

PROJECT COMPLETION REPORT

97-1 “Northeastern Regional Aquaculture Extension Network”

Termination Report Period: March 1, 1997 – June 30, 2000

NRAC Total Funding: \$171,732.17 (March 1, 1997 – June 30, 2000)

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Linda Howe	University of Vermont Extension System	Vermont
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Project Participants:

Skip Bason	President Delaware Aquaculture Association (Delmarva Aquatics, Inc.)	Delaware
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Frank Ayers	Maine Aquaculture Association (Maine Salmon, Inc.)	Maine
Chris Bartlett	University of Maine Sea Grant Program	Maine
Dick Clime	Maine Aquaculture Association (Dodge Cove Marine Farm)	Maine
Frank Gjerset	Maine Aquaculture Association (Atlantic Salmon of Maine)	Maine
Joseph McGonigle	Maine Aquaculture Association	Maine
Lori Howell	Maine Aquaculture Association	Maine
Mike Ianello	Maine Aquaculture Association (Atlantic Aquafarms)	Maine
Ike Levine	Maine Aquaculture Association (Coastal Plantations International)	Maine
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Melany Spenser	University of Maine Cooperative Extension	Maine
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Ken Bergstrom	Massachusetts Aquaculture Association (Fair Acres Farm)	Massachusetts

Dr. Roger Hanlon	Woods Hole Oceanographic Institute	Massachusetts
Richard Kraus	Massachusetts Aquaculture Association (Aquacultural Research Corporation)	Massachusetts
Richard Nelson	Massachusetts Aquaculture Association (Cotuit Oyster Company)	Massachusetts
Karl Rask	Massachusetts Aquaculture Association (Cape Cod Resource)	Massachusetts
Paul Battistoni	Maryland Aquaculture Association (Aquamar Industries)	Maryland
Dr. Reggie Harrell	University of Maryland, Horn Point Environmental Laboratory	Maryland
Dr. Tom Hopkins	Maryland Aquaculture Association (Biometrics, Incorporated)	Maryland
Dr. Don Meritt	University of Maryland, Horn Point Environmental Laboratory	Maryland
Pat Murphy	Maryland Aquaculture Association	Maryland
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Dr. Tim Jacobsen	Cumberland County College, Aquaculture Technology Program	New Jersey
Dr. John Kraeuter	New Jersey Fisheries & Aquaculture Technology Extension Center	New Jersey
George Mathis	New Jersey Aquaculture Association, (Mathis and Mathis Enterprises)	New Jersey
John Maxwell	New Jersey Shellfisheries Association	New Jersey
Linda O'Dierno	New Jersey Department of Agriculture	New Jersey
Debbie Gile	New Hampshire Aquaculture Association	New Hampshire
Melvin Murrel	New Hampshire Aquaculture Association	New Hampshire
Gordon Wilder	New Hampshire Aquaculture Association (Hy-On-A-Hill Trout Hatchery)	New Hampshire
David Morehouse	New York State Aquaculture Association (Morehouse Bait Farm)	New York
Norman Soule	New York State Aquaculture Association (Cold Spring Harbor Fish Hatchery & Aquarium)	New York
Brent Blauch	Pennsylvania Aquaculture Association (Susquehanna Aquaculture, Inc.)	Pennsylvania
Richard Colantuno	National Trout Farmers Association (Limestone Springs Trout Company)	Pennsylvania
Charles Conklin	Pennsylvania Aquaculture Association (Big Brown Fish Hatchery)	Pennsylvania
Andy Melick	President, Penn. Aqua. Association (Perdue Specialty Feeds, Inc.)	Pennsylvania
Joe McMullen	Pennsylvania State University	Pennsylvania
Gary Reddinger	Pennsylvania Trout Farmers Association (Cherry Valley Trout Farm)	Pennsylvania
Dr. Thomas Zeigler	Pennsylvania Aquaculture Association (Zeigler Bros., Inc.)	Pennsylvania
Roger Clapp	Vermont Department of Agriculture, Food & Markets	Vermont
Shirley Coleman	Vermont Aquaculture Association (Green Mountain Trout Farms)	Vermont
Doug Grimes	West Virginia Aquaculture Association	West Virginia
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Dennis Pitzer
Rob Nichols
Bill Warnick
Ron Widmyer

West Virginia Aquaculture Association
West Virginia Department of Agriculture
West Virginia Department of Agriculture
West Virginia Aquaculture Association
(Federal Hill Trout Farm)

West Virginia
West Virginia
West Virginia
West Virginia

PROJECT OBJECTIVES:

The objectives of the regional extension project (97-1) are to:

- 1. Develop regional educational programs on current topics identified by industry.**
- 2. Assist state Aquaculture Associations with educational outreach on local priority issues.**
- 3. Improve the technical expertise and function of the regional extension network.**

ANTICIPATED BENEFITS:

A shared priority and specific goal of the USDA Regional Aquaculture Centers is the active involvement of Cooperative Extension and the Sea Grant Advisory Service to transfer useful information to aquaculturists and serve as a link or liaison between industry, researchers, state regulatory agencies and the public. The Northeastern Regional Aquaculture Center, through its support of this regional extension project and its predecessor "Development of Northeast Regional Aquaculture Extension Network", is facilitating interaction and resource sharing among Sea Grant Marine Advisory and Cooperative Extension Service agents and specialists from around the twelve northeastern states and the District of Columbia.

Regional educational programming (Objective 1) involving the active participation of members of the NRAC regional extension network disseminates information on a variety of topics relevant to industry development to a diverse private and public sector audience. The regional extension network's participation in state aquaculture association educational initiatives (Objective 2) serves to distribute information at the local level, promotes improved regional industry/extension communication, and is a viable means for soliciting input and responding to industry priorities and concerns. Professional development opportunities for northeast extension personnel (Objective 3) facilitate increased technical expertise and the quality of

educational assistance provided at both the state and regional level.

PRINCIPAL ACCOMPLISHMENTS:

As this is the project final report, brief summaries are provided for all project initiatives. Please refer to the REP Home Page <<http://darc.cms.udel.edu/rep/>> for the original proposal, earlier progress reports describing project and administrative activities, Work Group meeting minutes, regional extension in-service workshops and other project related background information.

Ad hoc extension initiatives to utilize unexpended project funds were developed in proposal form with budget for submission to NRAC. Accomplishments of those initiatives reviewed and approved by The Chair of the NRAC Board of Directors (Bill Wise, New York) and the NRAC BOD Extension Liaison (John Gerber, Massachusetts) are included under the appropriate project objective in this report.

Objective 1. Develop regional educational programs on current topics identified by industry.

Conferences/Workshops

1.01 Industry Summit and Extension Work Group Meeting

An NRAC Industry Summit was held on November 20, 1998 in Rockport, Maine. The Summit was organized in conjunction with the **Northeast Aquaculture Conference & Expo** also held in Rockport, Maine from November 17-19, 1998. The meeting was attended by two aquaculture association representatives from each state (except Maine) and a representative from the REP (JJ Newman, New Hampshire). The purpose of the Summit was to develop a consensus among industry on the highest priority topics and sub-topics to be included in the next NRAC request for proposals. Topics identified for discussion included: regulations – environmental, HACCP, FDA (drugs) and unknown regulations; uncooperative wholesalers (distribution channels); water use conflicts; access to capital – no interaction

with banking community; technology transfer from the public domain; lack of recognition by the federal government; difficult access to insurance; lack of cohesive, directed research; access to help – quick, immediate help when needed; access to markets (need more market research); and the availability of water quality and veterinary information on demand (in crisis situations). Industry also cited the need for better communications and information flow from the NRAC administrative office, and the need for better communication among the individual state associations.

The Extension Work Group meeting, originally planned to be held in conjunction with the NRAC Industry Summit, was convened on August 17, 1999 at the BWI Airport Marriott Hotel, Baltimore, Maryland. The two principal Work Group meeting agenda items dealt with discussion of the current REP (project 97-1) and development of a proposal for a subsequent REP. A summary of the Extension Work Group meeting and supporting documents are posted on the REP web site at <http://darc.cms.udel.edu/rep/>.

1.02 Milford Aquaculture Seminar

Partial REP support was provided for publication of program abstracts and other expenses related to the educational programs at the **18th - 20th annual Milford Aquaculture Seminars** held in New Haven, Connecticut. The 18th annual Milford Aquaculture Seminar was held on February 23-25, 1998. The 19th annual Milford Aquaculture Seminar was held from February 22-24, 1999. The 20th annual Milford Aquaculture Seminar held from February 28- March 1, 2000. Each year, the aquaculture seminar was attended by 100-150 individuals representing industry, research, extension and state/federal agencies. Program abstracts are also published annually in the Journal of Shellfish Research (Appendix Items 1 A-F).

1.03 New England Farmed Fish Health Workshops

The **5th and 6th New England Farmed Fish Health Workshops** were held in Eastport, Maine on April 4, 1997 and from April 3, 1998 respectively. Both workshops were attended by up to 150 persons from industry, government agencies, allied industry and students from the northeastern US and the Canadian Maritime Provinces. The educational programs were developed in collaboration with a planning

committee with members from industry and state/federal agencies. The workshops were supported by a NRAC Extension funds, registration fees and industry donations (Appendix Item 2).

