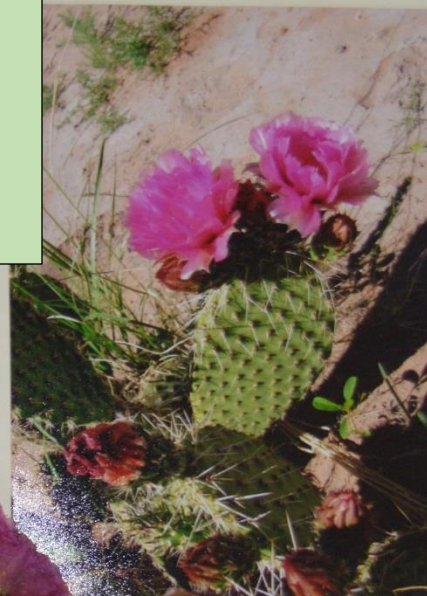


McDougall Herbarium Strategic Plan Museum of Northern Arizona

May 2018



Cactaceae of Arizona

Opuntia polyacantha Engelm. var. *erinacea*
(Engelm. & Bigelow) B. Parfitt

Coconino County: Paria Canyon, ca 2.5 miles
northwest of Lees Ferry, 12S 443676 E, 4084721
N, NAD 83/84, 3244 ft., 988 m.

At base of east-facing sand dune slope with *Atriplex canescens*, *Opuntia polyacantha erinacea*, *Rumex hymenosepalus*, *Dicoria canescens*, *Artemisia filifolia*, *Streptanthella longirostris*, *Lupinus kingii*, *Malacothrix parryi*, *Sphaeralcea grossularifolia*, *Vancleavea stylosa*, *Yucca baileyi*, *Helianthus petiolaris*, *Phacelia ivesiana*, *Gilia sinuata*, *Physaria rectipes*, *Mentzelia obscura*, *Cryptantha circumscissa*, *C. micrantha*. Locally frequent, flowers 86(l)x94(w) mm, 89x85 mm, 88x94 mm, 75x112 mm, 75x100 mm, 81x106 mm, outer perianth glossy pink with brown-tan midstripe, inner perianth glossy pink, filaments red (-orange), anthers cream-yellow, style cream-white, stigma lobes dark green.

7 May 2010
Wendy C. Hodgson 24856
with Kelly Watters, Vera Markgraf
Herbarium of Desert Botanical Garden (DES)



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McDougall Herbarium Strategic Plan

EXECUTIVE SUMMARY

This document, the first strategic plan for the herbarium, provides an opportunity for the herbarium staff and volunteers, as well as Museum administrators, the Museum board of directors, and other stakeholders to become familiar with the herbarium's organizational structure, to build a shared understanding of the role and breadth of the herbarium's activities, and to establish a strategy for success. The McDougall Herbarium is in a prime position to support and reaffirm the Museum of Northern Arizona's mission to inspire a sense of love and responsibility for the beauty and diversity of the Colorado Plateau and the herbarium's strategic plan follows the goals and guidelines established in MNA's Institutional Plan for 2014-2018, the MNA Biology Department plan for 2018, and the Museum's Collections Management Policy.

The strategic plan was developed during the Strategic Planning for Herbaria course sponsored by the Society of Herbarium Curators and iDigBio in April-May 2018. The plan identifies four main goals:

1. Build a sustainable financial base
2. Enhance and protect our collections
3. Expand public awareness of MNA and its programs
4. Foster excellence in research

Included in the strategic plan is an evaluation plan that provides concrete steps towards achieving these goals including 1) specific activities to be done to accomplish these goals, 2) how we will measure the success of the resultant outputs, and 3) what the outcomes will be as a result of performing the activities.

The plan lays out a path to sustainability and increasing success by identifying our current strengths such as our unique historical and ethnobotanical herbarium specimens, a dedicated group of local volunteers, a legacy of important research, and a newly renovated processing center and collections building. It identifies certain opportunities that could be capitalized upon such as the potential for external funding through donations and corporations and the potential to collaborate with local organizations and other herbaria. The plan also identifies weaknesses and threats such as unstable funding, limited space, and a lack of understanding of the importance of the collections and steps to address these weaknesses and mitigate the threats.

The plan will be revisited and revised frequently as we work with our stakeholders and planning partners to realize the potential of the herbarium to achieve greater success and recognition in research, education, and public engagement.



