Mission Fulfillment Committee

September 2022

September 8, 2022

9:15 a.m.

Boardroom, McNamara Alumni Center

MIS - SEP 2022

BOARD OF REGENTS
DOCKET ITEM SUMMARY

Mission Fulfillment **September 8, 2022**

AGENDA ITEM: 2022-23 Committee Work Plan

☐ **Review**	☐ **Review + Action**	☐ **Action**	☒ **Discussion**

☐ *This is a report required by Board policy.*

PRESENTERS: Regent Mary Davenport
Rachel Croson, Executive Vice President and Provost

PURPOSE & KEY POINTS

The purpose of this item is to review and discuss the committee's 2022-23 work plan.

BACKGROUND INFORMATION

Board of Regents Policy: *Board Operations and Agenda Guidelines* describes the role of the Mission Fulfillment Committee as follows:

> The Mission Fulfillment Committee oversees and makes recommendations to the Board related to the University's mission, as articulated in Board of Regents Policy: Mission Statement and carried out on five campuses and across the state, the nation, and the world. The committee oversees and advises the administration on academic priorities, activities, programs, and initiatives central to the threefold mission of research and discovery, teaching and learning, and outreach and public service.

Mission Fulfillment Committee
2022–23 Work Plan

Date	Topics
2022	
September 8–9	• **2022–23 Committee Work Plan** The committee will discuss the work plan agenda items for the 2022-23 meetings. • **Progress Toward MPact 2025 Enrollment Goals: Crookston** This is the first of a series of presentations during which the committee will engage with the enrollment strategies for each campus, focusing on plans to meet MPact 2025 enrollment goals, including recruiting, retention, pricing tactics, affordability, financial aid, and student success initiatives. • **Building a Stronger Minnesota Through Extension** The committee will hear an update on Extension activities and discuss new initiatives that advance the MPact 2025 goal to enhance Extension's impact and reach. • **Report on Academic Program Changes** The committee will hear an update on academic program changes approved by the Board in 2021-22, including an overview of the approval process.
October 13–14	• **Progress Toward MPact 2025 Enrollment Goals: Morris** The committee will engage with the Morris campus enrollment strategy, focusing on plans to meet MPact 2025 enrollment goals, including recruiting, retention, pricing tactics, affordability, financial aid, and student success initiatives. • **Update on Graduate Education** The committee will discuss the status of graduate education at the University. The item will include an overview of challenges, new and continuing strategies, and measures of student success, including the MPact 2025 goal to advance career outcomes for graduate students and postdocs.
December 15–16	• **Progress Toward MPact 2025 Enrollment Goals: Duluth** The committee will engage with the Duluth campus enrollment strategy, focusing on plans to meet MPact 2025 enrollment goals, including recruiting, retention, pricing tactics, affordability, financial aid, and student success initiatives. • **Annual Report on the Status of University Research & Commercialization of Technology** As required by Board Policy, the committee will receive an update on the status of the University's research and technology commercialization enterprise.

2023	
February 9–10	• **Progress Toward MPact 2025 Enrollment Goals: Rochester** The committee will engage with the Rochester campus enrollment strategy, focusing on plans to meet MPact 2025 enrollment goals, including recruiting, retention, pricing tactics, affordability, financial aid, and student success initiatives. • **Progress Toward MPact 2025 Enrollment Goals: Twin Cities** The committee will engage with the Twin Cities campus enrollment strategy, focusing on plans to meet MPact 2025 enrollment goals, including recruiting, retention, pricing tactics, affordability, financial aid, and student success initiatives.
May 11–12	• **Promotion and Tenure, and Annual Continuous Appointments** The committee will review the process and take action on recommendations for promotion and tenure and annual continuous appointments. • **Tuition and Pricing Strategies** The committee will learn about strategies, including pricing and aid models, payment plans, etc., and discuss which strategies should be considered for the University system.
June 8–9	• **Systemwide Enrollment Coordination** The committee will hear an update on the various systemwide coordinating efforts that support the activities to enroll students at each campus. The focus will be on the System Enrollment Council's initiatives, including collaborative admissions, marketing for enrollment, best practices for student success, financial aid and discounting strategies, and international student recruiting. • **Distributed Learning Strategy Update** The committee will discuss the University's efforts to achieve the MPact 2025 goal to develop innovative, coordinated, and scaled systemwide distributed learning models that increase access and meet workforce needs.

BOARD OF REGENTS
DOCKET ITEM SUMMARY

Mission Fulfillment **September 8, 2022**

AGENDA ITEM: Progress Toward MPact 2025 Enrollment Goals: Crookston

☐ **Review** ☐ **Review + Action** ☐ **Action** ☒ **Discussion**

☐ *This is a report required by Board policy.*

PRESENTERS: Rachel Croson, Executive Vice President and Provost
Mary Holz-Clause, Chancellor, Crookston campus

PURPOSE & KEY POINTS

This item is the first in a series of discussions on campus-specific enrollment goals as outlined in the MPact 2025 systemwide strategic plan. This item, focused on the Crookston campus, will include:

- a review of enrollment trends and student demographics data;
- challenges and opportunities;
- comparisons with competitors and peers; and
- plans for marketing.

Recently produced marketing materials include two commercials ("I Am Crookston" and "UMN Crookston – Online Opportunities") as well as print ads and other material, samples for which are included in the docket.

BACKGROUND INFORMATION

The committee most recently discussed systemwide undergraduate enrollment in June 2022.

UNIVERSITY OF MINNESOTA CROOKSTON
Driven to Discover®

STRATEGIC MARKETING PLAN

Three Primary Areas of Focus

These areas of focus are not stand-alone, rather each should connect to the other with one voice, complimentary branding, with an objective to enforce and lift up the overall mission, vision and strategic goals of the campus.

Recruitment | Reputation/Awareness | Athletics
Golden Eagle Pride

UMN Crookston Campus - Three Strategic Goals:

1. Campus Enrollment Growth and Greater Retention
2. Diversity, Equity, and Belonging
3. Golden Eagle Pride/Relationships and Engagement

MARKETING PARAMETERS

- Target Audiences
  - Prospective students (high school, transfer and adult learners)
  - Influencers (parents, grandparents, counselors, teachers, coaches, etc)
- Demographics
  - Continuous: Greater Minnesota, EasternNorth Dakota (lean into rural communities)
  - Partial: Eastern border of South Dakota and Western border of Wisconsin
- Time Frame- September 1, 2022- August 1, 2023

MARKETING TACTICS

- Lead Generation
  - Niche, RaiseMe, Student Bridge, ACT/NRCCUA
- Digital
  - Search, Display and Social Media Ads
- Traditional
  - Television (includes OTT - Hulu, YouTube TV, etc.)
  - Billboards
  - Radio
  - Print
- Website

MARKETING CREATIVES

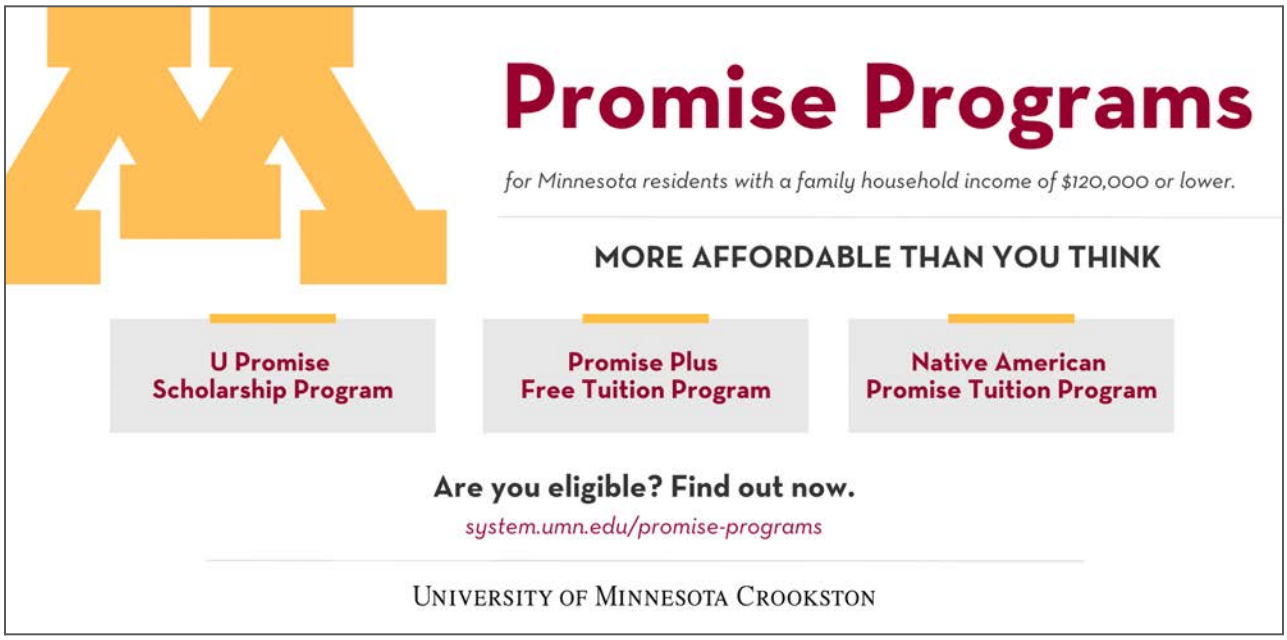
Commercials: www.youtube.com/user/UofMCrookston/videos

UNIVERSITY OF MINNESOTA
CROOKSTON

Real. Hands-on. Ready.

START YOUR APP


University of Minnesota
Crookston
TRANSFER OPTIONS AVAILABLE
new!
Meet our new Assistant Director of Online and Transfer Recruitment >>


Promise Programs
for Minnesota residents with a family household income of $120,000 or lower.
MORE AFFORDABLE THAN YOU THINK
U Promise Scholarship Program
Promise Plus Free Tuition Program
Native American Promise Tuition Program
Are you eligible? Find out now.
system.umn.edu/promise-programs
University of Minnesota Crookston

Admissions Viewbook

37 areas of study

Accounting*
Agricultural Business*
Agricultural Communication
Agricultural Education
Agricultural Systems Management
Agronomy
Animal Science
Applied Agricultural Communication Studies*
Applied Health*
Applied Studies*
Biology
Communication*
Criminal Justice*
Early Childhood Education
Elementary Education
English*
English Education
Environmental Sciences
Equine Science
Equine Business Management
Exercise Science & Wellness
Finance*
Golf and Sports Turf Management
Health Management*
Health Sciences (Pre-Professional)
Health Services Executive*
Horticulture
Information Technology Management*
International Business*
Management*
Manufacturing Management (B.M.M.)*
Marketing*
Medical Laboratory Science
Natural Resources
Quality Management (B.M.M.)*
Software Engineering
Sport & Recreation Management*

Learn about our majors and minors
www.umcrookston.edu/academics

**Offered both on-campus and online*

LET'S BREAK IT DOWN

OUR GOLDEN EAGLES

- 1,840 undergraduate students
- Average 16 students per class
- 38% of incoming first-year students are the first in their family to attend college

#1
MIDWEST PUBLIC REGIONAL COLLEGE

35+
MAJORS

15+
ONLINE MAJORS

300+ SCHOLARSHIP OPPORTUNITIES

NCAA DII ATHLETICS

LAPTOP UNIVERSITY

GOLDEN EAGLE PRIDE

- No ACT/SAT score needed for admission
- 88% of first-year students receive scholarships or financial aid
- Ranked #1 Best Public College Dorms in Minnesota
- Ranked #1 Safest College in Minnesota
- 90% of graduates report their job is related to their field of study
- Our graduates recoup their full net cost of attendance in just 3 years after they graduate, which ranks 4th among Minnesota's 33 four-year institutions.

TELL US MORE ABOUT YOURSELF

or visit z.umn.edu/more-info

SCAN ME

INVEST IN YOUR FUTURE

Scholarships

- Achievement Scholarships $500-$3,000
- Specialty Scholarships $500-$3,000
- U-Promise Scholarships $300-$4,000

OUR FAFSA CODE: 004069

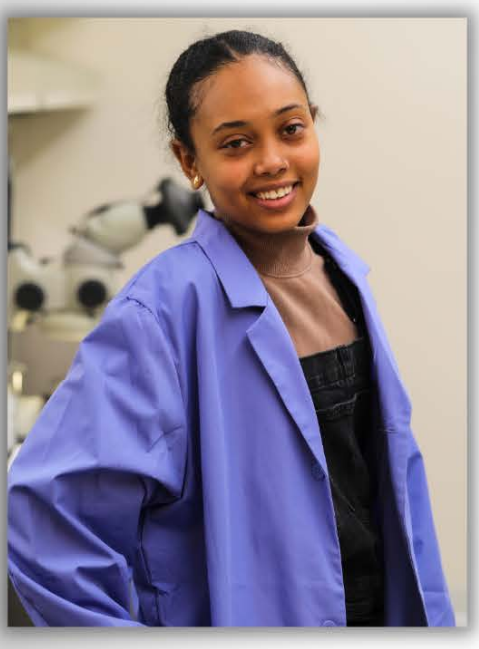
NO OUT-OF-STATE TUITION

FLAT-RATE TUITION
If you take 13 or 18 credits, it's the same cost

How much does it cost?

- Tuition & Fees $13,010
- Room & Board $9,792
- Total $22,802

*Represents total cost before scholarships and financial aid.



Tsebaot Getachew

ADDIS ABABA, ETHIOPIA

Health Science

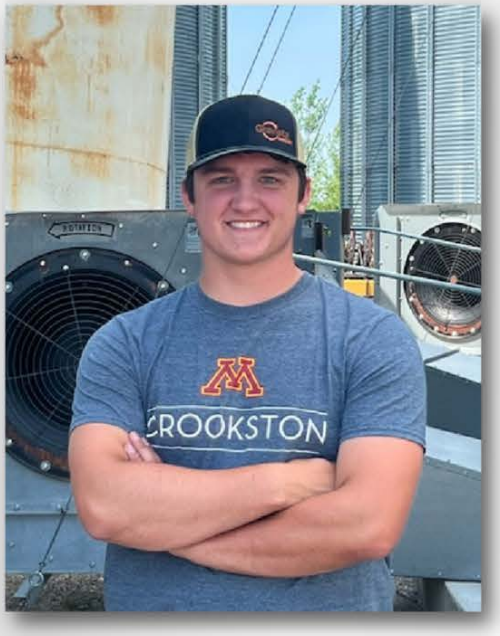
Read her full story:
crk.umn.edu/news/tsebaot-getachew

In addition to being involved in clubs and work experience on campus, I have jumped on the opportunity to conduct research. My professor and I will be studying the inhibition of bacteria in hopes to find a sample that will help attack other harmful bacteria. I don't think anybody, like as a freshman, would get the opportunity that I get here at a bigger college. It's pretty remarkable, honestly!

Brandon Van Den Einde

FERTILE, MN

Agronomy and Agricultural Business



The agriculture program is what brought me to UMN Crookston and it has not disappointed. The hands-on learning, personable professors, and small campus are second to none. The campus has felt like one big family from my first day.

ATHLETICS

WOMEN'S

- Basketball
- Cross Country
- Equestrian
- Golf
- Soccer
- Softball
- Tennis
- Trap Shooting
- Volleyball

MEN'S

- Baseball
- Basketball
- Cross Country
- Golf
- Hockey
- Trap Shooting

UNIVERSITY OF MINNESOTA
CROOKSTON
OFFICE OF ADMISSION
2900 UNIVERSITY AVENUE
CROOKSTON, MN 56716

GET IN TOUCH umcinfo@umn.edu | Call (218) 281-8569 | Text (218) 275-5556 | www.umcrookston.edu/admission

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Progress Toward MPact 2025 Enrollment Goals:

CROOKSTON

Board of Regents | Mission Fulfillment Committee | September 8, 2022

Rachel Croson
Executive Vice President
and Provost

Mary Holz-Clause
University of Minnesota Crookston
Chancellor

MPact 2025

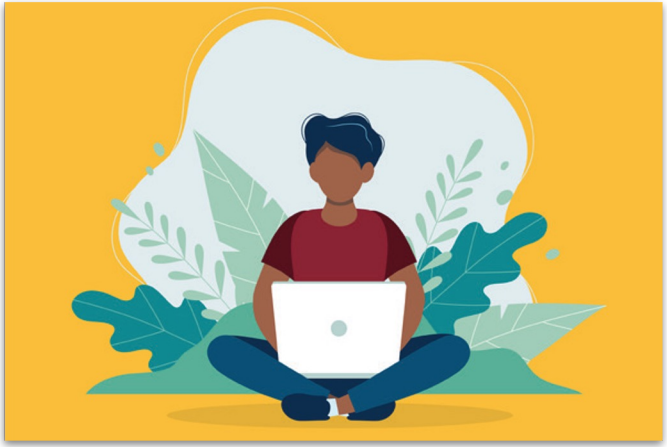
Commitment 1: Student Success

Action

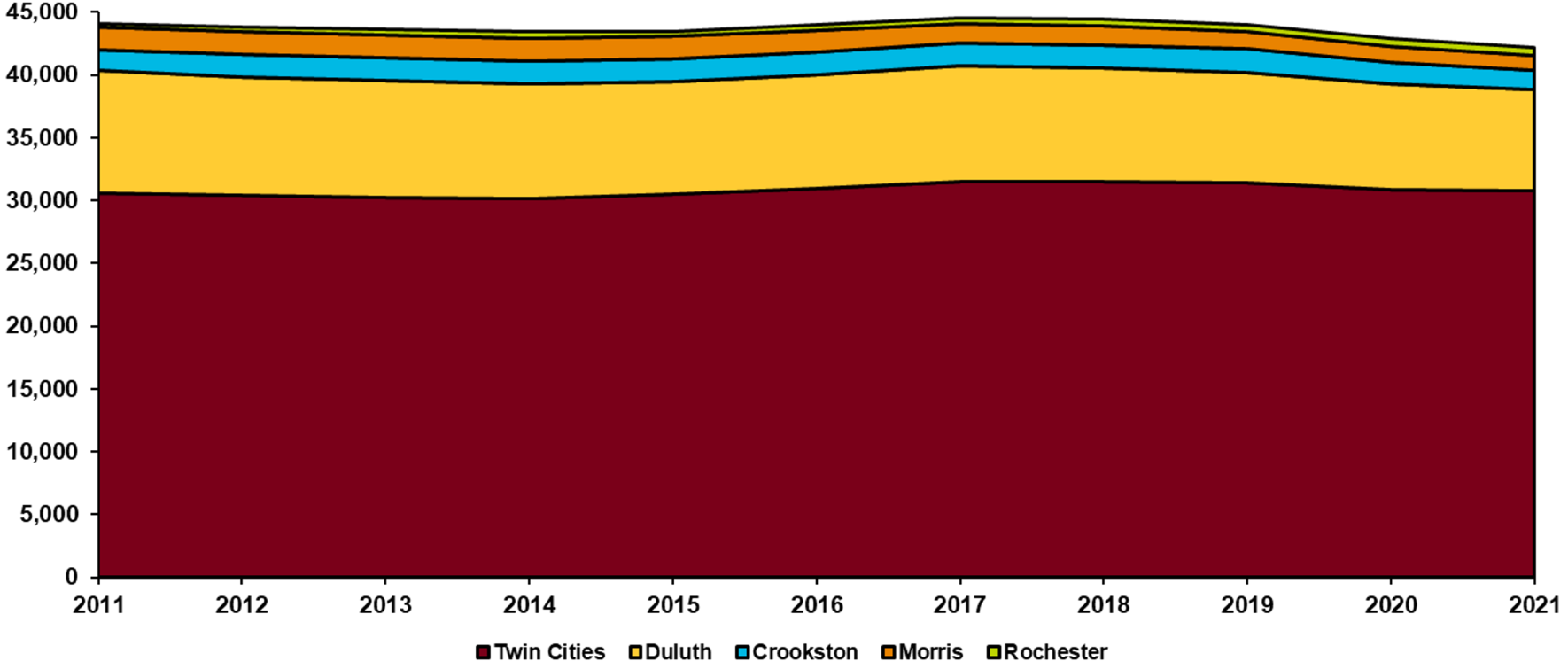
Establish comprehensive system wide strategic enrollment strategy.

Metric

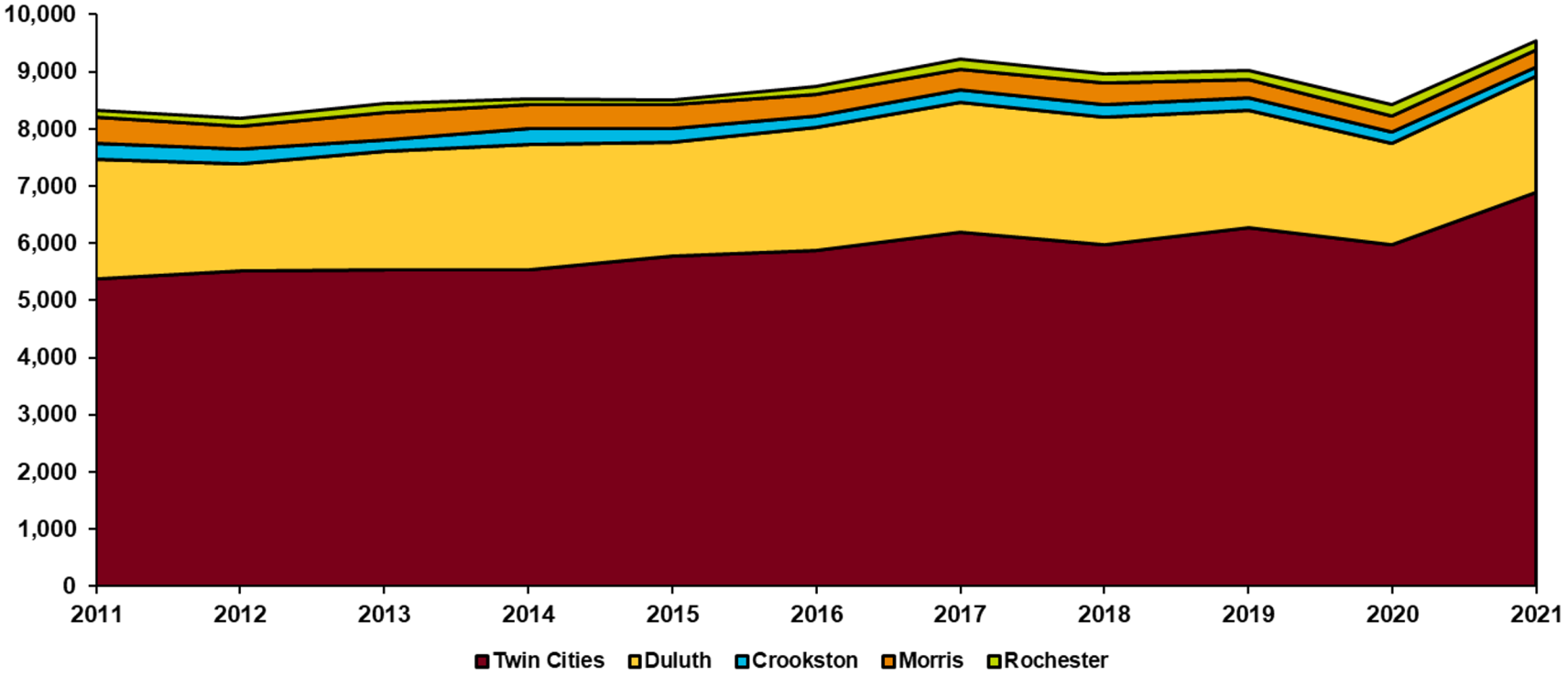
Meet undergraduate enrollment goals for each campus by Fall 2025.