1.04 NRAC WWW Site/Internet Training Workshops

Educating technical, industry and public audiences throughout the region on how to access the NRAC web site and other Internet information resources was accomplished through 1) individual and small group consultations with interested users and with state extension contacts; 2) distribution of a one page flyer via the NRAC information display consisting of the NRAC web site URL <http://www.umassd.edu/specialprograms/nrac/> and a graphic illustrating the NRAC Home Page and its contents (Appendix Item 3); 3) links to the NRAC Home Page from the Delaware Aquaculture Resource Center <http://darc.cms.udel.edu/> and NRAC Regional Extension Project (REP) <http://darc.cms.udel.edu/rep/> web sites and others; and 4) presentations that include a discussion of NRAC, the REP and/or the use of Internet resources for accessing all categories of information related to aquaculture, fisheries and extension education.

The following presentations were given: "**Aquaculture Information Resources**", Aquaculture Certificate Program, Delaware Technical and Community College, Georgetown, Delaware. October 21, 1998; "**Aquaculture Extension Programs in the Northeast Region**". Aquaculture America '99. Tampa, Florida, January 28, 1999; and "**The Live Aquatics Industry in the Northeast Region**". 1999 Maine Fisherman's Forum. Rockport, Maine, March 5, 1999; "**Regional Extension Activities Sponsored by the Northeastern Regional Aquaculture Center**". National Wildlife, Fisheries, and Aquaculture Extension Conference, Portland, Maine, September 29 - October 2, 1999; and "**Accessing Internet Resources for Aquaculture**". Maryland Waterman's Show and Aquaculture Exposition. Ocean City Convention Center, Ocean City, Maryland. January 28-30, 2000.

1.05 Aquaculture Session at Fish Expo '98, Boston

Speaker travel support was provided to organize and conduct a special seminar on "**Aquaculture**

Opportunities for Commercial Fishermen: Shellfish Aquaculture" at 1998 Fish Expo, Boston on October 17, 1998. The educational program attended by 95 commercial fishermen reviewed current and future opportunities and obstacles in commercial farming of shellfish. Presentation titles included: **"Shellfish Culture Techniques 101"**, Gef Flimlin, New Jersey Sea Grant Marine Advisory Service, Toms River, New Jersey; **"Growing Shellfish In Spite of the Neighbors"**, Bob Rheault, Spatco, Inc. Wakefield, Rhode Island; **"Surf Clams: Their Not Just for Chowder, Anymore!"**, Dale Leavitt, Southeastern Massachusetts Aquaculture Center, Massachusetts Maritime Academy; **"See More Scallops: Commercial Fishermen Working in Public Shellfish Aquaculture and Stock Restoration"**, Wayne Turner, The Waterworks Group, Westport, Massachusetts; **"Bags on the Bottom, Clam Culture in Narragansett Bay"**. Dave Beutel, Department of Fisheries and Aquaculture, University of Rhode Island, Kingston, Rhode Island.

1.06 Issues Workshops for Regulators

Year 1 and 2 project funds allocated for this portion of the project (\$5K) were combined with \$10K of combined Year 1 and 2 funds from activity 1.07 (see below). These monies were used as match in 4 separate (unfunded) proposals submitted to outside funding sources in support of in-residence educational conferences for regulators and financial officers from New England and the Mid-Atlantic states.

1.07 Regional Educational Conferences for Regulators and Financial Officers

Efforts to leverage NRAC REP (matching) funds to regionalize a successful in-residence training course for regulators and financial officers originally developed and held in Massachusetts were not successful. A pre-proposal entitled **"An Evaluation of the Effectiveness of a Program to Educate Regulatory and Financial Agents on Important Issues in Aquaculture"** that was submitted to the National Coastal Resources Institute (NCRI) was not funded. Subsequently, a full proposal of the same title was submitted to the National Sea Grant program in response to an RFP for "regional outreach and education initiatives". Although the proposal received very good external reviews, it was not selected for Sea Grant funding support. A scaled down initiative (one Mid-Atlantic and one New

England session) was drafted a means to reduce costs and attract additional external support. The revised proposal entitled **"Meeting the Need - Aquaculture for Regulators"** including \$15K of REP funds as match was submitted in 1998 to the Fund for Rural America and the 1999 Sea Grant Technology RFP. Neither proposal was accepted. Because none of the four proposals (to the National Coastal Resource Institute, Sea Grant (two submissions) and the Fund for Rural America) were funded, the decision was made to redirect these unexpended funds into ad hoc extension initiatives.

1.08 Other Conferences/Workshops and Regional Industry Meetings

Speaker travel support was provided for the **Northeast Aquaculture Conference & Expo** held in Rockport, Maine from November 17-19, 1998. Hugh Warren, Executive Director of the Catfish Farmers of America, was the featured keynote speaker at the conference banquet. His presentation was entitled **"Aquaculture Industry Crisis Management - a Common Sense Approach"** (Appendix Item 4).

(Ad Hoc REP Initiative)

Live Aquatics Conference Sponsorship

Revision of the University of Maryland subcontract and Scope of Work allowed the reallocation of funds originally budgeted in project 97-1 for the **National Aquaculture Extension Conference** held from April 1-4, 1997 in Annapolis, Maryland to be alternatively used for sponsorship and development of an east coast live aquatic products conference. The conference, entitled **"EAST COAST LIVE! 2000 The Business of Marketing Live Aquatic Products"** is scheduled to be held from November 1-4, 2000 also in Annapolis, Maryland. The **National Aquaculture Extension Conference**, sponsored by NRAC and the REP, was held using unexpended funds from NRAC project 95-11. A summary of the **National Aquaculture Extension Conference** is included in this final report in section 3.02 (page 18).

Members of the NRAC regional extension network who played a major part in planning and conducting the 1997 national extension program will also be the principal organizers of the live aquatics conference. REP funds were used for conference planning, organization and advertisement. The conference Co-Chairs (Webster, MD and Ewart, DE) attended **"Shipping and Marketing Live Seafood - Second International Conference and Exhibition"** held November 14-17, 1999 in Seattle, Washington. They

reviewed the program to screen potential speakers, attended, planning meetings with the conference organizers and promoted the upcoming east coast version of the conference. Additionally, funds were used to help support "East Coast Live" in the early planning stages through publication of a conference brochure (Appendix Item 5 A) and establishment of a conference Website:

<<http://www.eastcoastlive.seagrant.org/>>
(Appendix Item 5 B).

NRAC is a primary sponsor for this important meeting, which is expected to attract attendees from the eastern seaboard of the U.S. and international attendees from Canada and Europe. Two thirds of the targeted region to be highlighted is located within the NRAC jurisdiction and most if not all of the topics to be addressed are relevant to or directly involve the various industry segments represented by NRAC. The "East Coast Live" program includes the participation of several industry members, researchers, and extension personnel from the northeastern region. Other confirmed and pending sponsors besides NRAC include Aquaculture In The Mid-Atlantic, the New Jersey, Maryland, Delaware, Virginia, South Carolina, Florida, Rhode Island, and New Hampshire Sea Grant Programs, the Maryland Department of Agriculture and the New Jersey Department of Agriculture.

(Ad Hoc REP Initiative)

Northeast Regional Aquaculture Conference Brochure

REP funds were used to help sponsor development of the **Second Northeast Aquaculture Conference & Exposition** to be held in Portland, Maine during November 2000. Funds were used to print the conference brochure for distribution throughout the region (Appendix Item 6).

(Ad Hoc REP Initiative)

Aquaculture and the Environment Conference Sponsorship

REP funds were used to help sponsor development of the "Marine Aquaculture and the Environment" conference scheduled to be held from January 11 – 13, 2001 at the University of Massachusetts, Boston. The workshop is designed to understand the barriers stakeholders experience to the development of sustainable marine aquaculture and to facilitate a collaborative approach to address these challenges. The conference will focus on four areas: 1) impacts on habitats; 2) interactions between cultured and wild species; 3) mechanisms for building consensus for

action among stakeholders; and 4) effects on marine animals, birds, and invertebrates (Appendix Item 7).

Publications/Videos

1.09 Best Management Practices Publication and Video

Dr. Mike Opitz, University of Maine Cooperative Extension veterinarian and author of the best management practices publication and video withdrew from the REP. Dr. Opitz cited the unanticipated diversion of his time in response to the outbreak of Infectious Salmonid Anemia (ISA) disease that currently threatens the salmon industries in Maine and New Brunswick, Canada. He also cited other changes with the industry and state during the last year. As a result of Dr. Opitz's withdrawal from the project, monies originally budgeted for this activity were considered to be unexpended or surplus funds.

