Review Panel Report: Oregon State University Environmental Sciences Graduate Program

OVERALL RECOMMENDATION

The Review Panel recommends that the Environmental Sciences Graduate Program (ESGP), a multi-disciplinary program at Oregon State University offering PSM, MS, MA and PhD degrees be maintained. The mission of the ESGP is very much in alignment with the University’s mission to promote environmental progress; the challenge is to maintain high quality and provide evidence of success of graduates of this program. Program continuity by engagement and participation of more active faculty is essential for the future success of the program. Faculty need to be given a sense of ‘ownership’ in the program.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

The Environmental Sciences Graduate Program is currently academically administered and financially categorized under the Graduate School. Given its multi-disciplinary nature, the Graduate School provides a natural home.

The Graduate School provides some funding for administration and other purposes, however, the main support for graduate students falls to the major professor or their departments. The College of Science has also provided funding in the form of GTAs for basic biology classes. However, the Dean of the College of Science has indicated that future GTA funding for students in this program is not guaranteed. This funding model is precarious, especially in the face of the current budgetary climate. Unfortunately the panel could only identify this problem---we were unable to solve it, however a few suggestions are mentioned below.

Given the current funding model, we do not recommend that the program increase their admissions.

The budget from the previous four years provided on p. 38 of the Self Study report suggests that the year-end balances could be used to support approximately two graduate students per year. Perhaps the faculty in the program could pursue an IGERT in one or more of the thematic areas. If this is successful, graduate student support could be guaranteed for several years.

In other programs on campus, revenue from the professional side is used to subsidize the Master’s and PhD students. Perhaps that could be pursued here as well.

A related issue is the fact that faculty currently have little incentive to participate in the program, particularly as major professors. Apparently some financial incentive has been given in some past years, which might address this problem. According to the self study document, roughly only 10% of the graduate faculty have participated as major professors. ESGP students often end up as ‘second class citizens’, especially in terms of funding. Students within the various disciplines are generally given higher priority in their respective Departments.

The program is truly multidisciplinary, with almost 150 faculty listed as members of the ESGP faculty. They hail from across the OSU campus, as well as agencies such as the USEPA. While it is impressive to
see such a large faculty listing, it is clear from the Self Study report that very few of these faculty have actually participated in the program over the past few years. Again it might be helpful to reinstate financial incentives.

There are three required ES courses. Students then choose among eight tracks, with approved lists of course offerings. This cross-disciplinary focus is both a strength and weakness of this program. The panel suggests streamlining the tracks (the self study notes that the water resources track may be eliminated due to overlap, but the Deans and Directors recommend keeping it as it offers a niche not available in water resources). The Natural Resources track may overlap with the Master’s in Natural Resources degree. We also recommend streamlining/updating the course offerings within the tracks, perhaps with student and faculty input.

The program relies heavily on its web pages to attract applicants and inform current students of program requirements. These need to be regularly updated (since our review, these pages have been updated).

Given the fact that students in this program do not have a natural common home (other than the graduate school), there is little chance for students to form an ’esprit de corps’ other than that formed when they take the core ES courses in the winter term. Modern technology could afford students a virtual home, which we encourage the students to pursue. We would also recommend moving the ES courses to the fall term for entering students. Another issue that needs attention is inequality in student salary across Departments within ESGP and between students in the home Department and ESGP.

The panel recommends that the program reconsider the current policy that students follow the requirements of the respective Departments of their major professor in completing their degree, which are being undertaken. A uniform policy concerning exams, for example requiring only oral exams should be considered. Also, it would be helpful to provide major professors with an ‘information packet’ concerning the program requirements.

The requirement that incoming students have a major professor is reasonable for the MS and PhD students (PSM students do not have this requirement), however it appears that the Director, Andy Blaustein, is bearing the biggest burden in finding and contacting matches. Although the program has set up its own web-based admissions, which is excellent, there are apparently still problems with incentives for faculty to participate in committee work. This again goes back into faculty buy-in for the program. It is recommended that the Director, the Dean of the Graduate School, and the Deans of the participating Colleges meet to discuss ways in which faculty engagement can be enhanced. Perhaps an IGERT and/or graduate internship opportunities could motivate faculty into participating more actively in the program.

