

Babbitt Shakes Up Science at Interior

A sweeping reorganization of the department's biological research aims to improve long-term planning and to take stock of the nation's biodiversity

Last month, President Bill Clinton unveiled a plan to protect the northern spotted owl that was intended to resolve a bitter feud between environmentalists and the timber industry over the future of the Pacific Northwest's old-growth forests. But to Secretary of the Interior Bruce Babbitt, whose department manages 500 million acres of federally owned forest, the plan, while "fundamentally sound," arrived two decades too late. "The players waited until the crisis was white hot and everyone was backed into a corner," he lamented to Congress last month. Babbitt, who likens the collision of interests behind the spotted owl fiasco to a "train wreck," pointed out that while the government, the timber industry, and environmentalists argued in court about what to do, the spotted owl was slipping to the brink of extinction.

Babbitt argues that these wrecks occur in part because the protection of natural resources rests on an inadequate scientific roadbed. By the time a potential collision over resources is apparent, it is often too late to avoid. So, within weeks of taking office, Babbitt proposed a sweeping reorganization of the department's biological research, aimed at beefing up long-term sci-

ence. The centerpiece is a new bureau, the National Biological Survey (NBS), that will take over much of the biological research now scattered throughout the department. The goal is to "look at the big picture" and to avoid duplication of effort, says Eugene Hes-



Looking at the big picture. Bruce Babbitt (right) and Eugene Hester, who is helping plan the reorganization.

ter, associate director of natural resources at the National Park Service who is on detail to help organize the survey's scientific staff.

One of the key ingredients in that "big picture" will be an inventory of every animal and plant species in the United States and their habitats. This treasure trove of data,

Babbitt argues, will allow scientists and regulators to devise plans to protect fragile species well before they become threatened with extinction. Last month at a hearing before a subcommittee of the House of Representatives Committee on Merchant Marine and Fisheries, Babbitt predicted that, in a decade, the survey will have been so successful that "I would hope the Endangered Species Act has been virtually forgotten—not abolished" and that the country "will have reached a biological balance."

Maybe so. But several scientists inside and outside the department think Babbitt is moving too far, too fast. They worry that if agencies such as the Park Service and the Fish and Wildlife Service have their basic research transferred to the NBS, the agencies will also lose the ability to conduct the short-term research needed to manage the nation's natural resources. "If the survey decides those management needs aren't as important as the big glamorous ecosystem studies, then somebody's going to get hurt," says Dennis Finn, acting associate director for natural resources at the Park Service.

A biological USGS

One reason for the consolidation, Babbitt argues, is the current fragmentation of the department's research. At last month's hear-

A Threat to Property Rights?

Interior Secretary Bruce Babbitt's plans to consolidate the department's biological research in a new agency, the National Biological Survey, have so far been greeted warmly by Congress. Last month, the House Committee on Merchant Marines and Fisheries finished its work on a bill that would formally establish the survey. Although last-minute debate on the budget bill delayed a House vote until September, staffers expect easy passage. The Senate is expected to take up the measure later this year.

At a hearing last month on the House bill, which was introduced by committee chairman Representative Gerry Studds (D-MA), Babbitt had the chance to dwell on the benefits of the reorganization at Interior. The survey, Studds beamed after hearing Babbitt's pitch, "is the kind of big-picture thinking we need."

But not everyone at the hearing was quite so enthusiastic. Representatives Billy Tauzen (D-LA) and Charles Taylor (R-NC) worried that survey information might be used to prevent private landowners from developing their property. Asserts lobbyist Myron Ebell of the Multiple-Use Land Alliance: "We consider this the greatest threat to property rights since the Endangered Spe-

cies Act. Why would [the survey] want to gather information without using it?"

Babbitt insists the survey won't make regulatory decisions. "There's no chance [the survey] would turn out to be a regulatory monster," he said at the hearing. Nevertheless, Studds' committee accepted an amendment from Taylor to prohibit the survey from assessing private property without landowners' consent.

