# REPORT OF THE TECHNICAL SUB-COMMITTEE OF THE INTERNATIONAL TRAWL FISHERY COMMITTEE

Appointed By

The Second Conference On Coordination Of Fisheries Regulations Between

CANADA

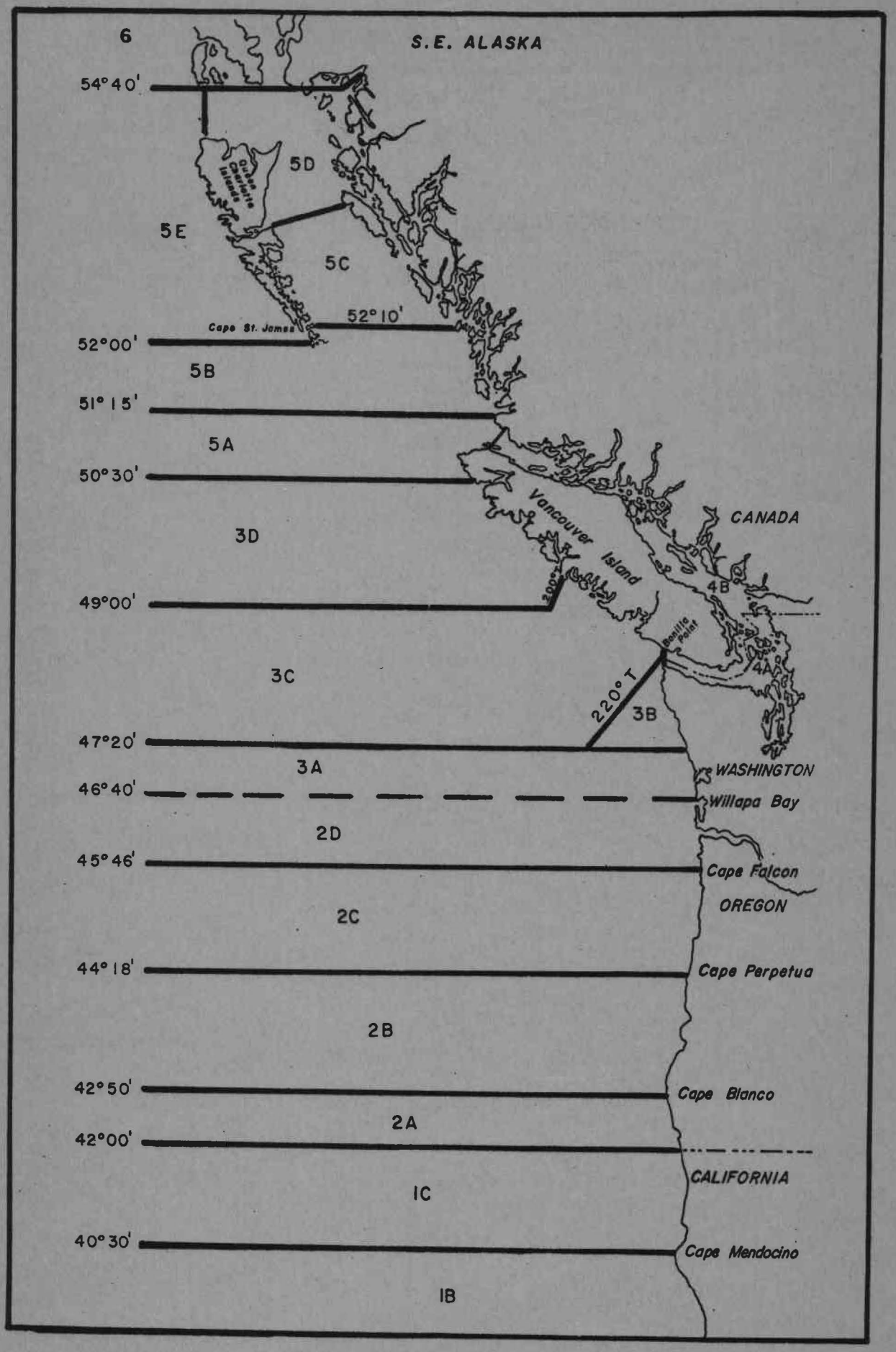
and the

UNITED STATES

MINUTES OF THE NINTH ANNUAL MEETING

JUNE 25-27, 1968

SAN FRANCISCO, CALIFORNIA




PACIFIC MARINE FISHERIES COMMISSION STATISTICAL AREAS

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Minutes of the Ninth Annual Meeting
June 25-27, 1968
San Francisco, California

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# 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

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DATE: June 25-27, 1968

PLACE: San Francisco, California

PARTICIPANTS:

| | | |
|---|---|---|
| CANADA | | C. R. Forrester |
| | | A. W. Argue |
| | | M. P. Houghton (observer) |
| UNITED STATES | | |
| | California | T. Jow - Chairman |
| | | R. J. Nitsos (observer) |
| | | P. A. Gregory (observer) |
| | | J. G. Smith (observer) |
| | Oregon | J. M. Meehan |
| | Washington | D. E. Kauffman |
| | | G. S. DiDonato |
| | PMFC | L. A. Verhoeven (observer) |

## I. CALL TO ORDER

The ninth annual meeting of the Technical Sub-Committee was called to order at 10:00 AM on June 25 by Chairman T. Jow under instructions set forth by the parent committee in 1959. The business of the meeting was guided by a prepared agenda (Appendix A).

## II. APPOINTMENT OF SECRETARY

D. E. Kauffman of Washington was appointed to act as recording secretary for the meeting.

## III. APPROVAL OF AGENDA

The agenda as circulated prior to the meeting was approved with the following modifications. A report on the status of PMFC Bulletin 7 was given under Item VII. Washington representatives requested that the

boundary line between PMFC Statistical Areas 3C and 3D as it pertained to the Esteban Deep be discussed. They also requested a brief review of methods used in compiling total effort. These topics were assigned to the agenda under Item V (Review of Data Exchange Procedure). Correspondence from the Fisheries Research Board of Canada to the Washington Department of Fisheries requested a review of the effect of lifting the minimum size limits on sole and data on the size composition of lingcod in the Washington trawl landings. Washington was prepared to discuss these items and they were accordingly assigned to Item VII (Review of Projects of Mutual Interest).

Verhoeven requested that Names of Fishes used in the PMFC Data Series be discussed under Item V.

## IV. STATUS REPORTS

### 1. Total Catch and Effort for the 1967 Trawl Fishery

The 1967 otter trawl catch by Canadian and United States fishermen from the northeastern Pacific was 170 million pounds (Table 1). Although down from the record catch of 185 million pounds in 1966, the catch exceeded the 1965 catch of 165 million pounds and the 10-year mean (57-66) of 142 million pounds. Total effort of 147,488 hours was a 0.9% decrease from the 157,735 hours in 1966.

The decline in Pacific Coast trawl production in 1967 was a result of labor and price disputes in Canada and Washington and a generally weak market which had vessels on market limits.

In British Columbia, where catches were 32% below the 1966 record year, a combination of a 4-month labor dispute and market limits placed on Pacific cod and Pacific Ocean perch, their major trawl species, had a depressing effect on the total catch of groundfish.

Table 1. Otter trawl landings from the northeastern Pacific by Canadian and United States vessels in 1966, 1967, and mean for 1957-1966 in thousands of pounds.

| | Mean | 1966 | | | | | 1967 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1957-66 | B.C. | Wash. | Ore. | Calif. | Total | B.C. | Wash. | Ore. | Calif. | Total |
| English sole | 12,207 | 1,243 | 3,692 | 3,538 | 4,841 | 13,314 | 1,448 | 4,162 | 2,304 | 5,824 | 13,738 |
| Rock sole | 4,440 | 7,235 | 1,376 | 17 | - | 8,628 | 5,697 | 1,879 | 8 | - | 7,584 |
| Petrale sole | 8,930 | 1,302 | 2,547 | 1,837 | 2,925 | 8,611 | 1,040 | 1,830 | 1,771 | 2,770 | 7,411 |
| Dover sole | 15,779 | 504 | 1,072 | 3,493 | 10,301 | 15,370 | 192 | 998 | 3,565 | 7,212 | 11,967 |
| Rex sole | 2,458 | 21 | 89 | 1,498 | 1,635 | 3,243 | 42 | 129 | 1,219 | 1,762 | 3,152 |
| Starry flounder | 1,943 | 153 | 483 | 477 | 284 | 1,397 | 239 | 1,271 | 277 | 788 | 2,575 |
| Other flatfish | 1,965 | 457 | 215 | 205 | 1,319 | 2,196 | 777 | 166 | 245 | 1,371 | 2,559 |
| Pacific cod | 20,321 | 26,803 | 9,447 | 628 | - | 36,878 | 14,552 | 8,365 | 430 | - | 23,347 |
| Lingcod | 8,103 | 4,337 | 5,739 | 993 | 586 | 11,655 | 4,159 | 5,778 | 1,067 | 737 | 11,741 |
| Sablefish | 2,798 | 684 | 245 | 68 | 2,077 | 3,074 | 306 | 182 | 67 | 1,398 | 1,953 |
| Pac. Ocean perch | 16,817 | 5,217 | 17,417 | 4,518 | 6 | 27,158 | 863 | 13,579 | 1,600 | 18 | 16,060 |
| Other rockfish | 22,005 | 542 | 9,314 | 5,068 | 8,493 | 23,417 | 500 | 6,863 | 4,061 | 8,149 | 19,573 |
| Misc. species | 4,984 | 834 | 8,641 | 12 | 339 | 9,826 | 521 | 83 | 7 | 429 | 1,040 |
| Dogfish | 3,486 | 370 | 1,381 | - | 3 | 1,754 | 124 | 3 | - | 3 | 130 |
| Animal food | 16,435 | 4,849 | 7,212 | 3,357 | 2,375 | 17,793 | 6,511 | 6,829 | 3,999 | 2,592 | 19,931 |
| Reduction | - | - | - | 79 | | 79 | - | 26,819 | 18 | - | 26,837 |
| Total | 142,671 | 54,551 | 68,870 | 25,788 | 35,184 | 184,393 | 36,971 | 78,936 | 20,638 | 33,053 | 169,598 |
| % of total catch | - | 29.6 | 37.3 | 14.0 | 19.1 | 100.0 | 21.8 | 46.5 | 12.2 | 19.5 | 100.0 |
| Total hours | NA[1/] | 28,124 | 51,837 | 23,676 | 54,098 | 157,735 | 26,483 | 49,733 | 20,183 | 51,089 | 147,488 |
| Catch/hr - lb. | NA | 1,940 | 1,329 | 1,089 | 650 | 1,169 | 1,396 | 1,587 | 1,023 | 647 | 1,150 |

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

Washington showed a 15% increase in total groundfish production over 1966 primarily due to an expansion of the coastal hake fishery and landings of hake from Puget Sound. The catch of fish for human consumption declined 12% from 1966 due to a 2-month price dispute and market limits.

In Oregon, market restrictions on petrale, English, and Dover sole and a decline in the abundance of Pacific Ocean perch dropped groundfish production 20% below 1966 and about 25% below the 10-year mean.

California trawl production showed the least change. A 6% decline from 1966 was caused chiefly by landing limits placed on Dover sole which, in effect, shifted fleet effort to English sole.

Similar to past years, the U.S. groundfish production from Alaska was insignificant.

2. Petrale Sole

a. Catch Per Effort

Total landings by U.S. and Canada were 7.4 million pounds, a decrease of 1.2 million pounds or 14% from 1966 and 17% below the 10-year mean of 8.9 million pounds.

Canada. Landings of petrale sole by British Columbia fishermen from the northern and southern stocks totaled 1.0 million pounds in 1967; about the same level of catch as has prevailed in the previous 10 years. The Canadian catch of petrale sole from the southern stock (off the lower west coast of Vancouver Island) was 265,500 pounds, about the same as in 1966. The average catch per effort (71 pounds/hr) was also not appreciably different from 1966 but much lower than the mean of 170 pounds/hr for the previous 10 years. Northern stock landings at 765,000 pounds were about 26% lower than in 1966.

Washington. Petrale landings in 1967 totaled 1.8 million pounds down 28% from 1966 and 38% from the 1957-66, 10-year mean. Southern stock catches from PMFC Area 3C are down 52% from 1966 and fishing effort decreased by 51%. Catch per hour decreased slightly from 215 pounds/hr in 1966 to 202 pounds/hr in 1967. Northern stock catches were down slightly from 1966 in spite of record-high effort expended in Queen Charlotte Sound. A 14% decline in catch per unit of effort from 1966 occurred.

Oregon. Total landings at Oregon ports were 1.8 million pounds, 3.6% less than 1966 and 9.5% less than the 10-year mean. Limits on landings during the first half of the year were primarily responsible for the decrease.

California. The 1967 landings of 2.8 million pounds were 5% below the 1966 catch and 7% below the 10-year mean. Petrale landings declined in all areas except 1C where landings increased 27% from 744,000 pounds in 1966 to 1,081,000 pounds.

b. Definition of Stocks

Analysis of recoveries from the 1962 Willapa Deep tagging study conducted by the Washington Department of Fisheries indicates that some interchange of fish occurs from year to year in deeps found on the Cape Flattery Spit and off Destruction Island and Willapa Bay. Results further indicate that petrale sole in these three spawning deeps contributed to the summer inshore fishery along the Washington Coast and the various banks off the lower west coast of Vancouver Island. This predominant inshore and northward movement generally complies with the southern stock definition given to petrale sole off British Columbia by Ketchen and Forrester, 1966[1/], particularly in its distinction from the northern stock found in PMFC Area 3D and

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

northward. The distinction of this stock from populations found off the United States Coast is not as clearly defined, however, as it is evident that some portion of the spawning populations off the Washington Coast interchange with deep water stocks off Hecata Bank (PMFC Area 2B) and as far south as waters off Eureka, California (PMFC Area 1C).

c. Winter Fishery

The 1967-68 winter fishery was the first to occur following rescindation of the winter landing restrictions by Oregon and Washington. This regulation had limited petrale sole landings to a maximum of 6,000 pounds per boat trip from December 23 to March 31. The lifting of the regulation did not result in any large-scale landings as occurred prior to the 1957 closure although some increase did occur in Washington. In Washington, 1,013,000 pounds of petrale sole were landed during the 1967-68 winter period of December through April. However, winter catches were down in both Oregon and California and there was no winter fishery for petrale sole in 1967-68 by Canadian trawl fishermen.

3. Lingcod

a. Catch Per Effort (Area 3C)

Excellent production of lingcod continued in 1967 with 11.7 million pounds landed, which was the same as in 1966.

Canada. The total Canadian trawl catch of lingcod in 1967 of 4.2 million pounds was about the same as in 1966 and 56% greater than the mean for the previous 10 years. Sixty per cent of the catch came from grounds off the west coast of Vancouver Island. Trawlers accounted for 58% of the annual lingcod catch.

In PMFC Area 3C, the catch was 1.8 million pounds, approximately the same magnitude as in 1966 and 1965. Catch/effort, based on catches by all vessels (with qualification that lingcod must have been 25% or more of the total landing) was 892 pounds/hr in 1967, which was 33% higher than the mean (672 pounds/hr) for the previous 10 years.

Washington. A total of 5.8 million pounds equalled the record year of 1966 and exceeded the 10-year mean by 41%. Major production (2.8 million pounds) came from Queen Charlotte Sound. In Washington, lingcod are harvested primarily by trawlers, averaging 87% of the landings during the 1960-66 period.

PMFC Area 3C accounted for 2.2 million pounds, a drop of 23% from 1966. A reduction in fishing effort in Area 3C in 1967 occurred even though a record catch per unit of effort of 918 pounds per hour was recorded, up 21% from 1966.

Oregon. Landings during 1967 of 1 million pounds were slightly above the 993,000 pounds landed in 1966. This level was far above the 1957-66 mean catch of 630,000 pounds.

California. The 1967 lingcod catch of 737,000 pounds was 26% greater than the 586,000-pound 1966 catch, but was 23% below the 10-year mean of 957,000 pounds. Area 1B, central California, where 410,000 pounds were taken, continued as the major lingcod area.

4. Pacific Cod

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

Pacific cod landings by U.S. and Canadian trawlers dropped drastically in 1967 to 23.7 million pounds compared to 36.8 million in 1966. Decreased landings occurred in all areas but were most significant in Canada. However, the catch still remained above the 10-year mean of 20.3 million.

Canada. Pacific cod catches with a total of 14.6 million pounds were again the dominant trawl-caught species in British Columbia. This level was about 46% below 1966 but was 20% above the mean catch for the 1957-66 period. The bulk of the catch, almost 10 million pounds, was taken in Area 5C and 5D. Market limitations severely affected the Pacific cod trawl production in 1967.

Washington. The 1967 Washington trawl catch of Pacific cod amounted to 8.7 million pounds, down 8% from 1966, however, still 9% above the 1957-66, 10-year mean. Although landings in PMFC Area 3C dropped 11% from 1966, the catch level remained significantly above the 1957-66 mean and catch/effort increased 24% over that of 1966. Puget Sound (PMFC Area 4A) trawl production of Pacific cod continued at a record high 2.4 million pounds landed. A substantial increase in effort for Pacific cod in Hecate Strait (PMFC Areas 5C and 5D) occurred in 1967 although total production of 1.2 million pounds was virtually equal to that of 1966.

Oregon. Total landings in 1967 of 430,000 pounds were 68.5% of the 1966 landings and 55.2% higher than the 10-year average.

California. No Pacific cod were landed in California in 1967.

5. Pacific Ocean Perch

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

The coastal catch of Pacific Ocean perch dropped sharply in 1967 to 16 million pounds, a decrease of 11 million pounds from 1966. Declines occurred in all areas due primarily to reduced availability of the species off Oregon and landing limitations in Washington and British Columbia due to poor markets.

Canada. Landings in 1967 amounted to 863,000 pounds, about one-sixth the amount landed in 1966 and about 38% lower than the mean annual catch from 1957 through 1966. The bulk of the catch, as usual, was taken in Queen Charlotte Sound (Areas 5A and 5B). The catch/effort in 1967 was 1,974 pounds/hr which was about 28% lower than in 1966 despite the reduced effort and catch in 1967. Intra-seasonal statistics suggest that there has been some reduction in stock available to the trawlers in Queen Charlotte Sound.

Washington. Landings of 13.6 million pounds in 1967 represented a 22% decrease from 1966 but remained 40% above the 1957-66 mean. Eighty-seven per cent of the catch came from Queen Charlotte Sound while fishing effort doubled in the Goose Island grounds compared to 1966 and catch/effort decreased 36%. A severe decline in perch landings occurred in all areas along the west coast of Vancouver Island, especially in PMFC Area 3C where production dropped 66% from 1966.

Oregon. The landings in 1967 were the lowest on record. The 1.6 million pounds landed was a decrease of 2.9 million pounds from 1966 and 72% less than the 10-year mean. The major cause of this drastic decrease seemed to be the overexploitation of the stocks.

6. English Sole

Coastwise catches were up 1 million pounds in 1967 compared to 1966. This increase was mainly due to larger California and Washington landings which offset a 1.2-million pound decline in Oregon landings.

Canada. A total catch in 1967 of 1.4 million pounds was about 6% less than the mean for the preceding 10 years.

Washington. Landings of English sole in 1967 amounted to 4.7 million pounds of which 4.2 were used for human consumption and 0.5 for animal food. Food-fish landings of English sole were up 13% from 1966 although slightly under the 1957-66 mean. The major coastal production came from PMFC Area 3B.

Oregon. Landings totaled 2.3 million pounds, sharply down from 3.5 million pounds in 1966, but the second highest year on record since 1960 and 14% above the 10-year mean. Severe market restrictions contributed to the reduced catch.

California. The 1967 catch of 5.8 million pounds was up 1 million pounds from 1966 and the largest since the 1950 catch of 8 million pounds. There was a decrease in the catch from Area 1A but catches increased in all other areas. The largest increase occurred in Area 1C. This increase reflected a shift in fishing effort from deep water to intermediate and shallow depths by the California fleet in 1967.

7. Dover Sole

The 1967 coastwide Dover sole catch of 12.0 million pounds dropped 3.4 million pounds from 1966 mainly due to a decline in California landings.

Canada. Landings in 1967 were 192,000 pounds taken principally in Area 4B (Port of San Juan area). The catch in 1966 was 504,000 pounds and the 1957-66 mean 354,000 pounds.

Washington. The 1967 landings of 1 million pounds were slightly below 1966 and 55% below the 1957-66 mean. Approximately one-half of the 1967 production was landed from the Goose Island grounds (Area 5B) and the remaining came from areas off the northern Washington coast.

Oregon. Continuing at a low level, the 1967 Dover sole catch of 3.6 million pounds was only 2% above the 1966 landing and 17% below the 10-year mean. Severe market restrictions contributed to the low landings.

California. The 1967 catch of 7.2 million pounds was the lowest catch since 1959 reflecting a decline in market demand for this species. Landings decreased 30% from the 1966 total of 10.3 million pounds and were also 19% below the 10-year mean catch of 8.9 million pounds. Catches in all areas were below those of previous years.

## V. REVIEW OF DATA EXCHANGE PROCEDURES

### 1. Formats and Procedures of Current Exchange of Data

#### a. Total Effort

A discussion of methods used in the calculation of total annual fishing effort was requested by the Washington Department of Fisheries representatives due to some uncertainty about the accuracy of their estimates. Reference was made to the computer program used by the Fisheries Research Board of Canada for total effort calculations. Since the methods of collecting effort data by the two agencies is quite similar, it was agreed that representatives of these two agencies would pursue the subject in greater detail by correspondence, if deemed necessary.

#### b. PMFC Areas 3D and 3C Boundary Line

Washington brought up the matter of fish caught in the deep water immediately south of the 3D boundary being coded to Area 3D rather than Area 3C, the actual area of catch. Apparently all Estevan Deep catches in 3C are being coded as caught in Area 3D. It was agreed that there should be no change in the boundary line between Areas 3C and 3D and the status quo maintained with each country being aware of the situation.

c. Turbot

It was suggested and agreed that the name "turbot" should be changed to "arrowtooth flounder" where used in the PMFC Data Series and all turbot catches from 1A should be changed to "mixed sole" since these are of the genus Pleuronecthes rather than Atheresthes. The 1967 supplement sheets will show this change.

