

*The Rob and Bessie Welder
Wildlife Foundation*

2016





The Foundation's Legacy

What would you do if you were given the directive to create a program that would enhance wildlife science, conservation, and management in Texas and expand it even beyond the state's borders? This is the exact challenge with which Robert H. Welder tasked the Trustees of the Rob and Bessie Welder Wildlife Foundation. It must have been a daunting task, to say the least, but one that the Trustees met with enthusiasm.

Rob Welder's passion for wildlife was forever codified in his will, which came into effect on his passing in December 31, 1953. Through that will, he would forever change the lives of hundreds of future wildlife biologists who would become Welder Wildlife Foundation Fellows.



E. A. Marth (left), Texas Game, Fish and Oyster Commission biologist, releasing quail with Robert H. Welder (right) on Rob's ranch near Sinton Texas in 1940.

His actions set a unique course for accomplishing wildlife research and conservation, the effects of which would soon spread throughout North America and eventually to other parts of the world, as is related in the adjacent letter we recently received from Dr. Koos Bothma, a Fellow who spent his career in Africa. Little did the trustees know the magnitude of the legacy Rob's philanthropy and their decisions would have on the future of wildlife science and conservation. The Foundation has now funded over 350 graduate students through fellowships that provide them support throughout the entirety of their Masters or Ph.D. programs, The Foundation has also supported countless other researchers and graduate students by providing research sites and living space on the Foundation's 7,800-acre Refuge.

The Welder Foundation is now in its 63rd year of existence and we are striving to enhance Rob Welder's vision. The recent development of the Rob and Bessie Welder Wildlife Conservation Foundation is helping to support our mission of research and education. Through the generous donations of many individuals, we are excited to announce we now have the funding within our Research Endowment to award an additional Welder Fellowship this year. We would like to invite you to be a part of our legacy by donating to the Welder Wildlife Foundation. Your donation will enhance wildlife research by helping to support a Welder Fellow. For more information about the Research Endowment, please contact our director Dr. Terry Blankenship.

We wish you and your families a joyful holiday season and a wonderful new year.

Dr. Terry Blankenship,
Director

Dr. Selma Glasscock,
Assistant Director

A Welder Fellow's Legacy



After completing my Bachelor's and Master's degrees at the University of Pretoria in 1964, I became a Professional Scientist in the Conservation Division of the Transvaal Province in South Africa. At that time, no one in conservation in South Africa had been trained in wildlife science and management, as it did not yet exist there. The private wildlife industry was still in its infancy and few expected the start of the vast commercial wildlife industry that now exists.

Wanting to study wildlife science in the USA, I applied and was accepted to Texas A&M University. James G. Teer took me on as his first doctoral student under a Welder Wildlife Foundation Fellowship. My wife, Babsie, and I arrived here in September 1965. Jim Teer had arranged for me to do a population ecology study of cottontail rabbits on the Welder Wildlife Refuge in south Texas. The Foundation's first Director, Dr Clarence Cottam, had been the Assistant Director of the U.S. Fish and Wildlife Service, and the Assistant Director, Caleb Glazener, had been Director of the Texas Game and Fish Commission. Babsie and I lived on Welder Wildlife Refuge from 1967 to 1969 and became part of a large family of friends and associates. It was a wonderful experience and remains one of our greatest privileges in life.



Dr. J du P (Koos) Bothma

In my absence, the University of Pretoria created a B.Sc. (Honours) graduate course in wildlife management in 1965, being presented by five visiting lecturers from the USA. Upon my return to South Africa, I assumed the Eugène Marais Chair of Wildlife Management in the Dept. of Zoology in 1970. This program became the graduate level Centre for Wildlife Management which I directed until I retired in 2005. It has now trained hundreds of senior wildlife researchers and managers from Africa, Argentina, Austria, Australia, Brazil, Britain, Canada, Croatia, France, Germany, Italy, Ireland, Japan, the Netherlands, Portugal, Switzerland, the United Arab Emirates and the USA. Some of these graduates later became Directors of Conservation bodies locally and abroad, served the huge commercial wildlife industry in South Africa or became wildlife veterinarians with academic training in both veterinary science and wildlife management.

