# Proposal for Authorization to Implement New Program

1. **PROGRAM IDENTIFICATION**
   1. **Title of Proposed Program:**

Bachelor of Science/Art in Environmental Science

* 1. **Department or Functional Equivalent:**

Biological Sciences; Chemistry, Economics, Geography & Geology, Finance & Business Law; History, Languages & Literatures, Occupational & Environmental Safety & Health, Philosophy & Religious Studies, Physics, Political Science, Sociology, Anthropology, & Criminal Justice, Women’s Studies

* 1. **College, School or Functional Equivalent:**

College of Letters & Sciences; College of Business and Economics; College of Education

* 1. **Timetable for Initiation:**

Fall 2012

**2. CONTEXT**

The University of Wisconsin-Whitewater (UW-W) is requesting authorization to implement a new degree program with optional Bachelor of Science and Bachelor of Arts in *Environmental Science*. This request is justified and appropriate due to targeted faculty growth in this area, improved facilities and access to teaching resources, and rapid increase in student interest in recent years. Moreover, there is growing evidence that job opportunities in this field are on the rise with particular growth needs in the fields of environmental technology and environmental management. Although there are a number of other excellent programs in the state focusing on similar topics, we feel that UW-W is ideally suited both geographically and programmatically to provide a unique major in environmental sciences that will accommodate the needs of our students and prepare them for a successful career in this field.

**2.1 History and Student Interest**

A popular minor at UW-W that has been in place for over a decade is Environmental Studies. Student enrollment numbers have been consistently between 40 and 50 minors each year with little effort made to recruit students or market the minor. Many of these students major in degree programs directly tied to Environmental Studies such as Biology, Geography, History, and Occupational Safety. Within those programs the student interest in environmental sciences is quite obvious. For instance, one of the most popular submajors in the Department of Geography and Geology, which currently has the largest number of undergraduate geography majors in the state, is the Physical/Environmental emphasis with 50 or more students typically enrolled at any one time. Similarly, in the Department of Biological Sciences, the Ecology/Field emphasis is one of their most popular submajors with rapid growth in this area as well as all other areas of biology (i.e. more than tripled since 2000). Many of the students in both of these programs are particularly interested in environmental sciences but presently cannot pursue a specific major in this field. This makes it challenging for them to compete for jobs in environmental sciences as well as to get into environmental science graduate programs. Instead, they must sell themselves as environmental scientists trained in the combination of their discipline-specific program and the environmental studies minor. Because there is no major in environmental sciences on this campus, their transcripts do not clearly indicate their study in this area.

During the spring of 2010, a campus-wide survey was completed to gauge student interest in development of the proposed major. This survey was done both online and in classrooms to allow a reasonable sample size across a broad spectrum of students. A total of 343 students responded. The results demonstrated strong support from current UW-W students for development of the new major. Most noteworthy was that 74% of students either “agreed” or “strongly agreed” that there would be interest among current and future students in a new major focused on Environmental Science. Moreover, more than half of the students surveyed indicated that students with a dedicated interest in this subject currently do not have an ideal major to select from and instead must select an alternative major that is close to the topic of Environmental Science (e.g. biology, geography, etc.).

Because the proposed major in environmental science would overlap significantly with the environmental studies minor it will likely result in a decrease in the number of environmental studies minors as well as some of the aforementioned submajor areas within certain existing programs. However, since the proposed major has a strong physical science emphasis which is not present in the minor, and a heavy interdisciplinary emphasis not present in the other existing programs, it is quite likely that many students will still choose other majors and elect to only minor in environmental studies. Thus, it is expected that the proposed major will not “wipe out” any current programs in place but instead provide an ideal option for students to choose from who are particularly interested in Environmental Science. This is supported by the recent growth in virtually all programs contributing to this major and the need to develop interdisciplinary alternatives that are more ideally suited to specific student interests.

**2.2 Instructional Setting of Proposed Program**

The proposed major is truly interdisciplinary. UW-W currently has 24 faculty from 13 different departments who are committed to teaching topics in environmental sciences. The combined expertise of these faculty provides a wide range of knowledge and experience within the broad fields of environmental sciences to offer a Bachelor’s degree to undergraduate students. These faculty are primarily located in the College of Letters & Sciences (CoLS) (*Biological Sciences*, *Chemistry*, *Geography & Geology*, *History*, *Philosophy & Religious Studies*, *Political Science*, *Sociology*, *Anthropology & Criminal Justice* and *Women’s Studies*) but also include individuals from the College of Business & Economics (CoBE) (*Economics, Business Law & Finance*) and from the College of Education (CoE) (*Occupational & Environmental Safety & Health*). Moreover, each of the proposed submajors as well as technique emphases all rely upon courses from across the three colleges. This allows a truly interdisciplinary approach to be taken with curriculum design and allow opportunities for team-teaching across both departments and colleges.

Because all of the faculty are already in place and teaching the courses for their current discipline-specific programs that would contribute to the proposed major, it will not be necessary to add substantial staffing. Instead, ideal combinations of courses have been identified to define the broad major and submajor course options and requirements. There may be a small amount of additional staffing necessary to potentially develop one or two new courses but at this time it is projected to be 1.0 FTE or less. Because many of the new environmental science majors are expected to select this major over others already in place (e.g. biology, geography/geology) while still sharing the same classes, it is anticipated that overall staffing needs will not substantially change. However, it is recognized that students will likely also come from new areas and additional staffing may be needed later as the number of majors increases.

Due to the heavy interdisciplinary nature of the proposed program there will not be a specific location where it is “housed,” but rather it will be managed by a core group of faculty coordinators currently located in each of their home departments but contributing heavily to the proposed major. These individuals will primarily be responsible for managing the scheduling and advising of students from within their respective submajors, and for coordinating with each other across submajors.

A program coordinator will be identified from this group to oversee the progam as a whole and to manage the core group of faculty coordinators from each area. The responsibilities of this individual will be typical of most program coordinators including overseeing advising, assessment, program modifications, and representation on college and university-level committees as needed. He/she will initially be given a 25 percent release time from teaching and be paid a modest stipend for this time commitment. The expected term of the program coordinator will be three years with annual reviews by the College of Letters and Sciences (L&S) Dean’s Office. The program coordinator will rotate every three years across each submajor with representation changing accordingly. As the number of students increase it will likely be necessary to increase the amount of release time given to the program coordinator. The L&S Dean’s Office will also be a coordinating partner of the new major in its infancy stages (i.e. during Year 1) before it becomes solely managed by the program coordinator and his/her team of submajor faculty coordinators.

**2.3 Relation to Mission Statement and Strategic Academic Plan**

UW-Whitewater’s Strategic Plan has five major components. This program supports the Strategic Plan in the following areas:

1. *Programs & Learning: In order to expand and extend learning, we must provide dynamic and accessible educational and co-curricular activities.*

The major will provide undergraduate students expanded degree opportunities that focus more on a specific topic of interest currently covered in a wide range of programs. Moreover, the interdisciplinary approach to this new major across multiple departments and colleges provides an opportunity for broad coverage as students are better prepared for a career in environmental sciences.

1. *Scholar-Educator Community: We must further develop UW-Whitewater’s reputation as a community of scholar-educators and professionals who possess and practice excellence in the creation of new knowledge and its effective integration in teaching, research, learning, and problem-solving.*

All students in the major will be required to complete a capstone course. This senior-level course will allow students to utilize their knowledge and skills acquired through their coursework and experiences while completing the major. Students will be required to collect original data or observations and use this information to answer a question that is directly related to contemporary environmental issues. Students will be expected to be proficient writers and presenters of this information upon completion of the course and fulfillment of the degree requirements.

1. *Diversity & Global Perspectives: We desire a reputation as an institution that truly values and nurtures diverse intellectual, cultural, creative, and service opportunities.*

The new major will have numerous components that provide increased opportunities for students to be exposed to a broad range of cultural diversity. This includes travel study opportunities to locations experiencing unique environmental challenges, service-learning initiatives in lower income urban and rural areas where environmental stresses are occurring, and exposure to how different cultures treat and utilize the environment for their differing needs. The latter will occur through invited speakers, guest lectures, and regional field trips associated with specific courses.