2. Expansion of Data Exchange

a. Consideration of Recording Groundfish Caught in Shrimp Trawls

This matter appears to be of concern primarily to Oregon and California where from several thousand to over one-half million pounds of rockfish may be caught and landed by shrimp trawlers. It was agreed that these catch values should be circulated among the agencies and that PMFC will investigate the possibility of providing space for them in a footnote in the Groundfish Data Series.

b. Statistical Data Being Prepared for Exchange with Soviet Union

Canada expressed an interest in the data being gathered for exchange with the Soviets. No action was taken.

3. Use of PMFC Data Series

At the 1966 Sub-Committee meeting it was agreed that summaries of completed tagging experiments should be provided in the Data Series. This agreement was reconfirmed at the 1967 meeting and formats were prepared and distributed as agreed.

It was decided at the 1968 meeting that the earlier agreement to use the Data Series for tagging summaries would make the instrument extremely bulky and that the interests of the agencies would be better served if the tagging summaries were compiled separately for distribution. Therefore,

California agreed to compile the tagging summaries and distribute them to the agencies. To facilitate this compilation, each agency agreed to send to California all tagging summaries from 1955 to the present that are complete (i.e., no further recoveries expected) and also data on new and incomplete tagging experiments.

It was further agreed that the formats suggested for exchange be modified slightly next year so that the year of recovery will designate the year after tagging rather than the calendar year.

Summaries of recent taggings by agencies are presented in Appendices B through F.

4. Groundfish Species Catch Distribution by Depth (Recommendation 2, 1967 Trawl Technical Sub-Committee)

The advisability of recording the catch of groundfish by standardized depth intervals for exchange was discussed and it was agreed that although feasible, a breakdown of catch by depth would not be particularly useful. Any agency requiring an analysis of catch by depth will use its own methods.

## VI. REVIEW OF CURRENT AND PROPOSED RESEARCH

Trawl research programs continued at about the same level as in 1966 with the exception of Washington where the availability of Federal support through PL 88-309 allowed a significant expansion of staff and programs.

Canada. Research programs on Pacific Coast trawl species are carried out by the Fisheries Research Board located at Nanaimo. Their groundfish staff in 1967 consisted of four biologists and eight technicians. Two of the technical 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 Investigations and the Distant Seas Investigations.

The Near Seas Investigations has the responsibility of maintaining watch on the various stocks which support the trawl fishery in waters adjacent to British Columbia. A major portion of the work involves collection and analysis of statistics of catch and effort and routine biological sampling at Vancouver, Steveston, and Prince Rupert, the main ports of landing. Age and growth studies are being intensified on rock sole, particularly with respect to the fishery on the Cape Scott Banks off the northern end of Vancouver Island.

Further progress was made in the program to measure the effects of variation of environmental factors on the embryonic development of petrale and flathead soles. Considerably more success was achieved in carrying petrale sole eggs to hatching.

Work continued on the suitability of aging Pacific cod routinely using otoliths.

The Distant Seas Investigations completed two cruises during 1967 to investigate rockfish spawning seasons and the bathymetric distribution of ocean perch off southwest Vancouver Island, in south Queen Charlotte Sound and off Cape Ommaney, Alaska. The ocean perch spawning period appeared to be about 30 days during March-April and their bathymetric distribution ranged between 140-279 fathoms in all areas.

Washington. Two biologists and one scientific aide were added to the groundfish staff in 1967 for a total of five biologists and four scientific aides. This increase in manpower was due to funds provided by PL 88-309 contracts.

Four tagging cruises were completed in 1967 as a part of a continuing program to determine the migration and distribution patterns of the principal trawl species. Pacific cod, petrale and English sole were tagged during these cruises. Three additional tagging cruises were made in early 1968 and further tagging is planned for Pacific cod and Dover sole.

Continuing programs included routine biological sampling of the trawl catch at Blaine, Bellingham, Everett, and Seattle as well as the collection and processing of basic catch and effort statistics. A survey of the Washington trawl fleet as to vessel and gear characteristics was initiated as part of an annual program to detect changes in the fleet. An analysis of Pacific ocean perch catch and effort statistics from 1955 to present by year, season and depth was begun for major trawl areas and a series of tests on petrale sole, Pacific cod, and Pacific Ocean perch samples was initiated to determine if there was bias present in sampling procedures.

Oregon. The bottomfish staff was unchanged with four biologists and two seasonal assistants. An additional summer aide will be added in 1968.

A total of 1,494 Dover sole were tagged during cruises in November 1967 and April 1968.

Market sampling continued at about the same level in 1967. Dover, English, and petrale sole and Pacific Ocean perch were sampled for age, sex, and length composition. Late in 1967 weight and stage of maturity information was included. Animal food and Pacific Ocean perch catches were sampled for species composition. A data report was published in February 1968 containing age-length frequency data on Dover sole landed in Oregon from 1948-65 from PMFC Area 2D.

California. The bottomfish staff of five biologists has remained at the level of previous years. Seasonal help was not available in 1967 but is expected to be restored in 1968. In addition, the PL 88-309 financed Shellfish and Bottomfish Data Analysis Project reported last year is continuing.

A total of 3,369 English sole was tagged and released in PMFC Area 1B in early 1968. Tagging of Dover sole in Area 1C in conjunction with distribution studies is planned for 1969 and analyses are scheduled for completed Dover and petrale sole tagging experiments.

Market sampling continued in 1967 although the level was reduced due to less manpower. Dover, English, and petrale sole are routinely sampled for age, size, and sex composition. Animal food landings were sampled for species and size composition. In 1967, 334 flatfish and 36 animal food samples were obtained.

Data systems have been designed for bottomfish research cruise data, specialized data, and market sampling data. A study of the population dynamics of petrale sole in the Fort Bragg area was recently initiated. New trawler log books have been designed and distributed. Changes in present trawler log data processing procedures are under consideration for implementation in 1969.

Other Items. A cooperative groundfish age-reading unit was established between the State of Washington and Bureau of Commercial Fisheries at the U. S. Bureau of Commercial Fisheries Lab in Seattle to provide a team skilled in the aging of groundfish. Initial assistance on aging Pacific ocean perch otoliths was received from the Fisheries Research Board of Canada. On July 1, 1968 a PMFC-sponsored technician was added to allow petrale sole and English sole otoliths from Oregon and Washington to be read and to expand the Pacific Ocean perch reading capacity.

## VII. REVIEW OF PROJECTS OF MUTUAL INTEREST

### 1. Action on 1967 Trawl Sub-Committee Recommendations

a. Recommendation 1. "That an exchange of correspondence be initiated for determining requirements for adequate monitoring of Pacific Ocean perch and petrale sole stocks." - Correspondence was exchanged between Canada and the U. S. agencies. Washington's reply explained their present procedures and outlined current problems and mutually beneficial studies. Washington indicated that it has initiated an increased sampling program on petrale and ocean perch and will begin a program of aging petrale sole on

a current basis. Canada is of the opinion that definition of adequate monitoring programs is not possible with the present status of knowledge of the two species and suggested that the agencies continue their present sampling programs.

b. Recommendation 2. "That agencies examine feasibility of determining depth distribution of catch for all species and be prepared to determine a satisfactory breakdown at next year's meeting."

The committee agreed that although feasible, a breakdown of catch by depth would not be particularly useful and each agency will use its own methods if such an analysis is required.

c. Recommendation 3. "That a standardized technique for age determination of Pacific ocean perch be studied."

A cooperative age-reading unit has been established in Washington State (see Item VI, Other Items) with consultation on Pacific Ocean perch aging received from Fisheries Research Board of Canada personnel. Otolith samples have been exchanged with Canada and readings compared. It was agreed that progress is being made and that a further exchange of Pacific Ocean perch and in addition petrale sole otolith samples should take place between the Fisheries Research Board of Canada and the U. S. age-reading unit for agreement comparison.

d. Recommendation 4. "Reaffirmation of Sub-Committee recommendations 2 and 3 of the seventh annual meeting that all agencies submit for inclusion in the PMFC Data Series tagging summaries of terminated experiments and inventories of all tagging experiments."

Formats for tagging data summaries and inventories of tagging experiments were prepared and distributed to Sub-Committee members for approval.

e. Recommendation 5. "That computer programs and card design be exchanged among agencies with each agency listing the titles and language of available programs."

Lists of computer programs in use were exchanged between agencies. It was agreed that any agency wishing a print out of a program in use should write to the agency for a copy.

2. Pacific Hake

Washington presented a report on the 1967 hake fishery off the Washington coast and the 1967-68 winter fishery in Puget Sound. In Puget Sound the 1967-68 hake landings may reach 8 million pounds, down from the 10.7 million landed in 1966-67. Fishing success was poorer because fewer boats were equipped with telemetry gear for controlling their net and in addition market demand and prices were down from the previous season. Off the Washington coast, the 1967 hake fishery landings totaled 19.3 million pounds. The fishermen were experiencing excellent fishing from late May until they ceased fishing August 5 simultaneously with the termination of the daily vessel guarantee provided by the Federal Government. The 12-mile limit law and U.S.-Soviet fishing agreement have eliminated much of the conflicts in the coastal hake fishery. The large Soviet fleet landed an estimated 300 million pounds of hake from coastal waters off northern California to northern Washington in 1967. It was announced that no U. S. coastal hake fishery will occur in 1968 since the $20 per ton offered to the fishermen was insufficient to attract sufficient vessels to begin a productive operation.

Following the discussion of the hake fishery, the Sub-Committee agreed that it is of international concern but not with respect to the Technical Sub-Committee.

3. Status of PMFC Bulletin 7

Verhoeven reported that PMFC Bulletin 7, which is devoted entirely to reports on groundfish studies, should be ready for publication late in 1968. An addenda to the groundfish bibliography was distributed by Washington.

4. Effect of Lifting Minimum Size Limits on Petrale, English, and Dover Sole and the Size Composition of Lingcod in Washington Trawl Landings

Washington presented length frequencies of English and Dover sole from port sampling to show that very few fish are brought in below 11.5 to 12 inches. Significant changes in Washington State trawl regulations and groundfish utilization restrictions were implemented November 15, 1967. Discussion on the effects of these regulation changes which ensued was primarily centered on the elimination of utilization restrictions on virtually all species and rescinding of minimum size limits on petrale, Dover, and English sole. Very little change in the size composition of the landings or in utilization has been observed to the present time.

Data on the size composition of lingcod landed in Washington in the spring of 1968 were presented which showed that approximately 10% to 20% of the landings from Queen Charlotte Islands and the lower west coast of Vancouver Island were composed of sizes below the present minimum in Canada. Virtually all of these fish were utilized for human consumption.

A synopsis of the Washington trawl regulations will be included in the 1968 PMFC data series.

5. Proposals for New Projects

It was agreed that Canada and Washington would exchange petrale sole otoliths for comparing age determinations to aid in the joint monitoring of the status of this species.

VIII. INTERNATIONAL PROBLEMS

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

Canada reported that a noticeable reduction in foreign fleet activities occurred off British Columbia in the past year. Presently about two vessels are fishing off the upper end of the Queen Charlotte Islands, both Soviet and Japanese. Russia appears to be recognizing Canada's 12-mile limit but Japan does not. It was noted that a Russian freighter was loading produce and supplies in Canada and supplying vessels off Washington. The Japanese are longlining for blackcod and trawling for perch off Queen Charlotte Sound.

During June 1968 Oregon reported 40-50 foreign trawlers off the coast and that stern trawlers are replacing side trawlers. Estimates of Soviet catches given were:

1967 Soviet Catch off U. S. Pacific Coast - About 196,000 Metric Tons.

| | | |
|---|---|---|
| Washington-Oregon | | 120,000 M.T. |
| Pacific hake | 112,500 M.T. | |
| Pacific Ocean perch | 7,500 M.T. | |
| California | | 73,000 M.T. |
| Pacific hake | 40-50,000 M.T. | |
| Rockfish species (balance of total) | 23,000 M.T. | |

1967 Soviet catch off Mexico - About 20,000 Metric Tons.

These figures represent the first 11 months of 1967. A minor variation in the final catch statistics may change the totals. Source was Bureau of Commercial Fisheries Market News Service.

B. Recent Development in Fisheries Agreements Concerning West Coast Groundfish Fisheries

The current status of the existing agreement with the Soviet Union was reviewed. A negotiations meeting with the Soviets in December 1967 in

Washington, D. C. resulted in the renewal of the February 1967 fishing agreement for one more year. A meeting of scientists of the two countries was held in Seattle in July 1967. Exchange of biological and statistical data and certain cooperative research programs on Pacific hake and Pacific Ocean perch was agreed upon pending formal approval by the governments of both countries.

It was announced that the Japanese have agreed verbally to observe the restricted areas established under the February 1967 U. S.-Soviet fishing agreement.

C. Recommendations for Cooperative Programs for the Conservation of Joint Stocks which are Exploited by Foreign Fleets

Although there were no new cooperative programs recommended, the Sub-Committee reaffirmed the desirability of continuing to monitor ocean perch and petrale stocks and to exchange sampling data with special emphasis on the winter petrale sole fishery and the establishment of uniform aging techniques for petrale sole.

IX. NEW PROPOSALS FOR TRAWL REGULATIONS

No proposals for new trawl regulations were advanced by Canada or the U. S. Oregon reported that her trawl industry and fishermen have requested a relaxation in the incidental catch limits on sole. No action has been taken. In California there are bills in the legislature proposing to open some inshore areas (waters inside 3 miles from shore) to trawling.

Washington also reported that it is studying the possibility of a mesh size change for trawl cod ends in Puget Sound and the Strait of Juan de Fuca.

X. OTHER BUSINESS

The Sub-Committee agreed to some changes in the tables of the PMFC Data Series. In the table listing animal food the Pacific sand dab would

be listed as a separate species and flathead sole would be included under mixed sole. In place of scrapfish, a miscellaneous heading would be provided.

XI. NEW BUSINESS

The projected opening of the new $ 1 million fish meal reduction plant on the Makah Indian Reservation at Neah Bay, Washington was discussed. The company is financed through a $791,000 combination loan and grant approved through the Economic Development Administration. Present plans are to utilize any and all combinations of fish species delivered to the plant. The Washington Department of Fisheries will monitor the landings as to species composition and obtain biological data such as length and age on the principal species being processed.

XII. RECOMMENDATIONS

A. Future Work, for Sub-Committee Action

The Sub-Committee recommends:

1. that the impending expansion of the multiple-use fishery be monitored and reported on at the next meeting;

2. that the agencies continue to exchange any new computer program useful in groundfish studies.

B. Recommendations to Parent Committee

1. The Technical Sub-Committee acknowledges the expansion of the groundfish programs in the United States in recent years and reaffirms Recommendation 2 of the 1966 Annual Meeting to the Parent Committee wherein the inadequacy of current knowledge of important stocks is emphasized as well as the need for "intensification of research programs to provide the necessary information for precise assessments of the various species involved".

2. The Technical Sub-Committee reaffirms Recommendation 3 of the 1967 Annual Meeting to the Parent Committee which "recommends that the International Trawl Fishery Committee should attempt to obtain data on catch by species and effort expended by nationals, other than those of Canada and the United States, fishing off the West Coast of the United States and Canada".

XIII. SCHEDULE OF MEETINGS

A. Parent Committee

The International Trawl Fishery Committee will meet the afternoon of November 20, 1968 at Coeur d'Alene, Idaho.

B. Technical Sub-Committee

The tenth annual meeting will be held in Seattle, Washington during June 1969.

XIV. ELECTION OF CHAIRMAN

C. R. Forrester, Fisheries Research Board of Canada, was elected Chairman.

XV. ADJOURNMENT

The Meeting was adjourned at 12:00 PM June 1968.

XVI. APPENDICES

A. Agenda

B. Summaries of Recent Tagging of Petrale Sole

C. Summaries of Recent Tagging of English Sole

D. Summaries of Recent Tagging of Dover Sole

E. Summaries of Recent Tagging of Pacific Cod

F. Summary of Recent Tagging of Lingcod

AGENDA AS ADOPTED
TECHNICAL SUB-COMMITTEE OF THE
INTERNATIONAL TRAWL FISHERY COMMITTEE
SAN FRANCISCO JUNE 1968

9TH ANNUAL MEETING

I. CALL TO ORDER

II. APPOINTMENT OF SECRETARY

III. APPROVAL OF AGENDA

IV. STATUS REPORTS

1. Total Catch and Effort for the 1967 Trawl Fishery
2. Petrale Sole
   a. Catch/Effort
   b. Definition of Stocks
   c. Winter Fishery (± 100 Fathoms)
3. Lingcod
   a. Catch/Effort (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. Formats and Procedures of Current Exchanges of Data
   a. Total Effort
   b. PMFC Areas 3D and 3C Boundary Line
   c. Turbot
2. Expansion of Data Exchange
   a. Consideration of Recording Groundfish Caught in Shrimp Trawls.
   b. Statistical Data Being Prepared for Exchange with Soviet Union.
3. Use of PMFC Data Series
4. Groundfish Species Catch Distribution by Depth (1967 T.S.C. Recommendation 2)

VI. REVIEW OF CURRENT AND PROPOSED RESEARCH

1. Tagging
2. Biological Studies
3. Sampling Program
4. Special Projects (IDS & US PL 88-309)
5. Other Studies

VII. REVIEW OF PROJECTS OF MUTUAL INTEREST

1. Action on 1967 TSC Recommendations
   a. Recommendation 1. Monitoring of mutually exploited stocks of petrale and Pacific Ocean perch.
   b. Recommendation 2. Depth distribution of catch for all species.
   c. Recommendation 3. Standardized technique for age determination of Pacific Ocean perch.
   d. Recommendation 4. Tagging data for inclusion in PMFC Data Series.
   e. Recommendation 5. Exchange of titles and languages of computer programs.
2. Hake
3. Status of PMFC Bulletin 7
4. Effects of Changes in Washington's Trawl Regulations.
5. Proposal for New Projects

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 Concerning West Coast Groundfish Fisheries
3. Recommendations for Cooperative Programs for the Conservation of Joint Stocks Which Are Exploited by Foreign Fleets

