July 29, 1988

CHANCELLOR STEVENS

Re: Academic Planning Study

Dear Robert:

The *Twenty-Year Academic Plan* provides a general discussion of the relationship between academic planning and growth. I am sending you a copy of the "Academic Planning Study" which summarizes various studies contributing to our recent academic plans and to the decision to attain a campus size of 15,000 students by 2005-06.

Identified in these studies are a variety of limitations of the academic programs which have been caused by the campus' truncated growth. The conditions and problems discussed in these studies remain with us today on the Santa Cruz campus, underlying our conclusion that we must grow to 15,000 students.

The attached study was the result of an in-depth evaluation of high quality undergraduate and graduate programs across the country, juxtaposed against our current curricular offerings. We found that the few universities of excellence with fewer than 15,000 students were able to maintain that quality because they are supported by a student-faculty ratio which is much richer than the student-faculty ratios available to public institutions -- some have ratios as low as ten to one. The University of California system, like most public universities, operates under tighter fiscal constraints. (In the UC system faculty resources are allocated at a unweighted student-faculty ratio of about nineteen to one.)

One feature of the attached report is that it estimates the minimum campus size required for excellence by examining the critical mass needed in each academic program. This program evaluation confirmed the conclusion of the *Twenty-Year Academic Plan* that we need about 800 faculty permanently assigned to the boards of study in order to offer programs of comparable breadth and depth of other high quality institutions. Given that we must maintain reserves of at least ten percent of our faculty (I recommend a reserve of fifteen percent), this translates to a campus FTE assignment of about 950 faculty positions.

It is clear to me from the report and in subsequent discussions with the deans and the Academic Senate that the alternative of a 2005-06 enrollment of 12,000 students, which would allow for only 650 FTE faculty, is unacceptable. The Santa Cruz campus, as a member of the University of California system, must offer a mix of graduate and professional programs comparable to other UC campuses. In order to achieve this goal we will need to add approximately 425 new faculty to our current boards of study. Given the State resource allocation formulae, we need to attain a student body of at least 15,000 students to acquire these needed positions.

Our current enrollment of nearly 9,000 students generates insufficient faculty to support the programs outlined in the *Twenty-Year Academic Plan*. Because our present size produces thinness in our curricular offerings, we currently lose students to other institutions. Our student retention figures are the worst in the system. We know that students transfer to other universities because they want programs we do not offer. We need to counteract this trend by expanding our current offerings. In addition, a direct outcome of enrollment growth will be an increase in ethnic diversity, both in terms of students and faculty, to provide an environment at UC Santa Cruz more reflective of California's population.

In my judgement, we have an obligation to increase our graduate enrollments to 20 percent for at least three reasons. First, to improve the quality of our undergraduate education. Teaching assistants are needed to sustain close interaction in our large classes. Second, graduate programs are critical if we are to attract and keep the best scholars; they expect to extend their research boundaries as they nurture graduate students. Lastly, we have an educational obligation to the State and the nation to produce the next generation of college faculty. In the next decade, projected enrollment growth and faculty retirements will create a demand for faculty positions that cannot be filled by existing projections of doctoral candidates. UC Santa Cruz must contribute its share of Ph.D.s to reduce this shortage.

In closing, I continue to be convinced that the Santa Cruz campus must grow to 15,000 students if it expects to meet the standards of the University of California and the internal goals the campus has set for itself.

I would be happy to discuss the report with you in more detail.

Sincerely yours,

Isebill V. Gruhn
Acting Academic Vice Chancellor

Enclosure

cc: Senior Planner Bice
Assistant Crooks
Director Jarvinen
Assistant Director Nelson
Executive Assistant Robinson

ACADEMIC PLANNING STUDY

July 1988

Office of the Academic Vice Chancellor
University of California, Santa Cruz

ACADEMIC PLANNING STUDY

EXECUTIVE SUMMARY

The purpose of the investigation was to assess the implications for campus development of the goals and academic programs envisioned in the Twenty-Year Plan[1]. A series of studies examined the breadth of UCSC's curriculum, size of faculty, and total enrollment with reference to the goals of UC Santa Cruz, standards of the University of California, and characteristics of peer institutions.

The University of California is consists of nine individual campuses. Each campus is expected to contribute its own unique features to the University while maintaining the standards of the larger institution. In accordance with its State mandate to provide research and instruction, the University has defined specific standards to be achieved on each campus in the following areas:

- Quality of graduate and undergraduate programs;
- Graduate and professional education;
- Breadth of the curriculum;
- Flexibility in staffing; and
- Research, basic and applied.

The results of each study were examined in light of these standards and are summarized below.

1. In January 1988, the academic deans and the administration reexamined the validity of the faculty FTE assumptions in the Twenty-Year Plan. A program-by-program analysis by the deans revealed that most current boards of studies were below the twenty-faculty-member average threshold cited in the Twenty-Year Plan. Most boards needed additional faculty to assure their long-term viability as research and teaching units. In order to offer the breadth of curriculum needed to support undergraduate and graduate students, several basic areas of study were not offered and some courses were offered only in alternate years[2].

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[1] University of California Santa Cruz Twenty-Year Plan, 1985; also referred to as the Twenty-Year Academic Plan.

[2] Such a practice, while ensuring that required courses are available, often causes hardships for undergraduates. For example, if such a required course is not completed in the junior year, the student must stay a fifth year for the next opportunity to enroll.

In addition, many programs were only partially developed and faculty recruitments were restricted to a few major subdisciplines. As a result, some boards did not have the flexibility to quickly focus research efforts on emerging fields of study[3] and were only partially developed in significant subdisciplines. Other boards attempted to offer a wide range of courses (i.e., breadth), but as a result lacked the depth of curriculum associated with a top-ranked university. Lack of a critical mass of resources (faculty FTE and the support that accompanies such FTE) was cited by many external review teams as a deterrent to attracting the first-rate faculty, including minority faculty members, needed to build new programs and to renew existing programs.

The unanimous conclusion of the deans and the UC Santa Cruz administration was that the Twenty-Year Plan goal of 15,000 students, which provides about 800 FTE faculty permanently assigned to the boards, is the minimum required to support the campus' goal of becoming a comprehensive teaching and research institution and that the introduction of graduate and professional programs is imperative if high quality undergraduate programs are to be maintained.

2. A study of programs at comparison institutions[4] provided statistical support for the deans' qualitative program reviews. Many of UCSC's boards were staffed at levels far below that of comparable institutions. For example, forty percent of the boards at UCSC had 10 members or fewer compared with only twelve percent of the departments at the comparison institutions. The study also provided evidence that an average minimum of 20 faculty members was associated with programs with excellence similar to those anticipated by the Twenty-Year Plan.

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[3] To have the ability to respond to new disciplines and future areas of intensified research requires that each program have an appropriate critical mass (the minimum number of faculty needed to provide quality teaching and research) as well as a pool of 10% to 15% unallocated faculty FTE. The unallocated faculty give the board the capability to quickly pursue newly emerging fields and to conform with University flexibility requirements.

[4] Comparison institutions included Harvard, North Carolina Chapel Hill, Northwestern, Princeton, SUNY at Stonybrook, UC Santa Barbara, and UC San Diego. This study, prepared by the UCSC Office of Finance and Planning, was reviewed and discussed by the Senate Committee on Planning and Budget, the academic deans, and the administration.

3. In an examination of the number of faculty required by each board to assure quality and breadth, the average department size of the most highly regarded graduate departments in the nation were compared with UCSC's boards. With only one or two exceptions, UCSC's boards are significantly smaller. The average board size of 20 core faculty cited in the Twenty-Year Plan appears to be the minimum required if UCSC desires to achieve national recognition.

4. A review of degree programs offered by the majority of UC campuses pointed to a lack of breadth and comprehensiveness in UCSC's curriculum. While undergraduate program coverage in the Arts and Letters is comparable, programs offered as specializations within a board at UCSC are often full departments on other campuses. Furthermore, more graduate programs in Arts and Letters were offered at other campuses. In the Natural Sciences, most UC campuses have more programs in the life sciences. Santa Cruz offered the same areas of undergraduate study in the Social Sciences as do most UC campuses, but offers fewer graduate programs. The most significant disparity in curricular offerings is in professional programs. For example, the Santa Cruz campus has only one undergraduate engineering program and none in business.

   Although the University of California does not have a core curriculum per se, the analysis of common University programs revealed that UC Santa Cruz does not offer undergraduate programs in several common disciplines, and offers significantly fewer graduate programs than other UC campuses. In order to meet the campus' and the University of California's criteria for quality, breadth of curriculum, and graduate programs, UC Santa Cruz must expand its curricular offerings.

5. A more general Twenty-Year Plan goal is "to join the ranks of the leading research Universities in the nation" and to have "vigorous graduate programs in all the basic disciplines[5]." Using information from An Assessment of Research-Doctorate Programs in the United States, top-ranked programs in each of the campus' three major divisions (Natural Sciences, Social Sciences, and Humanities) were identified. All U.S. public universities with top-ranked programs in two or more of these academic divisions had enrollments of 15,000 or more.

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5 University of California Santa Cruz Twenty-Year Plan, 1985, p. 21.

6. While size alone does not assure quality, studies of the public institutions whose graduate programs were rated among the top 15 in the nation[6] revealed that enrollments of at least 15,000 were associated with such highly ranked schools. Furthermore, graduate and professional enrollment at these schools averaged over 25 percent of their total enrollment, corroborating the Twenty-Year Plan goal to increase graduate enrollment to between 15 and 20 percent[7]. Thus for public universities, it appears that 15,000 students or more are required to support the breadth and quality of graduate curricula and active research faculties that are characteristic of top-ranked graduate programs.

7. One of the goals for the campus presented in the Twenty-Year Plan is to "rank among the top 100 research institutions in the nation measured by the receipt of federal research funds[8]." A study of institutions within this group reveals few below the 15,000 enrollment level. Such smaller institutions either did not offer a comprehensive curriculum[9] or had substantially larger graduate enrollments[10] than those envisioned for UC Santa Cruz. Of the University of California campuses, only the two smallest (Santa Cruz and Riverside) did not appear in this top 100 list.

As a result of the reexamination of the assumptions about average program size and total required faculty FTE underlying Twenty-Year Plan, it can be concluded that, in order for the Santa Cruz campus to fulfill its goals and become a full-fledged member of the University of California system in terms of the depth, breadth, and quality of its teaching and research programs, it must grow with care and forethought to provide facilities for an enrollment level of no fewer than 15,000 students.

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6 Roose and Anderson, "A Rating of Graduate Programs", 1970, and Jones, Lindzey, and Coggeshall, "An Assessment of Research-Doctorate Programs in the United States", 1982.

7 University of California Santa Cruz Twenty-Year Plan, 1985, p. 8.

8 Ibid., p. 23.

9 For example, Georgia Institute of Technology, with an enrollment of 12,000.

10 For example, New Mexico State University with a total enrollment of 13,718, and 25% graduate enrollment. In addition, half to three-quarters of the federal funds received by New Mexico State are from defense contracts, a source of funding not pursued at UC Santa Cruz.

PURPOSE OF THIS REPORT

This report has been developed to support University of California Santa Cruz's (UCSC) effort to meet its responsibility for academic planning. The administration of the University of California requires that "each campus ... formulate a plan for selective academic development consistent with a realistic range of resource expectations." The plan is to "incorporate regular and rigorous review of campus programs. Its objective is to capitalize on campus strengths and opportunities, ... and to make a distinctive contribution to the fulfillment of the University's mission[11]."

This report summarizes a series of studies which examine the breadth of the curriculum and the number of faculty required at UCSC. The studies were undertaken to examine the implications of the goals of the UC Santa Cruz campus as stated in the Twenty-Year Plan, and of being a campus of the University of California. The studies examined UCSC from a variety of perspectives with no one study intending to provide a comprehensive overview. As a whole, however, the studies provide a broad multidimensional view of the future in terms of the campus' aspirations, responsibilities, and current development.

A central issue examined by these studies is the number of faculty required to provide a curriculum of depth and breadth, and to conduct research consistent with the mission of the University. Guidelines provided by the University state that "in planning enrollment in graduate and professional programs, the University as a whole and each campus will be guided by ... critical mass, or the minimum size needed for a superior program of graduate instruction and research[12]." The importance of creating a nexus of scholars in each board was reflected in the Santa Cruz Campus Academic Plan 1965-75 which stated that "distinction is unlikely to be achieved without a critical minimum of colleagues who associate frequently and who have access to appropriate facilities ... (p.2)." The minimum faculty size required by a university may be approached in two ways: 1) on a departmental basis, or 2) on a university-wide basis. The studies cited in this report examine the issue from both perspectives.

