

Integrated Oyster Market Research, Product Development, Evaluation, Promotion and Consumer Education for the Gulf of Mexico's Oyster Industry

Sea Grant Contract # NA16RG1720 [#81]

Project R/LR-Q-23 Year I

FINAL REPORT



July 2003



The Mississippi Department
of Marine Resources
Managing Your Marine Resources Today for a Sound Tomorrow

1. Final Synopsis

2. Date: July 31, 2003

3. Investigators:

- | | |
|------------------------|---|
| Principal Investigator | - Ms. Judy Jamison, Executive Director
Gulf & South Atlantic Fisheries Foundation, Inc. |
| Collaborators | - Ms. Ruth Posadas, Director
Seafood Technology Bureau
Mississippi Department of Marine Resources |
| | - Mr. Ewell Smith, Executive Director
Ms. Tracy Mitchell, Assistant Executive Director
Louisiana Seafood Promotion Board |
| | - Ms. Joanne McNeely, Bureau Chief and
Mr. Paul Balthrop, Development Representative
Florida Bureau of Seafood & Aquaculture Marketing
Florida Department of Agriculture & Consumer Services |

4. Project Number: R/LR-Q-23 Year I

5. Institutions: Gulf & South Atlantic Fisheries Foundation, Inc.
Mississippi Department of Marine Resources
Louisiana Seafood Promotion Board
Florida Bureau of Seafood & Aquaculture Marketing

6. Dates Covered: October 1, 2002 – June 30, 2003

7. Project Title: **Integrated Oyster Market Research, Product Development, Evaluation, Promotion and Consumer Education for the Gulf of Mexico's Oyster Industry**

8. PROJECT RESULTS

A. Objectives

Objective 1. *To develop and evaluate the sensory characteristics of commercially available Post Harvest Processed (PHP) oyster products (pasteurized, quick frozen, high pressure treated) versus raw oysters and other existing product categories (e.g., char-broiled, steamed, etc.).* Objective 1 has been achieved.

(1) Mississippi Department of Marine Resources:

- Completed literature review on PHP and VAP oyster research

- Developed and printed 5,000 copies each of brochures, fact sheets, posters and power point presentations on various commercially available PHP technologies (i.e., Heat-Cool Pasteurization, High Hydrostatic Pressure, and Individually Quick Frozen oysters)
- Developed video documentary (300 copies on VHS tape and 150 copies on CD/DVD video/movie format) of commercially available PHP technologies for oysters through subcontract with Gulf Side Productions
- Conducted (a) PHP Product Profile Survey, (b) PHP Sensory Evaluation, (c) PHP Descriptive Studies, (d) PHP Economic Benchmarking Survey, and (e) initial VAP Product Development through the Mississippi State University Coastal Research and Extension Center and MSU Seafood Laboratory

(2) Florida Bureau of Seafood and Aquaculture Marketing:

- Conducted Focus Group Research on 15 American Culinary Federation (ACF) seafood chefs at the International Hotel/Motel and Restaurant Show held in Philadelphia last March 16, 2003

Objective 2. *To educate wholesalers, retailers, processors, food service professionals, high-risk individuals and general consumers of the availability, safety and sensory characteristics of new, commercially available PHP and other value-added oyster products.* Objective 2 has been achieved.

(1) Mississippi Department of Marine Resources:

The MS-DMR participated in various local/regional Gulf oyster promotional events where, aside from regular booth participation, research was conducted and new value-added products developed by the project team and introduced to the general public. The following were the venues for these promotional/research activities:

- Consumer Education and Sensory Evaluation Studies booths were established in the Jackson County Fair, Biloxi Seafood Festival, Celebrate the Gulf Festival, Cajun Crawfish Festival, Mississippi Business Expo Week, and the Mississippi State University Extension Service Open House

(2) Louisiana Seafood Promotion Board:

Gulf Oyster Project support was used to support various Gulf oyster consumer education and market promotion efforts of the LSPB. Among the 2002-2003 main LSPB events/activities that promoted Gulf oysters to consumers include:

- An oyster promotional article entitled, "Belly Up to the Raw Bar" was developed and submitted to the North American Precip Syndicate (NAPS) for distribution to various newspapers and magazines nationwide
- Sponsored the "Mardi Gras Alive – DC," an oyster promotional event held in Washington, D.C.
- Sponsored the "Shrimp and Oyster Education Day"
- Booth participation in the International Boston Seafood Show 2003 where Gulf oysters and promotional materials were presented

- Development and promotion of Gulf Oysters through the newly launched Louisiana seafood theme: “Start with the Main Ingredient” and accompanying website (www.LouisianaSeafood.com)
- LSPB co-sponsorship with Acme Oyster House of the “Louisiana Oyster Challenge – International Federation of Competitive Eating.” This oyster consumer promotion event was featured in local Louisiana Television news channels as well as in the NBC’s nationally syndicated “The Today Show.”

(3) Florida Bureau of Seafood and Aquaculture Marketing:

FL-BSAM was the collaborating agency directly in-charge of developing education materials and strategies to reach the *Vibrio vulnificus* At-Risk segment of the U.S. population as well as the promotion of PHP oysters to seafood wholesalers, retailers and food service professionals. Among the contributions of this agency towards the achievement of Objective no. 2 were:

- Booth participation in the annual International Boston Seafood Show 2003 where PHP oysters promotional materials and fact sheet were distributed
- Booth participation, focus group research and taste test featuring raw vs. various PHP oyster samples were conducted among American Culinary Federation Chefs at the annual International Hotel/Motel and Restaurant Show held in Philadelphia
- Efforts to reach V.v. at-risk individuals through standard ISSC brochures got a breakthrough and needed boost with the active, voluntary participation in the V.v. At-Risk consumer education program by 300 Winn Dixie Pharmacies throughout Florida.

Objective 3. *To develop technology transfer (targeted at oyster processors), consumer education (aimed at the wholesale, retail and food service industry professionals), and general seafood consumer market promotion materials and strategies centered on commercially available PHP and value-added oyster products (VAP) and processing technologies.* Objective 3 has been achieved.

- The items listed below (section 10.E. Items 1 through 8) lists the main technology transfer and education materials on commercially available PHP technologies and new value-added oyster products that were developed as a result of this project.

B. Problems Encountered

Delays in the sensory evaluation component were encountered due contract issues at Oregon State University. After all efforts to expedite the process were exhausted, time constraints called for the transfer of the sub-contract award to the Seafood Laboratory at Mississippi State University.

The planned consumer surveys were also rescheduled as the Jackson State Fair was moved to a later date due to the passage of a hurricane in the area. Time constraints prevented the expansion of the consumer surveys beyond the local/regional population.

C. New Research Directions – none resulting from Phase 1 (Year 1) results. Phase 2 (Year 2) of the Gulf Oyster Project will proceed as originally planned.

9. ADVANCEMENT OF THE FIELD

A. Integrated Research and Development Model

This project is unique because it recognizes the need for interdisciplinary effort to solve real-world problems and actually attempts to integrate fundamental product and marketing research, technology documentation, economic assessment, consumer education, and market promotion activities into a seamless Gulf Oyster R&D program. Furthermore, in order to solve a regional problem that goes beyond the confines of the academe, this project also brought geographically distant and diverse state agencies, university researchers and industry groups together - each leveraging their limited resources and employing their own unique perspectives and disciplinary approaches towards the achievement of common goals.

Given scarce monetary resources allocated by the government for applied research and development, vis-à-vis, the complex and substantial extent of the problems facing the seafood industry of the Southeastern United States, this integrated “theory-to-practice” project could serve as a model on how cost-effective and relevant regional research projects or programs could be conducted in the future.

B. Research-Based Consumer Education/Technology Transfer Programs

Under ideal conditions and consistent with good extension/education principles, consumer education programs and materials should be developed based on the results of sound research rather than on speculations. Unfortunately, this has not always been the case in past, especially among pioneering oyster consumer education/technology transfer programs and market promotion campaigns. These programs and their accompanying educational materials were often developed to address the pressing needs of the times, hence lack the benefits of *a priori* scientific research aimed at understanding the reasons “why” certain programs must be conducted and “how” could they be made more effective. Despite their limitations, most of these programs were able to fulfill their stated goals, thus establishing the foundation for more sophisticated consumer education and technology transfer programs of the future.

This project addresses some of the above deficiencies by linking sensory evaluation, marketing research and technology documentation to new oyster VAP development as well as to the preparation of consumer education/technology transfer materials and strategies. Furthermore, the utilization of the principles of the Individual Adoption Process (IAP), Diffusion Theory, and Technology Adoption Life Cycle (TALC) Model provides the conceptual and theoretical basis in which the Gulf Oyster Project activities and deliverables are structured.

C. Market-Oriented vs. Production-Oriented Product Development

Another significant contribution of this project is in the way it approaches the Gulf oyster problem. Instead of taking the narrow, production-oriented point of view, it attempts to understand the needs, characteristics and economics of the market first before proceeding with product development, market promotion and long-term consumer education/technology transfer strategies. By adopting this approach, it becomes possible to achieve a “win-win” solution, e.g., to the *Vibrio vulnificus* At-Risk Consumer problem, thereby gaining the support and willing participation of the Gulf oyster industry.

