MISSION of the RESEARCH RANCH: To be a living laboratory to determine and demonstrate methods to safeguard and rehabilitate grasslands and related ecosystems, and to assist policy makers and other citizens in the care and protection of our native ecosystems, natural resources, and quality of life.

GOALS
• Conservation— to be a premier semi-arid grassland ecosystem that fosters a natural diversity of native species.
• Research — to understand how grasslands and related ecosystems function, and to recognize the key elements that safeguard these ecosystems.
• Outreach and Education— to advocate for grassland ecosystems by encouraging citizens and policy makers to safeguard and rehabilitate native ecosystems throughout the region.

From the Director

This is a bittersweet effort for me—this is the last annual report for AWRR that I compile; I am retiring in January after more than 18 years at AWRR. It has been an honor to be an Audubon employee and part of the Research Ranch team. I’ve been privileged to work with some of the finest conservationists and scientists imaginable.

The vision of Frank and Ariel Appleton (founders of the Research Ranch) lives on:

“To leave the land better than we found it.”

~Linda Kennedy, Ph.D., Director

Mark Foreman, Conservation Program Manager
Linda Kennedy, Ph.D. Director
Suzanne Wilcox, Office Manager

Appleton-Whittell Research Ranch of the National Audubon Society
366 Research Ranch Road
Elgin, AZ  85611
Researchranch@audubon.org
520 455 5522
CONSERVATION

PRECIPITATION: 2017 was bleak. Both winter precipitation and monsoon totals were below average. July was the only bright spot, but after the first week in August someone turned off the tap. Less than 1” fell between Aug 7 and the end of November. Months with below average precipitation are noted in red (see chart below). Unseasonably warm temperatures added to plant stress; there were few fall flowers and many perennial grasses have reduced seed set. This does not bode well for animals (birds, rodents) that rely on seed for the winter. We are already seeing fewer grassland sparrows than typical for this time of year.

Although August and September rains were a disappointment, the rains in July created flow in several waterways, filling many tanks for the first time in several years.
Thanks to a donation from Phil Williams, we installed a weather station near headquarters that archives data on site and shares conditions at https://www.wunderground.com/weather/us/az/fort-huachuca/KAZELGIN17. Keegan Chapman and Tony Leonardini (volunteers) installed the equipment.

**FIRE:** Only one fire was reported on the Research Ranch in 2017. On July 17, lightning ignited this fire on East Mesa, which burned about 90 acres. The Sonoita-Elgin Fire District responded, as did a rainstorm. (Photo by Keegan Chapman.)

**WATER FOR WILDLIFE:** With financial support from US Fish & Wildlife Partners Program, advice and assistance from AZGF, volunteers from Sky Island Alliance, Borderland Restoration’s BECY team, our own volunteer crew, and willing hands from USFWS, three professionally designed wetlands were shaped, lined, landscaped, and receive water via two new solar systems, also funded through a Partners grant.
INVASIVE SPECIES: Work continues on uplands invaded by non-native grasses and in sacaton grasslands infested with whitetop. One grant from Arizona Forestry and Fire Management (PTG 14-901) was completed in September and another grant for Phase 3 to maintain and expand the project area was awarded (PTG-14-905). Monitoring has shown that uplands with up to 70% frequency of Lehmann lovegrass can be reclaimed. In Phase 3 we will address an area with 90% frequency of Lehmann lovegrass, and maintain the areas treated in the first two phases of this project.

RESEARCH & MONITORING

2017 Apacheria Fellows

Thanks to generous financial support from the friends of the Research Ranch, we were able to award four Apacheria Fellowships in 2017!

Left to right: Dawson Brown is a junior at Christopher Newport University, Newport News, VA. Dawson is studying aggressiveness and social dominance in long-tailed brush lizards (*Urosaurus graciosus*). Caylee Falvo is a graduate student at Colorado State University, Ft. Collins, CO. She is using her Apacheria/Fleharty fellowship to determine the impact of climate change on the Uinta ground squirrel (*Urocitellus armatus*). Anthony Gilbert, Ph.D. Candidate at Ohio University, is no stranger to our Honors Wall. This is the third year his work on the thermal dependence on locomotor performance of Ornate Tree Lizards (*Urosaurus ornatus*) has earned an Apacheria Fellowship. Cheyenne Hertzog is an undergraduate at Arizona State University. Her fellowship supports Cheyenne’s study to determine the abundance of meso-mammals in different forest types of the San Pedro and Gila Rivers.

CHRISTMAS BIRD COUNT: The 2016 AWCBC was held on Jan 3, 2017 and preliminary results tallied 103 species, down from 105 from the 2015 count, and 4448 individuals, up from 2726 in 2015. A Golden-crowned Sparrow was the most unusual sighting. Suzanne Wilcox, AWRR Office Manager, and Tony Leonardini, AWRR volunteer, organized the event and compiled the results. Emily Martell (at left), Teacher/Naturalist, Audubon Arizona.
UPLAND VEGETATION MONITORING: All transects were completed as scheduled. The saga of #706 continues with Cane Beardgrass still dominant but trending downward. Lehmann Lovegrass is trending upward but still well below the high point reached in 2009. This is the only untreated transect in which we have documented native plants (i.e. Cane Beardgrass and Sideoats) increasing in an area once dominated by Lehmann’s.

