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**RESOURCES & ENVIRONMENT**


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duced "irresolvable conflicts," and only one project besides the Tellico Dam was cancelled outright.

But the expense of court-ordered compromises falls entirely on industry. When the Grayrocks Dam in eastern Wyoming was challenged in 1978 on the grounds that it would dry up whooping crane habitats downstream, a utilities consortium had to pay \$7.5 million to remedy matters.

Congress's 1978 procedural reform will not solve the equity problem, Harrington warns. Extensive hearings must now be held before plants and animals are declared endangered. But the interagency board created to hear appeals on threatened projects can delay decisions for nearly two years. And its verdicts can be challenged in court.

The Endangered Species Act is, unfortunately, a law that imposes "concentrated costs and diffuse benefits," the author notes. Further changes in the act are likely, including some that may, in fact, allow certain species of flora or fauna to vanish.

### *The Greenhouse, North and South*

"The Politics of Carbon Dioxide" by John Gribbin, in *New Scientist* (Apr. 7, 1981), New Science Publications, Commonwealth House, 1-19 New Oxford St., London WC1, United Kingdom.

For years, scientists have warned of the so-called greenhouse effect—asserting that extensive burning of fossil fuels will dangerously increase heat-trapping carbon dioxide in the atmosphere, causing the Earth's climate to warm. Now, some have added a new twist. Climatologists at the University of East Anglia, in England, contend that the change will probably benefit the world's tropical regions but hurt the temperate zones. So reports Gribbin, a *New Scientist* consulting editor.

Fossil fuel use among the industrialized countries is leveling off. But growing Third World fuel consumption could contribute to a rise in the global mean temperature of 2–3°C by the year 2025. The change will not be uniform, according to the climatologists, who have compared colder and warmer years over a 50-year period (1925–74). During a warm year, a 3°C mean temperature rise in the Soviet Union, for example, is matched by only a 1–2°C increase in North America. Meanwhile, temperatures in the Middle East, around the Mediterranean Sea, and in the tropics hold steady or even drop in some areas. Rainfall becomes heavier in the tropics but diminishes in the United States, Europe, the Soviet Union, and Japan. The cause, scientists say, is a shift in the atmospheric circulation patterns when the atmosphere warms.

What would such a shift, over a long term, do to world agriculture? In the American corn belt, each 1°C rise in temperature can trim yields by 11 percent, even without a decline in rainfall. And in Soviet Kazakhstan, a 1°C increase can slash wheat crops by 20 percent. On the other hand, rice yields in India and other parts of Asia, Africa, and Latin America could soar by 10 percent or more. These changes are not likely

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to occur simultaneously, however. Harvests in the Temperate Zone may decline more quickly than developing countries can muster the resources to take advantage of their improved climate.

"The transition from a natural 'cool Earth' state to an unnatural 'greenhouse Earth' [is likely to be] a time of chronic and severe variations in the weather," writes Gribbin. Some scientists believe that we have entered this phase. A global rash of "unseasonable" frosts, heat waves, droughts, and floods during the 1970s, Gribbin suggests, signal that the "weather machine" is now reacting to the greenhouse effect.

### *Positive Pollution*

"Thermal Ecology: Environmental Teachings of a Nuclear Reactor Site" by J. Whitfield Gibbons and Rebecca R. Sharitz, in *BioScience* (Apr. 1981), 1401 Wilson Blvd., Arlington, Va. 22209.

Environmental benefits from a nuclear plant? It happens, write Gibbons and Sharitz, ecologists at the University of Georgia. They studied thermal pollution caused by the release of tons of hot water into streams and ponds from U.S. government plutonium reactors near Aiken, S.C. Nuclear reactors have been changing the environment of the region since the early 1950s—for better and for worse.

Three of the plant's original five reactors are still operating, regularly releasing 158°F water into manmade reservoirs and nearby natural streams, tributaries of the Savannah River. Waters in one 166-acre pond often exceed 122°F when the reactors are running. Some creeks that receive waste water enter the swamplands of the Savannah River at temperatures of more than 100°F.

The benefits to certain species in the area have been marked. The warmer environment has caused swamp primrose to flower earlier and produce more fruit and seed. Slider turtles enjoy a higher juvenile growth rate, larger body size, and more offspring. The reason, say the authors, is that warm water raises metabolic levels, energy requirements—and appetites. It also attracts fish, whose high-protein content enriches turtle diets. Meanwhile, the deepwater bluegill are producing more warmth-tolerant offspring—an indication of the rapid pace at which evolutionary adjustments can occur.

Yet the nuclear facilities have not been an unqualified environmental blessing. Young large-mouth bass grow big for their age, but the metabolic rate of adults rises to the point that food intake cannot meet physical needs. Many fish become emaciated and susceptible to disease. Year-round warm water also prevents alligators from going dormant. As a result, male alligators produce sperm four weeks earlier than usual and are out of synch with females. The heat has also killed many swamp cypress trees.

The environmental changes wrought by thermal pollution from nuclear plants are neither all bad nor all good, conclude the authors. They are more apt to include the enhancement of some species and the decline of others, or, in the warmest waters, loss of species diversity.