



**Strategies for Ecology Education, Development and Sustainability
Wetlands Ecology Student Field Trip
Lafayette, LA • November 18-21, 2004**

Field Trip Overview

Student field trips are an important component of the Ecological Society of America's Strategies for Ecology Education, Development and Sustainability (SEEDS) Program that are aimed to foster greater student identification with ecology through field experiences. From November 18 - 21, 2004 SEEDS supported a student field trip to Lafayette, Louisiana, highlighting the research of the United States Geological Survey's (USGS) National Wetlands Research Center (NWRC). Attendees included nineteen students from fourteen schools across the country, three SEEDS faculty, and two faculty mentors. A list of attendees can be found in Appendix A.

The primary goals of the field trip were to further students' knowledge about the field of ecology; provide students with an overview of several interesting and ecologically important sites; enable students to build a network among professionals and students sharing the same interests; expose students to the practical application of ecology; and to build student awareness of various ecological internships, degrees, and career options. An on-line photo album of the field trip can be found at <http://www.esa.org/seeds/albumPhotos/>.

Ecologists from the National Wetlands Research Center exposed students to the research being conducted at several sites in south Louisiana including a prairie, marsh, and swamp. The research focus varied from prairie succession, to wildlife management (nutria), to swamp sedimentation. A full itinerary of the field trip can be found in Appendix B. A complete list of volunteers who participated in the field trip can be found in Appendix C.

Students were asked to keep journals on carbonless xerographic paper. At the end of the trip, students kept a copy of their notes and submitted the copy to ESA staff. In addition to individual notes, rotating groups of five students were responsible for writing this report in half-day intervals, which was then edited by SEEDS staff. The sketches are also from the groups. Therefore, the report reflects the voices of diverse students who attended this trip.

Thursday evening, November 18

The field trip began the evening we arrived with an orientation at the Blue Moon Guest House. Jacoby Carter gave us an overview of the weekend, Catherine Schoeffler provided us with an introduction to the culture of southern Louisiana, and Melissa Jurgensen-Armstrong and Jason Taylor gave us more detail on the SEEDS program.

Friday morning, November 19 (Group 1: Karen Burgos, Felixia Mendoza, Jorge Ramos, Ku'ulei Vickery, Christina Wong)

Our group was welcomed by Greg Smith, the new director of the NWRC. Susan Horton, an Education Specialist with the NWRC, also welcomed the group and gave us a tour of the Center's facilities.

Our first stop of the tour of the National Wetlands Research Center was the mapping lab. Kelly Mouton, a cartographer, described the process of mapping Louisiana wetlands for research

purposes. A special ER2 plane is outfitted with timed camera equipment designed to take multiple picture frames so overlapping will occur. A stereoscope is used to create a 3-D image to access altitude and depth. A zoom-transfer scope provides latitude and longitude scales. These maps are then used for science projects that include GIS simulation models. We also met Chris Wells, who is in charge of the mapping room. The tour of the facility concluded with the library and fish and amphibian wet lab.

Larry Allain, a botanist, gave a presentation on coastal prairies in Louisiana. The south west coastal prairie is one of the most diverse and endangered ecosystems in the US. High plant diversity is typical of this prairie system, such as Indian Grass, Big Blue Stem, and Switch Grass. Human impacts to the coastal prairie include homesteading, cultivation, oil exploration, grazing, and residential and industrial development. This informative presentation gave us an overview of the prairie system, but did not discuss preservation issues and methods.

Next, our adventurous spirits took us to an old experimental prairie plot of the Center for Ecology and Environmental Technology (CEET) where warm weather and sunshine greeted us. Of the various plant species, the most intriguing was slander mountain mint; evidence shows it can kill e-coli bacteria. Cajun people used the mint to cure raw meat, which could then be used to treat certain sicknesses. Also in this experimental prairie, scientists conduct controlled burns to rejuvenate and maintain the prairie. We were surprised at the amount of fire ant mounds and discussed eradication techniques such as biocontrol.

Below are personal reflections of each group member included in the group report:

I found it interesting that the discussion of historical land use of the area only briefly mentioned Native American peoples and the contributions to the Louisiana prairie. Native American influence on the land was only discussed with respect to the controversial topic of historical controlled burns.

I found it interesting that Larry Allain recognized the importance of encouraging Louisianians to purchase native plants when landscaping their yards. I feel this is important because I am part of an urban Chinese community that was and still is unaware of the environmental problems plaguing our area and how we can help solve them. Landscaping with native plants is a good first step.

