



Program Review Self-Study Template

Academic unit: Biological Sciences

College: LAS

Date of last review Fall 2010 ____

Date of last accreditation report (if relevant) NA ____

List all degrees described in this report (add lines as necessary)

Degree: BS Biological Sciences CIP* code: 26.0101 ____

Degree: MS Biological Sciences CIP code: 26.0101 ____

Degree: _____ CIP code: _____

*To look up, go to: Classification of Instructional Programs Website, <http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55>

Faculty of the academic unit (add lines as necessary)

Name	Signature
George R. Bousfield (Professor) _____	_____
Karen L. Brown (Associate Professor) _____	_____
Donald A. Distler (Associate Professor) _____	_____
Jennifer Ellie (Undergraduate Lab Coordinator-UP teaches < 50%) _____	_____
William J. Hendry (Professor and chair) _____	_____
Gregory Houseman (Assistant Professor) _____	_____
Mary L. Jameson (Associate Professor) _____	_____
Christopher M. Rogers (Associate Professor) _____	_____
F. Leland Russell (Associate Professor and graduate coordinator) _____	_____
Mark A. Schneegurt (Associate Professor) _____	_____
Joe Shellhammer (Fairmount Lecturer of Biological Sciences-UP teaches > 50%) _____	_____
Bin Shuai (Assistant Professor) _____	_____
Li Yao (Assistant Professor) _____	_____

Submitted by: William J. Hendry (Professor and chair) _____ Date _____

1. Departmental purpose and relationship to the University mission (refer to instructions in the WSU Program Review document for more information on completing this section).

a. University Mission:

Wichita State University is committed to providing comprehensive educational opportunities in an urban setting. Through teaching, scholarship and public service the University seeks to equip both students and the larger community with the educational and cultural tools they need to thrive in a complex world, and to achieve both individual responsibility in their own lives and effective citizenship in the local, national and global community.

b. Program Mission (if more than one program, list each mission):

UNDERGRADUATE--The Department of Biological Sciences is committed to providing high-quality teaching for both undergraduate and graduate students and a scholarship source for the university and the Wichita community. This contribution is strongly enhanced by the active scientific research programs conducted by our faculty. Those teaching and research agendas include a balance of both field/ecology and cell/molecular activities.

Masters of Science Graduate Program

The mission of the Masters of Science graduate program in the Biology Department is to provide an advanced education in biology with either a research thesis or non-thesis option. For students pursuing the thesis option, our goal is to provide high-quality mentoring in the process of designing and conducting original biological research. We seek to equip thesis graduate students with the skills to formulate original research questions, collect data required to answer those questions, and prepare research results for dissemination to the scientific community. For non-thesis MS graduate students, our goal is to provide in-depth exposure to current ideas and techniques in biology through advanced coursework and to introduce students to biology-related professions through internship or research opportunities. By providing this instruction, we prepare our graduate students for doctoral programs, professional programs related to biology, and careers in scientific research, entrepreneurship, and/or teaching.

c. The role of the program (s) and relationship to the University mission: Explain in 1-2 concise paragraphs.

UNDERGRADUATE--The Department of Biological Sciences supports the university mission by offering a comprehensive core curriculum that prepares our students for careers in research, environmental studies, medicine, and other post-baccalaureate studies. A student's long-term goals are taken into consideration when he/she confers with an advisor to choose between the research or seminar options of the core program as well as select major elective courses.

Additionally, we participate in the Watkins Program along with the departments of chemistry, geology, and physics. We also assist the outreach mission of the Fairmount Center for Math and Science education by participating in the JASON project, the state Science Olympiad competition, and the Kansas Junior Academy of Science; all activities that focus on science and math education for middle and high

school students, both locally and statewide. Annually, we host one of four Watkins Visiting Professors and we recruit area teachers from Kansas middle, high school, community, and 4-year colleges for Watkins Summer Fellowships. All departmental seminars are advertised and open to the public to allow interactions among scientists and community members. Our field station sites (Ninnescah, Sellers, and Gerber Reserves) include native and restored prairie land tracts that are used by many local community groups (boy and girl scouts, field trips by schools) and other researchers in the state to demonstrate environmental principles and concerns.

Masters of Science Graduate Program

A key component of the Wichita State University mission is to provide comprehensive educational opportunities in an urban setting. The Masters of Science program in Biology furthers this goal because the sciences are an important branch of learning and our MS program provides an advanced experiential and classroom education in life science. By giving students intensive training in conducting original scientific research, we help society deal with the challenges of a complex world by contributing to a workforce trained to acquire new knowledge through application of the scientific method. In addition, exposure to the methods by which scientists discover knowledge about the natural world empowers individuals in making decisions in their own lives and in functioning as effective citizens. Scientific results often are central to policy debates in our society, so the ability to interpret results of scientific studies is crucial.

- d. Has the mission of the UNDERGRADUATE Program (s) changed since last review? Yes No
 i. If yes, describe in 1-2 concise paragraphs. If no, is there a need to change?

At this time there is no need to change the mission of the Undergraduate program.

- Has the mission of the GRADUATE Program (s) changed since last review? Yes No
 ii. If yes, describe in 1-2 concise paragraphs. If no, is there a need to change?

Masters of Science Graduate Program

While we previously articulated a mission statement for the Biology Department as a whole, we find no record of a mission statement specifically for our Masters of Science program. Although what appears above (item 1.b.) is the first mission statement for our MS program, it is consistent with the long-standing goals of our thesis MS program. The non-thesis MS program was not an active component of graduate study in the Biology Department for several years but we recently reinstated it as part of a response to KBOR triggering of our MS program. The non-thesis degree is less research-focused than the thesis degree. Non-thesis MS students do not write a research prospectus nor do they conduct and write-up a large research project. However, the non-thesis degree requires a greater amount of coursework than the thesis degree and non-thesis students must complete a written summary of a “capstone” experience. The capstone experience may be independent research on smaller scale than a thesis or an internship in a biology-related profession. Inclusion of training non-thesis students is a change in the goals of our MS program as compared to recent years.

- e. Provide an overall description of your program (s) including a list of the measurable goals and objectives of the program (s) (both programmatic and learner centered). Have they changed since the last review?
 Yes No

If yes, describe the changes in a concise manner.

- i. UNDERGRADUATE--The Department of Biological Sciences at Wichita State University offers a rigorous and exciting educational environment. The faculty is committed to both teaching and research. Our well-outfitted laboratories and classrooms facilitate meaningful interactions between faculty and students. The two curriculum options within the B.S. in Biological Sciences consist of biology/biomedical (BB) or ecological/environmental/organismal (EEO) concentrations. These concentrations depend on choices of elective courses in addition to the core courses required for all students.

Research opportunities for undergraduate students are numerous and varied. Research students work with a mentor on a specific project and build on the skills learned in teaching labs. Each student's research experience is unique and requires them to think independently and resolve challenges as they arise.

