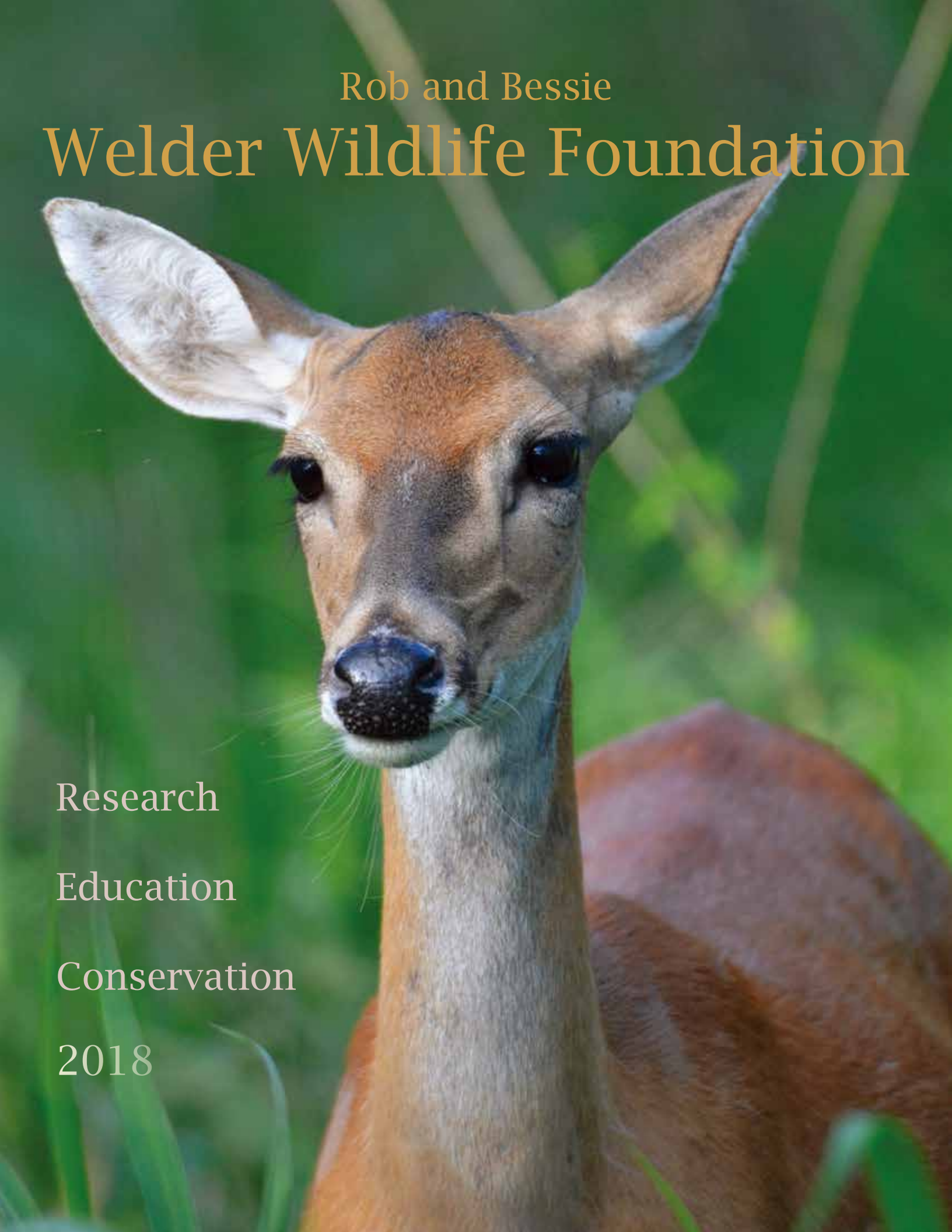
Rob and Bessie

Welder Wildlife Foundation

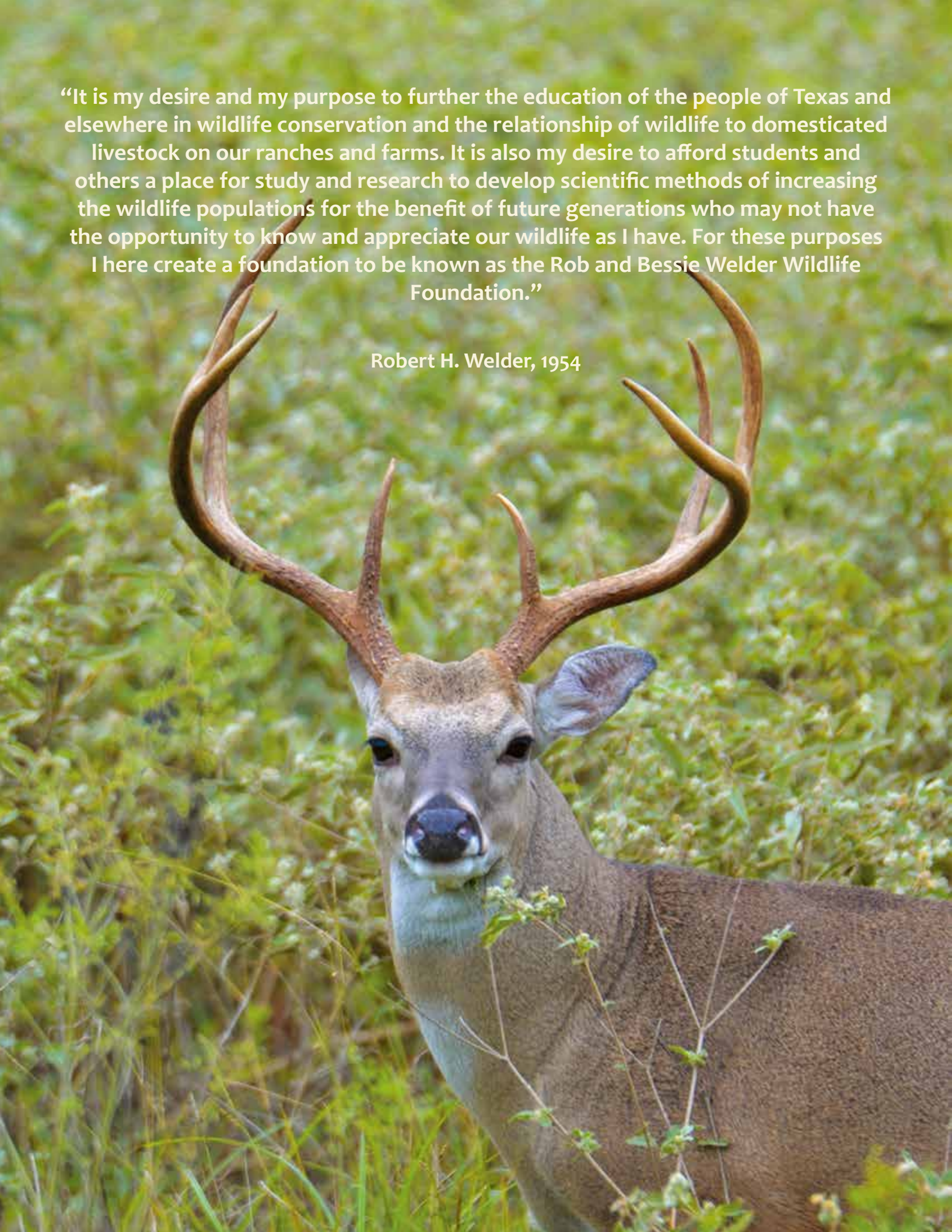


Research

Education

Conservation

2018



"It is my desire and my purpose to further the education of the people of Texas and elsewhere in wildlife conservation and the relationship of wildlife to domesticated livestock on our ranches and farms. It is also my desire to afford students and others a place for study and research to develop scientific methods of increasing the wildlife populations for the benefit of future generations who may not have the opportunity to know and appreciate our wildlife as I have. For these purposes I here create a foundation to be known as the Rob and Bessie Welder Wildlife Foundation."

