

Symposium on Integrative Conservation

February 6, 2015

Welcome to the 2nd 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 followed by the keynote speaker, conservation practitioner Dr. Nick Salafsky of Foundations of Success. Over the course of the day, we will hear from 22 presenters, all students of the ICON Ph.D. Program, which is now in its fourth year. The presentation topics range from examining ecosystem services provided by bats to expanding the Global OneHealth initiative to exploring the environmental governance of diverse landscapes. The presentations include research sites around the world, extending from the state of Georgia to countries as distant as Costa Rica, Brazil, Kenya, and Indonesia. 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 (#SIC2015)!

Morning Schedule

8:00AM – 8:30AM	Greeting & Coffee	Aderhold G6
8:30AM – 8:45AM	Dr. Nik Heynen - Introduction	Aderhold G5
8:45AM – 10:15AM	Session I	Aderhold G5
8:45 – 9:00	Jonathan Hallemeier <i>Tracking change in environmental governance and social-ecological systems in western North Carolina</i>	
9:00 – 9:15	Steve Padgett-Vasquez <i>Success is in the eye of the beholder: Evaluating payment for ecosystem services in the Bellbird Biological Corridor of Costa Rica</i>	
9:15 – 9:30	Rachel L. Bormann <i>The future status of the Gopher Tortoise - Ultimately linked with the private landowners in its range</i>	
9:30 – 9:45	John McGreevy <i>Pote Mak Sonje (The Bearer of the Scar Remembers): Systemic causation and linear blame in Haitian tree loss</i>	
9:45 – 10:00	Brian A. Crawford, David W. Kramer, & Joseph W. Hinton <i>Attitudes toward advocating science: Implications for students</i>	
10:00 – 10:15	Jessica C. Chappell, Cathy M. Pringle, & S. Kyle McKay <i>Socio-ecological trade-offs for freshwater management in El Yunque National Forest, Puerto Rico</i>	
10:15AM – 10:30AM	Coffee Break	
10:30AM – 12:00PM	Session II	Aderhold G5
10:30 – 10:45	Katherine Brownson <i>Assessing the efficacy of market-based watershed conservation: An exploration of potential indicators for monitoring the provisioning of watershed services.</i>	
10:45 – 11:00	Jen DeMoss <i>Bodily practices and ethnoecological collaboration within the Nature Connection Movement</i>	
11:00 – 11:15	Jillian Howard <i>Prime real estate for salamander conservation: An integrated approach to conserving wildlife in developing landscapes</i>	
11:15 – 11:30	Caitlin E. Mertzlufft <i>Reimagining “One Health:” An alternative approach to interspecies disease transmission</i>	
11:30 – 11:45	Rebeca de Jesús Crespo, Deanna Newsom, and Catherine Pringle <i>Building effective partnerships between Non-Governmental Organizations and Academia: Applying a collaboration framework to projects that evaluate sustainability certifications</i>	
11:45 – 12:00	Emily Y. Horton <i>Socioecological dimensions of small-scale fisheries governance in a Brazilian marine extractive reserve</i>	

Afternoon Schedule

12:00PM – 1:30PM	Lunch	TBD
1:30PM – 2:45PM	Session III	Aderhold G5
1:30 – 1:45	Shannon N. Bonney & Laurie A. Fowler <i>Transboundary water management institutions to balance competing water uses in the Apalachicola-Chattahoochee-Flint River Basin</i>	
1:45 – 2:00	Ryan Unks <i>Access, vulnerability, and landscape change in Laikipia, Kenya</i>	
2:00 – 2:15	Walker DePuy <i>The political ecology of social safeguards and their implications for Indonesia's Emerging REDD+ Landscapes</i>	
2:15 – 2:30	Jayanta Ganguly <i>Applying properties of systems to systems of property to understand resilience in a social ecological framework</i>	
2:30 – 2:45	Tara Gancos Crawford & Clinton T. Moore <i>Developing an integrated population model for adaptive harvest management of the American alligator</i>	
2:45PM – 3:00PM	Coffee Break	Aderhold G6
3:00PM – 3:45PM	Session IV – Speed Talks	Aderhold G5
	Sebastian Ortiz <i>Feeding wildlife: people and pathogens</i>	
	Cody Cox <i>Integrative conservation planning in the Corredor Biológico Pájaro Campana, Costa Rica using animal movement and participatory mapping data</i>	
	Anne Chesky Smith <i>This was our valley: Taking Asheville, North Carolina's watershed</i>	
	Richard Vercoe <i>The Maps Have 'I's: How can conservation research mapping be critical and participatory?</i>	
	Kristen Lear <i>A story of bats and tequila: Bat conservation amidst Mexico's tequila industry</i>	
	Dean Hardy & Bryan Nuse <i>Uneven seas, uneven culpabilities: State contributions to global sea-level rise</i>	
3:45PM – 4:00PM	Coffee Break	Aderhold G6
4:00PM – 4:15PM	ICON Student Awards	TBD
4:15PM – 5:15PM	Keynote Speaker	TBD
	Dr. Nick Salafsky <i>Co-Director and Co-Founder of Foundations of Success</i>	
5:15PM – 7:00PM	Reception	TBD

