

FROM: John Waterhouse
Chair, SCUP
Vice President, Academic

DATE: December 19, 2006

Motion :

The report of the External Review Committee for the Department of Biological Sciences was submitted in May, 2006 following the review team's site visit, which took place March 22-24, 2006. The response of the Department was received on June 6, 2006 and the response from the Dean on July 6, 2006.

SCUP recommends to Senate that the Department of Biological Sciences and the Dean of Science are advised to pursue the following as priority items.

1. WQB Requirements

- Complete the modification of existing courses to 'W' course status.
- Assess the effectiveness of the 'W' courses over the next few years once more experience has been gained in this area.

2. Collaboration

- Review the possibility of increasing collaboration between Departments and Faculties with regard to the utilization of research facilities.
- Continue to seek opportunities with other Faculties to embark on joint initiatives, including programmes and joint appointments.

3. Undergraduate Curriculum

- Undertake a review of the undergraduate curriculum with particular reference to seeking cooperation with other Departments, increasing the students' exposure to statistics, and possibly reducing the number of lab courses.
- Ensure the Co-op Coordinator is invited to Department meetings to ensure that the Department increases the profile of Co-op education within the Department.

4. Graduate Programme

- Continue to seek ways of recruiting good graduate students and providing them with competitive financial support.
- Reconsider the requirements that may be inhibiting the ease of transfer from the M Sc to a PhD by deserving students.
- Consider the establishment of a mentoring programme for new faculty, staff and students.
- Review, with the Dean, the issue of 'stacking' and the process that may be required to motivate for a change in SFU policy on the subject. (*'Stacking' is the scheduling of a faculty member's annual formal teaching into a single semester.*)

CC Mike Plischke. Dean of the Faculty of Science
Tony Williams. Chair, Department of Biological Sciences

SIMON FRASER UNIVERSITY

Office of the Dean of Science

MEMORANDUM

TO: W.R. Krane, Associate Vice-
President Academic

FROM: Dr. Michael Plischke, Dean
Faculty of Science

RE: External Review, Department of
Biological Sciences

DATE: July 6, 2006

I am writing to you with regard to the external review of the Department of Biological Sciences and the department's response to the Review Committee's report. The report is a positive, constructive document that indicates that the Department has made excellent progress toward a collegial cooperative environment since its last review. I believe that the last two Chairs, Norbert Haunerland and Tony Williams deserve much of the credit for that. The report contains twelve formal recommendations and a number of suggestions in the text of the document. The Department has largely either accepted these or committed to further deliberation. I will therefore be quite selective in my commentary. The recommendations are in three categories: for the University, for the Dean and for the Department and I will follow that format.

For the University

- (i) The Review Committee (ERC) questions SFU's policy on "stacking" and the counting of study-leave credits. By stacking they mean scheduling a faculty member's annual formal teaching into a single semester. The Faculty of Science has long had an informal policy prohibiting this except in special circumstances. The reason, as I remember it, is to prevent those faculty members whose research program is centered at TRIUMF from being absent from campus eight months of the year. This would not be an issue in Biological Sciences and I have some sympathy for stacking. However, the study-leave policy (A31.02) that is negotiated between SFUFA and the administration explicitly requires formal classroom teaching in order to accumulate credit for a given semester. This policy would have to be revisited if any changes in the scheduling of teaching were to be made.
- (ii) I take issue with the Review Committee's comment that "the environmental science program appears to be sound in curricular design". It is anything but sound.
- (iii) Recommendation #1 concerns the new WQB requirements. It is clear that we will have to assess the effectiveness of our W courses over the next few years. I agree with the Department's statement that it has responded in a "timely and

constructive way” and that nothing further needs to be done until we have more experience with this initiative.

For the Dean

- (i) The ERC expresses some concern regarding the lack of large CFI grants involving faculty in Biological Sciences. I should first mention that several of the recent hires in Biological Sciences were given access to CFI through the Leaders Opportunity Fund. Others, whose needs were more modest, had their startup package entirely funded by the University. As acknowledged elsewhere in the Report, our startup packages have erred on the side of generosity. As far as the large awards (IRMACS, CREM, HPC and others) are concerned, success in this competition requires a good deal of grassroots leadership and spadework. No such leadership has emerged in Biological Sciences to date although I note that Harald Hutter is taking a lead role in an application to CFI for confocal microscopy.
- (ii) “The Dean should express very clearly to individuals recruited into or currently residing in Biology that changing departments is not a viable option.” The impression left by this sentence is that there is an epidemic of department hopping. I’m aware of four cases in the Faculty of Science during the last thirty years (Boal, Hell, Verheyen and Quarmby) except at the time of formation of new departments in Molecular Biology and Biochemistry and Statistics and Actuarial Sciences. The most recent case of switching has clearly irritated some members of the Department, probably because it involved the loss of some high-quality lab space. There was, however, neither encouragement on my part nor any “poaching” on the part of MBB. I think that all requests by faculty members to switch to another department have to be considered on their merits. Having said that, I would not support a request from a recently arrived faculty member to change home departments.
- (iii) “It is crucial for both Health and Safety and productivity reasons to ensure that graduate students have desk space outside the laboratories in which they work.” I agree with this. We will be renovating and reallocating a considerable amount of space as a result of the move to TASC II. Graduate student seating space will have to be a priority.
- (iv) Recommendation #2 concerns shared facilities. I agree with the spirit of this recommendation. I have recently succeeded in obtaining \$200K from the remaining CFI Leader’s Opportunity Fund for an application for a confocal microscopy facility that will be shared principally by faculty in Biological Sciences and MBB.
- (v) Recommendation #3: “The Dean and the University could better define the processes for embarking on joint initiatives, including programs and faculty appointments supporting more than one unit.” The essential first step in formulating a potential joint initiative is for two or more faculty members from different units to talk to each other. Such discussions do take place but don’t seem to have, for whatever reason, involved faculty in Biological Sciences at

least to this point in time. I have every confidence that the program in Quantitative Epidemiology, jointly developed by Statistics and Actuarial Science and the Faculty of Health Science, will be successfully mounted. Such opportunities exist for Biological Sciences as well but someone has to take the lead.

