

CHIHUAHUAN DESERT RESEARCH INSTITUTE PROGRAM REPORT

THE MISSION OF THE CHIHUAHUAN DESERT NATURE CENTER AND RESEARCH INSTITUTE IS TO PROMOTE PUBLIC AWARENESS, APPRECIATION AND CONCERN FOR THE NATURAL DIVERSITY OF THE CHIHUAHUAN DESERT REGION THROUGH RESEARCH AND EDUCATION.

TO ACHIEVE THIS MISSION, THE CDRI PROMOTES AND DEMONSTRATES SUSTAINABLE DEVELOPMENT IN THE DESERT, PROVIDES ENVIRONMENTAL EDUCATION PROGRAMS TO THE COMMUNITY, AND ENCOURAGES BIODIVERSITY CONSERVATION.

Nature Center, Gardens, Public Outreach Program

The Public Outreach Program allows CDRI to offer informal educational services and opportunities to schools, youth groups, members, volunteers, researchers and regional visitors. As part of the Public Outreach Program, we operate the Chihuahuan Desert Nature Center, a 507-acre facility with a visitor center, 20-acre botanical garden, extensive cactus collection native to this Desert, and over three miles of hiking trails. Visitors learn about the flora and fauna of the desert, the geology of the Davis Mountains Region, and the history of mining, all through interpretive exhibits.

In 2013, CDRI welcomed 7000 guests to the Nature Center. Admissions income increased to just over \$25,000, continuing a rising trend since the devastating 2011 Rock House Fire. Net sales at the Gift Shop were up to \$24,802.

NATURE CENTER

- *Staffing* – CDRI added three new staff in 2013: Executive Director in September, Land/Site Manager and Business Manager in July.
- *Solar Array* – CDRI's six-paneled Solar Array generates 25% savings each month on our electric bill and give us another tool in our sustainability belt. The Array was erected and dedicated in November thanks to a \$30,000 installation grant from the Green Mountain Energy Sun Club.
- *Visitor Center, Pavilion, Maintenance Building* – Leaks in the VC roof were repaired, a copper grounding rod installed, and the air conditioning unit recharged and repaired after many years. An area family contracted to use CDRI's pavillion for a wedding. Maintenance Building continues to provide additional space for offices, the Library, and Board meetings.
- *Gift Shop and Business Practices* - The Leapin' Lizards gift shop was reconfigured, making it more open and welcoming. Working with CDRI's accountant, the new Business Manager instituted improved accounting for all aspects of CDRI business including: replacing manual visitation log with POS codes, instituting new checks and balances procedures, adding new items to the shop inventory, installing a new purchase order system, conforming and reducing databases for more accurate accounting of all aspects of CDRI administration and finances.
- *Library* - Volunteers assisted the Board Collections Committee in cataloguing the books in the Library and shelving or storing them in the newly created library. The Committee will now decide which books to keep and which to sell or dispense with. Many were left to CDRI as part of an estate.
- *Land Site* - Installed interpretive panels on the trails, repaired trails and main road after a flood, water bar construction, removed invasive species, constructed benches, created a map depicting trail modifications, collected GPS points to create a property-wide utilities map.

BOTANICAL GARDENS

- *Cactus Greenhouse* – Remodeled the main greenhouse and built a smaller greenhouse for the young cacti. A new roof, new electrical and conduit, better ventilation and controlled airflow have created optimal conditions for our exclusive collection of native Chihuahuan cactus.
- *Garden* – Visitors comment on the Cactus House and Gardens never looking better. In addition to safely sheltering cactus and plants during the greenhouse remodel, our Gardener repotted 2/3 of the adult species, began an inventory of the Collection, inventoried accessioned plants in the Garden, added accession numbers where needed, overhauled the Salvia bed, extended the front pollinator garden bed, and re-laid drip line throughout the garden.

