GRADUATE PROGRAM REVIEW

SONOMA STATE UNIVERSITY
DEPARTMENT OF BIOLOGY

FALL 2009

Dr. Daniel E. Crocker – Program Coordinator

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# CONTENTS

Introduction .............................................................................................................................................. 3
A. Basic Information ................................................................................................................................. 3
B. Learning Objectives ............................................................................................................................. 6
C. Aligning Courses with Learning Objectives ....................................................................................... 7
D. Diversity Efforts ................................................................................................................................. 9
E. Student and Program Assessment ..................................................................................................... 10
F. Department Self Study Questions and Action Items ........................................................................ 13

Appendix 1 – Adjunct Faculty Status: Criteria, Application Procedures and Review Process ............................................................................................................................................... 19

Appendix II – Graduate Coordinator Duties .......................................................................................... 21

Appendix III – Graduate Courses ......................................................................................................... 23

Appendix IV – MS Coursework and Timeline Form ............................................................................... 26

Appendix V – Thesis Assessment Rubric ............................................................................................... 27

Appendix VI – Teaching Associate Observation Rubric ........................................................................ 28

Appendix VII – Progress Report Form ................................................................................................ 29

Appendix VII – Graduate Student Employment Tracking ....................................................................... 32

Appendix IX – Graduate Survey ........................................................................................................... 34

Appendix X – SSU Masters Students’ Peer Reviewed Publications 2002-2008 ........................................ 38

Appendix XI – Graduate Student Tracking Data – Funding ................................................................. 41
Sonoma State University
Graduate Program – MS in Biology
PROGRAM REVIEW

Department or Program: Biology
School or Academic Division: Science and Technology

Date: October 9, 2009

The Masters of Science (MS) program in Biology at Sonoma State University (SSU) is designed to provide students strong foundations in scientific methodology, scientific literature and technological principles, and to prepare them to enter a variety of professional fields and doctoral programs. The program is thesis-based and requires students to conduct original research under supervision of members of the biology faculty. The program offers a diverse range of research opportunities in the four major areas of biology: molecular and cell biology, physiology and functional morphology, ecology and evolutionary biology, and organismal biology. Along with thesis research, all students complete a minimum of 30 units of course work approved by the student’s advisory committee.

Sonoma State University is a 'predominantly undergraduate' institution and offers degrees in 41 majors at the undergraduate level and 14 at the master's level. SSU is committed to the mission of ensuring quality educational programs for graduate students whose goals include personal and professional development through mastery of specific fields of study. There are currently 1158 graduate students enrolled at SSU, comprising 13% of the student population. Graduate programs at SSU are designed to provide opportunities for independent research in order to broaden intellectual and creative capacity. Developed with the time constraints of the working professional in mind, many graduate programs are structured to allow for part-time enrollment, offer advantages to work closely with faculty and peers, and promote close supervision in culminating projects.

A. Basic Information
Number of students currently enrolled: 27
Number of theses completed since 1966: 147
Number of full-time permanent faculty: 11
Number of participating faculty from other departments: 4 (Anthropology, Chemistry, Environmental Studies and Planning)
Number of biology graduate courses: 14
Number of degrees: 1 (Masters of Science)
Program Coordinator: Dan Crocker
Figure 1. Annual enrollment and number of students completing degrees.

Figure 2. Annual number of applicants and accepted students for the SSU Biology Master’s program. Some accepted students elect not to attend.
Figure 3. Mean undergraduate GPA and GRE scores for declined and accepted applicants, 2000-2008. The lack of a significant difference in GPA and GRE scores among accepted and declined applicants partially reflects the refusal of qualified students due to the lack of space in the appropriate advisor’s lab or a lack of suitable faculty for student’s expressed field of study.

Structure of the M.S. Program in Biology

The M.S. Program in Biology is structured to facilitate student conducted, original research. All applicants are strongly encouraged to contact one or more faculty members in the Department of Biology (or associated faculty, see below) whose area of research matches the applicant’s interests. This initial contact helps applicants find faculty members who would be willing to accept the applicant into their laboratory (and thus become the applicant’s major thesis advisor). Upon entering the program, the applicant, in consultation with the major advisor, chooses two additional faculty members to serve on the Advisory Committee. The functions of the Advisory Committee are to (1) help the student plan their course work, (2) serve on the student’s Oral Qualifying Examination Committee, (3) advise on thesis research, and (4) serve as the Thesis Defense committee.

As a means of expanding opportunities for student research, faculty in other departments at SSU with degrees or research interests/ experience in related fields also participate within the graduate program. Upon approval of the Department of Biology and the home department of the participating faculty member (see Appendix I), these faculty members are considered members of our graduate faculty, serve on graduate committees, and can be major advisors to students in
our program. In addition, one member of the Advisory Committee may be from another institution or agency.

The role of the Graduate Coordinator is to oversee the graduate program. This entails all aspects of the application process, tracking student progress in the program, and insuring all degree requirements have been met before graduation. A full description of the duties of the Graduate Coordinator is provided in Appendix II. The Graduate Coordinator serves a 3-year term and, unfortunately, receives no workload compensation (2 WTUs of release time per semester was the standard prior to Fall 2003).

The Graduate Committee (chaired by the Graduate Coordinator) serves as the final decision making body for individual students (acceptance to the program, course-work approval, conflict resolution, etc.) and as the initiator of policy changes for the Graduate Program within the Department of Biology.

B. Learning Objectives

The learning objectives for the program are integrated with those for the undergraduate majors. All upper division major’s and graduate courses are designed to offer topics within a research-based approach and are structured to challenge students to develop skills of critical analysis, reasoning, creativity, and self-expression. Often, graduate students take a number of upper division classes in the major (up to 14 units of upper division coursework applies to degree) and seniors in the major often take graduate classes. This integrates the learning objectives from the major with the Graduate Program. Thus the learning objectives designed for the Bachelor’s degree in biology, groups a, b, and c, also apply to courses taken by our graduate students. Learning objectives specific for the Graduate Program (group d) are based on the research emphasis of the M.S. degree.

a) Discipline Content: Develop a broad working understanding of a range of biological concepts including:
   1. Biological diversity in an evolutionary context
   2. Cellular and molecular basis of life
   3. Principles of inheritance
   4. Principles of evolution
   5. Structure-function relationships at the organismal level
   6. Principles of ecology
   7. Principles of reproduction and development
   8. Principles of physical sciences and mathematics that support and underlie the biological sciences

b) Skills: Acquire a range of skills to further career goals in biological sciences:
   1. Pose scientific questions, and answer them using appropriate scientific approaches. Form hypotheses and design experiments to address them.
   2. Identify and interpret processes at all levels of biological organization.
   3. Gather relevant scientific data using a range of techniques and instruments.
   4. Analyze data about biological processes using a variety of quantitative techniques.
   5. Effectively communicate concepts and ideas in verbal and written forms.
c) **Values:** Acquire the following values of an education in biological sciences.

1. Strong appreciation for scholarship in all its forms.
2. Critically assess socially relevant biological issues, and integrate them into their daily lives.
3. An ongoing curiosity about biological phenomena at all levels.
5. Pursue fulfilling careers in biology in a changing and competitive world.

d) **Research:** Develop ability to articulate, integrate, and express knowledge in advanced areas of biology through scholarship:

1. Demonstrate and articulate knowledge in advanced concepts in area of chosen emphasis in biology.
2. Demonstrate written and oral ability to integrate basic and advanced concepts into research.
3. Demonstrate ability to conduct independent research.