1.10 Predation Fact Sheet

A 4 page technical bulletin entitled "Control of Predators on Cultured Shellfish: Exclusion Strategies" (NRAC Publication 00-04) was submitted to NRAC and was accepted for publication. The publication was co-authored by Dale F. Leavitt, William P. Burt, Southeastern Massachusetts Aquaculture Center. The technical bulletin presents information on exclusion technology to minimize the impact of shellfish predators on shellfish farms. It provides details on one apparatus that has recently been developed that shows promise as a means to exclude predators, primarily large gastropod whelks of the genera Busycon and Busycotypus. The bulletin is currently waiting for permission to use a copyrighted illustration before going to press (Appendix Item 8).

1.11 Water Quality/Discharge Publication for Regulators

A 12 page technical bulletin entitled "Aquaculture Effluents: A Guide for Water Quality Regulators and Aquaculturists" (NRAC Publication 00-003) was submitted to NRAC and was accepted for publication. The publication was co-authored by Jennifer Mugg and Michael A. Rice, University of Rhode Island, Augusto Serrano, University of the Philippines in the Visayas and Angelo Liberti, Rhode Island Department of Environmental

Management, Division of Water Resources (Appendix Item 9 A).

Two presentations related to the publication were made. NRAC Publication 00-003 was discussed and distributed to aquaculture industry members and other interested individuals at the **20th Annual Milford Aquaculture Seminar**, held in New Haven, Connecticut from February 28-March 1, 2000. Approximately 50 fact sheets were distributed. On March 25, 2000 a presentation on aquaculture waste management using NRAC Publication 00-003 was given at the Connecticut Sea Grant workshop **“Issues and Advances in Aquaculture: a Workshop for Connecticut’s Growing Industry”** held in Groton, Connecticut. The workshop was attended by 60 people (Appendix Item 9 B).

Residual funds in the Rhode Island REP budget were also used to print **“Diseases of Cultured Flatfish: Diagnosis and Prevention”** (NRAC Publication 00-001) The publication, co-authored by Richard E. Wolke, David A. Bengston, Michael A. Rice and Maureen Whittaker, all from the University of Rhode Island, was originally part of the NRAC Summer Flounder Project, but never got completed in a timely fashion (Appendix Item 9 C).

1.12 Shellfish Culture Methods Fact Sheet

A 15 page technical bulletin entitled **“Nursery Growout Methods for Aquacultured Shellfish”** (NRAC Publication 00-02) was submitted to NRAC and was accepted for publication. The publication was authored by Gef Flimlin, Rutgers Cooperative Extension. The technical bulletin presents information on the various methods and gear used to raise shellfish seed from post set hatchery production to planting size for field growout. Ten copies were provided to each of the shellfish extension agents in the Northeast and the South, and copies were sent to the NRAC administrative office in Massachusetts (Appendix Item 10).

1.13 INAD/Drug Approval Fact Sheet

Dr. Mike Opitz, University of Maine Cooperative Extension veterinarian and author of the INAD/Drug Approval fact sheet withdrew from the REP. Dr. Opitz cited the unanticipated diversion of his time in response to the outbreak of Infectious Salmonid Anemia (ISA) disease that currently threatens the salmon industries in Maine and New Brunswick, Canada. He also cited other changes with the

industry and state during the last year. As a result of Dr. Opitz’s withdrawal from the project, monies originally budgeted for this activity were considered to be unexpended or surplus funds.

1.14 HACCP for Aquaculturists Fact Sheet

A 10 page technical bulletin entitled **“HACCP Guide for the Aquaculture Industry”** (NRAC Publication 00-005) was submitted to NRAC and was accepted for publication. The publication was co-authored by Ken Gall of New York Sea Grant and Gregg Rivara of Cornell Cooperative Extension. The publication answers frequently asked questions about HACCP (Hazard Analysis and Critical Control Point) by shellfish and finfish farmers. The guide provides information to industry on acceptable and exempt activities under the regulation and what similar practices are included. In addition, more specific resources including sample plans on the Internet that will assist in drawing up or modifying a HACCP plan for aquaculture businesses (Appendix Item 11).

1.15 NRAC Information Booth/Display

The Northeastern Regional Aquaculture Center display was used to disseminate information on the Regional Center and its research program through the distribution of NRAC extension fact sheets, bulletins and other publications, presentation of videos, and individual discussions with supporting extension contacts. Additional displays were purchased for use by other regional extension contacts to distribute NRAC materials at state or regional workshops and seminars in their states and by the NRAC home office either locally or at events and venues attended by the Executive Director. Between March 1, 1997 and June 30, 2000 the NRAC display was set up at 24 conferences and educational venues within the northeast region (see summary on page 27 for a detailed listing). Approximately 39,000 reprints of selected NRAC fact sheets were made for distribution at conferences and workshops, via the NRAC information display(s) and by mail for regional extension personnel. NRAC fact sheets reprinted for regional distribution included: # **101 – Is Aquatic Farming For You?**, # **120 – Aquaculture Systems for the Northeast**, # **130 – Aquaculture Species for the Northeast**, # **150 – Business Planning For Aquaculture – Is It Feasible?**, # **180 – Major Predators of Cultured Shellfish**, # **200 – History & Impact of MSX and Dermo Diseases on Oyster Stocks in the Northeast Region**, and # **300 – State Policies for Aquaculture Effluents and Solid**

Wastes in the Northeast Region. The reprint supply is being stored at the Delaware Aquaculture Resource Center in Lewes, Delaware and the Rutgers Ocean County Cooperative Extension office in Toms River, New Jersey for future distribution via the NRAC information display(s) at regional conferences and meetings.

Objective 2. Assist state Associations with educational outreach on local priority issues.

2.01 Connecticut Aquaculture Association

The Connecticut Aquaculture Association was not awarded a Year 2 subcontract by NRAC because of non-performance issues during project 95-11. As a result monies originally budgeted for this activity were considered to be unexpended or surplus funds. The association was invited to participate in development of a future REP.

2.02 Delaware Aquaculture Association

Association Display

The display was used to disseminate information about the Delaware Aquaculture Association, Delaware high school aquaculture programs, aquaculture research at Delaware State University and the University of Delaware and the Northeastern Regional Aquaculture Center program (Appendix Item 12 A). Estimated cumulative attendance for all venues was over 440,000 visitors. The Delaware Aquaculture Association table top display was set up at the following venues:

- **Delaware State Fair.** Harrington, Delaware. July 23-August 1, 1998. (250,000 attendance).
- **Coast Day.** University of Delaware College of Marine Studies. Lewes, Delaware. October 4, 1998. (3,500 attendance).
- **East Coast Commercial Fishermen's Show and Aquaculture Trade Expo.** Ocean City Convention Center, Ocean City, Maryland. January 29-31 1999. (500 attendance).
- **Delaware State Fair.** Harrington, Delaware. July 22-August 1, 1999. (175,000 attendance).
- **Coast Day.** University of Delaware College of Marine Studies. Lewes, Delaware. October 3, 1999. (estimated attendance: 10,000).
- **East Coast Commercial Fishermen's Show and Aquaculture Trade Expo.** Ocean City, Maryland. January 28-30, 2000 (estimated attendance: 2,000).

NRAC Video Distribution

A total of 250 copies of the NRAC video "**Northeast Aquaculture: Farming the Waters**" were purchased for distribution throughout the state to schools, libraries and to state agency personnel and other Delawareans with activities/interests in the fields of fisheries, agriculture, water quality, public education and economic development.

Delaware Aquaculture Education Program Support

Water quality testing kits and supplies were purchased by the association using REP funds. The test kits along with copies of the NRAC video "**Northeast Aquaculture: Farming the Waters**" were distributed via the Delaware Department of Education to nine Delaware secondary schools (high schools). The nine schools have active aquaculture programs and maintain fish culture systems and water quality laboratories.

Delaware Aquaculture Association Home Page

A Delaware Aquaculture Association Home Page <<http://darc.cms.udel.edu/DAA/daa.html>> was maintained to provide information on the industry association. The DAA Home Page currently carries membership information, a listing of DAA Officers and Directors (2000), the DAA Articles and By-Laws, and other information (Appendix Item 12 B).

2.03 Maine Aquaculture Association

The Maine Aquaculture Association has directed the Maine Aquaculture Innovation Center to retroactively cover the following costs related to travel expenses incurred by speakers at the **7th Annual New England Farmed Fish Health Workshop** held on April 8, 1999 in Eastport Maine: Dr. Myron Roth, Salmon Health/Sante du Saumon, 75 Albert Street, Suite 907, Ottawa, Ontario K1P 5E7, Canada. Dr. Roth made a presentation at the Workshop entitled, "**Availability of Sea Lice Treatments**". Mr. Alistair Goodlad, Trondra, Shetland Islands ZE1 OXL, UK made a presentation at the Workshop entitled, "**Silage Production and Fish Waste Management**" (Appendix Item 13).

2.04 Maryland Aquaculture Association

REP funds were used by the Association to educate the public about the aquaculture business through participation in industry and general public events. Funds in this project were used to build upon previous efforts where the organization purchased a

table top display and a combination TV/VCR. Twenty-four non-copyrighted aquaculture videos were reproduced for exhibition using the TV/VCR unit. The videos ranged from general aquaculture promotional pieces to specific production techniques for use with various species. Additionally, the Association was able to exhibit at events such as the **East Coast Commercial Fisherman's and Aquaculture Trade Expo** in Ocean City, Maryland, the **US Trout Farmers Association meeting** in Baltimore Maryland, as well as the **Maryland State Fair**, held annually in Timonium, Maryland.

