WEBER STATE UNIVERSITY

DEPARTMENT OF ZOOLOGY

2007-2008 PROGRAM REVIEW

Self-Study Completed November 15, 2007

A. Executive Summary

- The Department of Zoology has historically been and presently is amongst the largest departments in the College of Science. It is a broad, multi-faceted undergraduate life science department. Our mission statement articulates the program's expected outcomes, the process for determining and assessing them, and addresses the curricula that enables our graduates to achieve this mission.

- The Zoology degrees offered are the: Zoology Bachelor Degree, Biology Composite Teaching Bachelor Degree, Zoology Minor, Zoology Teaching Minor, Biotechnician Training Program Associate of Science Degree and Institutional Certificate. We also provide general education, on-line, and service courses. The Zoology faculty regularly determines ways to improve the curriculum. In the past five years major curriculum revisions have been made.

- Learning outcomes expected by the Department of Zoology include an understanding of basic principles such as the nature of scientific inquiry as it relates to the acquisition of biological knowledge, and the role of evolution as the major unifying principle in biology. The Zoology faculty feel that the described learning outcomes adequately address the standards in the Program Review guidelines, and have used this data to assess our program and will continue to do so.

- The Department of Zoology dedicates a significant amount of effort to student advising. We house the institution's premedical professional advisor, who also doubles as the preoptometry, prepodiatry and prechiropractic advisor, and the preveterinary advisor. We have enjoyed great success in placing students in medical, etc. colleges. We also have separate advisors for wildlife ecology, biotechnology, and graduate school admissions. This system of separate advising is effective in providing guidance to students.

- The Department of Zoology normally has 12 full-time (FTE) faculty and a small, variable number of adjuncts. Orientation and mentoring procedures for faculty and staff are informal within the Department. The Chair assumes the responsibility for informing personnel about their responsibilities, works with them so they know what is needed to excel in their positions, and informs them about development activities. Our contract faculty undergo several types of evaluation to assess the quality of their teaching. The size of the department is well suited to offering our courses in a timely, sequential fashion.

- We seek faculty with those qualifications suited for teaching and doing research with undergraduate students. All have doctorates, postdoctoral research and/or teaching experience, fine publication records, and are from institutions from throughout North America. A brief review of several outstanding projects is provided in the body of the main report.

- There is one full-time professional staff person, the Laboratory Manager, and one full-time classified staff member, the Secretary. Each has excellent credentials and are responsible for diverse, critical activities such as working with student records, public relations, equipment ordering, laboratory set-ups, and assistance with the budget. The Laboratory Manager employs several students on a part-time basis to assist with laboratory preparation and maintenance activities.

- The Department has four major teaching laboratories, a laboratory preparation area and a specimen collection room. In 1998, we opened a new teaching laboratory for the Human Anatomy course. Another unique facility is our DNA Laboratory. Within the last five years, we have also created new faculty research facilities and an ecology teaching laboratory in a neighboring building. The Department has made a concerted effort to upgrade its equipment holdings. We have a student computer laboratory in one of our classrooms. Last, the College of Science was recently given a $2 million gift to name and support our excellent premedical program. When fully funded over the next few years, it will result in a substantial new budget for equipment and materials for the Department of Zoology and other departments in the College.

- There are many ways in which the Department of Zoology interfaces with external communities. We cooperate with the regional secondary school community in many ways. We cooperate with the university's Center for Science and Mathematics Education in its efforts. The Dr. Ezekiel R. Dumke Family Premedical Program, which is housed in the Department, facilitates interactions with various external communities. The Department works closely with different elements of the region's natural resources management and education communities. Last, the Department plays the lead role in a University administrative-standing committee, the Animal Care and Use Committee.

- The previous Program Review team noted our Department's exceptionally strong involvement of undergraduates in research. Since that review, we have continued on this path. In the past five years, Zoology faculty have published 16 peer-reviewed papers, 12 of which have included undergraduate student co-authors. Thirty-nine students have presented their findings at national and international meetings.

B. Program Mission Statement

The Department of Zoology has historically been and presently is amongst the largest departments in the College of Science. It is a broad, multi-faceted undergraduate life science department.

The following mission statement was adopted in October 2000. It reflects how the department is devoted to our institutional goals of excellence in teaching, research and service.

The Department of Zoology is committed to training undergraduate students for diverse careers as biologists as well as for entry into graduate and professional schools. The department seeks to provide a sound academic foundation for the study of zoology by engaging students in creative scholarship and critical thinking. Broad faculty expertise is reflected in courses that explore animal biology at the molecular, cellular, organismal, and ecological levels. Integrated into the curriculum at all levels are exercises that help students develop additional skills fundamental to success in all fields of biology, regardless of specialization. Particular emphasis is placed on computer proficiency, laboratory and field experiences, written and oral communication, and understanding scientific literature. Research activities in the department are student-centered, providing an additional dimension to zoology education at Weber State. Students are encouraged to work closely with faculty on research projects, to complete an undergraduate thesis, and to publish and present their findings at scientific meetings. The department recognizes its special responsibility as the center of preprofessional training at the university and its faculty offer courses and serve as advisors for students from all departments who are interested in careers in medically-related professions. The department also offers a variety of general education courses to provide all interested Weber State students with an appreciation of and respect for life on Earth.

It is understood that the Mission Statement should articulate the program's expected outcomes, the process for determining and assessing them, and should refer to the curriculum that enables our graduates to achieve this mission. While these areas are addressed in the above statement, they are further discussed in this Review, especially in sections B: Curriculum Overview and C: Student Learning Outcomes and Assessment.

C. Curriculum Overview

1. The Zoology degrees offered are listed below; each program's courses are provided.
    - Zoology Bachelor Degree (B.S.)

      Zoology Courses Required (28 credit hours)
      Zool 1110 Principles of Zoology I (4)
      Zool 1120 Principles of Zoology II (4)

Zool 3200 Cell Biology (4)
Zool 3300 Genetics (4)
Zool 3450 Ecology (4)
Zool 3720 Evolution (3)
Zool 4060 Comparative Physiology (4)
or Zool 4210 Advanced Human Physiology (4)
or Zool 4220 Endocrinology (4)
Zool 4990 Seminar (1)

Elective Zoology Courses (12 credit hours)
Select a minimum of 12 upper division credit hours.

Zool 3340 Information Resources in the Life Sciences (2)
Zool 3470 Zoogeography (3)
Zool 3500 Conservation Biology (3)
Zool 3730 Population Biology (3)
Zool 4050 Comparative Vertebrate Anatomy (4)
Zool 4100 Vertebrate Embryology (4)
Zool 4120 Histology (4)
Zool 4060* Comparative Physiology (4)
Zool 4210* Advanced Human Physiology (4)
Zool 4220* Endocrinology (4)
**If not taken as a required course*
Zool 4250 Radiation Biology (4)
Zool 4300 Molecular Genetics (4)
Zool 4350 Animal Behavior (4)
Zool 4470 Wildlife Ecology (4)
Zool 4480 Aquatic Ecology (4)
Zool 4500 Parasitology (4)
Zool 4600 Protozoology (4)
Zool 4640 Entomology (4)
Zool 4650 Ichthyology (4)
Zool 4660 Herpetology (4)
Zool 4670 Ornithology (4)
Zool 4680 Mammalogy (4)
Zool 4800* Problems in Zoology (1-4)
Zool 4830* Readings in Zoology (1-4)
Zool 4890* Cooperative Work Experience (1-4)
**No more than 4 combined hours of Zool 4800, Zool 4830, or Zool 4890 may count toward the major.*
Zool 4900 Topics in Zoology (1-4)
Zool 4920 Short Courses, Workshops, etc. (1-4)
Zool 4950 Field Zoology (1-3)
Zool 4970 Thesis (2)
Zool 4980 Research Design (2)
Zool 4990* Seminar (1)

**Zool 4990 may count toward fulfilling the elective hours requirement only if it is additional to the 1 credit required for the major.*

Support Courses Required
Chem PS/1110 Elementary Chemistry (5)
Chem 1120 Elementary Organic/Biochemistry (5)
or
Chem PS/1210/1220 Principles of Chemistry (10)
Chem 2310/2320* Organic Chemistry (10)
or
*Chem 3070 Biochemistry (4)
*Chem 3070 may be taken instead of Chem 2320.
Premedical professional students should take Chem 1210/1220 and Chem 2310/2320.

