

UNIT REPORT

**Environmental and Sustainability
Studies PhD - Final Annual Report
2017-2018**

Generated: 6/19/19, 3:23 PM

Environmental and Sustainability Studies PhD

Program Mission: Environmental Sciences Ph.D.**Start:** 07/01/2017**End:** 06/30/2018**Reporting Year:** 2016-2017**Providing Department:** Environmental and Sustainability Studies PhD**Department/Unit Contact:** Dr. Hayden Mattingly**Mission/Vision/Goal Statement:**

Environmental Sciences Ph.D. Program Mission: The Environmental Sciences Doctoral Program's mission is to advance the knowledge and promote the leadership necessary to understanding natural environments by incorporating perspectives from social sciences, humanities, and environmental sciences in the program's teaching and research in the fields of natural resources and the environment.

Concentrations: There are two concentrations available within the Environmental Sciences (EVS) Ph.D. program. Students must select a concentration either in Biology or Chemistry.

Program Goal 1 / Outcome 1.1

Define Goal:

Program Goal 1: Environmental Sciences students will receive detailed interdisciplinary training and experience to enable them to address complex environmental problems with greater effectiveness.

Intended Outcomes / Objectives:**Student Learning Outcomes:**

1.1. Students will demonstrate understanding of the interdisciplinary nature of environmental sciences such that they are aware of a wide range of environmental concerns beyond the boundaries of any single, specific discipline.

Assessment Method: Written and Oral Comprehensive Exams. Also, the dissertation research project is evaluated by an interdisciplinary team (the student's graduate advisory committee) although this is currently not assessed within the formal IE framework.

Program Goal 2 / Outcomes 2.1, 2.2

Define Goal:

Program Goal 2: EVS student research projects will be peer-reviewed and widely recognized for their innovation and relevance to environmental concerns.

Intended Outcomes / Objectives:**Student Learning Outcomes:**

2.1. Students will improve oral and written communication skills by giving technical presentations at symposia, conferences, and similar venues where abstracts are peer-reviewed for acceptance.

Assessment Method: Student Annual Reports (poster and platform technical presentations given).

2.2. Students will improve written communication skills by submitting manuscripts to peer-reviewed publications such as scholarly journals, conference proceedings, books, or similar outlets.

Assessment Method: Student Annual Reports (manuscripts submitted and accepted for publication).

Program Goal 3

Define Goal:

Program Goal 3: Add new concentrations to the Environmental Sciences PhD program.

Assessment Method for Program Goal 1: Comprehensive Exams

Goal/ Outcome/ Objective: Program Goal 1/Outcome 1.1

Type of Tool: Other

Frequency of Assessment: Annual

Rationale:

Assessment Methods:

Comprehensive Exams (usually third year of program): Outcome 1.1

Assessment Method: The EVS faculty will monitor student understanding of the interdisciplinary nature of environmental science by the administration of oral and written comprehensive exams. The comprehensive exam is interdisciplinary and is comprised of questions written by each member of the graduate advisory committee. The results of these exams are kept on file by the EVS Director.

Rationale for Outcomes and Assessments (Process for Data Analysis):

Comprehensive Exams: The timing of the comprehensive exams represents an ideal opportunity for assessment because the student has just completed all or nearly all of his/her coursework. The exams are provided in two different formats (written and oral) that allow better insight into the student's interdisciplinary knowledge and proficiency. The student's graduate advisory committee discusses the results and provides paper copies of the exams to the Director, who monitors the results to maintain integrity and consistency.

Assessment Method for Program Goal 2: Student Annual Reports

Goal/ Outcome/ Objective: Program Goal 2/Outcomes 2.1, 2.2

Type of Tool: Annual Unit Report

Tracking Spreadsheet

Frequency of Assessment: Annual

Rationale:

Assessment Methods:

Student Annual Reports (submitted once per year): Outcomes 2.1 and 2.2

Assessment Method: In December of each year, the program Director requests annual reports from each student that cover the previous 12-month period. Reports are due by the end of January. For example, student reports received in January 2017 covered the reporting period of January-December 2016. Students are provided with a template to follow when preparing reports. The Director and academic associate staff members review each report and tally the total number of presentations and publications generated by students during the reporting period.

Rationale for Outcomes and Assessments (Process for Data Analysis):

Annual Reports: EVS students are required to submit an annual report to allow direct assessment of student productivity and development of written and communication skills in terms of presentations and publications. The report template also requires additional details regarding the nature of the presentation or publication. For example, the presentation might be at an international conference rather than a state meeting, or the publication might be in a high-impact journal as opposed to a

regional journal. These details can be used to generate a more refined analysis of the TTU EVS program's impact on the wider discipline of environmental sciences. Annual reports have the added benefit of student professional development because their CVs are current and updated with each successive year's accomplishments.

