Map Unit Properties Table B: Yosemite Valley Glacial and Postglacial Deposits, Yosemite National Park

Colors in Map Unit column correspond to Geologic Map Overview sheets 3 and 4. Bold text corresponds to sections of the report.
Surficial and glacial units are also included in the compiled bedrock and surficial map for Yosemite National Park. Refer to Map Unit Properties Table A.

Age	Map Unit (Symbol) *Sheets 3 and 4*	Geologic Description from Matthes (1930)	Geologic Issues	Geologic Features and Processes and General Location	Geologic History
QUATERNARY (Recent)	Granite Sand (Qag)	Granite sand washed into valleys and basins; bars in river channel	**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.	**Tension, Uplift, and Ice**—These unconsolidated units in Yosemite National Park represent recent fluvial deposition, flooding, and mass-wasting processes.
	River-Borne Sand (Qar)	River-borne sand and gravel filling glacial-lake basins			
	Fans (Qaf)	Fans, mostly of coarse rock waste, produced by torrent action		**Recent Geomorphic Features (Fluvial)**—Fans deposited primarily where streams spill out onto valley floor.	
	Rock Waste (Qts)	Rock waste shed from cliffs	**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.	**Talus Piles—**Large talus piles have formed beneath cliffs.	
QUATERNARY (Pleistocene)	Wisconsin Stage Individual Moraines (Qwmi)	Individual moraines	**Erosion**—Glacial deposits may form unstable slopes.	**Pleistocene Glacial Features (Depositional)**—Moraines. Qwmi comprises Bridalveil Moraine.	**Tension, Uplift, and Ice**—Moraines deposited by glaciations during the Wisconsin glaciation as described by Matthes (1930). The "Wisconsin stage" terminology is no longer in use. The deposits represent Tioga (26,000-18,000 years ago) and Tahoe (140,000-80,000 years ago) glaciations.
	Wisconsin Stage Morainal Material in Sheets (Qwms)	Morainal material in sheets; some of it washed and redeposited		**Pleistocene Glacial Features (Depositional)**—Moraines. Primarily mapped near Yosemite Creek and Little Yosemite Valley.	
	Wisconsin Stage Scattered Morainal Material (Qws)	Scattered morainal material			
	Wisconsin Stage Glacial Outwash (Qwo)	Glacial outwash in front of moraines		**Pleistocene Glacial Features (Depositional)**—Outwash. Mapped west of El Capitan Meadow to Pahono Bridge, near Bridalveil Moraine.	**Tension, Uplift, and Ice**—Outwash flowed out of glaciers, beyond moraines deposited by glaciations during the Tioga (26,000-18,000 years ago) and Tahoe (140,000-80,000 years ago) glaciations, referred collectively as the Wisconsin stage by Matthes (1930).
	Wisconsin Stage Limits of Ice (Qwx)	Approximate limits of area covered by ice of Wisconsin stage		**Pleistocene Glacial Features—**Encompasses a variety of erosional (e.g., U-shaped valleys) and depositional glacial features (e.g., till, moraines, outwash).	**Tension, Uplift, and Ice**—Reflects the maximum extent of glaciers during the Tioga (26,000-18,000 years ago) and Tahoe (140,000-80,000 years ago) glaciations, referred collectively as the Wisconsin stage by Matthes (1930).
	El Portal Stage Individual Moraines (Qemi)	Individual moraines (crests shown by rows of dots)		**Pleistocene Glacial Features (Depositional)**—Moraines. Mapped at higher elevations than Qwmi.	**Tension, Uplift, and Ice**—Moraines deposited during the El Portal stage as described by Matthes (1930). The "El Portal stage" terminology is no longer used. The deposits likely correspond to a pre-Tahoe glaciation.

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Surficial and glacial units are also included in the compiled bedrock and surficial map for Yosemite National Park. Refer to Map Unit Properties Table A.

