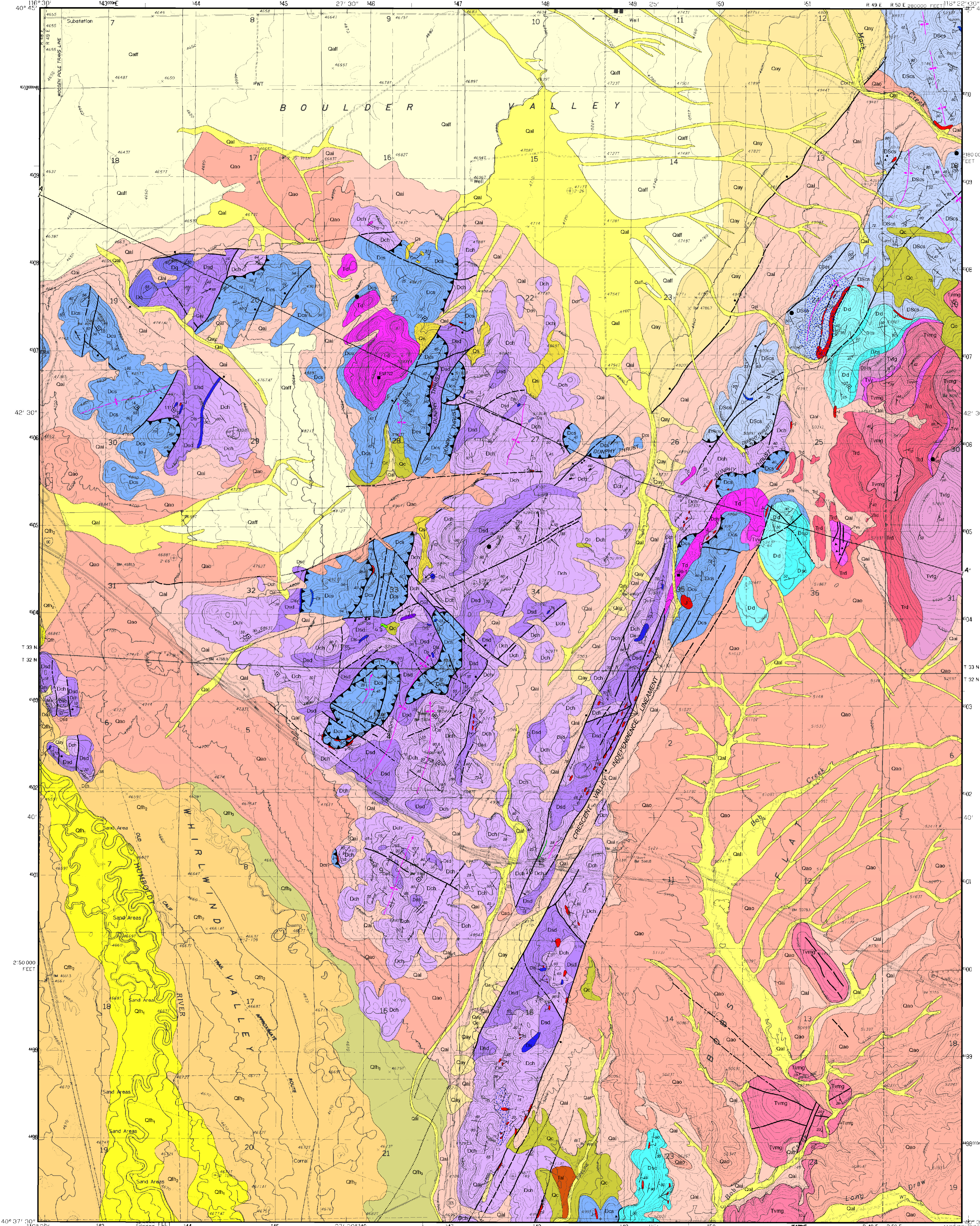


GEOLOGIC MAP OF THE BOBS FLAT QUADRANGLE, EUREKA COUNTY, NEVADA

Stephen G. Peters
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- Surficial Deposits**
- Qs** Estian deposits (Holocene) White to tan, unconsolidated fine-grained sand and silt deposits. May be partially derived from weathered crystalline Mesozoic ash deposits (Ta). Commonly contained in valleys and hillsides. Maximum thickness is 5 to 10 m.
 - Qal** Alluvium (Holocene) Usually includes some Pleistocene deposits. Usually sorted, unconsolidated silt, sand, and subrounded pebbles and cobbles. Young stream deposits and sheet flood deposits. Maximum thickness is a few meters.
 - Qca** Colluvium (Holocene and Pleistocene) Very heterogeneous mixture of cobble to pebble-size angular to subrounded rock fragments, sand, and silt, usually on hillsides or locally in valleys. Includes some talus deposits near outcrops of volcanic rocks.
 - Qfl** Young Humboldt River fluvial deposits (Holocene) Deposits in active stream channels and oxbow channels. Poorly sorted, unconsolidated silt, sand, and subrounded pebbles and cobbles.
 - Qfm** Intermediate-age Humboldt River fluvial deposits (Holocene) Poorly sorted, unconsolidated silt, sand, and subrounded pebbles and cobbles. Deposits flank younger deposits (Qfl) or are present as remnant islands. Deposits in oxbow channels are truncated by active channels.
 - Qhd** Old Humboldt River fluvial deposits (Holocene and Pleistocene) Partially consolidated deposits of silt, sand, and subrounded pebbles and cobbles. In places includes some consolidated pebbles conglomerate and gravel. Thick intermediate-age deposits (Qfm) on northeast parts. Covered by older alluvial fan deposits (Qao) on northern parts. Contains remnant channel and oxbow channel deposits.
 - Qao** Old alluvial fan deposits (Holocene and Pleistocene) Silt, sand, and rounded cobbles. Soil-covered and locally truncated at base with caliche, caliche, and silica. Composed of fans and sheets. Inclined and eroded, locally filled with deposits of Qal. Deposits in Bobs Flat include volcanic rocks. Other deposits in Humboldt River Valley and in Boulder Valley contain chert and some volcanic rock clasts. May include units Qh, and Qm in E70 sec. 6, T30N, R46E and sec. 31, T30N, R46E. Thickness of deposits may exceed 100 m in Bobs Flat area.
- Fluvial Deposits of the Humboldt River**
- Qfl** Fan fringe deposits (Quaternary) Alluvium and mixed colluvium down slope from alluvial fan deposits units Qal, Qca, Qao. Includes valley fill, stream, and floodplain deposits. Unconsolidated silt, sand, pebbles, and cobbles.
 - Qca** Young alluvial fan deposits (Holocene) Discrete 100- to 200-m-wide fans in center of quadrangle. Derived from drainages along uplifted crest. Includes large composite fans and smaller fans. Includes small fans and washes. Creek north of quadrangle. Thicknesses of small fan deposits is 10 to 20 m. Thicknesses of larger fan deposits may exceed 100 m. Unconsolidated silt, sand, pebbles, and cobbles.
 - Qfm** Intermediate-age alluvial fan deposits (Holocene) Poorly sorted, unconsolidated silt, sand, and subrounded pebbles and cobbles mixed with local colluvial deposits in valley areas. Unconsolidated silt, sand, and subrounded pebbles and cobbles. Thick clasts most common in western area of quadrangle and in Boulder Valley. Volcanic rock clasts more common in Bobs Flat area. Also present in interior parts of older alluvial fans (Qao) that have been eroded and reworked. Thicknesses of deposits is usually less than 20 m, but may locally exceed 50 m.
- Alluvial Fan Deposits**
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- Sedimentary Rocks of the Overlap Assemblage**
- Dd** Dolomite, chert, dolomitic shale, and sandstone (Pennsylvanian) Tan to creamy white, hard, poorly bedded, locally silicified, detrital-rich dolomite and limestone and shaly limestone with low knobby outcrops in northeast part of quadrangle. Contains 1- to 4-m-thick layers of sandstone and conglomerate (mapped as unit Dsc). May correlate with the Pennsylvanian Tompa Formation of Doh (1955) on the basis of fossil fragments of the conodont *Jovaria zigzagrostris* sp., Early Permian *Motrova* of Akobai, M. Kurik, written commun., 1969. Exposed thickness may exceed 300 m.
 - Dsc** Sandstone, conglomerate and shale (Pennsylvanian) Tan to light gray outcrops where unroofed. Usually silicified, dark-brown, bold, hard, resistant outcrops of rounded quartz pebbles conglomerate as channels in mudstone, shale, and fine to medium-grained quartzite. High bold outcrops where silicified. Thick conglomerate are 0.25- to 5-m thick. Locally truncated into basal sandstone layers. Interfingers with dolomite and dolomitic shale (unit Dd) in northeast part of quadrangle. May correlate with Pennsylvanian Tompa Formation of Doh (1955) on the basis of lithology and spatial association with unit Dd.
