

Biological Diversity FY 1989 Initiative For Interpretation

Editor's Note: Richard Cunningham, Western Region's far-sighted Chief of Interpretation, sent a March 1987 memo to all WR areas and offices, dealing with the interpretive initiative for FY 1989, as announced by NPS Director Mott. (1988 initiative is acid rain/air quality.) Excerpts from Cunningham's memo follow.

Biological diversity is simply the diversity of life and includes species diversity, genetic diversity, and ecosystem diversity.

The "average" person feels that species disappearance is not very important when compared to the "real problems" of nuclear arms, nuclear power, poverty, arid starving people, overpopulation, the economy, scandal in government, etc. But the problem of disappearing species is one of the great "sleepers" issues of our time. It also presents us, as interpreters, with one of our greatest challenges and opportunities for park interpretation. We have the chance to ring the "wake-up" bell.

On estimate is that at least one million species of plants and animals will become extinct by the end of this century. On a worldwide basis, people are daily consuming more foods and more medicines, and using more industrial products that come from wild species of plants and animals. Over 1,000 species of animals currently are recognized as under threat of extinction. Why should the public be concerned? Why should we save species of animals and plants? To me, there are at least four reasons why: (1) other organisms have a right to existence — compassion calls for their preservation; (2) species should be preserved because of their beauty, their symbolic value (i.e. bald eagle), or their intrinsic interest; (3) species should be preserved for their actual or potential economic uses; other species provide direct benefits to humans; (4) species are living components of the ecosystems in which they live.

For the "general public" though, the need for preservation of species most often comes down to "What's in it for me?" I think the economic or utilitarian reasons for species preservation is the interpretive "hook" by which we can capture the interest of the average person.

Included here is a selection of references I urge you to use in adding to your personal and park libraries.

About 80,000 possible edible plants are known to exist. At one time or another man has used at least 3,000 for food, but only about 150 have ever been cultivated on a large scale. Today fewer than 20 different plants produce 90 percent of the world's food. A major disease affecting any one of the four major crops (wheat, rice, corn, potatoes) would have serious implications for many people. Without sufficient stocks of genes from wild strains, modern agriculture is threatened by new diseases and resistant insect pests. Wild plants provide original gene resources for revitalizing and improving the strains of food plants we grow.

Plant and animal species contribute to a wide range of drugs and pharmaceuticals, including antibiotics, analgesic pain-killers, anti-leukemia drugs, anticoagulants, etc. About half of all prescription drugs in the U.S. contain a drug of natural origin. The U.S. is dependent for medicines upon imported plant mate-

rials, especially from tropical forests.

Alkaloids are an extremely valuable group of drugs. occur in about 20 percent of all plant species. They include strychnine and narcotics such as morphine, nicotine, and cocaine. Pain-killers, cardiac and respiratory stimulants, blood-pressure boosters, anti-malarials, muscle relaxants and anti-leukemia drugs are all derived from plant alkaloids, yet only about 2 percent of the Earth's 300,000 flowering plants have been tested for alkaloids.

The rosy periwinkle comes originally from Madagascar — an island with an incredibly high rate of extinction. A total of 75 alkaloids have been discovered in the rosy periwinkle, two of which, vincristine and vinblastine, have led to a breakthrough in the fight against cancer, especially Hodgkin's Disease. Vincristine has become a major treatment for children with acute leukemia. How many other "rosy periwinkles" are now verging on extinction — or have already been lost — that might contain a chemical with even more effective anti-cancer properties?

Many animal species also serve our medical needs. The study of elephant physiology may shed light on atherosclerosis. Desert pupfish show remarkable tolerances to extremes of temperature and salinity, a condition that could aid research on human kidney disease. The armadillo may eventually hold the key to a cure for leprosy; it is the only animal other than man to contract the disease. The blue blood of horseshoe crabs contains a chemical extract which clots upon contact with endotoxins. This extract is used for diagnosis of spinal meningitis, bubonic plague, and Legionnaire's disease. Yet millions of horseshoe crabs have been killed by commercial fishermen, or by pollution, or for fertilizer and chicken feed. Horseshoe crabs have not yet been bred in captivity and must be harvested from wild populations.

