MEMORANDUM

To: Dean Phillip R. Certain

From: Douglas Bates, Chair

Subject: Strategic Plan, 1993–98, Department of Statistics

December 23, 1993

Enclosed please find the response by the Department of Statistics to the College’s Strategic Plan distributed last summer. I have had the opportunity to discuss an earlier draft with Associate Dean Nagel shortly before our faculty meeting on December 16, 1993. Dean Nagel did not suggest changes to that draft. The only modifications from that draft to this final version, as suggested by our faculty at their meeting, were some grammatical corrections and production of a clearer figure.

I now submit this on behalf of the Department and extend Seasons Greetings to you and to your staff at South Hall. I also extend our best wishes for a speedy and complete recovery from your recent surgery.

cc: Final version of Strategic Plan

cc: Associate Dean Nagel
L&S Strategic Plan for the Department of Statistics

We note the basically positive evaluation of our Department in the College Strategic Plan, which we quote:

"The Statistics Department has a high quality graduate research program and provides significant services to other departments and colleges with a lean and frugal operation. It carries a large student load with a modest sized staff and has actually increased the graduate credit hours." Thus begins the QR review committee's comments on the Statistics Department, which goes on to recommend that the department suffer no cuts in faculty FTE.

If one looks more closely at 'efficiency' as defined by the number of teaching FTE required to teach 1000 student credit hours, Statistics is the least efficient among the departments of Mathematics, Statistics, and Computer Sciences. This is due in part to the fact that Statistics does not have large enrollment introductory courses such as calculus or computing.

Base Level FTE: 18.5  Decrease: 1  Target FTE: 17.5

When the only comment on the department, other than from the QR report, is in terms of "efficiency", one is left with the impression that this is the primary aspect of the department that was considered in the Strategic Plan. There are several ways we could respond to this consideration of "efficiency"; one of which is indicated in the last sentence of the evaluation. In terms of subject matter, it is natural to group Statistics with Mathematics and Computer Sciences but in terms of department size and especially in terms of the use of teaching assistants as primary instructional contact for introductory courses, it is not. We feel we should point out that the Statistics Department offers a wide range of courses and is committed to doing so in small to moderate class sizes taught by faculty. Even our introductory service courses are taught in faculty lecture sections, and frequently by senior faculty.

Later in this report we offer additional comments on the data analysis that produced this specific measure of efficiency.

Development of this Plan

This Plan was developed with the full participation of all our faculty and in consultation with our teaching assistants and graduate students. The College Plan was distributed to all faculty during the summer of 1993 and a preliminary discussion of our response was held at our first fall Executive Committee meeting. On the basis of that discussion we appointed an ad hoc committee to develop a draft departmental plan and report to the Faculty early in November. Hearings were scheduled with representatives of the graduate students before Thanksgiving. On the basis of comments received, the committee revised the draft to the plan which was submitted to a department meeting early in December.
Mission Statement (Adapted from our Self Study)

The role of the Department of Statistics at the University of Wisconsin, Madison, is to teach the theory and practice of statistical methods, to provide consulting aid to researchers through collaborative research, and to carry out new research aimed at improving current statistical methods as well as developing new techniques to meet the growing needs of society. Through the excellence in quality and diversity of its academic programs, the professional reputation of the faculty and their involvement in research programs bearing on important societal needs, the Department has not only acquired a unique status in the State of Wisconsin, but has also been recognized as one of the top ranking statistics departments in the nation. The mission of the Department is geared toward the three-fold objective of:

i. dissemination of knowledge through high quality and creative instructional programs at both the undergraduate and graduate levels,

ii. generation of new knowledge in the field by means of scholarly research activities,

iii. serving society through interactive research efforts in such diverse areas as agricultural and life sciences, business, engineering, environmental monitoring, medical science, and social studies.

Instructional and Degree Programs. — The Department offers a broad range of degree programs aimed at career development in statistics and in several other fields where statistics is heavily used. The degree programs include:

B.S. with major in Statistics
B.S. with joint major in Statistics and Computer Science
M.S. in Statistics
M.S. in Statistics with Emphasis in Biostatistics
M.S. in Statistics with Emphasis in Quality Improvement
M.S. in Biometry (joint with College of Agricultural and Life Sciences)
M.S. in Business-Statistics (joint with the School of Business)
Ph.D. in Statistics
Ph.D. in Statistics with Emphasis in Biostatistics
Ph.D. in Business-Statistics (joint with the School of Business)
Minor in Statistics for Ph.D. programs of other departments.

To meet the needs of these degree programs, a wide array of courses are offered at all levels. The course offerings accommodate a great deal of diversity in their emphases to fundamental theory, to effective blends of theory and applications, and to substantive applications in data analysis and computing. They are mutually reinforcing and they provide an enormous flexibility in career decisions of students.

Some basic knowledge of statistics, often referred to as quantitative literacy, is being increasingly recognized to be an integral part of a general college education. Also, additional exposure to statistics and familiarity with special techniques of data analysis are required in the academic programs of many fields.
We view maintaining a high quality of instruction as an important component of our Departmental mission. Senior faculty participate in undergraduate teaching as much as their junior colleagues do. Moreover, the lecture sections are taught by faculty even at the introductory level.

Research mission. — The research of members of the Department is oriented towards re-examination and improvement of current statistical methods and discovery of new and useful techniques. Research is closely integrated into the instructional program to ensure that new ideas are presented, discussed, and constantly re-evaluated.

