Map Unit Properties Table A: Compiled Bedrock and Surficial Map, Yosemite National Park

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Age	Simplified Map Unit (Symbol) *Overview Sheet 1*	Map Unit (Symbol) *Colored if present on Overview Sheet 2*		Geologic Description	Geologic Issues	Geologic Features, Processes and General Location	Geologic History
Quaternary Surface and Glacial Rock Units							
QUATERNARY (Holocene)	Alluvium (Qal)	Alluvium (Qal)		Primarily gravel, sand, and silt that underlies meadows. Deposited by streams.	**Debris Flow and Flooding**—Overbank and floodplain deposits represent flood and debris-flow events.	**Recent Geomorphic Features (Fluvial)**—Meandering channel patterns, point bars, cutbanks, terraces, floodplains, and debris deposited during flooding.	These unconsolidated units in Yosemite National Park represent flooding and mass-wasting processes that have occurred throughout geologic time (principle of uniformity). Geologists study these recent deposits to better understand ancient depositional environments and their associated geologic units.
	Talus (Qtl)	Talus (Qtl)		Rock debris derived from cliffs. Talus piles are present at most cliff bases, especially in Yosemite Valley.	**Rockfalls, Rockslides and Rock Avalanches**—These mass-wasting deposits represent unpredictable movement of rock material from unstable slopes. They are hazards that affect visitor safety and park infrastructure (i.e., roads, trails, buildings, sewer lines, campgrounds). Triggering mechanisms vary. **Erosion**—Slopewash involves the transportation of rock and soil down a slope by rain. In general, slopewash presents a smaller hazard than rockfall.	**Talus Piles**—Large talus piles have formed beneath cliffs that contain abundant joints, such as The Rockslides (west of El Capitan).	
	Talus and Slopewash (Qts)	Talus and Slopewash (Qts)		Unconsolidated mixture of debris (soil and rocks) that may be washed down slopes by running water not confined to channels.		**Talus Piles**—Primarily mapped in the Hetch Hetchy Reservoir quadrangle in the park. May contain abundant volcanic pumice.	
	Landslide (Qls)	Landslide (Qls)		Unsorted debris deposits resulting from mass movement.		**Landslides**—Includes inactive rock glaciers. The unit is mapped primarily in the northern part of the park.	
	Other Glacial Units (Qg)	Glacial Units	Neoglacial and periglacial deposits (Qng)	Angular rock debris and talus with particle sizes ranging from sand to cobbles and boulders of 3 m (10 ft) or more from existing Holocene glaciers (neoglacial). Includes deposits in glacial features that form along the margins of existing glaciers or former post-Pleistocene glaciers (periglacial).	**Erosion**—Glacial deposits may form unstable slopes.	**Modern Glacial Features**—Exposed in the northern and eastern parts of the park in the Tower Peak, Matterhorn Peak, and Mono Craters quadrangles.	**Tension, Uplift, and Ice**—Present-day glaciers began forming about 500 years ago. The deposits reflect changing climatic conditions that are melting the glaciers.
			Rock glaciers (Qrg)	Poorly sorted angular boulders and fine material with interstitial ice about 1 m (3.3 ft) below the surface.	None—Rock glaciers move slowly and are not a geologic issue.	**Modern Glacial Features**—Isolated deposits of limited areal extent exposed east of the eastern park boundary in the Mono Craters quadrangle.	**Tension, Uplift, and Ice**—Isolated deposits. Larger, mappable exposures lie east of the park.
QUATERNARY (Pleistocene)	Lake beds (Qlk)		Lake beds (Qlk)	The source map does not provide a detailed description.	None—This unit lies outside of the park boundaries.	**Geomorphic Feature**—Borders the western edge of Mono Lake in the Mono Craters quadrangle.	**Tension, Uplift, and Ice**—Remnants of a large lake in the Mono Basin fed by Pleistocene glaciers.
	Other Glacial Units (Qg)		Glacial deposits (Qg)	Primarily unconsolidated moraine and outwash deposits. Includes Tioga and Tahoe till.	None Significant	**Pleistocene Glacial Features (Depositional)**—Moraines	**Tension, Uplift, and Ice**—Late Pleistocene glacial deposits.
	Tills (Qcl)		Tioga Till (Qti)	Unsorted till deposits. All granitic, volcanic, and metamorphic rocks are relatively fresh.	**Flooding—Qti** forms the El Capitan moraine in Yosemite Valley and may act as a natural dam during spring flooding of the Merced River.	**Pleistocene Glacial Features (Depositional)**—Sharp-crested moraines, usually with abundant boulders on the surface.	**Tension, Uplift, and Ice**—Tioga-age (26,000–18,000 years ago) glacial deposits.

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QUATERNARY (Pleistocene)	Tills (Qcl)	Glacial Units	Till of Tenaya Glaciation (Qte)	Till deposits containing fresh metamorphic and volcanic boulders and moderately weathered granitic boulders.	None Significant—**Qti** and **Qta** deposits exposed at higher elevations in the Matterhorn Peak and Mono Craters quadrangles	**Pleistocene Glacial Features (Depositional)**—Sharp-crested, slightly eroded moraines in exposures of limited areal extent north of Twin Lakes, Matterhorn Peak quadrangle.	**Tension, Uplift, and Ice**—Described by Matthes (1930). Evidence of the Tenaya Glaciation has been eroded from Yosemite National Park.
			Tahoe Till (Qta, Qtao)	**Qta**: unsorted glacial till deposits. **Qtao**: older till of the Tahoe Glaciation mapped east of the park, east of Mono Pass.		**Pleistocene Glacial Features (Depositional)**—**Qta**: conspicuous, broad-crested, well-preserved moraines with deeply weathered granitic boulders, some of which have disintegrated into grus.	**Tension, Uplift, and Ice**—Tahoe-age (140,000–80,000 years ago) glacial deposits. Because they are older, these moraines are more subdued than the Tioga moraines.
			Till of Mono Basin Glaciation (Qmb)	Till deposits commonly containing deeply weathered granitic boulders. Fine-grained metamorphic and volcanic boulders are fresh.	None—These units lie outside of the park boundaries.	**Pleistocene Glacial Features (Depositional)**—Indistinct moraines with continuous crests east of Twin Lakes in the Matterhorn Peak quadrangle, north of the park.	**Tension, Uplift, and Ice**—Debate continues with regard to whether the Mono Basin Glaciation pre-dated the Tahoe Glaciation.
			Till of Sherwin Glaciation (Qsh)	Granitic boulders are deeply weathered and exfoliated. Fine-grained volcanic and metamorphic boulders are less weathered.		**Pleistocene Glacial Features (Depositional)**—Smooth, soil-covered moraines and other glacial deposits lacking conspicuous depositional form. Exposed east of Mt. Dana and the park.	**Tension, Uplift, and Ice**—Sherwin Glaciation occurred approximately 800,000 years ago (Pleistocene).
			Old Till (Qto)	Till deposits probably related to the Sherwin Glaciation. The source map does not provide a detailed description.	None Documented	**Pleistocene Glacial Features (Depositional)**—Isolated exposures along the eastern boundary of the park near Mt. Lewis and Gem Pass, Mono Craters quadrangle.	**Tension, Uplift, and Ice**—Possible remnants of the Sherwin Glaciation.
	Moraines (Qmy)		Moraine (Qmy)	Described as younger than the Wisconsin Stage of Matthes (1930).	None—Mapped in river valleys and on the surface of relatively flat topography.	**Pleistocene Glacial Features (Depositional)**—Moraines mapped in the Hetch Hetchy Reservoir quadrangle.	**Tension, Uplift, and Ice**—Mapped by Kistler (1973) after work done by Matthes (1930).
	Other Glacial Units (Qg)		Wisconsin Stage of Matthes (1930) (Qwgs)	Glacial till. The source map does not provide a detailed description.		**Pleistocene Glacial Features (Depositional)**—Moraines mapped in the Hetch Hetchy Reservoir quadrangle by Kistler (1973). Mapped as **Qti** by Huber et al. (1989).	**Tension, Uplift, and Ice**—Matthes (1930) mapped lateral moraines left by the Tuolumne Glacier in Hetch Hetchy Canyon and believed the valley was traversed by a glacier "60 mi long and 4,000 ft thick," which was 1,000 ft thicker than the glacier in Yosemite Valley.
			Deposits of El Portal Glaciation (Qegs)	Glacial till. The source map does not provide a detailed description.		**Pleistocene Glacial Features (Depositional)**—Deposits mapped in the Hetch Hetchy Reservoir quadrangle by Kistler (1973). Mapped as **Qti** and **Qta** by Huber et al. (1989).	**Tension, Uplift, and Ice**—Matthes (1930) described cobbles and fragments of granitic rocks, which he considered to be morainal material, scattered on a slate and quartzite bedrock surface about 850 m (2,800 ft) above the canyon floor west of El Portal.

Quaternary and Tertiary Volcanic and Sedimentary Rock Units

QUATERNARY	Cenozoic Volcanic Rocks (QTvl)	Basalt of Red Cones (Qbr)	Basalt cinders that are typically scoriaceous (having large gas holes) with prominent phenocrysts of plagioclase and olivine.	None—These units lie outside of the park boundaries.	Cinders exposed in the Red Cones, Devils Postpile quadrangle, southeast of the park.	Remnants of a 10,000-year-old volcanic eruption associated with the Long Valley Caldera.
		Andesite of Pumice Butte (Qap)	Cinder cones and associated flows. Typically, scoriaceous and nonporphyritic.		**Volcanic Bedrock**—Cinder cones and associated flows are located in the Devils Postpile quadrangle, southeast of the park.	**Tension, Uplift, and Ice**—Unit includes dacite that forms two knobs in northwest part of outcrop area, which may be older than the andesite.

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Age	Simplified Map Unit (Symbol) *Overview Sheet 1*	Map Unit (Symbol) *Colored if present on Overview Sheet 2*	Geologic Description	Geologic Issues	Geologic Features, Processes and General Location	Geologic History
QUARTER-NARY	Cenozoic Volcanic Rocks (QTvl)	Andesite of Devils Postpile (Qad)	Light- to dark-gray andesite. Commonly porphyritic with phenocrysts of plagioclase and olivine; rarely vesicular.	None—This unit lies outside of the park boundaries.	**Volcanic Bedrock**—The unit contains well-developed columnar jointing. Exposed in the Devils Postpile quadrangle, southeast of the park.	**Tension, Uplift, and Ice**—Remnants of Pleistocene volcanism.
NEOGENE (Pliocene)		Hypabyssal rocks (Tda)	Undifferentiated unit of igneous rock. The source map does not provide a detailed description.	None Documented—Limited areal extent.	**Volcanic Bedrock**—Isolated pockets with limited areal extent in the Tuolumne Meadows and Mono Craters quadrangles.	**Tension, Uplift, and Ice**— "Hypabyssal" refers to an igneous body of rock that formed at a shallow depth.
		Mafic phonolite (Tmp)	Mafic phonolite (extrusive igneous rock with abundant alkali feldspar) with phenocrysts of phlogopite and olivine in a groundmass with abundant sanidine and leucite.		**Volcanic Bedrock**—Limited to massive to platy flows near Merced Pass in the park, Merced Peak quadrangle. Also present outside the park along Grizzly Creek and the West Fork of Granite Creek.	**Tension, Uplift, and Ice**—Lava flows.
		Mafic phonolite, ultrapotassic (Tpp)	Ultrapotassic lava. The source map does not provide a detailed description.	None—These units lie outside of the park boundaries.	**Volcanic Bedrock**—Isolated exposures in the Merced Peak quadrangle.	**Tension, Uplift, and Ice**—Lava that solidified in a volcanic neck near the junction of Madera Creek and the West Fork of Granite Creek and a small volcanic pipe near Cold Springs Meadow.
		Quartz latite of Two Teats (Tqt)	Fine-grained volcanic equivalent of quartz monzonite containing 5–20% quartz and approximately equal amounts of plagioclase and potassium feldspar.		**Volcanic Bedrock**—Exposed in the Mono Craters quadrangle, east of the park.	**Tension, Uplift, and Ice**—Remnants of Neogene volcanism.
		Andesite of Deadman Pass (Tadp)	Series of interbedded andesitic flows, cinders, and rubble. Flow rock is commonly vesicular; essentially non porphyritic.		**Volcanic Bedrock**—Exposed in the Devils Postpile quadrangle, southeast of the park.	**Tension, Uplift, and Ice**—The unit includes scattered remnants of andesitic rock not necessarily from the same source, but of approximately the same age.
		Trachyandesite (Tan, Ttc)	**Tan**: lava flows containing up to 8% potassium oxide. **Ttc**: trachyandesite and trachyte (alkali-rich) cinder cones.		**Volcanic Bedrock**—**Tan**: exposed in the Bass Lake quadrangle, south of the park. **Ttc**: exposed near Post Peak, Merced Peak quadrangle.	**Tension, Uplift, and Ice**—Remnants of Neogene volcanism.
		Trachybasalt (Ttb)	Light- to dark-gray, fine-grained volcanic rock with abundant olivine phenocrysts. Distinctly alkali (contains abundant sodium and/or potassium).		**Volcanic Bedrock**—Exposed in volcanic necks. Exposed south of the park along Granite Creek.	**Tension, Uplift, and Ice**—May represent basalt magma mixed with granitic rock. Potassium-argon isotopic age about 3.3–3.8 million years (Pliocene).
NEOGENE (Miocene)		Disaster Peak Formation (Tdp)	Medium- to light-gray andesitic lahars with local interbedded stream deposits. Contains rounded to angular pebbles of andesite and basalt in a matrix of volcanic sand-sized particles. Contains conspicuous individual laths and clots of hornblende.		**Volcanic Bedrock**—Exposed west and northwest of the park.	**Tension, Uplift, and Ice**—Lahars are volcanic mudflows that flow down the flanks of volcanoes.
		Trachybasalt plug (Tbo)	Black, basalt plug of limited areal extent known as the Little Devils Postpile. Considered by some to be trachyandesite because it contains more silicon, potassium, and sodium than does basalt.	None	**Volcanic Bedrock**—Excellent columnar jointing in Little Devils Postpile. Located northwest of Tuolumne Meadows along the Tuolumne River, Tuolumne Meadows quadrangle.	**Tension, Uplift, and Ice**—Remnants of a conduit that fed magma to a volcano about 8–9 million years ago (Miocene).