When I set foot on the Welder Wildlife Refuge, little did I anticipate the huge wildlife research and management contributions to South Africa and many other countries that would germinate from my experience at the Welder Wildlife Refuge. The Welder Foundation's fellowships are gifts that keep on giving. I will forever be grateful for having been allowed to be part of the Foundation's legacy.

J du P (Koos) Bothma now lives in George, South Africa. Collectively, he has written over 381 papers, publications, and books to date and is still writing. He has presented many national and international papers at wildlife conferences, has trained 380 B.Sc. (Honours) graduate students in Wildlife Management and has acted as supervisor or co-supervisor to 52 Masters and 11 PhD students.





Welder Fellows Research

Angelica F. Arredondo

Texas A&M University-Kingsville, M.S.

April A. Conkey, Ph.D., Major Advisor

EVALUATION OF THE SUCCESS AND EFFECTIVENESS OF THE RANGELANDS CURRICULUM



The Millennial generation is perceived to be less in touch with the outdoors; thus there is a need to provide educational resources and outdoor experiences to address this gap. The Rangelands Curriculum was created to teach the fundamental elements of Texas rangelands to students in grades K–5, whether it is the management of livestock and grazing or conservation of wildlife. By presenting the curriculum, we hope to develop an appreciation for these rangelands among its audience. The curriculum has been implemented throughout all 20 Texas Education Service Centers, reaching over 1,000 teachers and counting. In order to evaluate the curriculum, teacher surveys have been created to attain feedback on both the workshops distributing the curriculum, and the curriculum itself. Teachers are asked to observe any changes in student behavior before and after curriculum use. Pre- and post-tests will help us evaluate knowledge and concepts gained by students from lessons used in the classroom. Data acquired from teacher surveys, and student pre- and post-tests will aid in the determination of the impact on students' behaviors, attitudes, and future goals. The evaluation of this curriculum will help to meet its overall objectives of instilling an appreciation and need for conserving our rangelands for future generations.



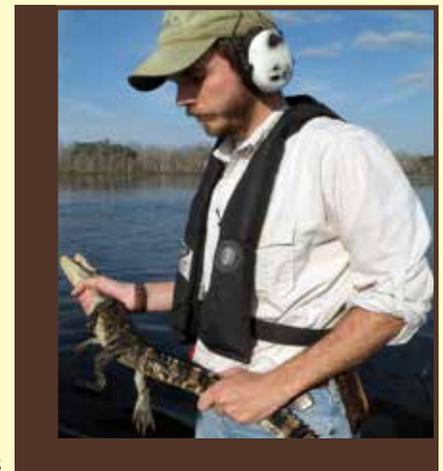
Cord B. Eversol

Texas A&M University-Kingsville, Ph.D.

Scott E. Henke, Ph.D., Major Advisor

TRANSLOCATION OF AMERICAN ALLIGATORS: IS IT A VIABLE MANAGEMENT STRATEGY?

Translocating wildlife to solve conservation and management problems is becoming increasingly common because many game animals have been successfully translocated in the past, and because wildlife translocation programs are often perceived by the general public as proven and humane strategies for overcoming these challenges. As many species are faced with an increase in human-wildlife conflict, determining the most effective strategies of managing these issues is important. In particular, the recent growth of American alligator (*Alligator mississippiensis*) populations has caused an influx of human-alligator conflict. Translocation of nuisance alligators has become a common management strategy for alligators in Texas; however, the effectiveness of this method has yet to be determined. In this study, we propose to determine if this is an appropriate and cost-effective strategy to be used to manage nuisance alligators reported in Texas (i.e., Can alligators be successfully translocated?). To date, we have translocated five American alligators outfitted with ARGOS GPS transmitters in order to gain insight on the effect of translocation on movement patterns of these individuals. Because we are in the preliminary stages of this study, no trends have emerged and individuals seem to remain at translocation sites when moved greater than 200 km.



Welder Fellows Research



Jessica L. Glasscock Texas A&M-Kingsville, Ph.D.