Seminar students are exposed to a broad spectrum of scientific topics presented by biology faculty, the WSU community, and invited visiting scientists. Speakers from outside the department significantly broaden our student's perception of biology's current status and where it may well go in the future.

To measure the success of our students, we propose the following goals and objectives:

GOAL # 1: STUDENTS WILL DEVELOP A BROAD KNOWLEDGE OF BIOLOGICAL CONCEPTS.

OBJECTIVE # 1: Students will demonstrate their understanding of biological processes at all organizational levels (molecular, cellular, organismal, community).

GOAL # 2: STUDENTS WILL DEVELOP THE INTELLECTUAL AND MECHANICAL SKILLS NEEDED TO COMPREHEND AND CONDUCT BIOLOGICAL RESEARCH.

OBJECTIVE # 1: Students will demonstrate: 1) their knowledge of the scientific method plus the methods of data analysis used to interpret scientific observations and 2) their ability to use contemporary scientific communication techniques.

GOAL # 3: STUDENTS WILL PARTICIPATE IN RESEARCH AND SCHOLARSHIP ACTIVITY THROUGH INTERACTIONS AMONG STUDENTS, FACULTY, AND OTHER PROFESSIONAL BIOLOGISTS IN THE COMMUNITY.

OBJECTIVE # 1: During one semester of their senior year, students will attend and participate in research seminars given by resident and visiting biologists or engage in a laboratory or field research project under the supervision of resident biologists or other professional biologists in the community.

GOAL # 4: ASSESSEMENT BY THE STUDENTS WILL BE PART OF THE DEPARTMENT'S REVIEW OF THE UNDERGRADUATE PROGRAM.

OBJECTIVE # 1: Students will anonymously provide their perceptions of the strengths and weaknesses of the undergraduate major utilizing a written survey instrument.

- ii. Provide an overall description of your GRADUATE program (s) including a list of the measurable goals and objectives of the program (s) (both programmatic and learner centered). Have they changed since the last review?

Yes No

If yes, describe the changes in a concise manner.

The 2008 Graduate Program Assessment Report identified largely programmatic goals and objectives that have been condensed into the "Programmatic goals and objectives" outlined here. That earlier assessment report included a section entitled "Educational student input/outcomes" that clearly emphasized the learning priorities for graduate education in the department. In this current report, the priorities emphasized in the 2008 "Educational and student input/outcomes" are re-phrased to form the "Learner-centered goals and objectives."

Learner centered goals and objectives

Goal 1: Students will become familiar with current research questions and hypotheses in their field of biology

Objective 1: We will introduce students to topical research questions and hypotheses in their field of biology.

Objective 2: We will mentor students in interpreting primary scientific literature.

Goal 2: Students will understand how to apply the scientific method to their particular discipline within biology

Objective 1: We will mentor students in formulating testable research questions and hypotheses

Objective 2: We will guide students in designing experiments or observational studies that test research questions and hypotheses and in the analysis of data from these studies

Goal 3: Students will develop the ability to communicate effectively with other scientists about scientific research.

Objective 1: We will guide students in acquiring the ability to orally communicate scientific research to other scientists in brief meeting-style presentations and seminars.

Objective 2: Students will demonstrate their ability to communicate scientific research to other scientists in writing within the format of research articles.

Programmatic goals and objectives

Goal 4: We will maintain a “critical mass” of graduate students to generate a dynamic, intellectually diverse Biology graduate student community

Objective 1: Recruit and enroll so that there is an average of 1-2 graduate students being advised per graduate faculty member.

Goal 5: Graduate faculty will maintain active, nationally recognized research programs.

Objective 1: Graduate faculty will average >1 peer-reviewed publication per year.

Objective 2: Graduate faculty will average attendance at >1 national or international scientific meeting per year.

2a. Describe the quality of the program as assessed by the strengths, productivity, and qualifications of the faculty in terms of SCH, majors, graduates and scholarly productivity (refer to instructions in the WSU Program Review document for more information on completing this section). Complete a separate table for each program if appropriate.

UG Program - BS (SCH from entire department)

Last 3 Years	Tenure/Tenure Track Faculty (Number)		Tenure/Tenure Track Faculty with Terminal Degree (Number)		Instructional FTE (#): TTF= Tenure/Tenure Track GTA=Grad teaching assist O=Other instructional FTE			Total SCH - Total SCH by FY from Su, Fl, Sp	Total Majors - From fall semester	Total Grads – by FY							
	TTF	GTA	O														
Year 1→	9	9	9	4	5.3	10539	152	16									
Year 2→	9	9	9	5.1	4.7	10946	160	30									
Year 3→	10	10	10	5.5	2.8	11480	182	32									
Total Number Instructional (FTE) – TTF+GTA+O							SCH/ FTE	Majors/ FTE	Grads/ FTE								
							↓										
Year 1→						18.3	575	8	1								
Year 2→						18.8	582	9	1.5								
Year 3→						18.3	627	10	1.7								
Scholarly Productivity	Number Journal Articles		Number Presentations		Number Conference Proceedings		Performances			Number of Exhibits		Creative Work		No. Books	No. Book Chaps.	No. Grants Awarded or Submitted	\$ Grant Value
	Ref	Non-Ref	Ref	Non-Ref	Ref	Non-Ref	*	**	***	Juried	****	Juried	Non-Juried				
Year 1	9		7	13												5/13	64,745
Year 2	9		8	8												3/11	6,665,887
Year 3	8	1	9	20								4		1		2/17	2,253,806

* Winning by competitive audition. **Professional attainment (e.g., commercial recording). ***Principal role in a performance. ****Commissioned or included in a collection. KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5; Graduates=2; Faculty=2 additional.

- a. Provide a brief assessment of the quality of the faculty/staff using the data from the table above as well as any additional relevant data. Programs should comment on details in regard to productivity of the faculty (i.e., some departments may have a few faculty producing the majority of the scholarship), efforts to recruit/retain faculty, departmental succession plans, course evaluation data, etc.

Provide assessment here: (same as master's assessment)

These data on faculty productivity are based upon faculty activity reports for 2008, 2009 and 2010 because these calendar years most closely correspond to fiscal years 2009, 2010 and 2011, which are the focus of this review. During these years, faculty research productivity met our programmatic objectives. In 2008 and 2009, graduate faculty averaged 1.29 peer-reviewed articles published per faculty member per year. In 2010, graduate faculty averaged 0.88 peer-reviewed articles or book-chapters published per faculty member per year. In addition, in 2010 graduate faculty produced an invited article and four on-line teaching guides and species guides that were not peer-reviewed. Research productivity was evenly distributed among the graduate faculty. During 2008-2010, three different faculty members had the highest number of peer-reviewed publications in a year. Articles published by graduate faculty were often in top-tier journals within their discipline. Of the 25 peer-reviewed articles published or accepted for publication by Biology graduate faculty 2008-2010, 9 were in journals ranked in the top 10% for their discipline according to article influence score by Eigenfactor.org. Graduate students were author or co-author on 7 of the 25 articles.

