

**AQUACULTURE IMMERSION EXCURSION: A TEACHER WORKSHOP
SERIES FOR INTEGRATING AQUACULTURE EDUCATION INTO THE
CLASSROOM**

**- Final Report –
July 14, 2009**

FDACS Contract No. 013965



Submitted to:
Mr. Kal Knickerbocker
Division of Aquaculture
Department of Agriculture and Consumer Services

Submitted by:
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PROJECT OVERVIEW

The goal of this project was to create and host two *Aquaculture Immersion Excursion* teacher workshops at Harbor Branch Oceanographic Institute at FAU (HBOI-FAU) to support science education among Florida middle school, high school, and community college students. The specific objectives of this project were to:

1. Develop a series of standards-based aquaculture curriculum for Florida teachers and educators
2. Host teacher aquaculture immersion workshops
3. Provide teachers and school districts with incentives and resources to support integration of aquaculture and aquatics into the classroom
4. Develop a directory of workshop participants with detailed information on schools and school districts represented, teachers, and updates on school projects and facilities.

During FY09 (July 1, 2008 – June 30, 2009), the Aquaculture Review Council (ARC) funded two education grants which each had a goal to develop curriculum for Florida educators. This grant, and “Aquaculture Education for Florida Teachers” by University of Florida and Hillsborough Community College. Therefore, at the beginning of the funding cycle, Harbor Branch PI (A. Garr) began to work closely with the University of Florida PIs (C. Ohs and L. Creswell) to combine our areas of expertise to develop the curriculum together and join the outreach activities (workshop and polycom sessions) and goals as stated in both of our projects. This enabled the development of a larger curriculum that was reviewed by master teachers and is available on the UF’s extension website.

PROJECT ACCOMPLISHMENTS (4th QUARTER)

The following objectives were completed during the fourth quarter (April – June). Please see pages below for a description and summary of each activity.

1. Completed curriculum and printed material for teachers attending workshop.
2. Accepted, registered, and assisted the 50 teachers who attended the workshop
3. Conducted workshops on June 8-12 and June 15-19, 2009.
4. Open call for proposals for the Aquaculture Small Grant Program and delivered 20 awards
5. Distributed teacher stipends and awarded the small-grant funds at the end of each session
6. Completed website posting to include final curriculum in a downloadable form (on UF site), list of participating teachers and schools, and summary of workshop successes.
7. Submitted final invoice and documentation on June 21, 2009.

DEVELOPMENT OF AQUACULTURE CURRICULUM

HBOI-FAU PIs (A. Garr and D. Hanisak) worked closely with the UF team to develop a series of eight modules. Each module contains several lessons that are tied to state and national standards, lists the duration time, provides a list and cost of supplies needed, and includes

specific teacher and student instructions. Additionally, supplemental presentations, handouts, and publications are included for the teachers to use. All of the lessons are posted on the UF IFAS website (<http://irrec.ifas.ufl.edu/teachaquaculture>) and are linked at the HBOI-FAU site (www.aquaculture-online.org). The following is an outline of the curriculum material provided to the teachers attending the workshop and what is posted on the website.

I. Introduction to Aquaculture

- a. PRESENTATIONS:
 - i. What is Aquaculture
 - ii. Aquariums in the Classroom
 - iii. Career Opportunities in Aquaculture
- b. HANDOUTS
 - i. Introduction pre/post test

II. General Biology of Aquaculture Species

- a. ACTIVITIES:
 - i. Anatomy of a Fish
 - ii. Fish Eating Contest
 - iii. Anatomy of a Clam
 - iv. Anatomy of a Shrimp / Crawfish
- b. PRESENTATIONS:
 - i. Biology of Cultured Fish
 - ii. Overview of Finfish Aquaculture
 - iii. Tilapia Culture
 - iv. Tropical Ornamental Culture
 - v. Fish Eating Contest
 - vi. Molluscan Culture Overview
- c. HANDOUTS
 - i. Tilapia: Life History and Biology (SRAC)
 - ii. Introduction to the Biology of Fish
 - iii. Fish External Anatomy
 - iv. Fish Internal Anatomy
 - v. Biology and Culture of the Hard Clam (SRAC)
 - vi. Introduction to the Biology of Molluscs
 - vii. Clam External Anatomy
 - viii. Clam Internal Anatomy
 - ix. Module pre/post test
- d. VIDEOS
 - i. Hard Clam Spawning Procedures
 - ii. Oyster Settlement
 - iii. A Conch's Life Story

III. Design and Operation of Growout Production Facilities

Introduction

- a. HANDOUTS
 - i. Intro to Design and Operation of Aquaculture Production Systems