Funds were used to provide aquaculture products for an educational products exhibit sponsored by the Maryland Department of Agriculture for state leaders. This exhibit showcased the many varied products produced and marketed by the agribusinesses in the state and served to heighten awareness of the aquaculture industry and its relationship with other facets of agriculture. Travel funds were utilized in order to conduct an educational seminar on "**Yellow Perch Aquaculture**" held on December 20, 1999 at the Maryland Department of Agriculture, Annapolis, Maryland. The seminar was designed to assist the current tilapia growers who were facing severe pinches in markets from overproduction of their species and allow alternative species to reach the live market.

2.05 Massachusetts Aquaculture Association

Two technical workshops were organized by the Massachusetts Aquaculture Association on shellfish and finfish. A farm pond workshop entitled: "**Raise Bait Fish for Fun and Profit**" was held on November 10, 1999 in Hadley, Massachusetts. The workshop was moderated by Ken Bergstrom, Executive Director of the Western Center for Sustainable Aquaculture at Hampshire College. Baitfish producer Dave Moorehouse, and state aquaculture coordinator Scott Soares also gave presentations. The Western Center was assisted by Franklin, Hampden, and Hampshire Conservation Districts. More than 50 individuals attended the workshop.

A second workshop entitled: "**A Historical Perspective on Shellfish Diseases in Massachusetts**", was presented at the Cape Cod Museum of Natural History on February 28, 2000. The program was attended by 56 growers, constables, state officials, and other interested individuals. Speakers included shellfish disease experts Bob

Barber, Haskins Shellfish Research Lab-Rutgers University, Bob Hillman, Battelle Memorial Laboratory, and Roxanna Smolowitz, Marine Biological Laboratory, and Richard Kraus, long time hatchery expert, and President of Aquaculture Research Corporation. The program speakers provided information on shellfish diagnostic work, shellfish health checks, current disease status of Massachusetts shellfish resources, and an industry perspective of shellfish disease problems within the state.

2.06 New Hampshire Aquaculture Association

Trade Show Booth for Annual Farm & Forest Exposition and Other Public Venues

The NHAA set up and staffed a display booth during the 1999 (February 5-6, 1999) and 2000 (February 11-12, 2000) **Farm & Forest Expo**, New Hampshire's annual winter agricultural fair in Manchester, New Hampshire (Appendix Item 14 A). The booth included a Downing display board with photos, 2 large aquaria with examples of New Hampshire farm raised fish species, and copies of a whole variety of RAC publications available for the taking. (The Downing display and the aquaria were purchased with funds from NRAC project 95-11). The New Hampshire Department of Agriculture estimates that 5000-8000 people attend the Expo each year. The New Hampshire Aquaculture Association (NHAA) also set up the Association display at two fairs during late summer 1999 – the **Lake Ossipee Watershed Fair** in Ossipee, New Hampshire, and the **Southeast Asian Water Festival** in Lowell, Massachusetts (Appendix Item 14 B). Both fairs were well attended (200-300 in Ossipee and over 20,000 in Lowell). The NHAA was invited to staff a booth at the **New Hampshire Grocers' Association Trade Show** held from April 23-25, 1999 in conjunction with the New Hampshire Grocers' Association Annual Convention in Manchester, New Hampshire. The exhibit was much the same as that at the Farm & Forest Expo, with the addition of a dressed fish and crawfish display, along with handouts on "**Why Aquaculture Products?**" and "**Seafood Handling Tips**". Over 1000 people visited the trade show (Appendix Item 14 C).

Annual Membership Educational Meeting with Invited Guest Speakers

The NHAA annual meeting was held in conjunction with the **Farm & Forest Expo** on February 6, 1999 and February 12, 2000. REP association funds were used for (invited) speaker support. Educational

speakers at the 1999 annual association meeting included 1) **“How to Sell Your Fish to Grocery Stores”** by John Dumais (NH Grocers’ Association); 2) a presentation/discussion of the **“NH Seal of Quality Program”** by Dick Uncles (NH Dept. of Agriculture); and 3) a school aquaculture talk by the FFA students at the Seacoast School of Technology/Exeter High School. Approximately 30 people attended the meeting. Educational presentations at the 2000 annual association meeting included: 1) **“Aquaculture in Recirculating Systems, Large and Small”** by Steve Van Gorder of Alternative Aquaculture Association in Pennsylvania; and 2) **“Sustainable Aquaculture in the Twenty-First Century”** by Ken Bergstrom of the Western Massachusetts Center for Sustainable Aquaculture. Approximately 40 people attended the meeting.

Establishment of a “Self-Education Library”

Project funds from this grant were used to purchase a number of aquaculture textbooks. These books are available for checkout to NHAA members and others who are interested in educating themselves further with regard to aquaculture. The books (and CD-ROM) purchased were:

Aquaculture: Principles & Practices
Aquaculture Management
Sustainable Aquaculture
Physiology of Fish in Intensive Culture
All About Aquaculture
CD-ROM Trout and Salmon Culture
Fish Hatchery Management

Display Improvement

To further improve the educational display that the NHAA takes to fairs and shows throughout the year, the association purchased a chiller so that trout and other coldwater species can be safely displayed at outdoor events in the summer; a TV/VCR combination to play videos with the display; and folding tables to accompany the display.

(Ad Hoc REP Initiative)

Cage Culture Workshop

A full day educational program educational program **“Growing Fish in Cages”** was held at the Kingman Farm, University of New Hampshire, Durham, New Hampshire on Saturday, April 22, 2000 (Appendix Item 14 D). Forty-one people registered for the workshop, with 36 people from New Hampshire, 2 from Vermont, 2 from Massachusetts and 1 from Rhode Island.

During the morning session two videos on caged fish culture were shown – “Hybrid Striped Bass in Cages”

from Illinois/Indiana Sea Grant and “Cage Culture: Raising Fish in a Pond” from the University of Maryland. The videos were followed by lectures on: 1) How to grow fish, 2) How cage/pond systems work, 3) Keeping your fish healthy, and 4) Sources of fish, feed and supplies. The afternoon consisted of a lab session where participants constructed actual fish cages.

Summary of Participant Evaluations

Participants were evenly split between those who only want to grow fish for their families and those who are looking to start aquaculture businesses. Some of the participants said that they want to begin by growing fish for their families and then move on to commercial aquaculture if they are successful on the smaller scale. Two of the participants were teachers who wanted to learn as much as they could to pass on to their students. Ten percent of participants had been interested in aquaculture for less than one year, 25% had been interested for 1-2 years, 35% had been interested for 3-5 years, and 30% of the participants said that they had been interested in aquaculture for over 10 years. 83% of participants said that the workshop met their expectations, 11% said that the workshop “mostly” met their expectations, and 6% said that their expectations were “more than” met. Participants were asked how much their knowledge of raising fish had increased by attending the program. On a scale of “none – some – a lot – an incredible amount”, more than half said “a lot”, 25% said “an incredible amount”, and 20% said that they had only learned “some” about raising fish. When asked how soon they plan to start raising fish, 20% said 1 month, 35% said 3-6 months, and the rest said from 1-2 years. When asked how much the program was worth to them, 16% of the participants said up to \$25, 42% said \$25-\$50, 37% said \$50-\$75, and 5% of the participants responded that the program was worth \$75-\$100.

All respondents stated that they would recommend this workshop to other people, and that we should offer more of them.

2.07 New Jersey Aquaculture Association

Ornamental Aquatic Plant Production Seminar

A one day seminar on **Ornamental Aquatic Plant Production** was held August 6, 1999 at Cumberland County College in Vineland, New Jersey (Appendix Item 15 A). The seminar was sponsored by the New Jersey Aquaculture Association, NRAC (REP),

Rutgers Cooperative Extension, and the New Jersey Department of Labor. A video-conference link also made the program available to participants at the Monmouth County Marine Academy of Science and Technology in Sandy Hook, New Jersey. A video of the program was also made for use within the state. The program, attended by 45 people, covered all aspects of aquatic plant production and marketing. Association REP funds were used for visiting speaker travel support. Speakers (and their presentation titles) included Carl Schulze, Division of Plant Industry, New Jersey Department of Agriculture, “**Importation of aquatic plants into New Jersey**”; Dr. David Sutton, Professor of Agronomy (Aquatic Plants), Institute for Food and Agricultural Science, University of Florida, “**Varieties and growth habits of aquatic plants**”; Dr. Gene Giacomelli, Professor of Bioresource Engineering, Rutgers University, “**Providing growing conditions needed by aquatic plants**”; Dr. David Sutton, “**Fertilizing, managing and propagating aquatic plants**”; Don Schnoor, Sr., Aquatic Plants and Koi Company, Jobstown, New Jersey, “**Sources of plants and supplies**” and “**Marketing aquatic plants**”. A question and answer panel composed of speakers and local growers was held at the conclusion of the presentations.