ABSTRACTS

Session I

8:45AM – 10:15AM

TRACKING FIT AND FEEDBACK OF ENVIRONMENTAL GOVERNANCE AND SOCIAL-ECOLOGICAL SYSTEMS IN WESTERN NORTH CAROLINA

Jonathan Hallemeier

Department of Anthropology, University of Georgia

Adaptive governance (AG) has been identified as a potential avenue for managing complexity, uncertainty, and rapid change in social-ecological systems. A central tenant of AG is enhancing the fit and feedback between environmental governance and ecosystems, primarily through dynamic networks of actors that can adapt to address problems at various scales and respond quickly to changing conditions. Recent work in AG has sought further understanding of the connections between governance and social-ecological systems through layering spatial ecological data and spatial environmental governance data to create hybrid maps that provide new ways to analyze fit and feedback. However, these methods are still emerging and often provide static depictions. In order to more effectively and equitably foster the networks and relationships that support AG, further research is needed to include the social-ecological processes that have shaped and continue to shape social, ecological, and governance configurations. I propose a research agenda for exploring these processes in the context of western North Carolina.

SUCCESS IS IN THE EYE OF THE BEHOLDER: EVALUATING PAYMENT FOR ECOSYSTEM SERVICES IN THE BELLBIRD BIOLOGICAL CORRIDOR OF COSTA RICA

Steve Padgett-Vasquez

Department of Geography, University of Georgia

The Bellbird Biological Corridor (BBC) or, as it is known in Spanish, the Corredor Biológico Pájaro Campana, is part of the Mesoamerican Biological Corridor. The BBC is located on the Pacific Coast of Costa Rica and represents a bridge between the Monteverde Cloud Forest Reserve and the mangrove forest of the gulf of Nicoya. Costa Rica initiated a scheme for Payment for Ecosystem Services (PES) in the late 1990s. Between 2008 and 2012 close to 50 PES Contracts were granted within the Bellbird Biological Corridor. Using freely available geospatial tools, I explored the success of the PES contract allocation within the BBC. Land cover changes were analyzed through CLASlite, which stands for Carnegie Landsat Analysis System lite, is a highly automated system for converting satellite imagery from its original format, through calibration, pre-processing, atmospheric correction, Monte Carlo Spectral Mixture Analysis, and classification to derive output maps of percentage of live and vegetation cover, bares soils, along with levels of uncertainties which can then be interpreted to determine forest cover, deforestation, and forest disturbance using an automated decision tree. Further analysis was done through QGIS. Determining success or failure on a particular contract depends on which performance metrics are used.

THE FUTURE STATUS OF THE GOPHER TORTOISE - ULTIMATELY LINKED WITH THE PRIVATE LANDOWNERS IN ITS RANGE

Rachel L. Bormann

Warnell School of Forestry and Natural Resources, University of Georgia

The gopher tortoise is a candidate for federal listing and a keystone species throughout its range in the southeastern U.S. The gopher tortoise's range is limited by its habitat needs of well-drained, sandy soils to allow burrowing, herbaceous ground cover for food, and an open canopy and sparse shrub cover. Within Georgia, much of this ideal tortoise range is located on privately-owned lands and their habitat typically requires active management involving fire or other thinning of shrub and hardwood cover and may or may not be consistent with current ownership's land objectives. We are examining conservation of the gopher tortoise in Georgia over three stages. First, we will model gopher tortoise habitat suitability throughout Georgia using publically available GIS layers that represent known

gopher tortoise habitat characteristics and field data on gopher tortoise burrow locations using an approach consisting of comparing multiple statistical approaches to modeling species distributions. Second, we will estimate habitat connectivity and identify pathways between fragmented habitats. Finally, we will investigate the effectiveness of wildlife incentive programs intending to encourage positive management practices by private landowners that benefit the gopher tortoise through interviews with participants and non-participants and identify reasons for non-participation such as lack of awareness of the plans, negative trade-offs for the landowner, negative prior experiences government workers or other programs, etc.