Graduate faculty actively sought external funding during the evaluation period (for 2008-2010 1.7, 1.57, 2.15 proposals / faculty member / year) and were awarded \$8,974,438. This funding success was driven by funding from the National Institutes of Health to a team of Biology faculty lead by Dr. George Bousfield. Nevertheless, significant awards (>\$20,000) were also received by graduate faculty in microbiology and ecology.

External confirmation of the professional standing of graduate faculty in the Biology Department comes from frequent reviews of manuscripts and grant proposals (2.2 per faculty member per year), editorships for journals (3 faculty, 4 journals) and service on grant review panels (USDA and National Science Foundation).

During this evaluation period we hired two new graduate faculty (Houseman, Jameson), which brought the size of our graduate faculty in the Biology Department to 9. In total, our tenured/tenure track faculty in Biology is 10. For comparison with our peer institutions as identified by the Kansas Board of Regents (University of Akron, University of Nevada-Las Vegas, Old Dominion University, Oakland University and Portland State University), the smallest Biology tenured/tenure track faculties at these universities are 20. So, faculty productivity must be considered in the context that service responsibilities are divided among a small number of faculty members in the Biology Department.

2b. Describe the quality of the program as assessed by the strengths, productivity, and qualifications of the faculty in terms of SCH, majors, graduates and scholarly productivity (refer to instructions in the WSU Program Review document for more information on completing this section). Complete a separate table for each program if appropriate.

Graduate program - MS

Last 3 Years	Tenure/Tenure Track Faculty (Number)		Tenure/Tenure Track Faculty with Terminal Degree (Number)		Instructional FTE (#): TTF= Tenure/Tenure Track GTA=Grad teaching assist O=Other instructional FTE			Total SCH - Total SCH by FY from Su, Fl, Sp	Total Majors - From fall semester	Total Grads – by FY							
	TTF	GTA	O														
Year 1 →	9	9	9	4	5.3	10539	19	5									
Year 2 →	9	9	9	5.1	4.7	10946	24	5									
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Total Number Instructional (FTE) – TTF+GTA+O							SCH/ FTE	Majors/ FTE	Grads/ FTE								
							↓										
Year 1 →						N/A	N/A	N/A	N/A								
Year 2 →						N/A	N/A	N/A	N/A								
Year 3 →						N/A	N/A	N/A	N/A								
Scholarly Productivity	Number Journal Articles		Number Presentations		Number Conference Proceedings		Performances			Number of Exhibits		Creative Work		No. Books	No. Book Chaps.	No. Grants Awarded or Submitted	\$ Grant Value
	Ref	Non-Ref	Ref	Non-Ref	Ref	Non-Ref	*	**	***	Juried	****	Juried	Non-Juried				
Year 1	9		7	13												5/13	64,745
Year 2	9		8	8												3/11	6,665,887
Year 3	8	1	9	20								4		1		2/17	2,253,806

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*From the table on page 3, indicate number of faculty (and instructional FTE) teaching in the graduate program.

- a. Provide a brief assessment of the quality of the faculty/staff using the data from the table above as well as any additional relevant data. Programs should comment on details in regard to productivity of the faculty (i.e., some departments may have a few faculty producing the majority of the scholarship), efforts to recruit/retain faculty, departmental succession plans, course evaluation data, etc.

Provide assessment here:

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3. Academic Program: Analyze the quality of the program as assessed by its curriculum and impact on students. Complete this section for each program (if more than one). Attach updated program assessment plan (s) as an appendix (refer to instructions in the WSU Program Review document for more information).

- a. For undergraduate programs, compare ACT scores of the majors with the University as a whole.

Last 3 Years	Total Majors - From fall semester	ACT – Fall Semester (mean for those reporting)	
		Majors	All University Students - FT
Year 1 →	152	23.1	22.66
Year 2 →	160	23.0	22.72
Year 3 →	182	23.6	22.81

KBOR data minima for UG programs: ACT_≤20 will trigger program.

- b. For graduate programs, compare graduate GPAs of the majors with University graduate GPAs.*

Last 3 Years	Total Admitted - By FY		Average GPA (Admitted) – Domestic Students Only (60 hr GPA for those with ≥54 hr reported) By FY					
							Comparisons	
	MS	PhD	MS GPA	PhD GPA	College – MS	College – PhD	Univ - MS	Univ PhD
Year 1 →08	15	N/A	3.37	N/A	3.44	N/A	3.48	N/A
Year 2 →09	15		3.29		3.41		3.48	
Year 3 →10	13		3.30		3.32		3.48	

*If your admission process uses another GPA calculation, revise table to suit program needs and enter your internally collected data.

- c. Identify the principal learning outcomes (i.e., what skills does your Program expect students to graduate with). Provide aggregate data on how students are meeting those outcomes. Data should relate to the goals and objectives of the program as listed in 1e. Provide an analysis and evaluation of the data by learner outcome with proposed actions based on the results.

In the following table provide program level information. You may add an appendix to provide more explanation/details. Definitions:

Learning Outcomes: Learning outcomes are statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire in their matriculation through the program (e.g., graduates will demonstrate advanced writing ability).

Assessment Tool: One or more tools to identify, collect, and prepare data to evaluate the achievement of learning outcomes (e.g., a writing project evaluated by a rubric).

Criterion/Target: Percentage of program students expected to achieve the desired outcome for demonstrating program effectiveness (e.g., 90% of the students will demonstrate satisfactory performance on a writing project).

Result: Actual achievement on each learning outcome measurement (e.g., 95%).

Analysis: Determines the extent to which learning outcomes are being achieved and leads to decisions and actions to improve the program. The analysis and evaluation should align with specific learning outcome and consider whether the measurement and/or criteria/target remain a valid indicator of the learning outcome as well as whether the learning outcomes need to be revised.

Learning Outcomes (most programs will have multiple outcomes)	Assessment Tool (e.g., portfolios, rubrics, exams)	Target/Criteria (desired program level achievement)	Results	Analysis
<p>Goal 1-Students will be required to take the ETS Major Field Achievement Test in Biology before they are certified for graduation.</p>	<p>Standardized exam in general biology topics.</p>	<p>Mean of WSU biology student scores to be at least 50% of mean score for all reporting institutions.</p>	<p>Average for all students/year Year 1—155.1 n=10 Year 2—155.1 n=19 Year 3—155.6 n=22</p>	<p>Year 1 & 2 Aggregate totals for all schools tested from August 2005 to June 2010 show that a score of 155 or above is at 50%. Year 3—Data for 2011 show that our students scored at 52%</p>
<p>Goal 2 & 3</p> <p>--Biol 497 Biology Colloquium (1 credit) students are required to attend weekly seminars and submit a term paper based on one of the topics presented during the semester.</p> <p>--Biol 499- Undergraduate Research (2-4 credits) students meet the objective by participation in a research project and the student will submit a written research report to the faculty</p>	<p>Written term paper/research report graded by faculty member and/or reviewed by the department affairs committee.</p>	<p>100 % satisfactory grade</p>	<p>Biol 497 Year 1—n=21:1-no grade submitted, 20-satisfactory Year 2—n=21:1-unsatisfactory, 20-satisfactory Year 3—n=25:25 satisfactory</p> <p>Biol 499 Year 1-14 enrolled: 14-satisfactory Year 2-24 enrolled: 24 satisfactory Year 3-35 enrolled: 35 satisfactory</p>	<p>Although 100% satisfactory grade was not achieved for year 1 and 2, no student can graduate from the program without the completion of colloquium or undergraduate research.</p> <p>There was 100% satisfactory grades reported for all 3 years. Undergraduate students work one-on-one with an individual faculty member throughout the semester which greatly contributes to satisfactory completion.</p>

