WildTrack Annual Report

2019

Welcome, and thank you for joining us…

Zoe Jewell and Sky Alibhai, co-founders of WildTrack

Now, more than ever, WildTrack's Mission to protect endangered species is a global priority.

Beautiful and charismatic species such as the Amur tiger, Black rhino and puma are disappearing at unprecedented rates as their habitats are destroyed and they come into conflict with humans. The trade in endangered species parts, for example rhino horn, also fuels strife amongst poor communities leading to social instability. At the end of 2019 this was brought into sharp focus as COVID-19, a zoonotic virus resulting from trade in endangered species, began to spread across the world.

Wildlife protection is no longer an 'optional extra'. The future of humanity is at stake. Policymakers need reliable data on the numbers and distribution of species. Our users (and the species we study) range across five continents. We partner with leaders in business, governments, academia, and other non-profits who share our passion. Together we work tirelessly to make those data available and win over hearts and minds for conservation.

In 2019 our work was profiled in Time magazine, and a documentary about our work won two Emmy awards. We had an unprecedented number of enquiries from conservation biologists looking for more ecologically sustainable ways to monitor endangered species, and our range of collaboration extended more widely from the field of biology to physics, geology, engineering, computer science, statistics, security and forensics. Our citizen science program, ConservationFIT has now attracted 48 zoo partners to help streamline algorithm development. At the same time our PhD students develop algorithms for their field research and take the program forward in Europe, Africa and Asia and the Americas..

As we look forward to a new decade we are investigating the use of AI algorithms to augment our capacity to deal with the increasing volume of data we collect, developing custom drones to track animal trails, engaging more grass-roots help with appealing educational material, and planning workshops to help our field projects expand their reach.

Together we can help to make the world a safer place for all species.

Our Mission and Objectives

WildTrack's mission is to protect endangered species, using non-invasive, cost--effective and community-friendly methods.

Our focus is unique. We work from the ground up, from analysing footprints to drone footage. We employ Traditional Ecological Knowledge based on thousands of years experience. We translate it using cutting-edge technology. We engage Citizen Scientists to help collect data. We partner with leaders across disciplines.

WildTrack training Namibian ecologists in footprint data collection

Objectives:

To research, develop and apply non-invasive and objective census and monitoring techniques as a fundamental resource for wildlife conservation.

To engage and document expert local ecological knowledge in communities that have lived with endangered and elusive species over generations.

To implement data-driven wildlife conservation that can reliably inform decision-makers on how to protect endangered species, particularly where human:wildlife conflict and illegal poaching occur.

WildTrack Board Members

Zoe Jewell, President and co-founder of WildTrack, Programs and Strategy. M.Sc., M.A., Vet. M.B., M.R.C.V.S.

Sky Alibhai, Director and co-founder of WildTrack, Programs and Software Development. D.Phil.

James Baker, Director. Legal Affairs. B.S., J.D, Attorney at Law, Hedrick Gardner Kincheloe & Garofalo LLP.

Laurie Durham, Director, Finance. B.A. Finance Director, SAS.

Charles Hall, Director, Web applications. B.Sc. Web Applications Developer, SAS.

Joseph Morgan, Director, Technology and Innovations, B.Sc. Principal Research Statistician, JMP.

Onyi Nwafor, Director, Operations and Logistics. Ph.D. Assistant Professor, Bryan School of Business, UNC Greensboro.

In 2019 we thanked retiring board members John Russ, Diana Levey and Rudie Van Vuuren for their hugely valuable contributions to WildTrack, and welcomed two new board members, Joseph Morgan and Onyi Nwafor. WildTrack is a Platinum member of GuideStar and our organisational reports and credentials are available here.

Where We Work

Dormouse

Golden Jackal
Wolf

Carpathian Lynx

Amur Tiger

Amur Leopard

Fisher

Bengal Tiger
Box Turtle

Eurasian River Otter

Leopard

Giant Panda

Tortoise
Striped Hyena
Monitor Lizard
Eurasian River Otter

Indian Rhino

Snow Leopard

Jaguar

Bengal Tiger

Lowland Tapir

Lowland Tapir

Cheetah
Black Rhino
White Rhino

African Lion
Leopard

Jaguar

African Elephant

WildTrack™
Non-invasive Wildlife Monitoring
Footprint Identification Technology FIT

