

Environment and Society 2009 Graduate Research Symposium



Friday, April 17th
8:30 am – 3:20 pm
University Inn 510

About the Symposium

Among the more difficult skills for a new researcher to develop is the ability to convey complex and often unfamiliar ideas to a diverse audience of scholars in the space of a few minutes – in other words, to make the type of presentation that occurs at scientific meetings. Often graduate students make their first such presentation at the thesis defense, when the pressure is greatest and the opportunity to adjust their presentation has largely passed. Today the Department of Environment and Society offers its first Graduate Symposium to provide an opportunity for graduate students to present their ideas to an audience of peers and professors, at a time when they're just beginning to focus on a researchable problem.

We will hear from 14 M.S. and Ph.D. ENVS graduate students who seek degrees in Human Dimensions of Ecosystem Science and Management or Ecology. Each will describe how they propose to undertake the research that will form the basis for their thesis or dissertation. Some students are just beginning to determine how best to tackle their topic of interest. Others may have already started their research process, but still can benefit by further developing their ideas as influenced by the insights of their peers.







The purpose of today's session then, is twofold:








- To offer a chance to practice making a scholarly presentation in a format that reflects how scientific research is commonly presented to other scholars; and
- To provide an opportunity to gain feedback from peers and professors on ways to improve their research approach, tackle a vexing question from another angle, and otherwise improve their future scientific inquiries.


Comments and questions, then, are not only welcome but necessary. Today is a venue for helping each other do the best science we can. The pace of the presentations is rapid: Students have been told to speak for no more than 15 minutes, leaving just four minutes for questions and suggestions. If you have an idea or question and don't get a chance to raise the issue in the time allotted, please take the time to contact the student later – perhaps at the Post-Symposium Social to be held at the Caine Home (691 E. 500 North) today from 4:30-6 p.m.



**ENVIRONMENT AND SOCIETY DEPARTMENT
PRE-PROJECT SYMPOSIUM
College of Natural Resources, Utah State University
UNIVERSITY INN ROOM 510
17 April 2009**

Time		
8:30 am	Coffee/opening social	
8:40	Opening remarks: Mark Brunson	
8:50	PRICE, EMILY (Ph.D candidate) Understanding the combined social and natural effects on the success of an introduced frog in Hawaii.	
9:10	MADSEN, JODIE (M.S. candidate) Exploration of recreation choices and boundaries for Latinos in Cache Valley.	
9:30	ABRAHAM, JEN (M.S. candidate) Identifying and monitoring stormwater non-point source pollution in urban communities: a Kaysville, UT case study.	
9:50	JOHNSON, ROBERT (M.S. candidate) Analysis of the sagebrush steppe ecosystem fire treatment decisions by western rangeland managers: Understanding how rangeland managers obtain and use research-based information in their decision-making processes	
10:10	HOFFMANN, SCOTT (Ph.D candidate) A preliminary investigation of dust production and associated soil and vegetation impacts on the Colorado Plateau.	
10:30	Morning Break/Bagels and juice	
10:50	WELSH, ADRIAN (M.S. candidate) Software for analyzing municipal water data to design water conservation strategies.	

<p>11:10</p>	<p>WHITCOMB, HILARY (M.S. candidate) Climate change, forbs and sage grouse: Range manager and Native American perspectives.</p>	
<p>11:30</p>	<p>WELSH, LISA (Ph.D candidate) Technology, policy, and water governance in the Bear River Basin: Transcending boundaries in conceptualizing water.</p>	
<p>11:50</p>	<p>MILLARD, NATHANIEL (Ph.D candidate) Exploratory research into language and nature connections.</p>	
<p>12:10</p>	<p>LUNCH</p>	
<p>1:30</p>	<p>D'ANTONIO, ASHLEY (M.S. candidate) Recreation resource impacts in the Bear Lake Corridor of Rocky Mountain National Park: An assessment of resource conditions and visitor perceptions.</p>	
<p>1:50</p>	<p>DOWNARD, REBEKAH (M.S. candidate) Keeping wetlands wet: Wetland policies and politics in the Bear River Basin.</p>	
<p>2:10</p>	<p>VAUGHN, DUSTY (M.S. candidate) GIS-based assessment of wilderness within the state of Colorado.</p>	
<p>2:30</p>	<p>LOWRY, JOHN (Ph.D candidate) Urban areas as ecosystems: An assessment of the relationship between tree canopy cover and human dimensions of urban/suburban neighborhoods.</p>	