For the Department
Undergraduate Curriculum

- (i) The principal recommendation here is a complete reexamination of the undergraduate curriculum and the Department has accepted this. On the other hand, the more specific recommendation to reduce the required number of lab courses has not been accepted. I agree with the Department that pedagogical considerations are more important than what the current Canadian norm is. However, I would urge them not to dismiss this recommendation without further consideration. Lab space is in short supply.

Graduate Program

- (i) Recommendation #6: This essentially calls attention to the perceived difference in support for Ph.D. students at UBC as compared to SFU. I agree with the Department's response that the only feasible method of bridging the gap is more extensive use of research dollars but it may be difficult to obtain consensus in the Department if the cost to researchers turns out to be too high.
- (ii) Recommendation #8: The substantive part of this recommendation is a suggestion that the Master in Environmental Toxicology Program be converted to a research based M.Sc. rather than a coursework program. The Department does not agree with this proposal. Since the Department has recently conducted a comprehensive review of the program I am comfortable with their decision to retain the current format.
- (iii) Recommendation #9: The heart of this recommendation is a suggestion to lower the barrier for students wishing to transfer from the M.Sc. to the Ph.D. program. I support this. I believe that a conscientious supervisory committee is able to judge whether or not a student has the ability to complete a Ph.D. relatively early in that student's M.Sc. program. The Department seems receptive to this suggestion.

All in all, this review was a positive and useful exercise and I congratulate the Department on an excellent review.

EXTERNAL REVIEW

DEPARTMENT OF BIOLOGICAL SCIENCES
SIMON FRASER UNIVERSITY

DEPARTMENT RESPONSE JUNE 6 2006

The Department of Biological Sciences was reviewed on March 22-24 2006. The written report of the external reviewers was received by the Chair, and circulated to all faculty, staff, graduate students and representatives of the undergraduate student caucus students, on April 26 2006. A draft Department response was discussed and approved at a Departmental meeting on 30 May 2006. This report is the official response by the Department that comments on the external review in general and the specific recommendations in the external review report.

Overview

The Department was pleased with the overall tenor of the External Review report: the review panel found that Biosciences "is an active and stimulating enterprise that operates in an open and collegial fashion.... is working well, making effective use of available space and taking a business-like approach to planning and renovation ... has been very well served by its recruitment operations ... is well organized with respect to planning of course offerings [and has responded] in a timely and constructive way to University initiatives such as the Surrey operation and the emerging Faculty of Health Sciences".

We were particularly encouraged that the External Review panel endorsed our current hiring plan through 2010 (approved with 94% support by the Department in January 2006) which they described as "well thought out" with positions in microbiology and toxicology, in particular, representing "key additions to the Department *and to the broader programs at SFU*" (our italics).

Below we outline some initial responses to specific recommendations in the report, although we note that some of these recommendations would take several years to implement and will require more detailed discussion and planning at the Department level.

Recommendations "for the University"

The review panel expressed concern over an increase in "downloading" of routine administrative and financial tasks to the Department level citing the implementation of Peoplesoft® as an example. The Department appreciates the need to upgrade and improve the Student Information Management System (SIMS), and other financial and academic management systems but has also routinely expressed concern about the increased workload being expected of DAs and Undergraduate Advisors in particular, the office staff in general, and the increase in "non-academic" tasks being required of faculty (examples being use of the new FAST and Purchase Requisition systems which still work less than smoothly). Although we have taken steps within the Department to deal with this issue (e.g. reorganising the main office, hiring a financial clerk)

this has had to be done without additional resources to meet the burden of the increased workload.

Recommendation #1: *The University must ensure that its move to writing initiatives can accommodate the realities of writing in science (for example) as well as in other disciplines. The University must ensure that the standards for the initiative are comparable across units and that there are adequate resources to support this approach. The Department appears enthusiastic about providing its students with more experience in writing. At this stage, however, it is not clear that Biology (and perhaps other areas of science) is well served by the template that appears to have been adopted and the apparent mismatch of resources to the envisioned programme. For example, at the University of Western Ontario we have hired a science editor to support the writing component of a required second year lab course.*

As the review panel concluded in their summary, Biosciences believes that it has responded in a "timely and constructive way" to the WQB curriculum reforms, within the constraints of the resources available to meet these changes. Twice we have forwarded a proposal jointly with MBB for a Writing Lecturer to UCITF to recruit someone with expertise in science writing to develop and offer a dedicated upper division writing course in the life sciences. This proposal was viewed as "too expensive" and was not funded. Nevertheless, we have continued to work with the Vice President's office and will go ahead with a revised plan to modify existing courses to W courses. This does work well for some of our upper-division laboratory courses, but with considerable increase in the workload for instructors, and for larger courses this approach is not desirable. While this might well provide sufficient W seats for Biology majors we are not convinced that this approach fulfils the "vision" of radical curriculum reform that was discussed at the outset of this process. In addition the "TA model" that many Departments have reverted to almost by default, where TAs provide much of the additional W instruction and feedback, will continue to be problematic simply due to a shortage of experienced TAs (indeed this was one of the main reasons why we didn't pursue BISC 102 as a lower division W course: it would have required an additional 10 TAs and these are not available in Biosciences).

Recommendations "for the Dean of Science"

"We were unclear about why the Department of Biological Sciences was not involved in any major applications to CFI."

Biosciences is certainly interested in participating in major CFI funding applications, especially for existing faculty following the changes with the Leader Opportunity Fund. However, major applications are strategic decisions of the University, due to the need for matching contributions from non-government funds; we would appreciate increased support and transparency in this process.

"The Dean should express very clearly to individuals recruited into or currently residing in Biology (or MBB) that changing departments is a not viable option. Neither department should be supported in any attempt at "poaching"."

The Chair has argued very forcefully for this in the past and we fully endorse the external review panel's comments. It will be especially important to consider this issue carefully in any future faculty- or department-level reorganisations, such as the proposals arising from the Environmental Science external review.

