P.3: Miscellany (Chair: Beth Ross)

P.3.1: Ross

Drivers of Mottled Duck Pairs on the Upper Texas Gulf Coast

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With increased variability in climate and decreased quality of coastal marsh habitat along the western coast of the Gulf of Mexico, the Mottled Duck (Anas fulvigula) on the Texas Gulf Coast has declined by an estimated 94% since 1986, with annual population growth rates as low as 0.54. While both decreases in adult survival and nest success likely account for declines in the population, it remains unknown how changes in climate directly impact population dynamics of the species. We used a Bayesian hierarchical model to simultaneously quantify the influence of changes in drought and density dependence on population density estimates of Mottled Ducks. We obtained data from aerial surveys conducted from 1985-2015 of Mottled Duck populations along the Texas Gulf Coast. Significant decreases in the abundance of Mottled Duck breeding pairs occurred in Texas from 1995 to 2000, and the population has remained at a relatively low but stable level since 2001. The strongest decreases in breeding pairs were seen in Brazoria and Big Boggy National Wildlife Refuges. Our results did not show evidence of strong density dependence, but did indicate that the average Palmer Drought Severity Index during late nesting season (May, June, and July) best predicted changes in population density in the subsequent year. Our results highlight the importance of seasonal effects on Mottled Duck population changes, and support previous research indicating large declines in population abundance along the Texas Gulf Coast.

P.3.2: Moon

A Stochastic Model to Simulate Mottled Duck Population Dynamics

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A systems-based modeling approach for regional mottled duck populations can be used to elucidate the importance of individual vital rates and develop predictions regarding mottled duck persistence, while simultaneously identifying key uncertainties and priority research needs. We used STELLA 10.0.3, to construct, parameterize, and evaluate a stochastic, seasonally-explicit, annual cycle demographic model based on data currently available from the Western Gulf Coast (WGC) population of mottled ducks. Our model is based on difference equations, with stochastic variables drawn from normal distributions. We simulated mottled duck populations for 100 years and evaluated our model by comparing results with independent estimates of population parameters reported in the literature. The model simulated the flow of individual mottled ducks through the annual cycle within the WGC region (i.e., the system). The flow of individuals was driven by production and began with nest survival in season 1. The model was partitioned into 3 different seasons based on mottled duck life history: breeding/brooding (season 1: February 1 - July 15), post-breeding (season 2: July 16-October 31), and winter (season 3: November 1 - January 31). Ducklings were separated into male and female classes in season 1 at a 50:50 ratio. Mortalities were removed seasonally from each population segment (i.e., ducklings, juveniles, and adults). Because mottled ducks are non-migratory and our model was based on the entire population of WGC mottled ducks, we assumed no immigration and emigration. Following model evaluation a sensitivity analysis was conducted. The model was sensitive to variation in all breeding parameters. As presented, the model assumes constant habitat conditions across time and does not incorporate future degradation of habitats. This quantitative model can be used to clarify functional relationships among demographic rates and population growth to provide input for conservation actions and long-term management of the WGC mottled duck population.

P.3.3: Lancaster2^

Diurnal Use of Private, Public, and Incentivized Conservation Wetlands by Female Mallards in Mississippi