POTE MAK SONJE (THE BEARER OF THE SCAR REMEMBERS): SYSTEMIC CAUSATION AND LINEAR BLAME IN HAITIAN TREE LOSS

John McGreevy
Department of Anthropology, University of Georgia

The area of Haiti covered by trees has dropped from 80% to less than 2% since the arrival of European influence. NGOs and foreign media have routinely blamed environmental mismanagement and local lack of ecological knowledge as the primary causes of tree loss. Yet, my iterative research with local resource users suggests a more complex answer, and application of a social-ecological systems framework questions the linear rhetoric of blame. In this presentation, I discuss an original graphic model (*Pwoblem Pyebwa* Model) that traces Haitian land cover history and reveals systemic causation of tree loss through complex social-ecological processes.

ATTITUDES TOWARD ADVOCATING SCIENCE: IMPLICATIONS FOR STUDENTS

Brian A. Crawford¹, David W. Kramer¹, and Joseph W. Hinton¹
¹*Warnell School of Forestry and Natural Resources, University of Georgia*

The goal of this work was to advance the conversation about scientists' roles in advocacy by including perspectives of students entering careers in natural resources and environmental sciences. Despite over 25 years of discussion about appropriate relationships between science and advocacy, few studies have formally identified areas of consensus or conflict within and across groups engaged in science and policy, and no study has assessed student perspectives. Academia bridges the professional gap between students and their potential careers in the natural resources profession, and differences in attitudes toward advocacy may lead to conflicting perceptions among generations of scientists. We drew from exploratory research to compare attitudes of 249 students, academic faculty, and other natural resource professionals, mostly in the Southeastern United States. We found general disagreement about what actions constitute advocacy and what conduct is acceptable for scientists, but groups agreed scientists should engage in advocacy to improve policy. Students, faculty, and professionals reported a lack of formal training about appropriate relationships between science, scientists, and policy, which offers ways to institute training beginning at the undergraduate level. Given a shift toward attitudes supporting a closer relationships between scientists and advocacy seen here and in other recent published works, our findings suggest acceptable contexts in which scientists can seek more active roles in influencing policy if they so choose.

SOCIO-ECOLOGICAL TRADE-OFFS FOR FRESHWATER MANAGEMENT IN EL YUNQUE NATIONAL FOREST, PUERTO RICO

Jessica C. Chappell¹, Cathy M. Pringle¹, & S. Kyle McKay²
¹*Odum School of Ecology, University of Georgia*; ²*Environmental Laboratory, U.S. Army Engineer Research and Development Center, Athens, GA*

Water from the streams that drain El Yunque National Forest is in high demand. A 2004 water budget estimated that 70% of water runoff in El Yunque is diverted, allowing only 30% to flow to the ocean. A withdrawal rate this high is potentially unsustainable for organisms living within the streams; however, a decrease in human water demand is unlikely as Puerto Rico has one of the densest populations worldwide. As dams are built to facilitate water removal, connectivity of the streams to the ocean is drastically reduced. This negatively impacts migratory organisms which depend on the stream's connection to the ocean to complete their life cycle. These organisms include native shrimps, which have been found to provide essential ecosystem services. However, dams also provide many benefits to local communities such as water supply, recreation areas, and flood control. This project plans to compare the importance of maintaining connectivity for stream organisms with the benefits dams provide within the forest. An existing connectivity index for El Yunque based on shrimp life history will be refined to assist in determining connectivity

values within watersheds through time. Connectivity is expected to vary annually and seasonally. Additionally, connectivity indices will be determined for multiple riverine taxa including shrimp, fish, and snails. Based on these findings, management recommendations can then be made to ensure both stream organisms and local communities benefit from the optimal watershed connectivity.

Session II

10:30AM – 12:00PM

ASSESSING THE EFFICACY OF MARKET-BASED WATERSHED CONSERVATION: AN EXPLORATION OF POTENTIAL INDICATORS FOR MONITORING THE PROVISIONING OF WATERSHED SERVICES

Katherine Brownson
Odum School of Ecology, University of Georgia

The use of market-based approaches for watershed conservation has expanded rapidly in recent years and has been promoted as an efficient way to improve water supply, water quality and flow regulation. Under Payment for Watershed Services (PWS) schemes, downstream users of watershed services purchase services from upstream land managers. To ensure the services purchased are actually being provided, indicators of watershed services provisioning are needed. At the same time, such indicators can be used by managers of PWS schemes to prioritize conservation activities in degraded areas and to monitor the efficacy of conservation practices for adaptive management purposes. Given that the transaction costs associated with comprehensive watershed monitoring can be high, simple indicators are needed that can be monitored at a low cost while still capturing the provisioning of watershed services with adequate accuracy. In this presentation, I explore the potential to use various metrics and methodologies to develop indicators for the provisioning of watershed services, with a focus on water quality services. I discuss these indicators in terms of their prior use, accuracy and feasibility of implementation and socioecological trade-offs associated with their use.