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NEOGENE (Miocene)	Cenozoic Volcanic Rocks (QTvl)	Olivine basalt (Tb)		Dark-gray to brownish-black, hard, dense, fresh olivine basalt with microphenocrysts of olivine and sodic bytownite.	None—These units lie outside of the park boundaries.	**Volcanic Bedrock**—Isolated outcrop north of the park in the Matterhorn Peak quadrangle.	**Tension, Uplift, and Ice**—Occurs as lava flows and igneous dikes.
		Volcanic rocks of Hunewill Hills	Basalt (Thb)	Brownish-black to dark-brownish, slightly vesicular, porphyritic basalt. Contains phenocrysts of olivine enclosed within a fine-grained, dense groundmass of labradorite (plagioclase feldspar group), pyroxene, and olivine minerals.		**Volcanic Bedrock**—**Thah** is the primary rock type. Other units have limited areal extent. Exposed in the Matterhorn Peak quadrangle, northeast of the park.	**Tension, Uplift, and Ice**—Occurs as volcanic lava flows in the Hunewill Hills.
			Dacite (Thd)	Dull pinkish-gray, weakly mottled, porphyritic. Contains phenocrysts of andesine, quartz, dark green pyroxene, and black biotite.			
			Andesite (Thah)	Light- to dark-gray, locally brownish, dense, porphyritic andesite. Contains phenocrysts of black hornblende and glassy white andesine. Includes interflow layers of andesitic tuff breccia (**Tht**).			
			Tuff breccia (Tht)	Volcanic tuff breccia of andesitic composition.			
		Stanislaus Group	Eureka Valley tuff (Tsgev)	Tollhouse Flat Member consisting of biotite-bearing, latite tuff. A lower unit consists of densely to moderately welded tuff. A locally exposed upper unit consists of poorly welded to nonwelded tuff.		**Volcanic Bedrock**—Exposed primarily on the south side of Dodge Ridge and south and east of Coyote Meadows in the Pinecrest quadrangle, northwest of the park.	**Tension, Uplift, and Ice**—Potassium-argon isotopic age is about 9.5 million years (Miocene).
			Table Mountain latite (Tsgtm)	Dark-gray to black porphyritic latite with platy plagioclase phenocrysts. Phenocrysts usually have strong tabular orientation.		**Volcanic Bedrock**—Isolated exposure of limited areal extent on the ridge crest northeast of Cooper Pocket, Pinecrest quadrangle, northwest of the park.	**Tension, Uplift, and Ice**—Potassium-argon isotopic age is about 9.2 million years (Miocene).
		Relief Peak Formation (Trp)		Brown to medium-gray andesitic lahars (mudflows) with local interbedded stream deposits. Contains porphyritic volcanic clasts and granitic rocks in a matrix of volcanic sand-sized particles.		**Volcanic Bedrock**—Underlies the Table Mountain latite, north of the park.	**Tension, Uplift, and Ice**—Volcanic mudflows underlie the Table Mountain latite, so they were deposited over 9.2 million years ago (Miocene).
		Andesite of Walker River (Twa)		Light- to medium-gray and pinkish-gray, platy, well-banded porphyritic andesite ranging from hornblende- to biotite-rich. Phenocrysts of hornblende and biotite.		**Volcanic Bedrock**—Exposed in the Matterhorn Peak quadrangle, northeast of the park.	**Tension, Uplift, and Ice**—Evidence of volcanic activity.
		Tuff and tuff breccias of Hanna Mtn. (Tt)		Light- to dark-gray and locally buff-colored, usually well-indurated, massive, poorly layered tuff and tuff breccia. Abundant andesitic and some basaltic debris are set in a fine-grained matrix of volcanic ash and mineral and rock fragments.		**Volcanic Bedrock**—Exposed in the Matterhorn Peak quadrangle.	**Tension, Uplift, and Ice**—Evidence of volcanic activity.

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NEOGENE (Miocene)	Cenozoic Volcanic Rocks (QTvl)	Basalt of Brown Bear Pass (Tbb)	Light- to dark-gray, massive basalt. Contains a highly vesicular unit and a purplish brecciated unit,also.	None—This unit lies outside of the park boundaries.	**Volcanic Bedrock**—Vertical columnar jointing. Overlies **Tvs**. Exposed in the Tower Peak quadrangle, north of the park.	**Tension, Uplift, and Ice**—Potassium-argon isotopic ages of 19–20 million years (Miocene).
NEOGENE (Miocene)	Cenozoic Volcanic Rocks (QTvl)	Mehrten Formation (Tmt, Tmf)	**Tmt**: black, dense trachyandesite. **Tmf**: brown volcanic mudflow with rounded cobbles and pebbles of andesite, large granitic boulders, and fragments of **Tmt**.	None Documented—Caps part of the crest and gentle slopes of Rancheria Mountain, north of the steeper slopes above the Grand Canyon of the Tuolumne River.	**Volcanic Bedrock**—**Tmt**: strongly jointed. Exposed in the Hetch Hetchy Reservoir quadrangle.	**Tension, Uplift, and Ice**—Evidence of high-energy mudflows transporting volcanic material downslope.
NEOGENE (Miocene) / PALEOGENE (Oligocene)	Cenozoic Volcanic Rocks (QTvl)	Valley Springs Formation (Tvs)	Rhyolite tuff, partly to densely welded, and bedded ash deposits. Locally includes rhyolitic sedimentary deposits.	None—This unit lies outside of the park boundaries.	**Volcanic Bedrock**—Exposed north of the park in the Tower Peak quadrangle.	**Tension, Uplift, and Ice**—Potassium-argon isotopic ages of 24–27 million years old (Oligocene).
Cretaceous through Triassic Plutonic Rock Units						
CRETACEOUS (Upper)	Upper Cretaceous Intrusive Rocks (Kib)	Aplite and Pegmatite (Kapp)	Fine grained, white aplite dikes and sills with minor widely dispersed euhedral crystals of biotite and hornblende. Pegmatite dikes and small masses.	None Significant—Linear exposure of limited areal extent. Limited potential for geologic issues.	Occurs as dikes and sills in the Half Dome granodiorite.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
CRETACEOUS (Upper)	Tuolumne Intrusive Suite (Ktu)	Johnson Granite Porphyry (Kjp)	Light-colored, fine-grained granite that locally contains potassium-feldspar phenocrysts set in a fine-grained groundmass as well as megacrysts of orthoclase and rounded reddish blobs of **Kcp**. Texture ranges from aplite to pegmatite. Forms the core of the Tuolumne Intrusive Suite and thin, aplite dikes marginal to the central mass.	**Rockfalls**—Primarily exposed north and south of Johnson Peak, where it may be prone to rockfall on steeper slopes.	**Granitic Bedrock**—Exposed around Tuolumne Meadows Campground.	**Rise of the Batholith**—Intrudes the Cathedral Peak Granodiorite. Textures suggest that **Kjp** may have been associated with an explosive volcanic event.
CRETACEOUS (Upper)	Tuolumne Intrusive Suite (Ktu)	Cathedral Peak Granodiorite (Kcp)	Medium-grained coarsely porphyritic hornblende-biotite granodiorite with conspicuous megacrysts of potassium-feldspar. Megacrysts are largest and most abundant in the margins of the body and are progressively less abundant and smaller inward. Orthoclase megacrysts are typically 8–10 cm (3–4 in) long and make up about 25% of the rock. Foliation in the rock is generally weak.	**Protection of Glacial Features**—Glacial polish, striations, and other glacial features present on domes composed of **Kcp** at Tuolumne Meadows. **Rockfalls**—Potential rockfall on steeper slopes.	**Granitic Bedrock**—Includes Fairview and Pothole domes. **Dikes**—A notable climbing route is the "Dike Route" on Pywiack Dome near Tenaya Lake. **Megacrysts**—Notable climbing include the "Southeast Buttress" and "Bachar-Yerian Route" on Medlicott Dome near Tuolumne Meadows.	**Rise of the Batholith**—Large crystals in **Kcp** indicate that the magma body must have cooled very slowly over millions of years. A Uranium-lead zircon age of about 88 million years was obtained from the rock.

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CRETACEOUS (Upper)	Tuolumne Intrusive Suite (Ktu)	Half Dome Granodiorite (Khd)	Light-colored, medium- to coarse-grained, massive, equigranular hornblende-biotite granodiorite. Contains large crystals of potassium and plagioclase feldspar, biotite, hornblende, and honey-colored sphene up to 10 mm (0.4 in) wide and phenocrysts of potassium feldspar up to 3 cm (1.2 in) wide. Spaces between these crystals are filled by quartz. May be divided into: 1) a porphyritic phase (**Khdp**) with potassium-feldspar megacrysts commonly slightly more than 1 cm (0.4 in) wide and 2–3 cm (0.8–1.2 in) long, and 2) a medium-grained equigranular phase (**Khde**) characterized by euhedral hornblende prisms 1–3 cm (0.4–1.2 in) long, biotite books up to 1 cm (0.4 in) wide, and conspicuous sphene.	**Rockfalls**—Previous rockfalls from Ahwiyah Point have buried part of the Mirror Lake Loop Trail and damaged the Ahwahnee Hotel.	**Granitic Bedrock**—Forms Half Dome and the sheer cliffs between the Ahwahnee Hotel and Mirror Lake. Good exposures at Olmsted Point and along the trail to Vernal and Nevada falls. **Splitter cracks—**A notable climbing route is "Sons of Yesterday" near Royal Arches beneath North Dome. **Flakes—**A notable climbing route is "Hermaphrodite Flake" on Stately Pleasure Dome above Tenaya Lake. **Dihedrals—**A notable climbing route is "Great White Book" on Stately Pleasure Dome above Tenaya Lake. **Dikes—**A notable climbing route is "Snake Dike" climb on the southwest face of Half Dome. **Slabs—**Popular slab climbs on the Glacier Point Apron include "Marginal," "Goodrich Pinnacle," and "The Cow". **Joints—**Exfoliation joints are the primary joint type responsible for the famous landmark Half Dome.	**Rise of the Batholith**—**Khd** is the youngest plutonic rock in the Yosemite Valley area with an age of approximately 87–88 million years.
		Granite of Marie Lakes (Kma)	Light-gray, fine-grained biotite granite.	None Significant—Dikes (linear features) pose little potential for significant geologic issues in the park.	**Granitic Bedrock**—Exposed in dikes near Marie Lakes and on the south slopes of Mounts Lyell and Maclure the Merced Peak quadrangle.	**Rise of the Batholith**—May be correlative with Half Dome Granodiorite.
		Granodiorite of Grayling Lake (Kgrl)	Fine- to medium-grained, well-foliated biotite-hornblende granodiorite. Contains 20–25% small anhedral (lacking well-developed crystal faces) grains of biotite and hornblende and relatively abundant sphene.	None Significant—Limited areal extent on relatively gentle slopes. Little potential for significant geologic issues.	**Granitic Bedrock**—Exposed along the west side of the Clark Range in the Merced Peak quadrangle.	**Rise of the Batholith**—Part of the igneous intrusions related to the Tuolumne Intrusive Suite.
		Granodiorite of Glacier Point (Kglp)	Dark, medium-grained, equigranular well-foliated granodiorite, tonalite, and quartz diorite containing abundant small dark inclusions. Typically contains 15–25% subequal biotite and hornblende. Biotite and hornblende may occur as anhedral grains or in clusters 1–5 mm (0.04–0.2 in) wide. Some grains contain augite.	**Rockfalls**—Rockfalls in 2008 impacted the historic Curry Village area.	**Granitic Bedrock**—Forms a band west of the Half Dome Granodiorite in the Yosemite quadrangle. **Splitter Cracks—**A notable climb is "The Grack" below Glacier Point.	**Rise of the Batholith**—Equivalent to part of the Sentinel Granodiorite (**Ks**) and the Granodiorite of Kuna Crest (**Kkc**). Potassium-argon and rubidium-strontium isotopic ages from a Washburn Point sample were about 92 million years.
		Tonalite of Glen Aulin (Kgla)	Dark-colored rock of variable composition ranging from fine-grained quartz diorite in the west to medium-grained granodiorite at the eastern contact with **Khd** and **Kcp**.	**Rockfalls**—Potential issues for areas north and south of the Glen Aulin High Sierra Camp, but relatively gentle slopes near the camp.	**Granitic Bedrock**—Exposed in the Tuolumne Meadows quadrangle.	**Rise of the Batholith**—Uranium-lead zircon age of about 86 million years.
		Granodiorite of Kuna Crest (Kkc)	Dark-colored, medium-grained, hornblende-biotite granodiorite. Crystals are smaller and biotite and hornblende more abundant than in some other granitic rocks in the park. May contain 20–25% anhedral biotite and hornblende. Contains abundant dark phenocrysts of plagioclase and biotite.	**Rockfalls**—Potential on steeper slopes. Exposed near Tioga Pass but well away from the road. Exposures primarily in the backcountry.	**Granitic Bedrock**—Forms the margin of the Tuolumne Intrusive Suite. The unit consists of gray dikes and small intrusive masses with abundant dark phenocrysts on Mt. Lyell, Mt. Maclure, Rodger Peak, and Electra Peak.	**Rise of the Batholith**—The oldest unit in the suite, **Kkc** gains its dark color from biotite and hornblende, which crystallize from magma before quartz and feldspar. Approximately 91 million years old.
		Sentinel Granodiorite (Ks)	Light-colored, medium-grained, equigranular granodiorite and less abundant tonalite, quartz diorite, and granite. Contains inclusions of El Capitan Granite (**Kec**). Hornblende, biotite, and sphene 2–5 mm (0.08–0.2 in) wide.	**Rockfalls**—From extensive sheet (exfoliation) jointing. Rockfall in 1980 was triggered by an earthquake.	**Granitic Bedrock—**Main mass crosses Yosemite Valley near Sentinel Rock. **Joints—**Exfoliation joints are present.	**Rise of the Batholith**—Dikes of **Ks** cut inclusions of El Capitan Granite, indicating it is younger than **Kec**. Approximate age is about 94 million years.

