

**APPLETON-WHITTELL RESEARCH RANCH**  
**of the**  
**NATIONAL AUDUBON SOCIETY**



**ANNUAL REPORT 2010**

The Appleton-Whittell Research Ranch of the National Audubon Society is a collaborative effort among Audubon, Bureau of Land Management, Swift Current Land & Cattle Company, The Nature Conservancy, The Research Ranch Foundation, and U.S. Forest Service. The 8,000 acre sanctuary for native plants and animals and ecological research facility is located in southeastern Arizona.

**MISSION:** To be a living laboratory to determine and demonstrate methods to safeguard and rehabilitate southwestern grasslands, 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 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.

## Friends,

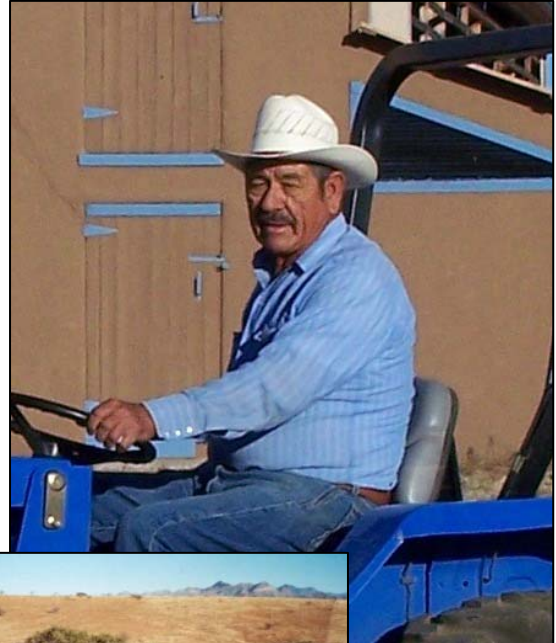
2010 has been a rewarding year – but along with the rewards came challenges. Like many charities, the Research Ranch has been hit hard by the downturn in the economy. My mom (a Midwestern farmer) used to say, “It takes both lean streaks and fat streaks to make a good bacon hog,” and using that analogy – this lean streak will make us better! We’ve taken some difficult steps to ensure that the core mission and goals of the Ranch are not at risk and are doing our best to make sure this lean streak isn’t too wide!

I hope that as you read this report you’ll see that even with financial adversity, the Research Ranch is leading the way in conservation of our beautiful grasslands!

Linda Kennedy, Ph.D.  
Director

## Thank You, Leo!

This 2010 Report is dedicated to Leo Gonzalez, who retired this spring after twelve years of devoted service to Audubon and the Research Ranch. His contributions to the Research Ranch are many and long-lasting. It didn't matter whether Leo was maintaining the roads, teaching volunteers how to build wildlife friendly fence, building a greenhouse, or constructing a pond for wildlife, he took pride in his work and treated everyone with gentle courtesy. We miss him but know he and his family are enjoying his retirement!



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## Audubon Staff at the Research Ranch



Roger Cogan, Conservation Coordinator (on staff since **Labor Day!**)  
Linda Kennedy, Ph.D., Director (on staff since 1999)  
Pat Kugler, Office Manager (on staff since 2006)

### Audubon Staff in Phoenix:

Sarah Porter, V.P. and Executive Director  
Sam Campana, Founding Director  
Becky Gilbreath, Office Manager, Development & Finance Associate  
Emily Morris, Teacher/Naturalist  
Steve Prager, Teacher/Naturalist  
Valerie Ramos, Development Associate  
Randy Schilling, Development Director  
Tice Supplee, Director of Bird Conservation  
Cathy Wise, Education Program Coordinator

## Interns

We really rely on the excellent assistance we receive from interns – and they're fun to have around! In return, they receive real, on-the-ground experience that often gives them an advantage in the job market or in competition for graduate school.



**Lindsey Reifel** spent the winter and spring on the Research Ranch working on a range of conservation and research projects and even shared her experience with sea turtles at our January Potluck and Presentation event!

Here's **Richard Chasey** in an uncharacteristic moment! During his internship he was busy setting up mesquite monitoring transects with Lindsey, removing non-native fish from Post Canyon and many other projects. He produced an outstanding contribution to our library, a 58 page annotated bibliography of Lehmann Lovegrass!



## Volunteers

The **Sierra Club Service Tour** group made their 7<sup>th</sup> annual appearance at the Research Ranch this fall. Even though there were only four participants, they and their leader, Charlie



Schulz, accomplished an amazing amount of conservation work, including repairing and expanding a gabion (erosion control structure) that had given way in the monsoon. They moved over 15 tons of rock!

Other valued volunteers include our intrepid well readers, Betsy and Sandy Kunzer, who monitor the depth to groundwater in all our wells and Jim

Koweek who helps Linda with vegetation monitoring. Maggie Barr spent a week helping Roger with FireWise work and Ralph Dinsman (who used to lead the Sierra Club Service Tour group) spent a week here this spring helping Leo build a structure for a solar charging station. Joanie Cogan is our newest member of the crew of volunteering spouses, John Kugler and Dan Robinett. Joanie is quick to help with landscaping projects, event preparation and you might hear her perky voice on the phone if you call.





## CONSERVATION

### GOING SOLAR!



This year we took a giant step forward in our effort to operate in a sustainable fashion! The Research Ranch was one of 13 successful applicants (out of a field of 60+) to the Arizona Department of Commerce's Renewable Energy Projects for Non-Profits grant program. This program was made possible through the federal stimulus funding (ARRA). Audubon received \$45,560 from this grant to install two photovoltaic systems, 8.6kW on the Grassland Center and 5.04kW at the Researcher Housing Complex. Along with this grant,

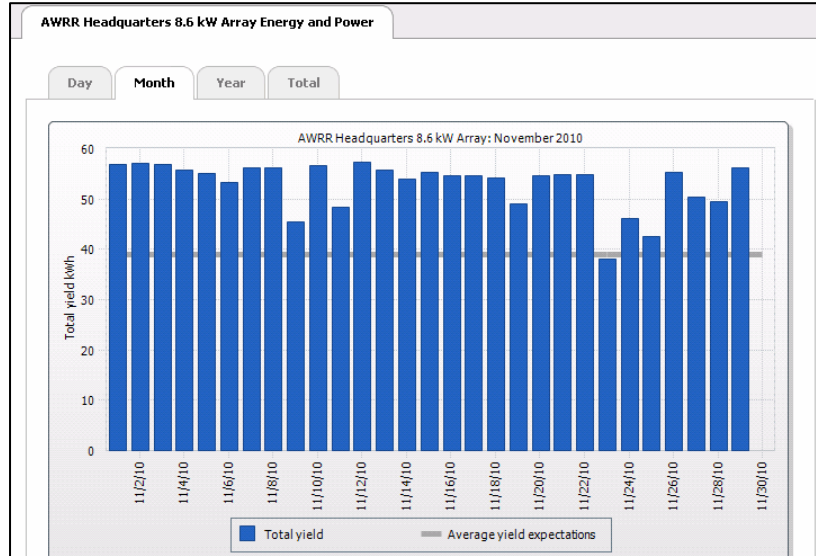
rebates from the Sulphur Springs Valley Electric Cooperative REST program and contributions from James Notestein, Erika and James Wilson, and James and Mary McCartney allowed us to install these renewable energy systems at no cost to our operating budget.

