

A scenic photograph of an alpine landscape. In the foreground, there are large, grey, moss-covered rocks. Several bright yellow flowers with dark centers are in bloom, along with some white flowers. The background shows rolling green hills under a blue sky with scattered white clouds.

# **The North American Botanic Garden Strategy for Alpine Plant Conservation: How you can engage**

**Colorado Rare Plant Symposium**

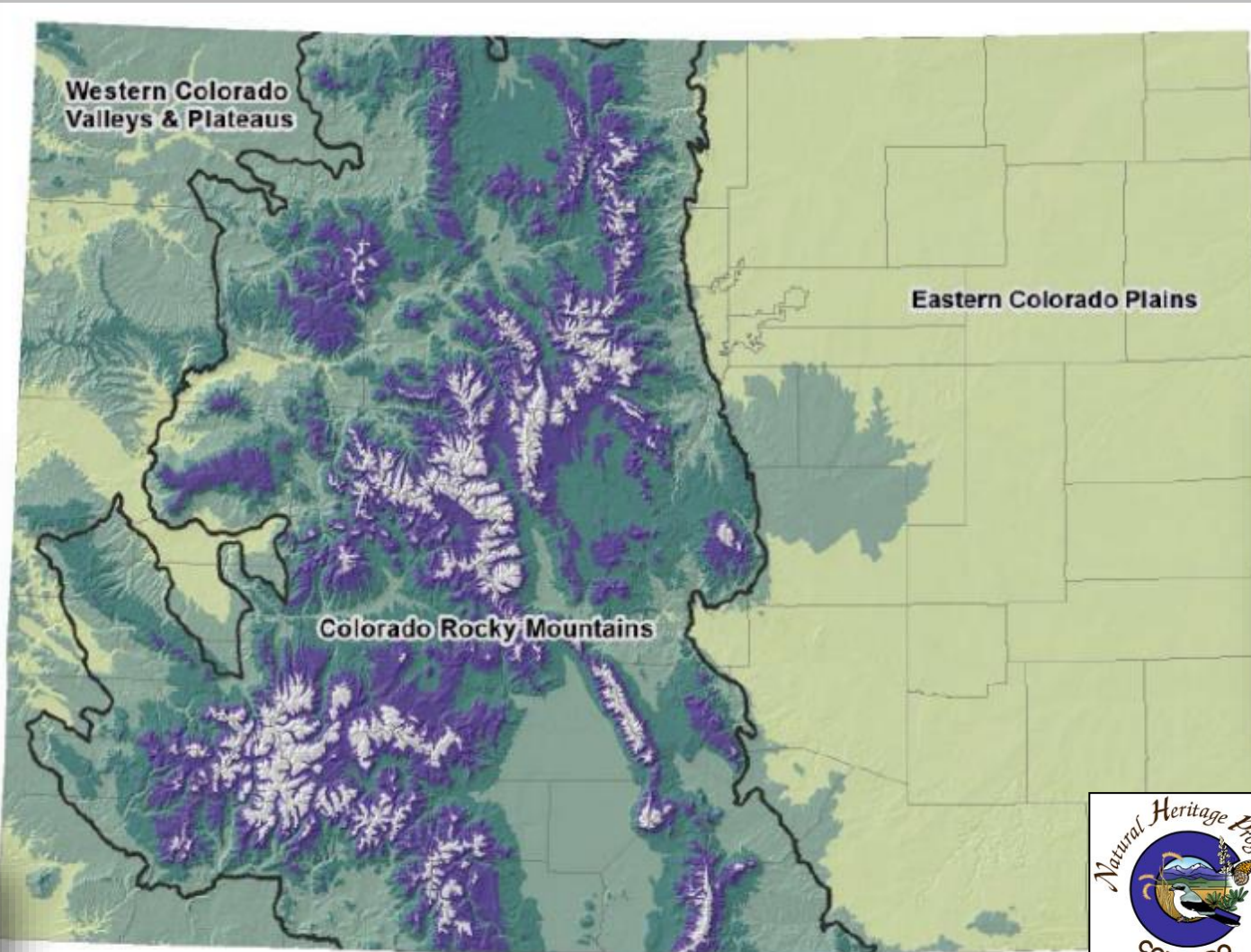
**September 10, 2021**

**Jennifer Neale - Denver Botanic Gardens**

**Mike Kintgen, Amy Schneider, Rebecca Hufft – Denver Botanic Gardens**

**Nicola Ripley, Nanette Kuich, Emily Griffoul – Betty Ford Alpine Gardens**





Alpine Sub-alpine Montane Foothills / Lower montane Plains



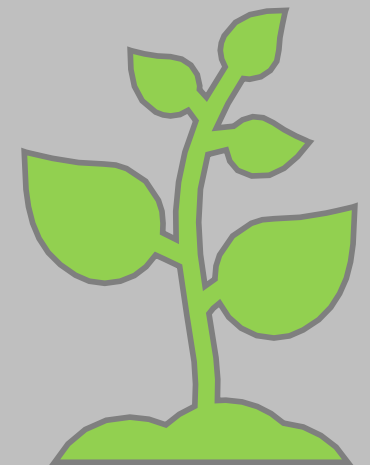
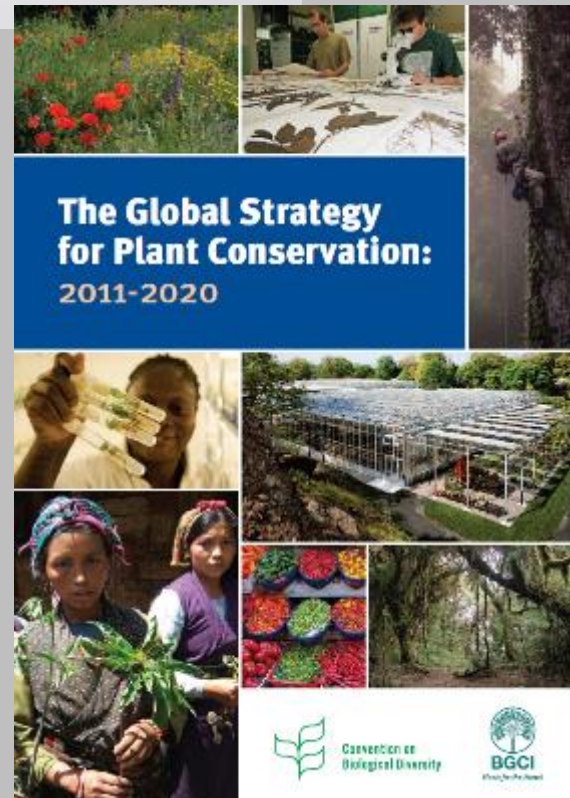


