TABLE 3.—*Summary description and correlation of Cenozoic sedimentary rocks in the Granite Mountains area, Wyoming*

Age		Southwestern part: Mappable unit	Southwestern part: Lithologic description	Southwestern part: Thickness (feet)	Southwestern part: Remarks	Northwestern part: Mappable unit	Northwestern part: Lithologic description	Northwestern part: Thickness (feet)	Northwestern part: Remarks
Quaternary	Pleistocene	Absent				Absent			
? ?	? ?								
Tertiary	Pliocene: Early or middle	Absent				Absent			
		Present erosion surface				Present erosion surface			
	Miocene: ?					Split Rock Formation: Upper porous sandstone sequence	Sandstone, white to tan, fine- to coarse-grained, soft, porous; rounded frosted quartz grains; several persistent pumicite and limestone beds; sparse algal reefs; waxy bentonitic green, gray, and pink claystone in upper part.	0–700	
	Miocene: Early and middle	Sandstone, light-gray, massive to thin-bedded, soft, porous, poorly cemented; chiefly rounded frosted quartz grains, hematite-coated quartz, glass shards, brilliant clear abraded quartz bipyramids, and small rounded magnetite grains.		0–500	Miocene vertebrate fossils.	Split Rock Formation: Silty sandstone sequence	Sandstone, gray to tan, fine- to coarse-grained, soft, porous; rounded frosted quartz grains; silty matrix; glass shards abundant; sparse lenticular limestone and conglomerate.	600±	
						Split Rock Formation: Clayey sandstone sequence	Sandstone, gray, gray, very soft; rounded frosted quartz grains embedded in a white clayey matrix; some beds of plastic tan claystone and gray to tan siltstone; numerous glass shards.	100–300	
		Miocene and Oligocene rocks undivided				Split Rock Formation: Lower porous sandstone sequence	Sandstone, pink and white; composed of frosted rounded quartz grains with little cement; interbedded with gray to pink arkosic conglomerate; some homogeneous pink sandstones are nearly 100 ft thick and resemble dune sands; glass shards, abraded quartz bipyramids, and rounded magnetite grains are abundant; hard white fresh-water limestones are common.	0–500	
						Unconformity			
	Oligocene: Early and middle		Claystone and siltstone, pale-orange-pink to white, hard and blocky in part, plastic and bentonitic in part; some tuffaceous gray sandstone; local lenses as much as 50 ft thick of cherty gastropod-bearing limestone; local lenses of boulder conglomerate at top.	100–500	Vertebrate fossils of early Oligocene (Chadronian provincial age of Wood and others (1941) age locally abundant.	White River Formation: Beaver Divide Conglomerate Member	Conglomerate, gray, massive; highly tuffaceous along west part of Beaver Divide escarpment; boulders of volcanic rocks from the Absaroka area as much as 5 ft in diameter; grades laterally to arkosic, less tuffaceous conglomerate.	50–125	Volcanic facies recognizable only along western part of Beaver Divide escarpment.
		Siltstone, tan, blocky; contains red and black flecks; lenticular conglomerate and conglomeratic sandstone beds of gray granitic debris.		0–300	Sparse mammal bones and abundant turtle-shell fragments.	White River Formation: Big Sand Draw Sandstone Lentil	Sandstone, pale-greenish-yellow to gray, soft; intertongues with lower part of Beaver Divide Conglomerate Member.	0–75	Locally developed in vicinity of South Sand Draw oil and gas field.
						Unconformity			
	Late	Ice Point Conglomerate	Conglomerate, brown, chiefly small to giant boulders of Paleozoic rocks and a lesser amount of Precambrian debris.	0–200	Unfossiliferous; age assignment based on regional relations to Oligocene and middle Eocene rocks.	Wagon Bed Formation: Upper part	Upper part: Mudstone, siltstone, and sandstone, green, yellow, and olive-drab to gray, very tuffaceous; decrepitates in water; locally abundant secondary silica; contains abundant magnetite, clinopyroxene, augite, and green-brown hornblende.	0–150	Locally oil saturated. Sparse vertebrate fossils of late Eocene age; small uranium deposits.
