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

REPORT OF THE SIXTH ANNUAL MEETING

JUNE 22-23, 1965

SEATTLE, WASHINGTON

SUBMITTED AUGUST, 1965

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Report of the Technical Sub-Committee of the 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 22 and 23, 1965

PLACE: Washington State Department of Fisheries, Salmon Bay Terminal, Seattle, Washington

PARTICIPANTS:

CANADA
- J. A. Thomson - Chairman
- C. R. Forrester
- S. J. Westrheim (observer)

UNITED STATES

Washington
- D. E. Kauffman
- E. K. Holmberg
- D. Day (observer)
- B. H. Pattie (observer)

Oregon
- J. M. Van Hyning
- A. R. Magill

California
- T. Jow

Alaska
- R. Rickey

PMFC
- L. A. Verhoeven (observer)

I. CALL TO ORDER

The sixth annual meeting of the Technical Sub-Committee was called to order at 0900 hours on June 22, 1965, by Chairman Thomson under instructions set forth by the parent committee in 1959. The business of the meeting was guided by a prepared agenda which is included as Appendix A.

II. APPOINTMENT OF SECRETARY

C. R. Forrester, of Canada, was appointed to act as recording secretary for the meeting.

III. APPROVAL OF AGENDA

The agenda as circulated prior to the meeting was approved and each item discussed consecutively.

IV. STATUS REPORTS

Some discussion took place regarding the format of this section of the report. The Sub-committee members agreed: (a) that the secretary should prepare from data submitted a summary of trends in total catch and effort for the years 1959 to 1963 inclusive for comparison with 1964 data in the report and (b) that the same general principles should apply when possible in discussion of catch, effort and catch/effort trends for particular species. (The report is therefore not a true record in the minute sense but does represent conclusions reached at the meeting. Draft copies of this report were circulated to participants for approval prior to final printing.)

The Sub-committee also discussed the question of difficulty in distinguishing between various PMFC areas when geographical descriptions were used rather than the numerical designation. It was agreed that the following general descriptions should be used when necessary (Fig. 1).

PMFC Area	Geographical Description
1A	Lower California coast
1B	Central California coast
1C	Upper California coast

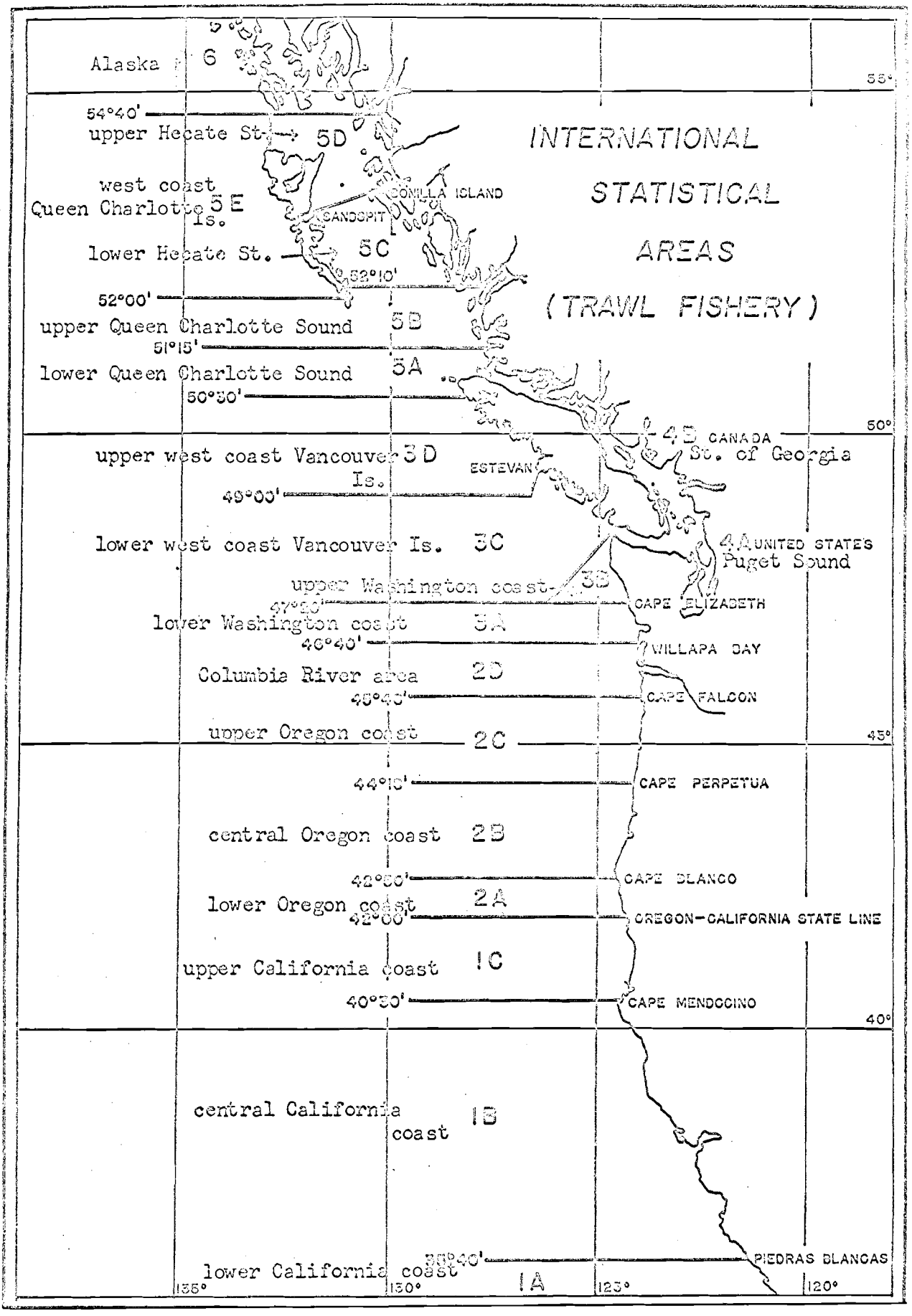

Fig. 1. Statistical areas for the trawl fishery along the Pacific coast of the United States and Canada.

2A	Lower Oregon coast
2B	Central Oregon coast
2C	Upper Oregon coast
2D	Columbia River area
3A	Lower Washington coast
3B	Upper Washington coast
3C	Lower west coast Vancouver Island
3D	Upper west coast Vancouver Island
4A	Puget Sound
4B	Strait of Georgia
5A	Lower Queen Charlotte Sound
5B	Upper Queen Charlotte Sound
5C	Lower Hecate Strait
5D	Upper Hecate Strait
5E	West coast Queen Charlotte Islands
6	Alaska

1. Total Catch and Effort for the 1964 Trawl Fishery

The 1964 otter trawl catch by Canadian and United States fishermen from waters of the northeastern Pacific was approximately 136.0 million pounds[1]. This catch was slightly above that taken in 1963 (135 million pounds) and above the mean catch in the 1959-63 period (131 million pounds).

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[1]This total includes catch from PMFC areas 4A and 4B, Puget Sound and Strait of Georgia respectively. While stocks of fish in these two areas may consist of populations largely separate from those in offshore waters, there is some interchange and catch should therefore be considered.

Total effort expended was about 163,000 hours (1963 - 168,000 hours and 1959-63 mean - 160,000 hours). Catch/effort of all species at 835 pounds per hour was above that in 1963 (807 pounds per hour) and close to the mean for the 1959-63 period (827 pounds per hour).

The catch taken by Canada rose to about 24% of the total while Washington State vessels remained the largest producers at 31% (Table I). Oregon and California landings each amounted to about 23% of the total catch.

Pacific ocean perch and Pacific cod were the major individual species landed (about 22 million pounds each), and together accounted for about 32% of the total landing. These two species and Dover sole have shared dominance in the fishery in the past six years.

Total sole landings in 1964 were 47.1 million pounds, virtually identical to the mean catch for the 1959-63 period. Dover sole was the dominant sole species landed as has been the case since 1958.

Landings of animal food at 13.8 million pounds were about one million pounds greater than in 1963, but 12% lower than the mean catch taken in 1959-63 (15.7 million pounds).

2. Petrale Sole

Total catch of petrale sole in 1964 at almost 8.0 million pounds was 16% lower than in 1963 and 13% lower than the mean catch for 1959-63. With the exception of Canada, all agencies reported a drop in landings. Approximately 58% of the petrale sole catch in 1964 was taken by Oregon and California. Reduction in catch from these states was believed due to some diversion of effort to Pacific ocean perch in Oregon and a general decline in all landings in California. Washington petrale landings were affected partly

Table I. Otter-trawl landings by Canadian and United States vessels from international statistical areas (PMFC) in 1964 and mean catch for 1959-63. (Landings in thousands of pounds)

	British Columbia	Washington	Oregon	California	Total	1959-63 mean
English sole	1,447	4,136	1,562	4,594	11,739	11,841
Petrale sole	1,225	2,180	1,877	2,699	7,981	9,160
Dover sole	501	1,739	5,529	9,267	17,036	16,402
Pacific cod	15,541	6,213	200	..	21,954	13,346
Lingcod	2,826	2,952	736	673	7,187	7,857
Pacific ocean perch	1,039	11,303	9,548	85	21,975	14,844
Other rockfish	782	5,504	4,147	6,702	17,135	18,685
Other species	3,957[a]	6,369[b]	1,701[c]	5,220[d]	17,247	16,622
Total food	27,318	40,396	25,300	29,240	122,254	106,632
Animal food	4,836	1,194	5,990	1,738	13,758	15,679
Total fish	32,154	41,590	31,290	30,978	136,012	128,311
Total hours	27,700	52,340	31,312	51,445	162,797	159,991
% of total catch	23.6	30.6	23.0	22.8		
Catch per hour (lb)	1,161	795	999	602	835	

[a]Mainly rock sole

[b]Starry flounder, other flatfish and miscellaneous other species

[c]Mainly rex sole and starry flounder

[d]Mainly sablefish, rex sole and other flatfish

by a price dispute early in 1964 which tied up vessels but mainly by a reduction in fishing effort for sole species in waters off northern British Columbia.

Catch/effort for this species off the British Columbia coast has been increasing in recent years with the appearance of one or two strong year-classes. It is doubtful that the trend will continue. Assessment of catch/effort of petrale sole in Oregon waters has been difficult because of the overlap of the fishery with that for Pacific ocean perch. Catch/effort data are not yet available from California.

Canada. Total catch of petrale sole by Canadian trawlers in 1964 was 1.2 million pounds. This was 31% above the 1963 landings and 28% above the mean 1959-63 landings. Increased catches were noted for both the southern (PMFC Areas 3B and 3C) and the northern stocks (PMFC Areas 3D to 5D inclusive). Mainstay of the 1964 fishery in both areas was believed to be the 1957 and 1958 year-classes. Length-frequency data and age determinations suggest that their immediate successors are of less strength and it is probable that the relatively high catch/effort of the past two or three years (with respect to the low period of 1955 and 1956) will not be sustained.

Washington. Landings of petrale sole in Washington State in 1964 at 2.2 million pounds were about 27% lower than in 1963 and the mean for the 1959-63 period. Reduced catches from the lower west coast of Vancouver Island (Areas 3C and 3D) were due partly to abundance of dogfish in Area 3C which hampered fishing and due partly to a price dispute early in 1964 which limited trawling operations. In northern British Columbia waters (Area 5A to 5D inclusive) increased interest in the Pacific ocean perch fishery resulted in reduced fishing for sole species.

Oregon. Petrale sole landings by Oregon otter trawlers were 1.9 million pounds in 1964. This was about 18% lower than 1963 landings but not appreciably different from the 1959-63 mean landings. Increased effort for Pacific ocean perch has resulted in a reduction in fishing effort for petrale sole.

California. Total landings of 2.7 million pounds in 1964 were 19% lower than in 1963 but only 9% lower than the mean catch for 1959-63. A 13% decline in overall fishing effort affected the catch of all species in California during 1964. The 1964 winter fishery off upper California (Area 1C) was sharply curtailed by adverse weather.

3. Lingcod

Total catch of trawl-caught lingcod reported by all agencies in 1964 at 5.7 million pounds was about 10% greater than in 1963 but still about 25% lower than the mean catch for the 1959-63 period. The lingcod fishery with trawl nets is an incidental one in California and Oregon and the bulk of the landings is taken by Canadian and Washington State vessels. In PMFC Area 3C (lower west coast of Vancouver Island) catch and catch/effort for Canadian and Washington State vessels increased in 1964 (Table II). While there are undoubtedly fluctuations in availability in the stock in this area, the data suggest that recent changes in catch and catch/effort have been due mainly to changes in year-class strength as suggested by changes in length-frequency composition (Fig. 2). Canada and Washington State agreed that an exchange of more detailed data on the lingcod stock in PMFC Area 3C would be of mutual benefit.

Canada. Total Canadian trawl catch of lingcod in 1964 was just over 2.8 million pounds, twice the catch in 1963 and about 22% greater than the

Table II. Statistics of the trawl fishery for lingcod in PMFC Area 3C.

Year of catch	Total catch (million lb)	Canada		Washington State	
		Catch (million lb)	Catch/Effort (lb)	Catch (million lb)	Catch/Effort (lb)
1959	3.8	0.8	634	3.0	473
1960	4.1	1.0	482	3.1	417
1961	4.3	1.6	643	2.7	349
1962	1.9	0.5	476	1.4	209
1963	1.4	0.4	722	1.0	170
Mean 1959-63	3.1	0.9	591	2.2	324
1964	2.4	0.9	878	1.6	500

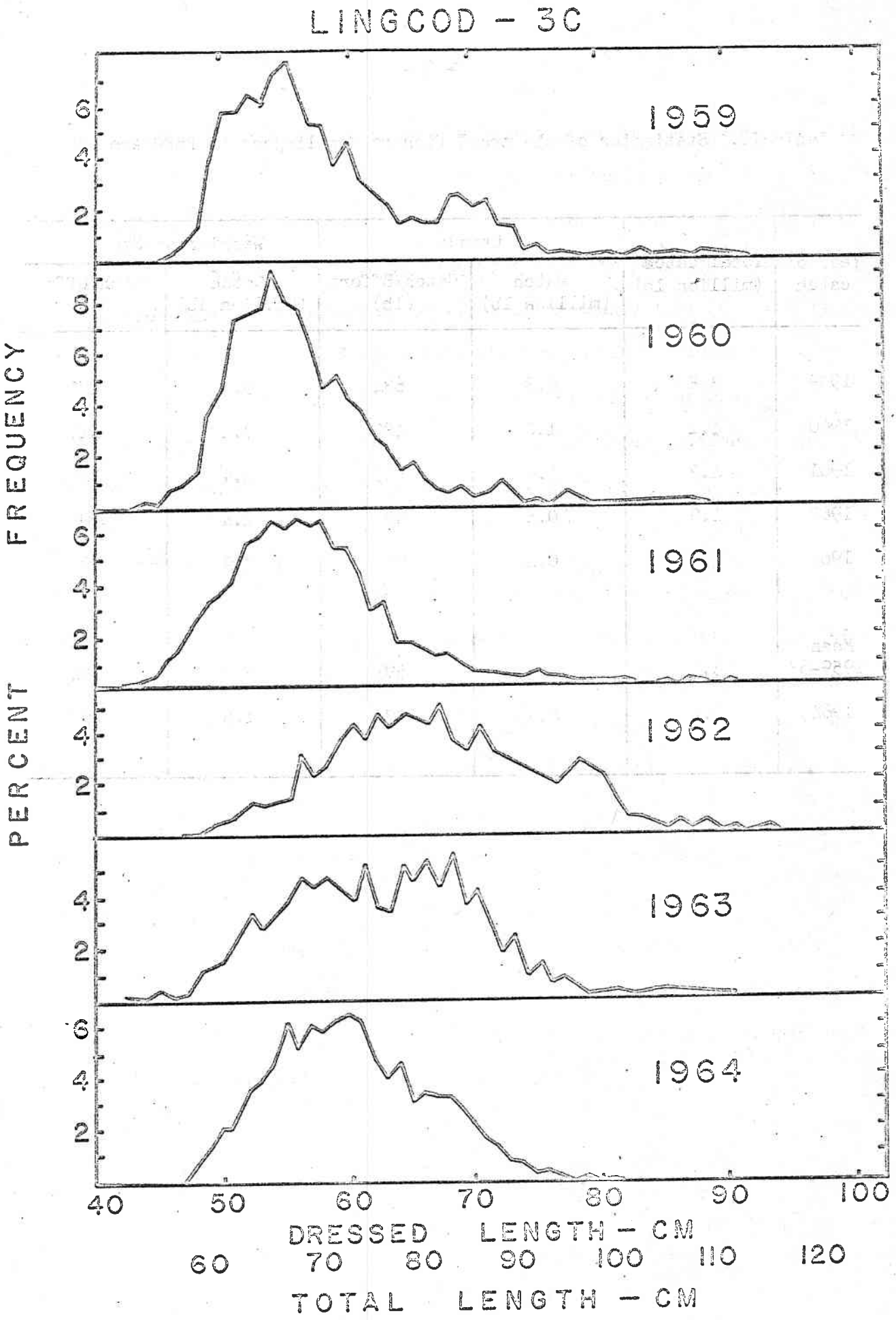


Fig. 2. Length-frequency distribution of trawl-caught lingcod taken in PMFC Area 3C during 1959 to 1964. (Data from Canadian vessels.)

mean for the 1959-63 period. Catch in PMFC Area 3C, off the lower west coast of Vancouver Island (0.9 million pounds), was more than twice that taken in 1963 and 10% higher than the mean for the 1959-63 period. Catch/effort in this area increased to 878 pounds per hour in 1964. In waters north of Cape Scott (PMFC Areas 5A to 5D inclusive) catch in 1964 was 1.2 million pounds, or about 20% greater than the mean for the 1959-63 period.

Washington. Total Washington State trawl catch of lingcod in 1964 was just under 3.0 million pounds. This catch was about 20% lower than in 1963 and 25% lower than the mean catch for the 1959-63 period.

Catch in PMFC Area 3C (1.6 million pounds) was up considerably from that in 1963 (1.0 million pounds) but was well below the mean for the 1959-63 period (2.27 million pounds). The improvement in PMFC Area 3C in 1964 is attributed to some increase in recruitment over that noted in 1962 and 1963. Catch/effort for this stock in 1964 was the highest in the six-year period (1959-64) for both Washington and Canadian vessels. Reduced catch of lingcod in other areas was due to a reduction in fishing effort for this particular species.

Oregon. Landings of lingcod by Oregon trawl fishermen are incidental to those of flatfish and are taken in relatively shallow water. Catch in 1964 (0.7 million pounds) was about 30% greater than the mean catch taken in the 1959-63 period.

California. As in Oregon, the California trawl-caught landings of lingcod are incidental to landings of other species. Trawl catch in 1964 was nearly 0.7 million pounds. The majority of lingcod are caught in the central California region (Area 1B) where an intensive sport fishery for the species also exists.

4. Pacific Cod

Total landings of Pacific cod reached almost 22 million pounds in 1964. The total catch was 40% greater than in 1963 and the highest since 1959. Production by Canadian fishermen reached a record of 15.5 million pounds due to fortunate coincidence of high availability and good market demand. Landings by Washington State vessels, which account in the main for the balance of the Pacific cod catch, were close to the average for the previous five years (6.2 million pounds). In PMFC Areas 5C and 5D, where the bulk of the 1964 Canadian catch was taken, catch and catch/effort reached their highest levels on record.