UW-W has a mission to serve students with disabilities. Thus, the campus has been designed to allow expanded access to students with disabilities so that they can participate in virtually all of the same learning activities as their able-bodied classmates. For instance, many of the science labs have instrumentation that has been designed or modified to allow student use from wheelchairs. The campus has a 120-acre Nature Preserve with natural prairies, forests, and wetlands, much of which is accessible to students in wheelchairs. In addition, certain Travel Study courses to be included in the proposed major that are already in place, such as the *BIOLOGY/GEOLGY 451* travel study course *Natural History of Yellowstone National Park and the Upper Great Plains*, have been designed to accommodate the unique needs of students with these challenges.

The proposed major will also be designed to allow expanded student access through online learning. Some of the courses planned for the new major already have online options and it is expected that this number will continue to grow. Thus, it will be possible for a portion of the major to be taken online. This will permit expanded access to the major for those that are unable to regularly come to UW-W to complete their degree.

1. *Regional Engagement: We desire to be a valued education, economic and cultural resource; we will continue to seek out new ways of serving regional communities.*

The experiential learning emphasis to the proposed major provides students with unique opportunities to learn beyond the classroom by studying environmental issues in the field, traveling to areas where the environment is different, and conducting research projects that allow students to collect, analyze, and write about their observations to better understand the complexities of environmental problems. The experiential learning component will provide ideal service-learning opportunities aimed at assisting the local or regional community at better understanding environmental problems and identifying alternative ways to use environmental resources while furthering sustainable development.

1. *Professional & Personal Integrity: We aim to build on our reputation as an institution of lasting integrity which is actively and visibly demonstrated through the words and deeds of faculty, staff and students.*

An important part of personal and professional integrity is understanding how to properly treat the environment in a sustainable way. Creation of a new major on campus with focus on Environmental Sciences will raise the level of awareness and importance of our role in properly managing environmental resources. The university has already made a commitment to reducing campus climate impacts through consideration of emissions, improved recycling, and less dependency on fossil fuels for energy. Students and faculty are becoming more aware of these issues through training workshops and new information being added to courses. However, the existence of a major focusing on the environment will provide more legitimacy to these efforts. The proposed major has a number of humanities courses (e.g. *HISTRY 190: N. American Environmental History*; *PHILSPHY 248: Environmental Ethics*) that help students to better understand where ethics, values, and personal integrity come into decision-making regarding contemporary environmental problems. This is an important part of a well-balanced environmental sciences program.

**3. DESCRIPTION**

**3.1 Program Description**

The details of the curriculum are provided in the next section. However, noteworthy characteristics of the program include the following:

1. There will be substantial breadth and depth with the proposed program. The breadth is provided by requiring all students to take a common set of core courses, a capstone course, and a minimum number of credits from each of the submajors. The depth is provided by giving students the opportunity to concentrate a majority of their credits in one submajor and by gaining expertise in at least one specific skill/technique in environmental sciences.
2. The breadth of the major is aligned with the strategic goals and objectives of Liberal Education America’s Promise (LEAP) which emphasize development of practical skills (e.g., writing, critical thinking, quantitative analysis) that can be applied across a wide range of applications. Writing and quantitative analysis, in particular, will be constant emphases throughout the major.
3. Experiential learning will be emphasized throughout the program. This will include a requirement for students to select from at least one of the following: intensive undergraduate research project with a faculty mentor, active involvement and leadership in a service-learning activity, travel study, or internship. Many students will likely do more than one of these. In addition, experiential learning opportunities within classes such as field trips, service-learning, and field work will be available. The Capstone course will require a project to be completed that focuses on a current problem in Southeastern Wisconsin or Northern Illinois with students expected to do field work to investigate the problem and develop potential solutions.

The conceptual layout of the proposed major is demonstrated in Figure 1 below.

Figure 1: *Conceptual layout of the proposed major*



**3.2 Academic Objectives and Learning Outcomes**

The proposed major has broadly-based learning objectives for the major as a whole, and specific learning objectives for each of the sub-majors and techniques requirements within.

1. **Broad Learning Objectives and Outcomes**
2. Students will have knowledge of significant current and historical environmental issues at the regional, national, and global scales, and be able to describe the origins, drivers, and implications of each from both scientific and social perspectives.
3. Students will be proficient at a broad range of skills and techniques needed to collect, analyze, and disseminate information related to contemporary environmental problems. Students will be able to demonstrate an advanced understanding of research techniques in their chosen field.
4. Students will be properly prepared for success in the 21st Century following the LEAP Essential Learning Outcomes (AAC&U, 2011):
5. Knowledge of Human Cultures and the Physical and Natural World
6. Intellectual and Practical Skills
7. Personal and Social Responsibility
8. Integrative and Applied Learning
9. **Submajor Learning Objectives**
10. Natural Sciences
    1. Students will gain an understanding of the scientific method and the basic principles of ecology at the population, community and ecosystem levels
    2. Students will gain an understanding of how humans have impacted biodiversity through biological, chemical, and physical changes to aquatic and terrestrial environments.
    3. Students will gain an appreciation of the importance of recognizing what constitutes normal biological variation in properly addressing environmental impacts.
11. Geosciences
    1. Students will appreciate the complexity and interconnectedness of earth systems, including the atmosphere, biosphere, hydrosphere, and lithosphere and how they influence the source, geographical distribution, and abundance of natural resources.
    2. Students will be able to recognize threats to natural resources from human activity, how humans are making themselves more vulnerable to threats from environmental hazards, and potential solutions to alleviate both types of threats.
12. Environmental Resource Management
    1. Students will recognize the vulnerability of natural resources to human activity and the need to nurture and manage them in a way that provides opportunity for sustainable development without compromising their longterm abundance and renewability.
    2. Students will understand major environmental governance theories and approaches to solving environmental problems including technical solutions, market approaches, regulation, and behavior modification. In addition, they will be able to demonstrate basic knowledge of the organizations that address environmental issues at various scales.
    3. Students will gain a basic understanding of environmental law in the United States and have the ability to recognize the objectives of the law, identify responsible parties and their legal obligations under the law, and evaluate the actions of these parties against their responsibilities.

**3.3 Curriculum**

The curriculum design for the proposed major is shown in Table 1 on the next page. The specific course options for the core, each submajor, and techniques area are provided in Appendix 1 along with additional details about each including pre-requisites and/or unique requirements. Courses that require development or modification from current structure are also noted. Additional course development will be done as needed and recognized through program assessment. A minimum number of 57 credits is required for program completion. No minor is required.

All students within each submajor will be required to take a minimum number of courses from other submajors as a way to ensure sufficient breadth within the major, and to enable all students to appreciate and understand the broad nature of all environmental problems. Furthermore, students will have numerous opportunities to work with students from other submajors throughout their coursework, particularly in the skills/techniques and Capstone courses. In the Capstone course, students will work in teams made of individuals from each of the submajors to study a real-world environmental problem and bring their unique knowledge and skills together to try and identify potential solutions. These opportunities will enable students to not only learn from professors and through their experiences, but also from each other while simulating the type of scenarios that are likely to occur in environmentally-focused jobs.

A second unique characteristic of the proposed major is the requirement that all students complete a minimum of three credits of experiential learning tied directly to their respective submajor or another submajor. Options include a focused undergraduate research project that extends across an entire academic year, participating in a travel study course with environmental focus, or study abroad to an environmentally sensitive region of the world, and/or completion of an internship focused on some aspect of environmental science. Numerous travel study courses have already been established include those to Yellowstone National Park (*BIOLOGY/GEOLGY 451: Natural History of Yellowstone National Park and the Upper Great Plains*) and Jamaica (*SAFETY/MANGEMNT 493: Sustainable Business in the Carribean*). Additional trips are being planned through new partnerships currently being established with the new major in mind between UW-W and institutions such as the Monteverde Institute in Costa Rica. UW-W also has signed international Memorandum of Understanding (MOU) agreements with various educational institutions around the world to allow students to study abroad. Some of these are in environmentally-sensitive regions such as Deakin University (Australia) and the University of Guanajuato (Mexico), thus allowing students the opportunity to intensively study the unique environmental challenges occurring in other parts of the world.