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[11] University of California Planning Statement, 1981, p. 61.

[12] Ibid., p. 55.

This report is also designed to review and to reassess the enrollment target ceiling cited in the Twenty-Year Plan. Although both smaller and larger enrollment targets have been discussed, recent enrollment plans have assumed a target of 15,000 students by the year 2005. This long-term target reflects the current understanding of how the University can meet its own internal goals given the State's and local community's resources.

The University's quality and breadth requirements must be the primary considerations in campus planning, but quality and breadth are directly related to the number of faculty and students available. As a publicly supported institution, the size of UC Santa Cruz's faculty is determined by its enrollment (the current ratio is about 19 students per faculty member). The number of faculty available to a campus heavily influences the breadth of the curriculum and, in many areas, has an impact on the quality of teaching and research. Because of this, the enrollment of the campus is integrally linked to the breadth and quality of the programs that can be offered.

Concepts such as "comprehensive" and "critical mass" cannot be defined in the same way for every university. Each institution must respond to different local, state, and national educational goals. Even an institution with well-defined educational goals may not be able to define such criteria across its campuses or within each discipline. A commission studying such standards at the University of California concluded that "the committee cannot propose a uniform standard for [critical mass], as the apparent minimum size differs from field to field and also depends on what are regarded as the boundaries of each discipline[13]." Thus the responsibility for setting campus and departmental curricula and faculty sizes must depend on the professional judgment of the faculty and administrators at each institution.

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[13] Ibid., p. 14.

THE MISSION OF THE UNIVERSITY OF CALIFORNIA

In 1960, the Master Plan for Higher Education in California, 1960-75 was developed to formulate a policy to meet the long-term higher educational needs of the State. In the plan, State-funded educational agencies were divided into three organizational units; each being accountable for providing unique educational services. The University of California was given the primary responsibility for providing research. In addition, the University was given the responsibility to provide higher education to a select group of undergraduate students, and to provide doctoral and certain professional programs. The differentiation of educational functions into three higher education systems was incorporated into State law with the Donahue Higher Education Act of 1960.

The University of California consists of nine individual campuses. Each campus is expected to contribute its own unique features to the University while maintaining the standards of the larger institution. In accordance with its legal mandate, the University has defined specific standards to be achieved on each campus in each of the following areas: quality, breadth, flexibility, graduate education, and research. Each standard is described below.

Quality. The University of California has a national and international reputation for excellence, and each campus is expected to maintain that standard. According to the Educational Objectives For The University of California 1975-1985, "every advanced degree program offered on every campus should be comparable with the best of such programs. (p.14)." Excellence is not restricted to graduate and research programs. "Although the University is characterized by its strong emphasis on graduate instruction and research and although its national and international reputation is largely founded on this work, the University is, in fact, equally committed to offering the highest quality of instruction to the undergraduates[14]."

Graduate education. "Professional education and graduate education, especially at the doctoral level, are a distinctive and fundamental responsibility of the University." The University of California Planning Statement goes on to say that "the quality of graduate and professional education, which has earned for the University an international reputation, will be preserved[15]."

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[14] University of California Planning Statement, 1981, p. 14.

[15] Ibid., p. 14.

Breadth. A third basic characteristic of the University and its campuses is its obligation to provide its graduates with a well-rounded education. In a special resolution in June of 1980, The Board of Regents reaffirmed "the historic commitment of the University of California to a basic educational policy of providing to undergraduates a broad general education, emphasizing humanistic values and intellectual breadth and including the study of science, technology, social sciences, the arts and humanities[16]."

Flexibility. Each campus is expected to maintain a reserve of allocated faculty positions in order to have the capability to respond to changes in enrollment and the curriculum. "As a way of meeting short-term shifts in local staffing needs and as a contribution to Universitywide flexibility in allocation of faculty positions, each campus will continue to maintain a pool of at least 10% of its faculty FTE in positions that can be released ... for reallocation[17]."

Research. "Out of a commitment arising from its nature as a university and from its designation as the 'primary state-supported academic agency for research[18]' the University of California will conduct a broad spectrum of research of the highest possible quality, from basic to applied, across the full range of University disciplines. It will do this as part of its obligation to advance knowledge, as an integral component of its programs not only in graduate and professional education but in undergraduate education as well, and as a service to the economic and cultural needs of society[19]."

In this study, each examination of the curriculum, faculty size, or total enrollment will be examined in light of the University standards.

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[16] University of California Planning Statement, 1981, p. 21.

[17] Ibid., p. 35.

[18] State of California Education Code, 22550.

[19] University of California Planning Statement, 1981, p. 26.

ENROLLMENT PLANNING FOR UC SANTA CRUZ

The first universitywide academic plan which included UC Santa Cruz envisioned an enrollment of 27,500 students[20] by 1990. Complementing undergraduate and graduate programs in the letters and sciences were professional programs in engineering, landscape architecture, forestry, business administration, and conservation of natural resources. Engineering was given specific emphasis because of the campus' proximity to the Santa Clara Valley. The unweighted student/faculty ratio was assumed to be 16 to 1.

The University Academic Plan, 1966-1976 reaffirmed UCSC's original enrollment limit of 27,500 (p. 68), and estimated that the campus would have 7,500 students by 1976. Academic planners saw this campus as having three academic divisions, a graduate division, and professional schools. Engineering was scheduled to be the campus' initial professional program, and others were under consideration.

The next revision of the University of California's academic plan[21] once again set the maximum enrollment at 27,500. The first years of the campus' development were to be devoted to the undergraduate colleges (pp. 57-58). Delays in the development of UCSC were attributed to budgetary problems. The report recommended temporarily deferring the development of engineering programs.

In the mid-seventies, students were not enrolling in the University in the numbers forecast. The University Academic Plan 1974-1978 projected the total enrollment for UCSC in 1982-83 to be 7,500 students. This "retrenchment plan" stated that Santa Cruz would retain its commitment to the collegiate system and probably could not expect more than ten percent of its enrollment to be graduate students. Engineering and other professional programs were not mentioned. The plan described an academic program which would enable the campus to function at an enrollment of 7,500 and did not discuss Engineering or other professional programs.

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[20] University Academic Plan, 1961.

[21] University Academic Plan 1968-69 - 1977-78.

The retrenchment plan and the accompanying truncation of growth led to a series of difficulties which are detailed later in this report. The increased popularity of UC Santa Cruz among prospective students provided the opportunity to redress these problems.

Recent planning efforts have reflected the increased demand for education within the University. Although the most recent systemwide report does not discuss an enrollment ceiling, the Graduate Enrollment Plan For 1985-86 Through 2000-01 projects that Santa Cruz will have an enrollment of about 12,000 by the year 2001 with a graduate enrollment of between ten and twelve percent.

The enrollment and composition of the student body directly influence the number of faculty at each campus. Faculty allocations to the UC campuses are based on formulae developed by the systemwide administration which are periodically revised. At present, the University of California allocates faculty to its campuses based on a formula which places different weights on students at different class levels. The weights assigned are as follows: lower division undergraduates (i.e., freshmen and sophomores) - 1.0; upper division undergraduates (i.e., juniors and seniors) - 1.5; first stage graduates (e.g., master's and certificate students) - 2.5; and second stage graduates (e.g., doctoral candidates) - 3.5. The number of full-time equivalent (FTE) faculty is obtained by multiplying the number of students in each classification by the appropriate weight, summing across all classifications, and dividing by a weighted student-faculty ratio (currently about 27.13). Based on the current make-up of UCSC's student body, this formula produces an unweighted student/ faculty ratio of about 19 to 1.

UC SANTA CRUZ: A REVIEW OF THE TWENTY-YEAR PLAN

In 1985 the UC Santa Cruz campus prepared an academic planning document entitled the UCSC Twenty-Year Plan which established the campus' academic objectives for the next twenty years. The plan states that in order to fulfill its academic mission the campus would have to grow from a small, predominantly liberal arts institution to one with a full complement of undergraduate, graduate, and professional programs.

The Twenty-Year Plan sets several goals for the development of the undergraduate curriculum. Included in these goals are to increase the depth and breadth of the instruction, and increase the retention and graduation rates, especially for women and minority students. The retention and graduation rates at UC Santa Cruz are the lowest in the University system. Increasing the range and frequency of course offerings should reduce the number of UCSC students who leave to continue their education elsewhere because of UCSC's limited curriculum.

The Twenty-Year Plan provides the blueprint for the realization of the campus' academic goals. In a section entitled "Appropriate Size of the Campus," the Plan states that to support strong graduate and undergraduate programs, an average of approximately 20 faculty members would be need to be assigned to each board. In addition, it states that a total of approximately 40 boards would provide opportunities to introduce new programs to broaden the currently limited offerings of the Santa Cruz campus. The Plan also calls for an increase in graduate student representation to 15 and 20 percent of the total student enrollment.

The total of 800 permanently assigned faculty members resulting from these assumptions could be expected to serve approximately 15,000 students, based on existing University student-faculty ratios. Although private institutions may be able to support the same number of faculty with fewer students, the University of California receives State funding based on a fixed student-faculty ratio which is not within The Regents' power to modify. The Twenty-Year Plan identifies a student enrollment level of 15,000 as "desired." Based on demographic uncertainties at the time the Plan was written, a lower enrollment level of 12,000 was also discussed and characterized as "conservative."

The Academic Planning Study was undertaken to reassess the enrollment analyses of the Twenty-Year Plan. For the purposes of long-range planning, the faculty size and enrollment ceiling proposed in this report will refine those discussed in the Twenty-Year Plan.

THE STUDIES

Each of the studies conducted take a different approach to evaluating the characteristics of a fully developed campus. A summary integrating the findings of the studies with the implications for curriculum development, faculty development, and total enrollment concludes the report.

The first analysis summarizes the reviews of each academic division by each of UCSC's deans. The dean's reviews are qualitative, and rely heavily on their experience and professional judgment.

The second study compares the curricular and degree offerings of UCSC with those of other UC campuses. This study is designed to compare the breadth of UCSC's graduate and undergraduate programs to those typical of University of California campuses.

The third study examines the number of faculty assigned to departments at seven peer universities. The peer universities have characteristics similar to UCSC, but are more highly developed. A comparison of UCSC's board sizes to that of their counterparts at peer institutions provides a measure of UCSC's current state of development.

The fourth study examines the department sizes of the ten most highly regarded doctoral programs in the country across a wide range of disciplines. Using information from this and the previous study, the number of faculty required at UCSC is estimated.

The last set of analyses describe the universities which attain the institutional, departmental, and research goals set for UCSC in the Twenty-Year Plan. The number of faculty and total enrollments of highly regarded research and graduate teaching institutions are examined to assess the feasibility of UCSC meeting its stated goals.

I. BOARD REVIEWS BY UCSC DEANS

As part of UCSC's efforts to evaluate the quality of the educational programs being offered, the deans of each academic division were asked by the Academic Vice Chancellor to assess the impact of various enrollment ceilings on the departments in their divisions.

A program-by-program analysis by the academic deans revealed that current staffing of the boards was considered inadequate by all three deans. Most current boards of studies were below the average threshold of 20 permanently assigned faculty members cited in the Twenty-Year Plan. The deans' concluded that most boards needed additional faculty to assure their long-term viability as research and undergraduate/graduate teaching units. Michael Cowan, Dean of Humanities, summarized his review by stating, "none of the disciplines could be said to offer a comprehensive curriculum--one characteristic of the best universities." Frank Drake, Dean of Natural Sciences, said that "freezing the campus at its present size will result in a rapid decline in quality and the exodus of our best faculty," and Robert Adams, Acting Dean of Social Sciences concluded that "the Social Sciences would be damaged seriously by maintaining the status quo."

Specific problems discussed by the deans centered on the breadth in the curriculum needed to support undergraduate and graduate students. Some basic areas of study could not be offered, and some courses could be offered only in alternate years. This practice, while ensuring that required courses are available, often causes hardships for undergraduates. For example, if a required course is not completed during the junior year, the student must stay a fifth year for the next opportunity to enroll. In addition, many programs were only partially developed and explicitly restricted faculty recruitments to a few major subdisciplines. As a result, some boards did not have the flexibility to quickly focus research efforts on emerging fields of study, and were only partially developed in significant subdisciplines. Other boards attempted to offer a wide range of courses (i.e., breadth), but as a result lacked the depth of curriculum associated with a top-ranked university.