Canada. Pacific cod was again the dominant species in trawl catches in British Columbia in 1964 and total catch was 15.5 million pounds. The bulk of the catch was taken in Hecate Strait (PMFC Areas 5C and 5D - 10.5 million pounds) and over 2.0 million pounds was taken from the lower west coast of Vancouver Island (Area 3C).

In Area 3C, catch was the highest since 1957 and catch/effort (859 pounds per hour) was about 17% higher than the mean for the 1959-63 period. In northern Hecate Strait (Areas 5C and 5D) catch and catch/effort reached record heights.

Washington. Landings of Pacific cod at 6.2 million pounds were about the same as in 1963 and equal to the mean catch for the 1959-63 period. The landings were approximately half those taken during the peak years of 1957-59 (average catch 12.1 million pounds) mainly because of diversion of effort to Pacific ocean perch.

5. Pacific Ocean Perch

Otter-trawl landings of Pacific ocean perch in 1964 were about 21.8 million pounds. The catch was about 10% lower than in 1963 but still 47%

greater than the 1959-63 mean catch. The bulk of the catch was taken by Washington and Oregon fishermen (11.3 and 9.5 million pounds respectively) from PMFC Areas 2A to 5C inclusuve. Catch/effort data from both Washington and Oregon vessels have shown an upward trend in recent years. Some measure of the increased catch/effort may be attributed to increasing vessel efficiency through use of improved fish-finding equipment and the use of bobbins.

Washington. Total Washington catch of 11.3 million pounds in 1964 was 28% lower than in 1963 but 20% greater than the mean catch for the 1959-63 period. Bulk of the 1964 catch was taken in PMFC Areas 5A and 5B (6.7 million pounds) and a large part of the balance from Areas 3C and 3D (3.5 million pounds). There has been a reduction in fishing effort in recent years in the latter areas, not because of reduced availability of fish but because of the higher availability and consequent diversion of fishing effort to the northern areas (Areas 5A and 5B). Catch/effort in 1964 was 935 pounds per hour in Areas 3C and 3D and 1,611 pounds per hour in Areas 5A and 5B, both of which exceed the mean for the years 1959-63.

Oregon. Catch of Pacific ocean perch in 1964 at 9.5 million pounds was the highest on record. This was an increase of 1.6 million pounds over the previous record of 7.9 million pounds in 1963. Major catches came from the upper Oregon coast and the Columbia River area (Areas 2C and 2D). Catch/effort of this species has shown a continued rise during the 1960-64 period.

6. English Sole

Total catch of English sole by otter trawlers on the Pacific coast in 1964 was about 11.7 million pounds. This was not appreciably different from the 1963 landings or from the mean catch for 1959-63. Canada, Washington and

Oregon reported lower landings while California noted an increase. Both Washington and Oregon reported increased abundance of small English sole in waters from the Columbia River area to north Washington area and improved recruitment is expected to result in increased catches in the near future.

Canada. The total catch of English sole by Canadian trawlers in 1964 was 1.4 million pounds of which just over 50% was taken in PMFC Area 5D.

The upper Hecate Strait English sole fishery (PMFC Area 5D) continues to depend on fish newly recruited. Catch/effort in 1964 (511 pounds per hour) continued downward despite a reduced catch as has been the case for the past several years. Age determinations of 1964 samples show greater-than-average representation of IV-year-old fish. This may indicate that recruitment is improving but confirmation must await the results of the 1965 fishery.

Washington. Total catch of English sole by Washington State otter trawlers was about 4.1 million pounds. Of the catch taken in offshore waters (1.9 million pounds) almost 90% was taken in the upper Washington coast area (PMFC Area 3B). Catch/effort in Area 3B in 1964 was the lowest recorded since 1959 and well below the 1959-63 average (1964 = 208 pounds per hour; 1959-63 = 262 pounds per hour).

Washington attributes the high catch and catch/effort in 1959 largely to the improved survival of young fish during the period 1955 to 1958 when large-mesh nets were required. They consider that this is borne out by the decline in catch, catch/effort and recruitment with the return to use of small mesh nets following 1959. They expect no increase as long as small mesh nets continue to be used.

Oregon. English sole landings, at 1.6 million pounds in 1964, were 15% lower than both 1963 landings and the mean landing for the 1959-63 period.

Better-than-average quantities of small English sole were noted off the Columbia River in late summer of 1964. It is hoped that this indicates improved recruitment which will reverse the downward trend in landings and catch/effort in recent years.

California. Landings of English sole in California in 1964 were 4.6 million pounds. This exceeded 1963 landings by 8% and 1959-63 mean landings by 20%. Increases occurred in all areas in 1964 except 1A where catch declined 10% (from the 1963 catch of 0.5 million pounds).

7. Dover Sole

Total Dover sole landings in 1964 were approximately 17.0 million pounds. The catch was 7% lower than in 1963 but 4% higher than the mean catch for the 1959-63 period. This species is the object of major fisheries in Oregon and California, is taken incidentally by Canadian fishermen and to a large extent incidentally by Washington fishermen.

Canada. Catch of Dover sole by Canadian trawl fishermen in 1964 was about one-half million pounds. The bulk of the catch was taken in the Port San Juan area off Vancouver Island.

Washington. Catch of Dover sole by Washington trawl fishermen in 1964 was approximately 1.7 million pounds. This catch was about 39% lower than both the 1963 catch and the mean catch for the 1959-63 period. The bulk of Washington Dover sole catch is taken from grounds off the west coast of Vancouver Island (PMFC Areas 3C and 3D) and the north Washington coast (Area 3B). In 1963 and 1964 increased landings were made from the upper Queen Charlotte Sound area (PMFC Area 5B). These landings were coincidental with increased landings of Pacific ocean perch from the same area.

Oregon. Landings of Dover sole in Oregon in 1964 reached 5.5 million pounds. This was an increase of 3% above 1963 landings and 17% above mean landings for the 1959-63 period. The increased catch in 1964 was due to sustained high market demand for this species. Major catches of Dover sole by Oregon fishermen came from southwest of Coos Bay (Area 2B), southern Hecata Bank (Area 2B), the south side of the Astoria Canyon (Area 2D) and from the Willapa Deep (Area 3A). There are no apparent trends in catch/effort of Dover sole caught by Oregon fishermen.

California. Total landings of Dover sole in California in 1964 were almost 9.3 million pounds. The catch was down 5% from 1963 but 9% greater than the mean for the 1959-63 period. Despite summer limits on landings of Dover sole in Area 1C, Dover sole continued to be the dominant single species in California trawl landings.

V. REVIEW OF EXCHANGE OF DATA PROCEDURES

1. Standardization of Effort and Catch/Effort

During discussion, the committee members agreed that strict standardization of catch/effort data was not possible. An important conclusion was that methods of obtaining and calculating effort and catch/effort data should be clearly definable and that trends in catch/effort for a stock fished by one or more fisheries should be similar if the trends are to be considered meaningful.

2. Evaluation of PMFC Data Record and Suggestions for Extended Use

Leon Verhoeven, PMFC Executive Director, stated that the 1964 trawl data on catch and effort would be ready for the Data Series by the end of 1965.

He anticipated publication of crab, shrimp and albacore data before that time. There was no commitment regarding extended use of the Data Series (though there was considerable discussion of types of data: market samples, tagging records, etc.).

3. Computer Techniques

All agencies stated that computer programmes were in common use in fisheries research either in the field of statistics or in biological research. The committee agreed that rapid development in techniques in this field would make a summary of programmes now in use of only short-term value.

VI. REVIEW OF CURRENT AND PROPOSED RESEARCH PROGRAMMES

All agencies emphasized the amount of effort required merely to keep abreast of statistics of catch and effort for current trawl landings. Canada and Washington State agreed to an informal exchange of sampling data on stocks jointly exploited. The exchange would facilitate comparison of conclusions concerning a particular species. It was agreed that such an exchange between the other agencies might also be profitable.

Some discussion took place on projects being considered for study under U. S. Public Law 88-309. The programmes are still in the planning stage but the United States committee members hoped for substantial provision for groundfish-directed research.

Summaries of recent taggings by agencies are presented in Appendices B to G (in map form).

Alaska. No groundfish research currently being conducted or planned.

Canada. A major portion of the work involves collections and analysis of statistics of catch and fishing effort. Routine sampling of various species

at the main ports of landings provides data which yield information on growth, mortality and recruitment in the various fisheries. At times special studies are undertaken to provide information on the life histories of important species. During field operations in 1964 approximately 3,700 Pacific cod were tagged in May in northern Hecate Strait (PMFC Area 5D) and in September 2,500 petrale sole and 2,000 lingcod were tagged off the lower west coast of Vancouver Island (Area 3C). In May, 1965, a further 3,600 Pacific cod were tagged in Area 5D. Laboratory work involved completion of a manuscript on the petrale sole off the British Columbia and Washington coasts which has been submitted for publication. Further studies of the effect of salinity and temperature on development of Pacific cod eggs were conducted. Additional experiments along the same lines for other species are planned.

Special attention is also being given to the Pacific ocean perch. Completion is expected, in 1965, of field collections required to define general features of the distribution and size and age composition of ocean perch throughout its range in the northeast Pacific.

In July 1965 funds for groundfish work were made available under the Industrial Development Service of the Government of Canada. The programme involved is exploration with standard and modified trawl gear in the lower Hecate Strait and upper Queen Charlotte Sound regions (PMFC Areas 5C and 5B respectively). The work is designed to discover, if possible, new fishing areas and extend boundaries of known fishing grounds. A chartered vessel has been obtained for a 90-day period beginning July 5, 1965.

Washington. Most effort expended on groundfish by Washington State is directed to the problem of maintaining fleet contact and adequate catch statistics. Biological work includes some age determinations on English sole

and starry flounder in Puget Sound and petrale sole from the Esteban Deep grounds. During October and November, 1964, approximately 3,450 English sole were tagged in Puget Sound and the lower portion of the Strait of Georgia. Of these 1,750 were the dart type and 1,700 Peterson type.

Oregon. Oregon reported that, similar to other agencies, main effort of the trawl fish investigation was directed to trawler interviews and the day-to-day problems which arose. Rockfish and mink food landings are examined at intervals to determine species composition. In addition length-frequency data are collected from landings of Dover, English and petrale sole, and Pacific ocean perch. Some problem has been encountered with aging (from scales) tagged Dover sole recovered after 10 years at liberty. Work will continue on the above studies.

California. The trawl investigation has continued its programme of routine sampling, statistical studies, and biological and systematic studies on rockfish. Landings of Dover, English and petrale sole, and animal food were sampled at major ports. During July and August, 1964, 2,870 petrale sole were tagged and released off Bodega Bay and Point Delgada in Area 1B. Systematic studies were concluded on several closely related rockfishes and a revised rockfish key was completed. An age study of English sole in the Monterey Bay region (Area 1B) has been completed and work on the manuscript has begun. Analysis of English sole tagging results has been completed. The programme generally will continue with little change during the coming year. However, there will be additional emphasis on analyses of existing data.

VII. REVIEW AND SUGGESTIONS FOR JOINT PROJECTS

The Executive Director, PMFC (L. Verhoeven) informed committee members that PMFC funds were available for publication of Bulletin No. 7, which was hoped to be on English sole and/or other bottomfish. He agreed to re-canvass all agencies regarding availability of such data and ask for firm commitments for publication. Canada made a firm commitment to submit an English sole tagging summary.

As noted earlier in the report, Canada and Washington State and other agencies agreed to exchange data on fisheries of mutual concern.

The question of preparing a bibliography of publications on west coast groundfish species was discussed. This was considered highly desirable and to facilitate preparation it was agreed that such a bibliography should exclude, for the most part, papers solely on systematics. Washington State reported that biologist, D. Day, was now working on such a bibliography and that other agencies might assist by forwarding information. It was also suggested that Bulletin No. 7 could be a place for publication.

VIII. SEISMIC PROBLEMS

The committee members discussed seismic activities and noted modification of shots through the use of gas exploders. This type of shot was considered to have little effect on marine life. Drilling was underway or about to commence in coastal waters of all agencies. California reported trouble with well-head casings in that a few were left projecting some distance from the bottom. It was learned that there was a Gulf States committee which assessed damage to fishing gear resulting from drilling debris and other

obstructions, such as pipelines and control structures; and made recommendations to the oil companies for settlement of justifiable claims. Discussion suggested such a committee would be desirable for the west coast area.

IX. INTERNATIONAL PROBLEMS

This item was placed on the agenda primarily because of activity of U.S.S.R. fleets off the west coast of North America. Observations off the British Columbia coast (PMFC Area 3C) by Canadian observers and United States fishermen suggest that Pacific ocean perch are the prime object of the Soviet fishery. Little data was available on size of fleets, but Alaska reported a fishing fleet in operation off Forrester Island (PMFC Area 6) for at least two months in 1965. The committee agreed that the parent committee (International Trawl Fishery Committee) should be asked to attempt to obtain data on catch by species and effort expended by other nationals fishing off the west coast of Canada and the United States.

X. NEW PROPOSALS FOR TRAWL REGULATIONS

Canada is considering a change in mesh size in codends in use in offshore waters. Present regulations read 4", and a reduction to $3\frac{1}{2}$" is contemplated to ease the serious gilling problem with Pacific ocean perch and dogfish.

Washington proposes to study the feasibility of increasing the minimum size limit of all sole above the limit of $11\frac{1}{2}$" now in effect. The study is aimed toward reducing wastage of small fish.

It was suggested that the resumé of trawl regulations appended to the

report of the fourth annual meeting of the Technical Subcommittee (Appendix E) be updated for inclusion in the report of the 1966 meeting.

XI. OTHER BUSINESS

The committee re-emphasized the need for co-ordinated research programmes on west coast species of groundfish. It was agreed that present programmes need evaluation to determine their effectiveness in an overall management programme for west coast groundfish stocks.

The executive director, PMFC, agreed to canvass agencies such as Oregon State University, etc., which might be doing bottom fish tagging in order to keep the committee up to date on all tagging programmes.

It was also agreed that agencies would exchange data on market sampling with respect to species, location, number sampled, sex ratio, etc.

XII. RECOMMENDATIONS

1. The Technical Sub-committee recommends that the current restrictions on petrale sole fishing remain unchanged.

2. The Technical Sub-committee recommends that the International Trawl Fishery Committee (appointed by the Second Conference on Coordination of Fisheries regulations between Canada and the United States) 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. J. Arthur Thomson, Fisheries Research Board of Canada, remained as Chairman for another year. He suggested the next meeting be held in Portland, Oregon. The date has been tentatively set for June, 1966.

XIV. The meeting was adjourned at 4:05 p.m., June 23, 1965.

XV. APPENDICES

APPENDIX A

TENTATIVE AGENDA (2)
Technical Sub-Committee of the
International Trawl Fishery Committee
Seattle, June 22-23, 1965
6th Annual Meeting

I. Call to order

II. Appointment of Secretary

III. Approval of Agenda

IV. Status reports
  1. Total Catch and Effort for the 1964 trawl fishery
  2. Petrale sole
    a) Catch/Effort
    b) Definition of stocks
    c) Winter fishery (± 100 fathoms)
    d) Effectiveness of regulation
  3. Lingcod
    a) Catch/Effort (Area 3C)
  4. True 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 exchange of data procedures
  1. Standardization of catch effort analysis
  2. Evaluation of PMFC Data Record and suggestions for extended use
  3. Computer techniques

VI. Review of current and proposed research programs
  1. Life history studies
  2. Tagging
  3. Sampling
    a) Priorities
  4. Research financed by US public law 88-309

