



3rd Annual

Symposium on Integrative Conservation

presented by graduate students of the
Integrative Conservation Ph.D. Program
at the
University of Georgia

Coverdell Center
 January 29, 2016



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Welcome to the 3rd 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. David Haskell, Professor of Biology from Sewanee: The University of the South. The ICON graduate students are pleased to co-sponsor Dr. Haskell's visit with the Wilson Center for Humanities and Arts.

Over the course of the day, we will hear from 17 presenters, all students of the ICON Ph.D. Program, which is now in its fifth 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, Haiti, Brazil, Puerto Rico, Costa Rica, and even 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 (#SIC2016)!

*Thank you to Steve Padgett-Vasquez for the 2016 cover graphic. The words in this leaf are taken from the 2016 SIC abstracts.



Morning Schedule

8:00AM – 8:25AM	Greeting & Coffee	Coverdell Rotunda
8:25AM – 8:30AM	Opening and welcome to SIC by co-chairs	Coverdell S175
8:30AM – 8:45AM	Introduction by Steve Padgett-Vasquez	Coverdell S175
8:45AM – 9:45AM	Session I	Coverdell S175
8:45-9:00	Economic Tradeoffs, Adaptive Capacity, and Tree Use: Lessons from Rural Haiti <i>John Ryan McGreevy</i>	
9:00 – 9:15	Implications of Sea Level Rise to Socio-Ecological Systems: Anticipating Changes to Salt Marsh dependent Fisheries in Georgia (USA) <i>Rachel Guy</i>	
9:15 – 9:30	Integratively Examining Vulnerability to Sea-Level Rise <i>Dean Hardy</i>	
9:30 – 9:45	Airbnb, Sustainability, and the Shared Economy in Athens, GA <i>Emily P. Ayscue</i>	
9:45AM – 10:00AM	Coffee Break	Coverdell Rotunda
10:00AM – 11:00AM	Session II	Coverdell S175
10:00 – 10:15	The role of the Environmental Quality Incentives Program (EQIP) and Food Hubs in Promoting Agricultural Sustainability and drought Resilience in Historically-Underserved Agricultural Communities in Southwest Georgia <i>Katie Brownson</i>	
10:15 – 10:30	Small-scale Fisheries Governance and the Search for Well-being and Sustainability in a Brazilian Marine Protected Area <i>Emily Y. Horton</i>	
10:30 – 10:45	Social Outcomes of Collaborative Structured Decision Making Processes <i>Tara Gancos Crawford</i>	
10:45 – 11:00	Applying an Integrated Analysis to Evaluate Management Decisions for a Declining Species <i>Brian A. Crawford</i>	
11:00AM – 11:30AM	Walk to Ecology Building	
11:30AM – 12:30PM	Keynote Speaker	Ecology Auditorium
	The Forest Unseen: Ecology, Ethics, and Contemplation <i>Dr. David Haskell, Professor of Biology, Sewanee: The University of the South</i>	

