

A close-up photograph of a person's hands wearing blue nitrile gloves, holding a large quantity of fresh oysters. The oysters are piled in the center of the frame, with their shells showing various shades of brown and grey. The background is slightly blurred, showing an orange garment and a metal mesh basket filled with more oysters.

# Virginia Shellfish Aquaculture Situation and Outlook Report

Results of 2008 Virginia Shellfish  
Aquaculture Crop Reporting Survey

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# Virginia Shellfish Aquaculture Situation and Outlook Report

## Results of 2008 Virginia Shellfish Aquaculture Crop Reporting Survey

*Recent growth of the shellfish aquaculture industry in Virginia has added significant value to the State's seafood marketplace. Today, watermen continue to harvest both hard clams and oysters from the State's public resources, albeit at diminished rates. At the same time, Virginia's watermen-farmers are providing additional quantities of quality shellfish to consumers. In recent years, following the lead of the hard clam industry, a significant transition to intensive aquaculture of native oysters has begun. The once-extensive oyster planting has disappeared primarily as a result of endemic oyster diseases and increasing wildlife predation of seed oysters. In its place is*

*an emerging aquaculture sector based on improved culture techniques and disease-resistant oyster seed.*

*While these trends are widely acknowledged, there has been no consistent 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 in order to gauge growth of and inputs into Virginia's shellfish aquaculture industry. This report is based upon an industry survey completed during the first quarter of 2009.*

## Methodology

### Survey

A mail and internet-based survey was developed to collect information from Virginia clam and oyster growers known to be active in the industry. A preliminary version of the survey instrument was pilot tested and revised based upon the field testing (see final survey in Appendix 1). Fifty-eight complete, useable surveys were returned on the internet, by mail or fax, including thirty-three clam growers thirty-two oyster growers and seven 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 2008.

Figure 1: Number of Hard Clams Planted in Virginia (2005-2008)

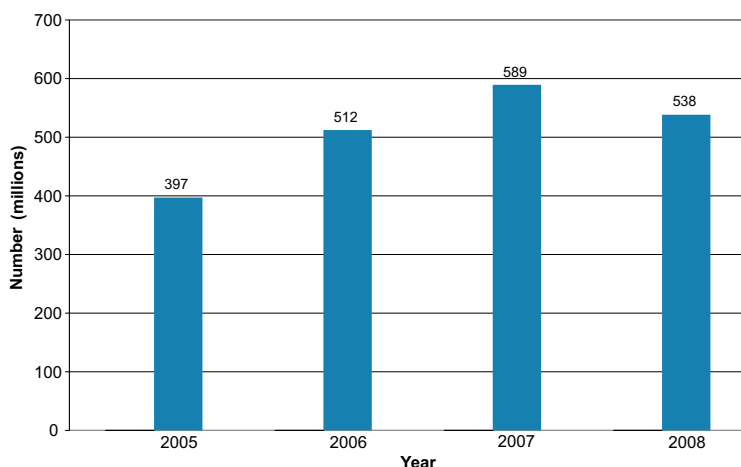
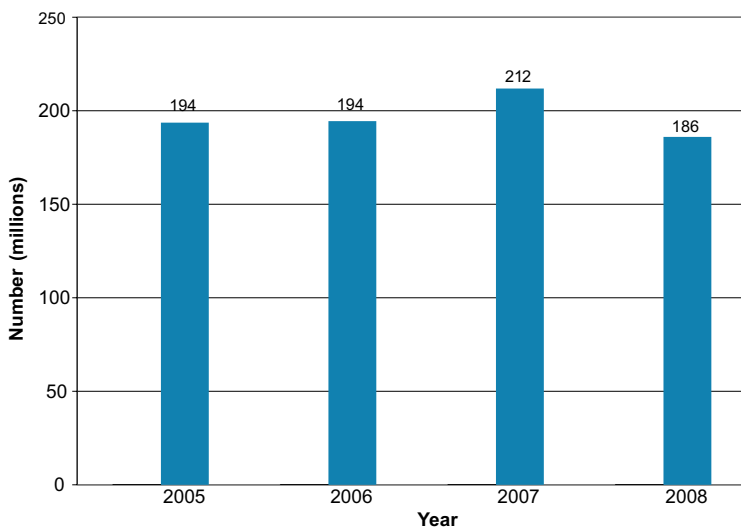


Figure 2: Number of Hard Clams Sold in Virginia (2005-2008)



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 2006-2008

The aquaculture of hard clams in Virginia, which expanded in recent years, contracted somewhat during 2008. 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.

