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TO: Digvir Jayas
President and Vice Chancellor

DATE: June 6, 2024

FROM: Alan Siaroff
Chair, Academic Quality Assurance Committee

RE: Environmental Science Program Academic Quality Assurance Review

In accordance with the U of L *Academic Quality Assurance Policy and Process*, the Academic Quality Assurance Committee approved the review of the Environmental Science Program at its May 24, 2024, meeting.

The Self Study Committee for this review was comprised of: Craig Coburn (Program Review Coordinator), Matthew Bogard, and Cam Goater.

The review produced 4 documents:

1. Self Study Report. Written by the Self Study Committee. Received February 15, 2023.
2. External Review Report. Written by Dr. Cherie Westbrook (University of Saskatchewan) and Dr. Matthew Reudink (Thompson Rivers University) based on a site visit February 12 to 13, 2024. Received March 22, 2024.
3. Program Response. Written by the Self Study Committee. Received April 22, 2024.
4. Dean's Response. Written by Matt Letts, Dean of the Faculty of Arts and Science. Received May 16, 2024.

Self Study Report

The Self Study Report asked for External Reviewer feedback on several areas:

- There is a lack of targeted support for the ENVS program. Despite our demonstrated success in enrolments and student successes, the ENVS program does not receive support that is independent of the two host departments. This means that there is no direct mechanism to address perceived shortcomings in curriculum or program development. Our view is that this lack of support constrains the real potential of the program. We seek advice on strategies that we might develop to enhance targeted support for the ENVS program.
- There is high disparity in the rigour of the B.Sc. ENVS program relative to the Post-diploma program. Whereas curricular changes implemented in recent years to the B.Sc. ENVS program have proceeded in lockstep with curricular changes in other departments (e.g. Biological Sciences), parallel changes have not been made in the Post-diploma program. We seek advice on strategies for enhancing the rigour of the Post-diploma ENVS program so that it better matches other B.Sc. major programs.
- The diversity of course offerings targeted to developments in the modern Environmental Sciences is low. ENVS 2000 and ENVS 4000 provide appropriate background and skills for our junior and senior students, respectively. But collectively, they do not provide students with targeted skills in key sub-disciplines (e.g. environmental chemistry, science policy, soil science) that would be appropriately offered at the 3XXX level. We seek advice on strategies to increase the diversity of our offerings of 3rd and 4th year specialized courses.
- Field courses are vital for a successful ENVS program. So too are regular courses in the host departments that have field components. We are limited in the numbers of field courses we offer. One unsatisfactory solution is the need to send our students (ENVS B.Sc.) to a 5-course program at Lethbridge College to satisfy part of the demand. While we have a dedicated field station 1.5 h drive from campus, we do not have faculty to offer new or even existing field courses. We seek advice how to prioritize field components in our program.

The body of the report noted several strengths of the Environmental Science Program:

- Our reputation has been established by the numbers, quality, and successes of our students in our 25-yr old program.
- Our reputation also stems from the wide-ranging expertise and international reputations of the faculty in the two host departments.
- We have state-of-the-art infrastructure, much of which is housed in the dedicated Water and Environmental Science Building (est. 2009). The facility includes dedicated soils, computer, and hydrology labs, together with a modern Aquatic Research Facility. The newly renovated and updated Westcastle Field Station provides opportunities for environmentally related research and for courses that emphasize field-components in alpine, sub-alpine, aquatic, and terrestrial ecosystems.
- There is a local research network that extends beyond campus to include large numbers of scientists (>100 in total) located at the Agriculture and Agri-Food Canada research station, Council, Ducks Unlimited).

- There are opportunities for diverse and rigorous independent student research through Co-Op and Applied Studies placements, to Independent Studies, and Honours Thesis courses with individual faculty.
- Bold and innovative outreach into the local and regional business community has expanded our reach, has provided excellent opportunities for our students, and has enhanced our reputation. Faculty-lead outreach to senior managers at Shell Canada led to substantial funds to support the expansion of the Westcastle Field Station. Similarly, faculty-lead outreach to the McCain Foundation has led to a substantial funding envelope that supports both undergraduate and graduate research for students interested in sustainable agriculture.

The following weaknesses and challenges were mentioned in the body of the report:

- We have an aging complement of tenured and tenure-track faculty. The disparity between retirements/relocations of tenure-track faculty and hirings has never been greater than it is at present. This disparity results in challenges to deliver our program. Our inability to hire new, young faculty severely reduces our versatility to respond to curricular needs and to respond to the expertise required to address the fast-paced changes that characterize modern Environmental Sciences.
- The roughly 140 students that are consistently registered in the ENVS program are not housed under the umbrella of a single department. One disadvantage of this model is that students do not feel a sense of belonging within a 'home' department. We often hear from students who feel disadvantaged, for example, when it comes to priority of registration for classes.
- By not existing under a single administrative unit (e.g. department, school), the implementation of curricular changes or program changes can be difficult. Likewise, streamlining the delivery of common courses (e.g. ENVS 2000 and ENVS 4000) between the two host departments can be a challenge. Lastly, students are required to select existing courses from the two host departments leading to a degree program that students view as overly complex.
- There is an increasing disparity between course requirements in the Post-diploma vs. B.Sc. program, particularly for courses associated with numeracy, hypothesis testing, writing, and laboratory skills. Furthermore, the constraints imposed on students in the 20-course Post-diploma program means that they are not able to experience the full range of courses or experiences such as Co-operative Education.
- There are a limited number of field course offerings in both host departments.