The interdisciplinary nature of the program makes the administration of the program complex. Luckily, the leadership has been enthusiastic and energetic under both Bill Winner and Andy Blaustein, and the staff (Linda James) has been indispensable. Reduction in staff support would be devastating, an increase would be more than welcome.

Students can easily fall through the cracks in this type of program. We recommend that students be evaluated annually (a standard form for students to ask their advisors to complete might work). Also, we recommend that the program keep track of completion rates, time to completion and student placement after graduation.
The current ES core teaching staff is excellent—enthusiastic, talented, and excited about the resourcefulness of their students. There is, however, no clear plan for long term teaching of these courses.

**Introduction**

This was the first review of the graduate program in Environmental Sciences (ESGP) since its approval in Winter 1998. The stated goals of the review were to assess: the direction and growth of the program, funding adequacy, adequacy of core courses, and the program’s ability to meet employer demands.

The review took place on June 3, 2009 at the Memorial Union. Because of the interdisciplinary nature of this program, no specific on-site tour of facilities was undertaken as a part of the review. The participants on the review team included: Alison Power (Dean of the Graduate School at Cornell University), Susan Walls (Florida Integrated Science Center), and two members of the Graduate Council: Vinod Narayanan (Engineering) and Shawna Grosskopf (Liberal Arts). The team was provided with guidelines as well as an excellent Self Study Report prepared by Dr. Andrew Blaustein (program director) and coordinators Kimi Grzyb and Kathleen Kraska before the review. We were also provided copies of the Category I proposal establishing the program.

Present as observers were Sally Francis, Dean of the Graduate School and Martin Fisk, Associate Dean. Nagwa Naguib from the Graduate School also attended.

We first met with Dr. Andrew R. Blaustein, ESGP director, who provided us with a very helpful summary of the written report. We then met with three of the seven deans involved in this program (Sherman Bloomer, Dean of the College of Science, Larry Curtis, Associate Dean, Agricultural Sciences, and Larry Rodgers, Dean of the College of Liberal Arts). Next we met with the faculty teaching the core courses (William Hogsett, EPA, Eric Seabloom, Zoology, Elizabeth Borer, Zoology), followed by meetings with graduate students, graduate faculty, and a closing session with the director and administrative assistant Linda James.

All participants were extremely open and helpful. The panel members appreciated the professional conduct of the review visit as well as the documents provided to us. We were provided ample time to pose questions, and we believe that the participants were given ample time to provide opinions, comments and suggestions for improving the program.

The rest of the report follows the outline for the review panel report provided by the Graduate School.

**INPUTS**

1. *Fit of the Mission of the Program with college and university missions*

The stated mission of Oregon State University ([http://oregonstate.edu/mission/](http://oregonstate.edu/mission/)) is to promote economic, social, cultural and environmental progress for people across Oregon, the nation and the world through our graduates, research, scholarship, outreach, and engagement. By providing a cross-cutting platform across several disciplines such as Zoology, Forestry, Liberal Arts, Agricultural Sciences, and Oceanic and Atmospheric Sciences, the ES Graduate Program fits well with OSU’s mission of affecting environmental, social and economic progress. The graduates from this program are trained to analyze environmental systems and predict changes in the environment as well as manage environmental resources. The ESGP is housed at the Graduate School and hence transcends the mission of each of its participating Colleges.
A unique aspect of the ESGP is that it is a Joint Campus program between Oregon State, University of Oregon and Portland State Universities. Faculty and students researchers participate in a Joint Campus conference once a year. The review team considers this conference to be of great value to students since it gives the students exposure to the diverse, yet complementary nature of environmental sciences. There were some concerns expressed related to the low turnout at a recent Joint conference. This review team was not privy to the structure of the ESGP at UO and PSU and hence cannot suggest ways of improving participation. However, the low attendance of participating faculty and Deans with the Review team indicates that the inter-disciplinary inter- institutional nature of this program is both its uniqueness as well as its challenge. One suggestion is to coordinate reviews of the ESGP at all three institutions or to have Directors of the ESGP from UO and PSU provide input on their respective programs to the review team.