PUBLIC OUTREACH

- *Membership* - Rising since 2011 to 567 this year. Membership income was up to \$36,875. The large majority of memberships are renewals. 89% of members are from Texas; 28% are from our local communities.
- *Volunteers* - The backbone of CDRI, volunteers reported 6,217 hours for 2013, the equivalent of 3 full-time employees. They provide gardening, weeding, raking, trail maintenance, Visitor Center painting and repair, citizen science projects such as bird and butterfly counts, significant support for all education programs and for Cactus and Native Plant sales, leading hikes and tours and numerous other tasks.
- *Partnering* – CDRI staff took a number of opportunities to partner in the region, including:
 - Big Bend Livestock Show Association - 4-H Food Show Judge
 - Sul Ross Strategic Planning Committee – “Alumni and External Relations” team.
 - Sul Ross Career Fair and Earth Day in Alpine – CDRI booths at both events
 - Marfa International School Science Fair Judge.
- *Media* – CDRI regularly publicizes events on our Website, local radio and newspapers, a monthly electronic newsletter, rack cards distributed in retail/tourist venues across the region and quarterly/annual Lifelong Learning brochure.
- *Social Media* - CDRI inked a deal at year’s end to up its social media presence exponentially thanks to Beth Nobles, executive director of Texas Mountain Trail. We will provide office space for Beth in exchange for her giving us daily outreach and exposure to a wide-ranging network of followers on Facebook, Twitter, Instagram and the TMT website, with pictures of our land site’s beauty and promotion that lures visitors.

SPECIAL EVENTS

- *Heart Healthy Hiker’s Club*: Participating in the American Heart Association annual focus on heart health, CDRI sponsored twice weekly early morning hikes for members during February.
- *Cactus Showcase*: Annual sale of native cactus and succulents with advice for their planting and care continues to be popular. The week-long event featured hikes and guided tours each day, each with a different focus.
- *Native Plant Sale*: The annual April Native Plant Sale lost money this year - \$7,416 income vs \$7,994 expense. A number of factors are at play and have been for several years: required staff travel and expense (some out of state) to acquire quality plants and insure they are safely delivered, rising plant costs, steadily declining Sale income have raised the question whether this event has run its course and should be replaced with a new venture. Therefore, the Board has elected to take a one-year hiatus from holding the Plant Sale in 2014 while it examines these questions and other options.
- *Annual BBQ/Benefit Auction Fundraiser*: The September BBQ/Auction was a popular success with those who attended and for CDRI’s bottom line - \$21,907 income, \$3,247 expense for a net of \$18,660. The quality of the donated auction items was high and the food drew rave reviews. Staff organized the event; the Board did yeoman’s work in procuring donations, bidding on items and hosting the evening – cooking, serving, and cleaning up!

- *Thanksgiving Open House:* The Nature center opened free of admission to all visitors on Friday and Saturday with special discounts in the Gift Shop.
- *Volunteer Appreciation Dinner:* In December, we hosted our Volunteer Appreciation dinner and our greatest resources turned out in number, bringing great food to share! Kurt Mannchen was named Volunteer of the Year.
- *Annual Appeal* brought a generous response - \$13,440 by year's end and growing.

Education Program

The CDRI Education Program, through partnerships developed with nonprofits, universities, and local businesses, provides science-based, interpretive education for learners of all ages by offering youth programs aligned with state mandated learning skills, teacher workshops, adult lifelong learning opportunities, and informal learning – ‘experiential’ education that is invaluable. The focal point for many but not all of the education programs is the Chihuahuan Desert Nature Center, a 507-acre facility owned and operated by CDRI. Program achievements for 2013 follow.

In 2013, CDRI education programs served over 2,000 individuals, a significant increase over 2012, and continued a growth trend over the past five years. The programs generated over \$15,000 income.

SCHOOL AND YOUTH GROUPS

- *Guided Hikes* through the Nature Center's canyon, overlook and gardens for 28 groups with 591 youth.
- *Toddle on the Wild Side* monthly morning at the Nature Center for ages 0+ to initially experience nature through their five senses & a *Nature Themed Birthday Party* for 146 youngsters.
- *Bugs, Bugs, Bugs April Field Day* - 250 2nd and 3rd graders from area schools visited 15 stations related to bugs, including sampling edible bugs, learning bug anatomy, viewing bugs, building a bug and more.
- *The EarthRocks!!! October Field Day* – 450 4th and 5th graders from area schools descended on the Nature Center for the hugely popular 8th annual hands-on natural science lessons in biology, geology, astronomy, energy and earth science. Dynamic volunteers and staff lead the 21 stations which are designed around the TEKS state guidelines to improve understanding and retention of classroom curriculum.
- *Critter Summer Nature Camp* – 10 children ages 4-6 – ½ day, 5 days nature-based activities such as hiking, birding, arts and crafts.
- *Desert Rat Club Summer Nature Camp* – 10 children ages 7-10, ½ day, 5 days nature-based activities such as learning camping skills water sampling, small mammal trapping, and hiking.