As depicted in Figure 1, for the first time since this annual survey began, clam growers reported a decline in seed plantings during the most recent year. The firms reporting indicated that during 2008 they decreased plantings by nearly 50 million clams (-9%) compared to 2007. The outlook for 2009 was incomplete at the time of survey; however, those reporting suggested the likelihood of an increase in their seed planting of 5-10% during 2009.

### Clam Sales and Prices

The 2008 crop reporting survey reflects a decrease (13%) in the total number of Virginia market clams sold between 2007 and the end of 2008. During 2008, it is estimated that Virginia's total farm output rose to an estimated 186.0 million "market" clams, as shown in Figure 2. Combining the overall sales with weighted average price per market clam it is estimated that total revenue for hard clam aquaculturists in 2008 was \$27.3 million—a slight decrease of \$0.24 million from the prior year.

There was an estimated 9% decline in sales of clam seed (Figure 3). This decline in sales has accompanied the expansion of

the industry's hatchery infrastructure over the past one or two 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 somewhat less in 2008 as 2007 and is projected by growers to remain the same in 2009.<sup>1</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 \$0.147 during 2008, essentially the same as in 2007.<sup>2</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, expansion at the farm level has entailed an increasing employment of both full-time (+2.3 %) and part-time (+23.8%) personnel during 2008

### Virginia Oyster (*Crassostrea virginica*) Aquaculture 2005-2008

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 the like.<sup>3</sup> As is depicted in Figures 6 and 7, the growers surveyed showed continued growth from 2005 through 2008. A four-fold increase in oyster plantings, has occurred during that period. Concerns continue to be voiced regarding the shortage of viable oyster

Figure 3: Amount of Clam Seed Sold by Virginia Hatcheries (2005-2008)

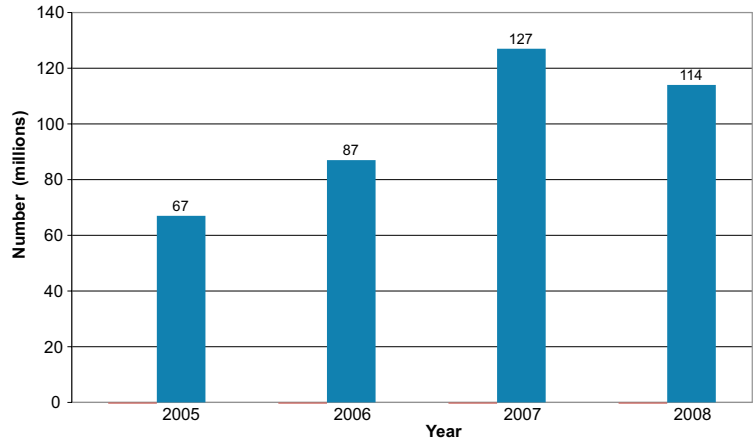


Figure 4: Clam Prices Reported by Virginia Growers (2005-2008)

