

2019
ANNUAL REPORT



CONSERVATION CENTERS
FOR SPECIES SURVIVAL

LETTER FROM THE CEO

Dear Friends,

This year marked the fifth anniversary of the Source Population Alliance (SPA), an innovative private-public sector alliance dedicated to creating and preserving long-term sustainable wildlife populations.

My first experience with C2S2 was in 2014 following the SPA program's launch at Bamberger Ranch. I was fortunate to hear about the program from C2S2 founder Dr. Dave Wildt, Senior Scientist and Head of the Center for Species Survival at the Smithsonian Conservation Biology Institute.

In 2015, I joined Dave, Kelley Snodgrass, and the SPA development and implementation committee at Fossil Rim Wildlife Center to create a five-year business plan which included getting published in *BioScience* in 2019 to highlight the synergy of this unique collaborative effort.

In the October 2019 edition, *BioScience* published as its cover story "Breeding Centers, Private Ranches, and Genomics for Creating Sustainable Wildlife Populations" by Dr. David Wildt and leadership of six C2S2 conservation centers. The publication highlights the successes of the SPA model, bringing together the resources of conservation centers with private landowners and zoos to create sustainable populations of African ungulate species. Wildt writes, "Most of the world's wild herbivore populations, from antelopes to rhinos, are collapsing. Even most protected areas in nature are too small to support sustainable, safe populations of large vertebrates. We have demonstrated a viable new model showing how breeding centers and private ranches can contribute to ensure genomic diversity and species survival."

Seeing this publication come to fruition is an exciting moment for C2S2. Other key achievements this year included the Cheetah Summit and the production of *Resilience: Story of the American Red Wolf*.

A big thank you to the C2S2 Conservation Centers, Affiliates, and Partners.

With gratitude,



Katy Palfrey

Inside:

Letter from the CEO	2
Purpose/Mission.....	4
Target Species World Map	5
C2S2 Members.....	6
Cheetah Sustainability Program	8
Source Population Alliance	10
Southern Black Rhino	12
Red Wolf	13
North American Species Initiatives	14
Annual Meeting.....	16
Financial Report.....	17
Support	18
C2S2 Board.....	19



KATY AT BAMBERGER RANCH



C2S2 Target Species World Map

Conservation Centers for Species Survival (C2S2) is a science-based global initiative taking collective action to save animals from extinction. By bringing together the resources and expertise of conservation breeding centers as well as conservation-minded zoos and private landowners, we are achieving the necessary leverage to build large-scale, sustainable populations of endangered species in secure havens. Given continued threats to critical habitats, an assurance population secured today is the best bet for many species' long-term survival.

Our Purpose

Conservation Centers for Species Survival cooperatively applies collective resources for the survival of threatened species with needs-large areas, natural sizes, minimal public disturbance, and research.

Our Mission

To provide leadership in studying and creating self-sustaining, secure populations ex situ (in human care) and in situ (in the wild) of some of the world's most endangered species.



C2S2 Members

Full Member Conservation Centers

AFRICAN LION SAFARI
 AUSTIN SAVANNA
 FOSSIL RIM WILDLIFE CENTER
 NORTH CAROLINA ZOO
 OMAHA'S HENRY DOORLY ZOO
 SMITHSONIAN CONSERVATION BIOLOGY INSTITUTE
 WHITE OAK CONSERVATION
 THE WILDS



Affiliate Members



New Affiliate Member: Natural Bridge Wildlife Ranch



Natural Bridge Wildlife Ranch, Inc. is a Family Land Heritage Property that has stayed within the same family for over 125 years. Natural Bridge's mission and obligation to its heritage and ranching tradition is to provide a healthy and sound environment for the animals that call the Ranch home. Natural Bridge strives to ensure the survival and reproduction of these diverse species from around the world for future generations to enjoy.

Since 1884, the Ranch's animal inventory has evolved from a few conventional livestock species to more than 45 species from all over the world. It was not until 1984 that their gates opened to the public to educate visitors from around the globe about the importance of conserving these species and the land on which they live, as approximately half of their species face a threat of extinction.

