THE JUNE 1972 BLACK HILLS FLOOD AND THE LAW *

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Abstract. An effort to increase rainfall by seeding clouds near Rapid City, South Dakota on June 9, 1972, was followed hours later by a flash flood that caused loss of life and property damage. A state inquiry concluded that weather conditions beyond human control brought about the flood. A lawsuit filed against the federal government was dropped after a court ruled that the case did not qualify as a class action. Nonetheless the flood interfaced with flood hazard mitigation law, weather modification regulation, legal liability, and governmental immunity.

1 INTRODUCTION

Everyone involved in weather modification should be aware of the Black Hills Flood of evening and night June 9, 1972. Because some clouds in Black Hills area had been seeded earlier that day as part of a precipitation enhancement experiment, state officials were concerned over possible public perception that the seeding had caused the flood. If a causal connection had been proven in court, the last decade and a half of weather modification history would have been different. It never was shown that the seeding contributed to the flood. Nevertheless weather modification legal developments have interacted with the events of June 9, 1972. Consequently it is useful to examine the legal ramifications of the Black Hills Flood.

Some flash floods are very destructive. The Black Hills Flood was (Boone, 1972). Two hundred thirty-eight persons died; property loss estimates exceeded $150 million. In addition to local and state funds, $48 million was provided by the federal Department of Housing and Urban Development for clean up and flood hazard mitigation (Swanson, 1987). During the recovery 152 commercial structures were relocated and 1,200 residential units were moved (Barnett, 1987).

The Institute of Atmospheric Sciences of the South Dakota School of Mines and Technology at Rapid City had conducted two seeding flights over the plains east of the Black Hills area on the day of the storm. The flights were part of an experimental sodium chloride seeding project, funded through a contract from the Bureau of Reclamation. A state-sponsored investigation of the flood concluded that some of the seeding material may have been caught up into the storm, but that the seeding had not contributed to the flood. The report stated that the "flood was caused by meteorological conditions beyond the control of man." It concluded that had there been no weather modification activities, "the damage would have been the same." (St.-Amand et al., 1973).

In addition to the state investigation of the Black Hills Flood, the National Oceanic and Atmospheric Administration sent a survey team to the area. The focus of the NOAA report was upon observation of storm development, flood warnings, and dissemination of flood hazard information (House, 1972). Weather modification was not mentioned. There also was a study of the meteorology of the flood done by the South Dakota School of Mines (Dennis et al., 1973).

From these inquiries, subsequent events such as the Big Thompson Flood, and legal developments during the years that have elapsed since the Black Hills Flood, several legal ramifications of floods following cloud seeding activities have appeared. Among the legal interfaces between the flood of Rapid City and the law are: (1) flood hazard mitigation law, (2) weather modification regulation, (3) legal liability, and (4) governmental immunity from liability.

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2 FLOOD HAZARD MITIGATION

Current law and practice of flood hazard mitigation have been affected by the Black Hills Flood. It is preferable to undertake mitigation measures before loss of lives and property by flooding, or to do so after a modest flood which sounds an alarm. However the community's will to do something to mitigate future dangers is at a peak only for a short time after a disaster. Rapid City was at risk after June 9, 1972 and it was clear that something should be done to break the cycle of building, flood loss, rebuilding, more flood loss, etc. In view of recurrent past floods, future floods could be expected. But they could be made less destructive. Disaster gave the city an opportunity to do something constructive. Rapid City's leaders and citizens did so (Rahn, 1975, 1984). Other areas subject to flash flood hazards have a positive example of what they too can do.

Two avenues might be pursued to reduce flood damage: (1) minimize flooding through impoundments, levees, vegetation management, etc.; and (2) mitigate flood losses through relocation and flood-proofing. The first techniques were not available for Rapid City. There was and is a dam at Pactola upstream from Rapid City, but the deluge of June 9, 1972 fell between the dam and the city. The Army Corps of Engineers had refused to build a closer dam at Dark Canyon because the cost-benefit ratio was not high enough. That left the city with the flood hazard mitigation option as its only course of action (Barnett, 1987).

Rapid City now has a belt of parkland four blocks wide and five miles long along the creek. The approach has been to get people out of the flood plain by clearing residences and moving businesses to higher ground. Two high-cost businesses were not moved, but were flood-proofed; a shopping center and the neighborhood around it were protected by a dike. The idea was to do as much as possible with available funding, not to achieve the perfect solution (Burnett, 1987). Rapid City has become a model for other communities which wish to protect their residents from flash floods. The relocation took a joint city-state-federal effort, and thus it came under the aegis of local, state, and federal laws.

The legal tools used by the city included flood plain zoning to keep people from rebuilding in the affected areas, buying properties in the floodway, and tightened building code flood proofing requirements. These actions were accomplished by enacting city ordinances. The property purchases, although they generally went smoothly, led to litigation which was taken twice to the South Dakota Supreme Court. In the so-called Boland Cases, that court ruled that property owners in the flood zone had rights to notice and to a hearing before their homes were demolished, and to fair compensation for the taking (Deering, 1987).

