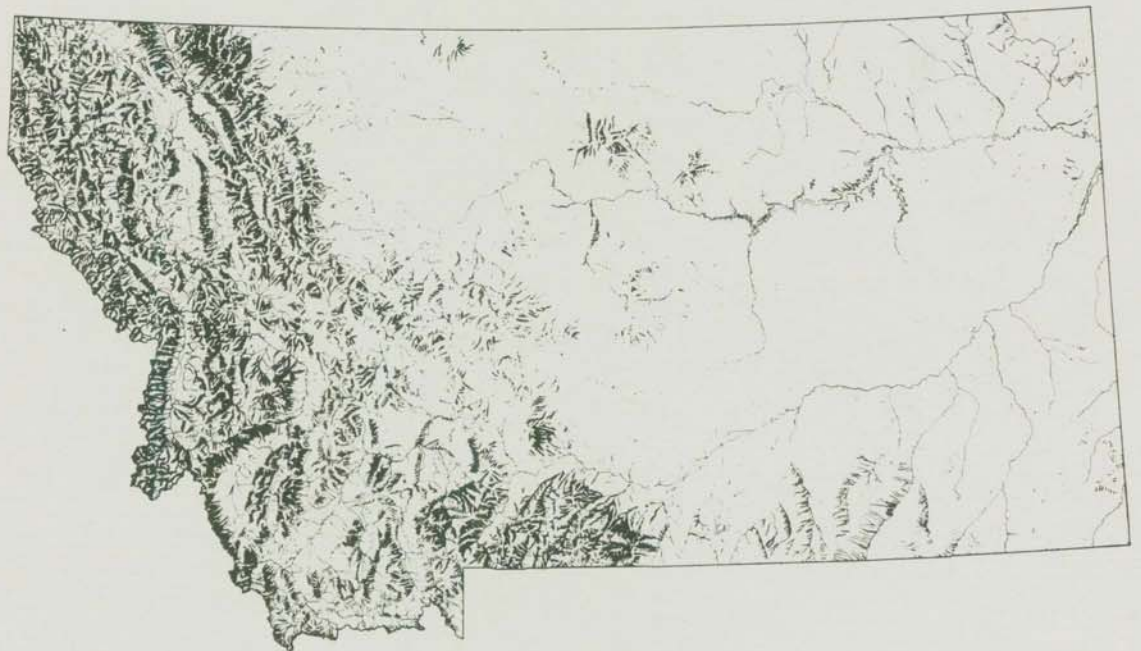


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CURRENT GEOLOGICAL AND GEOPHYSICAL STUDIES IN MONTANA

compiled by
Susan V. Foster
and
Eric S. Vokt



OPEN-FILE REPORT 235

1990

Montana Bureau of Mines and Geology
A Department of
Montana College of Mineral Science and Technology

Preface

Most studies are listed under one heading only, but because of the difficulty of assigning some studies to a single category, some are listed under more than one heading. The date following the entry is the expected date of completion. Many of the entries are numbered and plotted on Figures 1, and 2.

Many of the studies listed here are far from being completed. It is suggested that anyone who wants more information on a specific project should correspond directly with the investigator.

Completed theses are not included in this compilation. Special Publication 88, Compilation and Index of Theses on Montana Geology, 1899-1982 may be ordered from the Montana Bureau of Mines and Geology, Butte, Montana 59701, for \$10 postpaid. Special Publication 97 (Index of theses, 1983-1988) is also now available for \$5.00 postpaid.

Finally, the compilers would like to thank those who provided assistance by taking the time to send us information on their research. We appreciate this cooperation and hope that you will find this list useful.

Information for the next List of Current Geological and Geophysical Studies will be collected in early 1992 and released in the spring of 1992.

Susan V. Foster
and Eric S. Vokt
Montana Bureau of Mines and Geology

Butte
October 1, 1990

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FIGURES

- 1--Index map of Montana
- 2--Index map of southwestern Montana

Areal geology

<u>Investigator</u>	<u>Subject</u>
Bartholomew, Mervin J. MBMG Derkey, Robert E. Washington Geological Survey	Geology of the Deer Lodge area. Scale 1:50,000 (1990). Figure 1, no. 1
Berg, Richard B. Foster, Susan V. MBMG Colton, Roger B. USGS, Denver O'Brien, Hugh Geological Survey of Finland	Geology of the Belt 30x60-minute quad- rangle, central Montana (1991). Figure 1, no. 2
Bergantino, Robert N. MBMG	Geology and geological aspects of the Lewis & Clark Expedition, mouth of Yellowstone River to summit of Lolo Pass, 1805-1806 (ongoing).
Foster, Susan V. Bartholomew, Mervin J. Berg, Richard B. MBMG Colton, Roger B. USGS, Denver	Geology of the Stockett-Belt coal field area near Great Falls. Scale 1:50,000 (1990). Figure 1, no. 3
Hall, William B. Univ. of Idaho, Moscow	Study of central portion of Madison/Gal- latin block with emphasis on geomorphology, glacial history, and structural geology (ongoing). Figure 2, no. 4
Hanneman, Debra Whitehall, MT.	Tertiary-Quaternary geology of the Jefferson, Rocker and Divide-Melrose valleys, southwestern Montana. Figure 2, no. 5
Hanson, Tom Lundblad, Steve Reese, Joe Univ. of Wisconsin, Madison	Geology and structural analysis of an area in the Whitefish Range, Flathead County. Figure 1, no. 6
Harrison, Jack E. USGS, Denver	Belt Supergroup, northwestern Montana. Includes geologic mapping (1:250,000 scale) and studies of structure, stratigraphy, and stratabound ore deposits (1990).

- Figure 1, no. 7
- Hyndman, Donald W.
Univ. of Montana, Missoula
- Geologic map of the Boulder batholith and petrologic compilation and synthesis (1991).
Figure 1, no. 8
- Ihle, Bethany A.
USDA, Forest Service
- Geology of the Gipsy Lake Area, Big Belt Mountains, Montana (1990).
Figure 1, no. 9
- Kellogg, Karl S.
USGS, Denver
- Tectonic framework of the northwestern Madison Range, Madison County, Montana. Involves quadrangle mapping, structural analysis, geochemical and isotopic studies, and geochronologic studies of Archean, Cretaceous, and Tertiary rocks. Ennis 15-minute quadrangle will be completed 1992. Project is ongoing (in cooperation with Mike O'Neill), but Professional Paper on northwest Madison Range will be completed by 1993.
Figure 2, no. 10
- Lageson, David R.
Montana State Univ., Bozeman
- Structural geology and bedrock mapping of western Pioneer Mountains (west of Wise River), Beaverhead County, Montana.
Figure 2, no. 11
- Lange, Ian M.
University of Montana, Missoula
- Geology of the Hog Heaven volcanic field northwestern Montana, includes map and description of Hog Heaven mine.
Figure 1, no. 12
- Lewis, Sharon E.
MBMG
- Geologic mapping of Graphite Mountain 7.5-minute quadrangle (1991).
Figure 2, no. 13
- Lewis, Sharon E.
MBMG
- Geologic mapping of Lincoln Gulch 7.5-minute quadrangle (1990).
Figure 2, no. 14
- Liu, Yuguang
MBMG
- Geologic mapping and petrology of Archean metamorphic rocks, northern Greenhorn Range (1991).
Figure 2, no. 15

M'Gonigle, John USGS, Denver	Mapping (compiling) 4 quadrangles: Hauser Ranch, Medicine Lodge Peak, Jeff Davis Peak, Deadman Pass along the Idaho border, southwest Montana. Radiometric dates on sanidines in volcanics and basin fill tuffs (1990). Figure 2, no. 16
Miller, Fred K. USGS, Spokane	Geology of the Sandpoint 1x2-degree quadrangle. Figure 1, no. 17
Montagne, John Montana State Univ., Bozeman	Cenozoic history, geomorphology and glacial geology of the Yellowstone Valley from Gardiner to Livingston (ongoing). Figure 1, no. 18
O'Neill, J. M. USGS, Denver	Tectonic framework of the Madison Range and southern Gravelly Range, southwestern Montana (1996). Figure 2, no. 19
Pearson, R. C. USGS, Denver	Geologic mapping of the Burns Mountain 7.5-minute quadrangle, central Beaverhead County (1992). Figure 2, no. 20
Pearson, R. C. USGS, Denver	Geologic mapping of the Bannack 7.5- minute quadrangle, central Beaverhead County (1991). Figure 2, no. 21
Perry, William J. Skipp, Betty USGS, Denver	Geologic mapping of the Lima Peaks and Gallagher Gulch 7.5-minute quadrangles with emphasis on structural analysis of Cordilleran thrust belt/Rocky Mountain foreland interactions (ongoing). Figure 2, no. 22
Porter, Karen W. Montana State Univ., Bozeman	Geologic mapping and sequence stratig- raphy analysis of Cretaceous rocks (Fall River through Niobrara) in east-central Montana (ongoing).