10. ACCOMPLISHMENTS:

A. No Students Supported.

B. Publications:

Posadas, Benedict and Ruth Posadas. In press. *Consumer Preferences for Postharvest Processed Raw Oyster Products in Coastal Mississippi*. Technical Bulletin of the Mississippi Agricultural and Forestry Experiment Station.

C. No Patents applied for.

D. Ancillary Research – none conducted outside of those programmed.

E. A Public Presentation entitled “*Oyster Education Public Conference*” was held on June 5 to 6, 2003 at the Royal Sonesta Hotel, New Orleans, Louisiana. In this conference, the results of various research projects, consumer education efforts, and displays of different educational materials or products developed through the Gulf Oyster Project were presented to the public.

F. Technology and Information Transfer/Development of Consumer Education and Market Promotion Materials:

The main goal of the Phase 1 (Year 1) Gulf Oyster Project was to conduct the necessary background research that will serve as the basis for developing appropriate technology transfer, consumer education and market promotion materials and communication strategies. The materials developed in Year 1 will then be used in Phase 2 (Year 2) of the Gulf Oyster Project to design and implement focused consumer education/extension programs aimed at various target audiences, i.e., oyster processors, food service and restaurant facilities, general seafood consumers, and the *Vibrio vulnificus* at-risk consumer segment of the population.

The following were the consumer education, extension/technology transfer or market promotion materials developed by the Gulf Oyster Project (Year 1), as well as the initial education/outreach activities conducted by the different collaborating agencies:

- a. Video/CD “Available Post Harvest Processing Technologies for Oysters.” (150 copies on DVD/CD format and 300 copies on VHS format).

- b. Brochure on “Available Technologies for Post Harvest Processing of Oysters.” (5,000 copies printed).
- c. Poster on “Post Harvest Processing Technologies for Oysters.” (5,000 copies printed).
- d. Fact Sheet on “Post Harvest Processing Technologies for Oysters.” (5,000 copies printed).
- e. CD Power Point Presentations on (a) “Individually Quick Frozen,” (b) “Heat-Cool Pasteurization,” and (c) “High Hydrostatic Pressure” technologies for post-harvest processing of raw oysters.
- f. The main “Gulf Oyster Project” website (www.gulfoysters.net) was developed and regularly updated to highlight project activities, make available Gulf oyster consumer education materials, and provide product health and safety information for *Vibrio vulnificus* At-Risk individuals. Complementary website pages and links were also developed at the official Mississippi Department of Marine Resources (www.dmr.state.ms.us) website, the Louisiana Seafood Promotion Board’s website (www.LouisianaSeafood.com), and Florida Department of Agriculture and Consumer Services/Bureau of Seafood and Aquaculture Marketing website (www.fl-seafood.com).
- g. Two issues of “The Oyster Shack” was published - a downloadable newsletter that provides supplementary information about the project and website.
- h. Mississippi Department of Marine Resources’ quarterly newsletter included a public outreach column for the Seafood Technology Bureau’s programs.
- i. Sensory evaluation, product profiling and testing were conducted alongside MS-DMR oyster consumer education effort in the following venues:
 - 1. Biloxi Seafood Festival on September 14, 2002
 - 2. Celebrate the Gulf on September 28, 2002
 - 3. Jackson County Fair on October 13-18, 2002. Two demonstration and consumer education booths was set-up for the expected 100,000 to 150,000 attendees at this annual fair. A total of 515 respondents who visited the booth agreed to participate in the sensory evaluation and product profiling survey.
 - 4. Chef’s School at the West Harrison Vocational School, Gulf Coast Community Colleges; 30 respondents participated in descriptive survey, product profiling survey, and sensory evaluation survey from November to December, 2002.
 - 5. MS-DMR sensory evaluation survey held on December 2002 yielded over 50 respondents.
 - 6. Twenty-two survey respondents from the Coastal Aquaculture Unit of the Mississippi State University Extension Service Open House participated during the sensory survey on December 5, 2002.
 - 7. The two-day Mississippi Business Expo Week festivities held at Jackson, MS yielded 160 respondents who volunteered for sensory and descriptive evaluation survey.
 - 8. Consumer education/oyster product promotion and sensory testing of four different new value-added products (Smoked Oysters, Oyster Shortbread, Smoked Oyster Cheese Spread, and Smoked Oysters Dip) were conducted at the Cajun Crawfish Festival held in Biloxi Coliseum, Biloxi, MS.

9. VHS and CDs of the PHP Video, brochures, fact sheets and poster sample were presented at the Oyster Project's Public Presentation held at New Orleans, LA last June 5-6, 2003.

11. BENEFITS

- Consumer acceptability survey results concluded that all PHP oyster products scored "Good" (7 on scale of 1 – 10) and 76% of those surveyed indicated they would pay more for oysters with perception of increased safety. This encouraging news is a boost to the PHP technology transfer effort directed at the region's commercial oyster processing facilities.
- The findings of the consumer preferences survey for PHP raw oyster products indicate that (a) guarantee of a safe product, (b) education on health benefits, and (c) good presentation were the commonly cited types of inducement to consume PHP raw oysters among coastal Mississippi respondents. Knowledge of these popular consumer themes is of great benefit to designers of consumer education materials, advertising copies, promotional campaigns, or product packaging.
- The ready availability of brochures, fact sheets, video documentaries, posters, and presentation materials on various oyster PHP technologies offer direct benefit and assistance to busy and cash-strapped seafood extension/technology transfer professionals, state fishery agency staff and health care providers.
- The annual oyster promotional effort conducted by, e.g., the Louisiana Seafood Promotion Board, the Florida Seafood and Aquaculture Marketing Bureau, and the Acme Oyster House's "Louisiana Oyster Challenge – International Federation of Competitive Eating," is of great benefit to the Gulf oyster industry as it directly stimulates oyster consumption and demand.
- The development of safer PHP and value added oyster products as a tasty alternative to raw oysters for the V.v. At-Risk Consumers not only opens up new markets but also helps contain the bad publicity (and resulting decline in Gulf oyster demand) brought about by reported illnesses attributed to the consumption of raw, V.v. infected oysters.

12. Other Documentation - none

13. Other Assistance:

- A. Gulf Oyster Industry: Mainly provided either in-kind oyster products for use in the sensory evaluation, consumer education, market promotion and new value added product development component of the project, as well as access to their processing facilities during the videotaping of various oyster post harvest processing (PHP) technologies.
- Motivatiit Seafood, Inc.
 - Ameripure Processing Company

- Louisiana Seafood Processors
- Joey's Oysters
- Mississippi Seafood Dealers
- Bradford's Oyster Company
- Crystal Seas Seafood
- Fournier and Sons
- Gulfstream Seafood
- J and W Seafood
- Terry's Seafood

B. Contributing Agencies:

- Gulf Oyster Industry Initiative
- NOAA/National Sea Grant Program
- Florida Sea Grant College Program
- Mississippi Sea Grant College Program
- Mississippi State University (MSU) Natural Resource Economics Program
- MSU Coastal Research and Extension Center (CREC)
- MSU Department of Food Science and Technology
- MSU-CREC Experimental Seafood Processing Laboratory

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**Sea Grant Contract # NA16RG1720 [#81]
Project R/LR-Q-23 Year I**

FINAL REPORT

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PROJECT TITLE: **Integrated Oyster Market Research, Product Development and Evaluation, Promotion and Consumer Education for the Gulf of Mexico's Oyster Industry** (Sea Grant Contract # NA16RG1720 [No. 81] Project R/LR-Q-23 Yr. I)

AMOUNT OF GRANT: Federal: \$ 200,000 Match: \$ 100,000
 Total: \$ 300,000

AWARD PERIOD: From: October 1, 2002 To: June 30, 2003

GRANTEE: Gulf and South Atlantic Fisheries Foundation, Inc.

I. INTRODUCTION

Every year millions of Americans love to eat oysters, especially raw oysters on the half-shell. In 1999 alone, the total U.S. oyster landing was 27.0 million pounds of meat valued at \$72.7 million. Leading the country in oyster production is the Gulf region with 15.8 million pounds of meat landed or 58% of the national total.

For a small segment of the population, however, eating raw or undercooked oysters could cause serious illness or even death from *Vibrio vulnificus*. Infection can also occur when cuts, burns, or sores come in contact with seawater containing *V. vulnificus*. Between 1989 and 1996, the Centers for Disease Control and Prevention (CDC) reported 149 serious illnesses resulting in 75 deaths from *Vibrio vulnificus* infection or an average of 40 culture-confirmed cases, 35 hospitalizations, and 12 deaths reported each year from the Gulf region.

V. vulnificus is a bacterium found naturally in coastal waters. They are not caused by pollution and are commonly found in warm waters, including approved oyster harvesting areas in the Gulf of Mexico. As a warm water species, the amount of *V. vulnificus* found in oysters tends to be higher during warm weather months of April through October.