<p>2:50</p>	<p>FRISK, STACEY (Ph.D candidate) Biocontrol of <i>Tamarix spp</i>: A survey of economic and ecological values in developing of management plans and gaining public support in Southern Utah.</p>	
<p>3:10</p>	<p>Concluding remarks</p>	
<p>4:30 pm</p>	<p>Evening Social, appetizers Caine Home, 691 East 500 North, Logan</p>	

Abstracts

ABRAHAM, J.A. Identifying and monitoring stormwater non-point source pollution in urban communities: a Kaysville, UT case study. M.S. Candidate, Environment and Society. Jen.Abraham@aggiemail.usu.edu. Advisor: M.E. Dietz.

This research builds on the premise that urban areas increase stormwater runoff, and decrease the quality of runoff. These changes result in impacts to aquatic life in local water bodies. Recreational opportunities are also affected due to nuisance algae blooms. The ponds at the Utah Botanical Center (UBC) located in Kaysville, UT, regularly experience algal blooms and suffer from low dissolved oxygen, indicating high concentrations of inflowing pollutants. In Phase I of the Kaysville Stormwater Project, monitoring was implemented at both the inlet and outlet sites of the UBC ponds. In order to assess pollutant loading to the ponds, inflow and outflow volumes were measured, and water quality sampling was performed. Water quality analyses included total nitrogen (TN), total phosphorus (TP) and total suspended solids (TSS). In addition, a survey was mailed to the homeowners in the drainage area with the intention of gaining a baseline understanding of residents' perceptions of stormwater issues, and their lawn care practices that might impact stormwater quality. Results from the weekly monitoring found that the TN, TP and TSS levels were all below respective medians reported for urban areas around the United States. Water quantity measures indicated that 62.5% of the total volume was non-storm flow, and flow volume due to precipitation events was 37.5%. Survey results reported several significant responses. First, 86% of respondents had never received educational materials regarding stormwater. Second, fertilizer is used by 92.3% of respondents and typically more than one application a year. Lastly, 34.6% of respondents used the local water resources for recreation. Based on our baseline knowledge of the Kaysville community, Phase II of the Kaysville Stormwater Project will involve further investigation to identify sources of non-storm flow. In addition, targeted educational materials will be provided to residents who visit the site for a weekly farmers market.

Keywords: stormwater; pollutants

D'ANTONIO, A.L. Recreation resource impacts in the Bear Lake Corridor of Rocky Mountain National Park: An assessment of resource conditions and visitor perceptions. M.S. Candidate, Environment and Society. ashleydantonio@gmail.com. Advisor: C.A. Monz.

I propose to assess the condition and extent of recreation resource impacts in the Bear Lake Corridor of Rocky Mountain National Park. Global positioning system (GPS) technology will be used to map the location of recreation impacts; conditional attributes

such as relative vegetation loss, condition class, and mineral soil loss will also be collected. Photographic sampling methodology will be used to subsample within large areas of dispersed visitor use. Spatial qualities of the recreation resource impacts will be analyzed to better understand the extent and distribution of impacts within the Bear Lake Corridor. In addition to the recreation ecology work, visitor perceptions of recreation impacts will be explored using a self-administered survey. The survey will examine the influence of various visitor characteristics, experience use history, local ecological knowledge, and knowledge of Leave No Trace practices, on visitor perceptions of recreation impacts. Recreation impacts will be stratified by individual resource impacts and individual depreciative behaviors. All dependent variables will be evaluated by rating statements related to recreation impacts on a continuous scale from strongly disagree to strongly agree. To examine the effect of visitor characteristics on visitor perspectives structural equation modeling will be used. In order to relate the biophysical aspects of recreation impacts to the social aspects of recreation impacts, the results from the recreation ecology work and the visitor perceptions work will be combined in a relational analysis of current resource conditions and visitor perceptions of resource impacts.

Keywords: recreation ecology; recreation impacts; visitor perceptions; experience use history; Leave No Trace

DOWNARD, R. Keeping Wetlands Wet: Wetland Policies and Politics in the Bear River Basin. M.S. Candidate, Environment and Society.
Rdownard8@gmail.com. Advisor: J. Endter-Wada.