At OSU, the ES Graduate Program has eight tracks: Biogeochemistry, Ecology, Environmental Education, Natural Resources, Quantitative Analysis, Social Science, and Water Resources, in addition to a Professional Science Masters’ track. The Director has informed the Review Committee that two other tracks are in the planning stages, one of which is Conservation Biology. The Director further informed the Review team that only three of these eight tracks, namely Ecology, Social Science, and Professional Science Masters had the largest enrollments. This observation, coupled with the other regarding lack of active faculty participation except for a select group, suggests that elimination of tracks with low enrollment should be considered. While such a move would not necessarily change the financial situation, it would help in two ways: (a) present a more coherent front to the Program, and (b) reduce the burden of processing some additional applications.

2. Quality of Students
ESGP students consistently have GPA’s over 3.0 and GRE scores that are competitive with the national averages (as determined in 2000). For all degree programs in the ESGP, a high proportion of applicants and graduating students are female and either international or non-residents of Oregon. Students are resourceful, with many of them garnering their own funding and being recognized with a variety of honors and awards. Several have published in peer-reviewed scientific journals and given presentations at professional meetings.

3. Admissions selectivity
From 2004 to 2008, the number of applications to the ESGP that were received, followed by the number of students admitted, were as follows: 2004, 17 (3); 2005, 9 (7); 2006, 23 (12); 2007, 26 (10), and 2008, 22 (7). This resulted in an overall average rejection rate of 56.4%, ranging from 22.2 to 82.3%. The primary reason that applicants are not admitted to the program is the inability of a student to secure a major professor prior to admission (not a requirement of PSM students). The Program Director exerts a considerable amount of time and energy in attempting to match the interests of prospective students with those of ESGP faculty. This is an example of a task with which the Program Director needs the participation of his ESGP colleagues (see below).

4. Level of financial support of students
Many students receive external financial support and/or GRA’s through their major professor’s department, however support is not guaranteed. The self-study report notes that 56% of ES graduate students worked in non-university funded jobs during graduate school, compared to 35% of OSU graduate students overall. There are no ESGP fellowships available. To compete for, recruit and sustain high quality graduate students, teaching stipends need to be increased (both in terms of number of
stipends available and the funding amount per stipend). There are only 6 annual GTA positions available for students, offered in conjunction with the Biology undergraduate program, each at $1,380.00/month. These are mostly funded through the College of Sciences, and are not guaranteed. Moreover, because some GTA’s receive stipends from their respective home departments, and departments vary in funding available for stipends, GTA’s perceive that there is a disparity in stipend amounts for the same workload. Funding mechanisms for GTA’s should perhaps be standardized, if possible. Other possibilities for students to earn income in their academic field of study are described below.

5. Curriculum strength
The required core courses (ENSC 515, 520 and 508) are well-structured, relevant to current environmental issues, and germane to the mission and goals of the ESGP. In addition to these three classes, graduate students are required to take up to one additional course from an approved list of core courses to comprise a total of 9-12 credits of a core curriculum. The required and approved additional core courses address contemporary needs of prospective employers in both the public and private sectors. Additional courses are required to fulfill degree requirements, and the number of these needed vary with program of study. In theory, the lists of available courses are sufficiently diverse to allow students the flexibility to design a course of study tailored to their particular interests, whether more academic or applied. However, it is not clear how many of these courses are actually offered on a regular basis. A course that appears to be lacking, but which would be beneficial to students, is one on Professional Development (e.g. one that covers development of a curriculum vitae, statements of teaching and research, interview skills). This might be offered as a workshop at the annual meeting.