Math QL1050 College Algebra (4)
or Math QL1080 Pre-Calculus (5)
or Math QL1210 Calculus (4)
Students planning to attend graduate or professional schools are encouraged to take a class in the Calculus series (Math 1210/1220). Premedical professional students are required to take one year of mathematics.

Phsx PS/1010 Intro to Physics (3)
or
Phsx PS/2010/2020 General Physics (8)
& Phsx PS/2010L/2020L Lab (2)
or
Phsx PS/2210/2220 Calculus Physics (8)
& Phsx PS/2210L/2200L Lab (2)
Premedical professional students should take Phsx PS/2010/2020 with labs.

Choose any two (2) Botany or Microbiology courses from the list below. Approval must be obtained from the Botany Department Chair before taking Botany courses numbered 3000 and above. Ecology-oriented students should take at least one Botany class, and Premedical professional students should take at least one Microbiology class.
Botany LS1203 Plant Biology (3)
Botany 2104 Plant Form and Function (4)
Botany 2114 Evolutionary Survey of Plants (4)
Botany 2303 Ethnobotany (3)
Botany 3105 Anatomy & Morphology of Vascular Plants (5)
Botany 3204 Plant Physiology (4)
Botany 3214 Soils (4)
Botany 3454 Plant Ecology (4)

Botany 3504 Mycology (4)
Botany 3514 Algology (4)
Botany 3523 Marine Biology (3)
Botany 3624 Taxonomy of Vascular Plants (4)
Botany 3644 Intermountain Flora (4)
Botany 4113 Plant Evolution (3)
Micro LS/2054 Principles of Microbiology (4)
Micro 3053 Microbiologial Procedures (3)
Micro 3254 Immunology (4)
Micro 3305 Medical Microbiology (5)
Micro 3484 Environmental Micobiology (4)
Micro 3502 Environmental Health (2)
Micro 3853 Food Microbiology (3)
Micro 4054 Microbial Physiology (4)
Micro 4252 Cell Culture (2)
Micro 4554 Virology (4)

- Biology Composite Teaching Bachelor Degree

  Biology Composite Teaching majors must satisfy Teacher Education admission and certification requirements. This program is jointly administered with the Departments of Botany and Microbiology.

  Biological Science Courses Required (47 credit hours)
  Botany 2104 Plant Form and Function (4)
  or Botany 2114 Evolutionary Survey of Plants (4)
  Botany 3624 Taxonomy of Vascular Plants (4)
  Micro LS/2054 Principles of Microbiology (4)
  Zool 1110/1120 Principles of Zoology I & II (8)
  Zool 2200 Human Physiology (4)
  Zool 3300 Genetics (4)
  Zool 3720 Evolution (3)
  Zool 4570 Science Teaching Methods (3)
  Botany 3454 Plant Ecology (4)
  or Zool 3450 Ecology (4)
  Botany 2600 Laboratory Safety (1)
  or Micro 2600 Laboratory Safety (1)

  Biology Electives (7 credit hours)
  Additional biological science courses needed to meet the minimum 47 credit hour requirement should be discussed in advance with the advisor.

  Support Courses Required (26-28 credit hours)
  Chem PS/1110 Elementary Chemistry (5)
  & Chem 1120 Elementary Organic/Biochemistry (5)
  or Chem PS/1210/1220 Principles of Chemistry I & II (10)

Geosci PS/1110 Dynamic Earth: Physical Geology (3)
Phsx PS/1010 Intro to Physics (3)
or Phsx PS/2010 General Physics I (4)
& Phsx PS/2010L Lab (1)
Math QL1050 College Algebra (4)
Hist 3350 History & Philosophy of Science (3)
or Zool 2800 History of the Life Sciences (3)
Comm HU1020 Public Speaking (3)

- Zoology Minor

Course Requirements for Minor
Zoology Courses Required (19 Credit Hours)
Zool 1110 Principles of Zoology I (4)
Zool 1120 Principles of Zoology II (4)
Zool 3720 Evolution (3)

Elective Zoology Courses (8 credit hours)
Select 8 credit hours of Zoology courses at or above the 2000 level.

- Zoology Teaching Minor

Course Requirements for Teaching Minor
Zoology Courses Required (11 credit hours)
Zool 1110 Principles in Zoology I (4)
Zool 1120 Principles in Zoology II (4)
Zool 3720 Evolution (3)
or Botany 4113 Plant Evolution (3)

Elective Zoology Courses (minimum 8)
Select at least 8 credit hours at the 2000 level or above.

Required Support Courses (3 credit hours)
Hist 3350 History & Philosophy of Science (3)
or Zool 2800 History of Life Sciences (3)

- Biotechnician Training Program Associate of Science Degree (A.S.) and Institutional Certificate

This program is designed to meet the needs of the biotechnology industry. Students complete the three-year training program by completing a course of study leading to an Associate of Science degree in the first two years, and a laboratory-intensive course of study in the third year that would qualify them for a Biotechnician Certificate. This program is also jointly administered with the Departments of Botany and Microbiology.

Students should complete the A.S. program in two years and take the laboratory intensive courses for the Institutional Certificate in their third year.

Course Requirements for A.S. Degree

Courses Required (37 credit hours)
Micro LS/2054 Principles of Microbiology (4)
Micro 3053 Microbiological Procedures (3)
Botany 2104 Plant Form and Function (4)
or Botany 2114 Evolutionary Survey of Plants (4)
Zool 1110 Principles of Zoology I (4)
Zool 1120 Principles of Zoology II (4)
Chem PS/1210/1220 Principles of Chemistry I & II (10)
Phsx PS/1010 Intro to Physics (3)
Botany 2600 Laboratory Safety (1)
or Micro 2600 Laboratory Safety (1)
Math QL1050 College Algebra (4)

Course Requirements for Institutional Certificate
Thirty (30) credit hours are to be taken in addition to those courses required for the A.S. Degree.

Required Courses (22 credit hours)
Botany 3204 Plant Physiology (4)
Zool 3300 Genetics (4)
Chem 2310/2320 Organic Chemistry I & II (10)
Micro 4154 Microbial Genetics (4)
or Zool 4300 Molecular Genetics (4)

Electives (select 8 credit hours)
Chem 3030 Quantitative Analysis (3)
Chem 3050 Instrumental Analysis (3)
Chem 3070 Biochemistry I (4)
Micro 3254 Immunology (4)
Micro 4252 Cell Culture (2)
Micro 4354 Industrial Microbiology & Biotechnology (4)
Micro 4553 Virology (3)
Botany 3105 Anatomy & Morphology of Vascular Plants (5)
Botany 3504 Mycology (4)
Botany 3514 Algology (4)
Zool 3200 Cell Biology (4)
Zool 4120 Histology (4)
Zool 4220 Neuroendocrinology (4)
or Zool 4210 Advanced Human Physiology (4)
Zool 4500 Parasitology (4)
or Micro 3305 Medical Microbiology (5)

2. General education/distance education/service courses.

a. General education/Distance Courses
LS1010 - Animal Biology
LS1020 - Human Biology

These two LS courses are our only classes commonly taught at off-campus sites, and they are also offered as online courses.

LS1370 - Principles of Life Science: This course is taught for secondary school teaching students.

b. Service courses
Zoology 2100 - Human Anatomy
Zoology 2200 - Human Physiology
(Though many of our majors take Zoology 2100 and 2200, these courses are also taken by numerous students seeking entry into the health professions from other disciplines.)

- Program Effort for Major/Minor vs. General Education/Service Courses
- Provide a Course Rotation by Year for the Past Three Years
- Processes to Modify the Curriculum

The Zoology faculty regularly determines ways to improve the curriculum. In the past five years, our major curriculum revisions include: adding another alternative (Zoology 4220-Endocrinology) for students to complete the major physiology requirement, and fully restructuring the entry-level Principles of Zoology classes (Zoology 1110 and 1120). The organization of the material in the classes has been substantially altered, and we now employ a team-teaching format in them. As a result of their reorganization, the Zoology 1990 – Zoology Orientation course has been dropped from the curriculum.