- Paleozoic Sedimentary Rocks of the Roberts Mountains Allochthon**
- Rocks below Dunphy thrust (Silurian or younger)**
- Dsd** Sandy dolomite, shale, chert, limestone, and quartzite (Late Silurian?) Tan to orange, homogeneous dolomite, dolomitic and limy sandstone, and sandy dolomitic shale. Sandstone is fine-grained to locally medium grained with rounded quartz grains. Sandy dolomite and limestone grade into tan to green-gray dolomitic shale, sandstone. Limestone (Dsc) to gray weathering massive gray to reddish, black, locally micritic, and interbedded with 5- to 20-cm-thick black to dark-gray chert beds, and thicker horizons of dolomite, black cherty shale, and mudstone. Quartzite is massive and dark-gray to light maroon. Thickest sections of Dsd may be over 1,000 m thick.
 - Dch** Chert and undifferentiated rocks (Late Silurian?) and Devonian Poorly bedded, brecciated, commonly tightly and broadly folded, localized and fractured chert. Chert forms abundant subrounded to elongated interbedded beds and outcrops and flattened, or flame-like, anastomosing light-gray, light cream to black nodules. Unit also contains locally bedded and radiolarite-bearing, massive, black, gray, and tan cherts, tan to orange sandy dolomite, sandstone, green gray phyllite, limestone, and shale. A Devonian or younger age is inferred from poorly preserved radiolarians assigned to the Etrachtid species of Noble and Albritton (2000). This fauna includes *Furcata* and *Ceratolium*. In addition, samples containing fragments of *Furcata* are associated with a Famennian age. Unit horizons generally are not as thick as units in Dcs. Massive chert units are as much as 100 m thick. Carbonate local 1- to 10-m-thick chert units. Total thickness of Dch may be 150 m.
 - Dsc** Quartzite (Late Silurian?) Dark gray to light maroon, massive, hard quartzite, consisting of well-sorted, subrounded to rounded, medium to fine grained quartz grains in a siliceous matrix. Commonly is present as isolated 5-m-thick quartzite in unit Dsd. May be basal part of unit Dsd where thickness of a massive quartzite is sec. 16, T30N, R46E, 200 m.
 - Dsc** Limestone (Late Silurian?) to Devonian Gray to black layered to massive limestone, interbedded with black chert and sandy dolomite (Dsd). Many occurrences not mapped. Contains elements of the conodont *Polygnathus* sp. and *P. zigzagrostris* sp. in middle Devonian. Limestone through Devonian age (M. Kurik, written commun., 1969).
 - Dv** Volcanic rocks (Late Silurian?) to Devonian Creamy tan to black to reddish, and locally with black, 0.5- to 1-cm-thick, fine, orange, agglutinated, textured clasts. Interfingers with chert (unit Dch) in isolated outcrops, particularly near sec. 16, T30N, R46E. Thickness is between 2 and 100 m.
- Rocks above the Dunphy thrust (Silurian and Devonian or younger)**
- Dcs** Sandstone, chert, limestone, and shale (Silurian and Devonian or younger) Lies in the northeast part of the quadrangle and is contiguous with Paleozoic units to the east in the Emigrant Pass Quadrangle (Henry and Fooks, 1969) and Silurian and Devonian units in the Washoe Canyon Quadrangle to the northeast. The unit is shaly dipping and locally folded and contains abundant buff, tan, and gray calcareous, fine-grained sandstone units and 1- to 5-m-thick gray to tan chert horizons interbedded with gray and green shale and fine grained limestone (Dd). A diagnostic horizon is black, knobby, 1- to 2-m-thick limestone commonly in contact with localized gray limestone and dolomite, in hills north and south of Mack Creek. Approximate thickness is 470 m.
 - Dch** Chert, shale, limestone, and chert pebble conglomerate (Devonian or younger) Lies in the western part of the quadrangle. Chert is well bedded and tan, light gray, massive, and light green with common mammillary surfaces. Shale is maroon to black to light gray and locally siliceous. Chert pebble conglomerate layers are rare but significant in the unit. Exposed thickness of Dch may exceed 800 m.
 - Dd** Undifferentiated limestone units above the Dunphy thrust interbedded with horizons in Dcs and Dsc. Many occurrences not mapped. Commonly, 2-m-thick, gray to black, layered to massive limestone, particularly in Dcs. Within Dcs unit gray limestone interbedded with chert and black, and knobby, 1- to 2-m-thick limestone commonly in contact with bedded, gray limestone and dolomite in hills north and south of Mack Creek.