The bulk of the funding for the relocation came from the federal government. Such large sums are not available now, but the National Flood Insurance program currently provides subsidized flood insurance to property owners in communities which have adopted flood plain zoning that qualifies under federal standards (Gore, 1987; Baram & Miyares, 1982). Rapid City and thousands of other cities and towns throughout the country qualify. By keeping encroachment from flood prone areas, they are mitigating losses from future floods. Building in the flood plain no longer is happening in Rapid City.

3 WEATHER MODIFICATION REGULATION

Weather modification activities are regulated through state statutes which require cloud seeders to keep records of their activities, to make periodic reports to some administrative agency, to obtain professional licenses for project supervisors, and to be issued operational permits which indicate the target and control areas, set forth operational plans, and generally inform regulators about the projects (Davis, 1970). The critical need is restrict weather modification activities to sensible projects carried out by qualified persons in a professional manner. Good regulation effected under a strong statute and enforced by competent professionals cannot of itself insure that cloud seeding will be risk free, but it can reduce dangers. Hence the state investigation recommended improvement of South Dakota's regulatory system by clarification of the distinction between professional licenses and operational permits (St.-Amand et al., 1973). The legislature made the necessary change.

The Black Hills Flood influenced introduction of a new version of state weather control statutes. Earlier enacted laws, including South Dakota's did not require operational plans to include seeding suspension criteria. The draftsmen of the Illinois law had Rapid City in mind when they wrote that statute (Ackermann et al., 1976). It began a generation of state laws which not only required permits and licenses, but also demanded that weather modifiers set forth suspension criteria in their operational plans providing for automatic shut down in the face of known impending severe weather events (Council of State Governments, 1977).

There are two difficulties with seeding suspension criteria. First, they do not prevent seeding when

conditions leading to a storm are not forecast. The 1972 program in the Black Hills area had suspension criteria relating to soil moisture and rainfall conditions. The weather situation on the evening of June 9, 1972 was very different than the one presented at the morning weather briefing. Perhaps no set of criteria would have picked up on the remarkable confluence of events that led to such a change.

A second type of difficulty with seeding suspension rules is with the criteria themselves. They may allow seeding in meteorological situations in which either there will be an appearance of impropriety or even actual seeding-caused losses; or they may be so tough they will shut off seeding whenever there is a reasonable chance of successful treatment. A law demanding that the regulatory authorities avoid either extreme puts them in a delicate position. North Dakota, for example, drafted suspension criteria as part of its regulations. Later, regulators found it necessary to adjust the criteria so the public interest still was protected, but sound seeding projects could occur (Changnon et al., 1986).

4 LEGAL LIABILITY

Plaintiffs who have sought money damages from weather modifiers and their sponsors through judicial action have been unsuccessful. A basic reason for their failure has been complainants' inability to prove that their losses were caused by the weather modification activities. The same difficulty over establishing what would have happened but for the seeding and hence the ability to claim credit for precipitation or runoff that followed cloud treatment also has acted to protect the seeder from liability for harms which have taken place after his intervention (Davis & St.-Amand, 1975). The causal connection between seeding and something which happens later is hard to establish on statistical or empirical grounds.

To prove that their losses were caused by seeding, plaintiffs must establish through evidence that seeding materials were released which penetrated the clouds at such a place and time and in such a concentration as to change the storm behavior. In the Rapid City case, the state investigators assumed that salt could have been swept into the clouds. Additionally, a plaintiff would have to prove that, once in place, the seeding materials did in fact bring about a change. Calculations by the investigators concluded that the type of seeding material used, under these conditions, would not have intensified the storm (St.-Amand et al., 1973).

Expert testimony is necessary to establish causation. The Los Angeles basin floods of 1978 had a weather modification aspect. There had been seeding. Expert testimony was taken in depositions on the claim that cloud seeding played a role in bringing about the floods (Davis & St.-Amand, 1982). In June 1987, the Supreme Court of the United States decided in First English Evangelical Lutheran Church v. Los Angeles County, one of the cases arising from the flood, that if interim flood plain zoning by the county had the effect of banning use of the property and constituted a "taking" or confiscation of the property by the county, the Due Process Clause of the Federal Constitution would require the government to pay damages for such inverse condemnation (Kusler, 1987a). Chief Justice Rehnquist, in the first reference to cloud seeding by the high court, noted that the church also had made a claim that the flood was caused by cloud seeding sponsored by the county. He stated that the cloud seeding issue was a state matter which could be developed in state proceedings, and that its presence in the case did not prevent the Supreme Court from ruling on the "taking" issue.