"It is crucial for both Health and Safety and productivity reasons to ensure that graduate students have desk space outside the laboratories in which they work. Regulatory agencies are moving to ban the presence of student desks in laboratories and it would be prudent to take this into account as plans for new space unfold. This will be achievable in Science only with the provision of additional space and/or renovation money. The effort will require long term planning as new space becomes available in the new science buildings."

The issue of graduate student desk space could become a critical issue for Biosciences, and other Departments such as MBB and Chemistry, if future Health and Safety regulations prohibit students having desks in analytical labs. Biosciences currently has 130+ graduate students at least 65% of whom have desk space in analytical labs. Conservatively this would require 320 m² of additional office space (at 4 m² per student) to accommodate these 80+ graduate students. Again, we have tried to respond to this issue in the Department, e.g. converting an underutilised computer teaching laboratory to graduate desk space, and further renovation of B7217 (109 m²) could increase desk space in this room, assuming renovation monies were forthcoming. However, given the potential scale of the problem we would require the provision of substantial new space to deal with this recommendation.

Recommendation # 2: *The Department should be encouraged to make better use of shared communal research facilities. On campus it would appear that colleagues in several departments and faculties would benefit from communal facilities, but the move has to begin somewhere. Microscopy may be a good place to start as excellent facilities would enhance the research of faculty in Biology, MBB, Kinesiology and Psychology (so we were told). Clearly moving in this direction will involve collaboration across faculties but the arrival of so many new faculty may make it easier to access funds and disconnect from the past. Administrators should keep in mind that, inevitably, some research operations will require exclusive access to some equipment; communal facilities can reduce the need for space in individual labs, but not replace it.*

With the advent of Tri-council IDC funding, in particular, we have attempted to build up "communal research facilities" and equipment in Biosciences. We have encouraged faculty to submit joint applications for NSERC equipment grants, and we have encouraged the rational "communal" use of start-up funds to avoid unnecessary duplication of new equipment. We have also pursued several joint initiatives with MBB for major equipment items for shared use between Departments, some of which were funded (e.g. ultracentrifuge) and some of which have not yet been funded (e.g. confocal microscope). One problem that we face is the lack of appropriate space in a central location to house communal equipment. For example, we have set up some shared equipment in B7207 but this is not high-quality lab space and this location is

quite distant from Biosciences users who have labs in SSB.

Recommendation # 3: *The Dean and the University could better define the processes for embarking on joint initiatives, including programmes and faculty appointments supporting more than one unit. We got the impression that administrators were wondering why more such proposals aren't brought forward, while Departments were wondering how to route a proposal and why administrators were unreceptive to proposals brought. We suspect that a simple lack of communication is behind this mismatch.*

Generally, we feel that such opportunities are handled in an "ad hoc" fashion, through the normal University chain of command. If indeed there is the desire for strategic joint appointments between different faculties beyond those currently discussed, we would certainly welcome any suggestions and some clarification of the decision-making process and mechanism by which joint- or cross-appointments can be achieved.

Recommendations for the Department

a) Undergraduate Curriculum

Recommendation # 4: *The Department should undertake a serious and extensive revision of the undergraduate curriculum. We agree that the existing streams are realistic and appropriate for students of modern biology. This revision should include efforts to cooperate across units. For example, Kinesiology could provide the breadth as well as depth in the Integrative Biology (Physiology) program that is currently not possible in Biological Sciences because of a lack of academic staff. This could be achieved by shared, reciprocal access to courses or could even extend to a joint programme. The cell biology programme is well established. Students benefit from access to courses in MBB and reciprocal access to courses by students in the two Departments must be maintained and strengthened. The department is about to launch a cell biology lab course that will strengthen the stream and has made a strong effort to recruit new faculty into this area. The ecology and evolution stream is strong and reflects the concentration of high achieving professors in this area.*

We would encourage the department to strengthen the students' exposure to statistics and re-consider their requirements for courses outside biology (mathematics, physics, and chemistry) to make room for more courses in statistics. In deciding about these requirements, it is useful to remember that not all areas of biology (all streams) require the same depth in these other disciplines.

While we believe that offering some taxonomically-based courses is important in biology, it is not feasible to deliver every "ology" course. As a result, we do not recommend basing hiring decisions of apparent gaps in taxonomically-based offerings. In deciding about which specific courses to offer, the department must achieve a blend of diversity (based on faculty expertise) and fundamentals of the discipline that can be covered in available taxonomy/systematics courses.

The Department continually revises and updates the curriculum, taking into account the

requirements of our streams and the input of new faculty. That said, the Department agrees that it is timely to consider the curriculum with a fresh eye: starting from what we expect graduating students to know within each stream, and working back to the lower division requirements (including 'service' courses offered by other departments). This would allow for an assessment of our lower division requirements in light of the needs dictated by individual streams. Several of the comments made by the External Review Committee are already works in progress. For example, we have just passed a motion in the Department (at our April 25 2006 meeting) to increase students' exposure to Statistics by adding an upper division statistics course to the mathematics choices. In addition, students in the Integrative (Physiology) Stream are already allowed to apply Kinesiology courses towards their major program. We agree that it would be desirable to increase accessibility to Kinesiology electives that are relevant to our students, but this is often constrained by an abundance of KIN prerequisites, and the School of Kinesiology policy of restricting access for students outside their program. With the advent of additional programs related to the life sciences (especially Health), discussions have started to evaluate course prerequisites and perhaps consider alternatives. Perhaps this restriction can be addressed at the Faculty level?

The Department strongly believes that our lab requirements are a very positive aspect of our program. There is no expectation that we will be hiring specifically to increase the number of 'ology' courses available to students. There is also currently no move to encourage new faculty to develop new taxonomically-based lab offerings, although there is some expectation that existing courses will be updated. Several courses have been removed from the curriculum during the past several years and we expect this to continue as the field, and the Department, evolve, so that the curriculum reflects the strengths of our Department.