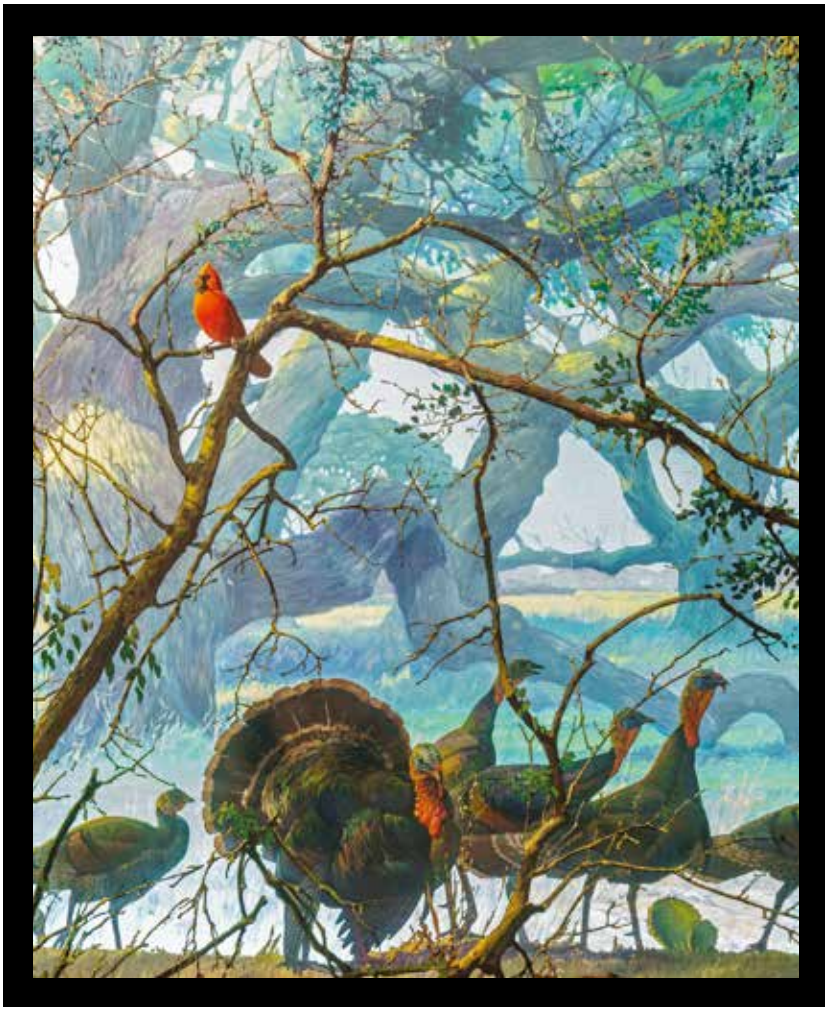
Robert H. Welder, 1954

From the Foundation

We are excited to share with you our completion of a long-term goal to enhance the Foundation's museum and educational facilities. The first phase of this project which was previously completed, was the remodeling of an existing building into a large educational facility that better serves the many groups who visit the Foundation. This facility accommodates much larger groups with its large main classroom, two smaller breakout classrooms, a small kitchen, and a library-workroom.

The second phase, completed this fall, was to update and remodel the Natural History Museum and exhibits in the Refuge Headquarters building. We had a grand opening for the museum in October to celebrate the event. This museum houses both the Foundation's valuable Francis Lee Jaques paintings, as well as our Donald E. Bowman bird collection. You will learn more about the museum later in this report.