Ruppel, Edward T.
MBMG

Study of the Proterozoic and Early Paleozoic rocks and structure of the cratonic region, including mapping of the Home Park Ranch and Spur Mountain 7.5-minute quadrangles. (ongoing)
Figure 2, no. 23

Ruppel, Edward T.
Bartholomew, Mervin J.
MBMG
Reynolds, Mitchell W.
USGS, Reston
(Coordinators)

Preparation of a revised, up-dated geologic map of Montana as a COGEOMAP project involving the USGS and MBMG. Compilation of previous mapping, field checking and new mapping (1995).

Wallace, Chester A.
Lidke, David J.
USGS, Denver

Completion of structural and stratigraphic analyses in the Butte 1x2-degree quadrangle (1992).

Wallace, Chester A.
Lidke, David J.
USGS, Denver

Geologic mapping, structural analysis, and stratigraphic studies in northeast corner of the Hamilton 1x2-degree quadrangle (ongoing).

Whipple, James W.
USGS, Spokane

Geology of the Whitefish Range. Emphasis on Belt Supergroup and Paleozoic stratigraphy. (1992)
Figure 1, no. 24

Structural geology

<u>Investigator</u>	<u>Subject</u>
Anders, Mark Lamont-Doherty Geological Observ- atory, Palisades, NY	Thermal and mechanical effects of the Yellowstone hotspot. Figure 1, no. 25
Bartholomew, Mervin J. MBMG	Structural study of the overthrust belt in southwestern Montana. Includes detailed geologic mapping of the Dixon Mountain and Dell 7.5-minute quadrangles. Figure 2, no. 26
Bonini, William E. Princeton Univ., Princeton, NJ	Structural modeling of the Beartooth front (ongoing). Figure 1, no. 27
Brodowy, Jeralyn Montana State Univ., Bozeman	Structure and neotectonics of the east- ern Three Forks basin (June, 1991). Figure 2, no. 28
Douglas, Bruce J. Indiana Univ., Bloomington	Field and laboratory studies of the deformation of the basement rocks, Tobacco Root Mountains. Emphasis on the relative timing and types of deformation mechanisms operating during successive deformation events including reactivation events (1991). Figure 2, no. 29
Douglas, Bruce J. Nightengale, Alice Indiana Univ., Bloomington	A study of the mechanics and timing of faulting and folding in the fold and thrust belt near Three Forks. Emphasis is placed on the fabrics formed to use as a control on the deformational history (1991). Figure 2, no. 30
Erslev, Eric A. Molzer, Phillip Colorado State Univ., Fort Collins	Three-dimensional kinematics of the southeastern Beartooth uplift (1992). Figure 1, no. 31
Glaman, Linda R. B. Montana Tech	Geology of Negro Hollow area, southwest- ern Montana. Figure 2, no. 32
Hanneman, Debra Whitehall, MT.	Cenozoic evolution of the Sage Creek- Blacktail basin, southwestern Montana. Figure 2, no. 33

Hanneman, Debra Whitehall, MT.	Cenozoic basin evolution in part of southwestern Montana.
Hanson, Tom Lundblad, Steve Reese, Joe Univ. of Wisconsin, Madison	Geology and structural analysis of an area in the Whitefish Range, Flathead County. Figure 1, no. 6
Harrison, Jack E. USGS, Denver	Belt Supergroup, northwestern Montana. Includes geologic mapping (1:250,000 scale) and studies of structure, stratigraphy, and stratabound ore deposits (1990). Figure 1, no. 7
Hendrix, Thomas E. Grand Valley State Univ., Allendale, Michigan	Sandy Hollow duplex structure, Madison County, Montana (August, 1991). Figure 2, no. 34
Hyndman, Donald W. Parker, David Gunkel, Kristin Sears, Jim Alt, Dave Univ. of Montana, Missoula	Relationship between granite and thrust belts in western Montana (1991). Figure 1, no. 35
Jolly, Arthur Univ. of Montana, Missoula	Paleomagnetic investigation of Two Medicine volcanic rocks at Wolf Creek. The intention of this study is to document possible rotation of thrust sheets within the disturbed belt of western Montana (Spring 1990). Figure 1, no. 36
Kellogg, Karl S. USGS, Denver	Tectonic framework of the northwestern Madison Range, Madison County, Montana. Involves quadrangle mapping, structural analysis, geochemical and isotopic studies, and geochronologic studies of Archean, Cretaceous, and Tertiary rocks. Ennis 15-minute quadrangle will be completed 1992. Project is ongoing (in cooperation with J. Michael O'Neill), but Professional Paper on northwestern Madison Range will be completed by 1993. Figure 2, no. 10
Lageson, David R.	Structural geology and bedrock mapping

<p>Montana State Univ., Bozeman</p>	<p>of western Pioneer Mountains (west of Wise River), Beaverhead County, Montana. Figure 2, no. 11</p>
<p>Lageson, David R. Montana State Univ., Bozeman</p>	<p>Detailed structural analysis and mapping of several quadrangles in the Horseshoe Hills north of Bozeman. This area lies along the transverse fault zone of the fold and thrust belt (Perry Line), and represents a large-scale, oblique-slip lateral ramp (September, 1991). Figure 2, no. 37</p>
<p>Lageson, David R. Montana State Univ., Bozeman</p>	<p>Structural and tectonic analysis of the western Crazy Mountains basin with particular emphasis applied to Late Cretaceous paleotectonic reconstructions (September, 1991). Figure 1, no. 38</p>
<p>Lageson, David R. Brodowy, Jeralyn Montana State Univ., Bozeman</p>	<p>Structural analysis of the Gallatin Valley using satellite imagery, aerial photography, and surface mapping to compile a neotectonic map. Late Cenozoic basin evolution will be considered through a new composite stratigraphic section (June, 1991). Figure 1, no. 39</p>
<p>Lewis, Sharon E. MBMG</p>	<p>Geologic mapping of the Lincoln Gulch 7.5-minute quadrangle (1990). Figure 2, no. 14</p>
<p>Lewis, Sharon E. MBMG</p>	<p>Geologic mapping of the Graphite Mountain 7.5-minute quadrangle (1991). Figure 2, no. 13</p>
<p>McConnell, David Kansas State Univ., Manhattan</p>	<p>Analysis of strain in foreland folds of the Tobacco Root Mountains, southwestern Montana (Summer 1990). Figure 2, no. 40</p>
<p>Nelson, W. John MBMG</p>	<p>Structural development of Cat Creek anticline, central Montana, based on surface and subsurface mapping. The influence of structural movements on sedimentation is being considered, with a view toward petroleum exploration (September, 1990).</p>

Figure 1, no. 67

O'Neill, J. M.
USGS, Denver

Tectonic framework of the Madison Range and southern Gravelly Range, southwestern Montana. Emphasis of project is multiple: character, metamorphic and structural evolution and age of basement rocks, resource evaluation of region (talc and gold); Cenozoic volcanic and tectonic history of area (Hebgen earthquake area of 1956) and general geologic mapping of Gravelly and Madison ranges (1996).

Figure 2, no. 19

Palmer, Steven R.
Univ. of Montana, Missoula

Magnetic fabrics (AMS) in the Bitterroot mylonite: Correlation with metamorphic grade, deformation fabrics, and strain, Sweathouse Creek drainage, east flank of the Bitterroot Range.

Figure 1, no. 41

Palmquist, John C.
Lawrence Univ., Appleton, WI

Leopard rock protolith for polyphase deformed amphibolite, Beartooth Mountains (ongoing).

Figure 1, no. 42

Perry, William J.
Sandberg, Charles A.
USGS, Denver
Sando, William J.
U.S. National Museum, Washington,
D.C.

Structural and stratigraphic characterization of the northern Tendoy Mountains, with emphasis on the structural configuration of shelf-to-basin Mississippian carbonate rocks in the McKenzie thrust system (formerly northern Tendoy, Limekiln and Johnson thrust sheets) (ongoing).

Figure 2, no. 43

Pierce, K. L.
USGS, Denver

Study of surficial geology and bedrock structure along the northern boundary of Yellowstone Park in the Mammoth-Gardiner-LaDuke area to determine whether or not there are any geothermal connections between Mammoth and LaDuke Hot Springs (December, 1990).