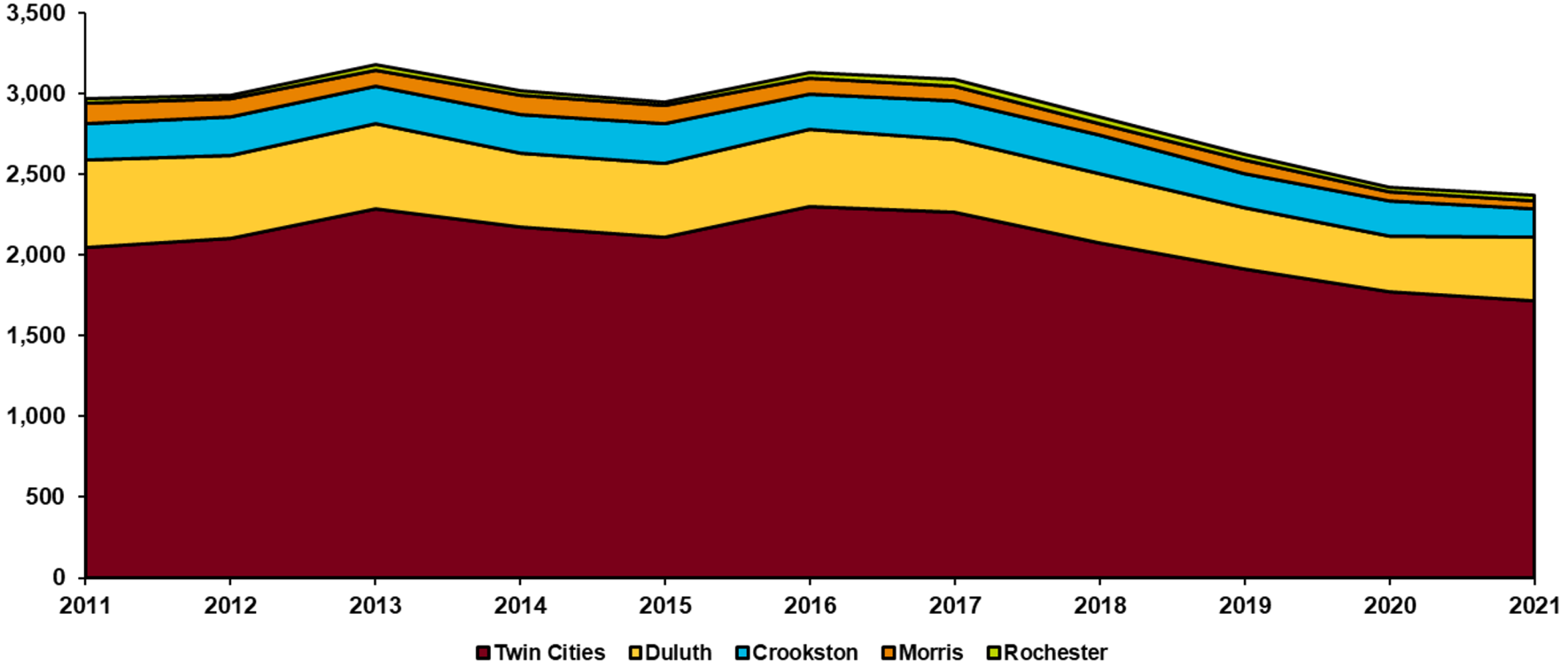
Fall Semester Undergraduate Headcount Enrollment

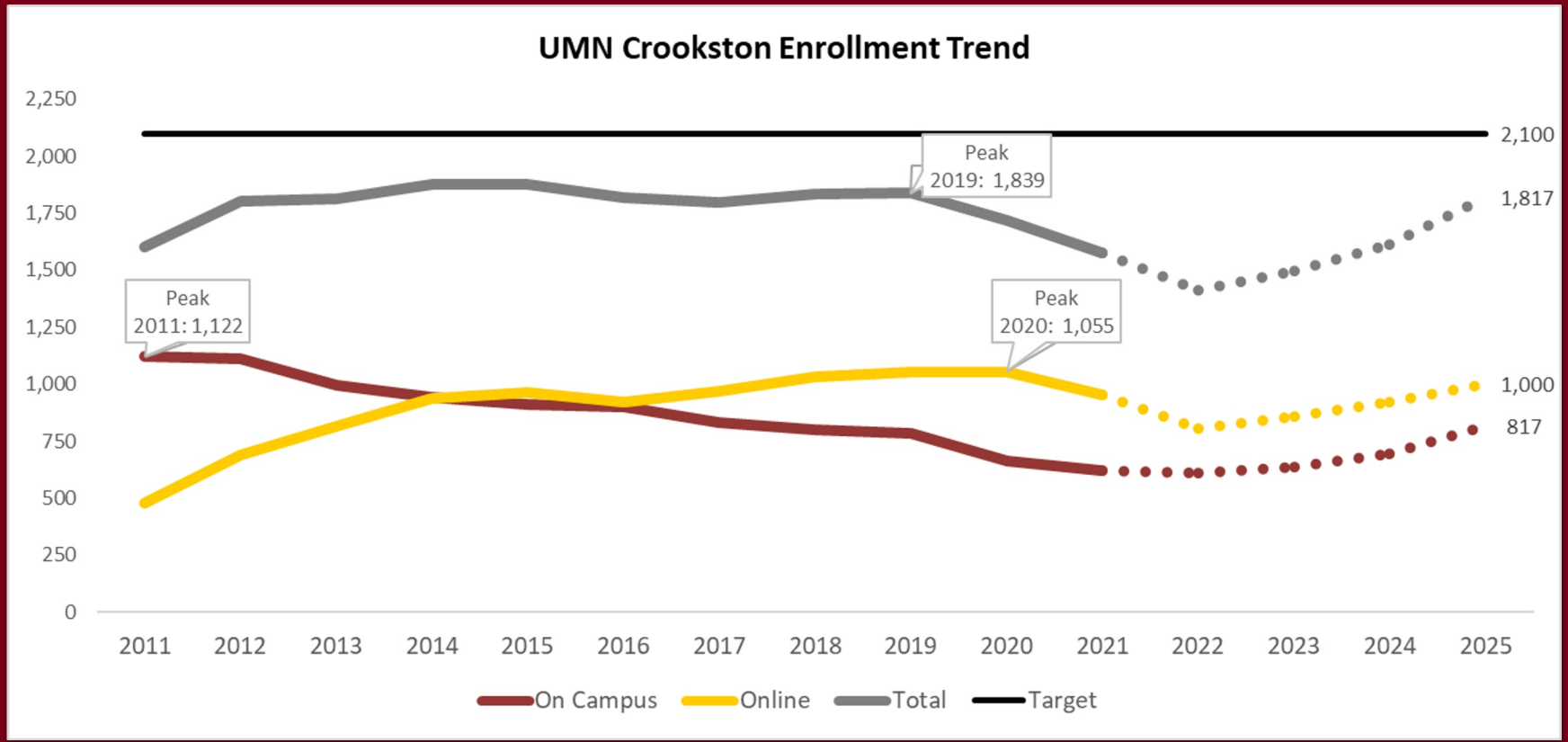


Fall Semester New Freshmen (NHS) Headcount Enrollment

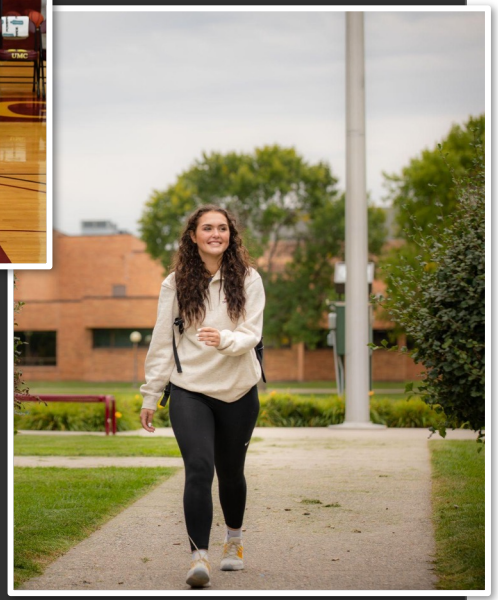


Fall Semester New Transfer (NAS) Headcount Enrollment



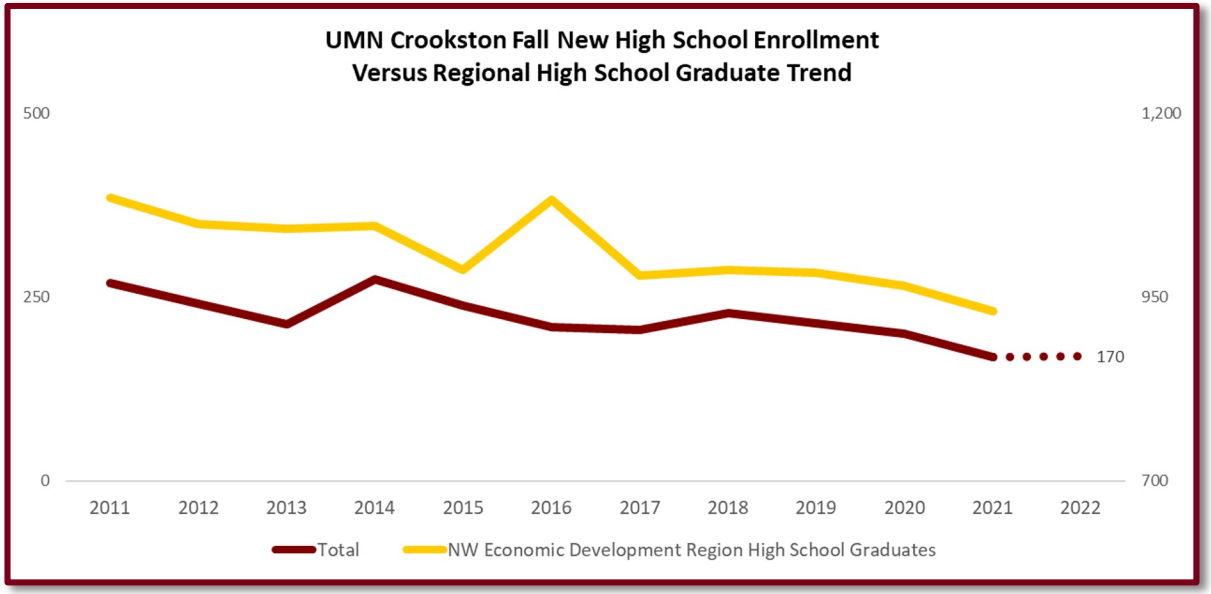

UMN Crookston Enrollment Trend
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
0
Peak
2011: 1,122
Peak
2019: 1,839
Peak
2020: 1,055
2,100
1,817
1,000
817
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
On Campus
Online
Total
Target

On Campus DEMOGRAPHICS



On Campus Enrollment	622
Average Age	20.9
Gender	362 (58%) female | 259 (42%) male
Race/Ethnicity	493 (79%) White 79 (13%) BIPOC 36 (6%) International 14 (2%) Not specified
Residency	404 (65%) MN 73 (12%) ND 36 (6%) IA SD WI 71 (11%) Other US 43 (7%) International
First Generation	266 (43%)
Pell-Eligible	209 (34%)
Athletics	225 (36%)
Enrollment Status	587 (94%) Full-time | 35 (6%) Part-time

On Campus
CHALLENGES



On Campus
OPPORTUNITIES

- Pathways for younger students
- STEM Outreach Program
- Campus engagement with FFA & 4-H
- Share-My-App
- Investigating 2+2 Pilots with UMN Twin Cities
- Collaboration with Morris Admissions
- MN Office of Higher Education Direct Admissions Program

Online DEMOGRAPHICS

Online Enrollment	952
Average Age	31.9
Gender	529 female (56%) | 420 male (44%)
Race/Ethnicity	694 (73%) White 209 (22%) BIPOC 19 (2%) International 30 (3%) Not Specified
Residency	669 (70%) MN 30 (3%) ND 85 (8%) IA, SD, WI 169 (18%) Other U.S. 22 (2%) International
First Generation	536 (56%)
Pell-Eligible	304 (32%)
Enrollment Status	419 (44%) full-time | 533 (56%) Part-time

Online
CHALLENGES

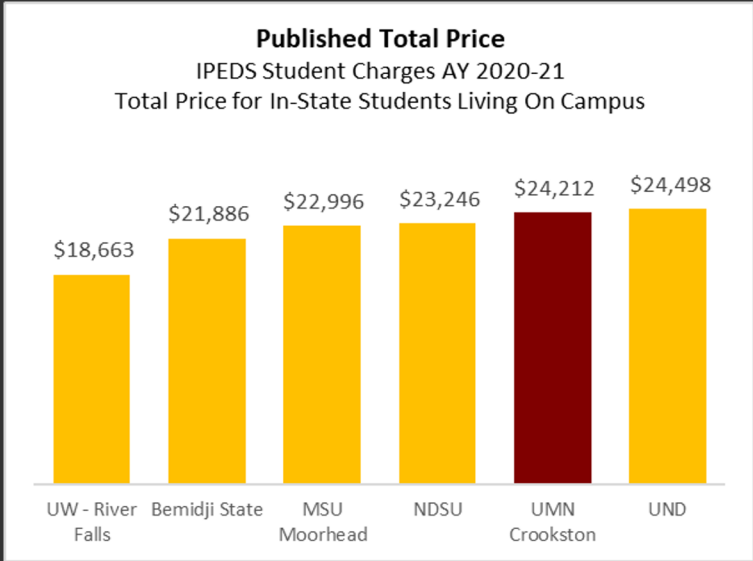
- COVID-19
- Increasing Competition
- Transfer hurdles
- Lack of financial aid options for part-time students

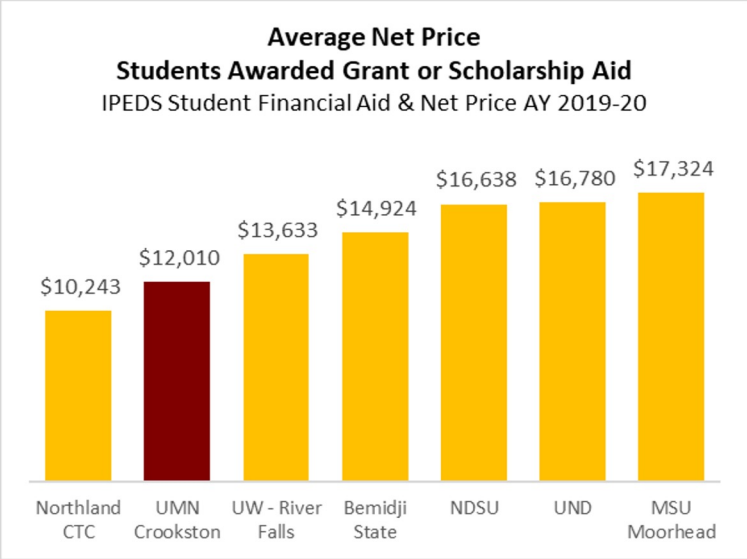
Online OPPORTUNITIES

NEW PARTNERSHIPS

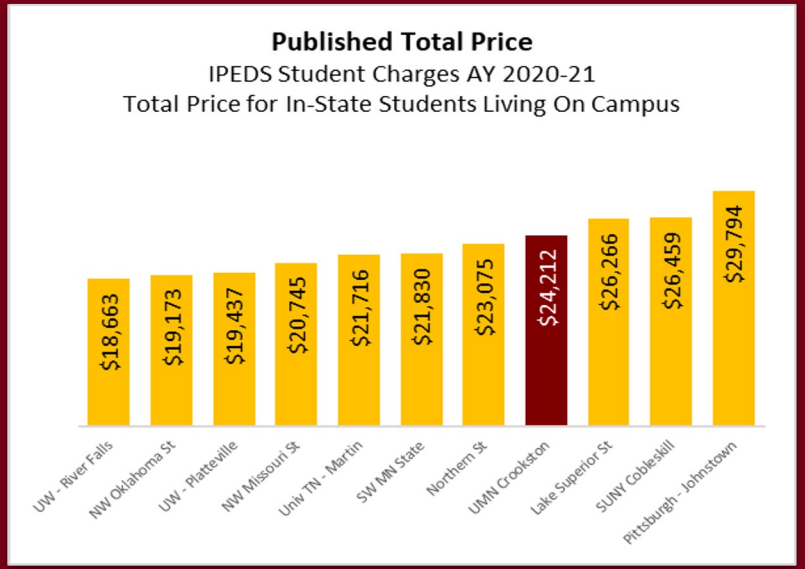
- Guild Education
- Huntington Bank
- Re-Engaging Regional Employers
- Archie's Institute for Sustainable Agriculture (Ag-Vets)
- NXT GEN Ag

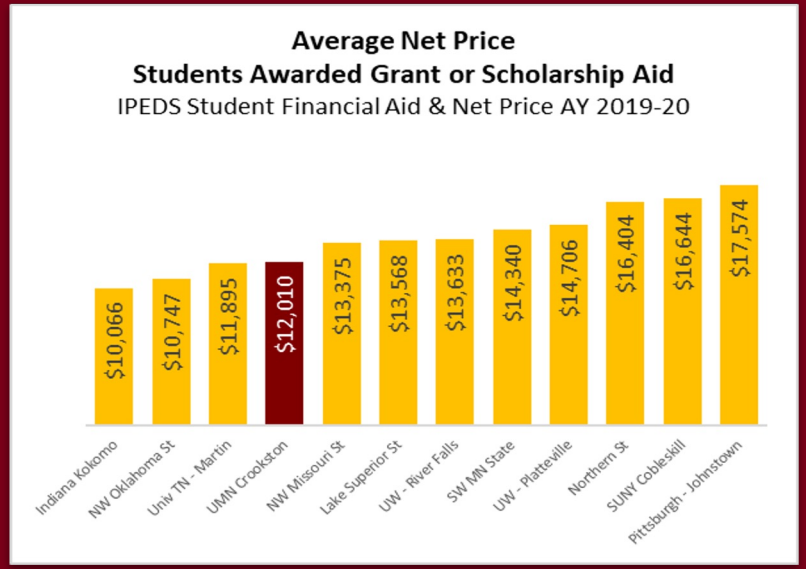
Pricing vs. Regional Competitors



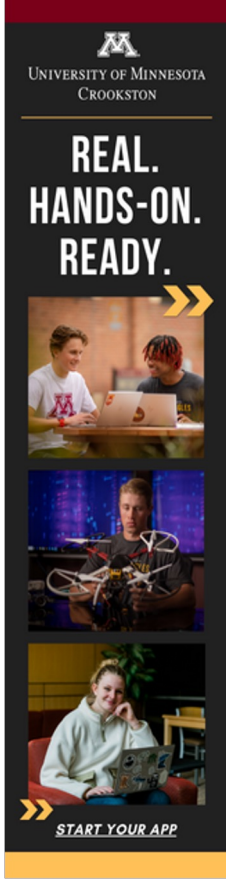


Pricing vs. Institutional Peers





MARKETING CREATIVES



Retention Success Strategies

- Reworking First Year Seminar Course
- Professional Advising for Incoming Freshmen
- Enhancement on Student Services and Updating Policies
- Admit for Success

Regents

FEEDBACK

- How would you suggest we recruit for agriculture-related programs given the shifting demographics of MN?

- What new markets would you suggest for both on campus and online recruitment?

BOARD OF REGENTS
DOCKET ITEM SUMMARY

Mission Fulfillment **September 8, 2022**

AGENDA ITEM: Building a Stronger Minnesota through Extension

☐ **Review** ☐ **Review + Action** ☐ **Action** ☒ **Discussion**

☐ *This is a report required by Board policy.*

PRESENTERS: Beverly R. Durgan, Dean, University of Minnesota Extension
Lily Krona, University of Minnesota Crookston student

PURPOSE & KEY POINTS

The purpose of this item is to discuss Extension activities, focusing on new initiatives that advance the MPact 2025 goal to enhance Extension's impact and reach. The item will address:

- A brief overview of Extension, including county partnerships and funding
- MPact 2025 implementation plan
- Collaborations with other land-grant universities
- Partnerships to support rural health programs
- 4-H and its role in student recruitment
- Rural leadership programs
- Extension's COVID-19 response and its impact on programming

Building a Stronger Minnesota through Extension

Mission Fulfillment Committee
University of Minnesota Board of Regents
Sept. 8, 2022

Overview of Extension:

The University's MPact 2025 strategic plan and Extension's "2020 Strategic Plan: A Pathway Forward" outline a future where Extension engages in meaningful ways with individuals, families, communities and stakeholders to lead and advocate for positive change across Minnesota, the nation and the world.

Extension already is nationally recognized for its innovative and strategic research and educational model. The education, research and engagement mission of Extension is delivered through an integrated state, regional and county system and is an essential part of the University of Minnesota's land-grant mission.

More than 65 percent of Extension's 800 researchers, educators and community-based staff live and work in greater Minnesota. By locating faculty and staff throughout the state in 15 regional offices, 87 county offices (funded by counties), and the University's research and outreach centers and campuses, Extension makes University research and knowledge readily available to the people of greater Minnesota. Extension's community networks enable citizens and stakeholders to provide feedback to campus Extension and research faculty, which leads to new research opportunities.

Extension's educational programming is funded through federal, state and county funds as well as gifts and grants from partner organizations and income from program registrations. All 87 Minnesota counties currently have memoranda of agreement with Extension, accounting for about 23 percent of Extension's budget funds in FY22.

Extension was forced to rapidly adjust its efforts and program delivery methods

during the COVID-19 pandemic of 2020-2022. The pandemic presented a range of unique challenges to Extension, including shifts in programmatic focus and in the modalities used to deliver educational programming. As the pandemic continues, Extension has continued to evaluate and adjust both program content and methods of delivery because of changing circumstances. .

Extension Strategic Priorities and Planning

Extension's priorities are focused on the goals outlined in the University MPact 2025 systemwide strategic plan as well as implementation of the Extension 2020 Strategic Plan: A Pathway Forward.

Specifically, MPact 2025 calls for Extension to expand its partnerships by 20 percent by 2025. Several Extension initiatives are being conducted toward this goal, including measuring current levels of engagement with partner communities and organizations. A survey of all Extension faculty and staff was conducted in Fall 2021 and will be updated this fall and annually going forward. The data is being used to foster rigorous scholarship, new programs, new tools, and acquisition of new methods that reflect our partnerships and collaborations. Moreover, this data will help build and support new and ongoing statewide networks that foster and support work within diverse communities.

Extension's partnerships include jointly funded tenure/tenure track faculty; programs/events funded or conducted jointly; educational program delivery; convening; research and financial support.

Volunteers play an important role in how Extension conducts programs. In 2021, volunteers across the state contributed nearly 1 million hours of time in support of 4-H, gardening and nature programming and as community advisors for Extension.

The future goals and strategies for 2023 and beyond as described in the Extension strategic plan reflect that emerging challenges and opportunities require new approaches. Emerging challenges include globalization and a competitive marketplace of ideas; an increasingly diverse society; game-changing technological advances; variable funding streams; and eroding public trust of hierarchical traditional systems. Extension's goals are focused in three areas: Engagement, Systems and People, and Scholarship.

Engagement

Extension engages in a meaningful way with individuals, families, communities and stakeholders to lead and advocate for positive change across Minnesota, the nation and the world. These relationships are grounded in mutual trust and understanding and allow Extension to respond nimbly and effectively.

a) Measure and Increase Extension Partnerships:

Partnerships are an important strategy for meeting the University's land-grant mission. Strategic partnerships provide opportunities to expand the reach of the university, especially to underserved audiences. Given the significance of partnerships, Extension leaders believed it was important to establish a definition and baseline of current/existing partnerships. To do this, the first Extension Partnership Survey was conducted in 2021.

