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U.S. Aquaculture Society

Providing a national forum for the exchange of timely information among aquaculture researchers, students, and industry members in the United States.

President: Ted Batterson

“We are here to serve...”

I want to welcome you to the first newsletter of 2006 for the United States Aquaculture Society (USAS), a Chapter of the World Aquaculture Society (WAS). It is with honor and pleasure that I serve as President of USAS and I want to express my sincere appreciation for everyone’s support of the Chapter, especially those who serve on the 2006-2007 Executive Board, as well as all Chapter members. I also want to thank Jeff Hinshaw, who is now the Past President of USAS, for his great leadership as President of our Chapter during 2005-2006. I would be remiss if I didn’t also acknowledge LaDon Swann for all that he has done on behalf of the Chapter and whose tenure on the USAS Executive Board ended at the conclusion of the Chapter’s Business Meeting in Las Vegas at Aquaculture America 2006 when his term as Past President expired. Though LaDon will no longer be serving on the Executive Board, he will still be actively involved in Chapter business serving on a variety of committees. I hope I can emulate the accomplishments of all of my predecessors, especially Jeff and LaDon, who have done so much for our Chapter. I also want to thank Laura Tiu, who has taken on being the editor of the Newsletter.

More thanks are in order for Jimmy Avery, who as Vice President for 2005-2006, chaired the Chapter’s Award Committee. He also took on the task of recruiting and coordinating the judging of the student awards (Best Abstract/Travel Awards and Best Presentation Awards) and I want to thank him and all of the judges for all of their time and effort. Many of this year’s winners were announced at the Plenary Session of Aquaculture America 2006 and a

complete list of all award winners is given elsewhere in this newsletter. My congratulations go to all of those very deserving recipients.

All Chapter members who attended Aquaculture America 2006 received a CD entitled “U.S. Aquaculture Outreach Publications 2006” in their registration packet. The CD contains all USDA Cooperative State Research, Education, and Extension’s Regional Aquaculture Center publications and NOAA Sea Grant College Program aquaculture publications. This CD was first envisioned as a publication by the joint USDA-NOAA National Aquaculture Extension Steering Committee, then presented as a project proposal to USAS who took on the responsibility of sponsorship and production. I would like to offer a sincere thanks to all of the many people who brought this CD to fruition, particularly Michael Masser and LaDon Swann, co-leaders of the project, as well as Wade Watanabe (chair) and Jimmy Avery of the USAS Publications Committee who helped administer the project for USAS. The CD is available for sale at \$10 through the WAS on-line store (<http://www.was.org/shopping/ShopExd.asp?ID=398>).

In closing, I would like to extend an invitation for you to contact me or any other Executive Board member at any time. We are here to serve our membership and we can only do that if we receive your input.



A chapter of the World Aquaculture Society



Public Confusion over Seafood

Written by: Gary Fornshell, Univ. of Idaho

Submitted by: Steve Harbell, Regional Editor

In 2004 the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA) issued a joint advisory on mercury and seafood. This was the first time the two agencies issued a joint advisory on mercury and in addition to discussing the risks associated with mercury ingestion they pointed out the health benefits derived from seafood consumption.

Unfortunately when people hear negative news first they tend to ignore the good news. Studies have shown decreases in seafood consumption following FDA advisories. A recent national consumer survey conducted by the University of Maryland Center for Food, Nutrition and Agriculture Policy confirmed what many within the seafood/aquaculture community thought: the public is very confused about the benefits and risks of seafood consumption. Most do not understand the FDA/EPA advisory. They either believe the advisory applies to everyone or they mistakenly believe the advisory applies to the wrong groups within the population, such as the elderly, men, or teenagers. Most could not identify which species had higher levels of mercury and those that have extremely low levels. Clearly, the FDA and EPA need to provide a clear, concise, easy to understand message on the benefits and risks involved with eating seafood.

Since the advisory was issued numerous articles on mercury and seafood have appeared in the print media as well as stories on television news broadcasts. The media has certainly contributed to consumer confusion with their mixed messages, misinformation and sensationalism. Unfortunately many rely upon the media for their health and nutrition information.