Afternoon Schedule

12:45PM – 2:15PM	Lunch <i>Catered by Tlaloc</i>	Coverdell Rotunda
2:15PM – 3:00PM	Session III	Coverdell S175
2:15- 2:20	Contentious Collaboration: the Interplay of Narratives and Networks in Environmental Governance <i>Jonathan P. K. Hallemeier</i>	
2:20 – 2:35	Where the Dragons Roam: Landscape Use by a Mexican Flagship Species, the Arboreal Alligator Lizard <i>Abronia graminea</i> <i>Adam G. Clause</i>	
2:35 – 2:40	Examining the Impact of Drought and Debt on Water Management Decisions in Puerto Rico <i>Jessica C. Chappell</i>	
2:40 – 2:55	Forest Cover, Development, and Sustainability in Costa Rica: Can one-policy-fit-all? <i>Karen Allen and Steve Padgett-Vasquez</i>	
2:55 - 3:00	Greening Affordable Housing: The Role of Environmental Rationales in Neoliberal Urban Policy <i>Jessica Alcorn</i>	
3:00PM-3:15PM	Coffee Break	Coverdell Rotunda
3:15PM-4:00PM	Session IV	Coverdell S175
3:15 – 3:30	Investigating the Potential for Bat-Friendly Agave Management for Mezcal and Other Cultural Products in Mexico <i>Kristen M. Lear</i>	
3:30 – 3:35	Participatory Watershed Mapping & White-bellied Heron Conservation in West-Central Bhutan <i>David M. Hecht</i>	
3:35 – 3:50	Assessing Landscape Effects on Avian Occupancy and Movement to Inform Conservation in Costa Rica <i>Cody Cox</i>	
3:50 – 3:55	Mosquito Population Dynamics Across an Urban Gradient <i>Michelle V. Evans</i>	
3:55PM – 4:10PM	Coffee Break	Coverdell Rotunda
4:10PM – 4:30PM	ICON Student Awards	Coverdell S175
5:00PM – 7:00PM	Reception	Coverdell Rotunda

ABSTRACTS

Session I

8:45AM – 9:45AM

ECONOMIC TRADEOFFS, ADAPTIVE CAPACITY, AND TREE USE: LESSONS FROM RURAL HAITI

John Ryan McGreevy

Department of Anthropology, University of Georgia

Haiti stands out as a country that is disproportionately vulnerable to climate change outcomes like drought, changing growing seasons, and increased storm intensity. Much of this vulnerability comes from centuries of deforestation that have left Haiti largely void of forests. Semi-structured interviews, participant observations, and focus groups conducted in three remote villages suggest that tree loss comes largely from limited adaptive capacity to climate change at the household level. Resource users ultimately cut trees after engaging in difficult analysis of trade-offs between short-term economic survival and long-term ecosystem services. Due to limited adaptive capacity and a constrained range of viable livelihood strategies, rural Haitians are often forced to cut down trees in times of economic need. In this process, stored economic and environmental capital (trees) is transferred to economic capital (charcoal) that is sold and removed from the household level. The result is an increase in vulnerability and decrease in future capacity to adapt to climate change.

IMPLICATIONS OF SEA LEVEL RISE TO SOCIO-ECOLOGICAL SYSTEMS: ANTICIPATING CHANGES TO SALT MARSH DEPENDENT FISHERIES IN GEORGIA (USA)

Rachel Guy¹ and Nathan Nibbelink¹

¹Warnell School of Forestry and Natural Resources, University of Georgia

Current models predict sea level rise to reduce and fragment salt marsh over the next century on the Georgia (USA) coast. Studies have demonstrated the importance of salt marsh habitat as essential to juvenile fishes and crustaceans, though broad scale quantitative models of these relationships have been lacking. Knowing these relationships at a landscape level is paramount to forecasting the long term stability of a social-ecological system challenged by sea level rise. Using a combination of ecological and social collected field data we sought to describe the sensitivity of juvenile nekton to changes in salt marsh structure on the broad scale, and explore adaptation strategies of commercial fishermen dependent on the available fish stocks supported by the salt marshes. For juvenile nekton we developed models using multi-scalar buffered environmental variables. Our results indicate the potential loss of species richness within the Georgia estuaries with increasing fragmentation caused by sea level rise. As a fishery that is both commercially and recreationally harvested, these findings have implications for the future success of the fishery. Interviews with Georgia commercial shrimp and crab fishermen, as well as archival data, revealed varying adaptive capacities to changes in the fisheries, but few with concerns about long-term habitat decline critical to their species. This may affect the future governance of the fisheries and the local fishery-dependent economies.