- b. PRESENTATIONS:
 - i. Types of systems
 - ii. Site selection

Ponds

- c. ACTIVITIES:
 - i. Volume of a Pond
 - ii. Algae (buckets, DO, sun)
 - iii. Soil permeability
- d. PRESENTATIONS:
 - i. Ponds types
 - ii. Pond lecture
- e. HANDOUTS
 - i. Calculating area handout
 - ii. DO SRAC
 - iii. Watershed SRAC
 - iv. Site selection SRAC
 - v. Pond fertilization SRAC
 - vi. Leaky ponds SRAC
 - vii. Levee ponds SRAC
 - viii. CO₂ SRAC

Recirculating Aquaculture Systems

- a. ACTIVITIES:
 - i. Aquaculture Measurements Made Easy
 - ii. Build Your Own RAS System (computer)
 - iii. Air-Lift Pump and Flow Rate Demonstration
- b. PRESENTATIONS:
 - i. RAS Components
- c. HANDOUTS
 - i. Exploring RAS
 - i. A Simple and Inexpensive RAS for Classroom SRAC
 - ii. Build Your Own RAS System (computer)

Open Ocean

- a. ACTIVITIES: None
- b. PRESENTATIONS:
 - i. Open Ocean Net Pens
- c. HANDOUTS
 - i. Open ocean summary

IV. Broodstock Breeding and Hatchery

- a. ACTIVITIES:
 - i. Selective Breeding (popcorn game)
 - ii. Clam Spawning (actual spawning of clams in class)
 - iii. Brine Shrimp Hatching

- b. PRESENTATIONS:
 - i. Artemia
 - ii. Domestication
 - iii. Fish breeding
- c. HANDOUTS
 - i. Spawning and larval culture of bivalves
 - ii. Fish Reproduction and Hatchery
 - iii. Artemia SRAC
- d. VIDEOS
 - i. Hard Clam Spawning Procedures
 - ii. Oyster Settlement

V. Water Quality

- a. ACTIVITIES:
 - i. How DO Changes with Salinity
 - ii. Follow Nitrogen Cycle in Aquariums
 - iii. What is in that water: Bacteria and UV light
- b. PRESENTATIONS:
 - i. Principles of Water Quality
- c. HANDOUTS
 - i. Nitrite in Fish Ponds
 - ii. Ammonia in Fish Ponds
 - iii. Interactions of pH, CO₂, Alkalinity and Hardness
 - iv. CO₂ in Fish Ponds
 - v. Measuring DO Concentrations

VI. Nutrition

- a. ACTIVITIES:
 - i. Make Your Own Pellet
 - ii. FCR (with and without animals in aquarium on feeding study)
 - iii. Satiation vs. Fixed Feeding
 - iv. Comparing Manufactured Feeds (characteristics, nutrition (vrs pellet), etc)
- b. PRESENTATIONS:
 - i. FCR
 - ii. Fish nutrition
- c. HANDOUTS
 - i. Nutrition EDIS
 - ii. Nutrition quiz
 - iii. Catfish Nutrition – MSU
 - iv. Decapsulating brine shrimp SRAC
 - v. Catfish prices
 - vi. Available fish food ingredients

VII. Harvesting, Processing, and Packaging

- a. ACTIVITIES:
 - i. Country of Origin
- b. PRESENTATIONS:
 - i. None
- c. HANDOUTS
 - i. Grading Ornamental Fish
 - ii. Harvesting Ornamental Fish from Ponds
 - iii. On-Farm Transport
 - iv. Ornamental Fish Trade
 - v. Packaging Ornamental Fish

VIII. Aquatic Plants and Seaweeds

- a. ACTIVITIES:
 - i. Plant Identification Using Dichotomous Keys
- b. PRESENTATIONS:
 - i. Aquaponics
 - ii. Plant Aquaculture – Freshwater Plants
 - iii. Plant Aquaculture – Overview of Marine and Freshwater Plant Culture
 - iv. Plant Aquaculture – Seaweed
 - v. Plant Aquaculture – Using Dichotomous Keys
- c. HANDOUTS
 - i. Integrated Multi-Trophic Aquaculture
 - ii. Education on a Half Shell
 - iii. Establishing an Ornamental Aquatic Plant Culture Facility
 - iv. Florida Aquaculture Statistics
 - v. Florida Native Aquatic Plants for Ornamental Water Garden
 - vi. Harry Potter and the Dichotomous Key
 - vii. How to Construct and Use a Dichotomous Key
 - viii. Watercress Article (EDIS)
 - ix. What's My Name Coral Reefs
 - x. World Aquaculture Article

