Survival Test for Kenya's Wildlife

Embattled ecologist David Western faces an uphill fight in his struggle to save Kenya's rich biological heritage—and the agency meant to protect it

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Michael McRae

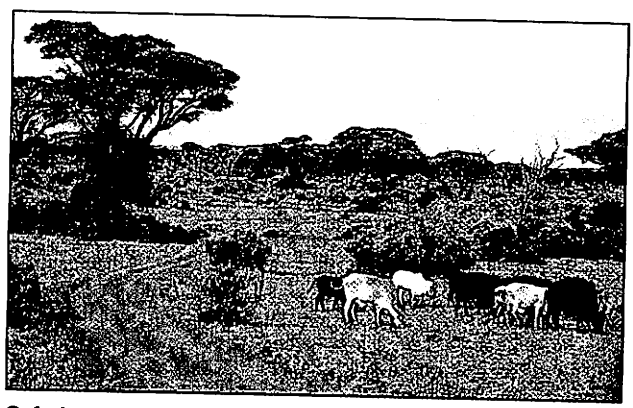
Two years ago, while working in Kenya's Amboseli National Park, elephant expert Joyce Poole encountered a gang of 28 Maasai tribesmen. Adorned in bright red shukas and carrying spears, the men told Poole they were out to avenge the loss of a fellow Maasai gored to death by an elephant. The vigilantes were out to get the attention of the Kenya Wildlife Service (KWS), too: "They told me they were going to kill 1000 elephants that day," Poole recalls. "They said that KWS wasn't listening to them." The group speared a cape buffalo—in plain view of tourists—and went on to spear a number of elephants, four of which died. When park rangers fired into the air to drive off one group of elephants under attack, the Maasai heaved spears at the rangers' Land Cruisers.

KWS is supposed to control "problem" animals—which can mean shooting them. But the Maasai lately have been taking matters into their own hands. Just last month, after a lion killed two goats on Maasai land, a group of 44 Maasai marched on park headquarters in Amboseli and threatened to eradicate the park's lions, says longtime Amboseli elephant researcher Cynthia Moss. "If you have a situation like that," Moss says, "something is not working."

Many things appear to be broken in KWS, an organization that paleoanthropologist Richard Leakey built into a strong-armed guardian of Kenya's biological wealth in the early 1990s before resigning in 1994. In the hot seat now is savanna ecologist David Western, who is presiding over KWS at a time when park revenues are bottoming out and the service is having a hard time meeting its $15-million-a-year budget. Drenched by El Niño–driven storms and wracked by political and ethnic unrest, Kenya has suffered a 60% falloff in tourist revenue since last fall—money that provides a third of the country's foreign-exchange income and 95% of KWS's operating budget.

Even under such duress, Western is pushing to extend the reach of KWS outside of Kenya's 26 national parks and 30 protected areas to "resolve the expanding number of problems that confront wildlife in Kenya today," Western says, and to preserve biological diversity country wide, not just in the parks. He's promoting an agenda of "parks beyond parks" and a network of community-based conservation projects in which landowners like the Maasai share profits from wildlife while assuming some of the responsibilities for protecting it. Community-based conservation is hardly a new approach, but Kenya's national experiment could serve as a model for wildlife agencies throughout the developing world (see story on p. 511).

Earlier this month, Western agreed tentatively to stay on as KWS director for another 2 years. But he faces a daunting challenge. Part of the battle is winning over colleagues and subordinates to his cause: Some observers have criticized Western for a remote management style that they say has put off KWS staff and potential donors. KWS is verging on "operational and financial breakdown," contended a commentary in the February-March issue of the journal of the East African Wildlife Society, *Swara*, which called the beleaguered service "a facade held together by a demoralized field staff."



M. McRAE

Safari scene. Amboseli rangers have struggled to keep wildlife in the park—and cows out.

Grand plans

KWS was formed in 1989 as a semiautonomous government corporation to replace Kenya's corrupt and ineffectual Wildlife Conservation and Management Department. Leakey, then director of Kenya's National Museums, was appointed to run the fledgling agency, which had inherited the old department's staff and infrastructure. Leakey cleaned house, built a crack force of anti-poaching rangers, and brought in new managers and researchers. By 1992, he had persuaded the World Bank to give KWS a 5-year, $143 million loan to underwrite a Protected Area Wildlife Service program (PAWS), whose goals were to rehabilitate Kenya's national parks and, more urgently, to halt elephant and rhino poaching and banditry. Based on rosy estimates of steadily rising tourist revenues, KWS projected that it would be self-supporting for the first time by 1997.