Our next goal is to begin working to enhance our Welder Wildlife Foundation Fellowship endowment. Through the years we have provided Fellowships to over 360 masters and PhD students working on degrees in the realm of wildlife research, management and conservation. This important component of our work stemmed from Rob H. Welder's wishes in his will. You will be learning about some of the research being conducted by our newest Welder Fellows in this report. Rob Welder would be pleased with all that our Fellows have accomplished for wildlife throughout their careers.



Francis Jaques painting on exhibit in the
Welder Wildlife Foundation Natural History Museum

We have been blessed with more rain this year than we have had in many years. All of our wetland lakes are full and bird life on them is abundant. Refuge habitats and the associated wildlife populations are flourishing. It is a good year not only for wildlife and wildlife habitats, but also for ranchers and wildlife managers. We are thankful.

The Directors, Trustees, and staff of the Welder Wildlife Foundation wish you a Merry Christmas and a blessed New Year.

Terry Blankenship, Director
Selma Glasscock, Assistant Director

Fellows Research

Evaluating Welder Wildlife Foundation's Rangelands Curriculum

Angelica F. Arredondo, Texas A&M University-Kingsville, M.S.
April A. Conkey, PhD, Major Advisor

Natural resource based educational and outdoor experiences can help mend our youth's disconnect from the outdoors. The Rob and Bessie Welder Wildlife Foundation created the Rangeland Curriculum for grades K–5 to teach concepts about rangeland conservation to youth. After 5 years of administering teacher workshops, we evaluated the curriculum's effectiveness through use of pre- and post-workshop teacher questionnaires and an online survey sent to 895 workshop attendees from years 2012–2015. Workshop pre- and post-tests were evaluated for knowledge gained during the workshop. A paired t-test comparing pre- and post-test scores produced a t-statistic of 23.34 and a Pr>|t| of <0.001*** ($\alpha < 0.05$), indicating a significant gain in teacher knowledge. Online survey results indicate 67.35% of teachers use the curriculum in the classroom and that the teachers observed a positive increase in student awareness of natural resources conservation. The results suggest the Foundation's goal of instilling a greater appreciation of rangeland conservation in our youth is being achieved. Future studies will assess knowledge retention of the curriculum's core concepts and curriculum use and its effectiveness in the classroom.

Estimating Mountain Lion Density in the Davis Mountains of Texas

Jamie L. Cooper, Sul Ross State University, M.S.
Patricia M. Harveson, PhD, Major Advisor

The effects of apex predator density on ecosystem trophic levels has widespread impacts and is only beginning to be understood. Studying these large carnivores can be difficult as they are often few in number, have very large ranges, and are elusive. A key apex predator in the southwest is the mountain lion (*Puma concolor*). Researchers at Borderlands Research Institute have been monitoring mountain lions in the Davis Mountain region of Texas for many years. The goal of this research is to evaluate new spatial capture-recapture (SCR) techniques using remote camera data to estimate the population density of mountain lions in the Davis Mountains. This research will use SCR methods with unmarked or partially marked animals. The results will be important in understanding mountain lion populations in west Texas and to wildlife conservation and management specialists throughout the state and other regions where density estimates of large carnivores are needed.

Fellows Research

A Evaluating Polar Bear Health in a Changing Climate

Tricia L. Fry, University of Wisconsin-Madison, PhD
Tony L. Goldberg, PhD, D.V.M, Major Advisor

Increasing temperatures in the Arctic are affecting all aspects of the Arctic ecosystem including its flagship species, the polar bear. Polar bears (*Ursus maritimus*) are vulnerable to the effects of climate change and the resulting loss of sea ice, which results in changes in behavior and nutrition, thus introducing polar bears to novel risks. My research explores how physiologic health of polar bears has changed over the last 35 years in the southern Beaufort Sea subpopoulation. We have calculated reference intervals for 13 blood-based biomarkers, which act as a baseline to aid in monitoring the health of the polar bear subpopulation. We are also assessing how these analytes vary based on demographic, behavioral, and environmental conditions that have fluctuated over the last 35 years. In addition to reporting changes in physiological health, our research not only aims to discuss health as more than simply an absence of disease, but instead a condition based on biotic and abiotic influences as well as distribution and reproduction. Our discoveries will benefit polar bear conservation by expanding our toolbox to better understand the health of polar bears in a changing climate.

