

# EAST COAST SHELLFISH GROWERS ASSOCIATION



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The ECSGA informs policy makers and regulators to protect a way of life.

1623 Whitesville Rd.  
Toms River, NJ 08755  
[ecsga.org](http://ecsga.org)

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Bob Rheault  
(401) 783-3360  
[bob@ecsga.org](mailto:bob@ecsga.org)

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## The Mouth of the Bay At Last Some Good News



Executive Director  
Bob Rheault

Hard to believe summer is already winding down, but the days are getting shorter and the nights are getting cooler—way too quickly for my liking. My efforts to find some relief for our community are starting to bear fruit. If you have yet to hear about the Coronavirus Food Assistance Program (CFAP 2) then you need to take a close look at the article below. Almost every shellfish farmer in the country is eligible to receive support from the USDA Farm Service Agency amounting to roughly 10 percent of their 2019 crop sales value.

You should also check with your state fisheries resource managers to determine the status of NOAA relief funds that were authorized under the CARES Act. Many states are already accepting applications for growers who can document a 35-percent decline in sales revenues compared to the average over the past five years. Don't wait! Once the application period opens, most states will only accept applications for a few weeks.

## Second Round of Coronavirus Relief Includes Aquaculture

by Robert Rheault,  
ECSGA Executive Director

On Sept. 21 the U.S. Department of Agriculture (USDA) began accepting applications for an additional \$14 billion in relief for agricultural producers facing market disruptions and associated costs due to the COVID-19 pandemic. Unlike the first go-round of Coronavirus Food Assistance Program (CFAP) funding, this time shellfish farmers are eligible for compensation. The deadline for submitting CFAP 2 applications is Dec. 11, 2020.

Thanks to the Herculean efforts of our congressional allies and the National Aquaculture Association (NAA), we have been able to clarify a number of questions about the CFAP 2 program. Visit [www.usda.gov/media/press-releases/2020/05/19/usda-announces-details-direct-assistance-farmers-through](http://www.usda.gov/media/press-releases/2020/05/19/usda-announces-details-direct-assistance-farmers-through) to read the official announcement.

### Highlights

- ❑ The amount of your payout will be based on a sliding scale of your 2019 crop sales, starting at 10.6 percent for the smallest producers and topping out at 8.8 percent for those with sales over \$1 million;
- ❑ According to information provided by USDA and Senate staffers on a Sept. 18 conference call, the program will include coverage for bottom-planted

As mentioned in the August newsletter, we are beginning to roll out programs to buy big, ugly oysters for shellfish restoration projects. Thanks to a team effort involving the ECSGA, The Nature Conservancy, Pew Charitable Trusts, USDA's Natural Resources Conservation Service and Sea Grant, I'm happy to report that projects in several states are starting up with both federal and private funding. Due to biosecurity concerns and funding constraints, not everyone will be able to participate, but we hope to alleviate some of the oversupply concerns before it gets too cold.

Lastly, we have been told that our petition to have the USDA Agriculture Marketing Service purchase \$30 million worth of oyster meat for food banks was rejected. We are still waiting to hear if they will buy \$30 million worth of clams. Since I don't take rejection well, I have redoubled my efforts to see if our congressional allies can have this decision reversed.

All of these success stories were made possible by a huge team effort. Only by working closely with the National Aquaculture Association, all the state growers' associations, dozens of congressional allies, State Ag. Leaders, the Farm Bureau and many others were we able to make this happen. It is a testament to the value of trade associations and teamwork.



shellfish crops, in addition to crops held in gear;

- ❑ If you bought shellfish from another grower simply for resale, that is not counted as part of your crop sales—this program only covers product grown on your farm;
- ❑ Based on what we were told in that Sept. 18 call, CFAP and the NOAA relief are independent programs, so growers can apply for both. In addition, you will not have to deduct any Paycheck Protection (PPP) loans, Economic Injury Disaster Loans (EIDL) or Pandemic Unemployment (PUP) payments from your CFAP relief;
- ❑ Even new growers with no 2019 sales can qualify—payments for growers who began farming in 2020 will be based on the actual 2020 sales as of the application date;
- ❑ If you suffered catastrophic crop losses in 2019, say from a hurricane or big storm, and you had