Matthew Lattanzio, Ph.D., Christopher Newport U.
Research annual report for summer 2017

This past summer at the ranch I continued my ongoing work at the ranch and nearby field sites. My work continues to focus on evolutionary ecology of lizards. I continued collecting data on the responses of tree lizards to varying burn histories at the ranch itself; my current goal is to compile data from 2010-2017 into a single publication, along with data from lizards sampled throughout Arizona. The focus of this publication will be on the factors contributing to changes in the color polymorphism (in terms of frequencies of each morph) in this species over time. Our understanding of these patterns and the role of other factors in driving them, remains limited. In future summers (2018), my goal is to still collect lizards from those established ranch sites, but focus on addressing other research questions. Currently, I am analyzing data for this bigger project and preparing a paper for publication.

I also continued my work on species from off the ranch as well, including a continued ecological study on Yarrow’s spiny lizards in the Huachuca Mountains and a study on the long-tailed brush lizard that I began last summer (2016). For the first project, I plan to compile a few more field seasons’ of data before considering it ready for publication. For the latter project, I had a student (Dawson) take lead on a behavioral study exploring the social dominance hierarchy in that species, which was unknown at the time. Although I also collected my typical physiological and ecological data on the species, the student’s project took center stage overall. Our collaboration has been highly productive, and I am happy to report that we have submitted a draft of a manuscript of his research to the peer-reviewed journal Behavioral Ecology!
Another exciting project was undertaken in 2017 – a bat survey! The rehabilitation of wetlands at McDaniel and Finley provided the opportunity to collect data pre-treatment to evaluate the effectiveness of these projects to provide habitat for bats. Sky Island Alliance provided funding for the preliminary data collection undertaken by Bat Survey Solutions, LLC. Janet Tyburek (right) is attaching a mist net, one of the techniques used.

Among bats captured and released was this California myotis. Photo credit: J.D. Chenger / www.batmanagment.com

To see a complete list of active research/monitoring projects and publications associated with the Research Ranch, see pages 13-14.
EDUCATION & OUTREACH

Field Trips, classes, trainings, and meetings are opportunities to share AWRR’s mission with a broad audience. Activities at AWRR in 2017 included:

Natural Resource Management Field Techniques Class
New Mexico State University
Dr. Pedro Chavarria, Instructor (in green)

Soils Training
Robinett Rangeland Resources, LLC

Joint Field Trip:
Department of Arizona Forestry & Fire Management
US Forest Service

Sentinel Landscape Restoration Partnership (left)
Chiricahua Leopard Frog, Unit 2 Recovery Team (below)
Living Gently on the Land

We added something new to our Living Gently on the Land (aka Potlucks & Presentations) educational seminar series. We usually take a break through the summer, but this July we asked the resident researchers and interns to share their projects (the photos below are of some of the presenters).

Our regular events featured:

“Black Footed Ferrets,” by Holly Hicks, Arizona Game & Fish
“Gray Hawk Study,” by Ariana LaPorte, University of Arizona
“Yellow Billed Cuckoos,” by Dr. Tony Leonardini, AWRR Volunteer
“Coronado National Forest,” by Daisy Kinsey, SV District Ranger
“Vaquita Porpoises,” by Greg Joder
“A Pictorial Trip through Africa of the 1960s,” by Chuck Hansen,
“Introduction to Field Research Stations” by Mary Price, Mark Stromberg, Kim Franklin, Nick Waser, Michele Lanan, Ben Wilder (Rocky Mountain Biological Laboratory, Hastings Natural History Museum, Arizona-Sonora Desert Museum, Rocky Mountain Biological Laboratory, Southwest Research Station, Tumamoc Hill Desert Laboratory, respectively).
The Science on the Sonoita Plain Symposium, an outgrowth of the Sonoita Valley Planning Partnership, was held at AWRR on June 3rd, the 9th year that scientists, land managers, and other interested parties have gathered to share information, updates and concerns. This year the focus of the morning’s presentations was how science is used to guide land management decisions. The afternoon included a session on “Water and Landscape” plus a “Grab-bag” session.

The Proceedings of the 2017 Science on the Sonoita Plain is available at: http://researchranch.audubon.org/library

ADMINISTRATION

PERSONNEL

Bill Piper passed away in 2017, and although he was never an Audubon employee, his influence on what has become the Research Ranch is too important not to memorialize. The Appletons hired Mr. Piper as manager of their Elgin Hereford Cattle Ranch in the 1950s & 1960s. He and the Appletons followed the “Leave the land better than you found it” policy of management, which included installation of multiple erosion control features, a reliance on sound range management principles, and encouragement of research. (photo courtesy of Terry Piper)

Mark Foreman, AWR’s new Conservation Program Manager, arrived just in time for monitoring season! Mark, a Tucson native, holds a M.S. in Range and Wildlife Management from Sul Ross University and came to us from New Mexico, where he was a Range Management Specialist with USDA NRCS. Mark replaced Roger Cogan, who retired in July after almost 7 years with Audubon.
**FACILITIES:** The Casita (AKA Robinson Cottage) now has a new roof. No. More. Leaks!

**FIREWISE DAY**! Volunteers helped protect facilities from damage by wildfire by trimming shrubs near buildings and creating fire resistant space around the well that serves the Research complex (photo, above). This well is especially at risk during wildfire as it is surrounded by sacaton. Flame lengths of sacaton can reach 40 ft.

**COLLABORATION** is a big part of advancing the mission of the Research Ranch, and 2017 brought the opportunity for a new effort that has great potential. It’s still in the very preliminary planning stages, but if enthusiasm will make it become reality then it’s only a matter of time before this becomes an established network of ecological field research stations/institutions with a regional focus. The initial meeting at AWRR included individuals with experience at the University of Arizona’s Tumamoc Hill/Desert Laboratory, Arizona-Sonora Desert Museum, American Museum of Natural History’s Southwest Research Center, University of California’s Field Research Stations, and Rocky Mountain Biological Laboratory. Among the issues to be addressed in future meetings will be opportunities to collaborate (research, facilities, equipment, PR, workshops, classes), mechanisms by which to capitalize on this collaboration, expansion of group size, and a name for this *ad hoc* group.

