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New at the Zoo: ZIMS

JEFFREY P. COHN

A new database about to be launched for zoos and aquariums will overhaul outdated record-keeping systems. Through the Zoological Information Management System, keepers, curators, and veterinarians will have access to integrated, up-to-date information about collections worldwide to track animals, diagnose diseases, and communicate treatments.

Zoos and aquariums around the world will launch a new, Internet-based computer data system early next year that could revolutionize how they keep and use records to manage their collections and to monitor new and emerging diseases. The new computer system, called the Zoological Information Management System (ZIMS), will allow keepers, curators, veterinarians, registrars, and other zoo and aquarium staffers to enter and access more reliable, consistent, and up-to-date information about their animals faster than they can today.

ZIMS will let any authorized zoo or aquarium staffer use the new database to check and revise animal records; get answers to husbandry, veterinary, or research questions; and combine data in new and more creative ways than was previously possible. ZIMS will also enable zoos and aquariums to eliminate redundant record systems and handwritten studbooks, replacing them with a single, comprehensive database available to all users in real time. That will let them more easily find mates for and determine the parentage, origins, or birth and death records of their charges. And it will help them better diagnose and treat their animals and to track diseases that could spread not only from animal species to animal species but also from wildlife to humans.

"Zoos need to know more about the animals in their collections," says Michael Hutchins, a former director of conservation and science at the American Zoo and Aquarium Association, now executive director of The Wildlife Society. "ZIMS represents a tremendous tool that will make life a lot easier for the living. It will be critical for providing information for zoo managers" who have had to wait sometimes months for written reports to be submitted and then entered into a database.

A strategic rethink

If everything goes as planned, ZIMS will replace the desktop software systems and databases run by the International Species Inventory System (ISIS). First adopted in 1974, the ISIS database contains information on the species name, age, sex, birth, death, sale, and loan of more than two million living and dead animals in 645 member institutions in more than 70 countries on six continents. That information will become part of ZIMS.

For more than three decades, ISIS has grown opportunistically, adding members, computer software, additional data sets, and new missions as it went along, says Nathan Flesness, the group's executive director. It comprises separate software systems for animal records, veterinary and physiological data, and single population analysis, known respectively by their acronyms as ARKS, MedARKS, and SPARKS.

By the late 1990s, however, ISIS software and data standards had become outdated. For one thing, some zoos added their own, newer software, some of which was incompatible with ISIS's. For another, a few zoos and aquariums maintained their own records and studbooks, which often contained information that was inconsistent with data held by ISIS and other institutions. Third, the ISIS, ARKS, MedARKS, SPARKS, and other software programs were designed at different times for different purposes, and only some of their data could be sent from one software program to another.

The ISIS database was originally conceived by the late Ulysses Seal, a University of Minnesota biochemist and researcher at the Veterans Administration Hospital in Minneapolis. It is important to note, however, that ISIS is now both a computer-based data system with

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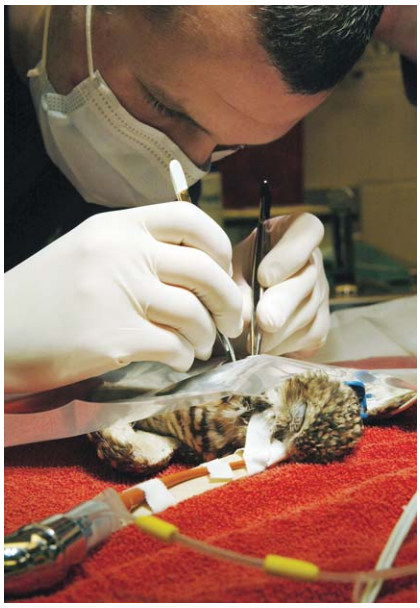
Members of the international zoo and aquarium community confer at a ZIMS design workshop. Workshop participants discussed the needs a new system would have to address, the kinds of data it would manage, and how it should be designed and implemented. Photograph courtesy of ISIS.



A St. Louis Zoo veterinarian performs a liver biopsy on an owl. ZIMS will help zoos share information about treating animals and tracking diseases that could spread not only from animal species to animal species but also from wildlife to humans. Photograph: © Saint Louis Zoo.

accompanying software and an organization that maintains and runs that database, whereas ZIMS is simply a software program. Although ISIS software programs will be replaced by those of ZIMS, the latter will be administered by ISIS in its offices in Eagan, Minnesota, a suburb of Minneapolis and St. Paul.

The idea for a single, integrated, Web-based data system to replace ISIS arose at a meeting in Amsterdam in 2000. The meeting enabled participants to undertake "a strategic rethink" of zoo databases, Flesness says. That, in turn, let participants envision what the next-generation database for zoos and aquariums might look like, adds Jonathan Ballou, director of conservation biology at the National Zoo in Washington, DC, and chairman of ISIS's scientific advisory committee.

