BACKGROUND: Periodic external program reviews are essential components of any academic unit’s commitment to vitality and excellence in its curriculum and research program. In the spring of 2010, I was asked by Professor Richard Whitkus, Chair of the Department of Biology at Sonoma State University (SSU), to conduct such a review of the Department of Biology. This report targets the undergraduate program in the Department of Biology, as the graduate program was recently reviewed by Professor Ed Connor from San Francisco State University.

On 20 May 2010, I was hosted by the Department for an on-site visit that included meetings with (a) Professor Whitkus and the Program Review Coordinator (Professor Murali Pillai), (b) nearly all faculty members in the Department, (c) a group of undergraduate students, (d) Provost Eduardo Ochoa, and (e) members of the Departmental staff. During my visit, I was given complete access to any and all relevant materials, including budgetary information, course evaluations, etc. The input of all parties – students, staff, and faculty – was invaluable for its candor and thoughtfulness.

Prior to my visit to the Department, I was provided with extensive pre-visit briefing materials, including (1) the SSU Program Review Policy, (2) a comprehensive and incisive Self Study conducted by the Department of Biology, including CV’s of all faculty members, (3) a series of appendices, including the most recent previous review of the program, and (4) a recently completed review of the Graduate Program in the Department. These materials, particularly the Self Study, provided the other main sources of information for this review, and set the stage for my site visit.

The SSU Program Review Policy states that a review should include a “thorough evaluation of” the following:

1. Missions and goals of a program, and their alignment with those of the University;
2. Assessment of current student learning outcomes;
3. The structure and content of the curriculum;
4. Quality and diversity of faculty and staff, and their roles in achieving programmatic goals;
5. Service and contributions to the community (i.e., outreach);
6. Recruitment, retention and support of students;
7. Issues requiring administrative support, including financial and other resources;
8. Potential changes in the program, including future assessment.

The most recent comprehensive review of the undergraduate program in the Department of Biology took place in 1994. Since then, a great deal has changed in terms of the composition of the faculty, and curriculum; unfortunately, the budgetary situation at SSU and throughout public higher education programs in California remains as critical now as it was then. Nevertheless, the Department then, as now, has retained a deep commitment to providing all of its students with a
diverse and modern curriculum. The most distinctive aspect of the undergraduate curriculum, noted unanimously by the faculty, and echoed enthusiastically by the students, is the devotion of the faculty to communicating the most recent research in their lectures and labs, and to providing all of the undergraduate students in the program the opportunity to participate in cutting-edge research. The students recognize that the faculty in the Department are all active researchers, and that that activity carries over into the quality of the education they receive.

In composing this report, I relied heavily on content of the previous report from 1994 authored by Gary Brusca from Humboldt State and Sheri Zidenberg-Cherr from UC Davis. That external report provided the most relevant and recent explicit benchmarks for assessing changes in the recent past, the extent to which the Department was meeting previous goals it had set, and whether the Administration had lived up to its commitments to the Department.

Following the general structure of the 1994 external report, I’ve organized this report into the following sections:

1. Current Status
2. Budget (Non-salary) and Personnel Issues
   a. Space and Facilities
   b. Equipment Related to Teaching and Research
   c. Library and Information Technology
   d. Faculty Support, Recruitment, & Development
   e. Staff Support
   f. Problems and Recommendations
3. Curriculum and Faculty Issues
   a. Lecture Courses
   b. Laboratory Courses
   c. Research Activities
   d. Problems and Recommendations
4. Staff Issues
5. Student Issues
6. Summary

Under each of these categories, I present a summary and synthesis of the information I gathered from the documents I was provided and from my interviews of faculty, staff, and students. Whenever possible, I include recommendations for the Department and SSU Administration aimed at resolving problems, and building a stronger future for the biology program.

