

PROGRAM REVIEW

Department of Fisheries and Allied Aquacultures
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TABLE OF CONTENTS

Introduction.....	3
Organization, Administration and Planning	5
Faculty	11
Program Support.....	14
Research Programs and Scholarship.....	19
Academic Programs and Teaching	
Undergraduate	22
Graduate.....	26
Extension Programs.....	30
International Programs.....	35
Administration and Department Questions and Issues.	39
Program Review Itinerary.....	50

INTRODUCTION

A comprehensive review of the teaching, research, and extension programs of the Department of Fisheries and Allied Aquacultures (FAA) was conducted at Auburn University (AU) at the request of the Acting Dean of the College of Agriculture (CA) and Director of the Agricultural Experiment Station (AES). The last USDA Cooperative State Research, Education and Extension Service (CSREES) review was conducted in 1986. The current review focused on programs on and nearby the Auburn campus, although significant research and extension programs are conducted at other locations in the state. The external review directed by the CSREES complements FAA's strategic planning process currently underway. The external review team consisted of four members from land-grant universities with diverse backgrounds in the aquatic sciences aligned with the major programs under evaluation, and a team leader from CSREES.

The overall goals and objectives of this review were discussed with the Provost and Vice President for Research of Auburn University Central Administration; the Dean of the College of Agriculture and Director of the Alabama Agricultural Experiment Station (AES); and the Director, Associate Director and Assistant Director of the Alabama Cooperative Extension System (ACES). Insights and topics of special interest were also discussed.

The team used pre-review documents provided by FAA and the onsite formal presentations by the major disciplinary groups; interactions with faculty, staff, graduate and undergraduate students, and diverse stakeholder representatives to formulate significant findings and recommendations. The team also visited the main campus building and various facilities located at the North Campus Fisheries Research Station. The team encouraged open dialogue with all groups and appreciated candid responses. Oral exit reports were provided to the Administration of the CA, AES, and ACES and to the Department Head, faculty and staff in FAA who attended the debriefing session.

The team is sincerely grateful to the Department Head and his associates for preparing the pre-review materials and to the FAA faculty, staff and students who kindly attended meeting sessions to offer valuable information and perspectives to support our work. With limited on-site time and with many issues raised, the team attempted to address those issues considered most critical in support of the performance, relevancy and quality of the Department as it addresses challenging issues and charts a course for its future direction.

Situation

Alabama has abundant and diverse aquatic resources. There are natural and constructed inland water bodies, coastal waters spanning estuarine and oceanic areas, and 77,000 miles of rivers and streams. FAA programs serve all users of these aquatic resources. Alabama has the highest aquatic biodiversity of any state and the highest number of endangered aquatic species. The Mobile River basin yields more water per unit drainage area than any other river in the US.

Alabama supplies the US with diverse seafood products and is the second leading producer of farmed catfish in the US; 25 aquatic species are raised commercially. Recreation activities associated with the aquatic resources also contribute substantial revenue. With projected population growth in future years, more pressures on both public and private aquatic systems with challenging policy options are anticipated. This scenario offers new challenges and opportunities for FAA centered on sustainable uses of aquatic resources and systems for both industry development and recreation opportunities. Sustainable use of aquatic resources is a critical issue not only for Alabama citizens and policy-makers but also for the US and the world.

There are significant economic opportunities linked to knowledge-based management of aquatic resources. Therefore, there is a great need to develop and train the next generation of educators, scientists, policy-makers and biologists in the diverse scientific disciplines related to aquatic systems. Yet, Alabama has only one undergraduate fisheries program and only a limited number of US universities offer graduate training with a concentration in aquaculture. Additionally, few institutions in the southeastern region offer programs oriented to adaptive fisheries management.

Broad citizen benefits have been realized through integrated research-extension-clientele programs which are a hallmark of FAA, and leadership in cutting-edge research in some niche scientific fields. FAA also has the largest array of facilities for research, education, extension, and outreach programs of any university department in the US providing the essential infrastructure and human capacity to accomplish the department's mission. This capacity reinforces the significant benefits that FAA provides the state, region, nation, and the world.

FAA has and continues to serve Alabama well through many partnerships; the diverse constituency views FAA as being essential and vital for businesses, state agencies, and communities. FAA seeks to build its future on a strong heritage of pioneering work. Few departments have the diverse expertise to address the complexity of issues related to aquatic systems. FAA's mission statement is, "to provide comprehensive programs of instruction, research, and outreach in areas related to living aquatic resources." In 2000, FAA excellence was recognized by AU as one of seven "Peaks of Excellence" for its reputation and potential capabilities for future advancements in management of diverse fisheries and water resources of national and global impact. FAA is also one of the top ranked AU departments in the amount of extramural grant funds obtained.

The Department is experiencing a gradual turnover in faculty and also facing critical decisions regarding the direction of undergraduate student programs, expanding discipline areas, the role of international programs, maintenance of an expansive research facility enterprise, and associated budgetary pressures. The review team believes the recent designation of a permanent Head of FAA is essential for stability, direction and leadership. The Acting Dean has charged the Department Head to develop a strategic plan for FAA and this review is quite timely to assist in serving as a roadmap to strategically guide research, education and extension programs into future years.

Preparation for Review

The administration and faculty did an excellent job of developing pre-review and self-study documentation. The materials included comprehensive information about the state of Alabama and Auburn University; description of the department with information on faculty and staff; statistics on undergraduate and graduate students, course listings, and curricula models; current programmatic activities, including accomplishments and impacts, and publications since 2001 for the major research program areas; description of extension and outreach programs; information and issues associated with international activities; physical facilities, major equipment; and operating budgets including financial resources. Other important documents included were the Department's component within the Auburn University Comprehensive University Planning Document (2001-2006), information on graduate programs, and a 2004 department annual report.

The following sections of this report contain analyses of findings and recommendations. In an ideal setting, the team prefers to have each of these recommendations pursued and accomplished. However, the team is aware that Auburn University, similar to many other institutions of higher education, has numerous fiscal constraints and challenges. Therefore, faculty and the administrators should view these recommendations in the context of available funds and resources.

Review Goals and Objectives

The goals and specific objectives for this review were provided in the pre-review documentation. The overall goal, however, was to assist AU/FAA in enhancing the quality, relevancy, and performance of FAA. The review team focused on the department's plans and readiness to meet future challenges. In addition, the Department and the AU Administration identified specific questions for the team to address. The FAA questions about specific issues are addressed in the different departmental sections of this report, while responses to the administration's questions about specific issues are included in a separate section. Lastly, the team responded to several specific questions that were posed during the on-site review by the AU Administration.

ORGANIZATION, ADMINISTRATION AND PLANNING

Findings

After several years of acting administrators, the FAA now has a permanently appointed Department Head to provide stability for long-range planning and opportunities for renewed vision and leadership. The Dean of CA is still in an acting appointment. The high turnover rate and interim or acting appointments in upper administration have created an environment of ambivalence, lack of direction, and instability concerning long-term strategic decisions. Lack of continuity in leadership at AU creates faculty concerns about their future direction and opportunities. This led to a "we/they" situation in the department and the administration rather

than the preferred “we are the team” situation. The Central Administration is now focusing on permanent appointments of College Deans; subsequent decisions will focus on academic programs.

FAA is one of eight departments in the College of Agriculture and is loosely organized into core disciplinary groups: Aquaculture; Aquatic Resources Management; Fish Ecology and Management; Fish Health; and Genetics. There is also an Extension group with faculty and staff located both on-campus and off-campus at several sites and an International group with faculty active in various international projects. Faculty often works across more than one group demonstrating a multidisciplinary approach to solving problems.

FAA has 11 committees established to oversee a variety of tasks related to routine department functions in addition to 6 specialty committees. There were no comments regarding the effectiveness or concerns of these specific committees, but there is a general sense that communication is limited among committees and the committees may not be the best use of faculty time. More importantly, the lack of dialogue among committees raised questions regarding the role of FAA faculty in departmental governance. Faculty involvement and commitment to governance were not consistent and have obviously varied based on the management styles of the relatively few Department Heads during the history of FAA. There were no significant issues raised by faculty on this topic, but faculty kept discussing communication challenges, which indirectly suggested a governance issue.

The extension programs associated with FAA are varied in that some off-campus area extension specialists have reporting and supervisory lines to the Alabama Cooperative Extension System yet have FAA as their academic home. Specific faculty with partial extension appointments are under the supervision of the FAA Department Head. This dual system can be awkward, but presents no critical problems because extension planning and programming for this specific group are coordinated through the Aquaculture and Recreational Pond Management Team.

There are more than 70 faculty, administrative professionals, affiliate professors, professional staff, and area extension specialists. The diversity of FAA and the scattered location of programs around the state create administrative challenges for internal communications, departmental governance, and planning exercises. The Department has significant off-campus facilities under its administration and has the additional responsibility of contributing to the funding of positions within the Mississippi-Alabama Sea Grant Consortium. A unique aspect in FAA organization is the multitude of its affiliated programs that range from federal agencies, the US Geological Survey and USDA Agricultural Research Service, to southeastern regional programs in fish disease and genetics. These significant partners support FAA mission areas and also benefit directly from FAA faculty expertise. When managed effectively, the combination of infrastructure, affiliations and personnel represents a tremendous departmental capability that has the potential to resolve critical issues in a timely manner.

The current Department Head has a long history as a faculty member in FAA. He is highly enthusiastic, committed to the AU/FAA land-grant mission, and dedicated to faculty governance. He has a receptive open-door policy. However, he is transitioning into a full-time administrator since his recent permanent appointment, and is relinquishing his past research, student advisement, and teaching roles. This transition is essential given the breadth of oversight responsibilities as Head of this large, complex Department. He will require administrative and faculty support to ensure the development of strong departmental leadership.

The Department Head has good access to the Dean's office, yet any interaction with the AU Central Administration appears rare. The Head is currently the Director of FAA's international program. FAA is the most active department relative to international work within AU. However, the added responsibility is unduly demanding, especially during a critical period of strategic planning for the department and overseeing a multitude of complex administrative matters.

FAA undertook a facilitated long-range planning/self-assessment exercise in April 2006. This exercise included the majority of the faculty addressing 'where should FAA be in 25 years.' This preliminary initiative allowed faculty to identify emerging and future issues, determine future faculty needs, and identify new opportunities over the next 20-25 years. Unfortunately, faculty recorded input was limited (7 faculty) but the dialogue and objectives were critical building steps. The team believes that total faculty participation and support are critical if this process is to be successful. The faculty must focus and thereby realize that the process is more than "discussion" sessions. Here the Department Head and the Administration can assist by implementing some "fixes" to show the faculty that the Administration is committed to the future betterment of FAA.

The team believes FAA needs to understand why no Peak funds (\$17.5 million) were allocated to the Department to advance leading-edge capabilities to a higher level and raise AU's competitive reputation throughout the world. The team believes that FAA can contribute to AU's goals, but FAA needs to present a clear, consistent, and united message to the AU Administration. This understanding should be factored into the future direction of the Department, particularly in light of AU's decision that FAA use extramural funds for the proposed Aquatic Resources Management Program activities rather than Peak funds.

There is an internal challenge and active endeavor to function as a united department defined by broader aquatic systems and sciences, rather than disparate disciplinary groups. Many students and staff are unfamiliar with colleagues who work outside their area of expertise. The large size of the Department presents a challenge to foster a sense of department-wide community and awareness of diverse activities, especially among students. This situation is also exacerbated by the limitations of faculty, staff, and students to meet collectively due to parking constraints and space limitations for large gatherings in Swingle Hall. The team believes that considerable progress has been made and will continue with the development of a common vision and recruitment of new faculty.

The anticipated decision by the President and Board of Trustees to create a new Institute structure raises some uncertainty about how this reorganization might impact FAA. However, this new restructuring may offer new opportunities and incentives to work across colleges and create new partnerships to effectively leverage limited resources. This is a critical reorganization period for AU and FAA should align its strategic planning within the broad framework of the strategic plan of the new organizational structure.

Stakeholders strongly recognize FAA as being essential and vital, both now and in the future, for sound management of Alabama's aquatic resources. The full range of expertise and disciplinary knowledge in FAA is not well understood by many who still categorically relate FAA to the legacy of international development and emphasis in aquaculture-related programs. Despite other programs being recognized nationally and internationally, they remain less understood by the AU upper administration, alumni, and the citizens of Alabama. This lack of understanding may also reflect the long-standing status of non-traditional agriculture for FAA within the College. FAA has been invigorated with new faculty with more diverse backgrounds and experiences, offering opportunities for new interdisciplinary approaches to address complex aquatics-related issues. While critical issues such as departmental facilities, economic resources, and faculty retirements exist, none are insurmountable.