C. **Aligning Courses with Learning Objectives**

1. Graduate courses in the Department of Biology (see **Appendix III** for descriptions) fall into three categories:

   i. **Seminar-style courses** (BIOL 500S, 511, 512, 513, 515, 516, 517, and 518). In these two unit classes formal lectures by the faculty are mixed with student led discussions. These courses cover the latest information about selected topics and provide a forum for students to discuss them in depth. Of the courses listed above, BIOL 500S provides faculty the ability to offer a special seminar course on recently emerging fields or areas of biological research. This class may be offered only once by a faculty member or if it appears to match the needs of the students and/or Department, can become a regularly scheduled seminar course. In the latter case, a new course title and number would be proposed for addition to the curriculum.

   ii. **Lecture/lab/field courses** (BIOL 510, 544, and 545). These are typically four unit classes with formal lecture and laboratory or field investigations. These are intensive investigative style classes in which students are exposed to the recent developments, research techniques and approaches in the field. The class BIOL 510 provides faculty the ability to offer a class on a trial basis first, before proposing it as a regularly scheduled class.

   iii. **Research courses** (BIOL 595, and 599). BIOL 595 is the course graduate students take to obtain credit for their research efforts prior to advancement to candidacy. BIOL 599 is the course students take after advancement to candidacy to obtain credit for their research. Up to 6 units of BIOL 595 and 599 each may be applied to the degree.

   *BIOL 590 is Biology Colloquium, a forum for presentations by visiting scientist. Graduate students are exposed to a wide variety of research investigations and professional experiences in biology. In signing up for the courses, graduate students are expected to meet with at least two speakers per semester and discuss the work of the speaker and their own work. This is an opportunity for graduate students to build up their professional networking skills.

Table 1. Alignment matrix for courses and learning objectives.
Table 2. Sample Curricular Plan

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Table 2. Sample Curricular Plan

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<td>COURSE</td>
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<td>FALL</td>
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<td>BIOL 599</td>
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<td>SPRING</td>
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* students requiring full time status may take additional courses

Table 3. Delivery of graduate curriculum and enrollment
D. Diversity efforts

The primary aim of the educational plan associated with the graduate program is to promote research training and education to graduate and undergraduate students, especially underrepresented students, through participation in cutting-edge research. Our proposed research and educational plan aims to: 1) broaden participation of underrepresented minority groups, 2) advance the discovery and understanding of science and math, while promoting learning, training and teaching, 3) enhance infrastructure for research and education at Sonoma State University, and 4) provide broad dissemination of research and educational materials to enhance scientific understanding.

Sonoma State University is also actively involved in increasing the participation of underrepresented groups in research training, both through recruiting them as graduate students and involving diverse undergraduates in research projects associated with funded research and the graduate program. Programs in place at SSU that integrate with the Department of Biology include the California State University Louis Stokes Alliance for Minority Participation (LSAMP), the McNair Scholars National Graduate Student Achievement Program (NoGAP) and the Mathematics, Engineering, Science Achievement (MESA) program. All of these programs rely heavily on the Biology Department's facilities to increase research training and graduate school preparation for underrepresented groups. Minority students are targeted for participation in NSF funded RUI research grants. LSAMP is an NSF sponsored program designed to broaden participation in science, mathematics, engineering and technology (STEM) disciplines and contribute to the national agenda to increase the number of URM (underrepresented minorities)
receiving baccalaureate degrees, and ultimately Ph.D.s, in STEM disciplines. In the 2007-2008 academic year, 54 students participated in Sonoma State's LSAMP program. The ethnic/racial breakdown for the 54 LSAMP participants in the 2006-2007 academic year was as follows: 18 African American, 31 Hispanic/Latino, 5 Native American. The LSAMP program targets minority students early in their undergraduate career with the aims of increasing their preparation for research activities and helping them transition into graduate programs. We target LSAMP program participants who are Biology, Biochemistry or Math majors for participation in the student research component of funded research and as assistants to graduate student projects.

The SSU NoGAP program began in October 2007 and has hosted 37 low-income and first-generation, or African American, Hispanic, Native American, or Pacific Islander students to date. Of these, 10 have been mentored in Biology, with most in organismal or field biology. To date, five of the recent Biology NoGAP students have been accepted into graduate programs.

E. Student and Program Assessment

1. Student Assessment – Assessment of students occurs before and during the program.

a. Entrance Requirements
Applicants to the program are reviewed for evidence that the prospective student is capable of initiating and performing original research as well as completing other degree requirements as outlined above. The program uses the following criteria to determine this potential:

i. Meets California State University admission requirements.

ii. Possess an undergraduate degree in biology or equivalent, including one course in calculus or statistics, one year of general chemistry, one semester of organic chemistry, and at least one other course in physical sciences. In general, courses should reflect the equivalent exposure to concepts in biology have been met that are required of a B.A. in biology at SSU.

iii. a 3.0 GPA or higher in the last 60 units of coursework.

iv. A score at or above the 50th percentile on each section of the General Examination of the GRE.

v. Evidence in two letters of recommendation of potential for conducting independent and original research in biology.

b. Advisory Committee Review of M.S. Coursework and Timeline Form
The student meets with the Advisory Committee by the end of the first semester to complete a M.S. Coursework and Timeline Form (Appendix IV) listing the Committee approved courses that the student intends to apply to the degree. This form is then submitted to the Graduate Coordinator for approval by the Graduate Committee.

c. Oral Qualifying Examination
Students must pass a two-hour-oral qualifying examination. The student’s Advisory Committee and a fourth member administers this examination. The Graduate Coordinator selects the fourth member from the biology graduate faculty. This examination should be completed no later than the end of the second semester. During the examination, students must demonstrate their ability to articulate the purpose of their proposed research project and that they are competent to complete the work. Students are also required to demonstrate their ability to integrate general principles of biology with their proposed work and a broader understanding of biological principles and concepts, irrespective of one’s specific area of research.
d. Thesis Defense
Students present results of their research in a public forum, either as a special seminar or in the Biology Colloquium. The students should be prepared to address questions and comments. All three members of the Advisory Committee must be present at this seminar. Immediately after the defense presentation, the student and their committee meet to further discuss, evaluate and comment on the thesis. At the end of this meeting, the student is excused and the committee decides on the acceptability of the thesis. The Committee may require the student to revise the thesis. We have recently developed an assessment rubric for the thesis that will be implemented as of Spring 2010 (see Appendix V).

e. T.A. Class Evaluation
All students are required to participate as a paid Teaching Associate in the Department of Biology for at least 2 sections of laboratory in GE biology (BIOL 110) or lower division major’s biology (BIOL 121, BIOL 122, BIOL 123). During his or her teaching semester, a member of the Graduate Committee or faculty instructor in lower division biology evaluates each student. This evaluation (see Appendix VI) follows a similar format as that used to evaluate tenure-track faculty. Upon completion of the evaluation, the student meets with the evaluator to discuss the class, the evaluation, and any means to improve their performance. The evaluation is signed by the student and evaluator before being entered into the student’s file. The evaluations become part of the student’s dossier and are often used by faculty members to write letters of recommendation.

f. Progress Report
By the end of the second full year in the program, students are expected to provide a completed draft of the thesis or a progress report to their Advisory Committee (see Appendix VII). The critical section of the progress report is a timeline indicating the work to be completed in the upcoming year. A copy of the progress report is signed by the Advisory Committee and submitted to the Graduate Coordinator.