**COORDINATED RESOURCE MANAGEMENT PLAN for AWRR**

Karen Simms, Acting Field Manager of the Tucson office at BLM, signed the CRMP prepared by the USDA-NRCS for the Research Ranch. This plan and other information about the Research Ranch can be found at: [http://researchranch.audubon.org/landing/library/reports-associated-awrr](http://researchranch.audubon.org/landing/library/reports-associated-awrr)
**Distributions** from the Research Ranch endowment for FY16/17 totaled $205,212. The market value of the endowment fund on July 1, 2017 equaled $4,833,074, which is very close to its value on July 1, 2014.

### NATIONAL AUDUBON SOCIETY, INC.
#### Research Ranch
#### Schedules of Activities - Research Ranch and Changes in Surplus Fund
#### For the years ended June 30, 2017 and 2016

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
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<tbody>
<tr>
<td><strong>Revenue</strong></td>
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<tr>
<td>Contributions</td>
<td>$32,470</td>
<td>$10,845</td>
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<td>Bequests</td>
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<td>10,226</td>
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<td>Grants</td>
<td>12,361</td>
<td>7,771</td>
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<td>Sales</td>
<td>-</td>
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<td>Rentals</td>
<td>8,283</td>
<td>8,820</td>
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<td>Pooled investment income - appropriated</td>
<td>205,212</td>
<td>199,876</td>
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<tr>
<td>Other income</td>
<td>31,000</td>
<td>21,030</td>
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<tr>
<td>Assets released from restrictions</td>
<td>-</td>
<td>12,575</td>
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<tr>
<td><strong>Total Revenue</strong></td>
<td>$289,336</td>
<td>$271,818</td>
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<td></td>
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<tr>
<td><strong>Expenses</strong></td>
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</tr>
<tr>
<td>Salaries and fringe benefits</td>
<td>188,816</td>
<td>173,740</td>
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<tr>
<td>Travel</td>
<td>16</td>
<td>103</td>
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<tr>
<td>Professional and consulting fees</td>
<td>706</td>
<td>855</td>
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<td>Postage - general</td>
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<td>81</td>
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<tr>
<td>Gas and electricity</td>
<td>1,585</td>
<td>1,960</td>
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<td>Building and office maintenance</td>
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<td>13,801</td>
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<td>Telephone</td>
<td>7,034</td>
<td>4,830</td>
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<tr>
<td>Insurance</td>
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<tr>
<td>Maintenance - general, road and vehicles</td>
<td>12,660</td>
<td>2,046</td>
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<td>Office and household supplies</td>
<td>2,569</td>
<td>2,846</td>
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<td>Scholarships</td>
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<td>1,250</td>
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<td>Equipment rental</td>
<td>59</td>
<td>108</td>
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<td>Furniture and fixtures</td>
<td>717</td>
<td>1,603</td>
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<td>Computer equipment and software</td>
<td>666</td>
<td>607</td>
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<td>Farm supplies</td>
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<td>1,269</td>
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<td>Printing</td>
<td>6,830</td>
<td>638</td>
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<tr>
<td>Research equipment</td>
<td>1,330</td>
<td>402</td>
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<tr>
<td>Licenses, permits and registrations</td>
<td>650</td>
<td>283</td>
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<tr>
<td>Dues and subscriptions</td>
<td>150</td>
<td>320</td>
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<tr>
<td>Support services allocation</td>
<td>46,063</td>
<td>41,562</td>
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<td>Building supplies</td>
<td>1,496</td>
<td>145</td>
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<tr>
<td>Meetings</td>
<td>154</td>
<td>385</td>
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<tr>
<td>Machinery and equipment</td>
<td>6,808</td>
<td>484</td>
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<tr>
<td>Animal care</td>
<td>12</td>
<td>25</td>
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<tr>
<td>Registration fees</td>
<td>-</td>
<td>175</td>
</tr>
<tr>
<td>Refuse and Recycling</td>
<td>712</td>
<td>-</td>
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<tr>
<td>Education Materials</td>
<td>32</td>
<td>-</td>
</tr>
<tr>
<td>Depreciation</td>
<td>52</td>
<td>1,708</td>
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<tr>
<td><strong>Total Expenses</strong></td>
<td>$288,989</td>
<td>$257,687</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Excess of revenues over expenses</strong></td>
<td>$347</td>
<td>$14,131</td>
</tr>
<tr>
<td><strong>Surplus, beginning of year</strong></td>
<td>$124,845</td>
<td>$110,714</td>
</tr>
<tr>
<td><strong>Funds added (released into operations)</strong></td>
<td>347</td>
<td>14,131</td>
</tr>
<tr>
<td><strong>Surplus, end of year</strong></td>
<td>$125,192</td>
<td>$124,845</td>
</tr>
</tbody>
</table>
Science on Appleton-Whittell Research Ranch

Active Research/Monitoring Projects – 2017

Active: One or more of following: Proposal approved but project not commenced; Field work/research within past two years; Publication received within past two years; Publications pending; Publications in demand within past two years; Projects with return intervals >1 year; Collaborative, long term efforts.

