Chapter 1: Introduction

Introduction

Aquaculture is defined as the culture of aquatic organisms under controlled or semi-controlled conditions (Stickney, 1996). According to the Food and Agricultural Organization of the United Nations (FAO; 2003), total world fishery production in 2002 was 133 million tons, of which 41.9 million tons came from aquaculture. In the United States (U.S.), per capita consumption of seafood rose to a record 16.3 pounds of fish and shellfish per person in 2003 ("Seafood consumption," 2004). However, due to many inherent aquaculture production issues in the U.S. such as environmental regulations and high labor, land, and energy costs, much of this seafood is cultured overseas and imported. This contributes to a national seafood trade deficit in excess of $7 billion annually (National Marine Fisheries Service, 2004). The largest trade deficit for any agricultural commodity, it is second only to petroleum for any natural product (U.S. Department of Agriculture/Agricultural Research Service Aquaculture Action Plan, 2003).

In an effort to decrease this trade deficit, reduce our reliance upon imported foods, enhance food biosecurity issues, and provide for new employment opportunities in rural America, governmental agencies such as the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of Agriculture (USDA), and Sea Grant under the Department of Commerce (DOC) are working together to enhance aquaculture as a viable agricultural sector in the U.S.. According to Swann and Morris (2001), outreach education via the Cooperative Extension Service (CES) is a core component toward the long-term development of an economically and environmentally sound

aquaculture industry in the U.S., and recently the CES has been identified by various federal agencies as a viable and effective system for integrating research, outreach, and clientele.

The Cooperative State Research, Education, and Extension Service (CSREES) is the federal partner in the CES and is responsible for distributing the annual Congressionally appropriated formula funding to supplement state and local funds (CSREES, 2004). These funds are leveraged with state and local funds and directed through land grant colleges and universities to implement Extension programming with the end user or clientele. Within this model, clientele needs are identified and communicated to researchers at land grant institutions as appropriate, with science-based results then disseminated back to the clientele via Extension in an appropriate and user-friendly format. At the grassroots level, aquaculture Extension agents work directly in the field and interact as needed with aquaculture producers, educators, other interested parties, and the public. To assist with aquaculture Extension programming at the local level, as well as to address specific subject matter issues, aquaculture Extension agents team with aquaculture Extension specialists. These specialists have strong subject matter experience in aquaculture and interact on a more frequent basis through home department affiliations in their institutions and directly with university researchers. These specialists establish the indirect linkage of CES between clientele and land grant university-based research and appropriately interpret needs and disseminate information (Taylor & Summerhill, 1994).

As compared with other agricultural commodity groups in the U.S., aquaculture production was slower to develop in the U.S. and did not come into prominence until the

1960s (Stickney, 1996). While aquaculture is still considered an emerging industry as compared to other agricultural sectors, it has since grown to a 3.5 billion dollar industry (National Marine Fisheries Service, 2004). As such, many issues related to the needs of clientele, as well as those of aquaculture Extension agents, specialists, and program administrators are not well known. To better understand these relationships, the USDA and CSREES conducted a national questionnaire of Extension and Sea Grant Extension educators in 2003 (Jensen, Murray, & Mayeaux, 2005). The questionnaire for this study was broad-based and solicited information in the following areas: position, career, professional growth and development, Extension, information and technology, research, regional and multi-state, national, international, clientele, accomplishment reporting, extramural funding, and future and emerging issues (Jensen & Murray, 2003). This initial survey provides an effective baseline from which to begin more in-depth studies.

Problem Statement

Aquaculture Extension programming through the CES and Sea Grant is an integral programming component for U.S. federal, state, and local governments seeking development of aquaculture as a viable industry. Uniquely positioned at the grassroots level, the aquaculture Extension agent and specialist are at the very heart of aquaculture Extension programming. The joint USDA/NOAA national aquaculture survey from 2003 establishes a baseline of data and information for future assessments (Jensen, Murray, & Mayeaux, 2005). However, we still require a firm understanding of what Extension agents, specialists, and program administrators need to effectively enhance programming initiatives. In addition, the Aquaculture National Information Center (AquaNIC),

supported by the USDA, NOAA, and Sea Grant, was established to be a gateway to the world's electronic resources for aquaculture information. While this Web site is designed to assist aquaculture Extension agents, specialists, and program administrators in their respective programming initiatives, an evaluation of this Web site from the perspective of this particular user group has never been conducted.

Purpose

There are increasing pressures for CES and Sea Grant, as well as other government agencies, to enhance program efficiency, productivity, and accountability, and to address the rapidly increasing national aquatic foods trade deficit through increasing domestic seafood production. The initial national aquaculture questionnaire provided baseline information and data regarding the population of aquaculture Extension agents, specialists, and program administrators who comprise the AQUA-EXT listserv. This study built upon this database by identifying the specific needs of aquaculture Extension agents, specialists, and program administrators to enhance program performance. The specific objectives of this study were:

1. To identify perceived continuing education and training needs of aquaculture Extension agents, specialists, and program administrators in 10 identified competency areas, as well as a perceived relative importance of each.

2. To determine electronic information resources presently utilized by aquaculture Extension agents, specialists, and program administrators within the AquaNIC Web site and identify those which need to be improved upon to enhance Web site utility to this population.

3. To identify demographics of Extension agents, specialists, and program administrators within the AQUA-EXT listserv, and how these may relate to individual education and training needs.

Limitations

This study was limited to the population of individuals with aquaculture interests and Extension appointments within Cooperative Extension and Sea Grant Extension programs across the U.S. and its territories, and who were members of the CSREES mail group AQUA-EXT. This is a closed mail group that was operated and managed by CSREES and identified the population to which these results could be generalized.

Terms

Aquaculture: Production of aquatic animals and plants.

Aquaculture Extension agent: An advisor employed directly or indirectly by CES to assist people in all aspects of aquatic animal and plant production.

Aquaculture Extension program administrator: An individual responsible for planning, implementing, and evaluating aquaculture Extension programming.

Aquaculture Extension specialist: Extension faculty employed directly or indirectly by CES with specialized training and experience in aquatic animal and plant production.

AQUA-EXT: A Web-based mail group established by USDA-CSREES as a means of disseminating information of interest in a timely manner to the broad U.S. Extension community with work and interest in aquaculture.

AquaNIC: A Web-based information and learning resource, supported by the USDA, NOAA, and Sea Grant, that is one of the nation's first network information centers to serve as a gateway to the world's electronic aquaculture resources.

Competency areas: Areas in which Extension personnel must be proficient in order to carry out their responsibilities (Gibson, 1992).

Competency components: Specific categories designed to encompass the scope of a competency area.

Information Technologies: The utilization of computer systems, applications, and software.

Program evaluation: The systematic collection of information about the activities, characteristics, and outcomes of programs to make judgments about the program, improve program effectiveness, and/or informed decisions about future program development.

Programming: A process whereby Extension staff and organized volunteers plan, conduct, and evaluate an educational program oriented to identified needs of clientele.

Preview of the Study

Chapter two provides the conceptual framework for the study, the literature review, and grounding in two previous studies by Gibson (1992) in North Carolina, and Hubbard (1971) in South Carolina. This is followed in chapter three with how the study was designed, and identifies the methodology applied to achieve three specific objectives. Results are specifically and sequentially identified in chapter four, and followed in chapter five with summary conclusions, recommendations, and implications.

Summary

This study identified the continuing education and training needs of aquaculture Extension agents, specialists, and program administrators to enhance program performance and reporting. This chapter provides an overview of aquaculture production statistics, the CES model, and how aquaculture Extension agents, specialists, and program administrators in aquaculture can enhance aquaculture as a viable agricultural industry through continuing education and training.

Chapter 2: Conceptual Framework and Literature Review

United States Aquaculture Industry

Globally, aquaculture can be traced back thousands of years to ancient Chinese and Roman civilizations. In the United States (U.S.) aquaculture is a relatively recent innovation, only beginning to develop as an industry in the 1960s (Stickney, 1996). Aquaculture as an industry in the U.S. received a boost with the National Aquaculture Act of 1980 and subsequent amendments as outlined in the National Aquaculture Improvement Act of 1985. In the 1980 Aquaculture Act, "Congress declares that aquaculture has the potential for reducing the United States trade deficit in fisheries products, for augmenting existing commercial and recreational fisheries, and for producing other renewable resources, thereby assisting the United States in meeting its future food needs and contributing to the solution of world resource problems. It is, therefore, in the national interest, and it is the national policy, to encourage the development of aquaculture in the United States" (National Oceanic and Atmospheric Administration (NOAA)/National Marine Fisheries Service (NMFS) National Aquaculture Act, 1980). Despite such legislation, numerous hindrances remain for U.S. aquaculture production such as environmental regulations, and high labor, land, and energy costs. These exacerbate a national seafood trade deficit which is in excess of $7 billion annually (National Marine Fisheries Service, 2004), and growing.

A healthy, robust, and growing domestic aquaculture industry is in the national best interest of the U.S. Aquaculture is uniquely positioned to address the growing seafood trade deficit, and has the potential to supply a projected shortfall of 10 – 40

million metric tons in global seafood demand by the year 2010 (United States

Department of Agriculture/Agricultural Research Service Aquaculture Action Plan,

2003). In addition, according to the United States Department of Agriculture (USDA)/

Agricultural Research Service (ARS) Aquaculture Action Plan (2003), domestic

aquaculture production has the potential to enhance national food production and

biosecurity issues in the U.S., while enhancing employment opportunities in an otherwise

struggling agricultural sector.

      While the U.S. aquaculture industry has grown since the 1960s to a net worth in

excess of $1 billion annually (USDA/ARS Aquaculture Action Plan, 2003), this growth

has not been consistent, and industry expansion has been minimal since the 1990s. The

reasons for this industrial stagnation are numerous and include factors that are

technological, social, environmental, technical, and biological, as well as regulatory in

nature. This chapter describes how the Cooperative Extension System (CES) is

appropriately positioned to assist development of U.S. aquaculture and discusses the

importance of identifying aquaculture Extension agents', specialists', and program

administrators' continuing education, training, skills, and online resource requirements to

enhance programming efficiency.

The Cooperative Extension System

      The Department Reorganization Act of 1994 established the Cooperative State

Research, Education, and Extension Service (CSREES) under USDA by combining the

previous Cooperative State Research Service and the Extension Service into a single

agency (USDA/CSREES Background, 2005). The CSREES, under USDA, is the federal

partner for the Cooperative Extension Service (CES) and is responsible for distributing to the CES annual Congressionally-appropriated formula funding (CSREES, 2004). The CES links both the educational and research resources of the USDA at the federal level with land-grant universities at the state level and county administrative units at the local level (Seevers, Graham, Gamon, & Conklin, 1997). The CES also leverages these federally appropriated formula funds via CSREES with state and local funds, directed through land-grant colleges and universities, to implement Extension programming for the end user or clientele. According to Seevers et al. (1997), this programming is best described through application of the following three conceptual models:

1. The technology-transfer model, whereby science-based results are transferred from the researcher to the client in an appropriate and user-friendly format.

2. The problem-solving model, whereby solutions to group problems identified by clients are proposed and evaluated by Extension.

3. The imparting-knowledge model, whereby skills generally taught in a formal educational process are brought to clientele in the field.

Within the CES, local issues are addressed by Extension agents. These agents work directly in the field and interact on an as-needed basis with clientele such as producers, suppliers, educators, and the public at large. When significant issues arise that go beyond a local need and may require more specialized assistance or research, an Extension specialist comes into play. The specialist provides strong subject matter experience, and direct linkage to the information and research capacities of land-grant universities to address these issues. In this manner, the CES indirectly links clientele and land grant university-based research, allowing for appropriate interpretation of client

needs, applied research, and subsequent information dissemination (Taylor & Summerhill, 1994).

CES and Aquaculture Industry Development

The CES has historically been instrumental in assisting agricultural development in the U.S.. Likewise, aquaculture Extension programming and outreach education has been an integral programming component for federal and state governments in development of an economically and environmentally sound aquaculture industry (Swann & Morris, 2001). Uniquely positioned at the grassroots level, the aquaculture Extension agent and specialist is at the very heart of aquaculture Extension programming, and according to Swann and Morris (2001), outreach and education with an emphasis on Extension is a key component to further development of sustainable aquaculture in the U.S.

At the state level, there are numerous challenges to Extension which directly impact its ability to address aquaculture development. A primary challenge has been significant budgetary constraints since the 1990s, and, according to Gentry-Van Laanen and Nies (1995), this has resulted in increased scrutiny of funding requests. In this environment, Extension must find ways to do more with less. This requires finding new ways to enhance programming effectiveness and increased utilization of distance delivery media (Gregg & Irani, 2004). This area of financial limitations has also significantly increased requirements on program accountability. Program impact must be more effectively demonstrated, as program reporting is more thoroughly scrutinized. Finally, the significantly diverse technological, social, environmental, technical, biological, and

regulatory issues facing aquaculture represent a monumental challenge to aquaculture Extension agents, specialists, and program administrators. According to Gregg and Irani (2004), the ability of Extension agents to effectively incorporate and utilize information technologies to better accomplish the Extension mission and serve clientele has become an essential job-related skill. In addition to addressing these rapidly emerging and changing issues, aquaculture Extension agents and specialists must find ways of accessing this information in a timely fashion and integrating them into programming initiatives. This endeavor is further complicated by the rapidly emerging World Wide Web (Web), which, while providing access to this information, makes it continually more diffuse and difficult to locate.

Needs of Aquaculture Extension Agent, Specialists, and Program Administrators

The Aquaculture Network Information Center (AquaNIC) is a Web-based information and learning resource that is one of the nation's first network information centers to serve as a gateway to the world's electronic aquaculture resources. Given the relative newness of aquaculture as an industry (Stickney, 1996), the complexity of issues limiting further expansion of aquaculture production in the U.S., and the significant challenges facing aquaculture Extension programming, identification of continuing education and training needs of aquaculture Extension agents, specialists, and program administrators is of paramount concern. In addition, given today's reliance upon computers and electronic media, a specific emphasis on identification of information technology (IT) training needs for this group is appropriate (Swann & Morris, 2001). Furthermore, the rapid emergence of the Web provides the capacity for immediate access

to information and resources, resulting in an increased reliance upon this medium by Extension for information. As such, an evaluation of these needs is appropriate to determine if the AquaNIC Web site is satisfactorily addressing these needs. Lastly, an investigation of the role of demographics and their possible correlation upon individual needs in the above categories is needed.

The joint USDA/National Oceanic and Atmospheric Administration (NOAA) national aquaculture survey from 2003 established a baseline of data and information for future assessments (Jensen, Murray, & Mayeaux, 2005). However, we still need a firm understanding of what Extension agents, specialists, and program administrators need to effectively enhance programming initiatives. According to Swann and Morris (2001), critical factors which hinder the development and implementation of Extension education programs are: (a) lack of institutional support for Extension; (b) lack of needs-based educational programs; and (c) the underutilization of distance education program delivery methods. The last element can be addressed via continuing education programming for aquaculture Extension agents, specialists, and program administrators, along with the following recommendations from Swann and Morris (2001):

1. Develop training programs for specialists on how to conduct distance education programs. Questions regarding when distance education is appropriate, expected costs/returns, and benefits/challenges need to be addressed.

2. Develop Web sites containing lists of experts, their specialties, and contact information, and utilize existing personnel to assist state specialists in developing state specialist Web sites.

3. Develop a list of distance education services within each state.

4. Develop distance education modules based upon regional education needs.

Furthermore, limitations in a sound understanding of Extension evaluation methodology such as survey development, collection and analysis of data, and reporting have been identified as limiting factors in effective program evaluation (Kiernan et al. in Radhakrishna & Martin, 1999). It is critical for Extension personnel to have a firm understanding and the required skills to effectively develop and disseminate evaluation results to funding agencies, government officials, legislatures, and all other program stakeholders (Radhakrishna & Martin, 1999).

The Growing Web and Online Research

Evolution of the Web is impacting most every facet of our daily lives. Some aspects of the Web include almost immediate access to vast amounts of information and other individuals. With the evolution of aquaculture in the U.S., an information and technology transfer need has developed. To address this need, AquaNIC was developed at Purdue University. This information and learning resource is Web-based and designed to help prospective and active aquaculturists learn additional information, access knowledge, and link with other aquaculture Web sites and databases on the Web. According to Swann and Einstein (2000), approximately 5,000 pages from the AquaNIC Web site are viewed daily by as many as 1,500 visitors, with more than 3 million files downloaded in 1999-2000 from more than 90 countries. Also, according to Swann and Einstein (2000), more than 75% of visitors accessed the site through an educational (.edu) domain in 1994. In 2000, access to the AquaNIC Web site was divided into the following categories: (a) primarily commercial (.com) at 56%; (b) networks (.net) at 30%; (c)

education (.edu) at 10%; (d) government (.gov) at, 1.6%; and (e) other organizations (.org) at 1.2%. Swann and Einstein (2000) stated that the Web is now the preferred form of mass communication media of interest to the adult educator. Clearly, the public clientele is becoming more networked and spending more time utilizing the Web as an information source, and AquaNIC is becoming a significant resource for aquaculture information.

Given this significant shift toward utilization and dependency on the Web for information, the Web is also rapidly gaining preferential application as a research tool for use in conducting surveys (Church, 1993; Dillman, 2000; Ilieva, Baron, & Healey, 2002; Ladner, Wingenbach, & Raven, 2002; Mertler, 2003). This is in part due to reduced costs associated with this medium, the ability to access larger and more geographically dispersed populations more easily, and the overall ability to more rapidly conduct the research (Dillman, 2000; Ilieva, Baron, & Healey, 2002; Ladner, Wingenbach, & Raven, 2002; Mertler, 2003; O'Neill, 2004). With regard to utilizing this new medium for conducting online research, the following suggestions by Lyons, Cude, Gutter, and Lawrence (2003), were designed to enhance online research effectiveness:

- Develop an introductory screen that is concise, motivational (e.g., describes the ease of responding) and clearly instructs respondents how to proceed.

