

2025

Bingham Research Center

ANNUAL REPORT

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Bingham Research Center
UtahStateUniversity



LETTER FROM THE DIRECTOR

We at the Bingham Research Center are grateful for what we've been able to do over the past year. I think our most important accomplishment this year is establishing a new Stakeholder Guidance Committee, consisting of volunteers from government, local industry, environmental groups, and the public, who have agreed to help guide and support our team's research path. Our mission is to carry out research that improves our local community and the world, and the efforts of our partners on the Stakeholder Committee and many others are just as essential to that mission as our own work.

We've continued our critical research on air quality in the Uinta Basin, with strong support from the Utah State Legislature, Uintah Special Service District 1, and numerous other partners. Our innovative AI-guided ozone forecasting system, developed by Dr. John Lawson, provided detailed ozone forecasts last winter, allowing industry and the public to reduce activities that enable winter ozone during inversion episodes. We've also found that ozone-forming pollution continues to decline in the Uinta Basin, even as oil and gas production increases. This reduction is due to better oil and gas production technology, improved monitoring of leaks, and changes to regulatory policy.

Separate from the winter ozone issue, we are leading a group of researchers across the West in a project that is enhancing our understanding of how mercury pollution moves through the environment. We are also involved in projects with colleagues at USU Eastern in Price to help land managers and farmers use drones to accomplish their work more efficiently.

This year, we welcomed two new high school students to our team—Myka Hansen and Luke Neilson—and we are hiring two more high school researchers, thanks to funding from the Marc C. and Deborah H. Bingham Foundation. We will also hire two new USU undergraduate researchers. Our exceptional student researchers are conducting field research, laboratory work, data analysis, and model and code development in many different areas of study. They are an invaluable part of our team, and their experience at the Center prepares them for successful college and career paths.

We hope you enjoy this report. Please reach out to us to continue the conversation.

Seth Lyman



Director



OUR MISSION

The Bingham Research Center is a trusted leader in innovative research that advances science to serve our community through collaboration, education, and engagement.



The purpose of our research

1

Investigate complex issues that impact the Uinta Basin, all of Utah, and the world

2

Engage students deeply in the research process

3

Help broad coalitions of stakeholders understand and resolve challenges they face

OUR TEAM



Seth Lyman

Bingham Center
Director &
Research
Professor



Justin Allred

Graduate
Researcher



Rachel Merrell

Undergraduate
Researcher



Colleen Jones

Research
Associate
Professor



Lisa Boyd

Graduate
Researcher



KarLee Zager

Undergraduate
Researcher



John Lawson

Research
Assistant
Professor



Loknath Dhar

Graduate
Researcher



Tristan Coxson

High School
Student
Researcher



Trevor O'Neil

Senior Research
Technician



Michael Davies

Undergraduate
Researcher



**Elspeth
Montague**

High School
Student
Researcher



Pamela Gardner

Project
Development
Specialist



Brant Holmes

Undergraduate
Researcher

STUDENT RESEARCHERS

Funding for student researchers at the Bingham Center comes from the Utah Legislature, an endowment from Anadarko Petroleum Corporation, the Marc C. and Deborah H. Bingham Foundation, and many other entities. Two undergraduates and four high school students received support in 2025. In addition, three PhD candidates are pursuing their research under the guidance of Bingham Center scientists.

To date,
36 undergraduate,
graduate,
postdoctoral, and
high school
student
researchers have
worked with the
Bingham Research
Center.



FUNDING



The Bingham Research Center received \$958,330 in research funding in the past 12 months. This included \$484,092 in grants and contracts, \$47,000 in gifts, \$400,000 in appropriations from the Utah Legislature, and \$27,238 in endowment disbursements. Two grants from the Department of Energy were approved and pending funding for an additional \$1,181,039. Among the grants and contracts, ongoing annual funding of \$250,000 from Uintah Special Service District 1 is particularly important to the team's work.

Funding received by the Bingham Research Center in the past twelve months.					
Project	Funder	Type	Start	End	Amount
Uinta Basin Air Quality Study	Utah Legislature	Appropriation	2025	2026	\$400,000
Uinta Basin Ozone Study	Uintah Special Service District 1	Contract	2025	2025	\$250,000
Supplemental funding for: Verification of Atmospheric Mercury Redox Reaction Rates	U.S. National Science Foundation	Grant	2025	2027	\$115,608
Precision Drone Technology for Sustainable Invasive Species Management and Herbicide Reduction at Stewart Lake	Utah Public Lands Initiative	Grant	2025	2027	\$59,598
Web tools to help land managers assess emissions from oil and gas wells	Utah Public Lands Initiative	Grant	2025	2026	\$58,886
Formaldehyde analyzer for air quality research in the Uinta Basin	Marriner S. Eccles Foundation	Gift	2025	2025	\$47,000
Anadarko student research endowment	Anadarko Petroleum	Endowment disbursement	2025	2026	\$27,238
Methane Measurement and Mitigation—Subaward--IBM	Department of Energy	Grant (Approved, Pending funding)	2025	2028	\$697,522
Carbon Management and Community Engagement—Subaward—University of Utah	Department of Energy	Grant (Approved, Pending Funding)	2025	2028	\$482,517

WINTER OZONE

The Uinta Basin is one of only two places in the world known to routinely experience wintertime ozone exceeding EPA standards (Wyoming's Upper Green River Basin is the other). Winter inversion conditions trap pollutants from oil and gas development near the ground, increasing their concentrations and allowing them to generate ozone.