The FDA/EPA advisory is for specific high-risk groups: pregnant women, women who may become pregnant, nursing mothers, and young children. It is recommended that these groups should not consume shark, swordfish, king mackerel and tilefish, and limit consumption of albacore (white) tuna to 6 ounces per week. Further, if consuming sport-caught fish they should check state advisories for local waters. However, this group should eat up to 12 oz/wk of a variety of seafood low in mercury such as shrimp, canned light tuna, salmon, pollock, catfish, tilapia, or rainbow trout to obtain the health benefits from seafood consumption. Seafood is an important part of a healthy diet. A high quality protein low in saturated fats, seafood contributes to a healthy heart and is necessary for the proper growth and development of children.

In fact, numerous medical experts argue that there is a greater risk to health with decreased consumption of seafood (American Journal of Preventive Medicine: 2005 volume 29, issue 4).

Due to consumer concerns and mixed messages in the media about seafood safety and health benefits, the United States Trout Farmers Association had the Environmental Quality Institute at North Carolina State University analyze farm-raised rainbow trout from Idaho, North Carolina and Pennsylvania for mercury. The study found that mercury levels are so low in farm-raised rainbow trout that a 160-pound person could eat up to 600 pounds in a year and not exceed EPA's recommended reference dose of 0.1 micrograms per kilogram of bodyweight per day.

Reference doses are usually based on the most sensitive and relevant studies. Often adequate human data is not available and it is necessary to rely on data from animal studies. A dose is set by identifying an exposure that has shown no harmful effects in the most relevant study and dividing it by uncertainty factors to allow for possible differences between experimental animals and humans, and between the average and most sensitive humans. The reference dose represents an intake that is without appreciable risk, but gives no indication of the possible risk at intakes above that level; however, exceeding the reference dose does not necessarily result in harmful effects, even in the most sensitive populations. The reference dose is intended as a gauge, not an absolute number above which a problem is likely to occur, precisely because of the fact that uncertainty factors are calculated into the reference dose.

The EPA mercury reference dose was calculated on the lowest dose at which a subtle subclinical effect was thought to occur (meaning the effect was not actually observed) and then building in a 10-fold uncertainty factor that makes EPA's reference dose for mercury the most stringent standard in the world.

So remember the advice from the American Heart Association – eat fish twice a week.

Reference:

What You Need to Know About Mercury in Fish and Shellfish, 2004 EPA and FDA Advice For: Women Who Might Become Pregnant, Women Who are Pregnant, Nursing Mothers, Young Children. <http://www.cfsan.fda.gov/~dms/admehg3.html>

Hot Topics Seafood Safety



Seafood and especially omega-3 fatty acids are so good for us that the following organizations and documents all recommend increased seafood consumption:

World Health Organization
American Heart Association
Institute of Medicine
2005 U.S. Dietary Guidelines
National Heart, Lung,
& Blood Institute
National Cholesterol E
Education Program
Even the FDA/EPA advisory –
up to 12 oz/wk for the
high risk group

“Medical experts argue that there is a greater risk to health with decreased consumption of seafood.”

AMERICAN JOURNAL
OF PREVENTIVE
MEDICINE



Managing Aquaculture in Federal Waters

Submitted by: John Ewart, Regional Editor
Photo credit: Univ. of New Hampshire



Seafood consumption in the United States has risen to over 16 pounds per person a year. Yet most of this fish and shellfish is not "home grown." Imported seafood — much of it from aquaculture — now supplies over 70% of the seafood eaten by Americans.

Aquaculture legislation pending before the U.S. Congress and recent reports by the U.S. Commission on Ocean Policy and the Pew Oceans Commission all acknowledge the growing significance of domestic marine aquaculture for seafood production and the need for a federal regulatory framework for marine aquaculture.

In addition to onshore and coastal areas, the nation's extensive federal waters, which generally begin at 3 miles off the coast and span out to 200 miles, also hold great potential to reduce the nation's dependence on seafood imports. However, the major stumbling block to offshore aquaculture in the United States is the lack of a comprehensive regulatory framework.

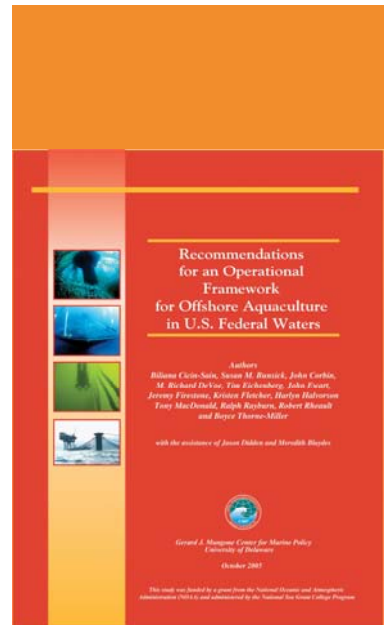
Biliana Cicin-Sain, director of the University of Delaware's Gerard J. Mangone Center for Marine Policy, recently led an interdisciplinary team of experts from across the United States in developing a detailed set of recommendations to overcome current regulatory gaps and deficiencies. The policy study was funded by the National Sea Grant College Program in the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce.