- Make the first question easy to answer and fully visible on the first screen.

- Avoid differences in the visual appearance of questions.

- Use the same question and answer format found on paper questionnaires.

- Use drop down boxes sparingly, and identify them with a "click here" command.

- Don't require respondents to answer each question before they can answer

 subsequent questions.

- Allow respondents to scroll from question to question.

- Provide "skip directions" to encourage clicking to the next applicable answer.

- Use "reminder e-mails" sparingly due to concerns about "spamming" and increased use of spam filtering software.

Demographic Characteristics

Population demographics have the potential to affect the need and type of continuing education and training needs required by different individuals within the population (Gibson, 1992). For example, it is possible that Extension agents, specialists, and program administrators with more years of experience will require different types of continuing education and training than younger individuals with less experience. In addition, varying levels of formal education may significantly effect required education and training. While there are numerous demographics which can be related to training and educational needs, age, level of education, and years of work experience often provide valuable insights (Gibson & Hillison, 1994; Ladner, Wingenbach, & Raven, 2002; Radhakrishna, 2000; Radhakrishna & Martin, 1999), and were selected as variables for this study.

Related Studies

   Need for and importance of continuing education and training. A landmark study was conducted in North Carolina with 133 area specialized extension agents (ASEAs), administrators, and subject matter specialists (Gibson, 1992), and provided grounding for

this study. The study by Gibson (1992) utilized eight of the 10 primary competency areas utilized in this study. These competencies had been established earlier in a study by McCormick (1959), and were subsequently validated by the Subcommittee on Staff Training and Development of ECOP (National Policy Statement, 1968). These same competencies were subsequently applied in a study by Hubbard (1971) in an evaluation of agents in the South Carolina Clemson Extension System. These eight basic competency areas utilized in the study by Gibson (1992), and descended from earlier studies and applications, were developed as a viable approach over the years to identifying continuing education and training needs of Extension personnel. These eight competency areas provide the basis for competencies utilized in this study to identify perceived importance and need for continuing education and training needs of aquaculture Extension agents, specialists, and program administrators on the AQUA-EXT listserv.

According to Gibson (1992), Area Specialized Extension Agents, administrators, and subject matter specialists maintained varying levels of importance for eight competency areas with regard to importance and training needs. For example, Gibson (1992) found that subject matter specialists found research to be of higher importance than did administrators or ASEAs, while administrators found program planning, educational processes, and Extension organization of higher importance than did ASEAs or specialists. Likewise, ASEAs, administrators and subject matter specialists expressed varying degrees of need for training in these same competency areas. However, the identification of program planning was the highest ranked competency area for all three

groups, providing a prioritized competency area for this researchers needs assessment of aquaculture agents, specialists, and program administrators in Extension programming.

Baseline data for this study descended from a preliminary national questionnaire of Extension and Sea Grant Extension educators conducted by the USDA, CSREES, and the National Sea Grant College Program in 2003 (Jensen & Murray, unpublished). The questionnaire for this study was broad-based and solicited information in the following areas: position, career, professional growth and development, Extension, information and technology, research, regional and multi-state, national, international, clientele, accomplishment reporting, extramural funding, and future and emerging issues.

Action items identified in this study include: (a) establishment of an annual emerging issues session; (b) establishment of a national committee to identify training priorities; (c) development of an expert reference database; (d) establishment of expert support teams on specific hot-button topics; (e) development of public domain digitized photos with meta data; (f) establishment of the role of Extension in public policy issues; (g) definition of roles and service of national staff; (h) mobilization and facilitation of broader communications (AQUA-EXT); (i) facilitation of access to research projects; (j) enhancement of research and Extension integration; (k) development of a national conference; (l) enhancement of funding and staffing; (m) enhanced efficiencies of existing infrastructure; (n) enhancement of the aquaculture Extension network; (o) enhancement of access to expertise from other disciplines (law, marketing, economics, ecology, engineering; and (p) maintenance of human linkages. This survey had an overall response rate of 43% from a population of 233.

A study of response versus nonresponse patterns from teachers to traditional and Web surveys (Mertler, 2003) found that a preponderance of nonresponses resulted from a simple lack of desire to commit the time to take the survey. In this study, the top three reasons for not completing a survey were: (a) survey was too lengthy (15%); (b) could not access the survey due to limitations in technology (20%); and (c) simply did not want to take the time to respond. Dillman (2000) stated that a critical component to high response rates is development of a perceived value to the respondent in completing and submitting the survey.

A study was conducted by Radhakrishna and Martin (1999) to assess program evaluation and accountability training needs of Extension agents. The population was all extension agents employed at Clemson University, and was conducted by mail. A 62% response rate was achieved, with results indicating that there was a clear need for in-service training in the areas of program evaluation, research, and accountability measures (Radhakrishna & Martin, 1999). The three greatest needs identified were: (a) developing evaluation plans; (b) focusing and organizing evaluations; and (c) preparing evaluation reports.

Summary

Extension personnel are well suited to identifying continuing education and training needs that would benefit them in their positions. Gibson (1992) found varying degrees of training requirements in the areas of research, program planning, and extension organization, for groups with different appointments in extension, while all groups identified program planning as very important. Jensen and Murray (unpublished),

as well as (Radhakrishna & Martin, 1999), found a similar ability of extension agents to be able to self-evaluate continuing education, training, as well as information needs required to enhance program effectiveness. However, in the U.S., a firm understanding of what aquaculture Extension agents, specialists, and program administrators need to effectively enhance programming initiatives for an emerging aquaculture industry hindered by a complexity of emerging issues is still required.

Chapter 3: Research Design and Methodology

Introduction

This chapter describes the research population and how it was identified and accessed. In addition, instrumentation design, validation, and procedures for data collection are discussed. Furthermore, methodology for data analysis, statistical analysis, and interpretation of results are delineated. The study was designed to identify the needs of aquaculture Extension agents, specialists, and program administrators identified from the AQUA-EXT listserv to enhance Extension programming efficiency, productivity, and accountability. The research methodology utilized in this study was similar to that utilized by Gibson (1992) to address training needs of area specialized Extension agents in the North Carolina Cooperative Extension Service, but was further tailored to identify specific subject matter requirements and resources presently utilized.

Population

The population for this study was the entire list of subscribers to the Cooperative State Research, Education, and Extension Service (CSREES) mail group listserv entitled AQUA-EXT (N = 223). This listserv is an electronic database containing the email addresses of individuals with some form of appointment or responsibility in aquaculture Extension programming, and is managed by Dr. Gary Jensen, National Program Leader for Aquaculture, United States Department of Agriculture (USDA) - CSREES. The use of these email addresses was granted and provided by Dr. Jensen.

Instrumentation

The World Wide Web (Web) is rapidly gaining preferential application as a research tool for use in conducting surveys (Deutskens, Ruyter, Wetzels, & Oosterveld, 2004; Dillman, 2000; Ilieva, Baron, & Healey, 2002; Ladner, Wingenbach, & Raven, 2002; Leung, 1998). This is in part due to reduced costs associated with this medium, the ability to access larger and more geographically dispersed populations more easily, and the overall ability to more rapidly conduct the research (Dillman, 2000; Ladner, Wingenbach, & Raven, 2002; Mertler, 2003; O'Neill, 2004; Solomon, 2001).

Historic standards for survey data collection include personal mailed questionnaires, telephone calls, and personal communications (Dillman, 2000). While effective and applicable to standard techniques for minimizing error as well as non-response bias, this methodology becomes cumbersome and expensive when applied to large and geographically dispersed populations. In addition, the telephone survey method has become more difficult in recent times with increased screening of telephone callers via call-blocking devices and the use of answering machines to identify callers before answering (Dillman, 2000). According to Dillman (2000), many of these issues are addressed via the utilization of new methods of self-administered questionnaires via the use of email and the Web and are rapidly gaining acceptance (Ilieva, Baron, & Healey, 2002). Given the broad geographic distribution of the study population, as well as limited funding resources available for conducting this study, a Web-based interactive survey medium was selected.

The survey was conducted online via an interactive, encrypted Web site. Each individual at the onset of the survey identified themselves by their email address. This

email address was not associated with survey response data to maintain confidentiality, but rather utilized to identify those who submitted and those who did not submit the online questionnaire. This allowed discernment between respondents and nonrepondents (Gregg & Irani, 2004; O'Neill, 2004). Once identified, non-respondents were followed up with additional email prompts, and as needed, subsequent telephone calls (Dillman, 2000; Ilieva, Baron, & Healey, 2002). The researcher's email address, telephone number, and cell phone number were made available to the population in the event any questions or unexpected problems arose at any time.

For this study, the perceived value to the respondent was related to benefiting their field of occupation, as well as potential resultant continuing education programming. To foster this perceived value, a detailed cover letter from the researcher, through Dr. Gary Jensen (National Program Leader for Aquaculture, USDA-CSREES), identified this as a follow-up to the 2003 survey, identified objectives and anticipated outcomes, referenced that results would be made available to those that were interested, provided an estimated time to complete the survey, and emphasized that only pooled data would be utilized to maintain confidentiality. Dr. Jensen added a brief preface citing involvement on the researcher's dissertation committee, and re-emphasized the importance of this questionnaire as a follow-up to the joint USDA/National Oceanic and Atmospheric Administration (NOAA) national aquaculture survey from 2003. The response rate achieved from this joint survey had been 43%.

Survey Instrument Design

The survey population was divided into three subgroups: aquaculture Extension agents, specialists, and program administrators. The questionnaire (Appendix A) was the same for all three groups, with response to the first question identifying group affiliation. Demographic data were collected as independent variables. There are numerous demographics which can be related to training and educational needs (Gibson & Hillison, 1994; Ladner, Wingenbach, & Raven, 2002; Radhakrishna, 2000; Radhakrishna & Martin, 1999). Common variables from prior studies and selected for this study were: (a) highest level of education attained; (b) length of time in the field; c) length of time in their present position; and (d) age of the individual. Given the importance of limiting survey length to maximize response rate (Deutskens et al, 2004; Dillman, 2000; Ilieva, Baron, & Healey, 2002; Ladner, Wingenbach, & Raven, 2002), the estimated time to complete the survey instrument was restricted to approximately 30 minutes. Questions were both open and closed-ended to enhance quality of the data (Kelsey & Mincemoyer, 2001). The closed-ended questions incorporated an interval of 1 through 4 (Gibson, 1992; Dillman, 2000; Kelsey & Mincemoyer, 2001). Responses to open-ended questions were grouped and reported quantitatively (Dillman, 2000). Descriptive statistics were utilized to analyze the data including means, ranges, standard deviations, frequencies, and percentages.

The questionnaire utilized in this study was adapted from Gibson (1992) in a study of training needs of area specialized Extension agents in the North Carolina Cooperative Extension Service (CES), and was derived from Hubbard (1971) in an evaluation of training needs for Extension agents in the South Carolina Clemson

Extension System. For the purposes of this study, permission was granted by Gibson (1992) for utilization of his instrumentation as the foundation for this study's questionnaire.

This questionnaire was applied to aquaculture Extension agents, specialists, and program administrators with the respondent's categorization initially established within the questionnaire. The questionnaire focused on eight general competency areas identified in the 1968 National Policy Statement on Staff Training and Development, as cited in Gibson and Hillison (1994). These were:

1. Extension organization and administration,

2. Program planning, development, and implementation,

3. Communication,

4. Research,

5. Human development,

6. Educational processes,

7. Social systems, and

8. Effective thinking.

For the purpose of this study, the competency areas were expanded to include the following:

9. Program evaluation, and

10. Information technologies.

These competency areas were evaluated from two perspectives; one identifying the perceived relative importance of the question to aquaculture Extension agents, specialists, or program administrators, and the second a rating of the perceived need from

the respondent for additional training or education on that issue. Both perspectives utilized an interval (Dr. Keying Ye, personal communication, October 17, 2005) of one through four, the first correlating to: "little or no importance," followed by "moderate importance," "important," or "very important," and the second correlating to: "little or no need," "moderate need," "need," or "great need." The survey instrument was field tested by an expert panel of Extension agents, specialists and faculty at Virginia Tech, as well as members of the USDA/NOAA National Aquaculture Extension Steering Committee, to establish content validity.

Addressing sources of error. Prior to the electronic age, survey samples were conducted predominantly by mail, telephone, and personal correspondence (Dillman, 2000). A comprehensive technique for conducting mail and telephone surveys termed the Total Design Method (TDM) was developed by Dillman in 1978 (Dillman, 2000) to maximize the validity, reliability, and response rate. While this methodology was able to achieve high response rates, it was tedious, time-consuming, and expensive, and became exceedingly more so as the sample size and geographic distribution of the population increased. With the emergence of the electronic age, many possibilities for increasing efficiencies in sample surveys have emerged; however, the basic requirements of minimizing error and attaining high response rates remains critical (Dillman, 2000). The TDM is grounded in addressing and minimizing identified sources of error, maximizing response rates, and implementing the social exchange theory of human behavior. The social exchange theory of human behavior is based upon generating perceived rewards for responding, decreasing perceived costs for participation, and the promotion in trust of beneficial outcomes from the survey (Dillman, 2000).

According to the TDM approach, four factors contribute to survey error: (a) sample error; (b) coverage error; (c) measurement error; and (d) non-response error. In this study, sample error was minimized via utilization of the entire population contained within the AQUA-EXT mail group. Because the entire population of the listserv was utilized, and since we electronically contacted a population that was identified via utilization of this electronic medium, coverage error was also addressed. Measurement error is the error obtained from poor question wording, resultant errors in answering the question, or the submission of answers which cannot be effectively interpreted. According to Dillman (2000), this source of error is exacerbated in the use of self-administered surveys such as this Web-based medium, for which Dillman emphasized the need to effectively conduct instrument validation. This instrument was validated via application in previous studies and through pilot testing with Extension personnel from Virginia Tech as well as members of the National Aquaculture Extension Steering Committee. The non-response error was addressed via identification of individuals not completing the electronic survey and follow-up with additional email reminders, as well as subsequent telephone calls as necessary (Dillman, 2000; Ilieva, Baron, & Healey, 2002).

Reliability of the instrument. According to DSS Research (2004), a measure is reliable to the extent that independent but comparable measures of the same trait or construct of a given object agree. Reliability for this instrument was determined by conducting a pilot test of this instrument with non-aquaculture Extension agents, specialists, and faculty at Virginia Tech, as well as members of the USDA/NOAA National Aquaculture Extension Steering Committee (Gibson, 1992). Reliability was

evaluated via Cronbach's Alpha for the part of the survey relating to the 10 competency areas, and was calculated at 0.95 utilizing the Statistical Package for Social Sciences (SPSS).

Validity of the instrument. According to DSS Research (2004), a measure is valid when the differences in observed scores reflect true differences on the characteristic one is attempting to measure and nothing else. This survey instrument is based upon a previous study (Gibson, 1992), and, through documentation, provided baseline instrument validity. Further content and face validity for this study was established by an expert panel (Gibson, 1992; Dillman, 2000).

Data collection. Dillman (2000) emphasized the importance of a research data-based collection process. This process involves a cover letter accompanying survey questionnaires during dissemination and timely follow-ups to maximize response rates. For this study, an introductory letter (see Appendix B) was sent by Dr. Gary Jensen (National Program Leader for Aquaculture, USDA-CSREES) to the entire AQUA-EXT listserv. This brief correspondence: (a) indicated that a survey would soon be emailed to each of them; (b) explained that the study was a follow-up study to the 2003 survey; (c) identified study objectives and anticipated outcomes; (d) referenced that results would be made available to those who were interested; (e) provided an estimated time to complete the survey; and (f) emphasized that only pooled data would be utilized to maintain confidentiality. A brief preface was added by Dr. Jensen citing involvement on the researcher's dissertation committee and re-emphasizing the importance of this study. Permission was granted by the Virginia Tech Institutional Review Board (Appendix C) to conduct this study.

The survey was conducted online via an interactive encrypted Web site
http://www.survey.vt.edu/. Each individual from the AQUA-EXT listserv was sent an
individual email which again contained the introductory letters as well as a direct link to
the survey (Appendix D). Email addresses were utilized to identify those who submitted
and those who did not complete the online questionnaire and provided for identification
of non-respondents (Gregg & Irani, 2004; O'Neill, 2004). After the initial peak response,
a general reminder was sent via Dr. Maxwell Mayeaux (assistant to Dr. Jensen) to the
entire listserv reiterating the importance of this survey, thanking those who had already
completed the survey, and urging others who had not yet done so to complete it (Dillman,
2000; Deutskens, et al., 2004) (Appendix E). Non-respondents were contacted
individually with an additional email prompt after a second peaking of daily submission
rates (Appendix F). A second personal email reminder (Appendix G) was sent 10 days
later. A third and final personal email was sent to all remaining non-respondents eleven
days after that (Appendix H). After the second email reminder, and several times
thereafter, telephone calls were also placed to all non-respondents at varying intervals to
encourage participation in the survey and maximize response rates (Dillman, 2000).

Data Analysis

Objective 1. The first objective of the study was to identify the perceived relative
importance and continuing education and training needs of aquaculture Extension agents,
specialists, and program administrators in 10 identified competency areas, with an
emphasis on situation analysis, program design, implementation, and evaluation.

Procedures. Perceived relative importance and continuing education and training needs of aquaculture Extension agents, specialists, and program administrators for the 10 competency areas were identified utilizing a self-rating interval scale of one through four, and were determined utilizing means and ranking.

