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MISSION

To cultivate a sustainable future for wildlife and their habitats and an appreciation of natural resources through research and education programs in environmental stewardship and wildlife conservation and management.

VISION

A world with effective conservation leaders, stewards of the land, and protectors of our natural resources. This vision honors the legacy of Robert H. Welder through excellence in land stewardship, education, and the discovery of knowledge needed to manage, restore, and protect wildlife populations and their habitats while sustaining the ranching heritage, all toward improving the quality of life for wildlife and people alike.

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"The earth will not continue to offer its harvest, except with faithful stewardship..."

MESSAGE FROM THE CEO

DALE JAMES, PH.D.

Dear Friends, Supporters, and Partners,

As we reflect on the Foundation's accomplishments in 2024, I am filled with immense pride and gratitude for the strides we made in our 70th anniversary year. This year marked a period of renewal and reinvigoration.

We embarked on essential infrastructure enhancements, expanded our team in conservation education and land stewardship, and forged new partnerships in our research and education initiatives. In this report, we share highlights of our work to deepen our collective understanding of the natural world

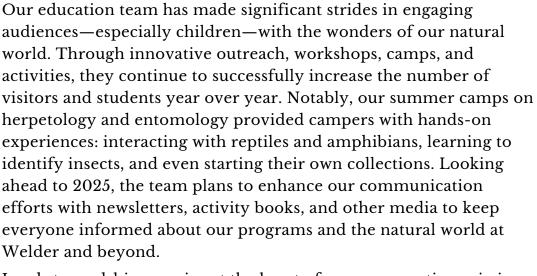
—and to inspire all of us to be faithful stewards of the earth.

Highlights

Our research program proudly supported ten Welder Research Fellows in 2024, and we are excited to welcome three new researchers in 2025. Moreover, fellowship interest continues to grow; last year we received nineteen applications from twelve different universities. We also hosted our bi-annual Welder Research Symposium, where our Fellows showcased their work and built meaningful connections through shared experiences. It was a particular pleasure to welcome former Fellow Wayne Brown and his family from Stolpen, Germany. Having once shared the Welder experience with Wayne and his wife Katrin during our time at the Foundation, reconnecting with them was truly a joy. We always cherish the visits of our alumni who bring back fond memories. In addition, several visiting researchers from various institutions utilized the refuge for data collection, further expanding our research presence. For more details on some of the impactful work conducted at the refuge or supported by the Foundation, please review the publications list in the research section.

-Pope John Paul II

Photo by Jeff and Angie Birminghan



Land stewardship remains at the heart of our conservation mission, with nature serving as our classroom. Under the leadership of our new Manager of Land Stewardship, Ty Higginbotham, our management activities will be guided by science and aimed at educating the public through demonstration. We are eager to adopt a more proactive approach, learn from our actions, and witness positive changes across our landscapes—changes we look forward to sharing with you.

The Foundation has consistently upheld Rob Welder's vision—to educate future generations about our natural world, to train emerging natural resource professionals, and to develop sustainable management practices for wildlife and their habitats. Yet, we recognize the importance of exploring new avenues for program growth and engagement. In 2025, we aim to bring to life a more interactive, immersive Welder Wildlife Foundation experience that will further invigorate our research and education programs. This spirit of revitalization has prompted us to develop our inaugural strategic plan—a supportive, accountable, and forward-thinking roadmap for advancing our conservation research, education, and land stewardship initiatives. We are excited to share this vision with you.

None of the accomplishments detailed in our 2024 Annual Report would be possible without you—our remarkable supporters. Your generosity, whether expressed through volunteering, donations, or partnerships, fuels our mission and fosters growth and sustainability across our conservation efforts and ensures development of good stewards of our natural resources.

Thank you for your unwavering support.



LAND STEWARDSHIP AND INFRASTRUCTURE UPDATE

TY HIGGINBOTHAM

Before diving into what happened around the refuge this year, I would like to introduce myself. Prior to becoming the Land Stewardship and Infrastructure Manager for the Foundation, I worked in private lands conservation helping landowners manage and restore their properties through habitat incentive programs using tools such as prescribed fire, brush management, prescribed

grazing, and native reseeding, to name a few. Since starting my new position at the Foundation, I have been assessing the current state of the refuge and its facilities to help outline new priorities going into the new year. This update will give some insight into the new year.

We have a lot to talk about regarding the refuge and its management. Similar to the headquarters infrastructure, the fences, troughs, and other various components needed to properly manage the refuge are experiencing the effects of age. We are currently in the process of updating the infrastructure along with how we manage the refuge as quickly as we can. Prescribed grazing and prescribed fire will be our main management tools along with brush management when it's needed. The use of proper grazing paired with a prescribed fire cycle can positively impact rangelands and maintain them at a drastically lower cost than any other management method once brush management has been completed. With that being said, moving forward you can expect to see a lot more smoke in the air at the refuge. Our prescribed fire equipment will be overhauled this year, and we will hopefully be burning around 20-30% (1,560-2,340 ac.) of our total acreage every year, mother nature allowing.



We will still be grazing on the refuge as we always have, but the number of cattle will be decreased to around 1 cow per 15 acres. Native bunch grasses like big bluestem and little bluestem have been prevalent this year and switching to a lower stocking rate will do nothing but benefit our rangelands and bunch grasses across the refuge. With focus on tackling our brush problem and maintaining the refuge using prescribed fire and prescribed grazing we will start to open our pastures back up and increase the quality of not only our habitat but also of our research that is done on the refuge.

Switching gears to our facilities, 2024 was a busy year with the start and end of multiple larger projects to get our aging infrastructure back to where it needs to be. The biggest projects we finished this year included installing a new emergency generator to protect our museum and scientific collections in case of power outages and the re-leveling of our main administration building. The biggest project we started this year though was our dormitory remodel. This remodel includes re-leveling the facility, along with updating plumbing, electrical, and all rooms within. The project was completed in the first week of February 2025. In the new year we have more projects coming down the pipe with the highest priorities being the remodel of residence 2; better known as the Glazner house, along with our Rotunda which is crucial to the education programs we host on the refuge.

