

**Department of Environmental Studies
Assessment Plan 2009/2010**

Department Mission Statement (adopted 02.06.09)

Our mission is to provide a broad-based, multidisciplinary education for students interested in the identification, study and solution of problems affecting the natural world. By integrating perspectives from the humanities, social and biophysical sciences in the best liberal arts tradition, our curriculum is designed to produce not only ethical and capable environmental professionals but environmentally literate, responsible citizens. Our emphasis on experiential learning, internship opportunities, communication skills, and teamwork creates an environment in which critical thinking and leadership skills are fostered that will serve students well in the workplace or the pursuit of advanced degrees. We are committed to attracting faculty members with a passion for teaching and to support them in the scholarly and research endeavors that keep them current and vibrant in the classroom. Our goal is to serve as a resource of environmental expertise for both campus and community and to create lasting partnerships.

Student Learning Goals (02.06.09)

Students successfully completing the major in Environmental Studies at Siena will be able to:

Goal 1. Informed Reasoning. Make reasoned and informed judgments about contemporary environmental issues from a multidisciplinary perspective.

Goal 2. Effective Communication. Effectively and efficiently describe, advocate, and interpret natural phenomena in oral, written and visual communications.

Goal 3. Technical Competency. Select and apply the appropriate analytical tool for environmental planning, monitoring, and restoration efforts.

Goal 4. Understanding Connections. Understand the connections between societal choices and sustainable outcomes for all living creatures and the physical environment.

Goal 5. Social Responsibility. Recognize that human impacts on the environment may have disproportionate effects on the poor and the marginalized and be equipped to address environmental inequities in their communities and beyond.

Environmental Studies Major Alignment Grid

Many Environmental Studies (ES) courses are cross-listed with other departments, mainly by the historical accident of their pre-existence in other departments at the time the ES program was created. As we move forward with curriculum review, our policy toward cross-listed courses will be revisited. It may not be possible to eliminate cross-listings from the multi-disciplinary ES curriculum, but we intend to reduce our dependency on them.

Course	Goal 1 Multidisciplinary Reasoning	Goal 2 Effective Communication	Goal 3 Technical Competency	Goal 4 Understanding Connections	Goal 5 Social Responsibility
<i>Introductory Sequence -- Required</i>					
ENVA 100, Environmental Science	X*	X	X	X	
ENVA 110, Environmental Policy	X*	X		X	X
ENVA 120, Environmental Ethics	X	X		X	X
<i>Required Cross-listed</i>					
ENVA 250/BIOL-225, Ecology†		X	X	X	
ENVA 290/CHEM 230, Environmental Chemistry		X	X	X	
ENVA 300/ECON 340 Environmental Economics†	X	X	X	X*	X
ENVA310/POSC 360, Environmental Politics	X	X		X	X
<i>ENVA Electives</i>					
ENVA-400, Topics in Environmental Studies:					
<i>Spring 2010: Rivers & Watershed Management</i>		X	X*	X	
<i>Spring 2010: GIS Environmental Applications</i>		X	X	X	
ENVA 420, Wildlife Conserv. Forest Ecosystems		X	X	X	
ENVA 440, Environmental Interpretation		X*		X	X
ENVA 410, Practicum in Environmental Studies	varies				
ENVA 499, Independent Study	varies				
<i>Cross-listed Electives</i>					
ENVA 255/BIOL 240, Plant Ecology					
ENVA 260/BIOL 230, Biology of Vertebrates					
ENVA 272/BIOL 235, Tropical Biology					
ENVA 274/BIOL 245 Tropical Marine Ecology					
ENVA-450/BIOL 460, Conservation Biology†	X	X	X	X	X
ENVA 140/SOCI 160, Environment & Society†	X	X		X	X
ENVA 220/ENGL 220, Literature & Environment†	X	X			
ENVA 230/ RELG 270, Religion & Environment					
ENVA 315/POSC 355, Global Environ. Dilemmas					
ENVA 320/PHIL 320, Philosophy of Nature					
ENVA 430/ATDV 100, Adirondack Environment†	X	X		X	

†Denotes cross-listed course taught by Environmental Studies faculty

*Denotes part of 2009-2010 learning goals assessment

Annual Academic Assessment Plan and Report 2009/2010
Department of Environmental Studies