David G. Hewitt, Ph.D., Major Advisor

GROUND JUNIPER AS A ROUGHAGE REPLACEMENT IN WILDLIFE AND LIFESTOCK FEEDS

Alternative feed resources are often sought during times of economic or environmental stress. Research conducted through the Texas A&M AgriLife Research Wood to Feed program has shown successful utilization of juniper (*Juniperus* spp.) as a roughage replacement in lamb feedlot diets. The objectives of my research are to evaluate: growth performance of Spanish X Boar kid goat crosses fed feedlot diets utilizing ground juniper or honey mesquite (*Prosopis glandulosa*) as the roughage ingredient; consumption of pelleted supplement containing ground juniper as a roughage ingredient by free-ranging white-tailed deer (*Odocoileus virginianus*); and the effectiveness of ground juniper in pelleted supplement to deter non-target species consumption. Data analysis to date has demonstrated successful use of 4 species of juniper as a roughage replacement for cottonseed hulls in Spanish X Boar kid goat cross feedlot diets. A pen study evaluating consumption of juniper-based pellets by feral swine (*Sus scrofa*), a non-target species, and a field trial assessing consumption of juniper-based deer pellets by free-ranging white-tailed deer and feral swine have been completed. Findings from the data analysis of the latter two studies could potentially decrease economic costs associated with supplemental feeding of white-tailed deer.



Julie M. Golla

Utah State University, M.S.

Julie K. Young, Ph.D., Major Advisor

URBAN BOBCAT (*Lynx rufus*) ECOLOGY IN DALLAS-FORT WORTH, TEXAS



Wildlife and people increasingly overlap in their use of space and resources in rapidly expanding cities. Urban carnivores cause concern because of their potential effects on human health and livelihoods. This study evaluated habitat utilization of bobcats (*Lynx rufus*) in an urbanized area within the Dallas-Fort Worth (DFW), Texas metroplex. Spatial data were collected from 10 bobcats via GPS in 2014–2015. Average home range size was 4.60 km² (kernel density estimators; $n=9$, $SE=0.99$ km²) for all resident bobcats and 3.48 km² ($n=5$, $SE=1.13$ km²) for females, and 6.00 km² ($n=4$, $SE=1.61$ km²) for resident males. Resource selection function (RSF) models showed bobcats selected for habitat within intermediate distances to grasslands and low-medium development, and selected habitat closer to developed open space and agricultural areas. Camera trap data analyzed with spatially explicit capture-recapture (SECR) models informed by the RSF results estimated a population density of 0.64 bobcats/km² ($SE=0.22$). Bobcats in DFW have smaller home ranges and occur at higher densities compared to both rural and peri-urban bobcat populations. These differences are likely due to abundant urban prey and limited space for bobcats in DFW. Understanding how bobcats coexist with people in an urban mosaic of resources will facilitate wildlife management in DFW.





Welder Fellows Research

Olivia A. Kost

Texas Tech University, M.S.

Clint W. Boal, Ph.D., Major Advisor

AVIAN COMMUNITY RESPONSE TO BRUSH MANAGEMENT EFFORTS ON THE WELDER REFUGE

Grassland-obligate birds are experiencing population declines across North America. Habitat loss due to brush encroachment is a primary driver of these declines. We are assessing avian community response to a brush-targeted herbicide treatment on the Welder Wildlife Refuge. We established 58 variable-circle survey points in a 355-acre treated and a 533-acre control plot. We conducted point count and vegetation surveys during the breeding season prior to herbicide application in October 2014, and continued post-treatment surveys for the breeding and wintering seasons of 2015 and 2016. We compared various avian community composition estimates in each study plot to determine effects following herbicide application. Our breeding season survey results indicate a decrease in Shannon-Wiener diversity between 2015 and 2016 in the treated plot. Brushland bird species density decreased in the treated plot between 2014 and 2015, and a grassland bird species density increased in the treated plot in 2016. Morisita's index of similarity showed low overlap between 2014 and 2016 avian communities in the treated plot compared to the control. These results point to a lag in avian community response to herbicide effects until two years post-treatment. We are currently conducting density estimates for wintering bird community in program DISTANCE.



Nabil A. Nasser

The University of Vermont, Ph.D.

