

STRATEGIC PLAN

Charles Maurer Herbarium at Colorado State University

Fort Collins, Colorado



OK. CR. 23
Aquilegia coerulea James 28
Determined by P. A. Rydberg

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| No. 274. | FLORA OF COLORADO. | 23 |
| Ord. <i>Ranunculaceae</i> . | | |
| Gen. & sp. <i>Aquilegia coerulea</i> , James. | | |
| Loc. <i>Horsetooth Gulch</i> . | | |
| Coll. <i>C. S. Crandall</i> . | Date <i>May 31, 1890</i> . | |
| HERBARIUM STATE AGRICULTURAL COLLEGE, COLORADO. | | |

CHARLES MAURER HERBARIUM STRATEGIC PLAN

Executive Summary

The Charles Maurer Herbarium at Colorado State University is the oldest herbarium in the southern Rocky Mountain region, founded in 1883. It is a museum-quality collection of over 100,000 plant specimens that primarily document the distribution and natural variation of the over 3,300 species of flowering plants, ferns, and conifers in the state of Colorado. The creation of this document, the first strategic plan for the herbarium, provides an opportunity for herbarium associates and staff to become familiar with the herbarium's organizational context, to build a shared understanding of role and breadth of the herbarium's activities, and to establish a strategy for success.

The herbarium's extensive collection of plants from Colorado continue to be its major asset and distinguish it from herbaria worldwide. The herbarium has also developed considerable research, education, and outreach activities over the last 15 years. These include providing internship opportunities for undergraduate students, floristic studies for graduate students, tours to K-12 students from local schools, outreach through STEM activities, and outreach through workshops and field trips on plant identification to the community.

The Charles Maurer Herbarium is in a key position to support CSU's College of Natural Sciences in achieving their "Discovery Begins Here" mission and goals by providing excellence in research, education, and public and professional service to CSU and the larger community. The herbarium is likewise committed to providing an inclusive community and a positive educational experience for students, inspiring the next generation of scholars, researchers, and leaders that will contribute to an ever-changing global society.

MISSION STATEMENT

The mission of the Charles Maurer Herbarium is to facilitate botanical research, teaching, and public service. It is especially concerned with encouraging student success by providing positive research and internship mentorship opportunities, creating and participating in outreach opportunities that increase engagement with the public, providing digitized specimen images and data online, and encouraging collaborations within scientific communities at Colorado State University as well as other professional herbarium users (U.S. Forest Service, Colorado Natural Heritage Program, Bureau of Land Management, The Nature Conservancy), other universities, and private land owners.

VISION STATEMENT

The Charles Maurer Herbarium will support the College of Natural Science's "Discovery Begins Here" vision of educating and inspiring the next generation of scholars, researchers, and professional leaders through research by becoming a prominent center for biodiversity research and citizen science in Colorado. The herbarium will provide external funding for research, continue to document Colorado's vascular flora, and ultimately benefit the citizens of Colorado and the world by supporting core activities that enhance our understanding of the diversity and distribution of plants in the southern Rocky Mountain region.

STRATEGY STATEMENT

As permanent records of the past, the botanical specimens housed at the Charles Maurer Herbarium provide invaluable and irreplaceable resources for protecting our future and engaging with students, researchers, and citizens in activities that further biodiversity research, resource management, and conservation in the Rocky Mountains.

OUR GOALS

1. Increase knowledge and awareness of plant biodiversity in Colorado
2. Provide positive research and internship mentorship opportunities for undergraduate students.
3. Create and participate in outreach opportunities that increase engagement with the public.
4. Encourage collaborations within scientific communities at CSU, other universities, professional herbarium users, and private land owners.
5. Provide external funding for research.



1. Increase knowledge and awareness of plant biodiversity in the Rocky Mountains

- Expand graduate degrees in floristic studies and actively seek students to pursue Master's degrees in Botany with a focus on floristic studies. *Continuous.*
- Work with the U.S. Forest Service, BLM, Colorado Natural Heritage Program, private land owners, and other land managers to determine a priority list of areas in need of floristic inventories. *2019.*
- Seek a partnership with The Nature Conservancy to fund floristic inventories on TNC lands in Colorado and the Rocky Mountains. *2019.*
- Publicize research activities. *Continuous.*
- Produce a list of accessioning priorities. *2019.*
- Update data dissemination portal for GBIF, SEINet, and iDigBio to ensure that online images and databased specimens are kept up-to-date. *2019.*



