

# COLORADO AIRBORNE SNOW OBSERVATORIES EXPANSION PLAN

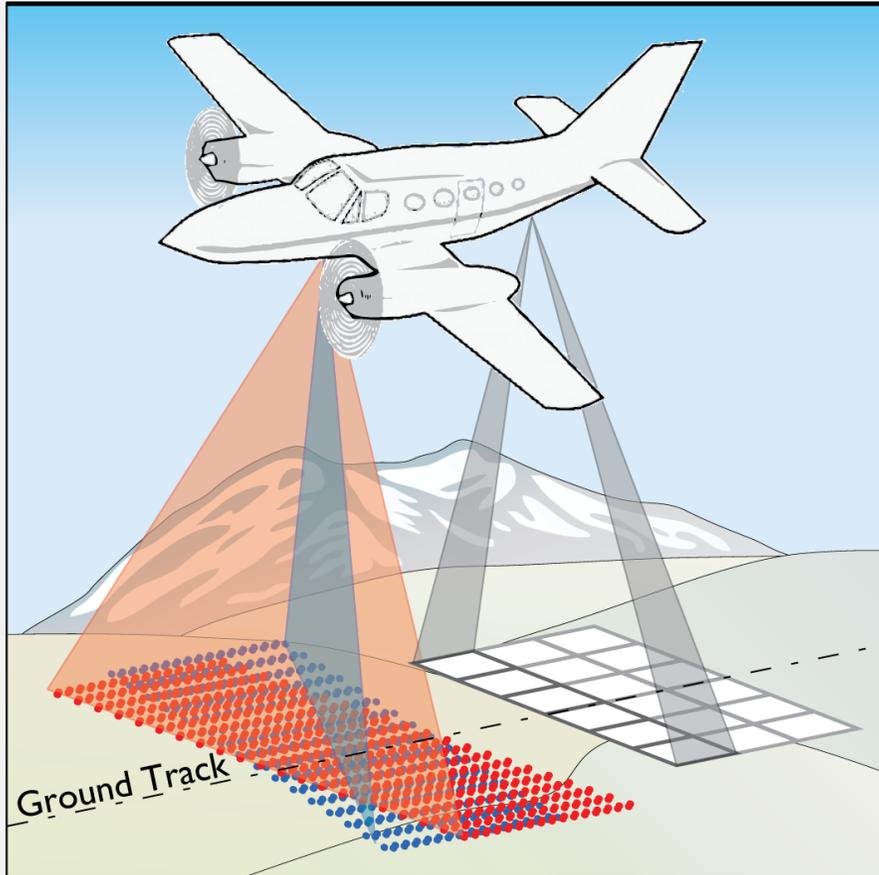
WSRF PROJECT

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Emily Carbone, Northern Water

## PRIMER QUESTIONS

1. What is the value of annual ASO flights to your work & sector?
2. What months are preferred for flights?
3. Who else should we connect with?
4. Would you like to engage during the project?

