
INTRODUCTION

The purpose of this report is to present some information which has been collected on the razor clam fisheries of Clatsop County beaches during the past several years. Topics which will be discussed are: (1) a brief resume of the investigation, regulations, and catches prior to September 1954; (2) regulation changes imposed in September 1954 and a brief discussion of the reasons for these changes; (3) a discussion of the effect these regulation changes have had on the harvest and; (4) a discussion of some regulation changes which have been suggested.

CONDITIONS PRIOR TO 1954

No changes had been made in the razor clam regulations for several years before 1954 and the number of clams available apparently varied widely. Little biological research had been attempted prior to 1949, and regulations were largely of an economic nature.

Old Regulations

The regulations governing commercial digging were a 3\(\frac{1}{2}\) -inch minimum-size limit and no restriction as to quantity. Personal-use diggers were limited to 36 clams, regardless of size. No season was imposed on either.

This minimum size allowed the clams to be taken before they had completed one year of life and these small clams made up a large part of the catch. The 36-clam bag limit was apparently little restriction to personal-use diggers since the average catch was considerably smaller than 36 clams. Here also, a considerable proportion of the catch consisted of clams less than one year old.
The purpose of the razor clam investigation, started in 1949, was to learn whether the clams were being harvested at a rate and size which would produce the optimum yield from the resource. Many things were learned about clams including the growth rate, death rate, composition of the catch, and so on. This information indicated that the optimum yield was not being realized from the resource and changes in the regulations were promulgated.

The commercial minimum size was increased to 4½ inches with no quantity restriction, and the personal-use bag limit was reduced to 24 clams per person. No seasonal closures were included.

Reason for Regulation Changes

There were two principal reasons for these changes. First, the most rapid growth of the clam occurs during the fall of the first year and the spring of the second year. Since many of the clams were being taken prior to and during this period, the best growth potential of the animal was not being realized. Protection of the clams until the late spring of the second year would result in a considerable increase in the yield in weight.

Secondly, since razor clams first spawn in May or June of the second year, the additional protection of the larger minimum size would allow many more individuals to mature, and spawn at least once before capture.

The minimum size for commercial diggers was considered practical because it was, and is, believed that experienced diggers can estimate the approximate size of a clam before digging it, or can feel the clam and estimate the size without removing it from the sand. A similar minimum size for personal-use diggers was considered impractical and wasteful because amateur diggers usually lack this ability. The only feasible alternative seemed to be a reduction in the personal-use bag limit.
EFFECT OF THE CHANGE IN REGULATIONS

The following information was collected to allow an appraisal to be made of the effect of the present regulations. Although comparable data for previous years is lacking, in some instances, sufficient data is presented to allow comparison.

Commercial Fishery

The commercial harvest of razor clams has declined steadily since 1952 (Figure 1). This decline has been consistent, except for a slight increase in 1955, since the change in regulation. This increase in 1955 was doubtlessly due to an exceptionally good set in 1953 which produced a very strong year class.

There are several factors which are contributing to this decline in commercial production. One of the main reasons is that few clams were taken during World War II and a large population of clams had accumulated on the beach. For a few years after the war, clams were plentiful and commercial clam digging was an easy and popular way to make extra money. As this accumulation was removed and clams became fewer, clam digging was neither as easy nor as profitable. Hence, many of the less-skilled and less-determined diggers were discouraged. The number of licenses sold has decreased in proportion to the catch since 1950 (Figure 1). The increase in the minimum size from 3½ to 4½ inches eliminated more of the not-so-skilled diggers. Their catches consisted mainly of smaller clams and since these were now illegal, digging became unprofitable for them. The remaining diggers were forced to dig only on offshore bars. Thus, the large decrease in commercial digging intensity because clams were not as plentiful and because of restrictive regulations, has decreased the annual commercial harvest. An increase in the numbers of diggers and relaxing the regulations would doubtlessly result in a considerable increase in poundage, at least until present stocks were depleted.
Figure 1. Numbers of Licenses and Commercial Catch of Razor Clams from Clatsop County Beaches, 1946-57.
Economic factors have probably had some effect on the razor clam catch, also. An improvement in economic conditions of the area, along with the rest of the country, have lessened the need for supplemental income. The availability of clams from other areas has decreased the price of clams to the diggers in Oregon and further reduced profits.