What makes it difficult for consumers to detect *V. vulnificus* is that it does not change the appearance, taste, or odor of oysters.

Most healthy individuals are not at risk from *V. vulnificus* infections. However, those with any of the following conditions belong to the "high risk" category: liver disease; alcoholism; diabetes; AIDS or HIV infection; gastric disorders; inflammatory bowel disease; cancer (including lymphoma, leukemia, Hodgkin's disease); hemochromatosis / hemosiderosis; steroid dependency (as used for conditions such as emphysema, chronic obstructive pulmonary disease, etc.); and any illness or medical treatment which results in a compromised immune system. While there is no shortage of quality medical/health care professionals in the U.S. (e.g., Florida has 42,532 licensed physicians, 2,685 physician assistants and 172,363 nurses), the level of awareness among medical professionals regarding the at-risk population and how they communicate the risks to their patients is still inadequate.

Failure to educate and warn high-risk individuals of vibriosis could lead to an increase in vibrio-related illnesses. The resulting media frenzy and public clamor for more stringent regulations could come at a

high cost. Dr. Walter Keithly of Louisiana State University studied the economic impacts of negative newspaper publicity and warning labels on the Gulf's oyster industry. He concluded that these negative publicity tend to scare consumers away, cause as much as 40% decline in the dockside price of oysters, lead to a net welfare loss of up to \$13 million and primarily impacts oyster growers and harvesters.

Essentially, high-risk individuals should never eat raw oysters but it does not mean they could not consume and enjoy processed oyster products. Post harvest treatment or processing (PHP) of oysters (e.g., by cooking oysters thoroughly) destroys *V. vulnificus* and

offers a safe product alternative to this segment of the population.

While the need to inform high-risk consumers of the dangers of eating raw oysters contaminated with *V. vulnificus* is paramount, it is equally important to educate the high-risk and general consumers of the availability of equally satisfying PHP oyster products with "safety added" features and other oyster value-added products (VAP) that everyone can enjoy. This win-win strategy requires an integrated R&D effort that combines consumer research, new product development and technological innovations with appropriate consumer education, market promotion and technology transfer programs.

II. PROJECT GOALS AND OBJECTIVES

The long-term goal of this program is to increase the overall consumption and sale of oyster products through

- (1) Promotion of new oyster PHP and VAP processes and technologies,
- (2) Development of acceptable and safer oyster product alternatives, especially for V.v. at-risk consumers, and
- (3) Formulation of effective consumer and food service professional education and product promotion strategies.

More specifically, the objectives of this project are three-folds:

- (1) To develop and evaluate the sensory characteristics of commercially available PHP oyster products (heat-cold pasteurization, quick freezing, high hydrostatic pressure) versus raw oysters and other existing or new value-added product categories (e.g., char-broiled, steamed, etc.).
- (2) To educate wholesalers, retailers, processors, food service professionals,

high-risk individuals and general consumers of the availability, safety and sensory characteristics of new, commercially available PHP and other value added oyster products.

- (3) To develop technology transfer (targeted at oyster processors), consumer education (aimed at the wholesale, retail and food service industry professionals), and general seafood consumer market promotion materials and strategies centered on commercially available PHP and value-added oyster products (VAP) and processing technologies.

Achievement of the above project goals and objectives depends on the degree in which seafood consumers and food service professionals could be persuaded to accept non-traditional oyster product forms and for oyster processors to consider the trial and adoption of new oyster processing technologies.

III. APPROACH

A. Theoretical Framework:

Maintaining the existing market share of traditional (raw oysters) requires an in-depth understanding of the industry's current and potential oyster consumer markets. Developing markets for new, post-harvest processed (PHP) products is even more complicated as it requires greater consumer education and product promotion effort. Significant amounts of capital investment, risk and commitment on the part of the oyster industry in the form of new processing methods, technologies and facilities are also expected.

The same hurdle is expected with respect to educating the food service professionals and at-risk consumers about the dangers of eating raw oysters and the availability of safer alternatives. This is the reason why this project's educational and technology transfer programs extended to oyster harvesters, processors, restaurateurs and seafood retailers as well as to the at-risk market segment.

Furthermore, aside from the essential consumer understanding and new oyster product R&D components of this project, most of the project collaborator's time and resources were devoted towards developing and implementing appropriate consumer education and/or technology transfer programs. The principles of *diffusion theory* and the *individual adoption process* provided the theoretical framework that guided various participants of this project.

(1) *Diffusion Theory and the Technology Adoption Life Cycle Model*

Diffusion research emerged out of the troubles that change agents had in getting people to use innovations and information that had been developed specifically for them, usually at

public expense (e.g., *V. vulnificus* education project aimed at preventing raw oyster consumption by high-risk individuals). *Diffusion* is the process by which an innovation is communicated through certain channels over time among the members of a social system.

The practical aspect of this theory is captured in the *Technology Adoption Life Cycle Model* that relates how communities respond to *discontinuous innovations*.

An *innovation* is an idea, practice, or object perceived as new by an individual or other unit of adoption. Truly *discontinuous innovations* are new products or services that require the end users and the marketplace to dramatically change their behavior in exchange for promises of equally dramatic benefits.

Applied to marketing, the model postulates that when a marketplace is confronted with the opportunity to switch to a new infrastructure paradigm – e.g., new oyster product forms or processing technology – customers self-regulate along an axis of risk aversion, with the risk-immune innovators moving to the forefront while the risk-allergic laggards retreat to the rear of the line. In-between, the model identifies three additional communities, i.e., early adopters (visionaries), early majority (pragmatists), and later majority (conservatives).

(2) *The Individual Adoption Process*

The *innovation-decision process* is a mental process through which an individual (or other decision-making unit) passes from first knowledge of an innovation to forming an attitude towards an innovation, to a decision to adopt or reject, or to implementation of a new idea, and to confirmation of this decision. The five stages in the individual adoption process is as follows:

a. Awareness. This is the first stage in the process where a person becomes aware of a new idea, product, or practice for the first time and possess only general information about it. If his interest is kindled, he will try to learn more about it. At this stage, the adopter simply needs to be notified of the innovation's existence, e.g., through mass media channels, fellow oyster processors, government personnel, etc.

b. Interest. At this stage a person develops an interest in the new idea or practice. General information is not enough and the person actively seeks additional detailed information to know what the innovation really is, what it will do and how it will work for him. Since the adopter is basically interested in becoming informed, the preferred information sources are similar to those in the awareness stage.

c. Evaluation. As the prospective adopter accumulates information, he weighs the pros and cons of the new idea and mentally relates it to his own situation. The person determines whether (a) the idea is a good one and (b) if it is good for him. At this stage, the adopter needs trustworthy sources of information, which includes trusted fellow oystermen, observation of local results, and other trusted individuals in the community or industry.

d. Trial. At this stage a person tries the new idea or practice. After initial trial, he may adopt the innovation for sustained use or choose not to use it. At this stage the adopter goes beyond knowledge and into actual hands-on-experience. His information needs at this point are more pragmatic and would include how-to-do-it publications, instructions with the product, experienced oyster processor's assistance, government extension agents, etc.

e. Adoption. At this stage the individual decides that the new idea is good enough for full-scale use. It is reasoned that he is likely to continue full use until something new starts

the cycle again. Therefore, what is more important here is the adopter's own experience and observations about the merits of the innovation as well as confirmation from his peers that his decision was the right one.

NOTE: Due to significant reductions in the overall proposal's budget as well as other industry considerations, the technology transfer aspect of this project was limited to developing communication materials and implementation of technology transfer-related activities up to the "evaluation" step of the process only.

B. Collaborators and Sub-Contracted Work:

This project required close cooperation with the Florida Department of Agriculture and Consumer Services (Bureau of Seafood and Aquaculture Marketing), Louisiana Seafood Promotion Board/Oyster Task Force, the Mississippi Department of Marine Resources (Seafood Technology Bureau) as well as industry groups such as Motivati Seafood Company, Ameripure Oyster Company, etc. Because of this, close coordination and more involved project planning were emphasized. Periodic face-to-face and telephone meetings were conducted throughout the project to evaluate the progress of the different programmed activities and to plan necessary updates.

The first year of this two-year program has three major components as outlined in Table 1 (Oyster Project Schedule of Activities Matrix).

1. New Oyster Product Research/PHP Processing Technology Transfer:

a. New Oyster Product R&D: Reduction or elimination of adverse health risks or illnesses resulting from eating *Vibrio vulnificus* infected oysters requires proper communication of risks, adequate consumer education, and the availability of equally tasty and reasonably priced PHP oyster products with safety added features. Consumer/Product Profiling and

Sensory Evaluation of commercially available PHP oysters and other value-added oyster products (VAP) were conducted by Food Scientists at Mississippi State University and under the supervision of the Seafood Technology Bureau of the Mississippi Department of Marine Resources (STB). The results of this study will later be used to improve the sensory quality and consumer acceptability of current PHP oyster products. It would also be used to screen other promising VAP oysters for later development and aid in the production of technology transfer materials or strategies and marketing/consumer education copies.

b. Industry Technology Transfer: Based on the economic and production performance of currently commercially available PHP oyster processing facilities, supplemented by findings under component (a) above, appropriate technology transfer strategies and extension materials aimed at promoting the benefits of new PHP technologies to other commercial oyster processors were developed. STB took the lead in the pilot implementation of this project component (i.e., Awareness, Interest, and Evaluation steps of the Individual Adoption Process).

