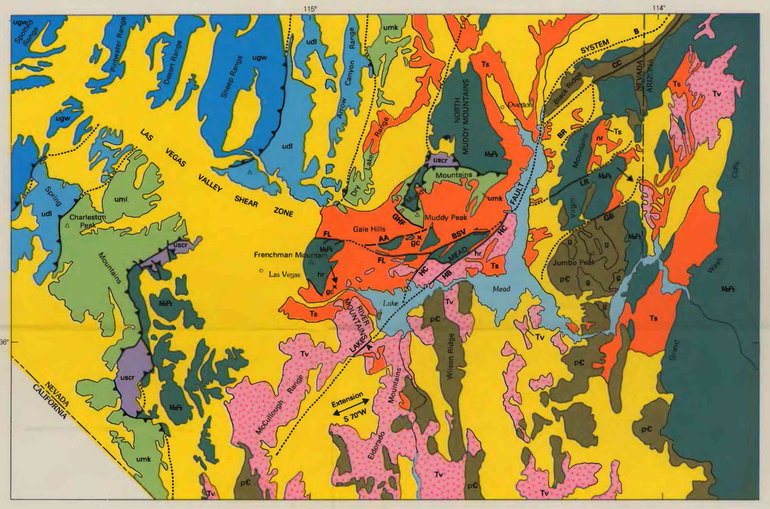
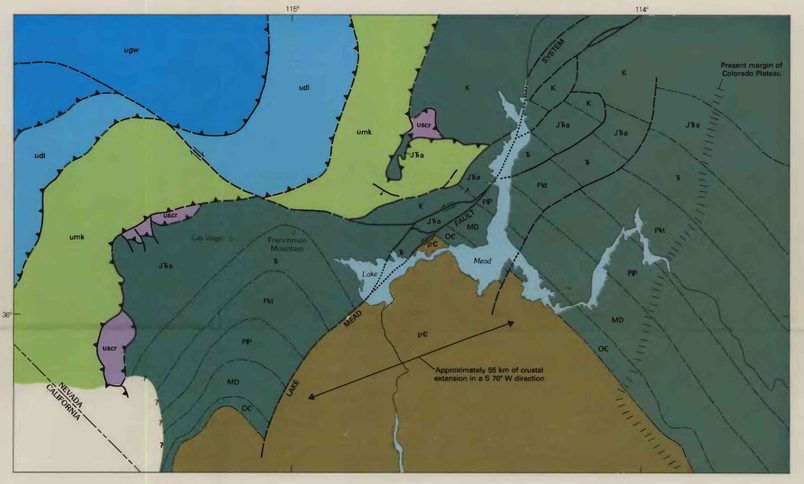
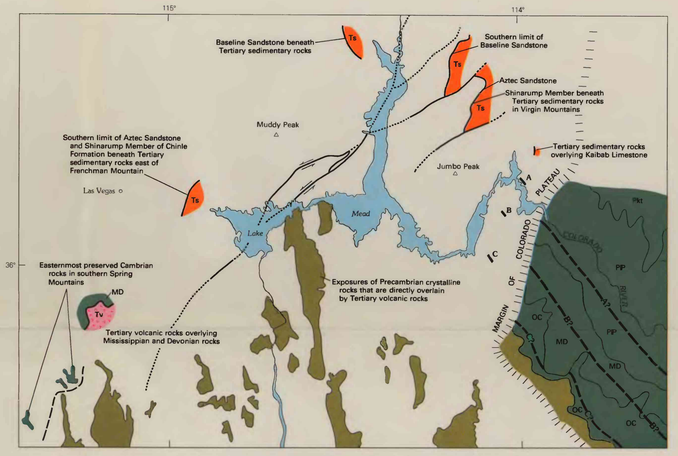


