EXECUTIVE SUMMARY FOR THE COMPREHENSIVE PROGRAM REVIEW OF THE BS AND BA DEGREE PROGRAMS IN BIOLOGY

The following narrative describes the results of a comprehensive review of the two degree programs offered by the Department of Biology at Columbus State University (CSU): the Bachelor of Arts and the Bachelor of Science Degrees. This review has been organized using procedures developed at our institution. Our findings are, for the most part, based on data from Fall Semester of 2000 through the Spring Semester of 2005.

Because our BS and BA degrees are similar in many regards, we have chosen to review them in together and point out differences in the two tracks whenever necessary. The fact that we were allowed to combine the number of BS and BA graduates to determine whether or not our program would be "triggered" substantiates this decision.

Finally, although we now offer a BA Biology plus Teacher Certification degree, it was not implemented until the Fall Semester of 2005. Consequently, this program is not reviewed herein.

Major Findings of the Program's Quality and Productivity

To facilitate the analysis and interpretation of the Biology Program at CSU, our strengths and weaknesses are listed as bulleted items below.

Strengths

- All full-time faculty have terminal degrees
- Faculty have a broad range of interests across the discipline.
- Faculty are professionally active and engaged, as is reflected by their publications and reports and the honors that they and their students have received.
- Use of part-time faculty is minimal.
- Advising is taken seriously and is evaluated in conjunction with instructional loads.
- Faculty and students interact outside the classroom, through clubs and organizations, senior research projects, contract-based research, and international, field-based courses.
- Our curriculum is comprehensive, exposing students to all areas of biology, and providing students with an opportunity to match their degree program to particular career goals.
- Each student receiving a BS is required to complete an undergraduate research project. BA students have this option.
- Students have ample opportunities to take international, field-based courses.
- Both minority and female students who have traditionally been poorly represented in the sciences are well represented in the program.

- Our students increased their performance significantly on a major field assessment test between their sophomore and senior years.
- Virtually all recent graduates are either successfully employed or pursuing advanced degrees.
- We assess the quality of our program annually through our strategic plan and outcomes assessment, and we use this information to improve our program as necessary.

Weaknesses

- We have experienced an unprecedented increase in majors, while the number of faculty in the department has remained basically constant.
- Many of our incoming students are poorly prepared for the academic rigor of our programs. We believe this accounts for our low retention rate.
- Due to the rapid increase of students, a shortage of space is imminent.
- Library holdings in biology are scant, making research by students and faculty more difficult.
- Faculty development opportunities are constrained by limited funding.
- Minorities are underrepresented on our faculty, although the number of women faculty members has improved.

The summary conclusion about the overall strength or weakness of our program's quality and productivity is that it is above average.

List of Recommendations for Improving Program Quality

- Increase the number of faculty in our program. According to the Dean of the College of Science, we are the most understaffed department on campus. A departmental analysis of faculty needs substantiates this assessment.
- Encourage administrative support for the higher academic standards we have established for our program.
- Support university recruiting efforts toward students who have the potential to succeed academically in a university environment.
- Add faculty who will recruit and advise students pursuing the BA Biology with Teacher Certification, as these secondary science education students are now required by the state to receive a degree in a science major.
- Re-double efforts to establish closer ties with our alumni, many of whom are in a position to contribute to the enrichment of our program.
- Provide adequate funding for faculty development.
- Continue the annual assessment of our program and modify our program in light of the results.

Recommendations for Improving Program Productivity

During the past five years, the number of students enrolled in our program has doubled, whereas the number of faculty has remained about the same. Though our program's productivity could be enhanced by continuing to increase enrollments, these additional students will eventually pay the price for this choice by suffering through larger class sizes, fewer interactions with faculty and, ultimately, a decline in achievement. We prefer to improve our program, our productivity, and the quality of opportunities for our students by adopting higher admission standards. Higher standards will benefit our program in two ways. First, students accepted into the program will have the skills and educational background necessary to succeed in what are, admittedly, academically demanding courses. Second, such standards are conveyed by teachers and counselors to high school students, which encourage students at that level to work harder and prepare more fully for the time when they will enter our program. Ideally, a long-term goal of higher education should be to provide all students who wish to obtain an advanced degree the opportunity to do so. In reality, many of our students are unprepared for the academic rigor associated with the attainment of a degree, especially in science. By raising our standards we can, we believe, help contribute to an atmosphere that encourages greater student achievement.

For these reasons, we would prefer to slow growth while enhancing the quality of students and student experiences in our program. Many of our faculty were initially attracted to CSU because of its modest size. Indeed, one of the strengths of our department is the individual attention that we are able to give our students. Without changes, this will become increasingly difficult to do.

Conclusions about the Program's Viability at CSU

The programs offered by the Department of Biology are quite viable. We have a large number of majors whose numbers continue to grow, we have a student-centered faculty who are engaged in the discipline and highly productive, and we produce graduates who are well-prepared to either further their education or pursue a number of different careers.

I. Brief Program Overview

The Bachelor of Arts (BA) and Bachelor of Science (BS) programs in biology include a broad spectrum of subjects, whose objective is to prepare broadly educated individuals who can successfully specialize in graduate or health professional schools or seek immediate employment; however, a number of students select a degree in biology just because they find it a fascinating discipline. Biology can be a valuable minor that enhances employment opportunities in many fields.

The BA degree in biology is designed for students who wish to exercise more control over the development of their degree program. Such students may wish to combine

studies in biology with areas such as art, business, education, or political science. Happily, some students simply want a liberal education with its focus in biology. The BA program has been designed for such students; however, some students use the BA degree to seek admission into dental or medical school by adding a number of the courses required in the BS program. Students selecting the BA degree must complete a minor or an approved equivalent.

The BS degree in biology represents the most appropriate preparation for those who wish to pursue post-graduate studies. The curriculum is built on a strong core in science with studies that explore the breadth and some of the depth of biology. The BS program provides the opportunity for each student to complete a required undergraduate research project. Students who are interested in entering graduate school, dental school, medical school, or a school of veterinary medicine, or who want a sound, comprehensive degree are urged to consider the BS degree.

As its mission the Department of Biology at Columbus State University is concerned with:

- undergraduate education and research in biology;
- graduate education and research in biology, science education, and environmental science;
- service to our geographic region in biology science education, and environmental science;
- sustenance of a community of scholars engaged in developing the ways of knowing, habits of the mind, and operational skills characteristic of capable biologists.

II A. The Quality of Teaching Supporting the Program

State your assessment of the strength of the evidence of program quality on this indicator.
Above Average

- *Explain how good teaching is assessed and rewarded.*

Each faculty member is required to submit an annual self evaluation. Faculty members are assessed on three basic review standards; performance as an instructor, professional development and performance and professional service. These three indicators are also assessed as meritorious review standards when applicable. Teaching is the major criterion in annual faculty evaluations. Included as part of the self evaluation are student evaluations of at least 50% of the courses taught by each instructor.

- *Explain how good advising is assessed and rewarded*

Each faculty member is required to be available in their office or lab during posted hours each week. Advising is considered part of the basic load for each instructor reducing the teaching load from 15 to 12 hours for each full-time tenure track faculty member. The faculty in the department of biology offer two weeks of advising each semester, as opposed to CSU's publicized one week, to ensure each student has ample opportunity to meet with their advisor to guide their course selection during registration.

- *Describe opportunities for interaction that occur between faculty and students outside the classroom*

The Department of Biology encourages interaction between faculty and students outside the classroom. By nature, the discipline of biology with its field and lab based learning offer plenty of opportunities for this type of interaction.

1. Students are required to consult with their advisors prior to registration in order to have their advisor hold removed. Each semester faculty set two weeks aside to ensure adequate advising time per student.
2. The student chapters of BBB (Biology honor society), AMSA (medical association) and PVMA (veterinary association) hold regular meetings with faculty sponsors present.
3. Students work on research projects under the supervision of faculty members. Students in the BS program are required, as partial fulfillment of the degree, to conduct an independent research project. Students in the BA program are encouraged to involve themselves in various research projects.
4. Biology students present and are encouraged to attend the annual CSU Honors Colloquium, and professional meetings such as the Association of Southeastern Biologists, and the Georgia Academy of Sciences.
5. Student research presentations and posters are an integral part of departmental open house events at which alumni have been contacted and encouraged to attend.

- *Describe opportunities for internships, service-learning, practica, study abroad, and career planning and placement*

    1. Students have completed internships at the Atlanta Zoo, the US Fish and Wildlife Service and Mead Coated Board in Phenix City, AL.
    2. The department of Biology offers International courses in five different countries [Bahamas (Andros Island), Africa (Botswana), Australia (Queensland), South America (Ecuador), Central America (Belize)]. The courses are taught at the 5000 level for biology majors as well as offered at the 1000 level for non-majors. Faculty from the department of Biology with expertise in ecology, botany and zoology serve as on-site instructors. Since 2000 143 students have taken advantage of the international courses offered by the Department of Biology.
    3. Biology 2285 serves as an initial career planning and placement opportunity for students. Faculty members are introduced to the students each semester and share their research interests with the students. Students are then free to seek mentorship with faculty members whose interests they share.