Water is a critical component of wetlands, yet most policies designed to preserve wetlands protect the land, not the water supply. The Bear River Basin provides an excellent case study of the different means to protect a water supply for wetlands in a heavily allocated river basin. It shows the difficulties and opportunities for securing water for ecological needs and the strengths and weaknesses of wetland policies. This study focuses on three large, federally managed wetland complexes along the. The Bear River Migratory Bird Refuge at the terminus of the river is the most vulnerable to drought and has secured water rights through the prior appropriation laws in Utah. Because certificated water rights don't guarantee the refuge will receive the water it needs they must manage the water they do get very heavily. Farther upstream, the Bear Lake National Wildlife Refuge has no certificated water rights; its water supply is protected by its strategic geographic location between the Bear River and Bear Lake. Farther upstream, Cokeville Meadows National Wildlife Refuge, a new refuge, is just beginning the process of determining their water rights and how they will manage their water. Depending on location, managers have different means for obtaining sufficient water to meet the ecological needs of wetland areas. However, maintaining water for wetlands is constrained by the availability of water in the river and the need to maintain good relationships with neighboring water users. Through open-ended interviews, people involved with wetlands management and water rights along the Bear River are providing information about the water supply issues in wetland areas, ways of dealing with drought, and the local politics involved in protecting wetlands. Interview research is complimented

by archival research focused on reviewing historical documents and water rights records.

Key Words: Wetlands; Bear River; Water Rights

FRISK, S. L. Biocontrol of *Tamarix spp*: a survey of economic and ecological values in developing of management plans and gaining public support in Southern Utah. Ph.D. Candidate, Environment and Society & Ecology Center. stacey.frisk@gmail.com. Advisor: T.L. Sharik.

In the early nineteenth century, eight species of *Tamarix* were transported to North America from home ranges throughout Europe and Asia for use in landscaping and erosion control. Recorded escapes into wildlands were first noted in the 1870's; tamarisk is now recognized as the dominant riparian shrub in the western United States (Glen & Nagler, 2005).

While researchers typically focus on ecological components of invasion, governing mandates for weed control also emphasize economics and human well-being. In the case of tamarisk, economic and ecological justifications for removal appear plentiful. As mechanical removal has proven ineffective and prohibitively expensive, biocontrol has surfaced as a possible solution. With the increased risks posed by wide-scale release of the imported tamarisk defoliating beetle, *Diorhabda elongata*, public support has become increasingly vital.

The framing of any proposed natural resource policy will impact its acceptance by the public, and tamarisk provides a unique opportunity to monitor the strength of responses to various ecological and economic testimonials. Through a series of educational talks and surveys, I intend to measure public receptivity to ecological versus economic justifications for proposed tamarisk biocontrol plans.

Additional work will investigate social reactions to tamarisk removal, including affective and cognitive responses to changing riparian aesthetics caused by tamarisk defoliation. Time lapse photography will be used to determine if responses to highly visible tamarisk mortality varies with ecological knowledge and levels of stakeholder engagement in tamarisk removal.

The final component of this research will explore the role of normative values held by land managers and involved researchers in tamarisk removal, and the relationship between these values and support for intensive biocontrol. Understanding both the agenda and governing values of relevant stakeholders, and likely public responses to proposed management initiatives, will provide a more complete view of the social, economic, and policy context of tamarisk removal.

Keywords: Invasive Species, Biocontrol, Ecological Values

HOFFMANN, S.L. A preliminary investigation of dust production and associated soil and vegetation impacts on the Colorado Plateau. Ph.D Candidate, Department of Environment and Society, Ecology Center, scott.hoffmann@aggiemail.usu.edu. Adviser: Mark W. Brunson.

