Minnesota Mineral Education Workshop
Fifteen Years of Bringing Minnesota's Geology and Mineral Resources Into K-12 Classrooms
What is the MMEW?

Three-day workshop on Minnesota’s geology and mineral resources for K-12 earth science teachers

MISSION
To promote awareness of the positive contribution that mineral resources make to the Minnesota way of life, by providing information and materials for teachers related to mineral resources, including geology, exploration, development, extraction, uses, reclamation, conservation and economics.

MMEW Website (www.mmew.org)
ORIGIN OF THE MMEW

• Conceived by Henk Dahlberg (DNR) in 1996 after discussions at a Minnesota Science Teachers Convention

• Supported by DNR Director Bill Brice

• Modeled after Nevada Mining Association Teachers Workshop
15 Years of MMEW

1997 – Ironworld Discovery Center, Chisholm (47)
1998 – Minnesota State University, Mankato (65)
1999 – University of Minnesota, Duluth (83)
2000 – St. Cloud State University, St. Cloud (80)
2001 – Mesabi Range Technical College, Virginia (72)
2002 – University of St. Thomas, St. Paul (66)
2003 – Hibbing Community College, Hibbing (52)
2004 – Winona State University, Winona (62)
2005 – Minnesota State University, Mankato (69)
2006 – University of Minnesota, Duluth (81)
2007 – Bemidji State University, Bemidji (47)
2008 – Vermilion Community College, Ely (64)
2010 – Macalester College, St. Paul (64)
2011 – Mesabi Range Comm. & Tech College, Eveleth (76)
2012 – Winona State University, Winona (96)
2013 – Hibbing Community College, Hibbing

Average Attendance - 68
WORKSHOP STRUCTURE

Day 1: Short Course Instruction

- Lectures and activities on geology, mining, reclamation, careers and pedagogy
- Emphasize hands-on learning
- Teachers choose the topics of interest
- Taught by geologists, educators, and industry professionals

Instructors:

- Ginny Aldag, Blake School
- Karen Campbell, Hamline University
- Paul Eger, Department of Natural Resources
- Barry Frey, Geowys
- Angela Henniksen, CAMAS, Inc.
- Retta James, Gooseberry State Park
- Dale Kittelson, Coon Rapids High School
- Alan Knaeble, Minnesota Geological Survey
- Ann Markegard, Houston High School
- Jim Miller, Minnesota Geological Survey
- Howard Mooers, University of Minnesota, Duluth
- Ken Perry, Franklin Junior High School
- Rick Ruhanen, Department of Natural Resources
- Jim Sellner, Department of Natural Resources
- Lauri Severson, Woodland Middle School
- Mark Severson, Natural Resources Research Institute
- Jim Welsh, Gustavus Adolphus College
- Larry Zanko, Natural Resources Research Institute

Schedule and Instructor List 1999 MMEW at UMD

<table>
<thead>
<tr>
<th>Time</th>
<th>Metamorphic Rocks</th>
<th>Mining Reclamation</th>
<th>Rock and Mineral Identification</th>
<th>Earth's Dramatic History</th>
<th>Glacial Geology</th>
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</thead>
<tbody>
<tr>
<td>9:50 - 11:05 am</td>
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<tr>
<td>11:10 - 12:10 pm</td>
<td>Natural Disasters</td>
<td>Mining-Not for Geologists only</td>
<td>Mineral Exploration</td>
<td>Internet</td>
<td>Geology in the State Parks</td>
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<tr>
<td>12:15 - 1:15 pm</td>
<td>Lunch</td>
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<tr>
<td>1:15 - 2:30 pm</td>
<td>Dynamic Earth</td>
<td>Reserve Mining Case Study</td>
<td>Rock and Mineral Identification</td>
<td>Minnesota Minerals</td>
<td>Iron Ore &amp; Taconite</td>
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<tr>
<td>2:30 - 2:45 pm</td>
<td>Break</td>
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<tr>
<td>2:50 - 3:50 pm</td>
<td>Geologic Maps</td>
<td>Observation &amp; Interpretation</td>
<td>Mineral Exploration</td>
<td>Minnesota Minerals</td>
<td>Geology in the State Parks</td>
</tr>
<tr>
<td>3:50 - 5:00 pm</td>
<td>Igneous Rocks</td>
<td>Mineland Reclamation</td>
<td>Earth's Dramatic History</td>
<td>Internet</td>
<td>Iron Ore &amp; Taconite</td>
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</tbody>
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Compiled by Moosavi (2008)
Day 1:
The Curriculum Binder:
Loaded with Lesson Plan Ideas
WORKSHOP STRUCTURE

Day 1: The Resources Box
Teaching resources donated from various sources, including:

- DNR (Water, land, and mineral resources, mining reclamation)
- MGS (Geologic info, maps, rock samples)
- USGS (Geology, water and earth resource info)
- GSM (MN mineral/rock samples)
- AIPG (Commodities samples)
- IMA (Ore samples, info on iron mining)
- MII (teacher packets w/ posters, lesson plans)
- MRGS (Mesabi Range Maps)
- Aggregate Industries (Industrial min. samples)

Occasionally distribute books on MN geology:
- *Minnesota's Geology* (Ojakangas and Matsch)
- *Geology on Display* (Green)
- *Lake Superior Agate* (Wolner)
- *Geology Underfoot* (Samsome)
- *Roadside Geology of Minnesota* (Ojakangas)
Days 2 & 3 - Field Trips

Highlighting the geology, mineral resources, and mining activity in vicinity of the workshop
WORKSHOP STRUCTURE

Days 2 & 3 - Field Trips
Covering the geologic and resource diversity of the state

Geologic Units Visited 97-08

Resource Types Visited 97-08

Compiled by Moosavi (2008)
THE TEACHERS

Mix of Grade Levels
Even Home Schoolers!