# Global Strategy for Plant Conservation

*“The Global Strategy for Plant Conservation is a catalyst for working together at all levels – local, national, regional and global – to understand, conserve and use sustainably the world’s immense wealth of plant diversity whilst promoting awareness and building the necessary capacities for its implementation.”*

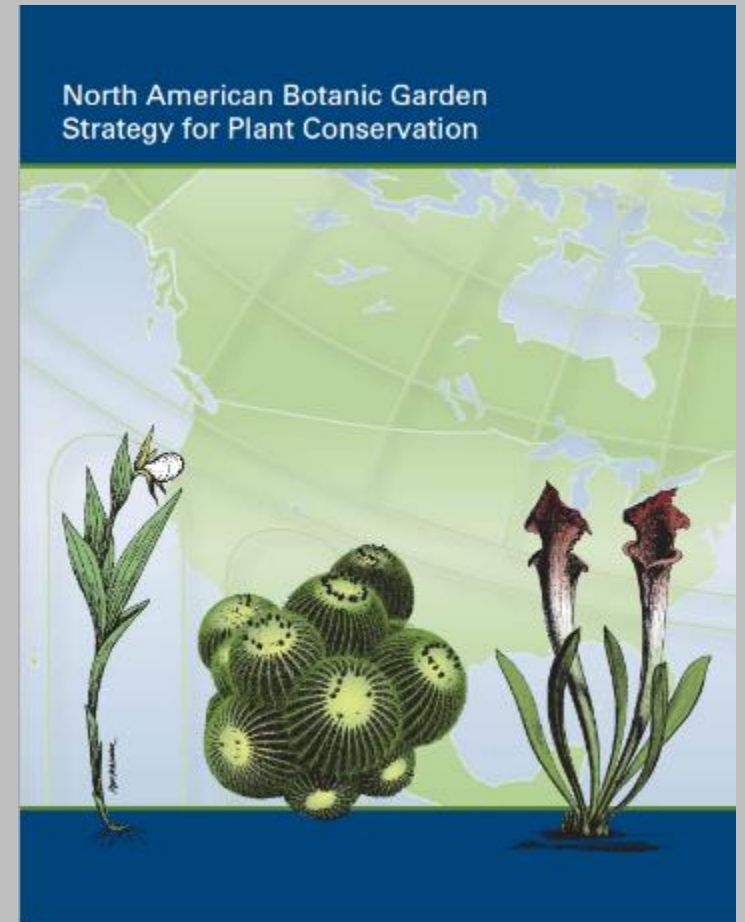
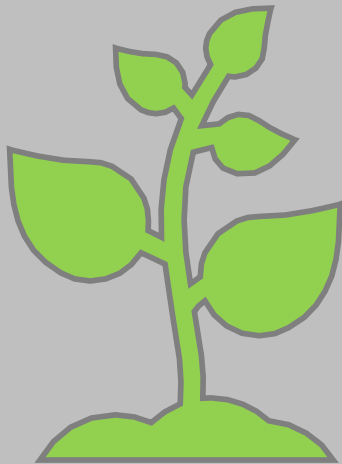


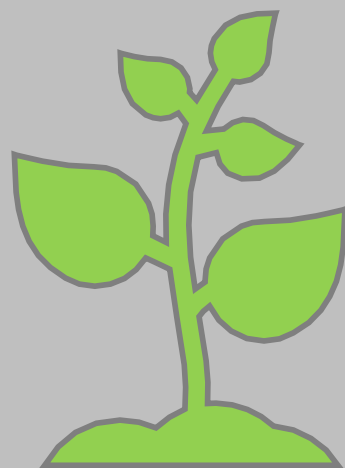
Photo: Hult International Business school