2. Program Assessment

a. External Review
A panel of invited scientists from similar/comparable institutions is invited to participate in a review the Department of Biology approximately every 10 years. The last Department review was conducted in 1994. Below are the recommendations made by the panel specific to the Graduate Program and the Department’s response.

Recommendation: At the graduate level, Biology 551 and 552 could be combined as a five (5) unit single semester course (three hours of lecture and six hours of lab per week).
Response: There have been 5 catalog revisions since this recommendation. Biology 551 and 552 were initially combined into a single course, BIOL 550, in the 1994-96 catalog. Due to retirement of the faculty member in charge of the course, and no replacement, this course no longer exists.

Recommendation: We also suggest considering the addition of a graduate course, Biology 5XX as a Special Topics in Advanced Biology, under which faculty teach courses in their specialties as demand warrants.
Response: BIOL 500S and BIOL 510 are designed to now serve this purpose.

Recommendation: We encourage the faculty who teach graduate courses to be vigilant in their recognition of the double-edged-sword nature of such classes. Just as those faculty must set and maintain rigorous standards of performance by their graduate students, the students expect an advanced course of instruction from the professor. Undergraduates who enroll in such courses must be made aware of these standards, and should only be allowed into the course with the expressed permission of the instructor.

Response: All graduate courses are taught to an advanced level of student. Although open to seniors in the major, they must now obtain permission of the instructor to enroll.

Recommendation: As financial conditions allow, we encourage an increase in the number of teaching assistant positions for graduate students. To the extent possible, laboratory teaching should be encouraged as an expected component of graduate education. To this end, we support the suggestion of converting temporary help positions to graduate TA assignments, with the condition that such conversions do not have a negative impact on undergraduate course offerings.

Response: The Department now relies on graduate teaching associates to offer our multiple lab sections in lower division general education and major’s classes. Although graduate teaching associates are responsible for running laboratories, the labs are designed and written by the faculty in charge of the course. The faculty are also responsible for supervising and mentoring the graduate teaching associates. Finally, the graduate policy in the Department of Biology now states: “All graduate students, including those supported by extramural sources of funding, are required to participate as a paid Teaching Associate in the Department of Biology for at least two 2 laboratory sections.” However, recent budget cuts have dramatically reduced the number of teaching associate positions available to the students.

b. Tracking Data
Our program maintains limited tracking data on recent graduates to evaluate how well students advance into positions following completion of their degree. Data on 37 of 38 graduates are available since 2000. Ten have moved into Ph.D. programs and 3 hold post-doctoral positions in biology at research universities, 11 have taken positions with private agencies, 6 with public agencies, and 7 are involved in education. See Appendix VIII for a detailed list of graduate tracking data.

c. Exit Evaluation
The Department developed an extensive exit assessment survey for evaluating the program. This survey consisted of 75 questions (See Appendix IX for a the 'beta' version of the exit evaluation). This survey was completed by a cohort of graduate students and based on this information and the level of student response we are currently revising this survey to a shorter length. We anticipate putting this exit evaluation in place in Spring 2010.

d. Informal Feedback
The Graduate Coordinator maintains an open door policy to all graduate students. This has led to numerous opportunities for students to express their views of program. We have found this to be an effective mechanism to judge the success of all aspects of our program on a real-time basis.
e. Thesis Publication
Since our program is research-based, we consider the ability of students to publish their thesis in peer-reviewed journals an important metric of our program success. Graduate students also earn co-authorships based on research contributions made while at Sonoma State University. Since 2002 SSU graduate students have published 19 first authored and 10 co-authored publications in 22 different peer-reviewed journals. While the lag time for publication prohibits direct comparison to completion rates, these data suggest that publication of student theses has become the norm for the department. See Appendix X for a list of publications.

F. Department Self Study Questions and Action Items.

The SSU Department of Biology and its Graduate Committee considered a number of topics as part of the self study component of the M.S. degree academic program review. Topics for consideration were generated from a series of meetings of the department’s Graduate Committee, department Chair Jim Christmann and department chair elect Richard Whitkus. In addition input was solicited from the full department and representatives of the graduate students. The department identified several areas of special concern for the review.

1. Address concerns about resources to support the graduate program, including:
   a. Lack of sufficient faculty to cover important research areas and support recruitment and mentoring of graduate students with interests in those areas.
      i. Especially problematic in cell and molecular biology.
   b. Lack of WTU resources to deliver the grad curriculum and needed new graduate courses.
      i. WTUs assigned for grad supervision do not reflect actual workload involved (e.g., same WTUs for one or three units of supervision coursework)
      ii. Committee members spend much time in advisory role and meeting with grad students with no compensation of WTUs
      iii. Small class sizes limits viability of offering graduate level courses other than seminars when administrative accounting is done on basis of FTES
      iv. The lack of release time for the graduate coordinator. Despite the lengthy list of duties, release time for the graduate coordinator was taken away in Fall 2003. Lack of sufficient workload release negatively impacts recruitment, program development and especially program assessment.
   c. Lack of resources for support of graduate students
      i. Compensation for TAships is too low as a mechanism to support graduate students, impacting recruitment and successful completion of degrees.
      ii. TA positions often exceed the capacity for institutional fee waivers.
      iii. Scholarship deadlines precede grad application deadlines precluding scholarship support for entering grad students.

2. Address concerns about graduate curriculum, including development of new courses.
3. Lack of university support for or understanding of resources and support needed to sustain research activities impedes development of robust graduate level program.
   a. Office of Research and Sponsored Projects is understaffed
b. No release time or time matching possible when faculty receive research grants (No WTUs are assigned for research related activities at all within SSU/CSU model).

c. Insufficient dedicated space for graduate and undergraduate research.

Areas of Special Concern

1. *What can be done to increase resources available for graduate instruction?* The biology graduate program is currently maintained by 11 full time faculty and several adjunct faculty. We estimate enrollment in the graduate program in Fall 2009 as 27 students. Low numbers of faculty relative to the number of undergraduate and graduate majors directly and indirectly impacts the ability to recruit students, find appropriate faculty advisors and deliver the graduate curriculum. This is particularly true of the MCB area where lack of faculty has significantly impacted the number of applicants and recruitments (Fig. 4). The recent moratorium on new hires and spring admissions due to budget constraints was particularly damaging to the graduate program. Extraordinarily low levels of start-up funding make searches for research-active faculty in this area especially challenging given the equipment needs of modern cell and molecular biological research programs. Recent retirements have created similar programmatic area deficits in the area of behavioral ecology. In addition, overall faculty size strongly impacts departmental needs in the undergraduate curriculum. Impaction in teaching workload has negatively impacted the ability to deliver the graduate curriculum, with some faculty teaching graduate seminar classes as overloads and graduate content courses being delivered intermittently, if at all. The department has generated policy to support the regular offering of graduate courses as part of regular workload but the ability to enforce these policies is limited in the context of the continuing budget reductions. This situation has also constrained the ability to develop the graduate curriculum through the addition of content based courses that support the learning objectives of the graduate program. The department feels that a strong administrative commitment to the graduate curriculum includes increased support of instructional workload in this area.
a. Graduate programs at this university are frequently viewed through the ability to generate FTES. Research based degrees generate low FTES relative to associated faculty workload while providing our students with excellent skills for post-graduate placement as evidenced by our excellent success in this area (see Appendix X). The biology graduate program views research activities by faculty as a critical component of a high quality degree and stresses integration of faculty research with graduate and undergraduate educational experiences. A weak campus commitment to supporting faculty research, as evidenced by small start-up packages for new faculty relative to other CSU's, loss of IDC return on major grants to the school and department and lack of consideration of research activities in faculty workload, directly impact the ability of faculty to foster and maintain competitive research programs. The small faculty workload associated with graduate student supervision (0.5 WTU per graduate student capped at 3 WTU for all contract classes including undergraduate research) directly limit faculty involvement and the size of the program.

