

West Coast watersheds... ...and the streams they create

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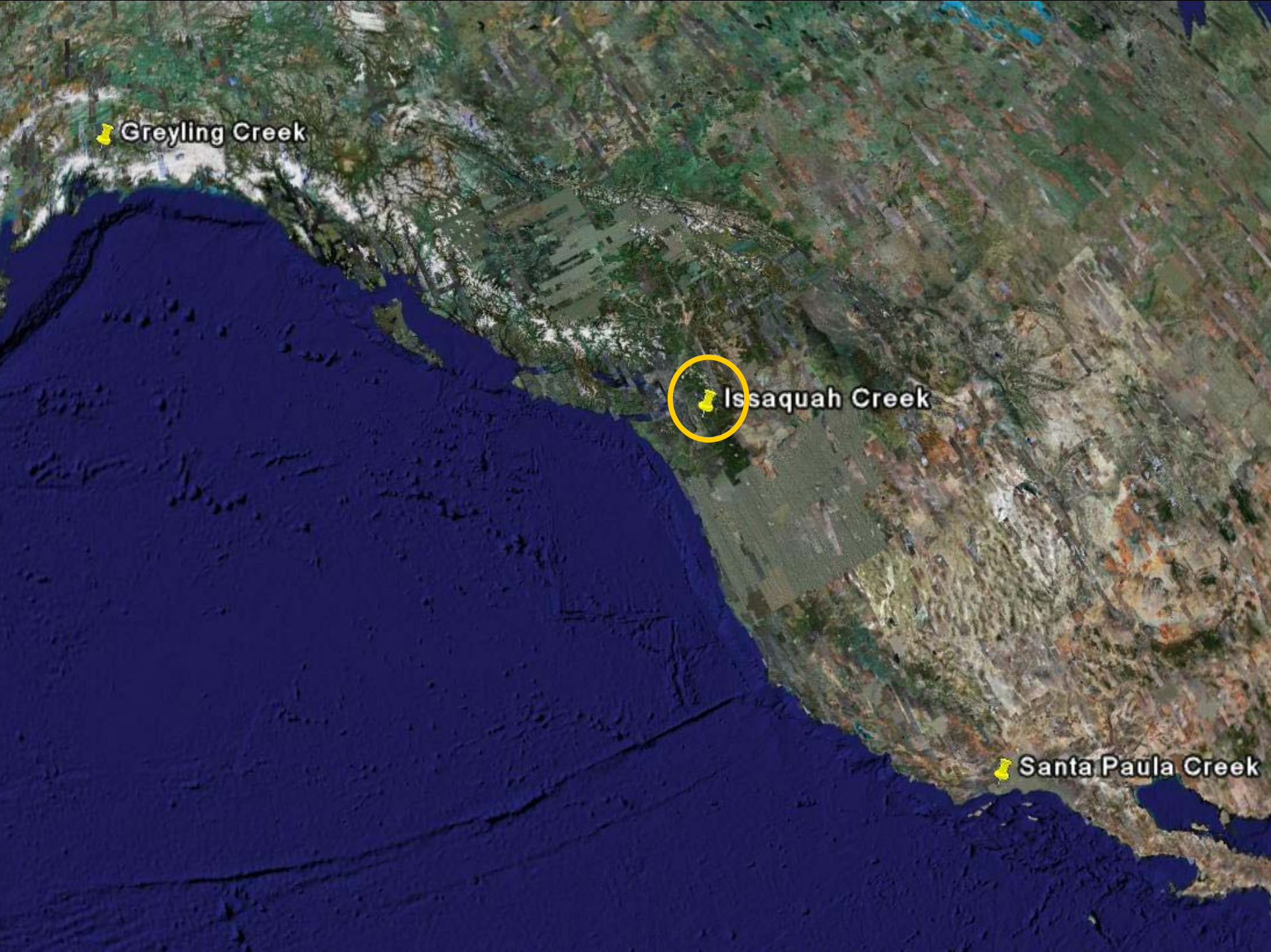
Water Center Annual Review
February 14, 2008

What's my point?

- Streams are different, because their watersheds are different. They may or may not look the same; but more importantly, they may not *act* the same.
- Understanding or predicting stream behavior can't always be done by borrowing knowledge from somewhere else (because the watersheds that create these streams can be very different).
- Stream management can only be successful if it recognizes these differences—**context matters.**

**1. Streams are different
because their watersheds
are different.**

How?



