

# **Assessment Report**

## **Environmental Studies Major**

Fall 2012

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## **I. Introduction**

Our last assessment report brought to light some areas where we were having difficulty assessing student learning in a consistent and effective way. As a result of that assessment work we had a number of action items, particularly related to senior thesis work and its evaluation. We redesigned the senior thesis course (ENVR 403) emphasizing assessment of independent work in a progressive way throughout the semester, and adding both an oral presentation component and exposure to various oral presentation styles and topics through required attendance at the Wells science colloquium series. To reduce the workload associated with overseeing senior theses and to add consistency to the senior thesis experience all of the seniors in the major now conduct their senior thesis work under one course number in the spring of the senior year. Also in follow up to our last round of assessment, we revised the comprehensive exam to make sure it reflected our curriculum as taught, and that it included coverage of local and current topics in environmental studies.

As a result of assessment-related activities, we found our program to be lacking in features aimed at making our graduates more career-ready. In response we added a goal of developing career skills to the major. Associated with this new goal are new language in the major's mission statement, a new internship requirement in the major, addition of a course in geographic information systems, addition of course content in the area of conservation biology, development of a course on environmental impact assessment and increased integration of environmental professionals into courses.

A variety of other factors have shaped the major and its courses in recent semesters. Changes in the biology curriculum necessitated a reworking of our introductory sequence to minimize content overlap with Ecology & Evolution (BIOL 119L). Cuts in the major required the deletion of ENVR 350L (Microbes & the Environment).

Whatever the impetus for changes in the major we are endeavoring to articulate appropriate goals more clearly, and to design our curriculum and our work in order to better achieve those goals. This year we have updated our assessment plan, incorporating changes in goals, outcomes, course descriptions, and course objectives. The updated assessment plan is described in the sections below. Sections XI and XII are a '2012 Evaluation of Assessment' section and a 'Next Steps' section, respectively.

## **II. Wells College Mission Statement**

The mission of Wells College is to educate students to think critically, reason wisely, and act humanely as they cultivate meaningful lives. Through Wells' academic program, residential atmosphere, and community activities, students learn and practice the ideals of the liberal arts. The Wells experience prepares students to appreciate complexity and difference, to embrace new ways of knowing, to be creative, and to respond ethically to the interdependent worlds to which they belong. Committed to excellence in all areas of its reach, Wells College equips students for lifelong learning and for sharing of privileges of education with others.

## **III. Wells College's Five Institutional Goals**

1. Provide an educational experience that supports students as unique individuals engaged in the study and practice of the liberal arts.
2. Maintain an excellent faculty that is skilled in teaching, dedicated to rigorous intellectual development, and actively committed to pursuing new knowledge and learning strategies.
3. Develop students' intellectual curiosity, analytical and critical capabilities, and aesthetic awareness and creativity.
4. Provide a rich community environment that fosters awareness and sensitivity to social diversity and encourages responsible action in an interdependent world.
5. Develop self-confident individuals who exercise sound judgment and have the knowledge and skills for thoughtful decision-making.

#### **IV. Wells College's Academic Program Goals**

A Wells education enables students to:

- examine enduring and contemporary questions that shape human understanding
- use the scholarly and creative traditions of the liberal arts and contemporary technologies to locate and evaluate information
- communicate reasoned points of view to inform and persuade a variety of audiences
- incorporate an understanding of diversity in their academic work and as members of a learning community
- develop an appreciation of languages and cultures in a global context
- acquire knowledge based on scholarship and research about women
- engage in collaborative practices in the classroom, in campus life, and in the community at large
- develop thorough knowledge of basic principles, methods of inquiry, and current issues in an academic field of study

#### **V. Mission of the Environmental Studies Major**

The mission of the Environmental Studies major is to develop in the student the intellectual skills and the career skills necessary to understand the environment as a complex system and to change it for the better. This major is by nature multidisciplinary, preparing students both in the scientific techniques and understanding necessary to implement change and in the knowledge of the political processes through which these changes are accomplished. The basic principles of biological, chemical, and physical systems must be understood if policies are to reflect the underlying complexities of nature. Understanding these interactions requires a sense of place, an appreciation of nature's awesome beauty, and of its impact upon the human experience.

