

MEMORANDUM

ATTENTION: Senate	TEL
FROM: Peter Keller, Vice-President, Academic and Provost, and Chair, SCUP	
RE: External Review of the School of Resource and Environmental Management (SCUP 17-33)	
DATE: October 10, 2017	TIME

At its October 4, 2017 meeting, SCUP reviewed and approved the Action Plan for the School of Resource and Environmental Management that resulted from its External Review.

The Educational Goals Assessment Plan was reviewed and is attached for the information of Senate.

Motion:

That Senate approve the Action Plan for the School of Resource and Environmental Management that resulted from its External Review.

c: S. Cox
I. Stefanovic

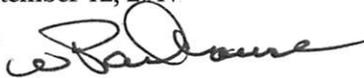


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MEMORANDUM

ATTENTION	Peter Keller, Chair, SCUP	DATE	September 12, 2017
FROM	Wade Parkhouse, Vice-Provost and Associate Vice-President, Academic	PAGES	1/1 
RE:	Faculty of Environment: External Review of the School of Resource and Environmental Management		

Attached are the External Review Report and the Action Plan for the School of Resource and Environmental Management (REM). The Educational Goals Assessment Plan is included, for information only, with the Action Plan.

Excerpt from the External Review Report:

“REM is an impressive and important actor on the regional, Canadian and international scene. The School has an excellent reputation as a leader in environmental education and research, especially its scientist practitioner, problem-solving model.”

Following the site visit, the Report of the External Review Team* for the School of Resource and Environmental Management was submitted in April 2017. The Reviewers made a number of recommendations based on the Terms of Reference that were provided to them. Subsequently, a meeting was held with the Dean of the Faculty of Environment, the Director of the School of Resource and Environmental Management and the Director of Academic Planning and Quality Assurance (VPA) to consider the recommendations. An Action Plan was prepared taking into consideration the discussion at the meeting and the External Review Report. The Action Plan has been endorsed by the School and the Dean.

Motion:

That SCUP approve and recommend to Senate the Action Plan for the School of Resource and Environmental Management that resulted from its external review.

*External Review Team:

- Mark Seasons, University of Waterloo (Chair of Review Team)
- Amanda Vincent, University of British Columbia
- Michael Jones, Michigan State University
- Rolf Mathewes (internal), Simon Fraser University

Attachments:

- 1. External Review Report (April 2017)
- 2. School of Resource and Environmental Management Action Plan
- 3. School of Resource and Environmental Management Educational Goals Assessment Plan

cc Ingrid Stefanovic, Dean, Faculty of Environment
Sean Cox, Director, School of Resource and Environmental Management

**Report of the External Review Panel
School of Resource and Environmental Management (REM)
Simon Fraser University**

April 15, 2017

1.0 Introduction

This report has been prepared in response to Simon Fraser University's external review policy. The client for this report is Dr. Glynn Nicholls, Director, Academic Planning and Quality Assurance. The report provides the external review panel's opinions about the School of Resource and Environmental Management (REM) generally, and addresses several evaluation questions that were provided by the university and by the School (see Appendix 1).

1.1 Expert Review Panel and Site Visit Process

The external review panel comprises the following members (in alphabetical order):

Dr. Michael Jones, Michigan State University

Dr. Rolf Mathewes, Simon Fraser University (internal representative)

Dr. Mark Seasons, University of Waterloo (chair)

Dr. Amanda Vincent, The University of British Columbia

The panel received and reviewed the terms of reference and a considerable number of context-setting files, policy explanations and evaluation criteria from the University. The panel convened on-site on March 1 and 2, 2017. The panel toured the School's facilities and met with numerous individuals and groups from the School administration and community. The panel had many conversations with students, staff, faculty, administrators and alumni. The panel's meeting and interview agenda was designed by the School and University administration (see Appendix 2), with modifications requested by the panel (particularly to explore diversity).

The preliminary results of the panel's findings were presented to the Director of REM and, separately, to senior University administration at day's end on March 2, 2017. This report reflects consensus from the panel members about issues and suggestions that we hope the School, and the University's administration, will find helpful as the School enters the next seven years.

2.0 Summary of Observations and Recommendations:

2.1 Observations

- *The School of Resource and Environmental Management (REM) is in very good shape overall.* REM is an impressive and important actor on the regional, Canadian and international scene. The School has an excellent reputation as a leader in environmental education and research, especially its scientist practitioner, problem-solving model.
- *Faculty research productivity is consistently high* as measured in numbers of publications in reputable, peer reviewed journals; impact numbers are generally quite high; and faculty have been successful in their efforts to attract funding support from industry, Tri-Council (i.e. NSERC, SSHRC), DFO and other sources.
- *The graduate programs – Master’s and PhD – are highly rated and are in demand.* Intake numbers are strong for both MRM and PhD programs. Career prospects are good for graduates of REM, with high rates of employment in relevant positions.
- *The new undergraduate program seems to meet students’ interests in environmental education,* with tremendous initial enrollment. This program is a positive addition to the School and it has considerable potential.
- *The work environment is positive and supportive.* Faculty, students and staff work in a highly collegial culture. The School seems well managed with steady, progressive leadership. The School’s research space and facilities are modern and well appointed.

2.2 Recommendations

- *As a top priority, the School should carry out a strategic planning process* that will position it to meet future challenges and opportunities. The findings of the strategic planning exercise will provide the necessary context and rationale for program design and delivery decisions, and related resource needs for the School.
- *REM has to operate within the new responsibility-based budget model.* As a result, the School will need to do things differently and compromises will be necessary. Future resource requests, including staff and faculty positions, and the type and distribution of teaching allocations must be made in this context, assisted by the strategic plan.

- The School needs a *faculty succession strategy*. Several faculty, including half the women, are approaching the end of long, productive and distinguished careers. In other cases, loss of faculty has occurred because of illness or death, or career decisions. Faculty succession must be directed by the findings of the strategic planning exercise, respecting the need to increase diversity a key consideration in hiring.
- *Enhanced diversity* should be an important objective for the School. We define diversity in broad and inclusive terms – i.e. gender, ethnicity, age, etc. The *faculty complement* should reflect the diversity of the student body and campus community, as well as the regional community. Efforts should be made to ensure that the *student body* itself is reflective of the regional community. As a general comment, we urge the University to require reporting on diversity and equity in any unit self-study and to guide all external reviewers to full exploration of these issues in their evaluations.
- *The School should explore its aspirations for postdoctoral training* and its support for postdoctoral fellows, neither of which seemed central to current thinking. We suggest the School hold an explicit discussion of its aspirations for postdoctoral training, making this part of its strategic planning exercise. As a general comment, we also urge the University to require reporting on postdoctoral training in any unit self-study and to guide all external reviewers to explore this in their evaluations.
- *REM philosophy and activities should reflect the central role of First Nations in British Columbia and Canada*. The recent hire of an indigenous scholar is a promising start in this direction, and reflects the School's recognition of the need to better understand and address First Nations issues. It will be ever important to reflect and include First Nations strengths and concerns in graduate training and the undergraduate curriculum, in a meaningful way.
- *Gender equity* in the faculty complement is a specific concern. Every effort must be made to achieve gender balance in the faculty composition.
- *Effective communication* between the Faculty of Environment and the School is vital to the ongoing success of the program. *The Dean of FENV should meet regularly with the School's executive committee and community* as a whole, to explain and place into context changes and decisions made at the Faculty and University level, and to better understand School concerns and perspectives. We heard a level of anxiety from several faculty members that could be addressed by clear communication about change from the Dean. In particular, the School needs to hear that it is essentially doing a very good job and has the Dean's support.

- *The excellent graduate programs should be reviewed to make improvements. In particular, the PhD comprehensive exam philosophy, structure and process need attention, while degree completion times remain a concern for MRM students. It would be helpful to establish and apply standards on issues such as supervision. Faculty supervisors should meet regularly with their students from the outset of their program of studies to ensure clarity of understanding about roles and expectations, and to provide reliable support.*
- *The School's Director should confer regularly and formally with the School's student association (REMSA) about the students' perspectives on life in REM; the growing undergraduate program will also require representation.*
- *The School's director should confer regularly with alumni and internal (FENV, campus) as well as external stakeholders and partners to ensure relevance and currency of research initiatives and course curricula.*
- *The School needs to develop and implement a standard process for communication with prospective graduate students when they are accepted into the program. A letter from the advisor to the student, following standard School (or University) guidelines, should be explicit about expectations for both the student and the advisor, especially with respect to funding support, or the lack thereof.*
- *To maximize its reach, we encourage the School to consider how it might deliver some of its courses through the SFU's downtown Vancouver campus at Harbour Centre (or in Surrey), thus allowing a different set of students to enroll, including some professional or part-time students.*

Specific recommendations are provided in response to the University's and REM's set of questions in Section 5.0, on pages 7-24 of this report.

3.0 REM Context

3.1 Mission

The School of Resource and Environmental Management (REM) was established in 1979. The School's mission statement states:

Our mission is to improve sustainable resource and environmental management and planning practices by applying, advancing, and disseminating interdisciplinary knowledge and expertise.

REM is designed for individuals with undergraduate training and experience in fields such as biology, engineering, chemistry, forestry, and geology, as well as business administration, economics, geography, planning, and other social sciences.

The aim of REM is to give students increased familiarity and competence in:

1. the strategies and techniques of natural resource and environmental planning, decision making and management; and
2. understanding the dynamics of natural resources and environmental systems and the biological, physical, social, economic, and institutional implications of resource and environmental management decisions.

The School was located in the Faculty of Applied Sciences until 2009, when the Faculty of Environment was established. The School is one of three academic units in the Faculty, along with the Department of Geography, and the Department of Archeology. The School houses the Centre for Tourism Policy and Research and 9 distinct research groups: Energy and Materials Research Group (EMRG), Quantitative Fisheries Research Group, Forest Ecology, Environmental Toxicology, Environment and Development, Climate, Oceans, and PaleoQ Environments (COPE), CoQManagement Group, Avalanche Risk Management, and Coastal Marine Ecology and Conservation Lab.