The age-composition of the commercial catch has not changed greatly since 1954, except that fewer small clams have been taken. Figure 2 shows the age composition of the commercial catch.

One important effect that the larger minimum size has had is that it has delayed the recruitment of a majority of the second-year clams into the commercial fishery until late May or early June each year.

The average catch per day for commercial diggers is shown in Figure 3. This has remained fairly stable except for the increase in 1955. It was expected that this would increase somewhat with the reduction in the number of diggers and the increase in the weight of clams taken. This has not occurred. The reason for this is not entirely clear. However, the effect of the restriction in the spring months, when digging success is normally quite high may provide at least a partial answer. Further, the competition that was formerly provided by commercial diggers has in part at least, been maintained by an increase in the number of personal-use diggers.

**Personal-Use Fishery**

The regulations imposed in 1954 have had almost the opposite effect on the personal-use fishery. The numbers of diggers have increased as well as the average number of clams taken per person. The average size of the clams increased as they did in the commercial catch. Figure 4 shows the age composition of the clams taken by personal-use diggers. There has been a decrease in the number of 0-age-group clams taken and an increase in the
Figure 2. Age Composition of Commercial Landings of Razor Clams, 1953-57
Figure 3. Commercial Catch and Pounds Per Dig, for Razor Clams, 1946-57.
Figure 4. Age Composition of Razor Clams Taken by Personal-Use Diggers, 1953 and 1955-57
numbers of all older groups. This tends to verify the contention, made when the regulations were changed, that the personal-use bag limit would weigh the same although fewer clams would be taken.

Figure 5 shows the average catch per digger for the years indicated. It is apparent that the average catch per digger has gradually increased each year.

This can be explained, in part, by an increase in the number of clams available because of the reduced commercial catch.

The few remaining commercial diggers are confined almost entirely to offshore bars because the clams are usually larger and because personal-use diggers do not normally utilize these areas, thus reducing competition. This leaves the rest of the beach almost entirely to the personal-use diggers.

The number of people digging clams each summer has also increased. Figure 6 shows the number of personal-use diggers utilizing the beach during the months indicated. There were 46,000 diggers in 1949 and 72,000 in 1957. The increase is considerable and it is anticipated that the numbers of diggers will continue to increase.

Another problem related to the increase in the personal-use catch is the wastage of small and broken clams. This must be laid at the feet of the personal-use digger because most commercial diggers try to avoid areas where small clams predominate. They are unable to dig profitably if a lot of sorting and measuring is necessary. Too, they are experienced in estimating the size before digging the clam. The small clams that are dug are much less apt to be broken and are usually discarded in their hole where their chance of survival is better. This is not true of practically all commercial diggers. However, observations of many of the better and com-
Figure 5. Numbers of Razor Clams Dug Per Day Per Personal-Use Digger, 1950-57.
Figure 6. Estimated Numbers of Personal-Use Razor Clam Diggers on Clatsop Beach, May-August, 1949-57
sistent commercial diggers indicate that relatively few small clams are dug and a fair proportion of those discarded can be expected to survive. This is not true of the average personal-use digger. Most of the clams he digs are injured. He usually cannot estimate the size of the clam before digging and exercises little, if any care in returning the clams to the sand, except to do so unobserved. Table 1 shows the results of samples taken to measure wastage. The 1957 wastage of clams was approximately 339,000 clams. This is roughly one third more clams than were taken by commercial diggers during the entire year. This would make one bag limit of clams for every man, woman, and child in Astoria. Wastage is presently one of the more serious problems of razor clam management.