## **VI. Environmental Studies Program Goals, Objectives and Outcomes**

Four goals have been identified and are drawn from the mission of the Environmental Studies major. Within these four broad goals we have embedded six objectives and ten outcomes as outlined below.

**GOAL 1: Skills** - Allow students to develop the intellectual skills and the career skills necessary to understand the environment as a complex system and to change it for the better.

- **Objective 1: Techniques** - Students will learn the scientific techniques necessary to study the environment and to determine how environmental issues can best be addressed.
  - **Outcome 1: quantitative skills** - Students will use the quantitative skills necessary to examine environmental issues and solve environmental problems.
  - **Outcome 2: research skills** - Students will critically evaluate literature and research on the environment.
  - **Outcome 3: career skills** – Students will gain practical experience through an internship in Environmental Studies and through increased integration of career-relevant topics into courses.
  
- **Objective 2: Knowledge** - Students will learn about the necessity of environmental policies being grounded in the reality of nature as expressed in the basic principles of biological, chemical, and physical systems.
  - **Outcome 4: applications in theory** - Students will know the basic laws of nature and be able to describe their application to environmental issues and environmental problem-solving.
  - **Outcome 5: applications in practice** - Students will use the basic field, laboratory and computer skills needed for environmental research and analysis.

**GOAL 2: Multidisciplinary learning** - Students will develop an understanding of the multidisciplinary nature of environmental issues.

- **Objective 3: Policy** - Students will learn about the political processes through which the environment can be changed for the better.
  - **Outcome 6: critical thinking** - Students will be able to think rationally and analytically about environmental issues and environmental problem-solving.
- **Objective 4: Environmental Values** - Students will develop an appreciation for the natural world and the ways in which it can be valued.
  - **Outcome 7: economics** - Students will understand the mathematics of the connection between economic systems and environmental Problems.

**GOAL 3: Local issues** - Students will become familiar with ecological and environmental issues in the Cayuga Lake Watershed.

- **Objective 5: Cayuga Lake Watershed** - Students will learn about the natural features and resources of the Cayuga Lake Watershed, and the relationship between humans and the watershed.
  - **Outcome 8: tradeoffs in local context** - Students will conduct class projects and activities on issues important to the Cayuga Lake Watershed, focusing on the interplay between the economy of the region and the preservation of natural resources.

**GOAL 4: Global issues** - Students will be cultivated as informed citizens of the global environment, citizens who can independently study environmental topics and who can effectively share with others the results and perspectives garnered from such study.

- **Objective 6: current global issues** - Students will learn to analyze a complex global environmental issue in a multi-faceted way that incorporates the science, policy and value-related components of the issue.
  - **Outcome 9: independent research** - Students will demonstrate the ability to work independently on a project that focuses on a particular environmental topic, problem or question.
  - **Outcome 10: oral presentation** - Students will be capable of preparing and delivering an oral presentation that is clear and well-reasoned.

## **VII. Assessment of Outcomes**

Assessment of outcomes will take place via four methods: course activities, including labs, projects and exams; a senior thesis project; and the two components of the major's comprehensive evaluation, an oral presentation and a comprehensive exam.

- A1** Course activities, including labs, projects and exams. The multidisciplinary nature of the major is reflected in the courses of the curriculum, some of which are ENVR listings and some of which come from supporting disciplines. Students take these courses over their four years at Wells.