In conclusion, there is a lot to look forward to in the new year on the refuge. The team here at the Foundation has big plans and I look forward to updating everyone on all the things we will accomplish this year. Finally, I would like to thank our generous donors because without them our progress would be much slower as we work to bring new life to all our facilities.

AN OASIS OF HOPE

IN THE TEXAS DROUGHT

THE FOUNDATION LOOKING BACK

The Rob and Bessie Welder Wildlife Foundation is not only unique in its abundant and diverse wildlife resources but also very rich in its history and prominence in the conservation arena. Being the first private wildlife conservation foundation and refuge in North America, possibly the world, at the time and given the notoriety of its first director, Dr. Clarence Cottam, the Foundation was very well-known to many local, regional and national media sources. In fact, the Foundation was featured in a six-page article titled "An Oasis of Hope in the Texas Drought"; in the January 21, 1957 edition of Sports Illustrated. An excerpt from that article is provided that gives you some insight into those early years of the Foundation and reminds us that we still have similar issues to address nearly seven decades later.

We invite you to come visit the Welder Wildlife Foundation to learn more about our rich history and how relationships with the land from years past played a role in the establishment of the Foundation. These same relationships continue today as the Foundation uses our lands to educate future generations of land stewards and supporters of conservation. SPORTS ILLUSTRATED

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AN OASIS OF HOPE IN THE TEXAS DROUGHT by JOHN O'REILLY

The greatest drought in the nation's history continued last week to blight the lives of people throughout a vast region in the central and southwestern part of the U.S., bringing withered crops, emaciated cattle, dead or dying trees, waterless streams and the decimation of wildlife. For the rest of the country, the proportions of the tragedy have just been emphasized by President Eisenhower's personal inspection of the disaster area.

The President's trip was for the purpose of determining what can be done, beyond the various government programs now in effect, to help drought sufferers over the

crisis. But, even if the rains come soon, recovery of the worst-hit sections will take many years, for even 300-year-old live oaks and tough mesquite trees are dead, the ground cover is gone, and thousands of wild animals have perished. The answers to the longrange problem of bringing back and maintaining a healthy, productive environmentfor both people and animals— may well lie in research work already started in south Texas by Dr. Clarence Cottam, the director of a new and unique institution called the Rob and Bessie Welder Wildlife Foundation.

Although the work of the foundation cannot mitigate the present drought crisis, landowners in Texas and other stricken areas are fortunate to have such an institution as a focal point for learning the lessons of how best to prepare for droughts of the future.

Conservationists agree that in few places has overgrazing and poor land use brought deterioration more rapidly than in Texas.

The foundation starts its program at a time when 90% of the state has been declared a disaster area, when drinking water is being bought at prices higher than oil and when 60,000 families have moved from their wrecked farms and ranches to the cities. The institution is the creation of a Texan who saw the need for a wiser treatment of the land.

Rob H. Welder, South Texas cattle baron and oilman, drew up a will that proved to be an unusual document for Texas or, for that matter, any other state. Subsequent to Mr. Welder's death

"As we rode, Dr. Cottam told of sighting a red wolf on the property, a smallish wolf which is becoming rare in south Texas. On three occasions, panthers have been sighted. Some 35 or 40 collared peccaries, speedy wild pigs, live on the place, and Dr. Cottam hopes they will increase."

on New Year's Eve of 1953, it was found that his will established a foundation such as America had never had before, an institution designed to have an ultimate impact on conservation practices not just in Texas but in the nation as a whole.

In the basic provisions of his will Welder set aside 7,799.24 acres of land, 32 miles northwest of Corpus Christi, to be used for research in how best to foster wildlife on farms and ranches. Although a large area, the gift of the land was not unique. The legacy became more impressive when it was found to be coupled with oil wells and cattle producing an annual income of more than half a million dollars, all of which is to be used in the furtherance of the purposes of the foundation...This ranch, originally a Spanish grant, has been owned by the Welder family for more than 100 years. Mister Rob, as he was known to his friends, had lived his entire life in south Texas and had seen drastic changes come to that wild, coastal area. He had watched the spread of intensified agriculture until cotton and other row crops reached to infinity with hardly a tree or bush to break the monotonous expanse.

He had seen the extended droughts and the overstocking of grazing lands bring wildlife scarcity. With the development of oil he had seen the silvery towers of refineries rise out of the flat landscape; had seen the night sky sparkle with the lights of new industrial plants; had watched the little towns grow into cities. And as more people sought outdoor recreation, he had seen the land become more bleak and barren.

To make his foundation national in scope, he stipulated that all the money did not have to be spent on the property or even within the state of Texas. Scholarships may be established or research financed at any university in the country. He also specified that the purposes were "to perform and foster study and scientific research related to wildlife propagation, growth and development both associated with and disassociated from the raising of livestock and domestic animals." ...

Industry and individuals have supported research in the past. Foundations have been established and organizations formed to help learn the best methods of conservation. The Rob and Bessie Welder Wildlife Foundation is the first of its kind in America and, properly established, will point the way for private income to aid in wildlife conservation. Dr. Cottam is aware of the size of his job. "It is a big responsibility," he said. "But it is also a challenge."

The eyes of Texas are upon the new foundation born when it is most needed. So are the eyes of conservationists of every other state.



RESEARCH PROGRAM

The Welder Wildlife Foundation has conducted and supported wildlife conservation research since 1956. Our science activities seek to understand relationships between wildlife species and their habitats and aim to provide solutions for land managers by linking the best available science to on-the-ground implementation. The 7,800-acre Welder Wildlife Foundation Refuge is a biologically diverse area that serves as a research station and "living laboratory" for staff, partner scientists, teachers, and research fellows.

The objectives of the Welder Wildlife Foundation research program are focused on sustaining wildlife populations, the natural habitats they depend on, and the many benefits the natural world bestows on people.

