California Aquatic Farming

Official Bi-Annual Publication of the California Aquaculture Association

Fall 2000

CAA 2001 AQUACULTURE CONFERENCE

March 18, 19, 20, 21, 2001

"WATERWISE AQUACULTURE"

Radisson Hotel, Sacramento

Don't miss this fun and informative conference and tradeshow – a *MUST* for all in or interested in aquaculture

Dedicated to furthering the success of commercial aquaculture in California.

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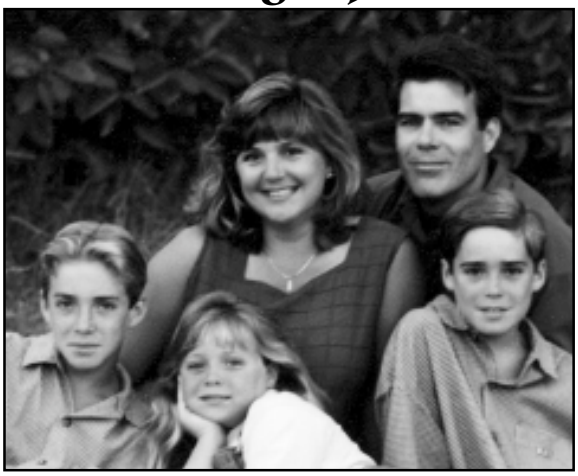
New Manager joins CAA



Sheryl Baldwin and Family

I would like to take this opportunity to introduce myself as the new California Aquaculture Association Manager. Earlier this year, after decades of unfailing service to CAA, George and Fern Ray announced that they would be phasing out of CAA. They have been the cornerstone of the association for so many years – answering questions from the public, publishing the newsletter, arranging the meetings and putting on the conferences. George remains CAA Secretary and Fern and her daughter Robin and the others in their family will no doubt still be around for many more years to come.

Since July 1st I have been serving as Manager of CAA under contract to take over George and Fern's tasks. I will be sharing the office with Executive Director, Justin Malan in Carmichael. I have been working with Justin on some other contracts and am sure that together we will be able to serve CAA well.

I have been living in the Sacramento area with my family for the past twelve years. I have extensive experience in organizational management, accounting and conference facilitation. I am excited by the opportunities offered by CAA and look forward to meeting each of you and visiting your farms.

Until then, we are preparing for our annual conference at the **Radisson Hotel in Sacramento March 18 – 21st, 2001**. If you would like a registration packet please let me know. I look forward to meeting all of you at the annual conference.

Please feel free to contact me at 3700 Chaney Court, Carmichael, CA 95608, by phone (916) 944-8477, fax (916) 944-2256 or email sherylbaldwin@aol.com

Editorial

The California Aquaculture Association is comprised of over 200 producers, suppliers, academia, students and other interested parties. Like the industry it represents, CAA is unique in its diversity. We raise catfish and caviar, abalone and algae, stripers and oysters – to name just a few of our 22 commercial fish, shellfish and plant species.

Over the past 100 years we have steadily grown into a sizable portion of the State's impressive agriculture industry. We face many more challenges than our predecessors but in turn have unprecedented opportunities. Today's demand frequently outpaces supply for many of our products as our local population continues to soar and more and more people look to fish – and often specifically farmed fish – as a healthful and affordable source of protein.

Two stalwart volunteers of CAA, George and Fern Ray from Niland, have been publishing this newsletter *California Aquatic Farming* for the past 16 years. It is the official bi-annual publication of CAA and a major voice for aquaculture for most of the Western United States that reaches over 3,000 readers all across the country. George and Fern have passed on the editorial reins to us, CAA's part-time contract staff. We accept this new task with some trepidation but with a hope that we can continue the stellar work of George and Fern. We would also like to encourage our readers to use this newsletter as a forum for debate on any of the hundreds of issues that affect our everyday business.

Please help us make this publication *your* voice. Call us at (916) 944-7315 or (916) 944-8477, email us or fax us at (916) 944-2256 if you have some news to share or opinion to offer. Our mailing address is 3700 Chaney Court, Carmichael, CA 95608.

Remember: If it's farmed…it must be fresh!

Justin Malan and Sheryl Baldwin, Eds

FIRST ANNOUNCEMENT
CAA 2001 AQUACULTURE EXPO

See enclosed registration packet for more information

THEME: **"WATERWISE AQUACULTURE"**
DATES: **MARCH 18 - 21, 2001**
VENUE: **RADISSON HOTEL, SACRAMENTO, CALIFORNIA (916) 922-2020**

2001 CAA Annual Conference & Tours

UC Davis Aquaculture Facility Tour March 18, 2001

The aquaculture facilities of the Center for Aquatic Biology and Aquaculture (CABA) represent the largest freshwater aquatic research facilities in the UC system and the only facilities available to all faculty on the Davis campus. They consist of the Aquatic Center, a five-acre complex located about a mile west of the main campus, and the Putah Creek facility located west of that and near the UC Davis landfill.

The Aquatic Center has a total of 8,700 square feet of inside animal holding space, and 3,900 square feet of outside animal holding space. The research and chemical lab space totals 4,400 square feet, with 1,100 square feet dedicated to equipment storage and administrative duties.

There are six buildings associated with the Aquatic Center. They consist of four Quonset-type buildings, one Butler-style building and portions of the Aquatic Biology and Environmental Science building (shared administration with the John Muir Institute of the Environment).

Animal holding units/tanks at the Aquatic Center are variable-sized plastic resin-fiberglass circular tanks, glass tanks and some larger concrete tanks. Their sizes and quantities include 5-15 gallons (315); 15-130 gallons (170); 130-260 gallons (50); 260-780 gallons (20); and 780-8,500 gallons (8).

The Putah Creek facility has 1,900 square feet of inside animal holding space and 15,000 square feet of outside space. All tanks at the Putah Creek facility are plastic resin-fiberglass circular units. Of the total 72 tanks there are 48 tanks of 235-705 gallons, 18 tanks of 700 gallons, and 6 tanks of 7,000 gallons.

What are the water sources?

The facilities are supplied by two sources of water: ground water through local wells, and surface water from the Solano Irrigation Canal/Lake Berryessa. The Aquatic Center receives ground water from an on-site well with a 1200 gpm of 18-19° C water, which is non-chlorinated, de-gassed, and temperature regulated. The Putah Creek facility is supplied with well water up to 400 gpm of 18-19° C water, and Solano Irrigation Canal/Lake Berryessa water directly from the pipeline supplying the campus irrigation system, which is available at up to 600 gpm. The Putah Creek facility has no active water heating or chilling capacity, but the two sources can be mixed to achieve intermediate temperatures.

The Fishery Tour March 21, 2001

Come tour & learn about White Sturgeon, Channel Catfish, Striped Bass and Hybrid Carp.

Two existing sites in Sacramento County, approximately 300 acres each are the principal sites, and will be seen during the tour. Also, an 87 acre site in Sacramento County, currently under construction, one site in Modoc County and a Sturgeon hatchery located in Cascade locks, Oregon.

Nimbus Fish Hatchery Tour
March 21, 2001

Visit the California Department of Fish and Game's Nimbus Salmon and Steelhead Hatchery in Rancho Cordova, now in its 45th year of production. Learn about some of the changes in practice and theory over time. See hatching jars with steelhead eggs, juvenile salmon and possibly steelhead eggtaking. Fish health management within California and a tour the the DFG Fish Health laboratory are offered.

Sacramento/Yolo Mosquito District Tour
March 21, 2001

The Districts fish farm was established in 1981, primarily for the culture of Gambusia. Currently we culture 3 different species of fish for mosquito control, the mosquitofish (*Gambusia affinis*), threespine stickleback (*Gasterosteus aculeatus*) and the common guppy (*Poecilia reticulata*). We have

24 ponds in operation throughout the year and 8 raceways for culture and distribution. The majority of fish produced here are used in Sacramento and Yolo Counties but we do supply other MVCD throughout the region when their stocks are in short supply. These fish are stocked into most permanent and semi-permanent aquatic mosquito sources like rice fields, wildlife areas, irrigation channels, and back yard ponds.

DFG Writing Program EIR's for Aquaculture

Bob Hulbrock, Aquaculture Co-ordinator, CDFG

In response to legislation sponsored by CAA and the continued urging of the Association Board of Directors, the Department of Fish and Game (DFG) is preparing Program Environmental Impact Reports (EIRs) for existing and potential commercial aquaculture projects in California. The California Environmental Quality Act (CEQA) provides for preparation of these types of EIRs when a series of related projects will have generally similar environmental effects that can be mitigated in similar ways. Both DFG and CAA believe that completion of the reports will provide both the foundation for the subsequent CEQA review required by local Lead Agency's (usually County governments) for individual projects, and will provide for greater consistency and predictability in DFG review of individual applications for Aquaculture Registrations.