IX. NEW PROPOSALS FOR TRAWL REGULATIONS

X. OTHER BUSINESS

XI. NEW BUSINESS

XII. RECOMMENDATIONS

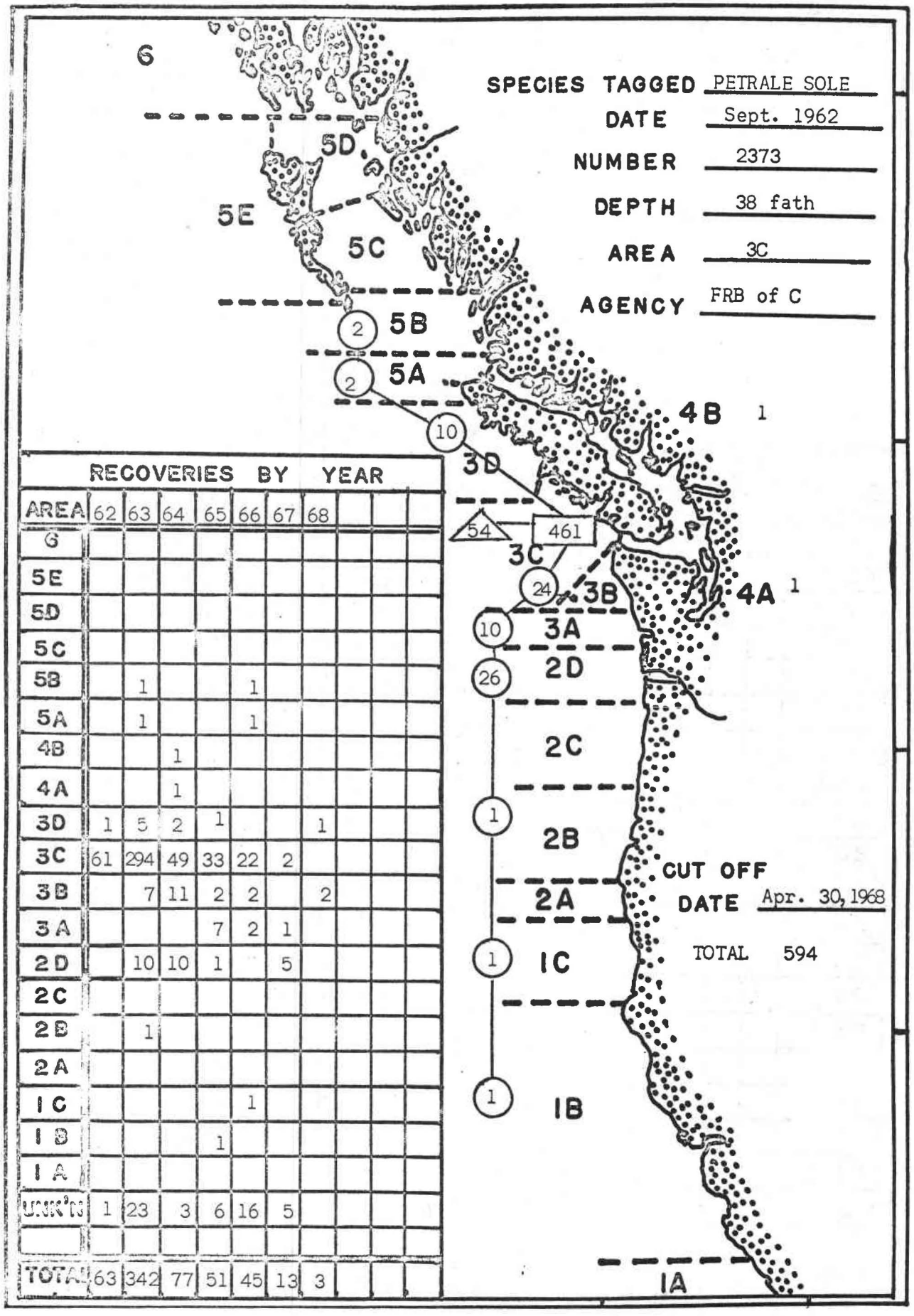
1. Future Work
2. Parent Committee

XIII. SCHEDULE OF MEETINGS

1. Parent Committee Meeting
2. 10th Annual Meeting of Technical Sub-Committee

XIV. ELECTION OF CHAIRMAN

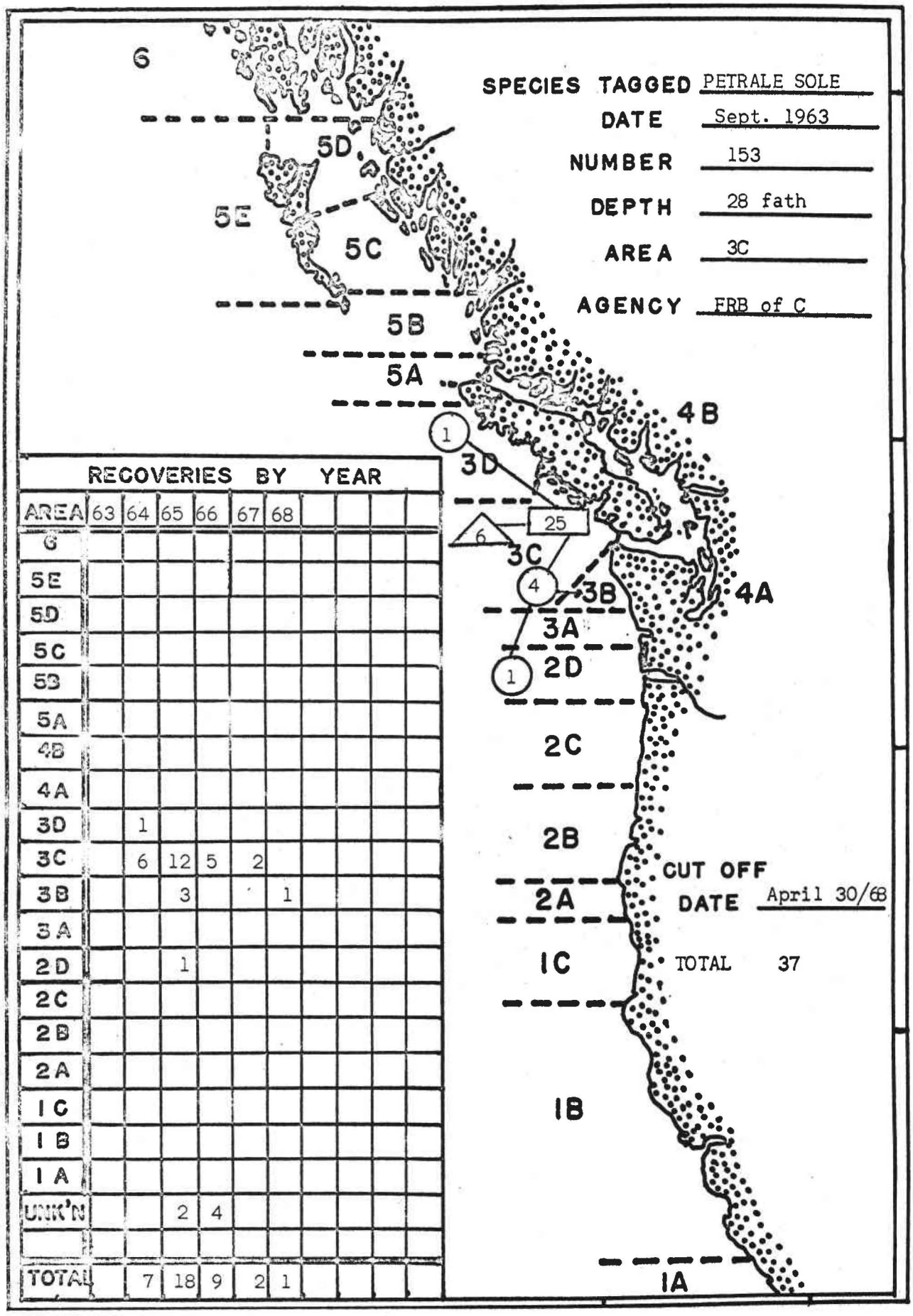
XV. ADJOURNMENT




RECOVERIES BY YEAR

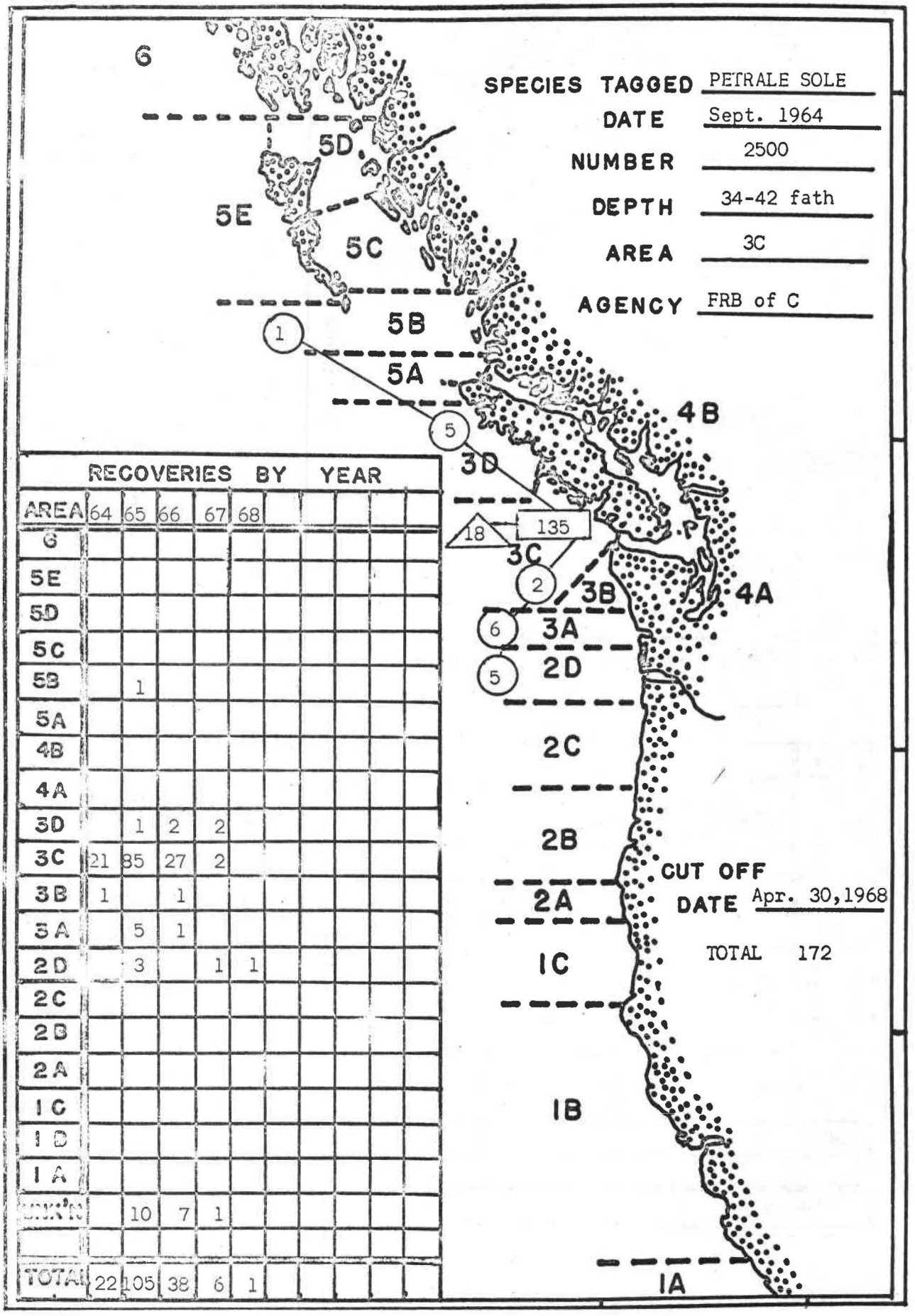
| AREA | 62 | 63 | 64 | 65 | 66 | 67 | 68 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | | | | | | | | | | |
| 5C | | | | | | | | | | |
| 5B | | 1 | | | 1 | | | | | |
| 5A | | 1 | | | 1 | | | | | |
| 4B | | | 1 | | | | | | | |
| 4A | | | 1 | | | | | | | |
| 3D | 1 | 5 | 2 | 1 | | | 1 | | | |
| 3C | 61 | 294 | 49 | 33 | 22 | 2 | | | | |
| 3B | | 7 | 11 | 2 | 2 | | 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 | 51 | 45 | 13 | 3 | | | |

Appendix B-2




RECOVERIES BY YEAR

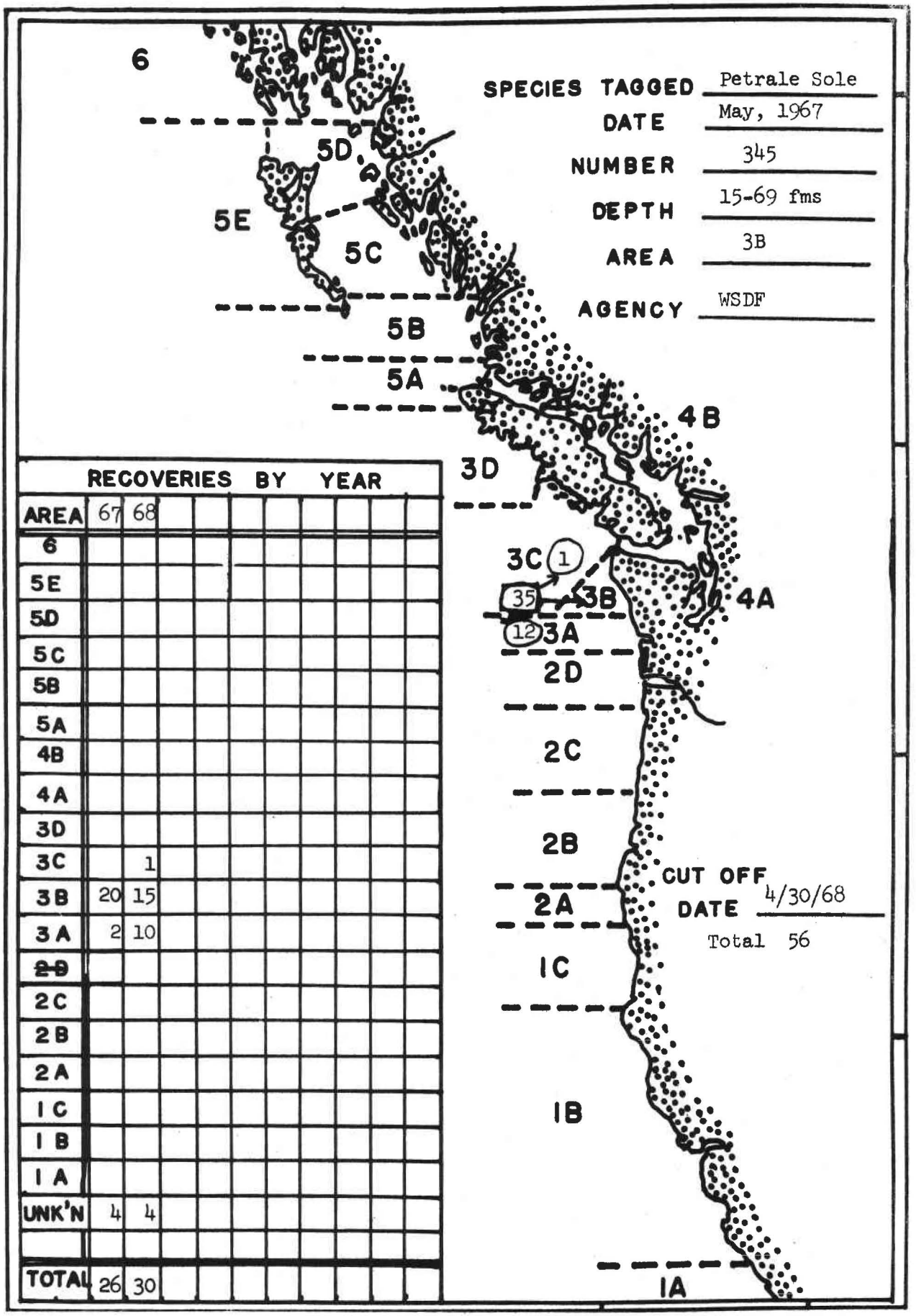
| AREA | 63 | 64 | 65 | 66 | 67 | 68 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | | | | | | | | | | |
| 5C | | | | | | | | | | |
| 5B | | | | | | | | | | |
| 5A | | | | | | | | | | |
| 4B | | | | | | | | | | |
| 4A | | | | | | | | | | |
| 3D | | 1 | | | | | | | | |
| 3C | | 6 | 12 | 5 | 2 | | | | | |
| 3B | | | 3 | | | 1 | | | | |
| 3A | | | | | | | | | | |
| 2D | | | 1 | | | | | | | |
| 2C | | | | | | | | | | |
| 2B | | | | | | | | | | |
| 2A | | | | | | | | | | |
| 1C | | | | | | | | | | |
| 1B | | | | | | | | | | |
| 1A | | | | | | | | | | |
| UNK'N | | | 2 | 4 | | | | | | |
| | | | | | | | | | | |
| TOTAL | | 7 | 18 | 9 | 2 | 1 | | | | |




RECOVERIES BY YEAR

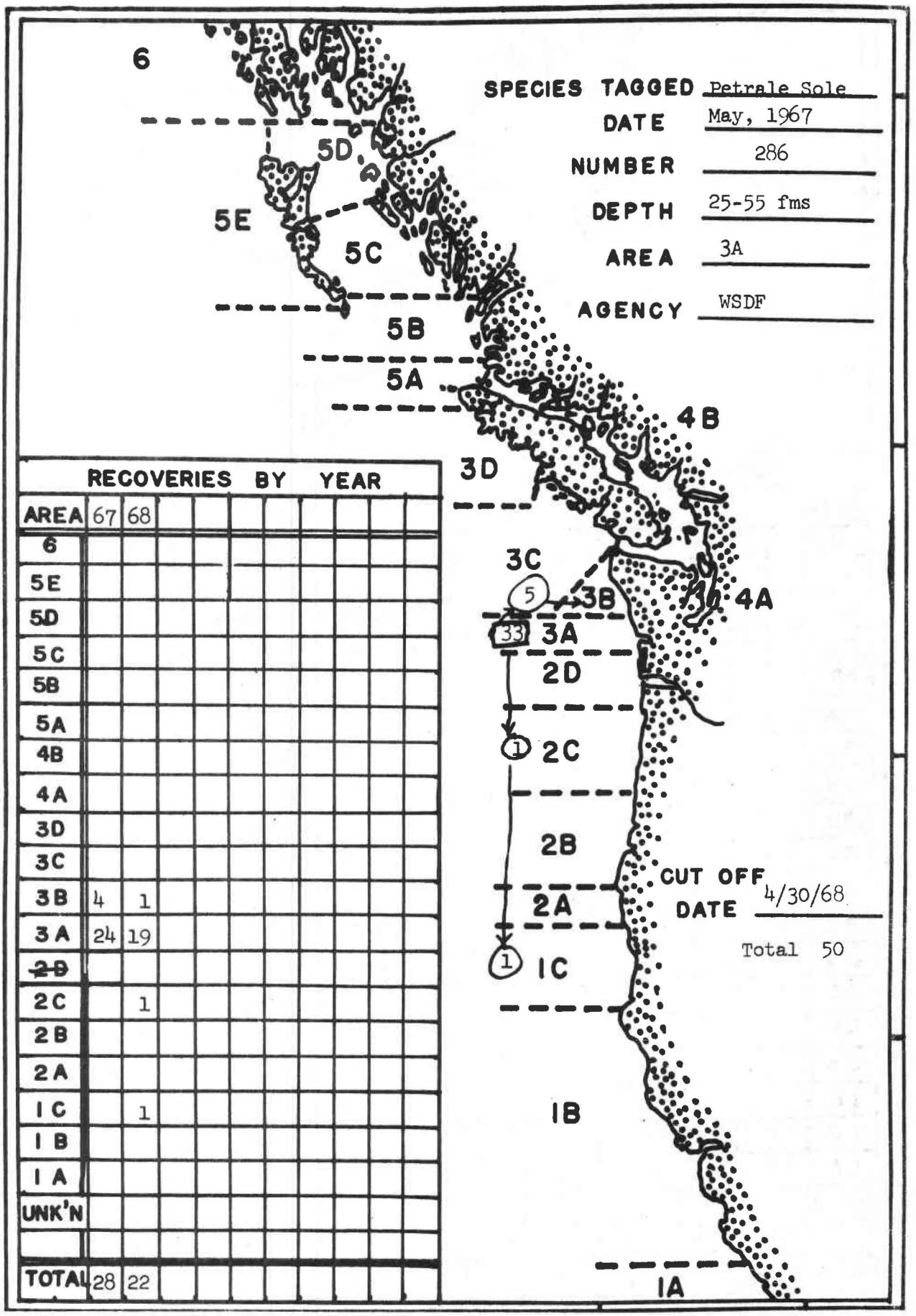
| AREA | 64 | 65 | 66 | 67 | 68 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | | | | | | | | | | |
| 5C | | | | | | | | | | |
| 5B | | 1 | | | | | | | | |
| 5A | | | | | | | | | | |
| 4B | | | | | | | | | | |
| 4A | | | | | | | |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

Appendix B-4




RECOVERIES BY YEAR

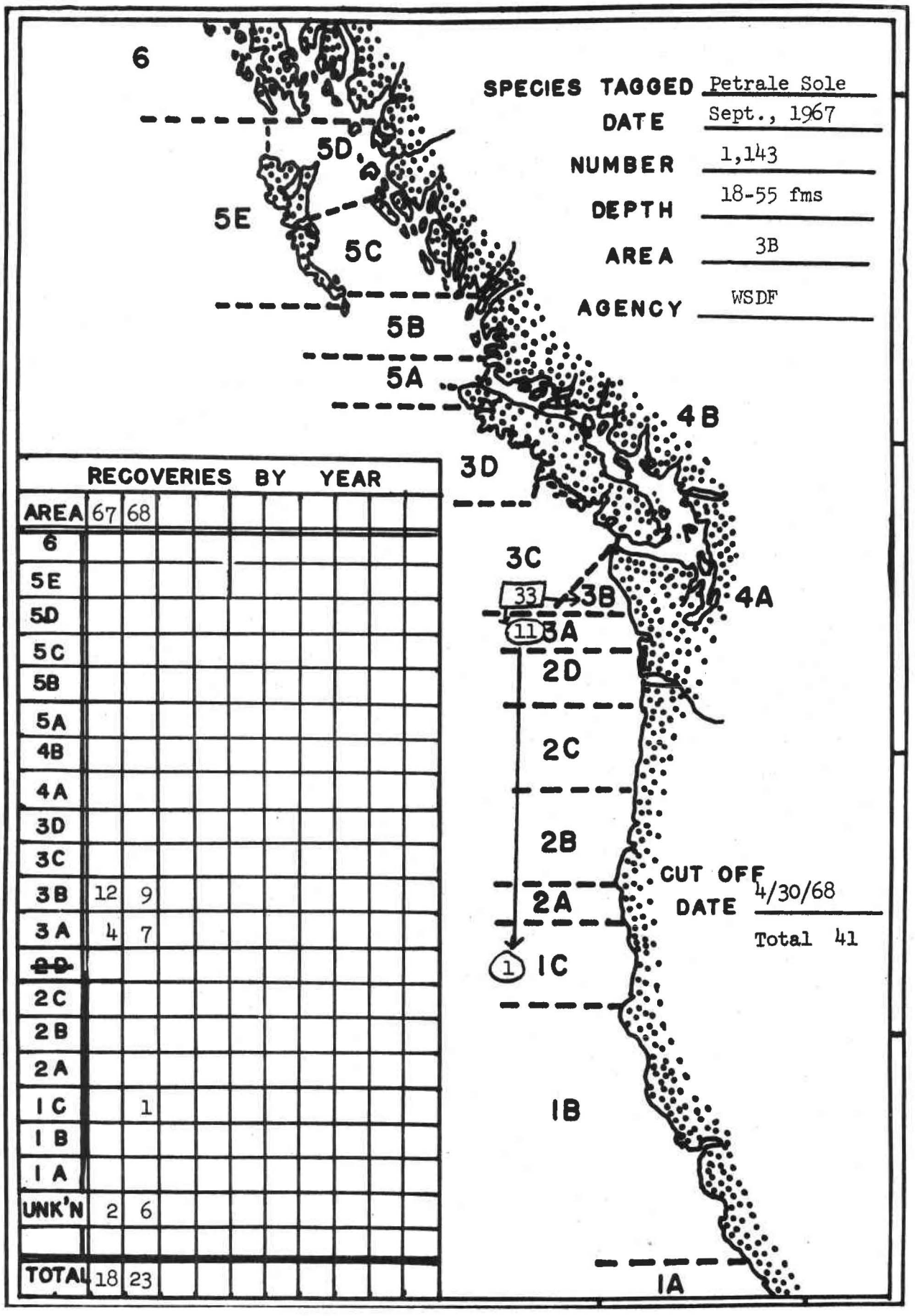
| AREA | 67 | 68 |
|---|---|---|
| 6 | | |
| 5E | | |
| 5D | | |
| 5C | | |
| 5B | | |
| 5A | | |
| 4B | | |
| 4A | | |
| 3D | | |
| 3C | | 1 |
| 3B | 20 | 15 |
| 3A | 2 | 10 |
| ~~2B~~ | | |
| 2C | | |
| 2B | | |
| 2A | | |
| 1C | | |
| 1B | | |
| 1A | | |
| UNK'N | 4 | 4 |
| | | |
| TOTAL | 26 | 30 |