# North American Botanic Garden Strategy For Plant Conservation

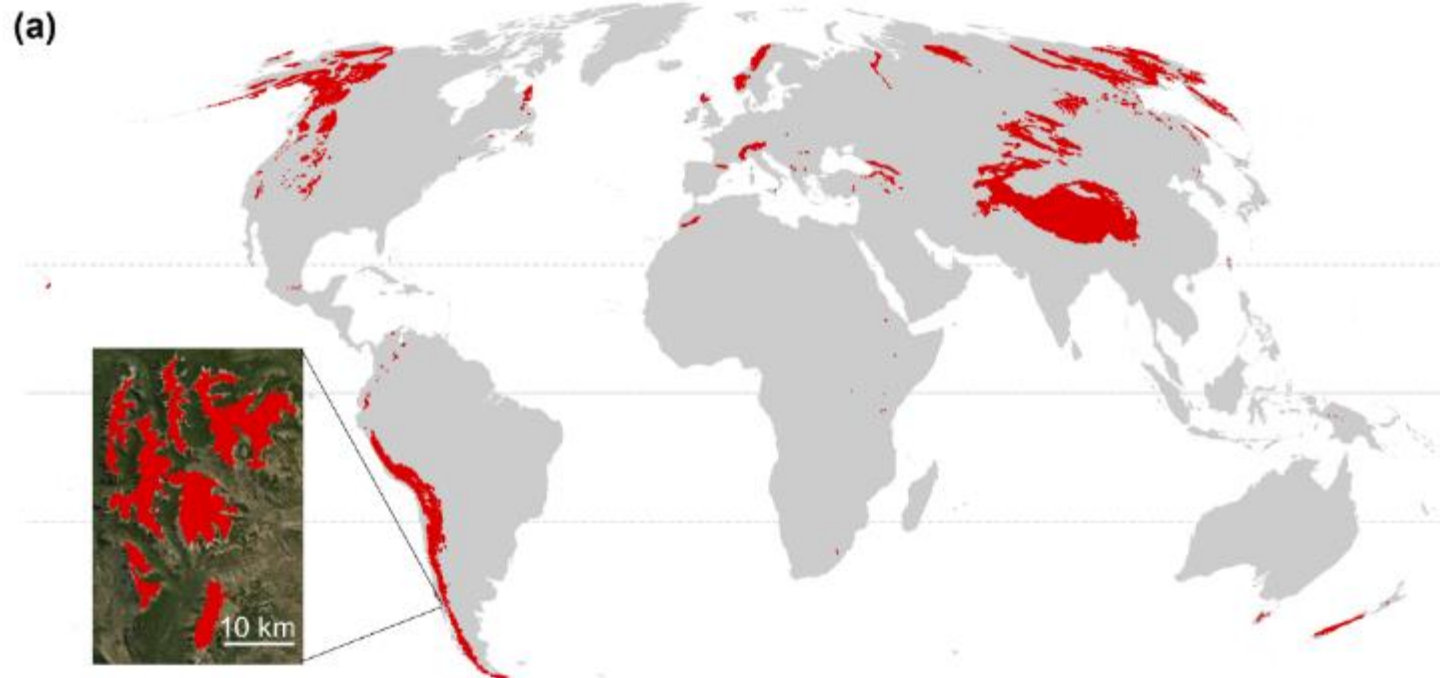




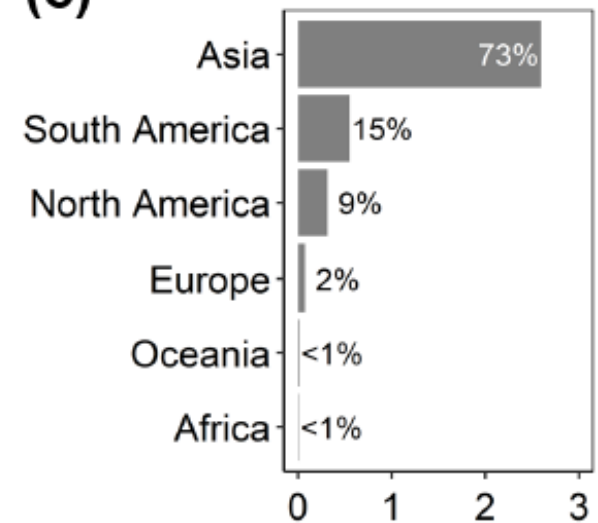
2020

**North American Botanic Garden**  
Strategy for Alpine Plant  
Conservation

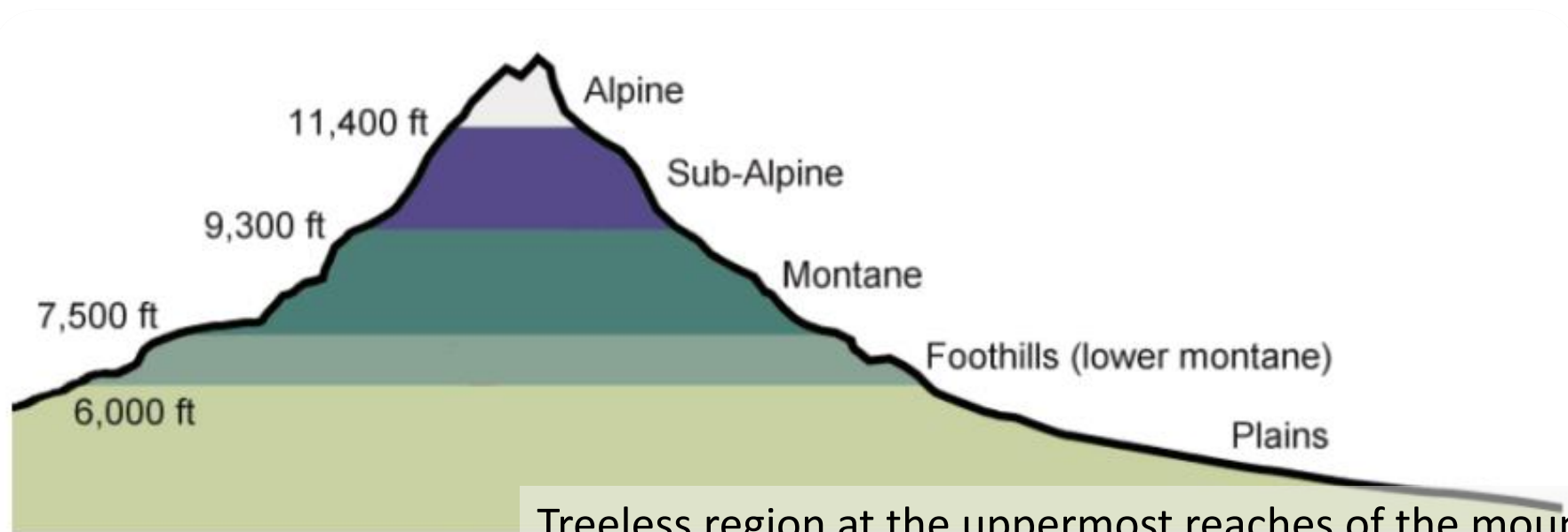




(c)