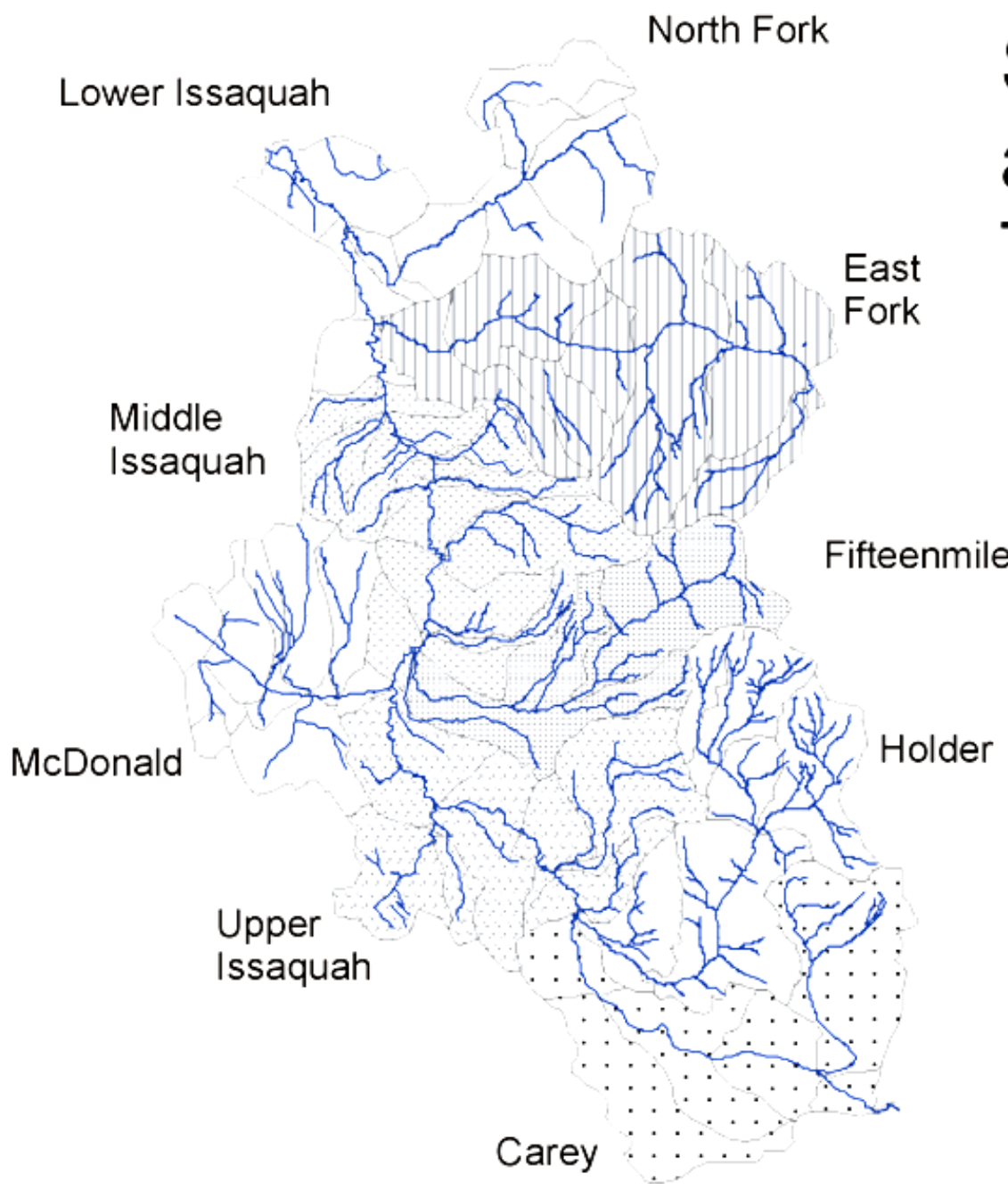
Greyling Creek

Issaquah Creek

Santa Paula Creek



Issaquah Creek
watershed

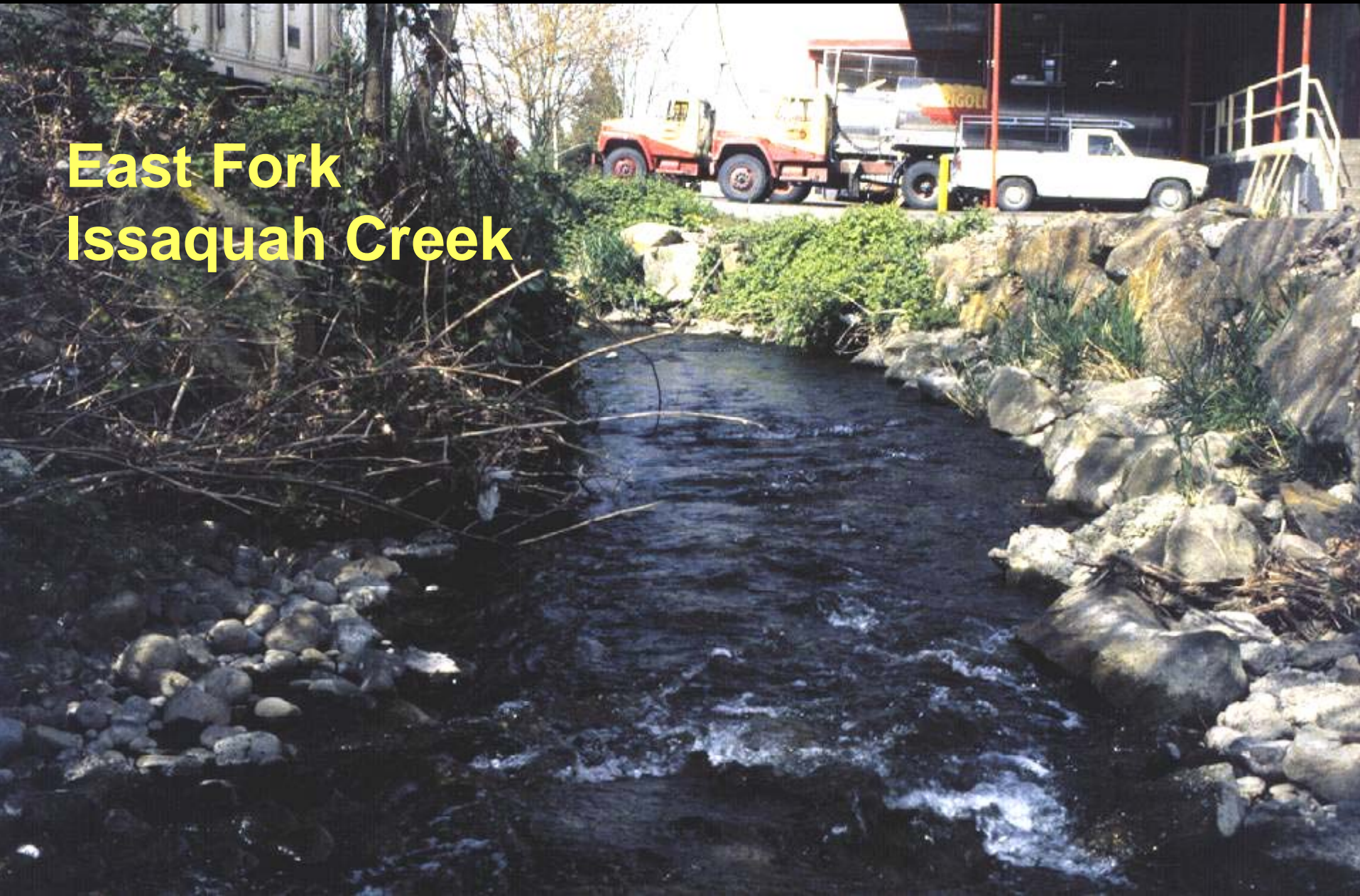