These systems were sized to produce 100% of the electricity used at the Headquarters Complex (Grassland Center, Director's home, Conservation Coordinator's home, shop, 2 wells, party barn) and 70% of the electricity used at the Researcher Housing Complex (bunkhouse, casita, lab, and well). Both systems are grid-tied, meaning that excess electricity produced during peak times is stored on the existing electrical grid. We draw on this excess as needed. If we produce more electricity in a year than we use, we will be compensated for those extra kilowatt hours.



After both systems went on line in September, we waited for our first electric bill with great anticipation – and weren't disappointed. In 2009 our October electric bill totaled \$297.69 – for the same period this year our bill totaled \$67.18!!! Plus, we were able to "bank" more than 1000 kilowatt hours to draw on as needed.

So what does this mean? At the current cost of electricity we anticipate that these systems will save our operating budget between \$2400 and \$3000 annually. The cost of electricity generated from coal is projected to increase dramatically in the future, making the contribution of these systems even more important to our budget. In addition, and perhaps even more important, the energy produced by these photovoltaic systems is clean – no CO<sup>2</sup> emissions. In just the two months these systems have been on line, more than **5 tons** of CO<sup>2</sup> emission have been avoided.



A communications device was installed with each system that allows us to view production levels and share that information via the internet. The graph to the left shows the production at headquarters for the month of November. For more information, check out <http://sunnyportal.com> and click the “publicly available plants.” You can find the Research Ranch systems by entering “Elgin” or “85611” in the proper fields.

Even before we were able to install these systems, the Research Ranch had been recognized by researchers from Columbia University as a leader within the Audubon network for our efforts to reduce our carbon footprint. For more information, see Suchman, et al., 2010 in our list of publications.

What’s next? We hope to focus on the “Old Ranch House” aka the guest house, the only housing structure on the Ranch that isn’t yet covered by a solar system. We’re looking for ways to raise the funds necessary to install an array to produce electricity for this house, insulate and add an efficient heating system so the ranch house can be used year round for researchers and workshop attendees.





## Precipitation



Rain! That's right – we had winter **and** summer precipitation this year! At the headquarters, we registered 7.24" of precipitation Jan-Mar, and 11.9" during July and August; the grasslands were just beautiful!

## Fire

There were no wildfires on the Research Ranch in 2010, and the 2500 acres that burned in the Canelo fire of May 2009 look great after the second growing season. Although we're strong proponents of returning natural processes such as fire to the land we want to take reasonable steps to protect people and structures. The fine fuel load is high thanks to the splendid monsoon, so we're preparing by reviewing our FireWise plan. Among other actions, we've mowed a firebreak about 30 ft wide around all buildings and are making sure that combustibles such as firewood are not stored too close to buildings.

## Cross-border Traffic

The decline in trespass noted in last year's report continued through 2010. There has been very little sign of traffic, and the network of trails through the uplands and riparian areas is now hard to see. We still occasionally find debris to clear, but far less than in the past.



## Water for Wildlife

The group from the Sierra Club Service Tour refurbished the water hole at **McDaniel Well** this fall by limbing up the willows and by deepening the tank by hand (muddy, messy work!) to hold more open water. The BLM is planning to install a new solar array and pump on the well at **Pronghorn (Antelope) Well** to ensure the many animals that depend on this site for water won't be disappointed (see photo, right). The first full year of water harvesting (courtesy of a grant from the USDA-NRCS) has been very successful! We've had to supplement the tank at the Headquarters only twice and haven't had to augment the tanks at the barn at all!



Image of pronghorn doe captured by remote camera at Pronghorn Well

## Endangered Species

Next spring we'll again have endangered pupfish on the Research Ranch. At long last the paperwork is complete – the Research Ranch is covered under Arizona Game and Fish Department's Safe Harbor Agreement via a Certificate of Inclusion. Ross Timmons, Native Fish Project Coordinator, has been diligently working to bring Desert Pupfish, *Cyprinodon macularis*, to the Ranch. Plans are for a release next June, in conjunction with an education event highlighting native fish. Check our website regularly for more information as the time gets closer, or e-mail Pat, [pkugler@audubon.org](mailto:pkugler@audubon.org) to receive announcements of all upcoming events.

What's next? Chiricahua Leopard Frogs! Building on the fine work that Sandy Volentine did during her internship in the summer of 2009, Roger is working with Arizona Game and Fish and the Bureau of Land Management to return this species to the Research Ranch.

## Non-native Invasive Species

This year we anticipated a surge in the number of bullfrogs spreading into waters of the Research Ranch because of all the summer precipitation, but were pleasantly surprised as only five were removed – all from ephemeral tanks. No reproduction (i.e. tadpoles) was noted. Bullfrogs were brought to Arizona from central and eastern states, and are highly predatory on native fish, reptiles and amphibians. They are also known to spread a disease that has a high mortality rate in native frogs.

Another predatory species, green sunfish, has been present in the rocky pools below Post Dam since the cattle ranching days, where it's assumed they were released for sport fishing. Before native species such as Chiricahua Leopard Frogs can be returned to these tinajas the sunfish must be removed. Although it's unlikely that the entire population can be removed by fishing, according to Jeff Simms, BLM fish biologist, reduction of the population by any means will enhance the final removal process and lessen the possibility that these fish could migrate into O'Donnell Creek (where individuals have been found in the past and

removed). Consequently, under the auspices of a scientific collection permit from Arizona Game and Fish, we have removed 233 green sunfish from the Post Canyon site, thanks primarily to the work of Richard Chasey during his internship. We may already have seen some results of his efforts, as no sunfish were found during the annual survey of O'Donnell Creek!

We are continuing to protect native grassland on sandy loam upland ecological sites through the judicious use of herbicide. Our practice of identifying the target invasive plants, Lehmann and Boer Lovegrass, and carefully spraying one plant at a time, has paid off by keeping the frequency of non-natives to less than 1%. In untreated areas, monitoring has shown that the invasive lovegrasses can launch from 1% to 60+% in a few short years. Another relict of the ranching days, Bermuda grass monocultures, are being transformed on the Research Ranch into sacaton grassland, a rare plant community found only along riparian areas of southwestern North America. With financial assistance from the RIESTER Foundation, sacaton plants are being transplanted directly into Bermuda to add diversity and structure to the floodplain.



