102nd ESA Annual Meeting
Portland OR
August 6, 2017
List of Presentations

SEGMENT A

1. Michigan Sustainability Case: Sustainable Alternatives for Phragmites management in the Detroit River International Wildlife Refuge

Sheila Schueller
Department: School for Environment and Sustainability
University of Michigan

This Michigan Sustainability Case (http://www.teachmsc.org/) is set in the Detroit International Wildlife Refuge, a unique aquatic and collaboratively managed urban site. Through a narrative and additional multimedia resources, students will learn about the loss of biodiversity related to the widespread coastal invasive plant, phragmites. Current management approaches on this site include aerial herbicide and fire. Alternative approaches are presented from other research or sites, including harvesting phragmites for biofuel, biocontrol, water level management, or no management when phragmites provides ecosystem services. Students engage in exercises that ask them to assess the effectiveness and relative sustainability of these different approaches, building data interpretation skills and an understanding of landscape-level ecosystem processes (such as nutrient loading). An interview-based podcast is then used to illustrate the human context of decision-making at this site, and students must make a management recommendation taking both the science and multiple stakeholder views into account.

Vision and Change Core Concepts: Pathways and transformations of energy and matter; Systems: Living systems interconnected and interacting

Vision and Change Core Competencies: Apply the process of Science; Tap into the interdisciplinary nature of science; Understand the relationship between Science and Society; Use quantitative reasoning

Status of Activity: In development, has not been implemented in a classroom, lecture or laboratory

2. Transforming traditional Supplemental Instruction into Guided Study in General Ecology: the role of active engagement and Blooms Taxonomy

Jon Stetler
Department: Natural Sciences
Paul Smiths College

For students who come underprepared to handle college learning expectations, traditional supplemental instruction (SI) in which the tutors simply 're-teach' material to a passive audience of students, is not usually a valuable use of that time. Over the 2015-2016 and 2016-2017 academic year at Paul Smiths College, the lead tutor of my general ecology class has worked with me to transform the model of weekly SI into GS (Guided Study). The model includes small groups of students engaging with their class notes and the text to answer questions in a set of worksheets that are organized along a hierarchy of blooms taxonomy (from recognize to recall, describe, to apply). Part of this process has also been introducing blooms taxonomy to my class throughout the semester to help with metacognition, and breaking their test questions into sections related to the taxonomy hierarchy. We would like to share the models, the outcomes, and the challenges we continue to face with getting attendance at our GS meetings.

Vision and Change Core Concepts: Student centered undergraduate teaching

Vision and Change Core Competencies: active learning can be applied to any of the above. Our activity addresses student learning

Status of Activity: Highly developed, implemented multiple times in a classroom, lecture or laboratory

3. School Woodland Ecosystem Study Curriculum

Rhea M M Esposito
Department: Education
Cary Institute of Ecosystem Studies

This unit aims to increase students understanding of schoolyard tree biodiversity, with lessons focusing on differences in dispersal, herbivory, growth strategies, and decomposition between tree species and forest types. We hope to engage students in thinking about local forests as dynamic, exciting systems,

as well as challenging them to think scientifically and employ the science and engineering practices outlined in the Next Generation Science Standards.

Vision and Change Core Concepts: Pathways and transformations of energy and matter; Structure and Function; Systems: Living systems interconnected and interacting

Vision and Change Core Competencies: Apply the process of Science; Understand the relationship between Science and Society; Use modeling and simulation; Use quantitative reasoning

Status of Activity: Newly developed, implemented once or twice in a classroom, lecture or laboratory

4. 15 ways oil sands development impacts oceans

Sue Silver
Department: Frontiers
Ecological Society of America

Since Fall 2016, authors of papers in *Frontiers in Ecology and the Environment* have been invited to write lay summaries and to create videos or commentated slide shows to accompany their paper. These highly accessible pieces are intended to appeal to a broad audience, and are posted on the ESA Facebook page and blog, Ecotone. We are interested to learn whether, in either their current or a slightly modified form, they could be used for teaching purposes. In this **Frontiers Focus**, which accompanied a paper from the March 2017 issue, Stephanie Green**,** a postdoctoral fellow at the Center for Ocean Solutions at Stanford University, discusses effects of oil sands development on our oceans. Stephanie explains in a video commentary, how bitumen – a thick, sticky petroleum extracted from oil sands – can impact some of the world's most biodiverse and productive ocean ecosystems. She describes key research gaps that need to be filled, including bitumen's toxicity to marine species, and identifies opportunities where existing research could be better used to inform decisions about extraction, transport, and energy alternatives. This Frontiers Focus could support lessons on human dimensions or sustainability. http://www.esa.org/esablog/research/oil-sands-frontiers-focus/.

