

# DEPARTMENT of the INTERIOR

news release

BUREAU OF RECLAMATION

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## RESEARCH FINDS NO MAJOR ENVIRONMENTAL DIFFICULTIES IN SEEDING WINTER SNOW STORMS

A responsible program of cloud seeding to enhance snowfall and runoff from the West's high mountain ranges would have minimal effect on forest or alpine ecosystems, Commissioner of Reclamation Gilbert G. Stamm said today.

"A team of 33 scientists, working on a six-year, \$1 million research project, report that variations in the environment caused by cloud seeding would be minor and would not disturb the mountain ecosystem," Stamm said.

Stamm cited the report entitled "Ecological Impacts of Snowpack Augmentation in the San Juan Mountains, Colorado." It was prepared for the Bureau of Reclamation by natural scientists from Colorado State University, the University of Colorado, and Fort Lewis College.

The San Juan Ecology Project was associated with the Bureau of Reclamation's Colorado River Basin Pilot Project, a 5-year cloud physics research program to determine the effectiveness of seeding winter weather systems for increased snowfall and spring runoff. The analysis of that project will be complete this summer. Preliminary results indicate that seeding specific types of weather systems could increase the snowpack in the San Juan mountains by about 10 percent during years of normal or below normal snowfall.

Dr. Harold Steinhoff of CSU coordinated the project with Dr. Jack Ives of the University of Colorado's Institute of Arctic and Alpine Research and Dr. Herbert Owen of Fort Lewis College. The scientists were asked to consider a theoretical increase in snowpack of 16 percent during a year of average snowfall and study the range of increase up to 30 percent.

"Information provided by the study, the San Juan Ecology Project, and supported by findings of other environmental studies will be most important in guiding the future of the weather modification technology," Commissioner Stamm said.

He explained that the Bureau is developing the technology of cloud seeding to augment the Nation's water supplies, and that a comprehensive understanding of the science's environmental effects is a necessary component of the technology.

"The most marked effect of snowpack was on two of the smaller species of animals, deer mice and chipmunks," Steinhoff said. Both showed a temporary population decline with deeper snowpack, probably caused by a delay in breeding and less availability of essential foods, he said. The effect, however, was not apparent in three other small species studied, pocket gophers, meadow voles and mountain toads.

(more)

Elk would be affected in that they may be excluded by deeper snow from winter food otherwise available to them. Steinhoff explained that, in spring, elk movement coincided with the growth of herbaceous plants, which developed slower due to snow depth. Adequate calving areas were always present, despite increased snow, he said.

During winters of above normal snowpack, Steinhoff said, the "initiation of shoot elongation was delayed for plants in both the tundra and forests as a result of lower soil temperature." He said the "delay in beginning of growth persisted through stages of the life cycle in most plants, but there seemed universally to be a compensation factor which permitted every species to complete its annual cycle of development each summer, regardless of snowpack depth."

The scientists also reported they could find no significant increases in silver concentration from the 705 pounds of silver iodide used in the 5-year seeding experiment, except within 100 yards of seeding generators.

The ecology project, the most extensive research in the environmental effects of cloud seeding in mountain environments to date, studied both the forest and alpine ecosystems. The forest study included phenology, phytosociology, tree biomass, moisture stress, elk, and small mammals. The alpine studies covered geomorphic processes, alpine vegetation, phenology, dendroecology, and gophers. The project also provided geomorphological, geological and ecological overviews, studies of historical climatology, and the disposition and environmental effects of silver iodide.

"Although the conclusions are most applicable in the San Juan Mountains," Steinhoff said, "research approaches were used which will permit the extrapolation of results to the other mountainous areas of the West. Some of the principles which have been found will be applicable to even broader areas."

The 500-page report will be available from the National Technical Information Service, Department of Commerce, 5285 Port Royal Road, Springfield, Va., 22161.

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