Department of Ecology and Evolutionary Biology
Update to 2003 Long-Term Plan and Goals for 2010-2015

In 2003, the relatively new (fall 2001) Department of Ecology and Evolutionary Biology presented a plan to the LSA College Executive Committee describing the department's current status, challenges, and plans to meet those challenges for the next five years. The report was very well received by LSA, with the department's target faculty strength set at 25 FTEs, allowing several new hires. However, the College and University could not/did not address most of our critical facilities needs, which have only become more serious in the intervening period.

In this report, we describe progress towards meeting the goals identified in 2003, and identify new and continuing goals for the next five years. Detailed description of the intellectual scope, history, current status and functioning of EEB and its interaction with the UMMZ and Herbarium can be found in the self-study document for the March 2010 joint external review of these three closely affiliated units. The self-study also details the intellectual rationale for the updated research priorities we have defined and for initiatives in undergraduate and graduate education. This document should therefore be regarded as an extract from the longer self study, focusing specifically on how the department has changed since the 2003 plan and summarizing the next set of goals and initiatives.

I. Research profile and faculty hiring

2003 goals for research profile and faculty hiring: 1) *maintaining our current strong program in evolutionary history of animals and reviving our program in evolutionary history of plants, which has been decimated by retirements*, 2) *addressing the dearth of junior faculty in ecology that restricts our expansion into some of the newest exciting parts of this field,* 3) *expanding our strength in evolutionary processes, and* 4) *maintaining a minimum level of expertise in functional organismal biology to cover teaching needs. Faculty hiring should also redress the very top-heavy profile of the department and add diversity to the faculty.*

We have made substantial progress in most of these areas over the last five years, with multiple hires in plant evolutionary biology (Berry, Dick, James) and in ecology, especially in mathematical and computational aspects (Hunter, King, Ostling, Rohani). We have also strengthened our program in evolutionary processes, with new hires in evolutionary genetics (Wittkopp, James), molecular ecology (Dick) and evolution of behavior (Tibbetts), but this broad area remains the most critical part of the department that needs strengthening. Berry and James bring expertise in phylogenetic analysis of plants, but a departure and upcoming retirements in jointly-appointed positions with the Museum of Zoology place our expertise in animal organismal diversity and phylogenetics at risk. In terms of functional biology, Tibbetts now covers our teaching in animal behavior. We also have hired a Lecturer III who can cover some teaching in animal structure and function, but organismal function remains a small part of our research and education profile.

2010 goals for research profile and faculty hiring: 1) Evolutionary biology and its interface with ecology is our highest research priority, followed by large-scale ecology. While searches will be conducted at this very broad level, specific research areas of interest will be noted in position descriptions. These include: evolution of genotype-phenotype-environment relationships, speciation, experimental evolution, phylogenetic theory, evolutionary theory, evolutionary ecology, landscape ecology, and global biology. 2) The department is committed to integrating research and education in these areas with expertise in organismal diversity; therefore joint searches with the museum units will retain these broad definitions of research areas, but oriented towards a particular taxonomic group, with taxonomic group defined as broadly as possible given curatorial needs. 3) Rather than searching for faculty in functional organismal biology, we will collaborate with other units across campus to develop an interdisciplinary group focused on the functioning of whole organisms.

These research priorities are also teaching needs, as described in Section IV below. EEB's target commitment from LSA is 25 college-funded FTEs and we are currently at 23.5, which includes two already authorized, but still open positions. Thus, within our current target, we can fill most, but not all, of these priority needs in teaching and research. Of course, we would like to expand still further, but recognize that this is unlikely in the current economic climate.

II. Faculty demography

While no explicit goals were stated in the 2003 plan, we emphasized the substantial number of retirements without replacement to date and inability to cover much of our teaching needs, the great need for a more balanced distribution of career stages (we had only 15% assistant professors) and the unacceptably low diversity (21% women and **no** under-represented minorities).