HISTORY OF THE MCDUGALL HERBARIUM

The Museum of Northern Arizona was established by Dr. Harold S. Colton and Mary-Russell Ferrell Colton in 1928 to preserve archaeological and ethnological treasures and scenic places and wildlife from needless destruction. Dr. Colton was a professor of zoology and the Coltons were collecting plants in the Flagstaff area as early as 1925. Mr. C. M. Armack, MNA's Curator of Biology, officially started the McDougall Herbarium in 1934. The next year ethnobotanist Mr. Alfred F. Whiting was appointed Curator of Biology. He established exchange relations with the Grand Canyon National Park, University of New Mexico, University of Arizona, University of Michigan, and others. He conducted a Hopi crop survey with the Ethnobotanical Laboratory of the University of Michigan in 1935.

Walter B. McDougall, for whom the herbarium was named, came to the Museum after a full career as an instructor of botany at University of Illinois and a ranger-naturalist for the National Park Service. He was MNA's Curator of Botany from 1956-1974, and was known for his floras of Yellowstone, Big Bend, Death Valley, and Natchez Trace. He also authored *Plant Ecology*, the first textbook on this subject, and two important plant



keys for this area: *Seed Plants of Northern Arizona* and *Grand Canyon Wildflowers*. One of the many contributions McDougall made while curator was growing the herbarium collection from 7,000 to over 26,000 plant specimens. McDougall built up the MNA Biology research department and hired several biologists who have gone on to develop tremendous careers. The Biology Department received its first government contract in 1968 and has continued to receive research grants ever since.

Today, MNA's McDougall Herbarium houses approximately 40,000 cataloged specimens. This important collection contains examples of most of the flora of northern Arizona and is particularly strong in plants of the Grand Canyon region. Numerous rare plants representing federally threatened and endangered species are preserved in the collection, as are a limited number of type specimens. Several regional, ethnobotanical collections are maintained in the McDougall Herbarium and include the Alfred F. Whiting Hopi, Havasupai, and Hualapai collections, the Grenville Goodwin San Carlos Apache collection, the Louisa Wetherill Navajo collection (ASM Collection), and Benjamin Wade Wetherill Navajo collection. These holdings contain indigenous food plants as well as medicinal and ceremonial plants. Also included are historical collections by Mary-Russell Ferrell Colton, and the Fort Valley Experimental Forest, the first Forest Service research facility established in the U.S, from the early 1900s.



MISSION STATEMENT

The McDougall Herbarium supports and reaffirms the Museum of Northern Arizona's mission to inspire a sense of love and responsibility for the beauty and diversity of the Colorado Plateau through collecting, studying, interpreting, and preserving the region's natural and cultural heritage. In furthering this mission statement, the McDougall Herbarium preserves and protects the floristic biodiversity of the Colorado Plateau, conducts interdisciplinary research that is relevant and addresses significant regional issues, and provides stimulating and engaging educational and interpretive programs and exhibits.

VISION STATEMENT

The McDougall Herbarium at the Museum of Northern Arizona is a welcoming resource of regionally and culturally important plant knowledge that preserves its specimens with great care and respect, is a leader in on-going significant regional research, is sustainably funded, and promotes the beauty and diversity of the Colorado Plateau through outreach and education.



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OUR GOALS

1. Build a sustainable financial base
2. Enhance and protect our collections
3. Expand public awareness of MNA and its programs
4. Foster excellence in research