mentor.				
Goal 4 Completion of written survey of their perceptions of the undergraduate program administered at the time of the MFT biology exam	Written survey (attached in appendix)	Would 75% of students surveyed choose to pursue a degree in Biological Sciences and Wichita State if they were to begin again?	Students answered survey: did you get a good education at WSU in biological sciences and would you do again? Year 1—n=11 81.8% strongly agree; 18.2% somewhat agree Year 2—n=21 52.4% strongly agree; 42.9% somewhat agree Year 3—n=21 47.6% strongly agree; 38.1% somewhat agreed	An average of 60% of all students strongly agreed and 33% somewhat agreed that they would again pursue their degree at WSU in biological sciences. Only 5.6% of the students somewhat disagreed or strongly disagreed that they would not pursue a degree again. Of the students who strongly disagreed, one lost interest in biology, the other felt they were not prepared for the job market.

MASTERS PROGRAM--Our mission statement identifies the goals for our MS program as equipping students with the skills that they need to conduct, communicate, and interpret original scientific research in the life sciences. For this reason and because biology is a diverse field with different sub-disciplines requiring different bodies of knowledge, our MS program focuses upon behavioral learning outcomes indicating that a student is progressing toward becoming an independent scientist or a knowledgeable consumer of scientific information. It is important to emphasize that because we are an MS program, and not a PhD program, we do not expect our graduates to be fully independent scientists when they graduate, but instead our role is to initiate them into this process. Many of our behavioral learning objectives are assessed from the oral or written presentation of research in the form of student prospectuses, theses, 15-minute presentations in Bio 797 (Departmental Seminar), and defense seminars. These are all graduation requirements for our thesis MS students. While non-thesis MS students are not required to write a research prospectus or thesis their graduate requirements include the 15-minute presentations in Bio 797 related to their capstone project and a written summary of their capstone experience that they defend before a committee. Therefore, graduation rates from the MS program provide one quantitative means of evaluating our success in achieving these learner outcomes. Further, this is the quantitative measure of our success in achieving learner outcomes for which we have data for the FY2009-

FY2011 evaluation period. In the table below, we use data from the early portion of the evaluation period because students that entered the program more recently have not had time to complete the program.

We now recognize that graduation rates are a coarse measure of success in achieving specific learner outcomes. In the future, to gather more precise data on our success in achieving our learner outcomes, we will institute a 'learning outcomes' rubric to be completed by faculty after serving on a thesis or capstone project committee. In addition, we will institute an exit survey to be completed by graduate students when they schedule their thesis/capstone project defense that addresses the student's perception of how effective we have been in providing instruction related to our learner outcomes. With the 'learning outcomes' rubric and the student exit survey we will have measurement tools, beyond graduation rates, for evaluating success in meeting learner outcomes.

Learning Outcomes (most programs will have multiple outcomes)	Assessment Tool (e.g., portfolios, rubrics, exams)	Target/Criteria (desired program level achievement)	Results	Analysis
1. Students will be familiar with topical research questions and hypotheses in their field of biology.	Research prospectus, written thesis	75% of MS graduate students graduate	Graduation rate of students admitted in FY 2009 and 2010 has been 33% (2 of 6; 1 still in program) and 39% (5 of 13; 4 still in program), respectively	Rate of graduation is lower than our target. See section 3g for further analysis.
2. Students will be able to interpret hypotheses, methods and results presented in primary scientific literature.	Research prospectus, written thesis	75% of MS graduate students graduate	Graduation rate of students admitted in FY 2009 and 2010 has been 33% (2 of 6; 1 still in program) and 39% (5 of 13; 4 still in program), respectively	Rate of graduation is lower than our target. See section 3g for further analysis.
3. Students will be able to formulate testable research questions and hypotheses.	Research prospectus, written thesis	75% of MS graduate students graduate	Graduation rate of students admitted in FY 2009 and 2010 has been 33% (2 of 6; 1 still in program) and 39% (5 of 13; 4 still in program), respectively	Rate of graduation is lower than our target. See section 3g for further analysis.
4. Students will be able to design and analyze experiments or	Research prospectus, written thesis	75% of MS graduate students graduate	Graduation rate of students admitted in FY 2009 and	Rate of graduation is lower than our

observational studies that test research questions and hypotheses.			2010 has been 33% (2 of 6; 1 still in program) and 39% (5 of 13; 4 still in program), respectively	target. See section 3g for further analysis.
5. Students will acquire the ability to orally communicate scientific research in meeting-style presentations and in seminars.	Two 15-minute oral presentations in Bio 797 (Departmental Seminar); thesis defense seminar	100% of students taking Bio 797 receive "S"	In spring 2011 (the first semester in which we required the two 15 minute presentations) the performance of all 9 students enrolled was scored at least satisfactory	Students' oral presentation skills meet our target
6. Students will be able to communicate scientific research to other scientists in writing in the format of research articles.	Written thesis	75% of MS graduate students graduate	Graduation rate of students admitted in FY 2009 and 2010 has been 33% (2 of 6; 1 still in program) and 39% (5 of 13; 4 still in program), respectively	Rate of graduation is lower than our target. See section 3g for further analysis.

- d. Provide aggregate data on student majors satisfaction (e.g., exit surveys), capstone results, licensing or certification examination results, employer surveys or other such data that indicate student satisfaction with the program and whether students are learning the curriculum (for learner outcomes, data should relate to the goals and objectives of the program as listed in 1e).

UNDERGRADUATE PROGRAM

Student Satisfaction (e.g., exit survey data on overall program satisfaction). [*] If available, report by year, for the last 3 years			Learner Outcomes (e.g., capstone, licensing/certification exam pass-rates) by year, for the last three years				
Year	N	Result (e.g., 4.5 on scale of 1-5, where 5 highest) EXIT SURVEY--OVERALL, DO YOU THINK YOU GOT A GOOD EDUCATION IN BIOLOGY AND, IF YOU HAD IT TO DO OVER WOULD YOU MAJOR IN BIOLOGY AT WSU?	Year	N	Name of Exam	Program Result	National Comparison \pm
1	11	81.8% strongly agree; 18.2% somewhat agree	1		Major Field Test in Biological Sciences	155.1	Mean 153.6
2	21	52.4% strongly agree; 42.9% somewhat agree	2		Major Field Test in Biological Sciences	155.1	Mean 153.6
3	21	47.6% strongly agree; 38.1% somewhat agreed	3		Major Field Test in Biological Sciences	155.6	Mean 153.2

^{*}Available for graduate programs from the Graduate School Exit Survey. Undergraduate programs should collect internally. \pm If available.