Sub-basins and Tributaries

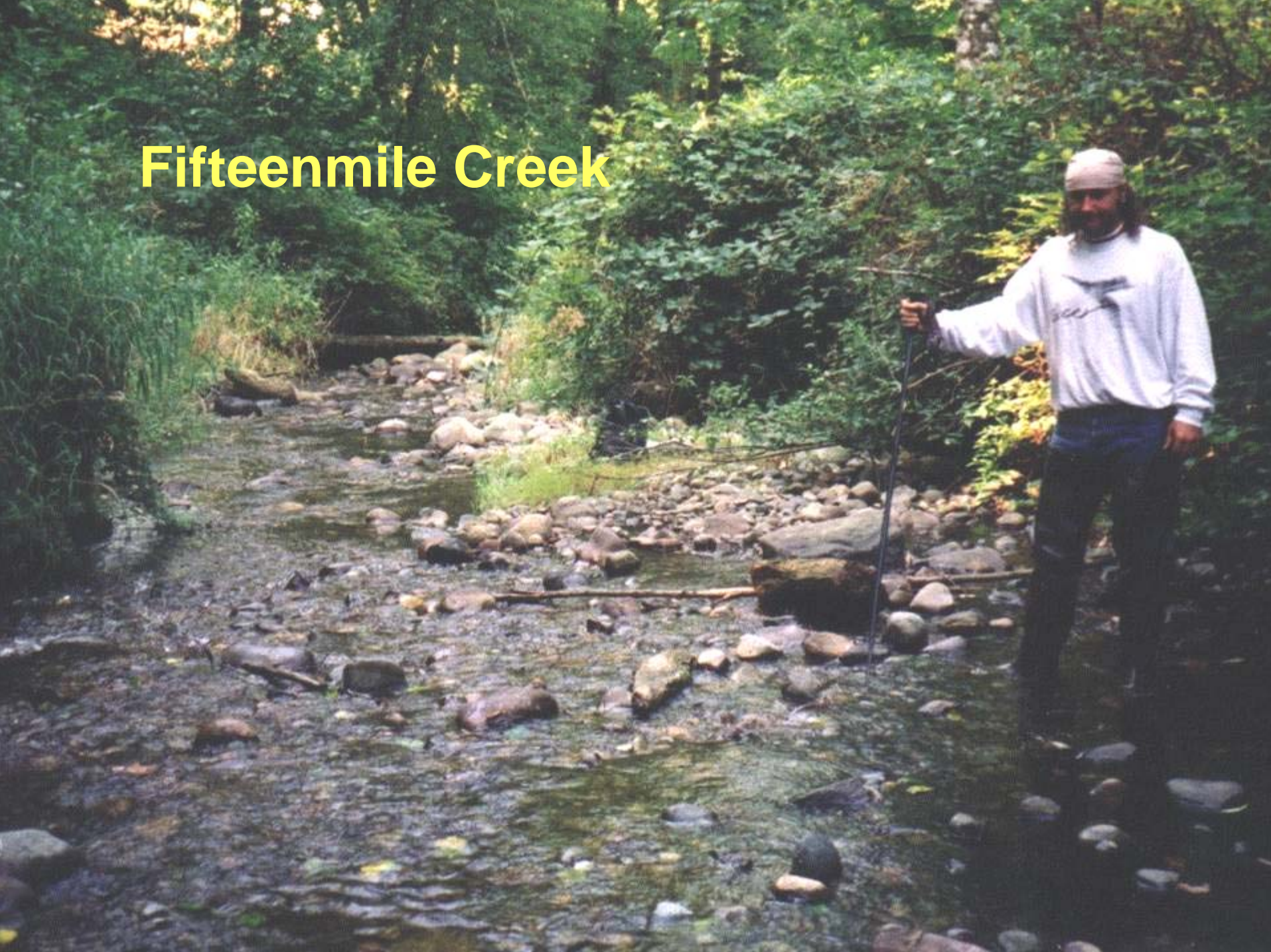
East Fork Issaquah Creek



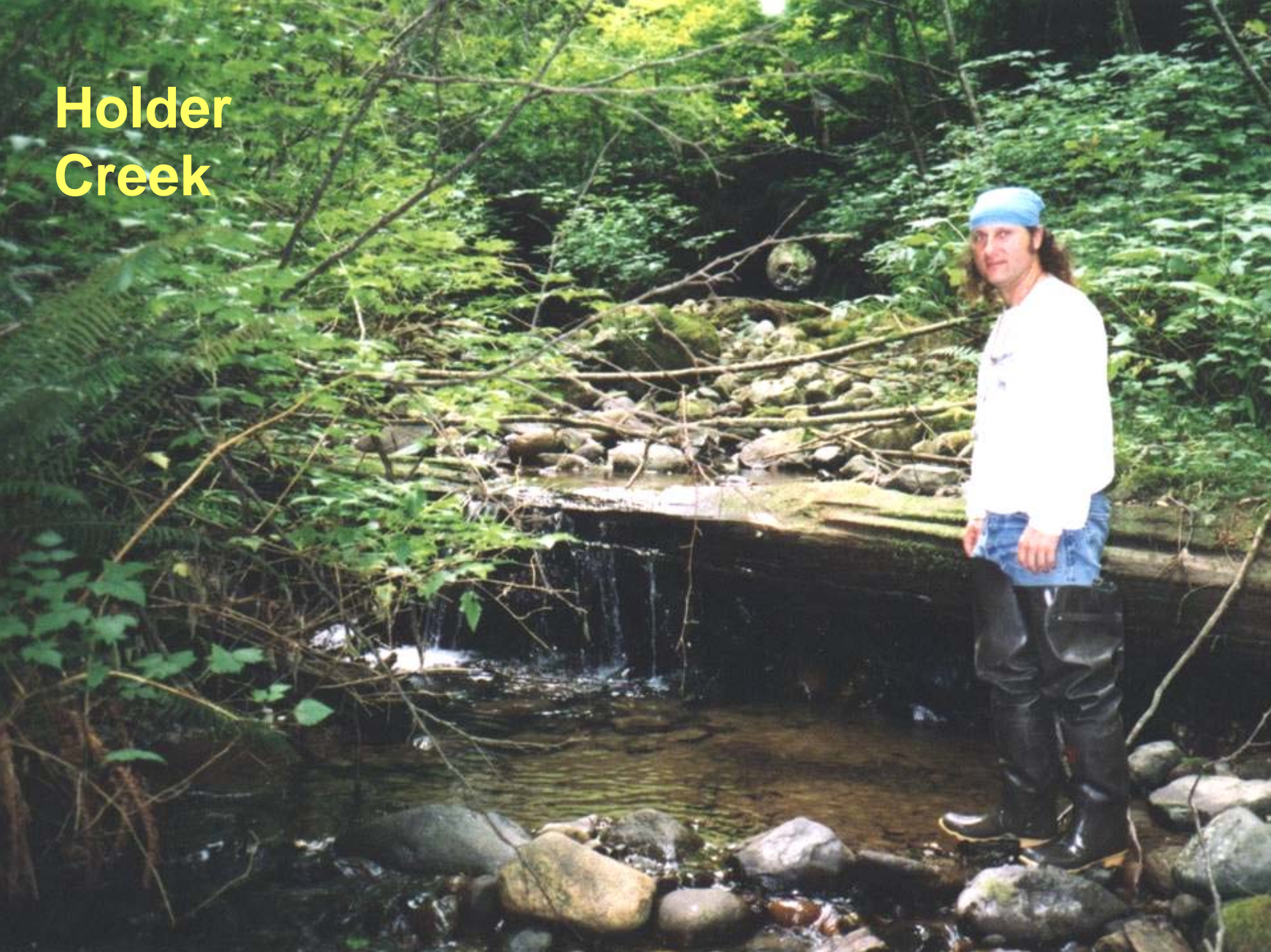
East Fork Issaquah Creek



Fifteenmile Creek



