
AREA	68	69	70
6			
5E			
5D	150	36	1
5C	195	53	
5B			
5A			
4B			
4A			
3D			
3C			
3B			
3A			
2D			
2C			
2B			
2A			
1C			
1B			
1A			
UNK'N	70	20	
TOTAL	415	109	1

SPECIES TAGGED: Pacific Cod
DATE: Dec., 1966
NUMBER: 860
DEPTH: 50-65 fathoms
AREA: 4A (Port Angeles)
AGENCY: WSDF



RECOVERIES BY YEAR

AREA	66	67	68	69	70
6					
5E					
5D					
5C					
5B					
5A					
4B	1	8			
4A	2	81	3		
3D		1			
3C		5	1		
3B		1			
3A					
2D					
2C					
2B					
2A					
1C					
1B					
1A					
UNK'N	1	12	6		
TOTAL	4	108	10	0	



SPECIES TAGGED Pacific Cod

DATE Jan., 1967

NUMBER 3,368

DEPTH 14-60 fathoms

AREA 4A (E. Juan de Fuca Strait)

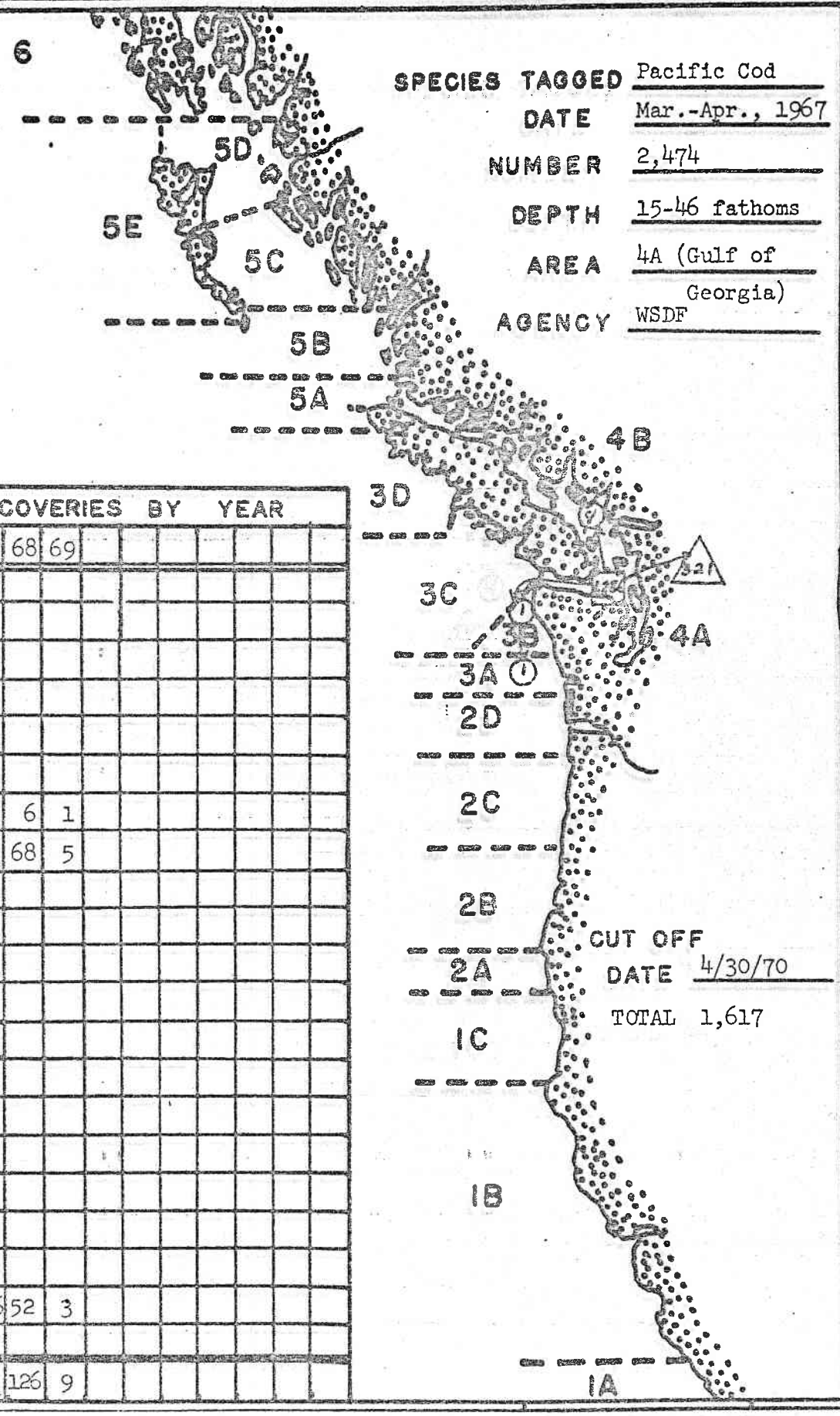
AGENCY WSDF

CUT OFF DATE 4/30/70

TOTAL 852

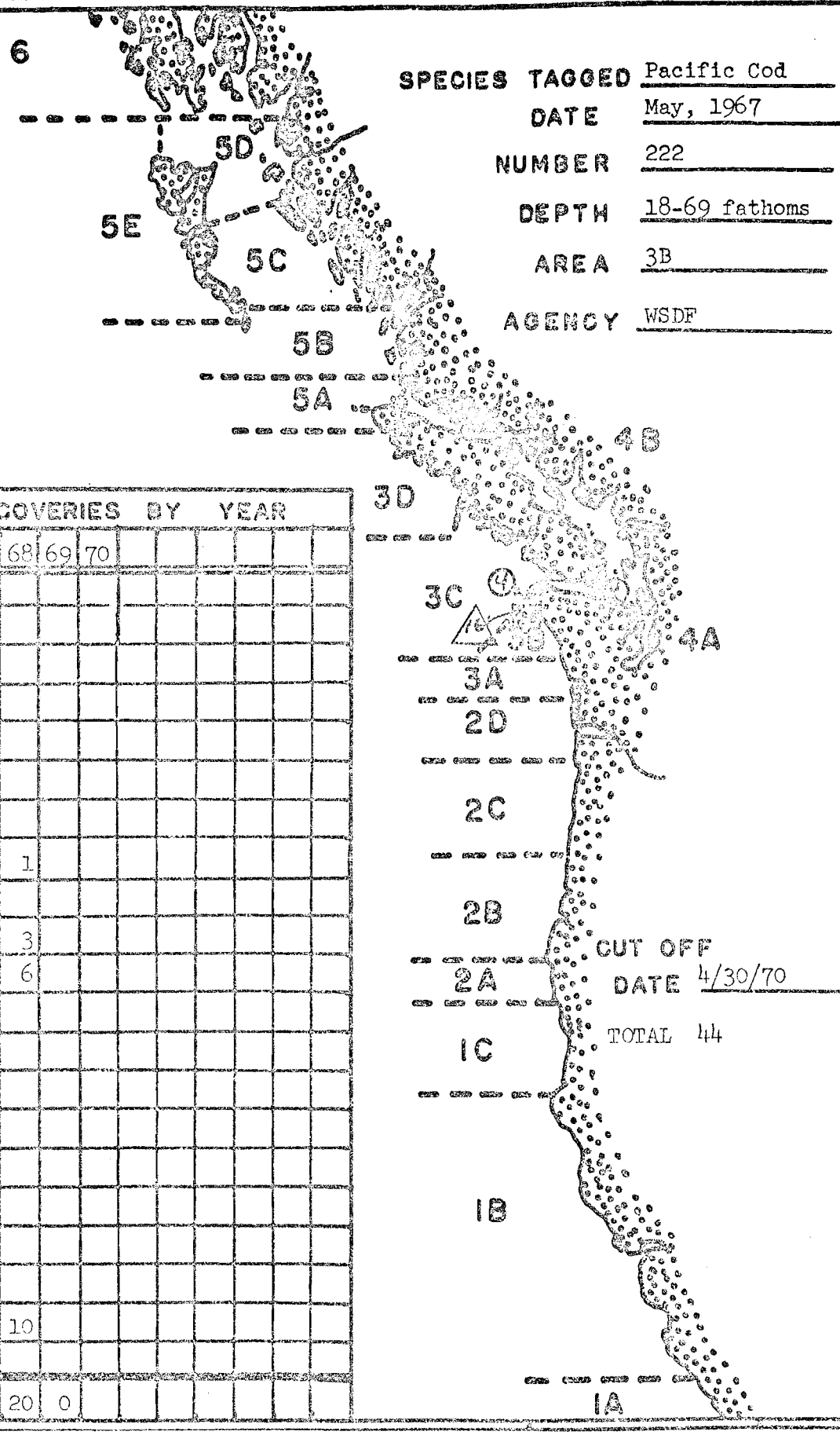
RECOVERIES BY YEAR

AREA	67	68	69	70
6				
5E				
5D				
5C				
5B				
5A				
4B	17	2		2
4A	687	103	13	3
3D				
3C	5			
3B	1	1		
3A				
2D				
2C				
2B				
2A				
1C				
1B				
1A				
UNK'N	65	51	1	1
TOTAL	675	157	14	6



RECOVERIES BY YEAR

AREA	67	68	69							
6										
5E										
5D										
5C										
5B										
5A										
4B	1	6	1							
4A	1/2/3	68	5							
3D										
3C										
3B	1									
3A	1									
2D										
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N	266	52	3							
TOTAL	1/4/8/2	126	9							