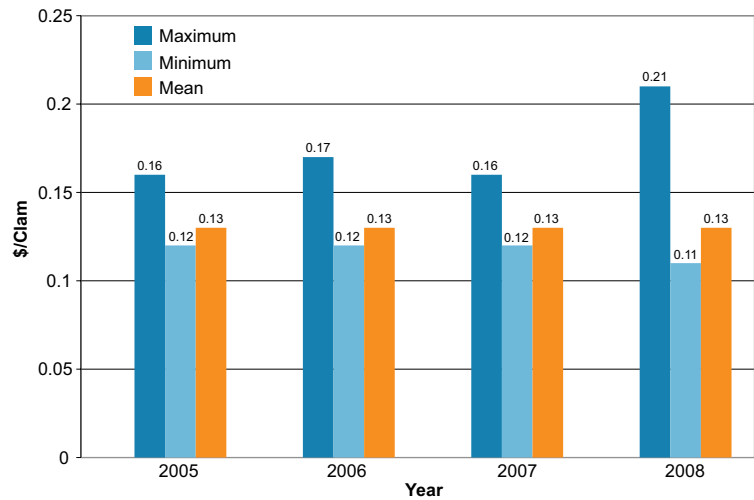
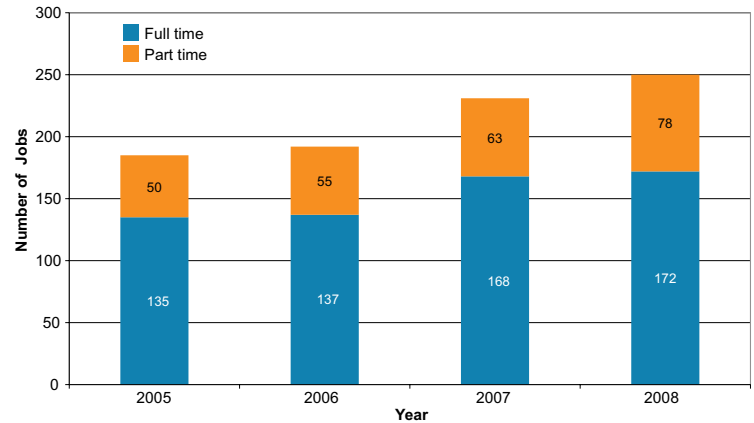


Figure 5: Virginia Clam Farm Employment (2005-2008)

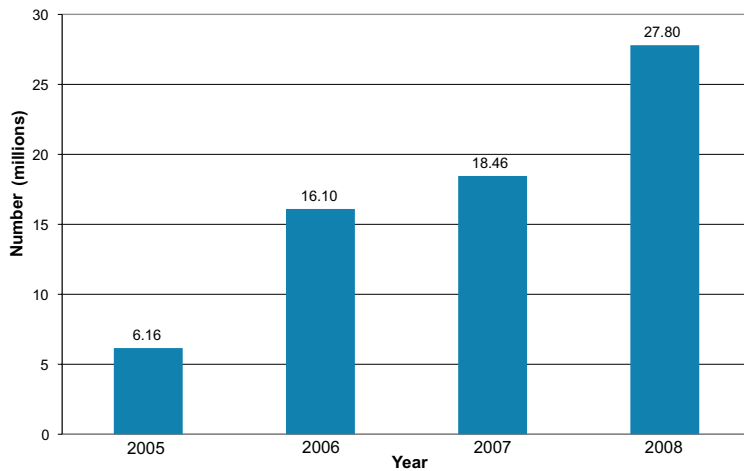


1 The price of seed depends upon size but the modal price reported was \$.025 per seed in 2008, the same as the prior year.

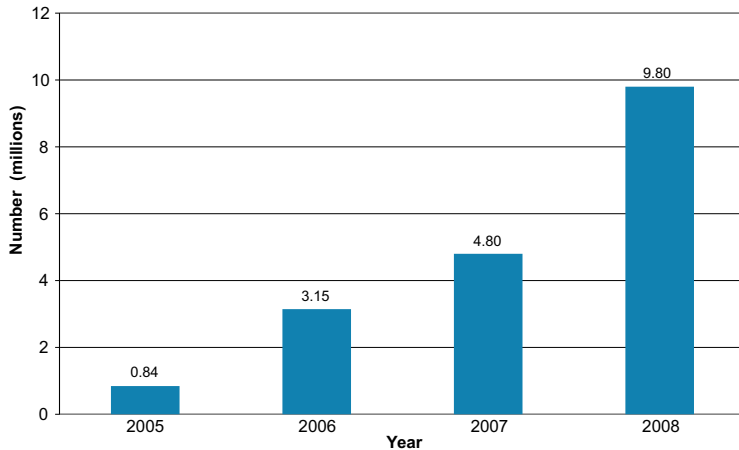
2 Smaller niche growers with production and sales of less than 50,000 clams reported average prices as high as \$0.21. Fourteen cents per market clam was the modal price to the grower. It should be pointed out that market level for most growers is equivalent to farm-gate prices. Some smaller growers market product directly at the retail level. \$0.13 is the simple average of all growers reporting. The weighted average across all growers was \$0.147 per market clam in 2008.