Inter-compatibility of AmeriFlux Sites
AmeriFlux Network Tech Team (ameriflux.lbl.gov), Lawrence Berkeley National Laboratory, Berkeley, CA; Project: Compare NOAA system at AWRR with roving eddy covariance system.
Application: Maintain high standare of inter-comparability between AmeriFlux Sites

Effect of mesquite cover on avian diversity, density and reproductive success in desert grasslands
Anderson, Erik and Dr. Robert Steidl. SNRE, University of Arizona.
Subject: Sites on Research Ranch to be used as control/reference compared to grazed grasslands
Applicability: Better understanding of ecological processes driving grassland ecosystems and aid development of sound management practices.

Chiricahua Leopard Frog Reintroductions and Surveys
Arizona Game & Fish Dept. (AZGF): Tom Jones, Audrey Owens & Hunter McCall
Subject: Survey leopard frog reintroduction efforts
Application: Protect native, federally listed species

Desert Pupfish
Arizona Game & Fish Dept. (AZGF): Ross Timmons.
Subject: Monitor and protect population of pupfish introduced into ranch stockponds and wildlife waters
Application: Conserve native species

Fish Surveys
Arizona Game and Fish Department (AZGF). Fisheries biologists
Subject: Conduct periodic surveys of the riparian systems of the Research Ranch and neighboring properties
Application: Evaluate stability of populations of native species, recommend management actions

Gould’s Turkeys near Huachuca Mountains
Arizona Game & Fish Dept. (AZGF) Brittany Oleson (2016) Sonoita, AZ
Project: Estimate populations
Application: Track success of re-introduction effort

Northern Mexican Gartersnake Management
Subject: Observe Mexican Gartersnakes
Application: Manage federally threatened species.

Pronghorn Survey
Arizona Game & Fish Dept (AZGF): Brad Fulk (2016); Audubon staff on AWRR
Project: Ground survey of Pronghorn on AWRR
Application: Data pooled with other surveys in area to estimate population size

Arizona Tree Frog documentation
Audubon Staff
Project: Document all sightings.
Application: Species was candidate for federal listing (declined) 2017. Continue to document sightings
Avian Monitoring for Research Ranch IBA
Audubon staff: Tice Supplee, Tony Leonardini (Vol)
Project: Monitor bird species on AWRR
Application: Support IBA nomination (see also Wonkka), examine longterm trends

Bullfrogs, Monitoring and Treatment on the Research Ranch
Audubon Staff: Linda. Kennedy, Mark Foreman, Suzanne Wilcox, Tony Leonardini (Vol).
Subject: Discover and eradicate individuals within boundary of AWRR
Application: Protect native fish, reptiles and amphibians from predatory, non-native species

Christmas Bird Count – Appleton Whittell Circle
Audubon staff: Suzanne Wilcox (Office Manager) & Tony Leonardini (Volunteer) Co-compilers since 2015
Subject: Conduct bird count as per Audubon standards.

Depth to groundwater on Research Ranch
Audubon Staff & Volunteers
Project: Monitor the depth to groundwater of the wells on Research Ranch.
Application: This study helps establish a water consumption baseline for the Sonoita Valley.

Ecological Site Monitoring (ESM)/ aka Upland Vegetation Monitoring
Audubon Staff– Linda Kennedy
Project: Establish permanent points to monitor vegetation change. Based on Ecological Site Map (Robinett & Breckenfeld)
Application: Identify trends in vegetation change

Effects of fire and climate change on cacti
Audubon Staff: Linda Kennedy
Project: Monitor the effects fire and climate change on native cacti
Application: Baseline information for future research

Effects of fire and climate change on mesquite
Audubon Staff: Linda Kennedy
Project: Monitor the effects of fire and climate change on mesquite.
Application: Baseline information for future research and identify trends

Geographic Information System
Audubon Staff – Suzanne Wilcox, Mark Foreman (see also: Geiger, Loomis, Seltzer)
Project: Map research, monitoring, conservation sites.
Application: Archival, management.

Gould’s Turkeys on the Research Ranch
Audubon Staff: Linda Kennedy, Suzanne Wilcox, Mark Foreman, Tony Leonardini (Vol)
Project: Record sightings of wild turkeys.
Application: Document spread of sub-species reintroduced in Huachuca Mtn.

Herbarium of the Appleton-Whittell Research Ranch
Audubon Staff
Project: Archive voucher specimens of plant species
Application: Baseline information. Reference. Research Support

Monarch Sightings
Audubon Staff: Linda Kennedy
Project: Report sighting of Monarchs to Gail Morris (Southwest Monarch Study)
Application: Advance knowledge of phenology, food sources of species.
Precipitation at Ecological Sites
Audubon Staff – Linda Kennedy, Suzanne Wilcox
Project: Establish range gages to correspond with ESM. Based on Ecological Site Map (Robinett & Breckenfeld)
Application: Correlate precipitation with changes in vegetation.

Sacaton Rehabilitation
Audubon staff: Linda Kennedy
Project: Re-establish Sporobolus wrightii in appropriate degraded sites.
Application: Improve wildlife habitat, bioremediation of sites dominated by exotic, invasive Bermudagrass.