## RESEARCH and MONITORING

### **2010 Apacheria Fellowship awarded to**

### **Pedro Mazier Chavarria**



Pedro is a doctoral candidate at Texas A & M University who is studying the population dynamics and habitat characteristics of Montezuma Quail. He is using a suite of methods, including radiotelemetry, to tease out information on this elusive species so that better decisions can be made to manage and protect this iconic species of the region.



## Research Highlights

### THE FIRST EVER!

If you look carefully at the photo on the right you'll see part of the scientific name of this tiny (3mm) insect is familiar – "*Acordulecera whittelli*." This species, new to science, was one of three captured by Eric Grissell and described by David Smith. Dr. Smith named this species after the Research Ranch where Dr. Grissell netted it. This appears to be the first species named for the Research Ranch! Another species was named *A. grisselli* in honor of Dr. Grissell, and a third, *A. sonoita*, was named for the location of capture. Dr. Grissell conducted research here for two summers and is the author of a new book, Bees, Wasps, and Ants – The indispensable role of Hymenoptera in gardens, which is filled with splendid information for the home gardener. We highly recommend it!



The Research Ranch hosted thirty-five research/monitoring projects this year, including Matina Donaldson-Matasci's new project: Honeybee communication and the ecological context. Dr. Donaldson-Matasci (to the left in the image) is a post-doctoral fellow at the University of Arizona, Department of Ecology & Evolutionary Biology.

Matt Lattanzio (shown left, with field crew Scott Bird and Aaron Cranford) was back for a second summer studying tree lizards. His poster, "Fire and the isotopic niche: quantifying resource-use variation by tree lizards among burned grasslands in southeastern Arizona," was judged the best student poster at the 7<sup>th</sup> International Conference on the Applications of Stable Isotopes to Ecology in Alaska this summer!



## Monitoring

### Vegetation

Audubon staff and interns added a new phase to our fire monitoring program – Richard Chasey and Lindsey Reifel established a series of permanent transects on North mesa that will allow us to track mesquite encroachment and survivorship. Mesquite is native to the area, but the spread into uplands is generally considered a response to fire suppression. We will repeat this exercise on a five year basis to evaluate changes and trends. We read about half of the

transects established on Ecological Sites and re-marked 225 cacti identified last summer after the Canelo Wildfire.

### Weather/Climate

USDA-ARS maintains several stations that monitor precipitation, temperature, soil temperature and other variables. Links to these data are available on the Research Ranch website. The National Oceanographic and Atmospheric Administration maintains a Climate Reference Network station near headquarters. This station records hourly temperatures, wind speed, precipitation, solar radiation, and other variables, and data are transmitted via modem to Knoxville, TN. Precipitation is recorded at more than a dozen sites across the ranch in association with the vegetation monitoring and several tipping gages have been installed that yield more precise measures of precipitation.

### Birds

Due to staff constraints, participation in the MAPS (Monitoring Avian Productivity and Survivorship) program has been temporarily suspended, but Tice Supplee, Audubon Arizona Director of Bird Conservation, has been conducting point-count surveys as part of the Research Ranch's designation as an Important Bird Area (IBA).



The 5th Appleton-Whittell Christmas Bird Count is scheduled for Sunday, January 2, 2011. Last year 29 participants tallied 103 species with a total number of 3,456 individual birds within the circle that includes the Research Ranch. Robert Weissler, Huachuca Audubon Society, is the compiler for this CBC and has posted information on past CBCs as well as the upcoming event at

<http://www.huachuca-audubon.org/CBC/AWCBC.php>

To see a complete list of active research and monitoring projects and publications associated with the Research Ranch, see pages 17 through 26 of this report.

## Opportunities for Research and Monitoring Lost

Studies comparing the ungrazed Research Ranch with our ranching neighbor to the north, the Babacomari Cattle Company, experienced a major setback this year when the Arizona Corporation Commission voted to allow the local electric cooperative to construct a 69kV power line adjacent to the north boundary of the Research Ranch. Among the transects compromised by the power line are those established by Drs. Carl and Jane Bock in the 1980s. They have authored numerous scientific publications that illuminated the effects of domestic livestock on southwestern grasslands, and the value of these and other permanent transects spanning this boundary would have only increased in the future.



## OUTREACH and EDUCATION



The Research Ranch is an outstanding place to hold conservation meetings, and several groups including the Arizona Game and Fish Non-Game Branch, BLM range staff, and the Rio Tinto Biodiversity team visited the Ranch this year for meetings and/or tours.

The Coronado RC&D held their annual meeting at the Research Ranch on March 10. Dan Robinett gave a presentation on the Babacomari River Protection research project funded through a grant from the Arizona Water Protection Fund and administered by the Coronado RC & D. Following the presentation, he led a tour through of some of the interesting features of the project including this site on the Babacomari Cattle Ranch. The tree-lined Babacomari River is in the background.



### Science on the Sonoita Plain

The Sonoita Valley Planning Partnership held a quarterly meeting at the Research Ranch and for the second year devoted the entire meeting to science – research and monitoring efforts on the Sonoita Plain. The day-long event was co-hosted by the Cienega Watershed Partnership, the

Bureau of Land Management, and the Research Ranch. Highlights of the well attended symposium included keynote speeches by Dr. Carl Bock, above, and Dr. Jane Bock, inset. The proceedings, including abstracts from presentations and posters, can be viewed or downloaded on our website: <http://researchranch.audubon.org> by clicking on our library.



## Expeditions

For several days last spring the Research Ranch hosted Patrick McMillen and his crew of videographers. Patrick is the star of “Expeditions”, a production of Clemson Public Service, and is a faculty member of Clemson University. One of our researchers, Al Wheeler, also on the faculty at Clemson, persuaded Patrick that he should film in the Southwest. We’ve not yet seen the end result – but the Ranch and its critters put on quite a show! Three rattlesnakes (two different species) slithered out of their den to be filmed and canyon tree frogs sang their mating songs. As a background to it all, the grasses and oak savannas at sunset were glorious!

## PE4RC

Sometimes it’s hard to decide if a project is research or outreach or conservation – and that’s the situation with “Practical Energy for Rural Communities,” or PE4RC. This project grew from a proposal submitted to the *TogetherGreen* Grant Initiative, an alliance between Audubon and Toyota. Proposals needed to be based on partnerships between an Audubon entity and another group, in this case, the Sonoita Crossroads Community Forum (SCCF). Our proposal outlined a plan to reduce carbon emissions in a rural community through conservation, energy efficiency and renewable energy, and was one of only three that received full funding for year 09/10.