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Age	Simplified Map Unit (Symbol) *Overview Sheet 1*	Map Unit (Symbol) *Colored if present on Overview Sheet 2*	Geologic Description	Geologic Issues	Geologic Features, Processes and General Location	Geologic History
CRETACEOUS (Upper)	Tuolumne Intrusive Suite (Ktu)	Yosemite Creek Granodiorite (Kyc)	Predominantly dark-gray, coarse-grained biotite-hornblende quartz diorite that grades to granodiorite. Locally porphyritic with abundant parallel, tabular, plagioclase phenocrysts. Includes about 15% biotite, hornblende, and sphene. Strongly foliated.	**Rockfalls**—Due to extensive sheet jointing.	**Granitic Bedrock**—Included in a myriad of dikes north of Mt. Hoffmann and crops out in a thin band between **Ks** and **Kglp** southeast of Illilouette Ridge. **Joints**—Exfoliation joints are present.	**Rise of the Batholith**—May be used to study the origin of exfoliation joints and their ability to trigger rockfall.
	Upper Cretaceous Intrusive Rocks (Kib)	Granodiorite of Mono Dome (Kmd)	Light- to medium-gray, medium- to coarse-grained, equigranular biotite-hornblende granodiorite; grades locally into biotite granite. Contains pyroxene as discrete crystals and as cores in hornblende.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Exposed east of the park.	**Rise of the Batholith**—Potassium-argon isotopic ages are about 85 million years. Rubidium-strontium whole-rock age is about 93 million years.
		Granodiorite of Tioga Lake (Kti)	Medium-grained dark-gray rock. Angular plagioclase and ragged, partly chloritized amphibole crystals are set in a matrix of fine-grained potassium-feldspar, quartz, plagioclase, and biotite.		**Granitic Bedrock**—Exposed north of Tioga Lake in the Tuolumne Meadows quadrangle.	**Rise of the Batholith**—Intrusive igneous rock bodies that join with others to form the impressive Sierra Nevada Batholith.
		Quartz monzonite of Ellery Lake (Kell)	The source map does not provide a detailed description.		Exposed east of the park in the Mono Craters quadrangle.	
		Sheared granodiorite of Koip Crest (Kko)	Granodiorite. The source map does not provide a detailed description.	**Rockfalls**—Limited areal extent. Minor rockfall potential in the backcountry.	**Granitic Bedrock**—Sliver of rock on the western slope of Koip Crest in the Mono Craters quadrangle, eastern border of the park.	**Rise of the Batholith**—Mapped as Cretaceous on the Mono Craters quadrangle but as Jurassic and Triassic metavolcanic hornfels on the Yosemite National Park map of Huber et al. (1989).
	Intrusive Suite of Sonora Pass (Ksp)	Granodiorite of Topaz Lake (Ktz)	Light-gray, coarse-grained biotite granodiorite and granite with roughly equant, well-formed potassium feldspar phenocrysts making up 2–10% of the rock. Quartz typically occurs in 0.5-cm (0.2-in) clots. Mafic mineral content about 10%.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Exposed north of the park. Schlieren—Asymmetric schlieren (tabular or disc-like concentrations of minerals in flow layers) locally abundant.	**Rise of the Batholith**—Rubidium-strontium isotopic age of about 87 million years.
		Granodiorite of Kinney Lakes (Kkl)	Medium-grained, equigranular hornblende-biotite granodiorite.		**Granitic Bedrock**—Exposed north of the park.	**Rise of the Batholith**—Rubidium-strontium isotopic age of about 90 million years.
	Upper Cretaceous Intrusive Rocks (Kib)	Felsic Granitic Rocks (Kfgr)	Biotite leucogranite and aplite. Includes trondhjemite in the east- and south-central parts of the Lake Eleanor quadrangle.	None Significant—Isolated exposures of limited areal extent.	**Granitic Bedrock**—Exposed in the Lake Eleanor quadrangle.	**Rise of the Batholith**—Some of the last minerals to crystallize in the evolution of a pluton.
	John Muir Intrusive Suite (Kjm)	Granodiorite of Cow Meadow (Kcm)	Fine- to medium-grained rock that has intruded into **Kmg**.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Exposed southeast of the park in the Kaiser Peak quadrangle.	**Rise of the Batholith**—Age relative to Granodiorite of Lake Edison (**Kle**) is unknown.
		Granodiorite of Lake Edison (Kle)	Equigranular, medium-grained granodiorite. Foliated in margins but structureless in core. Typically contains abundant sphene.			**Rise of the Batholith**—Intrudes **Kmg** and older plutons. Age relative to **Kcm** and to fine- to medium-grained quartz monzonite and granodiorite is unknown.

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CRETACEOUS (Upper)	John Muir Intrusive Suite (Kjm)	Mount Givens Granodiorite (Kmg)	Biotite-hornblende granodiorite and porphyritic biotite granodiorite.	None—These units lie outside of the park boundaries.	**Granitic Bedrock—**Forms the northern margin of one of the largest plutons in the Sierra Nevada Batholith. Exposed southeast of the park.	**Rise of the Batholith**—Potassium-argon isotopic age of 82–87 million years.
	Upper Cretaceous Intrusive Rocks (Kib)	Granodiorite of Soldier Lake pluton (Ksg)	Fine-grained, light-gray, massive, well-jointed, strongly foliated granodiorite. Contains zoned calcic andesine, quartz, biotite, hornblende, and alkali feldspar.	None Significant—Isolated backcountry exposure.	**Granitic Bedrock—**Surrounds Soldier and Spiller lakes, south of Virginia Peak in the northeast section of the park.	**Rise of the Batholith**—One of many igneous intrusions that compose the extensive Sierra Nevada Batholith.
		Rocks of Buckeye Creek pluton (Kbp)	Massive, light- to medium-gray and locally pinkish, porphyritic quartz monzonite composed of quartz, orthoclase, calcic oligoclase, biotite, and hornblende. Potassium feldspar phenocrysts. Grades locally into dark medium-grained hornblende-biotite quartz diorite.	None—This unit lies outside of the park boundaries.	Exposed north of the park.	**Rise of the Batholith**—Part of the Sierra Nevada Batholith.
	Intrusive Suite of Jack Main Canyon (Kjmc)	Granodiorite of Boundary Lake (Kblg)	Light-colored, medium-grained biotite granodiorite and granite characterized by discrete anhedral quartz grains. Locally porphyritic with varying proportions of plagioclase and small tabular potassium-feldspar phenocrysts.	**Rockfall**—Backcountry exposures with rockfall potential on steeper slopes.	**Granitic Bedrock—**Exposed in the northwest section of the park.	**Rise of the Batholith**—Units are thought to have been emplaced at relatively the same time as part of the Jack Main Canyon Intrusive Suite. **Kblg**: Rubidium-strontium age of about 91 million years. **Kgi**: Potassium-argon isotopic ages of about 81–88 million years.
		Granodiorite of Lake Vernon (Klv)	Hornblende-biotite granodiorite characterized by two distinct grain sizes of mafic minerals: 1) scattered grains 0.5–1 cm (0.2–0.4 in) in size, and 2) abundant grains up to 1 mm (0.04 in) in size. The two grain sizes give the rock a spotted appearance. Contains numerous flattened mafic inclusions.		**Granitic Bedrock—**Exposed in the northwest section of the park, Tower Peak quadrangle.	
		Granodiorite of Bearup Lake (Kbu)	Even-grained granodiorite characterized by euhedral hornblende and biotite crystals and a wide range of mafic mineral content.		**Granitic Bedrock—**Exposed in the northwest section of the park, Tower Peak quadrangle.	
		Quartz diorite of Mount Gibson (Kgi)	Dark-gray to black, coarse-grained, hornblende-biotite quartz diorite. Contains pyroxene.		Exposed in the northwest section of the park, Hetch Hetchy Reservoir and Tower Peak quadrangles.	
	Intrusive Suite of Washburn Lake (Kwl)	Granite porphyry of Cony Crags (Kcc)	Biotite granite porphyry in the core of a disrupted compound pluton at the headwaters of the Merced River. Contains sparse phenocrysts of plagioclase, quartz, and potassium feldspar in a fine-grained groundmass.	**Rockfall**—Backcountry exposures with rockfall potential on steeper slopes.	**Granitic Bedrock—**Only exposed in the Cony Crags area in the Merced Peak Quadrangle.	**Rise of the Batholith**—Forms the core of a compound pluton.
		Granite of Turner Lake (Ktl)	Biotite granite and felsic granodiorite containing abundant tabular 1–2-mm (0.04–0.08-in) phenocrysts of potassium feldspar in a medium-grained groundmass.		**Granitic Bedrock—**Exposed in the Merced Peak and Tuolumne Meadows quadrangles.	**Rise of the Batholith**—Part of the intrusive sequence that resulted in the Washburn Lake Intrusive Suite.
		Granodiorite of Red Devil Lake (Krd)	Equigranular granodiorite and granite forming the outer unit of the intrusive suite of Washburn Lake. Ranges from inclusion-rich mafic biotite-hornblende granodiorite at the outer margin to biotite granite at the inner contact with **Ktl**.		**Granitic Bedrock—**More widespread exposures than **Kcc** and **Ktl**. South of Gallison Lake, the granodiorite is strongly sheared.	**Rise of the Batholith**—Forms the outer unit of the intrusive suite of Washburn Lake. Uranium-lead isotopic age of approximately 98 million years.

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CRETACEOUS (Upper)	Upper Cretaceous Intrusive Rocks (Kib)	Granodiorite of Hodgdon Ranch (Khr)	Fine- to medium-grained hornblende-biotite granodiorite with coarse potassium feldspar crystals. Eastern margin is in contact with **Kncc** in the Lake Eleanor quadrangle.	None Significant—Primarily exposed on low-gradient slopes.	**Granitic Bedrock**—Exposed in the Lake Eleanor quadrangle.	**Rise of the Batholith**—Igneous intrusions that form part of the extensive Sierra Nevada Batholith.
		Tonalite of North Crane Creek (Kncc)	Medium-grained, biotite-hornblende tonalite. Includes a contact breccia zone (**Kccb**).		**Granitic Bedrock**—Exposed near the western border of the park in the Lake Eleanor quadrangle.	
		Tonalite of Tamarack Creek (Ktc)	Medium-grained hornblende-biotite tonalite. Sparse but conspicuous euhedral hornblende crystals, 5–10 mm (0.2–0.4 in) long.		**Granitic Bedrock**—Exposed in the Lake Eleanor quadrangle.	**Rise of the Batholith**—May be correlative with the granodiorite of Illilouette Creek (**Kic**) in the Merced Peak quadrangle.
	Intrusive Suite of Buena Vista Crest (Kbv)	Granite of Chilnualna Lakes (Kcl)	Light-colored, fine-grained, equigranular granodiorite containing 5–10% biotite.	**Rockfall**—Isolated exposures on steep slopes. Rockfall potential along the southern margin of Yosemite Valley. **Kcl**: limited areal extent.	**Granitic Bedrock**—Forms a small pluton northwest of Buena Vista Peak in the Yosemite quadrangle.	**Rise of the Batholith**—Units are thought to have been emplaced at relatively the same time as part of the Buena Vista Crest Intrusive Suite. **Khrr**: surrounds **Kcl**. **Kbv**: intrudes, and is thus younger than, nearly all rocks it contacts. **Kol**: Uranium-lead isotopic ages of 107 million years and 112 million years from a sample collected near Ostrander Lake are probably 10–15 million years too old.
		Granodiorite of Horse Ridge (Khrr)	Fine-grained, equigranular, calcic granodiorite forming an envelope around the lighter colored **Kcl**. Typically contains 10–15% fine flakes of biotite and about 10% potassium feldspar grains.		**Granitic Bedrock**—Exposed in the Yosemite quadrangle.	
		Bridalveil Granodiorite (Kbv)	Bluish-gray, "salt-and-pepper" granodiorite. Typically a sodic (containing sodium) granodiorite containing about 5% biotite in fine shreds, but near external contacts includes calcic (containing calcium) granodiorite containing about 10% biotite and less abundant hornblende. Includes a zone of abundant inclusions.		**Granitic Bedrock**—Forms dikes and gently dipping sheets in the southern wall of Yosemite Valley and several larger bodies farther south. Exposed in the Yosemite quadrangle.	
		Granodiorite of Breeze Lake (Kbz)	Light-gray biotite granodiorite with grains of various sizes. Abundant plagioclase phenocrysts up to 8 mm (0.3 in) in length are set in a fine-grained groundmass. Potassium feldspar ranges in different samples from fine interstitial grains to crystals up to 1 cm (0.4 in) wide.		**Granitic Bedrock**—Forms an elongate stock of limited areal extent near Breeze and Chain lakes, southeastern boundary of the park, Merced Peak quadrangle.	
		Granodiorite of Ostrander Lake (Kol)	Medium-grained equigranular hornblende-biotite granodiorite and biotite granite. Typically contains 6–10% anhedral biotite and hornblende. Contains about 10% mafic minerals, predominantly biotite in poorly formed grains 1–3 mm (0.04–0.1 in) wide. Locally contains phenocrysts of potassium feldspar.		**Granitic Bedrock**—Exposed in the southern part of the park as a large pluton in the eastern Yosemite quadrangle and western Merced Peak quadrangle.	
		Leaning Tower Granite (Klt)	Biotite-hornblende granite and granodiorite. Clusters of biotite and hornblende give the unit a spotted appearance. Biotite is replacing hornblende in some clusters. Sparsely porphyritic with potassium feldspar phenocrysts up to 5 mm (0.2 in).		**Granitic Bedrock**—Forms three small bodies exposed on the walls of Yosemite Valley.	
		Granodiorite of Illilouette Creek (Kic)	Medium-grained, equigranular, biotite-hornblende granodiorite and much less abundant granite and tonalite. Up to 20% biotite and hornblende. Includes stout prisms of hornblende up to 1 cm (0.4 in) long. Mafic inclusions and schlieren typically define a foliation. Includes a zone of inclusions (**Kici**).		**Granitic Bedrock**—Yosemite quadrangle: flanks Horse Ridge and extends northwest through Bridalveil Creek Campground. Merced Peak quadrangle: forms the marginal unit of a large compound pluton that extends westward to Bridalveil Creek.	

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CRETACEOUS (Upper)	Intrusive Suite of Buena Vista Crest (Kbv)	Quartz diorite of Tamarack Creek (Ktmc)	Dark-gray, coarse-grained biotite-hornblende quartz diorite. Locally foliated. Hornblende crystals are normally short and stubby, but locally more than 1.3 cm (0.5 in) long.	**Rockfall**—Isolated exposures on steep slopes. Rockfall potential along the southern margin of Yosemite Valley. **Ktmc**: limited areal extent.	Limited exposures in the southwestern part of the Hetch Hetchy Reservoir quadrangle.	**Rise of the Batholith**—Units are thought to have been emplaced at relatively the same time as part of the Buena Vista Crest Intrusive Suite. **Ktmc**: Potassium-argon isotopic age of approximately 89–96 million years. **Kid**: dikes cut **Kec** and **Ktg** on the northern wall of Yosemite Valley.
		Quartz diorite (Kid)	Dark, fine- to medium-grained dikes of hornblende quartz diorite to biotite tonalite and mafic biotite granodiorite. Contains about 20% biotite and hornblende.		Quartz diorite	
	Upper Cretaceous Intrusive Rocks (Kib)	Granodiorite of Turner Ridge (Ktr)	Distinctive dark, porphyritic granodiorite and tonalite. Contains conspicuous, corroded, equant phenocrysts of quartz and plagioclase and subhedral grains of biotite and hornblende. Tablets of plagioclase are up to 1 cm (0.4 in) in size.	None—Isolated backcountry exposures, some linear, with limited areal extent covering relatively gentle slopes.	**Granitic Bedrock—**Forms a small pluton and dikes in the Yosemite quadrangle.	**Rise of the Batholith**—The intrusion extends discontinuously from near Bridalveil Creek Campground to the South Fork of the Merced River.
	Intrusive Suite of Merced Peak (Kmp)	Granite of Timber Knob (Ktk)	White to very light gray, fine-grained equigranular biotite leucogranite.	None—These units lie outside of the park boundaries.	**Granitic Bedrock—**Forms a stock and dikes near Timber Knob and the Strawberry Tungsten Mine area of the Merced Peak quadrangle.	**Rise of the Batholith**—Part of the Merced Peak Intrusive Suite.
		Leucogranite of Norris Creek (Kn)	Very fine to medium-grained white leucogranite and aplite.		**Granitic Bedrock—**Forms a plexus of dikes near Jackass Meadow, Merced Peak quadrangle, southeast of the park.	
		Granodiorite of Jackass Lakes (Kjl)	Very light-gray, medium-grained granodiorite containing about 10% biotite and less hornblende. Ranges from tonalite and quartz diorite to porphyritic leucogranite with potassium feldspar phenocrysts. Locally contains abundant inclusions of older metamorphic and plutonic rocks (**Kjli**).	None Significant—In the park, backcountry exposures are located on relatively gentle slopes.	**Granitic Bedrock—**Large pluton underlies much of the southeastern half of the Merced Peak quadrangle, southeast of the park.	**Rise of the Batholith**—Units are thought to have been emplaced at relatively the same time as part of the Merced Peak Intrusive Suite.
	Upper Cretaceous Intrusive Rocks (Kib)	Quartz monzonite of Shellenbarger Lake (Ksl)	Fine- to medium-grained, commonly porphyritic with albite (feldspar) phenocrysts of possible replacement origin.	None—This unit lies outside of the park boundaries.	Exposed in the Devils Postpile quadrangle, southeast of the park.	**Rise of the Batholith**—Part of the extensive Sierra Nevada Batholith.
		Leucogranite of Red Peak (Krp)	Biotite leucogranite porphyry containing phenocrysts of plagioclase and quartz in a fine-grained, sugary-textured groundmass. Very light gray where fresh. Mostly weathered to shades of red and yellow due to alteration of disseminated pyrite.	None Significant—Isolated backcountry exposure near Red Peak. Potential rockfall on steeper slopes, but a relatively insignificant issue considering the location of the exposure.	**Granitic Bedrock—**Some calcic cores of plagioclase have been replaced by potassium feldspar. Contains miarolitic cavities (small irregular holes). Zone of abundant inclusions (**Krpi**). Exposed near Red Peak in the Merced Peak quadrangle.	**Rise of the Batholith**—Secondary minerals may form in miarolitic cavities. Forms part of the Sierra Nevada Batholith.
		Leucogranite of Post Peak (Kpp)	Fine-grained biotite leucogranite porphyry similar to **Krp** but lacking miarolitic cavities and pyrite. Weathers very light-gray. Zone of abundant mafic inclusions (**Kppi**).	None Significant—Isolated exposures with limited areal extent.	**Granitic Bedrock—**Forms small masses along the southeastern border of the park near Triple Divide and Post peaks, Merced Peak quadrangle.	**Rise of the Batholith**—Leucogranites contain few mafic minerals, suggesting that solidification occurred late in the evolution of the magma body.
		Granodiorite of Horsethief Creek (Khc)	Medium-light-gray hornblende-biotite granodiorite porphyry. Contains very abundant phenocrysts, predominantly plagioclase, in a fine-grained sugary-textured groundmass.	None—This unit lies outside of the park boundaries.	**Granitic Bedrock—**Forms a small mass along the South Fork of the Merced River east of Moraine Meadow, Merced Peak quadrangle.	**Rise of the Batholith**—Localized igneous intrusions forming part of the extensive Sierra Nevada Batholith.