The increasing amount of unpaved roads and vehicular traffic within the Colorado Plateau system, coupled with the growing popularity of recreational use and the development of roads and trails by OHV enthusiasts, raises many critical questions about the impact that eolian dust generated by these activities has on local ecosystem dynamics. While dust inputs from natural sources on the plateau average 20-40 g/m²/year, vehicle-disturbed surfaces may generate up to 610 g/m²/minute (J. Belnap, personal communication, January 9, 2009). Documented physical effects of dust on plants may include inhibition of photosynthesis, respiration, and transpiration, and physical damage to leaf and shoot structures (Farmer 1993). Dust movement over large spatial areas may create a source-sink relationship within nutrient budgets across varying elevations and landscape types (McTainsh and Strong 2007). Nutrient cycling on the Colorado Plateau is particularly vulnerable to surface disturbance due to relatively high nutrient content in the fine soil fraction, which consists of particle sizes most likely to be affected by sedimentation and wind erosion (Neff et al. 2005). Auerbach et al. (1997) demonstrated many of these effects as strong enough to influence overall plant community structure. Studies examining recreation-erosion-vegetation (REV) relationships are few in number, and the unique characteristics of the Colorado Plateau have never before been the focus of such work. My study will begin to examine the dynamics and the importance of dust within this semi-arid system. Specifically, I will seek to establish and understand linkages with regard to: 1) OHV user behavior and soil impacts such as compaction, sediment production, and wind erosion potential, 2) the resulting generation and transport of dust across spatial and temporal scales, and 3) the influence these processes have on plant community dynamics and transitions.

Keywords: *Soil fertility; Saltation; Recreation impacts; State-and-transition models*

JOHNSON, R.M. Analysis of the Sagebrush Steppe Ecosystem Fire Treatment Decisions by Western Rangeland Managers: Understanding How Rangeland Managers Obtain and Use Research-based Information in their Decision-making Processes. M.S. candidate. Email: rjohnson.providia@gmail.com. Adviser: M.W. Brunson

The frequency and intensity of sagebrush steppe ecosystem wildfires has increased dramatically over the last several decades. Due to wildfires and other factors, sagebrush steppe communities are deteriorating at an alarming rate in the Great Basin. The SageSTEP project is a 5-year study that has a dual purpose. First, to evaluate the sagebrush steppe restoration methods used by rangeland managers in the Western U.S. Second, to disseminate research-based information to rangeland managers to assist them in their decision making processes regarding sagebrush steppe restoration. The outreach

program of the SageSTEP project disseminates information via newsletters, listservs, field guides, fact sheets, guided site tours, a website, and multimedia materials. The purpose of this study is to understand how rangeland managers obtain and use research-based information that informs their decision-making processes. This study will draw on learning theories, social-psychology, and principles of human-computer interaction to provide a framework for analysis. This study will employ a mixed methods approach that will incorporate qualitative interviews with rangeland managers along with quantitative survey data. It is anticipated that the results from this study will identify which aspects of the SageSTEP outreach program are being utilized by rangeland managers and which areas of outreach could benefit from modification.

Keywords: wildfires, sagebrush steppe, SageSTEP, Great Basin, rangeland managers, decision-making processes, outreach program.

LOWRY, J. H. Urban Areas as Ecosystems: An Assessment of the Relationship between Tree Canopy Cover and Human Dimensions of Urban/Suburban Neighborhoods. Ph.D. Candidate, Department of Environment and Society. Email: john.lowry@usu.edu. Advisors: D. Ramsey, R. Toth, C. Radel, M. Hooten, M. Baker.

Urban foresters and planners have long recognized the value of trees in urban areas. In addition to their aesthetic benefits, urban trees offer ecosystem services that contribute to the well-being of humans and the sustainability of cities. Over the last ten years scholars have been working toward building a unifying theory of urban ecology. One goal of this project is to examine the hypothesis that the presence and abundance of trees in urban/suburban areas is related to social, economic, and demographic characteristics of human populations. Another goal is to provide planners, involved in tree-planting campaigns, with information that will help them more effectively target demographic segments of the human population, and prepare for the long-term results of tree-planting in urban areas.

I present preliminary data analysis of the relationship between urban tree canopy cover and human dimensions of urban and suburban neighborhoods in Salt Lake County. Tree canopy cover data are obtained from the USGS National Land Cover Database, and human dimensions data are obtained from the Potential Rating Index for Zipcode Markets (PRIZM) database produced by Claritas, Inc. I use GIS to prepare the response and predictor variables, and analyze the statistical relationship of these variables using a Spatial Regression Model (SRM). The second part of the research aims to spatially model tree canopy cover based on the SRM. I propose to both hind-cast and fore-cast the spatial distribution of urban tree canopy in Salt Lake County. Many urban tree-planting campaigns have goals of attaining a certain percent tree canopy cover for a given metropolitan area. This part of the research addresses the question: "how much urban tree canopy cover can we expect for Salt Lake County and how might it affect water consumption?" This will be accomplished through scenario-building using spatial models within a GIS.

