California
Aquatic Farming
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www.caa-aqua.org
Fall 2001

AQUACULTURE AMERICA TOURS 2002

The California Aquaculture Association (CAA) will sponsor four tours at Aquaculture America 2002. These tours offer an opportunity to visit a wide variety of aquaculture facilities at a very reasonable price. Proceeds will be used support the activities of CAA.


Fish Producers, Inc.

TOUR # 1
Baja California (Mexico)

Sunday, January 27, 2002

This full-day tour will take you to the Instituto de Investigaciones Oceanologias at the Universidad Autonoma de Baja California located in Ensenada, Baja California, MEXICO. The objective of the institute is to conduct research related to the optimal use of marine resources. Mariculture research at the institute includes reproduction, nutrition, and commercial production techniques for many different marine organisms.

Current aquaculture research projects include repopulation of the *Totaba Macdonaldi*, an endangered species of fish to the Gulf of California. Additional studies are being conducted on oyster, shrimp and other invertebrates.

There will be a 2 hour stop in town. You are on your own for lunch and site seeing.

Buses leave at 8:oo a.m. and will return at 6:30 p.m.

Cost for this tour is $75.00 *continued on page 3*

Dedicated to furthering the success of commercial aquaculture in California.

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Editorial

It has been - and no doubt will remain for a while - a challenge to promote California aquaculture due to our unparalleled diversity. We have over 20 species of fish, shellfish and plants. For many of these species there are different markets and products, mostly what we would call "niche" markets. Our catfish, bass or trout may go to live markets, be sold wholesale and processed or be used to stock private paylakes or the urban fishing program. The abalone markets may be local or all the way across the Pacific Rim. We produce eggs, fry, fingerlings and spat — all for a variety of customers. As a result, we have as many markets as products, and that is the challenge!

Over the past several years CAA has embarked on a series of marketing and promotion efforts. These have included working with Ag in the Classroom, supporting booths at the State Fair and Orange County Fair. We have an exhibit at the Anderson Welcome Center and we have joined forces with the California Seafood Council to promote sturgeon. Because of our diversity, we have, however, not yet developed a targeted marketing campaign for each of our main species. As a result most growers have to raise and market their fish.

The "Buy California Program" recently launched by California Department of Food and Agriculture Secretary Bill Lyons may be the very help we need. Intended to help specialty crops like ours, the "Buy California" program will create a multicommodity generic marketing campaign revolving around the development of a California brand that depicts quality and encourages increased consumer purchases. The program intends to include the majority of organized California agricultural products by the year 2005 and has set annual assessment rates based on the crop values. The program will seek state general fund appropriations.

All aquaculturists are urged to learn more about the program through CAA or CDFA. The contact details are provided on page 9

Perhaps this program will help us be the fish basket - not just the bread basket - of the nation.

MARK YOUR CALENDARS!

CAA to host the 2002 Aquaculture America January 27 - 30, 2002

Another world-class convention with stimulating speakers and fascinating tours will make this the aquaculture event of the year.
For more information contact John Cooksey at 760-432-4270 worldaqua@aol.com

January 27 - 30, 2002
Town and Country Resort
San Diego, California
800-772-8527
619-291-7131

Pacific Aquafarms

TOUR # 2

AQUACULTURE AMERICA TOURS 2002

SUNDAY JANUARY 27, 2002

Leon Raymond Hubbard, Jr. Marine Fish Hatchery, Carlsbad:

Hubbs Sea-World Research Institute operates this research/production facility, which is primarily funded by the California Department of Fish & Game's Ocean Resources Enhancement and Hatchery Program. White Seabass are spawned and the fry are reared to fingerling size, then transported to near shore based net-pens operated by non-profit groups, where they are reared until they are released into the ocean. Work is also conducted with California halibut, giant seabass and other marine species.

Scientific Hatcheries, Huntington Beach:

Scientific Hatcheries is an internationally known, closed cycle hatchery located in an industrial building in Huntington Beach, California. Both fresh water and marine animals are produced in high performance, automated recycle systems. Most of the 15,000,000 fish produced and sold per year go into the ornamental fish market with some production for the research and aquaculture markets.

Buses will depart at 8:00 a.m. and will return at 4:30 p.m.

Earthrise Farms

Cost for this tour is $75.00

TOUR # 3

AQUACULTURE AMERICA TOURS 2002

THURSDAY JANUARY 31, 2002

Imperial Valley Farm Tour

This full-day tour will take you to the Imperial Valley, located approximately 100 miles east of San Diego. It is a low desert area containing the south end of Salton Sea and one of the most productive irrigated farming areas in the world. Most of the area lies below sea level. It's hot in the summer with air temperatures peaking near 49 C. (120 F.). Winters are mild with an average rainfall of about 2.75-inches a year.

Mild winters, availability of relatively low cost Colorado River water, low temperature geothermal water, cloudless days, and the area's proximity to large markets has attracted several aquaculture operations to the area.

Pacific AquaFarm, Inc.:

A fish hatchery and grow-out facility that utilizes 140 F geothermal water to produce tilapia for live food fish markets. Pacific AquaFarm, Inc. coordinates the marketing and distribution of its live product with Fish Producers Inc.

Fish Producers, Inc. (Fish Partners):

A channel catfish and blue catfish hatchery and grow-out facility that produces and distributes over 1 million pounds of catfish for the live food fish and recreation fish markets. Production units consist of both ponds and a recirculating concrete raceway.

Earthrise Farms:

Produces Spirulina, a blue-green micro-algae containing a rich source of amino acids, pigments, vitamins, and growth factors. The 105-acre site utilizes plastic lined oval ponds for production. Processing and manufacturing facilities are on site to dry and process the product for sale as a food dye, human diet supplement, animal feed, and for the pharmaceutical industry. Earthrise Farms is a subsidiary of Diapon Ink and Chemicals, a large Japanese trading company.

Imperial Irrigation District:

A hatchery and production facility for triploid grass carp, which are released into the District's canal system for aquatic weed control. The Imperial Irrigation District's extensive canal supplies irrigation water to about 500,000 acres of farmland in the area.

Busses depart at 7:30 a.m. and return at 6:30 p.m.

Cost for this tour is $75.00

Aquaculture America Tours

TOUR # 4
AQUACULTURE AMERICA TOURS 2002
THURSDAY JANUARY 31, 2002

Coachella Valley Farm Tour

This full-day tour will take you to the San Gorgonio Pass area and Coachella Valley, which are located approximately 100 miles northeast of San Diego. This foothill and low desert area drops from over 2000 ft. above sea level to -235 ft. below sea level. The valley contains the north end of the Salton Sea and the surrounding highly productive irrigated farming area. Many tree and vine crops as well as vegetables are produced here. It's hot in the summer with air temperatures peaking near 49 C. (120 F.). Winters are mild with an average rainfall of about 3-inches a year.

SeaGreen Bio:

This intensive production facility was designed and construction with minimal capital input in mind. One pump and an innovative liquid oxygen injection system provide water flow and oxygen for the entire facility. Current production is approximately 300,000 pounds per year of tilapia, catfish, and hybrid carp for the live food fish markets of coastal California.

Kent SeaTech Corporation:

Kent SeaTech Corporation (KST) is the largest (and the first) of approximately 100 hybrid striped bass producers. KST employees a staff of about 85 and produces over 3-million pounds per year. California Farmed Striped Bass® are shipped in the round on ice to markets scattered across USA. Live hybrid striped bass are also sold to the live food fish market in southern California. KST's high density tank production system employees a unique recirculating water treatment system which utilizes fish-based solids removal, low-energy nitrification reactors, and constructed wetlands to reduce solids, ammonia, carbon dioxide, and nitrate, while restoring alkalinity and moderating summer water temperatures. Discharge water is used by adjacent agriculture operations to irrigate farmland.

Whitewater Trout Company Inc.:

This rustic trout facility is located in the spring-fed Whitewater Canyon in the foothills of the San Bernardino Mountains. Spring water and well water flow through circular tanks, which serve as production units. This integrated production and marketing company sells trout in its own onsite

restaurant and recreational fishing lake and delivers trout to fishing lakes throughout southern California.

Buses will depart at 7:30 and return at 6:00
Cost for this tour is $75.00

CAA Website Under Construction

With the assistance of webmaster Randy Reed of Reed Mariculture and CAA Board member, CAA is in the process of building its own website: www.caa-aqua.org. CAA's homepage has been hosted by Dr. Fred Conte, the extension officer at U.C. Davis website for the past several years.

