POLLUTANT MONITORING IN THE OLYMPIC NATIONAL PARK BIOSPHERE RESERVE

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Abstract. Interest in global contamination has been instrumental in the establishment of over 33 Biosphere Reserves in the United States. These reserves include pristine areas that have been protected from industrial development. They serve as areas in which present and future environmental pollution can be assessed.

Pollutant monitoring studies are being conducted in the Olympic National Park Biosphere Reserve by the U.S. Park Service and the U.S. Environmental Protection Agency. Studies are designed to identify levels of trace element and organic contaminants in physical and biological media. Ten remote sites were selected for intensive sampling. These areas were located in the Hoh, Quinault, and Dosewallips River drainages; at Anderson and Grand Pass; near Ozette Lake and, at the northern edge of Blue Glacier. Their proximity to vehicle-traveled roads varied from 3 to 20 kilometers.

Samples were taken in air, water, soil, litter and vegetation. Samples will be analyzed for organic and heavy metal contaminants. Airborne particulate size and chemical characterization is being investigated.

1. Introduction

A study was initiated to identify pollutant concentrations in specific biological and physical samples in the Olympic National Park for the development of a pollutant monitoring system. This study, similar to that conducted in the Great Smoky Mountains National Park as described by Wiersma et al. (1979), is a cooperative effort between the U.S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory at Las Vegas (EMSL–LV) and the National Park Service (NPS).

Olympic National Park, a public reserve of 360,041 hectares (ha), is one of more than 33 designated biosphere reserves in the United States. The concept and criteria used to establish this reserve system have been previously described by Franklin (1977). Basically, the biosphere reserve sites are physically and biologically undisturbed and protected natural background areas where life processes occur with minimal human interference. They are of value because they:

1. provide permanent and undisturbed areas in which long-term background or baseline studies can be conducted on environmental and biological features;
2. are natural sources of genetic pools of animal and plant species;
3. provide areas for assessing, identifying, and recording the physical and biological state of the environment;
4. provide endemic habitat to obtain data from local environmental studies instrumental for the formation of management plans and policies for the reserve;
5. provide areas for long-term biological research; and
6. serve as sites for measuring and assessing the concentration and impact of manmade pollutants on biological systems.
The use of biosphere reserves as pollutant monitoring sites originated with the Man and Biosphere program (MAB) at the 16th General Conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and with a 1970 Ad Hoc Task Force concerned with the Global Network for Environmental Monitoring (GNEM). The recommendations, criteria, and coordination of these groups was previously described (Wiersma and Brown, 1979).

Experimental design, methods, and approach used for collecting data to develop a pollutant monitoring system for the Olympic National Park follows the basic principle of the monitoring systems design described by Schuck and Morgan (1975) and Morgan et al. (1979). This approach addresses sampling and analysis of pertinent biological and physical components and the identification of the interactions occurring between these components. Methods for assessing and addressing the systems concept using kinetic modeling have been described by O'Brien (1979) and Barry (1979). Wiersma (1979) applied this method to the analysis of lead in the Great Smoky Mountains National Park.

This report describes and identifies the sampling locations, samples collected, equipment used and preliminary findings from the summer 1979 project in Olympic National Park. The objectives are to determine pollutant levels, assess variability between collected samples, determine biological accumulators of selected contaminants and evaluate sampling equipment.

![Fig. 1. Sampling locations in the Olympic National Park.](image-url)