These recommendations are explicitly or implicitly tempered by the recognition of the extraordinary financial challenges that we all face as faculty, administration, staff, and students in public institutions of higher education in California. That said, I want to emphasize from the outset that the SSU Department of Biology is exceptional in my experience, in terms of (1) quality and collegiality of its faculty, (2) concerns about staff workload and morale, (3) commitment of the faculty to maintaining vital, often extramurally funded, research programs, (4) involvement of all faculty members in maintaining and developing a vital, diverse, and accessible curriculum, and (5) incorporating “discovery-based” learning/training throughout the undergraduate curriculum. The Department is, on the one hand, one of the largest, most research-oriented units at SSU; on the other, it pays very serious attention to all aspects of undergraduate education. It may be unrivalled at SSU in its synergistic balance of teaching and scholarship. These are not just my own views: the
Department of Biology has long had an outstanding reputation in other programs for training excellent undergraduates who are widely viewed as having outstanding prospects for post-baccalaureate training.

1. CURRENT STATUS

The Department of Biology is one of the larger academic units at SSU, currently enrolling 368 undergraduate majors in either B.A. or B.S. programs, and 75 minors. The major degree programs allow students to concentrate their coursework in either Botany or Zoology (B.A.), or Molecular and Cell Biology; Ecology, Evolution and Conservation; Physiology; Marine Biology, or Microbiology (B.S.). The catalog currently lists 58 undergraduate course offerings, including 15 General Education (GE) courses, 3 service courses. In addition, the departmental curriculum serves a substantial number of students who are not declared majors, but instead are in other majors or programs that require many courses offered by the Department. Some of these students are in other pre-health sciences curricula, and many non-majors take lower-division departmental courses to satisfy campus-level GE requirements. Because of staff limitations, the Department provides limited advising services to its own students, partly through direct interactions with faculty, but also through its website. The Department also operates the SSU Health Professions Advisory Program, with numerous services that appear to be especially effective at placing students in advanced health care training (71% success rate, with 62% successful admission to medical school. To deliver this extensive curriculum and other services, there are currently 11 permanent faculty, 3 temporary instructors, and one 0.5 FTE emeritus faculty member who participates in the FERP. Staff support is skeletal, including 1.5 FTE administrative support staff, and 2 instructional support staff.

2. BUDGET & PERSONNEL ISSUES

Operating budget cuts affecting infrastructure (especially equipment and maintenance), staff support, and number of faculty positions continue to degrade the potential performance of the Department. Since the last review, staff positions have continued to decline, and faculty size has increased modestly from 10 to 11 permanent FTE. However, the reality is that several faculty positions lost to attrition and retirements have not been replaced. Moreover, as many faculty emphasized, an increasingly large fraction of faculty in the Department are now called upon to perform administrative duties that severely reduce the time they have available for other job duties.

Normally, there would be more compensatory FTE or relief assigned to departments with such a heavy administrative burden, but this does not appear to be the case. Combined with the heavy involvement of virtually all of the departmental faculty in mentoring numerous undergraduate and graduate researchers, faculty (and staff) are stretched beyond the limits of their ability to deliver the normal curriculum. Both my conversations with individual faculty, and Chair Whitkus, and the data on excessive WTU loads, support this view. The consequences are that classes are sometimes not regularly taught because there are no faculty available to teach them, and faculty potentially lack the time to sustain high-level research programs that will continue the levels of extramural support upon which the entire curriculum has come to depend.
As I discuss below, this ever-increasing workload is taxing the faculty and the program beyond the limits of what it can sustain. There are growing and increasingly irreversible impacts of the combined effects of asking the faculty to endlessly increase their WTU commitment, and at the same time to rely virtually entirely on their success at attracting extramural funds to support the equipment needs of a department that aims to provide modern training in biological sciences. **From the perspective of both workload and disciplinary breadth, the Department urgently needs at least two additional FTE, preferably in integrative disciplines that are rapidly growing elsewhere.** These potentially include molecular genetics, genomics, and/or bioinformatics. In any case, it is imperative that the Administration recognize the untenable budgetary situation in which it has placed the Department: on the one hand, the Administration has essentially eliminated support for instructional equipment, relying on faculty-generated extramural funds to support this critical aspect of instruction; on the other, workloads have increased to the point where soon the faculty will not be able to sustain the level of extramural funding success that they have achieved, which has to date limited the technical demise of the curriculum.

