

Partial Report

Understanding the relationship between the Andean cat and its habitat in the high Andes plateau: Implications for its long term conservation

Project Leader: Nicolás Lagos

Executive Summary

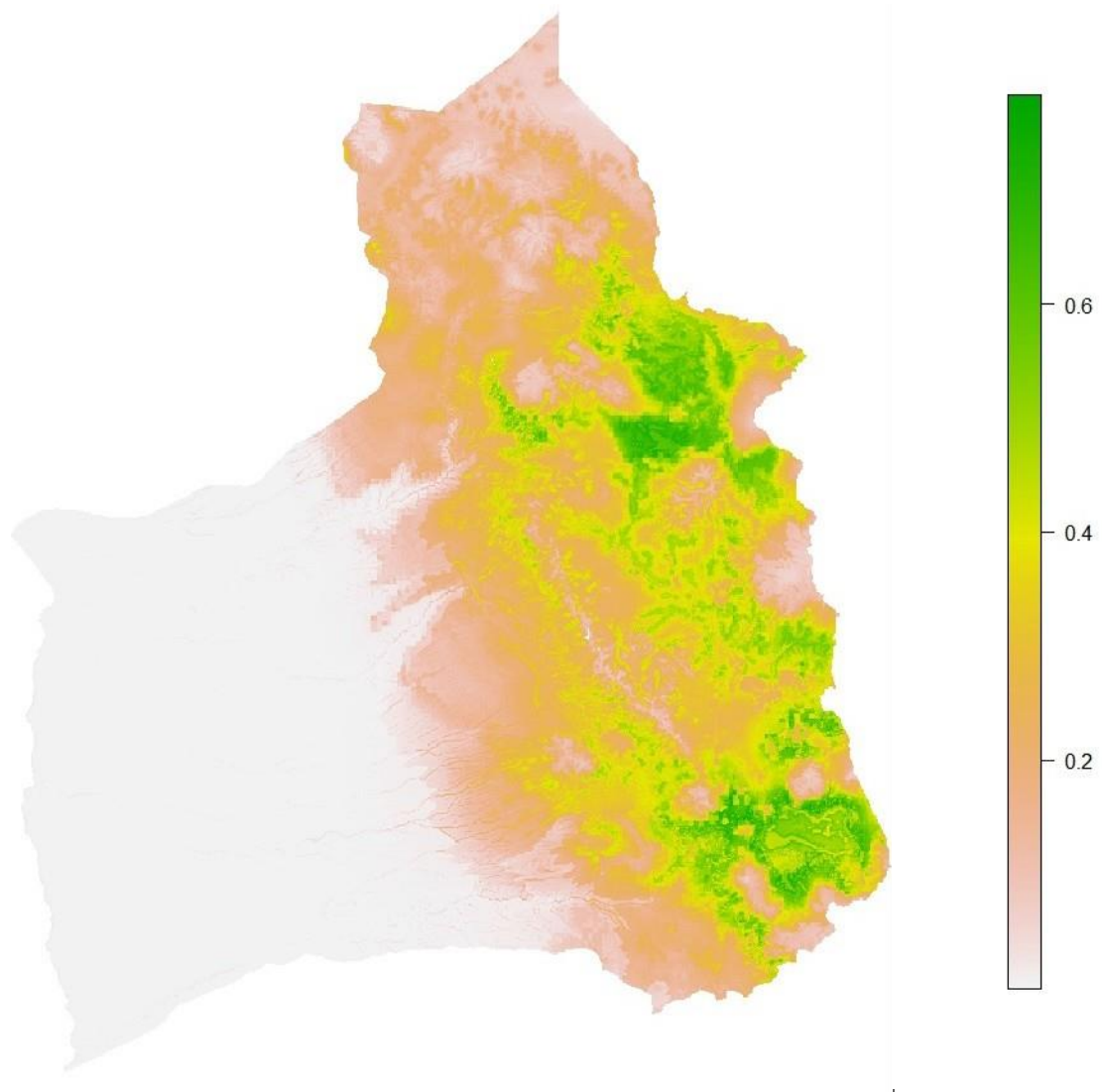
Here I present the main results of this project, started in January, 2015. The main objective of the present project is to generate a potential suitable habitat map and characterize the populations of the rare and endangered Andean cat in northern Chile, an area extremely threatened due to increasing mining activities, through camera trapping and DNA analysis. On this regard, we are now finishing with the field campaigns in which we increased in 13 the number of localities with presence of the Andean cat. We also developed a workshop with the participation of 16 parkrangers and protected areas personal throughout the Andean cat distribution range in Chile. In the upcoming months we expect to continue with the last field campaign, continue with the data analysis and modelling, continue working with the communities and communicate the main results to this project to the main stakeholders in the area.