Opportunities

The FAA needs to continue to build upon its historic and renowned traditions to develop future programs that fulfill the land-grant mission in Alabama. AU Central Administration recognizes the past legacy of excellence but is less familiar with the current expansion and outstanding reputation of FAA's contemporary diverse programs. Opportunity exists to redefine and clarify a strategic vision for future departmental goals and niches of excellence. There are numerous examples of the need and value of inter-department discipline leveraging in which FAA can take a stronger lead role in the aquatics disciplines. The recognition of the important contributions by FAA of both constituency-based adaptive research and fundamental discovery knowledge is essential.

Today, FAA is defined by multiple program areas each with unique inherent strengths that provide essential contributions to diverse constituents in the state. FAA is in a position to become more proactive in charting its future course and using investment return-based analyses to document its productive use of state funds. This requires strong leadership and vision to guide the Department towards a common vision, mission and an action plan that addresses critical state challenges in aquatic resources management. The Department is uniquely positioned through its programs to benefit agriculture (aquaculture) clientele in rural areas, urban populations, and the broader citizenry through management improvements of public lakes, reservoirs, rivers, streams, and marine coastal and oceanic waters. These broad clientele impacts can elevate awareness of AU's contributions to the State and provide excellent examples for achieving an increase in citizen appreciation of the value of this public investment.

The charge by the Dean to each department to develop a strategic/action plan creates a new opportunity to unify the department and for FAA faculty and staff to take command of this task. The planning needs to demonstrate how the implementation of the plan will benefit FAA as well as its pursuit of world-class standing in the aquatic sciences. The process requires a department-wide, collegial effort to resolve numerous critical issues referenced in this report and expressed by faculty. It also requires the direct involvement of the Administration. Communication is essential. Also, without resolution of critical issues, faculty and Administration frustration can result in opportunities being missed. Many issues raised in this review can best be addressed through the strategic/action planning process that engages faculty, staff, students, and the Administration to chart a visionary course for the 21st century. The process should also rally input from key stakeholders and alumni. The plan can be action-oriented with implementation components and benchmarks to monitor and report progress. Development of a FAA-driven strategic/action plan can also minimize potentially unfavorable impacts caused by changes in the upper administration and position FAA to support Administration initiatives.

Many staff and students have few opportunities to interact outside of their work or discipline. Opportunities to improve intradepartmental communications, and staff and student total knowledge of FAA activities should be pursued. FAA faculty and staff are very busy. Therefore, many strategies of communicating need to be explored so that “walls” among groups can be dismantled.

The selection of a permanent Head provides the foundation for stability in leadership and representation within the College of Agriculture. Interaction of the Head with the diverse constituencies is also a critical role. Greater cohesion in FAA via improved communication and transparency in operational protocol and decision-making are critical at this juncture in the Department’s future development. This communication and transparency need to operate via both a top-down and bottom-up process. The Head can benefit from more faculty assistance, especially from faculty who seek some leadership development experience.

FAA leadership needs to unite faculty under a common understanding of critical needs to advance strategic long-range goals. The FAA Head needs to lead the charge forward. FAA needs to conduct an intense internal review to define this future direction and culture. All parts of the Department should be identified and discussed with pros and cons listed to chart their future.

If an Institute of Natural Resources is created by AU to include Agriculture, Forestry and Wildlife, with the stated objectives to strengthen academic linkages across colleges, FAA is well positioned to take advantage of new opportunities within this system. FAA is a recognized leader in aquatic sciences with excellent teaching, research and extension programs supported by freshwater and marine coastal facilities. With AU upper administration support for more inter-departmental collaboration and boundary spanning across colleges, integrated initiatives could create new partnerships to further strengthen FAA programs. The Board of Trustees may also articulate new priorities and areas of emphasis to help guide FAA in the strategic planning process.

In the long term, FAA will likely be evaluated based upon a well-defined sense of mission, financial ratio analysis or its return on state investment, behavior and operation in markets of opportunity or entrepreneurship, and a high level of quality and excellence that can be clearly recognized and demonstrated. FAA can take the lead, with excellent examples, in using analytical methods to determine financial ratios for investments in their programs as a standard of performance. Meeting these challenges successfully and excelling will likely impact the future direction of FAA.

Suggestions

- That the Department Head consider a routinely distributed electronic newsletter, perhaps quarterly, to strengthen internal FAA communications, improve AU public relations, and highlight work and accomplishments of faculty, students and staff. It could also be distributed to alumni to energize its global network.
- Early- and mid-career faculty can especially benefit from annual evaluations by the Department Head to monitor progress in achieving career and FAA goals.
- College of Agriculture is encouraged to support leadership development training to assist the FAA Head in his newly acquired duties and provide assistance via an open door policy to help address critical issues in a timely manner. Mentoring in strategic planning will be timely and critical as well.

Recommendations

1. FAA can strongly benefit by developing a long range strategic/action plan that is dynamic and visionary in concert with strategic investments and resource allocations to support world class programs in research, instruction and extension. This plan should define the vision and direction for FAA in the 21st century. Ultimately, decisions collectively rest with the FAA Head and faculty to identify this vision and develop and implement strategies. These strategies should focus on niches of excellence on cutting edge issues that although limited by resources, target priorities for long-term success and preeminence. This process may result in a name change for FAA as well. The plan should be oriented as a business plan based upon both direct and indirect value to constituents and returns on investments.

2. FAA Head, with the final decision-making role, should solicit faculty assistance in some decision roles. This will provide for the development of future leadership and will distribute the heavy departmental work load. The FAA Head is also encouraged to establish a “Consultative Committee” with representatives elected by each of the discipline groups. We believe this committee will promote communication among the discipline groups and support unification of the department. Over time, the Consultative Committee will also encourage a departure from the disciplinary-centric paradigm currently embedded in Department functioning while still maintaining the benefits and strengths of the strong discipline-oriented groups in FAA.

FACULTY

Findings

The FAA has major disciplinary cores or sub-discipline groups that are redefining the Department's programs. The department faculty has made progress to become more integrated and harmonized, yet more effort is needed to integrate aquaculture, fisheries and aquatic resources management into a collective, interdisciplinary faculty. FAA has an outstanding, highly productive faculty with creative scientific and intellectual leadership in numerous knowledge areas. FAA ranks high both among all departments at AU and within the fisheries discipline. The performance, quality and relevancy of faculty and programs are excellent and duly acknowledged as a Peak of Excellence Program through a competitive AU-wide initiative.

Relative to the scope of programs and responsibilities, the faculty community provides a balanced portfolio of expertise dedicated to teaching, research and extension. In 2004, FAA reported employing 23 faculty members with the following assigned appointments; 7.72 FTEs for teaching, 12.5 FTEs for research, and 2.78 FTEs for extension appointments. With few exceptions, most faculty members have dual appointments. There are rare cases of three-way appointments that create heavy, often unrealistic, demands in balancing work loads across the three critical functional areas. Three faculty members have 100% appointments; two in research and one in teaching.

With nine vacancies in the past 10 years filled, FAA has fared well to maintain critical numbers by approved searches and by creating partnerships with USGS and Sea Grant. About one-half of faculty members have 9-month appointments now required for all new hires. Two tracks for positions based upon sources of funding, hard or soft, are creating a new model and operating framework. In addition to FAA faculty, the Department has eight affiliate professors, many associated with the USDA Agricultural Research Service Aquatic Animal Health Laboratory and who support critical FAA research.

FAA faculty expressed a high level of job satisfaction and is very entrepreneurial, resulting in a low turnover rate. In fact, numerous retired faculty members remain in the area and continue to lend valuable assistance to FAA programs. The faculty is very enthusiastic and dedicated with much freedom with respect to the methods of acquiring funding. Historically, the faculty has always been highly competitive and successful in acquiring support monies for research, teaching and extension programs. The faculty is also very scholarly and most are nationally and internationally recognized for their expertise and experience in their knowledge areas. A "we are on our own" attitude whatever the circumstance(s) has bred an entrepreneurial approach that has contributed to the various cost centers, including operation of facilities and provision of graduate student stipends.

During the next five years, the faculty will be confronted with possibly seven retirements, most of whom received their terminal degree from AU. Accordingly, individuals responsible for the early foundation of the Department, its development, and ultimate achievement of preeminent status will be gradually replaced by another generation of scholars. This transition has already begun with the hiring of four new faculty members with terminal degrees from different and diverse institutions during the last four years. Over a period of 10 years (2002-2011), it is conceivable that 11 (50 %) of the total faculty in the Department will be replaced.

Categorization of the different disciplinary groups apparently evolved for organizational purposes, but also appears to have unintentionally evolved into a separation that has actually reduced communication and collaboration among the different disciplines. Part of this current situation can be simply attributed to the time demands needed to address individual and collaborative research, teaching, extension, and outreach activities. Infrequent communication may even occur at times among faculty within particular disciplines.

We occasionally noted some perceptions that FAA faculty should conduct more interdisciplinary research. Further discussions with faculty indicated that a substantial amount of such interactions has and does occur within the College of Agriculture and other schools and colleges within the university system. The faculty does not understand a contrary perception by some. Some of this perception is a failure to communicate, but the isolation of the disciplinary groups within FAA from each other and its impact on students may be the major reason some believe a “silo” mentality exists at FAA. Students and staff within different groups have limited interactions and often do not know what others are doing. Certainly, the large size of FAA’s graduate program can be offered as an explanation, but the eradication of a “silo” mentality amongst many graduate students should be pursued with more faculty leadership and attention.

Faculty rarely uses sabbaticals. The lack of such requests may be based upon course load, research commitments, and the extent of international activities. The type and extent of mentoring available to various junior faculty members has been erratic to achieve a goal of providing insight into the performance measures necessary for successful achievement of promotion and tenure.

Opportunities

The next five years provides an enviable situation through strategic planning to timely and effectively address new challenges and opportunities based upon the changing landscapes in fisheries and aquaculture. Selection of new faculty will be an important and critical process to ensure that FAA remains strong, or even stronger, to address the challenges for the citizens of Alabama and the global society for the next 25-30 years. Vacant or new positions can be linked to achieving long-term FAA strategic goals via another career generation. However, FAA must realize that it cannot be everything to everyone and needs to identify niche strengths of excellence and obtain the required support.

Faculty should seek opportunities to integrate their expertise and contributions to assist the diverse extension programs and other services associated with FAA. A significant strength of successful extension programs is support and responsiveness by multidisciplinary research faculty that takes full advantage of the expertise across a department, college or university.

The off-campus extension programs provide great opportunities for student experiential learning and sites for adaptive research and field-method result demonstrations.

The sabbatical system can provide both invigoration and the opportunity for faculty to gain new skills, insights, and experiences and thereby enhance their research horizons and background for their teaching and extension responsibilities. If faculty cannot leave AU, FAA should seek scholars who may desire to come to AU for their sabbaticals. The Administration should support such an approach.

Suggestions

- Faculty may wish to pursue more team-teaching; teaching credit hours could be shared.
- Any critical inter-departmental needs, such as economics, should be located in the department that is most appropriate for meeting the requirements for tenure and promotion.
- A mentoring program should be implemented to assist junior faculty in successfully achieving promotion and tenure. Senior faculty should begin mentoring efforts the first year that a new faculty member arrives on campus. Specific assignments should be made to ensure adequate mentoring is accomplished.
- Strong communication channels must be cultured and maintained among faculty within the Department. Where necessary, strong ties with faculty in other Departments on campus must be promoted and advertised as it relates to conducting effective interdisciplinary research that can overcome deficiencies of expertise within the Department and contribute to comprehensive, high-quality research.
- FAA offers three graduate degree options and faculty should emphasize the importance of each to foster respect among students regardless of their program of choice.
- Compile a synopsis of interdisciplinary projects to determine and document whether the current level of interdisciplinary work is indeed sufficient, or whether further interactions might be desirable. The results of this effort must somehow be effectively communicated to the upper administration, which should be considered an essential task.

Recommendations

1. FAA faculty should design a plan to accommodate sabbatical leave that can be integrated among faculty members. FAA Head should coordinate the plan with the College Dean. If faculty cannot take a sabbatical, develop a plan to recruit other faculty to take their sabbatical at AU.

2. 'Senior' graduate students, especially those nearing the end of their programs, might be used to teach courses for faculty who are on sabbatical or involved in other important endeavors. The students expressed a very high level of interest in such teaching opportunities and faculty could directly mentor student teaching. FAA should ensure that a set of teaching evaluations be conducted for each teaching student.
3. Faculty and FAA Head, in consultation with CA, should immediately develop a strategic/action plan to replace retiring faculty. The plan should be directed toward enhancing and balancing the research, teaching, and extension efforts of the Department. The Plan should fulfill the Department's mission and vision within the context of the College, land-grant status, and pursuit of excellence.
4. The type of new faculty to fill the positions vacated by retirement must be expeditiously defined and agreed upon by the faculty, particularly in context with the needs of clientele and stakeholders. The filling of faculty positions should also be conducted with the intent of meeting any deficiencies that are identified through strategic planning activities and that capitalize on the strengths of other faculty in the Department, and other research scientists on the Auburn campus.

