



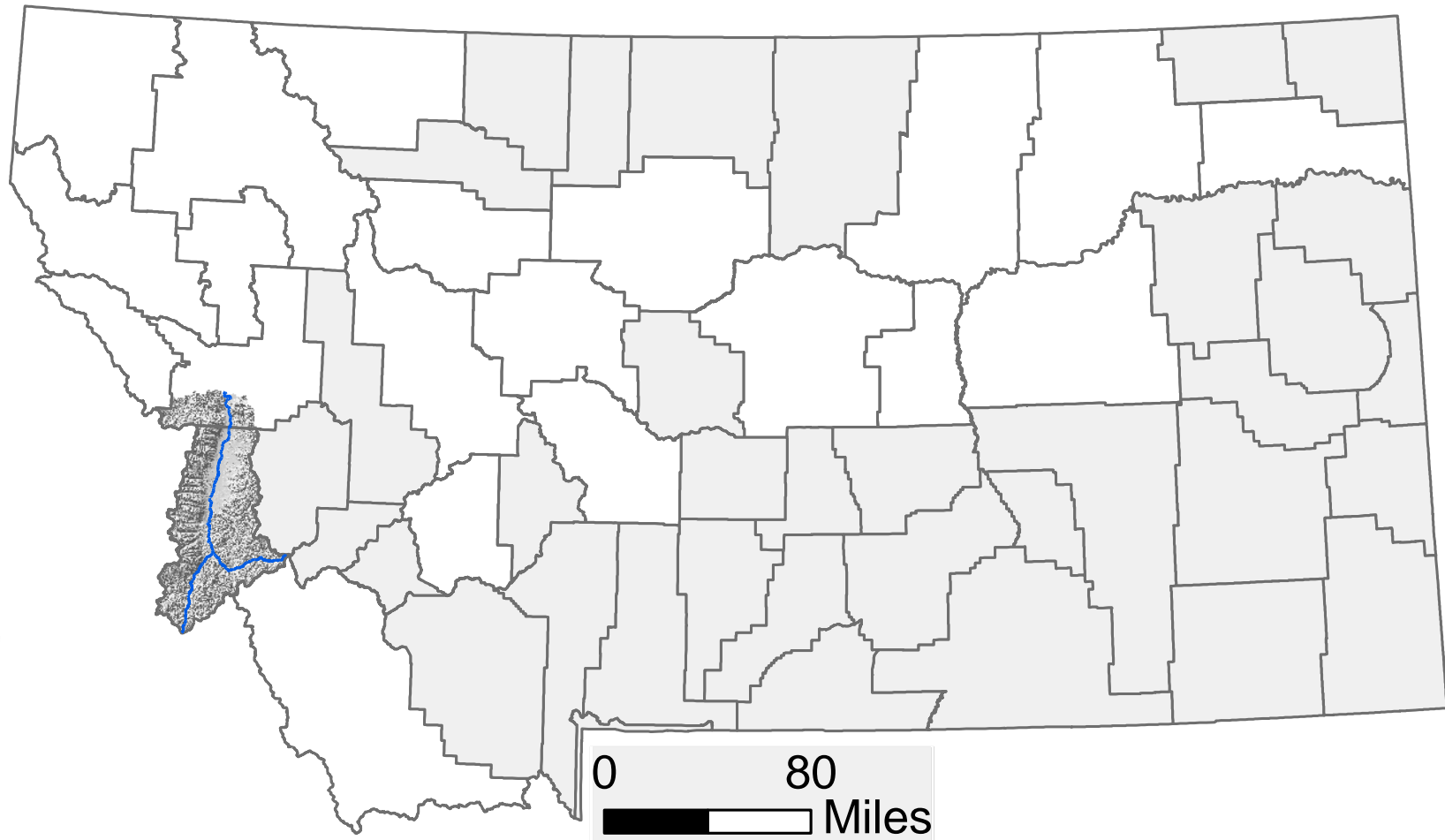
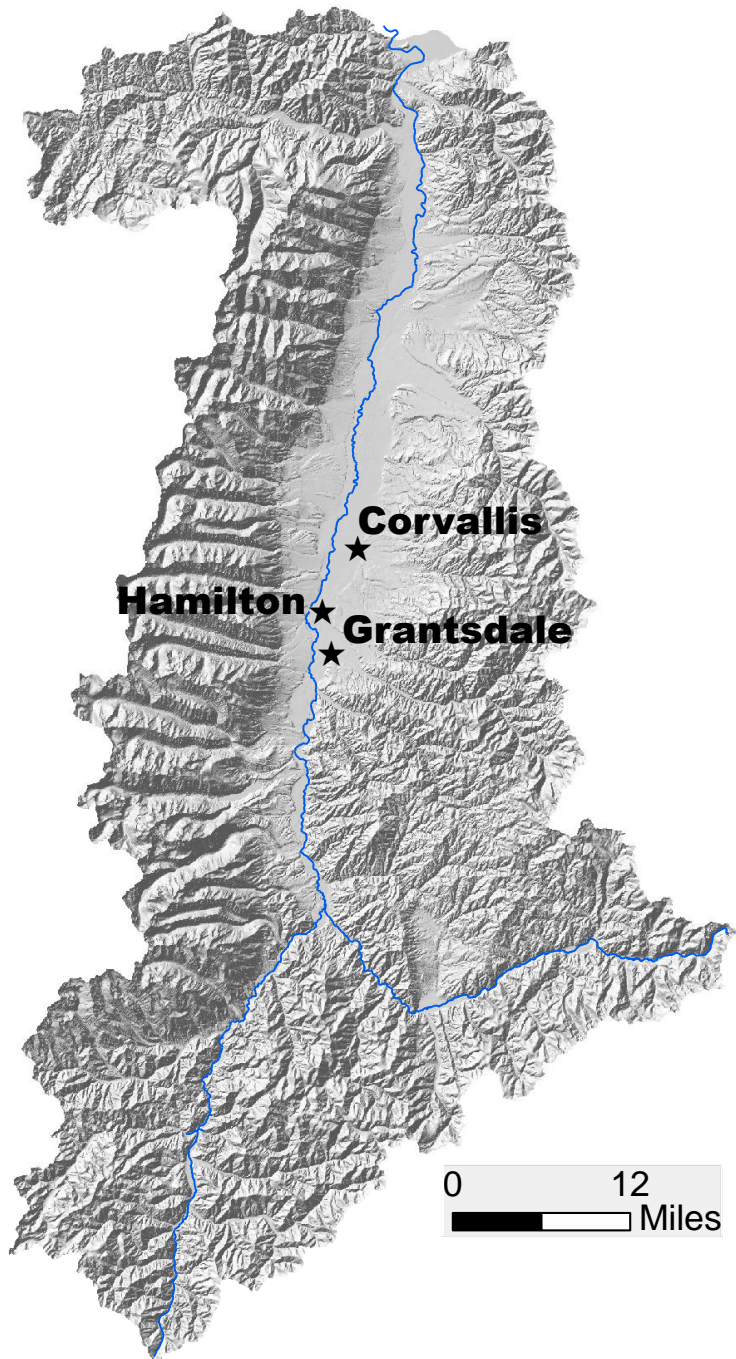
# The Geologic History and Hydrogeology of Hamilton, Montana