A, **Highly simplified geology of the Lake Mead region.**



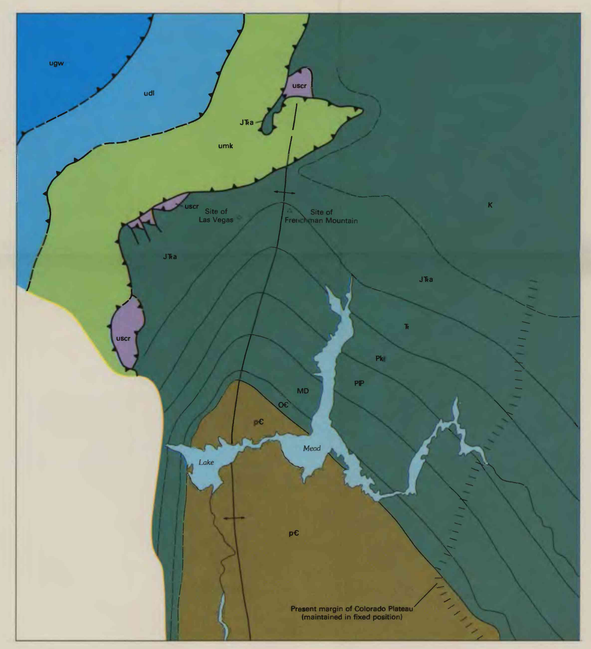
B, **Geology of Lake Mead region with Tertiary stratal tilting, Tertiary sedimentary rocks, and Tertiary volcanic rocks removed.**

Contacts have been restored to their probable pre-Rainbow Gardens Member position. Deformation resulting from Lake Mead fault system and Las Vegas Valley shear zone as well as distortion from crustal extension south of Lake Mead have not been removed.



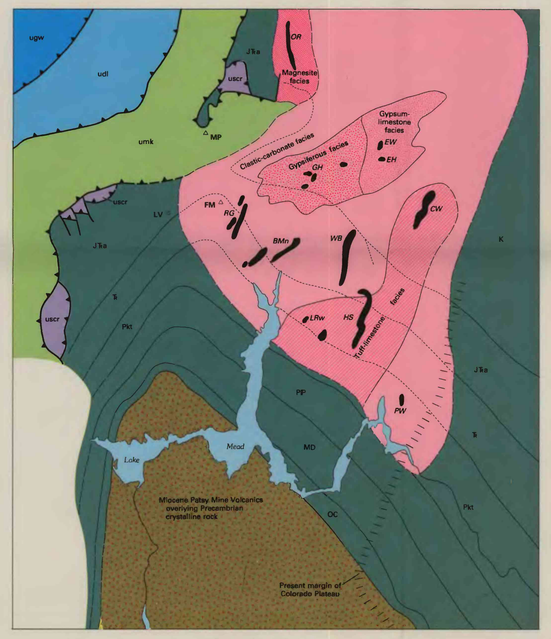
A Southwestern limit of Permian Kaibab and Toroweap Formations (Pkt)
B Southwestern limit of Permian and Pennsylvanian rocks (P P)
C Southwestern limit of Mississippian and Devonian rocks (MD)

C, **Data used to reconstruct pre-Rainbow Gardens arch.**



D, **Paleogeology of middle Tertiary pre-Rainbow Gardens time.**

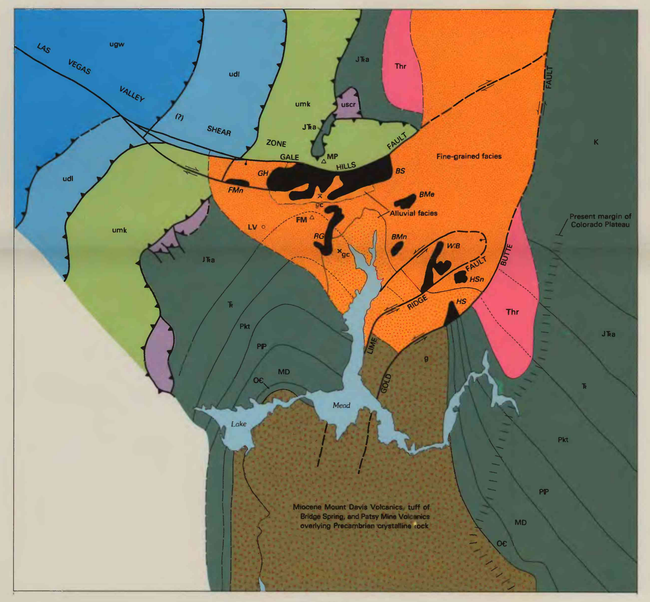
Chronologic data pertaining to initiation of Rainbow Gardens deposition is sparse, but map probably represents time period prior to about 20 m.y. ago.



