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TRENCH SECTIONS OF THE IRWIN QUADRANGLE, IDAHO-WYOMING

Trench section No. 1
Complete section of Phosphoria formation
Southwest end of Red Ridge above Bear Creek
NW¼ sec. 20, T. 1 S., R. 45 E., Boise meridian, Idaho
[Measured by B. N. Moore]

	Thickness (feet)	Lithology	$Ca_3(PO_4)_2$ (B.P.L.) (percent)	Sample No.
Rex chert member	16.0	Chert, black, weathers gray.		
	37.2	Concealed by hill wash; fragments of phosphate rock are present.		
Phosphatic shale member	10.3	Shale and siltstone, black, noncalcareous; many streaks of black oolitic phosphate rock.		
	1.6	Phosphate rock, black, coarsely oolitic.	52.96	6
	5.2	Siltstone and shale, black, noncalcareous; thin streaks of phosphate rock.		
	0.6	Phosphate rock, black, oolitic.		
	0.5	Siltstone, black, noncalcareous; laminae of phosphate rock		
	4.6	Phosphate rock, black, oolitic:		
		Upper part (not trenched)	57.07	5
		Lower part (trenched)	57.33	4
	1.3	Siltstone, black, noncalcareous; weathers brown.		
	6.8	Phosphate rock, black, oolitic:		
		Upper half	59.56	3
		Lower half	62.68	2
	2.3	Siltstone, black, noncalcareous.		
	1.0	Phosphate rock, black, oolitic.		
	1.6	Siltstone, black, noncalcareous.		
	0.3	Phosphate rock, black, oolitic.		
	1.2	Siltstone, thin-bedded, noncalcareous.		

Trench section No. 1.

67 feet to top of Wells formation.

TRENCH SECTIONS OF THE IRWIN QUADRANGLE, IDAHO-WYOMING

Trench section No. 2
Complete section of the phosphatic shale member of the Phosphoria formation
Mountain spur north of Indian Creek
NW¼ sec. 36, T. 1 N., R. 43 E., Boise meridian, Idaho
[Measured by B. N. Moore]

	Thickness (feet)	Lithology
Rex chert member		
	2.5	Shale, black; a few laminae of phosphate rock.
	12.0	Siltstone and clay, brown.
	1.1	Shale, black; a few thin layers of phosphatic shale.
	1.1	Shale, black; phosphatic in upper part.
	3.7	Siltstone, brown, calcareous.
Phosphatic shale member	1.0	Shale, black.
	1.0	Phosphate rock.
	1.2	Shale, black.
	0.7	Phosphate rock, black, oolitic.
	1.3	Shale and siltstone, black; many thin laminae of phosphate rock.
	2.2	Phosphate rock, black, oolitic.
	0.2	Shale, black.
	4.4	Siltstone, brown; some thin layers of shale.
	2.4	Phosphate rock, gray, oolitic; becomes brown in upper part.
	0.6	Siltstone, brown.
	0.7	Chert, black.
	1.1	Chert, black, phosphatic; impressions of oolites.
	1.6	Siltstone, gray to brown.
	1.0	Phosphate rock, granular.
	1.7	Siltstone, gray to brown.
	0.3	Phosphate rock, black, oolitic.
	4.2	Siltstone, gray to brown.
Wells formation		

Trench section No. 2

61-53

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TRENCH SECTIONS OF THE IRWIN QUADRANGLE, IDAHO-WYOMING

Trench section No. 3

Complete section of the phosphatic shale member of the Phosphoria formation
Near head of Papoose Creek
NE¼ sec. 21, T. 1 N., R. 43 E., Boise meridian, Idaho
[Measured by B. N. Moore]

	Thickness (feet)	Lithology	$Ca_3(PO_4)_2$ (B.P.L.) (percent)	Sample No.
Rex chert member		Chert, black.		
	45.0	Concealed. Includes part of chert member. Float of phosphate rock is present in the hillwash.		
Phosphatic shale member	1.8	Siltstone, black.		
	1.4	Phosphate rock, coarsely oolitic.		
	2.3	Siltstone, black; a few streaks of phosphate rock		
	1.4	Phosphate rock, oolitic.		
	1.4	Siltstone, black.		
	6.7	Phosphate rock, black, oolitic; 0.9 feet of very coarse oolitic phosphate at the top.		
	1.4	Siltstone, black.		
	1.3	Phosphate rock, black, oolitic.		
	0.6	Siltstone, black.		
	1.5	Phosphate rock, black, oolitic.		
	2.7	Siltstone, black; weathers to white, somewhat silicified rock.		
	0.2	Phosphate rock, oolitic ----------	72.55	1
	7.1	Siltstone, black; weathers to somewhat silicified white rock.		
Wells formation				