— Continued on page 2



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## — Continued from page 1 CFAP 2 for Aquaculture

little or no sales that year, it is unclear if you'll be able to use an alternate baseline period to calculate your compensation. I submitted that question during the USDA webinar on Sept. 21 and was told that it would be answered in the FAQ section, so check for updates at [www.farmers.gov/cfap/faq](http://www.farmers.gov/cfap/faq);

- ❑ If you produced seed or larvae in 2019 you should be eligible for relief as long as the animals were being reared for a food crop (not for restoration or companion animals);
- ❑ To complete the CFAP 2 application, you will need to reference your sales records, but since this is a self-certification program, you don't need to submit the documenta-

tion with the application. However, applications are subject to County Committee review and spot checks, so some growers will be required to provide documentation. Be sure to retain the records and documentation you use to complete the application. Visit [www.farmers.gov/cfap/apply](http://www.farmers.gov/cfap/apply) for information on additional documents.

There's a huge list of folks who deserve thanks for getting this epic effort to include aquaculture in the USDA relief plan to the finish line, and we all feel confident that this program should be able to help everyone out. Nice to finally get a win! Now, if we can just get the Section 32 program to buy clams and oyster meat....

For details on the Coronavirus Food Assistance Program for aquaculture producers visit [www.farmers.gov/cfap/aquaculture](http://www.farmers.gov/cfap/aquaculture).

## How to Apply for CFAP 2 Relief

The good news is that USDA is now including aquaculture producers in its \$14 million program to provide relief due to tanking sales from the pandemic—the bad news is it's not exactly easy to figure out how to apply. One big takeaway: if you are applying as an individual you have the option of doing it online or on paper, but if you are a business, corporation, LLC or other entity you have to go old school with paper and pen.

Here are several ways to navigate the process, listed in decreasing order of technological savvy:

- ❑ **Apply Online:** *If you are applying as an individual* (NOT as a business, LLC, corporation or other entity) and you already have a USDA eAuthentication account (maybe you applied for NAP coverage or some other USDA service at one point and created an account), visit [apps.fsa.usda.gov/cfap2](http://apps.fsa.usda.gov/cfap2) and click on the Login button.

*If you are applying as an individual* and you do not yet have a USDA eAuthentication account, contact your local service center ([www.farmers.gov/service-center-locator](http://www.farmers.gov/service-center-locator)) to confirm that you have a USDA customer record with a primary email address. If you have a USDA customer record, visit [www.eauth.usda.gov/eauth/b/usda/registration](http://www.eauth.usda.gov/eauth/b/usda/registration), select "Customer" and enter your primary email address. In the confirmation email you then receive, click on the "Continue Registration" link. *Note: When you log in, your User ID will be your email address.* Next, enter your name and set a password. Then you can visit the farmers.gov login page ([fsa-usda.force.com](http://fsa-usda.force.com)) and log in with your new eAuth account.

- ❑ **Fill Out a Paper Application:** If you are applying as a business, corporation, LLC or other entity you cannot apply online. Download and print out the application form ([www.farmers.gov/sites/default/files/documents/AD3117-CFAP2-ApplicationForm-09212020.pdf](http://www.farmers.gov/sites/default/files/documents/AD3117-CFAP2-ApplicationForm-09212020.pdf)), fill it in and return it to your local FSA office. For instructions on how to fill out the form visit [www.farmers.gov/sites/default/files/documents/AD3117-CFAP2-ApplicationInstructions-09212020.pdf](http://www.farmers.gov/sites/default/files/documents/AD3117-CFAP2-ApplicationInstructions-09212020.pdf).
- ❑ **Get Help From a Human:** Contact your local Farm Service Agency office and ask one of their staffers to help you (find your local office at [www.farmers.gov/service-center-locator](http://www.farmers.gov/service-center-locator)). You can also call the USDA call center, 877-508-8364 for help with the application process.

**The application deadline is Dec. 11, 2020, BUT don't delay, apply today. You do NOT want to wait til the last minute to figure this out.**

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## Member Profile: Cape Cod Oyster Company

by Robert Rheault,  
ECSGA Executive Director

For this edition's member profile, I met virtually with Al Surprenant of Cape Cod Oyster Company (CCOC) to hear about his new oyster-sorting machine. As anyone who has ever worked on an oyster farm can attest, sorting and counting oysters can be one of the most time-consuming and mind-numbing operations on the farm. Finding the holy grail of a machine to do those tasks well has been elusive.

