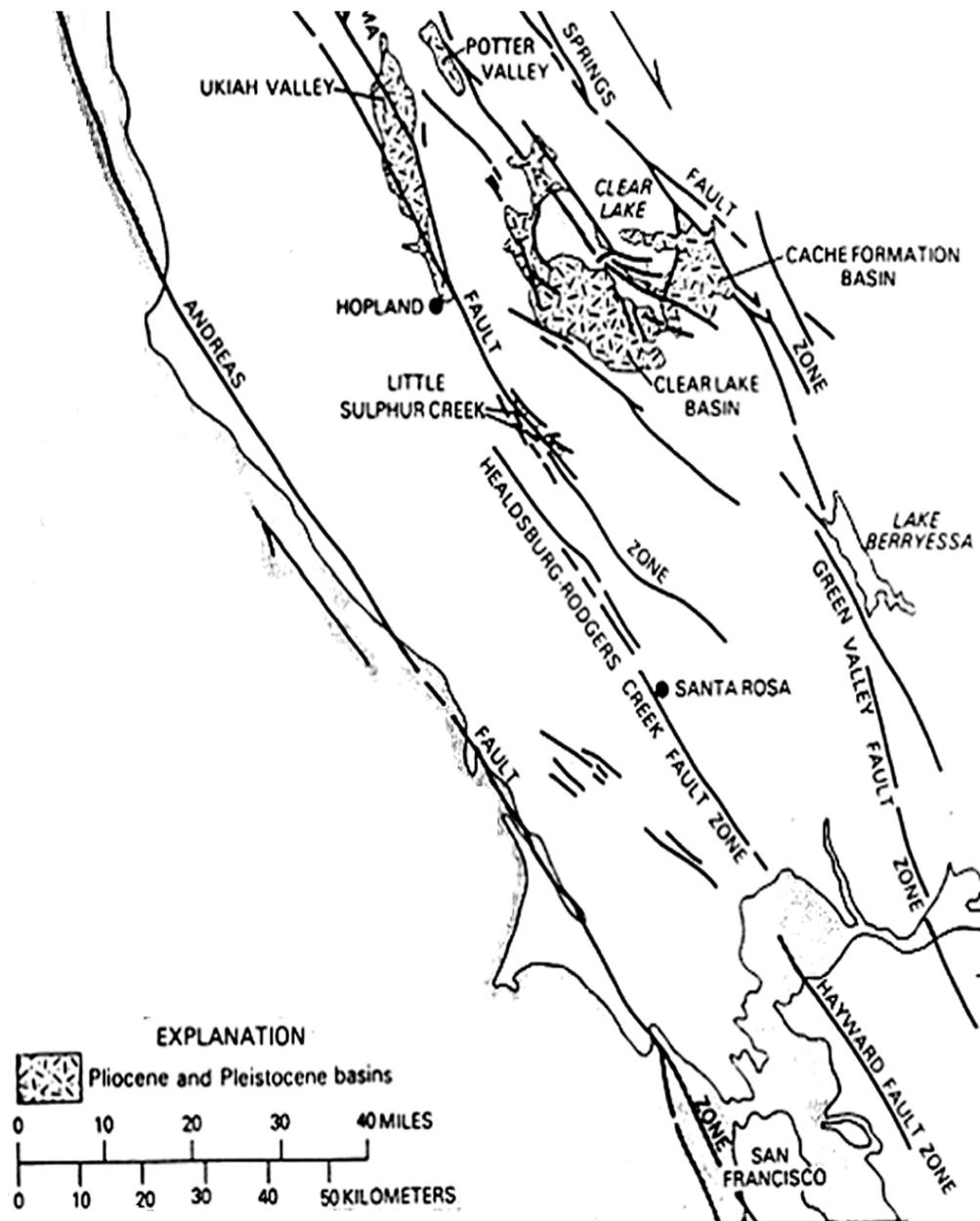
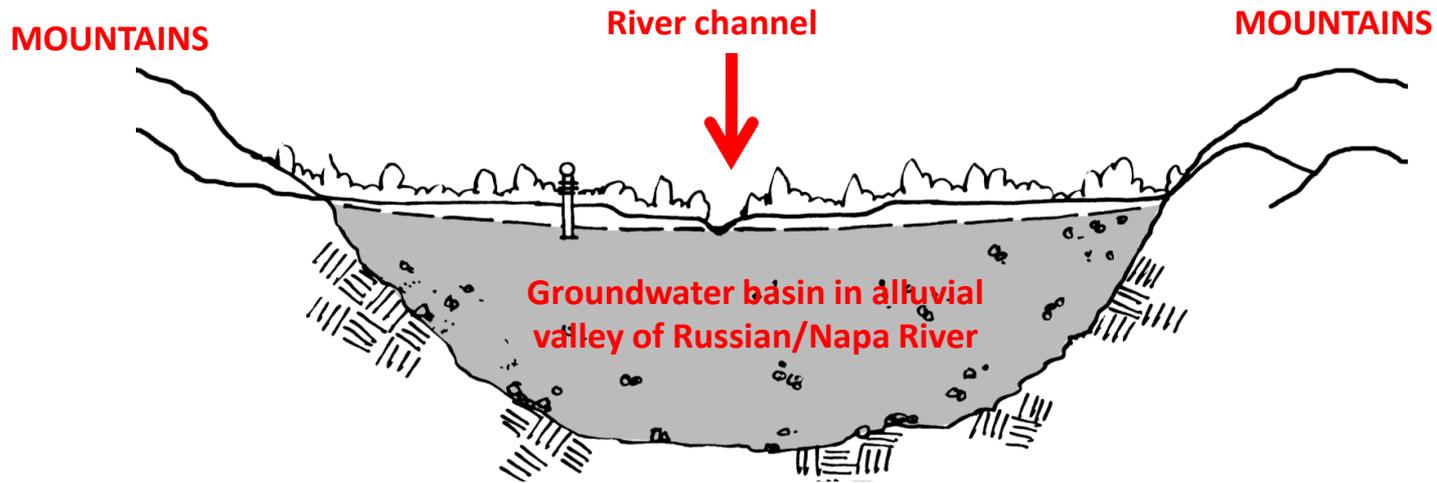


Laurel Marcus
Executive Director
California Land Stewardship Institute

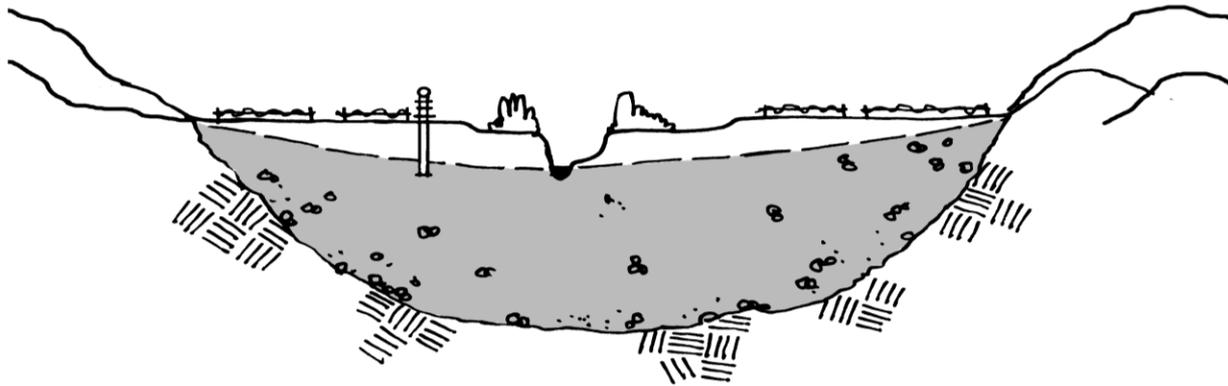
Intermittent Alluvial Fan Channels in
the California Wine Country



RIVER CHANNEL AND GROUNDWATER BASIN PRIOR TO ENTRENCHMENT



RIVER CHANNEL AND GROUNDWATER BASIN AFTER ENTRENCHMENT



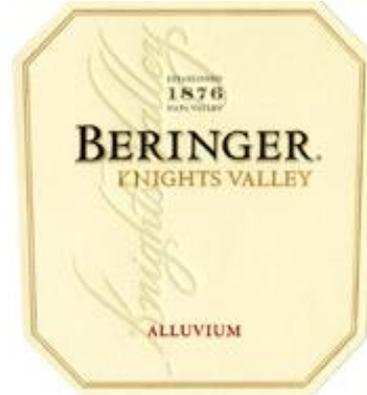
Both the Napa River and Russian River channels have entrenched into their alluvial floodplains



The Napa and Russian River watersheds support steelhead trout and several species of salmon