3.2 Program Details

The School offers three graduate programs: the MRM (Master of Resource and Environmental Management); the MRM (Planning); and the PhD (Resource and Environmental Management). The MRM program was initiated in 1979, the MRM (Planning) in 2004, and the PhD (Resource and Environmental Management) was created in 1994. There are typically 130-170 applicants to the graduate programs, with 25-30 graduate students admitted annually (25 MRM, 5 PhD). The MRM requires completion of 7 mandatory courses and 4 electives, plus a major research report; there is also an option to complete a co-operative education work experience. The MRM (Planning) is a professional degree that is accredited by the Professional Standards Board (PSB) and the Planning Institute of British Columbia (PIBC). MRM (Planning) students must take 10 mandatory courses and one elective.

There are approximately 112 graduate students at various stages in their respective programs: 33 students are registered in the MRM (Planning) program and 46 students are studying in the MRM program. Another 33 PhD students are working their way through that program. The average completion time for MRM students is 2.5-3.0 years, and 5.5-6.0 years for PhD students. The School is home (as of January 2017) to the BEnvREM program, an honours degree program with 107 majors. Another 22 students are enrolled in the Environment and Resource Management minor program. More than 670 students have graduated from REM's graduate programs since 1979.

The School has a faculty complement of 18 tenured or tenure-track professors (of various ranks), 1 professor of professional practice, and 1 instructor. The School has experienced the recent loss of 3 faculty due to illness, retirement, death or departure to another institution, thus the estimated current FTE faculty complement is 14.42. Another 39 adjunct faculty, 4 emeriti, and 5 support staff support the School's programs and activities generally.

4.0 The 2010 External Review – Key Findings

The School is evaluated every seven years. The last review was conducted in 2010. At that time, the School was encouraged to increase its PhD program intake numbers. The panel also noted "rigidity" in the PhD comprehensive examination, specifically the prescribed content element. Concerns were expressed about the time taken to complete the comprehensive examination process. For the MRM programs, the panel recommended greater flexibility in course work requirements, and a shorter time to degree completion. The panel suggested that a two-track MRM could be useful: one course-based and the other thesis/research based. The panel flagged concerns about the amount and reliability of student funding. Further, the panel encouraged the School to expand its inter-disciplinary course offerings, and to enhance opportunities for experiential learning and problem-focused education. In addition, the panel suggested that the School make significant changes to the BEnvREM program. Finally, the external review panel recommended greater emphasis on First Nations environmental issues.

5.0 The Six Evaluation Criteria:

With this context and the previous evaluation in mind, we turn now to address the five generic review areas and the supplementary, School-oriented areas provided to us in our Terms of Reference (Appendix 1). For each area, we present salient recommendations and then provide detailed explanatory comments.

A. Generic University Criteria

Q.1 The quality of the Unit's programs

Questions: Is the quality of the unit's programs high? Are there measures in place to evaluate and revise teaching programs?

Recommendations:

- The School should reduce its intake of graduate students to manageable levels.
- The School should review its course load expectations for both the MRM and PhD programs.
- The School should review its curriculum to make room for experiential learning, especially the co-operative experience.
- The School should continue its efforts to secure additional internal (Faculty, University) and external funding support for its graduate students.
- The School's acceptance/intake letter for graduate students should indicate very clearly expectations of the School, supervisor and student, with a particular focus on funding.
- The School should arrange a review meeting with each graduate student at the end of their first year.
- The MRM research should be designed for completion in only one field research season (i.e. between Year 1 and 2) to allow the report to be completed by the end of the second year.
- The School should consider changing the three-theme comprehensive examination knowledge requirement to reflect candidates' research interests instead of the current model's prescribed and fairly rigid knowledge expectations.
- The comprehensive examination should be designed and scheduled for completion within 16-18 months maximum.
- A successful defense of the comprehensive examination should be followed by development, review and approval of a research program by the candidate's committee; no examination should be required at this stage.

Comments:

The School's two MRM programs are well regarded and can be considered of high quality. The MRM degree was first launched in 1979, and it has consistently been oversubscribed since then; every year, the number of applicants far exceeds the spaces available. This presents both an opportunity and challenge to the School. Increased numbers of graduate students can support faculty research programs.

However, this can also increase the supervisory load experienced by faculty who supervise 7 graduate students on average. This is a heavy supervisory obligation that can affect faculty availability for course delivery, especially in the undergraduate program. We note that this number could be reduced with faster completion times for MSc students, creating less overlap between cohorts.

We note that REM faculty are expected, in theory, to deliver 4 one-semester courses annually, although most loads seem smaller. In this context of competing demands and resource constraints, the School should reduce its annual intake of graduate students to manageable levels. Our understanding of the University's budget system suggests that such a move would not cause financial problems for the School.

The degree requirements are considered comprehensive and responsive to the School's interpretation of environmental challenges, and employer expectations. However, the School should review its course load expectations for both the MRM and PhD programs. There is little evidence that the current course number and variety is necessary to prepare graduates effectively and efficiently. It could be argued that fewer core courses could be just as effective in terms of learning opportunities and career preparation, and alleviate challenges presented by resource constraints. This issue should be addressed as part of the recommended strategic planning exercise. The results of the University's and the Faculty's graduate student course evaluation process, and related annual surveys, should be considered important sources of information for this curriculum review process.

The University promotes experiential learning in graduate education; course credit is available for co-operative learning experiences. Since the MRM and MRM (Planning) are considered professional-type degrees, it makes sense to incorporate experiential learning at every opportunity. The School should review its curriculum to make room for experiential learning, especially the co-operative experience. This would enhance the marketability of students by providing experience with real-world environmental issues and responses. A paid co-operative work experience can also be an important source of revenue for graduate students.

It is important that the School's acceptance and intake letter be clear about expectations from the School, the supervisor and the student. We note, particularly, the need for the letter to articulate funding responsibilities and commitments from each of these parties. Gaps in funding need to be addressed directly and clearly, to ensure that students are fully aware of uncertainties before they arrive, so they can make informed decisions.

We suggest that the School set up a standard practice of a meeting with every graduate student at the end of the first year. This should include the student, the supervisor(s), and the Chair of the Graduate Committee, and should incorporate an *in camera* component with the student and the Chair of the Graduate Committee, where the student can raise professional and personal concerns. This *in camera* session should include explicit queries about issues relating to diversity and equity.

Completion times remain a challenge for the MRM program. This is a long-standing issue that the School has worked to address by reducing the number of core/required courses. However, there are opportunities for further reductions in the core. A related issue concerns the complexity and scope of major research report exercises.

The research report should be scoped for completion in one field research season, with the report completed and defended within 20-24 months. This will require the cooperation of School faculty whose research programs will need to be designed with this objective in mind. We acknowledge that some MRM students may wish to undertake an extended research program that could extend the completion date. This would remain their choice, but the most students should readily complete within two years. Such a shift in completion times would somewhat reduce supervisory loads, by minimizing overlap between Master's cohorts, thus freeing faculty time for other responsibilities.

As many students have noted, extended completion times can affect the affordability of this education. Teaching assistantships (TAs) can be difficult to secure. Students enter the programs knowing that funding might not be guaranteed; however, funding is clearly an important issue and irritant. The School should continue its efforts to secure additional internal (Faculty, University) and external funding support for its graduate students.

The PhD program presents different challenges. Here, the key issues remain those flagged in the 2010 external review: the nature of the comprehensive examination process, and the time required to complete this important step in doctoral education. Our opinion is that the School needs to revisit the three-theme comprehensive examination knowledge requirement. The PhD is ostensibly an inter-disciplinary degree, with candidates who represent many, diverse backgrounds and research interests. This diversity should be considered positively and respected by the School.

The comprehensive examination process should reflect candidates' research interests instead of the current model's prescribed and fairly rigid knowledge expectations. In addition, the comprehensive examination should be designed and scheduled for completion within 16-18 months maximum. A successful defense of the comprehensive examination should be followed by development, review and approval of a research program by the candidate's committee; no examination would be required at this stage.

Q.2 The quality of faculty research

Questions: Is the quality of faculty research high? Faculty collaboration and interaction provide a stimulating academic environment.

Recommendation:

- The School should explore new opportunities for research collaboration, particularly within SFU.

Comments:

School faculty members are highly productive and are well-respected scholars, with reference to traditional academic publication metrics. For example, the per capita publication rates are higher than the University average. The faculty publish in highly regarded peer-reviewed journals, and through texts and book chapters.

Faculty have been able to secure high levels of research funding, with \$1.5-2.5 million received annually by faculty over the 2011-2016 period. Sources include NSERC and SSHRC, as well as CRC funding and industrial sources. For the most part, this funding seems adequate to support many, but not all graduate students whose individual research programs need to align with those of faculty to receive funding support.

There are numerous opportunities for research collaboration within the School, in the Faculty of Environment, across the SFU campus, and with external sources. Our sense is that individual faculty self-organize in this respect with considerable benefit. The School should, however, explore collectively new opportunities for research collaboration as an aspect of its strategic planning exercise. Examples of opportunities include First Nations, tourism, climate and energy.

Q.3 Participation in administration

Questions: Do unit members participate in administration? Some issues to consider include: unit size, adequacy and effectiveness of the administrative complement and facilities. Do faculty take an active role in dissemination of knowledge.

Recommendations:

- The Faculty of Environment should provide sufficient resources to the School so that a new, dedicated staff position could support the BEnvREM program.
- The relationship of staff in the School who are attached to individual faculty members or units should be evaluated and regularized.
- School committee chair appointments should be made on a three-year basis.

Comments:

Administrative loads for most faculty members seem generally very reasonable. Overall, the School seems adequately resourced in terms of staff positions. There is one staff person with general oversight of administrative staff.

One staff person is assigned to support administration program management, and another staff person is responsible for graduate program management. One staff person provides in-house information technology support, while two more staff provide general administrative support to the unit.

We did not get a chance to meet any staff attached to individual faculty members or centres. Their status in the department – and even their employment relationship to SFU - seemed vague. Evaluating and regularizing these relationships is important, as they should be considered among the departmental staff with appropriate representation and support.

In terms of staff needs, we noted that the large BEnvREM program has recently (January 2017) been transferred to the School from the Faculty level. However, sufficient staff resources have not accompanied this shift, thus the School's senior administrative staff person handles this responsibility in addition to her other duties. The Faculty of Environment should provide sufficient resources to the School so that a new staff position within the School could be dedicated in support of the BEnvREM program.

