DEPARTMENT OF THE INTERIOR
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MAP SHOWING OUTCROPS OF GRANITIC ROCKS, ASH-FLOW TUFF, AND LAHARIC BRECCIA, BASIN AND RANGE PROVINCE, IDAHO

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INTRODUCTION

This map report is one of a series of geologic and hydrologic maps covering all or parts of States within the Basin and Range province of the western United States. The map reports contain detailed information on subjects that characterize the geohydrology of the province, including the ground-water hydrology, ground-water quality, surface distribution of selected rock types, tectonic conditions, geophysics, Pleistocene lakes and marshes, and mineral and energy resources. This work is a part of the U.S. Geological Survey's program for geologic and hydrologic evaluation of the province to identify potentially suitable regions for further study relative to isolation of high-level nuclear waste (Bedinger, Sargent, and Reed, 1984).

This map was prepared from published geologic maps and reports, utilizing the project guidelines defined in Sargent and Bedinger (1984). For this study, granitic rocks include granite, granodiorite, adamellite, and locally some gneissic and schistose metamorphic rocks. The metamorphic rocks are part of a metamorphic core complex (Miller, 1980) and are closely associated with granitic rocks. The ash-flow tuffs generally are less than 100 feet thick in this part of Idaho, however, locally they may be as thick as 700 feet. Laharic breccia is areally limited but thick. In the Description of Map Units the granitic rocks, ash-flow tuff, and laharic breccia are described separately. The age, lithologic character, thickness, and sources of data for each rock type are discussed within arbitrarily outlined and numbered areas in the counties of the study area.

DESCRIPTION OF MAP UNITS

[To convert feet (ft) to meters, multiply feet by 0.3048; to convert miles (mi) to kilometers, multiply miles by 1.609]

Part A--Granitic rocks

County-area number	Map symbol	Pluton or geologic unit	Geologic and radiometric age in millions of years (m.y.)	Lithology and comments	References for county area
CASSIA COUNTY (CS)					
CS-1	Tg	Almo pluton	Oligocene 28.6±1.0 m.y.	Biotite granodiorite to muscovite adamellite pluton. Medium grained, equigranular. Intruded by pegmatites.	Armstrong, 1968, 1970, 1976; Armstrong and Hills, 1967; Armstrong and others, 1978; Miller, 1980
	gn	Injection complex of Middle Mountain	Unknown	Pegmatitic granitic gneiss, foliated and lineated, gradational into mylonitic gneiss. Contains numerous inclusions of metasedimentary rocks.	
	BAg	Green Creek complex of Armstrong and Hills (1967)	Early Proterozoic to Late Archean, 2,400 to 2,700 m.y.	Gneissic adamellite and granodiorite containing muscovite schist and plagioclase-hornblende amphibiolite pods and layers.	
CS-2	RRGE-1	Unnamed granite	Unknown	Granite penetrated at depth of 4,960 ft in Raft River geothermal exploration well 1. Biotite is chloritic; trace of magnetite and pyrite.	Covington, 1977

Part B--Ash-flow tuff and laharic breccia

County-area number	Map symbol	Geologic unit	Geologic and radiometric age in millions of years (m.y.)	Lithology and comments	References for county area
BANNOCK COUNTY (BA)					
BA-1	Tsma	Starlight Formation, Tuff of Arbon Valley	Late Miocene	Thin ash-flow tuff that locally forms the middle member of Starlight Formation. Tuff less than 100 ft thick.	Trimble, 1976