Rainbow Gardens Member
- Clastic-carbonate facies
- Tuff-limestone facies
- Gypsiferous facies
- Gypsum-limestone facies
- Magnesite facies
- Outcrop restored to original depositional position

E, **Paleogeology of Rainbow Gardens time.**

Although the member is not dated, map probably depicts period about 20 to 17 m.y. ago.



Thumb Member
- Alluvial facies
- Fine-grained facies
- Outcrop restored to original depositional position
- Thr — Rainbow Gardens Member

F, **Paleogeology of Thumb time.**

About 17 to 13.5 m.y. ago.

EXPLANATION

- Tv — Tertiary volcanic rocks
- MzPz — Mesozoic and Paleozoic rocks (autochthon)
- Tv C — Tertiary volcanic rocks and Precambrian crystalline rocks
- Quaternary surficial deposits
- Ts — Tertiary sedimentary rocks
- K — Cretaceous rocks
- J'ka — Jurassic and Triassic(?) Aztec Sandstone
- 'k — Triassic rocks
- Pkt — Permian Kaibab and Toroweap Formations
- PP — Permian and Pennsylvanian rocks
- MD — Mississippian and Devonian rocks
- OC — Ordovician and Cambrian rocks
- pC — Precambrian crystalline rocks

THRUST PLATES

- ugw — Upper plate of Gass Peak and Wheeler thrusts
- udl — Upper plate of Dry Lake and Lee Canyon thrusts
- umk — Upper plate of Muddy Mountain and Keystone thrusts
- uscr — Upper plate of Summit, Contact, and Red Spring thrusts

- Contact—Dashed where inferred; dotted where concealed
- Normal fault—Dashed where approximately located; queried where uncertain. Bar and ball on downthrown side.
- Thrust fault—Dashed where approximately located dotted where concealed. Sawteeth on upper plate
- Strike-slip fault—Dashed where approximately located. Arrows indicate relative direction of movement
- Anticline—Queried where uncertain
- g — Outcrops of Precambrian rapakivi granite at Jumbo Peak
- pC x — Rapakivi clast locality
- hr — Measured section of Rainbow Gardens Member of Horse Spring Formation
- HC — Hamblin-Cleopatra volcano
- Direction of plunge of Mesozoic formations beneath Horse Spring Formation (Map A)

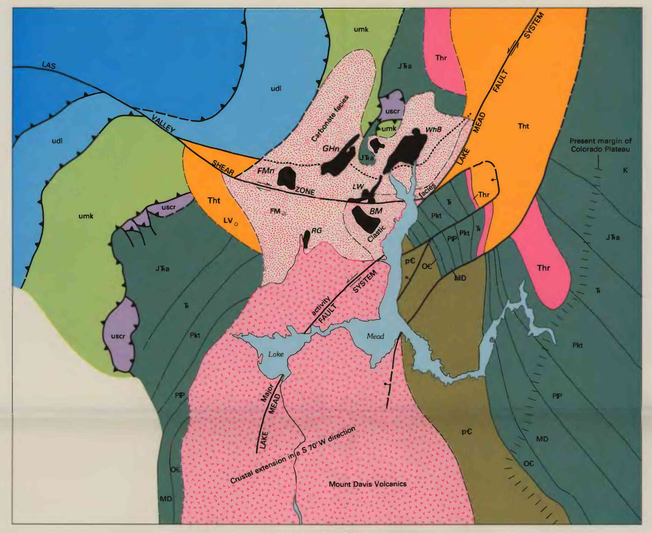
ABBREVIATIONS

LAKE MEAD FAULT SYSTEM AND RELATED FAULTS
- A — Fault between River Mountains and Eldorado Mountains
- B — Fault north of Black Ridge
- BR — Bitter Ridge fault
- BSV — Bitter Spring Valley fault
- CC — Cabin Canyon fault
- GB — Gold Butte fault
- HB — Hamblin Bay fault
- LR — Lime Ridge fault

LAS VEGAS VALLEY SHEAR ZONE(?)
- GHF — Gale Hills fault
- FL — Fault between north side of Frenchman Mountain and Lake Mead fault system
- AA — Fault between allochthon and autochthon

