

COLORADO DEPARTMENT OF REGULATORY AGENCIES
OFFICE OF POLICY AND RESEARCH

COLORADO WEATHER MODIFICATION ACT OF 1972

1995 SUNSET REVIEW



**Joint Legislative Sunrise/Sunset Review Committee
1995-1996 Members**

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June 30, 1995

The Honorable Richard Mutzebaugh, Chair
Joint Legislative Sunrise/Sunset Review Committee
State Capitol Building
Denver, Colorado 80203

Dear Senator Mutzebaugh:

The Colorado Department of Regulatory Agencies has completed the evaluation of the **Weather Modification Act of 1972**. We are pleased to submit this written report, which will be the basis for my office's oral testimony before the Joint Legislative Sunrise/Sunset Review Committee. The report is submitted pursuant to §24-34-104 (8)(a), of the Colorado Revised Statutes, which states in part:

"The Department of Regulatory Agencies shall conduct an analysis of the performance of each division, board or agency or each function scheduled for termination under this section..."

The Department of Regulatory Agencies shall submit a report and such supporting materials as may be requested, to the Sunrise and Sunset Review Committee created by joint rule of the Senate and House of Representatives, no later than July 1 of the year preceding the date established for termination..."

The report discusses the question of whether there is a need for the regulation provided under article 20 of title 36, C.R.S. The report also discusses the effectiveness of the division and staff in carrying out the intention of the statutes and makes recommendations for statutory and administrative changes in the event this regulatory program is continued by the General Assembly.

Sincerely,

Joseph A. Garcia
Executive Director

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EXECUTIVE SUMMARY

Agencies' Office of Policy and Research has concluded its sunset review of the Weather Modification Act of 1972 and recommends the sunset of the licensing provisions of the Act and recommends expanding the Weather Modification Permit Program to strengthen regulatory oversight. Weather modification activities if performed without any checks or safeguards by the state may have adverse effects to the health and welfare of the state. Specifically, unchecked weather modification activities could effect the snowpack in the mountains and subsequently could cause flooding. It could also result in additional snow removal costs, difficulty in feeding of livestock and create burdens on wildlife. Because of the inherent connection of water to Colorado's economy as well as the potential adverse effects of weather modification, OPR recommends continuation of the permitting program.

This review also addresses various statutory changes to allow the Department of Natural Resources to be more effective in administering the program.

BACKGROUND

Sunset Review Process

The licensing of weather modifiers pursuant to article 20 of title 36 is scheduled to terminate on July 1, 1996 unless continued by the General Assembly. (§24-34-104, C.R.S.). By July 1, 1995, the Office of the Executive Director of the Department of Regulatory Agencies (DORA) must submit its findings and recommendations to the Colorado Joint Legislative Sunrise/Sunset Review Committee, including an evaluation of the effectiveness of the regulation, a determination if continuation of licensure is necessary for the protection of the public, and determination whether the current degree of regulation should be decreased or increased to provide the least restrictive regulation consistent with the public interest. (The statutory sunset criteria are provided in Appendix A of this report.)

The sunset review of the licensure of weather modifiers included an analysis of the state statute and rules, interviews with licensed weather modifiers, political subdivisions, interviews with licensed weather modifiers, the Department of Natural Resources, the U.S. Environmental Protection Agency, and environmental organizations. Research was conducted for relevant publications as well as a review of relevant federal laws.

Background

It is obvious that water has a very important impact on Colorado and its citizens. Whether used for agriculture, daily life, or tourism, the amount of water that Colorado receives through precipitation via snow or rain impacts all facets of Colorado life and industry. The natural process of rain or snow fall occurs by the formation of clouds as the result of water vapor condensing around microscopic particles in the atmosphere. These particles, called condensation nuclei, come from many sources including dust, salt, and smoke. Rain occurs when these microscopic droplets combine together to become heavy enough to drop to the earth. To form snow, ice crystals grow around additional particles in the cloud called ice nuclei. Ice nuclei may be natural or man made particles. When these crystals become large enough, their weight causes them to fall to earth in the form of snow.

All clouds contain moisture, but many do not have enough natural nuclei to cause precipitation. The use of weather modification activities can artificially change the weather. This is most often done by cloud seeding. The process of cloud seeding adds additional nuclei into the cloud in an effort to create more precipitation. Cloud seeding may be performed in one of two manners. Carbon dioxide (dry ice) or silver iodide may be dropped into clouds from above using airplanes, or silver iodide may be sprayed into the atmosphere from ground generators, where natural wind patterns and updrafts carry them into the targeted clouds. (See figure 1 on the following page.) Silver iodide is the most widely used substance in weather modification activities because its molecular structure is ideal for water vapor to collect around it. Because of Colorado's mountain topography, ground-based seeding is easier and less expensive than aerial seeding. Consequently, ground seeding is more prevalent.

Ground-based generators are most often used in the winter to augment snow pack for reservoirs or to enhance snow fall for the ski areas. Generators are placed in various locations around a particular vicinity and are turned on when proper conditions exist. When the time is right, a generator is turned on. Silver iodide and acetone are mixed together to form a solution. This solution is sprayed via a regulator into a propane burner. The acetone in the solution burns creating a higher flame point. As a result of the higher temperature, a vapor is created containing the silver iodide. This vapor rises into the passing clouds where the water molecules connect to the silver iodide molecules and causes snow to fall to the earth. Most cloud seeding projects last several months and use anywhere from 1 to 80 generators. Actual seeding is conducted only when proper cloud conditions exist.