Objective 2. The second objective of the study was to determine electronic information resources presently utilized by aquaculture Extension agents, and program administrators within the Aquaculture Network Information Center (AquaNIC) Web site, and identify AquaNIC resources which needed to be added or improved upon to enhance Web site utility to this population.

Procedures. Utilization of electronic resources on the AquaNIC Web site were evaluated utilizing an interval scale of one through five, with one representing "never use," followed sequentially up the scale with "once or twice a year," "approximately once every 3 or 4 months," "approximately once a month," and "more than once a month." These results were expressed utilizing means and ranking. AquaNIC resources which needed to be enhanced or new resources to be added were identified via open-ended questions, with results grouped into similar categories and reported as percentages.

Objective 3. The third objective of the study was to identify demographics of aquaculture Extension agents, specialists, and program administrators and how these might relate to individual education and training needs.

Procedures. Selected demographics for the AQUA-EXT listserv were age, highest level of education attained, and years of work experience both in their present position as well as in the field. These data were reported as means and percentages for the population. Analysis of Variance was utilized to determine statistical differences in

means of self-rated skills identified in objective one, with demographic categorization as independent variables. Tukey's HSD was then utilized for comparison of means.

Summary

The population for this study was the entire list of subscribers to the CSREES mail group listserv entitled AQUA-EXT (N = 223). This listserv is an electronic database of individuals with some form of appointment or responsibility in aquaculture Extension programming. Based upon specific demographic criteria, a Web-based survey with closed- as well as open-ended questions was utilized to evaluate continuing education and IT training needs of this listserv population, as well as identification of information resource utilization on the AquaNIC Web site. Response means were compared and further analyzed via ANOVA based upon demographics. Results from this study identified specific needs of aquaculture Extension agents, specialists, and program administrators to enhance program performance and efficiency and provided insight to AquaNIC on how to better serve this clientele through Web site modifications.

Chapter 4: Results

This chapter provides a detailed compilation of the data collected during this study. Study results including survey response rate are followed by results for the three objectives.

Response Rate

Out of a population of 223 listserv members, 174 useable responses were collected, generating a final response rate of 78%. Out of 174 responders, 44 (25%) identified themselves as Extension agents, 70 (40%) as specialists, 27 (15%) as program administrators, and 33 (19%) as "other." The "other" group was comprised of individuals not fitting into the aforementioned three profession areas, or without a greater than 49% effort, and were excluded from further analysis.

Statistical Analysis

Objective 1. The first objective of this study was to identify the perceived relative importance to aquaculture Extension agents, specialists, and program administrators of competence in 10 areas, with an emphasis on situation analysis and program design, implementation, and evaluation, and to determine how great the need was among these professionals for continuing education and training in these areas.

Table 1 presents the perceived relative importance to respondent's competence in 10 identified areas. On a scale of 1 (*of little or no importance*) to 4 (*very important*), a mean response of 2.5 (identified as significantly important) or higher was given by each

Table 1

Perceived Relative Importance of Competency Areas to Individuals in Different Aquaculture-Extension Professions.

Competency area	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Program planning, development, and implementation	3.32	.50	1	3.26	.44	1	3.29	.73	1
Human development	2.95	.68	2	2.80	.61	8	3.03	.74	3
Social systems	2.87	.75	3	2.83	.61	7	2.75	.69	8.5
Program evaluation	2.86	.67	4	2.87	.58	5.5	2.88	.79	6
Educational process	2.85	.71	5	3.03	.63	3	3.09	.67	2
Communication	2.82	.46	6	2.87	.47	5.5	2.86	.66	7
Effective thinking	2.80	.82	7	3.01	.69	4	3.01	.69	4
Extension organization and administration	2.78	.64	8	2.74	.60	10	2.75	.75	8.5
Research	2.73	.61	9	3.08	.55	2	2.98	.77	5
Information technologies	2.42	.63	10	2.77	.57	9	2.46	.77	10

Note. Scale: 1 = of little or no importance, 2 = of moderate importance, 3 = important, and 4 = very

important.

[a]Rank = Rank of mean score, 1 being the highest.

of the three groups for all 10 competency areas, with the exception of information technologies (IT), which agents gave a mean score of 2.42. Program planning, development, and implementation was ranked as most important by agents, specialists, and administrators, who gave it mean scores of 3.32, 3.26, and 3.29 respectively. Each group identified human development, research, and educational process as the second-most important area. Of least importance for agents and administrators was IT, which received mean responses of 2.42 and 2.46 respectively; for specialists, Extension organization and administration was least important, with a mean response of 2.74.

Table 2 identifies perceived continuing education and training needs of respondents in 10 identified competency areas. Agents identified IT as the area in which they needed the most education and training, giving it a mean response of 2.17, whereas specialists and administrators ranked program evaluation highest, with means of 2.35 and 2.37 respectively. Program evaluation was the competency area ranked second-highest by agents, with a mean of 2.04; for administrators it was human development, with a mean of 2.33. Specialists ranked IT, human development, and effective thinking equally as the second-highest need, with a mean of 2.16. The competency area ranked lowest by both agents and administrators was Extension organization and administration, who gave it respective mean scores of 1.68 and 1.82. Agents identified social systems and Extension organization and administration equally as the competency areas in which they needed the least continuing education and training, with a mean of 1.92.

Table 2

Perceived Need for Continuing Education and Training in Competency Areas of Individuals in Different Aquaculture-Extension Professions

Competency area	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Information technologies	2.17	.74	1	2.16	.82	3	2.13	.79	6
Program evaluation	2.04	.76	2	2.35	.69	1	2.37	.80	1
Human development	2.01	.74	3	2.16	.72	3	2.33	.80	2
Research	1.95	.68	4	2.11	.79	5.5	1.99	.72	8
Educational process	1.91	.66	5	2.11	.67	5.5	2.17	.63	4
Communication	1.90	.57	6	2.09	.62	7	2.15	.66	5
Program planning, development, and implementation	1.90	.64	7	2.06	.73	8	2.20	.94	3
Effective thinking	1.80	.72	8	2.16	.82	3	2.12	.79	7
Social systems	1.79	.58	9	1.92	.69	9.9	1.95	.66	9
Extension organization and administration	1.68	.56	10	1.92	.68	9.9	1.82	.66	10

Note. Scale: 1 = little or no need, 2 = moderate need, 3 = need, and 4 = great need.

[a]Rank = Rank of mean score, 1 being the highest.

The first of 10 individual competency areas evaluated was Extension organization and administration. Table 3 displays seven individual components of Extension organization and administration ranked by perceived importance. The mean of the scores agents, specialists, and administrators gave each component was 2.50 or greater, with the exception of knowledge of national Extension policy and how it is formulated, which received a mean response of 2.34 from agents and 2.48 from specialists; history of Extension, with a mean score of 2.40 from specialists; and the importance of understanding Extension policy and procedure regarding promotion and salary, with a mean score of 2.44 from administrators. The Extension organization and administration competency area ranked most important by agents and specialists was a clear understanding of an individual's Extension appointment and responsibilities, with means of 3.50 for agents and 3.43 for specialists. Administrators identified understanding state Extension policy and how it is formulated as most important, with a mean of 3.04.

Table 4 displays data on how great the perceived need was among agents, specialists, and administrators for continuing education and training in these same seven components of Extension organization and administration. Agents and administrators alike claimed most to need education and training in understanding national Extension policy and how it is formulated; the mean score given by agents was 1.89, and by specialists, 2.11. Specialists identified understanding state Extension policy and how it is formulated as the area in which they needed the most education and training, with a mean score of 2.13. Agents and specialists identified understanding Extension promotion and salary policy and procedure as the next greatest need, whereas administrators next identified knowledge of state Extension policy and how it is formulated. Knowledge of

Table 3

Perceived Importance of Components within Extension Organization and Administration to Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Understanding of Extension app. and responsibilities	3.50	.73	1	3.44	.71	1	3.00	1.21	2
Understanding of Extension policy and procedure regarding promotion and salary	3.09	.8	2	3.11	.99	2	2.44	1.34	7
Understanding of local Extension policy and its formulation	2.80	.95	3	2.52	1.04	4	2.67	.88	5
Understanding of state Extension policy and its formulation	2.68	.96	4	2.71	.89	3	3.04	.90	1
Understanding of history of Extension	2.52	.82	5	2.40	.77	7	2.90	1.01	3
Understanding of CES organization and its relationship to Univ., USDA, or NOAA	2.50	.85	6	2.51	.93	5	2.63	1.04	6
Understanding of national Extension policy and its formulation	2.34	.89	7	2.47	.81	6	2.81	.96	4

Note. Scale: 1 = of little or no importance, 2 = of moderate importance, 3 = important, and 4 = very

important.

[a]Rank = Rank of mean score, 1 being the highest.

Table 4

Perceived Need for Continuing Education and Training in Components of Extension Organization and among Individuals in Different Aquaculture-Extension Professions Administration

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
National Extension policy and its formulation	1.89	.90	1	2.11	.84	2.5	2.11	.89	1
Extension policy and procedure regarding promotion and salary	1.84	.89	2	2.11	1.08	2.5	1.48	.70	7
State Extension policy and its formulation	1.77	.77	3	2.13	.80	1	2.04	.90	2
Local Extension policy and its formulation	1.59	.76	4.5	1.80	.93	5	1.85	.86	3
Extension app. and responsibilities	1.59	.66	4.5	1.89	1.02	4	1.52	.71	6
History of Extension	1.55	.63	6.5	1.67	.74	7	1.67	.92	4.5
CES organization and its relationship to Univ., USDA, or NOAA	1.55	.70	6.5	1.74	.83	6	1.67	.83	4.5

Note. Scale: 1 = little or no need, 2 = moderate need, 3 = need, and 4 = great need.

[a]Rank = Rank of mean score, 1 being the highest.

the history of Extension received the same mean, 1.55, as an understanding of how Cooperative Extension is organized and its relationship to the university and USDA or the National Oceanic and Atmospheric Administration (NOAA), to rank as the continuing education and training needs regarded as least important by agents. Extension specialists likewise identified knowledge of the history of Extension as the least-needed competency, giving it a mean response of 1.67, and administrators identified an understanding of Extension promotion and salary policy and procedure as the least important, with a mean score of 1.48.

The second competency area evaluated was program planning, development, and implementation. Five components of this competency area ranked by perceived importance are displayed in Table 5. Agents, specialists, and administrators responded with mean scores higher than 2.50 for all components. The competency area agents and administrators identified as most important was the interaction of research and Extension in Extension programming, with mean scores of 3.64 from agents and 3.56 from administrators. The competency area specialists perceived as most important was identifying and prioritizing clientele problems, with a mean of 3.51. The component of program planning, development, and implementation ranked second-most important by both agents and specialists was the ability to develop Extension programs, with a mean score of 3.55 from agents and 3.48 from specialists. Administrators judged identifying and prioritizing clientele problems as the second-most important component, with a mean of 3.52. The component of program planning, development, and implementation ranked lowest by agents, specialists, and administrators was understanding the situation analysis process, with respective means of 2.73, 2.82, and 2.88.

Table 5

Perceived Importance of Components within Program Planning, Development, and Implementation to Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Understanding interaction of research and Extension in Extension programming	3.64	.57	1	3.36	.70	3	3.56	.80	1
Ability to develop Extension programs	3.55	.70	2	3.48	.68	2	3.37	.93	3
Ability to identify and prioritize clientele problems	3.36	.78	3	3.51	.65	1	3.52	.73	2
Understanding interaction of agents and specialists in Extension programming	3.32	.71	4	3.10	.87	4	3.23	1.03	4
Understanding situation analysis process	2.73	.69	5	2.84	.79	5	2.88	.99	5

Note. Scale: 1 = of little or no importance, 2 = of moderate importance, 3 = important, and 4 = very

important.

[a]Rank = Rank of mean score, 1 being the highest.

Table 6 displays data on how great the perceived need was among agents, specialists, and administrators for continuing education and training in five components of the competency area of program planning, development, and implementation. All of the means fell below 2.50. The component in which agents and specialists claimed most to need education and training was the interaction of research and Extension in Extension programming, with a mean of 2.05 for agents and 2.13 for specialists. Administrators identified understanding the situation analysis process as the component in which they needed the most education and training, with a mean of 2.35. The component ranked lowest by agents, specialists, and administrators was the interaction of agents and specialists in Extension programming.

Table 7 displays data on the relative importance perceived by agents, specialists, and administrators of five components of program evaluation. The mean of the perceived importance scores given by each group of professionals was over 2.50 for all of the components except the use of focus groups in program evaluation. For this component the mean score was 2.36 from agents, 2.19 from specialists, and 2.19 from administrators; this component also earned the lowest perceived importance scores from each group for this competency. The component ranked highest by agents and administrators was correlation between program results and program accountability, with respective means of 3.20 and 3.42. Specialists also ranked this component most important but rated it equally as important as evaluation of Extension programs. Evaluation of Extension programs was ranked second by agents and administrators alike.

Table 8 displays data on how great the perceived need is among agents, specialists, and administrators for continuing education and training in five components

Table 6

Perceived Need for Continuing Education and Training in Components of Program Planning, Development, and Implementation among Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Interaction of research and Extension in Extension programming	2.05	1.01	1	2.13	.99	1	2.19	1.18	4
Situation analysis process	2.00	.81	2	2.10	.80	3	2.35	1.02	1
Development of Extension programs	1.93	.85	3	2.13	.93	2	2.22	1.05	3
Identification and prioritization of clientele problems	1.89	.72	4	2.06	.93	4	2.27	1.08	2
Interaction of agents and specialists in Extension programming	1.66	.71	5	1.91	.83	5	1.96	1.09	5

Note. Scale: 1 = little or no need, 2 = moderate need, 3 = need, and 4 = great need.

[a]Rank = Rank of mean score, 1 being the highest.

Table 7

Perceived Importance of Components within Program Evaluation to Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Understanding correlation between program results and program accountability	3.20	.88	1	3.20	.67	1.5	3.33	.88	1
Ability to evaluate one's Extension programs	3.02	.80	2	3.20	.70	1.5	3.19	.96	2
Competence in the data collection process for Extension program evaluation	2.95	.86	3	2.88	.76	4	2.73	.87	4
Understanding of design of evaluation studies in Extension education	2.77	1.02	4	2.93	.96	3	3.00	1.11	3
Ability to use focus groups in program evaluation	2.36	.97	5	2.17	.78	5	2.15	.99	5

Note. Scale: 1 = of little or no importance, 2 = of moderate importance, 3 = important, and 4 = very

important.

[a]Rank = Rank of mean score, 1 being the highest.

Table 8

Perceived Need for Continuing Education and Training in Components of Program Evaluation among Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Design of evaluation studies in Extension education	2.34	.99	1	2.40	.89	2.5	2.37	1.04	3
Evaluation of one's Extension programs	2.09	.88	2	2.50	.90	1	2.44	1.01	2
Correlation between program results and program accountability	2.07	.87	3	2.40	.84	2.5	2.65	.89	1
Data collection process for Extension program evaluation	2.00	.99	4	2.30	.92	4	2.31	.88	4
Use of focus groups in program evaluation	1.70	.74	5	1.96	.79	5	1.81	.83	5

Note. Scale: 1 = little or no need, 2 = moderate need, 3 = need, and 4 = great need.

[a]Rank = Rank of mean score, 1 being the highest.

of program evaluation. Specialists responded with a mean score of 2.50 for evaluation of Extension programs, and administrators with a mean higher than 2.5 for correlation between program results and program accountability, which represent the highest identified need for each of these groups. The program-evaluation component in which agents claimed most to need education and training was an understanding of design for evaluation studies in Extension education, with a mean of 2.34. The lowest ranked component by agents, specialists and administrators alike was use of focus groups in program evaluation, with means of 1.70, 1.97, and 1.85 respectively.

Data regarding perceived importance for components of communications among agents, specialists, and administrators are displayed in Table 9. Of the seven components of this competency, four had mean scores above 2.5 from agents, and five above 2.5 from specialists and administrators. The component deemed most important by agents, specialists, and administrators was the ability to prepare and deliver effective public presentations, with means of 3.73, 3.78, and 3.92 respectively. The second-most important component, according to agents and administrators, was the ability to write effective impact statements, with means of 3.32 and 3.33 respectively; according to specialists, the second-most important component was the ability to use and develop public exhibits and demonstrations, with a mean of 3.23. The component with the lowest mean perceived-importance score from agents and specialists was the ability to conduct effective online surveys, with 2.00 and 2.07 respectively, and for administrators, the ability to conduct effective telephone interviews with a mean of 1.81.

Table 10 displays data on the perceived need for continuing education and training in communication among agents, specialists, and administrators. A mean of 2.5

Table 9

Perceived Importance of Components within Communication to Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Ability to prepare and deliver effective public presentations	3.73	.54	1	3.79	.41	1	3.85	.46	1
Ability to write effective impact statements	3.32	.74	2	3.16	.85	3	3.33	.83	2
Ability to interact effectively with media	3.23	.81	3	3.01	.82	4	3.26	.81	3
Ability to develop/use public exhibits and demonstrations	3.12	.93	4	3.23	.75	2	2.96	1.14	4
Ability to conduct Web-based education programming	2.27	.92	5	2.70	1.07	5	2.74	1.26	5
Ability to conduct effective telephone interviews	2.11	.99	6	2.17	.88	6	1.81	1.10	7
Ability to conduct effective online surveys	2.00	.91	7	2.06	1.00	7	2.12	1.18	6

Note. Scale: 1 = of little or no importance, 2 = of moderate importance, 3 = important, and 4 = very

important.

[a]Rank = Rank of mean score, 1 being the highest.

