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# Virginia Shellfish Aquaculture Situation and Outlook Report

### Results of 2009 Virginia Shellfish Aquaculture Crop Reporting Survey

Virginia's shellfish aquaculture industry continues to add significant value to the State's seafood marketplace. While Virginia's watermen harvest hard clams and oysters from the State's public resources, they also grow shellfish for consumers. In recent years, following the lead of the hard clam industry, there has been a significant transition toward intensive aquaculture of native oysters. The once-extensive oyster planting has disappeared primarily as a result of endemic oyster diseases and wildlife predation of seed oysters. It has been replaced by an expanding aquaculture sector, which is based on improved culture techniques and disease-resistant oyster seed.

While these trends are widely acknowledged, there has been no consistent long term reporting of production and economic trends in Virginia's shellfish aquaculture industry. Periodic assessments are necessary to inform growers and related interests about the actual status and trends in the industry. The intent of this survey is to continue annual assessments with which to gauge growth and inputs in Virginia's shellfish aquaculture industry.

This report is based upon an industry survey of 2009 culture activities completed during the first quarter of 2010.

#### **Methodology**

#### Survey

A mail and internet-based survey was developed to collect information from Virginia clam and oyster growers permitted as commercial shellfish growers.<sup>1</sup> A preliminary version of the survey instrument was pilot tested and revised based upon field testing (Appendix 1). Ninety-one complete, useable surveys were returned via internet, mail, or fax, including forty-two clam growers, sixty oyster growers and eleven growers who cultured both molluscs. Discussions with industry members suggest that the firms responding represent more than 90% of Virginia aquaculture's total production of market size oysters and clams during 2009.

Figure 1: Number of Hard Clams Planted in Virginia (2005-2009) 700 589,380,000 600 538,350,000 512.266.000 500 Number (millions) 422.000.000 397,143,000 300 200 100 n 2005 2006 2007 2008 2009 Year

Figure 2: Number of Hard Clams Sold in Virginia (2005-2009) 250 211.900.000 193,600,000 194,500,000 200 186,000,000 Number (millions) 145,000,000 150 100 50 O 2005 2006 2007 2008 2009 Year

For confidentiality reasons, the information collected is aggregated and the total represents both the eastern and western shores of Virginia.

#### **Summary of Findings**

## Virginia Clam (*Mercenaria mercenaria*) Aquaculture 2005-2009

The aquaculture of hard clams contracted somewhat during 2008 and declined further in 2009 in Virginia. Based upon previous economic assessments compiled by the authors, Virginia leads the nation in the culture of hard clams. While Virginia continues to lead the nation in hard clam aquaculture production a downturn in planting and sales is evidenced by the most recent survey. Growers providing comments on the survey attributed the decline in sales and plantings to the overall economic situation which continues to dampen both shellfish retail and food service markets.

As depicted in Figure 1, for the second year in a row, clam growers reported a decline in seed plantings during the most recent year. The firms reporting indicated that during 2009 they decreased plantings by nearly 116 million clams (-22%) from 2008 plantings. The outlook for 2010 was incomplete at the time of survey; however, those reporting suggested the likelihood of a 7% increase in seed planting during 2010.

#### Clam Sales and Prices

The 2009 crop reporting survey reflects a decrease (-24%) in the total number of Virginia market clams sold between 2008 and the end of 2009. During 2009, Virginia's total farm output declined to an estimated 145.0 million "market" clams, as shown in Figure 2. Combining the overall sales with

I "VMRC 2009 Oyster and Clam Aquaculture Product Owner Permit List".

weighted average price per market clam, it is estimated that total revenue for hard clam aquaculturists in 2009 was \$21.7 million—a decrease of \$5.6 million from the prior year.

