Managed and Operated by
Consolidated Nuclear Security, LLC

International Conservation of Migratory Birds Through Research Collaborations – A Success Story

Pantex Plant
United States Department of Energy-National Nuclear Security Administration

James D. Ray
Wildlife Biologist/Environmental Science Senior Specialist
James.Ray@cns.doe.gov

International Conservation of Migratory Birds Through Research Collaborations – A Success Story

Pantex Plant

United States Department of Energy-National Nuclear Security Administration

- **James D. Ray**
- Wildlife Biologist/Environmental Science Senior Specialist
- *James.Ray@cns.doe.gov*

Success Story

Threatened: State of Texas

Proposed Threatened: Federal

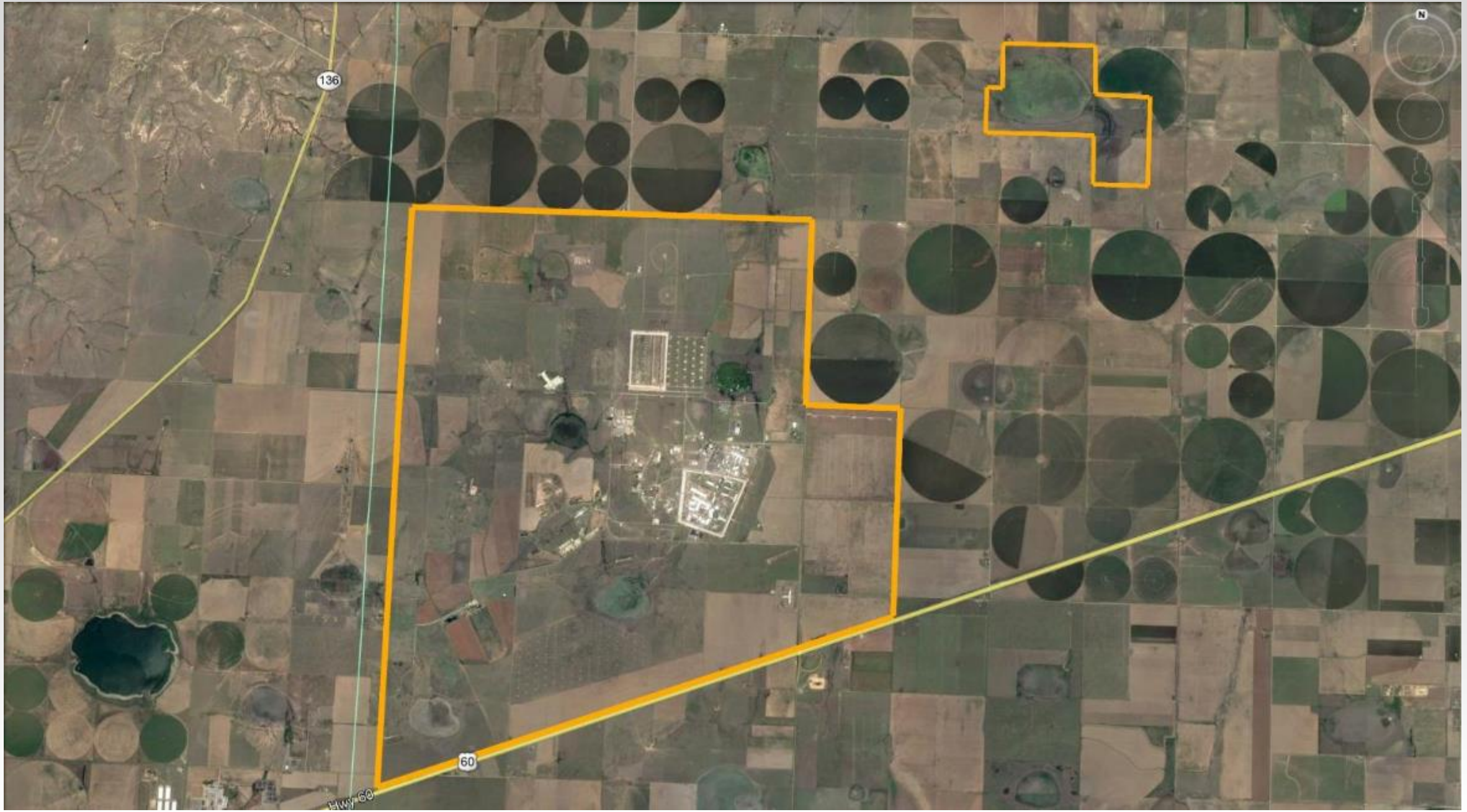
Species of Conservation Concern: Federal

USDOE-NNSA Pantex Plant

PANTEX

USDOE-NNSA Pantex Plant

- **Primary facility for the disassembly and maintenance of the nation's nuclear weapon arsenal.**


136
60
Hwy 60
N

Wildlife

44 Species of Mammals

203 Species of Birds

Wildlife

27 Species of Reptiles and Amphibians

> 900 Species of Macroinvertebrates

Credible, State-of-the-Art Land and Wildlife Practices

- **Several plans dealing with farming, ranching, and wildlife management are incorporated into the Texas State *Soil and Water Conservation Plan* which is monitored and certified yearly by the State Soil and Water Conservation Board.**

Research

Research

- **Research**
  - **Multi-year**
- **Collaborations**
- **Outreach**

Research

- **Research**
  - **Multi-year**
- **Collaborations**
- **Outreach**

Opportunity

Research

- **Data gaps**
  - Inventory – terrestrial macroinvertebrates
  - Inventory – reptiles and amphibians
- **Threatened and Endangered Species/Proposed listing**
  - State Threatened Texas horned lizard
  - Proposed listing of the black-tailed prairie dog
  - Biodiversity associated with colonies of black-tailed prairie dogs

Research

Set the stage for:
- multi-year research projects at the Pantex Plant
- research that expands beyond the boundary of the Pantex Plant
- agency and company appreciating the value of the "output" (outreach) from the research
- eventual goal of leading the agency in accomplishments for the U. S. Department of Energy (management level)

- **Data gaps**
  - Inventory – terrestrial macrovertebrates
  - Inventory – reptiles and amphibians
- **Threatened and Endangered Species/Proposed listing**
  - State Threatened Texas horned lizard
  - Proposed listing of the black-tailed prairie dog
  - Biodiversity associated with colonies of black-tailed prairie dogs