RECOVERIES BY YEAR

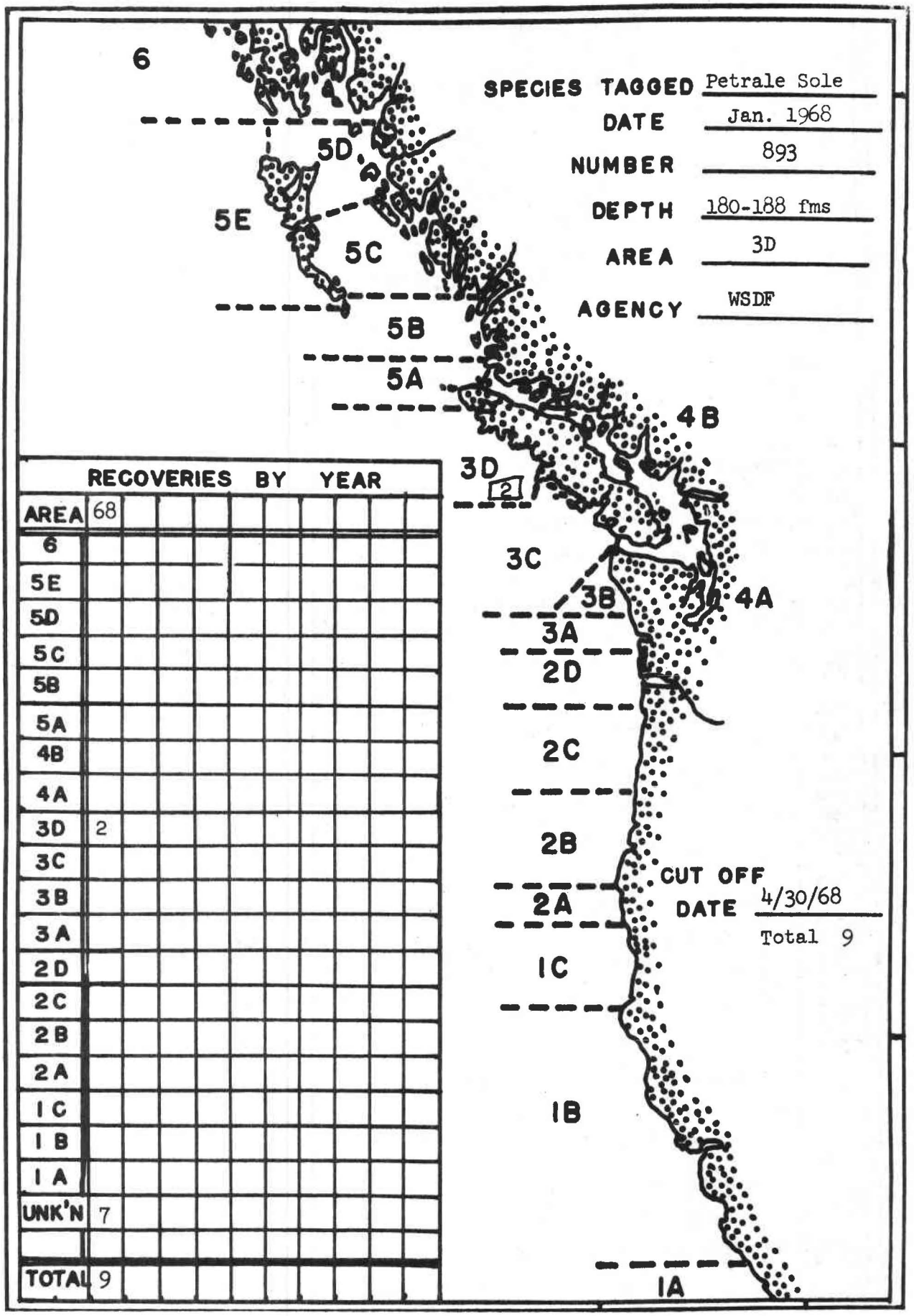
| AREA | 67 | 68 |
|---|---|---|
| 6 | | |
| 5E | | |
| 5D | | |
| 5C | | |
| 5B | | |
| 5A | | |
| 4B | | |
| 4A | | |
| 3D | | |
| 3C | | |
| 3B | 4 | 1 |
| 3A | 24 | 19 |
| ~~2D~~ | | |
| 2C | | 1 |
| 2B | | |
| 2A | | |
| 1C | | 1 |
| 1B | | |
| 1A | | |
| UNK'N | | |
| | | |
| TOTAL | 28 | 22 |

Appendix B-6



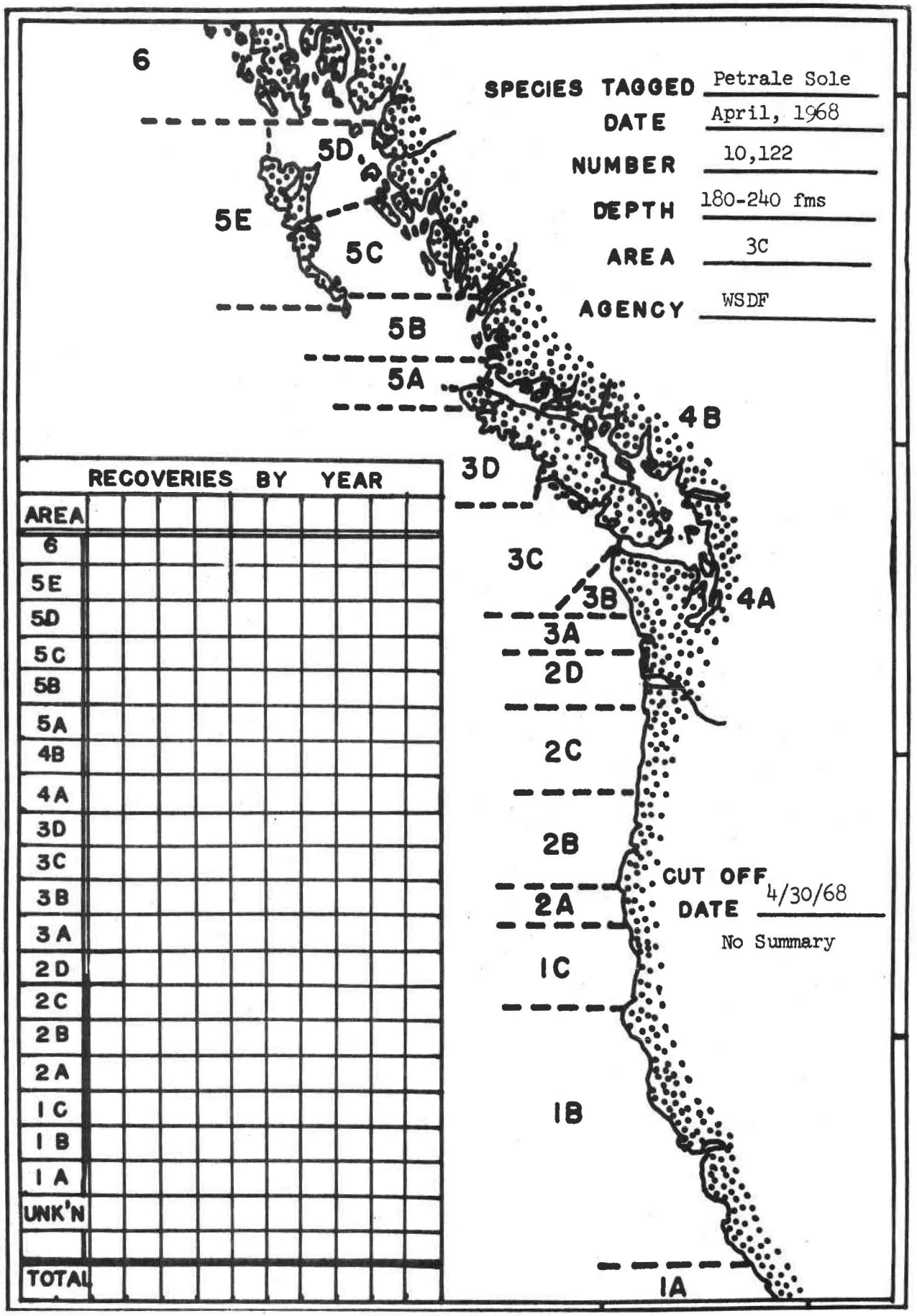

RECOVERIES BY YEAR

| AREA | 67 | 68 |
|---|---|---|
| 6 | | |
| 5E | | |
| 5D | | |
| 5C | | |
| 5B | | |
| 5A | | |
| 4B | | |
| 4A | | |
| 3D | | |
| 3C | | |
| 3B | 12 | 9 |
| 3A | 4 | 7 |
| ~~00~~ | | |
| 2C | | |
| 2B | | |
| 2A | | |
| 1C | | 1 |
| 1B | | |
| 1A | | |
| UNK'N | 2 | 6 |
| | | |
| TOTAL | 18 | 23 |

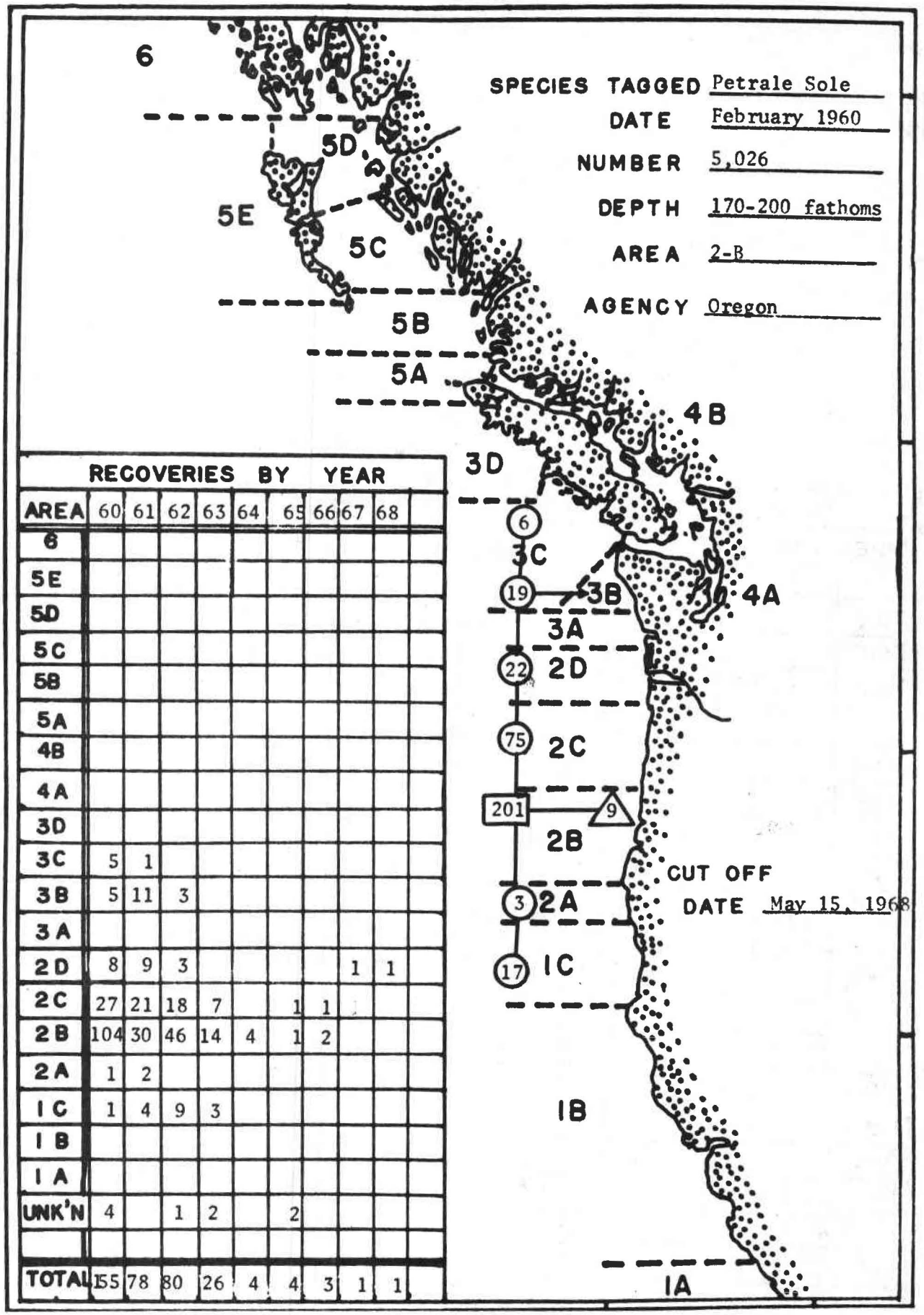



| RECOVERIES BY YEAR | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AREA | 68 | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 5E | | | | | | | | | | | |
| 5D | | | | | | | | | | | |
| 5C | | | | | | | | | | | |
| 5B | | | | | | | | | | | |
| 5A | | | | | | | | | | | |
| 4B | | | | | | | | | | | |
| 4A | | | | | | | | | | | |
| 3D | 2 | | | | | | | | | | |
| 3C | | | | | | | | | | | |
| 3B | | | | | | | | | | | |
| 3A | | | | | | | | | | | |
| 2D | | | | | | | | | | | |
| 2C | | | | | | | | | | | |
| 2B | | | | | | | | | | | |
| 2A | | | | | | | | | | | |
| 1C | | | | | | | | | | | |
| 1B | | | | | | | | | | | |
| 1A | | | | | | | | | | | |
| UNK'N | 7 | | | | | | | | | | |
| | | | | | | | | | | | |
| TOTAL | 9 | | | | | | | | | | |

Appendix B-8

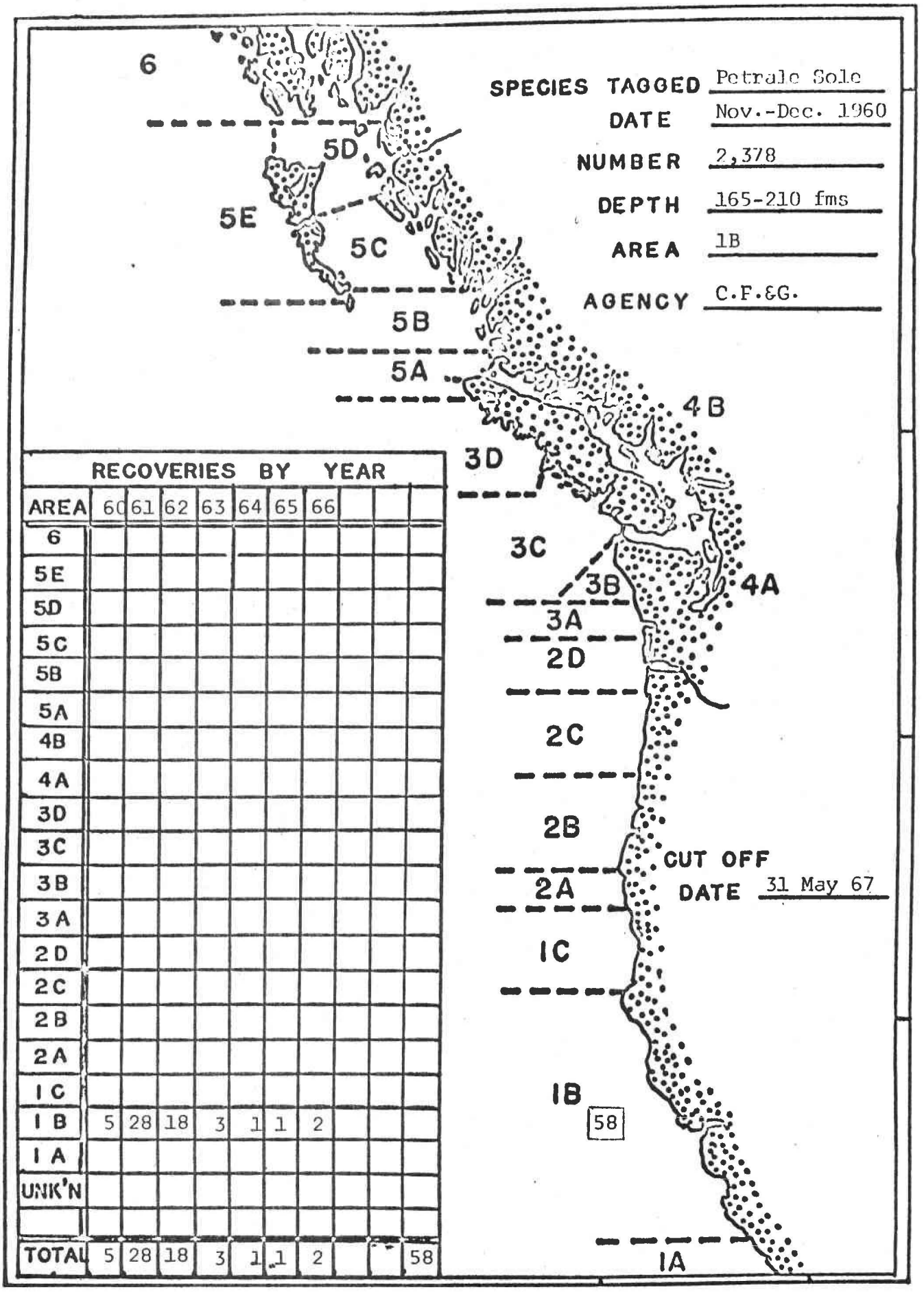



| RECOVERIES BY YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AREA | | | | | | | | | | |
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | | | | | | | | | | |
| 5C | | | | | | | | | | |
| 5B | | | | | | | | | | |
| 5A | | | | | | | | | | |
| 4B | | | | | | | | | | |
| 4A | | | | | | | | | | |
| 3D | | | | | | | | | | |
| 3C | | | | | | | | | | |
| 3B | | | | | | | | | | |
| 3A | | | | | | | | | | |
| 2D | | | | | | | | | | |
| 2C | | | | | | | | | | |
| 2B | | | | | | | | | | |
| 2A | | | | | | | | | | |
| 1C | | | | | | | | | | |
| 1B | | | | | | | | | | |
| 1A | | | | | | | | | | |
| UNK'N | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | | | | | |



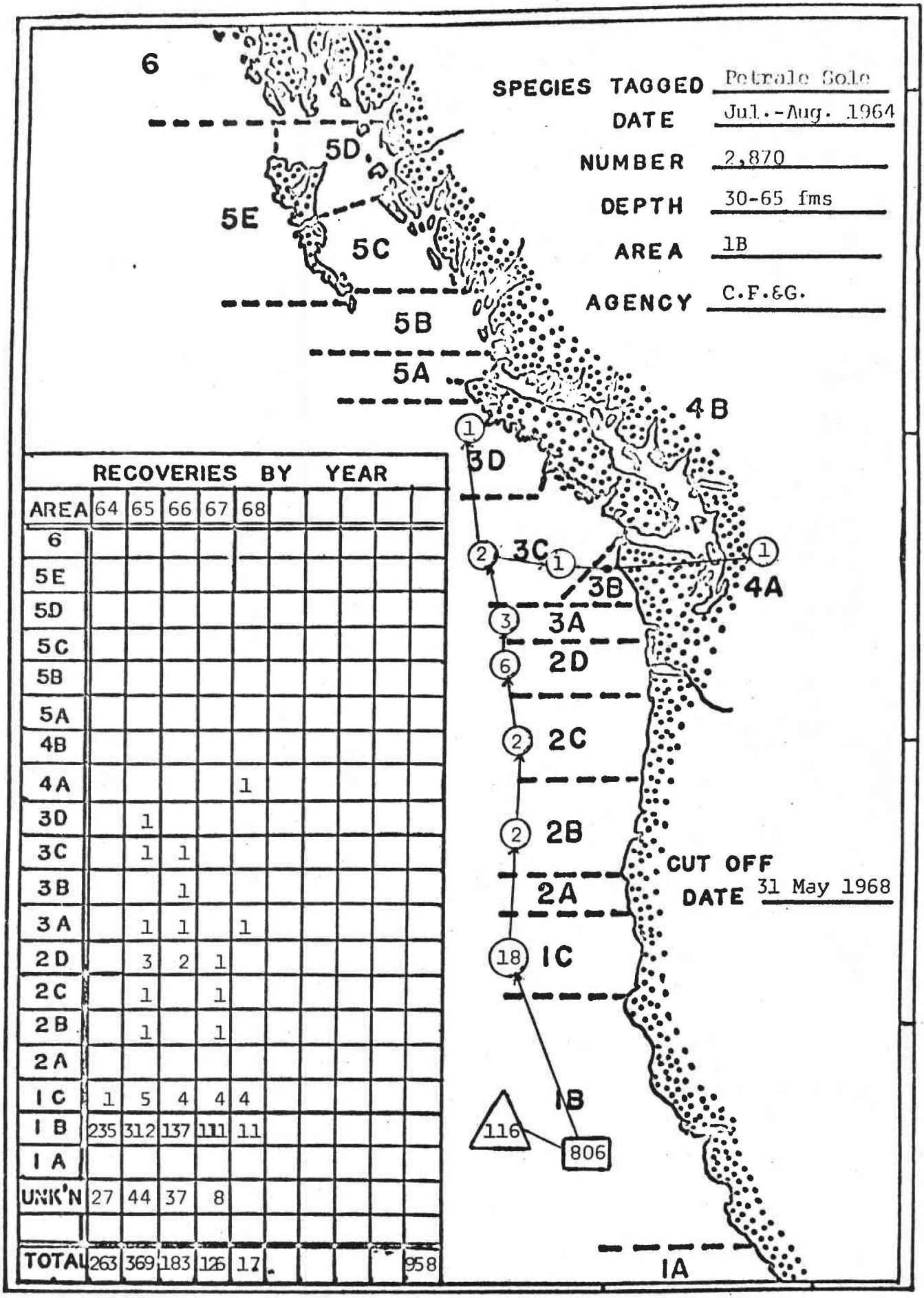

RECOVERIES BY YEAR

| AREA | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | | | | | | | | | | |
| 5C | | | | | | | | | | |
| 5B | | | | | | | | | | |
| 5A | | | | | | | | | | |
| 4B | | | | | | | | | | |
| 4A | | | | | | | | | | |
| 3D | | | | | | | | | | |
| 3C | 5 | 1 | | | | | | | | |
| 3B | 5 | 11 | 3 | | | | | | | |
| 3A | | | | | | | | | | |
| 2D | 8 | 9 | 3 | | | | | 1 | 1 | |
| 2C | 27 | 21 | 18 | 7 | | 1 | 1 | | | |
| 2B | 104 | 30 | 46 | 14 | 4 | 1 | 2 | | | |
| 2A | 1 | 2 | | | | | | | | |
| 1C | 1 | 4 | 9 | 3 | | | | | | |
| 1B | | | | | | | | | | |
| 1A | | | | | | | | | | |
| UNK'N | 4 | | 1 | 2 | | 2 | | | | |
| | | | | | | | | | | |
| TOTAL | 155 | 78 | 80 | 26 | 4 | 4 | 3 | 1 | 1 | |



