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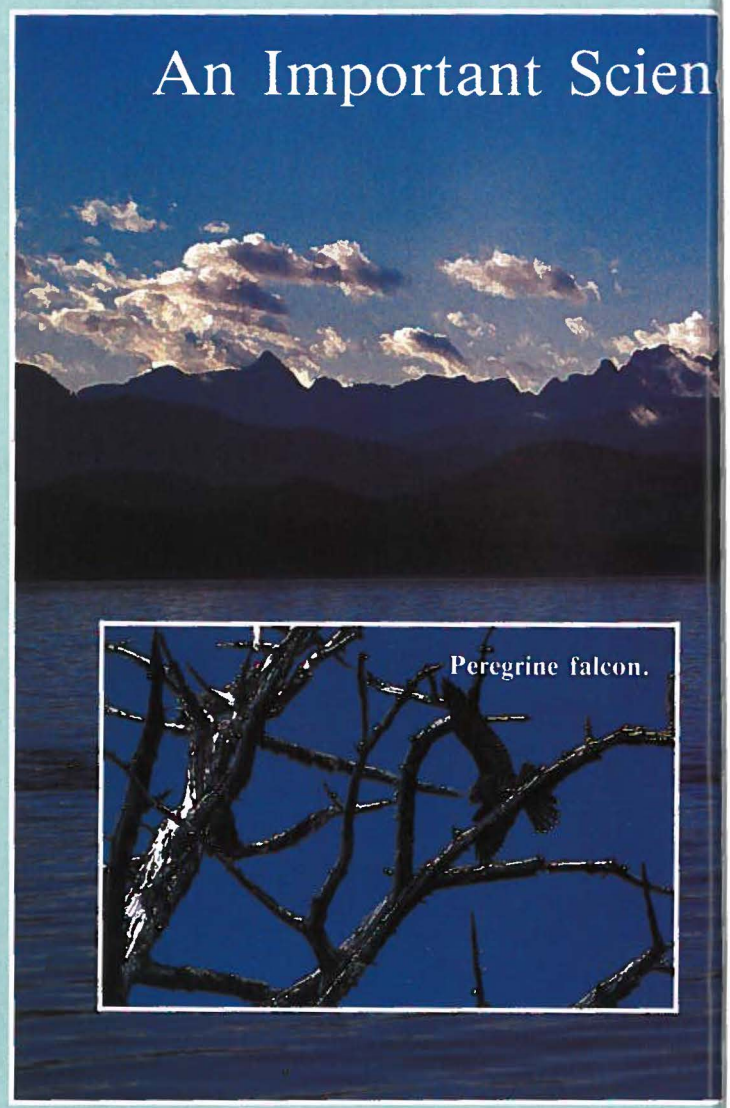
An Important Scien



Wildlife managers and ecologists throughout the world are becoming involved in a new field called conservation biology. Simply stated, conservation biology is an applied science directed towards maintaining the diversity of life on earth. Specifically, the goals of conservation biologists are to maintain the genetic diversity of species, the species diversity within ecosystems, and the diversity of ecosystems over the earth.

As a discipline, conservation biology evolved in the 1980s. The book *Conservation Biology—An Evolutionary-Ecological Perspective* edited by Michael Soule and Bruce Wilcox was published in 1980 and has become a standard text at universities throughout the country. The Society for Conservation Biology was founded in 1986 and published the first volume of its new journal, *Conservation Biology,* in 1987. By the end of the decade, bills to make the conservation of diversity a national goal had been introduced into both houses of Congress.

With more than 5 billion humans now making a living from the earth's resources, maintaining the diversity of life on our planet has become an increasingly serious and challenging task. Of the 5-30 million species estimated to inhabit the earth, scientists have described only about 1.4 million. Harvard Professor E.O. Wilson estimates the rate of extinction to be 4,000-10,000 species per year—most from the species-rich tropical rain forests. The extinction of species is a serious and irreversible threat to the long-term wellbeing of humans. It could be considered analogous to the destruction of unread volumes in the great libraries of the world.