We are widely regarded in the profession as the premier Statistics Department balancing theory and applications. Faculty with full time appointment in Statistics and those with joint appointments form a cohesive group in conducting research on all frontiers — basic theory, general methodology, methodology geared for specific fields of application, and collaborative research aiding scientific studies in other fields. This latter area includes interdisciplinary research.

A great deal of our research takes place in concert with our graduate students. Overall, we train statisticians for academic, industrial, and government work. Past students are following careers throughout the world. We intend to maintain and improve the strong graduate program that already exists.

Public service and statistical consulting activities. — The Department cooperates with many other segments of the Campus on a wide range of levels. This cooperation takes the form of dedicated instruction, statistical consulting, and collaborative research.

Proposed Means of Achieving Target

Changes in personnel

Because of high market demand in the areas of Statistics and Biostatistics, we have had to work hard on recruitment and retention of faculty over the past several years. During the past six years we have had six resignations and two retirements from our faculty representing a total of 5.8 FTE. Although we are trying to maintain our high quality faculty, we do face the very real possibilities of retirements, early retirements, or resignations in the near future. It is virtually certain that in the next five years we will have at least one retirement or resignation. Thus the answer to how we can meet a downsizing goal of 1 FTE is that it will be done through attrition. In the (highly unlikely) event that we have not reached this goal though attrition before July 1996, we will then propose an alternate plan to meet the goal.

Effect of personnel changes

The larger question is how such attrition will affect our teaching program and the vitality of our research efforts. There are several trends that could put pressure on our teaching program. As noted in the Quality Reinvestment report for the Social Sciences:

A final potential area of overlap concerns the wide variety of statistics courses provided by departments throughout LBS. While we recognize that some departments may have valid reasons for providing statistics courses through their own departments, it is also the case that some departments might forgo providing such courses if their students could enroll in similar courses elsewhere.
We do not know yet how other departments will respond to their own downsizing goals but it is entirely possible that some will choose to eliminate or restrict enrollment in their statistics courses. We would expect more enrollment pressure in our introductory courses in that case.

In addition, the August 20, 1993 report of the Committee on Undergraduate Education in recommendation A.2 suggests a requirement across the university of 6 credits of Mathematics and Quantitative Reasoning, and specifically suggests 3 credits from Mathematics, Computer Sciences or Statistics. Again, this could lead to substantial enrollment pressure in our introductory courses.

Obviously we would have to make some changes to try to meet current or increased enrollment demand with fewer faculty. We feel that the least damaging change would be to increase the size of lecture sections in our introductory course, Statistics 201. To be specific, we would collapse two sections of Statistics 201 into a single, much larger section. This would save 0.5 FTE. The other 0.5 FTE decrease would probably have to be generated by cutting back on the frequency of offering specialized graduate courses.

Our offering of graduate electives is already reduced to a skeletal form. Moreover, we shoulder the full responsibility of instructional programs in Biostatistics as well as in Statistics. In view of these facts, the latter measure would be painful and potentially damaging to our program.

From the perspective of research, we must also consider the age distribution of our faculty and the innovative ideas that young faculty can bring to a department. It is entirely possible that by next year we will have only one faculty member less than 40 years of age and who is not a joint appointee. Extending a gap like this in our age profile will have serious consequences in the future. If our faculty roster falls below 17.5 FTE, it is vitally important that we seek to hire young faculty for full-time Statistics positions.

Considering these possible reductions in our roster we expect that we will actually be in the position of hiring new faculty during the period of this Strategic Plan. When we are hiring for an appointment entirely within our department, we look for the candidate who will best complement existing strengths in the continuum between theory and applications. When hiring for a joint appointment, we balance this goal with the needs of the other department.

Summary of Steps to be Taken

The first loss of faculty through retirement, early retirement, or resignation will be used to fulfill our required reduction from the Strategic Plan. In the event of further losses we will request permission to hire replacements so as to stay at the 17.5 FTE level.

In the highly unlikely event that we have not achieved our goal though attrition before July 1996, we will then propose an alternate plan to meet the goal. We chose 1996 as the cutoff time so there would still be the opportunity to implement an alternate plan before the expiration of this Strategic Plan.

Additional Comments

As mentioned in the first section, the measure of teaching efficiency Total Credits/Total Teaching FTE (101) - excluding TAs is the basis for most of the commentary on our department. As Statisticians we realize the difficulty of summarizing a complex system in a few summary measures or indices. No matter what measure is chosen, there will be some who disagree with it or find fault with it. Even so, we feel obligated to point out that some aspects of this choice of measure put us at a disadvantage.
This particular measure of efficiency is in terms of faculty FTE per 1000 credits. Obviously, a way of enhancing this measure is to get more credits with little investment of faculty by having large introductory courses taught primarily by TA’s. As a department, we have chosen not to do this in past years and we would prefer not to do it in the future.

There is a high correlation between department size and efficiency as measured by this criterion. See Figure 1.

The grouping into “Large Physical Sciences Departments” and “Small Physical Sciences Departments” seems curious. The total faculty roster for Statistics seems lower than that for Geology and Geophysics and certainly the faculty on 101 budget is lower but Statistics is in the “large” group and Geology and Geophysics is in the “small” group. Since larger departments tend to be more “efficient” under this measure, it is a disadvantage to be grouped with large departments.

Grouping Statistics with Mathematics and Computer Sciences makes sense from the point of view of subject matter but does not make sense with respect to the size of the department nor from the nature of the instructional mission. As mentioned in the Quality Reinvestment Study for the Social Sciences, Statistics is taught in many different departments. For the most part, Mathematics or Computer Sciences are taught only within those departments. A more appropriate comparison of the teaching efficiency of the Statistics Department may be with respect to other introductory Statistics courses.