The team's 118-page report, Recommendations for an Operational Framework for Offshore Aquaculture in U.S. Federal Waters, provides guiding principles and specific provisions for the leasing and permitting of aquaculture facilities, site planning and assessment, potential environmental ramifications and steps for mitigating them, and proposed monitoring strategies for facilities raising native fish, shellfish, and seaweeds. The authors note that the question of management of non-native species is set aside for future debate and analysis.

"Sustainable offshore aquaculture has the potential to enhance the availability of food resources for the public," Cicin-Sain says. "Our hope is that this report will help policy makers 'hit the ground running' as consideration of pending aquaculture legislation moves forward."

The report is available on-line as a free download from Delaware Sea Grant's Aquaculture Resource Center Web site at <<http://darc.cms.udel.edu/sgeez/sgeez2final.pdf>>. The printed report may be purchased for \$5 per copy from the University of Delaware Marine Public Education Office at (302) 831-8083. Credit-card orders are accepted. Or make checks payable to "University of Delaware" and mail to University of Delaware, Marine Public Education Office, 222 S. Chapel Street, Newark, DE 19716-3530.

The report's co-authors include Susan Bunsick, who worked on the project as an independent marine policy consultant and is now a policy analyst with the NOAA Aquaculture Program; John Corbin, manager of the Hawaii Aquaculture Development Program in the Hawaii Department of Agriculture; M. Richard DeVoe, executive director of the South Carolina Sea Grant Consortium; Tim Eichenberg, environmental attorney and adjunct professor of law at the Vermont Law School; John Ewart, aquaculture/fisheries extension specialist for the University of Delaware Sea Grant College Program; Jeremy Firestone, assistant professor of marine policy at the University of Delaware College of Marine Studies; Kristen Fletcher, director, Marine Affairs Institute at the Ralph R. Papitto School of Law at Roger Williams University; Harlyn Halvorson, director of the Policy Center for Marine Biosciences and Technology at the University of Massachusetts; Tony MacDonald, past executive director of the Coastal States Organization; Ralph Rayburn, associate director and extension program leader for the Texas Sea Grant College Program; Robert Rheault, president of the East Coast Shellfish Growers Association; and Boyce Thorne-Miller, a consultant for national and international environmental non-governmental organizations.



This Delaware Sea Grant Report (above) details the Policy Framework Needed to Manage Offshore Aquaculture in U.S. Federal Waters.



Secrets of the Black Sea Bass

*Written by: Kirsten Weir, NH Sea Grant
Submitted by: John Ewart, Regional Editor
Photo credit: Karen Roeder/NOAA*

HOT TOPICS
New
Aquaculture
Species

Durham, NH – In a former cowshed on the edge of the University of New Hampshire campus, David Berlinsky, assistant professor of zoology, peers into a big blue plastic tub. Inside, black sea bass circle slowly in the dim light. The converted barn is now an aquaculture research facility for the College of Life Sciences and Agriculture, and home to Berlinsky’s latest research.

Black sea bass feature prominently on many menus, but wild populations of the fish are in decline and their availability is limited. Because of the high demand, they’re a good candidate for aquaculture on the east coast. Except, that is, for one problem: they have a tendency to change sex unpredictably in captivity.

“In the wild, black sea bass are born as females and turn into males at around two to five years old,” Berlinsky explains. “When you bring them into captivity, they change into males more quickly.” Some captive-born fish emerge as males even before reaching adulthood, devoting energy toward reproductive development and away from growth. Such problems make breeding and growing the fish in captivity a tricky proposition.

“Black sea bass is a wonderful fish to culture and to eat,” says George Nardi, vice president and director of GreatBay Aquaculture, a commercial fish farm in Newington, NH. But the sex change problem must be tackled if fish farmers are to bring a high-quality fish to market. “We invest in our brood stocks, the parents of the young fish, much as a thoroughbred horse farm invests in mares and stallions,” he says. “It doesn’t do us much good if we always have to go out and get new females.”