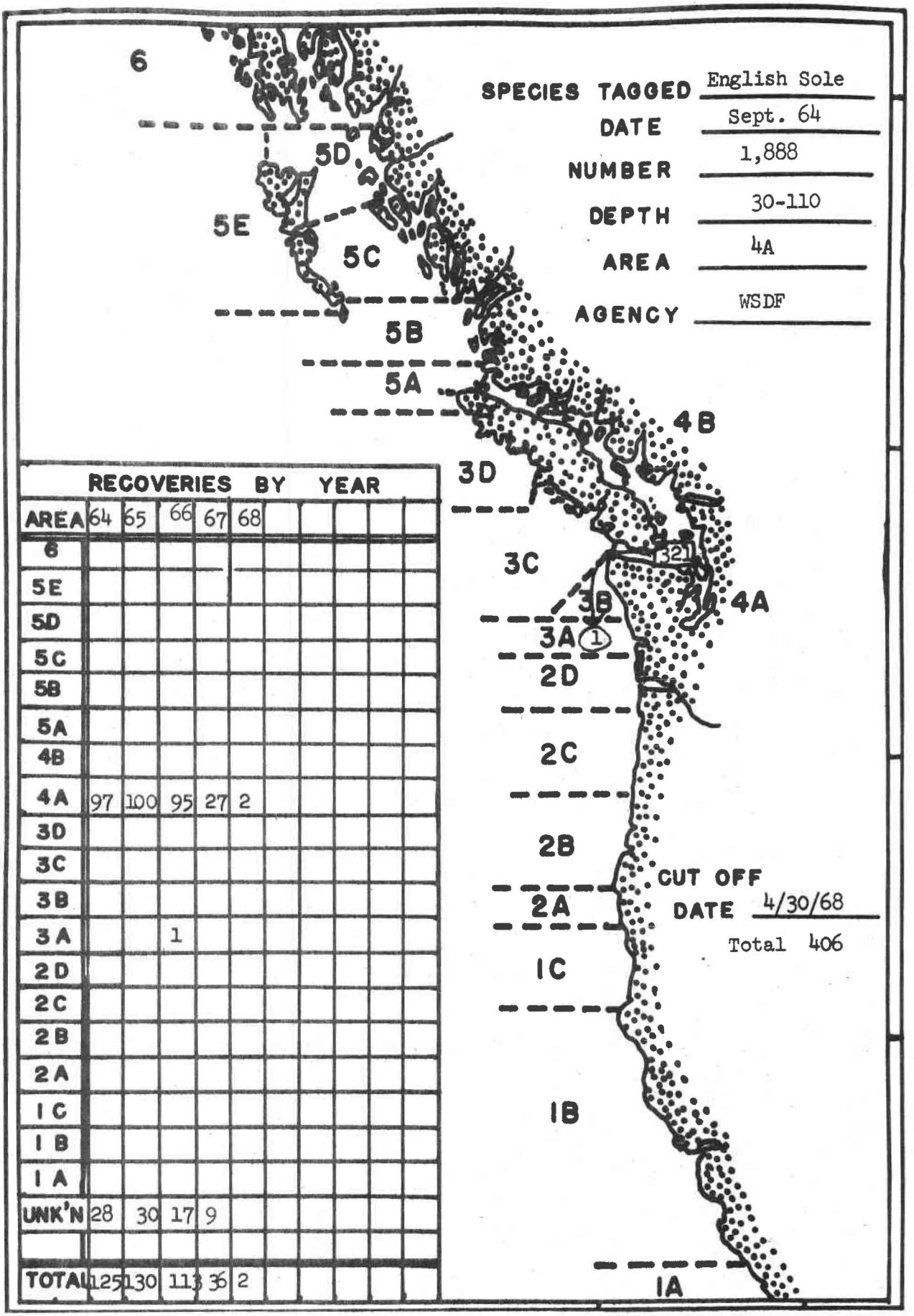

RECOVERIES BY YEAR

| AREA | 60 | 61 | 62 | 63 | 64 | 65 | 66 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | | | | | | | | | | |
| 5C | | | | | | | | | | |
| 5B | | | | | | | | | | |
| 5A | | | | | | | | | | |
| 4B | | | | | | | | | | |
| 4A | | | | | | | | | | |
| 3D | | | | | | | | | | |
| 3C | | | | | | | | | | |
| 3B | | | | | | | | | | |
| 3A | | | | | | | | | | |
| 2D | | | | | | | | | | |
| 2C | | | | | | | | | | |
| 2B | | | | | | | | | | |
| 2A | | | | | | | | | | |
| 1C | | | | | | | | | | |
| 1B | 5 | 28 | 18 | 3 | 1 | 1 | 2 | | | |
| 1A | | | | | | | | | | |
| UNK'N | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 5 | 28 | 18 | 3 | 1 | 1 | 2 | | | 58 |




RECOVERIES BY YEAR

| AREA | 64 | 65 | 66 | 67 | 68 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | | | | | | | | | | |
| 5C | | | | | | | | | | |
| 5B | | | | | | | | | | |
| 5A | | | | | | | | | | |
| 4B | | | | | | | | | | |
| 4A | | | | | 1 | | | | | |
| 3D | | 1 | | | | | | | | |
| 3C | | 1 | 1 | | | | | | | |
| 3B | | | 1 | | | | | | | |
| 3A | | 1 | 1 | | 1 | | | | | |
| 2D | | 3 | 2 | 1 | | | | | | |
| 2C | | 1 | | 1 | | | | | | |
| 2B | | 1 | | 1 | | | | | | |
| 2A | | | | | | | | | | |
| 1C | 1 | 5 | 4 | 4 | 4 | | | | | |
| 1B | 235 | 312 | 137 | 111 | 11 | | | | | |
| 1A | | | | | | | | | | |
| UNK'N | 27 | 44 | 37 | 8 | | | | | | |
| | | | | | | | | | | |
| TOTAL | 263 | 369 | 183 | 126 | 17 | | | | | 958 |




SPECIES TAGGED: English Sole
DATE: Sept. 64
NUMBER: 1,888
DEPTH: 30-110
AREA: 4A
AGENCY: WSDF

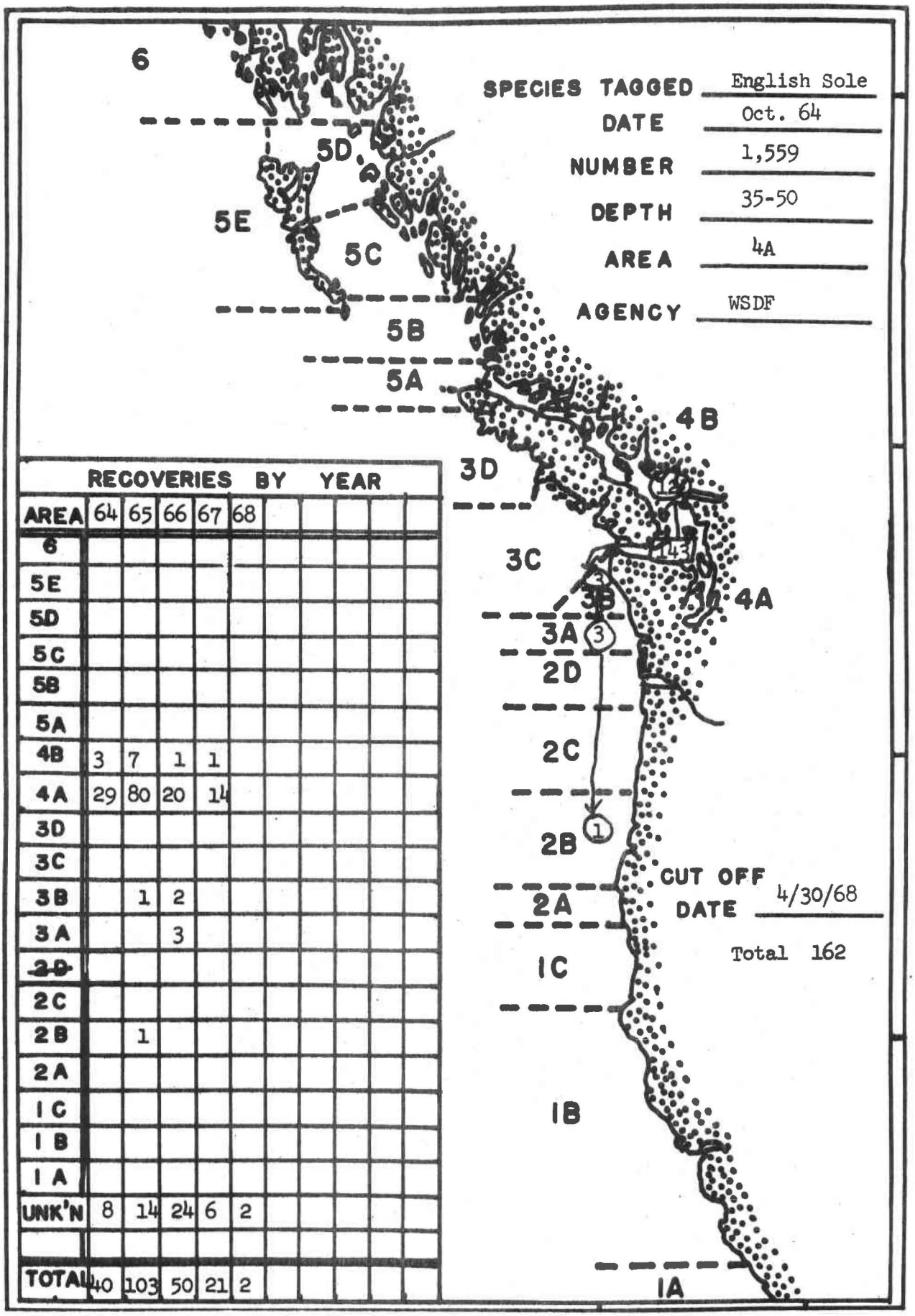
CUT OFF DATE: 4/30/68

Total 406

RECOVERIES BY YEAR

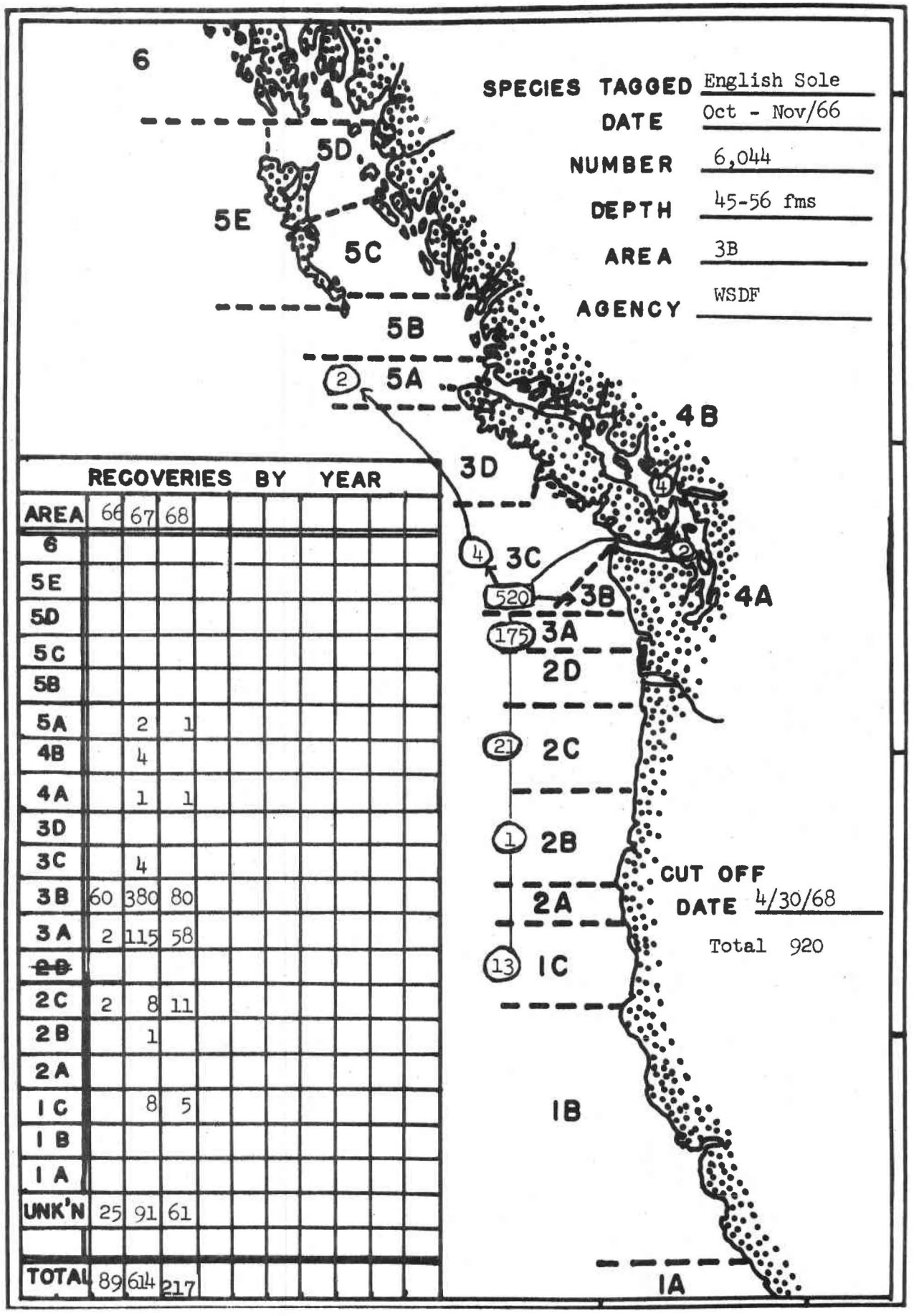
| AREA | 64 | 65 | 66 | 67 | 68 |
|---|---|---|---|---|---|
| 6 | | | | | |
| 5E | | | | | |
| 5D | | | | | |
| 5C | | | | | |
| 5B | | | | | |
| 5A | | | | | |
| 4B | | | | | |
| 4A | 97 | 100 | 95 | 27 | 2 |
| 3D | | | | | |
| 3C | | | | | |
| 3B | | | | | |
| 3A | | | 1 | | |
| 2D | | | | | |
| 2C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

Appendix C-2



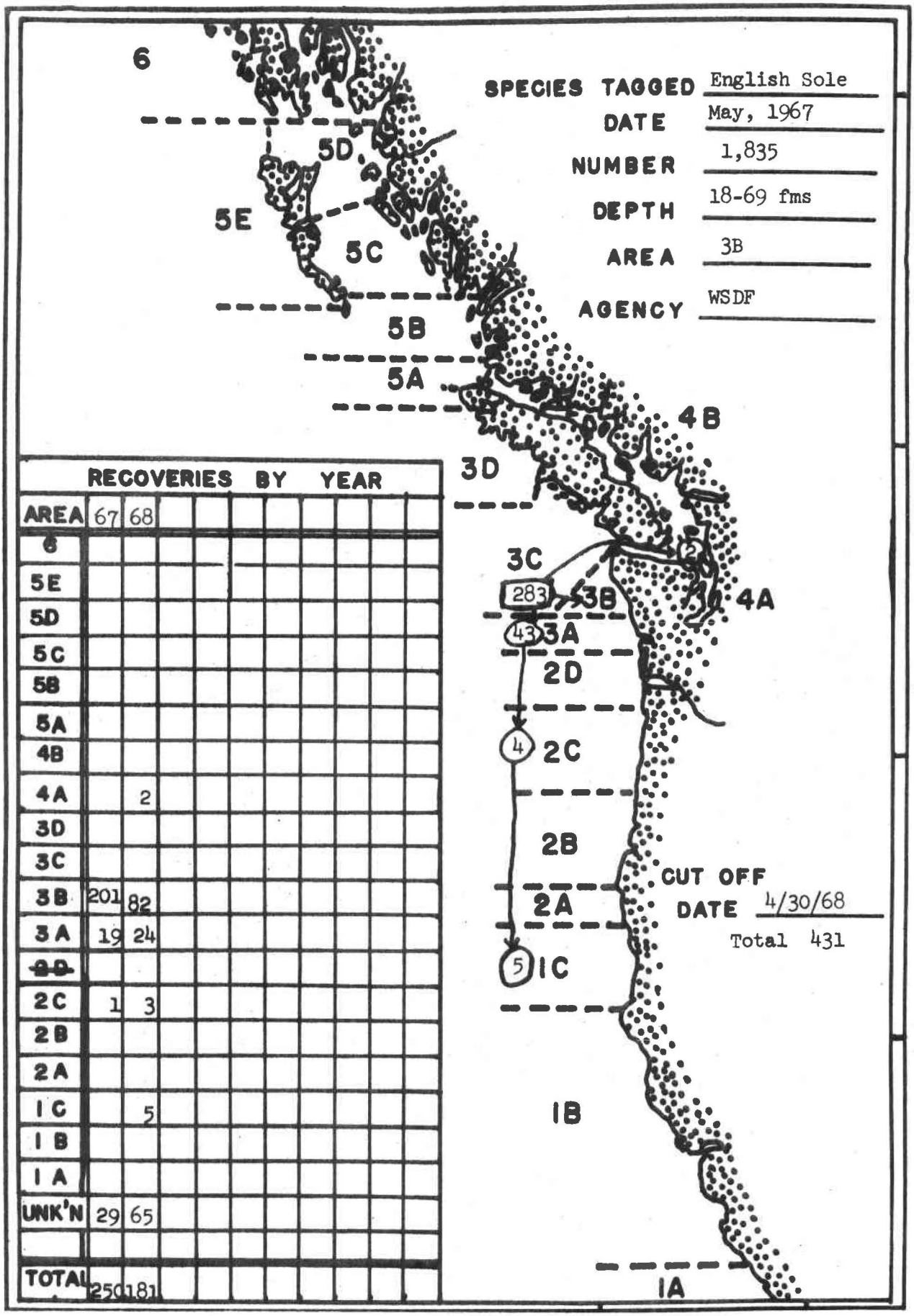

RECOVERIES BY YEAR

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



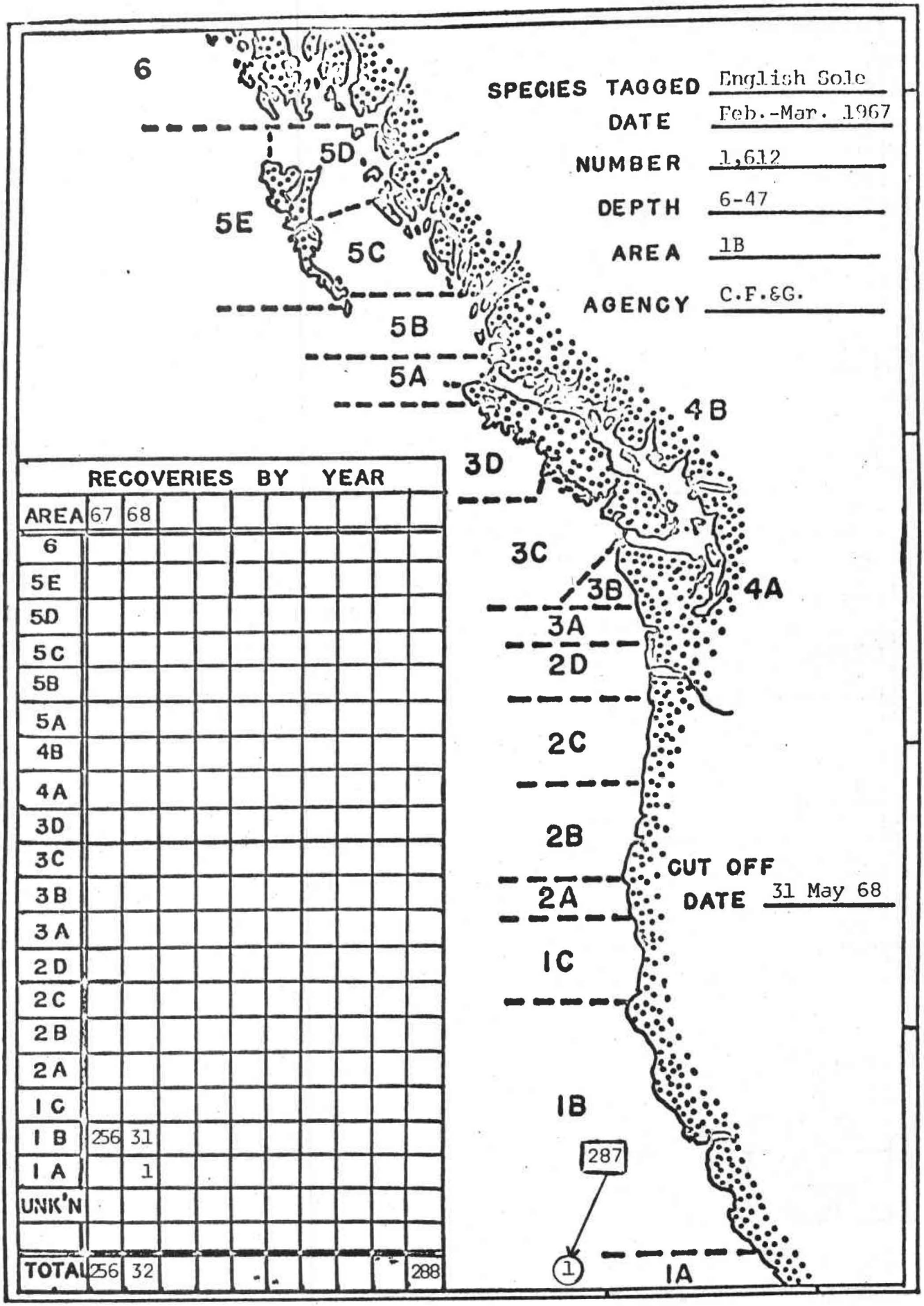

RECOVERIES BY YEAR

| AREA | 66 | 67 | 68 |
|---|---|---|---|
| 6 | | | |
| 5E | | | |
| 5D | | | |
| 5C | | | |
| 5B | | | |
| 5A | | 2 | 1 |
| 4B | | 4 | |
| 4A | | 1 | 1 |
| 3D | | | |
| 3C | | 4 | |
| 3B | 60 | 380 | 80 |
| 3A | 2 | 115 | 58 |
| ~~2B~~ | | | |
| 2C | 2 | 8 | 11 |
| 2B | | 1 | |
| 2A | | | |
| 1C | | 8 | 5 |
| 1B | | | |
| 1A | | | |
| UNK'N | 25 | 91 | 61 |
| | | | |
| TOTAL | 89 | 614 | 217 |