Summary of main activities

- Between February and October we deployed and checked 74 camera traps, all of them located in new localities, where no Andean cats were recorded before. By this time we have 13 new localities with presence of this specie in the study area, who will be added to the 42 existing. This is an important increment of new localities, considering the difficulty to get new records of this elusive species. We have 24 more camera trap stations already deployed on the field that will be checked in the next month, completing a total of 98 stations in this study.
- Between the same months we collected a total number of 98 faecal samples. We started with the lab procedures, already standardized the DNA extraction protocol for the samples, and we already sent 50 DNA samples extracted from the faeces for its sequencing in order to perform the species identification.
- We developed a preliminary predictive model for the Andean cat in the Region of Arica y Parinacota (Figure 1). The objective of this first approach was to check the performance of the modelling approach with the available occurrence points and environmental layers. To construct the model we used 56 occurrence records of the Andean cat and considered as

predictive variables the Digital Elevation Model (DEM) for the area, a Topographic Position Index (TPI) derived from the DEM, which measures the terrain ruggedness, a layer of the wetlands of the area, a land cover use layer and four of the WorldClim bioclimatic layers (Isothermality, Max Temperature of Warmest Month, Annual Precipitation and Precipitation of Warmest Quarter), which were selected using a Principal Component Analysis (PCA), in order to work only with the most informative layers. We worked with the DISMO package within R-Studio environment, preliminary using two modelling approaches: Random Forest and MAXENT, which showed good predictive performance. The results from both modelling approaches were averaged using its AUC (Area Under the Curve) values, who allowed us to combined them in one single predictive map, showed on Figure 1.

Figure 1: Andean cat preliminary potential distribution map for the Region of Arica y Parinacota , northern Chile. Highly suitable areas are shown in green, non-suitable areas are shown in white



- On July 21st and 22nd, in collaboration of AGA Members Jorge Valenzuela, Constanza Napolitano and Jim Sanderson, we developed a theoretic-practical workshop in the Pampa del Tamarugal National Reserve, located in the Region of Tarapacá. Sixteen parkrangers and CONAF (government service in charge of the protected areas in Chile) staff assisted to this workshop, in which we trained them in camera trapping monitoring techniques, data management and analysis using the software DataAnalyze, developed by Jim Sanderson. They learned the main pitfalls when setting a camera trap, as well as some recommendations to set up and program it on the field. This activity allowed also to share experiences between the different participants, some of them already familiarized in the methodology of the camera traps, and to standardize a common protocol to monitor the Andean cat and other fauna in the protected areas.
- Because of the need to raise public awareness of the Andean cat conservation, we actively participated in the elaboration of several notes in national and international journals and magazines, presenting this specific project and/or information about the Andean cat and its conservation. All of these notes can be checked at the end of this document.

Plan for the upcoming months

- On December we will perform our last field campaign in order to check the last 24 cameras deployed on October and take more faecal samples for its DNA analysis. This information will provide the occurrence records needed to start with the niche modelling of the Andean cat in the study area. Once we have this distribution model with the habitat suitability information for the Andean cat, we'll overlay it with the information of the main threats and allowing us to detect areas of conflict and/or areas who requires urgent conservation actions due to its threat.
- We'll continue with the DNA extraction in the lab, sequence the samples and perform microsatellite analysis of the Andean cat DNA samples. Information derived from microsatellites will complement the analysis and allow us to identify subpopulations and prioritize areas for its conservation based on their genetic structure.
- We already started conversations with the administration office of CONAF, in Santiago in order to develop together with AGA, a National Action Plan for the Andean cat inside the protected areas administrated by CONAF. We expect to continue with meetings and hope to start the next year with the elaboration of this National Plan, who will give the guidelines for the activities who will be performed inside the protected areas administrated by CONAF on the next years, allowing this to include the Andean cat in their annual plan. This will allow us to strengthen the conservation of this species inside the protected areas, favoring the collaboration between AGA and CONAF to develop activities and programs focused on the Andean cat as a flagship species.