2. Food Service Professionals and Consumer Education/Market Promotion:

a. Food Service Professionals and At-Risk Consumer Education: The insights gained from targeted focus group sessions as well as relevant research/surveys conducted in the past were used to develop appropriate consumer education materials and communication strategies targeted at food service professionals and the at-risk

consumer segment of the population. Awareness of the risks involved in eating *Vibrio vulnificus* infected oysters and information on the availability of equally good tasting product alternatives with safety added features (i.e., PHP and VAP oysters) was the main focus of this project's consumer education program. Participation in national conventions of food service professionals was one approach used to effectively reach this key group of people. The Florida Department of Agriculture and Consumer Services was the lead agency that developed and implemented these consumer education materials and strategies.

b. Gulf Oyster, Commercial PHP and Other Value-Added Oyster Product General Consumer Market Promotion: One way to effectively reduce the health risk associated with eating raw oysters as well as expand the market for oysters is by increasing the visibility and availability of safer but equally tasty product alternatives. This "demand-pull" strategy would also encourage seafood processors to consider the trial and adoption of oyster PHP technologies. This requires the development of appropriate commercial PHP oyster market promotion strategies and materials targeted at the general oyster consumers as well as new converts. Participation in local and national seafood/trade shows was effectively utilized to reach a large audience. The Oyster Task Force (OTF) of the Louisiana Seafood Promotion Board was the lead agency in-charge of this project component. OTF was also the lead agency that planned and coordinated the Gulf Oyster Project Public Presentation aspect of this project.

IV. PROJECT ACCOMPLISHMENTS

A. Gulf Oyster Project Website (www.GulfOysters.Net)

1. Project Staff:

- Dr. Tomas Jamir, Project Coordinator
- Ms. Juliana Smith, Webmaster
- Ms. Karen Tavares, Associate

2. Goals/Objectives

The ultimate goal of the oyster website is to provide the Gulf Oyster Project with an array of communication and information dissemination tools targeted at:

- General oyster consumer market
(Message: Eat PHP oysters – they're tasty and also good for you)
- Vibrio vulnificus* at-risk population
(Message: Abstain from eating raw oysters or follow recommended oyster preparation procedures)
- Commercial oyster processors
(Message: Adopt PHP technology for safer oysters, open up new market niche = increased sales)

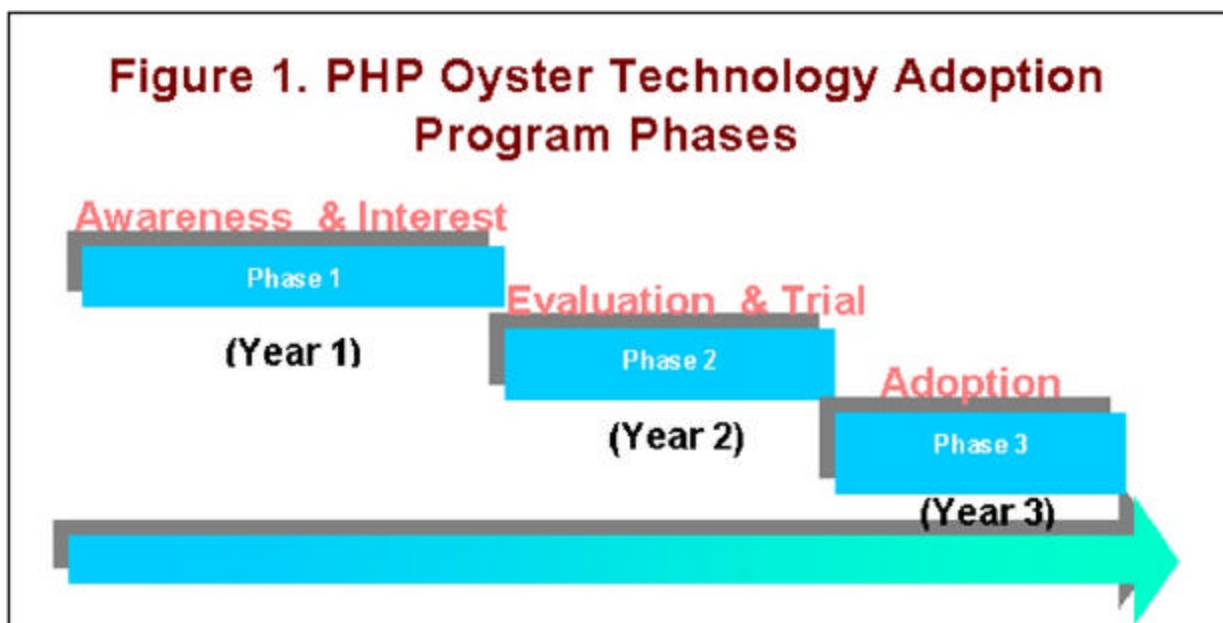
3. Approach

a. Theoretical Framework:

Following the general principles of the Individual Adoption Process, the contents of the Gulf Oyster Website was designed and programmed to provide the appropriate information needed by the project's target audience as they go through each of the five stages of the PHP oyster technology adoption process, i.e., Awareness, Interest, Evaluation, Trial and finally, either Adoption or Rejection of the new technology or innovation

b. Program Status:

Figure 1 shows the different phases of the PHP oyster technology adoption process from the perspective of an abbreviated three-year "accelerated" program. Phase 1 (Year 1) of the program concentrates mainly on the "Awareness" and "Interest" stages of the Individual Adoption Process. This coincides with the general information,



market promotion and educational materials being developed by the project collaborators for various target audiences at this stage in the project, e.g., commercial oyster processors, V.v. at-risk individuals, health providers and medical professionals, general seafood consumers, seafood chefs, restaurants and food service providers.

Year 2 of the abbreviated Gulf Oyster Project coincides with Phase 2 of the PHP Oyster Technology Transfer Program. During this stage in the process, the Gulf Oyster Website will carry informational or educational materials designed to increase awareness and interest for PHP oyster products and technology, as well as deliver pertinent materials or links that would enable the more serious audience to evaluate and possibly try for themselves whether the commercial oyster PHP technology or new oyster value added products is for them or not.

Phase 1 of the website project involved the initial website and visual graphic images design, image selection and processing (Macromedia Fireworks, Adobe PhotoShop), Javascript and HTML programming (Macromedia

Dreamweaver), wweb link research, and selection of relevant informational materials on PHP oyster technology and products, V.v. education for at-risk individuals, oyster recipes, background on the Gulf Oyster Project, pertinent information on each of the project's collaborating agencies, and other fun articles designed to make browsing of the website enjoyable like oyster trivia questions and facts, new oyster recipes, downloadable e-newsletter ("The Oyster Shack"), and pages of useful web links.

Once the design phase was completed, regular (monthly) website updates and maintenance became the main pre-occupation of the Gulf Oyster Project's Website Design and Development Team.

For Phase 2 (Year 2) of the project, the Gulf Oyster Project Website Design and Development Team will coordinate and work closely with the rest of the Gulf Oyster Project team in designing appropriate website structure and information delivery strategies corresponding to the "Evaluation" and "Trial" phases of the PHP oyster technology transfer program.

4. Website Contents

Figure 2 shows a section of the Gulf Oyster Project's home page. As the welcoming and introductory page to the project's website, the information found in the home page include:

- ✍ the website address,
- ✍ the target audience of the website and what the site is all about,
- ✍ navigational buttons that click-links to other internal sites,

Figure 2. The Gulf Oyster Project Home Page.



- Logos and links to the web pages of the collaborating agencies, and
- Pertinent project and website contact information.

In order to establish the credibility of the project and the message contained in the website, separate pages were allocated for each of the collaborating agencies (Figure 3). These pages contain relevant information about the agencies with respect to the Gulf oyster project's initiatives as well as their role in the current Gulf Oyster Project. Reciprocal web links to the different agencies' official websites and the Gulf Oyster Project website are also included.

Aside from promoting the benefits and satisfaction derived from eating oysters, one of the key consumer education goals of the Gulf Oyster Project is to reach out to the *Vibrio vulnificus* at-risk consumer segment of the population.

Figure 4. V.v. at-risk consumer education page.

