PERVASIVE INVASIVES: FLORIDA RANGE LIMITS FOR TWO PRIORITY NONNATIVE REPTILES (STUDENT)

HANNAH BEVAN, University of Central Florida Department of Biology, hperkins@knights.ucf.edu; DAVID JENKINS, University of Central Florida Department of Biology, David.jenkins@ucf.edu

Proactive management of nonnative species is paramount for effective mitigation strategies in Florida. Species distribution models (SDMs) are robust, predictive tools that can delineate species range limits based on known habitat preferences to inform optimal removal/control efforts. No Florida-specific SDMs exist for the cane toad (*Rhinella marina*) and Argentine black and white tegu (*Salvator merianae*), and it is not known whether these priority nonnative species have reached their full range potential in the state. Thus, SDMs were created for both the cane toad and tegu to determine potential areas for further spread and establishment. Presence data were expertly and spatially refined to represent known reproductive populations with a 1 km2 buffer between occurrences. Fine scale (1 km2), uncorrelated, environmental predictor variables represented species preferences based on climate, elevation, vegetative cover, land cover, and human population density. We applied ensembles of ten different algorithms to produce mean probabilities of habitat suitability for each species, and the final models represented high levels of accuracy and model performance (TSS > 0.87). Both the cane toad and tegu SDMs show little chance of spread beyond current reproductive populations throughout Florida, suggesting that these nonnatives may have reached their limits of dispersal. This also suggests that management efforts should stay focused on known areas of establishment. Both nonnative species show high levels of habitat suitability along parts of Florida’s west and east coasts as well as the southern tip. Interestingly, when the human population predictor was removed from models to mitigate for potential sample/observer biases, SDMs still represented high levels of performance (TSS > 0.83), but showed increased prediction of spread beyond areas of human impact (despite the use of spatial thinning). SDMs accounting for such sample biases may be more ecologically relevant to inform management decisions without potentially skewed anthropophilic associations. Overall, our results depict two highly accurate and robust Florida-specific ensemble SDMs that can be used to inform proactive cane toad and Argentine black and white tegu mitigation strategies.

EFFECTS OF TRANSLOCATION ON AMERICAN CROCODILE (*CROCODYLUS ACUTUS*) MOVEMENTS AND HABITAT USE IN SOUTH FLORIDA.

ARNOLD BRUNELL, Florida Fish and Wildlife Conservation Commission, Arnold.Brunell@MyFWC.com; VINCENT DEEM, Florida Fish and Wildlife Conservation Commission, Vincent.Deem@MyFWC.com; CAITLIN HACKETT, University of Florida, chackett@usgs.gov; BRITTANY BANKOVICH, Florida Fish and Wildlife Conservation Commission, Brittany.Bankovich@MyFWC.com; FLORENT BLED, Florida Fish and Wildlife Conservation Commission, Florent.Bled@MyFWC.com; SETH FARRIS, University of Florida, seth.farris@usda.gov; FRANK J. MAZZOTTI, University of Florida, fjma@ufl.edu.

A slowly Increasing population of threatened American crocodiles (*Crocodylus acutus*), combined with a high and increasing density of people, has led to an increase in conflicts between humans and crocodiles. Because of the perception that crocodiles pose an unacceptable threat to human safety in urban settings, managing human-crocodile conflicts is inextricably intertwined with the long-term viability of North America’s crocodile population. One approach involves the translocation of individuals perceived as problematic. However, translocated crocodiles often return, and little is known about the risks they face traveling back. We examined the impacts of translocation on crocodile movements, body condition, and survival to help managers develop strategies for addressing human-crocodile conflict in ways that minimize risks to crocodiles and reduce the probability of return. We captured and fitted GPS units to 17 crocodiles, which included 7 translocated and 10 reference (non-translocated) crocodiles. Body condition based on Fulton’s K was similar for both groups. One translocated and 2 reference crocodiles were recaptured, and all had higher Fulton’s K scores upon recapture. Three crocodiles were translocated ≤45 km, and all 3 returned to their original capture site. Four crocodiles were translocated >100 km, and none of them returned during the time that we tracked them. We did not document increased mortality or long-term negative effects on translocated crocodiles. However, translocated crocodiles had movement patterns and corticosterone levels that suggested they experienced greater stress while away from their original home range. Reference crocodiles exhibited slow, meandering movements, whereas translocated crocodiles exhibited fast, active, directional movements until their return to their original home range. Mean home ranges and core use areas were larger for translocated crocodiles than for reference crocodiles. Three translocated crocodiles that returned and 2 reference crocodiles residing near urban surroundings exhibited the greatest degree of habitat selection. Selected habitats included residential, industrial, and agricultural land use areas that are not ideal in terms of human-crocodile conflict potential. Indications of increased stress suggest that translocations should be conducted only as a last resort. When necessary, crocodiles should be moved at least 100 km to ensure that they will not return quickly, if at all.