- At the end of this project we expect to organize and perform a workshop with the communities, local NGOs, government agencies and other relevant stakeholders in order to share the results of the project, explain their importance and implications for the planning of strategies for the conservation of Andean ecosystems and collect suggestions to be incorporated in future conservation programs in the area.



Left: Teaching CONAF parkrangers about the use and program of the camera traps. Right: Participants of the camera trapping workshop in Pampa del Tamarugal National Reserve



Left: Deploying a camera trap on the field with Pedro Castro, CONAF parkranger of Isluga National Park. Right: Andean cat photographed by a camera trap in the high Andes of Tarapacá Region.

List of Publications:

Here we present a list of publications about the Andean cat and about this specific project in different diffusion magazines and web pages.

Small cats stories in Modern Cat Magazine (November 2014)


Wildlife Pet

ENCHANTING & ENDANGERED

Get to know these small wild cats (they have a lot in common with the feline you share your couch with) before it's too late

By Jeanne Bergman

Only a few of the world's 38 wild cat species are majestic predators who dominate their landscapes, like tigers and lions. Most are as small as house cats and seldom seen even by the conservation scientists who study them. Small wild cats are now mainly found in remote locations like the Tibetan Plateau, the Mongolian steppe, Asian rainforests, and the arid regions of Arabia, Africa, and the Andes. Many are keystone species that, despite their small size and low numbers, are critical to balanced ecosystems. Each cat species has evolved to adapt to its habitat, developing a unique set of characteristics that enable it to thrive. But now their survival is threatened by habitat destruction, poaching, and the wild pet trade.



Andean Cat

The Andean Cat is indigenous to the high Andes of Peru, Bolivia, Northern Argentina, and Chile. An endangered species, it is the most threatened cat in the Americas, and among the rarest and least known in the world. Nicolás Lagos Silva, a researcher at the University of Chile, says that he had "always wondered what creatures could survive in the harsh, arid environments of the magnificent Andes, where we humans can barely breathe the thin air. But the Andean cat and other phenomenal creatures live there." The Andean cat keeps warm by wrapping its furry tail, twice as long as its body, around itself. One of the top predators in a very fragile ecosystem, its protection is critical not only for its own survival but also for the biodiversity of the high Andes. Now, livestock grazing, mining, and unregulated tourism threaten its existence. Lagos Silva reports that he has been researching the Andean cat since 2007, and he has yet to see one in the wild. The world's small cats are at risk of disappearing before we even know enough about them to protect them. Lovers of small cats, both wild and domestic, can help save these rare species by donating to the Small Cat Action Fund, a conservation research program co-sponsored by the International Society for Endangered Cats (wildcatconservation.org) and Panthera (panthera.org/donate/SCAF), and by discouraging the trade in wild cats and hybrids as pets.

52 ModernCat FALL/WINTER 2014/15



Sand Cat

The little sand cat of North Africa and south-central Asia is also a desert species, but with a completely different personality. With its thick, insulating coat and matted fur on its feet to protect it from burning sand, this cat is so well adapted to the remote desert environment that it rarely faces competition or threats. When approached, it just hunkers down in the sand. Unfortunately, the sand cat's docile, sweet nature and cute appearance appeal to people who want wild cats as pets, and this illegal trade, along with habitat degradation, threatens its survival.



Black Footed Cat (wearing radio collar)

Harsh deserts are home to a few small cat species, such as the black footed cat. Alex Silva, a curator at Cologne Zoo in Germany, has studied the black footed cat in South Africa for 22 years. He says he'd never trade watching a lion or cheetah for this species, the smallest of the African cats, weighing only three to five pounds. "It's the most fascinating cat," he said, "with a very serious attitude to life. It's highly strung, very active—a real handful." Nocturnal, solitary, and alert, black footed cats are ready to hide or fight at any sign of danger. They can become accustomed to observation by researchers, but never tamed.



Flat-headed Cat

Most house cats avoid water, but a few wild cat species love it. Flat-headed cats are a small species found among the wetlands, lakes, and rivers of Borneo, Sumatra, and Malaysia. When threatened, they will dive into water rather than run into jungle. They have long snouts, uniquely close-set eyes, and, of course, flat heads. Their partially webbed toes help them swim efficiently, and their backward-pointed teeth allow them to grip the slippery fish and frogs that are their favourite foods. Once thought extinct, flat-headed cats are endangered because most of the wetlands that are their habitat are cleared for agriculture and other human purposes.