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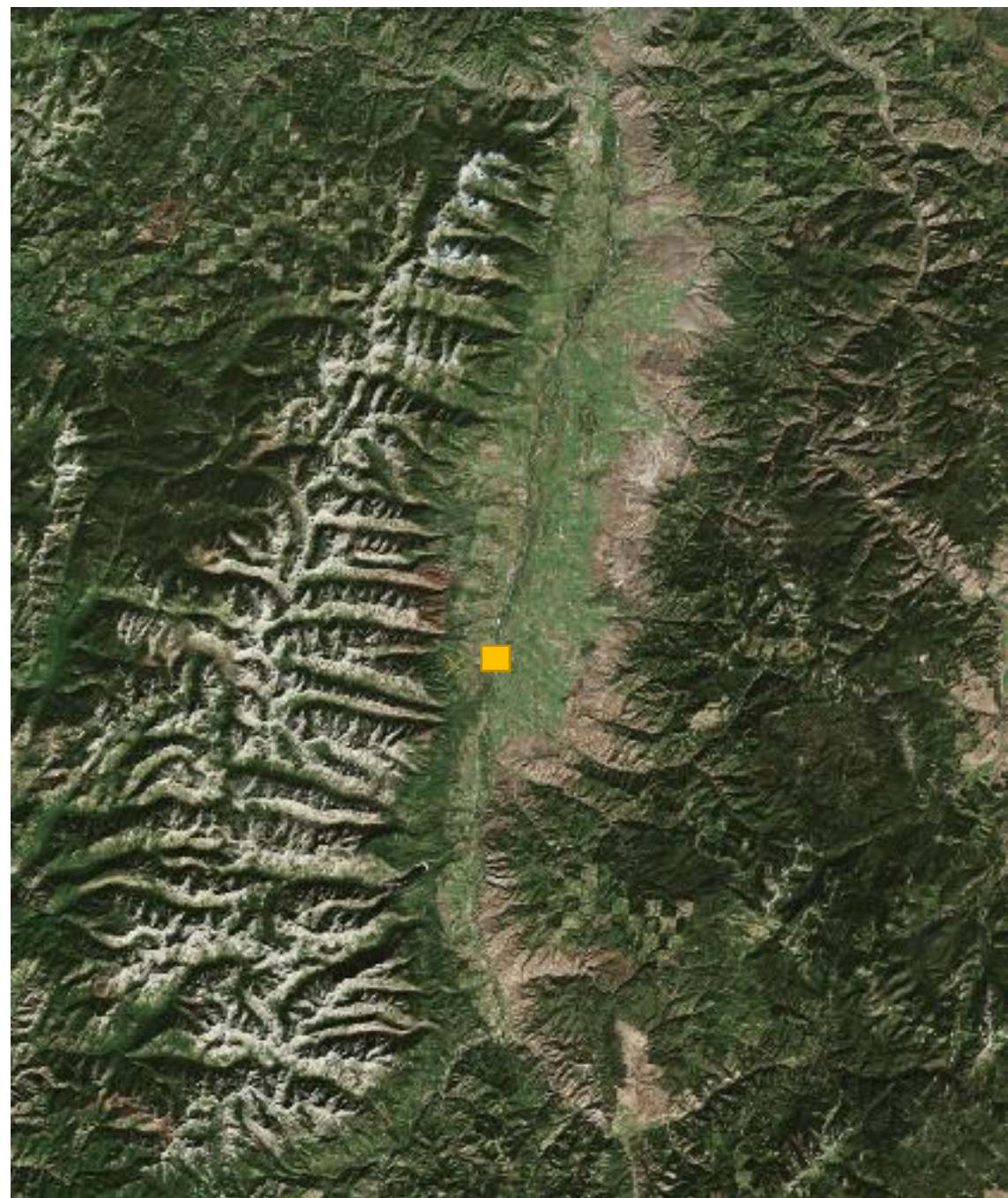
Google Earth







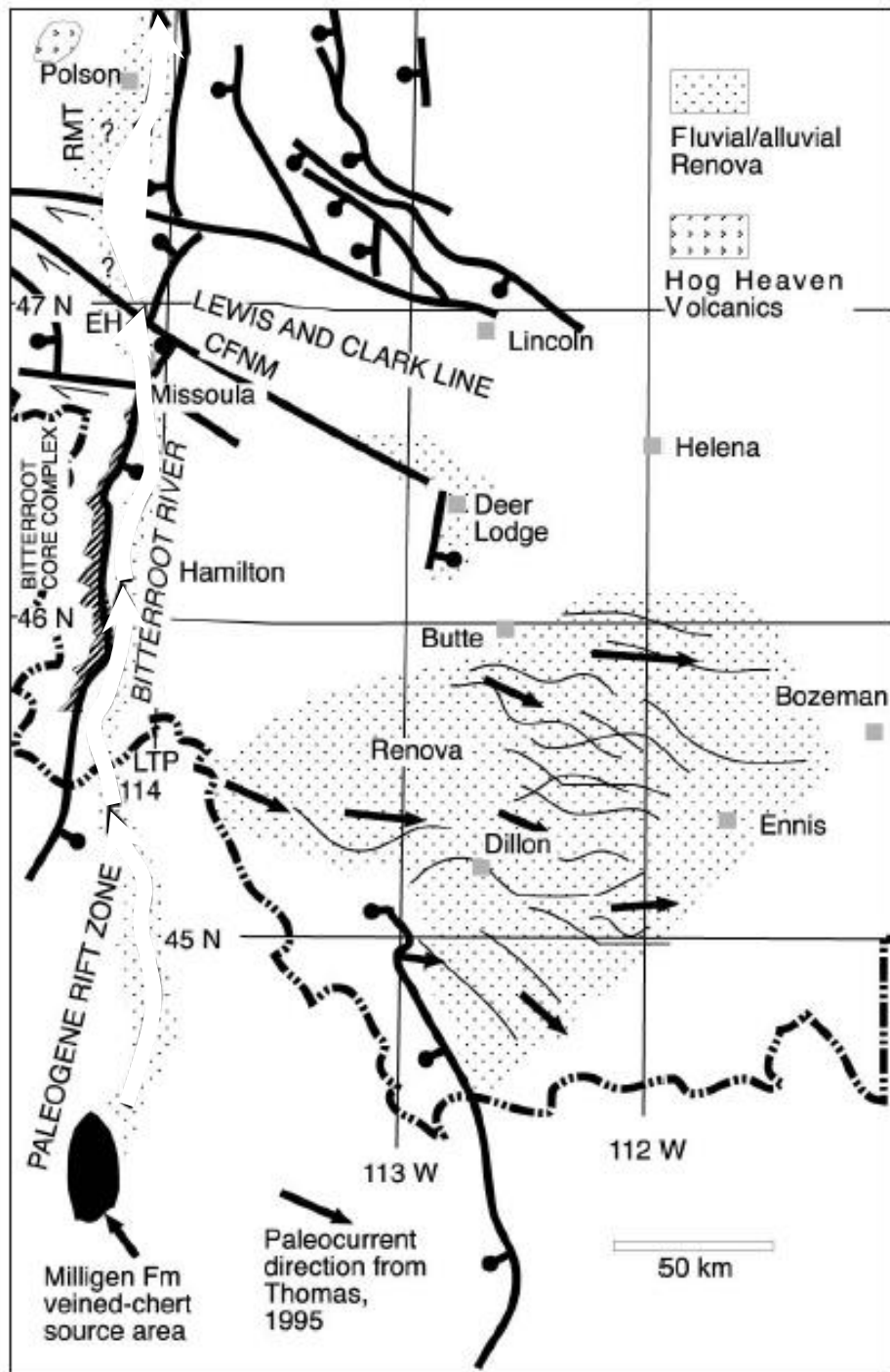






Structural framework and sedimentary architecture provide conceptual model for groundwater model.

