DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PROFESSIONAL PAPER 1456
PLATE 1

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Menlo Park, California

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NORRIS GEYSER BASIN
CORRELATION OF MAP UNITS

al, si	Alluvial and lacustrine deposits; sinter Hydrothermal explosion deposits	Holocene
he		
ps, psc	Younger deposits of Pinedale glaciation	Pleistocene
pt, ptc, pk		
pokc	Older deposits of Pinedale glaciation	
sich, sach, lb	Deposits older than Pinedale glaciation (lower unit of Lava Creek Tuff not exposed)	

QUATERNARY

DESCRIPTION OF MAP UNITS

al — Alluvial and lacustrine deposits, not differentiated. Includes some normal stream and lacustrine deposits and thin lenticular thermal deposits, approximately horizontal and changing seasonally. Thickness not known

si — Sinter. White, gray, yellow, and brown amorphous opaline sinter deposited from hot springs and geysers; highly colored varieties are from acid spring waters or from thermophilic organisms. Thickness < ½ m to >2 m

he — Hydrothermal explosion deposits from crater near west edge of basin. Debris not abundant, ranging in thickness from scattered fragments to >3 m; minor young explosion deposits in Porcelain and Back Basins not distinguished

Younger deposits of Pinedale glaciation

ps — Sand and gravel, latest stage outwash from Pinedale glacier immediately north of Norris Basin. Consists of debris dominantly from Lava Creek Tuff and lithoidal and vitric flow rhyolite. Thickness < ½ m to >5 m

psc — Same as unit ps but locally cemented by amorphous hot-spring silica

pt — Till, angular to rounded cobbles and gravel in fine-grained matrix, unsorted and unstratified, thickness generally ½ m to 1 m

ptc — Till, locally cemented by hot-spring silica near Steamboat Geyser's channel

pk — Kame sand, gravel, and cobbles from ice-margin streams at higher levels than unit ps, caused by rapid hydrothermal melting of ice. Consists of lithoidal rhyolite and obsidian, with minor erratics of basalt, andesite, and rare chalcedonic sinter (sich) and chalcedony-cemented sandstone (sach). Thickness locally >15 m

Older deposits of Pinedale glaciation

pokc — Brown and gray cemented kame sediments chaotically bedded from rapid hydrothermal melting of ice and slumping of sediments; cemented by hydrothermal action while still submerged under ice and ponded meltwater, but continuing flow of acid gases caused local bleaching and high heat flow. Almost entirely lithoidal rhyolite, pumice, and obsidian, probably from Solfatara and Gibbon River flows 100,000 years old. Thickness up to 40 m

Deposits older than Pinedale glaciation

sich — Chalcedonic sinter deposited as opaline sinter but later chalcedonized after burial and heating, probably during a pre-Pinedale interglacial interval. Occurs mainly as surface erratics (resistant relicts) on younger Pinedale kame deposits, so might be interglacial Pinedale in age (see text). One doubtful occurrence deep in throat of North Hydrophane Spring (G3)

sach — Chalcedonized sandstone deposited subaerially during a pre-Pinedale interglacial period. Original sand grains uncemented, largely quartz, minor feldspar and lithic fragments, probably from Lava Creek Tuff prior to burial under younger rhyolites. Clastic grains well rounded to angular in part from wind-blown sand. Sandstone chalcedonized, probably under an old hot-spring sinter terrace, now eroded by Pinedale glaciers. "Roots" of the spring system indicated by local hydrothermal adularia with chalcedony

lb — Lava Creek Tuff, member B. Gray and brown ash-flow tuff, densely welded, extensively bleached by continuing dispersed flow of acid gases along fractures. Abundant 1- to 5-mm phenocrysts of quartz and sanidine with relict Fe-Mg minerals and plagioclase

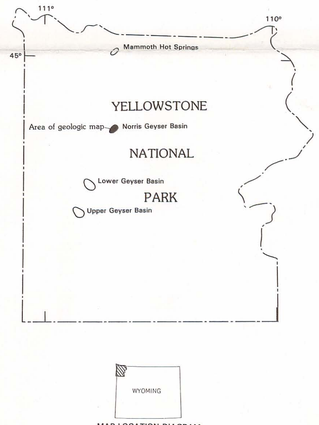
Contact—Approximately located
Strike and dip of beds
- Horizontal
- 25 Inclined

Vertical joint
Fan G ○ Geyser
Vents
- Flowing spring, generally thermal
- ○ May discharge vapor but no liquid
- Ψ Steam
- Numerous "frying pan" type, condensing minor water

Erratics on till and kames of Pinedale glaciation
- sich ✳ Chalcedonic sinter
- sach ✳ Chalcedonic sandstone or hydrothermal quartzite
- obs ✳ Obsidian cobbles

Y-9 + Drill hole
OB Coordinate
Basin retaining water—Maybe geyser, vent, pool, lake, or other
1967 road overlay—On previously mapped topography
Trail or boardwalk

Note: Because features in this area are continually changing, symbols can represent activity in an area rather than a particular geologic feature. A feature may be outlined as determined in the field or may be represented by a uniform symbol. Geysers are distinguished from vents in that they are named.



MAP LOCATION DIAGRAM

UNITED STATES—GEOLOGICAL SURVEY, RESTON, VA—1987—GQ5529

Geology by Donald E. White, 1969–1982

Base compiled from U.S. Geological Survey aerial photographs, series GS-VABH-O, 1965, and preliminary topographic contours mapped by U.S. Geological Survey in 1965-66. One-thousand-foot grid referenced to arbitrary origin. Thermal features field corrected through 1982 by Donald E. White. Approximate coordinates at Norris Museum: latitude 44°43.50'N., longitude 110°42.25'W.

0 200 400 600 800 1000 1200 FEET

CONTOUR INTERVAL 5 FEET; DASHED CONTOURS 2.5 FEET, HACHURED CONTOURS INDICATE DEPRESSION

APPROXIMATE MEAN DECLINATION, 1987

GEOLOGIC MAP AND THERMAL FEATURES OF NORRIS GEYSER BASIN, YELLOWSTONE NATIONAL PARK, WYOMING

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