3 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 two or three 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 using hatchery-produced seed, which have been adopted as a result of increased oyster disease and predation.

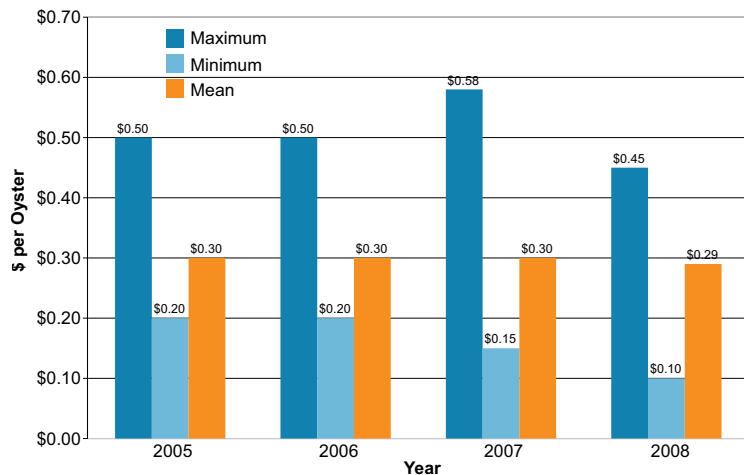
**Figure 6: Number of Oysters Planted by Virginia Aquaculturists (2005-2008)**



**Figure 7: Number of Aquacultured Market Oysters Sold by Virginia Growers (2005-2008)**



**Figure 8: Reported Market Prices for Virginia Aquacultures Oysters (2005-2008)**



seed from existing hatcheries. If the grower expectations indicated by this survey materialize, 2009 will see nearly a 15 % increase

in oysters planted (32.1 million) by Virginia growers. Prior grower surveys indicated that growers expected to sell 7.3 million oysters during 2008. The reported sale of 9.8 million exceeded expectations by 34%. In 2009, growers expect to harvest and sell 14.7 million market oysters, which would constitute a 50% increase above 2008. The growth in oysters sold by farmers (Figure 7) tracks increases in oyster plantings and demonstrates a more than ten-fold increase in farmed oyster sales by Virginia growers between 2005 and the end of 2008.

Oyster prices were reported without detail as to market segment (i.e. primary wholesale, secondary wholesale, retail, etc.). The data in Figure 8 show stability in the average prices received for cultured oysters over the four-year period while volume of sales has expanded.<sup>4</sup>

As shown in Figure 9, the oyster industry in Virginia has continued to expand its hatchery capabilities, reportedly producing 26.7 million seed oysters for sale or planting during 2007. Eighty-four percent of the seed planted by Virginia growers was purchased from a hatchery. The growers surveyed in early 2008 projected an additional 14% increase in oyster seed production during that year to an estimated 30.5 million. With the initiation of large-scale “remote setting” or “spat-on-shell” oyster planting in Virginia during 2008, the entire hatchery-volume picture changed, as existing firms became active in purchasing not just 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. After 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

<sup>4</sup> During 2008, the median price was \$0.28 per market oyster.

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 wild-caught 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) but to complement it with a means of 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 estimate that eyed-larvae purchases for culture will increase nearly four-fold during 2009 to an estimated 1.66 billion eyed larvae.<sup>5</sup>

Predicted increases in eyed-larva purchases derive directly from the continued growth in aquaculture of oysters 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.

Finally, as shown in Figure 10, Employment associated with oyster aquaculture has remained fairly steady over the recent years. One notable change is the apparent move from full-time employment to part-time employment. The difficulty of estimating the

Figure 9: Oyster Seed & Larvae Sold by Virginia Hatcheries (2005-2008)