The School has an undergraduate committee and a graduate committee, both comprising faculty members, students and staff. The mandates for these committees seem clear and the committees seem to be working well. We could not, however, discern a clear process for addressing pastoral concerns and encourage the School to be very attentive to student support, in an explicit manner. We also encourage both committees to conduct reviews of the composition of their student bodies with respect to sex, First Nations status, ethnicity and other metrics of diversity, and then to consider means of enhancing participation by and success of under-represented sectors.

At present, committee chairs are appointed for a one-year, renewable term. In our opinion, this short appointment cycle can lead to inconsistent, uneven decision-making over time. In the interests of enhanced stability and constancy, we recommend that committee chair appointments be made on a three-year basis.

Q.4 The workplace environment

Questions: *Is the School workplace environment conducive to achieving REM objectives including: working relationships within the Unit, with other University units, the community, and the Unit's alumni?*

Recommendations:

- The School must enhance its diversity in the professoriate and student body, with particular attention to adding more women to the faculty and generating a more diverse student body.
- The School should discuss its aspirations for postdoctoral training and its support for postdoctoral fellows, and the School should require consideration of postdoctoral support in all future external reviews.
- The School should explore opportunities with other academic units to enhance program reach/market and efficiencies through strategies such as cross-listing courses with other programs or between the School's BEnvREM and MRM programs, through co-supervisions with faculty from other units, and through combined graduate degrees and certificate programs.
- The School should pursue opportunities to enhance relationships with First Nations in British Columbia, with Department of Fisheries and Oceans, and with local and regional governments.
- The School should acknowledge and work to access the advice, resources, research and employment opportunities that program alumni could offer.

Comments:

In our opinion, the School is in a rather enviable position when compared with many other academic institutions and units. All reports and discussions suggested that the culture is collegial in nature. People seem to get along and work together well. Where possible, decisions are made by consensus, which is the preferred manner by which academic organizations should manage themselves. Social scientists collaborate with natural scientists, and opportunities for inter-disciplinarity are explored. We had no strong sense of disciplinary or ideological "camps" in the School although such considerations should certainly be surveyed in the strategic planning exercise.

An awareness of diversity and equity needs to be enhanced at the School, and remedial action taken to effect change. We find it telling that the very long self-study report made available to us for this review had effectively no comments on gender, race or other measures of diversity. We urge the University to make it mandatory for units to explore diversity and equity in all external reviews, and to request all external reviewers to focus explicitly on these issues, perhaps with guidelines on what to consider.

It is vital that the composition of the School reflects and empowers its regional community as well as the University community, not least because diverse contributors create more robust knowledge products. The tally of women faculty is far too low, and must be enhanced through focused effort until numbers approach parity with men.

Similar concerns apply to ethnic minorities and other underrepresented groups of society. We particularly urge that the University be cautious about depending on strategic hiring (i.e. through special programs) to build faculty numbers, since many such routes do not favour women or minority candidates, and may actually lead to greater biases. The School needs to evaluate its student composition at both the undergraduate and, especially, graduate level to ensure that it is attracting a representative array of students. As British Columbia and Canada continue to forge an equitable society, engagement by diverse sectors can only make environmental planning richer and more durable.

We suggest the School hold an explicit discussion of its aspirations for postdoctoral training, making this part of its strategic planning exercise. We noted a dearth of information about postdoctoral scholars in the self-study and found a general lack of knowledge about postdoctoral fellows and their academic pursuits. As well as being important scholars in their own right, postdoctoral fellows can be a wonderful source of collegiality for faculty members and mentorship for students. As with diversity and equity issues, we urge the University to require reporting on postdoctoral training in any unit self-study and to guide all external reviewers to full exploration of this matter in their evaluation.

The School has a long-established tradition and culture of self-sufficiency. This can be considered a strength, or a weakness if opportunities for collaboration with external groups are overlooked. School faculty work with counterparts and colleagues in other academic units and research centres in FENV and SFU, and, of course, with external organizations and academic institutions. There are, however, opportunities and obligations to enhance relationships with First Nations in British Columbia, with DFO, and with local and regional governments.

In terms of program content and curriculum, there are opportunities to enhance program reach/market and efficiencies through strategies such as cross-listing courses with other programs or between the School's BEnvREM and MRM programs, through co-supervisions with faculty from other units, and through combined graduate degrees and certificate programs. We were surprised to hear of some difficulty in cross-listing courses with Biology, for example, and suggest this is where the Dean could help with discussions with other Deans and Heads of unit.

With regard to facilities and services, the School is housed in two adjacent buildings on the main (Burnaby Mountain) campus, TASC (Technology and Science Complex) 1 and 2. These are new buildings, completed and occupied in 2009. The air quality seems good, and there is sufficient natural light. Space has been assigned for all faculty and graduate students. The laboratory spaces seem sufficient in terms of size, space and equipment, and there are meeting spaces for School community events. The separation of the unit into two buildings is not ideal for engagement, but those with whom we met did not articulate this as a substantial concern.

We encourage REM to think about how to use the hallways and common areas to share and disseminate knowledge, while adding colour to their space, perhaps through research posters and other outreach tools that enhance community.

In addition, we suggest that REM should conduct an alumni consultation exercise to determine what elements of their training and support the alumni most value in retrospect, based on subsequent professional experience. The School has graduated 675 people from its MRM and PhD programs since 1979. This is a large alumni base. These alumni could support the School by providing advice on curriculum, through co-op and graduate employment opportunities, and through collaboration on research. Alumni can be very effective ambassadors and advocates for the School; they can also provide external perspectives on School-related issues such as research foci, faculty recruitment, and program and curriculum design. We met by phone with two alumni, who sounded as if they valued SFU training, but we have no broader assessment of alumni satisfaction.

Q.5 Suitability of future plans

Question: *Are future plans for the unit appropriate and manageable?*

Recommendations:

- A new strategic plan should be developed as soon as possible, preferably in 2017.
- The new strategic plan should be prescriptive and implementable, with reference to the current and evolving institutional fiscal environment.

Comments:

The School currently operates with reference to its 2012-2017 strategic plan, the Faculty of Environment's Academic Plan (2013-2018), and related University-level plans. Our sense is that the School's current strategic plan is aspirational in nature, representing something of a list of desired achievements, rather than creating a true roadmap for collective enhancement. That plan, now nearly expired, did not anticipate or plan for some changes that have ensued. However, to be effective, the strategic plan needs to be prescriptive and implementable, even while allowing for unexpected challenges or opportunities.

The School must create a new strategic plan that revisits and addresses fundamental questions such as a vision for the School, its desire for societal linkages and contributions (with particular reference to First Nations), its interpretation of "environment" (from a planning perspective), program structures and expectations, resource needs generally, the importance of diversity, future faculty and staff positions, and ideal student training. All of these issues must be interpreted and decisions made in the context of a new strategic plan. *This strategic planning exercise should take place in 2017, and should resolutely look forward rather than revisiting the past.*

The strategic planning process needs to be guided by a *goal* and *objectives* that are directed at *outcomes*. What does the School want to achieve in terms of its role in society and societal change? This is particularly important given the applied nature of the school, the faculty members' proud reputations as scholar-practitioners, and its graduates' success in entering employment in the field. It is also highly relevant as the School begins training large numbers of undergraduates, whose education must also be directed towards agreed ends.

The School must then determine the course of action and outputs that will allow it to achieve these outcomes. Of particular importance will be the School's relationship with First Nations, which is central to planning in British Columbia and, increasingly, across Canada.

In planning for desired outcomes, the School will want to undertake a *SWOT analysis* that will identify and address the School's comparative strengths and weaknesses in the context of current and emerging external opportunities and threats. Possible scenarios of the future should be constructed. As a constant, the School should assume that something like the University's current financial situation will be the reality for the foreseeable future. In that context, how should the School operate? What might be the implications for programs, curricula and resources? What would need to change? What might be the implications and consequences of any changes – and who decides whether these changes are important or otherwise?

This process should be inclusive, with opinions and perspectives sought from the School community interpreted broadly – i.e. students, staff, alumni, faculty, FENV, employers and other stakeholder groups with perspectives to share about the School. Given the preponderance of white men on the faculty, the School should pay great attention to meaningful consultation with diverse sectors of society, particularly women, First Nations, and Asian-Canadians. *Someone who is external to the School should facilitate the strategic planning process.* That person should be expert in group facilitation and strategic planning for academic units, and also be familiar with the general field of environmental planning to grasp the School's mandate and challenges.

Further, it will be important for the Faculty and the School to *monitor and evaluate the strategic plan* to determine whether and to what extent the plan's goals, objectives, and actions have been realized, and whether they are appropriate as circumstances change. Anticipated outputs, outcomes and impacts will need to be articulated in the strategic plan. Appropriate, meaningful indicators and metrics will need to be developed through a participatory exercise with the School community. The strategic plan should have a 3-5 year time horizon, with annual review and reporting to the School community and Faculty. The School should carry out a comprehensive review of the strategic plan every 5 years to ensure currency and relevance.

In our view, strategic thinking and planning provide the foundation for change to take place. This should be complemented by a *change management strategy* that provides a clear roadmap to the future, clarity about roles and responsibilities, and addresses key issues and opportunities in a timely manner. The reality is that in the *new operating environment at SFU*, the School will have to find different ways in which to carry out research, structure programs and deliver courses.

B) Issues of specific interest to REM

Q.6.1 Viability and success of the BEnvREM program

Questions: *Can we identify feasible strategies to develop the new BEnvREM program? Can we identify feasible strategies to developing the new undergraduate program (BEnvREM) while maintaining our existing, high-quality REM graduate research, teaching, and community engagement activities?*

Recommendations:

- The learning needs of the BEnvREM should be developed in dialogue with external community members, particularly stakeholders and potential employers.
- Course design, expectations and delivery methods should be adapted to meet the learning needs of the BEnvREM program.
- Considerations of diversity and equity should be centrally incorporated, visibly, into undergraduate training and program development.
- The allocation and balance of instructional requirements in the undergraduate and graduate programs needs to be reviewed.
- The implications of new teaching obligations, especially in terms of supervisory load, require attention.