MASTERS PROGRAM

Student Satisfaction (e.g., exit survey data on overall program satisfaction). [*] If available, report by year, for the last 3 years			Learner Outcomes (e.g., capstone, licensing/certification exam pass-rates) by year, for the last three years				
Year	N	Result (e.g., 4.5 on scale of 1-5, where 5 highest)	Year	N	Name of Exam	Program Result	National Comparison \pm
2007-2011	24	4.36 (5-year aggregate data for the Graduate School Exit Survey was provided)	2007-2011		Grad School Exit Survey		

- e. Provide aggregate data on how the goals of the *WSU General Education Program* and *KBOR 2020 Foundation Skills* are assessed in undergraduate programs (optional for graduate programs).

Goals/Skills Measurements of: -Oral and written communication -Numerical literacy -Critical thinking and problem solving -Collaboration and teamwork -Library research skills -Diversity and globalization	Results	
	Majors	Non-Majors
THIS IS A NEW REQUIREMENT , SO DATA NOT YET AVAILABLE		

Note: Not all programs evaluate every goal/skill. Programs may choose to use assessment rubrics for this purpose. Sample forms available at: <http://www.aacu.org/value/rubrics/>

- f. Indicate whether the program is accredited by a specialty accrediting body including the next review date and concerns from the last review.

Provide information here:

There is no accrediting body for the Undergraduate or MS program in the Department of Biology.

- g. Provide a brief assessment of the overall quality of the academic program using the data from 3a – 3f and other information you may collect, including outstanding student work (e.g., outstanding scholarship, inductions into honor organizations, publications, special awards, academic scholarships, student recruitment and retention).

Provide assessment here:

UNDERGRADUATE-- The undergraduate program in the department continues to produce graduates who are prepared to continue graduate studies or become employed. Based on the ACT scores as well as the MFT exam scores in biology, students enter the program with a slightly higher than average ACT score and perform at least as well as 50% of all 280 undergraduate programs administering the exam with a slight increase to 52% in year 3. Despite the small number of faculty and the staggered course offerings, most students agree they would repeat their undergraduate experience at WSU.

MS Graduate Program

Near the beginning of the evaluation period our MS program was triggered by KBOR for low graduate student enrollment and low numbers of graduates. We took a number of measures to respond aggressively to this triggering (these responses are described in more detail in section 7 “Summary”). They include a required statement of purpose from applicants to allow faculty members to more effectively recruit new graduate students to their labs and more extensive attempts by the graduate coordinators to encourage applicants to interact with faculty during the application process. Both of these measures, which came into effect during the latter half of the evaluation period, allow graduate

students to begin their thesis research more promptly and thereby complete their degrees more rapidly. Therefore, while our graduation rate was lower than we would like, we feel that the rates will be higher for students admitted later in the evaluation period.

An additional assessment of our success in accomplishing learner outcomes is how the scientific community receives our students. Admission to PhD programs provides one measure of other scientists' opinion of the preparation we give our MS graduate students. For FY 2009-FY 2011, 5 of the 12 graduates from our MS program were admitted to PhD programs in basic or applied departments related to Biology. Given that students likely are entering our program with diverse professional goals, or perhaps unfocused professional goals, a >40% admission to PhD programs is quite respectable in our opinion.

Publication of graduate student research in peer-reviewed scientific journals is another sign of validation from the scientific community. However, publication rate for graduate students' theses is probably a more important measure for PhD programs than an MS program where most students are getting their first substantial introduction to independent research. Nevertheless, during the review period, four graduate student theses were published as peer-reviewed publications during the review period. Two of these publications were from graduate students who completed their theses before the review period began. Over all, for the past five fiscal years (FY07-FY011) the rate of publication of graduate student theses is 26%. During the review period an additional three publications included graduate student co-authors, but were not based upon the student's thesis research.

4a. Analyze the student need and employer demand for the program. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).

a. Utilize the table below to provide data that demonstrates student need and demand for the program.

Undergraduate - BS

Majors						Employment of Majors*															
Last 3 FYs – Su, Fl, and Sp	No. new applicants or declared majors	No. who enter or are admitted in the major	No. enrolled one year later	1 Year Attrition %	Total no. of grads	Average Salary	Employment % In state	Employment % in the field	Employment: % related to the field	Employment: % outside the field	No. pursuing graduate or professional education	Projected growth from BLS**									
Year 1→	132	125	80	36	16	NA	NA	NA	NA	NA	NA	Current year only ↓ 14%									
Year 2→	135	129	102	11	10	NA	NA	NA	NA	NA	NA										
Year 3→	109	103	102	1	10	\$35,500	0	1	0	0	2										
Race/Ethnicity by Major***										Race/Ethnicity by Graduate***											
		NRA	H	AI/AN	A	B	NH/PI	C	MR	UNK	NRA	H	AI/AN	A	B	NH/PI	C	MR	UNK		
Year 1→		7	6	0	18	3	0	102	0	16	0	1	0	2	2	0	10	0	1		
Year 2→		9	6	2	22	6	0	104	1	10	3	1	0	4	0	0	21	0	1		
Year 3→		7	13	2	35	6		107	2	10	2	1	1	5	1	0	22	0	0		

* May not be collected every year

** Go to the U.S. Bureau of Labor Statistics Website: <http://www.bls.gov/oco/> and view job outlook data and salary information (if the Program has information available from professional associations or alumni surveys, enter that data)

*** NRA=Non-resident alien; H=Hispanic; AI/AN=American Indian/ Alaskan Native; A=Asian; B=Black; NH/PI=Native Hawaiian/Pacific Islander; C=Caucasian; MR=Multi-race; UNK=Unknown

KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5; Graduates=2; Faculty=2 additional.

Provide a brief assessment of student need and demand using the data from the table above. Include the most common types of positions, in terms of employment, graduates can expect to find.

Provide assessment here:

UNDERGRADUATE--As an urban university in the largest city in Kansas, we allow traditional and non-traditional students the opportunity to pursue a bachelor’s degree. The economic downturn had an impact on the financial ability of traditional students to pursue their education at other Kansas universities. The data show that our program is in demand and, despite a slight decrease of majors in year 3, the retention of those students did improve. In addition, conversion of the University of Kansas Medical School-Wichita into a 4-year program may be contributing to the retention of students who otherwise would not be able to attend a professional degree program.

Data collection about employment or graduate studies was only collected as of year 3. 100% of respondents to the survey are either employed or pursuing graduate education.