		Unconformity				Unconformity			
	Middle: Wagon Bed Formation	Bridger Formation	Bridger: Claystone, pale-green and lemon-yellow, bentonitic, siliceous, pumiceous; interbedded with hard arkosic sandstone.	0–500	Sparse middle Eocene vertebrate fossils, abundant mollusks and ostracodes.	Wagon Bed Formation: Lower part	Lower part: Mudstone, siltstone, and claystone, green, brown, and gray; bentonitic; decrepitates in water; lenses of arkosic conglomerate and sandstone with plastic pale-green clayey matrix; less locally derived coarse volcanic debris than in upper part; one or more widespread siliceous marker beds in lower part; arkosic sandstone and conglomerate with bentonitic green matrix in basal part reworked from Wind River Formation and older rocks; contains abundant biotite and green-brown hornblende; sequence is red or pink in some sections near Triassic red beds.	0–600	Carbonaceous shale near base of reworked arkosic sandstone beds contains flora of middle Eocene age.
		Laney Shale Member	Laney: Oil shale, brown, green paper shale, sandy gray limestone, limy sandstone, arkosic sandstone, and granule conglomerate.	0–225	Abundant ostracodes and mollusks; unconformity at base north of Flatrop fault.				Locally oil saturated. Sparse vertebrate fossils of middle Eocene age; several uraniferous phosphatic zones.
		Unconformity — Cathedral Bluffs Tongue (Green River Formation); Unconformity — Tipton Tongue (Wasatch Formation)	Wagon Bed: Claystone and siltstone, variegated, plastic, bentonitic; interbedded with coarse- to fine-grained tuffaceous sandstone and pebble-cobble conglomerate.	0–400	Deposited across eroded edges of older Tertiary rocks.	Possible unconformity			
			Cathedral Bluffs: Claystone and siltstone, brightly variegated; interbedded with arkosic sandstone and cobble conglomerate.	0–200	do	Wind River Formation: Halfway Draw Tuff Member	Sandstone, pink and gray, arkosic; interbedded with variegated claystone and locally derived pink and gray conglomerate composed of large and small fragments of Precambrian, Paleozoic, and Mesozoic rocks; northwestern outcrops contain progressively more variegated claystone, some of which is highly tuffaceous. Halfway Draw Tuff Member, a white fossil tuff, is in upper part of the formation.	0–1,000	Sequence present as erosion remnant lapping southward and southeastward against lower Eocene topographic highs. Vertebrate fossils are of Lost Cabin provincial age of Wood and others (1941).
		Niland Tongue (Green River Formation)	Tipton: Oil shale, brown; ostracode-bearing clay shale, algal reefs, slabby and arkosic sandstone.	0–100	Present in subsurface sections; see sections *B–B'*, and *I–I'*.				
		Luman Tongue (Green River Formation)	Niland: Sandstone, gray and brown; siltstone, clay shale, coal, and thin oil shale beds.	0–275	do				
		Red Desert Tongue (Wasatch Formation)	Luman: Oil shale, brown; green-gray shale and siltstone and gray fine-grained sandstone.	0–75	do				
			Red Desert: Sandstone, gray, arkosic in part; some variegated claystone and many coal beds.	0–1,200 +	do				
	Early		Crooks Gap Conglomerate: Giant boulders of Precambrian rocks in a gray to pink arkosic sandstone matrix.	0–1,500					Rocks equivalent to Lysite Member of Wind River Formation are absent.
			Wasatch and Battle Spring Formations: Same general lithology as Red Desert Tongue of Wasatch Formation; become progressively more arkosic and conglomeratic to northeast.	0–6,000	Contain all uranium deposits in Crooks Gap area.				
						Unconformity			
						Indian Meadows(?) Formation	Conglomerate and sandstone, pink to gray, composed of granite, Paleozoic, and Triassic rock fragments; interbedded with lesser amounts of variegated siltstone and claystone.	0–1,0007	Remnants preserved under Emigrant Trail thrust fault.
		Unconformity				Unconformity			
	Paleocene	Fort Union Formation	Sandstone, white and brown; dully variegated claystone, thin coal beds, and bluish-gray conglomerate composed largely of siliceous Paleozoic rocks.	0–3,000	Abundant vertebrate fossils near well 227.	Fort Union Formation	Sandstone, conglomerate, and siltstone, chalky white to gray, noncalcareous; interbedded with lenses of dark-brown ferruginous hard sandstone; abundant gloconite in some sandstones; rock fragments in conglomerates are chiefly noncalcareous Paleozoic and Mesozoic rocks; some arkosic sandstone and deeply weathered granite fragments; sparse carbonaceous shale and coal beds; sparse dully variegated claystone beds.	0–1,000	Present only along extreme northwestern margin.