Trench section No. 3

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TRENCH SECTIONS OF THE IRWIN QUADRANGLE, IDAHO-WYOMING

Trench section No. 4
Section of the phosphatic shale member of the Phosphoria formation
Northeast end of the high mountain ridge northwest of Pritchard Creek
SE¼ sec. 36, T. 2 N., R. 42 E., Boise meridian, Idaho
[Measured by B. N. Moore]

	Thickness (feet)	Lithology	$Ca_3(PO_4)_2$ (B.P.L.) (percent)	Sample No.
Rex chert member				
	53.0	Concealed. Float in hillwash contains oolitic phosphate rock.		
Phosphatic shale member	2.0	Siltstone, black.		
	2.1	Phosphate rock, oolitic	68.42	4
	1.4	Siltstone, black.		
	4.9	Phosphate rock, oolitic	69.89	3
	1.0	Siltstone, black.		
	2.1	Phosphate rock, oolitic	65.30	2
	0.8	Siltstone, black.		
	2.0	Phosphate rock, oolitic	55.04	1
Wells formation				

Trench section No. 4

48127

61-53

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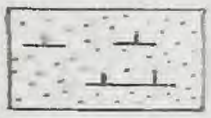
Explanation for columnar and trench sections

IRWIN QUADRANGLE, IDAHO-WYOMING

Sandstone

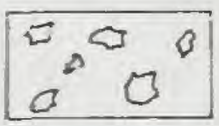
Conglomerate



Calcareous sandstone

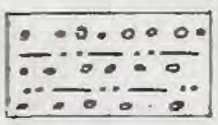
Chert

Limestone



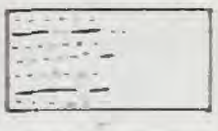
Breccia

Shale



Phosphate rock

Siltstone



Poorly exposed

Covered

COLUMNAR SECTIONS OF THE IRWIN QUADRANGLE, IDAHO-WYOMING

COMPOSITE COLUMNAR SECTION OF TRIASSIC, PERMIAN, PENNSYLVANIAN, AND MISSISSIPPIAN ROCKS IN THE CARIBOU MOUNTAINS, SOUTHEASTERN IDAHO

MEASURED AT VARIOUS PLACES IN THE VICINITY OF CARIBOU MOUNTAIN IN T3 AND 4S., R44 AND 45E.