INTEGRATIVELY EXAMINING VULNERABILITY TO SEA-LEVEL RISE

Dean Hardy

Department of Geography, University of Georgia

One of the major global challenges of this century is going to be mediating the social (including economic) and ecological impacts of sea-level rise. As recent research has shown that millions of coastal residents will be affected globally, coping with the predicted mass migration of refugees (up to 150,000 just in Georgia) will become a pressing issue in future decades. Vulnerability, or the potential for harm, is measured with many methods, and framed through many academic and colloquial lenses. While much of the literature on vulnerability emerged from hazards geography beginning in the 1930s, since the 1980s there has been more investigation of the social dimension of vulnerability due to the realization that hazard impacts vary significantly across social groups. However, recent approaches in the past 10 to 15 years, such as in the subfields of socio-ecological (SES) systems and political ecology, have proposed theoretical advancements that attempt to link the social and ecological together through the notion of vulnerability (or resilience and adaptive capacity in the SES case). In this paper, I present preliminary findings of an integrative examination of vulnerability to sea-level rise that draws on theory and methods from hazards geography, political ecology, and GIScience. I suggest that scale plays a central role in determining what particular theory and method are best applied. I argue that integrative research allows for framing complex socio-environmental challenges across typically incommensurate theoretical frameworks and methodological approaches, which when taken together provide more robust interpretations of the patterns and processes of vulnerability.

AIRBNB, SUSTAINABILITY, AND THE SHARED ECONOMY IN ATHENS, GA

Emily P. Ayscue

Warnell School of Forestry and Natural Resources, University of Georgia

The shared economy, a marketplace where production costs become low to none and “sharing” becomes “collaborative consumption” (Tussyadiah 2014), is steadily growing in patronage and receiving increasing attention from the research economy alike. Research on the shared economy include the impacts of Airbnb on hotel industries and trust in online rating platforms in the shared economy Teubner (2014); entrepreneurial success (Zervas, Proerpio, & Byer 2015; Slee 2014); the nuanced facets of the shared economy (Cheng 2014); the impacts of online sharing systems on social welfare (Muller 2014); the protection or regulations on consumers and providers in collaborative consumption by e-government (Chasin & Scholta 2015); how money mediates social interaction between hosts and users (Ikkala 2015); and the tradeoffs of the openness of closed-ness of sharing economies for their users (Smolka & Heinerth 2014). While the research on the shared economy is very diverse, the body of work is thin, spanning approximately 10 years. Many companies have grown out of the shared economy including Airbnb. This study aims to take a triple bottom line approach to assessing the sustainability of Airbnb in Athens, GA. This framework addresses not only the environmental sustainability gaps in shared economy research, but also provides a rounded approach to understanding the way that Airbnb exists in a specific city and its environmental, social, and economic impacts on the community in which it exists.

Session II

10:00AM – 11:00AM

THE ROLE OF THE ENVIRONMENTAL QUALITY INCENTIVES PROGRAM (EQIP) AND FOOD HUBS IN PROMOTING AGRICULTURAL SUSTAINABILITY AND DROUGHT RESILIENCE IN HISTORICALLY-UNDERSERVED AGRICULTURAL COMMUNITIES IN SOUTHWEST GEORGIA

Katie Brownson

Odum School of Ecology, University of Georgia

The combined impacts of climate change and increased demand for water resulting from population growth and the expansion of irrigated agriculture are likely to decrease the overall water supply in the Flint River Basin (FRB) of southwest Georgia. Historically, African-American farmers in the FRB have been especially vulnerable to the impacts of drought due to widespread discrimination within the USDA limiting access to federal emergency drought funds. The Southwest Georgia Project (SWGAP) is a civil rights organization based in Albany, Georgia that has been working since 1961 to improve social justice for underserved agricultural communities in the region. More recently, they have been working to establish a Food Hub, which is a model for strengthening regional food systems that has been promoted by the USDA. Food Hubs enable smaller producers to aggregate and distribute their crops to larger customers that they would not be able to access independently. SWGAP has also worked to ensure historically underserved farmers have the needed information and technical expertise to apply for USDA's EQIP program. While the EQIP program was ostensibly designed to incentivize the adoption of agricultural conservation practices, it also provides cost-shares for the expansion of irrigated agriculture, potentially imposing additional stress on local water supplies. In this presentation, I assess the potential role of food hubs and the EQIP program in improving resilience to drought and promoting social justice using quantitative and qualitative methods, with the FRB serving as a case study.