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The Mississippi Alluvial Valley (MAV) is a continentally important region for migrating and wintering waterfowl, especially mallards (*Anas platyrhynchos*). Historically, mallards exploited bottomland hardwood forests and associated emergent and riverine wetlands in the MAV. Flood abatement facilitated drainage and clearing of 7.5 M ha of hardwood bottomlands primarily for agriculture by early 20th century. Today, habitat and resources available to wintering mallards in the Yazoo Basin of the MAV generally fall within three categories 1) PROG - USDA Natural Resources Conservation Service (NRCS) programs that incentivize landowners' retirement of marginal farmland, wetland restoration, and inundation of restored wetlands and harvested croplands, 2) PRIV – private croplands and seasonal wetlands that are deliberately flooded or receive temporary or backwater flooding after rainfall, and 3) PUB – state or federal lands with wetland complexes. We have no contemporary information on how individual mallards use these classifications of habitats in the Yazoo Basin. We used very high frequency telemetry techniques to monitor use of the aforementioned categories by radio-marked female mallards in the north and south Yazoo Basin from December-March 2010-2012 and 2013-2015. Using compositional analysis, we divided proportional use of PROG and PUB by proportional use of PRIV and used natural log ratios of these as response variables in a split-plot multivariate analysis of variance to evaluate diurnal use of these lands by mallards. Specifically, we tested ($\alpha = 0.05$) influences of individual females, north or south regions, hunting or post periods, and a period by region interaction. We located 268 individual radio-marked females on 7,441 occasions, including 3,080, 1,255, and 3,106 locations on PRIV, PROG, and PUB lands, respectively. Categorical use varied among females, regions, periods, and the period by region interaction ($Ps < 0.001$). Female mallard use of PROG was 0.31-0.79 times less ($Ps \leq 0.03$) than PRIV among period by region combinations. Females used PUB 0.95 and 1.49 times more ($Ps \leq 0.002$) than PRIV during hunted periods in the north and south regions, respectively. After hunting season, mallards used PUB 0.73 times less ($P < 0.001$) than PRIV in the north region but used PUB and PRIV similarly ($P = 0.55$) in the south region. Mallards used federal lands closed to waterfowl hunting extensively during waterfowl hunting season, likely to reduce daytime hunting disturbance and mortality. Use of PRIV and PROG lands increased after waterfowl hunting season in absence of disturbance. Our results suggest that public and private lands are extensively used and provide resources that may promote survival during and after hunting seasons. Moreover, conservation programs increase resource availability by hydrological and other management otherwise unavailable without financial incentives for landowners. Future research may explore how use of public lands and conservation program easements on private lands contribute to wintering mallard survival.

P.3.4: Minor^

Avian Productivity and Community Ecology of Restored PPR Grasslands

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Grassland ecosystems of the Prairie Pothole Region (PPR) provide critical nesting habitat for many species of waterfowl and grassland birds. Historically, the PPR consisted of extensive grasslands and wetlands desirable to many avian species. However, altered disturbance regimes, habitat fragmentation, conversion to crop or grazing land, and wetland drainage, have led to the loss of vast expanses of native prairie and declines in numerous avian populations. Considerable conservation efforts have been focused on restoring vital nesting grounds of the PPR, with special attention for waterfowl species. A common restoration practice has been the establishment of low-diversity (3 – 5 species) Dense Nesting Cover (DNC) areas seeded with a mixture of introduced grasses and forbs including intermediate wheatgrass (*Thinopyrum intermedium*), tall wheatgrass (*Thinopyrum ponticum*), alfalfa (*Medicago sativa*), and sweet clovers (*Melilotus* spp.). While DNC provides secure duck nesting habitat, low-diversity seeding mixes have demonstrated vulnerability to invasion by less desirable vegetation species and often fail to meet habitat requirements of grassland nesting passerines. In attempts to develop more ecologically-sound and heterogeneous habitat, recent seeding practices have shifted towards higher-diversity plantings of 16-32 native forbs and grass species. Research indicates ducks select restored species-rich native vegetation at a level similar to DNC, but lower nesting success has been reported in some years, possibly suggesting an ecological trap via increased abundance of co-existing prey and predators. Understanding the impact of vegetation cover on grassland community dynamics and avian productivity is necessary before high-diversity seeding practices are implemented at the landscape level. The goal of this study is to understand the impacts of vegetation cover type on grassland duck and passerine productivity. Nesting density and success of ducks and passerines was monitored on 26, 20-ha experimental plots across south-eastern North Dakota and north-eastern South Dakota. Plots represented a species diversity gradient ranging from low-diversity stands of DNC to progressively more species-diverse plots (8-41 species). From May to July of 2014 and 2015, ATV chain drags and passerine rope drags were conducted at 7-day intervals to monitor density and nesting success of breeding ducks and passerines. Nests were followed until final fate (i.e. predated, abandoned, or hatched) was determined for duck species and until fledging for passerine species. 814 duck nests of 7 species and 215 passerine nests were located during 2014 to 2015. Small mammal abundance was estimated using Sherman live traps for 3 consecutive nights twice per year, during early and late nesting season. Mesopredator abundance was also monitored on 10 study plots, paired geographically, to represent extremes of the vegetation species diversity gradient using trail-camera scent stations for six weeks during June to July 2015. I present preliminary results obtained from this study. Results will provide predictions of how co-existing prey, predators, and grassland bird productivity should respond across a vegetation species diversity gradient. This information will help direct management efforts in developing restoration strategies that best facilitate avian productivity and suitable habitat heterogeneity for the interacting wildlife communities of grassland ecosystems.