Cape Cod Oyster Company has been in business since 1983, and is now the largest grower in Massachusetts. Al says that, "it all began as a hobby that started to get very expensive, so I had to take it commercial." He was summering near some old oyster grounds that had been in operation since the 1850s and became enamored of the idea of bringing them back into production. Now the company works 60 acres with 14 employees and five 27' Carolina skiffs. Al has leases on both the north and south shores of the Cape, in Barnstable Harbor and West Bay (Osterville) as well as in Falmouth.

When it comes to farming oysters, Al has a little bit of everything going on. CCOC operates 90 upwellers in North Bay (Osterville), along with extensive rack-and-bag leases in the Barnstable site, which is where most of his intermediate grow-out occurs. Since the site is intertidal and gets ice in the winter, he overwinters most of the seed in a couple of large insulated tractor trailers and then plants them on his bottom leases to finish them off on the south side of the Cape in Osterville.

He harvests the oysters with small, modified scallop drags and delivers them to his processing facility for washing, sorting and counting.



CAPE COD OYSTER COMPANY

With bottom-grown oysters, empties (dead oysters) and mud are an issue. After washing (the water is recycled) workers tap each oyster manually to make sure it's alive, then put the oysters onto a conveyor to go into the sorting machine.

Al is also working a bunch of floating Oyster-Gro cages, and I expect it won't be long before he tries an Australian long-line system.

He maintains a strong working relationship with Bill Mook and gets all his seed from Mook Sea Farm in mid-coast Maine. Al and Bill have been working together since the early 80s.

Al's shop in Marstons Mills (Barnstable) is on 8 acres, plenty of room for all the usual gear. He has two buildings housing around 8,000 square feet of storage, logistics and refrigeration, selling oysters under six brand names: Great White, Wianno, Washburn Island, Hammerhead, Three Bays and Malabar. Each is grown in different sites and has different characteristics. His marketing credo: "Quality at a fair price."

Al has been working on finding a sorting and counting machine for decades. His first

experience was with a machine he bought from down-under in 2005. He describes it as a "\$50,000 disaster that broke, chipped or damaged every oyster we put through it." After that sobering experience Al decided to do some extensive research before he invested in another machine. He took his time and went to see many different machines in action.

Al recalls that, "it was a long and costly experience, but you can't make that scale of investment and send it off to the junk pile. Lots of equipment suppliers are making elaborate claims, but they don't have a product that really works. Most important to me was the factory representative or distributor. You want to have someone on site to fix your machine if it goes down, or you can be in serious trouble."

Since most of Al's product is bottom-planted oysters, the speed of the machine was not his highest priority. Rather it was more important to give customers a very uniform product and an accurate count. "You can't get either of those if you are relying on people doing it by



CAPE COD OYSTER COMPANY

The Vendée machine is all stainless steel and very durable, able to accommodate as many sort sizes as you want as long as "you're willing to spend the money," said Al. "We have as many as we can fit in the building."

## HOT AQUACULTURE NEWS!!



*Fish Farming News* is the aquaculture industry's national newspaper, devoted exclusively to coverage and the betterment of domestic aquaculture.

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hand. If you are handling container-grown oysters, you probably can speed up the machine, which would give you a better efficiency, but bottom-grown oysters have a greater variation in size and shape."

In 2019 Al finally settled on a French machine made by Vendée Concepts, which is distributed in North America by Cube Automation. He said that once he brought in the machine, "we started using it the next day. We haven't had two consecutive down days since. The only issues have been software-related, and we can upgrade that with an internet connection. They fix it from France!"

The machine has three operating speeds: 6,000, 8,000 or 10,000

— Continued on page 5

— Continued from page 4  
**Cape Cod Oyster Co.**

pieces an hour, but Al has never gone as high as 10,000. “The size issue is ever changing. The software is very easy to use and very flexible, which allows us to adjust sizes all the time. It’s always a challenge changing from bottom-grown to container-grown oysters and location to location. We run the machine for two shifts a day, not every day, but at least three days a week. Four people can operate it very efficiently, but we often run with three,” he explained.



CAPE COD OYSTER COMPANY

“Anyone who has any idea what Covid will do to this business this fall and winter is dreaming,” says Al Surprenant, owner of Cape Cod Oyster Company.

