

Program Review of Weber State University Zoology Department

Program Review of Zoology Department, Weber State University

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SUBJECT: Program Review of Zoology Department, Weber State University

We conducted a review of the Weber State University Zoology Department at the request of Dr. David Matty, Dean of the College of Science at Weber State University. The purpose of the review was to identify ways in which the Zoology Department could be improved. On February 28, 2013, our review team spent a full day at Weber State, during which time we met with Dean Matty, the Chair of Zoology, Dr. Christopher Hoagstrom, the Zoology faculty (individually), two members of the Zoology staff, and a group of five Zoology students. We also toured the campus facilities, including classrooms, instructional labs, faculty research labs, cadaver dissection room, and animal care facility. Based on this visit, additional written materials such as the Departmental Self Study document and other materials provided by the Department Chair, our discussions, and individual reflections, we have drafted this review.

The review team wishes to thank the Dean and the Zoology faculty, staff, and students for making our limited time as productive as possible by sharing with us their frank assessments of the Department, and their perspectives on its strengths and weaknesses and its potential. All of us were impressed by many aspects of the Zoology Department and the people associated with it. Clearly, there is much to value in the Department as it currently exists. We were also struck by the particular social, economic, and cultural contexts in which the Department operates, and the careful attention the Department has devoted to effectively responding to those contexts.

Along with areas of excellence, our review also revealed areas in need of improvement. As our purpose is to provide recommendations for improvement, this report primarily concerns those areas.

Our report is divided into two sections. First, we provide a listing of what we considered to be the current strengths, weaknesses, opportunities, and threats (SWOT analysis) for the Zoology Department. The SWOT analysis then informs the second part of our report, our recommendations.

SWOT Analysis

Strengths:

Collegiality and the state of interpersonal relations within Zoology and across related departments

All of us were struck by the esprit de corps in the Department and the palpably high level of collegiality among faculty within Zoology, between faculty and students, and among faculty in related Departments, especially Zoology and Botany. This is a valuable quality that contributes to program performance and excellence in a great many diverse ways, ranging from short-term cooperation and coordination to long-term sustainability. Members of the review team who have experienced departments that lack this level of collegiality recognized this as a fundamental strength that is vitally important to preserve.

Disciplinary excellence and curricular rigor

Clearly, the Zoology Department is operating at a high level of academic excellence. This was evident in the comments of both students and faculty. The academic achievement expected of students is high. For example, there is an expectation that students will be

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familiar with scientific literature from an early point in their curriculum. As a result, the Department has an enviable reputation on campus for rigor and excellence.

Undergraduate research and faculty mentorship of undergraduate research

There is a high standard of excellence for undergraduate research, and faculty are committed to providing excellent opportunities and mentorship for undergraduate researchers. There is also excellent monetary support for undergraduate researchers. This thriving program of undergraduate research provides high quality contact with faculty for those students who participate, and produces tangible outcomes: published papers, participation in conferences, etc. by students. The product of undergraduate research is superior in both quantity and quality to undergraduate research at many major research universities, and impressed everyone on the committee.

Faculty commitment to teaching and teaching excellence

Comments by faculty indicated a strong commitment to high-quality instruction. Comments by students indicated a high level of student satisfaction with faculty instruction and with the major generally.

Small upper division classes

Small class sizes at the upper division level enhance student experience and teaching effectiveness.

Diversity of faculty expertise, interest, and teaching areas, notably in the “ologies”

Faculty expertise that spans many areas, particularly the broad range of taxonomic specialties, provides breadth in a small department.

Promotion and tenure requirements seem reasonable in the context of the institution.

Service seems to be given credit, and research requirements do not seem excessive, although teaching loads seem to vary across the faculty, and new faculty may need more protection from high teaching loads.

Service courses seem to be effective, are popular, and have large enrollments.

The Program provides courses for pre-professional programs as well as its own Program and serves both populations well.

Animal care facilities are adequate and in very good condition.

Weaknesses

The major is highly disciplinary.

In an age when students are going to need a wide range of knowledge and skills to be flexible in the face of a changing world, a narrow disciplinary education may be limiting. This disciplinarity also impedes a more unified and integrated understanding of the life sciences. (Note, that disciplinary expertise is also a strength of the Program.)

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Large amount of faculty time expended on teaching classes comes at the expense of other activities that could enhance student learning and faculty development.

The activities that are impaired include mentoring of undergraduate research, pursuit of external grants, faculty research, additional upper division course offerings, and instructional development.