The survey of Extension faculty and staff identified 1,414 partnerships developed and supported by Extension across Minnesota. The baseline survey was an important first step, but only offers a snapshot in time of Extension partnerships. Additional yearly data will be collected to provide a comprehensive picture of our partnerships; to that end, we have increased our staff capacity in the Dean's office to conduct ongoing survey development, analysis, and reporting of how Extension is expanding its partnerships.

Systems and People

a) Operations and systems:

Extension aims to consistently promote efficient, effective and integrated structures and practices that reduce administrative barriers to innovation and collaboration. Extension's strategic plan clearly identifies the importance of building systems that promote these structures and practices to support and enhance the abilities of those who are a critical part of the mission.

For example, in response to the need to increase efficiency and reduce costs, the Extension regional support staff team was reorganized in early 2021 to a shared-responsibilities system organized by functional areas and across regional borders. This system allows these administrative professionals to further develop their skills and to be stronger collaborators, as well as to work more closely with

colleagues in Extension administrative and operational units. In addition, the system provides for a more effective use of Extension resources. There will be no reduction in the services provided by this team; it is simply a different way to organize the way these services are provided.

b) Employee recruitment:

Both the Extension 2020 strategic plan and the MPact 2025 strategic plan require employees who are high-quality, committed and passionate. Their important roles within the organization require effective onboarding and ongoing professional development. Extension values a culture of belonging and inclusiveness and weaves equity and diversity into all aspects of its programming and employee engagement.

Extension's academic centers have 40+ open positions. Extension will need to fill many of these positions to increase Extension program capacity. Positions that will need to be filled will include; tenure/tenure track faculty, Extension educators, support staff and program directors.

Extension will establish a new partnership with University of Wisconsin Extension to develop a rural entrepreneurship program. This program is being funded by gifts from agricultural lending organizations in Minnesota and Wisconsin.

c) Employee retention:

Extension is investing additional resources to develop a more comprehensive onboarding process as well as a new comprehensive professional development training for all supervisors. This professional development opportunity will ensure supervisors are well-prepared to lead a successful onboarding process for all new employees. The foundation for this effort is an innovative technological design that offers all employees easy access to current onboarding information.

c) Commitment to diversity, equity and inclusion

Providing equitable and inclusive access to educational programs that are adapted to reflect and honor the increasing diversity of community partners and stakeholders is vital to Extension's mission. This commitment to expanded inclusiveness and respect for all backgrounds and perspectives is a responsibility that must be shared across all levels of Extension.

Extension has established a new diversity, equity and inclusion (DEI) advisory committee that will work directly with Extension's assistant dean and director of DEI

on strategic planning and policy/program development to help meet our DEI goals. The committee will provide advice and counsel to Extension leaders on several topics, including:

- Increasing diversity and building an inclusive environment throughout Extension's workplace.
- Increasing DEI education and training for all Extension employees.
- Developing recommendations and strategies for reaching new, diverse and historically underserved audiences.
- Supporting efforts to develop cross-cultural scholarship within and across all Extension centers.
- Developing recommendations and strategies for ensuring that Extension's leadership and workforce reflect the diversity of the population of Minnesota.

Scholarship

Rigorous research-based scholarship is foundational to the work of Extension and its work with stakeholders. As needs across the University and state change, the systems supporting Extension's approach to academic rigor must adapt and change as well.

a) Children, Youth, and Family Consortium re-imagined:

The Children, Youth, and Family Consortium was established in 1991 and reconfigured in 2021 to meet the needs of children, youth and families in Minnesota. This reconfiguration resulted in the hiring of a Director of Strategic Partnerships who will expand Extension's ability to identify partnerships that will grow research-based scholarship throughout the state.

For example, a partnership has been established with the Institute for Community Integration (ICI) through the Minnesota Leadership Education in Neurodevelopmental and Related Disabilities (MNLEND) Program in which Extension educators are partnered with a community organization to establish training that brings research-based information related to neurodevelopment to communities. In addition, Extension and ICI are partnering to find a location for a tele-outreach pilot that would offer people outside of the Twin Cities a location to connect with neurodevelopment resources at the University of Minnesota.

In another example, Extension and the Masonic Institute for the Developing Brain are working closely together to address the need for attracting young people into the field of neurodevelopment.

b) Harnessing technology:
Over the past two-plus years, Extension has learned a great deal about the potential of virtual meetings, programming and connecting with participants and volunteers in new ways. Educational programs have seen an increase in participation and enrollment. Virtual learning has required educators to use a variety of virtual tools to meet the needs of their audiences.

Extension reaches millions of people each year through its digital communications and educational channels, including:

- The external-facing website, which so far in 2022 has had about 10M pageviews and 5M users;

- At least 50 monthly e-newsletters and podcasts for targeted geographic or programmatic audiences

- 17 podcasts and at least 25 e-newsletters

All these tools have grown exponentially during the pandemic and have become essential to delivering Extension programming. Extension will continue to develop best practices for determining when to conduct meetings, educational programs and other work virtually, in compliance with federal, state and University guidance.

Minnesota 4-H and higher education

4-H is a key component of Extension's outreach and partnership efforts throughout the state. As the largest youth development organization in Minnesota, 4-H provides an opportunity for the University system to recruit and enroll high-potential, high-performing young people.

Minnesota 4-H does not track the post-high-school enrollments of individual 4-H members; however, national studies – and anecdotal evidence statewide – have shown that 4-H members are much more likely to enroll in post-secondary institutions than high school graduates who did not participate in 4-H.

Extension and 4-H conduct a number of activities throughout the year that introduce young people to higher education generally and to the University of Minnesota system specifically. This past summer, for example, members of a Moorhead 4-H group that includes Somali immigrant families took part in a campus immersion program at the University of Minnesota Crookston.

4-H has always been closely tied to agriculture, but a number of new initiatives are aimed at strengthening that connection and providing ways to introduce more young people to the possibilities of a career in agriculture.

UNIVERSITY OF MINNESOTA EXTENSION

Building a Stronger Minnesota through Extension

Board of Regents | Mission Fulfillment Committee | September 8, 2022

Beverly Durgan
Dean, University of Minnesota Extension

Lily Krona
sophomore, University of Minnesota Crookston

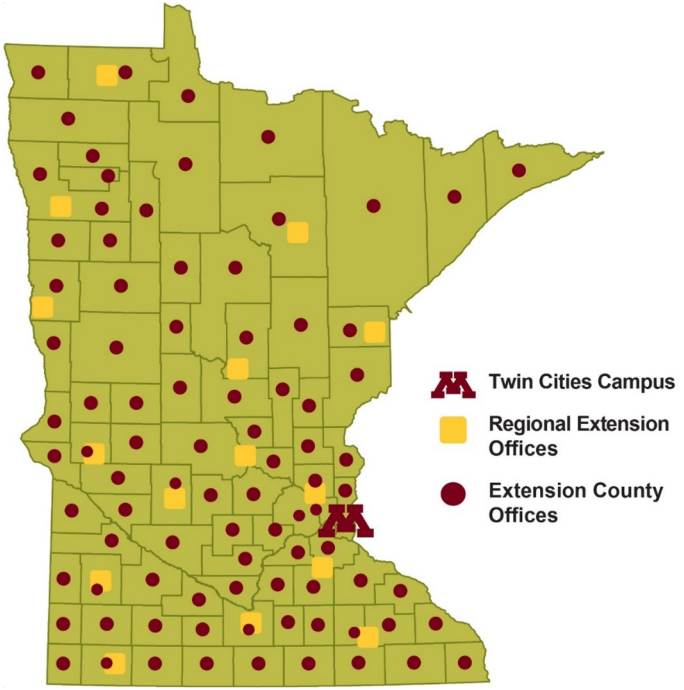
Extension Addresses Issues Important to Minnesota

Through research-based education, Extension makes Minnesota a better place to live, work, and play.

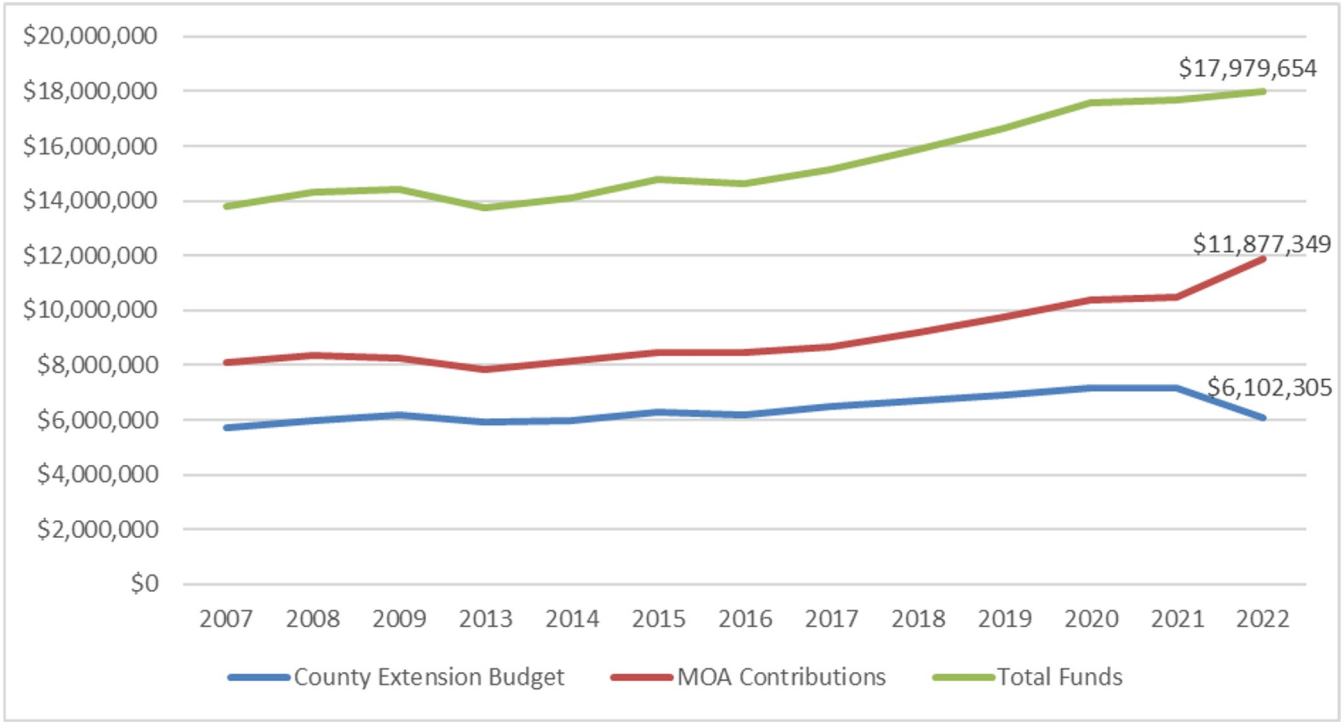
- Growing leaders
- Strengthening families
- Enhancing rural economies
- Bridging the opportunity gap
- Future workforce

Connecting Every County with the U of M

- 15 Regional Offices
- 87 County Offices
- 65% of employees live and work in Greater Minnesota



County Funding for Extension



Volunteers contribute nearly 1M hours/year

- Master Gardeners
- Master Naturalists
- 4-H volunteers
- Citizens Advisory Committee
- County Extension Committees
- AIS Detectors
- Cooking Matters

MPact 2025

Commitment 3: MNtersections

Goal 3

Enhance Extension's impact and reach

Action

Increase number of community partners by 20% by 2025

MPact 2025 Implementation Plan

- Baseline survey in fall 2021 included 734 extension faculty/staff
- 1,414 unique partnerships reported

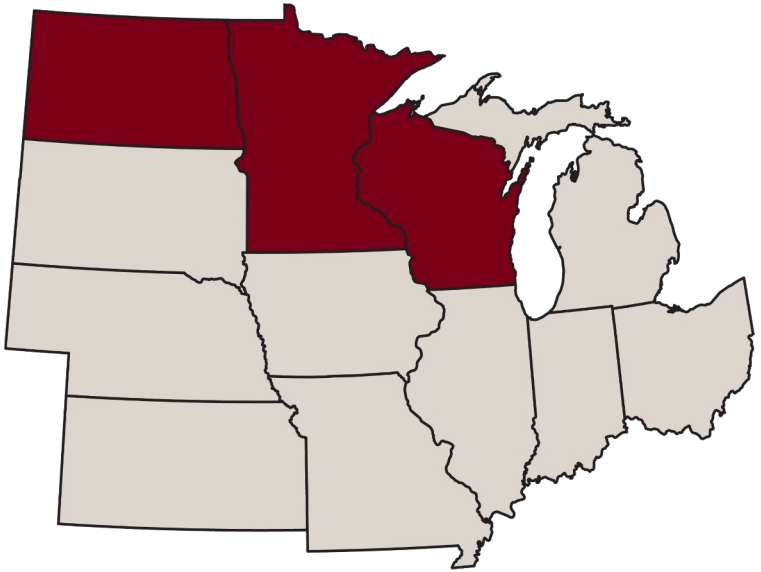
Next steps:

- Survey will be conducted annually
- Review partnerships to determine areas of the state or sectors that Extension is not serving

Extension Is a National Leader in Partnering with other Land-Grant Universities

Joint Faculty and Educator Positions

- **North Dakota State University**
- **University of Wisconsin**



Rural Health Partners in Minnesota

Community-Based Solutions to the Opioid Crisis

- Extension and the College of Pharmacy at UMD
- County and tribal nation partners
- Funded via federal grants

Mental health and safety in rural Minnesota

- Joint programs with UMASH and School of Public Health
- Rural stress initiative with Minnesota Department of Ag and others

4-H and the Minnesota State Fair

Addressing Leadership Needs in Rural Communities

- Minnesota Agriculture and Rural Leaders Program (MARL)
- Partnership with MN State system – SMSU
- 20 years

School Districts and Clean Energy

- Mounds View is one of 60 school districts across Minnesota that are saving money and enhancing their curriculum with solar panels
- The Clean Energy Resource Teams (CERTs) will serve as technical advisers to participating districts.
- Energy savings and curriculum development

“Climate-smart” decision-making

Minnesota Climate Adaptation Partnership (MCAP)

- Climate resilience = Mitigation + Adaptation
- Multi-agency partnership, collaborations across sectors and levels of government

MN Changing Rural Demographics and Workforce

“Rural Brain Gain”

- High school graduates often leave small towns - they go to college - they get jobs. Then, they want to come back!
- The population of residents ages 30 to 49 has increased in rural Minnesota counties.
- These newcomers have significant education, skills, connections, spending power and children.
- Communities can work together to attract newcomers and create a quality of life that all residents enjoy.

Extension's COVID-19 response and what we learned

Some programs will stay online

- Nutrition for low-income families
- Pesticide applicator certification
- Master Gardener core course

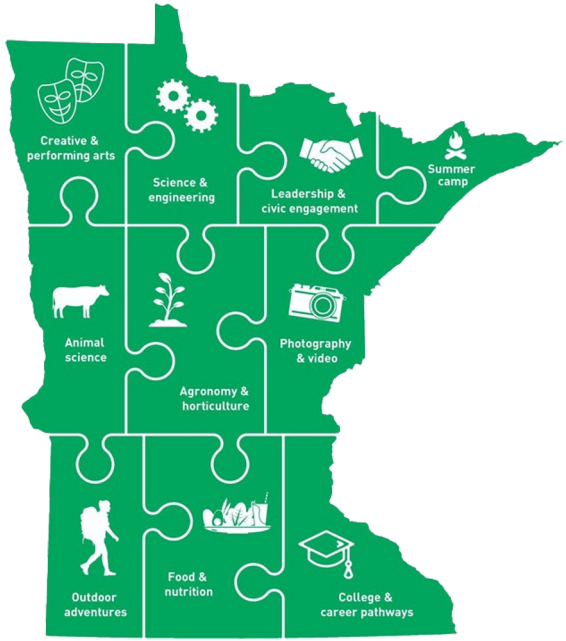
Some are offered in-person

- 4-H
- Hands-on learning

Some programs will be hybrid

WHERE: Across Minnesota's 87 counties and First Nations

4-H is Minnesota's largest youth development organization, growing leaders in every part of the state



Creating educational and career pathways

All of our priority programs include methods that promote the educational futures of youth

4-H and Student Recruitment

- Campus immersion at Crookston, Morris, Rochester, Duluth, Twin Cities
- Summer camps
- Department of Agriculture grant
- Cargill Foundation grant
- $750,000 ag education and careers federal grant with a focus on minority youth and first generation 4-Hers.

Minnesota 4-H and higher education

- 71% attend post-secondary institutions
- Majority do not attend a U of M campus

Summary and discussion

- **Future priorities and direction for Extension**
- **Extension funding challenges and opportunities**
- **Partnership Opportunities**

BOARD OF REGENTS
DOCKET ITEM SUMMARY

Mission Fulfillment **September 8, 2022**

AGENDA ITEM: Annual Report on Academic Program Changes

☐ **Review**	☐ **Review + Action**	☐ **Action**	☒ **Discussion**

☒ *This is a report required by Board policy.*

PRESENTERS: Rachel Croson, Executive Vice President and Provost

PURPOSE & KEY POINTS

The purpose of this item is to discuss 2021–22 academic program changes, the components of degree programs, and the ways in which courses are utilized. The item will include an overview of the review and approval process and the report of 2021–22 approvals.

The committee will be asked to consider whether the process for new, changed, and discontinued academic programs ensures that academic proposals come before the committee having undergone a rigorous, thorough review at appropriate levels.

BACKGROUND INFORMATION

Academic program proposal review and approval is governed by University of Minnesota Administrative Policy: *Adding, Changing, or Discontinuing Academic Plans.* Approval by the Board of Regents is required for the establishment of new academic programs; addition of formal tracks and of new sites for existing academic programs; discontinuance/merger of existing programs; and changes in program titles/degree designation.

This report is submitted annually in conformance with Board of Regents Policy: *Board Operations and Agenda Guidelines*.

University of Minnesota Board of Regents
Mission Fulfillment Committee
September 8, 2022

Annual Report on Academic Program Approval

Introduction

As part of its ongoing agenda, the Mission Fulfillment Committee reviews the new academic program approval and academic program changes recommended by the Executive Vice President and Provost. These recommendations are presented to the Committee on the consent agenda at each meeting. This report provides: (1) a summary of the process for approving new or changed academic programs, (2) an account of the changes approved by the Board in 2021–2022, and (3) a listing of five-year academic degree program trends by major, degree type, level, and campus.

Part I. The Academic Program Approval Process

The University of Minnesota's set of academic programs is among the most comprehensive of any institution in the world. The University offers over 300 undergraduate majors on its five campuses; more than 200 master's degree programs; and over 100 doctoral degree programs. The University is one of only four campuses in the U.S. with agricultural programs, a law school, and academic health science programs including dentistry, pharmacy, nursing, veterinary medicine, and a major medical school. This section describes the program proposal approval process, the principles that guide approval, the criteria used to assess proposals for new and changed programs, and the process's intersection with delegation of authority policies.

Program Approval Process

The process for establishing new academic programs, or making changes to current programs offered by any college or campus of the University of Minnesota, involves a series of steps designed to provide careful review and oversight. These processes originate at the programmatic and departmental level, progress through the colleges, to the Office of the Provost and, if necessary, the Board of Regents.

The stages of development and approval are additive, with various points of emphasis at each stage in the process. Early consultation within the college, among other colleges, with institutional units, and across campus is a key component of the process, as each unit focuses on different aspects of the proposal. For example, the Office of Undergraduate Education and the Graduate School focus their review on admission and degree requirements, University policy compliance, and other factors specifically related to the academic success of students. Review by the Office of the Provost focuses on things like need and demand, efficiency and effectiveness,

support and resources, mission, collaboration, and program duplication. New undergraduate major degree program proposals on the Twin Cities campus are also reviewed by the Campus Curriculum Committee.

The public review period, which occurs in the weeks leading up to the Board of Regents meeting, encourages open communication across colleges and campuses concerning the creation, discontinuation, and change of academic programs; fosters collaboration and productive exchanges across and between departments and disciplines; and prevents inadvertent encroachment upon and duplication of academic programs.

Principles
The principles that guide academic plan approval include the following:

- **Alignment**
  Academic programs should be aligned with the missions, strategic plans, and compacts of their home units and with the University's broad institutional goals and strategic directions.

- **Common Criteria**
  Proposals for academic programs should reflect consideration of common criteria: quality; centrality; comparative advantage; need and demand (including accreditation or competitive requirements as well as Minnesota workforce needs); efficiency and effectiveness; and growth and leveraging of resources. (See "Criteria for New Program Proposals" section below.)

- **Communication and Consultation**
  Decisions to offer, change, or drop academic programs, when they have the potential to affect or involve other units within the University, require consultation early in the program development stage.

- **Timely Review**
  The process ensures thorough and timely review and consideration of proposals for approval at the appropriate level: Board of Regents, Executive Vice President and Provost, Vice Chancellor for Academic Affairs, or collegiate dean.

Approval of academic program proposals should be carried out by the Board of Regents as guided by University Policy or by an appropriate-level administrator with the delegated authority from the Board. Formal approval by the Board of Regents or its designee is required before new and changed programs may be publicized or initiated.

Approval-Level Requirements
The type of requested action determines the required approval level. Changes requiring Board of Regents and Executive Vice President and Provost review and approval include the following:

- Adding a new degree, minor, or program track (subplan)
- Adding a new integrated degree program (e.g., 4+1 Bachelor to Master's program)

- Significant changes to a degree or minor, including: adding a subplan, changing a plan or subplan name, changing a degree designation (e.g., B.S. to B.A., M.S. to M.A.), changing the academic home of a plan, merging two or more degrees or minors
- Discontinuing a degree, plan, or subplan
- Offering distance delivery of all or substantially all coursework for an existing plan, adding or changing the delivery of a degree program.

Criteria for New Program Proposals

The University uses a standard set of criteria to review proposals for new or changed academic programs. These criteria parallel ones used in the University's periodic review of collegiate and departmental academic and administrative units.

Mission, Priorities, and Interrelatedness

- In what ways is the proposed program consistent with the University's and the unit's mission?
- How does the program support the unit's strategic direction and compact?
- How will the program contribute to the priorities of the University (SWSP), the campus, and the unit?
- How does the program relate to other University academic programs?
- What are the implications for other units, colleges, or campuses, including the impact on other units of prerequisites and related courses?

Demand, Development, and Leveraging of Resources

- What is the need and demand for the program? Proposals for programs that reach very small numbers of students are discouraged. The following type of evidence is provided, as appropriate:
  - Evidence that the program meets societal needs and expectations
  - Evidence of consultation with employers or professional organizations, if appropriate
  - Employment data, if appropriate (e.g., current and projected availability of jobs for graduates)
  - Enrollment data for similar programs
  - Data indicating student interest or demand, both short- and long-term
  - Projected number of applicants for the program
  - Projected number of degrees to be conferred per year at full operation
- What is the intended geographic service area and what is the prospective student market?
- How will students benefit from the program?

Uniqueness and Comparative Advantage

- What are the characteristics of the program that make it particularly appropriate for the University of Minnesota?
- Are there comparable academic programs in Minnesota or elsewhere?
- What planning and development expertise shaped the proposal?

Efficiency and Effectiveness

- Have resources been reallocated within the unit to support the proposed program? If so, how?
- If additional resources are needed, how will the program leverage existing resources to attract new resources?
- What steps will be taken to ensure the program is operated economically and effectively?