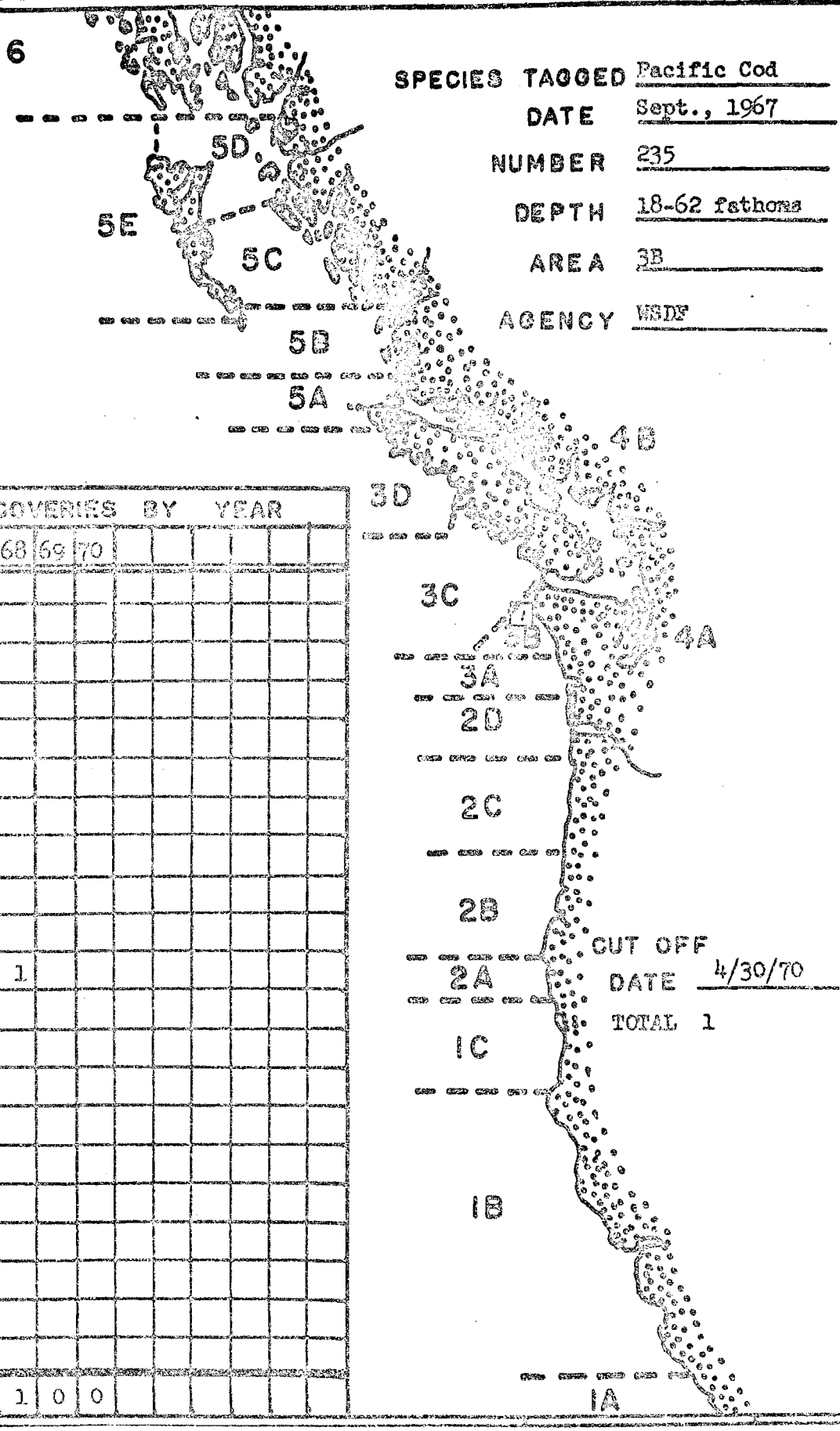
SPECIES TAGGED: Pacific Cod
DATE: May, 1967
NUMBER: 222
DEPTH: 18-69 fathoms
AREA: 3B
AGENCY: WSDF

RECOVERIES BY YEAR

AREA	67	68	69	70
6				
5E				
5D				
5C				
5B				
5A				
4B				
4A	3	1		
3D				
3C	1	3		
3B	14	6		
3A				
2D				
2C				
2B				
2A				
1C				
1B				
1A				
UNK'N	6	10		
TOTAL	24	20	0	

