

Oregon State University Undergraduate Program Review

Environmental Sciences Undergraduate Program

1. Overall Recommendation: (check box)

✓	Expand (with support)
	Maintain
	Restructure
	Reduce
	Suspend
	Discontinue
	Other (include brief explanation)

2. Review Process

a. Objectives and overview of review logistics, review team members

The Environmental Science Undergraduate Program (ESUP) within the College of Earth, Ocean, and Atmospheric Sciences (CEOAS) at Oregon State University requested completion of an external review covering both the on campus and Ecampus curriculum. The review team was charged specifically with examining program administration, curriculum, and student experience. The review process began with review of the following materials provided by the program director prior to visiting campus:

- A program Self Study Report authored by Program Director Larry Becker
- Self Study appendices, including institutional research data, selected course syllabi, program surveys, and the Program Director's CV
- Environmental science (ES) Program website and related pages

The review committee consisted of:

- Joe Bowersox, Ph.D, Dempsey Endowed Chair of Environmental Policy, Department of Environmental and Earth Sciences, Willamette University
- George Roderick, Ph.D, William Muriece Hoskins Professor, and Chair, Department of Environmental Science, Policy, and Management, University of California at Berkeley
- Terry Rooker, Instructor, Department of Electrical Engineering and Computer Science, Oregon State University
- Rebecca Mathern, Ph.D, Associate Provost and University Registrar, Oregon State University

The campus visit took place March 19-20, 2019. The review team, facilitated by Dr. Alix Gitelman (Vice Provost for Undergraduate Education) and Caryn Stoess (Interim Operations Manager, Office of Academic Programs and Assessment) met with the CEOAS Deans, program director and advising staff, contributing faculty, members of the ES Advisory Council, as well as students from both the on campus and Ecampus majors. We also briefly met with the director of the undergraduate Natural Resource Management program, Dr. Troy Hall.

b. Program Overview

Created in the early 1990s, the ESUP currently has 750 active majors (323 on campus, 427 Ecampus) completing their BS degree in ES with 11 specializations (9 for Ecampus students). The program has a solid national reputation for both its on campus and Ecampus offerings, and is growing steadily. Program administration is lean, with a 0.25 FTE program director, Dr. Larry Becker, covering both the teaching of the introductory course (ENSC 101) and extensive administrative duties. One tenured professor, Dr. Randy Milstein has a 0.3 FTE within the program for teaching Environmental Case Studies (ENSC 479, Writing Intensive Course). In our analysis of documents as well as in our on campus interviews, we were struck with the dedication and passion of the director, instructors, and staff of ESUP, which clearly has created a successful and growing program, thoroughly appreciated and frankly revered by its students (both on campus and online). Hence, our findings below start with what we perceive to be the ESUP's strengths in order to frame possible approaches to confronting challenges.

3. Detailed Program Evaluation and Assessment

a. Programmatic Strengths

1. Engaged and effective director

The director is a strong and thoughtful leader of a program that runs on a limited budget. He plays an active role in student success and was described as someone who would literally drop what he was doing to help students when they needed it. The director has performed many hours of work and developed a competent team of professionals who provide student support. The director has a deep understanding of the program and its history. During his tenure ESUP has both dramatically expanded and addressed many of the pressing administrative priorities that had not been accomplished by previous directors, such as assessment. His recent establishment of an Advisory Council is another significant step forward, and we look forward to its further development. His passion and dedication have been critical to the ESUP's success and the achievement of its students.

2. Caring and efficient advising professionals

The academic advising professionals support all aspects of the students' experiences. While the advisors are assigned to specific students, they operate with cross-team coverage and all advisors know all students in the program. The team is flexible and works with students to be sure that the program works to meet the specific needs of each student. The Ecampus students reported that, because of the strong academic advising team, their experience at OSU has been better than any other online experiences they have had and even better than some of their in-person course experiences at other schools. While the Ecampus students may not feel as strong a connection to other students, they have a connection to the school because the advisors make sure these students feel comfortable even though there is a physical distance between them. The advising model seems to have grown with the program growth and is viewed as strong by stakeholders who participated in the program review.

