

THE BIVALVE BULLETIN

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Economic Impact of the Florida Clam Culture Industry: 2007 Results

From small beginnings in the early 1990s, cultured hard clams have grown to be the most economically important component of the diverse mix of food items produced by the Florida aquaculture industry. The culture process and subsequent sales put into motion a significant source of economic activity within the communities where the industry resides. And aside from the revenue generated by the sale and distribution of market ready clams, an assortment of other associated businesses have arisen in support of that industry. For example, hatcheries produce seed, seamstresses make bags for planting, wholesalers process market-ready clams, etc. Thus, the process of getting the clams to the final destination... a consumer's plate... is represented by a myriad of businesses, each contributing to the local economy through sales, wages paid, supplies purchased, taxes rendered and jobs created.

An initial study conducted in 2000 found that the overall economic impact of the hard clam culture industry to the Florida economy was approximately \$34 million during 1999. This impact was associated with the sale of 143 million market ready clams, representing \$16 million in grower sales. A follow-up study, requested by the Florida Statewide Clam Industry Task Force and funded by the DACS Division of Aquaculture has been completed. The study, supported by the UF Shellfish Extension Program and Florida Sea Grant, collected the necessary data via a survey of

Florida shellfish wholesale dealers who handled Florida cultured hard clams in 2007. The study solicited information on the total number of clams purchased and sold, sources of clams, destination of clams sold, buyer type, and prices received. Of 52 wholesale dealers surveyed, 42 responded, or a response rate of 80%. However, given the firms that responded, the project team was assured that the vast majority of the cultured hard clams produced by Florida growers was accounted for by the respondents. The sales and distribution of cultured clams generated considerable economic activity and impact within the culture regions' and statewide economies of Florida.

The survey findings indicate that, during 2007, approximately 185 million cultured hard clams were purchased by wholesaler dealers from growers in Florida, producing grower revenues of \$19 million. The growing and marketing of these clams to wholesale dealers, restaurants, food service buyers, retail seafood shops, and direct to consumers created a total economic impact of nearly \$49.5 million during 2007. The total impact includes \$30.1 million in value added revenue, \$25.1 million in labor income, \$3.7 million in property income (rents, royalties, interest, dividends, and corporate profits), \$1.3 million in indirect business taxes, and 563 jobs (full and part-time). These economic impacts are associated with cultured hard clam sales inside and outside the state of Florida as a whole. **See regional Impacts on page 5.**

Aquaculture in a depressed economy provides food for thought in 2009

Most people have coping strategies to persevere during a crisis. Farmers, in particular, have developed nerves of steel, or at least thick skin, to survive the challenges that face them. The media reminds us daily at how glum the economic situation has become. Fortunately, aquatic farmers just may be able to roll with it. Let's look at some benefits and opportunities this financial collapse may create for our industry. The strengthening of the US dollar first comes to mind. As the dollar commands more respect, so will its purchasing power. Second, fuel costs have fallen significantly. Psychologists have suggested there is a direct correlation between lower fuel costs and one's overall sense of well being. Fuel surcharges on freight invoices have or should fall. This will allow suppliers to be more competitive in certain markets and could open markets that were previously too costly to serve. Cost of production on the farm will drop as well. End consumers will feel less compelled to dine at restaurants within a few block radius of their home. The food business is fairly resilient in the face of an economic down turn. Consumers may shun expensive holidays, cars and real estate. In return for these sacrifices, we may treat ourselves to specialty food, seafood for instance. Luxury gifts, such as jewelry or renovations, could well give way to a fancy dinner out or home cooked meal. If it is argued that less people will go to restaurants; this only means more will be cooking at home. People need to eat. **Go to page 5.**

Working Waterfront Properties Tax Assessment by Kathryn Hurd & Tom Ankersen JD, UF Conservation Clinic

The Florida Constitution generally requires the "just valuation of all property for ad valorem taxation." Just valuation is based on the market value of the property and its "highest and best use." There are several exceptions from this general rule in the constitution, allowing valuation to be based on the character or use of the property instead of the real estate market. These exceptions include agricultural land, land used exclusively for non-commercial recreational purposes, and historic properties. Constitutional Amendment 6 placed on the November 2008 ballot and approved by over 60% of the Florida voters will add "working waterfronts" to this list. The amendment adds the following language to Article VII, Section 4 of the Florida Constitution: "The assessment of the following working waterfront properties shall be based upon the current use of the property: Land used predominantly for commercial fishing purposes. Land that is accessible to the public and used for vessel launches into waters that are navigable. Marinas and drystack that are open to the public. Water-dependent marine manufacturing facilities, commercial fishing facilities, and marine vessel construction and repair facilities and their support activities. The assessment benefit provided by this subsection is subject to conditions and limitations and reasonable definitions as specified by the legislature by general law."