All students in the major take a common core of required foundation courses (ECON 102, ENVR 101L, ENVR 102L, ENVR 290, ENVR 303, ENVR 340, ENVR 403, MATH 151/MATH 251, ECON 320/ECON 325, and ANTH 280/ANTH 282/PHIL 240/RELG 330). In their sophomore or junior years students choose one of two concentrations in the major: Environmental Sciences or Environmental Policies & Values. Within each concentration the curriculum is composed of both required courses and electives.

Each course in the curriculum has its own objectives that are aligned with the major. Course descriptions and objectives for ENVR listings are included in Appendix 1.

- A2** Senior thesis project. All students in the major complete ENVR 403, the senior thesis course. The nature of thesis content differs for the two concentrations and for each student but original research and analysis, conducted under the guidance of an Environmental Studies faculty member is required in both cases. See Appendices 2 and 3 for thesis assessment guidelines.
- A3** Oral presentation. All students present their senior thesis work to the Wells community. An assessment rubric for this oral presentation is in Appendix 4.
- A4** Comprehensive exam. A three hour written examination taken in the fall of the senior year. Questions on the exam assess literacy in local and global environmental issues and evaluate the basic knowledge and skills necessary for college level study of the field as laid out in this document.



## VIII. Alignment of Objectives, Outcomes, and Assessment



Table 1 summarizes how ENVR goals, objectives, outcomes and assessment methods are aligned for the major.

Table 1. Alignment of Goals, Objectives, Outcomes and Assessment.

ENVR Goal	ENVR Objective	Outcome	Assessment Methods Most Obviously Appropriate
G1: Skills	1: Techniques	1: Quantitative Skills	A1 Course dependent, A2 Project dependent, A4
		2: Research Skills	A1, A2
		3: Career Skills	Internship in Major, A1 Course Dependent A2 Project Dependent
	2: Knowledge	4: Applications In theory	A1 Course dependent, A4
		5: Applications In practice	A1 Course dependent, A2 Project dependent
G2: Multidisciplinary learning	3: Policy	6: Critical Thinking	A1 Course dependent, A4
	4: Environmental Values	7: Economics	A1 Course dependent, A2 Project dependent, A4
G3: Local Issues	5: Cayuga Lake Watershed	8: Tradeoffs in local context	A1 Course dependent, A2 Project dependent, A4
G4: Global Issues	6: Current Global Issues	9: Independent Research	A2
		10: Oral Presentation	A3

Table 2 summarizes how course objectives (described in Appendix 1) align with the major's learning outcomes.

Table 2. Alignment of learning outcomes and ENVR course objectives.

<b>Outcomes</b> 	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>Courses</b> 										
<i>ENVR 101L</i> Introduction to Environmental Science	1,2	1,2		2-6	2-6	1-6	6	1-3, 5,6	1.2	2
<i>ENVR 102L</i> Conservation of Biodiversity	1-3	4,6	6	4,5	4,5	1-3, 6	4-6	6	2,3	1-3
<i>ENVR 131L</i> Physical Geology	1-8	1-8		1-8	1-8			9		
<i>ENVR 195</i> Tutorial in Geographic Information Systems			3	1	2					
<i>ENVR 290</i> Internship in Environmental Studies			1	2	2					3
<i>ENVR 303</i> Environmental Impact Assessment		1	4	1-5	1-5	1-4		3		6
<i>ENVR 340</i> Sustainable Agriculture	1.5	1,5		1-3,5	1-3,5	2-4	4	1,2,4,5		6
<i>ENVR 403</i> Senior Thesis in Environmental Studies		3,7	7			2,3,7			1,3-5	6

## **IX. Criteria for Success**

The following will be used to determine success in the four assessment outcomes:

- A1** Completion of course activities, including labs, projects and exams. Student artifacts are continually collected throughout the academic year by the faculty member teaching the targeted courses. Each faculty member evaluates if the students learned what was expected, based on each assignment. Percentages of how well the student answered/completed the activity are calculated, and students are considered proficient if 70% of the students demonstrated a passing grade on the assessed activity. This proficiency simply allows the faculty to assess student learning based on the completed activity, and is not tied to the final grade in the course, which may contain other determinates such as attendance and participation in class.
  