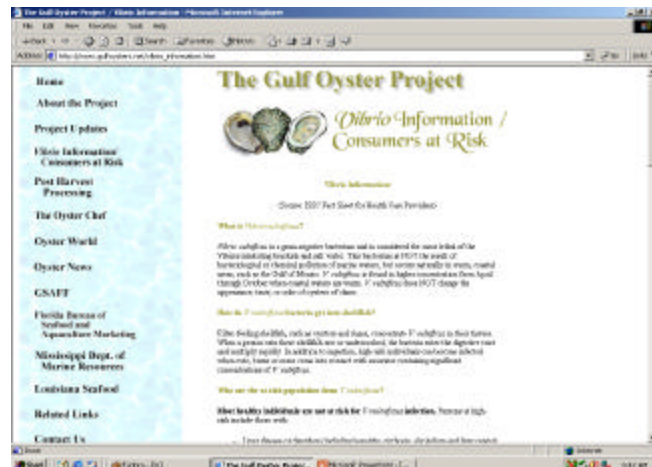
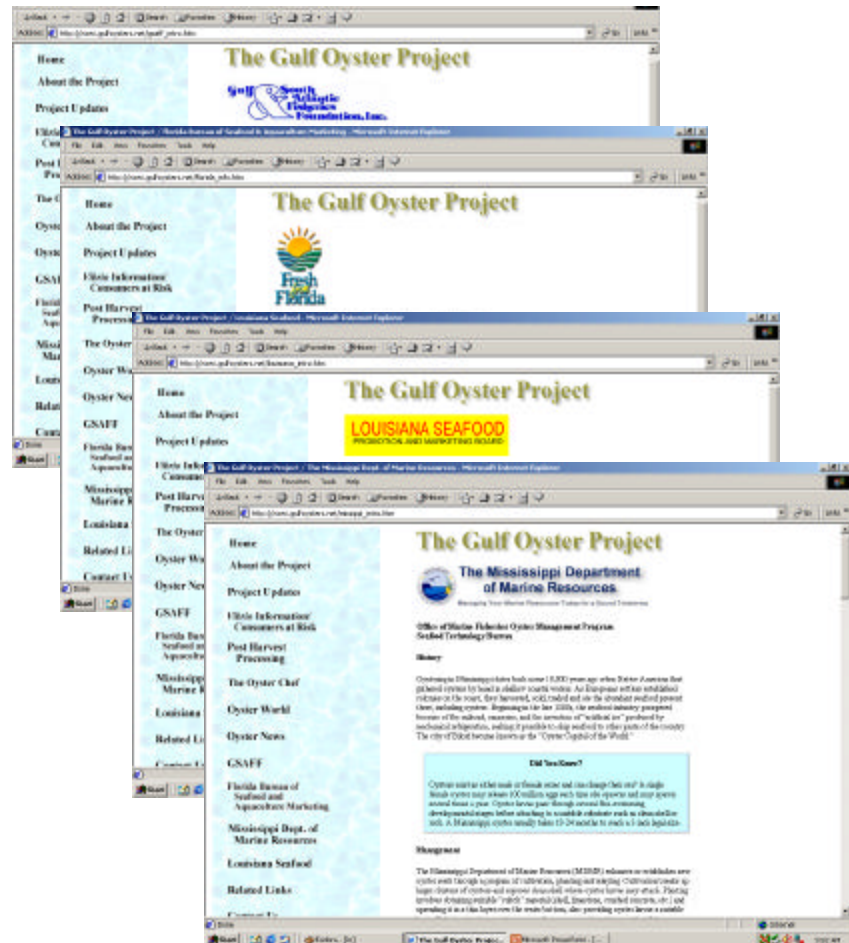


Figure 3. Web pages of collaborating agencies.



Reduction of vibrio-related health problems and illnesses requires a collaborative effort, sharing of materials, and cross-references among various agencies and projects (Figure 4).

The Gulf Oyster Project's website realizes the great strides already made by the Interstate Shellfish Sanitation Conference (ISSC) in reaching this segment of the population. So, aside from directly consulting and involving the ISSC in this project's consumer education effort, the project team also makes extensive reference, web links and utilization of various consumer education materials relating to V.v. at-risk population already developed by the ISSC.

As with any information medium, websites are among the potentially powerful tools available nowadays for conveying information on the information superhighway. However, websites cannot make its existence known to their target audience unless pro-active effort is made to advertise the site. It also needs to carry relevant, updated and “sticky” information that would motivate the target audience to bookmark the site, make multiple visits, and provide positive referral to members of the group.

In the case of food items like oysters, one of the effective ways to achieve this is by the inclusion of a recipe page that gets updated regularly (Figure 5). Inclusion of “The Seafood Chef” section in the website serves multiple purposes, e.g., it increases the number of visitors to the site, it educates V.v. at-risk individuals of equally tasty but safer oysters, and it also promotes the overall consumption of oysters among seafood lovers.

Safe oyster preparation methods, sumptuous oyster recipes, a variety of oyster cooking tips, etc. were researched from various seafood cookbook recipes, especially those compiled

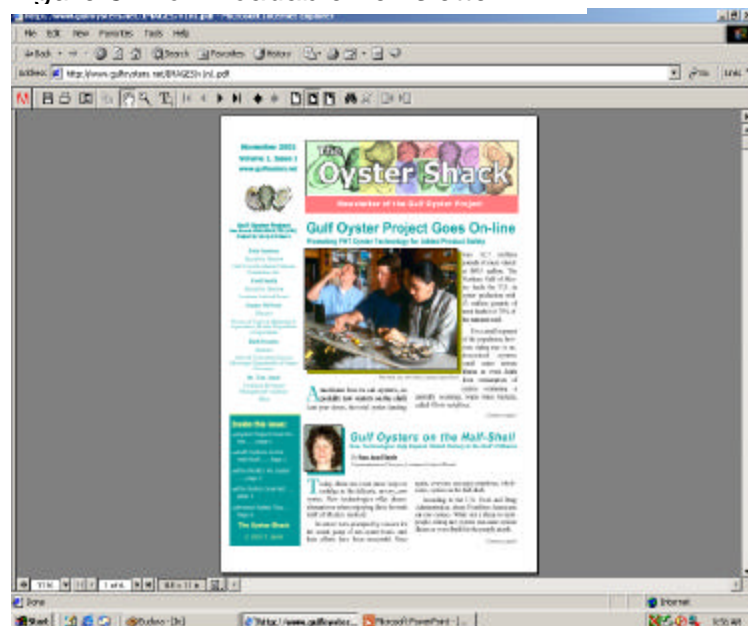
Figure 5. Oyster recipe page.



and produced by the Mississippi Department of Marine Resources (“Seafood South Mississippi Style - Get Hooked!”), Gulf and South Atlantic Fisheries Foundation, Inc. (“Seafood Adventures from the Gulf and South Atlantic” and LaFray-Young’s “The Underwater Gourmet”), ISSC website recipes, and recipes provided by the Louisiana Seafood Board.

Another approach to draw-in visitors to the website is through the Gulf oyster news and trivia page. Included in this section are fun oyster trivia quizzes, articles, project news updates, regional/state news postings, and a free downloadable e-newsletter – “The Oyster Shack” (Figure 6).

Figure 6. Downloadable newsletter.



The Oyster Shack combines a summary of the current website updates, contributed articles from various collaborating agencies, a seafood recipe section, and interesting news releases dealing with commercially available oyster PHP technology, new value added oyster products, or important information for *Vibrio vulnificus* at-risk consumers. The downloadable version of the newsletter comes in either the Acrobat pdf file format or in the original Microsoft Publisher file format.

Finally, another key item included in the Gulf Oyster website is the “Related Links” pages (Figure 7). The website staff meets regularly to research, update, select and upload relevant links to other oyster websites. This is important because it enables web surfers to access relevant information about Gulf oyster issues or topics without leaving the Gulf Oyster Project website.

As Year 2 (Phase 2) of the PHP Oyster Technology Transfer Program commences

and various Year 1 (Phase 1) consumer education materials get completed and become available for general distribution, additional elements will also be added to the current website. Depending on the final outcome of the Year 2 planning process, a large part of the additions will involve the development and expansion of the oyster PHP technology transfer section to include “click-and-play” audio-visual displays and CD/DVD file download capabilities.

Figure 7. Related links page.



B. Florida Seafood and Aquaculture Marketing Bureau

1. Project Staff:

- Joanne McNeely, Bureau Chief
- Paul Balthrop, Development Representative

2. Introduction

The Florida Department of Agriculture and Consumer Services, Bureau of Seafood and Aquaculture Marketing was among the three state agency participants in this multi-state and multi-agency collaborative oyster marketing research and consumer education project. The long-term goal of this effort is to increase the overall sales and consumption of Gulf oyster products through the development and promotion of safer, post harvest processed (PHP) oyster products, processes and technologies. The Florida component of the project also sought to develop effective education and promotion strategies aimed at the general consumers and food service professionals.

Awareness of the risks involved in eating oysters and information on the availability of equally good tasting and safer product alternatives was the main focus of this education program. In this regard, the Florida Department of Agriculture and Consumer Services helped develop and distribute appropriate consumer education materials and communication strategies targeted at food service professionals and the *Vibrio vulnificus* at-risk consumer segment of the population.

