



4th Annual

Symposium on Integrative Conservation

presented by graduate students of the

Integrative Conservation Ph.D. Program

at the

University of Georgia

Coverdell Center

January 27, 2017

ICON Integrative Conservation
PhD Program TRAINING AGILE SCIENTISTS TO ADDRESS
21st CENTURY SOCIO-ECOLOGICAL CHALLENGES

Symposium on Integrative Conservation

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Welcome to the 4th Annual Symposium on Integrative Conservation (SIC). SIC is organized and hosted by the graduate students of the Integrative Conservation (ICON) Ph.D. program at the University of Georgia (UGA). A central goal of SIC is to cultivate connections and conversations among ICON students scattered across campus in multiple departments and to promote the continued cross-disciplinary engagement of students throughout their tenure in the program. An equally important objective of SIC is to facilitate dialogue about complex environmental issues within the broader academic community at UGA. The inspiration for the creation of SIC rests in the ICON Program itself, which seeks to train future scholars to work with a diversity of researchers and practitioners on pressing social and environmental challenges. Such collaboration necessitates engaging with the insights, perspectives, and methodologies of multiple disciplines as part of the educational experience. SIC is intended to enhance these aspects of the ICON Ph.D. program by providing a space for the exchange of ideas between students and faculty interested in integrative research and practice.

For today's symposium, there are two morning sessions and two afternoon sessions, with the keynote speaker between them. Our keynote speaker is Dr. Mara Goldman, Professor of Geography from the University of Colorado at Boulder.

Over the course of the day, we will hear from 14 presenters, all students of the ICON Ph.D. Program, which is now in its sixth year. The presentation topics range from climate change implications, to management decisions and specific species studies within a social context. Likewise, it will be a geographically diverse journey covering Mexico, Georgia, Kenya, Costa Rica, Haiti, and Bhutan. We appreciate your attendance and we hope you find SIC to be an intellectually stimulating and exciting experience. Further information about the ICON Program can be found at <http://icon.uga.edu> and don't forget to follow the symposium on Twitter (#SIC2017)!

*Thank you to Mariana B. Alfonso Fragomeni for the cover graphic.

Morning Schedule

8:00AM – 8:25AM	Greeting & Coffee	Coverdell Rotunda
8:25AM – 8:30AM	Opening and welcome to SIC by Nik Heynen	Coverdell S175
8:30AM – 8:45AM	Introduction	Coverdell S175
8:45AM – 10:05AM	Session I	Coverdell S175
8:45 – 9:00	Trying something new: an ecologist's first foray into participatory mapping <i>Jillian Howard</i>	
9:00 – 9:15	Bats, Agaves, and People: An Interdisciplinary Approach to Assessing Potential "Bat-friendly" Agave Management by Mexican Communities <i>Kristen Lear</i>	
9:15 – 9:30	An Interdisciplinary Framework for Understanding Shared Lodging's Impacts on Communities <i>Emily Ayscue</i>	
9:30 – 9:45	Planning for Urban Biodiversity Conservation in Atlanta <i>Ashley Block, Michelle Evans, Suraj Upadhaya, David Hecht, Sameera Talati Gujarathi, and Hanna Morris</i>	
9:45 – 9:55	Land use change in the Grijalva-Usumacinta Watershed, Mexico: the expansion of oil palm plantations, their socio-economical influences and their impacts on aquatic ecosystems <i>Keysa Rosas</i>	
9:55 – 10:05	Conservation of Place Through Iconic Species <i>Sarah Horsley</i>	
10:05AM – 10:20AM	Coffee Break	Coverdell Rotunda
10:20AM – 11:15AM	Session II	Coverdell S175
10:20-10:35	A Kingdom of Deities: Spiritual Landscapes, Avian Conservation, and Collaborative Mapping in Bhutan <i>David Hecht</i>	
10:35-10:50	Insights from Two Endangered Species Act Petition Case-studies in the Era of "Mega-petitions" <i>Adam Clause</i>	
10:50-11:05	Urban Climate Planning: A Coproduced Methodological Approach to Integrate Land-Use Planning Practices and Human Bioclimatology in Savannah, GA <i>Mariana B. Alfonso Fragomeni</i>	

