Adult Education Workshop – A Gathering of Shellfish Commissions April 28, 2007

Factors Associated with Determining a Commercial Oyster Set

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A Symbolic Relationship

For over a century, Connecticut oyster growers would wait with anticipation over the success of the annual summer oyster set. In reality, two groups were anxious about the results. The first were the oyster growers who would plant the "seed oysters", then cultivate and protect them from predators and grow them to market size. The second were "natural growth" harvesters who would gather seed oysters and sell them to the growers. One had leased or purchased grounds (beds) and the other harvested from natural oyster populations called natural beds. The success of one was linked to the success of the other; between them, a commercial market for seed oysters existed.

The "Set"

The set occurred each summer with the natural spawning of oysters in creeks, harbors and rivers. First, eggs and sperm were fertilized in the water column and then matured. Next, this "spat" settled to the bay, cove or near shore bottoms looking for a place to "set." Clean oysters shells were the preferred place to start the four-to-five-year process of growing to an adult. Oyster growers and natural growthers knew this, and laws were enacted concerning the return of shells to the water so that ample setting surfaces were present. Oyster growers would plant hundreds of thousands of bushels of oyster shell on owned acreage to supplement the natural set. The rate at which they would plant was 1,000 to 2,000 bushels of clean, dock dried "cultch" per acre.

In late June, Connecticut oyster growers would carefully look for signs of the first "spat fall" and would microscopically examine sampled shell surfaces looking for it. This event would signal almost around the clock shell planting, as the period of setting was limited and had a defined "window" of success. Shells planted too soon were subject to natural marine fouling and silt covering the

shells with a slippery coating. Too late and the young oysters had perished for lack of suitable substrate. It was a gamble that clean oyster shells would be on the bottom just as the oysters larvae stopped drifting in the water and settled to the bottom. A few days either way would make or break the commercial outcome five years later. By August, the oyster setting period was usually over, although some historical records mention a few sets in September and even one as late as the beginning of October.

What Is A Good Set?

According to George McNeil and Hillard Bloom, a good set was around 4,000 per bushel of oyster shells. Under 2,000 per bushel was seen to be the lower limit of purchasing "seed" oysters. It was anticipated that, at best, only 500 oysters out of 2000 would survive to market size (about twenty dozen per bushel) 6 to 8 thousand set per bushel was excellent, and over that "outstanding". That may seem like a lot, but a bushel of shells can contain up to six hundred shells – or over a thousand potential setting surfaces. At 2,000 set per bushel, that would only be about 2 oysters per surface.

Determining the Set Count

Before seed oysters (newly set oysters on shells) were purchased, the set count needed to be calculated. Oysters were harvested from an area which was sampled. These samples combined to predict the average set per bushel. Shells would be collected from 5 bushels and each sampled until 5 coffee cans of shells would be taken. 25 coffee cans of shells equals that of one bushel – and the shells are "counted out." The other method is to take one coffee can from each bushel – count that out and multiply by 25. At about 20 shells to the can at 2 set/shell or 40 set/can x 25 = 1000 set/bushel or low to "poor." I have seen some shells with up to 50 set on each or 1000 set/can x 25 = 25,000 set/bushel which is outstanding. (MacKenzie, Jr. {1970} "Oyster Culture in Long Island Sound" records sets of up to 50,000 set/bushel.)

Price Paid By Volume

According to Richard Roberts, a natural growther for many years, it was too time consuming to count out each bushel of set, so the prices were paid on a per bushel or volume basis. If the set count per bushel was 2,000 and the price negotiated, then it is possible that 200 shells with an average of 10 set, or 2,000 could be combined with 800 empty shells or "blanks" in a bushel measure. Or it could be 1000 shells at 2/shell, the price would be the same, 2000 seed oysters in a bushel measure. If the set count dropped, a price was renegotiated. If the count dropped below commercial levels, buying from natural growthers would stop.

Buy Boats

To accommodate natural growthers in the 1990's, "buy boats" would sometimes be anchored close to the natural bed and deliveries made directly on the water. This assisted in the planting of oyster beds and subjected the seed oysters to a lesser degree of transportation damage. A "tally" or mark was kept and accounts settled at the end of the day. When seed oysters were plentiful, natural growthers would bring several boat loads of sets. In the evening, the day's purchase would be taken to oyster grounds, washed overboard and thus "planted."

River Natural Beds

What was a good set on offshore natural beds and commercially planted (shelled ground) beds was very different from natural beds in creeks and rivers. Here, oyster populations were subjected to terrestrial events, heavy runoff, silt, leaves and marine algae. Setting surfaces were often restricted to new shell growth around the mantle – so they have additional constraints and usually a much lower set count – 250 to as much as 750 set/bushel (up to 50% of the set can be on living oysters). Cycle Mackenzie, Jr. has done research on how to reuse buried shells and clean natural beds in preparation of spatfalls. In 1968, he observed that "black shells" obtained from muddy bottoms could be planted immediately and, being free of fouling organisms, would catch about as many spat as clean dock–stored shells. River natural oyster beds have shown increased setting rates after modest cultivation schedules, suggested by Mackenzie, were implemented.

Sampling River Oyster Beds

Sampling creek and river natural beds was also more difficult. Although a smaller version of the oyster dredge was used, it often proved to be unreliable. It was Richard Roberts who showed me how to sample natural beds in rivers. This required, at times, a great deal of patience and hard work! To properly sample the bed, it was necessary that all the leaves and sticks be raked off first. The natural beds were often tightly packed, so the hand oyster dredge tended to bounce off the bed. It sometimes would take an hour or more of 30 second to one minute tows with a hand-hauled oyster dredge to clean sticks and leaves from the oyster bed. This was followed by another 30 minutes to an hour to break the edge of the bed loosening the oysters. Care had to be taken not to "bill" the oysters, slicing off the tops by towing too fast. Once the oyster were loosened, you would start to "catch." Only then would a sample accurately portray what condition or how abundant the oysters were. The main difference is that set/bushel counts were much lower but survival generally higher since starfish and oyster drills are largely absent from these areas. The chief cause of mortality in these natural oyster beds were from silt and organic debris burial.

For more information on the preparation and surveying oyster beds sets, please review – **Commercial Fisheries Review** (Jan. 1970, pages 27-40) OYSTER CULTURE IN LONG ISLAND SOUND, 1966-69 by L. Mackenzie Jr. Original publication – US Dept of Interior Fish and Wildlife Service #859, Bureau of Commercial Fisheries Biological Laboratory, Milford, CT 06460.