Western Carolina University
Biology Graduate and Undergraduate Program Review
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I. Introduction

a. Description of visit length

Drs. Peter Bates, Claudia Jolls and Candace Timpte visited the WCU campus on February 15 and 16, 2010. There was an informal dinner gathering the evening of Februrary 14. The review team met with Faculty, Deans, the Provost, Chairman of the department, graduate and undergraduate students and graduate alumni over the course of 36 hours.

b. A summary and description of meetings conducted by the review team

The review panel met with the Provost (Kyle Carter) and Associate Provost (Beth Lofquist), Dean (Wendy Ford) and Associate Deans (David Butcher and Niall Michalson), of Arts and Sciences Dean of Research and Graduate Studies (Scott Higgins), Biology Department Head (Sean O'Connel) and Associate Department Head (Sabine Rundle), most Department Faculty, Executive and Associate Director of the Highlands Biological Station (Jim Costa and Anya Hinkle), Head of the Southern Appalachian Biodiversity and Education Center (Beverly Collins), Biology Graduate Students, Undergraduate students and Alumni of the Graduate Program. The review panel toured the Department and facilities.

II. Analysis of Program

a. Undergraduate program – Provide a brief synopsis of:

i. The curriculum (Is it appropriate for WCU's student body? Can students make adequate progress to degree? Are the prerequisites/required courses appropriate to the curriculum?);

The current curriculum is appropriate for WCU's student body although significant recent increases in enrollment re-emphasize limitations of faculty and departmental resources. The Department has revised the undergraduate curriculum to increase retention and graduation by reducing the required number of credits for graduation from 128 to 120. The courses represent the field thoroughly and the 'menu' options provide for a well-rounded education in the discipline. The capstone project requirement of involving all undergraduate majors in research is a laudable goal and in keeping with national trends and recommendations for Biological Sciences. However, this capstone research plan will require tremendous support from faculty and administration. The students that met with the review committee were pleased with the program and were able to take the required courses in sequence; although a few mentioned difficulty enrolling in some popular classes. Students appreciated the small class sizes and the direct interaction with the faculty both in classes and in research opportunities. The faculty and seven undergraduates with whom we spoke indicated that the cellular and molecular biology offerings were always full and that more courses would enhance the program. Given that the department

recently had an enrollment surge, soon there will be more students entering the upper division courses. The development of capstone courses to supplement the undergraduate research projects provides an excellent tool for recruitment into other STEM careers. There are no curricular gaps or fundamental skills missing. The recent curriculum revisions include standard cognates such as two semesters of inorganic and the same for organic chemistry, and an increase to two semester of physics, mathematics and statistics.

WCU Biology undergraduates are typical in expressing a desire to be involved in the health sciences aspects of biology; this puts additional burdens on the cellular and molecular courses. Given the large number of health science majors and the increased enrollment, another faculty member is desperately needed to teach cell and molecular biology and present more advanced offerings of interest to majors interested in human health programs. Many aspiring undergraduates will not be admitted to medical or clinical training programs, however, and the few we surveyed offer enrollment in graduate programs as an alternate albeit short-term career path. We applaud the efforts of the faculty to engage undergraduates in research (despite its difficulty due to their inexperience); it may well be a commitment that promotes enrollment in graduate programs and ultimately recruitment into STEM careers.

Program success is a function of building a critical mass of engaged, productive faculty and resources, including graduate students. Cellular and molecular biology cannot compete at smaller, more regional institutions such as WCU with limited resources. Additional resources may include recruitment of other senior faculty from nearby institution who have contacts and associated resources for collaboration.

A variety of concentrations in Biology may serve as a recruiting tool as students perceive a major with a concentration as more marketable. With careful attention to student enrollment in courses specific to major concentrations, the number of concentrations should not cost the department additional funds by supporting low enrollment courses. In fact, low enrollment in upper division courses would increase the quality of education through more focused class discussions and more opportunities for student presentations. However, it was not clear to the review panel whether five concentrations in the undergraduate majors were necessary. For example, could organismal biology be merged with the ecology and evolution concentration and/or conservation biology as noted in one of the planning documents? That said, whether or not the number of concentrations significantly impacts use of resources, recruitment or graduation rates is unclear.