The visit to the prairie test site was very new to me. I have never seen nor really knew much about a prairie and its importance. I am glad I was able to experience this venture.

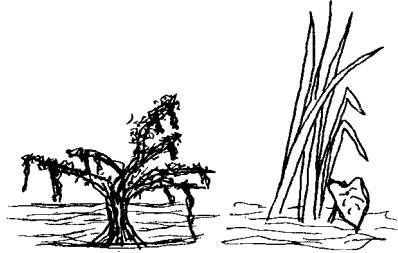
I think it is a very good experience for people who do not know about ecology. I learned a lot of things about wetlands and Louisiana. I most liked the Atchafalaya swamp and learned more about all the different species of plants there.

Getting to see coastal prairies and coastal wetlands has been a great experience. Coming from a dry, hot desert area, it is a whole different and new environment for me. It was such an interesting experience to get to ride about and walk on water. Learning how the wetlands are impacted, it shows that human actions have impacts on the environment, whether wetland or desert.

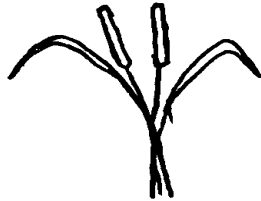
Friday afternoon, November 19 (Group 2: Adriana De Dios, Jasmine Cousins, Sharon O'Leary, Chris McLaughlin, Sarah Wells)

We're on the bus heading toward Rockefeller Wildlife Refuge for the afternoon. Jacoby Carter is at the front of the bus, microphone in hand, giving us some facts about the area:

- The roadside ditches were made by piling up the dirt from that area to make the road.
- The difference between a swamp and a marsh is that swamps are areas of water with trees and woody plants throughout, while marshes just have grasses for the most part.



- Live oaks are not deciduous.
- Cattle egrets were blown here from Africa in a very strong storm.
- Louisiana marshes are the largest in the country. They protect the area from hurricanes by helping to minimize the impact of incoming storms.
- Cattails are indicators of a freshwater swamp or marsh.



The views are equally interesting, with land as far as we can see. The Gulf of Mexico is very close, and it feels like we can almost see it, but not quite. Trees line the horizon of fields, some of which are planted with rice or sugar cane and some of which are roamed by cows and the occasional horse. We crane our eyes for alligators and snap many pictures as we speed along. Spanish moss hangs from gnarled trees and every house is raised on stilts, for good reason we're told.

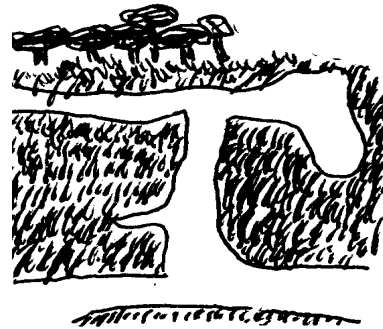
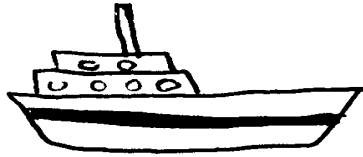
Everything from the views to Jacoby's facts are very interesting, and we're learning and taking in a lot of new sights we've possibly never seen before. Jacoby is doing a great job keeping our attention and keeping most of us awake as well as keeping it fun and making us all laugh with some stories of his own experiences. We're definitely having fun.

2:30 pm

We've finally arrived at the study site and research station. We've taken over a large living room, sprawled out on comfy leather couches as George Melancon who works at the station formally introduces us to the history of the area. Rockefeller Wildlife Refuge is a "76,000 acre haven for wildlife" along 26 miles of Gulf Coast in the state. The refuge could be thought of as a huge outdoor lab of sorts. This outdoor lab consists of many research projects, from migratory bird work to largemouth bass to this world-renowned alligator research. The area is also experiencing an incredible loss of 35 linear feet of coastline northward every year. The big question is.... Why?



George describes a number of possibilities: the Mississippi levee system, oil and gas exploration and drilling, agricultural practices, navigation and transportation methods and structures, etc., which alters tidal movements and so on. This is a good example of “cascading” interactions. We keep trying to solve big problems with short-term solutions. Much of what we do simply ADDS to the original problem!