Recommendations from the body of the report:

- 11% of industry in Alberta is environmentally related, which translates into the need for a large work force that possess adequate fundamental skills in this discipline.
- The Lethbridge region enjoys the widest range of economic diversity for any urban centre in Alberta. This high diversity presents vast opportunities for students that can apply their ENVS degrees to positions within the agriculture, water, and mining sectors.
- The two host departments offer a wide range of collaborative research opportunities for both undergraduate and graduate students. If we can increase our number of field courses offered and increase the numbers of technical skills taught in labs, we can offer the Technical Semester on our own campus.

- The streamlining and offering of courses to enable our students the opportunity to apply for professional accreditation (e.g. Alberta Institute of Agrologists) would enhance our reputation.
- Most of these opportunities cannot be realized in the current period of fiscal restraint. Offering a wider range of courses or establishing new field courses, while facing strongly reduced faculty numbers, is not feasible.

External Review Report

The External Review Report contained 12 (twelve) recommendations for improving the Environmental Science Program:

Recommendations from the body of the report:

- *Recommendation #1:* The Program Coordinator needs time to dedicate to running this program, whether it is in terms of recruitment (e.g., visiting schools, hosting events), coordinating program delivery (e.g., meeting with faculty from both departments), ensuring information is up-to-date on the website, attending to individual student day-to-day and class registration needs, etc. For the program to be successful, the Program Coordinator simply needs to be given the time to dedicate to the role. In addition, the Program Coordinator should not be doing administrative work. See recommendation #2.
- *Recommendation #2:* Following the above recommendation, the administrative assistant is outstanding and is doing an incredible job...We strongly recommend that [they] continue to be a point of contact for students in the program and ...we believe the Environmental Science program and students would be best served were [they] be able to dedicate [their] time *full time* to this program.
- *Recommendation #3:* In considering future hires, we suggest prioritizing the hire of an Environmental Scientist, potentially cross-appointed in the two units contributing to the Environmental Science Program. We further recommend that this hire be at the associate professor rank so that the new faculty could step into the role of Program Coordinator (with adequate course release, if possible) in order to bridge both departments, provide a strong backbone to the program, and a strong signal to Environmental Science students of the commitment of UL to the program.
- *Recommendation #4:* We suggest more frequent meetings with both contributing departments and ways to bridge the gap, as currently, the geography department is strongly invested in the program, whereas the program is a more minor consideration to the biology department.
- *Recommendation #5:* We suggest increasing an emphasis on outreach. Lethbridge College has made a strong push in advertising their competing program, yet the strengths of the UL program are not being made clear to prospective students. This outreach can start at the level of the website (which was last revised in 2018), but will also require going into the community, speaking to classrooms and school groups, and communicating the advantages of attending UL for the Environmental Science Program.
- *Recommendation #6:* There are several gaps in the curriculum that could use improvement. For example, the program is currently lacking in Indigenous content, whether through coursework in the program or through courses taken elsewhere in the university. In addition, the students would benefit from courses in the areas of environmental assessment, environmental change, and coding for the environmental sciences.

- *Recommendation #7:* There are relatively few required upper level (3000/4000 level) required courses. We suggest streamlining the program through removal of some requirements at the introductory level, while increasing program rigor and depth of skill and knowledge development through an increased course requirement of upper-level classes.
- *Recommendation #8:* We recommend discontinuing the Post-Diploma program and moving towards simple credit transfer for equivalent classes. There is currently inequity in program requirements between direct entry and post-diploma, which has created issues in terms of student experiences and program delivery. In addition, as Lethbridge College has now moved towards a four-year degree, the current post-diploma program appears to be a legacy that is no longer relevant.
- *Recommendation #9:* Consider options for removing the technical semester as a requirement (and rename it to a practicum if it is retained as optional). Given that the relationship with Lethbridge College is unclear moving forward, we suggest planning for a situation in which the technical semester is no longer offered. For example, the technical semester, at the moment, may not be necessary for students wanting the GIS concentration. In addition, some of the classes are offered at both universities leading to redundancy. For the hands-on work that is a major benefit to students during the technical semester, we strongly encourage adding more field-based courses or more hands-on field work in labs (e.g., through weekend trips), so those experiences are not lost for students.
- *Recommendation #10:* Ensure that the program is aligned with requirements for professional accreditation (e.g., P.Bio., P.Ag.). Also, advertise clearly on the website and include information in annual student advising meetings how the program aligns with professional accreditation.
- *Recommendation #11:* Consider creative ways to enhance student feelings of belonging to the program and building community. For example, there is an under-utilized computer room in the water building that could be used as an Environmental Science Clubhouse/social area if outfitted with a couch and a few tables and chairs. This would a) provide students in the program with a meeting place, b) enhance student presence in the water building, c) set conditions to build student-faculty relationships, and d) facilitate change to the current perception of the Environmental Science students as being an outcast group that does not belong in any department to a group with special privileges and opportunities.
- *Recommendation #12:* [It] would be beneficial for University of Lethbridge to invest in the development of promotional materials that describe the benefits of the degree to prospective students and parents, including student testimonials and information on job prospects. We noted that Lethbridge College has convincing promotional materials for their competing program, and that the Environmental Science program's website is more than 5 years out of date.

Challenges discussed in the report:

- There are a high number of first and second year required courses, with associated issues in timing/prerequisites due to assignment of duties being conducted separately for the two contributing departments. This results in an inability for some students to finish their degree in four years, depending on the year of their program entry.
- There are only two explicitly listed Environmental Science courses – Environmental Science 2000 and 4000. As well, the 2000-level course has different content (and associated textbook) depending if the instructor is a member of the Department of Biological Sciences or Department of Geography & Environment. Ensuring that the 4000-level course of this interdisciplinary program is a true capstone experience will lead to better student engagement and improved training (Gedye et al.,

2004). The limited number of degree-specific courses limits cohort development (see Recommendations), which is well known to reduce time to degree completion and increase student satisfaction with the overall learning experience (Lewis et al., 2010). Concerningly, students reported that they do not know other students in the program until they take the Technical semester at Lethbridge College.

