

Final Assessment Report of:
Geography and Environmental Management (Bachelor
of Environmental Studies)
Geomatics (Bachelor of Environmental Studies)
Tourism (Master of Environmental Studies) and
Climate Change (Master of Climate Change)

December 2015

Introduction

In accordance with Waterloo's Institutional Quality Assurance Process (IQAP), this final assessment report provides a summary and synthesis of (i) the external review of two Bachelor of Environmental Studies programs (Geography and Environmental Management and Geomatics), the Master of Environmental Studies program in Tourism and the Master of Climate Change program in Climate Change; (ii) the program (department) response to the external review; and (iii) an implementation plan for improvements that lists specific actions, timelines, required resources and responsibility.

The Department of Geography and Environmental Management offers the following undergraduate programs leading to a Bachelor of Environmental Studies:

- Geography and Environmental Management - Three-Year General
- Geography and Environmental Management - Four-Year Honours (Regular and Co-op)
- Honours Geomatics (Regular and Co-op)
- Honours Geography and Aviation (Regular)

The Geography and Aviation program has been recently reviewed separately, together with the Science and Aviation program.

The graduate Geography programs administered jointly with Wilfrid Laurier University (MA, MSc, MES, PhD) through the Waterloo-Laurier Graduate Program in Geography (W-LGPIG) are being reviewed separately. Graduate programs included in the current review are:

- Master in Climate Change (MCC), a coursework based degree that began with its first

class in the fall term of 2013

- Master in Tourism (MES) degree, offered in cooperation with the Department of Recreation and Leisure Studies in the Faculty of Applied Health Sciences. The department moving is to phase out this program due to persistently weak enrollments. No new Tourism students are being admitted in Fall 2015, although the Department of Recreation and Leisure Studies intends to admit a few students this fall and review the future of the program from their end. The reviewers evidently also determined this program was in trouble in their comment *“we do not understand why the Master is Tourism is still an option. It does not seem to be a viable program”*.

This report is one of three academic program reviews that have been prepared this year by GEM. In addition to the current report, GEM programs being reviewed include:

- the graduate programs offered by the Waterloo – Laurier Graduate Program in Geography; and
- the aviation degrees (Geography and Aviation, and Science and Aviation)

The last review of undergraduate and graduate programs administered by the department (including W-LGPIG) was undertaken in 2007. Eighteen recommendations were made, resulting in numerous improvements to curriculum (undergraduate and graduate), departmental web pages, student orientation, student recruiting, research and experiential learning opportunities for senior undergraduate students, oversight of space issues and computing resources.

Department of Geography and Environmental Management

From its 2013 strategic plan, the Department of Geography and Environmental Management is “committed to the discovery, innovation, dissemination, and application of geographic knowledge focused on the complex interactions within and between the human and natural environments. The Department embraces the goals of excellence in geographic research and excellence in geographic research-led teaching in undergraduate and graduate degree programs. It also seeks to stimulate and engage the sharing of geographic knowledge across the Faculty, University, and the wider global community.”

As of January 2014, the Department had 10 full professors, 12 associate professors, four assistant professors, and one continuing lecturer. There are currently 22 cross-appointed faculty to the Department. The cross-appointment is used primarily to allow these faculty to sit on graduate student committees.

The Department’s research and teaching activities fall into three broad areas: Earth System Science, Environment and Development, and Geomatics. Several cross-cutting research and teaching themes, such as climate change, are woven through all three of the theme areas. The

Department's reputation in Geomatics, GIS, Remote Sensing, Environmental Management, Economic Development, Tourism and International Studies distinguishes it from most other Geography programs. Unique to Geography at Waterloo are two new academic plans (Geomatics; Geography and Aviation) as well as two joint academic programs with Nanjing University). Compared with other universities, the program at Waterloo provides breadth equal to other large undergraduate programs in Geography in Canada. Approximately 700 undergraduate students are enrolled in the various programs offered by the department, the second highest in the province, with over half of the undergraduate students in Geography in the co-op program. For graduate programs – including those that are part of W-LGPIG – Waterloo also has the second largest Geography graduate program in the province (39 at WLU, 70 at Waterloo).