Table 10

Need among Individuals in Different Aquaculture-Extension Professions for Continuing Education and Training in Components of Communication

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Use of web-based education programming	2.32	1.01	1	2.52	.98	1	2.69	1.24	2
Effective media interaction	2.07	1.04	2	2.33	.85	2	2.70	.87	1
Writing of effective impact statements	2.05	.89	3	2.09	.96	4	2.07	.87	4.5
Execution of effective online surveys	1.86	.93	4	1.96	1.00	6	2.15	1.20	3
Preparation and delivery of effective public presentations	1.82	.69	5	1.99	.83	5	2.07	.67	4.5
Development and use of public exhibits and demonstrations	1.64	.65	6	2.13	.82	3	1.81	.83	6
Effective telephone interviewing	1.59	.79	7	1.64	.74	7	1.56	.80	7

Note. Scale: 1 = little or no need, 2 = moderate need, 3 = need, and 4 = great need.

[a]Rank = Rank of mean score, 1 being the highest.

or greater was calculated from the responses of specialists and administrators regarding the ability to conduct Web-based education programming as well as from the responses of administrators regarding the ability to interact effectively with the media. The communication component in which agents and specialists claimed most to need continuing education and training was the ability to conduct Web-based education programming; the ability to interact effectively with the media ranked second, with a mean score of 2.07 from agents and 2.33 from specialists. Those components' positions were reversed for administrators, whose mean response regarding Web-based educational programming was 2.69. The component ranked lowest by agents, specialists, and administrators alike was the ability to conduct effective telephone interviews, with means of 1.59, 1.65, and 1.58 respectively.

Three components constituted the research competency, and the perceived importance of each by agents, specialists, and administrators is displayed in Table 11. In this competency, the ability to conduct scientific trials as well as the knowledge of procedures for applying research results to clientele rated mean response scores above 2.5 from agents, specialists, and administrators. The component ranked most important by agents, specialists, and administrators was the knowledge of procedures for applying research results to clientele, with means of 3.20, 3.50, and 3.44 respectively. The component ranked least important by agents, specialists, and administrators was the ability to conduct surveys, with means of 2.43, 2.38, and 2.44 respectively.

Table 12 displays data on the perceived need by agents, specialists, and administrators for continuing education and training in research. Within this competency, none of the research components received a mean greater than 2.5. The research

Table 11

Perceived Importance of Components within Research to Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Knowledge of procedures for applying research results to clientele	3.20	.76	1	3.50	.58	1	3.44	.66	1
Ability to conduct scientific research trials	2.58	1.01	2	3.34	.80	2	3.07	1.24	2
Ability to conduct surveys	2.43	.93	3	2.38	1.00	3	2.44	1.05	2

Note. Scale: 1 = of little or no importance, 2 = of moderate importance, 3 = important, and 4 = very

    important.

[a]Rank = Rank of mean score, 1 being the highest.

Table 12

Perceived Need for Continuing Education and Training in Components of Research among Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Procedures for applying research results to clientele	2.00	.86	1	2.14	.97	1	2.07	.79	2
Execution of surveys	1.98	.90	2	2.06	.99	3	2.15	1.17	1
Execution of scientific research trials	1.89	.78	3	2.13	.95	2	1.74	.90	3

Note. Scale: 1 = little or no need, 2 = moderate need, 3 = need, and 4 = great need.

[a]Rank = Rank of mean score, 1 being the highest.

component in which agents and specialists claimed most to need continuing education and training was knowledge of procedures for applying research results to clientele, with means of 2.00 and 2.14 respectively. Program administrators ranked the ability to conduct surveys highest, with a mean of 2.15. The component ranked lowest by agents and administrators was the ability to conduct scientific research trials, with means of 1.89 and 1.74 respectively. Specialists ranked the ability to conduct surveys lowest with a mean of 2.07.

The relative importance of human-development components perceived by agents, specialists, and administrators are displayed in Table 13. For all components, the mean perceived importance score from agents, specialists, and administrators was above 2.5, with the exception of understanding reasons for aggressive behavior in people, which received a lower mean response from specialists. The human development competency area component ranked highest by agents and second-highest by specialists and administrators was the ability to develop an approach to Extension work that considers the feelings and values of people, with means of 3.19, 2.93, and 3.07 respectively. Conversely, the human development component specialists and administrators ranked highest and agents ranked second-highest was the development of leadership abilities, with means of 3.11, 3.52, and 3.16 respectively. The lowest ranked research component for all groups was understanding the aggressive behavior of people, with mean scores from agents, specialists, and administrators of 2.57, 2.48, and 2.60 respectively.

Table 14 displays data on the perceived need for continuing education and training in human development expressed by agents, specialists, and administrators. For this competency, a mean response of 2.5 or greater was expressed only by administrators

Table 13

Perceived Importance of Components within Human Development to Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Ability to approach Extension work with considerate feelings and values	3.19	.76	1	2.93	.82	2	3.07	.96	2
Development of leadership abilities	3.16	.81	2	3.11	.79	1	3.52	.75	1
Understanding of basic human psychological drives	2.91	.96	3	2.70	.79	3	2.85	.91	3
Understanding of reasons for aggressive behavior in people	2.57	1.07	4	2.46	.91	4	2.54	1.07	4

Note. Scale: 1 = of little or no importance, 2 = of moderate importance, 3 = important, and 4 = very

important.

[a]Rank = Rank of mean score, 1 being the highest.

Table 14

Perceived Need for Continuing Education and Training in Components of Human Development among Individuals in Different Aquaculture-Extension Professions

	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
Component	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Development of leadership abilities	2.20	.80	1	2.44	.96	1	2.52	.85	1
Understanding of basic human psychological drives	2.00	.94	2	2.20	.83	2	2.33	.92	2.5
Skills to approach Extension work with considerate feelings and values	1.98	.85	3	2.00	.90	3	2.33	.88	2.5
Understanding reasons for aggressive behavior in people	1.86	.91	4	1.96	.91	4	2.15	.91	4

Note. Scale: 1 = little or no need, 2 = moderate need, 3 = need, and 4 = great need.

[a]Rank = Rank of mean score, 1 being the highest.

for the development of leadership. The highest mean response given by agents, specialists, and program administrators was for the development of leadership abilities, 2.20, 2.45, and 2.54 respectively. The lowest mean for all groups again went to understanding the reasons for aggressive behavior in people, 1.86, 1.97, and 2.19 respectively.

The relative importance of educational process components perceived by agents, specialists, and administrators is displayed in Table 15. Agents, specialists, and administrators expressed a mean response of 2.5 or greater for all components. The component ranked highest by agents was knowledge of principles and procedures in teaching adults, with a mean of 2.95; by specialists, understanding the relationship between need and usefulness in subject matter learning, with a mean of 3.19; and by administrators, understanding how people are motivated, with a mean of 3.30. The educational process component ranked lowest by agents, specialists, and administrators alike was understanding principles of the learning process, with means of 2.68, 2.81, and 2.88 respectively.

Table 16 displays data on the need perceived by agents, specialists, and administrators for continuing education and training in the educational process competency area. For this competency, no mean was found above 2.50. The highest ranked means were 2.05 from agents for knowledge of principles and procedures in teaching adults and 2.24 and 2.42 respectively from specialists and administrators for understanding how people are motivated. The component ranked lowest by agents and specialists was an understanding of the relationship between need and usefulness in subject-matter learning, with means of 1.84 and 1.99 respectively, and by administrators,

Table 15

*Perceived Importance of Components within the Educational Process to Individuals in
Different Aquaculture-Extension Professions*

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Knowledge of principles and procedures for teaching adults	2.95	.78	1	3.06	.83	3	3.07	.96	2.5
Understanding Relationship between need and usefulness in subject-matter learning	2.93	.92	2	3.19	.75	1	3.15	.77	2.5
Understanding how people are motivated	2.82	.95	3	3.07	.75	2	3.30	.87	1
Understanding principles of learning process	2.68	.88	4	2.81	.86	4	2.85	.86	4

Note. Scale: 1 = of little or no importance, 2 = of moderate importance, 3 = important, and 4 = very

important.

[a]Rank = Rank of mean score, 1 being the highest.

Table 16

Perceived Need for Continuing Education and Training in Components of the Educational Process among Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Principles and procedures for teaching adults	2.05	.86	1	2.17	.87	2	2.30	.87	2
Principles and procedures for motivating people	1.91	.86	2	2.23	.79	1	2.44	.80	1
Principles of the learning process	1.86	.67	3	2.07	.82	3	1.89	.75	4
Relationship between need and usefulness in subject-matter learning	1.84	.68	4	1.99	.83	4	2.04	.76	3

Note. Scale: 1 = little or no need, 2 = moderate need, 3 = need, and 4 = great need.

[a]Rank = Rank of mean score, 1 being the highest.

understanding principles of the learning process, with a mean of 1.89.

As shown in Table 17, all groups gave mean responses above 2.5 regarding the perceived importance of each component of social systems, with the exception of 2.30 for understanding the purpose of the Cooperative Extension Service (CES) from administrators. The highest mean responses were 3.11, 3.09, and 3.00 respectively from agents, specialists, and administrators, each for understanding the interactions of individuals within groups. The lowest mean responses from agents and administrators were 2.64 and 2.30 respectively for understanding the purpose of CES or Sea Grant, and 2.64 from agents for understanding the functions of agricultural organizations.

As displayed in Table 18, no mean response higher than 2.50 was found concerning the perceived need for continuing education and training in social systems. The highest mean responses from agents and administrators were 2.00 and 2.30 respectively, regarding understanding the interactions of individuals within groups; with equal means of 2.01, both understanding the interactions of individuals within groups and understanding the functions of agricultural organizations were deemed most important by specialists. The lowest mean responses from agents, specialists, and administrators, 1.57, 1.74, and 1.56 respectively, all went to understanding the purpose of CES or Sea Grant.

Both components of effective thinking received mean perceived-importance scores greater than 2.50 from agents, specialists, and administrators, as Table 19 shows. The highest mean responses, 3.00, 3.28, and 3.22, came from agents, specialists, and administrators respectively concerning understanding the problem solving method. The competency area ranked lowest by agents, specialists, and administrators alike was knowledge of techniques for developing effective thinking in Extension groups, with

Table 17

Perceived Importance of Components within Social Systems to Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44) Mean s.d. Rank[a]	Ext. Specialist (n = 70) Mean s.d. Rank[a]	Program Administrator (n = 27) Mean s.d. Rank[a]
Understanding the interactions of individuals within groups	3.11 .92 1	3.09 .82 1	3.00 1.00 1
Understanding the functions of agricultural organizations	2.86 .96 2	2.64 .84 3	2.96 .85 2
Understanding the purpose of CES or Sea Grant	2.64 1.06 3	2.77 .88 2	2.30 .95 3

Note. Scale: 1 = of little or no importance, 2 = of moderate importance, 3 = important, and 4 = very important.

[a]Rank = Rank of mean score, 1 being the highest.

Table 18

Need among Individuals in Different Aquaculture-Extension Professions for Continuing Education and Training in Components of Social Systems

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Understanding the interactions of individuals within groups	2.00	.86	1	2.01	.78	1.5	2.30	.78	1
Understanding the functions of agricultural organizations	1.80	.85	2	2.01	.87	1.5	2.00	.88	2
Understanding the purpose of CES or Sea Grant	1.57	.73	3	1.74	.90	3	1.56	.85	3

Note. Scale: 1 = little or no need, 2 = moderate need, 3 = need, and 4 = great need.

[a]Rank = Rank of mean score, 1 being the highest.

Table 19

Perceived Importance of Components within Effective Thinking to Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Understanding the problem-solving method	3.00	.92	1	3.28	.73	1	3.22	.70	1
Knowledge of techniques for developing effective thinking in Extension groups	2.59	.95	2	2.76	.89	2	2.74	.86	2

Note. Scale: 1 = of little or no importance, 2 = of moderate importance, 3 = important, and 4 = very important.

[a]Rank = Rank of mean score, 1 being the highest.

means of 2.59, 2.76, and 2.74 respectively.

Table 20 displays no mean response higher than 2.50 from agents, specialists, or administrators about how great their need is for continuing education or training in either effective-thinking component. The highest mean response from agents was 1.82, regarding understanding the problem-solving method, and from specialists and administrators, 2.11 and 2.23 respectively, regarding knowledge of techniques for developing effective thinking in Extension groups. The lowest mean responses were 1.77 from agents regarding knowledge of techniques for developing effective thinking in Extension groups and 2.11 and 2.04 respectively from specialists and administrators regarding understanding the problem-solving method.

The final competency area evaluated was IT, with perceived importance scores displayed in Table 21. Specialists gave mean responses of 2.5 or greater concerning utilization of Excel in Extension evaluation and reporting, and agents, specialists, and administrators did likewise regarding utilization of PowerPoint in Extension programming, evaluation and reporting. Specialists and administrators also gave mean responses equal to or above 2.5 concerning the ability to implement computer-based Extension programming, and specialists and agents concerning the ability to use computer software to generate Extension publications. The highest mean responses from agents, specialists, and administrators were 3.43, 3.72, and 3.65 respectively, regarding utilization of PowerPoint in Extension programming, Evaluation, and reporting. The component agents ranked second-most important was the ability to use computer publishing software to generate Extension reports, with a mean of 2.74, whereas specialists and administrators deemed the ability to implement computer-based Extension

Table 20

Perceived Need for Continuing Education and Training in Components of Effective Thinking among Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Problem-solving method	1.82	.76	1	2.11	.93	2	2.04	.76	2
Development of effective thinking in Extension groups	1.77	.83	2	2.17	.80	1	2.23	.95	1

Note. Scale: 1 = little or no need, 2 = moderate need, 3 = need, and 4 = great need.

[a]Rank = Rank of mean score, 1 being the highest.

Table 21

Perceived Importance of Components within Information Technologies to Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Ability to use PowerPoint in Extension programming, evaluation, and reporting	3.43	.76	1	3.71	.49	1	3.56	.80	1
Ability to use computer publishing software to generate Extension reports	2.74	.96	2	2.84	1.05	4	2.41	1.31	3
Ability to use Excel in Extension evaluation and programming	2.34	1.01	3	2.81	1.00	3	2.35	1.29	4
Ability to implement computer-based Extension programming	2.32	1.03	4	2.85	1.04	2	2.74	1.23	2
Ability to use SAS in Extension evaluation, programming, and reporting	1.93	.91	5	2.43	1.04	5	1.89	1.12	6
Ability to use SPSS in Extension evaluation, programming, and reporting	1.74	.90	6	1.96	1.00	6	1.85	.99	5

Note. Scale: 1 = of little or no importance, 2 = of moderate importance, 3 = important, and 4 = very

important.

[a]Rank = Rank of mean score, 1 being the highest.

programming second-most important, with means of 2.85 and 2.74 respectively. The lowest mean responses from agents and specialists were 1.74 and 1.96 respectively, both regarding utilization of the Statistical Package for the Social Sciences in Extension programming, evaluation, and reporting; the lowest mean score from administrators was 1.85, regarding utilization of Statistical Package for the Social Sciences in Extension programming, evaluation, and reporting.

Table 22 displays data on the perceived need among agents, specialists, and administrators for continuing education and training in six components of IT. None of the means were equal to or greater than 2.50. The highest mean response from agents was 2.48, regarding the ability to use computer publishing software to generate Extension reports, whereas from specialists and administrators, the highest mean scores were 2.43 and 2.27 respectively, regarding the ability to implement computer-based Extension programming. The lowest mean responses from agents and specialists were 1.91 and 2.09 respectively, for utilization of the Statistical Package for the Social Sciences in Extension programming, evaluation, and reporting, and from administrators, 1.50, for utilization of Excel in Extension evaluation and reporting.

Objective 2. The second objective of the study was to determine which electronic information resources were being utilized by aquaculture Extension agents, specialists, and program administrators on the Aquaculture Network Information Center (AquaNIC) Web site, and to identify AquaNIC resources that needed to be added or improved to enhance Web site utility to this population. A scale of 1 (*never use*), 2 (*use once or twice a year*), 3 (*use approximately once every 3 or 4 months*), 4 (*use approximately once a month*), and 5 (*use more than once a month*) was incorporated to determine frequency of

Table 22

Perceived Need for Continuing Education and Training in Components of Information Technologies among Individuals in Different Aquaculture-Extension Professions

Component	Ext. Agent (n = 44)			Ext. Specialist (n = 70)			Program Administrator (n = 27)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Use of computer publishing software to generate Extension reports	2.48	1.02	1	2.34	1.03	3	2.04	1.16	2
Implementation of computer-based Extension programming	2.23	1.01	2	2.43	.99	1	2.27	1.22	1
Utilization of SAS in Extension evaluation, programming, and reporting	2.19	1.05	3	2.36	1.05	2	1.58	.95	5
Utilization of Excel in Extension evaluation and programming	2.18	1.08	4	2.29	1.06	4	1.50	.76	6
Utilization of PowerPoint in Extension programming, evaluation, and reporting	1.98	.90	5	2.14	1.00	5	1.74	.86	3
Utilization of SPSS in Extension evaluation, programming, and reporting	1.91	1.06	6	2.09	1.07	6	1.70	.99	4

Note. Scale: 1 = little or no need, 2 = moderate need, 3 = need, and 4 = great need.

[a]Rank = Rank of mean score, 1 being the highest.

use. As such, a mean of 2.5 would indicate a frequency of use approximating once every 4 to 6 months.

Out of 44 agents, 23, or 52%, reported having used AquaNIC; 50 out of 70 specialists, or 71%, reported having used AquaNIC; and 22 out of 27 administrators, or 81%, reported having used AquaNIC. Of the agents, specialists, and administrators who reported not having used AquaNIC, six indicated they were too busy to use the site, seven indicated being either unaware of or unfamiliar with the site, and 11 indicated they had no need for the site.