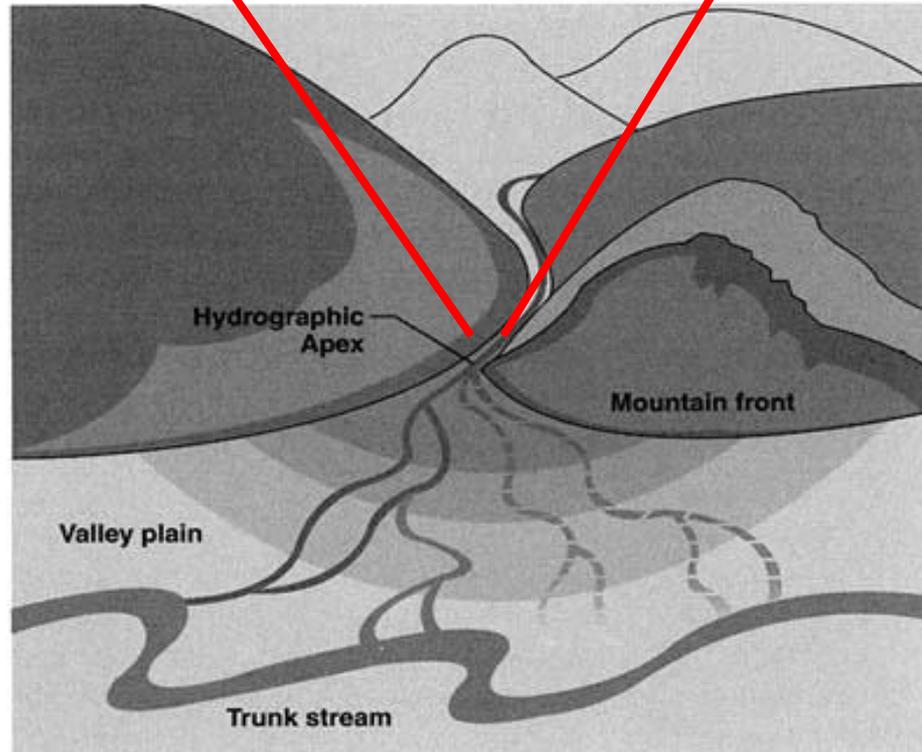
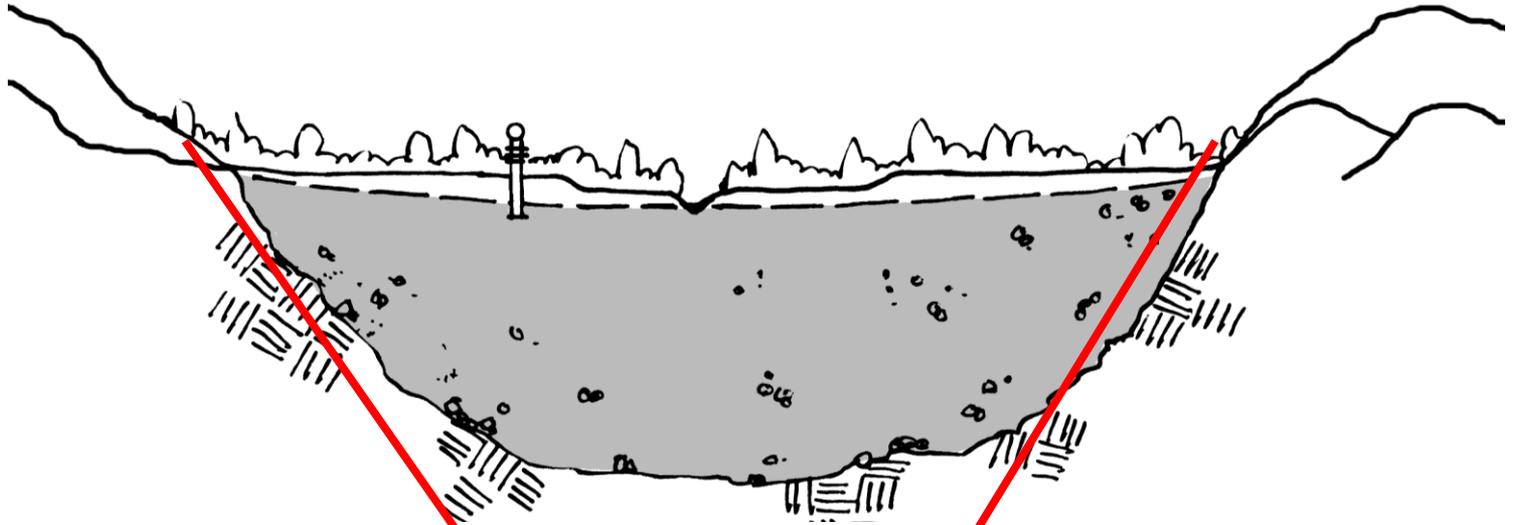
Both watersheds support high quality winegrapes and numerous wineries

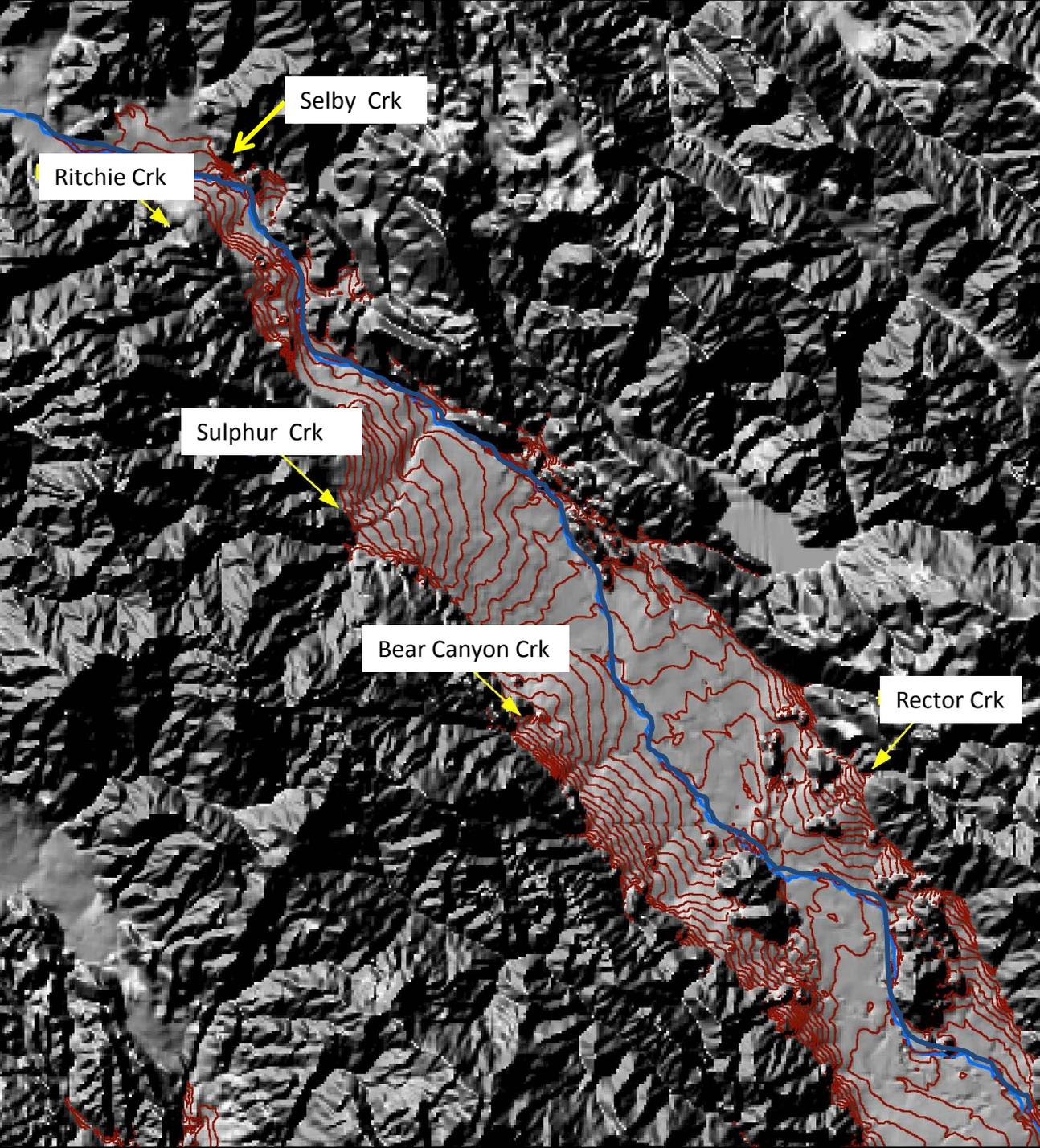




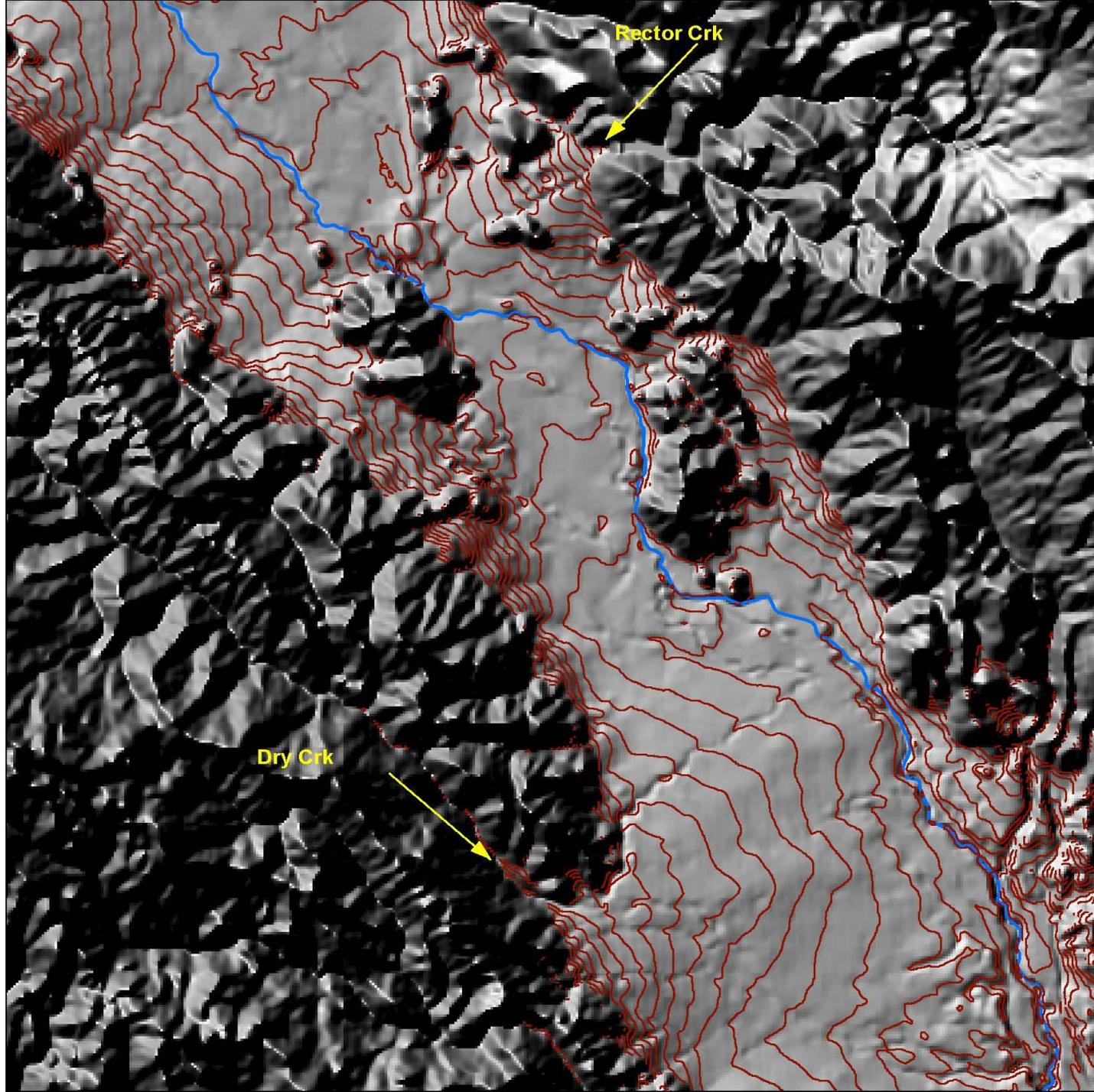
Napa Valley







Alluvial fans in
middle and upper
Napa Valley.
Location of Napa
River marked in blue



