**Wildlife Translocation in Florida Symposium**

**March 24th 2022**

9:00–9:05

WELCOME and INTRODUCTION TO Translocation

Karl E. Miller, Symposium Chair

9:05–9:25

POOR SURVIVAL OF CAPTIVE-REARED KEY LARGO WOODRATS RELEASED ON A CAT-FREE ISLAND

Daniel Greene

9:25–9:40

SUCCESSFUL TRANSLOCATION OF THE FLORIDA SCRUB LIZARD IN PALM BEACH COUNTY

Kevin Enge

9:40–10:00

Effects of Translocation on Gopher Frog Survival and Movement

Traci Castellón and Anna Deyle

10:00–10:15

MONITORING THE SUCCESS OF GOPHER TORTOISE TRANSLOCATIONS IN FLORIDA

Katharine Richardson

10:15–10:35

REINTRODUCTION OF BROWN-HEADED NUTHATCHES TO JONATHAN DICKINSON STATE PARK

Jim Cox

10:35–10:55

A SUCCESSFUL NEW METHOD FOR TRANSLOCATING FLORIDA SCRUB-JAY FAMILY GROUPS

Karl E. Miller

10:55–11:15

Translocation of captive-bred Florida grasshopper sparrows to augment a wild population

Juan Oteyza

11:15–11:35

RED-COCKADED WOODPECKER TRANSLOCATION HISTORY AND FUTURE POTENTIAL CHALLENGES

Will McDearman

11:35–12:00

TRANSLOCATION: CHALLENGES AND OPPORTUNITIES

Panel Discussion with Q&A

POOR SURVIVAL OF CAPTIVE-REARED KEY LARGO WOODRATS RELEASED ON A CAT-FREE ISLAND

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The Key Largo woodrat (*Neotoma floridana smalli*) is a federally endangered rodent endemic to Key Largo in the upper Florida Keys. In 2002, as the woodrat population declined, some individuals were captured for breeding in zoos. Unfortunately, most captive-reared woodrats released back to Key Largo were quickly depredated by house cats (*Felis catus*). To determine if survival rates of captive-reared woodrats would increase without cats present, we released 15 captive individuals (7M:8F) in December 2011 on Palo Alto Key, a small island adjacent to Key Largo that had no rodents and no cats or other non-native predators. We placed 15 nest boxes among downed trees on the island and released woodrats in the boxes in 2 cohorts, 8 days apart. Boxes were provisioned with nesting material and food, but the woodrats were free to leave. We fit each animal with a radio collar equipped with a mortality sensor and monitored them via radiotelemetry several days each week and with trapping each month. Seven individuals died within 10-14 days after release, and after 8 weeks only 5 animals were known to be alive. Three animals survived to 16 weeks, but only 1 of the 15 released woodrats was alive when monitoring stopped at 19 weeks. We suspect animals were depredated because we found 13 of the radio collars unzipped outside the nest boxes and 10 had blood and hair attached. Only 1 carcass was found and necropsy suggested predation by a raptor. Predation occurred at night when woodrats were active and great horned owls (*Bubo virginianus*), including a pair which nested on an adjacent island may have been responsible. Our results suggest that survival rates of captive-reared woodrats released into the wild will remain low even if house cats are absent. Any future captive-breeding program might improve survival by conditioning woodrats to evade predators before releasing them into the wild. The woodrats that survived >2 weeks gained weight and moved among nest boxes and even shared nest boxes. This suggests that our method of releasing animals directly into open nest boxes can be as effective as softer releases that temporarily confine individuals.

SUCCESSFUL TRANSLOCATION OF THE FLORIDA SCRUB LIZARD IN PALM BEACH COUNTY

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The range of the Florida scrub lizard (*Sceloporus woodi*), which has been petitioned for federal listing as Threatened, has contracted 77 km northward along the Atlantic coast since a 1986 survey. The species now occurs only as far south as northeastern Palm Beach County. In March 2019, we translocated 48 male and 54 female scrub lizards to 40-ha Hypoluxo Scrub Natural Area in east-central Palm Beach County using animals from 2 state parks with robust populations in southeastern Martin County. This population persists 3 years after translocation, extending the species’ range 37 km southward. We monitored the population monthly during the first year and bimonthly thereafter using visual encounter surveys. We observed the most lizards (31 adults and 23 juveniles) during the September 2019 survey, and lizards had dispersed at least 350 m south 17 months after release. The habitat at the site has remained apparently suitable for *S. woodi* for at least 30 years and causes for the population extinction remain unidentified. The success of this translocation, which required relatively little time and money, suggests the possibility of reestablishing a population along the southwestern Gulf coast, where the last population apparently went extinct in the 1990s.