As shown in Table 23, the AquaNIC resources agents, specialists, and administrators alike claimed to use most was "publications," with mean scores of 2.72, 2.56, and 2.62 respectively. Agents, specialists, and administrators all ranked "species" as the second-most utilized resource, with means of 2.28, 2.31, and 1.94 respectively. The AquaNIC resource agents and specialists claimed to use least was "online courses," which received a mean response from agents of 1.21 and from specialists 1.26, whereas administrators claimed to use "classified ads" least, with a mean response of 1.13.

Table 24 presents data on how frequently those agents, specialists, and program administrators who used the Web site used individual AquaNIC resources. According to this table, 81% of respondents claimed never to use "online courses," making it the least accessed resource, followed by "classified ads," "discussion groups," "media," "educators," and "news," which 77%, 69%, 65%, 61%, and 60% of the survey population respectively claimed never to use.

Thirty-nine percent of respondents claimed to have used "species" once or twice a year, the resource most commonly used that frequently. This was closely followed by use

Table 23

Frequency of Use of AquaNIC Resources by AQUA-EXT Users in Different Aquaculture-Extension Professions

AquaNIC resource	Ext. Agent (n = 23)			Ext. Specialist (n = 50)			Program Administrator (n = 22)		
	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]	Mean	s.d.	Rank[a]
Publications	2.72	1.28	1	2.56	1.30	1	2.62	1.43	1
Species	2.28	1.14	2	2.31	1.20	2	1.94	1.00	2
Sites	2.15	1.40	3	2.13	1.16	3	1.75	1.06	6
Systems	1.88	1.17	4	2.11	1.15	4	1.53	.91	10
Educators	1.80	1.19	5	1.58	.79	9	1.69	1.14	8
Discussion groups	1.78	1.16	6	1.47	.88	11	1.41	.87	13
News	1.71	1.20	7	1.57	.80	10	1.49	.65	11
Newsletters	1.68	1.07	8	1.73	.87	7	1.75	1.12	6
Job services	1.60	1.04	9	1.96	1.20	6	1.88	1.09	3
Contacts	1.48	.59	11	1.98	1.06	5	1.81	.83	4
Media	1.48	.84	11	1.45	.72	12	1.63	1.20	9
Calendars	1.48	.87	11	1.71	.80	8	1.75	1.06	6
Classified ads	1.46	.93	13	1.28	.65	13	1.13	.34	14
Online courses	1.21	.51	14	1.26	.61	14	1.44	1.03	12

Note. Scale: 1 = never use, 2 = use once or twice a year, 3 = use approximately once every 3 or 4

   months, 4 = use approximately once a month, and 5 = use more than once a month

[a]Rank = Rank of mean score, 1 being the highest.

Table 24

Frequency of Use of AquaNIC Resource Areas by Respondents Identified as Using AquaNIC

	Frequency of use (n = 95)					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	
Resource area	%	%	%	%	%	total
Publications	21%	35%	22%	7%	15%	100%
Species	26%	39%	23%	4%	8%	100%
Sites	42%	32%	11%	10%	5%	100%
Systems	42%	32%	14%	4%	5%	100%
Educators	61%	21%	13%	3%	2%	100%
Discussion groups	69%	17%	10%	4%	2%	100%
News	60%	25%	22%	6%	1%	100%
Newsletters	54%	29%	9%	6%	1%	100%
Job services	51%	28%	10%	2%	7%	100%
Contacts	46%	33%	15%	4%	1%	100%
Media	65%	22%	5%	4%	1%	100%
Calendars	55%	31%	10%	3%	1%	100%
Classified ads	77%	14%	5%	1%	1%	100%
Online courses	81%	13%	2%	1%	1%	100%

Note. Frequency of use: 1 = never use, 2 = use once or twice a year, 3 = use approximately once every 3 or

4 months, 4 = use approximately once a month, and 5 = use more than once a month

% = % of respondents from the AquaNIC "user group" in each frequency group by resource area

once or twice a year by the "publications," and "contacts," which 39% and 33% of respondents indicated using that often. "Publications" was also the resource accessed most frequently in the use more than once a month category by 15% or respondents, followed in frequency of use by "species" and "job services," with 8% and 7% respectively.

In appendix I, Tables I-1 through I-14 provide commentary on what users of these resources felt might make them of greater value. Table I-1 shows that users overwhelmingly responded that they simply did not have enough time to engage in the "discussion group" resource. A total of eight additional respondents indicated that the discussion groups needed to cover more relevant and timely information and further requested some form of forum oversight to maintain information integrity. Table I-2 shows responses regarding the "species" resource. Out of 28 respondents, four indicated that the site would benefit from more timely and relevant information. Furthermore, 10 indicated that this resource required more frequent updates as well as more species-specific information. Results from users of the "systems" resource are displayed in Table I-3. These results are similar to the preceding, with 5 out of 17 respondents indicating the resource would benefit from more in-depth and timely information updates. Table I-4 presents qualitative data concerning the "job resources" resource. The overwhelming response, from 6 out of 17 respondents, was that this resource was useful and "fine as it is." Constructive comments included suggestions for cross-listing from other online resources, simplifying its hierarchical structure, and allowing postings to be emailed directly to interested individuals. Table I-5 shows results concerning the "contacts" AquaNIC resource. Five out of 15 respondents indicated this resource needed more

updated individual contact information as well as a greater representation of the aquaculture community, with an emphasis on Extension personnel. The suggestions, shown in Table I-6, include requiring more information on such topics as aquatic plants and fish processing. Some respondents indicated it was sometimes faster just to do an online search than to use this resource. However, others indicated the resource is adequate, or even "excellent." Responses about the "publications" resource are listed in Table I-7. Five out of 18 respondents indicated that it was "okay as is," and four others indicated that more comprehensive and updated materials need to be incorporated. Recommendations included breaking the site into topic areas and incorporating an internal search by key word. As Table I-8 shows, 4 out of 10 respondents indicated that a more comprehensive listing of available resources was needed. Several others indicated the resource was "fine as is," and still others requested additional information or updates about the resource. Table I-9 displays comments on the "media" resource. Five out of 13 responses indicated the resource needed enhanced media content. A demonstration was requested to help users understand what the site could do for them, as was implementation of a searchable database. Table I-10 lists the 10 responses about the "education" resource. Constructive comments included suggestions to add more content and depth, as well as a demonstration section and a youth aquaculture section. Table I-11 displays qualitative data on what would make the AquaNIC "news" resource of greater value to the respondent. Four out of 13 responses recommended enhancing this section's content and coverage. In addition, respondents requested a direct-email service for new content and expressed a general need for education about this resource. Comments listed in Table I-12 about the "calendars" resource proposed partnerships with those who

sponsor events as a way to provide more in-depth and comprehensive information regarding upcoming events. In addition, an events-listing format was suggested. Tables I-13 and I-14 display responses about the "classified ads" and "online courses" resources. Concerning "classified ads," respondents recommended a breakdown into categories and requested enhanced content and participation by outside entities involved in aquaculture. Respondents also requested additional information about the site, with many indicating a general lack of need for or interaction with the site. Responses in Table I-14 indicate an interest in links to other online course materials and suggest incorporating a dedicated group of individuals to integrate and enhance resource materials. Other respondents indicated a lack of knowledge about this resource and expressed an interest in learning more about it.

Objective 3. The third objective of the study was to identify demographics of aquaculture Extension agents, specialists, and program administrators within the AQUA-EXT listserv, and to see how these related to perceived individual education and training needs. As displayed in Table 25, the mean ages for Extension agents, specialists, and program administrators were 44, 50.5, and 51.5 respectively. The greatest percentage of agents, specialists, and administrators were between 50 and 59 years old, with 48% of agents, 53% of specialists, and 54% of administrators falling into that age group. Twenty-six Extension agents, or 59%, had master's degrees. A majority of specialists (44, or 63%) and program administrators (19, or 72%) had doctoral degrees. Eleven percent of Extension agents held bachelor's degrees, and the same percentage held doctorates.

Extension agents had held their present employment positions for a mean of 13.4 years, specialists for a mean of 13.2 years, and program administrators for a mean of 8.4

Table 25

Demographics of the AQUA-EXT Listserv by Profession

Demographic	Ext. Agent		Ext. Specialist		Program Administrator	
	n	%	n	%	n	%
Age						
21–29	4	9	1	1	0	0
30–39	4	9	5	7	2	8
40–49	12	27	21	30	7	27
50–60	21	48	37	53	14	54
60+	3	7	6	9	3	11
Total	44	100	70	100	26	100
Mean	47.9		50.5		51.5	
Level of education						
Bachelor's	5	11	1	1	1	4
Bachelor's +	2	5	3	4	0	0
Master's	26	59	13	19	3	12
Master's +	6	14	9	13	3	12
Doctorate	5	11	44	63	19	72
Total	44	100	70	100	26	100

Table 25 (continued)

Demographics of the AQUA-EXT listserv by group

Demographic	Ext. Agent		Ext. Specialist		Program Administrator	
	n	%	n	%	n	%
Years in employment position						
1–5	9	20	13	19	13	48
6–10	10	23	18	26	8	30
11–15	8	18	13	19	2	7
16–20	6	14	15	21	1	4
20+	11	25	11	15	3	11
Total	44	100	70	100	27	100
Mean	13.4		13.2		8.4	
Years in CE or SG						
1–5	7	16	5	7	6	22
6–10	6	14	15	22	2	7
11–15	8	18	12	17	0	0
16–20	7	16	19	27	4	15
20+	16	36	17	24	8	30
Not in CE or SG	0	0	2	3	7	26
Total	44	100	70	100	27	100
Mean	16.6		16.1		15.5	

years. Agents and specialists most frequently responded that they had held their present jobs for 6 to 10 years, with frequencies of 10 (23%) and 18 (26%) respectively. Program administrators most often claimed to have worked 1 to 5 years in their present positions, with a frequency of 13 (48%). Fifty-seven percent of Extension agents had worked 11 or more years in their present positions, while 55% of specialists and 22% of program administrators fell in this range. Mean number of years in their present position for agents, specialists, and program administrators were 13.4, 13.2, and 8.4 years respectively.

Thirty percent of Extension agents and 29% each of specialists and program administrators had 10 years or less of service in the Cooperative Extension Service (CES) or Sea Grant (SG). Thirty-six percent of Extension agents, 24% of specialists, and 30% of program administrators had twenty or more years of service to these programs. Mean total number of years in either CE or Sea Grant for agents, specialists, and program administrators were 13.4, 13.2, and 8.4 years respectively. Three percent of Extension specialists and 26% of program administrators had never served CES or SG.

One-way analysis of variance was conducted at p = .05 for each of the AQUA-EXT subgroups, aquaculture Extension agents, specialists, and program administrators. Level of education attained was evaluated for each population subgroup with regard to perceived need for continuing education and or training in each competency area. Profession areas were also evaluated as to mean total number of years in CE or Sea Grant with regard to perceived need in competency areas. Lastly, mean age as well as mean years in present position were evaluated for each profession area with regard to perceived need for continuing education or training in each competency area. For each of these

ANOVA, no meaningful results could be extrapolated for this component of the third

objective.

Chapter 5: Summary of Findings, Conclusions, and Recommendations

Summary of Findings

Objective 1. The first objective of the study was to identify the perceived relative importance to aquaculture Extension agents, specialists, and program administrators of 10 identified competency areas, with an emphasis on situation analysis, program design, implementation, and evaluation, and to determine how great the identified need was among these professionals for continuing education and training in these areas. Respondents rated both variables on a scale of 1 through 4, scoring the competency areas as 1, "of little or no importance," 2, "of moderate importance," 3, "important," or 4, "very important," and scoring their need for continuing education in each area as 1, "little or no need," 2, "moderate need," 3, "need," or 4, "great need."

Only IT received a mean perceived-relative-importance score lower than 2.5. With regard to continuing education and training need, no competency area received a mean score greater than 2.5. However, the competency area of program evaluation was the highest ranked need by means for both specialists and program administrators, and the second highest by Extension agents. Extension agents ranked IT as the greatest continuing education and training need.

Individual analysis of the 10 competency areas provided more insight. As a general trend, individual competency-area subcomponents received higher mean scores in perceived importance than they did in the need for continuing education and training. For example, seven of nine subcomponents of Extension organization and administration received mean scores above 2.5 in perceived importance, whereas every single

subcomponent of Extension organization and administration was given a mean score below 2.5 by all three professional groups in the need for continuing education and training. Within this competency area, National Extension policy and how it is formulated was ranked the highest by both Extension agents and program administrators.

The second competency area was program planning, development, and implementation. For each subcomponent of this competency, program administrators identified a greater need for continuing education and training than did either Extension agents or specialists. Program evaluation was rated relatively high across all subcomponent areas, with the greatest needs in continuing education and training expressed by specialists and program administrators. Within this competency, the interaction of research and Extension in Extension programming was ranked the highest by Extension agents and specialists, with understanding situation analysis identified as the greatest need by program administrators.

In program evaluation, the area in which Extension agents claimed most to need continuing education and training was understanding evaluation study design in Extension education. Specialists claimed to need education and training most in evaluation of Extension programs, and program administrators in correlation between program results and program accountability.

Within the communication competency area, both Extension agents and specialists claimed most to need continuing education and training in the ability to conduct Web-based education programming. Program administrators identified the ability to interact effectively with the media as the greatest need.

Extension agents and specialists identified knowledge of procedures for applying research results to clientele as the research competency component in which they most needed continuing education and training. Program administrators identified the ability to conduct surveys.

Human development was the sixth competency area evaluated. Within this competency area, Extension agents, specialists, and program administrators alike identified the development of leadership abilities as the component in which they most needed continuing education and training.

Extension agents identified knowledge of principles and procedures in teaching adults as the educational-process component in which they most needed continuing education and training. Specialists and program administrators alike identified how people are motivated as their greatest continuing education and training need.

Social systems was the eighth competency area evaluated. In this competency, both Extension agents and specialists identified understanding the interactions of individuals within groups as their greatest continuing education and training need. Specialists ranked this component equally with understanding the functions of agricultural organizations as their greatest continuing education and training need.

Extension agents identified understanding of problem-solving methods as their greatest continuing education and training need within the effective-thinking competency component. Specialists and program administrators alike rated knowledge of techniques for developing effective thinking in Extension groups as their greatest continuing education and training need within effective thinking.

The final competency area evaluated under objective 1 was IT. Within this competency, Extension agents identified the ability to use computer publishing software to generate extension reports as their greatest continuing education and training need. Both specialists and program administrators alike identified the ability to implement computer-based Extension as their greatest continuing education and training need.

Objective 2. The second objective of the study was to determine which electronic information resources are presently utilized by aquaculture Extension agents, specialists, and program administrators on the Aquaculture Network Information Center (AquaNIC) Web site. This was accomplished utilizing an interval of 1 through 5, with 1 representing "never use," followed sequentially up the scale by "once or twice a year," "approximately once every 3 or 4 months," "approximately once a month," and "more than once a month." An additional objective was to identify the AquaNIC resources that needed to be changed or improved to enhance utility to this population.

Fifty-two percent of Extension agents, 71% of specialists, and 81% of program administrators reported having used AquaNIC. However, the average number of times individuals in each group accessed individual AquaNIC resource areas was reported to be less than once every 3 to 4 months. The AquaNIC resource with the highest access rates by all three groups was publications. Species had the second-highest access rates by each group.

The following individual AquaNIC resources were never used by more than 50% of the user population: (a) discussion groups, (b) job services, (c) newsletters, (d) calendars, (e) classified ads, (f) online courses, (g) media, (h) educators, and (i) news.

The AquaNIC resource with the highest access rate in the "once every three or four months" category was species, which 23% of the user population accessed that often.

Objective 3. The third objective of the study was to identify demographics of aquaculture Extension agents, specialists, and program administrators within the AQUA-EXT listserv and to see how these relate to individual education and training needs. The largest percentage of each professional group fell into the "50–59"-year age group. Fifty-nine percent of Extension agents had Master's degrees. The majority of specialists and program administrators, 63% and 72% respectively, had earned doctoral degrees.

The mean number of years Extension agents had held their present employment positions was 13.4. Specialists and program administrators had spent means of 13.2 and 8.41 years, respectively, in their present positions.

The last demographic evaluated was the total number of years in either the Cooperative Extension Service (CES) or Sea Grant. Extension agents had spent a mean of 16.6 years in service to one or the other. For specialists and program administrators, the means of total years in either CES or Sea Grant was 16.1 and 15.5 respectively.

From these demographics, the typical profession profiles were generated for the AQUA-EXT population: a) the majority of aquaculture Extension agents are in the 50 – 59 year age bracket, have a master's degree, have been in their present position for 13 years, and in CES or Sea Grant for a total of 16 years; b) likewise, most aquaculture Extension specialists were also in the 50 – 59 year age bracket, have been in their present position for 13 years, and in CES or Sea Grant for a total of 16 years; and c) typical aquaculture Extension program administrators were also in the 50 – 59 year age bracket

and had a doctorate degree, however, had only been in their present position for eight years, and in either CES or Sea Grant for a total of 15 years.

No meaningful results were obtained regarding how these demographics related to individual continuing education and training needs.

Conclusions and Recommendations

Of significance was identification by all professional areas of a strong need for continuing education and training in program evaluation, despite a lower ranking by all groups with regard to perceived importance. This is likely due to the perceived greater importance of the program planning, development, and implementation, as well as human development competencies on a day-to-day programming basis when compared with program evaluation. However, with recent trends of increasing emphasis on program accountability, the program evaluation competency has risen to the top with regard to perceived need for additional education.

Of additional interest was identification by all profession areas of IT as among the lowest ranked competency areas with regard to perceived importance, however among the highest competency areas with regard to perceived need for continuing education and training. With today's rapidly increasing reliance upon computers as well as computer software programs, as with the program evaluation competency area, this may be indicative of new trends which are yet to be recognized as important, but already identifiable as components utilized on a daily basis which all profession areas perceive as areas they could benefit from continuing education and training.

