



LONGLINES

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It's All About You!
PCSGA Membership Edition

PCSGA



PACIFIC COAST SHELLFISH GROWERS ASSOCIATION

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The PCSGA strives to ensure a healthy industry and environment for shellfish farming on the Pacific Coast.

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Rebecca Allen
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.....
Comments and questions about
Longlines are invited. Please email
outreach@pcsga.org.

What the Tide Brought In

Notes from the Director

I don't need to express to readers of *Longlines* the importance of a good pair of boots. They are vital in your line of work; ubiquitous on every shellfish farm and essential to a shellfish farmer's wardrobe. A good rubber boot shields the foot from unanticipated sharp objects, offers assurance that the foot will remain dry and confidence that each step will land where intended. If boots could talk, they would likely be considered the foremost expert on shellfish farming – being exposed to hours of crew discussions about preparing beds, testing equipment, and harvesting. Boots escort product through every stage of farming.

PCSGA needs some boots, figuratively. More specifically we need people who wear boots to help the industry consider possible changes to how shellfish is grown, processed, stored, and transported. 2019 is a year when we consider changes to the National Shellfish Sanitation Program (NSSP), the body of law that directs virtually all elements of shellfish production.

Over the past three cycles of NSSP proposals, PCSGA has implemented a system to review proposals and advocate positions which support the west coast industry. We have been fairly successful and want that to continue. As we embark on this next round of potential changes, I'm asking, seeking, begging, PCSGA members to encourage boot-wearing people to help us review and discuss proposals via conference calls.

In late spring we will see proposals to change the NSSP generated by both the industry and regulators. We will have until early October to consider the implications of each and every one of them. It's critical to consider a broad set of perspectives because proposed changes may be benign or potentially devastating for farms of different sizes, practices, and locations. If we can identify problems before the Interstate Shellfish Sanitation Conference (ISSC), October 5-11 in San Diego, CA, we have a better chance of avoiding unworkable regulations.

PLEASE consider being involved. I promise your involvement will add value to not only your company but also to the entire membership. I'm very happy to provide more information, including funding to support this work. For more information on funding, please feel free to reach out to me.

Be well.

Margaret A. Pilaro

Cover Photo: In October, PCSGA members and staff traveled abroad for a two-week shellfish-centric tour of France. The travelers enjoyed a demonstration of cooking mussels eclair. The mussels were carefully placed in a spiral on top of a pallet, covered with pine needles, and then set ablaze. Read more about this trip to France on pages 4-7.

Pearls from the Prez

Winter is here; bringing us less daylight and more winter storms, holiday chaos, eager customers and let us not forget about the lovely opportunity to work our jobs during the night tides. It can be a daunting time of year. I try to offset the harsh reality of winter by taking time to express my gratitude for all the enrichment that the shellfish industry has afforded me, not just professionally, but personally as well. Enrichment is defined as the action of improving or enhancing the quality or value of something. I have consistently found members of this community to be willing to educate me and others; providing their time and talents throughout the industry and sharing their experiences so others may benefit. I am so very appreciative of these actions and the value they bring. Collectively, we have so much historical knowledge which paints a robust picture of all the hard work that has come before us.

Throughout PCSGA there are a tremendous number of bright, seasoned famers that have a vast understanding of natural environments, business and government, all of which also guide us on a daily basis. Lastly, we have a huge willingness to mentor and make investments into others, without seeking profit. I am motivated by being part of this group knowing that we are all bringing something to the table. Our "table" can be big or small, round or long and narrow. No matter the size, I only hope that we maintain a willingness to collaborate, respect our varied perspectives, and choose to invest in each other.

I wish you all well in 2019. I look forward to seeing how I can be enriched, and in turn enrich others, in this New Year.

*"Try not to become a man of success
but rather a man of value"* - Albert Einstein



Miranda Ries
Coast Seafoods Co., CA

Monthly Winners of Ecosystem Services Photo Contest!



October: Wesley Hull snaps this photo of an Opalescent nudibranch, which is just one of many organisms inhabiting their oyster rafts.



November: Ben Reynolds photographs Kelp crabs utilizing a buoy line as a high point to capture passing food mimicking their namesake, kelp.



December: Nyle Taylor's photo shows how during the installation process of mesh tubes, schools of shiner perch and flounder are attracted to their work site to feed.

Snap a photo, win \$100!

Contest rules at www.pcsga.org

**Photo and caption are due on
the 15th of every month!**



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PCSGA Shellfish Growers Tour France

In October, twenty-two PCSGA members and staff embarked on an intense two-week tour of shellfish operations in France. The trip was organized at the request of Bill Dewey, Taylor Shellfish, who prodded the association into action after a previous trip he had taken to France in 2015. Bill was adamant PCSGA members would be astounded by the diversity of equipment and level of mechanization the French employ for farming, grading and handling seed and market oysters and mussels.

The much-anticipated departure date came on October 10. After a ten-hour flight, landing safely in Paris and negotiating five rental cars, our weary group was eager to begin our two-week adventure. We met our travel-guide translators, Jean and Victoria Bridges Moussaron, who helped us navigate the dizzying roundabouts of Paris. We began our counter-clockwise circuit through Normandy, Brittany, Charentes, Bordeaux, and points in between along the west coast of France. One highlight was a stop in Vannes where we attended the impressive 34th National Shellfish and Marine Cultures Exhibition. Local and national dignitaries warmly received us as guests of honor. The final leg of the journey involved a harrowing transit to the Bordeaux train station, returning rental cars, and catching the two-hour high-speed train back to Paris where it all began. Every farm we visited felt the need to represent their country and ply us with seemingly infinite amounts of fresh-shucked oysters that, by French law it seemed, must be accompanied by copious amounts of wine. We all took short afternoon naps whenever possible.

Special thanks to Connie Smith, who spent a year orchestrating and planning the trip, exchanging more than 250 emails, phone calls and Skype communications with Yves Harache, former President of the European Aquaculture Society, and a personal friend of Duane Fagergren. Arranging the logistics of visits to seven farms and trade association partners, as well as the National Conference/Tradeshow, called for patience, persistence, and more than a little faith. Benoit Eudeline, Taylor Shellfish, stepped up to do the majority of scientific and technical translation at farm and hatchery operations. Translators Victoria and Jean helped with daily translations, explaining much about French culture, wars, politics and art history as we contemplated confusing road signage, prolific roundabouts, and mysterious restaurant menus.

Most importantly, there were no accidents, all cars were returned without scratches, illnesses were held to a minimum, and everyone got along magnificently. We discovered not all GPS units are equal, which resulted in some of our drivers, besieged by backseat navigators, being forced to circumnavigate the roundabouts (around and around and around again) until a consensus was achieved in the back seat as to which exit to take. Even though the roundabouts made some folks dizzy, all agreed that the trip was exceptionally successful, in more ways than one.