Effects of Translocation on Gopher Frog Survival and Movement

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Mitigation translocation is increasingly used to move animals out of harm’s way at development sites, but translocation outcomes have rarely been adequately monitored, particularly for amphibians. We used radio telemetry to assess survival and movement of 23 experimentally translocated adult gopher frogs (*Lithobates capito*) to augment a recipient population in north-central Florida. Although post-translocation monitoring was our primary goal, we also compared our results with those of 24 non-translocated frogs that were monitored in three previous studies, conducted at different locations and times. For both translocated and non-translocated frogs, movement was the most important predictor of mortality, with translocated frogs having significantly higher probability of movement and higher mortality during the first month following release. However, the effect of translocation on survival was non-significant after controlling for movement because movement was dangerous for both translocated and non-translocated frogs. Higher probability of movement by translocated frogs was likely a behavioral response to the translocation experience, whereas the high rate of movement among non-translocated frogs was associated with breeding pond visitation, which was not observed among translocated subjects. Survival was high for both groups once they settled into underground refugia and movement declined. Despite comparatively high mortality of translocated frogs immediately following release, more than half survived and remained in the vicinity of the release site through the end of monitoring, meeting an early benchmark of translocation success.

MONITORING THE SUCCESS OF GOPHER TORTOISE TRANSLOCATIONS IN FLORIDA

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Gopher tortoise (*Gopherus polyphemus*) translocation is a frequently implemented conservation tool in Florida that involves capturing tortoises from planned development sites and releasing them to authorized locations known as recipient sites. Recipient sites are permitted on private and public lands with suitable habitat through several recipient site permit options, and recipient site permittees can charge development site owners a fee to place their tortoises on the recipient site. The financial incentive is greatest for a Long-term Protected Recipient Site Permit, as permittees under this permit type are eligible to receive up to four tortoises per acre if certain permitting criteria are met. The Long-term Protected Recipient Site Permit also offers the highest level of protection to translocated gopher tortoises on private lands, as it requires a monitoring commitment, a perpetual conservation easement and accompanying management plan, and long-term financial assurance. As such, issuance of translocation and Long-term Protected Recipient Site permits can play an important role in achieving the overall conservation goal of the Gopher Tortoise Management Plan to restore and maintain secure, viable populations throughout the species’ current range in Florida. However, our understanding of the success of these Long-term Protected Recipient Sites is limited until we establish a robust monitoring method and implement it across the numerous sites that have been permitted since the inception of the current translocation program in 2009. Here we describe our current work with partners to create a recipient site-specific Line Transect Distance Sampling approach to monitoring Long-term Protected Recipient Sites and the challenges we must overcome to account for potentially confounding variables and spatio-temporal heterogeneity introduced by the translocation and permitting process.

REINTRODUCTION OF BROWN-HEADED NUTHATCHES TO JONATHAN DICKINSON STATE PARK

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Habitat fragmentation and loss have led to the extirpation of brown-headed nuthatch populations in many parts of their range. The effects of these landscape-level processes have been especially evident in south Florida where recent studies documented a loss of genetic diversity among extant populations and extirpation of several populations once found on large public landholdings (e.g., Everglades National Park, Corbett Wildlife Management Area, and Jonathan Dickinson State Park). We initiated a nuthatch reintroduction project in 2017 for Jonathan Dickinson State Park (27.00 degrees, -80.10 degrees; Martin County) by catching and transporting juveniles from St. Sebastian River Preserve State Park (27.86 degrees, -80.45 degrees; Brevard County). Juveniles were targeted for translocation at a time of the year when they normally disperse and translocation could guide their ‘dispersal’ to a new site. The project takes a long-term perspective (10+ years) and uses inexpensive methods (ca $1,500 annually) in hopes of achieving 3 goals: (1) establish a second population containing the distinctive genetic signature now restricted to St. Sebastian River Preserve, (2) assess the emergence of cooperative breeding behavior in a *de novo* population, and (3) monitor the population for any long-term changes in behavior. This third objective follows a recent study of a nuthatch population reintroduced to the Florida Everglades that found reduced behavioral diversity two decades after the population was established. These changes could be an outcome of translocation. Successful breeding at Jonathan Dickinson has occurred each year and the population in 2021 featured 7 breeding groups. Cooperative breeding was observed in the first breeding season. Plans are to continue to translocate 3-4 additional juveniles annually until the population exceeds 25 breeding pairs. The lengthy translocation period should capture more genetic diversity and reduce the likelihood of changes in behavior.