Testolin et al. 2020. *Ecography* 43: 779-788

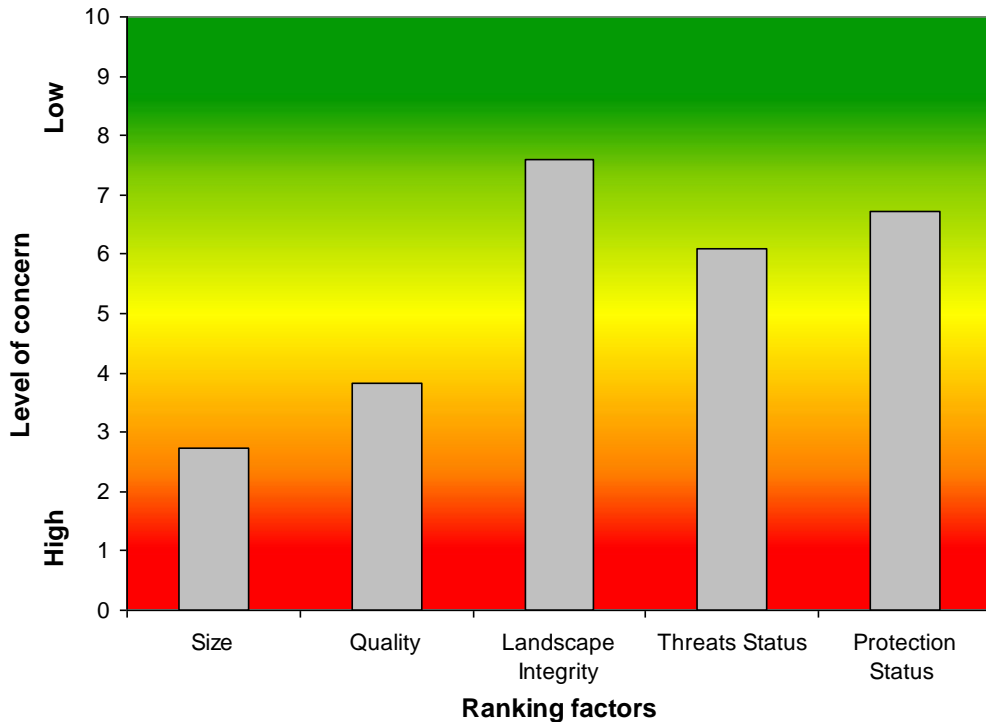


Treeless region at the uppermost reaches of the mountains (Körner et al., 2011)



# Alpine Environments

Average Scores for Rare Plants Occurring in  
Alpine Habitat (n=12)



**Alpine habitats account for about 3% of Colorado's landscape. Alpine habitats are effectively conserved; the primary threat to Colorado's alpine plants is global climate change.**

**Biodiversity Scorecard 2011**





# Threats

- Evidence of warmer temps
- Evidence of drier climates
- Pushing climate zones up in elevation and latitude



Photos: Emily Griffoul



## SUMMARY OF OBJECTIVES AND TARGETS

The Alpine Strategy has four objectives and twelve targets to guide botanic gardens in meeting the objectives, summarized below.

### OBJECTIVE 1 Understand and document alpine plant diversity.

TARGET 1. Develop a working map of all North American alpine areas by 2022.

TARGET 2. Create a list of all known alpine plants of North America that highlights alpine plants whose conservation status is ranked G1/T1 – G3/T3 by 2022.

TARGET 3. Assess land management designations for all North American alpine habitats by 2023.

TARGET 4. Provide online access to floristic inventories and research on North American alpine plants to minimize gaps in knowledge by 2030.

### OBJECTIVE 2 Conserve alpine plants and their habitats.

TARGET 5. Protect 50 percent of the most Important Plant Areas (IPAs) for alpine plant conservation in North America by 2030.

TARGET 6. Conserve at least 25 percent of all identified North American alpine flora *in-situ* by 2030.

TARGET 7. Conserve 60 percent of threatened alpine plant species in North America *in-situ* by 2030.

TARGET 8. Conserve 60 percent of all identified alpine plant species in North America *ex-situ* by 2030.

TARGET 9. Ensure that at least 75 percent of all identified threatened North American alpine plant species are held in *ex-situ* collections, and 10 percent are in recovery and/or restoration programs by 2030.

### OBJECTIVE 3 Promote awareness of the alpine ecosystem and plant diversity through education and outreach.

TARGET 10. Incorporate the irreplaceable value of the North American alpine ecosystem and plant diversity into educational and public awareness programs at botanic gardens by 2025.

### OBJECTIVE 4 Build capacity for the conservation of alpine plant species and associated habitats.

TARGET 11. Increase the number of trained professionals working on North American alpine plant conservation to address local, regional and national needs by 2030.

TARGET 12. Establish and strengthen networks, partnerships, associations and stakeholders for alpine conservation activities at regional, national and international levels by 2030.