Submitted: 6-1-2010		Department Head: Jean Mangun	
<p>Mission: Our mission is to provide a broad-based, multidisciplinary education for students interested in the identification, study and solution of problems affecting the natural world. By integrating perspectives from the humanities, social and biophysical sciences in the best liberal arts tradition, our curriculum is designed to produce not only ethical and capable environmental professionals but environmentally literate, responsible citizens. Our emphasis on experiential learning, internship opportunities, communication skills, and teamwork creates an environment in which critical thinking and leadership skills are fostered that will serve students well in the workplace or the pursuit of advanced degrees. We are committed to attracting faculty members with a passion for teaching and to support them in the scholarly and research endeavors that keep them current and vibrant in the classroom. Our goal is to serve as a resource of environmental expertise for both campus and community and to create lasting partnerships.</p>			
<p>Stakeholder involvement in the following: <input checked="" type="checkbox"/> Mission <input checked="" type="checkbox"/> Learning goals <input type="checkbox"/> Assessment procedures <input type="checkbox"/> TBD <input type="checkbox"/> Curricular changes</p>			
Assessment Plan		Assessment Report	
Major/Program Learning Goals (Course Alignment Grid attached)	Assessment Procedures	Assessment Results	Use of Results
<p>1. Informed Reasoning Make reasoned and informed judgments about contemporary environmental issues from a multidisciplinary perspective.</p> <p><i>(Being assessed 2009-2010 and 2010-2011).</i></p>	<p>Method: A series of integrative essays and group problem-solving activities:</p> <ol style="list-style-type: none"> 1) ENVA 100: individual effort issue-based field trip write-ups & ecosystem structure paper 2) ENVA 110: group research & presentations on policy issues; prepare issue briefs on local issue for policyoptions.org. <p>Sampling: Students enrolled in ENVA 100, Environ. Science & ENVA 110, Environmental Policy. When: Selected assignments throughout semester. Assessor: Instructors in ENVA 100 & ENVA 110. Metric: See attached rubric (under development), tested for ENVA 110. Incentive: ENVA 100: ecosystem paper 10%, trip reports 12% of grade; ENVA 110: Case studies/policy briefs 20% of grade. Goal: At least 80% of students meet or exceed standards.</p>	<p>Data were collected from ENVA 100, Environmental Science Fall 2009 integrative writing assignments. The stated goal was achieved. Overall, 85% of students scored $\geq 80\%$ on environmental issue identification assignments.</p> <p>Data were collected from ENVA 110, Environmental Policy Spring 2010. This second-semester course required students not only to summarize complex issues but to frame them from multiple stakeholder perspectives. New rubric tested on selected assignments. The stated goal was not achieved. Overall, 65% of students met or exceeded standards. Instructor felt first-year students lack sufficient social science skills for integrative policy analysis.</p>	<p>Goal 1 to be assessed across the ES curriculum. Baseline assessment initiated in 2009-2010 freshmen-level courses; process to be ongoing as rubric modified to assess progressive mastery in upper-level courses.</p> <p>Goal 1 considered central to our interdisciplinary program. As we go forward with curriculum review, our 3-course introductory sequence is being re-examined. Consideration being given to re-tooling ENVA 110 as an upper-level course, replacing it with ENVA 140, Environment & Society in the ES introductory sequence.</p>
<p>2. Effective Communication Effectively and efficiently describe, advocate, and interpret natural phenomena in oral, written and visual communications.</p> <p><i>(Being assessed 2009-2010 and 2010-2011)</i></p>	<p>Method: Persuasive communication skills were assessed via essays and self-assembled portfolio of interpretive writing & media projects prepared for various audiences. Sampling: Students enrolled in ENVA 440, Environ. Interpretation. When: ENVA 440 portfolio graded at end of semester. Assessor: Instructor in ENVA 440. Metric: See attached rubric. Incentive: Assembled projects 45% of grade. Goal: At least 80% of students meet or exceed standards.</p>	<p>Data were collected from ENVA 400, Environmental Interpretation Fall 2010. The stated goal was achieved. Overall, 85% of students met or exceeded standards.</p>	<p>Instructor plans to have next year's students develop digital portfolios to provide additional opportunity for writing through reflective commentaries to accompany portfolio entries.</p>

<p>3. Technical Competency Select and apply the appropriate analytical tool for environmental planning, monitoring, and restoration efforts.</p> <p><i>(Being assessed 2009-2010 and 2010-2011)</i></p>	<p>Method: Cumulative final exam with several questions that measure ability to recall quantitative information and perform computations. Results of selected questions to be analyzed. Sampling: Each student enrolled in ENVA 400, Rivers and Watershed Management (a new course for Spring 2010). When: Final Exam. Assessor: Instructor in ENVA 400. Metric: Scores of final exam question(s). Incentive: Final exam 15% of course grade. Goal: At least 80% of students meet or exceed standards (Score > 70%).</p>	<p>Data were collected for the ENVA400, Rivers and Watershed Management Spring 2010 final exam. The stated goal was not reached. Results shown in appended graphs.</p> <p>Overall, 11% of students scored > 70% on final exam.</p>	<p>Students in the ES major need to master basic computational skills earlier in their program -- before they attempt upper-level electives. A new special topics course, ENVA 400, Environmental Research Methods will be offered in Fall 2010 and evaluated for permanent placement as a second-year course in the ES curriculum. This new course is envisioned as a pre-requisite for Rivers and Watershed Management when taught in subsequent years.</p>
<p>4. Understanding Connections Understand the connections between societal choices and sustainable outcomes for all living creatures and the physical environment.</p> <p><i>(Being assessed 2009-2010 and 2010-2011).</i></p>	<p>Method: Graded outcomes from class diaries on food and energy consumption and footprints; selected final exam questions addressing learning goal. Sampling: Each student registered in ENVA 300, Environmental Economics. When: Continuing during semester; final exam. Assessor: Instructor in ENVA 300. Metric: Scores assigned by instructor (see attachments). Incentive: Total of scores used is 8% of course grade. Goal: At least 80% of students meet or exceed standards. (Score > 70%).</p>	<p>Total scores from diaries and selected final exam questions show that 7 students (64%) met the goal of 70%, while 4 students (36%) did not.</p> <p>Results varied substantially by area (see appended rubrics and results).</p>	<p>Students are able to identify appropriate concepts, and repeat specific arguments and simple graphical analyses. More complex calculations, or critical analysis of arguments is very challenging for most students. The end result here was not satisfactory. Structured problem sets introduced with more precise definitions and more examples will be used to address this shortcoming.</p>
<p>5. Social Responsibility Recognize that human impacts on the environment may have disproportionate effects on the poor and the marginalized and be equipped to address environmental inequities in their communities and beyond.</p> <p><i>(To be assessed 2010-2011)</i></p>	<p>Method: Not formally assessed in AY 2009-2010. Survey ES faculty to identify which courses do/can integrate an ASL component.</p>		

**Annual Academic Assessment Plan and Report 2009/2010
Department of Environmental Studies
Supporting Documents
and
Samples of Student Work**

Goal 1. Informed (Multidisciplinary) Reasoning

Sample of Student Work Meeting Expectations

Sample 1. ENVA 100, Environmental Issue Identification Summary (Freshman-level)

