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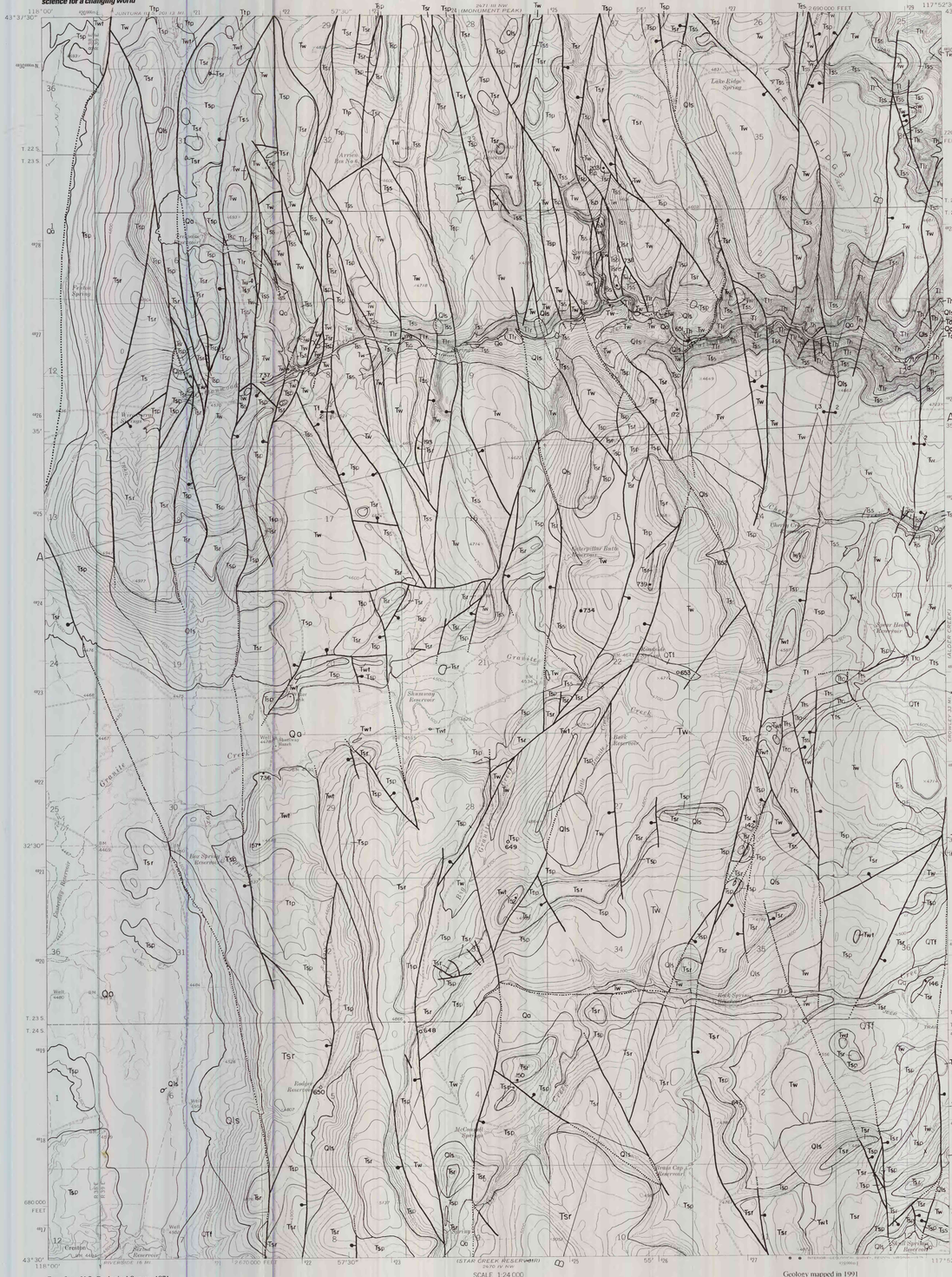
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

OPEN-FILE REPORT -138
SHUMWAY RESERVOIR QUADRANGLE, OREGON



Base from U.S. Geological Survey, 1971

Lambert conformal conic projection. 1927 North American datum
10,000-foot grid based on Oregon coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 11

UTM GRID AND 1972 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Geology mapped in 1991