- A2** Senior thesis project. Students who are majoring in Environmental Studies should be capable of planning and executing an original research project. Writing a thesis paper based on the student's work is a major component of the ENVR 403 course. Assessment of the senior thesis paper is done using the guidelines in Appendix 2 or 3 as appropriate. The overall quality of the work is assessed quantitatively and incorporated into the course grades received for the senior thesis course.
  
- A3** Oral presentation. Students should be able to deliver a senior thesis presentation that is deemed satisfactory in the judgment of the ENVR faculty.
  
- A4** Comprehensive exam. Students who are majoring in Environmental Studies should be capable of earning a "C" or better on the comprehensive exam.

## **X. Evaluation of Assessment**

The Environmental Studies faculty meet regularly to evaluate assessment outcomes. The faculty discuss the assessment outcomes from the previous academic year. The goal is to overview student performance in each of the four assessment areas. This is achieved using tools such as records of student performance in targeted course elements, samples of theses and comprehensive exams, and discussion of senior thesis oral presentations. The discussions provide us with an opportunity to reflect on and discuss all aspects of student performance as manifested in our assessment outcomes. Examined individually and together the assessment tools provide a reasonable way for us to assess whether our graduating students can think, act and communicate as intelligent people well-informed on environmental issues and principles.

We record our conclusions and any actions we feel are warranted for the future.

## **XI. 2012 Evaluation of Assessment**

At our assessment meeting we discussed the degree to which we are meeting our criteria for success in each of our four established assessment areas. We evaluated each area using appropriate evidence as laid out in Section IX.

Completion of course activities is the broadest and most diverse of our four assessment outcomes. Overall, evidence in the form of records of student work on various types of activities indicates that we are meeting our goals.

Faculty in the Environmental Studies major are involved to varying degrees in the senior thesis projects (and associated presentations) of our seniors. This is a handicap when the group as a whole wishes to discuss these assessment outcomes. While we feel comfortable agreeing that we have met our goals in these two areas, we have as an action item the increased attendance and participation of ENVR faculty at the oral presentations of senior theses in our major.

We reviewed the scores earned by recent seniors on the ENVR comprehensive exam. In a senior class of 8 in 2012, all but one student exceeded the assessment goal of a "C" or higher. Thus we are satisfied that overall, students are demonstrating that they have appropriate competency in the areas covered in the comprehensive exam.

## **XII. Next Steps**

- Increase attendance and participation of ENVR faculty at the oral presentations of senior theses in our major (see Section XI)
- Review of course content to make sure it is explicitly tied to course objectives and outcomes of the major. Over time course content naturally evolves. We want to make sure that we maintain alignment between course content, course objectives, and the larger objectives outcomes, and mission of the major.
- Continue to request added support for the major in the form of increased staffing. This would help us meet more fully the goals that flow from our mission.

**APPENDIX 1. Course Descriptions and Course Goals of ENVR Listings in the Environmental Studies Curriculum** (numbers in parentheses following each course objective indicate the alignment with the overall learning outcomes of the Environmental Studies major).

### **ENVR 101L. Introduction to Environmental Science**

(Required for all students in the major)

An introduction to environmental science including an analysis of natural resources and the environmental impact of their extraction and use. Environmental quality, pollution, toxicology and environmental science as the basis for effective environmental policy are among the topics covered.

*Students who successfully complete ENVR 101L will appreciate and understand*

- 1) The nature of the world's natural resources; (1,2,6,8,9)
- 2) The impact on humans and on the environment of resource extraction and use; (1,2,4,5,6,8,9,10)
- 3) The role of humans as effectors of environmental change; (4,5,6,8)
- 4) How complex environmental problems can be addressed and solved; (4,5,6)
- 5) Each individual's impact on the natural world; (4,5,6,8)
- 6) The importance of environmental science as the basis for sound environmental policies (4,5,6,7,8)

### **ENVR 102 L. Conservation of Biodiversity**

(Required for all students in the major)

An introduction to the field of conservation science. Local and global aspects of species, ecosystem and landscape conservation will be discussed.

