**Program Review Self Study Template**

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| **Program Code:** | **EMT/EMX** | **Date Completed:** | **March 2015** |
| **Program Name:**  | **Ecosystem Management Technician/Technologist** |
| **Indicator****1.0 Industry Trends** | **Summary of Key Findings** |
| **1.1 Sectoral Standards and Industry Trends****Review / discuss:*** New or emergent industry / sector themes or issues that may have a potential impact on program positioning
* Industry / sector issues identified by the Program Advisory Committee
* Recent labour market data or sector reports “FDR enrollment growth”
* Recent or anticipated changes in occupational standards, level of entry and credential and / or standards of accreditation
* Program alignment to labour market and sectoral trends
* Trends identified by the Program Advisory Committee
 | New/Emerging Industry Sector Themes or IssuesKey themes/issues that may have an impact on program positioning include:* Increased focus on a knowledge-based economy (versus manufacturing)
* Continued influence of globalization
* Industry requirements for higher-level skills/knowledge for entry-level positions (e.g. higher level of post-secondary education required)
* The deepening impacts of climate change at all levels - local, regional, and global (e.g. invasive species, biodiversity losses, ecological restoration and emphasis on urban/built environments, adaptation/mitigation strategies, carbon markets, integrated watershed management, etc.)
* Rapid growth in the areas of renewable/alternate energy sector
* Predicted increase in the development of local food systems and related infrastructure development that will reduce the carbon footprint of communities

Industry/Sector Issues and Trends identified by the Program Advisory CommitteeThe Ecosystem Management Program Advisory Committee (AC) met on May 6, 2014, and identified several additional issues that may influence program direction in the future:* Increasing importance of ‘cultural literacy’ within the sector, i.e. awareness of and sensitivity towards indigenous culture, traditional knowledge, etc.
* Continued importance of soft skills e.g. conflict management, negotiating, etc. in particular with jobs that have a stewardship component
* Policy development as an area of increasing importance (and related changes in policy and legislation that create employment opportunities)
* Need for graduates to have understanding of Species at Risk policies and programs, as well as Invasive Species
* Training in impact assessment would be an asset, and the skill set is transferable across many areas (esp. in government ministries)
* Continued need for individuals with well-developed writing and oral communications skills (proposal writing, proactive leadership, advocacy, public consultation, etc.)
* Need in the industry for both generalists and people with a passion in specific areas e.g. bird ID, herptiles, etc., and the college needs to encourage students to develop this passion while in school
* Certifications are always good to provide, e.g. chainsaw and exterminator licence esp. good for entry level job in urban centres (e.g. Toronto); Ecological Land Classification (ELC) training

Labour Market Data need to review recent data * Recent data suggests that growth in the environmental sector will continue, both globally and across Canada, in a number of sectors:
* Renewable energy, carbon markets, alternative fuels etc. (emerging or very high growth)
* Environmental remediation, protection of biodiversity and landscapes, etc. (moderate to high growth)
* Environmental education, policy and legislation, and environmental communications and public awareness (stable growth) 9Source: EOC Canada, 2010).
* It is important to note that growth in many of these sectors will be determined, in part, by policy direction at all government levels, as well as financial and economic drivers (increasing energy costs), consumer demand (for environmentally-friendly products) and environmental management practices (e.g. life cycle assessments, green purchasing policies, etc.) (ECO Canada, 2010).
* ECO Canada estimated that there were approximately 530,400 workers employed in the environmental industry in Canada in 2007 (approx. 3.2% of all workers in Canada).
* Recent labour market information suggests that there will be employment growth in the sector (2011 – 2020) and that the bulk of positions filled will be the result of retirements. The majority of positions will be filled by graduates from the educational system. \*\* Jobs are available across Canada, with wages in Ontario ranging from $16.00 per hour to $30.00 per hour.
* Both Canadian and US labour market information indicates that many positions require a university degree as the minimum educational requirement

*\*\* The EM program, by nature of the discipline, provides a breadth of learning experiences in the fields of ecology and resource conservation/management. As a result, it is difficult to find a category within the National Occupation Codes (NOC) that best reflects the occupation(s) available to program graduates. The data used for this report is based on the NOC for Biological Technicians and Technologists*.* “Employers place a strong emphasis on essential skills in the workplace. Essential skills are used in nearly every occupation, and are seen as ‘building blocks’ because people build on them to learn all other skills” (Ontario Job Futures)
* EM program graduates possess a comprehensive set of competencies that could lead to employment in a range of environmental domains, identified by the most recent ECO Canada Labour Market Research Study (2010) as Environmental Protection, Resource management, and Combined Environmental Protection/Resource management. Within these domains, EM program graduates qualify for entry level jobs in the following areas:
* Protection of biodiversity and landscape
* Management of natural resource activities
* Environmental education and training
* Environmental policy and legislation
* Communication and public awareness
* Eco-innovation, research and development
* Other environmental consulting and analytical services

Anticipated Changes in Occupational Standards, Level of Entry, and Credentials* Accreditation of programs and/or certification of individuals are likely to become increasingly sought after by employers in the environmental sector. As noted above, employers will also be seeking individuals with higher levels of post-secondary education for entry-level positions in the field. Employers from the natural resources and environmental sector report that it is important for graduates to gain solid practical experience while they are in college, through co-op work/study, field placements and/or volunteer work. Students gain practical, hands-on skills and can develop competency in a variety of technical skills as a result of these opportunities.
* Safety training and certification is becoming more important across many sectors. Graduates who have basic first aid and/or other safety training may be an asset to employers.