**Colorado
Statutes -
Historical
Perspective**

In 1951, the Colorado General Assembly enacted the Weather Control Act. The state claimed the right to all moisture suspended in the atmosphere that fell into or became part of the natural streams of Colorado. The Act also proclaimed the state's right to increase precipitation by artificial means for use in Colorado without causing material damage to others. The Act directed the governor to appoint a five-member commission consisting of a representative from each of the then four Congressional Districts and one member at large. Licenses were required for anyone who conducted weather control or cloud modification practices, and they were issued by the Commissioner of Agriculture. Applicants for licensure needed to meet certain requirements including: the skill and experience reasonably necessary to the accomplishment of weather control without attainable injury to property or person, proof of financial responsibility adequate to meet certain obligations reasonably likely to result from weather control activity, and a license fee of \$100.

In 1963, weather control activities were transferred from the Commissioner of Agriculture to the Coordinator of the Department Natural Resources (DNR). DNR became responsible for establishing rules, regulations and practices reasonably necessary to carry out the purposes of the Weather Control Act.

In June 1971, as a result of growing concern of the increasing number of weather modification projects in the state and the inadequacy of the current statute, the Colorado Legislative Council appointed a committee to examine problems associated with weather modification in the state. As a result of Legislative Council recommendations to the Committee, the Colorado Weather Modification Act of 1972 was enacted by the General Assembly. The statute established a ten member advisory committee to offer advice as requested to the Executive Director of the DNR. It required that a permit be issued for each project in addition to directing that anyone performing weather modification activities have a valid license. It also required publication of proposed project plans, and provided that public hearings be conducted in the affected area. The act empowered the Executive Director to set operation limits to modify or suspend the project when warranted.

In 1979, the Colorado Weather Modification Act was amended as a result of increased concern over possible illegal cloud seeding activity. The penalty for conducting illegal weather modification was changed from a misdemeanor to a Class V felony. Illegal seeding was defined as operating without the required license and permit or contracting with an unlicensed or permitless weather modifier.

In 1987, the Executive Director of the DNR delegated statutory authority for management of the state's weather modification program to the Director of the Colorado Water Conservation Board. Weather modifiers continue to be managed under the Board.

In 1992, the General Assembly amended the Weather Modification Act. Acting on a recommendation of the Sunrise and Sunset Committee, they eliminated the Weather Modification Technical Advisory Committee. The amendments also provided for a separate licensing category for ground-based winter cloud seeders. Permit renewals for this type of license were extended beyond the one year time period and bi-weekly reports summarizing the projects activities were no longer required. Additionally, the amendment waived the license requirement for political subdivisions that were conducting ground-based cloud seeding activities.

SUMMARY OF STATUTE AND PROGRAM DESCRIPTION

The Department of Natural Resources administers the Weather Modification Act through licenses and permits. The following terms are defined in the Weather Modification Act under §36-20-104, C.R.S.:

Definitions

Weather Modification means any program, operation, or experiment intended to induce changes in the composition, behavior, or dynamics of the atmosphere by artificial means. §104(4).

Operation means the performance in Colorado of any activity to attempt to modify or having the effect of modifying natural weather conditions other than usual and customary activities not conducted primarily for weather modification and having only a minor effect on natural weather conditions. §104(10)

Ground-based winter cloud seeding means the seeding of clouds between the months of November through May of each year by the use of the cloud seeding generation equipment. §104(2.5)

Licensing

In order to engage in weather modification activities, a person must possess a weather modification license and a permit for that particular operation. To obtain a license from the Department of Natural Resources, an individual must “demonstrate knowledge, skill, and experience reasonably necessary to accomplish weather modification without actionable injury to person or property...” §36-20-107(2)(b)(I), C.R.S.

However, political subdivisions that are engaged in ground-based winter cloud seeding are not required to hold a weather modification license. §36-20-112, C.R.S.

There are two types of licenses that may be obtained in order to perform weather modification activities. These licenses are: 1) the general weather modification license and 2) the license for ground-based winter cloud seeding only.

As an aid to research and development in weather modification and as a tool to protect life, property and the environment, §36-20-117, C.R.S. requires licensed weather modifiers operating in Colorado to file reports.

By regulation, report forms will include the method of operation employed, the type of equipment used, the kind and amount of each material used, the times and places the equipment is operated, the name and address of each individual other than the licensee who participates in the weather modifying activity and any environmental effect realized or suspected to have occurred.

Written bi-weekly reports are required to be provided to the DNR summarizing the project's activities and intended results while the project is actually in operation. One of two sets of reports are required to be submitted to the DNR. They are:

1. Written final operational report and a written final report evaluating the project.

or

2. An annual operational report and an annual project evaluation.

The written final operational report as well as a preliminary scientific evaluation of the project must be filed to the DNR no later than 30 days after completion of the project. A final complete scientific evaluation of the project is required no later than 180 days after completion of the project.

If the licensee is operating a ground-based winter cloud seeding project, reporting requirements are much less. The licensee is only required to keep a record of all operations conducted, showing the equipment, methods, types, amounts, times and places of seeding agents employed. Also included must be a statement as to the estimated effect of the operation in relation to its intended purpose and the name and address of each person participating or assisting in the operation. Finally, a yearly report is required evaluating the project results or if it is an ongoing project a report is required at least every two year.

The following chart illustrates the reporting requirements of a general weather modification and ground-based winter cloud seeding licensee.

General Weather Modification	Ground-Based Cloud Seeding
<ol style="list-style-type: none"> 1. Bi-weekly report 2. Final operational report and final evaluation <p style="text-align: center;">or</p> <p style="text-align: center;">Annual operational report and annual project evaluation</p> <ol style="list-style-type: none"> 3. Preliminary scientific evaluation 4. Final scientific evaluation 	<ol style="list-style-type: none"> 1. Keep records of operation - need not file 2. Project evaluation report within one year of termination or if ongoing, at least once every two years

General Weather Modification

The minimum requirements that an applicant must possess in order to obtain a general weather modification license are either:

- demonstration of eight (8) years' professional experience as a weather modification field research or operations with at least three of those years as a project director,
- obtain a baccalaureate degree in engineering, mathematics, or the physical sciences plus three years' experience in weather modification field research and operations,
- obtain a baccalaureate degree in meteorology or a degree in engineering or the physical sciences which includes, or is in addition to, the equivalent to at least twenty-five semester hours of meteorological course work and two years' practical experience in weather modification operations or research.