The Department has contracted with FishPro, Inc. to prepare, in accord with CEQA, two Program EIRs, one for inland and one for coastal marine commercial California aquaculture projects. Preparation of the two documents will include a review of currently available literature documenting valid scientific findings on the most significant potential environmental impacts of the types of aqua-culture commonly practiced in California. FishPro has already consulted with representatives of the aquaculture industry, visiting several production facilities, and will also contact principle regulators and other interested parties. Discussions of reasonable mitigation measures and cumulative impacts will be included in the EIRs.

It is intended that an effective presentation (such as a matrix) will make clear the correlation between the likelihood and significance of individually identified potential impacts with different project designs. Potential impacts will also be categorized and cross referenced with various California project types.

FishPro has a strong association with the aquaculture industry, including planning and design of production facilities, and evaluation of their environmental impacts. They have operated both freshwater and marine production facilities (principally salmonid).

FishPro has completed environmental impact reports and aquaculture-related permits in several states, and for this project, has partnered with ENTRIX, a biological firm that has completed dozens of EIRs in California in conformance with CEQA.

In 1994, on contract with DFG, FishPro completed The Statewide Trout Needs Assessment, a review of the demand for recreational trout and of the private industry and Department trout production capabilities. The report concluded that it will be necessary to develop all potential sources of production to their fullest extent to meet anticipated future demand. The Assessment recommended that Department might benefit from developing a more market-oriented approach to it product, and consider purchase of catchable trout from private growers.

CEQA requires that a draft of the EIRs be prepared and circulated for public comment. The drafts may then be improved in response to that comment, and the final reports prepared. It is anticipated that the drafts will be completed by mid November 2000 and the final EIRs may be completed shortly after the beginning of 2001. Contact Bob Hulbrock, DFG Aquaculture Coordinator (via letter, FAX, or e-mail), if you would like to receive a copy of a draft.

SactoNews

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

The 1999-2000 Legislative session in Sacramento was characteristically busy. All the "big" issues were on the table again – water management, health insurance, education, workers compensation and of course energy (de)regulation. Several of these issues affect aquaculture either directly or indirectly.

Access to adequate, clean and affordable water is paramount to us. The final Programmatic Environmental Impact Statement/Environmental Impact Report for the CALFED Bay-Delta Program was completed in July, 2000. The report outlines a preferred program alternative that identifies 15 benefits, including modification of the timing and magnitude of flow, enhancing flood protection, improving and increasing aquatic and terrestrial habitats, implementing better water management for managed wetlands and developing appropriate groundwater and surface water storage.

Much effort has gone into the development of this water blueprint for California, but no funds have been appropriated yet by either the federal or State government. Furthermore, not all parties to these protracted negotiations are pleased with the final outcome. The California Farm Bureau Federation (FBF) is suing over the program plan, asserting that CALFED does not adequately consider impacts of the plan on agriculture. For additional information on the CALFED program log onto www.calfed.ca.gov. For details on the CFBF suit, log onto www.cfbf.com.

In addition to the CALFED program, federal EPA is preparing new effluent quidelines for aquaculture facility discharges. The National Aquaculture Association is working with the JSA to ensure industry representation. CAA shares the concern of much of the industry that the new effluent limits may be too costly for the majority of the growers to meet. Anyone interested in tracking the process should contact CAA or NAA at www.natlaquaculture.org.

Bio-engineering and animal welfare have developed into major issues for our industry. Two state bills (AB 238 by Assembly members Honda and Machado and AB 2479 by Assembly member Kuehl) that deal with the humane treatment of animals in live markets have been signed into law. Both bills focused primarily on the treatment of frogs and turtles in live animal retail markets. CAA was successful in ensuring that neither bill would adversely affect our industry. For additional information on these bills contact CAA or log onto the California Legislative website at www.leginfo.ca.gov.

The alarm over "Frankenfish" has brought a bright spotlight onto bio-engineered farm–raised fish. Senate Concurrent Resolution 71 (Hayden) calls for the Department of Fish and Game to study the impacts of salmon farming in California with special attention to the potential impacts this type of aquaculture may have on the introduction and spread of diseases and genetic integrity of wild stocks. While HCR is non binding and does not provide any resources with which DFG could conduct this study, such a resolution may be considered by the ill-informed that these concerns are applicable to all aquaculture. In concert with the CFBF, NAA and other allied associations, CAA will be drafting a policy position on bio-engineering to assist the public and regulators in understanding our practices.

Elsewhere in this newsletter the newly-adopted Mission Statement for CAA is provided. This statement of the mission, goals and objectives of CAA has been redrafted to reflect changes in practices, the increased need for us to be custodians of water and wildlife resources and the commitment CAA has to serving its members. The Mission Statement also reaffirms our insistence that we be treated fairly in all regulatory matters, that aquaculture be recognized as agriculture and that the government should eliminate overlapping and duplicative laws that affect our livelihood. All CAA members, all aquaculturists and all supporters of the industry are encouraged to promote our goals in every appropriate forum.

Finally, the November elections will bring in a fairly large number of new legislators to Sacramento. CAA stands ready to work with the Legislature and regulatory agencies in meeting our common goals. We welcome any suggestions on new legislation that CAA may wish to sponsor this upcoming year. Please share any ideas for ways in which we can strengthen aquaculture in California with us.

National News

MUMS the word!

After years of anguish over lack of availability of drugs for aquaculturists to treat diseases, HR 4780 – The Minor Animal Species Health and Welfare Act was introduced in late June. Written by the MUMS Coalition and modeled on the highly successful Human Orphan Drug Program, the MUMS legislation, if passed, offers some relief to the industry.

The measure was introduced in the House by Congressman Pickering of Mississippi and co-authored by several other aquaculture supporters, including California's Richard Pombo of Stockton. CAA joined the effort to urge the California delegation to support the measure.

Room for Tilapia growth

For the second year in a row, domestic US tilapia production was estimated at around 18 million pounds in 1999. This represents a mere 12% of total domestic consumption! Most of the imported tilapia comes from China, Indonesia and Taiwan.

The closure of California's Solar Aquafarms has brought a 40% decline in tilapia production in the West. While higher production costs remain a significant challenge for domestic growers, the lack of effective regional marketing is also considered to be an impediment greater local supply.

Catfish acres continue to expand

In 1999 total catfish acreage increased another 2% in the major producing states of Alabama, Arkansas, Louisiana and Mississippi to 145,100 acres, although the foodsize inventory was down some 5%.

In July of 2000 catfish producers were receiving little more than $.75 per pound.

Don't blame Aquaculture

NAA, the Global Aquaculture Alliance (GAA) and the US Trout Farmers Association joined forces to rebut the recent report in "Nature" magazine which speculated that aquaculture might be causing overfishing of stocks used to produce fishmeal. (See "Gauntlet" on Page 28)

The rebuttal raised a compelling point: Annual worldwide fishmeal production has remained stable at around 6.5 million metric tons for nearly 20 years. In that time aquaculture has provided a growing percentage of the world's seafood, relieving pressure on stocks being fished at or beyond their limits.

Nation at a Glance

The National Fisheries Institute (NFI) appears to have abandoned a proposed resource enhancement and access program (in part a generic marketing effort) before being implemented. The proposal called for 1% tax on all first handlers of seafood, largely importers and primary processors. The proposal caused a split in NFI as several members withdrew and formed a separate group called America Seafood Association. A final decision will be made at NFI's fall meeting.

The National Marine Fisheries Service approved a $10 million loan to Southern States Cooperative (Farmer's Catch Division) to develop tilapia production. Most of the money is earmarked to finance high-tech closed system tilapia production, fingerling nursery, & processing plant.

The Food & Drug Administration (FDA) announced plans to begin testing food (including fish) for dioxin, possibly as early as October 2000. FDA is billing it as a fact-finding testing. No action level for dioxin in fish has been set, but l part per trillion is considered the "background" level. A few years ago FDA initially took drastic action when traces of dioxin were found in catfish and poultry. In that case the source was identified (natural compound in clay used in feed) and use of that clay was discontinued.

Pacific Coast Shellfish Growers Association (PCSGA) received a $98,960 grant from National Marine Fisheries Service to develop Environmental Codes of Practice for the shellfish industry on the Pacific Coast.

In a law suit filed against Taylor Shellfish charging that mussel larvae, feces, and shell debris constituted a pollution source under the Clean Water Act, Judge Franklin D. Burgess, in a summary judgement, ruled that there was "no discharge of a pollutant," as there was no physical production of a pollutant into water from the outside world. A homeowners group filed the suit. Who do you suppose is the greater polluter — the shellfish or the homeowners?

The National Marine Fisheries Service (NMFS) is considering developing an "umbrella" Habitat Conservation Plan (HCP) for shellfish growers. Supposedly a HCP would grant applicants immunity under Section 10 of the HCP. Also under consideration is the possibility of issuing a Low-Impact HCP for small growers. PCSGA members are being asked whether they wish PCSGA to work with NMFS to develop an HCP.

