

2017 Annual Report on Conservation and Science

HIGHLIGHTS



**ASSOCIATION
OF ZOOS
& AQUARIUMS**

The Association of Zoos and Aquariums and its member facilities envision a world where, as a result of their work, all people respect, value and conserve wildlife and wild places.

The 2017 Annual Report on Conservation and Science *Highlights* publication celebrates the cumulative effort of AZA-accredited zoos and aquariums and certified related facilities in the following areas:

- field conservation
- education programming
- green (sustainable) business practices
- mission-focused research

This publication underscores what the AZA community accomplishes together. Visit AZA's website to learn about what each member facility is doing individually.

www.aza.org/annual-report-on-conservation-and-science

Cover Image: Lake Sturgeon © Todd Stailey, Tennessee Aquarium

CONTENTS

- 1 field conservation
- 5 education programming
- 8 green (sustainable) business practices
- 11 mission-focused research

field conservation

\$220,000,000

SPENT ON FIELD
CONSERVATION

26%

of projects
LED BY AZA
MEMBER
ORGANIZATIONS



128 COUNTRIES

40%

of projects took
place in the U.S.

Projects most frequently
occurred in the United
States, Indonesia, Kenya,
Mexico and South Africa

60%

of projects took place
outside the U.S.



863

SPECIES &
SUBSPECIES
BENEFITED

281

=

229

+

52

listed under
U.S. Endangered
Species Act

Endangered

Threatened



218 FACILITIES REPORTED

208

accredited zoos and aquariums

10

certified related facilities



**OVER
1,000
PARTNERS
IN CONSERVATION**

Field Conservation

AZA-accredited zoos and aquariums and certified related facilities engaged in conservation that directly impacted animals and habitats in the wild.

More than 1,000 species, subspecies and species groups benefited from both species-specific and habitat-focused conservation projects. The International Union for Conservation of Nature (IUCN) Red List of Threatened Species™ indicates that 131 of these species and subspecies are Critically Endangered and 153 are Endangered. Seven of these species are listed by the IUCN as Extinct in the Wild, including the Guam kingfisher, Guam rail, Kihansi spray toad, Polynesian tree snail, scimitar-horned oryx, Socorro dove and Wyoming toad.

Species-specific projects focused on:

- » Mammals – 52%
- » Birds – 16%
- » Reptiles – 14%
- » Amphibians – 7%
- » Invertebrates – 6%
- » Fishes – 5%
- » Flora – 1%

Most Frequently Targeted Species

MAMMALS

Cheetah
Vaquita
Tiger
African elephant
Lion

BIRDS

African penguin
Whooping crane
Grey-crowned crane
African white-backed vulture
California condor

REPTILES

Loggerhead sea turtle
Green sea turtle
Komodo dragon
Western pond turtle
Massasauga rattlesnake

AMPHIBIANS

Hellbender
Puerto Rican crested toad
Panamanian golden frog
Wyoming toad
Oregon spotted frog, striped newt, western toad (tied)

INVERTEBRATES

Monarch butterfly
Staghorn coral
Elkhorn coral
Atlantic horseshoe crab
American burying beetle

FISHES

Sand tiger shark
Lake sturgeon
Blue rockfish, brook trout, smalltooth sawfish (tied)

Multi-species Conservation

AZA members supported conservation organizations or participated in multi-species or taxon-wide field conservation projects, in addition to species-specific efforts. The most frequently targeted species groups were:

- » Frogs
- » Rhinoceroses
- » Sea turtles
- » Freshwater turtles
- » Salamanders
- » Terrestrial turtles (tortoises)
- » Elephants
- » Sharks
- » Gorillas
- » Bats



“Members of AZA are serving critical roles to save species all around the world. Almost all wildlife and plants on Earth require some form of management. Expertise developed to manage the animals and plants in our care effectively is now being directly applied to species in the wild. Great examples of rescuing species from extinction include the California condor, American burying beetle, Puerto Rican crested toad and black-footed ferret. Other species are now in the process of being rescued in response to pressures being placed on them. The conservation arena is constantly changing while AZA-accredited zoos and aquariums and our partners continue to develop expertise to save species.”