Small mammal populations on the Appleton-Whittell Research Ranch
Audubon Staff: Linda Kennedy
Project: Develop long-term monitoring program based on Jones, Bock and Kennedy
Application: Indicate trends in small mammal populations

Yellow-billed Cuckoo Surveys
Audubon Staff: Steve Prager (Audubon AZ), Tony Leonardini (volunteer). See also Kraft & Leonardini
Project: Search for this federally threatened species using USFWS protocol
Application: Document presence and habitat use on AWRR

Invasive Green Sunfish
Audubon Staff
Project: Remove from tinijas in South Post Canyon
Application: Create habitat for native biota

Biodiversity of the Research Ranch
Audubon Staff/Volunteers (Virginia Dean, also Christina Francois)
Project: Accumulate data/records from publications
Application: Arrive at baseline of known biota

Precipitation at AWRR Headquarters (Physical gage)
Audubon Staff
Project: Determine precipitation received in 24 hrs prior to 7 a.m., daily
Application: Calibrate electronic gages. Enter into rainlog

Survivorship of Riparian Trees in the Southwest
Bock, Carl & Jane Bock. University of Colorado (retired)
Project: Resurvey the riparian trees tagged in the 1980s.
Application: Determine the survivorship of native trees after fires, flood and drought

Effect of Throat Color and Relative Resource Strength on Social Dominance in the Long-tailed Brush Lizard (Urosaurus graciosus)
Brown, Dawson and Matthew Lattanzio. Christopher Newport University, Newport News, VA 23606
Project: Determine relationship between throat color and social dominance and determine if social dominance is fixed or variable depending on environmental conditions.
Application: Contribute to limited information about natural history of this species.

Agave Monitoring
Bureau of Land Management (BLM) Tucson Field office and University of Arizona (Cochise Co. Extension). Kristen Duarte (BLM), Kim McReynolds (U of A)
Project: Establish permanent transects to monitor agave numbers, class and herbivory.
Application: Ungrazed land to function as control.

Assessing condition of O’Donnell Creek
Bureau of Land Management (BLM), Simms, Jeffrey, Fish Biologist, Tucson Field Office, Nate Dietrich, Hydrologist.
Project: Use Proper Functioning Condition Standards to evaluate a portion of O’Donnell Creek
Application: Environmental Assessment
Population dynamics and habitat characteristics of Montezuma (Mearn’s) Quail in southeastern Arizona
Chavarria, Pedro Mazier, Ph.D., New Mexico State University
Subject: Monitoring movement of quail.
Application: Fill knowledge gaps about life history and determine how behavior and genetic viability are affected in areas where hunting is, and is not, allowed.

Annotated Bibliography of Lehmann Lovegrass
Chasey, Richard Adam. San Francisco State University
Project: Gather all known publications associated with non-native, invasive Eragrostis Lehmanniana
Application: Aid to research and management

Survey of herpetofauna (reptiles and amphibians) including den sites of Crotalids on the Research Ranch
Cogan, Roger C.
Project: Document sightings of herps and monitor winter den sites
Application: Determine whether new species are on AWRR and if species earlier recorded are extant, plus document sites of critical importance to rattle snake survival.

Use of Cover Boards to Locate and Monitor Reptile Species
Cogan, Roger C.
Project: Distribute coverboards in specific locations across AWRR
Application: Evaluate technique to further baseline knowledge about reptiles on AWRR

A History of the Lands in the National Audubon Society’s Research Ranch Near Elgin, in Santa Cruz County, Arizona
Subject: Compile and document history of land transactions involving federal and state lands.
Application: Background

Seeds of Success
Desert Botanical Garden. Steve Blackwell, 1201 N Galvin Parkway, Phoenix
Subject: Collect specific native seeds on behalf of BLM program.
Applicability: To be used to augment collections of native, site adapted seed.

Current Distribution and Status of Slevin’s Bunchgrass Lizard, Sceloporus slevini, in southeastern Arizona
d’Orgeix, Christian, Ph.D.; Virginia State University; Petersburg, VA: see also also Nakiesha D. Bridgers.
Project: Survey for bunchgrass lizard. Collect tissue for DNA analysis (tip of tail – no take) to compare intrapopulation and interpopulation genetic variance.
Application: foundation for determining genetic relatedness of different populations and effects of bottlenecks on populations

Survey of Appleton-Whittell Research Ranch Drainages and Ponds for the Mexican Garter Snake
d’Orgeix, Christian, Ph.D.; Virginia State University; Petersburg, VA
Project: Survey for presence of Mexican garter snakes (Telles tank, O’Donnell Canyon, Post Canyon), and conduct long-term study of population at Finley tank.
Application: Management implications for species of special concern (AZGF)

Optimal Foraging in Harvester Ants
D’Orgeix, Christian H.; Blacksburg High School, Blacksburg, VA.
Project: Examine the role of seed size in foraging behavior
Application: Results will assist in determining the ecological role of ants in the environment

Annotated bibliography of selected reports, publications and theses
Dyson Ruth E.
Project: Prepare annotated list/bibliography of publications of particular interest to ARR.
Application: Facilitate information exchange and document publications
Coping with Winter Climate Change: Physiological Mechanisms & Demographic Outcomes
Falvo, Caylee. Utah State University, Department of Wildland Resources and the Ecology Center. Logan UT
Project: Determine the impact of climate change on the phenology, demography, and fitness of the Uinta ground squirrel (Urocitellus armatus).
Application: Add to our understanding of winter climate change impacts on hibernators.

Genetic approach for using pollen to determine plant resources used by nectarivorous bats.
Ferguson, George, University of Arizona, Tucson Arizona
Project: Collect tissue samples from Agave parryii v huachucaensis
Application: Determine usage of this species by Lesser Long Nosed Bats (Endangered Species)

Using soil moisture to assess ecosystem function following exotic lovegrass invasion in semiarid grasslands of southeastern Arizona
Fernald, Alexander G. (Sam), Ph.D., NMSU. Las Cruces, NM . Cross Anne F., Ph.D. Tulsa OK
Project: Measure soil moisture under Plains lovegrass (Eragrostis intermedia), a native species, and Lehmann lovegrass (E. lehmanniana), an exotic species.
Application: Determine whether a semiarid grassland retains its functional integrity following the invasion of an introduced, exotic grass.