Figure 1, no. 44

Qayyum, Mazhar
Montana Tech

Analysis of the Deer Lodge basin, south-
western Montana (May 1990).
Figure 1, no. 45

Schmidt, Christopher J.
Western Michigan Univ.,
Kalamazoo, MI
Garihan, John M.
Furman Univ., Greenville, SC
Dresser, Hugh
Montana Tech
O'Neill, J. M.
USGS, Denver

Nature of control of earlier structures
on basin and range faulting in
southwestern Montana (ongoing).

Schmidt, Christopher J.
Western Michigan Univ.,
Kalamazoo, MI
O'Neill, J. M.
USGS, Denver

Development of minor structures and
solution cleavage in the frontal
thrust belt adjacent to foreland
anticlines in the Camp Creek-McCartney
Creek area near Melrose (ongoing).
Figure 2, no. 46

Wallace, Chester A.
Lidke, David J.
USGS, Denver

Completion of structural and strati-
graphic analyses in the Butte 1x2-degree
quadrangle (completion estimated in
1992).

Wallace, Chester A.
Lidke, David J.
USGS, Denver

Geologic mapping, structural analysis,
and stratigraphic studies in northeast
corner of the Hamilton 1x2-degree quad-
rangle (completion date uncertain).

Zimmerman, Jay
Southern Illinois Univ.,
Carbondale, IL

Total finite strain analysis of Cherry
Creek-type rocks (Archean) from two
deformed conglomerates in the central
Ruby Range, Madison County (1990).
Figure 2, no. 47

Stratigraphy, sedimentary petrology and paleontology

<u>Investigator</u>	<u>Subject</u>
Clemens, William A. Univ. of California, Berkeley	Stratigraphy and vertebrate faunas of the Hell Creek and Tullock formations in Garfield and McCone counties.
Cobban, William A. USGS, Denver Kennedy, W. J. Oxford Univ., United Kingdom	Coniacian (Upper Cretaceous) ammonites of the western interior (1991).
Daniel, John A. Univ., of Minnesota-Morris	Lignite deposition study of the Dominy lignite, Pine Hills deposit near Miles City (May, 1990). Figure 1, no. 48
Dyman, Thaddeus S. USGS, Denver	Mid-Cretaceous stratigraphy, sedimentology, and paleotectonics in southwestern Montana (1995).
Elrick, Maya Virginia Tech, Blacksburg, VA	Field and computer modelling study of the development of Lower Mississippian cyclic carbonates, southwestern Montana and Wyoming (August, 1990).
Gassaway, Judith S. USGS, Denver	Studies of Paleocene silcrete, southeastern Montana (ongoing).
Hanneman, Debra Whitehall, MT	Cenozoic basin evolution in part of southwestern Montana.
Hanneman, Debra Whitehall, MT	Cenozoic evolution of the Sage Creek-Blacktail basin, southwestern Montana. Figure 2, no. 33
Hansen, William B. Long, George I. W. Bureau of Land Management, Billings	Introduction to the Bakken Formation in Montana and North Dakota (September, 1990). Figure 1, no. 49
Harrison, Jack E. USGS, Denver	Belt Supergroup, northwestern Montana. Includes geologic mapping (1:250,000 scale) and studies of structure, stratigraphy, and stratabound ore deposits (1990). Figure 1, no. 7

- Hartman, Joseph H.
Univ. of North Dakota, Energy
& Environmental Research Center,
Grand Forks
- Late Cretaceous and early Tertiary
nonmarine molluscan paleontology and
biostratigraphy of the Crazy Mountains
of south-central Montana, the Williston
Basin of eastern Montana, and the Powder
River basin of southeastern Montana
(ongoing).
Figure 1, no. 50
- Hiza, Margaret M.
Montana State Univ., Bozeman
- The influence of Eocene volcanism on
sedimentation in the Gallatin Range,
south of Bozeman Montana; studied in
conjunction with reconstruction of the
paleoenvironment of the Hyalite Peak
volcanic field.
Figure 1, no. 51
- Horner, John R.
Museum of the Rockies, Montana
State Univ., Bozeman
- Evolution of North American, Upper
Cretaceous dinosaurs and their
terrestrial ecosystems. Study in the Two
Medicine Formation sediments along the
east slope of the Rocky Mountains, from
the Canadian border to Wolf Creek,
Montana (1991).
- James, Harold L.
USGS, Port Townsend, Washington
- Bedded Precambrian iron deposits of
southwestern Montana.
- Johnson, D. Jay
Univ. of Montana, Missoula
- Regional stratigraphy and sedimentology
of the Helena and Wallace formations,
northwestern Montana (1992).
- Kauffman, Erle G.
Univ. of Colorado, Boulder
- Systematic paleobiology and biostrati-
graphy of Cretaceous bivalvia of Montana
at large; high-resolution event
stratigraphy of Middle Cretaceous strata
(ongoing, with some data to be published
in late 1991).
- Krause, David W.
State Univ. of NY, Stony Brook
Maas, Mary
Duke Univ., Durham, NC
- Geology and Mammalian Paleontology of
the Paleocene Fort Union Group in the
Crazy Mountains (south-central Montana)
and the Powder River and Williston
Basins (eastern Montana) (ongoing).
Figure 1, no. 52
- Kroeger, Timothy
Univ. of North Dakota, Grand
Forks
- Palynologic and sedimentologic study of
the lower Fort Union Group (Bear and
Lebo formations) in the eastern Crazy
Mountains. This study includes biostra-

- tigraphic and paleoecologic objectives (1991).
Figure 1, no. 53
- Lewis, Sharon E.
MBMG
Geologic mapping of the Graphite Mountain 7.5-minute quadrangle (1991).
Figure 2, no. 13
- Lewis, Sharon E.
MBMG
Geologic mapping of the Lincoln Gulch 7.5-minute quadrangle (1990).
Figure 2, no. 14
- Mack, Greg
New Mexico State Univ., Las Cruces, NM
Meyers, J. H.
Winona State Univ., Winona, MN
Provenance, depositional environments and basin analysis of the Renova Formation (Tertiary) southwestern Montana.
- Meyers, J. H.
Graves, C.
Winona State Univ., Winona, MN
Influence of basement structure on differential subsidence, uplift and sedimentation at the distal margin of the early Rocky Mountain foreland basin: the Ellis Group of western Montana (ongoing).
- Monson, Lawrence M.
Mineral Resources-Fort Peck Tribes, MT
Upper Cretaceous stratigraphy and gas-bearing potential on the Fort Peck Indian Reservation: Roosevelt, Valley, Sheridan and Daniels counties, in part (June, 1990).
Figure 1, no. 54
- Nelson, W. John
MBMG
Structural development of Cat Creek anticline, (central Montana), based on surface and subsurface mapping. The influence of structural movements on sedimentation are being considered, with a view toward petroleum exploration (1990).
Figure 1, no. 67
- Nichols, Douglas J.
USGS, Denver
Palynology of the Tullock Member of the Fort Union Formation in the Powder River basin, Montana and Wyoming (September, 1990).
Figure 1, no. 55
- Paull, Rachel K.
Paull, Richard A.
Conodont biostratigraphy of Triassic rocks in southwestern Montana (January,

Univ. of Wisconsin, Milwaukee	1992).
Porter, Karen W. Montana State Univ., Bozeman	Geologic mapping and sequence stratigraphy analysis of Cretaceous rocks (Fall River through Niobrara) in east-central Montana (ongoing).
Qayyum, Mazhar Montana Tech, Butte	Analysis of the Deer Lodge basin, southwestern Montana (May 1990). Figure 1, no. 45
Retallack, Greg J. Univ. of Oregon, Eugene	Paleosols across the Cretaceous-Tertiary boundary in Bug Creek, McCone County.
Sando, William J. U.S. National Museum, Washington D.C.	Stratigraphy and structure of Mississippian rocks in the Tendoy Range, Beaverhead County. Figure 2, no. 56
Suttner, Lee J. Malone, Andrew Indiana Univ., Bloomington	Tectono-stratigraphic and sedimentologic analysis of the Morrison Formation (Jurassic) in the vicinity of the Willow Creek fault zone, Jefferson and Madison Counties (1990). Figure 2, no. 57
Utgaard, John Southern Illinois Univ., Carbonadale	Petrology and depositional environments of the Hulett Sandstone Member of the Sundance Formation in the northern Bighorn basin (ongoing).
Vice, Mari A. Utgaard, John E. Southern Illinois Univ., Carbondale	Carbonate petrology of the lower Mission Canyon (Big Goose and Little Tongue members) in an area extending from the northern Bighorn basin (Cottonwood and Clarks' Fork canyons, Wyoming) northward into central Montana (Big Snowy and Little Belt mountains). Fluorescence, cathodoluminescence, stable isotope analysis, scanning electron microscopy, fluid inclusion and clay mineralogical studies, and molecular organic geochemical analysis are planned to supplement data gathered through standard petrographic and field/core studies (1992).
Wallace, Chester A.	Geologic mapping, structural analysis,