One of the major components of the grant was funding to award an Apacheria Fellowship to a graduate student to memorialize our rural community’s efforts as a formal case study. The fellowship was awarded to Wayne Porter, a graduate student in the School of Sustainability, Arizona State University. Wayne not only produced the required case study, but became actively involved in the community by initiating events such as “Green” home tours and presentations, and working with Santa Cruz County officials to draft a voluntary green building ordinance. The case study is complete and can be found on the PE4RC website: <http://sites.google.com/site/pe4rcarz/resources>, along with a wealth of other information. We’ve included the executive summary on page 27 of this report. In addition to the educational component – the main focus of the grant – Wayne’s thesis is based on research he’s been conducting concurrently with preparation of the case study.



A key deliverable of the TogetherGreen grant was hosting an Energy Exposition. Jeanne Horsmann, member of the SCCF energy committee, volunteered hundred of hours to make this event a success. More than 20 vendors were able to showcase their energy conservation products to a crowd of more than 200 attendees.

So what is PE4RC? Conservation? Outreach? Research? It’s all three, and the funders were so pleased with our efforts that they renewed our grant for another year so keep watching the website for updates!

## Potlucks and Presentations

We had a full slate of presentations and full plates of food at our Potluck and Presentation Educational Series this year! Leading off in January was our intern, Lindsey Reifel, as she shared her experience with sea turtles in Florida. Cathy Wise, Education Program Coordinator, Audubon Arizona, treated us to “Taking Wing” in February. Pedro

Chavarria, back by popular demand, gave an update on his research on Montezuma Quail on March 13. “Los Lobos - view from the radical middle” was presented by Cynthia Wolf in April, followed by “History of Ranching in Southeastern Arizona” by Dan Robinett in May. Wayne Porter finished out the first segment of our series with a presentation on renewable energy, then we took a break for summer. Dr. Phil Rosen of the University of Arizona kicked off our fall series with an introduction to the F.R.O.G. (Fish and Frog Restoration and Outreach Group) project, and Dr. Susan Wethington amazed us all with “Hummingbird diversity and abundance in southeastern Arizona” at our October event. Dr. Tom Strong closed out the fall with “Vertebrate species using caves and abandoned mines as habitat resources in Arizona.”

Pat has already lined up speakers for January and February – so check our website: <http://Researchranch.audubon.org> for updates or e-mail her at [pkugler@audubon.org](mailto:pkugler@audubon.org) to receive announcements and reminders of upcoming events!

## Fiscal Situation

We’re hangin’ in there...but it’s been tough and next year will be tough, too. Even with severe staffing cuts and stringent expense reductions, we ended up with a shortfall of over \$10,000 for the fiscal year ending June 30, 2010. Contributions and distribution from the Research Ranch Endowment were reduced, and a grant that we were counting on was pulled.

But that was last year – and even though we’ll receive even less from the endowment this year, the changes we made have put us into a better position. But we’re not where we need to be, yet. We’ve received one grant that will help our operating budget and we believe that the contributions will keep coming from those who believe in our mission.

We’re all committed to achieving the goals of the Research Ranch -

- **Conservation**– to be a premier semi-arid grassland 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.



Cattle Egrets visit the water tank by the party barn

## Publications received in 2010 associated with the Research Ranch

- Allington, G. R. H. 2010. Long-term Livestock Exclusion in an Arid Grassland is Associated with Changes in Perennial Grass Composition and Soil Properties. Abstract and Poster. Science on the Sonoita Plains 2010 Symposium. Quarterly Meeting of the Sonoita Valley Planning Partnership, Appleton-Whittell Research Ranch, Elgin, AZ. p 5.
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- Laing, L.E., D. Gori, and J.T. Jones. 2005. The Development of Landscape-Scale Ecological Units and Their Application to the Greater Huachuca Mountains Fire Planning Process. USDA Forest Service Proceedings RMRS-P-36. p 251-255.



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## Science on the Research Ranch

### Summary and Status of Active Research/Baseline Projects – updated 11 29 2010

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**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.

\* Denotes projects with field work conducted at the Research Ranch during 2010

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#### **Investigating the effect of livestock on the physical properties of soil in an arid grassland**

Allington, Ginger; Thomas J. Valone; Saint Louis University. St. Louis, Mo 63116

Subject: Collect water infiltration and soil compaction data on grazed and ungrazed land

Application: Evidence of impacts of livestock on physical properties may assist restoration efforts at desertified sites.

#### **Future planning for Sonoita Crossroads**

Andersen, Kent G., Research Ranch intern; Wm. V. Branan, director (then)

Subject: Develop report integrating public surveys, traffic conditions and development options

Application: Guide future planning decisions

#### **Survey results for mule deer, javelina and whitetail deer on the Research Ranch**

Arizona Game & Fish Department; John Millican, 555 North Greasewood; Tucson, AZ 85745

Project: Estimate populations

Application: Analyze impacts of hunting, climate on populations

#### **\*Leopard frog surveys**

Arizona Game & Fish Dept. (AZGF): Abigail Dinsmore, Wildlife Specialist, (2005) 2221 W. Greenway Road, Phoenix, Arizona 85023 (602) 789-3362, Adinsmore@azgfd.gov.

Subject: Survey leopard frogs, primarily in Post Canyon area

Application: Protect native species

#### **Native Fish Reintroduction in Turkey Creek**

Arizona Game & Fish Dept. (AZGF): Suzanne Ehret Fisheries biologist, Tucson Regional Office, 55 N. Greasewood Road, Tucson, AZ 85745.

Subject: Reintroduce Gila chub, longfin dace into Turkey Creek on Steen's Property. Potential to spread into Research Ranch.

Application: Protect listed species

#### **\*Fish Surveys**

Arizona Game and Fish Department. Fisheries biologists: Suzanne Ehret, 555 N. Greasewood Rd. Tucson, AZ 85743; 520 388 4453; [SEhret@azgfd.gov](mailto:SEhret@azgfd.gov)

Subject: Conduct periodic surveys of the riparian systems of the Research Ranch and neighboring properties *See also Jakle (archives) for earlier correspondence and reports.*

Application: Evaluate stability of populations of native species, recommend management actions

#### **\*Pupfish**

Arizona Game & Fish Dept. (AZGF): Susanne Ehert (2008), Native Fisheries Specialist I, Region V, 555 N. Greasewood Rd. Tucson, AZ 85743, 520.388.4453, 520.628.5080, SEhret@azgfd.gov Previously: Jeremy Voetz (2003) Rebecca Davidson (2001), Timmons, Weedman, Brown, Bagley, Hendrickson

Subject: Monitor and protect population of pupfish introduced into ranch stockponds and wildlife waters

Application: Conserve native species

#### **Survey of Gould's Turkeys near Huachuca Mountains**

Arizona Game & Fish Department; 555 North Greasewood; Tucson, AZ 85745

Project: Estimate populations

Application: Track success of re-introduction effort

#### **\*Avian Monitoring for Research Ranch IBA**

Audubon staff: Tice Supplee, L Kennedy, C. Hass.