Results: Comprehensive Exam

Goal/Objective/Outcome Number: Program Goal 1 / Outcome 1.1

Results:

Comprehensive Exams: All EVS students successfully passed their comprehensive exams on the first attempt during the 2016-2017 reporting period, as was also the case in the previous year. Student performance and interdisciplinary proficiency on both written and oral aspects were approved by the EVS faculty graduate advisory committees.

Results: Student annual reports

Goal/Objective/Outcome Number: Program Goal 2 / Outcomes 2.1, 2.2

Results:

Annual Reports: Student productivity related to written and oral communication in 2016 was generally higher compared to 2015 productivity (Table 1). Students gave more presentations and published more manuscripts in 2016 than in the previous two years. The number of manuscript publications ($n = 12$) reached its highest point since data collection started in 2012.

Table 1. Scholarly activity related to oral and written communication skills shown by EVS Ph.D. students in the current (2016) and previous 12-month reporting periods.

Type of scholarly activity	Student annual report period				
	Jan.-Dec. 2012	Jan.-Dec. 2013	Jan.-Dec. 2014	Jan.-Dec. 2015	Jan.-Dec. 2016
Conferences attended	25	14	13	15	25
Poster presentations	22	8	8	14	17
Oral presentations	6	5	8	8	9
Manuscripts submitted	9	5	6	12	10
Manuscripts published	2	6	6	8	12

In calendar year 2016, students attend eight local scientific conferences, seven state conferences, four regional conferences, and six national or international conferences (Table 2). Students also authored or co-authored 15 grant proposals that were submitted to funding agencies and four grants were successfully awarded in 2016. In general, the students were quite active in 2016 and even more engaged in developing their written and oral communication skills compared to recent years.

Table 2. EVS student activities during the reporting period of January through December 2016 in the Biology and Chemistry concentrations. For scientific conferences, L = local, S = state, R = regional, and N = national or international.

Results: Student published papers or manuscripts

Results:

Hill, A.J., Leys, J.E., Bryan, D., Erdman, F.M., Malone, K.S., Russell, G.N., Applegate, R.D., Fenton, H., Niedringhaus, K., Miller, A.N., Allender, M.C., and Walker, D.M. Common cutaneous bacteria isolated from snakes inhibit growth of *Ophidiomyces ophiodiicola*. *EcoHealth* (2017) 14: 4. Published online at <https://doi.org/10.1007/s10393-017-1289-y>.

Restraint Technique: *Sternotherus carinatus* (Razor-backed Musk Turtle) *Herpetological Review* 48(1): 86 **Cody Godwin**

Natural History Note: *Pantherophis Spiloides* (Gray Ratsnake), Diet and Mortality. *Herpetological Review* 48 (3): 679 J. Sean Doody, **Cody Godwin**, and Chris Brantle

D. Tabada, F. Mahmoudi, W.R. Carroll, Title: Examining the importance of the level of computational theory used in solution-phase structural determinations by NMR using residual dipolar couplings, *Magnetic Resonance*, 2017 *Journal of Magnetic Resonance*, Volume 45A, Issue 4, DOI: <https://doi.org/10.1002/cmra.21400>.

Abstract. Kenney, S. and G. Wells. 2017. Evaluation of madtom diurnal substrate use in the Clinch river, Tennessee. *Journal of the Tennessee Academy of Science* 92 (1-2): 36.

Knorp, N.E., and J.N. Murdock. 2017. Exclusion size and material have minimal effects on stream benthic algae and macroinvertebrate colonization within submerged cages. *Aquatic Ecology*, 51: 545-556

Gebhard, A. E., Paine, R. T. R., Hix, L. A., Johnson, T. C., Wells, W. G., Ferrell, H. N., and Perkin, J. S. (2017) Testing Cross-System Transferability of Fish Habitat Associations using *Cottus carolinae* (Banded Sculpin). *Southeastern Naturalist* 16: 70-86.

Wells, W. G., Johnson, T. C., Gebhard, A. E., Paine, R. T. R., Hix, L. A., Ferrell, H. N., Engle, A. N., and Perkin, J. S. (2016) March of the sculpin: measuring and predicting short-term movement of banded sculpin *Cottus carolinae*. *Ecology of Freshwater Fish* 26: 280-291. doi: 10.1111/eff.12274.

