

## CONSERVATION BIOLOGY

# Into the Wild: Reintroduced Animals Face Daunting Odds

Researchers in the emerging field of wildlife reintroduction battle hawks, habitat loss, and poachers to give animals a second chance

**CHICAGO, ILLINOIS**—In some ways, the science of reintroducing wildlife to the wild is like staging a reality show: Even after you get the principal actors into the right setting, there's no telling what they will do. Take the case of juvenile male otter A08, released with adult males and females in a peat bog in the Netherlands 3 years ago in an effort to restore a flagship species (*Lutra lutra*) that had gone extinct in the wild in 1998. Once released, A08 was “chased away by the other males,” says population geneticist Hans Peter Koelewijn of the Alterra Research Institute in Wageningen, the Netherlands. But a year later, A08 surfaced as the father of half of the 28 young otters born in the wild, shown via genetic analysis of the otters' scat. “Somehow he'd become the dominant male,” Koelewijn recalled. With Genghis Khan–like determination, A08 busily impregnated most of the females for the next several litters.

Despite all the baby otters, the effort “seemed doomed to failure,” says Koelewijn, because A08's dominance raised the specter of inbreeding. When reports came of otters being hit by cars—their chief cause of mortality—Koelewijn admits that team members would whisper, “Let it be A08.” Ultimately, A08 took a natural fall: His sons deposed him.

A08's time in the sun holds a lesson for reintroduction programs, Koelewijn told the

audience at a recent meeting here:\* “You can have a technical strategy, a scientific strategy, and a socioeconomic strategy, but the animals also have their own strategy.”

The young science of reintroduction biology is struggling to map out those strategies for success, as evidenced by the tenor of talks and posters at the reintroduction meeting, organized by the International Union for Conservation of Nature (IUCN) and the Lincoln Park Zoo (LPZ) in Chicago, Illinois. More than 200 scientists and wildlife managers from 31 countries met for the first time, hoping to bring new rigor to sprawling efforts to restore species including the American burying beetle (*Nicrophorus americanus*) on Massachusetts's Nantucket Island and the one-horned rhinoceros (*Rhinoceros unicornis*) in India.

It's a mighty challenge. Early reintroduction efforts often failed; and today, less than half of all such projects are proven successful, says Joanne Earnhardt, an LPZ population biologist. In some cases, reintroduced species do well at first, only to be felled later by the same forces that drove them extinct in the wild in the first place. In other cases, there are simply no data on how reintroduced species are doing. And yet the field is exploding, growing from a

\* First International Wildlife Reintroduction Conference, Lincoln Park Zoo, Chicago, 15–16 April 2008.

◀ **Ready for reentry.** Released otters in the Netherlands quickly had a baby boom.

total of some 100 reintroduced species in the early 1990s to more than 700 by this year, 74% of them mammals and birds. (Another conference, focused on bird reintroductions, takes place this week at the Zoological Society of London.)

There are some striking success stories: Golden lion tamarins (*Leontopithecus rosalia*) in Brazil now number more than 1500 in the wild, and an astonishing 80% of bird reintroductions in New Zealand have proved successful. Researchers hope there will be more to come, given the long list of species in need. “We are in a time of extinctions, and reintroductions will be key in the 21st century,” zoologist Philip Seddon of the University of Otago in Dunedin, New Zealand, said at the conference.

Every reintroduction faces daunting challenges, from assessing the genetic diversity of the animals to ensuring that the habitat can sustain them. “Habitat quality is certainly key,” said Debra Shier, a behavioral ecologist with the Zoological Society of San Diego in Escondido, California. “But you have to measure it from the perspective of the animal.” In essence, any reintroduction is a “forced dispersal,” she explained, and there can be many reasons why an animal won't settle after being released into what humans think is perfect habitat. For example, even after 40 years, red kites in Britain haven't moved into the high-quality habitat scientists had identified for them; instead, they crowd in with other kites in central Wales.

Animals often settle in better if there are signs of their fellows nearby; thus, before translocating black rhinos in South Africa, biologists from the San Diego Zoo spread rhino dung around the new area. “It doesn't seem to matter whose dung it is,” said Shier, “just so long as it's black rhino dung.” Similarly, playback calls of black-capped vireos in Texas have helped reassure newcomers, and wooden decoys have drawn fairy terns in New Zealand to reestablish old breeding territories.

That behavioral approach has guided the reintroduction of the Puerto Rican parrot (*Amazona vittata*), said wildlife biologist Thomas White of the U.S. Fish and Wildlife Service in Rio Grande, Puerto Rico. Since 2006, 62 parrots have been raised in large cages—designed to help them stay aerobically active—right at the Rio Abajo site where they were to be released; to date, 46 have been set free and another 20 are scheduled to fly

this year. Living in the cages helps “imprint” the habitat, making it more likely that the birds will stay in the vicinity and form a flock with other parrots. “When they’re released, they are already ‘home,’” said White.