Ground-Based Winter Cloud Seeding

To be eligible for a license as a ground-based cloud seeder, the applicant must have at least eight years' experience at the professional level in weather modification research or operations with at least two of those years as a project director.

The fee for a license is \$100. Exemptions from the fee may be allowed for 1) research, development, and experiments conducted by state and federal agencies, state institutions of higher education, and bona fide nonprofit organizations, 2) laboratory research and experiments, and 3) activities of an emergency nature for protection against fire, frost, hail, sleet, smog, fog, or drought. Licenses expire at the end of each calendar year.

Permit Requirements

As a prerequisite to obtaining a permit, all weather modifiers except for political subdivisions of the state engaging in ground-based winter cloud seeding must hold a valid weather modification license. Operations under permits must be conducted under the immediate direction or supervision of a licensee. The permit applicant must furnish proof of financial responsibility adequate to meet obligations reasonably likely to be attached to or result from the operation. Accompanying the application must be an operational plan for each proposed project prepared by the licensed operator. The plan must include a specific statement of the objectives, a map of the proposed operation area which specifies the primary target area, and show the affected areas.

Following the application and prior to issuing a permit, the operator must publish a notice of intent to modify weather in the counties to be affected by the weather modification program. The notice identifies the target area as well as the general area affected. The notice also will include the expected duration and intended affect. Prior to issuing a permit, DNR is required to hold a public hearing on the proposed weather modification project. Based on the findings of the operational plan and the public hearing, the DNR will determine whether to issue a permit. Specifically the DNR determines whether:

- if a commercial project, the proposed weather modification operation will offer an economic benefit to the area;
- the project will generally benefit in the affected area or the people in the state of Colorado;
- if a commercial project, that it be scientifically and technically feasible;
- if a scientific or research project, the project be designed for and offer promise of expanding the knowledge and technology of weather modification;

- the project does not involve a high degree of risk and designed to include adequate safeguards against substantive harm to land, people, health, safety, property or the environment;
- the project does not adversely affect another project; and
- the project is designed to minimize risk and maximize scientific gains or economic benefits to the residents of the state.

Fees for commercial permits are set at a minimum of \$100 plus 2% of the commission operations.

**Limits of
Permit - §36-
20-114, C.R.S.**

Except for ground-based winter cloud seeding, a separate permit is required annually for each operation. If an operation is conducted under contract, then a permit is required for each separate contract. Permits for ground-based winter cloud seeding are issued for a period of five years.

The DNR may conditionally approve a project other than ground-based winter cloud seeding in excess of one year. Permits must be renewed annually but the DNR may waive the initial permit requirements. Additionally, a permit may be issued by DNR without prior publication of notice in cases of fire, frost, hail, sleet, smog, fog, drought or other emergency. The DNR also has the authority to modify a permit.

Although licenses and permits are required for all people engaging in weather modification operations, the Director of DNR may exempt the following activities from fee requirements:

- Research, development and experiments conducted by state and federal agencies, state institutions of higher education, and non-profit research organizations.
- Laboratory research and experiments.

- Activities of an emergency nature for protection against fire, frost, sleet, smog, fog or drought.

Weather control operations may not be carried out in Colorado for the purpose of affecting weather in any other state if that state prohibits such operations to be carried on in that state for the benefit of Colorado.

**Legal
Recourse -
Liability - §36-
20-123, C.R.S.**

The state Legislature has decreed that the operation of weather modification activities pursuant to an authorized permit is not considered trespass nor involving an actionable or enjoined public or private nuisance. However, failure to obtain a license or permit prior to engaging in weather modification operations is considered negligence. The Director of DNR may issue a cease and desist order against an individual who is conducting weather modification operations without a license or permit. Persons conducting weather modifications without a license and permit, or who contracts with an unlicensed or permitless weather modifier operator are committing a Class 6 felony and punishable under §18-1-105, C.R.S.

**Weather
Modification
in Colorado**

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Commercially, there are six locations in Colorado that have consistently been permitted for weather modification operations. They are: San Juan, Grand Mesa, Aspen, Vail/Beaver Creek, Willows Creek and Western Kansas. (See Figure 2 on the following page.) The primary purpose for weather modification activities is to augment water reservoir collection. Other purposes include snow-making for ski areas and hail suppression. The following indicates the purpose of these permits.

San Juan	Water Reservoir Collection
Grand Mesa Water Authority	Water Reservoir Collection
Aspen	Snow making for Ski Industry
Vail/Beaver Creek	Snow making for Ski Industry
Willow Creek	Water Reservoir Collection
Western Kansas	Hail Suppression

Increases in snowfall have beneficial economic affects for the ski industry. More snow relates to more tourists and therefore more revenue. Additional snowfall in the state helps keep reservoirs at a maximum level and prevents depletion of groundwater saturation levels. Due to the arid climate and past history of drought in the state, weather modification activities have been consistently used through the years to assist in keeping reservoir levels high.

Heavier snowfall does have certain detrimental affects. Specifically, as currently noticed, heavier snowpack may create flooding. It also creates additional costs needed for snow removal on roads, highways, streets and sidewalks. Feeding livestock such as cattle at higher elevations may also be more difficult. Heavier snow makes it more difficult for trucks to reach livestock and spread hay. A heavier snow pack is also hard on wildlife since they need to borrough down further in the snow to find roots and other vegetation consumed as feed.

Finally, weather modification is used to suppress hail. Western Kansas will aerially seed clouds in Eastern Colorado to avoid hail damage in their state. Because of the extensive crop damage that can occur with hail, Western Kansas saves millions of dollars by using cloud seeding activities to cause the precipitation to fall as rain or hail in smaller sizes.