Alison Brody, Ph.D., Major Advisor

HONEY MESQUITE ACCRUE DEFENSE BENEFITS FROM HOSTING ANT-HEMIPTERAN MUTUALISMS



Ant-hemipteran mutualisms (AHM) are ubiquitous worldwide. Approximately half the ant genera in the world (41%) form a classic food-for-protection mutualism with hemipterans. Hemipterans secrete a substance rich in carbohydrates and amino acids as a waste product from feeding on the phloem of plants commonly called "honeydew." Ants harvest the honeydew produced and in turn remove hemipteran predators, parasitoids, and competing herbivores. The indiscriminant removal of insect herbivores has the potential to benefit their host-tree. My research over the past three years on the Welder Refuge has shown that honey mesquite (*Prosopis glandulosa*) with AHM present produced significantly more flowers and fruits than did honey mesquite in which AHM were removed ($p < 0.05$). In addition, honey mesquite that hosted AHM had a 65.3% increase in flowers and fruits produced compared to only a 23.2% in AHM removed trees from one year to the next. The increase in flowers and fruits produced is reflected in the increase of chewing insects, such as beetles and grasshoppers, that feed on honey mesquite flowers and fruits, and sucking insects, such as assassin bugs, that pierce the stem and consume the fluid flowing through the branches. Honey mesquite in which ants were removed had significantly higher abundances of chewing and sucking insects ($p < 0.05$).



Welder Fellows Research



Daniel R. Taylor

Texas A&M University-Kingsville, M.S.

Randy W. DeYoung, PhD., Major Advisor

LANDSCAPE GENETIC ANALYSIS OF BOBCATS USING NON-INVASIVE SCAT SAMPLING



Habitat fragmentation is a primary threat to biodiversity, and maintaining landscape connectivity is essential for the viability of wildlife populations. Bobcats (*Lynx rufus*) are highly mobile and well-suited for adaptation in response to anthropogenic changes on the landscape. Therefore, analyzing their patterns of gene flow will help determine if populations can maintain connectivity through fragmented habitats in south Texas. Barriers restricting bobcat movement could indicate dispersal resistances for wildlife that are less mobile. Identifying these barriers will help determine which landscapes are important for conservation, particularly within habitat corridors that are of high concern for the endangered U.S. ocelots (*Leopardus pardalis*). We are extracting DNA from scat samples collected along roads and trails as a non-invasive sampling strategy that allows us to quickly acquire samples across large geographic regions without directly trapping and handling bobcats. This method is an efficient way of collecting genetic information, whereas months of trapping efforts often result in only a few sampled individuals. We have been able to extract DNA and genetically confirm species for 82% of 164 samples collected to date. Our ongoing efforts will identify individuals, relative genetic diversity, and patterns of gene flow for bobcats throughout south Texas landscapes.



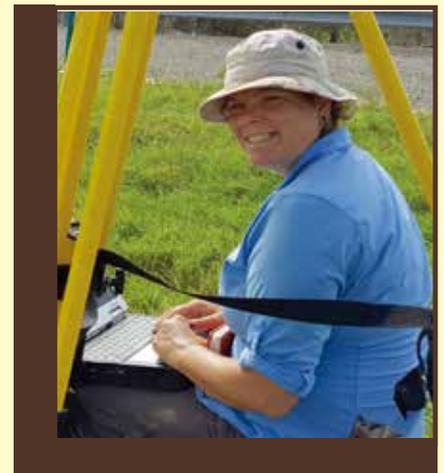
Cassandra M. Walker

Oklahoma State University, Ph.D.