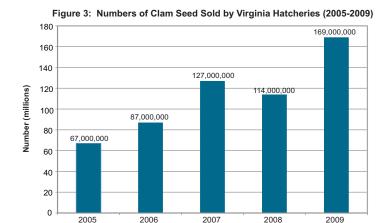
Sales of clam seed increased by an estimated 41% (Figure 3) in 2009 compared to the previous year. This increase in sales has accompanied the expansion of the industry's hatchery infrastructure over that past 2 years. Industry sources indicate that much of the new hatchery capacity is dedicated to producing seed for the hatchery owner's own planting. Essentially all of the seed produced is planted in Virginia. The reported average price of clam seed was the same in 2009 as 2008 and is projected by growers to remain the same in 2010.<sup>2</sup>

Figure 4 displays the survey findings regarding relative prices received for market clams. The weighted average price reported per market clam at the farm gate was \$0.15 during 2009, up somewhat from the prior year.<sup>3</sup> According to the growers, over 90% of all market size clams grown in Virginia continued to be shipped to out-of-state buyers.

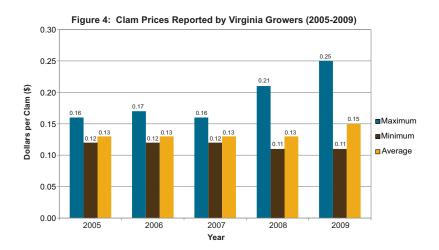
Also, as shown in Figure 5, contraction at the farm level has entailed a decrease in employment of full time (-29%) and an increase in part time (+21%) personnel during 2009.

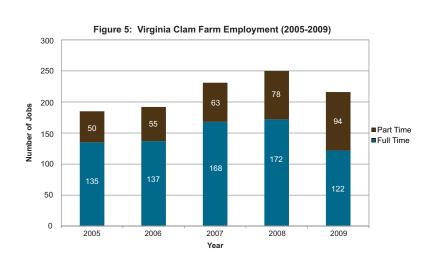
## Virginia Oyster (*Crassostrea virginica*) Aquaculture 2005-2009

The oyster industry continues to evolve from the traditional extensive planting of "shell on bottom" to more intensive, contained, aquaculture utilizing cages, racks, floats, and



Year





<sup>2</sup> The price of seed depends upon size, but the modal price reported was \$0.025 per seed in 2008, which was the same as in 2007.

<sup>3</sup> Smaller niche growers, with production and sales of less than 50,000 clams reported average prices as high as \$0.25. Fourteen cents per market clam was the modal price to the grower. It should be pointed out that market level for most growers is equivalent to farm gate prices. Some smaller growers market product directly at the retail level. The production weighted average across all growers was \$0.149 per market clam in 2009.

Figure 6: Number of Oysters Planted by Virginia Aquaculturists (2005-2009)

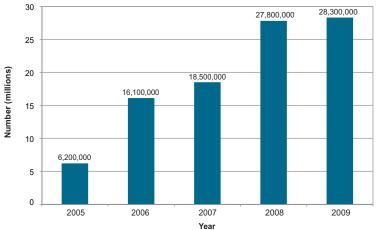


Figure 7: Number of Aquacultured Market Oysters Sold by Virginia Growers (2005-2009)

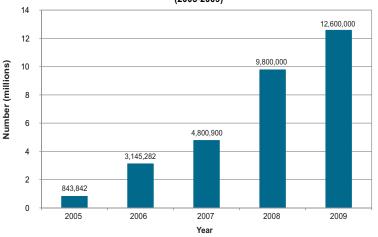


Figure 8: Oyster Prices Reported by Virginia Growers (2005-2009)

0.70

0.60

0.50

0.50

0.50

0.50

0.45

0.45

0.45

0.29

0.20

0.10

0.10

0.00

2005

2006

2007

2008

2009

the like.4

As depicted in Figures 6 and 7, the growers surveyed showed continued growth from 2005 through 2009. A nearly five-fold increase in oyster plantings occurred from 2005 to 2009. Fewer concerns were reported on the survey regarding what previously had been chronic shortages of viable oyster seed, as hatchery capacity is clearly expanding to meet the growing demand.

If the growers' expectations indicated in this survey materialize, more than 42.4 million oysters will be planted by Virginia growers in 2010 (nearly a 50% increase).