*Michael Mace
Director of Animal Collections and Strategy
San Diego Zoo Global
Recipient of the 2017 Top Honors for AZA's North American Conservation Award*



Collaborative Conservation

AZA members worked collaboratively on field conservation through 95 Animal Programs, including Taxon Advisory Groups, Species Survival Plans® and the Avian Scientific Advisory Group. More than ten members reported working with each of the following: Tiger SSP, Jaguar SSP, Komodo Dragon SSP and Ape TAG.

What Did AZA Zoos and Aquariums Do?

Field conservation projects worked directly with animals, their habitats and the people living with or impacting the targeted animals. The majority of field conservation projects in 2017 focused on:

- » Population biology/monitoring
- » Reintroduction
- » Conservation/environmental education
- » Community participation
- » Awareness
- » Habitat assessment/monitoring
- » Habitat protection
- » Rescue, rehabilitation and sanctuary
- » Conservation biology
- » Habitat restoration



SAFE: Saving Animals From Extinction



Launched in 2015, SAFE combines the resources and collective expertise of AZA members and partners with the power of zoo and aquarium visitors to save animals from

extinction. SAFE prioritizes collaboration among AZA member facilities and builds on existing recovery plans to implement strategic conservation and public engagement activities, allowing us to measure and report conservation achievements. In 2017, four new SAFE species programs were established, including for African vultures, black-footed ferrets, giraffes and radiated tortoises, bringing the total number to fourteen. AZA members reported spending more than \$15.7 million in 2017 to help save these animals from extinction:

- | | |
|----------------------------------|----------------------------------|
| » African penguin: \$630,000 | » Gorilla: \$1,950,000 |
| » African vultures: \$220,000 | » Radiated tortoise: \$80,000 |
| » Asian elephant: \$310,000 | » Sea turtles: \$4,300,000 |
| » Black-footed ferret: \$930,000 | » Sharks and rays: \$2,750,000 |
| » Black rhinoceros: \$520,000 | » Western pond turtle: \$320,000 |
| » Cheetah: \$720,000 | » Whooping crane: \$1,190,000 |
| » Giraffe: \$670,000 | » Vaquita: \$1,120,000 |

Download the 2017 *SAFE Annual Report* and learn more at:
www.aza.org/aza-safe.

education programming

TOP 5 HOT TOPICS INCLUDED IN PROGRAMS

- 1 Connecting to Nature
- 2 Habitat Loss
- 3 Human-wildlife Conflict
- 4 Careers
- 5 Sustainable Living



148 FACILITIES REPORTED

144 accredited facilities

4 certified related facilities



3,700+

FTE educators employed by
AZA-accredited facilities

supported by over

**28,500 EDUCATION
VOLUNTEERS**

contributed more than

**2.6 MILLION HOURS
OF SERVICE**

44%

**ENGAGED THROUGH
VISITOR-DRIVEN INQUIRY**

*including with hands-on learning
environments like nature play
spaces, interpreters at exhibits,
discovery carts and more!*

2,800+



**TOTAL EDUCATION PROGRAMS
REPORTED**

CONSERVATION MESSAGES WITH THE LARGEST REACH

CONSERVATION ACTION	INDIVIDUALS REACHED (NON-UNIQUE)
Make informed purchasing decisions/ be a conscious consumer	21+ Million
Learn about the issue and teach others/ encourage collective action	19+ Million
Support conservation efforts and organizations (e.g., give money, volunteer)	13.5+ Million
Conserve energy/reduce carbon footprint (e.g., use alternative transportation, unplug electronics)	13+ Million
Respect wildlife	11.5+ Million



Inspiring Conservation Action

When delivering conservation education programs, AZA-accredited facilities raise awareness about conservation issues and promote actions visitors can take that help save wildlife and wild places.

- » Programs that included actions to address conservation issues had a reach of **70 million**.
- » More than **96 percent** of responding facilities offer education programs that engaged participants on a conservation issue and promoted a conservation-related action.