We have made substantial progress in most of these areas. The department has grown since 2003 from 28 faculty (19 FTEs) to 33 faculty (24.5 actual FTEs). [Note, actual FTEs are not the same as the college-funded FTEs referred to above, which do not include positions funded from other sources, such as Provost support for partner hires or the President's Interdisciplinary Junior Faculty Initiative, but do include higher "costs" of senior faculty hires.]

Since the 2003 plan, we have doubled the number of assistant professors (4 to 9, 15% to 26%) and increased the number of women by more than 50% (6 to 10, 21% to 32%). The assistant and associate ranks now are both 50% or more women and women in the full professor rank have increased from 6% (1) to 14% (3). We still have only one under-represented minority on the faculty.

However, one assistant professor is currently in the tenure/promotion process (approved by the department) and three others are starting the process this summer. In the absence of further hiring, only 10% of our faculty will be assistant professors one year from now, with none in the Museum of Zoology; therefore it is imperative that we to continue to search to fill open positions over the next five years to maintain the high level of innovation, creativity, and energy brought by new junior faculty.

The Department has explicit guidelines for faculty search committees on expanding the diversity of the applicant pool, and, as is true for all of LSA, all members of search committees are required to attend a STRIDE workshop focused on explaining evaluation bias and how to minimize its impact. Hiring of women has been on average proportional or even disproportionately higher than their representation in the applicant pool. However, the applicant pool (15%-40%) is still substantially below PhDs in our discipline (ca. 50%). More narrowly defined searches have much lower proportions of women in the pool and all searches in the future will be very broadly defined. We have hired only one under-represented minority and it is difficult to obtain data on their representation in the pool because our pool data apparently do not distinguish under-represented minorities from all ethnic/racial groups, including international applicants. (We now obtain data on the pool from anonymous responses to online surveys of all applicants.) Nevertheless, the pool of under-represented minorities is, anecdotally at least, extremely small. We therefore need to focus on expanding the diversity of the applicant pool for both women and under-represented minorities, following processes outlined by STRIDE.

2010 goals for faculty demography: 1) increase the number of women at the full professor level and of under-represented minorities at all ranks, 2) maintain a balanced demography, with at least 4-5 assistant professors.

III. Research funding

2003 goals in research funding: "1) *increase research funding rate of faculty in the department and 2) take greater advantage of new initiatives from funding agencies for large, collaborative research programs*."

Total research funding has increased from $2.2 million in 2003-4 to 3.2 million in 2008-9, including all EEB faculty, although the funding per tenure-track faculty member ($74,000 - $96,000) has not shown any significant trends during this period (see Appendix K in self-study). Note that these numbers are direct+indirect costs: the Key Performance Indicators (KPIs) calculated by the College (Appendix L) are direct costs only.

The percent of the total faculty with significant (estimated as >$20,000) external funding is quite low for a department of our quality, running 60-65% in all but one of the last five years (Appendix K-4). The faculty without external funding divide into four roughly equal size categories: assistant professors, all of whom are submitting multiple proposals, getting good reviews and we expect to be funded in the near future; senior faculty on retirement furlough or close and winding down their research programs; faculty with

mostly consistent funding, submitted proposals and quite active research programs but in temporary gaps; and faculty who either do not submit grant proposals or have been submitting grants unsuccessfully over a period of at least four or five years. This last group is of the most serious concern, but it is also worth noting that most of this group is nonetheless publishing an average of at least 2-3 scholarly papers a year.

The department values research output in terms of publications and scholarly influence, rather than grant dollars and recognizes that different kinds of research programs both have access to different amounts of funding (e.g., primarily NIH vs. NSF support) and may require different amounts of support. On the other hand, our graduate funding package assumes that each student is supported by at least a year of GSRA support from their mentor and therefore some level of funding is essential for all faculty, unless their students consistently receive fellowship support (e.g., NSF or EPA-STAR) or training grant support. In addition, the validation of ongoing research programs by successful peer-reviewed proposals is an important consideration in evaluation of scholarly reputation. Thus, the annual merit review of research is primarily based on publication record, evidence of scholarly reputation, and the presence of peer-reviewed research grants, with less concern for dollar amounts.