Preservation of species for industrial and other uses (such as bee's honey used to monitor air pollution by heavy metals) are further subjects you may wish to investigate. At Organ Pipe Cactus National Monument bee's honey is being studied for accumulation of pesticides.

Another important reason for preservation of biological diversity could be called "ecosystem services." Examples include the production of oxygen; maintenance of the chemical composition of the atmosphere; the natural self-cleansing of water; the critical action of decomposers; the role of ecosystems in watershed storage, prevention of flooding and soil erosion; and climate modification. In other words, ecosystems and their component organisms **maintain the habitability of the Earth.**

It has been stated that there is not a single species for which it can be said with complete confidence that we know it in its entirety. We simply do not know enough to dismiss any species as having absolutely no value at all. Present scientific thinking sees the best solution for biological diversity in the creation of "genetic islands" or gene preserves . . . where healthy, diverse species populations of plants and animals could be maintained. Natural areas such as national parks may be the saving grace for biological diversity.

Interpretation of biological diversity offers a unique opportunity in providing the personal "hook" to the

"Why should I care?" crowd. We can extend ourselves beyond our park boundaries to develop visitor awareness and concern for global environmental issues that can and will affect each one of us.

When father's high blood pressure, or mother's cancer, or your best friend's kidney disease are related to treatment by a chemical derivative from a living wild plant or animal, species preservation hits home. Who knows what future cures still lie in some currently unknown plant or animal?

Examples of the importance of biological diversity can be interwoven into our existing interpretive activities. I'm sure you still get questions, as I did when I was in the field, on "What's the value of a (mosquito, coyote, weed, tree, etc., etc.)?" Knowledge of the utilitarian and ecological role of organisms will help to answer this question.

Interpretation of biological diversity ties in with what national parks are all about and what our role as interpreters should be . . . an opportunity for communicating global conservation awareness and the values of parks, wherever they are.

Selected References

- Caulfield, C. 1985. *In the Rainforest*. Alfred A. Knopf.
- Durrell, L. 1986. *State of the Ark*. Doubleday.
- Ehrlich, P.R. 1986. *The Machinery of Nature*. Simon and Schuster.
- Ehrlich, P.R. and A.H. Ehrlich. 1981. *Extinction*. Random House.
- Frankel, O.H. and M.E. Soule. 1981. *Conservation and Evolution*. Cambridge University Press.
- Freeman, J. 1986. *The parks as genetic islands*. *National Parks*, Jan./Feb. 1986:12-17.
- Forsyth, A. and K. Miyata. 1984. *Tropical Nature*. Charles Scribner's and Sons.
- Kaufman, L. and K. Mallory, eds. 1986. *The Last Extinction*. The MIT Press.
- Koopowitz, H. and H. Kaye. 1983. *Plant Extinction: A Global Crisis*. Stone Wall Press (Washington, D.C.)
- Myers, N. 1979. *The Sinking Ark*. Prentice-Hall.
- Myers, N. 1984. *The Primary Source*. W.W. Norton Co.
- Myers, N. 1985. *A Wealth of Wild Species, Storehouse for Human Welfare*. Westview Press (Boulder, Colorado).
- Norse, E.A., et al. 1986. *Conserving Biological Diversity in Our National Forests*. The Wilderness Society.
- Norton, B.G. 1986. *The Preservation of Species*. Princeton University Press.
- Oldfield, M.L. 1984. *The Value of Conserving Genetic Resources*. USDI/NPS.
- Schonewald-Cox, C.M., S.M. Chambers, B. MacBryde, and W.L. Thomas. 1983. *Genetics and Conservation*. Benjamin-Cummings Publ. (Menlo Park, CA).
- Soule, M.E. 1986. *Conservation Biology*. Sinauer Assoc. (Sunderland, MA).
- Soule, M.E. and B.A. Wilcox. 1980. *Conservation Biology*. Sinauer Assoc. (Sunderland, MA). (out of print).
- Wilson, E.O. 1985. *The biological diversity crisis*. *Bioscience* 35(11):700-706.