Photo Credit: Connie Smith, PCSGA

Member Reflections



Photo Credit: Bill Dewey, Taylor Shellfish

Duane Fagergren, *Calm Cove Oyster Co:*

My few “take home” observations: French shellfish farmers work very hard (often two low tides a day); finding farm labor is difficult in France; French farms are typically large-scale, rack and bag operations with lots of automation for sorting; *Crassostrea gigas* is king in France, with a few *Ostrea edulis* grown out deep; mortality occurs at very high rates, mostly due to Herpes virus when oysters are young; it takes five years typically to grow a market oyster, often with much product relay to attain right size and condition; French oyster annual sales are roughly ten times our U.S. production, and the vast majority of that occurs during the months of November to January; prices vary depending on size, but they’re comparable to U.S. farm-gate value. The French shellfish growers greeted us warmly and appreciated that we came to visit their farms. Some of the French growers and industry organizers expressed interest in a reciprocal visit to our west coast industry.

Trevor Sande, *Hump Island Oyster Co:*

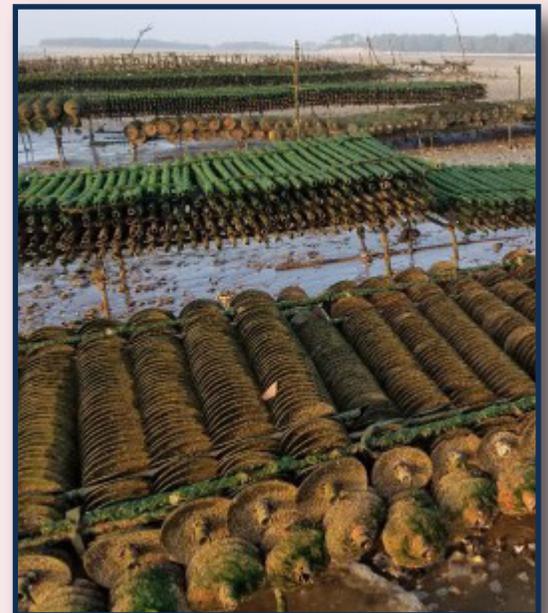
My French experience was full of moments of overwhelming awe at the sheer scale of the French oyster farms as well as fascination at the innovation and mechanization within the farms. As a civil engineer, the diked industrial park near Bouin was the most impressive stop. Massive computer-controlled tidal flood gates allowed the flow of seawater through canals into thousands of acres developed below sea level. The area was clustered with hatcheries, nurseries and grow out ponds with nearly all of the flow through these systems performed by gravity. I was blessed with delightful travel companions who were not afraid of an occasional wrong turn (although I did fire my navigator on several occasions only to rehire said navigator the following day). I learned a vast amount about a lovely country and thanks to Connie’s hard work I believe that I have the confidence to return on my own. My wife has forbidden me to travel with any of you again as I am already scheming to incorporate my observations into our Alaska operations.

Bill, Joyce and Andy Dewey, *Taylor Shellfish & Chuckanut Shellfish:*

The PCSGA entourage were guests of honor at the French growers’ annual national conference and trade show. Between the trade show and farm visits, we all had our eyes opened to scale of the French industry. The diversity of equipment available for farming and grading and handling seed and market oysters was awe-inspiring.

The French industry produces approximately 8 billion single seed oysters per year. About half from catching natural set on coupelles and French tubes, and the other half hatchery produced. One nursery facility we visited generated as much oyster seed as Taylor Shellfish produces in a year in two weeks!

Grading of shellfish, oysters and mussels is precise in France. The majority are graded by machine regardless of the size of the operation. Grade sizes are depicted by numbers that are standard throughout the country. As production of half shell oysters continues to grow in the US perhaps we should consider adopting it or a similar system.



Capturing oyster spat on French tubes and coupelles.
Photo Credit: Connie Smith, PCSGA

Member Reflections

Marty and Debi Beagle, FryeCove Farms:

Amphibious oyster workboats and barges allow easy access to muddy beaches and bays during high and low tides. We toured an extensive aquaculture vocational training school where high school students attend for three years learning everything about making a living raising shellfish: business plans, boat and machinery operations and maintenance, hatchery care and feeding, growing, and marketing techniques. "Mature students" also attend to update requirements such as safety certificates, captain's license, etc.

We were introduced to the Daurade Royals fish at the Vannes fish market and also by a disgruntled oyster farmer who shared a preserved jaw bone with several rows of monster teeth. This oyster farmer's nemesis devoured a large percentage of his crop seemingly overnight a few years ago and he has yet to recover a truly rational countenance.

Mussels are grown on rope, spiraled around a bouchot, (basically a 4x4), sometimes covered in netting and/or with a plastic skirt on the lower foot of the bouchot to protect from predators. This system was on display in the office of one large farm as well as at an active live display at the La Rochelle Aquarium. The French grow a lot of mussels!

We experienced beach-smoked mussels (somewhat like a clambake). Our host created a spiral arrangement of mussels on a pallet, piled it high with pine needles, and lit it on fire. Delicious! Just as were many, many other "fruits de la mer" (Fruits of the Sea) that we tasted at farms, the tradeshow and local restaurants.

One of the best spontaneous events was an assault on a marine supply store- t'was a beautiful and quiet Sunday afternoon at the store until 5 carloads of Americans pulled up and descended on aisle after aisle of shellfish gear- yep, it was a marine hardware store that carried "all-things-shellfish" (and it turns out, also manufactured equipment in their fabrication facility) - People went nuts.....It was like a bunch of puppies let loose in a tennis ball factory. The sole proprietor got a blister on his thumb from tearing off all of the sales slips from the register.



*Adding pine needles to smoke this pallet of mussels on the beach. This cooking technique is called eclad.
Photo Credit: Connie Smith, PCSGA*

Roberto Quintana, Taylor Shellfish:



*An example of the innovation and mechanization within French hatcheries and nurseries.
Photo Credit: Trevor Sande, Hump Island Oyster Co*

It was an eye-opening experience being able to travel to France and see part of their oyster industry, from hatcheries/nurseries to processing/packing facilities. Personally, and because of my field of work, my interest was focused on the production side of the industry (hatcheries and farms). It was in this area where I was most impressed by their level of automation and the scale of their production, which is ten times bigger than in the United States. Their level of automation was amazing, from the all too familiar oyster sorters and the seed screeners, to machines that clean screens and sieves as well as larvae and algae tanks that get cleaned automatically with the movement of a few levers. The thing that amazed me the most was the way they apply simple biological principles to maximize productivity, as well as how they utilize the natural environment in their favor to maximize and simplify their operations. An example of this was in the region of Bouin, where large parts of the nurseries in France are located. The nutrient content of the water is so high that they have natural blooms of algae in their ponds year-round. Simple concrete tanks that get inoculated with leftover algae from the same or a contiguous tank fill up with well water, aeration is added, and that's it. A thick, algae-rich tank is ready to be used as feed in less than four days. The well provides a natural filter and the soil adds the basic nutrients that the algae needs. Very simple, yet very effective.