a. **Space & Facilities:** In 1994, the infrastructure of the Department had deteriorated and become seriously antiquated. Since then, Darwin Hall, the home of the Department, has undergone a major renovation. From my perspective, the facility is physically in good condition, and generally suitable for activities of the Department. However, it is important to recognize that despite increasing enrollments and needs for research space, the department lost over 2000 square feet of research and instructional space that it has yet to recover. As I discuss below, this presents serious problems for the development of research and teaching infrastructure, particularly for the herbarium and museum collections that are so essential at an institution like SSU that is centered in one of the widely acknowledged global biodiversity hotspots.

b. **Equipment:** In the previous external review, the reviewers noted that the departmental allocation for equipment related to instructional and research support had declined from $50-60,000 per year to $0. Although a very modest (circa $300K) allotment for equipment came with the 2006 renovation of Darwin Hall, this is not even close to meeting the past, current, and future needs of the Department and its students. For the past 16 years, the equipment budget has remained completely non-existent. There is no dependable administrative support for acquisition, maintenance, repair, or upgrading equipment that is essential for delivering a modern undergraduate program that has any sort of hands-on component.

This situation cannot be sustained for much longer: all curricula in the sciences, and particularly the biological sciences, are far more expensive to deliver than other academic disciplines, especially at a time where state-of-the-art equipment, supplies, and computational facilities are essential for instruction and training at all levels. Every faculty member very clearly told me that he/she is relentlessly committed to seeking extramural support for their own work, and for purchasing equipment that is primarily used for instruction. Growing time constraints, however, limit these possibilities. In addition, the lack of contributions by the Administration, both in terms of direct allocations and overhead/indirect cost returns, are proving demoralizing to the faculty.

c. **Library & Information Technology:** The previous external review highlighted the declining status of the library’s collections, especially the journal collection, and the lack of support for computers on the campus and in the Department. At least in terms of access to journals, there has been a dramatic shift in the last 15 years to the use of electronic media. It appears that the
SSU Library has made serious efforts to provide appropriate access to all relevant electronic resources. There appears to be a positive atmosphere of consultation between library staff and faculty, and other than an occasional mention of a few missing journal subscriptions, there were no complaints that I heard from faculty or students.

I also asked several faculty and students about IT infrastructure, and specifically whether computational facilities and internet services were adequate. My overall impression on this front is positive. However, general use computational facilities sufficient to sustain teaching and research in bioinformatics and genomics, two areas in which the Department should increase its expertise, appear to be lacking, and should be developed.

d. Faculty Support, Recruitment, & Development: As I mentioned previously, in terms of workload, the faculty are at the limit of what they can be expected to teach, given the breadth and depth of the curriculum, their contributions to, and success at, administration at multiple levels, and their commitment to maintaining extramurally supported research and outreach programs. Several of the faculty asked quite specifically where the funds aimed at compensating the Department for administrative relief time go. My impression is that at least some of it is returned to the Department as temporary teaching funds. That said, I also think that the faculty’s perception that the Department is not adequately compensated for its major contributions to University administration is accurate, and needs to be addressed at the administrative level.

In addition, while the Department remains intellectually strong in most of the core disciplines that constitute the modern biological sciences, it is lagging behind other comparable institutions in the CSU system in its capacity to deliver instruction in molecular biology and genetics, genomics, and bioinformatics. Without new hires in these now-core disciplines, the Department’s status as a highly attractive undergraduate program in the biological sciences will soon diminish. Indeed, it was not only faculty who recognized this growing gap in their expertise; many of the students expressed concern about the lack of faculty and facilities who could provide them with essential instruction and research experience in these burgeoning disciplines.

At the same time, and related to both the overall lack of administrative support for equipment and supplies, as well as the apparent failure to return indirect costs to the unit that generated them, there are major, but avoidable, challenges to recruiting quality faculty in these areas. The SSU Administration must recognize that these are key areas for modest growth in the Department, and that such growth is fundamental to maintaining and enhancing the academic reputation of the University and Department. It must also acknowledge that successful recruitment in these areas requires substantial start-up funds in order to attract new faculty who will both be outstanding instructors and successful researchers (an essential combination in these areas).

e. Current Problems and Recommendations:

1. The situation regarding instructional equipment maintenance/repair and acquisition continues to threaten the integrity and quality of the curriculum. The faculty should develop a prioritized list of instructional equipment and maintenance needs for (a) the next 2-3 years itemized according to course(s). It should also develop a list of essential new equipment to meet the curriculum needs for the next 3-5 years. These
lists should include a rationale for the benefits of such acquisitions, and the consequences for failing to maintain and repair existing equipment and for not acquiring new equipment.