- *Describe methods to be pursued for program improvement.*

    1. The department plans to increase the number of faculty members. In addition a new service learning course will be offered on Andros Island for pre-professional students interested in the medical field.
    2. In order to declare a major in biology, a student will be required to have an overall GPA (including grades earned at other institutions) of 2.5 (without rounding up). Students must also have completed the following coursework prior to admittance into any of the junior-level core courses: Chemistry 1211, 1211L, and 1212 and 1212L; two additional laboratory science courses; Area A and Area D mathematics courses. Students must receive a grade of "C" or better for all classes required in the major. Classes with grades lower than a "C" cannot be used to satisfy prerequisite requirements for courses required in the major. To complete a degree in biology, students must obtain a minimum overall grade point average of 2.0 in all science courses applied to graduation.

II. B. The Quality of the Curriculum Supporting the Program

State your assessment of the strength of the evidence of program quality on this indicator
Very Strong

- *The relationship between the program's curriculum and its outcomes.*

    The expected outcomes of the program are defined in the 2005-2006 Columbus State University Catalog. The overall outcome is "…to prepare broadly prepared individuals who can successfully specialize in graduate or health professional

schools or seek immediate employment…" This goal is to be achieved through a number of specific outcomes that are described below.

1. Apply knowledge from mathematics, statistics, physical science, and chemistry to biological understanding.
2. Develop an understanding of biological theory, concepts, and skills in the areas of cellular biology, molecular biology, genetics, organismic biology, ecology, population biology, and evolution.
3. Think both individually and as members of collaborative groups, with a deliberate awareness of the process of critical thinking.
4. Employ critical thinking to formulate questions and synthesize answers.
5. Respect and enjoy the pursuit of knowledge and rational thought.
6. Place biological understanding into historical and contemporary contexts.
7. Appreciate and assess social implications of biological knowledge.
8. Demonstrate an awareness of and appreciation for codes of conduct valued by most scientists.
9. Communicate effectively by listening speaking, reading, and writing.
10. Apply appropriate communications technology.
11. Apply technology and scientific method to biological inquiry.
12. Assess opportunities and make personal decisions about career and life goals.

The program is required to provide courses serving different purposes. Most of the course offerings are for biology majors, but some courses (e.g., BIOL1125, BIOL1215 and BIOL1225) are directed at providing information for non-majors that will not take more biology courses. Only some of the outcomes above are appropriate for the program when non-major courses are considered, while all of them are appropriate when considering the biology majors. For instance, it may not be possible to consider outcome 2 for a class of non-majors, while outcomes 6 and 7 may be very important in that type of class. Because all of these outcomes can be considered by examining the curriculum for biology majors, this will be the focus of the discussion in this section.

The curriculum is carefully designed in several ways to meet all outcomes above for biology majors.

1. All majors are required to complete biology 2285 (Research Methods). In this course they are required to research biology careers, learn how to create a hypothesis, how to locate and peruse primary and secondary literature, how to analyze data with the correct statistical analysis using computer technology, and how to present data with Microsoft Power Point®. This course directly addresses outcomes 1, 4, 5, 8, 9, 10, 11, and 12. It also indirectly addresses the other points.
2. All majors are required to complete basic courses at the junior level in cell biology, genetics, ecology and taxonomy, which is the first instance in which the student addresses outcome 2 directly. In addition, the curriculum requires that the BA students take at least one cellular/molecular, two organismal and one ecology/evolution course

electives, while the BS students complete two cellular/ molecular, three organismal and one ecology/evolution program electives. These requirements strengthen the coverage of outcome 2.

3. All majors are also required to complete Biology 4795 (Capstone Senior Seminar). This course involves reading and discussing primary and secondary literature that focuses on, but is not exclusively limited to, important papers on ecology and evolution. This places the knowledge gained into a social and historical context, and allows the student to think critically about biological ideas as they discuss the topics as individuals and groups. This addresses most of the outcomes above, but specifically concentrates on outcomes 3-9 and 11.
4. All BS students are required to complete courses 4391, 4392, and 4393 (Research Proposal, Research, and Research Presentation). The BA students have the option to take these courses, but they are not required of them. These courses directly address all of the outcomes.
5. The courses related to the major, such as mathematics, statistics, physics and chemistry that are required help in directly addressing outcome 1.
6. Most, if not all, of the individual upper level 5515, 5525, and 5535 electives (respective courses in which cellular/molecular, organismal, ecology/evolution topics are considered) incorporate elements that address most of the outcomes while teaching facts, although each course places varying emphasis on each of the outcomes.

- *Indicate how technological skills are incorporated into the program of study*
  Technological skills in collecting background information and analyzing and presenting data are incorporated into the program to a large degree in research methods (biology 2285). Specific skills in using equipment and techniques are incorporated in the individual 5515, 5525, 5535 courses. Many of the 5000-level courses also require presentations and assignments that necessitate the further use of the analytical and presentation skills first introduced in biology 2285. Finally, the research project is largely devoted to the learning of specific techniques and the use of appropriate technology to gather, analyze and present the data.

- *Indicate how the program is relevant to student needs*
  The ultimate need of the student is to be prepared to enter graduate or professional school, or to gain immediate employment upon graduation. The program is geared to prepare students for any of these career choices. If the student wishes to pursue post-graduate studies, the critical thinking and analysis skills, combined with the technical skills gained during the coursework in the program will prepare them for such studies. The selection of 5515, 5525, and 5535 courses allows the student to gain specialized knowledge in an area that they may be interested in pursuing after graduation. The basic requirements for the differing types of electives prevents overspecialization so that if plans or interests change the student will already have some basic knowledge in the new area of interest. For students that plan on employment immediately after graduation, the cognitive skills (e.g., problem solving, the ability to prioritize tasks, etc.) learned will be

extremely valuable whether the specific techniques and skills learned are needed or not.

- *Describe how students are challenged to think across disciplines and explain how diversity, multiculturalism, and international perspectives are included in the program*

  Students are challenged to think across disciplines in several ways. In the Senior Capstone course (Biology 4795), students read papers from many areas of biology. Though focused on evolution, many of the papers have social, political and economic implications which students discuss. Furthermore, the department offers a number of international courses (in the Bahamas, Africa, Australia, Central America and South America) that are not exclusively focused on biology, but also include issues of culture, economics, land use and politics. This also provides the students with exposure to differing cultures and diversity. The program has been very successful with international efforts, as evidenced by receiving an award for Best Practices in International Education for the University System of Georgia.

  Biology majors are a very diverse group, as reflected in the table below.

  Table 1: Diversity of population of Biology majors at Columbus State University in academic year 2004/2005 in various categories.

Category	Percent of majors
Full time	75
Part time	25
Female	69
Male	31
International	1
Asian American	5
African American	35
Hispanic American	4
Native American	1
Multiracial American	4
Caucasian American	50
Under 21 years	57.8
21-25 years	28.7
26-30 years	7.2
31-40 years	5.5
41-50 years	0.8
Over 50 years	0

  This diversity in all of these categories promotes broadened reasoning and tolerance for differing opinions, both qualities that are essential for a properly educated scientist.

- *Describe methods to be pursued for program improvement*
  Possible issues to examine that may improve the program include:
  1. The hiring of more professors, some of which are newly in place. This allows offering of more courses of all types for more flexibility for the students to enroll in courses of the most interest.
  2. Re-examination of the introductory level course offerings, specifically Biology 1215 (Principles of Biology) and Biology 1225 (Contemporary Issues in Biology). It is currently difficult to properly cover the important topics of evolution, ecology and biodiversity in Biology 1215. Biology 1225 has not been offered recently because of difficulty in approaching the topics at an introductory level for students that are not required to have previous biology experience. It may be possible to restructure these courses to improve their role in the program.
  3. The department has recently implemented new academic requirements for our majors that may improve the skills they acquire by completion of the program. The students are now required to obtain an overall 2.5 GPA and to have completed Chemistry 1211, 1211L, and 1212 and 1212L, two additional laboratory science courses, and Area A and Area D mathematics courses before continuing to the junior level biology courses. Additionally, classes with grades lower than a "C" cannot be used to satisfy prerequisite requirements for courses required in the major. Finally, to complete a degree in biology, students must obtain a minimum overall grade point average of 2.0 in all science courses applied to graduation. The department anticipates that these standards will provide motivation for students to achieve, and thus they will be more competent graduates.