RECOVERIES BY YEAR

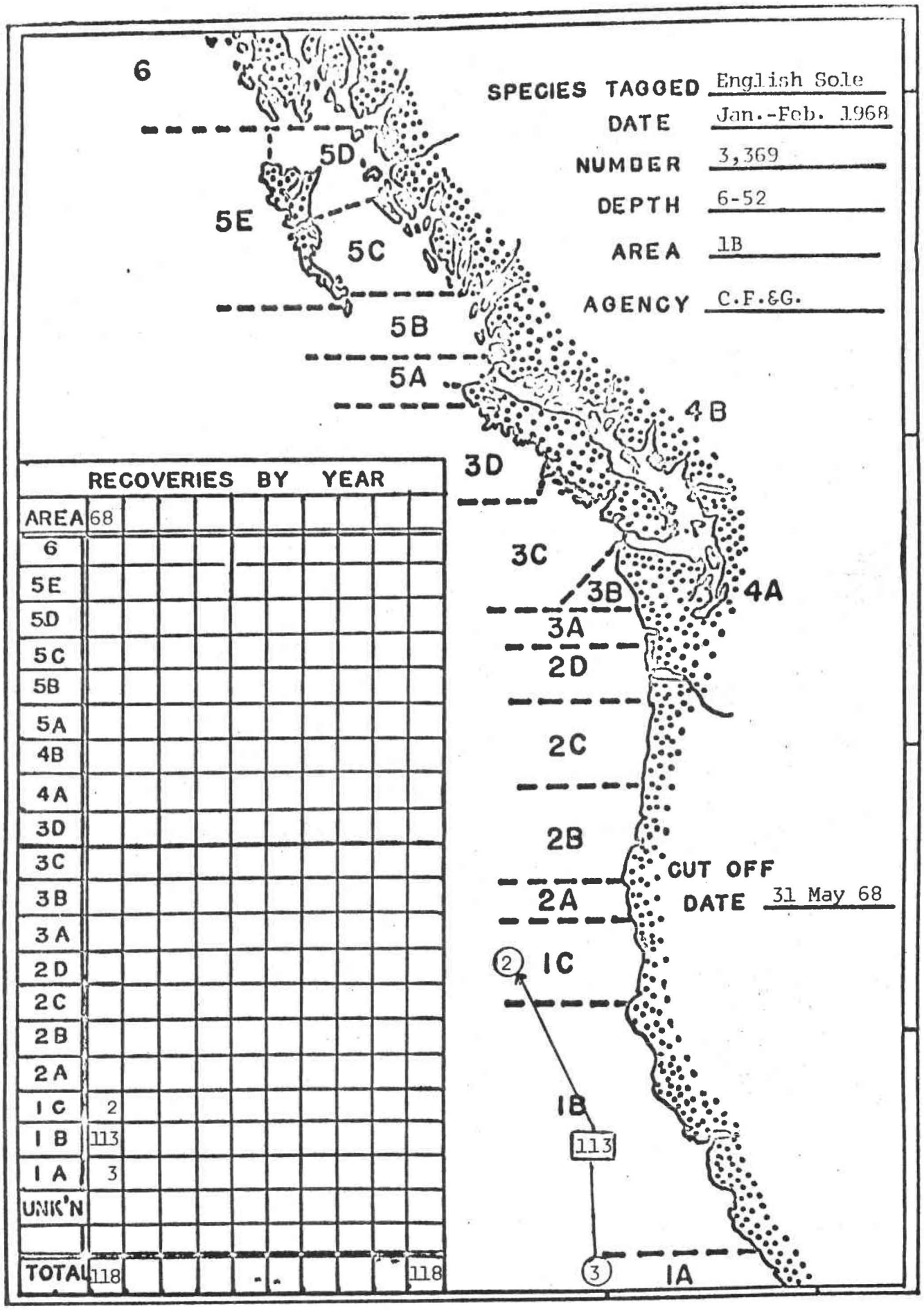
| AREA | 67 | 68 |
|---|---|---|
| 6 | | |
| 5E | | |
| 5D | | |
| 5C | | |
| 5B | | |
| 5A | | |
| 4B | | |
| 4A | | 2 |
| 3D | | |
| 3C | | |
| 3B | 201 | 82 |
| 3A | 19 | 24 |
| ~~2D~~ | | |
| 2C | 1 | 3 |
| 2B | | |
| 2A | | |
| 1C | | 5 |
| 1B | | |
| 1A | | |
| UNK'N | 29 | 65 |
| | | |
| TOTAL | 250 | 181 |




RECOVERIES BY YEAR

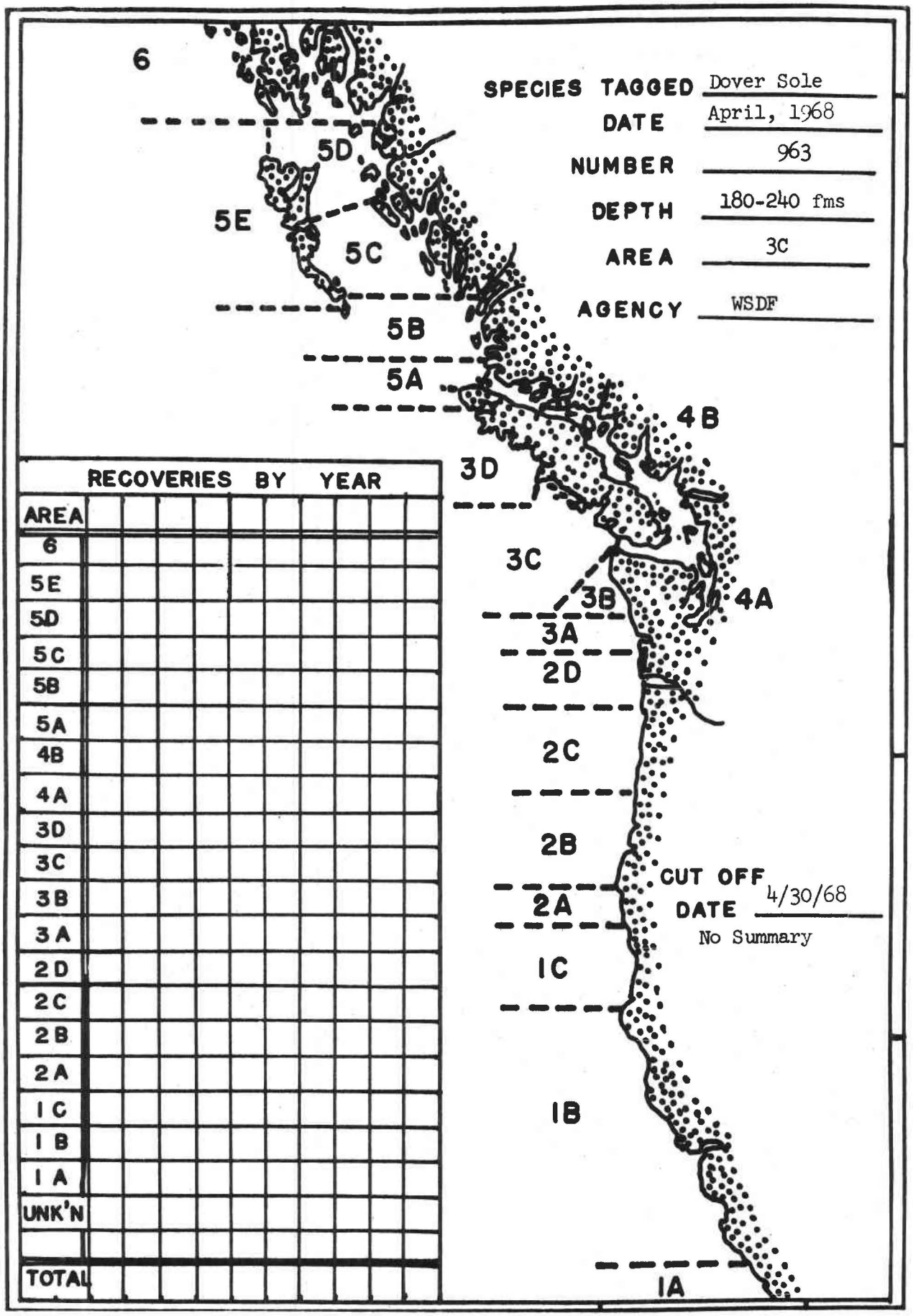
| AREA | 67 | 68 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | | | | | | | | | | |
| 5C | | | | | | | | | | |
| 5B | | | | | | | | | | |
| 5A | | | | | | | | | | |
| 4B | | | | | | | | | | |
| 4A | | | | | | | | | | |
| 3D | | | | | | | | | | |
| 3C | | | | | | | | | | |
| 3B | | | | | | | | | | |
| 3A | | | | | | | | | | |
| 2D | | | | | | | | | | |
| 2C | | | | | | | | | | |
| 2B | | | | | | | | | | |
| 2A | | | | | | | | | | |
| 1C | | | | | | | | | | |
| 1B | 256 | 31 | | | | | | | | |
| 1A | | 1 | | | | | | | | |
| UNK'N | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 256 | 32 | | | | | | | | 288 |

Appendix C-6

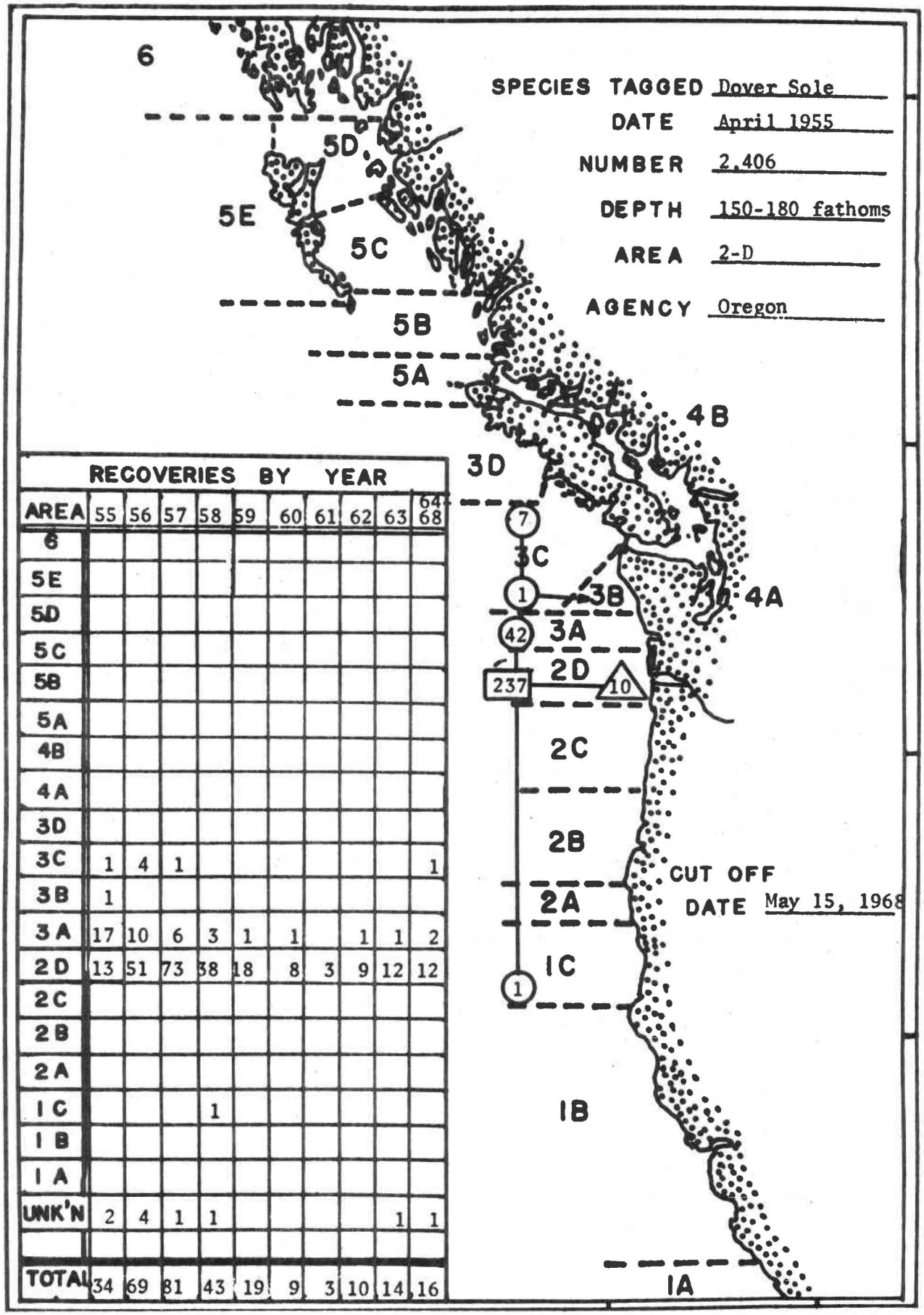



RECOVERIES BY YEAR

| AREA | 68 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | | | | | | | | | | |
| 5C | | | | | | | | | | |
| 5B | | | | | | | | | | |
| 5A | | | | | | | | | | |
| 4B | | | | | | | | | | |
| 4A | | | | | | | | | | |
| 3D | | | | | | | | | | |
| 3C | | | | | | | | | | |
| 3B | | | | | | | | | | |
| 3A | | | | | | | | | | |
| 2D | | | | | | | | | | |
| 2C | | | | | | | | | | |
| 2B | | | | | | | | | | |
| 2A | | | | | | | | | | |
| 1C | 2 | | | | | | | | | |
| 1B | 113 | | | | | | | | | |
| 1A | 3 | | | | | | | | | |
| UNK'N | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | 118 | | | | | | | | | 118 |

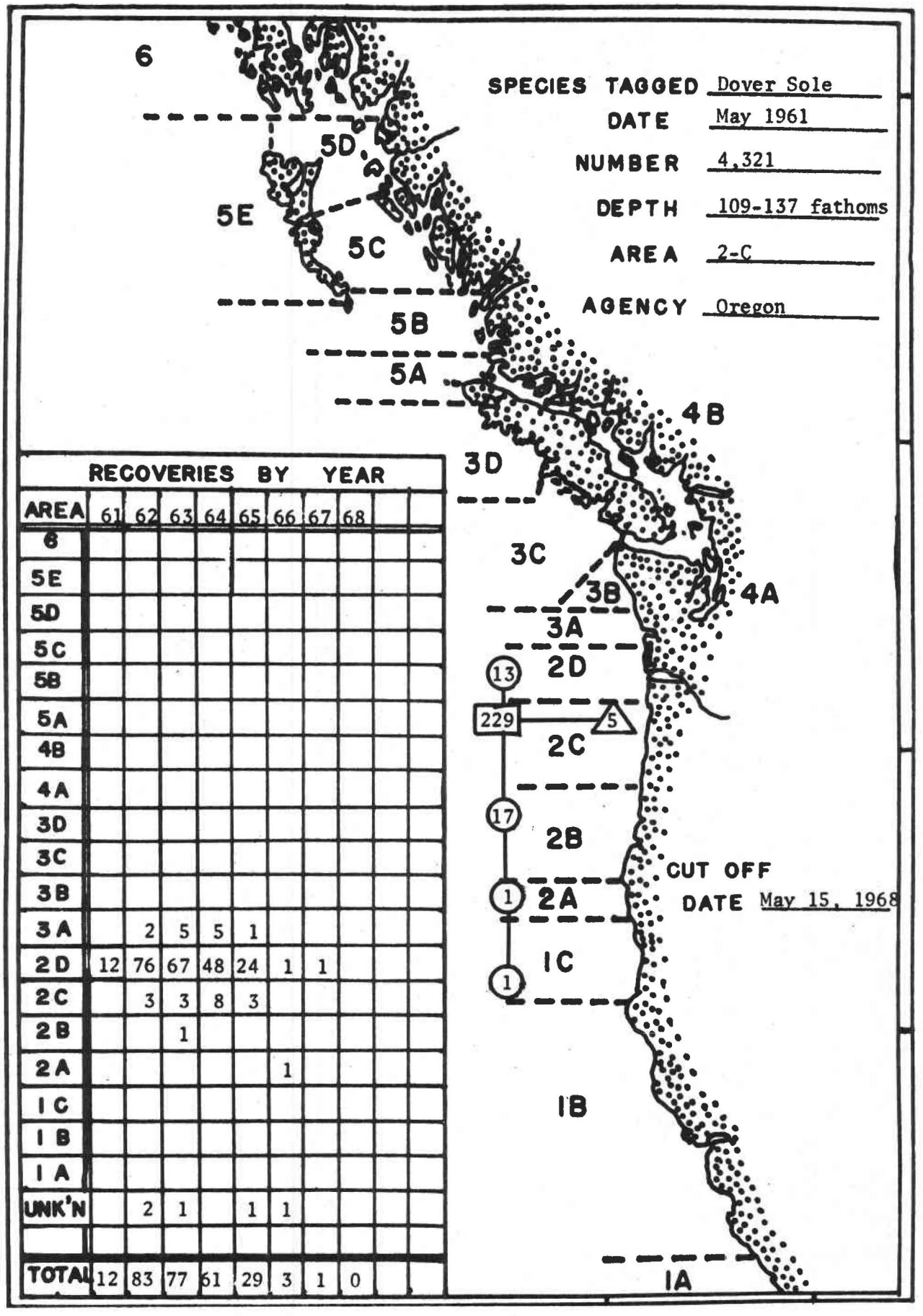



| RECOVERIES BY YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AREA | | | | | | | | | | |
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | | | | | | | | | | |
| 5C | | | | | | | | | | |
| 5B | | | | | | | | | | |
| 5A | | | | | | | | | | |
| 4B | | | | | | | | | | |
| 4A | | | | | | | | | | |
| 3D | | | | | | | | | | |
| 3C | | | | | | | | | | |
| 3B | | | | | | | | | | |
| 3A | | | | | | | | | | |
| 2D | | | | | | | | | | |
| 2C | | | | | | | | | | |
| 2B | | | | | | | | | | |
| 2A | | | | | | | | | | |
| 1C | | | | | | | | | | |
| 1B | | | | | | | | | | |
| 1A | | | | | | | | | | |
| UNK'N | | | | | | | | | | |
| | | | | | | | | | | |
| TOTAL | | | | | | | | | | |

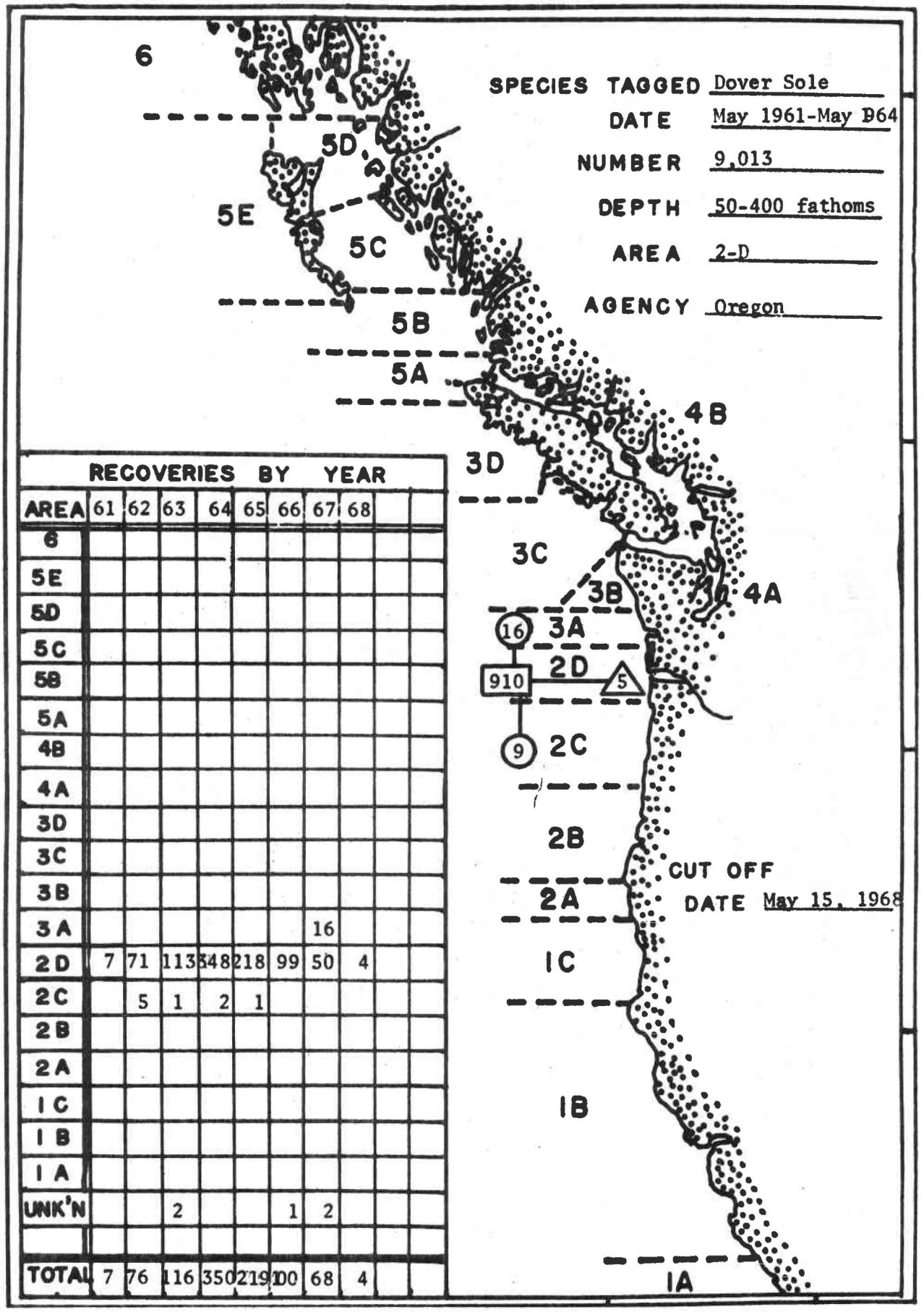



RECOVERIES BY YEAR

| AREA | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64-68 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | | | | | | | | | | |
| 5C | | | | | | | | | | |
| 5B | | | | | | | | | | |
| 5A | | | | | | | | | | |
| 4B | | | | | | | | | | |
| 4A | | | | | | | | | | |
| 3D | | | | | | | | | | |
| 3C | 1 | 4 | 1 | | | | | | | 1 |
| 3B | 1 | | | | | | | | | |
| 3A | 17 | 10 | 6 | 3 | 1 | 1 | | 1 | 1 | 2 |
| 2D | 13 | 51 | 73 | 38 | 18 | 8 | 3 | 9 | 12 | 12 |
| 2C | | | | | | | | | | |
| 2B | | | | | | | | | | |
| 2A | | | | | | | | | | |
| 1C | | | | 1 | | | | | | |
| 1B | | | | | | | | | | |
| 1A | | | | | | | | | | |
| UNK'N | 2 | 4 | 1 | 1 | | | | | 1 | 1 |
| | | | | | | | | | | |
| TOTAL | 34 | 69 | 81 | 43 | 19 | 9 | 3 | 10 | 14 | 16 |