2. It is not appropriate for the faculty to use extramural grant funds to purchase and maintain equipment used primarily for undergraduate instruction (unless the grant is explicitly for that purpose). The Administration should provide substantial funding to the Department to maintain existing equipment and to acquire critical new equipment for teaching labs. Without more specific information about the current situation and future needs, I am reluctant to propose a target level of support; minimally, the Administration should allocate a budget of $40-50K per year for repair and maintenance of existing equipment, and should fully fund justified requests for new equipment. In any case, it is neither tenable, nor ethical for the Administration to rely solely on the department faculty to support these essential curricular needs.

3. The Administration should immediately begin a practice of returning directly to the Department of Biology a substantial fraction of indirect costs that originate from grants awarded to faculty in the Department. It is my understanding from conversations with both administrators and faculty that all indirect costs are retained at higher administrative levels. This policy is counterproductive to both the teaching and research enterprises, both areas of excellence for the SSU Department of Biology.

4. The faculty should continue their already successful efforts to seek extramural sources of support for the development of instructional infrastructure. The Administration should provide matching funds whenever called for in these proposals.

5. The University's research and teaching collections housed in the Herbarium and museum are playing an increasingly critical role not only in instruction and research, but also in public outreach and service. To facilitate the completion of the faculty-initiated SSU "Diversity Collection," additional space should be allocated to the herbarium and museum to compensate for space lost during the renovation of Darwin Hall.

3. CURRICULUM AND FACULTY ISSUES

The part of the 1994 external review of the curriculum began,

"It is clear that curriculum is a focal point of concern and some controversy among administrators, biology faculty, and biology students. Comments received during our interviews and statements in the 12/8/1993 document point out that the Biology department is presently unable to adequately staff the diversity of courses it has traditionally offered, and that certain students are not being afforded the opportunities to take the classes they want or need in a timely fashion. The department's missions and goals are, in this regard, at risk."

Although much has changed in terms of the content of the curriculum and the faculty since then, overall, the capacity of the faculty to deliver the curriculum they have proscribed in the undergraduate degree requirements remains seriously compromised.
From the outset, it should be clear that the Department has done an outstanding job in developing and implementing its curriculum, and in assessing its effectiveness. As much, if not more than any other program that I know, the Department of Biology at SSU has combined both breadth and depth in its curriculum. Every aspect of the curriculum (lectures, labs, fieldtrips, research mentoring) has been deliberately designed to reinforce the general goals of developing students skills in, “critical analysis, reasoning, creativity, and self-expression.” The Department's faculty have developed a set of clearly defined learning objectives for each course (particularly in the lower division), and the curriculum as whole. The faculty is also to be commended for developing and implementing a clear protocol for assessing whether students are meeting the learning objectives (and faculty are realizing their teaching objectives).

In what follows, I briefly present my perspectives on the various components of the curriculum, and how they relate to the general problem of meeting the challenges of maintaining the high standards of an already distinguished undergraduate program that is seriously limited by budget and increasingly challenged by growing enrollments.

a. Courses: The domain of the biological sciences has substantially expanded in the last 20 years, as have the number of students choosing a biology major. In fact, because of student demand that consistently exceeds the capacity of the faculty to teach, the Department has been forced to limit enrollment in the major by declaring itself “impacted.” Despite the increasing range of, and demand for, the discipline, the number of faculty has slightly shrunk. Not unexpectedly, however, the diversity of courses the Department regularly offers – at least on paper – appears to have grown.

After reviewing the catalog of course offerings and major requirements, I found that the Department has a clear and highly effective vision of the curricular range that constitutes modern biology. Comments from students, and teaching evaluations, reveal that the faculty are exceptional teachers, in command of the lecture material, responsive to the students, and up-to-date in the material they present at all levels of instruction. The faculty as a whole are an exemplary group of teachers.