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CRETACEOUS (Upper)	Upper Cretaceous Intrusive Rocks (Kib)	Granite of Grace Meadow (Kgm)	Light-pink to white, sugary, medium- to fine-grained alaskite with rare dark minerals. Contains abundant inclusions of diorite, gabbro, quartzite, biotite schist, and marble.	**Rockfall**—Isolated backcountry location with few steep slopes. Potential rockfall but no significant issues for the park.	**Granitic Bedrock—**Exposed near the northern border of the park in the Tower Peak quadrangle.	**Rise of the Batholith**—Forms part of the extensive Sierra Nevada Batholith.
		Microgabbro of the Clark Range (Kcr)	Medium-gray microgabbro (fine-grained). Contains sparse tabular phenocrysts of plagioclase and clots of hornblende in a fine-grained groundmass.	None Significant—Linear exposure with limited areal extent.	Forms a 2–8-m (7–26 ft)- wide dike that extends from the east flank of Mount Clark to the Red Peak Fork of the Merced River, Merced Peak quadrangle.	**Rise of the Batholith**—Dikes are features that are younger than the rocks into which they intrude.
		Granodiorite of Grizzly Creek (Kgc)	Mafic hornblende-biotite granodiorite and tonalite west of Quartz Mountain. Contains abundant tabular phenocrysts of plagioclase and conspicuous corroded phenocrysts of quartz.	None—This unit lies outside of the park boundaries.	**Granitic Bedrock—**Distinct unit forms the north end of an elongate northeast-trending pluton cutting the leucogranite of Shuteye Peak, south of the park.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Quartz diorite of Aspen Valley (Kav)	Medium-grained biotite-hornblende tonalite to quartz diorite. Contains mafic minerals. Locally sheared. Locally divided into a fine-grained hornblende-biotite quartz diorite unit (**Kavt**).	None—Exposures in Aspen Valley are located on relatively gentle topography and do not pose a significant risk for rockfall in the park.	Where sheared, the unit is more felsic than elsewhere. Exposed in the western part of the park, Lake Eleanor quadrangle.	**Rise of the Batholith**—Probably correlative with the tonalite of Poopenaut Valley (**Kpv**).
		Granite of Piute Mountain (Kpm)	Light-pink to orange, medium- to coarse-grained granite containing abundant, closely packed, tabular microcline (feldspar) crystals.	None Significant—Isolated backcountry exposures with limited areal extent.	**Granitic Bedrock—**Limited exposure around Piute Mountain in the Tower Peak quadrangle, northern part of the park.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Complex of Mahan Peak (Kmp)	Strongly foliated and migmatitic complex of fine-grained leucogranite with abundant diorite inclusions and cut by unfoliated, fine-grained granitic dikes and irregular masses.	**Rockfall**—Backcountry exposures with rockfall potential on steeper slopes.	**Granitic Bedrock—**Northwest-trending exposure in the western part of the Tower Peak quadrangle, northern part of the park.	**Rise of the Batholith**—Considered to be equivalent to part of Granodiorite of Double Rock (**Kdr**), which may be Early Cretaceous in age.
		Granite of Avonelle Lake (Kavl)	Coarse-grained biotite granite, commonly with abundant tabular phenocrysts of microcline with maximum dimensions of 3 cm (1.2 in).		**Granitic Bedrock—**Extensive northwest-trending exposure in the Tower Peak quadrangle, northern part of the park.	**Rise of the Batholith**—Considered to be equivalent to Granodiorite of Rancheria Mountain (**Krm**) and part of Granodiorite of Double Rock (**Kdr**), both of which may be Early Cretaceous in age.
		Granodiorite of Fremont Lake (Kfl)	Medium-dark-gray, medium-grained, hornblende-biotite granodiorite. Where hornblende-rich, contains abundant lenticular or elongate mafic inclusions, locally in clusters.	**Rockfall**—Backcountry exposures with limited areal extent in the park. Potential rockfall on steeper slopes south of Twin Lakes.	**Granitic Bedrock—**Primarily exposed north of the park but crosses the border near Twin Lakes, Tower Peak quadrangle. Mostly mafic free and more granitic in the southwestern part of its exposure.	**Rise of the Batholith**—The unit extends west into the Pinecrest quadrangle where it is equivalent to the Granodiorite of Kinney Lakes (**Kkl**).
		Granodiorite of Long Canyon (Kloc)	Dark hornblende-biotite granodiorite and quartz-diorite with about 30% mafic mineral content and abundant mafic inclusions.	None—This unit lies outside of the park boundaries.	**Granitic Bedrock—**Exposed north of the park in the Tower Peak quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Granodiorite North of Tuolumne Peak (Ktp)	Small masses and dikes of hornblende-biotite granodiorite.	None Significant—Isolated exposures with limited areal extent.	**Granitic Bedrock—**Exposed in the Tuolumne Peak quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.

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CRETACEOUS (Upper)	Intrusive Suite of Yosemite Valley (Kyv)	Taft Granite (Ktg)	Light-colored, medium-grained, equigranular leucogranite. Weathers yellowish gray. Similar to **Kec** but is finer-grained and lacks phenocrysts.	**Rockfall**—Isolated exposures on steep slopes. Rockfall potential along the margins of Yosemite Valley.	**Granitic Bedrock**—Forms several small masses cutting **Kec** and extending south from El Capitan and Taft Point. Forms the brow of El Capitan. Exposed in the Yosemite quadrangle. **Dikes**	**Rise of the Batholith**—A uranium-lead isotopic age of 96 million years is probably too young.
CRETACEOUS (Lower)		Leucogranite of Ten Lakes (Ktnl)	White, coarse-grained leucogranite mottled by gray anhedral quartz crystals. Quartz, microcline, and plagioclase in equal proportions; about 4% mafic mineral content.	**Rockfall**—Backcountry exposures with rockfall potential on steeper slopes.	**Granitic Bedrock**—Exposed in the northern part of the park in the Hetch Hetchy Reservoir, Tower Peak, and Tuolumne Meadows quadrangles.	**Rise of the Batholith**—Rubidium-strontium whole-rock age of 98 million years.
		Granite of Rancheria Mountain (Krm)	Coarse-grained biotite granite and quartz monzonite. Commonly contains blocky phenocrysts of potassium feldspar. Evenly disseminated, fine- to medium-grained, anhedral biotite flakes. Phenocrysts of microcline are locally abundant.		**Granitic Bedrock**—Exposed in the Hetch Hetchy Reservoir and Lake Eleanor quadrangles.	**Rise of the Batholith**—May be correlative with **Ktg**.
		El Capitan Granite (Kec)	Light-colored, coarse-grained biotite granodiorite and granite with dark- gray blobs (enclaves) of diorite which contains abundant biotite. Weathers yellowish gray- to pinkish- gray. Coarse quartz and potassium feldspar crystals stand out on the surface. Dark quartz grains are as large as 1 cm (0.4 in) and potassium feldspar tablets may be 1.3 cm (0.5 in) in length. Biotite is the primary mafic mineral. Sparse hornblende. May be divided into: 1) granodiorite facies (**Keca**), 2) quartz monzonoite facies (**Kecb**), 3) quartz rich granodiorite facies (**Kecc**), and quartz rich quartz monzonite (**Kecd**).	**Rockfall**—Previous rockfalls have threatened visitor safety and damaged park infrastructure. The Cookie Cliff rockslide of 1982, for example, blocked the El Portal Road, severed sewage lines, and destroyed the telephone line.	**Granitic Bedrock**—Forms El Capitan and coarsely-jointed rock masses. Contains exfoliation joints. **Splitter Cracks—**A notable climbing route is "Reed's Pinnacle Direct" above the Big Oak Flat Road. **Flakes—**Notable climbing routes include "Boot Flake" and "Texas Flake" on the nose route of El Capitan, and "Wheat Thin" on Cookie Cliff. **Dihedrals—**A notable climbing route is "Five Open Books" west of Lower Yosemite Fall. **Dikes**—Dark, fine-grained diorite dikes cut across El Capitan granite. **Chickenheads—**Notable climbs can be found along the western exposures of El Capitan and include "Sloth Wall," "Boneheads," and "Fun Terminal" in Merced Gorge.	**Rise of the Batholith**—Enclaves may have formed when a second, darker (basaltic) magma mixed with the granitic magma, broke apart, and dispersed throughout the lighter granite. Uranium-lead isotopic age of a sample from Turtleback Dome is 103 million years.
		Granite of Big Creek (Kbc)	Light-colored, medium-grained, equigranular biotite granite and leucogranite, similar to **Ktg**. Contains about 5% biotite and opaque minerals in 1–2-mm (0.04–0.08-in) grains.	None Significant—Backcountry exposures on relatively gentle slopes.	**Granitic Bedrock**—Forms a small pluton intrusion into Bass Lake Tonalite (**Kblt**) at the southern margin of the Yosemite quadrangle.	**Rise of the Batholith**—Granitic rocks of the Yosemite Valley Intrusive Suite that form part of the extensive Sierra Nevada Batholith.
		Granodiorite of Double Rock (Kdr)	Gray, coarse-grained, porphyritic biotite granodiorite. Weathers buff or reddish- brown. Locally abundant lensoid mafic inclusions accompanied by aligned tabular potassium-feldspar phenocrysts give the granodiorite a streaked appearance.	**Rockfall**—Backcountry exposures on relatively gentle and steep slopes. Rockfall potential on the slopes of Regulation and Petit peaks.	**Granitic Bedrock**—Exposed in the Hetch Hetchy Reservoir and Tuolumne Meadows quadrangles.	
		Granodiorite of Mount Hoffman (Kmh)	Light-gray, coarse-grained biotite granodiorite. Locally porphyritic. Weathers buff or reddish brown.	**Rockfall**—Potential rockfall on the slopes of Mount Hoffman.	**Granitic Bedrock**—Mount Huffman pluton. The southeastern border of the pluton is locally sheared. Exposed in the Hetch Hetchy Reservoir and Tuolumne Meadows quadrangles.	**Rise of the Batholith**—Rubidium-strontium whole-rock age of approximately 98 million years.

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CRETACEOUS (Lower)	Intrusive Suite of Yosemite Valley (Kyv)	Granite of Gray Peak (Kgp)	Hornblende-biotite granite. Contains prominent tabular phenocrysts of potassium feldspar up to 3 cm (1.2 in) long in a coarse-grained groundmass. Much of the rock is strongly sheared.	**Rockfall**—Isolated backcountry exposure. Although a potential rockfall hazard on the slopes of Gray Peak, the unit is probably not a major geologic issue for the park.	**Granitic Bedrock**—Underlies the north slope of Gray Peak in the Clark Range. Exposed in the Merced Peak quadrangle.	**Rise of the Batholith**—Granitic rocks of the Yosemite Valley Intrusive Suite that form part of the extensive Sierra Nevada Batholith.
		Granite of Bald Mountain (Kbam)	Medium- to coarse-grained granite, similar to **Krm**. Locally highly sheared.	**Rockfall**—Exposures with rockfall potential on the slopes of Bald Mountain and slopes adjacent to the Tuolumne River. Exposures near buildings are on gentler slopes.	**Granitic Bedrock**—Exposed in the western part of the park in the Lake Eleanor quadrangle.	
		Granite of Swamp Lake (Kswl)	Medium- to coarse-grained granite and granodiorite, similar to **Krm**.	**Rockfall**—Exposures surrounding Swamp Lake are on gentle topography. Steeper south-facing slopes may have rockfall potential into Poopenaut Valley.	**Granitic Bedrock**—Exposed west of Hetch Hetchy Reservoir in the Lake Eleanor quadrangle.	
	Lower Cretaceous Intrusive Rocks (Kia)	Granodiorite of Beasore Meadow (Kbe)	Medium-grained hornblende-biotite granodiorite. Locally contains large swarms of abundant mafic inclusions. Intrudes **Ksp**.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Exposed south of the park in the Shuteye Peak quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
	Shaver Intrusive Suite (KJsh)	Granite of Shuteye Peak (Ksp)	Very light-gray leucogranite and biotite granite containing sparse to abundant tabular phenocrysts of potassium feldspar up to 1 cm (0.4 in) long. Much of the rock is strongly sheared.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Forms the north end of a large pluton that extends 50 km (30 mi) south of the park.	
		Granite of Stovepipe Campground (Ksc)	Light-colored, medium-grained, biotite granite with tabular phenocrysts of potassium feldspar. Contains 2–9% mafic minerals, primarily biotite.		**Granitic Bedrock**—Forms a small pluton in the southwestern corner of the Yosemite quadrangle, west of the park.	**Rise of the Batholith**—Composition and texture of **Ksc** is similar to **Ksp**, suggesting that the two units are correlative.
	Lower Cretaceous Intrusive Rocks (Kia)	Granodiorite of Bummers Flat (Kbf)	Porphyritic biotite granodiorite with potassium-feldspar phenocrysts commonly averaging about 2 cm (0.8 in) in length.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Exposed northwest of the park.	**Rise of the Batholith**—Preliminary Rubidium-strontium data indicate an age of about 101 million years.
		Granite of Upper Twin Lake (Kut)	Pink, coarse-grained, equigranular biotite granite. Locally has a very strong vertical lineation, probably of metamorphic origin.	None Significant—Backcountry exposures with limited areal extent. Rockfall potential on steeper slopes but no significant issue to the park.	**Granitic Bedrock**—Limited areal exposure along the northern border of the park, Tower Peak quadrangle.	**Rise of the Batholith**—The lineation may be of metamorphic origin.
		Granite of Bond Pass (Kbop)	Gray hornblende-biotite granite and granodiorite with moderately large, pink potassium-feldspar phenocrysts. Locally intensely sheared. Includes bodies of aplite or fine-grained sugary alaskite containing tourmaline rosettes.	**Rockfall**—Isolated backcountry exposures with rockfall potential on steeper slopes from Forsyth Peak south to Craig Peak.	**Granitic Bedrock**—Exposed along the northern border of the park in the Tower Peak quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Aplite North of Bernice Lake (Kabl)	Aplite. The source map does not provide a detailed description.	None Significant—Limited areal exposure. Low potential for geologic issues	Limited exposure of aplite north of Bernice Lake in the Tuolumne Meadows quadrangle.	

