

North Dakota Atmospheric Resource Board  
Video/Audio Conference Call Meeting  
10:00 a.m. CDT, Wednesday, April 24, 2024

---

*Connection information is on page 2.*

**AGENDA**

1. Call to order, Roll Call
2. ***Approval of Minutes: November 2, 2023*** (attachment)
3. Financial Status Report: March 31, 2024 (attachment) (Kelli)
4. ***2024 NDCMP Permit Applications*** (Darin)
  - a. ***Public Comment*** (attachment)
  - b. ***Weather Modification LLC - NDCMP District 1 & 2*** (attachment)
5. North Dakota Cloud Modification Project
  - a. 2024 Budget (attachment) (Darin)
  - b. County contracts (Darin)
  - c. Staffing (Mark and Kelli)
  - d. Seeding agent and supplies procurement (Mark)
6. ARB Cooperative Observer Network (ARBCON) Report (Dan)
  - a. Growing season rainfall totals and grid maps
  - b. Pushing Remote Sensors (PReSens) – 2024 site deployment
7. NDWMA Public Input Survey and Meetings (Darin)
8. Adjourn

***Bold, italicized items require Board action.***

# Microsoft Teams meeting

Join on your computer, mobile app or room device

[Click here to join the meeting](#)

Meeting ID: 233 013 982 577

Passcode: xKjTBo

[Download Teams](#) | [Join on the web](#)

Join with a video conferencing device

teams@join.nd.gov

Video Conference ID: 112 367 582 4

[Alternate VTC instructions](#)

Or call in (audio only)

[+1 701-328-0950,,582010760#](#) United States, Fargo

Phone Conference ID: 582 010 760#

[Find a local number](#)

# **MINUTES - NORTH DAKOTA ATMOSPHERIC RESOURCE BOARD**

## **NOVEMBER 2, 2023**

Chairman Christopher Theisen called a meeting of the Atmospheric Resource Board (ARB) to order at 1:30 p.m., November 2, 2023.

### ***ROLL CALL***

Roll call was taken. Members present were Christopher Theisen, District IV; Gail Yuly, District II; David Monson, District III; Jessica Magilke, District VI; Thomas Burke, District VII; Dr. Andrea Travnicek, Department of Water Resources (DWR); Kyle Wanner, North Dakota Aeronautics Commission; and Rebekah Pfaff, North Dakota Department of Environmental Quality.

Others present were Darin Langerud, Director; Kelli Schroeder, Program Manager; Mark Schneider, Chief Meteorologist; Daniel Brothers, Meteorologist; Abby Ebach, DWR Director of Public Policy; and Jody Fischer, Weather Modification International (WMI).

### ***MINUTES***

**IT WAS MOVED BY MR. WANNER, SECONDED BY MR. BURKE, AND CARRIED ON A VOICE VOTE TO APPROVE THE MINUTES OF THE APRIL 12, 2023, MEETING AS DISTRIBUTED.**

Steve Kemp, District I, joined the meeting at about 1:35 p.m.

### ***FINANCIAL STATUS REPORT***

Ms. Schroeder reviewed the financial status report for the period ending August 31, 2023. She noted that in the Operations and Research program line, most of the expenses are incurred from March through September.

Mr. Langerud noted that the operations program salaries are at 21%, while we are only 2 months into the biennium. However, we will not have additional expenses over the winter and early spring and this percentage will then come back in line.

## ***REVIEW OF THE 2023 NORTH DAKOTA CLOUD MODIFICATION PROJECT (NDCMP)***

### **Project Overview**

Mr. Schneider reviewed operations of the 2023 NDCMP. He explained the new mission categorization “dual” purpose seeding which includes cloud seeding for hail suppression and rain enhancement at the same time. This change is only for clarification, it is not an operational change.

In response to a question, Mr. Langerud explained that he and Mr. Schneider visit each participating county at a fall or winter meeting to review the project.

Dr. Travnicsek requested the board let DWR know if they have ideas to improve communication. There were a lot of questions and a lot of misinformation passed around during this last legislative session.

In response to a question, Dr. Travnicsek indicated that the DWR has a presence on Facebook.

Mr. Langerud noted though that we do not advertise on that Facebook page when our staff will be at various county commission meetings. These meetings are publicly noticed by these county commissions. ARB staff also meets with all participating weather modification authorities in early February to plan the upcoming project. The authorities will give public notice for these meetings also if they expect to have a quorum present. Finally, our field staff also participate in outreach during the operational program, such as county fair booths and local club presentations.

### **Cost Summary**

Ms. Schroeder reviewed the cost report for the 2023 NDCMP. She explained that the top seeding flight hours expense overage was offset by the reduced need to use base seeding aircraft. She also noted that the budget overrun in building and equipment, utilities, and insurance is largely due to replacement of a vinyl shed for chemical storage with a steel cargo container in Bowman and insurance valuation increases.

In response to a question, Ms. Schroeder didn't recall North Dakota Insurance Reserve Fund (NDIRF) mentioning increasing reinsurance rates. Our rates are billed on an annual basis starting July 1. We did a lot of valuation increases. The biggest portion of our

premium increase was due to being allowed to value our radars at actual replacement cost. Previously, the ND Insurance Department did not allow that when they were administering the State Fire and Tornado Fund.

Mr. Monson noted that he has heard re-insurance rates are increasing by 40% for some. Also, a re-insurer in Wisconsin went out of business. He said to expect insurance costs to increase greatly.

### **Seeding Agent Usage / Inventory**

Mr. Schneider reviewed the ending chemical inventory and usage for the 2023 NDCMP.

In response to a question, Mr. Schneider noted that we ask our staff to mark a flare with a marker when the flares won't light. Then we ask them to try the flare again but in a different position on the flare rack. Only after that, the flares are considered a dud. The manufacturer (Ice Crystal Engineering) is great about standing behind their product and reworking the flares at no additional cost.

In response to a question, Mr. Schneider mentioned that there has been a little bit of supply chain issues. Acetone can really fluctuate in price. We have typically waited out the high prices before purchasing when possible.

In response to a question, Mr. Schneider noted that silver iodide typically doesn't have many issues related to shelf-life. Ammonium iodide does and we try to use it up within 1-2 years. The flare manufacturer encourages using older flares first. We try to keep flares no longer than 3-5 years, when dud issues increase.

### **Generator Performance**

Mr. Schneider reviewed generator performance statistics – a percentage of generator failure versus hours of generator usage. In 2023, generators had a 4.89% failure rate. With base seeders having fewer flight hours in total, it was more difficult to correct the failure rate this year. Our 10-year average generator failure rate is 2.36%. Penalties only apply at a 10% failure rate or greater, which hasn't happened since the early 2000s when the seeding solution formulation had more salts and didn't burn as easily.

### **Intern Programs**

Ms. Schroeder reviewed the internship final report for the 2023 NDCMP. As of the end of the 2023 project, we have trained 407 intern co-pilots and 73 intern meteorologists.

The intern co-pilots worked a total of 2,201.75 hours this year. The intern meteorologists worked 1,350.03 hours this year.

Ground School was held May 24<sup>th</sup> through 26<sup>th</sup> for our summer field staff. We also had guests from Argentina and South Korea during Ground School.

Mr. Schneider encourages the University of North Dakota (UND) to have their meteorology students apply for our internship positions. He is hopeful for next year as he has heard that a couple of meteorologists will be in the Applied Weather Modification class in the spring semester.

### **UND Weather Research and Forecasting (WRF) Numerical Modeling**

Mr. Langerud reviewed the WRF numerical modeling effort agreement which expires at the end of April 2024. This effort supports numerical weather modeling in support of our forecasting operations for the NDCMP. There are also efforts to evaluate the WRF model being developed at UND.

### ***ARB RESEARCH & EVALUATION PROGRAM***

#### **Hail Retrieval Algorithm (HRA)**

Mr. Langerud noted that we rolled the WRF agreement into an assessment that utilizes the WRF model as a component of an evaluation, assessing how cloud seeding is impacting hail. This effort is utilizing an algorithm written by the National Center for Atmospheric Research (NCAR) a few years ago that looks at dual polarization radar signatures and determines the size of hailstones in the clouds being studied (seeded versus unseeded).

Mr. Schneider and Mr. Brothers are preparing the radar data, running it through some processes to get it ready for analysis. Then, UND graduate student, Lynnlee Rosolino, will do the evaluation.

### ***REVIEW OF THE 2023 NORTH DAKOTA CLOUD MODIFICATION PROJECT (NDCMP) continued***

#### **Aircraft Operations & Contractor's Final Report**

Mr. Langerud reviewed his memo to the board regarding liquidated damages recommendations. There were four cases reviewed with one penalty recommended for \$1,689.20.

**IT WAS MOVED BY MR. WANNER AND SECONDED BY DR. TRAVNICEK TO APPROVE THE DIRECTOR'S RECOMMENDATION RELATED TO LIQUIDATED DAMAGES AS PRESENTED. THE MOTION CARRIED UNANIMOUSLY.**

Mr. Fischer briefed the board on operations this summer.

Ms. Schroeder indicated that the digital copy of the final report will be uploaded to our web site after the meeting. Paper copies will be mailed to the board as soon as we receive them.

In response to a question, Mr. Langerud noted that we have good working relationships with the airports and their boards in the field. It has worked well having our King Air at the Watford City location.

In response to a question, Mr. Langerud indicated he wasn't aware of any other aviation impacts to our program. To date, there have also been no conflicts in District I and the Powder River Military Operations Area.

**IT WAS MOVED BY MR. WANNER AND SECONDED BY MS. PFAFF TO ACCEPT THE CONTRACTOR'S FINAL REPORT AND APPROVE THE FINAL CONTRACT PAYMENT. THE MOTION CARRIED UNANIMOUSLY.**

### ***WMI FOG DISPERSAL RESEARCH PERMIT EXEMPTION***

Mr. Fischer reported on WMI's fog dispersal research activities the last couple of years. This winter, WMI is hoping to have some opportunities to do some fog dispersal research using a drone at Ice Crystal Engineering in Kindred, which they have approvals for. However, they expect a larger project the following year in conjunction with UND.

In response to a question, Mr. Fischer indicated that their sample size for the research is very small so far.

### ***ADMINISTRATIVE CODE UPDATES FROM THE PASSAGE OF HOUSE BILL (HB) 1072***

Mrs. Ebach reviewed the passage of HB 1072 from the 2023 legislative session. With this, there were associated impacts in administrative rules. The first change is to section 89-07-02-14 Application for permit, number 13. The text ", as required by North Dakota

Century Code section 61-04.1-35" should be deleted because the referenced section has been removed from Century Code. The second change is to number 15(g)(5), removing the duplicated word "other."

The DWR is updating other chapters of Administrative Code related to bills that passed this past session. Publication will be December 1<sup>st</sup> to start the public hearing and comment process. To include this change inside the larger DWR packet, Mrs. Ebach is requesting this board's approval to move forward with these changes.

**IT WAS MOVED BY DR. TRAVNICEK AND SECONDED BY MR. BURKE TO APPROVE THE PROPOSED CHANGES TO THE NORTH DAKOTA ADMINISTRATIVE CODE SECTION 89-07-02-14. THE MOTION CARRIED UNANIMOUSLY.**

Mrs. Ebach noted that the tentative hearing will be January 29<sup>th</sup> at 1 p.m.