Holder Creek



Mainstem Issaquah Creek

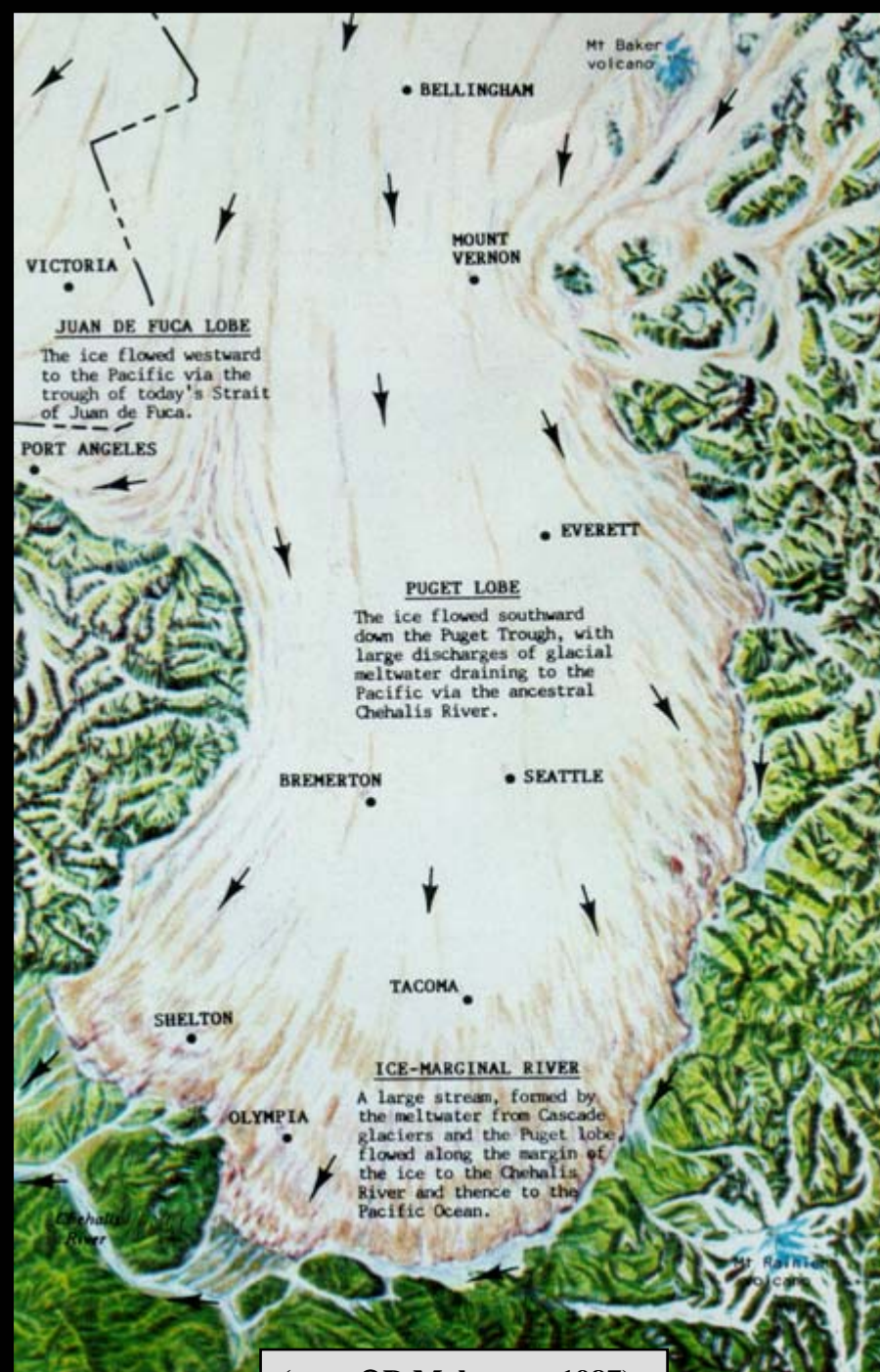




**Issaquah
Creek
delta**

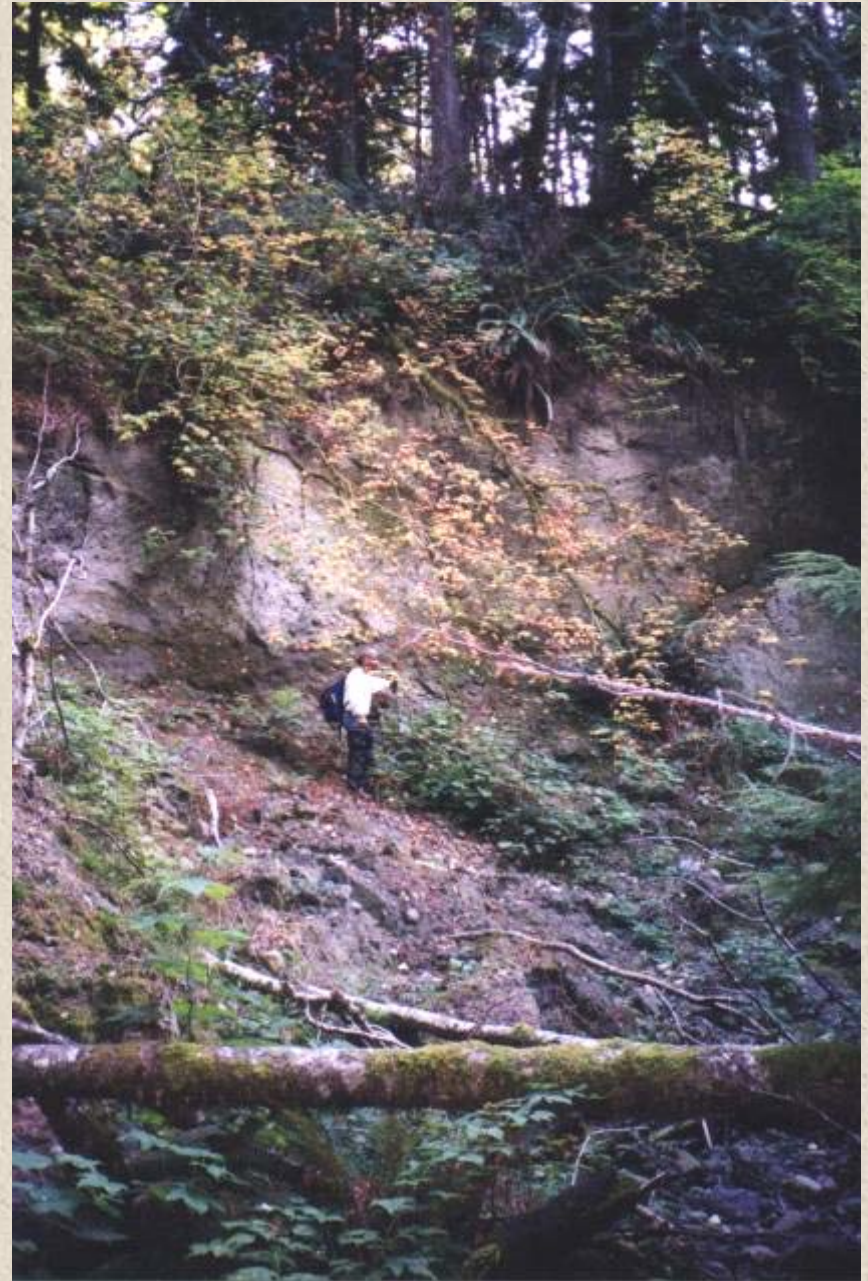
GEOLOGICAL CONTROLS:

20 mi



**SEDIMENT
DELIVERY
PROCESSES:**

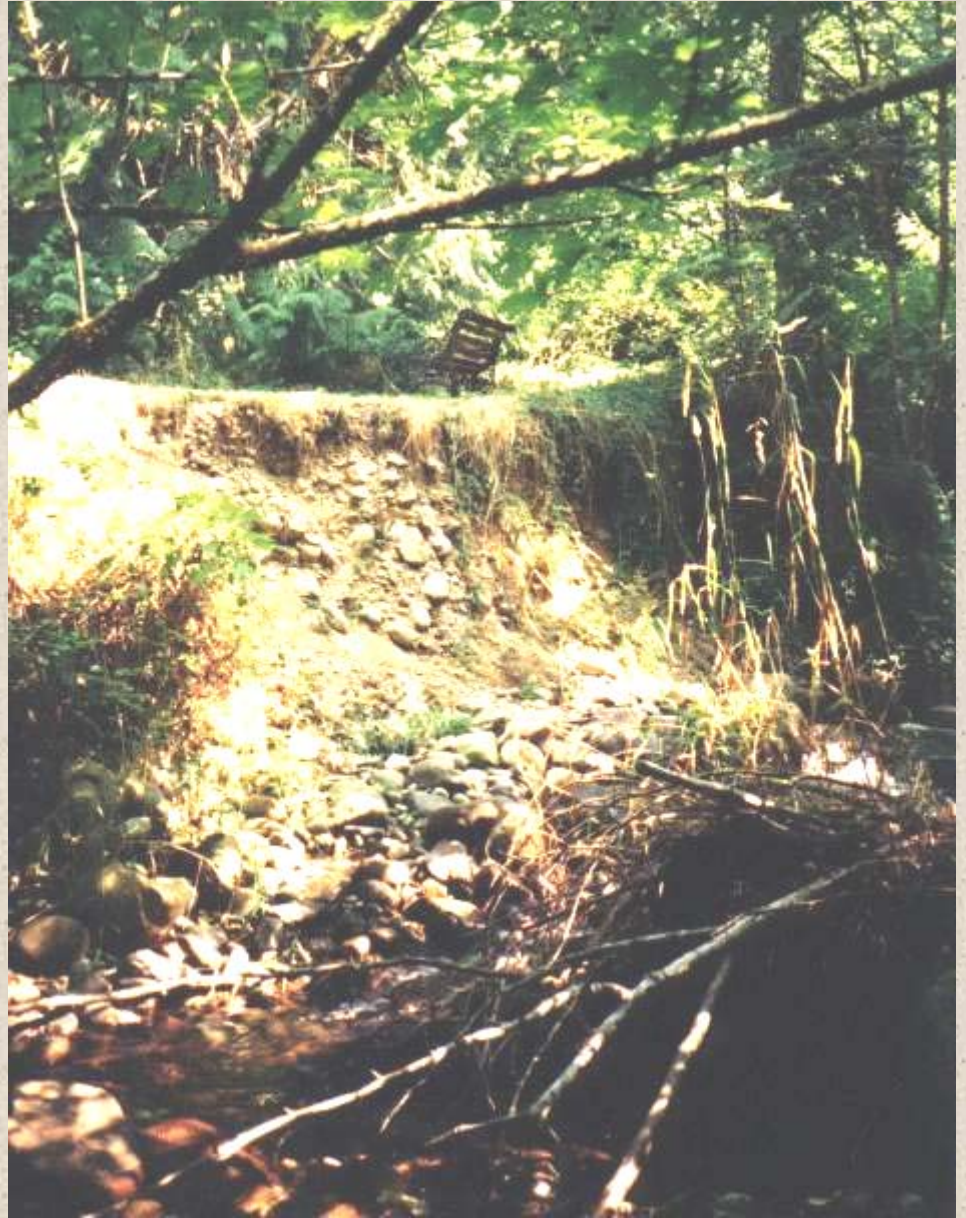
Landslides



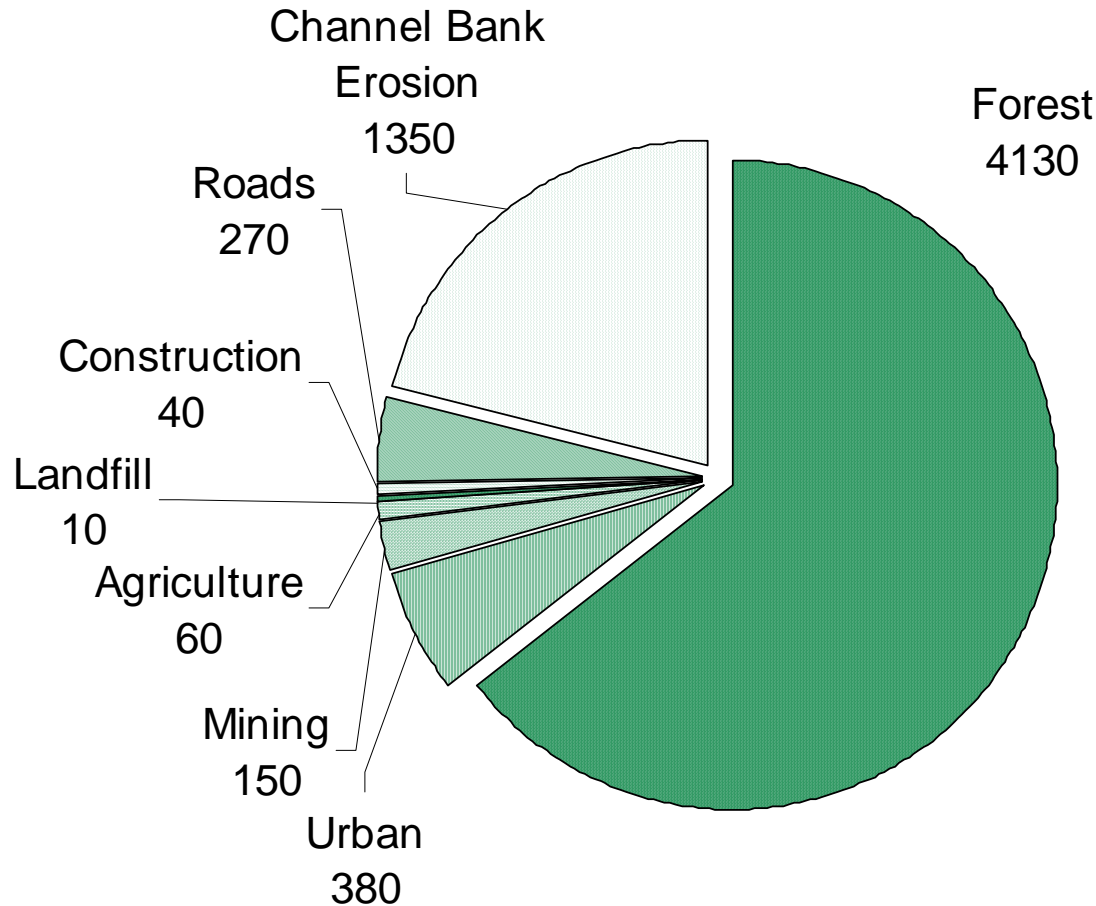
Road Surface Erosion



Channel Bank Erosion



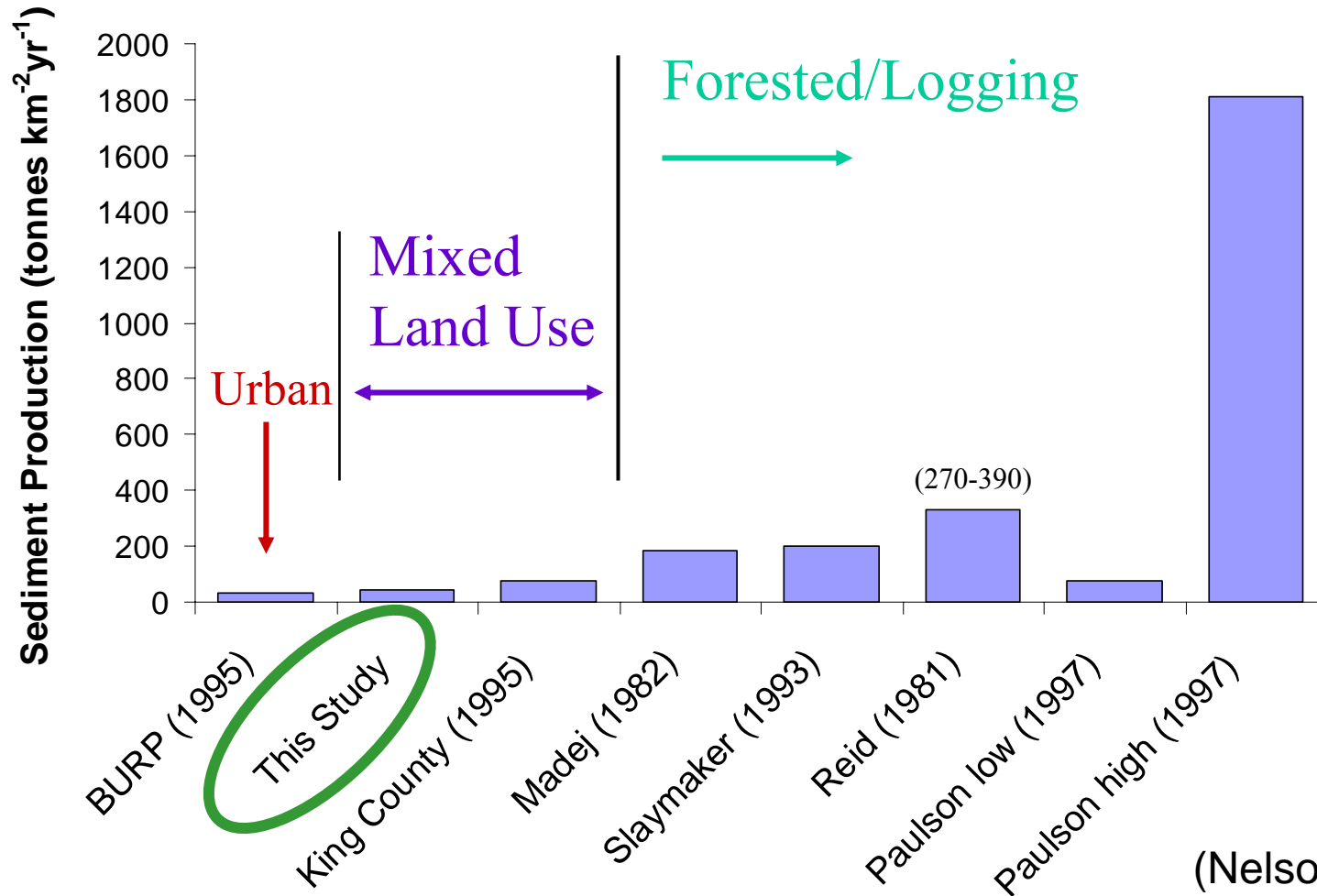
Total Sediment Production



Total Sediment Production
6400 tonnes/year (≈ 50 t/km²/yr)

(Nelson, 2001)

Comparison to Other PNW Studies



(Nelson, 2001)



A satellite-style map of a coastal area. The land is shown in various shades of green, brown, and tan, indicating different vegetation and terrain. The ocean is a deep blue. Three creeks are labeled with yellow pushpin icons and text. The first label, 'Greyling Creek', is circled in yellow. The other two labels are 'Issaquah Creek' and 'Santa Paula Creek'.