Manuscript approved for publication February 18, 1999

CORRELATION OF MAP UNITS

Qa, Qls, QTf	Quaternary, Pliocene, and(or) Miocene	QUATERNARY
Tsr, Twt, Tsp, Tw, Tss, Tto, Tts, Ttp, Tlr, Th, Td	middle Miocene	TERTIARY

DESCRIPTION OF MAP UNITS

Qa **Alluvium (Holocene)**—Unconsolidated sand, gravel, and conglomerate deposits along Cottonwood, Cherry, Granite, and Dry Creeks, unnamed creeks along the western margin of the quadrangle, and the Easterday Reservoir area

Qls **Landslide deposits (Holocene)**—Unconsolidated chaotic deposits where resistant volcanic rocks like welded tuff and basalt overlie poorly consolidated or unconsolidated sedimentary deposits, especially where the rocks are weakened by faulting

QTf **Alluvial fan deposits (Quaternary, and (or) Pliocene, and (or) late Miocene)**—Poorly bedded, poorly sorted, and poorly lithified brown, light brown and white volcaniclastic sandstone, and gravel. Sandstone is massive and is locally moderately to well cemented by carbonate (caliche), chalcedony, black oxide (MnO_2), and hematite. Clasts are angular to rounded, and consist of lithic fragments, such as welded tuff, lapilli tuff with red-brown pumice; scoria; opaque, brown, and clear glass; chalcedony vein material; devitrified glass; rhyolite; volcaniclastic siltstone; and mineral grains, such as plagioclase, ortho- and clinopyroxene, quartz, muscovite and magnetite. The mafic minerals are altered to hematite. Muscovite and (or) sericite formed in place in the silty matrix. The gravel contains angular to subrounded clasts of basalt as much as 1 m across, and welded tuff clasts similar to welded tuff units Tw and Twt (see below). Clasts of Twt are the most abundant and are as much as 2 m across with a brown weathering rind. The largest deposit is near the southeast corner of the quadrangle on the south side of Dry Creek, where the deposit is as much as 20 m thick. The scattered patches of the unit in the east-central part of the quadrangle suggest that the deposit was much more widespread

Tsr **Shumway Ranch Basalt (middle Miocene)**—Named by Kittleman and others (1965; used name "Shumuray" from a U.S. Army spelling; referred to in this report as Shumway Ranch Basalt to reflect updated spelling of name). The unit is dark gray to black, locally diktytaxitic or vesicular, basalt that weathers to blocks as much as 1 m across, is locally platy, and has a phonolitic resonance when struck with a hammer. The unit contains 5 to 25 percent phenocrysts as long as 6 mm of plagioclase, olivine, and clinopyroxene. The groundmass consists of grains as much as 1 mm of plagioclase laths showing trachytic texture, olivine, ophitic clinopyroxene, and magnetite. some of the clinopyroxene has abundant tiny grains of magnetite. Olivine is altered to bowlingite in places. Modal composition is plagioclase 45 to 76 percent, olivine about 5 percent, clinopyroxene 15 to 20 percent, bowlingite as much as 10 percent, and magnetite 5 to 10 percent. Eight samples of the unit were analyzed for major oxides and can be chemically classified as basalt, trachybasalt, basaltic andesite and basaltic trachyandesite (samples 738, 739, 144, 146, 150, 172, 193, and 203, Table 2). The unit is as much as 45 m thick. Age is based on radiometric dates (K-Ar method, Fiebelkorn and others, 1983)

Twt **Welded tuff (middle Miocene)**—Light gray, gray, and brown, glassy, generally platy welded tuff and lapilli tuff that underlies Shumway Ranch Basalt in NE¼4 sec. 11, T. 24 S., R. 39 E. and in sec. 29, T. 23 S., R. 39 E. Most of rock consists of laminated welded tuff; in places, original shard texture is obliterated. Shards are mostly clear, tightly and intricately folded and commonly devitrified. Some shards are dark brown. Some of the glass is slightly birefringent and contains opaque microlites (magnetite?). Welded tuff contains 2 to 5 percent angular, anhedral phenocrysts as much as 7 mm across of quartz, potassium feldspar (sanidine?), plagioclase, green hornblende with biotite rims, and magnetite. Lapilli tuff contains as much as 30 percent lithic fragments as much as 1 cm across of brown pumice, granophyre, rhyolite, brown laminated welded tuff, myrmekite, and partly digested (recrystallized and disaggregated) fine-grained hematite-rich mafic volcanic rock. Over most of quadrangle, unit is as much as 6 m thick or is absent. Just south of Shumway Ranch, however, the unit is as much as 40 m thick. Age is based on unit's stratigraphic position between middle Miocene units. Same as Twt in adjacent Alder Creek and Monument Peak quadrangles