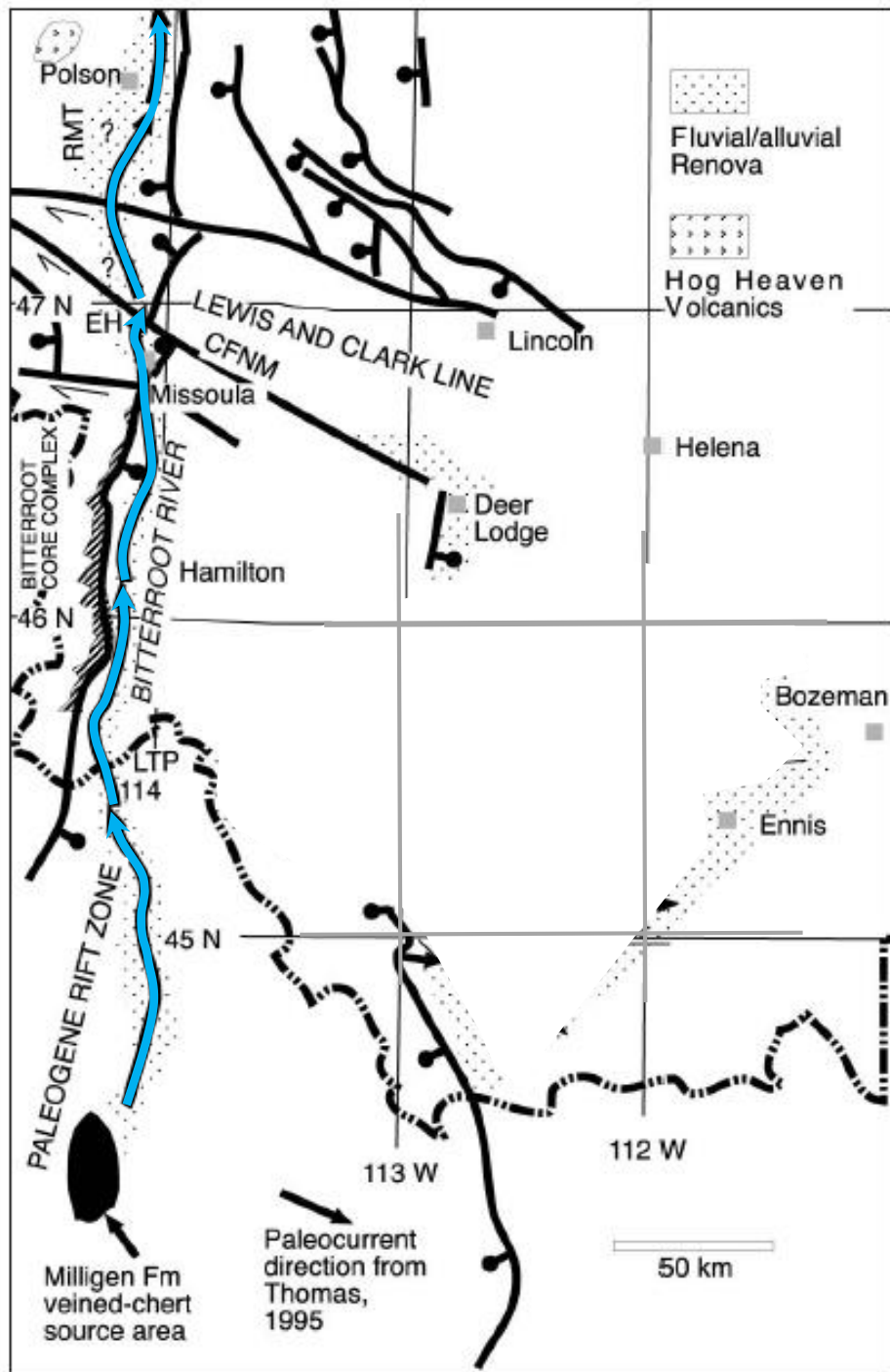
The better the conceptual model, the better the flow model.



# 1. 55 ma

Eastern Paleovalleys and Megafans.

Crustal thickening from emergence of Idaho Batholith and compressional regime ending.



2. 55 – 30 ma

Extensional regime.

Rift forms along eastern front of Bitterroot Core Complex

Sediment load to Hamilton predominantly from Challis Volcanic area.

Identifiers are rare clasts of black quartz-veined chert and translucent pink jasperoid quartzite







## 2. Renova Formation. Early Tertiary. 55-30ma.

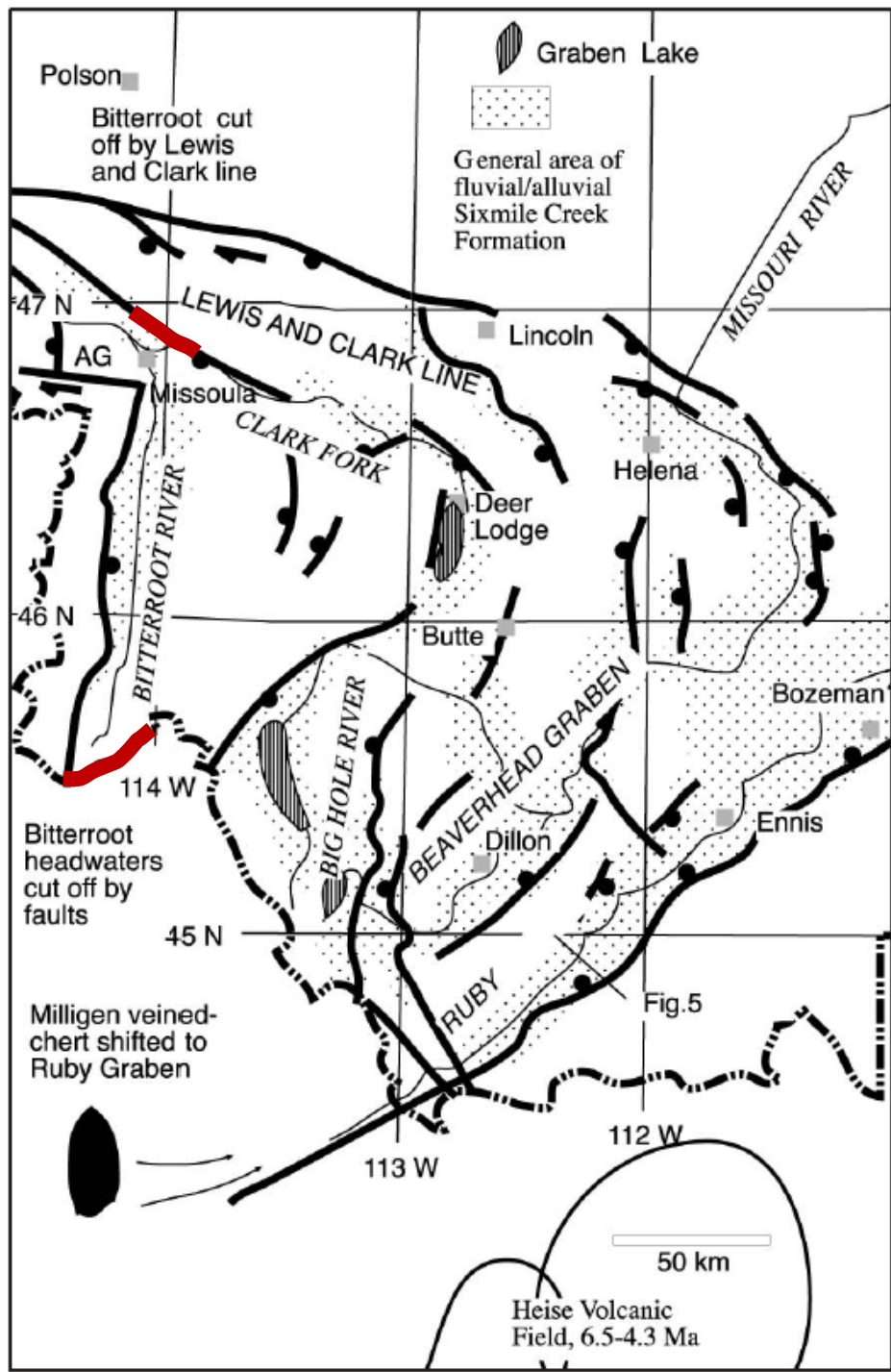
- cessation of thrusting; extensional regime begins.
- 50-40mya BCC emerged. Major rift system evolves.
- Bitterroot Valley (BV) - Graben (valley) forms on eastern edge of Bitterroot Core Complex (BCC)
- low energy; rapid subsidence; trend towards aridity
- fine grained, ash filled, extensive deposit.
- appears to thicken at normal faults.