During George’s presentation on the relationship that the refuge has with oil and gas exploration, several questions were raised and discussed: What impact does this industry have on the refuge? Is this impact truly as insignificant as George said? Is it right to drill on a wildlife refuge, an area typically protected from human exploration? We could go on longer talking about oil and gas exploration/extraction with George, but it is soon time to be moving again to see the study sites.



4:00 pm

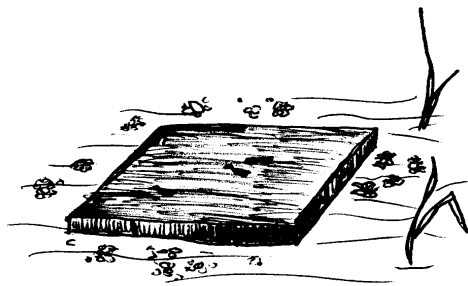
Half our group is hanging onto the boat as we speed along, wind blowing through our hair and smiles plastered on our faces. All too soon, the boats slow down and it’s time to disembark.



We’ve reached the nutria study site. Two of Jacoby’s coworkers, Sergio Merino and Garrett Thibodeaux, lead us through a few trees (some with 3-inch thorns) and then off a plank into the marsh itself. Every step feels as though we’ll sink through the unstable masses of plants, but we stay afloat. We walk over to a plank that is set out and Sergio explains the research. Nutria, *Myocastor capyus*, is an invasive species from South America, initially brought in by traders/farmers when the pelts were profitable. Unfortunately, with the decline of the fur industry, nutria fur is now of no value and the nutria have quickly moved into the area. [Fun fact: nutria have mammary glands on their backs to help feed babies while they swim!] The animals create “eat-outs” that diminish coastal wetlands. Jacoby and Sergio are doing research to attempt to determine the population of nutria. Although populations have risen, there is currently no population estimate (though, apparently at a \$4 bounty per tail, hunters can bring in \$60 - \$70 thousand per year). Without a population estimate, biologists cannot effectively manage the nutria.



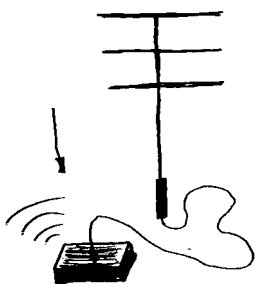
To attempt to estimate the population, Jacoby and Sergio have laid out a network of wooden platforms for the nutria to sit on. They bait them with sweet potatoes to lure them on. The hope is that they will then defecate before leaving, so biologists can come back and collect the scat to attempt to analyze the DNA.



Essentially, this is a model of capture-recapture population estimate. However, several problems stand out: DNA on the feces is only found on the surface, contamination is a possibility, heat leads to loss of DNA on the feces, males are territorial, etc. They have used a variety of collection methods for the feces including gloves and forceps, with alcohol preservation and more recently, paper smears. We question their methods, wondering if a true population estimate is possible if the DNA is so fragile on the feces and if males defend platforms from other individuals. Many of us prefer the idea of trapping and then re-trapping, which means the animals must be marked, which leads us back to the boats and on shore with Jacoby and the next stop.

4:50 pm

We're back near the road with Jacoby, learning about some of his telemetry work on nutria. In his hand is a receiver and antenna, and Jasmine has become the "nutria" and is sent off with a transmitter in her hand. Jacoby alternately aims the antenna at her and then away, demonstrating the strength of the signal when he aims at the radio in her hand. The signal becomes faint when he points away from her.



We distractedly dodge the continuous onslaught of mosquitoes and Jacoby goes on to describe the difficulties of radio telemetry on nutria. The animals are in and out of the water all the time; he shows the great weakness of signal as soon as the radio is plunged underwater. And then there is the issue of attaching the radio to the animal – putting the radios on their tails or necks doesn't work and implanting radios is serious business. Another idea is implanting pit tags, which are small computer chips that are easily injected into the animal with a truck needle. Running a hand-held device over the area shows an individual identification number, but it only works if the animal is caught and scanned right up-close. There really is no easy answer for marking and identifying nutria for this study. We've tried to brainstorm, and perhaps come up with some ideas. We decided marking the animals on the exterior is the best way, because then they do not need to be re-captured by traps. Jacoby tells us they're trap shy after one trapping. Apparently ear tags fall out quickly because they have fragile skin. Perhaps with a huge effort, they could quickly trap as many in an area as possible and then do resighting to estimate population before the tags come out. Or perhaps they could brand the tails of the individuals with numbers, which could easily be seen from far away and would be permanent (and when bounties are brought in, the number of captured individuals would be easily determined). We are skeptical of scat analysis since the DNA can be lost or contaminated, especially since the males (and others?) may be too territorial to allow others onto the platforms. It seems like there should be some way of using resighting techniques to identify marked individuals and determine an estimate of unmarked individuals.