Tsp **Sedimentary and pyroclastic rock unit (middle Miocene)**—White, pale gray, light brown, and brown claystone, siltstone, sandstone, tuffaceous sandstone, and tuff that underlie map unit Twt. Locally baked red along contact with Twt. Conglomeratic in places. Claystone, possibly an altered tuff, contains abundant orange-brown hematite veins. Siltstone is poorly lithified, has a parting and contains zones rich in brown and black oxides (Fe and Mn?) and white chalcedony veins. Sandstone is poorly to moderately lithified, porous, poorly sorted, and is generally massive. Angular to rounded clasts as much as 1 cm across include tuffaceous sandstone, laminated welded tuff, rhyolite, pilotaxitic basalt, pumice, devitrified glass, vitrophyre, and fine-grained mafic volcanic xenolithis rich in iron oxide. Mineral grains as much as 4 mm across include plagioclase, quartz, muscovite, biotite, pyroxene, hornblende, olivine, and sanidine. Sandstone is cemented by sericite, brown chalcedony, and carbonate (caliche). Tuff contains angular to rounded lithic fragments as much as 1 cm across of pumice, perlite, and rhyolite, and angular granitic fragments as much as 4 mm long of potassium feldspar, quartz, plagioclase, biotite, and hematite. Some of the tuff is cut by white chalcedony and altered to clay. Conglomerate contains pebbles, cobbles, and boulders as much as 1 m long of white, gray and lavender welded tuff, and black obsidian as much as 15 cm across. In the quadrangle, the unit is as much as 120 m thick, and is absent in places; the greatest thickness is in the western part of the quadrangle which is on the western margin of a north-northeast-trending graben (see separate text). Age is based on unit's stratigraphic position between middle Miocene units

Tw **Wildcat Creek Welded Ash-Flow Tuff (middle Miocene)**—Named by Kittleman and others (1965). In quadrangle unit is red, light to dark brown, purple, and black strongly welded tuff, lapilli tuff, black perlitic obsidian, and dark brown and black vesicular glass. Very vesicular in places, and parts of it weather irregularly showing "swiss cheese" texture. Much of the rock is very finely laminated welded tuff; although shards are devitrified, the shard texture is generally preserved and tiny hematite grains are concentrated on the shard margins. In places devitrification has nearly obliterated the shard texture; shard boundaries are partly outlined by lenses of minute hematite grains. In some of the rock the shard texture is obliterated and the remaining quartz contains disseminated hematite. The welded tuff contains as much as 2 percent angular phenocrysts as long as 5 mm of quartz, plagioclase, biotite, muscovite, and potassium feldspar (sanidine?, perthite, microcline), some of them partly absorbed by the matrix. Angular to rounded lithic fragments include rhyolite, partly altered (recrystallized and disaggregated) fine-grained mafic volcanic rock, granite, spherulitic material, and clear, light brown, and red-brown pumice. Contains amygdules and veins of tridymite. The unit is 42 to 98 m thick; the greatest thickness is in secs. 23 and 26, T. 23 S., R. 39 E. Age is based on unit's stratigraphic position between middle Miocene strata

Tss **Sandstone (middle Miocene)**—Light gray and light brown, silty, volcaniclastic and tuffaceous sandstone. Moderately lithified and generally massive; locally, thin-bedded (beds 1 to 2 cm thick). Angular lithic clasts include tuffaceous sandstone, fine sandstone, pieces of hematite nodules, pumice, fine-grained basalt or basaltic andesite, opaque glass, andesite, and rhyolite. Mineral grains include plagioclase, quartz, biotite, muscovite, and pyroxene. Rock is cemented by sericite, yellow chalcedony, and, locally, manganese oxide (?). Thickness ranges from 6 to 60 m; the thickest exposed sections of the unit are in the northeastern part of the quadrangle. Where the trachyandesite flow (see below) is absent as a marker, unit may include map unit Tts. Age is based on unit's stratigraphic position between middle Miocene map units