Rector Crk

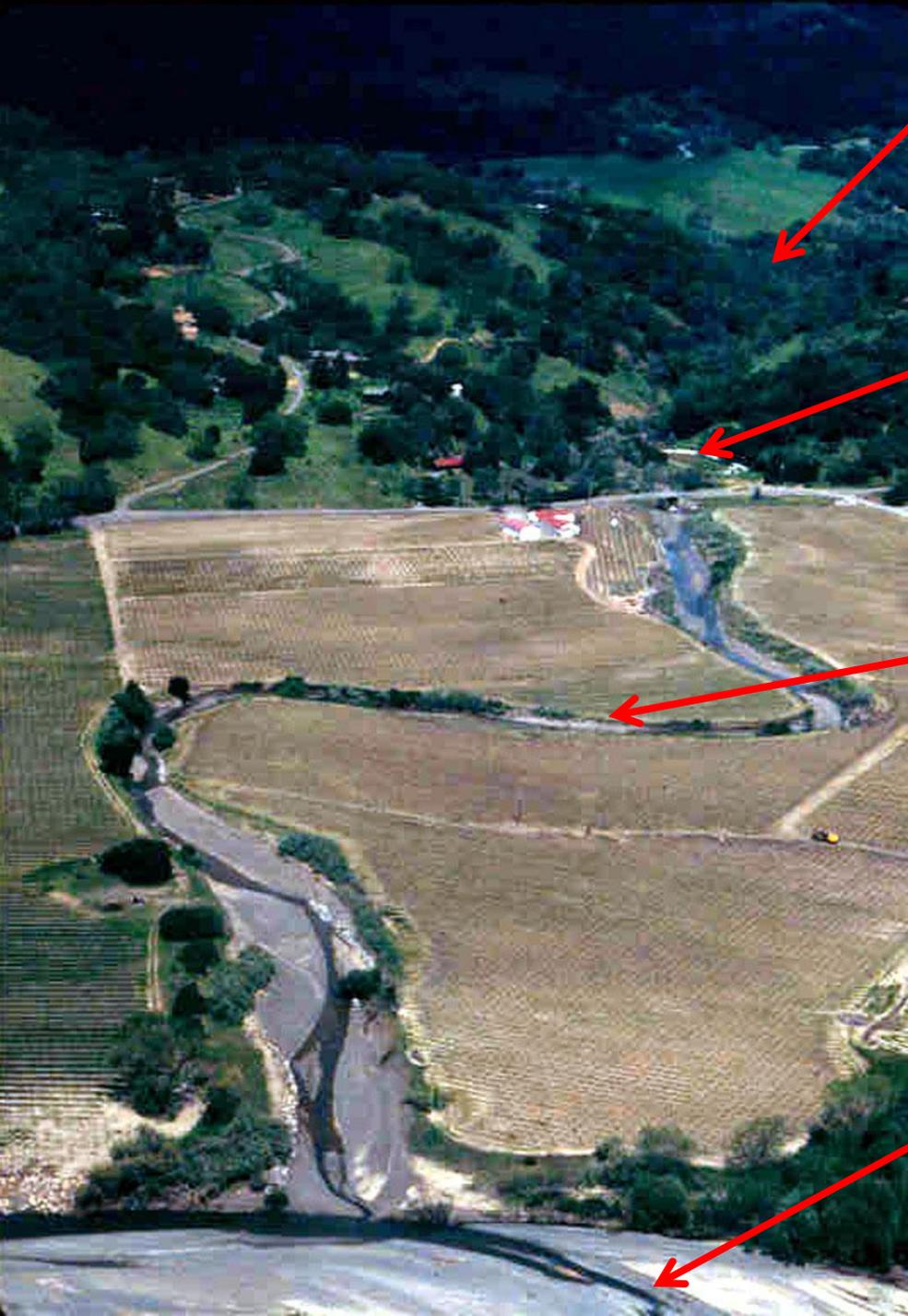
Dry Crk

Rector Creek Alluvial Fan









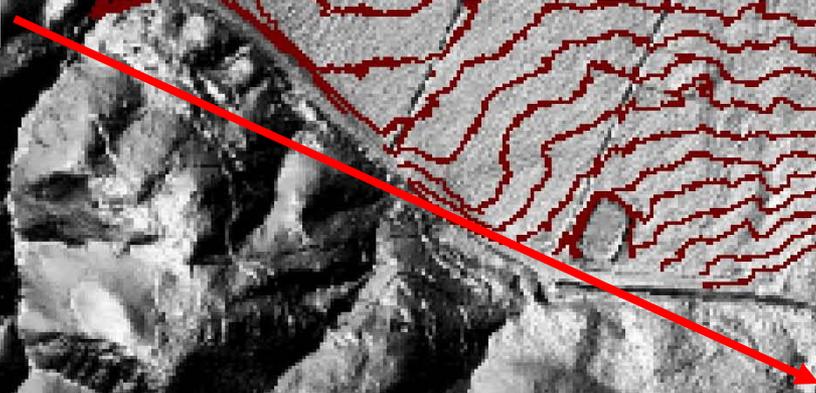
**Creek channel
in bedrock
canyon**

**Head of Alluvial
fan**

**Alluvial creek
channel**

**River channel in
alluvial valley**

Ritchie Creek



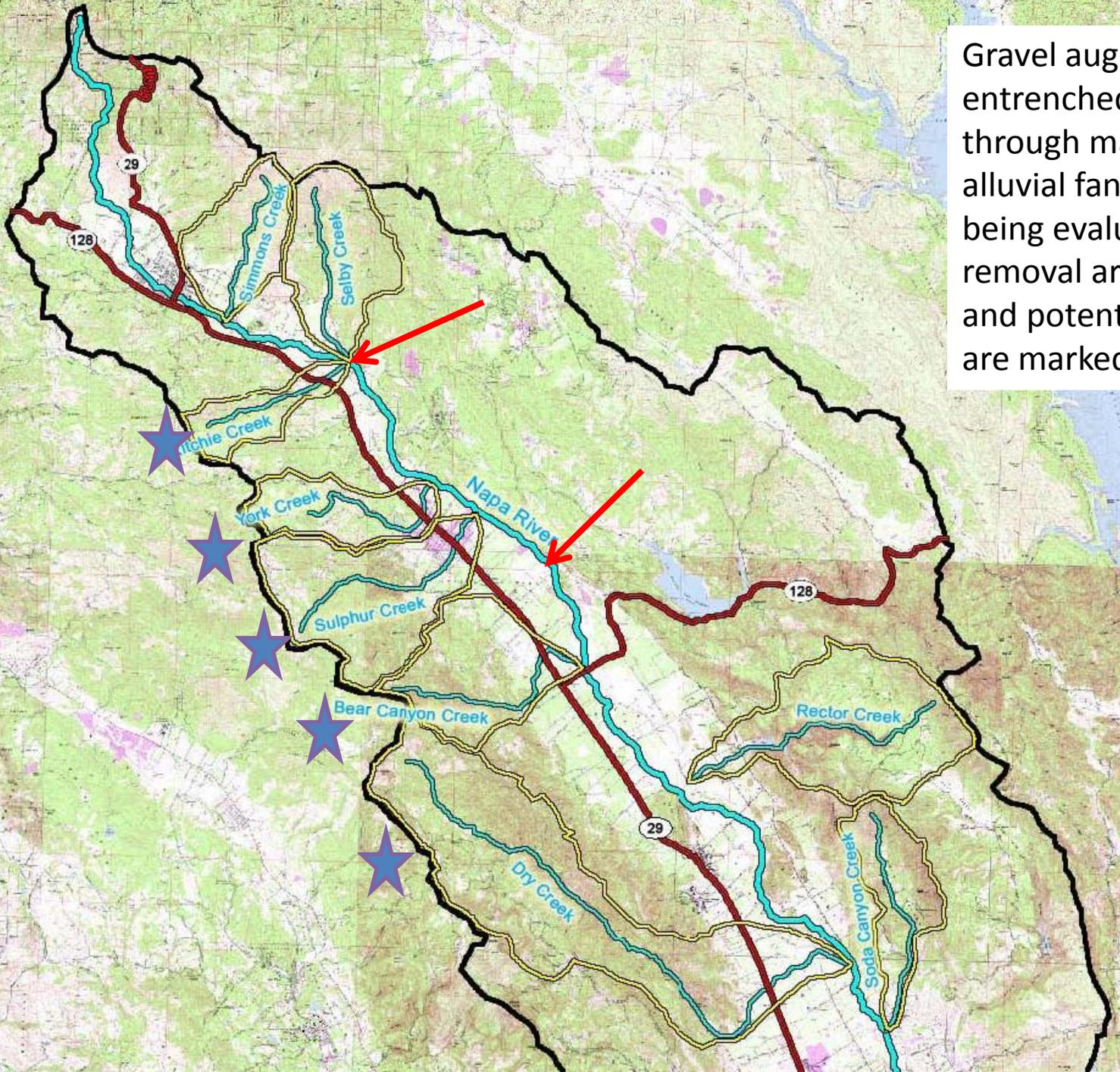








Gravel augmentation for entrenched Napa River through management of alluvial fan channels. Channels being evaluated for gravel removal are marked with stars and potential injection sites are marked with arrows