We also recognize that proposal preparation and grant administration has a very considerable time cost, independent of research productivity *per se*, and therefore faculty with strong research activity but no significant grant activity are assigned higher teaching efforts (Appendix I-2). Faculty without research or grant activity are assigned still higher teaching efforts. This new policy (effective AY2008-9) is intended to increase either individual grant activity or teaching activity and result in a more equitable distribution of effort across the faculty.

In terms of large collaborative research initiatives, EEB faculty continue to play national and international leadership roles as PIs and co-PIs in projects such as the NSF Long Term Ecological Research network (Kling), NSF Planetary Biodiversity Initiative (Berry), NSF Assembling the Tree of Life Initiative (Qiu), and NOAA's Oceans and Human Health Initiative (Pascual, King). However, this aspect of departmental funding still needs to expand as the balance between funding available for large collaborative research initiatives and for individual research programs continues to shift towards the former. We have also been increasing participation in UM proposals to obtain funding for national projects such as NEON, the NSF-funded Math-Biology Synthesis Center and, currently, the new NSF RFP for a Environmental Synthesis Center. EEB also has been active in the internally-funded President's Interdisciplinary Junior Faculty Initiative, with two successful proposals for cluster hires (microbial ecology and "data-mining") in the first year.

EEB has also been increasing leadership in education proposals, with a funded grant for undergraduate scholarships in biology through the NSF S-STEM program, an IGERT in microbial ecology pending at NSF, a site REU proposal focused on freshman-sophomore under-represented minorities pending at NSF, a proposal for support for a high-school to college transition program pending at HHMI, and a proposal in preparation for NSF's Undergraduate Research and Mentoring in the Biological Sciences Program. UMBS has had

ten years of funding for an IGERT in Biosphere-Atmosphere Research, will be submitting a new proposal for a different IGERT, and has just renewed their site REU program.

Our 2010 goals in research funding remain the same as in 2003: 1) increase the percent of faculty with significant external funding and 2) continue to participate and expand leadership roles responding to new initiatives from funding agencies for large, collaborative research programs

IV. Undergraduate Education

EEB has the responsibility to teach and train undergraduate students in the broad areas of life sciences that include the study of evolution at all levels from molecules to species, the morphological, physiological, and behavioral traits of organisms, and the complex interactions among organisms and between organisms and their changing environment on earth.

2003 goals for undergraduate education: 1) *increase offerings to non-science concentrators and first-year students,* 2) *evaluate introductory and core courses of the concentration and modify if needed,* 3) *improve pedagogy,* 4) *improve scientific communication skills,* 5) *stabilize teaching participation in core courses,* 6) *fill in major gaps in upper division curriculum,* 7) *renovate and expand teaching laboratory space.*

We have made great progress towards goals (2) and (5), some progress towards (1), (3) and (6), but none towards (7) as summarized below, as well as initiated a number of other programs described after these.

Goal (1) Increase offerings for non-science concentrators and first year students: We now offer ten different courses for non-science concentrators enrolling over 930 students a year (ca. 3500 student credit hours), up from eight courses enrolling ca. 850 students a year (3000 student credit hours). These are mostly large lecture courses. In contrast, we have unfortunately reduced the number of first-year seminars due to lack of faculty.

Goal (2) Evaluate and modify introductory biology courses: In 2005, EEB and its sister biology department, Molecular, Cellular, and Developmental Biology (MCDB), formed a taskforce to re-envision the Biology curriculum for undergraduate science majors. Following two years of detailed study and discussion, we completely revised the introductory Biology courses, which now include full semester treatments of EEB- and MCDB-oriented topics and a separate laboratory course reflecting both. The laboratory course is designed with project-oriented modules that build towards integration across levels of biological organization. These three courses, first offered in fall 2007, now enroll over 1900 students per semester during the regular academic year and are also offered in the Spring and Summer terms. These changes to introductory biology required us to make substantial changes to several of our next tier of courses (core courses in Genetics,

Evolution, and Ecology), which were implemented beginning in Fall 2008. Dr. Jo Kurdziel, Lecturer IV in EEB, has begun a three year project to evaluate the changes in introductory biology, with funding from IDEA Institute (a joint LSA-School of Education institute to investigate science learning and pedagogy).