b. Recent budget cuts have dramatically reduced the number of Teaching Associate positions available for graduate students and required students to teach single sections of classes to maintain fee waivers. In addition, cuts have made it challenging to continue to offer our graduate seminar classes.

c. This in turn makes it difficult to compete for qualified graduate students who have offers from other institutions with better compensation packages. It also makes it difficult for the student to meet the rigorous demands of producing publication quality thesis research if they must take on work not related to their studies in

Figure 4. Number and proportions of accepted and declined applicants to the ecology & evolutionary biology (EEB) and molecular and cellular biology (MCB) oriented faculty in the SSU Biology Master’s
order to support themselves while pursuing their MS degree requirements. Growth of the number of graduate students and teaching associate positions has often exceeded the capacity for institutional fee waivers. Fee waivers for TA’s serve as an important source of graduate student funding and as a recruitment incentive to low paying TA positions which are critical to delivery of the undergraduate curriculum. Fee waivers are not automatically linked to TAships. Furthermore, they are limited to a full year of TA service rather than on a semester by semester basis restricting the flexibility needed to work at remote locations sometimes required for learning new techniques or collecting field data. Scholarship deadlines for Fall semester are designed to mesh with undergraduate applicants. Deadline for scholarship application is months before the application deadline for graduate schools and even more time passes before students know they are admitted to the program. This means there is no institutional support for first year students and no resources to use in recruitment of top students.

2. Currently the bulk of the graduate curriculum is taught as seminar classes. Two graduate content classes are intermittently taught in the MCB area. Faculty have identified several areas where the ability of the graduate curriculum to meet learning objectives would benefit from additional courses for all graduate students including classes in scientific writing, quantitative analysis and advanced statistics. The department would like to increase the variety of graduate offerings through course development and implementation. We have run a ‘scientific skills’ class through the Biol 500S course and would like to implement this course as a permanent team-taught course, given sufficient instructional workload.

3. We view our single greatest concern as defending and maintaining a culture within the university that recognizes the importance of graduate student and faculty research to the greater mission of the university and sustaining mechanisms that provide resources and faculty workload that encourage faculty participation and recruitment of students.

a. One important component of the graduate program is the role that graduates students play in instruction, mentoring and interaction with the undergraduate population. In addition to the importance of these experiences in training the graduate students as future academics, teachers and public speakers, we feel this component of the graduate program is extremely beneficial to our undergraduates. Graduate students serve to increase the academic diversity on campus. Graduate students are closer to undergraduates in age or academic experience. This feature makes it easier for undergraduates to see options beyond their bachelor’s degree, such as work towards an advanced degree. In our program, graduate students may take some elective upper division courses. Alternatively, seniors may be allowed to take selective graduate classes. This mixing provides a different academic dynamic for the undergraduates as they see the level of achievement required of graduate students and how the subject matter can easily be carried to a higher level. In short, graduate programs and graduate students provide undergraduates the opportunity for a higher level of academic preparation than possible without such programs or courses.

b. External funding is critical to support research experiences for both graduate and undergraduate students as well as providing support to basic laboratory
instruction. There is no university, school or department budget to purchase or maintain equipment used in instruction. Currently a large proportion of the equipment used in undergraduate instruction is purchased using external funding acquired by individual faculty efforts in grant writing. The Office of Research and Sponsored Programs (ORSP) and the Chief Research Officer (CRO) are the primary mechanisms for facilitating these grant efforts. The CRO has been recently subsumed under the VP’s authority reflecting decreased appreciation for the important role of research on this campus.

c. Critical to establishment of faculty research programs and acquisition of external funding is the start-up funds available for new faculty. Startup funds at SSU are significantly lower than those at other CSU campuses. For example our last 4 hires received an average $16,000 in start-up funds.

4. Many of the resource issues described above have been exacerbated by the current budget crisis. As graduate education is not the 'primary' mission of a predominantly undergraduate institution, it is difficult to plan strategically to increase resources and faculty for graduate instruction from what is largely a defensive posture in a time of deep fiscal crisis. Some of the most basic and logical solutions to strengthening the quality of the graduate program, like moving forward with hires to return the department to its previous size and return of the graduate coordinator release time are largely off the table until the budget crisis eases. The department feels strongly that any discussion of moving the graduate program to self-support is untenable and that this viewpoint ignores the strong integration of the graduate program and undergraduate curriculum and the role that faculty research plays in providing modern equipment and laboratories for undergraduate instruction. Graduate students are key to delivering the undergraduate lower division curriculum and facilitate the faculty research programs that form the basis for the strong research component to undergraduate classes and research experiences in the BS degree.

**Action items for the short-term**

1. Make every effort to continue to offer 2 graduate seminars per semester as part of normal faculty instructional workload.
2. Continue to develop the current Biol 500S 'scientific skills' class as a required course offering.
3. Increase faculty efforts for external grant support for grad students to offset current loss of TA sections and potential loss of fee waivers in response to the budget crisis.
4. Advocate for return of IDC to support graduate research expenses, etc.
5. Explore strategies for developing office space for use by graduate students.
6. Progress from development to implementation of assessment tools for the graduate program.
7. Increase compliance with recent revisions to graduate policy through a mandatory retreat of graduate faculty.

**Action items for the long term**

1. Seek return of release time for the Graduate Coordinator position.
2. Make a strong departmental case for new hires with research programs in areas of programmatic deficits.
3. Explore workload mechanisms that acknowledge the extraordinary time commitment necessary for supervising publication quality student research and encourage faculty to accept graduate students.
4. Explore mechanisms for increasing institutional support for graduate students.

D. Crocker, Program Coordinator
R. Whitkus, Department Chair
APPENDIX I

Sonoma State University
Department of Biology

Adjunct Faculty Status: Criteria, Application Procedure and Review Process
(Approved 2/01)

The Department of Biology is open to creative mechanisms that improve upon the level of scholarship and service now conducted by its faculty. To this end, the Department welcomes outstanding academic professionals and scientists who wish to join our activities through adjunct faculty status.

1. Criteria for Adjunct Faculty Status

Scientists or academic professionals may be granted adjunct faculty status in the Department of Biology for one or more of the following reasons:

a. To facilitate collaborative research between scientists at other institutions and members of the faculty in the Department of Biology, when such efforts would be enhanced by adjunct faculty status.
b. To provide a host institution for scientists wishing to be based in the Department of Biology at SSU while conducting extramurally funded research.
c. To direct graduate student research in the Department of Biology by chairing a student's Graduate Advisory Committee (a status that applies only to tenure and tenure-track SSU faculty).
d. To provide a mechanism for individuals whose stature in the field of biology or in the community is such that the Department would benefit from their association.