Although Babbitt does not need legislation to establish the survey, he is eager to see the bill become law because it would give the new agency legal standing that only Congress could undo. It would also reverse a decision last month by the House not to transfer the National Wetlands Inventory from the Fish and Wildlife Service (FWS) to the survey. The House Appropriations Committee refused to fund the inventory unless it remained at FWS, its statutory home. Babbitt has called the 20-year-old inventory program and its slough of data, so to speak, on wetlands biota "critical to filling in the biological picture of the country." Studds' bill would legally place the inventory under the survey.

—R.S.

The Biological Survey's Scientific Core

When the National Biological Survey officially begins on 1 October, most of its biological research and inventory work will simply be a continuation of existing Interior Department programs, perhaps with some money added to this year's budget of \$142 million. Basic research will be the survey's primary pursuit, accounting for about half the total budget. It will focus on three areas: ecosystems, species biology, and population dynamics. A planning document notes that this research "will be both interdisciplinary and broader than just biological research." It will include, for example, the development of economic models to assess the value of resources.

Ecosystems research is the survey's most diverse and expensive program, drawing on resources from parts of seven Interior bureaus. The \$45 million program includes studies on the loss of wetlands in coastal Louisiana, how to manage streams and riparian habitats in the Pacific Northwest, and the impact of offshore oil development on marine animal habitats in the Outer Continental Shelf. The survey will acquire more than 300 ecosystem scientists from the Fish and Wildlife Service alone. In addition, the National Park Service's scientific expertise is concentrated in ecosystems research; these scientists, who will transfer to the survey, will continue to study problems such as the ecological effects of mountain goats introduced to Washington State's Olympic National Park.

The survey's species research, essential for designing recovery plans for endangered species, amounts to \$21 million and runs the gamut from cataloguing genetic diversity of declining species to studying the biology of the zebra mussel and other imported organisms devastating their new environments. The third leg of the survey's basic research stool, the \$14 million research program on population dynamics, includes, for example, studies of wildlife-disease epidemiology and techniques to predict extinction rates.

While basic research will increase understanding of the organisms to be catalogued, the survey will cull its biota beancounters from established Interior monitoring and inventory programs (see main story), whose operations will cost \$23 million next year. To transform existing inventory data to a more useful form, the survey plans to spend \$15 million on developing techniques for data storage, recall, display, and analysis. In addition, information scientists will initiate efforts to link up Interior's data system with those of other federal agencies, such as the Environmental Protection Agency's Environmental Monitoring and Assessment Program. "We've tended to be an enclave and do the research in-house," says Eugene Hester, who's overseeing personnel transfer to the survey. "We have to look at what information exists out there and how we can use it," he says.

—R.S.

ing, for example, Babbitt praised "the extraordinary depth of biological talent" at Interior but added in written testimony that the "scattered, disparate nature of [Interior's] research...results in ad hoc science" and that "myopic, mission-specific research has made it so we can't see the big biological picture."

He is not alone in complaining that Interior's biological research has been driven largely by the parochial needs of the department's agencies. Last August, a committee of the National Academy of Sciences (NAS) released a study, "Science and the National Parks," that found the Park Service science program to be "unnecessarily fragmented and lack[ing] a coherent sense of direction, purpose, and unity." Having park scientists report to other scientists rather than to park managers would help to "enhance the credibility and quality control of the science program," it said. Ronald Pulliam, a University of Georgia ecologist and past president of the Ecological Society of America, agrees. "There's been a lot of duplication of research effort at Interior," he says, and he thinks NBS will make better use of the department's biology research staff.

Babbitt has taken the academy committee's advice to heart and applied it to the entire department. In essence, Babbitt is planning to create a biological equivalent of the U.S. Geological Survey, with an initial budget of \$164 million and a staff of 1188 (out of 8312) biological scientists transferred from elsewhere in the department (see chart). Even more significant, practically all

research biologists will be placed under the new management. Those scientists remaining in the department's other agencies will be responsible largely for applying research to solve problems such as implementing recovery plans to save endangered species and ensuring the accuracy of environmental impact statements.