- Students could potentially graduate with just 6 upper-year (3000 and 4000 level) courses. This is problematic as it is in upper-year courses where students deepen their disciplinary knowledge and skill development.
- The technical semester, while innovative, is problematic. Technical skills in environmental science are the ability to gather, analyze and communicate complex technical data to others. The focus of the five courses students take at Lethbridge College is development of data gathering skills, not analysis and communication skills. While valuable, these skills are more appropriately referred to as practical skills and therefore it might be useful to rename the semester a 'practicum' (see Recommendations). Analysis and communication skills are best developed at the University of Lethbridge. As well, the undergraduate student pointed out that the semester at the College can disrupt the sequencing of courses at the University, creating challenges for graduating on time. Further, the College now has an approved, competing degree, meaning that [University of Lethbridge] will need to enhance its recruitment strategy now that there is competition for students in a reasonably small marketplace.
- The Truth and Reconciliation Commission released 94 Calls to Action to enable reconciliation between Indigenous and non-Indigenous Canadians (TRC, 2015). Most universities in Canada are working toward meeting these reconciliation calls to action. However, we saw no evidence of the Environmental Science program having Indigenous-focused courses or course content (see Recommendations).
- An independent study was required in the past in the program. We were informed by the self study group that this course is now optional but note that it is not listed in the curriculum as an upper year elective. This is despite the fact that 50% of graduates of the program identified the course as useful and important to their present careers. We recognize the tax of offering an independent study on individual faculty but given the high student value, perhaps a solution that benefits both faculty and students could be devised in the near future.
- Although part of the goal of the program is to "appreciate the role of humanity in global environmental change", we noted there is no course in 'environmental change'. This would be a particularly relevant course, given how fast environmental conditions are currently changing in Alberta. As well, there is presently no guidance in the curriculum for choosing social sciences classes that might align with or be of high value to the environmental sciences, which limits student appreciation of the role of humanity in global environmental change.
- [S]everal curricula and learning environment challenges were reported by the undergraduate student representative and several faculty. These challenges include the fact that several optional required courses in the program are no longer available, including field courses; there have been multiple faculty retirements in recent years without replacement, limiting course options for students; there is reduced engagement from the Department of Biological Sciences given it has its own major (with high enrolment) and contributes to five other interdisciplinary degrees; and there is overlap in course content between lower-year geography and biology courses that needs to be resolved.

- While students do have access to program planning, this has been identified by students as an area of weakness. Many students end up with course selections that are inappropriate for making it through the program in a reasonable time, resulting in lacking prerequisites and ultimately, taking 5-6 years or more to graduate. We suggest stronger communication with incoming students to ensure they are put in direct contact with advisors that are able to properly direct them in course selection and course sequencing, and that assist with monitoring progress throughout the early stages of the program.

Opportunities discussed in the report:

- An emerging trend in the evolution of the discipline is digital earth education, especially with the commonplace of drones, GIS and artificial intelligence/machine learning. It would be useful to focus on meeting these emerging needs, for example by including 4000-level courses in GIS and remote sensing, and developing a new course in 'coding for environmental scientists', focused on developing coding skills in the R and Python languages.
- There is clear demand for graduates with degrees in Environmental Science and the program appears to be preparing many students for future jobs and graduate work. EcoCanada report that 12% of all jobs in Canada posted online in 2023 were in environmental science, and that there was a 2% increase in the number of online posted environmental science in 2023 over 2022. Environmental job openings continue to grow in multiple provinces, including Alberta. Though some students in the self-study reported the opposite, this is to be expected in any survey and any program. However, we do recommend increased tracking of students post-graduation and highlighting student success (e.g., on the website and through marketing) to help with recruitment and retention.
- The Environmental Science program provides an interdisciplinary learning experience that does a good job of preparing students for a future in the environmental sector, whether through academia, government, or industry. Though the enrolments have dropped in recent years (due to a combination of factors), the program still supports a large number of students (~80), making it a critical program in which to invest. We suggest that resources be dedicated to marketing and communication to ensure that potential students are aware of the program and what the benefits of the program are, especially in light of a competing program at Lethbridge College. In other words, this is an excellent program with plenty of potential that potential students may be unaware of (as is also evidenced by the number of students that transfer into the program after beginning in other programs at UL). The facilities are outstanding and the high-quality faculty are in place to allow the program to expand and flourish, if provided with the support and resources to do so.

