

FOUR DECADES OF AMERICAN WEATHER MODIFICATION LAW

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Abstract. There have been distinctive American legal developments during each of the four decades of modern weather modification. Each ten year period has had its own unique societal setting and dominant legal agency. The first decade (1946-1957) was one of scientific and technological beginnings. Courts were the dominant law makers. In the second period (1957-1966) physical conditions gave rise to legal developments, and these took place mostly in legislatures. The social setting of the third decade (1966-76) set its legal agenda, and the executive branch of government carried it out. Since 1977 both the executive and legislative branches have reacted to economic conditions. Future weather modification legal developments also will be shaped by societal settings.

1. INTRODUCTION

Four decades of weather modification law in the United States reflect a significant fact about American attitude toward law: it is a tool to further societal ends, to bring about practical results. Ironically, however, in the interaction between weather modification and law, the law has been passive, acted upon by other societal forces more often than acting upon them (Hurst, 1950). The law has been shaped by outside events and ideas.

In perhaps the greatest of American legal studies, Judge Oliver Wendell Holmes, Jr., commented: "The life of the law has not been logic: it has been experience" (Holmes, 1881). So it has been with weather modification law. Its history, rather than being dominated by syllogistic determination of governing legal rules, has turned on "the felt necessities of the time, the prevalent moral and political theories, intuitions of public policy" and preferences of law makers.

Technological, physical, social and economic conditions have provided settings which have shaped legal developments during the forty years of scientific cloud seeding. The scientific and technological setting--the discovery, development and assessment of cloud seeding concepts--triggered the birth of weather modification law. The physical setting--especially the droughts of the 1970's and the western floods of the 1980's--exerted powerful influences. The social setting--such as American enthusiasms for growth and environmental protection--stimulated legal regulation. And the economic setting--economic growth followed by the water and energy crises and official fiscal

conservatism--dictated the nature of authorization and appropriation laws.

In these settings, weather modification legal history can be considered in four periods: the first decade from 1946 to 1957 was the genesis of the legal regime; the second from 1957 to 1966 saw a steady growth in legal rules and mechanisms; during the third decade (1966-1976) legal activity reached a peak; and since then during the present period there has been partial withdrawal from previously established legal positions accompanied by reduction in legal activity.

The focus in this paper is upon dominant societal settings, governmental branches and legal developments in each of the four periods since the inception of scientific cloud seeding. It should be noted, however, that throughout the history of weather modification there have been other themes and actors than those that dominated. Also, even when viewed from the present, lines between decades of cloud seeding blur. But here the emphasis is upon the dominant, and time period designations are used as an analytical tool.

2. SCIENTIFIC AND TECHNOLOGICAL SETTING (1946-1957)

2.1 Genesis

The scientific and technological setting dominated the genesis of weather modification law. Field testing laboratory discoveries started almost immediately after a seeding hypothesis was developed. Legal counsel for General Electric, sponsor of the studies, pointed out potential legal problems likely to confront the company if such outdoors experimentation

continued. Rather than drop their work, researchers sought shelter from legal difficulties and sustenance from government monies by contracting with the federal government which has some legal immunity. The Army and the Office of Naval Research jointly sponsored the work, and the Air Force furnished the planes and flight personnel (Schaefer, 1968).

Commercial application of the technology had barely begun when, in January 1949, Vaughn Ball, a law professor from Ohio State University, published the first full-fledged article about the legal implications of cloud seeding. His article examined the new technology, noted disputes that already had arisen, considered legal theories upon which liability could be based and suggested legislation (Ball, 1949). Most of what subsequently has been written about law and weather modification reprises the same themes.

Passage of seeding technology from its infancy was recognized during the Orville Committee's work in the 1950's. This Advisory Committee on Weather Control was formed in response to Public Law 83-256, the first federal statute on cloud seeding, and it contained Jack Oppenheimer's survey of the legal situation, a study which emphasized regulation of cloud seeding activities, but also considered litigation (Advisory Committee on Weather Control, 1957).

## 2.2 Judges and Litigants

Although state regulation did commence during the 1950's, the dominant legal developments were in the judicial arena. The first suit litigated was Slutsky v. City of New York. This action grew out of commercial rainmaking designed to augment municipal water supplies (Howell, 1981). The court was asked to order a shutdown of the project but refused to do so. Nevertheless, probably for political reasons, the seeding stopped. The New York litigation was followed during the 1950's by suits in California (Mann, 1968), Texas (Kirby, 1978), Oklahoma, Pennsylvania and Washington (Davis, 1974). In none of these lawsuits, were seeders ordered to pay any damages for their activities, but in all of them, like the Slutsky Case, courtroom activities had adverse affects upon seeding projects.

