



The Ecological Society of America's SEEDS Program



ESA SEEDS Field Trip Report
Mountain Lake Biological Station
September 17-20, 2009

Field Trip Overview



From September 17-20, 2009 SEEDS conducted a student field trip to the Mountain Lake Biological Station in Pembroke, Virginia. Attendees included 22 students from 20 schools across the country, a SEEDS Alumni / MLBS REU Awardee, two SEEDS faculty advisors and two staff members from the Ecological Society of America.

SEEDS field trips allow students to explore their interest in ecology by learning more about the science, exploring career options, and seeing the practical applications of ecology. Students have the opportunity to find out more about what ecologists do through hands-on experiences with professionals, training in specific areas, and networking with students and professionals.

During the field trip, students toured MLBS and met with faculty, staff and research ecologists. Students not only learned of the research being conducted at MLBS, but had the opportunity to conduct group investigations and present their results. In addition, the students enjoyed hikes in the area; participated an art workshop led by a botanical artist and experienced a career panel of ecologists, professors, an artist and a graduate student. The career panel discussion gave students some ideas of the diverse career paths in ecology. [Opportunities for undergraduate students at MLBS](#) was presented, including [Research Experience for Undergraduates \(REU\)](#) opportunities.

Students were given field notebooks and asked to keep journals. In addition to individual notes, rotating groups of 4-5 students were responsible for writing various aspects of the trip, which was then edited and compiled to create this report. This report reflects the voices of the students who attended the field trip.

A full list of the field trip participants is in Appendix A. The field trip itinerary can be found in Appendix B and a list of the host professionals in Appendix C. Evaluations for the trip are found in Appendix D.



Program Introduction

Group 1: Frankie Reyes, Manny Marshack, Pamjowen Grignon, Jorge Mendoza, Roberta Laing

We all arrived from different areas of the country at the airport of Roanoke, Virginia, met the staff members of SEEDS and Mountain Lake Biological Station (MLBS). The energy in the group was unique and what made it so special was the mixture of different cultures. The group was composed of 22 students. We took a thirty-minute drive and we were able to observe the vegetation of Virginia. To many of us the first thing that caught our attention as we were heading towards MLBS, was a beautiful hotel called Mountain Lake Hotel. Once we arrived to MLBS, Eric Nagy (Associate Director), provided a tour of the facilities. Our cabins were assigned and we had some time to settle in. After having a rush of excitement, some of us were anxious to taste the food of the facility. Following dinner we had the SEEDS Welcome Session and Orientation at the Lewis Auditorium. Our hosts were Butch Brodie (Director of MLBS) and Eric Nagy. We learned some of the history of the University of Virginia and also MLBS and its purpose.

Butch explained that the biological station is located at Pembroke, VA. This facility is generously leased by the amount of one dollar per fifty years to the University of Virginia (UVA), founded by Thomas Jefferson. MLBS is a research and teaching facility, founded in 1929, which is located 3800ft. in the Appalachian Mountains of southern Virginia. Another fun fact, MLBS is located precisely on the Eastern Continental Divide. The watershed flows to the Gulf of Mexico on one side and to the Atlantic Ocean on the other side. MLBS is also unique due to its endemic species.

The main purposes of MLBS are to provide the facilities and resources for graduate students and researchers to conduct their experiments. In addition, the summer is a good opportunity for MLBS faculty and staff to teach classes to graduate and undergraduate students. MLBS provides the opportunity for undergraduate students to conduct research through the Research Experience for Undergraduate (REU) Program.

As SEEDS students we were able to take advantage of the two main purposes of MLBS. We had exposure to different aspects of ecology and different areas of science. Also, we had the great opportunity to conduct a mini research with the mentorship of a faculty mentor.

Career Panel

Group 2:

Butch Brodie, Henry Wilbur, Becky Wilbur, Tami Ransom, Lelena Avila, Rita Canceres, Jane Zander, and husband wife team Steve and Carol Croy were the nine professionals that made up the career panel on the MLBS field trip. They came from all walks of life and all ecological backgrounds. The panelists were asked to describe their career path, what led them to this path, and to share some of the challenges and success they encountered on their journey. The panel had a plethora of advice for the SEEDS student ranging from grad school selection to how to maintain a personal life. Tami touched on how to manage time and how to balance school, career and family, a living example of what is possible and that it could be done successfully. Lelena provided the students some insight on nontraditional path choices. Carol mentioned how a student wouldn't have to sacrifice their personal interests/hobbies in selecting a career. The students were then given the opportunity to ask the panel questions and seek advice. Themes that were covered included finding your own way, seeking out your passion and how to remain true to yourself and your calling.

Emphasizing the importance of math in science and knowing your strengths was another theme covered.