Al has discovered that two or three good oyster-sorting machines are made in France, each with its pluses and minuses. “The Vendée machine had the closest and best local sales representative and that’s what sold me. It sells for about \$200,000 (not including your travel and research time and ancillary equipment) and I am still trying to work out the return on investment,” he concluded.



To see the Vendée sorting and counting machine in action, visit [youtube.com/watch?v=FLolGg\\_caFw&t=2s](https://youtube.com/watch?v=FLolGg_caFw&t=2s)

To see footage of Cape Cod Oyster Company’s growing grounds and sorting operation visit [vimeo.com/355891618](https://vimeo.com/355891618)



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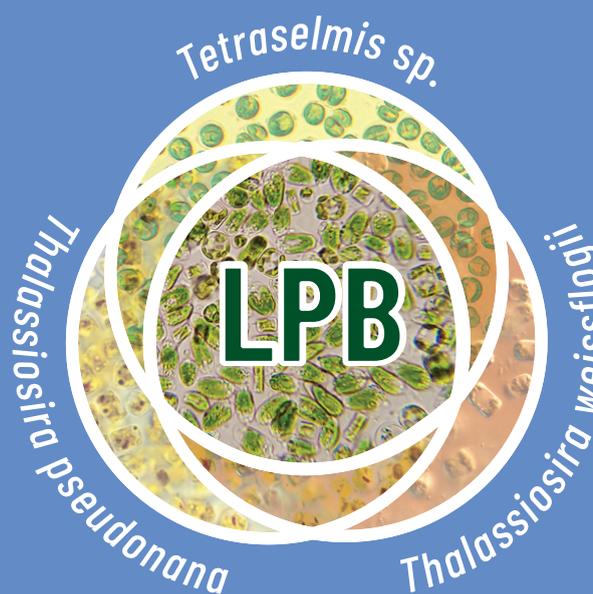
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# A Note from Danielle Blacklock, Director of the NOAA Fisheries Office of Aquaculture



I wanted to take this opportunity to provide you with updates from NOAA's Aquaculture Program, but first I want to take a moment and share with you what is on my mind, and certainly what is in my heart. I know

that many members of the aquaculture community are still struggling as restaurant demand remains low and shellfish sales have been slow to recover. I wanted to thank each of you who have reached out to our office to provide ideas, information about impacts, and general updates during this time.

While our office continues to create new opportunities for U.S. aquaculture, we understand that we must also support the existing industry. Our colleagues at Sea Grant continue to update the [seagrant.noaa.gov/seafood-resources](http://seagrant.noaa.gov/seafood-resources) webpage with COVID-related material and important announcements, and I encourage you to visit the site for more information.

For decades the U.S. aquaculture industry, in partnership with NOAA and others, has played a critical role in diversifying our seafood portfolio, making us more resilient in the face of economic and environmental changes. I believe that we are now entering a new phase of aquaculture development and resilience with the recent Executive Order on Promoting American Seafood Competitiveness and Economic Growth ([www.whitehouse.gov/presidential-actions/executive-order-promoting-american-seafood-competitiveness-economic-growth](http://www.whitehouse.gov/presidential-actions/executive-order-promoting-american-seafood-competitiveness-economic-growth)).

This Executive Order positions the United States to be a world leader in sustainable seafood by enabling industry growth, ensuring environmental conservation, opening new markets, and helping to highlight the benefits of domestic seafood production. Specifically for aquaculture, the order calls for the expansion of sustainable U.S. seafood production through more efficient and predictable aquaculture permitting, updating the development plan, promoting the aquatic animal health plan, and creating Aquaculture Opportunity Areas



NOAA FISHERIES OFFICE OF AQUACULTURE

NOAA selected federal waters off southern California and in the Gulf of Mexico as the first regions for focused evaluation to find Aquaculture Opportunity Areas suitable for future aquaculture development.

(AOAs) ([www.fisheries.noaa.gov/feature-story/noaa-announces-regions-first-two-aquaculture-opportunity-areas-under-executive-order](http://www.fisheries.noaa.gov/feature-story/noaa-announces-regions-first-two-aquaculture-opportunity-areas-under-executive-order)). AOAs are areas that show high potential for marine aquaculture (finfish, shellfish or algae) following a science-based public planning process.