The National Oceanic Atmospheric Administration (NOAA) is supposed to be notified of all weather modification actions. The Department of Natural Resources, however, is the only state agency which actively monitors weather modification activities. Permittees using weather modification to enhance snowfall are monitored by the Department of Natural Resources via monthly reports. Weather modification operations are required to indicate amounts of silver iodide and acetate that have been used, the number of days they operated, and which weather modification generators were used. Snowfall levels are monitored by the U.S. Soil Conservation Service through snow gages and that information is provided to the DNR. The DNR sets a water content threshold for snow gages in or near the targeted area. The threshold is based on the monthly average snowfall and is monitored by the Soil Conservation Service snow gages. When snow levels exceed the monthly average, the DNR will require the cessation of weather modification operations for that area.

SUNSET ANALYSIS AND RECOMMENDATIONS

Should Individuals Engaged in Weather Modification be Licensed by the State?

Under the current provision of the Weather Modification Act, the statute outlines a two phase approach to the regulation of weather modification. The act ensures that competent individuals performing weather modification are operating in the state through a licensing scheme. Secondly, the act also provides that individual weather modification activities are performed safely in the targeted areas through a permitting process. While the regulation of weather modification is important to protect the public, licensing of weather modifiers has not been demonstrated as necessary.

Public health, safety and welfare issues from weather modification activities are adequately addressed through the permitting function of the Act. Danger from an unregulated weather modification community may result in increased snowpack when it was not needed, cause an increase in snow removal or make it difficult for wildlife to feed itself. Through the mandatory reporting requirements of weather modification activities and DNR's monitoring of the snowpack level, the permitting process provides adequate protection of the public. This process also provides the state with a central oversight agency among any or all weather modification activities in the state.

Eliminating the licensing provision of the Act would not have a significant impact on the public. The public hearing process required in the permit application allows the citizens of the affected area to discuss information about the process as well as the individuals who would be operating the equipment. The hearing, coupled with DNR's expertise in this field will be adequate to identify those individuals who are not qualified to perform weather modification operations.

Communities and corporations who hire weather modifiers potentially are losing assurances that they are hiring a reputable individual. However, private organizations such as the Weather Modification Association have certain professional protocols and an inquiry by a potential client would assist in finding a knowledgeable weather modifier.

Another potential harm to the elimination of a licensure could be a rogue weather modifier charging for illegitimate services. DORA does not feel that this potential harm is significant. The permitting requirements would expose any irregularity and the Consumer Protection Act for fraudulent transactions serves as a safety net.

Because of the adequacy of the permitting process to ensure the public health, safety and welfare, OPR recommends to sunset the licensing provision but to amend the act to give the DNR the authority to require the education and experience of the person providing the weather modification activities to be part of the criteria for providing or denying the permit.

Recommendation 1 - Sunset the licensing provisions of the Weather Modification Act.

**Clarify
Reporting
Requirements**

Under §36-20-117, C.R.S., the reporting requirements are confusing and difficult to understand. General weather modifiers are required to submit at least five and as many as seven reports. In an effort to streamline this process while maintaining the public safety, OPR recommends that the statutory language be changed to require a bi-weekly report and an annual summary report that includes the operation of the project. If the project is completed, then a final scientific evaluation of the project be delivered to the DNR within 180 days. OPR recommends that the preliminary scientific evaluation be removed as a requirement. Additionally, OPR recommends that ground-based winter cloud seeding project evaluation reports include a scientific evaluation of the affected area.

Recommendation 2 - . OPR recommends that the preliminary scientific evaluation be removed as a requirement. Additionally, OPR recommends that ground-based winter cloud seeding project evaluation reports include a scientific evaluation of the affected area.

**Give Director
Authority to
Waive Fee**

Section 36-20-113, C.R.S. provides that:

The fee for each permit or the renewal thereof. . . shall be at a minimum of one hundred dollars. If the operation is a commercial project an additional amount equal to two percent of the value of the contract for such commercial project shall be required and paid before a permit may be issued. Said fees are intended to provide at least a portion of the monies necessary to administer this article. (Emphasis supplied)

The term "commercial project" is not defined in the statute, although it obviously is the opposite of a "research and development project," which term is defined under §36-20-104(8) and (9), C.R.S. and §36-20-108(2), C.R.S. Furthermore, the wording of §36-20-113, C.R.S., as quoted above, contemplates that a "commercial project" will involve a contract between a firm which performs weather modification activities and a sponsoring entity which will pay for weather modification activities. §36-20-108(4)(b), C.R.S. ("in contracting with commercial operators for the performance of weather modification and cloud seeding operations"). It is this contract which is the basis of the two percent fee.

Currently, DNR issues a permit to the Kansas Groundwater Management District for hail suppression activities. The district's operation appears to be a commercial project in that it is not a research and development project. However, the contract does not involve a commercial operator because the district is running the project with its own employees and its own aircraft.

DNR has waived the 2% fee and requires the Kansas Groundwater Management District to pay the minimum \$100. This position has been consistent since 1984. OPR recommends that the clause "at the discretion of the director" be added after the language "If the operation is a commercial project" under §36-20-113, C.R.S.

Secondly, if the 2% fee is to be applied to the district even though a contract is not involved, the question becomes whether the 2% should be applied to the cost of the entire operation or should the 2% apply only to the cost of seeding operations concluded in Colorado.

The second issue also is raised with political subdivisions in the state who perform their own cloud seeding activities as is currently performed by the Grand Mesa Water Authority,

OPR recommends that the statutory language of §36-20-113, C.R.S. related to the two percent value of the contract be clarified.

Recommendation 3 - Provide clarification for director to waive fee.