These conclusions are consistent with the findings of a report on academic quality produced in 1975. The report states that "as a Commission, we do not claim the ability to judge what constitutes 'critical mass' in numbers of faculty to present an undergraduate major. But the contrasts and anomalies [in the boards at UCSC] reinforce our conviction that the Santa Cruz staff is both thinly and unevenly spread over the range of subjects it offers to teach[22]."

The deans also cited a lack of a critical mass of resources (i.e., faculty FTE and the support that accompanies such FTE) as being detrimental to maintaining the quality of the current programs. Many external review teams cited UCSC's lack of resources as a deterrent to attracting the first-rate faculty, including minority faculty members, needed to renew the existing programs.

The addition of faculty and programs that would be made possible with an enrollment of 12,000 students was not deemed adequate by the deans. According to Michael Cowan, Dean of Humanities, "the Humanities disciplines ... would be largely fleshed out in terms of a thin, but fairly comprehensive undergraduate curriculum," and "some graduate programs and research clusters would have reached the size to achieve national visibility ..., but other areas ... would still be below critical scale." Robert Adams, Acting Dean of Social Sciences, reached similar conclusions. He stated that "with the increase of enrollment to 12,000, basically the Division ought to be able to fill out all the various programs that have been started or at least as a concept in the existing Boards of Study."

Overall, the deans concluded that with an enrollment of 12,000 students the currently existing boards could bring their curriculum coverage to satisfactory levels. However, each dean felt that the graduate and professional programs would not be sufficient for a campus of the University of California.

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[22] Academic Quality at Santa Cruz, 1975, p. 162.

With an enrollment of around 15,000 students, the deans agreed that all three academic divisions could offer distinctive graduate and professional programs as well as a comprehensive undergraduate curriculum. Robert Adams said that the Social Sciences "would turn [its] attention to the completion of the campus by adding programs that are essential to the balance of a research university and to meeting the needs of the students of California." Frank Drake concluded that "growth ... to 15,000, administered with imagination and skill, will allow [the Natural Sciences] to meet our present responsibilities and meet the challenges of the future." Michael Cowan, Dean of Humanities, summarized his analysis by stating that "Humanities could join in the fruits of a comprehensive research university. Major languages, literature, history, and cultures of the world would be sufficiently covered in the curriculum. Breadth and depth throughout. Strong clusters of minority faculty and ample contingents of minority students in most undergraduate and graduate programs would characterize the Division."

In summary, the deans concurred that an enrollment of 15,000 students would generate sufficient faculty to enable UC Santa Cruz to develop the quality, breadth, and flexibility expected of a University of California campus. Enrollment levels below that level were deemed inadequate.

The unanimous conclusion of the deans and the UC Santa Cruz administration was that the Twenty-Year Plan goal of 800 FTE faculty permanently assigned to the boards is the minimum required to support the campus' goal of becoming a comprehensive teaching and research institution and that the introduction of graduate and professional programs is imperative if high quality undergraduate programs are to be maintained.

The complete text of the deans' comments is contained in Appendix A. Also included in the Appendix A is a letter from the Academic Senate Committee on Planning and Budget to Chancellor Stevens which discusses the need for faculty growth.

II. AN EXAMINATION OF UCSC'S CURRICULA

One way to examine the curricular breadth of UC Santa Cruz is to compare the programs and degrees offered on this campus to those of other UC campuses. The University of California does not specify a standard curriculum for its campuses. However, examining the common elements across all the campuses produces a composite view of the curriculum regarded as important throughout the University.

Information on the UC curriculum is taken from the University of California Academic Program Inventory (September, 1987). The *Inventory* is the official compendium of degrees offered by the University. The following table compares the degrees and degree specialization areas offered by UC Santa Cruz with the degrees offered by the majority (four or more) of the other UC campuses. The table is partitioned by UCSC's academic divisions. Each academic division comprises boards in related disciplines (e.g., Social Science includes politics, psychology, sociology, etc.). Humanities has been partitioned into two smaller categories, Arts and Letters.

Degrees which are offered at UCSC but *not* at the majority of UC campuses are shown in **bold** in the *left* column. Degrees offered by the majority of UC campuses but *not* at UCSC are shown in **bold** in the *right* column. Areas of degree specialization which are offered formally through another UCSC board are designated with a "b" (bachelor's), "m" (master's), or "d" (doctoral). A more complete comparison of Santa Cruz's and other UC campuses' curricula is available in Appendix B.

DIFFERENCES BETWEEN UCSC CURRICULUM
AND THE MAJORITY OF UC CAMPUSES
September, 1987

ARTS		
	UCSC	UC Campuses
Art	BA	BA, **MA**
Art History	BA	BA, **MA**
Dance	b	**BA**
Music	BA	BA, **MA**
Music Performance	**MA**	--
Theater Arts	BA	BA, **MA**, **PhD**

LETTERS		
	UCSC	UC Campuses
Afro American Studies	--	**BA**
American Studies	**BA**	--
Classical Civilization	b	**BA**
Classics	b, m, d	**BA, MA, PhD**
Comparative Literature	b	**BA, MA, PhD**
English	--	**BA, MA, PhD**
Hispanic Amer. Studies	--	**BA**
History	BA, MS, PhD	BA, MS, PhD
History of Consciousness	**PhD**	--
Language Studies	**BA**	--
French	b	**BA, MA, PhD**
German	b	**BA, MA, PhD**
Greek	b, m, d	**BA**
Italian	b	**BA**
Latin	b, m, d	**BA**
Russian	b	**BA**
Spanish	b	**BA, MA**
Latin American Studies	**BA**	--
Legal Studies	**BA**	--
Linguistics	BA	BA, **MA**
Literature	**BA, MA, PhD**	--
Philosophy	BA	BA, **MA, PhD**
Religion	b	**BA**
Women's Studies	**BA**	--

NATURAL SCIENCES		
	UCSC	UC Campuses
Astronomy	**PhD**	--
Biology	BA, MA, PhD	BA, MA, PhD
Biochemistry	**BA**, m, d	**MS, PhD**
Botany	--	**MS**
Cellular/Molecular	b, m, d	--
Microbiology	--	**BA, MA, PhD**
Psychobiology	**BA**	--
Chemistry	BA, MA, PhD	BA, MA, PhD
CIS	BA, MA, PhD	BA, MA, PhD
Geology/Earth Sci.	BA, MA, PhD	BA, MA, PhD
Marine Sciences	b, **MS**	--
Mathematics	BA, MA, PhD	BA, MA, PhD
Applied Math	b, m	--
Statistics	--	**MS**
Physics	BA, MA, PhD	BA, MA, PhD

SOCIAL SCIENCES		
	UCSC	UC Campuses
Anthropology	BA	BA, **MA, PhD**
Community Studies	**BA**	--
Economics	BA, MA	BA, MA, **PhD**
Environmental Studies	**BA**	--
Geography	--	**BA, MA, PhD**
Modern Society	**BA**	--
Politics	BA	BA, **MA, PhD**
Psychology	BA, PhD	BA, **MA**, PhD
Sociology	BA, MA, PhD	BA, MA, PhD

INDIVIDUAL STUDIES		
	UCSC	UC Campuses
Individual Studies	BA	BA, **PhD**

BUSINESS		
	UCSC	UC Campuses
Business Administration	--	**MBA**

EDUCATION		
	UCSC	UC Campuses
Education	MA	MA, **PhD**

ENGINEERING		
	UCSC	UC Campuses
General Engineering	--	**BA, MA, PhD**
Chemical Engineering	--	**BA, MA, PhD**
Computer Engineering	**BS**	--
Elect. Engineering	--	**BA, MA, PhD**
Mech. Engineering	--	**BA, MA, PhD**

MEDICINE		
	UCSC	UC Campuses
Medicine	--	**MD**

As illustrated by the table, differences between UCSC's undergraduate curricula and that of the majority of other UC campuses include:

Arts UC Santa Cruz offers the standard array of undergraduate degrees in the arts for a UC campus.

Letters Areas of study offered through departments at other UC campuses are often offered as areas of specialization at UCSC. Examples include Afro American Studies, Hispanic American Studies, and languages. Distinctive disciplines offered at UCSC include American Studies, Women's Studies, and Legal Studies.

Natural Sciences UCSC offers the standard array of undergraduate majors and several distinctive programs including Applied Math, Pyschobiology, and Marine Sciences.

Social Sciences UCSC offers most areas of undergraduate study available at other UC campuses. The only undergraduate program available at other campuses, but missing at UCSC is Geography. Community Studies, Modern Society and Social Thought, and Environmental Studies are areas of study usually not offered at other campuses.

Professional Programs In comparison with other UC campuses, UCSC has very few professional programs. This campus does not offer a degree in Business, and there is only one undergraduate Engineering program.

Differences between UCSC's graduate curricula and that of the majority of other UC campuses include:

Arts UC Santa Cruz offers only one graduate program (Music Performance), unlike other UC campuses which typically offer master's programs in Art, Art History, Music, and Theater Arts.

Letters Distinctive graduate programs offered at UCSC include History of Consciousness and Literature. A majority of other UC campuses offer graduate degrees in Comparative Literature, English, French German, Spanish, and Philosophy, while UCSC currently does not.

Differences between UCSC's graduate curricula and that of the majority of other UC campuses include:

Natural Sciences UC Santa Cruz offers a majority of the graduate programs found systemwide, however most campuses offer degrees in Botany, Microbiology, Biochemistry, and Statistics.

Social Sciences Only two of the six commonly offered doctoral programs are available at UCSC (Psychology and Sociology). Graduate and doctoral programs in Anthropology, Economics, Geography and Politics are offered by other UC campuses, but not by UCSC.

Professional Programs In comparison to other UC campuses, UCSC has very few graduate programs. This campus does not offer degrees in Business or Medicine, and there are no graduate Engineering programs.

Each UC campus is responsible for developing a curriculum of quality and breadth. Compared to a profile of other UC campuses, UC Santa Cruz offers a typical range of undergraduate courses. The greatest difference between UCSC and its sister campuses is this campus' lack of graduate and professional programs. Although UCSC should not be expected to duplicate the typical UC campus's curriculum coverage, the differences point to areas not currently offered in its curriculum. The University also expects each campus to develop its own distinctive programs. This analysis clearly shows the programs at UCSC which are not found on its sister campuses. The currently existing programs such as Community Studies, Environmental Studies, History of Consciousness, and Modern Society and Social Thought demonstrate UCSC's unique contributions to the University of California system.

This analyses points out the development which must occur for UCSC to meet the standards of the University. The Twenty-Year Plan has addressed many of the campus' curricular weaknesses[23]. Most of the new degrees programs planned for currently existing boards are doctoral. Of the new programs, the majority offer doctoral or terminal graduate degrees. In addition, the proposed programs will significantly increase the professional education provided by UC Santa Cruz.

[23] See Appendix D for proposed new programs and Appendix E for proposed new degree offerings for the current boards.

III. THE COMPARISON INSTITUTION STUDY

In 1987, a study was made of the faculty sizes of comparable institutions. The institutions included in the study were Harvard, North Carolina Chapel Hill (UNC), Northwestern, Princeton, State University of New York at Stonybrook (SUNY), UC Santa Barbara (UCSB), and UC San Diego (UCSD). These universities were chosen as comparable based on their academic reputation, their mission, and their curricula.

The study compared the number of faculty allocated to departments comparable to the boards at UCSC. The faculty figures reported by each institution were either actual or budgeted FTEs. The faculty sizes were also compared after being standardized to a common enrollment level. A display of the results appears in Appendix C.

The study shows that the number of faculty at UCSC during the 1985-86 academic year was far below that of any of the comparison institutions. Forty percent of the boards at UCSC had ten members or fewer, which compared to only 11.9 percent of the departments at the comparison institutions.

The results of the study provide statistical support for the deans' qualitative program reviews. Many of UCSC's boards are staffed at levels far below those of peer institutions. Small boards undoubtedly will be hard pressed to provide the breadth of curriculum and quality of undergraduate and graduate teaching that are expected of a University of California campus.