Understand – basic research

Conserve – stakeholders

Educate – Use our platform

Build – Train and Network



# 1. Understand and Document

```
graph LR; A[1. Understand and Document] --- B[1. Develop a Working Map]; A --- C[2. Develop a Working List]; A --- D[3. Assess Land Management Designations]; A --- E[4. Conduct Floristic Inventories and Research (make data available online)];
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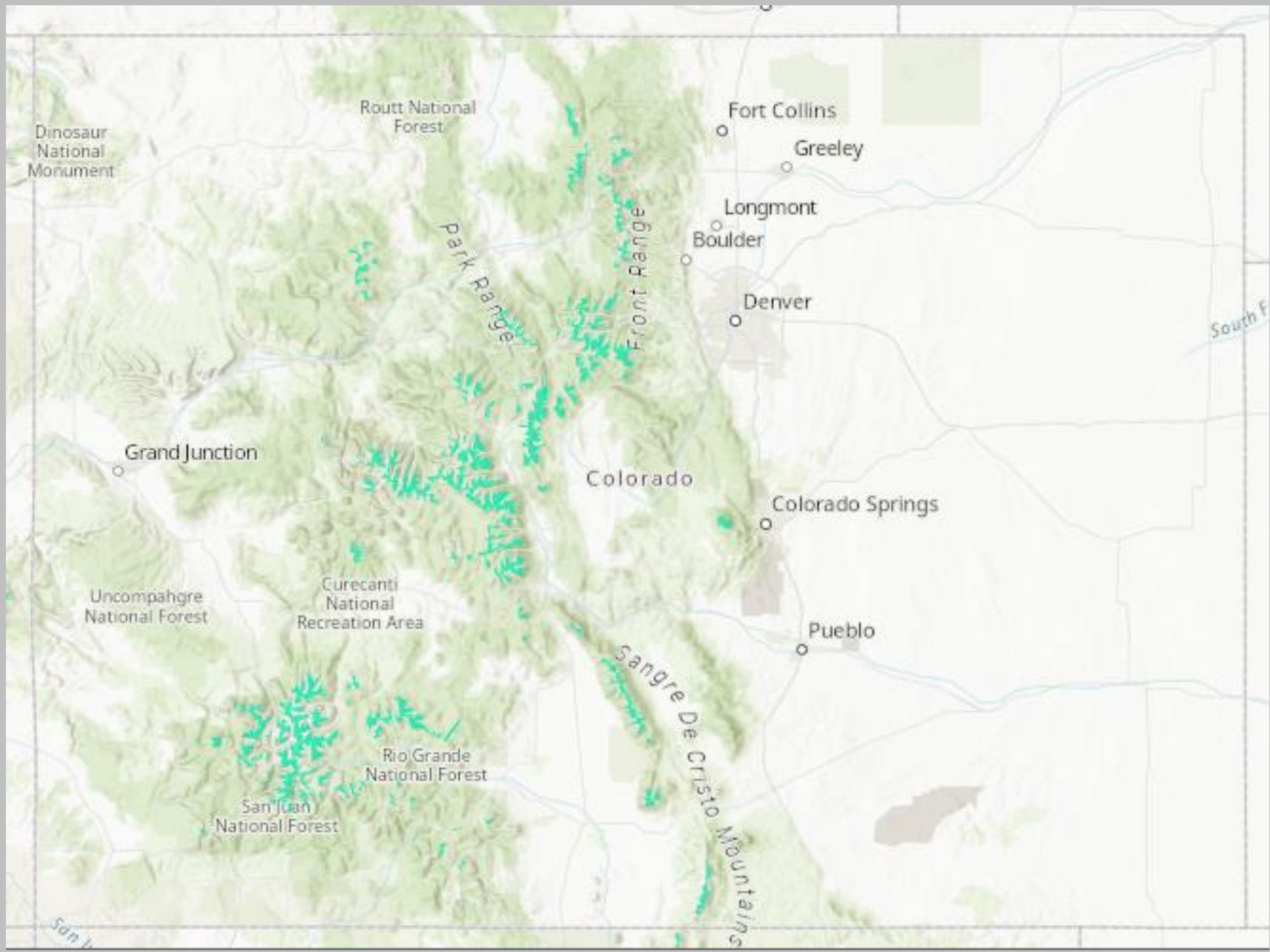
1. Develop a Working Map

2. Develop a Working List

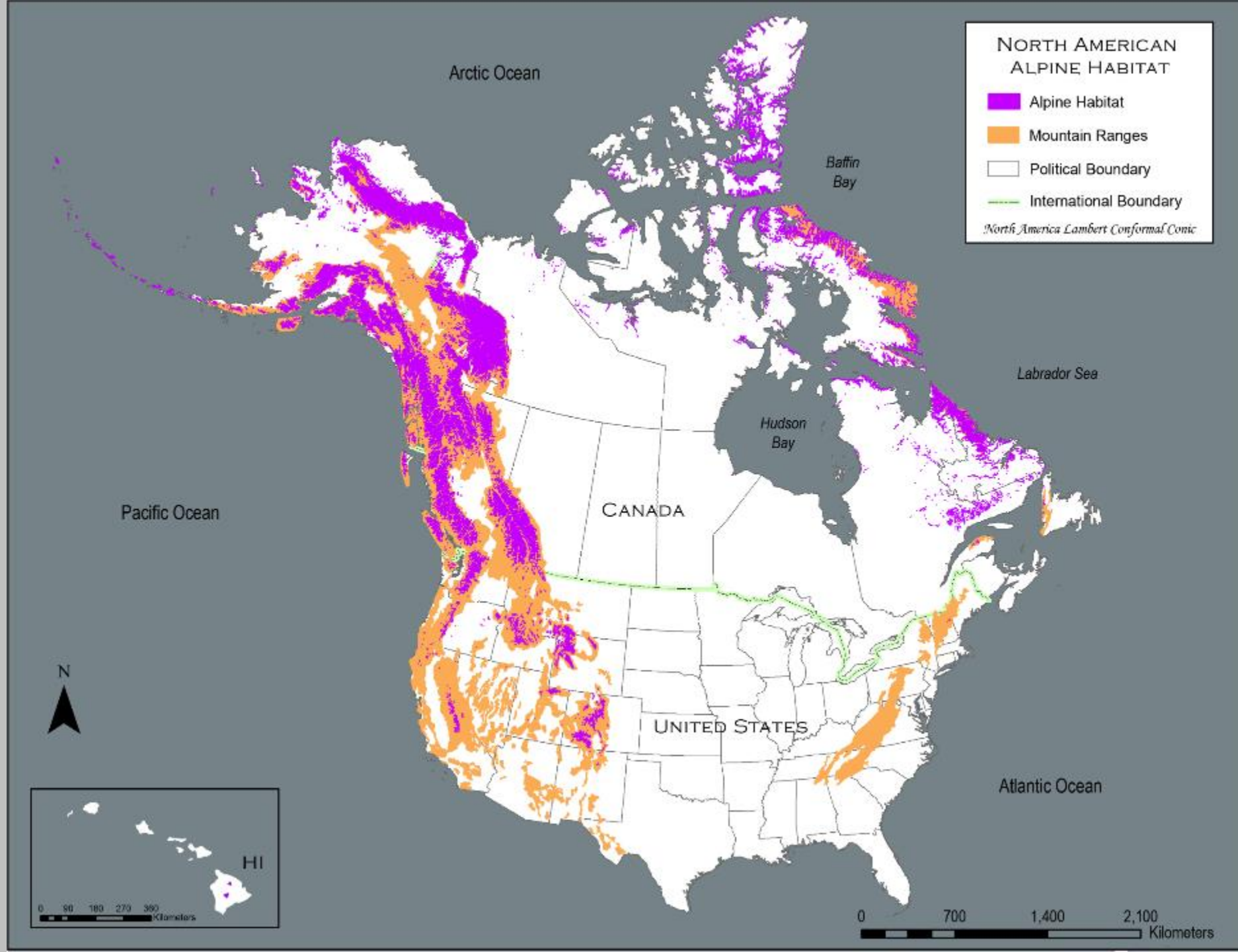
3. Assess Land Management  
Designations

4. Conduct Floristic Inventories  
and Research (make data  
available online)













Ericaceae	<i>Delphinium nuttallianum</i>
Ericaceae	<i>Descurainia incana</i>
Ericaceae	<i>Erigeron flagellaris</i>
Brassicaceae	<i>Eriogonum umbellatum</i>
Gentianaceae	<i>Erysimum capitatum</i>
Geraniaceae	<i>Frasera speciosa</i>
Geraniaceae	<i>Geranium richardsonii</i>
Boraginaceae	<i>Geranium viscosissimum</i>
Polemoniaceae	<i>Hackelia floribunda</i>
Cupressaceae	<i>Ipomopsis aggregata</i>
Cupressaceae	<i>Juniperus communis</i>
Cupressaceae	<i>Juniperus monosperma</i>

- Plant Lists being curated
- Gathered lists from regional experts
- Need to compare to online databases
  - SEINet
  - PLANTS
  - BONAP



Photos: Emily Griffoul



# Warming Chamber Research

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Photo: Emily Griffoul

## 2. Conserve Plants and Habitats