The 2008 survey indicated that growers expected to sell 10.0 million oysters in 2009. However, this survey found that sale exceeded expectations by 26% (12.6 million oysters sold).

Oyster prices were reported without detail as to market segment (i.e. primary wholesale, secondary wholesale, retail, etc.). Figure 8 shows that prices received for cultured oysters remained stable over the past four years, while volume of sales have expanded.<sup>5</sup>

With the expansion of large-scale "remote setting," also called "spat-on-shell" oyster planting, in 2008, the entire hatchery volume picture changed, as existing firms became active in purchasing not only

<sup>4</sup> Historically the most common oyster "culture" technique in Virginia was the transplanting of wild harvested seed to leased growing grounds. Prior to the onslaught of diseases, the grower paid little attention to the grounds between the time seed was planted and the time mature oysters were harvested, some 2 or 3 years later. Today there is little such culture practiced and the results here do not include information on such oyster planting. The results here represent the use of intensive aquaculture practices adopted as a result of increased oyster disease and predation using hatchery-produced seed.

<sup>5</sup> During 2009 the median price was \$0.30 per market oyster up from \$0.28 in 2008.

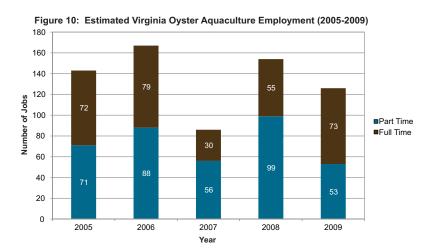
cultchless seed, but large quantities of eyed larvae for spat-on-shell development. Remote setting is a method of oyster cultivation in which oyster larvae and old oyster shells are mixed in a controlled environment in large tanks on land rather than in open Bay waters. The larvae attach, or set, on the old oyster shells and metamorphose into seed, or spat oysters. The resulting spat-on-shell is ready for almost immediate planting in the Bay where the spat will grow naturally until ready for harvest.

The primary advantage of spat-on-shell cultivation is that it requires less labor and fewer materials than single-oyster cultivation, thereby making it a more economically feasible option for producing oysters. Because spat-on-shell cultivation produces oysters grown in clumps (similar to wildcaught oysters), the primary product is oysters for shucking rather than single oysters for half-shell consumption. For this reason, remote setting is not meant to take the place of single-oyster culture (which produces consistent, high-quality, half-shell oysters). Instead, remote setting complements singleoyster culture by producing, on large scale, a local oyster for use by Virginia's oyster processors.

The industry forecast for continued growth in use of eyed larvae for spat-on-shell is clear. Growers had estimated that eyed larvae purchases for culture would increase nearly four-fold during 2009; however difficulties in hatchery production reportedly dampened that activity (Figure 9). Discussions with hatchery managers during the first half of 2010 indicated a significant advancement in the production of both seed and eyed larvae. It is expected that over 1.0 billion eyed larvae will be produced this crop year.<sup>6</sup>

This forecast derives directly from the continued growth in aquaculture of oys-

Figure 9: Oyster Seed & Larvae Sold by Virginia Hatcheries (2005-2009) 600 498 500 000 500 400 Number (millions) 347,000,000 300 200 100 26.724.000 20,400,000 26.205.000 n 2005 2006 2007 2008 2009



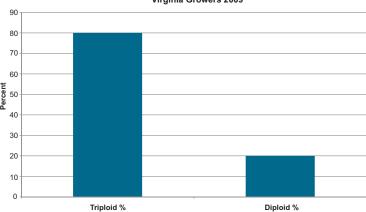
Year

ters in Virginia, as virtually all of the seed produced is either planted by the hatchery owners themselves in their aquaculture operations or sold to other Virginia oyster growers. This vertically integrated system, with eventual sales to many out-of-state consumers, adds important economic development to local coastal communities.