We follow a traditional method for addressing curriculum changes. Typically, suggestions for revisions emerge through informal discussions, and then are pursued either in department meetings or through a departmental curriculum committee or subgroup (e.g., those teaching the Principles courses). Recommendations are then made formally through appropriate university channels.

3. Program Effort for Major/Minor and General Education Courses

COURSE	TCH	SCH	TYPE OF COURSE
Zoology 1010 – Animal Biology	171	5958	General Education
Zoology 1020 – Human Biology	168	8910	General Education
Zoology 1110 – Principles of Zoology I	68	4792	Major – required
Zoology 1120 – Principles of Zoology II	64	2624	Major – required
Zoology 2100 – Human Anatomy	208	12620	Primarily service
Zoology 2200 – Human Physiology	91	6976	Primarily service
Zoology 3200 – Cell Biology	52	1556	Major – required
Zoology 3450 – Ecology	40	1116	Major – required
Zoology 3500 – Conservation Biology	16	171	Major – elective
Zoology 3720 – Evolution	52	1131	Major – required
Zoology 4050 – Comparative Vertebrate Anatomy	8	64	Major – elective
Zoology 4060 – Comparative Physiology	28	592	Major – required (option)
Zoology 4100 – Vertebrate Embryology	8	132	Major – elective
Zoology 4120 – Histology	20	332	Major – elective
Zoology 4210 – Advanced Human Physiology	20	344	Major – required (option)
Zoology 4220 – Endocrinology	12	136	Major – required (option)
Zoology 4300 – Molecular Genetics	16	124	Major – elective
Zoology 4350 – Animal Behavior	16	236	Major – elective
Zoology 4470 – Wildlife Ecology and Management	12	160	Major – elective
Zoology 4480 – Aquatic Ecology	12	80	Major – elective
Zoology 4500 – Parasitology	8	112	Major – elective
Zoology 4640 – Entomology	8	52	Major – elective
Zoology 4650 – Ichthyology	12	112	Major – elective
Zoology 4670 – Ornithology	16	220	Major – elective
Zoology 4680 – Mammalogy	16	304	Major – elective
Total:	1142	48854	

	TCH Totals	SCH Totals
General Education	339	14868
Service	299	19596
Major	504	14390

4. Course Rotation for Previous Three Years

FALL 2004		
COURSE	LECTURE	LAB
Zoology 1010 – Animal Biology	2	
Zoology 1020 – Human Biology	2	
Zoology 1110 – Principles of Zoology I	2	6
Zoology 1120 – Principles of Zoology II	1	2
Zoology 1990 – Zoology Orientation	1	
Zoology 2100 – Human Anatomy	2	15
Zoology 2200 – Human Physiology	1	3
Zoology 3200 – Cell Biology	2	2
Zoology 3300 – Genetics	1	1
Zoology 3450 – Ecology	1	1
Zoology 3720 – Evolution	1	
Zoology 3730 – Population Biology	1	
Zoology 4210 – Advanced Human Physiology	1	1
Zoology 4570 – Secondary School Science Teaching Methods	1	1
Zoology 4650 – Ichthyology	1	1
Zoology 4680 – Mammalogy	1	1
Zoology 4800 – Problems in Zoology (1-4 credits)	10 each	
Zoology 4830 – Readings in Zoology (1-4 credits)	10 each	
Zoology 4890 – Cooperative Work Experience (1-4 credits)	1 each	
Zoology 4900 – Topics in Zoology/Biomechanics	1	
Zoology 4970 – Thesis	10	
Zoology 4990 – Seminar	2	
Zoology 5030 – Zoology for Teachers (1-4 credits)	1 each	

SPRING 2005		
COURSE	LECTURE	LAB
Zoology 1010 – Animal Biology	5	
Zoology 1020 – Human Biology	4	
Zoology 1110 – Principles of Zoology I	2	2
Zoology 1120 – Principles of Zoology II	1	3
Zoology 1370 – Principles of Life Science	1	1
Zoology 1990 – Zoology Orientation	1	
Zoology 2100 – Human Anatomy	2	15
Zoology 2200 – Human Physiology	2	6
Zoology 3200 – Cell Biology	1	1
Zoology 3300 – Genetics	1	1
Zoology 3450 – Ecology	1	1
Zoology 3500 – Conservation Biology	1	1
Zoology 3720 – Evolution	1	
Zoology 4050 – Comparative Vertebrate Anatomy	1	1
Zoology 4060 – Comparative Physiology	1	1
Zoology 4220 – Neuroendocrinology	1	1
Zoology 4300 – Molecular Genetics	1	1
Zoology 4350 – Animal Behavior	1	1
Zoology 4500 – Parasitology	1	1
Zoology 4670 – Ornithology	1	1
Zoology 4800 – Problems in Zoology (1-4 credits)	10 each	
Zoology 4830 – Readings in Zoology (1-4 credits)	10 each	
Zoology 4890 – Cooperative Work Experience (1-4 credits)	1 each	
Zoology 4900 – Topics in Zoology/Biomechanics	1	
Zoology 4970 – Thesis	10	
Zoology 4990 – Seminar	2	
Zoology 5030 – Zoology for Teachers (1-4 credits)	1 each	
SUMMER 2005		
COURSE	LECTURE	LAB
Zoology 1010 – Animal Biology	3	
Zoology 1020 – Human Biology	3	
Zoology 1120 – Principles of Zoology II	1	1
Zoology 2200 – Human Physiology	1	1
Zoology 3200 – Cell Biology	1	1
Zoology 4800 – Problems in Zoology (1-4 credits)	10 each	
Zoology 4830 – Readings in Zoology (1-4 credits)	10 each	
Zoology 4890 – Cooperative Work Experience (1-4 credits)	1 each	

FALL 2005		
COURSE	LECTURE	LAB
Zoology 1010 – Animal Biology	6	
Zoology 1020 – Human Biology	4	
Zoology 1110 – Principles of Zoology I	1	6
Zoology 1120 – Principles of Zoology II	1	3
Zoology 2100 – Human Anatomy	2	15
Zoology 2200 – Human Physiology	1	4
Zoology 3200 – Cell Biology	1	1
Zoology 3300 – Genetics	1	1
Zoology 3450 – Ecology	1	1
Zoology 3720 – Evolution	1	
Zoology 4120 – Histology	1	1
Zoology 4210 – Advanced Human Physiology	1	1
Zoology 4570 – Secondary School Science Teaching Methods	1	1
Zoology 4650 – Ichthyology	1	1
Zoology 4680 – Mammalogy	1	1
Zoology 4800 – Problems in Zoology (1-4 credits)	10 each	
Zoology 4830 – Readings in Zoology (1-4 credits)	10 each	
Zoology 4890 – Cooperative Work Experience (1-4 credits)	1 each	
Zoology 4900 – Topics in Zoology/Biomechanics	1	
Zoology 4970 – Thesis	10	
Zoology 4990 – Seminar	1	
Zoology 5030 – Zoology for Teachers (1-4 credits)	1 each	

SPRING 2006		
COURSE	LECTURE	LAB
Zoology 1010 – Animal Biology	4	
Zoology 1020 – Human Biology	5	
Zoology 1110 – Principles of Zoology I	1	3
Zoology 1120 – Principles of Zoology II	1	3
Zoology 1370 – Principles of Life Science	1	1
Zoology 2100 – Human Anatomy	2	15
Zoology 2200 – Human Physiology	2	6
Zoology 3200 – Cell Biology	1	1
Zoology 3300 – Genetics	1	1
Zoology 3450 – Ecology	1	1
Zoology 3500 – Conservation Biology	1	
Zoology 3720 – Evolution	1	
Zoology 4060 – Comparative Physiology	1	
Zoology 4100 – Vertebrate Embryology	1	1
Zoology 4300 – Molecular Genetics	1	1
Zoology 4670 – Ornithology	1	1
Zoology 4800 – Problems in Zoology (1-4 credits)	10 each	
Zoology 4830 – Readings in Zoology (1-4 credits)	10 each	
Zoology 4890 – Cooperative Work Experience (1-4 credits)	1 each	
Zoology 4900 – Topics in Zoology/Biomechanics	1	
Zoology 4970 – Thesis	10	
Zoology 4990 – Seminar	1	
Zoology 5030 – Zoology for Teachers (1-4 credits)	1 each	