It also is appropriate to revisit questions of how material is covered in courses and which ones are supported by laboratories. A new curriculum could generate more synergy between faculty (and areas of biology) while achieving better use of resources (space, equipment, people). The arrival of so many new colleagues into the Department makes it timely to undertake this initiative. Currently, few students are able to finish a regular degree (not including Co-op) in 4 years because of the challenge of taking so many lab courses in the upper levels and the inability to fit them into their timetables. We worry that new staff will introduce more lab courses rather than modifying and streamlining existing ones. It is important to identify the crucial capstone course(s) for each programme and ensure that adequate lab training is available. The Department is rightfully proud of its tradition of having lab-intensive programs but they should examine whether they are overdoing a good thing. In undertaking this endeavor, consider how long it takes students to graduate and what challenges they face in finishing their programmes of study.

There are no data available that suggest that our requirement for 5 upper-division lab courses is the reason for long completion times. Both MBB and Kinesiology require fewer labs, but have similar degree completion times (16 semesters, on average; data available from E. Kirkwood). The Department would consider reducing the number of labs required of majors, if there was a compelling reason to do so, but we do not believe that this is the case at present.

Furthermore, we believe that maintaining a large practical or “hands-on” component contributes to making the Bioscience major at SFU different or even unique (e.g. compared to UBC), something that is becoming increasingly important as competition over enrollment intensifies. We also believe that the more extensive “hands-on” training that Bioscience majors receive makes them in demand and very competitive for Co-op positions, one of SFU’s strengths. While small laboratory courses are more expensive than large lecture courses, it should be noted that faculty involvement offsets the real costs: our faculty often spend many hours working with students in multiple lab sections in excess of the actual course contact hours. This provides an individualized teaching environment normally seen only in smaller institutions without a research mandate, and these courses also prepare our students better for independent research, and in turn give our department access to better trained undergraduate or graduate research students.

We were not convinced that the open laboratory structure, however traditional, is giving students the high quality experience they require or that it is an efficient use of resources (space, technical). Undergraduates admitted to us that it was easy to skip labs or knock them off in short order without giving them the experience needed for future studies. Considering the huge effort the support staff put into catering to the students as well as the expense of the labs, the Department should ensure that the students are fully engaged. If the numbers become too large to handle, alternating labs should be considered.

Regarding the perception by the External Review Committee that our ‘open lab’ format is inefficient, the Committee may not have understood the distinction between true open labs, where students go and complete experiments on their own time (currently only available in BISC 101), and more formal labs where the students perform experiments during scheduled lab hours under the supervision of TAs/laboratory instructors and occasionally need to return to the lab (also on their own time) to carry out additional procedures (e.g. BISC 303). We feel that it is extremely important that students experience this reality of the scientific method. Students in the formal lab courses are not permitted to “skip labs or knock them off in short order”. If that is occurring, it must be only in BISC 101. We will certainly investigate this claim and if true, discuss whether we wish to switch BISC 101 to the sort of timed labs that currently occur in BISC 102. Currently, there is no indication that the numbers are ‘too large to handle’.

Recommendation # 5: *The Co-op person assigned to Biology should be encouraged to attend department meetings to give him and the programme more profile.*

In the past the Co-op coordinator for Biological Sciences has been invited to Departmental meetings if they wished to attend. We will ensure that the current coordinator (Stuart Billings) is aware that this open invitation still stands especially since, in Mr. Billings, we again have a permanent, full-time coordinator for the Biology Co-op program (as of Summer 2005).

b) Graduate Programme

Recommendation # 6: *The real or perceived inequality in students' standard of living*

within the Department, especially compared to UBC, needs to be confronted and handled appropriately. The department must address concerns about the levels of financial support for graduate students. Levels of support are caught between pressures on the grants that pay student support and everyone's acknowledgement that current support is very low relative to the cost of living in Vancouver. We have no easy answers to this tension. However, we strongly recommend that whatever minimum level of support is adopted, this minimum must be guaranteed. Make strong efforts to inform graduate students about the availability of additional support (for instance, availability of T.Aships to fellowship students). Finally, the DGSC might want to seek reliable data on Ph.D. funding comparability between SFU and UBC. It might or might not be desirable to bring funding levels into line between the institutions; but regardless, the apparently contradictory beliefs of students and the Graduate School about the "freeness" of UBC's free tuition seem to be a source of confusion and tension.

We believe that there is a real, and substantial, difference in the *net* level of support for PhD students between UBC and SFU, due primarily to UBC's decision to waive tuition fees for their PhD students (see Appendix 1). The Departmental Graduate Studies Committee (DGSC) has considered this issue frequently and at length, and certainly appreciates the gravity of this issue. This is indeed a major problem for our University, but one which Biosciences cannot solve unilaterally: conservatively the total cost of paying tuition for our PhD students would amount to c.\$180,000 per annum (approximately 38% of our non-salary Operating budget). At the Departmental level, DGSC will consider additional ways to guarantee a minimum level of support, but this mainly requires the willingness and ability of each individual faculty member to ensure a suitable level of support, and this will increase pressures on research grants (which are not increasing). However, we also need to be aware of concerns in setting up a two-tier graduate student system with MSc and PhD students getting markedly different levels of support.

Recommendation # 7: *The recruitment and retention of top graduate students needs to be funded imaginatively by the Department and the University. According to the VP Research, the Faculty receives 50% of the overhead generated by its research activities with the Department receiving half or 25% of this amount. The department could use some of these funds to promote the graduate programme. Two obvious means are recruitment of students (flying in excellent candidates for interviews and promote their registration in the Ph.D. programme - as is done by other units on campus), and support for travel by graduate students to present their work at conferences. Alternatively, such programmes could be supported by the Dean of Science, perhaps by way of a modest reduction in startup packages (which offset the inability of the institution to access CFI Leader Opportunity Funds, but which in our experience are quite generous). The committee members have experience with new professors, flush with large start-up grants, who lose momentum because of the inability to attract good students. This is a critical retention issue for all Canadian scientists.*

We agree that Departments, the Dean of Science and the Dean of Graduate Studies need to work together to address some of the problems with recruitment of graduate students. However, we should point out that retention of graduate students is very high in Biosciences and this has not been a problem for our Department. The SFU Graduate Student Travel Awards (NSERC) were an

excellent, and much appreciated, example of a very positive initiative to support graduate students presenting their work at conferences (although many Bioscience faculty prioritise this with their own research funds) – it is disappointing that this funding could not be maintained. Individual faculty are largely prevented from paying for travel for visits by prospective graduate students, as a recruitment tool, since this is not an allowable expense for NSERC grants. Biosciences can consider providing some support for these types of initiatives though without an increase in our non-salary Operating budget this would be at a very modest level, e.g. our “income” from overhead on contracts in 2005/06 appears to have been only \$3,500.