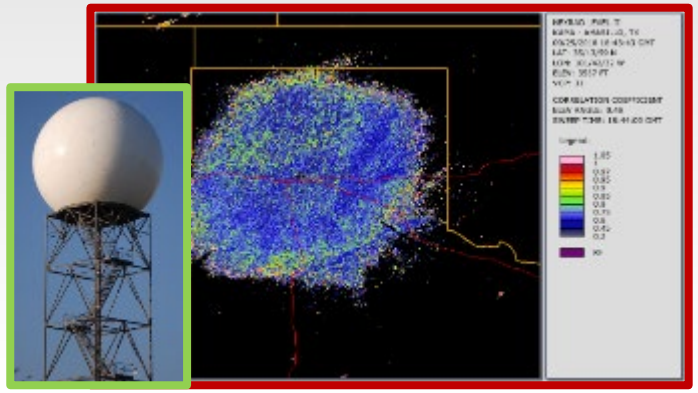
Research

- **Data gaps**
  - Inventory – terrestrial macroinvertebrates
  - Inventory – reptiles and amphibians
  - Effects of wind energy on bats and birds
- **Threatened and Endangered Species/Proposed listing**
  - State Threatened Texas horned lizard
  - Proposed listing of the black-tailed prairie dog
- **Safety**
  - Ecology of prairie rattlesnakes
  - Ecology of bobcats

Research – Two National Initiatives

- **Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds**

- **Federal Pollinator Health Task Force and Strategy**



Research – Two National Initiatives

- **Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds and Federal Pollinator Health Task Force and Strategy**
  - **These two initiatives gave us the opportunity to:**
    - **Justify habitat protection and enhancement**
    - **Justify research, partnerships and outreach**
    - **Justify research focus that is not necessarily on the Pantex property**
    - **Contribute to agency accomplishments on a national level**
    - **Develop a goal of leadership in these areas across the complex**

These were opportunities.

No mandate.

No dedicated funding associated with these initiatives.

Migratory Bird Research

Migratory Bird Research

- Research
  - Multi-year
- Collaborations
- Outreach

Federal Register
Vol. 66, No. 11
Wednesday, January 17, 2001

Presidential Documents

Title 3—
The President

Executive Order 13186 of January 10, 2001

Responsibilities of Federal Agencies To Protect Migratory Birds

plants that may [illegible] resources;

(11) promote research and information exchange related to the conservation of migratory [illegible] resources, including coordinated inventorying and monitoring and the collection and assessment of information on environmental contaminants and other physical or biological stressors having potential relevance to migratory bird conservation. Where such information is collected in the course of agency actions or supported through Federal financial assistance, reasonable efforts shall be made to share such information with the Service, the Biological Resources Division of the U.S. Geological Survey, and other appropriate repositories of such data (e.g, the Cornell Laboratory of Ornithology);

(12) provide training and information to appropriate employees on methods and means of avoiding or minimizing the take of migratory birds and conserving and restoring migratory bird habitat;

(13) promote migratory bird conservation in international activities and with other countries and international partners, in consultation with the Department of [illegible] authorities;

(14) recognize and promote economic and recreational values of birds, as appropriate [illegible]

(15) develop partnerships with non-Federal entities to further bird conservation

Migratory Bird Research

- **Research**
  - **Multi-year**
- **Collaborations**
- **Outreach**

- **Pantex staff**
  - **Annual mapping of prairie dog colonies since 1997**
  - **Purple martin outreach and banding program (< 12,000 banded)**
  - Occurrence of milkweed species and use by breeding monarch butterflies
- **University contracts**
  - Inventory – terrestrial macroinvertebrates
  - Inventory – reptiles and amphibians*
  - **Biodiversity associated with black-tailed prairie dog colonies**
  - **Ecology of western burrowing owls**
  - Ecology of Texas horned lizards*
  - Ecology of prairie rattlesnakes*
  - Ecology of bobcats*
  - **Effects of wind energy on bats and birds**
  - **Effects of wind energy on Swainson's hawks throughout its annual travels (wind energy focus)**
  - Evaluation of NEXRAD radar as a tool for monitoring flagship pollinators

* Heavy field involvement by Pantex staff

Had bird research components

Migratory Bird Research

- **Research**
  - **Multi-year**
- **Collaborations**
- **Outreach**

- **Opportunistic collaborations with Universities**
  - **Ecology and conservation needs of the eastern purple martin during the non-breeding season***
  - **Productivity of eastern purple martins in provisioned bird housing (technical guidance)**
  - **Can eastern purple martins be lured back into its natural habitats (technical guidance)**

* Heavy field involvement by Pantex staff.

Migratory Bird Research

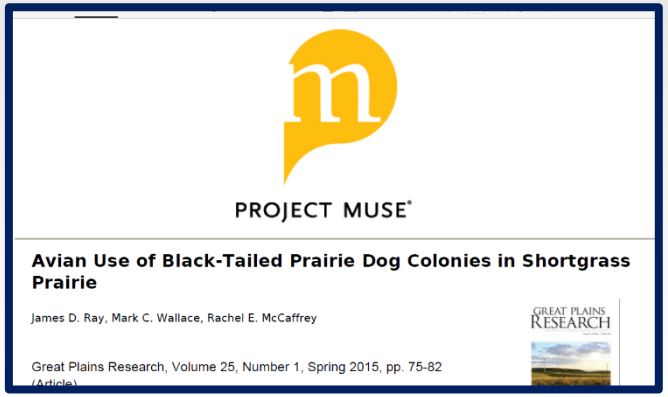
- **Research**
  - **Multi-year**
- **Collaborations**
- **Outreach**

- **Government**
  - USDOE-NNSA, NNSA Production Office
  - USGS Texas Cooperative Fish and Wildlife Research Unit at Texas Tech University
- **Corporate**
  - Consolidated Nuclear Security, LLC (Pantex)
- **University**
  - Texas Tech University
  - West Texas A&M University
  - Canada's University of Manitoba and York University
- **Non-government organizations**
  - Texas Ornithological Society
- **Public**
  - Many home and property owners, and volunteers
- **By extension: The Purple Martin Conservation Association, Disney World Wide Fund, Texas Parks and Wildlife Department**