BINGHAM COUNTY (BI)					
BI-1	Tsma	Starlight Formation, Tuff of Arbon Valley	Late Miocene 7.7 m.y.	Rhyolitic ash-flow tuff, as much as 200 ft thick.	Armstrong and others, 1975; Rember and Bennett, 1979b; Trimble, 1982
BI-2	Tw	Walcott Tuff	Late Miocene 6.3 m.y.	Welded rhyolitic tuff.	Armstrong, 1972; Armstrong and others, 1975; Rember and Bennett, 1979b; Trimble, 1982; Trimble and Carr, 1976
	Tsma	Starlight Formation, Tuff of Arbon Valley	Late Miocene 7.7 m.y.	Rhyolitic ash-flow tuff, as much as 200 ft thick.	
	Tbr	Laharic breccia	Late to middle Eocene 40 to 47 m.y.	Laharic breccia consists of multiple flows of hornblende andesite. Angular blocks, as much as 12 ft in diameter in basal part of layered lahars. Probably more than 2,000 ft thick.	
BI-3	Trt	Rhyolitic tuff and rhyolite of Mitchell and Bennett (1979), and rhyolitic rocks of Mansfield (1952)	Pliocene	Rhyolitic ash-flow tuff. Includes some nonwelded tuff, air-fall tuff, lava flows, and breccias. Tuff probably less than 100 ft thick throughout most of Bingham County.	Mansfield, 1952; Mitchell and Bennett, 1979
BI-4	Trt	Rhyolitic tuff of Mitchell and Bennett (1979), and unnamed ash-flow units of Allmendinger (1980)	Pliocene and Miocene, oldest unit 5.86±0.18 m.y. old	In descending order, tuff units are: Rhyolitic ash-flow tuff of Mitchell and Bennett (1979), at least three cooling units with variable welding; Rhyolitic ash-flow tuff, welding variable, composite of several cooling units, 200 ft thick; Rhyolitic ash-flow tuff, strongly welded with thick vitrophyre at base, platy weathering, 600 ft thick; Rhyolitic ash-flow tuff, strongly welded with thin vitrophyre at base, 120 ft thick. Mansfield (1952) reports maximum thickness of 700 ft of tuff about 5 mi north of Mount Taylor, which lies on boundary of study area near center of area BI-4.	Allmendinger, 1980; Mansfield, 1952; Mitchell and Bennett, 1979

			BONNEVILLE COUNTY (BO)		
BO-1	Ttr		Pliocene	Rhyolite and trachyte.	Mansfield, 1952; Mitchell and Bennett, 1979
	Trt	Rhyolitic tuff and rhyolite of Mitchell and Bennett (1979), and rhyolitic rocks of Mansfield (1952)	Pliocene	Rholitic ash-flow tuff. Includes some nonwelded tuff, air-fall tuff, lava flows, and breccias. Tuff probably less than 100 ft thick in most of Bingham County.	
			CARIBOU COUNTY (CR)		
CR-1	Trh		Pliocene	Rhyolitic ash and welded tuff, dense, devitrified. About 65 ft thick.	Oriel and Platt, 1980
			CASSIA COUNTY (CS)		
CS-1	Tvg	Tuff of Goose Creek area	Miocene 8.5±0.3 m.y.	Rhyolitic ash-flow tuff. Thickest welded tuff, reported by Mapel and Hail (1959), is 23 ft in basal part of upper Salt Lake Formation. Only two very small outcrops along west border of area.	Armstrong and others, 1975, 1978; Compton, 1972; Mapel and Hail, 1959; Rember and Bennett, 1979a
	Tv		Miocene 8.2 to 10.8 m.y.	Rhyolitic ash-flow tuff, welded dacitic tuff, and rhyolitic lavas. Welded dacitic tuff, reported by Compton (1972), is as much as 40 ft thick. P. L. Williams (U.S. Geological Survey, oral commun., 1981) reported that most occurrences were no more than a few tens of feet thick.	
CS-2	Tv		Miocene 8.2 to 10.8 m.y.	Rhyolitic ash-flow tuff, welded dacitic tuff, and rhyolitic lavas. Welded dacitic tuff, reported by Compton (1972), is as much as 40 ft thick. P. L. Williams (U.S. Geological Survey, oral commun., 1981) reported that most occurrences were no more than a few tens of feet thick.	Armstrong and others, 1975, 1978; Compton, 1972; Rember and Bennett, 1979a

POWER COUNTY (P)					
P-1	Tsma	Starlight Formation, Tuff of Arbon Valley	Late Miocene 7.7 m.y.	Rhyolitic, multiple ash-flow sequences of slightly to well-indurated vitric crystal tuff containing 20 to 30 percent quartz, sanidine, and biotite crystals. Maximum thickness 100 ft, but generally much thinner.	Armstrong and others, 1975; Trimble and Carr, 1976
P-2	Tsma	Starlight Formation, Tuff of Arbon Valley	Late Miocene	Thin ash-flow tuff that locally forms middle member of Starlight Formation. Tuff less than 100 ft thick.	Trimble, 1976

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