The department's QS rankings indicate that it has moved up through the past four years. Ranked in the 151-200 range in 2011, the department moved into the 101-150 range 2012, the 51-100 range for the years 2013 and 2014 and the top 50 in 2015.

Self-Study Process and Site Visit

The self-study was prepared by faculty and staff members of the Department of Geography and Environmental Management, with the chair of the department assuming primary responsibility for guiding the process. Statistical data related to faculty and student numbers, and finances were provided by IAP. In addition, departmental data on students were used to generate some of the tables, particularly in the sections on graduate students. An alumni survey was completed in 2013, by 111 individuals who graduated during the 2007-2014 period. Other information was obtained from publications of the Ontario Universities' Application Centre, the Canadian Association of Geographers, the Association of American Geographers and from web sites at UW and other universities.

The Department of Geography and Environmental Management submitted their self-study to offices of the Associate Vice President, Academic and Associate Provost, Graduate Studies on June 12, 2014. The site visit was conducted April 13-14, 2015. The external members of the review team were Professor Nigel Roulet, Chair and Professor of Biosciences, Department of Geography, McGill University and Professor Scott Lamoureux, Professor, Queen's University, Department of Geography. The internal member was Professor Anindya Sen, Associate Chair, Graduate Studies, Department of Economics.

The review team met with program administrators and departmental faculty and staff, graduate and undergraduate students, the Faculty Dean and Associate Dean (Undergraduate Studies), the Associate Provost, Graduate Studies, the Associate Vice-President, Academic and representatives from the library and co-operative education. The reviewers also toured the Faculty of Environment buildings and the main map library.

The external reviewers' report was received on June 10, 2015 and the department's response and implementation strategy, with timelines, responsibilities and resource needs assessment was received on August 20, 2015 and approved by the Dean of Environment on August 19, 2015.

This final assessment report is based on information extracted, verbatim in many cases, from the self-study, the reviewers' report and the program response.

Programs

The external reviewers noted that the learning outcomes for the programs under review were clearly laid out, and also commented on the "stronger emphasis at the University of Waterloo's Geography on educating graduates for employment.... and the programs associated with the co-ops seems to be very well developed and successful."

Undergraduate:

The objectives of the Geography and Environmental Management and Geomatics programs are well expressed through UW's eight Undergraduate Degree Level Expectations (UDLEs). The overarching programmatic objective is best captured in the first of the UDLES, namely to "have knowledge and critical understanding of the key concepts, current advances, theoretical approaches and assumptions in the field of Geography and Environmental Management and its various specializations (Earth System's Science; Development and Environment and Geomatics)." From the alumni survey, the majority of students agree that the Department's undergraduate program learning outcomes are being realized. However, results suggest that the Department needs to consider implementing strategies to enhance student awareness of cultural diversity; to provide specific transferable skills and to provide additional field work opportunities.

Graduate:

The self-study articulates the six Graduate Degree Level Expectations (GDLEs) for both graduate programs.

The overarching programmatic objective of the Master of Climate Change (MCC) Program is to provide an academic environment that promotes open critical interdisciplinary inquiry of the scientific and socio-political complexities of climate change, and prepares highly qualified graduates for ethical, innovative and professional practice in diverse climate change careers in government, civil society, business and local/international development.

The overarching objective of the Master of Environmental Studies in Tourism is to provide a constructive, critical, and interdisciplinary education that prepares graduates in careers in government, business, tourism and recreation planning, and consulting.

Programs Under Review – Strengths and Challenges

Undergraduate programs - general

Strengths:

- Students have a broad diversity of courses to support their programs and interests. GEM offered 66 undergraduate courses in 2013-14.
- Students report a consistently high level of satisfaction with courses that they take in the Department as well as overall high level of satisfaction with the teaching performance of instructors. Furthermore, a high percentage of the courses are taught by tenured or tenure track professors.
- The Department encourages a vibrant learning community via seminars and conference opportunities, and opportunities to interact with graduate students as well.
- Students continue to show strong interest in the co-op programs
- The Department's honours programs are becoming increasingly attractive to foreign applicants.
- Both the co-op GEM and co-op Geomatics programs have higher retention rates than the regular versions of these programs, and numbers are increasing over time
- Co-op employers give GEM and Geomatics students a rating of at least very good, with approaching half, in each case, assigning an excellent rating.
- Co-op students are largely satisfied with their co-op experiences. During the reporting period, three-quarters of the Department's co-op students (75.9%) rated their employees at least 8, on a 10-point scale
- Post-graduation outcomes are favourable for both GEM and Geomatics students – the majority of graduates continued their academic career following graduation, with 89% attending either a graduate or professional school. Most indicate working in an occupation that is closely related to their undergraduate program.
- Specific to **Geography and Environmental Management:**
 - There is growing interest in the GEM program by international students (5.3% were of international origin in 2007/2008, 10.7% in 2013/2014)
 - Genders are evenly represented