As reflected in Figure 10, employment associated with oyster aquaculture has been variable over recent years. The difficulty of estimating the time and labor associated with relatively small-scale aquaculture conducted in conjunction with other business lines makes estimates of oyster culture labor problematic at this point in industry de-

<sup>6</sup> For a complete description of the spat on shell remote setting industry development, see: http://web.vims.edu/adv/frg/FinalSpatonShell%20Project.pdf?svr=www

Figure 11: Percentage of Triploid vs Diploid Oyster Seed Purchased by Virginia Growers 2009



velopment. In view of this fact, the trends in these employment figures should be not overly interpreted. There is consistent expectation that with successful development of both spat-on-shell and cultchless oyster aquaculture, additional employment will be required to meet the greatly expanded planting and production needs.

Oyster growers have adopted the use of improved strains of oyster seed and larvae over the years to optimize disease resistance, growth rates and meat quality during warmer months. Perhaps most notably, the current survey of growers indicated that 80% of the seed planted in 2009 was of the triploid variety (Figure 11). Industry reports that the sterile seed is more viable from a commercial standpoint, as the oysters grow faster and do not diminish in quality with seasonal spawning.



#### Welcome

Thank you for taking a few minutes to complete the following commercial shellfish aquaculture survey. With your help, Virginia's past annual surveys have shown how useful timely information is for the shellfish aquaculture industry. Such information is vital to understanding the importance of Virginia's growing aquaculture business to the economy, and in turn the importance of clean water, reasonable land use and tax policies, access to financial capital and the like to shellfish growers.

All information provided will be held in the strictest of confidence and used only when combined with all of those providing information on their individual operations.

Not all questions may apply to your situation. Please answer all that do. The more accurate the information provided, the better the characterization of the Virginia aquaculture industry.

#### Please complete the survey by April 20, 2010.

If you have any questions or would like to discuss, please contact us at:

Thomas J. Murray Marine Business Specialist Phone: 804-684-7190

Fax: 804-684-7161

Michael J.Oesterling Aquaculture Specialist Phone: 804-684-7165 Fax: 804-684-7161

#### **Commercial Clam Aquaculture**

1. Do you aquaculture clams? (IF NO, SKIP To	QUESTION #9)	
No		
2. Do you have a clam hatchery?  Yes		
○ No		

## **Commercial Clam Aquaculture** 3. Do you "re-sell" seed? ( ) Yes ) No 4. Do you have a "cooperative" agreement with another clam producer? Yes ) No 5. Do you purchase hard clam crop insurance? ( ) Yes ( ) No 6. 2009 Commercial Clam Aquaculture a.) # Clams planted b.) % Seed purchased c.) Avg. price of seed purchased d.) # Seed sold e.) % Seed sold out-of-state f.) # Market (non-seed) sold i.) % wholesale ii.) % retail g.) % Market sold out-of-state h.) Avg. price per market clam i.) Avg. price wholesale ii.) Avg. price retail

i.) # Full-time help j.) # Part-time help

## Virginia Shellfish Grower Situation & Outlook Survey - 2010 **Commercial Clam Aquaculture** 7. 2010 ESTIMATED Commercial Clam Aquaculture a.) # Clams planted b.) % Seed purchased c.) Avg. price of seed purchased d.) # Seed sold e.) % Seed sold out-of-state f.) # Market (non-seed) sold i.) % wholesale ii.) % retail g.) % Market sold out-of-state h.) Avg. price per market clam i.) Avg. price wholesale ii.) Avg. price retail i.) # Full-time help j.) # Part-time help 8. Comments or Explanatory Notes on 2009 & 2010 Clam Aquaculture:

Virginia Shellfish Grower Situation & Outlook Survey -	2010
Commercial Oyster Aquaculture	
9. Do you aquaculture oysters? (IF NO, SKIP TO QUESTION #16)  Yes  No	
Commercial Spat-On-Shell Oyster Production	
Please report only oyster production which originated from an ons hatchery.	hore
No "natural strike" product moved to growing grounds.	
10. 2009 Commercial Spat-On-Shell Oyster Aquaculture  a.) # Eyed-larvae purchased  i.) % diploid  ii.) % triploid  b.) % Eyed-larvae purchased from out-of-state  c.) Avg. price per million eyed-larvae purchased  d.) # Bushels spat-on-shell planted  e.) # Bushels spat-on-shell harvested/sold  f.) Avg. price received per bushel of spat-on-shell sold  g.) # Eyed-larvae sold  i.) % diploid  ii.) % triploid  h.) % Eyed-larvae sold out-of-state  i.) % diploid  ii.) % triploid	