**Proportion of Total Harvest Changed**

The reduction in the commercial intensity and the increase in the personal-use intensity have resulted in a shift in the proportion of clams taken by the two fisheries (Figure 7). This graph shows the total catch and the share of each fishery for two years before the change in regulations and for the three years since. The commercial catch portion has decreased each year, under the present regulations, until last year it comprised only 10 per cent of the total harvest. As was previously stated, no such change was intended or foreseen when the regulation was imposed. Figure 7 also indicates that the total annual yield of clams from Clatsop Beach remained relatively constant at 1.3 to 1.8 million clams. This indicates that clam population is stable and is able to replace the numbers of clams removed.

**PROPOSED CHANGES IN REGULATIONS**

**Three and One-Half-Inch Minimum Size**

Recently a petition was received requesting the reestablishment of the 3½-inch commercial minimum size. This proposal is strongly opposed
Table 1. Clatsop Beach Razor Clam Harvest in 1957.

<table>
<thead>
<tr>
<th>Category</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Use</td>
<td>1,832,000</td>
</tr>
<tr>
<td>Personal-Use Waste</td>
<td>339,000</td>
</tr>
<tr>
<td>Commercial Catch</td>
<td>275,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,446,000</td>
</tr>
</tbody>
</table>
Figure 7. Numbers of Razor Clams Harvested by Commercial and Personal-Use Diggers on Clatsop Beach, May-August 1949-57.
for the same reasons the 4-inch limit was originally initiated. They are, as previously stated: (1) If the clams are left in the sand to grow through the fall of the first year and the spring of the second year they will approximately double the yield in pounds of clams. This fact is independent of the number of clams on the beach and will apply whether 1,000 clams or 100,000 clams are involved. Adjustment has been made for the fact that a part of these clams will die of natural causes before capture. The value of these clams to the commercial digger would be reduced by half if they are taken at 3½-inches in length. (2) The protection of clams until their second year not only results in an increased yield in weight, but also will allow many more individuals to mature and spawn at least once before capture. This aspect, although secondary to the main purpose, may be of some importance.

In addition to a decreased yield in the commercial catch, the wastage of clams by personal-use diggers would also increase because the average size of clams available to all would be reduced.

**Four-Inch Minimum Size**

Other individuals have suggested lowering the minimum size to 4 inches. This proposal has some merit, but also has some disadvantages.

Some of the advantages are: (1) it would allow commercial diggers to begin harvesting second-year clams earlier in the spring. This would eliminate considerable measuring and sorting during April and May before the majority of the second year clams are 4½ inches long. It should reduce any wastage by commercial diggers during the spring; (2) the period of fast growth would be completed by many more individuals than under the 3½-inch limit although not as many as under the present 4-inch minimum size; (3) it would allow many more individuals to spawn at least once before capture than would the 3½-inch limit although not as many as with the 4½-inch limit.
Some disadvantages are: (1) It would decrease the average size of clams available later in the summer and the wastage by personal-use diggers will be increased because of this. Since wastage by personal-use diggers is already of considerable magnitude, this point is important; (2) It would allow the harvest of faster-growing, first-year clams from June on. By early fall much of the digging will be on first-year clams because most of the second-year clams will have already been taken. Again the commercial man will be faced with a sorting and measuring problem, because most of the clams will be smaller than the legal size, and he may again request a decrease in the minimum size limit. The taking of the faster-growing, first-year clams would represent a substantial reduction in yield.

A Four-and-Four-and-One-Half-Inch Minimum Size

An alternative to the above proposal is to establish a 4-inch minimum size from April 1 to August 31 and a 4½-inch minimum size from September 1 to March 31. This proposal is slightly more complicated than the others. Some advantages are: (1) it will allow earlier exploitation of second-year clams than the present limit by commercial diggers; (2) it will allow a much smaller number of first-year clams to be taken than under a 4-inch limit all year; (3) most of the period of fast growth will be utilized by most of the clams; (4) a fair proportion of second-year clams will survive to spawn once, but not as many as do presently; (5) it should eliminate some of the sorting, and also decrease wastage by commercial diggers because few first-year clams approach a length of 4 inches in the spring, or 4½ inches in the fall.