ADULT GROUPS

- *Guided Hikes* through the Nature Center for 7 groups with 125 adults.
- *Field Trips* – 3 trips serving 39 adults to climb Miter Peak, hike Mt Livermore, and look for Bighorn Sheep.
- *Conservation Across Borders Workshop* - 9 teachers for one week's science-based education program focused on wildlife/natural resource conservation.
- *Nature Appreciation Workshop* with 5 Texas A&M AgriLife Extension Service presenters for 10 adults.

- *Lifelong Learning Lectures* – 9 lectures serving 165 adults on a range of topics particular to Desert region including water, sustainability trends, climate change, drought/wildfire & the avian community, herpetological diversity, bighorn restoration.
- *Tom Lea Month* – In honor of the quintessential painter of the Chihuahuan Desert, CDRI sponsored a presentation by Katherine Alexander focused on Lea's landscape paintings from a historical perspective. 30 attendees.
- *Presentations* to various groups by CDRI Director of Research.

MINING EXHIBIT

- Groups and individual visitors toured the Center's Mining Exhibit that displays the history of mining in the Chihuahuan Desert region. The exhibit is maintained by CDRI board members who are geologists and former miners in the area.

Research and Conservation Program

The goal for the Research and Conservation Program is to expand current research focused on the Chihuahuan Desert region, disseminate research findings for diverse purposes, and serve as a resource for the science and conservation communities. Achievements for 2013 follow.

C. HOYT BECOMES DIRECTOR OF RESEARCH

After 12 years as the Executive Director of the Chihuahuan Desert Research Institute, Dr. Cathryn Hoyt accepted the position of Director of Research. This new position will allow her to focus on strengthening the research programs of the Chihuahuan Desert Research Institute. Her position will be funded through a combination of operating funds and grants.

BIODIVERSITY OF THE CHIHUAHUAN DESERT NATURE CENTER

Over 50,000 photographs have been taken of the flora and fauna of the Chihuahuan Desert Nature Center over the past 10 years. Data from bioblitzes, bird counts, butterfly counts, and vegetation transects fills the filing cabinets and server files. However, there has never been an easy way to access the data or images. This spring, C. Hoyt began development of an Access database that will store, organize, and allow queries and searches of information gathered about the biodiversity of the Nature Center. The database currently contains basic information about the flora and butterfly fauna. In the early spring of 2014, Hoyt will apply for an IMLS grant to identify and catalog images, develop the database, and make it accessible on the web as a research tool.

CURRENT RESEARCH

Effective Pollinators of Rare Plants of the Trans-Pecos Region of Texas

In January, 2013, CDRI was awarded a grant from Texas Parks and Wildlife Department to study the effective pollinators of rare plants in the Trans-Pecos region. The effective pollinators of only a few rare plants are known. In order to recover listed plants and to help keep non-listed species from becoming listed, it is very important to know which species are effective pollinators so that the pollinator species can be conserved as well. The objectives of the project were threefold:

1. Produce a review of potential effective pollinators for the 212 species of greatest conservation need (SGCN) plants in the Chihuahuan Desert ecoregion
2. Test the predictions through field studies of at least 12 species.
3. Compile basic information on the phenology and habitat requirements for the pollinators listed in Objective 2 for conservation purposes.

This project was conducted during the spring and summer with the assistance of Patty Manning (Sul Ross State University), Jack Neff (Central Texas Melittological Institute), Dr. Allan Hook (St. Edwards University, Austin), Richard Newbold (summer intern for CDRI), and several volunteers. As part of the project, an Access database was created combining data on SGCN plants, bees, flies, and Lepidoptera. By filtering using location, phenology and hostplant, a list of potential pollinators for all SGCN plants is being developed. Although documentation of pollinators during field studies was primarily through photography, a few bees were collected for identification. According to Jack Neff, the bee authority, two of the bees collected from *Escobaria albicolumnaria* are “rarely collected” and one bee *Lasioglossum (Dialictus) droegei* was only described a few years ago from four specimens from the Chisos Mountains. Collecting it in the Davis Mountains represents “a nice range extension.” The final report was submitted to Texas Parks and Wildlife at the end of October.