Below are the institutions of several visiting researchers we had the pleasure of working with in 2024:

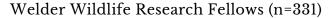
Auburn University Canadian Museum of Nature Caesar Kleberg Wildlife Research Institute Florida State Collection of Arthropods Tarleton State University: Wildlife and Natural Resources University of Texas: Department of Integrative Biology Virginia Museum of Natural History

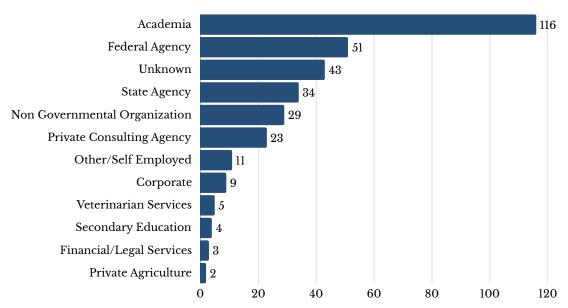


Research | Conservation | Education

WELDER FELLOWSHIP PROGRAM

Since 1956, the Welder Research Fellowship Program has awarded 351 graduate level degrees. These researchers have continued their professional careers with various conservation entities, and the impact they have had, and continue to have, on natural resource conservation is immeasurable. Many have mentored countless individuals as university and college professors and state and federal agency personnel. Below are the numerous roles our Welder Fellows serve in, today:





The Aldo Leopold Award is one of the highest awards a conservationist can receive in the natural resource field, and we are incredibly proud to highlight several Welder Fellows and Foundation directors who have received this award:

Aldo Leopold Memorial Award Winners

1955 –Dr. Clarence Cottam (WWF Director) 1994 –Dr. James G. Teer (Welder Fellow & WWF Director) 2006 – Dr. Paul Krausman (Welder Fellow) 2017 – Dr. Winifred Kissler (Welder Fellow)



RESEARCH PUBLICATIONS

(Bold Denotes Welder Research Fellow)

PEER-REVIEWED ARTICLES

- Barham, M. T., C. M. Kiel, and K. F. Perez. 2023. Review of the book Women in Wildlife Science: Building Equity, Diversity, and Inclusion. C. L. Chambers and K. L. Nicholson, editors. Journal of Wildlife Management 87 e22423
- Choi, J. J., L. C. Gaskins, J. P. Morton, J. A. Bingham, A. M. Blawas, C. Hayes, C. Hoyt, P. N. Halpin, and B. Silliman. 2024. Role of low-impact-factor journals in conservation implementation. Conservation Biology.
- Choi, J. J., O. Koubrak, J. Kuesel, M. Nowlin, S. E. Roady, S. J. Rolston, and D. L. VanderZwaag. 2023. Transboundary Marine Species at Risk and Their Recovery in a Changing Climate: Taking Stock of Canadian and US Scientific and Governance Responses, Enhancing Future Cooperation. Workshop Report. Environmental Law Institute.
- Choi, J. J., J. Kuesel, K. Barrows, E. Boos, M. Dister, C. Sakati, M. Skarjune, S. Roady, and M. Nowlin. 2023. Enhanced US-Canadian Collaboration on Migratory Species Conservation. Environmental Law Reporter.
- Cornaby, G. J., C. M. Kiel, E. P. Tanner, S. Rideout-Hanzak, A. M. Tanner, D. B. Wester, A. B. Montalvo, and T. J. Hibbitts. 2024. Pyric-carnivory: Predation of a Texas Tortoise, Gopherus berlandieri (Agassiz, 1857), by a Crested Caracara, Caracara plancus (Miller, 1777), following a prescribed fire in southern Texas. Herpetology Notes 17: 621–624.
- Eversole, C.B., D.R. Duffie, A.J. Mullaney, and S.E. Henke. 2024. "Rediscovery of a population of the plains spotted skunk, Spilogale interrupta, a species of conservation concern, from southern Texas, USA". Mammalia, vol. 89, no. 1, 2025, pp. 11-14.
- **Moeller C.**, S. Perales, W. Rodriguez, S.E. Henke, S. Rideout-Hanzak and C.B. Eversole. 2024. Playing "hide and seek" with Texas tortoises: value of a detector dog. <u>Front. Amphib. Reptile Sci. 2:1382591</u>.
- Pence, A. R., **C.M. Kiel**, A. Montalvo, A., B.L. Pierce, L.A. Brennan, and M.L. Morrison. 2023. Food niche responses in southern Texas small mammal communities. Southwestern Naturalist, 67(3): 216-223.
- **Rodkey**, T., B. Ballard, T.L. Tibbitts, R. Lanctot. 2024. Sod farms drive habitat selection of a migratory grassland shorebird during a critical migratory stopover period. <u>Scientific Reports 14: 20973</u>.

RESEARCH PUBLICATIONS

(Bold Denotes Welder Research Fellow)

POPULAR ARTICLES

Rodkey, T.L. 2024. Buff-breasted Sandpipers – The story a peculiar bird tells us about our grasslands. Texas Wildlife Magazine, April: 22 – 25.

PEER-REVIEWED ARTICLES FROM WELDER SUPPORTED RESEARCH (Logistical and/or Data Collection Support)

Bakner, D. L., Ringelman, K. M., Reynolds, L. A., Kaminski, R. M., Stephens, S. E., & Davis, J. B. (2024). Wood ducks and hooded mergansers as interspecific brood parasites: An evaluation of parasitic egg survival. <u>Ecology and Evolution</u>, 14, e11721.

Boucher, M., T. R. Rainwater, M. Stoner, L. Sigler, S. L. Whitmire, and J. T. Anderson. 2024. Conquering the crush: a novel tool for holding crocodilian jaws open. <u>Wildlife Society Bulletin 48(3): e1534</u>.