6. Quality of personnel and adequacy to achieve mission and goals
The credentials of the faculty available for participation in the ESGP are stellar. A pivotal concern is the general lack of faculty participation in the program, which undoubtedly could be increased by offering incentives. Faculty participation is needed for service on committees (e.g. admissions), as well as for teaching. The Program Director has had little support from his colleagues with detailed decision-making processes. The faculty who have been involved in teaching the core courses (Borer, Hogsett and Seabloom) are extremely creative, vibrant and enthusiastic, with excellent research credentials. They should be recognized for their commitment to the program (as should the Director). Participation by other faculty is greatly needed, however, to allow these faculty the opportunity to rotate out and teach other classes in their areas of specialties.

Administrative support: The program is understaffed. Linda James does an excellent job as the singular support person for this program. The addition of even modest additional support, such as a work study student, could potentially improve administration, especially if that person also had expertise to provide website support, a skill which is needed.

7. Level and quality of infrastructure
The Environmental Sciences graduate program is a purely interdisciplinary degree program involving eight colleges with degrees granted through the Graduate School; ESGP does not have its own physical facilities. The Director and Student Services Manager reside in offices in Cordley Hall which are shared with the Environmental Science Distance program, Entomology, Science Pre-Education and first and second year Biology/Zoology students. The program also receives support from the College of Science Management Center (Cindy Alexis and Leah Quinlivan handled ESGP finances and are moving to the Arts and Sciences Business Center); Dr. Ursula Bechert manages student recruitment, mentoring and outreach for the PSM Program in Environmental Sciences and Andrea Wirth is the Geosciences and Environmental Sciences librarian. Although library budgets have declined, roughly half of the
monographs in the environmental sciences section have been purchased since 2000. OSU subscribes to 18 of the 20 top journals in the environmental science area. Given that materials are available through Summit and Interlibrary loan, library services are probably adequate.

All participating faculty have home departments or agencies other than Environmental Science. There are no dedicated facilities for the graduate students in the program, which probably contributes to the perceived lack of cohesion and communication among these students. Although a physical home would certainly be welcome, the social infrastructure and communication among students and between faculty and students could be enhanced even without such a home. During our visit with graduate students, many suggestions were made, including setting up an online communication network among the students themselves (see section on student satisfaction below for more recommendations). **We recommend that the ESGP include student representatives on program committees (which will be done starting this Fall), make Fall orientation a community-building event by inviting returning students and faculty, consider moving required courses to the Fall term, and schedule an annual review of students to provide feedback on their progress.**

8. **Quality of Organizational Support**
The Graduate School provides financial support for the Environmental Sciences Graduate Program, which includes funding for the Director and Student Services Manager for the program. As mentioned in the previous section, additional staff support services are provided by the College of Science Management Center, which appears to be moving to the Arts and Sciences Business Center. Dr. Ursula Bechert provides services to the PSM Program in Environmental Sciences as part of her duties as director of off-campus programs.

According to the self study report, as of FY08 the program no longer receives funding from other units. Since FY04, there has been a positive end of year balance, which presumably could have been used to invite seminar speakers or finance graduate students. The report notes that the ESGP was awarded an additional $19,000 in 2008/2009 by the Graduate School which was to be spent on travel and student support by June 2009.

**The review committee would recommend additional funding for FTE staff or student workers to help with the web and perhaps an Associate Director,** however the persistent positive balances need to be addressed.

The organizational structure as it stands looks fine on paper, however, the support provided by the ESGP advisory committee and the Graduate admissions committee is lacking what economists call incentive compatibility. Participation on these committees is entirely voluntary with ‘rotating faculty’. In practice, it appears that participation on the admissions committee in particular, falls on a few faculty---currently the Director has apparently been bearing the major burden which is considerable given the requirement that all ESGP students (except PSM students) must have a major professor to be admitted. It is unlikely that students themselves can identify and convince one of the over 100 faculty listed as participating ESGP graduate faculty to be their major professor. Again, these faculty all have home departments and agencies, to which they have obligations and students to support and mentor. Although there were financial incentives in the past, currently there is no real incentive to actively participate as a major professor or committee member in this program. Although the problem is easy to identify, our review committee does not have a remedy, other than to refer the problem to the participating deans.
PRODUCIVITY

1. Level and quality of student performance
The review committee’s meeting with Environmental Science graduate students suggested that the majority of students are bright, articulate, and thoughtful. The quality of their academic performance was somewhat more difficult to evaluate based on the information provided in the program’s self-study.