2. Application Procedure

To be considered for adjunct faculty status, an application package must be submitted to the Chair of the Department of Biology. This package must include:

a. A letter of application that includes a summary of the applicant's recent research or other academic activities, and a statement of purpose for applying for adjunct faculty status.
b. A current curriculum vitae.
c. A letter of support from a member of the faculty in the Department of Biology.
d. For SSU faculty in other departments, a memorandum of understanding from the faculty member's home department that agrees to the granting of adjunct status.

3. Review Process

All applications must be reviewed and approved by a majority of the faculty in the Department of Biology, based on the criteria listed above. Tenure or tenure-track faculty applicants from other departments at SSU must have their application evaluated and approved by the Graduate Committee prior to the Departmental review.
MEMORANDUM OF UNDERSTANDING

For Adjunct Faculty in the
Department of Biology
Sonoma State University

Adjunct faculty status in the Department of Biology entails the following:

1. Adjunct faculty are not required to teach in the Department of Biology.

2. Laboratory and office space may be available to adjunct faculty from the sponsoring member of the Department of Biology with whom the adjunct faculty has a collaborative research project.

3. All graduate policy matters and graduate student information currently made available to the Department of Biology will be forwarded to adjunct faculty. Adjunct faculty will have the right to vote on new graduate policy.

4. Adjunct faculty are expected to provide office space and financial support for graduate students they advise. The Department of Biology will aid in financial support (Teaching Assistantships) when available and provide access for the students to the Department's facilities.

5. For Advisory Committees with adjunct faculty chairs, a Department administrative faculty representative must be chosen from the remaining committee members, both of whom are Biology faculty. This individual serves as the student's advocate in all administrative matters in the Department.

6. When Biology graduate students sign up for graduate supervisory courses (BIOL 595, BIOL 599), FTE earned in the Department of Biology will be assigned as workload to the adjunct faculty member in accordance with the policy of the adjunct faculty member's home department.

Additional comments or points of understanding provided by the home department should be attached as an additional page.

Adjunct Faculty Applicant: ___________________________ Date: ___________

Home Department Chair: ___________________________ Date: ___________
APPENDIX II
GRADUATE COORDINATOR DUTIES

I. PROGRAM ADMINISTRATION
A. Advertising
   1. Organize/construct/maintain Graduate Program website
   2. Disseminate informational materials to School, University, and public
B. Departmental/Programmatic
   1. Policy/curriculum
      a. Initiation/drafting of policy/curriculum changes
      b. Update policy/curriculum changes in various sources
         SSU catalog
         SSU/department website
         Brochures
      c. Oversee/coordinate graduate courses with Curriculum Committee/Department/Program
   2. Chair/member/coordinator of Departmental/Program Graduate Committee
   3. Faculty matters
      a. Orient/supervise new faculty in program
   4. Information coordination related to graduate program
      a. Report from Graduate Studies Subcommittee of Educational Policy Committee (EPC)
      b. Information sharing with individual graduate programs at SSU
      c. Information sharing with related graduate programs at other institutions
   5. Decide/coordinate disbursement of Project Continuation funds
   6. Gather/coordinate/draft information for program reviews
   7. Negotiate with other departments/faculty
      a. Access to space/equipment
      b. Attract faculty to serve on student committees
C. University-Wide
   1. Representative to Graduate Studies Subcommittee of EPC
   2. Interim Program Review for Western Association of Schools and Colleges
      a. Gather/coordinate/draft interim program review for Graduate Program
      b. Present/defend draft interim program review to Graduate Studies Subcommittee of EPC

II. STUDENT CENTERED ACTIVITIES
A. Prior to entering program
   1. Contact person for all inquires about Graduate Program
      a. Phone, email, letter communications
      b. Present overview of Graduate Program and suitability to potential applicant
      c. Advise potential applicants on Graduate Programs in general and relevance to career goals
   2. Organize application materials into individual application packets
   3. Contact applicants regarding status of application
   4. Initial review of applicants
   5. Coordinate applicants with potential major advisors
   6. Present applications to Department/Graduate Committee for selection
7. Contact applicants regarding acceptance/non-acceptance of application to Graduate Program
8. Signing/filing recommendation on applicants to Admissions and Records

B. In program
   1. Advising/orientating students
      a. General advisor to students throughout program (individuals or cohorts)
   2. Disseminate timely information to students
      a. Maintain mail and email list
   3. Tracking of students through program
      a. Maintaining adequate progress
      b. Change in status determination and filing forms
      c. Review and signing of GS01 and GS02 forms
   4. Police policy/curriculum requirements
      a. Timely signing/filing of forms
      b. Checking progress of individuals through program
      c. Advising/informing students on progress through program
   5. Nominate students for appropriate awards, provide letters or recommendation
   6. Negotiate/determine course validation for credits past seven year limit
   7. Coordinate/oversee scheduling/advertising of public thesis defense
   8. Maintain student files

C. Post graduation
   1. Post graduation assessment of program (WASC)
APPENDIX III

GRADUATE COURSES

500S Graduate Seminar (1-2)
Advanced seminars exploring diverse topics in biological sciences. Topics vary from semester to semester, depending on faculty interest and expertise. This course may be repeated for credit. 300, 301 or 345 recommended, or consent of instructor.

510 Selected Topics in Biology (2-4)*
Intensive study of biological topics, which will vary from semester to semester. Prerequisites: adequate undergraduate preparation in the topic under consideration and graduate or last-semester-senior standing with consent of instructor.

511 Conservation Genetics (2) / Fall, odd years
Lecture, 1 hour; discussion, 1 hour. An examination of the scientific approaches applied to species conservation. Although molecular genetic approaches will be emphasized, a variety of other approaches will also be considered (e.g. captive breeding, population viability analysis, and translocation). Prerequisite: consent of instructor.

512 Conservation Ecology (2) / Spring, even years
Lecture, 1 hour; discussion, 1 hour. A seminar format with occasional lectures. An advanced exploration of current topics in the rapidly expanding field of conservation ecology. Specific topics considered will vary from semester to semester, depending on student interests. However, topics will commonly include habitat fragmentation and loss, global climate change, metapopulation dynamics, biological invasions, restoration ecology, and design and management of preserves. Prerequisite: BIOL 300.

513 Speciation (2) / Spring, odd years
Lecture, 1 hour; discussion, 1 hour. Examination of the theoretical and empirical approaches to defining species and a detailed survey of speciation modes and mechanisms. Lectures provide a framework for student led discussion of specific topics and case studies. Prerequisite: consent of instructor.

515 Macroevolution (2)
Lecture, 1 hour; discussion, 1 hour. A seminar format with occasional lectures. A topical and historical overview of the major macroevolutionary transitions that have occurred during the history of life. Particular attention will be given to broad patterns of change over time at higher levels of structural/organismic organization. Prerequisite: consent of instructor.
516 Bioenergetics (2) / Spring, even years

Lecture, 1 hour; discussion, 1 hour. A seminar format with occasional lectures. An in-depth examination of energy flow through living organisms at all levels of biological organization, from molecules to populations. Topics may include cellular metabolism, animal energetics, thermoregulation, fasting physiology, locomotion, foraging energetics, reproductive energetics, life history theory, community energetics, and population energetics. Prerequisite: consent of instructor.