A comparison of the results of the study to the assumptions of the Twenty-Year Plan provides some interesting insights. The average department sizes by academic division at the comparison universities were: Arts 25, Letters 45, Natural Sciences 36, and Social Sciences 35. The assumption in the Twenty-Year Plan is an average board size of 20 permanently assigned faculty. Although average board size includes interdisciplinary boards, in view of the findings of this study, the Twenty-Year Plan figure is probably conservative.

IV. DEVELOPMENT OF CURRENTLY EXISTING BOARDS

> "Every advanced degree program offered on every campus should be comparable with the best of such programs. (p.14, 1975)." Educational Objectives For The University of California 1975-1985

Developing nationally regarded departments is a stated goal of the University and the Santa Cruz campus. To better understand the requirements of achieving this goal, a study of the number of faculty in nationally prominent graduate departments was made.

Obviously, a department's quality and reputation are not a simple function of the size of faculty. There must be, however, a sufficient number of faculty to provide quality undergraduate education, to conduct a wide range of research, to produce publications and papers, to promote professional and academic interaction, and to supervise graduate training. Review of highly regarded graduate programs will provide an estimate of the faculty resources required.

Establishing a comprehensive set of criteria for evaluating excellence in research and graduate education is extremely difficult. Although ratings of undergraduate institutions appear regularly in the popular press, serious evaluations of graduate program quality are rare. The most comprehensive study, An Assessment of Research-Doctorate Programs in the United States, was completed in 1982 by the Conference Board of Associated Research Councils (CBARC). Although no single study can be considered definitive, the *Assessment* constitutes the single largest effort and is considered to be a standard against which other evaluations are judged.

The *Assessment* examined graduate programs in five different areas: engineering, humanities, natural sciences, social sciences, and biological sciences. Academic departments were evaluated on fourteen individual measures. The *Assessment* did not combine the measures into a single index of overall program quality. To simplify the procedure for identifying the most highly regarded programs, only two of these measures were considered: department reputation and quality of graduates. For this analysis, the ratings on the two measures were given equal weight, and then averaged. Both areas were assessed by peers in each academic area from across the nation. In the table below, the numbers of faculty in the top ten rated departments are shown for each board at UCSC.

FACULTY SIZES FOR TOP RATED DEPARTMENTS AND UCSC[24]

Board	Top Ranked Depts. Mean	Median	UCSC Ph.D	Size
ARTS				
Art	na	na		10.00
Art History	17.6	18.0	P	6.00
Music	20.8	13.5		10.00
Theater Arts	na	na		12.00
LETTERS				
American Studies	na	na		1.00
History	42.9	48.5	D	22.00
History of Consc.	na	na	D	5.00
Language Studies	15.2	15.0		2.50
Latin Amer. Studies	na	na	P	--
Linguistics	20.3	16.5	D	7.00
Literature	34.7	33.5	D	39.00
Philosophy	17.0	18.0		9.50
Women's Studies	na	na	P	1.00
NATURAL SCIENCES				
Astronomy	na	na	D	8.10
Biology	33.8	23.0	D	28.75
Chemistry	31.8	29.5	D	16.00
CIS	25.1	28.5	D	14.00
Computer Engineering	49.8	53.0	P	10.00
Earth Sciences	20.6	19.0	D	13.00
Marine Sciences	na	na		5.00
Mathematics	21.5	20.8	D	17.50
Physics	46.3	41.5	D	16.75
SOCIAL SCIENCES				
Anthropology	28.0	31.0	P	12.00
Community Studies	na	na		7.50
Economics	35.5	36.7	P	19.00
Education	na	na	P	7.00
Environmental Studies	na	na	P	10.25
Modern Society	na	na		--
Politics	28.5	31.0		14.00
Psychology	49.2	44.5	D	24.00
Sociology	26.0	28.6	D	17.00

Notes na: Not applicable; program was not included in the CBARC study
--: Interdisciplinary board; no permanent faculty
D: Ph.D. currently offered
P: Ph.D. proposed in the Twenty-Year Plan

[24] Department sizes for UCSC are based on July, 1987 figures; Department sizes for top ranked programs are taken from the 1982 CBARC study.

From the previous table, it is clear that UCSC's current boards tend to be well below the size of the most highly regarded programs. Although the UCSC boards are in varied states of development, an indication of the development that has yet to occur can be found by comparing the average size of the boards that plan to or currently offer a doctoral degree to the department sizes of the highly regarded doctoral programs. For the fifteen departments where national data is available, the average department size for a top ranked program was 31.5. In comparison, the average board size at UCSC was 17.5 or a little over half the size. It is important to recall that the CBARC study was conducted in 1982; the current size of the departments at these top-rated institutions may now be larger.

The average faculty size of the seven UCSC boards that do not plan to offer doctoral programs is 9.2, about half the size recommended in the deans' review. Boards not included in the doctoral and non-doctoral groups are interdisciplinary programs that have few, if any, assigned faculty.

There is no standard method for calculating an optimum faculty size. To estimate the total number of faculty that would be required for a fully developed campus without any new programs, the following method was devised.

1) For boards which offer or plan to offer a doctoral degree, use the average department size from the CBARC study;

2) For the remaining boards without estimated sizes, use the median department size from the comparison institution study; and

3) For all boards with neither CBARC nor comparison institution data, compute the ratio of the estimated board sizes to the current board sizes using the average of the values produced by steps 1 and 2. Then multiply the current UCSC board size by that ratio.

This method uses estimates of the board size from the best empirical sources available. The faculty size for the boards without good estimates is based on the average of the boards which do. Using this method, the fully developed campus *with only the current boards of study* would require a faculty of about 690. This represents an average board size of 24. At present, the average board has about 12 members, about half the necessary size.

The new boards of study[25] discussed in the Twenty-Year Plan would require additional faculty. If each of the thirteen proposed boards are staffed by an average of 20 faculty, an additional 260 faculty members would be needed. The total projected faculty size would be about 950[26].

[25] See Appendix D for the list of new programs proposed in the Twenty-Year Plan.

[26] Each campus is required to maintain a reserve of at least ten percent of its allocated faculty, and in actual practice, the percentage tends to be higher. If 15 percent of the 950 faculty were held in reserve, there would be approximately 808 faculty members assigned to the boards. Given the required reserves, this is consistent with the estimate of about 800 permanently assigned faculty cited in the Twenty-Year Plan.

V. REVIEW OF UCSC GOALS

Another way to estimate the minimum required size of the faculty is to examine those institutions which have met the goals outlined in the Twenty-Year Plan. Differences in the structure, purpose, and goals of peer institutions make such comparisons very difficult. Nevertheless, general statements about faculty and enrollment size can be made.

National Reputation

The Twenty-Year Plan states that this institution's primary goal is to "become a comprehensive university of national distinction" (p. 1). For a university to become a nationally regarded institution it must have a faculty of depth, breadth, and quality. Although student/faculty allocation rates vary from state to state, an analysis of the number of faculty needed by other public universities to achieve national distinction should provide an indication of the enrollment levels required.

Rankings of institutional quality have been used since the 1920s to evaluate colleges and universities. Within the last 20 years, several nationwide studies have been conducted. Roose and Anderson's A Rating of Graduate Programs (1970) and Jones, Lindzey, and Coggeshall's An Assessment of Research-Doctorate Programs in the United States (1982) are two that have received wide attention. Although these studies each used different techniques and methods of analysis, the overall results were very similar. Listed below are the 15 top rated public institutions from the two studies, their graduate and total enrollments for 1987-88, and their number of faculty[27]. The order of the universities in the table are based on their total full-time enrollment.

[27] Enrollment and faculty information was obtained from Patterson's American Education, 1988.

FACULTY SIZE, AND GRADUATE AND UNDERGRADUATE ENROLLMENT OF THE TOP RANKED PUBLIC UNIVERSITIES

Institution	Faculty	Enrollment Grad	Enrollment Total	Percent Graduate
UC San Diego	1,542	1,998	15,108	13.2
U of Virginia	1,570	5,921	17,129	34.6
U of North Carolina	1,965	7,468	22,781	32.8
U of Iowa	1,634	11,687	29,504	39.6
U of Indiana	1,460	7,598	30,292	25.1
UC Berkeley	2,000	9,332	31,463	29.7
Purdue U	2,116	5,320	32,243	16.5
UC Los Angeles	2,100	11,338	33,326	34.0
U of Washington	2,500	13,249	33,674	39.3
U of Michigan	2,768	13,392	34,340	38.7
U of Illinois	2,692	9,131	36,330	25.1
U of Wisconsin	2,305	15,868	43,368	36.6
U of Texas	2,215	11,133	46,140	24.1
U of Minnesota	5,382	13,440	46,440	28.9
Ohio State U	2,949	8,304	49,200	16.9
Average	2,347	9,679	33,423	29.0

Important points illustrated by the table include:

- The universities with the smallest faculties had around 1,500 members.
- The two smallest schools, UC San Diego and the University of Virginia, have about 15,000 students.
- Although there is wide variation, graduate enrollment of the top rated schools averaged 29 percent.
- Many large public institutions did not make the list. Size alone does not assure quality.

In light of these results, it appears that a faculty well in excess of 1,000 is required for a public institution to have programs of sufficient breadth and quality to be considered among the most prestigious in the nation. Affirming the goals of the University, three UC campuses belong to this select group.

Departmental reputation

To complement UCSC's distinctive undergraduate curriculum, the Twenty-Year Plan states that "UC Santa Cruz's ultimate goal is to join the ranks of the leading research universities of the nation" (p. 23), and to have "vigorous graduate programs in all the basic disciplines" (p. 21). An examination of the universities which meet UC Santa Cruz's goals was undertaken. To be included in this group, a university must have *at least* one department ranked in the top ten percent of similar programs in each of three subject area divisions (natural sciences, social sciences, and humanities)[28]. The size of the faculty and total enrollment were then examined.

The most comprehensive study of departmental reputations, An Assessment of Research-Doctorate Programs in the United States, was completed in 1982 by the Conference Board of Associated Research Councils. The *Assessment* examined graduate programs in five different areas: engineering, humanities, natural sciences, social sciences, and biological sciences. Since UC Santa Cruz does not have an engineering division, these classifications were excluded. Biology is classified as a natural science at UCSC, thus the ratings for biological sciences were combined with those in the natural sciences. Departments included in the humanities ratings were Art History, Classics, English Language & Literature, French Language & Literature, German Language & Literature, History, Linguistics, Music, Philosophy, and Spanish Language & Literature. Departments included in the social sciences ratings were Anthropology, Economics, Geography, Political Science, Psychology, and Sociology. Departments included in the natural science ratings were Biochemistry, Botany, Cellular/Molecular Biology, Microbiology, Physiology, Zoology, Chemistry, Computer Science, Geosciences, Mathematics, Physics, and Statistics.

The *Assessment* evaluated each academic department on fourteen individual measures. To simplify the procedure for identifying the most highly regarded programs, only two of these measures were considered: department reputation and quality of graduates. Both areas were assessed by peers in each academic area from across the nation. Based on these criteria, the departments which were rated in the top ten percent were cited in Changing Times (Nov., 1983).

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[28] This set of criteria was chosen as a means of quantifying the goal stated in the Twenty-Year Plan.

The universities whose departments received the top rankings in all three academic divisions are listed in the first table. Those which received top ratings in two of the three academic divisions are listed in the second table. Faculty size, total enrollment[29], and the number of top ranked programs within each division are presented.

UNIVERSITIES WITH TOP RANKED DEPARTMENTS
IN THREE ACADEMIC AREAS

Institution	Faculty	Enrollment	Number of Top Ranked Programs		
			Hum	NatSc	SocSc
Princeton U.	821	6,256	7	6	1
Mass. Inst. of Tech.	1,800	9,500	1	12	2
U. of Chicago	1,153	9,980	4	6	6
Yale U.	2,273	10,800	8	7	4
Stanford U.	1,266	13,272	3	10	5
Harvard U.	3,000	17,379	6	7	4
Columbia U.	3,965	18,103	3	6	1
U. of Pennsylvania	3,100	21,742	1	2	3
UC Berkeley	2,000	31,463	7	13	5
UC Los Angeles	2,100	33,326	2	7	2
U. of Michigan	2,768	34,340	2	4	4
U. of Wisconsin	2,305	43,386	3	9	5

UNIVERSITIES WITH TOP RANKED DEPARTMENTS
IN TWO ACADEMIC AREAS

Institution	Faculty	Enrollment	Number of Top Ranked Programs		
			Hum	NatSc	SocSc
Johns Hopkins U.	711	10,871	2	1	0
UC San Diego	1,542	15,108	0	3	1
Cornell U.	1,558	17,588	3	8	0
U. of North Carolina	1,965	22,781	0	1	1
Indiana U.	1,460	30,292	2	0	2
U. of Washington	2,500	33,674	0	4	1
U. of Illinois	2,692	36,330	0	7	1
New York U.	3,538	46,000	2	1	0
U. of Texas	2,215	46,140	2	2	0

[29] Enrollment and faculty information was obtained from Patterson's American Education, 1988.