3. Strong program identity with a "small college in a big university" feel

The ESUP benefits from the family feel that exists in a small college. Students and other stakeholders spoke to this by offering multiple examples such as the wraparound advising approach, the outreach of the program director to individual students when he notices positive or negative behavior, and the faculty engagement with the students in the program such as when faculty speak to the environmental sciences orientation course. Additionally, the faculty who teach ESUP students have a strong commitment to their success and helping the students of this program thrive including TAs in other units who have a passion for environmental topics. The ES Club was a highlight for students and seen as

impactful even when the relationship is loose between the student and the club because they are participating in other activities.

4. Ecampus success story

Not only do the numbers demonstrate the success of the Ecampus program, but the Ecampus students interviewed during the program review articulated the value of the program and how it is one of very few programs that allow an online program to be tailored, with a wide range of classes that the students were able to find when looking at programs. They noted the following values: online, military friendly, robust in nature, stronger than other online programs, rigorous, and provided comprehensive interactive opportunities with courses such as chemistry. The students noted that the professors have gone above and beyond what students expected from distance learning and to these students, it is what helps foster a connection between the students and the school/faculty.

5. Relevance of major

Environmental science is internationally a trending interdisciplinary academic focus, critical for understanding and providing solutions for some of the earth's grand challenges in areas spanning climate change, changes in land use, loss of biodiversity, human health, access to resources, environmental justice, and science communication, among others. The timing was right both for the development of the program and as well for its continued growth. ESUP's focus on interdisciplinary studies is a central factor in its success and popularity, as it allows for optimum flexibility with students' interests.

6. Experiential opportunities, including undergraduate research, internships, and study abroad

Despite a lack of scholarship funds and graduate program connections, CEOAS excels in finding opportunities outside of the classroom for their students including study away, study abroad, internships, research opportunities, and other on-the-job type experiences (marine boot camp, vessel experiences, etc.). These opportunities are shared readily via advisor communication to students using known and standard tools that students have come to rely upon such as the weekly newsletter emailed to students in the major.

7. Career opportunities

Juniors and seniors who participated in the program review articulated a strong sense of what they wanted to do when they finished their program and that this sense of identity toward their future had grown during their progression toward degree. While there was some apprehension about what specific careers might be right for them, the self study points to reports demonstrating plenty of career placement opportunities. For example, workforce demands in environmental fields are increasing, and at a rate that is predicted to increase faster than that for all occupations combined, and for those in the life, physical, and social sciences.

b. Programmatic Weaknesses

1. No programmatic structure, separate from Director.

The program needs more than 0.25 FTE to be sustainable. One comment from an involved participant was that it was "hanging by a thread." ESUP's structure comprises only the director and the professional advisors. There is not a group of faculty advisors with whom the students can connect to as mentors, for letters of recommendation, and learning about the great OSU opportunities.

2. Lack of engagement and awareness among teaching faculty to each other and to the

program

There is no annual meeting or other engagement of the faculty who teach key courses in this program, but are not in the college. Some of the faculty expressed a desire to do more, but were limited by a lack of opportunity. Some of the faculty from other units who participated in the program review discussions expressed that this was their first conversation with the program director even though they were aware ESUP students were in their courses. Additionally, it was clear that some of these faculty (and others not in attendance) care deeply about environmental science and welcome an opportunity to engage with the program further, even if their own unit does not actively support that involvement.

3. Concern that learning outcomes were not obvious to graduating students

There currently is no capstone course to help students demonstrate they understand the goals of the program. The capstone being developed as a “project” course in which students synthesize their work may not provide sufficient time for the students to then reflect on the outcomes of the program AND prepare for career planning. There is a recommendation to consider this possibility.

4. No connection to an ES graduate program.

Having no connected graduate program means there are few accompanying benefits of mentoring and research experiences, as well as funding for associated graduate students. The interdisciplinary nature of this program suffers from not having focused graduate students in their specializations keeping those pipelines managed.