SUMMER 2006		
COURSE	LECTURE	LAB
Zoology 1010 – Animal Biology	2	
Zoology 1020 – Human Biology	2	
Zoology 1110 – Principles of Zoology I	1	1
Zoology 2100 – Human Anatomy	1	2
Zoology 2200 – Human Physiology	1	1
Zoology 4800 – Problems in Zoology (1-4 credits)	10 each	
Zoology 4830 – Readings in Zoology (1-4 credits)	10 each	
Zoology 4890 – Cooperative Work Experience (1-4 credits)	1 each	

FALL 2006		
COURSE	LECTURE	LAB
Zoology 1010 – Animal Biology	5	
Zoology 1020 – Human Biology	5	
Zoology 1110 – Principles of Zoology I	2	6
Zoology 1120 – Principles of Zoology II	1	2
Zoology 1990 – Zoology Orientation	1	
Zoology 2100 – Human Anatomy	2	16
Zoology 2200 – Human Physiology	2	6
Zoology 3200 – Cell Biology	1	1
Zoology 3300 – Genetics	1	1
Zoology 3450 – Ecology	1	1
Zoology 3720 – Evolution	1	
Zoology 4060 – Comparative Physiology	1	1
Zoology 4120 – Histology	1	1
Zoology 4210 – Advanced Human Physiology	1	1
Zoology 4470 – Wildlife Ecology and Management	1	1
Zoology 4480 – Aquatic Ecology	1	1
Zoology 4570 – Secondary School Science Teaching Methods	1	1
Zoology 4680 – Mammalogy	1	1
Zoology 4800 – Problems in Zoology (1-4 credits)	10 each	
Zoology 4830 – Readings in Zoology (1-4 credits)	10 each	
Zoology 4890 – Cooperative Work Experience (1-4 credits)	1 each	
Zoology 4900 – Topics in Zoology/Biomechanics	1	
Zoology 4970 – Thesis	10	
Zoology 4990 – Seminar	2	
Zoology 5030 – Zoology for Teachers (1-4 credits)	1 each	

SPRING 2007		
COURSE	LECTURE	LAB
Zoology 1010 – Animal Biology	6	
Zoology 1020 – Human Biology	5	
Zoology 1110 – Principles of Zoology I	1	3
Zoology 1120 – Principles of Zoology II	1	4
Zoology 1370 – Principles of Life Science	1	1
Zoology 2100 – Human Anatomy	2	16
Zoology 2200 – Human Physiology	2	6
Zoology 3200 – Cell Biology	1	1
Zoology 3300 – Genetics	1	1
Zoology 3450 – Ecology	1	1
Zoology 3500 – Conservation Biology	1	
Zoology 3720 – Evolution	1	
Zoology 4050 – Comparative Vertebrate Anatomy	1	1
Zoology 4060 – Comparative Physiology	1	
Zoology 4220 – Endocrinology	1	1
Zoology 4300 – Molecular Genetics	1	1
Zoology 4350 – Animal Behavior	1	1
Zoology 4650 – Ichthyology	1	1
Zoology 4800 – Problems in Zoology (1-4 credits)	10 each	
Zoology 4830 – Readings in Zoology (1-4 credits)	10 each	
Zoology 4890 – Cooperative Work Experience (1-4 credits)	1 each	
Zoology 4900 – Topics in Zoology/Biomechanics	1	
Zoology 4970 – Thesis	10	
Zoology 4990 – Seminar	2	
Zoology 5030 – Zoology for Teachers (1-4 credits)	1 each	

SUMMER 2007		
COURSE	LECTURE	LAB
Zoology 1010 – Animal Biology	2	
Zoology 1020 – Human Biology	2	
Zoology 2100 – Human Anatomy	1	2
Zoology 2200 – Human Physiology	1	1
Zoology 4640 – Entomology	1	
Zoology 4800 – Problems in Zoology (1-4 credits)	10 each	
Zoology 4830 – Readings in Zoology (1-4 credits)	10 each	
Zoology 4890 – Cooperative Work Experience (1-4 credits)	1 each	

D. Student Learning Outcomes and Assessment

These are the Learning Outcomes expected by the Department of Zoology; these were adopted in the 2000-01 academic year.

1. Students will understand these six basic principles:
   - The nature of scientific inquiry as it relates to the acquisition of biological knowledge
   - The role of evolution as the major unifying principle in biology
   - The importance of genetics to the evolutionary continuity and diversity of life
   - The relationship between structure and function in the organization of animals
   - The organization of life from molecules and cells to organisms and ecosystems and how the interactions among these levels have shaped life on Earth
   - The ecological relationship between humans and other organisms and the increasingly significant impact that human activity has on the biosphere
2. Students will appreciate the ecological, aesthetic, economic, and scientific value of animals.
3. Students will be aware of career opportunities available to a zoology graduate and will learn how to prepare themselves for employment and for professional or graduate school education.
4. Students will acquire the skills necessary for a successful career in biology, including proficiency in computer applications, laboratory and field research techniques, written and oral communication, and reading and critically evaluating scientific literature.
5. Data collected on student learning outcomes, including how/when data was collected.

   The Zoology faculty feel that the above learning outcomes adequately address the standards in the Program Review guidelines, and have used this data to assess our program and will continue to do so.

Results of Assessment

a. Direct measures

i. Grade point averages.

Grade Point Averages			
Assessment	**Graduates**	**Median**	**Mean**
2005-2006	32	3.33	3.26
2004-2005	41	3.22	3.29
2003-2004	55	3.39	3.38
2002-2003	45	3.49	3.37
2001-2002	28	3.55	3.43

ii. Performance on standardized exams

- Medical College Admissions Test (covers verbal reasoning, biological sciences, and physical sciences; maximum score is 45)

Performance on Standardized Exams			
Assessment	**Applicants**	**Median**	**Mean**
2005-2006	58	26	25.5
2004-2005	67	24	25
2003-2004	48	27.0	27.4
2002-2003	Data unavailable		
2001-2002	10	3.0	30.5

(This is the only test for which data are currently available; not all of these students are Zoology majors, although the majority are)

iii. Laboratory exercises

Nine courses, which were regularly offered during the five years of this study, required written laboratory reports that summarize student laboratory exercises. These are written in the style of a scientific paper, complete with introduction, materials and methods, data analysis and presentation, discussion, and bibliography of primary literature. In upper division courses, a typical report is six pages in length and is submitted as a draft, which is revised based on instructor comments. For example, during the 2005-2006 academic year 1,026 students submitted a total of 1,000-1,500 reports. We are confident that such exercises should enhance the writing and critical thinking skills of our students.

iv. Theses and capstone projects

- Thirty-nine students have presented their findings at national and international meetings, including Gordon Research Conferences, Society for Integrative and Comparative Biology, American Society of Ichthyologists and Herpetologists, Ecological Society of America, American Ornithologists' Union, the SSB/ASN/SSE Evolution meeting, Society for Molecular Biology and Evolution, and the National Council on Undergraduate Research (NCUR).