According to George Lockwood, Monterey Bay Foods Group, about 1 million pounds of oysters are being sold through the "natural" or "organics" marketplace where they command a 10-25% higher price than traditional markets. Contact Robin Downing (360-754-2744), PCSGA for additional information on "organic certification" for shellfish or log onto the Organic Trade Association's web site at www.ota.com.

Washington Fish Growers Association adopted the following statement on Transgenic Salmon: "Transgenic fish (as defined by actual transfer of genes from one species to another species) are not used in commercial production in Washington today and should not be used here or elsewhere in the future unless they are proven healthy and nutritious, safe for human consumption and of minimal risk to the environment. Approval by appropriate state and federal agencies is, therefore, an essential prerequisite for their use."

Florida aquaculture continues to make headway in encouraging aquaculture development in Florida through the legislative process. HB 2145, General Appropriations Act FY 2000-2001, adds 5 additional positions to the Division of Aquaculture. Over $1 million of new funding for aquaculture was appropriated. Department of Agriculture and Consumer Services received $150,000 for marketing projects; Mote Marine Lab received $500,000 for sturgeon aquaculture; the University of Florida (UF) received $158,000 for aquaculture support programs; UF support for shellfish in Cedar Key received $99,500; and the UF Tropical

Aquaculture Lab in Ruskin received $121,260 of recurring funds to support its programs.

Additionally Senate Bill 806 (Florida) transferred more duties to the Department of Agriculture and Consumer Services with regards to issuing, regulating and collecting revenues from aquaculture leases. Further simplification of language was also made for marking and commenting on leases. Minor, but positive changes helpful to alligator farmers were included in the bill. Other legislation (1) amended The Right to Farm Act to include aquaculture, (2) aquaculture was included in the definition of "agricultural production," and (3) Florida Building Code was amended to clearly exempt not-residential farm buildings.

The International Salmon Farmers Association recently became worried because salmon is often perceived as "red" meat and as you know beef & lamb sales are declining. They commissioned a consumer study from a French consultant. The consultant's conclusion: salmon is perceived as a feminine food — blessed with beauty and without anxiety, free from threatening behavior, it is attractive to both men and women. Contrary to the claim of many environmentalists, consumer attitude suggests salmon is a safe, non-threatening product with a very good environmental profile.

A recent article in *Nature* (UK magazine) raised sustainability issue of aquaculture is receiving considerable criticism from other member of the scientific community. The study led by Rosamond L. Naylor, a senior research scholar at Stanford University's Center for Environmental Science and Policy claims there is only "at maximum 19 million tons" of net gain of fish from the aquaculture industry (out of 29 million tons in 1997) due to use of fish meal in fish feed. The International Fishmeal and Oil Manufacturers' Association (IFOMA) and several other fishery scientist say the study misinterpreted the pelagic-fish catch assessments of both the FOA and the United States' National Research Council and used outdated trends to arrive at erroneous conclusions. The basis premise is flawed in suggesting that "ever-increasing amounts of small pelagic fish" are being caught for use in aquaculture feeds. In fact, the growth in aquaculture is not directly reflected by an increase in catches of fish for feed — there has not been an upward trend in catches in the past 20 years according to IFOMA. Progress in improving protein and energy conversion rates of fish feeds, increased use of plant protein, and changes in cultural practices are not adequately addressed in the article.

Strong consideration is being given to breaching some of the hydroelectric dams on various rivers so threatened salmon runs will have a better chance of recovery. Naturally this is controversial because the dams generate electricity and control flooding. Along comes the television news show "60 Minutes, which decides to do a story on the breaching of the dams. The National Marine Fishery Service NMFS), the agency contemplating destruction of the dams, invited the producers to also film the record (best in a decade or better) returns of salmon this year. They declined. Why? "They said they didn't want to confuse the issue," reported Jerry Harmon, NMFS biologist.

Alaska Governor Knowles declared key river drainage disaster areas due to lowest salmon returns since 1959. He also ordered state officials to investigate the rivers for possible sources of pollution to explain the low returns. Illegal drift net fishing in international waters and accidental catch by pollock & groundfish trawlers may also be the cause of the low returns.

The volume and value of fish & seafood Imports to USA have increased for 10 consecutive years to a record $9 billion and 3.9 billion pounds in 1999. Source: NMFS www.st.nmfs.gov/stl.

California at a Glance

A strain of exotic algae (*Caulerpa taxifolia*) was identified in California waters - a lagoon 20 miles north of San Diego. The algae poses a threat to native sea plants, fish, and coastal ecology.

The Chinese mitten crab (*Eriocheir sinensis*) is native to coastal rivers and estuaries of China and Korea along the Yellow Sea. In 1992 the mitten crab was discovered in San Francisco Bay, presumably introduced through ballast discharge or through a deliberate release intended to start a fishery. Since then the mitten crab population has exploded on the West Coast and eradication is extremely unlikely. The current debate: Should fishing or aquaculture of mitten crab be permitted? The mitten crab is prized as a culinary delicacy in its homeland but is listed as an injurious species in USA and import prohibited under the Lacey Act. Last year the California Fish and Game Commission denied request to fish or farm the mitten crab. Other states have been (or likely will be) approached. The United States Fish & Wildlife Service has prepared a draft National Mitten Crab Management Plan, contact Kim Webb (209-946-6400, ext. 311) or Jodi Cassell (650-871-7559) for additional information on the plan.

Dennis Sorrell of Grass Valley pled guilty to planting up to 400 channel catfish at Scotts Flat Lake, a misdemeanor under Section 6400 of the California Fish & Game Code (planting fish without a permit) and was fined $1,465.

An editorial in *Western Outdoor News* on electric power versus environmentalism following the power shortages in California this summer stated: "an accounting is very near, and if California continues with its open-door policy for new residents and new housing starts, it's going to have to come up with a plan for more power and more water at the same time planning for less impact on wildlife, waterways and fisheries. We don't see that as anything remotely feasible the way things are going, but it's something we all better consider - and quickly!"

On September 18, 2000 Dr. Robert Moll became the Director of the California Sea Grant College Program. He also serves as President of Sea Grant Association, which provides leadership to all 30 Sea Grant Programs. Previously he served as Director of the Michigan Sea Grant Program. His primary research interest includes the biology of phytoplankton and biostatistics.

California Farm Bureau Federation (CFBF) is working with its members and regulators to develop "safe harbor" regulations. The proposed "safe harbor" agreements between landowners and local government agencies (such as the county agriculture commissioner) will encourage landowners (particularly farmers & ranchers) to practice conservation to the benefit of threatened or endangered species without the fear of mindless government action if an inadvertent take occurs or if the habitat is modified.

The California Fish & Game Commission (CF&GC) must adopt a long-term management strategy to sustain nearshore fishery resources by January 1, 2002. To that end, on June 21, 2000, the commission sent a questionnaire to many nearshore fishery constituents asking for input.

According to the June 2000 report to the Fish Advisory Committee by the Department of Water Resources DFG intended to release up to 1.275 million yearling equivalent striped bass in June or July 2000. DFG also intends to contract with the Fishery Foundation of California (managers of the net pens) and three private aquaculturists to produce yearlings for release in 2000. Additional 168,000 yearlings will be held over for release as 2-year olds in 2001.

The project cost for the Robinson Ranch Salmon Habitat Restoration Project, Merced River has increased from $5.7 million (May 1998) to $7.9 million.

Dave Schuster of the State Water Contractors association strongly rejected the suggestion by CALFED and others that the "Four Pumps Agreement" effort be integrated into the CALFED process and is opposed to other proposals that would strip Four Pumps authority over how to spend its funds.

SeaFood Business magazine in its August issue recommended the following seafood restaurants located near the Los Angeles Convention Center — Café' Pinot, Checkers, Cicada, City Pier Seafood Cudad, Crustacean, McCormick & Schmick's, Pacific Dinning Car, R-23, Tower, and Water Grill.

Bioengineered Food

Below is the Farm Bureau Testimony on Bioengineered Food Presented to U.S. Food and Drug Administration Public Hearing Regarding Biotechnology in the Year 2000 and Beyond in Oakland, California December 13, 1999 .