With funding from NH Sea Grant, Berlinsky has teamed with Nardi and GreatBay Aquaculture to study what triggers sex reversal in black sea bass – and how to prevent it. Berlinsky and his colleagues have discovered that fish are more likely to become males if raised at constant temperatures. But temperature is hardly the only factor involved. Sex ratios and density also come into play. Berlinsky’s team found that females were more likely to change sex when no males were present in the tank. Additionally, the fish were more likely to turn into males when kept in crowded tanks.

Berlinsky is continuing his experiments to clarify the role that water temperature plays and to further understand what factors determine the initial sex of captive-born fish. He’s also collaborating with Canadian researchers to study the underlying biochemical mechanisms that cause the fish to change sex. In female fish, estrogen plays the major role, he said. In males, a steroid hormone called 11-ketotestosterone is involved. The scientists are now studying those hormones as well as the enzymes that control them.

By turning off estrogen production, Berlinsky says, he can turn a female fish into a male within a week. Giving 11-ketotestosterone to a female converts it into a male. “We’re studying the ways to control the enzymes that control sex reversal,” he explains. “We’re coming at the problem both behaviorally and biochemically.”

Though he still has details to sort out, Berlinsky believes he has already made important steps. “We have already made progress, determining optimal sex ratios and delaying sex reversal by controlling density,” he notes. “We’ve already made strides toward making black sea bass aquaculture possible.”

“We’ve already made strides toward making black sea bass aquaculture possible.”

DAVID BERLINSKY

USAS Distinguished Service Award

The 2006 recipient of the Society Distinguished Service award has been an integral part of the US chapter since 1989. In addition to serving as Chair of the Finance, Publications, and Program Committees, he has also served on the Rules/Regulations, Election, and Awards Committees. He has held the positions of Newsletter Editor, Secretary/Treasurer, President-Elect, and President.



His scientific contributions include 80 peer reviewed journal articles, 20 non-technical publications, author or editor of 13 book chapters or books, and over 100 presentations. He is a full professor teaching fish nutrition to both undergraduates and graduates and currently serves as editor for the Journal of Applied Aquaculture.

Our recipient of the 2006 USAS Distinguished Service Award is **Dr. Carl Webster** from the Aquaculture Research Center at Kentucky State University.

USAS Lifetime Achievement Award

Our 2006 recipient of the Lifetime Achievement Award has spent 37 years doing basic research, policy development, and industry relations which have made important contributions to aquaculture development in the United States. His work with freshwater shrimp, hybrid striped bass, and coxia has made significant contributions to commercial aquaculture. His



contributions to the understanding and culture of endangered sturgeon, stock enhancement of red drum, and culture of black sea bass and flounder have made critical contributions to our understanding of the biology of the fisheries and potential for stock restoration and enhancement.

He has authored or coauthored 165 articles, advised numerous students, and made presentations at nearly every WAS and USAS meeting since 1974. He worked with others to establish the Waddell Mariculture Center and has been its director since the mid 1990s. The aquaculture community will lose a dedicated champion when our recipient retires from the South Carolina Department of Natural Resources in June 2006.

Our 2006 recipient of the USAS Lifetime Achievement Award is **Dr. Ted Smith**.

M.P. Mulvihill Scholarship

In remembrance of Paul and Michael Mulvihill, the Mulvihill family and Aquaculture Research/Environmental Associates, Inc. (or AREA) have established the M.P. Mulvihill Aquaculture Student Scholarship. Since 2003, the \$1,500 scholarship has been awarded to a USAS student member at the graduate or upper class undergraduate level. The selection is based on financial need, academic history, contributions to the Society, and the student's commitment to date.



This year's winner is a doctoral candidate at North Carolina State University, conducting research to support domestication and selective breeding of hybrid striped bass. It is our pleasure to announce that this year's winner is **Ms. Charlene Couch** (left with Dan Fegan, WAS President).

Big Winners



"Winners are those people who make a habit of doing the things losers are uncomfortable doing."