- Other surficial deposits**
- Qs** Holocene ash and lacustrine deposits (Holocene) Ash and lacustrine deposits are present as local white, crystalline, detrital, porous, bedded sand and silt deposits below old alluvial fans (Qao) in sec. 22, T30N, R46E. The unit may be part of lacustrine deposits exposed to the south of the quadrangle and may correlate with deposits in the Emigrant Pass Quadrangle (see Henry and Fooks, 1969) to the northeast. While crystalline detrital sandstone is eroded and deposited in younger section deposits (Qa) and in soils on alluvial deposits (Qal, Qca) and some fluvial deposits (Qfl, Qfm).
- Volcanic Rocks (Eocene)**
- Tv** Vitrophyre and vitrophyre-bearing breccia units (Eocene) Black, concordably fractured, massive, 5- to 30-m-thick layered bodies among volcanic flow units (WV1) in sec. 30, T30N, R50E. Also included in this unit, but of probable intrusive origin at margins of units Td and Td. Includes mafic margins, auto intrusive (massive) breccia bodies, and clasts in igneous intrusion breccia (WV2) in sec. 30, T30N, R46E.
 - Tvfg** Fine-grained andesite volcanic flow (Eocene) Black to locally light red, hard, aphanitic, rarely hornblende-bearing andesite with local layering. Thickness may exceed 200 m. Western extension of Bobs Creek lava flows of Henry and Fooks (1969) in the Emigrant Pass Quadrangle (E6, E20-24, 4 Ma (sandine) and 37.16±0.10 Ma (hornblende)).
 - Tvm** Medium- to fine-grained dacite volcanic flow (Eocene) Buff pink to brown, layered, flow-banded volcanic flows with vitrophyre or brecciated bases. Thickness may exceed 200 m. Two main occurrences are interbedded with hypabyssal intrusives in sec. 30, T30N, R50E. Rocks in northeast part of quadrangle are part of the Mack Creek lava sequence, and rocks south of inaccessible 80 m may be part of Pinney lava sequence, both of the Emigrant Pass volcanic field in the Emigrant Pass Quadrangle to the east (Henry and Fooks, 1969).

