

Air Pollutants Monitored At Biosphere Reserve

Editor's Note: Science is the human way of organizing information to try to predict the future. Management is the human way of organizing action to try to influence the future. Scientific management in the National Park Service is the bringing of as much predictive capability as possible to the planning and operation of park units.

Cooperative scientific programs among agencies with impressive capabilities have made possible a variety of predictably salutary outcomes as the result of park management practices. Perhaps the grandest of schemes to have emerged within this general effort is the Man and the Biosphere (MAB) Programme, launched by the General Conference of

UNESCO at its 16th session in 1970, with the following aims:

"To develop within the natural and social sciences a basis for the rational use and conservation of the resources of the biosphere and for the improvement of the relationship between man and the environment;

"To predict the consequences of today's actions on tomorrow's world, and thereby to increase man's ability to manage efficiently the natural resources of the biosphere."

Of the 14 major international themes, or project areas, within the MAB Programme, Project 8 is a worldwide network of biosphere reserves, to include on a representative basis samples of all major types of ecosystems for in situ conservation and to provide sites for baseline research activities. Conservation of gene pools and whole ecosystem processes, integrated ecological research and environmental training activities are the heart of biosphere reserve rationale and work.

The Pacific Northwest and Western Regions of NPS contain 15 of the 35 U.S. biosphere reserves, where basic research is contributing to the ability of managers to track deterioration of the resources and to take preventive and/or corrective measures aimed at preservation of habitat and perpetuation of species.

As airborne pollutants circulate and settle in mounting quantities over expanding area, variously based scientists are pooling their knowledge and ef-

forts in air measurement projects jointly funded by agencies and institutions with mutual concerns. Meanwhile, talk of fuel-related development at Port Angeles, on the rim of the Olympic National Park and Biosphere Reserve provides context for research into present conditions at the park. Careful documentation of existing states will be crucial evidence in any future attempts to control human impact on the natural environment of that area.

The following report from Bruce Wiersma, ecologist with the U.S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nev., goes one step further — comparing data collected from two biosphere reserves. It would seem from the data that the degree of an area's "pristineness" could depend in large part on whether the prevailing winds blow in from several thousand miles of open sea or across a similar distance of industrialized land.

By Dr. G. Bruce Wiersma

Our work at Olympic National Park this summer was supported by the National Park Service. In addition to NPS personnel from Olympic, we were assisted in this project by Sarah Greene, Forestry Sciences Laboratory, U.S. Forest Service, Corvallis, OR; Dr. Cliff I. Davidson, Carnegie-Mellon University, Pittsburgh, and Dr. Clyde W. Frank, University of Iowa.

Biosphere reserves are remote, pristine areas set

aside in perpetuity. A pollutant monitoring system is being developed for implementation on the reserves. Purposes of monitoring pollutants on these areas are (1) to serve as locales for background reference levels of certain pollutants, (2) to provide a frame of reference against which changes in impacted areas can be measured, and (3) to reflect changes of a global nature before such changes are obvious in more impacted areas.

The reserves are areas that can be used to monitor the behavior of pollutants that have long range transport characteristics. This project is developing a monitoring system for pollutants on biosphere reserves. Olympic NP was first sampled in the summer of 1979 and again in 1980. Samples taken included air, water, soil, forest litter, and vegetation. Sampling was coordinated with watersheds in the park. Watersheds sampled included the Hoh River, Quinalt River, and the Oosewallips. Pollutants of interest were trace elements, pesticides, and certain trace organics.

In the summer of 1980, special power systems were tested under field conditions. These power systems were used to operate the air monitoring equipment. Two types of power systems were used, a portable solar panel and a hydrogen fuel cell. The solar panel was designed to fit on a pack frame. Coupled with a battery system this unit could power the air sampling equipment for indefinite periods. Eight such units were deployed in the park; all performed in a highly satisfactory manner. Two hydrogen fuel cells were deployed. Both operated off a 30-lb. hydrogen cylinder. Both performed according to expectations.

The Great Smoky Mountains NP had been sampled previously and some of these data have been paired with results from Olympic NP. Copper and lead levels in moss and litter are compared here for the two biosphere reserves.

Comparison of moss samples from Olympic and Great Smoky Mountains NPs, (micrograms per gram):

	Copper	Lead
Moss – Olympic		
Summer	4.4	5.7
Moss – Smoky		
Spring	13.5	42.4
Moss – Smoky		
Fall	15.3	108.0

Comparison of forest floor samples from Olympic

and Great Smoky Mountain NPs, (micrograms per gram):

	Copper	Lead
Olympic – litter	10.0	16.7
Smoky – unincorporated organic matter – spring 1978	18.2	37.8
Smoky – fermentation spring 1978	26.2	83.6

exotic plant incursions into the Kipahulu Valley, all within Haleakala NP.

R. Gerald Wright, systems ecologist and formerly key man for the proposed Wrangells-Mt. St. Elias NP in Alaska, went to the University of Idaho CPSU in July as project leader in biology. His 1980 publication with Lynne Zeitlin-Hale of a conceptual ecological model of Glacier Bay NM was a major product of his four years in Alaska.

