

ECOLOGY

Global Analyses Reveal Mammals Facing Risk of Extinction

Two new studies are helping conservation biologists think big—in the case of one of the studies, as big as one-tenth of the continents.

Conservationists typically set goals and priorities for relatively small regions. Although some have come up with priorities for the planet, these have often been wish lists rather than objectives drawn from rigorous analyses. Now a team of researchers, led by mammalogist Gerardo Ceballos of the National Autonomous University of Mexico, has conducted the first global analysis of the conservation status of all known land mammals. On page 630, they report that 25% of known mammal species are at risk of extinction. In order to decrease the risk to mammals worldwide, about 11% of Earth's land should be managed for conservation, the analysis finds.

This is the first time such a global conservation estimate has been calculated for mammals, and although experts are not surprised by these results, they praise the study for its comprehensiveness and detail. “This sets a new standard for global priority-setting analyses,” says Peter Kareiva, lead scientist for The Nature Conservancy.

A second conservation study, reported online by *Science* this week (www.sciencemag.org/cgi/content/abstract/1116030), finds that large mammals may be more threatened than their smaller relatives. A team led by Georgina Mace of the Zoological Society of London and Andy Purvis of

Imperial College London reports that adult mammals that weigh more than 3 kilograms tend to have biological traits that hike their



Big risk. Large size significantly ups the odds of extinction for mammals such as elephants and pandas.

risk of extinction. “Both of these papers provide us with finer and more detailed insights into threat patterns and processes,” says Thomas Brooks of Conservation International in Washington, D.C.

The two new analyses rely on massive data sets. Ceballos and his colleagues combed the literature and compiled geographic ranges for all 4795 known species of land mammals. After dividing the world's land into many thousands of cells, each 10,000 square kilometers, they plugged their range data into a conservation planning model, called MARXAN, that identified the least amount of area—all told, 17,020,000 km², or 1702 cells—that would conserve at least 10% of the range of each species. Various population models used by conservation biologists typically specify that threshold as the minimum amount of range needed to sustain a healthy population of a species.

This particular analysis won't be used in specific conservation efforts because the scale is much too coarse, but experts say it reveals important points. For example, the analysis shows that the collection of 1702 cells—11% of the total—would provide a resilient and flexible strategy, because almost any cell can be replaced by another cell without an overall loss of species diversity. But about 80% of these high-priority cells have already been affected by agriculture, ▶

CONFLICT OF INTEREST

Forty-Four Researchers Broke NIH Consulting Rules

An internal review of 81 National Institutes of Health researchers who consulted for industry since 1999 has found that 44 did not follow NIH ethics rules for such activities. Nine cases are serious enough to be investigated for possible criminal misdeeds, according to the review.

These results, released last week by the House Energy and Commerce Committee, are part of an examination of NIH ethics rules begun in late 2003 following media reports of large payments by drug and biotech companies to some NIH employees. The furor led NIH earlier this year to temporarily ban all consulting (*Science*, 11 February, p. 824).

The violations show that “the ethical problems are more systemic and severe than previously known,” declared Representative Joe Barton (R-TX), chair of the panel that has been investigating NIH. Spokesperson John

Burklow says NIH “has been aware of the issues and problems for some time” and is addressing them. Some NIH staffers and observers suggest that the report actually demonstrates how few of the agency's thousands of researchers committed serious violations. Still, “nine is too many,” says Howard Garrison, public affairs director of the Federation of American Societies for Experimental Biology in Bethesda, Maryland.

The 81 names appeared on lists that 20 drug companies gave to the committee but not on NIH's own tally of staff consulting activities. Although 37 people were cleared, the rest didn't request approval for their consulting, did the work on company time, and/or did not report the income, according to an 8 July letter from NIH Director Elias Zerhouni to the committee. Eight have since left NIH. Officials have concluded that the con-

sulting in some instances conflicted with the employee's official duties and in other cases traded on “the name of NIH as an affiliation.”

Nine cases have been referred to the Department of Health and Human Services' inspector general (IG), the letter says. A few of those names have been reported in the press previously—such as Alzheimer's disease researcher Trey Sunderland, who is still at NIH, and cancer researcher Lance Liotta, who left this spring for George Mason University in Manassas, Virginia. A spokesperson in the IG's office said that former government employees may still be prosecuted.

NIH is still reviewing the cases of 22 staffers. These scientists either admitted not reporting an activity or were named in stories by the *Los Angeles Times* that sparked the ethics overhaul.

—JOCELYN KAISER

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which destroys natural habitat. “We simply are not going to be able to do conservation without making it compatible with some measure of agriculture,” notes Kareiva.

The results from Ceballos’s team are only for mammals, whose ranges may not overlap with those of other taxa. Adding birds, amphibians, and reptiles would increase the amount of land needed to be conserved. “We need to do much more,” says study author Paul Ehrlich, a population biologist at Stanford University. “If you want to add [conservation of] 30% to 40% of Earth’s surface,” he speculates. Ehrlich adds that the population size of a species that can survive by preserving 10% of its former range won’t be as effective at providing ecosystem goods and services, such as pollination or bush meat.

Similar results about mammal ranges and conservation, not yet published, will come from John Gittleman, an evolutionary biologist at the University of Virginia, Charlottesville. His group spent 4 years collecting range maps and biological data for all known land mammals. “There’s a nice convergence,” he says. “It’s very reassuring.”