Note: SRAC: Southern Aquaculture Regional Center
EDIS: Electronic Data Information Source
MSU: Mississippi State University

AQUACULTURE IMMERSION EXCURSION TEACHER WORKSHOPS

On June 8-12 and June 15-19, 2009, two workshops were held at the HBOI-FAU Aquaculture Center for Training, Education and Demonstration (ACTED) facilities. Teachers completed an application (Appendix A) and a committee (A. Garr, M. Davis, and D. Hanisak) reviewed the applications and selected the participants (Appendix B). Participants were selected according to how the educator/teacher would use the curriculum, and how many students would be exposed to the curriculum (i.e., represent a variety of schools and geographical locations). We received a

total of 80 applications. Participants were notified via email and U.S. mail, and were asked to return the appropriate tax documents to receive their stipend.

Each workshop had 25 participants for a total of 50 teachers that represented 24 counties, 30 high schools, 17 middle schools, one elementary school, and two education facilities (Figure 1). The participants for each workshop received an \$800 stipend to be used for travel and honorarium. The checks were distributed on the final day of each workshop. Special conference rates were arranged at a local hotel.

The workshops were scheduled from 8:00 am – 5:00 pm each day with an early release on Friday (see Appendix C). The participants spent the first day of the workshop at the UF Indian River Research and Education Center (IRREC) in Fort Pierce to participate in the polycom session coordinated by C. Ohs as part of UF's ARC grant. In this session, the teachers were introduced to the field of aquaculture particularly in the state of Florida and to the newly developed curriculum. At the end of the day they toured of the aquaculture facilities at IRREC. For the remainder of the week, the teachers spent time reviewing the curriculum in greater detail, with the emphasis on laboratory activities. In addition to completing the activities, the teachers were also able to participate in the following guest activities and lectures:

1. Extensive tour of HBOI-FAU aquaculture facilities including Ocean, Reefs and Aquariums and seaweed culture
2. Set up of a saltwater aquarium in the classroom (A. Garr, HBOI-FAU)
3. Animal Care and Use in the Classroom (J. Scarpa, HBOI-FAU)
4. Introduction and use of HACH water quality test kits (A. Garr, HBOI-FAU)
5. Production, Marketing, and HACCP (M. Davis, HBOI-FAU)
6. Harbor Branch submersibles tour (D. Liberatore – HBOI-FAU)
7. Seining Trip and Plankton Identification (B. Nelson and T. Griffin, HBOI-FAU)
8. Aquaculture School Programs and Division of Aquaculture Certification Process (P. Sapp - FDACS)
9. FWC/FMSEA Aquatic Species Collecting Permit (R. Abrams - FWC)