Comments:

As a first step, the School needs to acknowledge that the School is no longer a graduate program-based organization. It is now a conventional academic unit with degree offerings at the undergraduate and graduate (MRM and PhD) levels. Ongoing discussion and debate about this changed landscape is not productive; rather the School and its faculty need to move on. In particular, the School needs to determine the goals and training objectives of the BEnvREM through meaningful consultation with stakeholders and potential employers; a consultation process would be beneficial and valuable for later student employment.

The BEnvREM program seems popular, with approximately 120 majors enrolled. While some faculty expressed concerns that the program could adversely affect graduate supervision and research initiatives, a program of this size would be considered by many units as a success - a "problem they'd love to have."

At a minimum, the program could contribute help address the School's chronic financial deficit. In addition, the program offers faculty the opportunity to interact with and educate a new group of learners, and that can be a satisfying and rewarding prospect. In summary, we consider the BEnvREM to be a wise addition that complements the graduate program offerings in the School.

The School should work to ensure that the BEnvREM program incorporates diverse people and perspectives, explicitly and meaningfully, both for social justice and for program enhancement. The student body needs to become as diverse as possible, with particular attention to recruiting First Nations students, and students from historically underrepresented groups need to be explicitly well-mentored.

Faculty need to consider who is teaching which courses and what overt and subtle messages they might be delivering based on their backgrounds and biases. At the same time, course loads must not become disproportionately high on women and faculty from other underrepresented groups. It is vital that First Nations perspectives be incorporated into the training program in ways that First Nations judge appropriate, through consultation. The student body should be encouraged to explore and promote diversity and equity issues in all aspects of learning and scholarship, keeping these considerations central in the minds of faculty.

In terms of impacts, the BEnvREM curriculum will need to be delivered effectively, efficiently and consistently. Faculty should expect to adapt course design, expectations and delivery methods to meet the learning needs of a new, less experienced group of students. Each faculty member will need to deliver his or her individual share of undergraduate courses.

From all that we have suggested, it is clear that the School will need to re-think the instructional demands for its MRM and PhD courses, and supervisory demands as well. In short, changes will be necessary to make room for the BEnvREM program. Similarly, the needs of the undergraduate program will have to inform future hirings.

Q.6.2 MRM completion times

Questions: *Whether and how to reduce MRM degree completion times? The School is under increasing pressure to reduce MRM completion times to levels comparable with other environmental Master's programs in Canada (i.e. from 2-3 years to 1-2 years). In the past 2 years, we have reduced the number of electives. Further streamlining would require reducing the required courses or reducing the scope and quality of the graduate research projects are options for further streamlining. Neither option is appealing. How might such reductions affect the value of the M.R.M. degree, as well as REM's overall reputation and brand? How can we protect these values while remaining competitive?*

Recommendations:

- A firm program completion target of 20-24 months should be established for the MRM and MRM (Planning) programs.
- The number of MRM core, required courses and electives needs to be reduced.
- The relevance of MRM core courses for the MRM (Planning) program should be examined.
- A future, two-stream MRM degree should be explored: one that is thesis/research-based, and the other course-based.

Comments:

At present, there are approximately 110 MRM or MRM (Planning) students in the School. Completion times have been expressed as a common concern in past program reviews. There are three perspectives on the issue of completion times. For most students, the less time spent in a program, the better when measured in terms of opportunity costs. Similarly, the University's senior administration considers the MRM and MRM (Planning) to be outliers in terms of completion times, taking too long. The majority of SFU's professional-type programs are designed for completion within 20-24 months. However, many REM faculty argue that the brand and quality of the MRM educational experience would be diluted if completion times were brought in line with comparable SFU graduate programs.

Our sense is that some REM faculty perspectives reflect traditional ways of managing the MRM program and an internal perspective that may not be shared by the University or external stakeholder groups. We are not convinced that the MRM program would be undermined or diluted through a reduction in required courses or a reconceptualization of the major report element. Instead, we believe that REM should design and deliver the MRM and MRM (Planning) for completion within 20-24 months. To achieve that objective, the School will have to review its expectations regarding mandatory, core course requirements. We see no evidence that 11 courses in total (7 core, 4 elective) is the appropriate level for Master's-level education.

The MRM (Planning) degree shares a core of required courses with the MRM program. The common core reflects historical understandings of what constitutes a proper education in environmental fundamentals. The benefit of this core is that students can transfer between the MRM and MRM (Planning) programs. However, we are not convinced that all MRM core courses are relevant to the MRM (Planning) program. The MRM (Planning) program should consider alternatives to the standard core courses that have environmental content, yet could reflect a broader definition of environment from a planning perspective. This will be especially important if the School chooses through its strategic planning to interpret the term "environment" to embrace aspects of the built environment.

With regard to the research project (REM699), this is not considered a traditional thesis, yet the workload can seem like a thesis. The objective should be to demonstrate proficiency in research design and execution as represented in a major report, and that can be achieved in 2-3 terms maximum. To achieve desired completion times, supervisors will need to engage early in project planning, supervisory committee meetings need to be held within 4-6 months of the student's arrival, and field projects should be planned to last only one summer.

Q.6.3 PhD design and management

Question: Whether and how to expand and improve the PhD program? Expanding and improving the PhD program was a key goal arising from the last external review. The REM Ph.D. program has grown substantially since then. Assess REM's progress towards this goal, in particular, the course requirements, comprehensive examination process, and interdisciplinary requirements for the REM Ph.D.

Recommendations:

- The PhD program curriculum should be designed to accommodate individual programs of study instead of a pre-determined curriculum.
- The comprehensive examination process should be revised to reflect candidates' research interests, and for completion within 16-18 months from date of entry.
- The intake numbers for PhD candidates should be maintained at 5-7 annually.

Comments:

The School, Faculty and University consider the PhD program a success. The relatively few PhD candidates we met expressed general comfort with the curriculum. The intake numbers are impressive; there are approximately 35 PhD students at various stages in their studies at REM. The average time to degree completion is approximately 5.5-6.0 years. Students seem generally content with the program.

Two issues have been flagged and require attention. The first issue concerns supervisory load. PhD students require supervision for the length of their studies. The more time spent with PhD students, the less time that faculty have for MRM student supervision and delivery of undergraduate courses. The second issue is that the comprehensive examination process can be taxing and onerous.

With regard to *supervisory load*, on average, each tenured REM faculty person supervises 7 MRM and PhD students (compared with the SFU average supervisory load of 4 graduate students per faculty). We note that some changes to the MRM program – e.g. development in future of a course-based stream - could free up supervisory resources that might be applied to other programs. For example, this strategy could make more faculty time available for delivery of the BEnvREM curriculum.

With regard to the *comprehensive examination process*, this issue has been noted in previous program reviews. There are two concerns here. First, the comprehensive exam requires mastery of knowledge in three thematic areas: environmental science, ecological economics, and public policy. These *substantive knowledge areas* were selected some years ago and they are considered to represent essential, foundational knowledge. However, we question the validity and necessity of these knowledge areas.

We interpret the comprehensive exam as an opportunity for candidates to demonstrate their mastery of foundation knowledge as expressed in the extant literature. The exam should be a test of research competence and understanding of the knowledge required for doctoral-level studies *in their area of research interests*. Once that standard has been established, then students could develop a research program and carry on to degree completion. The research program would require a presentation to the supervisory committee; an examination and defense would not be required.

We note that PhD candidates come from a variety of previous academic backgrounds and preparation; this diversity is a strength and asset to the School. Accordingly, the focus should shift from a pre-determined curriculum to the development of individual programs of study. One way to handle this would be to require participation in Ph.D. research seminar or directed studies courses. The candidate's supervisor and advisory committee could recommend supplementary courses as considered necessary, in consultation with the candidate, but these should be kept to low numbers.

A related matter concerns *time to completion* for the comprehensive examination. Currently, the process takes something like 20-24 months to complete. This is too long. The comprehensive exam should be designed for completion in a maximum of 16-18 months; the ideal would be completion by the end of Term 4 in the program. This would allow candidates to proceed with their research program and thereby reduce candidates' opportunity costs, and faculty supervisory load.

Q.6.4 Positioning REM for future environmental challenges

Questions: *What are REM's teaching and research strengths? Assess the portfolio of REM's research and teaching strengths in relation to key emerging trends in resource and environmental management. In particular, identify and assess the hiring trade-offs between supporting existing strengths/needs and possible expansion into new areas of research and teaching.*

Recommendations:

- The School needs to pay particular attention to enhancing its relationship with First Nations concerns, knowledge and learning.
- The School must enhance its diversity in the professoriate and student body.
- New opportunities for inter-disciplinary research and teaching with non-traditional partners and audiences should be explored, with an initial focus on colleagues within SFU.

Comments:

This “positioning” objective should be a focus of the School’s strategic planning exercise, to be undertaken in 2017.

The School needs to confront the challenge (as all academic units do) of balancing broad disciplinary strengths with investment in priority areas where they can become centres of excellence, either within REM or as a part of a larger campus collaborative. To a considerable extent, the answer to this question depends on how the School interprets and defines “environment” and “resource management.” If the School continues with a view that its research and teaching niche is the biophysical or natural environment, then the current curriculum emphasis on ecology, environmental science and natural resources management is certainly appropriate. We note that the majority of research clusters and groups reflect strength and expertise in these and related areas (e.g. Energy and Materials Research Group, Forest Ecology, Environmental Toxicology, etc.). If, however, the School chose to expand its mandate to the built environment, for example, then other considerations about curriculum come to the fore.

*The School needs to ensure that First Nations perspectives on, and concerns about, the environment are central to its research and training endeavours. Such an emphasis should be felt throughout the program with particular attention to meaningful consultation with First Nations communities about the School and its programs, training in indigenous perspectives during the undergraduate and graduate education, a strong determination to attract indigenous students into the programs (with particular attention to funding), an ongoing commitment by faculty to make links to indigenous communities wherever possible, and a visible presence in indigenous affairs by *hosting and contributing to extension events relating to First Nations and environmental planning.**

Our responses to question 4 include an important section on ensuring diversity in the School as a means of building knowledge quality and integrity. The School’s integrity in responding to environmental challenges in the future will depend largely on how well it appreciates those challenges and the array of possible engagement with environment. We here again emphasize that REM must position for future environmental challenges by adding more women and minorities to its professoriate and by ensuring the student body is diverse enough to reflect and support broader society. Diversity is not just a matter of equity, vital though that be. It is also the foundation on which intellectual integrity must be grounded in addressing societal challenges.