Migratory Bird Research

Avian Use of Black-Tailed Prairie Dog Colonies

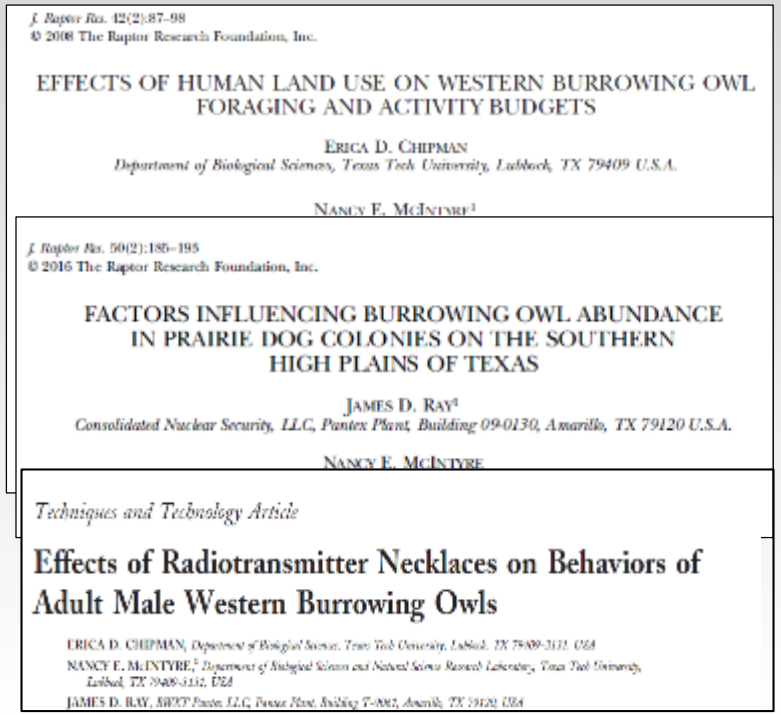
- **Avian use of black-tailed prairie dog colonies vs non-colonized shortgrass prairie**
  - Bird surveys (plots)
  - Work was performed during the proposed listing process involving black-trailed prairie dogs



Migratory Bird Research

Ecology of Western Burrowing Owls

- **Burrowing owls**
  - Habitat selection and production, regional scope
  - Effects of wind energy, continent scope



J. Raptor Res. 42(2):87–98
© 2008 The Raptor Research Foundation, Inc.

EFFECTS OF HUMAN LAND USE ON WESTERN BURROWING OWL FORAGING AND ACTIVITY BUDGETS

ERICA D. CHIPMAN
Department of Biological Sciences, Texas Tech University, Lubbock, TX 79409 U.S.A.

NANCY E. MCINTYRE[1]

J. Raptor Res. 50(2):185–195
© 2016 The Raptor Research Foundation, Inc.

FACTORS INFLUENCING BURROWING OWL ABUNDANCE IN PRAIRIE DOG COLONIES ON THE SOUTHERN HIGH PLAINS OF TEXAS

JAMES D. RAY[4]
Consolidated Nuclear Security, LLC, Pantex Plant, Building 09-0130, Amarillo, TX 79120 U.S.A.

NANCY E. MCINTYRE

Techniques and Technology Article

Effects of Radiotransmitter Necklaces on Behaviors of Adult Male Western Burrowing Owls

ERICA D. CHIPMAN, *Department of Biological Sciences, Texas Tech University, Lubbock, TX 79409-3131, USA*
NANCY E. MCINTYRE,[2] *Department of Biological Sciences and National Science Research Laboratory, Texas Tech University, Lubbock, TX 79409-3131, USA*
JAMES D. RAY, *SWCA Pantex LLC, Pantex Plant, Building T-0082, Amarillo, TX 79120, USA*

Migratory Bird Research

Effects of Wind Energy Development on Birds

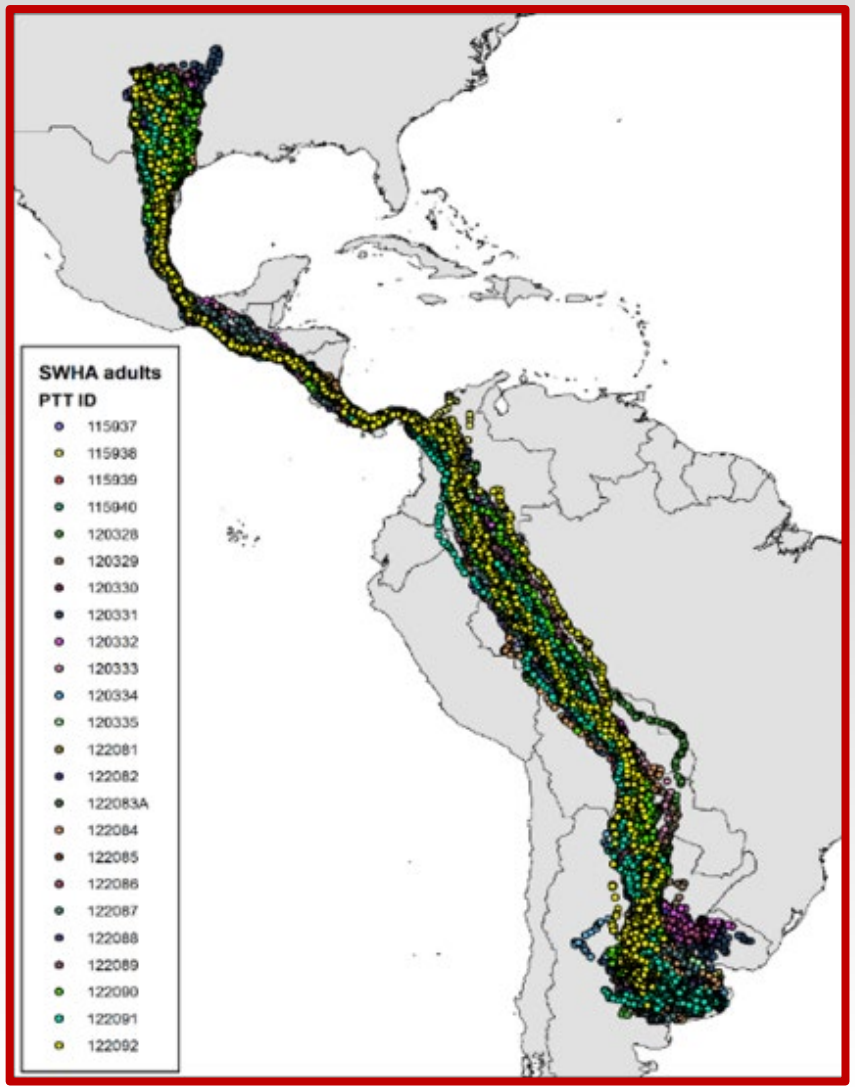
- **Effects of wind energy**
  - Mortality and carcass disappearance rates
  - Effects on bird presence at various distances from wind turbines