P.3.5: Pokley^

Testing Competing Hypotheses for the Seasonal Variation in Nesting Success

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Populations of lesser scaup and greater scaup have been below the North American Waterfowl Management Plan goal of 6.3 million since 1984. As of 2013, scaup populations are down 12% from their long term average (1955-2013) of 4.7 million birds (Walker 2005). Nesting success has shown to be an important factor in determining population growth. If the mechanisms of nesting success can be identified wildlife managers can make the necessary changes to increase scaup nesting success and thus increase the population. Nests were located during nest searches conducted from May through July and monitored until fate was determined. Nest age, nest location, vegetation height, distance to water and depth of water were recorded at each nest. Program MARK was used to determine known fate models. The model that incorporated both nest age and the effect of nest date showed the greatest support. I found a greater influence of date on nesting daily survival rate than age during this study, although both positively influenced scaup nest daily survival rate. The positive relationship between scaup nest daily survival rate and date, provided support for the nest concealment hypothesis. This posits that increasing vegetation height and density throughout the nesting season decreases predation. Sugden and Beyersbergen (1987) found similar results that artificial nests in tall, dense nesting cover escaped predation from crows for longer than those in sparse cover. The positive effect of nest age on nest survival supports the nest heterogeneity hypothesis, i.e., that low quality nests are depredated at a higher rate than nests of higher quality. Although these results have been supported by others (Klett and Johnson 1982) it has not received unanimous support. It is possible that these results might be influenced by the lack of heterogeneity in vegetation and differences in predator community at Red Rock Lakes National Wildlife Refuge compared to other sites.

P.3.6: Martorelli^

Evaluation of Waterfowl Use and Thermal Characteristics of Alfalfa and Perennial Grasses in Eastern South Dakota

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The Prairie Pothole Region provides migratory and breeding habitats for 50-80% of waterfowl in the United States. Increased agricultural production and declining Conservation Reserve Program reenrollment in the Midwest has resulted in declines in grassland habitats on private land, which supports the need for investigating and identifying effective management strategies to maximize available grassland nesting habitat on public lands. South Dakota Game Fish and Parks manages over 119,000 hectares of Game Production Areas (GPA) of primarily grassland habitat. To improve the quality and availability of grassland nesting habitat, marginal grassland and cropland cover are cleared and reseeded to perennial grass and forb mixes. Current management techniques for perennial grassland conversion use genetically modified planted row crops and herbicide treatment to remove noxious weeds and enrich the seedbed prior to reseeding. Although this technique is effective, planted row crops provide poor nesting cover. To evaluate other management techniques, we examined the use of Roundup Ready© alfalfa (*Medicao sative*) for preparing seedbeds for perennial grassland conversion. Previous research with alfalfa has indicated haying, which typically occurs during the peak nesting period, hinders nest productivity. Therefore, we investigated the influence of delaying the first cutting date (July 10) on waterfowl production by systematically nest dragging alfalfa and other typical grassland plantings. Additionally, the dynamic between vegetation structure and thermal qualities of grassland nesting habitat, which can influence nest-site selection and success are poorly understood. Thus, we assessed the vegetation structure and thermal properties of various grassland nesting cover types. We examined operative temperature at both the stand and nest level using thermal probes to identify possible patterns of nest site selection. In the first year of the study during 2015, nest densities appeared lower in Roundup Ready© alfalfa (0.24 nests/ha) than observed in other grassland types (cool-season mix = 0.38 nests/ha, warm-season mix = 0.39 nests/ha, and smooth brome (*Bromus inermis*) dominated stands = 0.30 nests/ha). Apparent nest success followed the same general trend with Roundup Ready© alfalfa appearing to lower nest success (14%) than observed in other grassland types (cool-season mix = 23%, warm-season mix = 23%, and smooth brome dominated stands = 31%). Preliminary results of temperature data revealed considerable inter-field heterogeneity. Further analyses will examine the relative influence of inter-field vegetation and temperature profiles on nest success and nest site-selection. The results of our study will provide land managers with information to maximize the quality and availability of waterfowl nesting habitat on GPAs.