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EVALUATION OF BREEDING POPULATION SURVEYS OF MOTTLED DUCKS

by Vijayan Sundararaj and Bart Ballard

Estimating animal abundance through surveys plays an important role in understanding population dynamics. Surveys are often the first steps in protecting and managing biodiversity. They are also important tools for tracking how species respond to disturbances in their environment in the long run. Patterns explained from long-term survey data help guide the management of species of concern.

Editor's note: Dr. Vijayan Sundararaj is an Assistant Professor of Research and Dr. Bart Ballard is a Research Scientist at CKWRI. Funding was provided by U.S. Fish and Wildlife Service. Dan Collins and Kathy Fleming of USFWS, and Kevin Kraai of TPWD collaborated on this project. ~

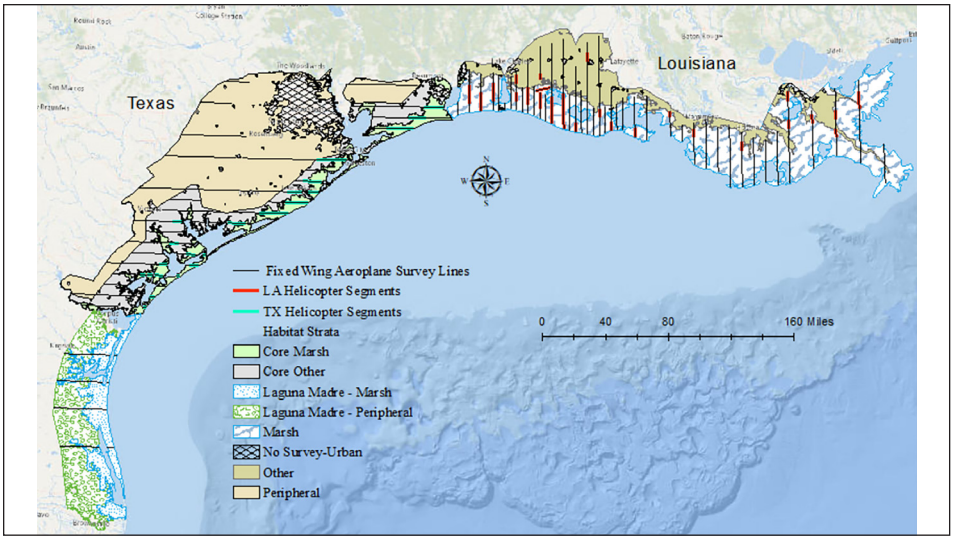
The mottled duck breeding population survey in the Western Gulf Coast covering Texas and Louisiana is one such exercise. The mottled duck is a non-migratory and medium-sized dabbling duck. Its population has shown a general decline over the last four decades. The primary reasons for this decline are habitat loss and degradation due to human activity and drought. The current population stands at less than 100,000 birds in the western Gulf Coast.

Because of concern for the duck, an annual range-wide breeding population survey was initiated in 2008. The purpose of the survey is to monitor population abundance and distribution. The U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department (TPWD), and Louisiana Department of Wildlife and Fisheries conduct the aerial surveys jointly. Surveys are typically conducted in mid-April on two aerial platforms: a fixed-wing airplane and a helicopter. The fixed-wing airplane transects (~2,200 miles) cover the broader area of the Gulf Coast known to contain the mottled duck population. This is then followed by a "beat-out" pattern of flying helicopters in selected segments to correct for missed detections during the fixed-wing survey.

After several years, the cooperating agencies stressed the need to re-evaluate the current survey design for changes and improvements. We analyzed survey data from the Western Gulf Coast using geospatial and statistical tools. We looked for distribution patterns, factors affecting duck detection, and influences of habitat type on duck counts. We also evaluated Texas Brush Country for suitable duck habitat for aerial surveys in the future.

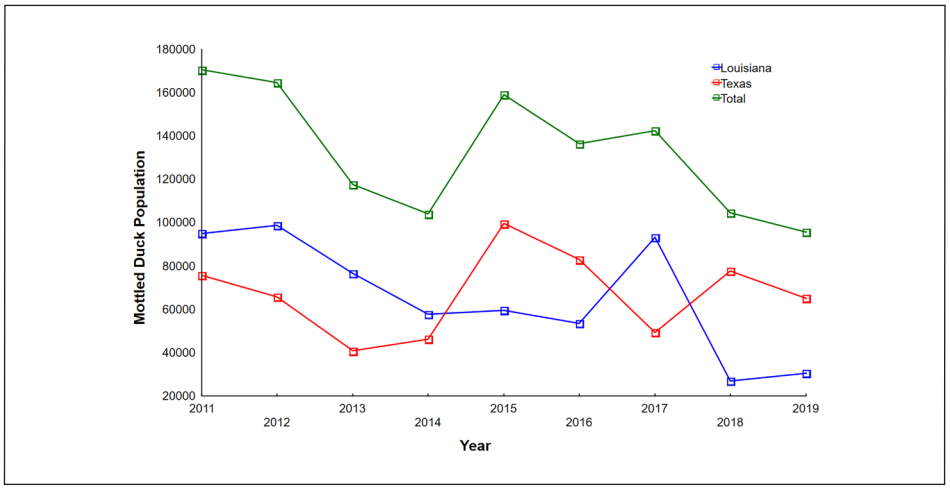
Spatial distribution revealed the Chenier Plains region of Texas and Louisiana as the hotspot for mottled ducks in the Western Gulf

This Issue



The mottled duck breeding population survey in the Western Gulf Coast depicting the survey lines passing through different habitat strata.