Quality, Productivity, and Impact

- What are the learning outcomes for the program? How will the outcomes be measured? How often?
- How, when, and by whom will program quality be measured?
- How will the college, the department, and program instructors continue to improve the teaching and learning in this program?
- Is the program subject to review by a specialized accreditation agency? If yes, what agency and what is the review cycle?
- How, if at all, will the program address the University's diversity goals, e.g., student and faculty recruitment, curriculum, etc.?

Part II. Summary of 2021–22 New and Changed Programs

NEW, CHANGED and DISCONTINUED PROGRAMS 2021–2022

TWIN CITIES CAMPUS

Academic Health Sciences

Change/correct the program delivery modality in the Medical Laboratory Sciences Certificate program from partially online to majority classroom	June 2021

Carlson School of Management

Discontinue Industry subplan in the M.B.A. degree	May 2022
Create research track subplan in M.S. Finance degree	May 2022
Change program delivery modality in the M.B.T. degree and corresponding business taxation Post-Baccalaureate Certificates to primarily or completely online	May 2022
Change program delivery modality in the M.B.A. degree to include both classroom (face-to-face) and primarily online options	May 2022

College of Biological Sciences

Create an undergraduate minor in Health and Genomics	Oct 2021

College of Continuing and Professional Studies

Create a partially online option in the B.A. and B.S. degree programs in Multidisciplinary Studies	Sept 2021
Create a completely online option in the Applied Business Certificate Program	Sept 2021
Create a completely online option in the Facility Management Certificate Program	Sept 2021
Create a Master of Professional Studies degree in Sexual Health	Oct 2021
Create a Post-Baccalaureate Certificate in Sex Therapy	Oct 2021
Create a Post-Baccalaureate Certificate in Regulatory Affairs for Food Professionals	Oct 2021
Create Regulatory Affairs for Food Professionals subplan option in the Applied Sciences Leadership M.P.S degree	Oct 2021
Create a Post-Baccalaureate Certificate in Transgender & Gender Diverse Health	May2022
Create two new subplans in the Master of Professional Studies degree in Sexual Health	May 2022
Create a Poultry Science Subplan in the Applied Sciences Leadership M.P.S.	May 2022
Discontinue the Dakota and Ojibwe Language Teaching Certificates	June 2022

College of Design

Discontinue subplan options in the Product Design B.S.	May 2022
Discontinue the Housing and Community Development Undergraduate Minor	May 2022
Discontinue the Landscape and Design Planning B.E.D.	May 2022
Create a Certificate in Design Justice	June 2022

College of Education and Human Development

Create a postbaccalaureate certificate in Learning Analytics	Dec 2021
Create a Graduate Minor in Special Education	Feb 2022
Create partially and completely online program delivery options in the Advanced Practices in Second Language Teaching Post-Baccalaureate Certificate	Feb 2022
Deliver the Online Distance Learning Post-Baccalaureate Certificate completely online	Feb 2022
Change program delivery modality in the Special Education Initial License M.Ed., Special Education M.Ed., and Special Education Graduate Minor degree programs from majority classroom to partially online	May 2022

College of Food, Agriculture and Natural Resource Sciences

Change the name of the undergraduate minor in Sustainable Agriculture and Food Systems to Food Systems	Dec 2021
Create an undergraduate minor in Agriculture and Food Education	Feb 2022
Create an undergraduate minor in Agriculture and Environmental Science Communication	Feb 2022
Create an Applied Poultry Science subplan in the Animal Science M.S. degree	Feb 2022
Create a Tribal Natural Resources subplan in the Natural Resource Science and Management Ph.D. and M.S. degrees	May 2022

College of Liberal Arts

Change the name of Bachelor of Arts, Bachelor of Science, and undergraduate minor in Sociology of Law, Criminology, and Deviance to Sociology of Law, Criminology, and Justice	Sept 2021
Discontinue the M.A. and graduate minor in Health Journalism and Communications (with School of Public Health)	Dec 2021
Create a Graduate Minor in Race, Indigeneity, Gender, and Sexuality	Feb 2022
Create an Undergraduate Minor in Dance	May 2022
Change the name of graduate minor in Race, Indigeneity, Gender, and Sexuality	May 2022
Change the name of the graduate minor in Classical and Near Eastern Studies	May 2022
Change the name of Bachelor of Arts in Mass Communications	May 2022
Change program delivery modality in the Master of Arts (M.A.) in Strategic Communication degree program from majority classroom to completely online	May 2022
Create a B.A. in Dakota Language	June 2022
Create a B.S. in Anthropology	June 2022

College of Science and Engineering

Discontinue the Co-op subplan in the Bachelor of Mechanical Engineering degree	Oct 2021
Create an M.S. in Data Science for Chemical Engineering and Materials Science	May 2022

Humphrey School of Public Affairs

Create a Graduate Minor in Development Practice	Feb 2022

Medical School/Graduate Medical Education (GME)

Create a Fellowship Program in Clinical Informatics	Sept 2021
Create a Fellowship Program in Pediatric Neuro-Oncology	Sept 2021
Create a Fellowship Program in Wound Medicine	Sept 2021
Discontinue the Pediatric Orthopedic Surgery Fellowship	Sept 2021
Create a Fellowship Program in Multiple Sclerosis	Oct 2021
Create a Fellowship in Advanced Imaging: Musculoskeletal and Emergence Radiation	May 2022
Create a Fellowship in Anesthesiology Critical Care	June 2022

School of Dentistry

Create an Oral Health Educator Certificate	June 2022

School of Nursing

Change the academic home of the Integrated Health and Wellbeing M.A. and the Integrative Therapies and Healing Practices Minor and Post-Baccalaureate Certificate from the Graduate School to the School of Nursing	Feb 2022
Create a Pediatric Nurse Practitioner - Acute Care Post-Graduate Certificate	May 2022
Create a Post-Baccalaureate Certificate in Population Health Informatics & Technology	May 2022

School of Public Health

Discontinue the M.A. and graduate minor in Health Journalism and Communications (with College of Liberal Arts)	Dec 2021
Change program delivery modality in the Master of Science (M.S.) in Clinical Research from primarily online to completely online	May 2022
Discontinue the Master of Public Health in Biostatistics degree	Oct 2021
Discontinue the Master of Public Health and Post-Baccalaureate Certificate in Public Health Informatics	Sept 2021

DULUTH CAMPUS

College of Education and Human Service Professions

Create at B.A.Sc. degree in Childhood Nature Studies	Dec 2021
Create a Plan C subplan option in the Environmental Education M.E.Ed.	May 2022
Change program delivery modality in the Social Work Graduate Minor from classroom only to partially online	May 2022

College of Arts, Humanities, and Social Sciences

Change program delivery modality in the American Indian Studies Graduate Minor from majority classroom to completely online	May 2022
Discontinue the English M.A.	May 2022
Create a Post-Baccalaureate Certificate in Indigenous Environmental Systems and Principles of Resource Management	Oct 2021
Create a Post-Baccalaureate Certificate in Tribal Administration and Leadership	Oct 2021
Create a Post-Baccalaureate Certificate in Tribal Sovereignty and Federal Indian Law	Oct 2021
Create a Post-Baccalaureate Certificate in Tribal Natural Resource Stewardship, Economics, and Law	Oct 2021
Discontinue the graduate minor in Music	Dec 2021
Change the name of the Environment and Sustainability subplan in the Bachelor of Arts in Environmental, Sustainability, and Geography	May 2022
Discontinue the Post-baccalaureate Certificate in Geographical Information Science	Sept 2021

Swenson College of Science and Engineering

Add a partially online delivery modality in the Master of Engineering (M.Eng.) degree program	May 2022

Labovitz School of Business and Economics

Create an Integrated Degree Program option in the Bachelor of Business Administration and Master of Business Administrations degrees	Oct 2021
Create an Integrated Degree Program option in the Bachelor of Accounting and Master of Business Administration degrees	Oct 2021
Create an Integrated Degree Program option in the Bachelor of Business Administration and Master of Business Administration degrees.	Dec 2021

CROOKSTON CAMPUS

Create an Undergraduate Minor and Certificate in Turfgrass Management	May 2022
Create an Undergraduate Minor in Soils	May 2022
Create an Undergraduate Minor in Precision Agriculture	May 2022
Change the name of the Bachelor of Science in Golf and Turf Management	May 2022
Discontinue subplan options in the Agronomy B.S.	May 2022

Discontinue respiratory care subplan Applied Studies B.S.	June 2022
Create three new sub plans in the Biology B.S. degree	Dec 2021
Create an online subplan option in the Software Engineering B.S.	May 2022
Create an online option in the Honors Program	Sept 2021
Create an online option in the Manufacturing Management Certificate	Sept 2021
Discontinue the Urban Forestry subplan in the B.S. degree in Horticulture	Sept 2021
Create a Health Service Executive B.S.	May 2022
Change the name of the Nursing Home Administrator Certificate	May 2022

ROCHESTER CAMPUS

Create a Lab Based Sciences sub plan in the Health Sciences B.S. degree	Dec 2021

Part III. Academic Degree Program Trends

Five-Year Comparison

Listed below are the number of degree programs by general degree type. The numbers in parenthesis represent the number of degree programs in September of 2018 and the numbers to the left of the parenthesis represent the current count as of September 2022.

	Undergraduate	*Master's*	*Doctoral/Professional*	*Post-Bacc Cert*
Twin Cities	**157 (151)**	**188 (185)**	**106 (108)**	**99 (77)**
Duluth	**97 (92)**	**24 (26)**	**2**	**6 (5)**
Morris	**34 (34)**			
Crookston	**37 (35)**			
Rochester	**2 (2)**	**1* (1)**	**1* (1)**	

* Graduate degrees granted by the Twin Cities campus, with the administrative home of the program on the Rochester campus.

Undergraduate, Graduate, and Professional Degrees Conferred

Listed below are the largest degree programs by degree type and campus.

Twin Cities Undergraduate						
Major	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Computer Science B S Comp Sc	227	254	295	329	368	1,473
Psychology B A	286	270	283	263	297	1,399
Journalism B A	267	238	289	246	249	1,289
Finance B S B	168	215	248	236	273	1,140
Psychology B S	179	185	194	218	232	1,008
Mechanical Engr B M E	194	209	203	198	200	1,004
Communication Studies B A	240	197	192	192	177	998
Political Science B A	171	176	194	215	218	974
Business and Marketing Educ BS	173	178	198	202	212	963
Biology B S	187	204	176	188	173	928
ALL OTHER DEGREES	5,715	5,685	5,758	5,769	6,071	28,998
Grand Total	7,807	7,811	8,030	8,056	8,470	40,174

Twin Cites Graduate Master's						
Major	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Business Admin M B A	479	454	469	370	353	2,125
Teaching M Ed	276	263	254	231	236	1,260
Social Work M S W	131	137	126	124	114	632
Business Analytics M S	80	99	101	137	13	430
Electrical Engineering M S E E	139	133	106	37	6	421
Public Policy M P P	83	78	88	81	69	399
Computer Science M S	79	50	77	67	84	357
Hlth Care Administration M H A	76	87	60	68	51	342
Master of Nursing	63	63	63	62	62	313
Mechanical Engr M S M E	74	46	54	56	60	290
ALL OTHER DEGREES	2,005	1,941	1,990	1,903	1,898	9,737
Grand Total	3,485	3,351	3,388	3,136	2,946	16,306

Twin Cities - Doctoral / Professional						
Major	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Medicine M D	220	216	229	199	242	1,106
Law J D	208	194	159	198	227	986
Pharmacy Pharm D	160	173	160	164	164	821
Dentistry D D S	107	114	122	127	121	591
Doctor of Nursing Practice	121	109	102	105	136	573
Veterinary Medicine D V M	98	102	99	93	102	494
Physical Therapy D P T	47	43	55	53	49	247
Chemistry Ph D	33	34	37	31	35	170
Electrical Engineering Ph D	29	34	36	26	31	156
Org Lead Pol and Dev Ph D	22	25	34	30	31	142
ALL OTHER DEGREES	641	622	715	593	635	3,206
Grand Total	1,686	1,666	1,748	1,619	1,773	8,492

Twin Cities - Postbaccalaureate Certificate						
Major	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
PK-12 Administration	20	29	20	45	30	144
Dual Lang. and Immersion Ed.	26	21	25	38	1	111
Clinical Training	27	21	20	21	12	101
Disability Policy and Services	18	19	16	13	16	82
Int Thpys & Hlg Practices Cert	11	13	12	10	9	55
Human Services Leadership		4	18	15	17	54

Nonprofit Management	12	19	7	5	5	48
Technical Communication	8	7	10	9	13	47
Public Health Core Concepts	5	12	8	10	8	43
Hlth Care Dsgn & Innov Cert	6	6	10	6	11	39
ALL OTHER CERTIFICATES	126	115	90	106	90	527
Grand Total	259	266	236	278	212	1,251

Duluth - Undergraduate						
Major	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Psychology B A Sc	121	134	142	126	159	682
Marketing B B A	123	109	118	123	113	586
Mechanical Engineering B S M E	89	123	122	125	113	572
Biology B S	90	72	91	106	117	476
Communication B A	86	95	82	77	80	420
Finance B B A	60	79	99	86	83	407
Accounting B Acc	79	94	74	78	50	375
Management B B A	70	75	63	52	50	310
Criminology B A	64	61	56	54	41	276
Civil Engineering B S C E	48	58	54	48	65	273
ALL OTHER DEGREES	1,072	1,196	1,125	1,177	1,220	5,790
Grand Total	1,902	2,096	2,026	2,052	2,091	10,167

Duluth - Graduate Master's						
Major	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Social Work M S W	31	24	43	43	36	177
Communication Sci/Disord M A	19	18	17	19	22	95
Education M Ed	16	19	25	20	13	93
Envmntl Hlth/Safety MEnvHltSaf	16	27	18	11	10	82
Business Admin M B A	14	10	4	17	36	81
Computer Science M S	13	9	16	7	13	58
Trib Admin & Govern M T A G	11	15	9	7	12	54
Psychological Science M A	8	9	15	14	8	54
Applied/Computational Math M S	12	15	8	9	5	49
Chemistry M S	12	7	6	14	10	49
ALL OTHER DEGREES	44	57	69	78	65	313
Grand Total	196	210	230	239	230	1,105

Duluth Doctoral						
Major	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Teaching and Learning Ed D	5	9	0	1	0	15
Grand Total	5	9	0	1	0	15

Duluth - Postbaccalaureate Certificate						
Major	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Community College Teaching		1	3	2	1	7
GIS		1		3	1	5
Environmental Education	1			1		2
Autism Spectrum Disorders		1				1
Educational Computing and Tech	1					1
Grand Total	2	3	3	6	2	16

Morris - Undergraduate						
Major	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Biology B A	32	51	47	53	42	225
Psychology B A	49	36	33	24	24	166
Management B A	29	22	27	22	26	126
Computer Science B A	20	20	23	21	17	101
Elementary Education B A	21	16	21	17	16	91
English B A	35	16	6	20	11	88
Chemistry B A	21	21	17	8	13	80
Sport Management B A	16	11	12	8	4	51
Human Services B A	2	16	13	9	11	51
Political Science B A	9	12	10	10	7	48
ALL OTHER DEGREES	133	117	116	130	76	572
Grand Total	367	338	325	322	247	1,599

Crookston - Undergraduate						
Major	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Accounting B S	46	46	45	54	45	236
Management B S	51	43	42	35	22	193
Health Management B S	42	28	31	33	34	168
Applied Studies B S	20	19	29	34	28	130
Natural Resources B S	31	31	18	26	17	123
Communication B S	18	26	23	22	22	111
Finance B S	16	14	16	25	29	100
Manufacturing Management B M M	24	20	20	17	18	99

Animal Science B S	19	17	15	18	18	87
Information Technology Mgmt BS	14	12	13	17	26	82
ALL OTHER DEGREES	139	150	155	162	159	765
Grand Total	420	406	407	443	418	2,094

Rochester - Undergraduate						
Major	**2017**	**2018**	**2019**	**2020**	**2021**	**Total**
Health Sciences B S	88	58	56	87	93	382
Health Professions B S	29	27	28	30	36	150
Grand Total	117	85	84	117	129	532

Annual Report on Academic Program Changes

Board of Regents | Mission Fulfillment Committee | September 8, 2022

Rachel Croson
Executive Vice President and Provost

MPact 2025

Commitment 1: Student Success

Goal 3

Increase innovative and high-quality educational offerings across modes of delivery to reach students where they are.

Action

Enhance the quality and support for educational offerings.

MPact 2025

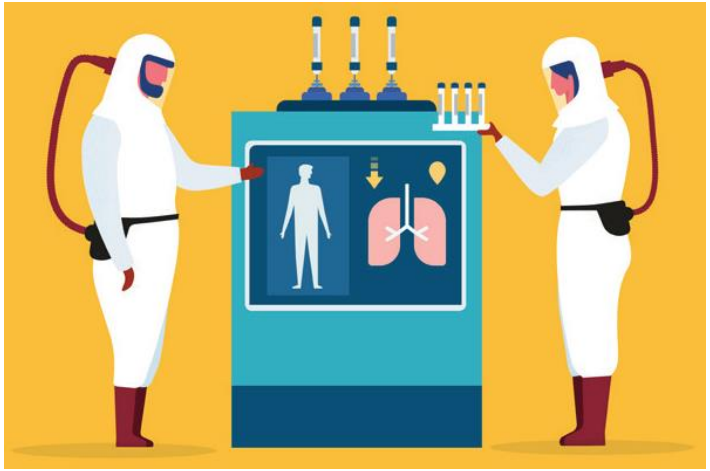
Commitment 2: Discovery, Innovation & Impact

Goal 2

Cultivate creativity, collaboration, and entrepreneurial spirit.

Action

Increase multidisciplinary opportunities in research and curriculum.



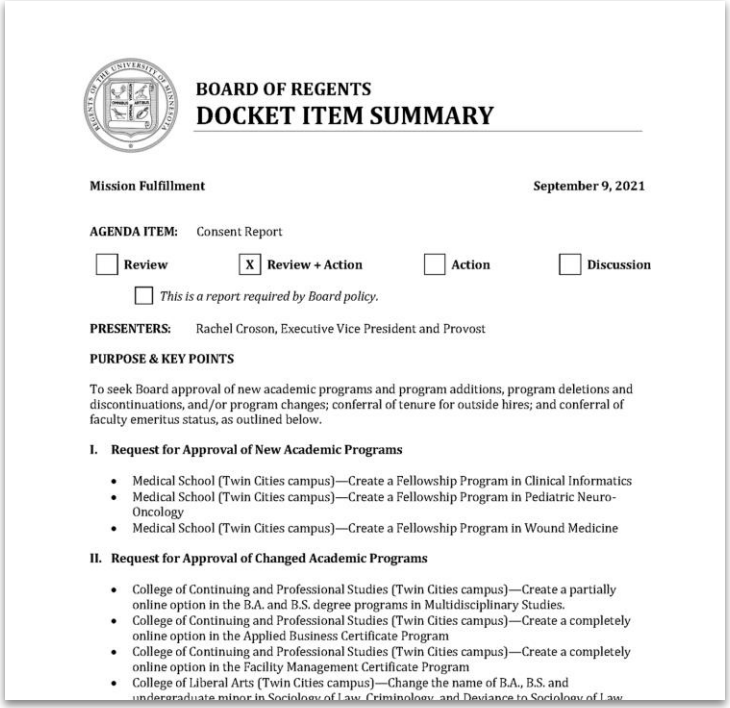
University Policy

Adding, Changing, or Discontinuing Academic Plans

Departments, colleges, and campuses have the authority to establish, change, and discontinue academic programs that may appear on official University transcripts, subject to appropriate consultation with other units and **subject to the final authority of the Board of Regents.**

> Undergraduate, graduate, and professional credit-bearing degrees, majors, minors, and certificates.

Board of Regents Approval



BOARD OF REGENTS
DOCKET ITEM SUMMARY

Mission Fulfillment **September 9, 2021**

AGENDA ITEM: Consent Report

☐ **Review** ☒ **Review + Action** ☐ **Action** ☐ **Discussion**

☐ *This is a report required by Board policy.*

PRESENTERS: Rachel Croson, Executive Vice President and Provost

PURPOSE & KEY POINTS

To seek Board approval of new academic programs and program additions, program deletions and discontinuations, and/or program changes; conferral of tenure for outside hires; and conferral of faculty emeritus status, as outlined below.

I. Request for Approval of New Academic Programs

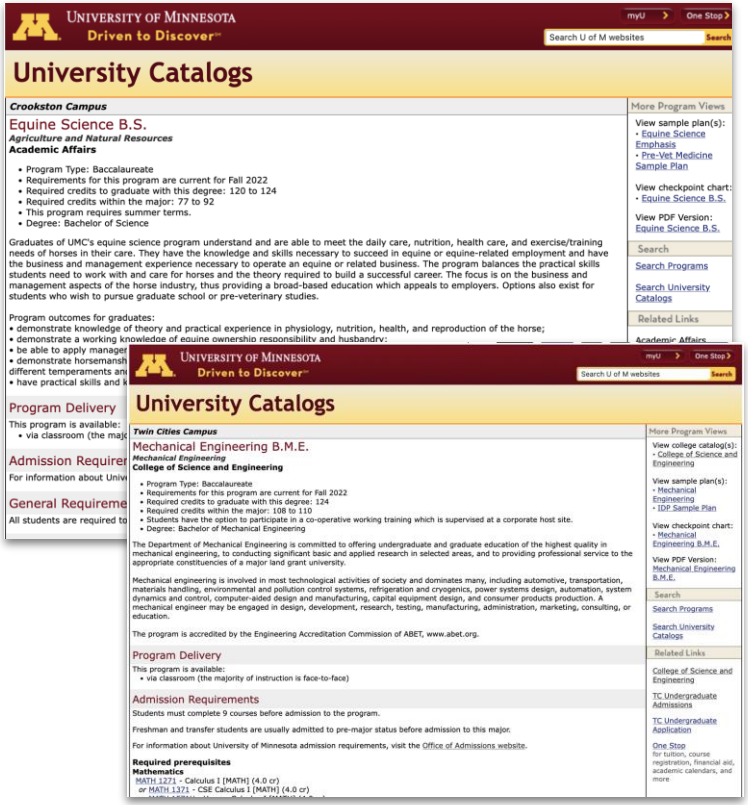
- Medical School (Twin Cities campus)—Create a Fellowship Program in Clinical Informatics
- Medical School (Twin Cities campus)—Create a Fellowship Program in Pediatric Neuro-Oncology
- Medical School (Twin Cities campus)—Create a Fellowship Program in Wound Medicine

II. Request for Approval of Changed Academic Programs

- College of Continuing and Professional Studies (Twin Cities campus)—Create a partially online option in the B.A. and B.S. degree programs in Multidisciplinary Studies.
- College of Continuing and Professional Studies (Twin Cities campus)—Create a completely online option in the Applied Business Certificate Program
- College of Continuing and Professional Studies (Twin Cities campus)—Create a completely online option in the Facility Management Certificate Program
- College of Liberal Arts (Twin Cities campus)—Change the name of B.A., B.S. and undergraduate minor in Sociology of Law, Criminology, and Deviance to Sociology of Law

Scope

- Adding a new or changing an existing:
  - degree plan (major)
  - subplan (e.g., track, emphasis, concentration)
  - minor
- Discontinuing a degree plan, subplan, or minor
- Process is collaborative, which supports all programs but in particular the development of multidisciplinary programs



Principles

- **Mission, Priorities, and Interrelatedness**—How does the program support the unit's strategic direction and compact?
- **Demand, Development, and Leveraging of Resources**—What evidence shows student or industry demand?
- **Uniqueness and Comparative Advantage**—What are the characteristics of the program that make it particularly appropriate for the University
- **Efficiency and Effectiveness**—Is the program within the capacity of the unit's resources?
- **Quality, Productivity, and Impact**—How will program quality be measured?

