

My Take-Aways from “Innovative Ideas from Around the Country” Symposium

October 23, 2016

Managing public fishery harvests

- There is essentially no public oyster fishery (other than through Native American claims) in Washington State (WA).
- Limiting entry to the fishery appears to be important. New Jersey (NJ) has been able to maintain modest but sustained harvest levels that are profitable to participants. On the other hand, VA has had little success in limiting the participants in the fishery through attrition and other requirements and relies on daily quotas and short openings that do not promote profitability for those most heavily engaged in the fishery.
- Restricting daily catch, hours, days, and open periods has had limited effectiveness in managing harvest and ensuring profitability.
- Stock assessments, coupled with individual quotas, have allowed NJ manage the harvest at sustained levels, improve profitability and simplify enforcement.

Working the bars

- VA managers and at least some watermen have come to understand that power dredging (employing dredges lighter than those allowed in MD) is destructive of spat and diminishes the available shell in a way that reduces future yields. This was the main motivation for moving to rotational harvest on public bars.
- NJ watermen believe that bars need to be dredged to keep them productive, but this may be because of the high sedimentation rates that silt over shells in the turbid Delaware estuary.

Rotational harvest

- Except in the highly productive James River, rotational harvest (closing grounds to dredging for 3 years after shell repletion) is used on public bars to produce more market oysters. After a limited, but intense harvest season the bars are practically “fished out.”
- In VA the effectiveness of rotationally harvested public bars depends greatly on repletion of shell, without which productivity would be very limited.
- A form of rotational harvest is also employed in NJ, with shell planting closely timed to larval setting.

Sustainability

- VA managers believe that the public fishery as presently managed is unsustainable outside of the James River without a continued supply of dredged, subfossil shell.
- NJ scientists, managers and watermen have worked together to sustain a modest but profitable harvest level of about 80,000 bushels (60,000 MD bushels) over the last 9 years. Participation is limited to only 81 licensees. The fishery is not, however, completely self-sustaining at present levels, but requires the input of cultch derived from the offshore clam fishery, which is paid for by a \$2 per bushel shell tax that the fisherman agreed to pay.
- Shellfisheries in WA have grown dramatically and are sustained by intense aquaculture, which is based on multiple species and is generally vertically integrated, i.e. a given company runs a

hatchery, tends plantings in leases, and sells the product. The success of this aquaculture allowed development of national and international markets. There is essentially no commercial harvest of wild shellfish, other than for geoducks.

Shell supply

- The modern shell supplies of oyster reefs in the Chesapeake and Delaware bays have all but been exhausted as a result of mechanical harvesting over the past 130 year and use of shell for road building. Despite repletion with subfossil shell, the inventory of shell substrate is not being rebuilt and is, in fact, being lost due to harvest extraction, burial, and physical, chemical and biological disintegration. As a rule, bioerosion is greater under higher salinity conditions, but shells near the sediment surface are always undergoing disintegration.
- The only dredging vessel capable of extracting subfossil shell in the Chesapeake Bay is up for sale and may cease operation because of marginal profitability. Reinstating dredging of subfossil shells in Maryland might make the operation of this dredge more economically viable.
- The supplies of subfossil shell in the Chesapeake Bay are finite. In VA this resource might last 20 years at the present rate of extraction. Consequently, VA managers see the planting of subfossil shell in public fishery areas as only an interim measure, allowing the oyster industry a period of time to convert to the sole dependence on aquaculture.
- Export of shell material from distant sources (e.g. the Gulf or Caribbean) is likely not economically feasible.

Alternative substrates

- In VA placement of alternative substrates (other than oyster shell) is now recommended or required for use in repletion in sanctuaries and in restoration projects. The limited supplies of subfossil shell are reserved for repletion of rotational harvest areas and supplies of fresh shell are reserved for aquaculture.
- Alternative substrates such as stone and concrete are not appropriate for use where there is a dredge fishery as this results in even greater mechanical damage to oyster spat than dredging up shell. However, these substrates are effectively colonized by oyster spat and thus are appropriate in sanctuaries where the oysters are not to be harvested.
- In NJ, because of the lack of availability of subfossil oyster shell and the declining availability of fresh shell (as more oysters are shipped away in the shell trade rather than sent to shucking houses), crushed clam shell or oyster shell that was buried and is recovered are used as cultch in the public fishery and on leased grounds.
- In WA oyster production is virtually all through aquaculture and mostly goes to the half-shell trade. This favors the use of single, cultchless oysters, the larvae of which are set on small shell-flour grains, thus reducing the demand for whole shell. In British Columbia the production of oysters that are set on shell and destined for the shucked market has generated a surplus of shell for which alternative uses are being sought in order to reduce disposal costs.

Brood stocks

- Sufficient spat set is seen as an important factor limiting oyster production in both VA and NJ.

- No-harvest sanctuaries are maintained near the rotationally harvested public bars in VA both to provide a basis for comparison with populations in the harvested areas and to increase the brood stock.
- In NJ, harvest levels are determined based on population surveys and stock assessments. Harvest of only about 2% of the spawning stock is the target.

Sanctuaries

- VA maintains sanctuaries for each of its public fishery areas outside of the James Rivers. Habitat enhancement through placement of substrate (now preferably alternative substrate) is undertaken in at least some of these sanctuaries.
- In some of the VA sanctuaries surveyed the total density of oysters was not greater than in adjacent harvest bars, but the density of market-sized oyster was greater.
- The five restoration sanctuaries to which VA committed under Chesapeake Bay Program agreements have all been designated.
- NJ watermen see no need for sanctuaries, as they believe the bottom must be worked, but this might be a manifestation of the high sedimentation rates in the turbid Delaware estuary.

Aquaculture

- Production of oysters under present conditions (limited substrate and spawning stocks and high disease pressures) seems to require aquaculture in some form or another. This may take the form of shell planting on public grounds (financed either by the public as in VA or the industry as in NJ), private leases on which substrate is improved and seed oysters may be planted by the lessee, or extensive (planting of oysters on the bottom) or intensive (involving racks, bags or strings) aquaculture. The trend toward extensive and then toward intensive aquaculture has increased global oyster production.
- Extensive and intensive aquaculture requires adequate infrastructure, most notably hatcheries capable of reliable larval production, and some level of vertical integration.
- Aquaculture, private leasing and well-managed public fisheries could be not only compatible, but synergistic.

Enforcement

- Enforcement is critical for harvest restrictions in a public fishery and for eliminating poaching of sanctuaries and protecting aquaculture leases.
- Allocation of quotas with rigorous reporting and tagging requirements in NJ improved effectiveness of management and reduced the costs of enforcement.
- Movement to more intensive aquaculture reduces poaching violations and enforcement costs based on experiences both in WA and VA.

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