Lidke, David J. USGS, Denver	and stratigraphic studies in northeast corner of the Hamilton 1x2-degree quadrangle (completion date uncertain).
Wallace, Chester A. Lidke, David J. USGS, Denver	Completion of structural and stratigraphic analyses in the Butte 1x2-degree quadrangle (1992).
Wardlaw, Bruce R. USGS, Reston	Extinctions at the upper Paleozoic system boundaries in the U.S.
Webster, Gary D. Washington State Univ., Pullman	Study of a crinoid fauna from the Otter Formation (1991). Figure 1, no. 150
Webster, Gary D. Washington State Univ., Pullman	Studies of the crinoid faunas of the Lodgepole Formation in the Big Snowy Range, Bridger Range and Gravelly Range (1991). Figure 1, no. 151
Webster, Gary D. Washington State Univ., Pullman	Working on a crinoid fauna from the Mississippian at Pentagon Mountain and Spotted Bear Lookout (1991). Figure 1, no. 152
Weishampel, David B. Johns Hopkins Univ., Baltimore, MD	Study of a Late Cretaceous dinosaurs, northwestern Montana (1990).
Whipple, James W. USGS, Spokane	Geology of the Whitefish Range. Emphasis on Belt Supergroup and Paleozoic stratigraphy (1992). Figure 1, no. 24
White, Brian Smith College, Northampton, MA	Sedimentology of the Altyn Formation (Precambrian) of Glacier National Park: a study of microbiotas, stromatolites and evaporitic dolomites in shallowing upward cycles (ongoing). Figure 1, no. 58
Winston, Don Univ. of Montana, Missoula	Stratigraphy and sedimentology of Ravalli and Missoula Group rocks of the Belt Supergroup, western Montana (ongoing).

Geochemistry, mineralogy and petrology

<u>Investigator</u>	<u>Subject</u>
Brookins, D. G. Univ. of New Mexico, Albuquerque	Geochemistry and economic geology of hydrothermal vein carbonate-fluorspar deposits, western Montana (ongoing).
Carlson, Robert R. USGS, Denver	Geochemical and analytical studies of the platinum-group elements including samples from the Stillwater Complex. Figure 1, no. 59
Carlson, Robert R. USGS, Denver Von Gruenewaldt, Gerhard Univ. of Pretoria, South Africa	Study of a "pyroxene marker" unit of the Stillwater Complex. Figure 1, no. 60
Dahl, Peter S. Wehn, David C. Kent State Univ., Kent, OH	Study of the tectono-thermal evolution of Archean basement in the Ruby Range, southwestern Montana. Focus will be on pressure-temperature-time modelling, based upon garnet zoning profiles in metapelitic rocks (June, 1992). Figure 2, no. 61
Foord, Eugene E. USGS, Denver	Petrologic study of lamprophyre dikes at the Golden Sunlight mine, Whitehall, Montana (October, 1990). Figure 2, no. 62
Hammarstrom, Jane M. USGS, Reston, Virginia	Petrology and mineral chemistry of the Pioneer batholith, Beaverhead County, Montana. Figure 2, no. 63
Hearn, B. Carter USGS, Reston	Study of kimberlitic diatremes in Montana including chemical and isotopic analysis of mineral separates (ongoing).
Helz, Rosalind T. USGS, Reston	Trace-element chemistry of fine-grained rocks from the Stillwater Complex with emphasis on the platinum-group elements and Cu, Ni and Ag. Figure 1, no. 64

Hess, David F. Western Illinois Univ., Macomb Vitaliano, Charles J. Smith, John Indiana Univ., Bloomington	Laramide granitic rocks in Tobacco Root batholith, Madison County, Montana (1994). Figure 2, no. 66
Hess, David F. Western Illinois Univ., Macomb Vitaliano, Charles J. Indiana Univ., Bloomington	Precambrian meta-basites (amphibolites and granulites) in Tobacco Root Mountains, Montana - petrography; trace element geochemistry; geothermometry and geobarometry; tectonic implications, Madison County, Montana (1990). Figure 2, no. 65
Hyndman, Donald W. Parker, David Gunkel, Kristin Sears, Jim Alt, Dave Univ. of Montana, Missoula	Relationship between granite and thrust belts in western Montana (1991). Figure 1, no. 35
Hyndman, Donald W. Tureck-Schwartz, K. Univ. of Montana, Missoula	Petrology and geochemistry of the Square Butte laccolith, Highwood Mountains (1991). Figure 1, no. 68
Hyndman, Donald W. Tureck-Schwartz, K. Foland, K. A. Univ. of Montana, Missoula	Petrology and geochemistry of alkalic and subalkalic rocks of the Bearpaw Mountains (1990). Figure 1, no. 69
Lee, Gregory K. USGS, Denver	Geochemistry of the Butte 1x2-degree quadrangle (1990).
Liu, Yuguang MBMG	Geologic mapping and petrology of Archean metamorphic rocks, northern Greenhorn Range (1991). Figure 2, no. 15
Loferski, Patricia J. USGS, Reston	Petrogenesis of anorthosites of the Stillwater Complex. Figure 1, no. 70
Luedke, Robert G. USGS, Reston	Early and middle Cenozoic volcanic centers, western conterminous United States.

<p>Maruyama, H. Akita Univ., Japan Volborth, Alex Montana Tech, Butte</p>	<p>Petrochemical and isotopic studies on the Boulder batholith. Figure 1, no. 71</p>
<p>McCallum, I. S. Univ. of Washington, Seattle</p>	<p>Petrologic/geochemical study of the Stillwater Complex (ongoing). Figure 1, no. 72</p>
<p>McCallum, I. S. Irving, A. J. Univ. of Washington, Seattle</p>	<p>Petrologic/geochemical study of the Eocene volcanics of central Montana (ongoing). Figure 1, no. 73</p>
<p>Miller, William F. USGS, Denver</p>	<p>A geochemical investigation of precious metal mineralization associated with Cretaceous intrusives on the eastern flank of the Bighorn Mountains. Age dates for several intrusions and the Elkhorn Mountains Volcanics are also being determined (1990). Figure 2, no. 74</p>
<p>Mogk, David Montana State Univ., Bozeman</p>	<p>Crustal evolution of Archean rocks, southwest Montana (ongoing).</p>
<p>Mueller, Paul A. Univ. of Florida, Gainesville</p>	<p>Investigation of elemental and isotopic composition of Archean metasedimentary rocks of southwestern Montana (ongoing).</p>
<p>Page, Norman J. USGS, Reston</p>	<p>Ore deposits and processes in the early magmatic environment (includes work in the Stillwater Complex). Figure 1, no. 75</p>
<p>Pearson, R. C. USGS, Denver</p>	<p>Field and laboratory study of Upper Cretaceous volcanic rocks southwest of Dillon, including major and minor element chemistry, $^{40}\text{Ar}/^{39}\text{Ar}$ age determinations, and paleomagnetism. The study emphasizes the relationships of igneous rocks, structure, and mineralization (1990). Figure 2, no 76</p>
<p>Petersen, Erich U. Univ. of Utah, Salt Lake City</p>	<p>Mineralogy of pyritic shales, Meagher County, Montana (Ongoing with publication in press). Figure 1, no. 77</p>

Plymate, Thomas G.
Southwest Missouri State Univ.,
Springfield

Variation in the structural state of
alkali feldspars in the Cretaceous/Tertiary
sills exposed in Cottonwood Canyon,
southeastern Jefferson County (ongoing).
Figure 2, no. 78

Pushkar, Paul
Wright State Univ., Dayton, OH
Gutman, James
Wesleyan Univ., Middletown, CT

Field geology, petrology and geochemistry
of the Lion Mountain volcanic
center, Gravelly Range (ongoing).
Figure 2, no. 79

Thompson, G. R.
Univ. of Montana, Missoula

Nature and origin of bentonite and K-
bentonites of the Sweetgrass arch and the
disturbed belt.

Thompson, G. R.
Univ. of Montana, Missoula

Burial diagenesis of Tertiary continental
clastic sediments in the Deer Lodge
Valley (ongoing).
Figure 1, no. 80

Toth, Thomas A.
Indiana Univ., Bloomington

Comparative study of the clay mineralogy
of Cambrian shales and those in the Belt
Supergroup, southwestern Montana
(ongoing).