```
graph LR; A[2. Conserve Plants and Habitats] --- B[5. Protect 50% of Important Alpine Plant Areas]; A --- C[6. Conserve 25% of all alpine plants in situ]; A --- D[7. Conserve 60% of all threatened alpine plants in situ]; A --- E[8. Ensure 60% of all alpine plants conserved ex situ]; A --- F[9. Ensure 75% of all threatened alpine plants conserved ex situ];
```

5. Protect 50% of Important Alpine Plant Areas

6. Conserve 25% of all alpine plants *in situ*

7. Conserve 60% of all threatened alpine plants *in situ*

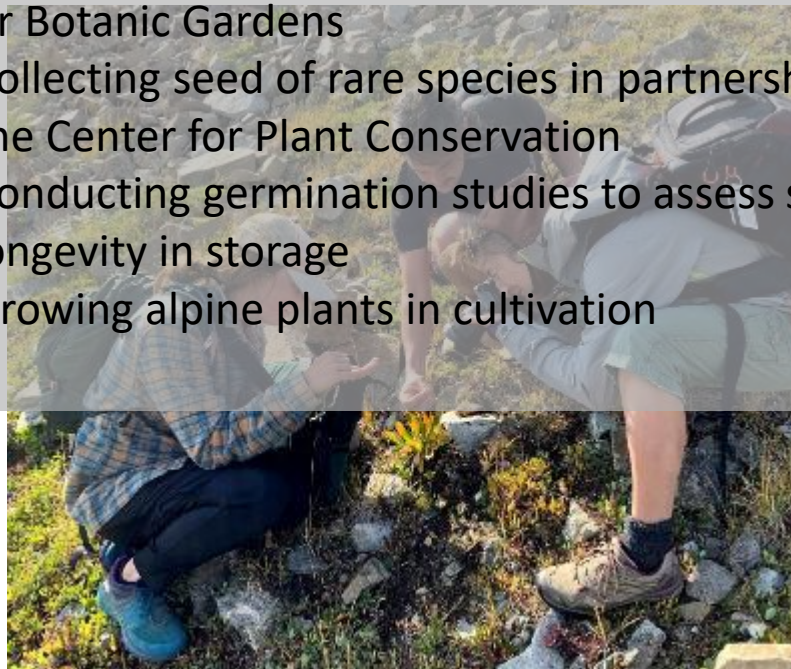
8. Ensure 60% of all alpine plants conserved *ex situ*

9. Ensure 75% of all threatened alpine plants conserved *ex situ*





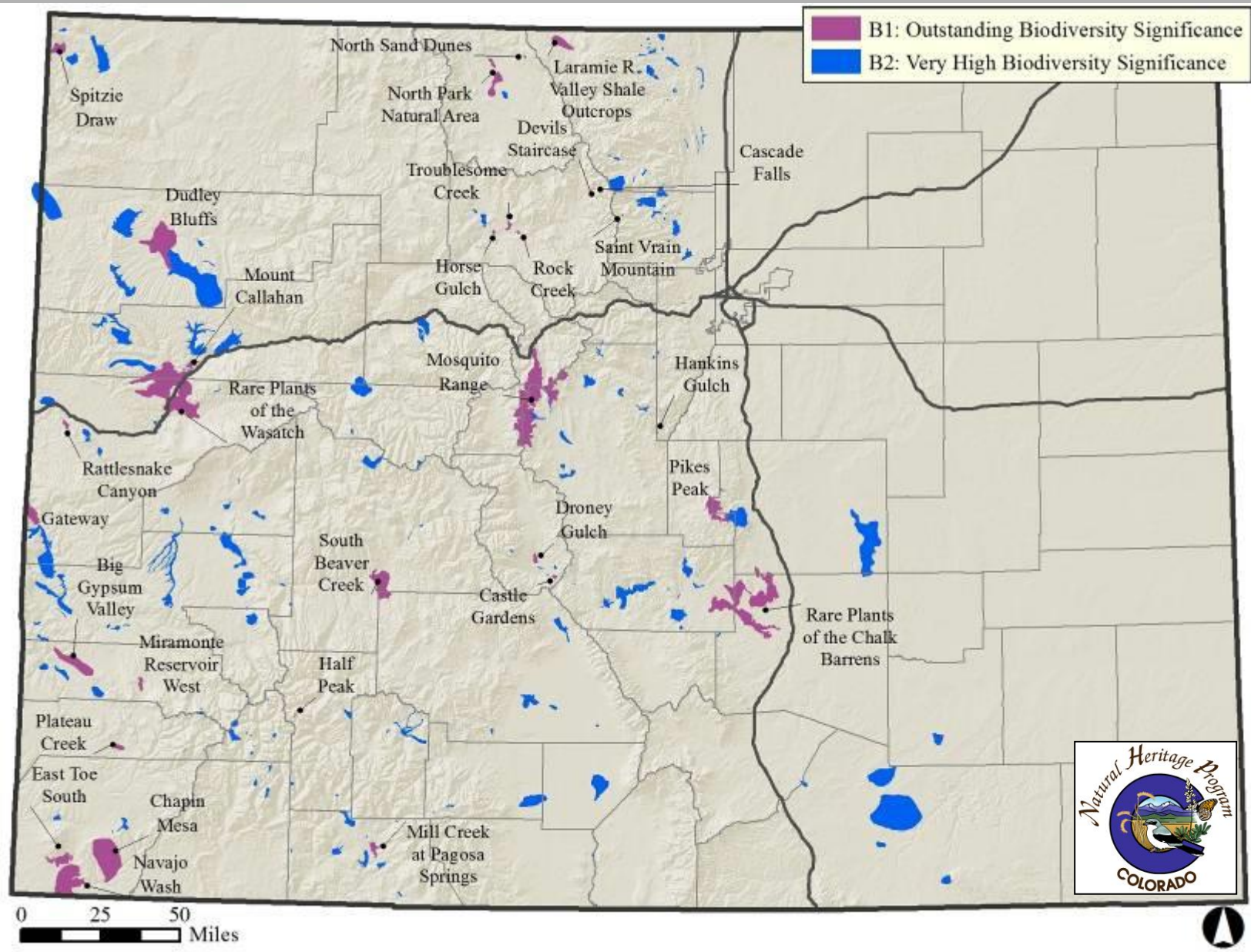
- Betty Ford Alpine Gardens
  - Collecting seed of common species for seed banking
  - Collecting vouchers to document diversity
  - Building partnerships with colleagues