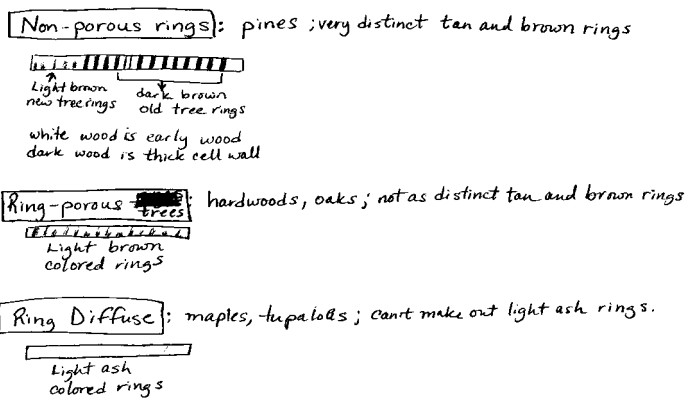


It has been a great afternoon! We've had a lot of fun exploring the marsh and hearing about nutria research. As darkness descends onto the marsh, we crawl contentedly back onto the bus and rejoice in an exciting day's memories.

Saturday morning and evening panel discussion, November 20 (Group 3: Bruce Machona, Edith Jaurrieta, Liz Harrison, Suhey Ortiz, Aiyana Hart-McArthur)

After waking to heavy rain, we began our day with breakfast at the guest house before heading to the National Wetlands Research Center, where we were met by Tom Doyle, Jacoby Carter and Richard Day. Dr. Doyle took us to his Dendrochronology lab, where he briefed us on tree coring and dating techniques. A core is removed from a tree using an increment bore, which is similar to a hollow drill bit. By examining the rings visible in the core, one can determine the life history of the tree, including information about when flooding, drought, hurricanes, and salt water intrusions occurred. One of Dr. Doyle's goals is to create a model of the effects of salt water intrusion.

While it was interesting to learn about this technique, we would have appreciated learning more about the application. It seems that data collected by this method is useful, but unreliable due to the multiple factors affecting the growth of the tree. Factors affecting tree growth that make tree ring counting unreliable: flooding, drought, salt water intrusion, nutrient availability, type of rings (e.g., non-porous rings – pines, very distinct tan and brown rings).



This technique used for dendrochronology could potentially damage the tree by providing an entry for insects and disease. Perhaps research can be done into less invasive techniques for examining tree rings or obtaining dendrochronological data. Possible ideas include infrared scanning and differential density scanning.

After visiting the tree lab, we headed for Atchafalaya Basin, just East of Lafayette where we toured the visitor center and drove down to see the Atchafalaya River. A free map of the Atchafalaya Basin can be obtained from the Dept. of Natural Resources – 225-342-7068.

In the evening, we returned to the NWRC where we met with seven science and education professionals for dinner and a panel discussion. The panelists included:

- Sergio Merino, General Biologist, Johnson Controls
- Andrea Anteau, Ecologist, USGS
- Ines Maxit, Zoologist, Dept. of Wildlife and Fisheries
- Sybil Jackson, French Professor, Southern University
- Macandol Parker, Soil Conservationist, USDA Natural Resources Conservation Service
- Pam Blanchard, Associate Professor of Education, Louisiana State University
- Jacoby Carter, Ecologist, USGS

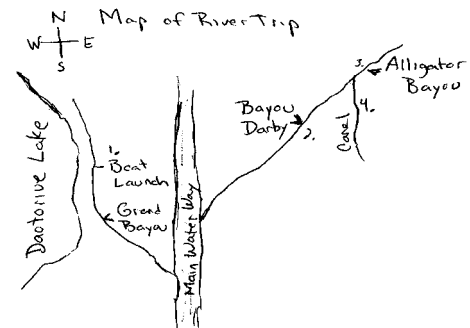
The panelists told us about their personal, educational and professional backgrounds, which were quite varied and indirect in leading to their current fields and occupations. We all enjoyed the advice they shared with us about pursuing careers in science and ecology, including skills that make us more marketable. Primary points made include being persistent, confident and flexible, following your interests, and developing communication, reading, writing, and technological skills.

