



Condor Valley Ecological Assessment

Explorers Club Flag Report Flag #210

February 2 – February 11

Area of Study: S 25.34488 W 65.29386

Expedition Summary: When it comes to conservation, the Northwest region of Argentina is largely unprotected. The region is home to not just condors, but to a diverse group of flora and fauna including a wide variety of cats, and a threatened species of highland deer called Taruca. Hank Bannister owns just over 70,000 acres in this region, and he would like to set half of this land aside as a preserve. Mr. Bannister believes in E.O. Wilson's Half Earth Theory, "In order to save biodiversity, we need to set aside about half the earth's surface as a natural reserve." With this in mind, our team set goals for this expedition.

- To establish the W. Henry Hudson Institute of Conservation
- Conduct an extensive assessment of the area's flora and fauna and double the number of existing Bushnell camera traps in both adjacent and new areas of the property
- Conduct a Climate Change Analysis
- Identify 20,000 to 30,000 acres of Mt. Creston and its' surrounding grasslands as a protected conservation property and research area

Our team was successful in accomplishing the above goals. With an ongoing analysis of the ecosystems and fauna from the base of operations at Condor Valley, the Institute and Global Wildlife Conservation, will work closely with U.S. Universities and worldwide research organizations to actively support conservation efforts critical to the Salta region of Northwest Argentina. Global Wildlife Conservation scientist, Dr. Chris Jordan noted, "Our mission at GWC is to save biodiversity, but we also recognize there is a strong correlation between biodiversity protected areas and human cultural and linguistic diversity. When you have these large protected landscapes where people live and work, it creates opportunities for the transmission of local and environmental knowledge from older generations to younger generations. When we're protecting biodiversity in expansive areas of habitat, we're also making a contribution to cultural survival and to human linguistic diversity."



Team:

Ivy Yin, project's principal investigator.

Ivy is a graduate student at the Patel College of Global Sustainability. In 2016, Ivy made three trips to the Condor Valley to assist in conducting wildlife assessments for Global Wildlife Conservation and the Condor Valley.

Dr. Chris Jordan, Global Wildlife Conservation Scientist with a focus in community-based conservation, indigenous people and conservation, developing conservation solutions in politically complex environments, and protecting the last intact forested landscapes of Central America. He has extensive experience in the United States, Guatemala, Mexico, Nicaragua, Argentina, Colombia and Guyana. His current work focuses on Baird's Tapir (*Tapirus bairdii*) and Jaguar (*Panthera onca*) spatial ecology, forest conservation and indigenous rights, and site security and protected areas management in the Caribbean coast of Nicaragua.

Dr. Jim Sanderson, Global Wildlife Conservation Scientist, and the FCF's expert conservation advisor. He is a world recognized expert on small cat species, as well as a landscape ecologist. He has used radio-telemetry and trail cameras to study small cats in Central and South America, Asia and Africa. He is an active member of the IUCN Cat Specialist Group and the founder of the Small Cat Conservation Alliance, a non-profit organization dedicated to the study and conservation of the worlds endangered small call species.

Dr. Erin Riordan, Plant Ecologist. Her research focuses on conservation and climate change, with an emphasis on plant communities and vegetation. Erin's PhD research modeled the potential impacts of future land use/development and climate change on the threatened plant community, coastal sage scrub, which extends from Santa Barbara south into northwestern Baja California.

Dr. Ben Wilder, Desert Ecologist and Botanist. His research is broadly focused in desert ecology and botany. He utilizes multiple approaches and time scales to establish baselines to better understand modern biodiversity and connect science to conservation.

Hank Bannister, Condor Valley land owner and conservationist.

Martin Pekarek, land manager, local guide, and expert anthropologist.

Bruno Pekarek, land manager, local guide, and equipment manager. Bruno has years of experience on Mount Creston and has previous field experience with GWC that is helpful in assisting the team.

Tomas Ontiveros, land manager, local guide, and equipment manager. Tomas had knowledge of the Arroya Creston Region that was important in assisting our team safely through this terrain to conduct our assessment.

Project Objective: Our project objective was to conduct an extensive assessment of the regions flora and fauna. Dr. Riordan and Dr. Wilder assessed the regions flora by collecting samples and collaborating with local experts to help record their findings. Dr. Jordan and Dr. Sanderson assessed the fauna by doubling the number of existing Bushnell trap cameras in both adjacent and new areas of the property. Together, Dr. Riordan, Dr. Wilder, Dr. Jordan, and Dr. Sanderson used their findings to identify specific areas of the property that are a priority to preserve.

Pictures captured on site by Bushnell Camera Traps



Taruca (*Hippocamelus antisensis*)



Puma (*Puma concolor*)

Field Methodology: In order to obtain our objective, we had to cover a vast amount of challenging terrain, and work through unpredictable weather patterns. While planning our expedition, our local guides advised us that we must travel by horseback in order to transport our equipment and reach our targeted elevations in a timely manner.

Flora: In the field, Dr. Riordan and Dr. Wilder collected over 100 plant species from different habitats. They focused on documenting the dominant plant species and major vegetation transitions. Each sample was cataloged with date, time, global positioning coordinates, elevations, and anything unique with the surroundings. Cataloging the samples will provide a baseline of the regional plant community. Creating a baseline will be important to help us better understand the biodiversity, and connect this to conservation. This baseline will also provide us with information we can use on a time scale to identify potential impacts of future land use or development, and climate change.