Communities and ecosystems are different aspects of ecological organization that come together across landscapes, to form what we know to be a biome. The major difference between ecosystems and communities is that a community is made-up of different species populations that live and interact with each other in an area, while an ecosystem is the combination of all the different communities and abiotic, or nonliving, factors in a specific area. With this combination, many different factors arise that can affect what species of plants and animals can survive and thrive in any given type of ecosystem. These factors can include anything from the climate of the ecosystem to the different types of predators in the ecosystem. In addition to factors being caused by nature, they can also be caused by humans, like the starting of a fire to limit an ecosystem from reaching its climax vegetation. But before these factors can be discussed in detail, it is important to look at and analyze different types of ecosystems. During the lab field trips, we looked at three different types of ecosystems, and these were the Siena College campus woodland, the Albany Pine Bush, and the Saratoga National Historic Park (SHNP). These ecosystems were all very different from each other, and have different factors that affect them, but they also share factors that influence the way the ecosystems have evolved. Before these factors can be distinguished from each other, the ecosystems must be looked at in detail, and analyzed to figure out the true differences in the ecosystems.

The first ecosystem that we looked at was the ecosystem that surrounded the Siena College main campus. This ecosystem is part of what would be called a temperate deciduous biome. This ecosystem type has a high level of biodiversity. This biodiversity was primarily made-up of plant species, including a variety of trees, herbaceous plants, vines, and shrubs. These species also included different types of native plant species and invasive plant species. The wooded area that was around the campus consisted of very large, old trees and broad-leaf trees, which shows that the trees in the woods have been around for a long time, and that they have been able to mature and possibly reach the climax community for this type of ecosystem. The factors that would affect this ecosystem would be the normal abiotic factors like temperature and rainfall, but there are also some biotic factors that are not normal for an ecosystem. The most prominent would be the fact that there is a college campus, with thousands of college-age kids. This has the possibly of having major effect on the environment. This is not a normal factor, and is not experienced by most ecosystems. The wooded area also has the normal types of disturbances that are experienced by all wooded areas, such as: the falling of a tree in the woods, and the creation of a gap; and the invasion of “gap specialists,” or species that are able to grow and thrive in an area in which a disturbance has occurred. This ecosystem would be a normal example of the temperate deciduous biome. But this was not the only ecosystem that we looked at in lab, and this type was very different from the other two that we looked at.

The next ecosystem that we saw was the Albany Pine Bush. This ecosystem was radically different from what we saw at Siena, even though they are both part of the same biome. This ecosystem is also much dryer and much more open than what we saw on campus. The Albany Pine Bush was primarily a coniferous ecosystem with an understory that consisted primary of oak new growth. The soil in this ecosystem was also very different. This soil was primarily sand, which allows conifer trees to thrive, while the broad-leaved trees were suppressed. But what makes this ecosystem distinctly different from the others was that it regularly has the disturbance of fire. This fire can either be caused naturally, like a lightning strike, or be caused by humans starting a controlled fire in the ecosystem. The main difference is that fire is needed to keep this ecosystem existing. The fire is used to destroy the oak undergrowth, which would normally thrive and grow into tall trees. This allows the conifers, which are resistant to fire, to grow, and remain the dominant tree species in the ecosystem. The disturbance of fire does not allow the climax ecosystem to be reached, and therefore, this leads to a lower level of biodiversity, both in the number of tree and animal species. The species of broad-leaf trees are not allowed to grow, and this leads to the species of animals that would normally live in a broad-leaf tree forest to not come to the area. The

fire that occurs in this area is allowed to happen, and this is because the pine bush is a rare ecosystem type that needs to be protected by preventing the climax ecosystem from being reached. The Albany Pine Bush includes not only coniferous trees but also some deciduous trees. These deciduous trees are just found in different locations, and are not as numerous as the coniferous trees. However, biodiversity appears less than the temperate deciduous woodland of the Siena campus.

The final ecosystem that we visited was very different from both of the others, and had very many different factors that affected it. The final ecosystem that we visited was at SNHP. This ecosystem had the highest level of biodiversity of all the ecosystems that we visited. This ecosystem was a combination of many different communities, and included wetlands, woodlands, and open grassland. One of the more noticeable things in this ecosystem is different types of tree species in the area. The boundary between the different types of species habitat is called the ecotone, and ecotones were very distinctive in this ecosystem. One could obviously see the differences in the environment. There were also very old and developed trees in the area, which shows us that the species in the area had been around for a long time. This ecosystem, especially in the wetland community, had large amounts of disturbance, most of which was caused by the wetness of the soil. Many trees had fallen, because the land was too wet to support them, and these disturbances again lead to the invasion of “gap specialists.” This was one of the reasons for the high level of biodiversity in the SNHP ecosystem.

Another interesting part of the SNHP ecosystem was the areas where there were patches of different species of trees that were unlike all the other trees that were in the area. These patches mostly consisted of Hemlock conifers, which is one of the few conifers that can survive in a climax deciduous ecosystem. There was also a lot of mechanical damage to some of the trees. This damage resulted in what is known as coppice. Some damage caused the tree that was damaged or cut to divide into many different trunks all coming from the same base of the same tree. This shows us that there was once movement of large objects or animals through the area. This could have been caused by a farm that was located nearby, or logging that was taking place at the time the trees were developing. There was also a location where a vegetable once was grown, we know this because of the existence of some vegetable-like asparagus that was still around, and the fact that the soil in a small area was completely depleted of nutrients because of the over-farming in that area. This leads to an area that had no forms of large trees, and only small herbaceous plants. All of these different factors lead to the high level of biodiversity, and a very interspersing habitat types.

