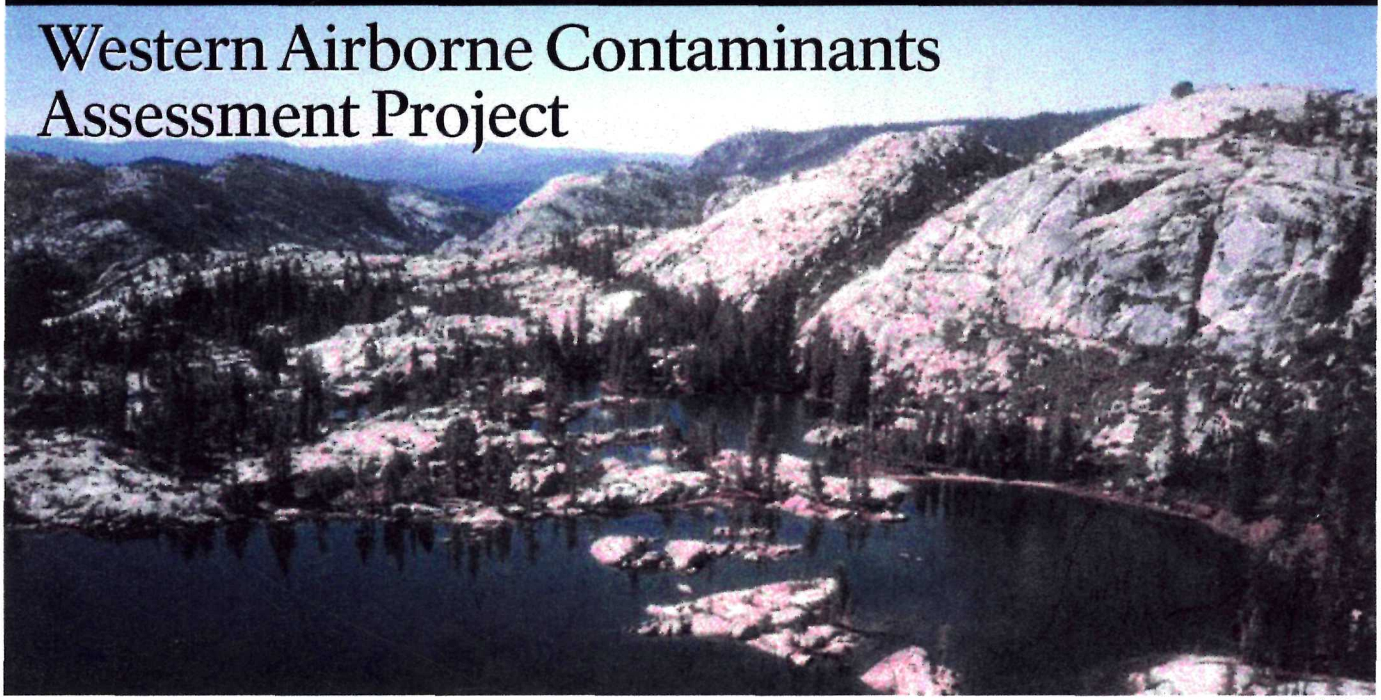
National Park Service
U.S. Department of the Interior

Air Resources Division

Western Airborne Contaminants Assessment Project



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PROJECT OBJECTIVE: Inventory airborne contaminants in national park ecosystems using a network of sites in parks of the western United States to provide spatially extensive, site specific, and temporally resolved information on the *exposure, accumulation,* and *impacts* of airborne toxic compounds.

BACKGROUND:

The "Western Airborne Contaminants Assessment Project" has been initiated to determine the risk to ecosystems and food webs in western national parks from the long-range transport of airborne contaminants. It is being designed and implemented by the National Park Service's Air Resources Division in cooperation with many western national parks, the Environmental Protection Agency, the U.S. Geological Survey, and several universities.

Airborne contaminants can pose serious health threats to wildlife and humans. Some toxic compounds tend to "biomagnify" meaning that small concentrations in air, water, snow, and plants, can result in large concentrations at higher levels of the food chain: like fish, and mammals. Biological effects of airborne contaminants include impacts on reproductive success, growth, behavior, disease, and survival. Subsistence hunters and gatherers in Alaska depend on wild food sources that may be affected by airborne contaminants.

The contaminants of concern are compounds and elements that are sometimes called Persistent Bioaccumulative Toxics or PBTs. This group contains a variety of persistent organic pollutants (POPs) such as PCB, DDT, and HCH; as well as elements such as mercury (Hg). These materials are direct or indirect products of human industrial activity and can be transported thousands of miles in the atmosphere. In some cases they can be deposited to aquatic or terrestrial ecosystems and then be re-emitted back into the air to continue their long journey through the atmosphere. Some of these materials have specific properties that permit them to accumulate, preferentially, in colder areas of the global environment. This phenomenon has been termed "cold condensation" and has been observed for some types of PCB, HCHs and even mercury. Hence, it is expected that high elevation and latitude ecosystems may be at greater risk due to the accumulations of these toxic compounds.

Several workshops have been conducted since January 2001 to assist in developing this program. As a result, a design has emerged that is centered around six key national parks in the west representing a latitudinal gradient as well as a coastal to interior gradient. Figure 1 (page 2) shows the broad elevation range and average latitude for many national parks in the west. The red bars represent the keystone parks in which all indicators will be sampled, if sufficient funding can be acquired. Note that Olympic and Glacier as well as Kings Canyon and Rocky Mountain National Parks are pairs of coast and inland sites located at roughly the same latitude. The green bars represent parks at which a smaller subset of samples will be taken if additional funding is available. At each of the six parks, two lake catchments will be selected at two different elevations. Samples will be collected at these sites to tell us where and to what extent airborne contaminants have been deposited on these landscapes, and how these contaminants may be distributed within food webs.