The California trial court in the Lutheran Church Case had dismissed the cloud seeding claim because there had been an effort to found it upon a theory of strict liability in tort. It is necessary for claimants not only to prove in court that the conduct of the defendant cloud seeders caused them harm, but also that such conduct fit within some liability theory. Because of the tremendous potential for harm, some flood cases have been fit within the theory of strict liability (Kusler, 1987b; Kusler & Platt, 1982). By extension, cases involving cloud seeding-induced floods would be founded upon the strict liability concept. The California court, however, did not accept the argument.

Water resources development, especially in arid and semi-arid country, usually is regarded both as natural and necessary. Hence there is authority for the proposition that flood losses associated with such development should give rise to liability only when the defendant developer has been guilty of negligence (Little, 1984; Fairchild, 1979). Since there is no printed report of the California court opinion, it is not possible to be certain why it rejected strict liability. An educated guess would be that trial court's decision was a vote in favor of carefully formulated and conducted weather modification. Only when cloud seeders are negligent by falling below the standards of professional conduct will they be liable for damages arising from their activities.

During the years since the Black Hills Flood liability law development has changed direction. The 1970s were a

time of expanding notions of liability. The 1980s have brought a new look at this area of law with the so-called "tort reform" movement. Governmental entities, professional groups, and insurers have banded together using their political muscle in state legislatures to alter in their favor substantive and procedural rules of tort law and the law of damages. The legal climate is better for defendants than previously. The message for cloud seeders and their sponsors is welcome: now and in the future they may be less likely to be targets of liability litigation (Davis, 1987).

5 IMMUNITY FROM LIABILITY

There were several candidates for defendants in liability litigation arising from the 1972 Black Hills Flood. First, there were the individuals--the pilot of the aircraft from which the salt was dispensed, the scientists at the School of Mines, and the Bureau of Reclamation officials who were involved with the federal research contract with the School of Mines. Considering the millions of dollars in property loss and the loss of 238 lives, none of individuals was a very attractive target for plaintiffs. Even with insurance, (most of them probably did not have personal liability insurance covering this sort of thing) there would not have been deep enough a pocket even to begin paying for the losses.

The state would have been a more attractive target. With its taxing capacity it could have raised a significant sum to pay damages; but South Dakota in 1972 retained sovereign immunity. It could not then have been found liable for harm caused by employees of one of its agencies--the South Dakota School of Mines and Technology (Keeton et al., 1984). During the decade and a half that has passed, the South Dakota situation has changed only to the extent that now the state and its agencies can be found liable only if they have purchased liability insurance (Marshall, 1983; Miner, 1981). Also, of course, if seeding activities could be fit within the concept of a "taking," then there would be liability under the notion of inverse condemnation (Deering, 1987).

The impracticality of suing individuals, and the immunity of the state, left the families of flood victims with only the option of suing the United States of America. That, too, had its problems, difficulties, which in the end, left the families without any remedy. Like the states, the government of the United States has immunity, except to the extent it has waived it. The Federal Tort Claims Act and its various amendments set forth that waiver, and the procedures that must be followed. Those procedures begin with filing an administrative claim with the responsible department, in this case the Department of the Interior which is the parent of the Bureau of Reclamation (Berman, 1985). Four claims were filed on behalf of the families of named flood victims, and a claim additionally was filed to represent other injured persons by a class action. The Department of the Interior rejected the claims. A variety of grounds could have been given: an assertion that the Bureau of Reclamation merely had financial oversight over spending contract funds and hence no federal activity or employee was involved; a claim that the seeding had not caused the flood; and the argument that the Federal Torts Claims Act did not allow predicating liability on a strict liability theory. No negligence was shown in this case.

When the claims were rejected by the Department of the Interior, they then were filed in federal court as Lunsford v. United States (Changnon et al., 1977). The South Dakota District Court ruled that the case was not proper for a class action because the named parties could not represent the entire class of flood victims. An interim appeal was taken to the Court of Appeals at St. Louis which ruled for the government stating that because the plaintiffs had not sought a definite sum on behalf of the unnamed members of the class and because their complaint did not show authority to represent the other victims, the case could be pursued only on behalf of the individuals named as plaintiffs. This created a problem of funding the trial. Lawyers and expert witnesses cost money. For example, it was estimated that litigation costs ran at least $300,000 in the Yuba City weather modification trial in the 1950s (Mann, 1968). Costs of Rapid City two decades later could have been higher. It is easier to raise money to pay litigation costs from a large group than from a few people. The Court of Appeals in Lunsford also ruled that there was not as yet an adequate record in the case to determine the applicability of federal flood control legislation which immunizes the federal government for actions undertaken as a part of such a project. In any event, the plaintiffs did not elect to continue the case, and federal immunity won the day.

6 CONCLUSIONS

The Black Hills Flood of 1972 was an important event in the legal history of weather modification. It influenced flood hazard mitigation; it gave emphasis to the need for legislatively and administratively mandated suspension criteria; it touched upon the liability issue; and it showed the continuing viability in at least one jurisdiction of the sovereign immunity defense.

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