Finally, the proposed major includes a unique requirement for all students to acquire expertise in a specific set of skills or techniques that are likely to compliment a career in environmental sciences. This will not only make students more competitive for potential job opportunities or graduate school but will allow them a more in-depth opportunity to understand how information is collected, analyzed, and disseminated when looking for solutions to contemporary environmental problems.

*Table 1:* *Overall summary of curriculum design, credits, and required courses for each section.*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Environmental Science Major- Curriculum Design | | | | | | |  |  |  |
| Core (13-15 credits) | | |  |  |  |  |  |  |  |
| 4 credits- Introduction to Environmental Sciences (new course) | | | | | | | |  |  |
| 3 credits- Human Environmental Problems or N. American Environmental History | | | | | | |  |  |  |
| 5 credits- Introductory Chemistry | | | |  |  |  |  |  |  |
| 3 credits- Technical & Scientific Writing (Environmental Writing) | | | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Submajors (40 credits for each) | | | |  |  |  |  |  |  |
| Natural Sciences: | |  |  |  |  |  |  |  |  |
| 5 credits- Introductory Biology 1 (Bio 141) | | | |  |  |  |  |  |  |
| 5 credits- Introductory Biology 2 (Bio 142) | | | |  |  |  |  |  |  |
| 15 credits- Other Approved Ecologically-focused Biology courses | | | | | |  |  |  |  |
| 6-9 credits- Other Approved Chemistry, Physics, Physical Geography, or Geology courses | | | | | | | |  |  |
| 6-9 credits- Approved Courses from Environmental Resource Management Sub-Major | | | | | | | | | |
| 1-3 credits- Experiential Learning Course (travel study, undergraduate research, internship) | | | | | | | |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Geosciences: | |  |  |  |  |  |  |  |  |
| 5 credits- Intro. Physical Geography (lab) | | | | | | |  |  |  |
| 3 credits- Environmental Geology | | |  |  |  |  |  |  |  |
| 15 credits- Other Approved Environmental Geography/Geology couses | | | | | |  |  |  |  |
| 6-9 credits- Other Approved Biology, Chemistry, and/or Physics | | | | | |  |  |  |  |
| 6-9 credits- Approved Courses from Environmental Resource Management submajor | | | | | | | | | |
| 1-3 credits- Experiential Learning Course (travel study, undergraduate research, internship) | | | | | | | |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Environmental Resource Management: | | | |  |  |  |  |  |  |
| 9 credits- Required OESH and COBE courses | | | | |  |  |  |  |  |
| 15 credits- Other Approved Environmental Resource Management courses | | | | | | |  |  |  |
| 6-9 credits- Approved courses from Natural Sciences submajor | | | | | | | | |  |
| 6-9 credits- Approved courses from Geosciences submajor | | | | | | | | |  |
| 1-3 credits- Experiential Learning Course (travel study, undergraduate research, internship) | | | | | | | |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Techniques Unique Requirement (at least one technique specialty required for all majors): | | | | | | | | |  |
| Geographic Information Systems (GIS) | | | |  |  |  |  |  |  |
| Analytical Chemistry | | |  |  |  |  |  |  |  |
| Ecological Field/Lab Analysis | | |  |  |  |  |  |  |  |
| Environmental Writing | | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Capstone Course (4 credits) | | | |  |  |  |  |  |  |
| All students work on team-based projects in groups made up of at least one student per submajor. | | | | | | | | | |

Because courses within the major are taught at least once per year and most commonly each semester (See Appendix 1), it is anticipated that with proper advising and early commitment by the student to the program, they will be able graduate within four years. For some students this may require enrollment in summer school and/or winterim classes at least once but given the wide variety of opportunities to earn credits beyond the traditional academic year, this should not be a problem. Given the financial challenges that some students face today which results in having to work while in school and take reduced load some semesters, it is anticipated that some students will likely take closer to 4.5 years for degree completion. This is the typical amount of time required for students to complete similarly designed programs at UW-Whitewater.

**3.4 Interrelationship with Other Curricula**

The curriculum of the proposed major builds on and compliments other curricula already in existence at UW-W. Two programs, in particular, are worth noting: the Department of Biological Sciences’ Ecology/Field submajor and the Department of Geography and Geology’s Physical/Environmental submajor. A substantial percentage of the courses listed in the proposed Geosciences and Natural Sciences submajors, respectively, will come from these areas. This will likely result in the loss of some student majors in both of those areas. However, these two programs are very popular and have long histories of a large numbers of majors, many of whom are interested in pursuing degrees within those discipline-specific areas. Thus, we are quite confident that the new Environmental Sciences major will not overly compromise the ongoing existence of these other two programs. While the Natural Sciences and Geosciences submajors share many courses with these two traditional submajors, it is the interdisciplinary component of the Environmental Science submajors that makes them unique and well-suited for today’s job market.

Although no other programs have the magnitude of interrelationship with the proposed program as the two described above, there are numerous other programs on campus that will contribute courses. This will allow the new major to be developed without having to create many new courses. Other than the Introduction to Environmental Science and Capstone courses, the vast majority of all other courses taken by environmental science majors will likely be shared with students from other majors. Although this can potentially limit the ability to focus specifically on environmental science issues in some of these classes, this is countered by the advantages of having students work side-by-side with students from other majors that will provide a differing and often complementary perspective to issues discussed in class.

Finally, the curriculum of the proposed major contains numerous courses that are classified as General Education “elective” courses. This not only provides opportunity to maintain continuity with the learning outcomes for General Education at UW-W but also allows students the flexibility of taking courses in the new major and choosing whether or not they want to continue or pursue another major. It is also worth noting that the learning objectives and outcomes for the UW-W General Education program are directly tied to those of LEAP and the same as those broadly listed above for the proposed major. Thus, there should be a smooth transition for students as they move into the new major from their general education courses.

**3.5 Accreditation Requirement**

There currently is no accreditation body overseeing requirements for an effective major in environmental sciences or related programs. The *National Council for Science and the Environment* (NCSE) has offered recommendations for program development and effective program management but does not hold programs accountable for adhering to these recommendations (Vincent 2010). Instead, they recognize the need to have varying types of environmentally-focused programs which utilize the unique combination of faculty expertise and resources available on each campus and the particular environmental challenges of the local and surrounding region. However, there are some key common attributes that seem to exist in most environmentally-focused programs such as a blend of physical science, social science, humanities, and business (primarily economics) curriculum as well as a strong interdisciplinary focus with applied learning opportunities available to students (Vincent and Focht, 2011). The design of this proposed major includes many of these key characteristics. The *Council of Environmental Deans and Directors* (CEDD), an association of academic environmental program leaders, regularly discusses ideal design models and best practices of environmentally-focused programs. UW-Whitewater has recently become an affiliate member of NCSE, which includes ongoing representation on CEDD, and thus provides regular access to the latest ideas on program design, development, and modification as needed.

**3.6 Diversity**

Each of the faculty individuals contributing to the new major come from programs committed to inclusive excellence and diversity. This includes providing equal opportunities and access for students of all races, sex, gender identity or expression, religion, color, creed, disability, sexual orientation, national origin, ancestry, socioeconomic status and age. These principles all fall within the strategic mission of the University of Wisconsin-Whitewater and thus, are imbedded within any curriculum or program on campus.

The program will attempt to help students better understand that the magnitude of human threats to the environment and vice-versa varies across diverse populations and is heavily influenced by cultural characteristics such as a race, religion, and socioeconomic stats. The course *SOC493- Environmental Racism* highlights the importance of these influences and will be among those available for students in the new major. As with all majors on campus, students will also be required to take at least one course designated for “diversity” credits. The aforementioned *Environmental Racism* course as well as another course currently in development, *WMSTUDIES 493- Gender, Ethnicity, and the Environment*, are two examples of “diversity” courses that will be available in the major.