		Unconformity				Unconformity			
Cretaceous	Late	Lance Formation and older Cretaceous rocks	See table 1.		Overlying Fort Union Formation deposited across beveled edges of progressively older Cretaceous formations (Lance to Frontier) from south to north.	Meaverde Formation and Cody Shale	See table 1.		Overlying Fort Union Formation deposited across beveled edges of Meaverde Formation and Cody Shale.

Age		Northern part: Mappable unit	Northern part: Lithologic description	Northern part: Thickness (feet)	Northern part: Remarks	Central part: Mappable unit	Central part: Lithologic description	Central part: Thickness (feet)	Central part: Remarks
Quaternary	Pleistocene	Lenticular ash deposit in Conant Creek area.	Ash, snowy-white, fine-grained, uncemented; interbedded with loess and sand.	0–5		Bug Formation	Claystone and siltstone, pale-green to gray, soft; interbedded with drab and gray highly tuffaceous sandstone; white soft marlstone, and algal limestone; conglomerate beds near top contain pebbles of volcanic rocks from Rattlesnake Hills.	0–120	Limestone contains thorium and uranium. Formation directly overlies Split Rock Formation so relationship to Moonstone is not known. Age is Pleistocene or Pliocene.
? ?	? ?					Probable unconformity			
Tertiary	Pliocene: Early or middle	Absent				Moonstone Formation	Shale, sandstone, claystone, tuff, limestone, and conglomerate, brown, pale-green, and white; abundant laminae, nodules, and beds of chalcedony; entire sequence is soft and most is porous and permeable.	0–1,250	Several zones of tuff and shale contain uranium; limestone lenses contain thorium.
						Unconformity			
	Miocene: ?	Present erosion surface in most places				Split Rock Formation: Upper porous sandstone sequence	Sandstone, white to tan, fine- to coarse-grained, soft, porous; rounded frosted quartz grains; several persistent pumicite and limestone beds; sparse algal reefs; waxy bentonitic green, gray and pink claystone in upper part. Widespread conglomerate containing "Sweetwater moss agate" chalcedony pebbles at base.	0–600	Youngest strata removed by erosion prior to deposition of overlying Moonstone Formation. Abundant middle Miocene vertebrate fossils.
	Miocene: Early and middle	Split Rock Formation: Lower porous sandstone sequence	Sandstone, white, soft, porous; abundant frosted rounded quartz grains, glass shards, abraded quartz bipyramids, and rounded magnetite grains; interbedded with gray moderately hard arkosic conglomerate and pink tuffaceous claystone; some uraniferous moss agate chalcedony nodules in conglomerate.	0–500	Forms broad dip slopes of Sweetwater Plateau terminated at north by Beaver Divide escarpment.	Split Rock Formation: Silty sandstone sequence	Sandstone, gray to tan, fine- to coarse-grained, soft, porous; rounded frosted quartz grains; silty matrix; glass shards abundant; sparse lenticular limestone and conglomerate.	600±	Sparse vertebrate fossils, probably of middle Miocene age.
						Split Rock Formation: Clayey sandstone sequence	Sandstone, gray, very soft; rounded frosted quartz grains embedded in a white clayey matrix; some beds of plastic tan claystone and gray to tan siltstone; numerous glass shards.	100–300	
						Split Rock Formation: Lower porous sandstone sequence	Sandstone, white to gray, soft, porous; rounded frosted grains, hematite-coated quartz grains, abraded quartz bipyramids, rounded magnetite grains, abundant glass shards; intertongues with and in places is underlain by gray hard and soft arkosic conglomerate that locally contains uraniferous moss agate chalcedony nodules.	500±	
						Unconformity			
	Oligocene: Early and middle	White River Formation	Claystone and siltstone, white to pale-pinkish-tan, blocky, homogeneous; abundant microscopic pink and black flecks and black biotite; tuffaceous throughout; sparse white to pale-green and pink bentonitic beds locally present in lower part; lenticular arkosic conglomerates in upper part and near base in some localities.	0–600	Vertebrate fossils of early Oligocene (Chadronian provincial age of Wood and others (1941) age locally abundant; sparse leaves and mollusks.	Absent			Probably above upper limit of deposition of White River Formation.