# WHAT IS AIRBORNE SNOW OBSERVATORIES (ASO)?



## Snow Water Equivalent

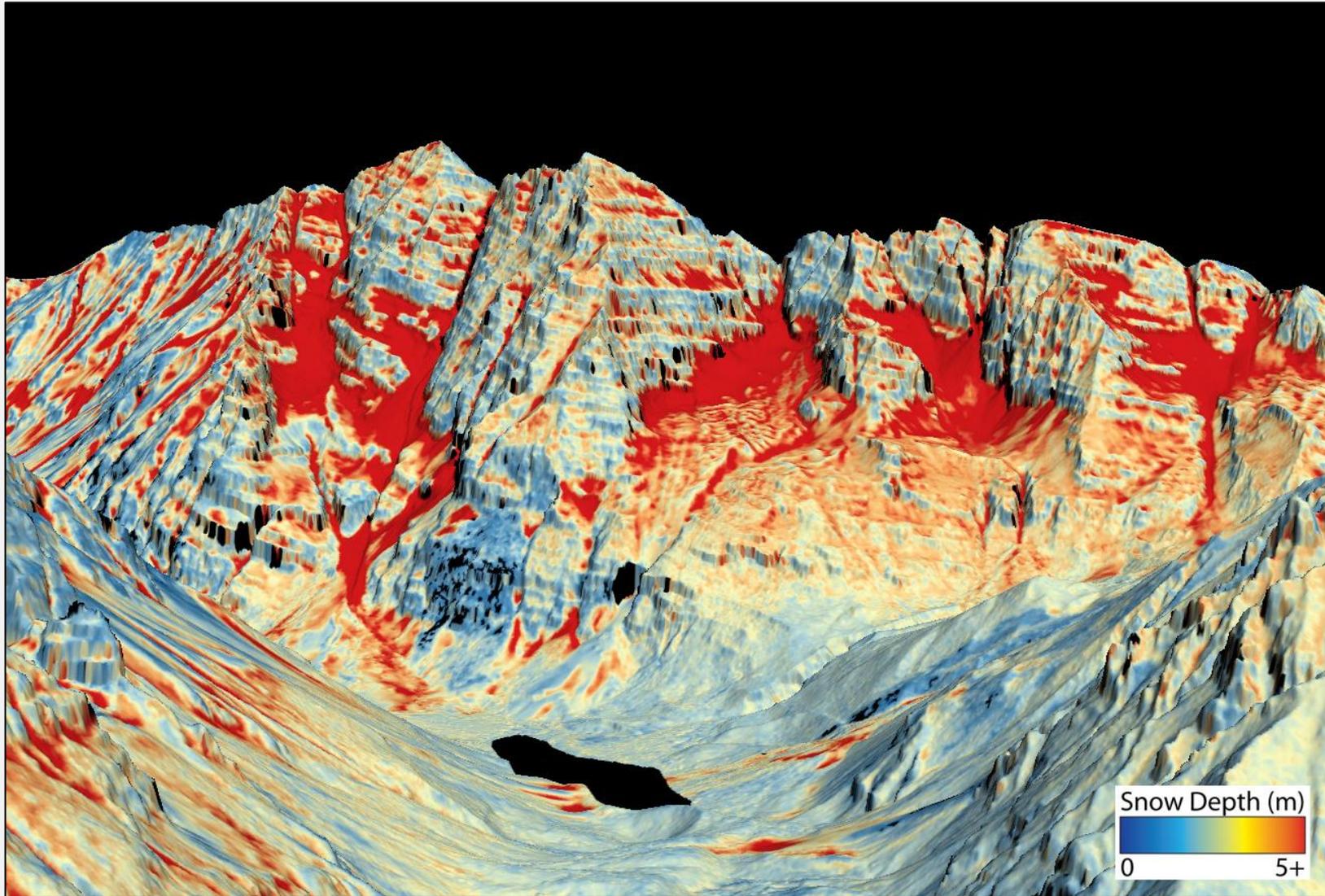
Lidar

## Snow Albedo