NOAA's Aquaculture Program is already moving forward to meet the mandates set by the White House, and last month we announced the selection of southern California and the Gulf of Mexico as the first regions for focused evaluation to find AOAs. Let me be clear, this selection does not mean the entire regions are opportunity areas. Instead the selection allows us to deploy our resources to investigate the two regions. With an Exclusive Economic Zone (EEZ) of over 3.4 million square nautical miles, it is great to have specific areas of focus.

Our partners at the National Centers for Coastal Ocean Science have already begun efforts to conduct in-depth spatial analysis of these regions. They will use hundreds of data layers to examine study areas within each selected region. This analysis is comprehensive and takes into account factors such as protected habitats, distance from ports, current speed and other users of an ocean space. In the coming months we plan to pair this in-depth spatial mapping approach with scientific reviews and stakeholder input (including outreach, requests for information, and listening sessions) to shape the creation of the first two opportunity areas.

It is important to note that AOAs do not change the permitting framework of marine aquaculture in the selected regions or anywhere else. Aquaculture operations proposed within an AOA would be required to comply with all applicable federal and state laws and regulations (e.g., Clean Water Act, Rivers and Harbors Act, Endangered Species Act, etc.). The creation of AOAs is a planning exercise that allows

— Continued on page 11

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## Create an Efficient Oyster-Sorting Schedule

by Lawrence Rudner  
Oyster Girl Oysters,  
Saint Michaels, Md.

In the August 2018 issue of the ECSGA newsletter, Chip Terry and the Oyster Tracker team provided a dramatic example of the Jiffy Pop Syndrome first outlined by Bob Rheault. They showed that the number of bags needed to house oysters grows exponentially as shell height increases. One million 0.3" oysters would initially fit in 114 bags, but would require 9,467 bags when they reached market size (3" or 76 mm)—an 83-fold increase! The Jiffy Pop Syndrome is actually an understatement. Popcorn only increases 40- to 50-fold.

The Oyster Girl equation for the oyster Jiffy Pop Syndrome, developed by algebraically combining volume-to-shell-height calculations and knowing how long it takes seed to grow to market size at a given farm, is:

$$M = \left( \frac{ct'}{x} + 1 \right)^{2.4237}$$

where M is the volume multiplier after t' months in the water for seed planted today with a shell height of x mm and whose shell height is growing at a rate of c mm per month. Thus, the equation predicts the future volume of seed as a function of planted shell length, time and your local growth rate.

With this equation and derivatives, you could identify:

- ❑ What the expected volume of seed planted today will be in a given number of months;
- ❑ The average shell height of today's oysters when their volume increases M-fold;
- ❑ How many months to leave seed in the water before the volume of oysters increases M-fold; and
- ❑ How much seed to plant today so that the volume will be what you want in a given number of months.

The equations present average expected values, but will be influenced by other factors—growth will be accelerated in the summer, there will be a great deal of variation within any single batch of

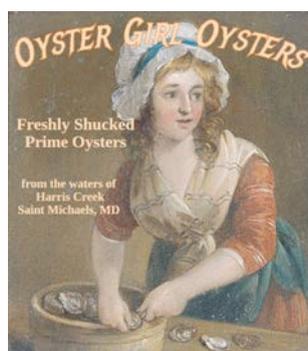
seed, and biofouling will remain an important consideration. Nevertheless, the equations are a powerful tool that can greatly facilitate farm planning. Visit [OysterGirl.us/OysterVolModel.pdf](http://OysterGirl.us/OysterVolModel.pdf) to read a paper explaining the equations, outlining examples, and showing the derivations.

### Look-up Tables

Rather than applying the formulas directly, it is extremely easy to use a look-up table derived from the equations. The following table shows the expected volume by time in the water and planted shell height for an 18-month grow-out period, which might be expected for triploids grown in bags placed in floating cages. Detailed tables for different grow-out periods are available in the full paper.

