

Billion Dollar Price Tag for New Animal Rules

Proposed regulations on dog and primate facilities would cost the private sector \$249 million in capital outlays

REGULATIONS ON the most controversial amendments to the Animal Welfare Act of 1985—on exercise for dogs and the psychological well-being of primates—are expected to be released soon from the Office of Management and Budget (OMB) where they have been under review since July.

According to the Agriculture Department's Animal and Plant Health Inspection Service (APHIS), the long-awaited "Part 3" of new regulations would cost research institutions about \$111 million in capital expenditures on primate facilities and \$138 million for dog facilities.

The total cost of the new law to the private sector would be \$885 million in initial outlays and another \$207 million a year in additional operating expenses, according to a "regulatory impact statement" accompanying the proposals. Over half of these costs would be borne by research institutions. Compliance costs for facilities run by the federal government would be another \$100 million. The figures include costs for implementing Parts 1 and 2 of the regulations, covering general animal care standards and the establishment of Institutional Animal Care and Use Committees, which were published last year.

APHIS's proposed primate rules, a copy of which was obtained by *Science*, draw heavily on recommendations from an advisory committee that included ten researchers. They contain a new section on social housing, revise specifications for "primary enclosures," and spell out ways to enrich cage environments (see *Science*, 30 September, p. 1753).

The draft says that according to scientific evidence, primates are "social beings in nature and require contact with other nonhuman primates for their psychological well-being." Therefore, they must be housed with others, in pairs or groups, "whenever possible and consistent with" their health, safety, and well-being. In contrast with old regulations, they may be housed with other species and other kinds of animals if they are all compatible. Where solo housing is necessary, they must be in a position to see and hear other members of the same species. Those that must be isolated from other

animal contact must be accorded "positive physical contact or other interaction" with a human for at least 1 hour a day.

Individually housed primates also must be allowed at least 4 hours of exercise a week in an area at least three times the size and twice the height of their cages.

Primate species are divided into seven categories by weight. New prescriptions for cage sizes are set for each category, which correspond for the most part with recommendations in the National Institutes of Health (NIH) Guide for the Care and Use of Laboratory Animals. Cage sizes range from 1.6 square feet and 20 inches high for a tiny 2-pound prosimian to 50 square feet and up to 84 inches high for an ape weighing over 88 pounds. A group of animals gets

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the prescribed individual floor space multiplied by the number in the group, plus additional vertical space. The draft says that precise adherence to cage sizes may be waived on occasion so long as exercise and social needs of the animals are met.

The rules go on to state that "the physical environment in primary enclosures must be enriched by providing means of expressing species-typical activities." This includes perches, swings, mirrors, and "other cage complexities"; manipulable objects; and "foraging or task-oriented feeding methods." The document adds that "the method of feeding nonhuman primates must be varied daily in order to promote their psychological well-being."

Special enrichment measures must be designed for juveniles, primates showing signs of psychological distress, and animals used in research that does not involve physical activity. If an animal must be immobilized in a chair, it must be allowed an hour of exercise both before and after the immobilization.

According to the regulatory impact analysis, a large part of the additional outlay of

\$111 million will be for new cages, which cost between \$678 and \$6500 apiece. Cage replacement will mainly be necessary for Category 3 of primates which, depending on which of several lists provided is correct, is made up either of macaques and New World monkeys or just New World monkeys. The total number of cages needing replacement is estimated at over 59,000. New recreational equipment is estimated at \$100 to \$1000 per cage. In addition, 429 facilities are said to need to add building space for primate housing, and 264 to require renovations.

The new dog rules have received far less publicity than the primate ones but will cost even more since dogs make up about 14% of the research animal population (primates constitute a little over 1%). The draft regulations require that dogs be released from cages for at least 30 minutes a day for "exercise and socialization" (the impact analysis puts the time at 60 minutes). Making a dog run on a treadmill does not count. The exercise area has to be 80 square feet or twice the minimum floor space, whichever is larger. Dogs housed together in large spaces are exempted.

Individually housed dogs must be able to see and hear other dogs. If there are none, then a dog must have "positive physical contact" with a human for 60 minutes a day. Dogs no longer have to be kept separate from cats if they are compatible.

Cage sizes do not have to be changed, but many new dog runs and dog handlers will have to materialize. Estimated costs for renovation, new cages, and construction of dog runs or exercise areas will cost research facilities \$138 million. The addition of 1099 dog handlers will add \$16.5 million in annual operating costs.

The new proposals also designate new cage sizes for cats, guinea pigs, hamsters, and rabbits, which are in accord with specifications in the NIH Guide. Costs for new rabbit housing is estimated at \$59 million.

The proposals contain a variety of other stipulations regarding comfort, safety, and sanitation. One of last year's proposals that has caused concern among primate researchers is the requirement that all surfaces that animals come in contact with be "substantially impervious to moisture." This would prohibit putting pieces of wood in cages. The latest rules add flexibility to "encourage provision of more natural environments" by allowing for dirt floors, planted areas, and pieces of wood so long as they are kept clean and are easily replaced.

According to the impact statement, the total costs for new animal housing facilities at research institutions, including new surgical facilities at 1277 institutions, will be

\$447 million. New limitations on the number of surgical procedures per animal will require an increase in the use of primates and dogs by 17.3% and 11.2%, respectively.