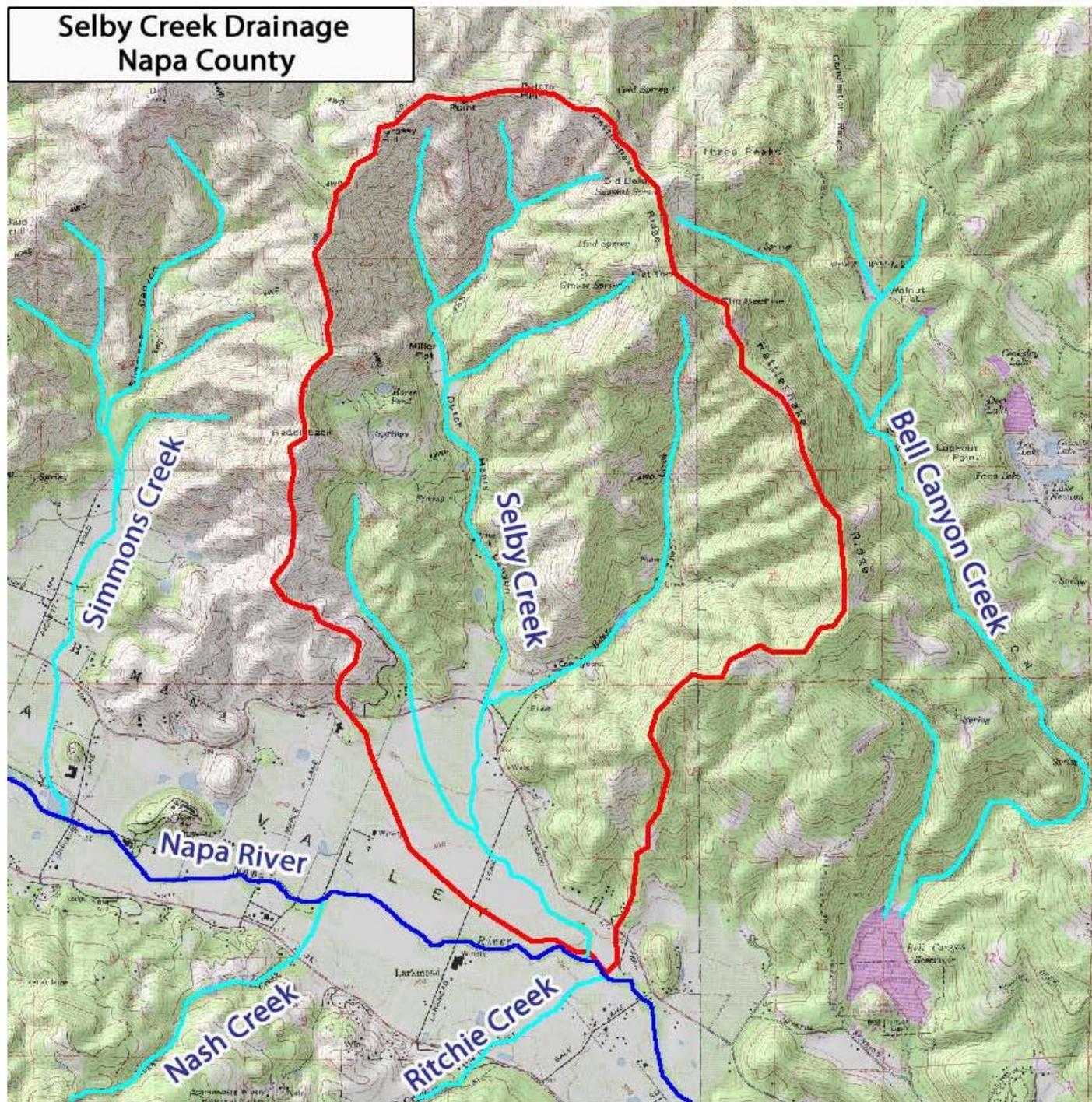






Napa River channel has incised 12-15 ft. and has very little gravel in some reaches