Annual Aquaculture Conference

Aquaculture X was held on January 8, 2000 at the Rutgers Cream Ridge Research and Extension Center, Cream Ridge, New Jersey (Appendix Item 15 B). The program was attended by over 40 people and the lecturers were from five states and Canada. The topics were split between finfish culture and shellfish culture. Aside from NRAC and NJAA there were seven other co-sponsoring organizations. Topics included algal culture, surf clam and oyster production, aquaculture economics, New Jersey regulations, black sea bass production, trout and arctic char production, engineering and finances for recirculation systems, and foreign markets for cultured species.

Aquaculture Association Display

The tabletop display, developed by the NJAA as part of NRAC project 95-11, to distribute information and extension literature was set up at two educational programs:

- **Ornamental Aquatic Plant Production.** Cumberland County College, Vineland, New Jersey August 6, 1999; and

- **Aquaculture X.** Rutgers Cream Ridge Research and Extension Center, Cream Ridge, New Jersey. January 8, 2000.

2.08 New York State Aquaculture Association

Long Island Fishermen’s Forum

Support through the New York State Aquaculture Association (97-1 project funds) was provided for out of state speaker travel for the **1999 Long Island Fishermen’s Forum Aquaculture Session** held on January 22, 1999 at Suffolk Community College, Riverhead, New York (Appendix Item 16). Presentations included (* denotes travel support funded by NYSAA/NRAC): **Vibrio parahaemolyticus- a new problem for the shellfish industry in the northeast**, Dave Relyea, F.M. Flower and Sons, Inc., Oyster Bay; ***Characteristics and Size of the Emergent Market for Live Bay Scallops in the Northeast United States**, Executive Director Richardson, E.J. Richardson Associates, Inc.; ***The practicalities and problems in today’s live scallop industry**, Jeff Gardener, Shellfish for You, Westerly, Rhode Island; **An economic and social evaluation of an oyster mariculture training program for Long Island commercial fishermen**, Steve Lang, York College; and ***Blue mussel culture on Prince Edward Island**, Jeff Davidson, University of Prince Edward Island.

NRAC-REP funding supported speaker travel for the **2000 Fishermen’s Forum Aquaculture Session** held on January 21, 2000 at Suffolk Community College’s Eastern Campus in Riverhead, Long Island, New York. The program was attended by 60 persons. Speakers supported with this funding presented information on timely issues for New York State shellfish culturists, including: results from a floating hatchery and tidally-powered floating upweller system and crab predation on hatchery-reared clam seed. Specifically, titles and speakers were as follows: **Design of a floating hatchery and performance data for a modified tidal upweller nursery**, Rick Karney and Jack Blake, Martha’s Vineyard Shellfish Group, Oak Bluffs, Massachusetts; **Green crab predation**, Bill Walton, fisheries science graduate student, Smithsonian Museum/University of Maryland.

Duplication of Extension Publications

Copies were made of extension publications frequently distributed to existing and potential culturists in New York. These included shellfish and finfish fact sheets and other appropriate items used in

joint educational efforts conducted by Cornell Cooperative Extension and the New York Aquaculture Association. Publications that were duplicated included a video produced by Cornell Cooperative Extension entitled “**Small Scale Oyster Farming**”; a New York Sea Grant fact sheet “**Getting Started in Shellfish Mariculture in New York State**” and a Cornell University bulletin, “**Fish Management in New York Ponds**”.

2.09 Pennsylvania Aquaculture Association

Pennsylvania Aquaculture Association Annual Meeting

Support through the Pennsylvania Aquaculture Association’s 97-1 project funds was provided for out of state speaker travel for the 1998 association annual meeting held from October 13-14, 1998 at Seven Springs, Pennsylvania. Betsy Sheehan, Executive Director of the National Aquaculture Association was the invited speaker. Her presentation was on “**Aquaculture Product Marketing and Sales**”. Additional support was provided for out of state speaker travel for the 1999 Pennsylvania Aquaculture Advisory Council meeting and the annual meeting of the PAA held on September 30, 1999 in Harrisburg, Pennsylvania. Dr. Eric May, University of Maryland, was the invited speaker. His presentation reviewed the State of Maryland’s fish health regulations.

PAA Trade Show Information Booth

The PAA set up it’s tabletop display to distribute association information and literature at 1) the **1998 annual meeting of the Pennsylvania Aquaculture Association** held in Seven Springs, Pennsylvania from October 13-14, 1998; 2) the **1999 Pennsylvania State Farm Show** in Harrisburg, Pennsylvania from January 9-15, 1999 and the **2000 Pennsylvania State Farm Show** in Harrisburg, Pennsylvania from January 8-13, 2000. Over 250,000 people attended the week long event each year; 3) the **US Trout Farmers Association Annual Conference & Trade Show** in Baltimore held from August 18-20, 1999 in Baltimore, Maryland. Approximately 150 people attended the event; and 4) the **1999 Pennsylvania Aquaculture Advisory Council** meeting and the **annual meeting of the Pennsylvania Aquaculture Association** held in Harrisburg, Pennsylvania from September 30, 1999.

2.10 Rhode Island (Ocean State Aquaculture Association)

The association declined to accept a subcontract, citing the contract issuance delay and the reduced time to complete proposed activities, the cumbersome University of Rhode Island (URI) administrative requirements and the resignation of Dr. Michael Rice, URI Cooperative Extension as the association’s institutional contact. As a result monies originally budgeted for this activity were considered to be unexpended or surplus funds.

2.11 Vermont Aquaculture Association

A final report from Vermont Cooperative Extension and the Vermont Aquaculture Association was not submitted by the requested deadline and is not included in this report.

2.12 West Virginia Aquaculture Association

Aquaculture in the Mountain State Brochure

A brochure with information on the West Virginia aquaculture industry was produced by Aggie Spicer at West Virginia University (Appendix Item 17 A). The brochure, primarily targeting public audiences and state agency personnel, was distributed throughout the state via a general mailing to the WVAA membership; a general mailing to the West Virginia University Extension “Fish List” for West Virginia and adjacent states; to participants at a multi-state **Aquaculture Forum** held on January 8, 2000 in Sutton/Flatwoods, West Virginia; and to aquaculture tour participants at the **Economic Development Summit** held in Beckley, West Virginia on April 4-6, 2000. The brochures are designed such that they will not become quickly out of date. They will continue to be of use for a variety of educational events in the foreseeable future.

West Virginia Aquaculture Association Web Site

The WVAA web site was completely redesigned (Appendix Item 17 B). The vendor was changed from CyberTimes Inc. of Morgantown, West Virginia, to Mountain State Trout Hatchery of Franklin, West Virginia. A new, simpler web address was obtained <www.wvaquaculture.com>. The WVAA web page contains information such as West Virginia Aquaculture Association minutes, regional aquaculture activities, and a listing of West Virginia Aquaculture producers and WVAA officers. Information on upcoming meetings is posted as well as information on West Virginia college and high school ag-science programs. Another new feature is

a threaded discussion where individuals can post questions, or information so others can respond. Information regarding feed suppliers, fish health and links to other sites is also provided. This site will continue to be developed as a focus of information for producers in West Virginia and adjacent states.

(Ad Hoc REP Initiative)

Aquaculture Forum

An **Aquaculture Forum**, organized by West Virginia University Extension Specialist Ken Semmens, was held on January 8, 2000 in Sutton/Flatwoods, West Virginia. The meeting was hosted by West Virginia University (WVU) Cooperative Extension Service and sponsored by the West Virginia Aquaculture Association (with support from the NRAC REP). The program targeted producers and suppliers from West Virginia and surrounding states with information on recent developments in West Virginia aquaculture and included a session with producers from outside the region who run aquaculture businesses of parallel nature to aquaculture businesses in West Virginia and the region. Invited speakers included Ken Cline, Boulder, Colorado. Ken operates a trout hatchery and sells his fish primarily to the recreational market. Pete Rieff, Murphysboro, Illinois. Pete operates a farm which produces a cool and warm water fingerling fish. Renee Stevens, Marion, North Carolina. Renee operates a fee fishing lake which has a novel contest format. The program also helped to: acquaint producers and supporters of aquaculture in West Virginia with the developing research program at West Virginia University; provide an opportunity for producers to become partners in the aquaculture research program at WVU; provide an opportunity for producers to meet each other and discuss items of mutual interest; bring in producers from other parts of the country to describe successful and unsuccessful strategies in their aquaculture businesses; and stimulate dialogue among researchers and aquaculture producers in West Virginia and build relationships among West Virginia producers and producers around the nation.