						Unconformity			
	Late	Wagon Bed Formation	Claystone, siltstone, and sandstone, green, yellow, and olive-drab to gray, very tuffaceous; decrepitates in water; locally abundant secondary silica; from Gas Hills to Rattlesnake Hills, upper half contains abundant volcanic sandstone and coarse conglomerate of andesite porphyry derived from vents in Rattlesnake Hills that were active during middle and late Eocene time; lower half has lesser amount and much finer grained locally derived volcanic debris; abundant magnetite, clinopyroxene, augite, and green-brown hornblende.	0–600	Carbonaceous shale near base of reworked arkosic sandstone beds contains flora of middle Eocene age.	Absent			Probably above upper limit of fluviatile and lacustrine deposition.
						Probable unconformity			
	Eocene: Early	Wind River Formation	Western Beaver Divide: Claystone, siltstone, and sandstone, variegated, soft; tuffaceous in part with several widespread white tuff beds; lenses and beds of arkosic conglomerate.	Western Beaver Divide: 0–2,500	Contains major uranium deposits in Gas Hills area. Both facies probably of Lost Cabin provincial age of Wood and others (1941).	Absent on outcrop, probably absent in subsurface			All or most of area above upper limit of fluviatile deposition.
			Gas Hills area: Upper coarse-grained facies: Conglomerate and sandstone, gray, arkosic; interbedded with gray mudstone, siltstone, and carbonaceous shale. Lower fine-grained facies: Siltstone and claystone, gray-green to variegated, soft; thin carbonaceous shale beds.	Gas Hills: 0–1,000; Gas Hills: 0–125	Rocks equivalent to Lysite Member of Wind River Formation and Indian Meadows Formation are probably absent.				
		Probably absent but no definite evidence available.							
		Unconformity				Unconformity			
	Paleocene	Fort Union Formation	Sandstone, conglomerate, and siltstone, chalky-white to gray, noncalcareous; interbedded with lenses of dark-brown ferruginous hard sandstone; abundant gloconite in some sandstones; rock fragments in conglomerates are chiefly noncalcareous Paleozoic and Mesozoic rocks; some arkosic sandstone and deeply weathered granite fragments; sparse carbonaceous shale and coal beds; sparse dully variegated claystone beds.	0–2,000	Present only in subsurface sections. Progressive growth of several anticlines during Paleocene time caused intraformational unconformities.	Absent; probably never deposited here			
		Unconformity				Unconformity			
Cretaceous	Late	Lance Formation and older Cretaceous rocks	See table 1.		Overlying Fort Union Formation deposited from south to north across beveled edges of Meaverde Formation, Lewis Shale, Mesteteise, and Lance Formations.	If rocks of Lance age were ever deposited, they probably were eroded away during Paleocene time			

Age		Northeastern part: Mappable unit	Northeastern part: Lithologic description	Northeastern part: Thickness (feet)	Northeastern part: Remarks	Southeastern part: Mappable unit	Southeastern part: Lithologic description	Southeastern part: Thickness (feet)	Southeastern part: Remarks	Age	
Quaternary	Pleistocene	Absent				Miocene and younger rocks, undivided: Green and brown conglomerate	Conglomerate, dark-green and brown, coarse-grained, partly lithified, chiefly silicified brown Precambrian iron ore and mafic igneous and metamorphic rock fragments in gray sandstone matrix.	0–50	Comprises youngest high-level strata in area; preserved as remnants on high hills.	Pleistocene	Quaternary
? ?	? ?					Unconf. ? Gray sandstone and arkosic conglomerate	Sandstone, light-greenish-gray, medium-grained, massive, soft; underlain by arkosic conglomerate interbedded with gray sandstone.	0–50	Deposited on surface that bevels across black shale and older units; contains rhinoceros, horse, and rabbit bones at base.	? ?	? ?