A decade of population dynamics on two medium-sized Florida scrub-jay sites

Monica Folk, Wild Folk, LLC, monicafolk@embarqmail.com

The remaining large populations of Florida scrub-jays (Merritt Island, Ocala National Forest, Archbold Biological Station) are intensively studied. Many small populations are monitored by citizen-scientists through Audubon’s Jaywatch project, which can detect population trends over time but provides limited details on population dynamics. I monitored two medium-sized populations (25-40 groups) annually, including number of groups, number of birds, group size, productivity (fledglings), dispersal patterns, response to habitat treatments and spatial dynamics, since 2012 (Indian River County) and 2017 (Greenways Triangle). Population trends, anthropomorphic influences, and response to restoration efforts are discussed.

EFFORTS TO REESTABLISH A SELF-SUSTAINING POPULATION OF STRIPED NEWTS IN THE APALACHICOLA NATIONAL FOREST.

RYAN C. MEANS, Coastal Plains Institute, ryan@coastalplains.org; REBECCA P. M. MEANS, Coastal Plains Institute, rebecca@coastalplains.org;

The Striped Newt (*Notophthalmus perstriatus*) Repatriation Project is an ongoing salamander conservation effort in the Apalachicola National Forest (ANF), Florida. Many partners collaborate to accomplish this work, including zoos, universities, agencies, NGO’s, and citizen scientists. The project began in 2011 in response to documented declines, especially in the western half of the salamander’s small global range. We addressed potential causes of decline before repatriation, including disease surveillance, disease susceptibility testing, and wetlands hydroperiod augmentation. We created captive assurance colonies and identified suitable recipient ponds prior to release. Release events occur annually and seasonally to mimic the known natural history of the species. To date, we have released almost 4,000 larval and adult striped newts into seven ANF recipient wetlands. We monitor repatriation success with a combination of drift fencing and dipnetting. Terrestrial recruitment varies by pond, season, and year. Overall documented terrestrial recruitment is 3.1%. We have observed several repatriation success benchmarks, including multi-generational reproduction, and returning terrestrial adults years after release at three wetlands. Although some success has been documented, we still have far to go in our effort to restore the ANF striped newt metapopulation back to pre-decline status. To enhance success, we adaptively manage the project. Currently we are experimenting with new husbandry and release techniques. We also are increasing captive newt output, disease testing, and enhancing water supply in a drought-stricken landscape. As the journey toward success continues, along the way, we are generating a blueprint for salamander repatriation.

WATER-WORKS? EFFECTS OF HYDROLOGIC RESTORATION ON THE FORAGING BEHAVIOR OF THE ENDANGERED FLORIDA BONNETED BAT (STUDENT)

L. P. NICHOLSON, Department of Wildlife Ecology and Conservation, University of Florida, lnicholson@ufl.edu; E. C. BRAUN DE TORREZ, Florida Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission, Elizabeth.Braun@MyFWC.com; and H. K. OBER, Department of Forest Ecosystems and Society, Oregon State University, holly.ober@oregonstate.edu

Wetlands provide critical foraging habitat for bats, but over half of wetlands worldwide have been degraded or destroyed. Although wetland restoration efforts have recently become more common, little is known about the effects of such efforts on bats. Understanding the potential impact of these landscape changes is particularly important for the endangered Florida bonneted bat (*Eumops floridanus*), given that much of the species’ geographic range is covered in wetlands that face increasing threats from development and sea level rise. We investigated the impacts of a large-scale hydrologic restoration project expected to affect over 2.5 million acres of wetlands and estuaries in the Florida Everglades. We conducted acoustic surveys at 194 detector sites in 2020 and 2021. Detectors recorded at each site for 16 total nights during 4 distinct sample periods spanning the dry and wet seasons. Sites were randomly stratified across a restoration gradient (unrestored, partially restored, restored) and compared with reference areas. Hydrologic and vegetation metrics were measured at each site to investigate drivers of bat activity in the context of wetland restoration. Acoustic files were classified in Kaleidoscope Pro and all Florida bonneted bat calls were manually verified. We describe patterns of bat activity relative to restoration categories and the relative importance of hydrologic and vegetative characteristics in driving habitat selection by Florida bonneted bats. Insights from this study will inform immediate management decisions for this endangered species and contribute to our understanding of how bats more broadly are influenced by hydrologic and subsequent vegetative changes in wetlands.