SMALL-SCALE FISHERIES GOVERNANCE AND THE SEARCH FOR WELL-BEING AND SUSTAINABILITY IN A BRAZILIAN MARINE PROTECTED AREA

Emily Y. Horton

Department of Anthropology, University of Georgia

Small-scale fisheries provision over half of the world's wild-caught seafood (Shester and Micheli 2011), providing food and employment for millions. Marine Extractive Reserves (MERs) are a new type of marine protected area in Brazil (Silva 2004) and represent one of the most significant efforts by the government to protect the common pool resources of small-scale fishers (De Moura et al. 2009). Researchers, however, are still evaluating the performance of MERs and their ability to achieve their objectives of ensuring sustainable natural resource use and safeguarding the livelihood and culture of traditional populations (Santos and Schiavetti 2014). My proposed dissertation research will be carried out in a MER in Northeastern Brazil to consider how exploring the social and ecological dimensions of small-scale fisheries through multiple viewpoints can inform more equitable governance that aims to promote ecological sustainability and human well-being. It will connect the "social" and "ecological" domains by pairing a diverse economy foodways

framework with ethnoecology and ecological literatures. The study will consider how ecological processes can influence when and why different fish species enter foodways while also asking how fisheries contribute to gendered well-being outcomes for actors differentially situated along foodways. In parallel, it will explore how a fixed seasonal fishing ban impacts actors' well-being and aligns (or is misaligned) with localized ecological patterns.

SOCIAL OUTCOMES OF COLLABORATIVE STRUCTURED DECISION MAKING PROCESSES

Tara Gancos Crawford^{1,2}, Brian Crawford², Clinton T. Moore^{1,2,3}, Nik Heynen⁴

¹*Georgia Cooperative Fish and Wildlife Research Unit*; ²*Warnell School of Forestry and Natural Resources, University of Georgia*; ³*US Geological Survey*; ⁴*Department of Geography, University of Georgia*

In recent decades, structured decision making (SDM) has emerged as a promising framework for addressing complex fish and wildlife management issues. In the context of SDM, management objectives, potential management actions, and current understanding of the resource system are independently specified, then assembled into a decision-making framework that can account for uncertainty and reveal potential consequences of alternative actions, as well as tradeoffs generated among objectives by those alternatives. Additionally, this framework facilitates diverse stakeholder engagement in policy-relevant discussions as it can accommodate multiple, potentially disparate perspectives, allowing each to contribute to the decision analysis. Since 2006, over 100 multi-interest stakeholder groups have participated in SDM workshops at the US Fish and Wildlife Service's National Conservation Training Center (NCTC) to receive hands-on training in applying SDM to address real-world conservation and management problems. As an exploratory study, we surveyed past NCTC SDM workshop participants to gain insight regarding the benefits and limitations of this approach to multi-stakeholder collaborative decision making. In particular, we were interested in participant perspectives regarding the degree to which SDM fosters social learning, cultivates social capital (e.g., cooperative relationships, shared understanding, values, and norms), and results in satisfactory management decisions. Furthermore, we sought to elucidate aspects of NCTC workshop structure and multi-stakeholder group dynamics that inspire or impinge upon collaboration, decision making, and professional development at NCTC. In this presentation, we will present our preliminary results, which contribute to our understanding of the value and practicality of engaging in SDM in diverse conservation decision problem contexts.