PROGRAM SUPPORT

Findings

The scale and diversity of research units, and plans for a new \$6 million controlled environment wet laboratory and modernization facelift funded through a federal grant at the North Auburn Fisheries Research Station sets FAA apart from all others in the US, and the world. This station complex is located about 6 kilometers from the main campus. The South Auburn Fisheries Research Station has ponds and a teaching laboratory but is located 16 km from campus. However, the ageing of many facilities and corresponding need for maintenance and repairs may concede the usefulness of some units for experimental research. This situation will eventually result in a severe crisis to FAA and the university. AU has provided substantial funding for programmatic support for on- and off-campus facilities, but critical needs exist because of the diminishing condition of aging facilities and increasing O&M costs. AU provides some O&M funding as well as emergency responses to safety problems, but FAA still covers significant costs for repairs, maintenance, and power. The North campus facility is considered by the grants and contracts office to be on-campus for indirect cost charges but off-campus by AU and ineligible for full O&M support, unlike off-campus Agricultural Experiment Stations. This reasoning may be symptomatic of the long-held view that FAA is non-traditional agriculture in addition to its record of high self-reliance.

Two station managers and six crewmen are often overwhelmed with the multitude of maintenance and repair responsibilities for the facilities, heavy equipment needs, and other logistics associated with the management of a large 1,600 acre station. Some revenue to partially offset costs of operation is generated from fish sales and harvests of pine trees.

Unlike many departments, FAA has a history of self-support that is evidenced by absorbing the considerable expenses associated with major heavy equipment to build and maintain earthen levees. Breakdown of critical major equipment jeopardizes use of the facilities. The consolidation of heavy equipment and mechanical shops for common use as more AES programs (Poultry facility) relocate to the North AU campus should create cost-share opportunities and increased cost efficiencies. With expansion of facilities and equipment combined with more urbanization in the surrounding community, security measures will require more attention by AU.

FAA has significant investments in specialized research infrastructure that has proven to be critical to address highly relevant needs of FAA's diverse constituency groups. These research units are costly to develop and maintain so that the high-quality research programs that have created FAA's highly distinguished national and international reputation can be sustained. However, these same facilities also support excellent teaching and extension programs of FAA. Campus facilities are scattered around the Auburn area and often impede research program development efforts of FAA faculty and campus-wide interdisciplinary opportunities.

FAA has other significant off-campus facilities; Alabama Fish Farming Center in Greensboro, Shellfish Laboratory on Dauphin Island, and the Marine Extension and Research Center in Mobile. Faculty, students and staff are also involved in research activities at the Claude Petet Mariculture Center in Gulf Shores. Key stakeholder support for FAA is evident through their contributions that assisted in the acquisition of the facilities in Greensboro and Dauphin Island. These actions indicate the critical role and relevancy of FAA work to its state constituents. Also, the Aquaculture Genomics Laboratory was established on the North Campus through a private donation with AU agreements to cover O&M costs and provide support staff. However, this support has not been forthcoming by AU for this highly productive program.

In summary, FAA has the largest operation at AU and consists of both on- and off-campus facilities. The 50 buildings, 70 miles of road, 344 ponds, 250 water acres, and 1,700 acres of land likely make it one of the largest university aquaculture and fisheries programs of this type in the world. These expansive resources are the foundation for this world-class Department.

AU/FAA support for permanent research associate or technician positions that can serve a vital role in increasing productivity of faculty is limited. These positions are especially critical for research requiring the operation of sophisticated laboratory equipment and use of special analytical tools to build strong programs. They also train students and contribute to the success of extramural funding. Some research associates are hired on soft funds but turnover rate is high for soft-funded positions. Investments in staff training and skill development are quickly lost.

More assistance may come from limited-term RAs with grant funds or with soft-funded RAs matched 1:1 with hard monies. The extension program responds to many requests for information and with loss of support staff, a laboratory technician volunteered to help. This may not be the best use of resources as a stopgap measure.

There is a critical need for more graduate teaching assistantships (GTAs). Each year, FAA funds two GTAs that are allocated based upon the most critical needs. Partial GTAs can also be hired. Many peer institutions or smaller universities generally provide funds for graduate teaching assistantships. A productive program that generates extramural dollars to fund a limited number of GTAs still needs support similar to that received by other AU departments.

Some specialized research requires state-of-the-art equipment to keep pace with data processing and analyses. The periodic replacement of outdated equipment is sometimes partially supported by AU but more often requires funds from extramural grants. The multiple use or cost sharing of high-cost specialized equipment across departments or colleges may help but time and logistical efficiency are relinquished. Interest in research on new drugs for aquatic species in collaboration with pharmaceutical companies is strong but FAA lacks the facilities to conduct Good Laboratory Practice (GLP) studies.

A large amount of FAA research requires boats to conduct studies on Alabama's public waters. Boats are costly investments, yet essential for many of the research programs supporting state agencies and constituents. There is concern about replacing these costly items and no system to facilitate purchases appears to be in operation.

Faculty indicated that key disciplines are currently not represented by on-campus AU faculty. Availability of expertise in these disciplines will be required in the future to enhance their research programs and the level of inter-disciplinary research, especially expertise in molecular biology, genomics, and statistics.

Computer technology support, including PC, Internet, Web-based conferencing, Web Page servers, digital publications, and associated technological applications was identified as essential to the missions of teaching, research and extension. At the Department's request, the College funded a 1.0 FTE departmental computer support position to enhance faculty programs through application of these technologies. Progress in advancing the Department's objectives through the application of these technologies has been severely impeded. Many IT projects are incomplete and pending because of unduly work demands and unscheduled troubleshooting for CA. The College plans to develop more IT capability which should provide needed relief.

FAA has developed the use of distance education technology for live lectures to students as far away as South Africa. FAA is the leader in CA for videoconferencing technology applications. Course lectures are also broadcast to FAA students working off-campus; four online courses have been developed. Plans include broadcasting seminars to high school students, farmers and others for continuing education.

Frustration with limited parking was repeatedly voiced and is partially related to so many mobile faculty, staff and students because of off-campus facilities, offices and meetings. This situation causes problems originating from any off-campus travel and return with concomitant loss of productivity. With the growth at AU, parking space is becoming a premium.

Opportunities

Facility consolidation in the North AU Campus area could improve cost efficiency and expansion of extramural support. Investments by FAA and AU to consolidate infrastructure should improve the return on investment of State funds and enhance the visibility of AU in fisheries, aquaculture, and aquatic resources. Numerous environmentally-related programs would benefit if FAA was centrally located.

Use of FAA funds for facility operations diverts funds from the direct support of critical program development. The costs of doing work increase annually. The State of Alabama provides about \$2M annually to FAA. With this funding FAA provides a high rate of return on research funding placing FAA among top departments within land grant universities. If AU wishes to quickly increase their return on investment in research, then more support personnel will be needed to free-up faculty time for growth in program development and investigation into promising new research frontiers. More competitive grants generate more indirect funds.

Grants and contracts depend on reliable, fully operational research facilities with needed support personnel and adequate funding for maintenance. The return of public dollar investment from research grants and contracts potentially offers a higher rate of return in addition to enhancing the quality of the instructional program with critical support, and extension with more programmatic funds. FAA can potentially increase its revenue generation from grants and contracts if the Central Administration would lend more support to O&M and utility costs for the highly specialized and high cost maintenance research units, buildings and grounds.

The research value of FAA's expansive facilities is obvious, but the North campus station also provides a unique outdoor classroom used in 18 courses. It also has value for training and education efforts. AU determined that facilities have 40% instruction and 60% research use which is undoubtedly a key factor contributing to FAA's preeminent status. More funding assistance from AU for these key resources will raise AU's competitive reputation throughout the world by strengthening research, teaching, and educational programs, thus supporting AU's core mission.

Under the current situation of uncertainty, CA should recognize that some critical issues need positive affirmation through investment of additional financial resources in the department. For example, funding graduate student assistants either directly or indirectly by picking up electrical costs would stimulate productivity of department faculty and increase benefits to the citizens of Alabama.

At the graduate level FAA has a long history of developing excellent, advanced-degree professionals in fisheries, aquaculture and aquatic resource management. PhD students are afforded the opportunity to gain valuable teaching experience commensurate with their academic career goals. Currently most graduate student support is dependent on faculty generated extramural funds and highly qualified students cannot be recruited and accepted until funds are guaranteed. This situation is causing the loss of highly qualified students who elect to attend other universities.

Suggestions

- Given the extensive amount of O&M support needed, we recommend that funding prioritizations for facility operation be developed within the FAA strategic plan in addition to a renovation plan with anticipated returns to investment.
- There is a lack of academic expertise at AU in several knowledge areas that impacts or impedes several research areas. The best option to access this expertise may be through contractual agreements as it is uncertain when AU might fill gaps in expertise.
- Make better use of IT specialist by developing an annual work-plan based on Department identified project priorities, and dedicated time of work schedule to complete activities, and placing the individual under supervision of the Department Head to direct work.
- Several federal agencies have competitive programs for graduate and postgraduate grants that could benefit faculty and graduate students.

Recommendations

1. Expedite the construction of a new building housing the FAA Department at the North Auburn Fisheries Station or another appropriate site. The North campus location will consolidate FAA faculty and provide the space needed for future program growth in FAA. It should also help programs operated at the North Auburn station by other departments.
2. Establish permanent support in FAA for teaching assistant funds to recruit highly qualified graduate students to the program and assist faculty in developing and teaching introductory university-wide courses that are cross-listed in other colleges. Many peer institutions provide permanent teaching assistantships. An investment in graduate teaching assistants represents one action that AU/CA can do with Peak's funds and reap an excellent return on investment through undergraduate enrollment. Teaching also provides the mechanism to help resolve the perceived or real "silo" issues as students belong to the entire faculty.

3. In the AU administration's process of allocating research associate and technician positions within the departments of CA, strong consideration should be given to FAA because of the consistently high return on investments by productive faculty.
4. Convert Swingle Hall to a primary, on-campus teaching site for FAA and possibly other AU environmental studies programs across campus to facilitate interaction among diverse but related faculty and students. Placing FAA and other significant environmental teaching programs in Swingle Hall would enhance multidisciplinary programs and initiate more interaction and subsequent collaborations desired by the Administration, faculty, staff, and students.

RESEARCH PROGRAMS AND SCHOLARSHIP

Findings

The research faculty has a notably high output of scholarly products (peer-reviewed publications and professional presentations). FAA has an outstanding record of successfully competing for competitive grants and government contracts. In FY05, FAA was responsible for 40% of total extramural funding in the CA. This amount was second among all colleges at AU. FAA research activities reflect a satisfactory balance between directed basic and applied research funded through diverse sources. The National Science Foundation, US Departments of Agriculture and Commerce all administer highly competitive grants programs emphasizing fundamental, applied, and integrated research. Funds from state agencies, producer organizations and private businesses serve as the foundation for a strong applied research portfolio as well. The scholarship of FAA faculty is duly manifested in the large number of awards and recognitions that they have received from professional societies, agencies, and constituency groups. In addition, many have served as officers in professional societies or provided other forms of service to their professional societies/organizations.

Both basic and applied research activities reflect timely and proactive commitments to constituents. Faculty members are innovators and have significantly contributed to intellectual property at AU by securing numerous US patents. FAA is taking a lead role at AU on intellectual property. A senior faculty has been, and is currently appointed as a prestigious AU Butler/Cunningham Eminent Scholar to address statewide agriculture and environment issues.

FAA faculty demonstrates a strong commitment to the successful transfer of research results to extension and outreach efforts. About 70% of the catfish industry follows FAA research-based protocols and after years of sustainable research, hybrid catfish are showing increased promise for use in commercial enterprise. FAA has the only federally approved outdoor facility approved for research on transgenic fish and the world's largest living gene bank for catfish. Research results from investigations in fisheries ecology and management have contributed to the development of policy and management actions in public bodies of water. Examples include fish

and plant interactions and reservoir hydrology. In addition, research results provide state and federal agencies with important information to address the problems of cultural eutrophication and the fate of PCBs in aquatic systems. Faculty has developed novel methods to guide decisions concerning conservation policy and permitting. Many projects and programs are highly integrated and multi-disciplinary to address increasingly complex problems.