### 3. Significant wet, erosional event ending Renova 20-17 ma

- extension rejuvenated.
- anomalously warm and wet - lateritic soil and Beech tree fossils.
- new grabens form and cutoff Bitterroot Valley (BV) from Milligen chert - diverted to Ruby Drainage.
- BV also cutoff at Evaro Hill Lewis and Clark fault.
- coincident with Yellowstone Hot Spot & Columbia River Basalts.





BV tectonically cutoff and sediment goes to Ruby drainage.

BV cutoff at north end by reactivation of L and C fault

BV now much smaller

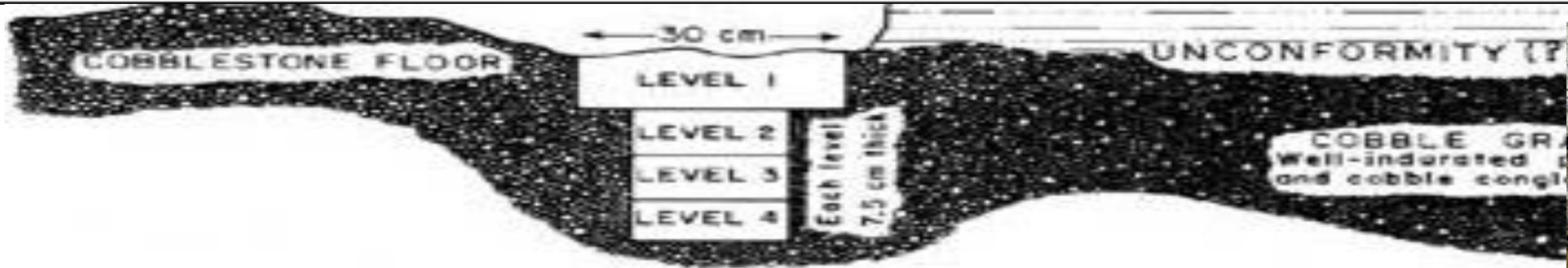
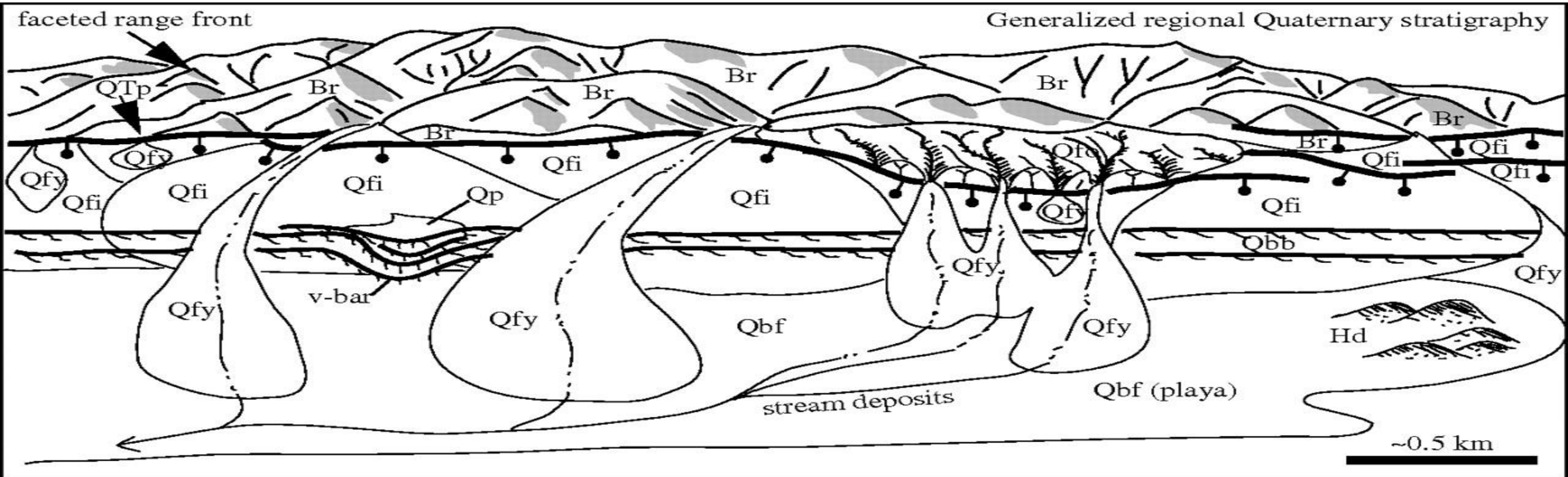


## 4. Six Mile Creek gravels. Later Tertiary 17 – 7 ma

- coarser grained than Renova Fm., ash filled.
- progressively greater aridity.
- higher energy deposition than Renova.
- eroded shoulders of newly formed and reactivated grabens.
- thickens to east 100's of feet.