Administrative Recommendation

During the 1992 legislative repeal of the weather modification advisory committee, the Weather Modification Act was amended with regard to ground-based winter cloud seeding. Under the amendments, winter ground-based cloud seeding activities requirements were separated from other weather modification activities. Specifically, those requirements were relaxed. For example, licensees were required to have only two years experience as a project director as opposed to the nominal requirement of 3 years. Additionally, the amendments provided that political subdivisions of the state could be issued a permit without a weather modification license. Finally, the statute allowed ground-based weather modification activities to receive a 5 year permit rather than require a permit each year.

These statutory changes have not been modified in the rules and regulations. Should the Legislature decide against the elimination of the licensing requirement, OPR recommends that the rules and regulations be modified to reflect the statutory changes.

Recommendation 4 - Make rules consistent with changes to the Weather Modification Act.

APPENDICES

Sunset Statutory Evaluation Criteria

- (I) Whether regulation by the agency is necessary to protect the public health, safety and welfare; whether the conditions which led to the initial regulation have changed; and whether other conditions have arisen which would warrant more, less or the same degree of regulation;
- (II) If regulation is necessary, whether the existing statutes and regulations establish the least restrictive form of regulation consistent with the public interest, considering other available regulatory mechanisms and whether agency rules enhance the public interest and are within the scope of legislative intent;
- (III) Whether the agency operates in the public interest and whether its operation is impeded or enhanced by existing statutes, rules, procedures and practices of the Department of Regulatory Agencies and any other circumstances, including budgetary, resource and personnel matters;
- (IV) Whether an analysis of agency operations indicates that the agency performs its statutory duties efficiently and effectively;
- (V) Whether the composition of the agency's board or commission adequately represents the public interest and whether the agency encourages public participation in its decisions rather than participation only by the people it regulates;
- (VI) The economic impact of regulation and, if national economic information is available, whether the agency stimulates or restricts competition;
- (VII) Whether complaint, investigation and disciplinary procedures adequately protect the public and whether final dispositions of complaints are in the public interest or self-serving to the profession;
- (VIII) Whether the scope of practice of the regulated occupation contributes to the optimum utilization of personnel and whether entry requirements encourage affirmative action;
- (IX) Whether administrative and statutory changes are necessary to improve agency operations to enhance public interest.

Weather Modification Act of 1972

36-20-101. Short title. This article shall be known and may be cited as the "Weather Modification Act of 1972".

36-20-102. Legislative declaration. The general assembly declares that the state of Colorado recognizes that economic benefits can be derived for the people of the state from weather modification. Operations, research, experimentation, and development in the field of weather modification shall therefore be encouraged. In order to minimize possible adverse effects, weather modification activities shall be carried on with proper safeguards, and accurate information concerning such activities shall be made available for purposes of regulation. While recognizing the value of research and development of weather modification techniques by governmental agencies, the general assembly finds and declares that the actual practice of weather modification, whether at public or private expense, is properly a commercial activity which the law should encourage to be carried out, whenever practicable, by private enterprise.

36-20-103. Declaration of rights. The general assembly declares that the state of Colorado claims the right to all moisture suspended in the atmosphere which falls or is artificially induced to fall within its borders. Said moisture is declared to be the property of the people of this state, dedicated to their use pursuant to sections 5 and 6 of article XVI of the Colorado constitution and as otherwise provided by law. It is further declared that the state of Colorado also claims the prior right to increase or permit the increase of precipitation by artificial means for use in Colorado. The state of Colorado also claims the right to modify weather as it affects the people of the state of Colorado and to permit such modification by activity within Colorado.

36-20-104. Definitions. As used in this article, unless the context otherwise requires:

- (1) Repealed.
- (2) "Director" means the executive director of the department of natural resources, as created by article 33 of title 24, C.R.S.
- (2.5) "Ground-based winter cloud seeding" means the seeding of clouds between the months of November through May of each year by the use of ground generation equipment.
- (3) "License" means a certification issued by the director indicating that a specific person has met the standards for certification as a weather modifier and is approved to direct weather modification operations in the state.
- (4) "Operation" means the performance in Colorado of any activity to attempt to modify or having the effect of modifying natural weather conditions other than usual and customary activities not conducted primarily for weather modification and having only a minor effect on natural weather conditions.
- (5) "Permit" means a certification of project approval to conduct a specific weather modification operation within the state under the conditions and within the limitations required and established under the provisions of this article.
- (6) "Person" means an individual, partnership, or public or private corporation or agency, except where the context indicates that "person" is used in the sense of a living individual.

(7) "Publication" or "publish" means a minimum of at least two consecutive weekly legal notices in at least one newspaper of general circulation in the county or counties, or portions thereof, included within the proposed operation. It shall not be necessary that notice be made on the same day of the week in each of the two weeks, but not less than one week shall intervene between the first publication and the last publication, and notice shall be complete on the date of the last publication. If there is no such newspaper, notice shall be by posting in at least three public places within the county, or portions thereof, included within a proposed operation. Publication of notices provided for in this article may be made, at the discretion of the director, by notices broadcast over any or all standard radio, FM radio, television stations, and cable television. Such broadcast notices shall make reference to locations or publications wherein details of the subject matter of the notices are located.

(8) "Research and development" means theoretical analysis, exploration, experimentation, and the extension of investigative findings and theories of a scientific or technical nature into practical application for experimentation and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials, and processes both in the laboratory and in the atmosphere.

(9) "Research and development operation" or "research and development project" means an operation which is conducted solely to advance scientific and technical knowledge in weather modification. Research and development operations may be conducted by state or federal agencies, state institutions of higher education, and bona fide nonprofit research corporations or by commercial operators under contracts with such entities solely for research purposes.

(10) "Weather modification" means any program, operation, or experiment intended to induce changes in the composition, behavior, or dynamics of the atmosphere by artificial means.

36-20-105. Administration. (1) The executive director of the department of natural resources is hereby charged with the administration of this article.

(2) The director shall issue all licenses and permits provided for in this article. He is hereby empowered to issue rules and regulations he finds necessary to facilitate the implementation of this article, and he is authorized to execute and administer all other provisions of this article pursuant to the powers and limitations contained in this article.

