Study Goal #1: Assess the potential for cloud seeding to augment snowpack and subsequent streamflow in select target mountain ranges in southwestern Montana.

Objective/Outcome

A. Complete a detailed analysis of cloud and precipitation characteristics in mountainous regions of southwestern Montana under current and future climate scenarios. (Methodology is based upon similar studies conducted for Idaho Water Resources Board, Wyoming Water Development Commission and Bureau of Reclamation).

B. Identify potential for coordination and collaboration with similar efforts in areas nearby target location (Idaho, Wyoming).

C. Use High Performance Computing resources provided by Montana Technological University to run Weather Research and Forecasting (WRF) model simulations.

Study Goal #2: Complete a preliminary cost/benefit analysis and preliminary program design based upon weather/climate analysis.

Objective/Outcome

A. Evaluate WRF simulations to assess the frequency and characteristics of cloud seeding opportunities and the potential impacts of cloud seeding on snowpack in the study region.

B. Map areas with high suitability for cloud seeding in target area.

C. Develop preliminary program design based on the cloud seeding potential (e.g., establish target area, ground-based vs airborne, period of operation, frequency of seeding).

D. Complete preliminary cost-benefit analysis for the optimized program design given climatology and scenarios identified in preliminary program design.

E. Estimate costs to run 3-5 year pilot project.

Study Goal #3: Support development of public engagement and education activities and materials related to cloud seeding.

Objective/Outcome

A. Develop a strategy for effective, segmented stakeholder engagement and education for project study and, if feasibility is demonstrated, potential cloud seeding pilot project.

B. Develop fact sheets and presentations in support of engagement strategy.

C. Implement public engagement strategy to inform targeted stakeholders about the study that can also serve as an effective platform for launching pilot project.

Study Deliverables:

A. Preliminary report including results of the feasibility analysis for current and future climate scenarios and a summary of design options that will be tested with model simulations. (October 2024).

B. Final report including modeling results and identification of cloud-seeding program design(s) with associated cost-benefit analysis. (January 2025).

C. Program design guidance for a 3-5 year cloud seeding pilot project, included estimated costs (January 2025).