II. C. Selectivity, Academic Achievement, and Satisfaction of Students in the Program

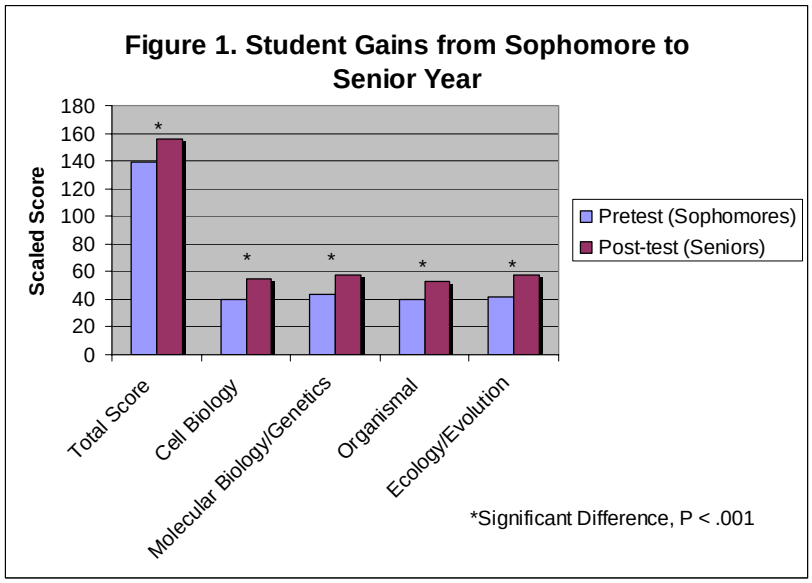
State your assessment of the strength of the evidence of program quality on this indicator.
Above Average

- *Describe the characteristics of students in the program.*
  For all Biology majors in 2004/2005, the average SAT Verbal score was 503, the average SAT Math score was 492, and the average GPA was 2.72. Retention is similar to or exceeds that of the University as a whole: 72% after one year, 47% after two years, and 44% after three years (2002 Freshmen Cohort).

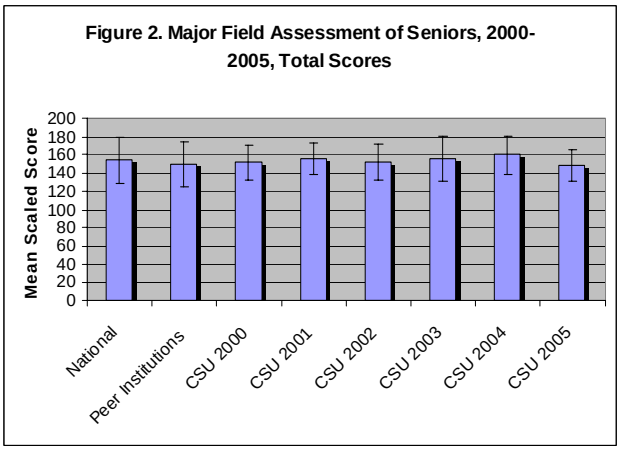
- *Describe student learning, satisfaction, and evidence of success in meeting student needs and learning outcomes as reflected by major field assessment.*

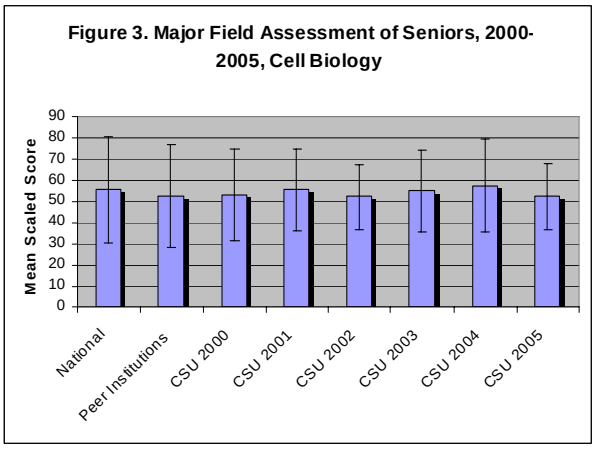
  Figure 1 demonstrates statistically significant gains in student scores on the Biology Major Field Test (ETS) between the sophomore and senior years. Gains were significant and similar for the total score and for each subscore. For the total score, the average student moved from the 10th percentile to the 55th percentile. Percentile gains for the subscores were similar to those for the total score.

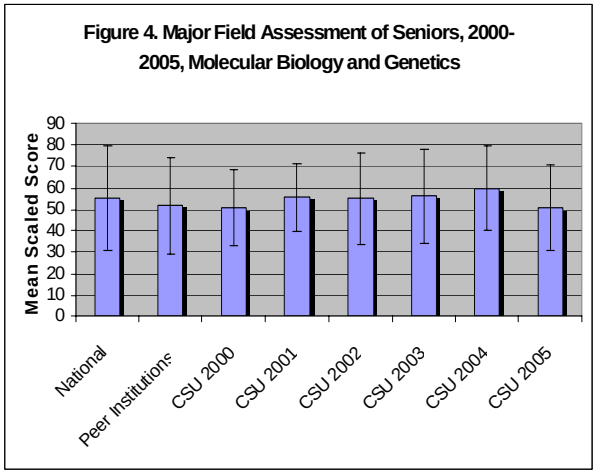
Significance of gains was tested using a paired t-test for 24 students who were tested as both sophomores and seniors between 2000 and 2004. We discontinued testing sophomores after 2004 in order not to skew national norms.

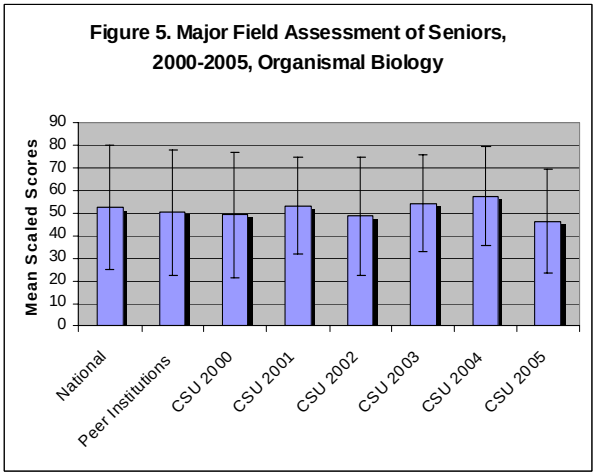


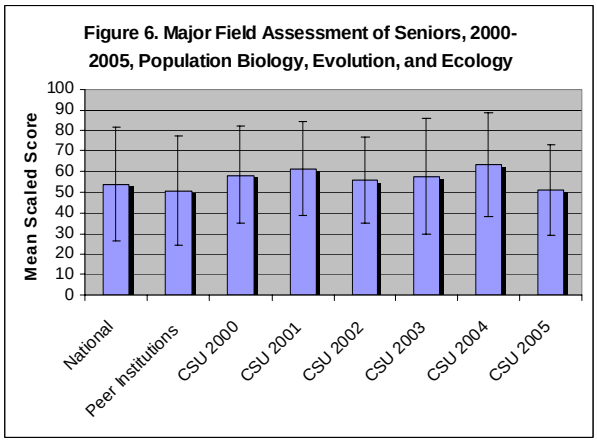
Figures 2-6 compare CSU seniors of the last 6 years to all students nationally who took the test and to students at 10 peer institutions. These peer institutions included Augusta State University (GA), Clayton College and State University (GA), Francis Marion College (SC), Georgia College and State University, Georgia Southwestern State University, North Georgia College and State University, University of North Alabama, University of South Carolina – Spartansburg, Valdosta State University (GA) and University of South Carolina – Aiken. The error brackets indicate 95% confidence intervals. CSU scores are not significantly different in any year from the scores of the two comparison groups.











We do not have data on student satisfaction and meeting student needs, as these items are not assessed by the Major Field Test.

- *Describe methods to be pursued for program improvement.*

1. We are implementing a requirement of a GPA of 2.5 for admittance to the junior year of the program. We hope that this will control growth of the program and ensure that limited resources are devoted to the more capable and serious students.
2. We are implementing a requirement that students receive a C or better in all courses required by the major. We hope that this will improve students' progress toward their degree and will better prepare them for Major Field Assessment and for further training and work in biology.
3. We will continue to assess the curriculum annually and make changes to address any needs revealed by Major Field Assessment.