Recommendation # 8: *The M.Sc. in Pest Management is worthy of continued support. The MET (Master in Environmental Toxicology) should be more self-sufficient and not rely on research grants for student funding. The conversion of the MPM (Master in Pest Management) programme to a research M.Sc. in Pest Management is an important positive step that should increase its reputation. The Finlayson Chair will be central to the long term success of the MPM operation and represents a wonderful opportunity to modernize and broaden the scope of the program. Any effort to hasten the filling of the Finlayson Chair, such as bridge funding, would be an excellent show of gratitude by SFU for Mrs. Finlayson's generosity.*

We agree that toxicology will be an important subdiscipline for the Department and for the University, especially with the establishment of a faculty of health sciences. Furthermore, we are supportive of the presence of “applied” research in the Department. However, we have concerns about the appropriateness of the current MET model. It is not clear why it is appropriate for a “professional” programme with a minimal research component to use support from RA (including grant) and TA funds as a source of student stipends. The MET programme should either follow the metamorphosis that has occurred in MPM, or it should emerge as a fully-fledged professional programme supported by differential fees.

The MET program was only recently reviewed internally, by Biosciences’ DGSC. Based on input from students and faculty this review concluded that the MET program provides students with a very high quality education, and students have been successful at gaining employment after graduation (virtually 100%). Overall, DGSC concluded that “we can feel confident that the program is meeting its objectives, [it] is a credit to those involved, and reflects well on the Department of Biological Sciences as a whole”. Converting the MET program to a research Masters in Environmental Toxicology, as with the MPM program, would not alleviate the funding issue since Masters students would be fully reliant on RA funding from faculty grants or TAs (unless they obtained external scholarships). In addition this would require a radical rethinking of the aims of the MET program and a shift from a course-based, to a research-based program. For example, currently MET students are required to take 30 credits or c.10 courses and we would have to reduce this to perhaps four “core” toxicology courses taken by all “M.Sc in Environmental Toxicology” students. We doubt that there would be sufficient demand for a true professional program fully supported by differential fees. The MET coordinator was asked to provide a formal response to the Department early in 2006 in relation to the DGSC’s recommendations and given the comments of the External Review committee the Department will revisit the issue of the MET program once this report has been received.

Recommendation # 9: *There needs to be an expectation that M.Sc. students are fully engaged in research and that they could convert to the Ph.D. program if they have demonstrated reasonable progress and insight into their research. The Department should require a research proposal from M.Sc. Students as it does for Ph.D.s, and should use the "how to be a scientist" course (likely expanded) as a vehicle for doing so. This would provide the students with an assignment in the course for marking purposes and give them the opportunity to focus early in their careers on their own research goals.*

Our DGSC will consider the issue of requiring M.Sc. students to complete a formal research proposal (as we do for PhD students). At present all students are required to form a committee and develop a research proposal before the end of their fourth semester. However, many faculty require their students to complete a proposal and have a supervisory committee meeting much earlier than this and, in most cases, we believe this system works well. One problem with changing this within the context of BISC 800 is that this course is offered once per year in the Fall but we allow flexibility in starting dates when admitting students (e.g. students can register Jan. 1 or May 1). We have received input from the Graduate Caucus with regard to suggested revision or development of BISC 800 –to make this course more useful to graduate students - and DGSC and the Associate Chair will be looking at the way this course is currently taught.

The Department encourage students and supervisors to discuss the quality and quantity of work expected of graduate students. We do not envision a one-size-fits-all prescription about such things as the minimum number of chapters in a thesis. Rather, supervisors or research groups could explore expectations with prospective and current students, perhaps by adopting the kind of contract available from the School of Graduate Studies.

The Department should make the mechanics of transferring from the M.Sc. to the Ph.D. programme more reasonable and accessible for deserving students. We believe that the requirement for publishing a paper before the switch is unrealistic, and may be costing the Department access to excellent Ph.D. students.

The DGSC has already been discussing this issue and there is interest in facilitating the transfer from M.Sc. to PhD, and in allowing students to enter directly into a PhD program more easily. The latter issue is coming up repeatedly with applications for graduate school from international students where it is the norm to go from a BSc directly into a PhD program (e.g. Europe, USA), but where such students –even with excellent academic records and letters of reference - do not have “research output” (e.g. published papers) from their Bachelors.

Both students and the Department expressed concern about the availability of sufficient graduate courses in all subdisciplines to allow students to fulfill the requirements of their programmes. Rather than increasing offerings, however, we advise reducing the numbers of courses required in research-focused graduate programmes (currently higher than at comparable institutions), along with an effort to ensure availability of an appropriate selection of courses.

The DGSC has discussed the issue of the number of required courses on several occasions and

there seems to be a developing view that we require too many courses of our graduate students for research-intensive degrees. We will revisit this issue. We do have a large number of graduate courses and some of these are taught infrequently, so streamlining the number of regularly-offered courses, and making more use of Special Topics courses for occasional offerings of other courses could be advantageous to the Department.

c)Other recommendations

Recommendation #10: *The Department should establish mentoring programmes for new faculty, staff and sessionals. Such programmes should introduce newcomers to the operations of the department and the university and provide support for people as they arrive and become established. A survival guide might be an excellent complement to this initiative. The experience of recently arrived colleagues could help to guide the establishment of a mentorship operation.*

In future we will assign a specific “faculty mentor” to each newly arriving faculty member (although it is unlikely that any single faculty member will have sufficient expertise in all areas). We have considered a “survival guide” for new faculty and have produced a similar guide for sessional instructors; we will revisit the idea of expanding this to provide a copy to newly-hired faculty. We do strongly encourage new faculty to attend the orientation sessions organised by the VP Academic.