Program Response

In their Program Response, the Self Study Committee addressed the recommendations from the External Review Report:

1. <i>The Program Coordinator needs time to dedicate to running this program, whether it is in terms of recruitment (e.g., visiting schools, hosting events), coordinating program delivery (e.g., meeting with</i>	We appreciate the external perspectives on our administrative structure. It was clear to external experts that the haphazard fashion that this program has been handled is a key shortcoming. There are no guidelines or tasks attributed to the role of Environmental Science Coordinator. As a result, it is difficult to hold faculty accountable for the lack of direction provided by the Dean's Office. We appreciate the suggestion that we separate the coordination role from other administrative tasks that Department Chairs can handle.
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	<p>faculty from both departments), ensuring information is up-to-date on the website, attending to individual student day-to-day and class registration needs, etc. For the program to be successful, the Program Coordinator simply needs to be given the time to dedicate to the role. In addition the Program Coordinator should not be doing administrative work. See recommendation #2.</p>
<p>2. <i>Following the above recommendation, the administrative assistant is outstanding and is doing an incredible job...We strongly recommend that [they] continue to be a point of contact for students in the program and ...we believe the Environmental Science program and students would be best served were [they] be able to dedicate [their] time full time to this program.</i></p>	<p>We appreciate the general thrust of this recommendation – having the Administrative Assistant associated with the Department of Geography and Environment assigned to the administrative work in the Environmental Science program is important. The Chair of Geography and Environment and coordinator of the ENVS program has already added these tasks to the department's Administrative Assistant. These tasks have been switched between various administrative assistants without regard for how this impacts students and their need for a point of contact and a “home” where they can connect with their degree program. The review committee has suggested that an administrative person be devoted full time to the ENVS program. We appreciate their candor, but having administrative assistants attached to single programs is not a financial reality. The current solution has only been underway for a few months and will take time to be completely integrated.</p>
<p>3. <i>In considering future hires, we suggest prioritizing the hire of an Environmental Scientist, potentially cross-appointed in the two units contributing to the Environmental Science Program. We further recommend that this hire be at the associate professor rank so that the new faculty could step into the role of Program Coordinator (with adequate course release, if possible) in order to bridge both departments, provide a strong backbone to the program, and a strong signal to Environmental Science students of the commitment of UL to the program.</i></p>	<p>We appreciate the recommendation that recognizes the unique nature and requirements of the ENVS program. Given the reduction in faculty resources in Environmental Science even a single faculty replacement (especially if granted course relief) will not be sufficient to cover our current needs. The Department of Geography and Environment have lost 6 faculty members including most of the areas mentioned later in the recommendations (Indigenous, water, and policy). We have advocated and made multiple requests but hiring restrictions and a lack of strategic planning have the departments struggling to meet their own degree requirements. The fact that this program has been allowed to falter is the direct result of these budgetary constraints. We need to heed this recommendation.</p>
<p>4. <i>We suggest more frequent meetings with both contributing departments</i></p>	<p>The current coordinator of the program has routinely met with both departments and considers this a priority. This recommendation needs to flow into the tasks and</p>

<i>and ways to bridge the gap, as currently, the geography department is strongly invested in the program, whereas the program is a more minor consideration to the biology department.</i>	responsibilities of the ENVS Coordinator once these have been established (Recommendation #1).
5. <i>We suggest increasing an emphasis on outreach. Lethbridge College has made a strong push in advertising their competing program, yet the strengths of the UL program are not being made clear to prospective students. This outreach can start at the level of the website (which was last revised in 2018), but will also require going into the community, speaking to classrooms and school groups, and communicating the advantages of attending UL for the Environmental Science Program.</i>	We agree that our efforts at recruitment, both within our unit and within the University, have deteriorated. While the development of an outreach program with goals for enhanced recruitment would be an appropriate direction to take, it is an untenable request in the absence of appropriate support. Ideally, this key task could be included in the modified roles of the ENVS Coordinator (Recommendation #1). The website is currently undergoing a renewal in an effort towards making this key recruitment tool effective.
6. <i>There are several gaps in the curriculum that could use improvement. For example, the program is currently lacking in Indigenous content, whether through coursework in the program or through courses taken elsewhere in the university. In addition, the students would benefit from courses in the areas of environmental assessment, environmental change, and coding for the environmental sciences.</i>	We agree. We need to make every effort to fill the curricular gaps identified by the reviewers if we wish to be a competitive program. The Department of Geography and Environment had an Indigenous Scholar with a focus on policy and northern communities. She retired due to health concerns and has not been replaced. The staffing plan for Geography and Environment has included an Indigenous position for years as a priority. Given our university's past leadership in this area, it is unfortunate that we are now well behind other universities in Canada with our responsibilities to meet the recommendation of the Truth and Reconciliation Commission.
7. <i>There are relatively few required upper level (3000/4000 level) required courses. We suggest streamlining the program through removal of some requirements at the introductory level, while increasing program rigor and depth of skill and knowledge development through an increased</i>	As noted in the start of the external review report, we have recently undergone a curriculum review process and reduced the number of introductory courses.