Aubree J. Hill, Jacob E. Leys, Danny Bryan, Fantasia M. Erdman, Katherine S. Malone, Gabrielle N. Russell, Roger D. Applegate, Heather Fenton, Kevin Niedringhaus, Andrew N. Miller, Matthew C. Allender, Donald M. Walker. Common cutaneous bacteria isolated from snakes inhibit *Ophidiomyces ophiodiicola*, the causative agent of snake fungal disease. *EcoHealth* DOI: 10.1007/s10393-017-1289-y. 2017.

National Quail Symposium Proceedings 8. Thomas V. Dailey, Roger D. Applegate. Editors. National Bobwhite Conservation Initiative, University of Tennessee, Knoxville, Tennessee. 2017.

Forward. Tom Dailey, Roger Applegate, editors. *National Quail Symposium Proceedings* 8:v. 2017.

Translocation as a population restoration technique for northern bobwhites: a review and synthesis. James A. Martin, Roger D. Applegate, Thomas V. Dailey, Michelle, Downey, Beth Emmerich, Fidel Hernandez, Mark M. McConnell, Kelly S. Reyna, Dale Rollins, Rebekah E. Ruzicka, Theron M. Terhune. *National Quail Symposium Proceedings* 8:1-16, 2017.

Do movement patterns and habitat use differ between optimal- and suboptimal-sized northern bobwhite coveys? Christopher K. Williams, Roger D. Applegate, Anthony R. Ives. *National Quail Symposium Proceedings* 8:196-206, 2017.

Free-ranging, northern bobwhite submissions to the Southeastern Cooperative Wildlife Disease Study (1982-2015). Roger D. Applegate, Richard W. Gerhold, Jr., Heather Fenton, John R. Fischer. *National Quail Symposium Proceedings* 8:316-317, 2017. Peer-reviewed extended abstract.

Vegetation response to canopy disturbance and season of burn during oak woodland and savanna restoration in Tennessee. Andrew L. Vander Yacht, Seth A. Barrioz, Patrick D. Keyser, Craig A. Harper, David S. Buckley, David A. Buehler, Roger D. Applegate. *Forest Ecology and Management* 390:187-202, 2017.

Modifications and Continuing Improvement: Program Changes due to Assessments (Outcome 1.1)

Goal/Objective/Outcome Number:

Outcome 1.1 (student understanding of interdisciplinary nature of environmental sciences)

Program Changes and Actions due to Results:

For Outcome 1.1 (student understanding of interdisciplinary nature of environmental sciences):

Currently, the existing assessment approach for interdisciplinary evaluation of comprehensive exams is recognized as being too coarse (i.e., we can only say how many students passed the exams and provide a qualitative description of the exams).

Therefore, a more quantitative rubric was drafted by the EVS Curriculum Committee in 2016-2017 to provide a refined, commonly used tool for assessing student interdisciplinary performance on their exams. The draft rubric was presented to the EVS Executive Committee during its April 2017 meeting. However, the rubric was not voted upon during the meeting and the vote was postponed until Fall 2017. The EVS Curriculum Committee will be suggesting minor changes to the rubric prior to the vote.

Modifications and Continuing Improvement: Program Changes due to Assessments (Outcome 2.1)

Goal/Objective/Outcome Number: For Outcome 2.1 (student technical presentations and communication skills)

Program Changes and Actions due to Results:

For Outcome 2.1 (student technical presentations and communication skills):

The School of Environmental Studies often supports student travel to meetings for the purposes of making presentations, in order to augment the support that students might already have from their external grants, faculty advisors, or concentration departments. Several students and their faculty advisors made formal requests to the School of Environmental Studies for travel support, and many of those requests were honored.

Modifications and Continuing Improvement: Program Changes due to Assessments (Outcome 2.2)

Goal/Objective/Outcome Number: For Outcome 2.2 (student publications and communication skills)

Program Changes and Actions due to Results:

For Outcome 2.2 (student publications and communication skills):

The EVS 7900 Scientific Writing and Grantsmanship course was altered to allow students the option to develop a journal manuscript (instead of only allowing a grant proposal). In Fall 2016, many of the EVS 7900 students elected to prepare a journal manuscript and worked one-on-one with the instructor during editing sessions. In addition, the EVS Executive Committee created a new policy in 2016 to require doctoral students to submit at least a portion of their dissertation for peer review before they can defend their dissertation. The new policy was submitted to GSEC and has now been approved and finalized. The implementation date for the peer-review policy was August 2, 2017. We expect this new policy to further increase student proficiency in their scientific writing and publication skills.