Early weather modification litigation set the pattern for subsequent litigants and trial judges. Defendant sponsors and modifiers have prevailed in court because the plaintiffs could not prove their cases. Lawyers have been unable to establish in courts that treating clouds caused plaintiffs harm. Failure to prove a necessary element of their cases--causation--has doomed plaintiffs

(Davis & St.-Amand, 1975). But, by complaining, litigants sometimes have won their war. By threatening suits, filing cases, litigating and legislative lobbying, they halted some seeding projects. Weather modifiers have prevailed in court, but evaluation of their conduct in the real world has not always been favorable.

## 3. PHYSICAL SETTING (1957-1966)

### 3.1 Growth

Although cloud seeding has been used as a tool to ameliorate severe weather, its commercial application principally has been precipitation enhancement. During its second decade, scientific weather modification largely moved to the west where water needs were greater than in the more humid east. The arid physical setting contributed to growth in utilization, knowledge and law. The Bureau of Reclamation, the nation's principal water resources development agency, entered the picture in 1961 when Congress appropriated funds "to be used for research on increasing rainfall by cloud seeding" (Kahan, 1969). With encouragement from this federal law, cloud seeding has been used as a water resources management tool.

Major federal evaluations of weather modification at the end of the second decade of scientific seeding were based partly upon analyses of western snow and rain augmentation projects. The National Science Foundation (Special Commission on Weather Modification, 1965) and the National Academy of Sciences (Panel on Weather and Climate Modification, 1966) reports lent respectability to weather modification. The NSF report was accompanied by Howard Taubenfeld's legal study--the first in-depth consideration of weather modification law and controls as they related to actual seeding operations (Taubenfeld, 1966). Taubenfeld placed seeding and law in their physical setting.

### 3.2 Legislators

As legal developments from 1946 to 1957 were judicially dominated, from 1957 to 1966 the preeminence was legislative. Just as the basic judicial patterns were set during seeding's first decade, legislative models emerged during the second decade. Congress determined that the federal government would accumulate data through the reporting process. It passed Public Law 85-510 which had been recommended by the Orville Committee and which designated the National Science Foundation as the agency receiving reports on seeding activities.

Congress also recognized the federal role in supporting weather modification research. While there was no express

congressional directive about which federal agency should exercise a lead role (Lambright, 1960), and there was no federal regulatory program established nor any operational program undertaken (Johnson, 1970), Congress provided appropriations for research.

The states became the weather modification regulators. State legislatures, particularly those in more arid areas, enacted weather control laws. By the period's end, state regulatory patterns had become clear. Weather modifiers were required to obtain licenses upon showing professional expertise, and persons proposing projects were required to get permits allowing them to operate within certain prescribed areas, during indicated time frames and in the manner authorized (Davis, 1970). Permits establishing the physical setting became the key weather modification legal controls. Two-thirds of the states passed weather modification laws. Most of the more complete regulatory schemes were from the western states, those in the arid physical setting.

#### 4. SOCIAL SETTING (1966-1976)

##### 4.1 Peak

The golden years of weather modification legal development were during the third decade of weather modification--1966-76. This was the peak time for social acceptance of governmentally-regulated cloud seeding. Although organized opposition to government regulation--environmental and fiscally conservative groups--lurked in the wings, their dominance was to come later during the 1980's.

The Weather Modification Association, which was organized in 1951, became interested during the 1960's in making input into the legislative process. In 1970 a Special Committee of the Weather Modification Association reported its model law to WMA. The committee recommended other states adopt the licensing and permitting features of the better existing state laws (Special Committee of the Weather Modification Association, 1970). Thus the organized profession formally assumed a legal development role.

The North American Interstate Weather Modification Council was organized in 1974. As conceived, this organization differed from the WMA. It was seen primarily as a group of states, Canadian provinces and the government of Mexico who had an interest in weather modification, its governmental support and its regulation (Keyes, 1976). The Council involved regulators, and saw itself as a body interested in state and federal relationships and in having an impact upon national weather modification policy. With cooperation from the Weather Modification

Association and other interested groups, the Council played a significant role in securing passage of Public Law 94-490 which established the Weather Modification Advisory Board. The Board considered federal policy and organization and reported its findings and recommendations in 1978. Although they have not been implemented, along with the Orville Committee and NSF/NAS reports, the Board's work is a significant document in the development of weather modification law (Weather Modification Advisory Board, 1978).