In reviewing these statistics, it is important to note the following points:

- Eight of the twelve top rated institutions were private. Of the four public universities, two were campuses of the University of California.

- Of the universities which had top rated programs in all three areas, the four public institutions had the highest enrollments.

- The eleven top rated public institutions averaged a faculty size of 2,240, with the smallest (Indiana University) having a faculty of 1,460 and an enrollment of 30,292. The public university with the smallest enrollment was UC San Diego which had an enrollment of 15,108 and a faculty of 1,542.

- The institutions with the smallest faculties, Johns Hopkins University (711) and Princeton University (821), are highly selective private universities with enrollments of about 10,000 students.

In summary, UC Santa Cruz will have to expand its programs and faculty well beyond their current levels to have a chance to be considered among this prestigious group of institutions. The most highly regarded public institutions typically have faculties well in excess of 1,000 and enrollments of at least 20,000 students. Two University of California campuses, Berkeley and Los Angeles, have been able to display the required breadth and quality to be ranked among the best universities in the nation.

Research

One of the goals stated in the Twenty-Year Plan for UC Santa Cruz is to "rank among the top 100 research institutions in the nation, measured by the receipt of federal research funds" (p. 23). The statement continues, "UC Santa Cruz's ultimate goal is to join the ranks of the leading research universities of the nation."

For a university to become a nationally regarded research institution it must have the faculty and facilities to support a wide range of research. As a publicly supported institution, the size of UC Santa Cruz's faculty is directly tied to its enrollment. Although the faculty allocation rates vary from state to state, an examination of the public universities which receive the highest levels of federal support should provide an estimate of the enrollment levels required to achieve the goal stated in UC Santa Cruz's Twenty-Year Plan.

The public universities which rank in the top 100 in total federal funds and research and development (R&D) funds for fiscal year 1986 are listed in the table below. The figures have been provided from the National Science Foundation and were published in The Chronicle of Higher Education (p. A22, December 9, 1987). Accompanying the federal funding information is the total enrollment and size of the faculty[30] for each institution for the 1987-88 academic year. Medical research accounts for a large portion of federal research funds. The names of universities with medical schools are printed in **bold.**

PUBLIC UNIVERSITIES IN THE TOP 100 FOR
1987 FEDERAL RESEARCH FUNDS

	Public Institution	R&D Rank	Overall Rank	Total Enrollment	Faculty
1	**U. of Washington**	4	4	33,674	2,500
2	**UC Los Angeles**	7	8	33,326	2,100
3	**UC San Diego**	5	9	15,108	1,542
4	**U. of Wisconsin**	8	10	43,368	2,305
5	**U. of Minnesota**	15	11	45,006	5,382
6	**U. of Michigan**	11	12	34,340	2,768
7	UC Berkeley	16	15	31,463	2,000
8	Penn. State U.	18	17	35,261	1,672
9	U. of Illinois	17	19	36,330	2,692
10	**Ohio State U.**	32	20	49,200	2,949

[30] Enrollment and faculty information was obtained from Patterson's American Education, 1988.

	Public Institution	R&D Rank	Overall Rank	Total Enrollment	Faculty
11	U. of Colorado	21	21	23,126	1,151
12	**U. of North Carolina**	25	28	22,781	1,965
13	**U. of Pittsburgh**	30	29	28,449	2,827
14	U. of Texas	20	30	46,140	2,215
15	**Michigan State U.**	39	31	41,897	2,657
16	**U. of Florida**	38	32	35,472	3,405
17	Indiana U.	49	33	30,292	1,460
18	**U. of Utah**	33	34	24,721	1,741
19	**U. of Iowa**	35	35	29,504	1,634
20	U. of Maryland	34	36	30,362	2,448
21	Purdue U.	41	37	32,243	2,116
22	**U. of Arizona**	36	38	31,079	1,667
23	Georgia Inst. of Tech.	42	44	11,494	721
24	**Texas A&M U.**	57	45	36,570	2,170
25	U. of Alabama	43	47	16,210	883
26	New Mexico State U.	51	51	13,718	612
27	**UC Davis**	46	52	19,808	1,411
28	Oregon State U.	54	53	15,199	1,623
29	**U. of New Mexico**	58	55	24,487	1,461
30	**U. of Virginia**	52	58	17,129	1,570
31	U. of Georgia	62	59	25,178	1,928
32	**U. of Kentucky**	82	61	20,764	1,509
33	Louisiana State U.	63	62	27,704	1,297
34	North Carolina State U.	71	64	24,000	1,466
35	Iowa State U.	88	65	26,431	2,133
36	U. of Massachusetts	75	66	26,422	1,276
37	U. of Connecticut	61	67	23,063	1,434
38	**UC Irvine**	60	68	13,567	1,128
39	**U. of Illinois Chicago**	67	69	36,330	3,800
40	**U. of Cincinnati**	66	70	21,288	2,186
41	**SUNY Stony Brook**	56	71	16,166	1,466
42	**Rutgers U.**	78	73	48,539	4,087
43	**U. of Missouri**	83	74	22,769	2,485
44	U. of Hawaii	70	75	20,884	2,134
45	Colorado State U.	73	76	18,381	4,524
46	UC Santa Barbara	69	80	18,000	900
47	Virg. Poly. Inst. & SU	77	81	22,345	2,171
48	**U. of Oregon**	111	82	17,142	1,307
49	**Virg. Commonwealth U.**	74	83	11,663	1,455
50	U. Tennessee Knoxville	98	86	25,290	1,557
51	Utah State U.	85	87	11,690	650
52	U. of Kansas	90	88	25,822	1,322
53	Temple U.	95	90	31,492	2,087
54	Oklahoma State U.	104	93	21,176	1,121
55	**U. of Vermont**	84	94	9,560	905
56	Washington State U.	96	95	16,391	1,574
57	**Wayne State U.**	101	97	29,070	2,200
58	**SUNY Buffalo**	79	98	24,022	556
59	Florida State U.	87	99	23,000	1,279
60	Auburn U.	116	100	19,363	1,141

In reviewing these statistics it is important to note the following points:

- Every public institution in the top 100 had an enrollment and faculty size larger than UC Santa Cruz.
- Seven University of California campuses were among the top 100 (including UC San Francisco which was not cited because it is not an undergraduate institution).
- Only six public institutions in the top 100 had enrollments of fewer than 15,000, and none of these institutions were in the top 40 overall or among the top 20 public institutions.
- Although the ten public institutions with the highest levels of support have an average enrollment of nearly 36,000 students, UC San Diego received the third highest amount of research funds for a public institution and had an enrollment of 15,108.
- Medical research represents a large portion of federal research funds, and half of the public institutions on the list have medical schools. Of the comprehensive public universities which do not have medical schools, the smallest five have an average enrollment of 14,642.

The goal of being ranked in the top 100 in federal research and development funds was attained by most University of California campuses in 1987. Federal funds obtained by UC Santa Cruz in 1987-88 amounted to $12,081,003, about half the amount needed to meet its stated goal[31]. Comprehensive public institutions without medical schools which attain this goal tend to have large enrollments.

Summary

A comparison of the goals set for UC Santa Cruz in the Twenty-Year Plan to the public universities which have met those goals provides an indirect measure of the faculty size and enrollment levels required. Analyses examining university reputation, departmental reputation, and the amount of federal research funds each corroborate the conclusion that for UC Santa Cruz to meet its long range goals, it must increase its faculty size to at least 800 members.

[31] The amount of total Federal obligations to the 100th ranked institution was over 27 million dollars.

CONCLUSIONS

Implications for program development

Findings from the study of the University of California curriculum supported the conclusions of UCSC's deans that UC Santa Cruz needs to expand its graduate and professional program offerings. Failure to support an enrollment of fewer than 15,000 students would prevent the academic divisions from adequately meeting all the University's standards.

The new degrees and programs envisioned in the Twenty-Year Plan remedy many of the curricular weaknesses perceived by the deans. The proposed programs would greatly reduce the differences between UCSC's offerings and those common to the majority of other UC campuses[32], especially in graduate and professional programs. The addition of twenty-three new master's or doctoral programs will help enable UC Santa Cruz to provide the programs expected of a campus of the University of California.

Implications for the size of the faculty

Based on information from top-rated and peer institutions, it was estimated that development of the curriculum to the depth and breadth needed for UCSC to become a mature UC campus requires a total faculty of as many as 950 members. Each campus is required to maintain a reserve of at least ten percent of its allocated faculty, and in actual practice, the percentage tends to be higher. If 15 percent of the 950 faculty were held in reserve, there would be approximately 808 faculty members assigned to the boards. Given the required reserves, this is consistent with the estimate of about 800 permanently assigned faculty cited in the Twenty-Year Plan. With the minimum reserve of ten percent required by University policy, a total faculty of 880 would be needed to assign 800 faculty to the boards.

The estimated number of faculty required for UCSC to meet its goals is based on staffing patterns at other institutions and the curriculum plan delineated in the Twenty-Year Plan. It should be considered as only a rough indicator and not taken as a definitive campus goal. Differences in staffing patterns (e.g., frequent use of interdisciplinary boards), changes in the University faculty allocation procedures, or changes in UCSC's long-term goals could dramatically affect the estimate.

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[32] See Appendices D and E for a complete list of the programs proposed in the Twenty-Year Plan.

Implications for enrollment

Estimating UCSC's future faculty FTE allocation requires an examination of the expected composition of the student body. The Twenty-Year Plan states a goal for graduate enrollment of 15 percent by 2001[33], and up to 20 percent in the long term. Furthermore, as a result of the Master Plan review[34], the University has been asked to set the proportion of lower division students at 40 percent. Variations in the composition student body will, of course, result in different faculty FTE allocations. However, to be allocated 800 FTE which can be permanently assigned to the boards (i.e., a total allocation of between 880 and 950 FTE), an enrollment of target of 15,000 students appears to be a minimum estimate of the enrollment level required for UC Santa Cruz to achieve maturity.

The analyses of the curriculum by the deans, the comparison of University of California campuses' curricula, the comparison of board sizes to top-ranked and peer institutions, and the analyses of universities which have achieved UCSC's goals all point to an ideal enrollment level of 15,000 or above. However, due of the many educational, financial, and political factors that will play an important role in the future development of the campus, the enrollment limit must remain open to periodic review.

As this campus emerges from a period of truncated development into a period of growth, UC Santa Cruz has the opportunity to become an outstanding and equal campus of the University of California. The programs and goals of the Twenty-Year Plan provide a valuable blueprint to guide this development, but the campus must retain the flexibility to allow it to respond to the challenges of the future.

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[33] University of California Santa Cruz Twenty-Year Plan, 1985, p. 21.

[34] The Master Plan Renewed, July, 1987, p. 15.

APPENDIX A

THE DEAN'S REVIEWS AND
LETTER FROM THE ACADEMIC SENATE

SANTA CRUZ: DIVISION OF HUMANITIES AND ARTS
OFFICE OF THE DEAN

March 8, 1988

ACTING ACADEMIC VICE CHANCELLOR GRUHN
McHenry Library

Re: LRDP Growth Scenarios

Dear Ronnie:

As requested, I've laid out three scenarios for development of the Humanities at different stages of the growth of the campus.

I. Campus Enrollment at 9,000

In this status quo model some disciplines and sub areas have minimally adequate coverage to meet an undergraduate teaching mission: for example linguistics, philosophy, European history, American, Latin American, and French literature. Others have less than adequate coverage: English literature, most subfields in History (especially American, Asian, Latin American, and political and economic history), and some European and Asian literatures. European languages and Chinese and Japanese are provided through the intermediate level, but not really sufficient sections to meet present student demand. The Division's major interdisciplinary programs are all understaffed. None of the disciplines could be said to offer a comprehensive curriculum--one characteristic of the best universities. Taken together the curriculum is reasonably wide-ranging, but far from comprehensive and with not much depth except in two or three areas (e.g., linguistic theory). Worse is the insufficient number of minority faculty, insufficient attractiveness of the curriculum to minority undergraduates and graduate students.

