The Public Oyster Grounds of the Rappahannock River

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A. Introduction

The Rappahannock River includes some of the best oyster grounds in the state. The public grounds comprise a poorly used natural resource of great potential value to the state. At present oystermen gather the "wild" crop which, unfortunately, represents only a small part of the oysters which could be raised by intensive management.

In a single phrase, the Rappahannock can be described as a river where oysters "grow fast but set poorly". The chief factor limiting production is the lack of adequate set of young oysters each year. It is not likely that biologists will learn in the near future how to improve setting by controlling natural conditions in a river. The alternative is to plant seed oysters.

Annual surveys by the Virginia Fisheries Laboratory for the past five years indicate the outlook is not hopeless for the lower part of the river. Below Towles Point, setting is light but fairly consistent from year to year; above this point, no set of importance has occurred since 1944.

The patent tong line crosses the river near Towles Point. Patent tongers are restricted to grounds in deep water below this line. This line is also the approximate upper limit of drills and several other pests and competitors which affect oysters.

All of these factors, (1) the setting characteristics, (2) the patent tong line, and (3) the occurrence of fouling organisms and pests, suggest that for management purposes the river might be divided into two areas - above and below Towles Point.

B. Records of setting

The history of setting in the Rappahannock River is vague. Old oystermen say that setting was never regular each year as it is in the James. Good oystering appears to have coincided with good economic periods such as 1900 and 1924-27. However, all agree that oystering is not as good as it was in the past.

The best set in recent years is reported to have occurred in 1941. Brief records indicate practically no set in 1942 and 1943. In 1944 a moderate set occurred which was the last of much importance above Towles Point. Oysters resulting from this set were being harvested in 1946-1948 which were years of relatively good oystering in the Rappahannock River.

Table 1. - Strike on natural cultch in the Rappahannock River (Average number of spat per bushel for all bars sampled)

Year	Below Towles Point	Above Towles Point
1944	303	103
1947	153	29
1948	94	4
1949	235	15
1950	168	26
1951	83	3
Five year average 1947-1951	147	15

Table 1 shows almost complete failure of spatfall above Towles Point since 1947 while the bars below the Point have had a light set each year. The differences in setting rates between the upper and lower river are probably greater than these figures show, for below Towles Point some spat are lost because of drills and soft bottoms.

Above Towles Point, it appears that the meager set is best on the north side of the river. This is the area where most shells have been planted in recent years but the set has been so light that the returns probably do no more than pay for the shells.

C. Analysis of the stock of live oysters, 1947-1951

A simple rule-of-thumb test which will give some idea of the status, future productivity, and recruitment of young oysters on a bar is to examine the ratio of spat to small oysters and small oysters to market-sized oysters. If the bar is flourishing there should be more spat than small oysters and more small oysters than market oysters.

An examination of Table 2 shows that below Towles Point spat are usually more abundant than small oysters which are in turn more numerous than market oysters. This is not true of the bars above Towles Point. Furthermore, oysters of all sizes are much less abundant above Towles Point, there being an average of 102 oysters per bushel above and 361 per bushel below Towles Point over a five year period. Market oysters are twice, small oysters approximately three times, and spat ten times as abundant below as above Towles Point. The number of spat added each year is certainly insufficient above Towles Point and an increase in the set would be desirable below this point.

Comparing the counts of oysters from 1947 to 1951 (Table 2), it appears that the supply of market oysters has decreased throughout the river but fairly good sets in 1949 and 1950 may improve oystering in the lower river for a few years. There is no reason for optimism about the upper river, in fact the meager sets of the past few years means fewer small and market oysters in years to come.

Table 2. - Live oysters and shell reserve in Rappahannock River, 1947-1951
(Number per bushel of natural cultch)

	Live oysters			Blank Shells	Cinder-% of bushel
	Market	Small	Spat		
Average below Towles Point					
1944			303		
1947	132	142	153	151	0
1948	76	81	94	189	3
1949	88	87	235	82	7
1950	68	192	168	111	7
1951	57	146	83	127	21
	84	130	147	132	8
Average above Towles Point					
1944			103		
1947	69	95	29	202	12
1948	50	43	4	254	14
1949	23	17	15	213	37
1950	25	37	26	205	44
1951	28	51	3	241	39
	39	48	15	223	29
Average for whole river					
1947	77	101	56	191	9
1948	60	58	40	228	9
1949	49	45	103	161	25
1950	46	114	97	157	23
1951	36	80	27	192	31

D. Analysis of the supply of shell

The Rappahannock River bars have a rather large amount of cultch or shell stock as a result of the plantings made by the Commission of Fisheries. This includes many blank shells (no oysters of any kind attached), other shells which are partially used, and cinder or shell fragments. The largest reserve of blank shells and cinder is above Towles Point where setting has been poorest. In a separate report to the Commission it was shown that upwards of 75% of planted shells in the area failed to get a set after one or two years of exposure.

Much of this shell is badly fouled and damaged by the action of encrusting and boring sponges but will catch some set whenever there are mature oyster larvae in the water. In 1951 clean shells were placed in wire bags off Monaskon each week through the summer. No set occurred indicating that larvae, if present, never developed to maturity.