*Ed. Note: A few cautionary notes. The example paints a picture of the gear required to accommodate the volume expansion of the crop, but the initial stocking density (and the target density for restocking) should be established by each grower through experimentation. Your food quality and current speed will determine what works on your site. While the table addresses the schedule for restocking, it does not account for fouling control and (depending on your conditions) you should*

— Continued on page 10



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# You Determine Your Own Destiny

by Robert Rheault,  
ECSCG Executive Director

The term “carrying capacity” is often used when we talk about shellfish farming. While we know that healthy shellfish populations are generally very good for the marine environment, we must admit that too much of a good thing can become a bad thing. The question is: *How much is too much?*

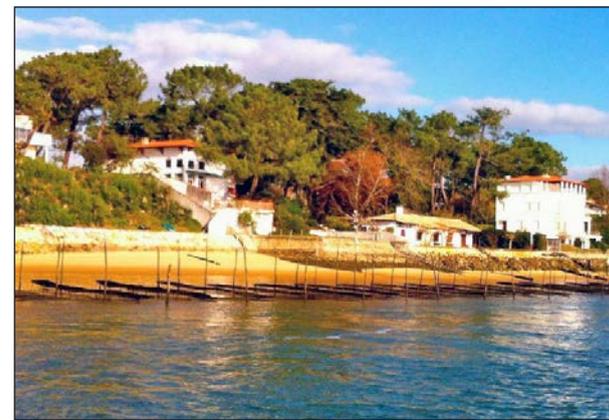
Carrying capacity is an active field for scientific study and can be divided into several types.

**Production carrying capacity** refers to how many shellfish you can put into a body of water before growth and productivity start to suffer. **Ecological carrying capacity** refers to how many shellfish you can farm in a space before their feeding starts to negatively impact other species and other parts of the food web.

Then there is **social carrying capacity**, which is the amount of something that society is willing to accept. Whether that something is how many visitors should be allowed in a national park or how many shellfish farms should be permitted in certain waterways, there are theoretical limits to what society is willing to tolerate.

The ecological and production carrying capacities can be determined with measurements of phytoplankton, shellfish biomass, feeding rates, current speed and well-tested models. But social carrying capacity (SCC) is a little different. Social scientists claim to be able to determine SCC with questionnaires, complex formulas, fuzzy logic and other tools that I don’t claim to understand.

One unique aspect of social carrying capacity is that it can change. Over time communities will often grow to accept something that they



ROBERT RHEAULT

Rack-and-bag oyster gear right up on the beach in front of expensive waterfront homes in Arcachon, France. Because French culture celebrates oysters, aquaculture gear in the viewscope (or literally in the back yard!) is commonplace and accepted. It’s hard to imagine any community in the U.S. that would tolerate siting aquaculture gear in this way.

previously rejected. Cell towers are unsightly, but communities are coming to accept their presence more and more, not only because people have become used to seeing them, but also because they value the improved cell service that the towers provide.

Another fascinating aspect of SCC is that different cultures have vastly different limits for what they will accept, usually based on their historical exposure, societal preferences and cultural values. Wind farms in Europe are quite commonplace, but in the U.S.—not so much. If you visit France you will see oyster trestles on the beaches right in front of million-dollar homes, and because oyster aquaculture is part of the French culture, no one complains.

Some communities, like Wellfleet, Mass., have hundreds of shellfish leases because they recognize that shellfish farms provide jobs and supplemental incomes. Yet other Cape Cod communities are not so tolerant. Go to beaches on the Gulf of Mexico and you will see communities that have made their peace with offshore oil platforms, but residents on the East and West coasts strongly oppose oil rigs in their waters.

Right now, each of us in the shellfish farming community has an opportunity to determine our own destiny. If we are good neighbors and have neat farms and don’t make a mess in the commons we can expect that society will grow accustomed to our presence and will accept more farms.

However, if we make a lot of noise and have ugly farms, or if our gear becomes unsightly debris washing up in the commons, then we could see societal tolerance for shellfish farming wane.

Each one of us has a role to play. Let’s all do the right thing—future generations are counting on us.

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## Late Breaking News

Just before this issue went to press we were served up a flurry of important announcements. We'll digest each one and share our observations on the Listserv and in our December newsletter, but here they are in brief.

**The FDA has published a final rule on reopening trade in shellfish with the European Union.** The announcement in the federal Register ([www.federalregister.gov/documents/2020/09/24/2020-20755/food-and-drug-administration-equivalence-determination-regarding-implementation-by-spain-and-the](http://www.federalregister.gov/documents/2020/09/24/2020-20755/food-and-drug-administration-equivalence-determination-regarding-implementation-by-spain-and-the)) confirms that shellfish imported from certain harvest areas in Europe meet our sanitary standards. Massachusetts and Washington State firms can apply to get on the EU Export List ([www.fda.gov/food/food-export-lists/online-applications-export-lists](http://www.fda.gov/food/food-export-lists/online-applications-export-lists)). We are waiting to hear how other states can be added to the list. Lots to unpack here. Stay tuned.