The amendment is a response to concerns that public access to the waters of the state, and commercial fishing and marine industries are being lost, especially to residential development and so-called "dockominiums." Amendment 6 will allow property appraisers to assess working waterfront property based on its current use instead of its market value—or highest and best use. For qualifying waterfront properties, the current use valuation will likely be lower than market value, resulting in a lower valuation of the property for the purposes of ad valorem taxation, and hence lower property taxes. The intent is to encourage current owners to retain the public water access that these properties provide, as well as water dependent marine support infrastructure for boaters in Florida. A corresponding loss of tax revenue to local governments will also result, based on the difference between the valuation at current use and the valuation at highest and best use. The Florida Legislature in the 2009 session will establish further conditions for the assessment and refine the definition of qualifying properties. Constitutional Amendment 6 will become effective January 1, 2010.

Note as this newsletter goes to the printer, Senate Bill 1468 has been filed providing definitions and identifying eligible properties. However, aquaculture is not specifically identified. Contact your legislators now to address this issue.

Clam Health Project Report by Dr. Denise Petty DVM, UF College of Veterinary Medicine

In 2007, funding was awarded by the U.S. Department of Agriculture (USDA) to provide research support for the Florida clam farming industry. This funding was in part secured through the efforts of the Cedar Key Aquaculture Association. I would like to report on the project's objectives pertaining to aquatic animal health.

Summertime Mortalities of Grow-out Clams

Six clams each from 12 lease sites were submitted to my laboratory in July, August, September, and October of 2007, and again in May, June, July, and August of 2008. Each clam was examined for any abnormality. A gill biopsy was performed and examined under light microscopy. Tissue sections from each clam were prepared for histologic examination and histologic slides of each clam were made. These are being examined for signs of disease. So far, no significant problems, such as QPX, have been identified in the submitted clams. Trematodes (immature flatworms) were observed in some clams, as were a few bacterial infections.

Health Assessment of Larval and Post-set Seed

During the winter of 2007-08, I visited nine commercial hatcheries. Management related to health of clam stocks was discussed. As requested by the hatchery owner, samples of algal stocks, larvae, post-set seed, and broodstock were collected for both histologic and bacteriologic analysis. The goal was to determine a baseline for each hatchery, in the event of future problems (i.e., algae crashes, poor larval survival, failure to set, etc.). I want to thank the hatcheries that voluntarily participated in these assessments, it was great to meet you! A few problems were identified at some hatcheries, and I hope information gleaned from diagnostic tests

was helpful. Some of you asked me if bacterial infections in clam seed could be treated. Please note there are no legal antibiotics for use in any shellfish. This is because no one knows how long antibiotic residues remain in the clam tissue. Chemical residues in food animal tissues can endanger public health, and if detected, may result in financial penalties.

In September 2008, Dr. Ralph Elston, an internationally known shellfish health researcher, and his technician were brought to Florida to share his expertise. Dr. Elston operates a diagnostic laboratory, AquaTechnics, in Washington. We visited hatcheries on the East coast and in Cedar Key. Dr. Elston was also a speaker at the Clam Industry Workshop and led a hands-on laboratory session. Hatchery personnel were instructed in how to perform bacterial cultures of algal stocks and seed clams, water quality monitoring, normal anatomy of seed clams, and more. Latter, I did a scaled-down version of the lab demonstration for East coast hatcheries.

In summary, I know I learned some new techniques from Dr. Elston, and I hope you did too. For those of you who wish to use these techniques at your hatchery, I can give you a list of suppliers for the materials. I can also make marine broth and TCBS agar plates for a modest price. In addition, my laboratory can perform the azocasein assay to detect toxin producing *Vibrio* bacteria. For more information and pricing, please contact Tina, my biologist, at (352) 273-3613, tcrosby@ufl.edu, or me at (352) 273-3612, pettyd@ufl.edu.



2009 Clam Seed Suppliers

These hatchery and nursery operations are supplying hard clam, *Mercenaria mercenaria*, seed to Florida growers this year.* Contact suppliers for information on seed sizes, price, color variation, and availability.