Mix of Experience

Grade Level

- K-4: 11%
- 5 thru 8: 47%
- 9 thru 12: 29%
- Home School: 9%
- College: 4%

Years of Teaching

- 0 to 3: 3%
- 4 to 10: 24%
- 11 to 20: 30%
- 21 to 30: 15%
- >30: 12%
- 0 to 5: 16%

2012 MMEW
Winona (96)
THE TEACHERS

Lots of Repeat Customers
- short duration
- good value
- continuing education credits
- lots of teaching resources
- unbiased information
THE TEACHERS

Satisfaction Surveys 2001-06

Overall Workshop

Geology Field Trips

Short Courses

Mining Field Trips
ORGANIZATION OF THE MMEW

1997-2009 – *ad hoc* group of volunteers involved in planning, fundraising, and instruction

- State Agencies ([DNR](https://www.dnr.state.mn.us), MGS, NRRI)
- Academia ([UMD](https://www.umn.edu), Mankato, St. Cloud, Bemidji, Winona, St. Thomas, Macalester, Gustavus, Hamline)
- Geoscience Organizations (GSM, mineral clubs)
- K-12 Educators ([MESTA](https://www.mesta.org), earth science teachers)
- Mining/Exploration Companies
- Professional Associations ([AIPG](https://www.aipg.org), Mining MN, IMA, SME,...)

2009-present – organized under the supervision of the non-profit
Minnesota Center for Mineral Resource Education
ORGANIZATION OF THE MMEW

2013 MCMRE Board of Directors

Chairman: Fred Corrigan (ARM)
convenes quarterly board meetings and presides over the executive committee at each meeting of the Board

Vice Chair – Treasurer: Mike Hultgren (AIPG)
receives and distributes funds, maintains books and records, files necessary tax returns

Vice Chair – Finance: Craig Pagel (IMA)
solicits contributions of cash or in kind to finance the workshops

Vice Chair – Operations: Jim Miller (UMD/PRC)
recruits instructors and team members, organizes the program for each workshop, selects the location, determines the content provides certificates and academic credit for attendees

AT-LARGE BOARD MEMBERS
SME - Julie Elkington
MESTA – Cheryl Sill
Mining MN– Ernie Lehmann
NRRI – George Hudak
DNR - Dennis Martin
MGS - Harvey Thorleifson (former Chairman)
ORGANIZATION OF THE MMEW

2008 MMEW Volunteers

MN Department of Natural Resources
Susan Balgie
Jean Matthew
Maryanna Harstad
Rich Ruhanan
Barry Frey
Dave Dahl
Paul Eger
Kim Lapakko
James Pointer

Minnesota Geological Survey – UM-TC
Barb Lusardi

Other Colleges
Dean Moosavi, Tulane University, New Orleans

K-12 Institutions
Roger Carlson, Matomedi HS (retired)
Dale Kittleson, Anoka-Hennepin HS (retired)
Chuck Corwin, Grand Rapids HS

Natural Resources Research Institute - UMD
John Heine
Mark Severson
Julie Oreskovich
Dean Peterson
Marsha Patelke
Devon Brecke

Industries
Ken Coats, Aggregate Industries
Lynn Carlson, Aggregate Industries
Joe Scipioni, Polymet Mining Corp.
LaTisha Geitzen, Polymet Mining Corp.
Richard Patelke, Polymet Mining Corp.
Dave Oliver, Duluth Metals Ltd.
Kevin Boerst, Duluth Metals Ltd.
Chris White, Duluth Metals Ltd.

Department of Geological Sciences - UMD
Jim Miller
Howard Mooers
John Goodge
### 2012 MMEW Instructors and Volunteers

