



The Ecological Society of America's SEEDS Program



**ESA SEEDS Field Trip Report
University of Alaska-Fairbanks Bonanza Creek
Long Term Ecological Research (LTER) station
May 24-31, 2008**

Field Trip Overview

From May 24-31, 2008 SEEDS conducted a student field trip to the University of Alaska Fairbanks' Bonanza Creek Long Term Ecological Research (LTER) station. Attendees included 19 students from 17 schools across the country and Puerto Rico, two SEEDS faculty advisors and two staff members from the Ecological Society of America. A list of attendees is in Appendix B1.

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.

Many activities took place during the field trip. Participants met with faculty, staff and graduate students involved in the LTER. The first day of the field trip consisted of an introduction to the LTER and an exploration of the UAF campus. The second and third days were spent at two different study sites and provided students the opportunity for field research on succession and fire ecology. The second day also included a generous dinner at the Alaska Salmon Bake Restaurant provided by the Bonanza Creek LTER. All involved were privileged on the third day to be joined by Alaska's poet laureate, Anne Hanley, who led the students on several writing exercises. The fourth day, students compiled their results and prepared presentations on their research. This day also included some time with EPSCoR faculty including talks, poster presentations, and dinner (provided by EPSCoR). The fifth day was spent at the home of Howard Luke, a native Athabascan elder, who lives at his family's camp on an island in the Tanana River. A full field trip itinerary can be found in Appendix B2 and a list of the host professionals in Appendix B3.

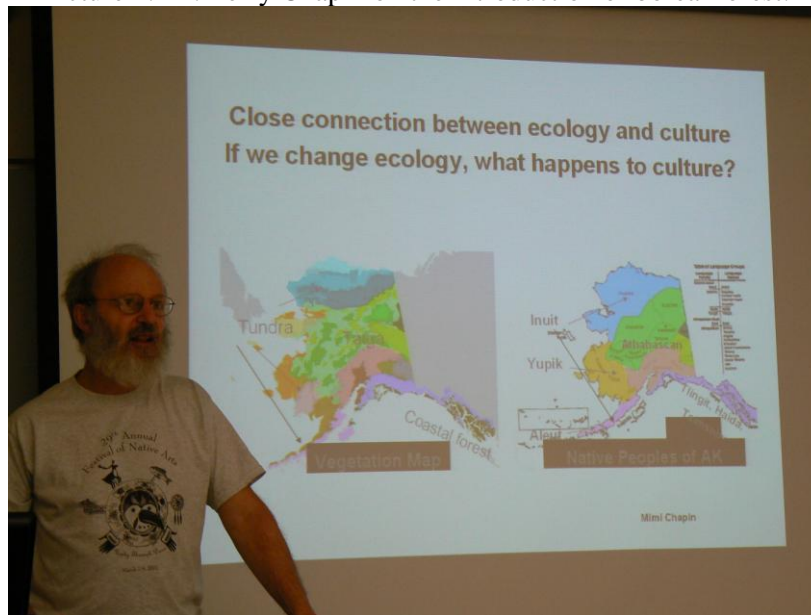
Students were asked to keep journals, and were given a field notebook, generously donated by Ben Meadows. In addition to individual notes, rotating groups of 4-5 students were responsible for writing about each day's events, which was then edited and compiled to create this report. The sketches are also from the group reports. This report reflects the voices of the students who attended the field trip.

Monday, May 26th, 2008: Frederick Abbott, Imani Bell, RaeLynn Butler, Sherrita Commey

After our first dark-less night in Alaska, we began our week's journey on a cold summer morning under the jetlag effect from our long flights to reach our destination. We walked towards the Lola Tilly Commons, where we enjoyed a scrumptious buffet breakfast. With our satisfied bellies, we walked out the door and noticed that the topography of the University of Alaska, Fairbanks is not like the Great Plains! We all walked to our first meeting of the Field Trip, where we met the great Dr. Terry Chapin; the Principal Investigator for the Bonanza Creek Long Term Ecological Research (LTER) site.

As we began our meeting, we had a chance to introduce ourselves and meet individuals with whom we share a passion. There were twenty-three individuals who came from an array of backgrounds. Some were launching their interest in ecology while others in the group have a clear understanding of it and are now providing guidance to those who are just beginning. Dr. Chapin began his lecture with an overview of the Alaskan ecology and the objectives of the LTER. The main idea behind this trip was to give us an understanding of the boreal forest and how a changing climate is affecting the cultures and ecosystems of interior Alaska. This lecture gave us an insight on how these changes are more evident in Alaska than in many other locations around the world. Some of these changes include; fire regime, increased levels of CO₂ (carbon dioxide) and CH₄ (methane) and the effect on wildlife and indigenous cultures.

Picture 1: Dr. Terry Chapin on the introduction of boreal forest.



Our next adventure was a hike through the forest on our way to the Institute of Arctic Biology's Large Animal Research Station (LARS). During this long hike we received a crash course on the five major tree species of interior Alaska and how the vegetation varies between north and south facing slopes. Also we noticed a change in permafrost depths and organic matter as we went along the way. We learned and become aware of the effects of melting permafrost (a sub-layer of frozen soil). As this layer melts down, the soil caves in and forms a puddle, which in a larger scale greatly changes the hydrology of boreal forests. This hydrology is really important because these forests receive less than 10 inches of precipitation per year (it is technically considered a desert).

Once we arrived at LARS we ate our brown bag lunch. During this meal we discussed the research that is being conducted at LARS on muskoxen, caribou and reindeer. This research station focuses on understanding the history, ecology, biology, physiology and conduct of these unique ungulates. Some of these include; stress levels in caribou, microbial diversity in ruminant stomachs and reproduction physiology. We participated on the guided tour of the facilities and enjoyed an afternoon under the warming sun. Our tour guide, Lindsey Blaine, was very knowledgeable and gave us an up-close look at the animals and their unique characteristics. During this presentation we had the chance to touch qiviut (the under hair of muskoxen), also known as the cashmere of the north. We also learned that the caribou population in Alaska is two caribou per human habitant.