While details of how the new agency will function are still "in a fog," as one scientist puts it, Interior officials have outlined several research areas for which the survey will have sole responsibility (see box, p. 977). A key function of the new agency will be to coordinate ongoing biological inventory and monitoring efforts. One such inventory is the Gap Analysis to map the distribution of terrestrial wildlife against land-use patterns to identify gaps in species' habitats. Other programs the survey will subsume include the Biomonitoring of Environmental Status and Trends program, which aims to determine how pollution affects endangered species and other wildlife; the

Great Lakes Fisheries Assessment; the Breeding Bird Survey; and the Wildlife Mortality Database. Survey officials also would like to snatch the National Wetlands Inventory from the Fish and Wildlife Service, but that transfer requires congressional approval (see box, p. 976). Sometime next year, says Hester, the survey will get advice from its own planning board, a second NAS panel, and other scientists to list priorities for long-term research.

SCIENTIFIC PERSONNEL TO TRANSFER TO SURVEY

	Bureau	Bureau total	Total to survey
1. Biological scientists	FWS	4256	1,027
	NPS	1205	135
	BLM	2628	21
	BOR	223	5
			1188
2. Physical scientists	FWS	184	98
	NPS	183	14
	BLM	1063	5
			117
3. Mathematicians	FWS	27	22
4. Social scientists	FWS	22	13
	NPS	27	5
	BLM	34	1
			19
5. Veterinary scientists	FWS	12	12
6. Museum curators	FWS	11	8

Total scientists transferred to survey: **1366**
(13.8% of Interior's 9875 non-Geological Survey scientists)

FWS: Fish and Wildlife Service; NPS: National Park Service; BLM: Bureau of Land Management; BOR: Bureau of Reclamation.

A biological head count

The new agency's most prominent job—and the one that has so far captured most of the public attention—will be to inventory the entire U.S. biota. The result would be a biennial report, called the National Biological Status and Trends, on the abundance, distribution, and health of wildlife and habitats. No one yet knows how to do it, and conservation biologist Thomas Lovejoy, on leave from the Smithsonian Institution, heads a planning team trying to figure that out. It will get help from a report expected this fall from an academy panel chaired by botanist Peter Raven, director of the Missouri Botanical Garden, setting out a vision for the survey. Academia has also answered the call. Last April, biodiversity experts gathered in Philadelphia to discuss how to survey every species on a plot of land, something that has never been done before (*Science*, 30 April, p. 620).

The new inventory will draw heavily on ongoing research and inventory efforts scattered throughout Interior. But outside help will be needed, too. "We won't have enough scientists," says Lovejoy. "There's a lot of questions in which the expertise lies outside Interior." The Ecological Society of America has asked NBS to recruit ecologists and systematists to the task, and Lovejoy says that statisticians will be hired to collate and analyze the reams of data anticipated from current and future inventories.

Science without a master

The prospect of a major new scientific mission for Interior and a reorganization of biological research along scientific lines has galvanized many Interior department scientists. Take such problems as the global decline of amphibians and the proposed North American network of wilderness reserves to protect biodiversity (*Science*, 25 June, p. 1868). "All of those things would benefit from an integrated attack" that NBS might provide, says fisheries biologist John Varley, chief of research at Yellowstone National Park. But Varley and others are also nervous about what might occur when research is separated from Interior's everyday missions.

"One of the biggest concerns," Hester concedes, "is that every bureau will put in its resources and then somehow the survey's needs will gravitate to higher national and international needs that I facetiously call 'Go study the ozone hole.'" Hester is trying to develop a strategy to prevent the bureaus from losing out; one component is a science board, composed of representatives from various bureaus, to review NBS's budget and suggest new areas of research.