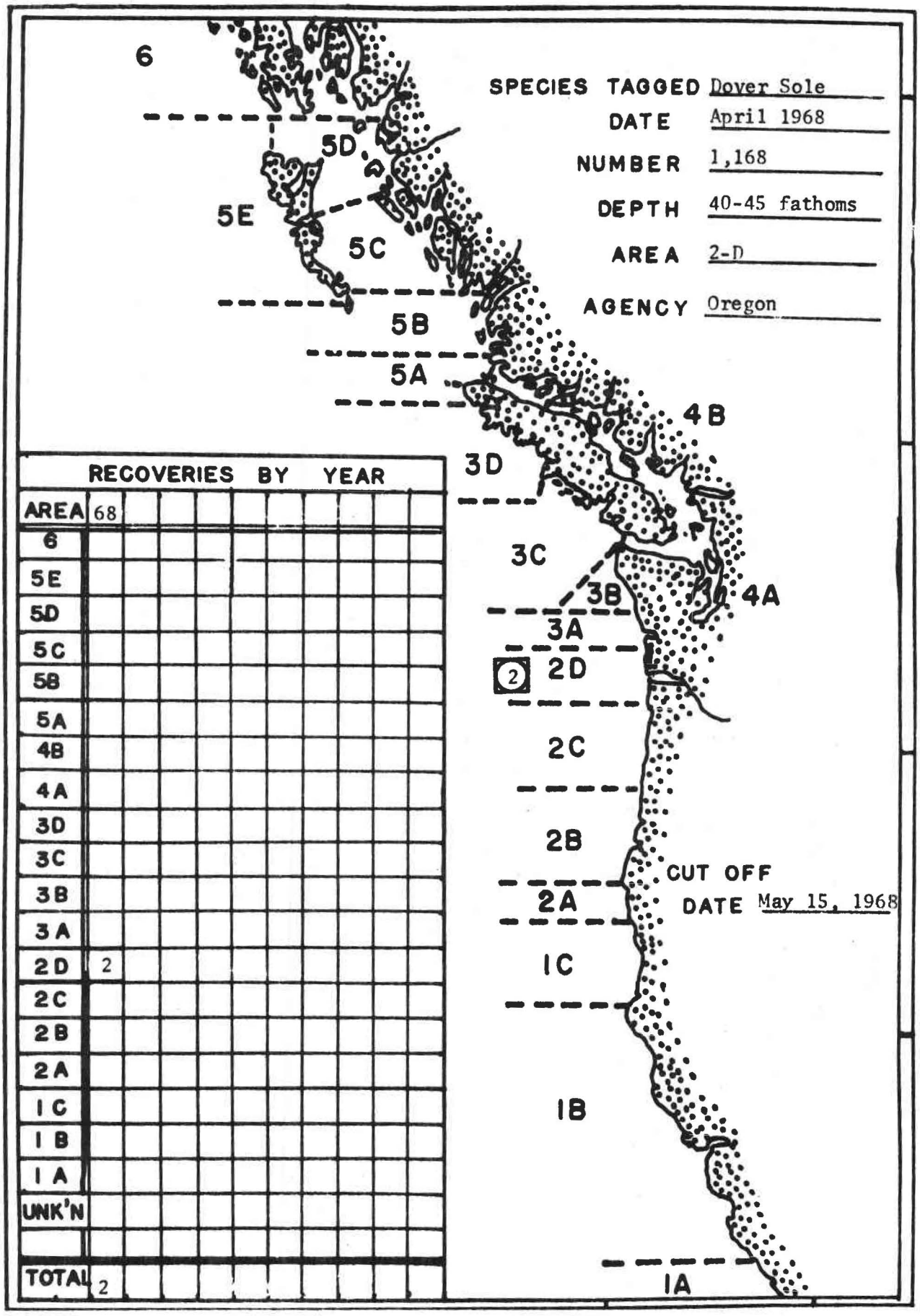


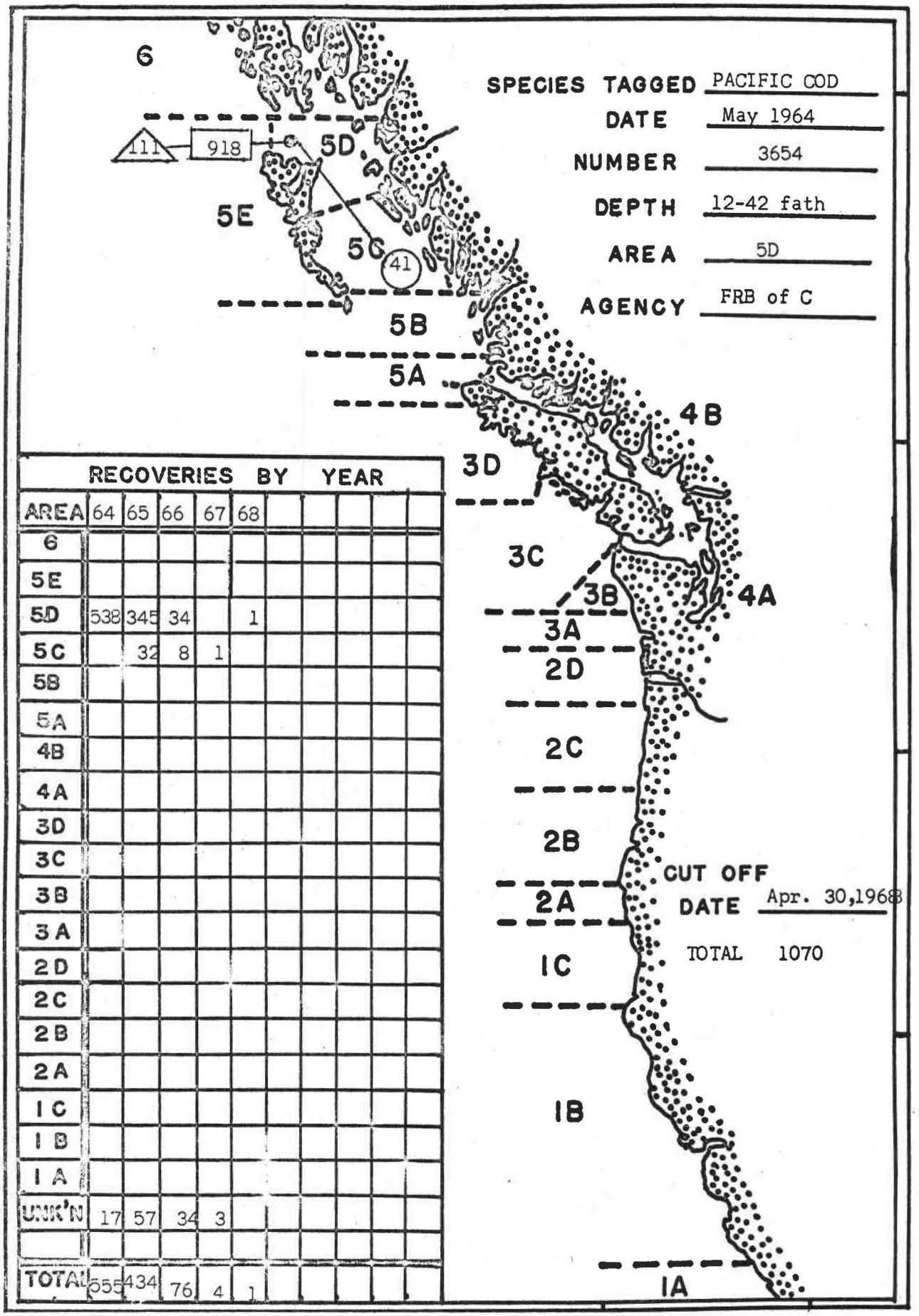

| RECOVERIES BY YEAR | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AREA | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | | |
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | | | | | | | | | | |
| 5C | | | | | | | | | | |
| 5B | | | | | | | | | | |
| 5A | | | | | | | | | | |
| 4B | | | | | | | | | | |
| 4A | | | | | | | | | | |
| 3D | | | | | | | | | | |
| 3C | | | | | | | | | | |
| 3B | | | | | | | | | | |
| 3A | | 2 | 5 | 5 | 1 | | | | | |
| 2D | 12 | 76 | 67 | 48 | 24 | 1 | 1 | | | |
| 2C | | 3 | 3 | 8 | 3 | | | | | |
| 2B | | | 1 | | | | | | | |
| 2A | | | | | | 1 | | | | |
| 1C | | | | | | | | | | |
| 1B | | | | | | | | | | |
| 1A | | | | | | | | | | |
| UNK'N | | 2 | 1 | | 1 | 1 | | | | |
| | | | | | | | | | | |
| TOTAL | 12 | 83 | 77 | 61 | 29 | 3 | 1 | 0 | | |




RECOVERIES BY YEAR

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

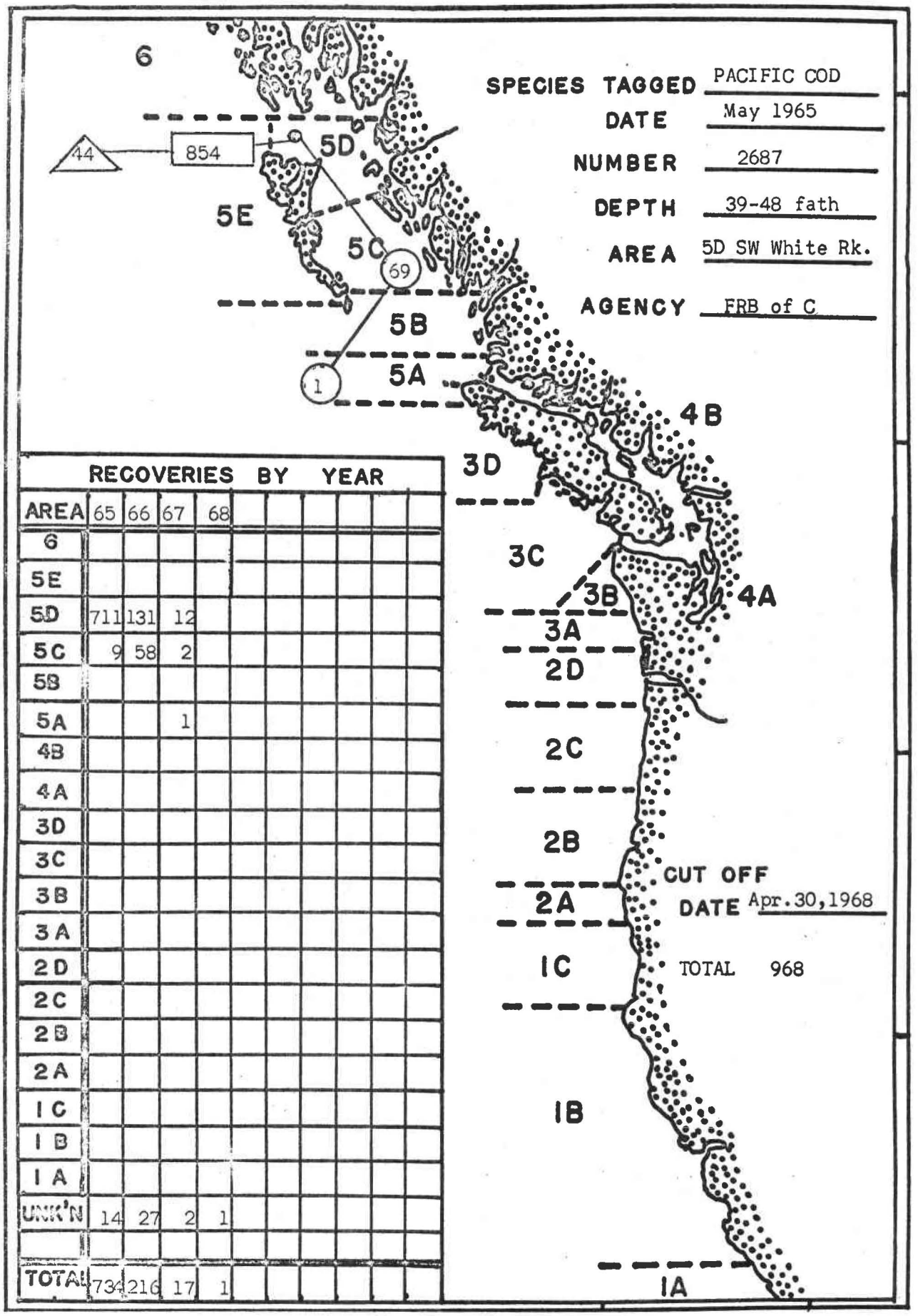

SPECIES TAGGED Dover Sole
DATE April 1968
NUMBER 1,168
DEPTH 40-45 fathoms
AREA 2-D
AGENCY Oregon
6
5D
5E
5C
5B
5A
4B
3D
3C
3B
4A
3A
2
2D
2C
2B
CUT OFF
DATE May 15, 1968
2A
1C
1B
1A
RECOVERIES BY YEAR
AREA 68
6
5E
5D
5C
5B
5A
4B
4A
3D
3C
3B
3A
2D 2
2C
2B
2A
1C
1B
1A
UNK'N
TOTAL 2




RECOVERIES BY YEAR

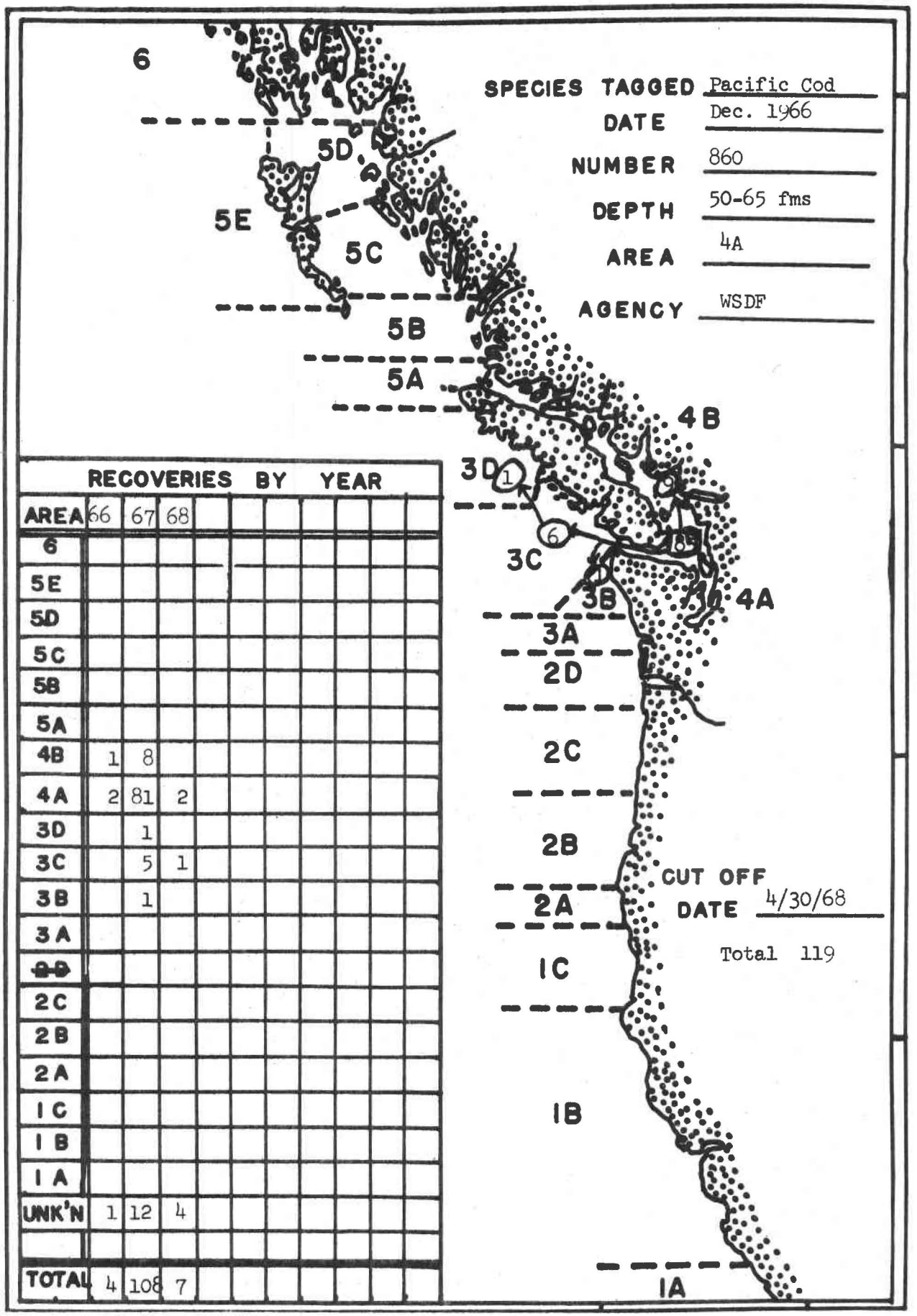
| AREA | 64 | 65 | 66 | 67 | 68 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | | | | | | | | | | |
| 5E | | | | | | | | | | |
| 5D | 538 | 345 | 34 | | 1 | | | | | |
| 5C | | 32 | 8 | 1 | | | | | | |
| 5B | | | | | | | | | | |
| 5A | | | | | | | | | | |
| 4B | | | | | | | | | | |
| 4A | | | | | | | | | | |
| 3D | | | | | | | | | | |
| 3C | | | | | | | | | | |
| 3B | | | | | | | | | | |
| 3A | | | | | | | | | | |
| 2D | | | | | | | | | | |
| 2C | | | | | | | | | | |
| 2B | | | | | | | | | | |
| 2A | | | | | | | | | | |
| 1C | | | | | | | | | | |
| 1B | | | | | | | | | | |
| 1A | | | | | | | | | | |
| UNK'N | 17 | 57 | 34 | 3 | | | | | | |
| | | | | | | | | | | |
| TOTAL | 555 | 434 | 76 | 4 | 1 | | | | | |

Appendix E-2




RECOVERIES BY YEAR

| AREA | 65 | 66 | 67 | 68 |
|---|---|---|---|---|
| 6 | | | | |
| 5E | | | | |
| 5D | 711 | 131 | 12 | |
| 5C | 9 | 58 | 2 | |
| 5B | | | | |
| 5A | | | 1 | |
| 4B | | | | |
| 4A | | | | |
| 3D | | | | |
| 3C | | | | |
| 3B | | | | |
| 3A | | | | |
| 2D | | | | |
| 2C | | | | |
| 2B | | | | |
| 2A | | | | |
| 1C | | | | |
| 1B | | | | |
| 1A | | | | |
| UNK'N | 14 | 27 | 2 | 1 |
| | | | | |
| TOTAL | 734 | 216 | 17 | 1 |




SPECIES TAGGED: Pacific Cod
DATE: Dec. 1966
NUMBER: 860
DEPTH: 50-65 fms
AREA: 4A
AGENCY: WSDF

