

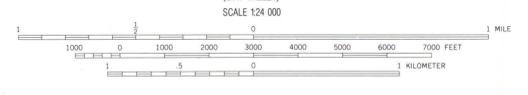
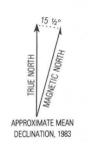
CORRELATION OF MAP UNITS

Qa	Qs	QUATERNARY
QTs		QUATERNARY AND TERTIARY
QTb	Pleistocene or Pliocene	QUATERNARY OR TERTIARY
Tsl	Pliocene and Miocene	TERTIARY
Tw	Eocene	TERTIARY
Jt	Middle Jurassic	JURASSIC
Tt	Lower Triassic	TRIASSIC
Rd		TRIASSIC
Ppr		PERMIAN
Ppm		PERMIAN
PPw		PERMIAN AND PENNSYLVANIAN
Mc		MISSISSIPPIAN
Mm		MISSISSIPPIAN

- DESCRIPTION OF MAP UNITS**
- Qa** ALLUVIUM (QUATERNARY)—Unconsolidated sedimentary deposits along stream valleys; may include colluvium in Fossil Canyon quadrangle and hillwash and alluvial fans in Dry Valley quadrangle
 - Qs** SURFICIAL DEPOSITS (QUATERNARY)—Includes colluvium, older alluvium, hillwash, talus, alluvial-fan, landslide, mud-flow, and boulder deposits
 - QTs** SEDIMENTARY DEPOSITS (QUATERNARY AND TERTIARY)—Undivided surficial deposits and Salt Lake Formation
 - QTb** BASALT (PLEISTOCENE OR PIOCENE)—Olivine and augite-olivine basalt. Approximately 20 to 150 ft thick
 - Tsl** SALT LAKE FORMATION (PLIOCENE AND MIOCENE)—Limestone, sandstone, and chert conglomerate and rhyolitic tuff
 - Tw** WASATCH FORMATION (LOWER EOCENE)—Red conglomerate and sandstone
 - Jt** TWIN CREEK LIMESTONE (MIDDLE JURASSIC)—Limestone, siltstone, and sandstone
 - Tt** THAYNES LIMESTONE (LOWER TRIASSIC)—Sandstone, limestone, siltstone, and shale. As mapped, may include the Lanes Tongue of the Ankarah Formation. Approximately 1,900 to 3,400 ft thick
 - Rd** DINWOODY FORMATION (LOWER TRIASSIC)—Siltstone, shale, and limestone. As mapped, may include tongue of the Woodside Shale. Approximately 1,400 to 2,900 ft thick
 - Ppr** PHOSPHORIA FORMATION (PERMIAN)—Includes: Rex Chert Member (Lower Permian)—Chert. As mapped, may include cherty shale member of the Phosphoria Formation and lentils of the Francon Member of the Park City Formation. Approximately 150 to 350 ft thick
 - Ppm** Meade Peak Phosphatic Shale Member (Lower Permian)—Phosphorite and mudstone. Approximately 110 to 200 ft thick
 - PPw** WELLS FORMATION (PERMIAN AND PENNSYLVANIAN)—Sandstone and limestone. As mapped, may include the Grandeur Tongue of the Park City Formation. Approximately 2,300 ft thick
 - Mc** CHESTERFIELD RANGE GROUP (UPPER AND LOWER MISSISSIPPIAN)—Limestone, sandstone, and siltstone. Approximately 1,900 ft thick
 - Mm** MADISON LIMESTONE (UPPER AND LOWER MISSISSIPPIAN)—Limestone

- CONTACT—Dashed where approximately located, gradational, indefinite or inferred; dotted where concealed; queried where doubtful
 - FAULT—Dashed where approximately located or inferred; dotted where concealed; queried where doubtful. U, upthrown side; D, downthrown side; arrows show relative horizontal movement
 - THRUST FAULT—Sawtooth on upper plate. Dashed where approximately located or inferred; dotted where concealed; queried where doubtful
 - ANTICLINE—Showing crestline. Dashed where approximately located or inferred; dotted where concealed; queried where doubtful
 - SYNCLINE—Showing troughline. Dashed where approximately located or inferred; dotted where concealed; queried where doubtful
 - OVERTURNED ANTICLINE—Showing direction of dip of limbs. Dashed where approximately located or inferred; dotted where concealed; queried where doubtful
 - OVERTURNED SYNCLINE—Showing direction of dip of limbs. Dashed where approximately located or inferred; dotted where concealed; queried where doubtful
 - STRIKE AND DIP OF BEDS—Inclined; overturned; vertical; horizontal
 - PHOSPHATE DRILL HOLE—For computing resource tonnages
 - PHOSPHATE TRENCH
 - PHOSPHATE MINE PIT BOUNDARY—As of September 1979
- The geology shown includes: 1) the trace of the top and bottom contacts of the Phosphoria Formation and where data are available the top and bottom contacts of the Meade Peak Phosphatic Shale Member of the Phosphoria Formation; 2) appropriate structural data required for construction of structure contours, overburden isopachs, and resource blocks; and 3) other structural data necessary for understanding the regional geologic picture.
- FAULT SEPARATION—No calculated resource
 - FAULT OVERLAP—Twice calculated resources if covered by 1500 ft. or less of overburden
 - OVERBURDEN ISOPACHS—On top of the Meade Peak Phosphatic Shale Member of the Phosphoria Formation. Only 300, 600, 1500 feet isopachs are shown. Dashed lines where control is poor and interpretation of structure is uncertain
 - RESOURCE BLOCK END BOUNDARY
 - IDENTIFIED PHOSPHATE RESOURCES—Excluding outcrop or projected outcrop of the Meade Peak Phosphatic Shale Member
- Map units and symbols shown with an asterisk are not on this map.

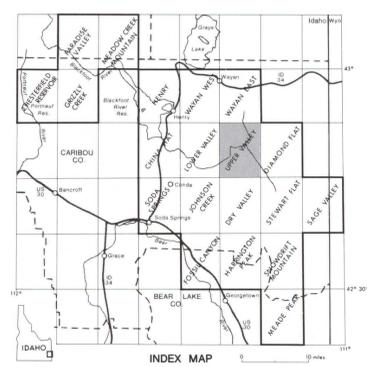
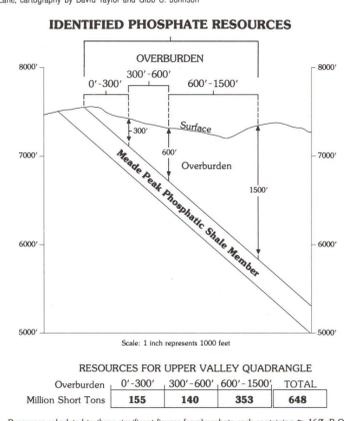
Base from U.S. Geological Survey, 1951



Geology compiled by Pamela Palmer from Rioux and others, (1975), Alumet, and FMC Corporation; geologic interpretation, overburden isopachs, and pit boundaries by Pamela Dunlap Derkey; drill hole and trench logs analyzed by Nancy J. Wotruba; resource blocks by Pamela Palmer; assisted by Margie Lane; cartography by David Taylor and Gibb C. Johnson

IDENTIFIED PHOSPHATE RESOURCES
MAPS SHOWING SELECTED GEOLOGY AND PHOSPHATE RESOURCES OF THE UPPER VALLEY QUADRANGLE, CARIBOU COUNTY, IDAHO

By
Pamela Dunlap Derkey, Pamela Palmer, and Nancy J. Wotruba
Idaho Bureau of Mines and Geology
1983



Resources calculated to three significant figures for phosphate rock containing ≥16% P₂O₅