Mountain Lion

Where We Are In 2019: By Numbers

31 Total Projects +5 added 2019

14 Students Undergraduate and Postgraduate

15 Partner Universities

13 Species Algorithms Developed

23 scientists supported to use FIT in JMP software

18 Countries across **5** Continents

Key Achievements 2019
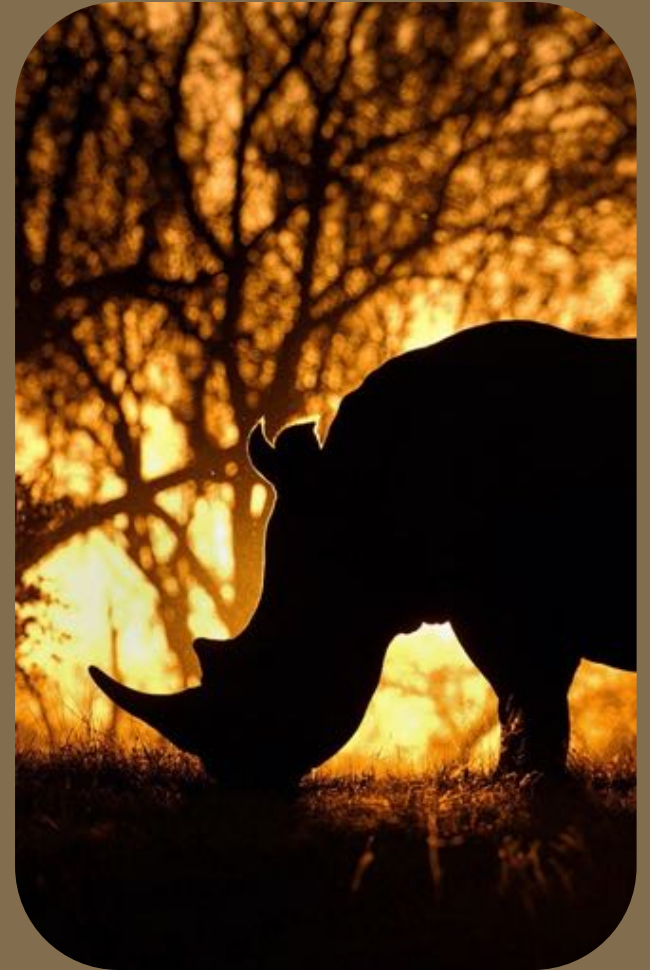
Protecting Namibia's Black Rhino

WildTrack visited Namibia in October/ November 2019 to meet with the Ministry of Environment and Tourism, Black rhino custodians and rhino stakeholders. We shared our 2018 field survey report and worked together to present it for publication. We consulted on the implementation of the footprint identification technique (FIT) in JMP software, to expand the effort to protect Namibia's black on Custodianship properties.

Our research in the rhino custodianships showed that FIT could be used as a flexible tool for montoring rhino, giving multiple options to custodians based on income and resources.

We were also invited to **film a science documentary** about our work with German TV company programme **TerraX**, which has an audience of 5 million viewers. The programme will be shown on Sunday 21st June 2020.

On the same visit we undertook drone trials with senseFly's eBeeX landscape-monitoring drone to capture images of rhino trails, with a view to developing an AI algorithm to identify rhino activity from the air. We captured some excellent images and trials are now ongoing to build a reference data library for different species to enable a remote survey approach.

#2 A Snapshot of some Field Project Developments

With the US Forest Service: Dr Jody Tucker from the Sierra Nevada Carnivore monitoring program worked with us to develop an algorithm for the endangered Pacific Fisher using footprints from track plates. The program is to be expanded in 2020 to monitor Fisher across the Sierra Nevada range.

With the FIT Cheetahs research project: Larissa Slaney Ph.D. student at Heriot-Watt University, Scotland, worked with us to use FIT to investigate relatedness between cheetahs to promote genetic fitness. Larissa collected, for the first time, the Asiatic subspecies (*Acinonyx jubatus soemmeringi*) from two captive facilities in the United Arab Emirates to build the database.

With the Indian Institute of Information Technology and Management - Kerala, India. Professor Jaishanker Nair and Arjun Purushothaman (Ph.D. student) started building on WildTrack's existing Bengal tiger reference dataset to study human:wildlife conflict in south India.