REFERENCE POINTS
- FM — Frenchman Mountain
- LV — Las Vegas
- MP — Muddy Peak

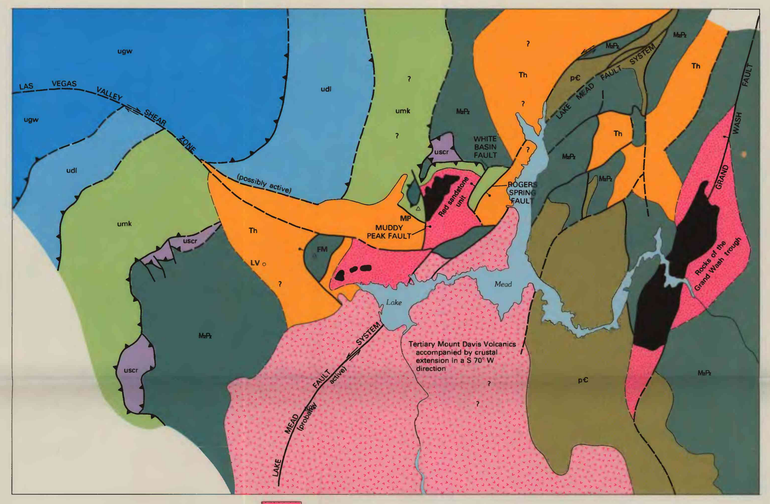
OUTCROPS
- BM — Black Mesa
- BMe — East of Black Mesa
- BMn — Northern Black Mountains
- BS — Bitter Spring Valley
- CW — Cottonwood Wash
- EH — Echo Hills
- EW — Echo Wash
- FMn — North of Frenchman Mountain
- GH — Gale Hills
- GHn — Northwestern Gale Hills
- HS — Horse Spring
- HSn — North of Horse Spring
- LRw — Western Lime Ridge
- LW — Lovell Wash
- OR — Overton Ridge
- PW — Pigeon Wash
- RG — Rainbow Gardens
- WB — Wechech Basin
- WhB — White Basin



Lovell Wash and Bitter Ridge Limestone Members
- Carbonate facies
- Clastic facies
- Outcrop restored to original depositional position
- Tht — Thumb Member
- Thr — Rainbow Gardens Member

G, **Paleogeology of Bitter Ridge Limestone and Lovell Wash time.**

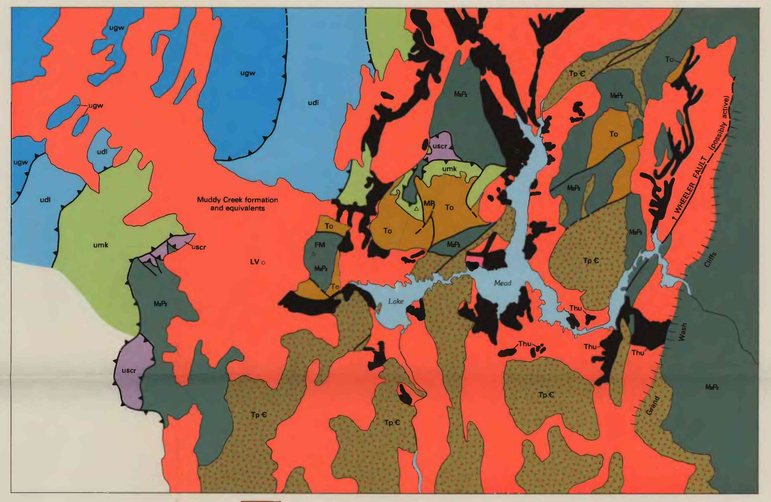
About 13.5 to 12 m.y. ago.



- Red sandstone unit and rocks of the Grand Wash trough
- Area of outcrop
- Th — Horse Spring Formation
- ? — Strata are covered by younger deposits here

H, **Paleogeology of time of red sandstone unit and rocks of Grand Wash trough.**

About 12 to 10 m.y. ago.



- Extent of deposition of Muddy Creek Formation and its equivalents
- Area of outcrop
- Thu — Hualapai Limestone
- To — Pre-Muddy Creek Tertiary rocks

I, **Paleogeology of late Muddy Creek time**

About 6 m.y. ago after major episode of basin-range faulting.

0 10 20 30 40 50 KILOMETERS

GEOLOGIC AND PALEOGEOLOGIC MAPS OF THE LAKE MEAD REGION, EASTERN CLARK COUNTY, NEVADA, AND WESTERN MOHAVE COUNTY, ARIZONA