Recommendation #11: *The Department should use “stacking” of teaching to give faculty more flexibility in meeting their obligations (in a semester in which a faculty member does not offer a formal lecture course, we understand that supervision of research students can ensure credit for a teaching semester). While the Department should be receptive to requests for stacking, it should accommodate them only when doing so does not compromise the curriculum. In our experience, this is often possible. Further flexibility should be sought by making more use of team teaching (which can also bring enhancements in course content).*

Stacking of teaching is something that is widely supported, especially by younger faculty, in Biosciences. The Department will consider implementing a policy of “stacking” of teaching within our regular course planning process, with caveats in place to make it very clear that the curriculum cannot be compromised, and that faculty must provide sufficient justification for stacking. However, since this issue may modify University policy we will request some further guidance on this issue from the Vice President Academic.

Recommendation # 12: *Activities of the undergraduate biology club should be promoted. The Department should assign a colleague to act as a “faculty advisor”, should use some funds to launch initiatives with the students (sponsor and organize a seminar, conduct career sessions) and should encourage them to establish a strong peer mentoring programme.*

Direct entry to a Bioscience major will mean that we will be better able to contact students to make them fully aware of our mentoring program as well as opportunities for Co-op and research experience (e.g. already this year the Chair has written “welcome” letters to more

than 100 students who have received offers from SFU and indicated an interest in Biology, and this letter highlights our mentoring program among other things).Emelia Kirkwood (Undergraduate Advisor) and the Chair of DUCC do liaise directly with the Biology Student Union (BSU) but we will consider the appointment of an additional "faculty advisor" to help advise on, and develop, activities of the undergraduate Biology Union. The Department has provided funding for BSU events in the past, we certainly can encourage the BSU to promote a career event (such as those organized by the students in MBB and Chemistry), and we continue to support this important student group.

Appendix 1: Comparison of UBC and SFU PhD student incomes

Table 1: Based on a four-year program for a student who does not have NSERC or other major scholarship funding (i.e. they rely on the minimum yearly stipend). Both SFU Biology and UBC Zoology state that stipends are a combination of RAships, TAships and small scholarships. Note that taxes have not been deducted here although they are collected each year.

	UBC PhD Student	SFU PhD Student
Yearly Stipend	\$19,702 (Guaranteed) ^a	\$18,000 (NOT guaranteed)
Tuition per year	\$0	\$3,615 ^b
Student Fees per year	\$600	\$758
Net Income per year	\$19,102	\$13,626
Net over four years	\$76,408	\$54,504

a) UBC Zoology guarantees that all PhD students receive this minimum stipend each year for four years, plus the amount to cover tuition (\$3786 per year). SFU Biology does not make a firm commitment to their minimum and does not make any provision for paying tuition. The guaranteed President's stipend (\$6000) from SFU covers one semester (making up part of one year's \$18,000) and so is not a bonus over and above the stipend to help defray the costs of tuition.

b) SFU PhD students pay full tuition for the first 8 semesters (\$1446.3) and the "continuing" rate for the remaining semesters (\$723.20). Averaged over the 12 semesters of a four-year degree the total per year is \$3615.81.

*Note, we have no information about the availability of internal, small scholarships, such as the SFU Graduate Fellowship for UBC Zoology students.

Over 4 years UBC PhD students net \$21,904 more than SFU PhD students. This equals \$5476 per year or \$1825 per semester.

Table 2: The same calculations as above except that here the student has received NSERC PGS D for the first two years of the degree.

	UBC PhD Student (with NSERC)	SFU PhD Student (with NSERC)
NSERC stipend (2 years)	\$21,000	\$21,000
Yearly Stipend (after NSERC)	\$19,702	\$18,000
Tuition per year	\$0	\$3615
Student Fees per year	\$600	\$758
Net Income per NSERC year	\$20,400	\$17,384
Net Income per stipend year	\$19,102	\$13,626
Net over four years	\$79,004	\$62,020

Over 4 years (2 on NSERC and 2 on stipend) UBC PhD students net \$16,984 more than SFU PhD students. This equals \$4246 per year or \$1415 per semester.

REPORT BASED ON AN EXTERNAL REVIEW OF THE

DEPARTMENT OF BIOLOGY

SIMON FRASER UNIVERSITY

We are pleased to report that the Department of Biology at Simon Fraser University is an active and stimulating enterprise that operates in an open and collegial fashion. The Department is working well, making effective use of available space and taking a business-like approach to planning and renovation. The Department has been very well served by its recruitment operations whether the focus is faculty, staff, or graduate students. The Department is well organized with respect to planning of course offerings, responding in a timely and constructive way to University initiatives such as the Surrey operation and the emerging Faculty of Health Sciences.

In many ways, the Department is a model for collaborations and interactions. BERG and CWE are established, ground-up operations that are internationally recognized and a credit to the University and the country. Other emerging groups (for instance, FABLAB) seem to be following the interactive examples of BERG and CWE. In spite of the recent establishment of MBB that occurred at some cost to the Department, the two operations now have more points of co-operation and collaboration than discord.

Professor Tony Williams, the Chair of the Department, is doing an excellent job. He is a leader who works well with others and is highly regarded by other members of the Department, from staff to faculty.

The Department has been, and continues to be, well served by the University and the Faculty of Science. The operations of the Library have been particularly effective in supporting the Department.

Below are some recommendations and suggestions that would/could lead to a further enhancement of the Department and its operations.

For the University

The Department of Biological Sciences is being pushed and pulled by many forces and is at a critical point in its evolution. It is feeling space and enrollment pressures that are challenging its traditions of lab-intensive courses and personal rapport between students and staff. The introduction of new accounting systems, increased regulatory demands by health and safety agencies, and the challenges of recruiting and retaining top staff and students in a very competitive market are some of the external forces shaping the Department. In addition, the Faculty of Public Health and the Surrey campus are future projects that offer incredible opportunity but also enormous challenges for the Department. The presence of related and sometimes competing units that are orbiting around the Department (Molecular Biology and Biochemistry (MBB), Kinesiology, Resources Management) offer opportunities for collaboration but the associated high expectations must be managed realistically.