VII. Review and suggestions for joint projects
  1. English sole
  2. Petrale sole
  3. Savings gear studies
  4. Others

VIII. Seismic problems

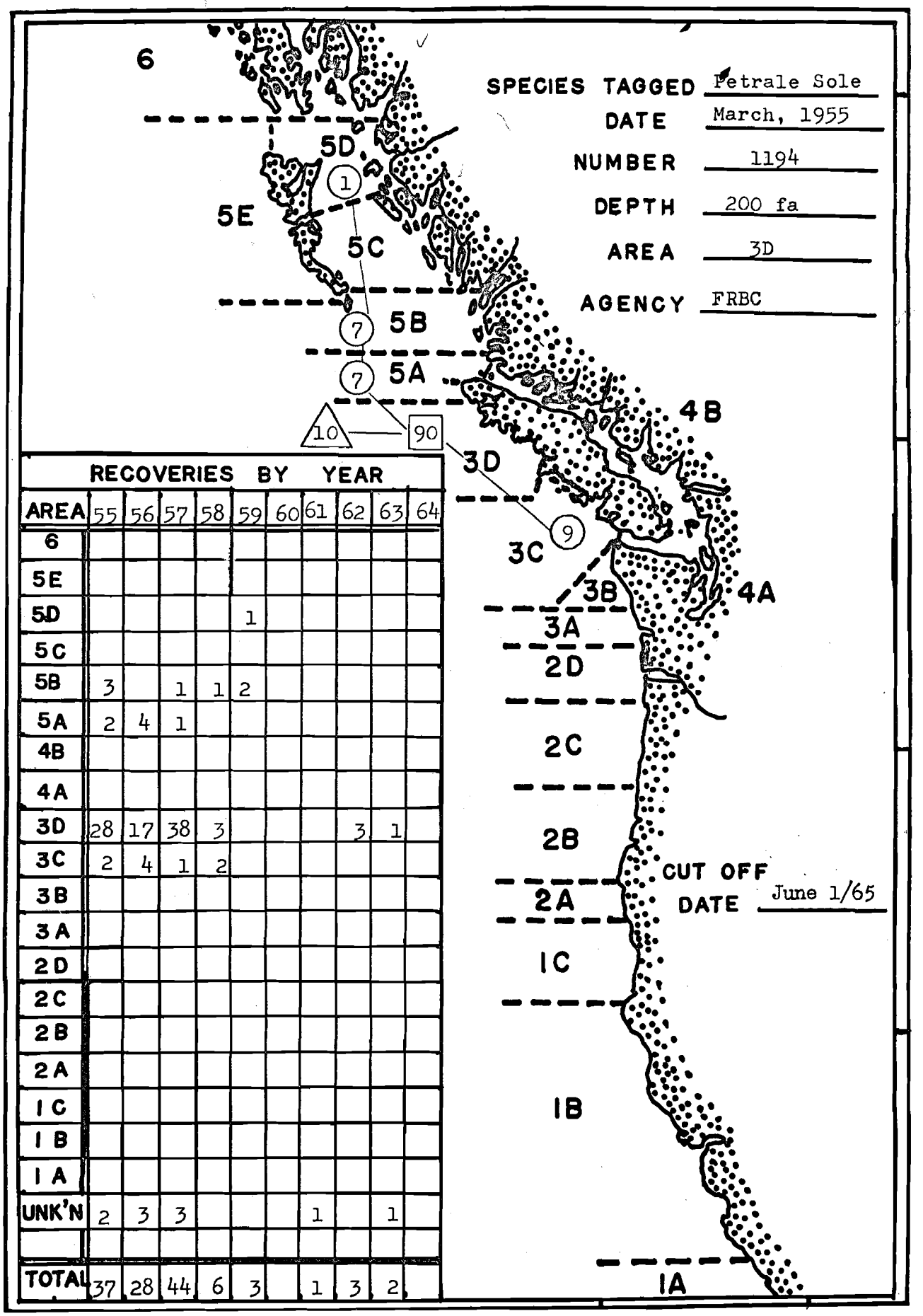
IX. International problems

X. New proposals for trawl regulations

XI. Other business

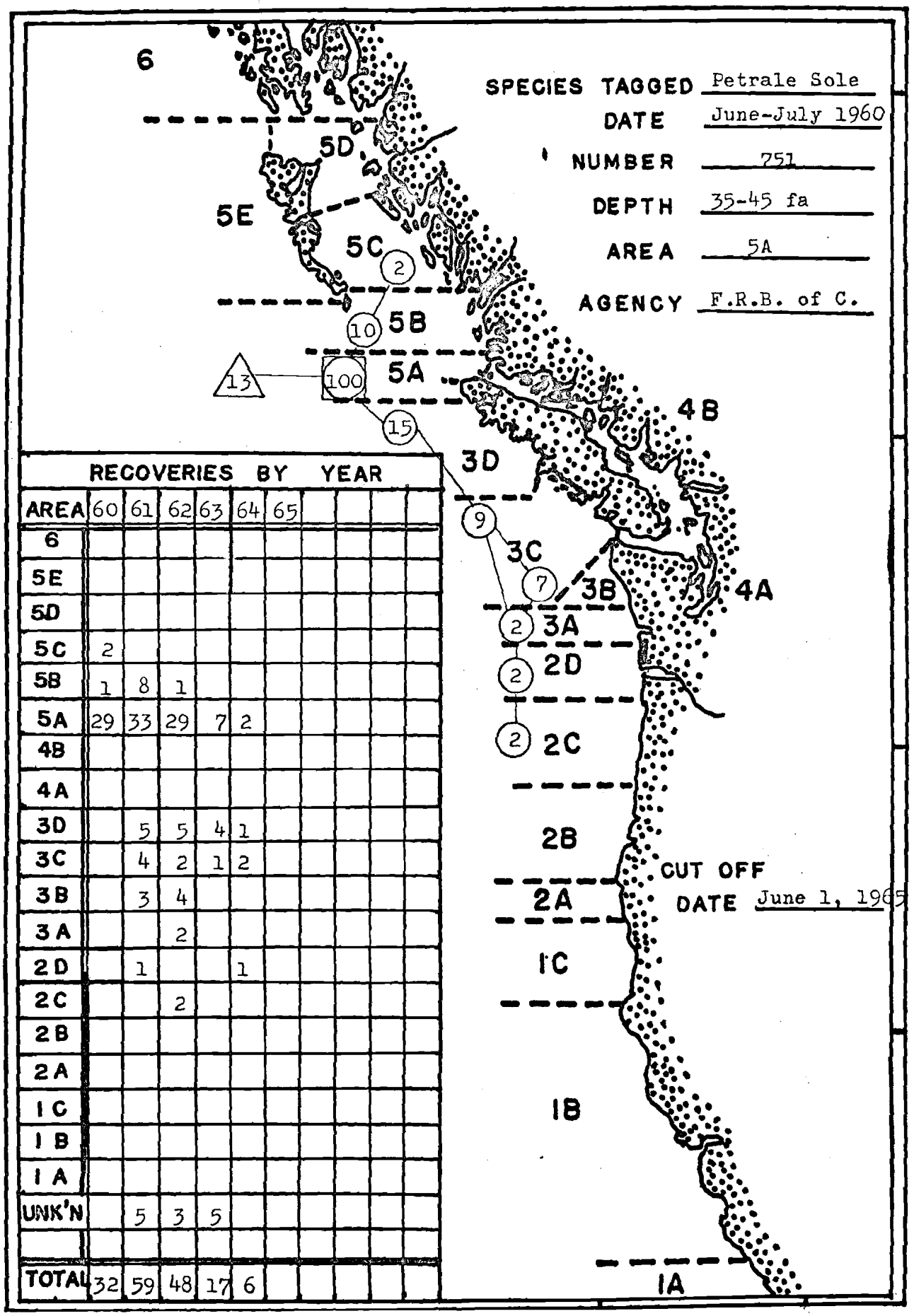
XII. Recommendations

XIII. Adjournment



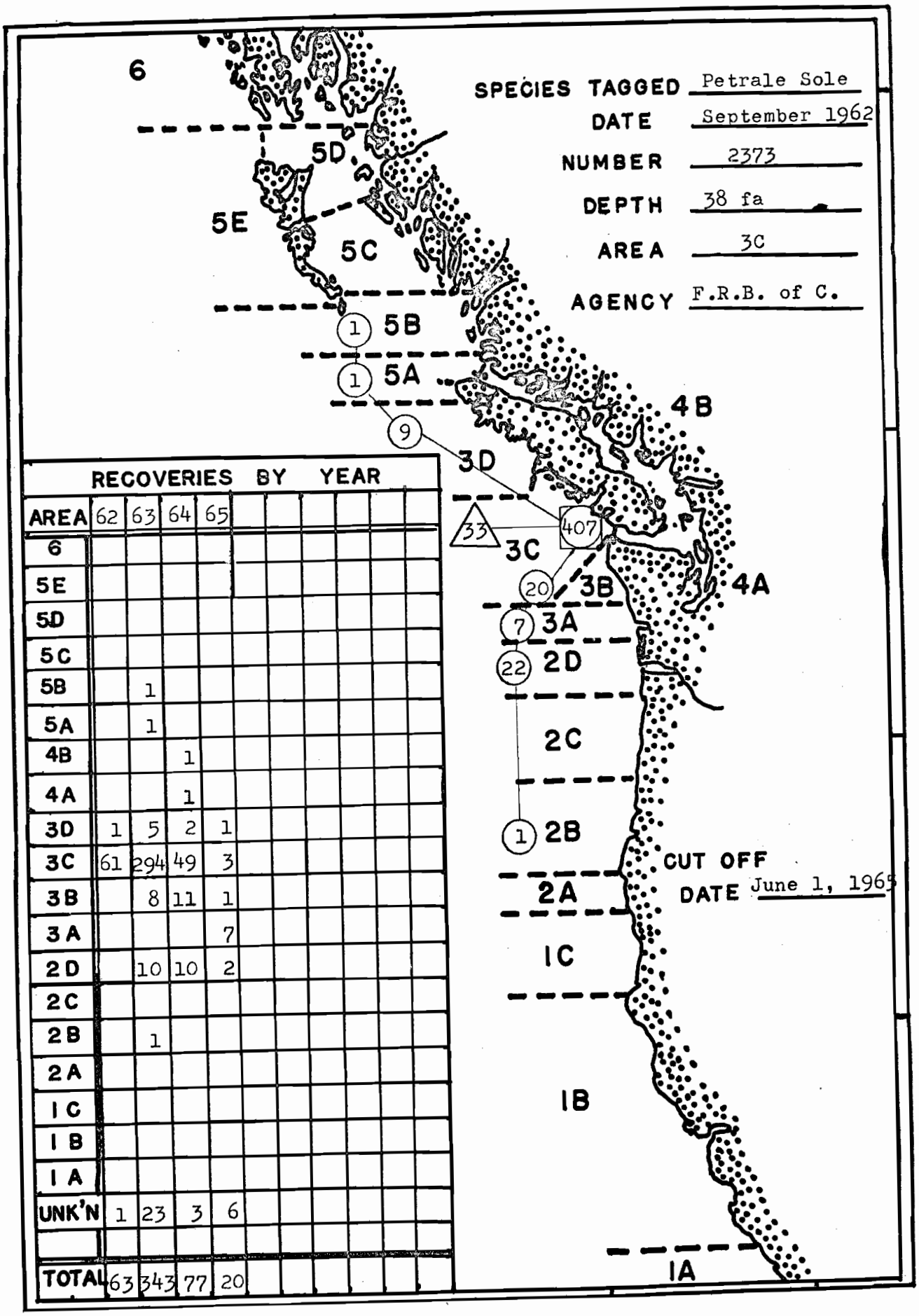
RECOVERIES BY YEAR

AREA	55	56	57	58	59	60	61	62	63	64
6										
5E										
5D					1					
5C										
5B	3		1	1	2					
5A	2	4	1							
4B										
4A										
3D	28	17	38	3				3	1	
3C	2	4	1	2						
3B										
3A										
2D										
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N	2	3	3				1		1	
TOTAL	37	28	44	6	3		1	3	2	



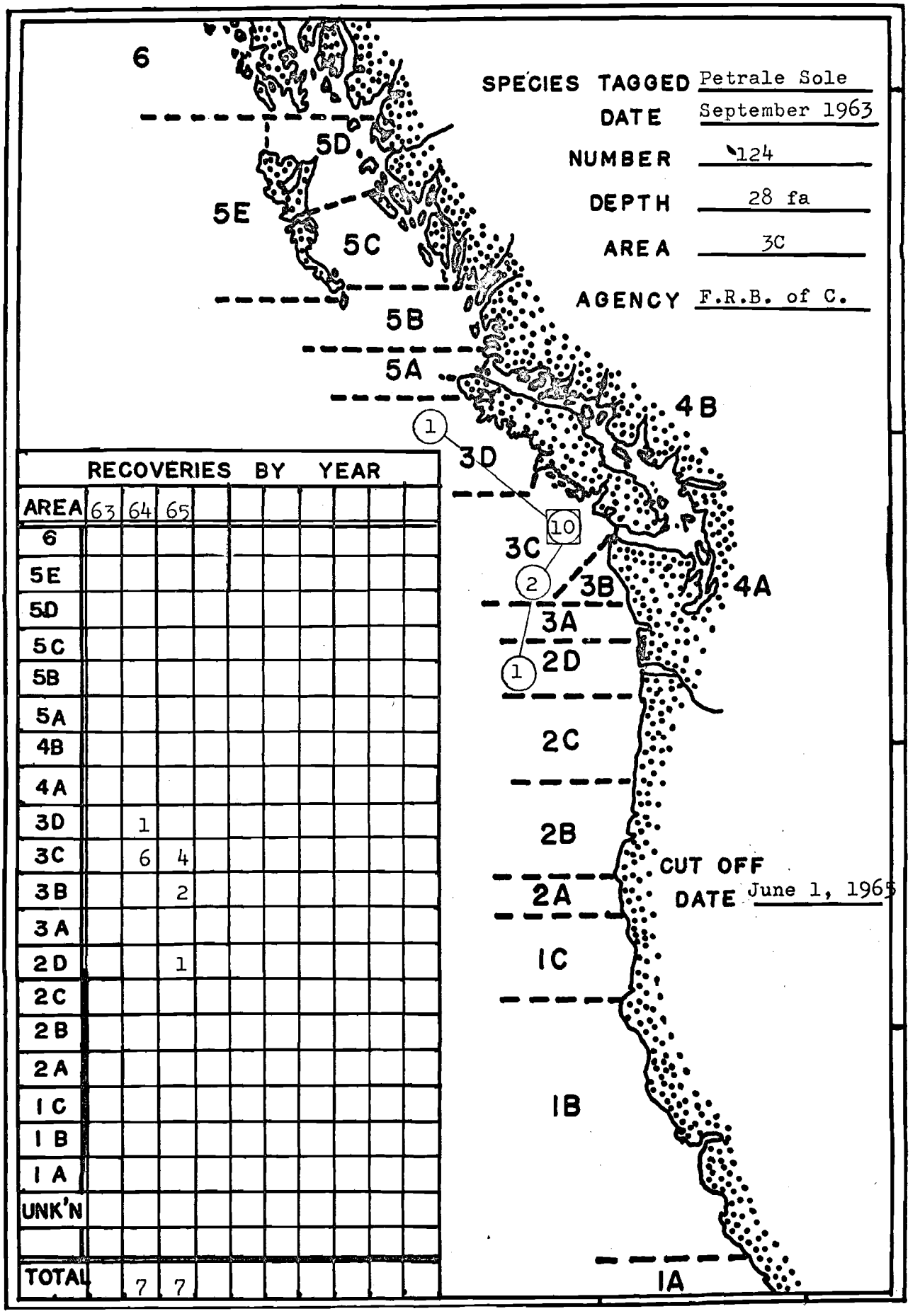
RECOVERIES BY YEAR

AREA	60	61	62	63	64	65				
6										
5E										
5D										
5C	2									
5B	1	8	1							
5A	29	33	29	7	2					
4B										
4A										
3D		5	5	4	1					
3C		4	2	1	2					
3B		3	4							
3A			2							
2D		1			1					
2C			2							
2B										
2A										
1C										
1B										
1A										
UNK'N		5	3	5						
TOTAL	32	59	48	17	6					



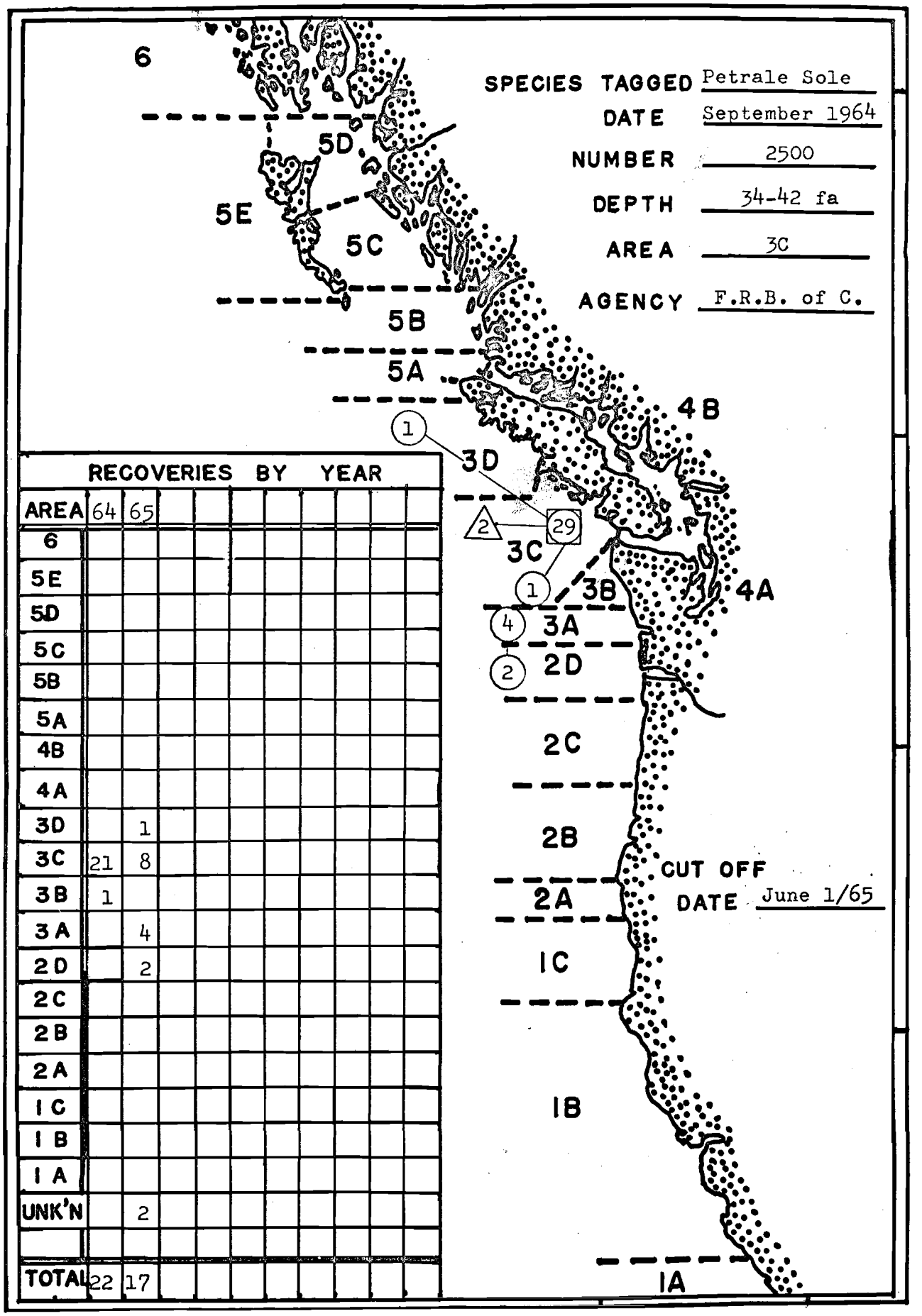
RECOVERIES BY YEAR

AREA	62	63	64	65
6				
5E				
5D				
5C				
5B		1		
5A		1		
4B			1	
4A			1	
3D	1	5	2	1
3C	61	294	49	3
3B		8	11	1
3A				7
2D		10	10	2
2C				
2B		1		
2A				
1C				
1B				
1A				
UNK'N	1	23	3	6
TOTAL	63	343	77	20



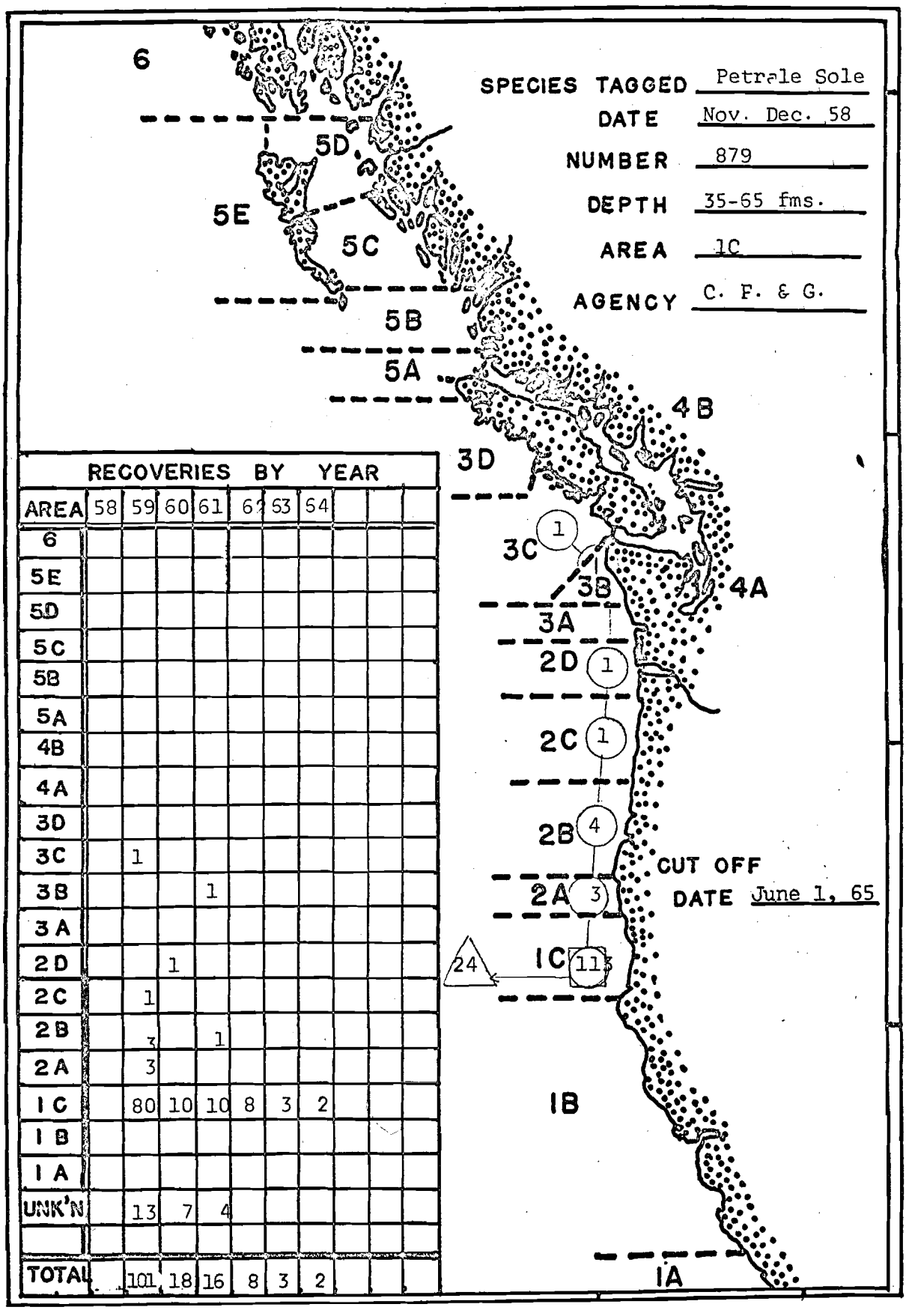
RECOVERIES BY YEAR

AREA	63	64	65							
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A										
3D		1								
3C		6	4							
3B			2							
3A										
2D			1							
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N										
TOTAL		7	7							

