

Olympic National Park

Information on ecosystem processes from Olympic National Park, where air pollution presently is minimal, will provide valuable baseline reference levels with which to compare acid deposition effects in other regions of North America, as well as with future effects here. The watershed studies in Olympic, contracted by NPS to the College of Forest Resources, University of Washington, were begun in 1984 and will run until FY1992.

The watershed of the main fork of the Hoh River (299 sq mi, about 60 percent within the park) was chosen as the geographic focus of this research. Because of the large area and the biological diversity represented, the more intensive aspects of the study are being conducted in smaller watersheds representative of major vegetation zones present within the main Hoh drainage. The hypothesis is that the chemistry of the Hoh River is a composite result of biogeochemical processes operating on many smaller units.

If, or when, pollution effects produce a response sufficient to be detected in drainage waters, the effect will probably not be uniform. Some vegetation types potentially are more sensitive to altered input chemistry than others. By focusing research on points near the source, changes in ecosystem function in the fragile subalpine areas, for example, will be detected before changes in chemistry of the Hoh River itself.

Two smaller watersheds are currently being studied: West Twin Creek (elevation 505-2800 ft; Sitka spruce-red cedar-western hemlock old growth rain forest, nearly closed canopy); and Hoh Lake basin (elevation 4100-5000 ft; silver fir forest, undisturbed, more exposure than at West Twin Creek). Both have basic vegetation community maps, permanent sample plots, a sustained history of scientific study, and a meteorological station (measuring relative humidity, air temperature, soil temperature at 8'' and 20'', insolation (pyranometer), windspeed and direction, and rainfall amounts and duration of events). Surface water chemistry is being monitored. In addition, the Twin Creek site, established during the first season of field work in 1984, has a permanent stream gauge, and an array of precipitation collectors to allow comparison of chemistry of direct precipitation, stemflow, and throughfall (drip) to the

chemistry of surface water of Twin Creek.

On the permanent sample plots, soils will be described, and measurements will be made of all trees larger than 5 cm in diameter at breast height, samples of understory vegetation, litterfall rates, biomass and production, and nutrient cycling. A related study in the Hoh River valley by researchers from the Department of Forest Science, Oregon State University is monitoring lichen productivity, moss productivity, canopy litter fall, leaf litter decay, and conifer needle retention times. Together these studies will establish the range of natural variation in Hoh valley ecosystems, so that effects of human influences such as air pollution can be identified.