Program Alignment to Labour Market and Sectoral Trends* The Ecosystem Management program continues to work towards the inclusion of more certifications within the program of studies for both the Technician (EMT) and Technology (EMX) programs. The addition of the Ontario Benthos Biomonitoring Network (OBBN) Protocol in the EMT program, as well as the replacement of the Winter Camp with a 2-week field placement at the completion of semester 4 of the EMT program, have provided students with a skill set that will enhance their employability for entry-level positions
* The EMX program continues to attract a significant number of university graduates, who are able to enter directly into the third year program. These individuals are highly sought after in the workplace due to the comprehensive skill set that they develop from their university and college experiences.
* Graduates from both the EMT and EMX programs have the necessary skills to apply on a broad range of jobs with a wide variety of employers both provincially and nationally in the environmental sector. Examples of the types of jobs graduates obtain include; check binder for more titles *Natural Environment Specialist, Stewardship Coordinator, Biological Monitoring Technician, Aquatic Biologist, Environment & Lands Coordinator, Resource Technician, Lakeshore Ambassador, Field Biologist, Assistant Ecologist, Lands & Waters Technician, Fish Habitat Biologist, Rural Planner, Forest Health Technician, Environmental Technologist, Waterfront Resources Planner, Conservation Programs Specialist, Enforcement Officer, Terrestrial Invasive Species Outreach Liaison, Stream Steward Technician, Riverwatch Program Coordinator, Environmental Education Assistant.*
* The program has numerous articulation/transfer agreements with universities in Ontario, across Canada, and internationally that provide pathways for students to degree completion opportunities (please see section 2.8 for details).
* The international component of the EM program continues to grow, with a sixth successful trip to Costa Rica in April of 2014 for 8 EMT students, and a fourth trip to South Africa in April of 2014 for 8 other EMT students. Students on these trips undertake a series of projects focused on conservation and restoration work. The program also introduced a team placement trip to Moose Cree First Nation in Moose Factory, in April of 2013 with a team of 5 students, a trip which also took place for a second time in 2014. The EMX program undertook its ninth successful class trip to an international environmental conference in Washington, D.C. in January of 2015. The College remains in full support of this activity.
* The program has re-introduced the Aboriginal Emphasis (AE) element across the curriculum in the EMT program in the fall of 2010. The recent AC meeting offered support for both the continued development of the international agenda as well as the AE initiative.
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| **1.2 Industry Liaison****Review / discuss:*** Program initiatives to maintain involvement with the industry / sector such as field placement supervisions, clinical, faculty renewal, professional learning, other professional affiliations, or community-based projects
 | In the winter of 2009, the EM program introduced an 80-hour mandatory field placement experience that students complete at the end of their fourth semester of studies. At the present time, there are over 100+ different organizations from across Ontario, Canada and around the globe that have offered offer placement opportunities to EMT students, and the list grows larger every year. This in itself is a testament to the quality of graduates from the program. The EMX program includes a double-credit course in both semesters five and six, in which students work in teams to complete a project for an external agency. Both of these program initiatives have provided excellent exposure for students to the range of opportunities within this industry sector; including government agencies, private sector companies, non-profit and non-government organizations, research agencies, public education institutions, and many others.The annual trip to Washington, DC, to attend an international environmental conference is an excellent professional learning opportunity for the EMX students who choose to take part. The annual Ecohealth conference, organized by the entire EMX class, provides students with the opportunity to network with professionals from the environmental field, community members, and members of the public, and to develop countless transferrable skills that they will use in the workplace. Faculty in the program are affiliated with and are members of a broad range of organizations (please refer to resumes located in the CLT directory at: S:\shared data\CLT\SENRS\SENRS\_PROGRAMS\EcosystemMgmtTechnician\_EMT\Ecosystem Management Program Review) Faculty in the program work tirelessly to enhance and develop their skills in the areas of learning technologies, e-learning and curriculum design, as well as specific expertise within their areas of interest. One faculty member, for example, has recently been certified as an aquatic taxonomist by the Society for Freshwater Science (SFS). Faculty also make an effort to remain connected to industry through attendance at conferences, participation in volunteer opportunities (e.g. with Toronto Region Conservation and Otonabee Region Conservation Authorities) and inclusion of guest speakers in course curriculum.  |
| **2.0 Curriculum Development and Framework** | **Summary of Key Findings** |
| **2.1 Curriculum Framework****Review / discuss:*** Describe how your program demonstrates a learner centered approach and addresses our core promise to students concerning personalized learning and support.
 | The EM program prides itself in providing holistic and engaging learning experiences for students that aim to develop both industry-specified skills and knowledge AND the ‘soft skills’ that will ensure success in the competitive job market that currently exists. Students develop their technical abilities at the same time as they develop their interpersonal/time management/organizational and other transferrable skills; the process is as important as the content. Our goal is to produce graduates who are confident in their skills and abilities, but also respectful of the need for continuous learning and improvement. Comments from the Program Advisory Committee members at the meeting in May of 2014 indicate that EM graduates have excellent soft skills, and “often stand out from the crowd in interviews”. Core courses in the EM program provide students with the opportunity to review all course materials after formal classes on the “Desire to Learn” (D2L) learning management system, available on-line 24/7/365. Students are also encouraged to meet with program faculty and staff to seek clarification when needed, and are also encouraged to attend tutoring and other help sessions as they need them. Students are also given opportunities to be tested in alternate formats, e.g. oral testing versus written, or in other environments, e.g. in Learning Support Services, if such alternatives may provide them with more chance for success.  |
| **2.2 Outcomes from Curriculum Renewal****Review / discuss:*** Key outcomes from the Curriculum Renewal processes of the past few years
* Progress to date in implementing the recommendations arising from Curriculum Renewal
* Success of the changes implemented and the means by which they are being evaluated
 | Outcomes of Curriculum Renewal process and Progress to DateReintroduction of a Camp Experience in the EMT program: September of 2014 saw the first iteration of a three-day Camp experience for all students in semester 3 of the EMT program. The program team has felt for many years that an experience of this type would be an excellent way for all EMT students to connect at the beginning of their second year of studies, with the goal of fostering effective relationships that could carry forward into subsequent project work within curriculum. The Fall Camp replaced the course hours that had until that time been taken up by the Environmental Issues course, which has since been removed from the program of studies. Successful introduction of the Field Placement Course In the winter of 2009, the EM program introduced an 80-hour mandatory field placement experience that students complete at the end of their fourth semester of studies. At the present time, there are over 100+ different organizations from across Ontario, Canada and around the globe that have offered placement opportunities to EMT students, and the list grows larger every year. This in itself is a testament to the quality of graduates from the program.This initiative replaced the Winter Camp course in April of 2009. Curriculum has been updated in the Introduction to Vector GIS course (current software is ArcGIS 9.3), and it appears that the program may have secured a consistent faculty member for this course, something which has been identified many times as a need for effective course development and delivery.The Restoration Ecology and Nuisance Species courses have also struggled with the lack of a consistent faculty member, and it remains to be seen whether this will continue to remain an issue. The Human Relations course and the Ecosystem Monitoring and Assessment (EMA) course have joined forces, whereby the major team project in EMA has team based evaluations in the Human Relations course. The goal is to have the Human relations course specialize in the team based approach to learning while the EMA course focuses in on the more technical elements of their learning. This model has proven to be very successful and provides much deeper learning for students. The program has re-introduced the annual Eco-health conference based on recommendations from the Advisory committee. April 2015 will mark the 7th successful conference since re-introduction. The conference has attracted such speakers as Gord Miller, The Environmental Commissioner of Ontario, Steve Hounsell from Ontario Nature; Kevin Callan, one of Canada’s most renowned canoe authors; Maude Barlow, from the Conference Board of Canada; and this year Ms. Sheila Watt-Cloutier, Nobel Peace Prize nominee and climate advocate for Arctic peoples. The Program has successfully introduced a number of additional certifications over-and-above the core curriculum (e.g. Ontario Benthic Biomonitoring Network Protocol, Radio Telemetry) These courses are not mandatory, they are simply value added for those students who are interested in building their educational portfolio.Future certification courses that the program would like to have in place include Backpack Electro-fishing Level, Land Pesticide Application License and ELC certification.The Program has been working on and promoting a “bridging” type initiative for University graduates who are interested in direct entry into third year. Students who are available to start in the January term are encouraged to complete; Forest Measurement (FSTY73), Soil Studies (NATR41), Trees and Shrubs of Ontario (FSTY50) Wildlife Observation Skills (FIWI 41) and EM-Geomatics (GEOM16). For the student who accepts this advice they are typically more prepared for third year and more accurately meet the Essential Employability skills and Program Vocational Outcomes as established by the program. It is anticipated that a 3-week summer institute will be developed for implementation in August of 2016 that may replace the bridging semester over time. Progress on Implementing Recommendations:The most recent Curriculum Renewal report identified three priority actions, all of which have been acted on at this time:* Introduction of indigenous knowledge into a minimum of four core EM courses, including but not limited to Ecology: Concepts and Linkages, Aquatic and Terrestrial Ecosystems, and Restoration Ecology. Some progress has been made on this action item, and faculty met in December 2014 with the Indigenous Studies coordinator and agreed on a set of next steps in the process
* Establishment of a professional on-line reporting system for the Field Placement course (completed)
* Establishment of a third international field placement opportunity (completed – not international per se, but very significant in terms of the linkage to the Aboriginal Emphasis in the EM program) to Moose Cree First Nation; some preliminary work on a possible placement in Arizona or New Mexico has also taken place

Other high priority areas recognized in the curriculum renewal report (2012) included the need for investment in capital equipment/infrastructure and the development of a space plan at the Frost Campus. A need for faculty development in the areas of curriculum redesign that incorporates alternate technologies, the need for a hiring plan to replace the wave of recent retirements, and the development and promotion of learning pathways (e.g. articulation agreements) for students were recognized as common themes across the School. Success of Changes and their EvaluationRegular program meetings, ongoing student feedback, and faculty and course evaluations are and will be used to evaluate the success of these changes over the long term. The Advisory Committee meetings, held on an annual basis, also provide a forum in which program changes are reviewed and future directions are established.A highlight for the program was the approval and hiring of a full-time program technologist in the summer of 2014. This individual has proven to be indispensable to the program.  |
| **2.3 Curriculum Sequencing and Alignment with Standards****Review / discuss:*** The Ontario College Credentials Framework and the extent to which the program aligns with the provincial standards.
* The program’s current admission requirements and their suitability in relation to program rigour and student preparedness
* The extent to which course content, levels of learning, and assessment methodology are successfully sequenced and aligned between courses and across semesters
 | Alignment with the Ontario College Credentials Frameworka) Vocational StandardsThe complexity of knowledge and the vocational outcomes reflect the level of learning required to meet the standards of an Ontario College Diploma (EMT) and Advanced Diploma (EMX). Graduates have a wide range of knowledge, skills, and abilities in the technical areas of Ecosystem Management and they are more than adequately prepared for entry-level positions based on their field skills.b) Essential Employability (EE) Skills The essential employability skills are addressed at the appropriate level for an Ontario College Diploma and Advanced Diploma. Graduates have achieved the fundamental, personal management, teamwork, and customer service skills to get, keep and progress in their career. In most cases, they have also developed the necessary skills to enter further postsecondary studies if they so choose. The industry requires a higher level of competency in some EE skill areas, such as written and oral communications, teamwork and negotiation skills. The EM program team has been deliberate in its efforts to provide opportunities for students to develop and excel in these areas. Recent program team meetings suggest that more emphasis will be placed on these skills in the future. c) Program HoursThere are 1419 hours in the EMT program, 80 of which are allocated to the field placement experience. There are 2089 hours in the EMX program, 180 of which are allocated to applied project work. These figures align with the CVS framework which requires between 1200 and 1400 instructional hours for the completion of an Ontario College Diploma and between 1800 and 2100 instructional hours for the complete of an Ontario College Advanced Diploma. Admission RequirementsEcosystem Management Technician:*OSSD with the majority of credits at the College (C) and Open (O) level, including:** *2 College (C) English courses (Grade 11 or Grade 12)*
* *2 College (C) Math courses (Grade 11 or Grade 12)*

*When (C) is the minimum course level for admission, (U) or (U/C) courses are also accepted*.Mature Students Students who are 19 years of age or older before classes start, and who do not possess an OSSD, can write the Canadian Adult Achievement Test to assess eligibility for admission. Additional testing or academic upgrading may be necessary to meet specific course requirements for the program.Ecosystem Management Technology:Admission requirements for the EMX program are the same; however, the program also offers advanced standing to university or college students as follows:*Advanced Standing**College or university graduates may be eligible for advanced standing entry to semester five of this program if they possess:** *A college diploma in environmental or natural sciences or the equivalent.*
* *Or, a Bachelor of Science with emphasis in Biology, Bachelor of Environmental Science/Studies or a degree with a joint major in Science/Geography.*

*All other degrees are assessed for eligibility based on the number of science-based courses acquired. Applicants who do not possess the academic requirements as stated may be considered on an individual basis.** One area that should be considered is the inclusion of a basic fitness standard as part of program admission requirements. The EMT program in particular, requires that students complete a significant portion of field work that necessitates a certain level of fitness.