The CAA site will contain information on CAA activities, Board members and publications. The U.C. Davis site will continue to be the primary source on aquaculture in California and beyond. Check us out at www.caa-aqua.org, and share your comments and suggestions with us.

Nation at a Glance

US seafood trade deficit was a record-setting $7.1 billion in 2000 (16% over 1999). The value of US seafood imports rose 12% to $9.9 billion. US exports increased slightly to $2.83 billion. Canada is the leading exporter to US, Thailand is second, and China is third. (Seafood Market Analysis).

United States Trout Farmers Association has released a color pamphlet titled: "Trout ...Treat yourself-it's as good as all outdoors!". For copies, contact www.ustfa.org or USTFA, 111 W. Washington St., Ste.1, Charles Town, WV 25414-1529.

The Aquatic Animal Task Force studying the eligibility of organic labeling for seafood rejected wildfish eligibility but recommended a federal labeling program for some farmed fish. The task force decided that farmed fish raised under certain guidelines should be eligible if the total feed ration included less than 5% nonorganic fishmeal and fish oil. Wildfish were rejected because there is a lack of producer management, continuous oversight, and discretionary decision-making that are characteristic of an organic system, simply put, we don't know where they have been or what they have eaten.

Fish imported from Vietnam fraudulently labeled as catfish in order to mislead the American consumer into thinking that it is the native channel catfish that is farm grown and processed in USA is showing up in the marketplace. Although US Food and Drug Administration (FDA) has determined that the proper label for the fish is basa, bocourti, basa catfish or bocoourti catfish, the regulation is being ignored. Unfortunately FDA, US Customs, and other law enforcement agencies have failed to aggressively enforce mislabeled, misbranded seafood regulations regarding this fish. The economic adulteration of this imported fish is unlawful and creates unfair competition that harms the USA catfish industry, and may turn people away from eating catfish if they unknowingly purchase an inferior product. Rep. Mike Ross of Arkansas has introduced a bill that would require all farmed fish to have a country-of-origin label at the point of sale.

Legislation introduced in Louisiana Legislature (Ellington & Smith) proposes to require country of origin labeling for catfish, define farm-raised (will exclude catfish reared in cages or other enclosures in natural streams or rivers), and provide for other related matters.

A proposal to give USDA's Animal and Plant Health Inspection Service equal authority with the U.S. Fish & Wildlife Service to manage and take migratory birds, S.B. 909, was introduced by Senator Blanche Lincoln (AR). Currently archaic laws relating to depredation permits require USDA's Wildlife Services to assess the need for depredation control and make recommendations which are forwarded to U.S. Fish & Wildlife service which collects a fee and issues a permit. Frequently Wildlife Services' recommendations are ignored and U.S. Fish & Wildlife Services sets arbitrary numbers for allowed take and inappropriate conditions in the permit.

Alaska Department of Fish & Game (ADFG) recently banned on-bottom aquatic farming in Kachemak Bay. The Alaskan shell fish industry is threatened by additional regulations being proposed by the ADFG. Already, farming of fin fish is prohibited, and ADFG has been stalling when it comes to issuing permits for shellfish operations.

Florida's' Department of Agriculture and Consumer Services has 56 projects fully funded by the state legislature. Source of funding is $2,871 from General Revenue Funds and $1,143,283 from the General Inspection Trust Funds. Additionally the Legislature funded (Specific Appropriation 1417) the following projects: Tropical Aquaculture Marketing, $200,000; Collier City/Pompano Beach Aquaculture, $250,000; Statewide Shellfish Aquaculture Extension Program, $120,250; Florida Aquaculture Extension Program, $89,166. In part through support from the Florida Department of Aquaculture & Consumer Services, aquaculture has grown from total sales in 1987 of $35 million to sales of $110 million in 1997. (Florida Aquaculture Association, 6-01).

Several companies, including Costco and Legal Sea Foods, have announced they will only handle oysters that have been processed to destroy Vibro.

Pacific Coast Shellfish Growers Association's "Environmental Codes of Practice" second draft recently underwent public review and may now be available (www.pcsga.org).

Oldways Preservation & Exchange Trust has organized a multi-year project titled Water Farming

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Initiative(WFI). WFI's three main objectives are: (1) Present correct and science-based information about aquaculture; (2) Establish a level playing field for aquaculture and its future sustainable expansion; and (3) Change public perceptions and public policies about aquaculture through ongoing public educational programs. WFI, together with National Fisheries Institute, will sponsor a conference on November 4-6, 2001, at the Renaissance Harbor Place Hotel in Baltimore, MD. Oldways Preservation & Exchange Trust is a nonprofit educational organization that promotes healthy eating, sustainable food choices, and preservation of traditional foodways.

Louisiana crawfish farmers won class action status in a legal effort to collect damages from Aventis CropScience and a group of seed distributors. The crawfish farmers claim a pesticide called fipronil (Icon trade name) used to control the rice water weevil was toxic to crawfish. The further claim Icon breaks down into substances that bind to the sediments where crawfish live and feed and that these substances have leached into the soil and possibly the ground water used for irrigation. The farmers claim Icon was responsible for the virtual destruction of their 1999 crawfish crop.

USDA"s Agricultural Research Service recently provided data to FDA showing that potassium permanganate and copper sulfate are effective therapeutic agents and treatment with these chemicals do not pose a hazard to people who eat farm raised fish.

North Carolina Sea Grant researchers are investigating polypeptides called histone-like proteins (HLPs) found in fish under stress for their potential use in monitoring fish health. By monitoring HLP levels in the skin, they hope disease problems can be detected before they become catastrophic. This may lead to low cost test for fish stress.

French researchers are warning an oyster herpes virus may prove to be devastating to the industry. There have been massive mortalities in Pacific oyster larvae and spat in France and various species of oysters in New Zealand. The virus may also affect the Eastern oyster, *Crassosstrea virginica*. Over 1000 diagnostic tests of oysters from the east and west coast of USA have failed to detect the virus. Both France and New Zealand oppose the designation of the disease as being notifiable by international animal health advisory organization. Why? Without documentation, they claim the virus is essentially ubiquitous.

Zebra mussels in an aquarium that were exposed to very low-frequency electromagnetic waves - around 60 hertz, or similar to what is emitted by a power outlet - died within 40 days, according to a study conducted by undergraduate students at Purdue University-Calllumet in Hammond, Ind. The irradiation appeared to cause zebra mussels to lose large amounts of calcium - essential for shell health and muscle control - as well as sodium and potassium. Only 10% of the unexposed mussels in control test died after 40 days. During the experiments, fish held in the same water survived. Native clams did not die until after 90 days of exposure. The hope is this knowledge can be used to apply wave technology to intake pipes and other structures to control zebra mussels without harming other wildlife. (AP)

Maryland became the first state (mid-April) to ban the farm-raising of genetically modified fish unless they are raised in ponds or lakes that do not connect to other state waterways. The law also requires growers of GM's to take steps to prevent spread by birds or other means. While this was happening, the Norwegian Fish Farmers' Association issued a statement supporting efforts by Greenpeace to ban the raising of GM fish.

In May, 2001 the White House announced it planed to begin serving some genetically modified (GM) foods at official government functions. The move was intended to head off criticisms by environmental and consumer groups that the altered foods are unsafe. Dinner fair is expected to include super salmon, Star Link corn, and other genetically modified foods.

Aqua Bounty Farms petitioned FDA to approve a GM salmon with a gene which allows the fish to reach maturity and full size more quickly than wild salmon. Aqua Bounty Farms says the GM female salmon will be sterile, to prevent reproduction. FDA has received over 60 requests for a moratorium on all GM fish.

A Gulf of Mexico sea urchin *Lytechinus variegatus* may have great potential for a fishery and for aquaculture. It grows rapidly, reaches gonadal maturity in less than one year. Researchers measured roe production in adults fed two formulated diets for a period of 10 weeks in the laboratory. "Gonad production in the sea urchin *Lytechinus variegatus*, fed prepared diets", S.A Watts et al., Journal of Shellfish Research, 17(5):1591-1595, 1998.

California at a Glance

California recently joined 48 other states that fully or partially exempt farm equipment sales from state sales tax, removing a significant disadvantage faced by California farmers. The tax equity bill (AB426, Cardoza) removed state sales tax on farming equipment and timber harvesting equipment, diesel fuel used in food production, delivery of farm products, and processing of farm products. Propane used for farm operations and rural household uses is now exempt from all sales tax. You must file a certificate of eligibility with vendors. Only the state sales tax is exempt, county & city sales tax is not exempt on equipment. The legislative effort was led by California Farm Bureau Federation and numerous other farm organizations.