4b. Analyze the student need and employer demand for the program. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).

a. Utilize the table below to provide data that demonstrates student need and demand for the program.

Graduate - MS

Majors						Employment of Majors*														
Last 3 FYs – Su, Fl, and Sp	No. new applicants or declared majors	No. who enter or are admitted in the major	No. enrolled one year later	1 Year Attrition %	Total no. of grads	Average Salary	Employment % In state	Employment % in the field	Employment: % related to the field	Employment: % outside the field	No. pursuing graduate or professional education	Projected growth from BLS**								
Year 1→	22	15	6		5	36,887		20	20	0	2	Current year only								
Year 2→	22	15	13	31	5	35,660	40	40	20	0	1	↓								
Year 3→	23	14	9	0	2	23,220	0	0	0	0	2	15%								
Race/Ethnicity by Major***						Race/Ethnicity by Graduate***														
	NRA	H	A I / A N	A	B	N H / PI	C	MR	UNK	NRA	H	A I / A N	A	B	N H / PI	C	MR	UNK		
Year 1→	9	1	0	1	0	0	8	0	0	3	0	0	0	0	0	2	0	0		
Year 2→	7	0	0	3	2	0	12	0	0	2	0	0	1	0	0	2	0	0		
Year 3→	5	1	2				14		1	2										

* May not be collected every year

** Go to the U.S. Bureau of Labor Statistics Website: <http://www.bls.gov/oco/> and view job outlook data and salary information (if the Program has information available from professional associations or alumni surveys, enter that data)

*** NRA=Non-resident alien; H=Hispanic; AI/AN=American Indian/ Alaskan Native; A=Asian; B=Black; NH/PI=Native Hawaiian/Pacific Islander; C=Caucasian; MR=Multi-race; UNK=Unknown

KBOR data minima for UG programs: Majors=25; Graduates=10; Faculty=3; KBOR data minima for master programs: Majors=20; Graduates=5; Faculty=3 additional; KBOR data minima for doctoral programs: Majors=5; Graduates=2; Faculty=2 additional.

Provide a brief assessment of student need and demand using the data from the table above. Include the most common types of positions, in terms of employment, graduates can expect to find.

Provide assessment here:

There appears to be significant demand by both domestic and international students for the training we provide in the Masters of Science program in Biology. Among domestic students, demand appears to be from a regional (Great Plains, Midwest) pool of students. For example, our graduate students enrolled in fall 2010 included students who earned undergraduate degrees from Wichita State and other Kansas colleges/universities (University of Kansas, Kansas State, Bethel, Benedictine), but also included students from Oklahoma State University, University of Nebraska-Lincoln, Washington University and Brigham Young University-Idaho. Further, student demand or our ability to attract students has increased as, over the past 5 years (FY 2007-FY 2011), fall

enrollment increased from 18 in fall 2007 to 23 in fall 2010, with a peak fall enrollment of 24 in 2009. We have been successful not only in attracting students, but in increasing the number of students graduating from our MS program. Over the past 5 years, the number of graduates increased from a low of 1 on FY 2008 to 5 in both FY 2009 and 2010. Although our number of MS graduates in FY 2011 was low (2) this does not indicate a trend toward decreasing demand for our program or low progress through our program. In the summer session and fall semester of fiscal year 2012 we graduated 7 MS students. Five more MS students have submitted application for degree forms for the spring 2012 semester.

There is demand both in the workforce and from doctorate programs in life sciences for young scientists who are equipped with the training that the MS program in Biology provides. Of our 12 graduates from FY 2009-2011, 10 currently are employed in jobs related to scientific research or teaching. By examining the three most recent fiscal years, we are considering employment status of recent graduates and, as a result, the most common activity of our graduates is continuing their education in Ph.D. programs. Five graduates from FY2009-2011 are in Ph.D. programs in biomedical, agricultural, or ecological academic departments. We are pleased that >40% of graduates from our MS program are in Ph.D. programs because we interpret this as indicating that our graduates enjoyed their research experiences in our program and acceptance of our graduates into Ph.D. programs provides external confirmation that we prepared them well for further research. In the table above, salaries and % job growth for these students in PhD programs is based on the "teacher assistant" category on the Bureau of Labor Statistics web site because students in PhD programs typically are funded as graduate teaching assistants or graduate research assistants. Four graduates are in research technician positions working in biomedical or environmental labs. Their employers include private industry, universities, and government agencies, indicating the diverse set of employers who are interested in graduates from our program. The one graduate who is employed in education is an adjunct instructor at a community college. For two students, we have been unable to determine their current employment. As our non-thesis MS program grows, it seems likely that a higher proportion of our graduates will move on to professional schools as our two non-thesis MS students currently identify medical school and veterinary school as their goals.

5. **Analyze the cost of the program and service the Program provides to the discipline, other programs at the University, and beyond. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).**

Percentage of SCH Taken By (last 3 years)			
Fall Semester	Year 1	Year 2	Year 3
UG Majors	18.5	19.7	18.9
Gr Majors	2.5	2.2	2.6
Non-Majors	79.1	78.0	78.5

- a. Provide a brief assessment of the cost and service the Program provides. Comment on percentage of SCH taken by majors and non-majors, nature of Program in terms of the service it provides to other University programs, faculty service to the institution, and beyond.

Provide assessment here:

UNDERGRADUATE--Given the total amount necessary to run our teaching labs, the cost/SCH is relatively low with an average of \$14/SCH over the past 3 years. This includes all materials used in lab as well as any equipment needed to purchase or maintenance of existing equipment. The department teaches general education courses as well as courses required for majors in biology education, forensic sciences, health professions, and bioengineering.

To equalize the cost of running high quality laboratories, we charge a \$40 laboratory fee per student per lab. This allows us to purchase microscopes and other costly equipment/technology items to enhance the experience of our students.

Masters of Science Graduate Program

We did not find data that separate the cost of our MS program from the cost of our undergraduate program. Therefore, here we will address the service provided by our MS program.

Mentoring MS graduate students represents a nexus of the research and teaching functions of our department. Graduate students are important to research success through their contribution to faculty research projects as graduate research assistants and through conducting their thesis research. During this evaluation period, MS graduate students participated in research funded by external grants to Biology Department faculty that totaled > \$7.7 million. These external funding sources were diverse, including National Institutes of Health, National Science Foundation, Flossie E. West Memorial Foundation, and Kansas Soybean Council. To be clear, some of these grants were awarded before FY 2009 but those funded projects supported the research efforts of MS graduate students and provided indirect costs to the university during the evaluation period.