5. Specializations may not be keeping up with campus priorities and nationally emerging topical areas

The OSU Marine Sciences Initiative is currently developing with strong external support, but ESUP is virtually absent from this effort; an error from the perspective of the program reviewers. In other areas, the students expressed an interest in a focus on social and humanist issues as either a specialization or embedded in multiple specializations. There are many local and national interests that are not supported, such as food systems. It’s possible that the lack of faculty involvement from other colleges/departments is causing the program to miss opportunities that are natural fits for the program.

6. University challenges affecting the program success

There are several broad challenges that are the result of limitations at the university-level. The program can and should work to rectify these issues, but they are not necessarily resolved at the programmatic or college level. These limitations include online tools, high school recruitment, and alumni communication. The online tools that support math tutorials are limited in usefulness because they are difficult and slow to use. Students referenced needing someone to meet with about math versus using online tools. The recruitment of students is inhibited by the university-wide recruiting strategies that advisors feel limit their ability to focus on recruitment of students of color, particularly from underserved communities. The program believes it is able to benefit from the trending topic if they can do some of their own recruitment. It’s unclear if this is an accurate reflection of the OSU undergraduate recruitment plan or not. The institution-wide approach to career placement and tracking career trajectories has left the program with no internal tools with which it can gauge success of its academic program. The program (and their students) could benefit from collaborating with the university programs that support these efforts, for reasons that include both academics and development.

c. Programmatic Challenges

1. Identifying funding for necessary program support.

Many of the weaknesses appear to result from lack of funding. There is one faculty at 0.25 FTE and one

at 0.3 FTE. The director has no direct subordinates to assist with many of the necessary tasks. There are no dedicated faculty responsible for developing and teaching classes. Better coordination with other faculty could be achieved through adjustments to their position descriptions or periodic meetings, maybe with lunch. The students also described how the student lounge/collaborative space is too small, not inspiring, and is now largely used as an overflow GIS lab. As CEOAS further develops its undergraduate portfolio, attention to providing necessary financial support for undergraduate education will be critical.

2. Finding incentives for those in other colleges to be engaged or participate.

Faculty from other colleges described how they have no incentive to actively participate in supporting ESUP students. Some faculty explained that they were specifically told not to engage with the ES students. These faculty are interested in doing more but are limited by their home department/college. Faculty do not see themselves as teaching for the ES program but teaching a course where these students might be.

3. Overcome limitations of non-cooperating colleges/departments for interdisciplinary studies.

Distinct colleges/departments “own” their classes. This can make it difficult for an interdisciplinary program to ensure what content is covered. If a class is changed the the interdisciplinary program may not be notified. It is also possible that a class could be added to or deleted from the catalog without prior notification.

4. Challenges resulting from the new budget model

Many of those interviewed mentioned how the new budget model is perceived to present challenges. Significantly, the perception is that funding is based on the number of students. This means that departments are trying to reserve their classes for their students and are hesitant to adjust courses or instructional load for classes in other degree programs. There is little institutional experience so there is little data to draw any conclusions. As it stands ESUP is challenged as other departments/colleges make decisions based on this perception.

5. Advising Challenges

The advisors are spending a lot of time guiding students out of their program who demonstrate a lack of ability in the sciences but are interested in the program. As these students realize they are not up to the rigor of the program, advisers spend significant time helping them find a degree more in line with their abilities. These students often end up in the related natural resources program.

6. Capstone course under development

The proposed capstone course should be reevaluated to ensure that its goals meet the needs of the students. The concept of a capstone course is a welcome addition to the program but there may be benefits to having this be a multi-course approach. As described, the course is a project based course where the students synthesize their learning into one project. This is useful and necessary. However, the benefit of a smaller, seminar style course after the project-based course would help students reflect on the program outcomes that they synthesized and prepare them for career planning and placement.