With WildCru, Oxford University and Living with Tigers project (LWT) Nepal: Amy Fitzmaurice, PhD student. Amy trained LWT field staff to use FIT, collected a database of free-ranging tiger footprints, and presented the use of FIT to promote human-felid coexistence in Nepal at the International Congress of Conservation Biology conference in Malaysia.
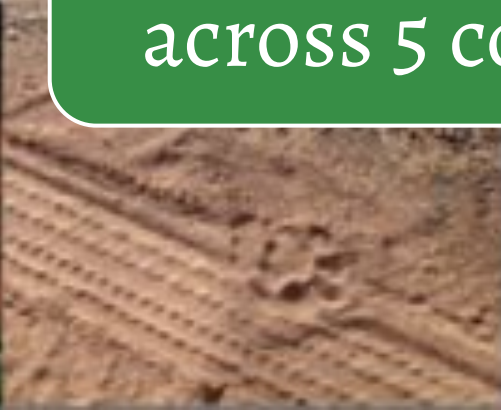
With the Piedmont Wildlife Center, North Carolina. We continue to monitor box turtles from their shell patterns using FIT.
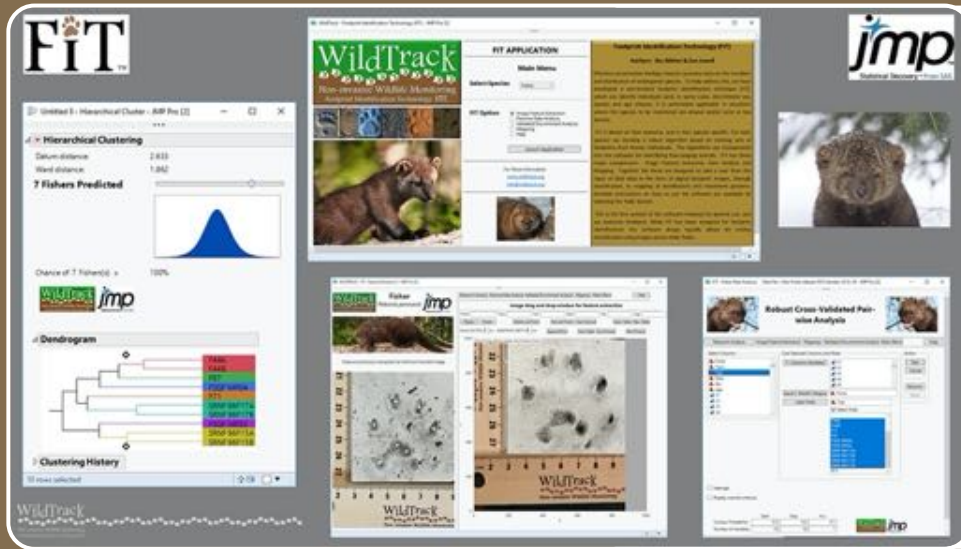
Collecting footprints across 5 continents

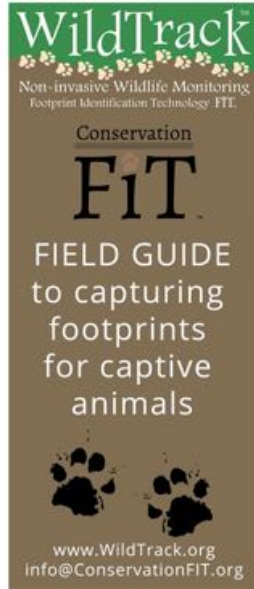# #3 Advancing Non-Invasive Monitoring Technology

We developed a new FIT algorithm for the endangered Pacific Fisher, a small carnivore. Our research partner, Dr Jody Tucker from the USFS, is working to protect Fisher in the Californian Sierra Nevadas.

#3A Adopting EpiCollect to Streamline Data Capture

Capture Footprints with the App

START
Download the App 1 — Epicollect5 for Android, iPhone, & iPad
2 **Add Project** — WildTrack Captive Footprint Collection
Add Entry 3 — Every time you find a new trail
4 **Read and follow instructions** — Enter Name, Instiution, & Academic Afflication
Continue to follow instructions 5 — Enter Date, Time & Click Update Location
6 **Select Species** — Select from list or add your own
Add Trail Information 7 — Trail ID, Animal Name, GAN/Local ID #, & Sex,
8 **Add Branch** — Every footprint in a trail is a single branch
Capture Footprint 9 — Take Picture or Access Pictures
10 **Save & Upload** — Save Branch Save Entry Upload data & photo separately	FINISH

WildTrack™
Non-invasive Wildlife Monitoring
Footprint Identification Technology FIT

Conservation

FiT™

FIELD GUIDE to capturing footprints for captive animals

www.WildTrack.org
info@ConservationFIT.org

To streamline our data collection protocols, we built two program projects in **Epicollect: WildTrack footprint collection (for monitoring free-ranging animals) and WildTrack Captive Footprint collection (for species algorithm development).**
With help from **Learn IT Digitally,** we produced a field guide for data collectors that explains every step of the process :)

JMP software developers wrote a script that allows us to feed Epicollect data seamlessly into **JMP our analytics platform**.