California Sea Grant during funding cycle 1999-2000 received a total of $8,031,340. 67% of the funds came from the federal government, the rest from state sources. Aquaculture and fisheries projects received $923,531 (12%), the rest; Coastal Ocean (25%), Extension (14%), Education (13%), New Marine Products (12%), Management (10%), Program Development (6%), Communications (5%), Ocean Engineering (2%), and Marine Affairs (1%).

Monterey Bay Aquarium will take its "Seafood Watch" campaign nationwide. They will distribute wallet cards by mail and its Web site. These wallet cards categorize species common to West Coast consumers as "best choices," "proceed with caution", or "avoid" based on environmental consciousness. The National Seafood Institute (NFI) claims "Seafood Watch" and other eco-guides are 'full of overgeneralizations and inaccuracies. NFI plans to release its own fact sheets of the most popular species addressing overfishing, bycatch, and habitat protection concerns this Fall.

The annual mitigation report for the "2000 State Water Project mitigation losses (5-year average) calculated by DFG were 370,281 striped bass yearling equivalents, 157,096 salmon smolt equivalents, and 9,717 steelhead yearling equivalents. The actual annual calculated loss increased in 2000 moderately for all three species. The Department of Water Resources will replace an estimated 1.3 million striped bass, 1.1 million salmon smolts, and about 50,000 steelhead yearlings in 2001 through Four Pumps projects. There are no remaining obligations through 2000 for the three species. DWR is now about 1 million fish ahead in striped bass mitigation, 1.9 million ahead for salmon, and about 130,000 ahead for steelhead." Source: Minutes of the Delta Pumping Plant Fish Advisory Committee Meeting (1-10-01).

A proposal to gillnet wild trout from 16 High Sierra lakes to save mountain yellow-legged frogs was announced in April, 2001. This was followed by a Finding of No Significant Impact by the Park Service in June for the project. This action allows the Park Service to avoid doing a comprehensive Environmental Impact Statement. Trout are not native to many High Sierra lakes, they were introduced by DFG.

DFG still seems intent on building a new Tuolumne River Fish Hatchery and is still calling for the expenditure of funds to that end. The proposed hatchery has received a lot of opposition from the scientific community, various government agencies, and Tuolumne River Technical Advisory Committee (TRTAC). Although all members of the TRTAC reached an agreement, "TRTAC Smolt Survival Study Fish Agreement," DFG management elected to not sign the cover memorandum used for filing the agreement (this does not affect the legally binding nature of the agreement under the FSA. A recent DFG Status Report implies that an existing Toulumne River Rearing Facility (TRRF) does not exist. DFG abandoned use of the TRRF in 1995 (about the same time DFG proposed a new salmon and steelhead hatchery on land purchased near La Grange with Four-pumps money). Since then the Turlock Irrigation District and the Modesto Irrigation District have repeatedly asked DFG to fulfill its obligations under the 1993 Agreement to use the TRRF. DFG has cited vague operational and safety concerns with the TRRF but has yet to provide a list of specific concerns as requested. Source: Notes (and attachments) of the Delta Pumping Plant Fish Advisory Committee Meeting (5-17-01).

Aquaneering, Inc. (Mark Francis) was featured in a two page article in the March/April 2001, Fish Farming News magazine.

California farm-raised caviar was the subject of a two page article in the May 2001 issue of The Aquaculture News (original article in the Los Angeles Times).

Getting to know you...

An Interview with CAA Board Member David McHone of PV Ranch Company.

CAA: David, tell us a little about your farm.

McHone: At this time we are raising only catfish in earthen ponds. Our product goes to wholesalers. It's quite intensive — 10,000 fish per acre and we are not using any liquid oxygen--we produce oxygen through towers, as the graivty drains from one pond to another. We have about 25 acres in ponds. Our water comes from snow melt. The flow is around 1,200 gallons per minute.

CAA: What about your discharge?

McHone: All the discharge goes to our avocado and orange groves.

CAA: What make your farm unique?

McHone: Maybe not unique, but quite advanced. We are very intensive - we feed 4 to 5 times each day. We are also highly computerized. The whole farm is digitized and we can virtually run it from Newport Beach.

CAA: Before we go on with that, who all is "we"?

McHone: It's a family business. My father and I work from Newport Beach and my brother lives on the farm.

CAA: Feeding 4 to 5 times a day must be a big job.

McHone: Yes, but we have 70% of the ponds on automatic feeders. We are working to automate the rest. The computer monitors the entire farm and we can view and check on each pond on the grid.

CAA: What are your biggest challenges facing your farm.

McHone: Getting the greatest density and fastest growth.

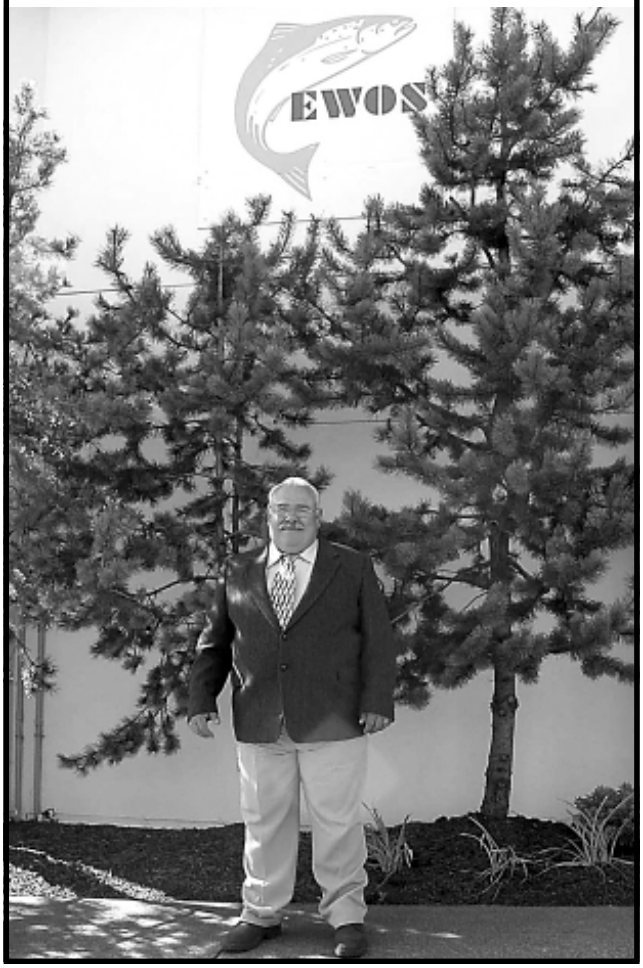
CAA: Do regulations impede your production?

McHone: Complying with all regulations comes with a cost. I would like to see Fish and Game open up some additional species that are currently restricted in the Central Valley.

CAA: What are your plans for the future?

Mchone: Keep on improving what we have. We need to fully automate, to improve densities and expand species mix. I would also like to explore being certified organic. At this point we are not able to call ourselves organic because of the feed. We may need another definition or label for products that are essentially organic, but that use feed that would not qualify. This is perhaps something CAA could work on.

EWOS Canada Limited is pleased to announce the appointment of Robert M. Lockhart, pictured below, as EWOS' Hatchery Specialist/ Fish Feed Sales Representative for the States of California and Oregon. Robert comes to EWOS with an extensive background in trout husbandry as General/ Hatchery Manager for his own family-owned fishing resort. His Bachelor of Science in Business Administration and successful business management will give him insight into the needs of both his commercial and enhancement hatchery customers in California and Oregon. We are very pleased to have him join our team. For more information about EWOS fish diets please call 1-888-673-9993.



Buy California Campaign

Pursuant to its powers under Division 21 of the Food and Agricultural Code of the State of California, the California Department of Food and Agriculture has launched the "Buy California Campaign". The goals of the program are:

1. To increase awareness and consumption of California agricultural products among California consumers;
2. To create a multicommodity generic marketing campaign revolving around the development of a California brand that depicts quality and encourages increased consumer purchases;
3. To use the California brand to create a point of differentiation for retailers and consumers during competitive periods;
4. To create a multifaceted campaign that reaches consumers with California brand messages in the many places they get information about food, health, nutrition and lifestyle;
5. To fund research as needed to develop and evaluate said program; and
6. To have most organized California agricultural products involved in the program by 2005.

The assessment for members is likely to range from $7,500 for commodity groups representing products sales valued less that $100 million FOB to $50,000 for commodities with FOB in excess of $1 billion.
The program is still in its formative stage, but additional information is available through CDFA Marketing Branch, 1220 N Street, Sacramento, CA 95814 or by calling (916) 654-1245.