(Ad Hoc REP Initiative)

Bioassay – Rainbow Trout in Effluent of Acid Mine Drainage Treatment Plants

Permission was solicited from two mining companies to conduct a bioassay in four different locations in northern West Virginia. Management with Eastern Associated Coal Corporation quickly responded with verbal and written permission to stock a cage of

rainbow trout in the polishing pond receiving discharge from an Acid Mine Drainage (AMD) treatment plant. One hundred fish were stocked (50 fish were placed in the cage and 50 fish were stocked in the pond) on May 26, 2000. Water quality data continue to be collected twice each week. Growth data is collected monthly. There has been no mortality of trout stocked into the cage. Data collection is expected to continue for a full year. Consolidation Coal Company verbally agreed to the project, but there has been delay obtaining a written agreement. Liability concerns have only recently been addressed and we expect to stock trout into three cages at three different locations once the letter of agreement is in hand. Mountain Partners, Inc. (Elkins, West Virginia) has obtained support from the Tucker County Economic Development Authority to pay local individuals to collect data and feed the fish in the cages at the two AMD treatment plants in Grant County. Orientation of these individuals was conducted on site on June 23, 2000.

Objective 3. Improve the Technical Expertise and Function of the Regional Extension Network.

3.1 Regional Extension Survey (S&O Report)

A survey questionnaire was developed and distributed during December 1997 to 75 individuals in the northeastern region representing extension (state contacts), industry (state association presidents), and government (state aquaculture coordinators). A total of 46 questionnaires were returned representing a 61% return rate (Appendix Item 18 A). Results were distributed at the **5th annual extension in-service training workshop** held in conjunction with **Fish Expo** in Boston, Massachusetts on October 16, 1998 and are posted on the REP web site at http://darc.cms.udel.edu/rep/NRACsurvey/nra_survey.html.

3.2 National Aquaculture Extension Conference

The northeastern region hosted the **2nd National Aquaculture Extension Workshop** in Annapolis, Maryland from April 9-12, 1997 (Appendix Item 18 B). A summary of the workshop program, short courses and tours is available on the Internet at <http://www.mdsg.umd.edu/extensionconf/summary.html>. The meeting was well attended by Sea Grant and Cooperative Extension agents and specialists from states representing the northeast and

the other four USDA regional aquaculture centers. Don Webster (Maryland) and John Ewart (Delaware) served as conference Co-Chairs. The Local Arrangements Committee, consisting of extension contacts (and REP participants) from the Mid-Atlantic states (Maryland, Delaware, New Jersey and West Virginia), arranged a series of tours of commercial operations including trout farms in West Virginia, ornamental fish and aquatic plant operations in western Maryland, and an urban finfish facility at the University of Maryland Biotechnology Institute's Center of Marine Biotechnology in Baltimore. Northeast extension personnel also participated extensively in the conference program as session chairs and as speakers. The Conference also provided extension specialists with short courses on aquaculture techniques in shellfish, finfish and recirculating systems, as well as applications on biotechnology and use of the Internet to locate and deliver diverse information, using text, photographs and video. The 4th Northeastern Regional Extension Workshop, the annual opportunity for regional extension contacts to meet, exchange information and receive in-service training in a variety of subject areas, was held in conjunction with this national extension meeting.

3.3 1997 – 2000 Annual Extension Workshops

Project funds were used to organize annual one day training workshops for regional extension contacts. The workshops, held in conjunction with another regional educational event, provided the opportunity for state extension personnel from around the northeast to meet, exchange information and attend and/or participate in the associated educational program. The workshop program agendas included in-service presentations on technical topics to improve extension expertise; updates on NRAC activities; reviews of state extension programs; and discussion of administrative and other issues related to the NRAC Regional Extension Project. Attendance ranged between 17-25 state extension personnel at each workshop. Annual REP workshops were held at the following locations:

The **4th Annual Northeastern Regional Aquaculture Extension Workshop** was held on April 10, 1997 at the Holiday Inn Hotel, Annapolis, Maryland. The meeting was held in conjunction with the 2nd National Aquaculture Extension Workshop). Annapolis, Maryland. April 9-12, 1997.

The **5th Annual Northeastern Regional Aquaculture Extension Workshop** was held on October 15, 1998 at the World Trade Center, Boston, Massachusetts. The meeting was held in conjunction with the Fish Expo which ran from October 15-17, 1998.

The **6th Annual Northeastern Regional Aquaculture Extension Workshop** was held on Wednesday, September 29, 1999 at the Radisson Hotel, Portland, Maine. The meeting was held in conjunction with the National Wildlife, Fisheries and Aquaculture Extension Conference which ran from September 29 – October 2, 1999.

The **7th Annual Northeastern Regional Aquaculture Extension Workshop** was held on March 8, 2000 at the Hynes Convention Center, Boston, Massachusetts. The meeting was held in conjunction with the International Boston Seafood Show which ran from March 7-9, 2000.

3.4 1997 National Association of County Agricultural Agents (NACAA) Annual Meeting

REP participants organized and conducted two in-service training workshops on infusing aquaculture education into traditional Vocational –Agriculture curriculum and the basics of fish culture at the annual meeting of the **National Association of County Agricultural Agents (NACAA)** held in Burlington, Vermont from July 13-15, 1997. The seminars were attended by several hundred agriculture extension contacts from the northeastern region and extension programs from other regions of the United States.

3.5 State Extension Program Assistance

REP funds were utilized to improve the availability of resource and reference materials for extension agents and specialists within the northeast. Funds were allocated toward one half the cost of books, CDs, periodicals, and related material for those with designated aquaculture extension appointments. Extension personnel were able to upgrade their reference texts on subjects that they were lacking in, or have been able to gain access to periodicals that were previously out of their range through severely restricted budgets. This leveraging of funds has allowed specialists to have in their possession current material relating to the production and marketing of fish and shellfish products and should better serve the industry by allowing quicker access to questions

raised. Funds were also utilized to support travel for aquaculture specialists to attend in-service training programs such as the Recirculating System Short Course held annually at Cornell University in Ithaca, New York. Providing support for this type of professional improvement has significantly assisted in providing technical expertise at the local level for direct industry application.

Regional Extension Project Home Page

An REP home page on the World Wide Web <<http://darc.cms.udel.edu/rep/>>, first established during NRAC Project 95-3 “**Development of a Northeastern Regional Aquaculture Extension Network**”, continued to be maintained during NRAC Project 97-1 (Appendix Item 18 C). The Website provides easy access to project related information and other resources for project participants, regional extension contacts, industry members and anyone else interested in project activities, progress and results. The page also proved to be a valuable resource for project coordination and the distribution of detailed information about upcoming workshops, meetings or other project related matters.

The REP home page, developed and maintained by the project coordinator, is located on the server of the Delaware Aquaculture Resource Center at the Delaware Sea Grant Marine Advisory Service, College of Marine Studies, University of Delaware in Lewes, Delaware. The site includes project proposals, progress reports, extension and state association directories, training opportunities, and numerous links to other resources of interest to extension along with the Delaware Aquaculture Resource Center home page, NRAC and other RAC home pages and The Aquaculture Network Information Center (AquaNIC).

(Ad Hoc REP Initiative)

Library of Digital Images and Video of Industry Facilities, Equipment and Methods for Extension Outreach

An initiative for the creation of a website of “tips, tricks and techniques” collected by extension and made available to the aquaculture industry is planned for the next NRAC Regional Extension Project Proposal. To begin developing a library of images and video as material for this website, two digital video/still cameras were purchased. The cameras, housed in Delaware and Long Island, New York will be available to extension personnel from surrounding

states in the region for filming or otherwise documenting aquaculture sites and other industry related methods, procedure and activities in their states, or when working in areas outside the northeastern region. Gregg Rivara (New York) will archive all materials (crediting the photographer and aquaculture firm) and will include a selection of these images and video on the web site to be developed under the next regional extension project proposal.

IMPACTS:

- REP activities and annual in-service workshops have increased the level of communication, interaction and resource sharing among Sea Grant Marine Advisory and Cooperative Extension Service agents and specialists from around the twelve northeastern states and the District of Columbia.
- Collaboration of regional extension personnel with the state aquaculture associations has strengthened regional industry-extension communication, promoted team building and problem solving at the local level and has proven to be an effective means for soliciting input and responding to industry priorities and concerns.
- The active participation of 12 northeastern aquaculture industry associations at public events within their respective states increased industry organization and participation in educational programming and outreach at the state/local level.
- REP sponsored educational programs, speaker support, information displays, tours and other related project activities planned and carried out by state extension contacts and/or the membership of the state associations have educated legislators, resource managers, other policy makers and the public about important current topics or issues affecting the aquaculture industry and the contribution of aquaculture to the state’s economy and the management of aquatic resources. Attendance/exposure of NRAC information and resources at regional outreach activities either sponsored and/or organized by REP participants is estimated at well over 1 million.
- REP sponsorship of the annual Milford Aquaculture Seminar has helped to maintain an important venue used for the last 20 years by

shellfish producers (and now other industry segments) for networking and information exchange with research and extension. Initial and subsequent REP sponsorship support for the New England Fish Health Workshops and the Cornell Recirculating Systems short course has led to establishment of an important annual regional educational and training venues for established firms and entrants to the finfish culture industry.

RECOMMENDED FOLLOW-UP ACTIVITIES:

Two regional extension Work Group meetings were held: the BWI Airport Marriott in Baltimore, Maryland on August 17, 1999 and the Sheraton Inn Providence Airport Hotel, Warwick, Rhode Island on January 12, 2000. Based on discussions at these meetings among state extension contacts, and representatives from industry and NRAC, a concept paper describing successful regional extension activities and recommended improvements <<http://darc.cms.udel.edu/rep/provvg00/NewREPplan2.htm>> was drafted. The concept paper was endorsed by project participants as a guide for future regional extension activities on behalf of the Center.

