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PROGRESS REPORT NO. 22
RAZOR CLAM INVESTIGATION

September-December, 1950

General

During September sport digging tapered off to little or nothing, especially after the Labor Day weekend. The first heavy fall storm occured during the latter part of the month halting all digging. Several random digs, some screening, elevations and commercial shell samples were taken during the month.

An unusually good set of clams was discovered in the area surrounding one of the sections being studied for changes in the beach contour (1.3 miles north of the wreck of the Peter Iredale). It was decided that this presented an exceptionally good opportunity to study the growth and mortality of the 1950 year class through the winter and into the fishery. Accordingly this area is being screened every month. This program is being conducted in such a manner as to make possible not only growth studies as such but also growth at various levels of the beach as well as progressive mortalities at the same levels.

The intensive fall screening program initiated in 1949 was continued in 1950. On the 11th, 12th, and 13th, of October, the eight areas covered in the 1949 study were screened through the combined efforts of Messrs. McKernan, Tollefson, Twohy and Woelke. Several random digs were made on the same tide series. On the short tide series at the end of the month elevations, random digs (for age analysis and dressed weight studies), and commercial shell samples were taken.

An unusually low surf combined with a good tide series resulted in several days of exceptionally good digging during the earlier part of November.

At this time screening (1.3 miles north of the Peter Iredale), random digging, elevations, and commercial shell samples were taken. The short tide series during November resulted in two days of fair to poor digging.

December tides followed the same pattern as those in November with somewhat poorer digging occurring. The field work followed the same pattern as the preceding months.

Over this period Mr. Twohy spent the greater share of the time, when not on the beach, analysing and preparing data in rough form for his forthcoming paper on the razor clam. Though most of these data are in his hands, summaries of the fall screenings and the 1950 sport censuswork are included in this report.

Summary of the 1950 Sport Census

In general the 1950 sport census was conducted following the method outlined by Donald W. Twohy in The Summer Sport Fishery for Razor Clams, Fish Commission Research Briefs, Vol. II, No. 2, pp. 28-35, December 1949. The 1950 program was carried out on a somewhat broader scale. The 1949 census covered from June 24 to September 8. In 1950 the work was started on April 29 resulting in 1-1/2 months more data.

Table 1 is a comparison of the 1949-1950 results. As previously noted these data are only rough totals from summaries provided by Mr. Twohy and further analysis may slightly alter the 1950 figures. Since the 1950 data extended over a greater period than that of 1949, it is presented both in part and in total so that the two seasons may be compared for the same periods. In general there were more than twice the diggers, thrice the number of clams taken and nearly thrice the poundage taken in 1950 as compared to the same period in 1949. The average size of the clams dropped six millimeters in 1950 and the catch per digger rose by 7.1 clams. This rise in catch and accompanying drop

in size may be some indication that the 1949 year class (which comprised much of the 1950 catch during August) will be a dominant year class, or at least more dominant than that of 1948. One may also consider the possibility of the 1949 year class having grown faster than the 1948 thus making themselves available to the fishery sooner. Also the change of regulations between the two seasons may account for much of the size difference since in 1949 the sport regulations were vague and many diggers thought there was a 3-1/2 inch size limit; in 1950 the regulations positively stated that regardless of size all clams dug must be kept. However, it would seem more probable that the greater intensity of the 1950 fishery removed large enough numbers of the available larger clams that diggers were forced to take the 1949 year class or go home empty handed. In any event the 1950 sport catch contained a large number of clams which were barely one year old.

When one compares the commercial landings with the sport catch for the 1949 and 1950 seasons during the same periods, an interesting parallel may be observed. In both years the commercial poundages only slightly exceeded that of the sport diggers, during the time covered by the sport census, indicating a nearly equal portion of the clam production going to the respective fisheries. This relationship may in the future serve as an index to measure the relative changes of intensity between the two fisheries.

In general summation then; the 1950 sport fishery was more than twice as intense and removed three times the number of clams as the sport fishery did in 1949 during the same period of time; the average size of the clams in 1950 was smaller while the average number of clams per digger was greater; an interesting relationship between the catch of the commercial and sport fisheries has existed during the past two years.

It is hoped that further analysis of the 1950 data will make it possible to somewhat reduce the amount of time expended in census work without significantly

affecting the results achieved. One change indicated is that the need for a total digger count for the entire beach every day may be reduced to only several total counts on a tide series with partial counts on the remainder of the days. This would leave more time for actual interviewing of more diggers for the purpose of counting and measuring their catches. There are indications that this phase of the sport census work is the one which most probably needs expansion, thus if the effort expended on actual counts can be safely reduced the time gained will be applied to good advantage to this second part of the sport census program.

Screening for the 1950 Year Class

The 1950 intensive screening program was conducted in the same manner and areas as in 1949. The methods, areas, etc. are described and discussed in Shellfish Investigation Progress Report 20 of July, 1950.

The actual comparison of results from the two seasons presented some problems as how to best handle the data. It had been envisioned that recording the distance from the same point on the upper beach in the drift line to the various levels of screening in any one area would give comparable results. In view of data being gathered in respect to contour studies it is becoming apparent that the overall beach shifts enough that what was well into the lower tidal zone a year ago, 100 yards out for example, may now be considered part of the upper beach. The possibility of clams setting at this level is very unlikely. Therefore, the change of intensity of set at one particular spot in reference to a given point higher upon the beach may well become a measure of environmental change rather than intensity of set. With this factor in mind, plus the complete lack of overlapping screenings in some areas, the data were treated in several different manners.