<i>course requirement of upper-level classes.</i>	
8. <i>We recommend discontinuing the Post-Diploma program and moving towards simple credit transfer for equivalent classes. There is currently inequity in program requirements between direct entry and post-diploma, which has created issues in terms of student experiences and program delivery. In addition, as Lethbridge College has now moved towards a four-year degree, the current post-diploma program appears to be a legacy that is no longer relevant.</i>	We appreciate the vision of the external reviewers. The reviewers are correct regarding the inequity in program requirements between the two ENVS programs. This has never been more glaring than at present, following the major curriculum changes made within Biological Sciences and Geography and Environment over the past few years. Post-diploma students simply do not have the appropriate background to do well in our senior classes, and that background is not comparable to our direct entry students. We view this scenario as untenable. Furthermore, the move by Lethbridge College to become degree-granting makes the post diploma program much less attractive to one of our main sources of students. We do not think that the cancellation of the post-diploma program will lead to a loss of the 20 or so students that are currently enrolled. Instead, we envision that this will see these students transfer into our main degree program. We must start differentiating ourselves from college programs and ensure that the additional value that a UofL degree brings is clear to students, accreditation bodies and employers. This will take effort and would also fall to the revised list of responsibilities that are in the purview of the ENVS Coordinator.
9. <i>Consider options for removing the technical semester as a requirement (and rename it to a practicum if it is retained as optional). Given that the relationship with Lethbridge College is unclear moving forward, we suggest planning for a situation in which the technical semester is no longer offered. For example, the technical semester, at the moment, may not be necessary for students wanting the GIS concentration. In addition, some of the classes are offered at both universities leading to redundancy. For the hands-on work that is a major benefit to students during the technical semester, we strongly encourage adding more field-based courses or more hands-on field work in labs (e.g., through weekend trips), so those experiences are not lost for students.</i>	This recommendation has surfaced many times over the years. We are under-resourced to deliver this technical training at UofL. There is little agreement in this recommended course of action regarding the Technical Semester, even within the ENVS Coordinating Committee. We feel that a full accounting of the costs and benefits of the long-standing Technical Semester is long overdue and must include our close colleagues at LC. We agree that there needs to be a degree of strategic planning with the elements of the program being addressed in this recommendation. We can see a future program development that would include an option to attend the Technical Semester or to remain at UofL for additional academic courses. We have lost a lot of capacity for field-based and experiential learning opportunities. This would be possible if Recommendation #3 was accepted.
10. <i>Ensure that the program is aligned with requirements for professional accreditation (e.g., P.Bio.,</i>	We appreciate the recommendation. The lack of clear administrative roles and responsibilities for the ENVS Coordinator have left this key recruitment vehicle (website) unattended for over 5 years. This is noted in several recommendations (1, 2, 3, and 5). We are already seeking to update the website, but this needs to be done consistently and evaluated

<p><i>P.Ag.). Also, advertise clearly on the website and include information in annual student advising meetings how the program aligns with professional accreditation.</i></p>	<p>as part of the duties of the ENVS Coordinator. We have already worked with accreditation bodies to ensure that our degrees and courses are recognized. There is a national body for Environmental Science Accreditation and other competing institutions have been granted accreditation. We will need to work towards this accreditation (https://eco.ca/educators/). This is an ongoing challenge and requires frequent attention – this coordination should also be made clear in the roles and responsibilities of the ENVS Coordinator.</p>
<p>11. <i>Consider creative ways to enhance student feelings of belonging to the program and building community. For example, there is an under-utilized computer room in the water building that could be used as an Environmental Science Clubhouse/social area if outfitted with a couch and a few tables and chairs. This would a) provide students in the program with a meeting place, b) enhance student presence in the water building, c) set conditions to build student-faculty relationships, and d) facilitate change to the current perception of the Environmental Science students as being an outcast group that does not belong in any department to a group with special privileges and opportunities.</i></p>	<p>We fully support this recommendation. The ENVS students require a sense of belonging and we hope to be able to move on this recommendation with the Dean's Office's approval by Fall 2024.</p>
<p>12. <i>[It] would be beneficial for University of Lethbridge to invest in the development of promotional materials that describe the benefits of the degree to prospective students and parents, including student testimonials and information on job prospects. We noted that Lethbridge College has convincing promotional materials for their competing program, and that the Environmental Science program's website is more than 5 years out of date.</i></p>	<p>The ENVS Committee will review the promotional materials and are happy to work with the Faculty of Arts and Science Dean's Office communication team to revise and appropriately promote our programs.</p>

Dean's Response

The Dean of the Faculty of Arts and Science responded to the 12 (twelve) recommendations from the External Review Report:

<p>1. <i>The Program Coordinator needs time to dedicate to running this program, whether it is in terms of recruitment (e.g., visiting schools, hosting events), coordinating program delivery (e.g., meeting with faculty from both departments), ensuring information is up-to-date on the website, attending to individual student day-to-day and class registration needs, etc. For the program to be successful, the Program Coordinator simply needs to be given the time to dedicate to the role. In addition the Program Coordinator should not be doing administrative work. See recommendation #2.</i></p>	<p>Whereas we appreciate that the program would ideally benefit from additional resources for program leadership and administration, including the provision of additional time for service by a standalone coordinator (ie., via workload adjustments such as course reductions), it must be understood that this would require a change in the distribution of financial and instructional resources unless we receive additional funding. The University of Lethbridge – Iniskim has a centralised budget model with some of the activities listed under Recommendation #1 directed from central communications, the registrar's office (SEARS), the Dean's Office and Academic Advising, of course with provision of disciplinary information and event assistance from the departmental units, but with due consideration made with respect to workload which causes us not to assign excessive levels of recruitment and outreach work.</p> <p>With regard to the recommendation to provide more direction, the Dean's Office is currently working on an update to the Faculty of Arts and Science Department Chair and Programme Coordinators Core Responsibilities: Guidelines document and is also planning a New Chair and Coordinator Orientation program for the beginning of the Fall semester. While this should assist with the issue of assignment of coordinator duties, as outlined in the Program Response document, it should be noted that, in Fall 2022, the Dean's Advisory Committee (DAC) recommended (and for 2023-24 the Dean's Office acted upon) the elimination of funding allocation for most Coordinators, to reduce course release and stipend compensation costs. This reduced the number of stand-alone Coordinators, including in Environmental Science. This was done as part of a sustainability exercise in the face of government budget cuts that required contributions from each Faculty. The reason for this commitment was related to a desire among chairs and coordinators not to eliminate good programs in a moment of financial austerity.</p> <p>To address the reviewer comments, we will enhance the outreach-related duties in the chair and coordinator duties document, plan a new chair orientation program, work with our communications experts and the Chair of the Department of Geography & Environment to promote Environmental Science programming, and engage in further analysis of department chair and coordinator structure and compensation distribution. A meeting between the Chair/Coordinator and the Dean or designate should also be arranged given the Department's stated request for additional direction from the Dean's Office.</p>
<p>2. <i>Following the above recommendation, the administrative assistant is outstanding and is doing an incredible job...We strongly recommend that [they] continue to be a point of contact for students in the program and ...we believe the Environmental Science program and students would be best served were [they] be able to dedicate [their] time full time to this program.</i></p>	<p>The Faculty of Arts & Science has outstanding administrative professionals. Unfortunately, with 18 Departments and about a dozen programs to chair and coordinate, it is not financially feasible to dedicate administrative support to individual units, let alone individual programs. In the face of this resource restriction, we are confident in the plan outlined by the Chair and will endeavour to minimise the frequency of restructuring of administrative support, so that efforts can be predictably and consistently expended toward the same units.</p>
<p>3. <i>In considering future hires, we suggest prioritizing the hire of an Environmental Scientist, potentially cross-appointed in the two units</i></p>	<p>Faculty members in the Department of Geography & Environment and the Department of Biological Sciences have broad and world-class expertise in fields of relevance to the Environmental Science program as it is currently structured, but we recognise the point raised by the external reviewers and alumni that, while one cannot address every theme in a program, there are some gaps in the areas of environmental assessment, energy,</p>