36-20-106. Advisory committee - appointment - duties - sunset review.
(Repealed)

36-20-107. Duties of the director. (1) The director shall establish rules and regulations, in accordance with article 4 of title 24, C.R.S., necessary to effectuate the purposes of this article.

(2) (a) The director shall establish qualifications, procedures, and conditions for the issuance of licenses for the purpose of conducting weather modification activities within the state.

(b) (I) The qualifications so established shall ensure that the licensee demonstrates knowledge, skill, and experience reasonably necessary to accomplish weather modification without actionable injury to person or property, but the licensee shall be limited in the exercise of such license to the method of weather modification within his area of expertise. At a minimum each such applicant, except for applicants for licenses for ground-based winter cloud seeding, shall meet requirements at least as stringent as one or more of the following:

(A) Demonstrates that such person has at least eight years' experience at the professional level in weather modification field research or operations, at least three of those years as a project director; or

(B) Has obtained a baccalaureate degree in engineering, mathematics, or the physical sciences plus three years' experience in weather modification field research or operations; or

(C) Has obtained a baccalaureate degree in meteorology or a degree in engineering or the physical sciences which includes, or is in addition to, the equivalent of at least twenty-five semester hours of meteorological course work and two years' practical experience in weather modification operations or research.

(II) Notwithstanding the provisions of subparagraph (I) of this paragraph (b), the qualifications established by the director for ground-based winter cloud seeding shall ensure that the licensee demonstrates knowledge, skill, and experience reasonably necessary to accomplish weather modification without actionable injury to person or property, but the licensee shall be limited in the exercise of such license to the method of weather modification within such licensee's area of experience. Notwithstanding the provisions of subparagraph (A) of subparagraph (I) of this paragraph (b), for ground-based winter cloud seeding a person shall have at least eight years' experience at the professional level in weather modification field research or operations, at least two of those years as a project director.

36-20-108. Powers of the director. (1) The director may issue permits applicable to specific weather modification operations. For each operation, said permit shall describe the specific geographic area authorized to be affected and shall provide a specific time period during which the operation may continue, which period may be discontinuous but for operations other than ground-based winter cloud seeding may not have a total duration exceeding one calendar year from the day of its issuance. A separate permit shall be required for each operation. Permits for ground-based winter cloud seeding shall have a duration of five years. The director shall issue a permit only after it is established that the project is conceived to provide economic benefits or that it will advance or enhance scientific knowledge. The director shall issue only one active permit for activities in any geographic area if two or more projects therein might adversely interfere with each other.

(2) The director shall, by regulation or order, establish standards and instructions to govern the carrying out of research and development or commercial operations in weather modification that the director considers necessary or desirable to minimize danger to land, health, safety, people, property, or the environment.

(3) (a) The director may make any studies or investigations, obtain any information, and hold any hearings the director considers necessary or proper to assist the director in exercising the director's power or administering or enforcing this article or any regulations or orders issued under this article.

(b) All hearings conducted under this article shall be conducted pursuant to the provisions of this article and article 4 of title 24, C.R.S., and the director may, by the director's own action, appoint an administrative law judge pursuant to part 10 of article 30 of title 24, C.R.S., subject to appropriations made to the department of administration, to conduct any hearing required by this article, said hearing to be conducted under the provisions and within the limitations of article 4 of title 24, C.R.S., and this article.

(4) (a) The director may, upon approval of the governor, represent the state in matters pertaining to plans, procedures, or negotiations for interstate compacts relating to weather modification, but, before any such compacts may be implemented, the consent of the general assembly must be obtained.

(b) The director may represent the state and assist counties, municipalities, and public agencies in contracting with commercial operators for the performance of weather modification or cloud-seeding operations. Counties, municipalities, and other public agencies of this state are hereby granted the authority to contribute to and participate in weather modification.

(5) In order to assist in expanding the theoretical and practical knowledge of weather modification, the director may participate in and promote continuous research and development in:

(a) The theory and development of weather modification, including processes, materials, ecological effects, and devices related to such matters;

(b) The utilization of weather modification for agricultural, industrial, commercial, municipal, recreational, and other purposes;

(c) The protection of life and property and the environment during research and operational activities.

(6) The director may conduct and may contract for research and development activities relating to the purposes of this article.

(7) The director, subject to limits of the department of natural resources' appropriation, may hire any technical or scientific experts or any staff deemed necessary to carry out the provisions of this article.

(8) Subject to any limitations imposed by law, the department of natural resources, acting through the director, may accept federal grants, private gifts, and donations from any other source. Unless the use of the money is restricted, or subject to any limitations provided by law, the director may:

(a) Spend it for the administration of this article;

(b) By grant, contract, or cooperative arrangement, use the money to encourage research and development by a public or private agency; or

(c) Use the money to contract for weather modification operations.

(9) The director shall prescribe those measurements reasonably necessary to be made prior to and during all operations to determine the probable effects of an operation.

36-20-109. License and permit required - exemptions. (1) No person may engage in activities for weather modification and control without a weather modification license and a weather modification permit issued by the director; nor may any person engage in any activities in violation of any term or condition of the license or the permit.

(2) The director, to the extent he considers exemptions practical, may provide by regulation for exempting the following activities from the fee requirements of this article:

(a) Research, development, and experiments conducted by state and federal agencies, state institutions of higher education, and bona fide nonprofit research organizations;

(b) Laboratory research and experiments; and

(c) Activities of an emergency nature for protection against fire, frost, hail, sleet, smog, fog, or drought.

36-20-110. Issuance of license. (1) The director, in accordance with applicable regulations, shall issue a weather modification license to each applicant who:

- (a) Pays the license fee, if applicable; and
- (b) Meets the qualifications for licensure established by the director pursuant to section 36-20-107 (2).