### ***ARB RESEARCH & EVALUATION PROGRAM (continued)***

#### **Hail Retrieval Algorithm (HRA) (continued)**

Mr. Brothers reported that he and Lynnlee feel like they have resolved problems they were having with programming this summer and are now making good progress running the data through the program.

### ***WEATHER RADAR OPERATIONS***

Mr. Langerud briefed the board on operations of the Stanley and Bowman radars.

The Stanley radar was brought back in service in May in preparation for the project and everything worked fine. At some point after that, it took a lightning strike which fried several components. In trying to solve the issue, other components were plugged in without success. A few low-noise amplifiers (LNAs) burned out and the radar was down all summer. The replacement LNAs just arrived in our office. The radar technicians expect to go to Stanley this weekend to test them right away before shutting the system down for the winter. Our field staff was able to continue working without the radar due to a software program that can ingest data from the NEXRAD radars in Deering and Glasgow and the Williams County radar at the Williston airport. However, we were not able to display our flight tracks on the web for public consumption.



Mr. Langerud informed the board that we requested \$1.8 million to replace the Bowman radar with a new system and the legislature granted the funds. The Request For Proposal (RFP) closed October 24<sup>th</sup>. Four proposals were received. Mr. Langerud, Mr. Schneider, and Mr. Theisen will evaluate the proposals. He expects they will have a decision made on which vendor is chosen sometime next week. They will then get the vendor under contract and get an Invitation For Bid (IFB) for a new tower for the radar to sit on. The new radar is expected to be up and running by the end of 2024.

In response to a question, Mr. Langerud noted that we will be using the current radar in Bowman throughout the 2024 operations project.

In response to a question, Mr. Langerud noted that in the future, we may be able to utilize existing infrastructure without running the Stanley radar with software that might become available soon. However, we are not at that point yet.

### ***ARB COOPERATIVE OBSERVER NETWORK (ARBCON) REPORT***

#### **Growing season rainfall totals and grid maps**

Mr. Brothers reported that we have 415 volunteer observers. 158 observers report precipitation online. There are 163 volunteers reporting at least periodic snow depths and, in most cases, daily snowfall reports. Mr. Brothers reported that our precipitation maps are available on our website.

#### **Pushing Remote Sensors (PRESENS) – 2023 site deployment**

Mr. Brothers reviewed the DWR's PRESENS remote sensor suite that was developed by the DWR's Water Appropriations division for groundwater and surface water remote monitoring and has been modified with atmospheric sensors. There are a total of 33 sites with weather monitoring equipment, 19 of which were deployed in 2023. There are close to 500 PRESENS sites statewide. The DWR is currently working on a public facing database interface.

In response to a question, Mr. Langerud noted that the PRESENS system was built internally in partnership with Amber Waves, a company in Richardton, to scale it up for manufacturing.

In response to a question, Mr. Brothers indicated that DWR's Water Appropriations technician crew installs and does maintenance on the sites that he stakes.

Mr. Langerud noted that each of these units can accept up to 12 inputs. So, there is opportunity to add a variety of equipment.

Dr. Travnicek indicated that the DWR has budgeted for additional units and are currently calculating how many to order.

Mr. Theisen discussed possible synergies with other industries.

In response to a question, Dr. Travnicek said that the DWR would be open to accepting cost share funding from counties or others regarding these sites. She will gladly accept any ideas the board has surrounding this.

### ***2024 MEETING SCHEDULE***

Tentative dates for 2024 board meetings were discussed. The spring meeting will be tentatively scheduled for Thursday, April 11<sup>th</sup>. The fall meeting will be tentatively scheduled for Thursday, November 12<sup>th</sup>.

### ***ELECTION OF OFFICERS***

Mr. Theisen called for nominations or volunteers. All current officers agreed to serve again.

**IT WAS MOVED BY MR. WANNER AND SECONDED BY MR. BURKE TO NOMINATE THE EXISTING SLATE OF OFFICERS (MR. THEISEN AS CHAIR; MRS. YULY AS VICE-CHAIR; AND MS. PFAFF AS SECRETARY). THE MOTION CARRIED UNANIMOUSLY.**

Mr. Theisen thanked the officers for being willing to fulfil those roles.

### ***INTERNATIONAL COLLABORATION WITH KOREA METEOROLOGICAL ADMINISTRATION***

Mr. Langerud reviewed collaboration our staff has had recently with the Korea Meteorological Administration (KMA). Five of their staff attended our Ground School in 2023 and three stayed a few extra weeks to observe operations. They then asked Mr. Langerud and Mr. Schneider to come to South Korea for additional collaboration, fully paid for by the KMA.

He discussed their schedule in South Korea and an atmospheric cloud chamber that is 30 cubic meters in size, 2 stories high, that can go down in pressure to 30 millibars. In this cloud chamber, KMA will be doing testing of all types of seeding agents and other

scientific work. The United States has not had a chamber to do this kind of testing since the late 1990s. We may want to have some seeding materials tested there.

Both Mr. Langerud and Mr. Schneider presented information to KMA about our operational program and cloud seeding for enhanced precipitation, in general. KMA views our program as a long-functioning, successful project to learn from. They are hoping to get a Memorandum of Understanding in place to document the future collaboration. Next summer, KMA will be sending PhD level scientists to work with Dr. David Delene at UND and visit our operational program. They also will be sending additional personnel to our Ground School next year and in the field for the first couple of weeks of project.

### ***OTHER BUSINESS***

Mr. Wanner asked if there had been any more efforts to fill the board's vacant seat in District V. Mr. Langerud noted that they had a couple of potential board members, but they all fell through. We have no one else we know in the area. Because there are no weather modification authorities in that area, the Governor can appoint anyone who lives in the area.

In response to a question, Mr. Langerud indicated that the makeup of the board has been set in North Dakota Century Code since its inception in 1976.

In response to a question, Mr. Langerud indicated that there has not been analysis of the board setup to see if it is the best structure for today. Dr. Travnicsek indicated she has thought about that as well as what other states are doing. Mr. Wanner indicated that he feels this is worth discussing and making recommendations to the legislature. He would be interested to see what the original intent was when the board was created. Mr. Theisen agrees that this is something that should be considered and potentially be an agenda item for the spring meeting. He would like to see information on how the board was set up and what it may take to make a change and what changes are recommended. Dr. Travnicsek indicated that the agency will look into this and hire out if needed.

Mr. Langerud introduced our new board member, Steve Kemp, representing District I.

**IT WAS MOVED BY DR. TRAVENICEK, SECONDED BY MR. WANNER, AND CARRIED ON A VOICE VOTE TO ADJOURN THE MEETING.** Being no further business, the meeting adjourned at approximately 3:41 p.m.

---

CHRIS THEISEN  
CHAIRMAN

---

REBEKAH PFAFF  
SECRETARY

Transcribed by Kelli Schroeder

**ATMOSPHERIC RESOURCE BOARD  
PROJECT BUDGET EXPENDITURES  
FOR THE PERIOD ENDED MARCH 31, 2024  
BIENNIUM TIME: 38%**

	SALARIES & WAGES 77010	OPERATING EXPENSES 77030	CAPITAL ASSETS 77050	GRANTS 77063	PROGRAM TOTALS
--	------------------------------	--------------------------------	-------------------------	-----------------	-------------------

**ADMINISTRATION (7500) - \$1,064,081.00** Project: WA75023

Budget *	988,274.00	75,807.00	-	-	1,064,081.00
Expended	392,242.73	17,685.70	-	-	409,928.43
Percent	40%	23%	0%	0%	39%

**OPERATIONS & RESEARCH (7600) - \$7,019,850.00** Projects: WA62023, WA62024, WA62025,  
WA68023, WA68024, WA68025, & WA69998

Budget	240,724.00	571,100.00	1,845,000.00	4,363,026.00	7,019,850.00
Expended	53,676.69	75,978.63	-	451,891.95	581,547.27
Percent	22%	13%	0%	10%	8%

<b>BUDGET *</b>	1,228,998.00	646,907.00	1,845,000.00	4,363,026.00	8,083,931.00
<b>EXPENDED</b>	445,919.42	93,664.33	-	451,891.95	991,475.70
<b>PERCENT</b>	36%	14%	0%	10%	12%

FUNDING SOURCE:	APPROPRIATION	EXPENDITURES	BALANCE	PERCENT
General Funds	-	-	-	0%
Resource Trust Funds *	4,240,155.00	507,409.61	3,732,745.39	12%
County Funds	2,343,776.00	484,066.09	1,859,709.91	21%
Federal Funds	1,500,000.00	-	1,500,000.00	0%
<b>TOTAL FUNDS: *</b>	<b>8,083,931.00</b>	<b>991,475.70</b>	<b>7,092,455.30</b>	<b>12%</b>

\* NOTE: FTE and board salary budget is shown under ARB Administration (7500) here for tracking purposes; but, it is held agency-wide under the DWR Administration Division. Actual ARB division appropriation budget total is \$7,095,657.

REVENUE:	
General Funds	100.00
County Funds	175,696.03
Resources Trust Funds	-
Federal Funds	-
<b>TOTAL</b>	<b>175,796.03</b>

**Subject:** Weather Mod  
**Date:** Monday, March 4, 2024 at 1:54:02 PM Central Standard Time  
**From:** Damon Mellmer  
**To:** dlangerud@nd.gov  
**Attachments:** Weather Mod.docx

You don't often get email from [damon\\_mellmer97@hotmail.com](mailto:damon_mellmer97@hotmail.com). [Learn why this is important](#)

\*\*\*\*\* **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. \*\*\*\*\*

LET US HAVE A VOICE. Admittedly, weather mod has effects on weather downwind. So surrounding downwind counties cannot vote for government programs that are directly affecting our livelihoods? WE DESERVE A VOICE. IT IS OUR WEATHER.

Thank you for letting me speak today.

Hello, my name is Damon Mellmer. I am a farmer in Adams County, North Dakota. I am writing this testimony in favor of HB1166.

Before I get into the bill, I am going to write about the reasons I am against weather modification, especially in Bowman County. For the previous years, I have continued to watch Bowman County seed storms consistently all summer long. I do not care what the ridiculous, fairytale studies the weather modification board has posted on their website says, I watch storm after storm disappear. I do not have to go onto the radar and see when or if the planes go up. I simply look into the sky and see the storm splitting and disappearing. I know the planes are seeding, but I check the radar just to be sure. Imagine that, every time I see the storm splitting, the planes are flying. The amount of anger and frustration I see from not only myself, but my fellow farming/ranching neighbors is absolutely sickening. How can we be allowing the government to control our weather and take away our storms? We sit here completely helpless. There is nothing we can do about it. I personally invite each of you to make the drive to Reeder, ND this summer before a storm. We can stand in my driveway and observe the effects of weather modification. Only then do I truly believe you will listen to me. I will even provide you with a home-cooked meal. This may come off as a joke. It is absolutely not. I mean this with 100% sincerity. Please come see for yourselves.