CENOZOIC				166 Red beds; mostly fine-grained sandstone.
MESOZOIC	TRIASSIC	UPPER	Ankareh	59 Limestone, gray, very hard, compact homogeneous, finely crystalline, nonfossiliferous, with a very few thin beds of red calcareous siltstone. 178 Red beds; shale, siltstone and sandstone; mostly noncalcareous and nonresistant; has some beds of dark red hard sandstone. 51 Sandstone, tan to olive drab, fairly resistant, noncalcareous; in beds 4 to 6 feet thick.
				215 Red beds; mostly siltstone, mostly red calcareous sandstone.
				47 Shale, red, poorly exposed. 27 Sandstone, white to buff, noncalcareous, quartzitic; fresh surfaces are spotted black.
			Thaynes limestone	113 Limestone, dark gray to black, hard; alternating with beds of nonresistant red shale. 36 Limestone, light gray to black, coarsely crystalline, fossiliferous; nonresistant; lower part is siliceous and very hard. 28 Limestone, gray brown and black; finely crystalline and sandy in middle; coarsely crystalline at top and at base. 66 Limestone, black to brown, sandy, finely crystalline. 43 Limestone, gray, poorly exposed; interbedded with sandy limestone; weathers brownish. 94 Limestone, gray, medium-bedded; has occasional bed of finely crystalline black limestone. 85 Limestone, gray, siliceous, thin-bedded, platy; contains some reddish layers; dark gray, hard, finely crystalline at the base; has 12 feet tan sandstone at the base. 20 Limestone, gray, finely crystalline, very hard. 16 Sandstone, tan brown and buff, calcareous. 53 Limestone, white to yellow, thin-bedded to platy, has 6 feet dark-gray limestone at top, and 8 feet of brown sandstone at the base. 86 Limestone, gray to dark gray; interbedded with sandy brown calcareous siltstone; has 11 feet dark-gray fossiliferous limestone at top. 29 Limestone, dark to light-gray, finely crystalline, cliff-forming. 85 Sandstone, gray weathering yellowish-gray, calcareous, poorly exposed. 75 Limestone, gray weathering yellowish, sandy; in beds up to one foot thick; some thin bands of nodular chert; upper part cliff-forming. 64 Limestone, gray weathering white, massive-bedded, cliff-forming; some thin lenticular beds of sandstone and many nodules and bands of chert. 72 Sandstone, dark-gray weathering yellow, very calcareous. 16 Sandstone, white, noncalcareous. 24 Limestone, gray, finely-crystalline, cliff-forming; rusty outlines of fossils on weathered surfaces. 123 Sandstone, gray weathering grayish-buff, thin-bedded, calcareous; weathers to smooth slopes; contains beds of dark-gray limestone up to 6 inches thick near top. 42 Limestone, gray, cliff-forming; locally becomes sandy and shaly with much platy calcareous sandstone with conspicuous MnO_2 staining. 70 Limestone, gray and pink, finely-crystalline, compact, cliff-forming; in beds 3 inches to 2 feet thick separated by beds of shaly limestone 1/4 inch to 3 inches thick.
		LOWER	Woodside shale	303 Red beds, poorly exposed; mostly fissile red shale and siltstone; some outcrop of greenish-gray siltstone. 50 Siltstone, greenish-gray; interbedded at top and bottom with red shale. 13 Sandstone, gray, calcareous, thin-bedded; and greenish-gray fissile silty calcareous shale. 87 Red beds, poorly exposed, mostly brick-red, thin-bedded calcareous sandstone with pea-sized geodes lined with calcite.
			Dinwoody	57 Siltstone, greenish-gray, highly calcareous; forms top of ridge. 147 Siltstone, olive-drab, calcareous, platy; limestone makes up about 20 percent of unit. 40 Siltstone, olive-drab, cliff-forming, thin irregular beds, very calcareous. 75 Siltstone, greenish-gray, calcareous; and gray limestone in thin beds. 375 Sandstone and siltstone, brownish-gray to greenish-gray, thin-bedded; has random thin beds of gray limestone; contains many fragments of fossils; slightly calcareous on fresh surface, noncalcareous on weathered surface.
	PERMIAN		Rex chert member	78 Limestone, gray, siliceous, poorly exposed; weathers to white chert.
			Phosphoria formation	57 Chert, black; lower part is well-bedded in layers as much as 6 inches thick. 26 Chert and limestone, black and gray 37 Concealed. Hill wash contains fragments of phosphate rock. 37 Phosphate rock, oolitic in thin layers interbedded with black siltstone and shale. 32 Chert, dark-gray; interbedded with fine-grained gray quartzite. 35 Sandstone or quartzite and chert, gray to black; has 4 feet of siliceous limestone at base. 39 Sandstone, very light-gray weathering tan; forms steep slope.
			Phosphatic shale member	
	PENNSYLVANIAN		Wells sandstone	86 Sandstone, tan to gray, cliff-forming. 140 Sandstone and limestone; mostly concealed by talus, but some discontinuous outcrops show sugar-textured limestone that contains angular fragments of bluish-gray chert. Limestone 25 feet above base has worm trails and borings. Interval probably is mostly nonresistant limestone. 60 Quartzite, white to gray, noncalcareous; thin beds show through talus in upper part; well exposed in lower part. 74 Quartzite, white to light pink, noncalcareous; has 4 feet of deep red to brown sandstone at top. 87 Concealed. Talus is mostly reddish-gray sandstone and white quartzite. 32 Quartzite, white to pale pink, crossbedded 53 Concealed 50 Quartzite, white to light gray, poorly bedded. 182 Concealed. Talus is coarse quartzite boulders. 28 Sandstone, white weathering light buff, well cemented, noncalcareous. 70 Concealed. Talus is coarse white sandstone. 74 Quartzite, white to pink, medium- to fine-grained, noncalcareous, iron-stained; many grains have fresh crystal faces. 86 Concealed. 88 Quartzite, white to pink. 117 Concealed. Talus is quartzite boulders. 16 Quartzite white to pink, medium- to fine-grained, thin-bedded, resistant, noncalcareous.
PALEOZOIC			Undifferentiated (Amsden?)	348 Concealed. Talus is mostly boulders of Wells quartzite. Elsewhere the interval shows some beds of gray limestone, pink to red siltstone and silty limestone, and gray to pink sandstone.
	MISSISSIPPIAN		Brazer limestone	187 Limestone, gray, massive- to thick-bedded, cliff-forming; contains many horn corals; has some thin layers and lenses of nonresistant gray calcareous siltstone. 50 Limestone, light-gray; some layers or areas are brecciated and recemented; some layers are sugar-textured limestone. 61 Concealed. Talus is limestone boulders. 50 Limestone, light-gray; some layers are sugar-textured limestone. 28 Concealed. 80 Limestone, light-gray, massive- to thick-bedded; contains lenses and nodules of light-gray chert; has some geodes lined with quartz and calcite; contains many horn corals and productid brachiopods.