In 1992, the Texas Department of Agriculture designated Natural Bridge as a Family Land Heritage Property. To qualify, a plot of 10 acres or more has to have been used for agriculture by the same family for at least 100 years. Today, the seventh generation continues these ranching traditions and values. In 2019, Natural Bridge Wildlife Ranch celebrated its 35th anniversary of operations.

Thank you to all our members for your ongoing commitment.

Cheetah Sustainability Program



Breeding Centers Coalition



With the cheetah population in the wild plummeting to just 7,000 animals, collaboration across groups to support the long-term sustainability of the species is more important than ever. Given widespread habitat loss and population fragmentation, breeding cheetahs outside of their natural range may be our last chance to prevent extinction. C2S2's Cheetah Sustainability Program (CSP) was launched in 2013 in collaboration with the Association of Zoos and Aquariums' (AZA) Cheetah Species Survival Program (SSP). As part of this program, the Breeding Centers Coalition (BCC) was formed.

The BCC now includes 10 conservation centers where cheetahs bred in human care thrive under naturalistic settings, with mate choice, and benefit from regular sharing of knowledge and expertise through the Coalition. The result of these efforts is a record of high birth rates and low mortality rates in the population. In 2019, a total of 32 cheetahs bred and 41 cubs in 11 litters were produced, with 13 cheetahs breeding for the first time. Reproducing new individuals each year is a high priority for the BCC to maximize genetic health of the population.

