

TESTIMONY OF

Darin Langerud, Director, Atmospheric Resource Division

Chairman Patten, and members of the Senate Energy and Natural Resources Committee, I am Darin Langerud, the Director of the Atmospheric Resource Division of the Department of Water Resources. I'm here today to provide testimony in opposition of SB 2106.

SB 2106, if passed, would do several things. It would ban weather modification (also known as cloud seeding) operations in the jurisdictions that choose to participate in the program, making it a class B misdemeanor for a person to perform or contract for the performance of weather modification in the state, it would eliminate research field trials used to better understand the science and improve the technology, and it would eliminate the Atmospheric Resource Board (ARB) and its regulatory role through the repeal of Chapter 61-04.1 of the North Dakota Century Code.

Existing statutes related to weather modification are working as intended. The same options exist to allow for counties to create or abolish a weather modification authority. Over the last ten years counties have chosen to continue in the cloud seeding program and to leave it. These decisions are made at the county or township level, not by the State. Passage of SB 2106 would eliminate this choice for those wishing to participate in the program and realize its benefits.

Those benefits have been demonstrated through several independent evaluations of the North Dakota Cloud Modification Project (NDCMP), to determine the effects of the project on rainfall, crop-hail damage, crop yields, and economic impact. A study of crop-hail insurance data showed a 45 percent reduction of crop-hail damage in the seeded counties. Five independent studies focused on precipitation have found that rainfall was increased in the target counties (and downwind) from 3 to 14 percent, an increase of up to an inch of additional growing-season moisture. Another study showed wheat yields were 5.9 percent higher in the seeded counties versus an adjacent control area with no cloud seeding.

The economic effects of cloud seeding have been analyzed by economists at NDSU's Department of Agribusiness and Applied Economics. The most recent by Bangsund and Hodur (2019) examined the benefits to the eight most common crops grown in North Dakota. Using long-term evaluations of 5-10 percent increases in rainfall and a 45 percent reduction in crop-hail losses, they calculated annual direct benefits to agricultural production of \$28.1-\$48.8 million in the project area. Estimated additional state tax revenues ranged from \$576,000 to \$999,000; more than double the amount of state cost-share funds expended on the program. Benefit to cost ratios ranged from 31-53 to 1.

A more recent (2021) Michigan State University study using 30 years of USDA Risk Management Agency data found that average annual wheat yields in seeded counties were 3.87 bushels higher than wheat yields in non-seeded counties. Further, their analysis showed crop-hail insurance loss ratios were lower in the seeded areas, with both results being statistically significant. The economic benefit to cost ratio was more than 36 to 1.

The ARB maintains a Memorandum of Understanding (MOU) with the University of North Dakota's John D. Odegard School of Aerospace Sciences for academic and field training of weather modification intern pilots, the only program of its kind in the U.S. Another ARB program provides meteorology students a summer educational opportunity working as intern meteorologists at the Bowman and Stanley radar sites. Through these training programs, 412 pilots and 76 meteorologists have participated as interns on the NDCMP. These training programs would end should SB 2106 be adopted.

Another impact of SB 2106 would be the loss of research and development opportunities in North Dakota. R&D in the U.S. is currently done by the states, not the Federal government. Elimination of state programs would limit the advancement of weather modification technologies in the U.S. at a time when foreign adversaries are accelerating their investment in R&D. China already has the world's largest weather modification program with an estimated 40,000-person workforce and tens of millions of dollars in annual expenditures. These technologies will continue to be developed and deployed whether the U.S. participates or not, potentially putting our country at a competitive disadvantage.

Lastly, one of the common concerns raised by the public is the environmental safety of the materials used in cloud seeding. Because silver iodide is such an effective ice nucleus, it is used in very small quantities. Based on the average rate of seeding material used in North Dakota each summer, only one one-hundredth of a gram (0.01g) would be expected to be deposited per acre of land in the operations area during the summer project, a nearly undetectable amount far below any existing safety thresholds. Published scientific literature from both domestic and international programs clearly shows no environmentally harmful effects from cloud seeding with silver iodide aerosols.

Thank you for the opportunity to testify, and I'm happy to answer any questions.

Submit Fiscal Note

| | | | | | |
|----------------------|-----------------------------------|------------|-----|-------------|-----|
| Bill Number | SB 2106 | Amendment | N/A | Engrossment | N/A |
| Original | 250494.01000 | In Context | N/A | | |
| Fiscal Note | 250494.01000 | | | | |
| Requested | 12/30/2024 5:42 PM | | | | |
| Revision Requested | 01/03/2025 3:28 PM | | | | |
| Next Hearing | N/A | | | | |
| Agency Contact | <input type="text"/> | | | | |
| Assigned To/Due Date | Sarah Felchle, 01/04/2025 5:42 PM | | | | |
| Agency Comments | | | | | |

Fiscal Note

1 - STATE FISCAL EFFECT

IDENTIFY THE STATE FISCAL EFFECT AND THE FISCAL EFFECT ON AGENCY APPROPRIATIONS COMPARED TO FUNDING LEVELS AND APPROPRIATIONS ANTICIPATED UNDER CURRENT LAW.

