Section I. Executive Summary

During the fifteen years of its existence, the Department of Statistics has been nationally recognized as a strong relatively young department: Three rankings during that time placed the Department in the top ten in the South with one ranking placing the Department 18th nationally. (The latest of the rankings occurred in 1993 before 40% of the current faculty were hired.) Also, an external review in 1999 further supports this recognition. Its international visibility is evident in that four of the ten tenure-track department faculty members are Fellows of the American Statistical Association, one is a Fellow of the Institute of Mathematical Statistics, and two are elected members of the International Statistical Institute. Also, seven of the ten tenure-track faculty are currently on editorial boards of fifteen different professional journals, and the three others are former associate editors. The faculty contains AMOCO and Mungo teaching award winners. The demand for graduates of the Department at all degree levels has been increasing in the past four to five years as evidenced by the numerous job advertisements received by the department and in the professional newsletters. In the past five years, 100% of the masters and doctoral graduates who have sought employment have been employed in the field. Many of these graduates are making important contributions to South Carolina and the nation. Currently, eighty percent of the department's graduate students are U.S. citizens and its international graduate students have excellent communications skills.

The strategic plan of the Department of Statistics involves two visions which are totally consistent with University goals and priorities. The first is to move the Department from the top ten programs in the South over the next five years to a sufficiently high level that it is recognized as one of the top five. Moving from the top ten to the top five in the South will require a relatively modest amount of new resources for the Department as recommended by the external review in spring 1999. Details for accomplishing this vision are given in the strategic Goals 1–12 in Section III.

The second vision is to greatly increase the number of students taught by the Department in service to other programs, in training statistics majors, and in outreach programs. As stated by H. G. Wells more than forty years ago, statistical thinking will be a vital skill for all citizens in the 21st century. In fact, Walter Shewhart, the father of statistical quality control, indicated that "...statistics is not simply a tool as is so often stated but a scientific way of looking at the universe: Statistical method is not something apart from the scientific method but is the scientific method." Also, Paul O’Neill, as CEO of ALCOA, stated

“As world competition intensifies, understanding and applying statistical concepts and tools is becoming a requirement for all employees. Those individuals who get these skills in school will have a real advantage when they apply for their first job.”

The Department of Statistics is the appropriate unit in the University to provide this training, and several of its strategic goals address this issue.

A report on the progress made toward the goals set in the Department's January 1999 Five-Year Strategic Plan Update is described in Section II. Section III addresses goals for our current five-year strategic plan.
Section II. Annual Report

Progress on Goals for 1999-2000. Recently rated as among the top ten statistics programs in the South, it is the Department's vision to move into the top five programs in the South within the next five years. Toward this vision, there were twelve strategic goals discussed in the 1999 Strategic Plan Update. The progress and accomplishments toward those goals in the past year are described here:

Goal 1. Increase enrollments in introductory Statistics courses at all levels.
Accomplishments: Several units, or majors within the University, including Journalism and Mass Communications and Nursing, have begun to require statistics courses, accounting for some of the dramatic increase in STAT 110 enrollments since 1995. We intend to work toward at least one required STAT course of all University graduates through the core curriculum, beginning with all majors in the College of Science and Mathematics. Such a requirement is quite reasonable in the age of information technology.

Goal 2. Increase faculty size to at least 14 including the recruitment of a Department Chair, two assistant professors and a full time permanent instructor for lower division courses in support of Goal 1.
Accomplishments: Based on recommendations of the external review in the spring 1999, a full-time instructor was hired for 1999-2000. Recruiting is underway to hire a senior-level faculty member at the rank of Full Professor with start date of August 16, 2000.

Goal 3. Within the next five years attain a level of external funding so that all regular faculty members have external support for their scholarly activities.
Accomplishments: In 1999, nine of the ten faculty members had some kind of external support. Since summer 1999, two additional NSF grants have been obtained involving four faculty members and six further proposals have been submitted to the NSF and NIH, in addition to several to other agencies. Additional faculty should increase overall funding since the department has been almost saturated with faculty external scholarly support. Interdisciplinary proposals also are under consideration with other units within the University.

Goal 4. Acquire additional space on the second floor of LeConte to reach the required 13,000 square feet to house the Department, along with renovations to appropriately improve its physical facilities.
Accomplishments: In January 2000, much of the space on the second floor of LeConte became available. The remaining office areas should be available to the Department by the summer. Some painting and repairs are being done, and it is expected that the nine faculty members, Statistical Laboratory, and graduate students remaining on the fourth floor will be moved to the new areas by the end of the summer. It is a high priority that the Department gain the needed small classrooms LC 201 and LC 201A for primary use in scheduling of classes. They are needed for partial use by Statistics for effective class scheduling.