Afterwards we hiked back to a lecture hall on campus where we had the opportunity to partake in an open discussion on restoration by Dr. Katharine Dickinson, Associate Professor of the Ecology Program and Alpine Ecosystem Research at the University of Otago in New Zealand. She gave us the chance to define commonly used terms in applied conservation ecology - restoration, conservation, sustainability, preservation and biodiversity. After trying our best to assign a definition to each of these terms, we learned that there is a great variability on the meaning of these words depending on your personal views. She brought up many issues which involve an individual's environmental ethics, including her own experiences in New Zealand.

Picture 2 & 3: Male Caribou “Bailey” and Female Muskoxen “Lilly”



The next stop on our list was the University of Alaska’s magnificent Museum of the North. This activity allowed all of us the chance to explore some of Alaska’s history on our own without the direction of a tour guide. A standout room was the gallery of Alaska which encompassed several things such as: traditional clothing, craftsmanship, tools, artwork, and jewelry. The architectural scheme of the museum brought to mind the images of Alpine Ridges, glaciers and a whale’s tail.

Although this day was filled with a tremendous amount of learning and was pretty exhausting, it was worth every minute of it. As for many of us this was our first trip to Alaska and through the SEEDS support it will never be forgotten. At our first group discussion we were able to reflect openly on our personal experiences for our first day in Alaska.

The End of Day 1!

Tuesday, May 27th, 2008: Antonio Cordero, DaVionshe Evers, Israel Del Toro, Jenna Hamlin

Tuesday morning the participants were still acclimatizing to the extent of daylight in Alaska. Who knew the sun doesn’t set in the Alaskan summer? After a hardy breakfast at the UAF Cafeteria, we traveled to the Tanana River. Upon arrival, the students scrambled to select a pair of rubber boots and “one-size fits most” life jackets from a set provided by the Bonanza Creek LTER. We were introduced to the UAF

LTER Staff (Knut, Jamie, Roger and Jack) who would be the field guides for the day. The students were divided into groups which rode on five different field-research boats or “mini- research vessels” to the determined site on the Tanana River (site 1C). The cold windy boat ride was an adventurous and enjoyable addition to our experience on the river; even if some students were slightly delayed due to logistical problems traveling upstream (the boat was grounded momentarily). The research staff was very helpful and informative as we traveled on the river, constantly providing natural history facts about the biota of the region. These same researchers added a positive feel to the field visit by giving off the “Alaskan vibe” meaning that they were very rugged, tough and simply put not your average Ph.D. They resembled lumberjacks or trailblazers.

When we arrived on the field site, the staff presented us with a brief introduction regarding the different projects being conducted at the field site. These projects revolved around Knut, Roger and Jack’s research on floodplain succession patterns. We would be collecting data on a slightly different project relating to herbivory by Snowshoe Hare and Moose on spruce seedlings at the site. The students were divided into four groups and distributed at two data collection sites. We were happy and proud to contribute to the exciting research being conducted at the field site. Eight plots were surveyed and a total density of spruce seedlings at each plot was counted, the age of each spruce seedling was estimated, and the presence or absence of herbivory noted.

After completing approximately half of the plot measurements, we had lunch at around mid-day. We “browsed” on our croissants like hungry snowshoe hares after the long Alaskan winter. Following the lunch, the students were allowed an hour for expression of their personal reflections concerning the day’s activities. Students actively engaged in exploration of the site and some took the time to do naturalist style writing, drawings and simply taking in the Alaskan air. Some students explored the site and came across an abandoned-grounded boat which reminded us of the wild nature of the river, sudden changes often leading to catastrophic consequences. Excerpt from Jenna Hamlin on the abandoned river boat: “Rubber hoses and gaskets broken off not to mend myself or someone else but remnants of the shipwreck in the interior”.

When the hour of reflection ended the students returned to their data collection and concluded their sampling with the researchers, “Browsed, browsed, browsed, no browsed, browsed, browsed, browsed, no browsed, browsed, no browsed.” As you can tell the snowshoe hare and the moose feasted heavily on the spruce seedlings. Around 3:30 we headed back through the saturated floodplain to our docked boats. While we waited for the return of the split group we tossed the Frisbee. We headed back through “suicide alley” and caught a glimpse of wildlife like peregrine falcons, bald eagles, and snowshoe hares. After unloading and saying goodbyes to our tour guides, we headed back to campus for a rejuvenating hot shower and to fill our bellies.

Thanks to the Bonanza Creek LTER, we got to enjoy a real Alaskan experience at the Salmon Bake Restaurant. Our mouths watered as we walked through a replica of a mining tunnel, and the idea of all you can eat salmon. The favorites of the evening were grilled salmon, fried cod, and fried halibut. As to satisfy all of our “sweet tooth” we entered the dessert and coffee tent. Our tourist instinct kicked in with a photo op with the wood- carved salmon. Jamie and Teresa showed us the “city,” we got to taste two more Alaskan experiences including an amazing coffee house and “Hot Licks Ice cream.” It was the sweetest reward for our long day, we felt like happy little kids. This concluded our second day in the last frontier as we all dreamed of dark skies, spruce seedlings, mouth watering salmon and Knut’s Norwegian accent.