Ground Juniper in Wildlife and Livestock Feeds

Jessica L. Glasscock, Texas A&M University-Kingsville, PhD
David G. Hewitt, PhD, Major Advisor

Woody plant encroachment can limit rangeland production for livestock and alter wildlife habitats. Research indicates several juniper species can be ground and utilized as a roughage ingredient in sheep and goat diets. We evaluated the effects on preference and intake by white-tailed deer (*Odocolius virginianas*) of supplemental feed containing ground blueberry juniper roughage, and the feed's potential to deter consumption by feral hogs (*Sus scrofa*). Twenty-four feral hogs were assigned pelleted diets and total consumption was recorded. Diets differed only by roughage source: 20% cottonseed hulls, 20% juniper, 40% cottonseed hulls, or 40% juniper. No intake differences were observed for % roughage × day, although analysis of in vitro digestibility of ground juniper suggested it was almost completely indigestible by pigs. Decreased intake of diets containing 40% juniper and 40% cottonseed hulls were observed in individual animals. To evaluate consumption by free-ranging feral hogs and white-tailed deer we are currently analyzing trail camera video captured at supplemental feeding sites. Results from this research may reduce non-target species consumption of supplemental pellets for white-tailed deer and supplementation costs.

Trace Mineral Supplies for Regional Productivity of Mammals in Texas

Kaylee A. Hollingsworth, Texas A&M University, PhD
Perry S. Barboza, PhD, Major Advisor

Copper (Cu), iron (Fe), and zinc (Zn) are trace minerals that arise from soils, are taken up by plants, and are essential for disease resistance and reproduction in wildlife. We compared mineral levels in hispid cotton rats (*Sigmodon hispidus*) and plants to assess differences across four ecoregions in Texas. Liver mineral stores were compared with diet using stable isotopes in hearts. Rodents were trapped during late summer, and plants were collected during peak growing season across 15 sites. Liver mineral concentrations were higher than plant concentrations and consistent among regions, indicating tight regulation of stores in rats. Diet varied widely in rats, indicated by large ranges in stable isotope levels, and was positively related to Zn stores. Plant mineral variation was greatest in Cu for woody browse and Fe for grasses, indicating differences in plant-soil interactions. Diverse diets with similar mineral stores are consistent with highly productive rat populations, even though plant mineral concentrations vary widely. We are testing this hypothesis by comparing mineral levels and diet in white-tailed deer (*Odocoileus virginianus*), a large seasonal breeder in the same ecoregions.

Modeling Shorebird Foraging Habitat in Texas' Laguna Madre

Mikayla M. House, Texas A&M University-Kingsville, M.S.
Bart M. Ballard, PhD, Major Advisor

The Laguna Madre is a hypersaline lagoon located on the south Texas coast that provides one of the most important stopover areas for migratory shorebirds in the western hemisphere. To provide better information for conservation and management efforts in the area, I am working to develop a temporal-spatial model that delineates shorebird foraging habitat during spring migration in the Laguna Madre. The model will be constructed from geospatial datasets along with habitat data collected from the field. Tidal fluctuation within the Laguna Madre is primarily wind driven, so I will inform the model with tide and wind data from 5 weather stations placed throughout the lagoon. We will assess the performance of our model with known locations of foraging habitat based on surveys of foraging flocks of shorebirds and water depth measurements at key foraging areas. The ability to model the spatial and temporal dynamics of shorebird foraging habitat will allow managers to prioritize areas for conservation, and identify potential environmental impacts of future development in and around the Laguna Madre.