Sue Cudd, Whiskey Creek Shellfish Hatchery:

The trip to France was amazing, the sheer scale of the industry is incredible as well as the amount of mechanization. I was really impressed with the Brittany wheel boats. Thanks a lot to Connie for the amount of work she put in to organizing and running the trip and to Benoit for putting up with all of us non-French speakers and organizing a couple hatchery side trips for me. The scale of the seed production was something none of us had seen before. One of the hatcheries that we saw was all stainless steel, mechanized and so clean you could eat off of the floor. It kind of made me want to burn mine down when I got home! Thanks also to our car driver and navigator, our off the grid adventures due to a few wrong turns were always interesting.

Benoit Eudeline, Taylor Shellfish:

October 10th was the beginning of a 2-week journey through the French shellfish industry for 22 PCSGA members. After a 10-hour flight, long immigration lines and a somewhat chaotic car rental process, we departed on a 3-hour drive to our first stop, Normandy. Although I could sense a lot of apprehension among the drivers (those dreaded roundabouts and “priorite a droite”), everybody made it very uneventfully to our first hotel in Port en Bessin. I was born and raised in Normandy until I left for the USA 23 years ago, so this was a special place to visit and share with the rest of my colleagues. In addition to its obvious historical value, Normandy is a special place when it comes to shellfish farming due to its very large tidal exchange (the largest in Europe with up to 40 feet of tide). We visited several oyster and mussel farms in the region, which showed how farmers had to adapt to the local conditions by developing new culture methods like bouchots (vertical posts to grow mussels) or wheeled boats, allowing access to remote farms often a kilometer or more from the shore.

Making our way from Brittany to La Rochelle, a few of us scheduled a last-minute stop to one of the largest pacific oyster seed facility in France, France Naissain, located in Bouin. Most seed nurseries in France are located in the same aquaculture

park in this polder (protected by dikes since it is below sea level) because of nutrient rich underground water used to bloom naturally occurring phytoplankton. Most of these companies are large, highly mechanized and vertically integrated, from breeding program, hatcheries, nurseries and field nurseries.

During an afternoon off in La Rochelle, a few of us were invited to visit a hatchery in the industrial harbor of La Rochelle. Eric Marissal, owner of Grainocean hatchery/nursery, and his daughter Lila, gave us a tour of their facilities. This hatchery was like no others we had ever visited with pretty much everything in it being custom designed and made of stainless steel.

The annual total oyster seed production for France (T6 and above) is about 4 billion seed! A majority of this seed is triploid and has been bred to offer some degree of resistance to the microvariant herpes virus, a major source of seed mortality in France.



*Most French farmers use these amphibious vehicles to reach their farming grounds that are often a kilometer or more from shore.
Photo Credit: Bill Dewey, Taylor Shellfish*

Dave Steele, Rock Point Oyster Co:

The Steele's enjoyed a great week in Paris before meeting the others at the airport car rental. I enjoyed visiting Omaha Beach where my Dad landed during WWII and impressed by shellfish farming flourishing where war once ravaged the region. One highlight was our visit to the shellfish growers' everything store in Marrennes (Ets. Roger Bertrand) where I think Santa's workshop resides. Bertrand has developed a few tools that need further investigation, such as an oyster grow-out bag anti-fouling cooker that kills bag fouling organisms while not hurting the oysters in the bag, racks used in rack-and-bag culture, and spuds used to hold your boat in position during off-bottom culture work. Regular use of shellfish handling was demonstrated by a couple in their 60's who produce 50 tons (I estimate about 1 million) of oysters per year with little outside help. We were all amazed by their packaging in France, hand packed in thin plywood boxes with decorative lids. Some companies package with seaweed for moisture and display decoration. Nobody uses ice and there is minimal refrigeration as vibrio is not a problem in France.

Warm Greetings from Hawaii!!!

by: Brian Koval, Hawaiian Shellfish

With another season come and gone, I would like to say “Mahalo” to our friends, customers, agency partners, and PCSGA for another successful year and annual conference. Hawaiian Shellfish was selected to receive some of the Grower Enrichment and Development Funds to help cover costs to attend the 72th Annual Pacific Coast Shellfish Grower’s Annual Conference.

Being 2656 miles from our farm to Seattle makes staying up to date with information and customers very challenging. The opportunity to meet customers and researchers whom I have only spoken on the phone is extremely valuable for us as a larvae and seed producer. Getting to know individuals, their challenges, expectations for the next year, and receiving feedback is what allows Hawaiian Shellfish to provide better products and services in the future.

Hawaiian Shellfish LLC was formed in 2012 by Dave Nisbet, owner of Nisbet Oyster Company and Goose Point Oysters, to provide his farm with eyed-larvae for cultch setting. With the problem of ocean acidification and the lack of natural sets, Dave sought to secure a steady supply of larvae for his farm to continue operations. Our three companies employ over 100 hard working men and women year-round, supporting communities in Washington and Hawaii. This year we were proud to announce the development of our own triploid oyster larvae and seed, as well as Kumamoto oysters.

In addition to larvae for our Willapa Bay operations, we also sell larvae and single seed to numerous West Coast farms from Alaska to Southern California. By attending the PCSGA conference, we not only gain information and contacts that are beneficial to us here in Hawaii, but we also pass on information and improved products to all of our customers and neighbor farms in Willapa Bay. I am acutely aware of the struggles many farmers in Willapa Bay are experiencing due to burrowing shrimp, and it was encouraging to hear an update from Brett Dumbauld from USDA and Kim Patten from WSU. Our Californian customers express a need for OsHv-1 resistant seed, and hearing talks from Colleen Burge, Chris Langdon, and Konstantin Divlov showed encouraging results. We look forward continuing to work with these researchers to offer the best seed available to our customers.

I would like to thank PCSGA for helping to cover some of my travel expenses and providing a great event that brings the industry together for the benefit for all. I would recommend all growers, big and small to apply for Grower Enrichment and Development Funds if that would encourage you to attend the conference!

Mahalo Nui Loa,
Brian Koval
Hawaiian Shellfish

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Local Regulations: Washington's Shoreline Master Programs

by: Audrey Lamb, Taylor Shellfish Farm

Regulatory and permitting processes have a huge impact on your ability to farm. This is true whether you are continuing current operations or changing species or culture techniques to adapt to market and environmental conditions. Out of all the regulatory processes that growers operate within, local regulations can sometimes have the biggest impact on your business and can be the most challenging to implement and manage. It's critical that growers stay engaged at the local level to stay up to date on permitting requirements and share their perspective on any potential changes to regulations.