Tta **Trachyandesite flow (middle Miocene)**—Dark gray to black diktytaxitic and vesicular trachyandesite. Some of unit weathers to 2-m-long slabs that contain 10 to 15 percent vesicles, some vesicles as much as 2 cm across. In places, contains white aragonite (?) amygdules. No clear bimodal size distribution to differentiate phenocryst and groundmass phases. Modal composition is plagioclase 50 to 65 percent, olivine 10 percent, clinopyroxene 15 to 25 percent, and magnetite or ilmenite 10 percent. In places, olivine is altered to iddingsite or bowlingite. Clinopyroxene is interstitial to plagioclase and locally forms oikocrysts as much as 1 cm across. Many plagioclase and clinopyroxene grains contain so many iron oxide inclusions that they are opaque. Unit is continuous with analyzed trachyandesite flow in adjacent Alder Creek quadrangle (Evans and Binger, 1998a). Maximum thickness of the unit in the quadrangle is 8 m. Age is based on unit's stratigraphic position between middle Miocene strata

Tts **Tuffaceous sandstone (middle Miocene)**—Light brown tuffaceous sandstone. Same as unit Tts in adjacent Alder Creek quadrangle (Evans and Binger, 1998a). Underlies the trachyandesite flow unit and is included in unit Tss where the trachyandesite is not present. As much as 30 m of the unit is exposed in the east-central part of the quadrangle. Age is based on unit's stratigraphic position between middle Miocene strata

Ttp **Tims Peak Basalt (middle Miocene)**—Named by Kittleman and others (1965) and adopted by Greene and others (1972). Dark gray to black basalt flows. Occurs as an erosional remnant in sec. 30, T. 22 S., R. 39 E. and sec. 32 and adjacent sections, T. 23 S., R. 39 E. along the western margin of the quadrangle. See Evans (1996) for more detailed description of unit. Age is based on unit's stratigraphic position between middle Miocene map units

Tlr **Littlefield Rhyolite (middle Miocene)**—Named by Kittleman and others (1965). Light to dark gray and brownish purple rhyolite containing 10 percent phenocrysts as long as 5 mm of plagioclase, sanidine, hornblende and (or) oxyhornblende, magnetite, hematite and possibly olivine, some of which are embayed by the groundmass. Hornblende has rims of iron oxide and biotite and is replaced by pseudomorphous magnetite. The groundmass consists of quartz, feldspar and hematite grains as long as 0.02 mm. Oval hematite-rich clots may be partly digested mafic volcanic rock fragments, and clumps of feldspar and hornblende may be granitic xenoliths. Black tuff breccia at the base of the rhyolite in center of sec. 12, T. 23 S., R. 39 E. contains 75 percent angular to subrounded fragments as much as 20 cm across of basaltic andesite like Hunter Creek Basalt in a matrix of slightly devitrified clear glass. A sample of the unit analyzed for major oxides is a rhyolite (sample 179, Table 2). The rhyolite is about 90 m thick in the northeastern part of quadrangle. Age is based on unit's stratigraphic position and radiometric ages of Lees (1994)

Th **Hunter Creek Basalt (middle Miocene)**—Named by Kittleman and others (1965) and adopted by Greene and others (1972). Black, generally aphanitic basaltic andesite that, in places, is diktytaxitic, platy, or brecciated and oxidized. Unit underlies Littlefield Rhyolite. Rocks contain less than 1 percent phenocrysts as long as 1 mm of plagioclase and clinopyroxene in a groundmass of plagioclase laths, magnetite, and clinopyroxene 0.1 to 0.5 mm long, and an unidentified orange-brown mineral. Rarely phenocrysts of plagioclase are as large as 1 cm. Modal composition is plagioclase 45 to 55 percent, clinopyroxene 30 to 45 percent, magnetite 5 percent, and glass 5 percent. Mafic minerals are locally much altered to hematite and zoisite. Such a sample taken from 15 m below the top of the unit may have been altered as a result of the thermal effects of emplacement of the overlying Littlefield Rhyolite. Age is based on unit's stratigraphic position between middle Miocene units and radiometric ages of the unit to the north (Lees, 1994)