Approval Levels and Process Overview

- Additive, with special points of emphasis at each stage.
- Consultation
  - within the unit
  - among colleges
  - posting for public review

Number of Degree Programs by Type

Five-Year Comparison 2018–2022

*2018 represented in parenthesis

	Undergraduate	Master's	Doctoral/Professional	Post-Bacc Cert
Twin Cities	157 (151)	188 (185)	106 (108)	99 (77)
Duluth	97 (92)	24 (26)	2	6 (5)
Morris	34 (34)			
Crookston	37 (35)			
Rochester	2 (2)	1* (1)	1* (1)	

*Graduate degrees granted by the Twin Cities campus, with the administrative home of the program on the Rochester campus.

Summary and Discussion

Process ensures that academic proposals before the committee have undergone a rigorous, thorough review at appropriate levels.

BOARD OF REGENTS
DOCKET ITEM SUMMARY

Mission Fulfillment **September 8, 2022**

AGENDA ITEM: Consent Report

☐ **Review** ☒ **Review + Action** ☐ **Action** ☐ **Discussion**

☐ *This is a report required by Board policy.*

PRESENTERS: Rachel Croson, Executive Vice President and Provost

PURPOSE & KEY POINTS

The purpose of this item is to seek approval of new academic programs and program additions, program deletions and discontinuations, and/or program changes; conferral of tenure for new hires; and conferral of continuous appointment for new hires, as outlined below.

I. Request for Approval of New Academic Programs

- Medical School (Twin Cities Campus)—requests approval to create a fellowship in Cell Therapy and Regenerative Medicine (CTRM)
- Crookston Campus—requests approval to create the NXT GEN AG undergraduate Certificate

II. Request for Approval of Changed Academic Programs

- College of Education and Human Development (Twin Cities Campus)—requests approval to add a completely online delivery modality option in the PK-12 Administration Post-Baccalaureate Certificate
- College of Food, Agriculture, and Natural Resource Sciences (Twin Cities Campus)—requests approval to add a completely online delivery modality option undergraduate Horticulture minor
- College of Food, Agriculture, and Natural Resource Sciences (Twin Cities Campus)—requests approval to add a completely and partially online delivery modality option undergraduate Insect Science minor
- College of Liberal Arts (Twin Cities Campus)—requests approval to discontinue the subplan options in the Global Health Studies Bachelor of Arts degree
- College of Liberal Arts (Twin Cities Campus)—requests approval to change the name of the undergraduate minor in Mass Communication to Media and Information Studies
- College of Science and Engineering (Twin Cities Campus)—requests approval to discontinue the business and management, product design, and interdisciplinary design subplans in the Computer Engineering B. Comp E. and Electrical Engineering B.E.E.
- College of Pharmacy (Twin Cities Campus)—requests approval to change the academic and administrative home of the Center for Allied Health Programs (CAHP) degree programs from Academic Health Sciences to the College of Pharmacy (CoP)

III. Request for Approval of Discontinued Academic Programs

- College of Food, Agriculture, and Natural Resource Sciences (Twin Cities Campus)—requests approval to discontinue the Risk Analysis for Introduced Species and Genotypes graduate minor
- College of Veterinary Medicine (Twin Cities Campus)—requests approval to discontinue the Integrated Food Systems Leadership Post-Baccalaureate Certificate

IV. Request for Conferral of Tenure for New Hires

- David Favero, associate professor with tenure, School of Mathematics, College of Science and Engineering
- Michael Latham, associate professor with tenure, Department of Biochemistry, Molecular Biology, and Biophysics, Medical School
- Mohammadali Maddah-ali, associate professor with tenure, Department of Electrical and Computer Engineering, College of Science and Engineering
- David Quinn, associate professor with tenure, Department of Organizational Leadership, Policy and Development, College of Education and Human Development
- Erich Sommerfeldt, associate professor with tenure, Hubbard School of Journalism and Mass Communication, College of Liberal Arts

V. Request to Grant Continuous Appointment to External Hire

- David Cleveland, clinical professor with continuous appointment, Law School

BACKGROUND INFORMATION

Approvals are sought in compliance with Board of Regents Policy: *Reservation and Delegation of Authority* as follows:

- Academic program changes: Article I, Section V, Subd. 2.
- Tenure and/or promotion recommendations: Article I, Section V, Subd. 1.

PRESIDENT'S RECOMMENDATION

The President recommends approval of the Consent Report.

University of Minnesota Board of Regents
Mission Fulfillment Committee
September 9, 2022
Consent Report: Academic Program Changes

I. Request for Approval of New Academic Programs

Medical School (Twin Cities Campus)—requests approval to create a fellowship in Cell Therapy and Regenerative Medicine (CTRM), effective June 2023. The CTRM fellowship is a one-year program that provides training for one fellow per year geared toward excellence in clinical services and adoption of innovative approaches to commonly encountered clinical problems. The University is a leader in CTRM as well as Laboratory Medicine/Pathology and Transfusion Medicine, with the latter already having well-established fellowship programs. As this field grows, there is a clear need to provide additional training through graduate medical education with only a few established programs in the nation. There has been an increase in the number of resident applications with dedication to this field over the last few years. Trainees will be eligible for this fellowship upon successful completion of an accredited Clinical Pathology or Anatomic and Clinical Pathology residency program. Training for this program will primarily take place at the University of Minnesota Medical Center and has financial support through Laboratory Medicine and Pathology departmental funds.

Crookston Campus—requests approval to create the NXT GEN AG undergraduate Certificate, effective fall 2022. The program is tailored to returning adult learners to help them to advance in their careers, engage with their communities, and persist in further post-secondary education. A needs assessment indicated that there is a significant need in rural communities to develop leadership and social capital development for sustaining the economic needs of the rural regions. This certificate addresses the University's commitment to partner with communities to find customizable educational paths that fit learner and community needs. This is an interdisciplinary program intended to align with the Minnesota Transfer Curriculum, and it will be delivered in an online modality.

II. Request for Approval of Changed Academic Programs

College of Education and Human Development (Twin Cities Campus)—requests approval to add a completely online delivery modality option in the PK-12 Administration Post-Baccalaureate Certificate, effective fall 2022. The post-baccalaureate certificate will be offered in both classroom and online delivery formats.

College of Food, Agriculture, and Natural Resource Sciences (Twin Cities Campus)—requests approval to add a completely online delivery modality option undergraduate Horticulture

minor, spring 2023. The minor will be offered in both classroom and online delivery formats, making it more accessible to a larger community of students.

College of Food, Agriculture, and Natural Resource Sciences (Twin Cities Campus)—requests approval to add a completely and partially online delivery modality option undergraduate Insect Science minor, spring 2023. The minor will be offered in classroom, partially online, and completely online delivery formats, making it more accessible to a larger community of students.

College of Liberal Arts (Twin Cities Campus)—requests approval to discontinue the subplan options in the Global Health Studies Bachelor of Arts degree, effective fall 2022. This proposed revision will provide a more coherent intellectual experience for students rooted in interdisciplinary methodologies and innovative pedagogy.

College of Liberal Arts (Twin Cities Campus)—requests approval to change the name of the undergraduate minor in Mass Communication to Media and Information Studies, effective fall 2022. The proposed name change reflects current curricular alignment.

College of Science and Engineering (Twin Cities Campus)—requests approval to discontinue the business and management, product design, and interdisciplinary design subplans in the Computer Engineering B. Comp E. and Electrical Engineering B.E.E. degree programs, effective fall 2022. Interested students will continue to be encouraged to pursue the existing undergraduate minor programs related to these subplans.

College of Pharmacy (Twin Cities Campus)—requests approval to change the academic and administrative home of the Center for Allied Health Programs (CAHP) degree programs from Academic Health Sciences to the College of Pharmacy (CoP), effective fall 2023. As part of this integration, the CoP will become the degree-granting, academic authority for the following degree programs: Medical Laboratory Sciences Certificate (MLS-Cert), Medical Laboratory Sciences Bachelor of Science (MLS-BS), Medical Laboratory Sciences Professional Master of Science (MMLS), Master of Science in Biomedical Laboratory Science (MS BLS), and the Occupational Therapy Doctorate (ODT). The actions/steps taken as part of the integration create improved structural alignment to support the mission of the CAHP in training and educating allied healthcare professionals in order to meet workforce needs and demands. The change aligns degree programs and related faculty and staff within an appropriate school or college, providing the academic and administrative supports for success. The CoP will consider all members of CAHP as members of the CoP, providing the infrastructure and support to ensure the quality, rigor, and integrity of the academic programs and student experiences.

III. Request for Approval to Discontinue Academic Programs

College of Food, Agriculture, and Natural Resource Sciences (Twin Cities Campus)—requests approval to discontinue the Risk Analysis for Introduced Species and Genotypes graduate minor, effective spring 2023. The discontinuation is due to the lack of financial resources available to sustain the minor, and lack of interest. There have been no new students since 2011 and the most recent student completed their degree in 2017.

College of Veterinary Medicine (Twin Cities Campus)—requests approval to discontinue the Integrated Food Systems Leadership Post-Baccalaureate Certificate, effective spring 2023. COVID, a challenging food sector economy, and changes in digital advertising had adverse impacts on recruitment efforts, resulting in low application rates and low course enrollments.

University of Minnesota Board of Regents Meeting
Mission Fulfillment Committee
September 8, 2022

Consent Report: Request to Grant Tenure to External Hires

The Executive Vice President and Provost recommends five external hires for tenure and faculty rank as outlined below. The decision of the Board of Regents to confer tenure and rank for any individual faculty hire with tenure becomes effective on the first day of that faculty member's academic appointment at the University.

David Favero, associate professor with tenure, School of Mathematics, College of Science and Engineering
Dr. Favero is an algebraic geometer whose research involves a combination of homological algebra, category theory, commutative and noncommutative algebra, and symplectic geometry. He earned his Ph.D. in 2009 from the University of Pennsylvania. Currently, Dr. Favero is an associate professor at the University of Alberta.

Michael Latham, associate professor with tenure, Department of Biochemistry, Molecular Biology, and Biophysics, Medical School
Dr. Latham is an expert in protein/nucleic acid structure, dynamics, and function. His research specializes in biomolecular solution-state NMR spectroscopy with a focus on the dynamic structures of DNA repair complexes. He earned his Ph.D. from the University of Colorado at Boulder in 2008. Prior to joining the University of Minnesota, Dr. Latham was an associate professor at Texas Tech University.

Mohammadali Maddah-ali, associate professor with tenure, Department of Electrical and Computer Engineering, College of Science and Engineering
Professor Maddah-ali's scholarship falls in the general areas of data science and information systems and includes calculating fundamental limits for distributed systems such as machine learning, content delivery networks, and blockchains. He earned his Ph.D. in 2007 from the University of Waterloo. Dr Maddah-ali joins the University of Minnesota from Stanford University where he is a research scientist.

David Quinn, associate professor with tenure, Department of Organizational Leadership, Policy and Development, College of Education and Human Development
Dr. Quinn's research encompasses several themes: inequality and the role of schools; teachers' racial attitudes and biases; framing racial inequity in education; teacher collaboration and instructional management; and methodological studies on educational inequality. He earned his Ed.M. in 2013 and his Ed.D. in 2016, both from Harvard University. Dr. Quinn is an associate professor at the University of Southern California's Rossier School of Education.

Erich Sommerfeldt, associate professor with tenure, Hubbard School of Journalism and Mass Communication, College of Liberal Arts
Professor Sommerfeldt is a strategic communication scholar with encompassing interests in global public relations, public diplomacy, and international development. He earned his Ph.D. from the University of Oklahoma in 2011. Currently, Dr. Sommerfeldt is an associate professor at the University of Maryland.

Request to Grant Continuous Appointment to External Hire

The Executive Vice President and Provost recommends David Cleveland for continuous appointment as outlined below. The decision of the Board of Regents to grant continuous appointment for any academic professional hire with continuous appointment becomes effective on the first day of that academic professional's appointment at the University.

David Cleveland, clinical professor with continuous appointment, Law School
Professor Cleveland is a nationally recognized teacher and expert in the field of legal writing who is known for his strong classroom teaching, service to the profession, and scholarship in legal writing. He earned his J.D. in 2002 from the Georgetown University Law Center. Professor Cleveland joined the University of Minnesota from Valparaiso University.

BOARD OF REGENTS
DOCKET ITEM SUMMARY

Mission Fulfillment **September 8, 2022**

AGENDA ITEM: Information Items

☐ **Review** ☐ **Review + Action** ☐ **Action** ☒ **Discussion**

☐ *This is a report required by Board policy.*

PRESENTERS: Rachel Croson, Executive Vice President and Provost

PURPOSE & KEY POINTS

University, Student, Faculty, and Staff Activities and Awards

A report of select activities among faculty, staff, and students at the local, regional, national, and global level in the areas of teaching, research, outreach, and other academic achievements at the University is included in the docket materials.

Agricultural Weather Study Interim Report

The Agricultural Weather Study Interim Report is included for the committee's information. The report was provided to the chairs and ranking minority members of the state legislative committees with primary jurisdiction over agriculture, energy, and environment as required by the Minnesota Session Laws - 2021, 1st Special Session, Chapter 4, Article 8, Section 29.

Minnesota Partnership for Biotechnology and Medical Genomics Report

The Minnesota Partnership for Biotechnology and Medical Genomics Report is included for the committee's information. The report was provided to Governor Walz and the chairs of the state legislative committees responsible for higher education finance as required by the Minnesota Session Laws - 2021, 1st Special Session, Chapter 2, Article 1, Section 4, Subdivision 4(e)(1).

Completed Comprehensive Review of Board Policy

The purpose of this item is to inform the committee that comprehensive reviews of the following Board policies are complete and the policy implementer recommends that no changes be made at this time:

- Board of Regents Policy: *Openness in Research*
- Board of Regents Policy: *University of Minnesota Press*

Each policy can be accessed using the above hyperlinks.

If there are items that the committee would like addressed, those will be recorded and referred back to the policy implementer. If the committee raises no additional items, the comprehensive review process will be complete, and the date of last comprehensive review will be noted within the policy. The president and policy implementers have the ability to recommend changes outside of the comprehensive review process as needed (e.g., changes resulting from the implementation of the MPact 2025).

University of Minnesota Board Of Regents
Mission Fulfillment Committee
September 8, 2022

Information Report: Report of University Faculty, Staff, and Student Activities and Awards

University Highlights

The University of Minnesota Medical School has received an $18 million grant from the Leona M. and Harry B. Helmsley Charitable Trust to provide law enforcement officers and first responders across Minnesota with more than 8,300 automated external defibrillators.

The University of Minnesota was mentioned in a *Forbes Magazine* article titled "Meet America's Best Employers By State 2022" for its work in promoting diversity.

The University of Minnesota has been recognized as one of the world's leading research universities by the Shanghai Ranking 2022 Global Ranking of Academic Subjects. Twelve subjects at the U of M were ranked in the top 25 globally. Out of the 54 subjects ranked, 36 subjects at the U of M were recognized among the top 100 in the world.

The University of Minnesota Rochester was named a 2022-23 College of Distinction. The campus was also honored for its institutional commitment to equity and diversity and its support initiatives in career development.

The University of Minnesota has been awarded a National Resource Center grant for International Studies and a second NRC grant for African Studies. This four-year, $3.5 million funding comes from the U.S. Department of Education's Title VI program and will help the University become one of only nine programs in the country to be designated a comprehensive international center, and one of ten programs in African studies.

The School of Nursing has been awarded $1.3 million from the American Nurses Foundation Reimagining Nursing Initiative for the Big 10 Practice-Ready Nursing Initiative led by the School of Nursing, and including University of Michigan School of Nursing and Purdue University School of Nursing.

The Institute on Community Integration and University of Massachusetts Boston received a $3 million grant from the Minnesota Department of Human Services to design and implement a statewide strategy for connecting Minnesotans with disabilities to better jobs and higher pay.

The Minnesota Invasive Terrestrial Pests and Plants Center has received a five-year $6.23 million grant through the Environment and Natural Resources Trust Fund to continue vital research addressing invasive terrestrial (land-based) species across the state.

The University of Minnesota's Center for Advanced Research on Language Acquisition has received its eighth round of funding from the U.S. Department of Education's Title VI Language Resource Centers

program, totaling more than $750,000 over the next four years. CARLA is one of sixteen centers funded by this program.

University of Minnesota researchers have been awarded a $3.7 million grant from the U.S. Department of Defense to prepare for a human clinical trial of artificial, bioengineered blood vessels that grow with the patient.

University of Minnesota researchers have been awarded an interdisciplinary-focused $3 million grant from the National Science Foundation to better educate students on topics like sustainability, resource conservation, and waste reduction.

Staff from the systemwide Academic Progress Audit System unit, including members from the Crookston, Duluth, Morris, and Twin Cities campuses, have received a best practices award at the CollegeSource Users Conference.

The University of Minnesota Law School was ranked #18 in the Thurgood Marshall Memorial Moot Court Competition. This is the first time the Law School has entered the top 20.

The research group NeuroPRSHM, led by the University of Minnesota Medical School, was featured in an American Psychiatry Association film. The NeuroPlasticity Research in Support of Mental Health group was featured for their new type of research that seeks to reveal better approaches and treatments to psychiatric conditions.

Faculty and Staff Awards and Activities

Herbert M. Kritzer, professor emeritus in the Law School, received the 2022 Harry J. Kalven, Jr. Prize from the Law and Society Association for empirical scholarship and the advancement of research in law.

Rahel Nardos, director of global women's health at the Center for Global Health and Social Responsibility, has been named a 2022 Bush Fellow.

Diti Bhadra, assistant professor in the Institute of Linguistics, has been awarded a five-year National Science Foundation CAREER grant for her project, “Theory, Fieldwork, and Typology: A Semantic/Pragmatic Triad in Underrepresented Linguistic Systems.”

Harry Orr, professor in the Medical School, was named one of four winners of the 2022 Kavli Prize in Neuroscience by the Kavli Foundation and the Norwegian Ministry of Education and Research. This award honors scientists for breakthroughs in astrophysics, nanoscience, and neuroscience.

Douglas Kearney, associate professor in the College of Liberal Arts, has won the 2022 Griffin International Poetry Prize. One of the most generous international poetry prizes, Kearney will receive $65,000.

Bonnie Keeler, associate professor in the Humphrey School of Public Affairs, has joined the U.S. Environmental Protection Agency's Board of Scientific Counselors.

Panayiota Kendeou, associate professor in the College of Education and Human Development, Danielle Dupuis, director of the Research Methodology Consulting Center, and their colleagues have been awarded a $1.9 million three-year grant from the Institute of Education Sciences to improve how people learn to code.

Sylia Wilson, assistant professor, and Damien Fair, professor, in the Institute of Child Development, have received a five-year $1.7 million grant from the National Institute on Drug Abuse.

Cynthia Bradley, assistant professor in the School of Nursing, is one of 20 nurse educators that will be inducted into the National League for Nursing's prestigious Academy of Nursing Education.

Christine Mueller, professor in the School of Nursing, has been appointed to the Minnesota Board on Aging by Governor Tim Walz.

Panayiota Kendeou, Kristen McMaster, and Nidhi Kohli, researchers in the College of Education and Human Development, have been awarded a five-year, $3.8 million Institute of Education Sciences grant to enhance their Early Language Comprehension Individualized Instruction technology.

University of Minnesota Extension garden experts are working with residents at the Lake Minnetonka Shores senior living complex to create a raised-bed garden.

Gail Ferguson, associate professor at the Institute of Child Development, and graduate fellows Lauren Eales, Sarah Gillespie, and Keira Leneman, were awarded the 2022 George A. Miller Award for an Outstanding Article by the American Psychological Association Division 1 (Society For General Psychology) for their article "The Whiteness Pandemic Behind the Racism Pandemic: Familial Whiteness Socialization in Minneapolis Following #GeorgeFloyd's Murder," published in a 2022 issue of *American Psychologist*.

Garry Jenkins, dean of the Law School and William S. Pattee professor of law, has joined the board of directors of the National Women's Law Center, a Washington, DC-based non-profit organization that fights for gender justice. Dean Jenkins was also honored, along with eight Minnesota Law alumni, by *Minnesota Lawyer* with Diversity and Inclusion Awards for significant impact with respect to diversity and inclusion to the community and institution.

JaneAnne Murray, professor in the Law School, was elected to serve on the board of directors of the National Association of Criminal Defense Lawyers.

Kelly Lyn Mitchell, executive director of Minnesota Law's Robina Institute of Criminal Law and Criminal Justice, received the Richard P. Kern Memorial Award for 2022 from the National Association of Sentencing Commissions. The award recognizes her contributions to the development of sentencing policy and research.

Rebecca Dordel, associate director in the Carlson School of Management, was selected as the 2022 recipient of the Marty Dockman Merit Award for her contributions to the Minnesota Career Development Association and the professional development of career coaches across the state.

Katy Backes Kozhimannil, professor in the School of Public Health, has been awarded the Aaka Pande and Sumit Majumdar Memorial Award from Harvard Medical School's Department of Population Medicine for her work in rural and maternal and child health policy.

Student Awards and Activities

College of Science and Engineering student-led Solar Vehicle Project team has taken first place for the first time in the 2022 American Solar Challenge, a biennial collegiate competition in which teams race solar-powered cars between 1,000 and 2,000 miles across North America.

The School of Dentistry, partnering with 3Mgives, continues to invite scholars from developing countries to join the Minnesota Dental Research Center for Biomaterials and Biomechanics.

Patrick Schultz and Isabel Atkinson, undergraduate students in the College of Design, worked with alumna Mary Deeg (BS '86, Interior Design), teaching specialist Bill Moran, and Goldstein Museum staff to design fabric wraps for the concrete pillars lining the basement of McNeal Hall.

Amirah Ellison, Abby Frerick, Dustin Loosbrock, and Ricardo Perez, students in the Law School, were all named Peggy Browning Fellows, a nonprofit organization dedicated to the education and advancement of worker advocates. This is a very selective program and four selected fellows is a new record for the Law School.

Jessica Looman, 2001 alumna of the Law School, has been nominated by President Joe Biden to serve as administrator of the Wage and Hour Division of the U.S. Department of Labor.

Nine Minnesota Law School alumni (Amy Erickson '17, Benjamin Hamborg '17, Anna M. Koch '18, Amber L. Kraemer '16, Caroline L. Marsili '14, Jon M. Schoenwetter '19, Aalok K. Sharma '13, Mickey L. Stevens '16, Anju Suresh '14) have been named Up & Coming Attorneys by *Minnesota Lawyer*.

The Carlson School Master of Business Analytics program partnered with non-profit organization Be The Match to curate a set of key business questions aimed at understanding possible drivers of the racial disparity among patients. A four-week student competition has students working in small teams to come up with data trends and patterns that would lead to meaningful insights and recommendations.

Vicki Ellingrod, College of Pharmacy alumna '94, has been named dean of the University of Michigan College of Pharmacy.

Agricultural Weather Study Interim Report to the Minnesota Department of Commerce

June 2022

University of Minnesota
Driven to Discover℠

Prepared by:
Dr. Heidi Roop, Dr. Tracy Twine, and Amanda Farris
University of Minnesota, Department of Soil, Water, and Climate
University of Minnesota Climate Adaptation Partnership

Per the requirements set forth in Minnesota Statute 3.197, the cost to prepare this report was $830.