In North America, the passenger pigeon, great auk, Steller sea cow, Carolina parakeet, and dusky seaside sparrow are a few of the species we have lost to extinction. The Endangered Species Act of 1973 was passed by Congress as a result of public and scientific concern for the maintenance of biodiversity. Over 560 plants and animals are listed as threatened or endangered in the United States. The California condor, whooping crane, and the black-footed ferret are among the best known species classified as endangered while the brown/grizzly bear and wolf are classified as threatened in the United States south of Canada. Threatened or endangered species in Alaska include the Eskimo curlew, peregrine falcon, and humpback whale.

Habitat loss or fragmentation is the greatest cause of extinction today. Just like islands, smaller, more isolated habitats sustain smaller populations of fewer species which are more vulnerable to local extinction. As human populations continue to expand and develop more wildlands for human uses (including residential, agricultural and industrial), wildlife populations throughout the world are increasingly jeopardized.

In the United States, large carnivores have been particularly vulnerable to extirpation by humans. The grizzly bear is a good example. Although millions of dollars are being spent on research and management of the Yellowstone grizzly, we are uncertain if this small, isolated population will persist beyond the next 50-100 years. Similar concerns exist for the spotted owl in the Pacific northwest as the last stands of old-growth forest are logged and become fragmented.

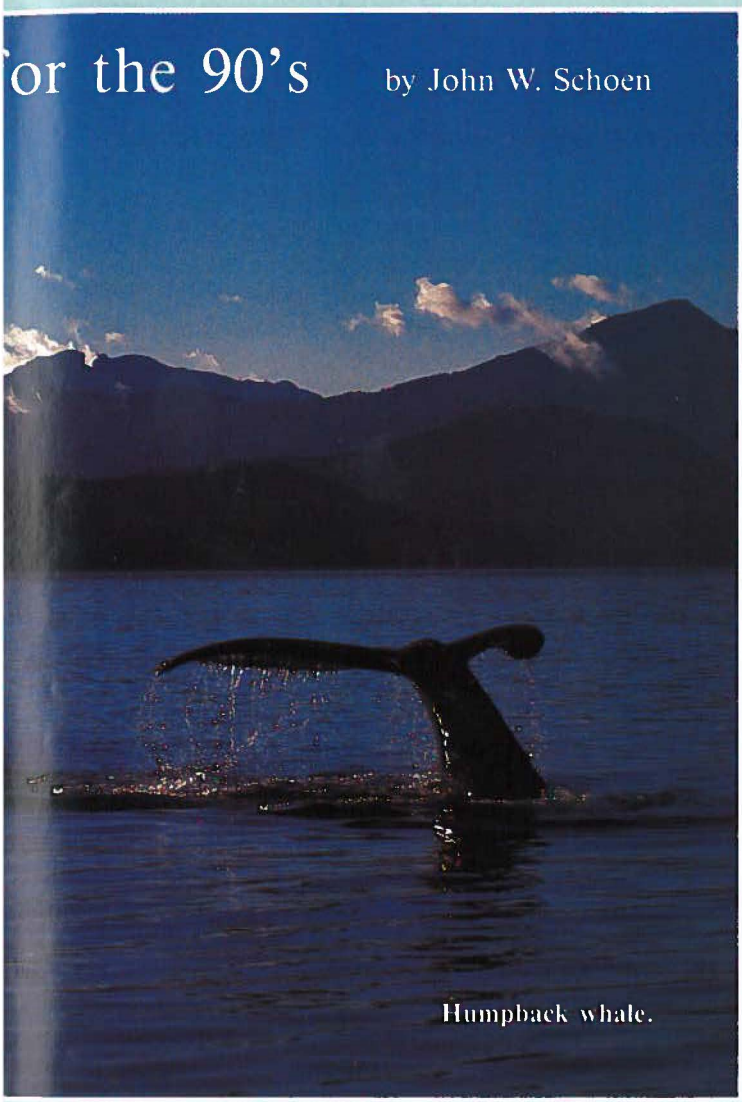
But why is biological diversity important? From a strictly utilitarian perspective, it is our greatest sustainable wealth. We derive all of our sustenance and many of our usable goods from other living resources. Although we have cultivated or domesticated relatively few of the myriad species on earth, many new opportunities await future discovery. Recently scientists discovered that a small plant from Madagascar, the rosy periwinkle, produces a substance which can be used to treat a form of leukemia. Not only has this organism saved lives and reduced human suffering, its annual economic value is worth millions of dollars.