The School would benefit from connecting more thoroughly with other SFU units and activities. REM Faculty do not need to have individual expertise, nor have to deliver all the courses or supervise students to address these multiple areas of concern. Instead, the School could implement strategies such as cross-listing courses with other FENV or SFU courses; through co-supervision and advisory committees comprising faculty from other academic units and research centres; and through future faculty hires (or sessional appointments).

Q.6.5 Potential to enhance policy impact

Questions: How might REM create sizeable policy impact? How can REM continue to create sizeable policy impact through its research outputs and other activities? Are there mechanisms that can further amplify our research impact with key audiences in the policy domain, government agencies, and the general public?

Recommendations:

- The University and the School should promote respect for societal change, as scholarly contributions.
- Traditional assessments of research impact should be complemented with measures of outcomes and difference made.
- Regular, ongoing communications and relationship building with internal (i.e. SFU) and external (i.e. other universities, First Nations, special interest groups, DFO and other employers) should be a priority for the School.
- We encourage the School to consider how it might deliver some of its courses through the SFU's downtown Vancouver campus at Harbour Centre, thus allowing a different set of students to enroll, including some professional or part-time students.

Comments:

The School is nicely positioned to influence the development of policy in areas such as the debate about sustainability, high-profile policy concerns such as climate change, water resource management, urban and regional-scale environmental governance, and especially First Nations challenges. In evaluating policy and research impact, the University and School should reach well beyond traditional academic measures such as the H-index and focus on metrics of societal change.

The University and School can create a climate where policy impacts are highly valued, not least by regarding and appraising them as scholarly contributions. In that respect, all faculty should be asked explicitly in their annual reports to explain their contributions to generating outcomes from their work, with particular reference to policy change. In many cases, they will be able to articulate metrics as to the number of hectares under better management or the number or stakeholders affected. Qualitative measures are, however, just as valuable. The School should gather and promote these reports as measures of its societal contributions.

Ideally, a mutual learning relationship with external resources/constituencies should be developed, starting with an engaged strategic plan development process. In this context, the School will need to enhance its communications so that external stakeholders and constituencies are aware of the School's efforts and potential contributions. In turn, enhanced communication with alumni, employers, special interests groups and government agencies could help to shape and direct the School's research and educational efforts.

In this respect, it might be hugely beneficial if some REM courses were delivered at SFU's downtown Vancouver campus in Harbour Centre, where a wider array of students might access them. Participation by professionals and other part-time students could greatly enhance REM's reach and influence, including in policy. Another option might be SFU's campus in Surrey. Such possibilities should be considered in deciding how to meet objectives arising from the strategic planning process.

Q.6.6 Engagement with FENV and SFU units

Questions: How could REM more meaningfully engage with units across the Faculty? For example, what is an appropriate role vis-à-vis programs such as the MSc in Ecological Restoration, offered jointly with BCIT?

Recommendations:

- The School should undertake a review of the viability and purpose of the research centres and groups with which it is associated.
- Partnerships with other post-secondary institutions should be maintained and extended (e.g. MSc in Ecological Restoration)

As noted previously in this report, there is considerable potential and many opportunities for research collaboration within FENV and across campus. There are nine research centres of various descriptions, mandates and levels of productivity in the Faculty. However, the level of distinctiveness, productivity and impacts of some of these centres needs to be evaluated and addressed during the strategic planning exercise. Some research groups seem under-populated while others exist for historical reasons and might not be viable. We believe that the School would be well served by an analytical review, in the interests of achieving a critical mass of productive scholars, and avoiding dilution of scholarship and resources. Difficult decisions may be necessary about future prospects for some of these research centres. The Dean of FENV should expect to play a role here, in dialogue with the School.

With respect to collaborations through joint degree programs, this is an excellent idea in theory and it should be supported with enthusiasm. Students in REM should have the opportunity to learn skills and knowledge that otherwise might not be available in the School's curriculum. There are many ways in which extended or complementary skills and knowledge could be acquired – for example, though short or block courses, on-line courses, graduate diplomas, and/or joint degrees.

The MSc in Restoration is a very good example of these arrangements; others could include studies in public administration, environmental sciences, and so forth. Such joint degree programs would be manageable if the School's program course load requirements were relaxed to make room for new or additional courses.

Acknowledgements

The panel wishes to thank the University, the Faculty and the School for its hospitality and excellent organization of our site visit. We also wish to acknowledge and thank the University's appointee to the panel, Dr. Rolf Mathewes, for his insights and advice.

Submitted by Mark Seasons (Chair) on behalf of the external review panel, which included Dr. Michael Jones and Dr. Amanda Vincent.

April 13, 2017

Appendix 1 - External Review Process Criteria

The University has established these 5 core evaluation criteria:

1. The quality of the Unit's programs (graduate and undergraduate) is high and there are measures in place to ensure the evaluation and revision of the teaching programs. Some issues to consider include: degree requirements, structure, breadth, orientation and integration of the programs including the cooperative education program and the course offering schedule of the graduate programs; enrolment management issues, student progress and completion, and support for graduate students; educational goals that are clearly aligned with the curriculum and are assessable.
2. The quality of faculty research is high, and faculty collaboration and interaction provide a stimulating academic environment.
3. Unit members participate in the administration of the Unit. Some issues to consider include Unit size, adequacy and effectiveness of the administrative complement and facilities.
4. The Unit's workplace environment is conducive to the attainment of their objectives, including working relationships within the Unit, with other University units, the community and the Unit's alumni.
5. Future plans of the Unit are appropriate and manageable.

In addition, the University, Faculty and School have expressed an interest in the panel's opinion about these issues:

- 6.1. Identify feasible strategies to developing the new undergraduate program (BEnvREM) while maintaining our existing, high-quality REM graduate research, teaching, and community engagement activities.
- 6.2. REM is under increasing pressure to reduce M.R.M. completion times to levels comparable with other environmental Master's programs in Canada (i.e. from 2-3 years to 1-2 years). In the past 2 years, we have reduced the number of electives. Further streamlining would require reducing the required courses or reducing the scope and quality of the graduate research projects are options for further streamlining. Neither is appealing. How might such reductions affect the value of the M.R.M. degree, as well as REM's overall reputation and brand? How can we protect these values while remaining competitive?

6.3. Expanding and improving the PhD program was a key goal arising from the last external review. The REM Ph.D. program has grown substantially since then. Assess REM's progress towards this goal, in particular, the course requirements, comprehensive examination process, and interdisciplinary requirements for the REM Ph.D.

6.4. Assess the portfolio of REM's research and teaching strengths in relation to key emerging trends in resource and environmental management. In particular, identify and assess the hiring trade-offs between supporting existing strengths/needs and possible expansion into new areas of research and teaching.

6.5. How can REM continue to create sizeable policy impact through its research outputs and other activities? Are there mechanisms that can further amplify our research impact with key audiences in the policy domain, government agencies, and the general public?

6.6. How can REM more meaningfully engage with units across the Faculty? For example, what is an appropriate role vis-à-vis programs such as the MSc in Ecological Restoration, offered jointly with BCIT?

Appendix 2 – Site Visit Schedule

Simon Fraser University School of Resource and Environmental Management Itinerary for External Review Site Visit March 1 - 2, 2017

Reviewers:	Dr. Mark Seasons, University of Waterloo (Chair, External Review Committee) Dr. Amanda Vincent, The University of British Columbia Dr. Michael L. Jones, Michigan State University Dr. Rolf Mathewes, Simon Fraser University
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Wednesday, March 1, 2017

7:15	8:00	Car Service from Delta Vancouver Suites to SFU Burnaby Campus – Drop off at Strand Hall Parking Lot	
8:00	8:45	Opening meeting with Senior Administrators: Dr. Gordon Myers, Associate VP Academic (Chair) Dr. Glynn Nicholls, Director, Academic Planning Dr. Norbert Hauerland, Associate VP Research Dr. Wade Parkhouse, Dean, Graduate Studies Dr. Ingrid Leman Stefanovic, Dean, FENV	Strand Hall, PCR Room 3187 Continental breakfast served
8:45	9:00	Walk to Department – Sean Cox	
9:00	9:45	Tour of the School and meeting with Sean Cox, Director, REM	TASC 1, Room 8219
9:45	10:15	Norbert Hauerland, Associate VP, Research	TASC 1, Room 8219
10:15	10:30	Break; Refreshments served	TASC 1, Room 8219
10:30	11:00	Meeting with REM Faculty (Evelyn Pinkerton, Mark Roseland, Pascal Haegeli, Jonn Axsen)	TASC 1, Room 8219
11:00	11:30	Meeting with REM Faculty (Cliff Atleo, Mark Jaccard, John Welch, Sean Cox, Murray Rutherford)	TASC 1, Room 8219
11:30	12:15	MRM Planning Committee (Tom Gunton, Mark Roseland, Murray Rutherford, Sean Markey)	TASC 1, Room 8219
12:15	1:30	Reception with Faculty, Staff, and Students	REM Lobby
1:30	2:00	Meeting with REM Faculty (Ken Lertzman, Duncan Knowler, Jonathan Moore, Zafar Adeel)	TASC 1, Room 8219
2:00	2:30	Meeting with REM Faculty (Karen Kohfeld, Alison Gill, Evelyn Pinkerton)	TASC 1, Room 8219
2:30	3:00	Phone meeting with Employers and Alumni	TASC 1, Room 8219
3:15	3:30	External Review Committee – Discussion Time	TASC 1, Room 8219
3:30	4:30	Ingrid Leman Stefanovic, Dean, Faculty of Environment	TASC 1, Room 8219