California Farm Bureau Federation represents more than 85,000 members who produce nearly 350 agricultural commodities. As producers and consumers, we welcome these hearings as an opportunity to review the FDA oversight of biotechnology and identify ways in which the public might be provided with needed information about biotechnology and its many uses. CFBF is an advocate of research and a supporter of technology adoption, including biotechnology. Biotechnology offers opportunities to produce safe, nutritious food that consumers desire in an environmentally responsible manner. People worldwide have been consuming "genetically engineered" food for many years. Ninety percent of the enzymes used in the making of cheese have been genetically engineered since 1990. The genetically engineered enzymes used to prevent bread from turning stale and hard as rock after one day have been in use in bread making since 1993. There are endless examples of genetically engineered food items in nearly every fast-food restaurant, household cupboard and refrigerator worldwide. It is important that consumers become familiar with the terms "genetic engineering" and "biotechnology" so they are not misled or confused by misinformation. Food biotechnology is based on age-old principles of selective breeding that have been used by farmers for centuries to provide variety, improve taste and produce more healthful foods. The only difference is that with today's techniques, plant breeding can be accomplished faster and with greater precision. Numerous scientific authorities, including the California Interagency Task Force on Biotechnology, have stated that there is no reason to distinguish between a plant bred by classical plant breeding techniques or genetic engineering. The National Research Council took the position in 1987 that "no conceptual distinction exists between genetic modification of plants and microorganisms by classical methods or by molecular methods that modify DNA and transfer genes." The NRC also stated that the evaluation of a genetically modified food should be based on the final food product and not the process that modified it. FDA's oversight policy for new plant varieties developed in 1992 adheres to the principles adopted by the NRC by clearly stating that if a food is altered significantly (i.e., composition or nutritional value) from its original state it must be labeled as such. FDA works closely with food companies and performs a thorough consultation and assessment process of new plant varieties. Any perception that FDA oversight is voluntary needs to be dispelled. As currently structured, FDA already has a mandatory labeling requirement that should assure any consumer that if the food product they are eating is significantly different from its original form, such as containing an allergen or new proteins, it would have to be labeled with that information. It would be a disservice to require labeling of every product that has been genetically modified because it would confuse consumers into thinking that a genetically modified food product should be avoided. Voluntary labeling of food products that have never been genetically modified is acceptable provided a government sanctioned labeling program fully identifies the genetic origin of all the ingredients of a food product and provides certification similar to the organic industry. Biotechnology has and will continue to be of tremendous benefit in the development of more nutritious and safer foods. Researchers have begun developing fruits and vegetables that contain beta carotene and vitamins C and E. They are also working on developing a banana that can be used to deliver vital oral vaccines for diseases such as hepatitis B and tomatoes with even more naturally occurring antioxidants. The greatest number of modern biotechnology applications appear in health care, where they offer new hope to patients with AIDS, genetically inherited diseases, diabetes, influenza, and some forms of cancer. New biotechnology-based processes are now used routinely in the production of most medicines, many diagnostic tools, and new medical therapies. Therefore our discussion about educating the greater public of the importance and safety of biotechnology should be comprehensive and not specifically focused on food products. In order for the public and producers to feel comfortable with biotechnology and its use, it is important that information be available to those who want to learn more about the technology. This may include such information as why it is used and how it relates to other production technologies, including medicinal and health care. It is also important to provide access to information about the process that is used to assure the safety and nutritional value of genetically modified foodstuffs relative to that of other

conventional foods. Relative to providing the information, the companies involved in the production of the products as well as the regulatory agencies seem most appropriate. USDA's APHIS Web site and the University of California represent a good start in providing information to the public regarding agricultural use of this technology. The Internet is an increasingly useful way of providing information to consumers. It should continue to be developed by all parties. Informational phone lines and traditional publications can also be useful. The roles that USDA and EPA also play in determining the safety of biotechnology in food and food production are extremely important and should be emphasized in educational efforts with the public. The efforts to communicate with consumers through new Web sites and an independent review of the regulatory process for biotechnology-derived plants by the National Academy of Sciences are examples of a strong coordinated framework to ensure food safety. New ideas to continue and enhance cooperation between the three agencies will only serve to make the process stronger and more efficient. We appreciate the opportunity to provide these comments to you. Biotechnology has great potential for the future, but if we are to realize this potential it is important that the public be comfortable with the processes that are in place to assure the safety and quality of the products they consume. We feel that the system has worked well to date for it has allowed producers access to the products and benefits of the technology and it has also protected the health and well being of consumers. It is important that the general public be equally comfortable with the system. We encourage you to seek ways to assure that the system continues to work as well in the future as it has to date as you address any concerns that exist. This will allow everyone to benefit from the potential improvements that can be made available through the use of this technology. For more information contact: Louie Brown National Affairs & Research Division (916) 561-5610 lbrown@cfbf.com

Proposition 13 Dollars to be Allocated

Over 20 million dollars will be made available for three grant programs funded by Proposition 13 – Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act (Costa-Machado Water Act of 2000)

Sometime in October 2000, request for proposals will be issued by the State Water Resources Control Board for Fiscal Year 2000-2001 funding for the following:

- ⇑ Watershed Protection Program ($8,400,000)
- ⇑ Nonpoint Source Pollution Control Program ($9,200,000)
- ⇑ Coastal Nonpoint Source Control Program ($2,200,000)

Proposals will be due on or about January 16, 2001. CAA is working on a proposal to reduce nonpoint pollution of Tomales Bay.

For additional information or questions contact Justin Malan with CAA at (916) 944-7315 or Jean Ladyman, Chief, Grant and Contract Administration Unit, Watershed Projects Support Section, SWRCB (916) 341-5475.

America's Biggest Abalone Farm Moving Toward Reality

on Polyculture Site in Fort Bragg, CA

Pacific Marine Farms, Inc., starts to see daylight in a horrendous EIR now in second year

By H. Roy Gordon

At full operation, Pacific Marine Farms will be sending 2,000,000 abalone to market each year. It will also be producing upwards of 2,000 lbs. of warm-water shrimp (pennaeus vannamei) per day plus 1,000 lbs. of finfish. This is the concept that drives the principals of Pacific Marine Farms, Inc. (PMF) to keep swimming even if it seems upstream!

After nearly two years in the Environmental Impact Review pipeline, PMF is finally beginning to see some daylight. Costs, however, have escalated: the Environmental Impact Report preparation costs soared from $115,000 in March to $200,000 in July. There's also a charge from the City of Fort Bragg for any City employee time spent on any phase of PMF's application. This could add another $30,000 or more to the cost of the EIR, according to CFO Bud D'Arezzo. Still, the City appears to be more committed than ever before to getting the process moving toward a favorable outcome for PMF.

PMF leases 33+ acres of coastal access land and three industrial buildings totaling 70,000-sq. ft. from the Georgia-Pacific Corporation, which is down-sizing it's large lumber mill in Fort Bragg, CA. The lease also includes electricity and steam from G-P's's 15-megawatt cogeneration plant, which burns sawdust and bark from the mill. Spent steam from the turbine still contains 400-500 F heat which will be piped to PMF's heat-exchanger where seawater will be heated to 86 F for the aquaculture operations.

The shrimp farm phase of Pacific Marine Farms, along with its finfish culture, has been designed by Jim Keeton of Keeton Industries, Fort Collins, CO. Both the shrimp and finfish farms employ closed-loop water systems, requiring only a ten- percent infusion of new water daily. The warm-water shrimp line, with its heavy waste production, features a series of filter steps, which remove about 90% of the waste and unconsumed food. An ozone enriched tank and settling ponds further clean the water, which is then recycled to the system and re-heated to 86 F.

The abalone operations of Pacific Marine Farms, Inc., designed by Fishtech, Inc., employs state-of-the-art technology in the areas of water delivery, feed and effluent treatment. The hatchery and nursery units are located in existing buildings on the site. Here, also, will be a laboratory for testing water quality and for bacterial study. The abalone will be fed entirely on a natural ingredient manufactured food, which will not only have cost, growth, and abalone health advantages, but will make ocean harvesting of kelp unnecessary. Each of the large 2,000 tanks in the grow-out area will be completely independent of all other tanks. The discharge water will flow through settling tanks and UV treatment before being discharged.

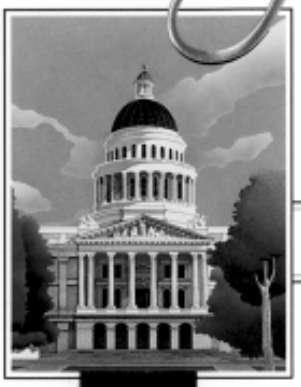
Among other sources, PMF has been talking to a Venture Capital group in Southern California about the next funding. Start-up is pegged at $7 million which will include back-up systems for power and heat. Second and third rounds of funding will bring the total investment to around $20 million over five years.

The EIR consultants will shortly begin the work of compiling all the data into a comprehensive report that will be submitted to the Coastal Commission. There it will be studied and evaluated before being presented to the Commissioners for decision on granting PMF's application.

Pacific Marine Farms' CEO, John Fonseca, is very philosophical about this lengthy, convoluted, unusually expensive process. "We'll simply do whatever it takes to get our aquafarm built. We will be the source of good new jobs for a job-starved Fort Bragg other than minimum wage jobs in the tourism industry. And we'll add new strength to a growing aquaculture industry. Look for us to start growing shrimp, fin-fish and those beautiful abalones next year!"