Sequencing and alignment of course curriculum and assessment methods between courses and across semesters. Assessment methodology in common first semester includes but is not limited to D2L-based testing, individual written work, individual and team-based oral presentations supported by PowerPoint or other media, assessment of field-based competencies (e.g. compassing, pacing factor), etc. In the fall of 2014, a ‘field day’ was incorporated into the semester one curriculum, which included several outdoor stations at which students were required to demonstrate competencies in a number of field skills. This was as excellent addition to the assessment methodology in semester one, as it reinforced and assessed a significant portion of what students had been taught in the first half of the semester. Multiple-choice, short and long answer questions, take-home tests, time-limited identification tests, oral interviews and presentations, collections, and team-based tests are all utilized by program faculty to assess student performance beyond semester one. Many of the assessment methodologies introduced in common semester are also used in core courses in semesters 2 through 4 of the program, and in some cases, assessment methods have been deliberately sequenced across semesters, in a way that builds on students’ prior learning. Major projects are included in core EM courses from semester 2 to 4, and a range of assessment methods are used to evaluate this work, culminating in the submission of a scientific research paper and an oral presentation to peers in a conference-like setting. More effort is being placed on joint assignments between courses – for example, a new joint assignment was introduced in the Terrestrial and Aquatic Ecosystems courses in the fall of 2014 that required students to use and interpret data gathered on a joint field trip earlier in the semester. Students, when surveyed, were very supportive of the joint project, and indicated that it helped them to understand the related concepts more fully. In the winter of 2015, the program is re-instating a joint assessment of students’ final research project presentations in the Ecosystem Monitoring and Assessment and Career Advancement courses. Students who continue to semesters 5 and 6 of the program are assessed on oral and written assignments that they complete either as individuals, in teams or as an entire class. A major focus of student work in semesters 5 and 6 is the double credit applied project course, Credit for Product I and II. In both these courses, student work is also evaluated by an agency external to the college. This is a significant difference between the two-and three-year program, in that student work is also evaluated by a third party organization. This in itself ‘raises the bar’ with respect to expectations of student work. Student participation in class activities and peer assessment are also key elements of assessment within individual courses. A consideration for the long-term would be to provide more opportunities for students to be evaluated progressively within a course, i.e. students would submit project work for assessment early in the semester that would be reviewed by faculty, returned and then re-submitted later on for final assessment. This practice takes place in the Credit for Product course, where students submit a draft project report that is assessed prior to submission of the final project. Another element that should be explored in future are the possible experiences that could be made available to students as a component of the “co-curricular report card”. With respect to course content, there is sometimes a need for faculty to be more explicit and deliberate about making the connections between courses within the program. This is needed, particularly in the areas of GIS and statistics, so that students can see the relevance of these subjects to the field of Ecosystem Management. GIS technology needs to be incorporated into assignments in core program courses, and data gathered in core courses could form the basis of projects within both the GIS and statistics course curriculum. A step in this direction was taken in the fall of 2014, when geospatial data collected at the EMT Fall Camp was incorporated into the GIS course in the subsequent fall semester. Another way to ensure these connections are made is for faculty to be well versed in the content of other courses within a particular semester, as well as to be aware of learning in both previous and subsequent semesters. Some faculty members have taken time to audit courses (without remuneration or SWF compensation) in order to be more knowledgeable about the program curriculum. One of the long-standing issues with the GIS subject area is the lack of a committed faculty member from the GIS department who can be relied upon to teach the GIS courses in the EM program on a continuous basis. As of the fall of 2014, the program may have secured a more consistent faculty member to teach these courses. Core EM faculty are encouraged to develop a basic level of knowledge in the GIS discipline; however, this will always be difficult to accommodate within already full workloads. |
| **2.4 a) Curriculum Map*** Review the Program Curriculum Map and discuss the extent to which there is alignment of vocational and course outcomes
* Review / discuss the distribution and progression of Vocational Learning Outcomes, Essential Employability Skills, and General Education themes across the curriculum.

 | The curriculum maps for both the EMT and EMX programs have been updated by individual faculty, and these can be accessed through the CLT shared folder at the following locations:Technician Program: S:\shared data\CLT\School of Environmental and Natural Resource Sciences\SENRS\_SCHOOL\_PROGRAMS\Ecosystem Management Technician\Program Curriculum MapTechnology Program:S:\shared data\CLT\School of Environmental and Natural Resource Sciences\SENRS\_SCHOOL\_PROGRAMS\Ecosystem Management Technology\Program Curriculum Map Kris, not sure if this is correct location??Distribution and Progression of VLO, EES, and GE themes across the curriculum: Kris is this something you can do?? |
| **2.4 b) Curriculum Map** **Submit an updated curriculum map as an attachment to the Program Review Report** |  |
| **2.5 Delivery Mode****Review / discuss:*** The *primary* modes used to deliver curriculum such as lecture, seminar, lab, applied project, field camp and web based courses
* The rationale for, and appropriateness of, these delivery modes in relation to program learning outcomes
* The degree and depth to which the program is providing work integrated learning experiences
* The degree and depth to which the learning experiences are enhanced by the use of educational technology.
 | Curriculum Delivery Modes* Curriculum in the EM program is delivered in a variety of modes, with an emphasis on lecture and lab components for the majority of courses, particularly in the EMT Program. The EMT program shares a common first semester of curriculum with all other environmental diploma programs at the School. The common first semester has been designed in a fashion that provides extensive opportunities for students to apply knowledge and skills acquired in one subject area to other areas of study, and deliberate integration of key concepts takes place between the six common courses in Semester One. Emphasis is placed on hands-on, outdoor learning wherever possible; for example, every course in the semester one curriculum has field trips, including the math and communications courses. Students also interact with D2L to access lecture notes, complete tests and activities, and access their course grades. Students are required to complete several oral presentations and all courses include individual written submissions. Case studies and group work form the basis of several assignments within the curriculum. All semester one students also complete a portfolio that includes examples of student work, an up-to-date resume, and any certifications acquired. Programs are encouraged to provide opportunities for students to continue to build this portfolio in subsequent semesters.
* Semesters 2 to 4 of the EMT program include several lecture and lab based courses, many of which incorporate e-learning components on the D2L platform; i.e. recorded lectures. videos, supplementary web-casts on specific topics, self-tests, e-book readings and practice questions, etc.
* Students complete several team-based projects over the duration of the program, culminating in an Experimental Design Project in their final semester of studies. Students also complete a two-week field placement at the completion of their fourth semester of studies. Emphasis is placed on hands-on activities, field trips, lab activities, and direct interaction with the subject matter wherever possible (e.g. use of live and/or preserved specimens - lichens and other understory plants, benthic invertebrates, plankton, aquatic plants, etc.). A wide variety of field and lab equipment is used across the program of studies, including computers, GPS units, water and soil sampling devices, etc. Videos, documentaries, and other media are used where appropriate. Guest speakers are utilized as often as possible. The use of learning technologies such as “I-clickers” is being incorporated into some courses. Faculty are also making a significant effort to engage students actively in lectures through demonstrations, discussions, ‘think-pair-share” activities, etc.
* Students who continue their studies in the Ecosystem Management Technology (EMX) program experience a unique learning environment in that the program of studies is unique to the EMX program, and as a result, students travel through the EMX program as a cohort. The student cohort in the EMX program consists of (on average) 60% flow-through students from either the EMT program or other diploma programs at the School, and 40% direct-entry students who have completed a university degree in a related discipline. Students meet together for the first time at a 4-day fall camp that is held in an off-site wilderness location in the first week of classes in the fall semester. Students are formed into their applied project teams at camp. These teams then complete a project for an external agency in both the fall and winter semesters of the program.
* Students also complete several team-based projects across semester 5 and 6 courses. Field work is heavily emphasized in the fall semester of studies, but new learning activities in the Ecosystem Health course will provide students with increased field work opportunities in the winter semester. Students also participate in several experiential learning activities including talking circles and a sweat lodge as part of the curriculum in the First Nations course. D2L is utilized in all courses for lecture/lab notes, grade records, and support resources for students. The entire class also plans and delivers a one-day conference at the end of their final semester that is open to both the college and wider community. This culminating activity was re-introduced into the program at the recommendation of the AC members, and provides a real-world, real-time opportunity for students to apply skills and knowledge gained over the course of their entire academic year.