COLUMNAR SECTIONS OF THE IRWIN QUADRANGLE, IDAHO-WYOMING

COMPOSITE COLUMNAR SECTION OF CRETACEOUS AND JURASSIC ROCKS IN THE CARIBOU MOUNTAINS, SOUTHEASTERN IDAHO

MEASURED ALONG THE SIDES OF FALL CREEK CANYON IN T.1N.,R.42 AND 43E.

ERA	SYSTEM	SERIES	FORMATION			
MESOZOIC	CRETACEOUS	UPPER	Wayan	C	300+	Shale, purplish-red, poorly exposed.
				C	60	Siltstone and shale, red, gray and greenish-gray, has 10 feet of salt-and-pepper sandstone at top.
				C	94	Shale, red, poorly exposed.
					29	Sandstone and shale, salt-and-pepper and gray, calcareous; has 2 feet of siltstone at the base.
				C	248	Shale, gray, sandy, calcareous; grades upward with red shale, mostly concealed.
					290	Shale, greenish-gray, slightly calcareous, locally becomes silty.
					118	Shale, greenish-gray, noncalcareous; has 15 feet of fine-grained calcareous sandstone at the top and 3 feet at the base.
				C	72	Concealed. Lots of sandstone fragments.
					20	Sandstone, salt-and-pepper, calcareous, thin-bedded.
				C	100	Concealed. Has 10 feet of dark-gray sandstone in lower part; probably largely red shale in lower part and gray shale and siltstone in upper part.
					30	Siltstone, calcareous; red in upper part, greenish-gray in lower part.
					89	Shale and siltstone, red, brown and purple, calcareous; has some greenish-gray beds.
					34	Sandstone, siltstone, and shale, salt-and-pepper and gray, calcareous; some red beds.
					94	Shale and sandstone, red and dark gray to greenish-gray, calcareous; in alternate units 5 to 40 feet thick.
					83	Shale, red, calcareous, with some gray to red sandstone and thin beds of limestone.
					32	Shale, red; with thin layers of gray sandstone and with 2 feet of hard siltstone at base.
					55	Shale, red.
					25	Sandstone, gray, thin-bedded; has brown shale near middle.
					110	Shale; alternate thick units of gray and red; has salt-and-pepper sandstone near the middle.
					21	Sandstone, brownish-gray, fine-grained, noncalcareous; with red shale near the middle.
					12	Shale, purplish-red and green, calcareous; and dark gray calcareous sandstone.
					39	Shale, purplish-red; has 4 feet of dark-gray calcareous, fine-grained sandstone near middle.
					76	Shale, red and purplish-gray; has dark-gray sandstone at bottom and top.
				C	80	Shale, gray; mostly covered.
					35	Sandstone, dark-gray, calcareous, fine-grained
					200	Shale, red and purple; contains several beds of salt-and-pepper sandstone.
					65	Sandstone, dark-gray, thin-bedded, medium-grained, calcareous.
				C	70	Concealed. Soil is red.
					20	Sandstone, salt-and-pepper, noncalcareous.
					210	Shale, gray to red; has a few thin beds of gray sandstone.
			Beer River		80	Sandstone, dark greenish-gray, noncalcareous, fine-grained, ledge-forming.
				C	40	
					25	Sandstone, dark-gray, noncalcareous.
					80	Shale, dark greenish-gray; and yellowish-gray siltstone.
					155	Shale, black; becomes dark-gray upward.
					40	Shale, black, noncalcareous, concretionary; has dark-gray limestone in lower part.
				C	30	Concealed. Soil is black.
					45	Siltstone, dark greenish-gray, massive, slightly calcareous; has 8 feet of greenish-gray to reddish-gray shale at base.
				C	40	Concealed. Probably greenish-gray to red shale.
			Tygee sandstone		55	Shale and sandstone, greenish-gray to brown, calcareous; some fossiliferous limestone in lower part.
					46	Shale, siltstone and sandstone, red, calcareous, impure; in beds 1 to 6 feet thick.
					62	Shale, red to reddish-gray, calcareous, and gray sandstone; has dark greenish-gray shale at base.
					22	Shale, gray to olive-green, calcareous; has some reddish-gray siltstone and dark-gray sandstone.
					51	Shale and siltstone, greenish-gray and red, calcareous.
					29	Siltstone and shale, red to dark greenish-gray, calcareous.
				C	62	Shale and limestone, black to dark gray.
			Draney limestone		48	Concealed. Probably black shale and dark-gray limestone. Has 4 feet dark-gray limestone exposed in middle.
					64	Shale and limestone, dark gray; limestone weathering light gray to white.
					87	Shale, medium-gray, calcareous; some thin beds of dark-gray limestone.
					26	Limestone, dark [illegible]
					68	Limestone, [illegible] gray, or calcareous shale.
					95	Shale and limestone, black, gradational.
			Bechler shale		54	Shale, purplish-red, calcareous; has 8 feet of red, green, and gray spotted siltstone near the middle.
					16	Limestone, gray, very shaly.
					54	Shale, siltstone, purplish-red to gray, calcareous; and dark-gray shaly limestone.
					81	Siltstone, red to gray, calcareous; some gray sandstone and purplish-gray limestone.
					54	Shale, siltstone and sandstone, red to greenish-gray, calcareous.
					37	Siltstone, red to gray, calcareous; with some sandstone.
					57	Shale, red to greenish-gray; with some reddish-gray argillaceous limestone and gray siltstone.