What…not yet a member of CAA!?

We need you just as much as you need us…
Anyone and everyone interested in aquaculture is encouraged to join CAA. For as little as $50.00 per year you can join the wave of the future. Check out our website at www.caa-aqua.org to view CAA's Mission and activities and find out how to join today!

Business Developments

In October of this year, Chicken of the Sea will close its San Diego tuna cannery. In recent years, the cannery processed about 100 tons of tuna and salmon daily and has annual sales exceeding $400 million. This was the last full-scale tuna cannery operating in USA. Chicken of the Sea will now do all of its canning in American Samoa.

California Desert Fish Farm, a tilapia producer utilizing geothermal water near Niland, CA, ceased operation in September, 2001. Federal Bankruptcy Court agents quickly sold the fish inventory and began procedures to dispose of other assets.

A & A Fisheries recently expanded their operation by leasing a 60 acre catfish farm, formerly operated and developed by Shasta Fins Inc., near Red Bluff. Kieth Provence, Ralph Arrowsmith, and John Gardner are the principals in A & A Fisheries.

PEW REPORT RELEASED

Marine Aquaculture in the United Sates - Environmental Impacts and Policy Options was prepared for the Pew Oceans Commission by Rebecca J. Goldberg, Matthew S. Elliott, and Rosamond L. Naylor. The report examined the role of aquaculture in meeting the nation's demand for seafood and its current and potential impacts on the marine environment.

Leon E. Panetta, chair of the independent Pew Oceans Commission and former White House chief of staff stated "The reality today is that aquaculture is supplying a significant source of protein to consumers as wild ocean fisheries are depleted or reach their limit." Dr. Goldberg said "Aquaculture is here to stay. The change is to ensure that this young industry grows in a sustainable manner and does not cause serious ecological damage." The authors conclude that "present harmful effects of U.S. aquaculture on the marine environment are minor compared to overfishing, coastal development, or global warming." The report calls for support of aquaculture development and the implementation of best management practices. Copies of the report are available online at www.pewoceans.org or by calling 703-516-0624.

Crop Insurance Update By: Kirk Kindelt, CAA Endorsed Insurance agent

Federal Crop Insurance for aquacultural species is certainly a topic of interest these days. I recently navigated my way through the phone lines of the USDA's Risk Management Agency (RMA) and came up with the following information that I hope will be of some help.

The only aquaculture insurance program currently in place is a pilot program for cultivated clams in Massachusetts, Virginia, South Carolina, and Florida. It is a three-year program that is about to end its second year. To date, the results are encouraging.

Year	Total Liabilities	Total Premium	Total Losses
2000	$36,478,461	$1,136,901	$1,518,105*
2001 (YTD)	$28,411,400	$ 908,131	$ 214,004

*$1,410,221 of the losses were a result of one storm in Florida

At the end of the program's third year, the RMA regional divisions overseeing the project will make recommendations to their national office. This will include whether or not to convert it to a regulatory program, and if so, with what changes. According to Cliff Parker, Deputy Director of RMA's Raleigh, NC office, one of the offices monitoring the program, the prospects look good so far. "The USDA definitely has an interest in aquaculture, and therefore, I think the clam program will continue as a regulatory crop," said Parker.

The USDA's interest in aquaculture may be somewhat proven by the recent partnerships and funding to study the feasibility of insuring catfish, salmon, trout, and baitfish. On September 30, 2001, funding was put in place and partnership agreements were made with universities such as Mississippi State University, among others, to conduct the four-year study. The project will initially focus on the feasibility of insuring these four species, but will likely expand to include others according to Charles Naglich, National Coordinator for Product Development at RMA's National office. " We looked at data from the National Agricultural Statistics (N.A.S.) and took the top four species based on production and value to start with," said Naglich. The project is funded for four years, however, the various delivery dates have yet to be determined. Because of this some of the results could be implemented prior to its four-year conclusion.

As for what is currently available to California producers, you have two options, the Noninsured Crop Disaster Assistance Program (NAP) and private insurance.

NAP is a USDA product that is available for crops that are currently not insurable. It provides very limited coverage. NAP will basically cover the amount of a loss greater than 50% of the producer's predetermined yield. It will pay out at 55% of the average market value. So, the producer can only hope to get 55% of any losses greater than 50% of his/her crop. The good news with NAP is it is inexpensive...as low as $100. For more information on NAP, or to sign up, you can contact your local Farm Service Agency office.

Private insurance, although much more expensive, is available through our agency, Wraith, Scarlett & Randolph. It covers a producer's stock at a limit and for species determined by the producer. The producer also chooses what perils they want covered. Electrical breakdown, mechanical breakdown, deoxygenation, contamination, flood/drought, earthquake, structural failure, freezing, disease, and adverse chemical constituents are the choices. Rates usually range from 2% to 5% depending on the species, perils, limit, protective safeguards, etc. For more information on this product you can contact me at (530) 662-9181 or kirkk@wsrins.com.

Finally, if the ultimate conclusion is to have affordable federal coverage for every aquaculture species in every state, then your voices need to be heard. Everyone I spoke to agreed that this can best be accomplished by every member writing to their congressmen and senators...quarterly!

Abalone Industry Status by H. Roy Gordon, FISHTECH, Inc.

The wild crop

The data available as to the size of the abalone industry, both capture and culture fisheries have long been considered to be 'inadvertently misleading'. The opening speech of the 4th International Abalone Symposium at Cape Town, South Africa last year addressed this situation. Delivered by Roy Gordon of Fishtech Inc. and called the Gordon Report, it 'standardized the production and export information for both the commercial catch and cultured product' to give, for the first time, an overview of the world situation and the implications to the industry of current trends, especially 'the challenges of sustaining world demand at premium prices'.

One of the major distortions has been the tendency of some countries to roll all their different styles of market presentation into an aggregate figure so that shell-on and shucked abalone are given the same 'weight value'. Roy Gordon has adjusted these figures to reflect the "shell-on" weight of the abalone and provide the industry with comparative data that measures 'apples against apples'.

These amended figures show that over the past 10 years, the world abalone fishery declined 30% more than previously thought as the 1989 catch was amended upwards to 14,830 tonnes (against the reported 12,995 tonnes). The 1999 catch was estimated at the time of the report as 10,150 tonnes, a decline of nearly a third.

The figures do not include the recreational or illegal catch but do include seeded reaches of the sea bed and seeded artificial reefs. The significance of the illegal catch, whether poached or over quota animals, was considered but not quantified in the survey: 'to discuss the topic of World Supply without consideration to the illegal catch would be grossly misleading'.

Australia, with an estimated crop of 5,500 tonnes made up more than half this figure. As an indication of good joint management of the resource by the fishing industry and government resource management agencies, the dive sector increased by approximately 500 tonnes per annum over the decade covered. New Zealand fared even better with an estimated 25% increase from 1,000 tonnes a year in the same period.

By comparison, the previously strong capture fisheries of Japan and Mexico have more than halved to an estimated 2,100 and 1,100 tonnes respectively.

The cultured crop

According to the Report: 'while the Abalone Fisheries declined 30% Cultured Abalone production increased over 600%!'. From an adjusted 1,220 tonnes in 1989 to an estimated 1999 crop of 7,775 tonnes, the culture fishery is rivaling the output of the dive industry and with the wild harvest unlikely to increase dramatically in the foreseeable future, should overhaul it soon as the major supplier of abalone to the world.

With abalone being so sought after in China, Taiwan and Japan it is not surprising to see these countries, all with established and successful aquaculture industries, dominating the cultured crop. In 1989 they produced 250 tonnes, 600 tonnes and 750 tonnes respectively. The estimated crop for 1999 for the three nations was 3,500 tonnes, 3,000 tonnes and with Japan the only one of the three main players to slip in production, to 500 tonnes.

Starting from a low base, in most cases negligible production from pilot projects, abalone growers from the USA, South Africa, Mexico, Chile and Australia have made a small but significant contribution to the world crop. Now, with their industry infrastructure and management in place, they are now set to expand their production.

The markets

The marketing dynamics have also shifted. While between them China and Taiwan produced 75% of the farmed crop, they have also become major consumers. Roy Gordon says "Just a few years ago, the majority of the abalone farming production in China was designed to export this premium product to Japan and elsewhere. Today,

virtually all 3,000+ tonnes of China's abalone production is consumed internally".