Rationale for Delivery Modes•The EM program is informed on a continual basis by program alumni and Advisory Committee members about the nature of the workplace and the careers that program graduates follow. The program coordinator and program faculty also receive numerous reference calls for students and graduates on a regular basis. The consistent messages from all these sources suggest the importance of producing graduates who have a breadth of technical skills and knowledge, but who are equally skilled in their abilities to communicate (in both oral and written formats), work both collaboratively and independently, anticipate and solve problems, take initiative, and be respectful human beings. The EM program places a high degree of emphasis on the development of both the requisite technical skills AND the transferable skills that will enable students to succeed in the workplace; as a result, delivery methods and learning opportunities that include real-world projects, team-based learning, independent reading and research, and guest speakers from the workplace are used extensively within the program. It is important to ensure that all opportunities to link theory and practice with applied work are explored. • The following program vocational outcomes reflect the importance of these teaching and learning methods in both the EMT and EMX programs:→ preparation of reports and field records in compliance with established policies and procedures→ effectively communicate and convey ideas and information → behave in accordance with norms and professional codes of ethical practice→ work effectively with others in a collaborative environment→ demonstrate negotiation, conflict resolution and facilitation skills→ collect, organize and manipulate geospatial data→ collect, measure and analyze data for the purposes of ecosystem monitoring and assessment→ work effectively with a wide variety of sampling tools, field and lab methodologies and digital/computer-based technologies to document, monitor and assess ecosystem and environmental change Kris, would you please check these and update to reflect any new program outcomes??Provision of work-integrated learning experiencesMany of these opportunities have already been discussed in previous sections of the report. Please refer to sections 1.1, 1.2, 2.2, 2.3 and 2.5 (above). Highlights of work-integrated learning in the program include:Semester 2:* Field work with local conservation agencies in the Ecology: Concepts and Linkages course

Semester 3: * EMT Fall Camp at Bark Lake Leadership Centre, where students participate in a service learning project for the Centre
* Field trips to assist with major restoration projects for a variety of resource stewardship organizations, e.g. the Ontario Federation of Anglers and Hunters
* Inclusion of guest speakers in course curriculum

Semester 4:* Completion of ecological field research projects that may include liaison with local stewardship and conservation agencies (students also present projects in conference-style setting at end of semester)
* EMT Interview Day at which each student is interviewed by an employer in the environmental field and given specific feedback on their resume, cover letter, and interview performance (12 interviewers from across Ontario)
* Completion of mandatory 2-week field placement with an environmental organization anywhere in the world (includes program-developed team placements to Costa Rica, Moose Cree First Nation and South Africa)

Semester 5:* Completion of double credit Applied Project course for an external partner agency (Credit for Product I)

Semester 6:* Completion of double credit Applied Project course for an external partner agency (Credit for Product II)
* Attendance at annual NCSE national environmental conference in Washington DC
* Entire class develops and presents one-day conference on an environmentally-related topic, and the event is open to the educational community and the general public

Enhancements of Learning Experiences through use of Educational TechnologyConnect to e-learning strategy Kris is this what we do here? HELPFeedback from a student focus group held in November, 2014, suggests that EM program students overwhelmingly prefer face to face classroom learning experiences to on-line activities. For example, one comment suggested that “on-line learning is generally forgotten or unfinished in my experience.” This feedback should be considered in the development of future courses and curriculum within the program.  |
| **2.6 Assessment and Evaluation Methods****Review / discuss:*** The program approach to learning assessment
* The balance and frequency of assessment types across the curriculum and their appropriateness to course / vocational outcomes
* Reflect and comment upon the variety of methods used to demonstrate outcomes. Are learner centered principles part of the assessment approaches?
 | Program approach to learning assessmentThe Ecosystem Management program includes two full-time faculty members, numerous part-time faculty, and a full-time technologist, all of whom perform teaching duties in either the EMT or EMX programs, or both. Faculty in the program approach their teaching commitments very seriously, and work from a platform of mutual respect, open communication, continuous learning, and passion for the subject matter. Hands-on, applied learning opportunities and both individual and team-based learning activities are core to program curriculum. The EM program team encourages students to ask questions, to be present and engaged, and to be accountable and responsible for their learning. Our goal is to produce confident, qualified, graduates, who are respectful of others and of the need to always be learning. Balance and Frequency of Assessment TypesPlease refer to sections 2.1, 2.3, 2.4 and 2.5 for information about the program and faculty approach to learning assessment and the appropriateness of assessments to course and vocational outcomes. In many cases, faculty attempt to have an equal balance of assessments between the first and second halves of the semester, i.e. at least 50% of the course marks assessed in Weeks 1 to 7 and 50% assessed in Weeks 8 to 15. This is not always possible, however, when there are major culminating assignments. This has at times been an issue, particularly in upper semesters of the program. This can be addressed to some degree by developing awareness amongst program faculty about the nature and timing of assessments within individual courses. Demonstration of Outcomes and Learner-Centered AssessmentsCulminating activities in both semesters 4 and 6 of the program require students to apply their prior learning from all previous semesters to successfully complete these tasks. For example, the Experimental Design Project (EDP) that students complete in the Monitoring and Assessment course in semester 4 requires that they apply their knowledge and understanding of statistics, sampling protocols, identification, technical writing, interpersonal and team dynamics, presentation/oral communication skills, and more, to successfully complete the assignment. The EM program is very deliberate in its approach to assessment from semesters one to four to six, and faculty take great effort to build not only on prior knowledge, but also on prior learning and assessment strategies. For example, students in the semester two Ecology course are expected to take their own notes in lectures, and review posted lecture notes along with the textbook after class. Listening and observation skills are strongly emphasized and students are given opportunities to practice and develop these as they move through the curriculum.Assessment techniques also follow a similar pattern. Students are introduced to competency testing in semester, which is continued in the Trees and Shrubs course in semester 2, and subsequently in the Aquatic Ecosystems course in semester 3. Increased rigour accompanies this assessment method as students move through semesters.  |
| **2.7 Curriculum and Diversity****Review / discuss:*** Program strategies that support student diversity and promote understanding of diversity, including program culture / climate, curriculum content and approaches to teaching and learning
 | The program has long recognized the importance of providing our students with a diverse set of skills and knowledge that includes both social and cultural knowledge. The program reintroduced an “Aboriginal Emphasis” designation in the fall of 2010, and all students who graduate from the EMT program will receive this designation on their official transcript. Students are required to take an Indigenous Studies course as a mandatory General Elective in their second semester of study. As well, specific curriculum elements are now included in the Aquatic Ecosystems, Terrestrial Ecosystems, and Ecosystem Monitoring and Assessment courses that address indigenous perspectives and knowledge. As a program we deem this to be a very important component of any student’s understanding of the natural world. This direction is also supported by the program Advisory Committee. Students who continue to the EMX program also take a “First Nations and Sustainable Development” course as a mandatory course in 5th semester. The program curriculum in EM exposes students to a wide range of environments, including relatively remote wilderness locations, as well as more settled and highly urbanized environments (e.g. field trips to Peterborough, Toronto, and Washington DC). This affords the students an opportunity to observe and experience both ecosystem and human diversity at a variety of scales. Students who are successful in one of the team placements to Costa Rica, Moose Factory or South Africa have a very unique opportunity to become immersed in other cultures and learn about other ways of knowing.  |
| **2.8 Learning Pathways****Review / discuss:*** Recent or anticipated initiatives that promote student pathways including high school articulations, dual credit, program laddering, dual diplomas, and university transfer, articulations, and partnerships
 | There are numerous initiatives that provide excellent entry and exit pathways for students. The following points summarize these opportunities:* High School Articulations – SENRS has existing articulation agreements with several high schools, including local area high schools as well as schools beyond the geographic catchment area of the college. These agreements generally provide direct entry into the second semester of several diploma programs, including the EMT program. Students are required to complete and achieve a minimum academic standard (usually 65-70%) in a specific set of courses in high school, as well as complete additional value-added learning activities, or a high school co-op experience, to be considered eligible for direct entry into semester 2.
* Dual Credit – Fleming College and SENRS have been very active in the provision of dual credit opportunities to students in the past couple of years, and many of these students do continue on to post-secondary education, some of them in the EM program at Fleming. The School has also served as the location for two credit-recovery programs in the past two years, and some program graduates do continue on to further studies at Fleming or other colleges.
* Dual Diplomas – The EM program offers students the opportunity to complete their second diploma in a matter of two additional semesters, provided they have successfully completed all the diploma requirements for their first diploma. The breadth of the EM program curriculum makes this an attractive option for the majority of diploma programs at the School. Students may also complete the EM diploma and a certificate program (e.g. Arboriculture or Urban Forestry) in a matter of three years. Dual diplomas provide students with a more comprehensive skill set and prepare them for a wider variety of entry-level positions.
* University Transfers and Articulations – SENRS has numerous articulation and/or transfer agreements in place, many of which offer degree completion options for students, in particular graduates from the EMX program. Graduates from the technology diploma program can often receive a university degree with only two additional years of study. Trent, York, and Royal Roads University offer this degree-completion pathway. Along with a number of other programs at the Frost Campus, The Ecosystem Management Program has solidified an articulation agreement with Cape Breton University whereby our graduates from the 3 year program are eligible to complete a degree in 8 months (full time studies) by distance education. The School is also working on transfer agreements with Guelph and Lakehead University that would provide similar degree-completion opportunities. It is hoped that a formal agreement can be developed with Acadia University in the near future. Currently, students who have completed all three years of the EM program are eligible to enter directly into a third year at Acadia, suggesting that such an agreement may be relatively easy to put in place. Please visit the following web-site for the most up-to-date information about transfer agreements in the EM program: <http://flemingcollege.ca/programs/pathways-to-university>