Now that the ecosystems and their communities have been described, we can look at the factors that made the ecosystems and communities different from each other. Each of the places that we visited had factors that caused them to be very different from each other. The communities at Siena were generally defined in specific areas and included many different types of species. Combining the biotic components with the abiotic factors forming this ecosystem supported a high level of biodiversity and a fairly well-balanced woodland ecosystem. The Albany Pine Bush also had very defined communities within it. One could obviously see where the different species of plant were present, and one could see the areas where the communities interacted with each other. Without the addition of fire into the ecosystem, however, the communities of broad-leaf trees would overtake and choke out the population of conifers in the ecosystem. Over time the soil would change from sand to soil because the leaves (providing the broad-leaf trees were around long enough to mature and able to produce that many leaves), would come down in the fall and decompose adding organic material to the soil. This would also hurt the ability of the conifers to grow, seeing that they thrive in sandy soil. Fire is the most important abiotic factor in this ecosystem. Fire allows the conifers to remain the dominant species of trees in the Albany Pine Bush ecosystem and keeps the large deciduous trees from developing in the area. The other communities and ecosystems did not have the factor of fire in them and it was not relevant in them, but in this ecosystem, it is the most important factor and it keeps the community the way that it is. Another factor that affected this ecosystem was the fact that it was dryer than the others. This helps the ability for fires to start, and regulates the ability for the ecosystem to reach its climax stage. In the SNHP, the communities were very diverse, and they consisted of many different types of species in them. They ranged from species that we saw at the other trips to species that were only native to the wetlands that

were in the area. The most important factor in this ecosystem that defined its communities was probably water and varying levels of soil moisture.

Although many of the abiotic factors were the same in all of the ecosystems visited, like the temperature and the presence of wind, a difference in only a few can cause radical changes in the way a ecosystem looks, the species that can live there, and the way the populations of species in the community work together and affect each other. But these factors are not just applied to the areas that we visited; they can be applied to any ecosystem or biome. Communities and ecosystems are greatly affected by the factors that are around them. The factors whether they are biotic or abiotic, small or large, or caused by humans or nature, will always have some form of an effect that changes the communities and ecosystems, and makes them into the natural areas that we know today. The ecosystems that we visited exhibited different degrees of biodiversity. An issue about the importance of biodiversity is whether or not higher levels of biodiversity contribute to greater stability of an ecosystem. It is thought by some ecologists that if more species are present at a location they can respond to change and reduce its effects. The stability of the ecosystems we visited would seem to support this position, The Albany Pine Bush had the lowest biodiversity of the three, was fragile, and needed human intervention with controlled fire to prevent communities of broad-leaf trees from replacing the population of conifers in the ecosystem.

It is important that we understand how the interaction of biotic and abiotic factors influence communities and ecosystems so that we are able to prevent human factors from causing harmful changes. Understanding how communities and ecosystems work and what influences them will give us a better understanding of our environment, and help us figure out how we can protect and save our environment.

Goal 1. Informed (Multidisciplinary) Reasoning

Environmental Studies Major

Multidisciplinary Reasoning Rubric†

Student:	Date:	Assignment:		
Criteria	Does not meet standards	Meets standards	Exceeds standards	Score
<i>Issue identification</i>	Student does not effectively identify or summarize the issue at hand; statement of the issue and its significance is unclear; differing or competing perspectives not recognized.	Student begins to frame the issue; issue definition and explanation of its significance all or mostly correct; differing or competing perspectives acknowledged.	Student clearly frames the issue and develops a position; issue definition and explanation of its significance correct; differing or competing perspectives acknowledged and explained.	
<i>Purposefulness</i> †	Student's paper/project lacks an identifiable purpose; no evidence of an integrative approach to problem solving.†	Student's paper/project clearly states a purpose; framing of the problem calls for an integrative approach.†	Student's paper/project clearly states a purpose; framing of the problem calls for an integrative approach. A clear rationale or justification for taking integrative approach is provided.†	
<i>Disciplinary Grounding</i> †	Student does not make effective or accurate use of disciplinary knowledge (e.g., concepts, theories, perspectives, findings, examples). Student cites non-credible sources or relies too heavily on one source.†	Student uses disciplinary concepts appropriately, key claims and generalizations are supported with examples or findings from the disciplines involved. Student uses relevant and credible sources to advance argument.†	Student uses disciplinary concepts appropriately, key claims and generalizations are supported with examples or findings from the disciplines involved; some insightful new examples, interpretations, or responses may be present. Student not only uses relevant and credible sources, but integrates source material thoughtfully to advance argument.†	
<i>Integration</i> †	Student views issues from a single disciplinary perspective, <i>or</i> -- if multiple perspectives are considered -- connections are unclear.†	Student uses two or more relevant disciplines to inform the issue at hand; an attempt to connect insights from different perspectives is discernible.†	Student uses two or more relevant disciplines to inform the issue at hand; an integrative device or strategy connects different perspectives in a coherent and effective manner.†	
<i>Critical awareness</i> †	Student exhibits little-to-no awareness of the differing contributions of relevant disciplines/perspectives.†	Student exhibits awareness of the contributing disciplines/perspectives; begins to discuss relative limitations and/or benefits of multiple perspectives.†	Student exhibits awareness of the relative limitations and benefits of all contributing disciplines/perspectives. Student also focuses on reciprocal relationships or interactions.†	

†Rubric adapted from: Boix Mansilla, V., Dawes Duraisingh, E., Wolfe, C. R., & Haynes, C. (2009). Targeted Assessment Rubric: An Empirically Grounded Rubric for Interdisciplinary Writing. *The Journal of Higher Education* 80 (3) 334-353.

Goal 1. Sample of Student Work Meeting Expectations

Sample 2. ENVA 110, Environmental Policy Presentation Outline (Freshman-level)

Paradise or Playground? Snowmobiles in Yellowstone National Park

Case Analysis:

Stakeholders and Actors:

1. Environmentalists (ex: Blue Water Network - a coalition of 60 environmental groups)
2. Snowmobilers (ex: Blue Ribbon Coalition - off-road advocacy group)
3. Yellowstone National Park
4. National Park Service (NPS)

Issues:

- This case questioned how far should regulation go to limiting how people can enjoy a national park.
- Secondly, it took into question the purpose of a national park. Should the park be for conservation of aesthetic environmental beauty or putting nature on display?
- Lastly, is it the park's responsibility to maintain the local economy or the health of the environment?