Of concern during our interview with seven undergraduates was the lack of information about career services and alternative biology careers. One student knew of services, but others did not. Career services communication with undergraduates is difficult at best as students tend to disregard such services until graduation nears. However, perhaps the department could engage the Biology Club to build a web page linked from the Biology website to include alternative biology career links. Similarly, the students seemed to have little knowledge of the requirements for applications to medical and pre-professional school as well as graduate school. Individual academic advisors certainly provide some information but a central source, even a webpage, within the department might serve students more efficiently. Perhaps the Career Center already has such websites and links from the Biology website may direct students to this vital

information. In this digital age, unit web sites are critical and necessary for communication. Again, having support staff to revise and maintain updates websites is recommended.

ii. The student body (Is the faculty/student ratio appropriate? Is the student body representative of the region, mission, goals/objectives of the program?)

The student body reflects the demographics of the surrounding area; in fact, the number of out of state students is surprising and laudable for a small, regional campus.

Clearly there is a need for new faculty positions to meet the increased enrollment, not only in intended biology majors, but in service courses for pre-nursing, nutrition, pre-med, pre-vet, physician assistant and other health-allied careers. In particular, there are great needs to cover more students in BIOL 140 but not at the expense of pedagogy. Failure rates (D, F, W) in introductory biology BIO 140 approach 50% or more, but are not atypical. Such attrition may be more a reflection of student preparation and advising than course structure or faculty performance. Is there sufficiently strong recruiting of qualified students? Are enrolling freshmen sufficiently prepared for introductory biology? We recommend that the Department review pre-requisites for BIO140; perhaps eligibility for College Algebra or introductory chemistry may prevent unqualified students from taking the course. Teaching unqualified students places undue burden on faculty time and wastes precious lab resources.

iii. The planning and assessment strategies (Can the program document student learning? Are the goals/outcomes appropriate? Do all faculty have an opportunity to participate in planning and assessment activities?)

The faculty actively participated in the restructuring of the curriculum and support the curriculum. The Goals and Outcomes of courses and the programs are appropriate. The Departmental QEP lists all educational goals and assessment measures, including e-portfolios, which is a recent educational trend. It is unclear whether or not this "electronic briefcase" has been implemented but may prove a valuable tool for students to assess their educational experience. The Biology Undergraduate Program Review 2009-2010 (p. 5) suggests that assessment exams or assessment questions may be in use (2007-2008 and then 2008-2009) thus they are developing the basis for robust assessment. The panel offers as a suggestion that particular assessment questions might be built into final exams. We also acknowledge that assessment is an evolving commitment.

b. Graduate program – Provide a brief synopsis of:

i. The curriculum (Is it appropriate given faculty interests/qualifications? Is the focus well-defined and appropriate to the mission of the program and needs of the discipline? Are the prerequisites/required courses appropriate to the curriculum? Is it of sufficient academic rigor?);

The graduate curriculum appears to be appropriate and focuses on the strengths of the faculty and the wealth of the natural resources at WCU. The program builds on the ecology and conservation biology opportunities for study both in the coursework and the graduate research

programs. The Introduction to Graduate Research is a course focused on grant-writing and proposal construction skills. Students realize these skills are important for their careers and appreciate the opportunity to hone these skills. Discussions with both undergraduate and graduate students suggest that courses cross-listed at the 400- and 500-level may limit rigor and effectiveness; both graduate and undergraduate students felt that the courses could and should be more challenging. Undergraduates were very positive about the involvement of graduate students. Graduates assisting undergraduates in these courses provide opportunities for deeper learning for graduates as well as increased rigor, and the opportunity to mentor undergraduates. Graduate students report difficulty obtaining funds. Communication about funding availabilities, such as summer TAs, seem decentralized. Advisory faculty could prepare students to be poised for opportunities, including ready CVs to act on opportunities when they arise. Some form of competitive funding from WCU, even $500 for the summer, could enhance a graduate student's ability to effectively conduct research during the summer. A small internal competitive programs would give students practice in grant writing and proposal writing skills. Since many of the graduate research projects include field research or sample collection, a summer TA position would not necessarily benefit these students. Many report funding their own research travels and inability to reach field sites due to gasoline prices or job constraints. In light of this obstacles, the time to graduation rates reported for the past few years is excellent. We are confident that graduation rates and time to graduation would improve with small amounts of summer funding for student research.