H. Roy Gordon is a Board Member and past President and Chairman. He is President of FISHTECH INC., a consulting firm specializing in the development of abalone farm planning, construction, training and marketing. FISHTECH has worked on abalone consulting projects in Argentina, Australia, Canada, Chile, Chine, Greece, Iceland, Ireland, Israel, Peru and Uruguay in addition to several major abalone projects in California.

CALIFORNIA LEGISLATURE



Assembly

RESOLUTION

By the Honorable Dennis A. Cardoza
Twenty-sixth Assembly District; Relative to recognizing the

Aquaculture Industry

and the

California Aquaculture Association

Whereas, Aquaculture has been practiced in the State of California for over 100 years since the beginning of the oyster culture in Northern California; and

Whereas, The aquaculture industry has developed into a significant sector in California's agricultural economy valued at more than $80 million annually; and

Whereas, There are over 20 species of aquaculture species grown throughout the state in nearly every county; and

Whereas, Aquaculture provides a safe, reliable and healthful source of protein for local and export consumers; and

Whereas, Farm-raised fish, such as catfish, bass, trout and sturgeon, sustain our recreational fishing in the state through the stocking of lakes and ponds; and

Whereas, Cultured oysters, mussels and abaloneprovide the only available commercial local supply of these shellfish in the state; and

Whereas, Aquacultured plants and ornamental fish bring much pleasure into our lives; and

Whereas, Many farm-raised products help to releive the pressures on wild-caught species of fish and shellfish; and

Whereas, It is appropriate at this time to acknowledge the importance of promoting aquaculture in the state; now, therefor, be it

Resolved by Assembly Member Dennis A. Cardoza, That he takes this opportunity to commend the California aquaculture industry and the California Aquaculture Association on their continuing efforts to promote this important industry in the State of California.

Members Resolution No. 1915

Dated this 2nd day of June, 2000

Honorable Dennis A. Cardoza
26th Assembly District

MISSION STATEMENT
CALIFORNIA AQUACULTURE ASSOCIATION

MISSION

Promote the private production of aquatic plants and animals in California to provide sound financial return on investment consistent with environmental sustainability and social responsibility.

GOALS

- Advocate on behalf of private aquaculture in the State before federal, state and local government;
- Provide quality member services and outreach;
- Promote appropriate marketing and applicable research; and
- Sponsor industry conferences and meetings.

OBJECTIVES

- Secure federal, state and local support for the industry;
- Assure the recognition of aquaculture as agriculture;
- Encourage wise use of natural resources;
- Eliminate overlap and duplication in laws governing aquaculture;
- Resist unfair regulation;
- Protect private property rights;
- Participate in policy dialogue that impacts aquaculture;
- Provide technical assistance to members and public;
- Sponsor annual conference and trade show, regular meetings and workshops;
- Safeguard industry and wild resources against importation of new diseases or potentially harmful exotics into State; and
- Promote protection of surface, ground and coastal water quality.

Farm Bureau News

Seeking to prevent the loss of farmland and agricultural water supplies, the California Farm Bureau Federation and three Farm Bureau members filed suit today against the Cal-Fed Bay-Delta Program. The lawsuit seeks an immediate halt to land and water purchases by Cal-Fed, a group of state and federal government agencies. The suit says Cal-Fed has not adequately addressed the program's significant negative environmental impacts on the state's agriculture, nor does it recognize the contributions to wildlife and habitat that are already a part of many working farms. Plaintiffs in the suit are the California Farm Bureau Federation and Fresno County Farm Bureau members Ted Sheely of Lemoore and Debbie Jacobsen and Don Laub of Fresno. The suit was filed in U.S. District Court in Fresno, and names as defendants the heads of the federal and state government agencies comprising Cal-Fed. The program was created to find long-term solutions to environmental and water problems in the Sacramento-San Joaquin Delta and San Francisco Bay. "California farmland is an environmental resource with worldwide importance," said California Farm Bureau President Bill Pauli. "Cal-Fed seeks to acquire approximately a million acres of farmland and hundreds of thousands of acre-feet of water. Both actions will cause significant environmental impacts in our state's rural areas, often with very few positive contributions to the preservation of endangered species." The lawsuit says both federal and state environmental laws require government agencies to consider significant impacts on agriculture, but that Cal-Fed has not done so. "We really didn't want to file a lawsuit," Pauli said, "but it is our only chance to prevent a massive and unnecessary loss of farmland. Farm Bureau offered specific suggestions for reducing the loss of farmland while preserving water resources that are vital to all Californians. The Cal-Fed plan simply doesn't recognize the environmental benefits of maintaining farmland in production." Cal-Fed filed a "record of decision" in late August, an action that certified federal and state environmental reports and precluded further public comment on the Cal-Fed plan. "California farmers care deeply about the land and its resources," Pauli said, "but they are unwilling to give up more land when the land the government already owns has yet to be managed for peak efficiency in water and species management. In our opinion, Cal-Fed should focus its environmental-restoration work on land already owned by government agencies," Pauli said. "Cal-Fed should work on behalf of fish and wildlife in ways that treat farmers as partners in restoration. This approach will be better for the species and better for the citizens of California. The Cal-Fed agencies have much to gain by working in partnership with farmers instead of seeking to force them off their land." The Farm Bureau lawsuit points out that agricultural land and water are critical environmental resources which produce food and fiber, and that they have a value at least equal to those of open-space land and wildlife habitat. "All Californians benefit from continued agricultural productivity. Many benefit directly because their jobs are tied to farm production, and others enjoy the fruits of the land through lower food bills," Pauli said. "And we must remember that well-managed farmland provides habitat for many creatures. Farmers stand ready to enhance the habitat benefits of their land in partnership with Cal-Fed and its member agencies." Such partnerships, he said, would avoid unnecessary harm to farmers whose land would be directly or indirectly affected by ecosystem-restoration work. The individual farmers joining Farm Bureau in the lawsuit each face the prospect of less-reliable and more-expensive water as a result of Cal-Fed actions. Ted Sheely farms pistachios, cotton, tomatoes and garlic in Kings and Fresno counties. Debbie Jacobsen and her father Don Laub grow grapes in Fresno County. The California Farm Bureau Federation is the state's largest farm organization, representing more than 92,000 members in 53 county Farm Bureaus.

Contact Dave Kranz for further information

(916) 561-5550

(Credit to the California Farm Bureau Federation for the reprinting this item.)

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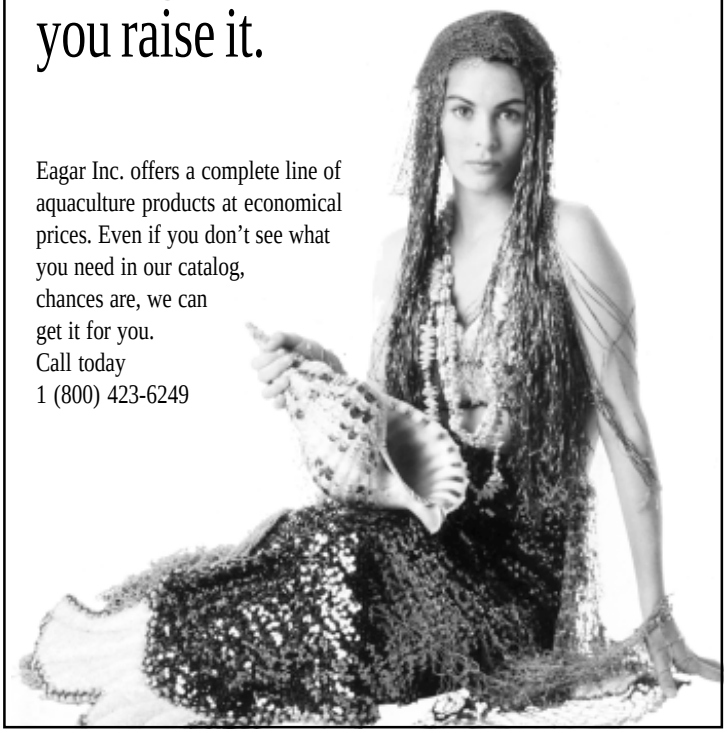

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Interview with Dr Fred Conte, UCD CABA

California Aquaculture Association Interview with Dr. Fred Conte, Acting Director for the UC Davis, Center for Aquatic Biology and Aquaculture (CABA)

What is a Center in the University of California system?

In general, a Center in the UC system is an administrative unit that directs resources toward a focused effort that is usually grounded in research and education. There are many formats for Centers in the system ranging from multi-million dollar internal institutions with international focus, to minimally funded administrative offices for focus groups. The latter relies almost entirely on external grants to conduct research or educational programs. Our Center, CABA, receives modest but significant funding with a focus on aquatic biology and aquaculture.

What is CABA and what is its mission at UC Davis?