Graduate instructional capability is stretched thin in most areas even in the entirely graduate program, History of Consciousness (for instance in feminist studies and colonial discourse studies). Literature has enough faculty on paper to handle a modest graduate program, but faculty clusters are too thin or otherwise overburdened to allow a satisfactory match with graduate student interests. Graduate programs are not offered in all the central disciplines. In the two largest graduate programs, Literature and History of Consciousness, their modest size makes national visibility and distinction virtually impossible.

In research and public service the Humanities have nowhere near attained the critical scale of faculty to achieve national scholarly visibility, although individuals do stand out.

II. Campus Enrollment of 12,000 to 12,500

The Humanities disciplines (and interdisciplinary efforts) would be largely fleshed out in terms of a thin, but fairly comprehensive undergraduate curriculum, i.e., major areas covered, but sometimes by only one or two people. In History and Literature, for instance, Europe would be adequately covered, but individual countries and comparative studies would still be thin. The major European, Asian, and Middle Eastern languages would be offered, but only through the intermediate level. Linguistics and Philosophy would reach sufficient critical scale. However, no applied programs in the Humanities would be possible (journalism, communications, educational linguistics, etc.). In sum; sufficient breadth, but inconsistent depth. At this stage the Division should have hired overall a minimally adequate but not desirable number of minority faculty and developed selective strengths in minority undergraduate and graduate students, although some programs will still have too few minority faculty and students.

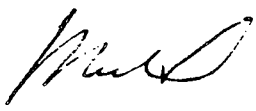
Graduate programs would have developed at this stage in all major disciplines, except perhaps Philosophy. Some graduate programs and research clusters would have reached the size to achieve national visibility and to attract excellent graduate students, but other areas--most notably History--would still be below critical scale. No professional programs in the Humanities would have been launched.

III. Campus Enrollment of 15,000

The Humanities could join in the fruits of a comprehensive research university. Major languages, literature, history and cultures of the world would be sufficiently covered in the curriculum. Breadth and depth throughout. Strong clusters of minority faculty and ample contingents of minority students in most undergraduate and graduate programs would characterize the Division.

The faculty in all programs would be connected to graduate programs. These programs would have developed strengths unique within the UC system and California. Our strengths would attract visiting graduate students from those institutions. At least one professional program would have developed. Research and public service would reach a state of maturity.

Sincerely,



Michael Cowan, Dean

cc: Executive Assistant Jorgensen

SANTA CRUZ: OFFICE OF THE DEAN-NATURAL SCIENCES

March 9, 1988

ACTING ACADEMIC VICE CHANCELLOR GRUHN

Re: Impact of Growth

Dear Ronnie,

This is in response to your request of March 2, 1988, for information relating to the impact of enrollment growth on programs in the Natural Sciences.

Some historical perspective is in order. When the campus opened in 1965 it was anticipated it would grow to 27,500 students by 1990. That was then the size of the Berkeley campus, and the Regents took that as the ideal size, to provide both the resources necessary for a major research University and to accommodate the higher education needs of the state of California. As academic programs were initiated, staffing patterns assumed this steady growth as a given, and decisions were based on the expectation that the faculty and financial resources necessary for complete programs would become available in what now seems a very rapid fashion. These assumptions and expectations led Boards of Studies to make initial staffing decisions based on the immediate needs of a new campus with a disproportionate complement of undergraduate students. Graduate students were added at a slower rate although all of the original science Boards had graduate students from the beginning. The necessary symmetry and balance would come soon, with the new resources which would be added rapidly.

Due to an unexpected combination of circumstances, mostly external and beyond our control, campus growth did not meet expectations. Our academic programs found themselves frozen in distorted and truncated forms. Across the Division, Boards were only partially developed, with large areas of disciplines unrepresented or understaffed. This meant we were not able to present the full range of undergraduate and graduate programs normally expected of a major university, and we were unable to take advantage of opportunities as new fields developed. One such opportunity came with the explosive growth in biochemistry and molecular biology, which began soon after the opening of the campus. New faculty positions were by then unavailable, and our programs in molecular biology, despite the heroic efforts of faculty such as Harry Noller, have suffered from a lack of adequate faculty for 15 years. Various other areas, and not just those glamorous and highly visible, never developed as they should have---statistics, analytical chemistry, plasma physics, field biology and marine sciences (both of which should be much larger now, given the superb

ACTING ACADEMIC VICE CHANCELLOR GRUHN
March 9, 1988
Page Two

opportunities afforded by our location, unequalled by any other US university), applied mathematics. The list is much longer, but these examples illustrate the lost opportunities we have suffered because of unforeseen circumstances.

The story of non-linear dynamics, where one of the hottest fields in current science got much of its initial impetus from the work of a group of Santa Cruz graduate students, is especially tragic for the campus. We lost the opportunity to make Santa Cruz the world leader in this field since it presented itself at a time when the campus was contracting, and resources, rather than being available, were being reduced. It is difficult to imagine a better opportunity to catapult this campus into a better position of world leadership in an important academic area, one that we created ourselves and could have presented as a Santa Cruz contribution.

In specific terms and in alphabetical order:

Astronomy has been the most successful of our Boards, but due almost entirely to the presence of the additional faculty resources here because of the presence of Lick Observatory. However, our present size limits important resources for the Board. We do not have an adequate research library or computing facilities, areas which would improve given a larger campus. The Astronomy and Astrophysics faculty feel the need for additional colleagues in closely related disciplines, such as physics, applied and computational mathematics, non-linear studies, and engineering. In addition to these general needs, we still have obligations to add faculty to fully staff the Keck Ten Meter Telescope, a major new astronomical venture centered on this campus. Major national initiatives in astronomy, such as the space telescope, will provide a wealth of new data, and we intend to be a major center for data reduction and interpretation. In many ways astronomy is poised on the threshold of a new golden age, and we intend to be in a position to maintain leadership in the field.

Biology has many unmet needs. The emergence of biotechnology and bioengineering as major scientific, environmental, and economic areas makes it imperative we participate in these vital developments. This impacts not only research but teaching as well. The faculty, facilities, and resources which come to the campus as a result of activities in frontier areas provide the infrastructure for excellent teaching programs. Santa Cruz has a well-earned reputation for environmental responsibility, and we are in a position to produce students able to deal with the legal, social, and philosophical issues involved. Our present size has made us uncompetitive for federal training and program grants which require a certain critical mass. Growth would add efficiencies of scale as well, in support areas such as greenhouses and animal facilities, which now have a high unit cost.

ACTING ACADEMIC VICE CHANCELLOR GRUHN
March 9, 1988
Page Three

Chemistry has suffered more than most from a lack of resources. I have already mentioned the need for analytical chemistry and biochemistry. To cover the field adequately, a faculty of at least 25 is necessary, a figure which can be attained with a student population of around 15,000. The recent outside review of the Board called for the immediate addition of strength in the increasingly important area of inorganic chemistry, particularly organometallic chemistry. We need a faculty member interested in the theory of molecular behavior, an important component in the broader area of Organic and Biochemistry. The review also put in frank terms the difficult position we find ourselves in attempting to attract a senior faculty member because of our small size: "The financial resources, intellectual climate, available space and instrumentation are all insufficient to appeal to a first-rate scientist."

Computer Science and Computer Engineering have received resources in recent years, but are still far from maturity. We need to add at least six new faculty to initiate the graduate program in Computer Engineering. Computer Graphics and Image Processing need strengthening. These areas are the subject of intense development now, with recent advances in computer technology such as optical disk technology, array processors and floating-point processors. Our location and our well-developed links with the leading industrial scientists put us in a perfect position to capitalize on these events. Computer architecture and operating systems are becoming increasingly important for advances in computer science, as we approach the limits of increasing the speed of semiconductors. We need to add faculty specializing in design of parallel architectures, and special purpose and multi-processor systems, to meet student demand in this area.

Earth Sciences has begun an excellent program in Seismology, and needs at least one more faculty member in that area within the next five years, giving them a total of three. There exist excellent opportunities for research and a strong teaching need in environmental geosciences, an area where there are campus links with Marine Sciences and Environmental Sciences. Their core faculty needs to be augmented by at least one more colleague in both metamorphic petrology and geodynamics. Both are areas of strong student demand, and geodynamics has relationships with nonlinear science.

Marine Sciences has been able to put together an absolutely minimal program. Even so, the program has attained a national reputation for excellence. They need at least two more FTE to be able to offer the Ph.D., and an increase of four, reached with a student body of 15,000, would give us one of the strongest programs anywhere. This is a reasonable goal for Santa Cruz, and is made possible by incorporating the staff, resources, and reputation of the Institute for Marine Sciences. Our emphasis is the study of large scale processes that

ACTING ACADEMIC VICE CHANCELLOR GRUHN
March 9, 1988
Page Four

control the distribution of natural and manmade materials in the sea, with an eye toward predicting large-scale alterations of the earth's environment. It is appropriate for us to adopt this emphasis given the strong environmental consciousness of Santa Cruz and concern for the public welfare of Californians and all who live near oceans.

Mathematics has borne for years an enormous service teaching load, that has required that more than half their courses be taught by visitors. This has had various ill effects on the Board, including an instability in their graduate program, and inadequate time for research. They need to add faculty in areas of pure mathematics, such as global and linear analysis, algebra, and geometry and topology. Even more important, the long delayed programs in applied mathematics need a substantial infusion of new faculty. These areas are becoming increasingly important parts of mathematics, areas with large student demand, and areas of immediate applicability to real world problems. Our weakness in this area is one of the most glaring results of the growth slowdown of the 1970s, and has a high priority for correction. Development of this area within the Math Board is crucial if we are to become as involved as we must in nonlinear work.

Physics has been forced to concentrate their resources in a few sub-fields. They have chosen wisely, and our programs in high energy physics, particle physics, and condensed matter physics are first rate. Even so, we cannot provide undergraduates and graduates a complete range of courses and research opportunities. One obvious area for growth is superconductivity, a formerly obscure branch of physics which has suddenly become an area of intense international interest. We have two faculty in that area now, but a larger group is needed to take advantage of the opportunities present, and to make full use of the Synchrotron Radiation Laboratory operated jointly by UC and Stanford. The theoretical side of particle physics needs two new faculty. Fluid dynamics is an area we can barely involve ourselves in, yet it is a very important part of modern physics, and carries with it strong student demand. Additional faculty will allow us to present yearly some courses which are now given every other year, causing some undergraduates to miss them completely. At the 15,000 student level, we will have enough faculty to become involved in particle accelerators and synchrotron X-ray sources, areas which are now beginning to receive great attention and substantial federal funding.

New Programs The above refers to our existing programs, and the need for additional faculty to round them out. We also need to develop new programs. A proposal for a graduate research and education program in Environmental Toxicology is now being reviewed by the campus. This program builds on existing strengths in Marine Sciences, Earth Sciences, and Chemistry, and will help meet a serious public problem.

ACTING ACADEMIC VICE CHANCELLOR GRUHN
March 9, 1988
Page Five

There is no similar program in California, a state faced with very difficult present and future problems in handling the toxic products of modern civilization. Santa Cruz is prepared to take the lead in this important area. Electronic Engineering will be the next area of engineering to be developed, as a natural complement to the Computer Engineering program and as another step toward the establishment of a School of Engineering. This will require six faculty at the initial stage, well within our capabilities with a student body of 12,000. A little further in the future a program in atmospheric sciences remains a possibility, a program which would bring together aspects of Astronomy, Biology, Earth and Marine Sciences, Mathematics, Physics, and Engineering. Most present academic efforts in this area have grown out of meteorology and suffer from that narrowness; we would adopt a much more global view.

The modest amount of growth we have seen over the past two years, which still does not completely reflect our increased student numbers, has been a great morale booster for our faculty. Once again it seems as if Santa Cruz has the possibility of fulfilling its original promise. Freezing the campus at its present size will result in a rapid decline in quality and the exodus of our best faculty. Growth to 12,000 and then 15,000, administered with imagination and skill, will allow us to meet our present responsibilities and meet the challenges of the future.