Next, I would like you to look at the hail claims in Bowman and Adams County for crop insurance the past 4 years, especially 3 & 4 years ago. If hail suppression is their claim, how is it possible I lost 4,500 acres of cropland 3 years ago? Not only were we in an awful drought (with some blame easily and definitively put on the weather modification program taking away moisture through cloud seeding), I then have to deal with losing thousands of acres of cropland. So not only do they kill rain clouds, they obviously can't suppress hail either. Why are we wasting millions of dollars for this absolute pathetic program? By the way, I farm 6 miles downwind from the Bowman County line. I am 6 miles from where they stop seeding. That doesn't stop them though. I have proof through the radar as well as my own eyes that have seeded 5 miles into Adams County.

They say they have all this data proving the positive effects of weather mod. Seriously? Who can believe this hoax? What are they comparing it to? They have seeded storms for the last 50 years. Without having data of no weather modification in Bowman County the last 50 years, this simply is a lie. Why do we not stop weather modification for the next 10 years? We then can have some actual data to compare weather mod's positive and negative effects. I assure you that weather modification would be no more. That is why this will never happen. Speaking of weather modification being no more, let's ask this million dollar question. Out of all of the counties in ND that have voted out weather mod, how come it has NEVER been voted back in? Common sense tells us the correct answer. The cons outweigh the pros. It simply is not effective. It causes more harm than good. If it was as good and amazing as they claim to be, these counties would have voted it back in by now. Also, why is someone trying to control our

weather? If I am supposed to get hail, I am going to get hail. If I am supposed to be in a drought, let me be in a drought. LEAVE the weather alone. Do not try to play "God" and control something you have no business trying to control. We are sick of being controlled.

I would also like to point out the fact that silver iodide is being dispersed into these clouds. I want to ask the question of what are the effects of silver iodide on humans? On animals? On land? Do we know? Has this been studied? If so, I cannot find it. We do not know what harm these chemicals can cause. That alone should be illegal.

Now let's get into this bill. First of all, they have admitted that weather modification affects weather downwind. Downwind of Bowman County is Adams County. So what Bowman County does affects my weather, and I have absolutely zero say in this. WE SHOULD BE ABLE TO VOTE ON SOMETHING THAT DIRECTLY AFFECTS OUR LIVELIHOODS. This is absolutely criminal that we (the people of Adams County) cannot vote on continuing or stopping weather mod since it affects our weather, our families, our jobs, and our livelihoods. This needs to be fixed ASAP. We should have a voice and vote on this topic. Since we cannot vote on this, why should Bowman County get to use ND taxpayer money to continue weather modification when no one else can vote for this? This is completely wrong. They can use their own money to fund this joke of a program. They can waste their own money.

I like the fact that this bill would make them stop spraying on the last township line. This will ensure that they do not come into my county and continue to spray (which they have done countless times before.) This is just common sense.

Lastly, I am going to finish with some proof from a Facebook post I made on July 2, 2017. (See attached photo).

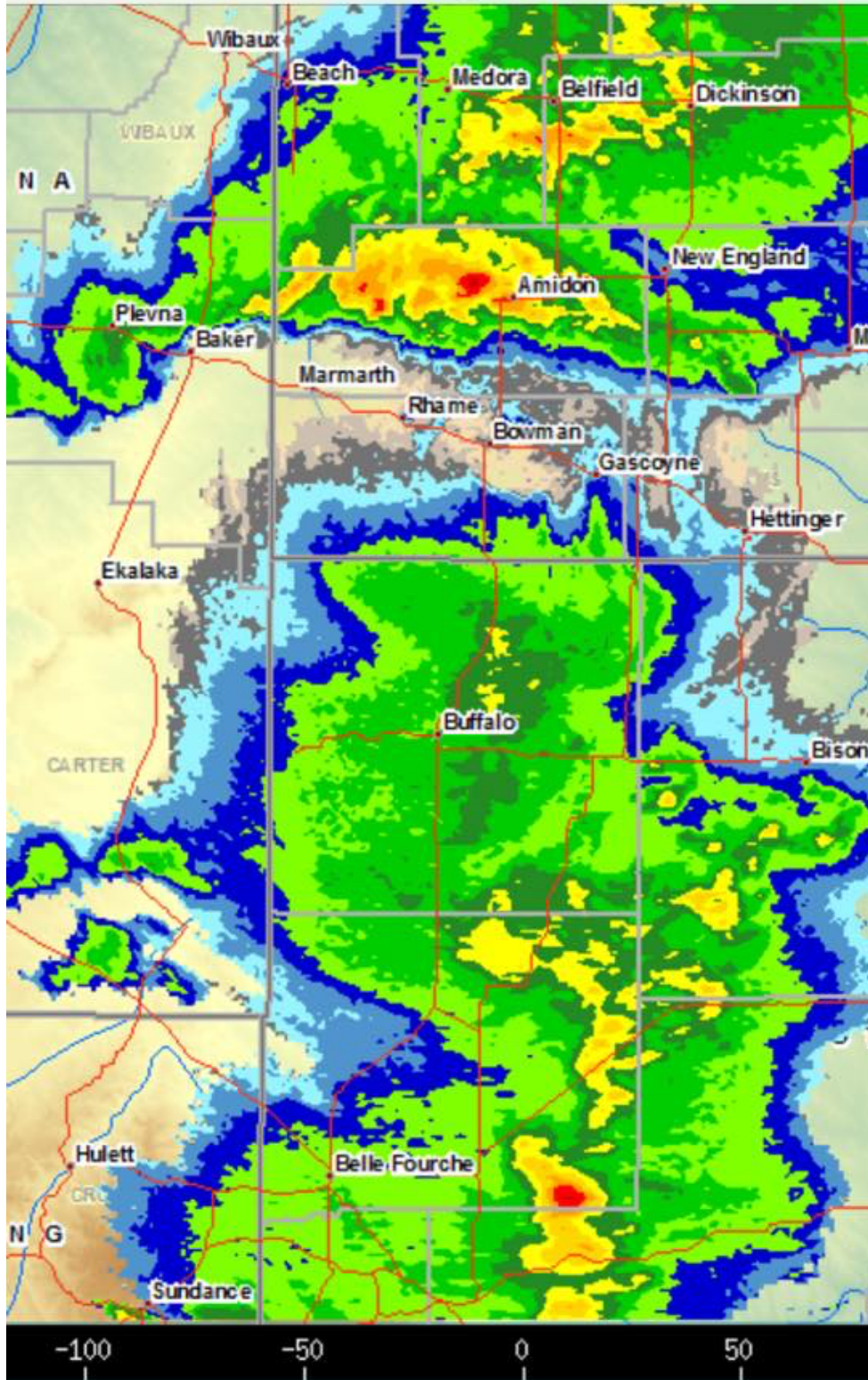
This is a picture of the storm that came across our area today. Before the storm hit Marmarth, the storm was seeded repeatedly north and south. The effects of this are pretty obvious as the storm completely split around us. If you doubt it, watch the radar yourself. The drought we are in is terrible and dangerous, not only for the agriculturalists, but for everyone in the area. Something needs to change.





9:34 PM  
swc.nd.gov

35%



PM

Loop Length (hours):

**Subject:** (none)

**Date:** Monday, March 11, 2024 at 10:12:32 AM Central Daylight Time

**From:** Audrey Skogen

**To:** kjschroe@nd.gov

You don't often get email from [audreyskogen@gmail.com](mailto:audreyskogen@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

I live in Adams County and have seen the negative impact of weather modification. I would like to see this program cease on every level.



Dear Director of ND Atmospheric Research Board,

Thank you for giving residents of surrounding counties the opportunity to express our thoughts concerning the cloud seeding in Bowman Co.

I am a resident, landowner, farmer in Northwest Perkins, Harding Co. SD. The cloud seeding affects our livelihoods, and not in a positive way. We depend on moisture and when a system we watch coming gets dispersed because of cloud seeding, there goes our much needed moisture. When we get a system from the SW it is a blessing to see it come before it hits Bowman Co. Please consider the others that are affected by your cloud seeding. It isn't a positive outcome for those outside of county who depend on those clouds.

Sincerely  
Barb Johnson

RECEIVED

MAR 28 2024

ND DEPT. OF WATER RESOURCES



Baub Johnson  
10381 156<sup>th</sup> Ave  
Hettinger, ND 58639

RECEIVED

MAR 28 2024

ND DEPT. OF WATER RESOURCES

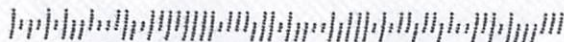
BISMARCK ND 585

26 MAR 2024 PM 1 L



Director, ND Atmospheric Research Board  
1200 Memorial Hwy  
Bismarck, ND 58504-5262

58504-526200



**Subject:** cloud seeding

**Date:** Tuesday, March 19, 2024 at 12:23:31 PM Central Daylight Time

**From:** Eric Andress

**To:** dlangerud@nd.gov

You don't often get email from [ericpandress@gmail.com](mailto:ericpandress@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

I am writing this letter in opposition to cloud seeding. I will keep it simple and brief. My family business, Grand River Honey Co., has been in business for 50 years as of 2024. We have bees located in Perkins County South Dakota and Adams County North Dakota. I remember watching thunderstorms build to the west and northwest of us and as they came it meant we would get the rains needed to get through the summers. Most of our rainfall in the summer is in the form of thunderstorms, not all day rains like in the spring. As the cloud seeding project went underway it diminished these essential thunderstorms in our area. As we see them build and the planes are sent up you can watch them disintegrate and leave us dry. I believe the altering of the weather is robbing our area of the moisture that our crops need. I believe that we have to quit trying to alter nature for the benefit of the insurance industry. That's essentially what this program does is try to get the moisture out of the air before it turns to hail but it also removes our only source of moisture in the summer. I also believe it is a huge burden on our local area fire departments. After the seeding we often see lightning without the rains causing grass fires. I would like to thank you for your time in reading this and would like to see your support in ending the program and let nature do its job.

Thanks,  
Eric Andress  
Grand River Honey Co.  
Hettinger, ND  
701-567-3439

**Subject:** NO to Modify Weather

**Date:** Tuesday, March 12, 2024 at 10:23:39 AM Central Daylight Time

**From:** Grant Miller

**To:** dlangerud@nd.gov, stmiller@ndsupernet.com

You don't often get email from [grant.miller32@gmail.com](mailto:grant.miller32@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Mr. Langerud,

Please quit trying to modify the weather in the SW corner in North Dakota. We Farm in neighboring Adams county east of Bowman County where the planes are stationed and participate in the cloud seeding project going on 50 years now?

I can attest to being in drought conditions in the early 2000's for a number of years, and the practice of cloud seeding was still in full effect. I would watch in desperation of much needed rain split before my eyes, keep us dry, and go further east to only cause more rain away from our operation or severe storms in the form of hail that cloud seeders were trying to suppress.

I also remember going to Bowman county on a field trip in Physics class with Mrs. Howe, and listening to the pilots and their job to increase rain and decrease hail. I understand the theory behind it, however; it seems to be more hit and miss for actual needed precipitation coming directly west to east for us neighboring counties. However, the storm that was seeded did its typical pattern, give us lightning, wind, no rain; only to go hail in Bismarck August 2004. How can the state continually fund this program if it causes issues like this?