Drawings By Antonio Cordero and DaVionshe' Evers



Wednesday, May 28th: PaHoua Lee, Elizabeth Quimba, Beatriz Otero, Edward Realzola

Alaskan Exposure

Wednesday, May 28, 2008, started out full of chill and sunshine. First we had a debriefing session concerning fire management and its effects. Katie, Emily, and their graduate advisor Teresa presented topics on vegetation patterns, post-conditions of fires, and the recent occurrence of invasive species. Something we hadn't known before was how to measure the severity of a fire. Teresa explained that the amount of organic matter lost reflects fire severity. Some factors that lead to the trajectory interior shift in Alaska includes mining – where clear cutting and burns allow for deciduous trees to grow – and the presence of Black Spruce – whose needles contain tannin, a fire-happy substance. We learned that while clear cutting results in lower biodiversity, fires actually lead to higher biodiversity. It was interesting that fires increase mineral exposure in soils, which allows for deciduous growth to occur. After burns, vole and bird populations greatly increase, moose populations don't peak until 30 years later, and caribou populations don't peak for 100 years - when lichen is present. It's amazing that while vegetation diversity increases, animal populations are affected so differently.

Our next site played out like a sci-fi movie! We visited the United States Army Cold Region Research and Engineering Laboratory in Fox, Alaska, to tour the Permafrost Tunnel. It is the only permafrost tunnel in the world that exists for research purposes. Many of us did not know what to expect. Once out of the van, we saw a small snowshoe hare, one of Alaska's most common mammals. We were given facts about the tunnel; such as the emergency lighting and emergency phone located inside the tunnel. We were also told that the tunnel would be 4°C, and we had to sign a safety waiver before entering the tunnel. We were then given hard hats and flashlights. Upon entering the tunnel, we were hit with the force of cold air and a very distinctive smell that can be described as manure-like, wet clay, or the odiferous excretion of a ground beetle. However, the stench was actually thousands of years of preserved organic matter.

The tunnel had a lit metallic walkway with railings. There was also a large pipe which circulated cold air from one end of the tunnel to the other, in order to maintain permafrost conditions. The ambience of the tunnel was creepy, but also amazing. There were huge portions of ice that lined the ceiling. Protruding from the walls were preserved mammoth and bison relics. Bands of ice in the wall, called ice lenses, were visible. Samples from these were thawed, and living microbes were found. They were still green, even though they had been extinct for thousands of years! We found a branch that was 14,000 years old, yet it looked like it could have come from present-day. It felt surreal knowing that organisms could survive under such extreme conditions. NASA is currently using the tunnel as a model for studying the Martian environment. We travelled out of the tunnel, thousands of years back to present-day.

When we exited, we were given some facts about Alaskan permafrost. We also held a mammoth shoulder bone that was found by one of the researcher's son. That was so cool! We learned that the history of Alaska was one of gold exploration, and that the active layer of permafrost is usually three to four feet deep; however, warming climate is melting the permafrost. Fairbanks is losing a great deal of permafrost, which is contrary to what scientists believed in the 1960's. Permafrost is not permanent. Afterwards, we headed to our next excursion.

On the drive to Caribou-Poker Creek, Terry Chapin pointed out the visible effects of climate change on the landscape. As a result of permafrost melt, houses were sinking and trees were tipping over, partially exposing their roots. Many people have had to leave their damaged homes. Seeing these things made climate change so much more real. We also spotted a grazing moose on the side of the road, which was very exciting.

Once we arrived at the Caribou-Poker Creek sites, we immediately noticed the different effects of the 2004 fire. There were three areas that we compared: an unburned site, a high-severity site, and a low severity site. Teresa gave us historical background concerning the research sites, which was crucial for understanding the importance of forest fires in boreal forests. During her lecture, we hiked around and saw small pools filled with beetle and mosquito larvae, as well as large water striders gleefully skipping on the surfaces. We also discovered wild edible cranberries and Labrador tea. Those who were daring tasted the refreshingly sour cranberries and the bitter tea leaves. Carpenter ants, however, taste like decrepit limes — so we suggest the cranberries and tea leaves: eat responsibly! It felt as if we had discovered a new world. We never thought that fire played such a significant role.

We met an Alaskan writer named Anne Hanley, who taught us that words are limiting and can only take you so far. Poetry helps her explain her emotions and experiences. She read two poems and helped us get in touch with our creativity by doing some writing and spiritual exercises. While Anne's exercises took us outside our comfort zones, we experienced our surroundings in new and exciting ways. We felt relieved to have some time to think outside the scientific box and to express our feelings.

In the afternoon, we broke up into two different groups to analyze fire effects on vegetation diversity and seedling recruitment, along with how severity affects the succession pattern of communities. Quadrat and circular sampling were used to collect data. Factors measured included the following: biomass, organic layer size, seedling composition, soil temperature, and permafrost depth. An interesting aspect of this research was learning the different functional groups in the Alaskan system. The hands-on approach was great; some student got to feel the actual frozen layer in the ground which was tactile and very memorable. Although we learned some research techniques that may have been unfamiliar to some students, it was tedious because the research felt insignificant. While the results were intriguing, our work didn't really matter because other than field work for the experience, the results weren't going to be used for anything. An alternative experience may have included other outdoor experiences – perhaps mountain climbing or explorative hiking.

Later on that evening, Terry and Erin led a discussion about our feelings on global climate change and how we plan to halt the process. Students from the University of Puerto Rico-Rio Piedras recorded our discussion as part of their documentary on the SEEDS Alaska field trip. Each of us took turns answering questions and describing our passion for ecology, career goals, and thoughts and feelings on global warming. The responses were very different, which illustrates the diversity of backgrounds in the group. One student described how she wants to make a contribution by acting as a voice for her tribe and encouraging other young female Native Americans to become scientists. Another student explained a research project he will conduct this summer studying the development of a largely unknown iguana species in his native Puerto

Rico. Several students agreed on the importance of educating youth and that reducing consumption is crucial to solving our environmental problems. The responses from the graduate students were touching. It was clear that they were very passionate about conservation biology. These ambitious goals make us hopeful for the future. In short, it was very inspiring to talk with a diverse group of students who are also interested in becoming ecologists.