BODILY PRACTICES AND ETHNOECOLOGICAL COLLABORATION WITHIN THE NATURE CONNECTION MOVEMENT

Jen DeMoss
Department of Anthropology, University of Georgia

Recognizing the growing alienation humans from natural environments, some environmental educators have designed outdoor programs to promote environmental behavior. In this research I will study the diverse cultural landscape meanings and bodily practices of members of one such outdoor education program. This project will take place within the Sticks and Stones Wilderness School (SSWS) in Ontario, Canada, specifically with its environmental education programs within the Georgina Island Chippewa Band, which adult members of the Chippewa band are slowly beginning to lead. This research site offers the opportunity to study innovations in landscape meanings and educational practices as Chippewa adults and SSWS mentors collaborate on educational programs, as well as to analyze the processes that accompany changing pedagogical roles within the community. In this research I seek to understand, (1) What are adults' cultural meanings of landscape features, and how are those meanings negotiated among participants? (2) How are cultural meanings of landscapes articulated with embodied practice? (3) What are the processes that characterize changing pedagogical roles as Chippewa members take over program leadership? To answer these questions I will use video ethnography, landscape walks, interviews, oral histories, and participant observation with the population of SSWS participants on Georgina Island over 12 months. I will analyze data using grounded theory to code interview, narrative, and observational data for themes related to landscape meanings, embodied practices, and transforming roles. In addition, I will use conversation analysis and descriptive statistics on video data.

PRIME REAL ESTATE FOR SALAMANDER CONSERVATION: AN INTEGRATED APPROACH TO CONSERVING WILDLIFE IN DEVELOPING LANDSCAPES

Jillian Howard

Warnell School of Forestry and Natural Resources, University of Georgia

Conserving biodiversity is challenging because populations are regulated by many natural and anthropogenic factors operating at different spatial and temporal scales. Future conditions are often hard to predict, and conservation actions require significant buy-in from local stakeholders to be successful. This project aims to facilitate conservation of terrestrial salamander populations in the southern Appalachian region by creating knowledge and key tools to forecast where resilient salamander habitat and high human-perceived conservation value overlap. My objectives are to (1) build a mechanistic population model for the genus *Plethodon* from long term demographic data, (2) estimate vital rates across key environmental gradients, (3) use those vital rates in a mechanistic model to spatially forecast areas capable of sustaining salamander populations under current or future climate scenarios, and (4) generate spatially explicit knowledge of stakeholder values that can be co-mapped with habitat quality to identify areas of high conservation value as well as areas of potential conflict between conservation and other stakeholder priorities. This project will be based out of the Coweeta Long Term Ecological Research site (CWT LTER) in Macon County, NC, and integrated with the Coweeta Listening Project (CLP) and the Land Trust for the Little Tennessee (LTLT) to ensure that the research is informed by the core foci of the LTER as well as local stakeholders, and that the final products will be available to local management organizations.

REIMAGINING “ONE HEALTH:” AN ALTERNATIVE APPROACH TO INTERSPECIES DISEASE TRANSMISSION

Caitlin E. Mertzluft

Department of Geography, University of Georgia

Over the last twenty years, a series of high-profile outbreaks of zoonotic disease, which affect humans and at least one other species of animal, have brought sharply to global attention the close ties between human and non-human health. These scares, including variant Creutzfeldt-Jakob ("mad cow") disease, West Nile Virus, SARS, and—most recently—Ebola, have fostered a shift in paradigm toward a more holistic approach to health. The “One Health” movement follows this trend. Spearheaded by the disciplines of public health, human medicine, and veterinary medicine, this movement recognizes the interrelatedness of human, animal, and environmental health, suggesting that all three are inextricably linked. Although an attempt to acknowledge a more interconnected worldview, I argue that the One Health approach enforces separation instead, by relegating actors into one of these three categories and by prioritizing human health a priori. This oversimplifies the dynamics of zoonotic disease and may limit effective mitigation approaches. I suggest instead that interspecies disease transmission is co-produced through a complex and nuanced interaction of human and non-human agents that work across and within One Health’s divisions. My research focuses on Chagas disease transmission in Panama, and I hope to show through this work that a better approach to understanding interspecies disease transmission is through an understanding of the network of human and non-human actors involved, the associations that bring these networks into being, and an assessment of the social, cultural, political, economic, and ecological drivers that dictate their actions.