517 Paradigms in Parasitology (2) / Fall, odd years

Lecture, 1 hour; discussion, 1 hour. A seminar format with occasional lectures. Parasitology is a subject area that crosses many biological disciplines, and concepts in parasitology can be applied to any field of science. Students may choose topics that most closely relate to their research interests. Topics may include: ecology of emerging infectious diseases, how parasites affect their host's behavior, co-evolution of host-parasite associations, RNA editing, and how parasites evade the immune system. Prerequisite: consent of instructor; parasitology background not required.

518 Biotechnology (2)

Lecture, 1 hour; discussion, 1 hour. A seminar format with occasional lectures. The field of biotechnology is moving at a rapid pace, and many of the molecular and biochemical techniques are being applied to a wide variety of biological disciplines. Topics include: Structure-based approach to drug design, expressing recombinant proteins, DNA vaccines, and toxicity screening. Prerequisite: consent of instructor.

544 Advanced Cell Biology (4)* / Spring, odd years

Lecture, 2 hours; laboratory, 6 hours. Development and applications of major concepts in modern cell biology. Specific topics will include membrane structure and properties, metabolic pathways and physiology of energy conversion, cell signaling and principles of intercellular communication, cell-cycle dynamics and macromolecular regulation of cell division. Prerequisites: BIOL 325, and BIOL 324 or 334.

578 Project Continuation (1-3) / Fall, Spring

Designed for students working on their thesis or master's project but who have otherwise completed all graduate coursework toward their degree. This course cannot be applied toward the minimum number of units needed for completion of the master's degree. Prerequisite: permission of the graduate coordinator. Cr/NC only.

585 Recombinant DNA Laboratory (4)* / Fall

Laboratory, 9 hours; discussion, 1 hour. Techniques for the manipulation of DNA through gene cloning applicable in the study of all biological processes. Prerequisites: BIOL 320 or BIOL 321 and CHEM 340 or BIOL 340.
590 Colloquium (1) / Fall, Spring

Lecture, 1 hour. A series of lectures by faculty, master’s degree candidates, and invited guests on current research and contemporary issues in biology. All graduate students are encouraged to enroll each semester, although no more than 2 units are applicable to the M.S. degree. Cr/NC only.

595 Special Studies in Biology (1-3)* / Fall, Spring

Investigations to meet highly specialized needs and to explore possible thesis topics. Project should be planned and described in writing with consent of faculty sponsor. Prerequisite: approved petition to enroll.

598 Graduate Practicum (1-4) / Fall, Spring

Application of previously studied theory to development and delivery of new instructional materials. Intended to provide professional growth for graduate students. Enrollees are required to write an evaluation of their course experience. Prerequisites: graduate standing in biology, consent of the instructor in whose course the student will be working, and an approved petition to enroll.

599 M.S. Thesis (1-3)* / Fall, Spring

Original investigation based on laboratory or field research that meets the department and university standards. Prerequisite: admission to classified standing and advancement to candidacy.
APPENDIX IV
Department of Biology – MS Coursework and Timeline Form

<table>
<thead>
<tr>
<th>Name</th>
<th>Advisor</th>
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**Graduate Course of Study**
University-wide criteria: Minimum of 30 units; At least half the units required for the degree must be at 500 level; Two-thirds of the units must be letter-graded; minimum GPA of 3.0 in program coursework with no course below a C (2.0); a minimum of 21 units should be done in residence with a maximum of 30% of coursework allowed in transfer (for large unit programs); no more than 6 units allowed for the thesis; no classes completed as an undergraduate may be used except those granted provisional graduate credit prior to award of baccalaureate degree.

<table>
<thead>
<tr>
<th>Dept\Course No.</th>
<th>Title</th>
<th>Units</th>
<th>Grade</th>
<th>Semester Taken/Place</th>
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**Total**

**Anticipated Timeline for Completion of Requirements:**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advancement to candidacy</td>
<td></td>
</tr>
<tr>
<td>Defense of thesis</td>
<td></td>
</tr>
</tbody>
</table>

**Student Signature**

<table>
<thead>
<tr>
<th>Committee</th>
<th>Name and Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second Member</td>
<td></td>
<td></td>
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<tr>
<td>Third Member</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate Coordinator</td>
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</tbody>
</table>
APPENDIX V
Thesis Assessment Rubric

- SSU Biology MS graduates display critical thinking and problem solving skills, including the ability to apply the scientific method in addressing research problems.
- SSU Biology MS graduates demonstrate effective written and oral communication skills.

### Generic Rubric For Assessing Program Objectives for Thesis Projects

<table>
<thead>
<tr>
<th></th>
<th>Unacceptable = 1</th>
<th>Marginal = 2</th>
<th>Acceptable = 3</th>
<th>Exemplary = 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence that the student has mastered this objective is not provided, unconvincing, or very incomplete</td>
<td>Evidence that the student has mastered this objective is provided, but it is weak or incomplete</td>
<td>Evidence shows that the student has generally attained this objective</td>
<td>Evidence demonstrates that the student has mastered this objective at a high level</td>
<td></td>
</tr>
</tbody>
</table>

**Score Comments:**

**Displays critical thinking:**
Insightful, skillfully designed purpose/hypothesis; Interpretation of evidence; Identifies salient arguments; Thoughtfully analyzes and evaluates evidence; Draws warranted, judicious conclusions.

**Effective written communication skills:**
Purpose clearly stated; Form and language are crisp, clear, and succinct; Effective organization contributes to understanding.

**Demonstrates understanding of research methods:**

* Subscale 1: Questions and goals of investigation reflected an in-depth knowledge of content area.

* Subscale 2: Methods of investigation were sufficient to answer research question.

* Subscale 3: Analysis was appropriate to answer research questions. Statistics were used and reported appropriately. Figures and Tables were well constructed and presented.

* Subscale 4: Conclusions were based logically on the results of the analysis.

* Subscales will be averaged to determine evidence of research methods.

**Comments on conclusions reached:**
# Teaching Associate Observation Rubric

## Generic Rubric For Assessing TA Teaching effectiveness

<table>
<thead>
<tr>
<th>Unacceptable =1</th>
<th>Marginal = 2</th>
<th>Acceptable = 3</th>
<th>Exemplary = 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA is not effective in this area of instruction</td>
<td>TA has limited effectiveness in this area of instruction</td>
<td>TA is generally effective in this area of instruction</td>
<td>TA has a high level of effectiveness in this area of instruction</td>
</tr>
</tbody>
</table>

## Score Comments:

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<tr>
<th>Content of introductory information provided</th>
<th>Score</th>
<th>Comments:</th>
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</thead>
<tbody>
<tr>
<td>TA provides context for the laboratory exercise. TA links exercise to course content.</td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>Protocols and procedures explained clearly</th>
<th>Score</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>TA is well prepared</th>
<th>Score</th>
<th>Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA is familiar with lab content and has appropriate resources for instruction</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Level of interaction with students</th>
<th>Score</th>
<th>Comments:</th>
</tr>
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<tbody>
<tr>
<td>Command of classroom. Responsiveness to student input or questions.</td>
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<tr>
<th>Teaching style and methods</th>
<th>Score</th>
<th>Comments:</th>
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</thead>
<tbody>
<tr>
<td>Use of blackboard or powerpoint</td>
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</table>