However, as both the faculty and students note, it is an increasing challenge to offer all of the courses on a regular basis. I discuss the causes of, and potential remedies for, this challenge in later sections. In any case, it is clear to both the faculty and students that the effects of staffing limitations on the ability to offer the courses required by the major frustrates all parties.

b. Laboratory Courses: One of the most distinctive and positive features of the Department’s curriculum is the emphasis on providing extensive laboratory and field experiences that are tightly linked to the lecture-course curriculum. The Department offers partner lab courses for virtually all courses that compose the lower-division core, and virtually all of its upper-division lecture courses. This emphasis on hands-on, discovery-based learning in the laboratory and beyond, although costly in terms of faculty effort and fiscal expense, is a jewel in the crown of the Department’s undergraduate curriculum. The role of hands-on experience, along with the faculty's emphasis on research mentoring for undergrads (see section 3.c below), is what led one of the undergrads to eloquently proclaim to me: “They create scientists here.” What more could a university want from its instructional program?
c. **Research Experience**: The faculty’s exceptionally high level of faculty commitment to research in the Department, and to engaging students in research programs, is both a blessing and a curse. Part of the blessing is that the Department faculty are extremely active in administration and service, instruction at both the undergraduate and graduate levels, and research. It is this combination of excellence across the board that makes the faculty so well-respected by the students in the Department and by colleagues at other institutions. Money generated from extramural research and equipment grants is also what has enabled the Department’s instructional programs to survive what would otherwise by fatal budget cuts, especially with respect to equipment and supplies.

Just as importantly, every undergraduate I interviewed noted that his/her experience as an undergraduate researcher was a defining feature of their outstanding undergraduate experiences at SSU. All of the students I interviewed were women, and all planned to pursue professions that required they enroll in graduate or professional school. All described their research experiences with faculty in the Department as being transformative. Here are a few of their comments:

- “In every class I took, even as a freshman and sophomore, I was encouraged to join the research enterprise of the department.”
- “Faculty are passionate, sincere mentors.”
- “It’s clear to all of us that the faculty have built an extraordinary intellectual community with us.”

**d. Problems and Recommendations**: The main curricular problem facing the Department is the growing conflict between ever-increasing demand by students to major in biology at SSU and the faculty’s commitment to delivering a balanced and outstanding undergraduate curriculum that thoughtfully integrates lectures, labs, field experiences, and research training. Limited support for the program in terms of FTE and course budgets is taking its toll on the faculty, staff and students. One metric of this toll is that many of the faculty have annual workloads that consistently exceed the expected 24 WTU, and yet it has become necessary to declare the major as “impacted.” This excess would be considerably higher if all of the research mentoring activities of the majority of the faculty were fairly weighed into the calculation. However, the way WTU are currently calculated at SSU, the more courses a faculty member teaches, regardless of enrollment, the more WTU he/she accrues, with a much higher rate of accrual (and higher cap) than if the faculty member were supervising undergraduate research.

_I believe that this regressive aspect of the WTU formulation has led to an inflation of the both the number of courses that the major requires, as well as a tendency to teach smaller classes than would perhaps be optimal_ (especially with limited faculty and resources).

This reality is growing into a lose-lose situation, where both the faculty are increasingly challenged to deliver the curriculum, and the students are either unable to enroll in the major, or find that classes they expected to be offered are cancelled because there are simply no faculty available to teach the course. Unless something changes in the near term, the faculty will lack the numbers and time will to deliver a rigorous, diverse, broadly conceived curriculum.

The situation now, as 16 years ago, raises many of the same curricular questions posed in the previous external review:
• What can the Administration do to assure that the Department maintains its hallmark of outstanding instruction, that spans the range of modern biology, and that offers cutting-edge and transformational research experiences to its undergraduates? The biology major at SSU continues to attract an ever-increasing number of prospective majors, many of whom are attracted by the gifted instructors and opportunities for research experience that make the program so distinguished. It is important that the Administration recognize the success of this formula, and that it not suffer further compromise.

• How should the Department deal with the persistent dilemma of too few faculty to offer the range of courses that constitute an outstanding degree program? In particular, how should they revise the curriculum? Once again, it is clear to me that any solution that led to reducing the involvement of faculty and students in research, and thereby reducing workload on that front, would seriously degrade the reputation and morale of an outstanding department and reduce the quality of training of the undergrads in the program.

