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Source: BioScience, 60(11) : 870-871

Published By: American Institute of Biological Sciences

URL: <https://doi.org/10.1525/bio.2010.60.11.2>

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The Biodiversity Blunder

GEORGE M. WOODWELL

It was a magnificent innovation: the Red List, a list of threatened species around the world published regularly by the International Union for Conservation of Nature (IUCN). The IUCN was established in 1948 in the heady postwar years of hope, and it quickly became the icon of conservation. Supporters founded the World Wildlife Fund in 1961 to raise funds for IUCN initiatives. There were many innovations along the way, but the Red List stood out as a statement of the mission of conservation. A listing put a finger on species and sites requiring attention.

The approach was remarkably effective. By 1963 there was recognition of a need for more formal support for preserving species, and the IUCN drafted the Convention on International Trade in Endangered Species. The convention entered into force in 1975, and by 2009, 175 nations were parties. International challenges such as whales, big cats, and tuna were objects of special attention.

Meanwhile, in the academic world, papers and books appeared around the truism that “extinction is forever.” The Red Lists became longer. The challenge was to save the full range of species on Earth. A shorthand developed; “biodiversity” emerged as a term consolidating all purposes in preserving species. Defending biodiversity in all its imaginable forms became conservation’s core objective.

It was an unfortunate choice. The emphasis on species was inadequate to the point of being misleading, both as a concept of science and as an objective for political action. This inadequacy appeared only over time as conservation slipped to the margins of human affairs and global biotic impoverishment soared. Biotic diversity was an attractive concept but it described everything—and nothing. It offered no implement, no tool in science, and

no model; it provided no example of success and no clear cost of failure. It was not easily defined, measured, or conserved in practical, specific, understandable terms.

Even so, the concept of biodiversity was bolstered by books and compendia of papers written by scholars (I was one of them). Efforts were made to find evidence that the number of species present defined the structure and function of landscapes, and conveyed substance to ecology and succor in various forms to human interests. The search intensified as scholars recognized that there are large differences in biodiversity around the globe. “Hot spots” of biodiversity were held to be more important targets for conservation than places less well endowed. But are they?

The logic refuted, or ignored, a century of analysis by botanists, who saw plant and animal communities as no less a product of evolution than species. The mutual dependencies and structural complementarities among species had provided ample basis for the theories. An arm of science had emerged around such ideas under various names, including ecology itself. The species list was important, but only if accompanied by other elements of structure and, later, physiology and genetics. Yet in the new revolution in concepts, that history was ignored in favor of biodiversity.

It was a strange argument, for it prejudged species numbers and novelty as important criteria for preservation. It overlooked genetic variability, ecotypes, community structure, species dominance, minimal ranges, interdependencies, and propinquity. The biodiversity argument also overlooked broad, chronic changes in environment such as chemical pollution and climatic disruption that changed the environment around each individual, not each species, and it ignored the

fact that each individual is a survivor of the competitive business of life, and every ecotype has been selected for success in that place. In today’s biodiversity-focused world, saving a hot spot of biodiversity is little more than a wish, certain to be dashed as chronic changes in environment accumulate and impoverish land and water. The impoverishment offers no hope of restoration in less than evolutionary time, for the neighboring ecotypes have all been lost as well, long before the species has been lost. There is no immediate recovery possible, and no resilience remaining.

Nevertheless, biodiversity became the criterion for conserving places, land, and water, and hot spots of biodiversity, parks, and reserves were established to preserve such sites. The emphasis on local parks seemed to satisfy the needs of conservationists who, thinking of migratory animals, attempted to connect parks with corridors. But again, the emphasis was narrow and specific. It took conservation out of the mainstream of politics and economics and left the rest of the world open to business as usual. Business as usual was in fact changing climate and chemistry for all parks and reserves. The parks were far too small and established far too late.

The examples are legion. All follow a classic pattern of environmental impoverishment just as definitive and predictable as more familiar developmental patterns, including growth and field-to-forest succession. The effects of biotic impoverishment are often overlooked despite the elementary fact that economic and political progress depend on a functionally intact environment.

The fishery of the northwest Atlantic is a classic case of incremental impoverishment despite an emphasis on the conservation of species. Spencer

Baird, who came to work in Woods Hole in the early 1870s, became persuaded that the fisheries were in peril, and managed to have Congress establish the US Fisheries Commission. He was correct about the fisheries, but the depredations of that time were trifling by comparison with what was to come, as steam, and later diesel, trawlers were developed that could scrape the bottom repetitively and strain substantially all the fish from the water column.

Trawlers worked the abundant inshore stocks of fish, especially herring, mackerel, and cod along the New England coast. Cod were abundant and could be flaked, dried, salted, and preserved to be traded far and wide. Those stocks are now gone. Such populations were unquestionably ecotypes, genetically fixed to the inshore environments, temperatures, depths, currents, and food, and adapted to all predators except the trawls. One might think the stocks would have been replaced by populations from the deeper waters, but those populations, too, are ecotypes, fixed to their special places, and they too are in danger from newer innovations in efficiency: stern trawlers, larger and more powerful than their predecessors, are able to stay out for weeks, hauling large bottom trawls that scoop up all life for miles. Conservation? Biodiversity? Outside the discussion. So, too, the once huge cod stocks of the Grand Banks of Newfoundland were destroyed by overfishing, and they have not recovered despite many years of protection. Their

conservation was clearly the business of government but we have allowed ourselves to be distracted, and have lost dismally.

Fisheries are a model for the forests, which once covered globally about 44 percent of the land area and now cover less than 28 percent. The forests, too, have lost ecotypes, and the losses mount as the environment erodes from under them.

Meanwhile, still seduced by biodiversity, we struggle for a better rationale for conservation and argue for preserving biodiversity because of the public-service functions of nature. We try to sell those functions as having a financial value. But the value accrues to the public at large, and protecting it falls to the government, which must fight the private interests that can profit immediately from selling the last fish. We scientists and conservationists are easily ignored as irrelevant. Our frame of reference is not compelling. We are ineffectual, ignored by commerce and industry and by the governmental agencies that should be our own.

The fact is that for continuity of function, the global environment is dependent on the totality of its elements—not only species but all ecotypes and communities of plants and animals, on land and in the global waters. It is the totality and integrity of life that is now threatened with systematic impoverishment as the biotic feedbacks of climatic disruption slide beyond control. Catastrophes such as the contamination of the entire Gulf of Mexico by one oil well join a global explosion

of chronic disturbances—the erosion of climate and an untold profusion of industrial toxins—to leave us with systemic environmental corruption. The remnant human survivors a thousand years from now will read the sedimental record and marvel at the stupidity of a culture that could so effectively march from Eden into oblivion.

The enemy is chronic disturbance, cumulative and irreversible, that moves the world systematically down the curve of biotic impoverishment, place by place, until the effects fuse and end this phase in the evolution of the biosphere. The cure is the loud and relentless pursuit of the restoration and preservation of the physical, chemical, and biotic integrity of Earth—all of Earth—as the special preserve of this civilization. That step requires the elevation of global conservation to a level competitive with other political and economic interests.

Conservation, focused tightly on preserving biodiversity, has been effectively defined to be outside the core of governmental function at the very moment when preserving the conditions that have succored all life should be at the core. We, scientists and conservators of life and environment, have been engaged in a perpetuating a monstrous, unnecessary, and possibly fatal, blunder.

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doi:10.1525/bio.2010.60.11.2