

government until appropriations bills are passed, is expected to contain \$7.5 million for UNEP, a cut of about 25 percent from current levels.

The conference came up with scores of recommendations for action by the federal government to help stem the erosion of biological diversity. Few of the recommendations were new, and many will be difficult to implement in view of

current budgetary stringencies. Moreover, the gathering generally failed to come to grips with the central issue in the impending loss of one million species. Habitats are being destroyed in the tropics chiefly because people in the developing countries need land to scratch out a living.

Nevertheless, several participants argued that the conference's chief contri-

bution was simply to expose the issue to a broad range of government officials and to the general public. Buckley, in his opening speech to the conference, argued that "we need to impress upon public consciousness that extinction is an act of awesome finality." The conference at least made a start in impressing that upon the federal government.

—COLIN NORMAN

Reviewers Pan Agent Orange Study Plan

A much-delayed study of veterans' exposure to dioxin-containing herbicides has been delayed again. The Veterans Administration (VA) told the team designing the protocol to head back to the drawing boards and gave the University of California at Los Angeles (UCLA) investigators 35 days to come up with a revised protocol after three review groups rejected the plan.

The study in question was mandated by Congress in December 1979 to supply a definitive answer as to whether Agent Orange has wreaked adverse health effects on American ground troops in Vietnam. The VA was to arrange the study, which was to be approved by the Office of Technology Assessment (OTA). A contract was awarded last May to Gary Spivey of the UCLA School of Public Health and public health school dean Roger Detels.

The first draft of the protocol, which was submitted in August, contained a description of a proposed historical cohort study that would track the health of veterans believed to have been exposed to the herbicides in Vietnam and those who had not. Five smaller studies were also proposed that would compare rates of morbidity and mortality among troops who served in Vietnam with those of other Vietnam-era veterans.

A flock of government work groups and task forces has been hovering over the project, which has been reviewed by the VA's advisory committee on the health-related effects of herbicides and the Agent Orange working group of the Department of Health and Human Services (HHS) as well as by the OTA. The protocol was so lacking in detail that one reviewer, Vernon Houk of the Centers for Disease Control, told a Senate committee, "we did not indeed even classify this as a protocol."

A fundamental problem was that the investigators did not specify how they would develop an exposure index. Without a reliable estimate of who was and who was not exposed to Agent Orange, as well as some idea of the severity of exposures, the study will be impossible. Yet the protocol indicated that it would take 14 months to determine whether an exposure index could be developed.

The OTA reviewers were also critical of the secretiveness of the protocol, which proposed to withhold from participants investigators' assumptions about the exposures as well as what health effects they were looking for. Reviewers pointed out that this was impractical and would undermine the public credibility of the study. The protocol was also faulted for its cursory description of the physical examination to be given the participants: no mention was made of testing for neurological, psychological, or repro-

ductive problems. (Detels explained to Science that since the issue of public access to the protocol has not been settled, they did not want to give information that would jeopardize a double-blind study.)

The General Accounting Office (GAO) has also weighed in with criticism of the data bases that the investigators proposed to use. The GAO pointed out, for example, that the VA's Agent Orange registry, which lists all Agent Orange-related complaints from people who have been examined at VA hospitals, was never intended for use in an epidemiologic study, that it contains a self-selected sample of men, and that it contains no information on degree of exposure to the herbicide.

Whatever the drawbacks of the protocol, there is no doubt that this will be an extraordinarily difficult study to conduct. The subject is highly charged emotionally, and anything sponsored by the VA is going to be regarded with suspicion by many vets. There will have to be heavy reliance on subjective information. And there will be no way to decide which health effects may be significant until a reliable exposure index has been established. Investigators will also have a formidable job in grappling with Army combat files. According to Richard Christian of the Army's Agent Orange task force, the history of the movements of each battalion in Vietnam takes up about 20 linear feet on the shelves, contributing to a total of 40,000 feet of combat records. These records, which are not indexed for the convenience of epidemiologists, will have to be put together with data from tapes that contain records of herbicide sprayings in order to establish whether an individual was in the vicinity of a spraying. Combat records will also have to be matched with records of 39 aborted spraying missions where pilots jettisoned thousands of gallons of herbicide. (The UCLA people didn't have this in their proposal because HHS Secretary Richard Schweiker only revealed it in September.)

The study, if it gets under way, should get some assist from preliminary findings of the Air Force's Ranch Hand study, expected late next year. The Ranch Hand project is designed as a 20-year study of the health of 1200 pilots engaged in spraying missions.

Veterans' groups are not wildly enthusiastic about the project that UCLA is trying to design, and their concerns were aggravated in September by reports that Spivey had told the California State Assembly that the biggest problem created by Agent Orange was probably "fear." But says Detels, Spivey was only stressing that it was important not to prejudge the outcome.—CONSTANCE HOLDEN