Volborth, Alex
Montana Tech, Butte

Mineralogy and geochemistry of the
Stillwater Complex palladium and
platinum, and rhenium mineralization.
Figure 1, no. 81

Isotope geology and geochronology

<u>Investigator</u>	<u>Subject</u>
Bown, T. M. USGS, Reston	Tertiary geochronology and basin analysis, Rocky Mountain basins (ongoing).
Friedman, Irving USGS, Denver	Study of light stable isotopes in thermal waters of Yellowstone National Park area (ongoing). Figure 1, no. 82
Gustin, Mae Sexauer Indiana Univ./Purdue Univ.	Carbon and oxygen isotope study of several talc deposits in southwestern Montana. Figure 2, no. 83
Guy, Russell Virginia Polytechnic Institute and State Univ., Blacksburg	Geochronology and geochemistry of the Archean basement terrain in Yankee Jim terrain and Lamar River Canyons, Montana and Wyoming (January, 1990). Figure 1, no. 84
Hearn, B. Carter USGS, Reston	Study of kimberlitic diatremes in Montana including chemical and isotopic analysis of mineral separates (ongoing).
Maruyama, H. Akita Univ., Japan Volborth, Alex Montana Tech, Butte	Petrochemical and isotopic studies of the Boulder batholith. Figure 1, no. 71
McCallum, I. S. Univ. of Washington, Seattle	Petrologic/geochemical study of the Stillwater Complex (ongoing). Figure 1, no. 72
McCallum, I. S. Irving, A. J. Univ. of Washington, Seattle	Petrologic/geochemical study of the Eocene volcanics of central Montana (ongoing). Figure 1, no. 73
Mogk, David Montana State University., Bozeman	Crustal evolution of Archean rocks, southwest Montana (ongoing).
Mueller, Paul A. Univ. of Florida	Investigation of elemental and isotopic composition of Archean metasedimentary rocks of southwestern Montana (ongoing).

Rye, Robert O.
USGS, Denver

Study of the sulfur isotope of the
Yellowstone geothermal system
(ongoing).
Figure 1, no. 85

Rye, Robert O.
USGS, Denver

Study of the Spar Lake copper-silver
deposits in conjunction with stable
isotope studies of ore deposits
(ongoing).
Figure 1, no. 152

Shuster, Robert D.
Univ. of Nebraska-Omaha

Isotopic studies of the northeastern
Idaho batholith.
Figure 1, no. 86

Tatsumoto, Mitsunobu
USGS, Denver

Isotopic studies of mineral separates
from the Stillwater Complex (ongoing).
Figure 1, no. 87

Geophysics

Investigator

Bankey, Vicki
McCafferty, Anne
USGS, Denver

Subject

Gravity map of Idaho and southwestern Montana, latitude 42° - 47° , longitude 110° - 118° , 1:1,000,000 scale (color maps and derivative product maps completion date 1990).

Bankey, Vicki
McCafferty, Anne
USGS, Denver

Compilation of gravity data for state map, 1:500,000 scale black and white contour map (1991).

Cady, John W.
USGS, Denver

Digital compilation and interpretation of geophysical and geologic data for the "Idaho Initiative", a mineral resource assessment of wilderness study areas in Idaho. Topographic, gravity, aeromagnetic, radiometric, and landsat linear feature data are being assembled for the region latitude 42° - 47° N., longitude 110° - 118° W., which overlaps southwestern Montana (December, 1991).

De Noyer, John M.
USGS, Reston

Preparation of gravity and magnetic maps of Montana.

Elston, Donald P.
USGS, Flagstaff

Paleomagnetic studies in the Belt basin of Montana and Idaho (ongoing).

Hanna, William F.
USGS, Denver

Butte 1x2-degree quadrangle - Gravity and aeromagnetic maps plus derivative maps and texts (1990).

Hanna, William F.
USGS, Denver

Dillon 1x2-degree quadrangle - Gravity and aeromagnetic maps and texts (1990).

Hoover, Don
USGS, Denver

Telluric and audio magnetotelluric studies related to the LaDuke Hot Springs, Gardiner, Montana, and northern part of Yellowstone National Park (December, 1990).
Figure 1, no. 88

Jolly, Arthur
Univ. of Montana, Missoula

Paleomagnetic investigation of Two Medicine volcanic rocks at Wolf Creek. The intention of this study is to document possible rotation of thrust

	<p>sheets within the disturbed belt of western Montana (Spring, 1990). Figure 1, no. 36</p>
<p>Kleinkopf, M. Dean USGS, Denver</p>	<p>Gravity and magnetic anomaly data for the western part of the Belt basin and the Libby thrust belt.</p>
<p>Kleinkopf, M. Dean USGS, Denver</p>	<p>Kalispell 1x2-degree quadrangle - Interpretation of gravity and aeromagnetic data with relation to structure.</p>
<p>Kleinkopf, M. Dean USGS, Denver</p>	<p>Sleeping Giant Wilderness area - Geophysics included in mineral resource assessment report (1990). Figure 1, no. 89</p>
<p>Kulik, Dolores USGS, Denver</p>	<p>Gravity and aeromagnetic data studies will be a part of the Gallatin-Custer National Forest mineral resource assessment work (Beartooth Plateau, 1992; remainder 1994).</p>
<p>Lankston, Robert Univ. of Arkansas, Fayetteville</p>	<p>Integrated geophysical study at the intersection of the Beaverhead and Blacktail Deer basins (May 1990). Figure 2, no. 90</p>
<p>Manley, William F. Univ. of Colorado, Boulder</p>	<p>Paleoseismology and glacial geology of the Mission Valley: interactions among the cordilleran ice sheet, glacial lake Missoula, local alpine glaciers and the Mission fault (1993). Figure 1, no. 91</p>
<p>Manley, William F. Univ. of Colorado, Boulder Ostenaar, Dean A. LaForge, Roland C. Gilbert, Jerry D. Weisenberg, Charles U.S. Bureau of Reclamation, Denver</p>	<p>Flathead Reservation regional seismotectonic study: an evaluation for dam safety, investigates recency, frequency and magnitude of large earthquakes, incorporating results from studies of soil development and fault-scarp morphology. Figure 1, no. 92</p>
<p>McCafferty, Anne USGS, Denver</p>	<p>Residual-intensity aeromagnetic map covering latitudes 42°-47° and longitudes 110°-118°. Compilation of over 60 separate aeromagnetic surveys along with</p>

a color-shaded relief map and terrace magnetization color map of same area all at a scale of 1:1,000,000 (1991).

Palmer, Steven R.
Univ. of Montana, Missoula

Magnetic fabrics (AMS) in the Bitterroot mylonite: Correlation with metamorphic grade, deformation fabrics, and strain, Sweathouse Creek drainage, east flank of the Bitterroot Range.

Figure 1, no. 41

Sheriff, Steven D.
Univ. of Montana, Missoula

General paleomagnetic investigations and gravity/magnetic modelling, relative to tectonic development of the northern Rocky Mountains (ongoing).

Sill, William
Montana Tech, Butte

Borehole to surface electrical measurements for ground-water flow direction - "Pole Plant", Butte (Fall, 1990).

Figure 2, no. 93

Smith, Robert B.
Univ. of Utah, Salt Lake City

Operation of seismograph network in Hebgen Lake area (ongoing).

Figure 2, no. 94

Stickney, Michael C.
MBMG

Seismic monitoring in western Montana. Record, locate and catalog seismic activity in western Montana and adjoining regions (ongoing).

Economic geology

Investigator

Ambrustmacher, T. G.
USGS, Denver

Ashley, Roger P.
USGS, Menlo Park

Berg, Richard B.
MBMG
Honda, Sakuro
Mining College, Akita Univ.,
Japan

Blount, Alice M.
Rutgers Univ., Newark, NJ

Carlson, Robert R.
USGS, Denver

Czamanske, Gerald K.
USGS, Menlo Park

DeBoer, Thomas
Western Washington Univ.,
Bellingham

Earhart, Robert
USGS, Denver

Elliott, James E.
USGS, Denver

Subject

Geology and resources of thorium, niobium and tantalum (ongoing).

Gold resource appraisal (includes work in Montana).

Chloritic alteration of Precambrian metamorphic rocks in the Highland Mountains (ongoing).
Figure 2, no. 153

The present investigation involves a study of the hydrothermal alteration haloes surrounding talc bodies and the expression of this alteration in the mineralogy of residual soils. Reflectance IR in the visible and near infrared will be tested on these high-talc soils.
Figure 2, no. 95

Geochemical and analytical studies of the platinum-group elements including samples from the Stillwater Complex.
Figure 1, no. 59

Magmatic sulfides in mafic rocks (includes work in the Stillwater Complex).
Figure 1, no. 96

Geology and conditions of tungsten skarn mineralization near Brownes Lake, Pioneer Mountains, Montana (1991).
Figure 2, no. 97

Compilation of data on volcanogenic massive sulfide deposits including information from Montana.