The International Society for Endangered Cats (SIEC) Canada has been working for conservation of the all small wild cat species since 1990. Find them at wildcatconservation.org. Panthera is the world's leading wild cat conservation organization. Learn more about their conservation work on behalf of the world's 38 wild cat species, big and small, at panthera.org.

ModernCat.com 53

Andean cat coverage in Chile Indomito Magazine (June 2014).

Available at: <http://issuu.com/jpharpe/docs/revistajunioissu/0>



FLASH BACK

El misterioso Gato Andino

Por Romina Revilla

El gato andino (*Leopardus jacobita*) fue descubierta por la ciencia en 1885 (Cornalia) y desde entonces es poco lo que se conoce de él. Su descubrimiento fue confirmado recién en 1980 por un par de científicos que divisaron al felino, lo observaron durante dos horas y lo fotografiaron pero luego, cuando otros expertos visitaron el área donde fue encontrado, no corrieron la misma suerte: el gato andino no aparecía por ninguna parte.

© Antonio Muñoz Lemus

Andean cat conservation coverage in Boletín Tarukari (June 2015).

Available at:

http://www.tarukari.cl/wp-content/uploads/2015/06/Boletin_Tarukari_02.pdf

| BOLETÍN TARUKARI 02

CONSERVACIÓN DEL GATO ANDINO, EL FELINO SAGRADO DE LOS ANDES

Nécdas Lagos Silva | Alianza Gato Andino (AGA)

De todas las formas de vida que forman parte y que de alguna forma influyen en la vida humana, existen algunas especies únicas, cuya relevancia ha llegado no solo a formar parte sino también influir en los seres humanos. Entre estas especies, los felinos siempre han generado un especial interés por sus características biológicas y su importancia cultural. Estos animales impresionan por su poder, velocidad y ferocidad, asociados a las fuerzas vitales de la sociedad. Muchas veces relacionados con el culto al agua y la fertilidad, los felinos han sido venerados y reverenciados desde tiempos y en culturas remotas, relacionados con deidades y considerados como icónicos incluso en la actualidad.

Los felinos además poseen una relevancia especial por su rol ecológico. Al estar siempre en la cúspide de la red trófica, efectos sobre estas especies repercuten sobre la estructura de todo el ecosistema en el que habitan. También son animales que necesitan grandes extensiones de espacio para vivir, muchas veces en condiciones de alta pristinidad, por lo que se han llegado a utilizar como especies indicadoras del buen estado del ecosistema, y han sido consideradas especies "paraguas", cuya protección repercute no solo sobre dicha especie sino también sobre toda la biodiversidad con que se relacionan. Los felinos han llegado a habitar los lugares más recónditos del planeta, adaptándose a condiciones

CONSERVATION OF THE ANDEAN CAT, THE SACRED CAT OF THE ANDES

Many living organisms have influenced the development of human communities. Among them, some species are unique and have a significant relevance for different cultures. Of these species, felids have always generated a special interest due to their attributes and cultural value. They impress with their power, velocity and fierceness, and therefore they have been associated with vital resources and values of society as water and fertility. Cats have been venerated and revered from ancient to current times in many cultures, associated to deities and giving them iconic roles.

In nature, cats have a special importance because of their ecosystem role. They are apex predators and any perturbation that affects them could also have repercussions on the entire ecosystem structure. As they require large territories – sometimes pristine areas – they have been used as indicator species for assessing ecosystem status. In the same way, wildlife managers frequently refer to them as an "umbrella species", because their protection has an impact over all biodiversity within their territory. Cats have started to inhabit the most remote places on earth, adapting to extreme conditions and developing exceptional skills for surviving there.