Bay Shellfish Co. - H, N

Terra Ceia, FL 34250
Contact: Curt Hemmel
(941) 721-3887 or 722-1346 (Fax)
bayshellfish@tampabay.rr.com

Blue Acres - N

Palm Bay, FL 32907
Contact: Kevin Reinecke
(321) 243-2526 (cell)

Blueswater Shellfish Inc. - H, N

Melbourne Beach, FL 32951
Contact: Steve Woodford
(321) 726-0523 or 848-4839 (cell)

Cedar Creek Shellfish Farm - H, N

New Smyrna Beach, FL 32168
Contact: Mike Sullivan
(386) 426-0113 or 847-3202 (cell)

Cole's Clam Nursery - N

Placida, FL 33946
Contact: Dot Cole (941) 697-3181

David Grudin - N

Merritt Island, FL 32953
Contact: David Grudin
(352) 250-0667 dgrud@yahoo.com

Island Fresh Seafood - H, N **

Meggett, SC 29449
Contact: Bill Cox
(843) 889-6920 or 696-7439 (cell)
billcoxfas@cs.com
or) Laura Adams, Cedar Key
(352) 949-0532 (cell)

Kibbe & Company - N

St. James City, FL 33956
Contact: Roy Kibbe
(239) 283-1448

Ewan Leighton - H, N

Melbourne Beach, FL 32951
Contact: Ewan Leighton
(321) 288-8201
sleighton1@cfl.rr.com

Orchid Island Shellfish Co. - N

Sebastian, FL 32958
Contact: Ed Mangano
(772) 589-1600

Oyster House LLC - H, N **

Charleston, SC 29422
Contact: Knox Grant
(843) 514-4232 knox@knology.net

Pelican Inlet Aquafarms - H, N

Cape Coral, FL 33914
Contact: Edwin or Michael Connery
(239) 549-8014 or 246-5820 (cell)
highimage@mac.com

Research Aquaculture - H, N

Stuart, FL 34996
Contact: Tom McCrudden
(561) 702-8159

Sandpiper Clam Hatchery - H, N

Ft. Pierce, FL 34946
Contact: Bill Donovan
(772) 486-3609 (cell) or
Peter Woodward
(772) 643-6726

Southern Cross Seafarms - H, N

Cedar Key, FL 32625
Contact: Shawn Stephenson or
Johnny Gill
(352) 543-5980



* This list is provided as a service of the UF/IFAS Shellfish Aquaculture Extension Program. We do not sponsor or endorse any of these suppliers over any others. ** Clam seed obtained from out-of-state suppliers must meet best management practices pertaining to genetic protection and disease prevention. Seed must be accompanied by documentation from a licensed veterinarian certifying stocks do not show clinical signs of any diseases that may pose a threat to natural shellfish populations. For information, go to www.FloridaAquaculture.com, or contact Mark Berrigan, FL Department of Agriculture and Consumer Services, at (850) 488-4033.

2009 Bag Suppliers

Remember every bag must be tagged
for crop assistance programs!

Island Bags

Cedar Key, FL 32625
Contact: Carla & Ray Ermel
(352) 543-5231 or 949-1869 (cell)
isbags@svic.net

M&R Seafood

Cedar Key, FL 32625
Contact: Rick Viele (352) 543-9395

Playing Hooky Enterprises

Crawfordville, FL 32327
Contact: Sharon Scarborough
(850) 508-0981 sharon@clambags.com

Southern Belle Bags

Old Town, FL 32680
Contact: Faith van Orden
(352) 542-2508 or 542-5288 (cell)
ospref@bellsouth.net

Chris Vandenberg

Cedar Key, FL 32625
Contact: Chris Vandenberg
(352) 949-0441 (cell)

For information on **Fabric, Thread, Net Coating and Tag Suppliers**, contact the UF Shellfish Aquaculture Extension Office at (352) 543-5057 or LNST@ufl.edu.

RESEARCH UPDATE: Initial Assessment of Soil Landscapes in Clam Farming Areas

Background: Soils are the uppermost portion of the Earth that support all plant and animal life. Soil properties vary over space and time across many scales. Accounting for this variability is crucial to understanding the interactions between soils and the plant and animal life supported by them. In aquaculture situations, such as clam farming, this is especially true as clams spend a considerable portion of their life cycle buried in the soil. Soil physical and chemical properties likely have an effect on clamming and vice versa. Understanding these relationships is crucial to maximize harvests in the short and long-terms.