Goal (3) Improve pedagogy: In academic year 2009-10, the department began an initiative to specify and formalize learning goals for courses taught by EEB faculty and for the department as a whole and to better align course evaluation methods to those learning goals. The faculty approved a set of general learning goals for the EEB program:

- explain key concepts in ecology, genetics, and evolution
- understand how ecological, evolutionary, and genetic processes interact with each other and the environment to influence current, historical, and future patterns of biodiversity
- understand the myriad ways humans interact with the rest of the biosphere and the consequences for biosphere functioning and for human well-being
- develop a robust understanding of how science works and be able to practice quantitative and scientific reasoning
- develop the scientific skills needed to embark on a career in the health professions, science education, biological research, natural resource management, or science policy
- intelligently and critically discuss scientific issues and bring a scientific perspective to relevant societal concerns

During the next few years, we expect all EEB faculty members to develop specific learning goals for their courses that will address the department-wide goals above. The department has also begun formulating methods of assessing how well the program as a whole, as well as individual courses are meeting these goals. In this, we are making use of the talents of two EEB lecturers, Drs. Jo Kurdziel and Laura Eidietis, both of whom have backgrounds in science education.

Goal (4) Stabilize teaching in core courses: After a number of years of being short-handed in our core courses for concentrators, we now have a group of tenure-track faculty and permanent lecturers identified who teach in our large-enrollment core courses in genetics, evolution, and ecology, including those who can rotate in during sabbatical and other leaves rather than hiring temporary lecturers. We also have a new permanent lecturer who can fill some of our core teaching needs in animal physiology and anatomy, although the exact structure of those courses is still being determined.

Goal (5) Improve scientific communication skills: We have added one upper-division course in writing for biologists, cross-listed and taught by an MCDB faculty member. Many EEB concentrators fill the Upper Level Writing Requirement by courses at UMBS, all of which satisfy this requirement. However, we still need to increase opportunities to develop critical scientific communication skills in EEB courses; now that teaching in our core courses is stabilized, we hope to develop a new writing course.

Goal (6) Fill in major gaps in upper division curriculum: In 2003, we listed a number of significant gaps that should be taught in a top EEB program for both undergraduate and graduate students. Our new faculty have filled, or will soon fill, some of these gaps (microbial ecology, evolution of development, molecular ecology, ecology of infectious diseases, plant evolution) and we also added courses in molecular ecology, advanced theoretical ecology, and statistical modeling of data. Important remaining gaps include evolutionary ecology, evolutionary genetics and genomics, phylogenetic theory, evolutionary theory, physiological ecology and evolutionary physiology, landscape ecology, global change biology, as well as courses on scientific writing and grant writing and advanced statistics appropriate for biologists. In biodiversity courses, we reinstated a course in fungal biology; the two biggest gaps remaining are in ornithology (study of birds) and in invertebrate biology. The audience for these courses includes EEB and other Program in Biology concentrators, Program in the Environment concentrators, EEB graduate students, students from the rapidly growing professional masters program in the School of Natural Resources (SNRE) and the School of Public Health (SPH), and Ph.D. students from SNRE, Epidemiology in SPH, Human Genetics, Bioinformatics, and Civil and Environmental Engineering.

*Goal (7) renovate and expand teaching laboratory space***:** We have begun teaching some courses in the new Undergraduate Science Building, but need to further expand use of that space—we have no room for any additional laboratory courses in our teaching space in the Chem 08 building, but fully expect that some of our new faculty will develop laboratory courses. Particularly important is microbial ecology and computational laboratories for molecular evolution and phylogenetics.

*Other issues***:** We have redefined concentration programs in Microbiology and in Plant Biology and started a new EEB concentration that has grown to >70 students in 3 years. The interdisciplinary microbiology concentration involves EEB, the Department Molecular Cellular, and Developmental Biology (MCDB), Epidemiology in the School of Public Health, and Microbiology and Immunology in the School of Medicine. It is now growing rapidly and we expect will continue to do so. The EEB concentration includes a required senior capstone seminar and a research experience. Many students fulfill the latter with courses at UMBS, all of which incorporate an independent research component including presentation at a station-wide symposium at the end of the semester. The Plant Biology concentration provides "vertical" integration of knowledge of plants from molecular to ecosystem levels and is joint with MCDB. It remains quite small.