Monica Papeş, Ph.D., Major Advisor

THE FINER THINGS IN LIFE: HIERARCHICAL VARIABLE DETERMINANTS OF DISTRIBUTION

Species distribution patterns across geographic space are shaped by constraining environmental conditions operating at multiple spatial scales from broad (climatic factors) to fine (microhabitat vegetation structure). To investigate the variables operating at a wide range of spatial scales, this project uses a combination of modeling, remote sensing, citizen science data, and field techniques to describe the distribution of Bell's Vireo (*Vireo bellii*) across the Great Plains. At broad scales, data derived from remote sensing techniques are used to identify the spatial scale at which climatic, vegetation, and topographic variables contribute most to distribution models for Bell's Vireos. Alternately, fine-scale vegetation structure is measured using LiDAR (Light Detection and Ranging), a remote sensing technology that uses reflected laser light to gather spatial data in three dimensions. Data analysis confirms that modeling techniques are sensitive to the extent and grain at which the environment is represented. We found that at broad spatial scales, climatic conditions contribute more to shaping Bell's Vireo distributions than other environmental conditions, but at smaller extents, the variable grain size contributes to model predictions of distribution. Additionally, preliminary data inspection indicates that terrestrial-based LiDAR may provide a quantification of vegetation structure at a very fine scale.





Welder Wildlife Refuge

The Welder Wildlife Refuge is situated within the Texas-Louisiana Coastal Prairie ecoregion of North America, a 9-million acre region that runs adjacent to the Gulf of Mexico from Corpus Christi, Texas north and east to southwest Louisiana. Prior to European settlement, this region was dominated by tall- and mid-grass prairie systems. Urbanization and land use changes have left less than one percent, or only about 65,000 acres, of the native prairie systems intact. The 7,800-acre Welder Wildlife Refuge, situated 40 miles north of Corpus Christi, still contains remnants of this native prairie, as well as habitats for nearly 500 species of mammals, birds, reptiles, and amphibians that spend all or part of the year with us.

Currently, the largest threat to the native grassland habitats on the Welder Refuge is invasive species. Our goal is to maintain diverse, native habitats for wildlife. One long-term management issue with which we contend is the tenacious encroachment of woody brush species. Over the past 60 years the Foundation has used a variety of techniques to keep woody canopy cover in check. These methods include burning, chemical oiling or spraying, and assorted mechanical treatments. Recently, however, huisache (*Acacia farnesiana*) has become an aggressive invader of rangelands and a target species in our brush control efforts. Huisache's swift growth rate leads to rapidly expanding canopy cover. Although the use of prescribed fire for control of invasive woody plants would be our preferred choice for maintenance of native grassland habitats, our plans to use multiple prescribed burns



*Coyote and Triangle Pastures in November 2016. Triangle Pasture (right of fence line) was sprayed with Invora VM in 2014. Brush densities were similar in both pastures. In 2016 research showed brush density in the Triangle Pasture to be 29% with a 95% mortality rate on huisache (*Acacia farnesiana*). Light colored grasses are predominately the invasive grass, Kleberg bluestem (*Dichanthium annulatum*).*

has been complicated by phenomena such as changing weather patterns and invasive grasses. Two invasive grasses that have established on the Refuge, Kleberg bluestem (*Dichanthium annulatum*) and Angleton bluestem (*Dichanthium aristatum*), tend to respond positively to disturbance factors such as burning or mechanical treatments. This in turn negatively affects native grasses and plant communities.

Grassland Restoration



Department, the Welder Foundation initiated a graduate student project to investigate changes in bird and plant communities in response to brush control. This project was conducted in the Refuge's 142-hectare Triangle Pasture. Pretreatment line transects indicated a 68% brush canopy cover in the pasture. The decision was made to utilize the herbicide Invora VM to meet the goal of quickly reducing canopy cover while also inhibiting other disturbance factors.

We sprayed Invora VM with a helicopter in October 2014. Our results indicated that overall canopy of mixed brush species was reduced to 29% by June 2016. In a study conducted by Texas A&M AgriLife Extension personnel, huisache mortality was determined to be 97%. As one might expect, birds dependent on brushland habitats have declined in the pasture. We have not completed analysis on the winter bird surveys at this time.