Opportunities to connect with those having limited access to campus such as adult student learners will also be made available through online sections of certain courses making up the proposed major. There are currently online sections for eight of the courses currently included in the proposed major with numerous others anticipated to be offered online over the next few years.

The faculty that will contribute courses to the proposed major are quite diverse in gender and nationality. This is also reflected in the current make-up of student majors in the two programs that would contribute most to the new major-- Biological Sciences and Geography/Geology -- as well as those pursuing the environmental studies minor. In each of these areas the percentage of females is close to or above 50%, which is greater than the national average for STEM fields. We anticipate that this higher than average proportion of females would likely be reflected in the proposed major as well. However, one area where improvement is needed is diversity in race. The majority of faculty contributing to the new major are Caucasian or of varying international backgrounds with few African-Americans. This is also reflected in the relatively low percentage of African-American students in these programs as well.

The departments that will be contributing faculty and their courses to the new major have been tasked this year with identifying specific recruiting strategies for within their disciplines that would improve the racial diversity of both faculty and students within their programs. Some of the efforts underway have included organizing visits from nearby intercity middle and high schools (primarily Milwaukee), increasing the racial diversity of guest speakers brought into classes to speak to prospective student majors, and more aggressively targeting publication outlets aimed at recruiting minority faculty in the STEM fields. Similar strategies will be employed with the new major.

**3.7 Collaboration**

The proposed major is designed to prepare students for jobs and admission to graduate school in nearby institutions (e.g. UW-Madison, UW-Milwaukee), thus enabling them to stay in Wisconsin to pursue master’s degrees in environmental sciences or related fields if they so choose. This provides an opportunity for recruiting from our campus. We anticipate collaboration between UW-Whitewater and the directors of these nearby programs to identify and modify as needed the skill-sets and knowledge that are needed at the undergraduate level to properly prepare students to be successful at the graduate level.

One example of a growing collaboration is with the relatively new UW-Milwaukee master-level freshwater sciences program. Although water resources is not a specific sub-major emphasis within the proposed major, there are numerous course offerings that focus on freshwater sciences and/or environmental threats to freshwater. Students interested in pursuing a master’s degree in freshwater sciences at UWM will be advised to take the appropriate sequence of courses within their Environmental Sciences submajor to prepare them for the graduate program. Moreover, it is likely that student internship opportunities and other resources will potentially be shared across these institutions with students from both programs participating simultaneously. As a result, undergraduate students from UW-Whitewater will be able to collaborate with graduate students from nearby institutions, thus furthering their learning opportunities and preparation for graduate school.

The proposed major is also designed to allow students to transfer in from other UW-System institutions with similar programs. Research will continue to be done towards identifying course credit equivalencies from other comparable programs in the state. This will require enhanced collaboration with other UW System schools. To work towards this goal, two individuals from UW-Whitewater recently (July 2011) participated in a meeting held on the UW-Milwaukee campus aimed at identifying common curricular interests across numerous UW System schools in Freshwater Sciences. Additional meetings are being targeted in the near future to identify more effective ways to share institutional resources.

**3.8 Outreach**

A substantial component to the experiential learning portion of the proposed major will be centered on service-learning activities. This will give students opportunities to actively work on real local environmental problems in ways that may provide assistance to local communities, businesses, and citizens. Internships will also be heavily connected to service-learning opportunities. Finally, the Capstone course will have a strong service-learning component with undergraduate research projects focused on local or regional environmental problems aimed at identifying potential solutions and sharing these ideas with the locations most directly affected.

A partnership has already been established with the Wisconsin Department of Natural Resources (WDNR) to utilize students in the proposed major for outreach work needed on projects led by the WDNR. This will primarily involve freshwater zoning issues in Southeastern Wisconsin but will likely expand to other areas as needed. Certain techniques training in field work, Geography Information System (GIS), and laboratory analysis will be designed to prepare students for these internship opportunities. Furthermore, due to the facilities already in place at UW-W enabling much of this type of work, it might be possible for students to become involved in related types of contract work as part of their internship experience. One example of this is the recently established GIS Center housed within the Department of Geography and Geology which provides paid or for-credit opportunities for students to work on projects that the Center has been contracted to complete for local businesses and governmental agencies.

Other components to the proposed program that provide educational outreach to the local community and surrounding region are already in place. For instance, non-credit GIS certification workshops with a focus towards environmental issues have been provided for those in the community wanting to be certified in GIS. The Department of Biological Sciences has provided Wisconsin Alliance for Minority Participation (WISCAMP) opportunities for high school teachers and students to learn about field and laboratory techniques that can be taught at the high school level and to increase student interest in science with a particular focus on biology and ecology. Another popular program in the sciences is the King/Chavez scholars program which is designed to complement the array of multicultural/disadvantaged programs at UW-W that serve the interests and needs of first generation/low income students. These types of outreach activities will continue as part of the proposed program.

**3.9 Delivery Method**

The vast majority of courses making up the new program will be delivered in traditional classroom style. However, as mentioned earlier, many courses will emphasize experiential learning opportunities, which will give students opportunities to learn beyond the walls of the classroom through field trips, travel study, guest speakers, and applied research.

Initially, approximately 10% of the courses to be offered in the proposed program will have online options that will be taught at least once per year. Because UW-Whitewater is encouraging more courses be developed online to allow more flexibility for students, it is anticipated that the number of course offerings with online options will continue to increase. However, there are certain courses that are not viable for online offering simply due to the type of content or specific skills/techniques that are being taught. The courses that currently have online offerings to go along with their classroom counterparts are identified in Appendix 1. Only one course is offered exclusively online (*GEOGRPY 120 Introduction to Weather and Climate*- 4 credits). However, a similar 3-credit classroom course is available (*GEOGRPY 320 Meteorology and Climate*- 3 credits).

1. **NEED**

**4.1 Comparable Programs in Wisconsin**

The table below (Table 2) summarizes current programs in the UW System that have active bachelor degree programs in areas similar to the major proposed here:

*Table 2:* *Other environmentally-focused degree programs in Wisconsin*

|  |  |  |
| --- | --- | --- |
| University | Program | Bachelor Degree Recipients 2008-09 |
| UW- Green Bay | Environmental Policy & Planning | 10 |
| UW- Milwaukee | Conservation & Environmental Science | 29 |
| UW- Oshkosh | Environmental Studies | 16 |
| UW- River Falls | Environ. Science and Conservation | 7/22 |
| UW- Stevens Point | Resource Management | 57 |

In addition, there are numerous other institutions within the UW-System that have recently had new environmental programs approved or have them in development including UW-Colleges, UW-Madison, and UW-Parkside. Although all of these programs have common themes focusing on environmental issues and/or natural resource management, each has a unique emphasis that utilizes the expertise of their faculty and/or the natural resources in their local areas. The proposed new major at UW-Whitewater will do the same and will provide unique characteristics to give student from Wisconsin and the surrounding states an alternative that is not duplicated at other UW System schools.