On Sept. 23 the FDA published new proposed regulations relating to record keeping in the Federal Register ([www.federalregister.gov/documents/2020/09/23/2020-20100/requirements-for-additional-traceability-records-for-certain-foods?utm\\_medium=email&utm\\_source=govdelivery](http://www.federalregister.gov/documents/2020/09/23/2020-20100/requirements-for-additional-traceability-records-for-certain-foods?utm_medium=email&utm_source=govdelivery)). Dealers and growers already keep mountains of records on receiving, chilling and shipping for their HACCP records, but if the Proposed Rule moves to a Final Rule, dealers would have two years to adopt electronic record-keeping procedures to track lot-codes and to be able to furnish sortable spreadsheets to the FDA within 24 hours of request to facilitate outbreak tracebacks and recalls. We expect the cost of implementation, software, scanners and training could be substantial for dealers. We also expect it could eventually save dealers manual data entry time, enhance traceback accuracy and eliminate transcription errors in receiving and shipping logs.

The Army Corps of Engineers has published proposed changes to many of the Nationwide Permits, including NWP48 for shellfish aquaculture, and will accept comments through Nov. 16 ([www.federalregister.gov/documents/2020/09/15/2020-17116/proposal-to-reissue-and-modify-nationwide-permits](http://www.federalregister.gov/documents/2020/09/15/2020-17116/proposal-to-reissue-and-modify-nationwide-permits)). The Corps is proposing changes to the way they view interactions between eelgrass and shellfish farms. These changes are likely to draw the ire of scientists and environmental groups who have shown a desire to protect even potential or historical eelgrass beds from shellfish farms, so it will be important to provide scientific documentation explaining how shellfish farming is compatible with eelgrass.

There's a ton of material to review, and I could use some help preparing comments to ensure our industry concerns are considered. If you can pitch in, please let me know.

—RBR

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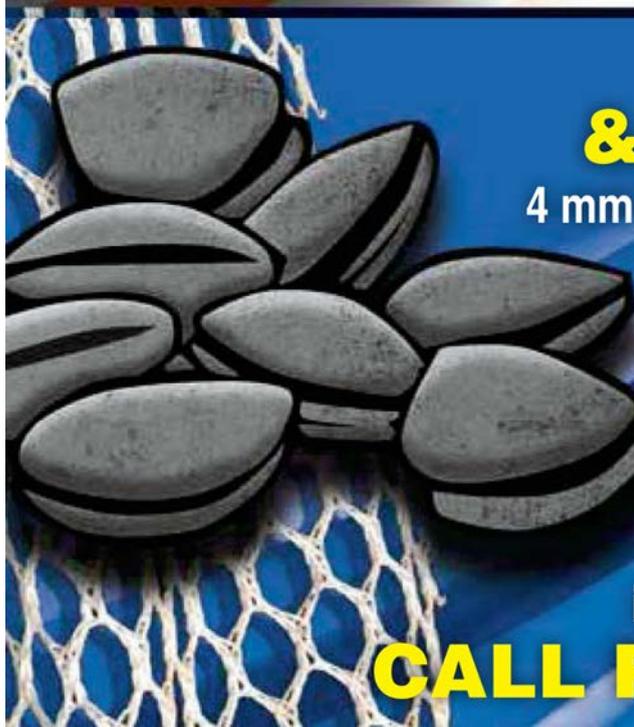
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— Continued from page 7  
**Oyster-Sorting Schedule**

be hauling your gear to control fouling much more frequently than the intervals shown in the table. Also, the table doesn't account for seasonal differences in growth rates or fouling. The table does, however, provide starting points for your experimentation.