In Washington, local aquaculture regulations are primarily determined by your Shoreline Master Program (SMP). Shoreline Master Programs are land-use policies and regulations which guide the use of Washington's shorelines. In 1971, the State Legislature passed the Shoreline Management Act to manage shoreline uses and developments, the statewide public interest, and environmental resources. The Act establishes a broad policy and gives preference to uses that protect water quality, are water dependent, and preserve public access. Each county, and most towns and cities with shorelines have adopted local Shoreline Master Programs based on the Act, tailoring them to the specific needs of their community.

Local jurisdictions are required to update their SMPs regularly. This is where you come in. You have a very important voice with your County's SMP. Even though aquaculture is given preference under the Act as a water-dependent use resulting in long-term benefit to the shoreline, it is frequently challenged at the local level. Some counties have tried to de-facto prohibit aquaculture in certain areas or have created permit application requirements which effectively make applying for a permit financially infeasible for most growers.

Policymakers need to hear your perspective during your County's SMP update process. Thurston County is currently in the process of gathering information and updating their SMP. Recently, a group of growers gave powerful public testimony at a County Planning meeting about the potential negative impact of the proposed regulations on their businesses. Growers shared stories of why they got started in the industry, how their farms support many families' livelihoods, and how proud they are to produce local food sustainably. PCSGA has supported growers in Thurston County by testifying at public meetings and submitting letters on how these proposed changes would affect its members. Shellfish growers are crucial advocates for clean water, bringing a unique perspective to local regulatory processes.

Don't hesitate to contact me (audreyl@taylorshellfish.com) to learn how you can get involved with your local SMP today.

For more information, visit <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/Shoreline-Master-Programs>

To learn about the Thurston County Shoreline Master Program Update, please visit <https://www.thurstoncountywa.gov/planning/pages/shorelines.aspx>



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What Does PCSGA Do?

We are your **advocate** and work with local, state and national partners to help define policies and regulations that affect your business.

We work with a team of consultants and scientists from leading universities and marine institutes to support **cutting-edge research**.

We believe **outreach** is key. We invite you to join our beach cleanup efforts, our annual community event (SLURP), and various festivals to help build relationships with the public that are vital to our success.

We recognize **education** is essential in achieving our long-term goals. We support programs that teach the value and benefits of our industry.

We organize an annual **conference and tradeshow**. You'll learn about current and emerging issues facing our industry - all at a discounted member rate.

We urge you to **get involved**. Volunteer at local festivals, join a committee, participate in our annual lobbying trip to DC and your state, or represent your region on our Board of Directors.

Grower Membership Benefits:

- *Guidance navigating local and national permitting processes*
- *Legal representation concerning industry-wide issues*
- *Member-exclusive trainings, workshops, and educational opportunities*
- *Legislative representation in state and federal arenas*
- *Discounts and rebates through allied partners*
- *Access to health care and business security with insurance partners*
- *Scholarships and funding opportunities for enrichment development*
- *Network for collaborations and information sharing*

Attention Grower and Allied Members!

Want to stay on board with PCSGA or join the Association for the first time?

YOU CAN DO IT ALL ONLINE!

Renewing Members: www.pcsga.org/renew-membership-dues

New Members: www.pcsga.org/join-pcsga

Allied Membership Program

Dedicated to local, national, and international businesses that support the shellfish industry.



Allied Membership Levels and Benefits:

All levels (except Subscriber) receive membership rates to the Annual Conference & Tradeshow

SUBSCRIBER \$40

- Subscription to quarterly newsletter, *Longlines*

FRIEND \$250

- Subscription to quarterly newsletter, *Longlines* and monthly Tidings emails
- Access to PCSGA membership list

ASSOCIATE \$500

- 2.25" x 2" (w x h) display ad in quarterly newsletter, *Longlines*
- Annual Resource Catalog, with 1/8 page business ad and listing
- Company name listed on PCSGA website
- Access to PCSGA membership list
- Subscription to quarterly newsletter, *Longlines* and monthly Tidings emails

SUSTAINING \$950

- Free Tradeshow Exhibit space and ticket to Tradeshow Reception at PCSGA Annual Conference
- 2.25" x 2.75" (w x h) display ad in quarterly newsletter, *Longlines*
- Annual Resource Catalog, with 1/4 page business ad and listing
- Full directory listing on PCSGA website, and link to your website
- Access to PCSGA membership list
- Subscription to quarterly newsletter, *Longlines* and monthly Tidings emails

CORPORATE \$1700

- Annual Conference meeting fee waived for one
- Free Tradeshow Exhibit space and ticket to Tradeshow Reception at PCSGA Annual Conference
- 2.25" x 3.5" (w x h) display ad in quarterly newsletter, *Longlines*
- Annual Resource Catalog, with 1/2 page business ad and listing
- Full directory listing and company logo on PCSGA website, and link to your website
- Access to PCSGA membership list
- Subscription to quarterly newsletter, *Longlines* and monthly Tidings emails

PATRON \$4,000

- Free entrance for two to PCSGA Annual Conference and Grand Awards Banquet; additional attendees pay at member rate
- Free Tradeshow Exhibit space and ticket to Tradeshow Reception at PCSGA Annual Conference
- 4.75" x 3.25" (w x h) display ad in quarterly newsletter, *Longlines*
- Annual Resource Catalog, with full page business ad and listing
- Full directory listing and company logo on PCSGA website, and link to your website
- Access to PCSGA membership list
- Subscription to quarterly newsletter, *Longlines* and monthly Tidings emails
- Gourmet holiday gift basket



PCSGA Grower Membership Application

Company: _____

Designated representative, for voting purposes: _____

Number of years in shellfish business? _____

Address: _____ City: _____ State: _____

Geographic location of farm (e.g. west side of Hood Canal near Brinnon): _____

Phone: (____) _____ Email: _____

Additional Information:

Name(s) of another grower near your farm location (if known): _____

Species you farm (check all that apply): Oysters Manila Clams Geoduck Mussels

For Emergencies:

In case of a toxic spill or other marine emergency, please list the counties where you farm so we can notify you quickly: _____

Calculate Your Dues:

Membership dues are based on your annual sales. Calculate your dues amount by taking 1% of the annual farm-gate value of your shellfish (minimum of \$250). Farm-gate is the value received when selling product to a buyer or to a processor for further value-added processing.

Example: You harvest and sell clams directly to a distributor for processing. The distributor pays \$100,000. Your dues are 1% of \$100,000, or \$1,000. (.01 x \$100,000 = \$1,000)

Annual farm-gate sales of \$ _____ x .01 = \$ _____ dues amount
(Minimum \$250)

Check one: 1 payment of _____

4 payments of _____ (due Jan, Mar, Jun, Sep)

Check Enclosed

VISA/MC # _____ Expiration Date: _____

****Payment will be charged to the above credit card once membership has been approved by the Board**

SIGNATURE REQUIRED: I affirm that my membership dues amount is an accurate reflection of my annual production.