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CRETACEOUS (Lower)	Lower Cretaceous Intrusive Rocks (Kia)	Granite of Ireland Lake (Kil)	Medium- to coarse-grained porphyritic granite, much of it strongly sheared.	None Significant—Limited areal exposure. Low potential for geologic issues	**Granitic Bedrock**—Limited exposure near Bernice Lake, Tuolumne Meadows quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Leucogranite of Gallison Lake (Kgl)	Fine-grained felsic granite.		**Granitic Bedrock**—Exposed south of Gallison Lake in the Tuolumne Meadows quadrangle.	
		Granite porphyry of Star Lakes (Kst)	Hornblende granodiorite, granodiorite porphyry, and biotite granite porphyry. Contains abundant phenocrysts of plagioclase in a medium- to fine-grained sugary-textured ground mass.	None Significant—Limited areal extent in the park. Low potential for geologic issues in the park.	**Granitic Bedrock**—Primarily exposed south of the park from Star Lakes to White Chief Mountain. In the park, limited areal exposure of the unit occurs along the northern margin of the El Capitan pluton.	**Rise of the Batholith**—Rubidium-strontium isotopic age of about 108 million years.
		Aplite (Kap)	Bodies of aplite or fine-grained sugary alaskite containing tourmaline rosettes. Borders **Klh** in the park.	None Significant—Linear exposure of limited areal extent. Limited potential for geologic issues.	Linear, dike-like features. Exposed along the northeastern margin of the Lake Harriet pluton, Tower Peak quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
	Fine Gold Intrusive Suite (Kfg)	Alaskite (Kal)	Light-colored, fine- to medium-grained leucogranite. Contains 1–2% small grains of biotite and red garnet.	None—This unit lies outside of the park boundaries.	**Granitic Bedrock**—Exposed in the southwestern corner of the Yosemite quadrangle, south of the park.	**Rise of the Batholith**—Granitic rocks in the Fine Gold Intrusive Suite that form part of the extensive Sierra Nevada Batholith.
		Granodiorite of Arch Rock (Kar)	Medium-grained, equigranular, hornblende-biotite granodiorite. Contains 6–8% mafic minerals, mostly subhedral biotite, but also subhedral hornblende and titanite. Contains potassium feldspar in poikilitic grains up to 1 cm (0.4 in) in size.	None Documented	**Granitic Bedrock**—Forms a small pluton in the Bass Lake Tonalite (**Kblt**) near the Arch Rock Entrance Station.	**Rise of the Batholith**—Similar in appearance to adjacent **Kblt**, but contains coarser, better-formed biotite grains. The two units may have similar cooling histories.
		Granodiorite of Crane Flat (Kcf)	Medium-grained biotite granodiorite. Contains evenly disseminated subhedral to anhedral biotite.	None Significant—Exposed on relatively gentle topography near the Crane Flat Ranger Station. Low potential for geologic issues.	**Granitic Bedrock**—Limited exposure near the western border of the park, Lake Eleanor quadrangle.	**Rise of the Batholith**—May have been emplaced at about the same time as the biotite granite of **Kar** in Yosemite Valley.
		Granodiorite of Sawmill Mountain (Ksm)	Medium to coarse grained, highly variable composition that ranges from biotite leucogranite to hornblende-biotite trondhjemite. Very similar in appearance to Kec.	None—This unit lies outside of the park boundaries.	**Granitic Bedrock**—Exposed just west of the park boundary in the Lake Eleanor quadrangle.	**Rise of the Batholith**—Uranium-lead isotopic age of 116.1 million years.
		Granite of Hogan Mountain (Khm)	Fine- to medium-grained leucocratic granite. Contains 2–4% small grains of opaque minerals and flakes of biotite.	None—Most of the unit is outside the park in the Bass Lake quadrangle. In the park, the unit has limited areal extent.	**Granitic Bedrock**—In the park, forms a small pluton centered on Mt. Savage in the southwestern corner of the park, Yosemite quadrangle.	**Rise of the Batholith**—Granitic rocks in the Fine Gold Intrusive Suite that form part of the extensive Sierra Nevada Batholith.
		Bass Lake Tonalite (Kblt)	Medium-grained, equigranular tonalite, granodiorite, and quartz diorite. Quartz is typically smaller and more irregularly shaped than in **Kec**. Generally foliated. Potassium feldspar is sparse. Abundant mafic inclusions of biotite, hornblende, and titanite.	**Rockfall**—Previous rockfalls have closed Highway 140 east of Yosemite View Lodge in El Portal.	**Granitic Bedrock**—Extends from the Bass Lake quadrangle, south of the park, into the western margin of the park.	**Rise of the Batholith**—Uranium-lead isotopic ages range from 124–105 million years. Previously called the Granodiorite of the Gateway.

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CRETACEOUS (Lower)	Fine Gold Intrusive Suite (Kfg)	Tonalite of Oakhurst (Koh)	Light-colored, medium-grained hornblende-biotite tonalite, with faint planar foliation defined by orientation of mafic minerals. Indistinguishable in outcrop from **Kbm**.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Exposed southwest of the park in the Mariposa quadrangle.	**Rise of the Batholith**—Uranium-lead isotopic age of about 105 million years.
		Tonalite of Blue Canyon (Kbm)	Light-colored, medium-grained granitic rocks, chiefly hornblende-biotite tonalite but grading locally into diorite, quartz diorite, granodiorite, and granite. Mostly equigranular. Potassium-feldspar phenocrysts up to 2 cm (0.8 in) long, biotite flakes up to 1 cm (0.4 in), and hornblende prisms up to 1.5 cm (0.6 in).		**Granitic Bedrock**—Exposed southwest of the park.	**Rise of the Batholith**—Considered to be part of **Kblt** by some geologists. Uranium-lead isotopic age of about 114 million years.
		Tonalite of Poopenaut Valley (Kpv)	Medium-grained biotite-hornblende tonalite. Ranges locally from granodiorite to quartz diorite, but generally has a uniform texture. Contains mafic minerals. Locally contains a porphyritic unit (**Kpvp**) with poikilitic potassium-feldspar phenocrysts up to 2 cm (0.8 in) long.	**Rockfall**—Rockfall potential on steep slopes adjacent to the Tuolumne River in Poopenaut Valley.	**Granitic Bedrock**—Exposed in the western part of the park in the Pinecrest and Lake Eleanor quadrangles.	**Rise of the Batholith**—May have been emplaced at about the same time as **Kbm**.
		Granodiorite of Hazel Green Ranch (Khg)	Medium-grained hornblende-biotite granodiorite and tonalite. Generally more felsic than Kpv but otherwise similar. Locally divided into mafic marginal facies (**Khgm**).	None—This unit lies outside of the park boundaries.	**Granitic Bedrock**—Adjacent to the western border of the park, Lake Eleanor quadrangle. Aligns with **Kblt** on the El Portal quadrangle to the south.	**Rise of the Batholith**—Granitic rocks in the Fine Gold Intrusive Suite that form part of the extensive Sierra Nevada Batholith.
	Lower Cretaceous Intrusive Rocks (Kia)	Granodiorite of Tueeulala Falls (Ktf)	Medium-grained hornblende-biotite granodiorite. Subhedral mafic minerals.	**Rockfall**—Rockfall potential on steeper slopes associated with Tueeulala Falls and Hetch Hetchy Reservoir. Infrastructure (dam buildings) is located west of **Ktf**.	**Granitic Bedrock**—Primarily exposed adjacent to the western end of Hetch Hetchy Reservoir, Lake Eleanor quadrangle.	**Rise of the Batholith**—Uranium-lead isotopic age of 108.7 million years.
		Granodiorite of Chowchilla Mountain (Kccm)	Medium-grained, biotite granodiorite. Contains about 8% fine, poorly formed mafic minerals, predominantly biotite but including less abundant hornblende.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Forms a small igneous body in the southwestern part of the Yosemite quadrangle, west of the park.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Granodiorite of Iron Creek (Kirc)	Medium-grained, equigranular to porphyritic granodiorite and less abundant granite Contains up to 20% hornblende and biotite. May also contain abundant fine-grained potassium feldspar.		**Granitic Bedrock**—Exposed in the southeastern corner of the Yosemite quadrangle, southeast of the park.	**Rise of the Batholith**—Rubidium-strontium age of about 110 million years.
		Granodiorite of Wawona (Kww)	Light-colored, calcic granodiorite with 15% mafic minerals. Biotite is more abundant than hornblende. Contains coarser, more equant quartz in grains as large as 5 mm (0.2 in). Less mafic and less well-foliated than **Kblt**.	**Rockfall**—Limited areal extent. Potential rockfall from steeper slopes.	**Granitic Bedrock**—Forms a small pluton in the southwestern corner of the park, near Wawona in the Yosemite quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Tonalite of South Wawona (Ksw)	Distinctive hornblende-biotite tonalite with 30–40% coarse euhedral phenocrysts of hornblende as long as 1 cm (0.4 in) and less abundant biotite in a very light-gray groundmass.	**Rockfall**—More limited areal extent than **Kww**. Exposed on gentler sloped than **Kww**.	**Granitic Bedrock**—Forms a band 300 m (1,000 ft) wide between **Kww** and **Kec** in the southwestern corner of the park, near Wawona in the Yosemite quadrangle.	
		Granite of Dorothy Lake (Kdl)	Light-pink, fine- to coarse-grained tourmaline-bearing granite. Contains rare miarolitic cavities. Locally intensely sheared, with tourmaline on shear surfaces.	**Rockfall**—Limited areal extent. Primarily exposed on gentle topography north of the park, but exposures on steeper slopes may present rockfall issues to the few visitors who might be in the area.	**Granitic Bedrock**—Exposed north of Dorothy Lake in the far northern part of the park, Tower Peak quadrangle. Most of the exposure lies outside of the park.	

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CRETACEOUS (Lower)	Lower Cretaceous Intrusive Rocks (Kia)	Granodiorite of Lake Harriet (Klh)	Dark-gray, moderately foliated granodiorite characterized by shreddy clots of biotite and hornblende. Aplite exposed along the northeastern margin.	**Rockfall**—Backcountry exposures primarily north of the park. Potential rockfall on steep slopes near Mary Lake.	**Granitic Bedrock**—Exposed in the far northern section of the park near Mary Lake and Craig Peak, Tower Peak quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Leucogranite of Mount Clark (Kmc)	Very light gray, medium-grained, equigranular hornblende-biotite leucogranite.	**Rockfall**—Limited areal extent. Potential rockfall on steep slopes of Mount Clark.	**Granitic Bedrock**—Exposed on Mount Clark, Merced Peak quadrangle, southwestern part of the park.	
		Leucogranite (Klg)	Fine- to medium-grained equigranular biotite leucogranite.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Forms isolated exposures southeast of the park in the Merced Peak quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Quartz Diorite and Tonalite (Kqd)	Medium-gray to medium-light-gray, fine- to medium-grained equigranular quartz diorite and tonalite in small masses within granitic rocks and along contacts within metamorphic rocks.		Exposed south of the park in the Merced Peak quadrangle.	
		Quartz Diorite of Long Creek (Klc)	Light-gray, medium-grained quartz diorite containing equally abundant biotite and hornblende. Includes a zone of abundant inclusions.		Forms several small masses and dikes in metavolcanic rocks in Bench Canyon and in the drainage basin of Long Creek, south of the park in the Merced Peak quadrangle.	
CRETACEOUS or JURASSIC	Cretaceous/ Jurassic Intrusive Rocks (KJi)	Granodiorite of Camino Creek (KJcc)	Fine- to medium-grained unit with variable composition ranging from quartz diorite to quartz monzonite. Average composition of granodiorite. Mafic content is predominantly biotite. Commonly contains abundant inclusions of metamorphic rocks.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Exposed south of the park in the Shuteye Peak quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Quartz monzonite of Mono Lake (KJml)	The source map does not provide a detailed description.		Exposed east of the park and west of Mono Lakes, Mono Craters quadrangle.	
		Mafic intrusive rocks (KJma)	Medium- to coarse-grained hornblende gabbro, hornblendite, and pyroxenite.		One exposure of limited areal extent west of the park in the Lake Eleanor quadrangle.	
		Quartz diorite and older mafic plutonic rocks (KJqd)	Mafic plutonic rocks ranging greatly in composition, grain size, and texture. Probably includes rocks of different ages.	None Significant—Limited areal extent.	Limited exposures in the eastern part of the park, Tuolumne Meadows quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Quartz diorite, diorite and gabbro (KJqdg)	Predominantly dark, medium grained, equigranular hornblende-biotite quartz diorite and less abundant diorite, gabbro, and tonalite in small scattered masses. Contains 20–40% mafic minerals. Fine-grained to coarsely porphyritic. Joints.	**Rockslides**—Joints in the Rockslides promote cliff collapse in Yosemite Valley.	**Diorite of the Rockslides**—The Rockslides contain the most closely-spaced joints in Yosemite Valley. Cliff collapse results in impressive talus piles.	**Rise of the Batholith**—The diorite enclaves in **Kec** may have originated from the magma that crystallized into the Diorite of the Rockslides.

