



## Environmental Science

### Final Assessment Report & Implementation Plan

<b>Faculty / Affiliated University College</b>	Faculty of Science
<b>Degrees Offered</b>	B.Sc.
<b>Modules Reviewed</b>	<ul style="list-style-type: none"> <li>Honours Specialization in Environmental Science</li> <li>Specialization in Environmental Science</li> <li>Major in Environmental Science</li> </ul>
<b>External Consultants</b>	<p>Dr. Barbara Murck, Professor, Department of Geography and Programs in Environment, University of Toronto Mississauga</p> <p>Dr. Scott Mitchell, Professor and Chair, Department of Geography and Environmental Studies, Carleton University</p>
<b>Internal Reviewer</b>	Dr. Brad Urquhart, Associate Dean, Basic Medical Sciences Undergraduate Education, Schulich School of Medicine and Dentistry, Western University
<b>Date of Site Visit</b>	February 24-25, 2020
<b>Evaluation</b>	<b>Good Quality with Report in Two Years</b>
<b>Approval Dates</b>	<p>SUPR-U: February 24, 2021</p> <p>SCAPA: March 3, 2021</p> <p>Senate (for information only): March 12, 2021</p>
<b>Year of Next Review</b>	Year of next cyclical review – 2027-28

### **Overview of Western’s Cyclical Review Assessment Reporting Process**

In accordance with Western’s Institutional Quality Assurance Process (IQAP), the Final Assessment Report (FAR) provides a summary of the cyclical review, internal responses, and assessment and evaluation of the undergraduate modules delivered by the **Centre for Environmental Science (CES)** in the **Faculty of Science**.

This report considers and reports on the following documents: the program’s self-study, the external consultants’ report, and the responses from both the Centre and the Associate Dean of Science.

This Final Assessment Report (FAR):

- i) provides an Executive Summary of the Review Process, including an overview of the Centre as outlined in the Self-Study brief;
- ii) identifies the strengths of the program;
- iii) identifies opportunities for program enhancement and improvement; and,
- iv) prioritizes the recommendations of the external consultants in the Implementation Plan.

The Implementation Plan details the recommendations from the Final Assessment Report that are required for implementation, identifies who is responsible for approving and acting on the recommendations, outlines any action or follow-up that is required, and provides the timeline for completion.

The Final Assessment Report and Implementation Plan is sent for approval through SUPR-U, SCAPA, Senate and the Ontario Universities’ Council on Quality Assurance and is made available on a publicly accessible location on Western’s IQAP website. The Final Assessment Report with the Implementation Plan is the only document resulting from the undergraduate cyclical review process that is made public; all other documents are confidential to the Program/School/Faculty and SUPR-U.

**Executive Summary** (from the departmental self-study brief)<sup>1</sup>

**Overview**

The Environmental Science program is interdisciplinary and as such, draws from courses and faculties across the university campus. As an interdisciplinary unit, it does not have a traditional departmental home.

The program is small with <70 students and has 4 full-time allocated faculty from Business and Biology plus two designated staff for program administration and counseling. Students join the Environmental Science program in upper years as they develop interest in this area.

*The Environmental Science program seeks to provide all students with the knowledge skills and values needed to improve society's understanding of and response to environmental issues. We define "environmental issues" as anthropogenic degradations of Earth's natural systems and constraints on human use of natural resources required to avoid or mediate such degradations. Examples include: climate change; habitat loss and degradation; pollution of air, soil, and water; soil erosion; biodiversity loss; invasive species; and renewable resource development.*

*Students can receive a degree by completing the Environmental Science Specialization or Honours Specialization modules or by combining any two majors. The Environmental Science program offers each of the four module types. In the Environmental Science program, the Honours Specialization module is distinguished from the Specialization module because the former requires an honours thesis.*

Western offers a wide variety of courses related to Environmental Science, with 43 courses offered in physical science, 37 in life science, and 32 in social science by 18 different departments across campus. Students are required to choose courses from each area in upper year levels to meet the degree level requirements.

The program has developed Learning Outcomes for Environmental Science that correspond directly to Western's Learning Outcomes and reflect specific requirements for Environmental Science as either a major or specialization. Environmental Science faculty have developed eight different curriculum maps as examples that reflect the breadth of courses and the diverse paths that individual students may take in completing degree requirements. For these maps,

*...we consulted with instructors from the courses that were most chosen by Environmental Science students and documented their alignment with program learning outcomes and the assessment criteria they use. ...[B]y focusing on these courses we... create map[s] that reflect the experience of most Environmental Science students.*

Based on the Centre's review of the various courses, student learning is assessed in multiple and diverse ways, including tests/examinations, literature review essays, student presentations, reflective writing

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<sup>1</sup> Direct quotes from the brief are indicated in *italics* while summarized notes are in regular font.

assignments, reports (e.g., technical; synthesis; budgeting; timelines); blogging, case studies map analyses, and problem solving.