A key part of Leakey's strategy was to give KWS pride. That meant new vehicles, equipment, armaments, aircraft, and uniforms, and a doubling of salaries for the lowest paid rangers. In 1992, Leakey started construction of a grand new KWS headquarters. Completed in 1995, the building cost more than $2 million—almost $1 million over budget. "The building was a bit of a folly," says Richard Kock, who directed KWS's veterinary unit under both Leakey and Western. "But people were keen to have a big splash. It certainly made them feel proud."

Leakey ran a tight ship. Staff "were well turned out, willing to work, enjoying the work, getting rewards from just the sense of achievement," says Kock. Zoologist Rob Brett, who was brought in to direct KWS's rhino program, says that working under Leakey was "a golden period for me. Everything worked fantastically well. It's not a situation you often find in wildlife conservation in Africa."

At first, research was a low priority. Leakey "had more critical problems to control, like poaching and security," says Jim Else, former deputy director for science at KWS. But slowly, Leakey and Else freed up funds for research and provided a training ground for Kenyan university students. "Without having a lot of expenses, we developed a highly relevant program of applied research," Else says. One study assessed the impact of Rothschilds giraffes on the acacia forests at Lake Nakuru National Park. The elephant program, under Poole's supervision, looked for solutions to the growing problem of human-wildlife conflict, but also undertook more experimental research. One study investigated controlling elephant fertility by vaccinating females with a contraceptive, the first field trial of its kind. "We were doing so much and were so motivated," Poole says.

Things began to unravel, for Leakey at least, in June 1993, when a plane he was piloting crashed. Leakey eventually had to have both legs amputated below the knees. Although some, including Leakey, suspected sabotage, an inspection of the aircraft found no foul play. Leakey was back at KWS by

edited by CONSTANCE HOLDEN

Red Alert

Chinese authorities are scrambling to deal with an exotic threat in their waters: a "red tide" of microscopic algae that last week caused massive fish kills off the Hong Kong and South China coasts.

"This is a new problem for them," says Don Anderson of Woods Hole Oceanographic Institution in Massachusetts. Although the region experiences periodic algal visitations, this was the first from a major fish killer, the neurotoxic *Gymnodinium*. Officials say the noxious bloom originated north of Hong Kong and drifted southwestward, leaving an estimated 1500 tons of dead and rotting fish in its wake. Zhang Qi, a fish farmer in South China's Guangdong Province, told *Science* he lost 300,000 of his 1 million charges in a 6-hour period on 17 April.

HE LONGSHENG/CHINA FEATURES FOR SCIENCE

"Death tide." Victims pile up at Guishan Island, Guangdong.

While local officials blamed the event on a combination of El Niño–driven warm ocean temperatures and excess nutrients from fertilizer and sewage in the water, the causes of such a toxic eruption are very hard to determine, says Anderson. "Why it blooms in a given place and time is a result of a complex series of events" relating to temperatures, winds, and nutrients, he says.

The red tide receded after a heavy rain last weekend. But scientists and officials in Hong Kong and inland China are bracing for the next one. According to an official from the Chinese Agriculture and Fisheries Department, experts met last weekend to start mapping out a strategy for establishing a red tide "early warning system." That would include beefing up satellite surveillance: the Hong Kong Observatory is looking into how to do better tracking of such events by combining data on sea surface colors and temperatures from low-flying satellites.

Researchers Weigh New Cloning Controls

Biomedical researchers may be more receptive to anticloning regulation this summer after helping crush a Senate move in February to outlaw human cloning.

Last winter, researchers argued that a Senate bill would have forbidden useful research involving the cloning of human somatic cells, and the proposal was shelved (*Science*, 20 February, p. 1123). But now, members of the Federation of American Societies for Experimental Biology (FASEB) are considering a new scheme—along the lines of the Recombinant DNA Advisory Committee that monitors gene therapy—that would impose administrative controls, but not criminal sanctions, on some research. "The [anticloning] regulatory train is coming down the rails," says FASEB member Roger Pedersen, a radiobiologist at the University of California, San Francisco. "The president wants regulation, the Congress wants regulation"—and so do a lot of voters.

Members plan to ask FASEB to sponsor a debate on cloning in hopes of coming up with something short of a ban that both Congress and researchers can support. The FASEB council is to review this proposal on 5 May.

NAS Separates Itself From Kyoto Petition

The governing council of the National Academy of Sciences (NAS) this week took the unusual step of disassociating itself from a recent mass mailing urging scientists to lobby against the Kyoto treaty to reduce carbon dioxide emissions.