11:05-11:15 The Relationship of Docks, Salt Marsh Conservation, and Property Rights
Jeffrey Beauvais

11:15AM – 11:30AM Coffee Break

11:30AM – 12:30PM Keynote Speaker

Coverdell S175

Conservation Border Crossings: Tending to differences within and beyond the Academy

Dr. Mara Goldman, Associate Professor Department of Geography, University of Colorado at Boulder

Afternoon Schedule

12:30PM – 2:15PM Lunch catered by Einstein Bagels

Coverdell Rotunda

2:15PM – 3:10PM Session III

Coverdell S175

2:15 – 2:30 “Integrative” Analysis of Interrelated Herding Livelihoods and Landscape-level Vegetation Changes in Laikipia, Kenya
Ryan Unks

2:30 – 2:45 Integrating Spatial Methods to Inform Avian Conservation in Costa Rica
Cody Cox

2:45-3:00 NGOs, Communities, and Environments: An analysis of social-ecological interaction and heterogeneity in two Haitian towns
John Ryan McGreevy

3:00-3:10 Why Expansion in the Demand for Blueberries is Responsible for Deforestation in Southern Georgia? Understanding through an Integrative Approach.
Suraj Upadhaya

3:10PM-3:30PM Coffee Break

Coverdell Rotunda

3:30PM-4:15PM Session IV

Coverdell S175

Prospective Student Q&A session

4:15PM – 5:00PM ICON Student Awards

Coverdell S175

5:00PM – 7:00PM Reception

Coverdell Rotunda

ABSTRACTS

Session I

8:45AM – 10:05AM

Trying something new: an ecologist's first foray into participatory mapping

Jillian S. Howard

Warnell School of Forestry and Natural Resources, University of Georgia

The ICON program requires students to work across disciplines and engage with methods that may be unfamiliar. As an ecologist trying to understand how people value land in my study region, I began a participatory mapping study as a near novice to social science research. Consequently, 2016 has been a year of learning by experience, with many pitfalls and some small successes. I hope that sharing what I've learned may help other ICON students from a similar background as they plan their own research.

Bats, Agaves, and People: An Interdisciplinary Approach to Assessing Potential “Bat-friendly” Agave Management by Mexican Communities

Kristen M. Lear¹, Jeffrey Hepinstall-Cymerman¹, Elizabeth G. King^{1,2}, Laura German³, Clint Moore¹, Meredith Welch-Devine³, and Jose Juan Flores Maldonado⁴

¹*Warnell School of Forestry and Natural Resources, University of Georgia, Athens, USA;* ²*Odum School of Ecology, University of Georgia;* ³*Department of Anthropology, University of Georgia;* ⁴*Especies, Sociedad y Habitat, A.C., Monterrey, Mexico*

In northeast Mexico, agaves (*Agave spp.*) are harvested from the wild and cultivated for the sale of market products and for other cultural uses by local communities. However, current use of agaves may be contributing to the declines of the endangered Mexican long-nosed bat (*Leptonycteris nivalis*), which relies on the nectar of agaves in the northern portion of its migratory range. “Bat-friendly” agave management, such as allowing some agaves to flower or replanting wild agaves, can potentially be encouraged within local communities to help conserve the species. This research integrates ecological and social science methods to understand where and how “bat-friendly” management practices could be implemented. The specific objectives are to: 1) examine the factors that influence foraging behavior of *L. nivalis* at agaves and create statistical models that can be used to identify target areas for “bat-friendly” agave management and 2) assess the current management and harvest of agaves by local communities and the factors that may influence adoption of “bat-friendly” practices. I completed a pilot study in summer 2016. I monitored bat feeding activity at flowering agaves with infrared cameras, conducted key informant interviews with community leaders and agave program managers, and trialed a household survey with agave harvesters to understand current management practices, rules governing agave harvest, and ecological knowledge of bats and agaves. Results from this pilot study and future directions for the research will be presented. Ultimately, the goal of this research is to inform conservation efforts for the endangered Mexican long-nosed bat.