- Eight Bachelor of Integrated Studies graduates completed a BIS thesis with a Zoology emphasis.

v. Time to graduation

Time to Graduation			
Assessment	**Graduates**	**Median (years)**	**Mean (years)**
2005-2006	32	6.5	6.76
2004-2005	41	8	6.24
2003-2004	55	6.00	6.11
2002-2003	Data unavailable		
2001-2002	28	4	4.57

b. Indirect Measures

i. Internships/Job placement

Internships/Job Placement			
Assessment	**Graduates**	**Employed in Zoology-related fields**	**Looking for work in Zoology-related fields**
2005-2006	32	5	3
2004-2005	41	5	3
2003-2004	55	3	2
2002-2003	45	4	8
2001-2002	28	9	3

ii. Graduate and professional school acceptance

Graduate and Professional School Acceptance							
Assessment	**Graduates**	**Medical School**	**Dental School**	**Graduate School**	**Optometry School**	**Veterinary School**	**Chiropractic School**
2005-2006	32	9	3	3	1		
2004-2005	41	5	3	3			1
2003-2004	55	5	2	3	1	1	
2002-2003	45	6	2	1	1	1	
2001-2002	28	8	2	1		1	

Preparing Application			
Assessment	**Graduates**	**Professional School**	**Graduate School**
2005-2006	32	11	4
2004-2005	41	12	5
2003-2004	55	25	5
2002-2003	45	16	5
2001-2002	28	4	4

iii. Exit interview

(See “Department of Zoology Assessment Questionnaire Results” below)

3. Interpretation

From results of previous assessment and program reviews, a clear strength of the Department of Zoology continues to be its commitment to quality undergraduate advising and instruction. These strengths are reflected in the results of assessment summarized here.

- Zoology continues to be a popular major, with substantial, often increasing, numbers of majors and graduates from year to year.
- Pre-professional training (medical/dental/veterinary) still represents the most popular focus of zoology majors.
- The Department of Zoology has made a strong commitment to developing the writing, critical thinking, and quantitative skills of its majors. This is demonstrated by the tremendous effort made by faculty in requiring and evaluating laboratory reports in which students summarize their own experimental observations.

	2005-2006 n=32	2004-2005 n=41	2003-2004 n=55	2002-2003 n=45
Question	**Rating (lowest=1 highest=5)**			
1. After completing my degree, my knowledge of the scientific method is:	**4.4**	**4.6**	**4.7**	**4.8**
2. After completing my degree, my knowledge of evolution is:	**4.4**	**4.5**	**4.4**	**4.5**
3. After completing my degree, my knowledge of genetics is:	**4.6**	**3.8**	**4.2**	**4.5**
4. After completing my degree, my knowledge of the structure and function of animals is:	**4.5**	**4.5**	**4.7**	**4.5**
5. After completing my degree, my knowledge of the organization of life, from molecules to ecosystems is:	**4.6**	**4.5**	**4.7**	**4.3**
6. After completing my degree, my knowledge of ecology and the effect of humans on the biosphere is:	**4.2**	**4.4**	**4.6**	**4.4**
7. My education in zoology has provided me with an awareness of career opportunities available in zoology.	**2.5**	**3.5**	**4.0**	**3.6**
8. My education in zoology has prepared me for employment or for graduate or professional school.	**4.2**	**4.5**	**4.6**	**4.7**
9. My education in zoology has provided me with an understanding of how scientific ideas are communicated.	**4.1**	**4.4**	**4.6**	**4.6**
10. My education in zoology has enhanced my oral and written communication skills.	**4.1**	**4.2**	**4.3**	**4.3**
11. My education in zoology has enhanced my critical thinking abilities.	**4.4**	**4.8**	**4.5**	**4.7**

Note 2006-2007 data were not collected (inadvertently); thus data from the previous 4 years are reported above.

E. Academic Advising

The following information depicts the Department's advising program. Many changes leading to our present structure have been based on our assessment of advising. These include: the hiring of a premedical secretary who assists with advising, working closely with the College of Science Academic Advisor, and the sharing of premedical professional advising with Department of Microbiology faculty, and those in other departments.

1. Individuals and processes used to advise major/minor students.

   The Department of Zoology dedicates a significant amount of effort to student advising. We house the institution's premedical professional advisor, who also doubles as the preoptometry, prepodiatry and prechiropractic advisor, a

preveterinary advisor, and other preprofessional advisors. The predental and prephysician's assistant advisors are in the Department of Microbiology. The premedical advisor also serves as the faculty advisor of Weber State University's chapter of the national premedical honor society Alpha Epsilon Delta, as well as for the University's chapter of The Hope Alliance, a very active humanitarian organization.

W.S.U. has enjoyed great success in placing students in medical, etc. colleges. The average rate of acceptance to medical colleges over the last 5 years is approximately 60%; the national average, as well as the average for Utah applicants in general is approximately 45%. Given that we are an open-admissions institution, this high acceptance rate is even more impressive. Annual rates of admission to dental and veterinary medicine schools are usually 100%. These success stories are in part attributable to our dedication and effectiveness in advising.

We also have separate advisors for wildlife ecology, biotechnology, and graduate school admissions. This system of separate advising seems to be effective in providing guidance to students.

Our departmental secretary is exceptionally well-versed about our programs, and serves as an excellent initial source of information about them. Premedical students are also initially advised by a staff person in this role. Students in the College of Science are also advised by its liaison with the university's Academic Advisement office, and receive career counseling from another individual with the Office of Career Services.

Finally, the Department of Zoology has considerable information about its programs and faculty on our webpages at http://weber.edu/zoology. The site is a useful additional advising tool.

Zoology Advisors

Mrs. Tara Diamond	Department Secretary, General advising
Mrs. Susan Himelright	Premedical Secretary, Premedical advising
Mrs. Ali Miller	College of Science Academic Advisor, General advising
Mr. Greg Nielsen	College of Science Career Counselor & Employment Advisor
Dr. Barb Trask	Premedical, Preoptometry, Prechiropractic, and Prepodiatry advisor
Dr. Karen Nakaoka*	Prephysician Assistant advisor
Dr. Matthew Domek*	Predental advisor
Dr. Ron Meyers	Preveterinary advisor and Graduate School advisor
Dr. Don Davies**	Prepharmacy advisor
Mrs. Valerie Herzog***	Prephysical and Occupational Therapy advisor
Dr. Jon Clark	Biotechnician advisor
Dr. John Cavitt	Wildlife and Conservation Ecology advisor
Dr. John Mull	Bachelor of Integrated Studies advisor
Dr. Sharon Ohlhorst****	Biology Teaching advisor
Dr. Sam Zeveloff	Department Chair, general advising, graduation advising, transfer student and credit evaluation advisor, major and minor advising

*Department of Microbiology
**Department of Chemistry
***Department of Health Promotion and Human Performance
***Director, Center for Science and Mathematics Education

All Zoology faculty and staff serve as advisors. Students are initially directed to particular faculty based upon an alphabetical listing of the student's last name.

F. Faculty

The Department of Zoology normally has 12 full-time (FTE) faculty and a small, variable number of adjuncts teaching each year. There are no contract part-time faculty. However, three of the faculty have reduced teaching responsibilities: Dr. John Cavitt due to his assignment as Director of Undergraduate Research for the institution, Dr. Barb Trask given her role as Premedical Advisor, and Dr. Sam Zeveloff as he is the Chair of the Department.

Orientation and mentoring procedures for faculty and staff are informal within the Department. The Chair assumes the responsibility for informing personnel about their responsibilities, works with them so they know what is needed to excel in their positions, and informs them about development activities (such information is widely available through on and off-campus sources). There are various

orientation activities sponsored by other campus offices, such as Human Resources and Academic Affairs.

Our contract faculty undergo several types of evaluation to assess the quality of their teaching. These conform with the methods and policies proscribed by the College of Science and the University, which will be reviewed shortly. It should be mentioned that faculty regularly engage in discussions about their courses and teaching methods with one another. This interaction provides individuals with feedback on how to approach various aspects of their teaching. Such dialogue forms the basis for an informal "peer-review" of one another's teaching as part of one's regular professional endeavors.

The performance of our adjunct faculty, which includes their pedagogy, is regularly reviewed by the Department Chair. Contract faculty provide input on adjunct faculty, especially if they are teaching courses in their subject area. On-line versions of courses are reviewed and subject to approval by the contract faculty. In reviewing our adjunct faculty, the Chair considers their syllabi and other course materials, observes their teaching, engages in discussion with them about their approaches, and considers their student evaluations.