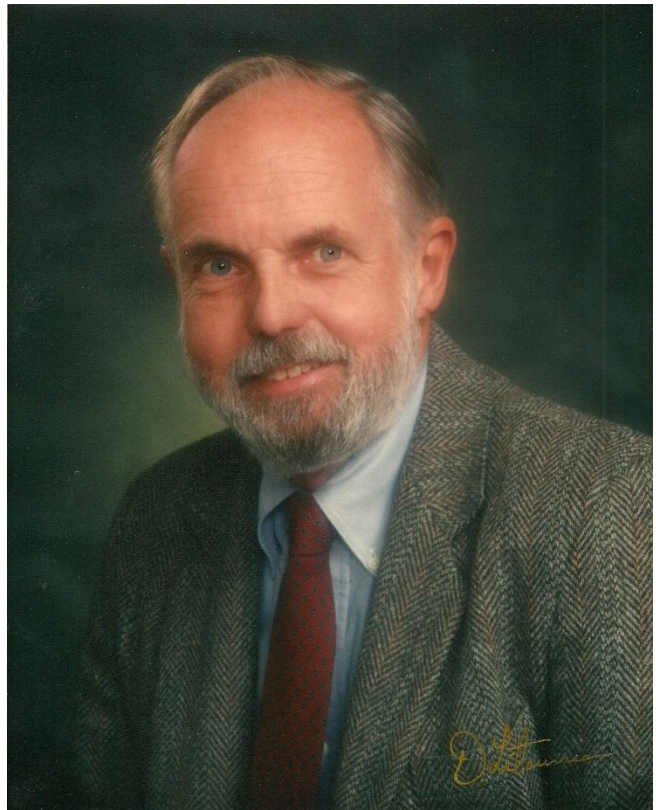
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Goal #1. Build a sustainable financial base

- Develop a strategic plan for the herbarium. *2018.*
- Develop a strategic plan for funding. *2020.*
- Develop a plan for increasing Linda Cooper Hevly and Charles Avery endowments. *2020.*



Goal #2. Enhance and protect our collections

- Increase collections so that the McDougall Herbarium has the most complete representation of the diversity of the Colorado Plateau flora.
 - i. Further develop robust exchange programs with other herbaria on the Colorado Plateau. *Continuous, starting 2018.*
 - ii. Develop a target list of taxa that are not currently represented in the herbarium. *2018.*
 - iii. Conduct collecting trips for targeted taxa that are not currently included in the herbarium. *2020.*
- Develop a priority list for conservation needs. *Continuous, starting 2018.*
 - i. Identify specimens that need repair or remounting.
 - ii. Test herbarium sheets for appropriate pH level and remount on acid-free paper if needed.
 - iii. Test herbarium sheets for mercuric chloride.



Photo credit: Tom Bean



Goal #3. Expand public awareness of MNA and its programs

- Create short biographies for important MNA collectors to put on website and on public Argus database. *Continuous, starting 2018.*
- Redesign herbarium website. *2018.*
- Curate lichens and database on lichenportal.org. *2020.*
- Digitize and image entire collection. *2022.*
- Develop informational signs about local ecology along nature trail and develop a historic walking trail on the research campus. *By 2024.*
- Develop an exhibit showcasing macro photographs of native plants of the Colorado Plateau. *By 2025.*



Goal #4. Foster Excellence in Research

- Develop interdisciplinary research questions that address significant regional research problems.
- Continue to apply for external funding.
- Connect with local organizations for collaborative projects.
- Collaborate with regional herbaria on region-specific issues.
- Collaborate with other herbaria with similar interests and collections.



Photo credit: Tom Bean



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SWOT ANALYSIS

STRENGTHS	OPPORTUNITIES
<ul style="list-style-type: none"> • Collections include unique historical and ethnobotanical specimens • Endowments in place • Successful volunteer program • Supportive management • Active research program • Past success of securing IMLS grants • New, modern storage facility • New data management system • Active loan and researcher programs • Backlogged specimens are being processed 	<ul style="list-style-type: none"> • Potential for external funding from donors and corporations • Potential to collaborate with other local organizations • Potential to increase awareness and interest through crowd-sourcing data entry • Recently approved for NSF funding • Abundant public land for floristic work • Increased public outreach through social media
WEAKNESSES	THREATS
<ul style="list-style-type: none"> • Lack of permanent funding • Limited space • Herbarium and botany lab are not adjacent • Not affiliated with a University (no direct access to students, faculty) • No active interdisciplinary research projects • Lack of digital images and georeferenced specimens 	<ul style="list-style-type: none"> • Unstable federal funding • Reductions in Collections staff • Natural disasters • Loss of knowledge from past collectors • Lack of understanding of the importance of the collections



SUSTAINABILITY

Maintaining Strengths

The MNA herbarium's core strengths include its unique historical and ethnobotanical specimens of the Colorado Plateau, a dedicated group of local volunteers, a legacy of important research, and a newly renovated processing area (Powell) and collections building (Easton Collections Center). Maintaining the herbarium's capacity to meet its goals and objectives involves exploring additional funding possibilities, collaborative research efforts, and increasing interest and support through social media and other outreach efforts. MNA will continue to expand the collection through targeted collecting and a robust exchange program with prompt processing of specimens, which includes databasing, georeferencing, and imaging of all specimens.