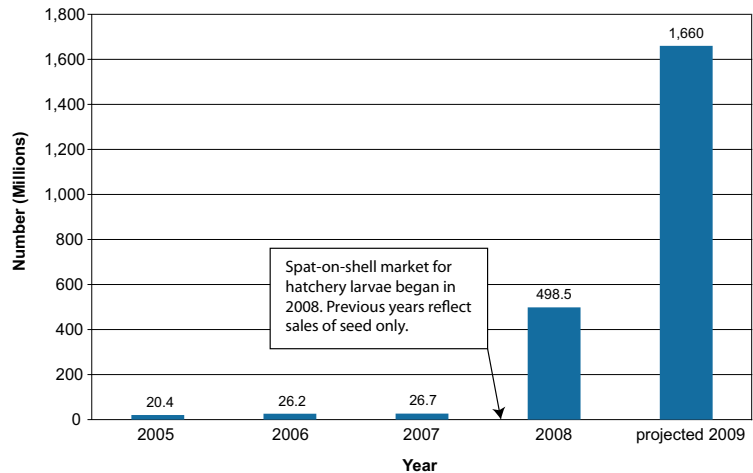
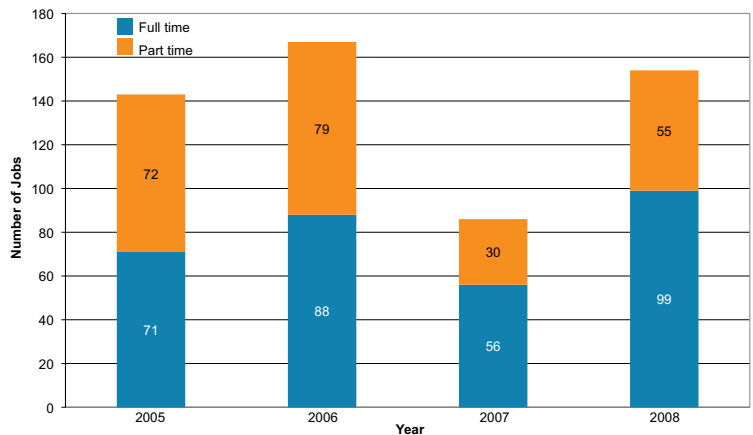
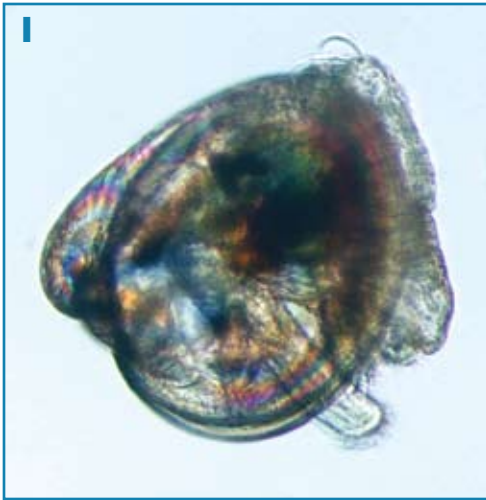


Figure 10: Estimated Virginia Oyster Aquaculture Employment (2005-2008)



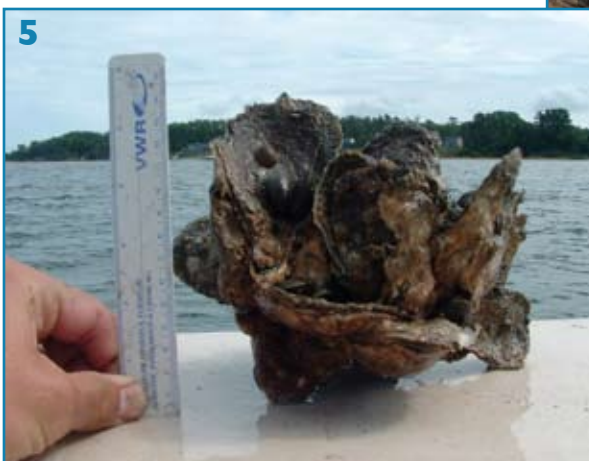
time and labor associated with relatively small-scale aquaculture conducted in conjunction with other business lines makes estimates of oyster culture labor problematic at this point in industry development. In view of this fact, the trends in these employment figures should be not overly interpreted. There is consistent expectation that with successful development of both spat-on-shell and cultch-less oyster aquaculture, additional employment will be required to meet the greatly expanded planting and production needs.

5 For a complete description of the spat on shell remote setting industry development see: <http://web.vims.edu/adv/frg/FinalSpatonShell%20Project.pdf>.



## Spat-on-shell Oyster Aquaculture

1) Eyed oyster larva. 2) Larvae and shell are combined in tanks on land. 3) Spat-on-shell. 4) Spat-on-shell are planted. 5) Harvested clump of oysters.