Indicators of student performance for doctoral and research master’s students include numbers of publications, numbers of presentations at national meetings, and grants received. While there is evidence that some students are presenting their research regularly at national meetings, it is not clear how common this is among the students. Numbers of publications in peer-reviewed publications are limited. Students appear to be applying for, and receiving, various small grants, but it is not clear whether they have been applying for national awards such as NSF Graduate Research Fellowships, EPA STAR fellowships, or NSF Doctoral Dissertation Improvement Grants. Success in these highly competitive national grant programs would be a clear signal of high quality student performance. However, faculty assistance is necessary to inform students about these opportunities and guide them through the application process, so a lack of these awards does not mean that the students could not be competitive with faculty guidance.

Students in the Professional Science Master’s program who are not carrying out research would not necessarily be expected to publish, present at meetings, or apply for grants. While GPA in coursework might be an appropriate indicator of performance for these students, the most useful indicator is likely job placement. As noted below under Outcomes, the data on job placement is minimal. We recommend a concerted effort to collect such data in a systematic way, though we recognize that this probably could not be done without additional administrative assistance.

Other measures of student performance, such as time to degree and completion rates, can be useful indications of the success of a graduate program. Those data were not available to the review team and therefore cannot be evaluated. Again, we recommend that the program systematically collect these data in collaboration with the Graduate School, to the extent that resources permit.

2. Level and quality of faculty performance
Overall, the Environmental Sciences Graduate Program faculty are demonstrably outstanding. They have garnered numerous honors and awards and have highly successful research programs funded by NSF, EPA, NIH, DOE, USDA, CDC, US Forest Service, and many other government agencies, foundations, and non-governmental organizations. Curriculum vitae indicate excellent publication records for many faculty members. Many of these faculty would be excellent advisors and mentors to Environmental Science students. However, it is the impression of the review team that relatively few of these faculty actually advise students. Instead, it appears that only a handful of faculty members are actively engaged in the program, either teaching core courses and/or advising students. Relatively few faculty came to the review team’s scheduled meeting with faculty. Moreover, there is some concern that a number of the active faculty are at or close to retirement. To ensure a successful program, it is essential to provide incentives to engage faculty, particularly early to mid-career faculty with active research programs.

3. Viability of scholarly community
Due to a lack of centralized space for Environmental Science graduate students, the ES scholarly community is less than the sum of its parts. Some students expressed strong feelings of isolation and a lack of interactions with other students and faculty in the program. The students who expressed the
most satisfaction had identified with the scholarly community in their home department (e.g., Zoology), rather than Environmental Science. **It is clear to the review committee that the program needs additional attention from faculty to build and sustain a viable scholarly community.**

**OUTCOMES**

1. **Professional viability of graduates:** The stated vision of the ESGP is to develop a strong interdisciplinary graduate program that prepares graduate students for employment in academia, government agencies, and private industries. Thus far, 56.5% of ESGP students have secured employment after graduation, and 100% of these positions were directly related to ESGP degree training. The data on job placement that were provided to the review team did not appear to be comprehensive, hence it is difficult to judge outcomes with any confidence.

With the exception of one student placed at a Turkish university, none of the placements listed in the self-study report were academic. Since the data were sparse, it is possible that there have been other academic placements. Unlike placements in the private sector, these would be relatively easy to find using simple web searches. Assuming that the data are accurate and academic placement has been rare for Environmental Science students, it would be useful to determine whether students are encouraged to consider an academic career, or whether the program actively directs them toward other professional options. It is telling that a survey of current students indicates that the students do not expect assistance from their major professor in seeking employment. Traditionally, the faculty advisor is the single most important source of advice regarding academic employment. The program course offerings are sufficiently diverse to provide a broad knowledge base that is adequate for students that wish to pursue an academic career, along with opportunities for specialization. But the surveys indicate that enhanced career services, for both academic and non-academic careers, are essential for students to succeed in realizing their professional potential.