Priority Setting:

- Environmentalists who enjoyed the park began complaining about all of the negative effects snowmobiles were having on their visiting experience and on the park itself.
- Complaints reached the NPS, who conducted surveys and collected data on the state of the park's environment and how the effects could be linked to snowmobile use in the park.
- The experts present in this case were those agents present who collected the data and interpreted how snowmobiles were affecting the park's environment.

Legal Framework:

- During the case, there were no laws capping snowmobile use in national parks. However, there were a number of laws and executive orders in place to preserve the quality of those parks.
- Laws including the Yellowstone Act, National Park Service Organic Act of 1916, and the Clean Air Act, all required parks to preserve and protect the park's condition, beauty, and quality for future generations.
- Presidential executive orders by President Nixon and Carter each mandate that parks should regulate where off-road vehicles can travel in national parks to minimize wildlife and environmental disturbances.

Social Landscape:

- Two sides were at odds about the controversy of using snowmobiles in national parks.
- Environmentalists wanted a healthy, quiet park where they can enjoy nature in its purest form. They felt that the purpose of a national park is to preserve the beauty of that environment, and to be a place to reconnect with nature.
- Snowmobilers didn't see themselves as an anti-environmental group; in fact they saw themselves as environmental enthusiasts who felt snowmobiles helped them access more of the park and experience nature to the fullest. They also stressed the economic impact that snowmobiles had on the local economy and how crucial of a setback it would be if a ban were established.

Resolution Process:

- The original plan was to phase out snowmobilers by 2003-2004. However, Congress delayed the phase-out and disallowed President Bush to block it this decision.
- Then a SEIS (Supplementary Environmental Impact Statement) was drafted, which complied with the first original EIS (Environmental Impact Statement). In light of this development, Congress decided to take a fourth alternative, which allowed some snowmobiles to enter national parks.
- Following this move, the District Court of Columbia overturned Bush's decision to allow a limited number of snowmobiles in and phase in the original decision to phase out snowmobiles all together by 2004.
- To end all the confusion, this new law was overturned by a district court in Wyoming, which restored bush's decision to only allow a limited number of snowmobiles into the park.

Goal 2. Effective Communication

Environmental Studies Major

Interpretive Project Rubric†

Student:	Date:	Project:
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Objective	Does not meet standards	Meets standards	Exceeds standards	Score
<i>Communication ability:</i> -thematic -organized -relevant	lacks theme confusing not relevant to audience	straightforward satisfactory/chronological appropriate to audience/provides audience with focus, demonstrates connections	engaging/memorable coherent unity appropriate to audience/ creates opportunity for audience to form their own connections	
<i>Depth of understanding/use of materials:</i> -level & diversity of sources -interpretation of sources	level too simple; too few inadequate and/or inaccurate	level adequate; number sufficient adequate and/or accurate	level sophisticated; number substantial insightful and/or provocative	
<i>Multiple perspectives in overall portfolio work:</i>	consistently employs single perspective	attempt to “see” from other points of view	balanced treatment, acknowledges multiple points of view	
<i>Creativity and higher-level synthesis</i>	“plays it safe”/depends on published examples; keeps ideas separate from one another	sometimes tries “new” approaches; somewhat integrative	“takes risks”/finds imaginative ways; pulls ideas together; explores relationships	
<i>Structure and style</i>	contains spelling, grammatical, typographical, or stylistic errors which impede or compromise interpretive effectiveness	contains minimal spelling, grammatical, typographical, and stylistic errors; receptive to correction/editing	avoids spelling, grammatical, typographical, and stylistic errors	

†Rubric adapted from: Portfolio Assessment Form, School of Leadership, College of Education, University of Kentucky, provided by Dr. Jane Lindle, Administration and Supervision, and Professional Standards for Learning and Performance, Interpretive Development Program, National Park Service

Goal 2. Effective Communication

Sample of Student Work Meeting Expectations

Sample 1. ENVA 440, Environmental Interpretation Essay (Upper-level)

Nature-Deficit Disorder is the non-medical term referring to the process or condition of being affected emotionally, spiritually, mentally, and physically from chronic deprivation of access to nature. Richard Louv, a seasoned book writer, journalist, and award winner (Audubon 2008), has elaborated on the problem of Nature-Deficit Disorder (NDD) in youth in international forums. Fear and ignorance have become catalysts for this serious malfunction not only on the individual level but in society at large. Environmental Interpretation as a profession can be an effective solution to this growing social and environmental dilemma.

The emotional and mental state of children becomes altered from a very early age. With the lack or deprivation from nature in a person's life from birth, cooperating and understanding the natural world becomes distorted. It has been found that depression and anxiety from life's difficult times can be magnified without the calm and esthetics of nature.¹ This becomes a predicament for toddlers through adolescents, according to a scientific survey taken in 2003 by Psychiatric Services, as well as a developed research project done by Cornell University.² Pre-schooled aged children happen to be the fastest growing consumers ("pre-scribees") of antidepressants.³ The rapidly increasing rates of prescribed antidepressants for toddlers through adolescents are extremely dangerous. Antidepressants (excluding Prozac) are to this day, still not approved from children under the age of eighteen; children under the age who use prescribed medications to help control their hormonal imbalances have been found to have their emotional thoughts influenced in a negative way due to the use of the drugs.⁴ Research from Cornell found that children who live in "high-nature concentration" were found to be less stressed when faced with difficult "life questions and tasks."⁵ These children were found to be able to understand and handle "life" in an efficient, emotionally balanced way.⁶

Attention Deficit Hyperactivity Disorder is another leading mental, emotional, and social disorder partially resulting from the direct impact of nature on a child. A report from 2006 concludes that in the United States alone, 4.5 million children aged 5-17 have been diagnosed

¹ Louv, Richard. *Last Child in the Woods Saving Our Children From Nature-Deficit Disorder*. New York: Algonquin Books, 2008. Print.