Even so, many Interior scientists about to join the survey fret about their futures and wonder what sort of research they might be doing at the end of next year. Forest ecologist Mike Collopy, director of the Pacific Forest

and Basin Rangeland Systems Cooperative Research and Technology Unit for the Bureau of Land Management (BLM) in Corvallis, Oregon, heads a seven-person staff assigned a year ago to implement the spotted owl plan on BLM land. "We came here specifically to help BLM do this," says Collopy, whose team is slated to move to the survey this fall. Collopy likes the survey's attempt to forge "a lean, mean responsive agency" but he worries about what might be lost in the transition. So do some of his colleagues at other agencies. "My fear is that some of us will have a hard time working on the plan with our survey work," says Park Service forest scientist Ed Starkey.

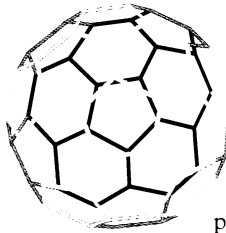
Even some members of the academy panel that urged the Park Service to separate scientists from managers feel NBS may be too much, too soon. "Our study, and those preceding it, recommended that science be a full partner in the Park Service, not a

stranger to it," says University of Idaho forest ecologist John Hendee. The survey is "a step backward for science," he says, because it "will destroy the competing hypothesis approach to science." For example, Hendee says that it was competition that shaped research on the spotted owl by scientists in different Interior bureaus.

As Interior scientists await a comprehensive survey strategy, they'll need to learn how to interact with colleagues from different bureaus. And that presents its own challenges. Last June, some 70 scientists met for a survey planning meeting in Denver. "There were a lot of tense moments," says one researcher, because scientists in the various bureaus "all speak different languages." For Babbitt, the challenge is to turn this diversity into a smoothly running machine and to avert painful collisions between the department's own scientists.

—Richard Stone

BUCKYBALLS



Patent Dispute Goes Public

Konstantinos Fostiropoulos should be on top of the world. As a young graduate student 4 years ago, he was part of a four-person German-American team that first produced buckminsterfullerene in significant quantities—a breakthrough that made it possible for researchers around the world to study the material. The paper describing the production technique (*Nature* 347, p. 354, 1990) became an instant "citation classic": It was the most cited chemistry paper published between 1988 and 1992, according to the Institute for Scientific Information.

Yet Fostiropoulos is far from happy, because he believes his contribution to the project has not been sufficiently recognized. Specifically, Fostiropoulos argues that his name should be on a patent application that was filed on the technique. But only the two principal investigators on the project, Wolfgang Krätschmer and Donald Huffman, are named as inventors. (Huffman's assistant, Lowell Lamb, was also not included on the application.)

It is not unusual for graduate students to feel that they do the hard work while their supervisors get the glory. Fostiropoulos, however, unlike most disgruntled graduate students, has gone public with his grievances. Earlier this month, his patent attorney, Ulrich Naumann, lodged an official complaint with the German Patent Office arguing that Fostiropoulos should have been named as a co-inventor. Fostiropoulos' challenge now means the German Patent Office will have to investigate the researchers' rela-

tive contributions to the invention—a process that could take 6 months or more, according to Naumann.

Fostiropoulos' claim is countered by the lawyers who handled the patent application on behalf of the University of Arizona and the Max Planck Society, the researchers' employers who are set to reap most of the benefits should the patent be granted. They have looked into who did what on the project and are satisfied that the filing correctly credits only Krätschmer and Huffman.

Fostiropoulos, now working at a branch of the Max Planck Institute for Radio Astronomy in Jena, says he simply wants recognition for his contribution to the discovery. However, in the worst possible case, disputes over inventorship can invalidate a patent, and a great deal of money could be riding on this one. The production technique described in the patent opened the floodgates of industrial research on fullerenes, and applications in the pipeline span everything from carbide and diamond coatings, lubricants, superconductors, semiconductors, catalysts, and even sunglasses. Companies such as Exxon, AT&T, Hughes, Xerox, Hoechst in Germany, and Sumitomo in Japan have all applied for patents on applications of fullerenes and many are using the technique at the center of this dispute to produce research quantities for sale at several hundred dollars a gram. The technique is, at

the moment, the only one that can produce fullerenes in large quantities with good yields, so any future fullerene producer will probably