II D. The Quality of Faculty Supporting the Program

State your assessment of the strength of the evidence of program quality on this indicator.
Above Average

- *Describe the adequacy of faculty and staff to support the program (locations of graduate training, post-graduate training, specializations, secondary fields)*

Faculty	2000	2001	2002	2003	2004	2005
Full-Time	13 (6)	13 (6)	14 (6)	14 (6)	14 (5)	14 (5)
Part-Time	3	3	5	3	5	4

Numbers in parentheses indicate the number of faculty with reduced teaching loads. Not evident in this chart, is the fact that our number of majors have doubled from 2000-2005 however, our net increase in faculty has been one. Thirteen faculty were full time from 2000-2005 with 6 individuals at a reduced teaching load due to administrative duties (Cleveland - Dean, Stokes – Assoc. Dean, Stanton – Chair and Dean, Birkhead – Asst. Chair and Chair, Champion – Director of Oxbow Meadows, and Gardner – Director of Science Education Outreach). Currently we have 14 full time faculty members with 5 individuals at a reduced teaching load due to administrative duties (Stanton - Dean, Stokes – Assoc. Dean, Birkhead - Chair, Ballenger – Asst. Chair and Champion – Director of Oxbow Meadows). This number is inadequate to effectively support the department's degrees offered by the program.

- *Describe the support provided for faculty development*
Over the past five years the faculty has received nearly $7000 in support for faculty development. This was received from the Faculty Development budget, the College of Science and the Department of Biology. In addition faculty members have received over $375,000 from a variety of outside agencies such as GA DNR, US Dept of Interior and NSF Course and Curriculum Improvement. This support has resulted in 21 professional papers and 9 professional talks. In addition, faculty have served as reviewers for professional journals and textbooks; and have attended conferences, presented research at conferences and served as officers in professional organizations.

- *Show faculty diversity and credentials*

Faculty Diversity

	Full time Faculty					
	2000	2001	2002	2003	2004	2005
Male	10	10	10	10	10	10
Female	3	3	4	4	4	4
Black	1	1	1	1	1	1
White	12	12	13	13	13	13

	Part-time Faculty					
	2000	2001	2002	2003	2004	2005
Male	1	1	1	1	2	1
Female	2	2	4	2	3	3

Faculty Credentials

George E. Stanton, Professor
Dean of Science, (2004-present), Interim Director, Environmental Science Graduate Program (2004-2005), Acting Dean of Science, (2003-2004), Chair, Department of Biology (1982-2003)
Ph.D., Zoology & Entomology, University of Maine
National Science Foundation, Science Faculty Fellow
Postdoctoral Fellow Auburn University, Aquatic Ecology

Glenn D. Stokes, Professor
Associate Dean College of Science (1986-present)
Ph.D., Zoology, The Pennsylvania State University

William S. Birkhead, Professor
Interim Chair (2003-present)
M.A., Zoology, Minor: Biochemistry; Botany, The University of Texas at Austin
Ph.D., Zoology, The University of Texas at Austin

Julie A. Ballenger, Professor
Assistant Chair (2003-present), Assistant Director, Center for International Education (2003-present)
M.S., Paleobotany, Fort Hays State University, Hays, Kansas.
Ph.D., Botany, Miami University, Oxford, Ohio.
Post - Doctoral Research Associate, L.H. Bailey Hortorium, Cornell University, Ithaca New York.

John A. Barone, Assistant Professor

Ph.D., Botany, University of Utah (Salt Lake City, UT)
Visiting Research Ecologist. North Central Experiment Station, USDA Forest Service, Houghton, MI.
Postdoctoral Researcher. Institute for Tropical Ecosystem Studies, University of Puerto Rico, Rio Piedras, PR.
Post-doctoral associate. Department of Forestry, Mississippi State University, Starkville, MS.
Postdoctoral Fellow. Smithsonian Institution, Smithsonian Tropical Research Institute, Panama City, Panama.

Rebecca A. (Becky) Champion, Associate Professor

Executive Director of Oxbow Meadows Environmental Learning Center
M. S., Georgia State University; Atlanta, GA
Ph. D, Georgia Institute of Technology; Atlanta, GA

John K. Davis, Assistant Professor

M. A., Microbiology, Indiana University, Bloomington IN
Ph. D., Microbiology; minor, Molecular Biology; Indiana University, Bloomington IN,
Postdoctoral research microbiologist, Armstrong Laboratory, Tyndall Air Force Base.
Postdoctoral research faculty, Center for Microbial Ecology Michigan State University.

Kenneth A. Gafford, Assistant Professor

MAE, Education, Biology, The University of Alabama at Birmingham
Ed. S., Education, Biology, The University of Alabama at Birmingham
Ph. D., Curriculum and Instruction, Science Education, The University of Alabama, Tuscaloosa

Harlan J. Hendricks, Associate Professor

M.S., Entomology, Auburn University
Ph.D., Entomology, Virginia Tech

Elizabeth Alfaro Klar, Part-time Faculty

Master of Science, University of Georgia

Milwood A. Motley, Associate Professor

M.S., Microbiology, Virginia Commonwealth University
Ph.D., Microbiology, University of Louisville
Postdoctoral fellowUniversity of Rochester

Lisa M. (Weis) Schneper, Assistant Professor
Ph.D., Biochemistry , University of Medicine and Dentistry of New Jersey (UMDNJ),
Research Scientist, Department of Molecular Biology, Princeton University, Princeton, NJ
Postdoctoral Fellow, Department of Molecular Biology, Princeton University, Princeton, NJ

Brian W. Schwartz, Associate Professor
Ph.D., Genetics, University of Wisconsin-Madison
Post-Doctoral Research Associate, Oklahoma State University

Kathleen W Sellers, Assistant Professor
Ph.D., Biomedical Sciences, University of Florida, Gainesville, Florida
Post-Doctoral Associate, Department of Physiology and Functional Genomics, University of Florida

Jeffrey A. Stratford, Part-time Faculty
M.S., Southeastern Louisiana University
Ph.D., Auburn University

Nora Gerdes Stevens, Part-time Faculty
M.S., Biology, California Polytechnic State
Doctor of Adult Education, Auburn University, Alabama, expected August 2006

Jeffrey A. Zuiderveen, Professor
Ph.D., Toxicology, University of Kentucky

- *Describe how part-time faculty are integrated into the program*
  Part-time faculty work with full-time faculty members to ensure course requirements and rigor are met and maintained. One afternoon of each week is set aside to meet and prepare lab materials for all full and part-time faculty members involved in Biol 1215 (Principles of Biology). Those part-time faculty teaching specialty courses meet with the appropriate faculty members with experience in the course or expertise in the area to determine books to be used and content to be covered. Part-time faculty members are provided an office, phone and computer. Part-time faculty members are invited to attend appropriate departmental meetings and professional meetings.

- *Describe methods to be pursued for program improvement*
  The department plans to increase the number of full-time faculty to ensure that the rigor of the programs can be maintained. An analysis by the chair determined that we need to double our faculty in order to deliver our programs effectively.

II E. The Quality of Facilities and Equipment Supporting the Program

State your assessment of the strength of the evidence of program quality on this indicator
Satisfactory

- *Describe the condition and adequacy of available space*

The condition of the space supporting the program is adequate, though it is beginning to become outdated. The major issue will soon be adequate space. As the student and faculty population of the university continues to increase, so will the number of classes that must be offered. This does not present a major difficulty for the lecture portion of classes, but it becomes very problematic for laboratory sections. Each laboratory room can seat only 24 students and must be specifically equipped for only a few uses. The program is now near or at the maximum capacity to offer more courses due to lack of appropriate lab space. The problem this presents is illustrated by the examples below.

The program is offering 11 sections of Principles of Biology consisting of 24 students per section in the spring semester of 2006. With each section meeting for 2 hours, and considering the time it takes to prepare for the labs, it is not possible to use that room for any other class. There is not even much free time to schedule additional sections of Principles of Biology in the room.

Some classes require the use of microscopes, but it is too costly to place 24 microscopes in each laboratory so that any class that needed microscopes could be held in any room. The only other choice is to transport microscopes to and from the room every class period, which is time consuming, cumbersome, and poses the possibility of damaging the microscopes. Most courses face a similar dilemma. There is insufficient time to set up and tear down labs in order to share them between courses with different space and equipment needs even if the room is free and the equipment is available. When one lab ends at noon and the next class that is different begins at 1:00 PM, there is not time for the instructors to prepare adequately between classes.

These examples should briefly illustrate that the program is in need of increased laboratory space if the quality is to be maintained in the face of a rapidly increasing student body.

- *Describe the condition and adequacy of technology labs, equipment, and library resources*

The program is suffering from the same problem, lack of space, when technology labs are considered. There is one computer lab in LeNoir Hall that seats approximately 30 students. There is increasing demand for classes that use this lab, and it is becoming difficult to schedule the use of this room since some classes now utilize the lab for every class period. The space to have specialty lab rooms for technical pieces of equipment (e.g., HPLC, DNA sequencers, ultracold freezers and spectrophotometers) is quite limited. These are machines with which modern Biology students must be

familiar in order to be successful in graduate studies or to gain employment in many fields of biology. Our ability to acquire and effectively use these devices is limited in part by lack of space, and partly by lack of funding. The program has recently improved some aspects of the technology by the acquisition a new autoclave, a purified water system and growth chambers. In addition, a DNA sequencer will be added soon, and the chemistry department has obtained a very good HPCL system that is available for our use as well.