Only a small proportion of students are engaged in faculty mentored independent research.

Faculty mentorship of undergraduate researchers is a very high quality resource that is accessed by relatively few students (we heard that approximately 15% take advantage of this opportunity).

Insufficient emphasis given to faculty-mentored undergraduate research as faculty scholarship

Based on comments of faculty, it appears that faculty-mentored student research was not accorded sufficient importance for promotion and tenure assessments nor in decisions about faculty release time.

Lack of time for faculty to pursue research

Needs of new faculty are not sufficiently addressed.

New faculty need more protection from teaching loads to allow them to pursue their own and student research (at least in some cases; the teaching load seems variable, especially with respect to high enrollment courses with demanding curricula).

There is also poor support of new faculty: startup funds are far too low and lab space is too limited. In addition to reducing effectiveness of the faculty, and impeding attainment of research expectations, this is likely to impair the ability to attract new faculty in the future.

Departmental support of course replacement during sabbaticals seemed lacking.

Sabbaticals should not require heavier teaching loads for faculty not on sabbatical.

Some key curricular areas are not sufficiently addressed.

These include: absence of a molecular/cell biology track in the major, not enough upper-level electives in molecular/cell biology (e.g., molecular neuroscience), lack of a major requirement in statistics, and lack of a biostatistics course.

Inadequate field transportation facilities for instruction and research

Given that providing field experience for students is part of the Department's mission, and the importance of field experience for some topic areas, particularly the "ologies" which are key areas of focus for the Program, it is essential to have a practical means for getting students into the field .

Inadequate teaching lab facilities

Providing lab experience is also part of the Department mission, and adequate teaching labs are essential to any life sciences program. The teaching labs are inadequate, mainly due to outdated equipment. The cadaver lab, with its low ceiling and cramped space, is particularly inadequate.

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Inadequate lab facilities for faculty research

Lab facilities for faculty research are clearly too small and too crowded. We heard of at least one case in which a faculty member's research was significantly set back by contamination in a lab, and it was easy to imagine how this could occur. It is telling that the best faculty lab space in the Program is a converted loading dock. We observed one lab space of less than 200 square feet that was shared by two faculty between themselves as well as with students.

Insufficient resources devoted to equipment, equipment maintenance, and replacement of equipment

Basic equipment (e.g., dissecting microscopes) is out dated and poorly maintained. Indeed, students questioned whether there was a research quality microscope at the University.

Inadequate equipment storage facilities

It appears that most of the Department's storage space has been pressed into other service, so virtually none remains. Apparently, an old van is a significant component of Department's storage facilities.

Inadequate advising of students following some of the career tracks

Students following career tracks without a formally supported advisor are subject to uneven and, in some cases, inadequate advising (only one advisor receives release time for advising). This raises two issues: poor advising for those students, and inequitable allocation of advising resources across the student population.

Over-commitment of, and over-reliance on, staff

Staff work assignments, particularly for Susan Gurr, appeared to be unsustainable, both in terms of amount of work assigned and difficulty of replacement.

Lack of knowledge about Program performance and student needs

It appeared that the Program lacked information about student needs and education outcomes. For example, there did not seem to be information available on how many students participated in undergraduate research.

Opportunities

The high level of current Program performance and faculty quality

The high quality of the Department and its faculty is an asset that allows changes to be considered from a position of strength. This is not a situation of having to choose among bad choices out of desperation.

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Better curricular coordination with related departments (Botany and Microbiology) could widen faculty teaching opportunities, particularly if a workload multiplier for teaching credit for large classes can be applied. Negotiation for a multiplier may need to be explored between the Institution and the Regents.

The Program has a compelling story to tell.

Instructional and mentoring excellence and undergraduate achievement provide a compelling story that has broad appeal and can be widely told. It can resonate with the community as well as with political and administrative decision makers.

Facilities exist for a wide range of class sizes, including large-format classes.

Large format classes can provide the economic value to offset important but smaller and more expensive upper-division, lab, and field courses.

The new building

The new building will result in improvement of facilities and, if negotiated successfully, perhaps more space

Under-utilized teaching lab space may exist.

Under-utilized lab space may exist at present that could be converted to research lab space or be reconfigured to be more useful as teaching labs.

Threats/Challenges

Resistance to change

Reasonable concerns in this (successful) department about the possible downsides of change may produce resistance to change.

Lack of growth in number of Zoology majors

This is a particular challenge in a time of budgetary scrutiny.

Low enrollments in some upper division courses

This is true for some of the “-ologies,” and for some other courses as well.