BUILDING EFFECTIVE PARTNERSHIPS BETWEEN NON-GOVERNMENTAL ORGANIZATIONS AND ACADEMIA: APPLYING A COLLABORATION FRAMEWORK TO PROJECTS THAT EVALUATE SUSTAINABILITY CERTIFICATIONS

Rebeca de Jesús Crespo¹, Deanna Newsom², and Catherine Pringle¹

¹*Odum School of Ecology, University of Georgia*; ²*The Rainforest Alliance*

Partnerships between non-governmental organizations (NGOs) and academics provide a unique platform for incorporating ecological research into conservation. An increasingly important type of NGO-Academia partnership involves NGOs that provide sustainability certifications, which have a growing need to evaluate the environmental effectiveness of their programs. In turn, these types of partnerships provide the opportunity for ecologists to address the global environmental footprint of developed countries. In this paper, we present a framework that explains how we developed our academic (University of Georgia) partnership with a certifying NGO, the Rainforest Alliance. The framework is then used to compare and contrast the goals of two other NGO-Academia partnerships that evaluate

the certification programs of the Forestry Stewardship Council and the Marine Stewardship Council. Our observations highlight the importance of cost sharing and involving graduate students to promote partnership continuity, which are fundamental aspects for effective transfer of ecological science into conservation practice.

SOCIOECOLOGICAL DIMENSIONS OF SMALL-SCALE FISHERIES GOVERNANCE IN A BRAZILIAN MARINE EXTRACTIVE RESERVE

Emily Y. Horton

Department of Ecological and Environmental Anthropology, University of Georgia

Following global trends, fisheries in Brazil have experienced dramatic declines in recent times. Marine Extractive Reserves (MERs) are one measure taken by the Brazilian government to protect small-scale fisheries. MERs aim to ensure sustainable natural resource use and safeguard the livelihood and culture of traditional populations. Ongoing research in the Cururupu MER in Maranhão analyzes links between a federally implemented seasonal fishing ban, MER objectives, local livelihoods, and aquatic resource dynamics. Results demonstrate that federal policy that doesn't consider socioecological complexities can constrain possibilities for equitable and sustainable fisheries.

Session III

1:30PM – 2:45PM

TRANSBOUNDARY WATER MANAGEMENT INSTITUTIONS TO BALANCE COMPETING WATER USES IN THE APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

Shannon N. Bonney¹ and Laurie A. Fowler¹

¹River Basin Center, Odum School of Ecology, University of Georgia

The Apalachicola-Chattahoochee-Flint (ACF) River Basin has been struggling to balance human and ecosystem needs for decades. The three states composing the basin (Georgia, Florida, and Alabama) have been in and out of the courtroom since the 1980's. Researchers from five universities and the ACF Stakeholders non-profit organization undertook a three-year interdisciplinary and collaborative research program to develop recommendations for institutional arrangements that could facilitate sustainable management of the ACF River Basin. During four phases of research, students and faculty in The University Collaborative: 1) characterized the structure and functions of well-known transboundary water management institutions; 2) described the myriad of ways regulatory authority is obtained by transboundary water management institutions and shared amongst governmental and stakeholder organizations; 3) conducted a gap analysis to identify and assess water management functions that are currently underway in the ACF River Basin in order to (a) disclose gaps where activities essential for effective multi-state planning and sustainable management of the ACF River Basin are missing and (b) illuminate initial opportunities for a transboundary water management institution to fill in those gaps; and 4) developed recommendations for transboundary management of the ACF River Basin, based upon a synthesis of previous institutional options research and a consensus-driven process between university researchers and members of the ACF Stakeholders non-profit organization.

ACCESS, VULNERABILITY, AND LANDSCAPE CHANGE IN LAIKIPIA, KENYA

Ryan Unks

Warnell School of Forestry and Natural Resources, University of Georgia

In Laikipia, Kenya, as in many other areas in East Africa, a number of factors have decreased pastoralists' access to seasonal grazing lands over the past century. While decreases in herders' abilities to track seasonally variable resources within semi-arid environments are known to have dramatic livelihood impacts, few studies have examined the ecological impacts of fragmentation at the landscape scale. However, changes in the mobility and composition of herds are thought to amount to large differences in landscape level ecological processes. This proposed PhD dissertation research will focus on the complex simultaneous changes in ecological and social dynamics in pastoralist communities in Laikipia. I propose an examination of the interaction of these factors as they relate to