# 5. Quaternary alluvium

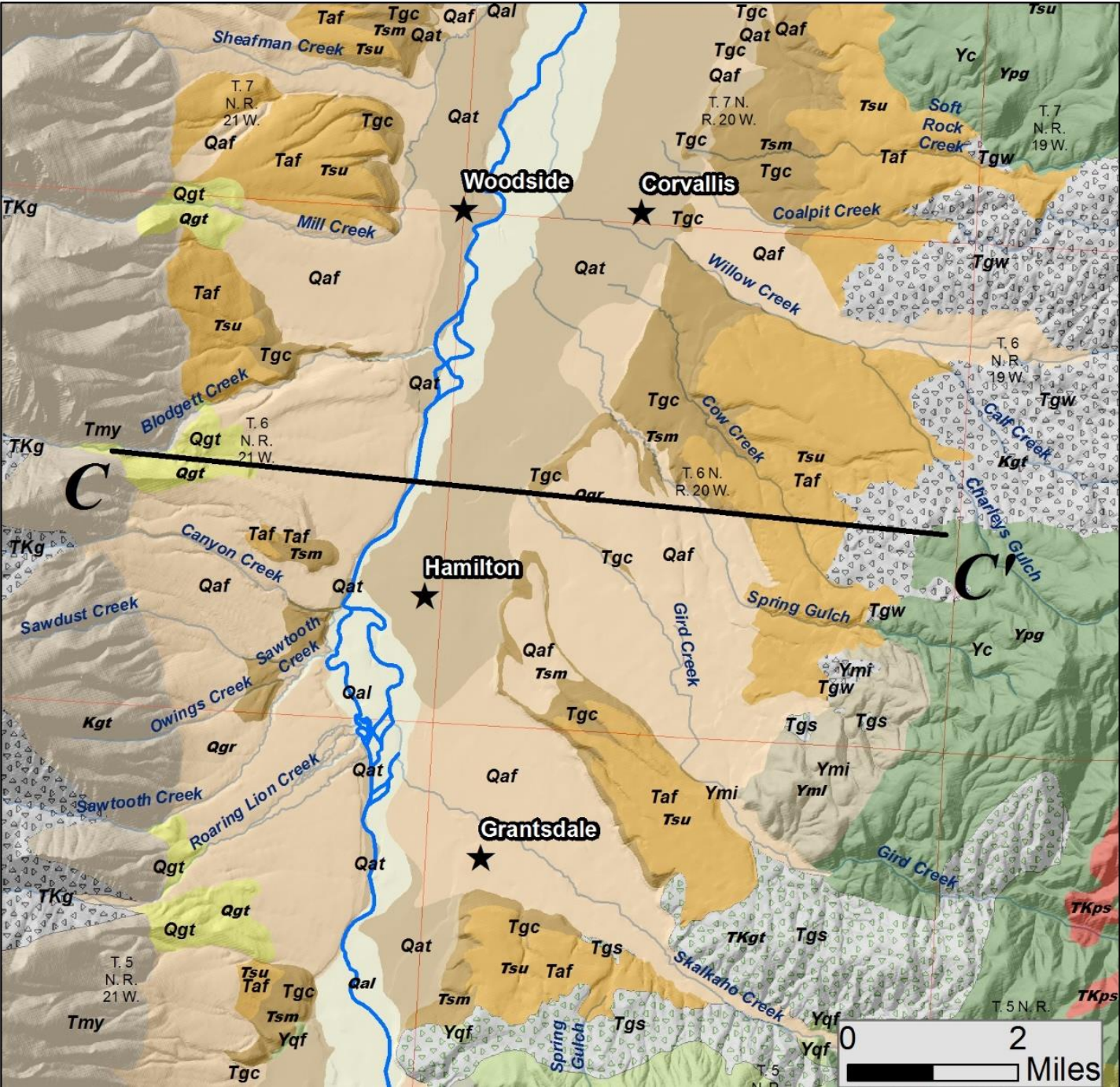
-very high energy-glacial runoff- large sediments-very productive



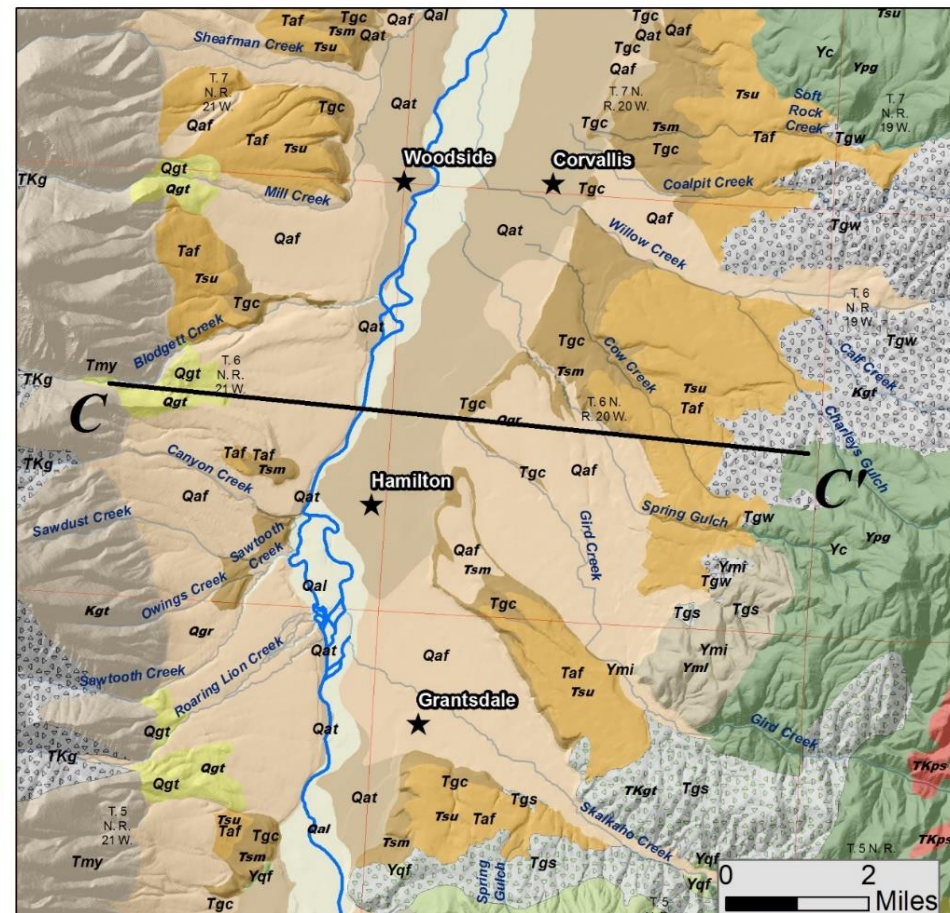
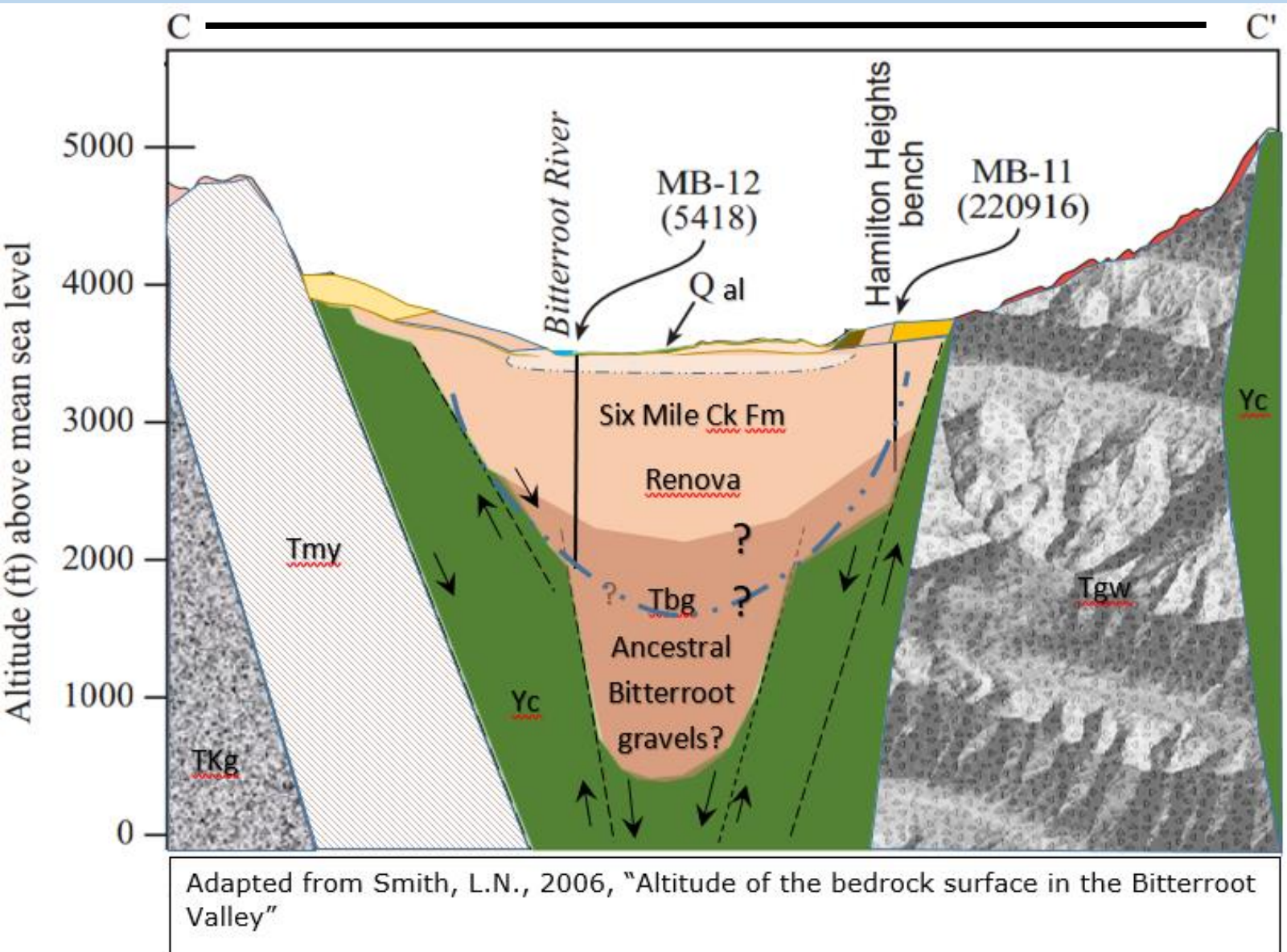