The mailing, which had a cover letter from former NAS President Frederick Seitz, included an eight-page attack on climate change research offered in a format that many scientists have mistaken for a reprint from the academy's journal, the *Proceedings of the National Academy of Sciences* (*Science*, 10 April, p. 195). NAS President Bruce Alberts says that congressional panels involved in R&D issues also have asked if the academy is involved in the petition drive, which has collected more than 15,000 signatures.

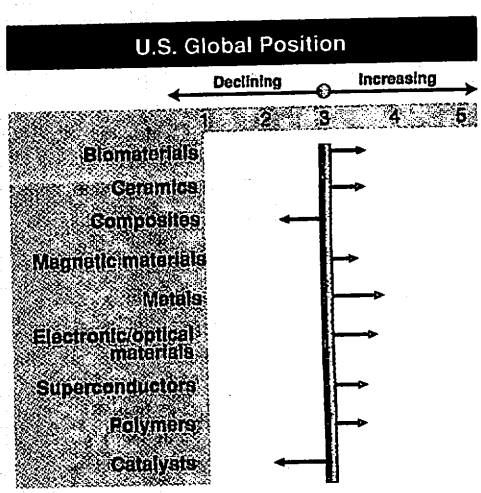
"It's important that Congress and the Administration not be confused about where we stand," says Alberts. "We're not taking a stand on the treaty, but we want everybody to know that we're not connected to the petition, that it would not have passed our peer-review system, and that in fact it takes a position that is the reverse of what the academy has said on the topic."

As an example of such efforts, the council's statement cites a 1992 academy report that concluded "greenhouse warming poses a potential threat sufficient to merit prompt responses." The date of that reference led one council member, mathematician Edward David, to abstain from voting on the resolution. "A lot has changed in 6 years, and I think our position should be based on the latest data," he says. A new academy report on the status of global climate change research is due out later this spring.

Material Wellbeing

U.S. researchers are either at the forefront or among the world leaders in virtually all aspects of materials science and engineering research, according to a new report released this week. And they are expected to remain on the cutting edge at least for the foreseeable future, with the exception of two subfields—composite materials and catalysts (see chart)—that are accorded very high priority by the competition in Europe and Asia.

Of "special concern," according to the report, produced by a joint committee of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine, is the need for a new neutron beam facility in the United States. Such facilities are used for everything from gauging the structure of polymers to tracking the behavior of electrons in superconductors. That deficiency should be remedied, however, if Congress follows through on its commitment to start building by 2000 a $1.3 billion Spallation Neutron Source at Oak Ridge National Laboratory in Tennessee.



"INTERNATIONAL BENCHMARKING OF U.S. MATERIALS SCIENCE AND ENGINEERING RESEARCH"

Others have questioned Western's research priorities. One of his first decisions was to cancel the elephant contraception experiment, which was nearing completion. Six mature cow elephants at a private sanctuary had been vaccinated with a pig-protein contraceptive in an attempt to permanently sterilize them or at least leave them infertile for a time. "If you're going to have elephants in small enclosed areas, you have to cull them or have alternatives" to prevent overpopulation, explains Poole. Some $34,000 had already been spent on helicopter spotting, darting operations, and serum monitoring when Western scrapped the project; the only remaining expense was about $6000 to administer final boosters and continue monitoring. "We were getting antibody titers," suggesting that the vaccines were having an effect, explains reproductive biologist Bonnie Dunbar of Baylor College of Medicine in Houston, who developed the vaccine. "But after we went to all that expense," she says, the project was canceled. When she tried to find out why, she says she was unable to get an appointment to see Western. "One of his cronies came out and said elephants were stomping people's houses and that spending money on contraception while that was occurring was politically unpopular," Dunbar says.

W. STONE / GAMMA LIAISON

Western "has put off donors and people of good will."

—Richard Leakey

Western says the project was aborted because it was too experimental to merit KWS funds and that the elephant research program as a whole was flawed. "I thought the standard of research was low, that they were not addressing crucial issues," he says. Instead, Western says, he has emphasized research on management issues, such as rehabilitating elephant-damaged ecosystems, satellite tracking of migration routes, and reducing human-animal conflicts. The revamped program also now has $350,000 from the European Union for independent researchers who want "to tackle those fundamental research questions that we don't think we should be doing," says Western. KWS should do more-applied research, he says: "identifying diversity, threats to diversity, and how they can be resolved."