The moisture we receive that is not compromised by cloud seeding comes from the south or more northerly patterns where the planes do not access the clouds to seed. We receive plenty of moisture WITH OUT this program. Seeding more chemicals in the air to produce more rain and decrease hail seems to be a compromising issue with environmentalists these days? How can we say this is a safe practice any more with environmentalists now going after farmers using roundup on crops while the seeding program is broadcast over one county but can affect multiple counties in any direction from application?

Anyone in agriculture or ranching east of these cloud seeding applications are against all of these practices, and would rather take whatever comes from nature in the form of rainfall. Please consider everyone east in the state of ND or NW SD of these actions in Bowman County.

Thank you,

Grant Miller  
Miller Farm and Ranch  
Hettinger ND



**Subject:** Weather Modification

**Date:** Tuesday, March 19, 2024 at 3:06:25 PM Central Daylight Time

**From:** dkknudson@ndsupernet.com

**To:** dlangerud@nd.gov

You don't often get email from [dkknudson@ndsupernet.com](mailto:dkknudson@ndsupernet.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Director North Dakota Atmospheric Resource Board,

I am definitely NOT in favor of weather modification in the Bowman Slope county area. It affects Adams county and the surrounding areas negatively. We have watched the clouds come up and the planes go up and dissipate the moisture in them and then the clouds come back together east of us and they get rain and we get left out again. This happens time after time. This observation has occurred many times over many summer seasons.

ALL scientific studies have shown NO benefits from messing with the weather and hail suppression is only a supposed benefit to sell the program.

All moneys should be suspended from this project. It does not serve the people of North or South Dakota; it only harms them overall.

Thank You

Kathleen and Dwight Knudson

210 Lakeview Dr

Hettinger, North Dakota 58639



**Subject:** Weather modification  
**Date:** Friday, March 8, 2024 at 10:03:23 AM Central Standard Time  
**From:** Gary Burkhardsmeyer  
**To:** dlangerud@ND.gov  
**CC:** Gary Burkhardsmeyer

You don't often get email from [gary@rusticwoodcreations.org](mailto:gary@rusticwoodcreations.org). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Please let it be known that we are against the weather modification project, aka cloud seeding in SW North Dakota for the dates of January 1<sup>st</sup> – August 31<sup>st</sup> 2024 with the possibility of extending this activity through October 2<sup>nd</sup>. as this creates harm from the activities of this project. We would like to see this project completely discontinued.

Gary and Gerri Burkhardsmeyer

**Subject:** Seeding the clouds  
**Date:** Friday, March 1, 2024 at 12:53:52 PM Central Standard Time  
**From:** Rod Cockeram  
**To:** dlangerud@nd.gov

You don't often get email from [rockeram@scullconst.com](mailto:rockeram@scullconst.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

My name is Rodney Cockeram and am writing this in response to what you people are doing to the environment, environmentalist have done more harm and damage to the environment than any natural occurrence in the history of mankind, you people are playing god and I am not ok with that, every time you people come up with what you think is a good idea, all you do is screw thing up more and require nature to try and compensate for what you moron are doing. Weather is nature and when people like you try to change it, it affect every living creature in the affected area, stop all of this crap with the Bill Gates junk, he is NOT A SCIENTIST AND HAS ZERO BUISSNESS BEING INVOLVED IN ANY OF THIS. Everything you people do has a side affect being it humans, animals, insects, water, plants etc. so stop this now as I am totally against any and all of you people trying to play god.

Rodney Cockeram  
(503)490-5020  
[rockeram@yahoo.com](mailto:rockeram@yahoo.com)

**Subject:** Cloud seeding

**Date:** Saturday, March 16, 2024 at 1:28:14 PM Central Daylight Time

**From:** Willie Tenold

**To:** dlangerud@nd.gov

[You don't often get email from [wtenold@sdplains.com](mailto:wtenold@sdplains.com). Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification> ]

\*\*\*\*\* CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. \*\*\*\*\*

I am Venoy Tenold from Harding County, South Dakota. I live in eastern Harding county near Reva. Cloud seeding has changed our county rainfall. We used to get more rain on the east side of the county but that has all changed so the western part of the county consistently has sometimes twice as much rain as we get. The prevailing winds from the northwest have done this. When Bowman seeds the clouds it provides more molecules for rain to develop thus pushing the rain farther east. Our clouds disappear as well as the clouds around Hettinger, North Dakota. If you are on the ground watching the clouds when a storm is developing you notice this. It however does not stop hail just pushes it east. Ask the residents of Hettinger! This experiment has gone on much too long! Between the decreased rainfall and the grasshopper problems we have dealt with over the last few years we are returning to the Dirty Thirties.

Venoy Tenold  
15098 S.D. Hwy 20  
Reva, S.D. 57651

Sent from my iPad

**Subject:** Weather Modification Concerns

**Date:** Tuesday, March 5, 2024 at 1:53:49 PM Central Standard Time

**From:** Cameron Wahlstrom

**To:** dlangerud@nd.gov

You don't often get email from [cwahlstrom2020@gmail.com](mailto:cwahlstrom2020@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

To whom it may concern,

My name is Cameron Wahlstrom, I am a farmer and resident of Alexander, in McKenzie County. I am writing this email with concerns about cloud seeding/weather modification. Over the years I have personally witnessed when rain storms are coming my direction from Montana and as soon as those storms get to the Montana/North Dakota border, the planes are up in the air trying to modify precipitation and reduce potential hail. From what I am witnessing, it is causing a negative benefit for my area to receive moisture. Almost every time a plane goes up for modification it is causing the storm to deplete or split right over my area resulting in little to no moisture. Consistently rain amounts have been higher on the montana side, then deplete over me, to increase again on the east side of highway 85, when the storms build back up. These rain amounts are documented thru the NDAWN weather stations system. This is having a negative effect on my crops, the natural vegetation, and my personal way of life to provide a living for my family. As other areas of the state have discontinued weather modification, it has made it so that weather modification is getting concentrated in my area and the natural weather pattern has less and less of a chance to unfold how it is naturally suppose to unfold. As time goes on it is leading to a continued reduction in subsoil moisture do to the fact it is raining less and there is less moisture to replenish the ground moisture. I am not the only one witnessing this, as most people along the North Dakota/Montana border to about highway 85 are witnessing these same results. This program needs to be brought to an end so that nature can unfold as it is intended to do so. Until there is concrete evidence that weather modification is providing a benefit to all areas, this needs to come to an end. The only way to prove it is actually working is to take a certain period of time off, preferably up to 3 years, so that we can actually see how the climate/weather patterns change. I have read your research, it is only based off theories and old research/data. Therefore it cannot be proven today that it is a net benefit to those right underneath where the planes are flying and releasing chemicals into the clouds. So I ask that there is more consideration into the harm it is causing the individuals right along the border and that this program be halted.

Sincerely,

Cameron Wahlstrom  
14632 35th ST NW  
Alexander, ND 58831  
701-770-6631

**Subject:** In response to notice about weather modification.  
**Date:** Monday, March 4, 2024 at 3:14:27 PM Central Standard Time  
**From:** Jay Transtrom  
**To:** dlangerud@nd.gov

You don't often get email from [jay.transtrom@gmail.com](mailto:jay.transtrom@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

I think that our weather modification efforts have been negatively effecting our moisture levels for many years.  
I live south of Arnegard and I'm opposed to weather modification.  
Thanks Jay T

**Subject:** cloud seeding observation

**Date:** Tuesday, March 5, 2024 at 3:05:52 PM Central Standard Time

**From:** Jim Jeske

**To:** dlangerud@nd.gov

You don't often get email from [nodak\\_jim06@yahoo.com](mailto:nodak_jim06@yahoo.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Hi there,

I am writing today in regards to the weather modification efforts in Mckenzie county. This last summer I paid very close attention to the weather and the weather modification efforts in Mckenzie county. What I noticed is multiple instances of the planes attacking weather systems that showed little to no risk of hail. I have multiple screen shots of this on my phone and it distinctly shows these storms fizzle out soon after the planes hit them. There were a few instances of strong storms that did show hail potential that were addressed as well but they were very few compared to the times the planes hit weak storms that were more than likely just rain events.

I would like to see weather modification completely eliminated but at the very minimum I would suggest changing policy to only confront storms that are distinctly hail warned.

I can send pictures that I saved but there are many.

Thank you

Jimmy Jeske  
Mckenzie county resident.

**Subject:** Intended modification of precipitation

**Date:** Monday, March 11, 2024 at 8:22:27 AM Central Daylight Time

**From:** Saul Mercado

**To:** dlangerud@nd.gov

You don't often get email from [saul\\_g\\_mercado88@yahoo.com](mailto:saul_g_mercado88@yahoo.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Hello,

I am contacting in regards to cloud seeding in mountrail county, ND. I myself farm in this and other adjacent counties. I would love for nothing but rain however, these means and methods do not outweigh the health risks associated with seeding. My family including myself do not need anymore exposure to unhealthy chemicals due to seeding. What goes up in the air must come down. With wind directions consistently changing in this area I do not see the benefits. I understand you would like to reduce hail damage, prevent drought ect. No matter how you try to manipulate weather mother nature will win in the end. Let it take its own course. The money we are trying to save insurance companies is far less important than health risks from this. Those responsible should be held accountable for negatively impacting my families health, as that should be the highest priority for the state of ND instead of money saved from loss or higher yields for farmers like myself. I am interested in the data for: application rates, chemical mix ratio, frequency, accurate coverage areas, dates, and durations for each application. How do i get the history for what areas have been seeded in the past?

Thanks,

[Sent from Yahoo Mail on Android](#)

**Subject:** 2024 June through August possible extension through October. Cloud seeding/reduction

**Date:** Thursday, March 7, 2024 at 12:25:45 PM Central Standard Time

**From:** Rose Summers

**To:** dlangerud@nd.gov

You don't often get email from [haburnr@gmail.com](mailto:haburnr@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Director Langerud.

I live in Mckenzie County.

One of the counties with the cloud seeding/reduction programs.

The nanoparticles of silver iodide has been detrimental to my health. The cumulative effects on the eco system are starting to effect native grasslands, plants and trees.

I vote to stop the cloud seeding/reduction program in Mckenzie County.

Thank you.

Kind Regards

Rose Summers



**Subject:** Weather modification

**Date:** Monday, March 4, 2024 at 1:45:49 PM Central Standard Time

**From:** Paige Uran

**To:** dlangerud@nd.gov

You don't often get email from [paigeuran@gmail.com](mailto:paigeuran@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Good afternoon!

I am writing in regards to the weather modification that continues to happen in Mountrail county. It is infuriating to watch weather patterns disrupted by those who think they have the authority to play God. It is harming our way of life as we watch beneficial rainfall for our pastures, hay land and farmland be broken up. It is a waste of taxpayer money as it is not a beneficial program for all involved.

We are strongly against the program and wish it to be ended as soon as possible.

Paige and Brian Uran  
Ross ND

Hello,

My name is Amy Dennis and I am a resident of Mountrail County.

First of all, thank you so much for allowing the public to be able to contact you regarding how we feel about Weather Modification practices. I appreciate you taking the time to read this and to have the opportunity to voice my concerns.