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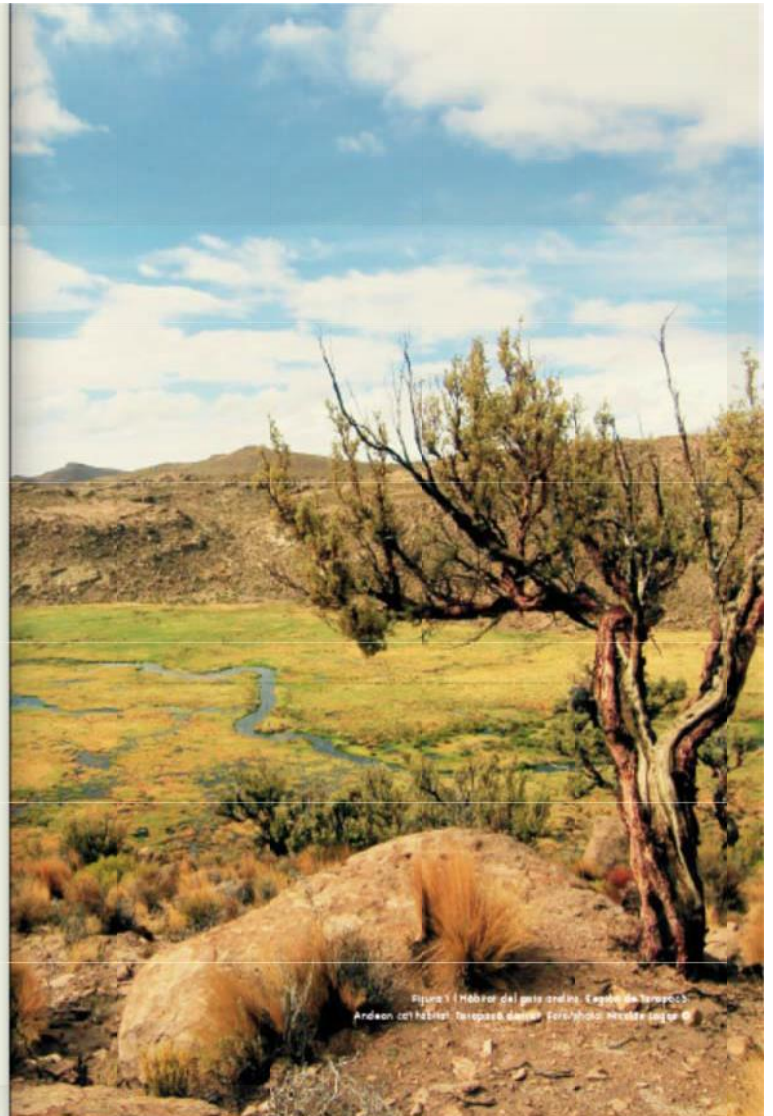


Figura 1 | Hábitat del gato andino. Expedición Insepco3. Andean cat habitat. Insepco3. Expedición Insepco3.

Project coverage in University of Chile web page (June, 2015)

Available at:

<http://www.uchile.cl/noticias/112365/investigadores-desarrollan-proyecto-para-conservacion-del-gato-andino>

and

<http://mascn.forestaluchile.cl/buscan-establecer-acciones-para-conservar-al-gato-andino-en-el-extremo-norte-de-chile/>

The screenshot shows the University of Chile website interface. At the top, there is a navigation bar with links for 'Móvil', 'English', 'Français', 'Português', 'Mi uchile', 'Correo', 'Facultades', and a search box. The main header includes the university logo and name 'UNIVERSIDAD DE CHILE' with 'FUNDADA EN 1842'. Below this is a secondary navigation bar with categories like 'PORTADA', 'PRESENTACIÓN', 'FACULTADES', 'PREGRADO', 'POSTGRADO', 'INVESTIGACIÓN', 'EXTENSIÓN', 'BIBLIOTECAS', and 'ADMISIÓN'. The main content area is titled 'NOTICIAS' and features a sub-header 'UCHILE.ONLINE'. A sidebar on the left lists 'Más noticias' with several headlines. The main article is titled 'Se encuentra en peligro de extinción' and 'Investigadores desarrollan proyecto para la conservación del gato andino'. It includes a sub-header 'Extensión y Cultura' and a small image of an Andean cat. The article text describes a project led by student Nicolás Lagos under the supervision of Dr. Jaime Hernández, aimed at conserving the Andean cat (Leopardus jacobita) in the highlands of Chile. A second image shows a person in a field, likely related to the research project.