Coast. The coastal marsh area in Texas and Louisiana contains the highest densities of ducks in the greater region. In Texas, variability in the detection of mottled ducks was influenced by frequent changes in airplane survey crew members. This suggests the importance of experienced and consistent crew members taking part in the surveys. Ground habitat conditions in terms of water and vegetation cover also played important roles in duck detection. Given the variation in habitat conditions in Texas, we recommend that helicopter transects be expanded across a broader area to account for detection errors. An analysis of preliminary data collected in the Texas Brush Country by the TPWD in 2019 suggests that this region may be home to more than 20,000 birds. A systematic aerial survey taking distribution and abundance of water bodies into account is needed. This will allow us to determine the true extent of the mottled duck population in the Brush Country. ~



Population trends of mottled ducks in the Western Gulf Coast over the last decade show a general decline.

By The Numbers

3-5 average number of eggs in an American Kestrel nest (Texas Parks and Wildlife Department. www.tpwd.texas.gov American Kestrel Wildlife Fact Sheet)

6 families of butterflies: Swallowtails, Whites and Yellows, Gossamerwings, Metalmarks, Brushfoots, and Skippers. (A Swift Guide to Butterflies of North America, J. Glassberg, 2017, Princeton University Press)

A Talk on the Wild Side

It's here! We've launched our biweekly podcast! We're on Apple Podcasts, Spotify, and other platforms. You can help us grow our listeners by leaving a review and rating for us on Apple Podcasts, and by sharing our podcast with friends.

You can also listen on our website:

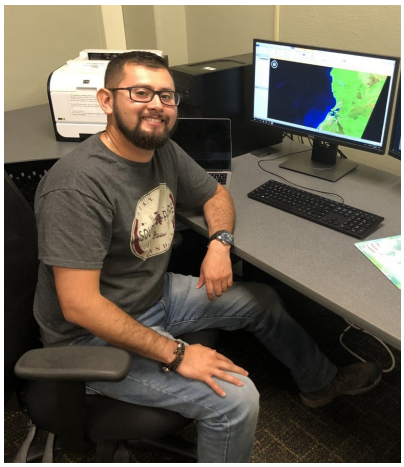
https://www.ckwri.tamuk.edu/media/talk-wild-side-podcast ~

First Meredith Long Wildlife Internship Awarded

Meredith Long was a longtime supporter of CKWRI, especially the Institute's quail research program. To honor his passion for CKWRI and wildlife conservation, Meredith's family established the Meredith Long Wildlife Internship Program endowment to fund wildlife students to work with CKWRI scientists and students. This program provides the interns an excellent educational and research experience and brings the best and brightest wildlife students to Kingsville to work on research projects. The first Meredith Long Intern is Christian Guajardo, a wildlife student at Texas State University. Christian's internship focuses on a project using drones to assess crop damage caused by feral pigs. He will also have opportunities to work on other research projects. CKWRI thanks Cornelia Long for her support

Visit our web page at http://www.ckwri.tamuk.edu

of young people passionate about conservation, and for helping to train the next generation of scientists. ~



Christian Guajardo

Texas State Aquarium Ocelots

CKWRI scientists recently collaborated with the Texas State Aquarium (TSA) to bring two ocelots to an exhibit there. Dr. Clay Hilton helped bring the sisters from the Albuquerque Zoo that will be used to breed ocelots for reintroduction to the wild. Dr. Sandra Rideout-Hanzak advised TSA on native plants to use in the ocelot exhibit. ~

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Did You Know?

In zoological nomenclature the family names of animals all end with the suffix "-idae." (A-Z Animals. www.a-z-animals.com Classification of Animals: The Complete Guide)

Plains bristlegrass (*Setaria leucopila*) is a good grass to use in seed mixes for brush control after root plowing. (Grasses of the Texas Hill Country, B. Loflin and S. Loflin. 2006. Texas A&M University Press)

CONNECTING THE DOTS: USING NETWORKS TO ADDRESS THE QUAIL DECLINE IN TEXAS

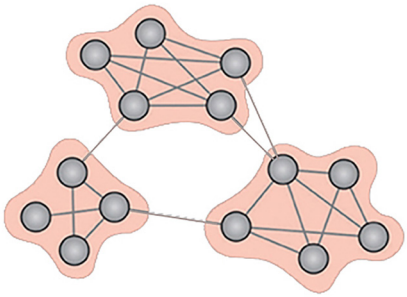
by Kristyn G. Stewart, Fidel Hernández & John W. McLaughlin

Networks are present in almost every aspect of our lives. We interact with networks all day. When we deposit a check, call a friend, or surf the web, we use networks. Networks are at play even when we don't realize it. An example of this is when our body shuttles nutrients to and from cells during digestion. All these systems—banks, friends, computers, and cells—are types of networks.