Executive Summary

The purpose of this report is to provide an overview of the work completed on the Agricultural Weather Study through June 2022. The Agricultural Weather Study is advancing towards the goals of developing dynamically downscaled climate projections for the state of Minnesota and creating online resources, an interactive data tool, and dedicated training opportunities to ensure the usefulness and usability of these data to inform a range of climate-related decision-making across the state. We have made significant progress since the project was launched in October 2021 and all current project tasks are in progress or on track.

Project Overview

Assumptions about climate are embedded in how we design and manage many of the socio-economic systems and resources we rely on every day. Observed climate data and climate models are used to inform how we design our infrastructure, when to plant our crops, how we design railways and bridges, how we assess risk of infectious diseases, etc. But the climate of the past is no longer the best predictor of future climate. To better understand future climate risks, we use future climate models. The Minnesota State Legislature supported the University of Minnesota to generate future climate projections, as well as associated resources to support the use and application of these data across Minnesota's diverse sectors from agriculture and forestry to water resources management and the built environment.

Differentiating the impacts of climate change at a fine spatial scale is particularly important in Minnesota, where we see large south-to-north gradients in warming, have long-duration snow cover, large and small lakes, and other complexities in our climate. In order to provide reasonable climate projections over Minnesota on the regional scale, we need information that captures these complexities. This project will produce climate projections at approximately 3-mile resolution for the entire state using regional climate downscaling techniques (See Task 1). These data will be made available to the public through an interactive web tool and will include projections for three future climate scenarios for three time-steps out to the year 2100.

Results from a recent statewide survey (Clark et al., 2021) and a subgroup of the State's Resiliency and Adaptation Action Team, point to broad, cross-sectoral demand for these projections and increased support for using this information in practice. Over 80% of respondents to the statewive survey felt that fine scale climate projections were important for carrying out their work. In addition to high demand from State agency staff, researchers, nonprofits and the private sector have all articulated needs and applications for this critical, forward-looking climate information. Anticipated applications span everything from agricultural decision-making to infrastructure design and community engagement. Leveraging the University's research and Extension capacity, this project was designed to both generate the model output and assist in the use of this needed information in risk management and related decision-making.

Highlights

The report is structured primarily around the tasks in the project contract. Highlights of the project to-date are summarized below.

1) Modeling and Data Visualization

   - The computer modeling using the Minnesota Supercomputing Institute (MSI) at the University of Minnesota is underway. We are currently running six global climate models and a 1D lake model out to the year 2100 under three different future climate scenarios. We are using the Weather Research and Forecasting Model (WRF) to generate the dynamically downscaled climate projections at approximately 3-mile resolution (4 km).

   - The University of Minnesota's U-Spatial team has assigned developers and data visualization experts to begin designing the interactive data tool.

   - In collaboration with U-Spatial and the University of Minnesota Office of Information Technology, we are conducting focus groups with data users and using affinity diagramming to capture user stories to inform the design and anticipated uses of the interactive data tool.

2) Capacity and Training

   - A new Climate Resilience Researcher was hired in February 2022 to help support community engagement and communications material development and to assist with training development and design. This researcher is actively working to expand partnerships, develop training materials, coordinate a project evaluation design, and develop a workflow for the train-the trainer events that will be implemented in 2023.

   - A new Climate Resilience Extension Educator, who will be focused on agriculture, was hired in June and will be working with the Agriculture Weather Study project team. This educator will help agricultural producers to understand and use this, and other, climate information in their work and decision-making. This Extension Educator is supported by both this project and the Minnesota Corn Growers Association. This support is enabling our team to develop dedicated capacity, resources, and training to support a new climate-smart agriculture extension program. The Minnesota Corn Growers Association and Minnesota Department of Agriculture both had representatives sit on the search committee for this position.

   - Widespread interest in these data and use across sectors, including engineering and architecture, has resulted in a dedicated summer internship opportunity for a University of Minnesota architecture student to work with the project team and experts at the Minnesota-founded architecture and engineering firm Hammel, Green and Abrahamson (HGA). This internship is currently underway and will include a survey of climate data user and data needs across the architecture, engineering, and urban planning disciplines. This work will facilitate the translation and use of this project's output into architecture, engineering and design.

3) Communication, Engagement and Future Planning

   - We are sharing this project with a range of audiences across the state and Midwest region. To-date this has included several conversations with public and private sector end users throughout Minnesota and with other end users and experts in the Midwest, and nationally. This included a recent presentation to colleagues with the National Weather Service, National Oceanic and Atmospheric Administration (NOAA), US Department of Agriculture and more at the 2022 Climate Prediction Applications Science Workshop (CPASW). We have also been invited to

share this work and the broader programming of the University of Minnesota Climate Adaptation Partnership (MCAP) at the upcoming National Adaptation Forum in October 2022.

- We are also sharing this research internally at the University of Minnesota through venues like the MSI Research Exhibition 2022 and are actively working to identify funding opportunities to further support the use and integration of these data in additional modeling efforts, such as hydrologic and ecosystem modeling, through other grant and research proposals.

Next Steps and Challenges

During the coming months, the project team will continue to make progress to meet the goals of this project. At present, we do not foresee any major challenges as we have all of the project tasks started or in the planning phases. The computer modeling is well underway and we are completing preliminary testing of the weather models and initializing routines for all of the model runs. We anticipate with current progress that we will be able to complete all model runs to develop the full dataset of downscaled climate projections, with initial data anticipated in November 2022.

As the climate modeling work is performed, we are advancing a range of next steps, including:

- Continuing to engage stakeholders to better understand climate data information needs and to inform development of the interactive web tool and train-the-trainer events.
- Applying methodologies from software engineering, including affinity diagramming and user stories, in conjunction with focus groups, interviews and surveys to capture stakeholder input to inform tool design.
- Developing educational resources and train-the-trainer opportunities that will be aimed at increasing the understanding of the climate projections and their applications in a diversity of decision contexts. These opportunities will include training in the use of the interactive web tool.
- Developing an evaluation plan informed by the rapidly evolving literature on climate services and knowledge co-production with data users, and geared toward continuous improvement of data usability and usefulness over time.

As we look towards the anticipated project completion in December, 2023, we see two potential long-term challenges. The first includes securing sufficient resources for hosting and maintaining the data and interactive tool long-term. Even after the full release of the tool, we anticipate ongoing maintenance and support will be required to ensure usability and function of the interactive web tool. There are also ongoing costs related to the data storage and for hosting the tool online. We are actively in dialogue about long-term solutions to this challenge. A second challenge is related to ensuring the ability to provide the ongoing support and requests for technical services that will stem from the generation of these data after the project is complete. Demand for such support is growing and we are actively seeking pathways to ensure continuity of the positions and staff capacity created by this project so the team is positioned to be able to provide end-users with the needed technical support required to ensure broad use and application of the climate projections across the entire State.

Tasks and Deliverables

Task 1. Computer Modeling

This task requires using resources at the Minnesota Supercomputing Institute to analyze high-performing weather model projections under at least two greenhouse gas emissions scenarios and develop a series of projections of temperature, precipitation, snow cover, and other climate parameters out to the year 2100 for the state of Minnesota at a scale as small as three square miles (~4 km).

Subtask 1.1. Select model scenarios for analysis

Status: We are currently running six global climate models from the Coupled Model Intercomparison Project 6 (CMIP6; Eyring et al., 2016) for this project. These global scenarios will be used in the downscaling of the climate projections to the state of Minnesota out to the year 2100 at approximately 3 mile resolution. This downscaling will be completed using the Weather Research and Forecasting Model (WRF). We have selected three different future climate 'pathways' intended to span a range of possible future outcomes, including ambitious adoption of adaptation and mitigation measures globally (less planetary warming) to continued development of fossil fuels (more planetary warming). We will be using Shared Socioeconomic Pathways (SSPs) as the future climate scenarios following the CMIP6 modeling process and the Intergovernmental Panel on Climate Change (IPCC). This work will update the downscaling of the previous generation of global climate model projections for Minnesota (Liess et al., 2022; Appendix A).

Subtask 1.1 Deliverables	*Due Date*	*Status*
Select model scenarios	1/1/2023	Complete

Subtask 1.2. Identify and delineate projection parameters

Status: In parallel with testing our simulations on the Supercomputer, we are consulting with other regional climate data experts and climate data end users at a range of organizations, businesses and state agencies to understand use cases, data needs and priority variables for inclusion in the interactive tool. These discussions include identification of the climate variables of most relevance to stakeholders as well as discussions on model characteristics including selection of a lake model to represent lake surface temperatures and temperatures within lakes.

This engagement work is ongoing and will continue throughout 2022. Examples of discussions we have had to date include staff at entities such as the Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, Minnesota Department of Health, Metropolitan Council, Hennepin County, HGA and Stantec Engineering, the 1854 Treaty Authority. The list of engagement and conversations is actively growing as we have new project members joining the team, increased awareness of the data and as we scope out gaps and needs for additional engagement and dialogue. We are also engaging experts from other states who have led the development of similar data projects and tools to help incorporate lessons learned throughout this project.

Subtask 1.2 Deliverables	*Due Date*	*Status*
Identify projection parameters	1/1/2023	On track

Subtask 1.3. Perform projections

Status: Simulations are currently underway at the Minnesota Supercomputing Institute. We are pre-processing the CMIP6 models, initializing the WRF model to ingest these data, and testing the model to correctly perform across the state. We are increasing the horizontal resolution from our previous project (Liess et al. 2022) by a factor of 6 per area from 10km x 10km (~6 miles) to 4km x 4km (~3 miles). By the end of the project we will have improved projections through the 21st century with the most recent scenarios of human greenhouse gas emissions and corresponding climate. For more information on the previous work using the Coupled Model Intercomparison Project 5 model products and a similar downscaling technique, see Appendix A.

Subtask 1.3 Deliverables	*Due Date*	*Status*
Model analysis and series of year 2100 projections	1/1/2023	On track

Task 2. Interactive Tool Development

This task will lead to the development of an interactive data tool to facilitate access and use of the model projection data. The tool will be hosted by the University of Minnesota Climate Adaptation Partnership on the following website: climate.umn.edu.

Subtask 2.1. Outline goals for user interface and experience

Status: We are partnering with U-Spatial and the University of Minnesota Office of Information Technology (OIT) to conduct focus groups with key data users and decision leaders across a broad range of sectors to identify data needs and guide development of the interactive data tool. We have developed a work plan utilizing affinity diagramming and user stories as methods for capturing and applying input from these focus groups to optimize user experience with the tool and usability of data provided for targeted resilience actions. Surveys and interviews of engineering and architecture professionals conducted by the graduate student intern co-mentored with HGA will provide additional input specific to the building sector.

Subtask 2.1 Deliverables	*Due Date*	*Status*
Outline goals for UI/UX	12/31/2023	On track

Subtask 2.2. Develop interface components

Status: We are conducting a review of existing online climate data tools to identify common interface components. Further input on components to include in the interactive data tool will be derived from focus group discussions and results from affinity diagramming and crafting of user stories, described in Subtask 2.1. We are also nearing the completion of a range of preliminary communication materials related to climate change projections and climate modeling. These resources are intended to help

end-users of the data have access to easy-to-understand resources about the source of the data, the downscaling methodology and climate projections basics.

Subtask 2.2 Deliverables	*Due Date*	*Status*
Develop interface components	12/31/2023	On track

Subtask 2.3. Perform preliminary testing on user interface

Status: We have not yet started any user interface testing as the tool is not yet built while we wait for the climate modeling task to be completed. Tool design and user engagement are underway to inform the eventual user testing process (see Task 2.1).

Subtask 2.3 Deliverables	*Due Date*	*Status*
Functional interactive data tool	12/31/2023	On track

Task 3. Training

Task 3 entails designing and holding at least two train-the-trainer events to increase access to, and understanding of the data, and how to use and apply them in different contexts. This will include providing written materials and communication resources about the data and their use for others to access outside of these training opportunities.

Subtask 3.1. Identify and publicize training opportunities to potential stakeholders

Status: Input on training needs, priority user groups, and potential training opportunities will be derived from focus group discussions and results from affinity diagramming and crafting of user stories, described in Subtask 2.1. Surveys and interviews of engineering and architecture professionals conducted by the graduate student intern co-mentored with HGA partners will provide additional input on training needs and opportunities specific to the building sector.

Subtask 3.1 Deliverables	*Due Date*	*Status*
Identify and publicize training opportunities	10/31/2023	On track

Subtask 3.2. Schedule and host training events

Status: We are actively scoping opportunities to conduct at least two train-the-trainer events in mid-2023 and also anticipate leveraging other opportunities including the University of Minnesota Climate Adaptation Partnership's monthly webinar series and anticipated new climate-ready for agriculture and other related Extension programming to engage additional end-users and public audiences in the availability and use of these data.

Subtask 3.2 Deliverables	*Due Date*	*Status*
Schedule and host training events	10/31./2023	On track

Subtask 3.3. Solicit and compile feedback from attendees, address questions and incorporate results into reporting and data tool refinements

Status: Encompassing our UX/UI processes described above we are planning a developmental evaluation that will start with identifying a group of research and experience-based principles for design effectiveness to guide the creation of data tool prototypes. These principles will be refined initially through UX/UI processes, and then through evaluative methods like surveys at the point-of-download or brief interviews with users. Over the course of the project, we expect these principles will resolve to guide effective design for our range of different user groups and sectors.

Subtask 3.3 Deliverables	*Due Date*	*Status*
Functional interactive data tool	10/31./2023	On track

Task 4. Project Reporting

This task relates to project reporting.

Subtask 4.1. Provide an interim report highlighting project progress and results to date.

Subtask 4.1 Deliverables	*Due Date*	*Status*
Interim report	6/30/2022	Complete; this report

Subtask 4.2. Produce a written final report that includes sufficient detail for technical readers and a clearly written summary for nontechnical readers.

Subtask 4.2 Deliverables	*Due Date*	*Status*
Written final report	12/31/2023	On track

Subtask 4.3. Final reports, any mid-project status reports, and renewable development account financial reports will be posted online on a public website designated by the commissioner of commerce and will adhere to State accessibility standards.

Subtask 4.3 Deliverables	*Due Date*	*Status*
Publicly available report materials	12/31/2023	On track

Task 5. Project updates and invoices

This task entails regular status updates and supplying project invoices. Regular updates and required invoicing are occurring in accordance with the project contract and requests from the Project Manager at the Minnesota Department of Commerce.

Subtask 5.1. Conduct phone conferences as needed with the State's Authorized Representative to apprise him/her of progress, accomplishments and issues encountered.

Subtask 5.1 Deliverables	*Due Date*	*Status*
Regular phone conferences with State's Authorized Representative	Ongoing	On track

Subtask 5.2. Schedule project update meetings as necessary to inform the State's Authorized Representative of deviations to the project schedule, the need to modify the scope of the project or at the request of the State's Authorized Representative to discuss any item related to the project's progress.

Subtask 5.2 Deliverables	*Due Date*	*Status*
Update State's Authorized Representative on deviations from schedule or scope	Ongoing	On track

Subtask 5.3. Quarterly Reporting and Status Updates

5.3.1 Status updates to the State for the preceding period's work detailing progress made toward completing individual project tasks as well as any deviations from the project schedule.
5.3.2 Invoices and supporting documentation to the State for the preceding period's work completed within the project scope; and
5.3.3 Budget overview for the preceding period's expenses and expenses to date

Subtask 5.3 Deliverables	*Due Date*	*Status*
5.3.1 Status updates	Ongoing	On track
5.3.2 Invoices	Ongoing	On track
5.3.3 Budget review with State's Authorized Representative	Ongoing	On track

Subtask 5.4. Upon project completion, submit the final invoice with supporting documentation.

Subtask 5.4 Deliverables	*Due Date*	*Status*
Final invoice	*12/31/2023*	*On track*

Appendix A

High-Resolution Climate Projections Over Minnesota for the 21st Century Liess et al., 2022 publication

AGU ADVANCING EARTH AND SPACE SCIENCE

Earth and Space Science

RESEARCH ARTICLE
10.1029/2021EA001893

High-Resolution Climate Projections Over Minnesota for the 21st Century

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Key Points:

- Over northern and central Minnesota, winters and summers may be up to 6 and 4°C warmer, respectively, at the end of the 21st century
- Spring precipitation may increase by more than 1 mm per day over northern Minnesota
- Snow depth may decrease by more than 12 cm. Number of snow days per year may decrease by up to 55

Supporting Information:

Supporting Information may be found in the online version of this article.

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Investigation: Stefan Liess, Tracy E. Twine, Peter K. Snyder, Gabriel Konar-Steenberg

Abstract Minnesota is the state with the strongest winter warming in the contiguous United States. We performed regional climate projections at 10 km horizontal resolution using the Weather Research Forecasting model forced with eight CMIP5 GCMs. The selected GCMs have previously been found to be in relatively good agreement with observations over Minnesota compared to other members of the CMIP5 model ensemble. Our projections suggest ongoing warming in all seasons, especially in winter, as well as shallower snow depth and fewer days with snow cover. We expect significant increases in spring and early summer heavy precipitation events. Our comparisons between different time slices and two different emission scenarios indicate a climate for the state of Minnesota near the end of the 21st century that is significantly different from what has been observed by the end of the 20th century. Winters and summers are expected to be up to 6 and 4°C warmer, respectively, over northern and central Minnesota, and spring precipitation may increase by more than 1 mm d^{-1} over northern Minnesota. Especially over the central part of the state, winter snow depth is projected to decrease by more than 12 cm, and the number of days per year with snow depth of more than 2.54 cm (one inch) is expected to decrease by up to 55.

Plain Language Summary Minnesota is the state with the strongest winter warming in the contiguous United States. We performed regional projections of the climate across Minnesota for the middle and end of the 21st century. We selected the results from eight recent global climate model projections to calculate climate data over an area of 10 km by 10 km with a regional climate model. Our results indicate that the future climate for the state of Minnesota is likely to be significantly different from what has been observed near the end of the 20th century. Over northern and central Minnesota, winters and summers are expected to be up to 6 and 4°C warmer, respectively, near the end of the 21st century. Spring precipitation may increase by more than 1 mm d^{-1} over northern Minnesota. Over the central part of the state, winter snow depth is suggested to decrease by more than 12 cm. The number of days per year with snow depth of more than 2.54 cm (one inch) is expected to decrease by up to 55. These results are expected to influence regional decision-making related to agriculture, infrastructure, water resources, and other sectors.

1. Introduction

For almost a century, surface warming has had its largest amplitude in the higher latitudes of the Northern Hemisphere (Callendar, 1938). Over the last several decades, the Arctic region has warmed between 0.14°C per decade (Bekryaev et al., 2010) and 0.17°C per decade (Polyakov et al., 2002), which is more than twice the rate of the rest of the planet. With anthropogenic climate change, it may warm an additional 4–8°C by the end of this century (Harvey et al., 2015; IPCC, 2013, 2021). The U.S. state of Minnesota is strongly affected by this Arctic warming, particularly during winter, when the influence of Arctic air is most dominant (Wang et al., 2017) and when reductions in snow cover lower the surface albedo (Shi et al., 2013). Minnesota's winter warming is the strongest among the 48 contiguous United States (NCEI, 2021). Future projections indicate ongoing warming as well as significant increases in spring and early summer heavy precipitation events over the north central United States by the end of this century (Harding & Snyder, 2014).

Despite the clear signals of increased temperature and precipitation in models of future climate, the large-scale outputs of general circulation models (GCM) are difficult to integrate into regional, state, and local planning

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where climate information is required by decision makers over smaller areas, such as individual watersheds and counties. GCMs typically have resolutions coarser than 100 km, which is insufficient for these applications (Boé et al., 2007; Zorita & von Storch, 1999). Differentiating the impacts of climate change at finer spatial scales is particularly important and challenging in Minnesota, where many days of snow cover and many small-scale open water sources, such as lakes and rivers all contribute to variations on the ground that are typically not addressed by GCMs. In order to provide reasonable climate projections over Minnesota on the regional scale, we dynamically downscaled GCM projections from an eight-model ensemble to a higher spatial resolution (~10 km) by nesting a finer scale regional climate model (RCM).

An early review of dynamical downscaling efforts (Giorgi & Mearns, 1991) describes simulations as high as 0.5° x 0.5° horizontal resolution, which has later been improved to a range of 25–50 km in the comprehensive Coordinated Regional Downscaling Experiment (CORDEX; Giorgi et al., 2015), especially the North American branch (NA-CORDEX; McGinnis & Mearns, 2021), which is preceded by the North American Regional Climate Change Assessment Program (NARCCAP; Mearns et al., 2009). However, these simulations have an insufficient horizontal resolution to resolve the small-scale open water sources in Minnesota.

Other high-resolution studies like Liu et al. (2017) at a 4-km horizontal resolution typically do not provide a multimodel ensemble to address the uncertainty in future climate projections. Ensemble downscaling simulations are considered crucial for providing a better estimate of future climate change and an uncertainty range (Xu et al., 2018). The downscaling experiment by Ashfaq et al. (2016) is probably closest to the present study. It uses 11 GCMs, including seven of the eight in the present study, for dynamical downscaling over the contiguous United States at an 18-km horizontal resolution, but only addresses one midcentury RCP8.5 scenario.

2. Methods

We use a dynamical downscaling approach based on nesting GCM input data with the Weather Research and Forecasting (WRF) RCM (Skamarock et al., 2008) coupled to the Community Land Model (CLM; Dai et al., 2003) with a dynamic crop module. This model version, also known as WRF-CLM4crop, has previously been described by Harding et al. (2016) and Lu et al. (2015). Vegetation, soil, and other land surface parameters for WRF-CLM-4crop are taken from the annual cycle of the Moderate-resolution Imaging Spectroradiometer (MODIS) satellite product at a 30-s horizontal resolution (Zhang et al., 2006) and kept consistent between all simulations. Atmospheric boundary conditions include 6-hourly prognostic variables such as temperature, wind speed and direction, specific humidity, and geopotential height from the Coupled Model Intercomparison Project 5 (CMIP5) GCM archive (Taylor et al., 2012) at the Earth System Grid (Williams et al., 2009).

From more than 40 available GCMs, we selected eight that provide all necessary prognostic variables and show reliable large-scale results over the Midwestern United States (Table 1; Harding et al., 2013). We adjusted the model selection in Table 4 of Harding et al. (2013) to only include GCMs that produce reasonable downscaling results during all four seasons, since Harding et al. (2013) only studied the summer season. Therefore, we needed to exclude MIROC4h and the ACCESS models after a short test simulation with our WRF downscaling setup. CCSM4 is not listed in Table 4 of Harding et al. (2013) because 6-hourly input data were not available at that time. However, it is ranked highly in their Figure 5, so we included it in this study.

Our downscaling approach is based on one-way nesting between the global and regional domains and two-way nesting between the two regional domains, so our RCM results cannot modify the global domain. Our regional domains comprise an outer nest over a large portion of North America at a 50-km grid-cell horizontal resolution and an inner nest over Minnesota and adjacent areas at a 10-km grid-cell horizontal resolution (Figure 1). These two nests are connected via two-way nesting and thus influence one another. The southern end of the outer nest is extended to the Gulf of Mexico in order to capture the Great Plains Low Level Jet (GPLLJ), which transports much-needed moisture from the Gulf of Mexico into the Central United States, especially during the warmer seasons (Zhou et al., 2021). However, the extent in other directions is limited by available computing resources, and therefore other storms such as those that develop in the lee of the Rocky Mountains may be represented only by the GCM input data instead of the regional WRF simulations. The inner nest in Figure 1 includes all lake points as represented in our WRF version.