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CRETACEOUS or JURASSIC	Cretaceous/ Jurassic Intrusive Rocks (KJi)	Diorite (Jd)	Diorite with extremely variable grain size, texture, and composition.	None Significant—Isolated outcrops of limited areal extent in the backcountry.	Occurs as generally small, irregularly shaped bodies throughout the Tower Peak quadrangle.	**Rise of the Batholith**—Some bodies are older and some younger than the plutonic rocks with which they are in contact.
		Hornblende gabbro (Kgb)	Two bodies of hornblende gabbro exposed near the center of the Tower Peak quadrangle.		Two igneous bodies have intruded a metasedimentary sequence and, in turn, have also been metamorphosed.	**Rise of the Batholith**—Uranium-lead zircon age of about 148 million years.
		Diabase of Reversed Creek (Jdrc)	Diabase. The source map does not provide a detailed description.	None—These units lie outside of the park boundaries.	Exposed north of Reversed Creek and west of June Lake in the Mono Craters quadrangle, east of the park.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Diorite of Waugh Lake (Jwl)	Diorite. The source map does not provide a detailed description.		**Granitic Bedrock**—Exposed east of the park in the Mono Craters quadrangle.	
		Diorite of Bloody Canyon (Jdbc)	Diorite. The source map does not provide a detailed description.		**Granitic Bedrock**—Small exposure west of Walker Lake in Bloody Canyon, Mono Craters quadrangle, east of the park.	
		Felsic dikes and masses (KJfd)	Fine-grained, rhyolitic felsic dikes and igneous masses. Commonly exhibits flow banding.		Most dikes occur as a swarm in and near the granodiorite near King Creek (**KJf**), Devils Postpile quadrangle.	
		Mafic dikes and masses (KJmd)	Fine- to medium-grained dikes and igneous masses, occasionally porphyritic or amygdaloidal.		Exposed east of the park in the Devils Postpile quadrangle.	
		Granodiorite of King and Fish Creeks (KJf)	Fine- to coarse-grained granodiorite. Contain numerous metavolcanic inclusions. Intruded by **Kcp** and **Kmg**. King Creek masses are cut by numerous mafic and rhyolitic dikes.		**Granitic Bedrock**—Mapped in the Devils Postpile quadrangle, east of the park.	
		Fine-grained quartz monzonite (KJfg)	Fine-grained aplitic quartz monzonite.		Exposed as a small mass and associated dikes at the north edge of the Shuteye Peak quadrangle, southeast of the park.	
		Dark granodiorite and other mafic plutonic rocks (KJd)	Dark, medium-grained hornblende-biotite granodiorite, quartz diorite, diorite, and gabbro.		**Granitic Bedrock**—Exposed southeast of the park in the Shuteye Peak quadrangle.	**Rise of the Batholith**—Various small bodies of mafic intrusive rock of uncertain ages relative to most other intrusive rocks.

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Age	Simplified Map Unit (Symbol) *Overview Sheet 1*	Map Unit (Symbol) *Colored if present on Overview Sheet 2*	Geologic Description	Geologic Issues	Geologic Features, Processes and General Location	Geologic History
JURASSIC	Jurassic Intrusive Rocks (Ji)	Quartz diorite of South Fork of Tuolumne River (Jqtr)	Dark-gray, coarse-grained, foliated biotite-hornblende quartz diorite.	None Significant—Limited areal extent.	Exposed in the southwestern corner of the Hetch Hetchy Reservoir quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Diorite (Jdio)	Fine-grained, massive, well-jointed, dark greenish-gray diorite composed of hornblende, biotite, oligoclase, augite, and quartz.	None—This unit lies outside of the park boundaries.	Exposed north of the park in the Matterhorn Peak quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Quartz porphyry (Jp)	Light-gray, dense, weakly lineated, and foliated quartz porphyry with phenocrysts of clear quartz and dull-white oligoclase.	**Rockfall**—Linear exposure in the backcountry. Minor potential for rockfall.	Thin, northwest-trending exposure south of Virginia Peak, northeastern border of the park, Matterhorn Peak quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Serpentinite (Jsp)	Dark, mottled green and brown, highly sheared serpentinite. Contains chrysotile, magnetite, and anthophyllite.	None—These units lie outside of the park boundaries.	Exposed north of the park in the Matterhorn Peak quadrangle.	**Rise of the Batholith**—Derived in part from pyroxenite and andesitic lavas.
		Granite gneiss (Jgn)	Light- to dark- gray, massive, well-jointed granite gneiss. Clear quartz porphyroblasts in a matrix of quartz, potash feldspar, plagioclase, and biotite.			**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
		Granite of Cottonwood Creek (Jcc)	Chiefly biotite granodiorite, locally porphyritic with potassium feldspar phenocrysts.		**Granitic Bedrock**—Exposed west of the park in the Pinecrest quadrangle but continues into the Lake Eleanor quadrangle as **Jwr**.	**Rise of the Batholith**—Uranium-lead isotopic ages of 148 million years and 151 million years (Late Jurassic).
		Granite of Woods Ridge (Jwr)	Fine- to medium-grained porphyritic biotite granite and granodiorite. Characteristically contains coarse-grained phenocrysts of potassium feldspar and biotite flakes.		**Granitic Bedrock**—Exposed west of the park in the Lake Eleanor quadrangle but continues into the Pinecrest quadrangle as **Jcc**.	**Rise of the Batholith**—Uranium-lead isotopic age of 150.9 million years (Late Jurassic).
		Tonalite of Granite Creek (Jgc, Jgcm)	Medium grained hornblende-biotite tonalite and granodiorite. Commonly strongly foliated. **Jgcm**: mafic marginal unit of medium-grained hornblende-biotite gabbro.		**Granitic Bedrock**—Exposed just west of the park in the Lake Eleanor quadrangle.	**Rise of the Batholith**—Uranium-lead isotopic ages of 165.7 million years and 162.6 million years (Middle Jurassic).
		Diorite (Jdi)	Dark-gray to black, fine-grained diorite. Contains biotite and hornblende in variable proportions.	None Significant—Isolated exposures of limited areal extent.	Exposed in the Hetch Hetchy Reservoir quadrangle.	**Rise of the Batholith**—Occurs as inclusions in granitic rocks of Jurassic age and may be mostly chemically reconstituted metamorphic rocks.
		Quartz monzonite of Billy Lake (Jbl)	The source map does not provide a detailed description.	None—These units lie outside of the park boundaries.	Exposed east of the park in the Mono Craters quadrangle.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.

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JURASSIC	Jurassic Intrusive Rocks (Ji)	Granodiorite of Rush Creek (Jrc)	Medium-grained, ranging in composition from granodiorite to diorite. Generally exhibits a pronounced linear structure and less pronounced foliation.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Exposed east of the park in the Mono Craters and Devils Postpile quadrangles.	**Rise of the Batholith**—Granitic rocks that form part of the extensive Sierra Nevada Batholith.
TRIASSIC	Triassic Intrusive Rocks (TRi)	Garnet bearing aplite (TRlvg)	Aplite containing garnet. The source map does not provide a detailed description.	None—These units lie outside of the park boundaries.	Exposed east of the park in the Mono Craters quadrangle.	
TRIASSIC	Scheelite Intrusive Suite (TRs)	Granite of Lee Vining Canyon (TRlv)	Medium-grained granite with varied texture and appreciable dense, fine-grained felsic rock, commonly porphyritic, locally banded. Numerous dikes and sills.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Exposed east of the park in Mono Craters and Devils Postpile quadrangles.	**Rise of the Batholith**—Possibly younger than Triassic. A Rubidium-strontium whole-rock analysis indicates an age of about 190 million years (Early Jurassic).
TRIASSIC	Scheelite Intrusive Suite (TRs)	Wheeler Crest Granodiorite (TRwc)	Medium-grained, commonly porphyritic granodiorite with phenocrysts of potassium-feldspar. Biotite and hornblende are the chief mafic minerals.	None—These units lie outside of the park boundaries.	**Granitic Bedrock**—Exposed east of the park in Mono Craters and Devils Postpile quadrangles.	**Rise of the Batholith**—Possibly younger than Triassic. Potassium-argon isotopic analysis of samples from the Mount Tom quadrangle to the southeast yielded ages of about 100 million years (Early Cretaceous).

Metamorphic Rock Units: Western Metamorphic Belt

Age	Simplified Map Unit (Symbol) *Overview Sheet 1*	Map Unit (Symbol) *Colored if present on Overview Sheet 2*	Geologic Description	Geologic Issues	Geologic Features, Processes and General Location	Geologic History
JURASSIC	Western Metamorphic Belt, Jurassic Rocks (Jwmb)	Greenstone of Bullion Mountain (Jbu)	Chiefly andesitic and basaltic metatuff and metatuff breccia, but includes lava flows.	None—These units lie outside of the park boundaries.	**Western Metamorphic Belt**—Exposed west of the park in the El Portal quadrangle.	**Rise of the Batholith**—Volcanic origins.
JURASSIC	Western Metamorphic Belt, Jurassic Rocks (Jwmb)	Mafic volcanic rocks (Jmav)	Chiefly amphibolites.	None—These units lie outside of the park boundaries.	**Western Metamorphic Belt**—Exposed in the Bass Lake quadrangle, south of the park.	**Rise of the Batholith**—May have been derived from basaltic and andesitic metatuff, metatuff breccia, and flows.
JURASSIC or TRIASSIC	Western Metamorphic Belt, Pre-Cretaceous Rocks (pKwmb)	Metavolcanic rocks east of Melones Fault (pKmv)	Chlorite-muscovite schist, hornfels, and amphibolite. Equivalents of basalt and andesite in lava flows, tuff beds, volcanic breccias, and small intrusive bodies. Mafic phenocrysts.	None—These units lie outside of the park boundaries.	**Western Metamorphic Belt**—Locally interbedded with metasedimentary rocks or intruded by small bodies of ultramafic rocks. Exposed in the Mariposa quadrangle, south of the park.	**Rise of the Batholith**—A Jurassic ammonite has been reported in rocks continuous with **pKmv** to the northwest. Elsewhere, **pKmv** are older than the Cretaceous granitic rocks that intrude them.
JURASSIC or TRIASSIC	Western Metamorphic Belt, Pre-Cretaceous Rocks (pKwmb)	Metasedimentary rocks east of Melones Fault (pKsmf)	Slate, phyllite, mica schist, hornfels, quartzite, and metaconglomerate. Equivalents of clastic sedimentary rocks except near intrusive contacts where original rocks have been altered to hornfels and/or coarse mica schist.	None—These units lie outside of the park boundaries.	**Western Metamorphic Belt**—Bedding is at high angles locally but generally not discernible in fine-grained rocks. Gradational bedding prominent in a few places. Exposed south of the park in the Mariposa quadrangle.	**Rise of the Batholith**—Age is uncertain. The unit is at least as old as Jurassic, and part or all may be Paleozoic. Outcrops are continuous with rocks assigned to the Calaveras Complex (Upper Permian–Lower Jurassic) in adjoining quadrangles.
TRIASSIC	Western Metamorphic Belt, Triassic Rocks (TRwmb)	Slate and phyllite (TRsp)	Slate, phyllite, quartzite and probably some chert.	None—These units lie outside of the park boundaries.	**Western Metamorphic Belt**—Forms the outer parts of the Coarsegold roof pendant, adjacent to **Jmav** in the Bass Lake quadrangle, south of the park.	**Rise of the Batholith**—Metamorphosed sedimentary rocks.
TRIASSIC	Western Metamorphic Belt, Triassic Rocks (TRwmb)	Phyllite of Briceburg (TRpb)	Chiefly phyllite, but includes quartzite, chert, graywacke, and limestone olistoliths (**TRpbls**).	None—These units lie outside of the park boundaries.	**Western Metamorphic Belt**—Conodonts. Exposed west of the park in the El Portal quadrangle.	**Rise of the Batholith**—The limestone olistoliths contain Early Triassic conodonts (small fossils important for age-dating).

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TRIASSIC	Western Metamorphic Belt, Triassic Rocks (TRwmb)	Phyllite and chert of Hite Cove (TRh)	Sequences of rhythmically banded chert in a matrix of phyllite. A few limestone lenses (**TRhls**) are present, some of which may be olistoliths. Locally contains metabasalt (**TRhmba**).	None—These units lie outside of the park boundaries.	**Western Metamorphic Belt**—Forms an extensive northwest-trending outcrop west of the park in the Lake Eleanor and El Portal quadrangles.	**Rise of the Batholith**—An interstratified bed in the central part of this unit has yielded fossil conodonts indicating an Early Triassic age.
PALEOZOIC ERA	Western Metamorphic Belt, Paleozoic Rocks (PZwmb)	Quartzite and phyllite (PZqs)	Characterized by massive quartzite beds.	None—These units lie outside of the park boundaries.	**Western Metamorphic Belt**—Exposed in the Bass Lake quadrangle.	**Assembling California**—Primarily metamorphosed sandstone.
		Paleozoic rocks of the Western Metamorphic Belt of Huber and others (1989) (PZmsq, PZmr, PZmdd, PZpr, cmp)	**PZmsq**: quartz-mica schist and quartzite.	None Significant—Exposures have a limited areal extent in the backcountry and pose little potential for significant geologic issues.	**Western Metamorphic Belt**—Minor exposures of limited areal extent in the Hetch Hetchy Reservoir quadrangle. **PZmr** is near Mount Hoffman, and **PZmdd** is located on the slope of Coyote Rocks. **May Lake Quartzite**—**PZmsq** mapped southwest of May Lake.	**Assembling California**—Metamorphosed sandstone and siltstone; associated with the May Lake conundrum involving beach sand deposited far away from the shoreline (see report fig. 20) 500-600 million years ago. The emplacement of Sierra Nevada batholith (and possible faulting) metamorphosed and deformed the rocks.
			PZmr: marble.			**Assembling California**—Metamorphosed limestone.
			PZmdd: metamorphosed dacites and rhyodacites.			**Assembling California**—Metamorphosed volcanic rocks.
			PZpr: massive quartzite interbedded with phyllite and schist on Pilot Ridge. Siliceous marble and skarn occur locally.	**Rockslides**—Exposed primarily outside of the park, but potential rockslides may impact the Mariposa and Tuolumne groves.	**Western Metamorphic Belt**—Exposed along the western border of the park in the El Portal and Lake Eleanor quadrangles.	**Assembling California**—Metamorphosed sedimentary rocks including sandstone, siltstone, and limestone.
			cmp: carbonaceous, metamorphosed mudstone (pelite).	None—This unit lies outside of the park boundaries.	**Western Metamorphic Belt**—Northwest-trending exposure west of the park in the El Portal quadrangle.	**Assembling California**—The unit may be tectonic, rather than stratigraphic, in origin and associated with the Calaveras-Shoo Fly thrust.

Metamorphic Rock Units: Eastern Metamorphic Belt

CRETACEOUS	Eastern Metamorphic Belt, Cretaceous Rocks (Kemb)	Metaandesite and metarhyodacite (Km)	Gray, slightly metamorphosed flows and tuff. Metaandesite contains euhedral tabular phenocrysts of plagioclase up to 5 mm (0.2 in) long.	None—This unit lies outside of the park boundaries.	**Eastern Metamorphic Belt**—Forms small outcrops on the flanks of Raymond Mountain, Yosemite quadrangle.	**Rise of the Batholith**—Metamorphosed volcanic rocks.
		Metavolcanic rocks – tuff and flows (Kmv)	Predominantly gray metarhyodacite tuff containing flattened dark lapilli and altered phenocrysts of plagioclase, quartz, and altered hornblende in a fine-grained groundmass.	None Significant—Isolated outcrops of limited areal extent.	**Eastern Metamorphic Belt**—Exposed southeast of Mariposa Grove and in small masses elsewhere in the Yosemite quadrangle.	**Rise of the Batholith**—Metamorphosed volcanic rocks.

