

SYSTEM	SERIES	STRATIGRAPHIC UNIT	LITHOLOGY	THICKNESS (FEET)	DESCRIPTION
TERTIARY	Oligocene to Pliocene (?)	Gravel deposits		10 to 25	High-level gravel, brown to red; pebbles, cobbles, and boulders of Precambrian quartz, quartzite, and schist and a minor amount of Paleozoic chert. Mapped by Darton and Paige (1925) as White River Formation.
		UNCONFORMITY			
		Pierre Shale		650+	Shale, dark-gray; weathers brown; breaks into blocky irregular fragments; plastic; contains bentonite as beds 2+ feet thick and as partings. Shale in lower 60+ feet, light-gray; weathers light brown; contains ironstone concretions and fracture fillings of hematite.
		Niobrara Formation		265+	Calcareous shale and marl, gray; weathers tan with gray flecks. Shale thinly laminated; orange-weathering spherical concretions in middle part. Grades into underlying Carlile Shale.
		Carlile Shale			Sage Breaks Member: shale, dark-gray; sandy concretions as much as 8 feet in diameter in lower part.
					Turner Sandy Member: sandstone, gray-brown, calcareous, fine- to medium-grained, subangular, thin-bedded, micaceous; interbedded with silty limestone and gray noncalcareous shale; sandy calcareous concretions dispersed throughout and a zone of concretions 8 feet in diameter at base.
					Lower shale member: shale, gray, silty; some calcareous mudstone interbedded in lower part.
		Greenhorn Formation		35 to 80	Limestone, gray; weathers buff; fossiliferous (<i>Inoceramus labiatus</i>); thin bedded with calcareous shale interbeds; generally forms ridge crests and underlies dipslopes.
				190 to 280	Shale and a few thin limestone beds. Shale, dark-gray; weathers brown; bentonite beds as much as 2 feet thick in upper part. Limestone calcarenite, gray-brown, thin-bedded; composed of fragments and calcite prisms from pelecypod shells. Contact of unit with underlying Belle Fourche Shale drawn at base of lowest persistent limestone bed.
		Belle Fourche Shale		240+	Shale, dark-gray, clayey; bentonite as partings in the shale and as beds 5 inches to 2 feet thick throughout. Iron-manganese concretions, 2 feet thick and 6 feet across, in lower 50 feet and at base.
		Mowry Shale		125+	Shale, dark-gray, weathers medium-gray, fissile; some beds sandy or silty; bentonite as partings in shale or as beds 1+ foot thick; locally a bentonite bed 2+ feet thick at top. Basal contact drawn at the top of highest sandstone bed where Newcastle Sandstone is present; where Newcastle is absent, contact is drawn between light-colored fissile shale and the underlying darker Skull Creek Shale.
		Newcastle Sandstone		25 to 45	Sandstone, siltstone, and shale. Sandstone, light-brown, fine- to medium-grained, poorly sorted; generally thin slabby bedding but lenses 6 feet thick massively bedded; locally contains carbonized wood. Siltstone and shale, brown-gray, interbedded with the sandstone. From Rapid Creek south to sec. 19, T. 1 N., R. 8 E., the sandstone grades laterally into siltstone and shale.
JURASSIC	Upper Jurassic	Skull Creek Shale		190 to 260	Shale, dark-gray; weathers light brown; breaks into large fragments; interbedded with siltstone; very fine grained sandstone lenses in upper part.
		Fall River Formation		125+	Sandstone interbedded with shale and siltstone. Sandstone, gray to light-brown; weathers red to brown; fine grained; thinly and evenly bedded; commonly ripple marked; a few lenses of conglomerate at contact with Lakota. Shale, tan to gray; weathers red, brown, or purple. Siltstone, tan; weathers gray or brown. A transition zone at top, 10-20 feet thick, of siltstone interbedded with dark-gray or purplish-gray shale grades into overlying Skull Creek Shale.
		Lakota Formation		225 to 375	Shale, sandstone, and siltstone. Shale, gray to buff near top, dark gray or brown lower in section; plastic; silty; carbonaceous near top and base. Locally, a 30+ foot thick gray to tan hard clay-siltstone, or a 50+ foot thick brown fine-grained fluvial crossbedded sandstone in upper part of formation. Sandstone, brown to light-gray, coarse to very fine grained; subrounded grains; crossbedded. Some petrified wood in lower part of formation. Erratic thickness of formation indicates channeling into underlying Morrison.
		Morrison Formation		0 to 100	Shale and siltstone. Shale, gray or light-tan, sandy. Siltstone, tan or buff; red siltstone lenses locally in lower part.
		Unkpapa Sandstone		60 to 150	Sandstone. Upper part buff to white; lower 5-30 feet yellow; fine grained; subrounded grains. Where Unkpapa is thick the overlying Morrison is thin. In W 1/2 sec. 26, T. 2 N., R 7 E., the Unkpapa appears to grade laterally into Morrison by becoming finer grained.
		Sundance Formation		75+	Redwater Shale Member: shale, gray, silty, glauconitic; sandy fossiliferous limestone near top.