

RESOURCES & ENVIRONMENT

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.