Western has tried to beef up research in other areas, too. As PAWS funding has dried up, he has sought bilateral aid for projects ranging from wetland and marine ecosystems to antelope genetics and has just reached an agreement to bring in researchers funded by Colorado State University and Michigan State University to establish an early warning system on how key ecosystems might change over time. Western is also finalizing a major deal with the European Union to endow a $10 million biodiversity trust to support independent research in Kenya. "We have expanded our research role," Western says.

But the debate over KWS's direction is less about research funds than about Western's management style, as he struggles to emerge from Leakey's shadow. The going is particularly rough, considering that Leakey himself is one of Western's biggest critics. "His management style has put off donors and people of good will, because he simply is not open, not a man who inspires confidence or warmth," Leakey says.

Western has also been assailed in the local press, including the blistering commentary in the journal of the East African Wildlife Society penned by Robert Shaw, director of Kenya's Institute of Economic Affairs and a founding member of Safina, the opposition party Leakey represents in parliament. Shaw wrote that "KWS has dangerously run down its core operation [the national parks], lived beyond its means with several budgetary extravaganzas, and devoted a lot of time and energy to a series of alternative [community conservation] projects which are not working."

Western claims the column was a political attack based on erroneous information. More broadly, he disputes the contention that morale is flagging, citing a decline in elephant poaching in national parks—down from 14 in 1994 to only five last year. Countrywide, elephant-poaching incidents fell from 75 in 1993 to 29 in 1996, although last year the number rose to 44. "Those figures tell a story about the efficiency of our forces," he says. "A lot of elephants have moved out of the parks, and we've shifted the rangers to where the threat is."

Indeed, some observers believe Western's appointment signaled a turn for the better. "Leakey beat his drum a lot, so that everyone thought he was doing a great job," says marine ecologist Tim McLanahan, who has been conducting a coral reef conservation project in Kenya for the Wildlife Conservation Society since 1986. "Western is a quieter leader than Leakey, so that may be taken as weaker. He's trying to set up an organization that will endure, and he's worked on the personality of KWS's internal culture and the way it relates to communities," McLanahan says.

The road ahead

Still, the increasingly vitriolic public attacks and flagging park revenues present Western with a grim challenge in sustaining his focus on community conservation as well as keeping KWS afloat. After already laying off 900 of his 4100 employees to save money, Western says he plans to cut another 300 jobs in the near future. KWS occupies only two-thirds of its new headquarters building; it rents out the rest to generate revenue. Moss says pink-slip paranoia is palpable. "People are still very afraid they're going to lose their jobs," she says. "They tell me they are sitting in their offices every week expecting a letter saying it's time to go."

Western acknowledges that KWS's financial problems are an albatross around its neck. "It was a misstep in the beginning to push KWS down a blind alley by saying it would be self-sufficient in 5 years," he says. The overly optimistic income projections resulted in the government in the past few years phasing out most of its subsidy to KWS. Yet during the same period, tourist revenues fell far below expectations—$11.6 million in 1993–94 versus the PAWS projection of $17.7 million—and donor contributions earmarked for KWS's salaries and operations were gradually phased out, declining from $3.5 million in 1992 to zero by 1996. Rather than amassing an estimated $8 million surplus by 1997, Western says, KWS went into the red by tens of millions of dollars. "KWS operations were heavily underwritten at the outset of PAWS, giving the illusion of wealth," he says. "Now we must cover the full burden."

Although Western says he has received preliminary signals that the subsidy will be restored, the Kenyan economy is in dire straits. Nor is KWS likely to get another World Bank bailout. "We've been increasingly concerned and dissatisfied about how KWS manages its resources and sets priorities," says Agi Kiss, principal ecologist for the bank's African Environmental Group. "They've been spending more money outside of parks with very little effect on conservation. We're dissatisfied enough so that we don't have a second loan in the pipeline."

Nevertheless, Western says he is convinced he is pursuing the right course. "Whatever happens on the financial side, I feel confident that the involvement of Kenyans and landowners is going to bode very well," he says, adding that he has at least achieved his initial goal "to inject a lot more biology into conservation here. That's happened and it's going to move forward. The seed has been planted."

–Michael McRae

Michael McRae is an Oregon-based writer who frequently reports on Africa.

Spreading the Profits—and the Pain—of Wildlife Protection

For Kenya Wildlife Service (KWS) chief David Western, the struggle to keep one of Africa's premier guardians of biodiversity afloat (see main text) also amounts to a defense of his philosophy of involving communities in wildlife protection. This approach, Western insists, may be the only hope for saving Kenya's wildlife.