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Major</th>
<th>Roles</th>
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<tbody>
<tr>
<td>Steve Allard</td>
<td>Winona State University</td>
<td>Local Chair, Logistics, Budget, Special Events</td>
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<tr>
<td>Jennifer Anderson</td>
<td>Winona State University</td>
<td>Special Events, Instructor</td>
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<tr>
<td>Julie Bartley</td>
<td>Gustavus Adolphus</td>
<td>Field Trip, Instructor</td>
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<td>Lee Beatty</td>
<td>Winona State University</td>
<td>Instructor</td>
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<tr>
<td>Candace Kairies-Beatty</td>
<td>Winona State University</td>
<td>Instructor</td>
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<tr>
<td>Devon Brecke</td>
<td>U of Wisconsin-River Falls</td>
<td>Curriculum, Instructor</td>
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<tr>
<td>Greg Brick</td>
<td>U of Minnesota Twin Cities</td>
<td>Instructor</td>
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<td>Toby Dogwiler</td>
<td>Winona State University</td>
<td>Field Trip</td>
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<tr>
<td>Paul Eger</td>
<td>Cotter HS-Winona</td>
<td>Instructor</td>
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<td>Sally Frisby</td>
<td>Cotter HS-Winona</td>
<td>Field Trip</td>
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<tr>
<td>Valerie Gamble</td>
<td>MN Dept. of Agriculture</td>
<td>Instructor</td>
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<td>Kent Gordon</td>
<td>Tartan HS - Oakdale</td>
<td>Promotion</td>
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<td>Julie Heinz</td>
<td>Natural Resources Res. Inst.</td>
<td>Registration</td>
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<td>Howard Hobbs</td>
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<td>Mark Jirsa</td>
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<td>Jim Lundy</td>
<td>MN Dept. of Health</td>
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<td>Barb Lusardi</td>
<td>Minnesota Geological Survey</td>
<td>Curriculum</td>
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<td>Dennis Martin</td>
<td>MN Dept. of Natural Resources</td>
<td>Resources</td>
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<tr>
<td>Timothy McAulay</td>
<td>Inver Hills Community College</td>
<td>Instructor</td>
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<tr>
<td>Jim Miller</td>
<td>U of Minnesota Duluth/PRC</td>
<td>Registration, Website, Budget, CE Credit, Instructor</td>
</tr>
<tr>
<td>Dean Moosavi</td>
<td>Rochester Comm College</td>
<td>Field Trip Chairman</td>
</tr>
<tr>
<td>Christina Morrison</td>
<td>Tiller Corporation</td>
<td>Instructor</td>
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<tr>
<td>Dick Ojakangas</td>
<td>U of Minnesota Duluth</td>
<td>Instructor</td>
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<tr>
<td>Marsha Patelke</td>
<td>Nat. Resources Res. Inst./PRC</td>
<td>Registration, Resources, Special Events</td>
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<tr>
<td>Ken Reid</td>
<td>U of Minnesota Twin Cities</td>
<td>Instructor</td>
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<tr>
<td>Lee Schmidt</td>
<td>Hamline U</td>
<td>Promotion</td>
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<tr>
<td>Nicollet Schossow</td>
<td>Winona State University</td>
<td>Logistics, Special Events</td>
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<tr>
<td>Cheryl Sill</td>
<td>Theif River Falls HS</td>
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FINANCIAL SUPPORT OF THE MMEW

MMEW Funding Sources (2005) ~$11500
- Industry Contributions
- DNR
- Registration Fees

Not included:
- Volunteer Instructor Time
- DNR, MGS, NRRI Staff Time

2012 MMEW (Winona)
$22,530 Total Expenses
- Industry Contributions $18,660
- Teacher Registration $3,870
FINANCIAL SUPPORT OF THE MMEW
1997–2008 Donors

Aggregate Industries
Aggregate Ready Mix of Minnesota
American Institute of Professional Geologists
American Magotteaux
Arcelor Mittal
Arrowhead Concrete Works, Inc.
Barr Engineering Company
Barton Sand and Gravel (Div. Of Tiller Corporation)
Bauerly Companies (now Knife River –North Central)
Bituminous Roadways
The Bosshart Company
Brielmaier Aggregates, Inc.
Fred Carlson Company
Cleveland-Cliffs Foundation
Dole Explosives
Edward Kraemer & Sons, Inc
Eveleth Fee Office
Jack Everett, C.P.G.
EVTAC Mining
Graham R. "Rudy" Ford
Jay Frischman
Granite City Ready-Mix
H & L Mesabi
Stephen J. Hedberg
Hibbing Taconite
Holcim / Holnam Inc.
Iron Mining Association of Minnesota
Iron Range Resources
Ispat Inland Mining
Jasper Engineering & Equipment
Johnson Aggregates
L.G. Everist, Inc.
Malton Electric Co.
Martin Marietta Aggregates
Meriden Engineering
Meridian Aggregates Company
Milestone Materials
Minnesota Power Foundation
National Steel - Keewatin Facility
New Ulm Quartzite Quarries
North Central Mineral Ventures
Northern Con-Agg
Northshore Mining Company
Patterson Quarries / Milestone Materials
Prior Lake Aggregates
Rendrag, Inc. / Thomas Gardner
Shakopee Gravel
SME – Minnesota Section
Southern Minnesota Construction
Tower Asphalt
Ulland Brothers, Inc.
Unimin Minnesota Corporation
United Taconite LLC
USS/Minntac
Wissota Sand & Gravel Company
THE TEACHERS

Cost for Participants

Registration Fee $0-40
Accommodations (Dorm/Motel/Camping) $0-100
Meals (breakfast and lunch included) $15-60
Travel to Workshop Site $25-100
(Participants have driven as far as 400 miles to attend)

Out of Pocket Cost to Teacher: $40-300

Two College Credits (UMD) $192 (2012)
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