*Students who successfully complete ENVR 102L will be able to demonstrate their knowledge of the following:*

- 1) major issues that define the discipline of conservation biology; (1,6,10)
- 2) the nature and importance of biodiversity; (1,6,9,10)
- 3) threats to biodiversity; (1,6,9,10)
- 4) efforts and approaches to conservation of biodiversity, species, ecosystems and landscapes; (2,4,5,7)
- 5) the history and significance of U.S. national parks; (4,5,7)
- 6) local organizations and their efforts to protect local ecosystems and the biodiversity they contain. (2,3, 6,7,8)

### **ENVR 131L. Physical Geology**

(Required for all students in the Environmental Sciences Concentration)

The origin, composition, structure, and geological history of the earth. This will include the study of geological processes affecting the earth's crust and interior, and examination of theories concerning geological phenomena such as origin of mountains and plate tectonics.

*Students who successfully complete ENVR 131L will be able to*

- 1) Understand the process of science and how it is applied in Geology; (1,2,4,5)
- 2) Understand Earth processes and their implications for the environment; (1,2,4,5)
- 3) Understand plate tectonics: how it occurs, and its importance in Earth's history; (1,2,4,5)
- 4) Understand mineral properties and classification, as well as the rock cycle and how rocks are classified; (1,2,4,5)
- 5) Understand the Earth's interior, the importance of convection and magnetism, and the importance of earthquakes; (1,2,4,5)
- 6) Understand the interplay of tectonic and surficial processes on Earth that create landforms; (1,2,4,5)
- 7) Appreciate the geologic time scale and the formation of Earth, the hydrosphere and the atmosphere; (1,2,4,5)
- 8) Read and interpret maps; (1,2,4,5)
- 9) Understand the geologic history of New York State.(8)

### **ENVR 195. Tutorial in Geographic Information Systems**

(Not required but recommended for all students in the major)

A self-guided tutorial in Geographic Information Systems (GIS). Focus is on the development of basic skills related to geospatial analysis, such as map symbology, data overlay and projection.

*Students who successfully complete ENVR 195 will*

- 1) Understand the theory of geospatial analysis (4)
- 2) Be adept in the practical use of the basic application of ArcGIS software (5)
- 3) Have developed an important career-relevant skills in the field of Environmental Studies (3)

### **ENVR 290. Internship in Environmental Studies**

(Required for all students in the major)

On-site practical experience with an not-for-profit, a company, an institution or other organization or group whose work includes a focus on environmental studies.

*Students who successfully complete ENVR 290 will*

- 1) Have obtained practical experience relevant to a career in environmental studies (3)
- 2) Have had the opportunity to apply theory of the field and put it into practice (4,5)
- 3) Present their work to the Wells community (10)

### **ENVR 303. Environmental Impact Assessment**

(Required for all students in the major)

An examination of the process that seeks to determine the potential environmental impact of a proposed project. The aims, elements, strengths and limitations of environmental impact assessments will be discussed as they apply to a variety of factors.

*Students who successfully complete ENVR 303 will*

- 1) appreciate the purpose and role of environmental impact assessment (EIA) in various decision-making processes; (2,4,5,6)
- 2) understand the benefits that EIA brings to environmental management; (4,5,6)
- 3) know fundamental aspects of EIA policies on the state and federal level; (4,5,6,8)
- 4) be familiar with the basic steps of EIA and the preparation of environmental impact statements; (3, 4,5,6)
- 5) understand the strengths and weaknesses of the EIA process; (4,5)
- 6) Prepare and deliver oral presentations related to environmental impact assessment. (10)



### **ENVR 340. Sustainable Agriculture**

(Required for all students in the major)

This course will examine the environmental consequences of agriculture as it is practiced today in tropical and temperate regions, and discuss the agroecological basis for tools and techniques designed to address these problems.