Partnerships – The EM program continues to establish partnerships, both within the College and externally at the provincial, national and international levels. Recent partnership activities within the College include working with the Centre for Alternative Wastewater Treatment (CAWT) to provide several placement opportunities for EMT students as well as specific applied projects for EMX students (the Credit for Product experience). Students also access the CAWT research ponds on campus on a regular basis, as part of a course activity. Most recently (winter 2015) students in the EMX program collected water samples as part of a course assignment, which were then tested in the CAWT for specific parameters. External partners at the local and regional level include numerous stewardship organizations, the Ontario Federation of Anglers and Hunters, the Ministry of Natural Resources, the Ministry of the Environment, first nations communities, Conservation Areas, and other agencies that provide opportunities for student placements, applied research projects and field work within specific courses in both the EMT and EMX programs. International placement opportunities are expanding on an annual basis, the goal of which is to establish sustainable activities in four countries by the end of 2016 – these include Costa Rica, South Africa, and possibly New Mexico or Ecuador. The program is also exploring the establishment of a semester abroad in South Africa (April 2015).  |
| **3.0 Student and Graduate Satisfaction** | **Summary of Key Findings** |
| **3.1 Formal Measures of Student and / or Graduate Satisfaction****Review / discuss:*** Key Performance Indicator results for the program with a focus on #s 4, 8, 9, and 11
* Program status and positioning in relation to the KPIs of other programs of a similar type (where applicable)
* Feedback and summary report from Learning Support Services (LSS) summary
* Themes or issues emerging from a review of course evaluation summaries (Chair/Dean response here)
 | KPI Results and Program Positioning* Student Satisfaction

Student satisfaction rates college-wide remained relatively constant between 2010 and 2014 for both metrics (i.e. satisfaction with teachers and the learning experience), with 5-year averages of 75% and 82% respectively. Student satisfaction rates in the EMT program averaged well above both rates, with teacher satisfaction at 84% and satisfaction with learning experiences at 89% respectively for the 5-year average. Both of these indicators appear to have remained stable relative to the previous 5-year reporting period (2005 – 2009). In the case of the EMT program, there are no similar competitor programs, so the system average in this case is the same as the college average.Student satisfaction rates in the EMX program for the 5-year reporting period (ending 2014) were also well above the college averages, at 85% for satisfaction with teachers and 90% for satisfaction with learning experiences respectively. Both of these indicators also appear to have remained stable relative to the previous 5-year reporting period (2005 – 2009). It is also interesting to note that the comparator system averages fall far short of the EMX program averages, sitting at 77% satisfaction with teachers and 83% for learning experiences respectively. * Graduate Satisfaction

The 5-year average KPI for graduate satisfaction with learning outcomes was 79%, and 85% for overall program satisfaction in the EMT program. These figures are both lower than the 5-year college averages of 87% and 83% respectively. Graduate satisfaction with learning outcomes has shown a decline since the previous reporting period, while overall graduate satisfaction with the program has increased over the same time frame. Review of the most recent data indicates that it is based on the responses of only 4 individuals in one reporting year and 8 in another. It is anticipated that these figures will improve as a result of the recent implementation of a mandatory Fall Camp in semester 3, the removal of the Environmental issues course from the program, and the establishment of a more consistent teaching cadre, particularly in the GIS courses. The 5-year average KPI for graduate satisfaction with learning outcomes was 82%, and 80% for overall program satisfaction in the EMX program. These figures are both lower than the 5-year system averages of 84% and 82% respectively, and also lower than the college average for graduate satisfaction with the program. While the figure for graduate satisfaction with the learning experiences has fluctuated almost 20% over the 5-year reporting period, the data for graduate satisfaction with program has increased over the 5-year period, from 78% in 2010 to 92% in 2014. It is prudent to note that some of the data in KPI reports is gathered from a VERY low number of respondents (in some cases, n = 4), and the timing of the survey occurs when many graduates may actually be off contract and therefore not actively working in the field. This might tend to colour the nature of student responses. In addition, the nature of the job market in this field is broad, and the program faces the constant challenge of balancing breadth of learning with depth. Program faculty need to be more deliberate in making the connections between what students are learning and its relevance to the real world, as students are sometimes not able to see the bigger picture. * Feedback and Summary Report from LSS
* Themes or Issues Identified in Course Evaluation Summaries Kris, not sure about these two things??
 |
| **3.2 Other Measures of Student and Graduate Satisfaction****Review / discuss outcomes from:*** Student focus groups (mandatory component)