Reaching Beyond Our Gates

Providing on-site visitors with an inspiring and educational experience is just one of the ways AZA-accredited zoos and aquariums share their conservation messages. Outreach into the community with off-site programs is a key way to reach new, often underserved audiences and create opportunities for hands-on conservation action. These include school programs, mobile exhibits, citizen science events and waterway clean-ups, as well as programs hosted at libraries, senior centers and hospitals.

- » **More than three-quarters of reporting facilities** offered off-site education programs reaching more than **3.25 million**.
- » **Over 775,000** were reached through programs targeting Title I schools, including over 425,000 in programs that took place off-site, online or had both on-site and off-site components.



Connecting People to Nature

An opportunity for family bonding, learning and fun begins with every trip to an AZA-accredited zoo or aquarium. A trip also represents a nature experience for many families. It is a means of connecting with animals and the natural world while in a familiar and safe environment. AZA-accredited zoos and aquariums are gateways through which millions of people learn about and value the diversity of the natural world.

- » **135 facilities** reported more than **1,000 education** programs that included content about connecting to nature, reaching more than **34 million**.

“At the North Carolina Aquarium at Pine Knoll Shores we recognize that youth are our next generation of ocean conservationists and environmental stewards. By focusing on our Aquarium Teen Ambassadors, we are supporting the ocean leaders of the future. Our goal is to teach and promote positive conservation actions which address environmental health, long-term. Our program also emphasizes the importance of youth development skills: increasing confidence, building communication skills, gaining public speaking experience and increasing the understanding of science and the scientific process. We are excited to connect teens with the stewardship role they play now, and in the future, and embrace that youth engagement in conservation is imperative to sustaining a healthy planet for future generations.”

*Windy Arey Kent
Education Curator
North Carolina Aquarium at Pine Knoll Shores*



green (sustainable) business practices

Percent of respondents that documented
annual resource use:



78
ENERGY



67
WATER



59
FUEL



45
WASTE

39

FACILITIES REPORTED HAVING A
DEDICATED LINE ITEM IN THE BUDGET
FOR GREEN PRACTICES



139 FACILITIES RESPONDED

138 REPORTED DATA



61

facilities purchased renewable
energy or generated it on-site

125.75

FTE staff dedicated to
coordinating the green
business practices at

70 FACILITIES



57%

SOURCED LOCAL FOOD
OR GREW SOME ON-SITE



Recycling and composting
were the most frequently
reported green practices

A Community Conserving Natural Resources

AZA-accredited zoos and aquariums and certified related facilities are increasingly careful stewards of the natural resources utilized in their business operations and are developing and implementing an array of innovative strategies to meet their green goals. Under the leadership of the Green Scientific Advisory Group, the AZA community actively mentors and challenges one another in this field.

The mission of the Green SAG is to lead the AZA community in reducing human impact on natural resources and wildlife through sustainable business operations.

The Green SAG is guided by its 2016–2020 Action Plan, which reflects a vision of operational sustainability embedded in the culture and implemented through the strategic plan of every AZA facility.

Become involved in and help advance this community of practice by connecting at workshops like the Green Summit at AZA's annual Mid-Year Meeting, exploring resources like the *Green Guides* and reading and sharing your stories in the *Green Tales* article in AZA's monthly member magazine, *Connect*. Learn more at: www.aza.org/green-practices.



“At Philadelphia Zoo, we strive to lead by example. Communicating the collective impact of our sustainability efforts and empowering visitors to join us in taking action on-site can plant the seed for visitors of all ages to become wildlife heroes in their homes, schools, workplaces and communities. We want our staff and visitors to know that each step they take for conservation matters, because taken together, these steps add up to make a big difference for wildlife.”

*Emily Katzin
Sustainability Manager
Philadelphia Zoo
Recipient of 2017 Top Honors for the Green Award*

TOP TEN MOST COMMON GREEN PRACTICES

- » Commingled recycling
- » Composting (on-site or off-site)
- » Waterwise landscaping
- » Local food procurement (on-site animals and/or guests)
- » Building energy management
- » Graywater reuse and/or rainwater harvesting
- » Construction waste diversion/recycling
- » Solar or wind energy generation
- » Stormwater management program
- » Green purchasing policy/green procurement

Green Power

In 2017, 60 facilities reported generating renewable energy on-site or purchasing it for their business operations. Thirty AZA member facilities reported the amount of renewable energy generated or purchased, totaling nearly 39 million kilowatt hours (kWh)—enough to power more than 3,600 homes for a year!