In a technical sense, networks are mathematical structures. They map relationships among objects. In networks, objects are represented by "nodes" and relationships by "links." Networks are ubiquitous in nature and society. Thus, network analysis today plays a role in many disciplines ranging from biology to economics to sociology. More recently, networks have been used in ecology and are shedding new light on old topics such as food webs, habitat connectivity, and population dynamics.

Systems in nature are comprised of at least three layers: habitat, wildlife, and people. Habitat is the landscape upon which wildlife occurs. People manage and influence both the landscape and wildlife. Each layer can be thought of as a network. For example, habitat loss results from urbanization, agriculture, and other factors. This creates a network of habitat patches (nodes). Patches may be isolated or connected by corridors (links). Wildlife on the landscape will occur as subpopulations located on these habitat patches (nodes). Some subpopulations will be completely isolated; others may be connected through dispersal of individuals (links). The people living on this landscape also represent a network. Some of the people are strangers with no relationship, while others are connected as neighbors, co-workers, friends, or family.

Most research on networks has been conducted viewing them as individual networks, with no connection to other networks. This perspective is limited because relationships occur not only within networks but also among them. Studying how information flows within and among networks provides a more holistic view of nature. This is termed a "meta-network" analysis. We will be using a meta-network approach to better understand the quail decline in Texas by linking habitat, quail, and human networks.



A network is a mathematical structure consisting of nodes (circles) and links (lines) that map relations among objects. Image obtained from internet.

Northern bobwhite, a valued and popular game bird in Texas, has been declining across its geographic distribution. Although bobwhites have been studied extensively, most of the research has focused on the species' ecology or habitat needs. Only a limited number of recent studies have focused on the human-dimensions aspect of bobwhite conservation. In addition, past studies have been conducted with little to no integration of the key components influencing populations (i.e., habitat, quail populations, and stakeholders).

Our goal is to integrate habitat, quail, and stakeholder networks into a single, unified social-ecological system. This should allow us to better understand and address the quail decline. Our objectives in using a meta-network approach are two-fold. First, we want to better

quantify how the landscape may be influencing quail populations and, in turn, how this natural context influences stakeholder perceptions. We also want to identify ecological and social levers that may exist to better address the quail decline through improved conservation and outreach strategies. Because of its breadth, this research is being conducted in collaboration with Alejandra Olivera-Méndez (Colegio de Posgraduados, México), Sabrina Szeto (Szeto Consulting, Germany), Jon Horne (Idaho Game and Fish Department), and Angela Guerrero (Stockholm Resilience Centre, Sweden), and is supported by Texas Parks and Wildlife Department.

The use of a meta-network approach is of great value for investigating social-ecological systems. It is particularly useful in cases where the species involved evokes strong human emotions, such as elk, gray wolves, or sensitive species. Such a meta-network approach is relatively new and growing in its application. We hope our use of it in the bobwhite decline serves as an exploration into the new era of social-ecological network research in conservation. ~

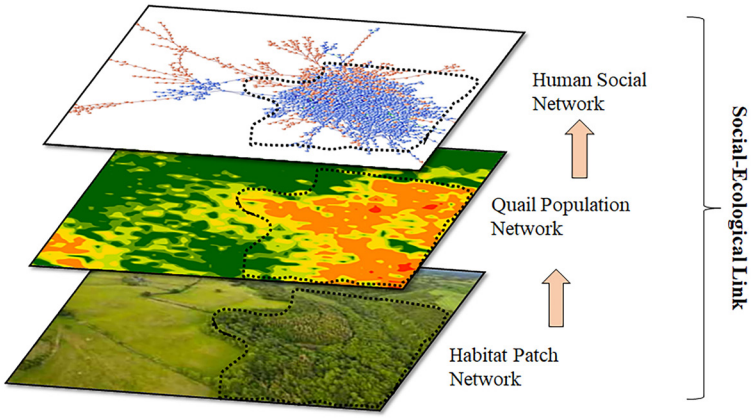


Illustration of a holistic system in which habitat, wildlife, and human networks have interdependencies (depicted by dashed polygons), and information flows both within and among networks. Images of landscape and human networks were obtained from internet.

What Do They Eat?

Purple martins eat many species of flying insects. However, the claim that they eat 2,000 mosquitoes a day is highly exaggerated. (National Audubon Society. https://www.audubon.org/field-guide/bird/purple-martin)

Aoudad browse on shrubs most of the year, but switch to primarily eating grasses during the winter. (Animalia. https://animalia.bio/barbary-sheep)

Editor's Note: Ms. Kristyn G. Stewart is a graduate student at CKWRI. Dr. Fidel Hernández is a Research Scientist at CKWRI. Mr. John W. McLaughlin is with the Texas Parks & Wildlife Department. ~

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