36-20-111. License fee - expiration. A license shall be issued under this article only upon the payment to the state of Colorado the sum of one hundred dollars for such license. Each such license shall expire at the end of the calendar year in which it is issued.

36-20-112. Permit required - when issued. (1) The director, in accordance with regulations, shall issue a weather modification permit to each applicant who:

(a) Holds, or if the applicant is a corporation, the corporation demonstrates that the person in control of the project holds, a valid weather modification license; except that, for ground-based winter cloud seeding, a political subdivision of the state may be issued a permit pursuant to this section without holding a weather modification license if the other requirements of this section are met;

(b) Pays the permit fee, if applicable;

(c) Furnishes proof of financial responsibility adequate to meet obligations reasonably likely to be attached to or result from the proposed weather modification operation. Such proof of financial responsibility may, but at the discretion of the director shall not be required to, be shown by presentation of proof of a prepaid insurance policy with an insurance company licensed to do business in Colorado, which insurance policy shall insure liabilities in an amount set by the director and provide a cancellation clause with a thirty-day notice to the director, or by filing with the director an individual, schedule, blanket, or other corporate surety bond in an amount approved by the director. The director shall not require proof of financial responsibility in excess of the limitations imposed by section 24-10-114, C.R.S., from any political subdivision of the state authorized to conduct ground-based winter cloud seeding weather modification activities pursuant to this article.

(d) Submits a complete operational plan for each proposed project prepared by the licensed operator in control which includes a specific statement of objectives, a map of the proposed operating area which specifies the primary target area and shows the area reasonably expected to be affected, the name and address of the licensee, the nature and object of the intended operation, the person or organization on whose behalf it is to be conducted, a statement showing any expected effect upon the environment and methods of determining and evaluating the same, and such other detailed information as may be required to describe the operation and its proposed method of evaluation. This operational plan shall be placed on file with the director and with any other agent as he may require.

(e) Publishes a notice of intent to modify weather in the counties to be affected by the weather modification program before the licensee secures a permit and before beginning operations. The published notice shall designate the primary target area and indicate the general area which might be affected. It shall also indicate the expected duration and intended effect and state that complete details are available on request from the licensee or the director or from the other agent specified by the director. The publication shall also specify a time and place, not more than one week following the completion of publication, for a hearing on the proposed project. Proof of publication shall be furnished to the director by the licensee.

(f) Receives approval under the criteria set forth in subsection (3) of this section.

(2) Before a permit may be issued, the director or his authorized agents shall hold a public hearing on the proposed project. Said hearing shall be held in a place within a reasonable proximity of the area expected to be affected by the proposed operation.

(3) No permit may be issued unless the director determines, based on the information provided in the operational plan and on the testimony provided at the public hearing:

(a) That, if it is a commercial project, the proposed weather modification operation is conceived to provide, and offers promise of providing, an economic benefit to the area in which the operation will be conducted;

(b) That the project is reasonably expected to benefit the people in said area or benefit the people of the state of Colorado;

(c) That the project is, if it is a commercial project, scientifically and technically feasible;

(d) That the project is, if it is a scientific or research project, designed for and offers promise of expanding the knowledge and the technology of weather modification;

(e) That the project does not involve a high degree of risk of substantial harm to land, people, health, safety, property, or the environment;

(f) That the project is designed to include adequate safeguards to prevent substantial damage to land, water rights, people, health, safety, or to the environment;

(g) That the project will not adversely affect another project; and

(h) That the project is designed to minimize risk and maximize scientific gains or economic benefits to the residents of the area or the state.

36-20-113. Permit fee. The fee for each permit or the renewal thereof under section 36-20-114 shall be at a minimum of one hundred dollars. If the operation is a commercial project an additional amount equal to two percent of the value of the contract for such commercial project shall be required and paid before a permit may be issued. Said fees are intended to provide at least a portion of the moneys necessary to administer this article.

36-20-114. Limits of permit. (1) Except for ground-based winter cloud seeding, a separate permit is required annually for each operation. If an operation is to be conducted under contract, a permit is required for each separate contract. Subject to the provisions of subsection (2) of this section, a permit may be granted for more than one year's duration. A permit for ground-based winter cloud seeding shall be issued for a period of five years.

(2) The director may conditionally approve a project other than ground-based winter cloud seeding for a continuous time period in excess of one year's duration. Permits for such operations must be renewed annually. In approving the renewal of a permit for a continuous program, the director may waive the procedures for initial issuance of a permit in section 36-20-112 and, upon review and approval of the project's operational record, the director may issue a renewed permit for the operation to continue. In such instances, the fees, based upon the value of the contract pursuant to section 36-20-113 may be prorated and paid on an annual basis.

(3) A project permit may be granted by the director without prior publication of notice by the licensee in cases of fire, frost, hail, sleet, smog, fog, drought, or other emergency. In such cases, publication of notice shall be performed as soon as possible and shall not be subject to the time limits specified in this article or in article 4 of title 24, C.R.S.

36-20-115. Modification of permit. (1) The director may revise the terms and conditions of a permit if:

(a) The licensee is first given notice and a reasonable opportunity for a hearing on the need for a revision; and

(b) It appears to the director that a revision is necessary to protect the health or property of any person or to protect the environment.

(2) If it appears to the director that an emergency situation exists or is impending which could endanger life, property, or the environment, he may, without prior notice or a hearing, immediately modify the conditions of a permit or order temporary suspension of the permit on his own order. The issuance of such order shall include notice of a hearing to be held within ten days thereafter on the question of permanently modifying the conditions or continuing the suspension of the permit. Failure to comply with an order temporarily suspending an operation or modifying the conditions of a permit shall be grounds for immediate revocation of the permit and of the operator's license.

(3) It shall be the responsibility of the licensee conducting any operation to notify the director of any emergency which can reasonably be foreseen or of any existing emergency situations in subsection (2) of this section which might in any way be caused or affected by the weather modification operation. Failure by the licensee to so notify the director of any such existing emergency, or any impending emergency which should have been foreseen, may be grounds, at the discretion of the director, for revocation of the license and revocation of the permit for operation.