Mineral resource assessment of the Gallatin and Custer National Forests. The first phase of the study will be of the portions of the forests in the Absaroka and Beartooth ranges, Montana (1993).
Figure 1, no. 98

<p>Elliott, James E. USGS, Denver</p>	<p>Geology of the Montana Tunnels mine and adjacent parts of the Wickes mining district. Study area covers approximately 25 square miles. (1991). Figure 1, no. 99</p>
<p>Foose, Michael P. USGS, Reston</p>	<p>Field studies of sulfide occurrences in the Stillwater Complex as part of a study of world nickel and cobalt resources (ongoing). Figure 1, no. 100</p>
<p>Gustin, Mae Sexauer Indiana Univ./Purdue Univ.</p>	<p>Carbon and oxygen isotope study of several talc deposits in southwestern Montana. Figure 2, no. 83</p>
<p>Hammarstrom, Jane M. USGS, Reston</p>	<p>Mineral resource assessment of the Gallatin/Custer National Forest (1994). Figure 1, no. 101</p>
<p>Johnson, Todd W. Washington State Univ., Pullman</p>	<p>Gold in skarn and replacement deposits in the New World mining district, Park County (January, 1991). Figure 1, no. 102</p>
<p>Lange, Ian M. Univ. of Montana, Missoula</p>	<p>Geology of the Hog Heaven volcanic field northwest Montana, with map and description of Hog Heaven Mine (1990). Figure 1, no. 12</p>
<p>Lockwood, Mark New Mexico Institute of Mining and Technology, Socorro</p>	<p>Geology of the Virginia City district, Madison County. Figure 2, no. 103</p>
<p>McCulloch, Robin B. MBMG</p>	<p>Compilation of mineral deposit data to determine state mineral potential, geologic terranes with development potential, and deposit grouping by models. Figure 1, no. 104</p>
<p>Miller, William F. USGS, Denver</p>	<p>A geochemical investigation on precious metal mineralization associated with Cretaceous intrusives on the eastern flank of the Bighorn Mountains. Age dates for several intrusions and the Elkhorn Mountains Volcanics are also being determined (December, 1990).</p>

Figure 2, no. 74

Nelson, W. John
MBMG

Structural development of Cat Creek anticline, (central Montana), based on surface and subsurface mapping. The influence of structural movements on sedimentation is being considered, with a view toward petroleum exploration (1990).
Figure 1, no. 67

Page, Norman J.
USGS, Reston

Ore deposits and processes in the early magmatic environment (includes work in the Stillwater Complex).
Figure 1, no. 75

Pearson, R. C.
USGS, Denver

Geology of the Blue Wing and Bannack mining districts, central Beaverhead County (1992)
Figure 2, no. 114

Petersen, Erich U.
Univ. of Utah, Salt Lake City

Mineralogy of pyritic shales, Meagher County, Montana
Figure 1, no. 77

Shurr, George W.
Saint Cloud State Univ., St.
Cloud, MN

Gas pressure anomalies on southern Bowdoin dome are being compared with subtle structural features visible on Landsat images. The gas pressure data set consists of semiannual pressure observations for about 300 wells from the 1930s to the 1950s (June, 1991).
Figure 1, no. 105

Tysdal, Russell G.
USGS, Denver

Mineral resources of the Sleeping Giant Wilderness study area.
Figure 1, no. 106

Volborth, Alex
Montana Tech, Butte

Mineralogy and geochemistry of the Stillwater Complex paladium and platinum, and rhenium mineralization.
Figure 1, no. 81

<p>Wheaton, John R. MBMG Regele, Steven Montana Dept. of State Lands, Helena</p>	<p>Drill hole plugging with bentonite in Montana (1991).</p>
<p>Wilkie, Kurtis Washington State Univ., Pullman</p>	<p>Field and laboratory study relating metasomatic and alteration mineralogy to gold mineralization near Beal Hill, Northern Pioneer Mountains, Montana (1993). Figure 2, no. 106</p>
<p>Woodward, Lee A. Univ. of New Mexico, Albuquerque</p>	<p>Relation of gold placers in Montana to bedrock geology and implications for lode exploration. Includes 290 placers in central and western Montana (1990).</p>
<p>Zeihen, Lester Montana Tech, Butte</p>	<p>Mineralogy of the Black Pine mine, Granite County (ongoing). Figure 1, no. 107</p>
<p>Zeihen, Lester Earll, Fred Montana Tech, Butte Ishikawa, R. Ishiyama, D. Akita Univ., Japan</p>	<p>Investigation of metalliferous veins in the western part of the Butte mining district (ongoing). Figure 2, no. 108</p>
<p>Zientek, Michael L. USGS, Spokane</p>	<p>Geologic setting and economic geology of magmatic sulfide and oxide deposits, Stillwater Complex (1994). Figure 1, no. 109</p>

Energy

Investigator

Bartholomew, Mervin J.
Foster, Susan V.
Berg, Richard B.
MBMG
Colton, Roger B.
USGS, Denver

Burruss, R. C.
USGS

Denson, Norman
USGS, Denver

Dolton, Gordon L.
USGS, Denver

Flores, Romeo M.
USGS, Denver

Hansen, William B.
Long, George I. W.
Bureau of Land Management,
Billings

Hickcox, David H.
Ohio Wesleyan Univ., DE

Long, George I. W.
Bureau of Land Management

Subject

Geology of the Stockett-Belt coal field area near Great Falls. Scale 1:50,000. Figure 1, no. 3

Study of the thermal history and fluid migration in sedimentary basins, includes analysis of coal samples from the Powder River basin (1991). Figure 1, no. 109

Tertiary geology and uranium occurrences in the Powder River basin, northeast Wyoming and southeast Montana. Figure 1, no. 110

Field size, finding rate and play analysis studies for the Minnelusa Formation in the Powder River basin will be utilized in the development of methodology for resource assessment. Figure 1, no. 111

Evolution of the Powder River basin. Figure 1, no. 112

Introduction to the Bakken Formation in Montana and North Dakota (September, 1990). Figure 1, no. 153

Water management, water policy and coal development in eastern Montana focusing on the Yellowstone and Tongue River basins (ongoing).

Geologic report and mapping of the Bakken Formation in the vicinity of Spring Lake field, Richland County, Montana (1990). Figure 1, no. 113

Sholes, Mark A. MBMG	Stratigraphy and sedimentology of coal bearing strata in Montana: a synthesis (1990).
Sholes, Mark A. MBMG	Petrographic studies of Montana coals and correlation of petrographic data with chemical and sedimentologic data (ongoing).
Sholes, Mark A. MBMG Sugawara, T. Akita Univ., Japan	Correlation between chemical and petrographic characteristics of Montana coals and the effectiveness of pretreating these coals to reduce sulfur (ongoing).
VanVoast, Wayne MBMG	Evaluations and predictions of hydrologic effects of surface coal mining, Rosebud and Big Horn counties, Montana (ongoing). Figure 1, no. 115
Wilde, Edith M. MBMG	National coal resource data system for Montana (ongoing).

Hydrogeology

<u>Investigator</u>	<u>Subject</u>
Briar, David USGS, Helena	Hydrology of valley-fill deposits and potential for additional ground-water withdrawals along the north flanks of the Little Rocky Mountains, Fort Belknap Indian Reservation, north-central Montana (September, 1990). Figure 1, no. 116
Briar, David USGS, Helena	Geohydrologic evaluation of the Helena valley, Montana (September, 1991). Figure 1, no. 117
Cannon, Michael USGS, Helena	Hydrogeology of the Blackfeet Indian Reservation, northwestern Montana (September, 1993). Figure 1, no. 118
Cannon, Michael USGS, Helena	Development of a geographic information system (GIS) database for hydrology of coal areas in southeastern Montana (September, 1990). Figure 1, no. 119
Clark, David W. USGS, Helena	Investigation of mine-spoils geochemistry near Colstrip and Decker mines in southeastern Montana to determine geochemical changes along flow paths (September, 1990). Figure 1, no. 135
David, Robert E. USGS, Helena	Regional aquifer system analysis of the northern Rocky Mountains intermontane basins, western Montana and northern and central Idaho (September, 1994).
Duaine, Terence E. MBMG Appleman, Richard A. Montana Tech, Butte	Monitoring the effects of thunderstorms on surface water quality in the upper Clark Fork basin (in cooperation with the USGS). Figure 1, no. 122
Duaine, Terence E. Miller, Marvin R. MBMG	Impacts on water quality from plowout and saline seep reclamation practices, Stillwater County, Montana (December, 1990). Figure 1, no. 120