Addressing Weaknesses

The herbarium's most significant weakness is the lack of permanent funding for a full-time collections manager. The Museum is committed to growing the botany endowments already in place through targeted asks and corporate sponsorship on highly visible projects. MNA will work closely with the new development director to reach out to potential donors and identify funding opportunities. Support from endowments will prevent high turnover and reliance on unstable federal funding and allow for continuous promotion and care of the collections. The botany department will also continue to explore research opportunities including interdisciplinary research projects within the Museum and collaborations with the University and other groups external to the Museum.

Capitalizing on Opportunities

The MNA herbarium is poised for success being located in a region of high plant endemism with abundant public land, with a legacy of important ecological research, and a recently renewed approval for NSF funding. We will capitalize on these opportunities by exploring new collaborations for research and funders and by inspiring a sense of love and responsibility of the area through education and experience.



Mitigating Threats

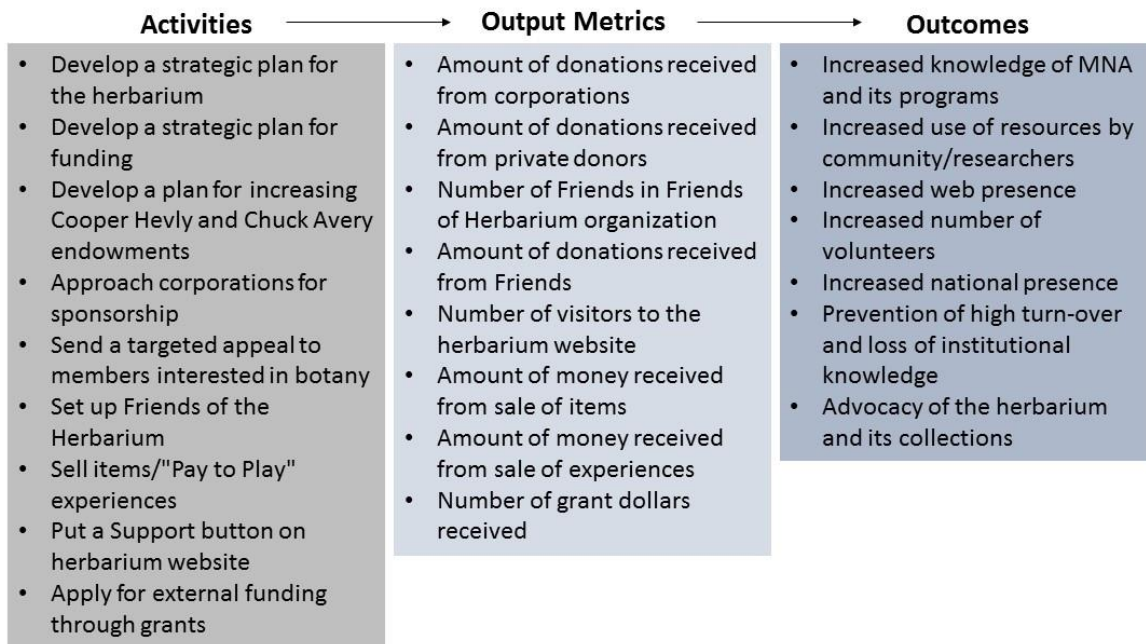
The biggest threat for the MNA herbarium is the potential lack of administrative support. The Museum Board of Directors may fail to understand the importance and relevance of the herbarium to the Museum's mission and they could authorize a future transfer of the collection to another institution because of the Museum's inability to properly staff, preserve, and curate the specimens. By properly funding a permanent botany collections manager, there will be an advocate in support of the importance and relevance of the botany collections. We will also demonstrate the importance of the collections by maintaining a continued active loan and exchange program, by expanding public awareness of the Museum and the plants of the Colorado Plateau, by conducting relevant research that addresses significant regional research problems, and by properly caring for and enhancing the collections. We will maintain institutional knowledge and not lose the knowledge of past collectors by maintaining a permanent botany collections manager and by processing the backlogged herbarium specimens while we can still contact the collectors.



