

Projects Conservation Heloderma and Conservation Abronia

Since 2005, Dr. Brad Lock, Director of Guatemalan Programs at the International Reptile Conservation Foundation (IRCF) has been an acting partner in **Conservation Heloderma** (*Guatemalan beaded lizard*) and **Conservation Abronia** (*Campbell's arboreal alligator lizard*). These projects started as conservation programs for some of Guatemala's most endangered reptile species and their habitat, but now encompass an umbrella of projects that benefit not just the animals, but the people and communities associated with them.

Guatemala's reptiles are some of the most endangered species in the world with many in real danger of extinction. This is due to

- naturally restricted distributions
- persecution
- habitat loss
- an historical absence of conservation

The projects strive for a comprehensive approach to conservation, involving

- applied research
- direct habitat conservation and restoration
- community involvement through a variety of social programs and education

Many groups and individuals have contributed to the success and funding of these projects over the years. The International Reptile Conservation Foundation (IRCF) is the hosting institution for the programs. And the non-governmental Foundation for the Conservation of Endangered Species of Guatemala (FUNDSGUA - Fundación para las especies amenazadas de Guatemala) is the in-situ partner of the programs. FUNDSGUA is a foundation that works to conserve endangered species and ecosystems by targeting species and habitats that have been neglected by other conservation groups or government agencies, whose primary focus tends to go to widespread ecosystems and large, charismatic species such as the jaguar.

The Animals and Their Homes

Guatemalan Beaded Lizard

The Guatemalan beaded lizard (*Heloderma charlesbogerti*), is a large lizard that lives in the dry forest region of the Motagua Valley in eastern Guatemala. It's the most endangered member of the family of venomous lizards that includes the famous Gila monster from the American southwest.

The Guatemalan beaded lizard was not known to science until 1988 and soon after was thought to be extinct. However, FUNDSGUA rediscovered it in 2003, estimating that only 200 - 300 individuals remain in the wild. By

2009, the lizard was elevated to Appendix 1, the highest threat level, by the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (cites.org).

To make matters worse, the lizard is a *flagship species* in an isolated area high in biodiversity and unique species. That means that if they die out, other plants and animals that depend on them will also disappear.

Why Are They Endangered?

Myths

Because it's venomous, the local name for the Guatemalan beaded lizard is Escorpión. And the many negative myths that have surrounded this species for millennium mean the locals fear it and don't hesitate to kill it on sight.

According to the myths, they sting with their tails and their venom is so powerful that it can pass through the shadow of a person causing them to get thinner and thinner over time until they die. It's also believed that their breath can cause dizziness and disorientation in people and that lightning only strikes where such a lizard is present.

Habitat Loss

Currently, the lizard's remaining dry forest habitat is restricted to approximately 47,000 acres, or about the size of a large Texas cattle ranch, by poverty-driven subsistence farmers who have nowhere else to go.

Campbell's Alligator Lizard

The alligator lizards of the genus *Abronia* are mid-size arboreal (tree-dwelling) lizards that inhabit cloud forest and high elevation pine oak forest habitats. Eight species of the genus live only in Guatemala, and Campbell's alligator lizard (*Abronia campbelli*) is listed as the most endangered. Its entire remaining habitat is contained within 8 large farms located in eastern Guatemala.

Why Are Thy Endangered?

Myths

The local name for this alligator lizard is also Escorpión, based on the false belief that it is venomous, and the myths surrounding it are similar to the beaded lizard, and include the belief that wherever an alligator lizard passes, the land dies and becomes fallow. As a result, they too are killed intentionally.

Habitat Loss

As a result of logging and deforestation, the limited habitat that does remain is highly degraded and severely isolated. These lizards only live in large, mature oak trees and throughout the entire valley only about 406 such trees remain. On average, 3 - 6 individual lizards live on a single tree, meaning the entire population of this species is between 1,200 and 2,400 individuals.

Conservation Actions: How We Work and Why

Political and social collaborations are fundamental to the success of any long-term conservation program. Without the input, engagement, and acceptance of conservation programs by everyone from members of the national and local government to landowners and villagers, they will ultimately not be effective.