Thursday, March 2, 2017

8:15	9:00	Car Service from Delta Vancouver Suites to SFU Burnaby Campus – Drop off by REM	
9:00	9:30	Wade Parkhouse, Dean, Graduate Studies	TASC 1, Room 8219
9:30	10:10	Meeting with the REM Undergraduate Studies Committee	TASC 1, Room 8219
10:10	10:30	Meeting with Post-doctoral Fellow (Paul Weidman)	TASC, Room 8219
10:30	11:15	Meeting with the REM Graduate Studies Committee (Iris Schischmanow, Murray Rutherford, John Welch, Mark Roseland)	TASC 1, Room 8219
11:15	11:45	Meeting with REM M.R.M. and Ph.D. Students	TASC 1, Room 8219
11:45	12:15	Meeting with Department of Fisheries and Oceans research group (Mike Bradford, David Patterson)	TASC 1, Room 8219
12:15	1:00	Lunch – ER Committee and Sean Cox	Club Ilia
1:00	1:30	Meeting with REM Staff (Elissa Cyr, Iris Schischmanow, May Fan, Laurence Lee, Sue Zillwood)	TASC 1, Room 8219
1:30	2:00	Centre for Sustainable Development (Mark Roseland and Sean Markey)	TASC 1, Room 8219
2:00	2:30	Centre for Tourism (Pascal Haegeli and Alison Gill)	TASC 1, Room 8219
2:30	2:45	Meeting with Year 1 MRM students	TASC 1, Room 8219
2:45	3:15	Closing Meeting with Sean Cox	TASC 1, Room 8219
3:15	3:30	Walk to Strand Hall, PCR	
3:30	4:00	External Review Committee – Discussion Time	Strand Hall, PCR Room 3187
4:00	5:00	<u>Closing meeting with Senior Administrators:</u> Dr. Gordon Myers, Associate VP Academic (Chair) Dr. Peter Keller, VP Academic Dr. Glynn Nicholls, Director, Academic Planning Dr. Wade Parkhouse, Dean, Graduate Studies Dr. Ingrid Leman Stefanovic	Strand Hall, Room 1003
5:00		Return to Hotel by Car Service – Pick up at Strand Hall Parking Lot	

Appendix 3 - Reference Materials

Self-Study Report (REM)

Draft Itinerary for the Site Visit

Terms of Reference for the External Review

Data on SFU Research Grants and Contracts to Academic Departments

Faculty of Arts and Social Sciences Five-Year Academic Plan (2013 - 2018)

Faculty CVs

FENV Academic Plan (2013-2018)

SFU Senate Guidelines

SFU Strategic Vision

SFU Five-Year Academic Plan

Strategic Research Plan (2016 - 2020)

Institutional Accountability Plan & Report (2015 - 2016 Reporting Cycle)

Senior Administrative Structure Chart

Senior Academic Administrative Structure Chart

Section 1 – To be completed by the Responsible Unit Person e.g. Chair or Director

<p>Unit under review School of Resource and Environmental Management</p>	<p>Date of Review Site visit 1-2 March 2017</p>	<p>Responsible Unit person Sean Cox</p>	<p>Faculty Dean Ingrid Stefanovic</p>
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Notes

1. *It is **not** expected that every recommendation made by the Review Team be covered by this Action Plan. The major thrusts of the Report should be identified and some consolidation of the recommendations may be possible while other recommendations of lesser importance may be excluded.*
2. *Attach the required plan to assess the success of the **Educational Goals** as a separate document (Senate 2013).*
3. *Should any additional response be warranted, it should be attached as a separate document.*

1. PROGRAMMING

1.1 Action/s (description what is going to be done)

1.1.1 Undergraduate

ER Q.6.1

- ER: The learning needs of the BEnv REM should be developed in dialogue with external community members, particularly stakeholders and potential employers. **[REM Note: FENV undertook considerable dialogue with stakeholders and employers in developing the initial BEnv ERM degree in 2013]**
- ER: Course design, expectations and delivery methods should be adapted to meet the learning needs of the BEnvREM program.
- ER: Considerations of diversity and equity should be centrally incorporated, visibly, into undergraduate training and program development.
- ER: The allocation and balance of instructional requirements in the undergraduate and graduate programs needs to be reviewed.
- ER: The implications of new teaching obligations, especially in terms of supervisory load, require attention.
- **Action: REM recognizes the critical importance of developing a successful undergraduate program. The REM Undergraduate Curriculum Committee will review and propose changes to the BEnv REM degree requirements to address most of the ER recommendations. REM is also in the process of hiring a new full time Lecturer to provide consistent delivery of several key undergraduate courses.**

1.2 Action/s (description what is going to be done)

1.2.1 Graduate

ER Q.6.2

- ER: A firm program completion target of 20-24 months should be established for the MRM and MRM (Planning) programs.
- ER: The number of MRM core, required courses and electives needs to be reduced.
- ER: The relevance of MRM core courses for the MRM (Planning) program should be examined.
- ER: A future, two-stream MRM degree should be explored: one that is thesis/research-based, and the other course-based.
- **Action: REM will overhaul the MRM program with the goals to (1) reduce overall graduate supervision loads by REM faculty, especially of course-based Master's students; (2) create conditions for improving faculty and graduate student research productivity, and (3) improve overall graduate student experiences, including reducing completion times in the MRM. As recommended by the ER, the REM Graduate Studies Committee is already working to create separate course-based (20 months) and thesis-based (30 months) MRM streams. Initial revisions to the MRM programs will be targeted to incoming students for the Fall of 2018, with additional revisions expected after our strategic planning process is complete (see below). Course requirements under MRM course-based and thesis-based programs will be designed to optimize graduate student learning opportunities with the 20 or 30 month completion time frames, respectively.**

ER Q.6.3

- ER: The PhD program curriculum should be designed to accommodate individual programs of study instead of a pre-determined curriculum.
- ER: The comprehensive examination process should be revised to reflect candidates' research interests, and for completion within 16-18 months from date of entry.
- ER: The intake numbers for PhD candidates should be maintained at 5-7 annually.
- ER: Reducing comprehensive breath exam completion times, as well as PhD program demands on PhD students.
- **Action: REM is currently overhauling the REM PhD program with the goal of improving faculty and PhD student research capacity and productivity. This goal will be achieved by modifying PhD program requirements to (1) reduce the time required to complete the breadth requirements from the current 22 month average to 4 months and (2) reduce pre-determined interdisciplinary requirements in the PhD thesis to allow individualized PhD research that better suits faculty and student interests. Specifically, we will (i) substitute the current PhD breadth comprehensive exam process with a simpler requirement that students complete (with good results) a small set of courses by the end of the first semester (second semester in exceptional circumstances) and (ii) revise the proposal defense requirement to be completed by the 4th semester. Other changes will include simplifying the interdisciplinary and committee membership requirements to**

improve research flexibility and reduce overall supervisory loads for REM faculty.

1.3 Resource implications (if any)

The BEnv REM program will require new staff (Undergraduate Advisor), as well as new faculty resources. In the short-term, increasing REM undergraduate courses and teaching will require at least 1 new faculty member capable of teaching environmental law.

1.4 Expected completion date/s

BEnv program changes – Fall 2018

PhD program changes – Fall 2017

MRM program changes – Fall 2018

2. RESEARCH

2.1 Action/s (what is going to be done)

ER Q.2

- ER: The School should explore new opportunities for research collaboration, particularly within SFU
- ER: Note: another specific Research recommendation seems to be on pg3, which states: "The School should explore its aspirations for postdoctoral training and its support for postdoctoral fellows..."
- **Action: REM faculty have a long history of collaboration within SFU and providing opportunities for postdoctoral research and training, which will continue as opportunities and funding arise; however, losses of research faculty over the past several years to retirement (e.g., a CRC Tier I Chair), accidental death, resignation, and health-related work reductions limit our capacity to seek out and support postdoctoral researchers, especially considering the high overhead expenses for postdoctoral researchers.**

2.2 Resource implications (if any)

Increasing postdoctoral training requires replenishing our REM faculty complement.

2.3 Expected completion date/s

There is no specific timeline for increasing postdoctoral presence in REM because it is mostly dependent on individual faculty research needs, capacity, and funding, as well as new faculty hiring. Nevertheless, REM will seek ways to incorporate and improve postdoctoral training in our strategic planning process (see below).

3. ADMINISTRATION

3.1 Action/s (what is going to be done)

ER Q.5

- ER: A new strategic plan should be developed as soon as possible, preferably in 2017.
- ER: The new strategic plan should be prescriptive and implementable, with reference to the current and evolving institutional fiscal environment.
- **Action: REM will develop a strategic planning process beginning in September 2017 with expected completion by the REM Faculty Retreat in Spring 2018. Faculty succession and renewal, gender diversity, and fiscally realistic teaching obligations will be key topics within this process.**

3.2 Resource implications (if any)

The strategic planning process will involve the cost of a facilitator (as recommended by ER) to develop and host a strategic planning workshop and costs for venues, catering, etc. for strategic planning workshops (one Fall 2017 and one Spring 2018).

3.3 Expected completion date/s

Spring 2018 or Spring 2019

4. WORKING ENVIRONMENT

4.1 Action/s (what is going to be done)

ER Q.4

- ER: Enhance diversity in the professoriate and the student body, in particular, adding more women to the faculty and generating a more diverse student body.
- ER: School to explore opportunities with other academic units to enhance program reach/market and efficiencies.
- **Action: Most of these recommendations are already in progress or slated for for future discussion in our strategic plan.**

4.2 Resource implications (if any)

4.3 Expected completion date/s

On-going.

5. OTHER

5.1 Action/s

ER: The ER did not comment on Educational Goals. Educational goals are being revised to align with the proposed changes to all REM degree programs. See Educational Goals Assessment Plans in Appendix A.

5.2 Resource implications (if any)

5.3 Expected completion date/s

Ongoing.

The above action plan has been considered by the Unit under review and has been discussed and agreed to by the Dean.

Unit Leader (signed)	Date September 5, 2017
Name  Title... Director, REM	

Section 2 - Dean's comments and endorsement of the Action Plan

We are pleased to have seen the overall positive report from the external review committee, and are equally pleased to see REM's responses and anticipated actions.

A few points to clarify from the perspective of the Dean's office:

- Page 2 – item 1.2: At the present time, both student advising as well as administrative support for the BEnv in resource and environmental management continues to be provided by the staff within the Dean's office, where the program originated. As enrolment numbers for the program increase, we will work with REM to shift staffing responsibilities, as appropriate.
- Page 4 – item 2.1: As a point of clarification, the document and the external report make it appear as if no postdoctoral researchers are in place, but that is not the case. While we all welcome postdoctoral appointments, REM correctly points out that there needs to be a clear justification for such positions as we move forward.
- Page 5 – item 3.2: Costs for the strategic planning process will be the responsibility of REM. The Dean's office acknowledges that funds are available in REM for such a purpose.