An Interdisciplinary Framework for Understanding Shared Lodging's Impacts on Communities

Emily Ayscue

Warnell School of Forestry and Natural Resources, University of Georgia

By combining a landscape approach and an ecological systems theory, we can better understand the positive and negative social impacts of neighborhoods being offered up for touristic consumption through shared lodging sites like Airbnb. Through this integrated framework, it is proposed that the true complexity of shared lodging and its implications for sustainable tourism and community development will be better understood than using siloed theoretical perspectives. With the recent growth in shared lodging, tourism landscapes at many scales are being forced to react to the presence of shared lodging. Tourism and residential landscapes currently both face issues such as losses in lodging tax revenue through shared lodging ability to circumvent bed taxes and gentrification of urban neighborhoods. Contextualizing the impacts of shared lodging through an integrated landscape approach creates a more relevant view of impacts on the community as a whole.

Landscapes are unpredictable and dynamic, thereby requiring a certain level of resilience and adaptation to ensure landscape viability. Similar characteristics are described within the ecological systems (ES) framework. A cyclical framework of tourism destination development has been proposed (Butler 1980), but does not account for disturbances in the cycle making the integration of a tourism destination life cycle and an ecological systems approach appropriate to understanding the impacts of shared lodging on the tourism-residential landscape. Understanding the context and extent of these social impacts allows us to move forward in converting this challenge into an opportunity for innovation.

Planning for Urban Biodiversity Conservation in Atlanta

Ashley Block¹, Michelle Evans², Suraj Upadhaya³, David Hecht¹, Sameera Talati Gujarathi², and Hannah Morris³

¹*Department of Anthropology, University of Georgia;* ²*Odum School of Ecology, University of Georgia;*

³*Warnell School of Forestry and Natural Resources, University of Georgia*

Biodiversity conservation is a growing concern for scientists and practitioners who work in urban environments. Planning for biodiversity conservation presents unique challenges in these urban spaces, where a complex mosaic of built and natural environments, social dynamics, and trade-offs must be navigated in order to allocate conservation resources. Here, we discuss the process and results of one effort to identify areas with a high potential for biodiversity in Atlanta, Georgia. We used various factors of the urban landscape, such as the type of land cover, population density, and the presence of desired plant and animal species to create a model that will produce an index/map of biodiversity potential for the greater Atlanta metro area. Our goal was to use an integrative approach to understanding what constitutes biodiversity potential, and our methods have allowed us to create various scenarios/maps that reflect different valuations of the factors included in the model. We address how the scenarios/maps that our model produces can be used to help practitioners make decisions as to how to allocate limited resources to biodiversity conservation. Finally, we discuss the advantages and limitations of our approach, as well as the process of working as an interdisciplinary team and in collaboration with The Nature Conservancy.

Land Use Change in the Grijalva-Usumacinta Watershed, Mexico: The Expansion of Oil Palm Plantations, Their Socio-economical Influences and Their Impacts on Aquatic Ecosystems.

Keysa G. Rosas and Krista Capps
Odum School of Ecology, University of Georgia

Over the last several decades, land conversion to palm oil production has been increasing throughout the globe due to increasing demand for palm oil as a renewable form of energy and as an additive to food and personal care products. From an ecological perspective, palm oil plantations, pose a threat to the integrity of ecosystems and have been linked to native species displacement, nutrient pollution, and habitat degradation. This is especially troubling as areas that are suitable for palm oil conversion, are also frequently tropical regions of high native biodiversity. The decision to convert land to palm oil production is dependent upon socio-political and economic factors. Therefore, in order to predict future regions and rates of land conversion and to quantify the impact of palm oil plantations on the structure and function of ecosystems, an interdisciplinary approach is needed. Land Use Change Science has emerged as an approach to understand the causes and consequences of land use and land cover changes worldwide by integrating social, natural and geographical information science. Using this approach, I propose to examine the historical and socio-economical context that has led to the expansion of palm oil plantations in the Grijalva-Usumacinta watershed, located in the Peten Region of Guatemala and in Chiapas and Tabasco, Mexico. Secondly, I will apply observational and experimental approaches to quantify some of the ecological impacts of land conversion on freshwater systems, and I will employ modeling approaches to predict how the structure and function of the watershed will change through time.