Móvil | English | Français | Português | Mi uchile | Correo | Facultades | Buscar en uchile.cl

UNIVERSIDAD DE CHILE
FUNDADA EN 1842

Postulantes | Estudiantes | Académicos | Funcionarios | Egresados

PORTADA | PRESENTACIÓN | FACULTADES | PREGRADO | POSTGRADO | INVESTIGACIÓN | EXTENSIÓN | BIBLIOTECAS | ADMISIÓN

Inicio > Noticias

Extensión y Cultura

NOTICIAS

UCHILE.ONLINE

Más noticias

- Núcleo Infancia y Justicia expondrá en Conferencia en Australia
- Cuatro mil personas mueren al año por enfermedades respiratorias
- La pregunta por la ética y democracia a Maturana desde la U. de Chile
- Pollosaurios y dinorobots: Nuevas investigaciones sobre dinosaurios
- Columna Rector Vivaldi: "Gratuidad en la educación superior chilena"
- Rector Vivaldi se reunió con autoridades y académicos de Cambridge

Se encuentra en peligro de extinción

Investigadores desarrollan proyecto para la conservación del gato andino

El estudiante de magíster en Áreas Silvestres y Conservación de la Naturaleza Nicolás Lagos, bajo la supervisión del Dr. Jaime Hernández, desarrollan un proyecto que busca establecer el hábitat del gato andino con fines de orientar su conservación en el altiplano chileno. Este tipo de gato es uno de los felinos más raros del mundo y se encuentra en peligro de extinción.

El gato andino (*Leopardus jacobita*) está entre los felinos más raros y desconocidos a nivel mundial. Catalogado como en peligro de extinción por la UICN (Unión Internacional para la Conservación de la Naturaleza), es el felino más amenazado del continente americano.

Como una manera de guiar acciones para su permanencia en el largo plazo, el estudiante del Magíster de la Facultad de Ciencias Forestales y de la Conservación de la Naturaleza, Nicolás Lagos, está desarrollando el proyecto de grado "Propuesta de áreas de conservación del gato andino (*Leopardus jacobita*) en la puna seca de Chile", bajo la supervisión del Dr. Jaime Hernández.

La investigación se realiza en el altiplano entre las regiones de Arica y Parinacota y Tacacá, una zona prioritaria para la conservación de la especie, debido a que concentra la

El gato andino es considerado como uno de los felinos más raros y desconocidos en el mundo.



Interview at Explora, diffusion and educational program of CONICYT (National Commission of Science and Technology) (July 2015).

Available at: <http://www.explora.cl/2015-03-26-04-22-44/entrevistas/5764-el-felino-mas-amenazado-del-continente>



Entrevistas de Explora

¿Quieres saber qué opinan los científicos? Aquí encontrarás múltiples entrevistas de los mas variados temas. Elige tu favorito.

Entrevistas Gato Andino: El felino más amenazado del continente

Notes in different newspapers and web pages covering the workshop developed with CONAF in Pampa del Tamarugal Reserve (July 2015).

Available at:

<http://diariolongino.cl/archives/22191>

<http://diariolongino.cl/wp-content/uploads/2015/07/longinoiqqjulio27.pdf>

<http://www.lun.com/lunmobile/pages/newsdetailmobile.aspx?lfr=1&dt=2015-07-23&PaginalD=15&bodyid=0&SupplementId=0>

<http://www.conaf.cl/guardaparques-se-capacitan-en-uso-de-cameras-trampas-para-monitorear-al-gato-andino/>

4 Crónica

El Longino

Lunes 27 de Julio de 2015

GATO ANDINO, UN ANIMAL SOLITARIO Y ACORRALADO

A lto interés de al menos 50 jóvenes concitó la conferencia del doctor Jim Sanderson, en el Campus Huayquilque, que giró en torno al tema "los esfuerzos globales de conservación del Gato Andino -Leopardus jacobita- (u otros felinos pequeños)", gracias a la invitación del Centro de Investigación en Medio Ambiente (Cenima) de la Universidad Arturo Prat (UNAP).

El director de la entidad, Cristián Carrasco, precisó al auditorio integrado por estudiantes y profesionales dedicados al medio ambiente que Sanderson es fundador de Small Wild Cat Conservation Foundation, y miembro del equipo central del Grupo de Especialistas de Felinos de la UICN, y del Wildlife Conservation Network. Asimismo, es director de investigación de Feline Conservation Federation y miembro del equipo de revisión Mohamed bin Zayed Species Conservation Fund. "En el último tiempo el Gato Andino ha sido un poco acorralado. Es un animal solitario, y por efectos del turismo y la minería, lo estamos



"El Gato Andino sólo existe en cuatro países. En Tarapacá los interesados en conocerlo más pueden acercarse a Conaf", expresó el doctor Jim Sanderson.

limitando en el desarrollo, lo cual ha significado que tenga que defenderse en su espacio y alimentación. Es importante que podamos realizar algunas observaciones, y junto a Conaf nos dedicaremos a implementar un programa de conservación de diversas especies y entre ellas, la del Gato Andino", explicó el académico en el escenario de Tarapacá.