APPLYING AN INTEGRATED ANALYSIS TO EVALUATE MANAGEMENT DECISIONS FOR A DECLINING SPECIES

Brian A. Crawford^{1,*}, Clinton P. Moore², Nik Heynen³, Terry M. Norton⁴, and John C. Maerz¹

¹*Warnell School of Forestry and Natural Resources, University of Georgia*; ²*USGS Patuxent Wildlife Research Center*; ³*Department of Geography, University of Georgia*; ⁴*Georgia Sea Turtle Center, Jekyll Island Authority*

A key challenge for making robust conservation decisions is predicting how wildlife populations respond to multiple, concurrent threats and potential management strategies, usually under substantial uncertainty. The aim of this research was to apply an integrated modeling approach to evaluate population viability under current and potential management conditions for a species of conservation concern – the diamondback terrapin (*Malaclemys terrapin*) – impacted by road mortality and subsidized predators on Jekyll Island, GA. We developed a Bayesian integrated model which combines two intensive mark-recapture datasets collected

between 2009 and 2015 to estimate annual abundance and survival, while directly assessing the impact of management strategies (flashing warning signage and roadside barriers) deployed during the study. Next, we used these estimates, in conjunction with expert opinion, to project population growth and estimate persistence under scenarios representing no management, current actions, and potential strategies to reduce road-associated threats. Survival estimates in years prior to management resulted in population declines and a low persistence probability; however, current management actions significantly increased survival, population growth, and persistence. Persistence was greatest for management strategies that included complimentary actions, such as installing roadside barriers, culling predators, and conducting awareness campaigns for drivers. This work builds on previous research that used ecological patterns to identify management targets and precedes research that will incorporate population persistence estimates in the context of other socioeconomic objectives within a collaborative structured decision making process with local stakeholders.

Session III

2:15PM – 3:00PM

CONTENTIOUS COLLABORATION: THE INTERPLAY OF NARRATIVES AND NETWORKS IN ENVIRONMENTAL GOVERNANCE

Jonathan P. K. Hallemeier

Department of Anthropology, University of Georgia

Social networks are central to environmental governance (EG) that can cope with complexity, change, and conflict in social-ecological systems (SEs). Networks can balance collective action with innovation and link the jurisdictions, scales, and interests needed to adequately, and equitably, address environmental issues. These contributions depend upon the particular relationship of networks with SEs, often understood in terms of alignment. Current scholarship points to patterns of network structure and to the common visions uniting network members as influential to network alignment. However, analyses of alignment tend to focus on structure and do not incorporate common visions or differentiate among actors with diverging, and potentially conflicting, values and understandings. Particularly in contentious, multiple-use contexts, if and how differences are negotiated influences the shape of networks and common visions. The proposed research puts forward the concept of narrative distance as a way to integrate network structure, common visions, and diversity in values and understandings. Based in current scholarship on narrative-networks (NNs), which describe the close connection between environmental networks and the stories told by members, narrative distance refers to the extent to which the stories of diverse actors diverge and create obstacles for bridging. A method of measuring narrative distance and investigating its potential role within emerging EG networks is proposed.

WHERE THE DRAGONS ROAM: LANDSCAPE USE BY A MEXICAN FLAGSHIP SPECIES, THE ARBOREAL ALLIGATOR LIZARD *ABRONIA GRAMINEA*

Adam G. Clause

Warnell School of Forestry and Natural Resources, University of Georgia

Understanding an animal's movement patterns, tolerance to habitat disturbance, and microhabitat preferences are essential for informing robust conservation efforts. It is particularly important for flagship species, which are used to catalyze awareness of threats to at-risk ecosystems. One such ecosystem is cloud forest in Central America, part of Conservation International's Mesoamerica biodiversity hotspot. This increasingly fragmented habitat supports remarkable endemism, exemplified by arboreal alligator lizards (*Anguidae*: *Abronia* spp.). This emerging flagship genus of 28 described species includes *Abronia graminea*, a Mexican species classified as Endangered by the IUCN. Using *A. graminea* as a model, I investigated questions concerning *Abronia* landscape use. First, what are the movement patterns of adult lizards? Second, how adaptable are adults to fragmented or disturbed habitats? Lastly, are adults microhabitat specialists or generalists? To answer these questions, I mounted external Holohil BD-2 transmitters to 15 adult *A. graminea* and monitored each lizard for 4–6 weeks. I found that lizards regularly moved between trees, occupying 3–11 trees or shrubs during the study. Several lizards occupied tiny forest fragments, and the majority inhabited forest where the understory vegetation was highly modified or removed altogether. Lizards were also habitat generalists, showing no preferential selection of trees based on species or epiphytic bromeliad abundance. My results suggest that *Abronia* could represent a useful flagship for balancing forest conversion and forest preservation needs in these working landscapes. Contrary to existing literature, protection of *Abronia*, and likely other cloud forest biota, need not rely on fortress conservation.