# Hamilton Surficial Geologic Map

-Lonn and Sears







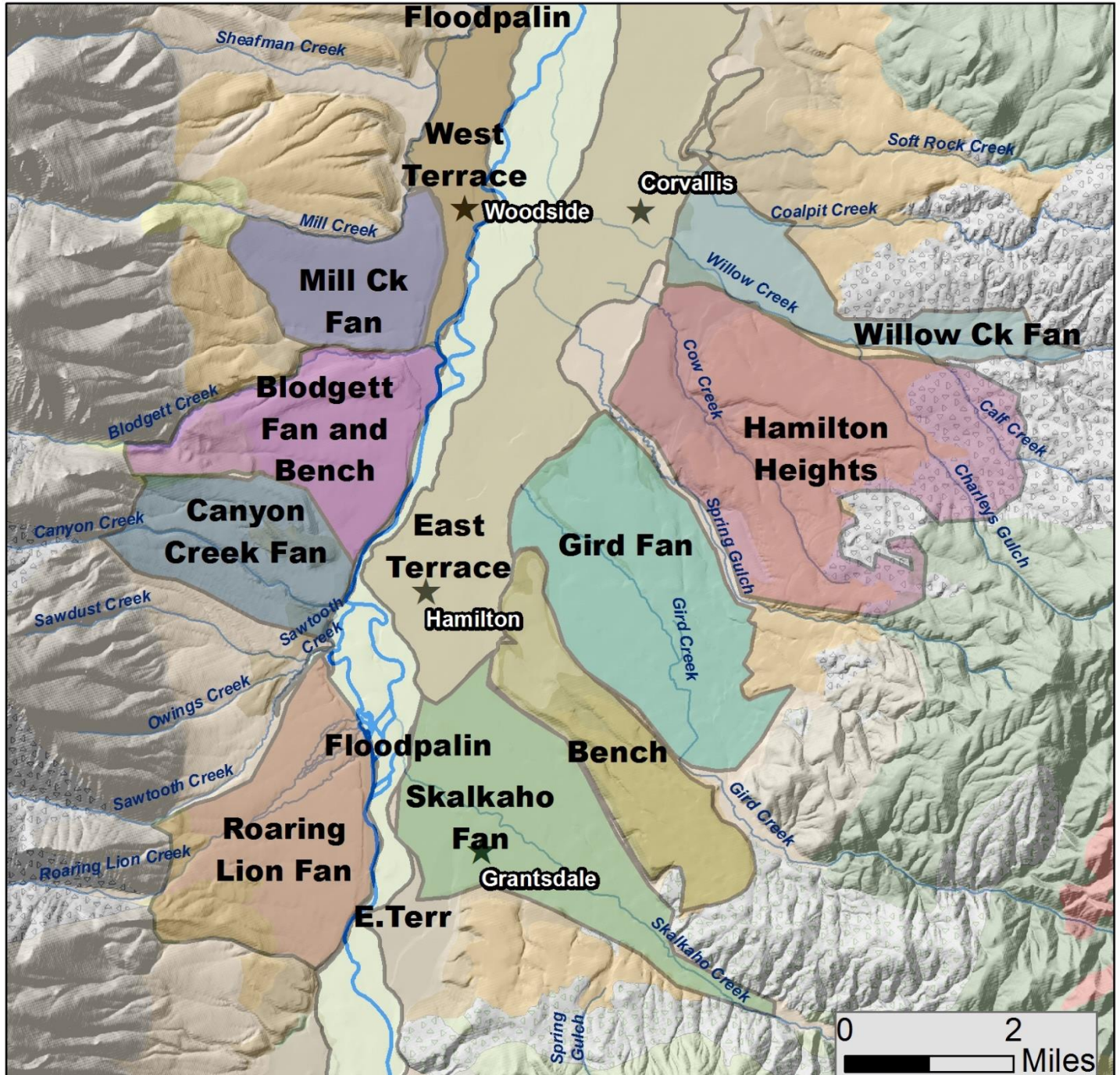
? Contact between Renova, Six Mile gravels, and Tbg very difficult to assess ?  
 Norbeck, 1980, "Evaluation of Deep Aquifers in Bitterroot Valley".