Greyling Creek

Issaquah Creek

Santa Paula Creek



Image © 2006 TerraMetrics

© 2006 Google™

Pointer: 61°27'33.48" N 145°43'07.89" W elev: 3042 ft

Streaming [|||||||||] 100%

Eye alt: 11.35 mi









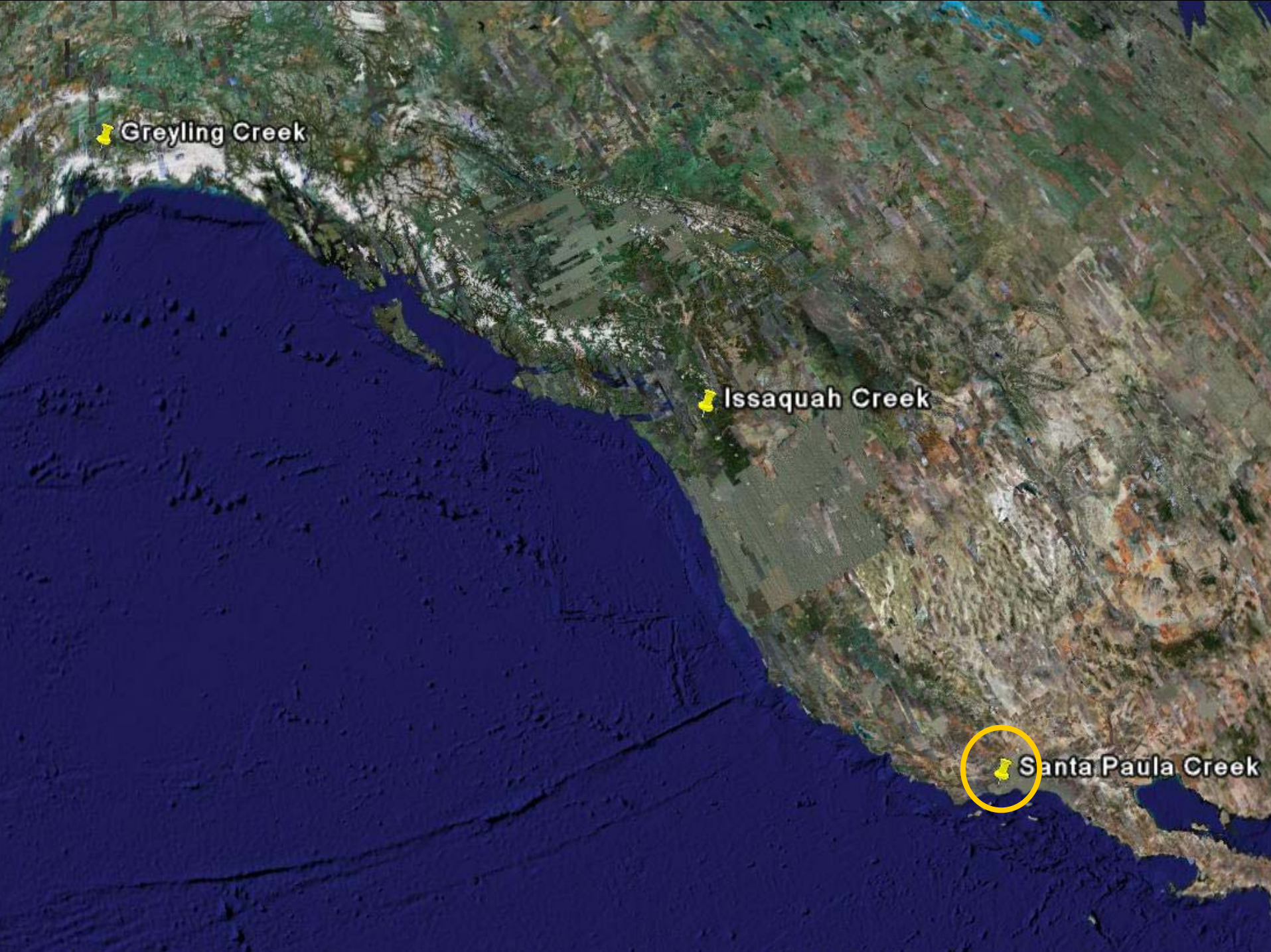


An aerial photograph of a river valley. The river flows through the center, surrounded by a modern floodplain. On either side of the river, there are terraces. The higher terraces are labeled 'High terrace' and the lower ones are labeled 'Low terrace'. The landscape is covered with sparse vegetation and patches of snow.