<p><i>contributing to the Environmental Science Program. We further recommend that this hire be at the associate professor rank so that the new faculty could step into the role of Program Coordinator (with adequate course release, if possible) in order to bridge both departments, provide a strong backbone to the program, and a strong signal to Environmental Science students of the commitment of UL to the program.</i></p>	<p>remediation, coding and Indigenous content. As the current coordinator notes, some of these areas, especially Indigenous, water and policy-related content, have been reduced through attrition during the period of major reductions to the Provincial Operating Grant.</p> <p>The difficulty for the Department of Geography & Environment, which now oversees the program in close collaboration with the Department of Biological Sciences, is that there are needs in four other core areas of the Department, including Physical Geography, Human Geography, GIS & Remote Sensing and Archaeology. Similarly, the Biological Sciences Department notes the need for growth in multiple fields of teaching and research including biology, biochemistry, agricultural biotechnology, agricultural studies, in addition to environmental science, to enable faculty members to deliver courses that regularly fall within their areas of expertise.</p> <p>Chairs of the two units should meet and consult with the Dean's Office to discuss how staffing requests could foreground either an Environmental Science position or positions in respective units that can help those with Environmental Science expertise dedicate efforts to the program. Such a proposal, provided by the disciplinary experts, would be well-received by the Dean's Office for recommendation to the Provost based on the outcomes of this review. Opportunities for the inclusion of courses across Departments or content within the program to address the gaps identified by the external reviewers should also be explored, bearing in mind that this might require further program streamlining considering the large number of courses already required in the program.</p>
<p>4. <i>We suggest more frequent meetings with both contributing departments and ways to bridge the gap, as currently, the geography department is strongly invested in the program, whereas the program is a more minor consideration to the biology department.</i></p>	<p>It is our understanding that such meetings are frequent and that, while the coordination is now carried out by the Chair of the Department of Geography & Environment, that the Environmental Science program is also a long-standing priority in Biological Sciences, which contributes very significantly to the program, has faculty members who are experts in the field eager to develop the program and has coordinated the program, which they were also integral in launching, several times in the past and as recently as Spring / Summer 2023. This concern raises the question of whether or not, despite the move in 2022 to reduce the number of program coordinators, that a stand-alone Coordinator of Environmental Science is a consideration that needs to be revisited. If compensation were to be provided for such a role, we would need to think about how funds could be redistributed, as the reduction of chair and coordinator compensation helped us to secure replacement faculty members during a difficult financial period and these were expected to be sustainable savings.</p>
<p>5. <i>We suggest increasing an emphasis on outreach. Lethbridge College has made a strong push in advertising their competing program, yet the strengths of the UL program are not being made clear to prospective students. This outreach can start at the level of the website (which was last revised in 2018), but will also require going into the community, speaking to classrooms and school groups, and communicating the advantages of attending UL for the Environmental Science Program.</i></p>	<p>This seems more like a recommendation to enhance marketing and recruitment efforts, rather than what we traditionally have considered to be "outreach" at the University of Lethbridge - Iniskim, the latter of which would include services and engagement with the community through various means such as PUBLIC Professor, Destination Exploration or engaging with community organisations in partnerships involving research and students.</p> <p>With respect to recruitment, which I believe is the intent, we agree that matching the advertising intensity of the college, to ensure that the benefits of attending a smaller to mid-sized CARU with graduate studies and original research opportunities are understood, is an important recommendation. The Faculty of Arts & Science greatly appreciates all efforts to ensure advertising investment is proportional to our size, so that programs like Environmental Science can compete among our competitors.</p> <p>All programs, including Environmental Science, have been featured in recruitment events and high school visits across Alberta as part of data-informed efforts led by SEARS and Communications, in consultation with relevant faculty members, but we agree there is room for improvement. While Chairs and Coordinators are sometimes involved and this is greatly appreciated, we do not require such demands on workload from each Department, aside from events like Open House and NSO, as well as individual recruitment and website maintenance.</p> <p>In response to this recommendation, we will make sure Chairs and Coordinators understand the expectation to work with our new Arts & Science Communications Specialist to ensure that the website is up to date and understand the value we place in direct involvement in recruitment events, as appropriate. This relates to Recommendation #1 and will be a topic at</p>