The panelists seemed to have genuine interest in us, and we appreciated their advice, particularly their honesty about their personal experiences. It would have been nice to have heard from everyone equally and to have allowed more time for questions and discussion, as we hoped to talk more with the panelists.

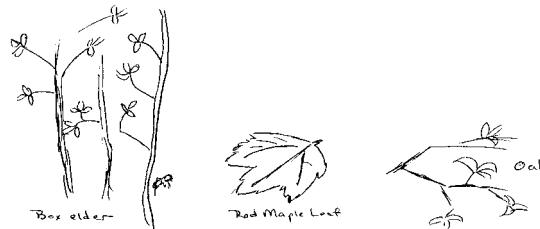
We ended the evening by collecting literature from the NWRC, returning to the guest house, debriefing the day, and beginning work on this report.

Saturday afternoon, November 20 (Group 4: Christine George, Kimberly Hoyt, Didio Martinez, Diana Moy, Jeramie Strickland)

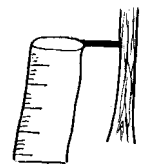
We started our Atchafalaya Swamp tour around midday. It was overcast with a light wind. We headed south to the main water way then turned north. Shortly up the main waterway we headed NE toward Bayou Darby.



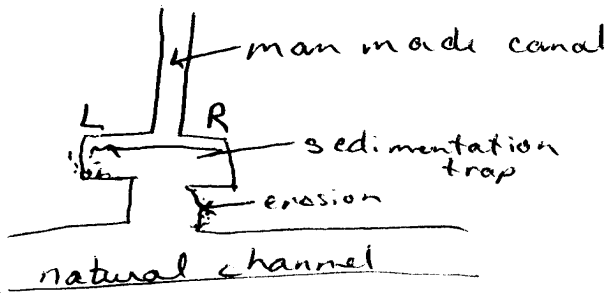
We left the boats on the Bayou and entered the bottomland natural forest to look at an experimental site measuring sedimentation over the land. The shoreline was lined with box elder and poison ivy. Some examples of the natural occurring trees in the bottomland forest are willow, oak, box elder, and red leaf maple.



On our way to the first site, we found a water gauge, which is used to measure the water level. It works by someone periodically checking and gauge because there is not a way to measure it electronically.



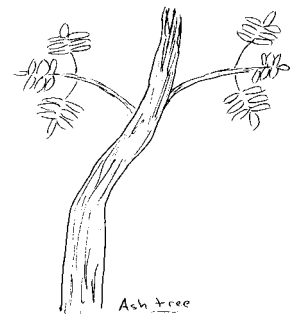
After visiting the first site, we proceeded into the natural channel on our way to see a human-made cut into the levee. The cut was made by the Army Corps of Engineers to increase influx of water into the habitat to alleviate concerns of anoxia in fish populations. The goal was



to increase water volume without increasing sedimentation. To aid with measuring sedimentation, traps were made in order to capture the sedimentation. The trap on the left side was near capacity and there was heavy erosion on the lower side of the right levee. The concern we have is that the study has been in progress for about five

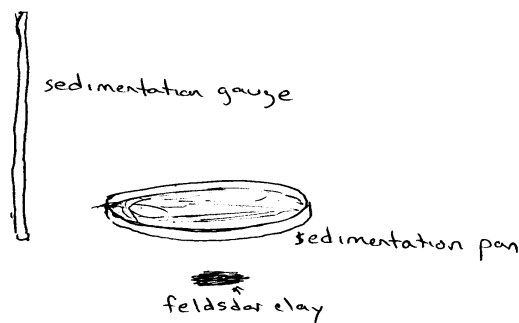
years, a relatively small time. With the heavy amount of sedimentation in a relatively short time, the trap would have to be dredged or a new one built up higher. Either way, it seems to be a very inefficient method for dealing with decrease oxygen levels. It is a short-term solution for a long-term problem.

Sedimentation is measured by several methods in Atchafalaya swamp. Since Ash tree seeds are wind dispersed, they are a good way to measure the amount of sedimentation in the area. To do this, the age of the tree needs to be calculated and then the height of the tree can be used to determine sedimentation rate. This method had an error of 5 – 10 years. Another technique is to use a pan to collect sedimentation from canal overflow on to stream banks. Sedimentation occurs when the canal overflows the banks bringing in sediments and other debris with it that is then deposited on shore. As the sediment is deposited in the pan, it can be collected over time and eventually measured. Currently the water level is around 10 feet and it has the potential to rise up to over 17 feet, causing seven feet of overflow. The USGS also installed tubing to measure sedimentation by marking off heights on a pipe.