The Report however sounds a warning to the abalone industry, be it culture or capture fishery. 'In effect, after shrinkage and canning cost, a USD20 tin of 252g meat equates to an "in shell" price as low as USD12 per kilo. Without the continued development of premium product and brand name tins, canned abalone will remain as a commodity with relatively lower prices'.

Roy Gordon concluded by pointing out some of the choices confronting an industry that appears set to make the dramatic shift from growers of a highly prized product to world commodity based food producer (with all the attendant economies of scale and logistic input). In spite of this, the Report goes on to say, 'abalone will never become a low cost food, however effort and promotion will be needed to maintain the highest market pricing levels'.

Under the heading 'Break Away from World Pricing', the Report said 'If you are responsible for larger quantities of abalone, whether fished or cultured, you have some important choices to consider.

- Continue the selling pattern:
- Develop premium market for export and within the exporting country
- Brand name product
- Multi functional processing and packaging
- Sous Vide and "skin packed" fresh and frozen
- Direct approaches to DWE's (distributors, wholesalers, major end users)'.

'To continue the current selling pattern, is to continue selling into a market driven predominantly by Asian demand with prices varying according to species, size and supply. These prices tend to equate on an "in shell" basis worldwide. To break away from what the Report calls the "price equation" would require the implementation any of the indicated strategies.

The demand

In 1975 the supply and demand were reasonably equal. The Report suggests an adjusted total of 24,000 tonnes or more. At any rate 'there was no major shortage of product forcing a demand/supply (im)balance'.

By 1999 the supply was 13,000 tonnes (not including Haliotis supertexta not a factor in the 1975 demand) and the potential demand remains at over 20,000 tonnes, leaving a potential shortfall of 7,000 tonnes.

The 2004 supply is estimated at 15,000 tonnes (again, excluding H. supertexta) leaving a potential shortfall in excess of 5,000 tonnes.

Product trends

Like many wild fish species that have been domesticated, the 'market size' for abalone has increased as production methods improved and the average individual size of the animals farmed increased. For instance: 10 yeas ago a 70mm abalone was considered 'market size'. Today it is closer to 90mm and animals of 120mm are likely to be requirement in the future.

The Report looks ahead to the year 2004. It expects the 'abalone fisheries to remain fairly flat at the 10,000 to 11,000 tonnes levels, while cultured abalone farms are anticipating very substantial increases. Political, environmental and pathological events will, of course, have some unknown impact on world abalone supply'.

In an appeal to industry attendees at the Conference, Roy Gordon said 'outside of the Asian world, the desire for this "caviar in a shell" priced animal will be directly related to our industries quality effort in the marketplace. Among other things, this should include Sous Vide preparations, brand identification, sophisticated processing facilities and unique DWE programs.

'For the sake of our own and future generations, we must do a better job of protecting the world's abalone fisheries, however it is the cultured abalone industry that must not only expand production, it must put forth efforts to assure a continual world premium market'.

H. Roy Gordon can be contacted at FISHTECH Inc, Box 6886, San Rafael, California 94903 USA or by e-mail on rgordon@fishtech.com

Monday, January 28

Trout Contributed (P)	11:00 - 12:30
Catfish Culture	11:00 - 12:30
Pew Foundation Ocean Commission (P)	11:00 - 12:30
Basics of Effective Presentations (P)	11:00 - 12:30
Niche Marketing (P)	11:00 - 12:30
Stock Enhancement Contributed	11:00 - 12:30
Shrimp Session	11:00 - 5:00
Offshore Culture	11:00 - 5:00
Mollusk Culture	11:00 - 5:00
Catfish Health	1:30 - 3:00
US Trout Farmers Association Workshop (P)	1:30 - 5:00
Environmental Impacts on U.S. Aquaculture (P)	1:30 - 5:00
Small-Scale Aquaculture	1:30 - 5:00
Aquaculture Processing and Marketing	1:30 - 5:00
State Regulations	1:30 - 5:00
Sturgeon	1:30 - 5:00
Finfish Nutrition (Catfish)	3:30 - 5:00

Tuesday, January 29

Oldways Preservation (P)	8:30 - 10:00
Bass Contributed	8:30 - 12:00
Marine Fish Culture	8:30 - 12:00
Are BMPs Right for You? (P)	8:30 - 2:30
Shrimp Session	8:30 - 4:30
Finfish Nutrition	8:30 - 4:30
Aquacultural Engineering Society Workshop	8:30 - 4:30
California Aquaculture Assoc. Workshop (P)	8:30 - 4:30
JSA Report to Industry (P)	8:30 - 4:30
Regulatory, Marketing & Production Issues in NE Aquaculture (P)	8:30 - 4:30
Special Aquaculture Topics	10:30 - 12:00
Algae	1:00 - 2:30
Fish Health & Disease	1:00 - 4:30
Striped Bass Growers Association Workshop (P)	1:00 - 4:30
Student Seminar	3:00 - 4:30
Getting Help from the Government (P)	3:00 - 4:30

Wednesday, January 30

Tilapia Contributed	8:30 - 12:30
Emerging Species	8:30 - 12:30
Invasive Species on the Farm (P)	8:30 - 12:30
Aquacultural Engineering Society Contributed	8:30 - 12:30
Genetics & Breeding	8:30 - 12:30
Shrimp Session	8:30 - 5:00
Aquaculture 101(P)	8:30 - 5:00
Flatfish Culture	8:30 - 5:00
Crustacean Culture & Nutrition	8:30 - 5:00
American Tilapia Association Workshop (P)	1:30 - 5:00
Aquaculture on Indigenous Lands (P)	1:30 - 5:00
Drugs, Therapeutants and INADs (P)	1:30 - 5:00
Interactions Between Private Aquaculture & Native Aquatic Fauna (P)	1:30 - 5:00

(P) = Producer Oriented Session

TRADE SHOW SCHEDULE

Monday, January 28 10:00 - 18:00
Tuesday, January 29 9:30 - 17:30
Wednesday, January 30 9:00 - 15:30

PROGRAMMATIC ENVIRONMENTAL IMPACT REPORTS FOR AQUACULTURE

The Department of Fish and Game (DFG) began work on Programmatic Environmental Impact Reports (PEIRs) for inland and marine aquaculture in California last year. While the project has been delayed due to workload complications of the environmental consultant hired to draft the documents, progress is being made slowly.

Both the industry and State regulators should benefit once the documents are completed and certified. The PEIRs are intended to satisfy requirements of the California Environmental Quality Act (CEQA) for environmental review when a series of related projects will have generally similar environmental effects that can be mitigated in similar ways. Once completed, the documents may be used by prospective aquaculturists in helping to plan projects that can avoid potential environmental impacts, minimize opposition to the project, and reduce their own regulatory burden. Likewise, local Lead Agencies for CEQA review of individual projects, and other regulators, may rely on the documents to highlight the most common potential impacts of aquaculture projects. That should help focus review where it will provide the most benefit toward protection of the environment while avoiding unnecessary restrictions on project sponsors. For those projects that will require more extensive, detailed review because of the projects siting or design, the PEIR can form a base for the project EIR.

CEQA requires that environmental documents be drafted and then made available for public review and comment. The Department will consider all of the comments received, and then rewrite the documents to address the expressed concerns. Once the final documents are completed, they may be certified by the Department to become available for use by project sponsors, Lead Agencies, and other regulators.

An additional benefit that may come from completion of the documents is an educational one for anyone who may have concerns about the potential impacts of the aquaculture industry, both present and future, in California. It is State Policy to encourage the development of a commercial aquaculture industry here, and the DFG has been charged with the responsibility to facilitate that development. The DFG has accepted the mandate, but only to the extent that development is not detrimental to California's wildlife resources. These documents should help to show how that dual objective is reasonably being met.

KOI HERPES VIRUS MANAGEMENT

The discovery in July of koi herpes virus (KHV) at a California Registered Aquaculture facility in Sacramento County, caused the Department of Fish and Game (DFG) to take action to eradicate the serious disease. All sizes and ages of koi (and common carp but not goldfish) are susceptible to the virus. It is not known if silver carp (goldfish/carp hybrid) are affected. Koi hobbyists can be devastated when they bring an infected fish home, put it in with their other fish, see it get sick and die, and seven to fourteen days later, see the rest of their fish get sick and die.

KHV was isolated in a laboratory for the first time at the University of California, Davis (UCD) in 1996. It is believed to have originated in Israel and then spread to various parts of the world, including the U.S., but this was the first confirmed report in northern California. Research is currently underway or planned at UCD, to answer questions such as: how long the virus survives outside its host and what disinfection methods are effective; whether additional species are able to carry and shed the virus; whether exposed fish become carriers, or if once exposed the fish become immune, with no live or dormant virus remaining.

