



**Strategies for Ecology Education, Development and Sustainability
Urban Ecology Student Field Trip
November 6-9, 2003**

Field Trip Overview

Student field trips are an important component of the Strategies for Ecology Education, Development and Sustainability (SEEDS) Program that are aimed to foster greater student identification with ecology through field experiences. On November 6-9, 2003 SEEDS supported a student field trip to Baltimore, Maryland and Washington DC, highlighting the Baltimore Ecosystem Study (BES) of the Long-Term Ecological Research Network and other local sites including the Smithsonian National Museum of Natural History, the Environmental Protection Agency (EPA) Headquarters, and the National Aquarium in Baltimore. Attendees included twenty-five students from seventeen schools and three SEEDS faculty. A list of attendees can be found in Appendix A and a list of staff and coordinators can be found in Appendix D. The primary goals of the field trip were to further students' knowledge about the field of urban ecology; provide students with an overview of several interesting and ecologically important sites; enable students to build a network among professionals in the field of ecology and with a group of other students sharing the same interests; expose students to the practical application of ecology; and to build student awareness of various ecological internship, degree, and career options.

The first day of the field trip was spent in Washington DC where students learned about graduate school opportunities and environmental justice at the EPA Headquarters. The second half of the day was spent at the Smithsonian National Museum of Natural History where a career luncheon panel was held followed by a behind-the-scenes tour of the Museum. The day concluded with dinner and music at the Jazz Café in the Museum. The second day of the field trip was spent at various sites of the BES ending with free time in Inner Harbor Baltimore. On Sunday, the final day, the morning was spent at the National Aquarium in Baltimore. A full itinerary of the field trip can be found in Appendix B.

Thursday, November 6, 2003

The field trip began with a pizza dinner and orientation at the hotel. Katherine Hoffman, Melissa Jurgensen-Armstrong, Andrea Socha, and Jason Taylor from the Ecological Society of America introduced themselves and provided an orientation for the field trip including an ice breaker for the students. After dinner, Shaaban Fundi, a graduate student at Towson University, gave a presentation on urban ecology and the BES.

Friday, November 7, 2003

Friday began with a visit to the EPA Headquarters in Washington DC. Elvan Gur-Edeman, SEEDS Program Manager at the United Negro College Fund, joined the field trip group for Friday's activities.

In July of 1970, the White House and Congress worked together to establish the EPA in response to the growing public demand for cleaner water, air and land. The EPA's mission is to protect human health and to safeguard the natural environment. The EPA leads the nation's environmental science, research, education and assessment efforts by developing and enforcing regulations, offering financial assistance, and performing environmental research. For more information about the EPA, visit <http://www.epa.gov>.

Ted Coopwood welcomed the attendees and discussed urban ecology and environmental justice. He used the Anacostia River as an illustration of environmental justice issues: it is little known compared to the Potomac River, but it supports fishing for many African American communities and has been found to contain high

levels of contaminants. Mr. Coopwood left these words of advice for the students, *“Create a vision, take what you know, think about what you know, and create meaningful relationships. Share your talents to make a difference. Learn to work with people and work smart, work hard.”*

Barry Hill, Director of the Office of Environmental Justice, then addressed the attendees. He gave an overview of the creation of the EPA and the early major achievement of getting lead out of the air. He stressed the importance of education and talking to students and that health is the underlying issue of the environment.

The focus was then turned to a graduate school opportunities session. Eugene Brown, Program Director for the Graduate Research Fellowship Program of the National Science Foundation, began the session. Created in 1950, the National Science Foundation (NSF) is an independent U.S. government agency responsible for advancing science and engineering in the United States across a broad and expanding frontier. NSF plays a critical role in supporting fundamental research, education and infrastructure at colleges, universities, and other institutions throughout the country. NSF’s broad support for basic research, particularly at U.S. academic institutions, provides not only a key source of funds for discovery in many fields, but also unique stewardship in developing the next generation of scientists and engineers. For more information about the NSF, visit <http://www.nsf.gov>. Dr. Brown provided information and answered questions about the fellowships offered by the Graduate Research Fellowship Program. This program offers 900 awards per year. Each award covers three years of support with a current annual stipend of \$27,500. Tuition and fees are paid for and there is a \$1,000 international research travel allowance. For more information about the fellowships, visit <http://www.ehr.nsf.gov/dge/programs/grf/>

Virginia Broadway, Georgette Boddie, and Becki Clark concluded the opportunities session by talking about the two graduate fellowship programs offered by the EPA. The Science to Achieve Results (STAR) Fellowship and the Greater Research Opportunities (GRO) Fellowship provide funds for advanced degrees and careers in environmental science and engineering. They have an annual stipend of \$20,000, \$5,000 for expenses, and up to \$12,000 for tuition and fees. For more information about these fellowships, visit <http://es.epa.gov/ncer/fellow/>

Mustafa Ali concluded the visit by talking about environmental justice and his career pathway. Environmental justice is “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” He also highlighted the Environmental Careers Organization (ECO) and the environmental protection and community intern programs offered jointly by ECO and the EPA. For more information about these programs, visit www.eco.org.