The department has tremendous strengths in the areas of ecology and the conservation of biodiversity. The department is making the effort to build a cell and molecular biology component to both their undergraduate and graduate programs. Program success is a function of building a critical mass of engaged, productive faculty and resources, including graduate students. Cellular and molecular biology programs have difficulty competing at smaller, more regional institutions such as WCU in the absence of resources. Additional resources may include recruitment of other senior faculty from a nearby institution who have contacts and associated resources for collaboration. Multiple barriers exist to the development of cellular and molecular Biology, including low start-up, modest facilities and large teaching responsibilities in lower level courses. Recruitment of quality graduate students is also difficult with smaller, regional programs competing with large medical center based programs. We suggest development of a critical mass of faculty for collaborative work in the area of molecular and cell biology. The Department request for an additional faculty position in these disciplines echoes their commitment to and support for this suggestion. We also suggest reserving a TA position or two to support cellular and molecular biology graduate students; these TA positions could later be released to other students if suitable graduate students in cell and molecular biology are not recruited.

When compared to the previous report on the graduate program, the Biology Department has made great strides in improving the program. Many of the recommendations were implemented with great success and the graduate program is indeed a commendable program. Both the students currently in the program and the alumni interviewed by the panel were pleased with their education and graduate opportunities.

ii. The student body (Are the qualifications and mix of students appropriate to the program? Does the program offer adequate support for students admitted to the program? Is the student body representative of the region, mission, goals/objectives of the program?)

Success of the graduate program is reflected in impressive placement statistics, including 75% of recent M.S. in Biology grads employed in the field, including nearly 33% placed in doctoral degree programs. Support for graduate training is improving, but more summer funding opportunities for graduate students would, in the committee's view, increase recruitment, retention and decrease time to graduation, particularly for the large number of students who do field-based research. The Graduate Student Association may be an untapped resource for graduate students in biology, particularly if support for travel to meetings is available. The graduate program clearly observes the mission of WCU to be an asset to the region and taps the wealth of natural resources in the area.

iii. The planning and assessment strategies (Can the program document student learning? Are the goals/outcomes appropriate? Do all faculty have an opportunity to participate in planning and assessment activities?)

The graduate program presents a clear timeline to students, including a requirement to present a proposal during the second semester of study. The panel applauds this clear timeline as a strong motivating tool to encourage graduate students toward completing their program. However, we recommend more assessments including documents for tracking students both during their program and upon completion of the degree. The Office of Alumni affairs might be an appropriate partner for tracking graduates after completion of their degrees.

Students appreciate the freedom to develop their ideas into research projects and were also aware that development of their ideas may increase the time to graduation. That said, with great opportunity comes great responsibility, and those students who align themselves with a mentor who have a funded research program will in all probability, graduate sooner. Students appreciated the faculty and felt that faculty assisted them in their research and progress toward a degree.

III. Analysis of Faculty

a. Qualifications – Provide a brief analysis of faculty qualifications (i.e., Does the faculty have the requisite degrees and credentials appropriate to the program?)