Open enrollment of WSU means that quality advising is critical for retention and for positive student outcomes.

Difficult economic and political environment for adding to faculty or budget

Student/community demographics and local culture present complex challenges.

These include: place-bound, time-bound students, students with full-time jobs, student with families

Low levels of student retention

This is due in part to the cultural context in which the Program operates

Lack of student community among the Zoology majors

This is a common phenomenon on non-residential campuses.

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Possibility that pedagogical innovations may not be considered or adopted

In a department that has few new hires and is dominated by long-time faculty, it is difficult to maintain an influx of current pedagogical practices and innovations.

Limited ability to provide new faculty with adequate resources—especially lab space

This is unsustainable in the long run, as it will make it more difficult to attract talented new faculty. In addition, start-up funds are next to non-existent, limiting the ability for new faculty to establish a research presence (on top of their required teaching loads).

Possible underutilization of existing teaching labs may weaken the Department's arguments for additional teaching labs in a new building.

Difficulty in maintaining ethnic/cultural diversity

This is a challenge in the sciences anywhere; it is especially challenging at WSU.

Apprehension about changes to the Department

It is likely that this is a widespread issue, no more or less at Weber State than elsewhere. It is critical that lines of communication remain open between administration and faculty, and that faculty be involved in planning the future of the enterprise. Some of what the team heard from faculty appeared to stem from apprehension about the administration's plans for the future.

Recommendations

In a nutshell, our recommendations point to a more integrated, but still departmentalized, set of life sciences majors that gain efficiencies in curriculum delivery, resulting in more faculty availability for valuable and rewarding activities besides core class instruction. In addition, our recommendations promote greater support of faculty and student interests and needs.

We explicitly do not recommend consolidation of departments. We think that the potential downside in terms of impaired esprit de corps, and simply the hazards of "fixing what ain't broke," are too great to justify on the basis of hypothetical efficiencies. That said, there are sound reasons that the dominant trend for colleges and universities is to move away from departmentalized subfields of biology and toward more integrated life sciences or biology programs. These include broader and more interdisciplinary education for students, increased future capacity of graduates to adapt to new knowledge and changing job markets, greater curricular flexibility for students and faculty, and synergies for faculty and administration across sub-disciplines within Biology. However, there are also advantages to the current departmental structure and focal areas of Zoology at WSU, and we believe there are several measures that the Program can take to retain the current departmental structure, and the strengths associated with it, while achieving many of the benefits of a more integrated program.

Recommendation 1

To that end, we recommend that an interdepartmental committee (faculty from Zoology, Botany, and Microbiology) be formed to investigate the possible development of a “Common Core” for courses in those majors that have substantial overlap and commonalities. Likely examples include: an Introductory Biology sequence; possibly Genetics, Ecology, and Cell Biology; and perhaps others, such as Systematics. Such a common core has the advantages of giving students wider exposure to the breadth of biology, more flexibility for students for changing majors and career paths, more cross-disciplinary interaction for students and faculty, more faculty and administrative flexibility for offering courses (e.g., covering sabbaticals), and more efficient use of faculty resources, thereby potentially freeing faculty to teach a wider range of courses and undertake other activities, such as mentoring student research.

This committee should also investigate opportunities to regularly offer conceptual and theoretically-based upper-division courses that transcend life-science majors and taxonomic boundaries (in addition to continuing to offer the taxonomically based courses at which the Zoology Department excels). These courses could include: Population Biology (on the books, but not offered in the last 2 years), Biomechanics, Biometry, Environmental Physiology, Biogeography (instead of Zoogeography), Endocrinology (on the books but not offered in the last 2 years), Developmental Biology, Molecular Cell Biology, and others. Not all of these courses need to be offered, but some should be offered, and with some frequency (e.g., every year or every other year).

The committee should also explore opportunities for more interdisciplinary upper level courses among the life sciences and between Zoology and departments outside the life sciences. This issue was raised during our meeting with Zoology students. Lack of interdisciplinarity and narrowness of scope can be the Achilles heel of disciplinary majors. This potential drawback should be recognized and intentionally addressed through, for example, inclusion in the curriculum (as electives or recommended) courses offered in collaboration with other departments. Possible examples of such courses are neurobiology, natural resource policy, translational research, and food science).