We have begun planning and obtaining funding for the Michigan Biology Academy Scholars program, which will focus on the high-school to college transition and the first two years of college to increase retention of diverse students at risk of leaving a STEM discipline. As a first step towards this, we have obtained a $600,000 grant from the NSF S-STEM program for scholarships for M-Bio students.

We have also greatly improved concentration advising with the hiring of a new lecturer, Dr. Lynn Carpenter, who coordinates all advising for the Program in Biology and works with

many of the students uncertain which of the seven biological sciences concentrations is best for them.

In 2003, we obtained a Whittaker grant for a "Biodiversity Research Program" to increase undergraduate research. As part of this program, we provided a 10% additional stipend for GSI and GSRAs to mentor undergrads in independent research; those mentors also took a seminar, "Entering Mentoring". The program also started a research open-house at the beginning of each term for students to meet with potential faculty mentors and initiated a new course called Biodiversity research seminar (EEB 335). This course is taught every semester; the students attend weekly EEB-sponsored seminars and then meet with the faculty instructor for discussion and evaluation of the material presented. The research open house and the biodiversity research seminar are now part of regular department practice but we have not had the funds to continue the graduate mentor program.

2010 goals for undergraduate education: 1) assess effectiveness of new introductory biology sequences and our core courses in genetics, evolution, and ecology and further improve pedagogy in those courses; 2) expand definitions of learning goals and alignment of course evaluation methods with learning goals in our classes; 3) increase the number of first-year seminars to at least one per term; 4) add upper division courses in aspects of evolutionary biology and large-scale biology as well as courses on scientific writing; 5) increase research opportunities for undergraduates; 6) increase retention and success of diverse undergraduates through the Michigan Biology Scholars Academy.

V. Graduate education

2003 goals for graduate education: *1) improvement in mentoring to help reduce time to candidacy and degree, 2) initiation of more interdisciplinary programs through training grants and possible joint degree programs, 3) increase diversity of our student body*

Goal (1) reduce time to candidacy and degree: Achievement of candidacy involves completion of a dissertation proposal and successfully defending that proposal to a dissertation committee. Time to candidacy varies enormously among cohorts with 91% of students meeting the two-year target in some years, but only 44-54% in the most recent two cohorts (Table 1 in self study). Nevertheless, this target is not missed by much: all students in the last two cohorts achieved candidacy within three years.

The average time to degree is difficult to estimate because only three cohorts since the founding of EEB and the establishment of a full funding package (see below) have had at least five years to complete their degree. On average, 41% of students in those three cohorts achieved a Ph.D. in five years (Table 1 in self study) and at least 77% in 6 years. For cohorts starting in the 1990s, mean time to degree was typically close to 7 years, so it is clear changes in the funding package as well as in departmental policies have had a substantial effect.

Goal (2) initiate more interdisciplinary programs: We have not established any new joint degree programs but have increased the total number of students supported by NIH-funded training grants in genome science (School of Public Health) and in genetics (Medical School) and an NSF-funded IGERT in Biosphere-Atmosphere Research based at the UM Biological Station. A new IGERT in microbial ecology, involving EEB, the School of Public Health and the College of Engineering, is at the final review stage at NSF.

Goal (3): increase diversity of student body: For recruiting of diverse students, in addition to attending conferences such as SACNAS and McNair, our major effort has been a partnership with biology departments in institutions that historically have high undergraduate populations of under-represented minorities (currently Howard University, Morehouse College, Spelman College, and University of Puerto Rico at Mayaguez). This program brings 2-4 students from each of those institutions to participate in a weekend of our advanced field ecology course and sends 2-3 current UM graduate students to visit each institution, give seminars on their research and meet with potential applicants. The program, carried out in partnership with the School of Natural Resources and the Environment, is now in its fourth year. It has been extremely successful in giving positive experiences to the students we bring in and many have kept in touch with our faculty and graduate students. Unfortunately, it has not yet resulted in an increase in applications to our Ph.D. program by under-represented minorities. We nevertheless want to keep this program to continue to build long-term relationships with these institutions. The initial funding (from the National Center for Institutional Diversity) is ending and we are working with Rackham to find other sources.