The following specific continuing education and training needs were identified for the population of Extension agents, specialists, and program administrators on AQUA-EXT. To be included on this list, the competency component had to be rated with a minimum of 2.0 as a perceived need by all professions, and have had a mean from the three profession areas greater than 2.25.

1. Evaluation in Extension programming

2. Understanding correlation between program results and program accountability

3. Correlation between program results and accountability

4. Conducting of Web-based education programming

5. Effective interaction with the media

6. Development of leadership abilities

7. Use of computer publishing software in generating Extension reports

8. Implementation of computer-based Extension programming

With regard to the AquaNIC Web site, greater then 50% never used most resource areas, and when utilized, use was infrequent. Recommendations provided by respondents to enhance Web site utility to them were to update it, be more comprehensive and timely, and incorporate in-depth materials in all resource areas. The following specific recommendations were identified for individual resource areas of the AquaNIC Web site:

1. Discussion groups: knowledgeable oversight.

2. Species: more species-specific information.

3. Job services: structural hierarchy, as well as an email service to notify subscribers when new positions are posted.

4. Contacts: greater Extension personnel representation.

5. Publications: keyword search.

6. Media: searchable database.

7. Educators: youth-education section.

8. Classified ads: categorization of posting.

9. Online resources: greater linkage to other online materials.

Relationship of Findings to Previous Studies

With regard to perceived importance of competencies, Gibson (1992) found that for agents, specialists, and administrators in the North Carolina Extension service, the most important competency area was program planning. This was followed by agents with educational process and a tie between communication and human development. Specialists, identified educational process and research, and communication as the next in importance, and administrators followed program planning as the most important with educational process and a split between communication and human development.

With regard to perceived need for continuing education and training, Gibson (1992) found that program planning was the highest identified competency area for agents, specialists, and administrators. This was followed for agents with educational process and a split between communication and research. Specialists identified research as the next most important competency area for continuing education, and followed this with a split between educational process and effective thinking. Administrators identified research as the second highest need, followed by a split between communication and research.

Results from this study also identified program planning, development, and implementation as the competency of highest perceived importance. Agents followed this with human development and social systems, specialists with research and educational process, and administrators with educational process and human development.

With regard to perceived need for continuing education and training, agents identified information technologies as the greatest need, followed by program evaluation and human development. Specialists identified program evaluation as the greatest perceived need, and followed with a three way tie for IT, human development, and effective thinking. Administrators likewise identified program evaluation as the greatest perceived need, followed sequentially by human development and program planning, development, and implementation.

Effectively, this comparison shows how significant program evaluation has become in recent times. It was ranked first by agents, and second by specialists and program administrators. Furthermore, IT was highly ranked by agents and specialists, but not so for administrators, perhaps indicating the technological need for development of presentations and publications in Extension work.

With regard to demographics, Hubbard (1971), found that only 15% of Extension agents in South Caroline had master's degrees. According to Gibson (1992), 53% of Extension agents in North Caroline held master's degrees and seven % held doctorates, whereas this study identified 59% as having master's and 11% having doctorates. Of greater contrast were differences in age and years of service. According to Gibson (1992), the average age for agents was 38 years old, with more than 50% of all agents being in their position less than five years, and total time in Extension less than six years.

In comparison, this study identified that regarding aquaculture Extension agents on the AQUA_EXT listserv, the average age was 48, with a majority of the population in the 50 – 59 year age group. Furthermore, agents in this population were employed an average of 13 years in their present position, and were employed in Extension for 17 years. These changes indicate that Extension personnel are becoming higher educated, have been in their position longer, and are significantly older.

Implications

Information technologies was ranked lowest in overall perceived importance by all three profession areas, but was ranked high with regard to perceived need for continuing education and training, likewise, program evaluation was not ranked high under perceived importance, but was also ranked high with regard to perceived need for continuing education and training. This is an excellent representation of the effect of modern times, and the emergence of changing continuing education and training needs. The perception of the importance of these skills is still low, but the emerging need for additional training is great with regard to the ability to conduct Extension work effectively.

Given these results, program evaluation should be given a high priority by Extension across the board for Aquaculture Extension agents, specialists, and program administrators alike. Furthermore, the perceived need for IT needs to be addressed as well to enhance Extension's ability to conduct programming effectively and efficiently. The focus of program evaluation should be on: a) design of evaluation studies in Extension education; b) evaluation of Extension programs; and c) correlation between

program results and program accountability. With regard to IT, the focus of continuing education and training should be on use of computer publishing software to generate Extension reports, and implementation of computer-based Extension programming. Given the relatively high level of education in the AQUA-EXT population, this continuing education may likely be conducted effectively with a variety of mediums at an accelerated instructional pace. National meetings such as the annual World Aquaculture Society Aquaculture America meetings, or the National Aquaculture Extension meetings which occur every few years may serve as excellent opportunities to engage these aquaculture Extension populations

Furthermore, there is an apparent aging of all aquaculture Extension profession populations. This could have significant negative ramifications in the near future as individuals near retirement and insufficient numbers of agents, specialists, and program administrators are available to replace them.

With regard to the AquaNIC Web site, results from this study indicated that very few aquaculture Extension agents, specialists, or program administrators utilize this Web site. The identified reasons for this lack of interest and use were a perceived lack of up-to-date information, a lack of professional oversight regarding content, and a general lack of emerging information regarding production species and systems. If a goal of AquaNIC is to serve as a viable information resource for Extension agents, specialists, and program administrators, then a significant increase in effort and funding will likely be required to accomplish this goal.

Recommendations for Further Research

The whole area of IT, Web sites, and other electronic forms of communication are changing rapidly, and beginning to take up greater amounts of time in the workplace. Many of these are useful to Extension professions on a day-to-day basis, and often enhance programming capacity as well as quality. However, there is growing concern that many of these mediums take up excess time at the workplace, and time is often further wasted attempting to locate specific and accurate information in the endless realm of online information. As such, continuing research into the area of online aquaculture information needs and resource evaluation is needed. In specific, further research regarding electronic information resources required by all aquaculture Extension profession areas is needed, and how these can potentially be addressed by AquaNIC

In addition, results from this study indicated significant emerging issues regarding aquaculture Extension profession areas, and perceived needs for continuing education and training in IT and program evaluation. Specific in-depth research into these two areas is warranted to further identify and define these emerging needs to enhance resultant continuing education programming required in these two areas for Extension professionals. Included in this study should be identification of underlying reasons for the apparent aging of aquaculture Extension profession populations, and what might be done to engage younger individuals.

References

Church, A. H. (1993). Estimating the effect of incentives on mail survey response rates: A meta-analysis. *Public Opinion Quarterly*, *57*, 62-79.

Cooperative State Research, Education, and Extension Service. (CSREES). (2004). *Introduction to Extension.* Retrieved December 3, 2004, from http://www.csrees.usda.gov/qlinks/extension.html

Deutskens, E., Ruyter, K. D., Wetzels, M., & Oosterveld, P. (2004). *Marketing Letters*, *15*, 21-36.

Dillman, D. A. (2000). *Mail and Internet surveys, the tailored design method* (2nd ed.). New York: John Wiley & Sons.

DSS Research. (2004). Online research-The good, bad, and ugly. Retrieved November 26, 2004, from http://www.dssresearch.com/toolkit/default.asp

Food and Agricultural Organization of the United Nations. (2003). FISHSTAT plus. Retrieved March 23, 2005, from http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp

Gentry-Van Laanen, P., & Nies, J. I. (1995). Evaluating Extension program effectiveness: Food safety education in Texas. *Journal of Extension*, *33*(5). Retrieved October 3, 2003, from http://www.joe.org/joe/1995october/a4.html

Gibson, J. D. (1992). *Training needs of area specialized Extension agents in the North Caroline Cooperative Extension Service*. Unpublished doctoral dissertation, Virginia Tech, Blacksburg.

Gibson, J. D., & Hillison, J. (1994). Training needs of area specialized Extension agents. *Journal of Extension*, *32*(3). Retrieved November 26, 2004, from http://www.joe.org/joe/1994october/a3.html

Gregg, J. A., & Irani, T. A. (2004). Use of information technology by county Extension agents of the Florida Cooperative Extension Service. *Journal of Extension*, *42*(3). Retrieved November 26, 2004, from http://www.joe.org/joe/2004june/rb2.shtml

Hubbard, R. C. (1971). *Training of county Extension agents in South Carolina*. Unpublished doctoral dissertation, North Carolina State University, Raleigh.

Ilieva, J., Baron, S., & Healey, N. M. (2002). Online surveys in marketing research: Pros and cons. International Journal of Market Research, 44(3), 361-382.

Jensen, G., & Murray, J. (2003). *National Extension questionnaire: Aquaculture and related disciplines*. Unpublished.

Jensen, G., & Murray, J. (2005, January). Presentation at the World Aquaculture Society Aquaculture America Meeting '05, New Orleans, LA.

Jensen, G., Murray, J., & Mayeaux, M. (2005). *Highlights and assessment of joint USDA/NOAA national aquaculture Extension questionnaire*. Proceedings of the World Aquaculture Society – Aquaculture America, New Orleans, LA.

Kelsey, T. W., & Mincemoyer, C. C. (2001). *Exploring the potential of in-service training through distance education*. Retrieved December 12, 2004, from http://www.joe.org/joe/2001april/rb7.html

Ladner, M. D., Wingenbach, G. J., & Raven, M. R. (2002). Internet and paper-based data collection methods in agricultural education research. *Journal of Southern Agricultural Research and Education*, *52*(1). Retrieved November 26, 2004, from http://aaaeonline.ifas.ufl.edu/publications/SRJAE/Internet.pdf

Leung, Y. F. (1998). Using the Internet for natural resource research: Results from an online user survey. *Journal Natural Resource Life Science Education*, *27*, 8-12. Retrieved March 28, 2005, from http://www.jnrlse.org/pdf/1998/e97-3.pdf

Lyons, A. C., Cude, B., Gutter, M., & Lawrence, F. C. (2003). Collecting consumer data using online surveys. *Consumer Interest Annual*, *49*. Retrieved April 15, 2005, from http://www.consumerinterests.org/files/public/OnlineSurveys_03.pdf

Mertler, Craig A. (2003). Patterns of response and nonresponse from teachers to traditional and web surveys. *Practical Assessment, Research & Evaluation*, *8*(22). Retrieved March 28, 2005, from http://PAREonline.net/getvn.asp?v=8&n=22

National policy statement on staff training and development. (1968). Staff Training and Development Subcommittee, National Extension Committee on Policy. Madison: University of Wisconsin.

National Marine Fisheries Service (NMFS). (2004). *Current fisheries statistics No. 2004-2*. Retrieved March 23, 2005, from http://www.st.nmfs.gov/st1/trade/documents/TRADE2004.pdf

National Oceanic and Atmospheric Administration/National Marine Fisheries Service (NOAA/NMFS). *National aquaculture act of 1980*. Retrieved September 1, 2005, from http://www.nmfs.noaa.gov/sfa/sfweb/aqua_act.htm

O'Neill, B. (2004). Collecting research data online: Implications for Extension professionals. *Journal of Extension*. *42*(3). Retrieved December 10, 2004, from http://www.joe.org/joe/2004june/tt1.shtml

Radhakrishna, R. B. (2000). *Professional development needs of state Extension specialists*. Proceedings of the 27th Annual National Agricultural Education Research Conference. Retrieved November 26, 2004, from http://aaaeonline.ifas.ufl.edu/publications/SRJAE/Internet.pdf

Radhakrishna, R., & Martin, M. (1999). Program evaluation and accountability training needs of Extension agents. *Journal of Extension*, *37*(3). Retrieved November 26, 2004, from http://www.joe.org/joe/1999june/rb1.html

Seafood consumption rose again in 2003. (2004, September 27). Retrieved December 14, 2004, from http://www.noaanews.noaa.gov/stories2004/s2322.htm

Seevers, B., Graham, D., Gamon, J., & Conklin, N. (1997). *Education through Cooperative Extension*. New York: Delmar.

Solomon, D. J. (2001). Conducting web-based surveys. *Practical Assessment, Research & Evaluation*, *7*(19). Retrieved March 28, 2005, from http://PAREonline.net/getvn.asp?v=7&n=19

Stickney, R. R. (1996). *Aquaculture in the United States*. New York: John Wiley & Sons.

Swann, D., & Einstein, M. (2000). User analysis and future directions of the Web-based aquaculture network information center. *Journal of Extension*, *38*(5)*. Available: http://www.joe.org/joe/2000october/iw2.html

Swann, D., & Morris, J. (2001). *A white paper on the status and needs of aquaculture extension outreach for the north central region*. Retrieved November 28, 2004, from http://ag.ansc.perdue.edu/aquanic/nrac/wpapers/ext0901.doc

Taylor, C. L., & Summerhill, W. R. (1994). *Concept of state major programs and design teams (Fact Sheet PE-56)*. Gainesville, University of Florida.

United States Department of Agriculture/Agricultural Research Service (USDA/ARS). (2003). *National programs- aquaculture action plan*. Retrieved January 29, 2005, from http://www.ars.usda.gov/research/programs/programs.htm?np_code=106&docid=276

United States Department of Agriculture/Cooperative State Research, Education, and Extension Service (USDA/CSREES). *CSREES background*. Retrieved September 1, 2005, from http://www.csrees.usda.gov/about/background.html

Appendix A

Survey Questionnaire for AQUA-EXT Listserv

This survey will take approximately 30-45 minutes to complete

IMPORTANT **Please provide your email address in the space below this paragraph. This will only be utilized to identify those who have and have not responded. Your email address will not be associated with the remainder of the survey, which will be completely confidential.**

[   ]

****

BEGIN SURVEY
****

What is your predominant appointment in Extension programming?

◯ 1. Extension agent: (> 49% FTE)

◯ 2. Extension specialist: (> 49% FTE)

◯ 3. Program administrator: (> 49% FTE)

◉ 4. Other > 49%: [   ]

Notation: For the following question, the definition of aquaculture Extension programming is broad based and includes all areas of marketing/economics, education, processing, safety, engineering, and other fields related to aquaculture. **How much of your FTE on a percentage basis would you estimate is dedicated to aquaculture, as compared to other responsibilities or appointments?**

◯ 1. <20% FTE

◯ 2. 20-49% FTE

◯ 3. 50-75% FTE

◯ 4. >75% FTE

What is your position or appointment title?

[   ]

****

EXTENSION ORGANIZATION AND ADMINISTRATION
1a. How important for you is a knowledge of the history of Extension?

◯ 1. Little or no importance

◯ 2. Moderate importance

◯ 3. Important

◯ 4. Very important

1b. How much additional training/education in this area do you think you need?

　▢　1. Little or no need

　▢　2. Moderate need

　▢　3. Need

　▢　4. Great need

2a. How important to you is an understanding of how Cooperative Extension is organized and its relationship to the university and USDA or NOAA?

　▢　1. Little or no importance

　▢　2. Moderate importance

　▢　3. Important

　▢　4. Very important

2b. How much additional training/education in this area do you think you need?

　▢　1. Little or no need

　▢　2. Moderate need

　▢　3. Need

　▢　4. Great need

3a. How important to you is a knowledge of national Extension policy and how it is formulated?

　▢　1. Little or no importance

　▢　2. Moderate importance

　▢　3. Important

　▢　4. Very important

3b. How much additional training/education in this area do you think you need?

　▢　1. Little or no need

　▢　2. Moderate need

　▢　3. Need

　▢　4. Great need

4a. How important to you is a knowledge of state Extension policy and how it is formulated?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

4b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

5a. How important to you is a knowledge of local Extension policy and how it is formulated?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

5b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

6a. How important to you is a clear understanding of your Extension appointment and responsibilities?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

6b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

7a. How important to you is an understanding of Extension policies and procedures with regard to promotion and salary.

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

7b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

****

PROGRAM PLANNING, DEVELOPMENT, AND IMPLEMENTATION
8a. How important to you is an understanding of how to identify and prioritize clientele problems?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

8b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

9a. How important to you is an understanding of the "situation analysis" process?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

9b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

10a. How important to you is the ability to develop Extension programs?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

10b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

11a. How important to you is the interactive role of Extension agents and specialists in Extension programming?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

11b. How much additional training/education in this area do you think you need?

　　1. Little or no need

　　2. Moderate need

　　3. Need

　　4. Great need

12a. How important to you is the interactive role between research and Extension in Extension programming?

　　1. Little or no importance

　　2. Moderate importance

　　3. Important

　　4. Very important

12b. How much additional training/education in this area do you think you need?

　　1. Little or no need

　　2. Moderate need

　　3. Need

　　4. Great need

****

PROGRAM EVALUATION
13a. How important to you is a comprehensive understanding of design for evaluation studies in Extension education?

　　1. Little or no importance

　　2. Moderate importance

　　3. Important

　　4. Very important

13b. How much additional training/education in this area do you think you need?