Thursday May 29th, 2008: Nadia Rivera, Carol Thomas, Melissa Scales, Ryan Tisdale

As the exhausted SEEDS students mingled during another breakfast session on a relatively warm Thursday morning, the question of how the science project presentations would unfold prevailed on everyone's mind. After working hard out on the field Tuesday and Wednesday collecting data, Thursday was the day for different groups to organize and analyze this data. Each of the four groups was assigned a specific day's data to present along with their hypotheses and questions regarding the respective data. After breakfast we walked toward a lab classroom on the University of Alaska Fairbanks campus where faculty members of the Natural Science department gave us guidance on how to go about with our challenging task. Time was limited to only two hours to analyze a day's worth of data, put it into graphs, and create a PowerPoint presentation. Each group came together to come up with questions and hypothesis to ask regarding the data. Given our different backgrounds in science, some of us had trouble with how to analyze and present such data. However, the groups received guidance from more experienced professionals. In particular our group received great advice from Teresa and Jamie Hollingsworth, who have had a lot of experience with the effects of fire on Alaskan forests.

Finally, after each group finished going through a session of "science on speed" as described by Jamie, the time to present the project results finally came. The following chart describes each group's hypothesis and their conclusions based on their data analysis.

Group #	Titles	Hypothesis/Main questions	Main conclusions
1	Comparison of natural regeneration of "no-browsed" Spruce inside an enclosure vs. Outside an enclosure	Spruce will have an average height in a non-enclosed environment rather than in an enclosed environment AND the average growth per year will be greater in a non-enclosed environment rather than an enclosed environment	Average height of individuals outside was lower than inside the enclosure AND average age outside is younger AND no difference between growth rates in sites
2	How does fire intensity affect the succession community patterns? Establishing links between the biotic and abiotic factors.	How does fire intensity affect the succession community patterns?	As organic layer increases, Aspen seedling decreases AND significant variance between the three sites on permafrost depth.
3	How significant is the effect of herbivory on the recruitment of <i>Picea glauca</i> ?	Browsing will negatively impact survival and height of <i>Picea glauca</i> saplings.	The enclosure had the greatest <i>P. glauca</i> seedling height; AND germination frequency was greater in the control than the enclosure.
4	Fire severity on functional group diversity and seedling recruitment.	How does fire severity affect growth form percent cover AND how does fire severity affect seedling recruitment?	Mosses appear to regenerate at rapid rate at both the low and high severity sites; sphagnum dominated the unburned control site; AND evergreen shrubs decreased post fire. Deciduous seedlings were more abundant than coniferous in the high severity; AND the low severity site had an unusual abundance of deciduous seedlings

After lunch time we headed toward an Experimental Program to Stimulate Competitive Research (EPSCoR) conference followed by a poster session of UAF students. The conference brought scientists of

distinct disciplines from Alaska's main universities to find ways of collaborating to gain a more holistic understanding on how to approach ecological problems faced in Alaska. The idea of bringing together scientists of distinct fields reflected the importance of collaboration between the different sciences given the complexity of such issues as global climate change. Although we didn't quite understand what was going on during the discussion, we did see the challenge in bringing together people of different backgrounds. Parallels between the SEEDS program and the EPSCOR program could be drawn, as it also brings students of different backgrounds and a common interest in ecologic issues.

Next, the poster session gave us the opportunity to see and interact with the authors of each poster. Viewing the posters gave us opportunity to interact with students in a professional poster session. At the same time we gained knowledge of the interdisciplinary and/or multidisciplinary issues of Alaska. Afterwards we were invited to a nice social dinner and were able to mingle with major researchers in different fields.

Later in the evening, the topic for our ritual discussion session was science ethics. Many of the students shared their ideas on the importance on educating the public about ecology through the use of mainstream media without commercializing science. Brought forth was the argument of intellectual property rights and the need for collaboration of scientists in sharing data. We all agreed on our confusion at the EPSCOR discussion, but realized that this is a reflection of the difficulties many scientific communities often face when trying to work together. Lastly, we also had some time to check out the raw footage of the SEEDS documentary which was shot by the film crew from Puerto Rico. One of the highlights of the footage was Imani going in and out of consciousness during an ecology lecture by one of the visiting professors. As our roaring laughter filled the room, it made many of us realize just how close of a family we have become. Hopefully, moments such as these will bring together more students in the years to come in the ESA SEEDS program.

Friday, May 30th, 2008: Alberto Tornes, Wanda Vargas, Gilda Victorino

As the morning sun invaded our four wall bedrooms we started getting ready for our last journey, a fieldtrip to Howard Luke's Culture Camp, an event that was to be filled with unexpected surprises. We met at 7:30 in the morning with the intention of making it to the cafeteria on time. However, some of us could not resist the temptation of sleeping a couple more minutes after such an intense week. Outside, the day promised to be sunny with clear skies.

Breakfast, as usual, was satisfying and scrumptious. Our silent faces while we savored our filled plates confirmed this assumption. Outside the cafeteria, our loyal friends from Gente Arbol were awaiting us to take a couple of group shots. Enthusiasm and excitement were reflected on these pictures; however, this short moment of flashes and laughter suddenly turned into a sad one as we said our final good-bye's to our film crew friends.

We gathered at the vans still in picture mode as we photographed each other. We boarded the vans to the Tanana River driven by Teresa and Chrissy. To reach Howard Luke's culture camp required a boat ride once again. As the crew loaded the boats into the water half of us relaxed by the shore the others entertained themselves with a much intense simple game of Frisbee. Once the boat drivers were ready for us we put our life vest on and climbed in the boats. Two trips were required to haul the group to Howard's camp.