CONVENIO CON CONAF

En ese aspecto, Carrasco sostuvo que "la convocatoria es importante por la programación que tenemos con Conaf,

para difundir la preservación; por ejemplo, en la iniciativa de implementación de cámaras para monitorear las especies en terreno, y actividades adicionales de observación". "Queremos estimular a los estudiantes que quieran incorporarse dentro de la agrupación del Gato Andino u otras, así como en diversas acciones que desarrollaremos en el segundo semestre o el próximo año, según la aprobación de los recursos que solicitamos. También es buena la información o fotos que nos pudiera hacer llegar la comunidad para apoyar en la contribución de la conservación de la vida



El director del Centro de Investigación en Medio Ambiente de la UNAP, Cristián Carrasco, sugirió a los ambientalistas contactar a Cenima para conocer mayor información sobre el Gato Andino y otras acciones que desarrollan con Conaf.

silvestre", afirmó Carrasco.

GATO ANDINO EN CHILE

Resumió Sanderson que su conversación se refirió a la conservación general en todo el mundo: "Los métodos que usamos son diferentes según los países, tenemos en este instante programas y proyectos que van por varios años". Detalló que está trabajando en Chile desde 1998, casi 17 años, y hoy se dispone de más capacidad para realizar proyectos y más estudiantes interesados que no existían hace 20 años, y saben qué hacer. "La mayoría de la población en Chile no ha escuchado del Gato Andino, es una de las especies raras en el país, y la gente no sabe que existe. Uno de nuestros problemas es que la gente sepa que el Gato Andino existe y necesita espacio para vivir y alimento que comer. El Gato Andino sólo existe en cuatro países. En Tarapacá

los interesados en conocerlo más pueden acercarse a Conaf", expresó Sanderson.

PROGRAMAS

El investigador lamentó, sin embargo, que "Chile y otras naciones sudamericanas saben que esta especie está desapareciendo, y si no hay comida, sigue el problema, pero es una tendencia mundial". "Hasta ahora no tenemos suficiente dinero como para averiguar el número de la población del Gato Andino y su impacto en el ecosistema. Por eso estamos impulsando estos programas junto a Conaf. Creamos la Alianza del Gato Andino (AGA) para la preservación del Gato Andino en 2004. En esta ocasión compartí a los estudiantes que piensan en grande y realicen acciones en terreno y vean qué amenaza al Gato Andino, y que muestren los resultados, más que efectuar un documento teórico del tema, expuso.

MONITOREO

Nicolás Lagos Silva, de la Alianza del Gato Andino, y representante en Chile del Gato Andino, añadió que "hasta 2011 no se conocía la presencia del Gato Andino, sino en la cordillera de la Región de Tarapacá (en Isluga y Sala de Huasco), así como en la de Arica y Parinacota y algo de Antofagasta. "Lo complicado para la gente es buscar un Gato Andino que raramente se ha visto. Yo he visto cuatro en 40 años, pero hay voluntarios como Nico que van a la cordillera y acampan con bajas temperaturas, y es lo que necesitamos apoyar, porque no tienen allí internet ni comunicaciones", valoró Sanderson en su experiencia en la I Región. Finalmente, Carrasco sugirió a los ambientalistas contactar a Cenima para conocer mayor información sobre éste y otros temas y acciones que llevan adelante con Conaf (cenima.unap@gmail.com).





Guardaparques se capacitan para ver al escurridizo gato andino

► La Reserva Nacional Pampa del Tamarugal, en Tarapacá, recibió a guardaparques de Conaf provenientes de toda la zona norte a quienes se les capacitó en el uso e instalación de cámaras trampa que servirán para monitorear al gato andino (*Leopardus jacobita*), uno de los felinos menos conocidos y con mayor amenaza en la región que habita sobre los 3.500 y 5.500 metros sobre el nivel del mar. ¿Ha visto uno? Difícil. En los últimos 20 años solo se ha logrado captar 3 gatos andinos: dos en Chile y uno en Bolivia. Se estima que su población no sobrepasa los 2.500 ejemplares en la zona cordillerana de Argentina, Bolivia, Chile y Perú.

Capacitan a guardaparques en monitoreo con cámaras trampa al gato andino

Este felino es uno de los menos conocido y con mayor amenaza en latinoamérica.