High terrace

Low terrace

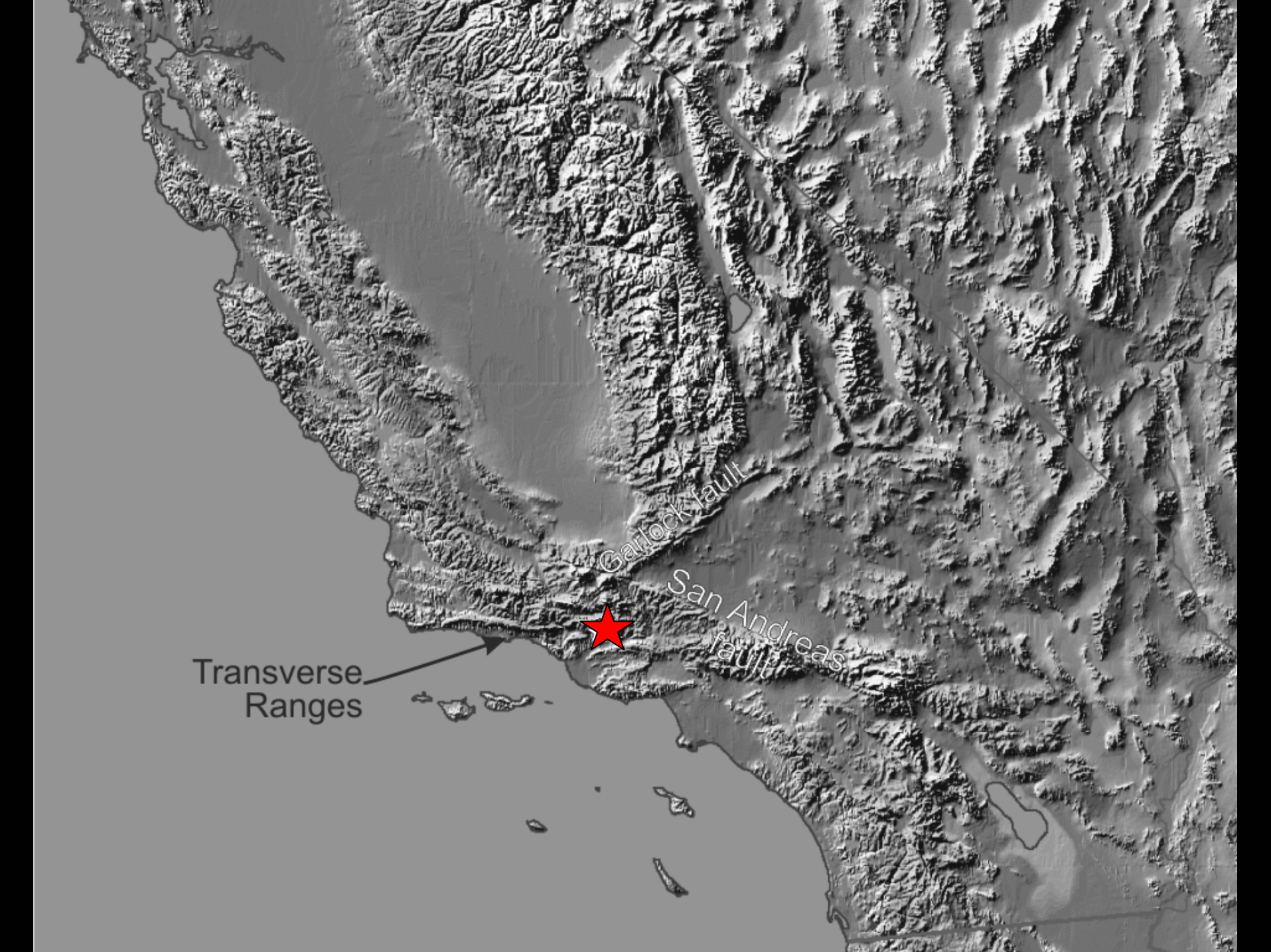
Modern floodplain



Greyling Creek

Issaquah Creek

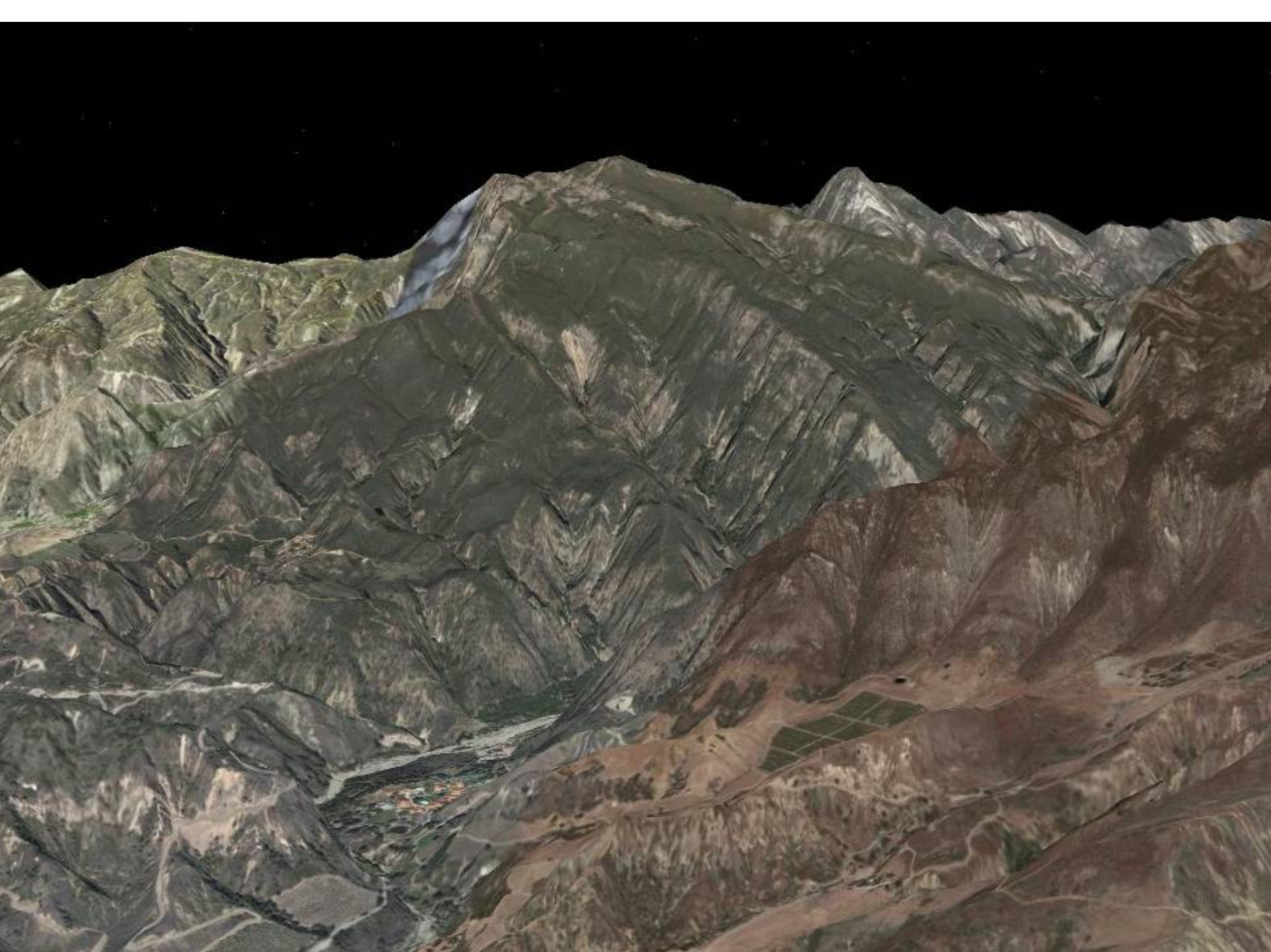
Santa Paula Creek