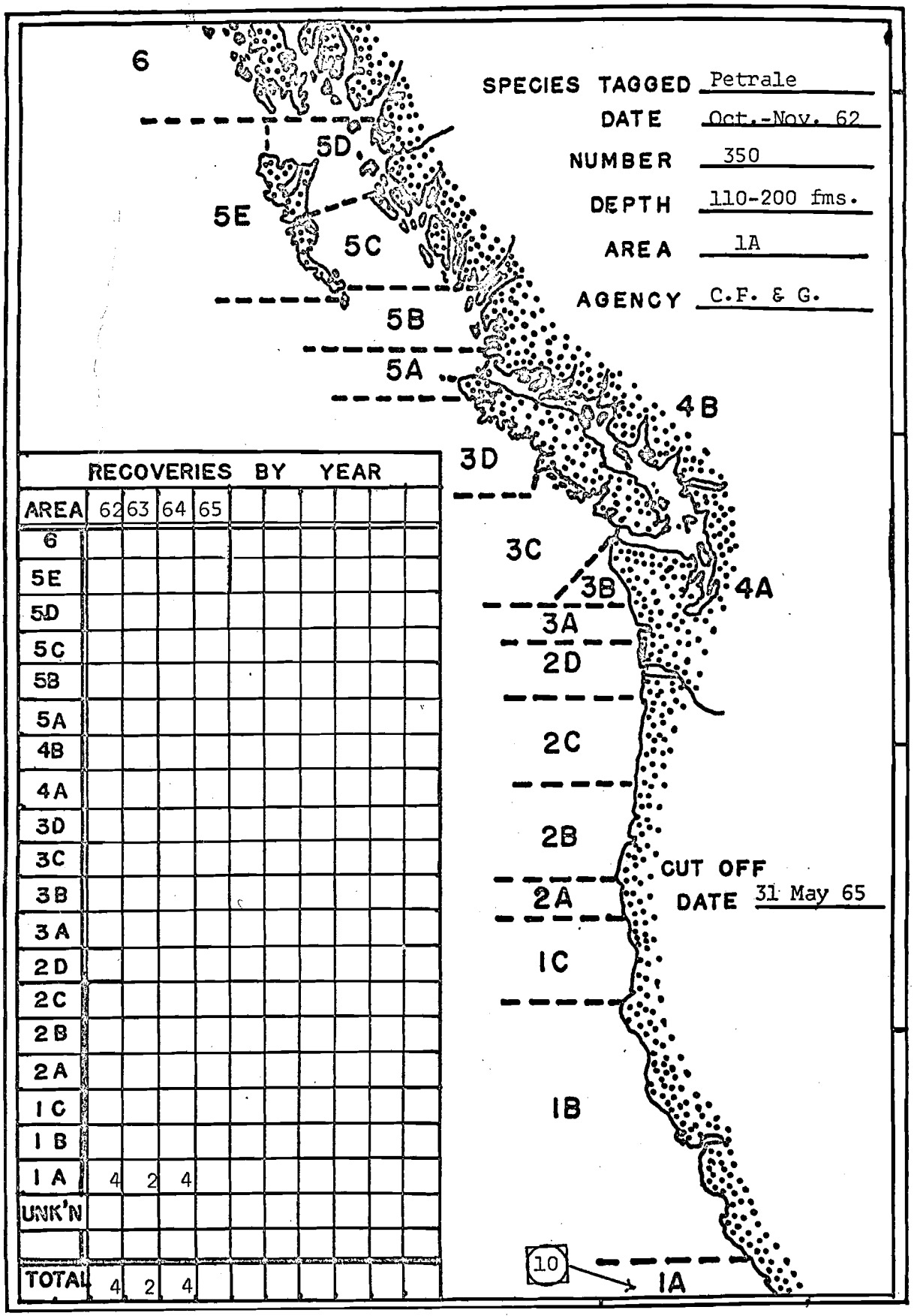


RECOVERIES BY YEAR

AREA	64	65
6		
5E		
5D		
5C		
5B		
5A		
4B		
4A		
3D		1
3C	21	8
3B	1	
3A		4
2D		2
2C		
2B		
2A		
1C		
1B		
1A		
UNK'N		2
TOTAL	22	17

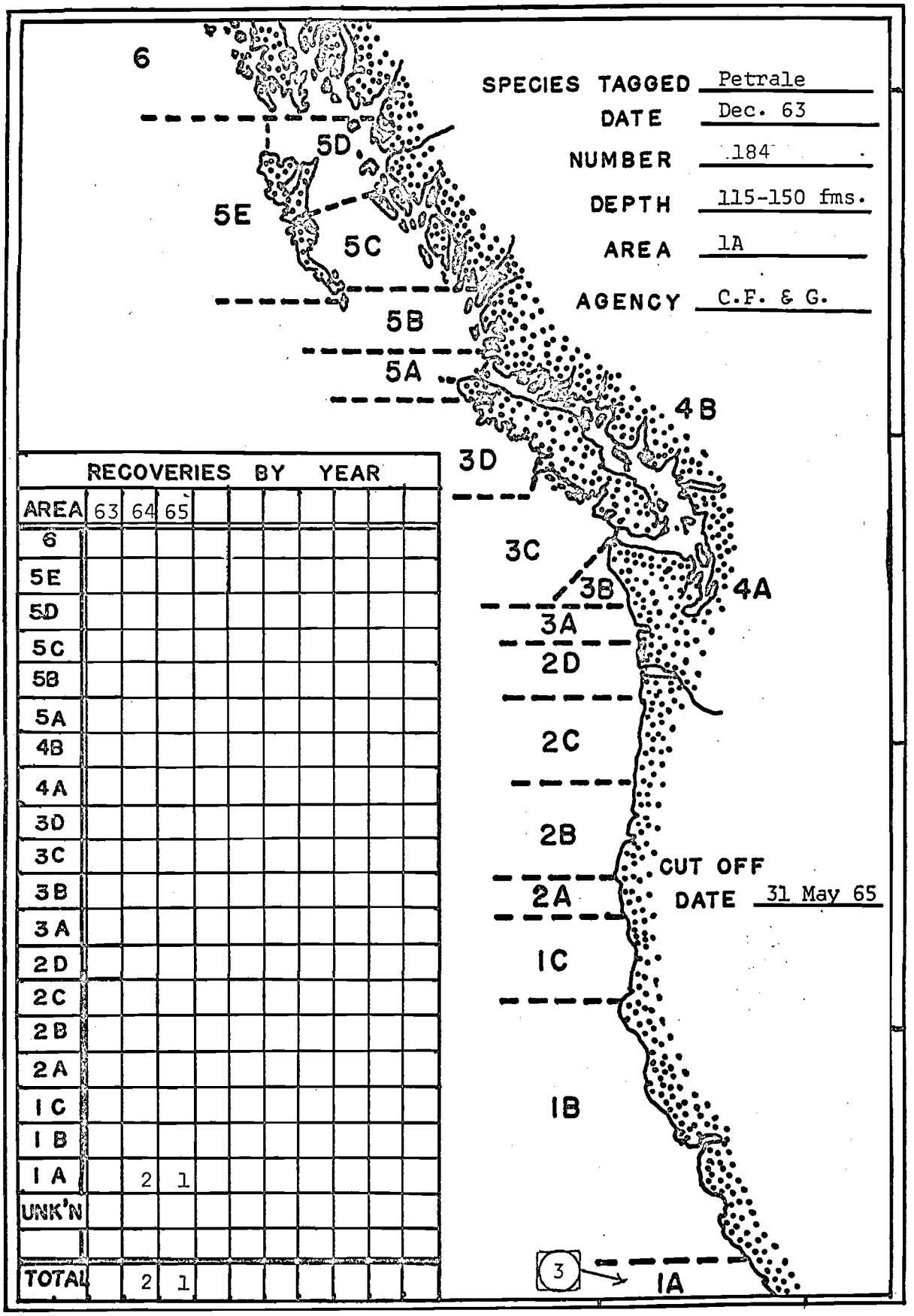


RECOVERIES BY YEAR										
AREA	58	59	60	61	62	63	64			
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A										
3D										
3C		1								
3B				1						
3A										
2D			1							
2C		1								
2B		3		1						
2A		3								
1C		80	10	10	8	3	2			
1B										
1A										
UNK'N		13	7	4						
TOTAL		101	18	16	8	3	2			

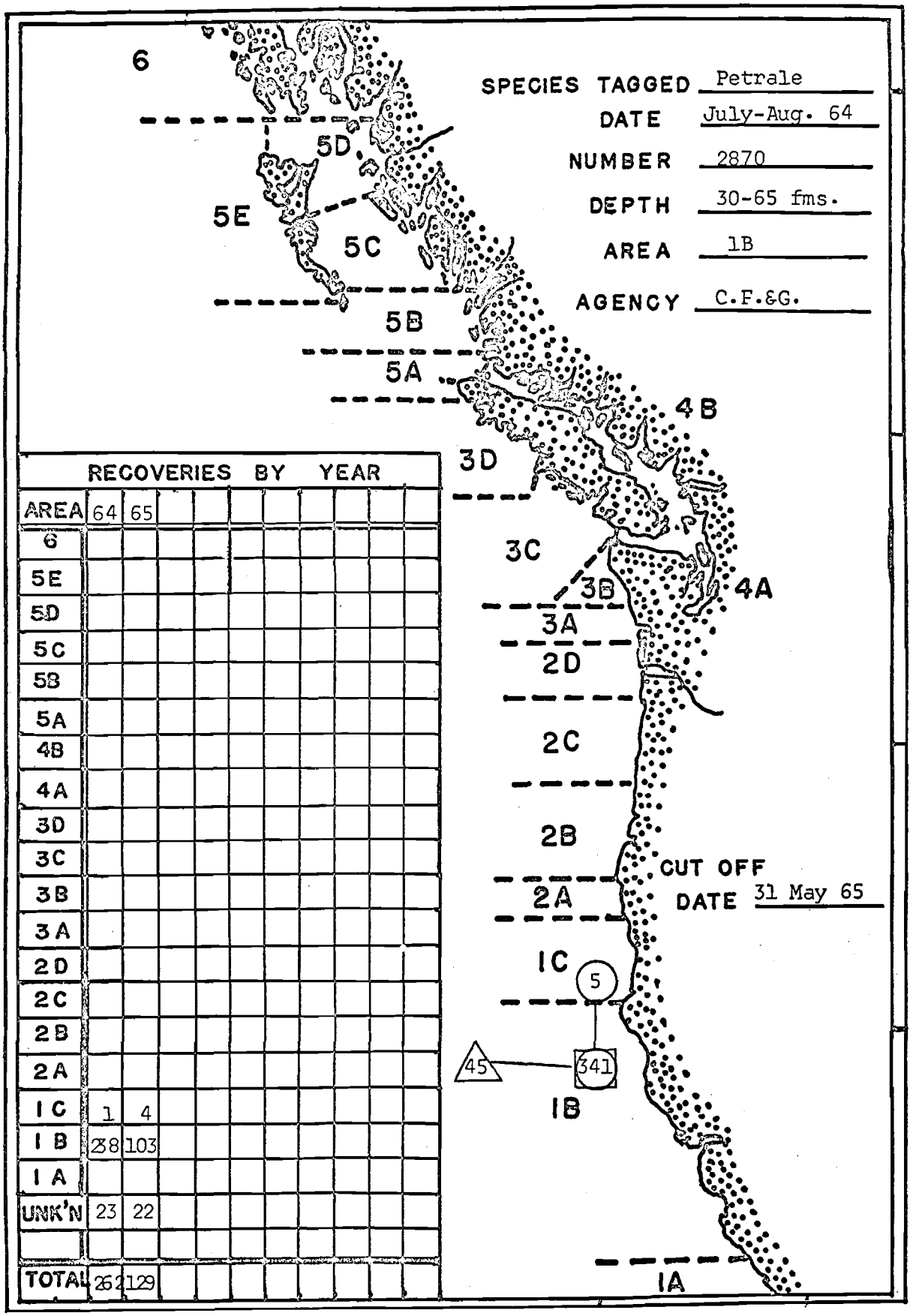


RECOVERIES BY YEAR

AREA	62	63	64	65						
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A										
3D										
3C										
3B										
3A										
2D										
2C										
2B										
2A										
1C										
1B										
1A	4	2	4							
UNK'N										
TOTAL	4	2	4							

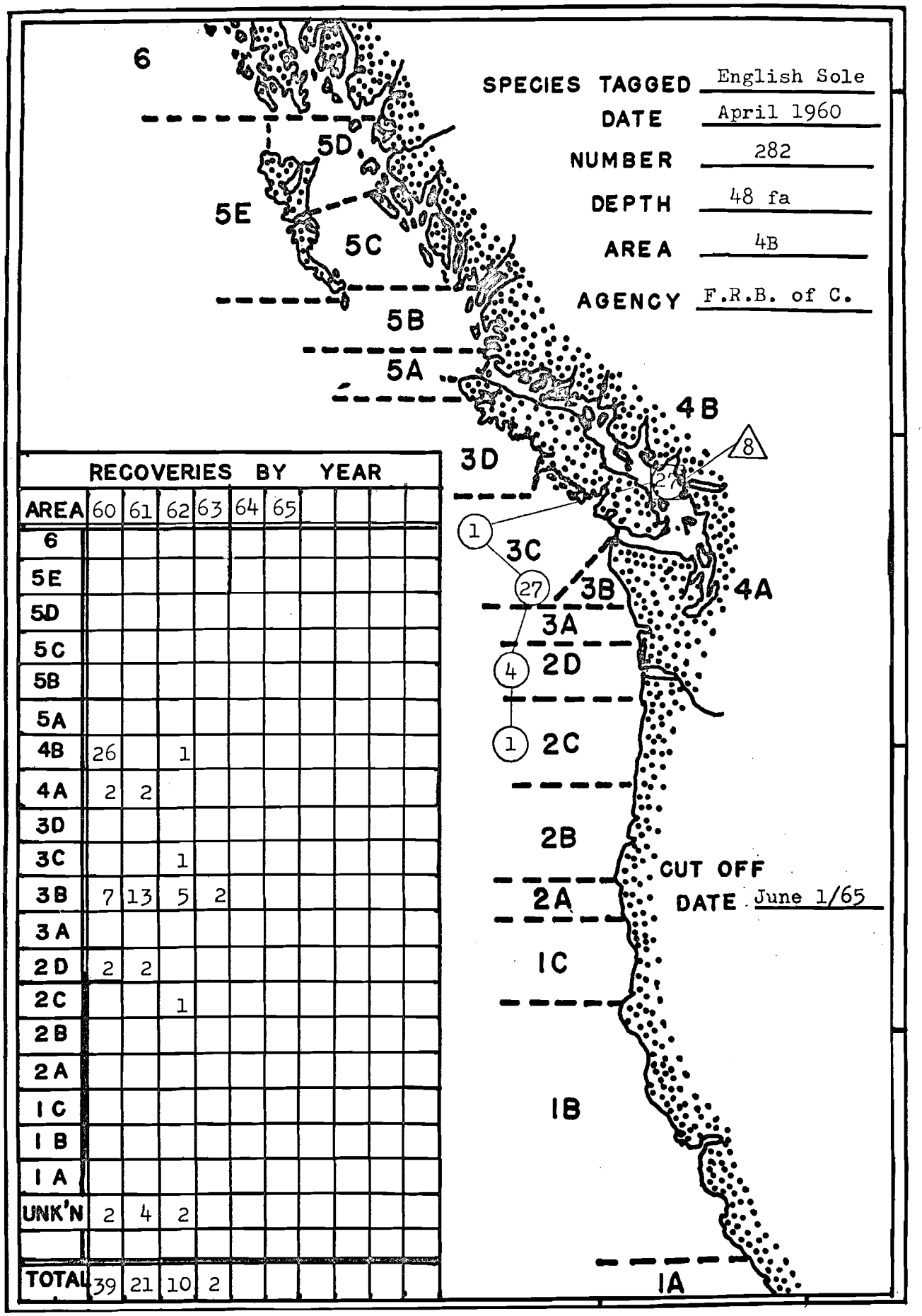


RECOVERIES BY YEAR										
AREA	63	64	65							
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A										
3D										
3C										
3B										
3A										
2D										
2C										
2B										
2A										
1C										
1B										
1A		2	1							
UNK'N										
TOTAL		2	1							