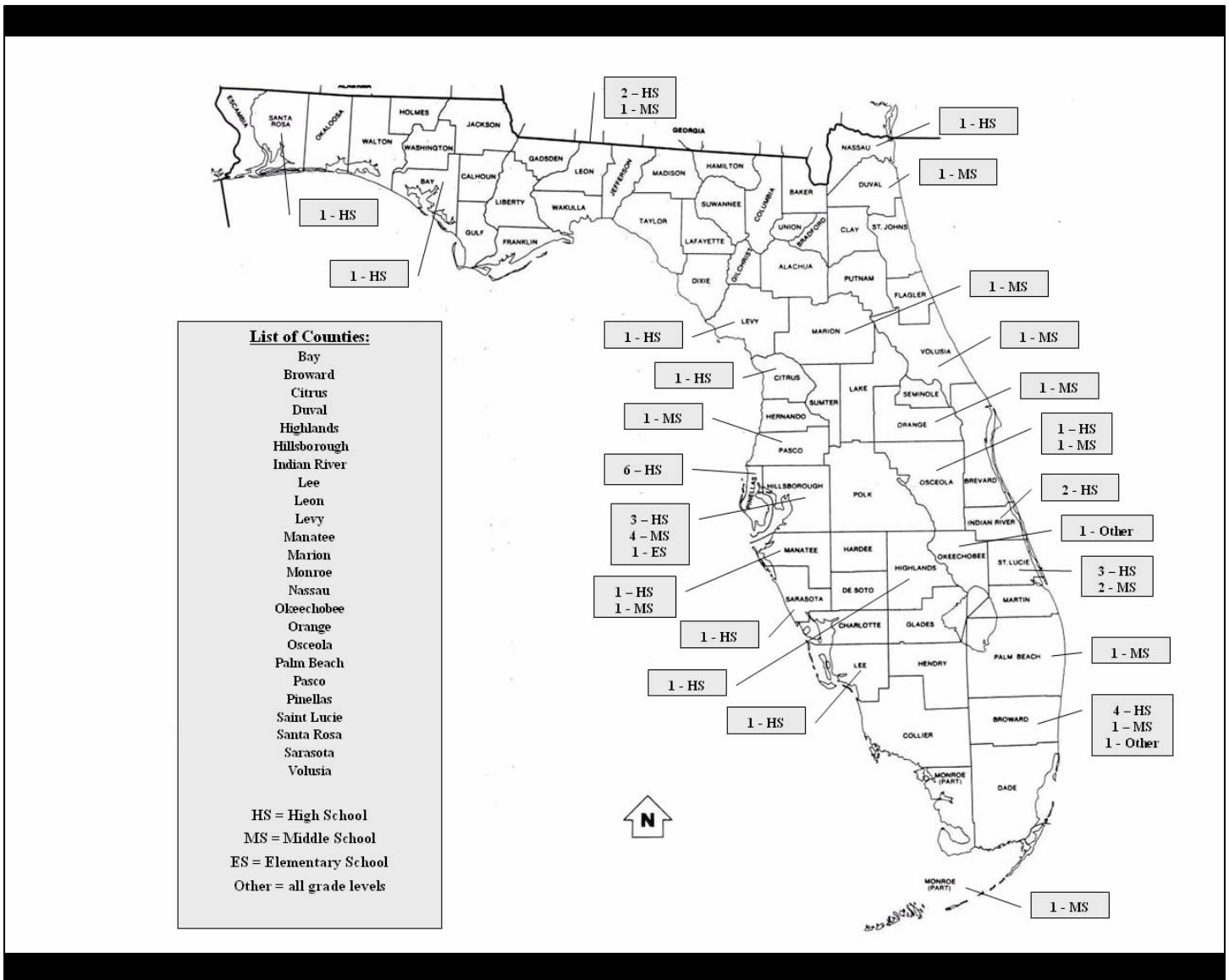


Figure 1. Distribution of the participants for the two Aquaculture Immersion Excursion Teacher Workshops held at HBOI-FAU June 8-12 and 15-19, 2009.

In all, eleven instructors from HBOI-FAU, FDACS, and FWC taught this program. Additionally, the program assistant helped with processing the tax forms, making binders for the teachers, and distributing the checks. Lunch was catered for the teachers each day, which allowed the program to remain on schedule.

Each participating teacher received a tote bag with the Aquaculture Immersion Excursion official logo which included the following reference materials:

1. Three-ring binder of all printed curriculum material (lessons, supplemental information and presentations)

2. Aquaculture Desk Reference book (Leroy Creswell)
3. Plankton Culture Manual (Frank Hoff)
4. Submersed Plants of the Indian River Lagoon (Diane Littler, Mark Littler, and Dennis Hanisak)
5. Aquatic Ecosystems 2009 Master Catalog
6. HACH 2009 Water Quality and Laboratory Supplies Catalog
7. Brochures for ACTED, ORA, HBOI-FAU Marine Education, and the HBOI-FAU monthly newsletter
8. Florida Aquaculture License Plate keychain

AQUACULTURE SMALL GRANTS PROGRAM

Each teacher completing the workshop series at HBOI-FAU was eligible to apply for a \$500 classroom grant to be used to aid in the development of their school aquaculture program. The original budget allowed for ten grants, however, we were able to allocate an additional \$5,000 towards ten more grants. We received 27 proposals and were able to fund 20. The teachers were given a proposal template and page limit (Appendix C), and a committee (A. Garr, M. Davis, D. Hanisak) reviewed and ranked the proposals. The grants were ranked according to content, the number of students impacted, and the geographical locations of the programs. Each school has received a \$500 check with the teacher's name on it, and the funds must be used during the 2009-2010 school year (Appendix D). A final report, budget summary, and photographs for each project will be submitted to Harbor Branch by May 1, 2010.

The following teachers received the \$500 award, and this information has been posted on our website. We will continue to update the website with project summaries as the school year moves forward.

Thomas Allison, Lake Weir Middle School – Beginner/Intermediate Aquaponics Program

Teresa Blank, Coral Glades High School – Zebrafish and Conch Aquaculture

Richard Brown, Lake Shore Middle School – Classroom Aquaculture

Scott Davenport, Admiral Farragut Academy – Marine Science Academy

Cindy Davidson, Youth Environmental Alliance – Aquaculture Explorations

Sue DeBlois, Vero Beach High School – Environmental Technology, Aquaculture Section

Susan Ferrell, Dowdell Middle Magnet School – Aquaculture Food Production in the Classroom

Lucy Given, Plantation Key School – Conch Aquaculture for 5th Grade

Carlos Gutierrez, Crystal River High School – Aquaculture for the Classroom

Heather Judkins, Seminole High School – Adventures With Aquaculture

Carl Melamet, Canterbury School – Aquaculture and Sustainability

Wendy Norton, Bellalago Academy – Florida a Unique Habitat, Nothing to Snail at?