CABA, the acronym for Center for Aquatic Biology and Aquaculture, performs a number of functions including administration of the Center's programmatic activities and the campus' two aquatic research facilities and their support staff. Other functions include promotion and development of resources for research and education associated with campus-wide aquatic programs. CABA is defined by its mission statement, so let's get it stated here, and then we can explore the concepts to find out how it works.

Mission Statement "The Center for Aquatic Biology and Aquaculture (CABA) was established to provide leadership, focus and support to University of California Davis researchers in addressing problems associated with California's cultured and wild aquatic biological resources. CABA and its aquatic research facilities provide the basic infrastructure to allow departments within the College of Agriculture and Environmental Sciences (CAES), as well as campus wide, to conduct multidisciplinary and interdepartmental research and associated programs. These activities provide the scientific base to sustain California's natural populations of aquatic species, support the technological framework of the state's marine and freshwater aquaculture industries and create sustainable aquaculture production utilizing the philosophy of resource management."

In this case, infrastructure means budgets and other resources such as the aquatic facilities.

What makes up CABA's personnel infrastructure and the aquatic facilities?

CABA's administrative office is in the Center for Special Programs complex, Room 3202 Meyer Hall. Support staff includes Jan Campbell, Administrative Assistant and Nicole Gibson, Program Assistant. Jan and Nicole are funded through the CABA budget but shared with three other centers in the complex. CABA's Director develops and administers activities with the advice and assistance from the CABA Executive Committee and Advisory Workgroup.

Both of the aquatic facilities are managed by Paul Lutes, Facility Manager. Bill Bentley is the Assistant Manager of the Aquatic Center, and Erik Hallen is the Assistant Manager of the Putah Creek facility. Students are employed part time for general tank maintenance and facility support.

CABA's aquatic facilities represent the largest freshwater aquatic research facility in the UC system and the only ones available to faculty on the Davis campus. The Aquatic Center, a five acre complex, is located about a mile west of the main campus, and the Putah Creek facility is located west of that and near the UC Davis landfill. (See 2001 CAA Conference Tours for facility description)

Who makes up CABA, and are University faculty part of CABA?

There are 42 UC Davis faculty from three colleges (Agriculture and Environmental Sciences, Biological Sciences and Veterinary Medicine) participating in CABA activities, most of whom hold or use animals at the aquatic facilities for teaching and research activities. CABA's primary research programs include 13 faculty and approximately 36 graduate and postgraduate researchers from academic units including Animal Science, Wildlife, Fish & Conservation Biology, Environmental Toxicology, Food Science & Technology, Agricultural & Environmental Engineering, Land Air & Water Resources and the School of Veterinary Medicine.

Participating faculty are not administered through CABA. Each faculty member "belongs to" and is administered by an individual department. CABA services both faculty and departments of the various colleges at UCD sharing objectives that fall under guidelines established by CAES and priorities established by CABA.

How does CABA differ from the original Aqua-culture and Fisheries Program (AFP)?

Actually, AFP was not the original program. The original aquaculture program was established at UC Davis through legislative appropriation in 1973. It was administered from 1973 through 1976 by the UC Davis Institute of Ecology, the Department of Animal Science, and then was reorganized as the Aquaculture Program as a special research effort of CAES in 1977. In 1984 the Aquaculture Program was expanded to become the Aquaculture and Fisheries Program (AFP). In 1999, the AFP was reorganized under the UC Davis, CAES Center concept, redefined and renamed the Center for Aquatic Biology and Aquaculture (CABA). Like the University as a whole, programs and centers evolve to meet both University and statewide needs. The primary differences between CABA and its predecessor, the AFP, are the expectations for each. A center has the same focus as a program, to serve the research needs of participating faculty. However, expectations for cen

ters include broader objectives and accountabilities to CAES administration. Broader objectives include development and expansion of multidisciplinary and cross-departmental programs in aquatic sciences and aquaculture. Broader accountability is the demonstration of contributions to the total mission of the college in terms of research, support of departmental teaching and outreach.

Do the changes in title and concept change the commitment to the state's aquaculture community?

No, the commitment is there. The primary programs in aquaculture of years past are in place today, and the research faculty continues to submit additional proposals for aquaculture during each grant cycle. CABA is committed to aquaculture, and will not only continue to serve the state's aqua-culture interests, but will do everything possible to expand aquaculture research.
Aquatic biology is an integral component of aqua-culture, fisheries and aquatic environmental science. Redefining CABA's mission accomplishes several objectives. It more appropriately defines what we are already doing and expands opportunities to secure additional funding for research activities that support the physical facilities. The programs in toxicology, aquatic animal physiology, and aquatic environmental science have been conducted at the facilities for years and have had significant impact on state environmental issues. Although as aquaculturists you may be less familiar with some of these programs, they have direct and indirect spin-offs that benefit our overall aquaculture programs, both through science and facility support.

How does CABA fit into the University administrative structure? Who does CABA answer to?

CABA is an administrative unit under the CAES. The administrative lines extend from the CABA Director to the Associate Dean for Agricultural Sciences, then to the Dean of CAES. The Dean is responsible to the Chancellor of UC Davis for campus issues and to the UC Vice President of DANR/ANR located in Oakland, who is responsible for overseeing the Land Grant University mission. Davis, Berkeley and Riverside are the three Land Grant campuses in the nine-campus UC System.

What are CABA's resources for research and other programs, and how are aquaculture priorities for these resources established?

CABA operates with an annual budget provided by CAES that supports the administrative staff, facility staff, and provides basic support for water and maintenance. This does not cover the total operational expenses, so additional support is derived from tank charges billed to researchers and paid for through their grants. Researchers apply to CABA for lab space and/or tanks, and the larger requests for resources require a closer compatibility with CABA priorities. Other operational expenses include basic system maintenance from wellhead to the tank, system upgrades, processing of animal care protocols, maintenance of facility permits and monitoring and reporting of effluents. Also included are feeding protocols and tank cleaning, assistance with system design and construction, accounting, recharge service, and administration of some Experiment Station HATCH funding for minor grants.
CABA's current priorities in aquaculture combine previously established and new priorities expanded through processes that have been developed since the Center concept was established. Priority input also comes from multiple sources, including individual growers, the CAA Board of Directors, and researcher-identified fundable opportunities.
The process by which priorities are now established is through the Aquaculture and Aquatic Science Workgroups. The CABA Director and the Executive Committee identify emphasis areas that are refined into sub-workgroups chaired by an Executive Committee member or CABA participant. Each sub-workgroup is charged with developing direction and funding opportunities for proposed research. Sub-workgroups are also expanded and can include other personnel from the University, industry and agencies.

Haven't workgroups been around, and how is this different? How do workgroups influence University funding for research?

The workgroup concept has been around a long time but seldom tied to mechanisms with real influence. Several decisions were made by DANR that have recently increased workgroup influence. There have been limited seed funds available through DANR to stimulate research, but now a segment of the Experiment Station and Extension budget administered through DANR has been designated as only available through the DANR workgroup process. This gated access to funds makes the workgroup process more attractive to potential participants.
A second process that has increased workgroup influence is CABA's recent adaptation of the workgroup route as its principal priority-setting mechanism for access to CABA resources. The process is also more inclusive and provides multiple channels for input.

How does CABA interact with funding agencies such as the Western Regional Aquaculture Center (WRAC), USDA and Sea Grant?

CABA has strong ties to these three funding sources through direct participation on boards and committees and indirect contact through CABA-associated researchers involved in the funding institutions' grant processes. These two avenues also expand contacts into other funding institutions such as the National Institute of Health, U.S. Fish and Wildlife Service, CALFED, Agriculture Drainage Districts, Department of Water Resources, Environmental Protection Agency, and other less obvious sources of support. A major function of CABA is to facilitate the recognition of California's aquaculture and aquatic priorities as appearing on the priority lists of state, regional and national funding institutions.

How do researcher priorities relate to CABA priorities?

CABA supports the concept of academic freedom for research

ers to pursue any direction of research. This concept is basic to the UC system. If a researcher's interests are among priorities of CABA, we actively strive to accommodate the researcher by making resources available. Even if the interests are not listed among CABA's priorities, we still strive to accommodate these efforts with the available resources after priorities are met. Many researchers conduct activities at our facilities that are not among CABA's priorities but are part of the teaching and research mission of the University as a whole.

What are the present CABA priorities for research?

CABA's research priorities are still being developed during this eighteen-month DANR workgroup reorganization period. To date there are seven areas of emphasis: sturgeon biology and conservation; fish and shellfish health and well-being; aquatic finfish and shellfish reproductive biology; biotechnology (genomics & transgenics); intensive aquaculture and aquaculture/environmental interface; conservation of endangered and threatened aquatic species; and invasive and pest species. Some areas will be refined, combined, or lose emphasis if development opportunities or participation are lacking. Please note, although CABA administers the freshwater facilities, it also actively pursues funding for marine interests such as the Bodega Marine Laboratory Molluscan Shellfish Program. Many Bodega faculty are CABA participants. The scope of existing and proposed research is large and covers both freshwater and marine interests. A catalog of this research, along with workgroup priorities and other information, will ultimately be posted on the CABA website (http://caba.ucdavis.edu). The information is being gathered, the databases are being built and this will be one of the chief mechanisms for making information available.