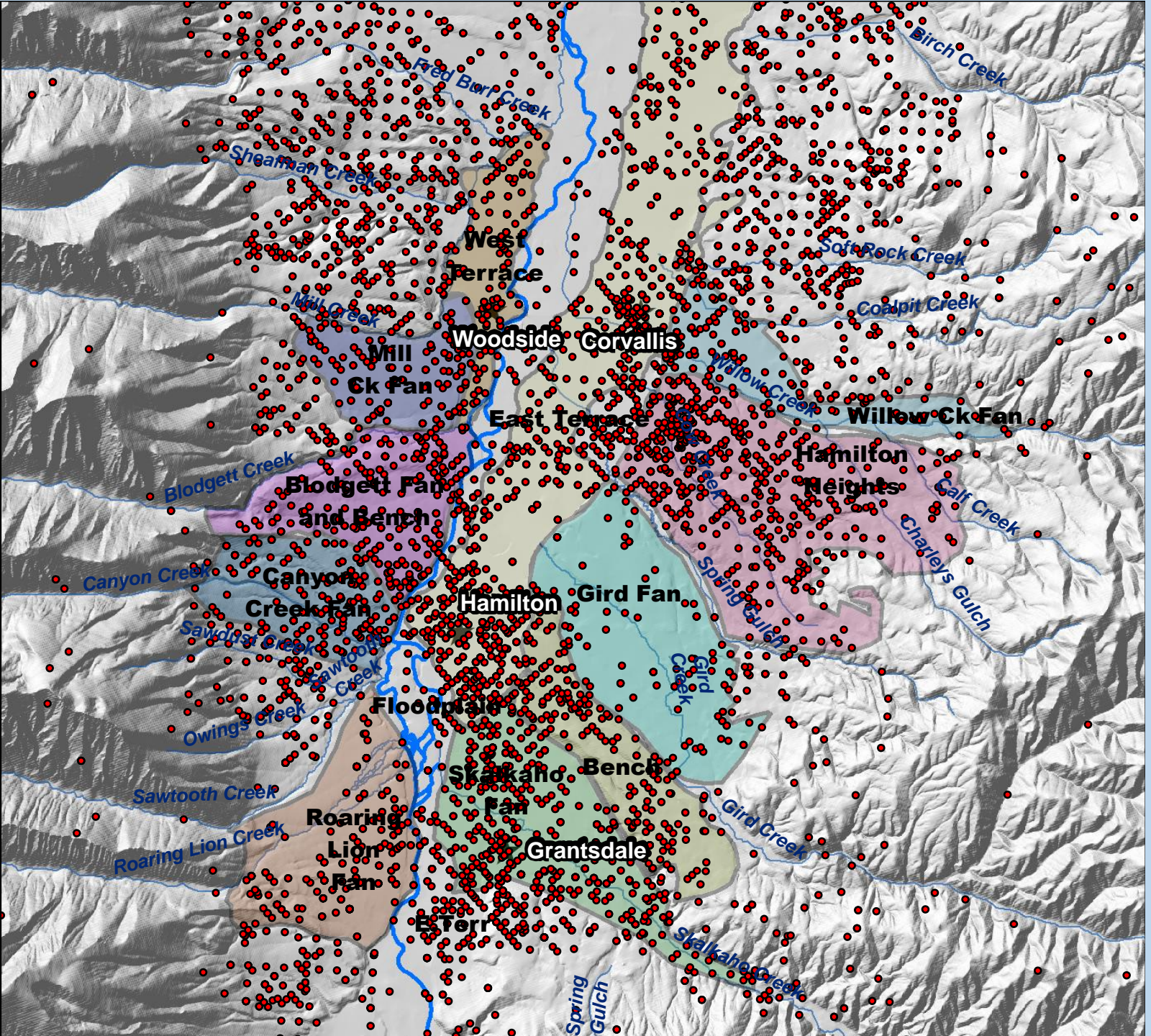
# Sedimentary regions

## Region Name

- Bench
- Blodgett Fan and Bench
- Canyon Creek Fan
- East Terrace
- Floodpalin
- Gird Fan
- Hamilton Heights
- Mill Ck Fan
- Roaring Lion Fan
- Skalkaho Fan
- Spring Ck Fan
- West Terrace
- Willow Ck Fan







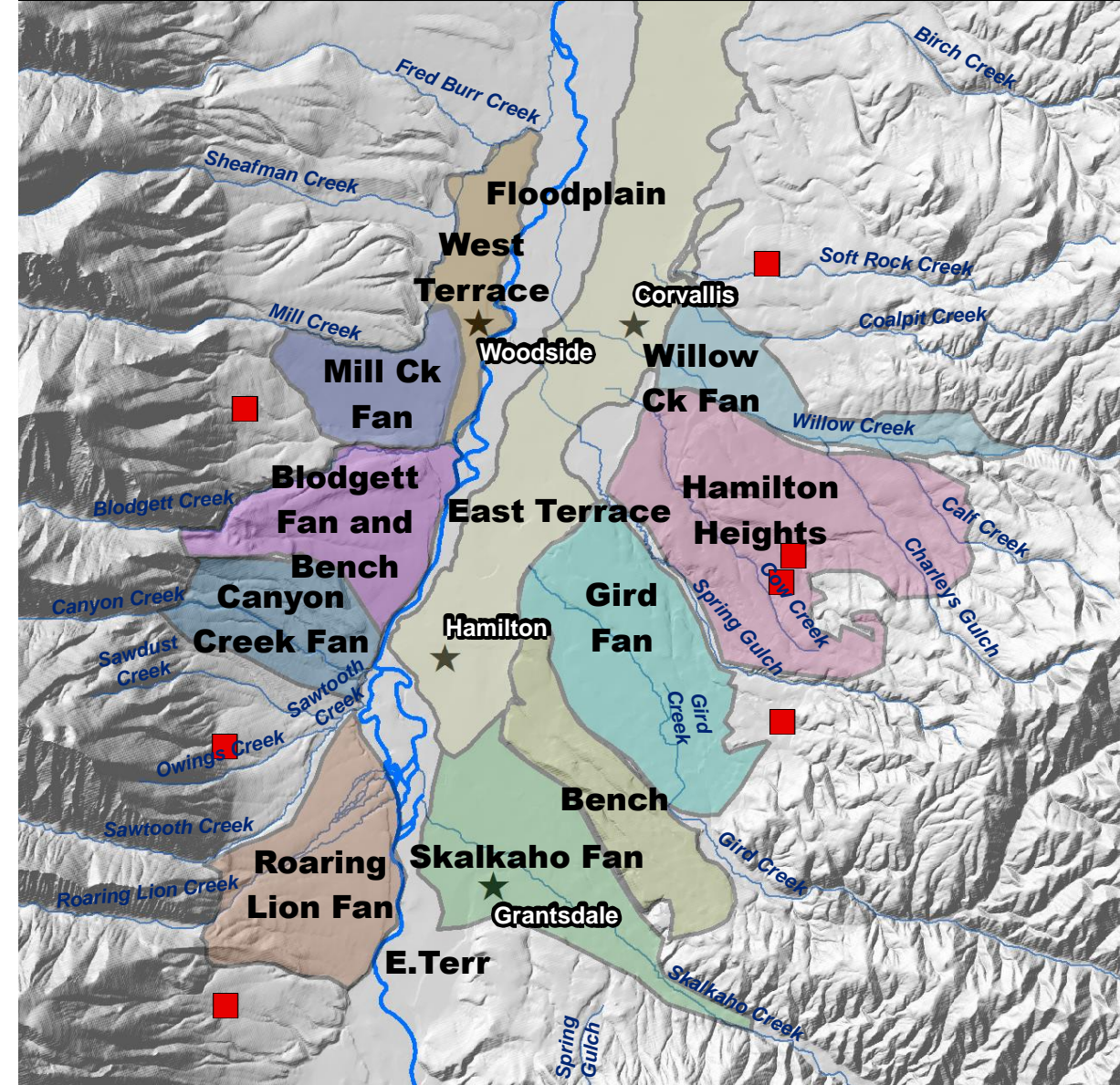
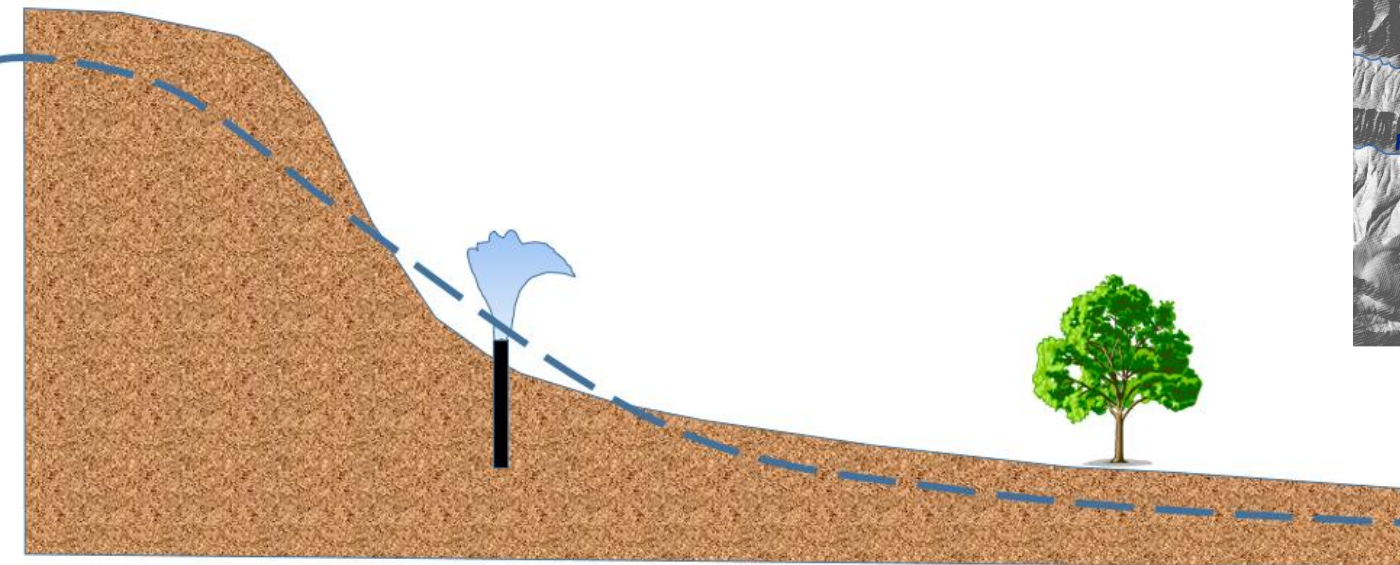
# Well network around Hamilton