- Denver Botanic Gardens
  - Collecting seed of rare species in partnership with the Center for Plant Conservation
  - Conducting germination studies to assess seed longevity in storage
  - Growing alpine plants in cultivation

Photos: Emily Griffoul





## Important Plant Areas

- Build off existing framework
- Determine methodology for all North America
- Identify priority areas



### 3. Promote awareness

10. Botanic Gardens Promote importance of alpine habitats through public programs, education and outreach







Photos courtesy of Betty Ford Alpine Gardens

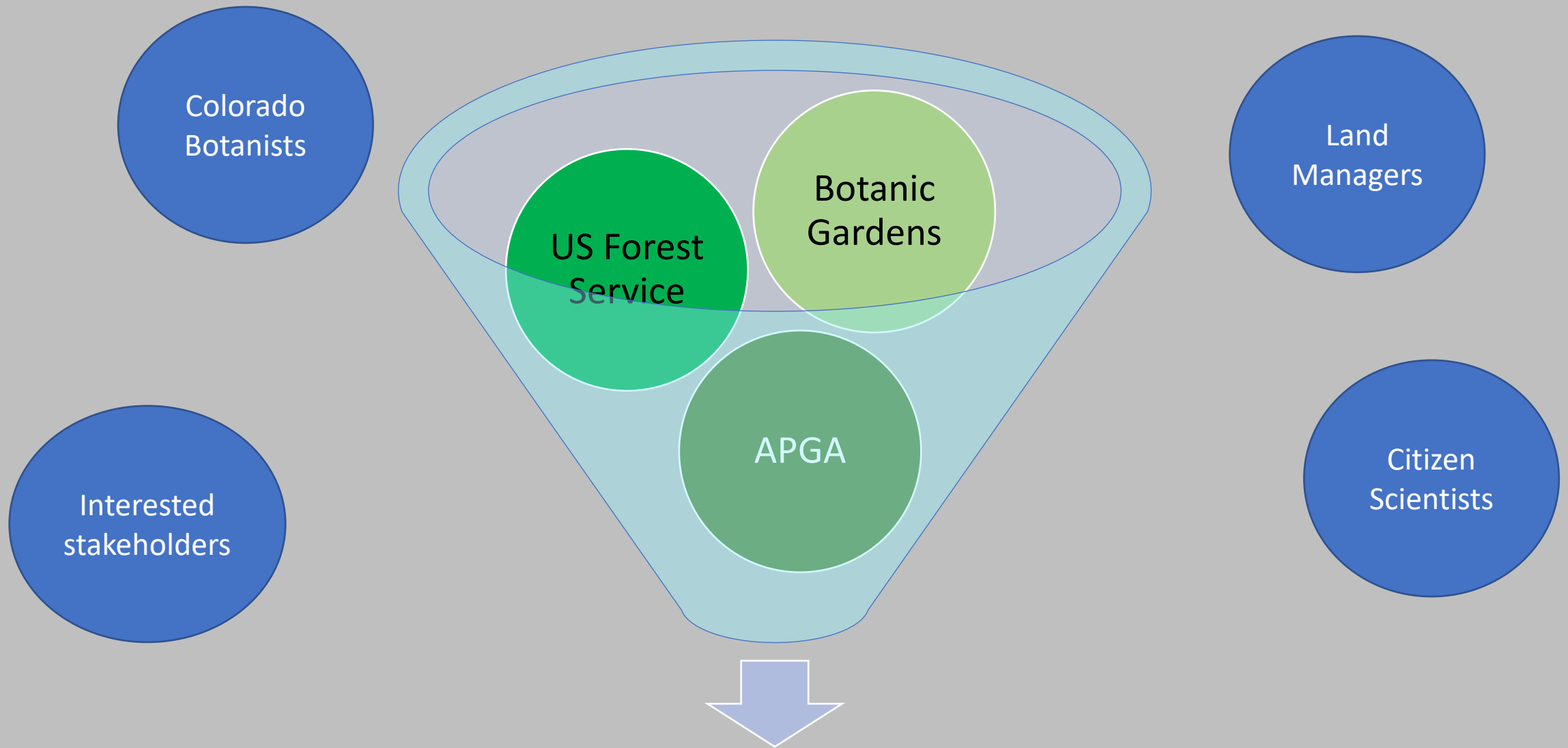
## 4. Build Capacity

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graph LR; A[4. Build Capacity] --- B[11. Increase the number of trained professionals at all levels]; A --- C[12. Establish and strengthen networks and partnerships];
```