　　1. Little or no need

　　2. Moderate need

　　3. Need

　　4. Great need

14a. How important to you are evaluations of your Extension programs?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

14b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

15a. How important to you is the process of data collection for Extension program evaluation?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

15b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

16a. How important to you is the correlation between program results and program accountability?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

16b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

17a. How important to you is the use of focus groups in program evaluation?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

17b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

****

COMMUNICATION

18a. How important to you is the ability to prepare and deliver effective public presentations?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

18b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

19a. How important to you is the ability to develop and use public exhibits and demonstrations effectively?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

19b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

20a. How important to you is the ability to write effective impact statements?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

20b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

21a. How important to you is the ability to conduct effective telephone interviews?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

21b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

22a. How important to you is the ability to interact effectively with the media?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

22b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

23a. How important to you is the ability to conduct effective online surveys?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

23b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

24a. How important to you is the ability to conduct web-based education programming?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

24b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

****

RESEARCH
25a. How important to you is an ability to conduct surveys?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

25b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

26a. How important to you is the ability to conduct scientific research trials?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

26b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

27a. How important to you is a knowledge of procedures for applying research findings to the benefit of clientele?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

27b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

****

HUMAN DEVELOPMENT
28a. How important to you is the development of your leadership abilities?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

28b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

29a. How important to you is an understanding of the basic psychological drives of people, such as the need for recognition and security?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

29b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

30a. How important to you are the skills to develop an approach to Extension work that considers the feelings and values of people?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

30b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

31a. How important to you is an understanding of the reasons for aggressive behavior in people?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

31b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

****

YOU ARE ABOUT 1/2 DONE WITH THE SURVEY, KEEP UP THE GOOD WORK :)
****

EDUCATIONAL PROCESS
32a. How important to you is understanding the relationship between the need for and usefulness of subject-matter information to learning?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

32b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

33a. How important to you is an understanding of the principles of the learning process?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

33b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

☐ 4. Great need

34a. How important to you is a knowledge of principles and procedures in teaching adults?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

34b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

35a. How important to you is an understanding of how people are motivated?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

35b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

****

SOCIAL SYSTEMS

36a. How important to you is an understanding of the interactions of individuals within groups?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

36b. How much additional training/education in this area do you think you need?

▢ 1. Little or no need

▢ 2. Moderate need

▢ 3. Need

▢ 4. Great need

37a. How important to you is an understanding of the functions of agricultural organizations?

▢ 1. Little or no importance

▢ 2. Moderate importance

▢ 3. Important

▢ 4. Very important

37b. How much additional training/education in this area do you think you need?

▢ 1. Little or no need

▢ 2. Moderate need

▢ 3. Need

▢ 4. Great need

38a. How important to you is an understanding of the purpose of Cooperative Extension or Sea Grant?

▢ 1. Little or no importance

▢ 2. Moderate importance

▢ 3. Important

▢ 4. Very important

38b. How much additional training/education in this area do you think you need?

▢ 1. Little or no need

▢ 2. Moderate need

▢ 3. Need

▢ 4. Great need

****

EFFECTIVE THINKING

39a. How important to you is an understanding of the problem-solving method in effective thinking?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

39b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

40a. How important to you is a knowledge of techniques for developing effective thinking in Extension groups?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

40b. How much additional training/education in this area do you think you need?

☐ 1. Little or no need

☐ 2. Moderate need

☐ 3. Need

☐ 4. Great need

****

INFORMATION TECHNOLOGIES

41a. How important to you is utilization of Excel spreadsheets in your Extension programming and evaluation?

☐ 1. Little or no importance

☐ 2. Moderate importance

☐ 3. Important

☐ 4. Very important

41b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

42a. How important to you is utilization of PowerPoint in your Extension programming, evaluation, and reporting?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

42b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

43a. How important to you is utilization of the analytical program Statistical Package for the Social Sciences (SPSS) in your Extension programming, research, evaluation, and reporting?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

43b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

44a. How important to you is utilization of the analytical program Statistical Analysis Software (SAS) in your Extension programming, research, evaluation, and reporting?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

44b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

45a. How important to you is the ability to implement computer-based extension programming?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

45b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

46a. How important to you is the ability to use computer publishing software to generate Extension publications and/or reports?

◻ 1. Little or no importance

◻ 2. Moderate importance

◻ 3. Important

◻ 4. Very important

46b. How much additional training/education in this area do you think you need?

◻ 1. Little or no need

◻ 2. Moderate need

◻ 3. Need

◻ 4. Great need

****

RESPONDENT INFORMATION
What is your highest level of education attained?

◻ 1. Bachelor's degree

◻ 2. Bachelor's degree plus graduate work towards master's

◻ 3. Master's degree

◻ 4. Master's degree plus graduate work towards doctorate

◻ 5. Doctorate

Please indicate the number of years you have been employed in your present position.

[   ]

Please indicate the number of years you have been employed with Cooperative Extension or Sea Grant.

[   ]

Please indicate your age.

[   ]

****
****

AQUANIC WEBSITE EVALUATION
****
****

The following section is designed to evaluate the AquaNIC website. The same questions are asked for each of 13 AquaNIC resource areas: (a) how often do you use the resource; (b) if never, is there another you utilize for this resource, and (c) what might make this resource on AquaNIC of greater benefit to you?

Have you ever utilized the AquaNIC website?

☐ Yes (If yes, please proceed with the remaining questions)

☐ No (IF NO, PLEASE INDICATE A REASON WHY NOT IN THE FOLLOWING TEXT BOX. THEN DO NOT ANSWER ANY OF THE REMAINING QUESTIONS, AND SCROLL TO THE END OF THE SURVEY AND HIT "SUBMIT")

[   ]

****

How often do you utilize the "discussion groups" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

[   ]

What do you feel would make the "discussions group" AquaNIC resource of greater value to you?

[   ]

How often do you utilize the "species" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

[   ]

What do you feel would make the "species" resource on AquaNIC of greater value to you?

[text area]

How often do you utilize the "Systems" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

[text field]

What do you feel would make the "Systems" resource on AquaNIC of greater value to you?

[text area]

How often do you utilize the "Job services" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank..

[text field]

What do you feel would make the "Job services" resource on AquaNIC of greater value to you?

How often do you utilize the "Contacts" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

What do you feel would make the "Contacts" resource on AquaNIC of greater value to you?

How often do you utilize the "Sites" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

What do you feel would make the "Sites" resource on AquaNIC of greater value to you?

How often do you utilize the "Publications" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

What do you feel would make the "Publications" resource on AquaNIC of greater value to you?

How often do you utilize the "Newsletters" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

What do you feel would make the "Newsletters" resource on AquaNIC of greater value to you?

How often do you utilize the "Media" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

What do you feel would make the "Media" resource on AquaNIC of greater value to you?

How often do you utilize the "Educators" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

What do you feel would make the "Educators" resource on AquaNIC of greater value to you?

How often do you utilize the "News" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

What do you feel would make the "News" resource on AquaNIC of greater value to you?

How often do you utilize the "Calendars" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

What do you feel would make the "Calendars" resource on AquaNIC of greater value to you?

How often do you utilize the "Classified ads" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

What do you feel would make the "Classified ads" resource on AquaNIC of greater value to you?

How often do you utilize the "Online courses" resource on the AquaNIC website?

☐ 1. Never

☐ 2. Once or twice a year

☐ 3. Approximately once every 3 or 4 months

☐ 4. Approximately once a month

☐ 5. More than once a month

If you answered never in the previous question, but utilize another Web site for this type of resource instead, please indicated the name of the other website in the space below; otherwise please leave blank.

What do you feel would make the "Online courses" resource on AquaNIC of greater value to you?

[text area]

This is the end of the survey. Please hit the SUBMIT button now to complete.

Submit

Appendix B

Questionnaire Pre-announcement

Tuesday July 26, 2005

**************** AQUA-EXT MAIL GROUP NEWS ********************

An important questionnaire will be disseminated to you via this aqua-ext listserv this Friday from Michael Schwarz. It will be sent as a URL, with specific instructions on how to access and complete the instrument. This questionnaire is a follow-up to the 2003 joint USDA-NOAA National Extension Questionnaire: Aquaculture and Related Disciplines which was designed to gain an understanding of issues and challenges facing Extension today. It is also Michael Schwarz's dissertation work at Virginia Tech. This new questionnaire is designed to build upon the 2003 survey data by identifying specific needs of aquaculture extension agents and specialists to enhance program performance. Specifically, the questionnaire will:

- identify the perceived relative importance of, and continuing education and training needs of aquaculture extension agents and specialists in ten identified competency areas, with emphases on situation analysis, program design, implementation, and evaluation.

- determine electronic information resources presently utilized by aquaculture extension agents and specialists within the AquaNIC website and identify those which need to be added or improved upon to enhance Website utility to this population.

- and identify demographics of aquaculture extension agents and specialists and how these may correlate with individual education and training needs.

With these objectives, a needs assessment of aquaculture agents and specialists in Extension programming will be developed. This information will be provided to the joint USDA-NOAA National Aquaculture Extension Steering Committee in a timely manner. The Committee will evaluate the need for specific follow-up actions for addressing critical findings in addition to gaining an improved understanding of national issues.

This survey should be of significant importance to the national aquaculture extension community, and I encourage you to take time out of your busy schedules to complete the questionnaire in a timely fashion. The results will be made available to anyone who is interested, and will also be presented at the upcoming Aquaculture America meeting next February in Las Vegas.

Thanks for your attention to this request.
Gary Jensen
CSREES-USDA

Appendix C

Letter of Permission to Conduct Study

Virginia Tech

VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

Institutional Review Board

Dr. David M. Moore
IRB (Human Subjects) hair
Assistant Vice President for Research Compliance
CVM Phase II- Duck Pond Dr., Blacksburg, VA 24061-0442
Office: 540/231-4991; FAX: 540/231-6053
email: moored@vt.edu

DATE: April 28, 2005

MEMORANDUM

TO: Michael Schwarz Virginia Seafood AREC 0512

FROM: David Moore

SUBJECT: **IRB Exempt Approval:** "Need Assessment of Aquaculture Extension Agents
            and Specialists on AQUA EXT listserve" IRB # 05-320

I have reviewed your request to the IRB for exemption for the above referenced project. I concur
that the research falls within the exempt status.   Approval is granted effective as of April 27, 2005.

Virginia Tech has an approved Federal Wide Assurance (FWA00000572, exp. 7/20/07) on file with
OHRP, and its IRB Registration Number is IRB00000667.

cc: File

A Land-Grant University - Putting Knowledge to Work
An Equal Opportunity/Affirmative Action Institution

Appendix D

Questionnaire Release

Friday July 29, 2005

***************** AQUA-EXT MAIL GROUP NEWS ******************

Please note the email below from Michael Schwarz requesting your participation and input for his dissertation research that can generate findings and insights to help direct future activities aimed at supporting our national aquaculture extension community. You will find a link to the survey and instructions for inputting your information. I serve on the graduate committee for Michael Schwarz and we are pleased to have the opportunity to gain broad benefits from his work.

We hope you can take a window of time from your busy schedules to contribute to this research.

Regards,
Gary Jensen
CSREES-USDA

_____

Dear Listserv,

   As indicated by Gary Jensen earlier this week, a follow-up to the 2003 joint USDA-NOAA National Extension Questionnaire is being conducted. This new questionnaire builds upon the 2003 survey data by identifying specific needs of aquaculture extension agents and specialists to enhance program performance.   Please follow the URL below (either by clicking on, or using the cut and paste function into your Internet browser) to access the survey.

URL: https://survey.vt.edu/survey/entry.jsp?surveyId=1122487016723

The password to access the survey is: aquaculture   (all lower case).

This is a very important survey for the Aquaculture Extension Community, and results will be provided to the joint USDA-NOAA National Aquaculture Extension Steering Committee to help evaluate the need for specific follow-up actions for addressing critical findings, in addition to gaining an improved understanding of national issues. Furthermore, results will be analyzed as part of my dissertation work at Virginia Tech.

If you have any problems accessing or conducting this survey, or have any questions, please do not hesitate to contact me directly via the following contacts:

Email: mschwarz@vt.edu
Cell phone: 1-757-817-1247
Office phone: 1-757-727-4861

This survey should take about 30-45 minutes to complete, and you must hit the "submit" button at the end of the survey to complete it. Please be sure to complete the survey by no later than the 10th of August. All data collected will be analyzed as pooled data to maintain strictest confidentiality. If you are interested in receiving final results from the survey, please let me know and I will gladly share them with you. In addition, results will be presented in the upcoming Aquaculture Extension Session at the Aquaculture America 2006 meeting next February in Las Vegas.

Thank you very much for providing some of your valuable time in conducting this survey. I am confident each and every one of you will benefit in some way from this follow-up initiative.

Kindest regards,
Michael

VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT

Michael H. Schwarz
Aquaculture Specialist
Virginia Polytechnic Institute
Seafood Research and Extension
102 S. King Street
Hampton, VA 23669 USA
Phone: 1-757-727-4861
Fax: 1-757-727-4871
email: mschwarz@vt.edu

VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT

You are currently subscribed to aqua-ext as: mschwarz@vt.edu
To unsubscribe send a blank email to leave-aqua-ext-20911I@lyris.csrees.usda.gov

Appendix E

First General Reminder to Non-respondents

Friday August5th, 2005

***************** AQUA-EXT MAIL GROUP NEWS ******************

Dear List,

On July 29th, each of you were sent via the list serve a survey which was both a follow up to the 2003 joint USDA-NOAA National Extension Questionnaire, as well has my dissertation work at Virginia Tech. I wish to thank those of you who have already responded to the survey, and urge those of you who have not yet had the opportunity to complete the survey to do so in a timely fashion. This is an important survey on several levels, in addition to helping direct future activities aimed at supporting our national aquaculture extension community. For those who have yet to complete the survey please find again the link and password below.

Please follow the URL below (either by clicking on, or using the cut and paste function into your Internet browser) to access the survey.

URL: https://survey.vt.edu/survey/entry.jsp?surveyId=1122487016723

The password to access the survey is: aquaculture   (all lower case).

Kindest regards,
michael

VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT

Michael H. Schwarz
Aquaculture Specialist
Virginia Polytechnic Institute   ><> ><>
Seafood Research and Extension   ><>   ><> ><> ><> ><>
102 S. King Street   ><> ><> ><> ><> ><> ><>
Hampton, VA 23669 USA   ><>   ><> ><> ><> ><>
Phone: 1-757-727-4861   ><> ><>
Fax: 1-757-727-4871
email: mschwarz@vt.edu

VT Virginia Tech
GO HOKIES!

VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT

You are currently subscribed to aqua-ext as: mschwarz@vt.edu
To unsubscribe send a blank email to leave-aqua-ext-20911I@lyris.csrees.usda.gov

Appendix F

First Personal Follow-up Email to Non-respondents

Tuesday August 16, 2005

Dear Aqua-EXT list serve member,

A few weeks ago you should have received a survey via Gary Jensen which was both a follow-up to the 2003 joint USDA-NOAA National Extension Questionnaire, as well has my dissertation work at Virginia Tech. Results from this survey will also be utilized by the joint USDA-NOAA National Aquaculture Extension Steering Committee to help evaluate the need for specific follow-up actions for addressing critical findings, in addition to gaining an improved understanding of national issues. I urge you to please take time out of your busy schedule to complete this survey. Please follow the URL below (either by clicking on, or using the cut and paste function in your Internet browser) to access the survey.

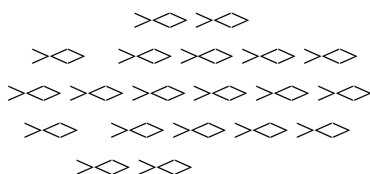URL: https://survey.vt.edu/survey/entry.jsp?surveyId=1122487016723

The password to access the survey is: aquaculture   (all lower case).

Thank you so much for your time and consideration in this matter. If you have any questions please feel free to contact me directly via the below contact information. The results will be made available to anyone who is interested, and will also be presented at the upcoming Extension session Gary Jensen, Chuck Pistis and I are putting together for Aquaculture America next February in Las Vegas.

Kindest regards,
Michael

VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT

Michael H. Schwarz
Aquaculture Specialist
Virginia Polytechnic Institute
Seafood Research and Extension
102 S. King Street
Hampton, VA 23669 USA
Phone: 1-757-727-4861
Cell: 1-757-817-1247
Fax: 1-757-727-4871
email: mschwarz@vt.edu

VT Virginia Tech

GO HOKIES!

VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT

Appendix G

Second Personal Follow-up Email to Non-respondents

Friday August 26, 2005

Dear XXXX,

In the event you did not receive the prior survey notifications from Gary Jensen or Max Mayeaux, or had problems accessing the survey, below please find the survey link and password I mentioned on your voice mail. If you have a moment we would greatly appreciate your input. If for some reason your university server does not connect the link, please copy link and paste into your web browser. Site is interactive, and submission is direct via submit button at the end of the survey.

URL: https://survey.vt.edu/survey/entry.jsp?surveyId=1122487016723

The password to access the survey is: aquaculture   (all lower case).

Thank you so much for your consideration in this matter, your information is very valuable to us.

Kind regards,
Michael

Cell: 1-757-817-1247

VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT

Michael H. Schwarz
Aquaculture Specialist
Virginia Polytechnic Institute
Seafood Research and Extension
102 S. King Street
Hampton, VA 23669 USA
Phone: 1-757-727-4861
Fax: 1-757-727-4871
email: mschwarz@vt.edu

VT **Virginia Tech**

GO HOKIES!

VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT

Appendix H

Third and Final Personal Follow-up Email to Non-respondents

Tuesday September 6, 2005

Dear Aqua-EXT list serve member,

We are closing the National Aqua-EXT survey this Friday evening at midnight, and the database shows your email address as a non-respondent. Several people have taken the survey, but omitted placing an email address in the initial response category. As such these individuals have conducted the survey, but were not be identified by the server as a respondent. If this is the case, thank you for your time in taking the survey and please reply with an email advising such so we can shift your email address over to the respondent category. Others may not yet have had the time to take the survey, been far too busy, or perhaps are still be unaware of the survey. Please let us know of your status either way. We are utilizing this survey as an opportunity to update the Aqua-EXT list serve and have been unable to connect several email addresses with an actual person. We have also received several requests to remove or change email address on the listserv. So please let us hear from you and let us know. Many thanks for your time, and best wishes for a great week.

PS, for convenience, please find the link and password below if you still wish to conduct the survey.
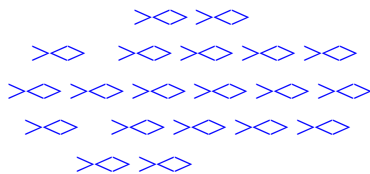
URL: https://survey.vt.edu/survey/entry.jsp?surveyId=1122487016723

The password to access the survey is: aquaculture   (all lower case).