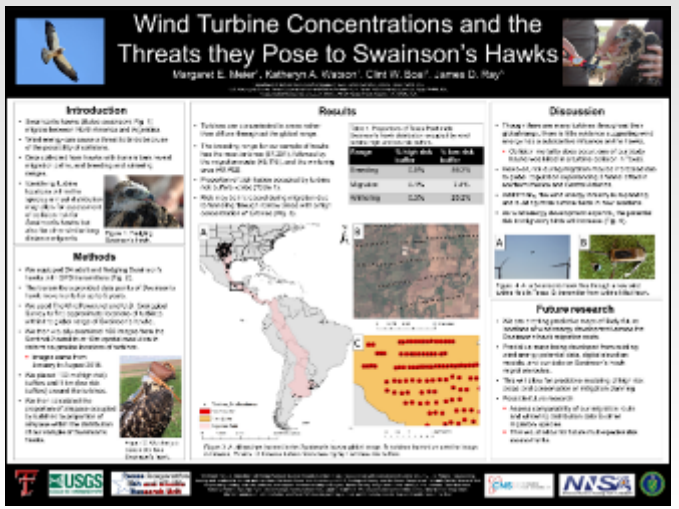
Migratory Bird Research

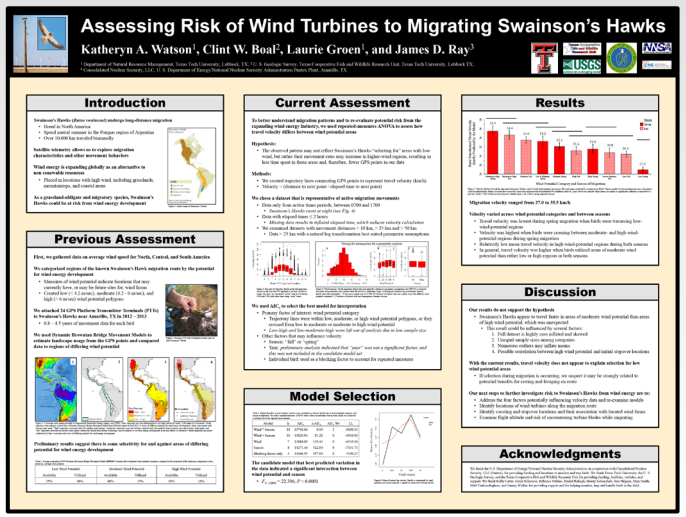
Swainson's Hawks – Wind Energy

- **Swainson's hawks**
  - Effects of wind energy, hemispheric scope
  - Habitat selection throughout its annual travels, hemispheric scope

Migratory Bird Research







Migratory Bird Research

Ecology of Purple Martins

- **Purple Martins**
  - Outreach program has resulted in the banding of > 12,000 nestlings
  - Habitat selection within stopover and wintering areas (nonbreeding season)

Migratory Bird Research

An opportunity.

Migratory Bird Research

Migratory Bird Research

Journal of Avian Biology 48: 001–007, 2017
doi: 10.1111/jav.01091

Subject Editor: Thomas Alerstam. Editor-in-Chief: Jan-Åke Nilsson. Accepted 20 July 2016

Determining fine-scale migratory connectivity and habitat selection for a migratory songbird by using new GPS technology

K. C. Fraser, A. Shave, A. Savage, A. Ritchie, K. Bell, J. Siegrist, J. D. Ray, K. Applegate and M. Pearman

K. C. Fraser (kevin.fraser@umanitoba.ca), A. Shave, A. Ritchie and K. Bell, Dept of Biological Sciences, Univ. of Manitoba, Winnipeg, MB, Canada. – A. Savage, Disney's Animal Programs, Lake Buena Vista, FL, USA. – J. Siegrist, Purple Martin Conservation Association, Erie, PA, USA. – J. D. Ray, Consolidated Nuclear Security, LLC, Pantex Plant, Amarillo, TX, USA. – K. Applegate, Mille Lacs Band of Ojibwe, Mille Lacs, MN, USA. – M. Pearman, Ellis Bird Farm, Lacombe, AB, Canada.

Migratory aerial insectivores are among the fastest declining avian groups, but our understanding of these trends has been limited by poor knowledge of migratory connectivity and the identification of critical habitat across the vast distances they travel annually. Using new, archival GPS loggers, we tracked individual purple martins *Progne subis* from breeding colonies across North America to determine precise (< 10 m) locations of migratory and overwintering roost locations in South America and to test hypotheses for fine-scale migratory connectivity and habitat use. We discovered weak migratory connectivity at the roost scale, and extensive, fine-scale mixing of birds in the Amazon from distant (> 2000 km) breeding sites, with some individuals sharing the same roosting trees. Despite vast tracts of contiguous forest in this region, birds occupied a much more limited habitat, with most (56%) roosts occurring on small habitat islands that were strongly associated with water. Only 17% of these roosts were in current protected areas. These data reflect a critical advance in our ability to remotely determine precise migratory connectivity and habitat selection across vast spatial scales, enhancing our

Migratory Bird Research

Precise direct tracking and remote sensing reveal the use of forest islands as roost sites by Purple Martins during migration

Auriel M. V. Fournier,[1,9,10,11] Amanda Shave,[2,11] Jason Fischer,[3] Joe Siegrist,[4] James Ray,[5] Edward Cheskey,[6] Megan MacIntosh,[6] Alisha Ritchie,[2] Myrna Pearman,[7] Kelly Applegate,[8] and Kevin Fraser[2]

Journal of Avian Biology 48: 001–007, 2017

Determining fine-scale migratory connectivity and habitat selection for a migratory songbird by using new GPS technology

K. C. Fraser, A. Shave, A. Savage, A. Ritchie, K. Bell, J. Siegrist, J. D. Ray, K. Applegate

J Ornithol

ORIGINAL ARTICLE

Migratory stopover timing is predicted by breeding latitude, not habitat quality, in a long-distance migratory songbird

A. Van Loon[1] · J. D. Ray[2] · A. Savage[3] · J. Mejeur[3] · L. Moscar[3] · M. Pearson[3] ·

SYMPOSIUM

Ecological Causes and Consequences of Intratropical Migration in Temperate-Breeding Migratory Birds*

Migratory Bird Research

- **Purple Martins**
  - Technical guidance was provided to a graduate-level class in analyzing a 72,000- record citizen science dataset of nest records
    - Are they productive in managed bird housing?

Concern:
- entrenched in a long-term decline in population
- only nesting in provisioned housing
- strong evidence that it is mainly people over 50 providing managed housing for this species

91% of 64 "landlords" were at least 50

Migratory Bird Research

Nest Survival Data Confirm Managed Housing Is an Important Component to the Conservation of the Eastern Purple Martin

DANIEL RALEIGH, *Department of Natural Resources Management, Texas Tech University, Lubbock, TX 79409, USA*
JAMES D. RAY, *Consolidated Nuclear Security, LLC, Pantex Plant, P.O. Box 30020, Amarillo, TX 79210, USA*
BLAKE A. GRISHAM,[1] *Department of Natural Resources Management, Texas Tech University, Lubbock, TX 79409, USA*
JOE SIEGRIST, *Purple Martin Conservation Association, 301 Peninsula Drive, Erie, PA 16505, USA*
DANIEL U. GREENE, *Weyerhaeuser Company, Southern Timberlands Technology, P.O. Box 2288, Columbus, MS 39704, USA*