11. Increase the number of trained professionals at all levels

12. Establish and strengthen networks and partnerships





Alpine Plant Conservation

# Rare Plant Conservation Initiative Goal

To **conserve Colorado's most imperiled native plants** & their habitats...

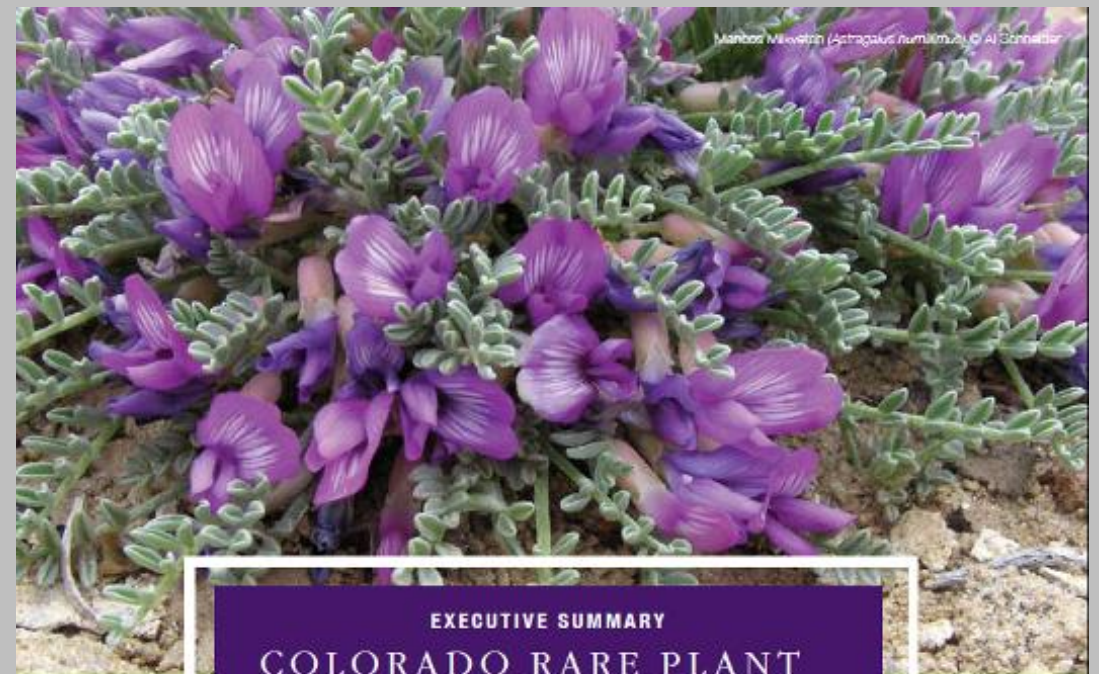
**through collaborative partnerships** for the preservation of our natural heritage & the benefit of future generations.





# Conservation Strategy Objectives

1. Secure habitat protection
2. Minimize impacts
3. Improve understanding of distribution & status
4. Adopt measures for *ex-situ* conservation
5. Develop state recognition & funding
6. Facilitate stewardship



EXECUTIVE SUMMARY  
COLORADO RARE PLANT  
CONSERVATION STRATEGY

"Plants have too long been hidden in plain sight. The prospect of continued threats to the nation's plant life, coupled with the large proportion of the flora already at risk, argues that now is the time to bring plants out from the background, and to put the conservation needs of our nation's flora squarely into view." - Stein and Gravuer, 2008



Download the Strategy: [bettyfordalpinegardens.org/wp-content/uploads/2021/02/AlpineStrategy.pdf](https://bettyfordalpinegardens.org/wp-content/uploads/2021/02/AlpineStrategy.pdf)  
[www.botanicgardens.org/sites/default/files/file/2021-05/2020AlpineStrategy.pdf](https://www.botanicgardens.org/sites/default/files/file/2021-05/2020AlpineStrategy.pdf)

2020

North American Botanic Garden  
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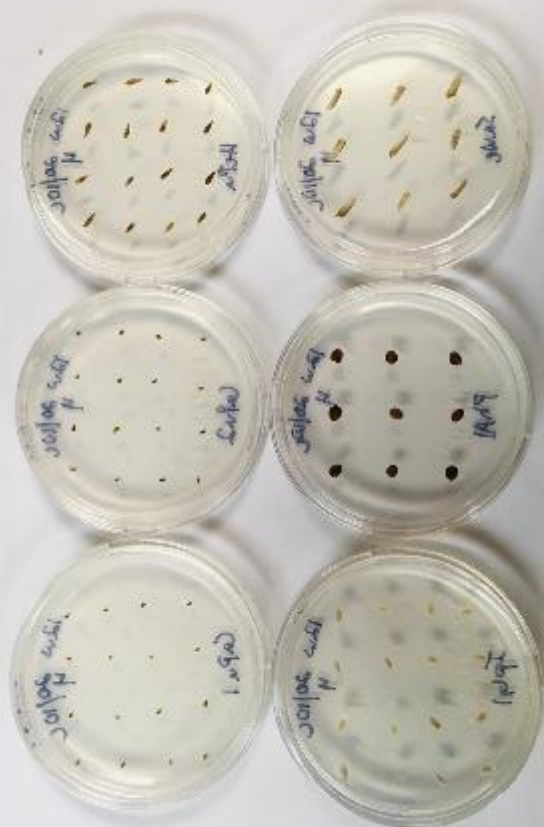



Photo: Emily Griffoul





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