

WEATHER MODIFICATION LAW AND
THE ENVIRONMENTAL EFFECTS OF
SNOWPACK ENHANCEMENT 1/

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By

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Introduction

The psalmist sang of the might of the Lord. It was He who made the weather.

Praise ye the Lord:
He giveth snow like wool:
He scattereth the hoarfrost like ashes.
He casteth forth his ice like morsels:
Who can stand before his cold?
He causeth his wind to blow,
And the waters to flow.
Praise ye the Lord.

Now, however, snowpack augmentation is being developed by the hand of man. Experimental orographic cloud seeding technology in the Intermountain and Pacific Coast states gives promise that man may in appropriate circumstances modify the Lord's weather.

Assertions have been made that there are ecological, as well as meteorological and hydrological, consequences of such atmospheric water resources development. For example, persons have voiced fears about air and water pollution resulting from dispersal of seeding agents such as silver iodide; concern has been expressed about increased avalanche potential from deepened snowpack; and added runoff has land use policy implications.

The picture, however, is complicated by many variables, some of which are not now well understood. There is much that needs to be learned of snow meteorology, cloud physics, and weather management engineering before there will be complete data as a foundation for ecological studies about the impact of weather modification to increase snowpack (Cooper, Cox and Johnson, 1974). Moreover, human intervention through air pollution and use of pesticides may account for more change than intended weather modification efforts. Another type of intervention, the use of law, can also play a significant role.

The discussion assumes that (1) properly conducted cloud seeding will be an economically-viable means of snowpack augmentation; (2) sensible environmental protection will provide long-term economic benefits; and (3) law is a useful tool for the accommodation of varying societal interests.

Federal and state laws establish four steps in planning and management which will minimize any negative aspects of snowpack enhancement: (1) project pre-assessment under the terms of the National Environmental Policy Act, state environmental policy acts, and state weather modification laws; (2) project monitoring required by federal and state reporting legislation, but hampered by Wilderness Act limitations; (3) project assessment through statutory evaluation requirements and evaluation by lawsuits; and (4) project alteration effected by modification and re-issuance of weather modification project permits.

These legal requirements, in some respects, are different for federal projects, state operations, and private activities. Three hypothetical cases will put the planning and management steps in perspective. The first case is federal seeding in Colorado. This

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corresponds to the San Juan Pilot Project of the Bureau of Reclamation. The second is a state seeding program in Utah. There is a state-managed precipitation enhancement effort in that state. The third hypothetical case is a private snowpack enhancement project in California. Pacific Gas and Electric Company sponsored cloud seeding in the Lake Almanor area. These three illustrations are considered for the sole purpose of looking at environmental law in context.

Project Pre-Assessment

National Environmental Policy Act. Project environmental pre-assessment is required by the terms of section 102 (2) (C) of the National Environmental Policy Act. This law applies to all "major Federal actions significantly affecting the quality of the human environment." In such cases an environmental impact statement must be filed with the Council on Environmental Quality by the agency proposing the project. Thus the Bureau of Reclamation would file a statement covering the federal project in Colorado if it had a significant impact on the environment. However NEPA does not by its terms apply to state and commercial projects.

The law requires that federal impact statements contain the following information:

- "(i) The environmental impact of the proposed action,
- (ii) Any adverse environmental effects which cannot be avoided should the proposal be implemented,
- (iii) Alternatives to the proposed action,
- (iv) The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
- (v) Any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented."

The impact statement was meant by Congress to be more than an exercise in form-filing. The law directs federal agencies to comply with its terms "to the fullest extent possible," and requires statements to be "detailed" in order to be acceptable. The NEPA requirement that federal agencies "utilize a systematic, interdisciplinary approach...in planning and in decisionmaking" should, if properly complied with, yield the sort of information on which acceptable impact statements may be based.

The federal courts have interpreted the NEPA impact statement rules literally. Statements must be non-conclusory; there should be full disclosure of the basis upon which assertions are made. Statements must be comprehensible to interested parties. Informed laymen should be able to understand them. Statements must be comprehensive. While adequacy is not judged on the basis of verbosity, terseness is not regarded favorably by judges. Even if that may be a reflection of judicial occupational bias, it nevertheless is a fact of life with which draftsmen of impact statements must cope.