-- Ed Foreman



Aquaculture America 2006 Best Student Abstract Awards

Each year, three USAS student members who are giving oral or poster presentations are selected to receive a \$200 award to assist in defraying travel costs. Additionally, our trade show vendors donate three registrations that are given to these students. This year's winners (shown with Greg Lutz, Chair of the Student Activities Committee) are:



Jason T. Lemus (top photo), from the University of Southern Mississippi for his presentation "Cannibalism in intensive cultures of *Acartia tonsa* (Copepoda: Calanoida) is affected by gender, copepod density, microalgae density and copepod instar."

Heidi Lewis (middle photo), from Southern Illinois University – Carbondale for her presentation "Plant-based protein sources partially replace menhaden fish-meal in practical diets for juvenile hybrid striped bass *Morone saxatilis* × *M. chrysops*."



Maria T. Gutierrez-Wing (bottom photo), from Louisiana State University for her presentation "Polyhydroxyalkanoates for denitrification in recirculating aquaculture: effect of salinity and nitrate concentration."



Aquaculture America 2006 CRSP Best Student Poster Award Winners

The Aquaculture Collaborative Research Support Program (CRSP) sponsors a poster competition for students at the annual WAS meeting. CRSP encourages research involving sustainable aquaculture development. Aquaculture CRSP student poster winners, standing between Chris Bridger (left), CRSP Research Projects Manager, and Kevin Fitzsimmons (right), CRSP Principal Investigator, are:



Jamie Greene (top photo), Kentucky State University, "Impact of substrate color, material, surface area and mesh size on survival, and growth of freshwater prawn *Macrobrachium rosenbergii* reared in pond microcosm tanks." (First Place)



Kyle Schneider (middle photo), Kentucky State University, "How does length of the nursery period effect subsequent pond production of freshwater prawns?" (Second Place—tie)

Warren T. Jones (bottom photo), University of Alabama at Birmingham, "Dietary vitamin requirements for the sea urchin *Lytechinus variegatus*." (Second Place—tie)



More Aquaculture America 2006 Winners

Oral Presentation:
Vanessa J. Maxwell, "Fouling control for off-bottom oyster culture *Crassostrea virginica* culture using the adjustable longline system" (First Place) and **Marc J. Turano**, "Use of cyclic feeding regimes to elicit a compensatory growth response in pond cultured hybrid striped bass *Morone chrysops* ♀ × *M. saxatilis* ♂ foodfish." (Second Place)

Poster Presentation: **Christopher D. Bentley**, "Preliminary investigations on the effects of dietary lipid level on spawning performance and egg quality in black sea bass" (First Place) and **Nathan Cochran**, "Can freeze dried krill be replaced in the feed training phase of largemouth bass *Micropterus salmoides*?" (Second Place)

Sea Grant Award: **Amanda G. Vincent**, "A model of necrotizing hepatopancreatitis -bacterium (NHPB) epidemics in its shrimp host *Litopenaeus vannamei*."



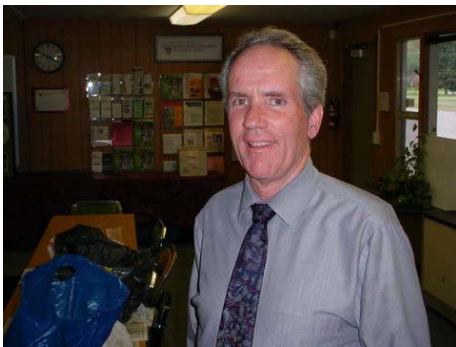
Mixed Bag

Stuff you should know



Photo of the season: Thirteen day old intensively reared larval yellow perch. Yellow perch, *Perca flavescens*, have been unable to transfer immediately to prepared diets due to small mouth gapes and undeveloped digestive systems. These new pictures, from Terence Barry of the University of Wisconsin Aquaculture Program, show some recent progress in successfully habituating yellow perch onto an a dry diet completely in tanks.

Regional Editors: The USAS newsletter relies on regional editors to deliver the news you want to know. Please contact them if you have news to share. Here's a brief snapshot of a couple of our volunteers.