Recommendations for the objectives, administration and content of the next REP included:

1) **The three objectives of the REP should remain unchanged** (*Develop Educational Programs on Priority Topics Identified by Industry; Assist state Associations with Educational Outreach on Local Priority Issues and; Improve the Technical Expertise and Function of the Regional Extension Network*). Developing programming for both regional and local (state) education and outreach and for maintaining and improving regional extension capabilities has proven to be a well balanced approach. The current project objectives adequately address these basic needs.

2) **The issuance of individual subcontracts by NRAC to each REP participant should be replaced by a system where all project funds are awarded to the home institution of the Project Coordinator (PC)**. The PC would administer these project funds directly and/or could exercise the option, through the home institution, to award subcontracts as warranted. This approach would enable the PC to maintain better control over project funds and disbursements, especially in the event of non-compliance by other project participants

(Co-Pis). Reimbursement of project funds to project participants based on completed milestones or tasks will facilitate the timely completion of planned work and the reporting of results and accomplishments to NRAC. Administering all REP funds from one institution will also greatly reduce the administrative load on the NRAC office for budget tracking, and requests for work plan and budget revisions, and other related matters.

3) **The next REP should incorporate those elements that have worked well during the last five years of practice**. Examples include line item budget support for speakers, annual conference sponsorship(s), NRAC publications, the NRAC display, state association work plans and the annual extension in-service training workshop. A small amount of additional uncommitted contingency funds would be reserved for disbursement on a case by case basis following the review and approval of the PC and TIAC Co-Chairs for extension publications, ad hoc conference sponsorship, emergency industry response and other unanticipated events or opportunities.

The Extension Work Group also recommended that a subsequent Regional Extension Project should include the following initiatives:

1) **an REP organized annual (or biennial) NRAC research report conference for the dissemination and discussion of NRAC sponsored research;**

2) **REP organization of “issue forums” with industry as the need arises or in emergency situations to identify a response or researchable topics for immediate action or inclusion in the Center RFP;**

3) **development of an “Extension Resources in the Northeast” information packet listing all extension contact and their respective areas of expertise**. The directory would be available in written form and via the NRAC and REP web sites. It would be referenced with the Center RFP for assist prospective investigators in developing project extension components and would also be used to facilitate collaboration and networking among regional extension contacts; and

4) **a pilot scale pool of travel funds set aside to enable technical consultations of extension personnel to other parts of the region where that particular expertise is lacking**. Extension visits

would be scheduled to achieve maximum interaction with local industry and would require prior industry support. A straightforward administrative procedure to insure equitable regional distribution of project resources would also be developed.

SUMMARY OF PUBLICATIONS AND OTHER OUTREACH ACTIVITIES:

The following is a summary of publications, regional/state educational programs and other outreach activities either wholly or partially organized, sponsored or conducted with regional extension project funds during the reporting period from March 1, 1997 to June 30, 2000.

Abstracts

Abstracts of technical papers presented at the 17th Annual Meeting, Milford Aquaculture Seminar, February 24-26, 1997, New Haven, Connecticut. Journal of Shellfish Research, Volume 16, No. 1. (June 1997), pp 279-297.

Abstracts of technical papers presented at the 5th Annual New England Farmed Fish Health Workshop, April 4, 1997, Marine Technology Center, Eastport, Maine. University of Maine Cooperative Extension, Orono, Maine. 10p.

Abstracts of technical papers presented at the 18th Annual Meeting, Milford Aquaculture Seminar, February 23-25, 1998, New Haven, Connecticut. Journal of Shellfish Research, Volume 17, No. 1. (June 1998), pp 343-365.

Abstracts of technical papers presented at the 6th Annual New England Farmed Fish Health Workshop, April 3-4, 1998, Marine Technology Center, Eastport, Maine. University of Maine Cooperative Extension, Orono, Maine. 10p.

Abstracts of technical papers presented at the 19th Annual Meeting, Milford Aquaculture Seminar, February 27- March 1, 1999. New Haven, Connecticut. Journal of Shellfish Research, Volume 18, No. 1. (June 1999), pp 259-280.

Abstracts of technical papers presented at the 7th Annual New England Farmed Fish Health Workshop, April 8, 1999, Marine Technology Center, Eastport, Maine. University of Maine Cooperative Extension, Orono, Maine. 10 pages.

Abstracts of technical papers presented at the 20th Annual Meeting, Milford Aquaculture Seminar, February 27- March 1, 2000. New Haven, Connecticut. Journal of Shellfish Research. Vol. 19, No. 1 (June 2000), pp 563-584.

Extension Bulletins

“Diseases of Cultured Flatfish: Diagnosis and Prevention”. 2000. Richard E. Wolke, David A. Bengston, Michael A. Rice and Maureen Whittaker, University of Rhode Island. (NRAC Publication 00-001). 12 pages.

“Nursery Growout Methods for Aquacultured Shellfish”. 2000. Gef Flimlin, Rutgers Cooperative Extension. (NRAC Publication 00-02). 15 pages.

“Aquaculture Effluents: A Guide for Water Quality Regulators and Aquaculturists”. 2000. Jennifer Mugg and Michael A. Rice, University of Rhode Island, Augusto Serrano, University of the Philippines in the Visayas and Angelo Liberti, Rhode Island Department of Environmental Management, Division of Water Resources. (NRAC Publication 00-003). 12 pages.

“Control of Predators on Cultured Shellfish: Exclusion Strategies”. 2000. Dale F. Leavitt and William P. Burt, Southeastern Massachusetts Aquaculture Center. (NRAC Publication 00-04). 4 pages. In press.

“HACCP Guide for the Aquaculture Industry”. Ken Gall, SUNY, New York Sea Grant Program, Stony Brook and Gregg Rivara, Cornell Cooperative Extension (NRAC Publication 00-005). 10 pages.

Brochures

“Aquaculture in the Mountain State”. West Virginia Aquaculture Association.

“Second Northeast Aquaculture Conference & Exposition”. Conference Brochure. Maine Aquaculture Association and the Maine Aquaculture Innovation Center.

“EAST COAST LIVE! 2000 The Business of Marketing Live Aquatic Products”. Conference Brochure.

Websites

“NRAC Regional Extension Project Home Page”
<<http://darc.cms.udel.edu/rep/>>.

“Delaware Aquaculture Association Home Page”
<<http://darc.cms.udel.edu/DAA/daa.html>>. Delaware Aquaculture Association.

“West Virginia Aquaculture Association Home Page” <www.wvaquaculture.com>. West Virginia Aquaculture Association.

“EAST COAST LIVE! 2000 The Business of Marketing Live Aquatic Products”. Conference Website <<http://www.eastcoastlive.seagrant.org/>>.

Educational/Training Programs/Presentations Sponsored by NRAC (REP)

5th Annual New England Farmed Fish Health Workshop. Marine Technology Center, Eastport, Maine. April 4 1997.

3rd Annual Short Course on Closed Recirculating Systems. Cornell University, Ithaca, New York. June 24-28, 1997.

6th Annual New England Farmed Fish Health Workshop. Marine Technology Center, Eastport, Maine. April 3-4, 1998.

Pennsylvania Aquaculture Association 1998 annual meeting. Seven Springs, Pennsylvania. October 13-14, 1998.

Special seminar on **Aquaculture Opportunities for Commercial Fishermen: Shellfish Aquaculture**. 1998 Fish Expo, Boston, Boston, Massachusetts. October 17, 1998.

Presentation: **“Aquaculture Information Resources”**. Aquaculture Certificate Program, Delaware Technical and Community College, Georgetown, Delaware. October 21, 1998.

First Northeast Aquaculture Conference & Exposition. Samoset Resort, Rockport, Maine. November 17-19, 1998.

New York State Aquaculture Association shellfish aquaculture program. 1999 Long Island Fishermen’s Forum, Suffolk Community College, Riverhead, New York. January 22, 1999.

Presentation: **“Aquaculture Extension Programs in the Northeast Region”**. Aquaculture America ‘99. Tampa, Florida. January 28, 1999.

New Hampshire Aquaculture Association annual meeting in conjunction with Farm & Forest Expo. Manchester, New Hampshire. February 6, 1999.

Presentation: **“The Live Aquatics Industry in the Northeast Region”**. 1999 Maine Fisherman’s Forum. Rockport, Maine. March 5, 1999.

7th Annual New England Farmed Fish Health Workshop. Eastport, Maine. April 8, 1999.

Workshop: **Ornamental Aquatic Plant Production**. New Jersey Aquaculture Association. Cumberland County College, Vineland, New Jersey. August 6, 1999.

1999 Pennsylvania Aquaculture Advisory Council meeting and the annual meeting of the Pennsylvania Aquaculture Association. Harrisburg, Pennsylvania. September 30, 1999.