DNA Analysis of Asclepias uncialis
Fishbein, Mark, Oklahoma State University
Project: Perform DNA analysis on lea tissue removed from A. uncialis
Application: Inclusion within large-scale phylogenetic study of milkweeds

Merging functional ecology and phylogenetics to predict the response of grasslands to global change
Forrestel, Elisabeth, Melinda Smith, Ph.D., Yale University.
Project: Compare natural grasslands across broad precipitation gradients in North America, Australia, South Africa.
Application: Provide evolutionary history and functional biology of ecologically and economically important grass species here.

Ecological and evolutionary responses of lizards to resource limitation
Gilbert, Anthony. Ohio University
Project: Quantify how resource limitation impacts lizard performance, fitness and social dominance.
Application: Furthering knowledge of how lizards may respond to anthropogenic disturbances such as climate change

Thermal sensitivity of insensitivity of dominance behavior
Goerge, Tyler, Ohio University.
Project: Compare laboratory-determined thermal sensitivities of push up displays in Urosaurus ornatus to those observed in the field.
Application: Insight into impacts of climate change on lizard social dynamics

Research Ranch boundary surveying and mapping
Greene, Dale and Kristen L. Greene. DK Greene Consulting, Inc. Bonsall, CA
Project: Survey and map Audubon property boundary and certain water catchments.
Application: 1) The exact perimeters of property owned by Audubon will be determined with up-to-date equipment and marked for posterity. 2) Location and physical characteristics of artificial water catchments will be determined and compared to existing records.

Survey of high desert grasslands Hymenoptera
Grissell, Eric, Sonoita, AZ
Project: Study insect diversity in southwest
Application: Significant contribution to state of knowledge

Monitoring wildlife in and near the Appleton-Whittell Research Ranch using trail cameras
Hass, C.C.
Project: Use trail cameras to identify and monitor various species of terrestrial wildlife.
Application: Identify habitat specific wildlife use and develop index for long-term trends.
Effects of Invasive *Tamarix* on Mammal Communities in Riparian Forests
Herzog, Cheyenne. Arizona State University, Polytechnic
Project: Measure abundance of meso-mammals across 3 riparian forest types.
Application: Provide sound science to support research decisions concerning saltcedar and habitats

Prey Abundance Survey for the Installation of Burrowing Owl Burrows
Igwe, Grace. New Mexico State University
Project: Compare arthropod abundance among native grasslands and grasslands dominated by Lehmann and Boer lovegrasses.
Application: Aid in decision making process for establishment of artificial burrows

Linking individual behavior, microhabitat use, and spatial population structure with fitness
Jaworski, Kortney. Christopher Newport University
Project: Study behavior of adult male mountain spiny lizards (*Sceloporus jarrovii*)
Application: Insight into the relationship between individual traits and population spatial structure and influence upon fitness.

Camera-trap Network
Joder, Greg., Tucson, AZ
Project: Collect photographic or video for archival purposes.
Application: Augmentation of research, ecosystem conservation and education/outreach goals of AWRR.

Photo-herbarium for the Research Ranch
Kennedy Linda, Director, Research Ranch
Application: Baseline information for future research; Aids identification.

Passive surveys of Yellow-billed Cuckoos
Kraft, John, Coronado National Forest, and Tony Leonardini,
Project: Place bioacoustic recorders along established avian transects
Application: Determine if passive survey techniques effectively monitor this federally listed (Threatened) species

Oak (*Quercus*) water use strategies in Sky Island Systems
Lackey, Russell; Texas Tech University, Lubbock, TX
Project: Determine physiological drought tolerance of native oak species

Modeling impacts of habitat alterations on habitat use and diet selection of desert reptile communities
Lattanzio, Matthew S., Ph.D., Christopher Newport Univ. VA.
Project: Determine how management practices and climatic variability affect resource availability and use by grassland reptiles
Application: Management practices may be altered to enhance habitat and use

How Duration of Occupancy Influences Lehmann Lovegrass Invasion Success: a Temporal Analysis of Plant-soil Feedbacks
Lehnhoff, Erik A., Ph.D. and Sherri L. Buerdsell. New Mexico State University, Las Cruces, NM
Project: Evaluate effect of Lehmann lovegrass invasion on black grama.
Application: Add to understanding the mechanisms of invasions in rangeland ecosystems and assist in management decisions for Lehmann lovegrass control

Avian Survey/Monitoring of the Research Ranch
Leonardini, Tony. Ph.D., Sonoita, AZ
Project: Document avian species composition and population size.
Application: Baseline information and trends. Develop database to track and archive data.

Flora of the Appleton-Whittell Research Ranch
McLaughlin Steven P., Ph.D., University of Arizona, (Ret.), Erika L. Geiger; University of Arizona; Janice E. Bowers; U.S. Geological Survey (Ret)
Project: Compile a flora—a complete list of all flowering plants, ferns, and conifers on the Research Ranch.
Application: Baseline for ongoing and future research
Flora of Upper O’Donnell Canyon
Miller, Kathryn. Patagonia Union High School
Project: Collect plant specimens at TNC’s Canelo Hills Cienega Preserve
Application: Creation of flora and herbarium for CHCP will establish baseline presence via voucher specimens. Duplicate specimens lodged at AWRR herbarium. Information available via SEINET

Factors affecting variation in the escape behavior of Urosaurus ornatus
Morris, Cynthia. Christopher Newport University, Newport News, VA
Project: Examine causes of escape behaviors in relation to social dominance.
Application: Add to body of knowledge of complex ecological dynamics of this species.