Goal 5. Adjust all departmental faculty salaries appropriately in order to at least meet the national median salaries for experience and rank as reported annually by the American Statistical Association.
Accomplishments: Some salary adjustments for several faculty members were accomplished for 1999-2000.

Goal 6. Increase the graduate assistantship budget in order to be more competitive in recruiting, to support a viable graduate program, and to support Goal 1.
Accomplishments: The stipends were increased by $1000 per academic year in 1999-2000 for all Statistics graduate assistants and another increase is anticipated for 2000-2001.

Goal 7. Increase the state-allocated operating budget to a level comparable to peer departments on a per faculty member basis.
Accomplishments: Research funding by the Statistical Laboratory, faculty members, summer school revenues, and other sources have given the department some necessary flexibility in its operating budget in the past five years.

Goal 8. Work with students, alumni, other departments, and potential employers to continually improve the curriculum and instruction and increase enrollments in statistics courses.
Accomplishments: Enrollments have increased approximately 7.6% overall and 28% in STAT 110 since 1996. Overall STAT enrollments have increased linearly in the past sixteen years (see Figure 1).

Goal 9. Actively identify and recruit high school and two-year college students to enter USC as undergraduate statistics majors.

Accomplishments. Mailings and visits to high schools and technical colleges in the state are being done with positive response. The new AP Statistics exam is also having an impact on incoming freshman majors.

Goal 10. Enhance recruitment and professional development of graduate students.

Accomplishments: Currently, a mailing is sent early each fall to mathematical science department chairs at approximately 500 institutions. Potential graduate students are identified and are personally contacted by the Graduate Director to invite them to apply to our graduate programs. This approach will be continued. A Certificate of Graduate Study in Applied Statistics was proposed and approved in 1999 to attract additional students. This is just being implemented and will provide a "minor" in Statistics for Ph.D. students in other fields.

Goal 11. Develop audio-visual, computer and on-line/technology-equipped classrooms for all statistics courses to enhance teaching effectiveness and to be competitive with other institutions into the next century.

Accomplishments: Two core graduate courses, STAT 704-705, were taught for the first time via closed-circuit TV in 1999-2000. A grant from the S.C. Commission on Higher Education was obtained for 2000 to begin the effort of teaching three other graduate courses via TV: STAT 706, 506, and 750. Further, the WebStat Internet computing package developed by Professors Ogden and West was incorporated into STAT 110, providing students access to this statistical computing package from wherever they have access to the Internet. This replaced the Minitab software that had been used in STAT 110.

Goal 12. Develop a teaching/research computing environment equal to the top five statistics programs in the South.

Accomplishments: As funds become available, computing equipment is being added to the Department and existing equipment upgraded. The College-funded Pentium PC Laboratories (LeConte 303A and 124) and SunStation labs have enhanced class-related computing in the past year. Plans are also underway to renovate our two STAT 201 teaching laboratories which will greatly enhance the learning experience there. This should be completed by the end of academic year 1999-2000.

Overall Teaching/Research/Service Quality. The external review of the Department in the spring 1999 undertaken by the Dean of the College praised our strong teaching and research faculty. During the past year, the faculty and graduate students continued to receive overall high marks on the College of Science and Mathematics Teacher Evaluation Surveys. New courses (STAT 772 - Binary Dose Response Theory and Methods, STAT 775 - Generalized Linear Models, STAT 590 - Statistics Capstone) were developed in the past two years, and a new Certificate of Graduate Study in Applied Statistics was approved in 1999. Further advances have been made in teaching via the Internet (the "WebStat" interactive statistical computing package via the Internet continues development and is receiving international
attention, and is being used in STAT 110). Four faculty members (40\% of the faculty) are Fellows of the American Statistical Association, an elected rank held by less than five percent of the ASA membership. Also, an adjunct professor (Huynh Huynh in the College of Education) was named an ASA Fellow in 1997. Seven regular faculty members (70\%) currently serve on editorial boards and three others are past members of such boards, representing seventeen different professional journals.

All tenure-track faculty members are active in research and represent broad research interests. The faculty has over 450 publications (at least 45 per faculty member); 32 papers were published or accepted for publication during 1999, along with three books. External funding, publications, presentations, and professional service are comparable to peer statistics departments. The department has considerable strength in the areas of environmetrics, ecological statistics, probability, industrial statistics, statistical computing, simultaneous inference, educational measurement, and reliability/survival analysis. It also continued activities in interdisciplinary research with extensive interactions with other units such as the Baruch Institute, the School of the Environment, and the College of Engineering. The Statistical Laboratory and the Center for Reliability and Quality Sciences also participate in interdisciplinary research and have considerable outreach to government and industry.