For those interested in employment opportunities with both state and federal agencies, there are online sources of information (see Attachment 1) that would be helpful for students to consult in designing a course of study that is best suited for their particular career interests. By informing themselves of the prerequisites for employment with these agencies, and by becoming aware of existing student employment opportunities, students can potentially enhance their professional viability upon graduation.

2. **Student Satisfaction**

The review team met with several graduate students in the ES program, including the PSM program. The team also evaluated the satisfaction section of the self-study report and e-mails received after the review. This section presents our findings of satisfaction of students currently enrolled in the program as well as that of the alumni. It affords several recommendations on how to improve student satisfaction by some simple means. In general, the students were very appreciative of the opportunity to be pursuing an inter-disciplinary degree in the ES. They were very positive about the efforts of both the Director, Dr. Blaustein, as well as the administrative assistant, Linda James.

The current student satisfaction survey indicates that students are in general satisfied with their experience in the ESGP, and very satisfied with their major advisors. Three areas have been indicated by students in the survey as less than satisfactory: Departmental advising/guidance, the level of financial support, and somewhat with the resources available for student research. Our meeting with the students also revealed that these areas needed to be addressed. We observed that student satisfaction was related substantially to the home Department of the ES student. For example students in the
Department of Zoology (the Director’s home unit) were very satisfied with their experience while those in other Departments were less than satisfied in several areas. Some of their concerns, along with recommendations, are indicated below.

Several students commented on inconsistencies in the expectation level of each faculty member on their dissertation committees. ESGP faculty echoed this comment as well. Students were also concerned with the multiple requirements (coursework as well as examination policies) that needed to be satisfied. The ESGP needs to have a consistent policy on requirements for students. This policy should clearly lay out the examinations and coursework.

Faculty who wish to mentor students in ESGP should be made aware of this policy and the differences between Departmental and ESGP students.

Faculty who participate in the ESGP students’ committee, in particular, the GCR, should be made aware of the policies of the program.

The Director of ESGP should meet with the Deans/Heads/Chairs of participating Colleges/Departments to ensure that students are not made to jump through two hurdles-- one for their department and the other for ESGP.

With the exception of the Joint-campus conference, students were mostly unaware of the advantages of the Joint-campus program, such as being able to take courses at either UO or PSU. The Director should meet with his counterparts at UO and PSU and discuss which of the courses in their institutions are equivalent to those in the OSU program.

The Joint campus advantages, as well as procedures, should be clearly identified on the website of all three campus programs.

Several students remarked that they faced an “Identity crisis” –This is a challenge with any program that transcends a single Unit level. With the exception of the first year, students are not in classes together. A seminar series that meets one or two term a year, in which each student presents his/her ongoing research, would help in bringing students together. A venue for students to meet gives them a chance to discuss their experiences and research. The Director or one of the core faculty could facilitate the seminar series (although the annual inter campus conference does help serve this purpose).

Students had resolved to form an e-mail listing by the end of our meeting with them-- this could be a simple, no-cost mechanism to connect students. Students could self-organize social events and such other activities. The recommendation is for the ES administration to formalize this listing of students and keep it current. A formal ESGP Graduate Student Association would probably be useful for continuity.

With the exception of Zoology students, ES students felt that they were treated as “second class citizens” within their departments: Teaching Assistantships and office space were offered to other students within their Departments prior to the ES students. This is a serious concern that needs to be addressed since there is little incentive for faculty to mentor ES students.

The Director needs to meet with Deans/Head/Chairs of participating Units and ensure that ES students are treated in the same manner as other students within the participating Units. This treatment includes: (a) equal opportunity to obtain TAs, office space as regular students (we have learned that office space will be available for 10-12 students this fall), and (b) equal pay scale for TAs within the unit. The committee realizes that this recommendation is very challenging to implement since the Director does not really have any “carrots” to offer to the Unit Heads/Chairs.
Although not explicitly mentioned by the students, the Director brought to the review team’s attention dissatisfaction among ES students with regards to the disparity in salary scale across the program. See the discussion above on level of financial support for students.

There was a strong desire by all students to see an updated course listing provided on the website as well as on the brochures of the tracks. The Director informed us that the website was being redesigned to address this concern.