As stated, the evaluation of the teaching of our contract faculty follows standard policies and procedures. All such faculty in the College of Science are reviewed annually. The consideration of their teaching accomplishments and performance normally plays the most significant part of this review. Attached here (Appendix E) is the form used as the basis for these reviews, which precedes a formal discussion and rankings with the Department Chair. The findings recorded on this form are discussed with the Dean of the College of Science.
Of course, there are various policies that govern the formal evaluation of teaching of contract faculty for their promotion and tenure. Promotion and tenure guidelines for all university contract faculty are provided in Section VIII of the institution's Policy and Procedure Manual which is available on-line (see http://documents.weber.edu/ppm/PPM8.htm). The most relevant portions of this section are 8-11 through 8-20, which are under the heading "Promotion and Tenure Guidelines." Tenure at Weber State University is governed by the separate colleges. Therefore, the College of Science has a tenure policy which is provided here (Appendix F).

Between 2002-2007, the above mentioned review processes were used to make numerous decisions and recommendations concerning merit pay, promotion, and tenure.

The Program Review directions ask for additional information, such as a description of the teaching standards and an indication for how faculty are made aware of these standards. All faculty, whether full-time tenure-track or adjuncts, are aware that teaching is the most important element of their work at Weber State University. We have high standards for all aspects of teaching. Professors are encouraged to be creative, caring, use appropriate technology, develop

challenging laboratories, encourage critical thinking and writing, and fully engage students in their research programs. Indeed, it is clear from the onset of the hiring process that we seek excellence in teaching and that research with students is expected. (Some of these goals are not possible with adjunct faculty.) Teaching methodologies and philosophies are commonly discussed amongst the faculty and in formal reviews.

To identify "typical faculty pedagogies" we have included faculty syllabi for our courses (Appendix G). These describe the various approaches that are employed in our general education, service, required major, and elective classes.

In determining teaching quality for contract faculty, we employ the criteria on the student teaching evaluation forms (Appendix H), and those categories listed on the Professional Files used for promotion and tenure reviews. We also conduct, as is required by university policy, a "peer review" of teaching as part of those evaluations. Faculty being reviewed prepare teaching portfolios which include the various materials used in their courses, as well as statements about their teaching philosophy and approaches. As indicated, adjunct faculty are reviewed using student teaching evaluations and through discussions with the department chair.

There are numerous "Faculty Standards" listed in the university's Program Review policy. To best illustrate how the Department of Zoology's faculty meet these standards, their curricula vitas are provided in Appendix I. It should be evident from this material that the faculty's composition is well suited to the program's missions of providing an outstanding undergraduate zoology major (which includes preparing students for postgraduate education and careers), as well as offering appropriate general education and service-related courses.

The size of the department is well suited to offering our courses in a timely, sequential fashion. We have grown by one full-time faculty during the past five years, from 11-12, although this growth is offset by the aforementioned reduced teaching roles of the Premedical Advisor and the Director of Undergraduate Research.

We seek faculty with those qualifications suited for teaching and doing research with undergraduate students. All have doctorates, postdoctoral research and/or teaching experience, fine publication records, and are from institutions from throughout North America. Faculty teaching assignments, typically at least two courses with laboratories, and service responsibilities, are coordinated and articulated by the department chair. We do not employ more than 2-3 adjuncts per semester. Those hired typically have advanced degrees in biology.

Highlighted Activities

In order to illustrate the types of high quality faculty endeavors in our department, I will provide a brief review of several outstanding projects. The first example is a brief discussion of the **6th International Conference on Nemertean Biology**, which was organized by Dr. Robert Okazaki. The conference convened at Weber State University June 21, 2004. Twenty participants were in attendance. The two-day conference was divided into two sessions. The consensus among participants was that the meeting was successful and exceptionally conducive to stimulating critical discussion. Prior to the conference, a one-day workshop on developing a nemertean list-server and personal pages on the Smithsonian Institution *Nemertes* website was attended by 12 participants and resulted in numerous constructive suggestions for supplementing this important resource for nemertean biologists. Various Department faculty and students participated in this conference.

In the summers of 2004 and 2005, Drs. John Cavitt and Ron Meyers hosted a National Science Foundation supported program: **Research Experience for Undergraduates in the Biology of the Greater Salt Lake Ecosystem**. This program provided support for ten students in each of two years to conduct full-time (ten weeks) independent research collaboratively with a faculty member from a department within the College of Science here. Students that participated in this program conducted research on the biology of the Great Salt Lake Ecosystem. Research was conducted on a diversity of taxa and at different levels of organization, from the molecular to the ecosystem level. Students applied to the program and upon acceptance were matched with a research mentor. This program targeted four student populations: those interested in attending graduate school, students from institutions where research opportunities are limited, women and underrepresented minorities, and nontraditional students. The major components of the program were: an orientation, independent research projects, a seminar on the biology of the Great Salt Lake Ecosystem, a research tools workshop, a course on research ethics, field trips, social events, and an end-of-program symposium. We felt that participation in this REU program transformed students from passive learners to active investigators. Students learned the process of science by active involvement in research and came to understand the sense of community that cooperation in research promotes. Our program encouraged participation in research by providing role models and close interaction with faculty mentors. The impact of this program was to provide students with the opportunity to assess their desire toward graduate school and gain first hand knowledge of the application of the scientific method.

It is worth noting that the student who worked with Dr. Jon Clark on that program, Eric Gabrielsen, was the sole individual selected from Utah to participate in the **Posters on the Hill** session in Washington, D.C., organized by the Council of Undergraduate Research. This exciting work addressed the genetic characterization of brine flies from the Great Salt Lake area.

Another noteworthy faculty research project occurs on the Great Salt Lake (GSL). This area is one of the most important inland sites for migrating and breeding shorebirds, waterfowl, and other aquatic birds in North America. Its importance has been recognized by numerous state and federal conservation plans and by its inclusion as a site of **Hemispheric Importance** within the Western Hemispheric Shorebird Reserve Network. Landscape fragmentation, impaired water quality, heavy metal contamination, invasive species as well as increasing impacts of predators have been implicated as current threats to its waterbird populations. These threats can directly influence populations through reductions in productivity or survival. Effective conservation and management of waterbird populations within the GSL requires an understanding of 1) the environmental and demographic causes of population problems; 2) the habitat requirements necessary for sufficient reproductive success and survival to ensure population maintenance; 3) how demographic and habitat factors interact to create population sources and sinks; and 4) how the utilization and management of the GSL may impact waterbird population demography. Dr. John Cavitt's studies have begun to examine these questions for waterbirds throughout the entire GSL ecosystem. His program has received over $430,000 in funding from federal, state, and non-governmental organizations to support this effort.

The last project to be described is one that Dr. Ron Meyers is doing with the National Institutes of Health. Dr. Meyers' lab is presently in the third year of a 5-year NIH grant in collaboration with Dr. Franz Goller of the University of Utah. He is examining the structure and function of the muscles that control the vocal organ of songbirds, the syrinx. Thus far, he has identified two populations of muscle fibers in the syringeal of both male and female European Starlings. A small fiber type (mean diameter 14-20 µm for all muscles) comprised roughly 30% of the muscles and reacted like fast oxidative muscle fibers with their histochemical reactions. A larger fiber type (mean diameter 31-38 µm for all muscles) comprised about 70% of the muscles and reacted like superfast muscle fibers, as described for rattlesnake tailshaker muscles. Similar patterns of fiber types and sizes were also found in species from three other songbird families, indicating that the presence of superfast fibers is likely a common trait of the songbird syrinx. Two further aspects of this research are in-progress: these include a development of an antibody to react with the superfast fibers and a study of Zebra Finch syringes; in Zebra Finches, females do not sing and do not possess any superfast muscle. Dr. Meyers has involved seven undergraduates thus far in research associated with this grant, and has presented data at two national and one international meeting, in addition to Weber State University's Undergraduate Research Symposium.

G. Support Staff, Administration, Facilities, Equipment and Library

There is one full-time professional staff person, the Laboratory Manager, and one full-time classified staff member, the Secretary. Each has excellent credentials and is responsible for diverse, critical activities such as working with student records, public relations, equipment ordering, laboratory set-ups, and assistance with the budget. The Laboratory Manager employs several students on a part-time basis to assist with laboratory preparation and maintenance activities.

The staff is evaluated informally by the Chair, with input from other faculty. Formal annual reviews are based upon the university's Performance Review and Enrichment Program (PREP) system; the process and forms used in this evaluation system are available at http://departments.weber.edu/hr/PREP/forms.htm. The evaluation process has helped the chair and staff to identify areas of concern pertaining to management of the office and teaching laboratories.