REM has a longstanding reputation of excellence across Canada for its graduate programs. The School's Director, faculty, staff and students are to be commended for their efforts to expand programming into the undergraduate arena. We look forward to further expansion of activities as the School continues to grow.

Faculty Dean


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Date

Sept 7, 2017
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Appendix A. Educational Goals Assessment Plan

Table A1: REM Major Program: Educational Goals, Components and Assessment Sources

Program EGs (at the end of this program, students will be able to ...)	Components (students demonstrate familiarity with ...)	Assessment Data Sources – Direct* (students must attain sufficient grades in ...)	Assessment Data Sources - Indirect	Years/Semesters of data collection
Analyze resource management challenges from historical, biophysical and socio-cultural perspectives, including differences among and implications of indigenous and First Nations perspectives.	<ul style="list-style-type: none"> • Historical aspects of REM • Biophysical elements of REM • Social & cultural perspectives of REM (general) • First Nations perspectives (specific) 	<p><i>Lower division courses:</i> ARCH 201 GEOG 111 BISC 101/102 FNST 101/212 GEOG 221/241</p> <p><i>Upper division courses:</i> GEOG 377 GEOG 315/317/319 FNST 332/433</p>	Student surveys Course evaluations Capstone course Program advisors Focus group sessions (as needed)	Fall 2019 Spring 2019
Analyze resource use and sustainability in terms of biophysical and socio-cultural processes and their interactions.	<ul style="list-style-type: none"> • Biophysical aspects of sustainability • Social and cultural aspects of sustainability • Interdisciplinary approaches in sustainability 	<p><i>Lower division courses:</i> EVSC 100 GEOG 215 REM 100/200 REM 201/204</p> <p><i>Upper division courses:</i> REM 311/321</p>	Student surveys Course evaluations Capstone course Program advisors Focus group sessions (as needed)	Fall 2019 Spring 2019
Apply geospatial, statistical and systems modeling to inform management and conservation of biophysical and socio-cultural	<ul style="list-style-type: none"> • Spatial analysis applications • Statistical methods and applications • Systems modeling training 	<p><i>Lower division courses:</i> GEOG 253/255 STAT 101/201/203/270 ENV 221</p> <p><i>Upper division courses:</i> GEOG 352/353/355/356</p>	Student surveys Course evaluations Capstone course Program advisors Focus group sessions (as needed)	Fall 2019 Spring 2019

resources.		REM 412		
Integrate biophysical and socio-cultural information to identify trade-offs and uncertainties in REM decision-making.	<ul style="list-style-type: none"> • Interdisciplinary methods and approaches to REM • Risk analysis training • Tradeoff analysis methods 	<p><i>Lower division courses:</i></p> <p><i>Upper division courses:</i> ENV 320W GEOG 389W REM 445</p>	Student surveys Course evaluations Capstone course Program advisors Focus group sessions (as needed)	Fall 2019 Spring 2019
Apply principles of effective communication and conflict resolution to multi-stakeholder negotiations.	<ul style="list-style-type: none"> • Communication training for REM • Stakeholder analysis • Conflict resolution methods and applications 	<p><i>Lower division courses:</i> ENV 222(no longer offered)</p> <p><i>Upper division courses:</i> CMNS 342/347/349/447 DIAL 390W/460</p>	Student surveys Course evaluations Capstone course Program advisors Focus group sessions (as needed)	Fall 2019 Spring 2019
Critique and analyze common REM documents, using REM principles.	<ul style="list-style-type: none"> • Documentation in resource and environmental management • Key management principles in REM • Critical thinking skills 	<p><i>Lower division courses:</i> REM 200</p> <p><i>Upper division courses:</i> GEOG 445 ENV 319 REM 356</p>	Student surveys Course evaluations Capstone course Program advisors Focus group sessions (as needed)	Fall 2019 Spring 2019
Evaluate legislation, policy and regulatory frameworks related to resource conservation, management and use.	<ul style="list-style-type: none"> • Policy analysis for REM • Elements of environmental law • Regulatory theory and approaches in REM 	<p><i>Lower division courses:</i> POL 253</p> <p><i>Upper division courses:</i> FNST 401 ENV 319 GEOG 445 REM 356</p>	Student surveys Course evaluations Capstone course Program advisors Focus group sessions (as needed)	Fall 2019 Spring 2019

Demonstrate subject area knowledge of at least one resource management sector.	<ul style="list-style-type: none"> Exposure to various sectors in REM 	<p><i>Lower division courses:</i> ARCH 286</p> <p><i>Upper division courses:</i> ARCH 386 FNST 353W GEOG 327/385 REM 370/471</p>	<p>Student surveys Course evaluations Capstone course Program advisors Focus group sessions (as needed)</p>	<p>Fall 2019 Spring 2019</p>
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Table A2: REM Minor Program: Education Goals, Components and Assessment Sources

Program EGs (at the end of this program, students will be able to ...)	Components (students demonstrate familiarity with ...)	Assessment Data Sources – Direct* (students must attain sufficient grades in ...)	Assessment Data Sources - Indirect	Years/Semesters of data collection
Familiarity with major Canadian and global environmental issues, their causes, and consequences.	<ul style="list-style-type: none"> Canadian environmental issues Global environmental issues Causes versus consequences of environmental problems 	<p><i>Lower division courses:</i> REM 100 REM 200</p> <p><i>Upper division courses:</i> REM 350 EASC 405 GEOG 315/322/415 HSCI 304</p>	<p>Student surveys Course evaluations Capstone course Program advisors Focus group sessions (as needed)</p>	<p>Fall 2019 Spring 2019</p>
Ability to identify and describe the inter-relationships among ecological, economic, institutional, cultural, and policy aspects of environmental issues.	<ul style="list-style-type: none"> Ecological and economic aspects of environmental issues Institutional & cultural aspects of environmental issues Policy & inter-disciplinary aspects of environmental issues 	<p><i>Lower division courses:</i> REM 100 REM 200 EVSC 100 GEOG 111</p> <p><i>Upper division courses:</i> ENV 319/320W BISC 309/413/419 REM 311/321/356</p>	<p>Student surveys Course evaluations Capstone course Program advisors Focus group sessions (as needed)</p>	<p>Fall 2019 Spring 2019</p>

Familiarity with quantitative and qualitative tools used in decision-making and ability to apply basic tools to real—world natural resource management problems.	<ul style="list-style-type: none"> Quantitative tools, e.g. statistics, modeling Qualitative applications in environment Case studies of environmental problems 	<p><i>Lower division courses:</i></p> <p><i>Upper division courses:</i> REM 370/375 REM 412/445</p>	<p>Student surveys</p> <p>Course evaluations</p> <p>Capstone course</p> <p>Program advisors</p> <p>Focus group sessions (as needed)</p>	<p>Fall 2019</p> <p>Spring 2019</p>
Ability to describe how natural resource managers integrate natural and social systems concepts into management applications.	<ul style="list-style-type: none"> Integrated analysis Key natural science concepts in environmental management Key social science concepts in environmental management 	<p><i>Lower division courses:</i> EVSC 100 REM 200</p> <p><i>Upper division courses:</i> ARCH 386 GEOG 428 RENV319/320W REM 471</p>	<p>Student surveys</p> <p>Course evaluations</p> <p>Capstone course</p> <p>Program advisors</p> <p>Focus group sessions (as needed)</p>	<p>Fall 2019</p> <p>Spring 2019</p>
Ability to collaborate and communicate in interdisciplinary problem-solving.	<ul style="list-style-type: none"> Collaborative planning and conflict resolution Effective communication for REM Role of stakeholder analysis in REM 	<p><i>Lower division courses:</i></p> <p><i>Upper division courses:</i> REM 301/401/403 ENSC 412 FNST 403</p>	<p>Student surveys</p> <p>Course evaluations</p> <p>Capstone course</p> <p>Program advisors</p> <p>Focus group sessions (as needed)</p>	<p>Fall 2019</p> <p>Spring 2019</p>

Table A3: REM MRM Program: Educational Goals, Components and Assessment Sources

Program EGs (at the end of this program, students will be able to ...)	Components (students demonstrate familiarity with ...)	Assessment Data Sources – Direct* (students must attain sufficient grades in ...)	Assessment Data Sources - Indirect	Years/Semesters of data collection
Knowledge & Understanding				
Knowledge and understanding of prominent concepts, theories and	<ul style="list-style-type: none"> Social science of natural resource management Population and community 	<p><i>Required courses:</i> REM 601, 611, 621, 631, 642/644, 801</p>	<p>Student surveys</p> <p>Course evaluations</p> <p>REM 699 Written</p>	<p>Spring 2020</p>

<p>methods in the core academic fields relevant to resource and environmental management (<i>interdisciplinary breadth knowledge</i>).</p>	<p>ecology</p> <ul style="list-style-type: none"> • Ecological economics • Earth systems and global change • Public policy and sustainable planning 		<p>Project REM 699 Oral defense</p>	
<p>Deep understanding in the specialized field of study selected for the student's project, including the relationship of this field to other relevant disciplines (<i>disciplinary depth knowledge</i>).</p>	<ul style="list-style-type: none"> • Knowledge in the student's selected field (e.g., fisheries, toxicology and contaminants, forestry, energy and materials management, environment and development, conservation policy, transportation policy, marine ecology, environmental impact assessment) • Ability to develop research ideas and a well-designed proposal with appropriate scope for a REM Masters' project 	<p>In addition to the required courses, the MRM degree requires at least four electives in specialized fields. REM 801 (required) REM 699 (research project)</p>	<p>Student surveys Course evaluations REM 699 Written Project REM 699 Oral defense</p>	<p>Spring 2020</p>
<p>Knowledge and appreciation of the perspectives and values of individuals and groups involved in resource and environmental management.</p>	<ul style="list-style-type: none"> • Knowledge and appreciation of the perspectives of Indigenous/Aboriginal peoples • Knowledge and appreciation of the perspectives of stakeholders and other interests • Knowledge about how to seek out diverse perspectives to inform research and practice 	<p><i>Required courses:</i> REM 601, 642/644, 698, 801</p> <p><i>Electives:</i> REM 641, 643, 660-663, 670</p>	<p>Student surveys Course evaluations REM 699 Written Project REM 699 Oral defense</p>	<p>Spring 2020</p>