## Recommendations and comments for TA:

Observer _______________________
TA Evaluated ____________________
Date: ___________ Class:_____________
#students attending________
APPENDIX VII

Department of Biology Graduate Program
Progress Report Form

Name: ________________________________  Date entered program: ________________

Progress Report for Academic Year: __________

I. Course Work
Courses to be completed (from draft of Completion of Requirements Form)

Courses to be completed (added after Qualifying Exam)

II. Qualifying Exam
Qualifying Exam Passed (date): __________

III. Research
Aims of Thesis Research Project
List the objectives that need to be completed and the expected dates of completion for each.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Date for Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV. Projected Completion Dates</td>
<td></td>
</tr>
<tr>
<td>Complete draft of thesis</td>
<td>___________</td>
</tr>
<tr>
<td>Thesis defense</td>
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V. Comments and Signatures
Comments of Advisory Committee

________________________________________________________________________
print                                               sign

________________________________________________________________________
print                                               sign

________________________________________________________________________
print                                               sign

Comments of Student

________________________________________________________________________
print                                               sign
# Graduate Student Employment Tracking

<table>
<thead>
<tr>
<th>Year</th>
<th>Student</th>
<th>Advisor</th>
<th>Current Position</th>
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<tbody>
<tr>
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<td>Skaer, Meghan</td>
<td>Cushman</td>
<td>Ph.D. Program, UC Davis</td>
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<td>Environmental Specialist, Sonoma Co.</td>
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<td>Gordon, Rebecca</td>
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<td>Research Technician, US Forestry Service</td>
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<td>Norris, Amy</td>
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<td>Ph.D. Program, Oregon State</td>
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<td></td>
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<td>Wood, Megan</td>
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<tr>
<td>2008</td>
<td>Yamamoto, Emi</td>
<td>Cohen</td>
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<td>Technician, American Peptide Co.</td>
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<td>Thompson, Sarah Ann</td>
<td>Nielsen</td>
<td>Database Mgr, Farrollone Inst. for Ecosystem Studies</td>
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<td>Environmental Consultant, Harvey Associates</td>
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<td>Teacher, Piner High School</td>
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<td>Researcher, UC Cooperative Extension</td>
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<td>Crocker</td>
<td>Lab Manager, Genentech; Instructor, SRJC</td>
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<td>Meentemeyer</td>
<td>Research Coordinator, Audubon Canyon Ranch</td>
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<td>Bruce, Douglas A.</td>
<td>Rank</td>
<td>Lab Instructor, community college in East Bay</td>
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<td>Skaarra, Danalea V.</td>
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<td>Champagne, Cory D.</td>
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<td>Hassrick, Jason L.</td>
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<td>Johnson, Brent E.</td>
<td>Cushman</td>
<td>Park Botanist, Pinnacles National Monument</td>
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<td>Zeno, Ramona L.</td>
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<td>Financial Aid Staff, UCSC</td>
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<td>Deiner, Kristy L.</td>
<td>Girman</td>
<td>Ph.D. Program UCD</td>
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<td>Fearnley, Shannon L.</td>
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<td>SSU teaching credential program</td>
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<td>Assistant Professor, Univ. of Mississippi</td>
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<td>Year</td>
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<td>Position</td>
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<td>Senior Wildlife Biologist, Prunuske Chatham, Inc.</td>
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<td>Yturralde, Kasey</td>
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<td>Educational programs at National Science Foundation</td>
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APPENDIX IX
GRADUATE SURVEY
GRADUATE PROGRAM IN BIOLOGY
SONOMA STATE UNIVERSITY

The Graduate Program of the Department of Biology is interested in feedback from our graduates. The information you provide will help us assess our Graduate Program and find ways to improve the educational and research experience for future students. Please take a few moments to consider each question and provide an honest response. Each question has space for any additional comment or constructive criticism on that particular topic. There is additional space at the end of the survey to provide any pertinent comments that you feel were not covered. All information is anonymous. Compiled results, as well as individual comments, may be used in official assessment documents.

Throughout the survey, please rate your response on a scale of 1 to 5 (1: strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree), or NA if not applicable to your experience.

Rate the follow factors as contributing to your initial interest in the Masters program in Biology

1. Reputation of Sonoma State University [ 1 2 3 4 5 NA ]
2. Reputation of the Graduate Program in Biology [ 1 2 3 4 5 NA ]
3. Reputation of the faculty of the Department of Biology [ 1 2 3 4 5 NA ]
4. Reputation of one faculty member [ 1 2 3 4 5 NA ]
5. Location of Sonoma State University [ 1 2 3 4 5 NA ]
6. Cost of attending Sonoma State University [ 1 2 3 4 5 NA ]

7. Other (fill in): __________________________________________________________

Rate the following factors in your experience of the application process.

8. Clarity of the information provided by the Admissions Office of the University [ 1 2 3 4 5 NA ]
9. Clarity of the information provided by the Department of Biology [ 1 2 3 4 5 NA ]
10. Interaction with the Graduate Coordinator/ Department Chair [ 1 2 3 4 5 NA ]
11. Timeliness of response to questions by the Admissions Office of the University [ 1 2 3 4 5 NA ]
12. Timeliness of response to questions by the Department of Biology [ 1 2 3 4 5 NA ]
13. Timeliness of notification of decision on your application by the Admissions Office of the University [ 1 2 3 4 5 NA ]
14. Timeliness of notification of decision on your application by the Graduate Committee of the Department of Biology [ 1 2 3 4 5 NA ]

15. Other (fill in): __________________________________________________________

16. In making your final decision to attend the Graduate Program in Biology, was it your (circle one)
   First choice
   Second choice
   Only choice

34
Other

Rate your satisfaction upon first entering the program with respect to
17. Introduction to and explanation of facilities in the Department and School [1 2 3 4 5 NA]
18. Curricular expectations to complete the program [1 2 3 4 5 NA]
19. Research expectations to complete your thesis [1 2 3 4 5 NA]

20. Other (fill in): __________________________________________________________

Rate your satisfaction during your time in the program with respect to
21. Access to required courses [1 2 3 4 5 NA]
22. Diversity of courses [1 2 3 4 5 NA]
23. Appropriateness of course offerings to your area of interest [1 2 3 4 5 NA]
24. Access to needed facilities [1 2 3 4 5 NA]
25. Level or diversity of facilities [1 2 3 4 5 NA]
26. Level of general operation funding (not research) available in the Department [1 2 3 4 5 NA]
27. Level of funding as a RA/Special Consultant [1 2 3 4 5 NA]
28. Level of funding as a TA [1 2 3 4 5 NA]
29. Level of other (grant) funding [1 2 3 4 5 NA]
30. Interactions with other graduate students [1 2 3 4 5 NA]
31. Interactions with undergraduate students [1 2 3 4 5 NA]
32. Interactions with faculty in Department of Biology [1 2 3 4 5 NA]
33. Interactions with faculty in other departments [1 2 3 4 5 NA]

34. Any other comments on courses (in general), facilities, funding, or student interactions:
________________________________________________________________________

Rate your impression of the graduate seminar courses as
35. Providing a solid basis for in-depth exploration of an area of biology [1 2 3 4 5 NA]
36. Giving useful factual information [1 2 3 4 5 NA]
37. Providing an opportunity to present my own synthesis on the subject matter [1 2 3 4 5 NA]
38. Giving an solid foundation for my future learning at the graduate level [1 2 3 4 5 NA]