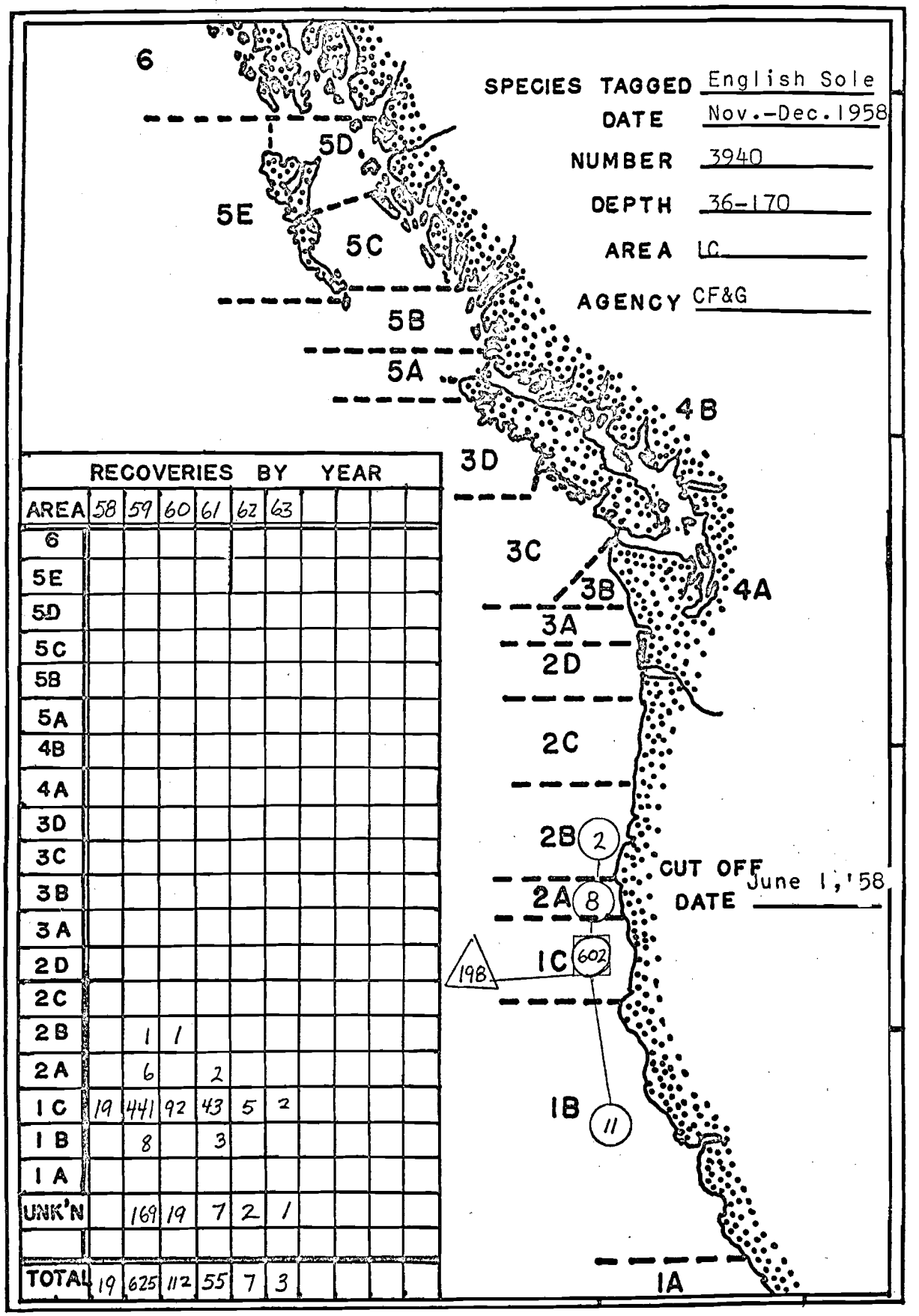
RECOVERIES BY YEAR

AREA	64	65
6		
5E		
5D		
5C		
5B		
5A		
4B		
4A		
3D		
3C		
3B		
3A		
2D		
2C		
2B		
2A		
1C	1	4
1B	28	103
1A		
UNK'N	23	22
TOTAL	262	129



RECOVERIES BY YEAR

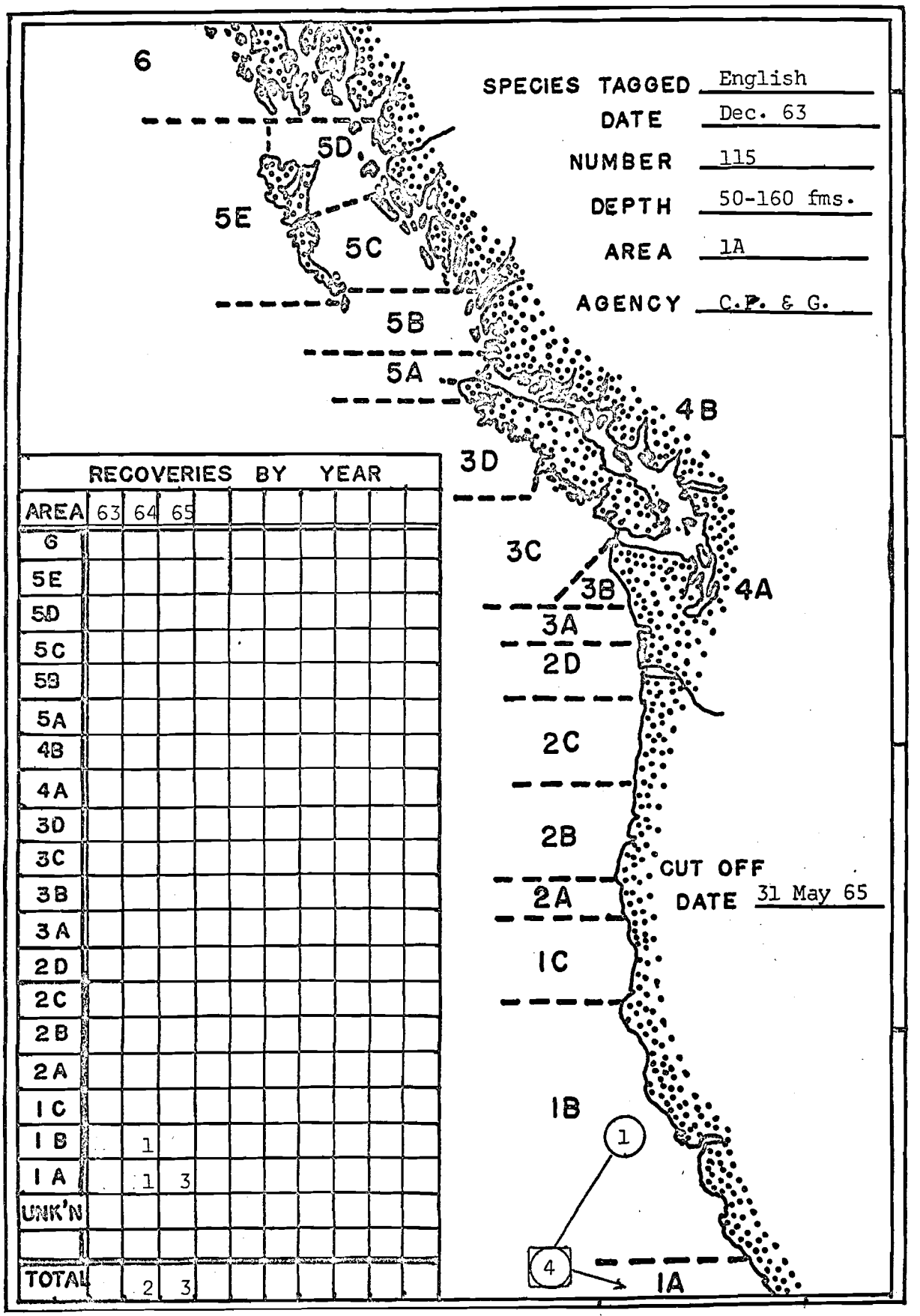
AREA	60	61	62	63	64	65				
6										
5E										
5D										
5C										
5B										
5A										
4B	26		1							
4A	2	2								
3D										
3C			1							
3B	7	13	5	2						
3A										
2D	2	2								
2C			1							
2B										
2A										
1C										
1B										
1A										
UNK'N	2	4	2							
TOTAL	39	21	10	2						



SPECIES TAGGED English Sole
DATE Nov.-Dec. 1958
NUMBER 3940
DEPTH 36-170
AREA LC
AGENCY CF&G

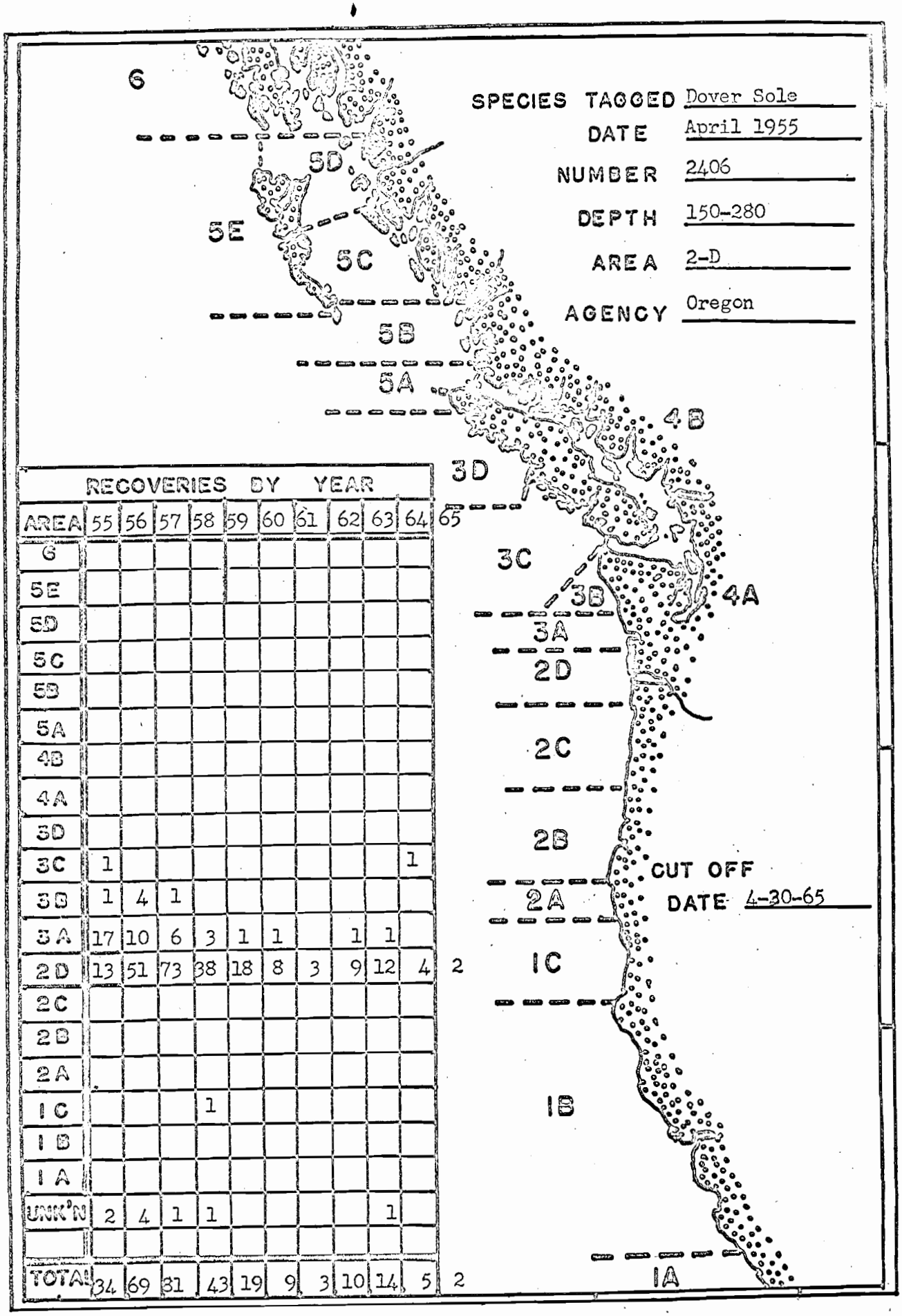
RECOVERIES BY YEAR

AREA	58	59	60	61	62	63				
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A										
3D										
3C										
3B										
3A										
2D										
2C										
2B		1	1							
2A		6		2						
1C	19	441	92	43	5	2				
1B		8		3						
1A										
UNK'N		169	19	7	2	1				
TOTAL	19	625	112	55	7	3				



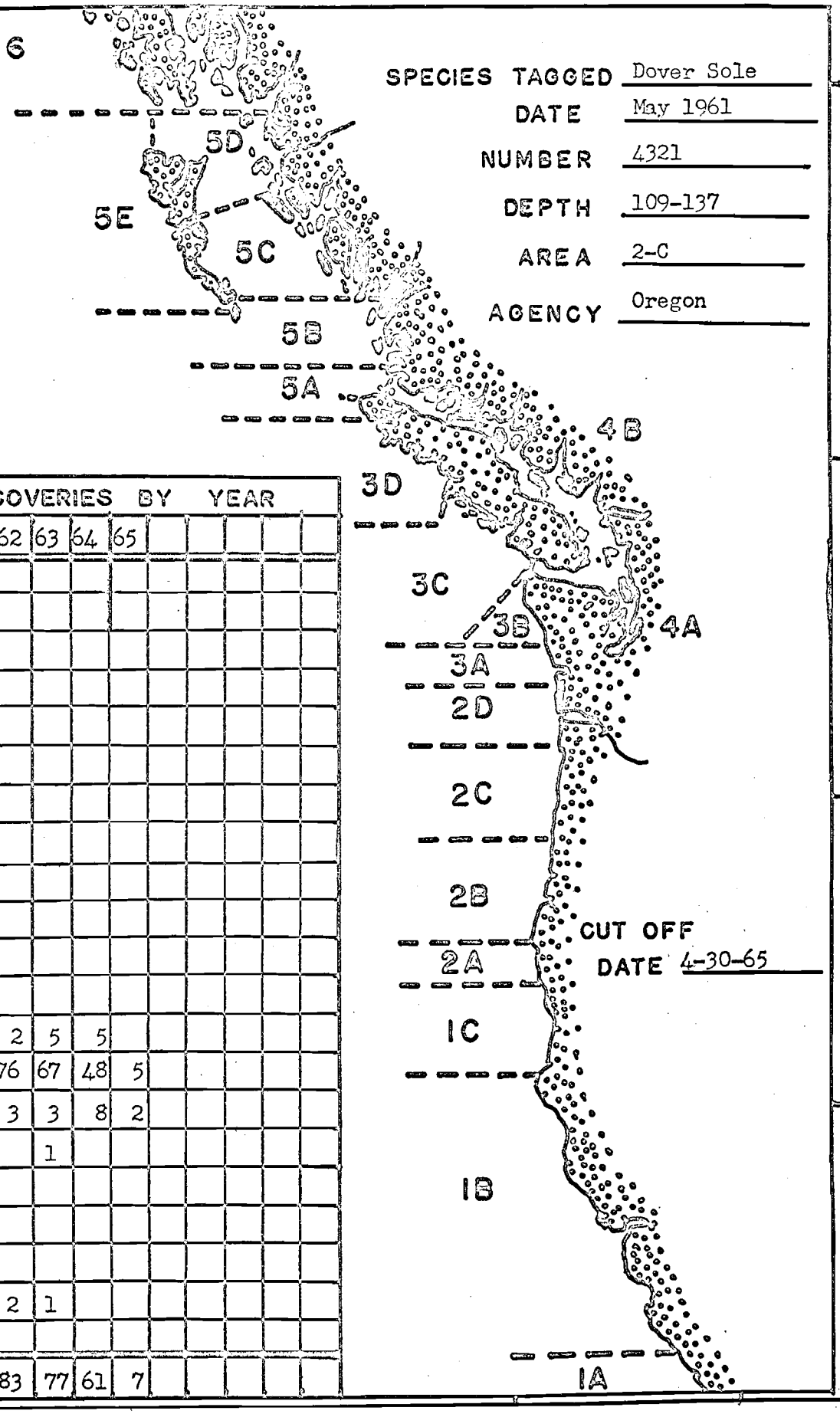
RECOVERIES BY YEAR

AREA	63	64	65
6			
5E			
5D			
5C			
5B			
5A			
4B			
4A			
3D			
3C			
3B			
3A			
2D			
2C			
2B			
2A			
1C			
1B		1	
1A		1	3
UNK'N			
TOTAL		2	3



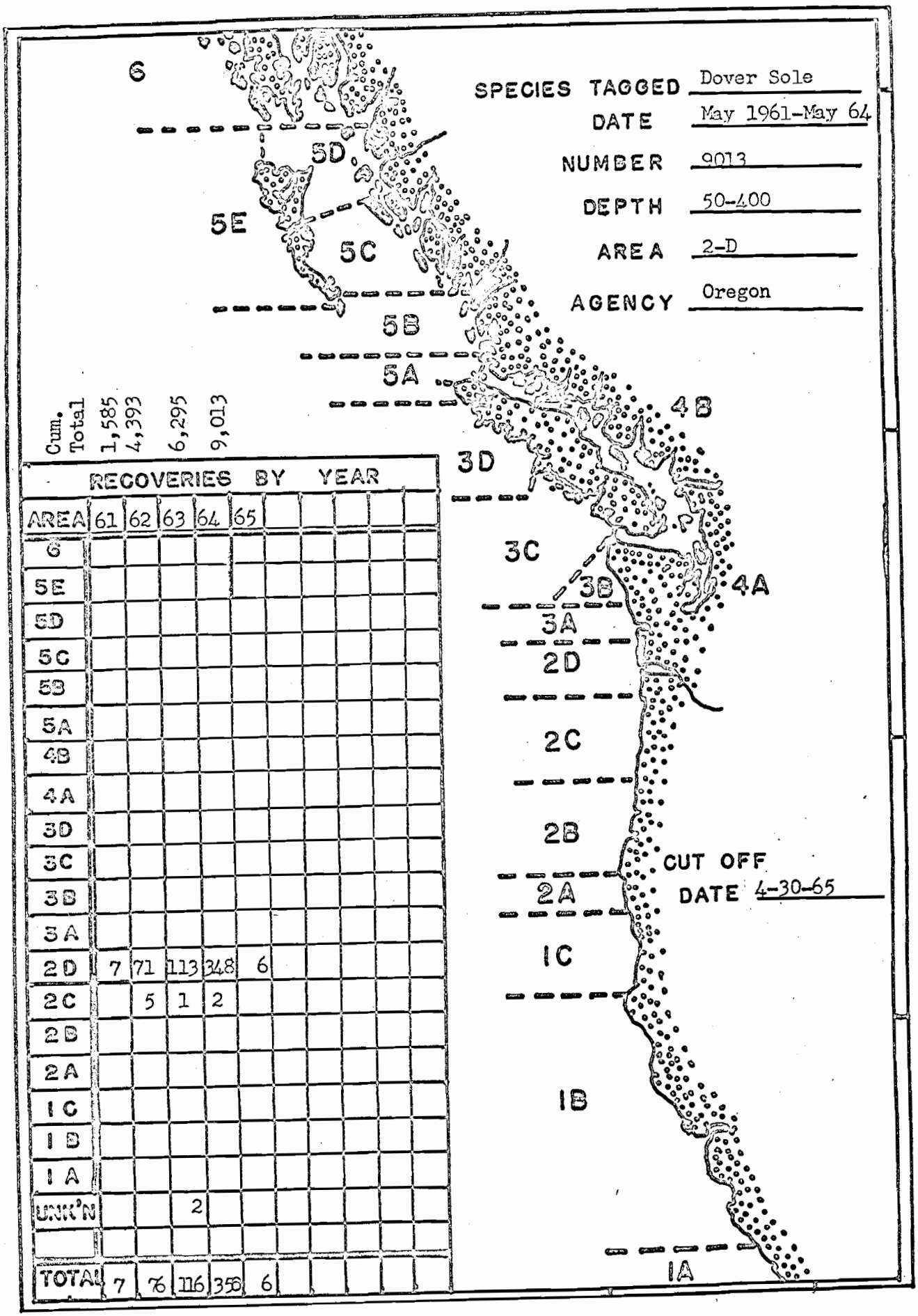
RECOVERIES BY YEAR

AREA	55	56	57	58	59	60	61	62	63	64	65
6											
5E											
5D											
5C											
5B											
5A											
4B											
4A											
3D											
3C	1									1	
3B	1	4	1								
3A	17	10	6	3	1	1		1	1		
2D	13	51	73	38	18	8	3	9	12	4	2
2C											
2B											
2A											
1C				1							
1B											
1A											
UNK'N	2	4	1	1					1		
TOTAL	34	69	31	43	19	9	3	10	14	5	2