All tenure- tenure/track faculty are extremely well qualified. Many faculty have obtained extramural funding and are regularly engaged in scholarship and publication; many are engaged in training graduate students.

b. Resources and Support – *Provide a brief analysis of program and institutional support for faculty (i.e., Does the program have adequate and appropriate processes and procedures for rank, tenure and promotion decisions? Is faculty compensation appropriate and adequate? Are library holdings and access adequate? Does faculty have access to adequate lab space, technological resources?)*

WCU faculty corps are clearly dedicated to developing a quality undergraduate program, as indicated by the QEP. One of the strengths of the QEP is the goal to include all undergraduate majors in a research project. However, faculty must devote considerable amounts of time training undergraduate students, particularly the less talented students. Often such research projects do not result in publishable data or preliminary data for funding proposals. Faculty need to be rewarded for the time they spend on undergraduate research where low course enrollment (1-2 students) is acceptable. A preferred mechanism would give faculty ongoing credit for such efforts as opposed to awarding course releases at infrequent intervals. Faculty have some creative ideas for improving undergraduate research project efficiency, such as coordinating group research projects; these ideas should receive departmental support.

A mechanism is needed to reward faculty for considerable time spent mentoring undergraduate and graduate students. It is surprising that teaching loads of Biology faculty are identical to those of some departments without graduate programs, and are higher than other science departments with graduate programs.

The review committee appreciates that personnel issues are complicated, by finances, health, appropriate “fit”, time, diversity, etc. The Department of Biology seems to have endured an atypical number of such issues, resulting in the absence of a full-time administrative assistant, the absence of a tenure-track faculty member and dramatic changes in administration and associated time allocation. Biology and WCU have been extremely creative and committed in weathering these changes. Nevertheless, the provision of more technical support staff and fixed-term faculty is the only way to address these needs in the short-term. In the longer term, such challenges will need to be solved permanently, given the growth of the institution and of biology. For example, a technician could support and maintain the the research program of the department head as well as promote use and maintenance of newly acquired equipment in molecular biology. The department and WCU should consider the real costs that occur when faculty are required to perform technician’s tasks.

The committee also recommends hiring another fixed-term person for laboratory coordination to help prepare materials for the considerable number of laboratory sections taught and in the face of increasing enrollments. Currently, TAs do participate in laboratory preparation; however, often TAs must learn new skills to prepare media and solutions. When TAs make errors in lab preparation, these errors lead to failed lab exercises and a lower quality undergraduate experience and increased costs. Hiring another fixed-term lab preparatory will release more graduate TAs to teach, and improve the undergraduate laboratory experience by promoting consistency among laboratory sections and across academic terms.

The revised CRD document provides a clear blueprint for all faculty, particularly new faculty. The committee was concerned that the specific wording of "discovery research" might preclude synthesis, application and development research as well as scholarship of teaching and learning. We feel that these areas of research are also valuable and might be considered for promotion and tenure decisions. Engagement of undergraduates in research represents a significant time commitment for faculty; this type of research does represent discovery science. Further, it must be recognized that few undergraduate projects will result in peer-reviewed publications;

however, research with undergraduates should be recognized in the CRD. Scholarly products that include undergraduate research, such as publications, presentations at meetings, and published abstracts, should carry considerable value for the time investment in undergraduate training.

The untenured faculty are clearly committed to WCU and are happy with the department's collegiality. The committee noted that the Departmental Head and Associate professed goals of supporting new faculty to achieve tenure and promotion. The newly revised CRD document has impacted the untenured faculty by more clearly defining the requirements for tenure and to some extent, has alleviated their concerns. However, untenured faculty can be overwhelmed and unaware; most would profit from a formal mentoring program. We noted confusion over the quantity of service expected on committees, expectations for attending professional meetings during the semester and other aspects of a faculty position within the university. The committee appreciates that young colleagues may be unaware of the considerable support and guidance available at WCU and regionally and that young colleagues may be resistant to proffered advice. New colleagues may achieve more with confidence when the same information comes from several sources and is codified, e.g., from senior colleagues internal and external to the unit as well as from code or other documents, when possible. We recommend the development of a formal mentoring program within the discipline, with a senior faculty chosen to support and guide the junior faculty. We understand that an internal mentor outside the discipline has been assigned, but only a person within the discipline can truly help with defining a balance between coursework, research, service and student engagement. A formal mentoring program would allow a confidence to develop between junior and senior faculty and a more structured level of support. The review committee offers that a College-wide faculty mentoring workshop also could be developed to inform all untenured faculty of the process and expectations external to the unit. Promoting multidisciplinary understanding of requirements across the disciplines would be beneficial for faculty development.