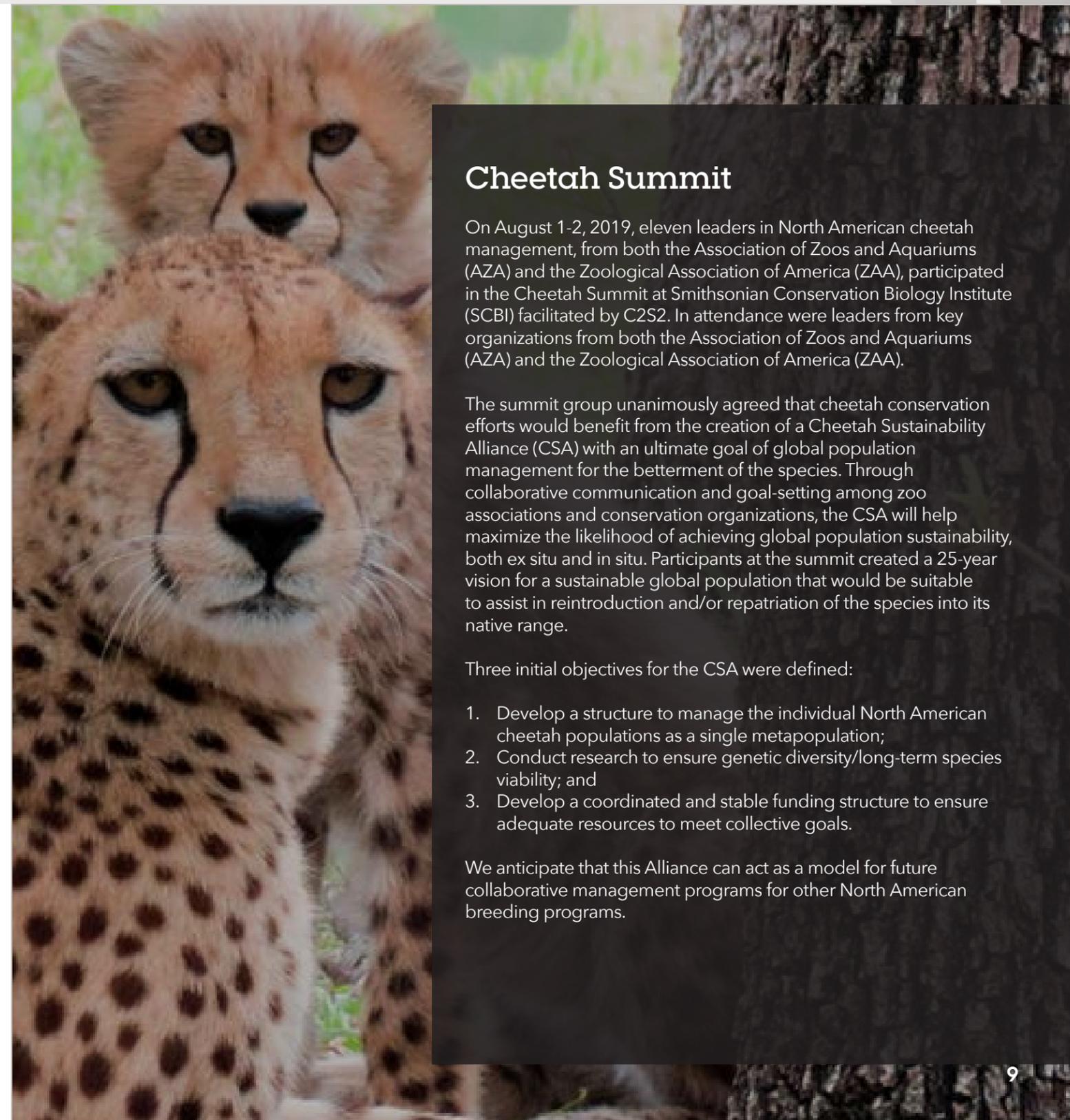
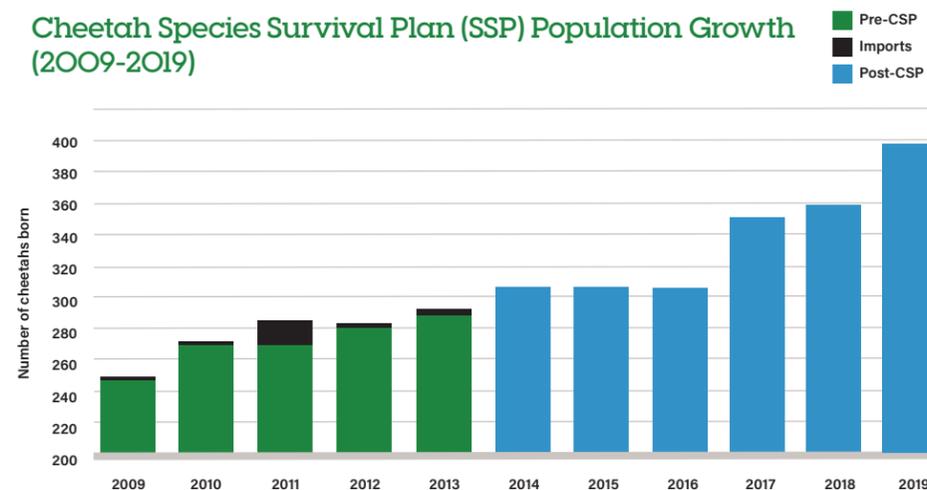
International transfers between populations is an important method of increasing genetic diversity. Several transfers between US and Canadian facilities were completed in 2019, and a transfer of 2.0 cheetahs from Caldwell Zoo to C2S2 member Taronga Western Plains Zoo in Australia is awaiting permit approval and will be completed in 2020. Based on extensive genetic and demographic modeling of the two populations, a transfer recommendation of 2.1 cheetahs to Japan was also made at this year's SSP meeting.

Program Sponsors:



Program Champion:
Adrienne Crosier, Ph.D
Smithsonian Conservation
Biology Institute

Cheetah Species Survival Plan (SSP) Population Growth (2009-2019)



Cheetah Summit

On August 1-2, 2019, eleven leaders in North American cheetah management, from both the Association of Zoos and Aquariums (AZA) and the Zoological Association of America (ZAA), participated in the Cheetah Summit at Smithsonian Conservation Biology Institute (SCBI) facilitated by C2S2. In attendance were leaders from key organizations from both the Association of Zoos and Aquariums (AZA) and the Zoological Association of America (ZAA).