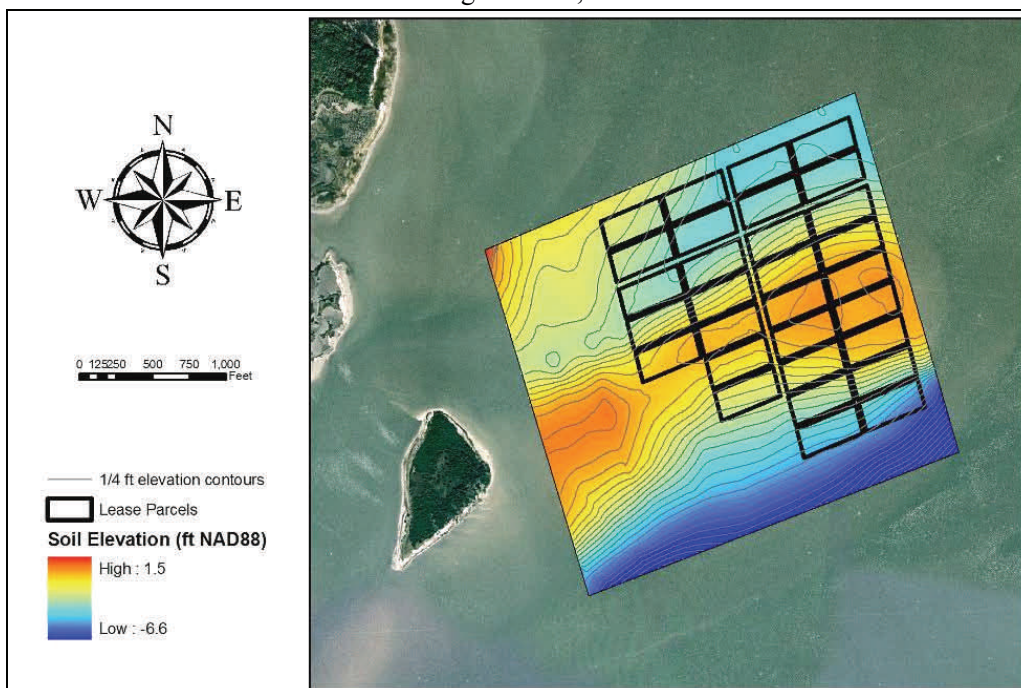
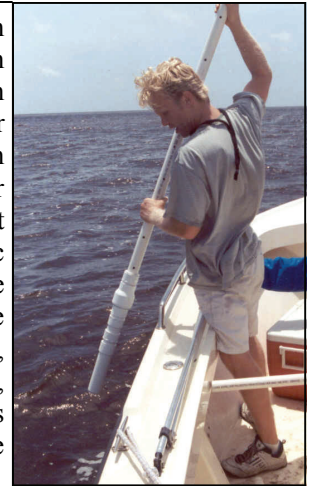
Sediment characteristics such as sediment type, particle size distribution, and soil permeability seem important for clam growth. In general, clams tend to grow better in sandy sediments relative to muddy sediments. Negative relationships have been found between silt and clay fractions with clam growth. It also has been suggested that mud content was positively related to production rate of pseudofeces (rejected particulate matter released as mucous-coated balls) by clams; thus, it is reasonable to suggest that with time, the deposition of pseudofeces contributes to an increasingly muddier substrate. However, although sediment affects growth, its signature may not always be strong, as effects of sediment characteristics can be confounded by other environmental variables, such as wave currents.

Soil organic matter (OM) is an important soil characteristic, as it provides an energy source for many of the biogeochemical transformations that can happen in estuarine environments. Organic matter decomposition byproducts can include hydrogen sulfide (H_2S , a colorless, poisonous gas which smells like “rotten eggs”). H_2S affects the survival and growth of bivalve species. Previous studies near high-density lease areas off Cedar Key found that soil OM was less than 2%. At the five monitoring stations, soils had

medium and fine grain sizes with no relationship between OM, grain size and H_2S concentrations in soils near the lease areas. In a later study, sulfide was used as an indicator of organic matter deposition. It was suggested that lease sites were sources of organic matter. Organic matter and sulfide concentrations were greater off the lease relative to the lease; however, because of large variability, patterns were not determined. This highlights the need for baseline soil characteristic information.