EXAMINING THE IMPACT OF DROUGHT AND DEBT ON WATER MANAGEMENT DECISIONS IN PUERTO RICO

Jessica C. Chappell¹

Odum School of Ecology, University of Georgia

Water management decisions in Puerto Rico have been largely unexamined. Although there has been a Long Term Ecological research station located on the island since 1988 which focuses its work on migratory stream organisms, little attention has been paid as to what motivates different water management agencies to maintain stream flow. This summer I completed an internship with the Office of Water Planning, a division of Puerto Rico's Department of Natural Resources (DRNA). The Office of Water Planning is in charge of planning the use of all freshwater resources on the island. Additionally, it serves as the DRNA representative to the Scientific Drought Committee, which convenes weekly during a declared drought. As Puerto Rico suffered one of the worst droughts on record from April – September 2015, I was able to participate in several of the Scientific Drought Committee meetings. Additionally, in August, Puerto Rico defaulted on a 58 million dollar bond loan. Given my position working with the DRNA, I was able to observe first-hand what information was considered important as decisions regarding water management were made. I noticed although theoretically several agencies are accountable to each other regarding water management decisions, in reality one agency has the authority. My observations this summer are informing my dissertation objective to determine which agencies have the responsibility to make water management decisions, and which agencies have the authority to maintain stream flows in Puerto Rico. This will help inform realistic conservation measures to maintain minimum flows in the future.

FOREST COVER, DEVELOPMENT, AND SUSTAINABILITY IN COSTA RICA: CAN ONE-POLICY-FIT-ALL?

Karen Allen¹ and Steve Padgett-Vasquez²

¹*Department of Anthropology, University of Georgia;* ²*Department of Geography, University of Georgia*

Forest Transition Theory offers the hope that global economic development can continue in tandem with forest recovery. Costa Rica has been lauded for its successful forest transition—once the fastest deforesting country in Central America, forests began to regrow in the 1980s and have had a steady trajectory of recovery since. This forest regrowth can be linked temporally to Costa Rican policies that have promoted tourism and discouraged small-scale agriculture. We use a case study from the Bellbird Biological Corridor (CBPC), Costa Rica, combining remote sensing analysis with interviews and ethnography, to unravel the relationship between national policy, forest regrowth, and social-ecological sustainability. The Land Cover Change analysis between 1986 and 2014 indicates that, at the parcel-level, national policy has served to promote farm abandonment in favor of tourism and that this change has been critical to forest recuperation. However, these changes have occurred within a development framework that has created new social-ecological challenges that threaten future forest and economic sustainability. Examining the parcel-level impacts of the driving forces of landscape change highlights that forest cover is an insufficient proxy for conservation success, and conservation policy focused primarily on forest recovery may create new sustainability challenges.