Judy Nova, Manatee Academy – Manatee Middle School Aquaculture Lab

Joanna Pearce, Marjory Stoneman Douglas High School – Conch in the Classroom

Raymond Powers, Bronson High School – The Bronson Middle-High School Eagle Aquaculture Project

Angela Ray, Fernandia Beach High School – Fernandia Beach High School Aquaculture Project

Rebekka Stasney, Electa A Lee Magnet Middle – There’s an Ocean in my Classroom

Marriette Stevensen, Gulf Breeze High School – An Introduction to Aquaculture: Environmental and Economic Benefits

Joyce Vickers, Driftwood Middle School – Fishing for Answers

Tracy Weaver, Centennial Middle – E’ Fishing Classroom

AQUACULTURE IN THE CLASSROOM WEBSITE

The information for the workshop (application process, requirements, dates, deadlines, and travel information) were posted on the www.aquaculture-online website and also distributed via the FMSEA (Florida Marine Science Educators Association) list serve and a brochure mailing to the Florida Ag in the Classroom and the Conch in the Classroom mailing lists. At the completion of the workshop, the web page was updated and renamed “Aquaculture in the Classroom” and the new content was added to the site. The site now includes a summary of the program and workshops, a description of the curriculum, a teacher database for each session, a photo slide show and video highlighting the two sessions, and a live link the UF IFAS Extension website where the curriculum can be downloaded.

The links to the individual curriculum modules require a password that can be obtained once a teacher registers (name, school, county, email address). This will allow HBOI-FAU and UF to track the usage of each module (which contains several lessons each). We will be able to contact those who have utilized the curriculum to survey its applicability and functionality.

WORKSHOP EVALUATIONS

Each of the 50 teachers filled out an evaluation form at the end of the workshops (Appendix E). The evaluations were used internally to evaluate the instruction procedures, organizational design of the workshop, as well as determine the interest in future workshops. The following 14 questions were asked and summaries of some of these questions can be seen in Table 1:

1. Overall quality of the course
2. What three lessons were of most interest
3. What three lessons were of least interest
4. Did the workshop meet your expectations
5. Are there any topics you would have liked to see covered in the workshop
6. Do you have any comments on the instructors
7. Are there recommendations you have for improving the workshop
8. Do you have any comments on how we prepared you for the course and your visit

9. Were there adequate breaks
10. Do you feel prepared to use these lessons in your classroom
11. Which topic do you teach and at what grade level
12. Which criteria were important to you in choosing this workshop
13. Would you attend another workshop at HBOI if stipends were not provided
14. How did you hear about this workshop

Overall, the evaluations of the workshop were excellent and the teachers provided feedback and comments on ways to adjust or improve their travel arrangements, the stipend payment, or the organization of the workshops. The teachers really enjoyed the hands-on portions of the workshops and they all feel prepared to teach most of these lessons back in their classrooms. The fifty teachers that attended and learned how to incorporate aquaculture into the classroom will have a combined impact on over 10,000 students. This will occur via direct instruction of their students and the exposure of other school students to the aquaculture systems in the teacher's room.

CONCLUSIONS

Overall, this grant allowed HBOI-FAU to assist with the development of an excellent curriculum that will allow teachers with and without aquaculture systems to expose their students to the field of aquaculture. Biology, marine science, ecology, environmental science, math, chemistry, history, and geography teachers will all be able to utilize different components of this curriculum to teach major concepts in their respective areas. For example, a math teacher can use the Feed Conversion Ratio and Metric Systems lesson, and the earth science teacher could use the Which Soil Is Best lesson to demonstrate different soil types and how that is pertinent to site selection in aquaculture. We have developed a multi-use curriculum that has the potential to impact tens of thousands of students in Florida each year.

The two teacher workshops were a great success, and the feedback was excellent. The teachers really enjoyed discussing their projects with each other, and it was great to see them teaching each other. We were able to have some of the more advanced teachers showcase their school programs, and they became a resource for many others wanting to do something similar in their own schools. We have intend to maintain a relationship with the workshop teachers in terms of open communication and project assistance. We will continue to update our website as their projects develop, and we hope that we can run similar programs at HBOI-FAU in the future.

Table 1. Summary of relevant workshop evaluations and feedback for each session.