Grassland birds are currently considered species of concern nationwide because of the loss of grassland habitats. A full one-third of all grassland birds in the U.S. are on the State of the Birds 2016 Watch List as a result of declining populations and loss of habitats. A variety of grassland bird species spend all or part of the year on the Welder Refuge, including Lincoln's Sparrow (*Melospiza lincolnii*), Sprague's Pipit (*Anthus spragueii*), Loggerhead Shrike (*Lanius ludovicianus*), Dickcissel (*Spiza americana*), and Le Conte's Sparrow (*Ammodramus leconteii*). In a collaborative research project developed with Texas A&M AgriLife Extension and DuPont Agricultural Products (now Bayer Environmental Sciences), and supported by grant funding from Texas Parks and Wildlife

Because the standing dead huisache trees remain, there is still little open grassland, so our next step will be to decide whether to utilize prescribed fire to remove dead plants and further reduce remaining brush species. Although we are hesitant to use fire because of the potential positive response of invasive grasses, a summer prescribed burn may still be the best option to further reduce woody cover. This will be a long-term project in which future graduate students will monitor changes in bird and vegetation communities following additional brush control treatments. Our goal is to restore this pasture to native coastal prairie.



Donors and Supporters

The Welder Foundation is deeply grateful for the generosity of all our donors and supporters. Your contributions are critical in allowing the Foundation to fund more wildlife research, reach more of the public with our programs, affect conservation through outreach, and carry out essential wildlife and range management projects on the Welder Wildlife Refuge.

As mentioned at the beginning of the report we are targeting our Research Endowment this year and hope to raise the funding to add an additional graduate student in 2017. Please consider contributing to this endowment. The funding you give will help provide an annual fellowship stipend for a Masters or Ph.D. student, as well as a portion of their health insurance.

The Rob and Bessie Welder Wildlife Foundation is a 501(c)3 operating foundation and the Rob & Bessie Welder Wildlife Conservation Foundation is a 501(c)3 charitable foundation. If you have questions about contributing to either foundation, please contact Dr. Terry Blankenship at Foundation Headquarters.



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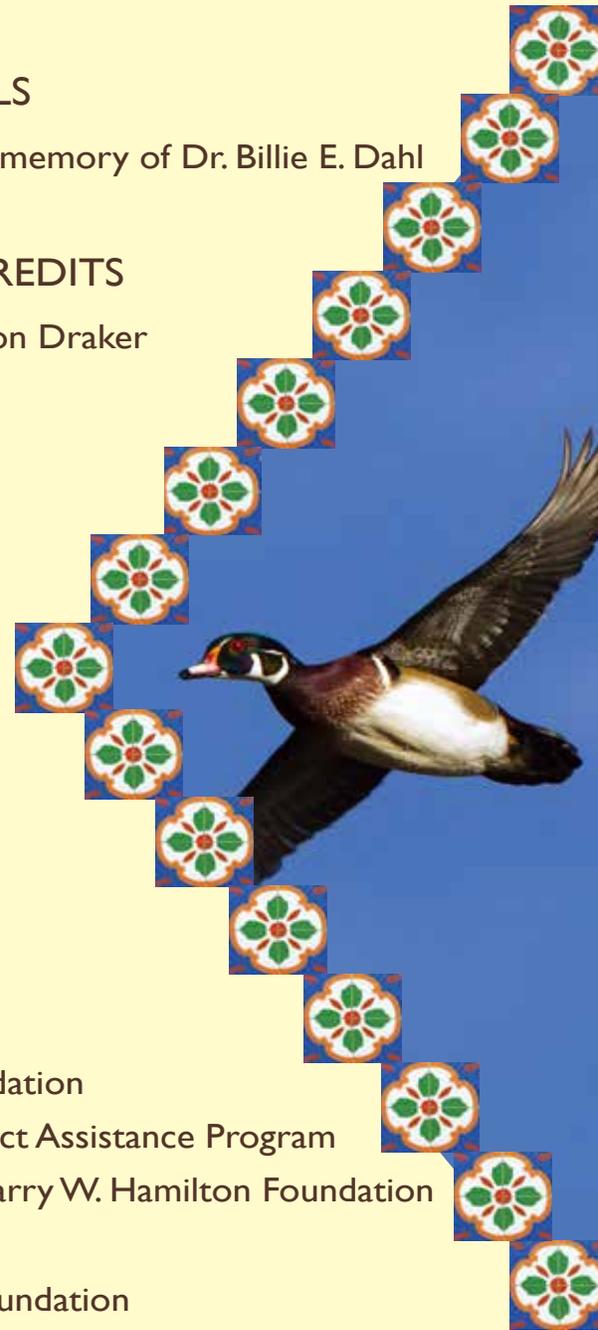
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