CUT OFF DATE 4/30/70

TOTAL 44



SPECIES TAGGED Pacific Cod

DATE Sept., 1967

NUMBER 235

DEPTH 18-62 fathoms

AREA 3B

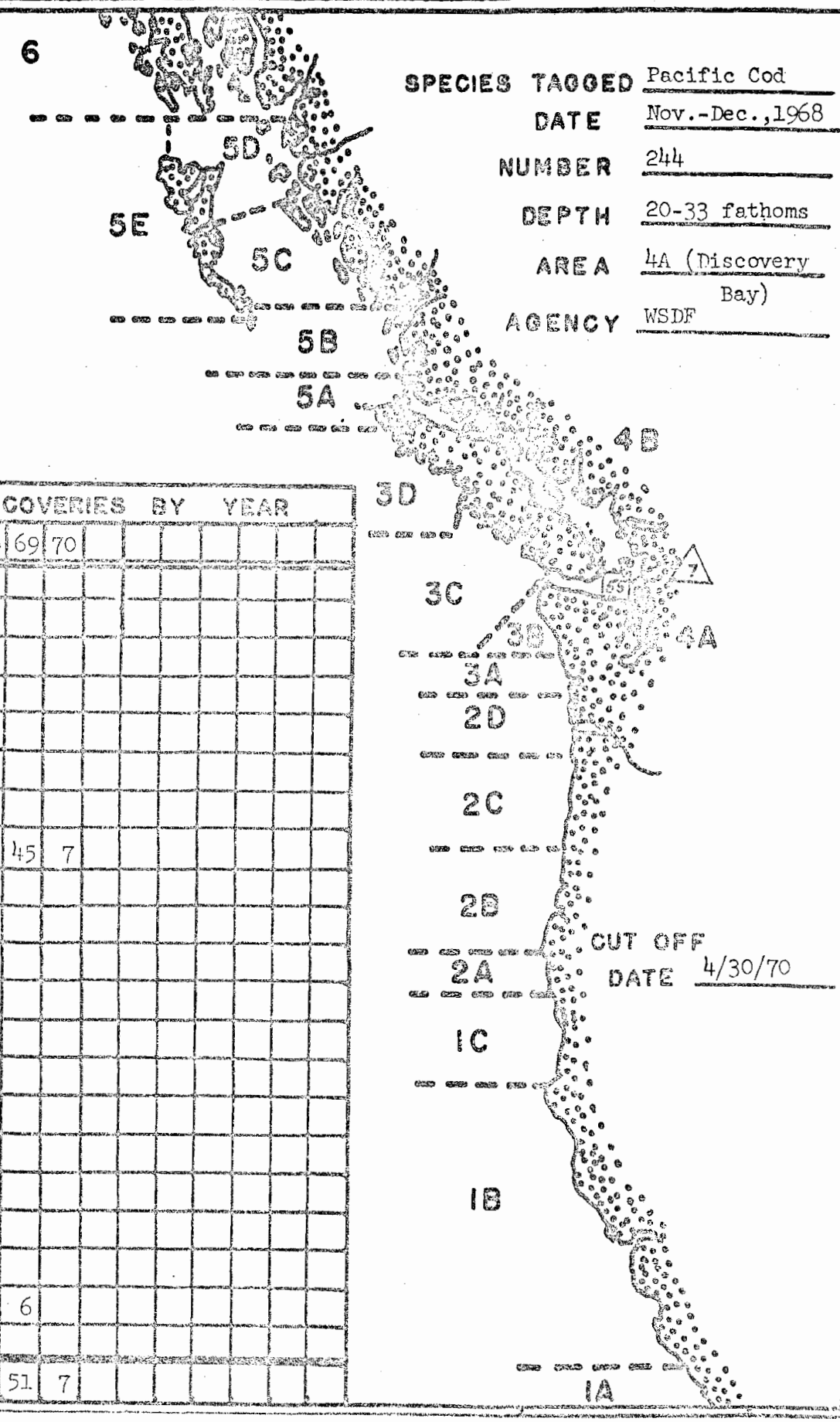
AGENCY WSDF

CUT OFF DATE 4/30/70

TOTAL 1

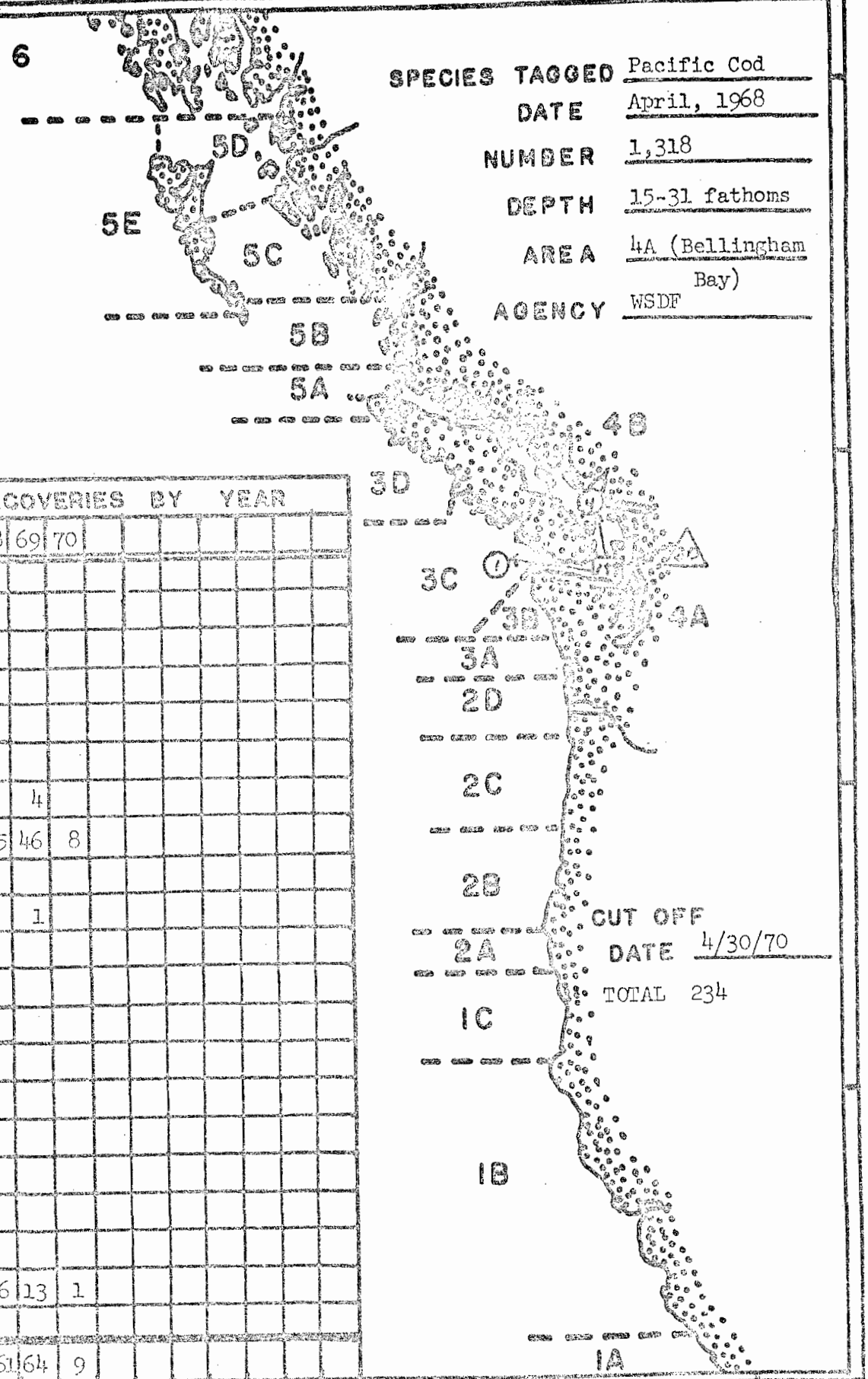
RECOVERIES BY YEAR

AREA	67	68	69	70
6				
5E				
5D				
5C				
5B				
5A				
4B				
4A				
3D				
3C				
3B		1		
3A				
2D				
2C				
2B				
2A				
1C				
1B				
1A				
UNK'N				
TOTAL	0	1	0	0



RECOVERIES BY YEAR

AREA	68	69	70
6			
5E			
5D			
5C			
5B			
5A			
4B			
4A	3	45	7
3D			
3C			
3B			
3A			
2D			
2C			
2B			
2A			
1C			
1B			
1A			
UNK'N	1	6	
TOTAL	4	51	7