The Director appoint “Track Leads” who can update and maintain the course listing in their tracks, perhaps with student input. The Director would have to provide some incentive for the track lead or negotiate with the unit heads to count this towards the Lead’s service obligation.

The PSM students had a more cohort sense than the other tracks—this is to be expected considering the structure of their program. However, they felt a disconnect with the rest of the ES program.

Recommendation: Drs. Blaustein and Bechert need to discuss how to better integrate and enrich the experiences of the two groups of students.

3. Rankings/Ratings

The major sources of graduate program rankings, the National Research Council’s Assessment of Research Doctorate Programs and U.S. News and World Report, do not include rankings of graduate programs in Environmental Science. Using rankings for biology programs, conservation biology programs, or even ecology programs, is tenuous, since Environmental Science is a highly interdisciplinary program that includes faculty from the social sciences as well as a variety of biophysical sciences. The review team was unable to identify a useful source of ratings for environmental science graduate programs.

The self study document points out the OSU is highly ranked in the area of research productivity in conservation biology according to a recent paper in Conservation Biology. Although this isn’t directly linked to ESGP, this certainly could be used as part of a recruiting effort.

The committee recommends that the ESGP track completion rates and time to completion of their students.

Conclusions

The overall recommendation of the panel is that the Environmental Sciences Graduate Program be retained. Steps to improve the Program are presented in the Summary of Findings as well as the Detailed Report above and include the following:

- Review tracks, streamline where there are low enrollments and redundancy with other programs
- Update course lists for tracks, perhaps with appointed track leaders and student input
- Keep web pages updated, including links to PSU and University of Oregon programs; additional staff or student worker help is recommended
- Work with Deans to provide incentives for faculty participation in the program as major professors, committee members and core teachers
- Collect consistent data on completion rates, time to completion and student placement after graduation. Also provide annual student reviews
• Consider moving core courses to fall term to build student esprit de corps, include returning faculty and students to fall orientation, encourage formation of student e-mail list, student seminar series and a formal ESGP Student Association
• Have a consistent policy on requirements for students, including examinations and coursework
• Work with Deans, Chairs etc to ensure that ES students are on par with students in the participating units
• Enhanced career services for both academic and non-academic careers
Attachment 1

For those interested in employment opportunities with both state and federal agencies, students should be advised at the start of their degree program to consult websites such as http://www.usajobs.gov/ for examples of prospective employment opportunities in their field of interest, and to pay particular attention to the required educational and experiential qualifications listed for a given position. Such consultation will aid in designing a course of study that is best suited for their particular career interests. Another means by which the professional viability of students can be enhanced would be to take advantage of student career opportunities that are available within at least some federal science agencies (e.g. U.S. Geological Survey, U.S. Fish & Wildlife Service and the USDA Forest Service). Within these agencies, there is a Student Educational Employment Program (SEEP) that has two components, the Student Temporary Employment Program (STEP) and the Student Career Experience Program (SCEP) (http://www.usgs.gov/ohr/student/benefit/seep.html). Pending available federal funds, this opportunity is available to all levels of students: high school, vocational and technical, associate degree, baccalaureate degree, graduate degree, and professional degree students. In the STEP program, job opportunities offer temporary employment that can provide students with a valuable work experience. Employment can range from summer jobs to positions that can last as long as student status is maintained (in one-year increments or less). The duties do not have to relate to a chosen academic field of study. Students in this program may be eligible for conversion to SCEP positions. The SCEP option offers valuable work experience directly related to a student’s academic field of study. It provides formal periods of work and study while attending school. The program is designed to be a partnership between the student, his or her academic institution, and the federal agency. SCEP combines academic classroom learning with practical, on-the-job experience and provides students with paid work experience in their field of study. The SCEP may lead to permanent employment after you graduation and upon meeting the necessary position requirements. Agencies such as the U.S. Geological Survey want to attract students who demonstrate the talent, skills, and abilities the USGS needs. USGS student vacancies are highly competitive. Moreover, in some situations, students may be eligible for tuition assistance.