Project: Establish transects to monitor bird species on ARR

Application: Support IBA nomination (see also Wonkka), examine longterm trends



**\*Bullfrogs and Green Sunfish, Monitoring and Treatment on the Research Ranch**

Audubon Staff: L. Kennedy, R. Cogan

Subject: Discover and eradicate individuals within boundary of ARR

Application: Protect native fish, reptiles and amphibians from predatory, non-native species

**\*Christmas Bird Count – Appleton Whittell Circle**

Audubon staff; Robert Wessler (Huachuca Audubon Society) – organizer and compiler; weissler@aves.org

Subject: Conduct bird count as per Audubon standards.

Application: Pooled data yield important information re avian populations, movement and trends.

**\*Depth to groundwater on Research Ranch**

Audubon Staff & Volunteers

Project: Monitor the depth to groundwater of the wells on Research Ranch.

Application: This study helped establish a water consumption baseline for the Sonoita Valley.

**\*Ecological Site Monitoring (ESM)**

Audubon Staff– Linda Kennedy

Project: Establish permanent points to monitor vegetation change. Based on Ecological Site Map (see Robinett & Breckenfeld)

Application: Identify trends in vegetation change

**Geographic Information System**

Audubon Staff and see : Crawford, Geiger, Loomis, Seltzer

**\*Precipitation at Ecological Sites**

Audubon Staff – Linda Kennedy

Project: Establish range gages to correspond with ESM. Based on Ecological Site Map (Robinett & Breckenfeld)

Application: Correlate precipitation with changes in vegetation.

**\*Recording Precipitation with Data Loggers**

Audubon Staff: Linda Kennedy, Christine Hass

Project: Install tipping gages equipped with dataloggers in key areas.

Application: Provide detailed information relevant to stream flows and changes in vegetation

**\*Wild Turkeys on the Research Ranch**

Audubon Staff; Linda Kennedy, Assistant Director

Project: Record sightings of wild turkeys.

Application: Document spread of sub-species reintroduced in Huachuca Mtns.

**MAPS (Monitoring Avian Productivity and Survivorship)**

Audubon staff. See also, Chase.

Project: MAPS station established under guidelines of continent-wide program to provide critical conservation and management information for populations of landbirds breeding within the United States and Canada.

Application: Increases knowledge of landbirds breeding within the US and Canada

**Subdivision versus ranching: Effects of livestock grazing and exurban development on the biodiversity of a southwestern grassland/savanna**

Bock, Carl (Carl.Bock@colorado.edu), Dr. Jane Bock (Jane.Bock@colorado.edu); Department of Environmental, Population, and Organismic Biology; University of Colorado; Boulder CO 80309

Subject: What are the impacts of conversion of ranches into housing developments? Species groups: Flowering plants, grasshoppers, butterflies, birds, rodents.

Application: Guide human population growth to minimize negative impacts on native species.

**Response of rodents, birds, and vegetation to the Ryan Fire, Sonoita Valley, AZ -a unique opportunity to examine the ecological consequences of fire in grassland/savannas of the Arizona Borderlands**

Bock, Carl, E., Professor; Department of Environmental, Population, and Organismic Biology; University of Colorado; Boulder, CO 80309. Linda J. Kennedy, Audubon

Subject: Quantify effects of wildfire on assemblages of small mammals, birds and vegetation.

Application: Help land managers predict response of species to large scale rangeland fire

**Soil inventory update**

Breckenfeld, Donald J., Daniel Robinett; U.S.D.A. N.R.C.S. 2000 E. Allen, 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.

**Renewable energy options for Southern Arizona**

Burand, Rachel, Intern, and Linda Kennedy, Audubon

Project: Develop educational material outlining alternatives to electricity generated from coal

Application: Assist residents and business owners reduce carbon emissions

**Avian microbial ecology**

Burt, Edward H. Jr. (Jed), Ph.D.; Professor and Chair of Zoology, Ohio Wesleyan University, Delaware, OH. 43015; 740 368 3886

Project: Examine occurrence of feather-degrading bacteria in plumage of Song sparrows and other species.

Application: Increases knowledge of biodiversity of region

**Wildland Philanthropy: An American Tradition (working title)**

Butler, Tom, Researcher/Writer/ Woodshed Communications, 835 Economou Road, Huntington VT 05462; Antonio Vizcaino, Photographer

Project: Book on natural areas conserved wholly or partly by private funding and initiative.

Application: Promote wildland philanthropy

**Comparison and impacts of Bronzed and Brown-headed Cowbird parasitism in southeastern Arizona**

Chace, Jameson F. and Dr. Alexander Cruz; Department of Environmental, Population, and Organismic Biology; University of Colorado; Boulder, CO 80309-0334

Project: Study the impact of cowbird parasitism on songbird communities in southeastern Arizona, a region of high biological diversity and thus of concern for the preservation of faunal communities

Application: Help wildlife managers evaluate whether control of brood parasites is necessary to protect other species

**\*Population dynamics and habitat characteristics of Montezuma (Mearns's) Quail in southeastern Arizona**

Chavarria, Pedro Mazier; Texas A & M University, and Louis Harveston, Ph.D., Sul Ross State University, Department of Natural Resources, P.O. Box C-16, Alpine, TX. 79832.

Subject: Monitoring movement of quail.

Application: Fill knowledge gaps about life history and determine how behavior and genetic viability is affected in areas where hunting is, and is not, allowed.

**\*Annotated Bibliography of Lehmann Lovegrass**

Chasey, Richard. (Intern)

Subject: Capture publications related to *Eragrostis lehmanniana* along with brief summaries

Application: Disseminate information about non-native, invasive species

**A History of the Lands in the National Audubon Society's Research Ranch Near Elgin, in Santa Cruz County, Arizona**

Collins, Glendon E., Bureau of Land Management (retired), Arizona State Trust Lands (retired). Phoenix.

Subject: Compile and document history of land transactions involving federal and state lands.

Application: Background

**Boer Lovegrass on the Research Ranch: Update 2008**

Crawford, David. (Intern). University of Iowa, Iowa City IA.

Subject: Use GPS and GIS to map locations of Boer Lovegrass (*Eragrostis curvula* var. *conferta*) on the Research Ranch

Application: Compare with previous work to assess trends. Provide time specific information re spread.