The Library's holdings are adequate in supporting our mission and programs. We have enjoyed a good relationship with the Library's science representative. This individual previously taught a library resources course.

The Department has four major teaching laboratories, a laboratory preparation area and a specimen collection room, on the 4th floor of the Science Lab Building, the area where our main office is located.

In 1998, we opened a new teaching laboratory for the Human Anatomy course. This class is a special part of our program, serving about 550 students per year. It involves numerous laboratory sections. Students receive sophisticated training on cadavers which are in various stages of "prosection." We are able to purchase four cadavers each year with funding support from a local maxillofacial surgeon.

Another unique facility is our DNA Laboratory. This is the only such teaching laboratory in the state solely dedicated to undergraduate instruction. It was largely funded through a National Science Foundation instrumentation grant with matching university funding. It strongly facilitates sophisticated student research projects, and serves as the teaching laboratory for our Molecular Genetics course and portions of the Genetics class. The Department provides supplies and occasionally equipment upgrades for this vital facility. It is a focal point for several faculty and many students.

The Department has made a concerted effort to upgrade its equipment holdings. Several years ago, we received $100,000 in grant support from the regional Willard L. Eccles Charitable Foundation to obtain new equipment for the teaching of cell biology, as well as anatomy and physiology. In 2007, we obtained approximately an additional $120,000 from the Lampros and Stewart Foundations to purchase equipment for our Premedical Program. Some of the

major items acquired at this time include: a low activity liquid scintillation analyzer - computer-controlled benchtop analyzer for detecting small amounts of alpha, beta and gamma radioactivity ($22,500); a molecular imager system - multicolor fluorescent imaging system capable of imaging direct chemiluminescence, chemi-fluorescence, and densitometric images ($20,750); a refrigerated centrifuge - performs high-speed separations, including cell gradient spins, nucleic acid precipitations, DNA mini-preps, protein precipitations, phase extractions, spin columns, and subcellular fraction pelleting ($11,100); and an inverted microscope - inverted transmitted-light/incident-light fluorescence microscope for the examination of cells and/or tissue specimens ($12,000).

We have a student computer laboratory in one of our classrooms. Students have access to such software as Sigmaplot, Respiratory Physiology, PowerPoint, and JMP Statistics on seven computers. We often replace existing computers with upgraded models.

The final unique item for consideration here is the quality of our specimen collections for teaching courses about certain groups of animals. For an institution of our type, we are fortunate in having a very good collection of mammal, bird, fish, and insect specimens, as well as those from other taxa.

We do not have a replacement schedule for our equipment. Rather, to be most cost-effective, we try to maximize equipment longevity through care and maintenance. We also attempt to capitalize on funding opportunities for new and replacement equipment, as indicated.

Last, the College of Science was recently given a $2 million gift to name and support our excellent premedical program. This generous donation has resulted in the new name: The Dr. Ezekiel R. Dumke Family Premedical Program. When fully funded over the next few years, it will result in a substantial new budget for equipment and materials for the Department of Zoology and other departments in the College.

The Department of Zoology works closely with the College of Science liaison with the university's Development Office. This relationship has been instrumental in obtaining the aforementioned gifts. Without such assistance, it would indeed be more difficult to purchase equipment for our programs. We understand that in today's budget climate it is important for public institutions to seek outside sources of funding.

H. Relationships with External Communities

There are many ways in which the Department of Zoology interfaces with external communities. These activities, while loosely coordinated through the Department Chair's office, are not organized in a formal sense. One of the most frequent ways in which the Department is involved with the local community is by its faculty and staff responding to questions and concerns about animals. Our

Secretary, Tara Diamond, fields these calls and directs them to the appropriate person.

We cooperate with the regional secondary school community in many ways. High school and other groups tour our facilities. These visits are organized by our Laboratory Manager, Susan Gurr, and have also been led by the recipients of the department's University Activity Scholarship. We have also conducted tours of our anatomy teaching laboratory for the area's high school teachers and students. In a few cases, faculty have even served as mentors to high school students.

We cooperate with the university's Center for Science and Mathematics Education in its various efforts. For example, Zoology faculty regularly participate in the S4 "Science Seminars for Superior Students" program. Members of our faculty and staff frequently serve as judges for the regional science fairs for middle and high school students which are held at the university. The Department is also involved in such conferences as "Expanding Your Horizons" (which focuses on attracting young women to science and mathematics careers), through use of its facilities and the contributions of its faculty and staff.

The Dr. Ezekiel R. Dumke Family Premedical Program, which is housed in the Department, facilitates interactions with various external communities. This program has developed and administers the Preceptorship Program, in which our students "shadow" physicians to learn directly about what they do on a daily basis. The Premedical Program is an active participant in the Hope Alliance through which our students and medical practitioners travel to disadvantaged countries to provide medical assistance. Our students attempt to raise money to support this effort in the local community. The Department serves as the host of various student organizations affiliated with the Premedical Program, such as the university chapter of Alpha Epsilon Delta (the premedical honor society). This organization invites speakers from the region's medical community, providing yet another vehicle through which the Department connects with this group.

The Department works closely with different elements of the region's natural resources management and education communities. Several faculty have served on the Board of Directors of the Ogden Nature Center. Other faculty cooperated with such state agencies as the Division of Wildlife Resources on research and teaching projects. Though such interactions with these natural resource programs are not formally organized, they have regularly occurred throughout the Department's history, and should continue given our faculty's interests and dedication to the goals of such organizations.

Last, the Department plays the lead role in a University administrative-standing committee, the Animal Care and Use Committee. This group oversees the use of animals in research and teaching projects. Its members include a local veterinarian and a representative from the area's clergy. The committee chair

meets with and responds to the directives of a United States Department of Agriculture employee charged with assessing the institution's activities in this area. Thus, by its involvement in the committee (which normally at least consists of having a Zoology faculty member serve as its chair and having our laboratory manager serve on it, the Department also interacts with yet another segment of its external community.

Note: no appendix used here; all information descriptive.

I. Results of Previous Program Review and Future Directions

Following is an edited version of the Department of Zoology's response to its Program Review Team's report of October 2002. This also serves as a basis for addressing future directions.

Along with the previous Review Team, we recognized that we are hampered by a lack of space for teaching, research, and other activities. Our Dean and central administration are cognizant of the space problems of the Department, as well as much of the rest of the College of Science, and are trying to solve this problem. We suggest that pursuit of private and state funding for a "Phase II" of the Science Lab Building should be made one of the institution's highest priorities. There is a long lag between the time when a building is approved and when it is ready. Our circumstances and those of the other departments are likely to become more acute in the near future. We continue to collaborate with the Dean and the Development Office to cultivate potential donors for our programs.

We agreed with the Team's suggestions that our Department would be better served by a closer configuration of its classrooms and research spaces. Yet we understand the logistic difficulties in fostering such a shift. Having our facilities spread over three buildings has imposed challenges for our faculty and staff. The Department has worked assiduously to develop new facilities such as the DNA laboratory and the Human Anatomy classroom, but has not always received an increase in the funding required to support such facilities. In addition, within the last 5 years we completed the construction of new office spaces, research laboratories, and an ecology teaching laboratory in the Engineering Technology building. We concurred with the Team's statement about our program lacking sufficient funding.

While pleased to have been able to construct a dedicated Human Anatomy laboratory, we recognize its shortcomings. Presently, our faculty for this course are modifying the courses organization, especially in regards to the training of its laboratory instructors. We could greatly benefit from a larger, well designed facility. Some remodeling and environmental systems improvements were made in Summer 2006.

The Review Team has suggested that we reorganize the premedical advising program. This has been a subject of discussion within the Department and

College for some time. Although pleased by the long-term success of this program, certain changes should be enacted for this success to continue. Our recommendations paralleled those of the Team: we believe that our students and faculty advisers would be best served by 1) the establishment of a university administrative standing committee on premedical advisement, and 2) establishing an office of premedical advisement housing a professional staff person who would assume significant advising responsibilities. Indeed, the new Premedical Advisor, Dr. Barb Trask, has implemented the second recommendation. She has plans to develop new courses to enhance application success. We are highly optimistic about this program's continued development, under her leadership, and with its recent endowment as the Dr. Ezekiel R. Dumke Family Premedical Program.