The Alabama Cooperative Fish and Wildlife Research Unit, while maintaining a rather low profile, provides valuable contributions to FAA. On a positive note, the Assistant Unit Leader has a faculty appointment rather than adjunct status with no salary cost to FAA; this is highly commendable. The Unit's contribution to graduate student teaching and mentoring is substantial. The presence of the Unit also contributes to the reputation of FAA within the fisheries and aquatic sciences profession. The USDA Agricultural Research Service (ARS) Aquatic Animal Health Research program associated with FAA provides critical laboratory facilities, equipment, and support to graduate training.

AU has historically provided FAA with significant state funding for programmatic support. FAA has provided AU an excellent return on investments (ROI) in their teaching, research, and extension programs. Most land grant universities have ROIs that fall within the range of 1:1 with the most productive land-grant programs approaching 4:1. FAA's ROIs in 2005 for state invested dollars ranged from 1.5:1 to 4:1.

Constituency groups, ranging from private sector (aquaculture) representatives, to federal cooperators (USDA-ARS), to state agencies (ADWFF and ADEM) consistently praised faculty cooperation, assistance, and accomplishments. They emphasized that faculty of FAA are essential and vital to their long-term needs. All constituency groups interviewed indicated substantial interaction with both the FAA Department Head and College Dean. Validation of FAA's outstanding performance with highly relevant research supported by high standards of quality by this diverse constituency group was very strong and highly complimentary.

Site-specific research is often needed to have true applicability and the resources available to faculty off campus should be used whenever appropriate. The definition of what is a campus site versus what is an off-campus site in the Auburn area is confusing. Different groups are using different definitions for these sites. This can confuse funding prioritization and allocation, and will certainly be confusing for multidisciplinary grant proposals.

Opportunities

The development of a strategic plan offers a unique opportunity to consolidate teaching and research resources and develop a protocol whereby prioritizations for facility operation can be established. The occasion of this internal review and the development of a strategic plan should assist in obtaining additional funding for facility operations as the definition of off and on campus sites is clarified.

The strengths of current faculty and those to be hired, and the strategic plan should be the foundation for enhanced partnerships with extension and education programs and this integrated approach should prove to increase funding opportunities at the federal level.

The replacement of retiring faculty offers the opportunity to strengthen the research program by the selection of new faculty with expertise that will strongly supplement and complement those of current faculty and address the coursework needs within the undergraduate and graduate curricula.

An appropriate mix of research that includes servicing current clients, continuing application for competitive grants, and an increased search for opportunities in interdisciplinary research would take advantage of the currently outstanding reputation of FAA. In addition, AU would benefit through involvement with other units on the campus. The Fisheries Division of ADWFF relies on AU to be their research arm, and they are also depending on FAA to provide the next generation of fisheries professionals for their agency during the upcoming hiring phase. Emphasis on competitive grant funding should continue, as well as the current level of interdisciplinary research, most of which is initiated by FAA. The diversity of programs at AU and within FAA provides the basis for the development of “experts” in many different arenas. AU and FAA are positioned to educate many specialists, but they can also develop “generalists” who are being sought by some management agencies and universities to fill faculty positions.

Recommendations

1. AU/CA/FAA must establish a consistent definition of on- and off-campus sites because these designations have significant implications relative to AU support for O&M costs. Then conduct economic analyses that use correct indirect overhead costs.
2. FAA should develop marketing strategies to more-effectively communicate the economic impact of its research and extension activities within the university and within the state. FAA should seek the assistance of AU marketing/sales faculty. FAA faculty must be aware that the nature of the audience determines how the presentation should be made.
3. Market FAA strengths within each of the discipline groups in FAA and the capacity for cross-disciplinary approaches to gain a competitive advantage in the ability to address new and emerging aquatic-related opportunities and challenges in the state. FAA should also reach out to other AU programs with aquatic expertise to reduce internal competition (where possible) in the aquatic arena.
4. Seek strategic partnerships with extension and education programs as required for federal competitive integrated programs funding in the numerous knowledge areas. The integrated approach and funding can support not only research, but also extension and/or teaching.

ACADEMIC PROGRAMS AND TEACHING

AU provides about 40% state departmental funds for teaching. Stakeholders have identified the essential role of FAA in producing professionals to meet the anticipated high demand in the State's public service and regulatory sectors associated with fisheries and aquatic resource management due to near-term retirements in the future.

Undergraduate Programs

Findings

Among faculty, there are mixed feelings about expanding the size of the undergraduate teaching program, or even continuing to offer an undergraduate degree. FAA is particularly recognized for its graduate training and there are some concerns about tradeoffs if more emphasis is placed on undergraduate education. There is also concern that the time devoted to undergraduate instruction by the faculty could be better used for graduate studies. However, all faculty members expressed consistent interest in improving the quality, rather than the quantity, of the undergraduate program. Increased effort seems necessary to increase undergraduate student enrollment to a level commensurate with essential teaching resources.

During the past 10 years, undergraduate enrollment in FAA has gradually increased, reached a high of 48 in 2004, and then declined again in subsequent years. However, this number is considered precariously low because it yields about 8 graduates per year. This number is near the minimum number mandated by the Alabama Commission on Higher Education for an undergraduate program. The number of undergraduates could likely be increased with a well-planned recruiting effort, which, except for one year, has not been implemented. FAA has only three undergraduate departmental scholarships to attract high-caliber students; fisheries students also compete for other AU scholarships as well. To date, the graduate program has not been dependent upon the undergraduate program as a continuum for new students.

Classroom resources suggest that a level of 50-60 undergraduate students could be accommodated and this number presumably could be met with a minimal recruiting effort. Nonetheless, the value/benefit of an undergraduate degree in FAA has been questioned by faculty and this issue cannot be accurately assessed because of a lack of data derived from a systematic placement assessment. Faculty also expressed concern about the current undergraduate academic program because there is no control over the quality of students who are enrolled. There is also a sense among faculty that considerations for promotion and tenure are based on research output and less on excellence in teaching and advising; however AU administration and Board of Trustees emphasize the importance of undergraduate programs. The current AU Provost recognizes the value of excellence in teaching in the promotion and tenure process, but this issue needs clarification.

Some faculty believe that an undergraduate education in the biological sciences with some focus on fisheries courses would be a more appropriate academic foundation for those students who would then opt to concentrate on a fisheries education at the graduate level. The Fisheries courses attract more inter-departmental students because of broader aquatic themes related to forestry and wildlife management. Although it is evident that AU has a strong commitment to undergraduate education, there seems to be no mandate that a department be obligated to have an undergraduate program.

There also appeared to be a need for more guidance and mentoring of undergraduate students, including information about opportunities such as American Fisheries Society (AFS) Certified Fisheries Professional requirements and how they can become engaged in research activities in FAA. In addition, concern about the value to identify the different disciplines (options) within the undergraduate degree was expressed. It was noted that greater flexibility and integration could be achieved by possibly offering one curriculum while still preserving the current professional/pre-veterinary curriculum.

The review team was asked for an opinion about the use of up to 10 credits of internship toward the 120 credits needed for graduation. While the value of internships and other such types of work experience are invaluable in this discipline, there is a belief that the use of internship credits toward the 120 credit hour requirement, in lieu of other courses, limits opportunity to take additional coursework that would greatly enhance the quality of the undergraduate educational experience. These credits could be better applied to coursework in other disciplines, additional coursework within the department, electives above the requirements, or to fulfill certification requirements such as those listed by the AFS. Students should seek work experiences during summer, and part-time work experiences may be available during the school year. Faculty should assist in the process by either providing students or helping students, find relevant work experiences. Such experience can simply be listed on a student's resume, and need not be part of the formal transcript for the student. Many other fisheries-oriented university programs do not require formal internships, yet still are able to relay the essential nature of work experience to undergraduate students.

Information collected relative to undergraduate student placement is currently insufficient for tracking purposes. Such information would be needed to assess the relevancy of both undergraduate and graduate student programs.

Opportunities

The greatest return on investment (ROI) to AU is derived from its undergraduate and graduate students. Providing the Department with graduate assistant funds can expand the undergraduate program and augment recruitment of excellent graduate students. Undergraduate studies could be strengthened if more teaching support is considered to be strategically important. Unlike the many opportunities for marine biology undergraduate training at numerous institutions in the state, there is only one undergraduate fisheries program with no institutional competition for

fisheries students. FAA could capitalize more on this situation as a new opportunity with potential growth trends for this program. If so, more resources could be justified for an expanding, promising program associated with successful job placement or career building.

The Department could still demonstrate a commitment to undergraduate teaching, while electing to eliminate the undergraduate academic program by working with the Department of Biological Sciences and/or the School of Forestry and Wildlife to offer courses to students who choose to have a fisheries emphasis. Undergraduate courses offered by FAA could constitute part of the undergraduate curricula in the biological, wildlife, and forestry departments. If these courses are “marketed” to the appropriate Department, enrollment and contact hours with undergraduates would probably not diminish substantially. Under this scenario, the need to meet requirements for the graduation of a certain number of undergraduates with a fisheries degree each year would be eliminated. The FAA may best serve the teaching mission of AU through a graduate program only. However, if such a decision is made, FAA must provide strong academic advisement to undergraduate students truly interested in fisheries.

Another possible approach to solving the precariously low enrollment in the undergraduate program is moving the marine biology undergraduate instructional program to FAA. This program is found in another College but probably would be more appropriately located within FAA because of the similarity in curriculum. Moreover, the FAA instructors and facilities located on the Gulf Coast would most definitively offer greater opportunities for education and training in the marine biology discipline. This approach would most likely increase the number of undergraduate students with minimal recruiting effort.

In general, the undergraduate students interviewed were satisfied with the undergraduate academic program. All believed that they had been satisfactorily mentored, and all had gained substantial work experience. If the undergraduate curricula were to be maintained and a corresponding effort to increase enrollment through recruitment strategies were to be implemented, then an opportunity to strengthen the undergraduate program becomes available. This strengthening could be founded in some GPA cut-off required for matriculation for an undergraduate degree in the department and the offering of a greater variety of courses.

Undergraduate students expressed a desire for a senior “capstone-like” course that would be based upon teamwork and draw upon the application of their training and educational skills. Students also expressed an interest in taking advantage of a marine biology course offered at Dauphin Island Sea Lab. Because of the distance, students expressed interest in the future possibility of offering the course through a web-based or satellite format.

Suggestions

- The Marine Biology program at AU should be encouraged to advise students about FAA courses and possibly cross-list courses of potential interest to Marine Biology undergraduates.
- The time of the IT specialist is best used for high-demand IT support and not undergraduate student recruiting. The intensity of undergraduate recruitment should be decided based upon FAA strategic goals to actively increase undergraduate enrollment with sound advisement.
- Find a way to utilize the benefits of the Dauphin Island Sea Lab for undergraduate education.
- An introductory seminar/orientation course be required for all students and taken during the first semester.
- The undergraduate education experience can be enhanced with quality advising, that also covers transition to a large university setting with multiple learning opportunities and choices.
- FAA should require exit interviews for departing undergraduates to learn about student issues and areas for potential improvement.
- An Undergraduate Student Handbook modeled after the currently available Graduate Student Handbook should be produced for undergraduate students in FAA to provide necessary information in the form of academic guidance.

Recommendations

1. After careful analysis of the options, the FAA faculty should develop a collegial vision concerning the fate of the undergraduate academic program based on tradeoffs and workloads. If not eliminated, then some strategy concerning an increase in enrollment that can be sustained must be made. FAA must also decide whether they can provide both a professional and a non-professional fisheries degree while the job market indicates diverse training is important to all AU degree programs.
2. If an anticipated increase in undergraduate enrollment occurs, then students should be required to have attained a certain grade point average at the end of the sophomore year, or they would no longer be able to continue matriculation within the fisheries major.
3. A capstone-type course be required and offered during the senior year whereby groups of students have an opportunity to apply collectively their educational skills through a project that involves management of a natural resource, or an aquaculture enterprise (such a course would also qualify in the human-dimensions category for AFS certification).

4. Internship credits should not be included toward the 120-credit major, unless necessary. However, internship availability should be retained because some job opportunities available within the profession require a formal internship program from the sponsoring school.
5. Post-graduate tracking should include collection of job placement data. Trends for critical core competency areas and job skills can then be assessed to revise curricula and learning activities as needed.

Graduate Program

Findings

Since the inception of FAA, emphasis has been placed on graduate education. The graduate studies program continues to attract students from across the US and world and is a program that other institutions envy and emulate. The graduate fisheries program at FAA is without peer in the country. For the fall of 2004, FAA had 73 graduate students with 3 in the Masters of Aquaculture, 41 in MS program, and 29 PhD students. The diversity in educational backgrounds and cultures among graduate students is outstanding. All graduate students interviewed were highly aware of the national and international reputation of FAA. This was reflected in their selection of this graduate program based on their belief in the high value of the degree eventually earned. There is a trend of an increasing percentage of US students.