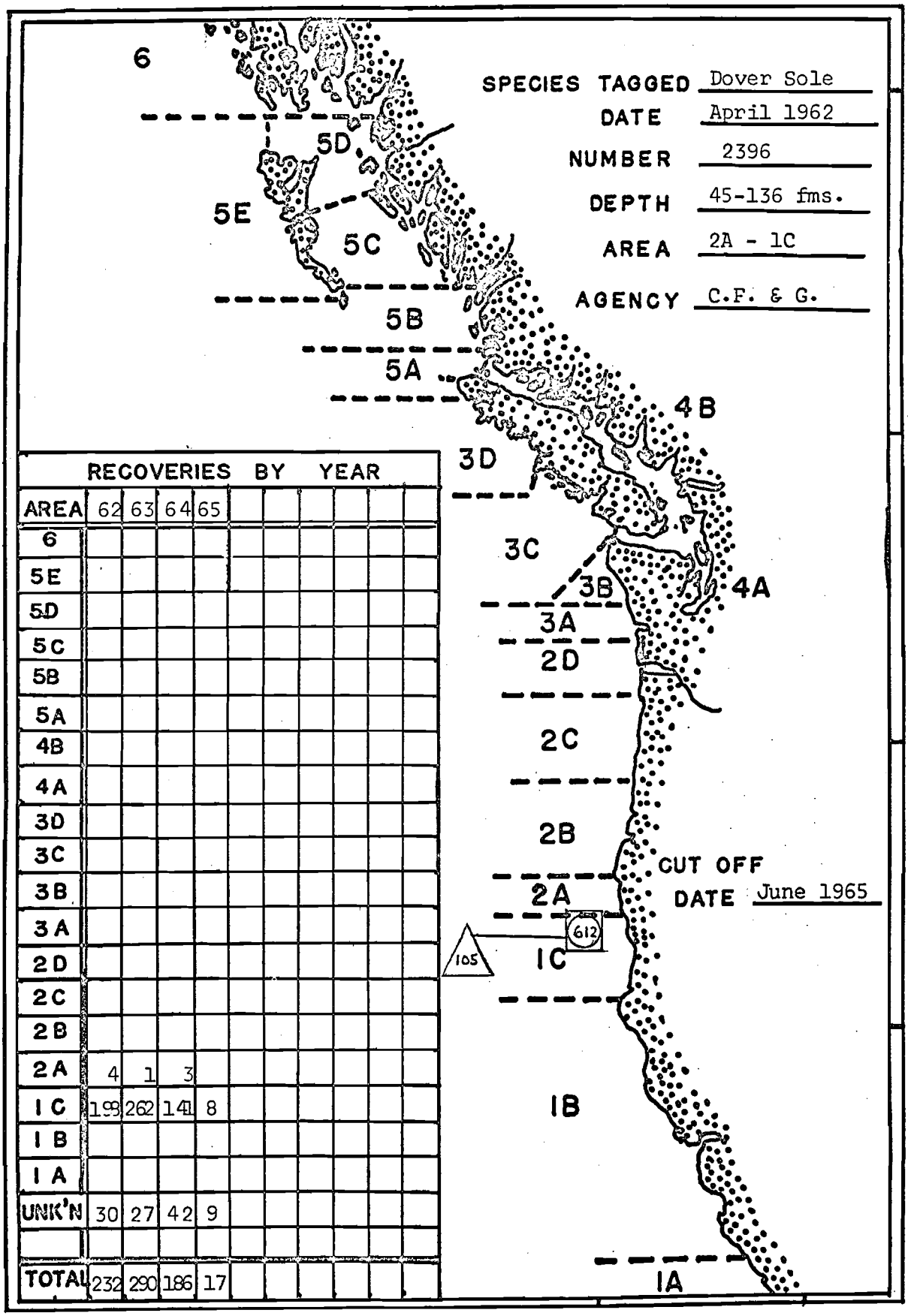
RECOVERIES BY YEAR

AREA	61	62	63	64	65
6					
5E					
5D					
5C					
5B					
5A					
4B					
4A					
3D					
3C					
3B					
3A					
2D		2	5	5	
2C	12	76	67	48	5
2B		3	3	8	2
2A			1		
1C					
1B					
1A					
UNK'N		2	1		
TOTAL	12	83	77	61	7



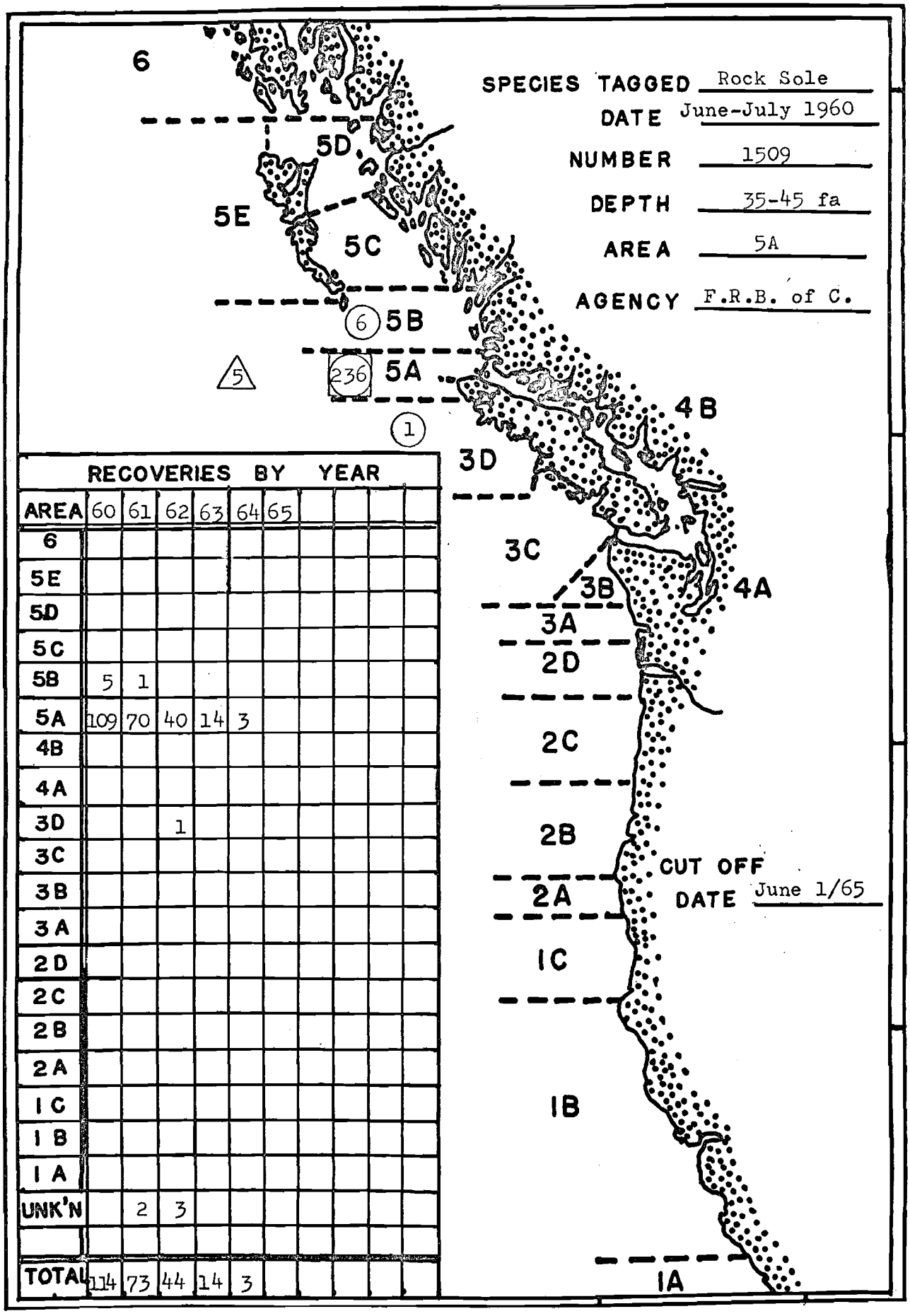
RECOVERIES BY YEAR

AREA	61	62	63	64	65	Cum. Total
6						
5E						
5D						
5C						
5B						
5A						
4B						
4A						
3D						
3C						
3B						
3A						
2D	7	71	113	348	6	1,585
2C		5	1	2		4,393
2B						
2A						
1C						
1B						
1A						
UNK'N			2			6,295
						9,013
TOTAL	7	76	116	350	6	

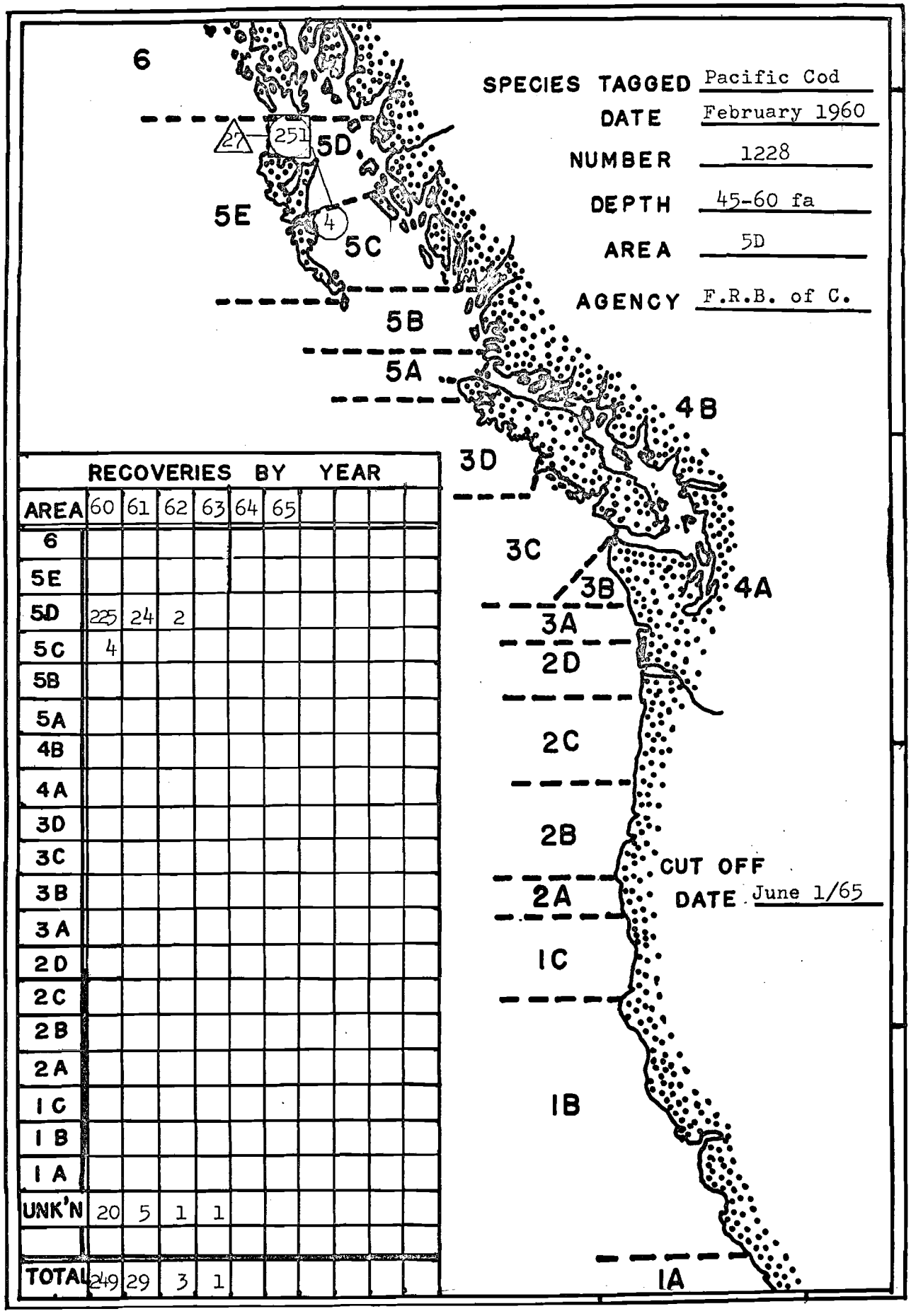


RECOVERIES BY YEAR

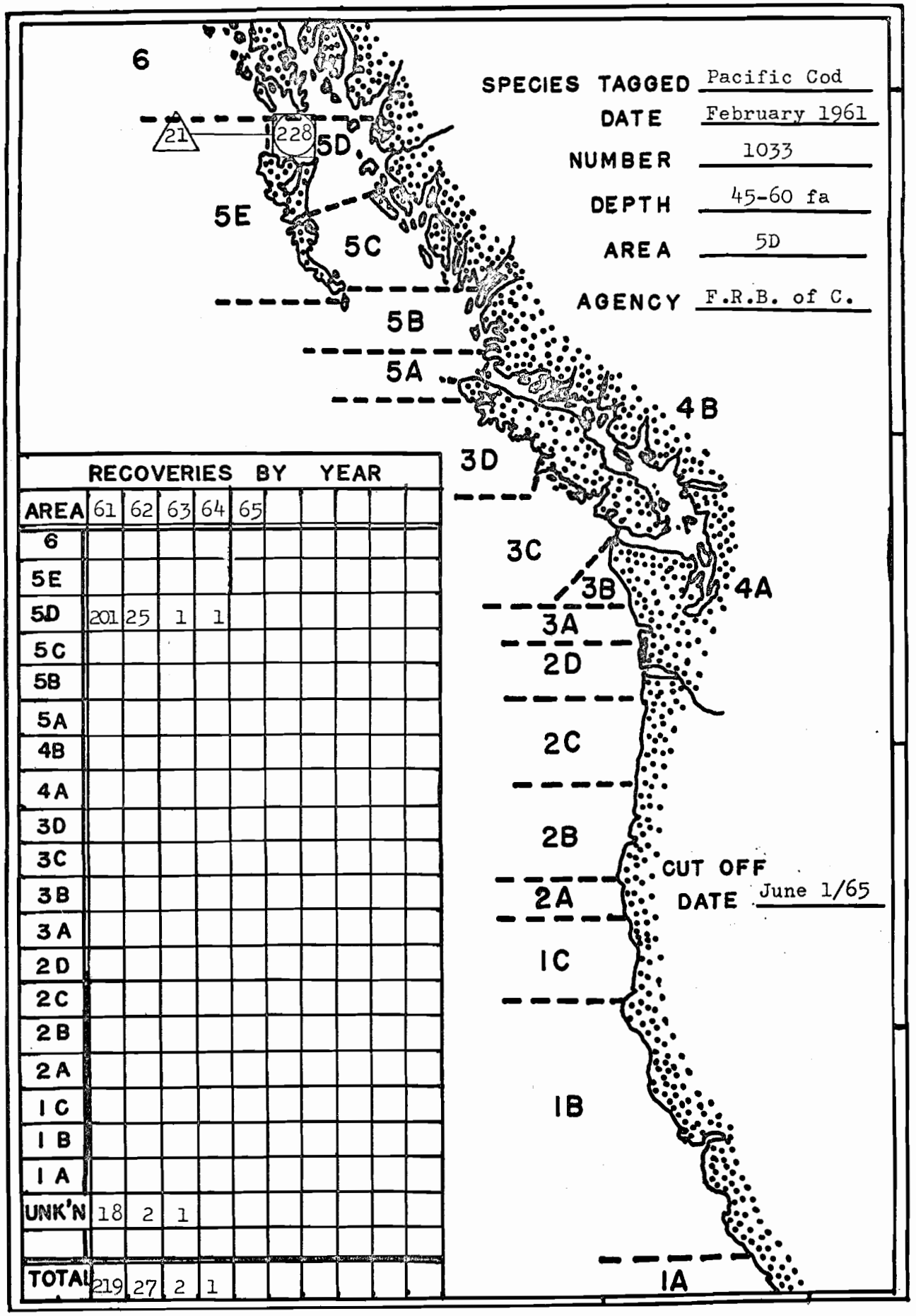
AREA	62	63	64	65
6				
5E				
5D				
5C				
5B				
5A				
4B				
4A				
3D				
3C				
3B				
3A				
2D				
2C				
2B				
2A	4	1	3	
1C	198	262	141	8
1B				
1A				
UNK'N	30	27	42	9
TOTAL	232	290	186	17



RECOVERIES BY YEAR										
AREA	60	61	62	63	64	65				
6										
5E										
5D										
5C										
5B	5	1								
5A	109	70	40	14	3					
4B										
4A										
3D			1							
3C										
3B										
3A										
2D										
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N		2	3							
TOTAL	114	73	44	14	3					

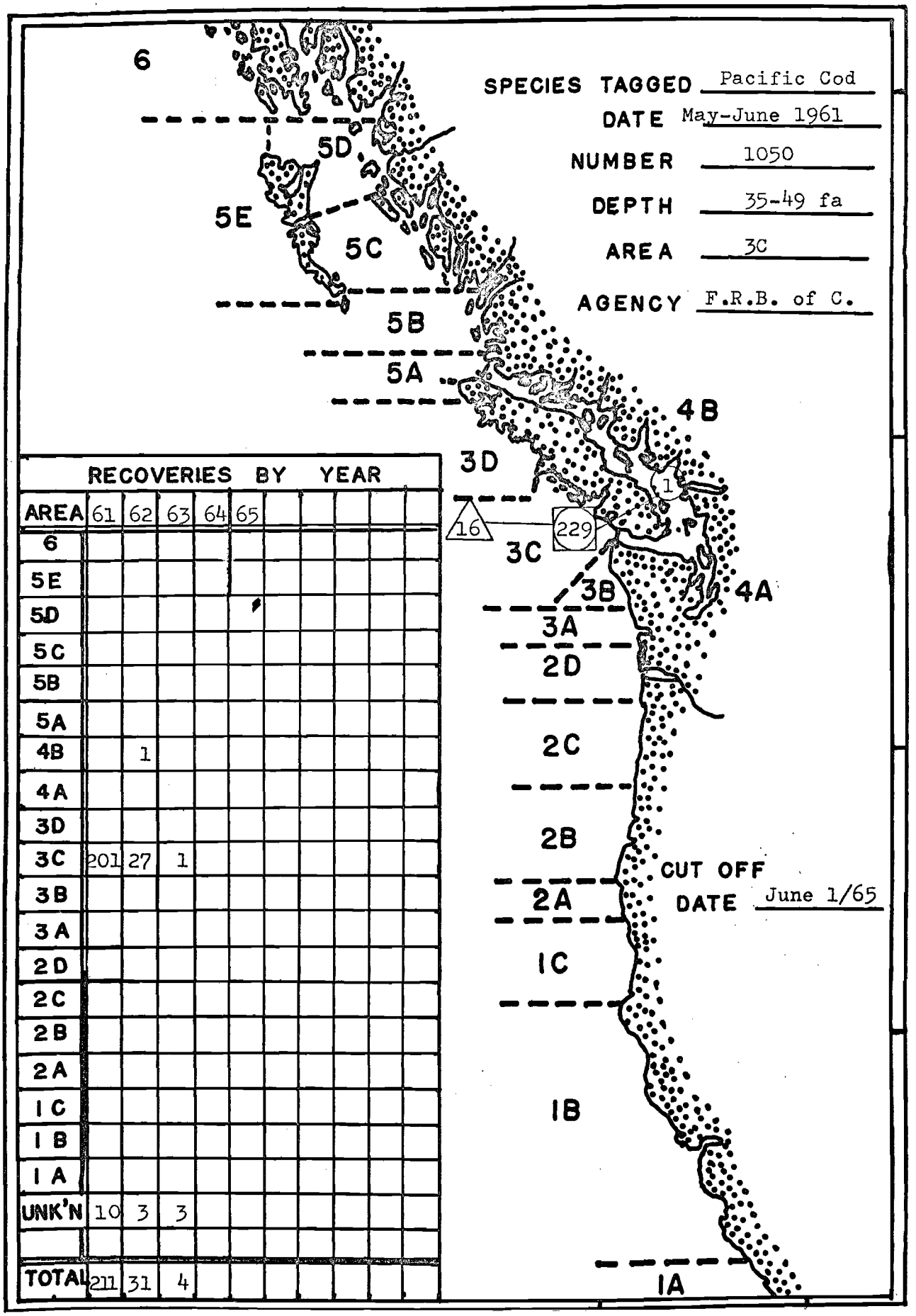


RECOVERIES BY YEAR										
AREA	60	61	62	63	64	65				
6										
5E										
5D	225	24	2							
5C	4									
5B										
5A										
4B										
4A										
3D										
3C										
3B										
3A										
2D										
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N	20	5	1	1						
TOTAL	249	29	3	1						