2. Provide positive research and internship mentorship opportunities for undergraduate students

- Maintain the active and popular internship program (BZ487V), and continue to reach out to underrepresented students of diversity to participate in internship opportunities. *Continuous.*
- Encourage students to complete a clearly defined project during their internship on museum curation or herbarium specimens that will be displayed at the annual CSU Celebrate Undergraduate Research and Creativity Showcase. *2019.*
- Have herbarium interns implement a social-media strategy for the herbarium, detailing projects, specimens of interest, etc. *2019.*



3. Create and participate in outreach opportunities that increase engagement with the community

- Develop citizen science opportunities to engage the community in museum collections. *2019.*
 - i. Create an iNaturalist project page for the Charles Maurer Herbarium where community members can report and add new records.
 - ii. Create a county record contest for community members to actively seek out undocumented species from counties across Colorado.
 - iii. Display citizen science opportunities prominently on the home page of the Charles Maurer Herbarium website.
- Continue to provide workshops through the Colorado Native Plant Society and Colorado Native Plant Master Program. *Continuous.*
- Continue to provide field trips through the Colorado Native Plant Society and at the Crested Butte Wildflower Festival. *Continuous.*
- Continue to have curators and students speak at local Colorado Native Plant Society chapter and annual meetings on current research, the importance of museum collections, and floristic studies. *Continuous.*
- Continue to provide tours of the Charles Maurer Herbarium for local school groups, other classes at CSU, and the general public. *Continuous.*



4. Encourage collaborations within scientific communities at CSU, other universities, professional herbarium users, and private land owners

- Collaborate with professors in the Warner College of Natural Sciences at CSU to encourage natural resource students to complete research projects utilizing herbarium specimens for class projects, which will be displayed at the CSU undergraduate showcase. *2019.*
- Collaborate with the Colorado Natural Heritage Program and other herbaria in Colorado and the Rocky Mountains to identify region of significant phylogenetic diversity and endemism to provide aids for conservation assessment. *2019.*



5. Provide external funding for research

- Continue to work with current donors, and send individualized reports detailing how their donations were used for staff and student research. *2019.*
- Work with CSU College of Natural Sciences Development Team to develop a strategy for reaching and connecting with new potential donors. *2019.*



SWOT (STRATEGIES, WEAKNESSES, OPPORTUNITIES, THREATS) ANALYSIS

STRENGTHS

- Curates collections used to write the first and current *Flora of Colorado* (Rydberg, 1906; Ackerfield, 2015).
- Curates important collections from the U.S. Forest Service, BLM, NPS, Natural Areas Program, and CNHP.
- Trains the next generation of botanists and collection's managers through the undergraduate internship program.
- Collection of 100,000 specimens is fully databased and digitized, and available online.
- Continues to acquire additional collections that fill in our gaps of understanding plant biodiversity in the Rocky Mountains.

WEAKNESSES

- Lacks full-time curation.
- Lacks room for growth.
- Lacks sufficient work space which limits the number of users to the herbarium.
- Lack of sufficient personnel to process specimens in a timely manner.
- Little social media activity.
- Little activity to maintain the Friends of the Herbarium.
- Low on-campus visibility to other departments and colleges.
- Lack of floristic studies students to increase collections.

OPPORTUNITIES

- Collaborations within the CSU community.
- The Colorado Native Plant Society has numerous amateur and professional botanists who are interested in learning about and conserving the flora of Colorado.
- Numerous agencies (U.S. Forest Service, BLM, Nature Conservancy, Open Space Program) that we can partner with and build mutually beneficial collaborations.
- Citizen science initiatives to increase records from under-collected counties.
- Local schools, science fairs, STEM outreach programs offer areas for science outreach in Ft. Collins.

THREATS

- Lack of adequate funding.
- Lack of sufficient external funding to becoming independently funded.
- Lack of separate prep room for incoming specimens increases the risk of insect infestations.
- Flooding from floors above.
- Natural disasters (floods, fire, tornadoes).

SUSTAINABILITY

Maintaining Strengths

The Charles Maurer Herbarium is the oldest herbarium in the Rocky Mountains, and its core strengths are its staff and Colorado and Rocky Mountain plant specimens. These specimens include:

- Collections from the Hall and Harbour expedition to the Rocky Mountains in 1861.
- Collections from the first curators (Charles Crandall and Jacob Cowen) of the herbarium from 1890-1898 that formed the basis for the very first *Flora of Colorado* (Rydberg, 1906).
- Collections from curator Harold D. Harrington that went on to form the basis of the *Manual of the Plants of Colorado* (1954).
- U.S. Forest Service collections from the Rocky Mountains, including the 1940-1950 collections of U.S. Forest Service Botanist Paul Ginter.
- The Denham collection of 15,000 specimens collected throughout Colorado from 1960-1990
- Collections of rare species of conservation concern from the Colorado Natural Heritage Program.