The Effects of Fire and Grazing on Grassland Bird Diversity and Abundance in an Arizona Oak-Savanna
Nichols, Clay. Eastern New Mexico University, Portales, New Mexico 88130.
Project: Re-survey bird diversity on oak transects established by Bock & Bishop after Ryan fire.
Application: Provide information, long-term, on effect of wildfire on avian diversity and abundance

Long-term meteorological, evaporation and carbon flux measurements
Subject: Establish a Climate Reference Network site – to characterize the water and carbon balance for typical ecosystem for arid southwest grasslands.
Application: These data will be used to improve the current land use models for climate change.”

Impacts of grazing, fire and precipitation variability on woody plant cover in Chihuahuan Desert grasslands, USA
O’Neal, Kelley. University of Maryland, College Park, MD 20742.
Project: Quantify changes in woody plant cover, map occurrence of grazing, fire and precipitation using (in part) Landsat and MODIS satellite data
Application: Identify trends, develop methodology

The Babacomari Restoration Project
Pulliam, H. Ron. Borderlands Restoration, L3C. Patagonia AZ 85624
Subject: Re-establish avian plots from 1970s & 1980s to serve as control/reference areas.
Applicability: Evaluate effectiveness of rehabilitation efforts on Babacomari Cattle Ranch.

Species boundaries and phyllogeography of the dwarf milkweed group
Riser, James P. II. School of Biological Sciences, Washington State University.
Project: Collect leaf tissue from Asclepias uncialis for DNA analysis
Application: Determine species boundaries and taxonomic status

Babocomari River Protection
Robinett, Daniel G., Robinett Rangeland Resources, Catalina, AZ; Donna Mathews, Coronado RD & D., Inc. Willcox, AZ.
Project: Establish transects and monitor streamside conditions of Babocomari River, O’Donnell and Turkey Creek
Application: Results will enable sound management decisions to maintain and/or improve vegetation conditions on Babocomari watershed. Will have application to other desert rivers.

Ornate Box Turtles in Arizona: Status, Ecology, and Conservation Study Methods
Rosen, Phil and David Hall. University of Arizona
Project: Conduct field surveys to determine current distribution, population status, and management needs of the Ornate Box Turtle.
Application: Evaluate trends and conservation status of Ornate Box Turtle

Effects of the Ryan Wildfire (April 2002) on Wintering Grassland Birds in the Sonoita Valley, Arizona
Ruth, Janet M. Ph.D., USGS Arid Lands Field Station, (retired)
Application: Evaluate the effect of wild fire on wintering avian abundance/densities and vegetation structure/composition in desert grassland habitats.
Wintering habitat use by priority grassland birds
Ruth, Janet M. Ph.D., USGS Arid Lands Field Station, (retired)
Project: How do high priority grassland birds use habitats during the winter season? How is winter habitat use affected by land use practices such as grazing?
Application: Aid in land management decisions to provide habitat.

Distribution and abundance of breeding Arizona Grasshopper Sparrow (Ammodramus savannarum ammolagus), and associated priority grassland species, throughout its known range in the Southwest U.S.
Ruth, Janet M. Ph.D., USGS Arid Lands Field Station, (retired)
Application: Understanding status and distribution, population trends, ecology and habitat relationships is essential for conservation of avian species of concern.

Continuously Monitor Groundwater Levels
Salywon, Andrew, Ph.D., and R.J. Tiller, Ph.D., Desert Botanical Garden, Phoenix, AZ
Project: Install pressure transducers in wells and piezometers to expand research program begun on northern portion of Las Cienegas NCA.
Application: Enhance ability to record temperature and water depth and data sharing capability.

Evolution of Hummingbird Visual Traits
Simpson, Richard (Rick). Arizona State University, Tempe, AZ
Project: Film male hummingbird courtship displays and measure plumage coloration
Application: Understand the mechanisms by which multiple ornaments evolved

Population and habitat assessment of Spiranthes delitescens
Stromberg, Juliet, Ph.D., and Dustin Wolkis. Arizona State University, Tempe, AZ. Kimberlie McCue, Ph.D., and Steve Blackwell, Desert Botanical Garden
Project: Survey for and assess population size of Spiranthes delitescens (Canelo hills ladies tresses) and the wetland habitat.
Application: Information necessary for development of recovery plan for federally Endangered species.

Huachuca Water Umbel seed bank study
Stromberg, Juliet. Arizona State University
Project: Sample for viable seed in sites known to harbor HWU (Federally listed species)
Application: Add to body of knowledge re protected species under auspices of USFWS

Compilation of Weather Data from the Sonoita Plain
Stromberg, Mark. Hastings Museum of Natural History, Berkeley (Retired)
Project: Develop archive of climate/weather data from grasslands of the Sonoita Plain
Application: Available to researchers and lay public interested in source of surface and ground water

Wet-Dry Mapping
The Nature Conservancy. Miller, J.B. (resigned, 2016), Canelo Hills Cienega Preserve
Project: Map extent of open water in O'Donnell Canyon
Application: Track health of the San Pedro river.

