CAPE THOMPSON: BALANCING TECHNOLOGY AND THE ENVIRONMENT

■ By the late fifties, thoughtful scientists had become deeply aware of the intricacy and sensitivity of the ecological web. At the same time, proponents of the Plowshare program were proposing to use nuclear detonations to excavate harbors and construct canals. To pave the way for such projects, an experimental harbor excavation, dubbed Project Chariot, was proposed for Cape Thompson in northwest Alaska. In a landmark effort, the AEC sent a team of scientists to survey the area beforehand—the first major ecological survey ever done in advance of proposed development. Among the goals were to gather enough information to allow credible estimates of the biological cost of the harbor project and to establish a baseline for assessing future change, natural and otherwise. In the end, the study contributed more basic ecological information about the Arctic than all previous investigations combined. Further, it suggested that Project Chariot would entail unacceptable ecological and public health risks, and, perhaps most important, it presaged a new era of ecological awareness, almost a decade before the National Environmental Policy Act of 1969 would demand such environmental impact assessments. ■

ecosystem metabolism, thus forming the basis for the DOE's later terrestrial carbon cycling research and becoming the centerpiece for the International Biological Program's global woodlands research effort in 1968. Still later, ecologists launched the Walker Branch Watershed project, which continues today, one of the two longest-running studies of a forest ecosystem in the U.S. Over the years, it has afforded deep insights into the flow of nutrients, water, and contaminants through a forested watershed and on the physical, chemical, and biological processes that control this flow. More broadly, it has provided new tools for evaluating the effects of human activities on natural environments.

The AEC was no less committed to supporting ecological research in universities, where ecologists and limnologists used tracers to study the transport of materials in lakes and rivers, sometimes using entire small lakes as experimental ecosystems. In 1951, for example, Arthur Hasler at the University of Wisconsin took a whole-ecosystem approach in testing a way to manipulate algal and fish production. He separated the two halves of an hourglass-shaped lake in northern Wisconsin with an earthen barrier, thus creating two separate lakes. One was then treated with lime to reduce the acidity and thus the concentration of dark organic matter in the water, while the other remained untreated as a control. Early efforts such as this paved the way for much of modern limnology by offering key insights into how lake ecosystems work and how they might be managed to enhance their intrinsic and utilitarian values.

On another ecological front, the late sixties saw growing environmental concern over the nonradioactive thermal discharges from nuclear power plants (which typically used river water as a coolant, heating it in the process). The lack of information on the sensitivity of aquatic organisms to heated discharges was highlighted in envi-

1980 The Congress established the ten-year National Acid Precipitation Assessment Program, involving several DOE national laboratories as major participants. Four years earlier, ERDA had responded to acid rain concerns by launching the Multistate Atmospheric Pollution Power Production Study.

1981 Tomas Hirschfeld at Livermore developed the remote fiber fluorimeter, an early application of fiber optic technology. Such instruments are now widely used for remote monitoring of environmental contamination.

1984 With OHER support, Warren Washington at the National Center for Atmospheric Research used a coupled atmosphere-ocean general circulation model to predict that a 4 degree Celsius global temperature increase would accompany a doubling of the atmospheric CO_2 concentration.