Kind regards,
Michael

Cell: 1-757-817-1247

VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT

Michael H. Schwarz
Aquaculture Specialist
Virginia Polytechnic Institute
Seafood Research and Extension
102 S. King Street
Hampton, VA 23669 USA
Phone: 1-757-727-4861
Fax: 1-757-727-4871
email: mschwarz@vt.edu

VT **Virginia Tech**

GO HOKIES!

VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT VT

Appendix I

Qualitative Responses Concerning the AquaNIC Resource (Tables I-1 – I-14)

Table I-1

Responses to the survey question, "What do you feel would make the 'discussion group' resource on AquaNIC of greater value to you?"

1. A group of credible experts who are willing to take the time to respond to good questions.

2. A way to be able to determine the geographical location of participants in the discussion groups.

3. After participating in one discussion group (shrimpone) I found that I did not have time to continue with this activity when other started (such as the EPA aquaculture effluents task force or the organic aquaculture group. I only have time for one or two discussion groups.

4. Am not sure what these groups do.

5. Based on this survey, I need to look at "AquaNIC" resources more often - their may be very good information I am not taking advantage of, Perhaps programs at USA Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the utility of AquaNIC resources would be appropriate.

6. Clientele who use the web.

7. Content too basic.

8. Discussion of general fisheries questions, issues, research, etc. as well as aquaculture edit old discussion threads and delete entries which are factually inaccurate, speculative or misleading.

Table I-1 (continued)

Responses to the survey question, "What do you feel would make the 'discussion group' resource on AquaNIC of greater value to you?"

9. Enough time in a daily schedule, more specific info/discussion on shellfish-based issues.

10. Extension work calls for triage and I just don't see how a discussion group would be worth the time.

11. Feedback from colleagues as to their value - show me.

12. Give me more time to peruse them!

13. Greater participation by growers/industry.

14. Hard to say, I have not used the discussion group yet.

15. I am not a great fan of discussion groups over the web. It can become extremely time consuming.

16. I don't mean to be disrespectful but I don't have time for internet based discussion groups.

17. I have a shortage of time, so need to obtain information quickly. The discussion group concept needs to have a value that is worthy of spending the time to visit AquaNIC and participate in the discussion group. I use AquaNIC to view available images for use in PowerPoint presentations and to access the list of websites the site links to.

18. I have not tried to use it so I can't comment.

19. I need to learn more about it.

20. If I did more programming in aquaculture.

Table I-1 (continued)

Responses to the survey question, "What do you feel would make the 'discussion group' resource on AquaNIC of greater value to you?"

_____

21. its fine, as is. I just don't have much time for it as my own institution and clients keep me busy.

22. It is being kept up to date and I find it excellent.

23. It is well done, I just have not had much occasion to use it. More training on its capabilities might help though.

24. Knowing it is available.

25. Knowing someone who wants to exchange there, and broadly, about what.

26. More experience using it.

27. More professional input.

28. More traffic. There's little interaction in the groups.

29. Never utilized the discussion groups.

30. Not sure as I've never used this feature.

31. The discussion groups have very little to add in the development of my program.

32. The discussion topics are most often unrelated to the needs I have.

33. There seem to be a few discussion leaders that dominate the discussion and as an occasional user get the impression that my comments and questions are not wanted or appreciated. In other words, it appears to be a 'closed' community.

34. Time.

Table I-1 (continued)

Responses to the survey question, "What do you feel would make the 'discussion group' resource on AquaNIC of greater value to you?"

---

35. While interesting, they are of limited value as they contain no method for separating

opinion vs. fact. Verification/validation/references would be needed to be of greater

value.

Table I-2

Responses to the survey question, "What do you feel would make the 'species' resource on AquaNIC of greater value to you?"

_____

1. A search by key word function.

2. A short description of what it is, emailed to me.

3. Am not sure what is in this resource.

4. An access to a more comprehensive research database on the species.

5. Based on this survey, I need to look at "AquaNIC" resources more often - their may

be very good information I am not taking advantage of, Perhaps programs at USA

Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the

utility of AquaNIC resources would be appropriate

6. Clientele who use the web.

7. Continued evaluation and up to date information.

8. Give me more time to peruse them!

9. I've never used it... It's hard to say...

10. I usually hit the UF IFAS EDIS pubs first, if I can't find it there my 2nd choice is

SRAC. AquaNIC is my fallback.

11. If I did more programming in aquaculture.

12. If they were updated frequently and contained more resources (i.e., complete

listings) in PDF. This really goes for all of the AquaNIC resources.

13. Information to basic.

Table I-2 (continued)

Responses to the survey question, "What do you feel would make the 'species' resource on AquaNIC of greater value to you?"

14. It's fine, as is. I just don't have much time for it as my own institution and clients keep me busy.

15. It is being kept up to date and I find it excellent.

16. It works fine for me.

17. Link to Fishbase.

18. Links to research papers or demonstration project results.

19. More content.

20. More experience.

21. More in-depth and cross-cutting information

22. More information on ornamentals.

23. More relevant and timely species and information.

24. Most of the information is not very detailed/specific. The value is in providing overview information to 'consumers' or practitioners of aquaculture.

25. No. The information is often not appropriate for my location.

26. Searching the web by species often reveals more up to date information than AquaNIC has.

27. Seems fine the way it is.

28. Useful information packaged in a convenient way.

Table I-3

Responses to the survey question, "What do you feel would make the 'systems' resource on AquaNIC of greater value to you?"

_____

1. A search by key word function.

2. A short description of what it is, emailed to me.

3. Based on this survey, I need to look at "AquaNIC" resources more often - their may

be very good information I am not taking advantage of, Perhaps programs at USA

Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the

utility of AquaNIC resources would be appropriate

4. clientele who use the web.

5. Give me more time to peruse them!

6. It's fine, as is. I just don't have much time for it as my own institution and clients keep

me busy.

7. It is being kept up to date and I find it excellent. Clients I have are directed to the

resource.

8. It is fine.

9. More content.

10. More in-depth and cross-cutting information.

11. More in-depth information.

12. More information on recirc and ornamental systems.

13. More relevant and timely information.

14. Need more detailed info and less intro stuff.

Table I-3 (continued)

Responses to the survey question, "What do you feel would make the 'systems' resource on AquaNIC of greater value to you?"

---

15. Not familiar with this.

16. References to original research publications.

17. Spend more time with it.

Table I-4

Responses to the survey question, "What do you feel would make the 'job services' resource on AquaNIC of greater value to you?"

_____

1. Based on this survey, I need to look at "AquaNIC" resources more often - their may be very good information I am not taking advantage of, Perhaps programs at USA Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the utility of AquaNIC resources would be appropriate.

2. Email of new job listings.

3. Give me more time to peruse them!

4. Great service.

5. I have referred others to this site, but have not had the need to use it personally.

6. If I were looking for a job.

7. Incorporate AFS listings and other aquatic job related postings.

8. It's fine, as is.

9. It is being kept up to date and I find it excellent. Job market developments. Options for my students.

10. It is good.

11. It is very useful in its current form.

12. More relevant and timely information.

13. Not looking for job.

14. Nothing.

15. Nothing.

Table I-4 (continued)

Responses to the survey question, "What do you feel would make the 'job services' resource on AquaNIC of greater value to you?"

_____

16.   Use a simple list option as default so you don't do a number of clicks & jump a

number of hoops just to browse through available jobs in the market.

17.   When we have posted jobs on AquaNIC, we tend to get a number of e-mailed

resumes but few if any viable candidates.

_____

Table I-5

Responses to the survey question, "What do you feel would make the 'contacts' resource on AquaNIC of greater value to you?"

_____

1. Based on this survey, I need to look at "AquaNIC" resources more often - their may

be very good information I am not taking advantage of, Perhaps programs at USA

Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the

utility of AquaNIC resources would be appropriate

2. Do not know.

3. Encourage people to add their info...especially at aquaculture and related meetings

and through aquaculture publications.

4. I would like a list of Extension contacts on AquaNIC if it was kept current. Right now

I end up using the Aquatic Ecosystems catalog listings for phone numbers, etc.

5. It is being kept up to date and I find it excellent. Quicker than my own listing site.

6. It is fine.

7. Knowing that a higher percentage of ext. folks were on it.

8. Last time I looked at it, it seemed fine. It's a good resource. I generally "Google",

someone's name first rather than wade through AquaNIC to find someone

9. More contacts.

10. Need other links.

11. Need to learn more about it.

12. Not familiar with this.

13. So far I have not had the need for this, nor the time to explore this resource fully.

Table I-5 (continued)

Responses to the survey question, "What do you feel would make the 'contacts' resource on AquaNIC of greater value to you?"

---

14. Update more frequently.

15. Willingness of people to keep their information up-to-date.

Table I-6

Responses to the survey question, "What do you feel would make the 'sites' resource on AquaNIC of greater value to you?"

---

1. Based on this survey, I need to look at "AquaNIC" resources more often - their may

be very good information I am not taking advantage of, Perhaps programs at USA

Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the

utility of AquaNIC resources would be appropriate

2. Do not know.

3. I find that a web search often provides similar quality and in some instances better

information and links.

4. I have never used it.

5. I like it, just add more links.

6. It is being kept up to date and I find it excellent.

7. More information on aquatic plants. More information on fish processing.

8. More participation from those who maintain sites.

9. Need to learn more about it.

10. Not familiar with this.

11. Not sure what it is!

12. Nothing.

13. Site is excellent!

Table I-7

*Responses to the survey question, "What do you feel would make the 'publications'
resource on AquaNIC of greater value to you?"*

_____

1. A more comprehensive list of available publications from more resource institutions.

2. Again, keeping the site updated.

3. Based on this survey, I need to look at "AquaNIC" resources more often - their may

be very good information I am not taking advantage of, Perhaps programs at USA

Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the

utility of AquaNIC resources would be appropriate

4. Fine as it is. Perhaps break publications up into topics i.e. ornamentals, recirc, ponds.

5. Generally I use abstracting services or other bibliographic search engines instead.

6. Generally, very good.

7. Give me more time to peruse them!

8. It's good, I just don't take much time to cruise around.

9. It is being kept up to date and I find it excellent. Clients request info on a topic and I

send linkage.

10. It is fine.

11. It would be nice to have a searchable database to facilitate topical informational

gathering.

12. More content.

13. More PDF resources.

14. Need to learn more about it.

Table I-7 (continued)

Responses to the survey question, "What do you feel would make the 'publications' resource on AquaNIC of greater value to you?"

---

15. Nothing.

16. Search by key word function.

17. The publications often do not meet my requirements.

18. Wider coverage and participation from those who generate publications.

Table I-8

Responses to the survey question, "What do you feel would make the 'newsletters' resource on AquaNIC of greater value to you?"

---

1. A more comprehensive list of available publications from more resource institutions.

2. Based on this survey, I need to look at "AquaNIC" resources more often - their may be very good information I am not taking advantage of, Perhaps programs at USA Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the utility of AquaNIC resources would be appropriate

3. Better source newsletters. Not a fault of AquaNIC.

4. Have more of them.

5. It is being kept up to date and I find it excellent. Good reading.

6. Need to learn more about it.

7. No changes necessary.

8. Not familiar.

9. Rarely have time to read them. Only use NWAC, UAPB and a few industry sites for recent things. Most scientific materials I get via AFS and WAS journals.

10. Wider coverage and participation from those who generate newsletters.

Table I-9

Responses to the survey question, "What do you feel would make the 'media' resource on AquaNIC of greater value to you?"

---

1. A better database of media.

2. A demo of what it can do for us.

3. Based on this survey, I need to look at "AquaNIC" resources more often - their may be very good information I am not taking advantage of, Perhaps programs at USA Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the utility of AquaNIC resources would be appropriate

4. I am often disappointed with the media available and use other sources.

5. I have never used it.

6. Increased ppt. presentations and videos available.

7. It is being kept up to date and I find it excellent.

8. It would be nice to have a searchable database to facilitate topical informational gathering.

9. More content.

10. Need to learn more about it.

11. Not familiar.

12. Nothing.

13. Wider coverage and participation from those who generate photographs, CBI and slide sets.

Table I-10

Responses to the survey question, "What do you feel would make the 'educators' resource on AquaNIC of greater value to you?"

---

1. Again, do not know what it offers and I have not taken the time to try it out. A general comment - provide an overview of these various AquaNIC features and what they can do to help us do our jobs better.

2. Based on this survey, I need to look at "AquaNIC" resources more often - their may be very good information I am not taking advantage of, Perhaps programs at USA Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the utility of AquaNIC resources would be appropriate

3. Development of a youth aquaculture section.

4. I like the function. I use regional Web sites more often.

5. More content.

6. More depth and participation.

7. Need to learn more about it.

8. No comment.

9. Not familiar.

10. Rarely need the info.

Table I-11

Responses to the survey question, "What do you feel would make the 'news' resource on AquaNIC of greater value to you?"

_____

1. A description of what it is, and email alerts to new postings.

2. Based on this survey, I need to look at "AquaNIC" resources more often - their may

be very good information I am not taking advantage of, Perhaps programs at USA

Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the

utility of AquaNIC resources would be appropriate

3. I obtain news from a number of other sources that include.

4. If it is updated regularly.

5. It is being kept up to date and I find it excellent.

6. More depth and partnerships with others who release news.

7. More links and access to more material.

8. Need to learn more about it.

9. Needs to widen its network of contributors. Many people do not realize they can

submit items for this section.

10. Not sure. Have several list serves and organizations that provide me news pertinent

to my position and extension role.

11. Nothing.

12. Send direct.

13. Usually glance at it to see if I'm missing anything.

_____

Table I-12

Responses to the survey question, "What do you feel would make the 'calendars' resource on AquaNIC of greater value to you?"

_____

1. A good reference to use when "double checking" an event.

2. Based on this survey, I need to look at "AquaNIC" resources more often - their may be very good information I am not taking advantage of, Perhaps programs at USA Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the utility of AquaNIC resources would be appropriate

3. Have something up to date, list something, conferences, etc.

4. I have never utilized this site. It could be useful in planning conferences, however, all I am involved in are planned 2 - 5 years in advance.

5. It is a matter of habit. I do not use AquaNIC as my primary gateway.

6. It is fine.

7. More depth and partnerships with others who sponsor events.

8. My professional contacts within the National Shellfisheries Association, Pacific Aquaculture Caucus, World Aquaculture Association, and National Sea Grant provide much of what I need to calendar information.

9. Need to learn more about it.

10. Not familiar.

_____

Table I-13

Responses to the survey question, "What do you feel would make the 'classified ads' resource on AquaNIC of greater value to you?"

---

1. Based on this survey, I need to look at "AquaNIC" resources more often - their may be very good information I am not taking advantage of, Perhaps programs at USA Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the utility of AquaNIC resources would be appropriate

2. Be able to break it out into categories, i.e. "wanted", "for sale", etc.

3. By using categories for items listed.

4. I have accessed the classifieds only a couple of times in the past years, but nothing of interest surfaces.

5. More depth and participation.

6. Need to learn more about it.

7. No comment.

8. No interest.

9. Not familiar.

10. Not in the market.

11. Nothing.

12. Sometimes glance at this page to see what's going on.

13. The utility of this site is limited to me due to purchasing requirements/limitations of my institution. The site is not the limitation.

Table I-14

*Responses to the survey question, "What do you feel would make the 'online courses'
resource on AquaNIC of greater value to you?"*

_____

1. Add more.

2. Based on this survey, I need to look at "AquaNIC" resources more often - their may

be very good information I am not taking advantage of, Perhaps programs at USA

Aquaculture Meetings or reminders from Gary Jensen's list serve mail educating us to the

utility of AquaNIC resources would be appropriate

3. Don't have time now to use them.

4. Don't know....have not had the need or opportunity to use this site.

5. For courses developed and then listed.

6. I didn't even know there were online courses on the AquaNIC Web site.

7. I do not receive many request for information about on-line courses. If the demand

was greater, I would use it.

8. It seems to be fine.

9. It should go beyond the basics and be linked to "attractive" or useful

courses/programs. This section has a great potential for on-line learning but it should be

developed, run and managed as such by a dedicated group of people.

10. My current responsibilities are so overwhelming, that time for on-line courses would

be a luxury.

11. Need to learn more about it.

Table I-14 (continued)

Responses to the survey question, "What do you feel would make the 'online courses' resource on AquaNIC of greater value to you?"

12. Not familiar with these-- if extension related courses, or courses in my area were advertised more, might have a better idea and use this resource.

13. Not in the market.

VITA

Michael H. Schwarz was born on September 27, 1965, in Montreal, Canada. In 1976 he immigrated with his family to the United States, living first in various locations in New Jersey and subsequently moving to Florida, where he graduated from satellite High School in 1983. In 1985 he received his Associate of Arts from Brevard Community College. In 1989 he received his Bachelor of Science from Texas A&M University, and in 1991 his Masters degree.

From 1991 to 1997 he helped build and operate Harvest Fresh Seafoods, Inc., a multi-million-dollar marine aquaculture production facility in Bacliff, Texas. In 1997 he started Quantum Tides, Inc., an international aquaculture consulting firm, of which he is still CEO. In 1997 he also accepted a position as aquaculture specialist at Virginia Tech's Virginia Seafood Agricultural Research and Extension Center (VSAREC).

On January 28, 1999, Michael's first child, Mason Dalton Schwarz, came into the world. Michael was blessed with his second child, Piper Delaney Schwarz, on February 22, 2001. These two children are the center of Michael's universe and his pride and joy. In the fall of 2001, while employed at the VSAREC, Michael began his doctorate studies at Virginia Tech in Career and Technical Education He completed his doctorate in the fall of 2005.

_____

Michael Hans Schwarz