The disease occurs when temperatures range from 18 to 23° C (64 - 73° F). This may result in seasonal disease outbreaks occurring in spring and fall. Mortality typically occurs 1 to 2 weeks after exposure, and may reach rates as high as 80% of koi in a pond. Signs of the disease include excessive mucous production and mottling of the gills, causing the fish to appear to be gasping for air. Often accompanying infections of bacteria and/or parasites are present.

It is difficult to detect the virus in fish that are not sick, which makes screening unreliable. Even

quarantining fish at a water temperature outside the virus' range may not protect the receiver from becoming infected. A healthy-looking fish may pass the virus to another koi sharing the same water, so practicing good hygiene and separating fish shown for judging is smart.

Suggestions:

- Buy fish from a reputable dealer and be observant about the conditions of the tanks and fish in general. Ask dealers if THEY quarantine their incoming fish.

- Quarantine all fish for a period of at least two weeks (three is best) at water temperatures within the virus' range before adding them to any pond. Use an expendable koi as a bioassay, or "guinea pig." Add it to the quarantine tank to monitor for shed virus. Disinfect the quarantine tank between batches of fish.

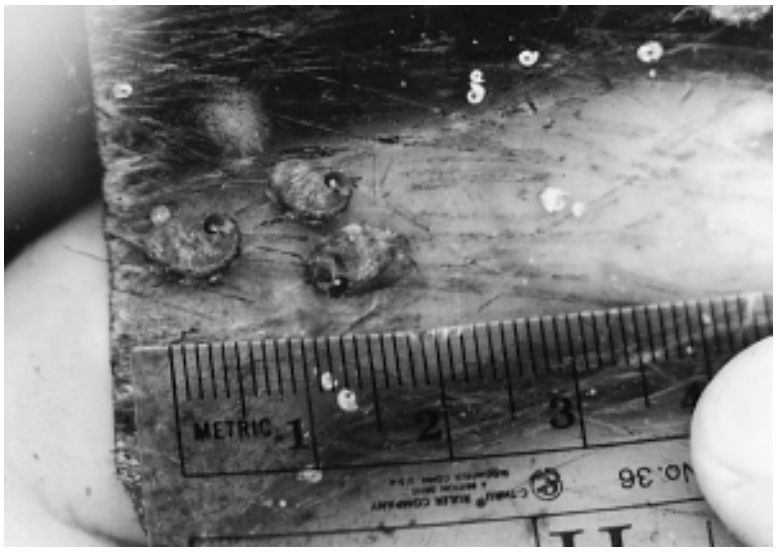
Based on current information, the best way to eliminate the virus from a lined pond is to expose all surfaces to 200 parts per million chlorine for a day (roughly 1 gallon of household bleach for every 250 gallons of water), and then dry the pond in sunlight for a week before refilling. However, research may show that less extreme measures are required. The DFG and UCD researchers expect to have more answers by the end of the year. Until more information can be gathered, exercise caution.

California Aquaculture Research
Aquaculture and White Abalone

Tom McCormick
Proteus SeaFarms/Channel Islands Marine Resource Institute (805) 640-1180

Curiosity perked my interest in white abalone almost ten years ago. I was curious about this seldom seen and increasingly rare southern California abalone. Commercial fisherman regarded it as the best of the abalone, often keeping some for their own personal use when the rest of the catch of red, green, or pink abalone was sold. The fact that the white abalone were most plentiful at depths of 120 - 150 feet isolated this species from the experience of most recreational divers.

Having cultivated red, green, and pink abalone I was curious if the deep living whites could be grown using techniques developed for the other species. What temperatures and foods were optimal? Could they be raised at high densities? In the early 1990's when the fishery for abalone was still open in southern California, I started asking sport and commercial divers if they could help locate and retrieve white abalone. These animals would be used as broodstock for hatchery spawning. As time passed I learned that while many fishermen claimed to know the precise location of quantities of white abalone it was extremely difficult to actually bring them in. In fact, most of the fishermen's knowledge of the location of white abalone dated back to the 1970's and 1980's. In a series of dives at 150' with divers who had spent the last 40 years in the area we found no live animals. We retrieved only empty shells. Over the next few years we did manage to locate a handful of white abalone. Unfortunately all but one were male and the single female never achieved spawning readiness.



By the mid-1990's I realized that if we were going to make any progress on the cultivation of the white abalone it would be necessary to form a coalition with others with an interest in this rare marine snail. The White Abalone Working Group is composed of biologists and resource managers from the National Parks Service, the California Department of Fish and Game, UC Santa Barbara, and two non-profit organizations. Previous work by others in the group suggested that the numbers of wild white abalone had dropped precipitously since the 1970's.

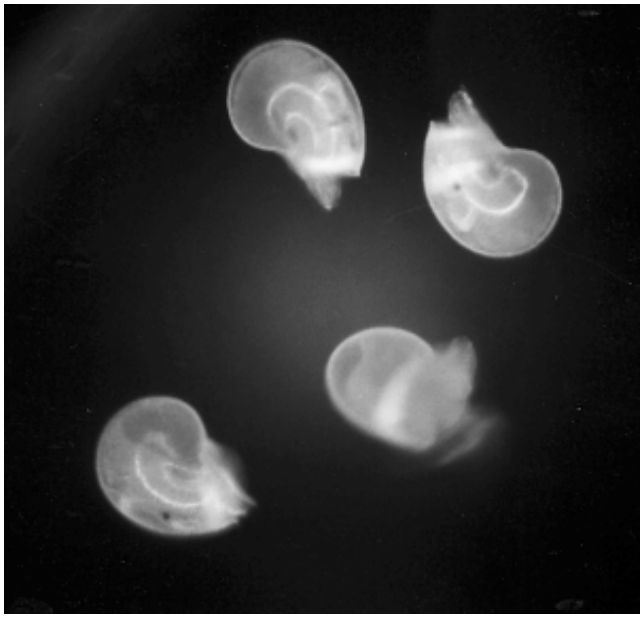
The fishery for white abalone was closed in 1996.

The Working Group developed the following four-step plan for recovery of the species:

1) Survey historic fishing grounds to locate survivors;
2) Collect and hold adults as breeding stock;
3) Produce a new generation of young adult abalone in the hatchery; and
4) Introduce hatchery grown adult animals into refugia to reestablish self-sustaining wild populations.

Preliminary funding for the plan was secured through the Marine Conservation Biology Institute and a Saltonstall-Kennedy grant from the National Marine Fisheries Service (NMFS). Surveying white abalone habitat at 150 feet with divers was impractical so a three-man mini-sub was used. Biologists could easily spot abalone through the view ports of the submarine.

The mini-sub was used to survey suitable rocky reefs at San Clemente Island, Santa Catalina Island, Santa Cruz Island, Anacapa Island, Santa Barbara Island, Cortes, Tanner, and Osborn Banks. Results of these cruises indicate that for the areas surveyed densities of white abalone averaged 2.75 per hectare, ranging from 0 - 9.79 abalone per hectare. Densities of 10,000 abalone per hectare were reported in the1970's. Using results



from the surveys, scientists at Scripps estimated that the entire population of white abalone in southern California was only 1,600 animals. Most of the animals found were older solitary individuals with little chance of reproducing successfully. Without intervention white abalone would be extinct in southern California by 2010. In June of this year the white abalone became the first marine invertebrate to be listed as and Endangered Species by the federal government.

A breeding program was begun with 18 abalone recovered from depths of 45m or less by divers from the California Department of Fish & Game using SCUBA gear. To minimize risk, abalone were transferred to separate holding facilities at the Channel Island Marine Resource Institute (CIMRI) a non-profit institute in Port Hueneme, California and UC Santa Barbara. Broodstock at CIMRI are held in a partially recirculating system that features particulate and biological filtration, UV sterilization, desaturation, temperature control, photoperiod control, and an alarm system. To prevent crawl out, animals are kept in submerged sealed containers.

Food production and optimal water quality are achieved by the production of the red algae Pacific Dulse (Palmaria mollis) within the system. This red macro-algae effectively absorbs nutrients from the system. Oregon State University previously demonstrated that co-culture of dulse and red abalone provided a reliable supply of high quality food while ensuring high water quality through uptake of ammonia and phosphorus by the dulse. In the CIMRI system, dulse was grown under high-intensity lamps in tanks separate from the abalone. In addition to the dulse, the abalone were fed giant kelp (Macrocystis) and feather boa kelp (Egergia). Following collection of white abalone broodstock in November 2000, system temperatures were kept at less than 16ºC and were allowed to drop to 12ºC during the winter months.