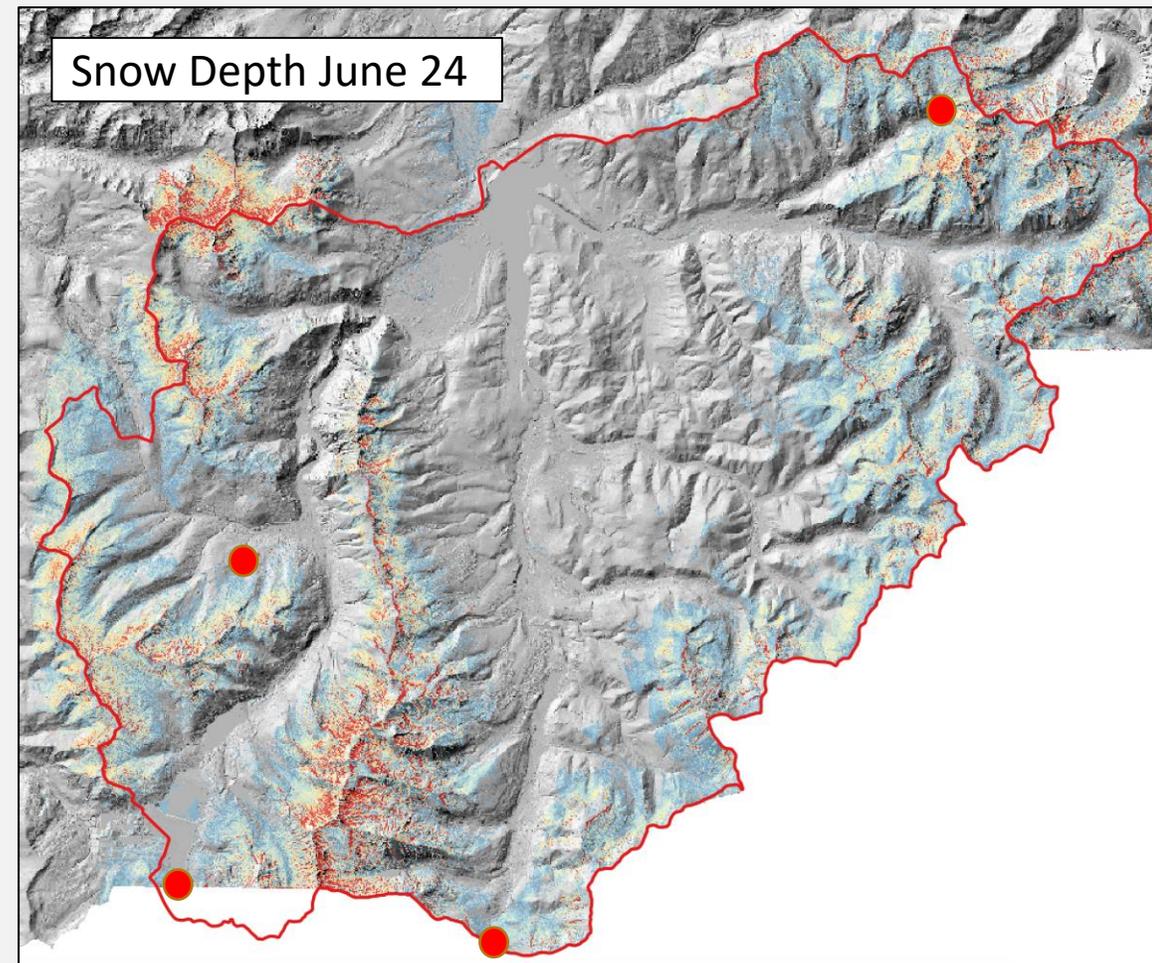
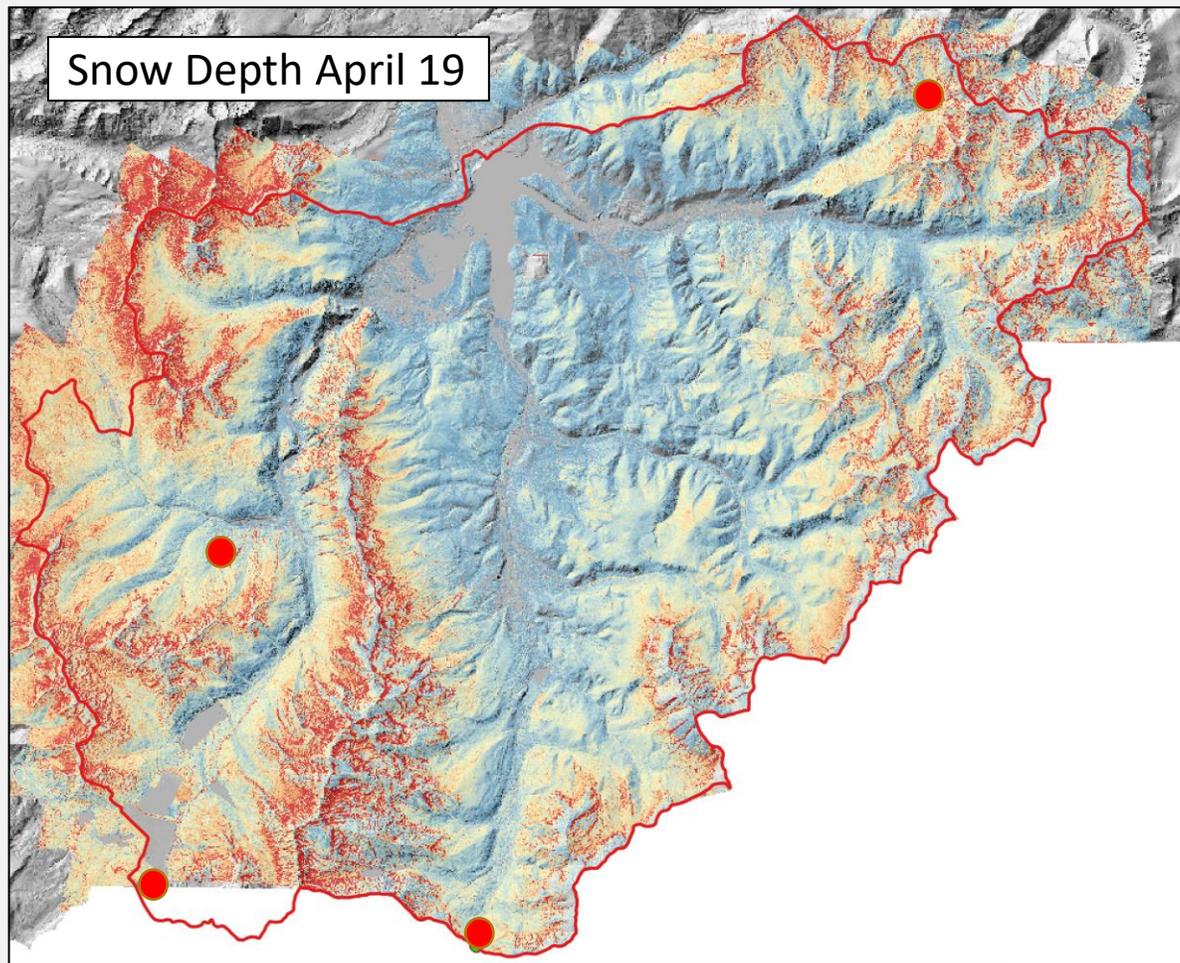
Spectrometer