	Session I	Session II
Quality of Workshop		
Excellent	100%	100%
Meet Expectations		
Yes	100%	84%
Somewhat		16%
Feel Prepared		
Definitely	100%	84%
Somewhat		16%
Top Three Lessons		
Rank 1	Set-Up of Aquarium	Exploring RAS Computer Program
Rank 2	Exploring RAS Computer Program	Set-Up of Aquarium
Rank 3	Artemia/Water Quality/Food Pellet	Feed Conversion Ratios
Criteria for Choosing		
Stipend	78%	61%
Location of HBOI	61%	43%
Curriculum	96%	83%
Interest in Aquaculture	100%	91%
Hear About Workshop		
County Coordinator	4%	22%
FMSEA	13%	4%
Florida Aquarium	18%	4%
Email from HBOI	30%	22%
Internet Search	9%	30%
Brochure	13%	4%
UF Extension Officer	0%	4%
Dept. of Education	13%	10%
No. Students Impacted	7,166	3,448
Would you attend similar workshop without stipend		
Yes	83%	61%
Probably Not	17%	39%

APPENDIX A. Workshop Application

APPLICATION FORM



The form constitutes formal application to the Aquaculture Immersion Excursion Teacher Workshop sponsored by the Florida Aquaculture Review Council and Harbor Branch Oceanographic Institute at Florida Atlantic University. Please print out form and type or print clearly. Late applications will be considered only if vacancies exist. This form may be duplicated.

Application Deadline: April 17, 2009.

Applicant Information

Applying For: Session I: June 8 – 12, 2009 Session II: June 15 – 19, 2009

Name: _____ Position: _____

School/ Education Center: _____

School Address: _____ City: _____

State: _____ Zip: _____ Phone: _____ Fax: _____

Email: _____ Principal/Supervisor's Name: _____

Instructional Experience

Subject(s) Taught: _____ Years Teaching: _____ Grade Level: _____

What instructional experience do you have teaching aquaculture or marine science concepts?

Explain why you would like to participate in this workshop and how you would use it in your classroom.

List any other similar workshops (if any) that you have attended in the last three years. _____

Completion of this application requires your principal or supervisor's signature below: I recommend the above person for participation in the Aquaculture Immersion Excursion Teacher Workshop. I will encourage and support the post-workshop activities to promote aquaculture and marine science in the classroom and community.

Signature of Principal/Supervisor: _____ **Date:** _____

Please fax or mail registration information to:

**Amber Garr
Harbor Branch Oceanographic Institute at FAU,
5600 US 1 North, Fort Pierce, FL 34946
Ph. 772.465.2400 Ext. 578 Fax. 772.466.6590 Email. agarr1@hboi.fau.edu**

For more information about the workshop, travel awards, and small-grant program, please visit:

www.aquaculture-online.org

APPENDIX B. Workshop Acceptance Letter (sent via email and US Mail)

Dear

Thank you for applying to the Aquaculture Immersion Excursion Teacher Workshop at Harbor Branch, sponsored by FDACS Aquaculture Review Council. We received 80 applications from elementary, middle, high school, and community teachers from all over the state. Applications were reviewed by a committee and ranked according to content, how the educator/teacher would use the curriculum, and how many students would be exposed to the curriculum (i.e., represent a variety of schools and geographical locations). We have selected 50 participants for the workshops.

We are pleased to inform you that your application was favorably reviewed and you have been accepted to Session II (June 15-19, 2009). Congratulations! We are excited to share this experience with you and look forward to meeting you on June 15th.

Each teacher accepted to the workshop will receive an \$800 stipend to assist with travel expenses. This stipend will be reported as income, and therefore you are required to complete a W-9 form for the Internal Revenue Service. In addition, you will need to complete a Florida Atlantic University Consulting and Professional Services Worksheet that is including in your acceptance packet. Each teacher will receive their stipend via check at their corresponding workshop. In order to process the checks, we are requesting that your W-9 and Consultant Form be returned to Harbor Branch no later than May 8, 2009.

As part of your acceptance, you are also eligible to apply for one of ten \$500 grants. The grants should be used to aid in the development of your school's aquaculture program. Grant applications are due electronically by May 15, 2009. They will be reviewed and evaluated by a committee of Harbor Branch scientists and educators and award announcements will take place at the end of each workshop. Awards will be mailed directly to the participating schools and teachers will be required to submit a final report to Harbor Branch demonstrating how the funds were used. Additional information about the Small Grants Program can be found on the [website](#).

Teachers participating in the workshop are required to make their own travel arrangements. We have secured rooms at [The Sandhurst Hotel and Suites](#) for a reduced conference rate of \$99 per night. Please call the hotel directly and mention the Harbor Branch conference in order to receive the discount (1.866.395.SAND). Additional travel information and a list of alternative hotels are provided in your application packet. There is no on-campus housing available at Harbor Branch.