In April 2000, eight white abalone from both CIMRI and UCSB were pooled for the first spawning attempt in 30 years. Using hydrogen peroxide as a stimuli, two females and one male spawned, producing 3 million eggs. Fertilization rates were normal (99%). Eggs were transferred to CIMRI for hatchout.

At CIMRI abalone larvae and juveniles were cultivated using large-scale methods that have been developed in the United States and Japan. Larvae were cultured in flow-through vats for six days until they were ready for settlement for 6. The 1/4 mm larvae were settled in tanks containing cultures of benthic micro-algaes. Nutrients for the growth of the micro-algae were supplied by a constant supply of seawater. After settlement the post-larval abalone loose the ability to swim and the shell shape changes from that of a coiled garden snail to the more open shell of an abalone. As the abalone grow they graze the micro-algae from substrate in the tanks.

At this writing, the juvenile abalone are five months old and average 6 mm in length. Survival has been excellent and there are now in excess of 100,000 abalone in cultivation. For the first time there are more white abalone in cultivation than exist in the ocean off southern California. As the abalone grow larger they will next be switched to a diet of macroalgae such as giant kelp. Feeding trials will be conducted to test the suitability of other macro algae, including Pacific dulse.

We have just started the cultivation of white abalone. This first crop of white abalone will be cultured for up to five years to produce animals that are 4" in length. At this size wild abalone emerge from their hiding places under cobble and from crevices in search of drift kelp. They are large enough to resist most predators and are capable of spawning up to 1 million eggs. The large abalone cultivated in the hatchery will be to create breeding colonies of 500 -1,000 individuals in former white abalone habitat. The goal is to produce a minimum of 10,000 animals each year for at least 10 years.

As we learn more about the white abalone there arise more questions about its culture and natural biology. Can cultivation methods be developed for white abalone, such as food production, and system design? Can the methods for white abalone be used to optimize the growth of other commercial species of abalone, and vice versa? Given the number of broodstock and an emerging view of the genetic structure of other abalone populations, what will be the best strategy to optimize and maintain genetic diversity?

Abalone have inhabited waters off California for 100 million years. Without aquaculture the species could disappear within the next ten years.

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SactoNews

from the Briefcase of CAA Executive Director Justin Malan (jgmalan@aol.com)

During this time of almost unprecedented insecurities over economic and national security, legislation on new government spending is being heavily scrutinized by lawmakers and federal and state administrations. The President signed the tax cuts, and a $170 BILLION farm bill has passed out of the House of Representatives, but any huge appropriation benefitting relatively few beneficiaries is not likely to make its way into law intact.

Even before the September 11 attack on America, both federal and California 2002 revenue estimates were scaled well back. Most of the legislation tracked and supported by CAA, which would have assisted the industry in some other fashion, has withered on the vine. (The Spring edition of Aquatic Farming provided the list of state legislation of interest to CAA). AB 7 (the Tractor Tax) passed, but AB 290 and SB 875 providing tax relief for certain manufacturer's investments and even SB 1003 that sought to protect agricultural energy supplies, have all died or become two-year measurers.

One significant pro-agricultural bill has unfortunately been vetoed by the Governor, AB 801 by Assemblymember Simon Salinas from Salinas, Monterey County. Had it become law, the Choose California Act would have required that all California state owned or state run institutions purchase agricultural products grown in California before those that are grown outside the state as long as specified criteria are met regarding the price of bids for in-state products. Essentially, the price of the in-state product may not have been more than 5% higher than the out-of-state product. With the Buy California campaign (discussed in the Editorial and briefly outlined on page 9) AB 801 may have made concrete progress towards a generic promotion of California agricultural produce, including aquaculture.

NEWS FROM NAA

NAA in Action

An appeal to support the National Aquaculture Association (NAA) has been enclosed in the CAA's members copy of this edition of Aquatic Farming. NAA President Randy McMillan urges all aquaculture producers, suppliers and supporters to sustain our national trade association: CAA acknowledges all that NAA does for our industry. There are in fact too many issues to list, but a few of NAA's priority activities include:

• The passage of Minor Use Minor Species (MUMS) legislation;
• Development of a world-class National Animal Health Emergency Management System;
• Promotion of USDA's APHIS program;
• Guidance in animal depredation issues;
• Representation on National Organic Standards Board;
• Coordinating industry involvement in the JSA Effluents Task Force; and
• Organizing the Producer Program for the upcoming 2002 Aquaculture America conference.

CAA members with the NAA membership application material are urged to review the information and consider joining or renewing their membership of NAA. Individuals can help maintain our voice in Congress and in the federal regulatory agencies for as little as $250 per year.

Anyone who has not received, but wishes to be sent the NAA materials may contact NAA directly at (304) 728-2167 or via email at naa@intrepid.net. The NAA website at natlaquaculture.org is also worth a visit!

WATER FARMING
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The Gauntlet

from CAA Executive Director Justin Malan (jgmalan@aol.com)

The views expressed in this column are not necessarily those of the California Aquaculture Association (CAA). Aquatic Farming hopes to stimulate discussion and receive feedback from its members and other interested parties from the topics raised.

Effluent limits from aquaculture: Does one size fit all?

Federal EPA is under a court order to evaluate the regulation of aquatic animal production discharges. Clearly they need to act, but it appears that with their current approach the agency may be backing into the solution to a problem it has yet to define. Before conducting the second highly intrusive survey of our businesses, the agency should be identifying what sectors or individual operations within the industry actually warrant additional regulation to reduce water pollution. Many in the industry question the scientific validity of the claims made by the detractors of aquaculture that we have an industry-wide problem that needs to be addressed. Is there really a demonstrated need for any new industry-wide discharge control programs? Aquaculture discharges in California and elsewhere across the nation are already regulated through the National Pollution Discharge Elimination System (NPDES) and state water discharge requirements, are generally adequately protective of public health and the environment.

Perhaps, rather than conducting surveys of what regulatory burden the industry can bear, the agency should identify what additional regulatory requirements need to be established to address the specific discharge issues. Also, while the agency intends to use the financial data from these surveys to assess the ability of the industry to absorb additional regulatory costs, we are concerned that any positive fiscal data can be used to justify the agency's imposition of new requirements, needed or not.

The industry in California is committed to the promotion of responsible aquaculture. Most growers believe that California already has rigorous business and environmental regulations working in conjunction with and adhering to best management practices, making aquaculture a sound economic prospect and an important part of our sustainable agriculture.

Let's step back and identify if and where the problem really is...

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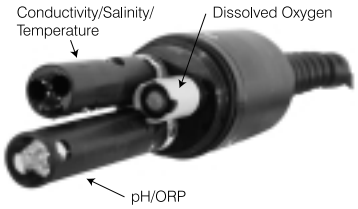

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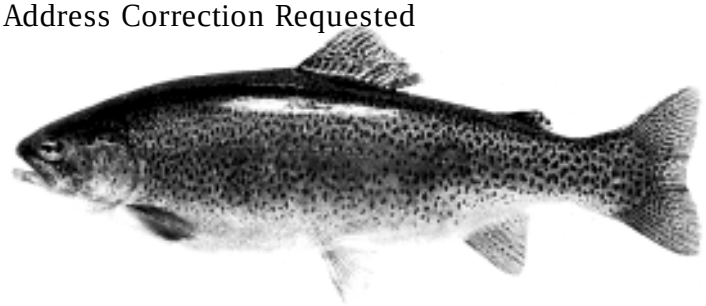

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Phone _____ Fax _____

email _____

REGISTRATION & OPTIONAL EVENT FEES	# people	Before Dec. 27	After Dec. 27	
Tour #1: Baja California (Mexico) January 27 (8am-6:30pm) (University, endangered species reproduction, Shrimp, Oysters)	_____	$75	$95	$ _____
Tour #2: Carlsbad and Huntington Beach January 27 (8am-6:30pm) (Halibut, White seabass, Giant Seabass, Aquarium fish with recirculating systems)	_____	$75	$95	$ _____
Tour #3: Imperial Valley January 31(7:30am-6:30) (Geothermal Tilapia, Catfish, Algae, and Carp for Irrigation Ditches)	_____	$75	$95	$ _____
Tour #4: Coachella Valley, Kent SeaTech, etc. January 31 (Intensive Tilapia, Hybrid Striped Bass, Trout)	_____	$75	$95	$ _____
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Registration Confirmation and Receipt will be mailed after processing.