The boats dropped us off at an unknown location to us where all we saw was a trail started by muddy steps. As hiking through this trail the boreal forest was to the left of us and the Tanana River to the right which made us feel like young explores that had just arrived in a new land. The path lead us to a field, the field lead us to cabins, the cabins lead us to Howard Luke and he opened our minds and transported us to a new culture, to a new land, to a new time.

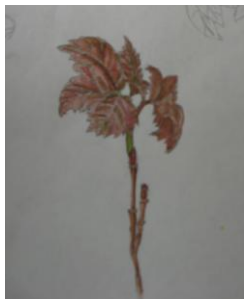
Howard is an Athabascan born in Alaska. He speaks of prayer and education for the young people. He shares his camp with all willing to learn and embrace nature and spirituality. He encourages individual growth and awareness of earth's critical current status. He speaks in stories and 85 years worth of memories. Memories of his uncle warning him of the very problems existing today.

When Howard finished welcoming us we were free to explore his camp, Gaalee'ya Spirit Camp named for the Weasle, the leader of the little elements. His mother's cabin stands in the middle of his field. Further down is a somewhat round cabin that houses his pictures, accomplishments and gifts from others for all to see. Howard was granted an honorary doctorate. Walking within the campsite brought a feeling of embracement from the wilderness. A sense of peace and serenity engulfed us all.

We met La'ona DeWilde, an admirable Athabascan woman, who is a Ph.D. candidate student of Terry Chapin here at University of Alaska Fairbanks (UAF). Her area of concern and research is on the treatment of water. Her knowledge expands to land misuse and contaminants. La'ona was the first woman in Alaska to become a smoke jumper, someone who parachutes into a wild fire and attempts to prevent the fire from spreading further. La'ona was a child that interacted with her natural world who



chose to integrate into the western world. As she led us on a trail, she introduced to us the different trees and their usage such as smoke cooking or pitch pieces used for boat repairs. She showed us the different berries and Labrador tea leaves (bitter to the taste). The path came across a burial site (pot lash) and she shared the custom of a loved one passed and the village's participation for grieving. La'ona taught us a few Athabascan words: "huklani" meaning disrespecting spirit and "anabasee gena" meaning thank you my friend.



Northern Red Currant



*"To either side of me stands
unspeakable beauty,
Stretched as far as the eye can see,
Landscapes so vast and wild,
Stretching for eternity"
Israel "Izzy" DelTorro*

We returned back to the center of camp for lunch, Terry's amazing fiddle playing and then a tale from Howard. Howard spoke of maintaining individuality, respecting mother Earth and her animals, getting educated, tradition, land and the negative use of the "dollar". He warned us to open our eyes to the bad that is accumulating in the earth and how mother earth is warning us. He related these messages through stories of strong community members and family lessons he learned as a child. Howard's main concern was for the young people or as he stated it "his heart goes out to the young people." His goal was to release all his knowledge to them as he made it very clear he did not want to take it with him when he passed on.

When Howard finished his tale and left to tend his garden with other visiting students, half our group went to assist in cutting wood while the other half were doing reflection of the wilderness by capturing nature's beauty through artwork and poetry.

The day concluded with a discussion started by Terry on encompassing the natural world with western science. The students discussed environmental ethics and politics. Student's personal perspective included growing up with environmental issues and its importance and how the western science clashed with their traditions. There was an emphasis in encouraging the young generation to learn both disciplines.

When the wood party returned, another round of Frisbee was tackled and each student just let go into the serenity of the camp as Howard sat in his rocking chair watching us, watching the river, watching this new enlightened generation.

*"A RIVER, A JOURNEY ACROSS IT,
A PATH, A FIELD, A SET OF CABINS,
AN OLD ATHABASCAN, A WISE ATHABASCAN AWAITING FOR HIS YOUNG PEOPLE
STORIES, DREAMS AND HISTORY TAKE OVER MY MIND AND LEAVE ME LOST,
FLOATING IN MID-AIR, EXPERIENCING A NEW CULTURE.
GAALEE'YA SPIRIT CAMP
LET ME ENJOY YOUR WISDOM ONE LAST TIME"
- ALBERTO TORNES*

Evaluation

Students and faculty who participated in the field trip were asked to evaluate various aspects of the trip through a combination of rating (on a scale of 1-7) and free response questions. A summary of the evaluations is presented here. Complete set responses for the rating questions can be found in Appendix F.

Students felt that seeing the work that ecologists do most increased their interest/understanding of ecology. This aspect had the highest average rating of 6.9. The focus on culture and traditions of Alaska was rated at 6.8. The other areas that the students found beneficial were the overview of Bonanza Creek LTER and UAF, meeting and socializing with ecologists and hands-on experience with all three aspects receiving an average rating of 6.7. With an average rating of 5.8, the students found presentations of research being conducted by UAF faculty and students, journal writing and the focus on art to be the least helpful in increasing their interest/understanding of ecology. Student networking and processing and discussion sessions were rated 6.6 and 6.3 respectively. These responses matched with faculty evaluations for the most part. Faculty rated seeing the work that ecologists do with the maximum score of 7.0, when asked which aspects helped increase students' interest/understanding of ecology. The only significant difference was with the importance of journal writing with the faculty score being 6.5, as opposed to the students' rating of 5.8.

Students cited seeing the work that ecologists do, focus on the culture and traditions of Alaska and hands on experience as their response when queried about the single most important aspect of the field trip that helped increase their understanding/interest in ecology. Meeting ecologists and working with them was a good way of seeing and experiencing the challenges of a scientific field. A student commented that taking classroom knowledge and applying it in the field brings a better understanding of the project and the work required to achieve the goal of the project in reference to the hands on experience during field work and student presentations. Meeting with Athabascans and learning the culture and traditions of Alaska inspired students to become teachers to share their knowledge, engage in the contrasts between traditional and scientific views and see the impact of environmental changes in Alaska and how ecology can be used to help indigenous groups.