3. Goals/Objectives

Statistics show that millions of Americans love to eat oysters. However, for a small segment of the population, eating raw or undercooked oysters could cause serious illness or death from *Vibrio vulnificus* (V.v.) -- a naturally occurring bacteria found in warm waters. Between 1989 and 1996, 149 illnesses were reported that resulted in 75 deaths from V.v.

infections. Failure to educate and warn high-risk individuals of this risk could lead to increased vibrio-related illnesses. The adverse media coverage was estimated at costing the Gulf oyster industry millions of dollars in lost sales. Without question, the need to inform high-risk consumers, the general consumers and the food service industry of the availability of equally satisfying and safer post harvest processed (PHP) oysters is of paramount importance.

The overall goal of this project is to increase the sales and consumption of Gulf oyster products through a variety of methodologies. Florida's year one objective was to educate the V.v. At-Risk consumers, general seafood consumers, and the food service industry on the availability and safety of new, commercially available PHP and other value added oyster products.

4. Approach

The Florida DACS-Bureau of Seafood and Aquaculture Marketing took a number of approaches to accomplishing the above stated objectives.

- a. The International Boston Seafood Show (IBSS) was held on March 12 thru 14, 2003. This show is the premier seafood event in the country featuring over 750



exhibitors and over 23,000 qualified buyers. McNeely and Balthrop staffed the "Fresh from Florida" Pavilion at the show where the staff

disseminated general oyster promotional copies, Gulf oyster project information, PHP oyster technology and products literature, and V.v. at-risk consumer informational brochure to over 400 attendees. To draw-in people to the Florida pavilion, give-away t-shirts and a golf putting game were hosted.

The impression received by the Florida staff regarding the knowledge level of IBSS attendees on PHP and V.v. at-risk consumers were:

- ✍ Most knew about V.v.
- ✍ Most knew about PHP and other oyster processing technologies
- ✍ Few knew about the availability of PHP oysters
- ✍ Fewer knew about value-added oyster products and their availability
- ✍ Almost all appreciated receiving the informational literature provided

- b. In November 2002, Balthrop staffed a booth at the International Hotel/Motel and Restaurant Show held at the Jacob Javits Center in New York, New York (Figure 8). ISSC informational brochures targeted toward the general and at-risk consumers were distributed. PHP and other value added oyster products, e.g., Oysters Rockefeller, were also displayed. PHP oysters were also highlighted at a culinary competition held at the show.

Figure 8. The 2003 International Hotel, Motel and Restaurant Show.



- c. In order to confirm the previous observations of the Florida staff regarding the general seafood provider's PHP oyster and V.v. at-risk consumer knowledge level, Balthrop facilitated a focus group research (FGR) of prominent seafood chefs at the American Culinary Federation (ACF) meeting held in Philadelphia on March 16, 2003. The purchase and delivery of oyster samples

required for the FRG was organized with the help of the industry. The FRG discussed the following topics:

- ✍ Knowledge level on *Vibrio vulnificus* in oysters
- ✍ Awareness of the risks from eating raw oysters
- ✍ Knowledge level of the V.v. at-risk population (people with weakened immune systems)
- ✍ Preferences and knowledge of post harvest processed (PHP) oysters (including packaging, storage, price differentials, etc.)
- ✍ Taste preference of each of the following sample oyster products: PHP oysters, value added oysters, fresh oysters



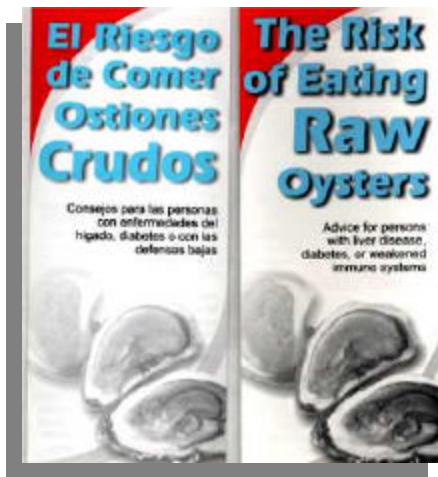
As part of the Gulf Oyster Project's education effort, the participants in the FRG were also provided with informational brochures on PHP oyster products and commercially available technologies, oyster VAP's currently being developed, and V.v. at-risk consumer information.

- d. On behalf of the Florida Department of Agriculture and Consumer Services, Bureau of Seafood and Aquaculture Marketing, official letters were sent to major pharmacy chains in Florida requesting that, as a public service in the interest of public safety, their affiliated pharmacies place ISSC developed brochures concerning the risk of eating raw oysters in each prescription filled for

individuals diagnosed with a compromised immune system.

Winn Dixie Pharmacies accepted the Florida offer to help launch a campaign to educate the V.v. at-risk consumers about the risk of eating raw oysters. As a public service, Winn Dixie agreed to flag prescriptions for immuno-compromised individuals for the purpose of placing a brochure containing valuable information about the risks of eating raw oysters in their prescription. These ISSC brochures (Figure 9) are being distributed by Winn-Dixie at their 300 Florida pharmacies both in English and Spanish.

Figure 9. ISSC brochure on the risk of eating raw oysters printed in both English and Spanish languages.



- e. A press release highlighting Winn Dixie Pharmacies' role in educating the V.v. at-

risk consumers was distributed nationwide to all newspapers with a readership of over 50,000 and to all television stations and daily and weekly newspapers in Florida.

- f. A press release regarding the Gulf Oyster Project, PHP oysters and technologies, and the consumer education effort aimed at V.v. at-risk consumers were also distributed to all newspapers with a readership of over 50,000 and to all television stations, and daily and weekly newspapers in Florida.

5. FRG Findings

The results of the facilitated focus group research involving fifteen ACF chefs were as follows:

- ~~/~~ Nine out of fifteen ACF chefs had knowledge of *Vibrio vulnificus*
- ~~/~~ Seven knew the risk of eating raw oysters
- ~~/~~ Six knew about the V.v. at-risk population
- ~~/~~ Only two knew about PHP technology
- ~~/~~ Thirteen preferred the value added product in the taste test
- ~~/~~ Eight would pay more for PHP oysters
- ~~/~~ Ten would pay more for the added safety and shelf life offered by PHP oysters
- ~~/~~ Twelve chefs preferred the "fresh-like" appearance of frozen PHP oysters
- ~~/~~ All fifteen chefs preferred PHP oysters packed individually on trays
- ~~/~~ Eleven preferred the taste of value-added oyster products to PHP oysters

C. Louisiana Seafood Promotion and Marketing Board

1. Project Staff:

- Mr. Ewell Smith, Executive Director
- Ms. Tracy Mitchell, Assistant Executive Director

2. Executive Summary

The Louisiana Seafood Promotion and Marketing Board has strengthened and expanded its traditional general consumer education efforts by expanding its programs to include information on the risks of eating raw oysters as well as the availability of alternative PHP oyster products for the *Vibrio vulnificus* at-risk consumer segment of the population. The focus and contributions of the Louisiana group in the Gulf Oyster Project primarily involves the participation and dissemination of V.v. at-risk segment and PHP/VAP oyster informational materials at several trade shows and industry promotional venues, project website and newsletter assistance, and the organization and facilitation of the Gulf Oyster Project's Public Presentation Conference at New Orleans, Louisiana.

3. Objectives

To educate consumers and the food service industry of the health hazards of *Vibrio vulnificus* to at-risk consumers, and the availability of equally satisfying post harvest processed (PHP) and new value added oyster products (VAP) with "added safety" features in the market.

4. Approach

For Phase 1 (Year 1) of the Gulf Oyster Project, the main activities of the collaborating agencies center on raising "Awareness" and "Interests" among the target audience of the availability of post harvest processed and value added oyster products. As a safer and equally tasty substitute to raw oysters, this

provides the at-risk consumer segments with products that they could enjoy.

An educational brochure was written and developed by the Louisiana Seafood Promotion and Marketing Board staff with input from industry and companies that adopted various post harvest processing technologies. The brochure addresses new technologies that offer consumers alternatives to eating raw oysters. Information on four commercially available post harvest processing technologies were included in the items brought to the attention of trade show conference attendees who drop by the Louisiana Seafood Promotion and Marketing booth. This includes the Low-Heat Pasteurization Process, High Hydrostatic Pressure Process, Cryogenic Freezing and the Low-Dose Irradiation Process.

While not a threat to most people, eating raw oysters can cause serious illness or even death for some consumers at risk (i.e., those that are immuno-compromised). Hence, special care was made to highlight this important information in the informational materials without causing undue panic to other consumers.

As a reassurance of the general safety of this healthy seafood product, it was also pointed out that over 20 million Americans love to eat raw oysters every year. The brochure also provides health and nutritional facts on oysters (e.g., low calorie, low cholesterol source of protein and minerals). Product handling and storage tips, oyster recipes, and other pertinent information are also incorporated in the consumer education/oyster promotion package.