A SUCCESSFUL NEW METHOD FOR TRANSLOCATING FLORIDA SCRUB-JAY FAMILY GROUPS

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Translocation of the threatened Florida scrub-jay (*Aphelocoma coerulescens*) has been proposed as a strategy to maintain landscape connectivity, to assist populations in growing and recolonizing vacant habitat, and to preserve genetic diversity. However, few translocations have occurred to date and with mixed results. We conducted research to test assumptions about Florida scrub-jay translocation and evaluate its impact on source populations and recipient populations. During late January and early February of 2017-2020, we translocated 12 family groups (31 individuals) from Ocala National Forest, including 10 family groups (23 birds) released at Seminole State Forest in Lake County and 3 family groups (8 birds) released at Jonathan Dickinson State Park in Martin County. All birds survived, settled, and established breeding territories at the recipient sites. We found no evidence that “soft” release (i.e., housing the birds in an acclimation cage for 1-2 days at the recipient site before their release) offered any short-term or long-term benefits over “hard” release (i.e., directly releasing the birds without an acclimation period); movements, home range size, and breeding success were nearly identical. Ten of the 13 family groups remained intact and most quickly settled within 50-200 m of their release site. The other family groups disbanded during their first year at the recipient site but reorganized themselves into other family groups. We recommend translocation of Florida scrub-jay family groups in late winter just prior to the breeding season, without the use of acclimation cages, as a safe and effective technique that yields greater success at recipient sites than previous studies. Our findings contradict previous assumptions about Florida scrub-jay translocation which were not tested empirically. Our study reinforces the importance of using appropriate release strategies for translocation at appropriate times of the year.

Translocation of captive-bred Florida grasshopper sparrows to augment a wild population

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Captive breeding and release programs are often used to help augment populations of critically endangered species, but little guidance exists on how to maximize recruitment rates of released individuals. For example, for birds, there is uncertainty surrounding the appropriate age and season of release despite the literature showing that these factors can influence the outcome of projects. We conducted an experiment releasing captive-bred Florida grasshopper sparrows (*Ammodramus savannarum floridanus*), one of the most critically endangered birds in North America, at two different ages and seasons. We determined settlement and recruitment rates to assess the most effective release strategy and, therefore, maximize future investment in this conservation program. Between 2019 and 2021, we released 498 Florida grasshopper sparrows into the wild, including 390 juveniles (40-75 days post-hatch) and 108 adults (6-10 months post-hatch). Juveniles were released during the breeding season, as they become independent from their parents, and around the time they would naturally start exploring their environment. Adults were released before their first breeding season to improve survival over their first winter and to allow time for them to settle in breeding territories. Settlement and recruitment rates for 265 birds released during 2019-2020 were 21% and 14%, respectively. Birds released as juveniles (n=181) had higher settlement and recruitment rates than birds released as adults (n=84) in both 2019 and 2020; 25% and 18% for juveniles versus 12% and 5% for adults. These recruitment rates compare favorably with other captive breeding and release programs and have helped augment the wild population. In 2020 and 2021, 45% of the adults at the release site consisted of released birds and 65% of the fledglings produced came from nests with at least one released parent. Furthermore, this population has increased by 84% between 2019 and 2021, suggesting that these releases, along with other management actions, have proven effective at helping this population. Based on these findings, we will continue to release captive-bred Florida grasshopper sparrow as juveniles during the breeding season.

RED-COCKADED WOODPECKER TRANSLOCATION HISTORY AND FUTURE POTENTIAL CHALLENGES

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Red-cockaded woodpecker (RCW) subadults have been translocated extensively since 1994 from large or stable donor populations to small, demographically and genetically vulnerable recipient populations, including Florida. The purpose is to augment recipient population size and growth, in conjunction with other management, to reduce risks of population decline and extirpation. From 2007 to 2020, at least 1,548 subadult RCWs were translocated as 774 male-female pairs via the RCW Southern Range Translocation Cooperative (SRTC) in 5 states. The U.S. Fish and Wildlife Service (USFWS) organized the SRTC in 1995, which continues today in partnership with federal, state, and other organizations. Since 1995 in Florida, 6 SRTC donor populations have provided translocation services to 25 recipient populations. Overall annual translocation success for a SRTC recipient, as one measure, is total number of subadults remaining in the population during the first breeding season following translocation. Overall annual translocation success for SRTC recipient populations during 2007–2020 was highly variable (0.00–1.00). Overall annual success during this period for all subadults pooled across all recipients each year ranged from 0.46 to 0.54. In Florida, 18 of 25 translocation recipient populations increased to attain 30 potential breeding groups (PBGs) or a smaller translocation population size objective, after which translocation ceased. Translocation currently continues at 7 Florida recipient populations. With rare exception, SRTC translocation recipient population sizes have increased. Translocation had the strongest effect on growth of small populations in the best linear mixed effect model with management and habitat covariates in the USFWS RCW Species Status Assessment. Challenges to continue a successful translocation program include funding and agency support for donor population services. Questions about modifying translocation procedures in the USFWS RCW Recovery Plan require research. Effects of a hard-release, for example, may be difficult to detect relative to a standard soft-release without careful experimental designs due to highly variable annual rates of translocation success at some recipient populations. Research also should be implemented before modifying the monitoring of donor population RCW group size and composition to identify suitable subadults for translocation.