## Virginia Shellfish Grower Situation & Outlook Survey - 2010 **Commercial Spat-On-Shell Oyster Production** 11. 2010 ESTIMATED Commercial Spat-On-Shell Oyster Aquaculture a.) # Eyed-larvae purchased i.) % diploid ii.) % triploid b.) % Eyed-larvae purchased from out-of-state c.) Avg. price per million eyed-larvae purchased d.) # Bushels spat-on-shell planted e.) # Bushels spat-on-shell harvested/sold f.) Avg. price received per bushel of spat-on-shell sold g.) # Eyed-larvae sold i.) % diploid ii.) % triploid h.) % Eyed-larvae sold out-of-state i.) % diploid ii.) % triploid 12. Comments or Explanatory Notes on 2009 & 2010 Commercial Spat-On-Shell Oyster Aquaculture:

#### **Commercial Cultchless (Single) Oyster Production**

Please report only oyster production which originated from an onshore hatchery.

No "natural strike" product moved to growing grounds.

13. 2009 Commercial Single Oyster Aquaculture	
a.) # Oysters planted	
i.) % diploid	
ii.) % triploid	
b.) # Seed purchased	
i.) % diploid	
ii.) % triploid	
c.) % Seed purchased from out-of-state	
d.) Avg. price of DIPLOID seed purchased (\$ per 1000)	
e.) Avg. price of TRIPLOID seed purchased (\$ per 1000)	
f.) # Seed sold out-of-state	
g.) Avg. price of seed sold (\$ per 1000)	
h.) # Market (non-seed) oysters sold	
i.) % wholesale	
ii.) % retail	
i.) % Market oysters sold out-of-state	
j.) Avg. price per market oyster (\$ per piece)	
i.) Avg. price wholesale	
ii.) Avg. price retail	
k.) # Full-time help	
I.) # Part-time help	

### **Commercial Cultchless (Single) Oyster Production**

14. 2010 ESTIMATED Commercial Single Oyster Aquaculture	
a.) # Oysters planted	
i.) % diploid	
ii.) % triploid	
b.) # Seed purchased	
i.) % diploid	
ii.) % triploid	
c.) % Seed purchased from out-of-state	
d.) Avg. price of DIPLOID seed purchased (\$ per 1000)	
e.) Avg. price of TRIPLOID seed purchased (\$ per 1000)	
f.) # Seed sold out-of-state	
g.) Avg. price of seed sold (\$ per 1000)	
h.) # Market (non-seed) oysters sold	
i.) % wholesale	
ii.) % retail	
i.) % Market oysters sold out-of-state	
j.) Avg. price per market oyster (\$ per piece)	
i.) Avg. price wholesale	
ii.) Avg. price retail	
k.) # Full-time help	
I.) # Part-time help	
15. Comments or Explanatory Notes on 2009 & 2010 Commercial Cultchless (Aquaculture:	(Single) Oyster
	<u>₩</u>

Virginia Shellfis	sh Grower Situation & Outlook Survey - 2010
Thank You	
16. Please provide	e any comments on the shellfish aquaculture industry situation.
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,	
	e to receive a copy of the overall report when completed?
Yes	
○ No	
18. Contact Inform	nation (Optional)
Name	
Address	
City, State & Zip Telephone	
Email	
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mank you for com	pleting the Virginia Shellfish Grower Situation and Outlook Survey.
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**Photos:** Cover @NRCS; Page 3 (clockwise from top left) @Margaret Pizer/VASG (oyster seed), @VASG (workboats), @ 本人 /Wikimedia Commons(hardshell clams, *Mercenaria mercenaria*), @VASG (clam beds), @VASG (spreading clam seed).