Conservation of Place Through Iconic Species

Sarah Horsley
Warnell School of Forestry and Natural Resources, University of Georgia

With many environmental conservation groups and agencies adopting “place-based” management strategies, understanding the physical and social features that shape perceptions of place is important. Previous research has identified symbolic meanings of environmental features as an influential mediator in the relationship between the physical environment and our attachments to it. Iconic species are one element of place that is described by ecological qualities, such as endemism, and cultural factors, such as symbolism or use. However, the role that iconic species have in the formation of place attachments is not known. I am interested in how the attachments and symbolic meanings associated with one iconic species, sea turtles, can influence place attachment to certain barrier islands of Georgia. Understanding this relationship may provide insight on the success of species-specific conservation campaigns, especially with management objectives of maintaining a sense of place. I hope to use Structured Equation Modeling with both quantitative and qualitative survey data to understand what kinds of meanings and levels of attachments to sea turtles may explain place attachment. I would also like to examine the role that species-specific conservation efforts, such as beach lighting restrictions or hatchling release experiences, may play in island residents’ and tourists’ place-making experiences. If environmental management actions can influence the physical features that form the foundation of a place, then it is important to understand how decisions affecting iconic species could influence sense of place through experiences and associated meanings regarding those species.

Session II

10:20AM-11:15AM

A Kingdom of Deities: Spiritual Landscapes, Avian Conservation, and Collaborative Mapping in Bhutan

David Hecht and Pete Brosius
Department of Anthropology, University of Georgia

As environmental conservation scientists increasingly address human beliefs and values, greater attention is being given to spiritual landscapes and sacred sites¹. In the Vajrayana Buddhist kingdom of Bhutan, the omnipresence of sacred sites and beliefs in local deity realms have led select conservation organizations to create programs that consider ways to align beliefs in sacred sites with traditional goals of environmental conservation². Many prominent conservation projects include avian conservation priorities, particularly for spiritually revered avian species like the Black-necked crane, at a time when institutional interest in spatial mapping tools (GIS) for monitoring species movement and home range estimations are rapidly growing. While attempts to align conservation priorities with beliefs in sacred sites are common in the E. Himalayas, there has no research investigating how local conceptualizations of sacred/deity “space” influence and interact with institutional prioritizations of conservation “space” through the proxy of emerging spatial technologies in Bhutan. In my research, I will investigate how politically inscribed and institutionally reinforced avian conservation “space”, interacts, relates to, and influences spiritually inscribed deity “space”, and vice versa, through the lens of prominent conservation research on two avian species. This project will highlight ways in which integrative research can be institutionally valuable and intentionally inclusive of multiple stakeholders, while remaining academically and theoretically rigorous.

Insights from Two Endangered Species Act Petition Case-studies in the Era of “Mega-petitions”

Adam G. Clause¹, Laura Cunningham², Kevin Emmerich², Robert W. Hansen³
¹*Warnell School of Forestry and Natural Resources, University of Georgia*; ²*Basin and Range Watch*;
³*Herpetological Review*

The federal Endangered Species Act (ESA) is one of the premier elements of environmental legislation in the United States. However, the process for listing additional taxa under the ESA is fraught with challenges. One such challenge is the increasing frequency of “mega-petitions” composed of dozens or hundreds of conglomerated species petitions. These petitions are rarely vetted by species experts, are prone to deficient or misleading scientific content, and contribute to a flooding the listing pipeline. Here, we offer examples of these issues using the Panamint alligator lizard *Elgaria panamintina* and Inyo Mountains salamander *Batrachoseps campi* as case studies. These co-distributed California endemics are presently under status review by the US Fish and Wildlife Service for possible ESA listing. A detailed literature review and threat analysis shows that the original mega-petition for these species did not reflect the best available science. Despite statements to the contrary by the petition authors, there is no evidence of population declines or extirpations in either species. Furthermore, they are known solely from remote and generally undisturbed federal lands. Only climate change and water withdrawals are substantial threats to these species, but even this remains speculative. Ultimately, such poorly justified petitions indicate a failing of the current petition landscape, which is largely driven by non-governmental organizations rather than species experts. We strongly suggest the need for increased collaboration

between scientific authorities and petitioners to limit such problems, thereby increasing positive outcomes for species that truly warrant ESA protection.