4. Summary of Findings (inputs of resources and outcomes of program performance)

a. Undergraduate Degree Programs Offered

The ESUP offers a BS degree in environmental science, with 11 available specializations for on campus students and 9 available specializations for Ecampus students. Created in 1992, the ESUP “seeks to

advance integrative science” by providing students a foundation in the basic sciences and the sciences of the atmosphere, biosphere, hydrosphere, and geosphere. Each of the ESUP “specializations contributes to advancing the science of sustainable earth ecosystems.” As such, the ESUP seems uniquely aligned with the CEOAS’s mission of enhancing “scientific understanding of the planet on which we live through innovative and relevant research, creative and effective teaching, and significant and practical outreach and engagement in support of (OSU’s) role as a land, sea, space, and sun grant university.”

b. Administrative Structure (Quality of organizational support)

Program administration is very lean, with a 0.25 FTE program director, Dr. Larry Becker, covering both the teaching of the introductory course and extensive administrative duties. One tenured professor, Dr. Randy Milstein has a 0.3 FTE within the program for teaching a writing intensive course in environmental case studies (ENSC 479). Additionally, there are five full time, 12-month CEOAS undergraduate advisors who devote most of their time to ESUP students and their recruitment. Given the amount of majors (750 and growing) and the programs success demonstrated quantitatively and qualitatively in student assessments and student interviews, this program clearly excels on a shoestring—or as one interviewee noted, “it hangs by a thread.” As the program director does not have the administrative and budgetary authority normally associated with department chairs, we question whether CEOAS has invested sufficiently in administrative support for ESUP and has a plan for leadership succession.

c. Faculty (Quality of personnel and adequacy to achieve mission and goals)

Beyond Program Director Becker, Dr. Milstein, and the future contributions of Dr. Tilt (non-tenure track) the ESUP is completely dependent upon courses provided by other CEOAS units and colleges. As such, the program director and professional advisors face a daunting ongoing task of staying apprised of which courses are actually still offered and still appropriate for the ESUP. The self-study as well as on campus interviews demonstrate that faculty contributing courses are restricted in their ability to support courses in the ESUP because of unit and college priorities for their own students. Some faculty interviewed were meeting each other for the first time.

d. Students (Recruitment and enrollment trends of students, admissions selectivity and other indications of selecting high quality students)

As indicated in the ESUP self-study, total ES enrollment has doubled over the last 10 years, higher than the University as a whole. The demographic profile is nearly identical during the period 2007 to 2016, with nearly 6 of 10 students female, nearly 75% white, and only 1 in 10 from underrepresented groups. Composite SAT scores at matriculation from 2010 to 2016 were pegged at 1673, with the average high school GPA holding steady at 3.43. Transfer students have also increased over the last 10 years. In- and out-migration for ESUP appears even, with students predominantly switching in from the Colleges of Engineering and Science, and switching out Forestry, Liberal Arts, and Agricultural Sciences.

e. Facilities and Resources (Level and quality of infrastructure)

Given the number of students and the prominence of the ESUP within CEOAS undergraduate programs, the program has a minimal physical and financial footprint. As noted previously, very little FTE has been invested in this significant and successful program. Interviews consistently referred to the recently enacted undergraduate budget model as an obstacle to cross-college funding and participation in interdisciplinary programs. As one interviewee put it, “The new funding model is killing inter-college innovation.” It is not clear if this is the case but how it is being perceived by academic units from their college leadership. Similarly, the physical space devoted to ESUP (such as the cramped student space in Wilkerson) is negligible, and not sufficient for cohort and community building. Students are aware that

other undergraduate programs on campus have more dedicated and inspirational study, collaborative, and gathering space.

f. Degree Program Structure, Courses, Curricular Innovations

The structure of the program is unique with only several other programs at OSU who operate similarly. The lack of ownership of most courses and inability to maintain control over those offerings affects students' degree and course planning. The innovative approach to this program can only be successful if there is collaboration among other units who offer the critical and required courses. Further exploration of the budget model and how it can positively impact collaboration is crucial to this program. The first step in this process should include conversations between College of Forestry (COF) and their NR program as it relates to transferability between the two programs.