Presentation: **“Regional Extension Activities Sponsored by the Northeastern Regional Aquaculture Center”**. National Wildlife, Fisheries, and Aquaculture Extension Conference, Portland, Maine. September 29 – October 2, 1999.

Workshop: **“Raise Bait Fish for Fun and Profit”**. Massachusetts Aquaculture Association. Hadley, Massachusetts. November 10, 1999.

Workshop: **“Yellow Perch Aquaculture”**. Maryland Aquaculture Association. Maryland Department of Agriculture, Annapolis, Maryland. December 20, 1999.

Aquaculture X; the tenth annual meeting of the New Jersey Aquaculture Association. Rutgers Cream Ridge Research and Extension Center, Cream Ridge, New Jersey, January 8, 2000.

Aquaculture Forum. West Virginia Cooperative Extension and the West Virginia Aquaculture Association. Sutton/Flatwoods, West Virginia. January 8, 2000.

2000 Fishermen’s Forum Aquaculture Session. New York State Aquaculture Association. Suffolk

Community College, Riverhead, Long Island, New York. January 21, 2000.

Presentation: “**Accessing Internet Resources for Aquaculture**”. Maryland Waterman’s Show and Aquaculture Exposition. Ocean City Convention Center, Ocean City, Maryland. January 28-30, 2000.

Aquaculture seminars: “**Aquaculture in Recirculating Systems, Large and Small**”, Steve Van Gorder of Alternative Aquaculture Association, Pennsylvania; “**Sustainable Aquaculture in the Twenty-First Century**”, Ken Bergstrom, Western Massachusetts Center for Sustainable Aquaculture. **New Hampshire Aquaculture Association annual meeting** at Farm & Forest Expo, Manchester, New Hampshire. February 12, 2000.

Workshop: “**A Historical Perspective on Shellfish Diseases in Massachusetts**”. Massachusetts Aquaculture Association. Cape Cod Museum of Natural History. February 28, 2000.

Presentation: **Aquaculture Effluents: A Guide for Water Quality Regulators and Aquaculturists** 20th Annual Milford Aquaculture Seminar. New Haven, Connecticut. February 28-March 1, 2000.

Presentation: **Aquaculture Effluents: A Guide for Water Quality Regulators and Aquaculturists**. Issues and Advances in Aquaculture: a Workshop for Connecticut’s Growing Industry. Connecticut Sea Grant Program. Groton, Connecticut. March 25, 2000.

Extension In-Service Training/Other

4th Northeastern Regional Extension Training Workshop (in conjunction with the 2nd National Aquaculture Extension Workshop). Annapolis, Maryland. April 9-12, 1997.

Aquaculture Education and Training Workshops. National Association of County Agricultural Agents (NACAA) Annual Meeting. Burlington, Vermont. July 13-15, 1997.

The 5th Annual Northeastern Regional Aquaculture Extension Workshop. World Trade Center, Boston, Massachusetts. October 15, 1998.

NRAC Regional Extension Project Work Group Meeting. BWI Marriot Hotel, Baltimore Washington International Airport. August 17, 1999.

The 6th Annual Northeastern Regional Aquaculture Extension Workshop. Radisson Hotel, Portland, Maine. September 29, 1999.

NRAC Regional Extension Project Work Group Meeting. Sheraton Inn Providence Airport Hotel, Warwick, Rhode Island. January 12, 2000.

The 7th Annual Northeastern Regional Aquaculture Extension Workshop. Hynes Convention Center, Boston, Massachusetts. March 8, 2000.

NRAC Information Booth/Display

2nd National Aquaculture Extension Workshop. Annapolis, Maryland. April 9-12, 1997.

National Association of County Agricultural Agents Annual Meeting. Burlington, Vermont. July 13-15, 1997.

Delaware State Fair. Harrington, Delaware. July 17-26, 1997.

Delaware Farm and Field Day. Georgetown, Delaware. August 13, 1997.

Symposium on Marine Finfish and Shellfish Aquaculture, Marine Stock Enhancement and Open Ocean Engineering. The Aquaculture Panel of the United States / Japan Natural Resources Committee (UJNR). University of New Hampshire, Durham, New Hampshire, September 16-18, 1997.

Coast Day. University of Delaware College of Marine Studies. Lewes, Delaware. October 6, 1997.

Topsfield Fair. Topsfield, Massachusetts. October 1-10, 1997.

Interstate Seafood Seminar/Aquaculture in the Mid-Atlantic. Ocean City, Maryland. November 5-7, 1997.

Maryland Waterman’s Show and Aquaculture Exposition. Ocean City Convention Center, Ocean City, Maryland. January 30 – February 1, 1998.

18th annual Milford Aquaculture Seminar. New Haven, Connecticut. February 23-25, 1998.

Delaware State Fair. Harrington, Delaware. July 23-August 1, 1998.

American Veterinary Association annual Meeting. Baltimore Convention Center, Baltimore, Maryland. July 25-28, 1998.

Third International Symposium on Aquatic Animal Health. Baltimore, Maryland. August 30 – September 3, 1998.

Coast Day. University of Delaware College of Marine Studies. Lewes, Delaware. October 4, 1998.

Fish Expo Boston. World Trade Center, Boston, Massachusetts. October 15-17, 1998.

First Northeastern Aquaculture Conference and Exposition. Samoset Resort, Rockport, Maine. November 18-19, 1998.

Workshop on Financing for Aquaculture. Holiday Inn, Concord New Hampshire. December 8 & 15, 1998.

Maryland Waterman's Show and Aquaculture Exposition. Ocean City Convention Center, Ocean City, Maryland. January 29-31 1999.

Vermont Aquaculture Association annual meeting (in conjunction with the Vermont Farm Show), Barre, Vermont. January 26, 1999.

19th annual Milford Aquaculture Seminar. New Haven, Connecticut. February 22-24, 1999.

Delaware State Fair. Harrington, Delaware. July 22-August 1, 1999.

US Trout Farmers Association Annual Conference & Trade Show. Baltimore, Maryland. August 18-20, 1999.

Coast Day. University of Delaware College of Marine Studies. Lewes, Delaware. October 3, 1999.

Maryland Waterman's Show and Aquaculture Exposition. Ocean City Convention Center, Ocean City, Maryland. January 28-30, 2000.

State Aquaculture Association Information Booth/Display

Delaware Aquaculture Association

Delaware State Fair. Harrington, Delaware. July 23-August 1, 1998.

Coast Day. University of Delaware College of Marine Studies. Lewes, Delaware. October 4, 1998.

East Coast Commercial Fishermen's Show and Aquaculture Trade Expo. Ocean City Convention Center, Ocean City, Maryland. January 29-31 1999.

Delaware State Fair. Harrington, Delaware. July 22-August 1, 1999.

Coast Day. University of Delaware College of Marine Studies. Lewes, Delaware. October 3, 1999.

East Coast Commercial Fishermen's Show and Aquaculture Trade Expo. Ocean City, Maryland. January 28-30, 2000.

Maryland Aquaculture Association

Maryland Waterman's Show and Aquaculture Exposition. Ocean City Convention Center, Ocean City, Maryland. January 30 – February 1, 1998.

Maryland State Fair. Timonium, Maryland. August 23 – 29, 1998.

East Coast Commercial Fishermen's Show and Aquaculture Trade Expo. Ocean City Convention Center, Ocean City, Maryland. January 29-31 1999.

East Coast Commercial Fishermen's Show and Aquaculture Trade Expo. Ocean City, Maryland. January 28-30, 2000.

US Trout Farmers Association Annual Conference & Trade Show. Baltimore, Maryland. August 18-20, 1999.

Maryland State Fair. Timonium, Maryland. August 22 – 28, 1999.

Pennsylvania Aquaculture Association

1998 annual meeting of the Pennsylvania Aquaculture Association. Seven Springs, Pennsylvania. October 13-14, 1998.

1999 Pennsylvania State Farm Show. Harrisburg, Pennsylvania. January 9-15, 1999.

US Trout Farmers Association Annual Conference & Trade Show. Baltimore, Maryland. August 18-20, 1999.

1999 Pennsylvania Aquaculture Advisory Council meeting and the annual meeting of the Pennsylvania Aquaculture Association. Harrisburg, Pennsylvania. September 30, 1999.

2000 Pennsylvania State Farm Show. Harrisburg, Pennsylvania. January 8-13, 2000.

New Hampshire Aquaculture Association

Farm & Forest Expo. Manchester, New Hampshire. February 5-6, 1999.

New Hampshire Grocers' Association Trade Show. Manchester, New Hampshire. April 23-25, 1999.

Lake Ossipee Watershed Fair. Ossipee, New Hampshire. August 14, 1999.

Southeast Asian Water Festival. Lowell, Massachusetts. August 21, 1999.

Farm & Forest Expo. Manchester, New Hampshire. February 11-12, 2000.

New Jersey Aquaculture Association

Ornamental Aquatic Plant Production. Cumberland County College, Vineland, New Jersey. August 6, 1999.

Aquaculture X. Rutgers Cream Ridge Research and Extension Center, Cream Ridge, New Jersey. January 8, 2000.

The Full report with all the data, tables and graphs is available at the NRAC office upon request.