Graduate students consistently praised the quality of coursework available within FAA. Departmental faculty and both College and University administrators expressed sincere concern over the quality of education that AU provides to students. Graduate students questioned whether sufficient and relevant coursework in statistics was available; however, they did indicate that the FISH 7530 course provided a very practical application of statistics. At this time, no marketing course on campus sufficiently fills the needs of graduate students. Graduate fisheries courses, excluding aquaculture-based courses, are limited in number, especially for graduate students who obtained a BS from the FAA program.

Currently, only the Master of Aquaculture (MAQ) program is included in the non-thesis Master's degree option. Present enrollment in this program is three students because no additional financial support is available for more graduate assistants. FAA does not accept graduate students unless financial support is available for an assistantship. The Alabama Cooperative Extension System funds one assistantship in this program of study.

The graduate students we met were primarily doctoral students. These students consistently expressed a desire to gain teaching experience, either to help prepare them for an academic career, or to determine if they wanted to pursue an academic career. They were especially interested in a teaching opportunity that involved responsibility for an entire course, perhaps under the guidance of a faculty mentor. We realize that FAA uses limited funds to cover GTAs

for three courses and no GTA funds are provided by AU. However, courses with laboratory work often need assistance and students expressed a willingness to teach while maintaining their research assistant responsibilities. Such teaching activities might be tied to an increased faculty sabbatical program, as noted in the “Faculty” section of this report.

FAA has no access to a computer teaching laboratory. Such resources could be utilized by FAA faculty to improve the quality of instruction (e.g., FISH 7530). There was varying recognition of the value for the departmental graduate student handbook. Among those who were more familiar with the booklet, there was a consensus that the handbook was extremely outdated.

While many 7000-level courses have enrollments of 10 to 15 students, enrollments in some courses have been lower. However, small class sizes and substantial hands-on experience are conducive to highly effective educational opportunities, and have allowed FAA to produce highly successful professionals in aquaculture, fish ecology, fisheries science and management, genetics, and aquatic resource management.

Across the nation, both state and federal conservation agencies forecast substantial numbers of job openings as a swell of retirement is anticipated within the profession. In our meeting with stakeholders, both the Alabama Division of Wildlife and Freshwater Fishes (ADWFF) and the Alabama Department of Environmental Management (ADEM) reported that substantial retirements would lead to high turnover in the next 5 years. In fact, ADWFF reported that a 60% turnover in personnel would occur during that time period. Also according to ADWFF, most other Southeastern universities no longer produce students with the practical skills needed by the agency. Consequently, they will rely almost exclusively on FAA graduates to fill these positions. While faculty members already are highly involved in graduate education and quite busy, the next 5-10 years may be unique within the fisheries profession. Both of these agencies were highly complimentary of the quality of FAA produced fisheries graduates during our stakeholder meeting. These conditions emphasize the increasing critical role of FAA graduate student training.

Information collected relative to graduate student placement is currently insufficient for tracking purposes. Such information is essential to the assessment of the relevancy of graduate student programs.

Opportunities

FAA has substantial marine biology facilities, expertise, and equipment. Increased course offerings in this topic area, or course modifications within FAA to capitalize on these resources might also positively affect the educational outcomes for graduate students. Graduate courses in marine sciences might also be related to FAA resources and the equipment and faculty at the Dauphin Island facility. Students also requested a more integrated graduate curriculum across departmental disciplines through use of team-teaching. This will also create greater interaction of students among the different discipline groups.

Senior graduate students mentored by faculty stated that they would relish the opportunity to teach undergraduates as an important teaching experience for those seeking higher-education careers. The team believes that all could benefit from this strategy. Other, more limited, teaching experiences could also be provided to both MS and PhD students through guest lectures in classes, participation in a seminar class for undergraduate students, and other related activities. PhD students could also be responsible for part or all of lower-division courses, such as a freshman orientation seminar, a freshman or sophomore-level introductory course designed to stimulate undergraduate interest in the program, or the offering of a service course for non-majors (e.g. aquatic resource conservation). Depending on their individual interests, providing teaching opportunities, especially to PhD students could be considered a potentially integral part of graduate education.

Faculty has limited flexibility to recruit quality graduate students on short notice. University support of GRA or GTA funds would allow: 1) greater flexibility in graduate student recruitment; and 2) the potential for PhD students to have one year of support while developing a proposal for research project funding.

Suggestions

- There is some concern for the MAQ program because of decreasing student interest. A re-evaluation may be worthwhile based on financial resources, job placement opportunities, industry needs, consultation with ACES, and commitment by FAA.
- FAA should determine the feasibility of establishing a computer teaching laboratory.
- We suggest that the graduate students develop a council of elected representatives who then can coordinate and relay commonly experienced concerns to the Department Head and carry responses back to the graduate student body.
- We encourage FAA faculty to discuss the possibility of making an exception whereby non-thesis option students are allowed to enroll in the program without an available assistantship. Departmental admission standards would still apply. We suspect that such enrollments would not be large. Under this plan only slight enrollment increases in graduate courses that might occur would have limited effect on faculty time.
- FAA faculty should consider assessing the need for and utility of a non-thesis Master's degree option for other disciplines in the Department. A larger program to accommodate the MAQ degree, as well as other uses for a non-thesis Master's degree, could be designed in such a manner that the MAQ program is not affected.
- FAA should consider adding a graduate-level marine fisheries or marine biology course to the curriculum.
- We suggest that FAA consider the addition of a human-dimensions course and the offering again of an advanced ichthyology course that would be an appropriate addition to the graduate curriculum.
- When appropriate, consider the offering of more graduate classes in alternate years to assist in meeting the minimum enrollment requirements.

- A comprehensive assessment of overall graduate course scheduling would be appropriate to achieve more efficient use of faculty teaching time.
- At a minimum, placement data should be collected by degree type and eventual employment. Trends then can be assessed over time.
- The Graduate Student Handbook should be updated with annual updates implemented as needed.

Recommendations

1. That the College and University administration consider the provision of Graduate Student Teaching funds. A limited availability of financial resources would likely increase the quality of graduate students recruited into the Department, and could pay dividends in terms of additional research proposal submission by PhD students and their faculty advisors.
2. The College and Central Administration should consider the need for expertise and courses in biochemistry, molecular biology, genetics, toxicology, and bioinformatics in their long-term strategic planning efforts. In addition, input from FAA might be used to determine where a useful marketing course might best be placed within the College and linked to promotion and tenure support.
3. In anticipation of future employment opportunities, we recommend that FAA make a concerted effort to produce as many qualified students as possible in anticipation of compensating for the impending retirements, especially in fisheries-related areas. While faculty members already are highly involved in graduate education and quite busy, the next 5-10 years appears to offer unique opportunities within the fisheries profession.
4. FAA faculty should include curriculum development for graduate courses during development of their strategic plan to reflect the needs of graduate education and not specific needs of faculty student groups.
5. That FAA faculty seeks opportunities for PhD students, especially experienced students nearing the end of their graduate program, to gain classroom-teaching experience. Such activities might be tied to an increased faculty sabbatical program, as noted in the “Faculty” section of this report. If teaching activities are not allowed without a teaching assistantship, then we recommend that the College administration consider providing a small amount of funds that could be split into small appointments for support of multiple graduate students per semester.

EXTENSION PROGRAMS

Findings

From an extension perspective of public education, Alabama presents many challenges and opportunities with its rich aquatic resources. The state's aquaculture production is valued at more than \$100 million annually and recreational anglers spend about \$1 billion annually on fishing with an economic impact reaching \$2 billion. The constituents are diverse and center on the sustainable use of the state's diverse aquatic resources for economic and social benefits. The aquaculture constituency is well-organized whereas the fisheries constituency is more diverse and diffused. The extension program is relevant, viable, and focused on client-based problem solving. Faculty and specialists are motivated to adapt and change as needed to deliver high-impact educational programs to diverse clientele. Unlike many traditional agricultural extension programs, FAA reaches new and diverse audiences because of the broad spectrum of issues associated with aquatic resources and sciences. The value placed on extension contributions that are considered to be academic in the faculty handbook for promotion and tenure has received mixed results over the years, but FAA faculty have not experienced problems. The Extension Administration expressed support for adequate percentages of extension functions in FAA faculty appointments to meet extension, as well as teaching and research needs.

In general, the Extension program personnel have worked effectively with the clientele user groups to identify and prioritize program areas that fit financial and support resources. The faculty and extension specialists of the Alabama Cooperative Extension System (ACES) and Sea Grant programs have achieved national and international recognition for the excellent quality of their Extension programs. The campus extension faculty and area aquaculture specialists are very dedicated to constituents with high quality service and programs. The extension program is not only supported by FAA faculty and area specialists (funded by ACES), but also by eight regional natural resources extension agents associated with the School of Forestry and Wildlife, and several key county extension coordinators. The ACES has identified 14 Priority Program Areas to enhance programmatic planning and coordination; the largest area team is the Aquaculture/Recreational Pond Management Team with a FAA coordinator. Ironically, but as is often the case, some FAA extension faculty have had limited training in extension programming and methodology, and adult learning. They depend on their disciplinary backgrounds, on-the-job experiences, and inherent people skills. However, FAA offers a Fisheries and Aquaculture Extension Methods Course that should provide the knowledge to engage student's interest about a professional career track that involves extension.

FAA has strategically located facilities, including the Alabama Fish Farming Center in Greensboro (under management oversight by FAA beginning October 2006) and the AU Marine Extension and Research Center in Mobile, to more effectively reach and impact extension clientele in catfish farming, aquaculture, and diverse coastal resource issues. A new mobile aquatic animal health laboratory now services catfish producers who are regionally concentrated near Greensboro as well. An Aquaculture Task Force has been instrumental in gaining support for the Greensboro Center that will transition into an advisory committee for FAA.

The Alabama Water Watch program includes more than 200 voluntary citizen groups and has gained national recognition and accolades from the US Environmental Protection Agency. It has been used as a model for a global program. FAA is taking a lead with youth development and education in the aquatic sciences. FAA and ACES have responded admirably to the strong public interest in recreational pond management.

The Blackbelt Initiative was funded by a competitive state program to advance new economic development opportunities in impoverished counties through inland marine aquaculture and natural resources management research and extension programs. Competitive state-appropriated funds directed to FAA and ACES, demonstrate the highly regarded value of these programs, and comes with strong accountability requirements to achieve measurable economic development impacts. Expertise in economic impact assessments and evaluation tools is urgently needed to document econometric outcomes in rural development. The ACES is shifting emphasis to impact assessments and there is need for an evaluation curriculum and expertise in this science. This needed expertise has not been available from the AU Agricultural Economics Department.

Extension programs also span marine waters to benefit commercial fishers and coastal users in addition to supporting commercial farming of marine fish and shellfish. Extension programs responded quickly to aid coastal residents and communities impacted by Hurricane Katrina and other hurricanes that have recently inflicted significant and widespread damage along the gulf coast of Alabama. These programs are principally supported by Sea Grant.

The Extension faculty shows a healthy attitude in the ability to adapt to the changing challenges that will affect the University's extension mission in the future. They are poised to modify programs and adopt new technologies to increase effectiveness in program delivery. Extension faculty and staff are capable of initiating new methods of delivering programmatic materials to their clientele, but they will require a more rapid development of computer-associated technologies to achieve these goals. Their program productivity as measured in publications, programmatic development, direct contact with and service to clientele is of the highest quality and definitely a match for any peer institution. However, Extension programs will be rapidly surpassed by peer institutions that are more rapidly incorporating digital technology to reduce the cost associated with hard copy distribution and monetary constraints associated with statewide meetings. This new focus does not mean the abandonment of these methods, but rather the use of the savings realized to provide hard copy and physical meetings for clientele groups with limited access to these technologies.

Additional staffing needs are always identified as a high priority for academic programs. When the Extension group was challenged with prioritizing the type of additional support if requests were possible, computer applications, support to replace the loss of clerical staff, and additional technical assistance to deliver programs rose as the top priorities. At present, the Extension faculty has identified statewide priorities in six major program areas covering freshwater, marine and natural resource issues. The current programs are completely consuming the available resources of both time and funding necessary to complete these missions.

In a predictive analysis of emerging issues for the next 3 to 5 years, areas of concern included, but were not limited to development of efficiency technologies and marketing associated with aquaculture production; and measurement of value and impacts associated with natural resources. Long-term challenges are identified as: competition from finfish imports; threats to aquaculture products from social issues including environmental and aquatic animal welfare concerns; and challenges to a sustainable natural resource. In an environment of level or declining funding challenges abound regarding how to effectively address these critical issues. With the reduction of clerical staff, Extension personnel are at a capacity level in their ability to respond to constituent requests for information materials, in terms of both mailing costs and time to compile and send information packets. The primary delivery mechanism for these materials is still by hard copy through US mail. In addition, the time and cost associated with travel often restrict efforts to engage in regional program planning, training and facilitation of cross-program interaction.