Signature _____ Date _____





A Small Taste of the Chesapeake

by: Alice Helker, Set & Drift Shellfish

When my husband (and co-farmer) Van and I were offered the chance to use a boat to cruise around the Chesapeake for a week in August, we didn't hesitate in saying yes. Having worked on native oyster restoration with the Puget Sound Restoration Fund (PSRF), I was keen to learn about restoration efforts in Chesapeake Bay for their Virginia oyster and about oyster culture overall.

Our first oyster-centric visit was at Knapp's Narrows, one of the last working waterman villages on Maryland's Eastern Shore, and home to the Phillips Wharf Environmental Center. The Center provides hands-on marine environmental education and features an oyster setting system and nursery for both commercial and restoration purposes. As we were visiting, the owner of South Point Oyster farm stopped by to pick up seed and we had the chance to talk shop and swap farming experiences.

From there we wound our way down to Cambridge, where we started the visit chatting over beers with University of Maryland (UMD) PhD candidate Melanie Jackson about her research on oysters' ability to remove nitrogen pollution from the water. The following day we visited the UMD Horn Point Laboratory which has produced billions of native oyster spat and seed. Having worked in the PSRF hatchery, it was fascinating touring and talking about hatchery capabilities with manager Stephanie Alexander.

Our last visit before leaving Cambridge was out to the Choptank Oyster Company, Maryland's first established oyster farm and home of the Choptank Sweets. It was a beautiful, bright sunny morning and the sun glinted off glassy waters while we talked with farm manager Kevin about their unique suspended grow method, distribution network, and the overall outlook for shellfish farming in the region. That night we spent our wedding anniversary enjoying amazing Chesapeake seafood (including Choptank Sweets!) at the locally famous Ocean Odyssey restaurant.



Van, future farmer Wayne, and the owner of South Point Oyster farm

On our way back to the boat's moorings we stopped again in Knapp's Narrows where we had an unexpected visit with shellfish biologist Anna Priester (a keynote speaker at the 2016 PCSGA Conference) as she drove down to the Horn Point Laboratory. She herself is starting an oyster farm in Duxbury, Massachusetts, the Deluxbury Oyster Company. As small farm owners ourselves, we were intrigued to hear about her journey in accomplishing this.

Though we had but just a small taste of what the Chesapeake had to offer, we had a wonderful time visiting charming bayside towns and getting a feel for what the oyster culture is like in another iconic body of water on the other side of the country.



Alice and future farmer Wayne getting a tour from UMD hatchery manager Stephanie Alexander

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WA Legislative Reception

Thursday, January 31st

DoubleTree by Hilton - Olympia, WA

Use this opportunity to connect with elected officers who write and pass laws. Speak with them about the shellfish industry from your perspective.

Walk the Hill

April 29th - May 3rd

Washington D.C.

Spend the week meeting with agencies and Congressional officers on issues facing the shellfish industry.

PCSGA Spring Beach Cleanup

Thursday, March 28th

South Puget Sound, WA

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Reflections from The Noble Oyster

by: Daniel Hanson, HC Snail, LLC

“We believe that one of the main reasons we have been so successful is because of our membership in PCSGA.”

We have been fortunate this year: good weather when we worked on the beach, healthy oysters, no illnesses (that we know of), good customers, and a great partnership with DeNotta Seafood. Plus, the seed we've been getting from our suppliers has been healthy, robust and fast growing. There have been times when we were tired and sore after our labors, but also times when we thought this endeavor is just too easy. The process we've developed is simple, efficient and flexible. With only two workers it has to be! Tumble baskets need to be repaired, rotated and cleaned of the inevitable accumulation of mussels and barnacles. Longlines need repair or re-tensioning. There is some heavy lifting going on, but with the system we have, the work is more than manageable. But the simplicity of fulfilling orders makes us feel good. By the time we plant seed for the year, we also have oysters that are nearing market size and need sorting. Mature oysters are put on the beach in a corral for “hardening” before bagging them into five or ten dozen lots. Once bagged they are hung from our dock waiting for orders; no need to wait for a low tide. We can and do deliver fresh, out of the water product direct to our customers within minutes.



Photo Credit: Daniel Hanson

We believe that one of the main reasons we have been so successful is because of our membership in PCSGA. Every interaction with the staff has been helpful. Every annual conference brings new insights and information we can put to work immediately. The connection and collaboration with individuals and shellfish companies alike benefit us in multiple ways. We find new ideas, new products and new friends. It doesn't get much better than that, and our company motto “Leave It Better” is met.

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Benefits of Membership: an Alaska Perspective

by: Margo Reveil, Jakolof Bay Oyster Co

It can be lonely on the frontier of oyster farming in Alaska. Everything we do here from the scale of our farm to the techniques used to grow oysters and take them to market feels different from almost any other farm we know of. And yet every year at the PCSGA annual conference, growers throughout the coast share their knowledge and we Alaskans learn as much from our differences, as from our commonalities. I'm humbled by how much time and effort researchers and growers put into their conference presentations. When anyone shares their knowledge, the sharing may not help them at all, it could even threaten an individual by boosting competitors, or exposing elements of research that could conflict with current practice, yet the sharing happens. And we all become better growers when we receive and contribute to that bank of knowledge. I am amazed at what generations of growers have accomplished, experimenting individually and together, and working with agencies to craft, mold, guide and inform the rules and regulations that have built a safe and viable shellfish food system. I am also grateful that PCSGA exists to facilitate and manage that sharing.

Much of what we learn we bring back to our own Alaska Shellfish Growers Association (ASGA) conference. We have a lot fewer growers (equally impassioned), and much of the sharing and learning

happens between sessions as we digest what we've heard and tie that in through conversation with our existing knowledge. Starting out it felt like a big investment to participate. Travel in Alaska is expensive and as a small farm, every hour focusing on ASGA or PCSGA is an hour not farming, but at 1% of gross (plus a travel budget and time) it still feels like a tremendous bargain to me. How do you put a dollar value on the benefits of so many people working together to make it possible for us to exist in this industry?

"I am also grateful that PCSGA exists to facilitate and manage that sharing."

When we started out, we were the fortunate beneficiaries of Grower Enrichment and Development Funds to participate in Walk the Hill in D.C. and a PCSGA Annual Conference. I've drawn on those experiences often for our own Juneau hill walk and organizing our own conference. It is still a significant investment in time and money to participate each year. But the overall generosity of other members has inspired me to invest more time and travel funds to participate now as a PCSGA board member. With every interaction ideas flourish. Not every gamete released will produce viable seed, not every seed planted will survive till harvest, but plant nothing, harvest nothing. I encourage anyone who wants to see improvements or changes on your own farm and in the industry to lean in, step up, get involved and come share. It is a commitment, but to reap the rewards we have to plant the seeds.