g. Program Assessment Practices (Curriculum and assessment strength)

As noted in the self-study (pp.61-66), the ESUP has faced significant issues during its existence regarding assessment, largely because of the dispersed nature of the curriculum. Under the leadership of Program Director Becker, assessment became a priority, with the development of Student Learning Outcomes (and their updates) that can be directly evaluated through surveys and other instruments. The anticipated inauguration of a senior capstone this fall facilitates closing the loop on SLO assessment. Annual reports by the CEOAS Associate Dean (2012-2015) and the Program Director (2015-present), online student satisfaction surveys (beginning in 2018), and evaluation of SETs round out ESUP curriculum assessment. Efforts to track graduate placement and career progress, as in many OSU units, have been challenging. The program director and advising staff maintain a common database that they update, but hope that new efforts via the OSU Foundation will enhance graduate tracking.

h. Outcomes and Impacts

Nationally and internationally, the ESUP enjoys significant recognition, in part because of OSU's prominence: 36th in the world for the field of "Environment/Ecology" based on reputation and research (U.S. News and World Report 2018), 51st in the world for Environmental Studies (QS World University Report 2018), though these rankings are not focused on just undergraduate programs. Similarly, OSU's Ecampus is ranked 3rd (2019) for online Bachelor's programs as a whole (not just Environmental Sciences) by U.S. News and World Report. Since 2015 ES students have won five national scholarships (4 NOAA-Hollings and 1 Udall Tribal Policy Awardees), and numerous internal CEOAS and ESUP scholarships (including 3 A.E. Sellers, 1 Gakstatter [CEOAS], 17 "excellence" and 8 "engagement" [ESUP] awardees). As noted, tracking of graduate placement has been challenging and largely anecdotal: graduates are pursuing Ph.Ds in ES, employed as GIS analysts for state and county agencies, working in environmental consultancy firms, thriving as environmental educators, teaching sustainable agriculture, and serving as Public Works directors for municipalities.

i. Key Issues

The program is successful despite its thin funding and lack of support for faculty and courses within the college. A better understanding of the program's competition, both in and outside of OSU is necessary and will improve the program's offerings by determining how to best offer specializations. A lack of a scaffolded set of courses for the students to follow in their college while performing much of their work in courses outside their college is detrimental to them graduating with a solid understanding of the program outcomes and how those prepare them for the broader society as environmental scientists. A scaffolded set of courses should help the program better evaluate their assessment goals and the

measurement of the student learning outcomes, but there must be administrative support to evaluate this assessment. Finally, career tracking must be resolved in partnership with the university-wide services such as career services and the foundation/alumni association.

5. Recommendations

This section serves as the foundation by which the program will develop its Action Plan, with the identified strengths, weaknesses and challenges of the program providing a rationale for each recommendation suggested by the Review Team.

3 Areas:

1. [Decanal Level] Increase administrative support to level needed for program sustainability.

The program is not sustainable in its current form. The profile of the program should not only be maintained but raised where it can be seen as a national leader versus a hidden gem. There are some distinguishing features that highlight the hallmarks of the program, and administrative support can provide opportunity to ensure its promotion. Ideas for improved support could include, but should not be considered directives or specific solutions:

- a) Provide considerable FTE for program management that includes director level work and support for professional advisors. Supporting a 750 student program on a 0.25 FTE director position is irresponsible.
- b) Provide additional FTE for ES courses that thread through the orientation course, midpoint course and the capstone course(s) that include project work but also program outcomes reflection and career preparation. The Natural Resources model in the COF could provide some guidance to identify a reasonable level of financial support for a program.
- c) Provide operational budget line for growth and development of the program, such as funds for faculty engagement and collaboration among the colleges who teach courses students select, student scholarship funds, professional development funds for enhanced support, and funds that support the college-level recruitment strategies (students felt this was needed).