Although both the ACES and Sea Grant (SG) funded faculty recognized the value of computer applications for program delivery, and have developed some Internet capabilities at the national and regional levels, opportunities to initiate cost and timesaving approaches to address these issues can be improved through the use of the rapidly advancing technology. The joint FAA and ACES Alabama Education in aquatic sciences, Aquaculture, Recreational fisheries and Natural resource conservation (ALEARN) web site offers rich, timely information to the public on aquaculture, natural resources, classroom education, and recreational fishing.

Water and soil sample analysis for constituents has become both a financial burden and a time-consuming activity for ACES personnel using current resources. This is of concern to Extension personnel because analytical services are necessary and highly valued by constituents. The cost for commercial analysis may preclude constituent investment in this necessary component to their business. With the static funding and current time constraints associated with Extension programs, the continuation of this activity needs to be assessed along with other associated program priorities.

The limitation in available funds is impacting Extension's ability to address the essential priority programs identified by clientele groups at a time of expanding challenges in production aquaculture and the maintenance of a sustainable natural resource base. There is a threshold of critical mass associated with reduction of priority programs that are identified by ACES/SG faculty and constituent advisory groups. The inability to address high priority programs because of the lack of funds or personnel will likely result in a reduction of support for Extension activities. As the urgency for program shifts occur, the initiation of new programs are often more expensive than the costs associated with the continuation of addressing old priorities. Additional funds will be essential for the delivery of quality extension programs associated with increasingly complex challenges in the future.

Opportunities

The issue of needed expertise in impact assessments of extension programs traverses many programs and will likely become more important in the future as economic impacts become the likely benchmark for future success. It may be prudent to nourish this expertise within the Department of Agricultural Economics to provide college-wide benefits. With this expertise, opportunities for new curriculum development and research to develop economic assessment models and tools would naturally follow. This expertise can be expected to be an increasingly important long-term critical need for extension programs statewide.

The Extension faculty has expressed an inability to communicate effectively the value of their programs and program needs to their respective administrations. The administrations of ACES and the Office of the Dean have emphasized the necessity for FAA to develop a Strategic Plan. This Plan is the mechanism and vehicle by which the administration will evaluate needs, necessity and distribution of resources.

Extension can take advantage of the videoconferencing and long distance capability that FAA has developed over the past years for teaching. There may also be some opportunities to seek capacity strengthening funds to further develop this method based also upon the overall plans of ACES to employ these technologies to serve clientele. This approach may present some viable options depending on the nature of the program and audience.

The US aquaculture industry is facing numerous challenges in its future competitive status and Alabama producers and allied sectors are no different. Highly relevant research linked to gaining efficiencies along the supply/value chain from farm to market and continued industry innovation will be important factors. The aging of farmers, new regulations, high land values, operating capital, and changing global trade policies are other critical non-production factors. The ability for Alabama producers to offer preferred products in a fast-changing global aquatic foods market with differentiated, highly valued, consumer-driven attributes provides opportunities for entrepreneurs. The role of extension in times of major challenges becomes even more crucial as all adapt to a changing business environment. Extension's relative importance among the many factors impacting commercial aquaculture will in part be determined by sound situational assessments of critical issues and consultative planning with constituents to deliver sound educational programs to improve livelihoods. With adequate support, Extension integrated with FAA expertise and resources is positioned and networked strategically to make a significant difference.

Suggestions

- That clientele groups be included in the development of funding mechanisms for analytical services and personnel for servicing these requests, or provide assistance to constituents in locating the most reasonable commercial laboratories.
- Accelerate the transition to digital supported programs by assessing the potential adoption of existing technologies used by other programs that have made these transitions.
- Develop short- and long-term strategies to increase FAA/ACES/SG investment in technical computer support personnel.
- With the assistance of ACES administration, explore opportunities where a portion of program costs can be recovered from industry while not in conflict with University-associated policy.
- In team efforts, work with industry to identify where funding measures are to be employed, and, if accepted, raise these issues to the highest priority.
- Extension should seek funding for integrated extension-research projects from the catfish feed check-off program to add educational value to investments in research.
- Accelerate the adoption of web-based technologies to facilitate cost and time reduction associated with regional planning, training, and program delivery.
- The ACES and Sea Grant Extension faculty should form a joint planning group, and in a team effort, develop an Extension strategic plan for insertion into the FAA Department Strategic Plan.
- Obtain needed assistance for economic development evaluations for the Blackbelt Initiative through inter-departmental joint faculty appointments, outside contractual agreements, or other viable options so that the needed interdisciplinary science for this highly visible project is acquired.
- The FAA Head and Extension Administration should engage in dialogue as needed to address any critical issues or concerns related to the different reporting and supervisory lines for the area extension specialists for everyone's benefit. FAA and the Extension Administration have numerous commonly linked programs, initiatives, facilities, and personnel.

Recommendations

1. Evaluate each program thrust as to the percentage commitment of time and funds internally and with advisory input. As priorities change, reduce the level of commitment to lesser priorities. In the face of extreme resistance, request program contribution or assistance in obtaining contributions from invested user groups.
2. Monitor the status of the identified long-term challenges by examination of those industries already impacted by imports; monitor international development of aquaculture production to assess potential impact.

3. Seek partnerships and stress new opportunities with research scientists to compete for funding in integrated (research-extension) grant programs.
4. Examine the potential of internal alliance with natural resource programs to lessen potential impacts of aquaculture to natural resources, and locate/accumulate resource materials that address animal welfare issues in states where these social challenges are currently being confronted.
5. Shift priority requests for clerical assistance to development of IT and associated computer assistance to facilitate digital delivery of information as the primary means of handling information requests, thus reducing the cost and workload of postal delivery and conserving this priority to clientele who have limited Internet capabilities.

INTERNATIONAL PROGRAMS

Findings

FAA built its international reputation through foreign assistance in more than 100 countries, training about 1,000 international students (438 graduate students), and leading 40 long-term projects in 16 countries as a core FAA mission area funded by USAID from 1967 to 1993. FAA seeks to continue as a world-class program under the very different conditions of today through its International Center for Aquaculture and Aquatic Environments (ICAAE). FAA has expertise in international programs, has the most active programs in international activities at AU, and has been assigned a leadership role for the College of Agriculture. An extensive global network of former FAA students trained formally and informally offers a unique resource for international contacts, surveillance of emerging issues, and world-class project partnerships. In the newly released promotional DVD for AU, the FAA Uganda aquaculture project was highlighted providing broad exposure within AU and the state. However, the scope of the program is significantly reduced compared to the level of participation in the 1970s and 1980s.

Over the years, the former International Center for Aquaculture supported faculty positions and advancements but this model has changed with current promotion and tenure criteria and emphasis on hard-funded faculty positions. The FAA attracts graduate students from throughout the world, in part, through its former students and collaborators, and continues its tradition of specialized training programs for foreign groups. As so many issues are now examined within a global context, FAA therefore receives significant benefits to research, teaching, and extension programs. Global trade and imports are impacting Alabama and other US aquaculture producers and seafood businesses. Benefits to this constituency from FAA and faculty investments in international activities should be clearly articulated and realized.

Today, international donor funding is highly competitive and requires innovative business approaches and new partnerships. AU now emphasizes scholarship outcomes linked to promotion and tenure requirements. Non-tenured faculty may need to be cautious and not overextend development-type work that does not have a scholarly component. A clear distinction exists between objectives to advance discovery knowledge through scientific collaborations and overseas development projects of capacity building. The nature of the project will determine the extent of scholarly opportunities along with faculty innovativeness.

FAA is very active in international work with 14 faculty, staff and students providing technical assistance or attending professional meetings in 16 countries in 2004. FAA has a specialty International Committee to address internal issues and provide a forum for dialogue. Currently FAA has a leadership role with the Global Water Watch program and Watershed Management programs in several countries. This global expansion builds on the success of the Alabama Water Watch volunteer program. FAA also administers a multi-year commercial aquaculture development program in Uganda funded by the local USAID Mission. Faculty participates in international professional conferences as key contributors and supports numerous projects that have global implications. Improvements in feeds development, aquaculture BMP, and water quality management are a few noteworthy examples. FAA also coordinates the USDA Aquaculture Genome Program with international participants and implications.

The full-time director for ICAAE and the College of Agriculture International Programs retired in 2004. The responsibility for the ICAAE was recently assumed by the FAA Head. Although he graciously accepted this role to fill a leadership vacuum, he does not have sufficient time to administer this position given the scope of responsibility. The ICAAE needs focused and sustained leadership to expand international activities as desired through marketing and awareness initiatives linked to extensive preparation of proposals and creating strategic international partnerships. The CA will appoint a part-time director to oversee the broader College-level international program; a program assistant to ICAAE and for the College presently resides in FAA.

Financial management support has been extremely challenging because of the lapse of time between administering a long-term international project and conforming to state regulations. The AU Business Office has limited experience with overseas payments.

Opportunities

FAA has highly qualified and motivated faculty who desire international work at a time when AU institutional knowledge and support have diminished. FAA has the opportunity to build on its legacy of distinction and offer broader contributions in aquaculture, fisheries management, and aquatic resources management as defined in a new strategic vision. Water use conflicts are anticipated to become more common and critical in future years both domestically and globally. Water quality and quantity will determine many aspects of life in urban and rural settings. FAA's expertise can provide far-reaching contributions to a global society, in addition to attracting

foreign students, funds, and lessons-learned applications to address Alabama problems. An aquatics-related portfolio of expertise may create new opportunities and international experiences for faculty and students. International programs can provide study abroad and experiential learning opportunities for undergraduate and graduate students in a global context. Early-career, tenure-track faculty needs to be mentored by senior faculty about the potential risks with over-commitment relative to international activity.

In addition to traditional technical assistance and training, new opportunities may exist in specialized international training programs for senior personnel on leadership development, policy analysis, conflict resolution, participatory decision strategies and other social/human aspects. FAA could develop a unique multidisciplinary program with AU faculty to assist senior administrators, policy analysts, and decision-makers associated with sustainable management of aquatic resources. FAA and AU can offer a cross-disciplinary training course integrating aquatic resource management, fisheries, and aquaculture. Case studies and effective adult educational approaches could be integrated into a world-class senior-level management program that would advance global recognition of AU expertise in this field. A needs-assessment accomplished through FAA alumni could help determine the feasibility of the program, in addition to evaluating progress.

The completion of a broader AU strategic plan will indicate the relative importance and support for international activities. FAA and the College of Agriculture may be in an excellent position to assume a stronger leadership role based upon changing emphasis for faculty, students and global contributions by AU.

If international program work increases within the College of Agriculture or becomes a high priority within the new Institute structure, there may be a need for an AU International Program Office. This could relieve FAA of its ICAAE administrative duties with this role funded by AU to provide support across the new Institute, College or AU campus-wide. Many land-grant universities have International Programs with a Director and management support for millions of dollars across diverse campus-wide programs. FAA will need to carefully assess the need for the ICAAE within the changing structure at AU, department priorities, available resources, and return on investment.

Suggestions

- The leadership responsibility for ICAAE could transition to a senior tenured faculty member as a part-time role needed during the interim when FAA determines the level of leadership and management needed to meet strategic departmental goals related to international programs.
- Identify potential sources of extramural funding for various types (scientific collaborations, development, technical assistance, scientific exchange programs, international scholarships, study abroad, etc.) of international projects or experiences that can be matched with FAA faculty interest and scholarly expertise, or those of students.

- Any strategic planning associated with IP should respond directly to and align with the broader mission and goals of AU and new Institute as future reorganization occurs.
- FAA faculty may wish to engage in international scholastic work under sabbatical leave.
- Consult with University of Rhode Island’s Coastal Resources Center relative to their experiences and lessons-learned in administering and managing projects overseas as they have sustained an active global assistance and training program in spite of reductions in core funds from USAID. USAID Collaborative Research Support Program management entities at land-grant universities also have extensive experience in the financial and business management of international programs.
- FAA faculty can be involved in USAID Collaborative Research Support Program (CRSP) international aquaculture research and development projects at various levels, including graduate student training and scholarly endeavors, without a significant business management demand that is assumed by the CRSP Management Entity.