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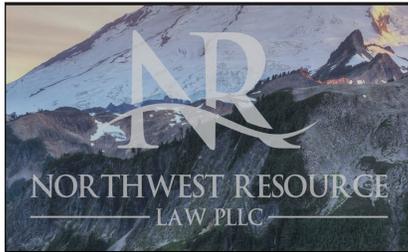
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Thoughts for the Future of Aquaculture Nutrition

Source: (e) National Aquaculture Association

Date: November 16, 2018

Whether the saying, “you are what you eat” is true or not, for modern aquaculture a critical key to success is nutritionally-complete, prepared feeds. Three authors, Giovanni M. Turchini, Jesse Trushenski and Brett Glencross, re-examine aquaculture nutrition in a new, open-access paper.

Abstract

In recent decades, aquaculture nutrition research has made major strides in identifying alternatives to the use of traditional marine-origin resources. Feed manufacturers worldwide have used this information to replace increasing amounts of fish meal and fish oil in aquafeeds. However, reliance on marine resources remains an ongoing constraint, and the progress yielded by continued unidimensional research into alternative raw materials is becoming increasingly marginal. Feed formulation is not an exercise in identifying “substitutes” or “alternatives” but rather is a process of identifying different combinations of “complementary” raw materials—including fish meal, fish oil, and others—that collectively meet established nutrient requirements and other criteria for the aquafeed in question. Nutrient-based formulation is the day-to-day reality of formulating industrially compounded aquafeeds, but this approach is less formally and explicitly addressed in aquaculture research and training programs. Here, we (re)introduce these topics and explore the reasons that marine-origin ingredients have long been considered the “gold standards” of aquafeed formulation. We highlight a number of ways in which this approach is flawed and constrains innovation before delving into the need to assess raw materials based on their influence on aquafeed manufacturing techniques. We then conclude with a brief commentary regarding the future funding and research landscape. Incremental progress may continue through the accumulation of small insights, but a more holistic research strategy—aligned with industry needs and focused on nutrient composition and ingredient complementarity—is what will spur future advancement in aquaculture nutrition.

The paper can be accessed at: <https://afspubs.onlinelibrary.wiley.com/doi/10.1002/naaq.10067>

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saragrants@pcsga.org*

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Oyster aquaculture limits disease in wild oyster populations

Source: (e) Virginia Institute of Marine Science
 Date: December 14, 2018

A study initiated by Dr. Ryan Carnegie of the Virginia Institute of Marine Science (VIMS) has found that oyster aquaculture operations can limit the spread of disease among wild populations of oysters. The findings are contrary to long-held beliefs that diseases are often spread from farmed populations to wild populations.

could spread to nearby wild or fishery resources. Our hunch was that oyster aquaculture could serve as a ‘sink,’ rather than a ‘source,’ for pathogens that primarily spread when oysters die, because the point of aquaculture is to remove oysters from the system before that happens.”

Dr. Tal Ben-Horin, the study’s lead author and a postdoctoral fellow at the University of Rhode Island, says “The very act of aquaculture has positive effects on wild populations of oysters. The established way of thinking is that disease spreads from aquaculture, but in fact aquaculture may limit disease in nearby wild populations.”

By showing that this hunch is correct, Carnegie says the research “highlights an important ecological benefit that intensive shellfish aquaculture may provide.” He adds, “This should help bolster the well-justified perception of shellfish aquaculture as a green industry worthy of public support, which this industry must have if it is to grow.”

Mathematical disease models

Carnegie, a study co-author and research professor at VIMS, brought the study team together as part of a Research Coordination Network on marine diseases funded by the National Science Foundation and led by Drew Harvell of Cornell University. Published this week in the journal *Aquaculture Environment Interactions*, the team’s study was part of a broader project at the National Center for Ecological Analysis and Synthesis.

Working with Carnegie, former VIMS postdoctoral associate Maya Groner, VIMS Master’s student Lauren Huey, and colleagues at the University of Maryland Baltimore County, Rutgers University, and the U.S. Department of Agriculture, Ben-Horin integrated data from previous studies into mathematical models to examine the interactions between farmed oysters, wild oysters, and the common oyster disease Dermo.

“We were interested in testing widely held assumptions about how diseases might impact shellfish aquaculture,” says Carnegie, “specifically the idea that large numbers of farmed animals would produce higher levels of disease that

Carnegie says “Our study was based on mathematical modeling that drew on field data that has been collected very widely—from the Gulf of Mexico through the Atlantic. The models were basically available on the shelf by virtue

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of having been developed over the years; we were able to take advantage of them to ask some specific questions about disease dynamics.”

Diseases are among the primary limiting factors in wild oyster populations. In the Chesapeake Bay and Delaware Bay, wild oysters are managed with the understanding that most will die from disease, while there are few wild populations of oysters in New England because of Dermo and other diseases.

Dermo is caused by a single-celled parasite that occurs naturally in the environment and proliferates in the tissue of host oysters, which spread the parasite to other oysters when they die and their parasite-infected tissues decay. But it takes two to three years for the parasite to kill the oysters. As long as the oysters are held on farms long enough to filter disease-causing parasites from the water, but not so long that parasites develop and proliferate and spread to wild oysters nearby, aquaculture operations can reduce disease in wild populations.

The disease does not cause illness in humans.

“As long as aquaculture farmers harvest their product before the disease peaks, then they have a positive effect on wild populations,” says Ben-Horin. “But if they’re left in the water too long, the positive effect turns negative.”

The researchers note that several factors can confound the positive effect of oyster aquaculture. Oyster farms that grow their product on the bottom instead of in raised cages or bags, for instance, are unlikely to recover all of their oysters, resulting in some oysters remaining on the bottom

longer. This would increase rather than reduce the spread of the disease.

“But when it’s done right, aquaculture can be a good thing for wild oyster populations,” says Ben-Horin. “Intensive oyster aquaculture —where oysters are grown in cages and growers can account for their product and remove it on schedule—is not a bad thing for wild populations.”

The study’s findings have several implications for the management of wild and farmed oysters. The authors recommend establishing best management practices for the amount of time oysters remain on farms before harvest. They also suggest that aquaculture managers consider the type of gear—whether farmers hold oysters in cages and bags or directly on the seabed—when siting new oyster aquaculture operations near wild oyster populations.

The next step in the research is to gain a better understanding of how far the Dermo parasite can spread by linking disease models with ocean circulation models.

“Everything that happens in the water is connected,” says Ben-Horin. “There’s a close relationship between the wild and farmed oyster populations and their shared parasite. Sometimes ecosystem level effects are overlooked, but in this case they’re front and center.”

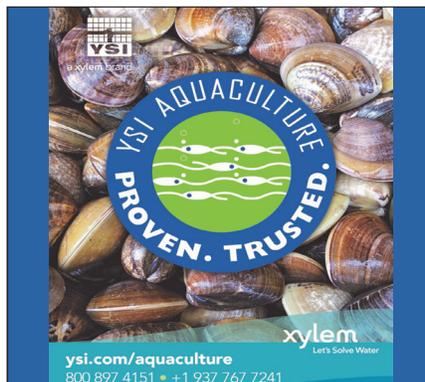
“It’s critical that we fully appreciate how aquaculture fits in the ecology of marine systems, and this study provides new perspective on this,” says Carnegie. “It highlights an important ecological benefit that intensive shellfish aquaculture may provide.”