**Expected Volume and Shell Height Through Time With Initial Volume of 1 Liter of Oysters of Various Sizes**

		Initial Shell Height (mm)					
		10	15	25	35	45	55
2	vol	3.8	2.6	1.9	1.6	1.4	1.4
	SH	(17)	(22)	(32)	(42)	(52)	(62)
4	vol	8.9	5.2	3.1	2.3	2.0	1.8
	SH	(25)	(30)	(40)	(50)	(60)	(70)
6	vol	16.8	8.9	4.6	3.3	2.6	2.3
	SH	(32)	(37)	(47)	(57)	(67)	(77)
8	vol	27.6	13.8	6.6	4.4	3.4	2.8
	SH	(39)	(44)	(54)	(64)	(74)	(84)
10	vol	41.8	20.0	8.9	5.7	4.2	3.4
	SH	(47)	(52)	(62)	(72)	(82)	(92)
12	vol	59.6	27.6	11.7	7.2	5.2	4.2
	SH	(54)	(59)	(69)	(79)	(89)	(99)

vol = volume in liters  
SH = shell height in mm

As an example, suppose we plant 10-mm seed and expect to restock in four months. How much seed should we put in each bag now and how much of the larger seed should we place in each bag after the first restocking so that the volume of oysters in the bags never exceeds 12 liters?

We see from the table that in four months 10-mm seed can be expected to have an 8.9-fold increase in volume. What volume of 10-mm seed should be planted? If we want no more than 12 liters in each bag four months from now, then no more than  $12/8.9 = 1.4$  liters of 10-mm seed should be planted in each bag. That seed will grow to an average shell height of 25 mm in four months.

It has been four months since we first splashed the bags, so we are planning for our now 25-mm seed. One liter of 25-mm seed will have a volume of 4.6 liters in six months. So, to keep the volume in the bag to no more than 12 liters, we should plant less than  $12/4.6 = 2.6$  liters of 25-mm seed. That seed will grow to an average of about 47 mm in six months.

Ten months after we started, we can now use the 45-mm column to plan for our 47-mm seed. One liter of 45-mm seed will grow to 67 mm and have a volume of 2.6 liters in six months. In eight months, that same seed will grow to 74 mm and have a volume of 3.4 liters. Therefore, if we want to haul and sort when a bag has 12 liters of biomass, we should either put  $12/2.6 = 4.6$  liters of 47-mm seed in a bag and plan to restock in six months, or plant  $12/3.4 = 3.5$  liters and plan for the final haul after eight months.

— Continued on page 11



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— Continued from page 6

## NOAA Announces AOAs

NOAA to use our aquaculture expertise to conduct a science-based evaluation to find potential areas that are suitable for future aquaculture development.

So how do these efforts expand aquaculture opportunities and benefit growers? The in-depth spatial analysis used to create these AOAs increases permitting efficiencies. This ultimately means that farmers applying for permits in these areas could have a shorter review time compared to those applying for permits outside of an AOA. Operations are still welcome to site farms outside of established AOAs, but those who choose to take advantage of the spatial analysis and public input used to create AOAs can expect to see a more efficient process to getting their farms in the water.

In the coming weeks we expect to expand our public input work and release a Request for Information (RFI) to gather data from our key stakeholder groups. We will announce this RFI through our newsletter and NOAA Fisheries social media platforms when it is posted to the Federal Register. I invite you to provide comments through this process. By combining these comments and perspectives with NOAA's spatial analysis we can increase aquaculture opportunities while also decreasing potential user conflicts.

Take care and best wishes,  
Danielle

— Continued from page 10

## Oyster-Sorting Schedule

While the above examples are applied to bags, the principles and equations are equally applicable to Hexcyl®, floating cages and cages on the bottom. Contact me at [VolCalc@OysterGirl.us](mailto:VolCalc@OysterGirl.us) for a free Excel® spreadsheet that allows you to vary the size of seed first planted, grow-out time and maximum volume you want in your bags or cages. The spreadsheet will tell you how long to leave seed before restocking and how much the seed will grow over time. It will also generate a detailed look-up table specific to your site.

Lawrence Rudner, PhD is a retired psychometrician/statistician and aspiring oyster farmer.



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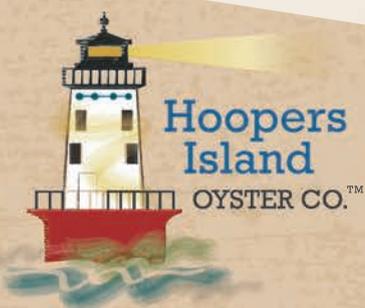
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