Specifically, the proposed new major at UW-W will be unique in the following ways:

1. Interdisciplinary across 3 colleges and 12 departments at UW-Whitewater
2. Curriculum design that provides both substantial breadth and depth requirements
3. Regional emphasis on freshwater resources and shoreline/shorelands management with extensive faculty expertise in water resource science and management.
4. Two physical science submajors focused on Natural Sciences and Geosciences
5. A management submajor focused on Environmental Resource Management
6. Integrated curriculum with experiential learning emphasis
7. Unique additional techniques or “skills” requirement
8. Capstone course that ensures all students have broad knowledge and specific skills
9. Unique facilities and resources such as dedicated labs and a campus Nature Preserve
10. Ideal location in SE Wisconsin that permits easy access for field studies
11. One of the most active undergraduate research programs nationally
12. Established travel study courses to environmentally sensitive regions

**4.2 Comparable Programs Outside Wisconsin**

It is evident from Table 3 that in the states neighboring Wisconsin there are numerous comparable programs in existence to the one proposed here, many of which are at private universities and colleges. This is not surprising given the growing interest in Environmental Science and the increasing number of career opportunities for graduates. Having a program in Environmental Science or a similar program is becoming the norm at most universities and colleges (Vincent and Focht, 2011).

|  |  |  |  |
| --- | --- | --- | --- |
| **Illinois** | Iowa | Michigan | Minnesota |
| |  | | --- | | Northwestern University | | Monmouth College | | Illinois Wesleyan | | Loyola University Chicago | | DePaul University | | Bradley University | | Benedictine University | | Chicago State University | | University of Chicago | | Southern Illinois University | | University of Illinois- Urbana-Champaign | | University of Illinois- Chicago | | Northern Illinois University | | Illinois Institute of Technology | | |  | | --- | | Cornell College | | Coe College | | Central College | | Simpson College | | Drake University | | University of Dubuque | | Grinnell College | | University of Iowa | | |  | | --- | | Wayne State University | | University of Michigan- Flint | | University of Michigan- Dearborn | | Olivet College | | Lake Superior State University | | Michigan Technical University | | Kettering University | | Grand Valley State University | | Central Michigan University | | Albion College | | Eastern Michigan University | | Michigan State University | | |  | | --- | | University of Minnesota | | Bemidiji State University | | Macalester | | University of St. Thomas | | Bethel College | | Hamline University | | St. John's University | | Carleton College | | St. Olaf College | | Vermillion Community College | | Univ. of Minnesota- Morris | | Univ. of Minnesota- Duluth | | Univ. of Minnesota- Crookston | | Winona State University | |

*Table 3: Universities and colleges with environmentally-focused degree programs in surrounding states (source: Green Careers Guide, 2011).*

Given the large number of universities and colleges in surrounding states that have comparable programs to the one proposed here, it is not practical to review each of them for similarities and differences. However, a cursory inspection of the curricular details associated with these other programs indicates that most have specialties differing from those proposed here. One advantage to the large number of programs in existence both within the state and in surrounding states is that students should have numerous opportunities to transfer from one university or college to another without losing substantial credits towards pursuit of an environmentally-focused degree. The broad design of the proposed program was partly intended to facilitate opportunities for transfer in to UW-Whitewater through compatibility with surrounding programs.

**4.3 Regional, State and National Needs**

Strong evidence exists for growth in job opportunities and demands for graduates with training in environmental science and related areas. For example, the most recent *Occupational Outlook Handbook* states: “Employment of environmental scientists and hydrologists is expected to grow much faster than the average for all occupations.” (U.S. Department of Labor, 2010). Job growth is expected to be greatest in private sector consulting firms as well as governmental jobs. According to the publication *Best Jobs for the 21st Century,* the job outlook for Environmental Scientists and Specialists is expected to have an “above average increase” with nearly 7000 job openings in 2008 out of a total 85,900 jobs available in United States (Farr et al., 2009). The number of total jobs is projected to grow to nearly 110,000 by 2018, a 28% rate of growth. This publication ranks opportunities for jobs in Environmental Sciences to be 72nd among the top 500 job professions to pursue.

To further these points, the Bureau of Labor Statistics (<http://www.bls.com>, 2011) indicates that “job opportunities for environmental managers and environmental technology specialists will expand much more quickly than similar engineering jobs in other specialties. With public concern mounting over pollution, global warming, and corporate responsibility, businesses and government agencies have started aggressively recruiting the best environmental management graduates. Environmental scientists will also be in demand to help interpret and limit the effects of human actions on our ecosystems, and to assist in the effort to restore these ecosystems.”

It is important to note that two key indicators of job growth mentioned above are integral parts of the proposed major. The first is the need for environmental technology specialists. The proposed major contains a requirement for all students to be proficient with an environmental “technique” or skill. Additional options for selection of these will become available as new needs are identified and appropriate facilities and faculty expertise are acquired. The second is the need for broadly trained environmental scientists with particular ability to become environmental managers. The breadth of the curricular design of the proposed major provides the broad-level training necessary for these positions. In fact, one of the three submajors is focused heavily on environmental resource management.

There is no reason to believe that the demand for environmental scientists will be less for the U.S. Midwest region or within the state of Wisconsin. If anything, these opportunities will be even more prevalent due to the increased attention being given to environmentally sensitive resources such as suitable agricultural land, sustainable forestry and clean water. Recent developments of programs aimed at proper management of these natural resources such as the Milwaukee 7 Water Council’s emphasis on freshwater in southeastern Wisconsin (<http://thewatercouncil.com>, 2011) are strong indications of increased attention and growing opportunities for management of these resources. Moreover, it appears that growth opportunities in government-funded positions in Wisconsin may be on the horizon for these types of jobs (Vincent and Focht, 2011). The partnership that is being established between the Wisconsin Department of Natural Resources and UW-W is an indication of that potential.

Finally, for the past five years, the Science Alliance, an advisory board for the College of Letters & Sciences, has recommended as a high priority the establishment of a degree program in Environmental Sciences with curriculum that provides students with knowledge of environmental policies and sustainable business practices. This recommendation is based on their own personal experiences, awareness of current job opportunities, market growth, and the increasing demands by the public for businesses to become more environmentally-friendly.

It should also be noted that an increasing number of environmentally-focused positions require advanced degrees. Thus, job opportunities described above should be viewed as opportunities that will be most readily available to students who continue on and pursue master’s degrees in related fields. This further justifies the basis for designing the proposed curriculum so that students will be able to transition into graduate programs and have the greatest opportunity for success.

**4.4 Student Demand – Future Enrollment Projections**

The anticipated student demand and future enrollment projects are listed in Table 4. These projections are based on survey data and evidence from advising sessions regarding potential immediate student interest in declaring environmental sciences as a major. Although initial enrollments could potentially be larger, it is anticipated that many of the students expressing interest now will be too far along in their current programs to switch majors. Once the new program is established, it is anticipated that the number of majors will consistently increase to100 or more by the 5th year. Such a rate of increase for new majors of this type has been common at other universities in the U.S. (Vincent and Focht, 2011).

*Table 4: Projections of student enrollments in the new major through Year 5.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | Implementation year | 2nd year | 3rd year | 4th year | 5th year |
| New students admitted | 20 | 30 | 40 | 50 | 60 |
| Continuing students |  | 15 | 20 | 30 | 40 |
| Total enrollment | 20 | 45 | 60 | 80 | 100 |
| Graduating students |  |  |  | 10 | 20 |

**4.5 Collaborative or Alternative Program Exploration**

Although not explicitly considered here, the proposed program contains numerous courses that are dual listed for graduate-level credit. Many of these courses also exist in similar form at sister institutions as part of their graduate programs. It is possible that students having completed their degree requirements here but not yet having taken all of these potential dual-listed courses could take one or more for graduate level credit before moving on to fully pursue their graduate degree. This will need to be more fully considered after the program has been established.

1. **ASSESSMENT AND ADVISING**

**5.1 Assessment**

The proposed major will have an aggressive and ongoing assessment plan. This will be accomplished through application of the methods described below and listed in Table 5:

*Table 5*: *Summary of assessment procedures to be completed at various stages of student program.*

|  |  |  |
| --- | --- | --- |
| Year of Program Sequence | Type of Assessment | Learning Outcomes (LO’s) Assessed |
| Freshman | Pre-Analysis (for paired comparisons later); Portfolio initiation | Broad Program LO’s; General Education; LEAP |
| Sophomore | Embedded questions; Pre-post Comparisons; Portfolio development | Primarily Course specific LO’s of knowledge/skills; Initial Submajor LO’s |
| Junior | Embedded questions; Pre-post Comparisons; Portfolio development; Mid-program | Knowledge and skills within submajors; professional development |
| Senior | Post-Analysis (for comparisons to pre-analysis); Portfolio completion; Senior exit survey | Broad Program LO’s; Program effectiveness; student satisfaction with experience |
| Post-Graduate | Career Progress Tracking Survey; Qualitative analysis | Program effectiveness; career preparation and satisfaction |

* 1. Pre-program and post-program comparison of broad program learning objectives

Students will be given pre-assessment “tests” as part of the *Introduction to Environmental Science* course. These will be designed to measure preliminary student knowledge of fundamental knowledge, skills, and techniques used to study environmental problems. In addition, students will be assessed to determine preliminary measures of their abilities in critical thinking, quantitative analysis, and communication particularly as they relate to environmental science topics. Specifically, students will be asked to complete a series of writing assignments that will allow a preliminary measurement of their writing ability. This will be compared with paired writing samples taken from the *Capstone* course to assess writing ability and improvement upon degree completion.