The analysis reports that 1021 research facilities now have Institutional Animal Care and Use Committees and 272 still have to establish them. Costs of additional staff for full compliance are put at \$40 million a year. New staffing needs for both animal handlers and clerical personnel add up to 1390.

The latest submissions contain no analysis of the potential impact on biomedical research. This, says the impact analysis, "remains an interesting empirical question."

The proposed regulations have been held up at the OMB by squabbles between OMB and the Agriculture Department. The OMB has asked for more information on alternative approaches to achieving regulatory objectives, and suggested that there is too much reliance on design rather than perfor-

mance standards. It also wants more analysis of the societal costs and benefits of the regulations and better scientific rationales for the APHIS recommendations. APHIS head James Glosser has contended that additional analysis is "unnecessary." In correspondence with the OMB's Office of Information and Regulatory Affairs he said the law rules out consideration of alternatives, that it is up to others to compute indirect costs and benefits, and that scientific analysis is impeded by a "dearth of scientific literature."

How and by whom the costs of all the changes will ultimately be borne remains an unanswered question. The only federal money specifically targeted for animal facilities improvement is a program in NIH's Division of Research Resources. The fiscal 1989 budget for this is \$11.6 million which requires matching funds from the recipient.

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The Ecosystem and Human Behavior

A group of social scientists is drawing up an international research strategy on "human dimensions of global change." The plan, to explore how humans cause and are affected by large-scale environmental changes, envisages the most massive collaborative effort—in terms of geographical and temporal scales as well as breadth of content—ever undertaken in the social sciences.

The National Science Foundation (NSF) has funded some preliminary workshops to develop the research agenda, and the National Academy of Sciences (NAS) plans to appoint a committee to further the project. There are no estimates yet of the total costs of the program, which would be borne by a variety of national, international, and private sources.

The program is intended to supplement the International Geosphere-Biosphere Program (IGBP), which was initiated in 1986 by the International Council on Scientific Unions. This effort, drawing on experience from the International Geophysical Year of 1957 and the 10-year International Biological Program, involves research projects throughout the world that will attempt to integrate physical and biological knowledge about the earth's environment and predict future changes.

Physical and biological scientists are now well versed in global modeling. But the social sciences have lagged far behind in assessing the interactions between physical changes and human activities. Far more is known about the processes of global warming, deforestation, resource depletion, and

pollution than about the processes of the human institutions that create these effects. Yet, states the report of a Brown University workshop held last spring, "For the first time in history, the unintended consequences of human actions and social processes now approximate the scale of the interactive processes of nature in their effects on the earth as a life-support system."

After initially trying to get IGBP organizers to incorporate more attention to human activities into their program, a separate but parallel effort was decided upon. As a participant at an Ann Arbor workshop put it, "If the natural scientists study ocean currents, we will study all of the human phenomena connected with ocean currents. We will study what they study."

Exploration of the human factor has been starkly lacking in most large-scale analyses of environmental change. While reports are always full of explanations and recommendations, there is little or no systematic exploration of why individuals, groups, and institutions do what they do in behavior affecting the environment. Roberta Balstad Miller, head of the NSF's Directorate of Social and Economic Science, observes that crucial questions are often ignored—such as the effects of values on behavior, the willingness of individuals to trade present pleasure for future gain, and industrial attitudes toward environmental risk.

At various meetings, some of the types of questions raised have been:

■ What affects a government's ability to change policies that accelerate environmen-

tal degradation or adopt measures to reduce it. What are the roles of direct government controls as opposed to market mechanisms.

■ How do population growth and demographic characteristics, including rural to urban migration, interact with economic growth and technology to affect resource use.

■ What are the environmental effects of financial policies and trade patterns.

■ What influences individual perceptions of the environment, how do perceptions affect attitudes, and how are attitudes translated into behavior. Why are rational courses of action not being followed.

The task ahead is daunting. To begin with, appropriate data sources that integrate information from a variety of disciplines do not exist. Demographic data exist separately from data on land use or data on industrial policy. Knowledge from areas of study such as "risk perception," which bears on how people make decisions, would be introduced for the first time into many types of projections. The new program would have a technology-forcing effect, so to speak, on social science methodologies, which would have to be adapted to long-term, large-scale multidisciplinary projects far beyond the customary scope of most disciplines.

Among the initiators of the human dimensions program are Harold Jacobsen of the University of Michigan's Center for Political Studies (Ann Arbor) and Robert Cates of Brown University's World Hunger Program. A number of organizations, including the Social Science Research Council and the International Federation of Institutes of Advanced Study in Toronto, have been exploring the subject. Objectives were sharpened up at a symposium held in Tokyo in September. The subject has increasingly become featured at international meetings, including the September meeting of the European Science Foundation in Oslo.

The Commission on Behavioral and Social Sciences and Education of the NAS has applied to the NSF and several foundations for funds to set up a committee on human dimensions of global change. According to commission director Robert Caplan, the committee will assess the types of data resources now available and their linkage with human activities, explore theories and models for long-term predictions, and come up with specific research questions. One example, says Caplan, might be an analysis of global warming on land use and agriculture in North America, and the demographic and political repercussions of a northward shift of the grain belt. Another would be what will happen when large areas such as Bangladesh go under water.

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