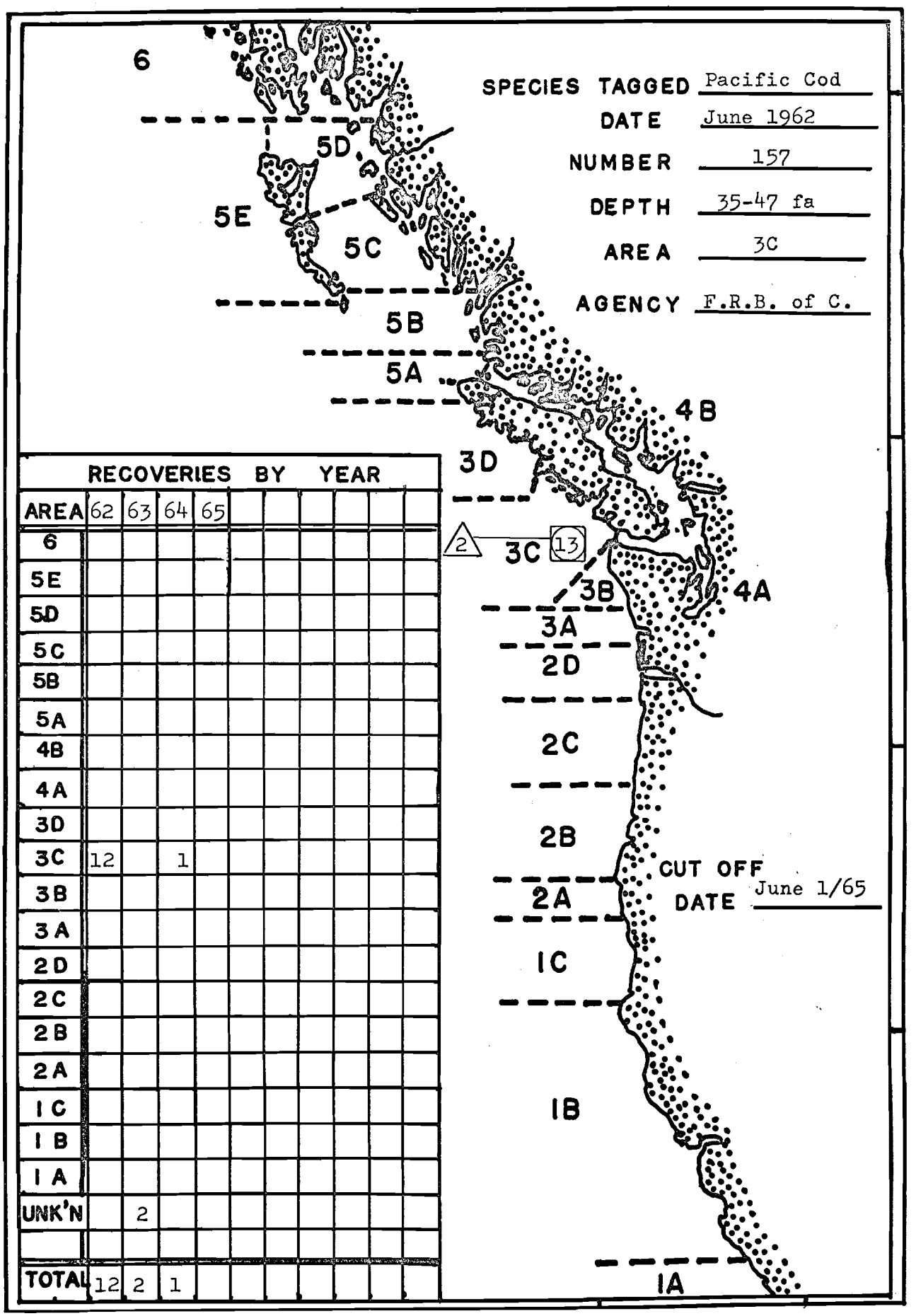


RECOVERIES BY YEAR

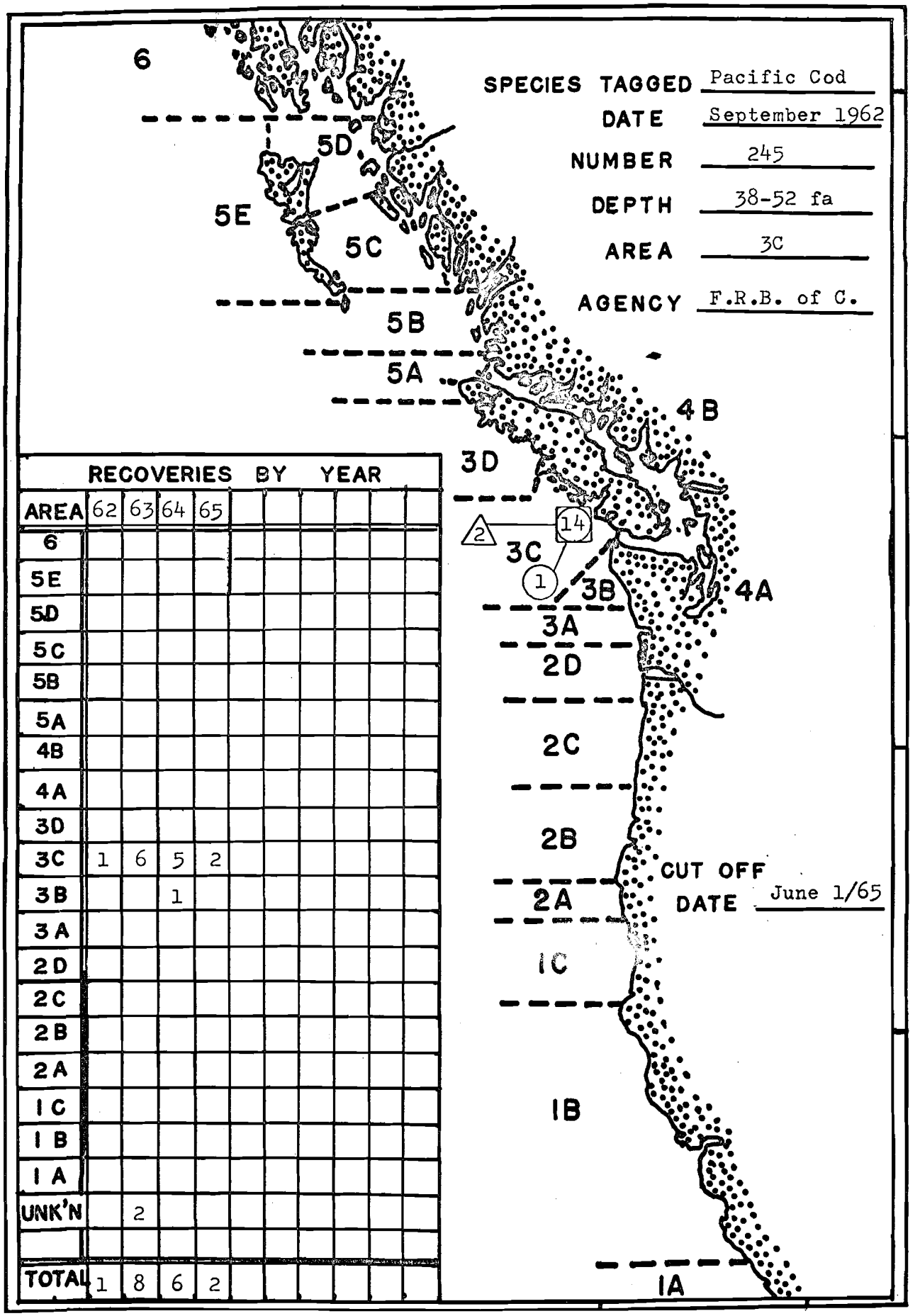
AREA	61	62	63	64	65					
6										
5E										
5D	201	25	1	1						
5C										
5B										
5A										
4B										
4A										
3D										
3C										
3B										
3A										
2D										
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N	18	2	1							
TOTAL	219	27	2	1						



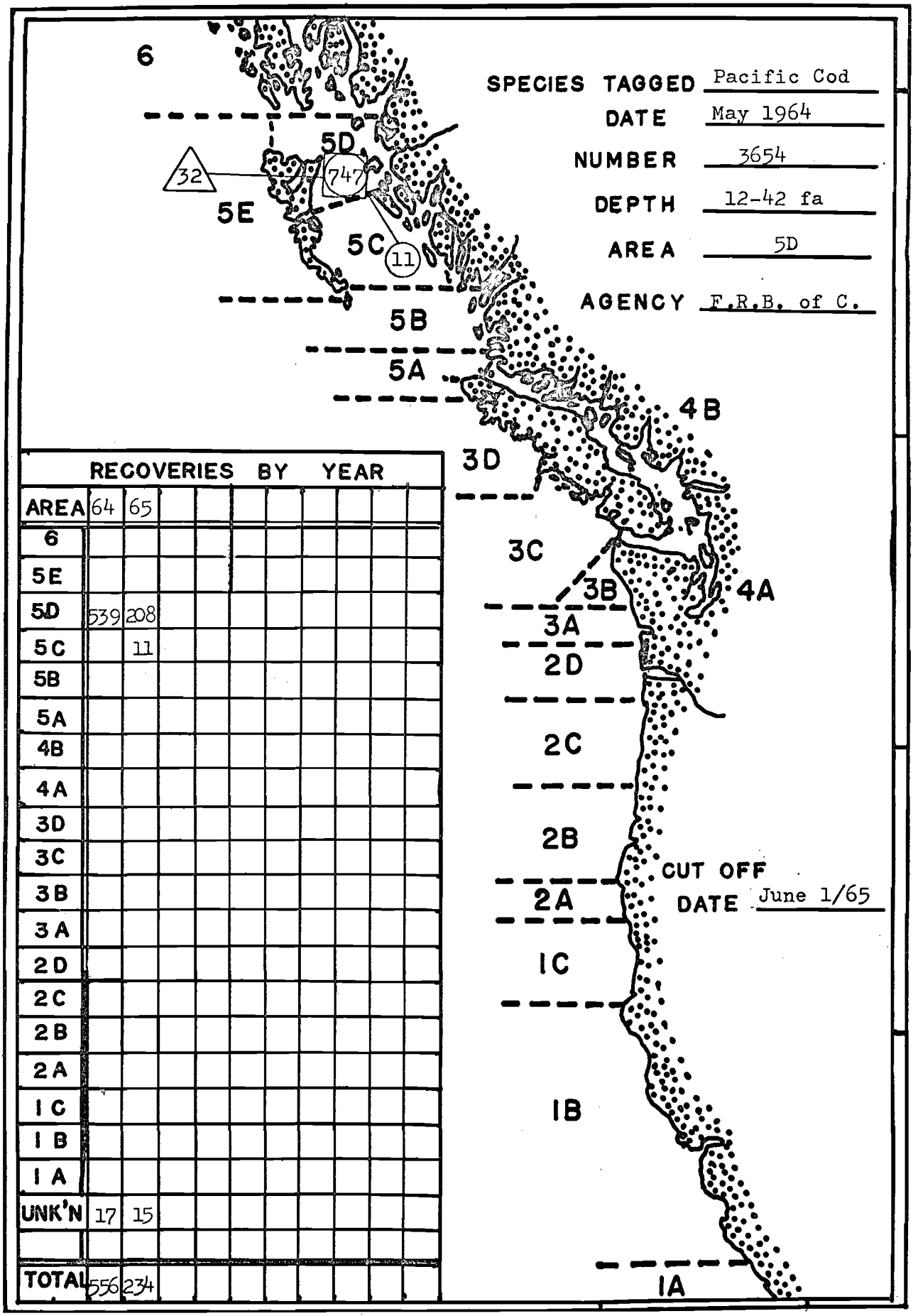
RECOVERIES BY YEAR										
AREA	61	62	63	64	65					
6										
5E										
5D										
5C										
5B										
5A										
4B		1								
4A										
3D										
3C	201	27	1							
3B										
3A										
2D										
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N	10	3	3							
TOTAL	211	31	4							



RECOVERIES BY YEAR										
AREA	62	63	64	65						
6										
5E										
5D										
5C										
5B										
5A										
4B										
4A										
3D										
3C	12		1							
3B										
3A										
2D										
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N		2								
TOTAL	12	2	1							

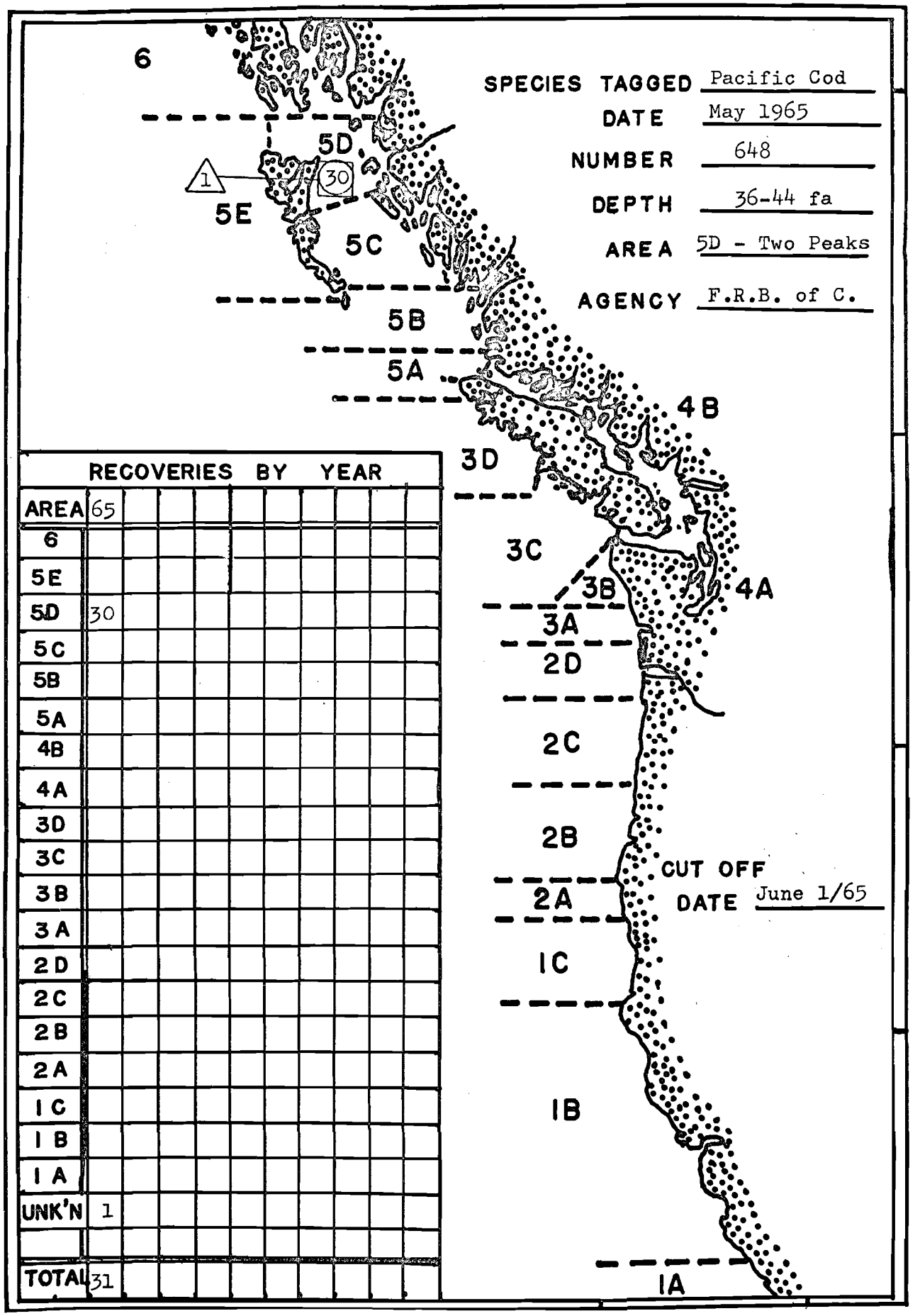


RECOVERIES BY YEAR											
AREA	62	63	64	65							
6											
5E											
5D											
5C											
5B											
5A											
4B											
4A											
3D											
3C	1	6	5	2							
3B			1								
3A											
2D											
2C											
2B											
2A											
1C											
1B											
1A											
UNK'N		2									
TOTAL	1	8	6	2							