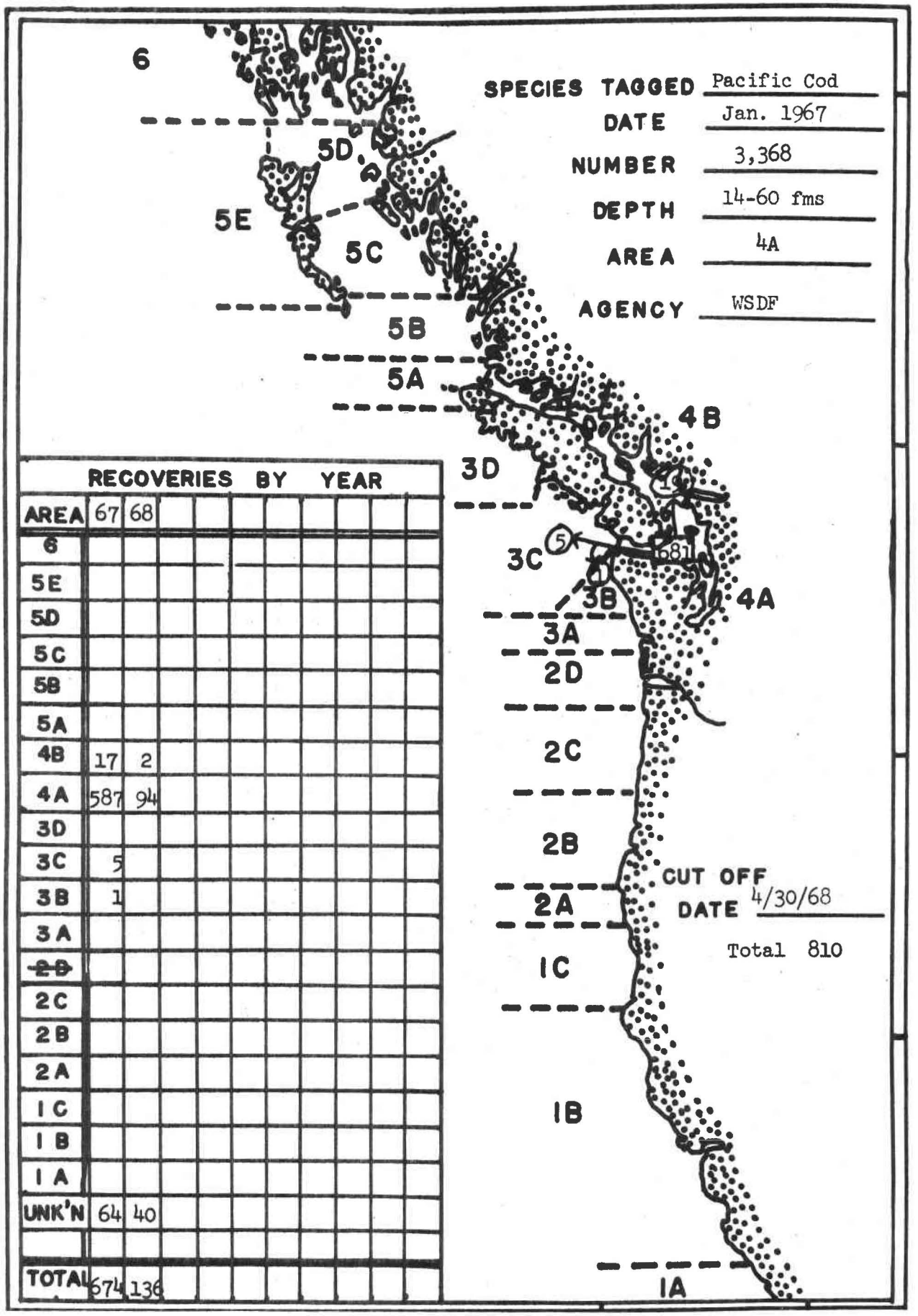
CUT OFF DATE: 4/30/68

Total 119

RECOVERIES BY YEAR

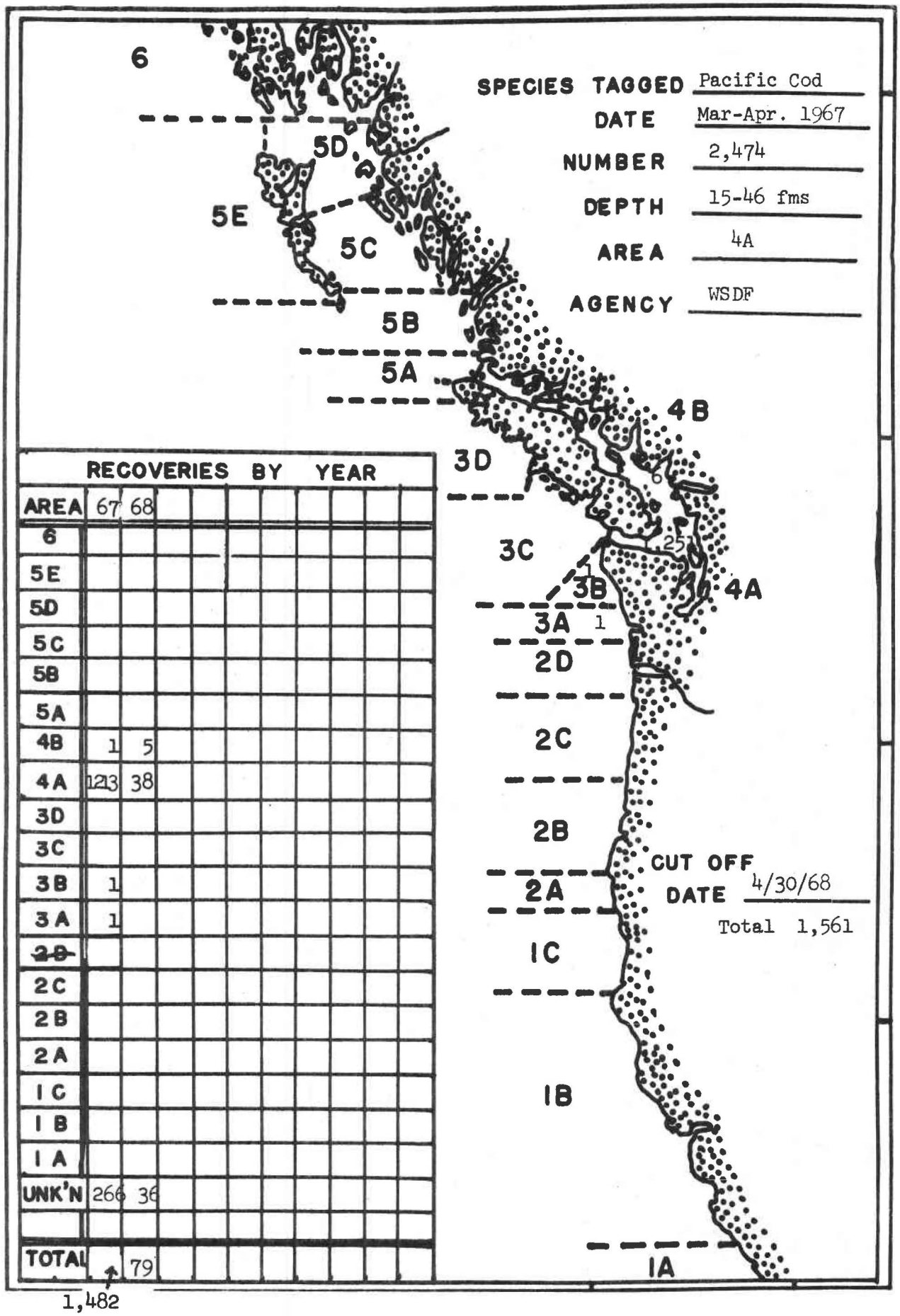
| AREA | 66 | 67 | 68 |
|---|---|---|---|
| 6 | | | |
| 5E | | | |
| 5D | | | |
| 5C | | | |
| 5B | | | |
| 5A | | | |
| 4B | 1 | 8 | |
| 4A | 2 | 81 | 2 |
| 3D | | 1 | |
| 3C | | 5 | 1 |
| 3B | | 1 | |
| 3A | | | |
| ~~2D~~ | | | |
| 2C | | | |
| 2B | | | |
| 2A | | | |
| 1C | | | |
| 1B | | | |
| 1A | | | |
| UNK'N | 1 | 12 | 4 |
| | | | |
| TOTAL | 4 | 108 | 7 |

Appendix E-4




RECOVERIES BY YEAR

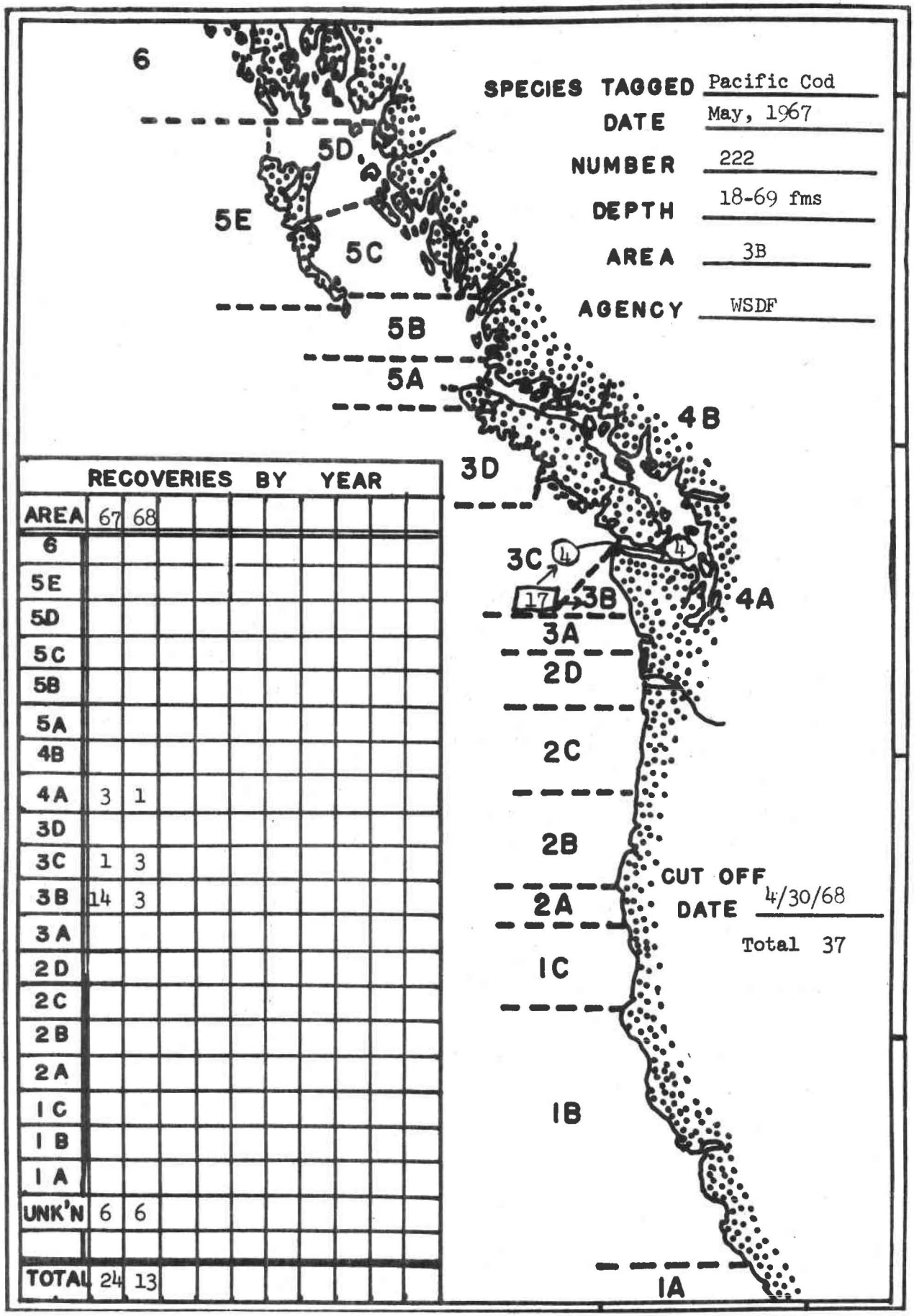
| AREA | 67 | 68 |
|---|---|---|
| 6 | | |
| 5E | | |
| 5D | | |
| 5C | | |
| 5B | | |
| 5A | | |
| 4B | 17 | 2 |
| 4A | 587 | 94 |
| 3D | | |
| 3C | 5 | |
| 3B | 1 | |
| 3A | | |
| ~~2D~~ | | |
| 2C | | |
| 2B | | |
| 2A | | |
| 1C | | |
| 1B | | |
| 1A | | |
| UNK'N | 64 | 40 |
| | | |
| TOTAL | 674 | 136 |




| RECOVERIES BY YEAR | | |
|---|---|---|
| AREA | 67 | 68 |
| 6 | | |
| 5E | | |
| 5D | | |
| 5C | | |
| 5B | | |
| 5A | | |
| 4B | 1 | 5 |
| 4A | 123 | 38 |
| 3D | | |
| 3C | | |
| 3B | 1 | |
| 3A | 1 | |
| ~~2B~~ | | |
| 2C | | |
| 2B | | |
| 2A | | |
| 1C | | |
| 1B | | |
| 1A | | |
| UNK'N | 266 | 36 |
| | | |
| TOTAL | | 79 |

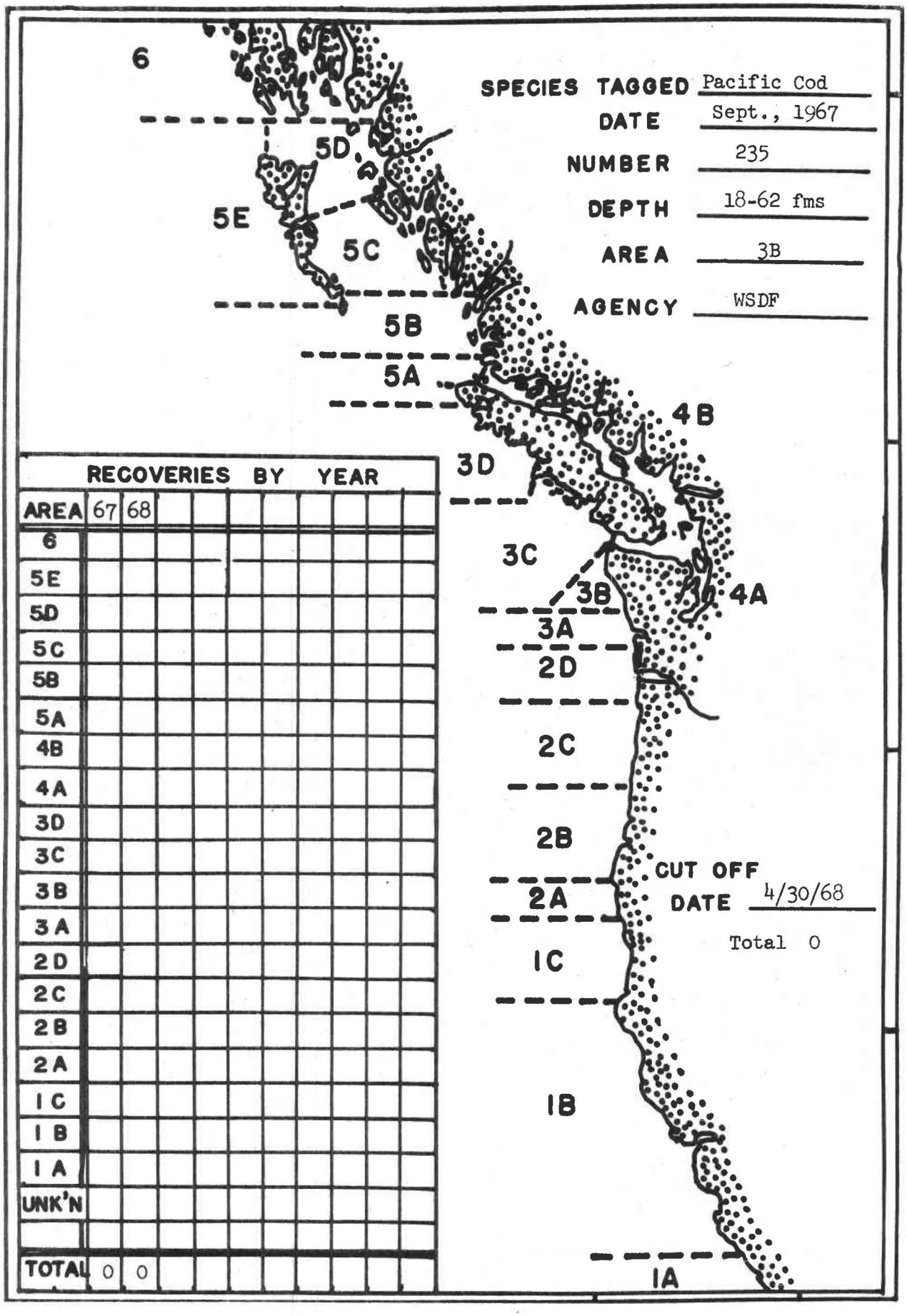
1,482

Appendix E-6



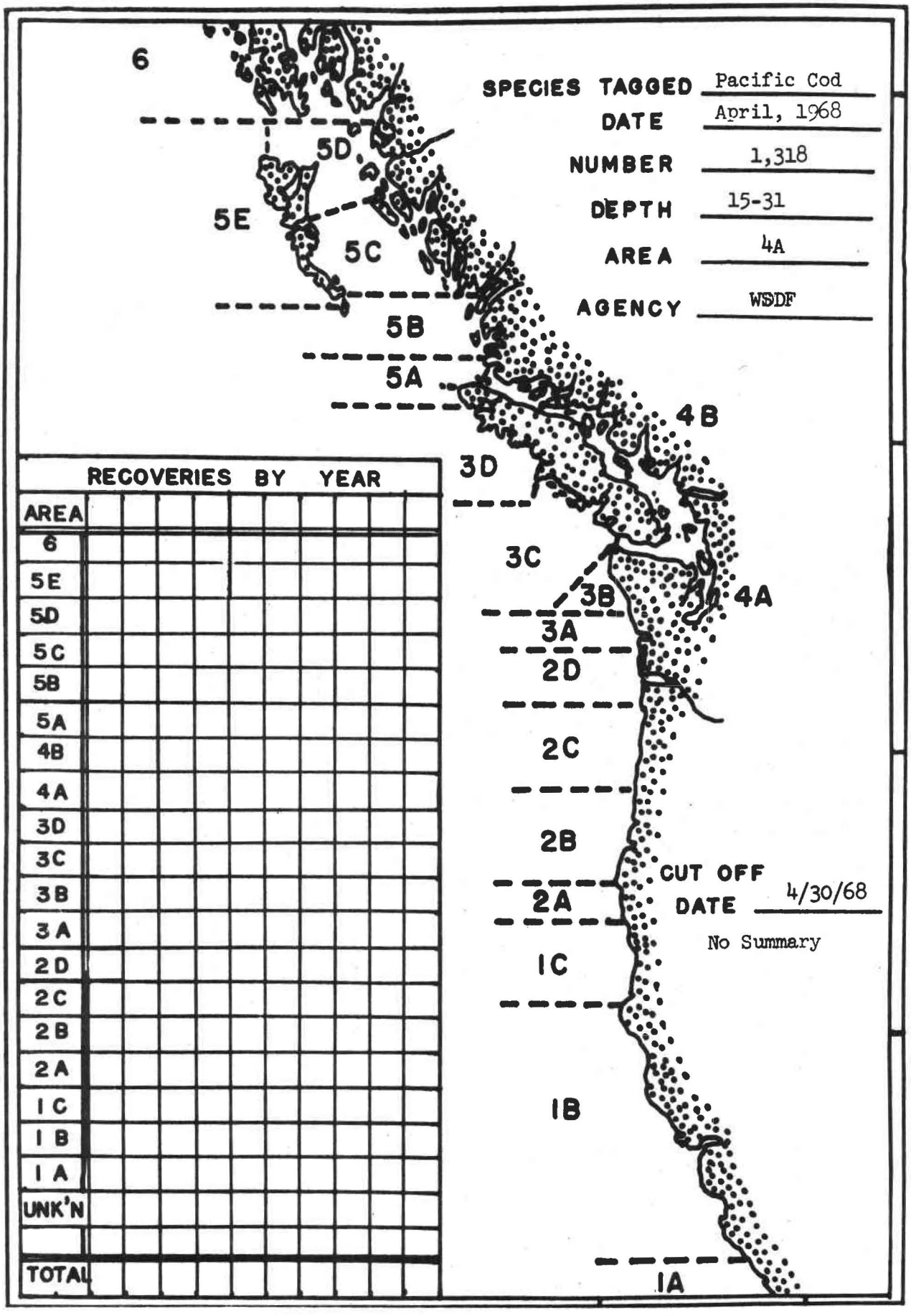

RECOVERIES BY YEAR

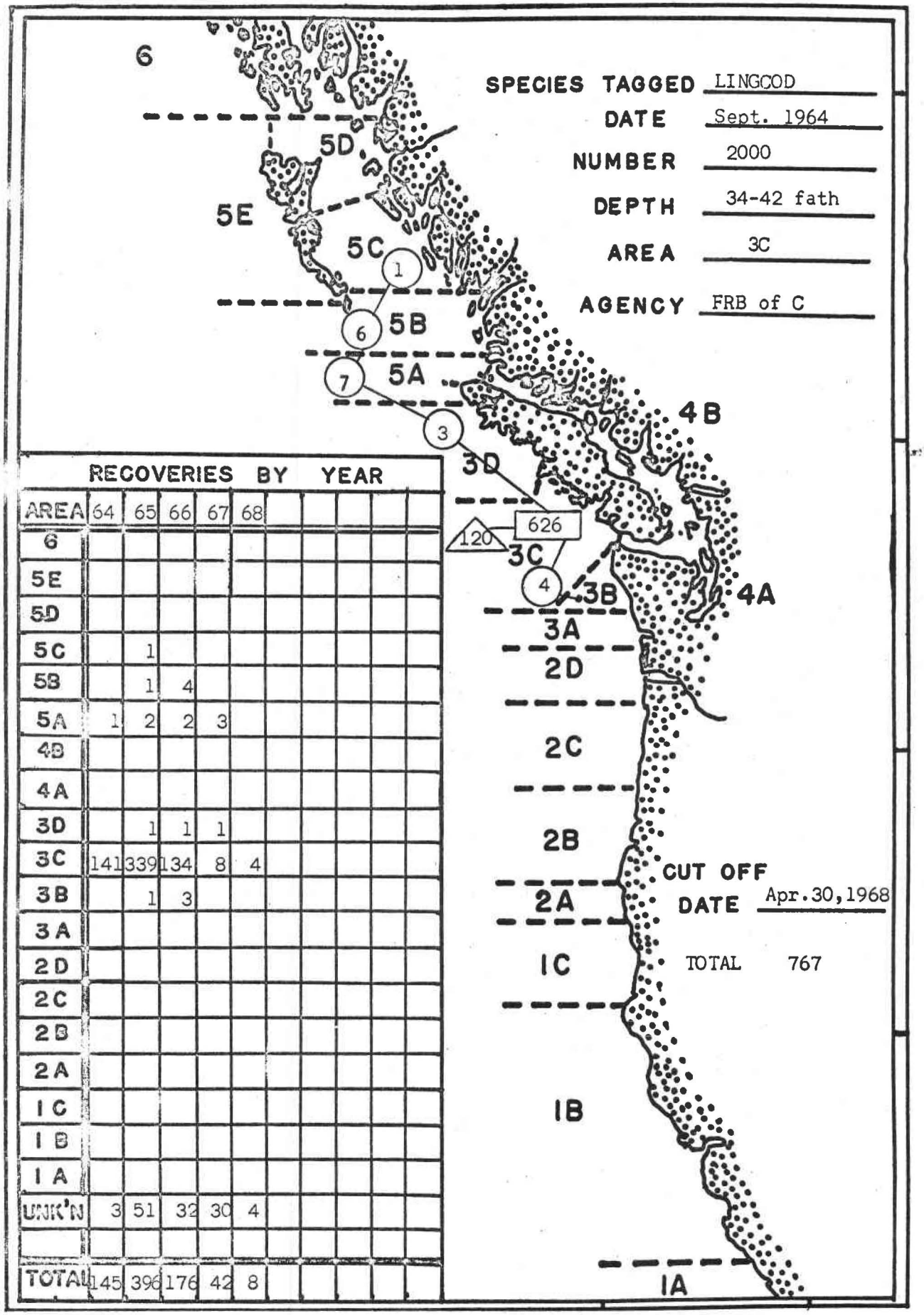
| AREA | 67 | 68 |
|---|---|---|
| 6 | | |
| 5E | | |
| 5D | | |
| 5C | | |
| 5B | | |
| 5A | | |
| 4B | | |
| 4A | 3 | 1 |
| 3D | | |
| 3C | 1 | 3 |
| 3B | 14 | 3 |
| 3A | | |
| 2D | | |
| 2C | | |
| 2B | | |
| 2A | | |
| 1C | | |
| 1B | | |
| 1A | | |
| UNK'N | 6 | 6 |
| | | |
| TOTAL | 24 | 13 |




| RECOVERIES BY YEAR | | |
|---|---|---|
| AREA | 67 | 68 |
| 6 | | |
| 5E | | |
| 5D | | |
| 5C | | |
| 5B | | |
| 5A | | |
| 4B | | |
| 4A | | |
| 3D | | |
| 3C | | |
| 3B | | |
| 3A | | |
| 2D | | |
| 2C | | |
| 2B | | |
| 2A | | |
| 1C | | |
| 1B | | |
| 1A | | |
| UNK'N | | |
| | | |
| TOTAL | 0 | 0 |

Appendix E-8


SPECIES TAGGED Pacific Cod
DATE April, 1968
NUMBER 1,318
DEPTH 15-31
AREA 4A
AGENCY WSDF
6
5D
5E
5C
5B
5A
4B
3D
3C
3B
4A
3A
2D
2C
2B
2A
1C
1B
1A
CUT OFF DATE 4/30/68
No Summary
RECOVERIES BY YEAR
AREA
6
5E
5D
5C
5B
5A
4B
4A
3D
3C
3B
3A
2D
2C
2B
2A
1C
1B
1A
UNK'N
TOTAL




RECOVERIES BY YEAR

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