Our MS program contributes significantly to undergraduate education in the Biology Department and to undergraduate education in departments whose majors take Biology courses. As graduate teaching assistants, our MS graduate students are rarely instructors of record for courses (80, 66 and 44 SCH by

GTAs who were IORs in Fall 2008, 2009, 2010 respectively), but provide a great service to the department and the university by teaching lab sections for our core curriculum for Biology majors (Bio 210, 211, 418, 419, 420) and for courses that primarily attract non-Biology majors (Bio 107, 220, 223). The table above makes clear that the Biology Department contributes greatly to the curricula of other departments on campus (>78% Biology Department SCH were taken by students from other departments) and running these courses with labs would be impossible without our graduate teaching assistants. Further, GTAs teaching lab sections are often a first point-of-contact for undergraduates in large classes with regard to learning about and participating in research in faculty member's labs. Therefore, the GTAs are important ambassadors for research in the department and help recruit undergraduates to participate in research.

Graduate students are important contributors to the out-reach mission of the Biology Department and Wichita State University. The "Pass the Salt" National Science Foundation-funded GK-12 program and the Ninnescah BioBlitz provide two examples of synergy between the Biology Department MS graduate program and WSU's mission of out-reach to the Wichita Community. First, through the "Pass the Salt" NSF GK-12 program (PI Dr. Mark Schneegurt) graduate students from the Biology Department lead research clubs involving >40 students in three Wichita-area high schools. This gives Wichita high school students the opportunity to conduct original research and present their findings at regional conferences (Kansas Junior Academy of Science, Kansas Academy of Science). This program also enhances teacher education giving them the opportunity to participate in research with their students and WSU MS graduate students. Second, Biology Department Graduate students and recent graduates of our MS program volunteer as mentors for the annual Ninnescah Reserve BioBlitz. This program attracts 30-40 high school biology students, primarily from Wichita but also including Upward Bound and Talent Search groups from Chanute KS, annually to participate in biodiversity data collection at the Ninnescah Reserve under the instruction of WSU graduate students, faculty and professional biologists from the Wichita area. In addition to their function in out-reach education, these programs that involve MS graduate students in mentoring high school science students create important connections that support undergraduate recruitment efforts.

Lastly, we strongly believe that teaching is an integral part of any graduate program in biology. Thus, we are proud to declare that, for many years through to the present, very close to 100% of our MS students are offered and do accept appointments as a GTA for at least one semester during their graduate studies.

6. Report on the Program's goal (s) from the last review. List the goal (s), data that may have been collected to support the goal, and the outcome. Complete for each program if appropriate (refer to instructions in the WSU Program Review document for more information on completing this section).

UNDERGRADUATE.

(For Last 3 FYs)	Goal (s)	Assessment Data Analyzed	Outcome
Unable to report due to lack of feedback regarding the last review			

MASTERS PROGRAM

The last review that outlined objectives for the Biology MS program is from 2008. This review outlined programmatic objectives for the Biology department that were classified into four categories: Graduate Students, Faculty/Graduate Productivity, Faculty Service and Infrastructure for the Program.

(For Last 3 FYs)	Goal (s)	Assessment Data Analyzed	Outcome
	Graduate student related objectives		
	1. 1-2 graduate students per graduate faculty member	1. Number of graduate students enrolled in fall semester / number of graduate faculty members	1. Grad students per faculty varied from 2.4 (FY 2009) to 3 (FY 2010)
	2. Award every MS student \geq 1 semester GTA support	2. Student employment records	2. 10 of the 12 graduate students who graduated FY2009-FY2011 received GTA support; one of the others was entirely supported as a graduate research assistant on external grant money
	3. Graduate faculty include graduate student support in grant applications	3. Faculty annual activity reports	3. For 2008-2010, annually between 25%-47% of graduate students were at least partially supported by external funding obtained by faculty. We expect that faculty will include graduate student support in proposals where funding agency guidelines allow.
	4. Advise/assist graduate students in pursuit of post-graduation employment/training	4. Current activities of MS graduates from past three fiscal years	4. >40% of MS graduates are in Ph.D. programs in Biology, >80% (counting PhD students) are involved in Biology research/teaching employment

	<p>5. Support for graduate student attendance at specialized research training sessions</p> <p>6. Support for graduate student attendance at scientific meetings</p> <p>7. Letters of recommendation and contacts made for grad students applying for advance grad work and professional programs</p>	<p>5. Faculty annual activity reports</p> <p>6. Faculty annual activity reports</p> <p>7. Current activities of MS graduates from past three fiscal years</p>	<p>5. We have no data on this beyond faculty funding for student attendance at professional meetings (see #6 below), where professional development workshops often are held.</p> <p>6. On average external funding obtained by graduate faculty funded attendance by 0.36 graduate students / year / faculty member at scientific meetings</p> <p>7. >40% of MS graduates in Ph.D. programs in Biology; 0 graduates in professional programs related to Biology</p>
	<p>Faculty productivity objectives</p> <p>1. 1-2 peer-reviewed publications per year</p> <p>2. 1-2 presentations at national and/or international meetings per year</p> <p>3. Maintain independent research programs involving MS students and supported by grants/contracts from federal agencies and private foundations</p>	<p>1. Faculty annual activity reports</p> <p>2. Faculty annual activity reports</p> <p>3. Faculty annual activity reports</p>	<p>1. FY 2009-2011 average 1.14 peer-reviewed publication per tenured/tenure track graduate faculty</p> <p>2. FY 2009-2011 average 1.18 presentations at national and/or international meetings per tenured/tenure track graduate faculty</p> <p>3. FY 2009-2011 graduate faculty averaged 2.36 graduate students per lab; graduate faculty were awarded \$6.78 million in research grants</p>
	<p>Faculty Service</p> <p>1. contribute to undergraduate teaching and develop/teach graduate courses in the area of their particular research programs</p>	<p>1. Faculty annual activity reports</p>	<p>1. Graduate faculty averaged 2.38 undergraduate course taught / year / faculty member and averaged 3 undergraduates enrolled in research (Bio 499) / year / faculty member; Graduate faculty averaged 0.32 graduate courses taught / year /</p>

	<p>2. Participate in peer-review process of scientific manuscripts</p> <p>3. Participate in peer-review process of grant proposals to federal agencies and private foundations</p> <p>4. Participate in invited presentations at other universities/schools that would further recruitment</p>	<p>2. Faculty annual activity reports</p> <p>3. Faculty annual activity reports</p> <p>4. Faculty annual activity reports</p>	<p>faculty member, not counting 1 credit Bio 797 which is taught every semester</p> <p>2. Graduate faculty averaged 2.23 manuscripts reviewed / year / faculty member</p> <p>3. Graduate faculty averaged 0.36 ad hoc (not counting reviews as panelists) grant proposals reviewed / year / faculty member; faculty served on 1 NSF and 1 USDA review panel.</p> <p>4. Graduate faculty averaged 0.27 invited presentation / year / faculty member at other universities or meetings that could further graduate student recruitment</p>
	<p>Infrastructure</p> <p>1. External funding for equipment and facilities acquisition, maintenance and upgrades</p> <p>2. Bridging funds for short-term assistance for productive laboratories between external funding</p>	<p>1. Faculty annual activity reports</p> <p>2. Faculty annual activity reports</p>	<p>1. Cell / Molecular graduate faculty received NIH/NCRR award (\$2.1 million) for lab renovation; Ecology/ Microbiology graduate faculty continued administration NSF award (\$240,000) for field station building</p> <p>2. We do not have a departmental fund for “bridge” funding. In spring 2011, three faculty technology enhancement proposals were funded by the College of Liberal Arts and Sciences. During FY2009-2011 two graduate faculty members applied for and received internal funding through Office of Research Administration (URCA, ARCS faculty grants)</p>

7. Summary and Recommendations

- a. Set forth a summary of the report including an overview evaluating the strengths and concerns. List recommendations for improvement of each Program (for departments with multiple programs) that have resulted from this report (relate recommendations back to information provided in any of the categories and to the goals and objectives of the program as listed in 1e). Identify three-year goal (s) for the Program to be accomplished in time for the next review.