**\*Using soil moisture to assess ecosystem function following exotic lovegrass invasion in semiarid grasslands of southeastern Arizona**

Cross Anne F., Ph.D.; 3740 E. 83<sup>rd</sup> St. Tulsa OK 74137; [Alexander G. Fernald](mailto:Alexander.G.Fernald@nmsu.edu), Ph.D., 4637 Maxim Port, Las Cruces, NM 88011, [fernalda@nmsu.edu](mailto:fernalda@nmsu.edu)

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.

**\*Honeybee communication and the ecological context**

Donaldson-Matasci, Matina. Dept. of Ecology & Evolutionary Biology, University of Arizona, P.O. Box 210088, Tucson, AZ 85721. [matina@email.arizona.edu](mailto:matina@email.arizona.edu)

Project: Explore relationship between resource distribution and value of communication.

Application: Basic science on species

**\*Current Distribution and Status of Slevin's Bunchgrass Lizard, *Sceloporus slevini*, in southeastern Arizona**

d'Orgeix, Christian, Ph.D.; Department of Biology; P.O. Box 9064; Virginia State University; Petersburg, VA 23806; phone: (804) 524-5023 fax: (804) 524-5732; e-mail: [cdorgeix@vsu.edu](mailto:cdorgeix@vsu.edu). 2006: 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.; Department of Biology; P.O. Box 9064; Virginia State University; Petersburg, VA 23806; phone: (804) 524-5023 fax: (804) 524-5732; e-mail: [cdorgeix@vsu.edu](mailto:cdorgeix@vsu.edu)

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)

**Annotated bibliography of selected reports, publications and theses**

Dyson Ruth E.; 2647 Lamb Road, Mason, Mi. 48854

Project: Prepare annotated list/bibliography of publications of particular interest to ARR.

Application: Facilitate information exchange and document publications

**Microsatellite DNA survey of desert pupfish**

Echelle, Anthony A., Oklahoma State University, Zoology Department, Stillwater, OK 74078. 405 744  
[9681.echelle@okstate.edu](mailto:9681.echelle@okstate.edu).

Project: Assess genetic status of desert pupfish refugium populations and develop management protocols for exchange of genetic material among populations.

Application: A conservation genetics protocol will be developed for long-term maintenance of desert pupfish populations.

**Finding effective strategies for adding native diversity into heavily invaded grasslands**

Fehmi, J.S., Ph.D., 530 621 7268. [jfehmi@email.arizona.edu](mailto:jfehmi@email.arizona.edu); U of A; SNR, Tucson

Project: RE-introduce native plants into areas dominated by naturalized, non-native plants

Application: Increase proportion of palatable native plants

**Survey of high desert grasslands Hymenoptera**

Grissell, Eric, PO box 739, 38 Terry Lane, Sonoita, AZ; [egrissell@dtg-llc.com](mailto:egrissell@dtg-llc.com)

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., Borderland Carnivore Studies, Vail, AZ.

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.

**\*Introduction of Species Diversity into Boer Lovegrass Monocultures**

Hershendorfer, Mary and Ramona Gardner, Ph.D., USDA-NRCS Plant Materials Center. Tucson

Project: Determine effectiveness of various methods to increase native biodiversity into monoculture created by non-native lovegrass.

Application: Protect native grasslands

**\*Meteorological Station**

Keefe Tim, Hydrologist, USDA-ARS; Southwest Watershed Research Center; Tucson, AZ 85711; 520 670 6380x 158; [tkeefe@Tucson.ars.ag.gov](mailto:tkeefe@Tucson.ars.ag.gov)

Project: Station jointly owned by ARR & USDA

Application: Baseline information on climate available to researchers and land managers of region

**\*Arbuscular mycorrhizal fungi associated with big sacaton (*Sporobolus wrightii*)**

Kennedy Linda J., Audubon; Jean C. Stutz, Ph.D., Arizona State University, Department of Plant Biology, Box 871601, Tempe AZ 85287; 480 965 5563; [jstutz@asu.edu](mailto:jstutz@asu.edu)

Project: Examine the role of AMF in the life history of big sacaton.

Application: Aid revegetation and restoration of sacaton grasslands

**\*Monitoring the effects of fire on semi-arid grassland and oak savannas after decades of fire suppression**

Kennedy Linda, Ph.D., Director Research Ranch

Project: Monitor the effects of prescribed burns and wildfire

Application: Baseline information for future research

**\*Photo-herbarium for the Research Ranch**

Kennedy Linda, Director, Research Ranch

Project: Document life stages of plant species found on the Research Ranch.

Application: Baseline information for future research; Aids identification.

**\*Sacaton Rehabilitation**

Kennedy Linda, Ph.D. Research Ranch

Project: Re-establish *Sporobolus wrightii* in appropriate degraded sites.

Application: Improve wildlife habitat, bioremediation of sites dominated by exotic, invasive Bermudagrass.

**A survey of rodent populations on the Appleton-Whittell Research Ranch**

Lapidus, Sarah. (Intern), Amherst; and L.J. Kennedy

Project: Develop long-term monitoring program based on Jones, Bock and Kennedy

Application: Indicate trends in small mammal populations

**\*Modeling impacts of habitat alterations on habitat use and diet selection of desert reptile communities**

Lattanzio, Matthew S.. Dept of Biological Sciences, Ohio University. Athens, OH.

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



**Multi-scale invasive plant inventory, monitoring and prediction protocols for TER-S management support**

Lehnhoff, Erik A., Ph.D. Montana State University, 333 Leon Johnson Hall, Bozeman, Montana, 59717.

Project: Improve understanding of non-native invasive plants on Fort Huachuca.

Application: Generate methodology to predict future distributions of non-native, invasive plant species on Fort Huachuca and surrounding lands.

**DOE – Ameriflux QA/QC Site Comparison**

Loescher, Hank. Oregon State University, 321 Richardson Hall, Corvallis, OR 94331

Project: To enhance the quality of data and assurance of site instrumentation (NOAA). Provide national standard toward existing measurements.

Application: Indirectly through long term monitoring of climate & abiotic variables that may affect future populations

**Recommendations on Sustainability - Housing**

Lundgren, Erick, Intern, Audubon Research Ranch

Project: Develop plan to upgrade buildings for sustainable energy use.

Application: Conserve energy

**\*Flora of the Appleton-Whittell Research Ranch**

McLaughlin Steven P., Ph.D., University of Arizona, (Ret.) Tucson AZ, Erika L. Geiger; University of Arizona, Tucson AZ ; Janice E. Bowers; U.S. Geological Survey (Ret) Tucson AZ 85745. Linda Kennedy

Key words: flora, floristic elements, grasslands, vascular plants

Application: Baseline for ongoing and future research

**Water use and the future of the Sonoita Valley**

Naeser Robert and Anne St. John, Yale School of Forestry and Environmental Studies, New Haven, CT.; Wm. V. Branam, Ph.D., Director, Audubon Research Ranch (Ret).