Another way to measure increased sedimentation is to use feldspar clay, which does not allow sediment to easily pass through it. It is used as a marker in the soil that can later be dug down to and the sediment layers above it can be measured. The sedimentation was measured at various transects marked by flags. They tried to keep the transect on state property and not private land.

In regard to the sedimentation trap, it would seem that it would be best left alone. The effect on the levee seems to be worse by dredging it. Why not leave the habitat to become anoxic? Having a fish kill seems to be less of a problem than managing an ever-filling sedimentation trap.



Our group had to be split in two because there was not enough room on the boats for the whole group. While one group was on the boats, the other group went to Lake Fausse Pointe State Park to look for alligators. We did not see any alligators, but Larry Dugas, a park ranger at the park,

invited us in to see the natural history collection of the park, including pelt and skull specimens of local wildlife.

Ideas:

1. How can we increase public awareness and empathy toward wildlife restoration? It takes time, money, and dedicated people to get the thoughts up and running.
2. As the human population continues to grow, we tend to place tremendous pressures on wetlands and wildlife habitats.

Pre-post Field Trip Evaluations

Before and after the trip, students were asked to rate their understanding of and exposure to wetland ecology, in addition to how likely they were to pursue a career in the field on a scale of one to five (5 highest, 1 lowest). The average scores in each of these three categories rose as a result of participating in the field trip. The greatest increase in rating was seen in students' understanding of wetland ecology.

Figure 1. Mean student rankings before and after field trip

Category	Pre	Post
Understanding of wetland ecology	2.90	4.12
Exposure to wetland ecology	2.93	3.98
Likelihood to pursue a career in wetland ecology	3.98	4.31

After the field trip, students were also asked to rate the various portions of the weekend. The panel discussion was rated the highest (4.88), followed by the welcome/orientation (4.64), the Atchafalaya Swamp tour (4.38), the Rockefeller Wildlife Refuge tour (4.02), and the tour of prairie study plots/restoration efforts at the CEET (3.88).

Students described the best aspects of the field trip as: having an opportunity to meet with other students from different parts of the country, getting out into the field to learn about wetland ecology (especially riding in boats to study sites), getting advice from professionals in the field during the panel discussion, and learning more about Louisiana culture and ecology.

When students were asked what improvements they would make for future field trips, several students mentioned more time for group discussion, mixing the smaller groups up so everyone could have a chance to meet, sending more information (including student bios) prior to the field trip, include ecology research from government and academic researchers, and making the field trip longer.

Appendix A Field Trip Attendees

Student Name	Institution	Email
Karen Burgos	Universidad Metropolitana	kyriel79@hotmail.com
Jasmine Cousins	Hampton University	cuznsfmly@aol.com
Adriana De Dios	University of Texas, El Paso	adedios@utep.edu
Christine George	Stanford University	hikachic@stanford.edu
Elizabeth Harrison	Howard University	liz_harrison_22@yahoo.com
Aiyana Hart-McArthur	University of Montana	aiyanaoutside@hotmail.com
Kimberly Hoyt	San Diego City College	khoyt99@hotmail.com
Edith Jaurrieta	University of Texas, El Paso	ejaurrieta@utep.edu
Bruce Machona	Wiley College	bmachona@msn.com
Didio Martinez	University of Arizona	didio@u.arizona.edu
Christopher McLaughlin	Fort Berthold Community College	tribesguy@hotmail.com
Felixcia Mendoza-Jones	Howard University	Trinigyul01@hotmail.com
Diana Moy	University of Texas, El Paso	dmoy@utep.edu
Sharon O'Leary	Fond-du-lac Tribal and Community College	sharoo@giigido.fdl.cc.mn.us
Suhey Ortiz	University of Puerto Rica at Humacao	Suhy324@hotmail.com
Jorge Ramos	University of Texas, El Paso	geckor21@gmail.com
Sarah Sells	Oregon State University	sellss@onid.orst.edu
Lauren Vickery	University of Hawaii Manoa	lvickery@hawaii.edu
Christina Wong	Occidental College	cwong@oxy.edu
Faculty/Staff Name	Institution	Email
Joseph Fail	Johnson C. Smith University	jfail@jcsu.edu
Louise Comas	USDA-ARS	lhc105@psu.edu
Melissa Jurgensen-Armstrong	Ecological Society of America	Melissa@esa.org
Jeramie Strickland	Ecological Society of America	jeramietroy@hotmail.com
Jason Taylor	Ecological Society of America	Jason@esa.org