The second half of the day was spent at the Smithsonian National Museum of Natural History. The National Museum of Natural History (NMNH) has become the most visited museum in the world. The collections at NMNH are the Nation's and they number over 124 million objects and specimens. The objects and specimens are studied and preserved not only because they are a national treasure and a public trust, but especially because scientific interpretation of their data is what allows us to know more about ourselves and the world around us. More than 100 scientists, in service to the Nation, are studying subjects as diverse as volcanic eruptions, strandings of marine mammals, Native American languages, and coastal environments in Florida. For more information about the Museum, visit <http://www.mnh.si.edu/>

Mary Sangrey, Director of the Research Training Program, presented information on an opportunity for undergraduate students at the Museum. The Research Training Program (RTP) of the NMNH, is an extraordinary opportunity for undergraduate students to actively participate in the research investigations of prominent museum scientists. The ten-week, in-residence, museum-based program is exclusively for English proficient undergraduate students interested in a career in natural history research, especially systematic biology, geology, and anthropology. For more information about the Program, visit <http://www.nmnh.si.edu/rtp/>

A luncheon panel was held with eight panelists in an ecology or related profession who explained their career and discussed their personal pathway to that career. Joining the group were Katherine McCarter, ESA Executive Director and Clifford Duke, ESA Director of Science Programs.

Panelists' current career responsibilities exemplified the wide variety of careers to which a background in ecology can lead, and the range of pathways demonstrated the many factors that come into play as a career path unfolds. For example, some panelists had an idea of what they wanted to do from an early age; others took a longer time (seventeen years in one case) to complete school, or had several career changes in between. A complete list of panelists and their contact information can be found in Appendix C.

Some of the overall messages that came from the panel included:

- Be good at what you do, and people will notice you.
- Have a plan, but keep it flexible; be open to try something new.
- Don't be afraid to say things that people may be uncomfortable hearing.
- Sometimes opportunities are simply a matter of being in the right place at the right time.
- There are many different and interesting career options where you can use a background in ecology.
- Do not get discouraged if a plan does not work out the way you expect the first time.
- Highly qualified people come from a broad diversity of backgrounds and circumstances.
- There are countless opportunities for students to gain experience in the field, and many people who are eager to help along the way.

Before lunch and a question period, students had a chance to go around the room and introduce themselves to panelists. The panel highlighted that there are many different layers of diversity, given that everyone's path was so distinctly unique. No panelist appeared to be doing his or her job solely as a means to make money; they all seemed to enjoy their work and take pride in it.

The panel was followed by a behind-the-scenes tour of the Museum. Two tour groups highlighted five departments and their collections: anthropology with Dave Hunt, mineral sciences with Linda Welzenbach, paleobiology with Jann Thompson, mammals with Suzie Peurach, and birds with Carla Dove. Contact information for the collection specialists can be found in Appendix C.

The day ended with free time on the National Mall and dinner and music by the Steve Greene Quartet at the Jazz Café in the National Museum of Natural History.

Saturday, November 8, 2003

The second full day of the field trip highlighted a watershed tour of the Baltimore Ecosystem Study site. The Baltimore Ecosystem Study is one of twenty-four research programs known as the Long-Term Ecological Research (LTER) Network established by the National Science Foundation to study ecological systems over long time periods. The LTER Network spans many different sites of interest to ecologists and decision-makers. There are sites in the Arctic, in Antarctica, in moist coniferous forests, deciduous forests, coastal areas, grasslands and deserts. BES represents the particularly dynamic and patchy ecosystem type found in and around cities, and enhances ecological understanding by including an urban ecosystem type rarely studied by ecologists. More people are moving to cities throughout the world and BES scientists are conducting research on the soil, the plants and animals on land and in the streams, the water quality, and condition of the air in and around Baltimore. In addition to studying the science, this site works with families, associations, organizations and political bodies that make decisions that affect ecological processes. For more information on the BES, visit www.beslter.org

Participants toured the Gwynns Falls watershed with many of the top scientists involved in the Baltimore Ecosystem Study (BES). Alan Berkowitz and Steward Pickett co-lead the tour and spent the day with the SEEDS group. A complete list of people involved in the BES tour and their contact information can also be

found in Appendix C. Researchers explained the different approaches that are being taken for studying the BES, including that watershed approach, which enables ecologists to look at the inputs and outputs of the entire watershed. Ecologists used the metaphor of a bathtub when describing what a watershed is like, keeping in mind that a watershed has a complex biological (i.e., some plants and animals come into the watershed naturally, some are planted or brought in by people) and social structure (i.e., the locations, methods, and materials of building).