Butterfly Monitoring at the Nature Center

Butterflies along the 2.5 mile Pollard transect continued to be monitored during 2013 although not as frequently as in the past due to the field work associated with the Effective Pollinator project. Data for the monitoring project has been updated in the database and a summary of the 2013 data will be submitted to the Texas Lepidoptera Survey. This year, two county (and Nature Center) records were set on the same day:

- OrangeBarred Sulphur (*Phoebis philea*)
- White Angled-Sulphur (*Anteos clorinde*)

Three additional Nature Center records were set this summer:

- Palmer’s Metalmark (*Apodemia palmeri*)
- Fatal (*Calephelis nemesis*) or Rawson’s Metalmark (*Calephelis rawsoni*). Metalmarks are extremely difficult to identify and the authorities are currently arguing over which one we’ve seen.
- Zebra Heliconian (*Heliconius charithonia*) This beautiful tropical butterfly was spotted and photographed by Leslie Spicer in the pollinator garden.

CDRI continues to organize and host the Fort Davis Butterfly Counts. This count circle includes the Nature Center, the town of Fort Davis, Davis Mountains State Park, and extends up to the Observatory. During this reporting period, two counts were conducted and reported to the North American Butterfly Association.

Vegetation Transects

M. Foreman and C. Hoyt completed data entry for the 14 vegetation transects in the burned and unburned grasslands. These data will provide baseline information about the recovery of the grasslands from fire and drought and will be used for numerous projects being conducted by CDRI staff and volunteers. Informal vegetation transects documenting blooming forbs conducted approximately once per month in the burned/unburned grasslands. These data provide information for the flora of the Nature Center as well as information about host plants available for Lepidoptera.

Birding Transects

The Breeding Bird Census was conducted every 4 days through the breeding bird season this year with the assistance of Josh Burns, Laura Belkin, Bill Sain, Mark Foreman, and Cathryn Hoyt. Josh Burns continues to submit all data collected during the counts to eBird.

POTENTIAL COLLABORATIVE RESEARCH PROJECT

C. Hoyt and J. Glasscock met with Dianne Doan-Crider and others at Big Bend National Park to learn about black bear studies in the region. Possible research collaborations include CDRI serving as the bank for black bear genetic samples and hosting a website on “Keep Texas Bears Wild.”

VISITS BY RESEARCHERS, CLASSES AND ORGANIZATIONS

University of Connecticut Moth Research

Dr. David Wagner recently published *Owlet Caterpillars of Eastern North America* (Princeton University Press, 2011) and is now working on a volume for Western North America. He, his students, and collaborators made three trips to the Nature Center to collect caterpillars and adult moths for their research. During Dr. Wagner's 4-hour visit to the Nature Center, he was able to collect 15 species of caterpillars. Highlights from the visit included:

- The first images of the caterpillar of *Neoprocris aversa* and of direct relevance to Ben Gagliardi's MS thesis research.
- The first images of the caterpillar of *Hyparpax aurostriata*.
- The first images of *Elasmia cave*. These images will be used in an upcoming monograph and Dr. Wagner's caterpillar guide.
- The caterpillar of the day-flying sphinx (bumble moth, *Hemaris diffinis*) differ from that of eastern populations. A colleague in Hawaii will do a molecular analysis of this specimen.

Dr. Wagner notes that the collecting at the Nature Center "was better than in the Davis Mountains Preserve." Following Dr. Wagner's successful visit, Dave Wikle, a colleague from California, came out to trap adult moths. He set up two light traps one evening. His preliminary list for the first trap included 20 species, but did not include those that needed spreading or dissection for identification purposes, nor the *Pyraloidea* (a tedious group that takes time to identify). Wikle will provide CDRI with a collection of pinned and identified moths to display or use as a reference collection. Barry Nall, a collaborator of Dr. Wagner, asked CDRI's Leslie Spicer to conduct an experiment to whether certain caterpillar eggs would successfully hatch if placed on their host tree, the Emery Oak. He gave Spicer a canister of eggs, which she placed on the tree branch with its leaves for food. One caterpillar successfully hatched – a *Nadata anastomosa* moth. Nall did not require Spicer to send it to him.

Crayfish Research

Dan Johnson, a crayfish researcher from Houston, visited the Nature Center to collect crayfish from Modesta Canyon. For many years we have tried to get these crayfish identified without any luck. Johnson was able to collect 9 individuals, mostly immatures, which he will raise out and identify for us. This is part of a larger "Crayfish of Texas" study that Johnson is doing.