We currently share a van and a pickup with many of the other departments in the College of Science. Both vehicles are dated and in need of replacement. The heavy use that our department alone incurs would make the purchase of a van and pickup a reasonable need for our department.

The resources of the library are somewhat limited. The searching capability often only finds resources in very obscure journals that are of little use, while missing relevant resources in well-known journals. The holdings of the library may be adequate in some fields of biology, but in many areas they are inadequate or even non-existent. Of a total of 822 total journal subscriptions the library currently holds, only 35 (4.26%) are Biological or Biology related journals. The list of all Biology and related journals below demonstrates the gaps in the journal coverage, with many of the journals covering education, human health, or general topics, while very few are field-specific in areas other than health. We recommend that the library be allowed to invest in biology-focused journals instead of encumbering the faculty members with the need to have individual subscriptions.

American Biology Teacher
American Midland Naturalist
Annals of Botany
Behavioral and Brain Sciences
Cell
Discover
Ecology
Field and Stream
Genome
JAMA
Journal of College Science Teaching
Journals of Gerontology A
National Parks
Nature
New Scientist
Nutrition Today
Physiological Reviews
Southeastern Naturalist
American Journal of Physiology
Animal Behaviour (added Jan. 2006)
Audubon
Canadian journal of applied physiology
Deadalus
Ecological Applications
Environmental Science & Technology
Genetics
Human Development
Journal of Clinical Microbiology
Journal of Environmental Health
Lancet
Natural History
New England Journal of Medicine
NSTA Reports
One Earth
Science
Trends in Ecology and Evolution

- *Provide other indicators of adequacy of campus infrastructure to support the program*

The campus infrastructure in general (e.g., the office of grants, alumni affairs, the registrar and financial aid) seems adequate to properly support the program.

- *Describe methods to be pursued for program improvement*

A new building that would provide more space for classes and equipment, more money for equipment, newer vehicles and increased library services would greatly improve our program.

II. F. The Quality of Research and Scholarship Supporting the Program

State your assessment of the strength of the evidence of program quality on this indicator.
Above Average

- *Explain how faculty members involve students in research.*

  We value undergraduate research. This is demonstrated by the requirement that all students seeking a B.S. in Biology must complete an independent research project. The research project includes 3 courses carrying 5 credits: BIOL 4391 (Research Proposal), BIOL 4392 (Undergraduate Research), and BIOL 4393 (Research Presentation). Since initiating the research requirement in 1997, 85 students have completed BIOL 4393. All of these students prepared written reports and made oral presentations on campus, and many of them have presented at scientific meetings. Several students have won research awards at the state, regional, and national levels (see indicator II. I). In addition, some faculty have involved student workers in research projects funded by outside agencies.

- *Describe how faculty research relates to the program mission.*

  The primary mission of the Biology program is to educate Biology majors in their chosen field. Faculty research contributes to this mission in two ways. First, faculty involvement in research helps to keep them current and active in their field of expertise. Therefore, through research experiences, faculty enrich the content of their courses. More importantly, Biology faculty view research experience as a necessary component to an undergraduate education in Biology. We view Biology not just as a body of knowledge to be learned, but also as a process to be learned by practice. Therefore, most faculty research is devoted to providing genuine research experiences to our students.

- *Describe mentoring and professional development opportunities for faculty.*

  Each new faculty member is assigned a mentor from among the more established faculty. The mentors offer advice and guidance as the new faculty members work to establish a body of accomplishments that will allow them to apply for

promotion and tenure. Mentoring relationships are ongoing and extend beyond the probationary period required for promotion and tenure. The Department devotes a modest part of its operational budget to professional development of faculty. Each year, faculty members attend a regional meeting on State of the Art in Biology (SOTAB). This meeting is designed to inform University System biologists of recent developments in various areas of biology and to keep them current in their field. In addition, funds are available to send each faculty member to one regional or national meeting in their discipline. The Department also has supported individual faculty members to travel to various conferences and workshops on topics such as teaching in biology and undergraduate research.

- *List faculty publications, papers given, and public lectures*

  Recent publications and reports:

  - Timmerman-Erskin, M., **J. Ballenger**, R. Dute, R. Boyd. 2003. Allozyme investigation of the *Trillium pusillum* Michaux complex (Trilliaceae): Taxonomic and conservation implications. Journal of the Torrey Botanical Society, latest edition
  - **Barone, J. A.** 2005. The Historical Distribution of Prairies in the Jackson Prairie Belt and in Western Mississippi. Journal of the Mississippi Academy of Science (in press).
  - **Barone, J. A.** 2005. The Black Belt prairie of Mississippi and Alabama: A re-assessment of historical and ecological data. Castanea (in press).
  - **Birkhead, W.S.**, B. N. Harris and **G. D. Stokes**. 2004. An assessment of the long-term fidelity of gopher tortoises, Gopherus polyphemus, to a relocation site at George W. Andrews Lock and Dam, Early County, Georgia. Report of U.S. Army Corps of Engineers.
  - Jensen, J.B., and **W.S. Birkhead**. 2002. Distribution and status of the Alligator Snapping Turtle (Macrochelys temminckii) in Georgia, U.S.A. Southeastern Naturalist. 2:25-34.
  - Gore, J.A., **W.S. Birkhead**, D.L. Hughes, S.L. Nichols, and T.W. Roever. 2004. Recovery and colonization dynamics of macroinvertebrates and fish in newly created habitat after sediment remediation from manufactured gas-processing waste in the Oconee River. River Research and Application. (IN PRESS)
  - **Birkhead, W.S.** 2001. Distribution and abundance of amphibians and reptiles during the 2000 activity season on the Callaway Extended Property, Harris County, Georgia. Report to Callaway Gardens Department of Conservation Studies. 24 p.
  - **Birkhead, W.S**. 2001. Relocation of gopher tortoises (Gopherus polyphemus) from the Muscogee County Technology Park (MTP) to suitable habitat on the Fort Benning Reservation, Muscogee County, Georgia. Report to Jordan, Jones, and Goulding Consultants, Norcross, Georgia, 11 p.

- **Birkhead, W.S.** 2002. Distribution and abundance of amphibians and reptiles during the 2001 activity season on the Callaway Extended Property, Harris County, Georgia. Report to Callaway Gardens Department of Conservation Studies. 22 p.
- **Birkhead, W.S.** 2002. Protected species survey: Georgia species of concern. Report to Golder Associates, Georgia. 10 p.
- **Birkhead, W.S.** 2003. Distribution and abundance of amphibians and reptiles during the 2002 activity season on the Callaway Preserve, Harris County, Georgia. Report to Callaway Gardens Department of Conservation Studies. 17 p.
- **Birkhead, W.S.** 2004. Distribution and abundance of amphibians and reptiles during the 2003 activity season on the Callaway Preserve, Harris County, Georgia. Report to Callaway Gardens Department of Conservation Studies. 17 p.
- **Stanton, George E.** 2003. First record of the crayfish *Procambarus (Ortmannicus) verrucosus* Hobbs in Georgia. *Southeastern Naturalist.* 2(4): 615-618.
- Stringfellow, C. and **J. Zuiderveen.** 2003. "Follow-up Report on Freshwater Mussels of the Tallapoosa and Little Tallapoosa River Drainage Systems in Georgia". Final report submitted to Eco-South, Inc., Covington, GA.
- **Zuiderveen, J. C.** Stringfellow and G. Dinkins. 2002. "Survey for the Purple Bankclimber (*Elliptoideus* sloatianus) and other Native Mussels in the Upper Reach of the Goat Rock Impoundment". Final report submitted to Georgia Power Company, Columbus, GA.
- Stringfellow, C. and **J. Zuiderveen**. 2002. "Report on Freshwater Mussels of the Tallapoosa River Drainage System in Georgia". Final report submitted to Eco-South, Inc., Covington, GA.
- Stringfellow, C. and **J. Zuiderveen**. 2001. " Freshwater Mussel Survey of the upper Flint River and Sullivan Creek ". Final report submitted to Eco-South, Inc., Covington, GA.
- Stringfellow, C. and **J. Zuiderveen**. 2001."Survey of a Section of the Chattahoochee River for Endangered Freshwater Mussels as Related to the Area Proposed for a Power Plant Outfall". Final report submitted to LS Power Development, LLC, St. Louis, MO.
- Stringfellow, C. and **J. Zuiderveen**. 2000. "Mussel Survey at the Proposed Marine Loading Facility Located Adjacent to the Flint River in Bainbridge, Decatur County, Georgia". Final report submitted to Stewart Machine Company, Bainbridge, GA.
- Stringfellow, C. and **J. Zuiderveen**. 2000. "Mussel Survey of the Flint River, upstream of Still Branch in Pike and Meriwether County, GA". Final report submitted to Engineering Strategies, Inc. Marietta, GA.
- Stringfellow, C. and **J. Zuiderveen**. 2000. "Mussel Survey of Line Creek at the Proposed TDK Boulevard Extension located at the Coweta and Fayette County line, Peachtree City, GA". Final report submitted to URS Corporation, Alpharetta, GA.