Along with mobilization of the profession for legal change, during this decade environmental groups marshalled to strengthen environmental law. The Wilderness Act in 1964 and the National Environmental Policy Act of 1969, among other laws backed by such organizations, have impacted cloud seeding activities (Davis, 1975). Environmental concerns also permeated the two technology assessments of cloud seeding carried out in the 1970's--the snowpack assessment done by the Stanford Research Institute (Weisbecker, 1974), and the hail suppression assessment led by the Illinois State Water Survey (Changnon et al., 1977).

##### 4.2 Executive

Among the departments of government, the executive played the most significant role in 1970's legal developments. Federal drought relief seeding in 1971 came through executive action. Cloud seeding in Vietnam was a Department of Defense project which had various legal implications (Davis, 1973). It led to the international treaty banning certain kinds of environmental warfare, possibly including certain types of weather warfare. And there was the Canadian-American 1975 agreement to report to each other border area seeding. It was negotiated by the State Department.

At the state level this also was a time of executive action. State seeding programs, such as those in South Dakota, North Dakota, and Utah, were conducted under management by public servants. The western drought during the latter 1970's brought executive recommendations followed by emergency seeding programs (Lambright, 1984). Up-dating legislation was proposed by executives, and a model law was developed through the auspices of the Illinois State Water Survey (Ackermann, Changnon & Davis, 1974; Council of State Governments, 1977). The first comprehensive state administrative regulations governing weather modification--those of Illinois, Utah, North Dakota, and South Dakota--were promulgated under the modernized statutes during the latter 1970's. It was a time when regulation was fashionable.

## 5. ECONOMIC SETTING (1977-1987)

5.1 Retreat

The promise of the early 1970's dwindled into the retreat later during that decade and the 1980's. Governmental cloud seeding financial support withered and regulatory philosophy was reexamined. Several explanations account for this reversal. Among them was the weather: who can support snowpack augmentation appropriations in the Utah legislature when flooding, not drought, is the problem? Also environmental laws assumed a larger and more restrictive role (Davis, 1975). But the basic consideration during the present weather modification decade has been economic. Regulation costs money; de-regulation is the rage. Budgets are tight; weather modification lacks the political constituency to be protected from budget-makers' axes. The money tree has borne less fruit.

5.2 Executive/Legislative

Both political branches of government, the executive and legislative, have climbed aboard the cost containment bandwagon. During the Carter administration there was the infamous "hit list" of federal western water projects proposed for abandonment; and during the Reagan administration cost-sharing for water resources development has reduced the federal share. Although some federal research programs have been funded, overall Congressional weather modification research funding has not grown as it did in earlier decades.

State retreat from prior weather modification law is manifested in the "sunsetting" movement. Legislatures prospectively repeal regulatory laws and sunset agencies administering them, subject to possible rebirth through later legislative reauthorization (Davis, 1982). If the agency is not given a new legislative charter, it dies. And even when it obtains new life, it may resurrect as a different species. Illinois dropped its licensing provision during sunseting (Changnon, 1983), and California abandoned all regulation, except required publication of notices of intent to seed, as its regulatory sun went down (Roos, 1985). Such de-regulation may reach other states.

Interstate legal troubles over cloud seeding have occasionally loomed, but always have retreated without litigation. Only Idaho's objections (complaints based on economic considerations) to Oregon and Washington seeding have brought official action. In the late 1970's the two upwind states promised not to seed in a manner that would diminish Idaho's precipitation (Davis, 1979). Rainfall is worth money

to northern Idaho timber and agricultural interests.

Proposed guidelines for international cloud seeding conduct (Davis, 1980) have not been promulgated by the appropriate United Nations agencies. But during the mid-1980's economics has pushed seeding abroad to the forefront.

## 6. CONCLUSIONS

Experience, rather than logic, indeed has shaped weather modification law. Legal developments have reacted to societal conditions during the four decades of modern cloud seeding. The future of weather modification and law relating to it likely will follow similar patterns. The law will respond to its technological, physical, social and economic settings.