Challenges:

- Both the regular GEM and regular Geomatics programs have retention issues Part of this could be explained by the transfer of students to other programs within Geography and Environmental Management
- specific to **Geography and Environmental Management:**
 - Interest from high school students has become flat in recent years
- specific to **Geomatics**
 - Females are not well represented in Geomatics enrollments, although the proportion of females has increased slightly over time (from 10.5% to 14.7%;

- Total applications to Geomatics have declined over the seven years (from 80 in 2007/2008 to 70 in 2013/2014), although annual fluctuations are observed. However, despite declining applications to the Geomatics program, first-year enrollment has increased, due to admission of students deflected from Computer Science.
- From their meeting with Geomatics students, the reviewers heard that there was little guidance for course selection.

Graduate programs – general

Strengths:

- Graduate students are supervised by top-ranked, successful faculty, as measured by awards from various academic, research, or other organizations; significant funding from a variety of sources; peer-reviewed publications and other indicators of productivity; memberships in various editorial boards; executive roles and memberships in professional associations; etc.
- Programs attract international students, who enrich the program.
- The Department encourages a vibrant learning community for graduate students with numerous opportunities for graduate students to participate in conferences (including international), seminars, workshops, various public events and exposure to international scholars as visiting faculty.
- specific to **Master of Environmental Studies - Tourism**
 - Quality of students coming into program has been very good
 - A number of students in the program have gone on to pursue doctoral studies, either at Waterloo or at other institutions.
 - The reviewers commented that *“Plans for growth appear particularly timely given the recent announcement of major climate-policy initiatives in central Canada.”*
- specific to **Master of Climate Change – Climate Change**
 - The professional internship option provides an opportunity for experiential learning
 - The MCC student cohort exhibits extraordinarily great diversity in any metric which can be used to assess diversity. It includes a large proportion of internationally trained students (6/13) and gender balance (6 males, 7 females).
 - While the MCC Program has yet to graduate a student, initial employment prospects appear promising. Of the 13 students in the program, 10 have secured internships

Challenges:

- specific to **Master of Environmental Studies - Tourism**
 - Enrollments are weak – program will be phased out in Faculty of Environment
- specific to **Master of Climate Change – Climate Change**

- International students have difficulties identifying and securing internship opportunities in Canada.

External Reviewers' Report

The reviewers were generally favourably impressed with the programs under review but there were several areas that were specifically mentioned in their report as being problematical.

"Since almost all professors in the program are traditional teacher-scholars, we were unable to assess at least fifty percent of their activities. We were not able to form any opinions of the great undergraduate experience that often comes from being an undergraduate in a strong research department. ... We had little opportunity to form much of an impressions of the strengths in human geography. This puts the reviewers at a bit of a loss on what to suggest may be fruitful avenues to explore.

The final general aspect of our review that was unexpected was the almost complete lack of representation from the Geography Tourism Masters program. ... the general lack of details in the written report in comparison to the other graduate programs we reviewed, and the complete lack of any discussion during our two day visit, indicates to us that this program exists in name only. Without champions and supporting faculty we see little value of continuing with this program."

The latter issue noted by the reviewers concerning the Tourism Masters program stems largely from plans to discontinue the program due to low enrollment. Even though the Department has not admitted any new students to this program for the fall of 2015, Applied Health Science's Department of Recreation and Leisure Studies is still admitting Tourism Masters students. The final fate of the Tourism masters program will be determined following discussions with the Department of Recreation and Leisure Studies in the coming year.