Sincerely,

Frank

Frank Drake
Dean

SANTA CRUZ: DIVISION OF SOCIAL SCIENCES
OFFICE OF THE DEAN

March 9, 1988

TO: Acting Academic Vice Chancellor Gruhn

RE: Impact of Growth

Dear Ronnie:

I would like to make some comments with regard to the impact of enrollment levels of 9,000, 12,000, and 15,000 students. Let me begin by considering the status quo situation of roughly 9,000 students. This circumstance would leave the Division in relatively bad shape. A number of programs that have begun would not reach the scale to make them sufficiently viable as either research units or undergraduate/ graduate teaching units.

Maintaining status quo would obviously, at this point, truncate and hold off Anthropology from proceeding in its Ph.D. in cultural anthropology. Such a limit would certainly do irreparable damage to the reputation and research program of the Board.

In Community Studies the status quo is viable, but it would only be at the expense of a very difficult workload problem for the existing faculty.

In Economics, the status quo would essentially mean limiting the program in two ways. We would not be able to proceed on the new and innovative Ph.D. in International Economic Studies. Such a limit would obviously hinder in a very serious way the possibilities for the Economics Board to move ahead as a major player in the economics profession. The status quo would also mean that the enrollment limits now present in the business track would have to be maintained. A large number of students would not be able to pursue further professional work in this area.

In Psychology, the status quo would inhibit the development of the exciting new track in development. The lack of growth would cut the Board off from these new developments and will truncate its natural growth.

At the present time the Sociology Board would handle the present status quo, but with specific curricular and research deficiences.

The Politics Board is presently coming through a review. In order to solve some of the problems, develop and move the Board ahead, further resources are required. Moreover, the Board needs to begin to talk about Master's level degree work. Should we maintain the status quo, such an adjustment would not be possible.

Acting Academic Vice Chancellor Gruhn
March 9, 1988
Page 3

I should also note that there are a number of research programs in the Division that are in the focused research status. Growth of the campus will assure their maturation.

Sincerely,

Robert F. Adams
Acting Dean

April 15, 1988

CHANCELLOR ROBERT B. STEVENS

Dear Robert,

The Committee on Planning and Budget has reviewed briefly the need for growth both from a programmatic need within various disciplines as well as the larger societal need of the state. We have listened (April 13 Forum) to a number of faculty express their views on campus growth, programmatic development, the need for a planning overview, the importance of retaining outstanding undergraduate programs, and a consideration of ways in which we can mitigate the impact of growth on the community.

As clearly indicated in our forum, the faculty recognizes many of the external constraints that will affect our ability to expand our facilities and recruit outstanding faculty in the future. These include the possibilities of future campuses, the anticipated increased competition for outstanding faculty in the 90's, and the need to provide space at the university for the burgeoning enrollment which includes underrepresented groups of students towards whom there exists a strong commitment. The present high student demand provides the opportunity for the campus to strengthen its existing programs and hasten our planning and development of new areas. The need for such development has been expressed in a number of planning documents over the last few years, in the letters of the Deans, and expressed again at our forum. It is clear that the planning process is incomplete, but we do not believe we should wait until a 'final' document is prepared. Planning by its very nature will change as new faculty arrive on campus, and the shape of the campus 15 years hence will to a large part be determined by the outstanding new people we recruit in the next decade. Planning must continue both at the incremental level of various boards as well as from a larger overview perspective in which the campus considers the size of the graduate program, the size of possible professional schools, and the extent to which we move into new areas (or contract existing areas). This planning can be carried out in tandem with a reasonable, uniform growth plan.

We believe there is general agreement that the present growth plan will lead to serious difficulties for the campus and the community if we try to accept roughly 700 students/year in the mid 90's. The idea of smoothing out the growth as suggested in the Deans' letter appears to have nearly unanimous support. We also recognize the need for breathing space to put our campus in

Bridges to Stevens - 2 - April 15, 1988

better order (better use of classrooms, an efficient preregistration system), but most of these actions can likely be carried out within the next year. In view of the realistic concern that recruitment will become extremely difficult in the mid 90's, we recommend, based on the sentiment expressed at the forum, that a shortened breathing space be considered and that we move toward a faster growth rate (in the range 400-500) within one to two years. We cannot say how long such growth might continue as it will again be contingent on a continuing increase in the number of eligible students who wish to attend UC. The campus's ultimate size will depend on the programs developed or expanded by the new faculty we attract in the next few years. At present an enrollment close to 15,000 appears necessary if we are to complete existing programs, build strong graduate programs, and develop professional schools. As we plan we should always look for ways to obtain some forward funding of FTE for well identified projects, but we should not require or expect such funding to be a major fraction of our FTE allocations.

In university-wide negotiations, it is crucial that our increased needs for faculties, faculty start-up funds, and related support be met if we accept a higher growth rate. At the local level, we need to do everything possible to minimize the impact of our growth on the community. The search for water on campus is an important step, but other possibilities need to be discussed with city and county leaders.

The campus needs to grow, to become a fully developed member of the UC system with distinctive programs and to provide access to the growing number of students who wish to attend UC and UCSC in particular. The opportunity to grow now exists as a result of increased student applications. We welcome further discussion as to how our goals can best be achieved within the many external and internal constraints.

Sincerely,

Bud / JD

Frank Bridges, Chair
Committee on Planning and Budget

APPENDIX B

DEGREES OFFERED:
A COMPARISON OF UCSC WITH OTHER UC CAMPUSES

This table compares degrees offered by the majority of UC campuses to those offered at UCSC. Degrees offered by a majority of other campuses, but not at UCSC are denoted by "--"; degrees offered by UCSC, but not by a majority of the other campuses are noted with an asterisk. The lower case letters "b," "m," and "d" denote bachelor's, master's, and doctoral degrees which can be obtained in a specialty area, but which are formally offered through another department at UCSC. It should be noted that this table does not reflect all of UCSC's degree offerings. Specialty area offerings at UCSC which are not offered by four or more departments in the University are not shown in the table.

Also included in the table are the number of departments reviewed in An Assessment of Research-Doctorate Programs in the United States, a nationwide study of departmental reputations completed in 1982 by the Conference Board of Associated Research Councils (CBARC). Doctoral programs in the humanities, social sciences, life sciences, natural sciences, and engineering were rated. The study examined graduate departments that were common to a large number of universities. In the table, a "D" denotes the disciplines in which UCSC currently has doctoral programs in the areas rated in the CBARC study. A "P" denotes the areas in which doctoral programs are proposed in the Twenty-Year Plan.

Degree	UCSC Degree	UC Campuses B/M/D	CBARC Study
	ARTS		
Art	BA	5/4/0	
Art History	BA	6/5/3	41[P]
Dance	b	4/1/0	
Music	BA	5/5/3	53
Music Performance	MA	2/2/1*	
Theater Arts	BA	6/5/4	

Degree	UCSC Degree	UC Campuses B/M/D	CBARC Study
	LETTERS		
Afro American Studies	--	4/1/0	
American Studies	BA	2/0/0*	
Classical Civilization	b	4/0/0	
Classics	b/m/d	6/5/4	35
Comparative Literature	b	5/7/7	
English	--	6/6/6	106
Hisp. American Studies	--	5/0/0	
History	BA/MA/PhD	7/7/7	102[D]
History of Consciousness	PhD	0/0/0*	
Language Studies	BA	1/0/0*	
French	b	6/6/6	58
German	b	5/5/4	48
Greek	b/m/d	4/2/0	
Italian	b	4/2/2	
Latin	b/m/d	4/2/0	
Russian	b	4/1/0	
Spanish	b	6/6/3	69
Latin American Studies	BA	3/2/1*	
Legal Studies	BA	0/0/0*	
Linguistics	BA	7/4/3	35[P]
Literature	BA/MA/PhD	1/0/0*	
Philosophy	BA	7/7/7	77
Religion	b	5/1/1	
Women's Studies	BA	3/0/0*	
	NATURAL SCIENCES		
Astronomy	PhD	2/2/3*	
Biology	BA/MS/PhD	7/5/5	
Biochemistry	BA/m/d	3/4/4	139
Botany	--	3/4/3	83
Cellular/Molecular	b/m/d	3/1/3	89
Microbiology	--	4/4/4	134
Psychobiology	BA	0/0/0*	
Chemistry	BS/MS/PhD	7/6/6	145[D]
CIS	BA/MS/PhD	6/6/5	58[D]
Geology	b	5/5/5	91[D]
Earth Sciences	BA/MS/PhD	0/2/2*	
Marine Sciences	b/M	0/0/0*	
Mathematics	BA/MA/PhD	7/7/7	115[D]
Applied Math	b/m	3/3/2	
Statistics	--	3/5/2	64
Physiology	--	3/3/3	101
Physics	BA/MS/PhD	7/6/6	123[D]
Zoology	--	3/3/2	70

Degree	UCSC Degree	UC Campuses B/M/D	CBARC Study
SOCIAL SCIENCES			
Anthropology	BA	7/6/6	70[P]
Community Studies	BA	0/0/0*	
Economics	BA/MS	7/7/7	93[P]
Environmental Studies	BA	1/0/0*	
Geography	--	6/5/5	49
Modern Society	BA	0/0/0*	
Politics	BA	7/6/7	83
Psychology	BA/PhD	7/7/8	150[D]
Sociology	BA	7/7/7	92[D]
Interdiscpl Soc	MA/PhD	0/0/0*	
INDIVIDUAL STUDIES			
Individual Studies	BA	6/1/4	
BUSINESS			
Business Admin	--	1/5/3	
EDUCATION			
Education	b/MA	0/5/4	
ENGINEERING			
Engineering, General	--	4/4/4	
Chemical Engineering	--	4/4/4	79
Civil Engineering	--	3/3/3	74
Computer Engineering	BS	3/0/0*	
Elect. Engineering	--	5/5/5	91
Materials Engineering	--	3/3/3	
Mech. Engineering	--	4/4/4	82
MEDICINE			
Medicine	--	0/0/5	

APPENDIX C

SELECTED TABLES FROM THE
COMPARISON INSTITUTION STUDY

COMPARISON INSTITUTION SURVEY
('UCSC VIEW'--see notes)
1985-86 ACTUAL FACULTY FTE
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ACTUAL FACULTY FTE	INSTITUTION: HARVARD	NC CHAPEL HILL(A)	NORTH-WESTERN(A)	PRINCETON(B)	SUNY STONY BROOK(B)	UCSB(A)	UCSD(B)	UCSC(A)	SUMMARY: AVG	MIN	MAX	RANGE
TOTAL STUDENTS	9,224	10,999	7,759	5,490	12,362	15,891	12,198	8,409	10,292	5,490	15,891	10,401
FACULTY CAMPUS TOTAL	584.00	686.71	614.00	535.26	608.63	716.63	612.81	390.99	593.63	390.99	716.63	325.64
ARTS												
Art	----	18.00	7.00	7.42	15.34	15.00	21.50	14.42	14.10	7.00	21.50	14.50
% of campus	----	2.62%	1.14%	1.39%	2.52%	2.09%	3.51%	3.69%	2.42%	1.14%	3.69%	2.55%
Art History	----	----	9.00	18.50	----	13.51	----	4.49	11.38	4.49	18.50	14.01
% of campus	----	----	1.47%	3.46%	----	1.89%	----	1.15%	1.99%	1.15%	3.46%	2.31%
Music	----	27.00	65.00	14.00	30.57	25.34	23.67	12.16	28.39	12.16	65.00	52.84
% of campus	----	3.93%	10.59%	2.62%	5.02%	3.68%	3.86%	3.11%	4.69%	2.62%	10.59%	7.97%
Theater Arts	----	14.00	20.00	4.56	13.00	21.25	18.00	15.75	15.22	4.56	21.25	16.69
% of campus	----	2.04%	3.26%	0.85%	2.14%	2.97%	2.94%	4.03%	2.60%	0.85%	4.03%	3.18%
SUBTOTAL ARTS	----	59.00	101.00	44.48	58.91	76.10	63.17	46.82	64.21	44.48	101.00	56.52
% OF CAMPUS	----	8.59%	16.45%	8.31%	9.68%	10.62%	10.31%	11.97%	10.85%	8.31%	16.45%	8.14%
HUMANITIES												
History	----	48.17	27.00	35.00	28.00	39.83	31.50	15.96	32.21	15.96	48.17	32.19
% of campus	----	7.01%	4.40%	6.54%	4.60%	5.56%	5.14%	4.08%	5.33%	4.08%	7.01%	2.93%
Languages	----	51.00	28.00	44.92	40.00	63.16	17.00	22.78	38.12	17.00	63.16	46.16
% of campus	----	7.43%	4.56%	8.39%	6.57%	8.81%	2.77%	5.83%	6.34%	2.77%	8.81%	6.04%
Linguistics	----	----	6.00	----	7.00	8.88	10.00	5.56	7.49	5.56	10.00	4.42
% of campus	----	----	0.98%	----	1.15%	1.24%	1.63%	1.43%	1.29%	0.98%	1.63%	0.65%
Literature	----	77.40	48.00	56.58	45.50	87.64	48.73	31.80	56.52	31.80	87.64	55.84
% of campus	----	11.27%	7.82%	10.57%	7.48%	12.23%	7.95%	8.13%	9.35%	7.48%	12.23%	4.75%
Philosophy	----	18.00	12.00	20.50	24.40	12.33	15.00	9.37	15.94	9.37	24.40	15.03
% of campus	----	2.62%	1.95%	3.83%	4.01%	1.72%	2.45%	2.40%	2.71%	1.72%	4.01%	2.29%
SUBTOTAL HUMANITIES	----	194.57	121.00	157.00	144.90	211.84	122.23	85.51	148.15	85.51	211.84	126.33
% OF CAMPUS	----	28.33%	19.71%	29.33%	23.81%	29.56%	19.95%	21.87%	24.65%	19.71%	29.56%	9.85%

