

White Paper

Sustainability Infusion Project

Title of Module/Activity

Aquatic Insects in the Context of Sustainability

Course Name and Course Number

ENTO 402/802 Aquatic Entomology (2.0 credit hours)

Length of Module/Activity

1 out of class session, 3 in-class sessions

Primary Learning Outcomes

Students will explain how freshwater availability and management practices pose threats to ecosystem integrity, aquatic insect diversity and human well-being. This outcome, and the session learning objectives below are derived from the InTeGrate curriculum "[Unit 1: What is Sustainability in the Context of Water?](#)" developed by Dr. Robert J. Turner (University of Washington Bothell). Each session has its own learning outcomes to support this primary learning outcome.

Resilience and/or Sustainability Connections

ENTO 402/802 Aquatic Insects has always had an implicit connection to water quality. Incorporation of this module will make this connection explicit and will connect human, insect and ecosystem health. This sustainability module focuses on a grand challenge in entomology, namely keeping our water clean and conserving insect diversity in support of healthy humans and ecosystems. The three activities described below focus primarily on sustainability, as defined by the UNL Sustainability Initiative Team: Sustainability: effective, efficient, economic, equitable, and environmentally/ socially responsible use of resources to meet our needs that considers the long-term implications of our choices today on the future of Earth's life support systems and the implications that this use has on all stakeholders involved. Sustainability aspects incorporated into the course include:

- Water sustainability issues (Module: *Are We Sliding into a Water Crisis?*)
- Defining sustainability (Module: *Sustainability in the Context of Water*)
- Responsible use of water resources (Module: *Unsustainable Water Use in Urban Settings*)

Identify One or More of the Key Sustainability Competencies Addressed

The following sustainability competencies will be addressed by the integration of this module:

- *Systems-thinking competence*: students will be able to analyze and discuss freshwater systems across societal, environmental, economic, agricultural domains here in Nebraska and globally.
- *Collaboration competence*: Students will be able to apply concepts of teamwork, stakeholder engagement, project management, effective verbal and written communication criteria.

Instructional Strategies

Are We Sliding into a Water Crisis? (One 50-minute class session)

This module introduces students to various water issues and sets stage for water sustainability discussions. Outside of class, students are provided with 3 short readings that have a global perspective, a short video and participate in an online discussion of the readings. Students will be provided with discussion prompts and a rubric. In-class, students will be split into groups and provided with different sets of water-related statistics (access to water, irrigation, water-related disease, geographic variability in water scarcity etc.). Students will work in groups to graphically display the “story” of the statistics which they will then present to the class.

What is Sustainability in the Context of Water? (One 50-minute class session)

Within the context of aquatic entomology, students will explore and develop sustainability definitions. Students will be provided with short readings on sustainability terminology, concepts of sustainability and ethical underpinnings. In groups, students will be provided with common definitions of sustainability and determine, through discussion and consensus, which definition they most support.

Unsustainable Water Use in Urban Settings (One 50-minute class session)

This module was originally designed to focus on unsustainable water use in agricultural settings. Readings will likely be selected to ensure that topics that relate closely to aquatic insects are represented. Outside of class, students will be assigned various readings about how current water management practices threaten ecological integrity, aquatic insect diversity, and human health. In class, students will first be grouped by similar readings to discuss (with guided prompts) insights and understandings from the readings. Students will then be grouped so that each represents a different reading and will discuss (with guided prompts) differences, similarities and issues shared between readings. Students will then individually reflect on the challenges of discussing the articles between groups.

Assessment Strategy

Learning outcomes focus on the ability to explain sustainability concepts and thus discussion and writing are key components of the assessment strategy.

- *Assignments*: Students will receive discussion prompts and rubrics for discussion grading
- *Class activities*: Rubric for student participation in group work and class discussions
- *Summative assessment*: essay (potentially collaborative) on sustainability, water and aquatic insect diversity