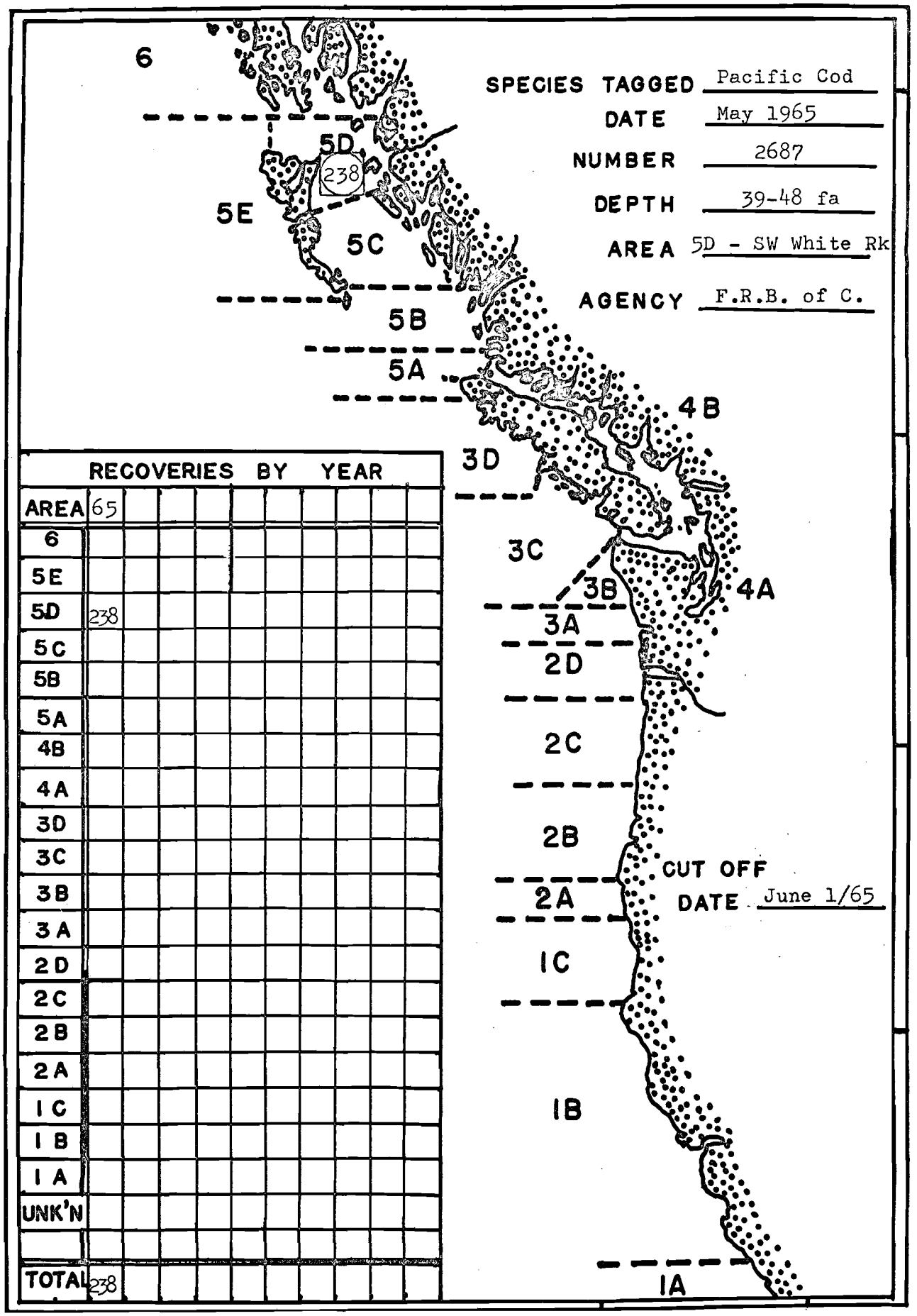


RECOVERIES BY YEAR

AREA	64	65
6		
5E		
5D	539	208
5C		11
5B		
5A		
4B		
4A		
3D		
3C		
3B		
3A		
2D		
2C		
2B		
2A		
1C		
1B		
1A		
UNK'N	17	15
TOTAL	556	234

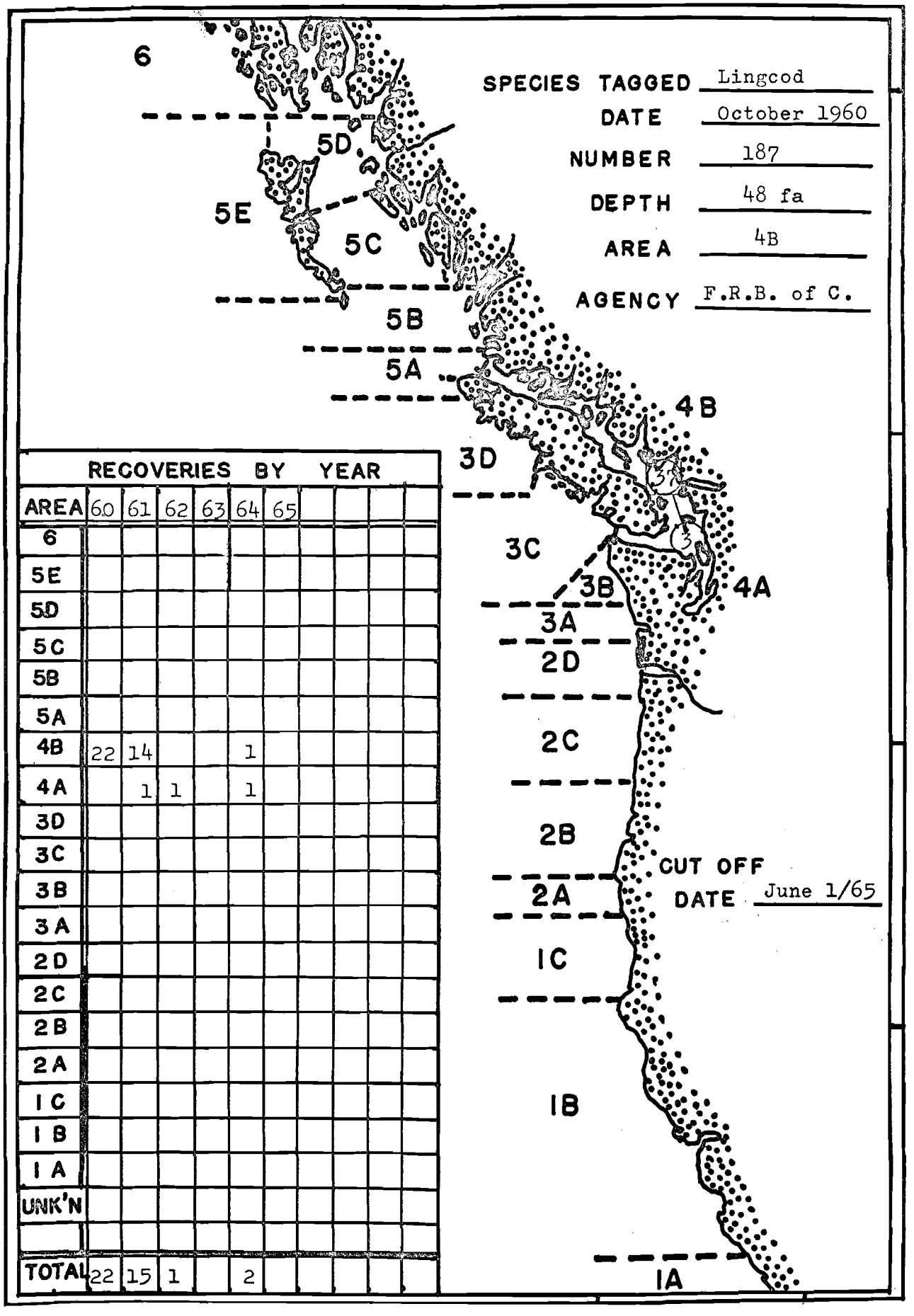


RECOVERIES BY YEAR	
AREA	65
6	
5E	
5D	30
5C	
5B	
5A	
4B	
4A	
3D	
3C	
3B	
3A	
2D	
2C	
2B	
2A	
1C	
1B	
1A	
UNK'N	1
TOTAL	31



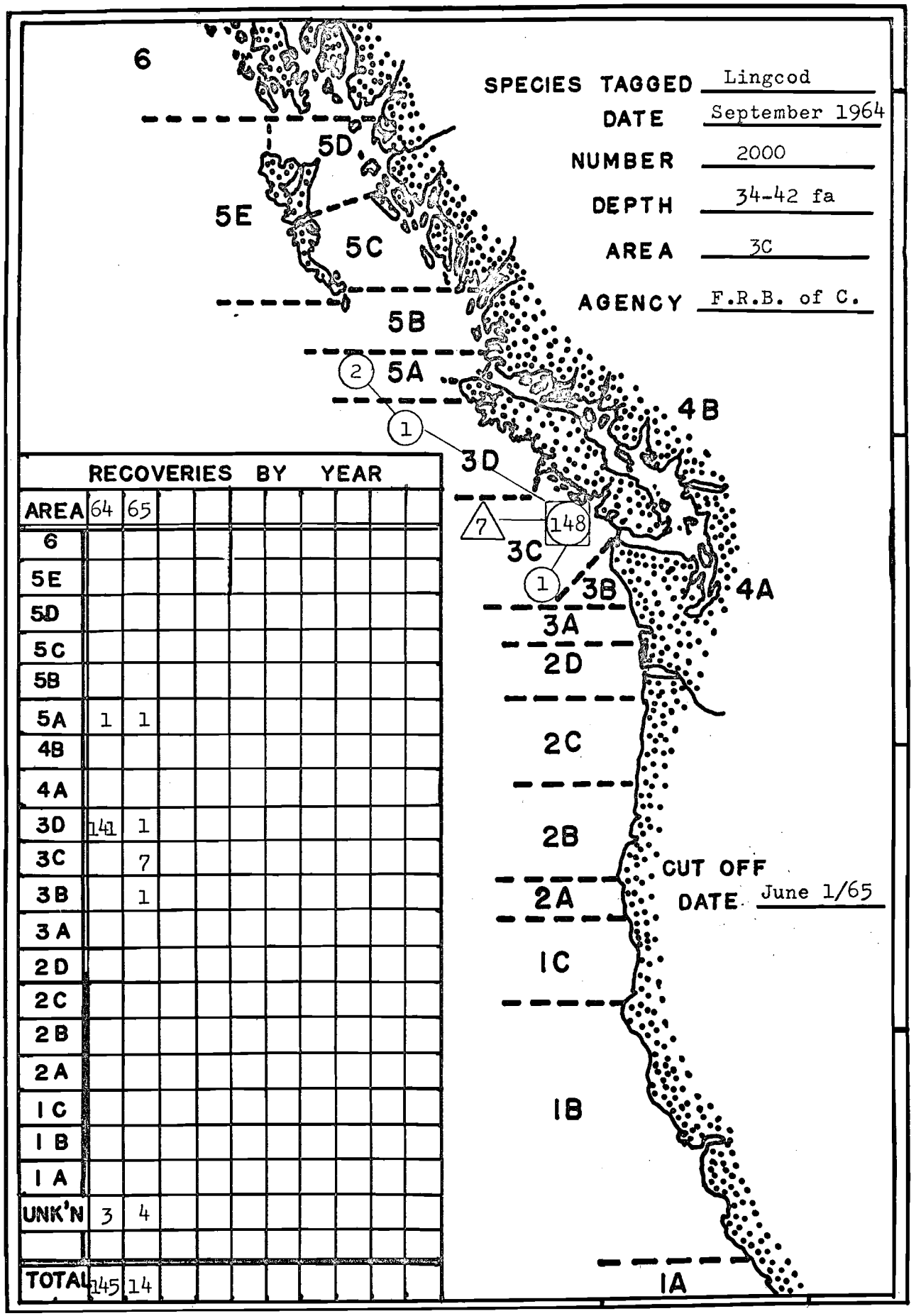
RECOVERIES BY YEAR

AREA	65
6	
5E	
5D	238
5C	
5B	
5A	
4B	
4A	
3D	
3C	
3B	
3A	
2D	
2C	
2B	
2A	
1C	
1B	
1A	
UNK'N	
TOTAL	238



RECOVERIES BY YEAR

AREA	60	61	62	63	64	65				
6										
5E										
5D										
5C										
5B										
5A										
4B	22	14			1					
4A		1	1		1					
3D										
3C										
3B										
3A										
2D										
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N										
TOTAL	22	15	1		2					



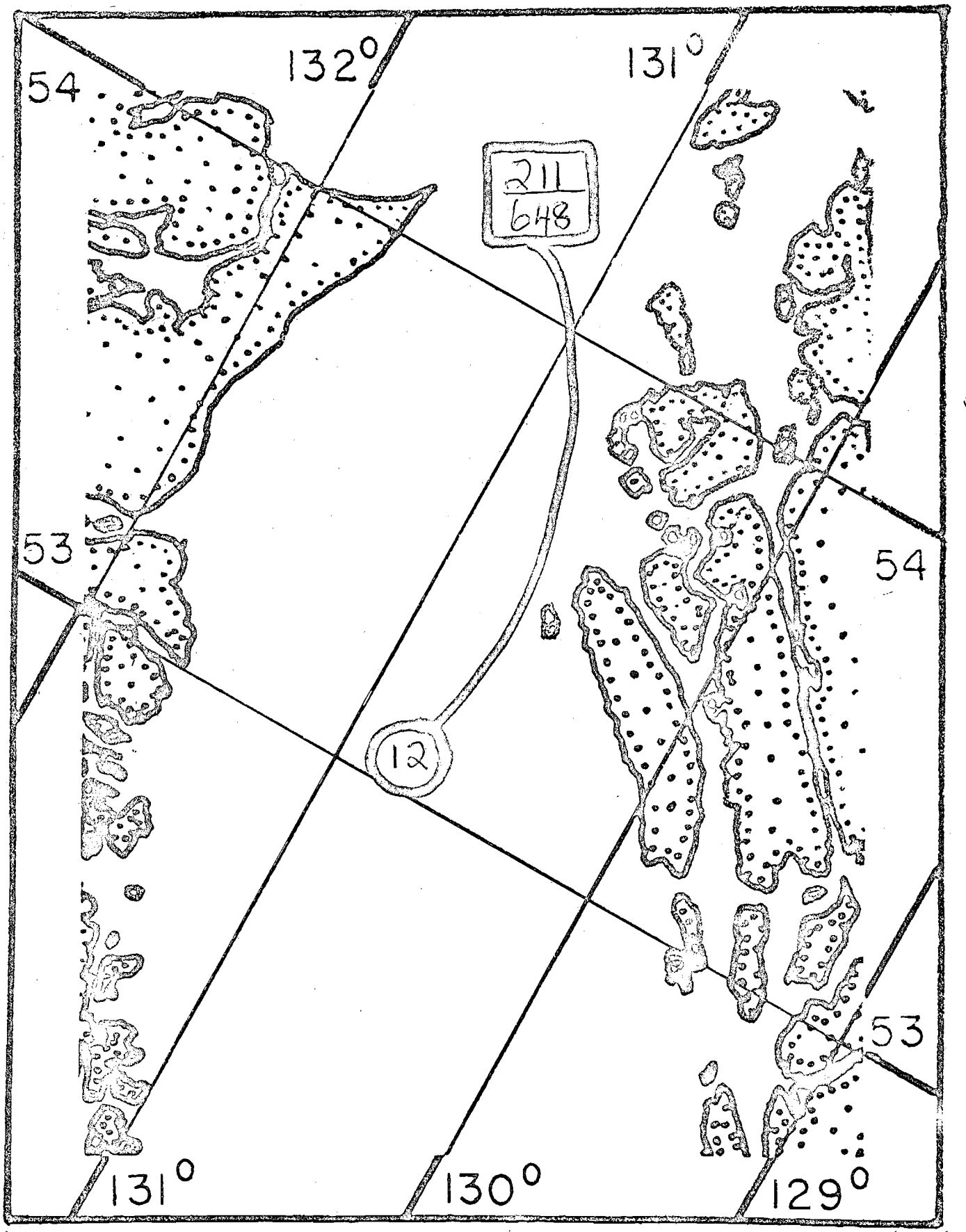
RECOVERIES BY YEAR										
AREA	64	65								
6										
5E										
5D										
5C										
5B										
5A	1	1								
4B										
4A										
3D	141	1								
3C		7								
3B		1								
3A										
2D										
2C										
2B										
2A										
1C										
1B										
1A										
UNK'N	3	4								
TOTAL	145	14								

MAY - 1964. TWO PEAKS - 65 } 3684.
SSW ARCHIBALD - 3619 }

NOV 1/65

70 UNKNOWN.

MAY 1965 - TWO PEAKS 648

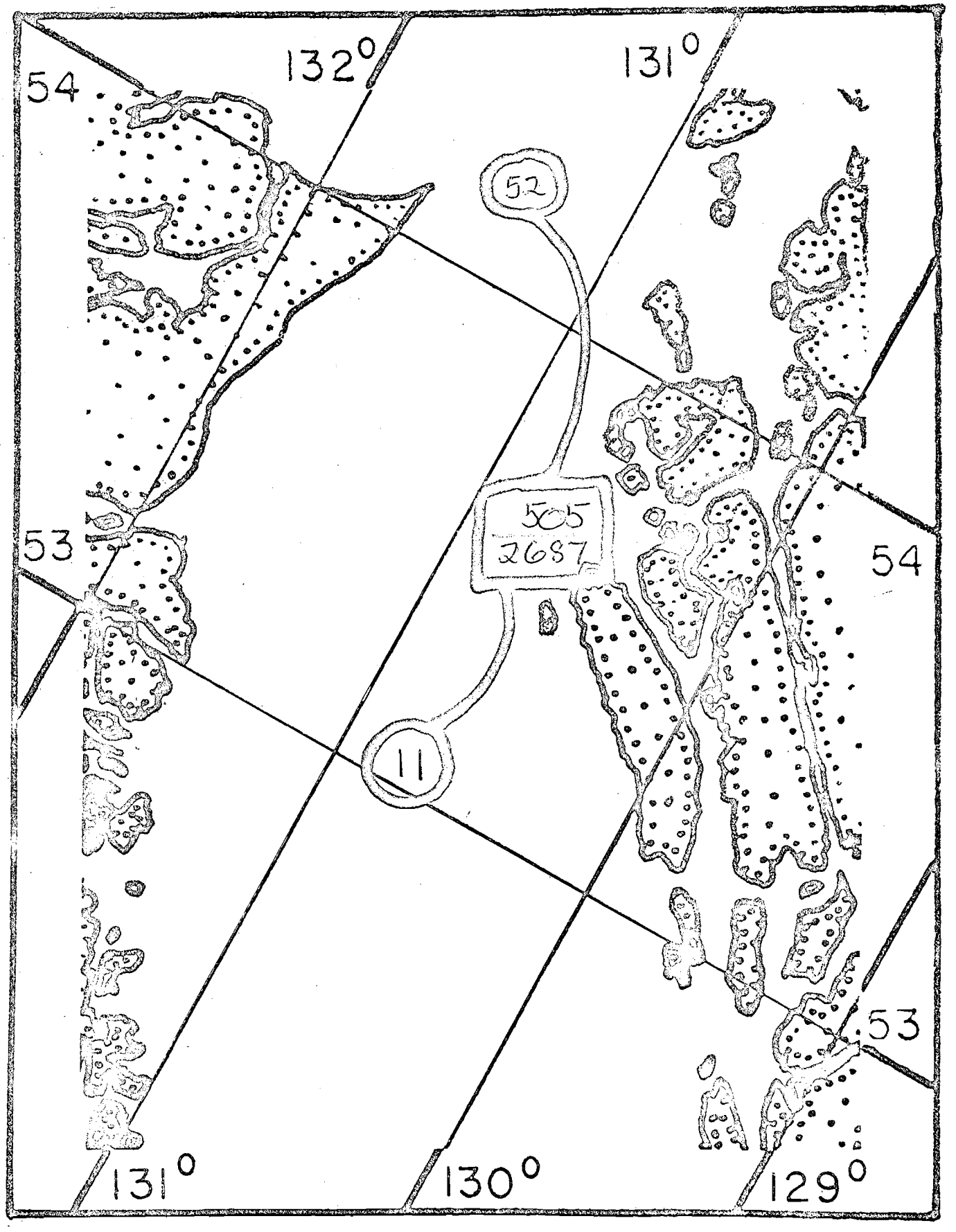


6 IN 51)

NOV 1/65

20 UNKNOWN

MAY 1965 - WHITE ROCKS. 2687 tagged.



12 UNKNOWN