	<p>the Chair and Coordinator Orientation events in the Fall. We also commit to profiling Environmental Science students and graduates, as well as contributing faculty members and we strongly encourage them to communicate achievements with our communications colleagues. We are also hopeful for increased advertising attention for environmental programming.</p>
<p>6. <i>There are several gaps in the curriculum that could use improvement. For example, the program is currently lacking in Indigenous content, whether through coursework in the program or through courses taken elsewhere in the university. In addition, the students would benefit from courses in the areas of environmental assessment, environmental change, and coding for the environmental sciences.</i></p>	<p>Indigenous perspectives are very important in the environmental sciences, especially on Blackfoot Confederacy Territory and at Iniskim, where Indigenisation is an integral component of our Strategic Plan. We also agree that our Environmental Science program would benefit from filling the identified gaps of environmental assessment, energy, remediation and coding. We believe the reviewers are mistaken that there is insufficient instruction in the field of environmental change as this is a feature of many of our courses even if there is not a specific course with this title.</p> <p>As outlined in Recommendation #3, coverage could be addressed through staffing requests, but we acknowledge that there are competing demands both within the contributing Departments and across the institution. Alternatives, where this is not successful, would be to incorporate material into the existing courses or to consider required or recommended courses in other Departments where available, bearing in mind the large number of courses already required as part of the program. There is always a balance between coverage and depth of instruction in program development, especially in a broadly interdisciplinary program, and it is not always wise to incorporate every possible theme.</p>
<p>7. <i>There are relatively few required upper level (3000/4000 level) required courses. We suggest streamlining the program through removal of some requirements at the introductory level, while increasing program rigor and depth of skill and knowledge development through an increased course requirement of upper-level classes.</i></p>	<p>The Environmental Science Program Planning Committee and the Department of Geography & Environment have recently made curriculum changes that ensure students must successfully complete a minimum of two courses in Biology or Geography at the 4000-level, in addition to Environmental Science 4010. They also reduced the number of introductory courses by one. All programs in the Faculty of Arts and Science require students to complete a minimum of 15 courses at the 3000/4000 level, with no more than 12 introductory (1000-level) courses. This addresses this curriculum issue in the direction of the reviewer recommendation, though the program committee should consider whether further adjustments are warranted.</p>
<p>8. <i>We recommend discontinuing the Post-Diploma program and moving towards simple credit transfer for equivalent classes. There is currently inequity in program requirements between direct entry and post-diploma, which has created issues in terms of student experiences and program delivery. In addition, as Lethbridge College has now moved towards a four-year degree, the current post-diploma program appears to be a legacy that is no longer relevant.</i></p>	<p>The post-diploma program in Environmental Science provides a pathway to degree completion for students from several college partners. For the 2020-24 period, we have had students from Aurora College, Douglas College, Keyano College, Lakeland College, Lethbridge College, Medicine Hat College, Olds College, Portage College, Selkirk College and SAIT and we have active post-diploma transfer agreements with other institutions, including Assiniboine Community College, Nunavut Arctic College and Georgian College. Our largest post-diploma transfer partners are Olds College (12 since 2020) and Lethbridge College (8 since 2020), based on new registrant counts on September 1 of each year. We have built relationships with these colleges in alignment with the Ministry priority of providing alternative learning pathways.</p> <p>The external reviewer report focuses on the recent success of Lethbridge College in developing popular Environmental Science four-year programs as a reason why the program might no longer be relevant to them, but this is not the case at all our transfer institutions. We accept that there are differences between the post-diploma and direct entry program requirements and recommend that we examine how to mitigate these differences, but the intention has never been for the experiences and learning outcomes to be identical. Direct-entry students and college transfer students have distinct advantages and disadvantages in their preparation in the first two years. The focus on this issue as an inequity does not account for the positive cross-pollination of ideas that occurs when these students are brought together, with distinct applied, theoretical and academic foci.</p>

Whereas the external reviewers focused on the possibility of moving toward direct credit instead of block transfer and named our main local partner as one for which this program might not be relevant, the internal program response recommends cancellation. It is true that, with major exceptions such as Computer Science, that we have seen falling enrolments in transfer programs at the University of Lethbridge in recent years, including in Environmental Science. However, the primary rationale for the cancellation recommendation was a report that students do not have appropriate background to succeed in senior classes, with reference made to numeracy, hypothesis-testing, writing and laboratory skills. Despite this observation, post-diploma students in the Environmental Science program at the University of Lethbridge have high retention rates around 79%, which is similar to the 77% retention rate for transfer students bringing direct credits from other institutions, though lower than the retention rate for direct entry students, which stands at an impressive 87%. Overall, the Environmental Science program has above-average retention rates of 82% and is a better than average program in terms of student success in degree completion.

We do not believe that cancellation of the post-diploma transfer program is warranted at this time. Measures of student success do not support the suggestion that insufficient preparation is an insurmountable barrier. We can continue to work with our partners to identify gaps they can address. There is also considerable financial risk involved with such a cancellation given the number of students currently enrolled, as well as some risk to our college partnerships. It is also important to note the advantage of post-diploma transfer programs in terms of adding students to senior courses, which have plenty of capacity unlike many junior classes.

We also recommend caution in the consideration of a shift to a direct credit transfer system. This would require study into the advantages (e.g., simplicity of accreditation process, ensuring similar programs and preparation) and disadvantages (e.g., greater workload for chairs and transfer coordinators, slower degree pathway, less differentiation from other university transfer programs, less diversity of student experiences in the classroom), which could impact enrolments negatively or positively. It is unclear that this would have any significant bearing on student success, given the similarity in retention rates among post-diploma transfer vs. direct credit transfer students. The financial and partnership risks of such a change would be smaller than with cancellation. Direct credit transfer could impact enrolments but increase the credit hours of transferred students who still decide to come to the University of Lethbridge - Iniskim. For most of our transfer students, we would not be able to credit anywhere near 20 courses because of some of the distinct material and courses used to achieve learning outcomes. Overall, it is not clear that there is compelling evidence of a need to shift from block to direct-credit transfer with the data provided but we are open to further study of such a recommendation.