livelihoods and ecological processes using a multi-scalar approach that employs landscape ecology, plant community ecology, and anthropological methods. Using remote sensing and plant ecology field methods, I will analyze vegetation changes as they relate to herding practices. Focus-group interviews, key-informant interviews, and household surveys will be used to examine how institutional factors mediate individual households' access to seasonal grazing resources, and how this relates to vulnerability to drought events. Ecological changes and barriers to sustainability will also be explored from herder's perspectives. Potential beneficial outcomes of this research include an improved understanding of the dynamics and thresholds of change in semi-arid ecosystems, increased understanding of processes that directly impact plant diversity, and a more nuanced understanding of the relationship between these factors, social processes, and novel natural resource management regimes.

THE POLITICAL ECOLOGY OF SOCIAL SAFEGUARDS AND THEIR IMPLICATIONS FOR INDONESIA'S EMERGING REDD+ LANDSCAPES

Walker DePuy
Department of Anthropology, University of Georgia

Conservation over the past century has seen marked shifts in both regimes of value and scales of governance. The United Nations' Reducing Emissions from Deforestation and Forest Degradation (REDD+) policy is a potent example of both shifts, explicitly connecting national forest conservation to global climate change mitigation (Angelsen, et al. 2012). Such a policy seeks to transnationally connect local communities to international markets, metrics, and norms, as well as implicitly produce new *carbonized* conservation landscapes (Rice 2010). Importantly, however, such a policy likewise raises questions of environmental justice and in particular how local communities will be engaged (or not) in such processes.

To address such concerns, the international community has promoted the concept of social safeguards as a necessary component of REDD+ policy. Whether risk-based or rights-based, such frameworks are meant to ensure that local communities are not adversely impacted from REDD+ policy and practice (Arhin 2014). And yet, despite purportedly emphasizing issues of local consent, participation, and co-benefits, social safeguards are seen as a "black box" whose diversity of actors, priorities, and implications for local communities have been little studied (*ibid*). Looking at the case study of Indonesia, whose national government in 2013 created an agency explicitly to enact REDD+ policy, I will investigate 1) how social safeguard frameworks are discursively and materially created across governance scales and value regimes; 2) how such frameworks contribute to the territorialization of Indonesian forests and communities; and 3) what lessons can be learned for effective and equitable REDD+ policy from this.

APPLYING PROPERTIES OF SYSTEMS TO SYSTEMS OF PROPERTY TO UNDERSTAND RESILIENCE IN SOCIAL ECOLOGICAL FRAMEWORK

Jayanta Ganguly
Department of Geography, University of Georgia

Resilience thinking analyses the structure and function of a social-ecological system to inform adaptive management on how to avoid a regime shift into a new and potentially undesirable state (Walker 2005). The focus of resilience approaches on how much shock a coupled social-ecological system can absorb and still remain within a desirable or undesirable state begs many questions about what that state is, why it is so desirable, and for whom. For example, a system is considered to be in a desirable state based on its ability to provide ecosystem services for social well-being and development. However, resilience studies of such systems rarely address whose needs are being met from these goods and services, and what kind of politics influences their distribution and management. I would like to show that through a systems approach to property and rights, we can view grass roots social movements as a commons property resource. This in turn allows us to observe how resilience operates in social ecological systems.

DEVELOPING AN INTEGRATED POPULATION MODEL FOR ADAPTIVE HARVEST MANAGEMENT OF THE AMERICAN ALLIGATOR

Tara Gancos Crawford¹ and Dr. Clinton T. Moore²

¹*Georgia Cooperative Fish and Wildlife Research Unit, Warnell School of Forestry and Natural Resources, University of Georgia;* ²*U.S. Geological Survey, Georgia Cooperative Fish and Wildlife Research Unit, Warnell School of Forestry and Natural Resources, University of Georgia*

Establishing regulatory policies for harvested species can be a formidable task. As interest in recreational hunting has increased following the American alligator's delisting from the Endangered Species Act, wildlife managers have struggled to establish regulations that safeguard this long-lived, slow-growing game species from over-exploitation. Complicating matters, alligators' semi-aquatic nature makes monitoring difficult. Managers seek a biological basis on which to base harvest decisions to ensure sustained benefits for consumptive and non-consumptive users. Implementing adaptive harvest management, which iteratively identifies optimal management decisions for multi-objective management problems and reduces uncertainty about how the population responds to harvest pressure, requires the development of population and harvest models that describe the underlying mechanisms of alligator population dynamics. These models represent alternative hypotheses about alligator population structure and function, and enable managers to evaluate potential outcomes of alternative management decisions. Our project aims to develop integrated population models (IPM) that can capitalize on existing isolated data sources regarding alligator survival, reproduction, and response to harvest. This presentation will describe our use of simulation in the development of an IPM that will provide inference on underlying demographic parameters and survey characteristics, such as detection probability. Future work will fit this model to various types of data sourced from our participating state agency partners, and it will characterize the biological importance and variability in these parameters with respect to key habitat types for broader regional applicability and use in adaptive management of public alligator harvest programs.