Steve Harbell is an area Marine Resources Extension Agent, providing technical assistance and educational programs for the commercial fishing, aquaculture, and seafood processing industries on the coast of Washington. Marine education, seafood utilization and safety, and marine exotic species management are also included in his program. Steve is also County Director for Washington State University (WSU) Extension in Grays Harbor and Pacific counties, and the WSU Learning Center. He has a BS degree in Fisheries from the University of California, Davis and an MS in Fisheries from the University of Washington.
Email: harbell@wsu.edu



John Ewart is an aquaculture/fisheries extension specialist with the University of Delaware Sea Grant Program at the College of Marine Studies in Lewes, Delaware. His professional interests include aquatic production systems/live transport; commercial and recreational fisheries; shellfish restoration and stock enhancement; water quality management; technology transfer and training; aquaculture policy; and information technologies. John has been a WAS member since 1978 and is a Charter member of the USAS. He organized and has coordinated the WAS Employment Service since its inception in 1984. Other WAS activities include participation on the WAS Membership, Electronic Networking and Student Activities Committees; Vice President, USAS (1999-2000); Director, USAS Board (2002-2004); and Regional Editor (northeast), USAS newsletter (1997-present).
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Managing Threats to the Food Industry: A Common Sense Approach

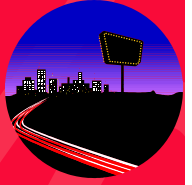
Gerald Kinard, the keynote speaker at Aquaculture America 2006, held everyone in rapt attention describing his in-depth knowledge of the players in the various terrorist animal welfare organizations. He maintains that these people are pursuing the abolition of animal agriculture. To protect our industry, Gerald recommends a common sense HACCP approach. First, perform a vulnerability assessment of your process, people and facilities. Establish preventative measures, like controlling who gets in, to harden the target. Finally, train your employees that it is okay to "ring the bell." Please report any suspicious activity to the Joint Terrorist Taskforce officer on your local police force.



Student Matters

A great time was had by all!

Aquaculture
America
2006 USAS
Student
Reception





Business: U.S. Chapter Report

*Written by: Ted Batterson, President
for the WAS Board of Directors Meeting
Firenze, Italy—May 7-8, 2006*

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Executive Board (2006-2007)

Ted Batterson (President), Jimmy Avery (President-Elect), Brian Nerrie (Vice-President), Jeff Hinshaw (Past President), Wendy Sealey (Secretary/Treasurer), Rebecca Lochmann (Member at Large), Ron Malone (Member at Large), Dennis McIntosh (Member at Large), Wade Watanabe (Member at Large), and Melody Danley (Student Liaison – ex officio)

Chapter Status

As of April 20, 2006 there were 779 people who were considered active members of the US Chapter. Of those, 69 people had addresses outside of the US; the most (10) coming from Canada. A significant number of WAS members with US addresses are not members of the Chapter. We are hoping to increase our numbers through development of a flyer that will be included in the mailing for WAS membership renewals touting the benefits of US Chapter membership.

Budget

Financially the Chapter is in good shape with assets as of March 31, 2006 totaling \$98,330.65. That number includes most of the Aquaculture America 2006 conference revenues.

Activities

Publications – This has been a high priority over the last year and last spring we developed and issued a proposal for publications by USAS/WAS members which continues to run in World Aquaculture magazine. Two publications to date have been approved. The first, a CD compiling USDA Cooperative State Research, Education, and Extension's Regional Aquaculture Center publications and NOAA Sea Grant College Program aquaculture publications, was placed in registration packets of all Chapter members at Aquaculture America 2006 and is now available for sale at \$10 through the WAS on-line store (<http://www.was.org/shopping/ShopExd.asp?ID=398>). The second is a book on BMPs in Aquaculture that is being edited by Craig Tucker and John Hargreaves. This will be a co-publication with Blackwell Publishing that is targeted to be available for sale fall 2007. Another publication that is being considered for co-publication with Blackwell is the proceedings of a symposium entitled "Socioeconomic Aspects of Species and System Selection for Sustainable Aquaculture." It is being edited by Pingsun Leung and Cheng-Sheng Lee.

Students – Our student members continue to be a very active and vital part of our Chapter and we are pursuing how we might collaborate with the Fish Culture Section of the American Fisheries Society in ways that would be beneficial to both organizations' students.

Aquaculture Curriculum Development – Rebecca Lochmann, who co-chairs with Gary Jensen a project on aquaculture curriculum development and is a USAS Member at Large Board of Director, serves as the Chapter's liaison to an ad hoc group called the Ad Hoc Fish Class Project Development Team which is in the process of developing an estimate of the type and amount of support that they will need from USAS, which is being asked to sponsor the project. Current members of the Ad Hoc Fish Class Project Development Team are Gary Jensen, Kevin Hopkins, Matt Landau, Tessa Getchis, Junda Lin, Daniel McVeigh, and Neil Pugliese (student representative).

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