Recent presentations:

- **Ballenger, J.A., W. S. Birkhead, G. S. Stanton, H. J Hendricks, G. D. Stokes, J. Barone** and R.C. Stringfellow. 2005. A Road Less Traveled (poster). State of the Art in Biology Annual Meeting, Athens, Georgia
- McCrillis, N.R., **J.A. Ballenger** and S. Eijssen. 2005. Internationalizing Columbus State University: Curriculum, Study Abroad and Programming. Stepping up to the Plate in Diversity Education: A Best Practices Conference for Educators and Administrators. Atlanta, Georgia.
- **Birkhead, W.S., J.A. Ballenger** and W.F. Chambers. 2005. International Education Programs at CSU. Georgia Ornithological Society Spring meeting. Columbus, Georgia.
- **Barone, J. A.** "Black Belt Prairies of Mississippi and Alabama: An evaluation of historical evidence". Department of Entomology and Plant Pathology, Mississippi State University, Starkville, Mississippi. (May 2004)
- **Davis, J. K**., C. Harzman, S.-H. Kim, and J. M. Tiedje. Microarray analysis of reductive dehalogenase gene induction in Desulfitobacterium hafniense DCB-2. Presented at the 104th annual general meeting of the American Society for Microbiology, New Orleans, LA, May 23-2, 2004.
- **Schwartz, B.W.**, Morris, J.L., and Demons, S.T. (2002) OCCURRENCE AND GENETIC CONSEQUENCES OF SELF-FERTILIZATION IN THE HOMOSPOROUS FERN *CERATOPTERIS RICHARDII* (C-FERN). Paper presented at Annual Meeting of the Genetics Society of Georgia.
- **Schwartz, B.W.**, **H.J. Hendricks**, J.L. Dugas, & P.K. Adams. 2004. Use of data collection technology in an introductory biology laboratory. Georgia Academy of Science Annual Meeting, Berry College, Mount Berry.
- **Stanton, G.E.** and P.T. Lopez. 2001. Georgia distributions and habitat characteristics of *Procambarus (Ortmannicus) acutissimus* and *P. (O) verrucosus.* Presented at 62nd meeting of the Association of Southeastern Biologists, New Orleans (April, 2001)
- **Stokes, G.D.** Use of Geographical Information Systems in the study of Gopher Tortoise ecology. GIS in Teaching and Research Meeting. 2004.

- *Describe methods to be pursued for program improvement*
  - We will encourage undergraduate research students to prepare their reports for publication in appropriate journals such as *Bios*.
  - Faculty will continue to be encouraged to carry out research and publish their findings.
  - We will continue to press the administration to adequately fund faculty development and research activities.

II G. The Quality of Service Supporting the Program

State your assessment of the strength of the evidence of program quality on this indicator
Above average

- *Describe projects completed and outcomes which contribute to the program, department, college, institution, community and/or the region*

  The quantity and quality of service by the members of the faculty in the Biology department are remarkable. The faculty members have been and currently are involved in service projects at all levels that are too numerous to describe adequately here. The reader is referred to the *curriculum vitae* of the individual faculty members for a complete list of service activities. These are located in the departmental office.

  The faculty members of the Biology Department are dedicated to involvement in any project that will enhance the learning of the students, either directly or indirectly by improving the department or university. A very incomplete list of a few projects that faculty have been involved in are:

  - Science Fair judging and organizing
  - Science Olympiad organization and judging
  - Television and newspaper interviews
  - Grant writing to obtain computers and other equipment for improving lab exercises
  - Development of international classes to The Bahamas, Australia, Equador, Belize and Botswana
  - Service on many substantive committees, including QEP, Faculty Senate, Strategic Planning Committee, and many others.
  - Agency funding to conduct floral and faunal surveys.
  - Installation of a canopy walk at Oxbow Meadows Nature Center
  - Members and officers of professional societies
  - Presentation of research at professional meetings
  - Presentations to local schools and civic clubs

- *Describe methods to be pursued for program improvement*

  This partial list demonstrates that the faculty members are extremely active in service to the department, university and community. Encouragement will be provided so that they can find new ways to be of service, and to provide time so that they are able to serve to the best of their abilities.

II. H. Program Honors and Awards

State your assessment of the strength of the evidence of program quality on this indicator.
Above Average

- *Identify the formal honors, awards, high rankings, citations of excellence, accreditations, positive external reviews, etc. that this degree program has received over the last seven years.*

    - Best Practices in International Education – University System of Georgia – 2005

    - Beta Beta Beta Biological National Honor Society – Outstanding Chapter – 2004

- *If program accreditation is available but has not been attained at CSU, explain why.*

    Program accreditation is not available in biology.

II. I. Exceptional Achievements and Honors of the Program's Students, Graduates, and Faculty

State your assessment of the strength of the evidence of program quality on this indicator.
Very Strong

- *Identify the exceptional achievements and honors received by the program's students, graduates, and faculty over the past five years which reflect on the quality of the program.*

    - Faculty
        - Julie Ballenger – Educator of the Year – 2003; Outstanding BBB chapter adviser – 2005; Finalist , Faculty Service Award – 2005
        - Bill Birkhead – Finalist, Faculty Service Award – 2003
        - Francis Gardner – Faculty Service Award – 2000
        - Brian Schwartz – Finalist, Educator of the Year – 2004
        - Glenn Stokes – Educator of the Year – 2000
        - Jeff Zuiderveen – Finalist, Educator of the Year – 2000; Who's Who Among American Teachers – 2000, 2005

- Students
  - Joanne Brown − 2nd place, Brooks Award, BBB District Convention − 2003; BBB Research Grant
  - Ashley Chaplin − 1st place, Georgia Academy of Science – 2004
  - Dorothy Cheruiyot – 1st Place, Brooks Award, BBB District Convention – 2004; 2nd Place , Brooks Award, BBB National Convention − 2004
  - Elizabeth Danner – 2nd place, Johnson Award, BBB District Convention – 2005
  - Jeremy Dockery – 3rd place, Brooks Award, BBB District Convention – 2001
  - Josh Fields − 1st place, Georiga Academy of Science − 2002
  - Jennifer Fuller − honorable mention, Brooks Award ,BBB District Convention − 2005
  - Blayke Gibson – Faculty Cup – 2005; 1st place, Brooks Award, BBB District Convention – 2005
  - Tony Griffin − 2nd place, Brooks Award, BBB District Convention − 2002
  - Brett Harris − 2nd place, Brooks Award, BBB District Convention − 2005
  - Jason Harrison − honorable mention, Brooks Award, BBB District Convention − 2000
  - Mary Hill – Faculty Cup – 2003; 1st place, Brooks Award, BBB National Convention – 2004; 1st place, Brooks Award, BBB District Convention – 2003
  - Ruth Ann Welch – 2nd place, Brooks Award, BBB District Convention – 2000; BBB Research Grant – 2000

II. J. General Success of the Program's Graduates

State your assessment of the strength of the evidence of program quality on this indicator.
Satisfactory

- *Report the results of the department's assessments of the general success of the program's graduates such as licensure or certification rates, job offers, job placement statistics, average salaries, subsequent career advancement, test scores, admissions to post-baccalaureate programs, etc.*

  We do not have a mechanism for tracking our graduates' post-baccalaureate careers in the detail required to address all of these issues. We recommend that the Office of Institutional Effectiveness track all graduates and provide departments with relevant statistics.

However, we have been able to determine initial career steps for 77 of our 104 students who have graduated during the last 5 years. This information is summarized in the table below.

Occupation	Number of Graduates
Teacher	13
Graduate School (Science)	13
Sales, Customer Service	8
Professional School (Health)	6
Medical School	5
Veterinary School	4
Management	4
Data Processing	3
Medical Technician	3
Graduate School (Education)	3
Environmental Research/Consulting	2
Homemaker	2
Military	2
Laboratory Technician	2
Conservation Biology	2
Law School	1
Graduate School (Business)	1
Educational Staff	1
Quality Control	1
Unemployed	1

The table indicates that the vast majority of recent graduates are gainfully employed or are actively being trained for a career. Most of our students go right into graduate or professional schools of some kind. Teaching is the most common career choice for recent graduates who entered the workforce directly.