39. Any other comments about the graduate seminar courses:
________________________________________________________________________

Rate your impression of the oral qualifying examination with respect to
40. Having adequate time to prepare [1 2 3 4 5 NA]
41. Having adequate advisement from my advisor for preparation [1 2 3 4 5 NA]
42. Having adequate advisement from my committee for preparations [1 2 3 4 5 NA]
43. The questions on the exam were a good assessment of your general knowledge in biology [1 2 3 4 5 NA]
44. The questions on the exam were a good assessment of your area of emphasis in biology [1 2 3 4 5 NA]

35
45. The quality of feedback from the testing committee on your general knowledge [1 2 3 4 5 NA]
46. The quality of feedback from the testing committee on your thesis proposal [1 2 3 4 5 NA]

47. Any other comments about the oral qualifying exam:

Rate your impression of the following with respect to your thesis research
48. Had sufficient advising from my major advisor [1 2 3 4 5 NA]
49. Had sufficient advising from my advising committee [1 2 3 4 5 NA]
50. Felt comfortable in seeking advice from faculty outside my advisory committee [1 2 3 4 5 NA]
51. The research project was intellectually challenging [1 2 3 4 5 NA]
52. The research project was technically challenging [1 2 3 4 5 NA]
53. Funding to conduct the research was adequate [1 2 3 4 5 NA]

54. Any other comments about the your thesis research project:

Overall, rate your satisfaction with
55. The University (Admissions, Records, Graduate Office) [1 2 3 4 5 NA]
56. The School of Science and Technology [1 2 3 4 5 NA]
57. The Department of Biology [1 2 3 4 5 NA]
58. The Graduate Coordinator [1 2 3 4 5 NA]
59. Your major advisor [1 2 3 4 5 NA]
60. Your advisory committee [1 2 3 4 5 NA]
61. Your oral qualifying examination committee [1 2 3 4 5 NA]

62. Any other comments you feel you would like to make about your overall satisfaction with your time in the graduate program:

63. How many semesters did it take for you to complete the graduate program? __________

Please indicate your response to the following statements as reflective of your experience in the Masters program in Biology. Again, use a scale of 1 to 5 (1: strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree), or NA if not applicable to your experience. Circle your response.

My experiences during the Masters program allowed me to develop an understanding of a range of biological concepts that include:
64. Biological diversity in an evolutionary context [1 2 3 4 5 NA]
65. Cellular and molecular basis of life [1 2 3 4 5 NA]
66. Structure-function relationships at the organismal level [1 2 3 4 5 NA]
67. Fundamentals of ecology [1 2 3 4 5 NA]
68. Basic principles of physical sciences that support and underlie the biological sciences [1 2 3 4 5 NA]
My experiences during the Masters program allowed me to acquire a range of skills to further my career goals including:

69. Ability to pose and answer important scientific questions, using appropriate scientific/research approaches. [ 1 2 3 4 5 NA ]
70. Ability to identify and interpret biological processes in a variety of field settings. [ 1 2 3 4 5 NA ]
71. Ability to gather relevant scientific data using a range of laboratory techniques and instruments. [ 1 2 3 4 5 NA ]
72. Ability to analyze data about biological processes using a variety of quantitative techniques. [ 1 2 3 4 5 NA ]
73. Ability to effectively communicate concepts and ideas in verbal and written forms. [ 1 2 3 4 5 NA ]

My experience during the Masters program allowed me to acquire values of an education in biological sciences including:

74. Strong appreciation for scholarship in all its forms. [ 1 2 3 4 5 NA ]
75. Ability to critically assess socially relevant biological issues, and integrate them into their daily life. [ 1 2 3 4 5 NA ]
76. An ongoing curiosity about biological phenomena at all levels. [ 1 2 3 4 5 NA ]
77. Strong foundation for life-long learning. [ 1 2 3 4 5 NA ]
78. Capability to pursue fulfilling careers in biology in a changing and competitive world. [ 1 2 3 4 5 NA ]

My experience during the Masters program allowed me to develop the ability to:

79. Demonstrate and articulate knowledge in advanced concepts in area of my chosen emphasis in biology. [ 1 2 3 4 5 NA ]
80. Demonstrate a written and oral ability to integrate basic and advanced concepts into research. [ 1 2 3 4 5 NA ]
81. Conduct independent research. [ 1 2 3 4 5 NA ]

82. Did you attend Sonoma State University as an undergraduate [ Yes  No ]

83. Please add any additional comments that you feel were not covered in the survey:
APPENDIX X

SSU Masters Students’ Peer-Reviewed Publications 2002 – 2008

29 publications in 22 journals. Graduate students in bold.


### Appendix XI

Graduate Student Tracking Data – Funding

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Year</th>
<th>Title</th>
<th>Funding Source</th>
<th>Funds Obtained</th>
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<td>Hare, Catherine</td>
<td>2009</td>
<td>Environmental Fellowship Program</td>
<td>Switzer Foundation</td>
<td>$15,000</td>
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<td>Paquin, A.</td>
<td>2009</td>
<td>Carlos Call Scholarship</td>
<td>Sonoma State University</td>
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<td>2009</td>
<td>James H. Glass fellowship</td>
<td>Hamilton College</td>
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<td>2009</td>
<td>Lerner-Gray Grant</td>
<td>American Museum of Natural History</td>
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<td>Ethyl &amp; Earl Myers Oceanographic Trust</td>
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<td>Kleinhesselink, A.</td>
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<td>Research Grant</td>
<td>California Native Plant Society</td>
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<td>Environmental Fellowship Program</td>
<td>Switzer Foundation</td>
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<td>Research Grant</td>
<td>California Native Plant Society</td>
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<td>Teddy Roosevelt Grant</td>
<td>American Museum of Natural History</td>
<td>TBA</td>
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<td>2008</td>
<td>Research Grant</td>
<td>Northern California Botanists</td>
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<td>Research Grant</td>
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<td>2008</td>
<td>Entomology Outreach</td>
<td>Sonoma County Wildlife Commission</td>
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<td>Research Grant</td>
<td>California Horticultural Society</td>
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<td>Research Grant</td>
<td>Northern California Botanists</td>
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<td>TBA</td>
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<td>Ethyl &amp; Earl Myers</td>
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<td>Institution/University/Nationality</td>
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<td>American Museum of Natural History</td>
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<td>National Science Foundation</td>
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<td>Sonoma State University, Dept. of Biology</td>
<td>$250</td>
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<td>In-House Research Fund</td>
<td>California Academy of Science</td>
<td>$560</td>
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<td>Pre-doctoral Fellowship</td>
<td>California State University</td>
<td>$3000</td>
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<td>Sonoma State University, Dept. of Biology</td>
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<td>UC White Mountain Field Station</td>
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<td>Ethyl &amp; Earl Myers Oceanographic Trust</td>
<td>$1,500</td>
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<td>Lerner-Gray Grant</td>
<td>American Museum of Natural History</td>
<td>$1,000</td>
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<td>McDonald, G.</td>
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<td>Graduate Fellowship</td>
<td>Norwegian Women in Science</td>
<td>$4,000</td>
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<tr>
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<td>2001</td>
<td>Biology Alumni Research Award</td>
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<td>McDonald, G.</td>
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