Recommendation 2

Expansion of undergraduate research opportunities, which currently are limited by faculty time. One of the most impressive aspects of the WSU Zoology program is the level at which some undergraduates participate in research. However, the opportunities for this participation seem to be limited. With efficiency gains from course consolidation (and other mechanisms, possibly

including a teaching credit multiplier for large courses; see below), the potential exists for faculty to have more time to devote to undergraduate research. This could occur simply as an expanded number of undergraduate research opportunities in the current format, with faculty receiving teaching credit for each undergraduate participant, or through a new senior-level undergraduate course (e.g., "Investigative Biology"), that is limited to a small number of students (e.g., 8 – 12), who pursue, either singly or in small teams, research questions in a faculty member's research area. One or two sections of such a class could be offered per semester, rotated among all faculty who wish to participate.

Recommendation 3

A variety of additional measures could improve the balance of faculty responsibilities to better serve faculty and student needs and interests, including expanded opportunities for faculty mentored-undergraduate research. These are:

- a. A points system that provides significant teaching credit for faculty for supervising undergraduate researchers. The current system either is not actually applied or provides too little credit to be meaningful, or both.
- b. Use of a scholarly activities fund that could provide a class buyout for faculty research; activities eligible for support should include undergraduate-faculty research.
- c. Increased teaching credit for lab supervision to make the credit commensurate with the time required.
- d. Increased teaching credit for large-format classes (a multiplier for large classes). This may need to be negotiated between the Institution and the Regents. Precedent exists at other Utah institutions of higher education.
- e. Faculty, in consultation with the Chair, could choose to have summer courses count as part of annual teaching load. This would be beneficial for student and faculty flexibility, and would be especially useful for field classes that are dependent on weather and season.

Recommendation 4

We recommend that the Department undertake a strategic planning effort to refine its curriculum and to determine what courses should be offered, how often, and how large they should be. This effort should be informed by community need and student demand. Specifically, we recommend the Department survey students regarding career goals, desired courses, and possible offering of evening or summer sections. The fundamental question should be: What are the students' needs and how can they be addressed? Using this as the organizing principle is likely to result in curriculum design that increases numbers of majors, improves

retention and completion time, and results in more favorable post-graduation outcomes. We further recommend surveying graduates of the Program to get a clearer picture of overall education outcomes of students who follow the Zoology major.

Recommendation 5

In advance of, or as part of, the strategic planning effort, several specific curricular changes (in addition to those identified in Recommendation 1) should be considered. These include:

- a. Although there are additional considerations besides enrollment numbers (e.g., faculty research program), the following low-enrollment courses should be evaluated for offering at lower frequency (e.g., every other year) to gain instructional efficiencies and allow broader curricular offerings:

Zoogeography (or Biogeography, as suggested above)

Vertebrate Embryology

Histology

Advanced Human Physiology

Entomology

Herpetology

Ichthyology

Ornithology

Mammalogy

Note: A further consideration regarding the vertebrate taxonomic courses (“ologies”) is the degree to which they cover similar material (i.e., vertebrate biology). This may lead to the conclusion that in spite of sizeable enrollments in some classes (e.g., herpetology in Fall 2012), they nonetheless only need to be offered every other year because other vertebrate ologies are offered when herpetology is not. The opinions of committee members differed on exactly what frequency was appropriate for specific courses, and we chose not to make recommendations at that level of detail. We were unanimous in our thinking that the Program should make such decisions based on considerations of student need, faculty interest, competing curricular needs, and resource efficiency.

- b. Adding Statistics as an option for one of the courses satisfying the math requirement for the Zoology major, and adding a more advanced Biostatistics elective.
- c. Investigating the feasibility of adding a molecular/cell biology track within Zoology, or as an interdepartmental major (this may be possible with current courses, through adjusting frequencies of course offerings), and/or design of an advising stream that draws on the existing Bachelors of Integrated Studies degree.

Recommendation 6

The Department should adopt a more active role in reaching out to the institutions that supply their students. To do this, the Department should

- a. Expand outreach and cultivate relationships with local high school students through concurrent enrollment courses. This can promote awareness and interest of prospective students and prepare them to continue with Zoology at WSU if they choose. For example, an entry-level general studies class, BIOL 1010, could be concurrently offered at high schools—or perhaps better yet, on the WSU campus—for better articulation between the Department and feeder high schools. This would have the positive effects of introducing students to the field of study and providing a little bit of college credit to give them a foot in the door to their degree. It would also increase familiarity with WSU Zoology among local high school science teachers, who can then be advocates for the Program. It should be noted that in the short term, it may decrease enrollments in Biol (or Zool) 1010 because some students would be taking it in high school, but the outreach and marketing benefits should outweigh this downside.
- b. Facilitate more transfers from source institutions by conducting more outreach to feeder two-year colleges.
- c. Improve articulation of curriculum with source institutions. Improved coordination of course requirements can increase the probability that 2-year students will have taken at least one or a few major course requirements or pre-requisites before arriving at WSU, and that they receive credit for those courses for the Zoology major. This is likely to increase the number of majors, and may improve retention.