II K. Stakeholder Satisfaction with the Program

State your assessment of the strength of the evidence of program quality on this indicator. Unknown

- *Report the results of surveys of students, alumni, employers, community partners, etc. concerning their satisfaction with the quality of the program and its learning experiences and any program improvements initiated as a function of such feedback over time.*

  We do not have these data, thus we cannot address this topic. Again, we recommend that the Office of Institutional Effectiveness survey our graduates and provide us with the relevant statistics.

II L. Program's Responsiveness to Change & Improvement

State your assessment of the strength of the evidence of program quality on this indicator.
Very Strong

- *Cite the most significant examples of improvements made in the program over the last seven years in response to changing conditions, new external requirements, and/or departmental assessment initiatives.*
    - The Bachelor in Science degree requires an independent research project as partial fulfillment of the degree
    - The Bachelor of Arts requires a minor or an approved equivalent and two semesters of a foreign language at the 2000 level to complete the degree.
    - The curriculum has been internationalized by adding five different courses taught in five different countries.
    - The overall GPA requirement to enter into the junior biology courses is 2.5.
    - Students must receive a grade of C or better in all classes required for the major.
    - A minimum GPA of 2.0 in all science courses is required for those courses applied to graduation.

- *Comment on how frequently the program's faculty is engaged in program assessment activities, comprehensive program evaluations, and fine tuning of the program and its requirements.*

  Each year, the department completes a program assessment consisting of student major field tests. The results of this assessment are discussed at the department's first meeting of the academic year and concerns and recommendations are addressed. We also review our strategic plan annually and develop a strategic plan for the upcoming year. Recently efforts to track alumni have been strengthened and will become a regular part of the overall assessment process. A comprehensive program review is completed every seven years.

III. Summary Findings of the Program's Overall Productivity

III A. Enrollment of Students in the Program

State your assessment of the strength of the evidence of program quality on this indicator.
Above average

- *Analyze and interpret the numbers of enrolled upper division majors in the program and the enrollment trends of these majors for the past five years.*

  The enrollment of our upper division majors has steadily increased over the past four years, going from 91 ('01-'02) to 131 ('04-'05) students. This 44% increase seems to indicate a growing interest in the Biology programs by CSU students.

- *Compare the strength of the number of the upper division majors and enrollment trends for this program with the enrollments and trends of upper division declared majors in other undergraduate programs at CSU.*

  This growth is equal to or better than nine other major departments, but less than that of 8. There are currently 406 biology majors as of fall semester of 2005, as compared to 223 in the fall semester of 2001.

- *Describe methods to be pursued for program improvement.*
  Because this substantial level of growth has the faculty working at or beyond capacity, substantial growth is not feasible without additional resources (e.g., faculty and facilities).

III B. Annual Degree Productivity of the Program

State your assessment of the strength of the evidence of program quality on this indicator.
Satisfactory

- *Analyze and interpret the numbers of degrees granted annually (fiscal year) by this program and the trends of the program's degree productivity over the past five years.*

  The number of degrees conferred by our three programs has varied over the past four years, from a low of 12 in '01-'02 to a high of 26 in '04-'05. The mean number of degrees conferred during the past four years is 20.5. The BS Biology degree has experienced a steady increase from five degrees granted in '01-'02 to 15, 16 and 17 in each of the following three years.

- *Compare the strength of the degree productivity of this program with the productivity of other undergraduate programs at CSU.*

  While three academic units in the College of Science and two in the College of Arts and Letters confer more degrees, we are conferring as many or more degrees than the remaining 17 programs in both colleges.

- *Describe methods to be pursued for program improvement.*

  In an effort to further increase productivity, we have increased the number of students allowed into our junior level required classes by adding additional sections.

III C. Program Completion Efficiency and Graduation Rate

State your assessment of the strength of the evidence of program quality on this indicator.
Satisfactory

- *Analyze and interpret the program's graduation rate. Compare the program's graduation rate with those of the other undergraduate programs at CSU and offer possible explanations for this program's unusually high or low graduation rate, if applicable.*

  The mean six-year graduation rate, for the students in our programs graduating in '03, '04 and '05, was 22.9%; which was slightly below the total CSU average of 26.4%. Several factors contribute to this graduation rate. First, a significant subset of our students struggle in their early chemistry and biology courses. Although aspirations of becoming a physician appeal to a large number of students, many are unprepared for the coursework. Therefore these unprepared students often leave CSU or transfer to another department. In addition, we have pre-pharmacy majors that only stay for two years before transferring to finish their undergraduate degree in pharmacy at other institutions (e.g., Auburn University, University of Georgia). Finally, we have students in the military, or married to someone in the military, who leave CSU when they, or their spouses, get transferred. Even though these students are successfully pursuing their academic careers, this negatively impacts our graduation rates.

- *Describe methods to be pursued for program improvement.*

  Under our current system, each student is assigned to a faculty advisor who requires them to be advised prior to registering for classes each semester. Our intent is to work with the students to plan a logical course of study and to balance their class load with their nonacademic life (e.g., hours worked at a job) in order to increase their chances of graduating.

III D. Efficiency and Clarity of the Program's Course Requirements

State your assessment of the strength of the evidence of program quality on this indicator.
Very Strong

- *Analyze the published course requirements for program completion in terms of the simplicity and efficiency of the program's curricular design and the degree to which program requirements are communicated clearly and effectively.*

  The published course requirements, as stated in the CSU college catalog, are straightforward, denoting all the classes required within each of the academic areas. Although there are prerequisites for a number of the classes, they are all clearly stated. The Biology Department also has created additional progress sheets for each of the programs. These are used by the faculty during advising and are available, in the department's main office, to all students.

- *Comment on the ease with which majors understand and successfully navigate through the required curriculum for program completion.*

  Biology students seem to determine what classes they need and to plan out their degree with a fair amount of accuracy. Their efforts are further guided by the aforementioned required advising sessions with the faculty.

- *Describe methods to be pursued for program improvement.*

  Because this doesn't seem to be an area of concern, we are not developing methods to improve this portion of the program.

III E. Frequency and Sequencing of Course Offerings Required for Program Completion

State your assessment of the strength of the evidence of program quality on this indicator.
Above average

- *Analyze and interpret the scheduling and enrollment history of courses required for program completion, giving particular focus to the regularity, frequency and sequencing of course offerings required for program completion.*

  All classes required by our programs are offered at least annually. The junior level "core" is somewhat constrained as Genetics and Cell Biology are offered only in the Fall semesters, while Ecology and Biosystematics are only offered in the Spring semesters. All other upper level courses are offered during each of the two main semesters, with additional sections being offered during some summers. In addition, special care is given to schedule courses that could or should be taken concurrently, with minimal to no overlap. We also try to provide multiple

offerings of our upper level electives to accommodate both the student's schedule and their preferences regarding topics.

- *Describe methods to be pursued for program improvement.*

  We will continue to provide this flexibility in scheduling. We are also moving towards a two-year scheduling plan to allow students to plan their schedules further in advance and ensure that faculty expertise is being used efficiently.

III F. Enrollment in the Program's Required Courses

State your assessment of the strength of the evidence of program quality on this indicator.
Satisfactory

- *Analyze and interpret the strength of the enrollments in the courses required for program completion. Comment on differences between core and elective course enrollments as well as differences among courses required for optional tracks and concentrations. Identify any required courses that are dropped from the schedule of classes frequently due to low enrollment and which majors must complete through approved substitutions or directed studies.*

  Enrollment in our required courses varies quite a lot depending on the nature of the course. For example, our junior level classes (BIOL 3215-BIOL 3218) are usually filled to capacity. Since these are laboratory classes, each section is limited in how many students are allowed, but we have expanded to offering 2-3 sections of these classes each semester they are offered. The opening of the extra sections, based on the needs of the students, has made the average enrollment for these classes lower, which benefits the students. On the other hand, our 4000 level courses are mainly the components of our research requirement for the B.S. undergraduates. In two of these courses (BIOL 4392 and BIOL 4393), the student has a specific faculty mentor and the section is based solely on the project, so enrollment in these courses is 1 or 0. The upper (5000) level classes are mainly electives, thus enrollment varies due to interest. The average reported was about 5.6 students per class over the last four years. However, we feel this may be somewhat inaccurate. Most of our 5000 level classes have both undergraduate and graduate sections. While the undergraduate enrollments may reach capacity (running between 10-24 for most classes), the graduate student enrollment is often 2 or less (sometimes "0"). This, we feel, might artificially deflate our enrollment numbers. Because most of our classes (both lower and upper level) have required laboratory components and there is a limit to how many students can reasonably participate in a laboratory class or can fit on a van for a field trip, the size of the classes will not greatly increase. However, to serve the most students effectively, we are starting to plan our course offerings two years in advance. We do not have students needing to do approved substitutions or directed studies for our required classes. Our problem is too many, not too few students in our classes.