ABSTRACT The purple martin (*Progne subis*) is entrenched in a consistent, long-term decline. This is especially true for the subspecies east of the Rocky Mountains (*P. s. subis*), which today nests almost exclusively in provisioned housing (birdhouses and hollow gourds) provided by citizen scientists. One benefit of provisioned housing is reduced nest-site competition with nonnative European starlings (*Sturnus vulgaris*) and house sparrows (*Passer domesticus*) when managed by citizen scientists. Increased competition for nest

Outreach

Outreach

- Research
  - Multi-year
- Collaborations
- Outreach

- Media coverage and social media

Outreach

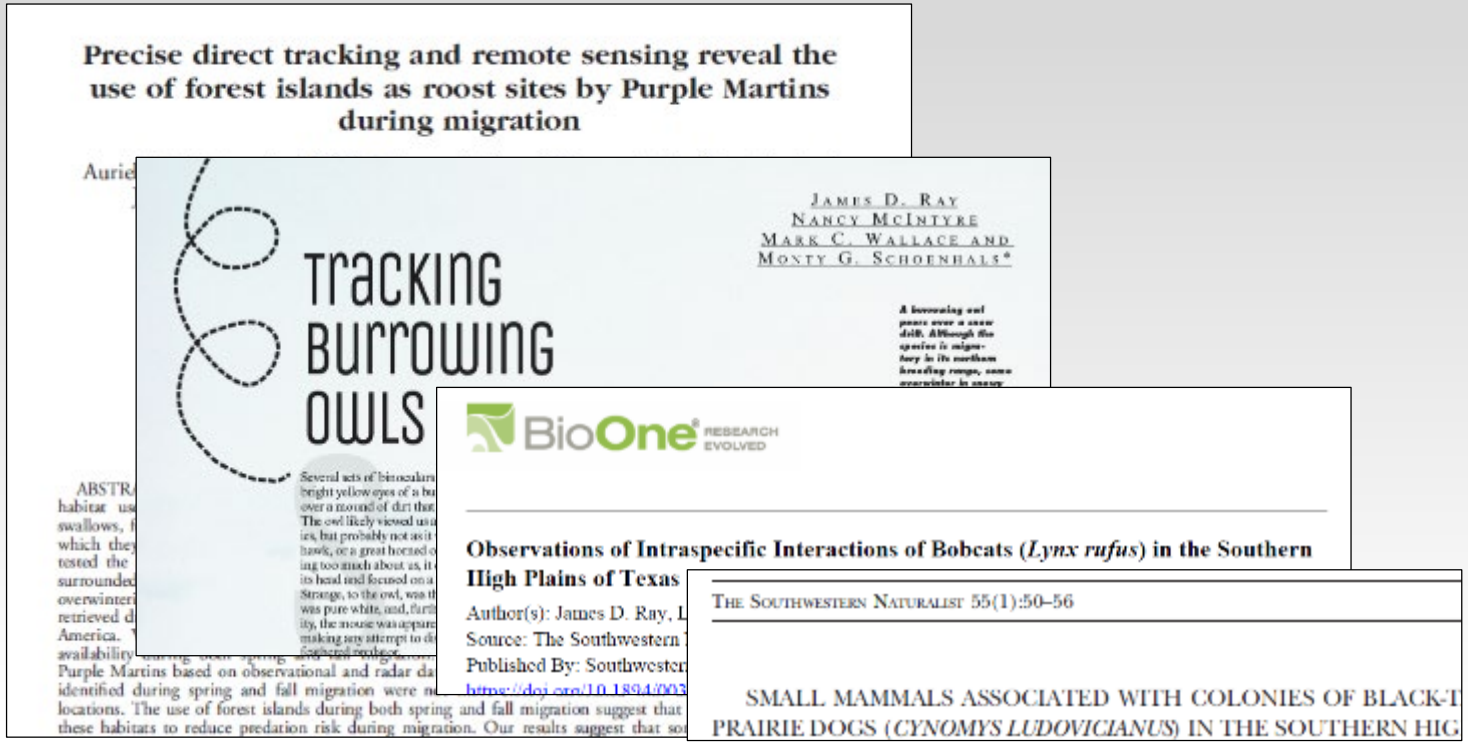
- **Research**
  - **Multi-year**
- **Collaborations**
- **Outreach**

- **Presentations to agency, company, lay, and scientific audiences**
  - Presentations made by both Pantex and collaborators

Outreach

- **Research**
  - **Multi-year**
- **Collaborations**
- **Outreach**

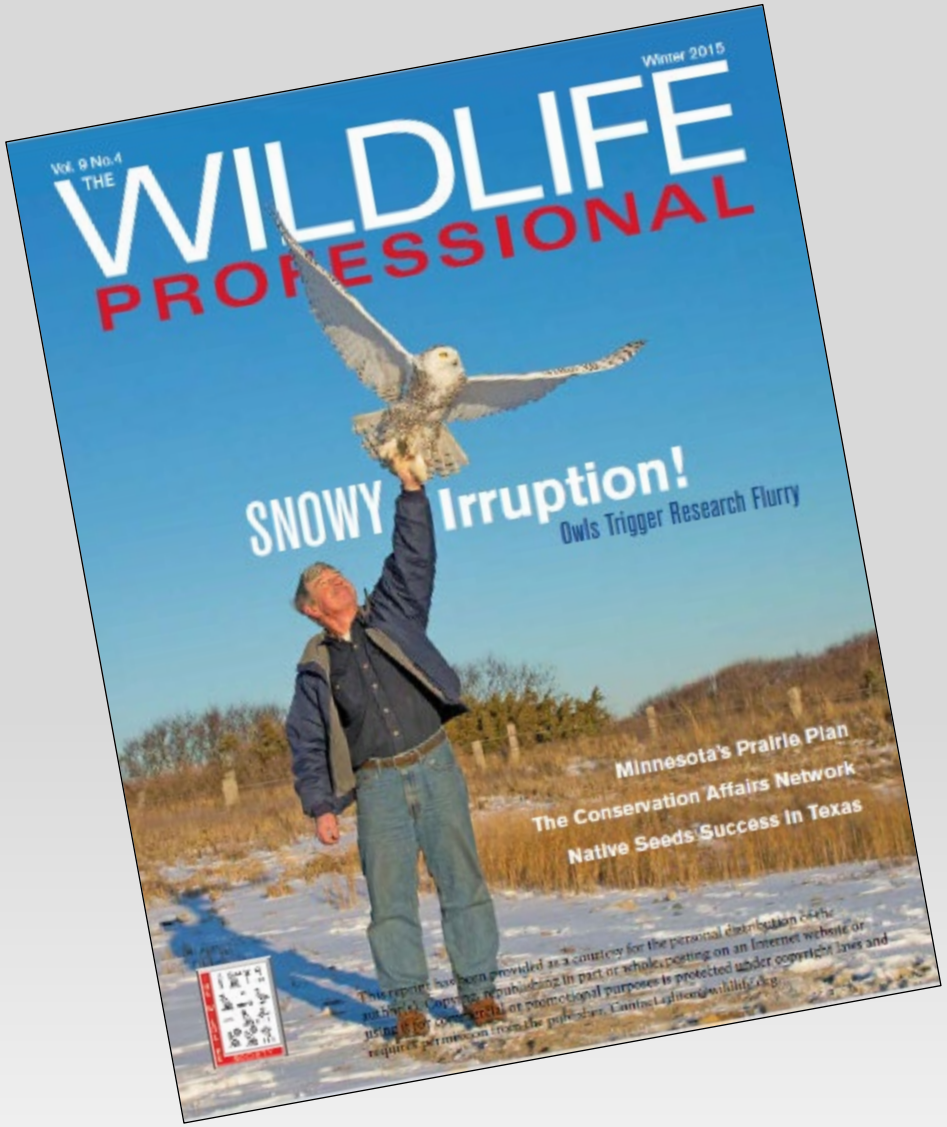
- **Popular and Scientific Journal Articles**
  - Publications led by both Pantex and collaborators