At trade shows, the Louisiana Seafood Promotion and Marketing Board is usually represented by two to three staff members and one fisheries specialists who are well-trained to answer seafood related questions and put in product orders from accredited buyers and distributors. During the project

implementation period, the seafood promotion team set-up booth displays at the International Boston Seafood Show (IBSS-Boston), International Hotel, Motel and Restaurant Show (IHMRS-Las Vegas), the Louisiana Restaurant Show (Louisiana), and the National Restaurant Show (Chicago). About 500 brochures are made available and distributed to each of these trade shows.

Aside from raising “Awareness” and “Interests” of PHP and VAP oyster products to the general consumers and at-risk segment of the population, the Louisiana seafood promotion team also collaborated with the Gulf oyster industry to provide post harvest processed oyster products to trade show participants. This is one of the important contributions of face-to-face encounters at trade shows where the actual products being promoted are only display and ready to consume. The impromptu opportunity to try and taste these products first hand enables interested individuals to “Evaluate” and conduct “Trials” of the products, and possibly decide to either “Adopt” or “Reject” the new product(s) and/or PHP technology within the course of the trade show.

Consumers could conveniently follow-up on the general information provided in the brochure by logging in on the Louisiana Seafood Promotion and Marketing Board's website as well as the Gulf Oyster Project website. Contents of the Louisiana website are prepared by the staff with the help of two industry members: Mr. Mike Voisin, the Chairman of the Louisiana Oyster Task Force and owner of the Motivatiit Seafood Company, and Mr. Alfred Sunseri, also a member of the Louisiana Oyster Task Force and owner of the P&J Oyster Company. This website is an informational tool that brings together those involved in the project and their functions. It fully explains the goals of the project, provides an effective education and promotion platform for today's internet connected general consumers and food service professionals, and serves as a tool to promote awareness of

the risks involved in eating raw oysters and the availability of equally good tasting but safer PHP/VAP product alternatives.

Finally, the Louisiana seafood team organized and hosted the Gulf Oyster Project's Public Presentation Conference held on June 5 and 6, 2003 at the Royal Sonesta Hotel, New Orleans, Louisiana. In addition to the public conference, a tour of the Motivatiit PHP (High Hydrostatic Pressure and Individually Quick Frozen) oyster facility was conducted on the second day. The conference was well attended by project collaborators and respective state agency and Interstate Shellfish Sanitation Conference (ISSC) representatives as well as oyster processors and interested publics.

6. Highlights of Accomplishments

a. Seafood Industry Promotion. The Louisiana Seafood Promotion and Marketing Board promoted PHP and VAP oyster products and technologies at the 2003 International Boston Seafood Show (Figure 10). At the IBSS, 500 copies of the Gulf Oyster Project brochures and informational materials were handed out to attendees who visited the Louisiana seafood display booth. Samples of PHP oysters were also made available for tasting by interested visitors.

Figure 10. Louisiana Seafood Promotion and Marketing Board Executive Director at the International Boston Seafood Show.



b. Legislative Promotion. During the project implementation period, Louisiana held three major events in both the Louisiana Legislature and at the nation's capital. This included the Mardi Gras Alive/Oyster event in Washington, D.C., the Shrimp/Oyster Education Day, and Baton Rouge Legislative events (Figure 11).

Figure 11. Legislative events sponsored by the Louisiana Seafood Promotion and Marketing Board.



c. Print Media Exposure. Louisiana seafood, including oyster products have also been featured in various local magazines, courtesy of the Louisiana Seafood Promotion and Marketing Board (Figure 12).

Figure 12. Array of local magazines featuring Gulf oysters and other seafood.



d. Press Releases. Several articles prepared by the Louisiana Seafood Promotion

and Marketing Board staff have been submitted to the North American Precis Syndicate (NAPS). In return for a \$2,000 per article submission, NAPS enables the major newspapers and magazines in the nation to access the article for a period of one year – a good PR return for a minimal investment (Figure 13).

Figure 13. Example of oyster-related news articles submitted to NAPS.



e. Local Media Promotion. Another avenue used by the Louisiana Seafood Promotion and Marketing Board to increase awareness and interests among a broad spectrum of consumers within the region is through participation or co-sponsorship of local oyster promotional events (e.g., Louisiana Oyster Challenge together with the International Federation of Competitive Eating), provision of radio prize give aways, farmers market promotions, and through participation in the Shrimp and Oyster Interfax Daily (Figure 14).

Figure 14. Local collaborative activities of the Louisiana Seafood Promotion and Marketing Board.



f. Website. Complementing the widespread media exposure of the Louisiana Seafood Promotion and Marketing Board is the website at: www.LouisianaSeafood.com (Figure 15).

Figure 15. Home page of the Louisiana Seafood.com website.



g. Establishing a Popular Tradition. Gulf oysters get big local television news and public image boost with the success and popularity of the oyster eating contest run by the ACME Oyster House and the International Federation of Competitive Eating (Figure 16).

Figure 16. The 2003 Louisiana Oyster Challenge competitive eating competition.



h. National TV Exposure. The increasing popularity of the ACME Competitive Oyster Eating Competition has caught the TV eye of NBC's "The Today Show" (Figure 17) that featured this year's winners in the International Federation of Competitive Eating for various food categories, including oysters.

Figure 17. NBC's The Today Show featuring this year's winners in the International Federation of Competitive Eating. Inset picture shows oyster eating champion gulping dozens of raw oysters on the half-shell. Background picture shows the crowd gathered in New York City to watch The Today Show.



D. Mississippi DMR – Seafood Technology Bureau

1. Project Staff:

- Ruth Posadas, Bureau Chief
Research Team Coordinator

MS Department of Marine Resources
Seafood Technology Bureau

- Jeff Davis
- Rod Jordan
- Jan Welker
- Clay Boulet
- Irvin Jackson
- Lauren Thompson
- Tom Van Devender
- Joe Jewell
- Ruth Alviola Posadas, Team Leader
- William “Corky” Perret, Adviser

Mississippi State University (MSU)
Coastal Research and Extension Center
Department of Food Science and
Technology

- Dr. Patti Coggins
- Neil Bogart
- Jonathan Wilborn
- April Gandy
- Michael Lynn Tynes

MSU-CREC
Experimental Seafood Processing
Laboratory

- Patrick Broussard
- Tommy Schultz
- Susan DeBlanc
- Dr. Linda Andrews

MSU-CREC
Natural Resource Economics Program

- Dr. Benedict C. Posadas

Gulfside Productions

- Gordon Larson

Gulf Oyster Processing Industry


- Louisiana Seafood Processors
- Ameripure Processing Company
- Motivait Seafood, Inc.
- Joey’s Oysters


Mississippi Seafood Dealers


- Bradford’s Oyster Company
- Crystal Seas Seafood
- Fournier and Sons
- Gulfstream Seafood
- J and W Seafood
- Terry’s Seafood

2. Goals/Objectives

The over-all goal of this particular segment of research is to document the three new post harvest processing (PHP) technologies commercially available to the seafood dealers namely:

 Heat-Cool Pasteurization also known as warm-cool pasteurization (HCP),

 High pressure processing or high hydrostatic pressure (HHP), and

 Individually quick frozen (IQF) processing technologies.

Currently, the Mississippi seafood industry does not have any of the three commercially available technologies. The majority in the industry are traditional processors selling locally, exporting shell stock and selling shucked products to other states.

The following are the key project objectives tailored to provide some answers to the industry’s needs, namely:

- ✍ To document the standard steps involved in the post harvest processing of oyster products,
- ✍ To determine the economic viability of currently available PHP technology in the region,
- ✍ To gather baseline information on the acceptability of the PHP products in coastal Mississippi,
- ✍ To develop oyster value added products (VAP) that is acceptable to the market,
- ✍ To develop technology transfer materials (video, brochure, poster, fact sheet and manual) for the whole project,

4. Approach

In adopting the marketing approach (vs. the traditional production approach) to product development, the Gulf Oyster Project incorporated consumer research and standard sensory evaluation of raw oysters (control) and both post harvest processed (pasteurized, high pressure treated and quick frozen) and new value-added oyster products developed in the food science laboratory.

The basic idea behind this research procedure was derived from Dr. Theodore Leavitt's definition of marketing as composed of three important functions, i.e., "Segmentation, Targeting, and Positioning" (STP).

Consumer surveys designed to uncover the demographic and socio-economic attributes of both non-oyster eaters and oyster lovers was the first step done by the research team towards uncovering the market segments and understanding the commonalities and buying behavior of each segment.

When conducted properly in a statistically sound manner, matching what oyster products or forms "tastes good" or "not good" to the consumers enables product developers to

develop, refine and "customize" various ingredients, formulations and product attributes that match what the ultimate buyers want. Consumer acceptability and preference tests were conducted on several occasions, mainly during well-publicized and attended state or county fairs in order to get larger samples that represent a wide cross-section of the population (Figure 18).

Figure 18. Oyster Profiling at Crawfish Fest.