* 1. Submajor and in-course evaluations of success in accomplishing specific learning objectives

Students will be regularly assessed in a minimum of five courses within each submajor that are deemed to be most appropriate for measuring their success in reaching specific course learning objectives and representative of those for each submajor. This will be done by imbedding key questions on exams that are tied to specific learning outcomes. Some will be course-specific and others will be both course and submajor-specific.

* 1. Mid-program assessment

When student majors reach their junior year (between 60-90 total credits) they will be assessed for broad-level professional development and potential for continued progress towards degree completion. This will be a qualitative assessment done by faculty and advisors that are most familiar with each student and look at measures such as writing, communication, quantitative analysis, and general professional development, among others. The student will then meet one-on-one with his/her advisor and be given this feedback.

This assessment is meant to be in both directions with students also asked to give feedback on their level of satisfaction to this point in the major. They will be asked to comment on strengths/weaknesses of the major, their individual courses, and level of satisfaction and asked to identify specific examples of where they feel we can do better. Students will also be asked to comment on their own professional development and where they feel that they have improved the most to this point and where further improvement is most needed.

* 1. Internship assessment

Although internships are not a requirement, it is anticipated that the majority of students will complete one. As with many programs, this is most likely to occur during the summer between the junior and senior year when students are best prepared from a knowledge and skills standpoint. The performance of students completing an internship will be assessed through a questionnaire and one-on-one conversations with the interning agency. Specifically, assessment will be done on student professional development, knowledge of the subject, and skill development. Students will also be asked to complete a self-assessment of their performance in the internship and identify specific areas where they should focus during the remainder of their program to better prepare them for success upon graduation.

* 1. Student portfolio

All students in the major will be required to maintain a portfolio showing their academic and professional development through specific examples of their accomplishments. This will be regularly reviewed by each student’s advisor and discussed during advising sessions. The portfolio will not only benefit students by maintaining awareness of their development but also provide specific evidence of their accomplishments for demonstration when job seeking. As part of the Capstone course, students will be given an assignment to evaluate their progress in the major through analysis of their portfolio.

* 1. Senior exit assessments

All students at UW-W are required to complete a senior exit survey prior to graduation. These surveys assess levels of student-satisfaction in a wide variety of areas including advising, professional development, knowledge acquisition, and skills development, among others. Most of the questions are broadly aimed at their university experience as a whole but individual programs have the ability to add questions that more specifically targeted towards a certain major. This has proven to be a very beneficial source of assessment information for these programs.

A minimum of 10 such questions will be added to the student exit survey for all student majors within the proposed program. Since these surveys are done anonymously and immediately prior to graduation, students often feel that they can speak freely about their experience at UW-Whitewater and level of satisfaction with their specific major with no strings attached. Thus, it is anticipated that this will be highly valuable information for considering the effectiveness of the proposed program.

* 1. Alumni assessments

Efforts will be made to stay in touch with graduates and assess student success in their career progression and how this relates to their level of preparation in the major. Alums will be asked to identify areas within the major where they felt they were most prepared compared to their peers from other institutions as well as where they were least prepared. This will guide changes that need to be made to the curriculum as a whole and/or within certain submajors.

* 1. Review and changes resulting from assessment

The assessment materials for the proposed major will be regularly reviewed by a group of faculty contributing courses to the major. This *Environmental Science Assessment Committee* will be a subcommittee made up of faculty currently existing on other assessment committees within their respective departments and colleges. They will meet a minimum of once per semester to review assessment guidelines, methods being used, and data that are collected. They will make recommendations as needed to the program and submajor coordinators for potential curricular or course content modifications to be made as identified from this analysis.

The members of the *Environmental Science Assessment Committee* will also be responsible for overseeing the writing of the assessment portion of the *Audit & Review* report that will be required for completion every five years. The Audit & Review process is a university-level review of all programs at UW-W every five years intended to review their effectiveness and recommend changes that might be needed. A key component of that report is the assessment section, which is expected to include a description of how assessment information is regularly collected and guides changes to the program.

**5.2 Advising**

All freshmen students at UW-W are advised exclusively through the Advising Center. During this first year, occasional supplemental advising comes from faculty within certain programs but this is not encouraged. Thus, for specific programs to be involved in the first-year advising process it is incumbent upon them to keep the Advising Center informed of any curricular changes, scheduling adjustments or additional unique requirements that may affect the program. This responsibility will be that of each of the submajor program coordinators and the overall program coordinator.

Once students reach sophomore level they will be assigned a permanent faculty advisor. Early in the program while the number of student majors are anticipated to still be modest, advising will be managed by the core group of program coordinators who will also be considered master advisors representing each submajor. This “master advisor” model is one that is already in place at UW-W both at the university level and within each of the colleges. These master advisors receive special training to prepare them for higher level responsibilities of advising within their respective programs. They also are available as a resource for other faculty to use when advising questions come up. This model has worked well and frequently resulted in graduating students giving very high evaluations for the advising that they have received while pursuing their degrees at UW-W.

For the proposed major, each master advisor will be expected to take on less advising within their discipline-specific areas, thus allowing them to devote more time to Environmental Science majors within their area. Since these individuals will also be program coordinators for one of the submajors, it is quite likely that they will need additional release time from their usual department-level teaching and service obligations to take on these added responsibilities. Coverage for this release time is addressed in the Additional Faculty Needs section below. As the number of student majors increases, it may eventually be necessary to increase the number of advisors within each area.

Once students move beyond the freshman year they will meet with the program coordinator and be assigned the master advisor for the submajor that they chose to pursue. For those that do not initially know which submajor they want to pursue, they will continue to meet with the program coordinator until this determination is made. All students will be required to meet with their advisor at least once per semester.

**5.3 Access for Individuals with Disabilities**

One of the most widely-recognized components of UW-W’s strategic mission is to serve students with disabilities. This has led to national recognition in a number of areas including one of the best wheelchair athletics programs in the country. Thus, the infrastructure is already in place to serve students with disabilities of all sorts. The campus is physically designed to accommodate students with a wide range of disabilities and numerous programs are in place to work with students who have non-physical disabilities.

For the proposed program there are courses already in place that have been modified to accommodate students with a wide range of disabilities including the use of equipment with modified apparatus, captioning of all online courses, and optional test-taking avenues for students with learning disabilities, among many others, following universal design standards.

1. **PERSONNEL**

**6.1 Current Faculty Requirements**

The number of faculty from each department contributing to the major and the approximate combined FTE percentage of their total appointment from each area that will benefit the major are listed in Table 6.