Outreach

Table 1. Numbers of presentations, popular articles, and peer-reviewed journal articles related to research conducted by Pantex and collaborators.

	Migratory Birds	Other Wildlife	General Wildlife Research Program
Presentations and Posters (Professional Audiences)	12	8	3
Major Published Articles	15	11	2
Popular Magazine Articles	5	4	2
Peer-Reviewed / Refereed Journal Articles	10	7	–



EDUCATION

An Unusual Location for Student Research

HOW A NUCLEAR WEAPONS SITE FOSTERED A COLLABORATIVE WILDLIFE PROGRAM

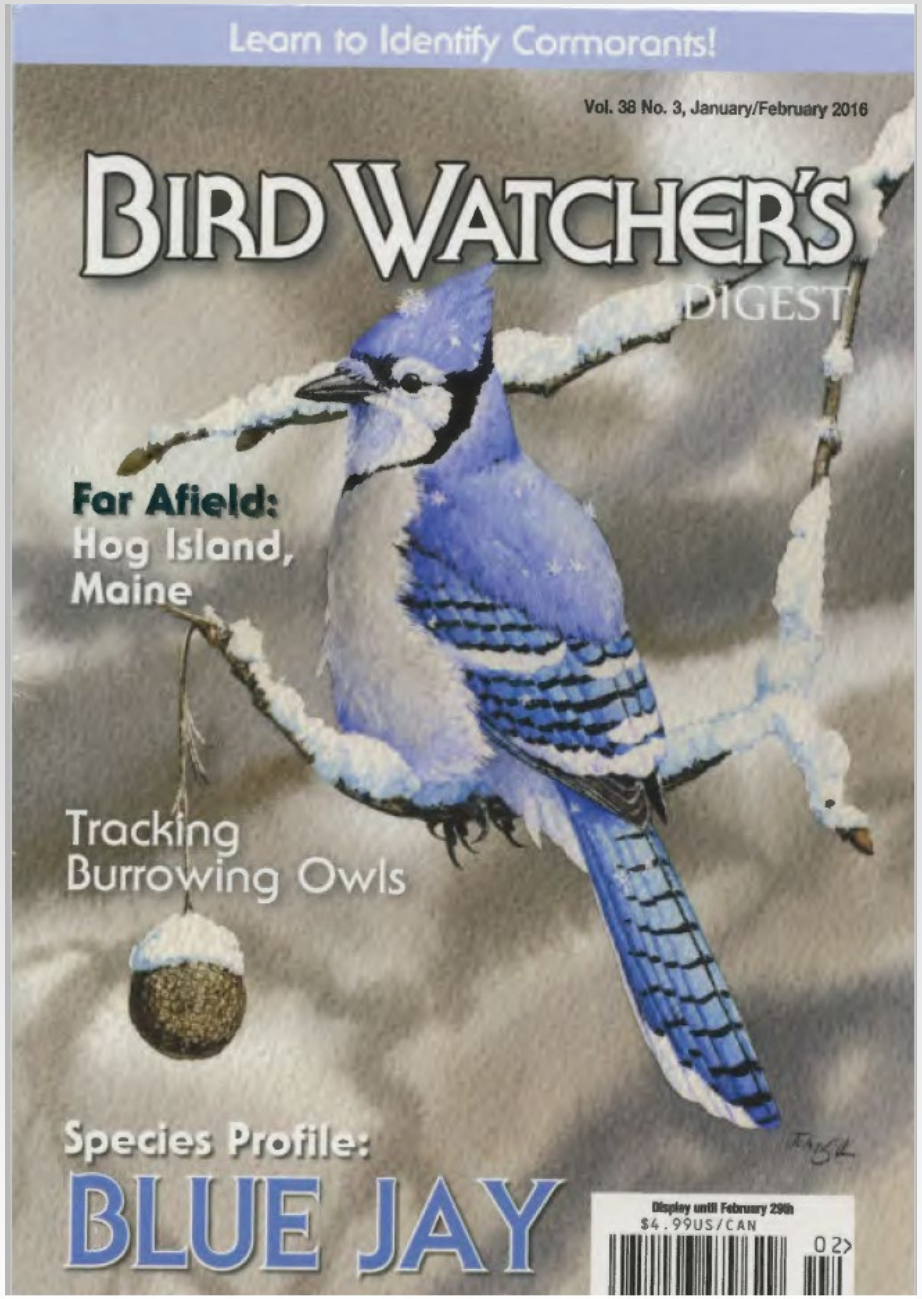
By James D. Ray, Clint W. Boal and Richard T. Kazmaier

Approximately 17 miles northeast of Amarillo, Texas, sits the United States Department of Energy/National Nuclear Security Administration's (USDOE/NNSA) Pantex Plant — the primary facility for maintaining and disassembling the nation's nuclear weapons arsenal and for interim storage of plutonium components. In 1990, the plant site — which covers 28 square miles — had only one newly hired wildlife biologist who faced a number of high-profile, regional management and conservation issues. Now, 15 years later, many graduates from West Texas A&M University in Canyon and Texas Tech University in Lubbock have advanced into their profession carrying unique experience gained while conducting wildlife research on this highly unusual property thanks to the formation of a unique research program.

Today, this collaborative effort dictated by the needs of the Pantex site has evolved into a well-respected wildlife conservation and management program that allows local university students to study a wide variety of topics including species with special statuses or the impact of wind energy on birds and bats. In three recent years — 2012, 2013 and 2014 — their research studies helped the Pantex program be recognized as the USDOE/NNSA's winner of its single nomination for the Presidential Migratory Bird Federal Stewardship Award, an achievement that has given even greater credibility to the ongoing programs.