Table 1
List of GCMs for Boundary Conditions

Model	Institution	Resolution [°]	Reference
bcc-csm1-1	BCC (China)	1 x 1.33	(Wu et al., 2010)
CCSM4	NCAR (USA)	0.9 x 1.25	(Gent et al., 2011)
CMCC-CM	CMCC (Italy)	0.75 x 0.75	(Scoccimarro et al., 2011)
CNRM-CM5	CNRM-CERFACS (France)	1.5 x 1.5	(Voldoire et al., 2012)
GFDL-ESM2M	NOAA-GFDL (USA)	2 x 2.5	(Dunne et al., 2012)
IPSL-CM5A-LR	IPSL (France)	1.875 x 3.75	(Dufresne & Bony, 2008)
MIROC5	MIROC (Japan)	2.8 x 2.8	(Watanabe et al., 2010)
MRI-CGCM3	MRI (Japan)	1.125 x 1.125	(Yukimoto et al., 2012)

We compute downscaled regional climate projections for the historical period of 1980–1999; from the RCP4.5 scenario, which assumes a moderate amount of mitigation of GHG emissions (van Vuuren et al., 2011) for two 20-year periods of the 21st century (2040–2059 and 2080–2099); and from the RCP8.5 scenario, which assumes only a minimum of mitigation, for the 2080–2099 period (Riahi et al., 2011). For the state of Minnesota and surrounding regions, we use WRF to generate hourly averages of the following surface variables: 2-m air temperature, 2-m humidity, 10-m wind speed and direction, precipitation, downward solar radiation, net radiation, latent, sensible, and ground heat fluxes, snow depth, and soil temperature and moisture content at 10 layers to a depth of 2.5 m. The seasonal cycle of these values, especially precipitation, is generally improved by physical downscaling (Mendez et al., 2020).

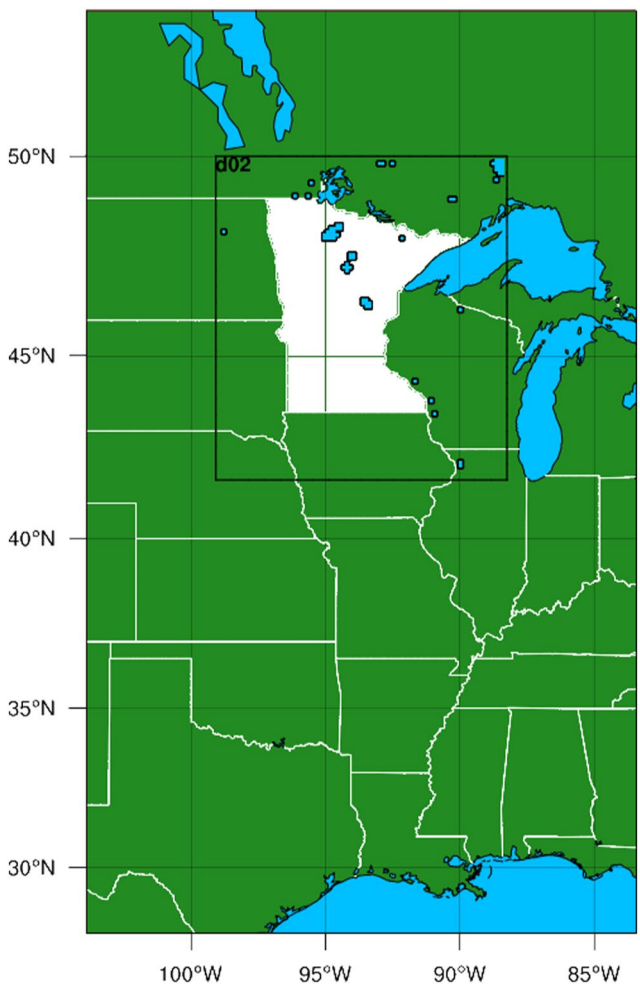

Figure 1. The outer (complete map) and inner grid (black frame) used for climate projections. The state of Minnesota is marked in white.

We perform a simple linear-scaling bias-adjustment (Teutschbein & Seibert, 2012) to surface air temperature and precipitation as described in equations 1–4 in Shrestha et al. (2017) using monthly mean observations as reported by the PRISM group (Daly et al., 2017). For snow depth, we perform bias adjustment with the NSIDC analysis that uses a combination of observed snow depth observations and the PRISM data set (Broxton et al., 2019; Zeng et al., 2018).

For the bias adjustment, we compare observations and WRF-simulated values from runs forced with each GCM for each monthly average (i.e., the average temperature difference over every January from 1980 to 1999 is calculated to receive one offset value for January at each grid point). Precipitation and snow depth are scaled by dividing monthly observational averages for 1981–2000 by monthly model values. The 2-m air temperature, precipitation, and snow depth error adjustments are then applied to data from each WRF run for each future scenario. Bias adjustment based on linear scaling retains the interannual variability but forces each multiyear monthly average for each GCM-forced WRF run in the historical simulations to equal the PRISM observations and NSIDC analysis, respectively. Linear scaling assumes that this offset carries through to the climate simulations of the future, so the simulations will now diverge in their calculations of these variables. Variables other than air temperature, precipitation, and snow depth are not adjusted because of lack of available observations. The prognostic variables for CCSM4 and CMCC-CM were previously bias-adjusted, so their historical multiyear monthly means match reanalysis data as described in Bruyère et al. (2014). We apply the same bias adjustment to the prognostic variables of all future scenarios for these two models.

In addition to analyzing WRF results forced from each GCM, we analyze the multimodel ensemble (MME) of each variable averaged over all WRF-driven

runs from all GCMs. Individual years of the simulations are treated as individual ensemble members in our analyses, and we adjusted the degrees of freedom in our statistical tests to account for lag-1 autocorrelation in our data, according to Wilks (2011), which allows a robust statistical analysis with 160 ensemble members per scenario. The advantage of this approach is that the variability of individual GCM simulations is being preserved, compared to smaller ensemble sizes with average GCM forcings. Although an MME approach with eight downscaled models should be considered as more reliable than individual model results, as previously demonstrated by Pincus et al. (2008), we also quantify bias adjustments for individual realizations of the historical climate in the next section.

3. Results and Discussion

3.1. Statewide Area Averages

The statewide area averages are computed by averaging over all grid cells with more than 50% of their area inside the state. Figure 2 depicts the statewide area averages for the bias adjustment offset for 2-m temperature and the adjustment factor for precipitation. These adjustments are applied to the WRF simulations to generate the bias-adjusted results. Although the GCM input data (Figures 2a and 2c) are closer to the observations, the WRF simulations (Figures 2b and 2d) convey the larger climate variability on the regional scale. However, the larger bias in the simulated precipitation is partly due to the choice of the 10-km horizontal resolution, which is within the 5–10 km range where neither convective parameterization nor a fully explicit approach provide convincing results (Molinari & Dudek, 1992). WRF-CLM4crop uses a convective parameterization scheme that adds subgrid-scale precipitation to the explicit approach and thus leads to an overestimation of precipitation in our results, in contrast to the study by Ashfaq et al. (2016), which uses cumulus convection parameterization on the larger 18 km grid or the study by Liu et al. (2017), which does not add cumulus convection parameterization to the smaller 4 km grid.

Although the trend analysis in the present paper is independent of linear scaling, we find that the analysis of absolute values and threshold values, such as the number of days per year with snow depth of more than a certain value benefits from the bias adjustment. It should also be noted that the downscaled results (Figures 2b and 2d) do not reflect the performance of individual GCMs (Figures 2a and 2c), they are merely a reflection of how WRF interprets the given sets of input data. Thus, although we use the term MME, our results are obtained with a single regional model at a single horizontal resolution, which makes the statistical analysis more feasible.

Many characteristics of individual GCM input data are also reflected in the WRF simulations during our 20-year historical simulation. For example, GFDL-ESM2M, IPSL-CM5A-LR, MIROC5, and MRI-CGCM3 have a warm bias in winter, whereas bcc-csm1-1 and CCSM4 have a cold bias in winter. CNRM-CM5 shows a slight warm bias from July to September, and MIROC5 depicts a strong warm bias from June to the end of the year. All WRF simulations apart from the ones driven by CMCC-CM have a cold bias in April and May, potentially due to the positive precipitation bias during this wet season. All area-averaged GCM input data are too dry in winter but only WRF runs driven by CMCC-CM, GFDL-ESM2M, IPSL-CM5A-LR, and MRI-CGCM3 share this GCM dry bias in winter. Especially in summer, all WRF runs are too wet based on the overrepresentation of convective precipitation, as discussed above (Figures 2c and 2d).

A detailed spatial analysis of the differences between the nonbias-adjusted WRF runs and the GCM input data in terms of comparability to observations is given in Figures S1 and S2 in the supplemental material. Figure S1 in Supporting Information S1 shows that historical 2-m temperatures in WRF are slightly too high in winter and too low in the spring rainy season compared with observation and also with GCM input. However, in summer, WRF simulations fit better with observations than the GCM input. Summer temperatures in the GCM input data are generally too high, but therefore match over the urban heat island of the Twin Cities metro area in southeast Minnesota, although urban climate is typically not included in GCMs. Fall temperatures are generally well represented in WRF and the GCM input data. Figure S2 in Supporting Information S1 depicts the general wet bias in the WRF MME that outweighs the aforementioned dry bias in some WRF simulations in winter. Although the relative precipitation bias is strongest in the dry summer season (Figure 2d), the absolute differences to observations are still not statistically significant over the southcentral region.

Figures S3–S6 in Supporting Information S1 compare future projections from the MMEs for GCMs and the WRF runs. Despite the wet bias in the WRF MME, they have similar trends for all three emission scenarios. Figure S7

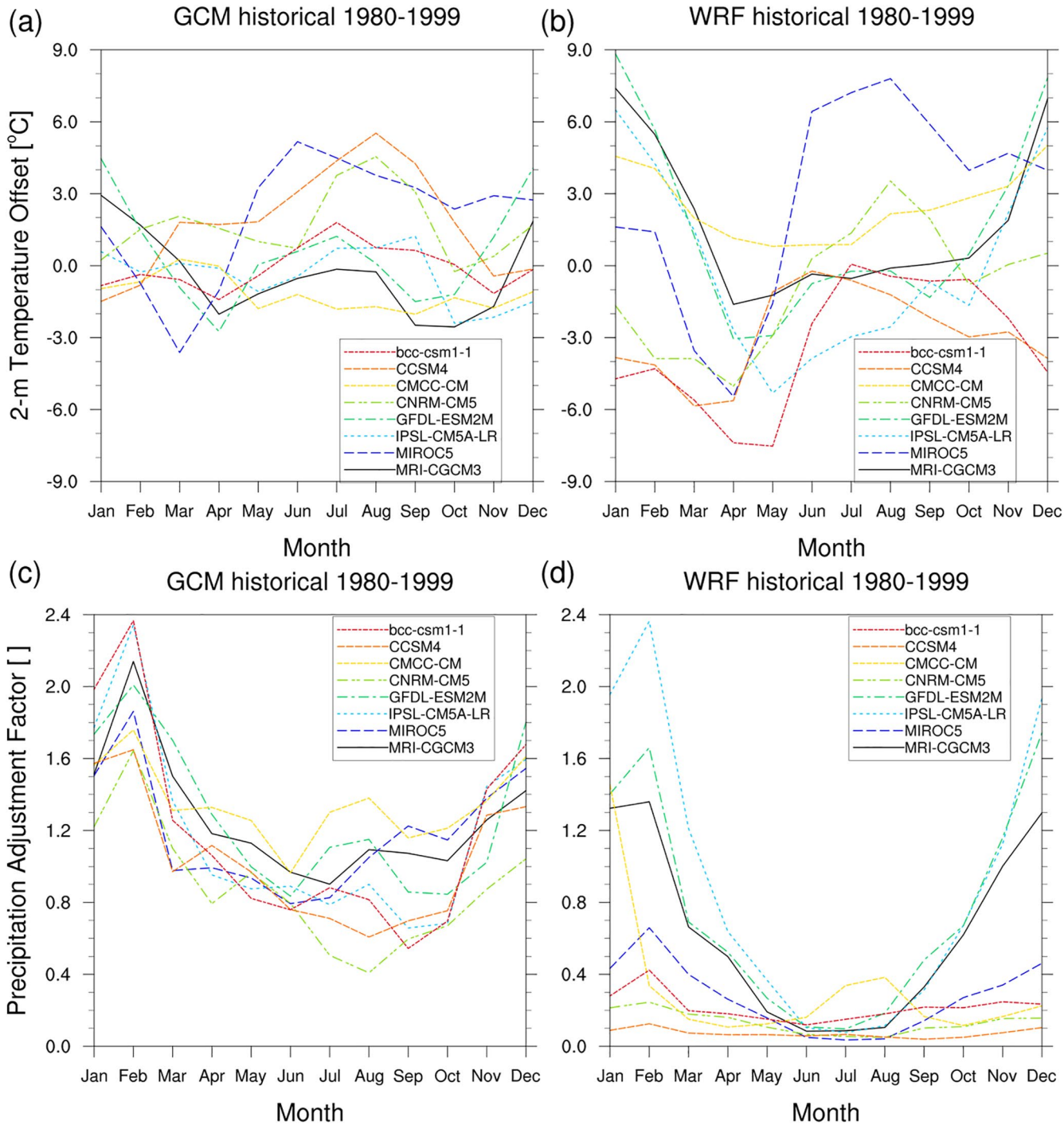

Figure 2. Bias adjustments area-averaged over every grid cell within the state of Minnesota for (a) 2-m temperature difference between GCM runs and PRISM, (b) as (a) but for 2-m temperature difference between WRF runs and PRISM, (c) as (a) but for fraction of PRISM precipitation over GCM runs, and (d) as (b) but for fraction of PRISM precipitation over WRF runs. Please note that the optimum offset in (a) and (b) is 0, whereas the optimum fraction in (c) and (d) is 1.

in Supporting Information S1 provides the bias adjustment factors for snow depth. Their values divert away from 1.0 for smaller absolute snow depth values in spring and fall. We suggest that higher values in WRF snow depth are a direct result of increased precipitation.

MME 2-m temperature increases in each scenario compared to the historical period, particularly in winter (Figure 3). WRF simulates less future warming than the MME when driven by MRI-CGCM3 and GFDL-ESM2M

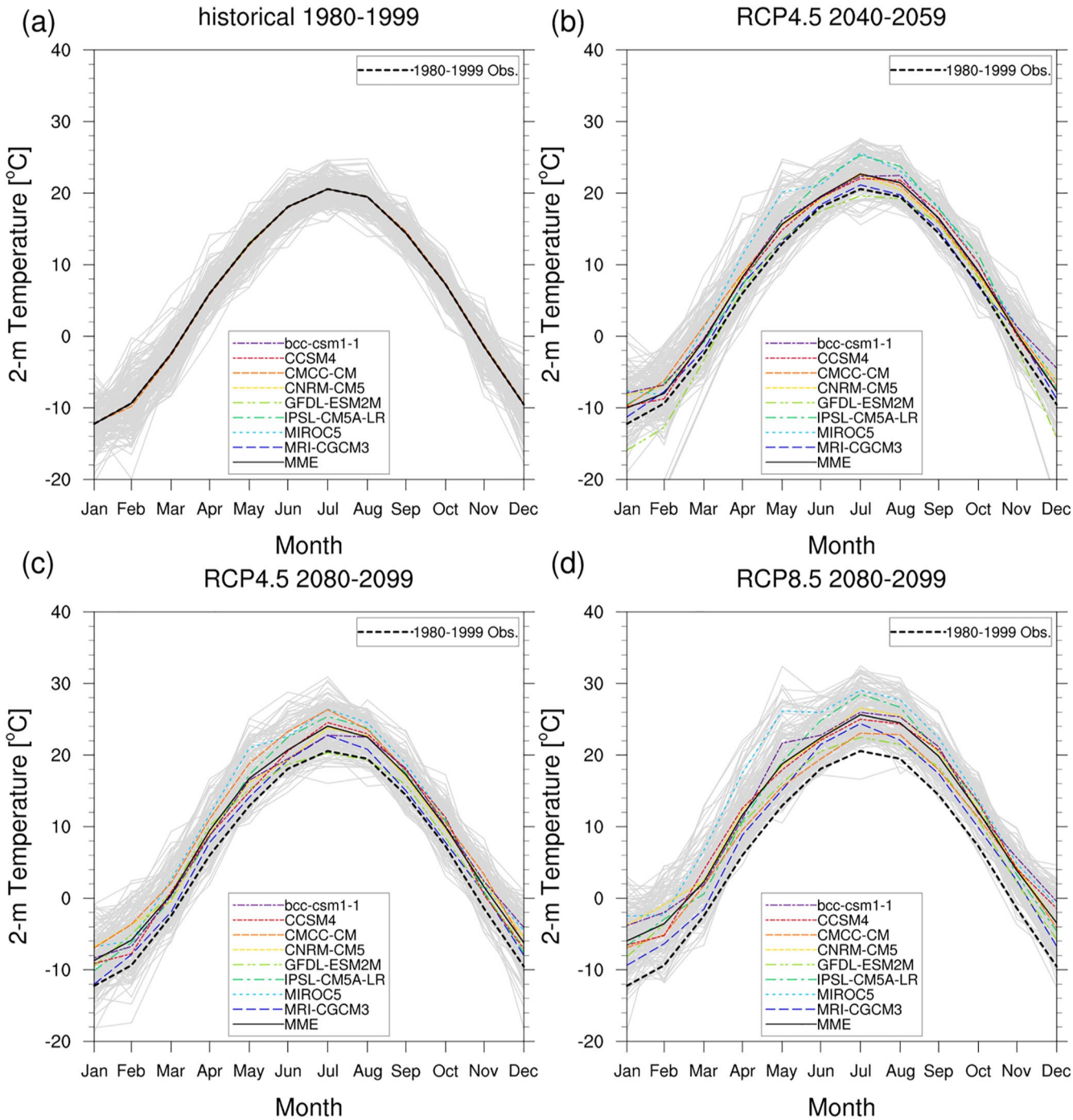

Figure 3. Monthly average 2-meter temperature averaged over every grid cell within the state of Minnesota for each Weather Research and Forecasting (WRF)-downscaled GCM (colors), the multimodel mean (MME; black line), and the PRISM data set (dashed line). Also shown are all years of the 20-year WRF simulations for all GCMS (160 realizations; gray lines).

and generally stronger warming when forced with MIROC5 and IPSL-CM5A-LR. Simulated warming driven by bcc-csm1-1, CCSM4, CMCC-CM, and CNRM-CM5 is relatively close to the MME. Figure S8 in Supporting Information S1 depicts the anomaly time series and overall standard deviation for a more detailed analysis of future trends, which does not only show the projected temperature increase of 2°C by the midcentury but also results in the individual WRF runs. These include strong warming during the month of May of up to 13°C in the

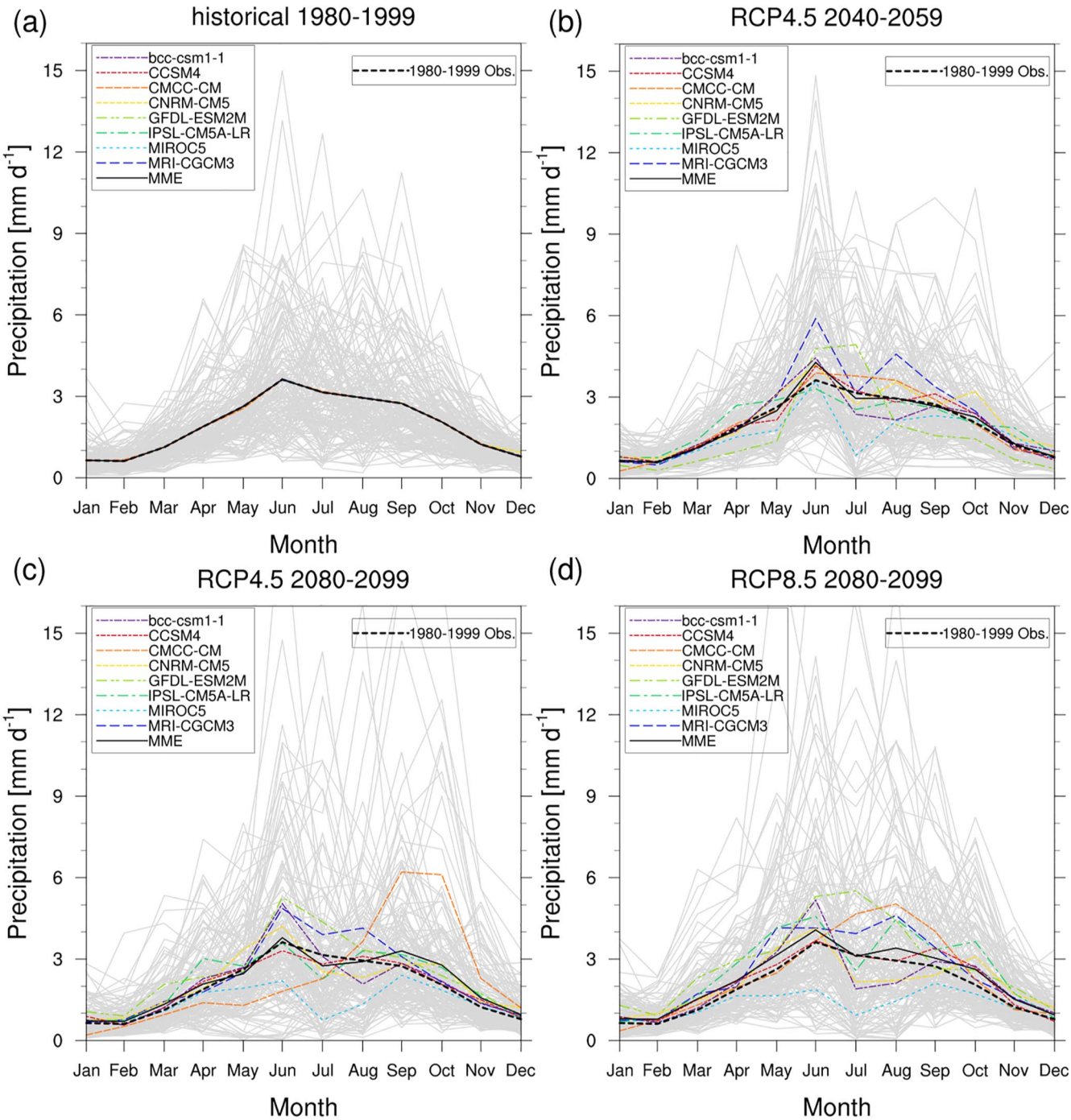

Figure 4. As Figure 3, but for precipitation.

MIROC5-driven runs and an especially weak warming during the month of March of generally less than 1°C in the MRI-CGCM3-driven runs.

Simulated precipitation variability (Figure 4) increases in spring and summer, especially in the late 21st century. Early summer MME rainfall increases in the mid-century and in the RCP8.5 late-century scenarios, while fall MME rainfall increases in both scenarios in the late century. There is a very small increase in winter MME precipitation of about 0.1 mm d^{-1} in all scenarios. When WRF is driven with GFDL-ESM2M and MRI-CGCM3, increases in summer are strongest with values above 2 mm d^{-1}, whereas the MIROC5-driven simulations show

decreases of up to 2 mm d^{-1} from late spring through early fall in all scenarios. WRF-forced simulations of precipitation from CMCC-CM are notably different from those of other models, with large increases of up to 4 mm d^{-1} in the fall for both late 21st-century simulations. As with temperature, precipitation from WRF driven with bcc-csm1-1, CCSM4, and CNRM-CM5 is closest to the MME. Anomaly time series and standard deviation for precipitation and the related snow depth are displayed in Figures S9 and S10 in Supporting Information S1.

