growth in the use of short-term contracts for university researchers—the United Kingdom has moved toward a pattern more familiar in the United States in recent years.

May is enthusiastic about the potential for scientific cooperation at the European level. "In environmental topics there is going to be an increasing need for things on a European scale," he says. As one example he argues that a series of studies of ecological communities from the Mediterranean to the far north of Europe is needed to act as a baseline for analyzing the effect of increases in atmospheric carbon dioxide input in 20 or 30 years' time.

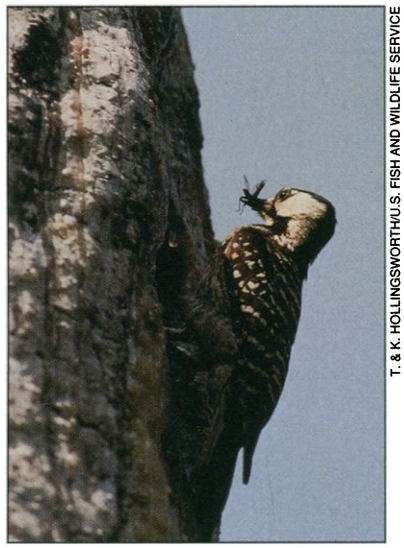
Although he's never one to languish in a particular field for too long, May strongly implies that he intends to remain in his new job, no matter which party wins the next general election. "It is worth emphasizing that this is a 5-year appointment that is independent of who is in political power," he says. And he adds: "Like all civil-service appointments, it is jealously and rigorously protected from political input." But he's not yet ready to make a complete transition from scientist to government official: He has an agreement that his new job will allow him to spend 10% of his time continuing his work on theoretical immunology and biodiversity. This, he says, will "help retain street credibility."

–Nigel Williams

ENDANGERED SPECIES ACT

Incentives Offer Hope for Habitat

A quarter century after being placed on the government's first list of endangered species, the red-cockaded woodpecker remains on the brink of extinction. But this year, the federal government and major landholders in the Sandhills region of North Carolina are negotiating a novel agreement that could do more for the woodpecker's chances of survival than 25 years of federal regulation. Instead of banning all development on the woodpecker's habitat until the bird is no longer endangered, the agreement would allow landowners to develop property later if they restore tracts of land now to increase the number of potential nesting sites. The goal is to give an immediate boost to the woodpecker's chances of survival and buy time to develop alternative conservation plans if landowners eventually develop the land.



T. & K. HOLLINGSWORTH/U.S. FISH AND WILDLIFE SERVICE

Lofty goal. Plan offers tax incentives to save woodpecker's habitat.

The Sandhills agreement would be a radical change from how the federal Fish and Wildlife Service (FWS) enforces the Endangered Species Act (ESA). But it could be a prototype of a new approach to species preservation that is attracting growing political interest: Instead of threatening private property owners with fines or jail for harming endangered species—the agency's current method of enforcing the ESA—the agency would offer financial incentives, from tax breaks to future development rights, to owners who choose to protect species. While such incentives are not prohibited under the act, they have only recently been seen as a practical alternative to enforcement. Indeed, in July such an approach was endorsed by a coalition of scientists, environmentalists, and business people in a report* from the Keystone Center, a Colorado-based nonprofit organization that mediates contentious issues in the environment, biotechnology, and other fields (see Policy Forum, p. 1231). According to congressional aides, the incentives recommended in the Keystone report are likely to form the backbone of major bills to be introduced this month that would revise the act but keep it alive. "Incentives will be the main vehicle for making the act more reasonable" for private property owners, says a House aide.

Preserving the ESA would please many scientists. Last spring a report from a National Research Council panel concluded that the law's approach to protecting endangered species is scientifically sound (*Science*, 26 May, p. 1124). And the preservation of critical habitat—the main method of asserting this protection—got a ringing endorsement this summer from the Supreme Court (*Science*, 7 July, p. 23). "The great strength of the act is the close tie between species and habitat protection," says University of Tennessee ecologist Stuart Pimm.