The summit group unanimously agreed that cheetah conservation efforts would benefit from the creation of a Cheetah Sustainability Alliance (CSA) with an ultimate goal of global population management for the betterment of the species. Through collaborative communication and goal-setting among zoo associations and conservation organizations, the CSA will help maximize the likelihood of achieving global population sustainability, both ex situ and in situ. Participants at the summit created a 25-year vision for a sustainable global population that would be suitable to assist in reintroduction and/or repatriation of the species into its native range.

Three initial objectives for the CSA were defined:

1. Develop a structure to manage the individual North American cheetah populations as a single metapopulation;
2. Conduct research to ensure genetic diversity/long-term species viability; and
3. Develop a coordinated and stable funding structure to ensure adequate resources to meet collective goals.

We anticipate that this Alliance can act as a model for future collaborative management programs for other North American breeding programs.

Source Population Alliance



Participating Facilities:

4-F Exotics
 8 Bar 8 Ranch
 African Lion Safari
 Alabama Safari Park
 Anonymous
 Austin Savanna
 Bamberger Ranch
 Bear Creek Exotics
 Camp Creek Wildlife
 Cross Bar C Ranch
 Cypress Creek Ranch
 Fort Worth Zoo
 Fossil Rim Wildlife Center
 Game Creek Ranch
 Griffin Point Ranch
 Gulf Breeze Zoo
 Hatada Ranch
 Hemker Park Zoo
 Lion Country Safari
 Micanopy Zoological Preserve
 Monarto Zoo
 Natural Bridge Wildlife Ranch
 Red Wire Wildlife Ranch
 Rough Hollow Preserve
 Safari Enterprises
 Smithsonian Conservation Biology Institute
 Six Flags Great Adventure Safari
 Stewards of Wildlife
 Tanganyika Wildlife Park
 Taronga Conservation Society Australia
 Ten Triple X Ranch
 The Living Desert Zoo & Gardens
 The Wilds
 Triple C Ranch
 Virginia Safari Park
 White Oak Conservation
 Wildlife Conservation Center

37
Participants

2,058
Total SPA Animals

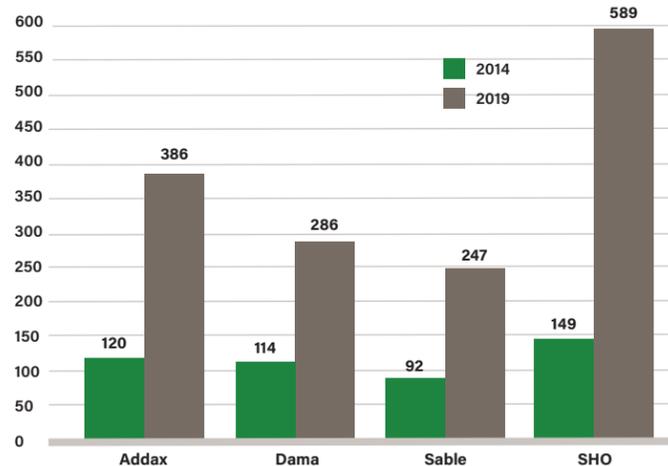
22%
Metapopulation growth in 2019

Since its inception five years ago in 2014, the Source Population Alliance (SPA) metapopulations of the initial four target species has grown 196% to 1,508 animals. The SPA saw a 22% population increase between 2018 and 2019, for a total of 2,058 animals across the target populations.

Other key developments during the year included taking initial steps to form a strategic partnership with the Asian Wild Cattle Specialist Group (AWCSG) and completing work on two body conditioning scoring guides for addax and scimitar horned oryx that will be instrumental in helping participants monitor the health of their herds.

The Alliance also added five new participants comprising seven new facilities including our international partner, Taronga Conservation Society of Australia. The new participants added in North America were Sabino Grande Ranch/ Spitfire Exotics, Oklahoma City Zoo, Six Flags Great Adventure Safari Park, and Zoofari Parks, which has facilities in Alabama, Florida, and Virginia.