The students were queried about features of the field trip other than the ones we had listed that helped increase their understanding/interest in ecology. Their responses reflect the array of issues covered in the field trip and also the nuances of the features that we had listed. The responses ranged from being outdoors, visit to the UAF Museum of the North, seeing the importance of interdisciplinary work and research on UAF and other concepts related to the field trip prior to the trip. Other student responses fall under two broad categories - field work and meeting with the ecologists and other students. Field work was considered insightful as it allowed the students to see the extent of the work required and interact closely with experienced graduate students and faculty. The ecologists at Bonanza Creek helped students understand the environmental issues facing Alaska and raised news questions in their minds. According to a student, "the ecologists who participated in the field trip gave a lot of good advice and contributed greatly to discussions." Close interactions with ecologists and other like-minded students also provided students with a venue to discuss their own research. This was also empowering. A student commented that interacting with other students just as passionate about ecology and nature made the student realize that as a generation they could work on solving the most pressing environmental issues.

The faculty participants also had a positive experience. One faculty was very impressed with the level of academic commitment of the students. Another faculty said it was a refreshing experience to be one of the students and participate in each activity as one of them. Unlike regular classes, he waited for the students to gain confidence in him themselves instead of offering to give advice. He believes that this allowed him to transmit his knowledge in a very easy and natural way.

Students were generally satisfied with the planning and logistics of the field trip. Food, transportation, lodging, pre-trip communication and schedule of the trip were rated 6.8, 6.6, 6.6, 6.5 and 6.2 respectively. Faculty rated the logistics of the field trip with near perfect scores. Although some students found the pace to be a little too hectic, it was understood that the duration of the field trip was only five days. Students had some suggestions to improve the field trip. Students wanted the opportunity to experience more of Alaska. They felt that exploring the natural beauty of Alaska through hiking or camping would have put into perspective the beauty of the region and ‘why as ecologists we need to work together to preserve such beautiful places.’ Other suggestions were to further explore and connect the themes of art, culture and science. They wanted to develop creative thinking further. Some students wanted slightly more experienced students or only students with a science background to participate in future field trips. This was possibly in reference to the field work, and the desire of some advanced students to do more sophisticated field work and analysis. Other suggestions related to student body composition were to make the science aspect clearer to non-science students and discussion of participants’ personal backgrounds to gain a better understanding of each other. Another suggestion was to have cultural and social activities at the beginning of the trip rather than towards the end. The faculty had suggestions to improve the field work component of the field trip. They wanted students to have a larger hand in developing the research question and experimental design. One suggested that this could be achieved through forming student groups and communicating possible ideas for experiments with host site researchers prior to the field trip, and refining them once at site.

As a result of the field trip students will most likely contact some of the professionals involved, ‘apply to another SEEDS experience and talk to their friends about the field trip with all three categories receiving an average rating of 6.8. Talking to family was rated 6.6 and giving a presentation at the students’ school 6.1. Unfamiliarity with the Ecological Society was reflected as renewing their ESA membership was rated 6.0, with two respondents not answering the question. To further gauge the effectiveness of the field trip, students were asked to rate their pre-field trip and post-field trip position on various aspects. All of the aspects surveyed showed a positive increase. The awareness of diverse students and professionals involved in ecology showed the most increase with a 2.3 point increase. This was followed by the awareness of diverse students in the field of ecology, and the understanding of what ecologists do with a 1.8 and 1.7 point increase. Owing to a highly prepared group of students, interest in entering graduate school for ecology or a related field and commitment towards a career in ecology showed the least increase with 0.8 and 0.6 point increase respectively.

Acknowledgements

The success and continued growth of the SEEDS program is due to the support of many organizations, foundations, corporations, and individuals. We would like to acknowledge and extend our sincere thanks to the following for their contributions to the SEEDS Alaska Field Trip:

- **All field trip volunteers** who donated their time and expertise to help make this field trip an unforgettable success.

- **Bonanza Creek Long Term Ecological Research Site** for their generous contribution in covering the Salmon Bake dinner on May 27.

- **Ben Meadows** for donating the field research journals used by all of the SEEDS students to record their daily experiences in Alaska.

- **Experimental Program to Stimulate Competitive Research (EPSCoR)** for inviting the SEEDS group to be a part of their discussions and for providing a delicious Alaskan meal to all SEEDS participants.

- **The University of Alaska Fairbanks** for hosting our group.

Appendix B1

List of Participants

Students

Frederick Abbott – University of Puerto Rico Humacao
Imani Bell – Lawson State University
RaeLynn Butler – Haskell Indian Nations University
Sherrita Commey – Florida A&M University
Antonio Cordero – Oregon State University
Israel Del Toro – University of Texas at El Paso
DaVionshe’ Evers – Alcorn State University
Jennafer Hamlin – University of North Carolina Asheville
Pa Houa Lee – University of Wisconsin Eau Claire
Beatriz Otero – University of Puerto Rico Rio Piedras
Elizabeth Quimba – Oregon State University
Edward Realzola – San Houston State University
Nadia Rivera – Occidental College
Melissa Scales – Northern Arizona University
Carol Thomas – University of New York Syracuse
Ryan Tisdale – New College of Florida
Alberto Tornes – Miami Dade Community College
Wanda Vargas – Leeman College City University
Gilda Victorino – University of Texas at El Paso

University of Puerto Rico – Rio Piedras’ SEEDS Chapter (AKKA) Film Crew

Manuel Sanfiorenzo De Orbeta
Colibri Sanfiorenzo-Barnhard
Angel Santiago Diaz
Catherine Vargas Marrero

Faculty Advisors

Joseph Fail – Johnson C. Smith University
Denny Fernandez – University of Puerto Rico Humacao

SEEDS Staff

Jui Shrestha – Ecological Society of America
Erin Vinson – Ecological Society of America

Appendix B2

Field Trip Itinerary

Sunday May 25: arrival

Vans will pick up students from the Fairbanks Airport at the following times: 3:10pm; 7:40pm; 9:30pm; 11:10pm; 12:45am. Student housing is in UAF Bartlett Hall. Students will get their room keys from the front office upon arrival.