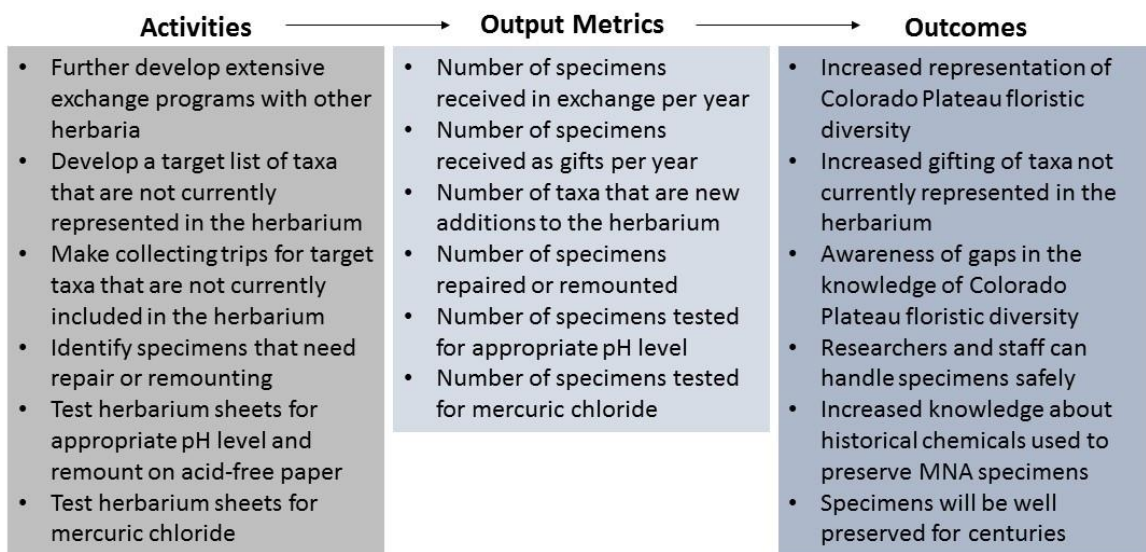
EVALUATION PLAN

We developed a logic model that involves activities leading to outputs leading to outcomes with metrics, benchmarks, and milestones for outputs and outcomes. A summary of the evaluation plan is below.

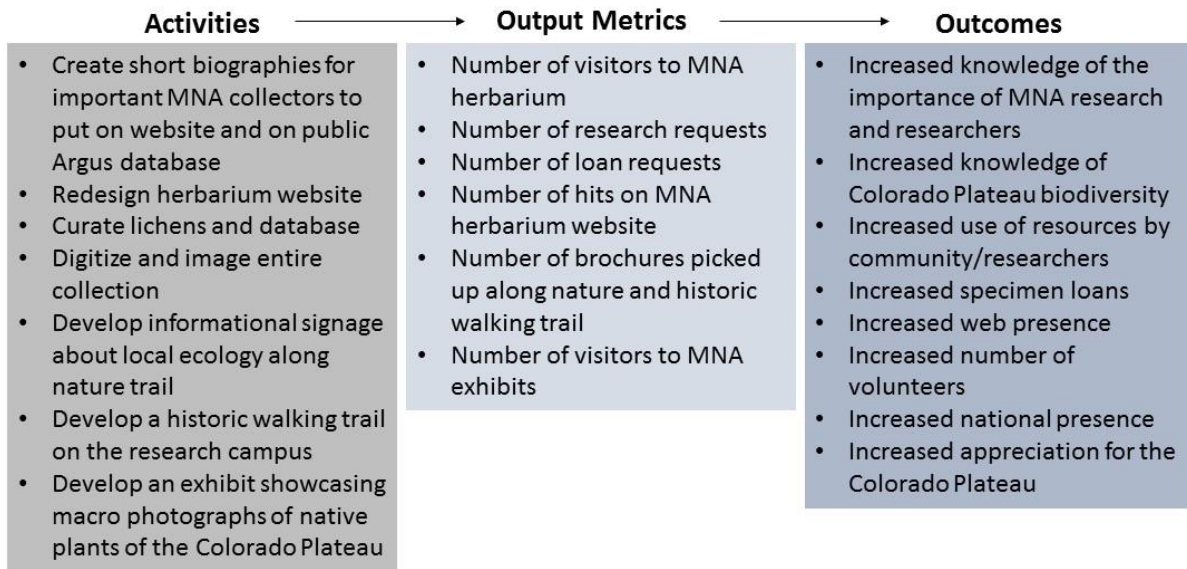
Goal #1 Build a sustainable financial base