## 7. REFERENCES

- Ackermann, William, Stanley Changnon & Ray Jay Davis, 1974. The Weather Modification Law for Illinois, Bull. Am. Meteo. Soc'y, 55, 745.
- Advisory Committee on Weather Control, 1957, Final Report. Gov't Print. Off., Washington.
- Ball, Vaughn, 1949. Shaping the Law of Weather Control, Yale Law J., 58, 213.
- Changnon, Stanley, 1983. Sunset and Sunrise of the Illinois Weather Modification Act, J. Weather Mod., 15, 71.
- Changnon, Stanley, Ray Davis, Barbara Farhar, J. E. Haas, J. L. Ivens, Martin Jones, Donald Klein, Dean Mann, Griffith Morgan, Steven Sonka, Earl Swanson, C. R. Taylor, Jon Van Blokland, 1977. Hail Suppression: Impacts and Issues, Ill. State Water Survey, Urbana.
- Council of State Governments, 1977. Suggested State Legislation, p. 9, CSG, Lexington, KY.
- Davis, Ray Jay, 1982. Weather Resources Law at Sunset and High Noon, J. Weather Mod., 14, 81.
- \_\_\_\_\_, 1980. WMO/UNEP Weather Modification International Law Proposals, J. Weather Mod., 12, 127.
- \_\_\_\_\_, 1979. Weather Modification Interstate Legal Issues, Idaho Law Rev., 15, 555.
- \_\_\_\_\_, 1975. Legal Responses to Environmental Concerns About Weather Modification, J. App. Meteo., 14, 681.

- \_\_\_\_\_, 1974. Weather Modification Law Developments, Okla. Law Rev., 27, 409.
- \_\_\_\_\_, 1973. Weather Warfare: Law and Policy, Ariz. Law Rev., 14, 659.
- \_\_\_\_\_, 1970. State Regulation of Weather Modification, Ariz. Law Rev., 12, 35.
- Davis, Ray Jay & Pierre St.-Amand, 1975. Proof of Legal Causation in Weather Modification Litigation: Reinbold v. Sumner Farmers, Inc. and Irving P. Krick, Inc., J. Weather Mod., 7, 127.
- Holmes, Oliver Wendell, Jr., 1881. The Common Law, p. 1, Little, Brown, Boston.
- Howell, Wallace, 1981. The Precipitation Stimulation Project of the City of New York, 1950, J. Weather Mod., 13, 86.
- Hurst, James Willard, 1950. The Growth of American Law: The LawMakers, pp. 4, 6-15, Little, Brown, Boston.
- Johnson, Ralph, 1970. Weather Modification and the Federal Government, Natural Resources J., 10, 222.
- Kahan, Archie, 1969. Weather Modification in the Bureau of Reclamation, J. Weather Mod., 1, 5.
- Keyes, Conrad, 1976. North American Interstate Weather Modification Council: Its Purposes and Activities, Pub. No. 76-2.
- Kirby, Jerone, 1978. Cloud Seeding in the Texas Panhandle: A Legal Viewpoint, J. Weather Mod., 10, 170.
- Lambright, W. Henry, 1984. Policymaking for Weather Modification and Drought in Colorado, 9th Conf. on Weather Mod., p. 45, AMS, Boston.
- \_\_\_\_\_, 1969. Four Part Study of Federal Weather Modification Policy Making.
- Mann, Dean, 1968. The Yuba City Flood: A Case Study of Weather Modification Litigation, Bull. Am. Meteo. Soc'y, 49, 690.
- Panel on Weather and Climate Modification, 1966. Weather and Climate Modification: Problems and Prospects, NAS Pub. No. 1350.
- Roos, Maurice, 1985. Status of Weather Modification Regulation in California, J. Weather Mod., 17, 71.
- Schaefer, Vincent, 1968. The Early History of Weather Modification, Bull. Am. Meteo. Soc'y, 49, 337.
- Special Commission on Weather Modification, 1965. Weather and Climate Modification, NSF Pub. No. 66-3.
- Special Committee of the Weather Modification Association, 1970. Report on Model State Legislation for Weather Modification, J. Weather Mod., 2, 221.
- Taubenfeld, Howard, 1966. Weather Modification Law, Controls, Operations, Report to NSF Special Commission on Weather Modification.
- Weather Modification Advisory Board, 1968. The Management of Weather Resources, Report to the Secretary of Commerce. Gov't Print. Off., Washington.
- Weisbecker, Leo, 1974. The Impacts of Snow Enhancement-- Technology Assessment of Winter OROGRAPHIC Snowpack Augmentation in the Upper Colorado River Basin, Univ. Okla. Press, Norman.