Monday May 26: Introduction to Alaska

6:45am Meet in front of Lathrop Hall to walk to breakfast.
7:00 am Breakfast (in UAF Lola Tilly Commons) – bring outdoor gear with you (raincoat, boots, etc)
- SEEDS participants introductions
8:00 am General introduction of people and the week's schedule – Irving I Building, Room 201
- Lecture/discussion: Alaskan ecology and Bonanza Creek LTER (Terry Chapin)
10:00 am Field trip: Alaskan forests (walk to Large Animal Research Station)
12:00 pm Lunch with discussion of wildlife issues in Alaska
1:00 pm Large Animal Research Station (Lindsay Blaine)
2:00 pm Field trip: Alaskan muskegs and wetlands (walk back to campus)
3:00-4:00 pm Kath Dickinson seminar; Irving I, room 201
4:00-5:00pm UAF Museum (the culture and ecology of Alaska)
6:00 pm Dinner
7:00 – 9:00 pm Processing and discussion time
Topic: First thoughts on America's Last Wilderness Frontier

Tuesday May 27

7:00 am Breakfast
8:00 am Vans depart
8:30-5:00 pm Field trip on the Tanana River
(Roger Ruess, Knut Kielland, Jack McFarland, Jamie Hollingsworth, Jason Downing)
Data collection related to riparian succession
Time for reflection and exploration of area
6:00 pm Salmon Bake Dinner – courtesy of Bonanza Creek LTER
Driving tour of downtown Fairbanks with Jamie and Teresa Hollingsworth

Wednesday May 28

7:00 am Breakfast
8:00 am Vans depart
9:30 Tour of Army Corps of Engineer-operated permafrost tunnel
8:30-5:00 pm Field trip to Caribou-Poker Creek
(Teresa Hollingsworth, Terry Chapin, Katie Villano, Emily , Chrissy , Anne Hanley, Kath Dickinson)
- Introduction to Caribou-Poker Creek research site
- Writing reflection (Anne Hanley)
- Data collection on the role of fire in Alaskan ecology
6:00 pm Dinner
7:00 – 9:00pm Processing and discussion time
Topic: Dynamic Perceptions of Global Climate Change (Erin Vinson and Terry Chapin)

Thursday May 29

7:00 am Breakfast
8:00 am Analyze results, prepare presentations
(Terry Chapin, Pat Doak, Diane Wagner, Teresa Hollingsworth, Jamie Hollingsworth, Jason Downing, Kath Dickinson)
11:30-1:00pm Mini-symposium with presentations by the 4 research groups
1:00 pm Lunch

2:00 pm Presentations of science integration plans for social-ecological research (EPSCOR faculty)
3:30 pm Break
4:00-5:30 pm Poster session (by students and faculty) with opportunity for informal discussion
5:30 pm Dinner with EPSCOR Faculty – Courtesy of EPSCOR

Friday May 30

7:00 am Breakfast
8:00 am Vans depart
8:30-5:00 pm Howard Luke's culture camp
(Howard Luke, Laura Henry-Stone, La'ona DeWilde, Terry Chapin, Jamie Hollingsworth, Brian)
- This will be a discussion of Athabascan cultural traditions, a walk in the woods discussing how Athabascan Indians interact with their natural world (for comparison with western science observations of previous field trips). We will be joined by artists and writers who will talk about how they see this same landscape. This will end with discussions by students, scientists, teachers, and writers of what they do, why they do it, and how they got there. This discussion will include SEEDS students, writers/artists, students from an Alaska Native high school, and teachers from Native schools in rural Alaska.
6:00 pm Dinner
7:30-10:30 pm Report writing
10:30 - ? Closing and social time

Saturday May 31: Departure

7:00 am Breakfast
7:30 am Van departs for airport (for 9:10am flights)
1:00 pm Van departs for airport (for 3:00, 3:25, and 3:55 flights)
5:00 pm Van departs for airport (for 6:35pm flights)
All students are on their own after breakfast to do as they wish, but need to meet the vans back at UAF for airport transportation.

Appendix B3

List of Participants from Host Site

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Appendix B4

Wilderness Reflection Samples

[Greens](#) by Israel Del Toro

[Wilderness Reflections](#) by Israel Del Toro

[Reflections](#) by Elizabeth Quimba

[Dialects](#) by Ryan Tisdale

Appendix G

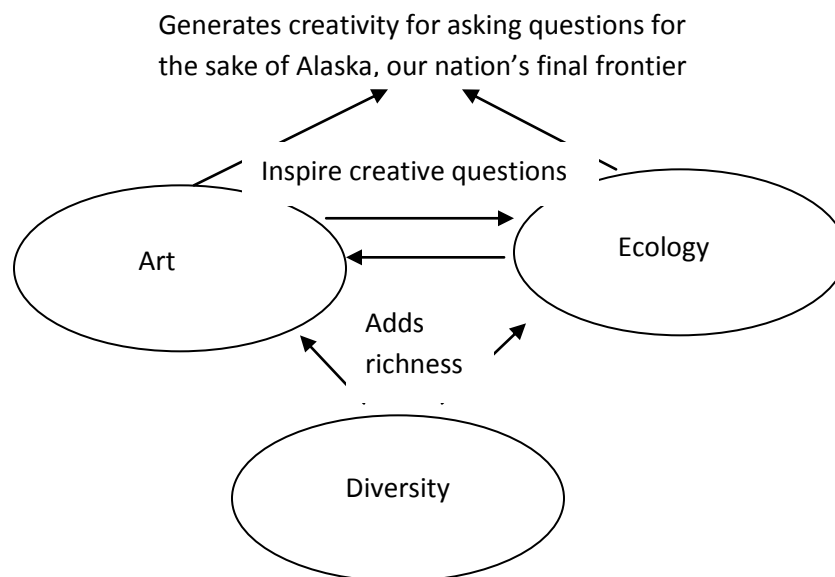
The flow among diversity, ecology, and art: SEEDS Bonanza Creek Field trip 2008- Melissa Armstrong