Urban Climate Planning: A Collaborative Methodological Approach to Integrate Land-Use Planning Practices and Human Bioclimatology in Savannah, GA

Mariana B. Alfonso Fragomeni
Department of Geography, University of Georgia

The challenges in applying urban climatology in city planning go beyond a disciplinary knowledge gap. Issues such as public health, quality of life and social vulnerability relate directly to climate and challenge planners to create long-term plans that could mitigate the effects of urban climate interactions. This project is based on the premise that struggles in the incorporation of urban climatology, as a component of plans at a city scale, are related to methodology and practice. It focuses on the city of Savannah, Georgia. A coastal city that has narrowly addressed urban climatology in land-use planning by focusing on flooding and sea level rise. To intersect both disciplines, this project proposes the incorporation of bioclimatology, the study of human perceptions of climate. On the other hand, to overcome differences in practice this project proposes to coproduce a methodology, by working collaboratively with practitioners. The invited participants will represent governmental institutions focused on climate, planning or heat health. This approach allows the research to engage with practice and actively experience the barriers for incorporating urban climatology. It seeks to expand upon planning practices by creating a replicable, yet non-generalizable methodology to addressing climatic impacts to human health and well-being.

The Relationship of Docks, Salt Marsh Conservation, and Property Rights

Jeffrey Beauvais and Jeb Byers
Odum School of Ecology, University of Georgia

Coastal populations of Georgia and South Carolina are rapidly growing, popular tourist destinations, and a sharp increase in the number of docks has accompanied this growth. Docks have been shown to reduce stem density of nearby *Spartina alterniflora* through shading effects, however, little research has been done to test the ecological effects of docks on other organisms or abiotic components of salt marsh ecosystems. Through their influence on vegetation, docks may influence soil dynamics, nutrient cycling, and the animal community. Docks also offer ample settlement sites for fouling communities, potentially altering salt marsh food webs by concentrating the spatial distribution of prey. To accommodate the growing numbers of people in Georgia and South Carolina, large stretches of previously undeveloped land have been converted by developers into luxurious residential and vacation properties. Developers have historically targeted heir's property, a type of land ownership that limits tenant's ability to utilize and maintain control of their land, to build large communities and resorts. Development along coastal salt marshes is correlated with the building of docks for private homes, highlighting the need for an integrative examination of docks. This project seeks to study the ecological impacts of docks, as well as the social and legal features of the southeast that promote dock building.

Session III

2:15PM-3:10PM

“Integrative” Analysis of Interrelated Herding Livelihoods and Landscape-level Vegetation Changes in Laikipia, Kenya

Ryan Unks

Warnell School of Forestry and Natural Resources, University of Georgia

Mobility in semi-arid lands is essential for wildlife and herders alike to gain access to spatially and temporally variable key resources. On the Laikipia Plateau, as in many other East African semi-arid rangelands, decreases in pastoralists' seasonal grazing access are thought to be related to shifts in land tenure, decreasing porosity of property lines, and increasing intensity of conflicts in surrounding lands. Interrelated to these changes, the influence of wildlife conservation actors within pastoralist group ranches over the past two decades has become increasingly salient. Group ranch members remain highly dependent on livestock, and changes in herding strategies and livestock types are thought to be producing large changes in landscape processes. How these changes relate to recent shrub and succulent encroachment, reduction of perennial grasses and lianas, and local extirpation of canopy species is not well understood. Explicitly considering how herder mobility and vegetation are interrelated, we used mixed methods to study linkages between recent changes in livelihoods and ecological dynamics. The role of novel herbivore pressure was analyzed as situated in a complex social landscape where changes in access, markets, knowledge and politics at different spatial scales interact with local herding practices. We used a combination of ethnographic and landscape ecological methods, including herbivore pressure modeling, and remotely-sensed imagery to explore historical vegetation changes while simultaneously analyzing the institutional basis of access, and the ecological knowledge of different actors.