The assessed quality indicators of the undergraduate, graduate, and service programs are shown in Appendices B and C of the complete version of this Strategic Plan.

**Enrollment Changes.** The Department has experienced a large enrollment increase in its lower division courses in the last four years. STAT 110 has increased from fall 1995 to fall 1999 by approximately 28\%, and for the spring 2000 increased by almost 90\% over the spring 1996 enrollment! STAT 201, with the laboratory experience added five years ago, has surpassed previous enrollments after an initial decline. Overall, the Statistics course enrollments have increased about 13\% from 202 FTE students in Fall 1995 to 228 FTEs in Fall 1999, following a steadily increasing trend since the Department’s formation in 1985 (Figure 1).

**Support of the USC Honors College.** Typically, a senior faculty member in the Department teaches SCCC 312A (Proseminar in Statistics) each semester for Honors College students. Faculty also regularly advise Honors students doing their senior theses. One senior thesis was completed in 1999 and another is currently underway. Further, the Statistical Laboratory provided help with statistical aspects of the senior thesis projects of eight Honors College students in 1999. No research fellows were supported, although the Department employed one of its majors who is an Honors College student as a lab assistant in 1999. A faculty member serves on the Honors College Policy Committee.

**Section III. Strategic Plan**

1. **Strategic Goals for the Department of Statistics.** As stated earlier, it is the Department's vision to move into the top five programs in the South within the next five years. The in-depth self-study and external review in the winter and spring of 1998-99 identified several opportunities and critical needs for the Department in the next five years, and existing strengths and weaknesses were explored. Strategic goals for the next five years and a plan of action were set:

   **Goal 1.** *All USC graduates should be statistically literate in the information technology age.*

   **Strategy:** At least one statistics (STAT) course should be required in the University's core curriculum. A first step is to develop such a requirement of all College of Science and Mathematics majors within the next two years.
Goal 2. Add at least four faculty positions within the next five years, bringing the faculty size to fifteen, including the full-time instructor hired in August 1999.

Strategy: One faculty position should be allocated for each academic year beginning in the Fall 2000 (a senior faculty search is underway for August 2000).

Goal 3. Increase the graduate assistantship budget immediately in order to increase the number of graduate teaching assistants to 25 and to raise stipends to the necessary level to compete better for top graduate students.

Strategy: This is necessary to support Goal 1 and to maintain a viable graduate program, keeping up with demand for graduates. Concurrently, the department will strive to increase the average number of Ph.D. graduates to three per year from the current two, a 50% increase. Demand for statistics graduates, especially at the graduate level, is at an all-time high. We have had 100% placement of all master's and Ph.D. graduates who sought employment, in-field, over the past five years, and more advertisements and requests for graduates appear than can be filled currently.

Goal 4. Adjust faculty and staff salaries as necessary each year in order to keep all faculty salaries at least at the national median for years in rank and to provide long-term retention of the current high quality staff, including the Statistical Laboratory Manager.

Strategy: Use the legislated raise pool each year to provide adjustments for inequities as much as possible.

Goal 5. Within the next five years, increase the outside funding of the department so that all regular faculty members have external support for their scholarly activities. This includes both individual or small group funding within the department and participation on interdisciplinary grants.

Strategy: Increasing the number of faculty (Goal 2) is expected to increase the number of proposals to external agencies and, correspondingly, the amount of funding. The Department's outside funding is comparable to peer departments. The total amount of outside funding in effect in 1999 was $592,612, more than $59,000 per regular faculty member.

Goal 6. Obtain the needed additional space for the Department on the second floor of LeConte College, providing more suitable offices, classrooms and laboratories in a contiguous area. Eventual renovations should include classroom enhancement for audio/visual/computational needs as well as distance learning capabilities.

Strategy: We will continue plans to move the faculty and graduate students to the second floor space as it is modestly renovated during the spring and summer of 2000. LeConte will be a high priority for total renovation within the next five years.

Goal 7. Within the next five years, all core courses for the Certificate of Graduate Study in Applied Statistics and the Master of Industrial Statistics degree will be offered via distance education.

Strategy: One or two courses will be developed for Distance Education each year for the next two to three years. A grant from the S.C. Commission on Higher Education will help provide resources for developing distance education versions of STAT 706, 506 and 750 next year. STAT 704 and 705 are being taught via closed circuit TV during 1999-2000. Other courses to be revised for distance learning are STAT 702, 703 and 761. These offerings will also provide most courses required for the new Certificate of Graduate Study in Applied Statistics program, increasing enrollments of professionals around South Carolina in both the Master of Industrial Statistics and the Certificate programs. The Certificate program will also be emphasized as a "minor" in Statistics for Ph.D. students in other disciplines within the University.