Factors Driving Trophic Niche Variation in a Widespread Lizard
Ternes, William (Will). Christopher Newport University, Newport News, VA
Project: Test diets of 10 populations of Urosaurus ornatus (Ornate tree lizard)
Application: Characterize mechanisms that may contribute to variation among populations

Research and reintroduction effort for Huachuca Water Umbel
Titus Jonathan H., Ph.D., SUNY-Fredonia, Fredonia, NY; Priscilla Titus, Fredonia NY
Key words: Lillaeopsis schaffneriana ssp. recurva., listed species, recovery plan
Project: Transplant plugs and monitor success
Application: Protect listed species, aid in development of recovery plan for species
Bluebird and Climate Watch Pilot Study
Tucson Audubon Society, Jennie Macfarland (TAS Bird Conservation Biologist), Lead. Tony Leonardini (AWRR volunteer)
Project: Conduct annual surveys of Bluebirds per NAS protocol
Application: Will document species’ response to climate change on large scale

Audubon Research Ranch/Sky Island Alliance Bat Survey 2017
Tyburec, Janet. Bat Survey Solutions, LLC. Tucson, AZ
Project: Perform pre-construction surveys of bat populations and Finley and McDaniel
Application: Baseline information that can be used to determine effectiveness of wetland construction

Conservation Effects Assessment Project on the Cienega Creek Watershed
USDA-ARS, Southwest Watershed Research Center, Goodrich, David C. and Haiyan Wei.
Project: Research Ranch as a control to judge vegetation cover and condition for a non-grazed condition
Application: Quantify the benefits of conservation management and practices.

Meteorological Station
USDA-ARS; Southwest Watershed Research Center.
Project: Station jointly owned by ARR & USDA
Application: Baseline information on climate available to researchers and land managers of region

Walnut Gulch Experimental Watershed Herbarium
USDA-ARS Southwest Watershed Research Center, Phil Heilman, Ph.D., Research Leader & Linda Kennedy, AWRR.
Project: Prepare digital record of existing herbarium vouchers, updated per USDA Plants Database.
Application: Baseline vegetation information available in digital format.

Inventory of ecological sites, their present day condition, trend and rangeland health on the Research Ranch
USDA- N.R.C.S. Robinett Dan, Don Breckenfeld, (Both Retired) Tucson, AZ
Project: Mapped the ecological sites on ARR and compared present day plant communities to what our site guides show as potential for MLRA 41.
Application: Baseline information for future research and land management. Control area for comparison by ranch managers.

Soil inventory update on the Research Ranch
USDA-NRCS Breckenfeld, Donald J., Daniel Robinett; (both retired) Tucson, AZ
Project: A soil inventory update that coincides with soil surveys that have been done elsewhere in southern Arizona – updating the old soil survey to the new soil series and map units used in MLRA 41-1.
Application: Baseline information needed by other research projects.

Natural Resources Inventory – Primary Site Unit
Project: Transects established in 1982, to be resampled on approximately decadal basis.
Application: Identification of trends – reference area for MLRa-41

Rangeland Health Reference Areas
USDA-NRCS. Tucson Soil Survey Office. Tucson, AZ. Wilma Renken, Ecological Site Inventory Specialist.
Project: Determine reference areas for Ecological Sites Descriptions in MLRA-41 (high functioning rangelands with minimal human and livestock impacts)
Application: Reference areas used to support rangeland health descriptions in 2-3 million acres of SW.

National Soil Health & Sustainability
USDA-NRCS Dial, Heather. Tucson Plant Materials Center.
Project: Haney Soil Test on loamy upland, sacaton bottom, Boer monoculture
Application: Reference for comparison through time and against other land uses.
Terrestrial Ecosystem Unit Inventory
USFS. Boness, Patricia (field lead), David Watson (soil scientist), Wayne Robbie (Albuquerque Regional Field Office)
Project: Mapping of soils and vegetation/Coronado NF Progress Field Review of CNF lands within AWRR
Application: Include in FS-wide effort to classify ecosystem types and map ecological units at different spatial scales

Agave Monitoring on the Coronado National Forest
USFS Biedenbender, Sharon, Ph.D. (retired)
Project: Monitor impacts of livestock grazing on florivory of agave
Application: Management of food source for lesser long-nosed bat

Pectis imberbis surveys
USFWS. Julie Crawford. Tucson, AZ.
Project: Survey reported sites
Application: Information on species that may become federally listed.

Inventory of native plant-feeding insects Arizona
Wheeler, Alfred G., Clemson University, Clemson, SC
Project: Collect insects that feed on Eragrostis spp. and other plants to identify species, and compare species composition with collections from NM, OK and TX.
Application: Baseline information on species occurrence and host plants

20 Year Dynamics of North American Ant Communities: Evaluating the Role of Climate and Biogeochemistry on Ecological Change
Weiser, Michael D., University of Oklahoma, Dept of Biology, Norman OK.
Project: Resampling ants from transects established by Mike Kaspari’s group in 1980’s
Application: Measure changes in abundance, diversity and composition

Ground Beetle (Coleoptera: Carabidae) assemblage responses to fire in southern Arizona
Wright, Corynne A., Christopher Newport University, Newport News. Virginia
Project: Study Carabid diversity at four sites with varying fire histories.
Application: Contribute to understanding of how ground beetle assemblages respond to fire and habitat succession.

Pollination without a keel: an investigation of floral form change in the genus Dalea (Fabaceae)
Zweck, Justin. Saint Louis Univ. St. Louis MO
Project: Compare pollination biology of Dalea species with “closed” and “open” floral forms
Application: May encourage planting of specific Dalea species to serve as host plants for pollinators that are important for legume crops.

Reports and Publications Associated with the Research Ranch
Received since 2017 Annual Report


Sunrise
December 5, 2017