Regarding admission criteria, the reviewers indicated those for the undergraduate programs were "fine" but "were very confused by the graduate admissions and the criteria for admitting students. ... the report and our discussions did not lead us to have a lot of confidence that GEM was striving to get the top students".

The reviewers' comments on the undergraduate curriculum led them to state that it reflects "to a large extent the current state of the discipline of Geography, or at least several thematic areas of Geography quite well. Clearly, to us the Geomatics program is probably the most complete and rigorous program in Canada." With reference to physical geography, they observed that students graduating from the GEM programs earned a BES rather than a BSc and wondered as a result whether the lack of mandatory basic science courses in the curriculum (calculus, algebra, chemistry, physics. biology) put these students at a disadvantage in applying for graduate

positions at other institutions where physical geography was more strongly underpinned by basic science at the undergraduate level.

The human geography theme area also prompted comment on several issues. *“First, there was no coherent presentation of a program through curriculum mapping. It was not clear what the goals and objectives of the human geography offering were, or what a human geographer graduating from the University of Waterloo looks like.”*

Regarding the theme of the geospatial analysis of public health, the reviewers noted that with the exception of one recent addition to the Faculty, *“[N]one of the existing human geographers seem to have a particular strong emphasis in health geography”*. They further commented that *“Waterloo uniquely has an emphasis on many dimensions of public health, which should have a very strong geographical component. Given the strength in Geomatics at Waterloo this might be an area worth exploring.”*

Concerning resources, the reviewers paid a significant compliment to the Department’s staff and faculty in that the reviewers *“were very surprised to not hear a long list of complaints about how under- resourced the GEM was”*, which was not a reflection of having all the desired resources, but learning to do an excellent job with the resources at hand. Minor space concerns were raised, which the reviewers noted was a common complaint in universities in general.

The reviewers indicated that the “additional criteria” for graduate programs as described in the guidelines for reviewer *“seem to be fine”* and their comments regarding the Tourism program and Climate Change program have been articulated earlier in this report. The reviewers noted that, with respect to a possible Master in Geomatics program, *“GEM has the faculty and the expertise to mount a high-end graduate program that we believe few other institutions could match”* and they recommended this initiative be approached as a *“co-op graduate program because we believe these students would be very attractive in industry and could, given the emergence of this field in the main stream economy, could be business innovators.”*

The reviewers concluded their report with a series of 11 recommendations that provided the basis for the program response.

Program response and implementation plan

Recommendation 1: We recommend that GEM consider a strategic visioning of the Department as a whole, to define future plans and identify priorities for faculty positions, undergraduate and graduate teaching programs, and resources.

Response: We agree with this recommendation. Discussions around the future of the department are ongoing. Currently, we are reviewing our experiential learning activities, our undergraduate recruitment activities, and the overall research and teaching focus of the department, with a particular emphasis on human geography. These activities will continue over the next year with the specific goals of: reviewing and revising the undergraduate and graduate curriculum, clarifying and improving our experiential learning activities, and arriving at a plan for future hiring, with a focus on human geography. These activities will be led by the department chair and associate chairs.

Recommendation 2: Undergraduate student advising and mentorship should be broadened within the department to include a wider range of faculty and on a more frequent basis.

Response: We will take this recommendation under advisement. The department has two associate chairs and two staff who are available to advise students on academic and curriculum matters. We are not aware of any complaints from students regarding a lack of access to academic advising. Further, we are concerned that other faculty in the department do not have sufficient knowledge of policies, procedures, and curriculum requirements to provide accurate and uniform advice. Over the next year, we will review and discuss our current academic advising activities with student representatives to determine if adjustments are required to improve the service we provide. This activity will be led by the department chair and associate chairs.

Recommendation 3: We strongly recommend the Department seek to improve communication with undergraduate students related to course enrollment. Determining Department course offerings prior to student registration would eliminate many challenges faced by students in meeting their program requirements. Additionally, given the complexity on offering courses due to the co-op programs, we recommend the Department consider multi-year course planning to improve student access to courses.