3.2. Spatial Distributions

Historical 20-year average winter (Figure 5a) and summer (Figure 6a) MME 2-meter temperatures illustrate the strong north-south temperature gradient in the state. Anomalies of future winter MME projections (Figures 5b–5d) show that temperature increases are strongest along the northern border in the mid-century runs (Figure 5b), throughout much of the northern half of the state in RCP4.5 by the end of the century (Figure 5c) and throughout most of the northern half of the state in the RCP8.5 scenario (Figure 5d).

The increased rate of warming in the north is suggested to be related to both synoptic-scale warming (Wang et al., 2017; their Figure 8) as well as reduced albedo from reduced snow cover, which results in increases in average winter temperature ranging from ∼1°C by the mid-century to 6°C by the end of century in RCP8.5 (Figure 5d). This warming trend can be observed across Minnesota (Runkle et al., 2017; their Figure 1) and our simulations suggest that the trend will continue. Lakes will be ice-free for longer periods and the resulting decrease in albedo will contribute to local winter warming. The average summer temperature shows a more homogeneous increase across the state that ranges from ∼1°C by the mid-century (Figures 6b) to 5°C by the end of the century in the RCP8.5 scenario (Figure 6d). These simulated future increases in average summer temperature contrast with observations of average summer temperature across the state that do not have a significant trend in the historical record (Runkle et al., 2017; their Figure 2a).

Some of the future simulations also do not depict significant temperature changes by the mid-century, especially GFDL-ESM2M and MRI-CGCM3, whereas others show a much stronger warming. Strong mid-century warming of about 4°C occurs with bcc-csm1-1 and CNRM-CM5 forcing in winter and with IPSL-CM5A-LR and MIROC5 forcing in summer (Figures 3b and S8 in Supporting Information S1), which is also depicted in the detailed maps of temperature trends for different GCM input data (Figures S11 and S12 in Supporting Information S1). The stronger warming in the northern parts of the state in the MME is consistent with most model simulations, only CCSM4 and MRI-CGCM3 show a stronger warming in southern and central Minnesota during both seasons and GFDL-ESM2M only during summer. CNRM-CM5 and MIROC5 project a more pronounced negative west-east gradient in winter temperature change than most models, only simulations forced with MRI-CGCM3 and in RCP4.5 also CMCC-CM result in a positive west-east gradient during both seasons. In GFDL-ESM2M, this appears only in winter. Input data from CCSM4, CMCC-CM, and IPSL-CM5A-LR lead to the strongest response over lakes. In summer, increased evaporation over lakes mitigates local warming.

According to the statewide average analysis of precipitation (Figure 4), most of the change in future precipitation occurs in spring and early summer; therefore, we analyze spring average MME precipitation (rain and snow water equivalent) here. Spring average MME precipitation across Minnesota is strongest in the southeast portion of the state and weakest in the northwest (Figure 7a). Simulated precipitation changes by the mid-century differ among WRF runs with some runs showing spring increases (e.g., driven with IPSL-CM5A-LR) and some showing decreases (e.g., driven with MIROC5 and GFDL-ESM2M; Figure 4b), which together result in no significant changes in spring average precipitation across the state (Figure 7b). By the end of the century, spring precipitation is projected to increase slightly in the far north of the state in the RCP4.5 scenario (Figure 7c) and by up to 1 mm d^{-1} in the northern half of the state as well as the southern portion of the domain in Iowa in RCP8.5 (Figure 7d). This is in contrast to statistical projections from Localized Constructed Analogs (LOCA; Pierce et al., 2014), where the strongest precipitation increase occurs in the northeastern and central parts of the state (Figure S13 in Supporting Information S1). This is similar to the historical trend (NCEI, 2021). Our results show that the greatest future increase in rainfall is projected to occur in the northern part of the state indicate a change in regional circulation, and spring average rainfall across the state will become more homogeneous. Winter average MME precipitation is projected to increase slightly, with a statistically significant increase by end of century of up to 0.25 mm d^{-1} in RCP8.5 (not shown).

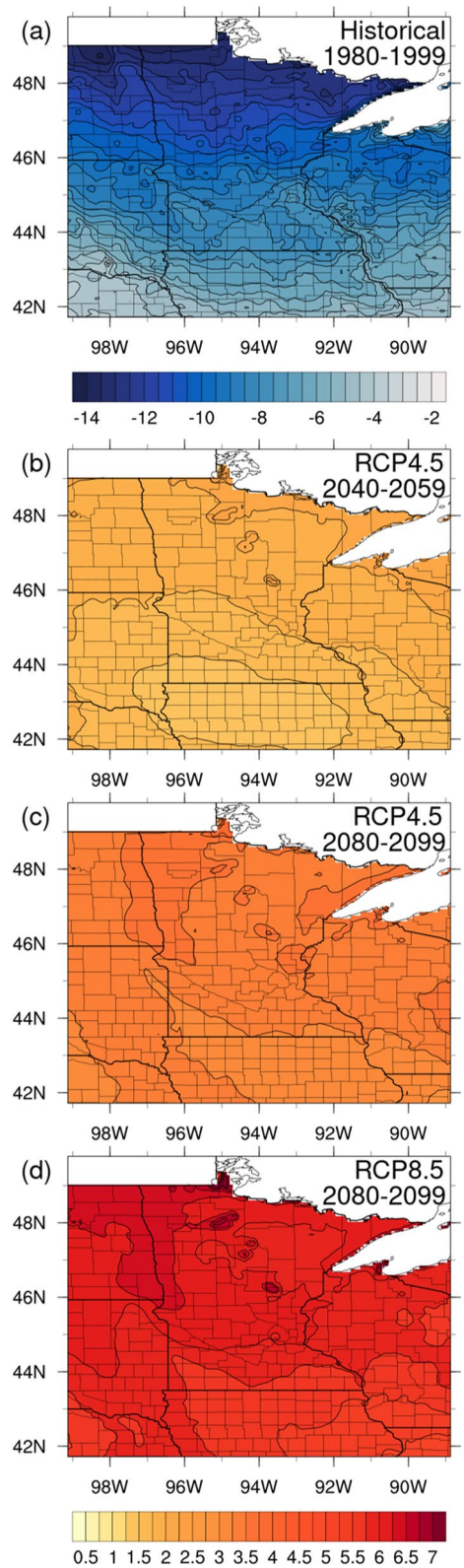

Figure 5. Average winter (December–February) MME 2-meter temperature in °C for (a) historical simulations and (b)–(d) anomalies of each RCP scenario compared to the historical period. Shading in (b)–(d) indicates statistically significant changes over U.S. land points at the 95% confidence interval. Please note that there is a different color bar for (a) than for (b)–(d).

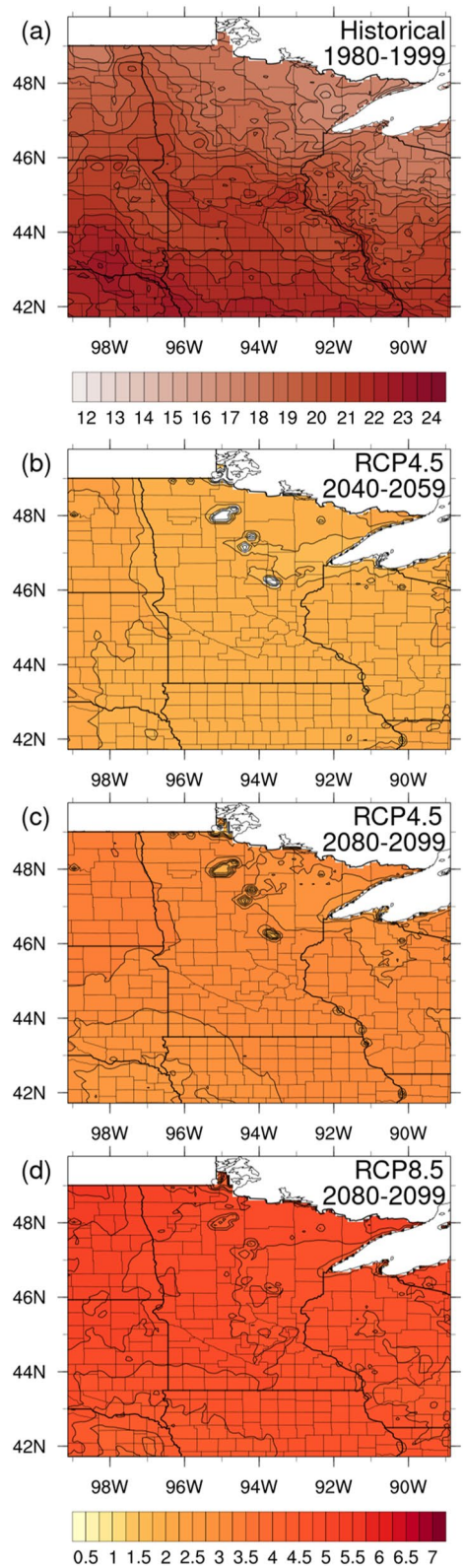

Figure 6. As Figure 5, but for summer (June–August).

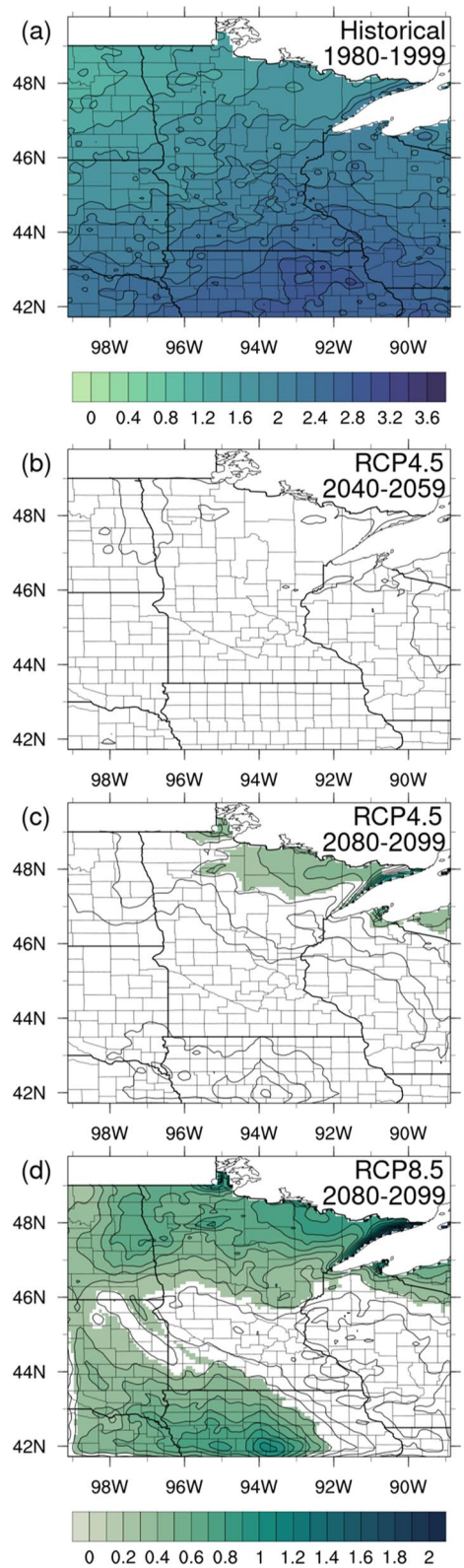

Figure 7. As Figure 5, but for precipitation and precipitation anomalies in mm d^{-1} in spring (March–May).

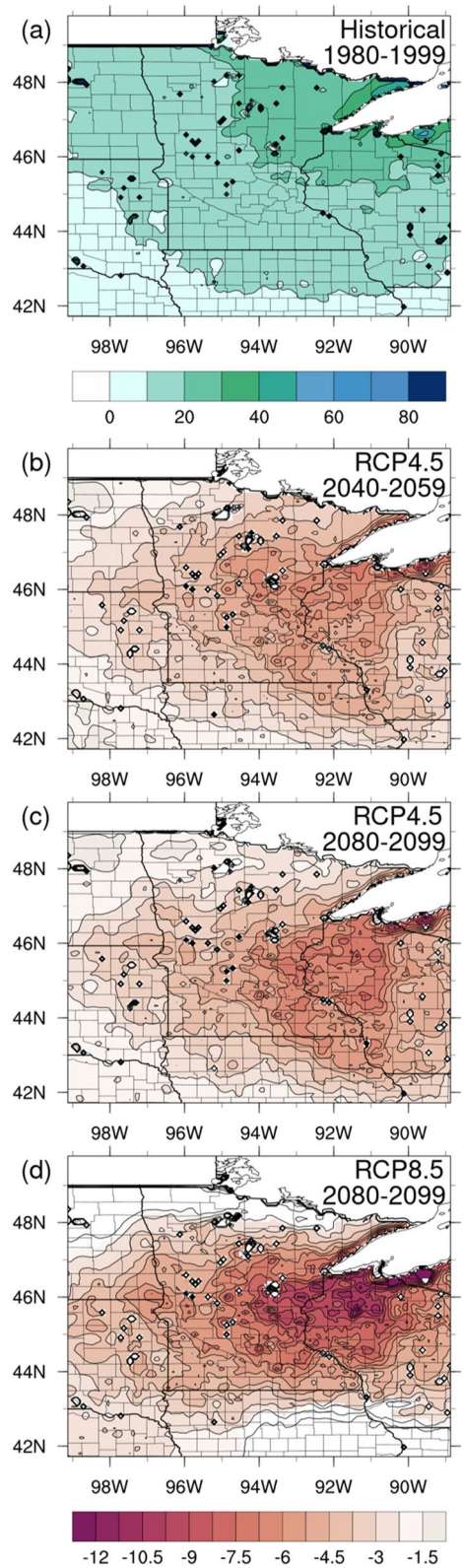

Figure 8. As Figure 5, but for MME snow depth and snow depth anomalies (cm) in winter (December–February).

Average winter MME snow depth generally increases with latitude across the state; however, there is a lobe of lower snow depths stretching northward on the far western side of the state (Figure 8a). Despite the currently observed and projected increases in precipitation, snow depth is projected to decrease across the state except in the northernmost region during the 21st century (Figures 8b–8d) because of increased surface air temperature. Strongest decreases in snow depth are projected to occur in central Minnesota, where average snow depth is expected to decrease by up to 50% by the middle of the 21st century (Figure 8b). By the end of the 21st century under RCP8.5, this change is expected to also cover southern Minnesota and the maximum reduction in snow depth reaches more than 12 cm. While snow depth over the northernmost part of the state remains virtually unchanged, the simulations show significant decreases in snow depth along the Minnesota North Shore and into much of Wisconsin exceeding 12 cm. These regions include part of the U.S. National Forest system and are at risk of decreasing revenues in winter recreation as well as threats to ecosystem health from pests that may survive warmer winters (Govindan & Hutchison, 2020; Venette & Hutchison, 2021).

The average MME number of days per year when snow depth meets or exceeds a threshold of 2.54 cm (equivalent to one inch) follows a similar pattern as average MME snow depth (Figure 9a). Warmer winters result in fewer days with snow cover on the ground. Significant decreases in days per year with snow cover above one inch are found over central and southeast Minnesota and western Wisconsin of up to 40 days per year by the mid-century (Figure 9b). By the end of the century in the RCP8.5 scenario, there are up to 55 fewer days of snow cover in Minnesota and more than 60 fewer days in central Wisconsin (Figure 9d). Because of the large uncertainty of observed snow depth, we also provide non adjusted snow depth values in Figures S14–S16 in Supporting Information S1. They complement Figures S10 in Supporting Information S1 and Figures 8 and 9, and although snow depth is generally lower in observations, the days per year with snow cover are remarkably similar, which suggests that the number of snow events is similar, despite the higher snowfall rate in the WRF simulations.

The goal of this study is to develop a dynamically downscaled climate data set for Minnesota to be used for impact studies. This data set will be useful if it provides value to previously developed, well-tested data sets (i.e., higher resolution while broadly agreeing with other projections). While there are differences in the number of GCMs, time periods, and downscaling methods between our study and that of the National Climate Assessment (NCA), our results are consistent in magnitudes and patterns. For example, our statewide average annual temperature increases (Figures 3b–3d) agree broadly with Midwest average projected increases for RCP4.5 by mid-century (Δ 2.3°C) and for end of century for RCP4.5 (Δ 3.1°C) and RCP8.5 (Δ 5.3°C) in Table 6.4 of the NCA (Vose et al., 2017).

The benefits of downscaling are highlighted for a variable like precipitation that varies strongly in space and time and for which variability is projected to increase in the future. Like our analysis, the NCA found more significant changes in projected precipitation in winter and spring than in fall and summer (Easterling et al., 2017). While their analysis shows a homogeneous increase in winter and spring precipitation for RCP8.5 by the end of the century of about 20%, we found a smaller though statistically significant increase in winter precipitation and more spatial variability in projected spring precipitation. Our projected RCP8.5 end of the century spring precipitation ranges from no statistically significant change in the southern portion of the state to a 12%–30% increase in the central region and a 30%–60% increase in the north. While our analysis provides a more detailed projection of future precipitation than the NCA, we note that there are limitations to our analysis because of the single regional climate model used to downscale data and the single method of bias adjustment we employed (Laux et al., 2021). Future studies will examine alternate methods of bias adjustment of this data set.

The data presented here are immediately useful for impact studies of agricultural, energy, economic, and other ecosystem service sectors of Minnesota and will be a baseline for comparison with future downscaling efforts of CMIP6 (Stouffer et al., 2017). Multimodel ensemble values of temperature and precipitation are available at a variety of user-defined domains from climate.umn.edu (The Minnesota Department of Natural Resources Climate Explorer Tool), and all daily data are available for download at the University of Minnesota Digital Conservancy website. Other raw data are available upon request.

4. Conclusions

The present study describes a high-resolution regional climate modeling effort over the U.S. state of Minnesota that is already providing input for various projects, including improved projections of weather extremes, management of infrastructure, industry, and water resources (Noe et al., 2019) as well as the tracking of invasive species

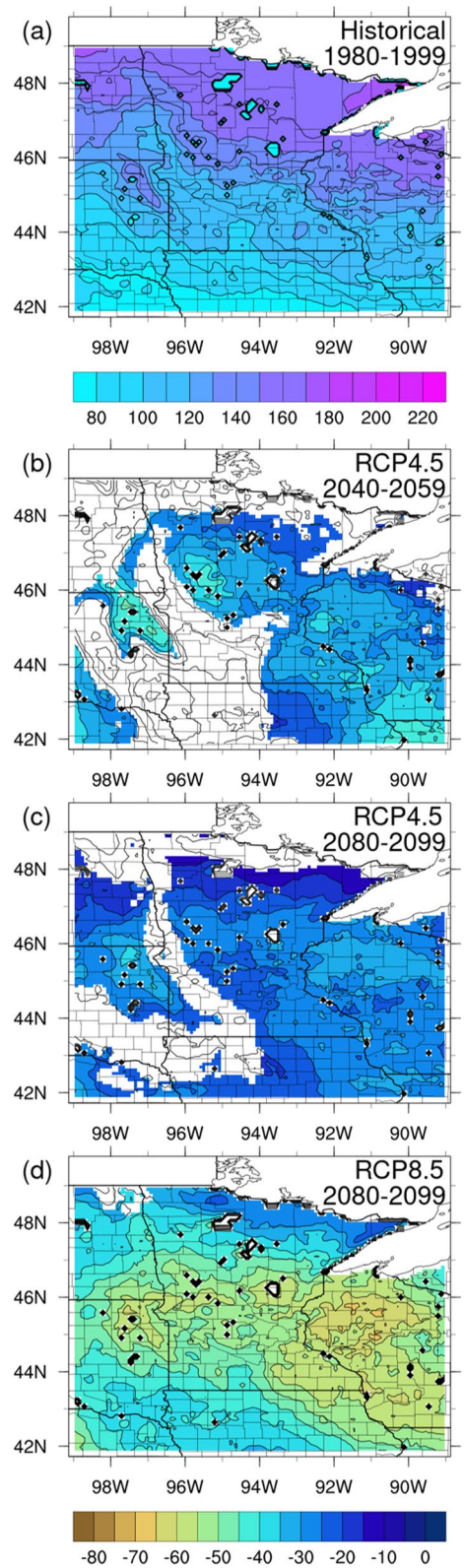

Figure 9. As Figure 5, but for MME days per year and difference in days per year with snow depth above 2.54 cm (one inch).

(Govindan & Hutchison, 2020; Venette & Hutchison, 2021). This state-level downscaling effort links climate projections to decision-making within regional communities. Snow depth simulations emphasize the need for detailed modeling efforts of the hydrological cycle, especially over high-latitude climates.

Data Availability Statement

The daily WRF model data are hosted at the University of Minnesota Digital Conservancy website at: https://doi.org/10.13020/YV29-JY19. CMIP5 forcing data were obtained from the World Data Center for Climate (WDCC) hosted by the German Climate Computing Center (DKRZ) at https://cera-www.dkrz.de/WDCC/ui/cerasearch/q. Monthly temperature and precipitation observations for 1981–2000 were made available by the PRISM group at http://www.prism.oregonstate.edu/recent, and the snow depth analysis was provided by NSIDC at https://doi.org/10.5067/0GGPB220EX6A.

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June 21, 2022

The Honorable Tim Walz
Office of the Governor & Lt. Governor
Room 130 State Capitol
75 Reverend Dr. Martin Luther King Jr. Blvd.
Saint Paul, MN 55155

Dear Governor Walz:

A model of collaboration for 19 years, the Minnesota Partnership for Biotechnology and Medical Genomics (the Partnership) has brought together researchers from the University of Minnesota and Mayo Clinic to advance research aimed at improving the economic and human health of our state. The 2021 Legislature demonstrated its continued support of the Partnership by authorizing the base appropriation of roughly $8 million annually.

Research in cancer, atrial fibrillation, brain mapping, and liver disease dominated the Partnership's research grant program in 2021. Five projects were awarded roughly $4.5 million to research new treatments for disease and develop novel diagnostics. The titles of the projects are as follows:

- Manipulating natural killer cell signaling to enhance immunotherapy
- Novel implementation of spatiotemporal mapping and electroporation for the treatment of persistent atrial fibrillation
- Unexplored pathways: The impact of abnormal glycosylation on the hypothalamic-pituitary-adrenal and -gonadal axes and bone health in patients with congenital disorders of glycosylation.
- An intraoperative stylet-based electrode array for mapping subcortical brain regions
- Lead optimization of a novel epigenetic inhibitor series for alcoholic hepatitis therapy

Finally, $3 million of current year and previous year funds were allocated to the Translational Product Development Fund, which supports the advancement of projects with potential to be commercialized, such as projects that aim to form a start-up company or create a license agreement with a commercial entity. This program is facilitated in cooperation with each institution's Clinical and Translational Science Award from the NIH.

Partnership awards have led to successful licensing, patents and commercialization of discoveries including therapies for glaucoma, multiple sclerosis, diabetes, heart failure, fungal infections, Alzheimer's disease, and various cancers. As of 2021 there have been more than 79 patent filings, 18 patent filings still pending, and 15 issued patents. This involves more than 32 new technologies stemming from Partnership-funded projects, with 7 currently licensed to existing companies, and two start-up companies (CoreBiome, Inc. and Qlaris).

If you would like more information, please do not hesitate to contact us or our legislative staff, Kelly Mellberg at 262.960.4000 or Kate Johansen at 651.900.3482.

Sincerely,

Gregory Gores, M.D.
Executive Dean for Research
Mayo Clinic

Jakub Tolar, M.D., Ph.D.
Dean of the Medical School / Vice President for Clinical Affairs
University of Minnesota

cc: Senator David Tomassoni, Chair, Higher Education Finance and Policy
Representative Connie Bernardy, Chair, Higher Education Finance and Policy Division