(A) Actual Faculty FTE
(B) Budgeted Faculty FTE

SC:F&P 9/87

COMPARISON INSTITUTION SURVEY
('UCSC VIEW'--see notes)
1985-86 ACTUAL FACULTY FTE
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ACTUAL FACULTY FTE	INSTITUTION								SUMMARY			
	HARVARD	NC CHAPEL HILL(A)	NORTH-WESTERN(A)	PRINCE TON(B)	SUNY STONY BROOK(B)	UCSB(A)	UCSD(B)	UCSC(A)	AVG	MIN	MAX	RANGE
TOTAL STUDENTS	9,224	10,999	7,759	5,490	12,362	15,891	12,198	8,409	10,292	5,490	15,891	10,401
FACULTY												
CAMPUS TOTAL	584.00	686.71	614.00	535.26	608.63	716.63	612.81	390.99	593.63	390.99	716.63	325.64
NATURAL SCIENCES												
Astronomy	----	----	----	6.66	----	----	----	7.56	7.11	6.66	7.56	0.90
% of campus	----	----	----	1.24%	----	----	----	1.93%	1.59%	1.24%	1.93%	0.69%
Biology	----	43.45	37.00	40.50	52.25	49.50	43.91	25.34	41.71	25.34	52.25	26.91
% of campus	----	6.33%	6.03%	7.57%	8.58%	6.91%	7.17%	6.48%	7.01%	6.03%	8.58%	2.56%
Chemistry	----	33.00	30.00	21.50	28.00	30.15	30.83	13.76	27.90	13.76	33.83	20.07
% of campus	----	4.81%	4.89%	4.02%	4.60%	4.21%	5.34%	3.52%	4.63%	3.52%	5.34%	1.82%
CE & CIS	----	11.00	44.00	28.00	45.05	43.75	44.32	20.20	33.76	11.00	45.05	34.05
% of campus	----	1.60%	7.17%	5.23%	7.40%	6.10%	7.23%	5.17%	5.70%	1.60%	7.40%	5.80%
Earth Sciences	----	14.50	4.00	14.25	24.00	20.83	----	9.13	14.45	4.00	24.00	20.00
% of campus	----	2.11%	0.65%	2.66%	3.94%	2.91%	----	2.34%	2.44%	0.65%	3.94%	3.29%
Marine Sciences	----	----	----	----	14.00	----	----	4.06	9.03	4.06	14.00	9.94
% of campus	----	----	----	----	2.30%	----	----	1.04%	1.67%	1.04%	2.30%	1.26%
Mathematics	----	34.00	30.00	38.50	38.00	44.58	56.17	23.69	37.83	23.69	56.17	32.48
% of campus	----	4.95%	4.89%	7.19%	6.24%	6.22%	9.17%	6.06%	6.39%	4.89%	9.17%	4.28%
Physics	----	30.50	31.00	33.00	41.00	25.16	34.01	15.59	30.04	15.59	41.00	25.41
% of campus	----	4.44%	5.05%	6.17%	6.74%	3.51%	5.55%	3.99%	5.06%	3.51%	6.74%	3.23%
SUBTOTAL NAT SCI	----	166.45	176.00	182.41	242.30	214.00	217.24	119.23	188.23	119.23	242.30	123.07
% OF CAMPUS	----	24.24%	28.66%	34.08%	39.81%	29.86%	35.45%	30.49%	31.80%	24.24%	39.81%	15.57%
SOCIAL SCIENCES												
Anthropology	----	14.00	12.00	7.50	16.00	17.33	14.00	8.86	12.81	7.50	17.33	9.83
% of campus	----	2.04%	1.95%	1.40%	2.63%	2.42%	2.28%	2.27%	2.14%	1.40%	2.63%	1.23%
Economics	----	32.75	29.00	27.75	25.00	42.50	31.00	19.01	29.57	19.01	42.50	23.49
% of campus	----	4.77%	4.72%	5.18%	4.11%	5.93%	5.06%	4.86%	4.95%	4.11%	5.93%	1.82%
Politics	----	34.00	22.00	30.50	18.50	25.28	28.32	14.24	23.80	14.24	34.00	19.76
% of campus	----	4.95%	3.58%	5.70%	3.04%	3.25%	3.81%	3.64%	4.00%	3.04%	5.70%	2.66%
Psychology	----	43.00	23.00	22.50	41.60	24.25	22.00	18.32	27.81	18.32	43.00	24.68
% of campus	----	6.26%	3.75%	4.20%	6.84%	3.38%	3.59%	4.69%	4.67%	3.38%	6.84%	3.45%
Sociology	----	21.50	14.00	12.50	26.00	25.33	21.70	11.81	19.12	11.81	26.33	14.52
% of campus	----	3.13%	2.28%	2.34%	4.27%	3.67%	3.54%	3.02%	3.18%	2.28%	4.27%	1.99%
SUBTOTAL SOC SCI	----	145.25	100.00	100.75	127.10	133.67	112.02	72.24	113.00	72.24	145.25	73.01
% OF CAMPUS	----	21.15%	16.29%	18.82%	20.88%	18.65%	18.28%	18.48%	18.94%	16.29%	21.15%	4.86%
TOTAL % OF CAMPUS	----	82.32%	81.11%	90.54%	94.18%	88.69%	83.98%	82.82%				
TOTAL % OTHER PROGRAMS		17.68%	18.89%	9.46%	5.82%	11.31%	16.02%	17.18%				

SC:F&P 9/87

COMPARISON INSTITUTION SURVEY
PROFESSIONAL SCHOOL 1985-86 FACULTY FTE
AS PROPORTION OF CAMPUS TOTAL
****

	HARVARD	NC CHAPEL HILL (A)	NORTH-WESTERN (A)	PRINCETON (B)	SUNY STONY BROOK (B)	UCSB (A)	UCSD (B)	UCSC (A)
GENERAL CAMPUS	584.00	686.71	416.00	521.26	563.58	672.88	568.49	373.10
PROFESSIONAL SCHOOLS								
ARCHITECTURE				15.75				
CREATIVE STUDIES						9.5		
DESIGN SCHOOL	36.00							
DIVINITY SCHOOL	20.00							
EDUCATION	40.00	61.00				91.50		11.89
ENGINEERING AND APPLIED SCIS			150.00	82.25	107.60	84.75	74.65	6.00
GOVERNMENT	40.00							
JOURNALISM		19.91	47.00					
LAW		38.50					21.67	
LIBRARY SCIENCE		12.00						
MANAGEMENT/BUSINESS ADMIN	156.00	71.39	117.00		7.50			
MARINE AND ENVIRO SCI							20.92	
MEDIA			65.00					
PUBLIC & INTERNAT AFFAIRS				34.50				
SOCIAL WORK		21.80						
SPEECH			89.00					
SUBTOTAL PROF SCHOOL FTE	292.00	214.60	468.00	132.50	115.00	125.75	117.24	17.89
NUMBER OF PROF SCHOOLS	5	6	5	3	2	3	3	2
CAMPUS TOTAL FTE (excluding Health Sciences)	876.00	901.31	884.00	653.76	678.58	798.63	685.73	390.99
PROF SCHOOL FTE % CAMPUS TOTAL	33.33%	23.81%	52.94%	20.27%	16.95%	15.75%	17.10%	4.58%
HEALTH SCIENCES								
DENTAL SCHOOL	86.00		156.00					
MEDICAL SCHOOL	1,889.00		150.00				165.99	
PUBLIC HEALTH	95.00							
SUBTOTAL HEALTH SCIENCES FTE	2,070.00	0.00	306.00	0.00	0.00	0.00	165.99	0.00
CAMPUS GRAND TOTAL FTE	2,946.00	901.31	1,190.00	653.76	678.58	798.63	851.72	390.99

SC:F&P 9/87

COMPARISON INSTITUTION SURVEY
SUMMARY OF 1985-86 FACULTY FTE FOR
MAJOR & MINOR* PROGRAMS

* MAJOR Programs: Faculty FTE ≥ 10.00
MINOR Programs: Faculty FTE < 10.00

	FACULTY FTE															
	HARVARD		NC CHAPEL HILL (A)		NORTH-WESTERN (A)		PRINCETON (B)		SUNY STONY BROOK (B)		UCSB (A)		UCSD (B)		UCSC (A)	
	MAJOR	MINOR	MAJOR	MINOR	MAJOR	MINOR	MAJOR	MINOR	MAJOR	MINOR	MAJOR	MINOR	MAJOR	MINOR	MAJOR	MINOR
COMPARABLE TO UCSC			436.87	0.00	294.00	29.00	338.00	27.94	428.46	7.00	475.93	15.88	514.66	0.00	268.75	65.60
CNT OF PROGRAMS			16	0	12	5	15	5	17	1	18	2	18	0	15	10
FTE % COMPARABLE			100.00%	0.00%	91.02%	8.98%	92.36%	7.64%	98.39%	1.61%	96.77%	3.23%	100.00%	0.00%	80.38%	19.62%
NON-COMPARABLE TO UCSC			179.75	9.50	168.00	116.00	139.88	27.44	128.25	18.50	195.83	25.99	13.80	3.33	0.00	14.03
CNT OF PROGRAMS			9	1	9	19	8	6	7	4	8	4	1	1	0	3
FTE % NON-COMPARABLE			94.98%	5.02%	59.15%	40.85%	83.60%	16.40%	87.39%	12.61%	88.28%	11.72%	80.56%	19.44%	0.00%	100.00%
SUBTOTAL FTE			616.62	9.50	462.00	145.00	477.88	55.38	556.71	25.50	671.76	41.87	528.46	3.33	268.75	79.63
TOTAL PROGRAMS			25	1	21	24	23	10	24	5	26	6	19	1	15	13
OTHER PROGRAMS			60.59		7.00		2.00		26.42		3.00		81.02		42.61	
CAMPUS TOTAL FTE			686.71		614.00		535.26		608.63		716.63		612.81		390.99	
CAMPUS TOTAL PROGRAMS			26		45		33		29		32		20		28	
CAMPUS TOTAL FTE/TOTAL PROGRAMS			26.41		13.64		16.22		20.99		22.39		30.64		13.96	

SC:F&P 9/87

APPENDIX D

NEW PROGRAMS DISCUSSED IN THE TWENTY-YEAR PLAN

Program	Degrees
ARTS	
Film/Video	B.A.
LETTERS	
Asian Studies	B.A.
Communications*	B.A.
Comparative and Intl. Studies	Ph.D.
Creative Writing	M.F.A.
NATURAL SCIENCES	
Biotechnology	B.A., M.S., Ph.D.
Environmental Toxicology	M.S.
Neurosciences	Ph.D.
SOCIAL SCIENCES	
None*	
ENGINEERING	
Environmental Engineering*	B.A., M.S., Ph.D.
Electronic Engineering	B.A., M.S., Ph.D.
Industrial Automation	B.A., M.S., Ph.D.
Engineering Management*	M.S., Ph.D.
LAW	
Jurisprudence*	Ph.D.

Note *: An asterisk denotes the proposed programs that were listed both in Social Sciences and another academic division.