Original Four Target Species Metapopulation Growth 2014-2019



Target Species



Program Sponsors:



8 Bar 8 Ranch
 Griffin Point Ranch
 Natural Bridge Wildlife Ranch
 Rough Hollow Preserve
 Safari Enterprises

SPA and SBRSP Manager:
 Gavin Livingston

BioScience Publication

C2S2's Source Population Alliance was featured as the cover story in BioScience in October of 2019. The article titled "Breeding Centers, Private Ranches, and Genomics for Creating Sustainable Wildlife Populations", written by Dr. David E. Wildt, C2S2 founder and Senior Scientist Emeritus at Smithsonian Conservation Biology Institute (SCBI), reflects the contributions of C2S2 Conservation Centers African Lion Safari, Austin Savanna, Fossil Rim Wildlife Center, Smithsonian Conservation Biology Institute, White Oak Conservation, and The Wilds.

The paper, which was a culmination of nearly five years worth of work, describes how the alignment with and management of large breeding centers, combined with privately-owned ranches, provide environments that give animals the necessary space to thrive while preventing inbreeding, genetic depression and ultimately disappearance of the species. The new study demonstrates a viable new model showing how breeding centers and private ranches can contribute to ensure genomic diversity and long-term species survival, helping reverse the trend in which many of the world's wild ungulate populations are collapsing.

Our novel yet highly effective solution of applying cutting-edge genomics to the Alliance model offers opportunities to produce sustainable populations and improve herd management by estimating genetic diversity, inbreeding status, lineage integrity, ancestry, and kinship. To date, SCBI and partners have generated reference genomes and additional whole genome resources for the sable antelope, dama gazelle, and scimitar-horned oryx.

Project Leads:
 Budhan Pukazhenth, Ph.D,
 and Klaus-Peter Koepfli, Ph.D,
 Smithsonian Conservation Biology Institute; Philip Miller, Ph.D,
 Conservation Planning Specialist Group



Southern Black Rhino

Only 5,500 black rhinos remain in the wild today, declining from more than 65,000 in the 1970s as the species continues to be hard-hit by poaching and habitat loss.

C2S2 and the International Rhino Foundation (IRF) formed a partnership in 2017 to co-lead the Southern Black Rhino Sustainability Program (SBRSP) to expand the USA-based black rhino conservation breeding program, grow its sustainability and genetic diversity, and support critical research.

Currently, 18 facilities in North America and Australia have signed on to participate and collaborate in this Sustainability Program. C2S2 is working to identify new rhino holders with large tracts of land for holding and breeding, applying the SPA model to rhino conservation.

The IRF has funded the genomics analysis of the SBRSP population currently underway at the C2S2 Conservation Center Smithsonian Conservation Biology Institute (SCBI), led by Dr. Klaus Koepfli. Dr. Benn Bryant, Senior Veterinarian of C2S2 Member Taronga Western Plains Zoo, has also been awarded a grant by IRF to undertake a project focused on investigating the uptake, distribution, and metabolism (i.e. 'pharmacokinetics') of non-steroidal anti-inflammatory drugs (NSAIDs) by black rhinoceroses. The University of Sydney partners with Taronga and the IRF on this work.

White Oak Conservation, a C2S2 Conservation Center, produced a black rhino bull calf, the first US-born calf in over 2.5 years. SBRSP participant El Coyote welcomed a female calf and has another pregnant female who is slated to give birth in 2020. Additionally, the SBRSP has been working with The Kingdom of Eswatini to foster long term cooperation and movement of animals between the US, Australia, and Eswatini. A transfer between C2S2 Affiliate Member Taronga Western Plains Zoo and Eswatini is already in process.

Co-led by:



Program Sponsors:



Red Wolf



Film Production

C2S2, in collaboration with Endangered Wolf Center and the award-winning filmmaking team, Running Wild Media, are proud to have launched a film project highlighting the dire need for American red wolf conservation. This species is the rarest wolf in the world and the only large carnivore solely native to the United States. Without direct intervention, they are expected to go extinct in less than a decade.

The film emphasizes the species' important role in our ecosystem and how their survival will benefit humans. The team worked with US Fish and Wildlife Biologists and leaders in red wolf management to capture compelling footage of an animal that is seldom seen and even more rarely photographed in the wild.