Building a Collaborative Program

The Pantex facility, which sits atop the Texas Southern High Plains, employs more than 3,000 people, although most of the work is concentrated on about 3.8 square miles. Except for the developed area of the facility, the property blends into the surrounding landscape. Its representative habitats and controlled access make the site an especially desirable area for wildlife studies and in many ways a defacto nature reserve.



Outstanding Popular Article
Texas Chapter of The Wildlife Society
2017

Tracking Burrowing Owls

James D. Ray
Nancy McIntyre
Mark C. Wallace and
Monty G. Schoenhals*

A burrowing owl peers over a snow drift. Although the species is migratory in its northern breeding range, some overwinter in sunny areas.

Several ears of biscuits were fixed on the bright yellow eyes of a burrowing owl peering over a mound of dirt that marked his burrow. The owl likely viewed us as potential adversaries, but probably not as it would a coyote, a hawk, or a great horned owl. Instead of worrying too much about us, it occasionally turned its head and focused on a nearby mouse. Strange, to the owl, was the fact that the mouse was pure white, and, further piquing its curiosity, the mouse was apparently not afraid nor making any attempt to distance itself from the feathered predator.

Momentarily, the temptation overcame the owl and it "flipped into the air" and made a grab at its quarry. Much to the owl's surprise, its feet became entangled in an invisible web. Soon, we made our way to the captured owl, secured it, and carefully slipped its talons from the recesses of fishing line that converted a caged mouse into an effective trap.

That was in spring 2003, and this capture heralded the beginning of several years of our research on the species. Over the next four years, we studied the ecology of the western burrowing owl, whose scientific name, *Athene cunicularia hypugaea*, literally means "wise one who dwells under the earth."

Oddly enough, our focus was on one of the most unlikely of places—the primary facility for maintenance and disassembly of the nation's nuclear weapons arsenal. The Pantex Plant, a facility within the U.S. Department of Energy/National Nuclear Security Administration complex, encompasses an area of more than 18,000 acres. The operational core of the plant is surrounded by native shortgrass prairie, prairie dog colonies, playas, cultivated fields, and grasslands enrolled in the Conservation Reserve Program: a landscape representative of the southern High Plains, making it a desirable research site. Other study sites were located farther south in the southern High Plains, involving prairie dog colonies on the outskirts of Lubbock.

Western burrowing owls breed from southwestern Canada through the Great Plains into the Texas Panhandle. They are migratory and leave northern breeding grounds to overwinter in the southwestern United States, along the Texas Gulf Coast, and down into Mexico. Consequently, Texans may see burrowing owls

the decline of prairie dog colonies and, thus, in burrowing owl populations.

The owls do not dig their own burrows; they rely on holes dug

larger set of unique numbers to increase readability when viewed through a spotting scope.

Our graduate students would eventually capture and band 137

times—the researchers knew when and where the bird was banded and when it was sighted after that. At other times, the location of the animal is unknown.

Pantex/USDOE-NNSA Conservation Reach

Pantex/USDOE-NNSA Conservation Reach

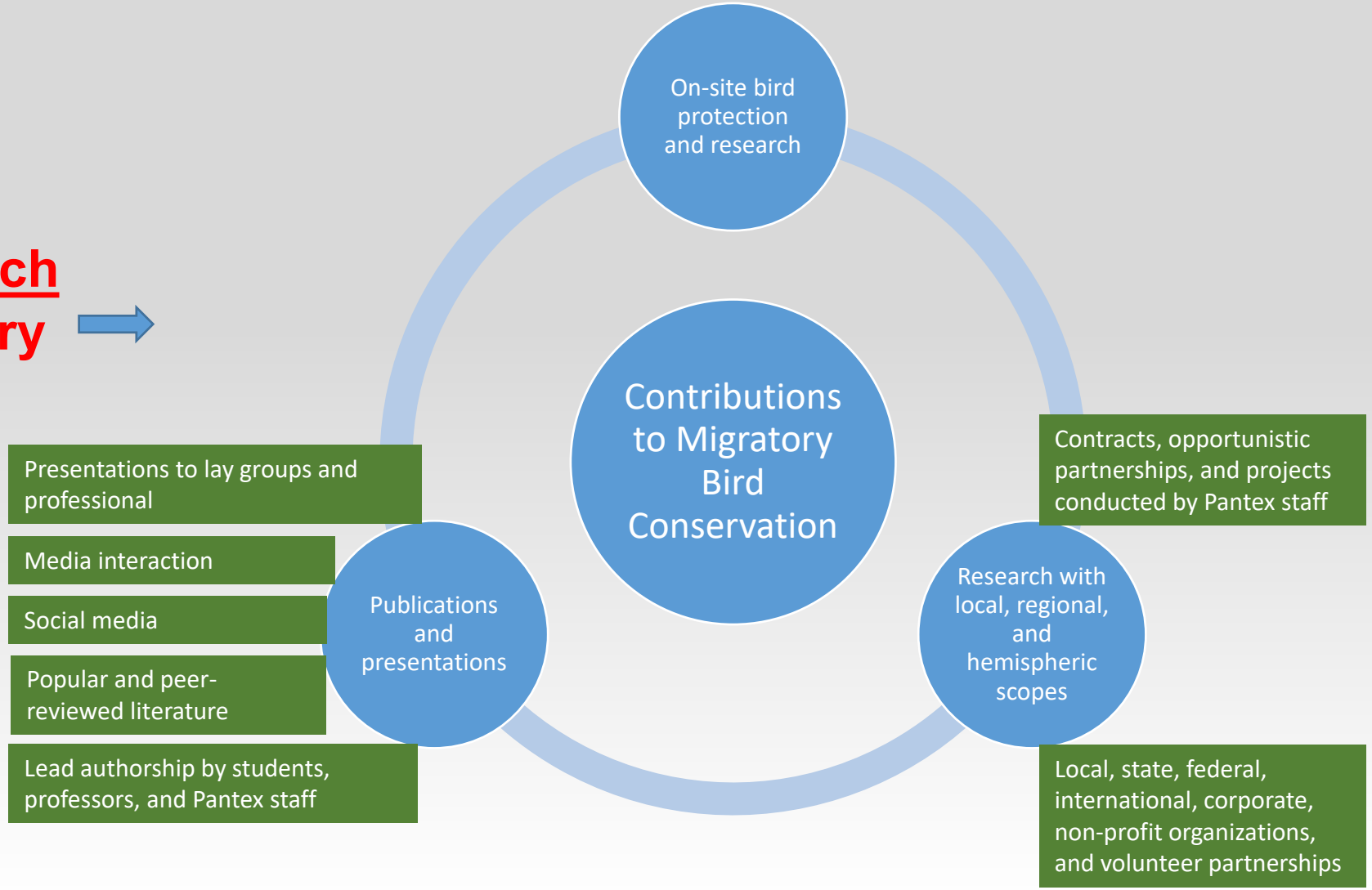
Accomplishment for USDOE-NNSA

- **2019 Presidential Migratory Bird Federal Stewardship Award**

Pantex/USDOE- A Multi-Dimensional Approach to Contributing to Migratory Bird Conservation Across Hemispheres