- *Describe methods to be pursued for program improvement.*

  With the steady increase in departmental enrollment over the last few years, we expect that the enrollment in the upper level required courses will increase and that more will need to be offered. Thus, to meet this additional need, we will need to offer more sections of the required classes and will need both space (mainly laboratory) and personnel (faculty) to accomplish this.

III G. Diversity of the Program's Majors and Graduates

State your assessment of the strength of the evidence of program quality on this indicator.
Above average

- *Analyze and interpret the gender, ethnicity, nationality and age of the upper division majors and graduates in the program.*

  From 2001 through 2005, the biology programs have had graduates from every ethnic group listed in the annual reports. Because of our location, we have had fewer students of Hispanic or Native American descent than from the other groups (4% or less). Our highest numbers of students identify themselves as "Black" or "White", who also represent the highest percentage of our graduates (23% and 62%, respectively over that time frame). In addition, the number of "Black" students has risen consistently over those years, increasing from 24% ('01-'02) to 35% ('04-05). Consistently, we have also had more female biology majors than males by greater than a 2:1 margin (averaging 70% female and 30% male).

- *Comment on the program's success and distinctiveness in enrolling and graduation a diverse mix of students.*

  We feel that in this area we are strong and are successfully helping under-represented groups (specifically females and blacks) become biological scientists.

- *Describe methods to be pursued for program improvement.*

  Since this is an area that we feel is doing well, we are not pursuing methods of improving this in the immediate future.

III H. Cost-effectiveness of Instructional Delivery in the Program's Home Department.

State your assessment of the strength of the evidence of program quality on this indicator.
Above average

- *Contrast the instructional cost-effectiveness of this program's home department with others at CSU.*

  As our enrollments have increased, so has our cost-effectiveness. The cost of educating a student in our program has declined from just over $4000 per major in '01-'02 to $2653 in '04-'05.

- *List the principal factors that cause this program's home department appear to be unusually cost-effective (i.e., have a low ratio of instructional expenses per weighted credit hour of instruction) or appear to be unusually costly (i.e., have a high cost per credit hour).*

  We believe this steady decrease in cost can in part be attributed to increasing class sizes (which may not be so good pedagogically), while the number of faculty has remained the same. While the cost of running labs for the various classes does increase the cost per student, our cost is still below that for the University as a whole, which ranged from $4221/student in '01-'02 to $3494/student in '04-'05.

- *Comment on the degree to which this program contributes to or detracts from the cost-effectiveness of the department.*

  Since this program's home department is mainly concerned with the BA and BS Biology degree programs, our cost-effectiveness reflects the programs directly.

- *Describe methods to be pursued for program improvement.*

  Since the only values we were given for comparison were that of the University as a whole and since we are consistently below that number, we feel that this is not an area that needs significant improvement and methods are not being developed to reduce our costs.

III I. Program's Responsiveness to State Needs and Employer Demand for Program Graduates.

State your assessment of the strength of the evidence of program quality on this indicator.
Below average

- *Comment on the demand for graduates of this program, followed by an assessment of the program's success in responding productively to such need and demand.*

  The degrees associated with the Biology Department can be used in diverse ways to fill a number of needs in both our area and in the State of Georgia. Our graduates can be found in such needed positions as high school science teachers, physician's assistants, doctors, veterinarians and other biological scientists. Since these areas are almost always in high demand, we try to accommodate as many students as possible that desire a degree in one of our programs.

- *List the factors that limit the program's ability to be more productive and responsive to these needs and demands.*

  Our biggest limits to this are laboratory space and faculty numbers.

- *Describe methods to be pursued for program improvement.*

  In order to truly handle the perceived needs, we need to further increase our faculty size so that additional sections of certain classes (e.g., junior level core classes) can be offered and so that students wishing to complete research projects (required for B.S. Biology program) can have adequate supervision. However, without additional faculty and space for offices and laboratories, accommodating an increase in the number of students in our programs will be difficult to impossible.

III J. Position of the Program's Annual Degree Productivity among Comparable USG Programs.

State your assessment of the strength of the evidence of program quality on this indicator.
Satisfactory

- *Identify the ranking of this program relative to comparable programs in the University System of Georgia (or region or nation) in terms of the number of degrees granted annually.*

  This particular portion of the assessment is difficult, since comparing Universities with different missions and student bodies is questionable. However, when we compared CSU to the other "State Universities" in the University System of Georgia, we found that for the most recent 3 years of data available ('03-'04

being the most current), we graduated approximately the same number or more students than six of the institutions, but fewer students than five. While this seems to indicate that we are satisfactory, most of the state universities to which we compared favorably had smaller enrollments. The two institutions closest to our size (Armstrong Atlantic University and Augusta State University), both graduated more students than we did (e.g., 53 for CSU, 78 for AAU and 107 for ASU during those three academic years). We are uncertain of the reasons for this lower rate.

- *Describe methods to be pursued for program improvement.*

  To help increase our degree productivity, we have increased the requirements for students entering our junior level core classes, which are prerequisites for the other upper level classes. We believe that part of the productivity problem is that a number of students are repeating classes that they have failed or withdrawn from at an earlier time. This decreases the rate at which they graduate and impedes others from getting into these required classes. The unavailability of junior core classes could cause students to either transfer or change majors, since the first two classes (Cell Biology and Genetics) serve as prerequisites for other upper level classes. Another solution is to hire additional faculty, in order to offer these bottleneck courses more than once a year (Note: two new faculty positions have recently been approved). Additional faculty would also increase the number of students who could participate in senior research projects.

III. K This Program's Contribution to Achieving CSU's Mission

State your assessment of the strength of the evidence of program quality on this indicator.
Very Strong

- List the substantive contributions this program makes to the achievement of CSU's published statement of institutional mission.

  The degree programs that are part of the Biology program help to meet the mission of CSU by offering students a chance to earn baccalaureate degrees with different emphases. The BS Biology degree is designed specifically for those who wish to continue their education in professional schools (e.g., medical, dental, veterinarian, graduate). Many of these students often return to Columbus after completing their degrees and practice in the community. The BA Biology degree is designed to facilitate students who want to focus on biology within a broader, more traditional liberal arts degree. Finally, the BA in Biology with a concentration in Science Education degree is specifically designed to provide high schools in the area with trained biology educators of all ethnicities. Since high school science teachers are in demand in this area, we are trying to meet community needs. Thus, within our department we meet the mission statement of "providing a mixture of liberal arts and professional programs leading

to…baccalaureate…degrees". Beyond this, but still within the broad mission statement, the department helps with the "core of general education" by supplying CSU with multiple offerings of core and support courses in the field of biology. These are offered every term and at many different times, so as to accommodate as many students as is possible.

Beyond the Mission Statement itself, the biology programs meet several goals within the Vision Statement for CSU. For example, we are "dedicated to academic excellence". We want the students who graduate with a Biology degree from CSU to be able to compete with students from UGA, Auburn U. and Georgia Tech to gain acceptances into professional degree programs, as well as compete favorably for jobs offered to students with a baccalaureate degree in biology. We have designed our programs, especially the BS, to definitely fulfill the stated mission of "educating students to think critically (hence the the research requirement for BS students and the laboratory portions of the classes for all our students), work creatively (laboratory sections), communicate effectively (research presentations) and become technologically literate (reflected in the required class for all biology majors: BIOL 2285 Research Methods).

To go further into CSU's mission, the institution has selected certain "select mission" areas in which our programs play a strong part. CSU has a select mission for "international education". We accomplish this, for both our majors and non-majors, by offering a variety of classes in international settings. Having won the award from the University System of Georgia for the "most internationalized department", we are proud of having conducted courses in places such as Australia, Belize, Botswana, Ecuador and the Bahamas. We offer two or three of these trips each year. These classes and typically filled and they consistently receive favorable student evaluations.

- *Describe methods to be pursued for program improvement.*

  Since this area is one we feel is very strong, we are not pursuing methods for program improvement, but just plan to continue doing as well as we have in the past.

IV. Conclusion about the Program's Viability at CSU

The programs offered by the Department of Biology are definitely viable.

V. Program Improvement Plan

The approach we have chosen to improve the quality of our program is to raise our admission standards and recruit additional faculty, two initiatives which we have already begun to do.

VI. Summary Recommendation

In order to maintain the quality of our program, we will need the continued support of the administration to provide additional faculty for our department. We have, in addition, reached a point at which classroom, laboratory, and office space is becoming a problem. The clock continues to tick…