First of all the average number of clams per square meter from overlapping screenings were compared. This is shown in the first and second columns

of Table 2. When these values were totaled it was found that by this method the 1950 set was 59.3 percent of the 1949 set for the six areas in which overlapping data were available. However, since the distance between screening areas is variable, each figure was multiplied by the number of miles of beach (column 3) that it is representative of (last two columns). In this manner localized sets of higher intensity had less effect on the total figures. For example a relatively heavy set in the Cove (Area VIII) in 1949 had an average of 14 clams per screen. When treated in the above manner this restricted area entered into the overall computation with a true weight in respect to the rest of the areas involved. This method resulted in the 1950 set being 79.4 percent of the 1949 set.

By using the total number of screenings made per area, excluding the blanks, (when sampling, an effort was made to find the width of the setting zone by screening both up the beach and out toward low water until no clams were gotten in two successive screenings, these terminal screenings referred to here as blanks), irrespective of whether the data from the two years overlapped, values of 56.9 percent and 83.9 percent were obtained (Table 3). Both compare very well with the results from the previously discussed method.

Finally the absolute values (Table 4) in number of clams were treated in the same manner. These resulted in the 1950 set being 57.3 and 76.5 percent of the 1949 set for the weighted and unweighted data.

It would appear as though the value of knowing the distance from a given point to the level at which the screening takes place from year to year is not of great significance since the range in the percentages calculated (percent the 1950 set was of the 1949) for the unweighted data by the three methods was less than three percent. The weighted range was somewhat greater with a spread of a little over eight percent. This is not to say that knowledge as to the level of setting is of no value, but at present it would seem to be of little

significance in determining relative magnitude of set between the two years under consideration. These distances however will become very important when strip digging is done in these same areas. Then these data will be used in determining whether the magnitude of set in the fall has a direct relationship to the abundance of that year class in subsequent seasons as well as determining the mortality rates at the various beach levels.

From these data it would seem that for comparative purposes any one of these three methods could be used so long as that same one is used from year to year. It is felt however that the 83.7 percent value in Table 3 is closer to the true picture as to the overall set since it takes into consideration all the clams screened from a given strip, the average number per meter, and the amount of beach each strip represents. The comparison of absolute numbers of clams, though appearing to be potentially good, would tend to be unworkable if during a year of heavy fall storms the screening were restricted to a generally narrower beach area by a high surf. In such a case the set may be good but fewer screenings would result in less clams even though the number per screen were relatively high.

Depending on the method used in comparison of these data, the 1950 set was between 56.9 and 83.7 percent of that occurring in 1949. For the present it is felt that the 1950 set was 83.7 percent of the 1949 set. It is felt that this same type of analysis should be continued for at least several more years before any definite conclusions are reached as to which figure is more truly representative of the yearly fluctuations occurring in the razor clam sets.

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Table 1

SUMMARY OF 1949-1950 SPORT CENSUS DATA

	1949 6/24-9/8	1950 6/24-9/1	4/24-9/1/50
Total number of diggers	32,982	73,048	105,206
Total number of clams	386,483	1,227,579	1,628,736
Total number of pounds	53,049	145,836	193,494
Average catch	11.4	17.5	15.5
Average size	95.6	88.9	95.99
Commercial poundage for same period	54,993		196,793

Table 2

COMPARISON OF CLAMS PER SQUARE METER FROM THE SAME BEACH LEVEL

Area	Average number of clams per meter. 1949	1950	Length of beach represented in miles.	Corrected for beach length. 1949	1950
I	No overlapping data for 1949 and 1950				
II	2.6	5.2	4.0	10.4	20.8
III	5.2	2.0	4.0	20.8	8.0
IV	No overlapping data for 1949 and 1950				
V	0.4	2.5	1.8	0.7	4.5
VI	8.5	2.0	1.2	10.2	2.4
VII	1.7	3.8	0.9	1.5	3.4
VIII	16.0	3.7	0.6	8.4	2.2
Totals	32.4	19.2	12.5	52.0	41.3
Percent the 1950 set is of the 1949	59.3			79.4	

Table 3

COMPARISON OF CLAMS PER SQUARE METER REGARDLESS OF BEACH LEVEL

Area	Average number of clams per meter.		Length of beach represented in miles.	Corrected for beach length.	
	1949	1950		1949	1950
I	1.5	4.6	2.2	3.3	10.1
II	2.5	5.6	4.0	10.0	22.4
III	5.6	2.6	4.0	22.4	10.4
IV	3.4	1.7	3.5	11.9	5.9
V	1.0	2.6	1.8	1.8	4.7
VI	6.1	1.8	1.2	7.3	2.2
VII	3.1	3.8	0.9	2.8	3.4
VIII	22.3	3.2	0.6	13.4	1.9
Totals	45.5	25.9	18.2	72.9	61.0
Percent the 1950 set is of the 1949	56.9			83.7	

Table 4

COMPARISON OF CLAMS PER STRIP IN ABSOLUTE NUMBERS

Area	Average number of clams per meter		Length of beach represented in miles.	Corrected for beach length.	
	1949	1950		1949	1950
I	6	28	2.2	13.2	61.6
II	32	39	4.0	128.0	156.0
III	50	26	4.0	200.0	104.0
IV	17	10	3.5	59.5	35.0
V	2	27	1.8	2.6	48.6
VI	61	11	1.2	73.2	13.2
VII	62	42	0.9	55.8	37.8
VIII	156	38	0.6	93.6	22.8
Totals	386	221	18.2	625.9	479.0
Percent the 1950 net is of the 1949	57.3			76.5	