PAYMENT METHOD: **All fees must be paid in U.S. Dollars** **FID# 58-1739990**

☐ Check #_____ Payable to: **Aquaculture America 2002** ☐ Visa ☐ Mastercard ☐ American Express

Card # _____ Expiration Date _____ Amount US$

Name on Card _____ Signature _____

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- Cancelled registrations will receive a refund minus 20% handling after the meeting.
- Cancellations must be in writing and received no later than January 30, 2002.
- **QUESTIONS? Please call Conference Manager at 1-760-432-4270.**

FAX BOTH SIDES of this form to: **+1-760-432-4275**

or Mail to: **AQUACULTURE AMERICA 2002**
Conference Manager
2423 Fallbrook Place
Escondido, CA 92027 USA

CAA SPONSORED PRODUCER PROGRAM

TUESDAY, JANUARY 29, 2002

MODERATOR: Justin Malan, Executive Director, CAA

8:30 a.m. STATE OF THE STATE (CALIFORNIA) - Justin Malan
8:50 a.m. HOW THE NATIONAL ASSOCIATION OF STATE AQUACULTURE COORDINATORS CAN HELP, Robert Hulbrock, President
9:10 a.m. GOVERNMENT'S ROLL IN AQUACULTURE'S SUCCESS OR FAILURE, George Lockwood, Monterey Bay Foods Group
9:35 a.m. GEOTHERMAL WATER IS KEY TO CALIFORNIA'S TILAPIA PRODUCTION, Bill Engler, Pacific Aquafarms Inc., (Tilapia)

10:00 a.m. BREAK (Sponsored by, Silver Cup Fish Feeds)

MARINE AQUACULTURE —MODERATOR: Dave McHone, P.V. Ranch

10:30 a.m. ABALONE PRODUCTION: Ray Fields, The Abalone Farm (Abalone)
11:00 a.m. COMMERCIAL MARINE MICRO ALGAE PRODUCTION: Tim Reed, Reed Mariculture (various marine algae)
11:30 a.m. PRODUCING FOR MARINE ENHANCEMENT, Tim McCormick, Proteus Seafarms International Inc. (White Abalone, White Seabass and others)

12:00 **LUNCH BREAK**

RECIRCULATION SYSTEMS - MODERATOR: Tony Vaught, Professional Aquaculture Services

1:00 p.m. USE OF WETLANDS: Mike Massingill, Kent SeaTech (Hybrid Striped Bass)
1:30 pm STURGEON RESEARCH, STURGEON AQUACULTURE: A SUCCESS STORY: Jim Michaels, Stolt Seafarms California LLC (sturgeon)
2:00 pm HIGH WATER QUALITY SYSTEMS: Dr. Dallas Weaver, Scientific Hatcheries (various aquarium fish).

2:30 p.m. BREAK (Sponsored by Silver Cup Fish Feeds)

LIVE FISH TRANSPORTATION & MARKETING: MODERATOR: Dennis Faria, Kent SeaTech

3:00 SUPPLYING LIVE FOOD FISH MARKETS: George Ray, Fish Producers, Inc. (catfish, tilapia, carp)
3:30 LIVE FISH TRANSPORTATION: Doug Drover, Alpine Fisheries
4:00 MANAGEMENT & PROMOTION OF LARGE RECREATION FISHING LAKES: Doug Elliott, Santa Ana River Lake, & Corona Lake

4:30 p.m. Conclusion of formal program

ATTENDEE REGISTRATION FORM
AQUACULTURE AMERICA 2002

January 27-30, 2002 – San Diego, California USA

PLEASE PRINT CLEARLY OR TYPE ALL REQUESTED INFORMATION

BADGE INFORMATION: (As you want your name badge to read)

Name (No titles, please) _____

Company or Institution _____
(Limited to 40 Letters & Spaces)

City _____ State / Prov _____ Country _____

MAILING INFORMATION: **Dr.** **Mr.** **Ms.** **Mrs.**

Address _____

City _____ State / Prov _____ Postal Code _____ Country _____

Phone _____ Fax _____ Email _____
(Include country and city code) (Include country and city code)

REGISTRATION FEES: **FULL CONFERENCE & TRADE SHOW** In order to receive the Pre-Registration discount rate, this form and payment must be received by the date above.	**Register by December 12, 2001**	**Register by January 10, 2002**	**Register On Site** † See note below
ASSOCIATION MEMBER RATE*	☐ US$ 250	☐ US$ 350	☐ US$ 450
STUDENT MEMBER RATE* Include copy of Student I.D.	☐ US$ 75	☐ US$ 75	☐ US$ 75
Non-Member Rate	☐ US$ 350	☐ US$ 450	☐ US$ 550
Student Non-Member Rate Include copy of Student I.D.	☐ US$ 125	☐ US$ 125	☐ US$ 125
You can join NAA or WAS on the reverse side and use the Member Rate.			
Spouse Rate Name _____	☐ US$ 125	☐ US$ 150	☐ US$ 200

* To qualify for **Member Rate** you must complete the **Association Memberships** section on the reverse side.

• • • • • • • • • • •

Trade Show is included in the Full Conference Registration Rate.

TOTAL REGISTRATION FEE

US$ _____

MEMBERSHIP DUES – Enter amount from Membership Application on other side if applicable. **TOTAL MEMBERSHIP DUES US$** _____

INDUSTRY TOURS – Industry tour information will be available in the final registration brochure. If you register with this form, you will receive updated tour information and can add tours at a later time.

SELECT ABSTRACT BOOK IN PAPER OR CD – This year the Abstract Book will be available in both paper and CD. Please check the format you would like in the appropriate box below. If no box is checked, you will receive a paper Abstract Book. If you check the Paper box, you can also order a CD copy for $10.00.

☐ Paper ☐ CD ☐ Order additional CD - $10.00 **CD TOTAL US$**

TRADE SHOW PASS – Good for 3 days admission to exhibits only – Jan. 28, 29, 30 (Trade show pass is included in the Full Conference Registration)

(Trade show pass is included in the Full Conference Registration)

☐ US$ 50 **TOTAL TRADE SHOW PASS US$** _____

† Do not mail registration after Jan. 13, 2002 or fax after Jan. 22
After these dates, bring this form with you to register at the event.

➜ **TOTAL AMOUNT US$**

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REGISTRATION FORM - SIDE 2

Name

ASSOCIATION MEMBERSHIPS: Please check all boxes for associations of which you are a current member. Membership in any of these associations qualifies you for the Member Rate* on the Registration Fees. You can join an association at any time before registering to qualify for the Member Rate.

- ❑ American Tilapia Association
- ❑ American Veterinary Medical Association
- ❑ Aquacultural Engineering Society
- ❑ Aquaculture Association of Canada
- ❑ California Aquaculture Association
- ❑ Catfish Farmers of America
- ❑ Caribbean Aquaculture Association
- ❑ Fish Culture Section – AFS
- ❑ Latin American Chapter WAS
- ❑ National Aquaculture Association
- ❑ National Shellfisheries Association
- ❑ Striped Bass Growers Association
- ❑ US Marine Shrimp Farming Association
- ❑ US Chapter of WAS
- ❑ US Trout Farmers Association
- ❑ World Aquaculture Society

MEMBERSHIP APPLICATIONS

❑ NEW APPLICATION ❑ RENEWAL

TO JOIN THE WORLD AQUACULTURE SOCIETY, FILL OUT THE FORM BELOW:

WORLD AQUACULTURE SOCIETY APPLICATION

For details on the different types of memberships and options, please contact the WAS home office at
Tel: +1-225-578-3137 Fax: +1-225-578-3493 Email: wasmas@aol.com

MEMBERSHIP CATEGORY: *(Indicate only one)*

___ **Individual** ($60/yr) *Applies to an individual only*

___ **Student** ($40/yr) *(Copy of Student ID or Signature of Professor required)*

___ **Corporate** ($100/yr) *Applies to any one individual from a company*

___ **Lifetime** ($1000/yr) *Applies to an individual only*

___ **Sustaining** ($250/yr) *Allows all employees of one company to attend meeting at Member Rate*

CHAPTER OPTIONS: *(Must have active membership in one of the categories at left)*

___ **U.S. Chapter**($5)

___ **Latin American Chapter** ($5)

___ **Southeast Asian Chapter** ($5)

Total Amount for WAS Membership US$ _____

Please enter this amount under "Membership Dues" section on opposite side of this form.

For membership in other associations, please contact them directly. If you need a phone number, contact the Conference Manager (+1-760-432-4270).