Introducing Ourselves: Workshops

Workshops provide a public forum where the conservation-research team can get to know the people in the region and their needs. The projects make contact with the local governmental entities, community leaders, and villagers and invite them all to a series of workshops complete with live presentations, interactive activities, and brainstorming sessions with the participants. Villagers are in the best place to know what is feasible and acceptable in their own region, and so a number of project strategies have come directly from the locals including *things that we would not have thought of otherwise*, like the creation of a community managed forest.

Conservation Education

For both Projects, the education programs are just as important, if not more so, than any other aspect. Without conservation education, awareness, and subsequent support from the local community, no conservation program will be effective. The education programs incorporate a variety of methods including interactions with live animals, presentations, field excursions, and actual conservation activities such as planting trees, field surveys, and assisting in the care of captive animals.

Each program is specifically aimed at the audience, the conservation site and project goals for that year. The initial presentations to a site concentrate on introducing the species, dispelling any myths, and informing the local people about the conservation process and how they can be involved, and then evolve and expand into a more holistic conservation message with reforestation and ecosystem presentations and activities.

Live Animals

It's important to take live animals to the presentations, as many villagers will have never seen a live beaded or alligator lizard before. They learn that these species are neither aggressive nor overly dangerous. In some cases, an alligator lizard is allowed to bite the finger of an instructor or an audience member. The same instructors always return for subsequent presentations to dispel the myth that a person who touches the lizards will die. Now that the villagers know about the lizards and don't fear them, they are more likely to reach out when forest destruction is planned or happening.

School Programs

The aim is to take the program to all the surrounding schools every year, meaning the presentations are given to more than 6000 school children per year and, in total, more than 100,000 people.

Disney Conservation Fund (thewaltdisneycompany.com/conservation) support has funded the educational and conservation awareness programs for more than 10 years and provided conservation-themed products and storybooks. Notebooks for mathematics and language studies, computers, pencils and erasers are in short supply and are specifically requested by the school teachers and students. T-shirts have also been provided, which in some cases may be the only new item of clothing these children receive all year. One class even adopted the t-shirts as their physical education uniform.

In addition, field trip programs give children an enjoyable but educational day out of school, and DCF funding pays for at least one trip per year for schools that cannot afford them. In 2007, a field station was constructed on Reserva Heloderma that can sleep six people and has solar power, showers, a stove, a freezer, and a large open-air pavilion. Visitors receive instruction on reforestation and radio-tracking. There are also university-level courses for biology, herpetology, botany, entomology, avian biology, and conservation biology. And besides being a teaching venue, the field station has also been used to host visiting researchers, workshops, and a few eco-tourists.

Applied Research

Applied research is research that helps to establish how best to conserve the target species and their habitats.

Since all of the target species are not well-known due to their rareness and secretive habits, the projects emphasize natural history studies that are critical in guiding our conservation decisions. This includes

- *questionnaires* to determine the range of species in the area, and where and how they utilize the habitat
- *surveys* to identify distribution and abundance
- *radio-telemetry studies* to discover home-range size, seasonal and daily movement patterns, as well as critical habitat features required for survival and reproduction.

Home-range size is important when deciding the minimum amount of habitat that needs to be preserved in order to be effective. Daily movement patterns, and how those patterns sterilize habitat features (both in different seasons and at different life stages) are also critical to identify quality of habitat to be protected.

Radio-telemetry work has revealed that the Guatemalan beaded lizards in the Motagua Valley have a home range of 250 acres. Hence, protecting only small patches of habitat will not be adequate or effective to conserve this species. Additionally, this species utilizes three different burrow types during different seasons. Without the presence of all these features in the protected habitat, the potential for survival of the species is questionable.

Data from original site surveys suggested that only one adult male Campbell's alligator lizard and a few females could occupy any individual tree because of the aggression and territoriality in this species. However, the first ever radio-telemetry studies on Campbell's alligator lizard showed that more than one adult male and three to four females can occupy a large oak tree. The same study also found that the animals in this degraded habitat do not move between trees during any season.