Bowman, E.A., C.V. Hawkes, N. Jones, R.M. Plowes, D.J. Martins, and L.E. Gilbert. 2024. Invasive Buffelgrass, Cenchrus ciliaris, Balances Opportunistic Acquisition of Foliar fungi With Host and Environmental Filtering in Its Introduced Range. <u>Molecular Ecology e17609</u>.

Dickey, M., M. Whilden, J.T. Ellis, and J. Rangel. 2024. Comparative prevalence of Nosema ceranae infection between wild and managed honeybee(Apis mellifera) colonies in South Texas. <u>Apidologie 55.62</u>.

Dickey M., M. Whilden, J.T. Ellis, and J. Rangel. 2023. A preliminary survey reveals that common viruses are found at low titers in a wild population of honey bees (Apis mellifera). Journal of Insect Science, 23(6): 26;1-11.

Henshaw, M.T, E.C. Book, M.M. Skinner, E.E. Kowal, S.E. Johnson, N.A. Longo, A. Kern, C.W. Smith, S. Hamilton, and A. Kayfish. 2024. Cold tolerance strategy, supercooling, and cold hardening in three populations of the jumping spider Phidippus audax (Araneae: Salticidae). The Journal of Arachnology 52(2), 143-150.

Teveni III, Pablo C., Robert D. Cox and Caitlyn E. Cooper-Norris. 2024. Temperature Effects on Huisache (Vachellia farnesiana (L.) Wight & Arn.) Seed Germination. <u>Rangeland Ecology and Management 96: 197-202.</u>

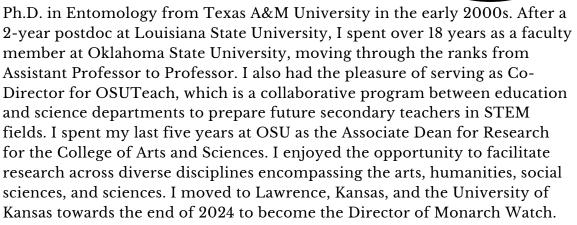
BOOKS

Rappole, John H. 2024. Migration Mysteries: Adventures, Disasters, and Epiphanies in a Life with Birds. Texas A&M University Press, College Station, Texas, USA.



DR. KRISTEN A. BAUM

I'm excited to write a Welder Fellow Spotlight, especially since Dale, Chief Executive Officer of the Welder Wildlife Foundation, and I were fellows at the same time. I earned a M.S. in Wildlife and Fisheries Sciences from Texas A&M University in the late 1990s and completed my



Monarch Watch is an education, conservation, and research program focusing on the monarch butterfly and its long-distance migration. We have a long-term (32 years and counting) community science program that uses tags (stickers) with unique codes to study the monarch's fall migration. The tags are applied to the hind wings of monarch butterflies by people (including kids!) across the eastern U.S. and southern Canada with tag recoveries from the overwintering sites in central Mexico providing important information about the fall migration each year. Our education efforts focus on connecting people to monarchs, especially their life cycle and long-distance migration, as well as providing information about monarch biology and conservation needs. Our conservation efforts focus on creating and maintaining monarch habitat, which also supports many other wildlife species. We have a habitat registration program (Monarch Waystations; the 20th anniversary is in 2025), with more than 49,000 Monarch Waystations registered in 12 countries or territories worldwide. We also have several programs to distribute milkweed across the U.S., including



a free milkweed program for schools and educational non-profits and a free milkweed program for restoration sites.

I spent five summers at the Welder Wildlife Refuge, where I completed the research for both my master's and dissertation projects. I spent two summers recording Black-chinned and Buff-bellied hummingbird foraging behavior at patches of Turk's Cap and artificial "flower" arrays. I didn't appreciate it at the time, but Turk's Cap produces copious amounts of nectar, which makes measuring the volume and sugar concentration much more enjoyable than many of the plant species that I have sampled since then. I still have a bag of color-coded microcentrifuge tubes that I used as nectar reservoirs for my artificial flower arrays (rebar stakes with plastic tubing to insert and remove the centrifuge tubes). After completing my M.S. degree, I spent several more summers, as well as numerous trips throughout the year, studying the population of feral honey bees located in tree cavities on the Welder Wildlife

Refuge. I still have notebooks of 35mm slides of pictures of each cavity. Living in the bunkhouse during the summer, conducting research on the refuge, and being part of a community of Welder Fellows opened up many opportunities for me and strongly influenced the path I have followed throughout my career. I also recall taking advantage of the library and collections, not to mention the guidance and support from Lynn Drawe, Terry Blankenship, Selma Glasscock, and others at the refuge.

My time as a Welder Fellow and at the Welder

conservation.

Wildlife Refuge was very formative for me. The emphasis on pollinators stayed with me, and I have continued to work on bees and butterflies throughout my career (and I keep saying that one of these days I want to do another project on hummingbirds!). The managed ecosystem and grassland focus has also been a consistent theme throughout my research, which has centered around the effects of land use and management practices on pollinators and plant-pollinator interactions. I also continue to value the substantial contributions of working lands and multifunctional landscapes to conservation. It has not gone unnoticed to me that Monarch Watch's three focus areas of education, conservation, and research match those of the Welder Wildlife Foundation. I'm grateful for the opportunities afforded to me as a Welder Fellow and proud to be part of an ever-growing group of previous Welder Fellows who have continued to make a difference in wildlife

DUSTON R. DUFFIE

Texas A&M University-Kingsville, Ph.D. Scott E. Henke, Ph.D., Major Co-Advisor, Cord B. Eversole, Ph.D., Major Co-Advisor

RESEARCH FELLOW

Invasive Vegetation Impacts on Herpetofauna and Mammal Populations and Communities