E. Mortalities

A serious loss of oysters occurred in the deeper water above Towles Point in the summer of 1949. Some oysters died on bars in the lower river. The cause of this mortality has not been established definitely but a discussion of the factors involved is available in the files of the Virginia Fisheries Laboratory. Small local mortalities have occurred almost every year in some part of the river. It is believed that hot summers may lead to excessive losses after oysters have spawned but no recommendations can be made at this time.

F. Drill activities

There is considerable evidence that the oyster drill or screw-borer is increasing in abundance in the Rappahannock River and extending its range up the river. Drills are killed by fresh water or water with less than one-third the salt of sea water. In the summer of 1945 an extensive period of freshened waters during hot weather reduced the drill population and effectively killed those in large parts of the James, York, and Rappahannock Rivers. This year, drills were caught in samples at Drummond Ground and egg cases and drilled spat were fairly common.

Drills have no free swimming stage but must crawl from place to place. Their dispersal is slow unless transported by man. It is unlikely that drills would persist very long above Towles Point before spring freshets killed them. On the other hand, the salinity on November 1, 1951, at Ross Rock was approximately 13 parts salt per thousand (sea water 35) which would allow drills to live there until the water freshened. Oystermen would be wise to avoid drill infested seed altogether, unless they are certain the water is too fresh for drills or that their grounds are already badly infested, and they are ready to accept losses of seed oysters. Seed oysters from Brown Shoals, which are taken in May while the drills are laying eggs, should be avoided, particularly by oystermen with drill-free grounds.

The Virginia Fisheries Laboratory is preparing specimens of the two kinds of drills for distribution to oystermen upon request. These may be kept in shucking houses or on buy boats for ready comparison with specimens caught on oyster grounds. Many people confuse drills with mud snails and periwinkles.

G. Pests and fouling organisms

Red and yellow encrusting sponges are exceptionally bad on Drummond Ground and Parrotts Rock. These sponges are worse on public than private grounds because of failure to remove infested cultch from the former. Besides being a competitor of the oyster for food, these sponges cover shells and oysters making it difficult for spat to set. Since the sponges produce free-swimming larvae, all grounds, public and private, must be cleaned regularly before any reduction of these pests can be expected.

The boring sponges are most destructive on the high salinity grounds of the lower river but some species extend as far up as Morattico. The greatest damage is done to old oysters and the oysters on regularly worked private grounds are probably not damaged as much. Again the large public grounds are reservoirs of reproducing sponges.

H. Growth and fattening

It is commonly recognized by most oystermen that growth is exceptionally good in the Rappahannock River from its mouth to Morattico. To what extent this is a result of the sparse populations on the public bars is not known. If all public grounds and private grounds were producing to capacity, the population of oysters might be too large for the food supply.

In 1947 and 1948 most of the oysters on public bars were very fat. Since the mortality of 1949 they have been exceptionally poor. Too little is known about the food requirements of oysters to even guess what has caused this or what conditions favor fattening.

I. Recommendations and conclusions

1. The annual set of young oysters in the upper Rappahannock River is inadequate. Methods by which setting can be improved should be sought but there is little or no precedent to suggest that man can learn to control setting in a river. This situation should be recognized by all oystermen. The obvious solution is to plant seed oysters as private planters are now doing on rented grounds adjacent to the public grounds.

2. New seed oyster areas should be developed in rivers near the Rappahannock to increase the supply of seed oysters and relieve the excessive demands on the James River. Parts of public and private grounds in the Corrotoman and Piankatank Rivers are suitable for seed production.

3. The control of drills can be accomplished by continuous trapping of all drill infested grounds. During May and June the drills have a tendency to climb up on objects to lay their eggs. The capture of breeding adults during those months would greatly reduce the damage. Spat or very small seed oysters can be used for bait.

To be effective, trapping should be done on all infested grounds, otherwise the drills will slowly crawl from one ground to another. Private planters would undoubtedly be willing to trap their grounds if adjacent public grounds were attended to. The chief obstacle would be the amount of labor required to tend the traps. Oystermen themselves are best equipped to do this job. Trapping could be discontinued when few or no drills are caught on the grounds. All planters should exercise extreme caution that seed oysters infested with drills or drill egg cases are not transplanted.

It is recognized that this will be an expensive and continuous program and that the drill problem is not as serious in the Rappahannock River as in the lower York and James Rivers and Chesapeake Bay. Yet, oystermen probably do not realize the extent of their losses from drills. Most losses occur when spat are from pinhead to small button size.

It may be that oystermen are willing to rely on periods of freshened water to control drills but this does not happen every year and extensive losses may occur in the periods between the freshets.

4. It is recommended that most of the state-purchased shells allotted to the Rappahannock be planted in the lower river and adjacent rivers where setting is known to be good. It is believed that a sufficient supply of shells exists in the upper river to catch a set in a year favorable for setting.

5. The yield of oysters per unit area is not known on public grounds. Until such information is available, it will be difficult to determine the level of production on public grounds. The wheat farmer does not estimate his yield from the amount of seed he plants, and yet that is nearly all we know about our public oyster grounds -- the number of young oysters added each year. Effective management of the public bars depends to a large extent upon detailed production records. Without such records repletion activities are shots in the dark. A statistical program is urgently needed as a tool for management.