For years, ecologists have recognized that there are many complex interrelationships among the organisms which make up most ecosystems. Consider the variety and complexity of

on Biology:

for the 90's

by John W. Schoen



Humpback whale.

Photos by John Hyde

food chains associated with some of our high-profile Alaska species like king crabs, eagles, moose, mosquitos, and bears. The important role of large trees in an old-growth forest in providing habitat for fish, birds, and mammals is another example. As these trees die and fall, they become inhabited by an entirely new flora and fauna as they are slowly decomposed and recycled through the ecosystem. Ecological processes like nutrient cycling, competition, and predation are important elements of biological diversity. The loss of one component of an ecological community may cause the entire community to unravel. Decades ago, Aldo Leopold recognized the importance of biodiversity when he said, "The first rule of intelligent tinkering is to save every cog and wheel."

Alaska is truly the last frontier. Few places on earth have the amount of wildlands and spectacular resources we have in Alaska. Here too, however, we are beginning to recognize our vulnerability to environmental degradation. Logging of rare streamside old growth, the wreck of the *Exxon Valdez*, and build-up of arctic haze (air pollution originating in the Soviet Union and eastern Europe) are examples of human-caused problems with long-term consequences for several of Alaska's varied ecosystems. Although much of Alaska is still undeveloped wilderness, many of the same problems which have occurred elsewhere in the United States are waiting on our doorstep. For example, increased road building, logging, mining, and tourism in southeastern Alaska has greatly heightened concern for the conservation of brown bears.

The principles of conservation biology must be incorporated into our wildlife management if we are to maintain Alaska's unique biodiversity. This will require blending the diverse disciplines of genetics, demography, and community ecology. University and agency research relevant to conservation biology in Alaska include genetic molecular studies of geographic variation in wildlife populations, habitat fragmentation studies of deer in the Tongass Forest, studies on the effects of the Greens Creek and Red Dog Mines on brown bear populations, investigations into the potential impacts of petroleum exploration and development on arctic ecosystems, and ecological studies of oil spill impacts on the marine ecosystem of Prince William Sound.

In 1933, Leopold defined game management as the art of making land produce sustained annual crops of wild game for recreational use. Today, wildlife management has evolved to encompass a much broader spectrum of concerns. Greater numbers of people interested in watching wildlife dictate that managers provide more and varied nonhunting experiences as well as the traditional hunting opportunities. Wildlife management has generally been single species management. More emphasis must be placed on a broad-based ecosystem approach to research and management. Long-term planning and interdisciplinary and multiagency cooperation on an international scale will also be essential for maintaining biodiversity and providing knowledgeable stewardship of Alaska's world-class wildlife resources. Alaska's wildlife is not only an important economic, aesthetic, and recreational resource; it is also a sensitive barometer of the environment on which we all depend. Responsible stewardship requires that resource managers and the public balance short-term economic gain with long-term ecological and economic sustainability. This decade will be crucial in determining what wildlife legacy we will bequeath our future generations.

John Schoen received his Ph.D. from the University of Washington. He has worked for ADF&G since 1976 primarily as a research biologist studying the habitat relationships of brown bears and Sitka black-tailed deer in southeast Alaska. He has just accepted a new position as Senior Staff Biologist for Conservation and Education.

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