MOVEMENT PATTERNS OF WADING BIRDS AS A MECHANISM LINKING FRESHWATER WETLANDS AND COASTAL ECOSYSTEMS IN THE GREATER EVERGLADES (STUDENT)

ALEXANDER R. SHARP, Harte Research Institute for Gulf of Mexico Studies, asharp1@islander.tamucc.edu; DALE E. GAWLIK, Harte Research Institute for Gulf of Mexico Studies, dale.gawlik@tamucc.edu; MICHELLE PETERSEN, Florida Atlantic University, mpetersen@fau.edu

Metrics of wading bird nesting and abundance have been used as indicators of hydrologic conditions in a wide variety of wetland ecosystems, including the Everglades of Florida. When tolerance differences to hydrologic conditions among species are known, this group of birds provides clear and rapid signal of environmental conditions. However, in coastal ecosystems little is known about the degree to which these birds are affected by freshwater management practices. Therefore, we used a resource selection framework to test the dependence of coastal wading birds on freshwater ecosystems and alternate freshwater habitats. In this study, satellite transmitters are being deployed on nonbreeding little blue herons (*Egretta cerulea*) in the lower Florida Keys (Great White Heron National Wildlife Refuge), and the Charlotte River Estuary (J.N. “Ding” Darling National Wildlife Refuge), with the goals of (1) contrasting the annual movement patterns of little blue herons in a south Florida estuary and archipelago with an emphasis on the linkage between colony sites and foraging habitat and (2) quantifying the annual cycle of habitat selection by little blue herons in a south Florida estuary and archipelago. One heron was trapped and fitted with a transmitter during the 2021 nonbreeding season in the Florida Keys study site. To date, we have collected 2871 location points for this individual, identifying key little blue heron roost site and foraging locations, two potential nest sites, and a 1,240 km migration. Three herons in the Florida Keys and nine herons in the Charlotte River Estuary have been tagged during the 2022 nonbreeding season to date, allowing for a suitable comparison in nonbreeding space-use between these populations. Preliminary data collected from these individuals highlight the potential importance of freshwater habitats for nesting of herons found in coastal environments during the nonbreeding season. Continued data collection from additional tagged herons will identify if this pattern is more representative of a large proportion of the population or if this is individual preference.

ARE SOME BATS SNOWBIRDS? THE SUMMER ORIGINS OF TRICOLORED BATS OVERWINTERING IN CAVES

LISA M. SMITH, Florida Fish and Wildlife Conservation Commission, Lisa.Smith@myfwc.com; JEFFERY A. GORE, Florida Fish and Wildlife Conservation Commission, jagore@comcast.net; TERRY J. DOONAN, Florida Fish and Wildlife Conservation Commission, Terry.Doonan@myfwc.com; CAITLIN J. CAMPBELL, University of Florida, cait.j.campbell@gmail.com

Animal migration is a widespread global adaptation by which individuals move in response to environmental conditions to reach more favorable conditions. For bats in temperate climates, migration and hibernation are often associated with each other when these bats must migrate to reach suitable overwintering sites. But the degree to which hibernation drives migratory behavior of bats in subtropical climates, where conditions may remain warm with available prey year-round, remains unclear. Understanding the migratory strategy of subtropical bats during winter is of increasing importance as they are threatened by stressors such as disease and environmental change. We evaluated migration patterns of tricolored bats (*Perimyotis subflavus*) in Florida, through analysis of stable hydrogen isotope ratios of the fur. We inferred the summer geographic origins of the fur samples and estimated the minimum distance and likely direction traveled by hibernating individuals. We used linear models to examine whether hibernation region, colony size, and an individual’s sex affected distance traveled. We sampled 111 bats hibernating at 40 sites and found that more than half (54%) of individuals were residents of the area in which they hibernated. We found that almost half of the sampled bats (43%) traveled from southern Florida to overwinter in North Florida. We also documented three individuals that traveled >100 km from northerly origins, one of which had traveled an estimated minimum distance of 1,382 km. Our results indicate an unexpected pattern of poleward (south to north in the northern hemisphere) autumnal movements of tricolored bats in the subtropical southeastern portion of their range. We also found that tricolored bats moved farther to reach hibernacula in Northwest Florida and hibernacula with more populous colonies, with no difference between sexes in the distance traveled. Even though we found that few (3%) bats migrated into Florida from farther north, those migrants can potentially transfer the fungus that causes the deadly white-nose syndrome, which does not currently occur in the state. Our results support the characterization of tricolored bats as flexible partial migrators at the southern edge of their range, with an infrequently exercised capacity for long-distance movements.