Lunch, coffee and snack breaks will be provided each day for the workshop participants. Please complete your Lunch Order form as well as your Emergency Contact form and return to Harbor Branch by May 22, 2009. You have received a tentative agenda for the workshop which will be updated via email correspondences as the workshop approaches.

We are very excited to work with you in June. Please do not hesitate to contact us with any questions or concerns. Thank you again for your interest and we look forward to meeting you!

Sincerely-

Amber L. Garr
Research Associate
agarr1@hboi.fau.edu
772.465.2400 Ext. 578

APPENDIX C. Workshop Schedule and Agenda

Monday:

Time	Activity	Instructor
8:00 – 9:00	Orientation, Introductions	Amber Garr
9:00 – 9:45	Travel to IRREC (Fort Pierce)	Amber & Gabby Barbarite
10:00 – 12:00	Teach Aquaculture Part I	UF-IFAS Team
12:00 – 1:00	Lunch (provided)	
1:00 – 3:00	Teach Aquaculture Part II	UF-IFAS Team
3:15 – 4:30	Tour of UF Aquaculture Facilities	Dr. Courtney Ohs
4:30 – 5:00	Return to HBOI	Amber & Gabby

Tuesday:

Time	Activity	Instructor
8:00 – 8:15	Catch-Up	Amber
8:15 – 8:30	Introduction to HBOI	Amber
8:30 - 9:45	Tour of HBOI Aquaculture	Amber & Dr. John Scarpa
9:45 – 11:15	Set-up Saltwater Aquarium	Amber & Gabby
11:15 – 11:45	What Kind of Feeder are You?	Amber & Gabby
11:45 – 12:00	Biology of Aquaculture Species	Amber
12:00 – 1:00	Lunch (provided)	
1:00 – 1:30	Animal Care in the Classroom	Dr. John Scarpa
1:30 – 2:00	Water Quality	Amber
2:00 – 2:30	Water for Life (Day 1)	Amber & Gabby
2:30 – 3:30	Dissolved Oxygen Lab	Amber & Gabby
3:30 – 4:15	Water Quality Tests and Equipment	Amber & Gabby
4:15 – 5:00	Decapsulate Artemia	Amber & Gabby

Wednesday:

Time	Activity	Instructor
8:00 – 8:15	Catch-Up	Amber
8:15 – 8:30	Nutrition	Amber
8:30 - 9:30	Make Your Own Fish Food	Amber & Gabby
9:30 – 10:00	Design and Operation of Growout Facilities	Amber
10:15 – 11:45	Exploring RAS Systems	Dr. Jim Masterson
12:00 – 1:00	Lunch (provided)	
1:00 – 1:30	Water for Life (Day 2)	Amber & Gabby

1:30 – 2:15	Create an Airlift System	Amber & Gabby
2:15 – 3:00	Which Soil is Best?	Amber & Gabby
3:15 – 3:45	Harvesting, Processing, and Packaging	Amber
3:45 – 5:00	Production, COI, HACCP	Dr. Megan Davis

Thursday:

Time	Activity	Instructor
8:00 – 8:15	Catch-Up	Amber
8:15 – 8:30	Broodstock Breeding and Hatchery	Amber
8:30 - 9:00	Artemia Hatching and Counts	Amber & Gabby
9:00 – 9:45	Freshwater Plants and Seaweed	Dr. Dennis Hanisak
9:45 – 10:30	Dichotomous Key Lab	Dennis & Gabby
10:30 – 11:00	Introduction to Plant Activities	Dennis
11:15 – 11:45	Seaweed Aquaculture Tour	Dennis & Gabby
12:00 – 1:00	Lunch (provided)	
1:00 – 1:45	Feed Conversion Ratios	Amber & Gabby
2:00 – 3:30	Marine Education Tour Group 1: Seining Group 2: Plankton	Brandy Nelson & Tracy Griffin
3:30 – 5:00	Marine Education Tour Group 1: Plankton Group 2: Seining	Brandy & Tracy

Friday:

Time	Activity	Instructor
8:00 – 8:15	Catch-Up	Amber
8:15 – 9:15	Aquaculture Programs in Schools	Portia Sapp
9:30 – 12:00	Florida Aquatic Species Collecting Workshop	Rich Abrams
12:00 – 1:00	Lunch (provided)	
1:00 – 2:00	Collecting Workshop Field Work	Rich Abrams
2:00 – 2:30	Open Forum, Q & A Session	Amber
2:30 – 3:00	Wrap-Up, Awards, Assessment, Graduation	Amber & Gabby

APPENDIX C. Small Grant Proposal Template

Applicant Name:

School Name:

School Address:

Phone:

Fax:

Email:

USE THIS DOCUMENT AS YOUR PROPOSAL

- 1) Save it on your computer using the applicant name as the name of the document
- 2) As you complete, delete the directions appearing in blue italics, keeping the following headings you see in bold.
- 3) Use Times New Roman 12 point font, with all headings bolded and underlined and margins should be set at 1".
- 4) This document should be no more than 3 pages, single spaced and no larger than 3MB.
- 5) Once you have read through this document, should you have any questions please direct them to Amber Garr, agarr1@hboi.fau.edu.