The Keystone report represents an unlikely consensus of 32 scientists and land managers from industry, environmental organizations, and the government. "Given the diversity of people, it was remarkable that there was such unanimity in the report," says panel member John Doggett, director for governmental relations at the American Farm Bureau Federation, which has lobbied to make the act easier on small landowners.

The report suggests ways to entice private landowners into managing land in a way that benefits endangered species. To date, their reluctance to do so has been the act's Achilles heel. For instance, farmers in California's Central Valley will often plow certain plots rather than letting them lie fallow to prevent kangaroo rats from making their burrows in the fallow ground, says Environmental Defense Fund wildlife program chair Michael Bean, a Keystone panel member. The reason? Providing homes for the endangered rats would subject farmers to ESA-related restrictions on future development.

The kangaroo rat illustrates how the ESA has been "all stick and no carrot," says Bean. The Keystone report's recommendations, he notes, "add a lot of carrots to the mix of strategies for achieving the act's goals."

One tempting morsel would be tax reform. Tax codes often value land according to its "highest and best use," that is, after development. As a result, according to the Keystone report, property-tax rates "function as a deterrent to the maintenance of natural habitat on which many species depend." The report suggests a tax credit for land on which the owner has agreed to specific conservation measures, or for land harboring an endangered species that is donated to a conservation group.

The report also recommends that the act encourage landowners to take voluntary steps to maintain, enhance, or set aside habitat. One such mechanism is the Sandhills "safe harbor" agreement. That provision is an attempt to halt the continuing decline of the red-cockaded woodpecker by promising future development in return for the immediate protection of the old stands of longleaf pine that are the bird's habitat. Under the "safe harbor" proposal, about 30 pairs of birds would gain nesting sites after the removal of hardwood trees that have invaded the 6100 hectares of longleaf stands, inhibiting red-cockaded woodpecker colonization. The woodpeckers prefer open pine forests to the denser mixed hardwood and pine forests becoming more prevalent in the Sandhills region. "In the absence of this kind of assurance, private landowners are going to consider endangered species on their lands inimical to their interests," says

* "The Keystone Dialog on Incentives for Private Landowners to Protect Endangered Species," The Keystone Center, 25 July 1995.

FWS biologist Bill Lehman.

The Keystone report argues that the ESA should be amended "to give explicit congressional endorsement" to the expanded use of safe-harbor agreements. Of course, the landowners would be free to raze the very land they nurtured for the woodpecker. But, says Bean, the arrangement may provide a chance for the bird to recover to the point where nesting pairs could be trapped and relocated. "We are taking a chance, but we're taking a chance in an area where we aren't doing very well," says Lori Williams, the agency's legislative director.

Not everyone agrees with the Keystone group's conclusions. One analyst who dropped out of its discussions, R. J. Smith, senior environmental scholar at the Competitive Enterprise Institute, a conservative think tank in Washington, D.C., says he left because "it seemed to me like there was a conclusion reached before the group had even started." Smith, who favors replacing the act with voluntary, nonregulatory incentives for protecting species, says the Keystone participants started from a premise of improving, rather than erasing, the act.

The Keystone incentives appear to be a big hit with Congress. Pending bills in the Senate and the House use incentives outlined in the Keystone report as a major tool to reform the ESA, congressional aides told *Science*. One bill, expected to be co-authored by Representative Don Young (R–AK), chair of the Committee on Natural Resources, which is considering the act's reauthorization, "is having every incentive but the kitchen sink" written into it, says a House aide. Similar language is part of a bill being drafted by Senator Dirk Kempthorne (R–ID), chair of the Committee on Environment and Public Works, which earlier this summer held ESA reauthorization hearings.

The bills will not please everyone, however. The Kempthorne bill, for instance, may require the Secretary of the Interior, whose department enforces the act, to rank endangered species according to their potential value to society. Although such a controversial provision—one scientist says a scaling system "has no basis in science whatsoever"—may well be toned down, a Senate aide predicts that the Interior Secretary is still likely to end up with "considerable latitude" in choosing which species to protect.