The film, released in 2020, is a free and inspirational conservation education tool available on C2S2's website for anyone who wants to help spread the word and learn to advocate powerfully for this endangered species.

Thank you to the Red Wolf Film sponsors (left).

Alpha Pack Leaders



Beta Wolf Partners



Wolf Guardians

American Association of Zoo Keepers
Knoxville Zoo
Little Rock Zoo
New Zoo Adventure Park
Wolf Haven International

USFWS Recovery Challenge Grant

C2S2 was awarded \$257,000 by the United States Fish and Wildlife Service's (USFWS) Recovery Challenge Grant toward construction of additional captive red wolf space. Funds are being sub-granted through a peer-review process to build as many as 10 new red wolf enclosures to accommodate multi-generation groups (up to 15 individuals) within two years.

Construction of additional enclosures is critical to creating a sustainable future for American red wolves. The enclosures contribute to the recovery by creating the space needed to increase the conservation breeding population prior to reintroduction into the wild.

Program Champion: Regina Mossotti, Endangered Wolf Center

North American Species Initiatives

Songbirds: Loggerhead Shrike

Three C2S2 Member organizations (African Lion Safari, Smithsonian Conservation Biology Institute and Nashville Zoo) participated in the conservation breeding and release program for Loggerhead Shrike in 2019, producing 80 fledglings, of which 64 were released into the wild in Ontario.

Collaborative research projects at C2S2 Member facilities are underway to improve the management of the captive population and ultimately, the success of recovery for the northeastern subspecies of loggerhead shrike. Ten birds were fitted with Motus radio transmitters to help identify migratory timing and pathways for the species. Additionally, research progressed on a study in collaboration with Dr. Kerry Schutten to examine the efficacy of the current vaccination protocol for breeding and reintroduced individuals against the West Nile Virus, a disease loggerhead shrikes are highly vulnerable to. Given the critical importance of each member of this small population and the potentially devastating impacts of West Nile Virus on the species, developing an effective vaccination strategy for captive-bred young is an important tool in the recovery of this species.



Species Champion: Amy Chabot, Ph.D, African Lion Safari

Native Biodiversity Pilot Study

In 2019, C2S2 initiated a pilot biodiversity study funded by Smithsonian Conservation Biology Institute. The objective was to develop a knowledge base of native species diversity and soil health using C2S2's existing network of Texas ranches and conservation centers. This 'Texas Working Landscapes' concept closely follows the model developed by Smithsonian's Virginia Working Landscapes for bird and plant surveys.

The large-herbivore stocking histories of the selected Texas sites span the spectrum, ranging from all non-native species (C2S2 Conservation Center Fossil Rim Wildlife Center) to mixed non-native/domesticated species (SPA participant Ten Triple X) to all domesticated species (SPA participant High Hope). Across all sites, Texas Master Naturalists (the Rio Brazos chapter in particular) conducted a total of 54 bird point counts (recording a total of 50 species), 6 plant surveys (recording a total of 53 species), and 6 soil health surveys. The study results can be used to recruit additional properties to participate in biodiversity surveys in subsequent years.

Project Lead: Wylie Harris

Annual Meeting

Many thanks to **African Lion Safari** for hosting our 2019 Annual Meeting. What a beautiful backdrop for our sessions!



At the C2S2 Annual Meeting at African Lion Safari in April 2019, the theme was "Building and Sustaining a New Movement for Conservation". Conversations centered around the programmatic, communications, and financial ways to create a catalyst for growth. A key takeaway of the meeting was to emphasize connecting and supporting in situ activities for all programs, made possible by creating new partnerships with specialist groups from the International Union for Conservation of Nature, and participating wherever possible in species action planning and reintroduction efforts.