Does CABA have undergraduate and graduate teaching responsibilities?

The teaching programs are the responsibility of departments. CABA has a responsibility to support these teaching efforts and does so through staff participation in hands-on teaching as part of established courses and graduate student training in animal care practices. We encourage the development of expanded courses and teaching programs, but the ultimate responsibility for teaching lies with the departments and teaching faculty.

Why did you take on the job of Acting Director?

For five years after Gary Moberg left the Directorship of the AFP to serve as a CAES Associate Dean for Animal Biology, he and I would meet for lunch two to three times a week to argue, debate and philosophize about the nature of the University and its infrastructure. It was a most stimulating exercise, which included a mix of intellectual, pragmatic and emotional expression. During that time the nature of the AFP was discussed and argued in detail. We did not always agree, but we came to our own joint resolutions. In 1999 when Gary stepped down as Associate Dean to return as Director of AFP, a course of action had been determined for the AFP to be reorganized under a new format that created opportunities to adopt many positive changes. At that time I agreed to serve on the Executive Committee after a long absence because of these new opportunities. Gary began as Director in February, and in August we lost him due to his untimely death. I was elected Chair of the Executive Committee to proceed with CABA's development, and when our present Dean accepted his position, I was appointed Acting Director of CABA in October 1999. I had a strong investment in the changes that Gary had initiated as Director, as well as a commitment to him personally, and I was determined to stay the course.

How do you handle your commitment to Extension programs and CABA's programs, both in terms of time and effort?

Extension programs and CABA's programs are intimately related, as the end result is the generation of information. Prior to accepting this position, my human resources consisted of a 1/5 investment in an outstanding computer programmer and myself. If I left the office for any task, the larger parts of my program would be on hold. At present, CAES provides a full-time post-graduate researcher to help me conduct Extension activities, and the CABA administrative staff assists by providing coverage while I am there and in my absence. Extension coverage has increased, and time management has improved with the additional coverage and assistance.

What has CABA accomplished during your tenure as Acting Director?

The changes and progress made during my tenure as Acting Director result from the support of CABA's highly dedicated administrative and facility staff. Programs for facility upgrades and research initiatives initiated by Gary Moberg have continued. In the past six months we initiated and completed an accounting review and developed a University proposal to adjust tank charges to recover costs. These and other changes have secured CABA's financial stability. The workgroup concept was established as the determinate for CABA priorities. A policy was also developed and implemented to require formal submission of annual requests for tank and laboratory resources including updated information on past and present publication citations, grant information, students, their thesis and dissertation titles and other outputs that were created using CABA resources. The receipt of this information is essential to CABA's continued funding and to supporting the industry's ongoing interests. Once compiled into a standard format, the information will be available in a retrieval database. This is being accomplished with a strong Executive Committee that is committed to building support for CABA from both within and external to the University.

What are the CABA's plans for a Director?

The Dean will likely have a Director in place at least by early 2001.

Have you enjoyed your experience as Acting Director?

It has been both a positive and educational experience.

CAA Logo Contest

CAA is sponsoring a contest to help it develop ideas & images for a logo to represent the diverse California aquaculture industry.

Contest rules:

- Logo must be submitted on one side of an eight and one half by eleven sheet of paper.
- Logo may be in color or black and white.
- Logo may be a sketch or fully completed artwork.
- You may submit as many entries as you wish.
- All entries and creative ideas presented in the entries become the property of the California Aquaculture Association and will not be returned.

CAA's Board of Directors will select first, second, and third place winners and will award cash prizes of $300, $200, and $100 respectively.

The CAA Board of Directors will make the selection. Their decision is final.

Winning entries will be announced in Aquatic Farming and at the 2001 California Aquaculture Conference & Trade Show.

Send all entries, no later than January 1, 2001, to CAA, 3700 Chaney Court, Carmichael, CA 95608

California Aquaculture Association 1999-2000 Legislative Session

- **AB 76 , Keeley:** Marine resources.

  Chaptered by Secretary of State - Chapter 483, Statutes of 1999.

- **AB 238 , Honda and Machado:** Importation: bullfrogs and turtles: local regulation. Chaptered by Secretary of State - Chapter 1062, Statutes of 2000. (09/30/2000)

- **AB 445 , Ashburn:** Sport fishing license fees. Died pursuant to Art. IV, Sec. 10(c) of the Constitution. (02/03/2000)

- **AB 641 , Lempert and Shelley: Topic**: Water quality: enclosed bays and estuaries. Died on inactive file. (02/03/2000)

- **AB 642 , Lempert: Topic**: Wetlands mitigation banking. Chaptered by Secretary of State - Chapter 950, Statutes of 2000. (09/30/2000)

- **AB 993 , Shelley:** Marine resources: Marine Life Protection Act. Chaptered by Secretary of State - Chapter 1015, Statutes of 1999. (10/10/1999)

- **AB 2057 , Briggs:** Reduced fee sport fishing licenses. Chaptered by Secretary of State - Chapter 238, Statutes of 2000. (08/25/2000)

- **AB 2310 , Ducheny:** Resource planning and management. Re-referred to Com. on APPR. (06/06/2000)

- **AB 2387 , Keeley:** California Ocean Resources Stewardship Act of 2000. Chaptered by Secretary of State - Chapter 516, Statutes of 2000. (09/19/2000)

- **AB 2479 , Kuehl:** Cruelty to animals. Chaptered by Secretary of State - Chapter 1061, Statutes of 2000. (09/30/2000)

- **SB 227 , Alpert:** Water quality: nonpoint source pollution. Chaptered by Secretary of State. Chapter 560, Statutes of 1999. (09/29/1999)

- **SB 291 , Chesbro:** California Coastal Salmon Conservation and Recovery Act. Died in Committee (09/03/1999)

- **SB 1834 , Alpert:** Water quality. Vetoed by Governor. VETOED (09/25/2000)

- **SCR 71 , Hayden:**Salmon resources. Chaptered by Secretary of State. Res. Chapter 130, Statutes of 2000. (09/12/2000)

Striped Bass Conservation Plan Results in Resource Enhancement

The California Department of Fish and Game (DFG), the National Marine Fisheries Service (NMFS), and the U.S. Fish and Wildlife Service (USFWS) have completed a five-year effort which will enable DFG to release striped bass into San Francisco Bay.

A Striped Bass Conservation Plan developed by the California Department of Fish and Game (DFG), the National Marine Fisheries Service (NMFS), and the U.S. Fish and Wildlife Service (USFWS) allows striped bass enhancement activities over the next 10 years. These State and Federal agencies jointly developed this Conservation Plan to prevent further striped bass declines and stabilize the striped bass population at 1994 levels of 712,000 adults.

Four hundred striped bass were first introduced on the West Coast in the late 1800s. The fish were moved by rail car to the Sacramento San Joaquin river delta. The fish rapidly reproduced in the delta and many tributaries leading into the delta. Soon there was a major striped bass fishery with enough fish to initiate a commercial fishing industry for striped bass. This commercial take ended in 1935 due to pressure from sport fishing interests. Striped bass abundance peaked in the early 1960's at 3 to 4.5 million fish. Striped bass populations began declining in the late 1960's. Several factors contributed to the decline, including delta water diversions, reduced outflow, zooplankton changes and reductions, pollution, and poaching.

A total of four California producers were contracted to produce the fish for enhancement, D&S Fisheries, The Fishery, Professional Aquaculture and The Fishery Foundation of California. A variety of culture techniques and stocking schedules are being used to insure success. The program calls for fish salvaged from the delta to be raised in netpens as well as fish hatched and raised at inland facilities to supply fish for the program. Striped bass are being stocked at both yearling size,6-8, inches as well as two year old fish at one pound. A tagging program is being conducted to properly evaluate survival and catch rate of fish stocked. A total of 880,000 fish were release in June and July as a result of the efforts of private aquaculturists.