Nonnative and invasive plants are considered a conservation threat to native ecosystems. As ecosystems are invaded, invasive plants can replace native plant species resulting in changes in the vegetative

structure and biodiversity of an area. The objectives of our study are to determine if vegetative invasions and subsequent changes in vegetation structure influence community composition, species abundance, and habitat associations of herpetofauna and mammals. To meet these objectives, we surveyed the herpetofauna and mammal communities at the Welder Wildlife Refuge. We surveyed herpetofauna and small mammal communities at six plots at varying levels of plant invasion. Additionally, we established 24 remote camera stations across the Refuge to monitor medium and largesized mammal communities. Fieldwork was completed in August 2024. We documented 31 reptile species, 12 amphibian species, and 11 small mammal species in our six survey plots. Our remote cameras have detected 21 mammal species, including the plains spotted skunk (Spilogale interrupta), a species of conservation concern. From our preliminary results monitoring small mammal and herpetofauna communities, we learned that habitat specialists are more likely to be negatively impacted by plant invasion. In contrast, generalist species are either unaffected or increased in abundance at sites with a high density of invasive plants. We expect medium and large-sized mammals to similarly respond to increasing density of invasive plants because plant invasion alters habitat availability, which affects specialist species and prey availability. Our study will provide information on managing invasive vegetation to maintain animal populations, species diversity, community composition, and ecological function. \bigwedge

DAWN R. HOUSTON

Texas State University, Ph.D.
Joseph A. Veech, Ph.D., Major Advisor

RESEARCH FELLOW

Analysis of Stopover Habitat for Migrating Songbirds in Central Texas

Migration is the period of greatest mortality throughout migratory songbirds' annual cycle and has profound effects on breeding success and survivorship. High-quality stopover sites, with abundant food resources, allow for rapid refueling of fat stores enabling a songbird to

continue the next portion of its journey. Identifying where highquality stopover sites are located along migratory pathways, and how habitat characteristics affect the physiological condition of migratory birds has implications for the conservation of these species. Central Texas lies squarely in the Central Flyway, yet no research to date has investigated stopover habitat in this region. Our study aims to assess relative stopover habitat quality of riparian and upland habitats in central Texas by comparing refueling performance, physiological condition, and chronic stress of migratory songbirds using plasma metabolite profiling and other laboratory techniques. Utilizing remote sensing methods, we will also compare fine-scale habitat characteristics between habitat types with regard to migratory songbird abundance. Additionally, we will develop predictive models to assess whether NDVI values, a proxy for vegetation productivity, are strong indicators of high-quality habitat. Finally, we will evaluate arthropod abundance to identify which habitat type may be more useful as a food resource for migrating songbirds. Preliminary results show refueling performance was similar between habitat types; however, fat deposition differed among years and taxa. Variation of fat deposition may be due to the fluctuation of environmental factors affecting food resources. This research will strengthen our knowledge of stopover habitat use and contribute to the overarching goal of facilitating avian conservation.

CAMRYN M. KIEL

Texas A&M University, Ph.D.
Toby J. Hibbitts, Ph.D., Co-Advisor
Andrea Montalvo, Ph.D., Co-Advisor

RESEARCH FELLOW

Effects of Prescribed Fire on the Texas Tortoise (Gopherus Berlandieri)

Prescribed fire has become a popular land management tool to create variety in vegetation, which may benefit wildlife species that utilize multiple cover types. One such wildlife species is the state-threatened

Texas tortoise (Gopherus berlandieri), a slow-moving, long-lived ectotherm in southern Texas. The body of literature examining the effects of fire on herpetofauna is growing; however, we found no such data for Texas tortoises. This study assesses the vegetation tortoises use in southern Texas coastal rangelands, as well as the effects of prescribed fire on their movement, thermal ecology, and survival through fires. On the East Foundation's El Sauz Ranch in Willacy County, we affixed tortoises with GPS loggers, radio transmitters, and temperature loggers to monitor these variables through prescribed fires from 2022 to 2024. This property employs a prescribed fire regime with pastures assigned to summer burns, winter burns, or no burns (control) at varying burn frequencies. We also monitored tortoises before and after fires to quantify fireinduced mortality. We collected data across seasons to determine if the season of fire plays a role. Preliminary analyses show that Texas tortoises use a variety of vegetation types throughout the year, which denotes the importance of heterogeneity for their conservation. Additionally, winter fires may also have a lower risk of fire-caused mortality. This study was designed to inform land managers of prescribed fire practices that mitigate tortoise mortality through maintaining vegetation structure that suits their activity and thermal needs.

CHRISTIN A. MOELLER

Texas A&M University-Kingsville, M.S. Scott E. Henke, Ph.D., Major Advisor

RESEARCH FELLOW: COMPLETED

Effects of Translocation on the Threatened Texas Tortoise

Due to a 98% decrease in population size and distribution, the Texas tortoise (Gopherus berlandieri) is classified as a threatened species in Texas. Their populations, which were once widespread in southern Texas from Victoria to San Antonio to Del Rio, are

now scattered, with concentrations estimated to be around 0.1 tortoises per acre. It has been documented that Texas tortoises favor lomas in southern Texas; these areas are at high risk of habitat fragmentation due to industrial development. Although translocation has been proposed as a potential management strategy, it is unclear how such efforts will affect tortoise survival, movements, and reproduction. Therefore, to date, we translocated 221 Texas tortoises from the Port Isabel area to 3, 5-acre enclosures at Kingsville, Texas, to assess the viability of translocation for Texas tortoises as a potential mitigation option before their habitat is altered. We monitored tortoise movements, survival, and reproduction via cellular telemetry. After 4, 8, and 12 months within enclosures (soft release), enclosure walls were dismantled to determine if tortoises remained in their newly established habitat or left. The walls of the 4-month and 8-month enclosures were removed during March and July, respectively, which allowed 28 and 30 tortoises equipped with cellular transmitters to have free choice of movement. Tortoises have not displayed directional movement (i.e., homing behavior) but instead have randomly moved from the enclosed area at a rate of ~ 23 m/day, on average.