Upon preparation of a "draft" environmental impact statement, the law directs that "the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved." Other interested persons and groups are also circularized for comments. The preparing agency must then employ the responses in a meaningful manner in preparation of a "final" statement. Failure to follow the commenting process will result in rejection of the statement by the courts (Anderson, 1973).

State Environmental Policy Acts. A number of state legislatures have responded to environmental concerns by passing state environmental policy acts. These laws are, for the most part, patterned on NEPA. Draft impact reports or statements are prepared, comments are solicited, final statements are drafted, and final statements are filed with some designated state environmental agency. Actions affecting the environment may not be taken until acceptable statements have been filed (Yost, 1973).

State laws differ on two major questions about the scope of their coverage. The first is: What agencies must file? Usually all or almost all state agencies come within the filing requirement. In a state with such a law, the Utah project would be covered. (Utah does not have a state environmental impact statement law.) Local agencies are not so frequently covered by state laws. In California, however, the attorney general has ruled that

the Santa Clara Valley Water District, a local agency, must prepare an Environmental Impact Report in connection with its cloud seeding activities.

A second difference among state laws is whether exercise of the licensing function and making land use control decisions must be accompanied with impact statements. If a state has such a rule and also allows cloud seeding only after a permit has been issued, then filing an impact statement would be a condition precedent to issuance of a weather modification permit. In the California example the electric power company's permit to enhance the snowpack would not have been issued until an impact report had been made.

Compliance with a broadly written and interpreted state environmental impact statement law can be expensive. After the New Mexico legislature passed an impact statement law, the courts of that state read it rather broadly. Then the legislators became convinced that the statute was a luxury the state could not afford and repealed it (McCash, 1974).

State Weather Modification Acts. The key regulatory provision in the better state weather modification laws is a ban on cloud seeding unless the person in charge of the project itself is covered by an operating permit. Licensing is meant to limit practice of cloud seeding to those persons who are professionally competent. The permit requirement is a means of assuring that projects will be soundly conceived and carefully operated. An applicant for a permit must provide information about his plans. Colorado now requires each applicant to "describe" the significant ecological effects which will result from his anticipated efforts." This is in effect an environmental pre-assessment requirement (Davis, 1974a).

Project Monitoring

Federal Reporting. Information is essential to successful policy making and regulation. By statute and by administrative regulation both the federal government and most of the states with weather modification laws stipulate that cloud seeders maintain records of their activities and make periodic reports to governmental officials. There is consequently information generated which can be monitored.

The only federal law on weather modification authorizes the Department of Commerce to promulgate reporting rules. This power has been subdelegated to NOAA which has made regulations that would require states, like the Utah illustration, to report on their seeding activities. Commercial snowpack enhancement efforts, as that undertaken by Pacific Gas and Electric in California, must also be reported. By agreement with the other departments of the national government, cloud seeding by all federal agencies is now also being reported to NOAA. This would cover the San Juan snowpack augmentation pilot project. Federal reporting forms now ask for information on safety procedures and environmental guidelines followed by persons or organizations reporting (Charak and DiGiulian, 1974).

State Reporting. State and federal regulators have learned from each other in compiling their reporting forms. The burden on persons seeking to increase snowfall is minimized by the fact that, for the most part, state reporting laws and regulations ask for the same kind of information as do the NOAA forms--time, place, and amount of seeding; kind of seeding agent and seeding equipment used; instrumentation employed and recordings made from it; purpose of the project; weather conditions at the time of seeding. Some states, like Utah, ask for very little other than a copy of the form filed with NOAA.

Use of a copy of the federal form by the state regulatory agency is paralleled in other federal-state situations. For example, most state tax commissions now attempt to model their forms for reporting income upon the forms of the Internal Revenue Service. Fortunately neither the NOAA forms nor those from the states are as complex as are tax forms, and compliance with them is certainly not so painful as sending that check along with tax returns.

