

TERRESTRIAL RESEARCH AND MONITORING AT HIGH LATITUDES:
SOME CURRENT INITIATIVES

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There is increasing popular and scientific recognition of the global significance of the north to topics ranging from energy development to management of renewable resources, from preservation of biological genetic diversity to appreciation of cultural heritages, from understanding early man's entrance into North America to geopolitical and global strategy considerations. Subarctic and Arctic Alaska--approximately the zone of discontinuous and continuous permafrost--constitute the U.S. sector of the circumpolar high-latitude regions. To implement rational management of these environments, there must be improved knowledge concerning the functioning and interrelationships of polar and global physical, chemical, and biological systems and their components. One facet of developing this knowledge is found in sustained monitoring programs: development of documented data sets maintained over time, quantifying system attributes, processes, and rates. Such data sets, obtained for selected environmental settings and utilizing accepted measurement and archival protocols, can provide baselines against which possible changes in environmental attributes can be assessed. Examples of such baseline programs in the temperate, contiguous "lower 48" U.S. include the U.S. Geological Survey Benchmark Basin and Vigil Network programs, the National Atmospheric Deposition program, and the U.S. Forest Service Barometer Watershed program. There is opportunity, and need, to extend and supplement existing baseline monitoring programs in the circumpolar high latitude regions of the northern hemisphere, including Alaska. Such long-term monitoring is currently being approached on several fronts, including re-occupation of "old" research sites, establishment of newly designated field research and monitoring locations, and extension of existing national and international research and monitoring activities to high-latitude locations. Atmospheric chemistry is being monitored at a minimal level in central and northern Alaska, providing knowledge fundamental to understanding polar transport of trace elements and "contaminants." The United States Man and the Biosphere program (MAB) is presently encouraging research in northern environments, specifically at the northern forest limits (the taiga/tundra ecotone) and is cooperating with agencies including the U.S. National Park Service and U.S. Forest Service in establishment of a long-term environmental monitoring station in northwest Alaska, one component of a Global Environmental Monitoring System (GEMS). Circumpolar initiatives include the northern Research Basins program of UNESCO-IHP, and the Northern Science Network of UNESCO-MAB, which has a specific concern with Biosphere Reserves and related designated research sites. More tightly focused circumpolar or bilateral research and monitoring efforts are under way in many fields, including northern forest regeneration and treeline dynamics, permafrost-related research, geophysics, and (perhaps most significantly) indigenous people's interest in and control of northern regional development. These diverse initiatives will be valuable components of an operational high-latitude geophysical/biological program.