I urge the Administration and Department to implement the following recommendations as soon as possible, before the instructional program irreparably deteriorates:

1. **The Administration should appoint a broadly constituted taskforce that analyzes the strengths and weaknesses of the current method for calculating WTU and that proposes a solution to the inequities of the system.** Such an analysis must recognize the critical role that faculty research plays in research mentoring and support at the undergraduate level, especially in the natural sciences. I cannot overemphasize that this kind of experience will only become more important for undergraduates in the biological sciences as technological expertise becomes increasingly essential for success at any level. The taskforce should make recommendations that acknowledge the extraordinary demands on faculty effort that effective research mentoring exacts, and reward faculty (or at least not penalize them) for these efforts.

   In addition, the taskforce should consider another important consequence of the current way that WTU are calculated, namely that it seems to encourage a proliferation of small-enrollment courses, and disfavors thoughtful ways to consolidate courses. Faculty should be rewarded for teaching larger classes, especially when consolidation of multiply-offered courses makes it possible for a department to maintain (or expand) both the diversity of its curriculum and its capacity to engage undergraduates in the research enterprise. In other words, a major factor in WTU calculations should be enrollment, not just number of courses taught.

2. **The faculty should consider significant changes in the organization of the upper-division curriculum that could reduce the number of courses currently offered in the major and the diversity and number of requirements for both the B.A. and B.S. degrees.** The incentive for this effort partly depends on changes in the way that WTU are calculated by the University. That critical issue aside, I do feel the department could streamline the design of its curriculum without severely compromising the faculty’s commitment to covering all of the major disciplines that constitute modern biology. Since my visit was quite brief, I am not in a position to make specific recommendations.
about how courses could be consolidated, and which courses could be dropped or offered with lower frequency with minimal impact on the quality and diversity of the curriculum.

My discussions with individual faculty members, and the Department’s Self Study, show that faculty members recognize the importance of critically examining the diversity of the curriculum, in light of the limited size of the faculty, the increasing number of students in the major(s), and the availability of other resources. I encourage the faculty to consider the following structural changes to the upper-division curriculum:

- **For the B.A. degree, reduce the number of existing concentrations from two (Botany and Zoology) to one (Biology).**
- **For the B.S. degree, reduce the number of existing concentrations from the current five (Microbiology; Marine Biology; Ecology, Evolution, and Conservation; Physiology; Molecular and Cell Biology) to two (e.g., Ecology, Evolution and Biodiversity; Molecular, Cell, and Developmental Biology).**
- **Give students more up-front flexibility for electives to fulfill requirements of areas of concentration.** This was a recurring theme in my discussions with faculty, and if implemented in a thoughtful way would not seriously compromise the rigour of the curriculum, and at the same time reduce time to graduation.

Such changes would potentially give students more latitude in the range of courses they could use to satisfy the requirements of either the general B.A. degree, or a particular concentration in the B.S. program. This, in turn, would mean that some courses could be offered in alternate years, rather than every year (or every semester), and still allow students to meet the requirements for the degree in a reasonable amount of time, and without the frustration of petitioning for course substitutions to satisfy degree requirements.

3. **The Department and its curriculum would greatly benefit by adding at least two FTE in the areas of molecular biology, molecular genetics, genomics, and/or bioinformatics.** From my review of the curriculum, as well as conversations with faculty and students, it is clear that the Department lacks essential strength in several burgeoning areas of modern biological sciences. The Department should develop a recruitment plan that identifies its curricular and scholarly strengths and weaknesses, and that specifies how and why these positions would be transformative. These new hires should have research interests that bridge the existing strengths in the department, and who are strongly committed to the ideal of a synergy between teaching excellence and scholarship. **The Administration should recognize that it is essential to provide adequate resources for start-up packages for these positions, and that it would be appropriate to use instructional equipment funds and indirect cost returns to fund these start-ups.** Such investments would attract top-quality candidates, and would both reduce the impacts of over-enrollment and simultaneously strengthen the teaching program of the Department.

At the same time, existing strengths in organismal biology, physiology, developmental biology, microbiology, ecology, evolution, and genetics should not be compromised. Even a cursory look at the CV’s of the faculty in the Department reveals
an impressive record of scholarly achievement across the board, with no signs of dwindling commitment either to research or teaching.