State rules and statutes differ on whether federal projects must be reported. Under the Constitution of the United States it has long been quite clear that the federal courts will not permit the states to regulate agencies of the federal government. Otherwise the supremacy clause would be meaningless. In those states which do not exempt federal projects from reporting, it is unnecessary for those federal officials in charge of the project to make such reports.

Federal agencies, however, frequently work through contractors and grantees. The San Juan project, as an example, has been contracted out. There are many cases in which federal contractors have been held to be exempt from state efforts to regulate them. Perhaps those precedents are applicable to reporting by federal contractors to state officials (Davis, 1968). Reporting, however, is a minimal burden, particularly when the information sought is the same as or similar to that needed to comply with the NOAA rules. Federal contractors engaged in snowpack enhancement operations would do well to follow the principle of comity and file reports with state regulators. For that matter, so would federal employees engaged in an in-house snowpack operation do well to file with the states affected.

Wilderness Act. Obtaining information needed to comply with reporting requirements may be obstructed by the limitations upon collection of hydrometeorological data imposed by the interpretation made of the Wilderness Act by some federal agencies. The Wilderness Act of 1964 was designed to set in motion creation of a National Wilderness System in which lands to be designated by legislation are preserved and protected in their natural condition. According to the act, a "wilderness, in contrast with those areas where man and his own works dominate the landscape, is ... an area where the earth and its community of life are untrammelled by man ... retaining its primeval character and influence."

The National Park Service and the National Forest Service have taken a purist approach to their task of administration of wilderness areas under their jurisdiction (Foote, 1973). They assert that weather modification would result in unnatural conditions incompatible with the intent of Congress, and they have placed restrictions on the introduction and servicing of new instrumentation to measure the effects of snowpack augmentation efforts.

The other point of view is expressed by the Bureau of Reclamation which argues that the effects of cloud seeding "are not manifested as an observable artificiality in wilderness character" and urges that monitoring devices be allowed in wilderness areas. A bill introduced by Congressman Sisk in 1974 would allow cloud seeding and use of measuring devices in wilderness areas upon permission of the departments administering them (Division of Atmospheric Water Resources Management, 1974). The Sisk Bill has been given the support of the Western Snow Conference. In view of the fact that many high snow yield areas for federal, state, and commercial orographic cloud seeding lie in wilderness areas, this position is not surprising.

Project Assessment

Statutory Evaluation Requirements. Monitoring to get environmental information is not enough foundation for making sound policy judgments about the environmental and ecological consequences of snowpack enhancement. The data obtained must be evaluated properly. NOAA officials have indicated that they will assess information from reports sent to them. In the event they determine that a project represents a danger to the environment, they will make a report to that effect to state officials. Regulation by adverse publicity can be devastating (Gellhorn, 1973). Not only would state officials consider such a report from NOAA in making decisions about permits, but also persons with an interest in bringing about administrative, legislative, or judicial decisions concerning cloud seeding could make effective use of such an assessment.

State agencies which are empowered to receive cloud seeding reports are often advised by weather modification boards and by staffs which usually have representation by persons knowledgeable in weather modification and water resources management. At least to some degree they are in a position to evaluate the information handed to them. Some state laws require regulatory agencies to publish annual reports which often contain assessments of the results of seeding during the period covered.

Another possibility, of course, is to have the cloud seeder make the evaluation of the impact of the project. The California law requires operators to supply an evaluation statement "which shall include a report as to estimated precipitation, defining the gain or loss occurring from nucleation activities, together with supporting data therefor." Weather modifiers, quite apart from statute, will also make evaluations in their reports to sponsors.

Evaluation by Litigation. Not only do administrators assess environmental data, but also judges have been called on to evaluate information about the environmental impact of cloud seeding. The volume of litigation about seeding, however, has been relatively light.

Persons claiming damages for harm from artificial nucleation activities have been unable to present adequate data to the courts to convince the judges that seeding caused them any harm. Historical inability to prove cases has discouraged potential litigants from assuming the financial burdens of bringing lawsuits.