In 2008, we started a new, fully-funded masters program (see Appendix O-3) designed to attract students from non-traditional backgrounds who might not have considered a degree in ecology and evolutionary biology. Our long term goal is to increase the diversity of the graduate student body, and ultimately the diversity of the workforce, in the fields of ecology and evolutionary biology. The immediate goal for students in the Frontiers Program is to become fully prepared to be admitted and be successful in top-ranked Ph.D. programs, especially at the University of Michigan. The two year program enrolls four students each year and thus has eight students at steady state.

The program starts with a summer transition program of classes and research at the University of Michigan Biological Station. At UMBS, students receive one-on-one training with a research mentor, take foundational classes in ecology or evolution, and participate in weekly professional development workshops. On their return to campus in fall, students take courses including the intensive field ecology and a laboratory rotation. These experiences are designed to help them choose a permanent research mentor and a long-term research project. They also gain experience teaching and mentoring undergraduates and, by the end of their first year, Frontiers Students are well integrated into our larger graduate student body. They are expected to finish a thesis masters in two years and thus are guaranteed GSI appointments for two years and a stipend for two summers, as well as all costs at UMBS. To date, the program is supported by NSF (AGEP) funds through the Rackham Graduate School, LSA, and EEB funds, but we are very actively searching for long-

term sources of support. Rackham is using this program as a model for other programs bridging to the Ph.D. in the natural sciences.

Our first cohort is just finishing the program this semester so that we cannot yet evaluate effectiveness in terms of student success in entering and finishing a Ph.D. program, but we have succeeded in our very short-term goal of diversifying the graduate program and all four students do plan to apply to Ph.D. programs.

Other issues: Our graduate student funding package of $20,000 annual stipend, including two fellowship terms, was highly competitive when it was initiated in 2002, but is no longer so. Because the total amount was fixed, as the academic year Graduate Student Instructor (GSI) rates increased, consistent with agreements with GEO, the spring-summer stipend declined. In response, in 2008, we froze the spring-summer rate at about $5000 for the four month period, which was still below the academic year stipend of $8,347 per term. Thus, the total stipend now increases annually and is currently $21,944. Our goal is to match the spring-summer stipend to the academic term stipend and we are evaluating options to change the current funding package to allow this (the current funding model and actual student funding are described fully in the self-study).

From the 2009 climate survey (Appendix J-2), our students want more opportunities to work in interdisciplinary teams and more career advice, including non-academic options, although, overall, they were very satisfied with the research mentoring they receive. The IGERT proposals described in the research funding section above are meant to address the need for more interdisciplinary training. The EEB Diversity committee will be making recommendations for ways of providing career advice after evaluation and discussion of the full climate survey results.

2010 goals for graduate education: 1) improve graduate funding to be more competitive and to provide regular increases; 2) increase interdisciplinary opportunities and experience working in research teams; 3) add upper division courses in aspects of evolutionary biology and large-scale biology as well as courses on scientific writing and grant writing and advanced statistics appropriate for biologists; 4) provide more information and advising on career options, 5) increase diversity of the graduate student body

VI. Governance and procedures

2003 goals for governance and procedures: 1) *improve mentoring of junior faculty by more incentives for interaction with mentors and by closer monitoring by the Chair and the Promotions and Merit Committee,* 2) *improve coordination of graduate program by appointing an Associate Chair for Graduate Studies*.

Goal (1) improve faculty mentoring: We have further formalized our process for junior faculty career advising and evaluations (Appendix I-3). Our hiring and mentoring have been highly successful, with 100% success in promotions from assistant to associate

professor with tenure rate (5 cases since 2001), as well as in promotion from associate to full professor (7 cases). Retention continues to be excellent despite attempted hires of our faculty (only two faculty members left the department for other academic positions (Futuyma and Mindell); all other turnover has been through retirement).