Keywords: Urban ecosystems; Urban tree canopy; Demographics; Urban planning; GIS; Spatial-statistical modeling.

MADSEN, J. Exploration of recreation choices and boundaries for Latinos in Cache Valley. M.S. Candidate, Environment and Society.
jodie.madsen@aggiemail.usu.edu. Advisor: C. Radel.

I intend to investigate the “geography of recreation” among the Latino population in Cache Valley, Utah. A spatial emphasis will be applied while examining activities in which Latinos engage for recreation, free time, and leisure. Of special interest is identifying boundaries and barriers to some areas of recreation, most commonly traditional outdoor recreation sites. I will employ qualitative interviews and participant mapping to collect information about where Latino participants choose to recreate, where they would like to but don’t, and where they don’t want to and why. Using this information, an attempt to identify common barriers and boundaries to recreation sites will lead to a discussion about potential implications for recreation managers.

Keywords: Latino, recreation, geography, boundaries

MILLARD, N. M. Exploratory research into language and nature connections. Ph.D. Student, Environment and Society. nathanielmilesmillard@gmail.com
Advisor: Dr. Burr, S.W.

Following a Grounded Theory approach, I am conducting exploratory research into the connection between language, experiences in nature, environmental attitudes, and civic engagement.

In my studies into sustainability, civic engagement, and education, I came to realize how important community is to communication, to moral development, and to fostering a land ethic. We are, literally as well as figuratively, made from the community in which we live. The early experiences we had, the food we ate, and the people with whom we conversed, helped our bodies and minds to develop. With this in mind, I decided to go back home after a very long time away to do my research.

Using semi-structured interviews, I am contacting life-long residents of the Central Coast of California, having them take the New Ecological Paradigm (NEP) scale, and then asking them a few other open-ended questions about early experiences in nature. I am also surveying local high school seniors and juniors. They will take the NEP and then answer, in writing, a list of short, open-ended questions about experiences in nature and community involvement.

While looking for early experiences that appear statistically linked to higher environmental attitudes and civic engagement, I am developing curriculum for a local non-profit to provide and implement those experiences for young children. Along with

curriculum development, I am looking at connotative and denotative uses of words, looking at symbolic interactionism, and searching for connections between language use and moral development. Through interviews and archival work, this project will work with the local historical society to develop an environmental history of the bioregion.

There are four major end goals for this project. I will publish the research and data in a scholarly journal; I will publish a creative non-fiction piece in a literary journal for a broader audience; I will develop curricular outcomes inductively pulled from the research data; and lastly, I will develop hypotheses for further research in this area.

Keywords: Exploratory Research, Eco-linguistics, Language/Nature, Communication

PRICE, E.A. Understanding the combined social and natural effects on the success of an introduced frog in Hawaii. Ph.D. Candidate, Environment and Society and the Ecology Center. emily.price@usu.edu. Advisors: M.W. Brunson and K.H. Beard.

Since the introduction of the coqui frog (*Eleutherodactylus coqui*) to the Hawaiian Islands in the late 1980s its range has increased as a result of both intentional and unintentional human behaviors. Horticultural trade, human transport, and other anthropogenic impacts, such as disturbance, could aid in the spread of this invasive frog, but the role of each is presently unknown. This past summer (2008), I interviewed 87 property owners and 1 director of landscaping on the Island of Hawaii and collected a variety of ecological data (coqui density, vegetation cover, understory density, flying and leaf litter insect counts, canopy cover, and frog dB level). Building off of this initial research I propose to conduct a large mail survey across the four main islands of Hawaii (Hawaii, Maui, Kauai, and Oahu). Using Dillman's four-wave tailored design, I will send mail surveys to 4,000 potential participants across the islands of interest. Questions about attitudes, beliefs, knowledge, and behavior related to the coqui frog will be selected and written based on themes I uncovered in my semi-structured interviews this past summer. Question selection and design will further be guided in part by Ajzen's recommendations for surveys based on the Theory of Planned Behavior. The purpose of this mail survey is to determine if there is a link between attitudes, knowledge, social norms, demographic variables, and behavioral intention related to management towards the coqui frog. Results from this study will be used to guide the future development of a predictive model of coqui spread and may be useful in developing education programs on coqui management and control.