The Charles Maurer Herbarium's staff are assistant curator Jennifer Ackerfield and curator Mark Simmons. Jennifer Ackerfield is well-known for her work on Colorado botany, and wrote the *Flora of Colorado* (<https://shop.brit.org/products/coloradoflora>) in 2015. One of Jennifer's main strengths is her ability to bring people together from multiple disciplines to collaborate on projects.



Addressing Weaknesses

The Charles Maurer Herbarium's most significant weaknesses are 1) lack of full-time curation and 2) lack of space for growth. We currently have the potential to acquire an additional ~50,000 specimens from additional collections on campus, but lack the space to house these collections. The appointment of a director in addition to a collection's manager and part-time curator would allow us to actively work on achieving our goals and objectives.

Capitalizing on Opportunities

Situated on the Colorado State University campus, with access to a world-renowned natural resource department, the Charles Maurer Herbarium is in an excellent position to pursue collaborations within the CSU community. We will continue to engage with the local community through education and outreach activities, and through this effort potentially gain donor funding. Jennifer Ackerfield has a strong connection to the local botanical community, and actively engages numerous community members in citizen-science initiatives.

Mitigating Threats

The most significant threat to the Charles Maurer Herbarium is the possibility that CSU decision-makers will deem the collection unimportant and either decrease funding and/or space, or eliminate the collection altogether. Continued communication of the strengths and achievements of the Charles Maurer Herbarium to policy makers is important so that herbarium is not forgotten. This strategic plan will enable the Charles Maurer Herbarium staff to highlight the goals, objectives, mission, and vision of the Charles Maurer Herbarium, demonstrate how these align with the goals of the college and university, and detail how the Charles Maurer Herbarium can help achieve these goals. We will work with the CSU College of Natural Sciences Development Team to seek external funding, including funds for specific student-led projects through CSU's Ramfunder website (<https://giving.colostate.edu/ramfunder/>).



KEY STAKEHOLDERS

1. Charles Maurer Herbarium staff, consisting of Jennifer Ackerfield (Assistant Curator), Mark Simmons (Curator), and an undergraduate assistant.
2. Collectors of the specimens that the Charles Maurer Herbarium curates, including those made by curators as well as graduate students who conduct floristic inventories.
3. CSU undergraduate and graduate herbarium interns.
4. Charles Maurer Herbarium volunteers.
5. CSU instructors and students using Charles Maurer Herbarium specimens for coursework. These courses are: Plant Identification, 150 students) taught by Jennifer Ackerfield, RS420 (Grass taxonomy, 20 students) taught by Jennifer Ackerfield, BZ325 (Plant Systematics, 20 students) taught by Mark Simmons, and BZ338 (Plant Morphology, 30 students) taught by Dave Steingraeber.
6. Natural resource managers based in Colorado. These include the Colorado Natural Heritage Program, the Nature Conservancy, the U.S. Forest Service, Bureau of Land Management, U.S. Department of Agriculture, and Open space and natural areas programs in Fort Collins and Boulder.
7. Include the Center for Environmental Management of Military Lands (CEMML) as a specimen-data provider through the Charles Maurer Herbarium portal.
8. Natural-history-pecimen data aggregators, including Integrated Digitized Biocollections (iDigBio; <https://www.idigbio.org/>), SEINet (<http://swbiodiversity.org/seinet/collections/>), and the Global Biodiversity Information Facility (GBIF; <https://www.gbif.org/>).
9. National and international colleagues who use Charles Maurer Herbarium digital data or physical specimens, including researchers, environmental consultants, and contractors.
10. Faculty and graduate students in the Warner College of Natural Resources at Colorado State University.
11. Education and outreach partners, including CSU extension agents, the Colorado Native Plant Society, the Crested Butte Wildflower Festival, and Colorado Master Gardeners.
12. The local community of amateur naturalists, especially members of the Colorado Native Plant Society.
13. Supporters of the Charles Maurer Herbarium, including Charlie and Ruth Maurer, the Jirsas, and those who have contributed to the Friends of the Herbarium giving fund that CSU established.
14. Funders, including the National Science Foundation and CSU Department of Biology

EVALUATION

A logic model involving activities leading to outputs, outcomes with metrics, benchmarks, and milestones for outputs and outcomes will be developed. These will be derived from our stated goals.

ACKNOWLEDGEMENTS

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