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Charting a New Course

As the Columbus Zoo and Aquarium in Powell, Ohio, heads toward its 100th anniversary in 2027, it is embarking on a number of exciting changes, including renovations and fresh spaces, new programs, and a higher profile for conservation work. With the projects in different stages of planning and completion, all are part of an intentional shift in focus to position the institution for the next 100 years.

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Partners In Conservation

The Partners In Conservation program has been helping wildlife and people in Rwanda, Uganda, and the Democratic Republic of the Congo since its founding at the Columbus Zoo and Aquarium in 1991. Partners in Conservation focuses on three key pillars: gorilla conservation and health; education and sustainable livelihoods; and habitat protection and conservation.

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Columbus Zoo's EEHV Lab Part of a Life-Saving Network

By October 2022, the Columbus Zoo and Aquarium's EEHV lab was fully operational, and the Zoo became just the fourth U.S. zoological park to have this on-site lab. Planning, developing, running, and maintaining an EEHV lab is a huge commitment but certainly one that is impactful and worthwhile.

BY ADAM FELTS AND DAN WALLON



A HOLISTIC APPROACH TO
Rhino Research

The American Institute of Rhinoceros Science

By Sarah Gilsoul



As wild rhino populations face ongoing threats to their survival, the need to ensure the health and sustainability of managed populations in zoos grows. Yet, maintaining a thriving *ex situ* population does not come without its challenges as our understanding of rhino health and behavior, their reproductive challenges, and the impact of diet in managed care is not yet complete.

A coalition of rhino scientists established the American Institute of Rhinoceros Science (AIRS) to tackle the scientific challenges for sustaining rhino populations through four research pillars: physical fitness, wellbeing, reproduction, and iron overload disorder.

The initiative is a partnership between the Cincinnati Zoo and Botanical Garden's Lindner Center for Conservation and Research of Endangered Wildlife (CREW) in Cincinnati, Ohio; Disney's Animals, Science and Environment in Orlando, Fla.; George Mason University; the South-East Zoo Alliance for Reproduction and Conservation; the University of Stellenbosch in South Africa; and The Wilds in Cumberland, Ohio, which serves as the base of operations for the program. Funding for the initiative was provided by the Institute of Museum and Library Services (IMLS). Through the IMLS grant, the Cincinnati Zoo and Botanical Garden appointed Dr. Parker Pennington as the on-site operations manager at The Wilds, serving as a driving force behind the AIRS program as well as being the reproductive pillar leader.

2022 marked the completion of The Wilds' first full year working in collaboration with AIRS. While the work is far from complete, this milestone provides an opportunity to reflect on a year of data collection.

Comprehensive Care at The Wilds

Due to The Wilds' long history of collaboration with CREW and its notable success in rhino reproduction, the facility became a natural choice for AIRS as its base of operations. Despite the community's challenges with reproductive dysfunction in rhinos, in 2022, The Wilds welcomed its 29th white rhino calf.

There are certainly some theories as to why The Wilds has seen so many births over the years. The rhinos are able to explore 130 acres of pasture and exhibit a wide range of natural herding behaviors during the warmer months. Southern white rhinos are also sensitive to phytoestrogens in their food and due to their freedom to graze for eight months out of the



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year, rhinos at The Wilds receive very little supplemental grain. It is possible that both the ample space and diet positively impact their reproduction.

“The Wilds has created the only fourth and fifth generation rhinos outside of Africa, so clearly, they’re very good at making rhinos,” said Dr. Pennington. “Through AIRS we want to understand what exactly enables them to be so successful.”

With this objective in mind, the reproduction pillar aims to understand the factors contributing to the varying levels of breeding success in rhinos across facilities. Recent research has revealed that a significant portion of the managed population does not ovulate regularly. Through hormone analysis and ultrasounds, researchers have found that some animals’ ovaries are inactive and others have active ovaries but are not ovulating. The pillar’s primary goals include the accurate classification of individuals who are not ovulating, the identification of normal cycling animals, and the establishment of measures of estrogen, which would offer insights into ovarian activity.

The goal of understanding reproductive success in rhinos is but part of the broader objective of AIRS to holistically manage rhinos.

In addition to the part they play in reproductive research, the rhinos at The Wilds contribute to the physical fitness and wellbeing pillars.

When researching the physical fitness pillar, AIRS staff examine rhino measurements and the biomarkers that indicate important health information, such as sugar levels and heart rate.

Researchers have taken an innovative approach to tracking activity levels under different management regimes by using anklets, similar to Fitbits®, to monitor the movement of the rhinos over a set period of time. This data enables an understanding of individual activity levels and the potential correlation with overall health parameters.

While the wellbeing pillar also looks at activity, it shifts its focus to the individual personalities of rhinos and how social interactions might impact their welfare under different management conditions. Building upon the activity data gathered from the anklets, researchers track the type of movements that rhinos are engaged in, as well as their interactions with other rhinos and their keepers. Additionally, participating facilities complete a husbandry survey that provides insight into how the animals are managed and if that has any behavioral outcomes.

At The Wilds, rhinos have not been involved in the iron overload disorder pillar, as this syndrome is primarily seen in browsing species like black rhinos. However, significant research is underway in this area to find non-invasive biomarkers that can indicate the presence of excessive iron in the body.

While there are specific goals within each pillar, nothing happens in a vacuum. The project scale allows researchers to investigate rhino physiology at the intersection of these research areas.

“How physically fit an animal is can have an impact on its wellbeing, which in turn can impact its reproductive success or failure,” said Dr. Terri Roth, vice president of conservation and science at the Cincinnati Zoo and Botanical Garden and director of CREW.



Alongside its contribution of data, The Wilds has served as a testing ground for AIRS' research procedures. The program's launch at The Wilds also involved the training of graduate students who now travel to participating institutions to acquire and collect data. The data collection follows a seasonal timeline, with each facility visited once during the summer and again in the winter. Independently, participants collect monthly blood samples for one year and are tasked with collecting weekly samples for 12 weeks in both the summer and winter seasons.

“Our rhinos have helped us figure out the best way to do certain procedures,” said Dan Beetem, director of animal management at The Wilds. “They've helped us figure out what works and what doesn't before we go out and ask other facilities to do the same.”

Building the Momentum

AIRS is still far from finished. After a year of implementation at The Wilds, the facility still plans on enrolling the other half of its rhino herd into the program for another full year of research. Moreover, as new institutions continue to join the

program, data collection will expand.

“The last year of this project is going to be a lot of pulling those pieces together,” said Beetem. “We're going to be doing the data analysis, starting to write the manuscripts, and then coming up with care recommendations.”

The goal is to take all of the data collected from the AIRS studies and compile it into a centralized database accessible to all members. In addition to updated rhino care recommendations, participating members will be provided with reports specific to each facility and their rhinos, with information about how their animals compare to the rest of the population.

Although the study results are not yet known, AIRS researchers remain open-minded and optimistic.

“This project is a really great example of what we can do when we put our resources together,” said Dr. Jan Ramer, senior vice president of animal care and conservation at Columbus Zoo in Powell, Ohio, and The Wilds. “Together, we can achieve a lot for the wellbeing of our animals.”

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