MIRANDA R. PETERSON

Texas A&M University, Ph.D.
William E. Grant, Ph.D., Major Co-Advisor
Hsiao-Hsuan Wang, Ph.D., Major Co-Advisor

RESEARCH FELLOW

Spatially Explicit Modeling of Woody Plant Encroachment: A Review of Work Published During the Period 2013-2022

Grasslands cover about 40% of the Earth's land and are vital for wildlife, livestock, carbon and water storage, plant genetic conservation, and other ecosystem services.

Despite their importance, grasslands are the most threatened and least protected biome. For over a century, woody plant encroachment (WPE) has increasingly threatened grasslands worldwide, leading to significant impacts on biodiversity and ecosystem services. Woody plant encroachment (WPE) has increasingly endangered grasslands for over a century, impacting biodiversity and ecosystem services. Factors driving WPE include fire suppression, overgrazing, elevated CO2 levels, climate change, and altered hydrology. These factors often interact in complex ways to influence encroachment, and their relative importance remains debated. Simulation modeling is a valuable tool for understanding and addressing WPE, as it allows for the separation, identification, and exploration of influencing factors. Given the global threat of WPE in grassland ecosystems, our goal was to simulate potential future WPE dynamics on the WWR in response to different grazing and prescribed fire schemes under different projected climate change scenarios. To explore WPE dynamics on the WWR, we simulated various grazing and prescribed fire strategies under baseline and future climate scenarios, accounting for moderate and worst-case CO2 emissions. Preliminary results show that heavy stocking rates and summer burns consistently reduce grass biomass. However, heavy stocking rates with winter burns decrease biomass only in current climates, while future climates maintain biomass. This model provides a tool to evaluate grassland management

practices in the face of WPE. \(\) 0.03 \(\) 0.05 \(\) 0.1 Km

Red-Edge Normalized Difference Vegetation Index (NI

070

AMARIS D. SHAMMAA

Texas Tech University, M.S. Clint W. Boal, Ph.D., Major Advisor

RESEARCH FELLOW

Community Structure Among Owls on the Texas Coastal Bend Region

The nocturnal and elusive behavior of owls makes them a challenging taxonomic group to study. This has resulted in a poor understanding of community structure and distribution among species. This is especially true in the Coastal Bend region of Texas

where little research has been conducted on owl communities. My objectives are to determine species-specific densities, spatial distributions, and extent of overlap of owl species on the Welder Wildlife Refuge (WWR) and Aransas National Wildlife Refuge (ANWR). I am using audio playback surveys and passive acoustic monitoring (PAM) to better understand the distribution of four owl species: the Eastern Screech-Owl (Megascops asio), Barn Owl (Tyto furcata), Barred Owl (Strix varia), and Great Horned Owl (Bubo virginianus). I conducted three rounds of call-playback surveys for each species at 30 points on the WWR and 10 points on the ANWR. I found an estimated native occupancy of 20% for Eastern Screech-Owls, 70% for Barn Owls, 46.7% for Barred Owls, and 33.33% for Great Horned Owls on the WWR. Occupancy estimates and PAMrecorded data for ANWR are still undergoing analyses. My final results will provide a better understanding of species-specific occupancy and habitat associations across the two refuges. Additionally, I plan to assess second-generation anticoagulant rodenticide exposure in owls of the area if adequate samples can be obtained. Overall, this study will allow for a deeper assessment of regional owl population distributions and possible ongoing pesticide exposure along the Coastal Bend region. Λ

JONATHAN J. CHOI, J.D.

Duke University, Ph.D.
Patrick N. Halpin, Ph.D., Major Advisor

RESEARCH FELLOW

Offshore Wind Energy Development & Migratory Shorebird Conservation

U.S. federal agencies are accelerating offshore wind energy development in the Gulf of Mexico. Concurrently, researchers are rapidly deploying satellite tracking technology to understand shorebird migration in the face of global population declines. My dissertation

uses shorebird tracking data to understand how new offshore wind leases in the Gulf of Mexico may affect migratory shorebird conservation. Working with researchers at the Smithsonian Shorebird Collective, I will create a network model to identify critical stopover sites along the Gulf and their connections to breeding sites in the Arctic and non-breeding sites in Latin America. I will also use my legal background to understand how different management regimes have addressed the problem of industrial use of the ocean and wildlife conservation, beginning with a comparison between British and U.S. approaches to bird conservation and offshore wind development. Thus, my dissertation aims to not only improve our understanding of shorebird ecology, but to also directly inform offshore wind energy siting and future legislative and regulatory efforts.

ELLE A. SUTHERLAND

Sul Ross State University, M.S. Justin T. French, Ph.D., Major Advisor

RESEARCH FELLOW

Niche Plasticity of Desert Bighorn Sheep in the Trans-Pecos, Texas

In Trans-Pecos, Texas, desert bighorn sheep (Ovis canadensis) were extirpated by the 1960s. However, restoration efforts have shown signs of success. Management of desert bighorn in the region became

particularly complex with the rapid growth of aoudad (Ammotragus lervia) populations. Aoudad carry and transmit diseases to desert bighorn and also use similar habitats and forage. Previous research demonstrated the potential for aoudad and desert bighorn to compete for habitat, even at low aoudad density. This is particularly relevant due to recent disease-related die-offs of desert bighorn in the Trans-Pecos. I am exploring variation in niche breadth, position, and configuration among populations in the Trans-Pecos to determine whether desert bighorn can behaviorally compensate for competitive pressure from aoudad. Specifically, I am using integrated step selection analyses to model inter-individual habitat selection behavior and assess the niches of desert bighorn at both the individual and population levels. To accomplish this, I am utilizing 21 population-years of movement data from 7 desert bighorn populations. My preliminary results indicate differences in niche breadth and position among populations, suggesting flexibility in desert bighorn sheep resource use. To further investigate this niche plasticity, I will analyze the internal configuration of the population niche, which has implications for social dynamics and disease transmission, along with niche plasticity. Evidence of niche plasticity will indicate the potential for desert bighorn to shift their niche to avoid competition with expanding aoudad populations and will inform future management actions for desert bighorn in landscapes cooccupied by aoudad.