Provide assessment here:

Undergraduate Program

Strengths:

Faculty, especially research active faculty, have world-class expertise in their fields that is shared with students.

Faculty, staff, and graduate students provide significant community outreach

Upper division labs taught by faculty

Diverse course offering especially given the small size of our faculty

Engenders strong faculty/student interactions

Weakness:

All core courses are not taught every semester due to the extensive teaching loads plus research commitments of existing faculty

Additional space is needed for teaching labs and office space for emeritus faculty

Old and outmoded equipment in some teaching labs

Three-year goals to be accomplished by next review:

Refill the Assistant Chair/Undergraduate Advisor position (individual chose to retire in June 2010, search to replace will begin in April 2012). A strong emphasis for the new hire will be enhanced advising of biology majors students plus the development and maintenance of accurate and up to date information on our departmental website. Also, the person hired will seek additional co-op education opportunities and will work with career services to pursue new employment opportunities for graduating students in the Wichita area.

Enhance the senior exit survey so as to better reflect goals and learner outcome assessments. For example, determine if students are able to pursue employment outside the Wichita area.

Use the MFT exam results in the 4 subsets (cell biology; molecular biology and genetics; organismal biology; and population, biology, evolution, and ecology) of the exam to determine if students' choice of concentration is reflected in the subset scores.

Continue to partner with other university units including the new Bioengineering Program in the College of Engineering.

Response to the KBOR triggering of the Biology MS graduate program

A major focus of our efforts with our MS program during the evaluation period was to address the triggering of our program in FY 2009 for having a low number of graduate students enrolled and a low number of graduates. We responded aggressively to the triggering of our MS program, first, by reinstating the non-thesis MS degree to broaden our appeal to students who are interested in professional programs or teaching careers and to provide a route to graduation for students who were unable to complete thesis research. In FY 2012 the first non-thesis MS student graduated from our renewed non-thesis MS option. Moving forward, we will track the number of thesis vs. non-thesis MS students graduating in Biology to better understand the effect on the non-thesis option on the vigor of our MS program. Second, we increased our efforts to build relationships with regional colleges and universities that will enhance graduate student recruitment. As an example of our efforts to strengthen our relationships with undergraduate institutions in Kansas, in FY 2011 we committed to hosting the 2012 Kansas Academy of Science annual meeting in the Biology Department's building at Wichita State. The Kansas Academy of Science meeting is a significant forum for oral and poster presentations of research conducted by undergraduates from across Kansas. We hosted this meeting March 30-31 2012. Finally, if graduate students become associated with a lab/faculty mentor before the end of their first semester, then the student's likelihood of completing the MS program in a timely manner is much greater. Therefore, our graduate coordinators focus intensively on facilitating interactions between graduate school applicants or newly arrived students and faculty. In addition, by instituting a requirement that applicants to our MS program submit a statement of purpose, we also make it easier for graduate faculty to participate in recruiting new MS students to their labs. These efforts have been successful as enrollment in the MS graduate program has increased from lows of 18 and 16 students in fall of FY 2007 and 2008 to 24 and 23 students in fall FY 2010 and 2011. We also increased our number of graduates from 2 and 1 in FY 2007 and 2008 to 5 in both FY 2009 and 2010. The number of graduates was lower in FY 2011 (2), but in FY 2012 we already have graduated 7 MS students with 5 additional students scheduled to defend their theses in spring 2012. Therefore, our efforts to expand our options available to graduate students, to attract more graduate students, and to increase the efficiency of associating new students with labs are remedying the problems that triggered our MS program.

Performance in comparison to past objectives

We were successful in meeting the largely programmatic objectives that were identified in the 2008 graduate review report. For faculty productivity, publication rate and rate of presentations at national and international conferences is within the range outlined in the 2008 report. Such engagement of the faculty in scholarship resulted in frequent requests for professional service, including manuscript

reviews, associate editorships, and service on panels for federal funding agencies. In a difficult funding environment, external funding was obtained and administered to fund graduate student participation in meetings, graduate student research assistantships, and to enhance departmental research and teaching infrastructure.

Resources

Graduate teaching assistantships are a critical resource for maintaining a dynamic MS program when federal funding, which could support graduate research assistantships, is scarce. We are grateful for such funding that allows us to maintain a graduate program that averages 2-3 MS students per graduate faculty member and that provides crucial support for our undergraduate laboratory teaching. Our ability to teach these labs supports our program, but also has far-reaching effects for the education provided by the university as a whole because we provide courses needed by majors of many other departments.

For ecological/evolutionary/organismal biology, natural areas where long-term faculty research programs can be established without risk of revocation of access or precipitous changes in management are important. Such sites for long-term faculty research projects enhance the rate at which MS theses can be completed because research infrastructure that graduate students can make use of is already in place. The Gerber Reserve and Sellers Reserve, which are relatively recent acquisitions, as well as the much more established Ninnescah Reserve provide these kinds of sites where long-term research programs that can readily accommodate new graduate student research can be established.

Human resources are also essential to a vibrant graduate program. For the biomedical component of our graduate program, collaborations with CIBOR (Center for Innovation in Biomedical and Orthopedic Research) and KU Medical School have provided research opportunities for both graduate and faculty research. However, adequate faculty numbers are critical to maintaining faculty productivity as well as a large, intellectually engaged graduate student community. The size of our faculty in Biology is between 40-50% of the size of Biology faculty at universities identified as our peers by the Kansas Board of Regents. With departmental, college, university and professional service demands being divided among a small number of faculty, inevitably time for graduate student mentoring and scholarship is challenged.

Three-year Goals

1. Maintain an active MS graduate program that consistently includes >20 MS students.
2. Graduate a minimum of 5 students from our MS program per year.
3. For the biomedical component of our MS graduate program, expand our research collaborations, including graduate student research, with CIBOR (Center for Innovation for Biomaterials and Orthopedic Research) and KU Medical School to further exploit these opportunities for clinical research.
4. For the ecology/evolution/organismal component of our MS program, begin faculty/graduate student research use and research productivity from our two relatively new natural areas, the Gerber and Sellers Reserves, and maintain rates of research productivity from our established Ninnescah Reserve.