Overall Impression of the Fieldtrip

Group 3: Omar Bonilla, Dinorah Chacin, Jasmine Sharp, Alisha Woodson, Carlos Zayas Santiago

In the beginning it was obvious that each of us did not know each other. However it was not long before we started talking and realizing that we have a lot of things in common including our love for nature and science. The SEEDS program was inspiring because it really encourages underrepresented backgrounds in the field of natural scientists. We had the wonderful opportunity to start with a tour on the facilities of the station and a brief explanation of main research projects that are currently being studied. The program directors divided us into groups where we engaged into individual research projects assisted by the principal investigators. We put the scientific method into practice by developing our own hypothesis and gathering data in order to answer our questions. We did not only learn about the ecology of beetles but also about the ecology of Mountain Lake Biological Station. Furthermore, we especially appreciate the career panel for sharing with us their experiences, advice, and having our questions answered. It was insightful and helpful for all of us.

What really intrigued us was the fact that there were so many people from all over the country and we had much in common as far as what inspires us to work in ecology or biology. We appreciate all the effort the staff put into promoting all the information and research activities; they were very excited to have us involved and they even participated with us. This had really helped us on a whole to think about our future careers in a new and inspiring way. We felt very welcome and enlightened to continue our careers in natural sciences.

Conclusion for SEEDS Field Trip at MLBS

Group 4: Amanda Balarezo; Diana Guzman Colon; Betsabe Castro Escobal; Dayani Pieri

This field trip to MLBS gave us reason to be excited about what we aspire to be as budding ecologists. We began with the drive up to the beautiful Appalachian Mountains on Thursday with eager expectations and returned on Sunday ending our mountain top experience with renewed excitement to make a difference in the world.

Our experiences at MLBS were a blast from the breathtaking scenery to the changing leaves that gave us an initial taste of the Autumnal beauty soon to come, from the research experience to the earth worms, bugs, snakes, and salamanders that found their haven underground under mushrooms, boards and rocks respectively, from the hike with the panoramic view to the rustic cabins that took us back in history, from the delicious food to the party that rocked Mountain Lake on Saturday night. All these were possible due to the extremely friendly, helpful, trusting, competent and knowledgeable staff both of SEEDS and MLBS who made our trip very exciting and thought provoking.

The overview of the history of the area given by Butch, The Biological Station Facility Tour led by Eric and the Research tour with demonstrations and discussions led by the MLBS research

teams were fascinating. These led to our most exciting research experiences and presentations which some of us had for the very first time. The Art workshop brought out a side of us that some of us didn't know existed. It gave us a closer look at the environmental beauty that surrounded us. The Career Panel gave us snapshots in to their lives and helped us dream of possibilities that may be awaiting us round the bend in the path of our ecological journey. It gave us hope and encouragement to pursue what we love.

The kitchen staff did a fantastic job feeding us very delicious food from beginning to end. The Friday cookout was topped with exciting boat rides and spontaneous dives into the cold pond. The night came to a reluctant end after toasting of marshmallows and making of smores before a rising bonfire that gave out blue/green flames from time to time helping to dry out the wet clothes of the brave divers.

We felt comfortable with each other and spoke freely about the things that we were passionate about, especially the science of Ecology. One of the students said, "Even though we come from different backgrounds and different cultures, we all think alike and come together as scientists." One of the many objectives of SEEDS is to diversify the science field, and in this fieldtrip we saw many students who represented different countries such as the US, Puerto Rico, Perú, Venezuela, Sri Lanka, China and Pakistan. Each one displayed the potential to become a leading Ecologist. As the weekend progressed, the group got to know each other. "What I liked about the fieldtrip," said one "were the new friendships I gained". These friendships are a part of the networking that is necessary in life and this program encourages it.

We all had a fantastic time, and we thank SEEDS and MLBS for an unforgettable experience in the paths of our lives! Thank you!

Student's Research Project Reports:

Group 1:

Frankie Reyes, Manny Marshack, Pamjowen Grignon, Jorge Mendoza, Roberta Laing

Trees

Group one looked at various species of trees. They had the opportunity to take core samples of the trees and analyze them. They learned that a "tree cookie" and core sample can divulge much about not only the tree but environment surrounding that tree over the span of many decades. Dr. Henry Wilbur led them on a hike through the forests of the Appalachian Mountains and explained how to learn from trees.



Group 2:

Brenda Gerald, Gabrielle Jackson, Songling Du, Tsetan Lobsang, Anum Mian, Jose Trujillo, Jarrett Wansley

Predator-prey Coevolution: Snakes



Our research focused on the predator-prey co-evolution. The garter snake is the predator and the newts as the prey. The reason why we are studying these two organisms is because Tetrodotoxin (TTX) resistant strands are found in the genome of garter snakes and the Tetrodotoxin gene is found in the adult newts. TTX is a very poisonous sodium (Na⁺) channel blocker found in the muscles of organisms. This defense mechanism causes animals that are non-resistant to go into paralysis and eventually die. The garter snakes show variable resistance to the toxin and can show slowed movement. We are interested in the relationship between the co-evolution of two organisms. From previous research we know that the garter snakes are not specialist of the newt

(prey).