Left to right: Martin Pekarek and Dr. Erin Riordan observe the bird activity as Dr. Ben Wilder documents the vegetation near a waterfall. Photo: Ivy Yin

Fauna: Our team was able to increase our number of camera traps from seven to fifteen. Our camera traps are strategically located in different regions of the property ranging from 900 meters to 2800 meters. We evaluated the location of each camera trap based on elevation, type of coverage or vegetation, and distance from the nearest water source. All of our locations were recorded using global positioning systems. Our camera trap locations allow us to collect

data on a wide variety of species in different habitats. Our network of camera traps are producing many thousands of images over modest time periods. Dr. Sanderson, has helped create a program that does automatic camera trap data organization, storage, and analysis. This program is helping us sort through thousands of images and categorizing them by date and time, location, and species. This methodology is intuitive and does not require data entry by hand from a keyboard, and therefore eliminates human error and saves time.



Left to Right: Dr. Chris Jordan and Dr. Jim Sanderson programming one of our camera traps.
Photo: Ivy Yin

Preliminary Results: A majority of the different types of flora found in Argentina, are found here in the northwest region. The northwest region of Argentina is unique due to the many elevation changes that provide an array of micro-climates. Such environmental gradients provide an opportunity to study patterns in vegetation change as plant species respond to a rapidly changing climate (Riordan 2017). Across the globe, scientists are already observing the fingerprint of climate change in species responses such as distributional shifts to higher latitudes and elevations, and shifts in the timing of phenological events such as budburst, flowering, and insect emergence (Parmesan 2006). This initial survey will provide the baseline from which to detect vegetation response to climate change.

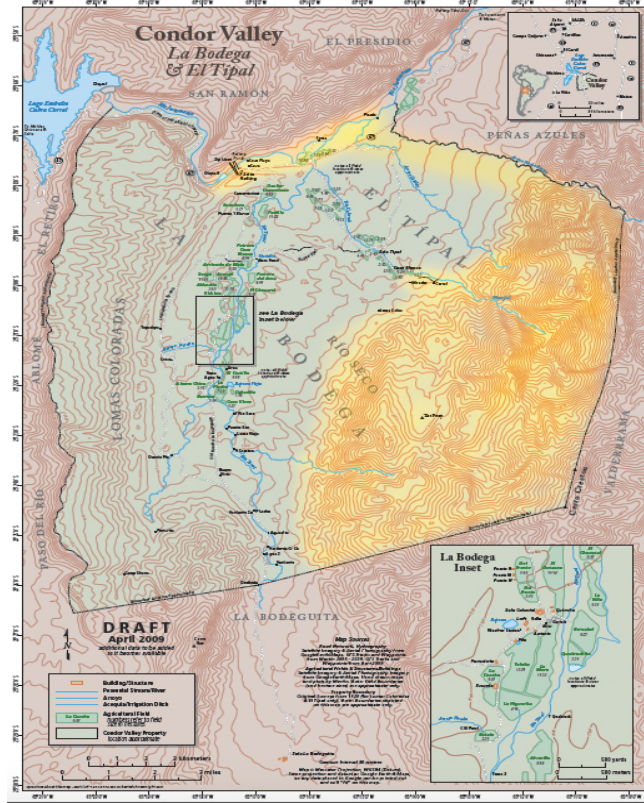
Our camera traps have been successful in identifying many species, including the threatened Taruca (highland deer listed as vulnerable). Our camera traps have also identified four different species of cats that call this region home.

- Puma (*Puma concolor*)
- Ocelot (*Leopardus pardalis*)
- Geoffroy's cat (*Leopardus geoffroyi*)
- Pampas cat (*Leopardus colocolo*)

Conclusion: Our results have helped us identify which region of the property is a priority to preserve and protect from future development. Our research has helped us better understand the importance each species plays in maintaining healthy biodiversity in the region. Much of the mountains are largely inaccessible, which will help in providing protection. During this expedition, we have seen how livestock can wreak havoc on a landscape. The long history of human land use in northwest Argentina will be viewed as an opportunity to better understand the ecological effects of human activities and provide a guide to more sustainable practices.



Photo: Ivy Yin



Above: Shaded area in yellow represents land identified to be preserved
 Below: W. Henry Hudson Institute of Conservation



Photo: Ivy Yin



Photo: Ivy Yin

Above: Andean Condor, Conservation Status: Near Threatened
Below: Tomas Oniveros guiding us through the Arroyo Creston



Photo: Ivy Yin



Photo: Ivy Yin

Above: Dr. Ben Wilder and Dr. Erin Riordan observe the vegetation in the Arroyo Creston
Below: An example of the extreme plant diversity located within different micro-climates



Photo: Ivy Yin



Photo: Ivy Yin

Above: Roseate Spoonbill
Below: The Southern Crested Caracara



Photo: Ivy Yin



Photo: Ivy Yin

84 year old Antonio Salinas is loading his saddlebag with Arcayuyo before a 4 hour ride back down the mountain to his home. The Arcayuyo plant is good to alleviate stomach ache and gall bladder pain. 42 species of plants used as medicine by indigenous people have been identified in the Northern Puna Region of Argentina.



Photo: Ivy Yin



Photo: Ivy Yin

Above: Dr. Jim Sanderson assessing fresh Puma tracks
Below: Picture of a Puma captured on site by Bushnell Camera Trap





Photo: Ivy Yin

Above: Dr. Erin Riordan, Dr. Chris Jordan, Martin Pekarek, Dr. Jim Sanderson
Below: Dr. Ben Wilder and Dr. Erin Riordan



Photo: Ivy Yin

REFERENCES:

Parmesan, C. 2006. Ecological and evolutionary responses to recent climate change. *Annual Review of Ecology Evolution and Systematics* 37:637-669.