So far, KWS's community conservation efforts have focused on stimulating ecotourism and game ranching on lands around the national parks. The sale of hides and meat from zebras and other large animals is supposed to provide a small income to communities with few other prospects for earning money. Other projects include sea-cucumber farming around marine reserves and collecting butterfly pupae from coastal forests for sale to breeders and zoos abroad. And rather than cut trees for firewood, pastoralists in the desert north are being encouraged to tap resins such as gum arabica, frankincense, and myrrh, which are sold for use as thickeners or fragrances.

WILDLIFE CONSERVATION SOCIETY

Expansive view. Western wants to extend protection beyond park borders.

The approach is Western's answer to the changes he's watched unfold in Africa since his boyhood in Tanzania during the 1940s and '50s. "People now have legal rights to their land, and they are looking for ways to earn money off their resources, including wildlife," he says. "In areas where there has been no participation by the community, animal populations have suffered. ... Every single hectare you win outside parks is another hectare for wildlife."

Western's approach has plenty of skeptics—among them the very communities he's trying to help. That's because KWS once promised to share 25% of park proceeds with people living around the parks, a policy that Western inherited from Richard Leakey and has been trying to reverse, he says, because "it builds dependency, not self-involvement." Still, asserts elephant expert Cynthia Moss, "There's an attitude among the Maasai that they've been promised all this stuff, but it hasn't come through. ... They generally have a very negative feeling about KWS." Another prominent critic is the World Bank, which concluded in a recent study that community-based programs in Africa are failing to return much conservation bang for the buck.

But other experts say that over time, such efforts stand a good chance of succeeding. "There is so much biological diversity—frogs, reptiles, butterflies, and a whole lot of other organisms—that isn't included in parks," says A.R.E. Sinclair, director of the University of British Columbia's Center for Biodiversity Resources and a longtime field researcher in East Africa. "We just need to be more hard-nosed about the costs and benefits. So far no one has been prepared to impose penalties [on villagers] for not sticking with their side of the agreement."

Private landowners, meanwhile, applaud Western's approach. "Our community feels he needs help, not condemnation," says Gilfred Powys, a farmer in the game-rich Laikipia Plateau. "He's a scientist, not the world's finest administrator. But he has a clear idea of where he wants to go, and he can get it across." **–M.M.**

November, only to come under increasing political pressure after the World Bank funds began flowing. Kenya President Daniel arap Moi launched a probe of KWS that scrutinized everything from high salaries for KWS's expatriate consultants to the agency's military capability. The probe found that Leakey was not operating by the book and accused him of ignoring a mandate to share KWS's wealth with communities. Although Moi asked him to stay on, Leakey resigned in March 1994, claiming he had lost the president's support. Moi appointed Western to replace him.

Western was in trouble from the start. Many senior managers and researchers were more loyal to Leakey than to KWS. "Essentially the whole management team left," says Kock. Else did not want to join what he calls the "initial stampede" and stayed about 6 months before resigning with no job lined up. Poole was among the scientists who quit KWS when Leakey did, in what she calls a gesture of support—despite the fact that the European Union had just committed $2 million for her elephant project. "From the day Leakey left," says Kock, "there was despair."

After the managers abandoned ship, the rank and file lost their enthusiasm. "The junior staff and ordinary rangers settled back into their old ways and said, 'Well, no point in making much effort as long as we continue to get our salary,' " says Kock. "A culture of inaction developed."

M. McRAE

Tag, you're it. This elephant-tracking project reflects KWS's more-applied research bent.

A new focus

Against this backdrop, Western tried to implement a sweeping change in wildlife conservation. The PAWS program, he thought, was too narrowly focused on safeguarding Kenya's parks and game reserves, which encompass 8% of Kenya's land mass and only about 10% of its native species. KWS was going to live up to its legally defined mission to protect all of Kenya's flora and fauna—and it would begin using more science and less firepower to do it. Says Western, "I place the highest priority on the maintenance of biological diversity and the need to use biological information as the core of planning and managing."

Western's first big move was to order KWS's research department to inventory the country's biological resources. In 1995, Western began a 2-year process of reorganizing the entire staff, sending many Nairobi-based researchers into the field. The newly decentralized agency's emphasis shifted from protectionism to preserving biodiversity, monitoring wildlife populations, and forming partnerships with landowners in community wildlife utilization and ecotourism enterprises.

"The reorganization caused a lot of disturbance," recalls remote-sensing specialist Wilber Ottichilo, who replaced Else as research director. About $500,000 of PAWS money was available for ecological monitoring, but the staff relocations made it hard to get work done. "Everything came almost to a halt," Ottichilo says.