Learn **IT** Digitally

#3B Increasing the Speed of Algorithm Development

WildTrack's ConservationFIT program is specifically designed to streamline algorithm development. With an initial focus on cheetah, jaguar, snow leopard and mountain lion, we increased our international zoo partner list to 48 institutions. We are now prioritizing helping zoos to collect the data we need.

Dr Karin Schwartz presented a paper at the **Conservation Technology session** at the September 2019 AZA Annual Meeting in New Orleans. Schwartz, K. and Jewell, Z. September 2019. ConservationFIT: AZA Big Cat Footprints Contribute to Conservation Monitoring in the Wild. 2019 AZA Annual Meeting Proceedings, New Orleans, LA

Dr Juarez Pezutti of the Federal University of Pará, Belém (UFPA) is interested in using FIT as an ethno-ecological tool as part of his research into the many ways that indigenous ecological knowledge can contribute to wildlife conservation. He collected footprint trails from more than 20 jaguars that are in the process of analysis by FIT.

#3C Making Each Step Count…

Frederick Kistner, Ph.D. student at Karlsruhe Institute of Technology, is working to protect the river otter in several European countries, Germany, the UK and Portugal. As part of his PhD project he is looking at ways to be able to use even imperfect or incomplete footprints into the dataset, thus making FIT a stronger tool for monitoring.

We underwent several days of **drone pilot training** with partners senseFly, in preparation for fieldwork in Namibia. senseFly kindly loaned us an eBeeX drone for the fieldwork and we captured some incredible images that are now being analysed for an AI application to identify and monitor species from trails alone.

Otter prints in southern Portugal

Species Classification Visualization Using t-SNE
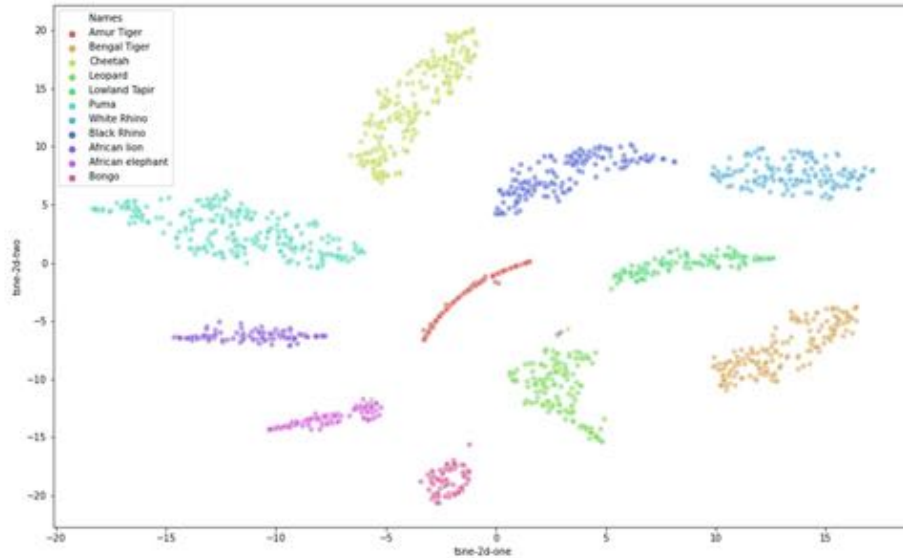
WildTrack started working with the Berkeley School of Information, UC Berkeley, to develop algorithms that can identify at the species and individual level. Early results are very encouraging and this work will advance in 2020.

WildTrack Conservation Outreach and Education

Reaching out to the international academic and field communities:

Time magazine reported on WildTrack's work

WildTrack presented two papers at the First International Symposium on Tiger and Leopard Conservation, Harbin, China. July 2019.

A documentary about WildTrack won two Emmy Awards

WildTrack launched a new website in April 2019 that brought our research and community-outreach programs together under one site.

WildTrack ran an FIT and drone field training workshop in Portugal focusing on the European river otter, with Frederick Kistner and Ceres International Field Research

Amy Fitzmaurice, WildTrack PhD student ran an FIT training workshop for the Nepal Tiger Trust in Nepal

Our new interactive FIT data-collection training videos

We thank our extraordinary partners, who contributed so much to WildTrack's success in 2019, including:

JMP software

The US Army Research Office

senseFly

The UC Berkeley School of Information

WildBook

Carolina Tiger Rescue

... and with gratitude to WildTrack's many dedicated supporters across the world and to the indigenous trackers who continue to inspire our work

Thank you for helping us protect endangered species more effectively.

Scouts and rangers work hard in dangerous and difficult conditions to protect endangered species. Once in a while they relax with a game of soccer