36-20-116. Scope of activity. Once a permit is issued, the licensee shall confine his activities within the limits of time and area specified in the permit, except to the extent that the limits are modified by the director. He shall also comply with any terms and conditions of the permit as originally issued or as subsequently modified by the director.

36-20-117. Reports of licensee. (1) In order to aid in research and development in weather modification and to aid in the protection of life and property or the environment, any person conducting any weather modification operation in Colorado or elsewhere by undertaking operations within Colorado shall file such reports at such time and in the manner and form as shall be required by regulation of the director; except that, for ground-based winter cloud seeding projects, operators shall be required to keep a record of all operations conducted, showing the equipment, the methods, the types, amounts, times, and places of seeding agents employed, a statement as to the estimated effect of the operation in relation to its intended purpose, and the name and address of each person participating or assisting in the operation. A report on the evaluation of project results for ground-based winter cloud seeding shall be filed with the director within one year of the termination of a project or, in the case of an ongoing project, at least once every two years. The director may require such additional reports as the director deems necessary. Ground-based winter cloud seeding projects shall not be subject to any other reporting requirements contained in this article or rules and regulations of the director.

(2) Report forms may be developed by the director and shall include basic records showing: The method employed, the type of equipment used, the kind and amount of each material used, the times and places the equipment is operated, the name and address of each individual, other than the licensee, who participates or assists in the operation, any environmental effects realized or suspected to have occurred, and any other necessary data the director may require.

(3) Except for ground-based winter cloud seeding projects, the director shall require written biweekly reports summarizing the project's activities and intended results while the project is actually in operation, and except for ground-based winter cloud seeding projects, the director shall require a written final operational report and a written final report evaluating the project, or an annual operational report and an annual project evaluation, as the case may be. Except for ground-based winter cloud seeding projects, a final operational report along with a preliminary scientific evaluation of the project shall be filed no later than thirty days after the completion of the project. Except for ground-based winter cloud seeding projects, a final complete scientific evaluation of the project shall be filed no later than one hundred eighty days after the completion of the project. Except for ground-based winter cloud seeding projects, an annual summary report shall be filed sixty days prior to the renewal of a permit under the provisions of section 36-20-114 (2). All such reports are declared to be public records subject to the provisions and limitations of part 2 of article 72 of title 24, C.R.S.

36-20-118. Operations affecting weather in other states. Weather control operations may not be carried on in Colorado for the purpose of affecting weather in any other state if that state prohibits such operations to be carried on in that state for the benefit of Colorado or its inhabitants.

36-20-119. Suspension - revocation - refusal to renew. (1) The director may suspend or revoke a license or permit if it appears that the licensee no longer has the qualifications necessary for the issuance of an original license or permit or has violated any provision of this article.

(2) The director may refuse to renew the license of, or to issue another permit to, any applicant who has failed to comply with any provision of this article.

36-20-120. Operation under permit. Operations under permits may only be carried forward by or under the immediate direction and supervision of a licensee.

36-20-121. Hearing required. (1) Except as provided in section 36-20-115, the director may not suspend or revoke a license or permit without first giving the licensee notice and a reasonable opportunity to be heard with respect to the grounds for his proposed action.

(2) Said hearing shall be conducted by the advisory committee in the manner provided in section 36-20-106 (2) or in the same manner by an administrative law judge.

36-20-122. Governmental immunity. The state and its agencies, counties, and municipalities, all other public entities (as defined in section 24-10-103 (5), C.R.S.) within the state, and the officers and employees thereof are immune from liability resulting from any weather modification operations approved or conducted by them under the provisions and limitations of this article. Nothing in this section shall be construed as providing any broader waiver of immunity than is provided by article 10 of title 24, C.R.S.

36-20-123. Legal recourse - liability - damages. (1) The mere dissemination of materials and substances into the atmosphere pursuant to an authorized project shall not give rise to the contention or concept that such use of the atmosphere constitutes trespass or involves an actionable or enjoined public or private nuisance.

(2) (a) Failure to obtain a license or permit before conducting an operation, or any actions which knowingly constitute a violation of the conditions of a permit, shall constitute negligence per se.

(b) The director may order any person who is found to be conducting a weather modification operation without a license and permit to cease and desist from said operation. Any person who fails to obey said order commits a class 6 felony and shall be punished as provided in section 18-1-105, C.R.S.

36-20-124. License or permit as defense in actions. The fact that a person holds a license or was issued a permit under this article, or that he has complied with the requirements established by the director pursuant to this article, is not admissible as a defense in actions for damages or injunctive relief brought against him.

36-20-125. Judicial review. Judicial review of any action of the director or findings of the advisory committee may be had in accordance with the provisions of section 24-4-106, C.R.S.

36-20-126. Penalties. (1) (a) Any person responsible for conducting a weather modification operation without first having procured the required license and permit and any person who contracts with or pays another person known to be unlicensed and without a permit to conduct a weather modification operation commits a class 6 felony and shall be punished as provided in section 18-1-105, C.R.S.

(b) Any person operating an aircraft conducting a weather modification operation, which operation has not received the required permit, shall have this violation reported to the United States department of transportation, federal aviation administration, by the director.

(2) Any person who makes a false statement in the application for a license or permit, or who fails to file any report as required by this article, or who violates any other provisions of this article, except as otherwise provided in section 36-20-123 and subsection (1) of this section, is guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine of not more than five thousand dollars, or by imprisonment in the county jail for not more than six months, or by both such fine and imprisonment. Each such violation shall be a separate offense.

36-20-127. Repeal of article. This article is repealed, effective July 1, 1996. Prior to such repeal, the function of the issuance of permits for specific weather modifications operations through the director shall be reviewed as provided for in section 24-34-104, C.R.S.