It was obvious that the University has not been well served by the move to Peoplesoft®, accounting and management software that has great promise but is a bear to implement. In

addition to leaving units struggling to find additional time to complete routine tasks, the system has left many convinced that they are the victims of “downloading” by the administration. The University must either substantially reduce the burden of using Peoplesoft® or must provide units with additional resources to meet that burden.

The University must take full advantage of the excellence of operations such as BERG and CWE. These are mature, internationally renowned centers and should serve as models for interdisciplinarity and extra-university collaborations. In conversations with individuals outside the department we were repeatedly left with the impression that these operations were not much valued compared to endeavours (even hypothetical ones) more oriented to medicine.

Institutional policies and procedures should be designed to enrich the academic atmosphere and promote the success of faculty and students. We were bemused by formal policies about “stacking” and teaching credit toward sabbatical leaves that seem to discourage flexibility for both units and faculty members. In our respective institutions, these matters are routinely addressed while achieving flexibility without loss of responsibility or due diligence.

We applaud the efforts to strengthen the University’s presence in environmental topics. Our meetings and discussions did not reveal any inherent antipathy to this among biologists, although we would not recommend housing broadly based environmental programmes in the Department. The re-organization initiative we were told about is to be commended. We hope that environmental sciences will be accommodated with other environmentally-focused programmes such as REM. Setting aside concerns about trends in enrolment expressed by the Dean of Science (for which we saw no data), the environmental science programme appears to be sound in curricular design and seems to attract excellent students. The University’s final decisions about environmental programmes will be informed by the external review of environmental science.

Recommendation #1. The University must ensure that its move to writing initiatives can accommodate the realities of writing in science (for example) as well as in other disciplines. The University must ensure that the standards for the initiative are comparable across units and that there are adequate resources to support this approach. The Department appears enthusiastic about providing its students with more experience in writing. At this stage, however, it is not clear that Biology (and perhaps other areas of science) is well served by the template that appears to have been adopted and the apparent mismatch of resources to the envisioned programme. For example, at the University of Western Ontario we have hired a science editor to support the writing component of a required second year lab course.

For the Dean of Science

We were unclear about why the Department of Biological Sciences was not involved in any major applications to CFI. In our experience CFI provides the opportunity to obtain significant support for new research collaborations and the kind of communal facilities we call for below. In discussing this with Mario Pinto, VP Research, it became apparent that the matching resources for the Leader Opportunity Fund were meagre and the Faculty is to be commended for its generous support of its new professors. Still, the lack of evidence of past CFI applications suggests that SFU has foregone a wonderful opportunity to build the infrastructure needed for a forward thinking biology department.

It is very important to maintain and expand the positive momentum and synergy between BS and MBB. Lingering personality conflicts and the impacts of real or imagined transgressions are waning, but are best vanquished by positive initiatives. The Dean should express very clearly to individuals recruited into or currently residing in Biology (or MBB) that changing departments is a not viable option. Neither department should be supported in any attempt at "poaching".

It is crucial for both Health and Safety and productivity reasons to ensure that graduate students have desk space outside the laboratories in which they work. Regulatory agencies are moving to ban the presence of student desks in laboratories and it would be prudent to take this into account as plans for new space unfold. This will be achievable in Science only with the provision of additional space and/or renovation money. The effort will require long term planning as new space becomes available in the new science buildings. Given the presence of a space audit that we did not see, the Dean must mediate conflicting demands on the limited available space. He can show leadership by taking into consideration the requirements of health and safety and effective operation of ongoing laboratory courses.

The department's hiring plan is well thought out. It anticipates the additional pressures that will come from health sciences students. Specifically, microbiology and toxicology will be key additions to the department and to broader programs at SFU. We were pleased that MBB has been involved in, and supports, the microbiology position. The Chair's plans for the Surrey campus are aligned with these recruitments.

Recommendation # 2. The Department should be encouraged to make better use of shared communal research facilities. On campus it would appear that colleagues in several departments and faculties would benefit from communal facilities, but the move has to begin somewhere. Microscopy may be a good place to start as excellent facilities would enhance the research of faculty in Biology, MBB, Kinesiology and Psychology (so we were told). Clearly moving in this direction will involve collaboration across faculties but the arrival of so many new faculty may make it easier to access funds and disconnect from the past. Administrators should keep in mind that, inevitably, some research operations will require exclusive access to some equipment; communal facilities can reduce the need for space in individual labs, but not replace it.

Recommendation # 3. The Dean and the University could better define the processes for embarking on joint initiatives, including programmes and faculty appointments supporting more than one unit. We got the impression that administrators were wondering why more such proposals aren't brought forward, while Departments were wondering how to route a proposal and why administrators were unreceptive to proposals brought. We suspect that a simple lack of communication is behind this mismatch.

For the Department

Undergraduate Curriculum

Recommendation # 4. The Department should undertake a serious and extensive revision of the undergraduate curriculum. We agree that the existing streams are realistic and appropriate for students of modern biology. This revision should include efforts to cooperate across units. For example, Kinesiology could provide the breadth as well as depth in the Integrative Biology (Physiology) program that is currently not possible in Biological Sciences because of a lack of

academic staff. This could be achieved by shared, reciprocal access to courses or could even extend to a joint programme. The cell biology programme is well established. Students benefit from access to courses in MBB and reciprocal access to courses by students in the two Departments must be maintained and strengthened. The department is about to launch a cell biology lab course that will strengthen the stream and has made a strong effort to recruit new faculty into this area. The ecology and evolution stream is strong and reflects the concentration of high achieving professors in this area.

We would encourage the department to strengthen the students' exposure to statistics and re-consider their requirements for courses outside biology (mathematics, physics, and chemistry) to make room for more courses in statistics. In deciding about these requirements, it is useful to remember that not all areas of biology (all streams) require the same depth in these other disciplines.