Keywords: *Eleutherodactylus coqui*, Theory of Planned Behavior, Invasive species, Coupled system, Management

VAUGHN, G.D. GIS-based assessment of wilderness within the state of Colorado. M.S. Candidate, Recreation Resource Management, dusty.vaughn@aggiemail.usu.edu. Advisor: C. Monz.

I propose to assess 36 Wilderness Areas located within the state of Colorado using a geographic information system (GIS) based approach. This project will model the wilderness continuum for the state of Colorado using GIS and multi-criteria evaluation techniques. An accessibility model will also be developed for each wilderness that integrates Dijkstra's Shortest Path Algorithm with Naismith's Rule. These models will be used to evaluate the 7 maps produced below.

This is part of a larger project that will utilize existing data to produce 7 maps that will help inform land managers of the conditions of the areas as well as identify data gaps. The 7 maps that will be produced will be developed are: 1) recreation opportunity spectrum (ROS) classification spectrum; 2) identification of areas exceeding standards; 3) campsite locations and conditions inventory; 4) visitor use levels, 5) a use-pressure map (accessibility and "magnet" areas); 6) recommended wilderness/roadless areas for designation; 7) air quality airsheds (class 1 and 2).

Keywords: geographic information systems, wilderness, accessibility, Naismith's Rule, Dijkstra's Shortest Path Algorithm, Colorado

WELSH, A.P. Software for analyzing municipal water data to design water conservation strategies. M.S. Candidate, Environment and Society. Adrian.welsh@usu.edu. Advisor: J. Endter-Wada.

Planning for drought and growth-induced water scarcity is a challenge confronting municipal water departments. When water shortages occur, demand management policies and programs are often implemented to encourage water conservation. Due to the public nature of water resources and municipal water delivery systems, cities are particularly concerned about meeting citizens' basic water needs. A city can easily review water billing records to see how much water people use, but how do they know how much water people need? Standards and guidelines have been established for indoor water use (gallons/person/day). The amount of water needed to irrigate outdoor landscapes is more variable, highly contextualized, and harder to determine. This project develops a custom software application that allows water billing data to be integrated with GIS and various other types of municipal databases. Because of the GIS data, a strong spatial component allows for use of parcel, structure, land cover, slope, and soils data. The output shows how actual landscape water use compares with estimated landscape water need, which is used to determine capacity to conserve outdoor water. The software can display spatial patterns and help analyze factors contributing to water use variation. This project will help cities design water conservation programs with the greatest potential for savings.

Keywords: water conservation; software development; drought management; water billing data analysis; GIS technologies; landscape irrigation

WELSH, L.W. Technology, Policy, and Water Governance in the Bear River Basin: Transcending Boundaries in Conceptualizing Water. Ph.D. Candidate, Environment and Society. lisa03@gmail.com. Advisor: J. Endter-Wada.

Water sustainability has become part of a large global concern as many people realize the extent of the growing world water deficit. As the world faces climate change, population growth, and urbanization, it is anticipated that the problem of water scarcity will only get worse. Further complicating the issue, water is a difficult resource to manage because humans are intimately connected with water in a multitude of ways. In the Bear River Basin, a watershed located in the juncture of Utah, Wyoming, and Idaho, water managers, scientists, and other stakeholders must manage water for multiple uses, often in times of drought. Various users are embedded in different geographical locations within the Basin that influence their adaptations to variable and scarce water supplies. Users below Bear Lake are able to rely on Bear Lake storage water for drought relief, while users above Bear Lake remain more vulnerable to water scarcity and variability. Predictive models and accounting stream models have been developed, providing information on how much water is available, who is using the water, and when the water is being used. The models have allowed greater efficiency of water use, but the result of this increased efficiency has not always been beneficial to environmental entities like the Bear River Migratory Bird Refuge. In addition, the Basin is undergoing rapid growth, leading to the reallocation of water as land is converted to municipal use from agricultural use. These elements of the Bear River Basin present a dynamic context in which to analyze barriers to and opportunities for the production and dissemination of knowledge and technologies and the potential for adaptive water governance. I propose to utilize interviews and document analysis to examine stakeholder perspectives about water management, sustainable development, and the role of science and technology in decision-making.