Goal (2) appoint associate chair for graduate studies: We created this position in 2003, and this has been a great success in terms of better coordination of the graduate program and tracking of student progress from admission to completion of degree. However, the role is enormously time-consuming.

Other issues: We have redefined determination of equitable teaching effort away from an attempt to define "research activity" (Appendix I-2). The new policy makes it clearer that, *independent* of research activity in terms of publications and scholarly reputation, maintaining an expected teaching effort of two course equivalents a year assumes time invested in grant preparation and administration and mentoring of independent research students, from undergraduate to postdoctoral levels.

The climate of the department, as reported by a survey of EEB faculty, was overall significantly more positive and collegial than the other natural sciences departments in LSA and faculty were quite satisfied with their positions (other than wanting more time for everything). Although there was strong agreement that the department's procedures are fair and transparent in general, approximately half did not agree that teaching assignments were equitably determined. In addition, faculty perceived only a moderate-low influence on department directions.

The EEB diversity committee is being given a charge to go through the climate survey in depth, lead a faculty discussion of these and other emergent issues, and develop recommendations for changes in practice to reduce sources of dissatisfaction.

2010 goals for governance and procedures: 1) address faculty concerns about equitability of teaching assignments and about influence on departmental directions.

VII. Staff support and organization

No specific goals were listed in the 2003 plan about staff support and organization, but we have improved a number of aspects nonetheless. We have hired an outstanding communications person, who maintains the website as an extremely up-to-date, interesting, and informative source for the department and visitors. We have reorganized our graduate support staff to increase focus on recruitment, especially of diverse students. We have increased shared staffing with other units, including in graphics (with UMMZ) and photography (with Geological Sciences) and in finance and research administration (with the Herbarium).

The key current challenge is in dealing with an increased devolving of duties to departments at a time when the College is reconsidering staffing budgets. We had planned to hire an additional grant administrator in EEB because of the increasing sponsored

research in the department and our handling of Herbarium finances. However, that position is currently on hold and will probably not be filled due to the economic situation. In the absence of additional staff, we are working to find ways to streamline processes without reducing services provided to faculty. Shared staffing is one model for this that we have successfully pursued but the importance of having support staff who know the unit – the type of work we do and the individual faculty and students—cannot be overstated. EEB has an absolutely outstanding staff, who work with each other and with the faculty and students very effectively, as indicated by the climate surveys of all three groups (Appendix J). Maintenance of this excellent team is critical for the department's continued smooth functioning. We are currently preparing a plan for the mandated budget cuts that we hope will allow us to do this, without too much reduction in effectiveness.

2010 goals for staff support and organization: 1) Maintain our outstanding staff and level of service to faculty and students despite necessary budget cuts.

VIII. Space and facilities

2003 goals for space and facilities: 1) *add space for new faculty*, 2) *bring the Herbarium back to central campus and house all of EEB, the Museum of Zoology, the Herbarium, and the Museum of Paleontology in a single building that is fully up to modern science laboratory standards,* 3) *construct or expand common facilities for molecular (DNA) work and chemical analysis, plant growth, and animal care*, and 4) *improve infrastructure at University-supported field sites, especially ESGR and UMBS*.

Goal (1) on expanding space: All available space in EEB's portion of the Kraus Natural Science Building (Appendix S-1) has been converted to faculty office and laboratories, with the exception of one laboratory that is planned for the microbial ecologist for whom we are currently searching. Therefore, without retirements, there will be no space for additional faculty in Kraus. UMMZ's part of the Ruthven Museums Building (Appendix S-2) has some space available that could be used for 1.0 EEB faculty whose research programs fit well with the current faculty there, but most space to be released by the movement of the alcohol collections to Varsity Drive will not be suitable for human occupation even with major renovation.