Selby Creek Drainage Napa County

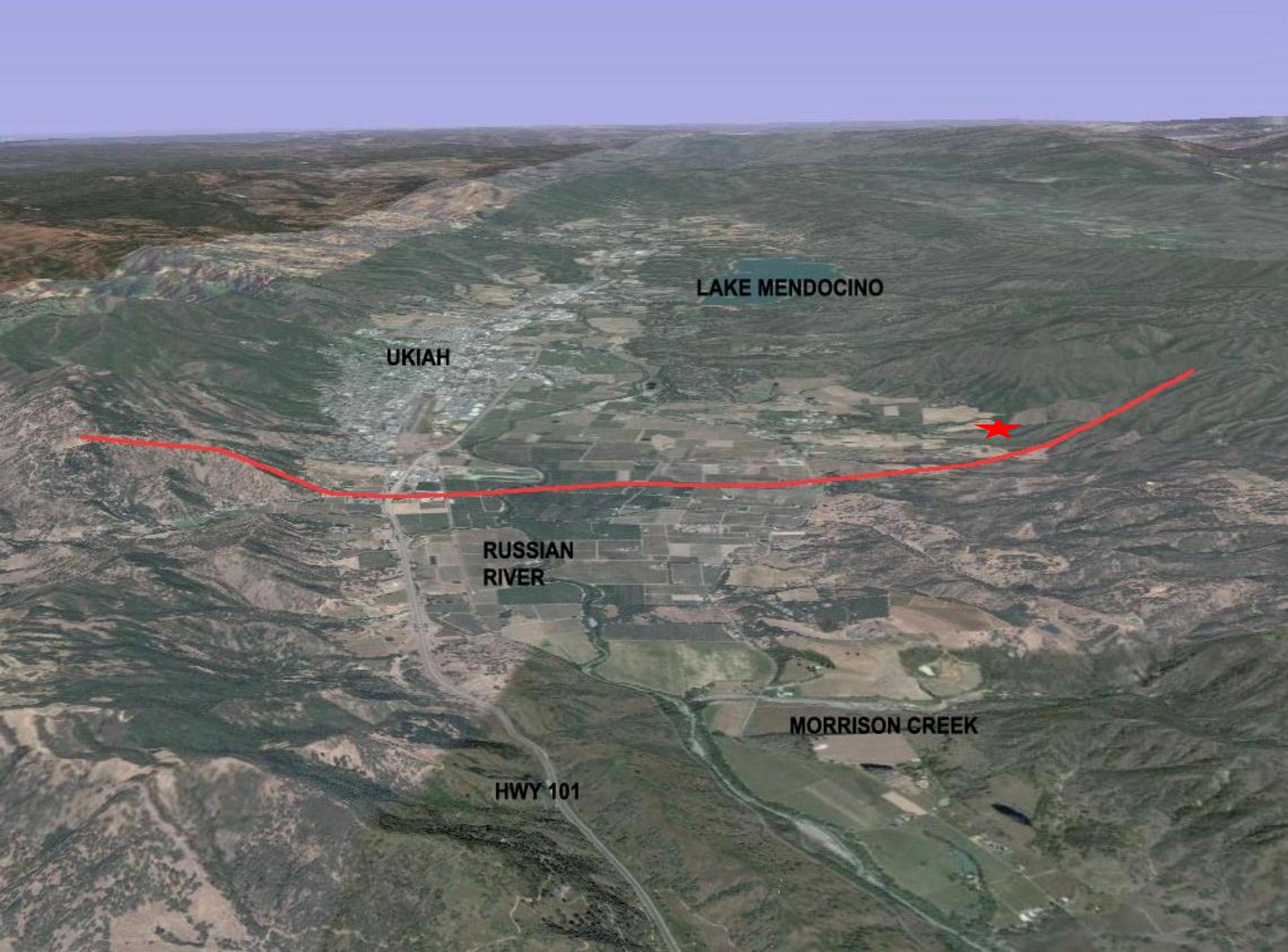












LAKE MENDOCINO

UKIAH

**RUSSIAN
RIVER**

MORRISON CREEK

HWY 101



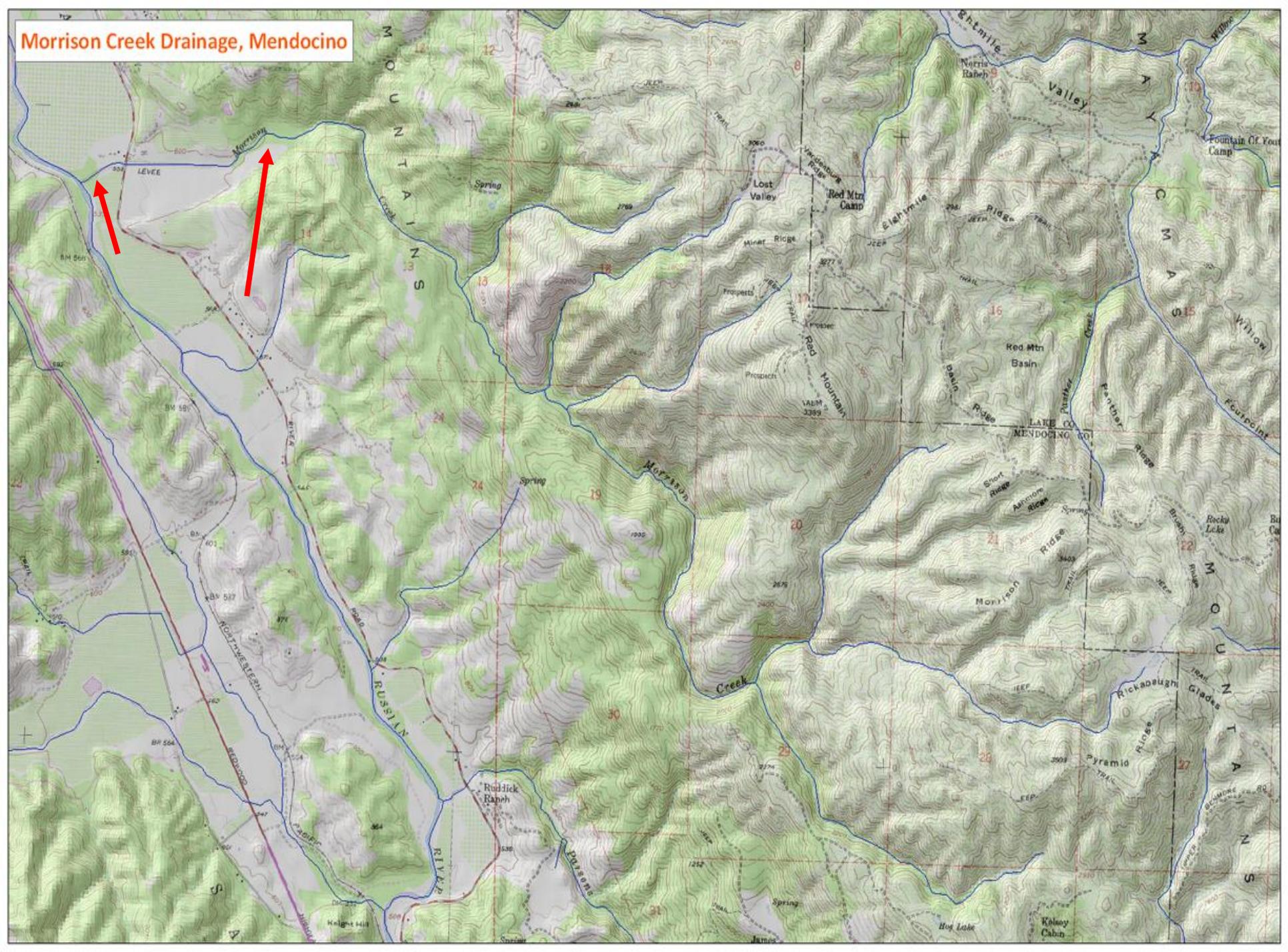


RUSSIAN RIVER
WATERSHED AND
TRIBUTARIES



MORRISON CREEK

Morrison Creek Drainage, Mendocino







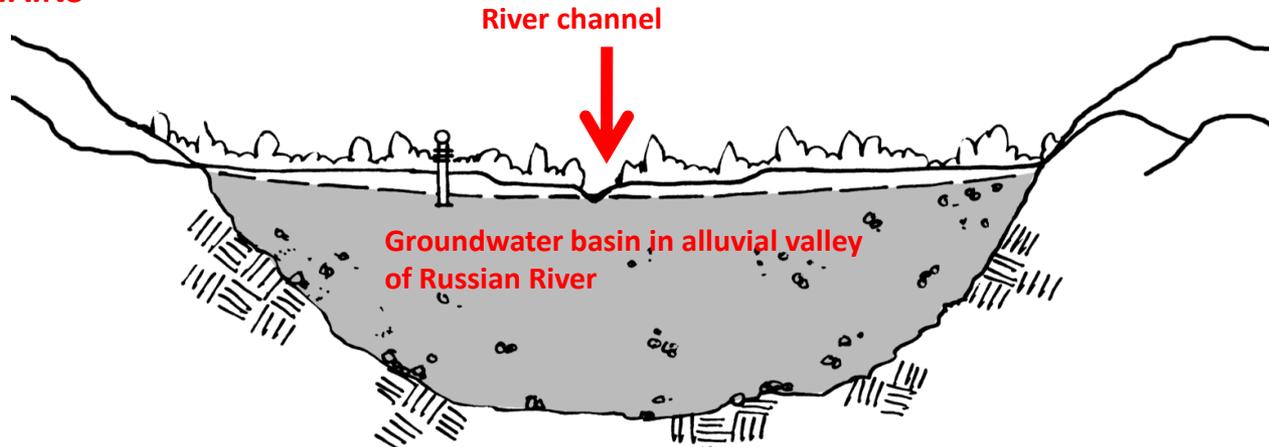




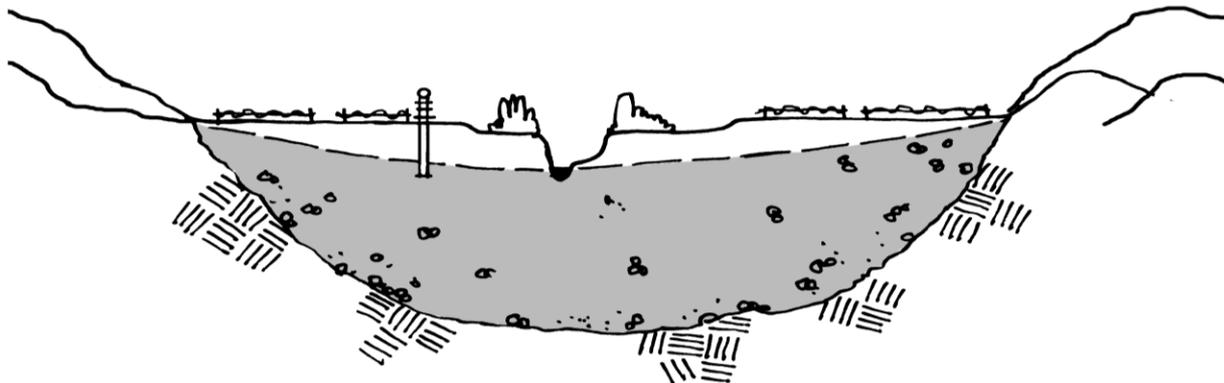
RIVER CHANNEL AND GROUNDWATER BASIN PRIOR TO ENTRENCHMENT

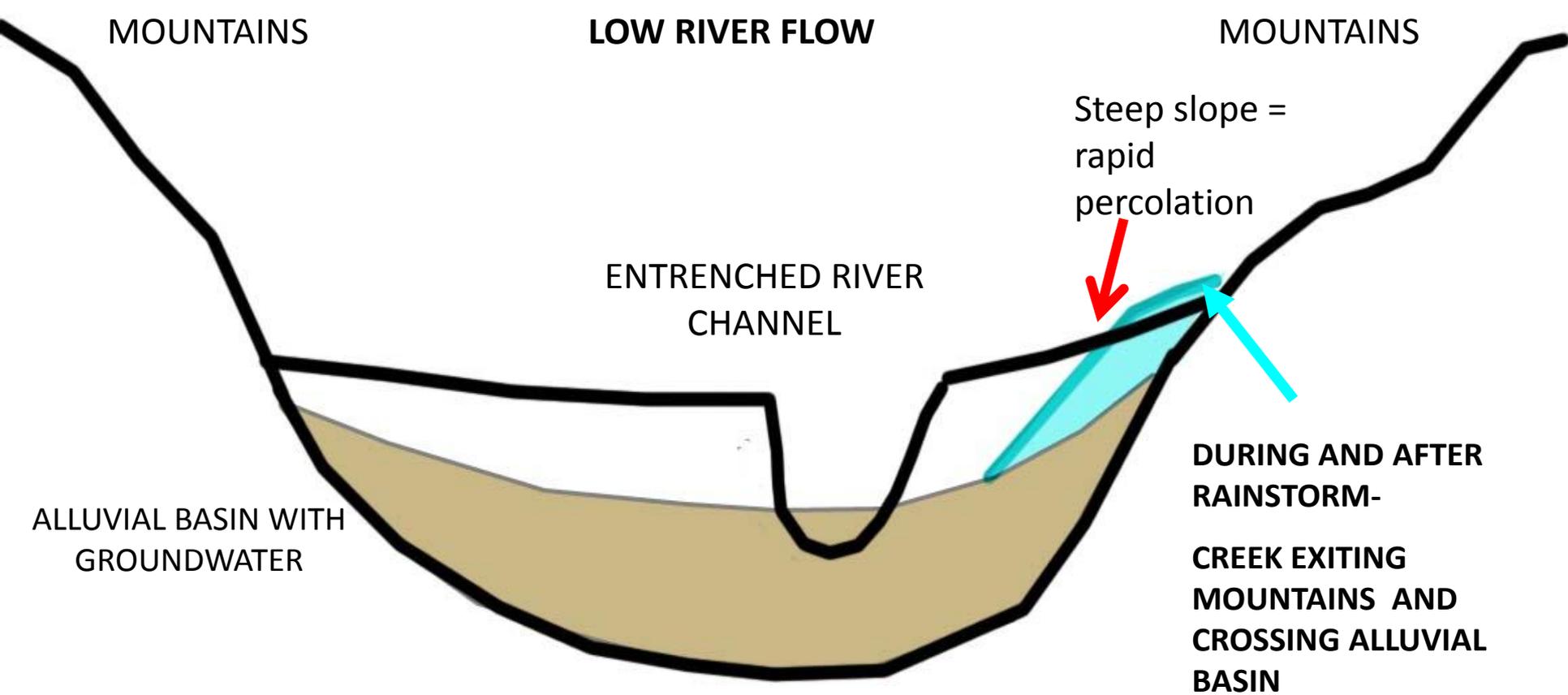
MOUNTAINS

MOUNTAINS



RIVER CHANNEL AND GROUNDWATER BASIN AFTER ENTRENCHMENT – SIGNIFICANT SYSTEM-WIDE CHANGE





At low flow in the river channel water exiting the creek canyon onto the alluvial valley will percolate into the alluvium until the alluvium is filled with water and the river rises. The slope of the ground water basin between the creek outlet and the river level determines how quickly the water percolates