Tertiary	Pliocene: Early or middle	Absent				Unconf. Black shale mem.	Shale, black to greenish-gray, very fine grained, fissile, soft; contains Cretaceous and Tertiary pollen; interbedded with pink and gray claystone, shale, and sandstone.	0–80	Black shale apparently was derived from Cretaceous outcrops in Hanna Basin south of Seminoe Mountains.	Pliocene	Tertiary
						Moonstone Formation	Claystone, shale, and sandstone, white to pale pink, soft; interbedded with thin-bedded white limestone and pumicite.	0–150	Contains Pliocene vertebrate fossils.		
						Unconformity					
	Miocene: ?	Absent				Split Rock Formation	Sandstone, light-gray, massive to crumbedded, soft, porous, poorly cemented; chiefly rounded frosted quartz grains, hematite-coated quartz, glass shards, abraded magnetite grains; arkosic conglomerate locally present in lower 200 ft, and lenticular conglomerates 700–1,000 ft above base.	0–3,000	The various Miocene and younger lithologic units were not mapped separately in this part of area.	Miocene and younger rocks, undivided	
	Miocene: Early and middle	Present erosion surface									
		Split Rock Formation	Basal beds are conglomerate, gray, moderately hard, arkosic, widespread; intertongues with and is overlain by gray to white soft porous tuffaceous sandstone with abundant frosted rounded grains, glass shards, abraded quartz bipyramids, red-coated quartz grains, and rounded magnetite grains; some pink, green, and white claystone beds in lower and upper parts.	0–700	Surface and subsurface data not adequate to distinguish the various sandstone sequences recognized farther west. Lower Miocene vertebrate fossil 400 ft above base.				
		Unconformity								Unconformity	
	Oligocene: Early and middle	White River Formation	Upper part is siltstone and claystone, white to light-gray, tuffaceous; thin beds of white sandy tuff and pumicite; lenticular arkosic conglomerates; middle part is gray siltstone and sandstone with lenses of arkosic conglomerate; lower part is red, brown, pale-green, and gray siltstone, claystone, and sandstone; thin arkosic conglomerate locally present at base.	0–850	Numerous vertebrate fossils throughout; local lens of uraniferous carbonaceous siltstone in lower middle contains abundant pollen; formation laps out southward against steep north flank of Granite Mountains.	Probably absent	Oligocene	Early and middle	Oligocene	Tertiary
		Unconformity									
	Late	Wagon Bed Formation	Conglomerate, dark-green; composed of angular fragments of Eocene volcanic rocks from the Rattlesnake Hills embedded in a green bentonitic claystone and siltstone matrix; along east margin are remnants of pale-green to white siliceous gaudy claystone, in part plastic and bentonitic.	0–200	Only thin remnants survived pre-Oligocene erosion; not everywhere mappable on the scale of geologic map; where not mappable, is included with the White River Formation.	Absent				Late	
	Middle									Middle	
	Eocene: Early	Wind River Formation	South of north Granite Mountains fault system: Absent; eroded away prior to later Eocene and Oligocene deposition.				North of north Granite Mountains fault system: Upper coarse-grained facies: Sandstone and conglomerate, yellowish-gray to pink, soft, porous, arkosic; lenticular dark-gray carbonaceous claystone and siltstone beds. Lower fine-grained facies: Upper part is greenish-gray and drab siltstone with yellowish-gray arkosic sandstone. Lower part is variegated claystone and siltstone with some coarse sandstone and conglomerate containing Paleozoic and Mesozoic rock fragments.	0–750	Finer grained beds are commonly radioactive.	Absent	Eocene	Tertiary
								0–4,600			
		Unconformity									
		Indian Meadows Formation	Absent; eroded away prior to later Eocene and Oligocene deposition.				Arkosic conglomerate and sandstone, white to yellowish-gray, interbedded with dark-gray to black siltstone and claystone.	0–4,000	Locally contains uranium mineralization.		
		Unconformity									
	Paleocene	Fort Union Formation	Sandstone and siltstone, chalky white to dark-gray, noncalcareous; interbedded with lenses of dark-brown ferruginous sandstone; several beds of pebble conglomerate, chiefly rounded fragments of siliceous Paleozoic and Mesozoic rocks; sparse Precambrian granite fragments; thin beds of carbonaceous shale and coal.	0–2,500	Strata present only in northeast corner of area.	Absent				Paleocene	
		Unconformity									
Cretaceous	Late	Lance Formation	See table 1.			Absent; removed by pre-Miocene erosion.				Late	Cretaceous