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CRETACEOUS	Eastern Metamorphic Belt, Cretaceous Rocks (Kemb)	Metavolcanic rocks, undifferentiated (Kmva)	Predominantly medium- to light-gray, quartzofeldspathic (quartz- and feldspar-rich) hornfels, epidote-amphibolite hornfels, and less abundant schist and gneiss. Includes dark-gray flows of porphyritic metabasalt and meta-andesite and well-bedded volcanogenic siltstone, sandstone, and conglomerate along the southeastern edge of the park.	None Significant—Isolated outcrops of limited areal extent.	**Eastern Metamorphic Belt**—Massive to weakly foliated rocks having well-preserved relict textures derived from massive rhyodacitic vitric and vitric-crystal tuff, lapil1i tuff, and tuff breccia. Exposed along the southeastern border of the park near Merced and Sing peaks, Merced Peak quadrangle.	**Rise of the Batholith**—Metamorphosed pyroclastic rocks, lava flows, and other volcanic rocks originally ranging in composition from basalt to rhyolite.
		Quartzo-feldspathic gneiss (Kmq)	Very light-gray, fine-grained, weakly foliated rocks.	None—This unit lies outside of the park boundaries.	**Eastern Metamorphic Belt**—Exposed near Jackass Meadow, Merced Peak quadrangle.	**Rise of the Batholith**—Derived from silicic tuff or volcanic intrusive rocks of granitic composition.
		Metarhyolite (Kmr)	Light-gray quartzofeldspathic hornfels.	None Significant—Isolated outcrop of limited areal extent.	**Eastern Metamorphic Belt**—Forms a 20-m (66-ft)-thick layer near Cold Springs Meadow, Merced Peak quadrangle.	**Rise of the Batholith**—Derived from crystal-vitric tuff, breccia, and flow rock of rhyolitic composition.
		Metadacite porphyry (Kdp)	Fine-grained gray rock composed of plagioclase phenocrysts in a matrix of plagioclase, quartz, and opaque minerals.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—These units are exposed between Tioga Lake and the eastern boundary of the park, Tuolumne Meadows quadrangle. All have limited areal extent. **Kph** contains larger plagioclase grains and cross-beds in some places.	**Rise of the Batholith**—Metamorphosed plutonic rock.
		Felsic metatuff (Kft)	Quartz and feldspar crystals abundant, and collapsed pumice fragments present locally. Includes thinly laminated calc-silicate rock composed of quartz, feldspar, epidote, and opaque minerals.			**Rise of the Batholith**—Metamorphosed volcanic rock.
		Pelitic hornfels (Kph)	Thin-bedded fine-grained metasiltstone composed of tiny grains of plagioclase, muscovite, quartz, and opaque minerals.			**Rise of the Batholith**—Metamorphosed siltstone.
		Interstratified mafic and felsic tuffs (Kmft)	Includes a lens of pebble conglomerate. Tuffs are composed chiefly of quartz, biotite, plagioclase, and opaque minerals.			**Rise of the Batholith**—Metamorphosed volcanic rock, primarily tuff.
CRETACEOUS or JURASSIC	Eastern Metamorphic Belt, Cretaceous/ Jurassic Rocks (KJemb)	Mafic metatuff and metatuff breccia (KJm)	Medium- to dark-gray metamorphosed pyroclastic rocks. Rock is typically a quartz-feldspar-mica hornfels with amphibole locally abundant. Does not contain fragments of nonvolcanic rock. Ranges from fine-grained massive metatuff to metatuff breccia with lithic fragments up to 0.5 m (1.6 ft) long.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Exposed south of the park.	
		Metarhyolite tuff (KJr)	Light-gray metatuff. Includes metatuff breccia and flow-banded rhyolite.		**Eastern Metamorphic Belt**—Forms a dark, slightly metamorphosed, rhyodacite porphyry dike about 9 m (30 ft) wide near Star Lakes, south of the park.	
JURASSIC	Eastern Metamorphic Belt, Jurassic Rocks (Jemb)	Metavolcanic rocks south of Ireland Lake (Jvil)	Predominantly tuff-breccia of intermediate composition containing angular to rounded fragments that average 2–10 cm (0.8–4 in) wide but are as large as 75 cm (30 in).	**Rockfall**—Isolated backcountry exposures of limited areal extent near Ireland Lake. Rockfall potential on steeper slopes, but no significant geologic issues for the park.	**Eastern Metamorphic Belt**—Exposed in the Tuolumne Meadows quadrangle, south of Ireland Lake and includes limited exposures northwest of Hooper Peak and west of Babcock Lake.	**Rise of the Batholith**—Metamorphosed volcanic rocks.

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JURASSIC	Eastern Metamorphic Belt, Jurassic Rocks (Jemb)	Metavolcanic rocks west of Ireland Lake (Jsil)	Thinly laminated calc-silicate hornfels and quartz-biotite schist with epidote layers and eye-like structures. Locally interbedded with volcanic conglomerate.	**Rockfall**—Isolated backcountry exposures of limited areal extent near Ireland Lake. Rockfall potential on steeper slopes, but no significant geologic issues for the park.	**Eastern Metamorphic Belt**—Exposed west of Ireland Lake in the Tuolumne Meadows quadrangle.	**Rise of the Batholith**—Metamorphosed volcanic rocks
		Saddlebag Lake area rocks (Jlb, Jrt)	**Jlb**: tuffaceous lake beds. Thinly bedded and fine grained volcanogenic sediment. Common minerals include plagioclase, quartz, biotite, and hornblende.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Exposed in the Saddlebag Lake area, east of the park in the Tuolumne Meadows quadrangle.	**Rise of the Batholith**—Metamorphosed volcanic rocks.
			Jrt: rhyolite ash-flow. Light-gray tuff with a few flattened pumice fragments. Phenocrysts of quartz and plagioclase.			**Jrt**: Rubidium-strontium whole-rock age of about 185 million years (Early Jurassic).
		Undifferentiated metasedimentary rocks (Jm)	Predominantly medium-gray, fine-grained, thinly bedded micaceous metaquartzite, but includes less abundant gray quartz-biotite hornfels and schist, red-weathering quartz-plagioclase hornfels, tactite, and marble.	None—Exposures in the park have limited areal extent and pose no geologic issue for the park.	**Eastern Metamorphic Belt**—Exposed along the southern border of the park in the Merced Peak quadrangle. Most of the mapped exposure lies south of the park.	**Rise of the Batholith**—Metamorphosed sedimentary rocks.
		Tactite (Jmt)	Mostly epidote-pyroxene-garnet-magnetite rock.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Limited exposures south of the park in the Merced Peak quadrangle.	**Rise of the Batholith**—Metamorphosed sedimentary rocks, including limestone and conglomerate.
		Quartz-pebble conglomerate (Jmq)	Quartz-pebble conglomerate. The source map does not provide a detailed description.		**Eastern Metamorphic Belt**—Exposures are near Cold Springs Meadow, Merced Peak quadrangle, south of the park.	
		Marble (Jmm)	Medium-gray cherty marble.		**Eastern Metamorphic Belt**—Exposed east of Chiquito Lake and west of Gray Peak, Merced Peak quadrangle, just south of the park.	
		Undifferentiated metasedimentary and metavolcanic rocks north of Hooper Peak (Jmsv)	Metasedimentary and metavolcanic rocks. Includes abundant dikes of the adjacent plutonic rocks.	None Significant—Limited areal extent in the backcountry.	**Eastern Metamorphic Belt**—Exposed in the northwest corner of the Tuolumne Meadows quadrangle.	**Rise of the Batholith**—Metamorphosed sedimentary and volcanic rocks.
		Ritter Range roof pendant rocks (Jxt, Jsm, Jth)	**Jxt**: graywackes, volcanic tuffs and flows, sandstones.	None Significant—Limited areal extent.	**Eastern Metamorphic Belt**—Exposures of limited areal extent between Mount Dana and Gaylor Peak, eastern border of the park, Mono Craters quadrangle.	**Rise of the Batholith**—Metamorphosed sedimentary and volcanic rocks.
			Jsm: marble and calc-silicate hornfels.			**Rise of the Batholith**—Metamorphosed limestone and siltstone.

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JURASSIC	Eastern Metamorphic Belt, Jurassic Rocks (Jemb)	Ritter Range roof pendant rocks (Jxt, Jsm, Jth)	**Jth**: volcanic tuffs and flows, shale and hornfels	None Significant—Limited areal extent.	**Eastern Metamorphic Belt**—Exposures of limited areal extent between Mount Dana and Gaylor Peak, eastern border of the park, Mono Craters quadrangle.	**Rise of the Batholith**—Metamorphosed sedimentary and volcanic rocks.
		Ritter Range rocks (Jbr, Jts, Jdf, Jeg, Jab)	**Jbr**: undifferentiated metavolcanics, chiefly breccia. Highly varied unit, but consists chiefly of tuff breccia, somewhat lesser amounts of crystal tuff and crystal-lithic tuff, and much smaller flows, hypabyssal intrusives, and bedded tuff. Composition ranges from rhyolite to basalt but averages near dacite or rhyodacite. Lithic fragments may reach 0.3 m (1 ft) in maximum dimension. Fragments are typically volcanic but may be sedimentary or granitoid.	**Rockfall**—Limited areal extent. Steep slopes carry the potential for rockfall, but limited exposures would result in minor geologic impact.	**Eastern Metamorphic Belt**—An area of extensive migmatization occurs south of Bench Canyon, east of the park. Exposure extends into the park from the Devils Postpile quadrangle.	**Rise of the Batholith**—Total thickness of Ritter Range metavolcanic rocks is approximately 4,600 m (15,000 ft).
			Jts: tuffaceous metasandstone and metasiltstone.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Thin slivers of metamorphic rock associated with **Jbr**. Exposed east of the park in the Devils Postpile quadrangle. **Jts**: exposed south of Bench Canyon. **Jdf**: exposed north of Twin Island Lakes.	**Rise of the Batholith**—Volcanic flows and metamorphosed sandstone and siltstone. **Jeg**: interpreted as metamorphosed limestone.
			Jdf: metadacite flow. Medium dark-gray to dark-gray thin dacite flow or hypabyssal intrusive in structureless pyroclastic rocks.			
			Jeg: narrow belt of epidote-garnet rock.			
			Jab: meta-andesite and metabasalt. Gray, fine-grained to porphyritic, thin to thick flows with some tuffaceous rocks. Contains tabular plagioclase (oligoclase to labradorite) phenocrysts up to 3 cm (1.2 in) in maximum dimension.			
		Twin Island Lakes rocks (Jtlb, Jma, Jtis)	**Jtlb**: basalt. Thick flows of medium dark-gray to dark-gray basalt. Massive and porphyritic.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Exposed west of Twin Island Lakes, east of the park in the Devils Postpile quadrangle.	**Rise of the Batholith**—Metamorphic rocks near Twin Island Lakes are approximately 3,000 m (10,000 ft) thick.
			Jma: dark-gray sequence of thin to thick andesite and basalt flows, commonly interlayered with thin layers of tuffaceous rocks. Tabular plagioclase phenocrysts, local quartz amygdules.			
			Jtis: a generally well-bedded sequence of chiefly siltstone and fine-grained sandstone, tuffaceous in part. Includes tremolite-bearing carbonaceous marble, carbonaceous hornfels and slate, and conglomerate.			
		Virginia Lakes sequence rocks (Jrs, Jmb, Jas, Jrtp, Jqhm, Jhm, Jqhg)	**Jrs**: quartz-sericite schist and phyllonite. Highly sheared.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Thin slivers of metamorphic rocks north of the park in the Matterhorn Peak quadrangle.	**Rise of the Batholith**—Derived principally from lavas of rhyolitic composition.

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JURASSIC	Eastern Metamorphic Belt, Jurassic Rocks (Jemb)	Virginia Lakes sequence rocks (Jrs, Jmb, Jas, Jrtp, Jqhm, Jhm, Jqhg)	**Jmb**: metabasalt. Dark-gray to dark greenish - brown, dense, fine-grained, well-jointed.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Thin slivers of metamorphic rocks north of the park in the Matterhorn Peak quadrangle.	**Rise of the Batholith**—Metamorphosed basalt.
			Jas: amphibolite and biotite-hornblende schist. Dark- to light-green, gray, and purplish andesitic and dacitic lavas and pyroclastic deposits; metamorphosed into amphibolites and biotite-hornblende schist.	None Significant—Backcountry exposures with limited areal extent in the park. Rockfall potential on some of the steeper slopes.	**Eastern Metamorphic Belt**—Tuff is locally sheared to slate. Northwest-trending exposures along the northeastern border of the park, Matterhorn Peak quadrangle.	**Rise of the Batholith**—The Virginia Lakes sequence is approximately 300 m (1,000 ft) thick and consists predominantly of metamorphosed lava flows and interlayered pyroclastic deposits. The units are highly interfingered and stratigraphically repeated, thus this stratigraphic order is only a crude representation.
			Jrtp: creamy-white to light-gray, locally stained brown by limonite, fine-grained, highly sheared, tuffs and tuff breccias of rhyolitic and dacitic composition metamorphosed into quartz-sericite schist and phyllonite.			
			Jqhm: dark-gray to dark-brown, well-bedded, banded quartzofeldspathic hornfels, andalusite-bearing; calc-silicate hornfels, metaconglomerate (**Jqhmc**) and thin, gray marble beds.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Exposed northeast of the park in the Matterhorn Peak quadrangle.	**Rise of the Batholith**—Part of the Virginia Lakes sequence.
			Jhm: streaked light-gray and white, medium- to fine-grained, poorly layered massive marble. Locally contains white wollastonite and pale orange-brown garnet.		**Eastern Metamorphic Belt**—Exposed northeast of the park in the Matterhorn Peak quadrangle.	
			Jqhg: light-gray, brown to dark-gray, bedded, banded siltstone, sandstone, chert, and minor conglomerate; all metamorphosed to quartzofeldspathic hornfels, calc-silicate hornfels, quartzite, metachert, and metaconglomerate.			
JURASSIC, TRIASSIC, or OLDER	Eastern Metamorphic Belt, Pre-Cretaceous Rocks (pKemb)	Basaltic metavolcanic rocks (pKmvb)	Basaltic and andesitic metavolcanic rocks derived from lava flows and tuffs. Includes associated dark metasedimentary rocks.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Exposed in the Tower Peak quadrangle, north of the park.	**Rise of the Batholith**—Derived from lava flows and tuffs.
		Rhyolitic metavolcanic rocks (pKmvr)	Rhyolitic and dacitic metavolcanic rocks derived from tuffs, some probably ignimbrites. Includes metarhyolite breccia.		**Eastern Metamorphic Belt**—Associated with **pKmvb**, north of the park in the Tower Peak quadrangle.	**Rise of the Batholith**—Derived from volcanic tuffs.
		Quartz-biotite-plagioclase schist (pKs)	Fine- to medium-grained layered schist of probable metasedimentary origin.		**Eastern Metamorphic Belt**—Exposed north of the park in the Pinecrest quadrangle.	**Rise of the Batholith**—Protoliths for this unit are probably pre-Cretaceous in age.
		Metasedimentary rocks (pKms)	Includes quartzite, marble, biotite-andalusite schist, meta-conglomerate, and calc-silicate hornfels. Predominate rock type indicated in local areas: **pKmsq**, white, cross-bedded quartzite; **pKmsm**, white to gray marble; **pKmsh**, fine-grained hornfels.	None—Backcountry exposures are predominately north of the park and pose no geologic issues for the park.	**Eastern Metamorphic Belt**—Exposed along the park boundary near Bigelow Peak, Tower Peak quadrangle. Most exposures are north of the park.	**Rise of the Batholith**—The original sandstone, limestone, and siltstone were metamorphosed to quartzite, marble, and hornfels, respectively.