Recommendation 7

To increase enrollment and to better serve the community, the Department should explore the feasibility of offering more evening or perhaps online courses, starting with courses for which there are already multiple sections. This will open the degree to many potential students who have day jobs. These sections are likely to be small until there are enough offerings during the evening and/or online to provide an evening/online path to graduation. This may be a way to boost enrollment over a relatively short timeline. It should be noted that while the committee thought that on-line instruction is an option worth investigating in this context, we recognize that online classes present a trade-off between teaching effectiveness (including student retention) and access, and therefore we are unanimous in recommending a cautious and skeptical approach to on-line classes.

Recommendation 8

The Department should be more active in telling its story, which is compelling. More outreach is needed to convey the value and excitement of research—faculty and undergraduate— for enhancing the education of undergraduates (in terms of learning outcomes, retention, and employment opportunities). This needs to be directed at the community and to the people who can make a difference for Department and Institution support. These outreach efforts are likely to increase the number of Zoology majors and the number of non-major students in Zoology classes, and also could improve institutional and outside support for the Department.

Recommendation 9

Expand transportation resources for field research and teaching of field classes. At a minimum, this would mean acquiring a Department van, but more would likely be required. Study will be needed to identify the best transportation alternative. It is likely that the most efficient alternative would involve coordination of all the field science departments. This may best be done at the College of Science level.

Recommendation 10

Improve the condition and size of lab facilities for research. At a minimum, each faculty member needs enough space to carry out his or her research. Investigation of the potential for conversion of currently under-utilized teaching lab space may reveal some opportunities. The new building may provide opportunities as well, either for new faculty lab space or for teaching lab space that frees up existing teaching labs that can be reconfigured for faculty research space.

Recommendation 11

Improve the condition of teaching lab facilities. The cadaver lab is in most need of replacement. Again, the new building and existing teaching lab facilities may offer possibilities. Basic laboratory equipment should be updated and maintained. This is critical not only for effective learning of concepts and principles but also for practical skill acquisition, and for recruitment and retention of students.

Recommendation 12

All sabbaticals of faculty who teach required courses should include teaching replacement that does not over-burden faculty. Limited-term faculty should be hired as sabbatical replacements. If a full time replacement cannot be provided, adjuncts should be readily available with University of Utah and Utah State University nearby, and a sufficient number should be hired to fully cover the teaching loads of faculty on leave.

Recommendation 13

More attention should be devoted to ensuring the success of new and early-career faculty in order to improve their prospects of developing a research program that can establish them in their field and improve their chances for tenure. This will also enhance the ability of the Program to attract talented applicants for faculty positions. Specifically, start-up funds need to be greatly increased and more lab space and facilities need to be provided for new faculty. In addition, new faculty should not be overloaded with teaching responsibilities and, when possible, teaching assignments should be designed to contribute to the faculty person's research.

Recommendation 14

To ensure that the pedagogy of Department faculty remains current, faculty development around instruction should be supported with funding, supported time, and with credit in the promotion and tenure process. Examples of activities that could be undertaken are faculty participation in workshops at other campuses and supported formal faculty groups that meet, e.g., for a semester, to devote attention to an issue or area of pedagogy.

Recommendation 15

Develop mechanisms for fostering more community among Zoology and life Science students to address the limited sense of community resulting from the non-residential nature of the campus. Examples of measures that could be taken include:

- a. A new 1-credit class, a Zoology or Zoology/Botany/Microbiology seminar series, that students could sign up for in multiple semesters. This could consist of research presentations, career-oriented presentations, or a mix of the two.
- b. Formal faculty advising of a Zoology club; this could be part of an increased advising effort.

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Recommendation 16

Expanded and more equitable advising of students in all career tracks. This would require an additional time-supported advisor to advise students in the professional tracks not addressed by Dr. Barbara Trask. It would increase the overall effectiveness of advising in the major, helping with retaining students and building community, as well as improving post-graduate outcomes for students.

Recommendation 17

To address the over-commitment of existing staff, an additional staff person is needed to assume some of the roles now handled by current staff. It is possible that some staff functions could be shared across departments.