Fellows Research

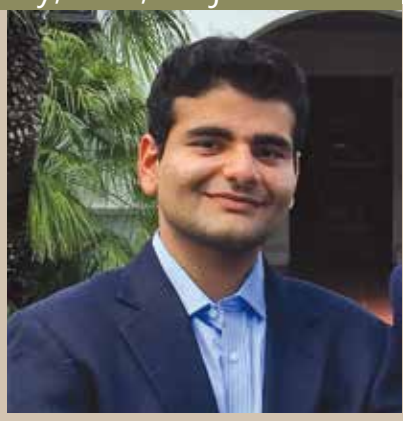
Community Response to Prairie Restoration on the Welder Wildlife Refuge

Derek R. Malone, Texas Tech University, M.S.
Clint W. Boal, PhD, Major Advisor

Grassland-obligate birds are experiencing declines across North America, including the coastal prairies, which have undergone an extreme reduction in size. We are monitoring avian and vegetation communities in control and treatment plots to evaluate their responses to prairie restoration efforts. We are also focusing research on the Greater Roadrunner (*Geococcyx californianus*), an understudied but charismatic species, that requires a combination of open areas for foraging and brush for perches and nesting locations. We are assessing how brush management by application of herbicide to a 144-ha treatment plot in 2014, and a follow-up winter burn in 2018, will influence the home range sizes and habitat selection of roadrunners compared to those in an untreated 216-ha control plot, as well as the refuge as a whole. Ten roadrunners were captured and outfitted with VHF backpack style transmitters in 2018. Analysis of home range size and habitat use are currently underway. Our goal is to understand how prairie restoration efforts can contribute toward grassland bird community recovery, while also accounting for species, such as the roadrunner, that require a mixture of vegetation communities.

Landscape Genomics and Conservation of Montezuma Quail

Samarth Mathur, Purdue University, PhD
J. Andrew DeWoody, PhD, Major Advisor



Geographic distribution of genetic variation, determined mostly by organismal dispersal and reproduction, is especially pertinent to conservation. Small, isolated populations are subject to loss of genetic diversity due to inbreeding and genetic drift. Both of these evolutionary forces can be mitigated by effective gene flow, but that depends on both intrinsic factors, for example biology of the species, and extrinsic factors such as environmental variables. Our research strives to better understand the biology of the Montezuma quail (*Cyrtonyx montezumae*), a galliform found in the Southwestern U.S. and in Mexico. The range and abundance of this species continues to decline in Texas, and our research should bear upon relevant conservation strategies for this game species. Baseline genetic data is imperative to determine if management action (e.g. supplementation) is needed to prevent local population extinctions that may result from loss of genetic diversity and functional connectivity for example. Ultimately, our results should provide key insights into the demographic history, population genetics, and landscape ecology of Montezuma quail to help managers conserve this species in Texas.

Education and Outreach

The Foundation's Conservation Education Program continues to meet Rob Welder's mission of providing educational opportunities to the people of south Texas and beyond. Over the past 10 years the Foundation has reached on average about 6,000 people per year through our outreach and education programs. This year 2,865 individuals visited the Refuge. Of these, 765 were public-school and homeschool students, and 156 were from 4H, scout, and youth groups. With the assistance of our many volunteers, our outreach programs reached 434 individuals outside the Refuge boundaries this year. Volunteers are integral to our program, so this year we plan to expand the WWF volunteer program. Look for our new online application on the Foundation website. This process will streamline the application process for volunteers.

Our Educators

Angie Arredondo is our new Conservation Education Program Coordinator. Angie has a BS and will soon complete her MS degree in range and wildlife management from Texas A&M-Kingsville.

Jamie Cooper served as our interim Conservation Education Program Coordinator before she began her MS degree at Sul Ross State University this fall. Jamie has a BS in wildlife and fisheries sciences from Texas A&M Univ.