Ozone negatively impacts respiratory health, especially for those with lung diseases. During wintertime temperature inversions, ozone in the Uinta Basin sometimes increases to levels that exceed the standard of 70 ppb set by the U.S. Environmental Protection Agency (EPA). Because of this, portions of Uintah and Duchesne counties have been designated as a non-attainment area.

Since 2010, the Bingham Research Center has worked with stakeholders in government, industry, and environmental organizations to understand and resolve this critical issue.



Stakeholder Committee

In 2025 we established a new Stakeholder Guidance Committee. The members of this committee have been kind enough to volunteer a great deal of time and energy to help us guide our air quality research and ensure it is relevant to local needs. The committee meets quarterly to discuss Uinta Basin air quality issues generally, review the Center’s ongoing research, and plan new projects.

Stakeholder Guidance Committee Members	
Amadeus Guy	Sagebrush Biological Consulting
Ashley Miller	Breathe Utah
Ashley Korenblat	Public Land Solutions
Brandon Anderson	Rocky Mountain Power
Chanse Rinderknecht	Utah Trust Lands Administration
Dusty Carpenter	Jones and Demille
Erik Vernon	Bureau of Land Management
Heather Murray	Utah Trust Lands Administration
John Gates	Ute Energy
Joshua Hirschi	Harvest Midstream
Kati Chachere	Bureau of Land Management
Katie Balakir	HEAL Utah
Marise Textor	Consultant for Utah Petroleum Association
Reed Page	Summit Energy
Ryan Grant	Utah Division of Air Quality
Sheila Vance	Utah Division of Air Quality
Sonja Norton	Uintah County Commission
Tyler Elgiar	Bureau of Land Management
Tyson Pond	WEM

Other Engagement Activities

- Ozone Alert wintertime air quality forecasting program: Provides alerts about periods with poor air quality so industry can reduce emissions when it matters most
- Uinta Basin Ozone Working Group: Regular meetings with a diverse group of stakeholders to understand and discussion air quality issues
- Drone demonstrations with USU Extension: Teaching local farmers and land managers how to use drone technology to improve operations
- Web tools: New real-time air quality and weather website and online data explorer tools



KEY AIR QUALITY OUTCOMES FOR 2025

- Dr. Seth Lyman appointed to the Utah Air Quality Board, the primary air quality policymaker for the State of Utah
- No exceedances of the EPA ozone standard at regulatory monitoring stations during winter 2024-25
- Clyfar, a new machine-learning system to predict winter ozone more quantitatively, helped industry reduce emissions when it mattered most
- Precision spray drone technology demonstrated to reduce herbicide use and improve habitat quality across Utah wetlands and agricultural lands
- Laboratory atmospheric mercury chemistry analysis system developed and operational in partnership with three other universities
- Showed the impact of Wasatch Mountains on snow outcomes in the Uinta Basin and need for additional measurements
- Found that winter ozone is sensitive to organic compound pollution in early winter and to organics and nitrogen oxides in later winter

OUTCOMES FROM ANNUAL AIR QUALITY PROJECT OBJECTIVES

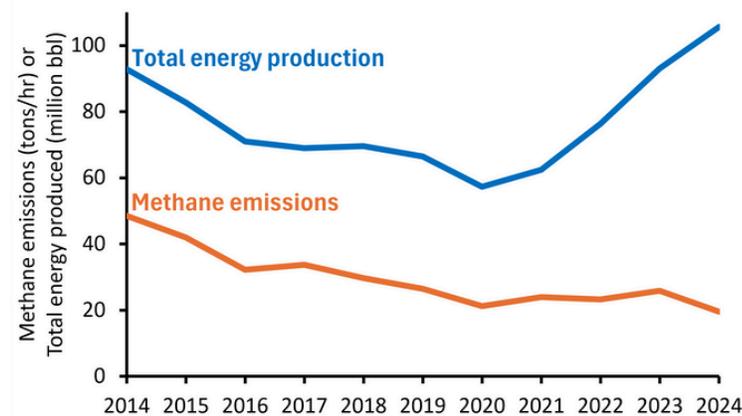
More information about research outcomes for the Bingham Research Center is available at <http://usu.edu/binghamresearch/files/reports/2025AnnualReport.pdf>.



Scan the QR code to learn more about the work the Bingham Center is doing.

UINTA BASIN AIR POLLUTION IS DECREASING

Air quality in Utah’s Uinta Basin has improved significantly over the past decade, with important decreases in both ozone pollution and methane emissions from oil and gas operations. Notably, the region is moving closer to meeting the EPA’s ozone standard and is likely to be declared in attainment of the standard soon. This improvement is happening despite increased energy production in the Basin over the past five years. In 2013, about 5% of energy produced in the Basin as oil and natural gas was lost to the atmosphere as methane. By 2024, this had dropped to just 1.5%—a 70% reduction in waste.



These positive trends result from a combination of factors: regulatory requirements, voluntary industry efforts to reduce emissions, improved equipment and practices, and periods of reduced natural gas production.

The Bingham Center is working on several projects, including using new drone technology, to better understand what specific industry practices have contributed to these improvements so we can do more of what works.

Explore energy and emissions data at <https://ubenergyexplorer.streamlit.app/>.





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