Response: We agree with this recommendation. We currently advise students of our term-by-term course offerings one year ahead of time. However, the specific scheduling of these courses in each term is handled by the Registrar's Office, with notice of the schedule given about two months prior to the start of that term. This scheduling of classes and times is beyond the control of the department. We will review our communication of course offerings

to students to improve the availability of this information and lengthen advance notice of course offerings. This activity will be led by the chair and associate chairs over the next year.

Recommendation 4: The program in Human Geography is in a transition period and we recommend initiating a review and visioning for the program to reflect the current faculty complement. We anticipate elements of the geography of health would be well supported by the expertise in the group, and natural linkages could be developed to the Geomatics and other units in the Faculty and across campus.

Response: We agree that the Department is in transition with respect to its strengths in Human Geography. We would note, however, that the Department's combined strengths in the human and physical dimensions of climate change place are noteworthy, and the ways in which social science and natural science are integrated around this theme reflect an important aspect of Waterloo's Geography programming, and that is Human and Physical Geography do not exist as two silos. That said, we agree that a review and visioning exercise it needed, with a particular focus on human geography, and this has been underway for the past year. These will continue with a view to outlining a vision for the Department that will guide future hiring. This activity will be led by the department chair and associate chairs.

Recommendation 5: The program in Geomatics has rapidly developed and appears poised for further growth. Increased promotion to incoming undergraduate students with interests in computing may further increase enrollments.

Response: We agree with this recommendation. We have recently struck a committee for undergraduate recruiting. This committee will develop a strategy that will include raising awareness of geomatics amongst high school students. Additional resources from the Dean's Office may be required for promotional activities, such as the revival of the "Geomatics Roadshow" or the preparation of promotional materials. This activity will be led by the department chair, working with the undergraduate recruitment committee.

Recommendation 6: Development of a Masters program in Geomatics appears to hold strong potential. The existing faculty complement could support an advanced program that would be uniquely positioned to train students for research and development aspects of Geomatics. A co-op offering would be a logical consideration given the university strengths.

Response: We agree with this recommendation. Discussions regarding the development of a masters in geomatics have taken place in the past. The department will consult with the Dean of Environment to explore the feasibility of developing a co-op masters in geomatics.

Recommendation 7: The new Masters of Climate Change program has already built a strong international attraction and had positive feedback from students. Maintaining the "lead" of

this program in a rapidly developing sector in Ontario and globally will require continuing to innovate in order to attract high quality students. We recommend considering the development of co-op and research program streams to better meet student career goals and to make sure that student expectations are being matched effectively.

Response: We agree with this recommendation. Over the next year, we will explore and discuss the possibility of adding a co-op stream to the MCC program. This initiative will be led by the Director of the MCC program, working with the department chair and associate chairs.

Recommendation 8: The Masters of Tourism appears to be at a crossroads, with declining enrollments and a change in the faculty complement that makes the viability of this program questionable.

Response: We agree with this observation. GEM has already decided to discontinue offering the Masters in Tourism. The Department of Recreation and Leisure Studies has decided to admit students to the Tourism program for the fall of 2015. However, they will review their commitment to the program over the next year. We will coordinate with them as they make that decision.

Recommendation 9: Based on feedback, we feel that the Department needs to invest in expanding cultural and related support for the programs that attract a sizable international cohort (2+2, Masters of Climate Change).

Response: We will take this recommendation under advisement. The Faculty of Environment has a full-time Coordinator of International Education who works with international students, and especially the 2+2 students, to support their adjustment to the Canadian academic environment. We will work with the Dean of Environment to review the activities of the coordinator and address any perceived needs.

Recommendation 10: Graduate student application review and acceptance practice in the Department appears to be heavily weighted towards support staff with limited academic oversight. The volume of applicants and the screening process should be reviewed to increase faculty involvement.

Response: We disagree with this assertion and recommendation. Support staff facilitate the review of graduate applications, but they do not make decisions with respect to the admission of graduate students. The final decision regarding the admission of each applicant is made by the potential faculty advisor of that student and the Associate Chair – Graduate Studies, under the supervision of the Associate Dean – Graduate Studies.

Recommendation 11: Support staff in the Department are in the process of developing documentation for best practices and procedures to enhance the continuity of staff support. We recommend continuing to support this positive initiative.

Response: We agree with this recommendation. This activity will be ongoing, under the supervision of the department chair.