Appendix B

Field Trip Itinerary

Thursday, November 18

- 1:00-4:00 pm Arrive at the Lafayette Regional Airport, claim luggage, and meet Melissa Jurgensen-Armstrong at the Lafayette Convention & Visitors Commission's Information Center located on the first floor of the terminal building
Shuttle to the Blue Moon Guest House
- 6:00 pm Dinner at the Blue Moon Guest House
- 7-8:30 pm Field trip orientation at the Blue Moon Guest House with Dr. Jacoby Carter, NWRC ecologist, and SEEDS staff

Friday, November 19

- 7:00 am Breakfast at Blue Moon Guest House
- 7:45 am Transportation to National Wetlands Research Center (NWRC)
For more information about NWRC, visit <http://www.nwrc.usgs.gov>
- 8:00-9:30 am Tour of the Center, presentation on coastal prairie.
- 9:30 am Transportation to the University of Louisiana's Center for Ecology and Environmental Technology (CEET)
For more information about CEET, visit <http://research.louisiana.edu/VP/CEET.shtml>
- 9:45-11:00 am See prairie study plots/restoration efforts at the CEET
- 11:00 am Transportation back to NWRC
- 11:30am-12:30pm Potluck lunch at NWRC
- 12:30pm Transportation to the Rockefeller Wildlife Refuge
For more information about the Refuge, visit <http://www.wlf.state.la.us/apps/netgear/index.asp?cn=lawlf&pid=230>
- 1:00-5:30 pm See freshwater and saltwater marshes; research projects; management techniques; wintering waterfowl; Dr. Carter's nutria research at the Refuge
- 5:30 pm Return to Blue Moon Guest House
- 6:00 pm - ? Walk to Downtown Alive Festival for dinner and music

Saturday, November 20

- 7:00 am Breakfast at Blue Moon Guest House
Pack lunch for the day
- 7:45 am Depart for field trip
- 8:00 am-5:00 pm Field Trip to the Atchafalaya Swamp with NWRC ecologists
- 5:00-5:45 pm Return to the Blue Moon Guest House to change, refresh, relax
- 5:45 pm Transportation to NWRC for dinner panel
- 6:00-8:30 pm Dinner and career panel at the NWRC
- 8:30 pm Transportation back to Blue Moon Guest House

Sunday, November 21

- 8:00 am Breakfast at Blue Moon Guest House
Pack lunch for the day
- 9:00 am Transportation to Acadian Cultural Center
For more information about the Center, visit <http://www.nps.gov/jela/Acadian%20Cultural%20Center.htm>
- 11:00 am Transportation to Lafayette Regional Airport for departure

Appendix C

Field Trip Participants

Thursday, November 18

Orientation

Jacoby Carter

Ecologist

USGS National Wetlands Research Center Forest Ecology Branch
700 Cajundome Boulevard
Lafayette, LA 70506
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jacoby_carter@usgs.gov

Catherine Schoeffler

Propriétaire

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215 E. Convent Street
Lafayette, LA 70501
877-766-BLUE (2583)
info@bluemoonhostel.com

Friday, November 19

NWRC Tour

Greg Smith

Director

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Susan Horton

Education Specialist

Johnson Controls at USGS National Wetlands Research Center
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Kelly Mouton

Cartographer

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Chris Wells

Geographer

USGS National Wetlands Research Center

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Coastal Prairie Presentation/Tour of CEET

Larry Allain

Botanist

USGS National Wetlands Research Center Wetlands Ecology Branch

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Rockefeller Wildlife Refuge

George Melancon

Wildlife Biologist

Louisiana Department of Wildlife and Fisheries

Rockefeller Wildlife Refuge

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Sergio Merino

General Biologist

Johnson Controls at USGS National Wetlands Research Center

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Garrett Thibodeaux

Biological Technician

Johnson Controls at USGS National Wetlands Research Center

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Saturday, November 20
Tour of Atchafalaya Swamp

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