Session IV – Speed Talks

3:00PM – 3:45PM

FEEDING WILDLIFE: PEOPLE AND PATHOGENS

Sebastian Ortiz

Warnell School of Forestry and Natural Resources, University of Georgia

The world's growing human population continues to expand further into areas inhabited by wildlife, and feeding animals is an increasingly popular activity as a way for people to enjoy and connect with nature. Taking into account that approximately 75% of all human emerging infectious diseases originate from wildlife, closely examining supplemental feeding, is a matter of interest for both the public health and conservation fields. Animal species that are able to adapt to the novel environment presented by growing cities, often encounter abundant sources of nutrition within easy access in the form of food provided by humans or household waste. However, large gatherings due to these new food sources can lead to an elevated risk of transmission of contact-dependent pathogens. In the urbanized area of Jekyll Island in coastal Georgia, raccoons, gray foxes and feral cats are three species of mammals coming into close contact due to supplemental feeding stations. My project aims, on one hand, to describe the natural history of pathogens of raccoons on Jekyll Island, determine what pathogens can be transmitted between raccoons and feral cats, and whether these pathogens are also found in foxes coming into contact with them. On the other hand, I seek to explore Jekyll Island resident's perceptions of zoonotic disease transmission, their attitudes towards the number of raccoons visiting feral cat feeding stations, and to discern the local inhabitant's thresholds between liking and disliking raccoons.

INTEGRATIVE CONSERVATION PLANNING IN THE *CORREDOR BIOLÓGICO PÁJARO CAMPANA*, COSTA RICA USING ANIMAL MOVEMENT AND PARTICIPATORY MAPPING DATA

Cody Cox

Warnell School of Forestry and Natural Resources, University of Georgia

Biological reserves alone fail to adequately protect many animal species. Costa Rica established a network of biological corridors to address this problem and facilitate connectivity between protected areas, allowing individuals to move through the landscape to find food and mates. The University of Georgia – Costa Rica, located within the *Corredor Biológico Pájaro Campana* (CBPC), has undertaken a reforestation program that could increase habitat area and connectivity for a range of species. However, there is a need for research to determine the most effective locations for trees to be planted. In this study, I will research the movement patterns of three species of birds [emerald toucanets (*Aulacorhynchus prasinus*), blue-crowned motmots (*Momotus momota*), and clay-colored thrushes (*Turdus grayi*)] and two species of mammals [white-headed capuchin monkeys (*Cebus capucinus*) and Central American agoutis (*Dasyprocta punctata*)] using Global Positioning Systems (GPS) units to determine each species' habitat use and movement patterns. These data will allow me to assess the current level of habitat connectivity in the CBPC and identify key targets for conservation and reforestation. I will also conduct focus group participatory mapping activities with members of the CBPC's initiative council to identify the land use preferences and conservation priorities of local community members. These data will then be compared with the biological data to identify areas of alignment and conflict and to assess trade-offs to create a comprehensive plan that highlights target areas for protection and reforestation that not only are biologically effective but also have stakeholder support.

THIS WAS OUR VALLEY: TAKING ASHEVILLE, NORTH CAROLINA'S WATERSHED

Anne Chesky Smith

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Though 19th and early 20th century development projects—construction of roads, mines, dams, reservoirs, and the like—provided a variety of benefits for large numbers of people, the social and economic consequences, ranging from landlessness, joblessness, and homelessness to food insecurity, loss of access to common property, and social disintegration, fell on a displaced few. Because social impacts are difficult to quantify, however, the compensation displacees received was typically only monetary in nature, which did not account for the value of their more intangible losses, such as their former social networks and livelihoods. As a result, the social consequences of development-induced displacement accrued in displaced populations and their descendants over the long term. To understand the multi-generational impacts of development-induced displacement, I consider the 50 families and their descendants who were displaced from their ancestral homes in 1926 to provide a drinking water reservoir to the growing urban population of the nearby city of Asheville, North Carolina. The over 250 people, whose ancestors had first settled the area as early as the 1790s, were given a one-time payment of the market value of their property, involuntarily removed from their homes, and forbidden from accessing the entire 22,000-acre watershed. Many displacees gave interviews, authored newspaper columns, and wrote books lamenting their displacement, and several would attempt to gain access—legally and illegally—to the closed property. Today, though North Fork's original families have passed on, their descendants are still drawn to the North Fork valley, which remains closed to the public.