2002

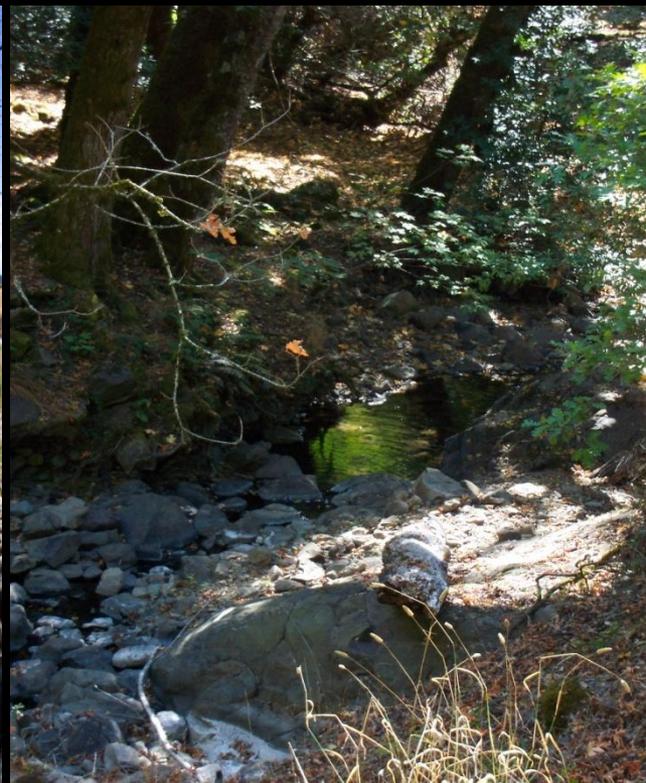
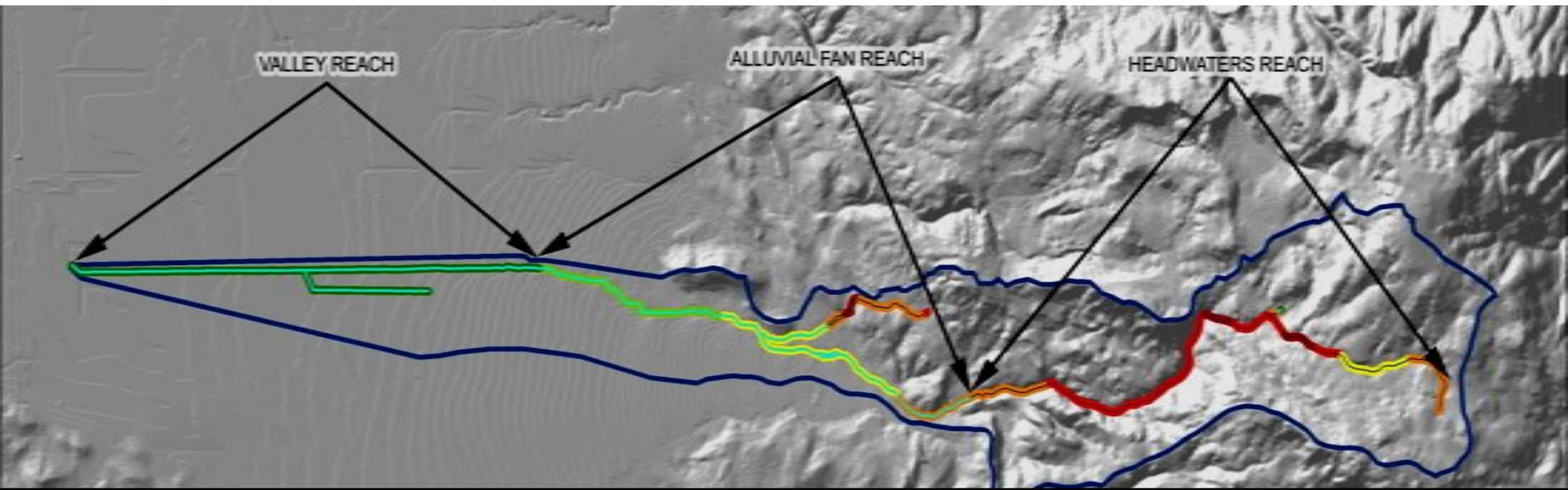


2008

Two year old white alder colonized bank edge. Numerous alders have colonized the bank edge and grown much quicker than the planted willows.