The department has increased the number of faculty in cell and molecular biology in recent years and the chair has expressed his primary goal is to help his new faculty achieve tenure and promotion. It is critically important to not only recruit, but retain new faculty, particularly in cell and molecular biology. We recommend that resources be allocated to allow young faculty to continue ongoing scholarship. For example, reduction in section numbers, perhaps by increased class size, as well as possible released time for scholarship and/or assignment of graduate teaching assistants would assist productivity of new faculty. Team-teaching is another possibility, both to provide young faculty with models to develop their teaching skills as well as time flexibility for scholarship and other professional development activities, such as attending conferences.

Flexibility is critical for recruitment, retention promotion and success of young faculty and ultimately the institution. Such flexibility can involve teaching assignments, allocation of resources such as support for travel, supplies and equipment, undergraduate and graduate research, and most importantly, time. This adaptability presents logistic challenges but can dramatically impact the moral of the department as a whole. Other recommendations include more collaboration of cell/molecular biology faculty with teacher-scholars external to WCU, perhaps as part of the faculty mentoring program mentioned above.

The committee notes that the distribution of faculty by ranked is skewed, with a dearth of full professors. We appreciate this is historic and demographic. The recent hires of more senior faculty with reduced time to tenure and promotion review is laudable and an excellent solution. Such hires also should be considered for growth of programs in cell and molecular biology. Senior faculty can provide mentoring, the flexibility of time management that comes with experience and the connections in the academy and profession that provide for more effective service.

c. Teaching, Research/Creative Activity, and Service – *Provide a brief analysis of faculty participation in teaching, research/creative activity, and service (i.e., Does the faculty sustain an adequate publication record or its creative equivalent? Does the faculty pursue and obtain an adequate amount of external funding? Are the program faculty recognized by their peers for scholarly contributions to their discipline?)*

The review panel feels that the general productivity of the Biology Department is strong. The faculty show consistent and broadening contributions to service. Engagement of the entire department in hosting regional Association of Southeastern Biologists meetings demonstrates the evolution of the entire faculty from "participant to …leader in service activities". Demonstration of teacher/scholar model is manifest in inquiry-based labs and capstone engagement projects. Overall, the students praised the accessibility and decication of the faculty.

The faculty should be complemented on the extent of external funding, particularly in support of undergraduate education. The Mobilab cart is an excellent example of funding that supports education throughout many courses. It is not clear, however, whether the infrastructure at WCU is sufficient to support significant external grantsmanship. Faculty and graduate students report confusion about procedures and delays in processes. Such challenges are not atypical, given the diversity of external funding sources and the complexities of budget and personnel processes in the State of North Carolina; however, greater support for the university infrastructure to support external funding is advised.

Providing opportunities for undergraduate research through the capstone research experience expands the foundation for faculty research. The opportunity to present student research through the National Conference for Undergraduate Research (NCUR) represents the expansion of the WCU research productivity, can enhance recruiting and reputation. This opportunity is promoted campus-wide, particularly in the humanities and social sciences; it is encouraging that biology is making an increased presence at that venue. Nevertheless, such opportunities to highlight undergraduate and faculty research collaborations also are available elsewhere, including the NC Academy of Sciences and the associated Collegiate Academy of Sciences and the annual meeting of Beta Beta Beta (TriBeta), the biological research honor society (with the Association of Southeastern Biologists). Because these activities provide undergraduate training visibility and discovery scholarship, we feel that it is critical for this faculty time in support of scholarship be acknowledged as student teaching credit hours in some fashion. For example, every faculty member who engages students in research perhaps could have a section of Biol 480 and thus increase SCH to represent the significant input of faculty time.