ELIZABETH EVERETT

Texas A&M University-Corpus Christi, M.S.
Frauke Seemann, Ph.D., Major Co-Advisor
Adam Mitchell, Ph.D., Major Co-Advisor
RESEARCH FELLOW

Microplastics as a Disturbance to Food Web Dynamics in Texas Gulf Coastal Bays

Studies have improved our understanding of how aquatic organisms uptake microplastics (MPs), but there is a lack of information on their transfer through the food chain.

To address this gap, a study combining field observations and lab experiments on ingestion is needed. This research will focus on the impact of MPs in the marine food web of Matagorda Bay in the Gulf of Mexico. By studying the abundance, composition, and distribution of MPs in this ecosystem and conducting feeding experiments on a two-level trophic chain from copepod to jellyfish, critical information on microplastic retention and its effects on fecundity, behavior, and growth will be provided. Copepods will be sampled in situ and examined for the microplastic body burden. MPs obtained from the field will be used in the lab-feeding experiments with copepod nauplii and jellyfish ephyra. It is expected that the consumption of MP-contaminated copepods will negatively impact jellyfish development, with reduced pulse-per-minute rates and survival indicating physiological stress. Additionally, MP-fed copepods are likely to experience reduced growth, reproductive output, or impaired physiological functions. Initial findings revealed MP concentrations ranging from 1,591 to 15,275 MPs per liter across the 7 sampled bays. The three highest MP/L concentrations were observed in bays influenced by freshwater input. The initial analysis demonstrated that adult copepods exhibit a higher MP body burden compared to nauplii stages. Adult copepods average 4.0 MPs per individual, while nauplii average 1.7 MPs per individual. Additionally, the copepods from sites with freshwater input recorded the highest MP body burden. This data will inform future policies to reduce microplastic pollution in the marine environment and protect aquatic resources.

JAMES N. HELFERICH

Texas A&M University- Kingsville, Ph.D. Lisanne S. Petracca, Ph.D., Major Advisor

RESEARCH FELLOW

Applying Spatially Explicit and Genetic Capture-Recapture for Ocelot Density Estimation

Robust and accurate estimates of population parameters are crucial for effectively managing endangered species. Estimates of abundance and density are needed to monitor populations over time, make comparisons among sites, and assess extinction risk. While analytical advancements

such as spatially explicit capture-recapture (SECR) models have generally improved our ability to estimate abundance, there is still a need to identify the most effective methods for monitoring elusive, lowabundance populations over time. We will use SECR to answer questions related to the last remaining populations of the federally listed ocelot (Leopardus pardalis) in the United States while evaluating the efficacy of field and analytic techniques. First, we will use simulations to determine the ideal detector array design under multiple movement strategies, giving researchers insight into how to design trap arrays when movement models are known and unknown. We will utilize camera traps and scat detection dogs to estimate ocelot and bobcat (Lynx rufus) densities for the South Texas ocelot populations. This effort will provide the first multi-site estimate of abundance and allow for the evaluation of camera trap versus scat detection dog methodologies. We will then extrapolate potential density to a region-wide scale using remotely sensed landscape characteristics. Finally, we will use a combined Integrated Population Model- Population Viability Analysis to jointly estimate parameters of Texas ocelot populations and predict future population size and extinction risk under climate and land cover change scenarios. An IPM-PVA will give us insights into the dynamics of ocelot populations through the end of the 21st century and beyond. \bigwedge

RESEARCH SYMPOSIUM

We held our bi-annual research symposium in October, during which our Welder Fellows and their faculty advisors came together to present and discuss their research. The event was highlighted by several guest speakers and former Fellows Dr. Mike Tewes (Caesar Kleberg Wildlife Research Institute/Texas A&M University- Kingsville) and Richard Heilbrun (Director of Wildlife Diversity, Texas Parks and Wildlife Department). The Fellows were also provided with a one-day leadership workshop to better their development as outstanding leaders in conservation.





EDUCATION PROGRAM

As a knowledgeable outdoor enthusiast and trained teacher with years of experience both in and out of the classroom, I've aided in meeting our educational goals of developing innovative programs, strengthening present offerings, and increasing our reach in conservation education. My experience with the Texas Education Knowledge Skills (TEKS) allows us to ensure our programs meet the changing student requirements so they can be successful in their academic careers.

Additionally, knowing how teachers work to integrate activities into their curriculum will facilitate building closer ties with schools.

While working to meet the needs listed above, the biggest reward is the "aha" moment, where learners of all ages discover a connection with an idea, an organism, or just enjoyment. Going forward, I am excited to spend more time interacting with people as they find their "aha" moments through our ever-increasing educational opportunities here at Welder. Being a Conservation Educator at Welder has allowed me to use my experience in both formal and informal learning methods to support and develop opportunities for various conservation learner experiences.

-Ron Schulze, M.S. Conservation Educator



I am the newest member of the education department, having joined in November. During this time, I have had the privilege of participating in several outreach events and more. What I find most rewarding about my role as a Conservation Educator is the chance to inspire young people by teaching them about nature, the value of spending time outdoors, and the importance of conservation. Moving forward, I am particularly excited to continue fostering an interest in wildlife and conservation among young individuals. Looking ahead, I am eager to contribute to additional outreach events and to organize more public-facing activities that can foster community involvement. I am truly grateful to be part of such a dedicated and talented team.

> -Taylor Zamora Conservation Educator



Another successful, exciting, and fun year for the education team; 2024 was a year filled with learning and transition for our program. We said goodbye to wonderful educators and welcomed new ones, eager and filled with new ideas. Reaching nearly 5,500 individuals through outreach and on-site educational programming, we know we are heading in the right direction every day, and I couldn't be more proud to be part of such a hardworking team.

Our summer camps programs continue to be well-received among local and surrounding counties. In 2024 we hosted our first youth wildflower workshop, a Herpetology Day Camp, and Entomology Day Camp. Programs 4000 like these would be impossible without our amazing education volunteers, and partner organizations that help to share our passion for conservation. Thank you all for your incredible work.