*Table 6*: *Total number of faculty and FTE percentage contributing to the proposed program.*

|  |  |  |  |
| --- | --- | --- | --- |
| Department | College | Total Number of Faculty | Total Program FTE/Year |
| Biological Sciences | Letters & Sciences | 6 | 3 |
| Chemistry | Letters & Sciences | 2 | 1 |
| Geography & Geology | Letters & Sciences | 4 | 2 |
| History | Letters & Sciences | 2 | 0.375 |
| Languages & Literatures | Letters & Sciences | 2 | 0.5 |
| Philosophy & Relig. Studies | Letters & Sciences | 1 | 0.125 |
| Political Science | Letters & Sciences | 1 | 0.125 |
| Physics | Letters & Sciences | 1 | 0.125 |
| Soc., Anthro., & Crim. Justice | Letters & Sciences | 1 | 0.375 |
| Women’s Studies | Letters & Sciences | 1 | 0.125 |
| Economics | Business & Economics | 1 | 0.25 |
| Finance & Business Law | Business & Economics | 1 | 0.5 |
| Occ. Environ. Safety Health | Education | 1 | 0.5 |
| **Total** |  | **24** | **9** |

Nearly all of the faculty resources that are needed to support the proposed major are already in place at UW-Whitewater. This includes faculty from 13 different departments across three colleges. Each of these individuals already teaches the majority of courses that they will contribute to the major. None of these faculty will be directly “assigned” to the new major in terms of teaching, but instead their courses will simply be made available to students in the new major. As mentioned previously, some will be assigned a small amount of release time from their usual department responsibilities to act as coordinators and to oversee advising and/or assessment for the new major but this should not be substantial. However, departments that are most heavily affected by these new responsibilities will be provided additional part-time staff as needed.

By as early as Year 2, it is quite possible that additional sections of certain courses will need to be opened to accommodate the increased number of students. This will be supported by the colleges providing these courses as needed through reallocation of current staffing in other areas. A small amount of additional FTE has been committed to the proposed major for this purpose and others as described in the next section.

**6.2 Additional Faculty Requirements**

The college of Letters & Sciences has allocated 1.0 new FTE, 0.5 of which is dedicated to instruction, to support the initial needs of the new major. This will primarily be used to open additional sections that might be needed for certain courses and to cover a small amount of faculty reassignments for those doing program coordination, advising and/or assessment work. In addition, there will be one new course to be taught in Year 1 (*Introduction to Environmental Science*) and eventually another new course to be taught by Year 3 as the first group of students entire their senior year (*Capstone course*). This extra FTE will be used to cover those reassignments.

Discussions are underway for an additional 1.0 FTE faculty line position to eventually be granted to support the proposed major by the Provost’s Office. This will be contingent on early indicators of strong student interest and evidence for further growth in subsequent years. If granted, the position will likely be filled by an individual having a Ph.D. in environmental science or related discipline and expected to focus all of his/her teaching, service, and research interests to the new major. The individual would have a split appointment across two or more departments already contributing courses to the new major. This would be beneficial in a number of ways beyond simply added staffing. Such a position would naturally bring a more holistic approach to the major with no direct affiliation to one department or disciplinary area already in existence on campus. This would likely result in development of new courses and enhancement of more interdisciplinarily-designed courses.

As with all faculty searches at UW-W, all efforts will be made to recruit and attract faculty candidates with diverse backgrounds. This will include advertising in hard-copy and digital media outlets that are aimed towards faculty of diverse backgrounds, actively soliciting applications from candidates of diverse backgrounds, and continuing to make UW-W an appealing place for faculty of diverse backgrounds to work.

**6.3 Academic Staff**

At the present time, no Instructional Academic Staff will be needed to directly support the proposed program. All of the courses being offered will be taught by faculty as well as the program coordination, advising, and assessment responsibilities. However, there may be some indirect support of the new major by Instructional Academic Staff. This would primarily occur when faculty are given partial release time from other teaching obligations to fulfill some of the service requirements expected here. Instructional Academic Staff may then be needed to cover some of these course releases. At this time, however, it is anticipated that less than 1.0 FTE of Instructional Academic Staff will be needed to support the new major until at least Year 2 or 3 when the number of student majors may have increased to a point requiring the opening of additional sections of certain courses potentially taught by Instructional Academic Staff.

**6.4 Classified Staff**

Because the proposed major will be primarily supported by the College of Letters & Sciences, this college has committed to reallocating 0.5 FTE for purpose of hiring a 50% classified staff support person. This person will be located in Upham Hall, home of the physical science departments at UW-W (Biological Sciences, Chemistry, Geography/Geology, and Physics) but not affiliated with one particular department. This person’s job will be to support the coordinators of the new major as well as any of the faculty contributing interdisciplinary courses to the major. In addition, he/she will set-up appointments for students, manage e-mail communication streams between students (both current and prospective) and faculty regarding questions about scheduling, course requirements, and track the program budget.

1. **ACADEMIC SUPPORT SERVICES**

**7.1 Library Resources**

Because the proposed program represents a new major that utilizes the expertise and courses taught by faculty already existing in other areas on campus, there exists an extensive resource of library information on campus directly related to the proposed major. A search of the library holdings under the keywords of “environment” and “science” together indicates that over 1000 different reference items are available focusing on topics in environmental sciences. These include a wide variety of media types including books, governmental reports (both hard copy and electronic), database holdings and subscriptions to numerous journals, among others. In addition, the library has access to digital holdings of thousands of additional documents available both online and in our libraries around the UW System, Midwest, and other parts of the United States. For these reasons, there should only be a minimal amount of additional library costs needed to support the new major. Moreover, it is quite likely that any items added to the library will be done so through cost-sharing with current departments on campus due to common interests between discipline-specific areas and the proposed program.

**7.2 Access to Student Services**

Students in the new major will have the same access to student services as all other majors at UW-W. This includes access to all areas of student support services such as tutorial services and any special needs that they may require due to physical and/or learning disabilities. The needs of diverse students will be managed by making all courses as accessible as possible, including online courses as described previously. Unique needs of students will be accommodated on a case-by-case basis as they become evident. As mention above, UW-W has as part of its core mission a dedication to serving a diverse body of students having a wide range of characteristics and unique challenges. This major will be no different than others on this campus in that regard.

1. **FACILITIES - EQUIPMENT**

**8.1 Capital Resources – Existing Facilities and Capital Equipment**

The majority of faculty contributing courses to the new major are housed in Upham Hall, the primary science building on campus. Nearly all of the physical science and related skills/techniques classes will be taught here. This building was recently renovated and expanded (completed in 2004) with state-of-the-art science teaching labs including one of the largest dedicated Geographic Information System (GIS) facilities in the Midwest. In addition, through a combination of alumni donations, grants, and university funding, we have acquired an impressive suite of specialized instrumentation ideal for environmental science work. Faculty use these instruments primarily as teaching tools for students to use in course assignments and on undergraduate research projects. Some examples of the specialized instrumentation that is available for student use both in classes for their research projects include:

* + - 1. Inductively Coupled Plasma Optical Emission Spectrophotometer
      2. Gas Chromatography Mass Spectrometer
      3. Gas Chromatography Conductivity Detector
      4. Ultraviolet-Visible Spectrophotometer
      5. Cold Vapor Atomic Fluorescence Spectrophotometer
      6. High Performance Liquid Chromatographer
      7. Flame Atomic Absorption Spectrophotometer
      8. Microwave Digestion System
      9. Mercury Analyzer System
      10. X-Ray Diffraction and X-Ray Fluorescence Systems
      11. Advanced Global Positioning System (GPS) and related software for field work
      12. Large variety of field sampling equipment in the natural sciences and geosciences.
      13. Dedicated Environmental Chambers

The campus also has a dedicated 40-acre Nature Preserve where students can study certain types of ecosystems, collect data for research projects, or simply take class field trips as scheduled by faculty. This facility is heavily used by the science faculty in a wide range of courses that will contribute to the new major (e.g. physical geography, ecology, water resources, etc.). Moreover, there is a campus weather station located near the entrance to the Nature Preserve that provides real-time weather data to campus via the web and more than a decade of archived data for students to use in classes and research projects related to meteorology, climate, and climate change.

The majority of social science and non-science courses will be taught in other buildings on campus. These subjects are less dependent upon high-end facilities to be taught effectively. However, it should be noted that many of them, particularly in the social sciences, regularly do field trips or service-learning based activities in local and regional sites of interest that relate directly to environmental issues.