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Could California's ocean ranches solve a global food shortage and fix the seafood trade deficit?

Source: (excerpt) The Washington Post
 Author: Scott Wilson, November 26, 2018

ABOVE THE SAN PEDRO SHELF — The Pacific Ocean is mountain-spring clear here six miles off the coast of Huntington Beach, Calif., where Phil Cruver has been ranching for a few months now.

“Ninety percent of the ocean is a desert,” said Brian Schmidt, whose company Primary Ocean Producers is an investor in Cruver’s kelp-harvesting operation. “But it doesn’t have to be.”

Dangling between buoys that rise on the occasional swell are sweeps of lines, some strung horizontally, others plunging vertically toward the sea plateau’s floor 150 feet below. The depth drops into oblivion about a mile to the west, and what rises are nutrients that make this prime farming territory. The proof is on the lines — the thick coils of mussel, Cruver’s livestock and his bet that deep-ocean ranching is the future of the world’s food supply.

Nearly five decades ago, Jacques Cousteau urged the world to “plant the sea and herd its animals” as projections for human population forecast that the world would one day run out of food. But the controlled raising and harvesting of shellfish, finfish and seaweed has been slow to develop in the United States, which — despite its long coastlines, once-bountiful fisheries and maritime traditions — imports 90 percent of its seafood.

This 100-acre patch of Pacific is the Catalina Sea Ranch, the first commercially viable aquaculture operation in federal waters. The first mussel harvest was this summer, and it is expanding to a planned 30 times its current size.

That is changing. A rare common ground inhabited by the Trump administration and the environmental community has made developing offshore sea ranches such as this one off the Southern California coast a national priority, though for different reasons.

Diving along line No. 38 in the unseasonably warm water, it is easy to see the promise. The clumps of mussels are bulky along the length of the lines, which vanish into cobalt blue about 60 feet down. Schools of small fish swirl around the lines, and tiny scallops grow on the shells of the jet-black mussels.

The administration wants to reduce a roughly \$15 billion annual seafood trade deficit, much of it with Asian nations such as China, Japan and South Korea. In its current strategic plan, the Commerce Department states that “a strong U.S. marine aquaculture industry will serve a key role in U.S. food security and improve our trade balance with other nations.”

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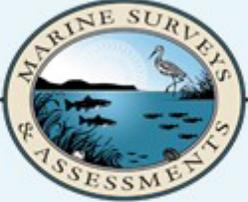


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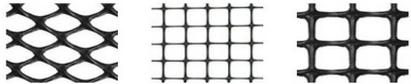
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Photo Credit: Ralph Pace for The Washington Post

For environmentalists who still have some concerns about the nascent industry, the potential benefit is more far-reaching.

Farming and ranching have depleted land and animal species on a broad scale worldwide, and as the global population grows by an estimated 2.4 billion people in the next three decades, the world will need to produce 70 percent more food than it does today. The oceans — covering more than two-thirds of the planet but producing just 2 percent of its food — could be a substitute for terrestrial farming.

“We’re at the proverbial tipping point over whether we want to take responsibility for our own food production,” said Michael Rubino, director of the office of aquaculture at the National Oceanic and Atmospheric Administration. “This is a new frontier. It’s exciting, and it’s also not without its difficulties.”

Small-scale aquaculture operations have been running in state waters for years, mostly along the southeastern U.S. coast, where farms raising shellfish have thrived. Those operations are expanding, if slowly, because operating close to

shore can bring farms into conflict with shipping, recreational fishing and water sports. The water quality also is likely to be lower than in the open ocean.

Federal waters, largely off limits until recently, are the industry’s immediate future. The reason they have not been opened sooner has less to do with concerns about aquaculture as a practice than with a federal bureaucracy that is hesitant to take the lead in regulating a new industry.

To operate in navigable federal waters, an operation needs a permit from the Army Corps of Engineers. But a number of other agencies have had a stake in aquaculture regulation, including the Environmental Protection Agency, the Food and Drug Administration and NOAA. Would-be aqua farmers often bounced from one agency to another, racking up costs and frustrating investors.

NOAA officials have been working with other federal agencies and aqua farmers to clarify the process. One proposal would have NOAA act as the lead agency in issuing aquaculture permits in coordination with other regulators. Legislation to make that official was introduced in the House and Senate this year, but it is likely to have to be resubmitted to the Congress taking office in January.

Read the full article:
https://www.washingtonpost.com/national/could-californias-ocean-ranches-solve-a-global-food-shortage-and-fix-the-seafood-trade-deficit/2018/11/26/0866dcca-e42a-11e8-b759-3d88a5ce9e19_story.html?noredirect=on&utm_term=.ebc0e127323b

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Study Shows How Mussels Handle Microplastic Fiber

Source: (e) Bigelow Laboratory for Ocean Sciences
Date: December 3, 2018

New research shows that mussels readily take in microplastic pollution fibers from the ocean but quickly flush most of them out again, according to a study by researchers from Bigelow Laboratory for Ocean Sciences. The findings were published in December's Marine Pollution Bulletin.



Photo Credit: Bigelow Laboratory for Ocean Sciences

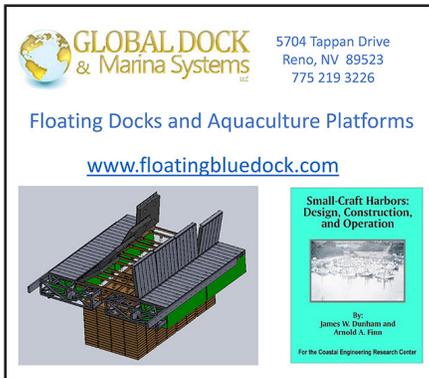
Human-made microplastics exist throughout the global ocean, from busy coastal areas to remote regions far from human habitation. They have myriad impacts: microplastics are eaten by tiny animals called zooplankton, play host to bacterial colonies, and can even change how energy and nutrients flow through ocean ecosystems.

fleece clothing, and whose small size makes them edible by marine life as small as zooplankton. However, few studies to date have focused on this type of ocean pollution. Matrai worked with Bigelow Laboratory Senior Research Scientist David Fields and researchers from the Shaw Institute to learn how marine animals handle fibers – which has important implications for understanding how microplastics move up the food web. Plastic can both directly affect the animals that ingest it and accumulate in the animals that feed on them, including humans.

“The big pieces of plastic you find on the beach are in your face, but microplastics are everywhere,” said Bigelow Laboratory Senior Research Scientist Paty Matrai, one of the study’s authors. “We desperately need ways to accurately and precisely measure their numbers in the ocean.”