According to a news release issued by DFG in June, the Striped Bass Conservation Plan focuses on striped bass recovery and maintenance, and is part of DFG's

commitment to 1) stabilize and restore the Estuary's striped bass fishery 2) restore and improve habitat for striped bass and other aquatic species; 3) ensure that

(continued on page 29)

The Gauntlet

(This is a new column in our newsletter aimed to stimulate discussion among members and interested parties. The views are not necessarily those of the California Aquaculture Association. We look forward to receiving some feedback via email, fax or mail)

"Nature" Review Article Takes Aim at Feeding Fish to Fish

In the June edition of "Nature" a review article by a host of scientists and marine conservationists focused on the practice of feeding farm fish with wild caught fish. The contributors, including representatives from the Institute of Aquaculture in Stirling, UK, the Beijer Institute in Sweden and the Environmental Defense Fund challenged the industry to reduce wild fish inputs in feed and to adopt more ecologically sound management practices. The article asserts that the diversity of the production systems throughout the world leads to an inherent paradox, namely that "aquaculture is a possible solution, but also a contributing factor, to the collapse of fisheries stocks worldwide".

While detractors of aquaculture have historically cited problems associated with habitat modification and disease and genetic impacts, this relatively new criticism poses a different challenge for the industry – that of meeting a growing public consciousness on the issue of net energy balances – a consideration that for now at least is not being regulated.

Feeding farm fish with wild fish is not too different from growing semi-tropical crops in the desert. In California it is a resource use issue that is driven largely by economic considerations. The determination of the "highest and best use" of the fishmeal or the water quickly becomes a political judgment call rather than a strict farming decision when the externalities of global poverty, declining wild fish stocks, or even broader ethical considerations such as humane treatment of animals and bio-engineering come into play.

The authors champion raising herbivorous fish in favor of higher value carnivorous species – or farming "down the food web". In theory it would work, but in practice, in order to be able to sustain our production levels, we would have to overcome a major challenge. Either we will need to change the palettes of many discerning consumers who favor fish fed with fish or we will have to convince some of these carnivorous species to modify their diet.

Oh yes, maybe more significantly, we may also have to urge the wild salmon, tuna and other highly priced catches to improve *their* feed conversion ratio to one that is at least as good as ours!

(Striped Bass, continued from page 27)

striped bass recovery programs do not jeopardize the continued existence of any state or federally listed species. The Conservation Plan also supports the Fish and Game Commission's goals to stabilize and restore the striped bass fishery in the Sacramento-San Joaquin Estuary. The actions to increase the striped bass population are consistent with the Department's long-term mission and public trust responsibilities. This Conservation Plan is compatible with CVPIA goals of doubling the striped bass population.

The Habitat Conservation Plan incorporates mitigation measures to protect endangered salmon runs, delta smelt and steelhead. These mitigation measures include screening diversions in the Sacramento River to protect salmon on their migration; funding for delta smelt protection; striped bass predation monitoring; and population monitoring for striped bass, salmon and steelhead. Over $2 million dollars will be spent by DFG on these mitigation obligations.

What does more striped bass mean for anglers? The 880,000 striped bass yearlings released this summer will reach legal size in two years, at current survival rates this means approximately 88,000 legal sized fish in 2002. At recently measured harvest levels, that translates to an additional 13,000 striped bass caught by anglers annually. Income generated by striped bass anglers is approximately $400 per striped bass caught and the additional 13,000 fish will add approximately 5.2 million to the California economy.

The funds collected through the sale of the Striped Bass Stamp support the Conservation Plan. The stamp is required to fish for striped bass. This program an excellent example of how private aquaculture, the Department of Fish and Game, and the angling public have cooperated to help stabilize the resources of the state and generate economic prosperity for California.

CAA member SeaGreen Bio (Dean Farrell, owner) was featured in the July/ August 2000 issue of Fish Farming News that focused on US tilapia production. SeaGreen Bio is located near Desert Hot Springs, California and produces over 300,000 pounds a year of tilapia for the live fish market.

Business Developments

CHICO FIRM TO GROW TO MEET EXPANDING MARKETS FOR FISH

Professional Aquaculture Services (PAS) is in the process of expanding its current location near Chico California to increase production to serve the increasing market for live fish. By addition of a liquid oxygen system and the design and construction of a passive water reuse system the current facility is expected to double production in 2001.

The primary activities of the company include the production, sales and distribution of fin fish as well as consulting and marketing services. Fish such as channel catfish, striped bass, sturgeon, Sacramento blackfish and largemouth bass are produced and sold.

PAS has diversified to cover six primary markets.

Fish for State and Federal fish enhancement projects. Stocks for private lakes and reservoirs. Fingerlings to other fish farms. Newly hatched fish for export. Food fish for the live fish markets in metropolitan areas. Management, marketing and consulting services

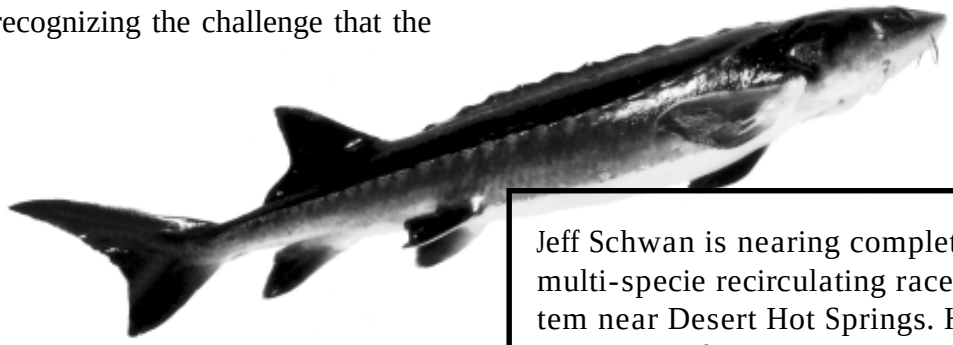
PAS is involved in the California Department of fish and Game Striped Bass Conservation Plan by producing striped bass for stocking in the San Francisco Bay. Fingerlings, yearlings and two-year- old fish are being produced to supply fish to the resource.

PAS is also working in China. Most recently PAS is developing a production site south of Shanghai. The development of techniques for culture of striped bass in open ocean sea pens as well as broodstock management are two of the current goals of the project. The fish are being cultured for sale to other Chinese fish farms and the live seafood markets in China.

For more information please contact Tony Vaught@(530) 343-0405, e-mail tvaught@proaqua.com, or through our website www.proaqua.com.

California Agriculture Secretary Visits Tomales Bay Oyster Farm

CALIFORNIA AGRICULTURE SECRETARY VISITS OYSTER FARM IN TOMALES BAY.
On July 13, Bill Lyons Jr., California's Secretary of Food and Agriculture, visited Hog Island Oyster Company in Tomales Bay to hear about the shellfish industry's problems with polluted growing waters. Secretary Lyons had been invited by Assembly member Kerry Mazzoni, a strong ally of the shellfish industry, to hear firsthand from the growers how runoff into the bay from dairy operations, septic tanks and other non-point sources are jeopardizing the shellfish industry in Marin.
Oyster farmers and dairy farmers broke bread after the tour at a local ranch and treated the Secretary and Ms. Mazzoni to the area's best oysters and steaks. While recognizing the challenge that the diary industry faces in curbing dairy waste run-off into the bay, the Secretary and his staff committed to work with both industries to expedite a resolution to the problem. CAA is committed to working with CDFA and the dairy industry to solicit grant funds from state and federal sources to help with implementation of best management practices that will reduce contamination of the streams and bay.



Jeff Schwan is nearing completion of a multi-specie recirculating raceway system near Desert Hot Springs. He plans to produce catfish, tilapia, and carp. A few tilapia have already been stocked and catfish will be added soon.

A Library Resource on Aquaculture in the San Francisco Bay Area

There is an information center available to aquaculturists in California that you may not know about. It is the Aquatic Research Institute located in the Novalek, Inc., building in the North Hayward Industrial Park near the east side of the Hayward/San Mateo Bridge at 2242 Davis Ct., Hayward, CA 94545, telephone (5 10) 785-2216. It houses about 60 tons of world-wide publications on aquatic sciences and technology and related subjects. It has a full time librarian, Ms. Verle Jean Parker, and copying facilities. It has been gathering literature for decades and receives many of the main journals on aquaculture and fisheries published in America, Europe and Asia. It does not lend publications and other materials, but will copy a reasonable amount gratis or at cost for the user. It is open by appointment 8 am to 5 pm weekdays. A map of how to reach the Institute is on the website www.novalek.com Under "general information about Novalek" that shows how to reach the Novalek building.

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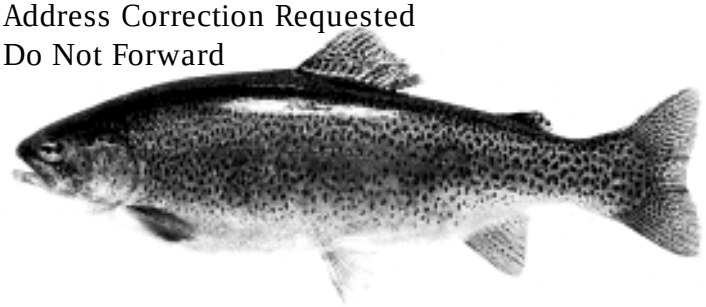

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