Newly released wildlife may also need to learn other key behaviors, including hunting and parenting. In the case of the parrots, White and his team try to train them to recognize and avoid their chief predator, red tail hawks, by watching managed attacks. With a parrot pair now nesting in the wild, 18 months after release, and about 25 birds still alive, the project may prove successful—although many at the meeting questioned just what “success” means in reintroduction biology.

IUCN defines the term as the establishment of a “self-sustaining population that requires minimal long-term management.” Some projects do meet this standard. For instance, dozens of bird species are thriving on their own again in New Zealand, where scientists are now bringing back reptiles, invertebrates, and plants—all the key players in island ecosystems that were lost after rats arrived on European ships. Some of the Kiwis’ success is due to the government’s



**Against the odds.** The Puerto Rican parrot (*top*) may yet be reestablished, but the Oman Arabian oryx is almost extinct in the wild.

“practical approach,” says Ian Jamieson, a behavioral ecologist at Otago. Faced with fewer regulations, managers can “just go in and do the job,” including removing all invasive species. Elsewhere, as in the United States and Europe, a tangle of government agencies may be involved in any reintroduction, and managers must juggle competing interests.

That’s why, for many projects, IUCN’s definition of success might “not be grounded in reality,” argues biologist Markus Gusset of Germany’s Leipzig Zoo. He studied a project in South Africa, which has reestablished several small populations of African wild dogs in conservation areas. There are islands of habitat separated by mostly unsuitable areas where people have moved in. So when the dogs reproduce, they must be trucked from one area to another, “mimicking a dispersal,” and put together in new packs. “It’s successful in the short-term,” Gusset said, because the dogs are reproducing. “But it can only be successful in the long-term if the translocations continue. It’s the best we can do.”

Indeed, the human hand hovered over every talk and poster at the meeting, and many researchers pointed out that without the support of local communities, reintroduction projects are doomed to fail. Wildlife biologist Andrew Spalton, an adviser on the environment to the Royal Court in Muscat, Oman, described how the once-lauded Oman Arabian oryx reintroduction program rapidly collapsed because of a thriving illegal wildlife trade, which caused the antelope’s original decline.

The last wild oryx (*Oryx leucoryx*) was killed in the desert of Oman in 1972; but Operation Oryx, working with the San Diego Zoo, was already breeding the animals in captivity. A decade later, oryx were returned to the wild, and within 13 years, in 1995, there were 450 wild Oman oryx roaming free. But the following year, poachers began capturing the oryx to sell to private collectors with “small zoos or pens in their backyards,” said Spalton. Buyers anted up \$25,000 for a wild female oryx. Some 100 poachers were arrested and convicted to no avail. Today, there are few wild oryx in Oman. Poaching for meat and catching females to sell was the “cause of the original decline, and it happened again,” said Spalton, perhaps because the project’s rangers “all came from one community.” Those left out were among the first poachers. “We did do the science,” Spalton concluded, “but we should have had social scientists on our team,” who might have come up with a better response to the poaching.



**Digging in.** The burying beetle is gaining a toehold on Nantucket.

Even when a project seems successful, in some cases it’s hard to be sure of the reasons because the original data are missing or incomplete. “Were Hawaiian crows reintroduced as adults or fledglings? No one really remembers,” says Earnhardt. “When you have a high-profile species such as the California condor, every egg that’s laid is documented. But for low-profile species such as the brown nuthatch, almost no data” have been collected. To help remedy these problems, Earnhardt unveiled a new LPZ database documenting the 602 releases of 128 avian species ([www.lpzoo.org/ARTD](http://www.lpzoo.org/ARTD)); a similar database is being created for amphibians.

An initial baby boom in the wild, like that spurred by A08, is no guarantee of long-term success, either, Seddon and others pointed out, saying that monitoring must continue. Conservation biologist Devra Kleiman of the Smithsonian Institution, who coordinated the tamarin project, now fears that it may be doomed by its own achievements. “It’s labeled a ‘success,’ so everyone thinks we can stop now,” she said. “We’re having difficulty getting funds to continue the monitoring,” leaving the tamarins potentially at risk for a repeat decline. “That’s the trap,” agrees Seddon. “I’m not sure we can ever take our eye off the ball,” especially because climate change may transform environments after animals have been released.

As for the Dutch otters, they may soon be on their own: The government may cut off funding next year. As feared, A08’s exuberant mating has led to sister-brother and aunt-nephew couples, and it’s not clear what the long-term effects will be. But other otters are mixing it up with more recently released individuals, Koelewijn says. Despite the challenges, he and other researchers are still optimistic that their work will help give the otters and other teetering-on-the-brink species a second chance to make a home in the time of the Anthropocene.

—VIRGINIA MORELL