The other approach that is being used to study the BES is the patch approach, which attempts to understand social and biological “patches” within the watershed. This is also in conjunction with the way that people look at the area – in terms of neighborhoods, forests, and parks, instead of a grouping of watersheds.

The tour began at **Baisman’s Run** in a forested low-density residential area. Andy Miller joined the group and spoke about hydrology. He discussed the function of groundwater that feeds a stream so that it runs at “base flow” even when there has been no rainfall. A forested watershed enables rain to slowly be absorbed into the ground and then travel through the soil down to a stream; this means that it will take some time for a stream to reach “peak flow” during a rain event. For example, it takes two hours for the stream at Baisman’s Run to reach peak flow, whereas another stream (Moors Run) in the Gwynns Falls watershed that is completely underground reaches maximum flow in fifteen minutes because there is no forested land to absorb the water.

Dr. Miller showed the group the U.S. Geological Survey's (USGS) monitoring station. As part of the USGS program of disseminating water data to the public, the USGS maintains a distributed network of computers and file servers for the storage and retrieval of water data collected through its activities at approximately 1.5 million sites around the country. This system is called the National Water Information System (NWIS). Many types of data are stored in this NWIS network, including: site information, time-series (flow, stage, precipitation, chemical), peak flow, ground water, water quality. Such data can be found on the USGS website at <http://waterdata.usgs.gov/nwis/>.

Participants learned that Baisman’s Run is not actually within the Gwynn’s Falls watershed, but in an adjacent watershed. BES scientists could not find a low-density forested area within the study watershed that had comparable soils to the rest of the watershed, so they chose Baisman’s Run because it was an example of the type of location scientists were looking for within the Gwynn’s Falls watershed.

Glyndon was the next site visited, a medium density suburban small watershed. The buildings were relatively new, and the neighborhood contained retaining ponds near areas with much impervious surface, a restriction that came in during the 50s and 60s, which lets water into the streams slower. Aerial photographs and Lydar imaging showed the streambeds straighter because they had been engineered. Participants discussed the inputs of Nitrogen into an urban ecosystem, such as leakage from septic tanks, which are new considerations for ecologists.

Mama and Baba Jahi welcomed participants to the Rognel Heights Cultural Center for lunch. There the group learned about the work they do, including the construction of a nature trail through the forest that the community can use, and where kids can learn about forest plants and animals.

After lunch, participants went out to the ball field in **Rognel Heights**, a high density residential area. Rich Pouyatt joined the group and talked about soils. He also discussed the concern of rising Nitrogen levels, and the role of the common night crawler worm in this phenomenon. The common night crawler is an exotic species that has found its way into urban forests. Urban forests, bordering residential neighborhoods have a high level of interface with people, and worms can come in as a result of people disposing of their leaves or wood chips or tossing bait. Worms in forests increase the rate of the Nitrogen cycle so that much more Nitrogen is coming out of the system. For example, Nitrogen that would take 2-3 years to be released from leaf decomposition is now taking less than a year because of worms are driving the process.

In the Rognel Heights neighborhood there was also evidence of the water table dropping in urban areas. In an area where a stream comes out of a culvert into its natural channel, the water table has dropped more than 20 feet. This is because the water comes out of the culvert with such force that the channel is eroded at a much greater rate than it would be normally. As the water table drops, riparian areas are becoming dryer. Rognel Heights is an older neighborhood that does not have retaining ponds.

The next stop was **Washington Village/Pigtown**, a very high density residential / commercial urban watershed. Bryant Smith and Justin Freedman discussed the work they do there with the U.S. Forest Service. Much of their work entails community surveys, which is a new area for the Forest Service to be involved in. Pigtown got its name from when the business of pig processing used to be profitable in the neighborhood. Today, there is a 40% vacancy rate. They showed a small patch of green space that the neighborhood joined together to create with much effort.