d. Southern Appalachian Biodiversity and Ecology Center (SABEc)

While it is not the mission of this committee to review centers and institutions, even funded ones, we view SABEc as a promising initiative. The mission of this new, unfunded multidisciplinary effort to foster collaboration among WCU, Highlands Biological Station, regional organizations and K-12 education focus on western NC mountain systems is creative, laudable and ambitious. Such a center builds on extant and historic strengths of WCU Biology in ecology, organismal biology and conservation, local natural resources and addresses strategic visions and goals of Biology, WCU and the university system as addressed in UNC Tomorrow. SABEc can provide centralized focus of potential resources for faculty, students and local citizenry for education, outreach and research. The success of such centralization fosters multidisciplinary collaboration, evident from the more than two dozen student research projects, grant proposal submission and community engagement documented by the more than 20 WCU faculty involved in SABEc. The role of this WCU initiative relative to other regional efforts merits further consideration and investment. We support the continued engagement of more WCU faculty in the center, as well as other regional organizations such as NCCAT to promote research, teacher training and recruitment, environmental education and community participation. Other areas for expansion might include economic development such as sustainable tourism. Given the success of SABEc to date, its regional interdisciplinary focus and stated WCU and UNC missions, support from the university for a pilot of SABEc as a potential center is encouraged. Such support might include assignment of a graduate teaching assistantship, a modest operating budget and partial released time for administration, grantsmanship, research and outreach by an acting director. Given the current and projected extensive demands on Biology for service-related teaching and outreach and the university- and regional-focus of SABEc, it is imperative that such support come from sources external to the Department of Biology.

IV. Analysis of Operational Facilities and Budget

a. Does the program have adequate facilities to meet their educational mission?

Typical of most biology departments, the facilities at WCU that support biology modestly support the increasing enrollment and change in research focus. While recent renovations to Stillwell have helped this growth, we anticipate that increasing enrollment, which includes the expansion into cell and molecular biology areas, will require enhanced facilities. Course offerings in the cellular and molecular biology areas will need to increase, and along with that, increased lab and lab expenses to support students pursuing pre-allied health careers. Faculty have demonstrated their creativity in developing solutions with the Mobilab cart. With additional support, faculty could address these needs.

One glaring need for the continuation of the educational mission is vans for transportation of students. The existing fleet vehicles, given their ages, seem to border on unsafe for transporting WCU students. Many courses include field experiences; these field experiences are critical to the mission of WCU and the department for students to explore and appreciate the wealth of natural materials in the locale. The hands-on field experiences may prove instrumental in determining student career options from allied health areas to ecology, conservation biology and environmental education. With the current economy many students may not have access to

personal transportation for course-related field experiences; thus, WCU sponosored vans seem an economical and ecologically sensitive solution.

b. Does the program have adequate budget to meet their educational mission?

The operating budget has remained essentially flat for the past five years, typical of what other regional schools in the state have endured. Recent increases to the Education and Technology funds are laudable, encouraging and appropriate. Given the productivity and size of Biology, such increased should be made permanent. One of the challenges with state funding is its lack of continuity and permanence. Notwithstanding, a vigorous program such as Biology, which is growing in quantity and quality, needs to be able to depend on sufficient resources to teach laboratory classes, provide photocopying and other materials for teaching purposes. In the absence of such assurances, communication and transparency of the process become even more important.

Internal funds are available to recognize faculty contributions to teaching, however, few exist to applaud scholarship. Particularly in the sciences, it is critically important that faculty and graduate students receive support for travel to professional meetings, particularly regional meetings. This allows faculty and students to form collaborations with nearby colleagues. Such collaboration provides exhanced scholarship and teaching, opportunities for undergraduate admission to other graduate programs and promotes graduate training including doctoral programs and career opportunities. WCU awards to faculty as monies for travel, research and released time and graduate student stipends are laudable; we encourage their expansion.