GREENING AFFORDABLE HOUSING: THE ROLE OF ENVIRONMENTAL RATIONALES IN NEOLIBERAL URBAN POLICY

Jessica Alcorn

Department of Geography, University of Georgia

Beginning with the Energy Policy Act of 2005, the US Department of Housing and Urban Development (HUD) has been required to "reduce utility expenses through cost-effective energy conservation and efficiency measures" (sec. 154). Since then, HUD has implemented a variety of programs, namely HOME's Investment Partnership, designed to further energy efficiency within affordable housing (Cranston-Gonzalez National Affordable Housing Act, 1990, Title II). Even though HOME is targeted at residential restoration, HUD recommends combining HOME funding with the Community Development Block Grant (CDBG) to enable more extensive neighborhood "revitalization" (HUD & Office of Community Planning and Development, 2008). Historically, many of HUD's affordable housing revitalization policies, namely HOPE VI, have been critiqued for promoting economic development goals at the expense of the displacement of low-income African American households. As sustainability has become a prominent ancillary objective in public policy, the question remains as to whether sustainability objectives can be considered distinctly different from other forms of private investment and whether this form of investment might have constructive, positive implications for low-income communities. In this research, I intend to delve into whether sustainability simply serves as a vehicle for promoting neoliberal objectives or has the potential to address social and environmental justice concerns. In this preliminary dissertation research, I intend to use data from HUD's American Housing Survey to track the physical state of units rehabilitated with HOME funding. Evaluation of broader physical changes to the community will be conducted via qualitative analysis and possibly remote sensing of urban green space.

Session IV

3:15PM-4:00PM

INVESTIGATING THE POTENTIAL FOR BAT-FRIENDLY AGAVE MANAGEMENT FOR MEZCAL AND OTHER CULTURAL PRODUCTS IN MEXICO

Kristen M. Lear¹, José Juan Flores Maldonado², Laura German³, Elizabeth King^{1,4}, and Jeffrey Hepinstall-Cymerman¹

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

Throughout Mexico, agave plants (*Agave* spp.) are used by people for the development and sale of market products (such as the alcoholic beverage mezcal) as well as for other cultural uses. During agave cultivation the stalk is often cut before flowering in order to increase the sugar yield. However, this practice removes the food source for migratory pollinating bat species, including the endangered Mexican long-nosed bat (*Leptonycteris nivalis*). Agaves are also harvested from the wild by rural communities for important cultural products, a practice which can have significant implications for the conservation of Mexican long-nosed bats. One proposed solution to aid in conservation of this species is to create “bat-friendly” agave management practices that would retain food for the bats and allow farmers and communities to sell “bat-friendly” products at a price premium, thereby increasing their income and contributing to environmentally sustainable development. In collaboration with a Mexican conservation organization (*Especies, Sociedad y Hábitat, A.C.*), this research will be conducted in the northeast region of Mexico and will integrate analysis of the ecological aspects of the system (e.g. identifying critical bat foraging areas) with analysis of the social aspects aimed at understanding how decisions are made regarding agave management and what factors may influence the adoption of “bat-friendly” practices. This integrated approach will better enable bat conservation efforts to be implemented in a way that will benefit both the bats and the people who use agaves.

PARTICIPATORY WATERSHED MAPPING & WHITE-BELLIED HERON CONSERVATION IN WEST-CENTRAL BHUTAN

David M. Hecht

Department of Anthropology, University of Georgia

While preliminary studies in community-based approaches to land management, environmental modeling, and geospatial mapping have occurred in Bhutan in recent years, little applied research has been done to include participatory watershed mapping. Complimentary to long-term ecological research and conservation programs initiated by Bhutan’s only domestic conservation NGO, the Royal Society for Protection of Nature (RSPN), this project is designed to include diverse stakeholder groups in documenting socio-cultural and ecological change in communities downstream of developing hydroelectric energy projects within the Punatsangchhu watershed. More specifically, I propose to conduct a community-led initiative designed to inclusively frame the impacts of hydroelectric dams on human communities, as well as White-bellied heron (WBH) populations along the Punatsangchhu. The WBH is one of the 50 rarest birds in the world, considered critically endangered by the IUCN Red List of Threatened Species. With an estimated 200 individuals left

in the world (~15% of the global population residing in Bhutan) and little research on the ecological impacts of hydro-electric energy development along Bhutan's major river systems, the survival of the species in the kingdom may be dependent on socially-oriented conservation initiatives that include, yet go beyond, ecological research. In partnership with RSPN Bhutan, this project aims to build the capacity for collaborative research frameworks, community-based conservation models, participatory watershed mapping, and NGO training of community field partners in the midst of Bhutan's rapidly changing socio-ecological landscapes.