While we believe that offering some taxonomically-based courses is important in biology, it is not feasible to deliver every "ology" course. As a result, we do not recommend basing hiring decisions of apparent gaps in taxonomically-based offerings. In deciding about which specific courses to offer, the department must achieve a blend of diversity (based on faculty expertise) and fundamentals of the discipline that can be covered in available taxonomy/systematics courses.

It also is appropriate to revisit questions of how material is covered in courses and which ones are supported by laboratories. A new curriculum could generate more synergy between faculty (and areas of biology) while achieving better use of resources (space, equipment, people). The arrival of so many new colleagues into the Department makes it timely to undertake this initiative. Currently, few students are able to finish a regular degree (not including Co-op) in 4 years because of the challenge of taking so many lab courses in the upper levels and the inability to fit them into their timetables. We worry that new staff will introduce more lab courses rather than modifying and streamlining existing ones. It is important to identify the crucial capstone course(s) for each programme and ensure that adequate lab training is available. The Department is rightfully proud of its tradition of having lab-intensive programs but they should examine whether they are overdoing a good thing. In undertaking this endeavour, consider how long it takes students to graduate and what challenges they face in finishing their programmes of study. We were not convinced that the open laboratory structure, however traditional, is giving students the high quality experience they require or that it is an efficient use of resources (space, technical). Undergraduates admitted to us that it was easy to skip labs or knock them off in short order without giving them the experience needed for future studies. Considering the huge effort the support staff put into catering to the students as well as the expense of the labs, the Department should ensure that the students are fully engaged. If the numbers become too large to handle, alternating labs should be considered.

Recommendation # 5. The Co-op person assigned to Biology should be encouraged to attend department meetings to give him and the programme more profile.

Graduate Programme

Recommendation #6. The real or perceived inequality in students' standard of living within the

Department, especially compared to UBC, needs to be confronted and handled appropriately. The department must address concerns about the levels of financial support for graduate students. Levels of support are caught between pressures on the grants that pay student support and everyone's acknowledgement that current support is very low relative to the cost of living in Vancouver. We have no easy answers to this tension. However, we strongly recommend that whatever minimum level of support is adopted, this minimum must be guaranteed. Make strong efforts to inform graduate students about the availability of additional support (for instance, availability of TAs to fellowship students). Finally, the DGSC might want to seek reliable data on Ph.D. funding comparability between SFU and UBC. It might or might not be desirable to bring funding levels into line between the institutions; but regardless, the apparently contradictory beliefs of students and the Graduate School about the "freeness" of UBC's free tuition seem to be a source of confusion and tension.

Recommendation #7. The recruitment and retention of top graduate students needs to be funded imaginatively by the Department and the University. According to the VP Research, the Faculty receives 50% of the overhead generated by its research activities with the Department receiving half or 25% of this amount. The department could use some of these funds to promote the graduate programme. Two obvious means are recruitment of students (flying in excellent candidates for interviews and promote their registration in the Ph.D. programme - as is done by other units on campus), and support for travel by graduate students to present their work at conferences. Alternatively, such programmes could be supported by the Dean of Science, perhaps by way of a modest reduction in startup packages (which offset the inability of the institution to access CFI Leader Opportunity Funds, but which in our experience are quite generous). The committee members have experience with new professors, flush with large start-up grants, who lose momentum because of the inability to attract good students. This is a critical retention issue for all Canadian scientists.

Recommendation #8. The M.Sc. in Pest Management is worthy of continued support. The MET (Master in Environmental Toxicology) should be more self-sufficient and not rely on research grants for student funding. The conversion of the MPM (Master in Pest Management) programme to a research MSc in Pest Management is an important positive step that should increase its reputation. The Finlayson Chair will be central to the long term success of the MPM operation and represents a wonderful opportunity to modernize and broaden the scope of the program. Any effort to hasten the filling of the Finlayson Chair, such as bridge funding, would be an excellent show of gratitude by SFU for Mrs. Finlayson's generosity.

We agree that toxicology will be an important subdiscipline for the Department and for the University, especially with the establishment of a faculty of health sciences. Furthermore, we are supportive of the presence of "applied" research in the Department. However, we have concerns about the appropriateness of the current MET model. It is not clear why it is appropriate for a "professional" programme with a minimal research component to use support from RA (including grant) and TA funds as a source of student stipends. The MET programme should either follow the metamorphosis that has occurred in MPM, or it should emerge as a fully-fledged professional programme supported by differential fees.

Recommendation #9. There needs to be an expectation that MSc students are fully engaged in research and that they could convert to the Ph.D. program if they have demonstrated reasonable progress and insight into their research. The Department should require a research proposal from M.Sc. Students as it does for Ph.D.s, and should use the “how to be a scientist” course (likely expanded) as a vehicle for doing so. This would provide the students with an assignment in the course for marking purposes and give them the opportunity to focus early in their careers on their own research goals.

The Department encourage students and supervisors to discuss the quality and quantity of work expected of graduate students. We do not envision a one-size-fits-all prescription about such things as the minimum number of chapters in a thesis. Rather, supervisors or research groups could explore expectations with prospective and current students, perhaps by adopting the kind of contract available from the School of Graduate Studies.

The Department should make the mechanics of transferring from the M.Sc. to the Ph.D. programme more reasonable and accessible for deserving students. We believe that the requirement for publishing a paper before the switch is unrealistic, and may be costing the Department access to excellent Ph.D. students.

Both students and the Department expressed concern about the availability of sufficient graduate courses in all subdisciplines to allow students to fulfill the requirements of their programmes. Rather than increasing offerings, however, we advise reducing the numbers of courses required in research-focused graduate programmes (currently higher than at comparable institutions), along with an effort to ensure availability of an appropriate selection of courses.

Other

Recommendation #10. The Department should establish mentoring programmes for new faculty, staff and sessionals. Such programmes should introduce newcomers to the operations of the department and the university and provide support for people as they arrive and become established. A survival guide might be an excellent complement to this initiative. The experience of recently arrived colleagues could help to guide the establishment of a mentorship operation.

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We thank the members of the Department of Biology and others from Simon Fraser University, particularly Charmaine Dean, for their assistance and hospitality.

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