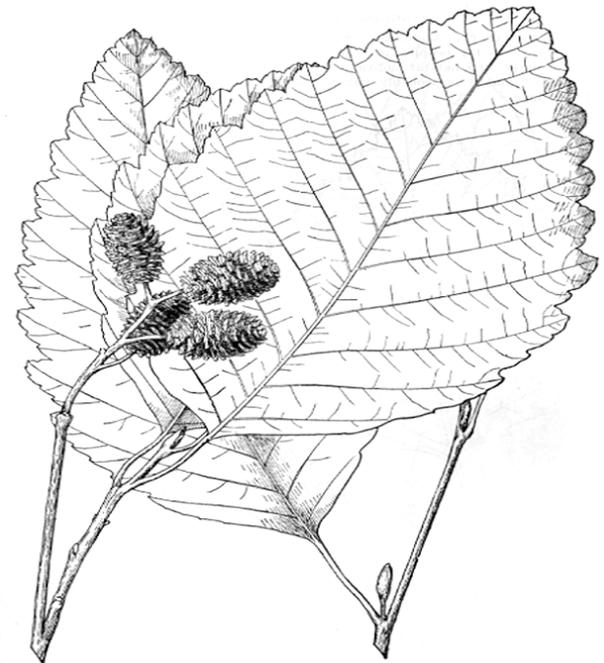








WHITE ALDER



© 2002 by the author

















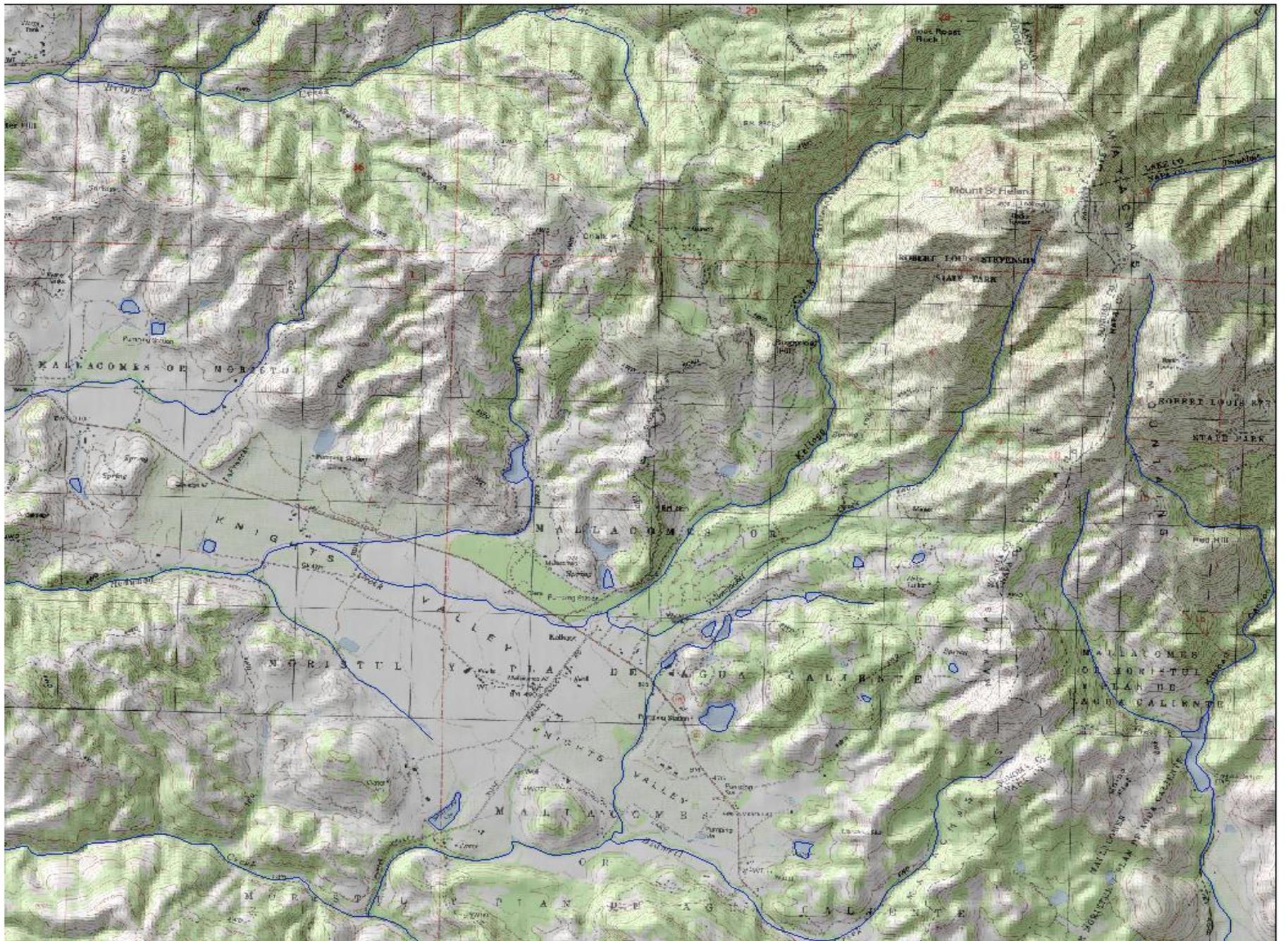




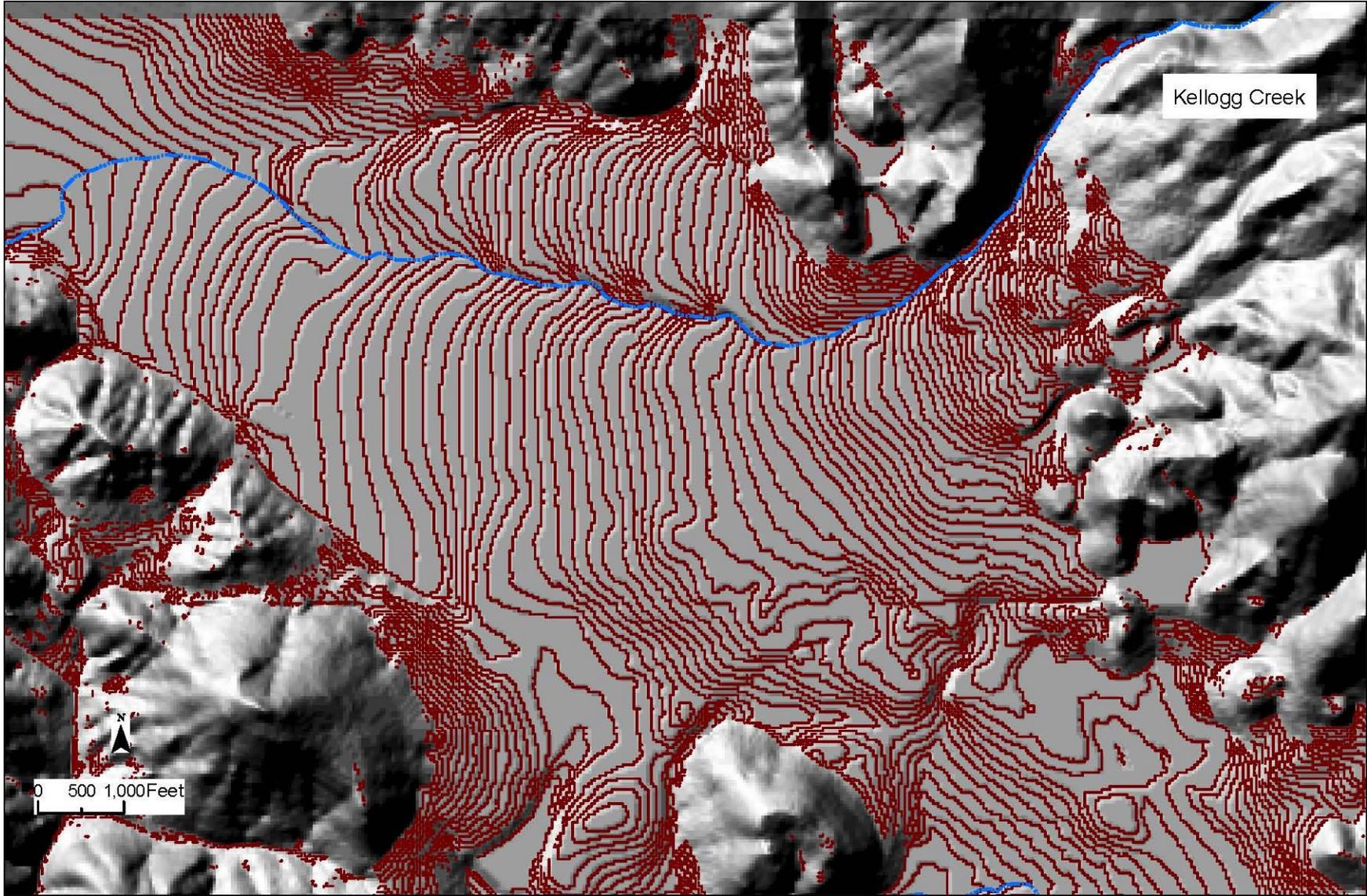










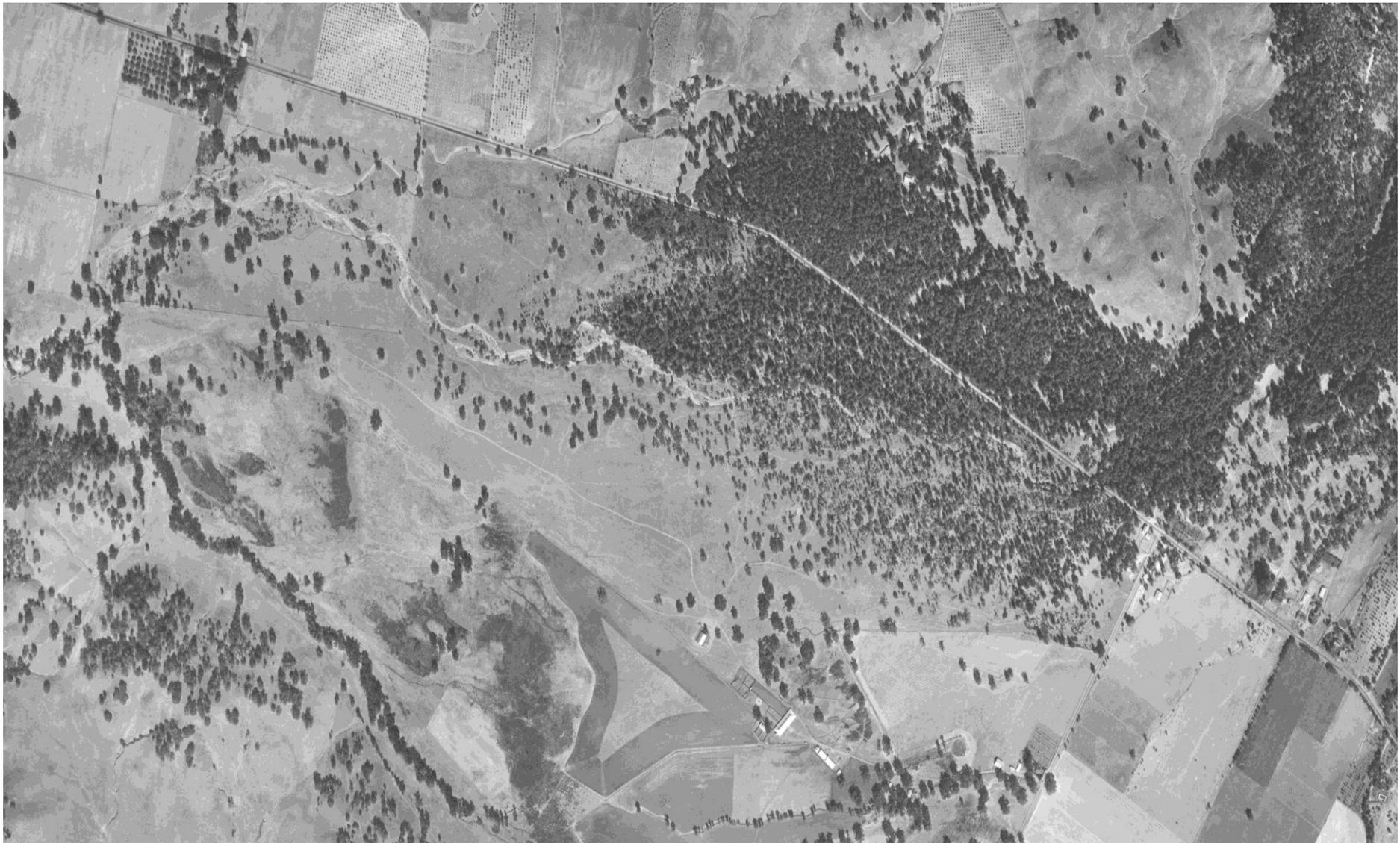


Kellogg Creek

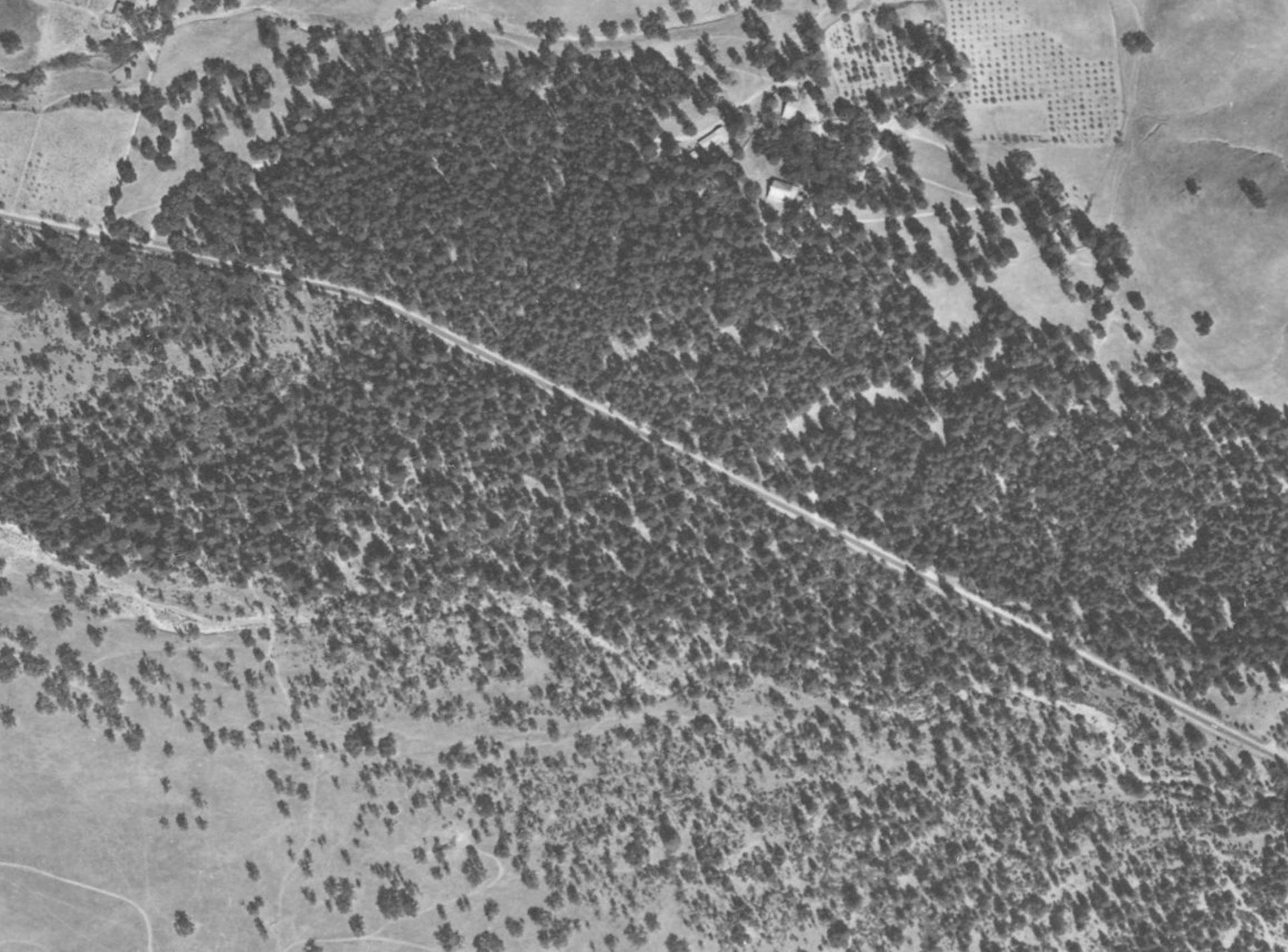
0 500 1,000 Feet



1947



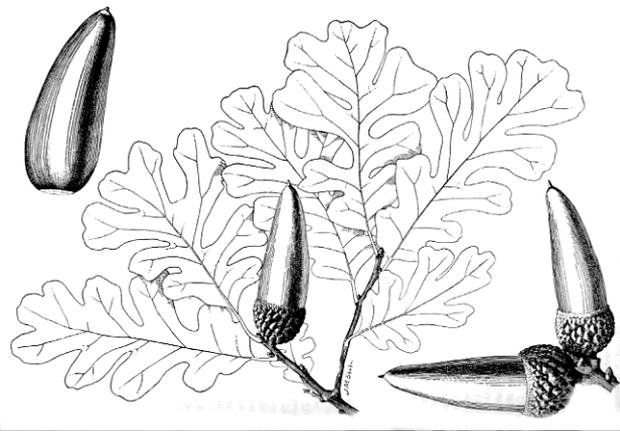
REDWOOD CREEK FAN /KNIGHTS VALLEY 1947





Knobcone pine (*Pinus attenuata*)