| | 2023-2025 | | 2025-2027 | | 2027-2029 | |
|----------------|--------------|-------------|--------------|-------------|--------------|-------------|
| | General Fund | Other Funds | General Fund | Other Funds | General Fund | Other Funds |
| Revenue | | | (\$200) | (\$559,690) | | |
| Expenditures | | | | (\$443,690) | | |
| Appropriations | | | | | | |

2 - COUNTY, CITY, SCHOOL DISTRICT, AND TOWNSHIP FISCAL EFFECT

IDENTIFY THE FISCAL EFFECT ON THE APPROPRIATE POLITICAL SUBDIVISION.

| | 2023-2025 | 2025-2027 | 2027-2029 |
|------------------|-----------|-------------|-----------|
| Counties | | (\$532,961) | |
| Cities | | | |
| School Districts | | | |
| Townships | | (\$26,729) | |

3 - BILL AND FISCAL IMPACT SUMMARY

PROVIDE A BRIEF SUMMARY OF THE MEASURE, INCLUDING DESCRIPTION OF THE PROVISIONS HAVING FISCAL IMPACT (LIMITED TO 300 CHARACTERS).

SB 2106 removes the authority of the ND ARB, restricts the SWC authority as it relates to the statewide water development program and its ability to provide funding for the program, to the priorities identified in Section 61-02.1-02.1 and restricts it from providing funding for weather modification.

4 - FISCAL IMPACT SECTIONS DETAIL

IDENTIFY AND PROVIDE A BRIEF DESCRIPTION OF THE SECTIONS OF THE MEASURE WHICH HAVE FISCAL IMPACT. INCLUDE ANY ASSUMPTIONS AND COMMENTS RELEVANT TO THE ANALYSIS.

Section 2 and 4 removes the authority for electors and Water Resource Boards to expend funds for weather modification which reduces county expenditures and State revenue by \$559,690. Section 3 restricts the State Water Commission from expending funds for weather modification, however expenditures will not be reduced as these funds would be utilized for water projects other than weather modification. Expenditures include the cost to dismantle the Stanley radar, transport equipment for surplus, and demolish the building, estimated at \$120,000. Section 6 repeals Chapter 61-04.1 relating to weather modification eliminating all related licensing and permitting requirements and will result in a reduction in revenue to the state of \$200.

5 - REVENUES DETAIL

FOR INFORMATION SHOWN UNDER STATE FISCAL EFFECT IN 1 OR 2, PLEASE EXPLAIN THE REVENUE AMOUNTS. PROVIDE DETAIL, WHEN APPROPRIATE, FOR EACH REVENUE TYPE AND FUND AFFECTED AND ANY AMOUNTS INCLUDED IN THE EXECUTIVE BUDGET.

Section 6 repeals Chapter 61-04.1 relating to weather modification eliminating all related licensing and permitting requirements and will result in a reduction in revenue to the state of \$200, General Fund. SB 2106 removes the authority for electors and Water Resource Boards to conduct weather modification activity, to collect revenues related to such activity, and provides for a penalty for conducting such activity, which would be a \$559,690 reduction in revenue from counties and townships.

6 - EXPENDITURES DETAIL

FOR INFORMATION SHOWN UNDER STATE FISCAL EFFECT IN 1 OR 2, PLEASE EXPLAIN THE EXPENDITURE AMOUNTS. PROVIDE DETAIL, WHEN APPROPRIATE, FOR EACH AGENCY, LINE ITEM, AND FUND AFFECTED AND THE NUMBER OF FTE POSITIONS AFFECTED.

SB 2106 removes the authority for electors and Water Resource Boards to conduct weather modification activity and to collect revenues related to such activity. Expenditures reduction will match reduction in revenue of \$559,690, reduction of expenditures for the ND Atmospheric Resource Board member pay of \$2,300 and travel \$1,700, plus the addition of costs to dismantle and demolish the Stanley radar of \$120,000. Weather modification does receive funding from the DWR's cost-share program in the amount of \$288,325, however these funds will continue to be expended for other water projects in place of the weather modification program resulting in a net reduction of \$0 for expenditures of the cost-share program.

7 - APPROPRIATIONS DETAIL

FOR INFORMATION SHOWN UNDER STATE FISCAL EFFECT IN 1 OR 2, PLEASE EXPLAIN THE APPROPRIATION AMOUNTS. PROVIDE DETAIL, WHEN APPROPRIATE, FOR EACH AGENCY AND FUND AFFECTED. EXPLAIN THE RELATIONSHIP BETWEEN THE AMOUNTS SHOWN FOR EXPENDITURES AND APPROPRIATIONS. INDICATE WHETHER THE APPROPRIATION OR A PART OF THE APPROPRIATION IS INCLUDED IN THE EXECUTIVE BUDGET OR RELATES TO A CONTINUING APPROPRIATION.

There is no appropriation in the bill.

CONTACT INFORMATION

| | |
|----------------------|-------------------------|
| Name | Sarah Felchle |
| Agency | Dept of Water Resources |
| Telephone | (701) 328-4946 |
| Date Prepared | 01/03/2025 12:00 AM |