In addition to our onsite efforts, we have made tremendous strides in our outreach efforts as well, reaching 3,095 individuals alone through offsite events. Although our goal is to have people visit the Foundation, outreach events are a wonderful way to show the public the many resources we have to offer. Because of these outreach efforts, we are now seeing a positive impact on

10%

Another 10% growth of individuals reached in educational programming from 2023 to 2024!







individuals now visiting the Foundation to find out more, join us for a public tour, or schedule a field trip. Through these combined efforts, we expect to see continued growth in both our public presence and onsite attendance.

In 2025, we will continue our youth day camps, which will include Arthropod Camp (by popular demand from the kiddos), a Land Stewardship Camp for high school students, and a slew of informational materials like monthly newsletters, activity books, and more to keep folks informed on the latest Refuge happenings. Thank you all for your support of our program, and we will continue to work hard to deliver exciting and engaging educational programming, just like Rob always wanted! 🖊

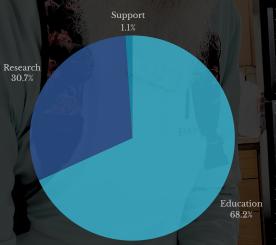
-Angie Arredondo, M.S. Manager of Education, Outreach, and Curation

VOLUNTEER PROGRAM

VOLUNTEER HOURS

Our amazing Welder Volunteers are the reason we can accomplish so much throughout the very busy year. Being such a small staff, we heavily rely upon the efforts dedicated by these amazing individuals. From large field days with 200 students enjoying the refuge, to long, early mornings of research, we would be lost without them.

Events like our annual Youth Hunt in partnership with the Texas Youth Hunting Program, summer camp programs, field days, career days, MAPS research (Monitoring Avian Productivity and Survivorship), trail maintenance, and so much more are possible because of these wonderful people.



Now that the Education Department has expanded, we intend to dedicate more time to keeping volunteers engaged in 2025. This means monthly volunteer workdays to help prepare for upcoming events, updating existing trails, or establishing new things for visitors to enjoy; there is always something to do here on the Refuge. If you would like to become a Welder Volunteer, please visit our website and submit an application or sign up for our monthly newsletter. "Welder Now!"

We cannot thank our Welder Volunteers enough for all of their efforts over the years, but a particular thank you to individuals who assisted us with all programs in 2024. Here are just a few of our wonderful volunteers:

Philip Woods Gregg Simmons and Sally Scroggs Chad Huckabee Grace Lopez Kris and Ray Kirkwood Jeremy Miller Bill Burge Yvette Stewart John and Sarah Failla Laura Bonneau Sarah Rock Joise Gunter Randy and Dawn Bissell Kathryn Fernald Paityn Macko Matti Bradshaw

Texas A&M University- Kingsville Student Chapter of the Wildlife Society Mr. & Mrs. Lawrence Jordan Ryland Wieding Albert Flores Aiden Flores Lerrin Williams Matt Hendrix Ronald Schulze Paul Swacina Patrick Haritgan David Griese Dale Rasco Bailey Rangel Amaris Shamma **Duston Duffie**



and the Donald

taxidermy collec

MUSEUM &

COLLECTIONS

The term conservation is often extended to resources other than land and wildlife. The Foundation has also been entrusted to conserve a number of other special items including an extensive research library and collection of scientific specimens to be used for educational and research purposes. These collections include:



405 Taxidermied Birds 170 species represented

The Roy Quillin Egg Collection
10,000 eggs
400 species represented

Francis Lee Jaques Art Collections
Wildlife murals and dioramas of
native flora and fauna

Specimen Collections
Herbarium- 1,400 pressed plants
Avian- 545 species represented
Amphibians and Reptiles- 104 species represented
Mammalian- 61 species represented

Historical Library
24,000 Volumes of Books
Rare text dating back to the 1600s





2024 SUPPORT

Private donations, contributions, and sponsorships are a driving force behind the Welder Wildlife Foundation and our ability to deliver conservation programs. We are grateful for our supporters who give generously through general gifts and/or project-specific contributions. This support develops tomorrow's leaders in conservation science and educates future generations toward growing good stewards of our natural resources. We are thankful to our many partners and friends of the Foundation who make our work possible.

Ed Rachal Foundation M.G. & Lillie Johnson Foundation Steel Dynamics Southwest LLC. Dr. & Mrs. William Andelt Corpus Christi Rotary Club Coastal Bend Community Foundation H-E-B H-E-B Sinton Behmann Brothers Foundation Union Pacific Foundation Texas Mutual Harry & Diana W. Hamilton Foundation Sharp Shooter Foto Texas A&M University-Kingsville Foundation, Inc. South Star Wealth Management South Texas Electric Cooperative Rockport-Fulton Area Chamber of Commerce Alimento Catering John & Laurie Gwaltney

Dr. Guy Cameron

Randy & Dawn Bissell Cita Breitenwischer Barbara Briggs Mr. & Mrs. Patrick M. Hanus Dr. Dale & Michelle James Richard Thomas Heath Weaver & Julie Young Davey Edwards III Russell & Cindy Marshall Jane Wicker John Welder V and Family Dr. Michael and Linda Vickers Dr. Marshall & Janna Wiener Jane & David McKee **Hughes Thomas** D'ann Williams Joel Thomas Dr. Clait and Nancy Braun Cotulla ISD Ada Fish Christopher Nieto Louise O'Connor

Thank you!

RESEARCH & CONSERVATION PROGRAM PARTNERS

The Welder Wildlife Foundation would not be as effective and efficient in delivering our research and education programs without the collaboration and support of our many partners. We aim to engage with public and private conservation professionals whose goals align with our conservation mission and those collaborative partnerships that advance conservation research and education.







































RESEARCH & CONSERVATION PROGRAM PARTNERS









CONSERVING THE LAST FRONTIER



















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Rob & Bessie Welder Wildlife Foundation