**Strengths/Innovations of the Program** (as identified in the brief)

- Wide diversity in choice of courses
- Development of *Alternatives Journal* to provide opportunities for students as writers and editors
- Experiential learning opportunities in lab spaces
- Library and research facilities

**Opportunities for Development** (as identified in the brief)

- With only 4 full-time faculty there is a limit to program expansion
- Student concern about a lack of community in the program
- Need to develop “streams” in the program for students to combine courses in a more field-based stream or a more policy-based stream within the field of ES.

**Changes & Enhancements** (as identified in the brief)

- Planning for continuous review and renewal of courses
- Adding indigenous content to courses
- Developing an Environmental Science field course (Ireland)
- Developing a required 2000 level course to support development of sense of community in ES

**Self-Study Process**

As noted, the information summarized above was collected from the Department’s self-study document (Volume I). The unit’s self-study was a collective effort involving participation from members of Environmental Science, including the Program coordinator, faculty, staff, undergraduate academic counselor, administrative assistant, students, and alumni.

Faculty meetings and a retreat were designated for the purposes of reviewing the undergraduate modules and students were invited to participate in a focus group in which they outlined reasons for entering the program, described the strengths and challenges of the program, and discussed their process of integrating knowledge and skills from other courses. Recent alumni were surveyed to measure their satisfaction with the courses, programs and outcomes.

## Review Process

During the on-site external review, the review committee (comprised of the two external reviewers and one internal reviewer) were provided with Volumes I and II in advance of their visit and then met over two days with:

- Vice Provost (Academic Programs)
- Vice Provost (Academic Planning, Policy and Faculty Relations)
- Associate Dean (Academic), Faculty of Science
- Acting Director, CES
- Undergraduate Chair, CES
- Undergraduate Faculty, CES
- Undergraduate Students, CES
- Associate Chief University Librarian & Associate Librarian, Teaching & Learning; STEM Disciplinary Coordinator
- Patricia Mason, Career Service Officer, Science Internship Program

The reviewers also engaged in a guided tour of the department's teaching and research facilities.

Following the site visit, the external reviewers submitted a comprehensive report of their findings which was sent to the Director of the Environmental Science program and the Dean for review and response. These formative documents, including Volumes I and II of the Self-Study, the External Report, and the Faculty response, have formed the basis of this summative assessment report of the Environmental undergraduate programs.

## Assessment by the External Reviewers<sup>2</sup>

### Significant Strengths of the Program

*The program provides excellent opportunities for the students to achieve the program objectives through a variety of paths.*

- Program's core values
- Dedicated faculty and staff; students 'loyal' to the program
- The Learning Outcomes from entrance to program completion are consistent with Western's Degree Outcomes
- Curriculum reflects the current state of the art for this field of study
- Broad interdisciplinarity (but also a strength that can cause challenges)
- High degree of flexibility for students to customize the degree components (can also cause challenges)
- Science Internship Program
- Strong library and laboratory resources

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<sup>2</sup> This section summarizes information in the External Reviewers' Report. Direct quotes from the report are noted in *italics*.

### **Challenges for the Program**

- Shortage of field experiences
- Gaps in areas of environmental management, policy, law, indigenous issues, and other extensions and applications of environmental science.
- Lack of physical community space for ES students

### **Summary Statement**

*This is clearly a strong program academically, with committed faculty, administrators, staff, and students. It is meeting many student needs, interests and is fulfilling an important role within the University.*

### **Summary of the Reviewers' Key Recommendations and Department/Faculty Responses**

From the Director of the Centre of Environmental Studies, pursuant to receiving the report of the external reviewers:

*Since the external review, ...the Faculty of Science intends to consider moving the Environmental Science modules to the Department of Earth Sciences. Responses to many of the reviewers' recommendations will depend on the finalization and the nature of this move. ... The Department of Earth Sciences has developed a Working Group...to explore plans to migrate the Environmental Science program to Earth Sciences.*