A second radio-telemetry study was conducted on a closely related alligator lizard in an intact forest, confirming that they do move between nearby trees from connected canopy branches and via short ground movements when forestation is dense enough to allow it.

This discovery has led to a breeding-and-release program at the Abornia Home in order to increase the genetic diversity in the remaining population and a reforestation program to increase connectivity between isolated tree patches. Now that these natural movement patterns are understood, monitoring of behavior and movement-pattern changes in Campbell's alligator lizards will be more accurate as the reforestation program proceeds.

The foundation also began a range-wide genetics study of all 4 populations of the Guatemalan beaded lizard, and there are plans to produce the genetic tools to conduct a similar study of the alligator lizards. These studies will help to determine the current genetic diversity of these populations and allow for the development of an informed management plan crucial for this species' survival and which will help increase the genetic diversity of this small population until the forest restoration program has time to mature and allow nature to complete the job.

Land Preservation and Restoration

Land conservation, preservation, and restoration are key components and strategies of any *in situ* conservation program. However, the approach to this is quite different for the two lizard projects in Guatemala.

In the Motagua Valley, where Conservation Heloderma is based, there is land available to purchase from private owners at a reasonable price. In 2006 and 2007, the project purchased 220 acres of very good-quality habitat. And In 2015, an additional 250 acres of adjacent habitat was purchased. Known as Reserva Heloderma, the refuge already contained a population of beaded lizards. And fencing in the land employed local villagers – providing a brief, but well-received, boost to the economy.

For Conservation Abronia, most of the range habitat is contained within 8 privately-owned farms and isn't available for purchase. Collaboration with the landowners has allowed for the reforestation of riparian habit along a small river that runs through all 8 farms. When completed, this project will have reforested an area 30 feet wide on each side of the river extending for a total of 5 miles, and will ultimately connect intact patches of old-growth oak trees and enhance the existing watershed.

A local villager was hired to plan, develop and manage a nursery. As of 2015, over 60,000 seeding oak and pine trees were germinated; and with the help of a huge amount of community volunteer hours, 20,000 oak trees were planted.

Currently, based on an idea from villagers, the first community managed, fast-growing forest that can sustain the demand for firewood in the largest village was created in 2015 and the second will be completed in 2017. Each

forest has been planted with 10,000 trees and is 25-30 acres in size. Once this concept has been established there, it will be taken to other villages.

El Hogar de la Abronia (The Abronia Home)

Completed in 2014 on the grounds of a disadvantaged children's home near Guatemala City, the Abronia Home started with a few alligator lizards housed in adequate but small enclosures. They were used for educational presentations and to learn more about basic husbandry methods. Through grant support, the Abronia Home has evolved into a breeding, head-start, training and educational center for Conservation Abronia. Conservation messaging and signage is provided on each enclosure. The location near the city is convenient for staff to provide day-to-day care and monitoring of the animals being maintained at the facility, and has the advantage of easy access for school children and families to visit and learn about the animals and their conservation needs. More than 150 people visit the facility every month.

As mentioned, natural history data collected indicates that, due to degraded habitat, individual adult Campbell's alligator lizards rarely move from their isolated "home" trees. This makes genetic diversity in the current habitat suspect with each tree probably hosting closely-related animals. Knowing this, the program can now act as an assistant to more quickly increase and maintain genetic diversity in this population of lizards until our reforestation projects have time to mature, allowing nature to take over.

Six adult male and female Campbell's alligator lizards are brought into captivity at the Abronia Home each year from distant home trees. After the breeding season, all the adults will be released back to their original "home" trees and the offspring will be released to "non-home" trees. To date more than 60 offspring have been released.

Similarly, we have begun very positive conversations with the government of Guatemala about a repatriation project for the Guatemalan beaded lizard. Zoo Atlanta holds and owns the only legal group of this species in the world and has been successful at captive breeding. The plan is to release offspring from this group back to their home habitat.