- from GWIC  
data base



# Flowing Wells

Flowing wells.  
Break in slope goes below water table



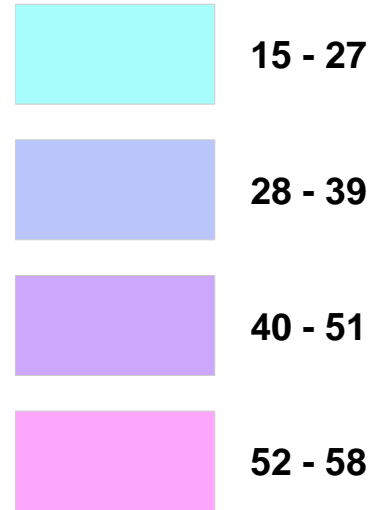
**Hamilton Flowing Wells**  
height above ground, feet

■ 1 – 12 feet



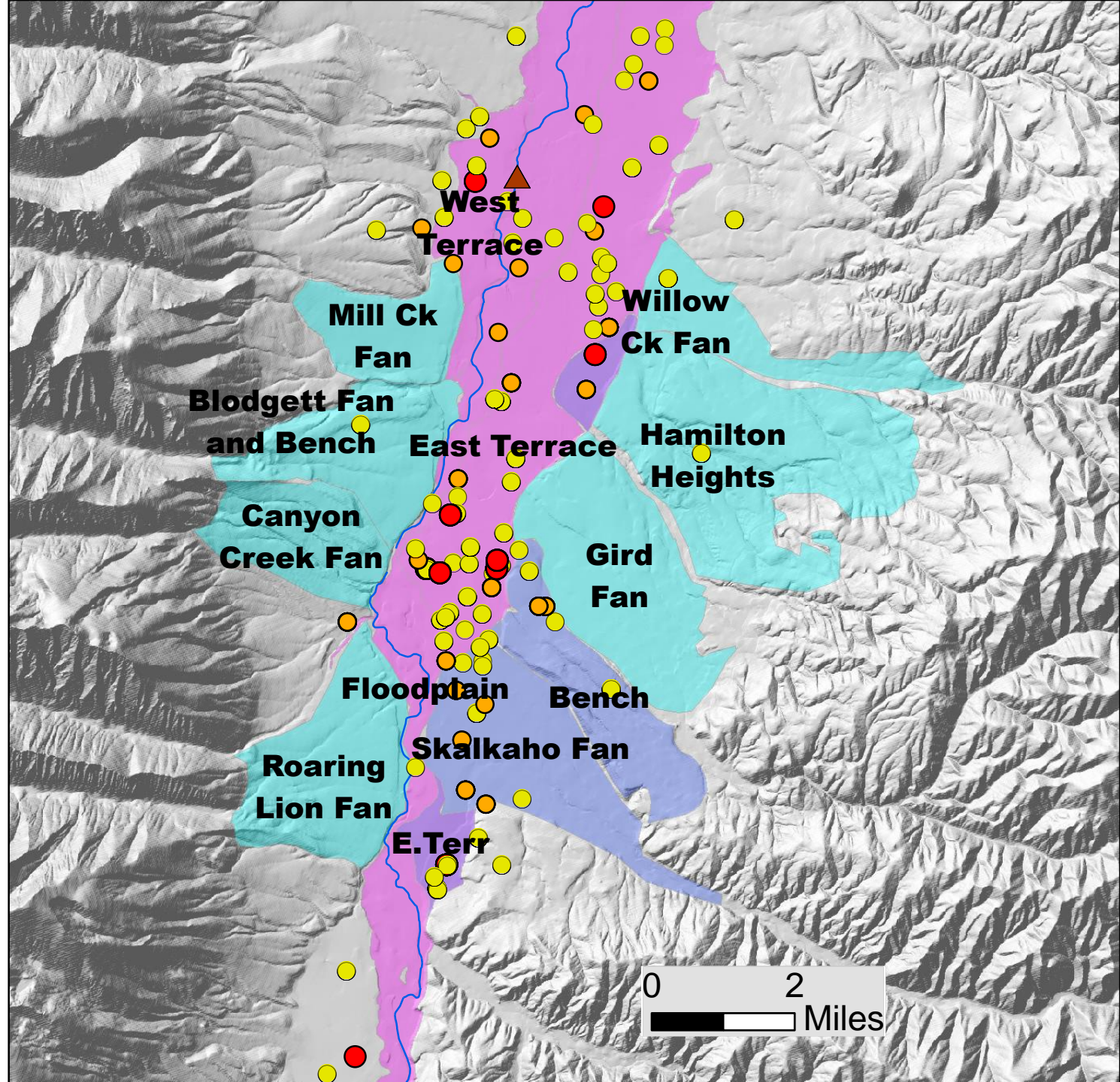
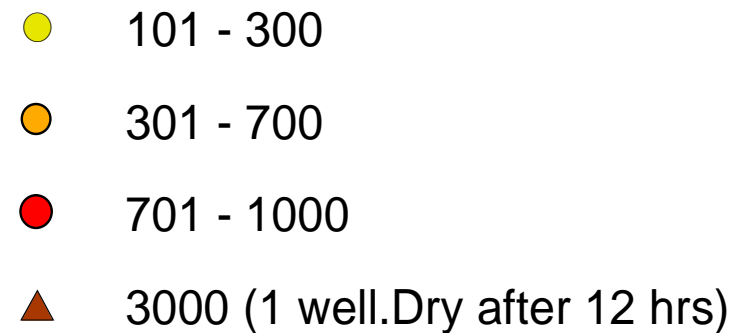
# Sedimentary regions

Average well yield, gpm



## Hamilton Yield

reported well yield, gals per min





# Average Total depth, feet

## Sedimentary regions

Td, feet