We examined the primary breeding pond found at the Mountain Lake Biological Station under the supervision and mentoring of Lelena. Previous studies/experiments performed at MLBS have found three garter snakes that ate newts in the North and East side of the pond. This gave us an initial point to start our experiment. We hypothesized that the garter snakes would be present on the South and North sides of the pond as due longer in length, more shallow and less disturbed area of the land as it is away from human



interaction. Also, the south side is closer to the forest and we believe that will allow the garter snakes to be farther away from their predators (humans), resulting in finding a greater abundance of the snakes.

We tested our hypothesis by collecting newts from South, North, East, and West sides of the pond. We used the seining and sorting processes of collecting the newts and other organisms from the pond. Then we went to the lab and data was collected as to the size, weight, and



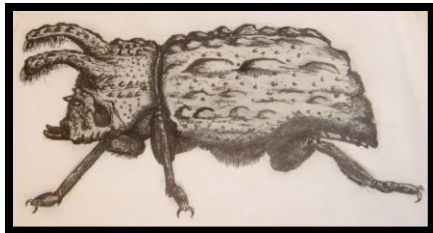
potential food source. (puking the snake) We learned how to do the tagging process in which a small device was inserted in the skin of the snake with a specific identifying number. The “tagging machine” is used to scan the device that was inserted into the snake and read the identification number.

In conclusion we could not accept or reject our hypothesis because the species of snake that we were researching was not caught and also due to the time allowed.

Group 3:

Omar Bonilla, Dinorah Chacin, Jasmine Sharp, Alisha Woodson, Carlos Zayas Santiago

Forked Fungus Beetle Project Report



The Forked fungus beetle (*Bolitotherus cornutus*) preferred habitat is the fungal brackets that grow on decomposing trees. Two of the bracket species where these beetles can be found are *Ganoderma applanatum* and *Fomes fomentarius*. The Forked beetles lay their eggs on the surface of the fungus, and after they hatch the larvae feed and live within the fungus. The sex of the beetles can be determined by

certain physical traits. Males develop hairy horns and hairy chests, whereas females lack these characteristics.

Often, these beetles are infested with mites that also live and feed on the fungus. The mites potentially use the beetles for transportation. Therefore, we conducted a study to see if the sex of the beetle determines the number of mites present, and if the species of fungus would have an effect on the number of mites and beetles. The beetles were collected from five different populations, they were sorted by sex, the number mites were counted, and the species of fungus was recorded. According to our results, females on average carried a greater number of mites compared to males. In addition, not only were more beetles found in the *Ganoderma* species of



fungus, but also mites were more abundant. However, larger sample size needs to be collected in order to obtain significant results.

Group 4:

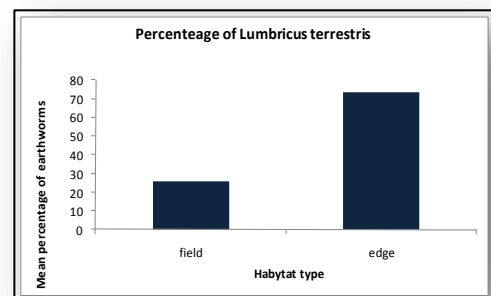
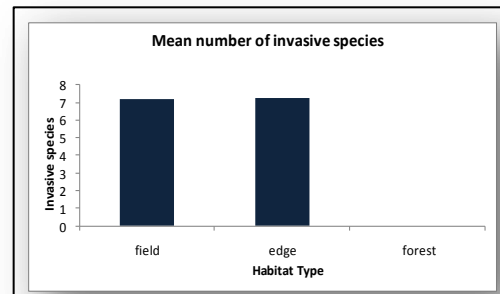
Amanda Balarezo; Dayani Pieri; Diana Guzmán Colón; Rita Irene Cáceres; Betsabé Castro Escobar

Distribution of Earthworm Species in Three Habitats at MLBS

During the evening of Friday, September 18, 2009 we had the opportunity to explore the field, edge, and forest of the Mountain Lake Biological Station with University of Virginia's Graduate student, Tami Ransom. Tami's dissertation is based on the study of earthworm and salamander relations. She is conducting research and studying the benefits and negative effects of this interaction. Because of her deep knowledge and understanding of the earthworm species she was able to lead us in a mini research experiment. Tami first introduced us to her work and helped us gain a greater understanding of earthworms. Our research project consisted of collecting earthworms from three habitats around the station: the forest, the field, and the edge of the forest in order to test the abundance of each in the areas.