4. STAFF ISSUES

Overall, staff morale was more or less what one would expect under the current budgetary situation. However, the staff uniformly noted that the static salary structure, combined with limited or no opportunities for merit increases or development, provides few incentives for improving productivity and expanding skills.

Just as importantly, the staff noted several serious impediments to their job performance. All noted that protracted delays in external accounting practices prevented them from performing their internal accounting duties in a timely fashion. This needs investigation and remediation: there is no reason that accounting information should not be provided to the Department efficiently and accurately, yet this does not seem to be happening, and the departmental staff take the heat for this problem.

Two other significant staff-related issues were brought to my attention. First, the staff noted that there is no identified position for supporting undergraduate lab development and implementation. This is a critical function, and the staff do their very best to ensure that labs are delivered to a high standard. However, the curriculum and staff would be far better served if there were a designated staff position with this function. Second, the staff are consistently torn between providing administrative and advising support for undergraduate and graduate programs. All of the staff agreed that that an additional 10-20 hours per week of administrative support for both the undergraduate and graduate programs would greatly improve the quality of advising at both levels. This was a serious problem noted in the recent graduate program review, and also noted without prompting by all of the undergraduates I interviewed.

Recommendations:

1. **The Administration should prioritize re-instituting the merit and promotion systems for University staff as well as a professional development program.** Staff in the Department felt that their careers had hit a glass ceiling, and that the University had removed incentives and opportunities for professional development. In spite of this, the staff were clearly hard-working, disciplined, and intensely loyal to the Department and institution.

2. **The SSU Administration should immediately begin a comprehensive review of its accounting practices.** The staff and faculty unanimously noted that there are endless and inexcusable delays in providing the Department with timely accounting information. For a unit like the Department of Biology, with an extensive extramural research enterprise, this is untenable and irresponsible. It is also embarrassing to the departmental staff, who do not have the information they need to advise on timely budgeting decisions within the unit.

3. **The Administration and Department should work collaboratively to resolve two additional problems that directly impact the undergraduate curriculum:**
(a) The Department needs a fulltime staff member whose primary responsibility is the development and implementation of the extensive laboratory curriculum that is one of the hallmarks of the Department’s outstanding program. This is a huge undertaking, and is currently the partial responsibility of several staff members (due to attrition in the staff). Such a person could also be tasked with maintaining lab equipment and facilities.

(b) The department desperately needs a staff member whose primary responsibility is undergraduate academic advising. With such a large major, and with so many post-graduate professional tracks emerging from the major, the students would greatly benefit from a more structured, hands-on advising system. In my experience, the most effective advising systems begin with an veteran staff member providing curriculum advice to ALL students in a major, with faculty members meeting with students to provide academic and professional advice. My impression is that a support for a staff member on the order of 10-20 hours per week would greatly improve an advising program that serves 350+ students.

5. STUDENT ISSUES

During my site visit, I met for an hour with six students in the major. Without exception, the students were outstanding, and all were planning on attending graduate or professional school as soon as they graduated. They struck me as extremely well-prepared to move on, far more so than most undergraduates in our own program. I (and so do they) attribute their preparation and determination to the superb mentoring they receive by the faculty in the Department. I related several of their representative comments about their experiences as undergraduates on Page 8 of this report. I also want to re-iterate that all of the students who met with me were women, and they were self-selected. From my more probing discussions with the students, it is clear to me that the faculty in the Department have not only been extraordinary academic mentors to these students, but that they have gone well beyond the call of duty to promote diversity in the program, successfully encouraging groups traditionally under-represented in the STEM disciplines to become professional scientists.

The students astutely recognized many of the problems identified by the faculty with the curriculum:

• All remarked that the department needed more faculty; that the diversity of course offerings was too limited for a modern department, especially in the realm of molecular biology and genomics.
• A common theme of student comments, also noted by the faculty, was that there are too many courses in the catalog that are not regularly offered because of limited instructional staff.
• All were concerned that proposals to offer virtual labs to reduce costs and faculty involvement was not a solution to the problem; all praised the high priority the faculty place on hands-on lab and field experiences, experiences that excited them about the process of discovery and provided them with essential skills.
• The undergrads also were concerned that funding reductions to the graduate program limited the number and experience of graduate student TA’s available to assist in their lab courses. This places an unusually large burden on faculty to teach these labs.
• The students felt that TA’s, especially for lower-division labs, could benefit from more extensive training.
• Finally, the undergrads questioned whether all upper-division lecture courses needed to have labs associated with them.