Waste Not

Waste management includes proactively minimizing the amount of waste that would be generated or sent to landfills, in addition to recycling and composting wherever possible. 51 facilities reported recycling more than 88,000 tons of waste, while 40 facilities reported composting nearly 25,000 tons of materials.

Third-party Verification

Independent organizations confirm the green practices at AZA facilities. Twenty-three facilities reported having certified wildlife habitat on-site, 22 facilities reported buildings that are LEED-certified by the U.S. Green Building Council, and 11 were Dine Green-certified by the Green Restaurant Association. Additionally, facilities reported receiving their state or city's Green Travel, Hospitality or Green Business/Building-related certifications in eight U.S. states (Alaska, California, Maryland, North Carolina, Tennessee, Virginia, Washington and Wisconsin) and two Canadian provinces (Alberta and Ontario).

Eat Local

Seventy-nine AZA facilities reported sourcing local food or growing it on-site. Thirty-seven facilities quantified the amount of local food as 5,904 tons. In the 2008 Food, Conservation and Energy Act, the U.S. Congress defined a “locally or regionally produced agricultural food product” as having traveled less than 400 miles from its origin, or having been consumed within the state in which it is produced.



mission-focused research



\$25,000,000

SPENT ON RESEARCH

170

peer-reviewed papers,
technical reports, book chapters
or graduate theses published



60% of research
projects

**LED BY AZA MEMBER
FACILITIES**

1,280

PROJECTS
REPORTED



173 FACILITIES REPORTED

455.15

FTE researchers on staff
at 80 reporting facilities

485

**SPECIES AND
SUBSPECIES STUDIED**



“As an animal welfare scientist, my research initially focused on gauging the welfare status of zoo animals by combining behavioral observations with non-invasive measurement of stress hormones. This led to the development of multi-institutional studies of behavior using keeper assessments and epidemiological statistical techniques to understand the factors that combine to influence zoo animal welfare. In zoos, our interpretation of good welfare is changing as we shift from considering only longevity, breeding success and physical health to measures of individual psychological well-being, particularly those assessing positive affective states. This is evidenced by environmental enrichment techniques becoming an everyday part of husbandry, and the development of individual welfare monitoring tools. As we move forward, study of the reciprocal benefits of good keeper-animal relationships promises to lead to better understanding of the cognitive and emotional requirements of zoo animals.”

*Kathy Carlstead, PhD
Research Associate
Smithsonian Conservation Biology Institute
2017 honoree of the Devra Kleiman Scientific Advancement Award*

Research Focus

Contemporary animal management, husbandry, veterinary care and conservation should be based in science and a commitment to scientific research is a trademark of modern zoological parks and aquariums.

Animal care, health and welfare are the AZA community’s most common focus of research followed by species and habitat conservation, dealing primarily with populations in the wild or those being prepared for reintroduction into the wild. This second topic is where the most research funds are directed. Together, these two disciplines describe 68% of the AZA community’s research. Other research explored basic biology (17%), sustainable animal collections (focused primarily on populations held in human care; 11%) and conservation education and public engagement (4%).

Species Studied

More than half of all research focused on mammals, with western gorillas, chimpanzees, Asian elephants, African elephants and tigers being the most frequently studied. Out of the projects focused on specific species or taxa, research focused on:

- » Mammals – 61%
- » Birds – 15%
- » Reptiles – 8%
- » Fishes – 7%
- » Invertebrates – 5%
- » Amphibians – 3%
- » Flora – 1%

Where is Research Done?

Research by staff at AZA-accredited zoos and aquariums took place in 60 countries, with the vast majority occurring in the United States, distantly followed by research conducted in Canada, Peru and Madagascar. While some research took place in coastal regions, wetlands, tropical rainforests and other habitats, 664 projects were conducted on-grounds at AZA-accredited zoos, aquariums or certified related facilities.