² Louv, Richard. *Last Child in the Woods Saving Our Children From Nature-Deficit Disorder*. New York: Algonquin Books, 2008. Print.

³ Louv, Richard. *Last Child in the Woods Saving Our Children From Nature-Deficit Disorder*. New York: Algonquin Books, 2008. Print.

⁴ Louv, Richard. *Last Child in the Woods Saving Our Children From Nature-Deficit Disorder*. New York: Algonquin Books, 2008. Print.

⁵ Louv, Richard. *Last Child in the Woods Saving Our Children From Nature-Deficit Disorder*. New York: Algonquin Books, 2008. Print.

⁶ Louv, Richard. *Last Child in the Woods Saving Our Children From Nature-Deficit Disorder*. New York: Algonquin Books, 2008. Print.

with ADHD.⁷ Males living in a low-income home (below poverty) reported significantly more often than males in families with incomes at or above the poverty threshold.⁸ These families do not have the proper facilities or funds for nature education for their children, and as a result, the anxieties of life are not as manageable. In Louv's book, "Last Child in the Woods: Saving our Children from Nature-Deficit Disorder," it was found that in a 2000 report, assistant professor at the New York State College of Human Ecology, Nancy Wells, found that green spaces are linked to the heightening of a child's attention span. Research was done in Sweden comparing the social and physical coordination of children located at two different preschools.⁹ One preschool was located in an urban setting, as the other was located near an open pasture and full garden. The children at the school based in nature had better motor coordination, as well as an enhanced ability to concentrate on their schoolwork.¹⁰ Louv mentions other cases in which families bring their children who have ADHD to beaches and parks in order to watch their children be able to calm down and focus when life gets too stressful for them. The family trips to natural setting have made a dramatic impact on these families' emotion and mental states. The soothing affects of nature aren't only seen inside the classroom, or on family vacations, but "nature sounds" CDs have become popular in yoga classes and upper-end spas in order to create a calmer, focused environment. There are reasons for why people go outside to calm down after a heated fight, why the sunset and stars seem to romance and relax those who are absorbed in it, and why people purchase mini waterfall and water fountains for their homes. Nature induces a calming, moving environment for those who choose to become involved in it.

As well as the emotional and mental conditions that nature can help ease, understanding and being involved in nature can help with the physical aspects of a human being.

American society has become 'obseogenic,' characterized by environments that promote increased food intake, nonhealthful foods, and physical inactivity. Policy and environmental change initiatives that make healthy choices in nutrition and physical activity available, affordable, and easy will likely prove most effective in combating obesity. (cdc.gov/obesity, Dec 23, 2009.).

⁷ "CDC - ADHD, Data and Statistics - NCBDDD." *Centers for Disease Control and Prevention*. Web. 23 Dec. 2009. <<http://www.cdc.gov/ncbddd/adhd/data.html>>.

⁸ "CDC - ADHD, Data and Statistics - NCBDDD." *Centers for Disease Control and Prevention*. Web. 23 Dec. 2009. <<http://www.cdc.gov/ncbddd/adhd/data.html>>.

⁹ Louv, Richard. *Last Child in the Woods Saving Our Children From Nature-Deficit Disorder*. New York: Algonquin Books, 2008. Print.

¹⁰ Louv, Richard. *Last Child in the Woods Saving Our Children From Nature-Deficit Disorder*. New York: Algonquin Books, 2008. Print.

Obesity is a huge issue within the United States. In a report done by the US government in 2008, it was found that only Colorado had an obesity population of less than 20% of its people.¹¹ Thirty two states had an obesity population equal to or greater than 25% of its total population.¹² Six of the 32 states had an obesity prevalence of equal to or greater than 30%.¹³ The ignorance about where our food comes from, how it is prepared, and what may be in our food has led to the over-consumptive way-of-life that has taken over America. People are not out in nature enough, and do not realize that most of our foods come from agribusiness: factory farms and over-produced, low nutritional crops. Preservatives and false flavorings make up a huge percentage of the food and beverage items that we bring home from the grocery store. Disconnection from nature has created a false reality in which harmful farming tactics, dangerous pollutants, and mystery substances are overlooked, misunderstood, and have failed to be registered by our brains as a negative aspect of our “bigger is better” distorted mindset. With proper education, people will see that tainted meats, antibiotic filled milks and creams, chemical-composed sodas, and processed, cholesterol-ridden snack foods are poison. Emotion needs to be reestablished and reconnected to the nature, opening the human mind to what is really going on in the world around them.

The ignorance found internationally when it comes to the natural world has gone beyond disturbing, and has had an incredibly negative impact on the living situation of human beings. As a profession involved with re-engaging humans to the natural world, Environmental Interpretation can not only enhance the lives and well-being of seemingly “healthy” human beings, it can help those who are diagnosed with serious life-threatening or life-altering illnesses or disorders. Nature can be the cure (the sanctuary, the Ritalin, the grocery store, etc.) for several alarming conditions present in society. With increased education about environmental benefits, the fear of nature, along with other misconceptions, can be dealt with properly. Ignorance and fear has made society numb, and at risk for being permanently damaged, if not destroyed, by the growing prevalence of nature-deficit disorder.

¹¹ "Obesity and Overweight for Professionals: Data and Statistics: U.S. Obesity Trends | DNPAO | CDC." *Centers for Disease Control and Prevention*. Web. 23 Dec. 2009. <<http://www.cdc.gov/obesity/data/trends.html>>.

¹² "Obesity and Overweight for Professionals: Data and Statistics: U.S. Obesity Trends | DNPAO | CDC." *Centers for Disease Control and Prevention*. Web. 23 Dec. 2009. <<http://www.cdc.gov/obesity/data/trends.html>>.