Recommendations: Many of the recommendations I made regarding curricular and staffing reforms also directly address the problems identified by the students. Most importantly, I recommend the following actions:

1. **Pursue the recruitment of new faculty in the areas of molecular biology, genomics, and/or bioinformatics.** This will also enhance the graduate program, and provide more highly skilled TA’s for upper-division labs.

2. **Reduce the number of upper-division concentrations, and add more flexibility to the choices for fulfilling requirements of the concentrations.**

3. **Improve the system of advising, so that students have more extensive contact with knowledgeable staff about requirements, etc., freeing faculty to advise on matters concerning academic success and professional development.**

4. **Provide more extensive training for teaching assistants, particularly novices without substantial previous experience.**

**6. SUMMARY**

The undergraduate program in Biology at Sonoma State University is one of the most visible and impressive in the entire CSU system, and well beyond. The faculty are uniformly accomplished: they have developed an iconic curriculum that brings their superb records of scholarly achievement to bear on all aspects of the program, from classroom and laboratory instruction to the research mentoring. The program embodies all of the ideals of a first-rate liberal arts education: the degree program is general, yet rigorous; the curriculum encourages discovery and intellectual independence; and the students are diverse and highly enthusiastic.

The main challenges facing the program arise from the dire fiscal situation facing public higher education in California and the increasing enrollment pressures on the major (arising from its strong reputation). I believe that the faculty in the Department have made an unparalleled entrepreneurial effort to maintain instructional quality, through relentless pursuit of extramural funding to support the curriculum. They should be congratulated and rewarded for these efforts. Instead, overhead produced by extramural grants does not appear to make its way back to the unit that generated the funds, limiting the benefits that such grants could provide to the instructional program.

The SSU Administration should make supporting the Department of Biology one its top priorities: it would be a tragedy to allow one its premier undergraduate programs to deteriorate further. To this end, I recommend that the Administration establish and implement the following priorities:
1. Provide substantial funding to the Department to maintain existing equipment and to acquire critical new equipment for teaching labs.
2. Return directly to the Department of Biology a substantial fraction of indirect costs that originate from grants awarded to faculty in the Department.
3. Appoint a broadly constituted taskforce that analyzes the strengths and weaknesses of the current method for calculating WTU, and that proposes a solution to the inequities of the system and its unintended consequences for the curriculum.
4. Develop a financial plan for recruiting 2-3 new faculty members in cutting edge biological disciplines, including molecular biology, genomics, and bioinformatics.
5. Re-institute the merit and promotion systems, as well as a professional development program, for university staff.
6. Comprehensively evaluate central accounting practices to improve accuracy and efficiency, and reduce delays in transmitting essential fiscal information to the departmental level.

I also encourage the faculty to re-double its already highly successful efforts to secure extramural support for its instructional and research programs. In addition, I recommend consideration of the following major changes in the curriculum:

1. Reconfigure the upper-division curriculum to a simpler structure, with fewer concentrations and more flexible requirements.
2. Insofar as possible, consolidate courses offered in multiple, small sections into larger sections, offered annually or in alternate years.
3. Evaluate the links between laboratory and lecture courses, with the goal of reducing or eliminating non-essential labs (with the possibility of developing new lab courses).
4. As staff availability permits, develop a more formalized advising program.
5. Develop a staffing plan that addresses the competing needs of accounting, academic and administrative planning, academic advising, maintenance, and lab coordination so that duties and expectations are clearly defined. Use this plan to identify areas in which there are critical staffing shortfalls.

In closing, I feel compelled once again to mention that I fully recognize the huge fiscal obstacles to achieving many of the goals set by the Department and to implementing many of the recommendations I have proposed. The situation for all of us is almost beyond chaotic. Nevertheless, it is also an unprecedented time to establish academic priorities, and there is no question in my mind that no priority can be higher than sustaining and building a program that has, largely through its own efforts, achieved excellence across the board.