The report by Mace, Purvis, and their colleagues relies on information from Gittleman’s group as well as other data sets such as the so-called World Conservation Union’s Red List, which ranks mammals according to the extinction threats they face. Drawing on such information for 4000 mammal species, the authors determined what factors, such as small geographic ranges or large body size, put particular species at higher risks of extinction.

The analysis found that for mammals smaller than 3 kilograms, the main risk factors were environmental, such as proximity to agriculture or human populations. Identifying and conserving habitat is likely to be enough to keep these species going, the scientists conclude. But larger animals, such as elephants and pandas, face threats magnified by intrinsic biological constraints, such as small litters and long gestation times. Conservation biologists had suspected that larger mammals face greater extinction risks, but the size of this data set puts the premise on a much stronger footing, Gittleman says.

Mace, Purvis, and their colleagues conclude that the survival of large mammals will likely require a concerted effort tailored to the biology of each species.

—ERIK STOKSTAD

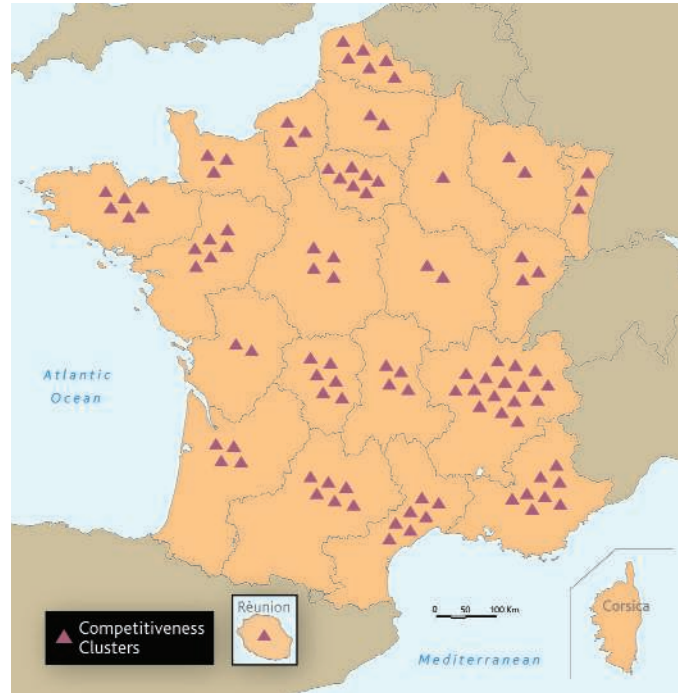
RESEARCH FUNDING

France Hatches 67 California Wannabes

PARIS—France may soon have its own Silicon Valley—or, more likely, 67 miniversions of that icon of American innovation. Last week, Prime Minister Dominique de Villepin announced a list of 67 regional partnerships across the country that his government hopes to nurture into cutting-edge science and technology engines designed to create new jobs and kick-start the economy. But the plan has already run into criticism: Some researchers say industrial strategy shouldn’t drive research policy, while others argue that the funds available—some €1.5 billion for the next 3 years—are spread so thin they can’t possibly have much impact.

The decision to create “Competitiveness Clusters,” as the new regional hubs are called, was taken last year by the previous government, led by Jean-Pierre Raffarin. But it has been embraced by Villepin, who made fighting France’s double-digit unemployment his number one priority when he took over last month. Flanked by four cabinet ministers and citing Silicon Valley as a “historic example,” Villepin called the plan a “choice for ambition” when he presented it last week.

The clusters—selected from 105 candidates by an interdepartmental panel—consist of a regional collaboration among research institutes, schools, universities, and businesses. Their focus ranges from nanotechnol-



Spreading the wealth. Almost every region in France will be home to several of 67 new Competitiveness Clusters. (The number on this map is greater than 67 because interregional clusters are shown more than once.)

ogy and secure communications to sports equipment and—in “Cosmetic Valley,” a plan backed by companies such as Dior and Yves Saint Laurent—“the science of beauty and well-being.” The centers will benefit from tax breaks as well as specific support from funding agencies, including the new National Research Agency. They will also enjoy priority status when the government allocates the 3000 new research jobs it has promised for next year (*Science*, 27 May, p. 1243).

But some fear that Villepin’s version of Silicon Valley may be unattainable. The failure thus far to translate French research into new, profitable technologies stems from a variety of factors, says Alain Trautmann, the spokesperson of *Sauvons la Recherche* (Let’s Save Research), a protest movement—including a less entrepreneurial spirit, timid venture capitalists, and discouraging bankruptcy laws. He doesn’t think they can be fixed by scattering extra funds here and there. What’s more, Trautmann says, U.S. high-tech hubs arise in areas with excellent basic research, which doesn’t “take its orders from industry.”

Others have criticized the large number of centers, suggesting that the plan is inspired more by behind-the-scenes lobbying and U.S.-style pork-barrel politics than by a desire to promote excellence. The resulting budget per center (some €7.5 million per year, often shared by dozens of partners) is bound to be ineffective, the opposition Socialist Party said in a statement last week.

But Bruno Goud, a group leader at the Curie Institute—a partner in a health cluster in the Paris region that’s on the list—says something is better than nothing. Although it may be “typically French” for the government, rather than market forces, to designate the hot spots of the future, he adds, that doesn’t mean it won’t work.

—MARTIN ENSERINK