The Bonanza Creek field trip, more than any of the 12 prior SEEDS field trips, will include an artistic element to broaden and personalize participants' ecology experience. This will be done outwardly by building into the agenda time for wilderness reflection, providing basic art supplies (and encouraging students to bring their own), and involving local artists in the field trip lineup. Art forms of all kinds will be encouraged during the field trip, including visual, photos, writing, music, and performance.

In addition, a film crew of 4 SEEDS Chapter students from UPR Rio Piedras will be filming the field trip and creating three different products: (1) an hour long visual documentary that will be played silently (or to music) during the SEEDS diversity mixer during the ESA Annual Meeting. This piece will include many landscape and group dynamic footage that is intended to evoke emotion as diversity mixer attendees periodically watch it during their conversations. (2) A 20 minute documentary that will be viewed during the SEEDS orientation at the ESA meeting. This documentary will include sound and require viewer's attention. We will receive 15 copies of this documentary for promotional purposes for SEEDS. (3) A short 1-2 minute clip of the field trip that is essentially a trailer for the 20 minute documentary. This will be placed on the SEEDS homepage.

There are two goals in incorporating art into the Bonanza Creek field trip. First, to welcome students completely into ecology. Art will help students connect and identify with their surroundings in a way that is not only scientific, but holistic as it invites students to broadly express the meaning of what they learning. Avenues for artistic thought will reinforce the message that students are wanted for who they are, they belong in SEEDS, they belong in ecology. The second goal is to display student creations during the ESA meeting, at the diversity mixer in an effort to demonstrate to our members the results of whole person learning/welcoming. We hope the diverse displays of art, media, in addition to the solid science results, will further highlight the strength of diverse thought and expression - the mission of SEEDS.

Finally, we are including art (and media) into SEEDS experiences because both art and science are processes which create products, or solutions, but also lead to further questions. Diversity included in these processes naturally adds richness and brilliance. Because this field trip theme is "ecology on the edge", a leap into another realm (art) will help students push themselves further than ever before into asking creative questions about the "edge", the last frontier.



Appendix H

Readings and Handouts

Chapin, F.S., III, A.D. McGuire, R.W. Ruess, M.W. Walker, R. Boone, M. Edwards, B. Finney, L.D. Hinzman, J. B. Jones, G.P. Juday, E.S. Kasischke, K. Kielland, A.H. Lloyd, M.W. Oswood, C.-L. Ping, E. Rexstad, V. Romanovsky, J. Schimel, E. Sparrow, B. Sveinbjornsson, D.W. Valentine, K. Van Cleve, D.L. Verbyla, L.A. Viereck, R.A. Werner, T.L. Wurtz, and J. Yarie. 2006. Summary and synthesis: Past and future changes in the Alaskan boreal forest. Pages 332-338 in F.S. Chapin, III, M. Oswood, K. Van Cleve, L.A. Viereck, and D.L. Verbyla (Eds.) *Alaska's Changing Boreal Forest*. Oxford University Press, New York.

Chapin, F. S., III, S. F. Trainor, O. Huntington, A. L. Lovecraft, E. Zavaleta, D. C. Natcher, A. D. McGuire, J. L. Nelson, L. Ray, M. Calef, N. L. Fresco, H. Huntington, T. S. Rupp, L. DeWilde, and R. L. Naylor. In press. Increasing wildfire in the boreal forest: Causes, consequences, and pathways to potential solutions of a wicked problem. BioScience.

K. van Cleve, F.S. Chapin III, C.T. Dyrness, and L.A. Viereck. "Element Cycling in Taiga Forests: State-Factor Control. A framework for experimental studies of ecosystem processes." BioScience 41.2: 78 – 88.

Taken from Johnstone, Hollingsworth, and Chapin (in press PNW GTR). "Post-fire successional trajectories in interior Alaska. "

"Invasive Plants in a Changing Alaska."

Knut Kielland, Jack McFarland, and Roger Ruess. "Effects of snowshoe hare browsing on spruce recruitment, growth and survival in early successional stands along the Tanana River, interior Alaska."

Appendix I

Student presentations of field work

Group 1: Long Term Ecological Research at Bonanza Creek LTER "Comparison between natural regeneration of "No-Browsed" spruce inside an enclosure vs. outside an enclosure"

- Frederick Abbott, Imani Bell, RaeLynn Butler, Sherrita Commey, Alberto Tornes
- Presentation available [here](#)

Group 2: "How does fire intensity affect the succession community patterns: establishing links between the biotic and abiotic factors"

- Antonio Cordero, Israel Del Toro, DaVionshe' Evers, Jennafer Hamlin, Wanda Vargas,

- Presentation available [here](#)

Group 3: “How significant is the effect of herbivory on the recruitment of *Picea glauca*?”

- Pa Houa Lee, Beatriz Otero, Elizabeth Quimba, Edward Realzola, Gilda Victorino
- Presentation available [here](#)

Group 4: “Fire severity effects on functional group diversity and seedling recruitment”

- Nadia Rivera, Melissa Scales, Carol Thomas, Ryan Tisdale
- Presentation available [here](#)