Recommendations

1. The work demands, complexity of issues, and need for focused leadership for both FAA and ICAAE require that each have a separate leader. The Department Head cannot be expected to dedicate much attention to ICAAE at this time or assume other than an “emergency management” role. FAA may consider a permanent position to direct the ICAAE with the appointment commensurate with the desired level of support for international programs.
2. FAA should develop a road map or action plan for establishing an enabling capability for AU to efficiently administer and manage short- and long-term international programs. Within the FAA Strategic Plan, the international program should emphasize scholarship outcomes wherever possible, create desired engagement capability, and identify program staffing options.
3. Develop a database of FAA and other potentially interested AU faculty with an interest in international work, including a description of experience and knowledge areas in aquatic sciences. Include critical knowledge areas of faculty in other departments or colleges for a more-comprehensive AU-wide capability in the aquatic sciences. This action should integrate new science disciplines and expertise for more complex projects or those with critical expertise lacking in FAA. AU/FAA can develop a portfolio of multidiscipline scholarship in aquatic sciences.
4. With complications with overseas payments exacerbated with compliance to Alabama laws that impede needed financial business in a foreign country (Uganda), FAA needs more enabling business management and support procedures before other large projects are considered. Currently, complications and problems with international projects often require much time and energy for proper management. Experiences gained may result in valuable lessons learned for the administration of potential future projects.

ADMINISTRATION AND DEPARTMENT QUESTIONS AND ISSUES

The following are a series of questions that were prepared by the AU Administration and FAA Department for the Team to consider in this review. Some of the questions were added to the list based on meetings with the Administration during the review. The questions from the Central and College Administrations each have a team response, whereas the questions from FAA are addressed under the various major sections of this report.

I. Questions from the Provost and Vice President for Research (AU Central Administration)

1. *Which institutions would be appropriate for Auburn University to use as benchmarks for the Department of Fisheries?*

The Department of Fisheries and Allied Aquacultures (FAA) is a benchmark unit for many fisheries and aquaculture programs outside Alabama. There can be no doubt that FAA has served Alabama well in the past and diverse stakeholders see FAA as extremely important to the future of Alabama.

Alabama is in a state of transition from strong agricultural societal base to a dominant urban foundation. This transition has unsettled people throughout Auburn University. The University will have to look to land-grant universities in states like California and Florida to determine what approaches helped them through the transition. Land-grant universities in states like Michigan and New York might be the benchmarks if urbanization in Alabama reaches such levels. However, whatever other unit is evaluated, the leadership and faculty at Auburn University will have to make modifications that work best for Alabama.

At the University of Florida, the Department of Fisheries and Aquatic Sciences views Fisheries and Allied Aquaculture as the benchmark for many endeavors.

It will be difficult to find a comparable department to FAA at Auburn University. The unique combination of the aquaculture program with the other fisheries disciplines is not something found at other institutions. The team would like to indicate to AU administrators that the graduate program in FAA is second to none in this country.

The difference in benchmarking with smaller programs is the level of the Central Administration's support for teaching and research whereby more funds are directed to critical research, teaching, facility and equipment needs. This added investment increases the productivity of faculty.

2. *Is the Department exhibiting appropriate focus on all three elements of Auburn's mission: instruction, research, and extension?*

Fisheries and Allied Aquacultures on the surface is exhibiting appropriate focus, but the climate is shifting and decisions need to be made by the leadership and faculty. For example, a short-term decision needs to be made on undergraduate teaching. The faculty believes they have inadequate resources and time to do any more work in the area of undergraduate teaching. In fact, they consider the possibility of eliminating the undergraduate degree. On the other hand, the Legislature, Board of Trustees, the President and others appear to be committed to undergraduate education. Until the Department sets its priorities through strategic/action planning, the question cannot be answered on whether additional resources should be requested from the University for the undergraduate program. This also presents options with other departmental undergraduate programs.

FAA and the leadership have an opportunity to create a long-term return on investment with targeted inputs of funding to FAA. The senior graduate students want to teach, and with the right guidance and mentoring they would be excellent undergraduate instructors. Auburn University provides FAA with no permanent graduate assistantships. If the Auburn leadership could provide substantial funding from its "Peaks of Excellence" initiative and cover the utility costs at the North Auburn Fisheries Research Station, additional departmental resources could be redirected to the undergraduate instruction program for significant expansion at minimal cost.

Providing instructional funding in the form of graduate assistant stipends would also provide Auburn University with other indirect benefits. Research faculty could redirect money paid to graduate students to other investment areas, which would ultimately result in more extramural money for AU. Having a dedicated pool of graduate assistantship funds would improve Auburn's competitiveness for the best and brightest graduate students. The graduate students with whom the team met were indeed bright, sincere, enthusiastic, articulate, intelligent, and appropriately proud of FAA programs. Providing state-supported assistantship with student responsibilities in instruction, research, and extension would also strengthen cross-disciplinary interactions among faculty and staff as students reached across programs and disciplines to accomplish their missions.

FAA has a very productive, competitive research program with benefits across diverse constituents in the state who view FAA's role as essential and vital to their future. The focus is appropriate with more opportunities to seek integrated programs with teaching and extension programs in FAA. There is a good balance of basic and applied research based on meeting emerging needs of constituents and also on the diverse sources of extramural funds.

The FTEs in FAA, combined with the specialists' positions and multi-county in ACES, provide a strong effort in extension. With the increasing demands for extension programs in the commercial, recreational and public policy aspects of aquatic resources management, it

will be important to continue a strong focus of extension within FAA in partnership with ACES and the Alabaman Sea Grant Program. Each program contributes important resources and expertise for an effective, collaborative statewide extension program.

3. *How does the Department compare to other departments in other institutions in terms of research funded with external grants and contracts?*

FAA is recognized as an extremely productive unit within Auburn University in terms of extramural support. Most land-grant universities have a return on investment (ROI) for their state dollars of 1:1. The top land-grant universities have research ROIs in the range of 4:1.

FAA's research ROI is approximately 4:1, which is a clear demonstration that the research faculty is performing well. However, it seems that upper administration leadership at universities tends to judge the success of a faculty based upon grants from National Science Foundation (NSF), or other like organizations. Somehow those with NSF money are viewed as more competitive. However, FAA faculty is extremely competitive with NSF-like extramural funds, and also "non-NSF" monies, such as agency contracts or industry funds, that could easily go to other universities if the needs of stakeholders are not met.

II. Questions from the Dean of College of Agriculture and his Associates

1. *What faculty positions are needed to maintain critical mass, support research, extension and teaching needs and meet the expectation of commodity groups in the state?*

FAA and the AU leadership have not collaborated yet to develop a strategic plan for the department. In 2000, FAA was named one of seven Auburn University "Peaks of Excellence," but no funding was provided. The faculty does not understand why they did not receive funding; all could benefit from a frank and direct discussion with CA on this issue. The faculty has many "wants" but struggles to identify true needs. This situation exists, in part, because there are "silos" of faculty expertise that diminish a unified position. The review team wants to note that FAA is already making progress on this issue.

A strategic plan with a good focus on ROI issues will show what faculty positions are needed and when they are needed. It will help the faculty to work together both amongst themselves and with other departmental faculty. They will recognize that all ships can rise on the rising tide of more funds.

2. *How do the undergraduate and graduate programs compare with respect to improving quality, retention, recruitment, placement, etc.?*

Alabama needs both the undergraduate and graduate programs as clearly stated by FAA stakeholders. Retirement by the "baby boomers" will open many professional positions from the BS level to the PhD level. Auburn is uniquely positioned to meet the emerging need, but there are issues that can compromise success.

The team believes that Auburn University's and FAA's greatest return on investment for state dollars is in the area of instruction. Potential problems, however, exist because the faculty is focused on the professional-side of fisheries education; this can improve the empowerment of senior graduate students to become excellent teachers. Comments from some undergraduates suggested that there was a perception of an over-focus on research by some faculty.

Some FAA faculty lamented that some undergraduates in FAA were not well-qualified, so option exists to either drop the undergraduate degree or strengthen requirements. Stakeholders indicate fisheries faculty does teach students to think and not all students in FAA need to pursue a professional track. A non-professional FAA degree at the undergraduate level or a non-thesis option at the graduate level might provide a great ROI and meet emerging needs.

3. Is the extension program serving the needs of the state?

The answer to this question is best answered by the stakeholders. Our meeting with a very diverse group clearly demonstrated how important is not only extension, but how the whole department is to the future of Alabama. The stakeholders recognize that extension will need to change relative to how information is delivered, but also the critical need to have delivered to them cutting edge research results in a timely manner and *visa versa* communicating the clientele's emerging needs back to the research and teaching community for responsive actions.

It is also important for AU to recognize that extension does have a tremendous ROI. The Alabama Legislature provides the largest investment in AU. If extension was not meeting the needs of Alabama's residents, businesses, and communities, the Legislature could easily redirect money to other institutions or programs. Legislators interact with Auburn's stakeholders who interact directly with extension personnel. This is a historic communication chain that needs to be nourished and empowered for future benefits.

We also wish to clarify that Extension should not be called "outreach" as everyone does outreach when responding to a simple request. Only the extension service conducts planned extension education. Extension should capitalize more on this uniqueness.

4. How much involvement should this department have in international programs?

All land-grant universities have or are establishing international programs. The establishment of these programs is in response to the increasing importance of globalization issues that relate to direct impacts and new opportunities. All states have expressed a sincere belief that their students should be prepared for a global society. Before FAA's future involvement in international programs can be addressed in detail, the department and university leadership need to determine how international programs fits within the AU master plan.

FAA has a long history of international leadership and recognition so it would be easy to just continue. However, the sources and competition for funding have changed along with AU emphasis on scholarly work for promotion and tenure.

Unless specifically directed by the Alabama Legislature and new strategic plan for AU Agriculture, FAA needs to rely on federal or NGO-donor funding. Faculty need to consider all the pros and cons for various options to conduct a proper evaluation of the level of engagement and leadership. A critical review of the risks and benefits to ROI need to be understood. All these discussions need to also consider not hiring a permanent full-time director at this time, but placing program leadership in the hands of a senior faculty member.

It is very clear that continued active involvement in international programs needs the support of AU's upper administration. Problems often develop with overseas projects: the AU leadership needs to be involved in resolving these challenges. Junior faculty cannot be expected to solve complex, non-technical problems. More importantly, the AU administration needs to produce a written document developed in concert with senior faculty, explicitly stating what is considered scholarly activity. Young faculty should take caution to participate in any international program unless they can clearly understand the criteria for tenure promotion as related to the needs of the international program.

5. *What is the value of conducting research on units outside of campus?*

The answer to this question rests with different perspectives. For example, some administrators and faculty consider the North Auburn Fisheries Research Station as an off-campus unit. Others consider it to be on-campus for different purposes. FAA considers the station to be a financial hardship and wants AU to cover more operational and maintenance costs, e.g., electricity. However, if AU helped more, how would FAA invest additional funds? All units close to the central campus are amazing resources. Units far away from Auburn need to be judged in the context of contributions to Alabama and stakeholders. Conducting applied research, apart from basic research, at off-campus sites can provide the greatest benefit to stakeholders, especially when integrated with teaching and extension. A multi-functional team effort oftentimes provides the university the greatest ROI.

6. *What is the percentage of your department's research is conducted on units outside of campus?*

The Department of Fisheries and Aquatic Sciences at the University of Florida (UF) is located nine miles from the central campus and are defined as an off-campus unit. The aquaculture programs are primarily conducted at sites away from our departmental headquarters. Major research efforts (95%) on tropical fish are conducted at the Ruskin Laboratory, which is over 150 miles away. Research on other species is conducted at the Ft. Pierce facility, over 200 miles away. Only 15% of all aquaculture research is conducted at departmental headquarters.

All of the UF marine and freshwater fisheries research is conducted at sites away from the departmental headquarters in Gainesville. The Gainesville location is the site of faculty offices and some laboratories.

The Department of Wildlife and Fisheries Sciences at South Dakota State University typically has 60-65 students in the graduate program (Wildlife and Fisheries combined). We have no facility such as the North Fisheries Station at AU and have spent the past 15 years legitimately trying to put together a combined funding source to develop a series of research ponds. Given the applied nature of our program, most research occurs off campus. Percentages can vary over time with funding, but in general about 90% of research is conducted off campus and about 10% on campus. Most of the on-campus research involves experimental studies in controlled environments.