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Age	Simplified Map Unit (Symbol) *Overview Sheet 1*	Map Unit (Symbol) *Colored if present on Overview Sheet 2*	Geologic Description	Geologic Issues	Geologic Features, Processes and General Location	Geologic History
JURASSIC, TRIASSIC, or OLDER	Eastern Metamorphic Belt, Pre-Cretaceous Rocks (pKemb)	Schist and metaquartzite, tactite (pKsq, pKt)	**pKsq**: dark biotite schist, gray metaquartzite, and less abundant rusty-weathering argillite. Mapped as equivalent to **PZqs** in the Bass Lake quadrangle to the south. **pKt**: tactite layer, composed mostly of epidote, pyroxene, garnet, and magnetite.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Metasedimentary rocks exposed near the southeastern corner of the Yosemite quadrangle.	**Rise of the Batholith**—Metamorphosed sandstone and siltstone.
		Calc-silicate hornfels, quartzite and schist (pKcs)	Hornfels, quartzite, and schist. The source map does not provide a detailed description.	None—Unit is in a narrow, northeast-trending depression that was carved by glaciers. No known geologic hazards are associated with these units.	**May Lake Quartzite**—In isolated outcrops between Glen Aulin and May Lake, Tuolumne Meadows quadrangle.	**Rise of the Batholith**—Units are associated with the May Lake conundrum involving beach sand deposited far away from the shoreline (see report fig. 20) 500-600 million years ago. Emplacement of the Sierra Nevada batholith metamorphosed and deformed the rocks.
JURASSIC or TRIASSIC		Massive quartzite (pKq)	Highly jointed metamorphic quartzite.	None—Associated with **pKcs**.	**May Lake Quartzite**—Forms a northeast–southwest trending layer of quartzite in the depression filled by May Lake at the base of Mount Hoffman.	
		Shadow Creek and Mammoth Crest rocks (JTRu, JTRpz, JTRqa, JTRa, JTRx, JTRd, JTRc, JTRss)	**JTRu**: undifferentiated metavolcanic rocks. Highly varied unit that includes (in order of decreasing abundance): crystal-lithic tuff, tuff breccia, tuffaceous sandstone and siltstone, flows and hypabyssal intrusives, mostly mafic.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Exposed southeast of the park in the Devils Postpile quadrangle. **JTRu**: primary textures and structures are generally well preserved south of Garnet Lake. **JTRc**: Rocks composing the sedimentary lentil near Minaret Summit contain a much smaller proportion of volcanic material than most sedimentary rocks in the metavolcanic sequence.	**Rise of the Batholith**—Volcanic rocks of Shadow Creek and Mammoth Crest are approximately 5,000 m (16,000 ft) thick. **JTRqa** is a metamorphosed, previously kaolinite-bearing alteration zone. Fossil bivalves and ammonites of Early Jurassic age were found in **JTRc** about 2,600 m (8,500 ft) stratigraphically above the base of the section. Some of the metavolcanic sequence below this bed may be Triassic. A suite of samples collected approximately 900–1,200 m (3,000–4,000 ft) above the base have rubidium-strontium whole-rock ages of 230–265 million years, indicating that some rocks in the lowest part of this sequence may be as old as Permian. These units, however, are considered to be Triassic (?) and Jurassic pending further corroborative evidence. **JTRx**: most layers originated as ash flows.
			JTRpz: piedmontite-bearing zone.			
			JTRqa: quartz-andalusite-corundum rock.			
			JTRa: dark-gray meta-andesite and metabasalt in thin to thick flows and hypabyssal intrusives. Aphanitic to porphyritic with plagioclase phenocrysts; local quartz amygdules.			
			JTRx: gray crystal tuff, rhyolite to quartz latite in composition. Contains lithic fragments and feldspar. White and pink feldspar and small wispy dark patches, bent around crystals or lithic fragments.			
			JTRd: gray metadacite and meta-andesite. Massive porphyritic flows and hypabyssal intrusive rocks. locally amygdaloidal with quartz or calcite fillings.			
			JTRc: calcareous sedimentary rock. Thin-bedded tuffaceous sandstone and siltstone, commonly calcareous. Contains minor amounts of marble, slate, and conglomerate.			

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Age	Simplified Map Unit (Symbol) *Overview Sheet 1*	Map Unit (Symbol) *Colored if present on Overview Sheet 2*	Geologic Description	Geologic Issues	Geologic Features, Processes and General Location	Geologic History
JURASSIC or TRIASSIC	Eastern Metamorphic Belt, Pre-Cretaceous Rocks (pKemb)	Shadow Creek and Mammoth Crest rocks (JTRu, JTRpz, JTRqa, JTRa, JTRx, JTRd, JTRc, JTRss)	**JTRss**: gray metasandstone, metasiltstone and slate. Contains andalusite and garnet and is aphanitic to fine-grained with thin laminations of quartz, plagioclase and amphibole.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Exposed southeast of the park in the Devils Postpile quadrangle. **JTRss**: primary texture generally well preserved but locally phyllitic.	**Rise of the Batholith**—Volcanic rocks of Shadow Creek and Mammoth Crest are approximately 5,000 m (16,000 ft) thick.
		Metavolcanic rocks of Silver Creek (JTRsc)	Extensively recrystallized metavolcanic rocks. Primary textures and structures are obscure or absent. Correlation with units exposed in the Ritter Range Pendant is uncertain.		**Eastern Metamorphic Belt**—Exposed east of the park in the Devils Postpile quadrangle. Well-developed foliation is the dominant structure with schist and gneiss as the most common rocks.	**Rise of the Batholith**—Crystal-lithic tuff was probably the chief parent rock type; a few mafic flows and calcareous epiclastic rocks formed a quantitatively minor part of the sequence.
TRIASSIC	Eastern Metamorphic Belt, Triassic Rocks (TRemb)	Saddlebag Lake area rocks (TRmi, TRso, TRft, TRrt, TRsc, TRrh)	**TRmi**: mafic hypabyssal intrusive rock. Probably of andesitic composition.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Exposed northwest of Saddlebag Lake, Tuolumne Meadows quadrangle.	**Rise of the Batholith**—Metamorphosed volcanic rock.
			TRso: altered biotite-hornblende monzonite. Probably hypabyssal and cogenetic with Triassic volcanic rocks.		**Eastern Metamorphic Belt**—Exposed along the southeastern, southern, and southwestern margins of Saddlebag Lake, Tuolumne Meadows quadrangle.	**Rise of the Batholith**—Rubidium-strontium whole-rock age of about 220 million years (Upper Triassic).
			TRft: mafic flows and tuff. Pebble conglomerate at the base of the unit is overlain by tuffaceous beds of intermediate composition. Mafic flows occur at the top of the unit.	None—Northwest-trending exposure lies west of Saddlebag Lake and enters the park north of Gaylor Peak, Tuolumne Meadows quadrangle.	**Eastern Metamorphic Belt**—Sedimentary layer overlain by igneous volcanic rocks.	**Rise of the Batholith**—Rubidium-strontium whole-rock age of about 224 million years (Upper Triassic).
			TRrt: light-gray rhyolite ash-flow tuff with many flattened pumice fragments. Phenocrysts of quartz and plagioclase.	None—This unit lies outside of the park boundaries.	**Eastern Metamorphic Belt**—Narrow, northwest-trending exposure between **TRft** and **TRsc**, west of Saddlebag Lake.	**Rise of the Batholith**—Rhyolitic ash flows.
			TRsc: tuffaceous sandstone, siltstone, and conglomerate. Lenses of rhyolite tuff are present in a few places. Flattened pebbles are identical with rock in Paleozoic strata down section to the east.	None Significant—Exposures in the park have a limited areal extent.	**Eastern Metamorphic Belt**—Northwest-trending exposure crosses into the park west of Tioga Lake, Tuolumne Meadows quadrangle.	**Rise of the Batholith**—Conglomerate lenses apparently were deposited in stream channels.
			TRrh: rhyolite tuff. Mostly bedded.	None—This unit is not exposed in the park.	**Eastern Metamorphic Belt**—Thin slivers exposed along the eastern edge of **TRsc**.	**Rise of the Batholith**—Volcanic eruptions of rhyolite.
PERMIAN	Eastern Metamorphic Belt, Permian/ Pennsylvanian Rocks (PPNemb)	Ritter Range roof pendant rocks (Phv, Pax, Ptx, Pbc, PPNhy, PPNmy)	**Phv**: quartzofeldspathic hornfels, calc-silicate hornfels, and volcanic flows.	None Significant—Limited areal extent within park boundaries. Rockfall potential on steeper slopes.	**Eastern Metamorphic Belt**—Northwest-trending, linear exposures that cross the eastern border of the park. Most exposures are located east of the park in the Mono Craters quadrangle.	**Assembling California**—Metamorphosed sedimentary and volcanic rocks of Permian age.
			Pax: andesite flows and breccias, local graywacke and sandstone lenses.			

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Age	Simplified Map Unit (Symbol) *Overview Sheet 1*	Map Unit (Symbol) *Colored if present on Overview Sheet 2*	Geologic Description	Geologic Issues	Geologic Features, Processes and General Location	Geologic History
PERMIAN	Eastern Metamorphic Belt, Permian/ Pennsylvanian Rocks (PPNemb)	Ritter Range roof pendant rocks (Phv, Pax, Ptx, Pbc, PPNhy, PPNmy)	**Ptx**: volcanic tuffs, volcanic flows, and local greywacke.	None Significant—Limited areal extent within park boundaries. Rockfall potential on steeper slopes.	**Eastern Metamorphic Belt**—Northwest-trending, linear exposures that cross the eastern border of the park. Most exposures are located east of the park in the Mono Craters quadrangle.	**Assembling California**—Metamorphosed sedimentary and volcanic rocks of Permian age.
			Pbc: local basal conglomerate.			
PERMIAN or PENNSYLVANIAN			**PPNhy**: pelitic and siliceous hornfels. Moderately well-bedded dark siliceous hornfels and small amounts of interbedded pelitic hornfels, slate, and quartzite.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Minor exposures east of the park in the Devils Postpile quadrangle. **PPNmy** contains crinoid fossils. The two **PPNmy** outcrops are separated by massive tuffaceous conglomerate that contains many marble fragments.	**Assembling California**—Age tentatively assigned to Permian or Pennsylvanian.
			PPNmy: gray marble in two small outcrops north of Minaret Summit.			
		Gull Lake roof pendant rocks (PPNhcl, PPNmgl, PPNq, PPNc)	**PPNhcl**: quartzofeldspathic hornfels.	**Preservation of the Geologic Landscape**—historic mine complex is present.	**Eastern Metamorphic Belt**—Exposed in the Mono Craters quadrangle.	**Assembling California**—Age tentatively assigned to Permian or Pennsylvanian.
			PPNmgl: carbonaceous marble.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Exposed east of the park primarily in the Mono Craters quadrangle. **PPNhcl** crosses the eastern boundary of the park, but most exposures lie east and southeast of the border.	**Assembling California**—Age tentatively assigned to Permian or Pennsylvanian.
			PPNq: hornfels, quartzite, and quartzofeldspathic hornfels.			
			PPNc: marble and calc-silicate hornfels.			
		Twin Peak sequence (PPNhtp, PPNmtp, PPNqz)	**PPNhtp:** brown, green, greenish-gray, and gray calc-silicate and quartzofeldspathic hornfels, biotite schist, and marble.	**Rockfall**—Rockfall potential on the steeper slopes near Virginia Peak, but these backcountry exposures pose no significant geologic issues for the park.	**Eastern Metamorphic Belt**—Exposed near Virginia Peak in the Matterhorn Peak quadrangle, northern border of the park. **PPNmtp** contains garnet, epidote, and wollastonite.	**Assembling California**—The sequence is approximately 900 m (3,000 ft) thick and similar to the rocks of the Ritter Range and Gull Lake pendants. Age tentatively assigned to Permian or Pennsylvanian.
			PPNmtp: light-gray and buff-colored, massive to poorly bedded, fine- to medium-grained crystalline marble.			

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Age	Simplified Map Unit (Symbol) *Overview Sheet 1*	Map Unit (Symbol) *Colored if present on Overview Sheet 2*	Geologic Description	Geologic Issues	Geologic Features, Processes and General Location	Geologic History
PERM. or PENNSY.	Eastern Metamorphic Belt, Permian/ Pennsylvanian Rocks (PPNemb)	Twin Peak sequence (PPNhtp, PPNmtp, PPNqz)	**PPNqz:** light- to medium-gray and brown, massive to layered quartzite, quartzofeldspathic hornfels, and metaconglomerate.	**Rockfall**—Rockfall potential on the steeper slopes near Virginia Peak, but these backcountry exposures pose no significant geologic issues for the park.	**Eastern Metamorphic Belt**—Exposed near Virginia Peak in the Matterhorn Peak quadrangle, northern border of the park.	**Assembling California**—The sequence is approximately 900 m (3,000 ft) thick and similar to the rocks of the Ritter Range and Gull Lake pendants. Age tentatively assigned to Permian or Pennsylvanian.
SILURIAN or ORDOVICIAN	Eastern Metamorphic Belt, Silurian/ Ordovician Rocks (SOemb)	Ritter Range roof pendant rocks (SOhm, SOsm)	**SOhm**: dark-colored, bedded to massive hornfels. Local beds of silicate marble.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Exposed east of the park in the Devils Postpile quadrangle. **SOhm** contains plagioclase, tremolite, diopside, and wollastonite as well as minor amounts of quartzite.	**Assembling California**—Age tentatively assigned to Silurian or Ordovician. Parent rocks of **SOhm** were shale, siltstone, marly siltstone, and quartz-bearing limestone.
			SOsm: massive to poorly layered silicate marble.			
		Log Cabin Mine roof pendant rocks (SOm, SOq, SOa, SOx, SOc, SOh, SOs)	**SOm**: marble and calc-silicate hornfels.		**Eastern Metamorphic Belt**—Exposed west of Mono Lake and east of the park in the Mono Craters quadrangle.	**Assembling California**—Age tentatively assigned to Silurian or Ordovician.
			SOq: biotite-bearing quartzite.			
			SOa: older metasedimentary rocks, hornfels.			
			SOx: older metasedimentary rocks, quartzite.			
			SOc: marble, calc-silicate hornfels, and quartzite.			
			SOh: quartzofeldspathic hornfels.			
			SOs: marble and calc-silicate hornfels.			
PALEOZOIC ERA	Eastern Metamorphic Belt, Paleozoic Rocks (PZemb)	Metasedimentary strata (PZms)	Quartzofeldspathic hornfels, calc-silicate hornfels, and carbonaceous marble.	None—These units lie outside of the park boundaries.	**Eastern Metamorphic Belt**—Exposed east of the park in the northeast corner of the Tuolumne Meadows quadrangle.	**Assembling California**—Age assigned to the Paleozoic.