Performance & Practice				
The ability to select and apply appropriate methodologies for inquiry and analysis (the collection, management, evaluation and interpretation of data) within a particular research field.	<ul style="list-style-type: none"> • Required skills: • Ability to select and apply fundamental statistical tools, techniques, and software appropriate to a particular research problem • Elective skills: • Risk assessment • Simulation modeling • Quantitative surveys • Qualitative methods • Policy analysis 	<p><i>Required courses:</i> REM 601, 611, 621, 631, 642/644, 801</p> <p><i>Electives:</i> REM 610, 612, 613, 614, 625, 650, 655, 656, 660-663, 670, 671 REM 699 (research project)</p>	REM 699 Written Project REM 699 Oral defense	Spring 2020
The ability to integrate and apply knowledge, theory and methods from multiple disciplines to analyze and address problems in resource and environmental management.	<ul style="list-style-type: none"> • Understanding of conceptual frameworks for interdisciplinary research and analysis • Ability to draw on multiple disciplines to analyze and address problems 	<p><i>Required courses:</i> REM 601, 642/644, 801</p> <p><i>Electives:</i> REM 602, 646, 650, 651, 655, 660-663, 658, 670 REM 699 (research project)</p>	Student surveys Course evaluations REM 699 Written Project REM 699 Oral defense	Spring 2020
The ability to apply effective decision-making methods (collective and individual) under conditions of uncertainty and risk	<ul style="list-style-type: none"> • Effective methods for individual decision making • Effective methods for collective decision making 	<p><i>Required courses:</i> REM 601, 621, 642/644, 801</p> <p><i>Electives:</i> REM 612, 613, 614, 625, 643, 646, 650, 651, 655, 656, 658, 660-663, 670 REM 699 (research project)</p>	Student surveys Course evaluations REM 699 Written Project REM 699 Oral defense	Spring 2020

<p>The ability to communicate effectively orally and in writing in a variety of contexts to diverse audiences, including interdisciplinary and multi-stakeholder groups</p>	<ul style="list-style-type: none"> • Effective oral communication skills • Effective written communication skills 	<p><i>Required courses:</i> REM 601, 611, 621, 631, 642/644, 801</p> <p><i>Electives:</i> Oral presentations and written reports are required in all REM electives REM 699 (research project)</p>	<p>REM 699 Written Project REM 699 Oral defense</p>	<p>Spring 2020</p>
<p>Knowledge and skills in respectful and reciprocal engagement and collaboration with Indigenous/Aboriginal peoples, stakeholders and other interests</p>	<ul style="list-style-type: none"> • Skills to respectfully engage with Indigenous/Aboriginal peoples and those with differing perspectives and interests • Understand how to foster cooperation, teamwork and creative problem solving among multi-party groups • Skills in negotiation and dispute resolution 	<p><i>Required courses:</i> REM 601, 642/644, 801</p> <p><i>Electives:</i> REM 643, 660-663, 670</p>		<p>Spring 2020</p>
<p>Leadership skills</p>	<ul style="list-style-type: none"> • The ability to participate effectively in, and lead, multi-disciplinary research teams and other groups 	<p><i>Required courses:</i> REM 601, 642/644, 801</p> <p><i>Electives:</i> REM 643, 655, 646, 660-663, 670</p>		<p>Spring 2020</p>

Ethical awareness and conduct	<ul style="list-style-type: none"> • The ability to describe and contrast ethical perspectives related to resource and environmental management • A critical ethical dimension to the student's own academic and professional practice 	<p><i>Required courses:</i> REM 601, 631, 642/644, 801</p> <p><i>Electives:</i> REM 643, 660-663, 670 REM 801 (required) REM 699 (research project)</p>		Spring 2020
Cognitive Skills	•			
Creativity and innovation	<ul style="list-style-type: none"> • Creativity and innovation in analyzing problems and designing research and other strategies to address these problems 	<p><i>Required courses:</i> REM 601, 801, 642/644 REM 699 (research project)</p>	REM 699 Written Project REM 699 Oral defense	Spring 2020
Critical thinking skills	<ul style="list-style-type: none"> • The ability to critically evaluate various conceptions of the goals of resource and environmental management (e.g., multiple-use, sustainable development, resilience) • The ability to critically evaluate theories, research methods, models and approaches in resource and environmental management (e.g., in reports and journal articles) • An understanding of how theoretical and methodological approaches, framing and other biases affect the ways in which problems are formulated and evidence is interpreted 	<p><i>Required courses:</i> REM 601, 611, 621, 642/644, 801</p> <p><i>Electives:</i> All REM electives include these critical thinking skills</p>	REM 699 Written Project REM 699 Oral defense	Spring 2020

Self reflection and learning	<ul style="list-style-type: none"> The ability to be self-critical and to reflect on the student's own functioning and the functioning of others in order to improve practice 	<i>Required courses:</i> REM 601, 801 REM 699 (research project)		Spring 2020
Independence and responsibility	<ul style="list-style-type: none"> The ability to act independently and with originality in research and problem solving 	REM 801 (required) REM 699 (research project)		Spring 2020

Table A4: REM MRM Planning Program: Educational Goals, Components and Assessment Sources

The MRM (Planning) program must meet all of the educational goals established for the MRM program (see Table A3). In addition, MRM (Planning) students must demonstrate the competencies specified by the Professional Standards Board for the Planning Profession in Canada (applicable to all accredited planning programs in Canada). At the time of each renewal of accreditation for the MRM (Planning) program (maximum term of 5 years), the Professional Standards Board appoints an external review panel to conduct an intensive evaluation of the program against the specified competencies.

Table A5: REM PhD Program: Educational Goals, Components and Assessment Sources

Program EGs (at the end of this program, students will be able to ...)	Components (students demonstrate familiarity with ...)	Assessment Data Sources – Direct* (students must attain sufficient grades in ...)	Assessment Data Sources - Indirect	Years/Semesters of data collection
Knowledge & Understanding				
Knowledge and understanding of key concepts in three core academic fields relevant to resource and environmental management (<i>interdisciplinary breadth</i>).	<ul style="list-style-type: none"> Population and community ecology Ecological economics Public policy 	<i>Required courses:</i> REM 611, 621, 644, 802	REM 899 PhD Comprehensive Exam REM 899 PhD Thesis	Spring 2020

<p>Deep and systematic understanding of theories and methodologies in the specialized field of study selected for the PhD research, including the relationship of this field to other relevant disciplines (<i>disciplinary depth</i>).</p>	<ul style="list-style-type: none"> • Knowledge in the student's selected field (e.g., fisheries, toxicology and contaminants, forestry, energy and materials management, environment and development, conservation policy, transportation policy, marine ecology, environmental impact assessment) 	<p>REM 802 (required) PhD proposal exam/defence REM 899 (PhD thesis and defence)</p>		<p>Spring 2020</p>
<p>Performance & Practice</p>				
<p>Research skills.</p>	<ul style="list-style-type: none"> • The ability to conduct independent and original research and analysis at the forefront of the field of study selected for the PhD research • The ability to select and apply appropriate methodologies for inquiry and analysis (the collection, management, evaluation and interpretation of data) • The ability to write a high-quality thesis that advances knowledge and includes research that applies knowledge, theory and methods from at least two of the three core academic fields (environmental science, ecological economics, and public policy/planning) 	<p>REM 802 (required) PhD proposal exam/defence REM 899 (PhD thesis and defence)</p>		<p>Spring 2020</p>

The ability to present information (e.g., research and results) and communicate effectively orally and in writing in a variety of contexts to diverse audiences and in interdisciplinary settings.	<ul style="list-style-type: none"> • Effective oral communication • Effective written communication 	REM 802 (required) PhD proposal exam/defence REM 899 (PhD thesis and defence)		Spring 2020
Ethical awareness and conduct.	<ul style="list-style-type: none"> • The ability to describe and contrast ethical perspectives related to resource and environmental management • A critical ethical dimension to the student's own academic practice 	<i>Required courses:</i> REM 644, 802 REM 802 PhD proposal exam/defence REM 899 (PhD thesis and defence)		Spring 2020
Leadership skills.	<ul style="list-style-type: none"> • The ability to participate effectively in, and lead, multi-disciplinary research teams and other groups 	<i>Required courses:</i> REM 644, 802		Spring 2020
Cognitive Skills				
Creativity and innovation.	<ul style="list-style-type: none"> • Creativity and innovation in analyzing problems in resource and environmental management and designing research and other strategies to address these problems 	<i>Required courses:</i> REM 644, 802 PhD proposal exam/defence REM 899 (PhD thesis and defence)		Spring 2020

Critical thinking.	<ul style="list-style-type: none"> • The ability to critically evaluate different conceptions of the goals of resource and environmental management (e.g., multiple-use, sustainable development, resilience) 	<i>Required courses:</i> REM 621, 644, 802		Spring 2020
	<ul style="list-style-type: none"> • The ability to critically evaluate theories, research methods, models and approaches in resource and environmental management (e.g., in reports and journal articles) 	<i>Required courses:</i> REM 611, 621, 644, 802 PhD proposal exam/defence REM 899 (PhD thesis and defence)		Spring 2020
	<ul style="list-style-type: none"> • An understanding of how theoretical and methodological approaches, framing and other biases affect the ways in which problems are formulated and evidence is interpreted 	<i>Required courses:</i> REM 644, 802		Spring 2020
Self reflection and learning.	<ul style="list-style-type: none"> • The ability to be independent and self-critical as a learner, to reflect on the student's own functioning and the functioning of others in order to improve practice, and to guide and support the learning of others 	<i>Required courses:</i> REM 611, 621, 644, 802 PhD proposal exam/defence REM 899 (PhD thesis and defence)		Spring 2020
Independence and responsibility.	<ul style="list-style-type: none"> • The ability to act autonomously and with initiative and originality in research and problem solving 	REM 802 (required) PhD proposal exam/defence REM 899 (PhD thesis and defence)		Spring 2020