SEGMENT B

5. Concept mapping the ecological and social impact of everyday objects

Vikki Rodgers
Department: Math & Science
Babson College

In this activity I will walk through an exercise I do in my non-majors' ecology course to get students comfortable with large-scale systems thinking, by connecting the ecological and social systems impacted by the life cycle of a simple product. I will briefly introduce concept diagrams and then have participants select an object and work together to create a rough concept map depicting the direct and indirect

impacts and feedback effects of inputs and outputs. Concept maps can focus on one part of the product life cycle or connect all aspects of raw material extraction, distribution, manufacturing, use, and decomposition. In doing this exercise I encourage my students to consider impacts to specific parts of the world and communities of people at each stage. This activity can be used as a short in-class exercise or adapted as a semester-long group research project including a sustainable product development lab.

Vision and Change Core Concepts: Pathways and transformations of energy and matter; Systems: Living systems interconnected and interacting

Vision and Change Core Competencies: Tap into the interdisciplinary nature of science; Understand the relationship between Science and Society; Use modeling and simulation

Status of Activity: Highly developed, implemented multiple times in a classroom, lecture or laboratory

6. Exploring ecology survey methods with HHMI BioInteractive's Great Elephant Census

Tara Jo Holmberg
Department: STEAM
Northwestern Connecticut Community College

The story of African elephants is a powerful case study of how science can inform conservation. HHMI BioInteractive's Great Elephant Census materials provides students an introduction to scientists working on large-scale aerial elephant surveys in the field through a short Scientist at Work film. Students then use interactive and hands-on classroom activities to learn about the current state of elephant populations in Africa and to explore and model the methods scientists use to survey elephants. These resources offer students an opportunity to describe the various methods for surveying elephant populations, determine the appropriate method for different scenarios, and assess advantages and disadvantages of each survey method. They collect data on both a sample and total count, calculate densities, and analyze any variations. Finally, students discuss major challenges facing elephant populations and explain how data informs conservation and management strategies.

Vision and Change Core Concepts: Systems: Living systems interconnected and interacting

Vision and Change Core Competencies: Apply the process of Science; Understand the relationship between Science and Society; Use modeling and simulation; Use quantitative reasoning

Status of Activity: Highly developed, implemented multiple times in a classroom, lecture or laboratory

7. Forest Forensics outdoor activity

Louise Weber
Department: Biology/ENVS
University of Saint Francis

Students assess history of a forest based on a check off form. Previous agricultural use, weather events, time since last cutting, old growth characteristics, and other features are assessed. The activity requires little prep or equipment and works best in woods with an active human presence, such as urban woods. For such a simple activity, this is one of the student favorites as cited in my evaluations. Students report that they "see" the forest in radically different ways after this activity, and are eager to try out their new skills in other settings, like their grandmother's woodlot.

Vision and Change Core Concepts: Structure and Function; battling nature deficit disorder

Vision and Change Core Competencies: Tap into the interdisciplinary nature of science; Understand the relationship between Science and Society

Status of Activity: Newly developed, implemented once or twice in a classroom, lecture or laboratory

8. Bringing Data Nuggets into undergraduate courses

Melissa Kjelvik
Department: BEACON
Data Nuggets / Michigan State University

Originally developed as a collaboration between K-12 teachers and scientists, Data Nuggets are now widely used in K-16 classrooms. They are free activities that bring authentic research and data into the classroom, revealing to students how the process of science really works and increasing the connections between scientists and the public. Data Nuggets are created from cutting-edge scientific research and include authentic, and sometimes messy, data sets. The goal of Data Nuggets is to engage students in the practices of science through an innovative approach that combines scientific content from authentic research with key concepts in quantitative reasoning. For examples and more information, visit http://datanuggets.org.

Vision and Change Core Concepts: Evolution; Structure and Function; Systems: Living systems interconnected and interacting

Vision and Change Core Competencies: Apply the process of Science; Understand the relationship between Science and Society; Use quantitative reasoning

Status of Activity: Highly developed, implemented multiple times in a classroom, lec