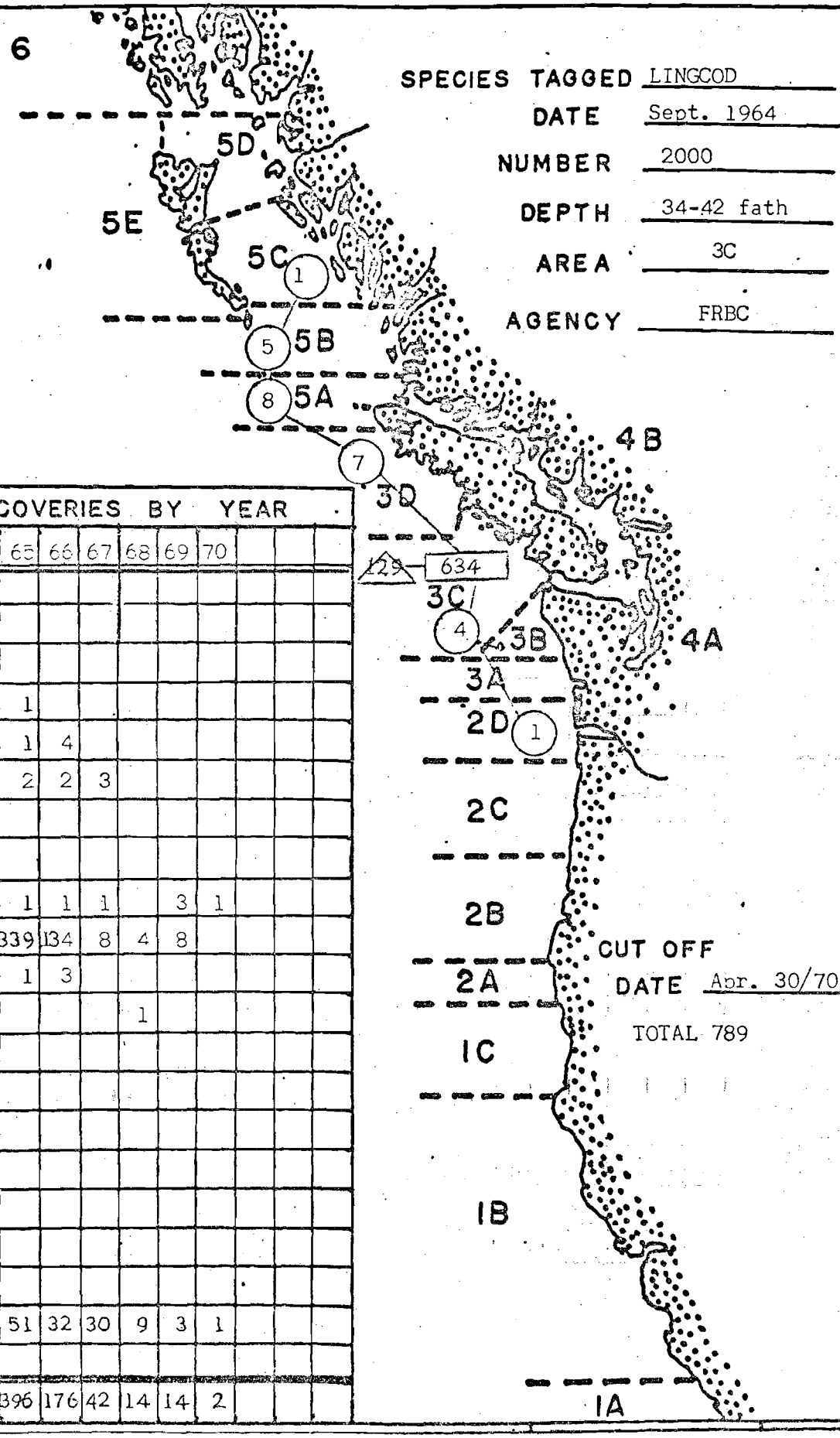
SPECIES TAGGED: Pacific Cod
DATE: April, 1968
NUMBER: 1,318
DEPTH: 15-31 fathoms
AREA: 4A (Bellingham Bay)
AGENCY: WSDF

RECOVERIES BY YEAR

AREA	68	69	70
6			
5E			
5D			
5C			
5B			
5A			
4B		4	
4A	145	46	8
3D			
3C		1	
3B			
3A			
2D			
2C			
2B			
2A			
1C			
1B			
1A			
UNK'N	16	13	1
TOTAL	161	64	9