All facilities on campus are accessible to students with disabilities. Special care is given to ensure students not only have access to facilities and classrooms but are given the same opportunities to participate in both in-class and out of class activities as able-bodied students. For instance, the Nature Preserve has a paved path near the entrance allowing students in wheelchairs access into this area and with additional assistance passage through the majority of this area.

**8.2 Capital Budget Needs – Additional Facilities and Capital Equipment Required**

At this time, no additional facilities or capital equipment are required to support the proposed major. Eventually, it may be necessary to acquire some additional field equipment to accommodate an increased numbers of student majors but presently there is a sufficient amount available to support the initial number of students anticipated through at least the first two or three years of the program.

**8.3 Security**

As with all programs at UW-W, the institution will protect the integrity of student work and ensure credibility of credits and degree awarded by applying consistent standards for appropriate work completion and grade determinations across all courses in the proposed program. The university has policies in place regarding confidentiality of student records and requirements releasing such records as detailed in the *Student Rights & Responsibilities* section of the *Undergraduate Catalog 2010-12* (p. 20).

The university also has policies in place regarding student conduct and academic misconduct.  These are designed to guide student behavior toward appropriate and ethical academic outcomes while protecting students from the potential academic misconduct of others. Definitions and procedures for dealing with the academic misconduct of students are detailed in the *UW-Whitewater Student Handbook* (Chapter 14). All students taking courses in the proposed program will be expected to abide by the university policies on student conduct.

Graduation from this program will require approval from both the program coordinator and the registrar’s office.  Additionally, the program coordinator and each student’s advisor must approve the course of study including the required experiential learning and techniques courses. The aggressive assessment plan described above will ensure that the program is effective and successful at accomplishing learning objectives. As noted previously, the program will be reviewed every five years by the university through the Audit & Review process and modifications made as needed. Finally, the university is required to complete a detailed self-study a minimum of every 10 years to request university-level re-accreditation by the Higher Learning Commissionof the North Central Association. This will include a review of the proposed program along with all others on campus.

1. **FINANCE**

**9.1 Operating Budget and Budget Narrative**

As has been described throughout this proposal, the vast majority of staffing costs for the proposed program are already in place. Only a small amount of additional staff will be needed, although this may be increased further beyond Year 3 as the number of student majors grows. The bulk of the operating budget will be for support for the new major in the form of a part-time classified staff person, supplies and expenses, and some minor equipment needs. The proposed budget contains an estimated 3% annual salary increase per year for unclassified and classified staff. All funds to support the new program will come from GPR dollars either as committed now or reallocated from other areas as needed. Since the majority of students for the new major will likely come from other majors on campus this should result in opportunity to reallocate dollars from certain programs as needed to support the new program.

**9.2 Extramural Research Support**

There are numerous funding opportunities being investigated to support the new major and the various activities planned within. Although the modest anticipated cost of the major suggests that funding is not needed, it is prudent to explore these opportunities anyway due to uncertainties about future state fiscal support of all academic programs such as this one. In particular, two funding avenues are being explored: The first is the Environmental Protection Agency’s (EPA) Environmental Education Regional Grant which provides funding opportunities for institutions such as UW-W to develop community-focused projects that address environmental stewardship in a local educational context and use community-based stewardship activities as the primary teaching tool. This fits in well with the service-learning, outreach, and experiential learning focuses that are included in the new major.

The second funding source that is being pursued is one that will help support travel-study opportunities to environmentally-sensitive regions of the world. Because the cost of travel continues to rise it is necessary to identify ways to offset student costs and enable them this opportunity. Moreover, travel study is one of three options for experiential learning in the new major and thus should be given equal opportunity for pursuit as the other two (undergraduate research and internships) for those interested. One specific funding source being pursued is the Luce Foundation which provides support for travel to Asia for students to better understand and appreciate environmental challenges in that part of the world. Similar funding support is being sought for other international (e.g. Costa Rica) and domestic (Outer Banks of North Carolina and Yellowstone National Park) travel study opportunities tied to the major.

There are currently faculty in three different departments (Biological Sciences, Chemistry, and Geography/Geology) with extramural funding supporting research projects that are directly tied to environmental sciences. These are large and ongoing projects from funding agencies such as the National Science Foundation, National Institute of Heath, and Merck Foundation, among others. These provide students with opportunities to work on grant-funded projects that are dealing with current environmental problems. It is expected that faculty will continue to solicit grant-funding to support their work and that which will contribute to the new major.

**9.3 Commitment to Maintain Program**

Because there are no exorbitant new costs needed to support the proposed program it is not anticipated that it will be difficult to maintain an ongoing commitment. The faculty resources are already in place and the campus has made a commitment to support the ongoing costs of the equipment and facility resources needed to support the major. The only eventual challenge may be to find a “home” for the new major should student interest reach a point where it can no longer be coordinated by faculty located in multiple areas. In addition, it would be beneficial to students to eventually have a physical location that they can identify with as the “home” of the new major. For the time being this is not being considered seriously but should the need arise there are numerous possibilities that can be evaluated as space becomes available on campus in other buildings. However it should be noted there are other programs in place on campus and throughout the UW-System that have succeeded for many years in this way.

Grant-funding and revenue from added online courses should also help to offset any new cost burdens encountered due to the existence of the new program. Should the anticipated student interest become reality there will be no problem supporting the ongoing existence of this new program.

BUDGET FORMAT: AUTHORIZATION TO IMPLEMENT

**Estimated Total Costs and Resources**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | FIRST YEAR | | | SECOND YEAR | | | THIRD YEAR | |
| CURRENT COSTS | #FTE | | Dollars | #FTE | | Dollars | #FTE | Dollars |
| Personnel |  | |  |  | |  |  |  |
| Faculty/Instructional Staff | 9.0 | | 522,000 | 9.0 | | 537,660 | 9.0 | 553,790 |
| Graduate Assistants |  | |  |  | |  |  |  |
| Non-instructional Academic/Classified Staff | 0.5 | | 15,500 | 0.5 | | 16,480 | 0.5 | 16,974 |
| Non-personnel |  | | |  | | |  | |
| Supplies & Expenses | 5000 | | | 5500 | | | 6000 | |
| Capital Equipment | 1000 | | | 1500 | | | 2000 | |
| Library | 500 | | | 500 | | | 500 | |
| Computing | 1000 | | | 1000 | | | 1000 | |
| Other (Define) |  | | |  | | |  | |
| Subtotal | $545,000 | | | $562,640 | | | $580,264 | |
|  |  | | |  | | |  | |
| ADDITIONAL COSTS | #FTE | Dollars | | #FTE | Dollars | | #FTE | Dollars |
| Personnel | 0.5 | 22,727 | | 0.75 | 34,091 | | 1.0 | 45,455 |
| Stipends for Coordinators | $5000 | | | $5000 | | | $5000 | |
| Nonpersonnel |  | | |  | | |  | |
| Other (online course development and delivery) | $1000 | | | $1500 | | | $2000 | |
| Subtotal | $28,727 | | | $40,591 | | | $52,455 | |
| TOTAL COSTS | $573,727 | | | $603,231 | | | $632,719 | |
|  |  | | |  | | |  | |
| CURRENT RESOURCES |  | | |  | | |  | |
| General Purpose Revenue (GPR) | $545,000 | | | $562,640 | | | $580,264 | |
| Gifts and Grants |  | | |  | | |  | |
| Fees |  | | |  | | |  | |
| Other (Define) |  | | |  | | |  | |
| Subtotal |  | | |  | | |  | |
|  |  | | |  | | |  | |
| ADDITIONAL RESOURCES |  | | |  | | |  | |
| GPR Reallocation  (Specify source) | $28,727 (internal reallocation) | | | $40,591 (internal reallocation) | | | $52,455 (internal reallocation) | |
| Gifts and Grants |  | | |  | | |  | |
| Fees |  | | |  | | |  | |
| Other (Define) |  | | |  | | |  | |
| Subtotal |  | | |  | | |  | |
|  |  | | |  | | |  | |
| TOTAL RESOURCES | $573,727 | | | $603,231 | | | $632,719 | |

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