Financial Report

Revenue

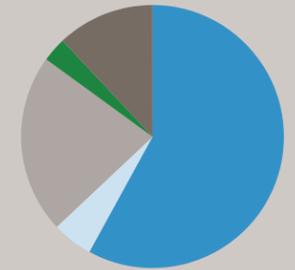
Annual Fund	\$30,602
Grants	262,000
Membership	141,115
Program Income	17,522
Sponsorships.....	65,430
Total Income.....	\$516,669

Expenditures

Programs	\$244,975
Operations.....	103,698
Fundraising.....	47,722
Total Expenditures.....	\$396,395

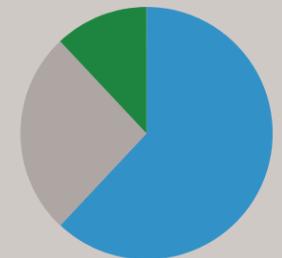
In Kind Contributions to C2S2

Programs	\$52,938
Gen Administration	135,242
Payroll.....	13,800
Total In Kind.....	\$201,980



Revenue

- Annual Fund - 5%
- Grants - 58%
- Membership - 22%
- Program Income - 3%
- Sponsorships - 12%



Expenditures

- Programs - 62%
- Operations - 26%
- Fundraising - 12%

Support

C2S2 would like to thank the following institutions, facilities, foundations and individuals who provided financial and in-kind support to our organization in 2019. We sincerely thank each and every one of you for making our work possible.

ANGEL - \$250,000 and up

- Stephen & Denise McDonough
- United States Fish & Wildlife Service

BENEFACTOR - \$100,000 to \$249,999

- Mark Paul Terk Charitable Trust
- Konstantin Nikolaev

STEWARD - \$50,000 to \$99,999

- African Lion Safari
- Austin Savanna
- Fossil Rim Wildlife Center
- Omaha's Henry Doorly Zoo and Wildlife Safari Park
- Judy & Sean Palfrey
- Smithsonian Conservation Biology Institute and National Zoological Park
- The Wilds
- White Oak Conservation

PATRON - \$25,000 to \$49,999

- Center for the Conservation of Tropical Ungulates
- Bradford Clements
- Columbus Zoo and Aquarium
- Disney's Animal Kingdom
- Houston Zoo
- North Carolina Zoo
- Taronga Conservation Society Australia
- ZooTampa

SPONSOR - \$5,000 to \$24,999

- Dallas Zoo
- Fort Worth Zoo
- Fresno Chaffee Zoo
- Eastman Foundation
- Endangered Wolf Center
- Horne Family Foundation
- Moffat Foundation
- International Rhino Foundation
- Monarto Zoo
- National Zoological Gardens of South Africa
- Natural Bridge Wildlife Ranch
- Nashville Zoo
- Oklahoma City Zoo
- Katy Palfrey
- Philadelphia Zoo
- Saint Louis Zoo
- Scovill Zoo
- Smoke Rise Foundation
- Virgil Van Trease
- Michael Weisser

FRIEND - \$1,000 to \$4,999

- 4-F Exotics
- 8 Bar 8 Ranch
- AAZK Little Rock Chapter
- AAZK Omaha Chapter
- Akron Zoological Foundation
- Arkansas State University
- Bamberger Ranch
- Bear Creek Exotics
- Birmingham Zoo
- Brevard Zoo
- Camp Creek Wildlife
- Cross Bar C Ranch
- Cypress Creek Ranch
- Dickerson Park Zoo

- Game Creek Ranch
- Gimbel Foundation
- Griffin Point Ranch and Hayden Kelly
- Hatada Ranch
- Hemker Park Zoo
- Norman & Dale Kahn
- Knoxville Zoo
- Lion Country Safari
- The Living Desert Zoo and Gardens
- McCombs School of Business University of Texas Austin
- Micanopy Zoological Preserve
- Northeastern Wisconsin Zoo
- Northern Piedmont Community Foundation
- Pat O'Neil
- John Palfrey & Catherine Carter – Vanguard Charitable Trust
- Point Defiance Zoo & Aquarium
- Red Wire Wildlife Ranch
- Red Wolf Coalition
- Roger Williams Zoo
- Rough Hollow Preserve
- S03 Ranch
- Safari Enterprises and Larry & Toni Johnson
- Eben Scanlon
- Safari West
- Six Flags Great Adventure Safari
- Stewards of Wildlife Conservation
- Tanganyika Wildlife Park
- Ten Triple X Ranch
- Tres Changos Ranch
- Triple C Ranch
- Wildlife Conservation Center
- Wolf Haven International

C2S2 Board

C2S2 board is composed of experts in conservation biology, reproduction, reintroduction science, animal care and management, and natural resource management.