*[We had planned] to establish an Environmental Science Undergraduate Education Committee (ESUEC) as a key first step to address many of the recommendations [outlined below]. The ESUEC would be chaired by the Program Chair and include the Director of the Centre for Environment and Sustainability, and Academic Counsellor..., as well as faculty representatives from the Departments of Biology, Earth Sciences, Chemistry, Geography, and Political Science and two student members selected by the Environmental Students Association (ESA). The committee would be charged with overseeing and developing the Environmental Science curriculum and would take up the reviewers' recommendations as their first priorities.*

<b>REVIEWER'S RECOMMENDATIONS</b>	<b>FACULTY/DECANAL REPSONSES</b>
<p><b>1. Core course in 2<sup>nd</sup> year:</b> <i>Our principal recommendation is that support be provided for the program to offer a core course at the 2<sup>nd</sup> year level. ...In particular, it is evident that interest in Environmental Science is being developed in the highly successful and growing 1<sup>st</sup>-year course, but that interest is allowed to wane, and students end up in other programs because they have nowhere to go that is clearly and specifically seen as part of Environmental Science after completing their first year.</i></p>	<p>Agreed - recommend that the Earth Sciences support this when ES moves into that department.</p>
<p><b>2. Updated course listings:</b> <i>The Undergraduate Chair should continue with his ongoing initiative to update and rationalize the ECL course listings – both paring down and eliminating courses that are out of date, not relevant, or not offered on a regular basis, and adding relevant new courses from other disciplines.</i></p>	<p>Recommended for implementation in 2021</p>
<p><b>3. Sample pathways:</b> <i>The Undergraduate Chair in collaboration with core faculty and advisory staff should look at producing some “sample pathways” for students with different interests and backgrounds, to provide more guidance through the interdisciplinary complexity of the course offerings.</i></p>	<p>Agreed</p>
<p><b>4. Add Indigenous content:</b> <i>It...would be specifically beneficial for Environmental Science students to be exposed to Indigenous perspectives on the environment as part of their program. ...The new core course recommended above is one place some of this new content could be introduced, as well as through the review of the ECL.</i></p>	<p>In progress</p>
<p><b>5. External partnerships:</b> <i>The pursuit of external partnerships and better tracking of program graduates would be of clear benefit to both the program and the University.</i></p>	<p>In Progress:</p> <ul style="list-style-type: none"> <li>• With local companies</li> <li>• Engage alumni to become involved in placements, professional development, etc.</li> </ul>

<p><b>6. Undergraduate student space:</b> <i>The University should make a space available to the undergraduate students in this program. Undergraduate student space for this program is non-existent, and this contributes centrally to the students' feeling of a lack of affiliation with the program.</i></p>	<p>Needs to be addressed with the move to Earth Sciences</p>
<p><b>7. Expansion into Environmental Studies:</b> <i>...Serious consideration should be given to expanding the reach of CES to meet the needs of students with interests beyond Environmental Science, for example, in environmental management, policy, law, philosophy, etc.</i></p>	<p>Strong support for implementing this recommendation</p>

**Implementation Plan**

The Implementation Plan provides a summary of the recommendations that require action and/or follow-up. The Department Chair/Director, in consultation with the Dean of the Faculty/Affiliated University College Principal will be responsible for monitoring the Implementation Plan. The details of progress made will be presented in the Deans’ Annual Report and filed in the Office of the Vice-Provost (Academic).

<b>Recommendation</b>	<b>Proposed Action and Follow-up</b>	<b>Responsibility</b>	<b>Timeline</b>
1. Core course in 2 <sup>nd</sup> year	Develop a required 2 <sup>nd</sup> year course for the program. Potentially include some of the content from ENV3300F and revise the 3 <sup>rd</sup> year course. Follow-up next program review.	UG Chair/Department	2 years
2. Undergraduate student space	Designate space for undergraduate students. Recognizing the difficulty of obtaining new space this could take the form of sharing space currently allocated to Earth Science students. Follow-up discussion if UG chair with chair of Earth Sciences	Chair/Department	2021-22 academic year
3. Update course listings	Update and rationalize course listings across the program. Eliminate out of date courses. Follow-up at next program review.	UG Chair	By Sept 2021
4. Add Indigenous content	Include Indigenous perspective of the environment in course offerings. This could be accomplished at the same time as the development of the new 2 <sup>nd</sup> year course. Follow-up next program review.	UG Chair/Department	2 years
5. Sample Pathways and External Partnerships	Develop sample pathways for students with different interests. Include external partners including alumni to show students career options that relate to different pathways. Follow-up next program review.	UG Chair/Contributing Faculty Members and Staff	September 2021 with possible evolution over time.