Project: Review existing information to determine how much water is currently being used in the Sonoita valley

Application: Establish safe yield development density that will keep the area from growing beyond the capacity of the water supply.

**Natural Resources Inventory – Primary Site Unit**

Natural Resources Conservation Service – USDA. Tucson, AZ. Emilio Carrillo (2004), Christine Egen (1992), Steve Barker (1982)

Project: Repeated measures: vegetation and soil. Transects established in 1982, to be resampled on approximately decadal basis.

Application: Identification of trends – reference area for MLRa-41

**\*Long-term meteorological, evaporation and carbon flux measurements**

National Oceanic & Atmospheric Administration (NOAA); Tilden P. Meyers, Ph.D. Meteorologist; NOAA, Oceanic and Atmospheric Research, Air resources Laboratory, Atmospheric Turbulence and Diffusion Division, 456 S. Illinois Ave., P. O. Box 2456; Oak Ridge, Tn 37831-2456  
meyers@atdd.noaa.gov, 865 576 1245, F 1327; John Hughes, NOAA, National Data Climatic Center, U.S. Climate Reference Network, 151 Patton Avenue Federal Building Room 420-F, Asheville, NC 28801-5001; Ph 828 271 4020; John.P.Hughes@noaa.gov

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.”

**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. [Clay.nichols@enmu.edu](mailto:Clay.nichols@enmu.edu)

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

**\* Pre-monsoon post-fire sediment survey**

Nichols Mary, Hydraulic Engineer, USDA-ARS; 2000 E. Allen Rd. Tucson, AZ 85719; 520 670 6381 x 161; [mnichols@tucson.ars.ag.gov](mailto:mnichols@tucson.ars.ag.gov)

Subject: Survey several stock tanks on ARR to determine level of sediment movement after monsoon and evaluate transpiration and evapotranspiration

Application: Evaluate factors in rangeland health post fires.

**Impacts of grazing, fire and precipitation variability on woody plant cover in Chihuahuan Desert grasslands**

O’Neal, Kelley. Department of Geography, University of Maryland, 2181 LeFrak Hall, College Park, MD 20742. [kelleyo@umd.edu](mailto:kelleyo@umd.edu)

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

**Spatial variability of infiltration on rangelands**

Paige Ginger, Research Hydrologist, USDA-ARS; 2000 E. Allen Rd. Tucson, AZ 85719; 520 670 6381 x 143; [gpaige@tucson.ars.ag.gov](mailto:gpaige@tucson.ars.ag.gov)

Subject: Determine the hydraulic properties of the soils on ARR as part of a larger project to characterize the hydrologic responses of different ecological sites within MLRA 41-3 that are in different states of "health".

Application: Quantify the relationship between the "health" of an ecological site and the risk of an "at risk" site transitioning to another state.

**\*TogetherGreen Apacheria Renewable Energy Analysis**

Porter, Wayne. Arizona State University School of Sustainability, Tempe, AZ

Project: Develop a replicable methodology for characterizing, and also disseminating information about the available renewable energy resources.

Applicability: Analyze methodologies by which to reduce carbon emissions

**\*Identification of bobcats using photos from trail cameras**

Reifel, Lindsey (Intern) and C.C. Hass (Assistant Director) Research Ranch

Project: Determine identifiable characteristics on peltage of bobcats (*Lynx rufous*)

Application: Monitor number and movement of bobcats on Research Ranch

**Inventory of ecological sites, their present day condition, trend and rangeland health**

Robinett Dan, Don Breckenfeld, both retired from U.S.D.A. -N.R.C.S. 2000 E. Allen, 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.

**\*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 for 5 years .

Application: Results will enable sound management decisions to maintain and/or improve vegetation conditions on Babocomari watershed. Will have application to other desert rivers.

**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, Fort Collins Science Center, Department of Biology, University of New Mexico, Albuquerque, NM 87131.

Project: Compare pre-fire data collected on the Audubon Appleton-Whittell Research Ranch in 1999-2001 with post-fire data collected on the same transects and plots.

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., Research Ecologist, USGS Fort Collins Science Center, Arid Lands Field Station, Department of Biology, University of New Mexico, Albuquerque, NM 87131

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 ammodramus*), and associated priority grassland species, throughout its known range in the Southwest U.S.**

Ruth, Janet M. Ph.D., Research Ecologist, USGS Fort Collins Science Center, Arid Lands Field Station, Department of Biology, University of New Mexico, Albuquerque, NM 87131

Project: Document current distribution and abundance of Arizona Grasshopper Sparrows and associated priority grassland bird species. Test methodologies.

Application: Understanding status and distribution, population trends, ecology and habitat relationships is essential for conservation of avian species of concern.

**Preliminary mapping of archaeological sites revealed after Ryan Wildfire**

Schupp Leslie, P.O. Box 921, Patagonia Az ; phone & Fax 520 394 2003; e-mail: pathless@dakotacom.net

Project: Map archaeological sites between headquarters and research housing post Ryan fire.

Application: Establish permanent record.

**\*Assessing Condition of O'Donnell Creek**

Simms, Jeffrey, BLM Fish Biologist, Tucson Field Office, Nate Dietrich, BLM Hydrologist.

Project: Use Proper Functioning Condition Standards to evaluate condition of a portion of O'Donnell Creek

Application: Environmental Assessment

**The herpetofauna of the Research Ranch**

Smith Hobart, Ph.D., University of Colorado, Department of Biology, Boulder, CO 80309; David Chiszar, Ph.D., Department of Psychology, Boulder, CO 80309

Project: Develop a checklist of reptiles and amphibians known or thought to occur on the Research Ranch.

Application: Baseline information

**Quantifying runoff and erosion after the Ryan Fire at The Research Ranch, southeastern Arizona**

Stone Jeffrey, (jstone@tucson.ars.ag.gov) and Ginger Paige, Research Hydrologist (520 670 6381 x 143; gpaige@tucson.ars.ag.gov), USDA-ARS; 2000 E. Allen Rd. Tucson, AZ 85719; 520 670 6381  
Subject: To develop a methodology which will provide framework for future experiments  
Application: predict the effects of management on the amount of runoff and erosion from ecological sites within MLRA 41-3.