Among those lawsuits which have been litigated are several that have complained of harm from precipitation change. For example, last November a litigant in Michigan sued in a state court for losses suffered from a severe storm which he asserted was caused by seeding by the defendant upwind from his farm. After a hearing which centered on the causation issue, the jury found for the defendant (Davis and St.-Amand, 1975). And in a dispute tried during the 1950's in Texas, some ranchers obtained a temporary injunction against a hail suppression project on the basis of a claim that seeding for reduction of hail losses resulted in a decrease in precipitation. The case, which did not involve a claim for damages, is of interest because of the weight the judge put on lay testimony from the ranchers in his assessment of the impact of the weather modification effort (Davis, 1970).

Other lawsuits have involved complaints about refusals to issue permits (Davis, 1974b), and improprieties in setting up weather modification districts (Davis, 1968).

Another class of cases has involved environmental concerns. Two 1968 decisions in Pennsylvania dealt with potential biological consequences from artificial nucleation through cloud seeding. In one of them the judge considered "the dramatic effect weather or climate modification could have upon man's ecosystems," but he denied relief because the plaintiffs showed only a bare possibility of harm. In the other case the same judge upheld the conviction of a seeder who had violated a township ordinance banning all weather modification. He ruled that the ordinance was a proper exercise of the power delegated to the township by the legislature to establish rules to protect the "health, cleanliness or comfort" of citizens. He assessed the seeding agent used as a source of potential pollution (Davis, 1968).

Montana Wilderness Association v. Hodel involved a complaint filed early in 1974 against various federal officials seeking an injunction against carrying out a snowpack enhancement project in the Hungry Horse area of Montana. Because the snowfall was adequate last year, the government decided not to go ahead with the project. The judge dismissed the case as moot. Had it gone to trial, the suit would have involved an environmental assessment. Environmental concerns were the basis on which the plaintiff organizations brought their case. Future governmental projects, both federal and state, will doubtless encounter similar litigation.

Project Alteration

Modification of Permits. After assessing environmental data, voluntary changes may be made in projects. For example, when snow depth reaches a pre-determined amount, the seeding equipment will be shut down. Meteorologists do not incur the costs of seeding once the objectives sought have been reached. Even if they wanted to seed for the sheer joy of doing something they are able to do, their sponsors would soon turn them off.

Involuntary alterations in projects may result from pressure brought to bear by regulatory agencies or threats of litigation. Also in a few jurisdictions the weather control acts specifically empower the regulatory officials in charge of handling operational permits to modify those permits. The Illinois law sets up a mechanism for bringing about an alteration in a permit. Normally the permittee will get a hearing on the matter before an action is taken. But, should an emergency condition exist, the Illinois statute provides for a summary suspension or modification of the permit, subject to a later hearing (Ackerman, Changnon and Davis, 1974).

Reissuance of Permits. Cloud seeding is a seasonal activity. Permits in most cases expire within a year of their issuance or sooner. It thus is necessary in the case of an ongoing project to get the operational permit reissued each year. Colorado and a few other states allow conditional approval for projects which will run for longer than one year. But they too require annual reissuance of the permits.

The power to examine the permit and operation each year gives state regulators a basis on which they can take into consideration the environmental consequences of the project. State and commercial projects with poor environmental records can be scratched or required to make alterations which will make them environmentally sounder.

Conclusions

In conclusion some predictions might be offered. They are:

- (1) Law will continue to provide a framework for the environmental assessment of weather modification and for adjustment of snowfall enhancement projects.
- (2) Snowpack augmentation through cloud seeding will be widely practiced under legally controlled conditions.
- (3) The quality of the environment will not be degraded through such controlled weather modification activities.

A poem which I learned from my children phrases these conclusions another way.

The cold wind doth blow,
And we shall have snow.
What will the robin do then?
 Poor thing!
He will go to the barn
To keep himself warm;
And hide his head under his wing.
 Poor thing!

There will be snow--man-caused snow. The environment will be affected; robins will be cold. But the hand of man will come to their aid. Consider the law as a barn.

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