Although difficult issues remain, most prognosticators see a political compromise on the horizon for ESA. "The story now isn't where we disagree [on how to change the act], but where we agree," says Doggett. If he's right, that's good news for woodpeckers and property owners.

–Richard Stone

Richard Stone is on leave from Science *with a Fulbright Fellowship to teach at Rostov University in Russia.*

SUPERCOMPUTING

Panel Suggests Fewer NSF Centers

The four supercomputing centers that have played a key role in making supercomputers available to researchers across the country are facing an uncertain future. A special task force is preparing to recommend that the National Science Foundation (NSF) should support fewer centers, which would be chosen by a national competition. The panel, whose recommendations were circulated last month in a draft report, says the 10-year-old program has done a good job serving the scientific community, but future centers should work more closely with existing state and regional supercomputing facilities.

The panel, headed by Edward Hayes, vice president for research at Ohio State University, was set up last winter after the National Science Board (NSB), NSF's governing body, rejected a plan drawn up by a previous panel to renew the centers' contracts without holding an open competition (*Science*, 17 March, p. 1585). The board, noting that the centers' role has changed, decided that their raison d'être should be re-evaluated. NSF created the centers to make supercomputers available to scientists studying problems like protein folding and global climate change and linked them with a high-speed network—part of the embryonic Internet. Now they are also involved in developing software and providing support services for academic and industrial researchers. NSF currently provides about $60 million a year for the program, which covers about half the operating funds for the activities of the National Center for Supercomputing Applications in Urbana-Champaign, Illinois; the Cornell Theory Center; the San Diego Supercomputing Center; and the Pittsburgh Supercomputing Center. The board told the task force to assume a flat budget over the next 5 years.

The draft report endorses the centers' current mission and rejects the idea of eliminating the program. But the panel concluded that an open competition to choose two or three "leading-edge" centers would be the best use of limited resources. Under that plan, the winners would form partnerships with half a dozen or more universities, smaller supercomputing centers, and other NSF research centers to serve the larger scientific community. Such partnerships would increase the staff available to help scientists develop their algorithms and would provide a broader range of computing power that could be tailored to a particular user's needs, the panel says. "The goal is to find a mechanism that gives us the biggest bang for the buck," Hayes says.

Numbers game. NSF panel chair Ed Hayes believes that less is more.

The panel's recommendations are drawing a mixed reaction from center officials. "I think it's very reasonable," says Cornell's Malvin Kalos, although he adds that the recompetition will "mean a great deal of work for me and my staff." Kalos says he expects the current centers to compete separately rather than join forces. Indeed, Kalos says the prospect of a contest has already hindered an existing partnership aimed at projects such as networking the supercomputers to create a unified environment. "It's been an uneasy marriage" among the centers, agrees task force member Peter Kollman, a computational chemist at the University of California, San Francisco.

Some observers worry that the selection process might open the door for political dealmaking. Larry Smarr, director of the Illinois center, says Congress has played a major role in starting other non-NSF supercomputing centers and that the same thing could happen with site selection for the new centers. A competition, he says, will also provide a forum for lobbyists from companies such as IBM and Cray, which supply machines to the current centers. "It's just a very dangerous environment to try to do a rational, calm, scientific analysis," Smarr says.

Politics aside, the draft report endorses the centers' record of allocating computing time among researchers. The panel found that scientists who receive funding from the supercomputer centers also do well in competitions held by other NSF directorates. The draft report says NSF should "increase the involvement of the directorates" in approving proposals but suggests no specific changes. "They say ... we basically need minor tuning of the present system," says Princeton University cosmologist Jeremiah Ostriker, a center user.

The report is being circulated for comments, but Hayes expects few changes in the final version that will go to the board this fall. The centers' contracts expire in 1997 after the board extended them last fall for 2 years.

–Jocelyn Kaiser