DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

TO ACCOMPANY
WRI REPORT-83-4117-D

MAP SHOWING OUTCROPS OF THICK, DOMINANTLY ARGILLACEOUS SEDIMENTARY AND METASEDIMENTARY ROCKS, 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 reports contain detailed information on subjects that characterize the geohydrology of the province, including ground-water hydrology, ground-water quality, surface distribution of selected rock types, tectonic conditions, areal 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 report was prepared from published geologic maps and reports utilizing the project guidelines defined in Sargent and Bedinger (1984). The map shows the known occurrences of argillaceous sedimentary and metasedimentary rocks which include shale, claystone, mudstone, siltstone, argillite, slate, and schist. The argillaceous units commonly include non-argillaceous rocks, such as sandstone and limestone, which were deposited with argillaceous rocks. The project guidelines include mapping argillaceous rock units of more than 500 ft in thickness, but because argillaceous rocks may impede the movement of ground-water and commonly have sorptive properties, locally units of lesser thickness were included. The Description of Map Units includes the geologic age, lithology, thickness where available, and sources of data for the argillaceous units within arbitrarily outlined and numbered areas in counties within the study area.

DESCRIPTION OF MAP UNITS
[To convert feet (ft) to meters, multiply feet by 0.3048]

County-area number	Map symbol	Geologic unit	Geologic age	Lithology and comments	References for county area
			BANNOCK COUNTY		
B-1	Cb(?)	Bloomington Formation(?)	Middle Cambrian	On Pocatello 2° map these outcrops are called Bloomington Formation; however, shown as Brigham Quartzite on map by Ludlum (1943).	Ludlum, 1943; Rember and Bennett, 1979a
B-2	Bi	Inkom Formation	Late Proterozoic	Upper part is argillite or slate, siltite, and quartzite grading downward into phyllite in lower part. Thickness, 850 to 2,300(?) ft.	Ludlum, 1943; Rember and Bennett, 1979a; Trimble, 1976
	Bpu	Pocatello Formation, upper member	Late Proterozoic	Upper one-third is interbedded quartzite and argillite; lower two-thirds is slaty to phyllitic argillite and contains quartzite interbeds in upper part. Thickness is 1,800 to 5,000(?) ft.	
B-3	Bi	Inkom Formation	Late Proterozoic	Phyllitic and massive argillite, some conglomerate at base. Thickness, 850 to 900 ft.	Corbett, 1978
	Cb	Bloomington Formation	Middle Cambrian	Limestone and limestone conglomerate interbedded shale, argillite, and siltstone. Maximum thickness, 1,705 ft.	
B-4	Clb	Lead Bell Shale	Middle Cambrian	Mainly mudstone and some limestone interbeds. Thickness, 400 ft.	Oriel, 1965
	Cb	Bloomington Formation	Middle Cambrian	Mostly mudstone and claystone some siltstone and sandstone interbeds; limestone moderately abundant in upper part. Thickness, 1,000 ft.	
B-5	Clb	Lead Bell Shale	Middle Cambrian	Mainly mudstone but includes some limestone. Thickness is 400 to 500 ft.	Oriel and Armstrong, 1971; Oriel and Platt, 1968, 1980
	Cb	Bloomington Formation	Middle Cambrian	Mainly mudstone and clay and some interbeds of quartzitic siltstone and sandstone. Limestone moderately abundant locally, and conglomeratic limestone interbeds in middle and lower parts. Thins southeastward from 1,000 to 870 ft.	
			BINGHAM COUNTY		
BI-1	Rd	Dinwoody Formation	Early Triassic	Mudstone, shale, and limestone, 1,000 ft thick.	Rember and Bennett, 1979b; Trimble, 1982

	TRtr	Thaynes Formation, Ross Fork Limestone Member	Early Triassic	Uppermost part is silty limestone; middle is shale or siltstone and and silty limestone; basal part, limestone separated by shale. The Ross Fork, the basal member of Thaynes Formation, is 1,700 ft thick.	
BI-2	TRd	Dinwoody Formation	Early Triassic	Siltstone and silty limestone. Rocks assigned to Woodside Shale by Mansfield (1952). Thickness, 1,200 to 1,804 ft.	Allmendinger, 1980; Mansfield, 1952; Mitchell and Bennett, 1979
	TRt	Thaynes Formation, main part	Early Triassic	Upper part, sandy limestone. Middle part, sandstone. Lower part, shale, limestone, and minor sandstone. Thickness, 1,099 to 1,706 ft.	
BI-3	TRd	Dinwoody Formation	Early Triassic	Shale containing some very thin sandy beds, and in middle and upper parts, thin limestone beds. Rocks assigned to Woodside Shale by Mansfield (1952). Thickness, 2,000 ft.	Mansfield, 1952; Mitchell and Bennett, 1979
	TRt	Thaynes Formation	Early Triassic	Outcrop on map mostly the lower member of the Thaynes (Ross Fork Limestone Member) which consists of about 500 ft of shale underlain by 800 ft of massive to thin-bedded limestone interbedded with shale.	