Mandy Krause serves as our contract educator. Mandy has a BS in wildlife and fisheries sciences from Texas A&M Univ. She heads up our Rangeland Curriculum program and Home on the Range workshops.

The Foundation continues to annually sponsor educational programs such as youth hunts through the Texas Youth Hunting Program, and this year we offer a new wildlife-oriented workshop for high school agriculture teachers.

Our Home on the Range workshops reached 240 educators state-wide this year. Each teacher receives a free a copy of "Rangelands: A Conservation Education Guide", which teaches science-based concepts surrounding wildlife and range conservation and stewardship. Since 2010, approximately 2,750 Texas educators have attended our workshops and received the curriculum. Our goal is to help ensure their students will become better conservationists and land stewards.

On the Refuge

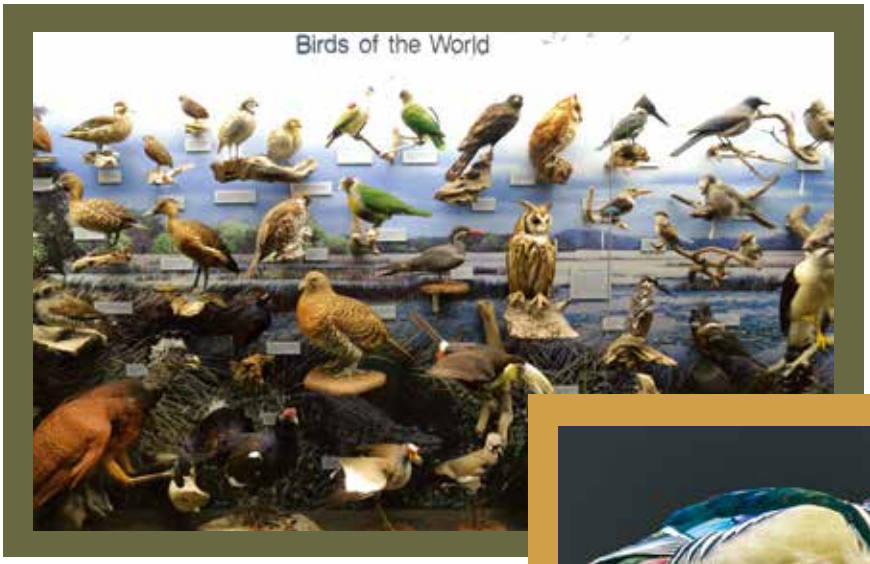
We continue to manage the Foundation's 7,800-acre Refuge to provide a diversity of habitats for south Texas wildlife. We use a variety of tools such as prescribed fire, grazing, and chemical and mechanical techniques to manage Refuge vegetation for a diversity of wildlife habitats. These activities provide excellent opportunities for graduate students to conduct research and for Welder staff to provide educational opportunities to the public. The Foundation funds graduate student fellowships for 8–10 students per year. A large part of the research conducted on the Refuge stems from their projects. We also continue to fund other graduate projects elsewhere in Texas and the U.S.