\*Regarding precipitation:

- no county has seen an increase in precipitation in the 40 years in the program
- 25 years or so PRIOR to entering the program, the average rainfall was higher (for June, July and August)
- Western ND is not wetter overall.
- if you attempt reducing hail by 40%, you reduce rain by 30% (1/3 on average)
- places like Kansas have hail that TOWERS ours in size, yet, they have ended their programs and haven't turned back
- there are studies showing (and can be found on the State Water Commission's website) hail suppression WEAKENS storms, causes less intense rainfall AND can cause a storm to rain out earlier than the storm is 'ready' for
- there is no proof rain lasts longer or seeding clouds increases updrafts
- Another problem is the excessive number of flights. There are real world (not studies or numbers based on hypotheticals) statistics showing there has been no significant increase in our rainfall in the last 50 years. Instead of just focusing on hail suppression which would mean flying ONLY when there is a severe forecast with clouds likely to bring hail, every little cloud we see gets seeded. That is when the project becomes excessive and out of control. That is when Weather Modification loses its purpose as something for good. The excessive nature of the project creates an atmosphere rife with overspending, questionable benefits, cronyism and harm.

\*Regarding livelihood and well-being

- In hail suppression, it's great that very little silver iodide is used but in areas where cloud seeding was previously performed, residents claim they had MORE hail storms WITH weather modification than without
- though, yes, little silver iodide is used in seeding, every drop of precipitation that falls when Weather Modification is in practice contains silver iodide. Are you convinced that's safe?
- many of us farmers oppose Weather Modification. We pay high premiums for hail insurance protection every year and every year we have hail losses. Neighboring counties who do NOT modify the weather report fewer crop hail losses than we do.
- I would argue the amount of revenue lost in at least Mountrail County from an agronomic standpoint due to the overall drought conditions in Western North Dakota in just the past 5 years FAR surpasses what appears to be 'cheap' insurance that is harming us instead.
- Government funded studies quoted by proponents of weather mod. claim over 30 to 1 economic returns from weather modification. This claim has not and cannot be proven. If real world data supported the claim, everybody would be bringing it home...but they're not, because the studies they quote are based on hypothetical data gleaned from hypothetical scenarios. We cannot accurately measure the results of hypotheticals and scientifically apply them to real world data.

-If funding everywhere is so tight, and we know it is, why would we continue to fund a project like Weather Modification that sounds good in theory but has no real-world proof? It is a cold, hard fact we need the money for roads, parks, law enforcement, county extension services, social services and property tax relief, etc.

If this program was doing what its proponents claim, we'd all support it. Ward County recently ended their program by a 9-1 margin. Why are counties leaving the program and not coming back to it?

Thank you for taking time to read this. I appreciate it so, so much.

Amy Dennis  
Stanley, North Dakota

**Subject:** Weather modification  
**Date:** Saturday, March 16, 2024 at 8:57:33 PM Central Daylight Time  
**From:** Camie Anderson  
**To:** dlangerud@nd.gov

You don't often get email from [andersoncamie@hotmail.com](mailto:andersoncamie@hotmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

To whom it may concern,

I'm writing to talk about something that's been on my mind lately: weather modification. I live in Mountrail County. Actually 6 miles straight south of the Stanley airport. Weather modification is a topic that's been getting a lot of attention, and for good reason. While it might sound like a good idea to control the weather, there are some serious downsides we need to think about.

First off, messing with the weather can have some unintended consequences. Things like cloud seeding or geoengineering might seem harmless, but they can actually disrupt the natural balance of ecosystems. That means plants and animals could be affected, and not in a good way.

Another thing to think about is fairness. Not everyone benefits from weather modification equally. Some communities might get all the perks while others are left dealing with the negative side effects. That's not really fair, is it?

Plus, if we start relying too much on weather modification, we might end up ignoring other solutions. We need to be looking at the big picture and finding ways to tackle the problem that don't cause more harm in the long run.

So, let's take a step back and think about the consequences. We need to make sure we're doing what's best for everyone, not just a select few.

Thank you for your time,

Camie Anderson  
8172 56th ST NW  
Stanley, ND 58784  
701-629-5592  
[andersoncamie@hotmail.com](mailto:andersoncamie@hotmail.com)

Sent from my Verizon, Samsung Galaxy smartphone  
Get [Outlook for Android](#)

**Subject:** FW: Weather modification

**Date:** Thursday, February 22, 2024 at 8:50:16 AM Central Standard Time

**From:** Langerud, Darin W.

**To:** Schroeder, Kelli J.

First public comment.

---

**From:** Mary Lou <[mldennis3@gmail.com](mailto:mldennis3@gmail.com)>

**Date:** Wednesday, February 21, 2024 at 1:47 PM

**To:** Langerud, Darin W. <[dlangerud@nd.gov](mailto:dlangerud@nd.gov)>

**Subject:** Weather modification

You don't often get email from [mldennis3@gmail.com](mailto:mldennis3@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Good afternoon,

I am requesting that the chemicals not be sprayed in the clouds that affect the northwestern side of Mountrail County. (my wish is that it would not be sprayed anywhere) I believe this spray is having adverse effects on my eyes and in my lungs. Please stop.

Thank you,

Mary Dennis

6989 84<sup>th</sup> Ave NW

Stanley, ND 58784

**Subject:** Weather modification

**Date:** Monday, March 4, 2024 at 10:55:42 AM Central Standard Time

**From:** Rondee Hanna

**To:** dlangerud@nd.gov

[You don't often get email from [llazyh@ruggedwest.com](mailto:llazyh@ruggedwest.com). Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification> ]

\*\*\*\*\* CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. \*\*\*\*\*

Hi,

I DO NOT believe that weather modification is necessary in any county in North Dakota. We are residents of McKenzie County. I believe it is unhealthy and we should NOT be modifying the weather which is a part of God's creatoon!

Kelly and Rondee Hanna

Sent from my iPhone

**Subject:** Regards to McKenzie County weather modification.  
**Date:** Monday, March 4, 2024 at 7:06:36 PM Central Standard Time  
**From:** mairide12  
**To:** dlangerud@nd.gov

You don't often get email from [mairide12@yahoo.com](mailto:mairide12@yahoo.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Good evening, this letter is in regards to a public notice that has been recieved amongst the residents of McKenzie County, and the weather modification plan for the year of 2024 in the spoken county.

Myself, as well as several persons, have severe concerns, and disagreements in the operations of weather modification in this county.

As known, the past several years in this county, have been abnormally dry. Several years ago, this dry weather caused the North Unit of our park to burn, not only putting lives at risk, but also polluting our town with the smoke, ash, and taking away one of our very few outdoor resources for the summer.

We can not point fingers at the weather patterns for this event, or past events, nor can we point fingers at the modification of weather being an under-lying cause to the events. As we can not give any gaurentees that it's your fault, you can not conclusively say that your research and program does not have an impact either.

You may argue the points, but my question is this. If you are 100% positive of your abilities, why are the residents of the county not given breaks on insurance just as those on hills pay less for flood coverage?

I was once a citizen of Bowman County as well, back in around 2005. I spoke with the pilots that piloted the program there as well. A question I must ask is, why all of the PPE when handling the substances loaded into your planes? If it's not harmful to anything living, why must they be so cautious around the stuff?

Aluminum in small quantities is normal, what's not normal is what has happened to the peak of Mt Shasta, in the wake of weather modification programs.

Your programs intent is to change mother nature's natural cycle, which is uncalled for. Hail damage happens, that's why people carry insurance on homes, vehicles, and crops. What is not covered by our insurance policies are the ever-long lasting effects of the toxic chemicals which you rain down on us all summer long. What our insurance doesn't cover, is our once lush green gardens, drying out and being destroyed by your program. My home owners insurance does not cover my land, my trees, or my garden which feeds my daughter and I. I do not have a government subsidized food plot that cuts a check if it fails do to drought.

You have had many years to prove your effects to the land, yet statistics are never given to the residents. Just as the tax payers are required to report to the government every year, YOUR COMPANY should be required to letter every resident of the effected counties, and include soil sample testing, water testing, and success rates of your program. Instead, it's kept quiet, residents are unaware it even happens, and it's our taxes that fun it.

This program needs to be 100% open and transparent to those which it has a direct effect on! It's time we get the truth, and have our concerns answered!

Regards,  
Mike Mai

Sent from my Verizon, Samsung Galaxy smartphone



**Subject:** Weather modification  
**Date:** Tuesday, March 26, 2024 at 3:58:38 PM Central Daylight Time  
**From:** Doug Stangeland  
**To:** dlangerud@nd.gov  
**Attachments:** Missouri Ridge Township Annual Meeting March 20, 2024.pdf

You don't often get email from [stangelandfarmdranch@yahoo.com](mailto:stangelandfarmdranch@yahoo.com). [Learn why this is important](#)

\*\*\*\*\* **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. \*\*\*\*\*

The Missouri Ridge Township has voted at their annual meeting that they do not support weather modification in their township.

Michelle Stangeland  
Missouri Ridge Township  
Treasurer

---

1. Call to order at 6:08 PM

A. Mark absent

2. Pledge of allegiance.

3. Michelle—Reading of the minutes.

A. Approval of the minutes. Bryce votes, Ben seconds, no dissent

4. Treasurers report:

A. \$410,289.57 Checking Account

B. \$45,920.33

C. Bills to be approved

a. Prosafe (\$325)

b. Eide Bailly (\$450)

c. Bryce's Credit Card Reimbursement for post box (\$176)

d. Marquis Metal Invoice—to be resent for approval at the next meeting.

e. Bryce Motions to approve, Kyle second. It was approved to pay bills.

f. Ben will receive a paycheck of \$1847 (Other board members will not)

D. Old Business

a. None

E. New Business

a. Audit Report (Michelle)

1. Michelle explains audit report

b. Township Budget (Michelle)

---

1. Audit report.

A. Do not approve budget of 2023 due to open investigation.

a. Ben motions, Daniel 2nd, approval (no dissent)

b. Roll Call Vote:

c. Daniel Yes

d. Ben Yes

e. Kyle Yes

f. Bryce Yes

2. Discuss loan—interest in 1.75%

c. Williston Ambulance Fees

1. Currently paying \$1390

2. New bill for 2025 is \$15,650.

3. Meeting set for April 3, 2024 @ 7 PM for townships boards.

4. Bryce reads the entire email.

5. Tax equalization meeting is April 2, 2024 (Must be advertised at least 10 days prior)

6. Will have meeting about ambulance issue in May, 2024 @ monthly meeting.

d. Board will approve to advertise in paper twice—

1. Ben motions, Daniel second, Board approves (no dissent)

e. Bid approvals

1. Two bids received.

A. JTI

B. Marquis Metal

C. Received two bids for dust control.

a. JMAC

b. Storbakken

D. Bryce motions to elect Marquis Metals as the primary Township Road company

a. Bryce reads both bids.