- Depth = snow-on – snow-free
- Depth at 3m resolution!

# OUTPUT: HIGH RESOLUTION SNOW DEPTH AND SWE



# ASO CASE STUDY: DENVER WATER 2019

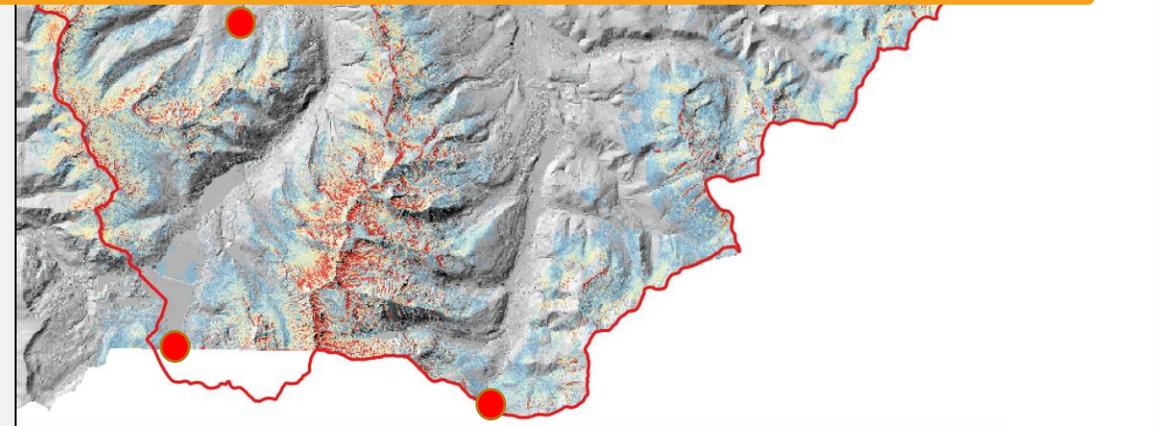
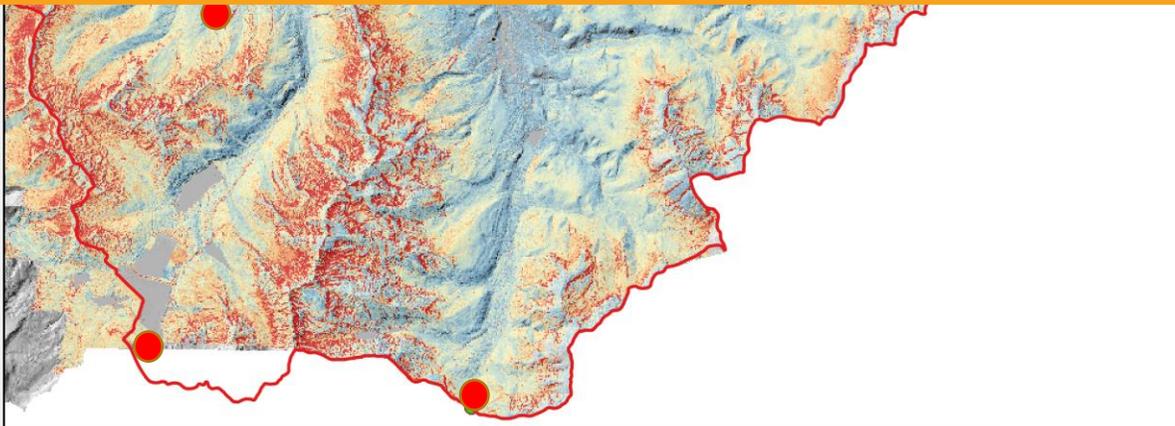


# ASO CASE STUDY: DENVER WATER 2019

Snow Depth April 19

Snow Depth June 24

ASO provides accurate estimate of volume of water (in acre-feet) remaining in snowpack



## CURRENT STATE

ASO pilot projects in Colorado have been geographically scattered and lack consistent funding

How can we build a sustainable Colorado ASO program that benefits as many water stakeholders as possible?



PROJECT  
GOAL

Develop and communicate a roadmap for creating a phased and sustainable ASO flight program in Colorado that would ultimately benefit multiple basins and a diverse group of water stakeholders

## MANY QUESTIONS NEED ANSWERING

- Which basins should be flown to benefit the most stakeholders?
- How often should they be flown?
- How much would it cost each year? What is the cost/benefit?
- How can we collaboratively and sustainably fund flights?
- What data does ASO provide?
- What information is most valuable to water agencies?
- How would the data be managed and distributed?
- What additional value would an expanded ASO program bring?