ASSESSING LANDSCAPE EFFECTS ON AVIAN OCCUPANCY AND MOVEMENT TO INFORM CONSERVATION IN COSTA RICA

Cody Cox

Warnell School of Forestry and Natural Resources

Costa Rica is a nation of incredible avian diversity, and many of its 903 bird species depend on forest habitat. However, between 1950 and 1988, two-thirds of Costa Rica's extensive tropical forests were cleared, reducing the total amount of forest habitat and leaving much of the remaining forests highly fragmented. The goal of many conservation programs is to protect and expand forests to provide habitat for forest-dependent species. However, little is known about the behaviors and habitat requirements of many Costa Rican bird species. To make the targeting of conservation initiatives more effective and efficient, it is important to understand which features are important predictors of suitable habitat for particular species and how they move through the landscape, since some species are tolerant of moving across agricultural areas, while others are not. Bird point counts have been conducted along 12 transects representing a range of environmental gradients in the vicinity of UGA Costa Rica since 2009. Additionally, since the summer of 2015, I have mist netted along these transects to capture birds. To date, I have caught 383 individuals representing 66 different species. I am using these data to develop species distribution models for a suite of bird species to determine which landscape variables provide suitable habitat for each species and develop predictive maps of suitable habitat for each species. Additionally, I have used radio telemetry to track the movements of 22 blue-diademed motmots and 3 blue-throated toucanets through the landscape to determine how landscape structure affects their movement patterns.

MOSQUITO POPULATION DYNAMICS ACROSS AN URBAN GRADIENT

Michelle V. Evans¹, Courtney Murdock^{1,2}

¹*Odum School of Ecology, University of Georgia;* ²*Infectious Diseases*

Incidence of vector-borne disease is often unevenly distributed across urban landscapes, which are themselves comprised of a diversity of land-use types with differing thermal microclimates. Because mosquitoes are small ectotherms, their growth, survival, and reproduction are all sensitive to this fine-scale variation in environmental climate, however most studies model disease prevalence at coarser scales. In order to further explore the relationship between microclimate and vector-borne disease, we investigated the effect of land-use type on microclimate and *Aedes albopictus* mosquito populations across rural, suburban, and urban land use sites in Athens, GA. We found microclimate to differ significantly across land-use types. Specifically, urban sites were on average hotter than rural sites ($20.03^{\circ}\text{C} \pm 0.11$ s.e. vs. $19.27^{\circ}\text{C} \pm 0.41$ s.e.), evidence of a heat island effect. Mosquitoes emerged 24-hours earlier in urban than rural sites, however mosquitoes from urban sites were smaller than those from other land-use types. Suburban sites had the highest per capita growth rate, suggesting that disease risk may be higher in suburban areas due to increased

mosquito densities. We found significant heterogeneity in mosquito dynamics across an urban gradient, demonstrating that future studies must incorporate finer scale microclimate.

Acknowledgements

Co-chairs: Caitlin Mertzlufft and Jenny Bloodgood.

Program committee: Rocio Rodriguez Granados (chair), Shannon Bonney and Rachel Bormann

Audio-visual committee: Suraj Upadhaya (chair) and Jon Hallemeier

Feedback committee: Jillian Howard (chair) and Katie Brownson

Culinary logistics committee: Jessica Alcorn (chair)

Prospective students boarding committee: Emily Ayscue and Jessica Chappell

Souvenir committee: Mariana Alfonso (chair) and Anne Chesky Smith

Publicity Committee: Liz Guinessey (chair), David Hecht and Michelle Evans