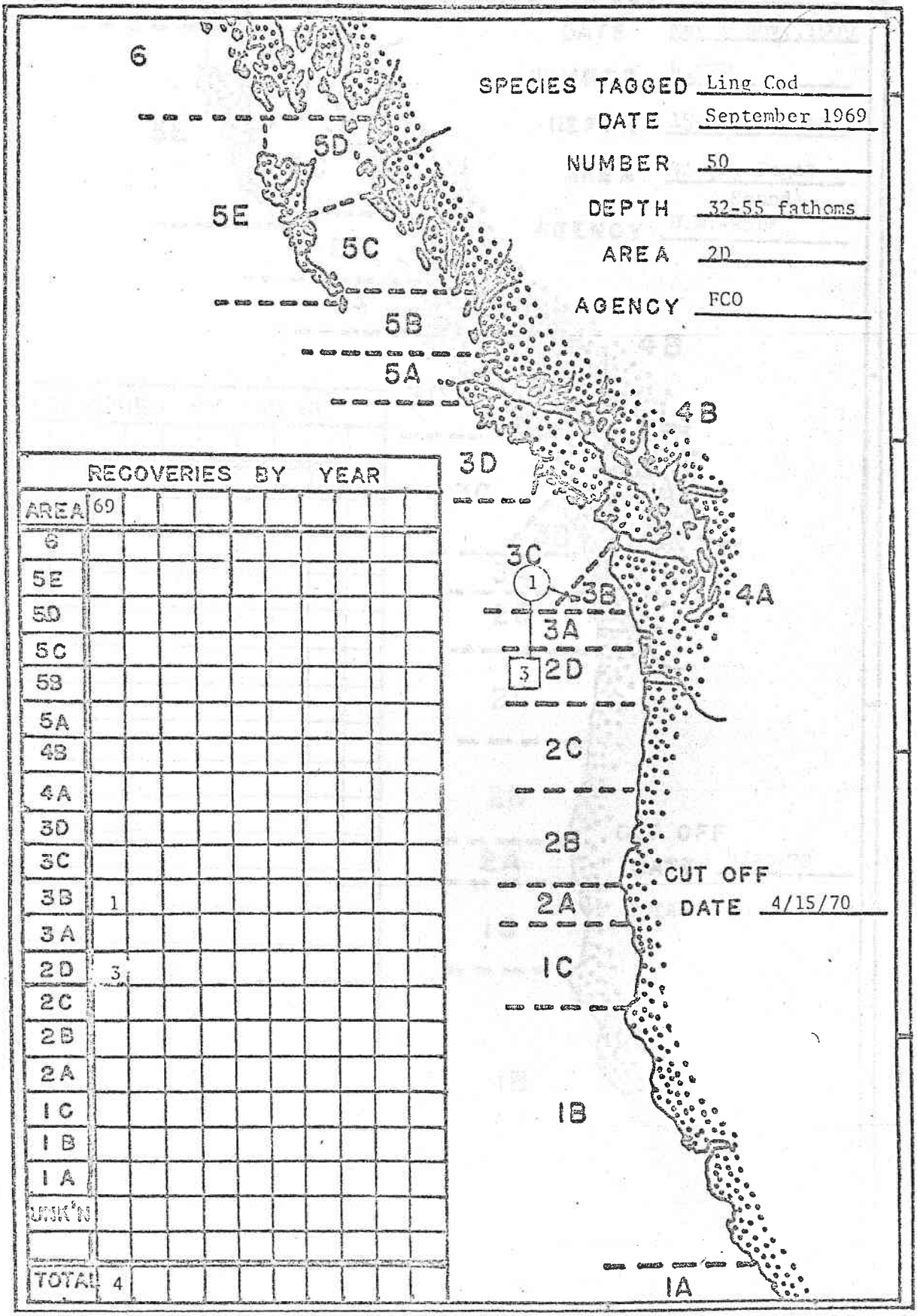
CUT OFF DATE 4/30/70

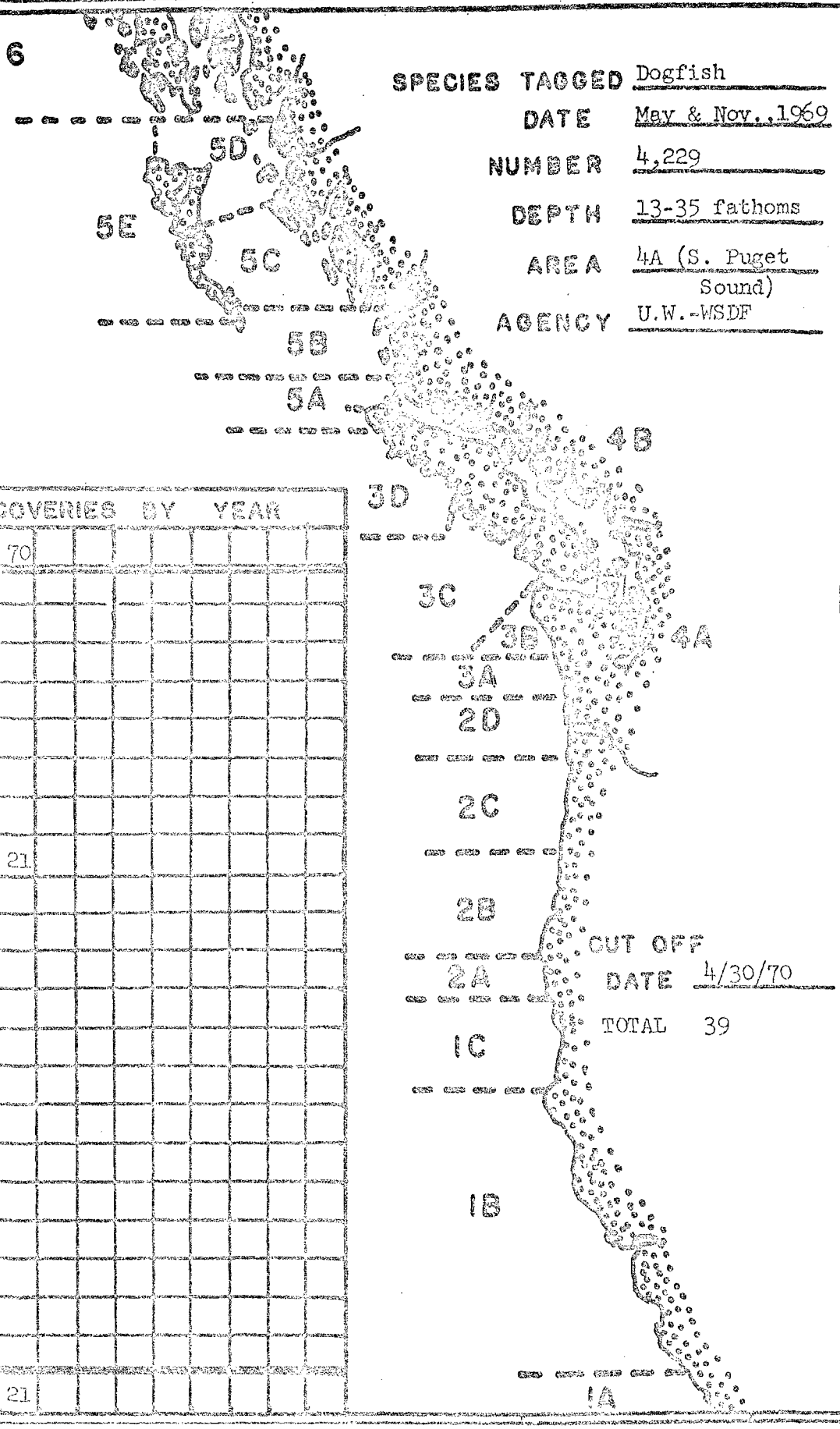
TOTAL 234



RECOVERIES BY YEAR

AREA	64	65	66	67	68	69	70			
6										
5E										
5D										
5C		1								
5B		1	4							
5A	1	2	2	3						
4B										
4A										
3D		1	1	1		3	1			
3C	141	339	134	8	4	8				
3B		1	3							
3A					1					
2D										
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N	3	51	32	30	9	3	1			
TOTAL	145	396	176	42	14	14	2			


SPECIES TAGGED Ling Cod
DATE September 1969
NUMBER 50
DEPTH 32-55 fathoms
AREA 2D
AGENCY FCO
6
5D
5E
5C
5B
5A
4B
3D
3C
1
3B
4A
3A
3
2D
2C
2B
CUT OFF
DATE 4/15/70
2A
1C
1B
1A
RECOVERIES BY YEAR
AREA 69
6
5E
5D
5C
5B
5A
4B
4A
3D
3C
3B 1
3A
2D 3
2C
2B
2A
1C
1B
1A
UNK'N
TOTAL 4



SPECIES TAGGED: Dogfish

DATE: May & Nov., 1969

NUMBER: 4,229

DEPTH: 13-35 fathoms

AREA: 4A (S. Puget Sound)

AGENCY: U.W.-WSDF