THE MAPS HAVE 'I'S: HOW CAN CONSERVATION RESEARCH MAPPING BE CRITICAL AND PARTICIPATORY?

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Participatory Mapping (PM) is an approach to spatial information and communication management based on citizen engagement with research, knowledge creation, and socio-ecological governance processes. PM combines Participatory Learning and Action (PLA) methods with Geographic Information Systems (GIS). Spatial information and analysis tools are used by participants to represent and facilitate spatial learning, discussion, information exchange, analyses, decision making, and advocacy. In contrast to state or official maps, lay knowledge and accompanying maps are increasingly valuable for issues of governance of contested resources and spaces. PM has the capacity to “counter-map” or problematize state-centric regulations or unequal power dynamics held by controlling private parties and allow for advocating and exerting power by otherwise marginal or underrepresented

individuals, groups, and communities (Peluso 1995). Participatory mapping is intended to empower underrepresented groups or communities through measured, demand-driven, user-friendly and integrated applications of geo-spatial technologies. Rocheleau (2005) warn however, that making a map with a local group is not just an act “*against* power, it is an exercise *of* power” (emphasis hers). This paper explores some of the strengths and limitations of using PM in conservation research. What should a researcher consider when unlocking the black box of mapping to place control and use of culturally and ecologically sensitive spatial information and knowledge in the hands of local communities for the purposes of conservation? How *critical* can PM be while achieving specific natural resource conservation goals?

A STORY OF BATS AND TEQUILA: BAT CONSERVATION AMIDST MEXICO’S TEQUILA INDUSTRY

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Mexico is home to the popular alcoholic drink, tequila. Tequila is an important socio-economic product of Mexico and is often considered the country’s national drink. Tequila production must follow strict standards in order for the product to be called by that name: the product must be made from at least 51 percent blue agave (*Agave tequilana* Weber variety azul) that is grown within delimited boundaries of five Mexican states: all of Jalisco (the traditional home of tequila) and select counties of four other states. In today’s industry, most agave farmers (both smallholder farmers and large corporate producers) rely on vegetative propagation of their plants instead of cross-pollination by pollinators such as bats, which has had the detrimental effect of reducing agave genetic diversity and increasing their susceptibility to pest and disease outbreaks. Three species of nectarivorous bats migrate between central Mexico and the southwestern U.S./northern Mexico. Their migration follows the blooming of agaves and other flowering plants as the bats rely on the nectar and pollen from these plants to fuel their migration. However, the spread of vegetative propagation techniques in agave farming has created large food deserts for these bats during their migration and has likely contributed to their declines. I am interested in understanding the interplay between agave production and bat conservation within an international transboundary context, and investigating potential bat-friendly agave management methods. Specifically, I would like to explore agave farmers’ perceptions of and willingness to use these methods that could contribute to bat conservation efforts.

UNEVEN SEAS, UNEVEN CULPABILITIES: STATE CONTRIBUTIONS TO GLOBAL SEA-LEVEL RISE

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Climate scientists and oceanographers have measured a steady rise in global temperatures and seas since the end of the 19th century. Using paleological and historic data, these scientists have demonstrated a strong empirical relationship between atmospheric greenhouse gas concentrations, global temperature, and global sea levels. Drawing on such data, climate modelers have developed semi-empirical models to forecast a range of accelerating rates for both global temperature and sea-level rise. It is well known that developed countries have produced the majority of greenhouse gases from fossil fuel burning, which has resulted in international debates over curbing emissions. Only recently climate scientists have begun apportioning global warming contributions to states, yet state culpability for sea-level rise has not been assessed. This indicates a need to evaluate the uneven distribution of state culpability for sea-level rise. In this paper, we present an extended analysis of published data on state contributions to global warming and global commitment to sea-level rise for the top twenty greenhouse gas emitting countries. We found that the largest total contributor is the United States, while the largest per capita contributor is the United Kingdom. We base our results on observed historic emissions and project them into the future using current annual emissions of greenhouse gases by countries. The results have implications for international negotiations over curbing emissions, but in particular as regards social equity, for identifying states most responsible for providing sea-level rise adaptation aid to more vulnerable and less culpable countries.

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