More involved sensory evaluation procedures (both descriptive and quantitative) to determine the important sensory attributes of raw as well as processed oyster products were conducted under more controlled conditions at the MS-DMR facilities (Figure 19), at the local culinary schools (Figure 20), and at the MSU Sensory Science Laboratory. Initial Focus Group Research (FGR) and review of currently available literature helped the sensory science team in focusing and refining the design of their research.

Figure 19. Sensory tests at MS-DMR facilities.



Figure 20. Sensory tests at community college chef school facilities.



Based on the results of these sensory tests, seafood processors, retailers and food service providers could then match and position the new oyster VAP and PHP products (Figure 21) to their respective target market segments. In addition, they would also be used by the project to customize consumer promotion and V.v. at-risk population education materials and strategies to achieve maximum impact.

Figure 21. Value added oyster products being tested with the crowd at the Crawfish Festival.



Finally, video documentation of the PHP operations and an economic assessment of the viability of various commercially available oyster PHP technologies enable potential adopters to conduct proper technical and financial evaluation of these potential investment opportunities.

4. Results

The following consumer education and technology transfer materials were developed by the MS-DMR during the project period (see Annexes):

- ✍ 3,000 copies of PHP Brochure on "Available Technologies for Post Harvest processing of Oysters;"
- ✍ 300 copies of PHP technology transfer video entitled "Available Post Harvest Processing Technologies for Oysters;"
- ✍ 3,000 prints of posters on "Post Harvest Processing Technologies for Oyster;"

- ✍ Downloadable electronic/CD Power Point presentations files (upon request) featuring the three commercially available PHP technologies, i.e., "Individually Quick Frozen," "Heat-Cool Pasteurization" and "High Hydrostatic Pressure;"

- ✍ 3,000 copies of fact sheets on "Post Harvest Processing Technologies for Oysters" and

- ✍ Downloadable electronic copies (upon request) of Power Point presentations by the project collaborators dealing with specific topics under the contract.

A generic Hazard Analysis Critical Control Point (HACCP) Plan suitable to the commercial PHP technologies documented by the MS-DMR were also developed for use by any processor or dealers who may decide to adopt the technology.

The following MS-DMR reports on various subcontracted research projects were completed and presented during the Year 1 Gulf Oyster Project Public Presentation Conference (see files in the Appendices):

- ✍ Dr. Linda Andrews (*Consumer Acceptability of Post Harvest Processed and Value Added Oysters*),
- ✍ Dr. Benedict Posadas (*Consumer Preferences for Post Harvest Processed Raw Oysters in Coastal Mississippi*),
- ✍ Dr. Benedict Posadas (*Preliminary Economic Benchmarks for Raw Oyster Post Harvest Processing Systems*), and
- ✍ Dr. Patti Coggins (*DMR Report on Post Harvest Processed Oysters*).

VII. PROGRAM EVALUATION

The major deliverables and activities planned for Year 1 (Phase 1) of the project are enumerated in Table 1. Despite delays in the starting date of the project, all items listed on Table 1 were completed within the revised project period.

Pre-project activities (team program planning and preparation) were conducted during the Gulf Oyster Industry Council meeting at Biloxi, Mississippi in order to avail of the industry, ISSC, and GOIC expertise in attendance as well as present to the GOIC members what this project is all about.

Delays were encountered in the contract processing stage, especially between the Mississippi Department of Marine Resources and one of their subcontractors, the Grants Management Office administering the project for the Sensory Science Laboratory at Oregon State University. As time constraints became acute, the subcontract was dropped and transferred to Mississippi State University.

Most of the consumer and sensory evaluation studies were conducted side-by-side with the Mississippi Department of Marine Resources, Seafood Technology Bureau's consumer education and market promotion booth set-up at various trade shows, and state/county fairs and festivals.

A significant delay in the sensory and consumer education studies were encountered as the Jackson County Fair was moved to a later date due to the passage of a strong hurricane in the area on the scheduled festival week. However, the MS-DMR and MSU-Sensory Evaluation teams were able to recover most of the lost time later in the project.

All consumer education materials (general consumers and V.v. at-risk individuals) were developed, printed and made available for distribution as planned. This included technology transfer brochures, posters, video documentary, and fact sheets. Also completed by the end of the project are Power Point presentation slides of various aspects and subcontracted researches included in the project.

The project staff made significant progress in raising the awareness and interests of their target audiences. It was a worthy learning experience for all involved. The Florida team achieved a huge breakthrough in their V.v. at-risk information dissemination effort when the Florida Winn Dixie store chain accepted their request to participate in a public health education campaign. As a result, Winn Dixie mobilized their 300 Florida pharmacies to help identify immuno-compromised customers so they could include V.v. at-risk consumer education materials together with their prescriptions.

Both the Florida and Louisiana teams actively promoted PHP technology and products at major trade shows as well. Much of the consumer education and promotion materials developed by the project as well as those provided by BSC were distributed at the Annual International Boston Seafood Show (2003), the International Hotel/Motel and Restaurant Show, and at the American Culinary Federation meetings. Major success in promoting a good image of the Gulf oyster industry were made by the Louisiana team in their collaborative work on the Louisiana Oyster Challenge with the Acme Oyster House and the famous International Federation of Competitive Eating. The growth and popularity of this event generated multiple coverage at the local as well as national news arena.

All Gulf Oyster Project collaborators were very active in disseminating information and reaching their target audience, especially at the local level. This was hastened by the development of pertinent, research based consumer education and technology transfer materials by the Mississippi Department of Marine Resources, Seafood Technology Bureau. Additional avenues for information dissemination were opened by the Gulf Oyster Project's website as well as

the excellent website of the Louisiana Seafood group.

Overall, the goals of increasing the awareness and interest of various target audiences of this project (i.e., general seafood consumers, V.v. at risk consumers, seafood restaurants and chefs) were more than adequately met.

Table 1. Project schedule of activities and deliverables.

ACTIVITY DESCRIPTION	TIME SCHEDULE											
	1	2	3	4	5	6	7	8	9	10	11	12
(Starting on June 2002)												
Pre-Project Implementation:												
a. Program Planning & Preparation	x	x	x									
b. Contracts Processing	x	x	x									
I. New PHP/VAP Oyster Product R&D:												
a. Literature Review		x	x	x								
b. Consumer/Product Profiling				x	x	x	x	x	x	x		
c. Sensory Evaluation				x	x	x	x	x	x	x		
d. Plan/Dev. Tech. Transfer Materials			x	x	x							
e. Print Tech. Transfer Materials					x	x	x	x	x			
f. Industry Extension Activities					x	x	x	x	x	x	x	x
g. New PHP Economic Study			x	x	x	x						
II. Consumer/Food Svc. Prof. Education:												
a. Restaurant/Chef Focus Group				x	x							
b. Dev. Video & PHP Processors Guide					x	x	x	x				
d. Print Education Materials					x	x	x	x				
e. Dev. PHP/VAP Oyster PR/Brochures		x	x	x	x	x	x	x				
f. Print PHP/VAP Promo. Materials					x	x	x	x				
g. LA Trade/Seafood Show Participation		x	x							x		
h. FL Trade/Seafood Show Participation				x			x		x	x		
i. Local Seafood Show Participation				x	x	x	x	x	x	x		
III. Program Close-Out:												
a. Public Presentation												x
b. Final Report Preparation (last 3 mos.)										x	x	x
c. Other Closing Activities (last 3 mos.)										x	x	x

VIII. CONCLUSION/RECOMMENDATION

Despite initial reservations regarding the ability of geographically dispersed, highly diverse, and technically specialized groups (comprised of the Mississippi Department of Marine Resource – Seafood Technology Bureau, the Louisiana Seafood Promotion and Marketing Board, the Florida Department of Agriculture and Consumer Services – Bureau of Seafood and Aquaculture Marketing, and the Gulf and South Atlantic Fisheries

Foundation, Inc.) to function together as a cohesive team, in the end, the project worked well beyond every one's expectations. In retrospect, this project could be used as an incipient model of how collaboration among industry, state agencies and consumers could be made to work towards the achievement of commonly held goals.

The results of the sensory and consumer studies indicate that post harvest processed oysters and value added oyster products proved to be equally tasty and competitive compared to raw oysters on the half shell. Given that marketing efforts are focused on the right market segments, preliminary results of the economic analysis of commercially available post harvest processing (PHP) technologies and business operations also indicated that they could be financially and organizationally viable for adoption by medium to large size companies.

The legislative impact of California's seasonal ban on the importation of raw or unprocessed oysters coming from the Gulf of Mexico is a

wake up call for everyone in the oyster industry. Despite the conflicting analysis of the potential short and long-term implications of the California oyster ban, the fact is that it also offers a unique opportunity for those involved in various technology transfer programs to expedite the adoption and development of commercial PHP technologies to the seafood industry (processors) of the region.

In retrospect, the Gulf Oyster Project has been a very productive and great learning and team building experience for all participants and industry supporters alike.

Ms. Judy L. Jamison, Executive Director
Principal Investigator

31 July 2003
Date

Dr. Tomas Vergel C. Jamir
Project Technical Consultant

31 July 2003
Date

APPENDICES