Accomplishment for USDOE-NNSA

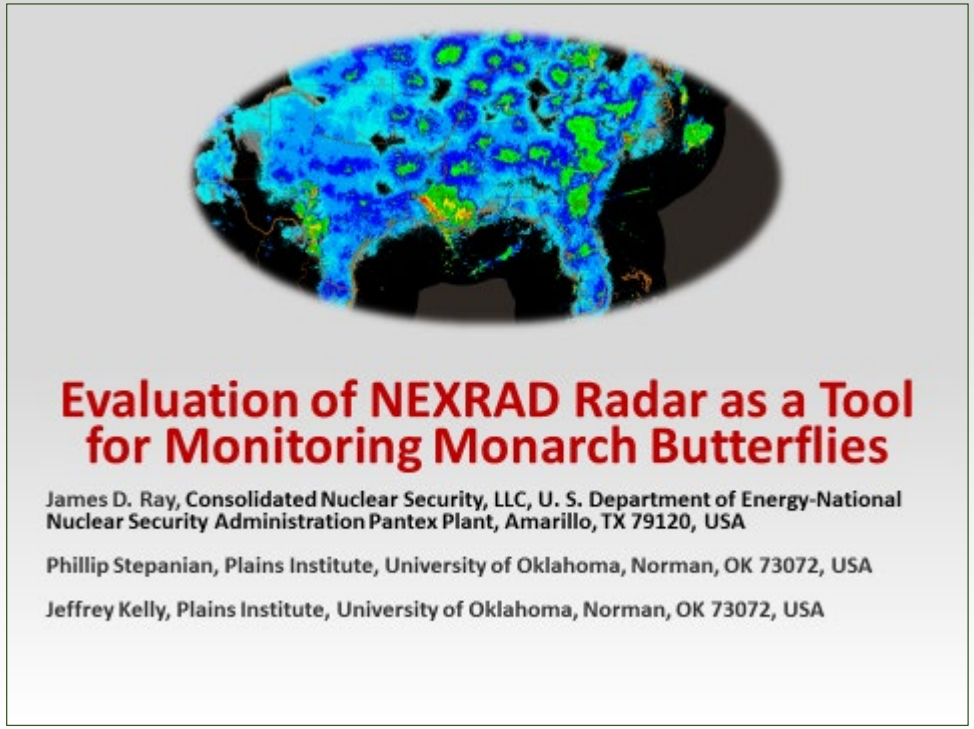
Pantex/USDOE- A Multi-Dimensional Approach to Contributing to Migratory Bird Conservation Across Hemispheres



Accomplishment for USDOE-NNSA

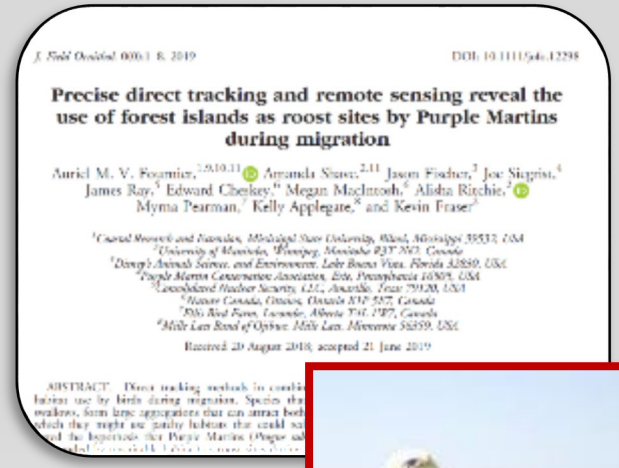
- **Presidential Memorandum - Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators (2014)**

Migratory Bird Model → **Applied to pollinator research**



Sustainability – Credibility is Key

- **Think no further than Rocky Flats**
  - **Perception is reality**
- **Positive wildlife press, awards, presentations, etc. helps all environmental programs**
  - **Citizens**
  - **Agencies**
  - **Media**
  - **Etc.**



Precise direct tracking and remote sensing reveal the use of forest islands as roost sites by Purple Martins during migration

Rocky Flats (Colorado)

Watkins issues flats death blow

But key production building to be restarted, stay on standby

By GREGORY TODO

There is none

"Plutonium manufacturing at Rocky Flats is now terminated."
— U.S. Energy Secretary James Watkins

Sunday Camera

WILL THE PLUTONIUM EVER GO AWAY?

Local headlines since the late 1970s reflect how local communities – who once fought over the location of a nuclear weapons facility – now pressured the government to remove it. Watkins' announcement made front-page news on January 30, 1992. By July 30, 1995, frustration with the length of time it was taking to dismantle it put Rocky Flats in the headlines once again.

Rocky Flats (Colorado)

Watkins issues Flats death blow

But key production building to be restarted, stay on standby

By GREGORY TODO

There is none

"Plutonium manufacturing at Rocky Flats is now terminated."
— U.S. Energy Secretary James Watkins

Sunday Camera

WILL THE PLUTONIUM EVER GO AWAY?

Local headlines since the late 1970s reflect how local communities – who once fought over the location of a nuclear weapons facility –

1989 – Raid by FBI

1992 – Death Blow

Acknowledgements

- Dr. Clint Boal and students, U.S.G.S. Cooperative Fish and Wildlife Research Unit at Texas Tech University
- Drs. Warren Ballard (deceased), Blake Grisham, Nancy McIntyre, and Mark Wallace, and students, Texas Tech University
- Dr. Raymond Matlack and students, West Texas A&M University
- Dr. Bridget Stutchbury and students, York University (Canada)
- Dr. Kevin Fraser and students, University of Manitoba (Canada)
- Monty Schoenhals and Pantex Management, Consolidated Nuclear Security (Contractor of the Department of Energy)
- Many private landowners and volunteers
- Beverly Whitehead and Josh Silverman, U.S. Department of Energy

USGS
science for a changing world

University of Manitoba

Texas Cooperative Fish and Wildlife Research Unit

York University / Université York

Photo by D. Clark

NNSA
National Nuclear Security Administration

PanTEX
Managed and Operated by
Consolidated Nuclear Security, LLC