Keywords: Drought Management; Water Policy; Human Hydrology; Adaptive Capacity; Conflict Management; Watershed Governance.

WHITCOMB, H.L. Climate change, Forbs and Sage Grouse: Range manager and Native American perspectives. M.S. Candidate, Environment and Society and the Ecology Center. hilarylouise@gmail.com. Advisor: M.W. Brunson.

Will climate change affect ecologically, ethnobotanically and sage grouse significant rangeland plants? What are the current range manager and Native American perspectives? My research will be a three part study: 1. I propose to examine the effects of increased temperature on two specific indigenous forbs that are important to sage grouse and Native Americans. 2. I propose to examine the same results on two invasive forbs that threaten to displace the native forbs and disrupt community structure and ecology. 3. Finally, I intend to evaluate the rangeland manager and Native American

perspectives on climate change and the forb community in sage steppe. Temperature effects will be determined using a factorial design with four species crossed with two temperature treatments (control vs. elevated) resulting in eight treatment combinations. Each treatment will be replicated ten times. To increase temperature, in the field, passive warming open-top-chambers (OTC) constructed from Sun-LiteHP (0.10cm thick) fiberglass for solar applications will be set up. The focus plants are: *Sphaeralcea munroana* (Munro's Globemallow), *Crepis acuminata* (Tapertip Hawksbeard), *Erodium cicutarium* (Storksbill) and *Lactuca serriola* (Prickly Lettuce). Perspectives will be determined by semi-structured interviews of rangeland managers and Native American plant gatherers in the Great Basin and an interview protocol will be developed. Many of these questions have previously not been addressed in Utah. The interview and ecological information gathered will be used to predict implications of study findings and provide baseline information for potential future studies.

Keywords: Climate Change, Ethnobotany, Sage Grouse, Native, Invasive, Forb

ENVS Graduate Research Symposium Schedule

8:30 Opening Social/Coffee and tea

8:40 Opening remarks

Session 1 (moderator: Ashley D'Antonio)

8:50 PRICE, EMILY Understanding the combined social and natural effects on the success of an introduced frog in Hawaii.

9:10 MADSEN, JODIE Exploration of recreation choices and boundaries for Latinos in Cache Valley.

9:30 ABRAHAM, JEN Identifying and monitoring stormwater non-point source pollution in urban communities: a Kaysville, UT case study.

9:50 JOHNSON, ROBERT Analysis of the sagebrush steppe ecosystem fire treatment decisions by western rangeland managers

10:10 HOFFMANN, SCOTT A preliminary investigation of dust production and associated soil and vegetation impacts on the Colorado Plateau.

10:30 Morning Break/Bagels and juice

Session 2: (moderator: Emily Price)

10:50 WELSH, ADRIAN Software for analyzing municipal water data to design water conservation strategies.

11:10 WHITCOMB, HILARY Climate change, forbs and sage grouse: Range manager and Native American perspectives.

11:30 WELSH, LISA Technology, policy, and water governance in the Bear River Basin: Transcending boundaries in conceptualizing water.

11:50 MILLARD, NATHANIEL Exploratory research into language and nature connections.

12:10 LUNCH (on your own)

Session 3: (moderator: Hilary Whitcomb)

1:30 D'ANTONIO, ASHLEY Recreation resource impacts in the Bear Lake Corridor of Rocky Mountain National Park

1:50 DOWNARD, REBEKAH Keeping wetlands wet: Wetland policies and politics in the Bear River Basin.

2:10 VAUGHN, DUSTY GIS-based assessment of wilderness within the state of Colorado.

2:30 LOWRY, JOHN Urban areas as ecosystems: An assessment of the relationship between tree canopy cover and human dimensions of urban/suburban neighborhoods.

2:50 FRISK, STACEY Biocontrol of Tamarix spp: A survey of economic and ecological values in developing of management plans and gaining public support in Southern Utah.

4:30 Evening Social, Caine House, 691 E 500 N, Logan, UT