Over the next five to seven years, we anticipated that the Department of Zoology would continue its efforts to provide its students with an excellent education. We recognized that this would be difficult given rising costs for equipment and supplies, and the need to implement often increasingly expensive technologies into our classrooms and laboratories. One way in which we planned to meet this problem is through modest student laboratory fees. Beginning in 2002-03, these were required in our Human Anatomy and Human Physiology courses, and we planned to propose such fees for others over the next few years. This has now been done and the additional funds have provided an important source of money for the Department. The following courses now have laboratory fees:

ZOOL 1110 – Principles of Zoology I – $20.00
ZOOL 1120 – Principles of Zoology II – $20.00
ZOOL 2100 – Human Anatomy – $25.00
ZOOL 2200 – Human Physiology – $25.00
ZOOL 3200 – Cell Biology – $25.00
ZOOL 3300 – Genetics – $25.00
ZOOL 3450 – Ecology – $25.00
ZOOL 4060 – Comparative Physiology – $25.00
ZOOL 4220 – Endocrinology – $25.00
ZOOL 4210 – Advanced Human Physiology – $25.00

The previous Program Review team noted our Department's exceptionally strong involvement of undergraduates in research. Since that review, we have continued on this path. The University has established an Office of Undergraduate Research of which one of our faculty, Dr. John Cavitt, is its Director. This office has provided, on a competitive basis, significant support for student stipends and travel, as well as for materials. Such support has helped our activity in this area to flourish (without a concomitant drain on our budget). As described earlier in this report, we have dozens of students engaged in a wide array of research projects in the field and laboratory. Many have presented their findings at scientific meetings. In every conceivable way, student research is a critical aspect of our endeavors.

In the past five years, Zoology faculty have published 16 peer-reviewed papers on research conducted at Weber State, 12 of which have included undergraduate student co-authors. Thirty-nine students have presented their findings at national and international meetings, including Gordon Research Conferences, Society for Integrative and Comparative Biology, American Society of Ichthyologists and Herpetologists, Ecological Society of America, American Ornithologists' Union, the SSB/ASN/SSE Evolution meeting, Society for Molecular Biology and Evolution, and the National Council on Undergraduate Research (NCUR).

In the foreseeable future, we will continue on the main pathways described: excellence in teaching and learning in general education, service, and majors courses; an outstanding commitment to premedical professional training; our substantial involvement of increasing numbers of students in research; and the ongoing development of sources of external funding, which will help us to continue to acquire state-of-the-art equipment for teaching and research.

Undoubtedly, our program will be shaped to a large extent by the unique talents and expertise of the faculty. In the past few years, we have hired individuals with expertise in molecular cell biology, invertebrate genetics and physiology, stream ecology, physiological ecology, and nutritional physiology. The nurturing and growth of their programs, and the ongoing development of the faculty, will shape the future of the Department of Zoology.

APPENDIX A

Department of Zoology

Student and Faculty Statistical Summary

(data provided by Institutional Research)

	2002-03	2003-04	2004-05	2005-06	2006-07
Student Credit Hours Total [1]	**10,546**	**10,225**	**11,097**	**10,233**	**10,120**
Student FTE Total [2]	**351.53**	**340.83**	**369.90**	**341.10**	**337.33**
Student Majors [3]					
Zoology	293	305	249	390	347
Program Graduates [4]					
Bachelor Degree	48	56	41	37	29
Student Demographic Profile [5]	**293**	**305**	**249**	**390**	**347**
Female	121	119	91	138	137
Male	172	186	158	252	210
Faculty FTE Total [6]	**13.8**	**13.58**	**13.09**	**12.21**	**13.75**
Adjunct FTE	3.2	3.42	3.55	4.17	4.19
Contract FTE	10.6	10.16	9.54	8.04	9.56
Student/Faculty Ratio [7]	**25.47**	**25.10**	**28.26**	**27.94**	**24.53**

[1] **Student Credit Hours Total** represents the total department-related credit hours for all students per academic year. Includes only students reported in Banner system as registered for credit at the time of data downloads.

[2]**Student FTE Total** is the Student Credit Hours Total divided by 30.

[3]**Student Majors and Minors** is a snapshot taken from self-report data by students in their Banner profile as of the third week of the Fall term for the academic year.

[4]**Program Graduates** includes only those students who completed all graduation requirements by end of Spring semester for the academic year of interest. Students who do not meet this requirement are included in the academic year in which all requirements are met. Summer is the first term in each academic year.

[5]**Student Demographic Profile** is data retrieved from the Banner system.

[6]**Faculty FTE** is the aggregate of contract and adjunct instructors during the fiscal year.

[7]**Contract FTE** includes instructional-related services done by "salaried" employees as part of their contractual commitments. **Adjunct FTE** includes instructional-related wages that are considered temporary or part-time basis. Adjunct wages often include services provided at the Davis campus, along with on-line and Continuing Education courses.

[8]**Student/Faculty Ratio** is the Student FTE Total divided by the Faculty FTE Total.

APPENDIX B
Department of Zoology

Contract Faculty Profile

NAME	GENDER	ETHNICITY	RANK	TENURE STATUS	HIGHEST DEGREE	YEARS OF TEACHING			AREAS OF EXPERTISE
						WSU	Other	TOTAL	
Dr. John Cavitt	M		Associate Professor	Y	Ph.D.	8	2	10	Avian Ecology and Conservation
Dr. Brian Chung	M		Assistant Professor	N	Ph.D.	½	2 ½	3	Regulation of intestinal nutrient transport
Dr. Jonathan Clark	M		Professor	Y	Ph.D.	9	0	9	Molecular evolutionary genetics
Dr. Christopher Hoagstrom	M		Assistant Professor	M	Ph.D.	1 ½	½	2	Fish ecology and conservation
Dr. Neil Jensen	M		Professor	Y	Ph.D.	37	0	37	Genetics and population biology
Dr. Ron Meyers	M		Professor	Y	Ph.D.	14	1	15	Vertebrate functional morphology
Dr. John Mull	M		Professor	Y	Ph.D.	10	3	13	Insect ecology
Dr. Nicole Okazaki	F		Assistant Professor	N	Ph.D.	3	10	13	Biology and human physiology
Dr. Robert Okazaki	M		Professor	Y	Ph.D.	10	8	18	Invertebrate physiology and Endocrinology
Dr. Michele Skopec	F		Assistant Professor	N	Ph.D.	1 ½	½	2	Nutritional physiology
Dr. Barbara Trask	F		Assistant Professor	N	Ph.D.	4	2	6	Molecular Cell Biology
Dr. Sam Zeveloff	M		Professor	Y	Ph.D.	23	4	27	Mammalian Ecology

APPENDIX C

Adjunct Faculty Profile

NAME	GENDER	ETHNICITY	RANK	TENURE STATUS	HIGHEST DEGREE	YEARS OF TEACHING			AREAS OF EXPERTISE
						WSU	Other	TOTAL	
Dr. Benton Bramwell	M		Adjunct Instructor	N	D.N.M.	2	½	2 ½	Human Anatomy and Physiology
Ms. Susan Gurr	F		Adjunct Instructor	N	B.S.	1	0	1	Human Biology
Mr. Walter Prothero	M		Adjunct Instructor	N	M.S.	24	3	27	Wildlife Ecology
Dr. Ami Sessions-Robinson	F		Adjunct Instructor	N	Ph.D.	8	1	9	Animal Behavior

APPENDIX D

Contract Staff Profile

NAME	GENDER	ETHNICITY	YEARS AT			AREAS OF EXPERTISE
			WSU	Other	TOTAL	
Mrs. Tara Diamond	F		4	2	6	Advising, data management, scheduling, planning, p-card reconciliation, interaction and coordination with campus and community, orders supplies, knowledge of technology equipment and repairs
Ms. Susan Gurr	F		3	3	6	Lab preparation, knowledge of chemicals and complex materials, animal care and safety, budget, ordering and maintenance of supplies and equipment, lab safety administration