¹³ "Obesity and Overweight for Professionals: Data and Statistics: U.S. Obesity Trends | DNPAO | CDC." *Centers for Disease Control and Prevention*. Web. 23 Dec. 2009. <<http://www.cdc.gov/obesity/data/trends.html>>.

Goal 2. Sample of Student Work Meeting Expectations
Sample 2. ENVA 440 Interpretive Signage (Upper-level)

A Historic Highway: Exploring the Hudson River of Yesterday and Today



The Half Moon

Past

Henry Hudson sailed up the Hudson River on his ship The "Half Moon" in 1609.... 400 Years Ago! The River provided a pathway for early explorers to settle the Hudson River Valley. These early settlers used the Hudson as a route for trading with each other and with the Native Americans



Present

In the spirit of Henry Hudson's journey people can use the River today to embark on their own expeditions. Have you ever used the river for sightseeing, boating, fishing, and swimming? All of these activities help to inspire a new generation of explorers like Henry Hudson.

Goal 2. Sample of Student Work Meeting Expectations
Sample 3. ENVA 440 Interpretive Signage (Upper-level)

Red-tailed Hawk

Buteo jamaicensis

The Red-tailed Hawk is the most common predatory bird in North America. They live in many environments including open fields, deserts, and forests.

When a hawk reaches maturity, they choose a mate for life. Did you know that the Red-tailed Hawk can live up to 20 years in the wild?

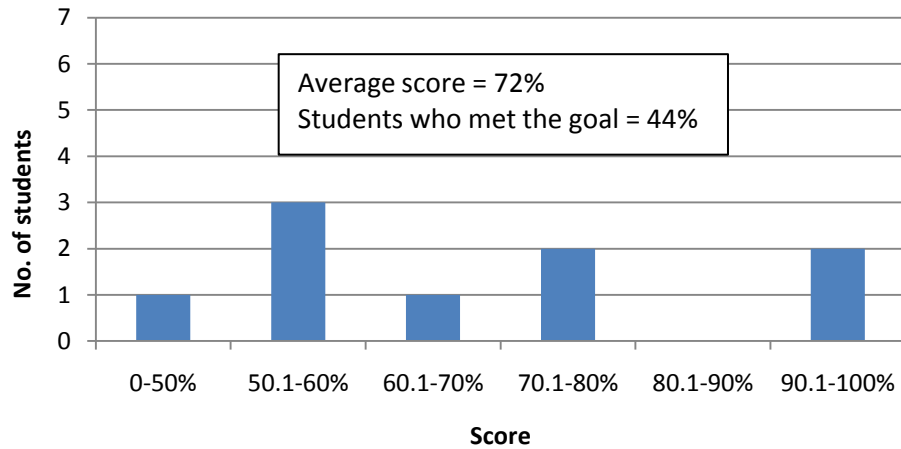


The Red-tailed Hawk has very few known predators. Their main threat is human activity, so it is very important to respect these birds and their habitats. How can you protect these stately, soaring birds?

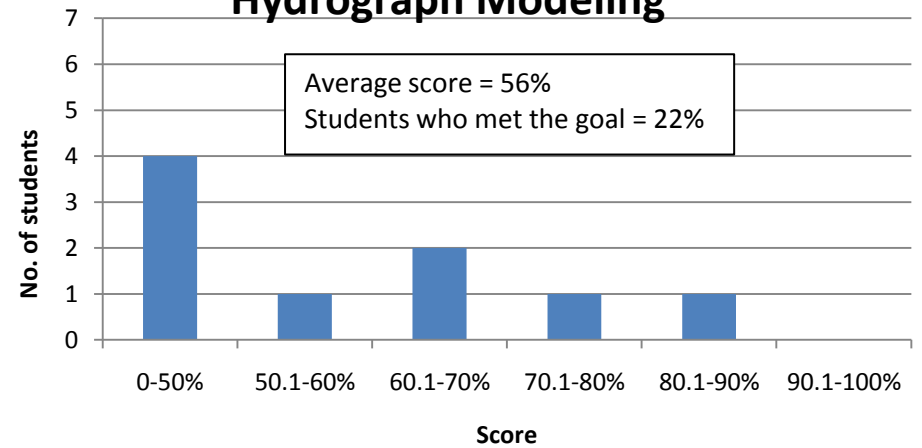
<http://shishka0441.deviantart.com/>

Goal 3. Technical Competency
Grade Distributions on Selected Exam Questions
ENVA 400, Rivers & Management Final (Upper-level)