<p>Duaime, Terence E. Miller, Marvin R. Metesh, John MBMG</p>	<p>Monitoring of the Butte mine flooding (ongoing). Figure 2, no. 121</p>
<p>Duaime, Terence E. Sonderegger, John A. MBMG</p>	<p>Hydrologic projects for the Anaconda smelter site. Figure 2, no. 123</p>
<p>Hickcox, David H. Ohio Wesleyan Univ., DE</p>	<p>Water management, water policy and coal development in eastern Montana focusing on the Yellowstone and Tongue River basins (ongoing).</p>
<p>Metesh, John Duaime, Terence E. MBMG</p>	<p>Oversight of Montana Power Company transformer yard: well installation and contaminant sampling, Butte. Figure 2, no. 124</p>
<p>Metesh, John Duaime, Terence E. MBMG</p>	<p>Oversight of Hart oil refinery, Mis- soula: well installation and contaminant sampling (ongoing). Figure 1, no. 125</p>
<p>Patton, Thomas W. MBMG</p>	<p>Turner-Hogeland ground-water recharge study. Figure 1, no. 147</p>
<p>Patton, Thomas W. MBMG</p>	<p>Turner-Hogeland aquifer study. Figure 1, no. 148</p>
<p>Patton, Thomas W. MBMG Colton, Roger B. USGS, Denver</p>	<p>Identification of glaciofluvial and buried preglacial aquifers in the Havre, Harlem and Whitewater 30x60-minute quadrangles. Figure 1, no. 126</p>
<p>Patton, Thomas W. Miller, Marvin R. Sholes, Brenda Schmidt, Fred MBMG</p>	<p>Ground-water information center library, basic data, interpretative and field services (ongoing).</p>
<p>Pierce, K. L. USGS, Denver</p>	<p>Study of surficial geology and bedrock structure along the northern boundary of Yellowstone Park in the Mammoth-Gardiner- LaDuke area. The purpose of the study is try to determine whether or not there are</p>

any geothermal connections between Mammoth and LaDuke Hot Springs (December, 1990).
Figure 1, no. 44

Reiten, Jon C.
MBMG
Brine contamination of shallow ground water supplies, Sheridan County (ongoing).
Figure 1, no. 127

Reiten, Jon C.
MBMG
Study of oil field reserve pit contamination, Richland County (ongoing).
Figure 1, no. 126

Reiten, Jon C.
Lalley, Joe
Wheaton, John R.
MBMG
Study includes column leach experiments to improve ways of interpreting overburden salinity data for hydrologic uses. Overburden salinity data are from coal deposits in southeastern Montana (ongoing).

Reiten, Jon C.
Lalley, Joe
Wheaton, John R.
MBMG
Coal lands hydrologic monitoring study utilizes more than 200 observation wells in and near active coal mines (ongoing).

Schmidt, Fred A.
MBMG
Monitoring ground-water quality and quantity Poplar River near Scobey, Montana (ongoing).
Figure 1, no. 128

Slagle, Steven E.
USGS, Helena
Evaluation of the quantity and quality of water in sandstone and limestone aquifers along the north flank of the Little Rocky Mountains on the Fort Belknap Indian reservation (September, 1991).
Figure 1, no. 129

Thamke, Joanna
USGS, Helena
Hydrogeologic reconnaissance of the Fort Peck Indian Reservation, northeastern Montana (September, 1990).
Figure 1, no. 130

Tuck, Lori K.
USGS, Helena
Investigation of the hydrogeologic framework of the Sweet Grass Hills, north-central Montana (September, 1992).
Figure 1, no. 131

VanVoast, Wayne
MBMG

Evaluations and predictions of hydrologic effects of surface coal mining, Rosebud and Big Horn counties, Montana (ongoing).
Figure 1, no. 115

Wheaton, John R.
MBMG

Evaluation of ground water for irrigation along the north flank of the Pryor Mountains, south-central Montana (ongoing).
Figure 1, no. 132

Wheaton, John R.
Reiten, Jon C.
VanVoast, Wayne
MBMG

Evaluation of ground water for irrigation use from underground mines in the Roundup area (1991).
Figure 1, no. 133

Wylie, Allan
Univ. of Montana, Missoula

Hydrologic investigation of Pine Butte and McDonald swamps in Teton County.
Figure 1, no. 134

Geomorphology and glacial geology

Investigator

Subject

Buchanan, John P.
Eastern Washington Univ., Cheney

A new cave survey will be initiated in the Pryor Mountains during summer, 1990. Goals include: 1) location of all known and reported caves in publications, 2) assess accuracy of published cave maps, and 3) locate and survey additional unknown caves (Summer, 1992).
Figure 1, no. 136

Carrara, Paul E.
USGS, Denver

Quaternary chronology - Glacier National Park.
Figure 1, no. 137

Hall, Robert D.
Indiana Univ., Indianapolis

Hornblende etching as an indicator of relative age of glacial deposits in the Tobacco Root Mountains (ongoing).
Figure 2, no. 139

Hall, Robert D.
Indiana Univ., Indianapolis

Glacial geology of the Bear Gulch, North Meadow, South Meadow, and South Willow Creek valleys, Tobacco Root Mountains (ongoing).
Figure 2, no. 138

Hall, William B.
Univ. of Idaho, Moscow

Study of central portion of the Madison/Gallatin block with emphasis on geomorphology, glacial history, and structural geology (ongoing).
Figure 2, no. 4

Ihle, Bethany
U.S. Forest Service

Geology of the Gipsy Lake area, Big Belt Mountains, Montana (September, 1990).
Figure 1, no. 9

Locke, William
Montana State Univ., Bozeman

Glaciation and glacial climates of western Montana (ongoing).

Manley, William
Univ. of Colorado, Boulder

Paleoseismology and glacial geology of the Mission Valley: interactions among the cordilleran ice sheet, Glacial Lake Missoula, local Alpine glaciers and the Mission fault (1993).
Figure 1, no. 140

Meade, Robert H.
Moody, John A.

Long-term study (began in 1975) of year-to-year changes in the channel and flood

USGS, Denver	plain of Powder River between Moorhead and Broadus in Powder River County (ongoing). Figure 1, no. 141
Montagne, John Montana State Univ., Bozeman	Cenozoic history, geomorphology and glacial geology of the Yellowstone Valley from Gardiner to Livingston (ongoing). Figure 1, no. 18
Pierce, K. L. USGS, Denver	Study of surficial geology and bedrock structure along the northern boundary of Yellowstone Park in the Mammoth-Gardiner-LaDuke area. The purpose of the study is try to determine whether or not there are any geothermal connections between Mammoth and LaDuke Hot Springs (December, 1990). Figure 1, no. 44
Turner, Ted R. Locke, William W. Montana State Univ., Bozeman	Spatial and temporal geomorphic response of the Madison River to point sediment loading; the Madison Slide, southwest Montana (September, 1990). Figure 2, no. 142
Vandeberg, Gregory S. Montana State Univ., Bozeman	Study of late Pinedale glaciation in the Tom Miner basin, Montana. Interaction between local valley glaciers and the northern Yellowstone-Dutlet glacier (June, 1990). Figure 1, no. 143

Environmental and engineering geology

<u>Investigator</u>	<u>Subject</u>
Appleman, Richard A. Montana Tech Duaine, Terence E. Metesh, John MBMG	Monitoring operation at Montana pole plant hazardous waste site (ongoing). Figure 2, no. 144
Custer, Steve Montana State Univ., Bozeman Carling, Paul Cambria, U.K. Ergenzinger, Peter Berlin, W. Germany	Bed-load transport research, Squaw Creek, Montana. Examination of coarse pebble and cobble transport and controlling hydrologic conditions (1991 to 1994). Figure 2, no. 145
Metesh, John Duaine, Terence E. MBMG	Oversight of Montana Power Company transformer yard, Butte: well installation and contaminant sampling (ongoing). Figure 2, no. 124
Metesh, John Duaine, Terence E.	Oversight of Hart oil refinery, Missoula: well installation and contaminant sampling. Figure 1, no. 125
VanVoast, Wayne MBMG	Evaluations and predictions of hydrologic effects of surface coal mining, Rosebud and Big Horn counties, Montana (ongoing). Figure 1, no. 115
Weight, Willis D. Johansen, Eric Montana Tech	Quantitative analysis of debris flows and sediment yield on hill slopes deforested by fire near West Yellowstone, Montana (December, 1990). Figure 2, no. 146
Wilde, Edith M. Bartholomew, M. J. Daniel, F. Stickney, M. C. Derkey, P. D. Vokt, E. S. MBMG Colton, R. B. Brabb, E. E. USGS, Reston Dresser, H. W. Montana Tech	Landslide map of Montana. Scale 1:500,000. (1990).