## **Appendix I: Survey Instrument**

# Virginia Shellfish Grower Situation & Outlook Survey

## Welcome

Thank you for taking a few minutes to complete the following commercial shellfish aquaculture survey. With your help, Virginia's past three 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, 2009.***

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

**1. Do you aquaculture clams? (If no, skip to question 9.)**

- Yes
- No

**2. Do you have a clam hatchery?**

- Yes
- No

**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

# Virginia Shellfish Grower Situation & Outlook Survey

## Commercial Clam Aquaculture

### 6. 2008 Commercial Clam Aquaculture

- a.) # Clams planted
- b.) % Seed purchased
- c.) Avg. price of see purchased
- d.) # Seed sold
- e.) % Seed sold out-of-state
- f.) # Market (non-seed) sold
- g.) % Market sold out-of-state
- h.) Avg. price per market clam
- i.) # Full-time help
- j.) # Part-time help

### 7. 2009 *Estimated* Commercial Clam Aquaculture

- a.) # Clams planted
- b.) % Seed purchased
- c.) Avg. price of see purchased
- d.) # Seed sold
- e.) % Seed sold out-of-state
- f.) # Market (non-seed) sold
- g.) % Market sold out-of-state
- h.) Avg. price per market clam
- i.) # Full-time help
- j.) # Part-time help

### 8. Comments or Explanatory Notes on 2008 & 2009 Clam Aquaculture:

# Virginia Shellfish Grower Situation & Outlook Survey

## Commercial Oyster Aquaculture

9. Do you aquaculture oysters? (If no, skip to question 18.)

- Yes
- No

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

No "natural strike" product moved to growing grounds.

### 10. 2008 Commercial Spat-On-Shell Oyster Aquaculture

- a.) # Eyed-larvae purchased
- 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

### 11. 2009 *Estimated* Commercial Spat-On-Shell Oyster Aquaculture

- a.) # Eyed-larvae purchased
- 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

### 12. Comments or Explanatory Notes on 2008 & 2009 Commercial Spat-On-Shell Oyster Aquaculture:

# Virginia Shellfish Grower Situation & Outlook Survey

## Commercial Oyster Aquaculture

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

No "natural strike" product moved to growing grounds.

### 13. 2008 Commercial Single Oyster Aquaculture

- a.) # Oysters planted
- b.) % Seed purchased
- c.) % Seed purchased from out-of-state
- d.) Avg. price of seed purchased (\$ per 1000)
- e.) # Seed sold out-of-state
- f.) Avg. price of seed sold (\$ per 1000)
- g.) # Market (non-seed) oysters sold
- h.) % Market oysters sold out-of-state
- i.) Avg. price per market oyster (\$ per piece)
- j.) # Full-time help
- k.) # Part-time help

### 14. 2009 *Estimated* Commercial Single Oyster Aquaculture

- a.) # Oysters planted
- b.) % Seed purchased
- c.) % Seed purchased from out-of-state
- d.) Avg. price of seed purchased (\$ per 1000)
- e.) # Seed sold out-of-state
- f.) Avg. price of seed sold (\$ per 1000)
- g.) # Market (non-seed) oysters sold
- h.) % Market oysters sold out-of-state
- i.) Avg. price per market oyster (\$ per piece)
- j.) # Full-time help
- k.) # Part-time help

### 15. Comments or Explanatory Notes on 2008 & 2009 Commercial Cultchless (Single) Oyster Aquaculture:

# Virginia Shellfish Grower Situation & Outlook Survey

## Thank You

**16. Please provide any comments on the shellfish aquaculture industry situation.**

**17. Would you like to receive a copy of the overall report when completed?**

Yes

No

**18. Contact Information (Optional)**

Name

Address

City, State & Zip

Telephone

Email

**Thank you for completing the *Virginia Shellfish Grower Situation and Outlook Survey*.**





**Photos:** Cover ©Margaret Pizer/VASG; Page 3 (clockwise from top left) ©VASG (clams), ©Michael Congrove (spreading spat-on-shell), ©Michael Congrove (clump of spat-on-shell oysters), ©Margaret Pizer/VASG (checking individual oysters in cages), ©VASG (clam beds); Page 8 (spat-on-shell photos) ©Michael Congrove.