**Habitat, movements and roost characteristics of Montezuma quail in southeastern Arizona**

Stromberg Mark R., Ph.D., Director, Hastings Reserve, UC Berkeley, 38601 E. Carmel Valley Road, Carmel Valley, CA 93924; Stromber@socrates.berkeley.edu; 831 659 2664  
Project: Understanding the status of populations and habitats of this species  
Application: to facilitate management decisions.

**\*Ecology of *Sporobolus wrightii* (Big sacaton): Implications for restoration and management of riparian grasslands in southwestern North America**

Tiller Ronald L. (currently TNC) , Brantlee Spakes (UNC) , Juliet C. Stromberg, Jean C. Stutz, Duncan T. Patton , Arizona State University, Box 871601, Tempe, AZ 85287-1601; Linda Kennedy.  
Project: Understand the ecological processes, variables and relationships influencing regeneration and maintenance of sacaton grasslands.  
Application: Enhance restoration/revegetation/protection of sacaton grasslands

**\*Research and reintroduction effort for Huachuca Water Umbel**

Titus Jonathan H., Ph.D., Dept. of Biology, Jewett Hall, SUNY-Fredonia, Fredonia, NY 14063 716-673-3818 titus@fredonia.edu; Priscilla Titus, Fredonia NY 14063  
Project: Transplant plugs and monitor success  
Application: Protect listed species, aid in development of recovery plan for species

**\*Agave Monitoring on the Coronado National Forest**

USFS. Sierra Vista Ranger District, Coronado National Forest, 5990 S. Highway 92, Hereford, AZ 85615. Biedenbender, Sharon, Ph.D., sbiedenbender@fs.fed.us. and Melinda Castillo.  
Project: Monitor impacts of livestock grazing on florivory of agave  
Application: Management of food source for lesser long-nosed bat

**Chiricahua Leopard Frog Reintroduction to the Research Ranch, a Conservation Strategy**

Volentine, Sandy. (Intern) Prescott College, Prescott AZ  
Project: Explore opportunities and suitability for reintroduction effort of *Lithobates [Rana] chiricahuensis* to historic habitat  
Application: Protect endangered species

**\*Inventory of Native Plant-Feeding Insects in Arizona**

Wheeler, Alfred G., Department of Entomology, Clemson University, Clemson, SC 29634-0365; 864-656-5061; awhlr@clemson.edu  
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

**Floral biology of *Penstemon dasyphyllus* and other *Penstemon* species on ARR.**

Wilson, Paul. Department of Biology, California State University, Northridge, CA 91330-8303.  
Project: Study the diversity of *Penstemon* flowers in terms of morphology, pollinators, nectar secretion characters, and pollen presentation characters.  
Application: May aid in conservation of *Penstemon* species that are of conservation concern





**Executive Summary of Case Study  
Encouraging Energy Conservation and the Use of Alternative Energy:  
A Model for Rural Communities**

**Objectives and Origin**

Practical Energy for Rural Communities (PE4RC) is a community-based organization that was founded using a \$24,400 grant from Audubon's TogetherGreen initiative. Its overarching goal is to reduce carbon emissions in Santa Cruz County. PE4RC originated as a result of dedicated efforts by a small group of activists who believed the business-as-usual approach to providing power to a growing community—the electricity co-op running another power line across the scenic grasslands—is not the best way to proceed.

**Challenges**

- ✓ Effectively reaching out to widely-dispersed rural area residents.
- ✓ Small turnouts at events.
- ✓ The ever-changing regulatory and incentive environment for renewable energy technologies.
- ✓ Technical utility-related, regulatory and legislative roadblocks that seem to inhibit the more widespread implementation of renewable energy systems.
- ✓ Utility-related issues such as a traditional approach to energy generation and distribution

**PE4RC's Activities and Results**

- ✓ Conducted the Energy Priorities, Actions and Knowledge Survey of study area residents.
- ✓ Encouraged the development of distributed renewable energy for both residents and businesses.
- ✓ Provided education through outreach efforts. These included: the 2009 Energy Summit in Patagonia, development of the website (<http://pe4rc.org>), two Santa Cruz County Energy Expos, "Greening Your Home Tours" in Patagonia and Sonoita, formal presentations on energy and water conservation and renewable energy options at Expos and area meetings, booths at community events, interviews and press releases for local media, and the compilation of an email list of interested local residents.
- ✓ Established a dialog with the Southeast Arizona Community Action Program (SEACAP) to provide support for weatherization projects for lower income residents.

**Evidence of Success**

- ✓ PE4RC's work with Santa Cruz County officials was key to development of a Green Building Program.
- ✓ The Solar Electric Power Association's 2009 Utility Solar Rankings recognized SSVEC as the top ranked utility for solar Watts/customer installed in 2009.
- ✓ Audubon's Appleton-Whittell Research Ranch was awarded a grant to install two PV arrays.
- ✓ TogetherGreen's award of a \$15,000 grant to fund another year of PE4RC's operation.

**A Model for Creating a Successful Energy-Focused Organization in Other Rural Areas**

The organization's goals should include efforts to educate and advocate for changes in three areas: reducing energy use, increasing energy efficiency and implementing renewable energy systems. To create this type of organization you need at least two community members to spearhead it, other organizations with roots in the community, communication channels to reach area residents and a galvanizing event or process.

**Steps to Create a Carbon Footprint-Reducing Organization**

- ✓ Work from within (or become a member of) a locally-based organization that will support your efforts.
- ✓ Partner with other, more established organizations.
- ✓ Develop relationships with one or more politicians.
- ✓ Seek out experts.
- ✓ Capitalize on a galvanizing issue.
- ✓ Organize local events.
- ✓ Identify funding opportunities.
- ✓ Recruit locally-available volunteer talent.

Prepared by Wayne Porter. PE4RC- November 2010

### Appleton-Whittell Research Ranch Budget

<b>Revenue</b>	<b>Fy 09/10</b>
Contributions	9433
Grants	16322
Sales	93
Rentals	3420
Other Income	1000
Pooled Investment Income	232408
Assets Released from Restriction	10355
<b>Total revenue</b>	<b>273031</b>
<b>Expenses</b>	
Salaries/Benefits	183313
Travel	200
Vehicle oper	1699
Staff Training	592
Postage-General	1132
Bank Fees	32
Professional and Consultant	14137
Gas & Electricity	5391
Buildings, Maintenance	3258
Telephone	4308
Insurance	7372
Maintenance	5632
Equip. Maintenance Contracts	373
Office and Household Supplies	3657
Educational Materials	772
Computer Equipment and Software	2413
Research Equipment	100
Farm Supplies	981
Printing	120
License, permit, registration	310
Dues & Subscriptions	293
Depreciation	3212
Other	250
Support Service Allocation	33484
<b>Total Expenses</b>	<b>273031</b>
<b>Net surplus/deficit (-)</b>	<b>0</b>