1. Bryce Motions, Kyle Seconds, Board approves.

b. Kyle reads bids for dust control

1. Board is not ready to vote on this yet

E. Elections

a. Daniel nominates Kent Ralph

b. Kyle nominates Ben Marquis

c. Kaylee Turner Nominates Bryce

d. Angela Black nominates Kaylie Castillo

e. Kathy calls for cease

f. Votes recieved

1. Bryce— 19 (3 yr term)

2. Ben— 17 (3 yr term)

3. Kaylie— 13 (2 yr term)

4. Kent— 11 (DQ)

g. Nomination for Clerk

h. Josh Feil close nomination

1. Tracy Ralph (Board Votes all in favor)

i. Michelle will remain treasurer (appointed by Tracy)

F. New EIN Number

2. Doug S. Discusses Weather Modification (cloud seeding)

A. Discussion

B. Ben makes motion to abolish Weather Modification in MRT

C. Bryce Seconds

D. Votes carries (no dissent)

3. Ben will remain chairman for 2024.

f. Motion to adjourn (8:30 PM)

1. Ben, Bryce Seconds.

**Subject:** (none)

**Date:** Wednesday, March 6, 2024 at 10:55:43 PM Central Standard Time

**From:** b g

**To:** dlangerud@nd.gov

You don't often get email from [bgaraas48@gmail.com](mailto:bgaraas48@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

I'm against the weather modification program in Williams County. The storm we had in June of 2021 in Williston where there was millions of dollars of damage to roofs and vehicles is one example of a disaster of a program. The airplanes were flying over New Town when it hit, I have flight radar data on that night. The drought we had in 2022 over most of Williams County is another example of a disaster. The hail storm that took out thousands of acres of land in 2023 on August 1st was the worst of it, our farm alone lost over 1 million dollars in crop damages. The planes were never in the area. You say is good for the county, I disagree. I hope it makes it to the ballot this year to vote it down. Let mother nature decide what it wants to do.

Brandon Garaas  
7017704027

RECEIVED

MAR 11 2024

3-5-24

To:

ND DEPT. OF WATER RESOURCES

Director of North Dakota Atmospheric Resource Board,

We live on the MT-NDak. border. We know Weather Modification suppresses rainfall and has done a huge amount of damage to Williams County, and our farm and ranch operations.

On a drought year we need all the rain we can get for crops, pastures & dams.

Weather modification can't have it both ways. Hail is frozen rain. If you stop hail you also stop the rain that comes along with it. Will take rain any day over the Weather modification.

Please stop doing damage to weather. We believe it cost us \$100,000 on loss production from lower crop yields over the year.

Thank-you  
James & Bea +/orob



James and Bea Hovib  
1540+ 61st ST NW  
Williston, N. Dakota  
58801-9555

RECEIVED

MAR 11 2024

ND DEPT. OF WATER RESOURCES

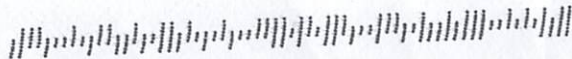
Director of North Dakota Atmospheric Resource Board  
1200 Memorial Highway  
Bismarck, North Dakota  
58504-5262

BISMARCK ND 585

6 MAR 2024 PM 1 L



58504-526200





**Subject:** STOP CLOUD SEEDING

**Date:** Monday, March 4, 2024 at 4:27:19 PM Central Standard Time

**From:** jennifer bummer

**To:** dlangerud@nd.gov

You don't often get email from [jen\\_bummer@hotmail.com](mailto:jen_bummer@hotmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Please stop interfering with natural weather phenomena. It is extremely unhealthy for humans and livestock.

Weather modification leaves lasting effects in the surrounding areas. We need natural weather patterns.

STOP THIS NONSENSE

Jennifer Bummer Thomte

**Subject:** Cloud Seeding  
**Date:** Thursday, March 7, 2024 at 10:22:19 AM Central Standard Time  
**From:** JessiKay Wojahn-Noll  
**To:** dlangerud@nd.gov

You don't often get email from [jk\\_noll@hotmail.com](mailto:jk_noll@hotmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

### To Whom It May Concern:

Cloud Seeding, putting chemicals into the air and then letting them fall to the ground. Wow...sounds like cancer cells everywhere to me and spending unnecessary money. Let nature be nature, quit messing with it, and then throw out there we have Global warming...just stop doing it, it seems to be taking moisture out of the air and farmers and ranchers need moisture for their products they produce.

If the Government wants to be spending money, maybe they should give it to those who need it. Farmers and ranchers in this country are failing due to costs of products, but when selling their own products not seeing the profit due to low buying costs for their commodities and cattle. We need to protect those who feed us.

Please rethink the cloud seeding and put the money to better use.

**Subject:** Cloud seeding

**Date:** Sunday, March 3, 2024 at 8:55:41 PM Central Standard Time

**From:** Allison Streeter

**To:** dlangerud@nd.gov

[You don't often get email from [allisonjhaynes@gmail.com](mailto:allisonjhaynes@gmail.com). Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification> ]

\*\*\*\*\* CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. \*\*\*\*\*

Hi, Darren. I'm interested in your opinion on cloud seeding and if you can show me any evidence to how this is more helpful vs harmful for the average ND citizen. I personally do not want to inhale toxic chemicals and fiberglass nor have that on my foods in my garden or the grass my children play on. I understand it is primarily used for hail control but why are we making citizens sicker for that?

I hope and pray that the Holy Spirit is inside of you urging you to do the right thing for the people you represent.

Thank you for your time.

Allison Streeter, RN, BSN, OCN

Bismarck, ND

**Subject:** Weather MANIPULATION

**Date:** Monday, March 4, 2024 at 11:45:48 AM Central Standard Time

**From:** Bonnie Estabrook

**To:** dlangerud@nd.gov

You don't often get email from [2bonestabrook@gmail.com](mailto:2bonestabrook@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

We need to stop this from happening in our beautiful ND and the insanity to think you will not affect our people and children!

**Subject:** Weather Modification Concern

**Date:** Sunday, March 10, 2024 at 2:26:01 PM Central Daylight Time

**From:** Carrie Axt

**To:** dlangerud@nd.gov

You don't often get email from [caxt2006@gmail.com](mailto:caxt2006@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Director Langerud,

I write in opposition for the weather modification in any county in our state. The health and wellness of our residents are at risk and the responsibilities should be taken seriously to protect life in this state. I sit here enjoying the afternoon sunshine only to find moments later, white streams lingering throughout the sky above me after the planes litter the air that I will breathe, the soil that will grow crops to feed the world, and the waters to bring hydration. This is ethically wrong. Please, consider the natural design of the systems in place by our Creator. I urge you to support an end to this plan.

Sincerely,

Carrie Axt

**Subject:** No modify precipitation

**Date:** Monday, March 4, 2024 at 4:31:18 PM Central Standard Time

**From:** Myriah Watkins

**To:** dlangerud@nd.gov

You don't often get email from [myriah1@hotmail.com](mailto:myriah1@hotmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Do not "modify natural precipitation ". Stop controlling drought or floods for your own profit. Stop wrecking havoc in people's lives for your own profit. I've watched the plane flights and how precipitation will stop. Stop your control of everyone else's farms and grocery prices.

**Subject:** Commets

**Date:** Thursday, March 21, 2024 at 3:36:51 PM Central Daylight Time

**From:** CM

**To:** dlangerud@nd.gov

[You don't often get email from [cnh320hc@gmail.com](mailto:cnh320hc@gmail.com). Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification> ]

\*\*\*\*\* CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. \*\*\*\*\*

The continued practice of trying to manipulate mother nature should not continue. You do far more harm than good in drought conditions perhaps a little haul goes through but you wipe out much needed moisture in an area that could extend out of county and put of state. The state of South Dakota should be suing you for these acts because the weather is affected far across county lines. EPA should also jjmp

In how many wet lands have been drained because of these actions?

Sent from my iPhone

**Subject:** Clean Air

**Date:** Friday, March 1, 2024 at 1:56:59 PM Central Standard Time

**From:** Mindy Olson

**To:** dlangerud@nd.gov

You don't often get email from [mindyolson33@gmail.com](mailto:mindyolson33@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Dear Director-

I am writing to inform you that I would like North Dakota to focus on clean air. The weather modification has been getting out of hand. The prettier the sunset the more contaminated our air is.

Have you noticed that the sunsets have become very vibrant lately???

For those who suffer from allergies, asthma, lung issues advised that you are helping contribute to the illness if everyone. Can we put a stop to this???

Please I ask you again to focus on cleaning up our air and not contaminating it.

Warm Regards

Mindy



**Subject:** Weather modification

**Date:** Tuesday, March 5, 2024 at 4:47:56 PM Central Standard Time

**From:** Denise Goehring

**To:** dlangerud@nd.gov

You don't often get email from [goehringdenise@gmail.com](mailto:goehringdenise@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Hello

I am asking this be stopped immediately! Mother Nature should not be tampered with. This is wrong on all levels. Think about your kids and grandkids and generations to come. Please do the right thing and end it!

Denise Goehring

March 25, 2024  
5250 77 $\frac{1}{2}$  Ave  
Hebron ND 58638

Dear Darin Langerud

I am writing to let you know about my opinion on cloud seeding that is going on in Bowman County.

I live and ranch in northwest grant county.

Since they started cloud seeding in Bowman County we have watched the storm clouds break up and instead of getting rainfall we would get little or nothing.

The clouds would split and it would rain 10 to 20 miles north and south of us, then form together 5 to ten miles east of us.

We have been droughted out many years having to sell cattle and buy hay because of some damn fools, think they benefit from it.

All of my neighbors agree that we have received a lot less rainfall since this B.S. program began.

I would like to see this program gotten rid of and let the boys needing fly time hours from Fargo get a job and pay their own way!

P.S. there are help wanted signs everywhere

Thank you

Denis Tiller

Denis Tibor  
5250 77<sup>1</sup>/<sub>2</sub> Ave  
Hobron ND 58638

BISMARCK ND 585

27 M **RECEIVED** PM 1 L

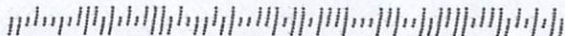
APR 01 2024

ND DEPT. OF WATER RESOURCES

The Director ND Atmospheric Resource Board  
1200 Memorial Highway  
Bismarck ND 58504-5262



58504-526200



**Subject:** Harmful Chem Trails

**Date:** Monday, March 4, 2024 at 12:32:38 PM Central Standard Time

**From:** Eleanor Heuer

**To:** Dlangerud@nd.gov

[You don't often get email from [eleanor.heuer@icloud.com](mailto:eleanor.heuer@icloud.com). Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification> ]

\*\*\*\*\* CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. \*\*\*\*\*

Hello,

I am writing as I am very opposed to your Chen trails. These are awful and toxic spreading into the air we breathe along with our children. I have 2 littles I try my very best to keep them healthy but at this point with all you high powered psycopath who think there is a need for chemicals just points the finger even more at you that all you care about is money. Everything is toxic. Our food, water the air we breathe.. maybe you should start by eliminating shit like this so people arnt dying from this shit or constantly sick. It's disgusting.

**Subject:** Weather modification

**Date:** Wednesday, March 13, 2024 at 8:19:01 AM Central Daylight Time

**From:** Marianne Sears

**To:** dlangerud@nd.gov

You don't often get email from [mks@summersmfg.com](mailto:mks@summersmfg.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Please stop performing any type of weather modification. The manner in which this is carried out and what ingredients are used have not been shared publicly. The public has a right to know what is being dumped into the skies.