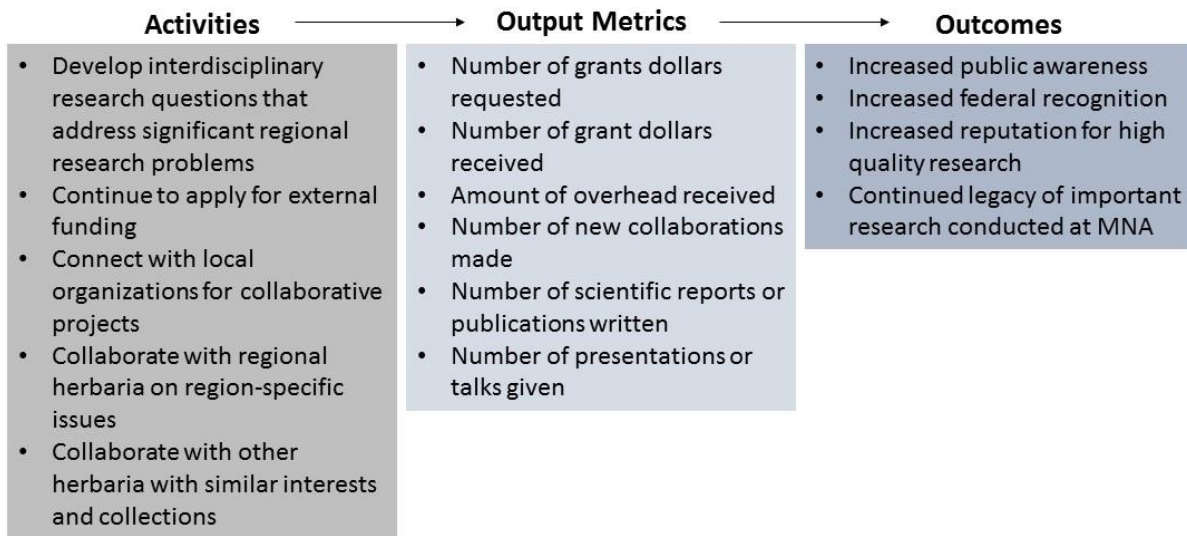
Goal #2 Enhance and protect our collections



Goal #3 Expand public awareness of MNA and its programs



Goal #4 Foster excellence in research



STRATEGIC PLANNING PARTNERS

The strategic planning team is composed of Kirstin Phillips (Botany Collections Manager), and Elaine Hughes (Collections Director) with oversight by the Museum's Director and CEO (Carrie M. Heinonen) and the Museum's Board of Directors.

KEY STAKEHOLDERS

- Museum staff (collections managers and curators)
- Museum director and CEO
- Museum Board of Directors
- Museum donors and funding agencies
- Museum researchers (local and worldwide)
- Land managers (U.S. Forest Service, National Park Service, Bureau of Land Management)
- Tribal members (Hopi, Navajo, Hualapai, Havasupai, Ute, Paiute, Zuni, Apache, Acoma, Yavapai)
- General Public
- Researchers and collectors
- Museum volunteers
- Herbarium interns



ACKNOWLEDGEMENTS

The McDougall Herbarium strategic plan was produced as part of the activities of a course sponsored by the Society of Herbarium Curators and iDigBio and co-taught by Austin Mast, David Jennings, and guest-instructor Shari Ellis. The 2018 strategic planning course participants (Jennifer Ackerfield, Sarah Chamberlain, Sara Fuentes-Soriano, Amanda Grusz, Maribeth Latvis, Melanie Link-Perez, Amy Litt, Adriana López-Villalobos, Nina Lundholm, Kirstin Phillips, Alan Prather, Nina Rønsted, Tristram Seidler, Karly Tumminello, Rick Williams, Paul Wolf, Ya Yang) helped to formulate and format the ideas presented here. A special thanks to Jennifer Ackerfield for her formatting ideas and Karly Tumminello for reviewing this document. MNA Collections Director, Elaine Hughes, helped tremendously in the development this document. Thank you!