*Students who successfully complete ENVR 340 will be able to*

- 1) Apply ecological principles to agricultural systems; (1,2,4,5,8)
- 2) Understand the environmental impact of temperate agriculture; (4,5,6,8)
- 3) Become familiar with the environmental impact of tropical agriculture; (4,5,6)
- 4) Discuss how government policies affect decisions made by farmers in the United States; (6,7,8)
- 5) Describe how the application of ecological principles can be used to reduce the environmental impact of agriculture. (1,2,4,5,8)
- 6) Prepare and deliver oral presentations related to sustainable agriculture. (10)

### **ENVR 403. Senior Thesis in Environmental Studies**

(Required for all students)

Identification of an original topic and development of a senior research paper or alternative project in environmental studies. Preparation and presentation of a paper or project based on independent research and analysis. Work to be conducted in conjunction with a member of the ENVR faculty.

*Students who successfully complete ENVR 403 will be able to*

- 1) Demonstrate the ability to work independently; (9)
- 2) Conduct library-based or other appropriate research related to the thesis topic (6)
- 3) Incorporate primary literature into their senior thesis paper; (2,6, 9)
- 4) Adequately review written work based on revisions suggest by faculty members; (9)
- 5) Demonstrate overall proficiency in writing (9)
- 6) Prepare and deliver an oral presentation on the thesis (10)
- 7) Reflect on a variety of different presentation styles and topics by attending science colloquium weekly

**APPENDIX 2. Assessment Criteria for Senior Theses in Environmental Studies**  
**(if no data collected)**

- 1) Specific title that accurately reflects thesis and scope of paper
- 2) Hypothesis or thesis, as well as objectives and goals, clearly stated
- 3) Arguments well-constructed
- 4) Points supported by evidence
- 5) Consideration of counter-arguments, obstacles, downsides, costs as well as benefits
- 6) Appropriate sources cited
- 7) Citation style consistent and appropriate
- 8) Conclusions solid and well-stated, consistent with what has preceded them
- 9) Overall structure, flow and logic
- 10) Quality of writing style
- 11) Originality
- 12) Sophistication
- 13) Overall impression

**APPENDIX 3. Assessment Criteria for Senior Theses in Environmental Studies**  
**(if data collected)**

- 1) Specific title that accurately reflects nature and scope of study
- 2) Appropriate background and rationale provided for project, with reference to scientific literature
- 3) Research hypothesis and/or objectives clearly stated
- 4) Concise and clear methods section
- 5) Sample size sufficient to support conclusions
- 6) Appropriate data analysis
- 7) Correct and appropriate usage of tables and figures as needed
- 8) Well-founded and clear conclusions based on evidence presented in results section, with reference to supporting literature where warranted
- 9) Appropriate sources cited
- 10) Citation style consistent and appropriate
- 11) Overall structure, flow and logic
- 12) Quality of writing style
- 13) Originality
- 14) Sophistication
- 15) Overall impression

#### **APPENDIX 4. Oral Presentation Evaluation Form**

1. Ready to begin promptly, materials in order
2. Well-prepared and practiced
3. Speaking distinctly and towards the audience
4. Coherent in speech
5. Good use of notes (speaking rather than reading)
6. Good use of visual aids
7. Thesis of talk clear
8. Talk clear and well-organized
9. Complexity of talk  
(not a superficial treatment of the topic)
10. Able to answer questions
11. Good management of time limit  
(not too short, not too long)
12. Good contribution to talks by others (questions)
13. Talk flows freely, without unnecessary pauses
14. Choice of vocabulary is varied, and not colloquial
15. Tone is serious, and appropriate for presentation
16. Eye contact with audience
17. Overall impression