Valley Oak



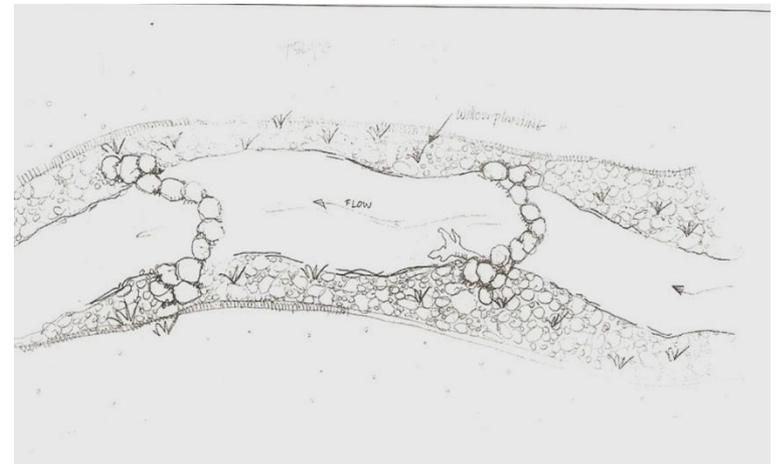
1947



2000





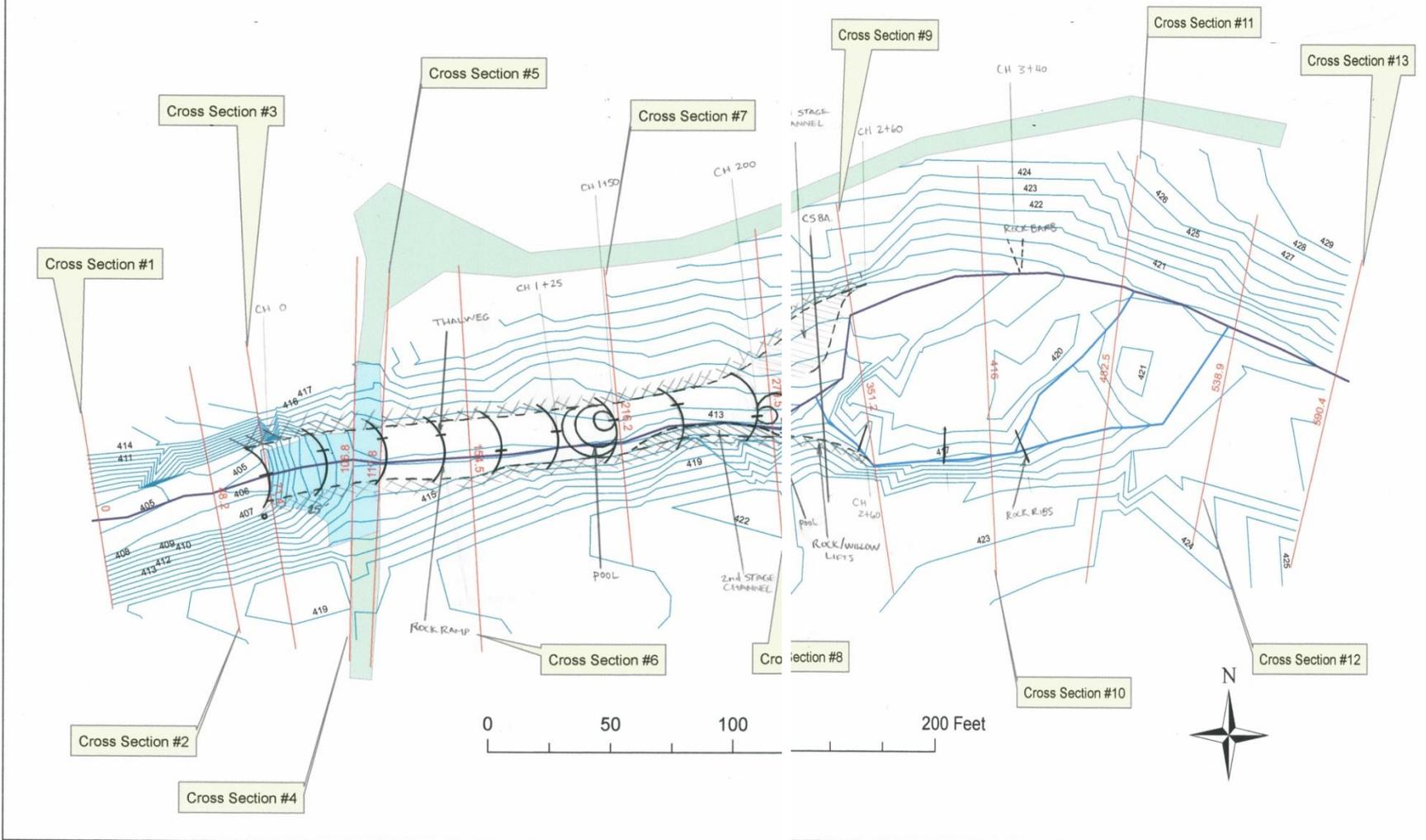


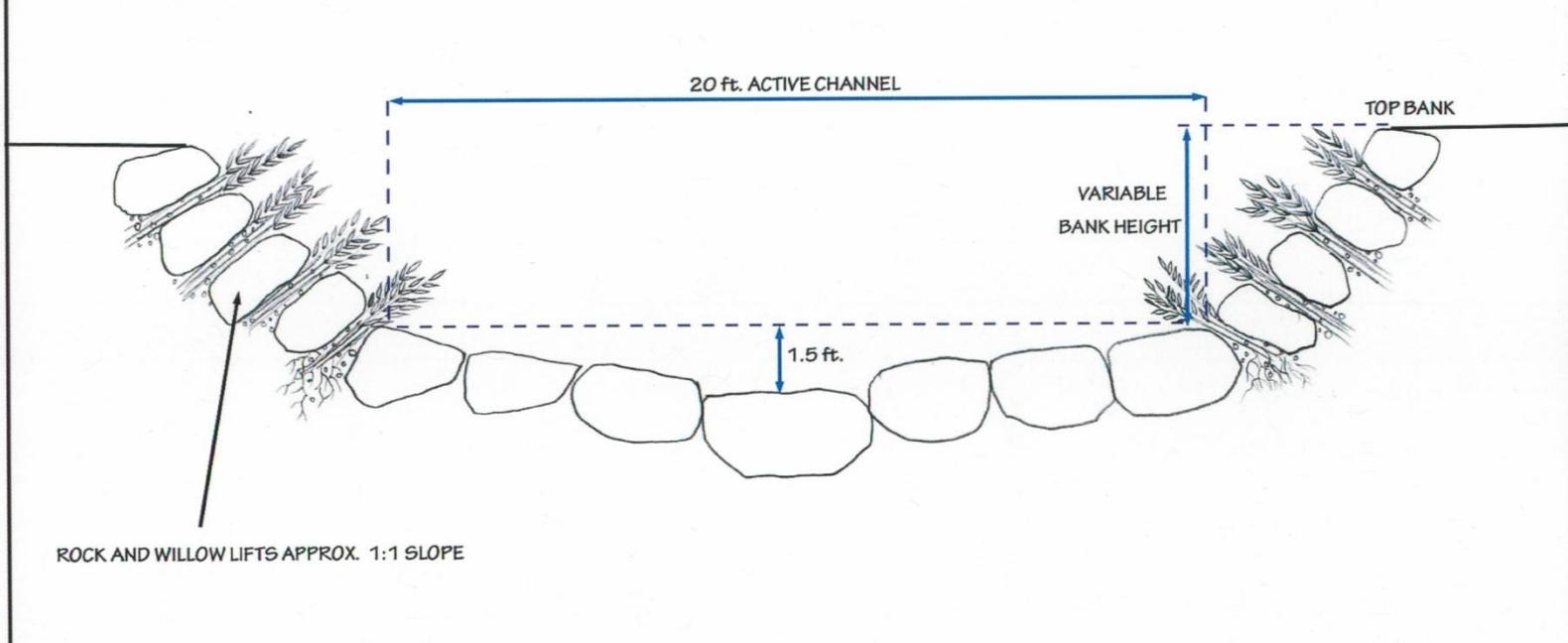






Redwood Creek Stream Crossing Removal





Design is expected to create self-maintaining channel, although it is not clear how it differs from the previous design

Design is expected to create a riparian corridor and use willows to stabilize banks

The part of this project to be completed by CLSI will be monitoring and analysis of this and 5 alluvial fan channels and development of improved protocols for agency staff to recognize these channels and recommendations for restoration practices

SUMMARY

Alluvial fans serve as fish migration corridors and in low water or changed conditions may not support adequate periods of connected flow

Restoration projects need to recognize the functions of alluvial fans in salmonid migration and the intermittent nature of stream flow

Revegetation of alluvial fans needs additional monitoring and experimentation and needs to reflect the non-riparian nature of these areas

Alluvial fans are great for vineyards and orchards due to their good drainage