Goal 8. Increase the departmental operating budget to a level comparable to peer departments, on a per-faculty member basis.

Strategy: Continue to request this increase.

Goal 9. Proactively recruit high school students to enter USC as undergraduate Statistics majors.

Strategy: This should be possible since in the third year of the AP Statistics Examination given in May 1999, more than 25,000 high school students nationally took the exam, more than 3.5 times the 7,500 students who took the AP Exam in its first year (1997). Seek funds for scholarships for undergraduate majors—a recruiting tool. Continue to improve the B.S. program in Statistics as recommendations from national organizations, alumni, and potential employers are implemented.

Goal 10. Obtain a full time computer systems technician dedicated to the Statistics Department's computational needs, assisting the current Computer Systems Administrator, who is shared with the Department of Mathematics.
Strategy: Statistics is a computational discipline and such staff support is needed to maintain the computer systems, laboratories, software, and networks. Funds will be requested to fill such a position.

Goal 11. Begin "Anniversary Alumni Conferences" featuring Department graduates as speakers and participants, taking place on significant anniversary dates of the Department.

Strategy: The first conference, the "15th Anniversary Alumni Conference" is planned for March 2001, with others following on Department anniversaries every five years thereafter.

Goal 12. Increase Departmental outreach activities.
Strategy: Several opportunities exist to increase outreach significantly over the next five years. (i) The opportunity to increase professional training courses for industry, business, and government personnel through the Center for Reliability and Quality Sciences exists. For example, we are beginning this spring to work more closely with the College of Engineering and Information Technology to provide training modules in industrial statistics. (ii) The Statistical Laboratory works on statistical problems under contract with industry and government agencies. There are many opportunities to increase this type of professional interaction. (iii) Closer interactions with secondary schools are possible, due to the AP Statistics course and exam that was first offered in 1997 (over 25,000 students nationwide took this exam in 1999). Training and support for high school teachers to effectively handle the AP Statistics is important and the Department will continue to regularly apply to the S.C. Department of Education for funds to offer the AP Statistics Teacher Institute as was done in the summers of 1998 and 1999.

2. Academic Program Assessment Plans. The Department of Statistics offers the B.S. degree, a Certificate of Graduate Study in Applied Statistics, the Master of Industrial Statistics degree, the M.S. degree, and the Ph.D. degree in Statistics. An Assessment Plan for each of these programs is provided in the complete version of this Strategic Plan.

3. Support of the USC Honors College. Typically, a senior faculty member in the Department teaches SCCC 312A (Proseminar in Statistics) each semester for the Honors College. Faculty also regularly advise Honors students doing their senior theses. One senior thesis was completed in 1999 and another is currently underway. Further, the Statistical Laboratory provided help with statistical aspects of the senior thesis projects of eight Honors College students in 1999. A faculty member serves on the Honors College Policy Committee. The Department can offer additional sections of SCCC 312A as more faculty are hired (Strategic Goal 2) and as such sections are needed by the Honors College.

4. Assessment of Performance Indicators. The following two performance indicators are addressed in this Plan:

A. How the Strategic Plan Supports the Department Mission: "Statistical thinking" is an important aspect of modern higher education, as mentioned in Section I. It will enhance the vision of the University of South Carolina to be among the top five public institutions in the South in undergraduate education if basic statistics were required in the curriculum for all undergraduates, and especially for liberal arts and professional majors. In addition, the Department must train professional statisticians at all degree levels to meet the demand in the job market. The vision of the Department to grow in quality and size to become one of the top five statistics programs in the South in the next five years totally supports the University's vision and stated goals to become an AAU institution. All of the goals stated in the Department's strategic plan fundamentally support its mission to teach and train students well at all levels, to produce cutting edge research results, and to serve the statistical needs of the University and surrounding community. This mission will be greatly enhanced if the strategic goals are achieved.

B. Procedure for Tracking Statistics Graduates: Each year, the Department records all of its graduates receiving each degree, along with their first job or the institution and program in which they are continuing their education, when it is known. In the past five years, 100% of the masters and Ph.D. graduates who sought
employment obtained a position in the field within six months of graduation. Most baccalaureate graduates also found suitable employment or continued their education. Lists of all graduates for 1996-1999 along with employment or graduate school information are available. These lists will continue to be kept.

Section IV. Resource Requirements

To move to a top five program in Statistics in the South and to dramatically increase the number of students that are taught by the Department, a modest amount of additional resources are required. These are itemized in the complete version of this Five-Year Strategic Plan as submitted to the Dean of the College of Science and Mathematics.