The last stop was to **Carroll Park**, a park adjacent to Pigtown where the river comes close to meeting the Chesapeake Bay. The last stops were a sharp contrast to the forested watershed where the tour started. Alan Berkowitz mentioned the concept of an ecological footprint, and commented that it is likely that the residents of Pigtown have a lighter impact on the environment than the people in the mansions at Baisman's Run. If one were to add up the resources that a person in each neighborhood uses, it would be interesting to see who is having the greatest impact on the environment.

The day ended with free time and dinner in the Inner Harbor area of Baltimore.

Sunday, November 9th, 2003

The final day of the field trip highlighted the National Aquarium in Baltimore. Participants had several hours to explore the aquarium including a special exhibit on seahorses. The National Aquarium in Baltimore seeks to stimulate interest in, develop knowledge about, and inspire stewardship of aquatic environments. More than 10,500 marine and freshwater animals are housed in the Aquarium's exhibits and facilities. The Aquarium strives to blend naturalistic exhibit elements with the most modern interpretive techniques, engaging visitors by focusing on the beauty of the aquatic world and thereby eliciting an emotional response and awakening in visitors the desire to be environmentally responsible. Exhibits are designed to replicate natural environments and avoid the unnatural mixing of species. Specimens are chosen to give the best examples of biological concepts in an interesting and accurate way. The collections embrace diverse world-wide habitats. The ultimate goal is for the exhibits and programs to spark responsible actions in visitors. For more information about the Aquarium, visit <http://www.aqua.org>

Field Trip Evaluations Summary

Overall, the feedback on the evaluations was extremely positive. The field trip was described as "encouraging, rewarding, excellent, experiential, educational, enlightening, inspiring, eye-opening, enriching, and a once-in-a-lifetime experience." When asked what accomplishments were achieved, responses included: meeting people of diverse backgrounds, learning about new careers, learning about internship and funding opportunities, networking, gaining courage, attaining information to make a clear decision for graduate studies, feeling assurance for finding a job, acquiring new energy to pass on, learning about the importance of urban ecology, receiving inspiration to pursue a Ph.D., being exposed to new ideas, listening to the best panel I've ever heard, meeting scientists from such a diverse group, gaining hope coming up with a research topic, and broadening horizons in thoughts about ecology.

Suggestions for improvement included: having more student representation from small colleges, making the field trip longer so that it is less rushed, holding it earlier in the semester, allowing for more restroom breaks, requiring students to bring information about their school to share, including a workshop on grant writing, finishing each day by 6 pm, allowing for more free time to explore the area, and hosting a panel of the scientists in the hotel at the end of the field trip so that students can ask questions and critique the studies.

Appendix A

Field Trip Attendees

Field Trip Attendees

Students

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Appendix B Field Trip Itinerary

Thursday, November 6

- afternoon participants arrive to Baltimore-Washington International Airport and take hotel airport shuttle to Best Western BWI Airport Hotel (6755 Dorsey Road, Elkridge, MD 21075, 410-796-3300)
- 6:00 pm pizza dinner and orientation at hotel in Dorsey A Meeting Room
- 7:00 – 8:00 pm presentation by Shaaban Fundi on urban ecology

Friday, November 7

- 8:00 – 8:30 am continental breakfast in hotel
- 8:45 am meet in hotel lobby
- 9:00 am charter bus departure for Washington DC
- 10:00 am arrive at Environmental Protection Agency (EPA) Headquarters (Ariel Rios Building, 1200 Pennsylvania Avenue, NW, Washington, DC 20460)
- 10:00 – 10:30 am meet with Urban Ecology & Environmental Justice staff at EPA in Ariel Rios South Room 6045
Presenters: Ted Coopwood, Barry Hill, and Mustafa Ali
- 10:30 – 11:30 am opportunities session with representatives from the National Science Foundation (NSF) and the EPA
Presenters: Eugene F. Brown (NSF), Virginia Broadway (EPA), Georgette Boddie (EPA) and Becki Clark (EPA)
- 11:30 am walk to Smithsonian National Museum of Natural History (NMNH) (10th Street and Constitution Ave., NW, Washington, D.C. 20560)
- 12 noon – 2:00 pm luncheon career panel “Pathways to Careers in Ecology and Environmental Science” in NMNH Archaeology Seminar Room
Panelists: Waqi Alam, Joe Boyd, Luke Jones, Geroge Middendorf, Sonia Ortega, Lynne R. Parenti, M.A. Sanjayan, Kim Waddell
- 2:15 – 3:45 pm behind-the-scenes tour at NMNH
- Group I
- 2:15 - 2:45 pm Dave Hunt (Anthropology) will meet Group I in the Anthropology Seminar Room for a quick lesson about "what the bones can tell"
- 2:45 – 3:15 pm Suzie Peurach (Mammals) will then meet the group in the Seminar room at 2:45 p.m. and give them a "tour" of mammals concluding in the Great Ape room.