 * Student Advisor observations / reports
* Formal or informal discussions with students and graduates such as class councils, class representatives, individuals or delegations
* Debriefing sessions following a field placement, clinical placement, or practicum
 | Review/Discussions from Student Focus GroupsA focus group session was held in November, 2014, which was attended by students from both the second and third year programs. Student comments expressed a very high level of satisfaction with the program; in fact many indicated that the program went far beyond their expectations. Many chose Fleming because of the reputation of the program. Students indicated that workload in the program is demanding, with many assignments, several of them team-based, that may be due at the same time or within a short time frame. This was not a complaint, but rather recognition of the importance of developing time management and interpersonal skills in order to successfully complete work. Students saw a progression in terms of the learning materials across semesters, i.e. that the program curriculum in subsequent semesters builds on skills and knowledge acquired in previous semesters. Students overwhelmingly indicated that they received timely and purposeful feedback from their instructors, and indicated that marking rubrics and specific expectations for assignments are always appreciated. In general, students felt that there was enough hands-on learning in the program, but some improvements could be made in the EMX program in terms of adequate preparation and follow up to some of the field-based activities. Students expressed an overwhelming sense of pride and belonging in being associated with the EM program, and commented repeatedly on the commitment and dedication of the program staff and faculty as a highlight of the program. Hands-on field experiences and related opportunities to develop skills and network with environmental professionals were also shared as program highlights. Overall, students rated the program at 9 out of 10, suggesting that one area for improvement would be to ensure that all faculty in the program have the requisite teaching skills and subject matter expertise to effectively deliver course materials. (A challenge in the program that has been identified in previous program reviews is the use of contract faculty to deliver a large majority of the courses in the program. This results in a lack of continuity in some of the core program courses, making it more challenging to ‘ladder’ materials between courses and semesters). The following testimonials from EM students speak directly to their satisfaction while they were students and how the program prepared them for a career in the environmental sector.*“Just wanted to drop you all a line updating where I have been since the work placement in Costa Rica. First off, I cannot speak highly enough of the trip, WOW what an experience it was.* *I love to hear about peoples' experiences with nature, especially the moments that touch you in a way that is so surreal and breathtaking; it’s simply an inexplicable feeling. Those moments make everything in my life worthwhile and bring hope and passion to everything I do. The experience in Costa Rica, from start to finish, was exactly that. The wonder and raw nature of the rainforest was the most memorable experience of my life, it's sad I will never be able to put into words that will do it justice.* *Anyways, just thought I'd add that I recently found a job at an Environmental Supplying company as an equipment specialist. The company is called Halltech Environmental located in Guelph, and we supply kick nets, electrofishing equipment, GPS devices, GIS programs, microscopes and everything in between to clients all over the world.* *It's giving me excellent experience with research equipment, and allowing me to talk with researchers, professors, field techs and scientists all over the world. Although the job is a permanent, full time job I am still planning on going back to school for a Bachelor's degree at Guelph in the near future. Something I've always wanted and extremely excited for.* *I hope you all are doing well, and are not working too hard in preparation for the new year, always making time for the moments I talked about previously. Feel free to update me on the going ons at Frost, EM in general or anything else for that matter. Thank you all for making my time at Fleming the most educational, enjoyable and truly inspirational experience of my life, I am so proud to be an alumni of the program. I've never met a group of individuals so dedicated to what you do. Thanks Again!” (Josh Cronmiller, 2010)**“I just wanted to let you know that I got the job at Lower Trent Conservation Authority sampling streams for benthic invertebrates and groundwater flow. I am so excited to start this job, which is a first for me, believe me. I truly feel qualified and confident for this position and I have you to thank. Thank you for all of the personal time you set aside to make sure this course is sparkling like gold because that is exactly what all of your hard work has made it become. I have had the TIME of my life here at Fleming and I am only looking forward to continuing with this field of study. I hope you have a great summer and thank you for opening up to us and becoming way more than a teacher, but a great friend. The effort that you, Barb and Ernie put forward into breaking those walls of separation between students and teachers made a world of difference. I know you guys will continue to do this for each class, but thanks again because as I said before it helped me to open up and learn.” (Jade Watson, 2010)**“I wanted to send you a fast note of appreciation for being a reference for me. The last one paid off!**I am now based out of Smiths Falls, at the Rideau Canal National Historic Site. I am one of two Ecosystem Conservation Technicians at this recently designated UNESCO World Heritage Site. It's an 8 month contract, but they are already considering lengthening it - I couldn't be more thrilled!**I also couldn't be more thankful to you and the excellent faculty you have with you in the ecosystem management program. Despite walking into Fleming holding an honours BA, I had zero confidence that I could ever actually be successful at a job that I loved. I walked out of the program a more professional, confident and skilled person. I couldn't have done it without the amazing knowledge base you folks have, nor the guidance and understanding. You always told us students that if we worked hard and applied ourselves, the faculty will work just as hard for us, and you weren't kidding! You yourself didn't even have me as a student in any of your classes, yet you saw the potential I had, and continually had faith in my abilities as a student and beyond.” (Shannon Moore, 2010)* |
| **4.0 Employment Trends** | **Summary of Key Findings** |
| **4.1 Employment****Review / discuss:*** Graduate employment statistics over the last few years, including those of students employed in the field, in a related field, outside the field, or unemployed, and any emerging patterns in this data
* Student preparedness for entry-level positions
* Emergent employment trends such as new types of positions, changing job market, regional distinctions, changing employer profile, or emerging skill shortages
 | FDR website ‘enrollment growth’As above Student Preparedness for Entry Level PositionsStudents who have successfully completed the EMT program and were fully engaged in the learning process, extracurricular activities related to their learning and volunteer opportunities while a student, stand a better than average chance of obtaining an entry level position. This is the case because the curriculum focuses on a broad range of skills which include technical and “soft skills” (e.g. writing, public speaking, business acumen, human relation skills). Although students do not always see the value of some of the curriculum at the time of their studies, they often do after graduation. The following email message demonstrates a classic example of how students feel prepared for the work force both at the entry level position and beyond.*I have met Fleming students in every position I've held, and the variety of jobs held by EM students is astounding; from forestry and environmental education to ecosystem restoration and environmental monitoring of types.* *Although I attended Trent University and have obtained my BSc since graduating from Fleming, I feel certain that my experience at Fleming is what makes me successful in obtaining jobs. While my degree may get me in the door, it's always the knowledge I obtained at Fleming that makes me stand out in an interview, whether it be my identification, GIS and database, or technical reporting skills! In particular, it seems that there is always a need for people with GIS and database skills and the ability to integrate the two. I know that for the majority of EM students the GIS and database classes are the ones they dread the most, but my advice would be to pay attention - these may just be the skills that get you a job! My experience with my C4P placement with Kawartha Conservation (a tax incentive database linking Access and GIS info) always seems to peak a prospective employer's interest!* *I would also stress the importance of obtaining a summer position in your field while you are in school - it gives you a head start when you graduate and start looking for employment. There are always positions available, particularly through the Ontario Summer Experience Program and conservation authorities. I took advantage of both while in school and they were excellent resume builders. Several organizations also provide paid internship opportunities - MNR in particular offers an excellent pay rate at the intern level. In fact, the job I am currently doing resulted from an internship interview. The initial job was offered to an internal MNR employee, but my interviewers were so impressed by my interview that they created a position for me!*Emergent Employment Trends (changing job market/employer profile, future skills shortages, etc.) Please refer to section 1.1. |
| **4.2 Other Graduate Destinations****Review / discuss:*** Alternative graduate destinations such as further education, international opportunities, volunteer service, or other experiences
 | Students from both the EMT and EMX programs follow a variety of pathways after graduation, including but not limited to pursuing further education at universities across Canada and around the world; travelling and volunteering in a variety of locations (including Africa and South America); working for companies, government agencies, other organizations, or starting their own business. The previous quotes (Section 3.2) provide an indication of the range of destinations of program graduates. Additional information about the specific learning pathways that graduates follow is provided in section 2.8. |
| **5.0 Strategic Positioning** | **Summary of Key Findings** |
| **5.1** **College Alignment****Review / discuss:*** Program alignment with college priorities such as vision, mission, values, strategic plan, academic framework, and the educational mandate, and / or academic priorities of the School
* Opportunities for new program initiatives based on Program, School, or community strengths and alliances
 | Alignment with College and School PrioritiesFleming College is in the process of updating its strategic plan (2010). There are key elements of the current plan that will carry forward to the next plan that is developed, and the EM program aligns very well with these priorities, including:Achieving Excellence in Student LearningOne strategy to meet this goal is to differentiate education at Fleming by ensuring that all programs emphasize applied learning. The EM program demonstrates a heavy emphasis on applied learning, as discussed in section 2.5 above. Another strategy includes a focus on effective teacher/student interaction. The EM program curriculum provides numerous field trips in both the EMT and EMX curriculum. The EMT program includes a regularly scheduled field day once per week that provides the opportunity for full-day field trips that are often organized to meet the needs of two courses. The EMX program includes a full-day timetabled for applied project work, and an additional day in which full-day field trips can occur; as with the EMT program, often these full-day trips can meet learning objectives for two courses in the program. The EMX program begins with a 4-day field camp and includes an optional 4-day trip to Washington D.C. to attend an international conference. All these activities provide excellent opportunities for students and faculty to interact outside of the formal college environment. These situations provide a unique atmosphere for learning and socializing with fellow students and program staff. The School has also placed a high priority on achieving excellence in student learning with a specific objective to improve pathways both into Fleming and between Fleming and university partners. Please refer to section 2.9 for details on these learner pathways. Leading in Environmental Programs and PracticesFleming College has committed to becoming more sustainable in all aspects of its operation – economically, socially, culturally and environmentally. The EM program, by definition, embodies the concept of sustainability, and continues to demonstrate leadership in this area – in terms of course content, partnerships with organizations committed to sustainability (e.g. Ontario Federation of Anglers and Hunters, conservation authorities, stewardship organizations, other non-profit and non-government organizations, etc.), and leadership in student government (i.e. EM students are well represented on the Frost Initiative and the Frost Sustainable Campus Initiative, and many EM students have held the positions of President and Director of Ecology in the Student Association). In the 2009/2010 academic year, EMT students raised over $800.00 through fundraising activities, and donated the majority of this money to a local non-profit agency committed to stewardship and conservation. The EMX students raised almost $6000.00 in the 2009/2010 academic year, and this money supported the students’ annual trip to Washington, as well as relief efforts in Haiti. The students also left a portion of the money to be accessed by future students. Both the College and the School have expressed a commitment to providing students with opportunities to become more global citizens, and for the first time in several years are encouraging faculty, staff and students to seek opportunities to gain international experience. The EM program developed a strategic plan for the 2007-2012 period, the goals of which included:adjust to reflect new strat plan* To establish reputable globally-focussed partnerships that provide outstanding learning opportunities for students, both within the program and from around the world
* To maintain and develop collaborative research opportunities with organizations at the local, provincial, national and international levels

The EMT program has successfully completed two student field placements to Costa Rica in 2009 and 2010, and will be expanding these opportunities in the future to South Africa in 2011 and two additional countries in the coming years.The EMX program has completed nine very successful trips to an international science and policy conference in Washington, D.C., and it is anticipated that this event will continue for the foreseeable future. The College and School have been very supportive of these activities and have contributed professional development dollars to support faculty and staff in these initiatives. The EM Program Advisory Committee is also in full support of the pursuit of these kinds of opportunities for students. A strategic priority for the School is to enhance opportunities for students to participate in international placement experiences, and the EM program is committed to the development of sustainable partnerships in this area. There is no shortage of evidence to support the value of these types of experiences for students. Positive benefits of international experiences include but are not limited to; developing a deeper understanding of oneself, developing a sense of understanding of and respect for other cultures and ways of living, and refining real-world skills in risk management, organization, adaptation to circumstances, etc. need to review strategic planFleming College’s ‘core promise’ speaks to a focus on hands-on, inspired learning opportunities (LEARN); a supportive community where learners feel at home (BELONG); and the development of skills, knowledge and attributes that will enable all students to be successful in the next steps beyond Fleming, whether it is to a career or to further education (BECOME). The EM program reflects the elements of the core promise and faculty are deeply committed to helping students be successful at Fleming and beyond. It is worth noting that the EM program also has its own Strategic Plan that is used by the program to guide its activities and priorities. This plan is reviewed and renewed on a regular basis by the entire program team. Opportunities for New Program InitiativesMany of these have been discussed in previous sections of the report.The program will be developing a “summer field school” that will run for two to three weeks in August, beginning in 2016. This field school will be an entry requirement for most university students (with rare exception) entering the EMX program, and the focus of the curriculum will be to develop field work and identification skills in university transfer students. This will ensure that program graduates will demonstrate competency in all program outcomes at the time of graduation. Two faculty members are also returning to South Africa in the spring of 2015 in an effort to move forward with the concept of a ‘semester abroad’ with several partner organizations in that country. One member of the faculty also sits on the International Education Committee, and this linkage may offer other avenues to pursue in the future.  |
| **5.2 Competitor Programs****Review / discuss:*** Key parallels and differences between this program and those of its closest competitors, where applicable
* ’Value-added’ program distinctions and their attractiveness to prospective students
 | Ecosystem Management Technician (EMT) ProgramCompetitor Programs – parallels and differencesThe following colleges in Ontario offer technician-level programs in disciplines that are somewhat related ***(NOTE: KPI data for the EMT program uses Fleming College as the comparator, suggesting that there are no comparable programs at the technician level that are comparable)***:1. Confederation College – Forest Ecosystem Management Technician (co-op)

This program is heavily focussed on the forest industry and related occupations. An interesting feature of the program is the “integration of aboriginal approaches to forest and land resource development, in addition to a business/entrepreneurial focus and applied delivery” (<http://www.confederationc.on.ca/node/551>). Students are also assessed for their mathematical skills at the beginning of the semester and may test out of certain math courses. 1. Northern College – Natural Resources Technician

This program appears to cover a broad range of natural resource management areas, including parks, forestry, fish and wildlife, and environmental remediation/assessment. The program also includes a student work placement. The program emphasizes hands-on experiences as well as a broad range of both technical and communication skills. program has considered partnering with this school 1. Ridgetown College – Environmental Management Technician

This program is quite similar to the Environmental Technician program at SENRS. Emphasis is on environmental/waste management, nutrient management, water treatment, site assessment and environmental/agricultural management. The college also promotes the ‘dual diploma’ concept to students who complete this program.1. Sault College – Natural Environment Technician, Conservation and Management