CUT OFF DATE: 4/30/70

TOTAL: 39

RECOVERIES BY YEAR

AREA	69	70
6		
5E		
5D		
5C		
5B		
5A		
4B		
4A	18	21
3D		
3C		
3B		
3A		
2D		
2C		
2B		
2A		
1C		
1B		
1A		
UNK'N		
TOTAL	18	21

DISTRIBUTION OF MINUTES
TECHNICAL SUB-COMMITTEE

Technical Sub-Committee			Total
California	-	T. Jow (2)	2
Oregon	-	J. Meehan, R. Loeffel	2
Washington	-	~~D. Kauffman,~~ G. DiDonato	2
Alaska	-	C. L. Rosier (2)	2
Canada	-	C. R. Forrester, R. D. Humphreys	2
Trawl Fishery Committee			
Canada	-	M. P. Houghton (4, 2 for Ottawa)	4
U.S.	-	~~L. Verhoeven~~ (4, 2 for U.S. Gov't) John P. Harville	4
Advisors and Others			
Canada	-	K. S. Ketchen, S. J. Westrheim (2, 2 for Ottawa)	4
U.S.	-	G. R. Arnett - Calif. Fish & Game (2)	2
		R. W. Schoning - Oregon	1
		W. Hublou - Oregon	1
		T. Tollefson - Washington (2)	2
		H. A. Larkins - ~~B.C.F.~~ NMFS	1
		W. Noerenberg - Alaska	1
IPHC		S. H. Hoag	1
Spare		D. Kauffman	4 / 1
			35