					78	Siltstone, red to gray, calcareous; has some beds and lenses of fine-grained gray sandstone.
					38	Siltstone, greenish-gray to mottled red and gray; has light-gray sandstone; base is unexposed.
		LOWER Gannett group	Paterson limestone		54	Limestone, light- to medium-gray, finely-crystalline to dense, resistant.
					38	Limestone, light to dark-gray, upper part has stringers and lenses of dark-gray chert.
					36	Limestone, purplish-red to gray, finely crystalline.
			Ephraim		98	Shale, red; has red siltstone in lower part and bluish-gray limestone in upper part.
					25	Sandstone, white to gray, fine- to coarse-grained, crossbedded, slightly calcareous to noncalcareous.
					105	Shale, siltstone and sandstone, red to white; sandstone is noncalcareous, other rocks are calcareous.
					79	Shale, red, calcareous; has 6 feet of white calcareous fine-grained sandstone in lower part.
					14	Limestone, blue-gray; with thin red shale and siltstone.
					37	Shale, red and calcareous; with gray calcareous sandstone at top.
					69	Shale, red, calcareous; has yellow and purple sandstone at top.
			Stump sandstone		86	Siltstone, red to purple, calcareous; with some gray sandstone and red shale.
					92	Shale, red.
					34	Sandstone, gray to pink, slightly calcareous; has thin layers of fine conglomerate.
					101	Shale, red, calcareous; and brown to gray calcareous sandstone.
					118	Shale, red; has some light-gray quartzitic sandstone near base and at top.
					29	Sandstone, light gray, quartzitic and some purple calcareous sandstone.
					163	Shale, red; apparently has some beds of red sandstone and conglomerate.
					112	Shale, red; poorly exposed.
					70	Shale and siltstone, red and purple.
					120	Conglomerate, gray to brown, noncalcareous; has pebbles up to 1 inch in diameter. Upper 40 feet has lenses of coarse-grained sandstone.
					31	Shale, greenish-gray, calcareous; silty limestone near top.
					15	Porphyry sill.
					45	Shale, bluish-gray, calcareous; has 6-inch bed of gray silty limestone.
					79	Shale, bluish-gray to greenish-gray, calcareous, fossiliferous; has thin beds of argillaceous limestone.
				C	110	Concealed. Probably greenish-gray calcareous fissile shale.
					70	Shale, greenish-gray, calcareous, fissile.
					40	Concealed
					95	Sandstone, greenish-gray, very calcareous; becomes silty upward.
				C	30	Concealed
					71	Limestone or calcareous sandstone, gray to greenish-gray, crossbedded.
					75	Siltstone, red; calcareous and noncalcareous in alternate layers; has greenish-gray shale near the top and red calcareous sandstone at base.
					96	Shale, red, noncalcareous; much red siltstone and some sandstone. At 70 feet above base is a 1-inch layer of white porous noncalcareous ash.
					25	Sandstone, red, calcareous, fine-grained.
					41	Shale, red, noncalcareous; and red calcareous siltstone and sandstone.
		UPPER	Preuss sandstone		180	Siltstone, red, calcareous; has some layers of greenish-gray and red siltstone.
					140	Siltstone, red, blocky; and greenish-gray calcareous massive siltstone.
					46	Limestone or calcareous siltstone or sandstone, reddish-gray to greenish-gray, thin-bedded; becomes more calcareous upward.
					102	Limestone, bluish-gray, silty.
			Twin Creek limestone		450	Limestone, dark-gray weathering light-gray; becomes shaly upward.
					25	Concealed. Probably dark-gray shaly limestone.
					67	Limestone, dark-gray, shaly, compact, shaly shale partings or some thin layers of oolitic limestone.
					90	Limestone, dark-gray, medium-crystalline; has thin shale partings and some beds of oolitic limestone.
					25	Shale, red, silty, calcareous.
					62	Limestone, dark-gray, silty; and extremely calcareous gray siltstone.
					15	Limestone is very oolitic at base.
					37	Shale and limestone, bluish-gray, contorted and mashed.
					63	Limestone, dark-gray, in lower part, travertine-like in lower part which contains fragments of dark-gray limestone, red shale and light-gray chert.
					44	Sandstone, red and yellow, noncalcareous; grades upward into 17 feet of red calcareous shale and siltstone.
					40	Sandstone, reddish-gray, brown and purple, fine-grained, [illegible] stone; some beds near middle are very silty and argillaceous.
					140	Sandstone; off-white in lower part and at top, reddish-brown in middle, noncalcareous and fine-grained.
		MIDDLE	Nugget sandstone	C	210	Sandstone, pink to white, noncalcareous, fine-grained, well-bedded; some beds are crossbedded and some are ripple-marked.
					91	Concealed. Slope is covered with sandstone fragments similar to rock above.
					66	Sandstone, reddish-gray to light-brown, very fine-grained, noncalcareous, ripple-marked, contains scattered mud balls and mud streaks; weathers to irregularly striped gray and light-brown surfaces.
						Sandstone, light-gray, slightly calcareous, fine-grained; many mud cracks in lower part; upper 2 feet is light-brown coarse-grained noncalcareous sandstone.

