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## Cloud seeding hits snag

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Friday, March 16, 2007 2:04 AM MDT

There may be more questions up in the air over the Wind River Range than the silver iodide particles used in a state-sponsored cloud-seeding experiment.

The project has stalled over a U.S. Forest Service-required environmental study and the question of who pays for the study.

At issue is whether the cloud seeding -- tiny particles of silver iodide aerosolized into the air to allow ice crystals to form around the particles -- is compatible with the 1964 Wilderness Act or with a Forest Service regulation banning weather changes that affect wilderness areas.

The Wyoming Water Development Commission has allocated \$9 million for a five-year cloud-seeding research program, designed to increase the snowpack in the Medicine Bow, Sierra Madre and Wind River ranges, for the benefit of irrigators, municipalities and industry. The state has contracted with Weather Modification Inc. of Fargo, N.D., for the project.

"I think this is a clear violation of the Wilderness Act and a Forest Service manual regulation," said Jonathan Ratner, a Pinedale-based conservationist.

The Bridger-Teton National Forest has sent a letter to Weather Modification Inc. asking for more information, said forest spokeswoman Mary Cernicek -- the type of information that would typically be answered by an environmental study of some sort. The company wants to conduct ground-based cloud-seeding operations that would affect the Popo Agie, Fitzpatrick and Bridger wilderness areas, via 12 generators targeting the clouds above Raid and Granite peaks.

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"Weather modification over wilderness is not allowed in the Forest Service's own wilderness handbook," said Liz Howell, executive director of the Wyoming Wilderness Association. "The Forest Service is the enforcement agency to preserve the wilderness character of the Fitzpatrick and Bridger wilderness areas, and WWA expects them to do so."

A regulation in the Forest Service's manual states, "Do not permit long-term weather modification programs that produce, during any part of successive years, a repeated or prolonged change in the weather directly affecting wilderness areas."

Bruce Boe, director of meteorology at Weather Modification Inc., said there are long-standing cloud-seeding operations that affect wilderness areas in Utah, Nevada and California.

"There's never been any trouble over wilderness in those operations," he said.

Boe said the Forest Service has many years worth of nitrogen deposition data from the high country lakes of the Wind River Mountains.

"The Forest Service wants to know whether more precipitation would produce more nitrogen deposition," he said. In his opinion, the answer is no. "Deposition of pollution is much more complicated than a straight linear response," he said.

Boe said the Forest Service has a new policy of "cost recovery" -- that is, recovery of Forest Service costs from permit applicants such as that from Weather Modification Inc. He said he needs to learn from the Wyoming Water Development Commission whether that agency can pay that cost recovery bill, and whether the commission want to move forward with the program in the Wind Rivers.

If the commission has the money and the will to continue, then the Forest Service needs to decide what kind of environmental study is necessary, Boe said. Such a study might be a relatively quick environmental assessment, or a more lengthy, costly and time-consuming environmental impact statement, he said.

"Or they might allow a categorical exclusion," said Boe, who acknowledged that would be "unlikely." Such an exclusion would allow the project to proceed without a study.



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Boe emphasized that no cloud-seeding generator is in or has been proposed to be in a wilderness area. He has five generators on state and private lands in the southern end of the Wind River Range and would like to have seven more in the north.

"We're in the second of a five-year program," Boe said. If he has to spend two years on an environmental impact statement to get those seven sites, he'd only have one more year to gather data.

"I don't know what we'd do" in that eventuality, he said. Cloud seeding by aircraft is not as cost effective as by propane generators that aerosolize the silver iodide particles and waft them into the clouds. Generators need to be sited at fairly high altitudes, he said, far above valley floors.

At the same time, weather conditions over the Wind River Mountains this winter have often been characterized by dry, warm air, according to State Climatologist Steve Gray -- not the wet, cool conditions needed for cloud seeding.

"I do know they've been able to fire up the cloud-seeding generators a number of times since January," Gray said. Yet there have been predominant weather patterns this winter that have shunted wet and cool air away from the machines. Gray anticipates a strong ridge of dry, warm air to move into the region and stay for a week or two.

"Conditions have not been ideal in the Wind River country, but we have been doing fairly well in the Medicine Bow Mountains," Boe said.

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