Some disadvantages are: (1) fast growing, first-year clams will be legally taken during June, July, and August; (2) commercial diggers will need to distinguish between two sizes of clams under two minimum limits; (3) the enforcement of the regulation may be somewhat more complicated. However, since most enforcement is now being done on or near the beach,
this shouldn't cause a significant change from present procedures; (4) the second-year clams will be taken earlier, thus reducing the average size of clams available. This will increase the amount of personal-use wastage.

It should be pointed out that none of these proposals will greatly increase the total number of clams harvested. The clams will simply be taken at a slightly earlier age (a considerably earlier age in the case of the 3½-inch minimum).

**Personal-Use Regulations**

Because the number of personal-use diggers has increased, and is expected to continue to increase, additional restriction of this fishery should be considered. Proper curtailment could be doubly beneficial because the clams otherwise wasted, as well as the clams that would be taken, would be left on the beach.

Effective control of this fishery is more difficult because a minimum-size limit is not practical. It would doubtlessly increase the number of clams wasted.

Other possibilities are: (1) A seasonal closure for personal-use diggers. This would be strongly opposed unless the commercial fishery was included and a seasonal restriction is not necessary on the commercial harvest when it is controlled by a minimum size. However, if a closed period for personal-use diggers was properly timed, the double benefit previously mentioned would be achieved; (2) A reduced bag limit. Reducing the bag limit, for example, to 18 clams per person would theoretically restrict the catch 25 per cent but a portion of this would be lost through increased wastage. To illustrate this, the average personal-use catch last year was about 21 clams per person and an average of 4 clams per person was wasted. This raises the total clams destroyed per day per
person to 25, or 1 more than the bag limit. Diggers would be even more inclined to sort out the smaller clams than at present. If the numbers of personal-use diggers continue to increase there might be no net reduction.

(3) Require a license for personal-use diggers. It is believed that requiring a license, costing a modest sum, to take a limit of razor clams would reduce the practice of "digging for the family", where the parents will dig a limit for each child and sometimes the neighbor's children. Defense is often made of this practice by the saying that several limits must be taken to cover the cost of the trip. If clams are taken primarily for recreation, as are various game animals and fish, then enjoyment of the outing is payment enough and the clams taken are only an additional reward and not the primary purpose. This attitude must be encouraged because of the obvious limitations of the clam stocks.

Other less-enthusiastic diggers may also be discouraged by the necessity of a license, but anyone who truly enjoyed the outing and the recreation would persist as so many anglers and hunters have for their sport.

CONCLUSIONS

1. The razor clam regulations imposed in September 1954 accomplished the planned objective of drastically reducing the number of first-year clams being taken.

2. They also disturbed the proportion of the catch taken by each fishery which was not anticipated, and some adjustment of this seems desirable.

3. Re-establishing the $\frac{3}{8}$-inch limit would not provide for optimum utilization and would be wasteful of the resource.

4. A 4-inch minimum size would tend to balance the proportion of the catch; would allow most of the clams to attain the fast growth; and would allow the majority of the clams to spawn at least once. On the debit side, it would increase wastage by personal-use diggers and allow
the harvest of fast-growing, first-year clams.

5. A 4-inch minimum size limit from April 1 to August 31 would have all the advantages of the 4-inch limit and would in addition prohibit the taking of almost all first-year clams from September 1 to late May or June. Disadvantages are that some fast-growing, first year clams will be taken during the 4-inch period, diggers will have to adjust to two minimum sizes, and enforcement might possibly be complicated.

6. The personal-use catch is increasing, and is expected to continue to increase. Further curtailment of this fishery appears necessary. Three possible means are seasonal restrictions, reduced bag limit, and licensing diggers. All possibilities have good and bad points, but the licensing appears to have fewer disadvantages than the others.

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