3:15 – 3:45 pm Linda Welzenbach (Mineral Sciences) will meet the group in the Great Ape room at 3:15 p.m. and take them over to Mineral Sciences where they'll see the meteorites. At 3:45 p.m. they will return to the ARC.

Group II

2:15 – 2:45 pm Jann Thompson (Paleobiology) will meet Group II in the Seminar Room at 2:15 p.m. and give them a tour of the paleo collections. At 2:45 p.m. Jann will bring Group II back to the Seminar room.

2:45 – 3:15 pm Dave Hunt (Anthropology) will meet Group II in the Seminar Room for a "what the bones can tell" demonstration.

3:15 – 3:35 pm At 3:15 p.m. Carla Dove (Birds) will meet the group in the Seminar Room and take them over to birds for a look-see at the collections. At 3:45 p.m. they will return to the ARC.

4:00 – 6:00 pm free time on the National Mall

6:00 pm meet at NMNH Jazz Café (Atrium Café) for dinner and music (The Steve Greene Quartet)

8:00 pm charter bus pick-up at NMNH and return to hotel

Saturday, November 8

7:00 – 7:30 am continental breakfast in hotel

8:15 am meet in hotel lobby

8:30 am charter bus departure with BES field trip leaders (Berkowitz & Pickett)

9:00 am – 5:00 pm Exploring the Gwynns Falls Watershed and Baltimore Ecosystem Study (BES) Research Sites
 Presenters: Alan R. Berkowitz, Steward Pickett, Andrew J. Miller, Richard V. Pouyat, Bryant Smith, Justin Freedman

time	location	topic	leaders
9:30 am	Stop 1. Baisman's Run.	Hydrology and ecology of forested and low-density residential small watersheds.	Alan Berkowitz, IES Steward Pickett, IES
10:30 am	depart stop 1.		
11:00 am	Stop 2. Glyndon.	Hydrology and ecology of medium density suburban small watershed; schoolyard ecology; best management	Andy Miller, UMBC
11:45 am	depart stop 2.		
12:30 pm	lunch at the Rognel Heights Cultural Center		
1:15 pm	depart lunch stop		
1:30 pm	Stop 3. Rognel Heights.	Hydrology and ecology of high density residential urban small	Richard Pouyat, USDA Forest Service

		watershed; schoolyard ecology; permanent forest plots for soil and vegetation ecology.	
2:30 pm	depart stop 3.		
3:00 pm	Stop 4. Washington Village / Pigtown.	Hydrology and ecology of very high density residential / commercial urban storm-watershed; schoolyard ecology; neighborhood and community science; participatory education and research.	Bryant “Spoon” Smith, Justin Freedman USDA Forest Service
3:50 pm	depart stop 4.		
4:00 pm	Stop 5. Carroll Park.	Hydrology of entire Gwynns Falls watershed; pollution mitigation; urban myths and legacies	Alan Berkowitz, IES Steward Pickett, IES
5:00 pm	depart final BES site		

- 5:15 pm arrive at hotel
- 6:00 pm charter bus pick-up at hotel to go to Baltimore Inner Harbor
- 6:15 pm – 9:00 pm dinner and free time in Inner Harbor
- 9:00 pm charter bus pick-up at Baltimore Inner Harbor and return to hotel

Sunday, November 9

- Morning continental breakfast in hotel
- 9:00 am meet in hotel lobby
- 9:15 am charter bus pick-up at hotel
- 9:45 am arrive at National Aquarium
(501 East Pratt Street, Baltimore, MD 21202)
- 10:00 am – noon tour of Aquarium
- 12 noon pick up box lunches in Marine Mammal Pavilion Atrium Food Court
- 12:15 pm charter bus pick-up and return to hotel
- 12:45 pm - ? participants depart for airport via hotel airport shuttle

Appendix C Field Trip Presenters

(listed in alphabetical order by day and location)

Thursday, November 6th

Orientation

Shaaban Fundi

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Friday, November 7th

Environmental Protection Agency

Urban Ecology & Environmental Justice

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Opportunities Session

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Smithsonian Museum of Natural History

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“Pathways to Careers in Ecology and Environmental Science” Panelists

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Behind-the-Scenes Tour

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Saturday, November 8th

Baltimore Ecosystem Study

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Mama and Baba Jahi

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