Age	Map Unit (Symbol) *Sheets 3 and 4*	Geologic Description from Matthes (1930)	Geologic Issues	Geologic Features and Processes and General Location	Geologic History
QUATERNARY (Pleistocene)	El Portal Stage Morainal Material in Sheets (Qems)	Morainal material in sheets; some of it washed and re-deposited	**Erosion**—Glacial deposits may form unstable slopes..	**Pleistocene Glacial Features (Depositional)**—Moraines. Mapped at higher elevations than Qwms.	**Tension, Uplift, and Ice**—Moraines deposited during the El Portal stage as described by Matthes (1930). The "El Portal stage" terminology is no longer used. The deposits likely correspond to a pre-Tahoe glaciation.
	El Portal Stage Scattered Morainal Material (Qes)	Scattered morainal material		**Pleistocene Glacial Features (Depositional)**—Moraines. Mapped at higher elevations than Qws.	
	El Portal Stage Gravel Deposits (Qeg)	Gravel deposited in ice-dammed lake		Deposited in Illilouette Creek valley above Illilouette Falls.	**Tension, Uplift, and Ice**—During the a pre-Tahoe glaciation ("El Portal stage" of Matthes 1930), an ice dam formed in Illilouette Creek valley. Gravel was subsequently deposited in the lake that formed behind the dam.
	El Portal Stage Limits of Ice (Qex)	Approximate limits of area covered by ice of El Portal stage		**Pleistocene Glacial Features**—Encompasses a variety of erosional (e.g., U-shaped valleys) and depositional glacial features (e.g., till, moraines). Glacial erratics from El Portal and Glacier Point stages mapped throughout Qex.	**Tension, Uplift, and Ice**—Reflects the maximum extent of glaciers during a pre-Tahoe glaciation.
	Glacier Point Stage Limits of Ice (Qgx)	Approximate limits of area covered by ice of Glacier Point stage		**Pleistocene Glacial Features**—Encompasses a variety of erosional (e.g., U-shaped valleys) and depositional glacial features (e.g., till, moraines). Glacial erratics from Glacier Point stage mapped throughout **Qgx**.	**Tension, Uplift, and Ice**—Reflects the maximum extent of glaciers during a pre-Tahoe glaciation. Matthes (1930) interpreted these deposits as the oldest glaciation evident in Yosemite Valley.
CRETACEOUS-JURASSIC	Un-glaciated Deposits (ung)	Rock not covered by the ice	**Rockfall**—a potential issue for all bedrock exposed on steep slopes throughout Yosemite Valley.	**Nunataks**—Peaks that reached above glaciations include El Capitan, Half Dome, and Eagle Peak. Additional features and processes are listed for bedrock geologic map units such as **Khd** (Half Dome granodiorite) and **Kec** (El Capitan Granite).	**The Rise of the Batholith**—Bedrock units are primarily intrusive granitic rocks of Cretaceous or Jurassic-Cretaceous age. Refer to Map Unit Properties Table A for more information.
	Bare Rock, Missing Glacial Material (bedrock)	These are areas of bare rock devoid of morainal material that were most likely glaciated at one time	**Rockfall**—a potential issue for all bedrock exposed on steep slopes throughout Yosemite Valley. **Protection of Glacial Features**—glacial polish, striations, percussion marks, crescent gouges, chatter marks, and subglacial water polish may be present. They can be damaged or destroyed via natural weathering processes or vandalism.	**Pleistocene Glacial Features (erosional)**—Encompasses a variety of erosional features (e.g. walls of U-shaped valleys).	**The Rise of the Batholith**—Bedrock units are primarily intrusive granitic rocks of Cretaceous or Jurassic-Cretaceous age. Refer to Map Unit Properties Table A for more information. **Tension, Uplift, and Ice**—Glaciers from one or more glaciations covered these units.

Source map: Matthes, F. E. 1930. Map of glacial and postglacial deposits in Yosemite Valley, Mariposa County, California. Plate 29 *in* F. E. Matthes. 1930. Geologic history of Yosemite Valley. US Geological Survey. Professional Paper 160.