2. [Decanal Level for support and Director level for action] Incentivize and facilitate engagement of faculty.

Faculty within the college and those teaching necessary ES courses in other colleges are not engaged to the extent they need to be. Ideas for improved support could include, but should not be considered directives or specific solutions:

- a) Establish an undergraduate program committee (with a curricular mandate distinct from the charge for the advisory council).
- b) Ensure that succession planning or cross-training occurs for eventual changes in leadership.
- c) Incentivize faculty to consider ES needs in their course syllabi by providing teaching assistants to large courses of high value to the ES program.
- d) Fund quarterly faculty collaboration events that include social activities for relationship and program development. Include opportunities for ES students to better know the faculty in other colleges (for the purposes of student success, career planning, etc).
- e) The capstone course model should be embraced but also include a threaded course that acts as the breadcrumbs between the orientation course and the capstone, in which students experience implied cohort development in a mid-program course that helps them draw program objectives together regardless of their specializations. These should be required courses for all students and include career preparation and awareness in the senior year.

- f) Reassess the value of specializations and whether there should be many or few. Arguments could be made for either approach. Ideas that were addressed by stakeholders were environmental chemistry, humanist/social justice, marine sciences, and law. These could serve both existing students and attract a more diverse population of students.

3. [Decanal and Director Levels]. Provide support for student success.

Numerous existing structures and practices limit the eventual success of students. Examples could include, but should not be considered directives:

- a. Explore coordinating ES Undergraduate Program with ES Graduate Program with possible move of graduate program to College, with benefits to both the undergraduate and graduate programs such as teaching opportunities for graduate students, mentorship opportunities for undergraduate students, and better conversations related to environmental science careers for both UG and GRAD.
- b. Review opportunities for synergies and efficiencies through collaboration with other interdisciplinary undergraduate programs including ES, Marine Sciences, Natural Resources, Sustainability Studies (2 programs). It was clear that the ES and NR programs had some duplicative efforts but there is clearly a need for both programs and it is important to differentiate them, help students understand those differences, and then advise collaboratively to promote student success in whichever program they land.
- c. Review opportunities for synergies and efficiencies through collaboration with departments that teach key courses in each ES Specialty. This opportunity is ripe for success especially if ES graduate students who have interests in these specialties can be leveraged to maximize those synergies.
- d. Review ES Specialities on a regular basis, with attention to campus opportunities and relevant topics paying close attention to market research and graduate programs that are growing. This should include the consideration of the importance of GIS in ES programs and whether it needs to be a program requirement or only optional coursework. Additionally, the Marine Studies initiative at OSU can only be improved with the inclusion of the ES program participation. This review should also include the sequencing of courses so that ES students are not ill-prepared for the rigorous courses they choose to take in their specializations (i.e., physics sequence might be necessary for full success in certain specializations).
- e. Provide welcoming space for ES student study, collaboration, and community building. This was a constant concern brought up during the program review stakeholder discussions. Consideration for creating a physical environment for on campus students to study, community build, collaborate, and perform critical lab projects appears woefully necessary if a disparate program wants to draw a thread between their student population.
- f. Overlay an equity lens into the decisions made related to student success and this program. There is a desired interest to better serve students of color and growing those populations in the program will require assessment of how those students are currently attracted to the program and served.
- g. Coordinate with campus development and alumni centers to track students in their careers and eventual development capacity.

6. Conclusions

The Environmental Studies Undergraduate Program is a vibrant, growing, interdisciplinary program that enjoys a solid national reputation for both on campus and Ecampus offerings. The program focuses on the highly relevant and popular “environment” discipline, with strong professional prospects for

graduates, and is characterized by a stellar and overachieving director, state of the art professional advising, and engaged students who value the attention and focus of a small college at a major research university. Despite the success of the program, it is not sustainable in its current structure. Opportunities exist in three areas, administrative investment to ensure program sustainability, faculty engagement in all parts of the program, and attention to elements critical for enhancing student success.