Community Outreach

Projects supporting conservation programs should be positive contributors to the communities they partner with. The projects' social programs have evolved over time and will continue to do so, as need and funding allow. While these programs are strategies that help implement conservation goals, they are also truly meant to care for, improve, and engage in the lives of the people in the communities. The conservation teams become part of the community and work toward the benefit of the whole ecosystem, including the animals, habitats, and local populations. They gain an understanding of how residents live, and of the social issues facing the people of the region.

Outreach is one of the most useful tools to achieve these overall goals. Local conservation projects can only be successful if everyone works together for the greater good of the species and habitats in the region. It's amazing what a community will do and achieve when they trust and know that you are truly there for them, as well as the trees and the animals.

Food Program

Since a majority of the villagers work in agriculture, they spend a lot of their day working in fields and forests where they often encounter our target species. The food-incentive program provides residents with a basket of staples for each lizard they bring to the research team for measuring and recording. These baskets contain items chosen by the villagers such as black beans, sugar, salt, coffee, rice, and flour. The provisions are relatively inexpensive to supply, so the program is sustainable for the long term.

With the help of these villagers and transponder tags, movement, growth rate, seasonal weight fluctuations, longevity, reproductive condition, and other natural history data can be monitored at levels that would be very difficult or impossible using traditional methods.

Una Casa Para Cada Hogar (A House for Every Home)

Since 2013, the home program's goal has been to construct one modest but well-built home for a family every year, and it has kept to that schedule. The mission statement is, "Constructing a brighter future by building dignified housing." Families are receiving a physical house deserving of the love and comfort they provide despite current living conditions.

Though the idea is not unique, the dangerous areas in which the work is done makes the project unique. The families chosen are those identified to have the greatest need, the poorest of the poor. Families with young girls are given special consideration since, in Guatemala, those households are statistically the most vulnerable. All construction is done by local builders with locally purchased materials, a tangible benefit to the local economy, and often with help from the family and community. When the first such house was built, everyone in the village came to the unveiling, as it was the first time something substantial had been done for their community.

Just as importantly, the home program gives our conservation team, who always work tirelessly with limited funds for long hours and sometimes in the face of general indifference or outright opposition from the locals, a morale boost. The energy and passion generated on both sides goes a long way in sustaining the workload of a conservation program, and it helps forge long-lasting relationships that support the program overall.

English Lessons

Beginning in 2014, the foundation expanded the job training program to include English lessons, and currently about 24 students regularly attend our classes. In the city, English is taught in Guatemalan schools as part of the curriculum, as even the most proficiency can give a rural student an advantage when competing for employment, especially at the call centers in the area that pay above minimum wage.

Scholarship Program

In February of 2015, after being approached by a local teacher, the team provided the funding to keep in school six kids who lacked the small amount of money needed to purchase supplies and uniforms. This small start sparked a new program for the foundation.

In the area, an elementary education is provided free of charge to all children. The costs for elementary school supplies are relatively inexpensive and no uniforms are required, and these young children, for the most part, are not required by their families to help in the fields for food and income, none of which is the case once children advance to middle school. In addition, only one of the 12 villages has a middle and a high school. For those living in the other villages, the walk is 2 - 2.5 hours each way. These factors commonly result in children dropping out after elementary school. Those who can stay in school can often get jobs in nearby cities. This not only provides better income for the family, but reduces the need for subsistence agriculture that further deforests and degrades the habitat.

The scholarship program now has 150 high school students in the program. And in anticipation of this program growing, the group has contacted bus companies and have been given assurance that, when they're needed, the buses will be provided at a highly discounted rate. This very exciting project can make a huge difference in a few years.

Results

As the result of a wide array of efforts, the conservation teams have truly become a part of the community. They get invited to birthday parties, graduations, dances, and in turn, they are privy to knowledge and given access to land that was inaccessible before. But most importantly, a real trust has resulted between these teams and the local populations that will ensure the building of communities and conservation efforts that will continue for years to come.

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