CASSIA COUNTY

C-1	Mm	Manning Canyon Shale	Late Mississippian	Dark argillite and siliceous siltstone, shale, limestone, and conglomerate; exposed in several thrust sheets.	Armstrong and others, 1978
C-2	PMm	Manning Canyon Shale	Early Pennsylvanian and Late Mississippian	Dark argillite, siliceous siltstone, shale, limestone, and conglomerate.	Armstrong and others, 1978
C-3	TRd	Dinwoody Formation	Early Triassic	Shale, sandstone, and thin limestone beds.	Armstrong and others, 1978
C-4	PMm	Manning Canyon Shale	Early Pennsylvanian and Late Mississippian	Dark argillite, siliceous siltstone, shale, and lenses of quartzite and limestone. Estimated minimum thickness, 6,560 ft.	Smith, 1982

CARIBOU COUNTY

CA-1	TRd	Dinwoody Formation	Early Triassic	Platy shales alternating with thin limestone beds. Rocks assigned to the Woodside Shale by Mansfield (1929).	Mansfield, 1929, 1952; Oriel and Platt, 1980

	$\overline{R}$t	Thaynes Formation	Early Triassic	Thaynes includes from top to bottom: Portneuf Limestone Member (2,600 ft), massive cherty limestone. Fort Hall Member (800 to 1,000 ft), mostly limestone but some sandstone at base. Ross Fork Limestone Member (1,800 to 2,600 ft), an upper 500-ft-thick shale overlying 800 ft of interbedded limestone and shale, and basal 50-ft-thick limestone.	
CA-2	$\overline{R}$d	Dinwoody Formation	Early Triassic	Upper one-third to one-half is mostly thin- to thick-bedded limestone interbedded with shale and siltstone. Remainder is mostly siltstone and shale and some thin limestone. Dinwoody ranges in thickness from 1,600 to 2,500 ft. Rocks assigned to the Woodside Shale by Mansfield (1927).	Armstrong, 1969; Cressman, 1964; Cressman and Gulbrandsen, 1955; Gulbrandsen and others, 1956; Mansfield, 1927; Oriel and Platt, 1980; Rioux and others, 1975
	$\overline{R}$t	Thaynes Formation	Early Triassic	Upper 600 to 1,000 ft mostly limestone, sandstone, and siltstone. Middle 1,100 to 1,700 ft mostly siltstone and shale and some thin limestones in lower part. Lower 500 to 850 ft mostly limestone and lesser amounts of shale and siltstone. Thaynes Formation ranges from 2,100 to 3,200 ft in thickness.	
CA-3	ϵb	Bloomington Formation	Middle Cambrian	Interbedded shale and limestone; limestone more abundant in middle. Much limestone conglomerate. Formation, 1,480 ft thick.	Armstrong, 1969
CA-4	ϵlb	Lead Bell Shale	Middle Cambrian	Mainly mudstone but includes some limestone. Thickness, 400 to 500 ft.	Oriel, 1968; Oriel and Armstrong, 1971; Oriel and and Platt, 1968, 1980
	ϵb	Bloomington Formation	Middle Cambrian	Mainly mudstone and claystone and some siltstone and sandstone interbeds. Limestone moderately abundant in upper part. Thickness, 1,000 ft.	

FRANKLIN COUNTY

F-1	ϵlb	Lead Bell Shale	Middle Cambrian	Mainly 400 to 500 ft of mudstone but includes some limestone.	Oriel and Armstrong, 1971; Oriel and Platt, 1968, 1980
	ϵb	Bloomington Formation	Middle Cambrian	Mainly mudstone and claystone and some interbeds of quartzitic siltstone and sandstone. Locally, limestone is moderately abundant, and interbeds of conglomeratic limestone occur in middle and lower parts. Thickness, 870 to 1,000 ft.	

F-2	pЄa	Unnamed Precambrian unit	Precambrian	Argillite and minor volcanic rocks.	Rember and Bennett, 1979a
F-3	Єb	Bloomington Formation	Middle Cambrian	Shale and limestone.	Rember and Bennett,1979a
			ONEIDA COUNTY		
O-1	Єb	Bloomington Formation	Middle Cambrian	Shale and limestone.	Rember and Bennett, 1979a
			POWER COUNTY		
P-1	₱Mm	Manning Canyon Shale	Early Pennsylvanian and Late Mississippian	Shale and argillite interbedded with limestone, siltstone, sandstone and with quartzite mainly in lowermost and uppermost parts. Thickness, 1,200 ft.	Trimble and Carr, 1976
P-2	Mm	Manning Canyon Shale	Late Mississippian	Black shale and quartzite.	Rember and Bennett, 1979a
P-3	Єb	Bloomington Formation	Middle Cambrian	Limestone interbedded with nearly equal quantities of shale, argillite, and siltstone. Quartzite more than 80 ft thick occurs about 700 ft above the base. Thickness, 1,800 ft.	Trimble, 1976; Trimble and Carr, 1976

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