The most abundant type of microplastics are fibers, which shed readily from materials as common as carpets and

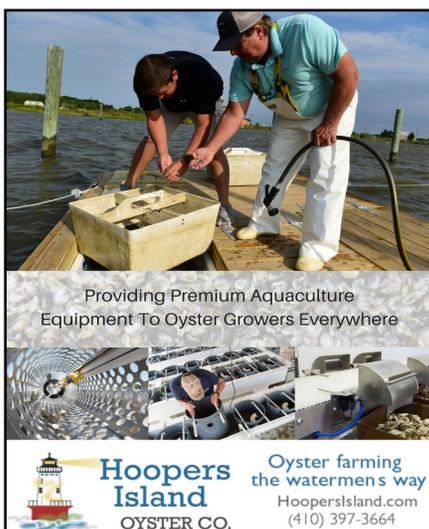
“We know that microfibers can be consumed by shellfish, but at what rate and how long they are retained by the



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animals remains unclear,” Fields said. “The degree to which plastic is impacting the food chain is unknown, but as more plastic make its way into the ocean, the number of organisms containing plastics is sure to increase.”

Through a series of laboratory experiments, the team found that the mussels quickly rejected most of the fibers they took up by coating them in mucus and expelling them. This method allowed them to efficiently rid themselves of some of the fibers without taking them fully into their bodies.

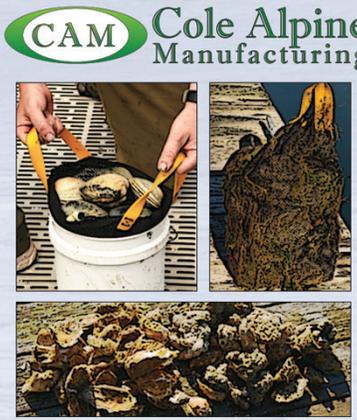
However, the mussels did ingest nearly one in 10 fibers, accumulating them in their body tissues. Moving those mussels to clean water, the scientists found, allowed them to flush most of the accumulated fibers from their bodies.

“Our work with microplastic fibers emphasizes the need for laboratory studies that accurately mimic an organism’s natural environment,” said Madelyn Woods, marine research coordinator at the Shaw Institute and lead author on the study. “Detailed studies of

individual species and their mechanisms for particle selection will be important for understanding how microplastics affect ecosystems on a larger scale.”

The primary experiments used for this research placed mussels into water containing fibers at levels equivalent to those in the ocean. However, measuring the effect of those conditions presented the researchers with a major challenge: how to count the tiny plastic fibers. Most other microplastic experiments have used methods that are exceedingly laborious or do not resemble natural conditions, potentially skewing results. Matrai’s team used a FlowCam, an optical instrument originally developed at Bigelow Laboratory, to more easily enumerate the particles. Establishing this new method opens the door for future experiments into microplastic fibers.

“Because the ocean is so vast, microplastics aren’t actually that concentrated,” Matrai said. “But no one knows the full impact they have. The bottom line is, we need data to help us make informed decisions.”



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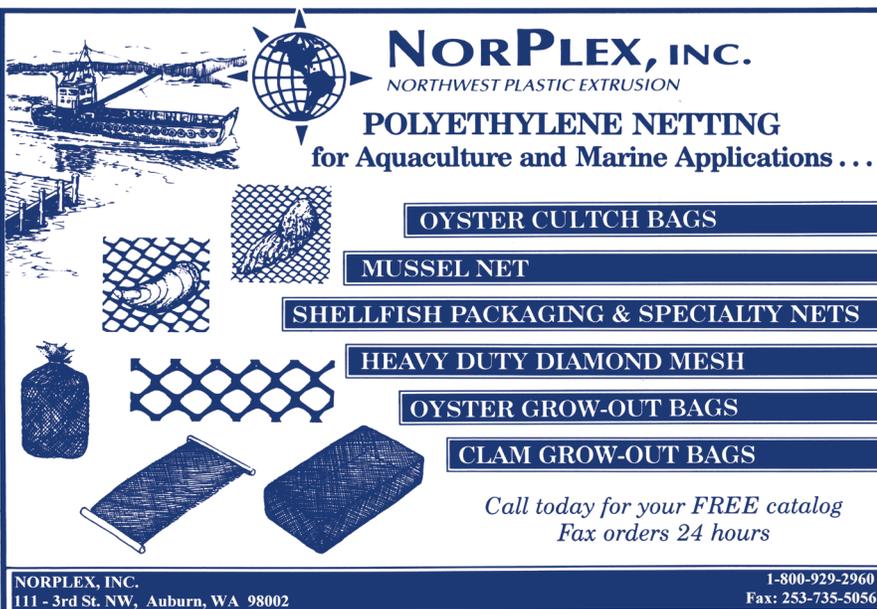
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Calendar of Events

January

- 9-11: Northeast Aquaculture Conference & Exposition (NACE)
– Boston, MA
- 15: Ecosystem Services Photo Contest Submission Due
- 15-17: Global Seafood Market Conference (GSMC)
– San Diego, CA
- 15-16: PCSGA Board Meeting LIVE – Port Townsend, WA
- 31: WA Legislative Reception – DoubleTree, Olympia, WA**

February

- 12: PCSGA Board Meeting via Conference Call
- 15: Ecosystem Services Photo Contest Submission Due
- 21-24: Newport Seafood and Wine Festival - Newport, OR

March

- 2-3: Penn Cove MusselFest - Coupeville, WA
- 7-11: 2019 Triennial Aquaculture Conference
– New Orleans, LA
- 11-12: WA Sea Grant Conference for Shellfish Growers
– Alderbrook Resort, Union, WA
- 14: PCSGA Board Meeting via Conference Call
- 15: Ecosystem Services Photo Contest Submission Due
- 17-19: Seafood Expo North America – Boston, MA
- 28: PCSGA Spring Beach Cleanup – South Sound, WA**

April

- 1-3: Pac Rim Conference – Reno, NV
- 15: PCSGA Board Meeting via Conference Call
- 15: Ecosystem Services Photo Contest Submission Due
- 20: CoastSavers Earth Day Beach Cleanup - WA Coast
- 26-28: Astoria Warrenton Crab, Seafood & Wine Festival
– Astoria, OR
- 27-28: Oregon Ag Fest - Salem, OR
- April 28 - May 3: Walk the Hill - Washington, DC**
- TBD Spring: SLURP! Fundraiser - Olympia, WA**
- TBD Spring: Hama Hama Oyster Rama - Lilliwaup, WA

*For updates to the calendar, please visit
www.pcsga.org/events/month/*



PCSGA Grower Enrichment and Development Fund

The fund provides financial assistance to members of PCSGA for expenses related to education opportunities, experimental practices, and attending PCSGA events such as the Annual Conference or Walk the Hill in Washington, DC

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