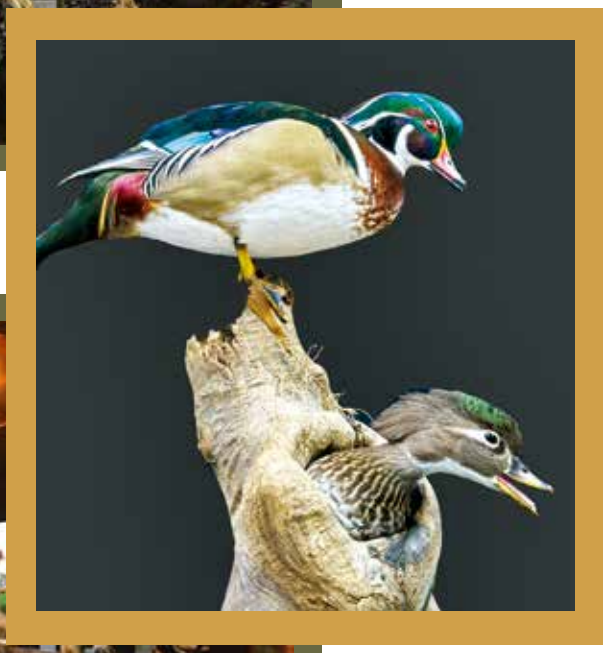
Range conditions on the refuge have improved throughout the year because of increasing rainfall. We were 7 inches below average in May and 5 inches above average by the end of October. Wetlands, stock tanks, and potholes are full and the Refuge is lush. In June, Pollito Lake was completely dry, but it is now full. It has not had this much water since 2010–2011. Native grasses and the Old World bluestems have responded exceptionally well to the rainfall and grass coverage is very good. Big bluestem and Indian grass continue to spread in Pollito Pasture, and we have seen stands of big bluestem in other pastures as well. We are currently rotating a single large cow herd through 7 pastures. This allows ample rest for some of our native tallgrass species. On the downside, Old World bluestems and other invasive species continue to spread, which provides some challenging, yet interesting ecological questions. The summer rains have impacted our ability to conduct a planned summer burn on our prairie restoration project; therefore, we will attempt to implement a winter burn if conditions allow.

Oil and gas activity in some areas of south Texas has increased over the last several years. Although there has been no drilling activity on the Refuge, we are seeing an increased need for pipelines to move products out of Corpus Christi. Some of these will be transported through pipelines on easements that transect the Refuge. Our goal is to minimize the impacts of such activities and use the revenue generated to increase our fellowship program endowment.

Natural History Museum and Exhibits

In 2003 the Welder Foundation received a very special gift of 312 taxidermy bird specimens from Donald Eugene Bowman. Don is considered to be one of the top ten bird taxidermists in the world. Although Don's passion since childhood has been bird taxidermy, he spent his career as a research chemist. Don donated over 300 specimens of his collection to the Foundation, including the Black-bellied Whistling Duck on the back cover of this report. This collection includes specimens of Passenger Pigeons and a Heath Hen, as well as many species of North American raptors, waterfowl, and upland gamebirds.





The Foundation contracted Terry Chase of Chase Studio, a division of the Ozark Museum of Natural History. Terry redesigned the museum and oversaw the construction of exhibits.

The bird exhibits are displayed with our paintings by the famed wildlife artist Francis Lee Jaques (1887–1969). Jaques, a well-known wildlife artist who worked for various North American museums including the American Museum of Natural History in New York, came to the Welder Wildlife Foundation in 1958 to paint south Texas wildlife. Our nine Jaques paintings include the only 3-panel, 3-dimensional paintings he ever produced.

We completed the project in October of 2018. Please take the opportunity to visit us and see these spectacular exhibits.

Natural History Museum Donors

Thank you to the many individuals and organizations who contributed to our the museum redesign campaign.

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The Rotary Club of Corpus Christi Harvey Weil Sportsman Conservationist Award
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2018 Research and Education Donors

The Welder Foundation is grateful to all of our supporters. Your gifts allow us to support more graduate students, fund more research, provide more education and outreach programs, and carry out wildlife and range management projects on the Refuge.

We continue to raise funding for our Graduate Fellows Research Endowment with the goal of increasing the numbers of graduate fellowships we provide. Please join us in this effort. You may now donate online to the Rob & Bessie Welder Wildlife Conservation Foundation through our Network for Good link at www.welderwildlife.org. The Rob & Bessie Welder Wildlife Conservation Foundation is a 501(c)3 charitable foundation.

If you have questions, please visit our Giving Page, www.welderwildlife.org/content/giving, or contact Dr. Terry Blankenship, Welder Wildlife Foundation Director.

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