This new program appears to be quite similar to the EMT program at Fleming both in terms of its breadth and focus. The program includes a co-op work placement after completion of semester 2, and also has a component that certifies students in the use of ATV’s, boats and snowmobiles. 1. Seneca College – Environmental Landscape Management

The focus of this program is primarily on landscape management and horticulture but is based on foundation knowledge of ecosystems and ecology. Graduates secure work with landscape companies, municipal parks and conservation authorities, parks, golf courses, or start their own companies. There is a mandatory 16-week co-op term between first and second year of the program. The college has transfer agreements with universities in Ontario and New Brunswick that provide pathways to degree completion. There are some parallels between these competitor programs and the EMT program, including the emphasis in most cases on hands-on field skills and some form of student work placement, whether it be a course with a semester, or an entire semester between first and second year of the program. There are some commonalities with respect to an emphasis on the use of GIS technology and/or aboriginal awareness. Fleming needs to be mindful of the success of the new program at Sault College, which is considered to be the most significant competitor at this point. The program needs to look into Alberta’s provincial standards for accreditation because a number of EM students have indicated that the program is not well recognized in Alberta and are often encouraged to complete a Forestry Program to meet provincial standards even though the EM students get hired.Additional programs of a similar nature appear across the United States; however, these are not seen as competitors. Need to review library data for this section‘Value-added’ program distinctions and their attractiveness to prospective studentsThe unique features of the EMT program at Fleming appear to be the greater emphasis that is placed on the development of GIS skills as well as the focus on career preparation (resume preparation, EM interview day), public speaking/advocacy, and the integrated capstone field ecology project in semester 4 of the program. The EMT program has also introduced a field placement course that students must complete at the end of their fourth semester of studies. This course now includes team placement opportunities in Costa Rica, Moose Cree First Nation, and South Africa. The Aboriginal Emphasis designation for all EMT graduates is also a value-added element of the program.  The other ‘value-added’ element of the SENRS diploma programs is the common first semester of studies, which provides students with an opportunity to be exposed to a wide variety of program areas and change their program choice prior to continuing on to semester 2. The other added feature of the SENRS programs is the opportunity to begin studies in the January semester (for most programs) and ‘fast-track’ to diploma completion.  Ecosystem Management Technology (EMX) ProgramCompetitor Programs – parallels and differencesThere is only one college in Ontario that offers an Ontario College Advanced Diploma (Technology diploma) in a related discipline:1. Sault College – Natural Environment Technologist – Conservation and Management

This program is promoted as an extension of the 2-year technician program. The program offers advanced GIS techniques (only one course), ‘emerging disciplines’ such as energy site development and invasive species, as well as a field placement opportunity for an outside agency in the fifth semester of the program. Courses are delivered in a modularized format to enable students “to work on projects for a continuous block of time” *(http://www.saultcollege.ca/Programs/Programs.asp?progcode=5221&cat=overview&groupc=NR5)*Several colleges across Ontario offer a post-diploma certificate in a natural resources/environmental discipline, but these do not appear to be direct competitors to the EMX program. Both Cambrian and Niagara College offer a post-diploma certificate in Environmental Monitoring/Assessment, but these are more closely aligned with the Environmental Technician/Technology program. Niagara College also offers a post-diploma certificate in Ecosystem Restoration, but this program is more of a competitor program to the Ecological Restoration Joint degree program. Sault College offers a post-diploma certificate in Ecosystem Surveys – Field Skills; however, this appears at the outset to be a blend of skill-based courses that are similar to the suite of courses offered in semester 2 of the diploma programs at SENRS. ‘Value-added’ program distinctions and their attractiveness to prospective studentsThe EMX program at SENRS attracts a significant number of university students every year, such that approximately 40% of the student cohort in any year consists of university students who have completed a degree in a related discipline. The EMX program is also open to students who have graduated from a technician program, either from Fleming or another college in a related discipline. Every year there are several students who join the EMX cohort from related programs. The balance of students consists of students who have completed the EMT program. This student mix creates a unique, rich and challenging teaching and learning environment for students and faculty, the results of which can be seen in the projects and work that is completed, by individual students, student teams, and the class as a whole. The EMX program has a unique focus on urban ecosystems, ecosystem health, economics and sustainable development, from both the corporate and first nations’ perspective. Applied projects (in particular the Credit for Product double-credit course) span both semesters of the program, and all students have the opportunity to travel to an international conference in Washington, D.C. at the beginning of their final semester of studies. Project management and the ability to work successfully in a team environment are two essential employability skills that set the EMX program apart from all others at the School.All of these elements are unique to the EMX program, and are features that should be maintained as the program moves forward.  |
| **6.0 Enrolment Trends** | **Summary of Key Findings** |
| **6.1 Demand for the Program** **Review / discuss:*** Patterns in the number of program applicants, qualified applicants, and actual registrants over the past 6 years
* Changes, if any, in the student demographic profile, including level of maturity, diversity, prior knowledge, technological literacy, work experience, and expectations
* Impact, if any, of this changing student profile on program curriculum
 | Program Applicants and RegistrantsThe most recent available data from Fleming Data Research (FDR) indicates that student numbers in both the EMT and EMX program have increased between Fall 2004 and Fall 2013 (based on Day 10 registration data). Changes in Student Profile and Impact on CurriculumData obtained from Fleming Data Research (FDR) indicates that the majority (63%) of students who entered semester one in the fall of 2008 were non-direct students, i.e. students who did not attend school for the previous 12 months and who had either completed high school (or not), or who had completed some post-secondary education (or not). The majority of these students were over the age of 21. The majority of students from both direct and non-direct categories were male, and the large majority (75 to 83%) of both non-direct and direct students was not from the local area. These mature learners have high expectations of teachers, support staff and their classmates, and this serves as a positive influence to the learning environment. The EMX program includes approximately 30 to 40% university students, who also have high expectations of faculty and staff. FDR ‘enrollment growth’As above |
| **6.2 Student Progression****Review / discuss:*** Patterns of student success and retention on a semester by semester basis over the last six years
* The effectiveness of any strategies adopted to improve student success and retention
 | Student Success and Retention**EMT Program:** FDR data indicates that, between 2003 and 2007, an average of 57% of students who entered the EMT program in semester one of the fall term continued on to semester two the following winter.\* For the same time period, an average of 86% of the students continued from semester 2 to 3, and 93% continued to semester 4. These figures have not changed significantly from year to year over the 5 year period. *\* Students are still given the opportunity to change their program choice in semester one, even though they have to select a program when they initially apply through the OCAS system. The data indicates that 89% of the EMT students are retained within the college between semesters one and two, so clearly a proportion of the student cohort transfers out of the EM program at the end of semester one*. *This is also the case for some of the other diploma programs at SENRS*. **EMX program:**FDR data indicates that, between 2003 and 2005, an average of 98% of students who entered the EMX program in semester five of the fall term continued on to semester six the following winter. The number of students who continue from the EMT to the EMX program has also increased between 2003 and 2005, from 23% in 2003 to 48% in 2005. Strategies to Improve Student Success and RetentionProgram faculty and staff in the program are committed to supporting students in the program, and all team members go above and beyond to assist students. Students who are on academic probation are also required to meet with the Program Coordinator on a regular basis to review their academic progress and provide necessary support. The Coordinator calls each and every student coming to third year during the summer period to answer any questions they may have about the program, and to help them prepare for the year ahead. This takes countless hours of time in the evenings.  |
| **7.0 External Relations** | **Summary of Key Findings** |
| **7.1 Alumnae** **Review / discuss:*** The type and range of alumnae involvement in the program
* Current and future strategies to engage alumnae in the program
 | The EM program welcomes alumni into the classroom to provide guest lectures for students whenever it is possible to do so. Program alumni are also very involved in the annual EM interview day, which takes place in February of each year. This effort requires the participation of 9 to 12 individuals who commit to spending the day conducting individual interviews with students in their fourth semester of the program, and participating in a debrief with the entire class at the end of the day. In addition, these individuals also review student resumes and cover letters, and provide individual feedback on these documents. Many program alumni also participate in the Credit for Product applied projects course in semesters 5 and 6, and serve as project mentors for small teams of students. This is a major time commitment, and we have had some individuals who have supported the program in this capacity for over 10 years. Program alumni also serve as active members on the Advisory Committee. The Program is hoping to involve alumni and program supporters in some of our international experiences in the future, and perhaps engage them in more concrete ways in the annual Ecohealth conference. |
| **7.2 Community Relations****Review / discuss:*** Significant partnerships, relationships, connections, or offers of support from the community that help to enrich the program and the student experience
* Faculty, staff, and student involvement in volunteer projects and events
* Contributions to the not for profit sector such as committee or board service by program-associated faculty and staff
* Community recognition in the form of student bursaries, awards and scholarships
 | PartnershipsThe program has partnerships with a wide range of organizations that are involved in the provision of field work activities, field placements and applied projects. These include but are not limited to: the Ontario Federation of Anglers and Hunters, local conservation authorities (Kawartha Conservation, Central Lake Ontario Conservation Authority, Toronto and Region Conservation Authority), city of Toronto, city of Cobourg, City of Kawartha Lakes, Ross Memorial Hospital, Ontario Stewardship Councils, the Ministry of Natural Resources, numerous non-government organizations, cottagers associations, etc. Involvement in Volunteer Projects and EventsThe EM program team and program students participate in numerous volunteer events, both on campus and in the broader community. These events include, but are not limited to: annual campus clean-up, TD annual shoreline clean-up, Frost Sustainable Campus Initiative and Students for Sustainability, Let’s Talk Science programs, Open House and other marketing events, local Dragon boat races in support of breast cancer research, etc. Both the EMT and EMX students fundraise to support curriculum-based activities, including the team-based field placements, the trip to Washington, and solicitation of sponsorships for the annual Ecohealth conference. Where fund-raising targets are exceeded, monies are donated to community organizations, both locally and abroad, and seed money is left to support students in subsequent years. Program faculty also participate in citizen science activities with conservation organizations, such as the annual BioBlitz, sponsored by the Royal Ontario Museum, and monitoring surveys with conservation authorities. Contributions to the not-for-profit sectorProgram faculty are involved in many committees and organizations beyond their work at Fleming College. These include, but are not limited to: * Peterborough Rotary Club
* Greater Peterborough Chamber of Commerce
* Peterborough and District Labour Council
* Royal Canadian Legion
* Community theatre, neighborhood associations, etc.
* Local stewardship councils
* Canadian Organization for Tropical Education and Rainforest Conservation
* please refer to faculty and staff resumes for more detailed information (S:\shared data\CLT\School on Environmental and Natural Resource Sciences\SENRS\_SCHOOL\_PROGRAMS\Ecosystem Management Program Review\Appendices) Kris, please can you check to see if these documents are still in the folder??If they are not, we should take this out.