PRELIMINARY GEOLOGIC MAP OF THE IRWIN QUADRANGLE

CARIBOU AND BONNEVILLE COUNTIES, IDAHO, AND LINCOLN AND TETON COUNTIES, WYOMING

by L. S. Gardner

EXPLANATION OF FORMATION SYMBOLS

	Qal Alluvium	Qc Colluvium	Qls Landslide debris	Qt Travertine	Ql Loess	QUATERNARY
			Qm Glacial deposits			
Pliocene (?)	Tv Thin rhyolite and basalt and (or) andesite flows			Td Dikes and other igneous intrusive bodies		TERTIARY
			Tls Salt Lake formation			

	WESTERN AREA	EASTERN AREA	
Upper Cretaceous		Kf Frontier formation	CRETACEOUS
	Kw Wayan formation	Ka Aspen shale	
	Kbr Bear River formation		
Lower Cretaceous	Kt Tygee sandstone		
	Kd Draney limestone		
	Kb Bechler shale		
	Kp Peterson limestone	Kg Gannett group	
	Ke Ephrain conglomerate		
Upper Jurassic	Js Stump sandstone		JURASSIC
	Jp Preuss sandstone		
Middle Jurassic	Jtc Twin Creek limestone		
Lower Jurassic	Jn Nugget sandstone		
Lower Triassic	Ta Ankareh formation		TRIASSIC
	Tt Thaynes limestone		
	Tw Woodside formation		
	Td Dinwoody formation		
	Pp Phosphoria formation	Cp	PERMIAN
	Cw Wells formation		PENNSYLVANIAN
	Ca Amsden formation		
Upper Mississippian	Cb Brazer limestone		MISSISSIPPIAN
Lower Mississippian	Cm Mission Canyon limestone		
Madison group	Cml Lodgepole limestone		
Middle and Upper Devonian	Djt Darby formation		DEVONIAN
Upper Ordovician	Ob Bighorn dolomite		ORDOVICIAN
Upper Cambrian	Cg Gallatin limestone		CAMBRIAN
Middle Cambrian	Cgv Gros Ventre formation		

CARBONIFEROUS