Project Title:

Program Background *(Describe your science education program, including previous aquaculture experiments if applicable, the number of students impacted, your vision for expansion of the program, etc.)*

Project Goals and Objectives *(Define the specific goals and objectives. It is anticipated that the number of objectives and goals will be different for every project)*

- 1) Goal
 - Objective
 - Objective
- 2) Goal
 - Objective
 - Objective

Project Impact *(Discuss the specific impact of the project and include: the number of students affected, value to established program, assistance with future goals and directions, etc.)*

Schedule

- a) Project Initiation Date –
- b) Project Completion Date -

Budget *(Provide a detailed budget describing how the \$500 will be used)*

By signing this form the applicant understands that a final report must be submitted to Harbor Branch within one year of receiving funding. The final report should describe how the funds were utilized and provide a summary of the project results.

(Applicant Signature)

(Date)

(Principal/ Supervisor Signature)

(Date)

*The Aquaculture Immersion Excursion Small-Grant Program is supported by a grant from the Florida Aquaculture Review Council of the Florida Department of Agriculture and Consumer Services. Grant funds are limited to ten \$500 awards. The proposal deadline is **May 15, 2009** and applicants will be notified by June 22, 2009.*

APPENDIX D. Small Grant Award Letter

May 27, 2009

Dear -

Thank you for applying to the Aquaculture Small-Grants Program at Harbor Branch, sponsored by FDACS Aquaculture Review Council. We had an overwhelming response to this call for proposals, and we were pleasantly surprised at the quality of the proposals. The grant applications were reviewed by a committee and ranked according to content, the number of students impacted, and the geographical locations of the programs. We were able to select 20 grants to fund at \$500 each.

We are pleased to inform you that your grant application was favorably reviewed and you have been awarded a \$500 classroom grant to advance your aquaculture program. Congratulations!

The award will be in the name of your school, and you should receive your check at the end of the workshop you are attending or shortly thereafter. In order to process these, each teacher will be responsible for obtaining the school's W-9 form. If you are from a public school, the county school board should be able to supply this. If you are from a private school, your administration will have this form. We are requesting that the W-9 forms be returned to Harbor Branch by Monday, June 1, 2009.

As part of your award, a final report demonstrating how the funds were used should be delivered to Harbor Branch by May 1, 2010. Additionally, a project synopsis should be provided for posting on the aquaculture education website at Harbor Branch (www.aquaculture-online.org).

We are very excited to meet you in June and are looking forward to assisting with your classroom projects. Please do not hesitate to contact us with any questions or concerns.

Sincerely-

Amber L. Garr
Research Associate
agarr1@hboi.fau.edu
772.465.2400 Ext. 578

Appendix E. Teacher Workshop Evaluation Form

- Excellent Good Fair
- 1) Overall quality of the course
- 3) What three topics/lessons are you *most* interested in using in your classroom?
1. _____
2. _____
3. _____
- 4) What three topics/lessons are you *least* interested in using in your classroom?
1. _____
2. _____
3. _____
- 5) Did the workshop meet your expectations?
 Yes Somewhat Expecting something else
- 5) Are there any topics that you would have liked to see covered in the workshop? _____

- 6) Do you have any comments on our Instructors? _____

- 7) Are there recommendations you have for improving the workshop? _____

- 8) Do you have any comments on how we prepared you for the course and your visit?

- 9) How many students do you teach and how many will be affected by your classroom aquaculture program?

- 2) Were there adequate breaks? Yes No Sometimes
- 10) Do you feel prepared to use these lessons in your classroom?
 Definitely Somewhat Would like more instruction
- 11) Which topic do you teach and which level (elementary, middle, high school)? _____

- 12) Which criteria were important to you in choosing this workshop (*check all that apply*)?
 Stipend Location of HBOI Curriculum Interest in Aquaculture
- 13) Would you attend other marine science-based teacher workshops at HBOI if stipends were *not* provided?
Yes Probably Not
- 14) How did you hear about this workshop? _____
- Please sign (*optional*) _____