Community RecognitionThe program faculty support several annual awards that recognize students who have gone above and beyond the call of duty, overcome personal challenges at school, or contributed in a positive way to the learning community while at college. Program faculty provide some of their own money to recognize these students with specific awards.  |
| **7.3 Program Advisory Committee****Review / discuss:*** The distribution of Committee membership by constituency, sector, and / or region
* The vitality of the Committee such as the frequency of meetings, and members’ level of participation, engagement, and turnover
* The extent to which Committee operations are aligned with the Fleming College Advisory Committee Orientation Manual and Advisory Committee policy.

  | The EM Program Advisory committee has undergone a revitalization of its membership over the past few years, and includes individuals from a broad spectrum of industry and related sectors, including universities, municipalities, Ontario Government ministries, private consulting firms, government agencies, and non-government organizations. The majority of members are located in Ontario, but one member is located in Manitoba.The Advisory Committee meets once per year, or more often as required (e.g. Program Review panel). Members are highly engaged and many of them support the program through direct involvement in applied projects, guest speaking engagements and the provision of field placement opportunities. All committee members have received the College’s Orientation and policy manuals and abide by the guidelines therein.  |
| **8.0 Program Resources**  | **Summary of Key Findings** |
| **8.1 Human Resources** **Review / discuss:*** The number and distribution of all faculty, technicians, and technologists associated with the program including full-time, part-time, sessional, and cross-appointments
* Profile of the Dean, faculty, and staff associated with the program including cumulative credentials, scholarship, work-related and teaching experience, and expertise in education
* Significant faculty or staff accomplishments such as professional recognition and awards, achievement of credentials, and appointments
* Contributions to the professional community or industry by program-associated faculty and staff including board / committee service, research, and presentations / publications
* Current staffing levels for the program in relation to program

 numbers, curriculum, delivery modes and areas of specialization / generalization* Hiring priorities over the next few years based on the above
* Current professional development and renewal plans in relation to program or student needs
 | Faculty and Staff ComplementThe EM program consists of two full-time faculty, one full-time technologist, and between 10 and 12 part-time faculty associated with the program in any given semester. There are some full-time faculty who teach in the program from either another program area or School. Please refer to the faculty resumes in the Appendix for details regarding their credentials and expertise in education (S:\shared data\CLT\School on Environmental and Natural Resource Sciences\SENRS\_SCHOOL\_PROGRAMS\Ecosystem Management Program Review\Appendices). Faculty and Staff Profiles and RecognitionThe majority of faculty in the program have completed their undergraduate degrees, and several have completed both a B. Ed. and a Master’s degree. The program team includes individuals who have taught at Fleming College for over 20 years, as well as some who are new to the institution. Program faculty also hold an extensive range of certifications in a wide variety of current protocols. Two faculty have received the Charles E. Pascal Award for Teaching Excellence, and have also received several nominations for this award. One faculty member also received the NISOD Excellence in Teaching award from the University of Texas. More detailed information regarding individual faculty awards and credentials can be found in the detailed faculty resumes, available in the CLT directory (S:\shared data\CLT\School on Environmental and Natural Resource Sciences\SENRS\_SCHOOL\_PROGRAMS\Ecosystem Management Program Review\Appendices). Kris, again, would you please check to see if these are still in the folder? If not, please remove this statement. Thank you so much.Committee Membership, Research and PresentationsProgram faculty are (or have been within the last 5 years) involved in numerous committees, both within the Fleming College community and beyond. These committees within Fleming include: President’s Advisory Committee, President’s Strategic Planning Advisory Committee, Board of Governors, Academic Planning and Development Committee (now the Academic Council), Academic and Student Affairs Committee, Council of Coordinators, Student learning First Initiative, Internationalization Committee, Program Advisory Committees, etc. Faculty have also been involved in countless presentations to a wide range of groups and associations outside the college. These presentations are done on a volunteer basis, beyond normal working hours (often on weekends and/or during official vacation periods) and faculty do not receive any financial compensation for these contributions. Hiring PrioritiesCurrent Staffing Levels and Hiring PrioritiesThe EM program includes a significant number of part-time faculty in its teaching roster. This makes it a challenge to build continuity and create synergies within any given course, and between core program courses. This challenge is particularly evident in the GIS area, where there has been a high faculty turnover in these courses over the past several years. It is critical that students are able to see the connections between courses in the program, made more visible through the development of joint assignments, shared data, and other means. Without consistent faculty in core program courses, these synergies are very difficult to create. A priority continues to be the establishment and maintenance a consistent cadre of committed teaching faculty in all core program courses. Professional Development PlansThe EM program, upon the recommendation of the advisory committee, re-introduced the Aboriginal Emphasis into the program in the fall of 2010. Members of the program team met in December of 2014 with the Aboriginal Studies Coordinator and will be working with this individual over the coming months to enhance indigenous content within specific core program courses. Individual faculty continue to participate in training courses and certifications to enhance their skill sets and expertise. |
| **8.2 Physical Resources****Review / discuss:*** Program costing information
* Scope of current program resources such as laboratory equipment, software, library holdings, or tools essential to or which enhance program delivery or student learning
* The adequacy of above resources in the context of program outcomes, program currency, and student numbers
* Program specific external revenue such as sponsorships, grants, donations or gifts-in-kind
* Other externally generated revenues, if applicable
 | Program CostingThe EMT and EMX programs each contribute 48 per cent to College overhead. Program ResourcesThe EM program continues to build capacity in terms of tools and resources available for student learning. Faculty are diligent with respect to the provision of both on-line and hard-copy resources for student learning. Software is constantly being upgraded in the geomatics area to ensure that students are provided with the most current technology. Some of the resources for student learning (e.g. plant and invertebrate collections) require continual maintenance and upgrading. The EM program places a high degree of emphasis on “experience-based” learning, which requires investment in field trips, guest speakers, and the willingness to take a certain amount of ‘risk’ in the techniques that are used to meet learning outcomes (e.g. the organization and delivery of the annual Ecohealth conference). As budgets continue to tighten, it becomes more challenging to deliver such experiences in a cost-effective manner that does not compromise student learning. The third year fall camp, which takes place in the first week of classes, requires a significant amount of field tools, and the program continues to acquire additional equipment for this camp, as dollars permit, to become a more self-sufficient operation. This camp will now take place at a new location starting in the fall of 2015, so time will need to be spent in the May-June period to assess the human and physical resource requirements in order to successfully deliver camp at this new location. The program re-introduced a camp experience for students enrolled in the EMT program for the first time in the fall of 2014. This camp will also require assessment over the May-June period to make any adjustments to curriculum and delivery prior to fall 2015. Adequacy of Resources Resources are adequate to meet the needs of the current enrolment; however, an increase in student numbers may require additional resource procurement. External RevenueThe program does not have any significant external sources of revenue from any large companies or organizations; however, the annual student-run Ecohealth conference has generated, on average, approximately $1,000.00 in revenue through sponsorships, registration fees and donations. The third year class also raises between $5,000 and $7,000 every year through organized activities such as pubs, leaf raking, and bottle drives. This money has been used to off-set the costs of their annual trip to attend an international conference in Washington, D.C.  |
|  |  |

File Program Review report in: **S:\shared data\CLT\School Name\Program Name**

Attach copies of existing and revised bench marks

Attach an updated Program Curriculum Map

**Based on an analysis of your key findings, identify areas that require attention.**

**Develop recommendations and an action plan that reflects the program’s priorities and its capacity to achieve them.**

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| **Program Review Action Plan** | **Responsibility** | **Timeframe** |
| **Recommendations:** |
| **Review admission requirements to the EMT program and consider the inclusion of a fitness standard.**  |  |  |
| **Review graduation requirements for the program and consider current first aid and CPR certification as a graduation requirement of the EMT program.** |  |  |
| **Provide opportunities for core faculty to become trained in Ecological Land Classification.** |  |  |
| **Explore opportunities for activities that could be included in the students’ co-curricular report card.** |  |  |
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