Disturbing anything in the natural state has long term side effects. We and residents of this state don't want to be sprayed from the skies any longer.

Marianne Sears

**Subject:** Operations to Modify Precipitation  
**Date:** Wednesday, March 13, 2024 at 11:41:03 AM Central Daylight Time  
**From:** Ruthie Strauss  
**To:** dlangerud@nd.gov

You don't often get email from [ruthie.strauss0709@gmail.com](mailto:ruthie.strauss0709@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Good Morning Mr. Langerud,

I have recently become aware of your proposal to modify precipitation by the addition of ice nucleating agents in Bowman, McKenzie, Mountrail, Williams and Slope counties of North Dakota.

I am writing to tell you that I do not consent to this weather modification operation or any weather modification you have planned for the future. As a citizen of the state of North Dakota I kindly ask you to cancel these operations.

Altering natural weather patterns will create unknown repercussions and should be avoided at all costs. The almighty God controls weather and climate, not man. It is our natural born right to experience God's weather patterns, thus continuing with your proposal would be taking away my God given rights.

Warm Regards,  
Ruthie Strauss

**Subject:** not for it

**Date:** Tuesday, March 5, 2024 at 9:24:45 AM Central Standard Time

**From:** tsjs@bektel.com

**To:** dlangerud@nd.gov

You don't often get email from [tsjs@bektel.com](mailto:tsjs@bektel.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Hello,

The notice of intention to modify natural precipitation. Please Stop messing with our weather! What effect does all of this have on our country and state of ND. Every time I see planes in the air, I pray they find another job instead of spraying all these things into our air that we breathe. We are aware of what is happening and we do not like it. Stop modifying our weather with this and the chemtrails. Please use the resources for the good of our world as God intended it to be.

Sincerely,

Tanya Schneider  
ND

**Subject:** Cloud seeding

**Date:** Monday, March 11, 2024 at 2:32:33 PM Central Daylight Time

**From:** Cindy Hoikkala

**To:** kjschroe@nd.gov

You don't often get email from [cdhoik@yahoo.com](mailto:cdhoik@yahoo.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

I'm not sure where to send this email. Would you make sure it gets to where it's supposed to be? When I was told that you were manipulating the weather I had a hard time believing it until I found the facts that you were indeed manipulating our weather. Are you god? Doesn't God take care of the earth that he created. Whether you like to hear this or not it is affecting everybody's health. No wonder we've been in drought and haven't had rain for the last 2 to 3 years. I am absolutely opposed to what you're doing and ask that you would reconsider and stop this nonsense.

[Yahoo Mail: Search, Organize, Conquer](#)



**Subject:** Cloud seeding

**Date:** Monday, March 4, 2024 at 12:18:22 PM Central Standard Time

**From:** Tara Mertz

**To:** dlangerud@nd.gov

[You don't often get email from [taram.m2010@gmail.com](mailto:taram.m2010@gmail.com). Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification> ]

\*\*\*\*\* CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. \*\*\*\*\*

Hello,

It has come to my attention this email address is for complaints for our air quality from cloud seeding.

It is very apparent even to school children what is happening in our skies. We do not agree or approve of our weather being chemically altered.

Leave us alone.

Signed,

North Dakota Residents

March 4<sup>th</sup>, 2024

RECEIVED

MAR 08 2024

ND DEPT. OF WATER RESOURCES

To whom it may concern:

Weather modification in North Dakota has no place of its own. While the intentions may be good, the effects of messing with nature are proving to be costly to farmers and ranchers across the state. A single rainstorm can make or break a family farm's operations for the year. Livestock can run short of grass, crops run short of moisture and die, and other vegetation dries up which creates a huge fire risk.

North Dakota is a wonderful state. I think we could agree that we have lots to offer and share with the nation. I understand the idea of wanting to minimize the risk of hail damage to property, but I would encourage you all to study the results of the counties beyond western North Dakota. I live in Kidder County, and we rely on rain showers and thunderstorms to get started growing in the western part of the state. When this happens, they continue their path to the east, bringing rain and moisture to our area.

Our soil is very sandy, and water moves through the profile very quickly. The plants can only take up so much moisture before it is gone. We are currently experiencing a drier

and milder winter. Spring and early summer drought is not out of the question currently. I feel that weather modification would not help this matter, it would only hurt our chances of receiving importantly needed amounts of measurable precipitation.

There have been several instances in the past 3 years of 2021, 2022, and 2023 where storm chances have been high. The powerful storms start building and are formed, and it seems that the cloud seeding begins. It is claimed that, in your words, "existing clouds are selected for seeding according to current operational procedures for enhancing rainfall and decreasing hail damage." The claim that it decreases hail damage is correct because the entire storm falls apart and takes away all chances for precipitation. This includes measurable rainfall. Many parts of North Dakota are only a week or two away from a drought as it seems, I would encourage you to consider not helping that come true.

I am strongly encouraging you to consider dropping the weather modification programs. It is not a good idea to mess with nature. It is especially important to remember that one of North Dakota's primary industries, Agriculture, relies heavily on all kinds of weather to remain where it does.

Please consider hosting informative town hall meetings around the state. It would be a good idea to get community members out and involved by hosting meetings in the

**town where the county seat is located. By doing this, you can explain your cause, and also see how it affects real people in the real world.**

**Thank You for your time and consideration. I hope that you care enough to make some considerations.**

**Respectfully submitted,**

**Cody D. Mack**

**5<sup>th</sup> generation farmer**

**Pettibone, North Dakota**

Cody Mack  
P.O. Box 22  
Pettibone, ND 58475

RECEIVED

MAR 08 2024

FARGO ND 581

4 MAR 2024 PM 1 L



ND DEPT. OF WATER RESOURCES

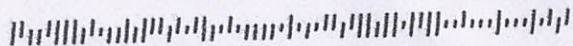
North Dakota Atmospheric Resource Board  
Attn: Director of Board  
1200 Memorial Highway  
Bismarck, ND 58504-5262

RECEIVED

MAR 08 2024

ND DEPT. OF WATER RESOURCES

58504-526200



**Subject:** Weather Modification in ND and WMI  
**Date:** Friday, March 8, 2024 at 8:01:15 PM Central Standard Time  
**From:** Joshua Anderson  
**To:** dlangerud@nd.gov

[You don't often get email from [joshua\\_eric\\_anderson@yahoo.com](mailto:joshua_eric_anderson@yahoo.com). Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification> ]

\*\*\*\*\* CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. \*\*\*\*\*

Hi Darin,

I am writing to you in opposition of the weather modification through Weather Modification Inc.

I believe this action taken allowed by the state is an over-reach that should not be allowed but is being pursued under the guise of reducing hail damage. This maybe true but it is coming at the cost of localized downpour instead of widespread rain coverage.

As a farmer, I have witnessed actions taken by WM Inc in 2021 that halted thunderstorm growth and resulted in reduced rainfall coverage. I have several instances of WM Inc activity that ended rain chances for us in NC ND in the year 2021. As you may remember 2021 was a tough ag production year for our state and there were several instances where rainfall chances were high but WM Inc action ended those chances shortly after thunderstorms entered from MT into ND.

Furthermore, I believe there needs to be class action suit against those in favor this action, much like was done in the state of MT to end such activity. I have several contacts in the state of MT that personally testified and were agents of change that led to the halt of such weather modification activity in their state, hence the reason such activity always is performed on the MT-ND border.

As a youth, we got rain from the west moving to the east. Now, we do not see such rain system movement across the state. I believe this is largely due to fact there is human manipulation of the weather in our state.

Please understand my concern as a family farmer in the state of ND. I hope those involved would learn to consider the interest of others in the state of ND before their own personal interests.

Please stop all such weather modification activities.

Thanks,

Josh Anderson

Sent from my iPhone

**Subject:** STOP CLOUD SEEDING

**Date:** Monday, March 4, 2024 at 8:52:04 AM Central Standard Time

**From:** Kari Roller

**To:** dlangerud@nd.gov

You don't often get email from [3jskettlecorn@gmail.com](mailto:3jskettlecorn@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Why do we continue to waste money and try to control what God has put in motion! These chemicals are terrible for us. They are killing us! It's needs to stop!!

[https://thatsprettygoodscience.com/2016/09/15/cloud-seeding-may-be-affecting-your-health/?fbclid=IwAR0jqbOOlu1t8QOb9QYOynOcKL2jdTbP3o9FEqStuvZz\\_240-To5PFdpltM\\_aem\\_Ae5m37y9NrG0ka601nSA22YJVzS8V5sDCz-aVYpPEI16wBuwQMvIWTUymuvI-uqGFyQ](https://thatsprettygoodscience.com/2016/09/15/cloud-seeding-may-be-affecting-your-health/?fbclid=IwAR0jqbOOlu1t8QOb9QYOynOcKL2jdTbP3o9FEqStuvZz_240-To5PFdpltM_aem_Ae5m37y9NrG0ka601nSA22YJVzS8V5sDCz-aVYpPEI16wBuwQMvIWTUymuvI-uqGFyQ)

Kari Roller

**Subject:** Cloud seeding  
**Date:** Tuesday, March 5, 2024 at 10:35:34 AM Central Standard Time  
**From:** Mark and Roxane Anderson  
**To:** dlangerud@nd.gov

You don't often get email from [markandroxane@gmail.com](mailto:markandroxane@gmail.com). [Learn why this is important](#)

**\*\*\*\*\* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. **\*\*\*\*\***

Hello,

I am emailing you because of my concerns with the cloud seeding/weather modification you have been doing and plan to do in the state of ND. As a citizen of this state, and speaking for others that are concerned about this, we do NOT want cloud seeding and/or the weather modification that you are planning to do and have been doing. No one has asked me or any other citizens that I know of, if this is okay with us. We do not want this! Please, quit playing God.....He is capable of handling our weather by Himself.

Please stop spraying our skies with chemicals in general. We want fresh air and sunshine again. No more chem trails! Please listen to the citizens of this state, as they are doing in South Dakota. We have had enough.

Sincerely,  
Roxane Anderson



DATE: APRIL 16, 2024  
 TO: ATMOSPHERIC RESOURCE BOARD  
 FROM: DARIN LANGERUD, DIRECTOR  
 RE: DIRECTOR’S RECOMMENDATION FOR NDCMP PERMIT APPLICATIONS

**Background**

The North Dakota Cloud Modification Project (NDCMP) is a grass-roots, local-control project. Funding for the NDCMP is provided through local funds from the participating counties (or townships) combined with state cost share. Overall, two-thirds of project funding comes from the counties while the state contributes one-third.

To participate in the NDCMP, a process must be followed whereby the public, through petition or vote, creates a weather modification authority. Once that authority is created, a board of five members is appointed by the county commission to oversee the project for that county. A project cannot occur in North Dakota under state law without this process, and state funding would not be applied to cloud seeding operations without a local sponsor.

To solicit public comments per N.D.C.C. § 61-04.1-17 and N.D.A.C. § 89-07-02-15, the Board published notice for two consecutive weeks in the county newspapers in the “area of the state reasonably expected to be affected by operations conducted under a permit.” During the 20-day comment period, which ended on March 28, 2024, 43 comments were received (attached). The comments were reviewed and categorized by location and concern. A summary of the comments and responses by the ARB Director follows.