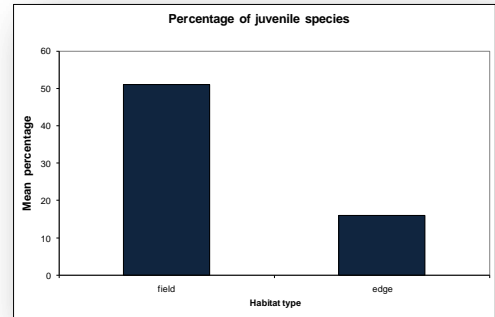
We began by preparing a mixture of mustard powder and water. The solution consisted of twenty grams of mustard powder for every two liters of water. The purpose for using the mustard mixture is because it is highly irritable to the earthworms. When they sense that mustard is seeping through their soil they immediately seek to escape the area in which they live. As soon as the earthworms reach the surface we extracted them from the three different locations. The first location that we explored was the forest. We set a two hundred meter transect into the forest. Then we set up six random and dispersed plots which measured half a meter square each. After clearing areas of any leaf litter we then poured two liters of mustard solution into each lot. For a period of fifteen minutes we collected any earthworms that came to the surface and placed them into a plastic bag that contained a wet paper towel in order to conserve moisture. For the edge we sampled five distinct areas, and in the field, six, using the same collecting procedure. After having collected all our specimens we



washed, identified, and classified each earthworm by habitat and species. All data was recorded and then analyzed.

We derived several conclusions from the analysis of our data. Firstly, invasive species in the forest edge and the field were equally abundant. However, the invasive species population differed between edge and field. The proportion of unidentifiable juvenile earthworms was greater in the field than the edge. There were several variables that affected our results. We only found one native earthworm

and this could be because of several reasons: native earthworms have a greater resistance to mustard than invasive species; they usually respond better to electrosampling. The cocoons may have not hatched in the field and edge areas. Also it is known that the calcium levels in the edge and field are less than in the forest. This is most preferable for the native species of earthworms, which we found only one in the forest. We concluded that differences in soil chemistry may affect the abundance and distribution of earthworms in the three habitats.





Appendix A SEEDS Participants

SEEDS Field Trip ♦ Mountain Lake Biological Station
September 17 -20, 2009 ♦ Pembroke, Virginia

SEEDS Students	Anam Mian <i>Rust College</i> Princessarj@yahoo.com
Amanda Balarezo <i>Miami Dade Honors College</i> abalarezo@bellsouth.net	Dayani Pieri <i>Oakton Community College</i> dapieri@flash.net
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Appendix B Trip Itinerary

SEEDS Field Trip ♦ Mountain Lake Biological Station
September 17 -20, 2009 ♦ Pembroke, Virginia

Thursday Sept. 17: Arrival

Afternoon Pickup at ROA in ESA and MLBS vehicles.
Afternoon Check-in and housing assignments, MLBS Office.
7:00 p.m. Dinner, Jefferson Dining Hall
8:00 p.m. Welcome Session and Orientation, Lewis Auditorium - Mountain Lake
Biological Station Hosts Eric Nagy and Butch Brodie
SEEDS Welcome / Journal Writing – SEEDS Staff

Friday Sept. 18

7:30 a.m. Breakfast
8:30 a.m. Biological Station Facility Tour
MLBS Opportunities for Students
Research Tour; four station stops with research demonstrations and
discussion
12:00 p.m. Lunch
1:30 p.m. Group Investigations with station scientists
6:00 p.m. Dinner / Social activity – cookout at pavilion

Saturday Sept. 19

7:30 a.m. Breakfast
9:00 a.m. Career Panel
10:30 a.m. Art Workshop
12:00 p.m. Lunch
1:30 p.m. Hike to local attraction, weather permitting
6:00 p.m. Dinner
7:30 p.m. Group Investigation Presentations
Journal writing report summaries, Evaluation, Wrap up
Dance party

Sunday Sept. 20: Departure

5:30 a.m. Breakfast
6:30 a.m. Departures; Transport to ROA



Appendix C MLBS Hosts and Professionals

SEEDS Field Trip ♦ Mountain Lake Biological Station
September 17 -20, 2009 ♦ Pembroke, Virginia

MLBS Hosts	Professionals
Butch Brodie <i>Mountain Lake Biological Station Director</i> bbrodie@virginia.edu	Melissa Armstrong <i>Ecological Society of America</i> Melissa@esa.org
Eric Nagy <i>Mountain Lake Biological Station Assoc. Director</i> enagy@virginia.edu	Charlee Glenn <i>Ecological Society of America</i> charlee@esa.org
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