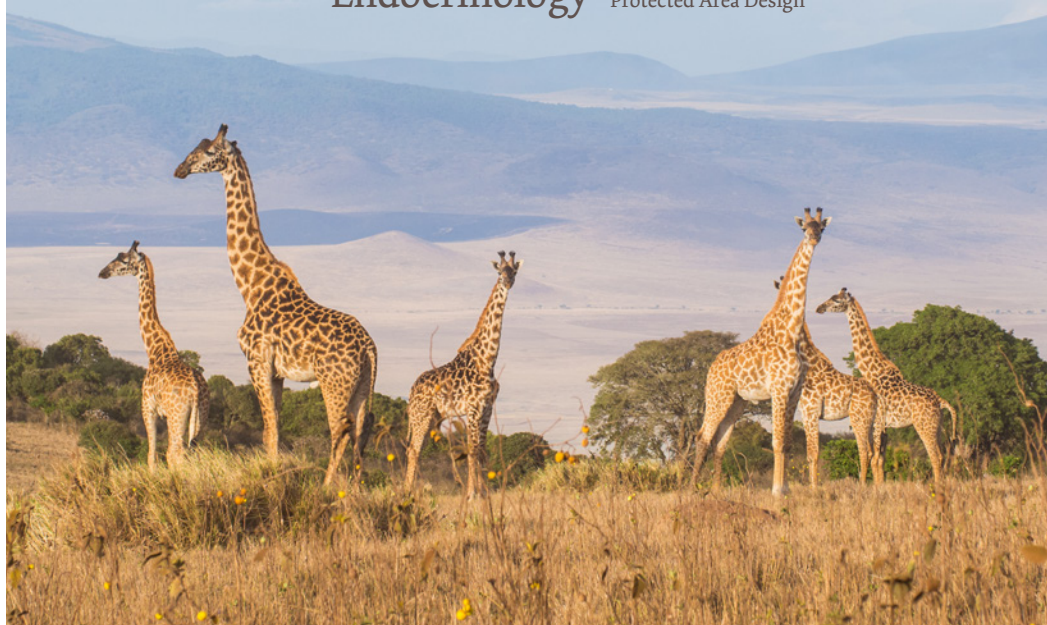
Find Our Findings

Facilities reported 170 peer-reviewed papers, technical reports, book chapters or graduate theses published in 2017. These publications most frequently appeared in:

- » *Journal of Zoo and Wildlife Medicine*
- » *PLOS ONE*
- » *Zoo Biology*
- » *Oryx*
- » *Diseases of Aquatic Organisms*
- » *Herpetological Review*
- » *Journal of Herpetological Medicine and Surgery*
- » *Journal of Wildlife Diseases*
- » *Marine Ecology Progress Series*

KEYWORDS USED TO DESCRIBE EACH RESEARCH PROJECT

Environmental Education Ecology/Natural History
Reproductive Biology Sensory Biology
Population Biology Physiology
Welfare/Wellness Non-Native Species
Biology Genetics Population Management
Animal Training
Nutrition Ethics **Behavior**
Husbandry Reintroduction and Translocation
Conservation Education Pathology Botany Life History
Habitat Preservation and Restoration
Exhibit Design/Evaluation Visitor Studies
Animal Health Taxonomy Cognition
Program Evaluation Biotic Survey Pharmacology
Habitat Assessment/Monitoring
Citizen Science Conservation Status Assessment
Enrichment **Disease/Epidemiology**
Human-Wildlife Conflict Habitat Demography
Endocrinology Protected Area Design



By the close of 2017, the AZA community included 230 accredited zoos and aquariums and 12 certified related facilities. Members' survey response rate varied by topic: 90% for field conservation, 61% for education programming, 57% for green business practices and 71% for mission-focused research. AZA is grateful to each member that responded to these surveys.

These Highlights were compiled by Arslan Ahmad (Program Assistant, Conservation and Science), Shelly Grow (Vice President, Conservation and Science), Amy Rutherford (Director, Professional Development and Education) and Haley Gordon (Program Assistant, Conservation and Science).