Table 1 shows the number of responses broadly grouped by category: Science/Efficacy, Environment/Health, and Unspecified.

	Science/Efficacy	Environ./Health	Unspecified	Total
District 1	7	1	1	9
District 2	7	8	1	16
Unknown	5	13	0	18
Total	19	22	2	43

Table 1. Responses by category and district.

## Science/Efficacy

Regarding the science and program efficacy, several studies have been conducted of the NDCMP. Five studies using crop insurance data have been conducted looking at the effects of seeding on hail. Miller et al. (1975) found: (1) the ratio of average rainfall to hail energy was greater for seed days than no-seed days, (2) crop-hail insured losses were lower on seed days than on no-seed days, (3) radar characteristics of seeded storms differed from those of unseeded storms, and (4) case studies of 34 storms indicated that damaging hail was usually suppressed when their updraft areas were continuously seeded at cloud base.

Smith et al. (1987) found a 43.5% reduction in crop hail losses in seeded counties during a 10-year period (1976-85). Following on the prior study, Smith et al. (1997) reported a 45% reduction in crop hail losses in the NDCMP counties over a 13-year period (1976-88).

A Nodak Mutual Insurance Company internal study (1995) of seven years of data found 43% lower incidence of hail claims in the NDCMP counties versus the rest of the state.

Finally, Knowles and Skidmore (2021) at Michigan State University recently evaluated thirty years of USDA Risk Management Agency data in an effort to review crop yields and insurance loss ratios. They concluded that “our evaluation indicates that the cloud seeding program had significant positive effects on crop yields and improved (insurance) loss ratios.”

Miller, J.R., Jr., E.I. Boyd, R.A. Schleusener, and A.S. Dennis, 1975: Hail suppression data from western North Dakota, 1969-1972. *J. Appl. Meteor.*, **14**, 755-762.

Smith, P. L., J.R. Miller, Jr., and P.W. Mielke, Jr., 1987: An exploratory study of crop-hail insurance data for evidence of seeding effects in North Dakota. 24 pp. (Final Report)

Smith, P.L., L.R. Johnson, D.L. Priegnitz, B.A. Boe, and P.W. Mielke Jr., 1997: An exploratory analysis of crop hail insurance data for evidence of cloud seeding effects in North Dakota. *J. Appl. Meteor.*, **36**, 463-473.

Pifer, K.D., 1995: Personal communication with Bruce A. Boe, NDARB Director.

Knowles, S., and M. Skidmore, 2021: Cloud Seeding and Crops Yields: Evaluation of the North Dakota Cloud Modification Project. *J. Wea., Clim., And Soc.*, **13**, 885-898.

In addition to hail, several studies have looked at seeding effects on rainfall in North Dakota. The North Dakota Pilot Project (NDPP), a randomized seeding program was conducted in McKenzie County from 1969-1972 (Dennis et al., 1975). Mountrail and Ward counties were added to the project in 1972. The NDPP found statistically-significant results that silver iodide seeding of convective clouds leads to: (1) an increase in the frequency of rainfall events at the target gauges, (2) an increase in the average rainfall recorded per rainfall event, and (3) an increase in total rainfall over the target area. These results apply on days with dynamic seedability, that is, days when a cloud model predicted an increase in cloud top height under the influence of silver iodide seeding. The authors estimated there were about 50 days with dynamic seedability each summer during the NDPP. Further, they estimated a potential increase of one inch of rainfall per growing season for western North Dakota from cloud seeding.

Additional studies, using various datasets have also indicated positive results. Studies by Eddy & Cooter (1979); Johnson (1985); Wise (2005); and Tuftedal et al. (2022) have suggested percentage rainfall increases from the low single digits to the low teens in and slightly downwind of the target areas.

Other concerns about downwind effects are addressed by a recent study of several operational projects by DeFelice et al. (2014), which concluded that seeding for precipitation enhancement in the target area increased precipitation downwind.

Dennis, A.S., J.R. Miller, Jr., D.E. Cain, and R.L. Schwaller, 1975: Evaluation by Monte Carlo tests of effects of cloud seeding on growing season rainfall in North Dakota. *J. Appl. Meteor.*, **14**, 959-969.

Eddy, A., E. Cooter and W. Cooter, 1979: An evaluation of operational cloud seeding in North Dakota: An exploratory analysis. Final Report to the North Dakota Weather Modification Board, Bismarck, ND, 146 pp.

Johnson, H.L., 1985: An Evaluation of the North Dakota Cloud Modification Project. A final report to the North Dakota Weather Modification Board, June 1985. 35 pp.

Wise, E.A., 2005: Precipitation evaluation of the North Dakota Cloud Modification Project (NDCMP)., M.S. Thesis, Department of Atmospheric Sciences, University of North Dakota, Grand Forks, ND., 63 pp.

DeFelice, T.P., J. Golden, D. Griffith, W. Woodley, D. Rosenfeld, D. Breed, M. Solak, and B. Boe, 2014: Extra area effects of cloud seeding – An updated assessment. *Atmos. Res.*, 135-136, 193-203.

Tuftedal, M.E., D.J. Delene, and A. Detwiler, 2022: Precipitation Evaluation of the North Dakota Cloud Modification Project (NDCMP) Using Rain Gauge Observations. *Atmos. Res.*, 269.

No statistically-significant indication of detrimental effects has been shown in the many independent evaluations of the NDCMP. On the contrary, results indicate that precipitation has been enhanced in and slightly downwind of the target areas and crop-hail losses have been reduced.

## **Environment/Health**

Concerns raised about the potential environmental effects of cloud seeding in North Dakota constituted the majority of comments received. Silver iodide, the most commonly used seeding agent, has been rigorously studied in its use on programs all around the globe. The Weather Modification Association (2009) conducted a review of the published scientific literature and found “no environmentally harmful effects arising from cloud seeding with silver iodide aerosols have been observed, nor would they be expected to occur.” Environmental impact studies related to silver iodide usage in cloud seeding were reviewed from the 1960s to today, with all findings indicating no adverse environmental or human health impacts.

Silver iodide is exceedingly efficient as an ice nucleus, thus its use on the NDCMP is quite low. Seeding activity also varies from year to year depending on weather conditions. Generally, the

total amount of silver iodide dispersed from both seeding generators and flares ranges from 50 to 100 kilograms per season. Based on the average rate of seeding material dispersed, only one one-hundredth of a gram (0.01g) would be expected to fall on an acre of land during the summer.

<http://weathermod.org/wp-content/uploads/2018/03/EnvironmentalImpact.pdf>

Comments in the context of “nature” or natural weather were also voiced. They mainly arise in the context of religious beliefs, or environmental concern. Cloud seeding can be viewed as “messaging with Mother Nature”, but so can nearly everything else that humans do. Genetically Modified Organism (GMO) seed varieties, fertilizer, herbicides, pesticides, irrigation, drainage, the pollution generated from driving your car or truck – all of these activities are altering nature to some degree. Though these concerns are understandable, they are not a valid reason to deny or curtail a permit.

Finally, “chemtrails” were mentioned in several of the comments received. This is a conspiracy theory that has persisted and grown over the last several years. The theory contends that the contrails that form in the wake of high altitude commercial jet traffic is a government program spraying chemicals on an unsuspecting public. This has been debunked time and again, yet the conspiracy theory still maintains a not insignificant following. Of course, as “chemtrails” are fiction, they are not an effective argument against cloud seeding.

#### **Director’s Recommendation**

In consideration of the comments received, the Director’s recommendation on the permit applications for Weather Modification LLC follow:

#### **District 1: Bowman County and the townships of Connor, Hume, Carroll, Cash, Sheets, Mineral Springs, and Cedar Creek in Slope County.**

*Director recommends the Board approve the permit for the District 1 target area as publicly noticed. Concerns regarding the environment, health effects, science, and program efficacy are not borne out by independent evaluations of the NDCMP or other external evaluations relevant to North Dakota seeding operations.*

#### **District 2: McKenzie, Mountrail, and Williams Counties.**

*Director recommends the Board approve the permit for the District 2 operations area with the following conditions. The permit shall include the three-county target area and the 10 statute-mile buffer zone surrounding the target area in adjacent North Dakota counties, but shall exclude the downwind buffer zone in Ward County. Concerns regarding the environment, health effects, science, and program efficacy are not borne out by independent evaluations of the NDCMP or other external evaluations relevant to North Dakota seeding operations.*

**2024 NDCMP Project - 4 Cloud-base, 1 Cloud-top KAC90 - 415 Flight Hours**

LINE ITEM	BUDGET	COMMENT / NOTATION
<b>Radar Maintenance &amp; Parts</b>	26,300	Includes technician, preventive maintenance and misc. parts & materials (Contract)
<b>Aircraft Base Cost</b>	565,461	Aircraft, seeding equipment, pilots and related services
<i>Top Aircraft</i>	217,485	1 A/C per year @ \$217,485 (3.0% inc.)
<i>Base Aircraft</i>	347,976	4 A/C per year @ \$86,994 (3.0% inc.)
<b>Cloud Base Flight Hours (Seneca)</b>	39,783	300 hours @ \$132.61 (3.0% inc.)
<b>Fuel Surcharge</b>	2,000	Excess above \$6.50 per gallon
<b>Cloud Top Flight Hours (KAC90)</b>	62,831	115 hours @ \$546.36 (3.0% inc.)
<b>Meteorologists</b>	57,939	2 Meteorologists, 3 Intern Meteorologists
<b>Chemicals</b>	31,529	All chemicals, flares, and dry ice
<i>Dry Chemicals / Acetone</i>	10,629	Ammonium Iodide, Sodium Perchlorate, Acetone (sufficient inventory of AgI)
<i>Ejectable Flares</i>	0	
<i>Burn-In-Place Flares</i>	0	
<i>Dry Ice</i>	20,900	19,000 lbs @ \$1.10 (est.)
<b>Housing</b>	0	
<b>Travel / Delivery / Freight</b>	3,700	
<b>Chemical Storage</b>	1,700	Hangar space in Williston (\$285/mo 2023) & Watford City (\$200/mo 2023)
<b>Ground School</b>	3,200	Hotel and meals
<b>Communications/Data</b>	500	Telephone and internet
<b>Newspaper Fees</b>	1,600	Permitting requirements
<b>Supplies / Postage</b>	750	
<b>Bldg &amp; Equip/Utilities/Insurance</b>	5,600	
<b>TOTAL:</b>	<b>802,894</b>	
COUNTY FUNDING:	528,668	
OTHER LOCAL FUNDS:	1,250	Carry-over funds
STATE COST-SHARE:	272,976	
BALANCE:	0	

2024 Rev. Increase: 1

County Contracts	2023	2024
McKenzie	137,917	137,917
Mountrail	111,568	111,568
Williams	145,406	145,406
Bowman	120,802	120,802
SWMA	12,975	12,975
<b>Total</b>	<b>528,668</b>	<b>528,668</b>

county share 66.00%  
state share 34.00%  
cost per acre \$0.150