- Intrusive rocks**
- Td** Rhyodacite (Eocene) Gray, equigranular, medium-grained to hypabyssal, locally foliated porphyritic intrusives. May be texturally and mineralogically transitional to volcanic. Flow bodies in the east and intrusive Td body to the west. Biotite, plagioclase, sanidine, quartz, and hornblende. Contains vitrophyre-bearing (Tv) breccia bodies on southern margin.
 - Td** Dacite (Eocene) Gray porphyritic hornblende-biotite intrusive rock. Forms two main bodies: (1) a small plug northwest part of the map (Bobs Flat Plateau 37, 37.27 Ma hornblende), and (2) a 100-m-thick dike in the east-central part of the map (E7, 40±0.17 Ma hornblende) (Henry and Fooks, 1969), which strikes northeast into an irregular-shaped plug and is transitional to unit Td to the east. Several 5- to 1-m-thick dikes (not all mapped) also are present along the northeast-trending ridge between Bobs Flat and sec. 26, T30N, R46E.
 - Gg** Granodiorite (Mesozoic?) Medium grained, equigranular, quartz, biotite, plagioclase. K-feldspar. Intra-granular in weathered outcrops in valley in sec. 30, T30N, R46E. Contains orthomylonite to decimeter-scale orbicular nodules of siliceous white apatite.
 - Ld** Lamprophyre dikes (Jurassic?) Fine- to medium-grained, porphyritic, highly weathered, gray to greenish gray, 1- to 1-m-thick steeply dipping dikes striking northeast along ridge from upper part of sec. 11, T30N, R46E. Also may fill northeast trending faults along ridge in northeast-central part of quadrangle.

- Contact**
- Fault:** Showing dip where known. Dashed where approximately located or inferred; dotted where concealed; queried where uncertain. Arrows indicate sense of displacement.
 - Normal fault:** Bar and ball on downthrown block. Dashed where approximately located or inferred; dotted where concealed; queried where uncertain.
 - Thrust fault:** Sawtooth on upper plate. Dashed where approximately located or inferred; dotted where concealed; queried where uncertain.
 - Lineament:** Determined from aerial photography.
 - Shear zone:** Dike
 - Breccia:** Projection to the surface of approximate outer limit of hydrothermal alteration.
 - Sand and gravel pit:** Jasperoid
- Strike and dip of bedding**
- Inclined
 - Vertical
- Strike and dip of foliation**
- Inclined compaction foliation in volcanic rocks
 - Vertical compaction foliation in volcanic rocks
 - Inclined tectonic foliation and jointing in Paleozoic rocks
 - Vertical tectonic foliation and jointing in Paleozoic rocks
 - Joint
- Folds**
- Anticline, showing direction of plunge, dashed where approximately located or inferred
 - Syncline, dashed where approximately located or inferred
 - Fold axis with plunge (measured)
 - Fold lineation
 - Fold axis with plunge (by stereographic net)
- Sample locations**
- Paleontological sample
 - Radiometric age sample
 - Anthropologic artifact site

See accompanying text for references and a discussion of the geology of the Bobs Flat Quadrangle.

Topographic base from U.S. Geological Survey 1:24,000 Bobs Flat Quadrangle (1988), Transverse Mercator, 1927 North American Datum.

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