Next, ISIS and other groups organized a series of meetings and conferences over the next three years in the United States and elsewhere around the world. The meetings brought together computer technicians, registrars, curators and keepers, and contractors and consultants from zoos and aquariums. Together, participants discussed what kind of new data system they needed; the equipment, software, and data standards required to operate such a system; what uses might be made of a new system and the data it would hold; and how it should be planned, designed, and implemented.

That effort turned out to be an "amazingly complex, exciting, and draining" process, says Hans Keller, chief technology officer at the National Aquarium in Baltimore, who chaired the technical subcommittee that helped develop ZIMS. In all, more than 500 staffers, volunteers, consultants, and contractors from more than 200 institutions in 30 countries participated, most at no cost to ISIS. Keller estimates he has spent on average 10 hours a week since 2001 on ZIMS, or about 2000 hours total—all of which came on top of his regular job at the aquarium. "I felt a sigh of relief at the end," he admits.

Getting it done

Before anyone could feel relief, though, a number of issues and problems had to be resolved. The most important was, and remains, funding. To date, ISIS has raised more than $4 million of the projected $10-million cost of planning, designing, developing, and adopting ZIMS. That leaves more than $5 million yet to be raised, says Jeffrey Bonner, president of the Saint Louis Zoo and chairman of the ISIS board of directors. Supporters hope to get most of that from government grants, but so far ISIS has received money only from the National Science Foundation, the Centers for Disease Control and Prevention (CDC), and the Institute of Museum and Library Services.

Most of the money collected so far came from contributions by ISIS members. Member dues were also raised by about 50 percent to fund new staff to help develop ZIMS. That created some problems. "We heard about it," Flesness says, explaining: "There were some ill feelings among the larger zoos, but none dropped out." ISIS dues are prorated depending on a zoo's or aquarium's size and location. Larger ones in the United States and other developed countries pay up to $12,000 a year, while those in the developing world pay as little as $250.

ZIMS may be delayed, but is unlikely to be derailed by any problems over raising the additional money needed to fund its implementation, says Bruce Bohmke, deputy director of the Woodlands Park

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Zoo in Seattle. If necessary, ISIS may again raise its dues. "ZIMS is an essential tool for every zoo and aquarium," Bohmke states. "We'll get it done."

Another, more technical problem arose over how animals that normally live in herds, colonies, or other groups could be listed in databases. Take neon tetras in an aquarium. Since one tetra cannot be differentiated from another, Keller says, it is virtually impossible to list them as individuals, let alone identify their parents or offspring. As a result, ZIMS will treat them and other fish, as well as herding animals, as a single group.

A third issue involves what data to report to ZIMS, the National Zoo's Ballou says. Reporting data could harm a zoo or aquarium if the information affected its public relations, attendance, or insurance liability. Zoos, for example, regularly necropsy dead animals found on their grounds, whether they are part of their collections or not. As a result, veterinarians at the Bronx Zoo learned that dead crows found there were carrying the West Nile virus. The virus was probably widespread in New York, but when that information became public, the adverse publicity led some would-be visitors to stay away from the zoo. To resolve the problem, Flesness says, ZIMS will list data by county or state, as CDC currently does, rather than by specific zoo or aquarium. "That avoids the negative consequences for zoos that share data," he says.

On the other hand, the fact that zoos study dead animals illustrates one way ZIMS will benefit the larger society beyond zoos and aquariums, says Gerald Borin, executive director of the Columbus Zoo and Aquarium, in Ohio. Veterinarians will be able to query the ZIMS database to find out how and with what dosages vets at other zoos treated a camel with, say, purple spots. The information will also let CDC and other researchers monitor and track diseases like the West Nile virus as it spreads through wild and zoo animals.

Visit this Web site for more information:

International Species Information System: *www.isis.org/CMSHOME*

ISIS staff and volunteers from the zoo and aquarium community will launch ZIMS as a pilot project this fall at 20 institutions worldwide. Results will allow ZIMS's developers to correct any glitches, Flesness says. Once that is done, ISIS staffers will begin the two- to three-year process of converting the remaining 625 zoos, aquariums, and other ISIS members to the ZIMS software one by one, beginning in early 2007.

"Nothing like this has ever been done before," Ballou says of the zoo and aquarium communities' efforts to plan, design, develop, and adopt ZIMS. "Everybody is ready for something new. [ZIMS] will take us into the 21st century of computer databases."

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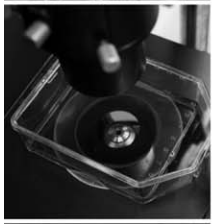


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