V. Summary of program strengths and areas for improvement

a. What is your general impression of the program?
Overall, the undergraduate program is strong and growing. The commitment to the QEP and the restructured academic plan support student education and should enhance recruitment and retention. The program has experienced a burst of student enrollment and thus requires increased financial resources to support the teaching and laboratory needs for a quality educational experience. The requirement for a student research project is an ambitious goal that deserves support in faculty time and resources. Undergraduate research is a key determinant in student entering STEM careers, and thus is an excellent requirement.

The robust graduate program is a gem for WCU. The time to graduation has been reduced significantly and graduate placement appears strong. Graduate students are actively engaged in quality research, publication and want to travel to meetings to present their work. The graduate program is strong in the areas of conservation biology and ecology; the Department plans to expand the cell and molecular biology component which will require a significant investment of resources. The department has clearly worked hard to improve the program since the previous review and as a result, have built a tremendous program.

b. Overall, what are the areas of strength?
The WCU faculty are committed to and concerned about student education and development both in the graduate and undergraduate program. The undergraduate students appreciate the

small class sizes, and accessibility and caring nature of the faculty as a whole. The faculty are collegial and committed to providing excellence in education. The involvement of the faculty and administration in shared governance represent another area of strength as well as the commitment for continual program review.

Another less tangible strength is the location of WCU with the natural diversity and geographic setting. The geography is an excellent recruiting tool, unmatched by many other state institutions. The graduate program and to a lesser extent, the undergraduate program, takes full advantage of the local natural diversity and resources. The proximity of the Highlands Biological Station and the Southern Appalachian Biodiversity and Ecology Center are great strengths which the biology department can use to advantage.

c. Overall, in what areas could the program make improvements?

The Department has recently revised the undergraduate curriculum and is implementing the QEP. The Department has implemented many of the recommendations for the graduate program from the previous program review, resulting in a significantly improved program.

Although the committee applauds the requirement for the undergraduate senior capstone experience, we recognize that this requirement will consume much time from the supervising faculty, taking time away from their research, teaching and graduate student training responsibilities. With limited faculty numbers, and increasing student loads, we urge that the department develop models to maximize faculty time per capstone experience and attempt to decrease teaching responsibilities in other areas as well as recognize undergraduate research in the scholarship component of promotion and tenure considerations.

VI. Summary of Recommendations

The WCU Biology Department is providing an excellent educational experience on a very tight budget, but will likely be unable to sustain this quality in the face of increased enrollments. In light of this, the committee's recommendations are primarily financial. The departmental budget should be reviewed and recieve a permanent increase to stabilize operations. The committee also recommends support for a full-time adminstrative assistant to return time to the department leadership.

Clearly to support student interest in medical and allied health fields, the cellular and molecular biology subdiscipline needs additional faculty. To continue improvements and make efficient use of existing facilities, the committee recommends additional administration and lab/technical support personnel to support use of confocal microscope, DNA sequencing and amplification equipment, etc. and to support increased student enrollment in the teaching laboratories. Field courses require decent, safe transportation in University sponsored vehicles; purchase of new vehicles would support both graduate and undergraduate program goals.

The committee recommends the establishment of a formal faculty mentoring program for new faculty within biology and perhaps across the campus within each discipline.

One low-cost, high return investment is university support for website developmen for unit advising, senior capstone experience information, career development and professional school

application information. The committee is certain that these bits of information reside on campus but a comprehensive website would provide more consistent information for the students.

As with most units, including each member of the committee, space for teaching and research is quite limited. We recommend that WCU and the Biology leadership review existing space needs, and develop plans for laboratory renovations in the Natural Science building, including examination of a shared research space model. We urge that WCU commit in the long term planning for a new science building.

Note: For future external reviews, a notebook containing hard copies of all review documents and a more complete table of contents would be appreciated. For instance, location of critical documents such as CRD document, assessment of courses, program plans should be noted. Alternative Appendix file names may be very informative.

The committee is grateful for the opportunity to discuss and formulate the main points of this document while at the site visit during time specified for working.