Wilson, Stephen
USGS, Denver

Preparation of two soil standards for the National Institute for Science and Technology. Focus of project is trace-metal analysis (ongoing).

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Palmquist, John C.	8
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Patton, Thomas W.	31
Paull, Rachel K.	12
Paull, Richard A.	12
Pearson, R. C.	3, 17, 26
Perry, William J.	8
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Regele, Steven	27
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Winston, Don	14
Woodward, Lee A.	27
Wylie, Allan	33

Zeihen, Lester	27
Zientek, Michael L.	27
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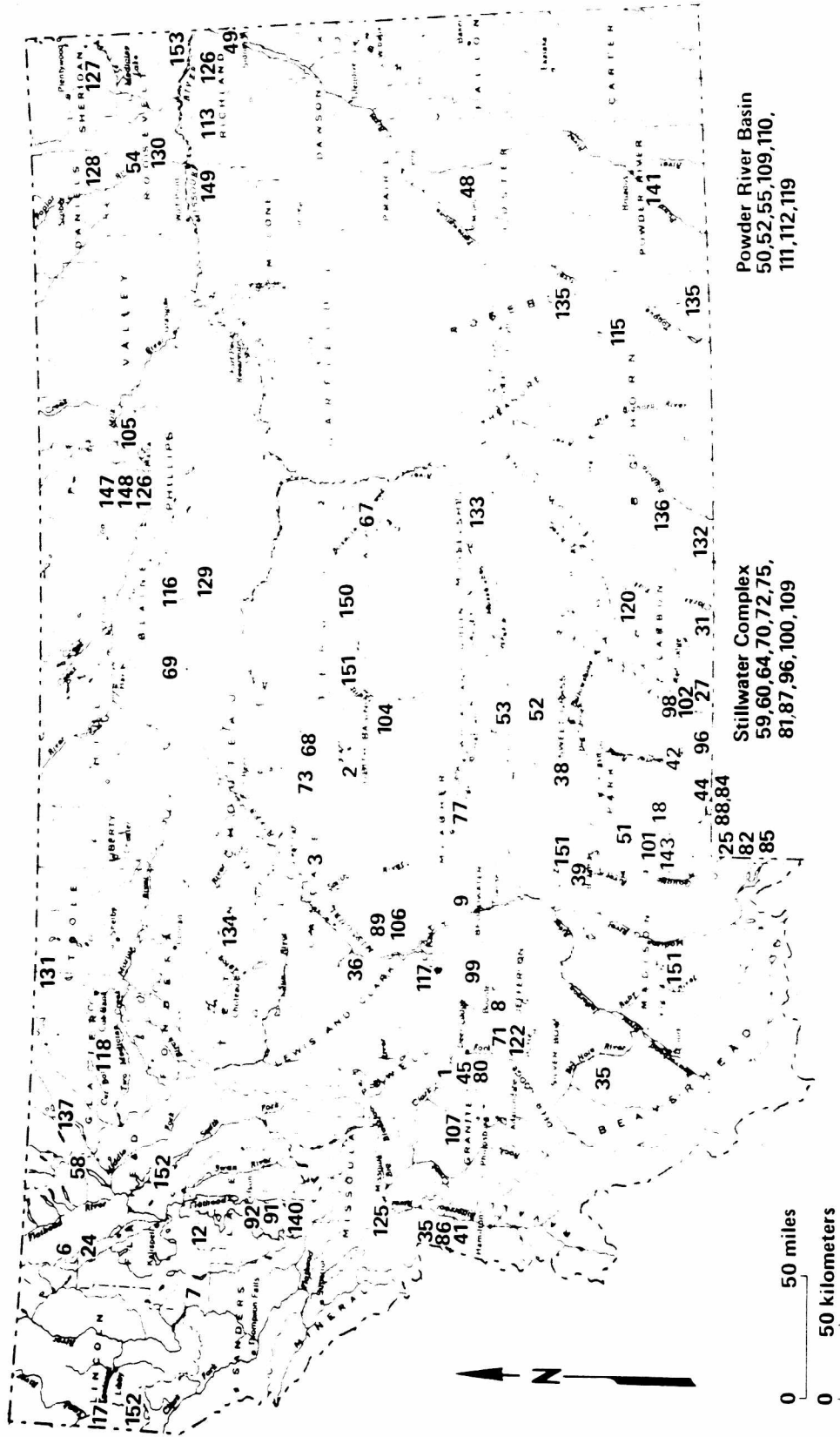


Figure 1 — Index map of Montana.

MONTANA BUREAU OF MINES AND GEOLOGY
 A Department of Montana College of Mineral Science and Technology

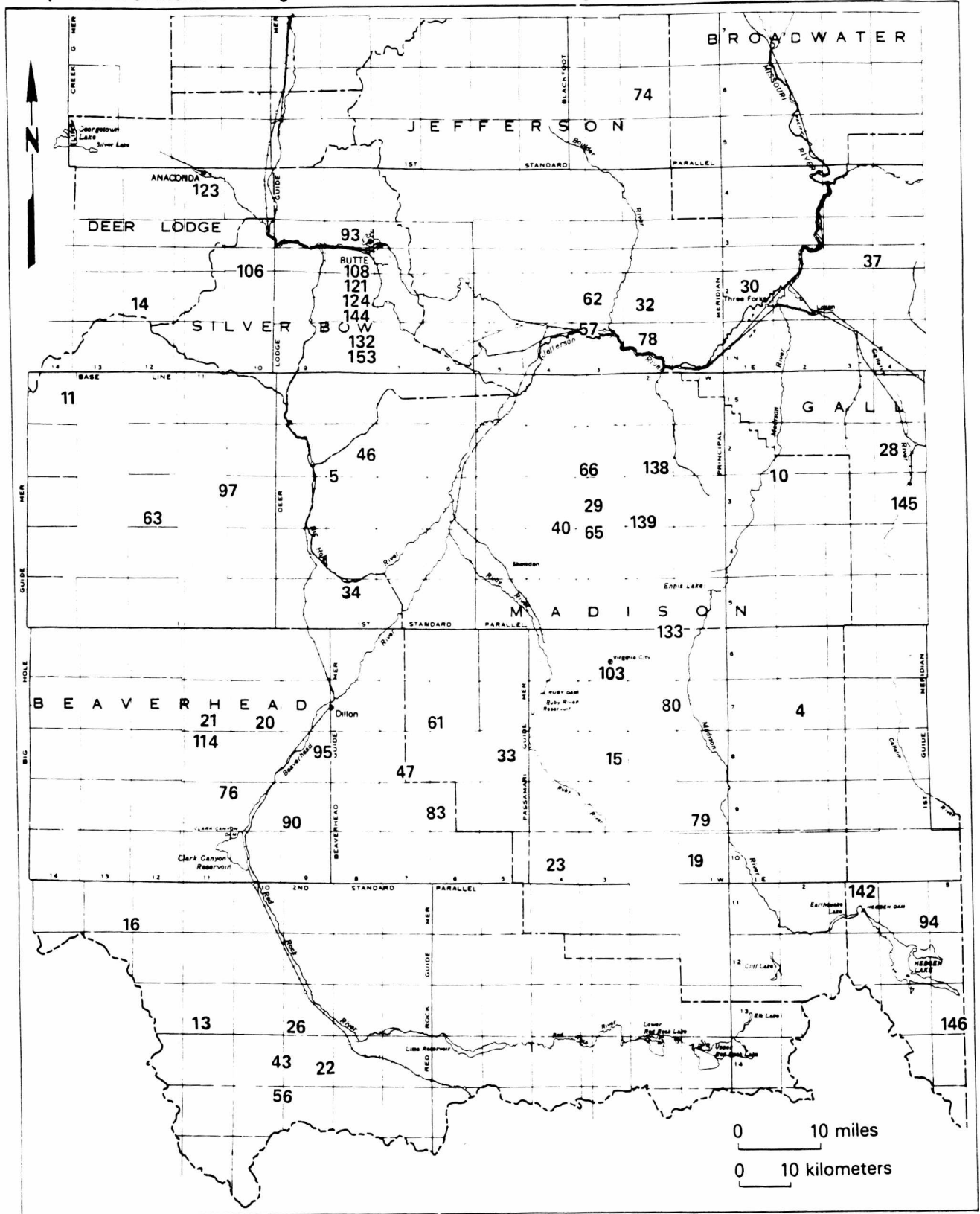


Figure 2. Index map of southwestern Montana.