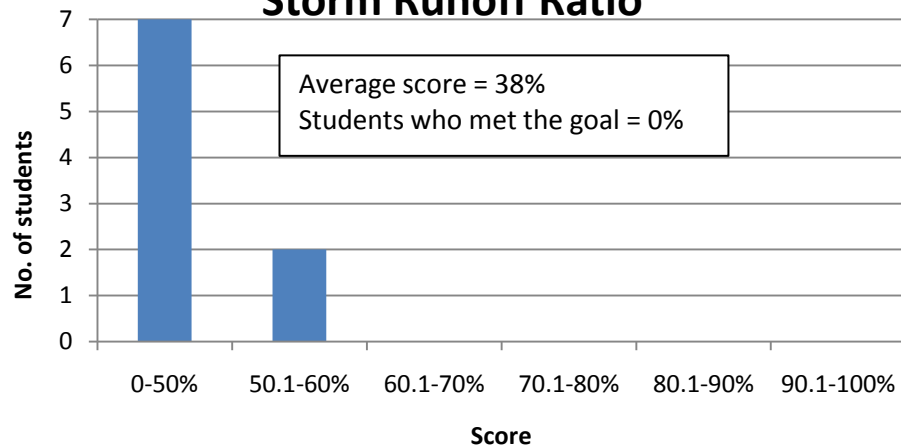
Q1: Analysis of a Flow Duration Curve



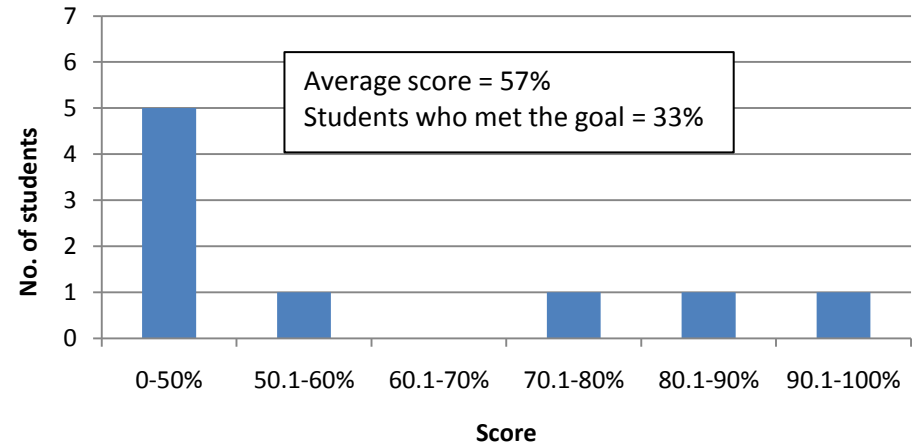
Q2: Unit Hydrographs and Hydrograph Modeling

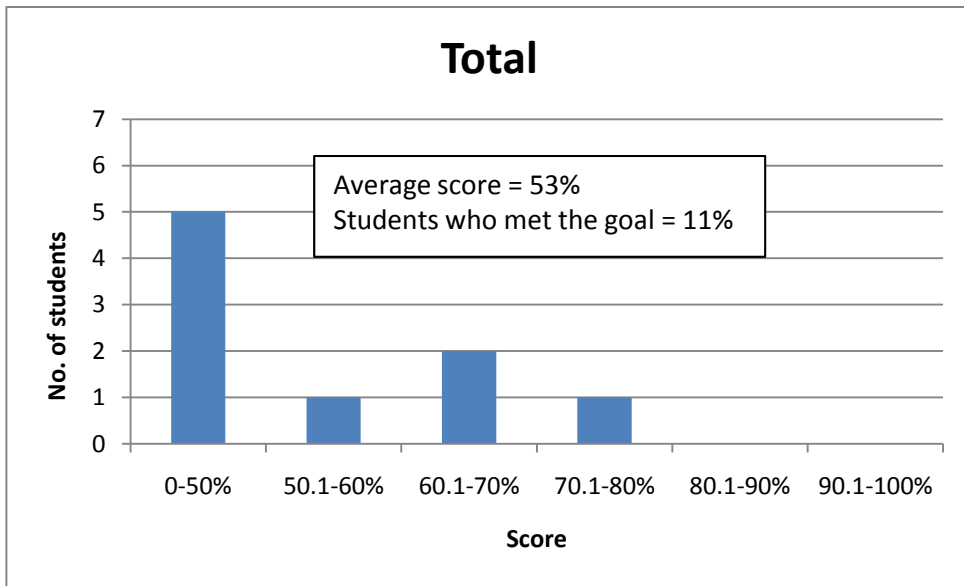


Q3: Manning's Equation and the Storm Runoff Ratio



Q4: Water Quality Mass Balance





Goal 4. Understanding Connections

Notes and rubrics supporting Environmental Studies Learning Goal 4: *Understanding Connections* (Understand the connections between societal choices and sustainable outcomes for all living creatures and the physical environment.)

Spring 2010

J. Booker

Assessment rubrics and discussion (basic goal to meet standard: 70% of maximum score).

1. Energy and food diaries were kept, and resulting carbon footprints were calculated for each. Substantial guidance was given, and mastery of the necessary conversions was not demanded. The primary purpose was to demonstrate the connection between choice and outcome.

Results: 10 students (91%) met the standard; 1 (9%) did not.

Raw scores: 9,5,7,9,9,10,10,9,9,10,8.

2. Show the connection of a supply and demand model of choice to environmental outcome. Assessed using questions from final exam:

7. Show using a graph the economically efficient level of oil which should be produced. Also show on the graph the amount produced in the absence of any effective regulation or liability for spills and emissions.

8. Show using a graph how much oil from a spill should be cleaned up.

Results: 9 students (82%) met the standard; 2 (18%) did not.

Raw scores: 5,4,3,6,6,6,5,3,6,5,6 (out of 6)

3. Explain solutions to failures of individual decisions. Assessed using questions from final exam:

16. Explain a policy solution to the tragedy of the commons (one of the three from class).

17. If the future is discounted at 2% per year, and the costs of dealing with climate change will be four times as high in 70 years as today, should we act today or in 70 years? Answering using the appropriate calculations.

Results: 9 students (82%) met the standard; 2 (18%) did not.

Raw scores: 8,6,8,9,8,10,8,6,8,8,9 (out of 10)

4. Demonstrate how policy and incentives affect sustainability outcomes. Assessed using questions from final exam:

18. Is cap and trade effective in reducing emissions? OR What does Krugman argue is Hansen's moral objection to cap and trade?

20. Should you buy a Honda Insight or a Civic? (10 points)

Assume that the only differences that matter are listed below. Use a 10 year life for the car, 150,000 total miles, an 8% discount rate, and gas prices of \$3.00 per gallon.

Vehicle	mpg	gallons required to drive 150,000 miles	Purchase price	external cost per gallon
Insight	40	3,750	19,800	1.00
Civic	30	5,000	17,200	1.00

a. Answer for your private choice. b. What is best from a social perspective?

Results: 2 students (18%) met the standard; 9 (82%) did not.

Raw scores: 10,9,8,5,9,9,6,12,11,5,9 (out of 15).