In general, sediment characteristics affect clam growth; however, characterization of sediment is a short coming in many studies. It has been suggested that aquatic bottoms could be investigated using a soil-based approach, thus creating a more holistic view of soil/sediment properties. This approach involves relating soil properties to subaqueous landforms and could be beneficial to aquaculture activities, such as clamming.

Objective: The objective of this research was to conduct an initial land assessment of high-use and unused clam lease areas using a soils-based approach. This would provide an important initial assessment of soil and clamming relationships. Supporting this objective were several tasks: 1) Create a digital terrain model of the study area, 2) Sample soils to capture variability within and between leased and unleased areas, and 3) Analyze samples for bulk soil characteristics to establish relationships between soil characteristics and clam productivity.



Distribution of Soil Properties

Bathymetry (measurement of water depth) and soil were sampled throughout the Dog Island High-density Lease Area, located east of Cedar Key. Soils were analyzed for organic matter, particle size distribution, and bulk density. These variables were selected because they control the physical and chemical behavior of the soils in which the clams live. All soil and bathymetry data were positional recorded using GPS and formatted using GIS. The results are a variety of spatial maps of soil properties. Figure 1 displays the water depth throughout the lease area and surrounding waters. In addition, there are maps available that depict soil clay content and soil organic matter.

Figure 1. Bathymetry (water depth) map of the Dog Island Lease Area, Cedar Key.

Update continued on page 5.

Soil Research Update (continued from page 4)

Relationships between soil properties are evident. These patterns may help explain biogeochemical differences (for example, enhanced H₂S) throughout the clam lease area.

Hydrogen Sulfide and Toxicity Risk to Clams

Sulfate is an ubiquitous ion in seawater and can be transformed to hydrogen sulfide (H₂S) during anaerobic (in the absence of oxygen) decomposition of organic matter in waters and soils that are low in oxygen. This form of sulfur can be detrimental to animals, including aquacultured clams, when ambient concentrations of H₂S reach toxic levels. This often occurs in the summer months when water temperatures are high or organic matter concentrations are elevated. As the soils-based portion of this research was conducted, an additional objective was created: develop a rapid method for clam lease evaluation of H₂S concentrations so that lease operators can bring samples to the Shellfish Aquaculture Extension Office for analysis and determination of H₂S toxicity risk. This work is ongoing and two similar methods are being tested. Further, a relationship between water temperature and H₂S concentration is being developed for selected lease soils through laboratory experiments. This information, when the study is completed, may allow clam growers to determine H₂S toxicity risk during extreme temperature events based on current or projected water temperatures at the lease site.

This research is being conducted by Rex Ellis, Todd Osborne and Mark Clark, University of Florida, Soil and Water Science Department, with funding obtained from the USDA CSREES. Their findings will guide future clam soils-based research. For more information or to obtain maps, contact Dr. Ellis, at (352) 392-1951, extension 240.



Regional impacts (continued from page 1)

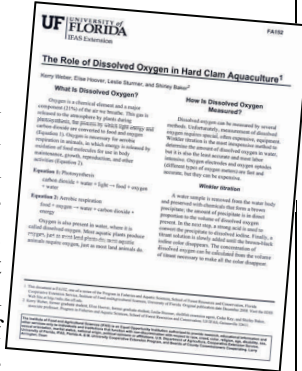
The study did allow a regional perspective on economic activities associated with the hard clam culture industry. The state of Florida was separated into two major production regions: Region 1 (northwest Florida, including the Big Bend/Levy County area) and Region 2 (all other areas of the state, including southwest Florida and the Indian River areas). For Region 1, the total economic impact was estimated to be \$36.1 million, including \$24.1 million in value added revenue, \$20.7 million in labor income, \$2.4 million in property income, \$950,000 in indirect business taxes, and 460 jobs. For Region 2, the total economic impact was estimated to be \$7.8 million, including \$2.4 million in value added revenue, \$2.2 million in labor income, \$160,000 in property income, \$79,000 in indirect business taxes, and 50 jobs. Due to the movement of product between the two regions and outside of Florida, the regional values are not additive. In fact, note that the sums of the two regions' values are less than the total values for the state.

A final report will soon be available from the University of Florida. The report will contain more detail than presented in this brief newsletter summary. For more information, contact Chuck Adams at cmadams@ufl.edu.