Board of Directors

Mike Takacs (Chairman/ President), African Lion Safari– Hamilton, ON, Canada
James Gregory, (Treasurer), Austin Savanna– Austin, TX
Jan Ramer, DVM, (Secretary), The Wilds– Cumberland, OH
Dan Cassidy, Omaha's Henry Doorly Zoo– Omaha, NE
Budhan Pukazhenth, B.V.SC., Ph.D., Smithsonian Conservation Biology Institute– Front Royal, VA
Kelley Snodgrass, Fossil Rim Wildlife Center– Glen Rose, TX
Roger Sweeney, North Carolina Zoo– Asheboro, NC
David Wildt, Ph.D., Smithsonian Conservation Biology Institute– Front Royal, VA
Lauren Zarama, InKemia Green Chemicals– Houston, TX

Board Observers

Dan Beetem, The Wilds– Cumberland, OH
Amy Chabot, Ph.D., African Lion Safari– Hamilton, ON, Canada
Justin Gregory, Austin Savanna– Austin, TX
Holly Haefele, DVM, Fossil Rim Wildlife Center– Glen Rose, TX
Paul Marinari, Smithsonian Conservation Biology Institute– Front Royal, VA
Jb Minter, MS, DVM, Dipl. ACZM, North Carolina Zoo– Asheboro, NC
Gareth Morgan, African Lion Safari– Hamilton, ON, Canada
Cheryl Morris, Ph.D., Omaha's Henry Doorly Zoo and Aquarium– Omaha, NE
Patricia Simmons, North Carolina Zoo– Asheboro, NC
Nucharin Songsasen, Ph.D., D.V.M., Smithsonian Conservation Biology Institute– Front Royal, VA

Advisory Board

Craig Allenby, National Zoological Gardens– Pretoria, South Africa
Evan Blumer, Oso Mono Ltd– Gahanna, OH
Nick Boyle, Taronga Conservation Society Australia, New South Wales, AU
Nicole Cavender, Ph.D., The Morton Arboretum– Lisle, IL
Peter Clark, Montaro South, SA, Australia
Adrienne Crosier, Ph.D., Smithsonian Conservation Biology Institute– Front Royal, VA
Joe deGraauw, Nashville Zoo– Nashville, TX
Susie Ellis, Ph.D., International Rhino Foundation– Strasburg, VA
Gina Ferrie, Ph.D., Disney's Animal Kingdom–Lake Buena Vista, FL
Sara Hallager, Smithsonian National Zoo– Washington, DC
Dwight Lawson, Oklahoma City Zoo– Oklahoma City, OK
John Lukas, Wildlife Conservation Global/ Okapi Conservation Project– Jacksonville, FL
Larry Killmar, ZooTampa at Lowry Park– Tampa, FL
Danny Morris, Omaha's Henry Doorly Zoo– Omaha, NE
Regina Mossotti, Endangered Wolf Center– Eureka, MO
Tiffany Soechting, Natural Bridge Wildlife Ranch– San Antonio, TX
Brandon Speeg, White Oak Conservation– Yulee, FL
Mandi Shook, Ph.D., Disney's Animal Kingdom– Orlando, FL
Steve Shurter, White Oak Conservation– Yulee, FL

Your Support Makes a Difference!



CONSERVATION
CENTERS
FOR SPECIES
SURVIVAL

2019 Annual Report | © Conservation Centers for Species Survival

CONSERVATION CENTERS FOR SPECIES SURVIVAL (C2S2)

701 Brazos St. 16th Floor

Austin, TX 78701

E: info@conservationcenters.org

W: www.conservationcenters.org