Td **Dinner Creek Welded Tuff (middle Miocene)**—Named by Greene and others (1972; formerly Dinner Creek Welded Ash-Flow Tuff of Kittleman and others, 1965). Upper maroon glassy welded tuff and lower white cross-bedded tuff under Hunter Creek Basalt along Cottonwood Creek in the northeastern part of the quadrangle. This section of Dinner Creek Welded Tuff is like the better exposed section of Dinner Creek in the adjacent Alder Creek quadrangle. Some of the welded tuff is devitrified and superficially resembles the Wildcat Creek Welded Ash-Flow Tuff with its well preserved compaction foliation and tiny hematite grains concentrated at the margin of the shards. The welded tuff contains less than 1 percent phenocrysts as long as 2 mm of plagioclase, biotite, pyroxene, and magnetite. Lithic fragments are rare and include welded tuff containing a high concentration of magnetite, brown welded tuff, rhyolite, and fine grained basalt. As much as 36 m of the unit is exposed in the quadrangle. Age of the unit is based on radiometric ages of about 15 Ma in the Malheur Gorge area (Fiebelkorn and others, 1983)

Tm **Basalt of Malheur Gorge (Middle to early Miocene)**—Named by Evans (1990a,b; formerly "unknown igneous complex" of Kittleman and others, 1965). Unit consists of a flood-basalt sequence that is as much as 1 km thick. Unit is shown only on cross-sections

Contact

Fault. Dotted where concealed; bar and ball on down-thrown side. Where more than one direction of movement is indicated, the oldest direction is labeled "1"

Location of unaltered rock sample listed in Table 1

Location of altered rock sample listed in Table 5

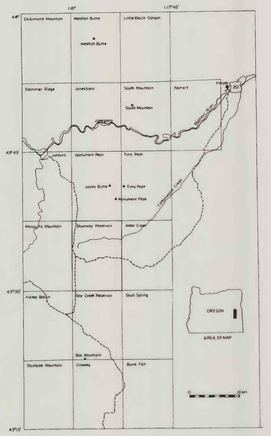


Figure 1. Index map showing locations of the Shumway Reservoir quadrangle, adjacent quadrangles, and other quadrangles mentioned in this report. The thicker uninterrupted line is U.S. Highway 20; dashed lines are dirt roads.

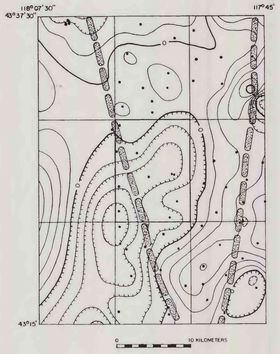


Figure 2. Isostatic residual gravity anomaly map of the Shumway Reservoir quadrangle (bold outline) and adjacent quadrangles. Modified from Griscom and Halvorson (in Smith, 1994). Contour interval 2 milligals. Hachures indicate closed lows. Large dots are locations of gravity stations. Stippled hot-dogs mark the western margin (fault zone) of the Oregon-Idaho graben (NNE) and the western margin of the horst (NNW). See Figure 1 for names of quadrangles adjacent to Shumway Reservoir quadrangle.

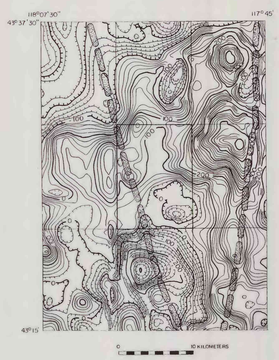
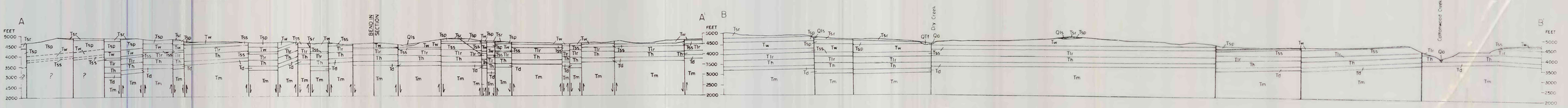


Figure 3. Aeromagnetic map of the Shumway Reservoir quadrangle(bold outline) and adjacent quadrangles. Modified from Griscom and Halvorson (in Smith, 1994). Contour interval 20 and 100 nanoteslas. Hachures indicate closed lows. The stippled hot -dogs are aligned along the western margin (fault zone) of the Oregon-Idaho graben (NNE) and the western margin of the horst (NNW). See Figure 1 for names of quadrangles adjacent to the Shumway Reservoir quadrangle.



GEOLOGIC MAP OF THE SHUMWAY RESERVOIR QUADRANGLE, MALHEUR COUNTY, OREGON

By

James G. Evans and G. Benjamin Binger

1999