New Informational Resources Available

The Role of Dissolved Oxygen In Hard Clam Aquaculture

This publication is the latest in a series addressing environmental factors that affect hard clam production in Florida. Topics include: what is dissolved oxygen, how is it measured, why is it variable, how does it affect clam physiology, and what are signs of oxygen stress. Information is provided on how to manage crops in response to oxygen. This EDIS publication, and those addressing water temperature and salinity, are available online at <http://edis.ifas.ufl.edu>. Click on Topic Areas, Crops, Aquaculture, and then Clam.



References for Clam Seed Suppliers

Useful references on clam hatchery, nursery and algae culture, as well as water quality parameters have been compiled and are available on a CD-ROM. Recent manuals published by FAO on bivalve hatchery culture, installation and operations are included. For a copy, contact the UF Shellfish Extension Office.



Food for thought in 2009 (continued from page 1)

But will they continue to eat the bounty of aquaculture—salmon, oysters, clams or shrimp? As our population continues to grow, increase in food consumption will inevitably ensue.

The main concern for seafood producers and vendors is credit. The wild fishery has traditionally been conducted on a cash basis. But aquaculture product is generally sold on credit. In a situation when lines of credit are in jeopardy or vanishing all together, how do we cope? We cope by being better account managers. Tolerating clients who take 45 to 60 days to pay may be a thing of the past. This economic crisis gives us a great excuse to enforce terms. Where courage was lacking before in pressuring customers to pay on time, we now have no choice but to demand faster payment.

Investors may now shun the automotive, banking, real estate, oil and dot.com industries. Where can they invest? In a bull market investing in industries in which you don't have a firm grasp is standard. In a bear market it is safer to put your money in tangible business that you have experience with. Everyone has experience with food. The food industry will become a safe haven for investment. There may be more interest in our field of business by investors than ever before.

Now is not the time to believe you have no control over the economy or success of the aquaculture industry. Rather, thinking what you want to is the most empowering thing you can do for the success of your business.

This advice was excerpted from an editorial by Patrick Warren in *Cultured: Global Aquaculture Newsletter*, January 2009, Smokey Bay Seafood Group, www.smokeybay.com.

CLAMmunications

Statewide Clam Industry Task Force Meeting

Wednesday, March 18, 10:00 AM—1:00 PM

DACS Division of Aquaculture, Tallahassee

A joint meeting is planned with the Oyster Task Force to discuss common topics, such as Interstate Shellfish Sanitation Conference representation, issues for the next ISSC meeting in May, and legislation for tax assessment of working waterfront properties. Additional agenda items can be submitted by task force members to the DACS Division of Aquaculture, call (850) 488-4033. The spring meeting coincides with the Florida Farm Bureau's annual legislative reception on March 17, 5 PM at the Tallahassee Civic Center. Visit www.floridafarmbureau.org, for more information.

Shellfish Code of Practice Meeting

Friday, March 20, 3:00-5:00 PM

Senator Kirkpatrick Marine Lab, Cedar Key

The East Coast Shellfish Growers Association is developing model Best Management Practices to assist the shellfish aquaculture industry. They have had a series of meetings already in the Northeast to solicit input about how industry in the various states works and how issues have been addressed. This meeting will allow Florida growers to participate in the process. The anticipated outcome is a grower-generated Code of Practice that could be used to promote/protect the industry.

NSA's 101st Annual Conference

March 22-26 Savannah, Georgia

The National Shellfisheries Association (NSA) begins its second century with a conference featuring sessions on 24 topics and many social events. Go to <http://shellfish.org> to register.

Romancing the Clam

Monday, March 23, 7-9 PM

Bryson Hall, Savannah, Georgia

A special evening is being hosted by the East Coast and Pacific Coast Shellfish Growers Associations to coincide with the kick off of the NSA annual meeting. Participants will have the opportunity to sample an array of clam dishes, including hard clams/quahogs, manilas, and geoducks, prepared by some of the country's top chefs. The whole idea behind the event is to encourage the eating of sustainably farmed clams. Chefs will be filmed preparing clams in a variety of regional dishes, and the DVD and recipe cards will be distributed to seafood dealers nationwide as a marketing tool. Chef Peter Stefani from The Island Room in Cedar Key will represent Florida. Food writers will join in tasting the dishes and help "spread the word." In addition, the Cedar Key Aquaculture Association and the University of Florida will oversee a professional taste characterization of raw clams from different regions. Visit www.ecsga.org for details.

A listing of 2009 clam seed and bag suppliers can be found on page 3 of this newsletter.

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