## APPROACH: COPRODUCTION AND ANALYSIS

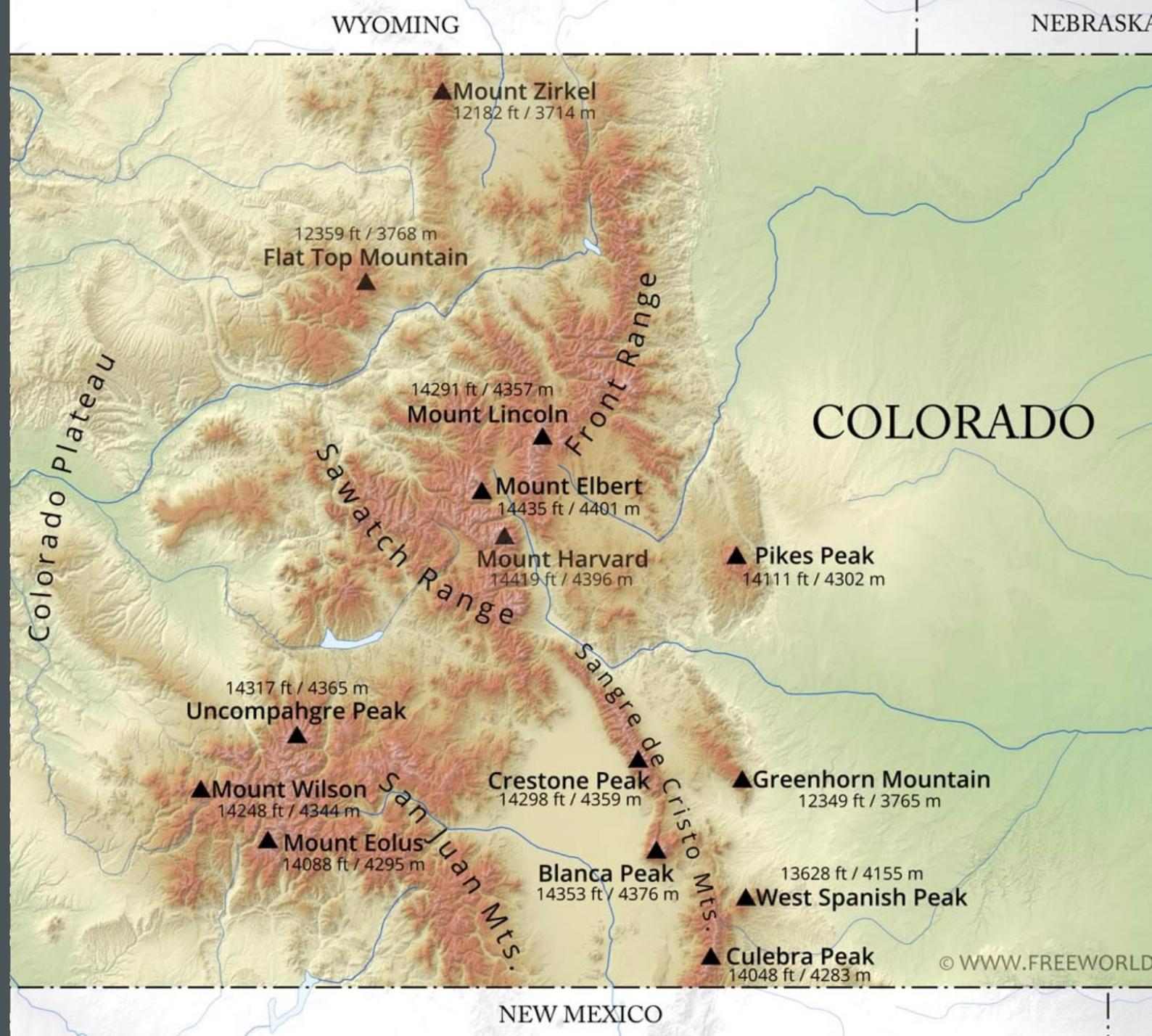
- **Project Planning Team:** Denver Water, Northern Water, ASO, Inc., Lynker Technologies, LLC
- **Collaborative Workgroup**
  - Colorado Springs Utilities
  - City of Aspen
  - City of Fort Collins
  - Colorado River District
  - City of Boulder
  - City of Greeley
  - Thornton Water
  - Pueblo Water
  - Eagle River Water & Sanitation District
  - Aurora Water
  - City of Westminster
  - Ruedi Water and Power Authority



# APPROACH: COPRODUCTION AND ANALYSIS

## Four Tasks

- Basin Flight Planning, Data Collection, Analysis
- Stakeholder Values Research
- Funding Stream Review
- Governance Structure





TO JOIN THE  
COLLABORATIVE!

## New Partners

- DWCD
- SLVWCD
- SJWCD
- Colorado DWR
- Round Tables
- NRCS
- Navajo Nation
- Army Corps
- Reclamation
- Boulder County
- DRCOG
- CWCB
- CO ski resorts
- CSAS
- CBRFC
- Colorado State University
- University of Colorado
- SW CO ASO Stakeholder Group

# THANK YOU

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## Discussion/Chat Questions

1. What is the value of annual ASO flights to your work & sector?
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