Integrating Spatial Methods to Inform Avian Conservation in Costa Rica

Cody Cox

Warnell School of Forestry and Natural Resources, University of Georgia

Between 1950 and 1988, two-thirds of Costa Rica's tropical forests were cleared, significantly reducing and fragmenting forest habitat. While many conservation initiatives aiming to protect and restore forest habitat for wildlife have emerged in Costa Rica, most conservation has been opportunistic rather than targeted to the specific needs of individual species and specific opinions of stakeholders. This study aims to increase effectiveness in avian conservation in Costa Rica by spatially identifying important target areas for conservation using integrated ecological and sociological methods. Within the upper Guacimal watershed in northwestern Costa Rica, I am determining which landscape gradients are important predictors of suitable habitat for particular bird species using a combination of two avian survey methods, point counts and mist netting, to determine the species composition at discrete locations. These data will be used to develop models predicting suitable habitat for each species. It is also critical for conservation to understand how individuals move through the landscape, since some species are more tolerant of moving across non-habitat areas than others. Thus, I am using GPS transmitters to track the movement patterns of two species: Blue-diademed Motmots and Blue-throated Toucanets. Finally, I am conducting participatory mapping-based interviews with key informants within the study area representing different interests, such as conservation, tourism, agriculture, and government agencies, to highlight differences in

conservation preferences between groups. Participatory mapping results will then be compared with ecological data to identify opportunities and potential conflicts for avian conservation initiatives.

NGOs, Communities, and Environments: An analysis of social-ecological interaction and heterogeneity in two Haitian towns

John Ryan McGreevy¹, Elkins Voltaire²

¹*Department of Anthropology, University of Georgia;* ²*State University of Haiti*

Researchers and casual observers from northern countries often present the global south as a cautionary tale of environmental degradation, and the Caribbean nation of Haiti is no exception. Discussions of Haiti have long focused on labels that promote a homogeneous and largely discouraging view of its social and ecological systems in comparison to its neighbors. These labels come from aspects of truth, and some may even fit the vast majority of the country. Yet, some all-encompassing labels and homogeneous ideas do not provide accurate portrayals of Haiti's social-ecological systems in all settings, and this representation can influence the way various actors, including local resource users and NGOs, respond to social and ecological change. This paper questions the homogenous portrayal of diverse natural and social systems in the global south, and we use two Haitian towns as case studies to explore the range of diversity in such systems. We build off of our ethnographic research between 2012 and 2016 in Sources Chaudes and Camp Perrin, Haiti and we take a mixed method and interdisciplinary approach. This research contributes to the evolving conversation on long-held assumptions about Haitian tree loss as well as wider theory on heterogeneity and complexity of social-ecological interaction in the global south.

Why Expansion in the Demand for Blueberries is Responsible for Deforestation in Southern Georgia? Understanding through an Integrative Approach.

Suraj Upadhaya and Puneet Dwivedi

Warnell School of Forestry and Natural Resources, University of Georgia

As per the 2015 Global Forest Resource Assessment, the world is losing about 3.3 million hectares of forestlands each year. Several studies have analyzed the social, economic, and environmental impacts of deforestation in the context of developing countries. However, no study, to the best of our knowledge, has analyzed deforestation due to expanding demand of agricultural commodities in the context of developed countries so far. This is especially true in Southern Georgia where about 1400 hectares of evergreen forestlands (mostly loblolly pine) have been converted to blueberries between 2010 and 2014. We used integrative approach of using geospatial and economic tools to understand linkages between deforestation and agricultural expansion. We first developed a site suitability model for blueberry production in SE GA. Then, we developed economic models to understand any differences in profitability between loblolly pine and blueberry. Our suitability model suggests that more than 85% of the available land is suitable for blueberry. The same model suggests that more than 80% of existing pine forestlands overlap with land that is highly suitable for blueberry production. The economic analysis shows that landowners producing blueberries obtain higher profits compared to those producing loblolly pine by a margin of about \$27,500. Therefore, it is quite likely that a further rise in the demand for blueberries will increase deforestation rates in Georgia. As understanding the conditions of forests and the linkages between deforestation and agricultural expansion is key to defining actions needed to arrest deforestation, we propose an integrated approach must be developed for reducing deforestation rates in the region.

Acknowledgements

Co-chairs: Emily Ayscue and Kristen Lear

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