Goal (2) on co-location of all faculty in a modern building: We have made no progress towards this goal and, with the planned move of the UMMZ alcohol collections to the Varsity Drive facility, we have even gone somewhat in the reverse direction. The dispersion of laboratories and offices between Kraus and Ruthven, as well as the off-campus location of the Herbarium at Varsity Drive, are ongoing impediments to maximizing the synergies among our research programs. The infrastructure in both buildings is substandard, with insufficient emergency auxiliary power and cooling and lack of automatic resets for air cooling to core equipment rooms and plant and animal growth rooms. Both buildings need major electrical and air handling upgrades and capacity for the latter especially is limited because of inadequate head space between floors. Teaching

laboratories are further dispersed across Kraus and Ruthven, as well as Chemistry and the new Undergraduate Science Building and these also make support of these programs problematic. We recognize that we live in difficult times and that a new building or complete renovation is extremely unlikely in the near future. However, the lack of even a *process* for long-term planning for the life-science units in LSA is a major source of frustration to the faculty and represents a substantial constraint on our long-term success.

Goal (3) development of common facilities: Creating shared facilities to truly increase efficiency of space and equipment use would require both new space and a much more flexible building structure than we currently have; this is not a realistic goal at the present time.

Goal (4) improve infrastructure at field sites: The University of Michigan Biological Station has added a number of facilities and upgraded some buildings, although the laboratory building is still out of date. Most of the infrastructure in ESGR is still badly in need of renovation and a more regular maintenance schedule. However, after several years of negotiation, responsibility for maintenance of the ESGR has recently been transferred from Plant Department to LSA and we are in the midst of hiring a new facility supervisor, which should greatly improve the regular maintenance of the Reserve.

2010 goals for space and facilities: 1) Add auxiliary emergency power and automatic resets for air cooling in core equipment rooms and animal and plant growth rooms to avoid any further losses of research materials, 2) Continue to improve infrastructure at UMBS and ESGR, 3) Initiate planning for the long-term space needs of the biological sciences in LSA and their linkage to the broader research communities in the life sciences and the environmental sciences at UM.

IX. Overall goal

2003 goal: *Establish the Department of Ecology and Evolutionary Biology in the top five departments in the country for research, graduate training, and undergraduate training in the biodiversity sciences, within the next five years.*

In 2003, we stated that "*we are already ranked in or near the top ten and therefore this goal is quite attainable with the resources requested*." Our current status varies considerably among the different segments of the department in our own assessment. In ecology, relative to other top EEB departments, we are perhaps within the top five; not nearly as large as UC Davis nor as elite as the small groups at Princeton and Stanford, but on a par with Cornell, UC Berkeley, and Duke. In evolutionary biology, we lack critical mass in many areas and remain behind top EEB departments such as the University of Chicago and Harvard—in our own assessment we are probably not yet in the top ten. UC Berkeley and Harvard are the only universities on a par with the expertise in organismal diversity at UM, but upcoming retirements in the Museum of Zoology put this status at risk. In functional organismal biology, we are nowhere near the top ten and do not foresee attempting to be there.

Overall, we are probably somewhere in the top ten, but not yet in the top 5, although the unreliable US News and World Report ranks us as tied for 11th in 2007 (the last year EEB was evaluated). We have hired terrific junior faculty and this continues to be the key to our increasing scholarly reputation, although senior leadership in evolutionary biology could be strengthened. Our participation in large scale research initiatives is also increasing our visibility, as does our annual Early Career Scientists Symposium.

As stated earlier, it is clear that we need to increase our strength in a number of areas in evolutionary biology, as well as in areas of large-scale ecology that are becoming increasingly important in thinking about global sustainability. Our current open positions and cluster hires can meet most of these needs, although we will continue to apply for cluster hires as part of the President's Interdisciplinary Junior Faculty Initiative to expand our linkages with other units on campus in creative ways. Replacement of upcoming retirements can address most of the issues with declining organismal diversity expertise, with the critical exception of ornithology.

2010 goal: Solidify the reputation of the Department of Ecology and Evolutionary Biology as one of the finest departments in the country in ecology and bring its reputation in evolutionary biology to that same top status. We should be included in any list of the best departments in ecology *and* evolution for new faculty to develop their careers and for undergraduate, graduate, and postdoctoral education.