9. *Consider options for removing the technical semester as a requirement (and rename it to a practicum if it is retained as optional). Given that the relationship with Lethbridge College is unclear moving forward, we suggest planning for a situation in which the technical semester is no longer offered. For example, the technical semester, at the moment, may not be necessary for students wanting the GIS concentration. In addition, some of the classes are offered at both universities*

We are open to studying the possibility of removing the technical semester with a view to examining the feasibility of adding a field course and additional hands-on field and laboratory experiences (and/or filling identified gaps), as demanded in the student survey. Such a study would need to include an assessment of how this would improve student learning objectives and whether such additions could be cost-neutral or better. Any tuition gains could also potentially be directed toward Recommendations #3, #6 and/or #7.

<p>leading to redundancy. For the hands-on work that is a major benefit to students during the technical semester, we strongly encourage adding more field-based courses or more hands-on field work in labs (e.g., through weekend trips), so those experiences are not lost for students.</p>	
<p>10. <i>Ensure that the program is aligned with requirements for professional accreditation (e.g., P.Bio., P.Ag.). Also, advertise clearly on the website and include information in annual student advising meetings how the program aligns with professional accreditation.</i></p>	<p>We support efforts to move beyond existing accreditation opportunities to include ECO Canada accreditation and to keep the program website updated on accreditation pathways. We agree with the program response recommendation that expected coordinator duties include updating and relating information to students about accreditation.</p>
<p>11. <i>Consider creative ways to enhance student feelings of belonging to the program and building community. For example, there is an under-utilized computer room in the water building that could be used as an Environmental Science Clubhouse/social area if outfitted with a couch and a few tables and chairs. This would a) provide students in the program with a meeting place, b) enhance student presence in the water building, c) set conditions to build student-faculty relationships, and d) facilitate change to the current perception of the Environmental Science students as being an outcast group that does not belong in any department to a group with special privileges and opportunities.</i></p>	<p>Measures to provide students with a sense of belonging are of critical importance. We are open to considering recommendations for a student social space that we can propose to Facilities to improve space use and foster community-building. We should also connect with the Executive Director of Student Services regarding the 'social space', to see if the RecRoom program could see the addition of an upper-campus location in the AWESB. It is also notable that there was once an Environmental Science Club and this could be another way to regain a sense of community and belonging.</p>
<p>12. <i>[It] would be beneficial for University of Lethbridge to invest in the development of promotional materials that describe the benefits of the degree to</i></p>	<p>As outlined in the program committee response, we support the recommendation that we improve our website, review our promotional materials and produce student testimonials and information on job prospects. The external reviewers clearly recognized our need for all forms of advertising that will allow us to compete with other institutions (Recommendations #5 and #12).</p>

prospective students and parents, including student testimonials and information on job prospects. We noted that Lethbridge College has convincing promotional materials for their competing program, and that the Environmental Science program's website is more than 5 years out of date.

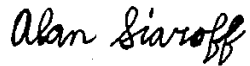
While the External Reviewers' Report contained 12 (twelve) recommendations for improving and/or maintaining the Environmental Science Program, the area, Dean Letts, and the Academic Quality Assurance Committee each felt that the recommendations were too narrow in focus and were better presented as broad goals to be met before the next review. The committee modified and consolidated most of the 12 (twelve) recommendations into the following 4 (four) recommendations:

1. The Faculty of Arts and Science will work with the Environmental Science program to ensure the Program Coordinator role is clearly defined and properly resourced. The role should include:
 - a. coordinating ongoing website maintenance;
 - b. coordinating program promotion and outreach;
 - c. liaising between both departments involved in the program;
 - d. ensuring alignment with accreditation bodies;
 - e. ongoing communication and collaboration with Lethbridge College.
2. The Faculty of Arts and Science Dean's office will prioritize the hiring of an Environmental Scientist as resources permit across the Faculty, ideally cross-appointed in the two units contributing to the Environmental Science Program. This hire should be at the associate professor rank so that the new faculty member could step into the role of Program Coordinator.
3. The Environmental Science program will discuss:
 - a. Adding courses in the areas of environmental assessment, environmental change, and coding for the environmental sciences;
 - b. Increasing Indigenous content, whether through coursework in the program or through courses taken elsewhere in the university;
 - c. Discontinuing the Post-Diploma pathway into the program and moving towards simple credit transfer for equivalent classes;
 - d. Making the technical semester optional for students and renaming it as a practicum, and adding more field-based courses or more hands-on field work in labs;
 - e. If implementation of the changes listed above in points a.- d. necessitate, revisiting all program requirements to reduce or streamline requirements to accommodate change(s).

4. The Environmental Science program will consider ways to enhance student feelings of belonging to the program and building community.

The Academic Quality Assurance Committee is satisfied that the Environmental Science Program academic quality assurance review has followed the U of L's academic quality assurance process appropriately, and acknowledges the successful completion of the review.

Sincerely,

A handwritten signature in black ink that reads "Alan Siaroff". The signature is written in a cursive, slightly slanted style.

Dr. Alan Siaroff
Chair, Academic Quality Assurance Committee
Professor, Department of Political Science

cc Michelle Helstein, PhD.
Provost & Vice-President (Academic)