The University of California Davis (UCD) operates relatively small aquatic facilities and primarily confines its on-campus facilities research to address more fundamental scientific concepts rather than production associated research. This is more a reflection of the objectives of the University rather than industry-driven priorities. Production-related research is more often conducted in conjunction with commercial operators at commercial facilities. UCD aquaculture research faculty focus more on discipline area research such as pathology, reproductive biology, nutrition, and physiology rather than specific production problems. Extension faculty research is currently focused on computer simulation addressing shellfish sanitation and environmental impacts. This is also a reflection of a state with a diverse aquaculture industry, and limited faculty to address the many species-specific problems. There is little undergraduate aquaculture education at UCD; graduate student education being the primary focus. Graduate education in aquaculture is conducted in Departments of Animal Science, Vet Medicine, Wildlife and Conservation Biology and Agricultural Engineering. Fisheries biology is more evenly split between undergraduate and graduate education and conducted in Wildlife, Fisheries and Conservation Biology (WFCB). There are about 70 graduate students associated with aquaculture, about 50 in WFCB, and about 120+ associated with aquatic biology, ecology and toxicology. Aquatic sciences in both marine and freshwater are highly dispersed among the various UCD departments.

III. Alabama Cooperative Extension System Administrative Questions

1. *How do you feel that our Extension Aquaculture/Fisheries program is addressing the appropriate and most significant issues?*

Meeting the total needs of state marine and freshwaters aquaculture industries and natural resource is an impossible task as the State's appetite for program assistance in all of these areas is insatiable. The extension faculty recognizes that limited resources are a growing concern of their associated administrations, and for themselves, in their ability to maintain continued delivery of quality programs valued by the University's constituents. These problems are common to all Extension programs nationally. Alabama extension programs

appear to have identified the appropriate and significant issues facing the State in their related fields and are focusing resources towards priority areas. Certainly, integration of user groups into decision-making process for dealing with funding limitations is appropriate.

2. What changes would recommend in the focus or direction in our Extension aquaculture/fisheries program?

Alabama places a high priority on youth programs associated with aquaculture and fisheries. This is a luxury that can no longer be met in many high-population states because of limitations in available resources. However, if youth education is to remain a priority in program areas, evaluation and recognition should be forthcoming from the youth education systems in the state to assess a value relative to these activities.

3. How can we best measure or quantify the value to the general public of our extension efforts and funding in aquaculture/fisheries?

This is a question that is often asked of the people in the field doing the work. If extension organizations, or other organizations, need this assessment, evaluation experts would be used to design the mechanisms to acquire that information. With present resources, it cannot be done alone by personnel delivering the programs. The only effective way to acquire that information is through direct input by user groups, with the information gathered by an independent group working with extension faculty.

4. How can appropriated funds be best used to create leveraging of additional resources from non-traditional sources?

With the assistance of the ACES administration, explore opportunities where a portion of program costs can be recovered from industry support and that is not in conflict with University-associated policy. Combine this effort with input from user groups to identify programs in which those groups are willing to provide a partial support for these efforts. This also provides an indication of the value of these efforts to the user clientele and provides information to the value question addressed earlier.

5. How can public/private entrepreneurial opportunities be expanded?

The critical elements to this are proper guidance from the responsible administration. Extension personnel are creative and can exploit these opportunities, but have to have the clearance from administration as to the legality and appropriateness of proposals. This is an area that could benefit from user-group input working with extension faculty and the Administration.

6. *What revenue generating opportunities (cost recovery programs) are best suited and available to expand our programs? How can they be best designed and implemented?*

The easiest cost-recovery programs are associated with industry and other user groups to cover the travel and *per diem* associated with some programmatic activities. If a programmatic area is identified as high priority to a user group, they are often receptive to covering these expenses. Often one or more representatives of a user group will bear a higher percentage of the associated costs. Quality program workshops with a registration fee can offset much of this expense. Travel and *per diem* are major costs. Other support dollars are more-easily obtained through small independent grants.

7. *Suggestions for increasing the use of technology (web, etc) to be best utilized in the design and delivery of our programs?*

This is essential for Extension's financial survival and effectiveness in delivering programs. The Administration has to invest in both computer support personnel and equipment to achieve this goal. Extension personnel have to be capable and willing to accelerate their training and use of these technologies in extending their programs. This includes the ability to transmit quality and quantity information directly from their desktop computers using standalone software designed to store and deliver such information, and/or to be able to do the same using a web-based server containing that information. Extension personnel should be provided access to web-based infrastructure for conferencing and teaching; and provide training to clientele as to the use of these technologies. As emphasized in this report, hard copy and personal delivery of information should not be dropped for clientele who do not have access to these technologies. The cost and time saving will be realized as most of the daily information delivery is switched to digital means.

IV. Department of Fisheries and Allied Aquaculture Issues and Questions

General questions and issues:

- 1. How do the outputs from our department relative to instruction, research, extension and outreach compare with other departments within the university, as well as other peer institutions?*
- 2. Are there needs relative to instruction, research and extension that we are not addressing? If so, how would we best address them and what resources would we need to do so?*
- 3. Is the balance among instruction, research, extension and outreach within our department appropriate?*
- 4. Have we identified likely and relevant emerging issue and is our plan to begin to address them suitable?*
- 5. The North Auburn Fisheries Station is simultaneously an amazing resource and a financial burden. How can we get Auburn University and the Alabama Agricultural Experiment Station to provide the financial support for this facility as they do for other university teaching and research units? Are there other sources that we should pursue to provide additional renovation and operating funds?*
- 6. Given the diversity of our department activities, should we consider a new department name that reflects its breadth and scope?*

Instructional Issues and Questions:

- 1. Are there changes that we should consider in the department's undergraduate and graduate curricula that would benefit students relative to the academic background we provide and their preparation for the future?*
- 2. Is there still a place in the field for a specialized undergraduate degree in fisheries, versus a more general, broader degree in some aspect of the biological sciences?*
- 3. Are the sizes of our undergraduate and graduate student bodies appropriate given our mission and the demands of the field?*
- 4. How active should we be in recruiting new undergraduate students?*
- 5. Are we doing a suitable job of advising our undergraduate students?*
- 6. Is the size of our graduate program adequate, particularly given the potential need for Master's level graduates in the near future?*

Research Issues and Questions:

- 1. How does the research productivity of our department (both quantity and quality) compare to peer institutions?*
- 2. Does the research activity within the department reflect a suitable mix of basic and applied research? Are we maintaining a suitable diversity of funding sources?*
- 3. How does the state of our research facilities compare with those at peer institutions?*

Extension Issues and Questions:

- 1. Are we poised to adapt to the changing challenges that will affect our extension program in the future?*
- 2. How do we position ourselves to be ready for changes in the way information is delivered to constituents?*
- 3. How does our extension productivity (publications, programmatic development, direct contact with and service to clientele, etc.) compare to that at peer institutions?*
- 4. Are we adequately staffed to meet the challenges of current and changing extension needs?*

International Issues and Questions:

- 1. How do we address the need for a director of the International Center for Aquaculture and Aquatic Environments that is separate from the Department Head?*
- 2. Is there an understanding of the importance of international work at the university level, particularly as a function of the promotion and tenure process?*
- 3. How do we leverage international activity to contribute more to scholarly output?*

Issues Facing the Department

FAA requests that the review team consider the following issues related to instruction, research, extension and international aspects of their department's programs:

- We feel that the continued population growth will only put increasing pressures on Alabama's vast aquatic resources and that leadership in the State and region will be needed more than ever to help develop sustainable uses of our aquatic resources. We also recognize the changing land use practices and the needs to further develop economic opportunities in fishing, ecotourism and recreation as they relate to the aquatic environment in the State and region. We believe the Fisheries Department can and should provide the leadership in these critical areas facing the State and region.*
- Undergraduate student recruiting and advising has probably not received the attention that it should. Part of this is because faculty members feel that most considerations for promotion and tenure are based on research outputs and not excellence in teaching and advising. Staff may need to be hired to meet demands of improving student recruitment and advising.*
- The University administration and its Board of Trustees place a strong emphasis on the undergraduate teaching role of the University. Although we feel that our undergraduate program is sufficient for the size of our departmental resources, we recognize the conflicting demand to further grow the undergraduate program.*
- State and Federal agencies are anticipating that as much as 49% of their fisheries biologists will be retiring in the next 5-10 years, and have expressed great concern over being able to find replacements to fill these anticipated vacancies. We expect there to be a strong demands for our graduates, particularly those completing a Master's degree.*
- The Fisheries facilities at the North Auburn campus provide a unique outdoor classroom used in 18 of our courses, as well as in a number of other training and educational and research purposes. The University provides little support for maintenance of the facilities*

and no support for the utilities to operate the facilities as they do for other teaching and research facilities. The Department is burdened with the entire financial cost to operate this facility. These costs have had a major negative impact on opportunities to expand our research and teaching programs. The FAA believes that the University and the Alabama Agricultural Experiment Station should provide the same financial support to operate our facilities as they do for other teaching and research units.

- *The department will likely continue to experience faculty turnover in the near future. There are at least seven faculty members with enough years of service to consider retiring in the next 5 years. Replacement of these positions, even if in new areas will be critical for the department to maintain its contributions and high productivity.*
- *We believe that all the major areas of Extension programs in our department can flourish and be important in at least a short-term (5-10 years) future. Production aquaculture will face significant challenges in the future. The inherent advantages of climate in the developing equatorial countries suggest the potential for much greater competition from these areas for aquaculture markets in the future. It will be our challenge to help producers adapt and cope with this competition via both improved efficiency and by shifting to products and markets that overseas producers cannot easily address.*
- *As priorities shift, the future role of Cooperative Extension as an organization becomes less certain. Other non land grant colleges and universities have developed active outreach programs diluting the unique nature of the land grant university. As funding becomes less certain and the infrastructure of Cooperative Extension declines, it will be our challenge as the departmental level to 1) develop funding for extension programs outside the current hard money sources, and 2) find ways to more efficiently deliver extension programs with less institutional support. Electronic delivery, greater cooperation with professionals in other agencies and universities, and further development of national information systems such as the current extension effort are all part of the brave new world we must face in extension.*
- *Most faculty and staff in the department recognize the significant contributions of the international activity and want to continue their international activity. Concerns, especially from younger faculty, are that their efforts will not be appreciated during promotion and tenure reviews. A second concern is that the administration of the department and the ICAAE have fallen to the department head. A departmental faculty position and director of ICAAE was lost in 2004. Both programs are of great enough complexity that the administration of the ICAAE should be separate.*
- *While the field facilities that our department possesses represent an outstanding resource for use in instruction, research, extension and outreach, the buildings in which we operate are inadequate. Currently, faculty from our department are housed in six different buildings on campus or on the North Auburn Fisheries Research Unit, making collaborative efforts more difficult than if housed in a single facility. Swingle Hall is showing signs of its age, and a recent review identified that it would be more cost effective to build a new building than to attempt renovations to the current structure. A new building would provide state-of-the-art facilities, while simultaneously allowing our faculty to be housed in a single on-campus location.*

Program Review Itinerary

Department of Fisheries and Allied Aquacultures June 19 – 23, 2006

Monday, 19 June

6:00

Travel

Dinner with Department Head, Planning Committee Chair

Tuesday, 20 June

Breakfast

8:30 - 10:00

Meeting with College of Agriculture and Extension Administrators
(Comer 109)

10:30 - 11:30

Meeting with Auburn University Administrators (Samford 208)

Lunch

1:30 - 3:00

Introductory Meeting with Department Faculty (Comer 109)

3:00 - 5:00

Tour of North Auburn Fisheries Unit

6:00 - 8:30

Fish Fry/Social with Faculty and Administrators (AE Pavilion)

Wednesday, 21 June

Breakfast

8:00 - 9:15

Meet with Fish Health Group (Swingle 303)

9:15 - 9:30

Tour of Swingle Hall

9:30 - 10:45

Meet with Fish Ecology & Management Group (Swingle 303)

10:45 - 12:00

Meet with Extension Group (Swingle 303)

Lunch

Lunch with Stakeholders (ADCNR, ADEM, USDA/ARS,
USDA/Wildlife Services, ALFA, Alabama Catfish Producers,
Water Watch Citizens Group) (Comer 109)

1:15 - 2:30

Meet with Aquatic Resource Management Group (Swingle 303)

2:30 - 3:45

Meet with Genetics Group (Swingle 303)

Break

4:00 - 5:15

Meet with International Group (Swingle 303)

Thursday, 22 June

Breakfast

8:00 - 9:15

Meet with Curriculum Committee (Swingle 303)

9:15 - 10:15

Meet with Graduate Students (Swingle 303)

10:15 - 10:45

Meet with Undergraduate Students (Swingle 303)

10:45 - 12:00

Meet with Aquaculture Group (Swingle 303)

Lunch

Lunch with College of Agriculture Department Heads (Comer 109)

1:30 - 2:30

Meet with Research Support Staff (Swingle 303)

2:30 -

Open (any additional meetings, report preparation)

Friday, 23 June

Breakfast	
8:30 - 9:30	Closing Session with College of Agriculture and Extension Administrators (Duncan Hall Conference Room)
10:00 - 11:00	Closing Session with Department Faculty (Swingle 303)
12:00	Prepare for Departure to Atlanta