CITIZEN SCIENCE PROJECTS

Three citizen science projects were conducted this year including:

- Great Backyard Bird Count (February 19): 28 species documented.
- Fourth of July National Butterfly Count (July 13th): 37 species and 441 individuals. This is a significant increase in both species and individuals compared to the last two years: 2012-25 species, 153 individuals; 2011-12 species; 65 individuals.
- Fall Butterfly Count (September 27): 48 species and 674 individuals.

PUBLICATIONS & MEDIA

Chihuahuan Desert Discovery Published

The 2011 issue of the Chihuahuan Desert Discovery was completed and mailed in early 2013. This issue contained brief reports current research projects including:

- West Texas Hummingbird Project
- Vegetation and Butterfly Recovery after the Rock House Fire
- Bird studies at the Nature Center
- Pollinator Research
- A feature-length article on the Rock House Fire.

2012 Edition of Chihuahuan Desert Discovery in Production

The 2012 edition of the Chihuahuan Desert Discovery is in production and should be completed by the end of the year. Feature articles include a report on the Breeding Bird Census by Josh Burns.

Discovery of Spotless Comma Makes the News AP Story

The story of the discovery of the Spotless Comma (*Polytonia haroldii*) was picked up by the AP and distributed worldwide. The story appeared in newspapers such as the San Francisco Chronicle, the Houston Chronicle, San Antonio Express-News and on numerous news websites.

Article in American Butterflies

In addition, an article titled “Spotless Comma: A New Species in the United States” by Cathryn Hoyt was published in the Summer 2013 issue of American Butterflies (vol. 21[2]: 42-43).

PUBLIC OUTREACH

Army Corps of Engineers Interpretive Project

Alicia Johnson, project manager for the US Army Corps of Engineers, contacted C. Hoyt in the summer requesting assistance with an interpretive project she was working on. The Corps was finishing an ecosystem restoration project in the city of Las Cruces, NM. The project focused on the enhancement of Chihuahuan Desert plant species for playa, wetland, meadow, and arroyo riparian habitats; they needed maps and photographs for interpretive signs along a trail through the restoration area; Hoyt provided 25 photographs of plants and animals for their signs.

Advertisement Designed for Big Bend and Texas Mountains Travel Guide

C. Hoyt provided photographs and worked with the designer of the Big Bend and Texas Mountains Travel Guide to put together a full-color, 1/3 page vertical advertisement for the Chihuahuan Desert Nature Center. The guide is one of the largest regional publications in Texas and is distributed to over 100 locations.

Feature Story on Chihuahuan Desert Nature Center to Appear in TPWD Magazine

CDRI is not a state park, but TPWD likes what it is happening here. C. Hoyt was interviewed by TPWD Media Relations Coordinator Rob McCorkle for the article and worked with TPWD photographer Earl Nottingham as he photographed the Nature Center grounds. The story should appear this winter.

BBC Show Films at the Nature Center

The Nature Center was used as a film site for the popular Deadly 60 series broadcast by the BBC (and NatGeo Wild in the U.S.). While at the Nature Center, C. Hoyt worked with host Steve Backshall and his crew as they filmed black widows, scorpions, tarantula hawks, and a copperhead hunting near the spring. According to Wikipedia, the series Deadly 60: Deadly Pole to Pole features Steve Backshall and his crew travelling the world in an attempt to find the 60 “most deadly” animals in the world. Each episode features Backshall tracking the animal in its habitat, and giving details of what makes the animal notable, with particular emphasis on its impact on the wider ecosystem and the manner of its predatory behavior; thus, why it is “deadly.”

Resource Services

C. Hoyt worked with a textbook editor to find an image of a fence line showing the effects of heavy grazing and light/no grazing. Although several photographs were submitted for consideration, none showed the drastic difference that the editor was looking for. We’d had too much rain and our ranchers take care of their land! C. Hoyt also worked with a National Geographic writer to clarify information about tumbleweeds that he was using in a story about the Plains states.

Presentations & Tours

C. Hoyt gave several presentations this year including:

- Presentation on the CDRI and tour of botanical gardens given to Leadership Big Bend
- Effective Pollinators of Rare Plants. Presentation given to CAB Teacher's Workshop
- Presentation on the CDRI given to CAB Teacher's Workshop
- The Rock House Fire. Presentation given to the Austin Cactus and Succulent Society
- Welcome to the CDRI. Brief orientation given to Tierra Grande Chapter of Master Naturalists
- Chihuahuan Desert Weather and Climate. Presentation given to Tierra Grande Chapter of Master Naturalists
- Took members of the Twin Lakes Audubon Society birding in the quarry area.