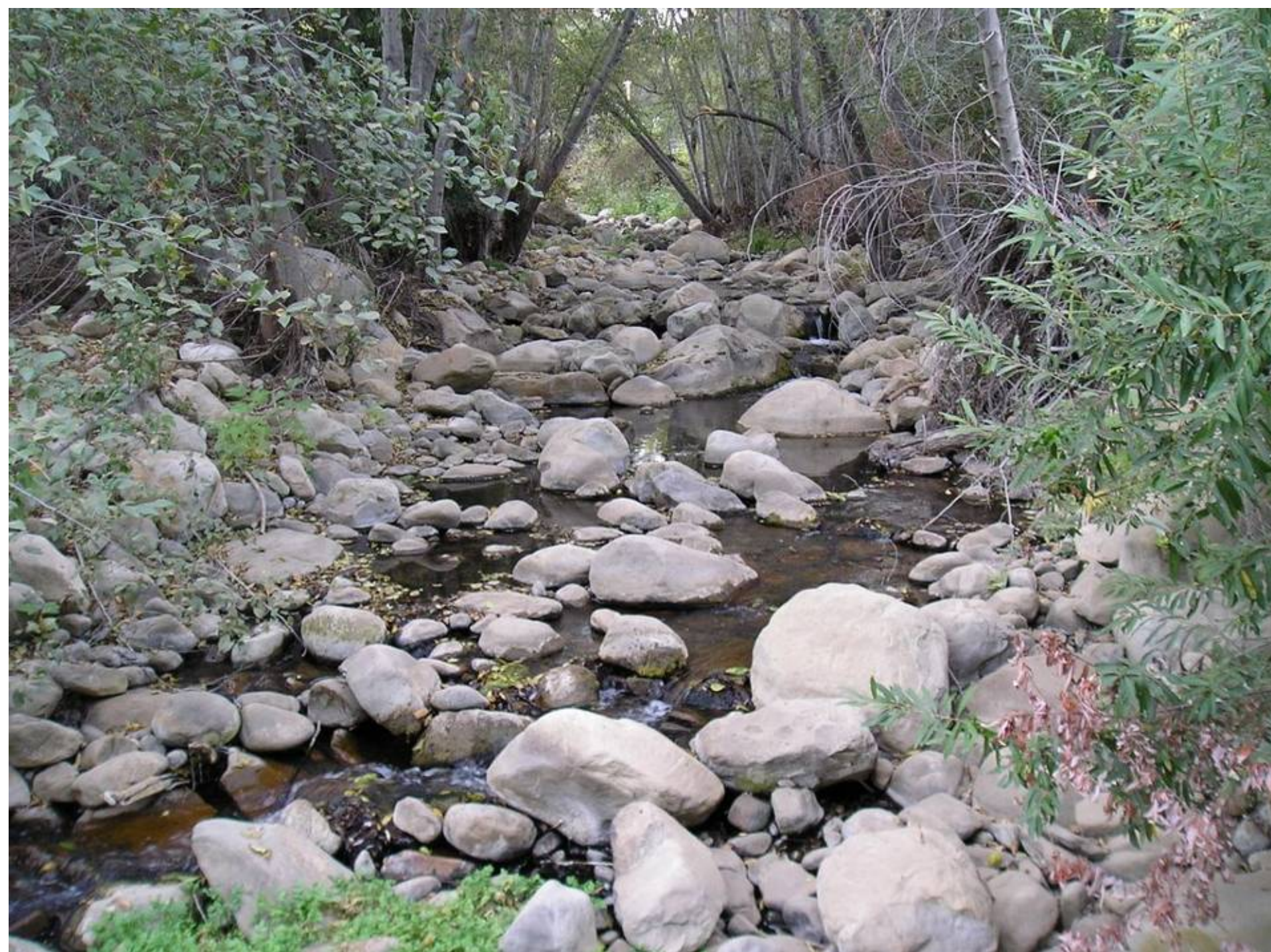


Transverse
Ranges

Garlock fault

San Andreas
fault







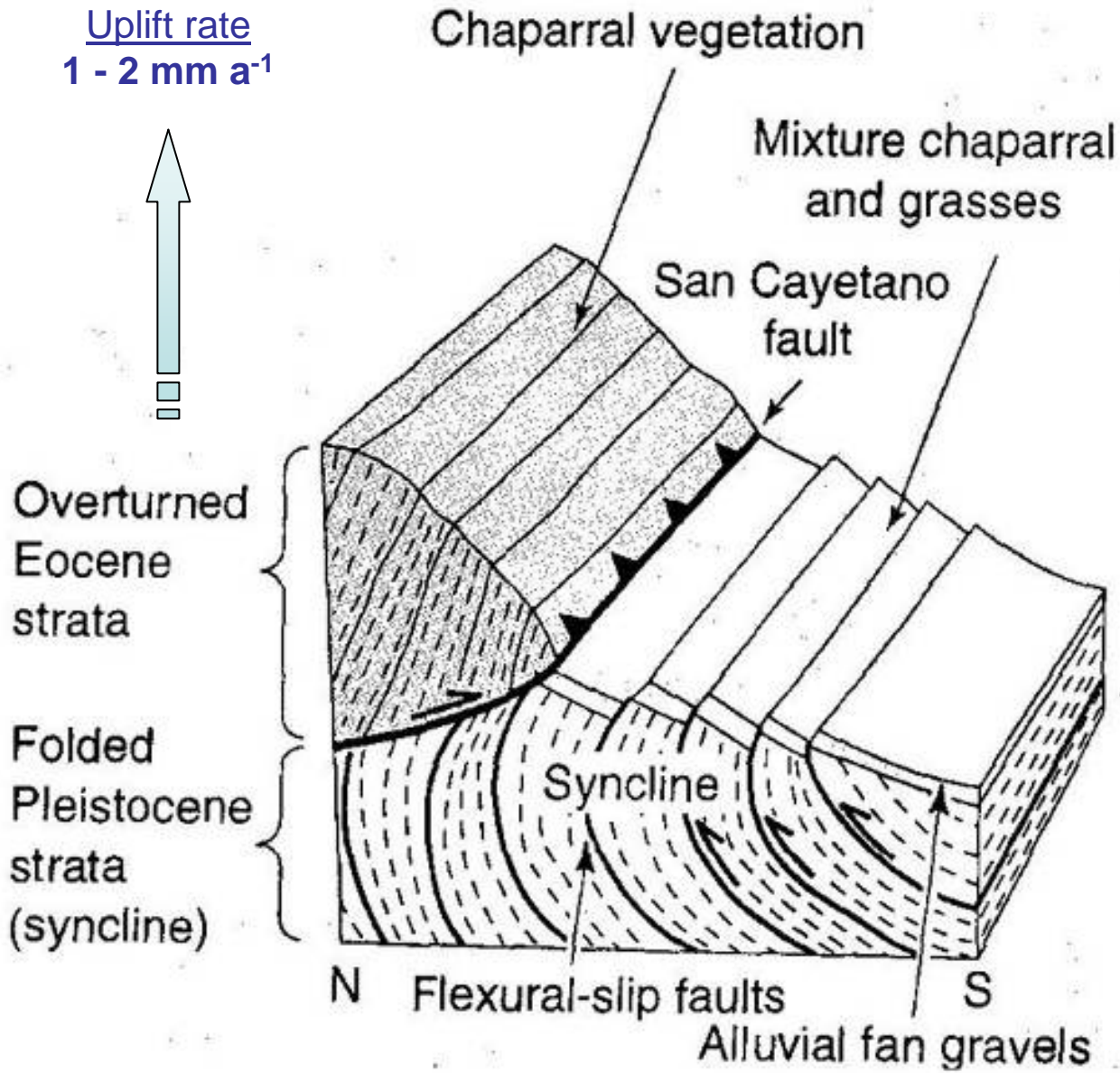
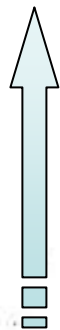




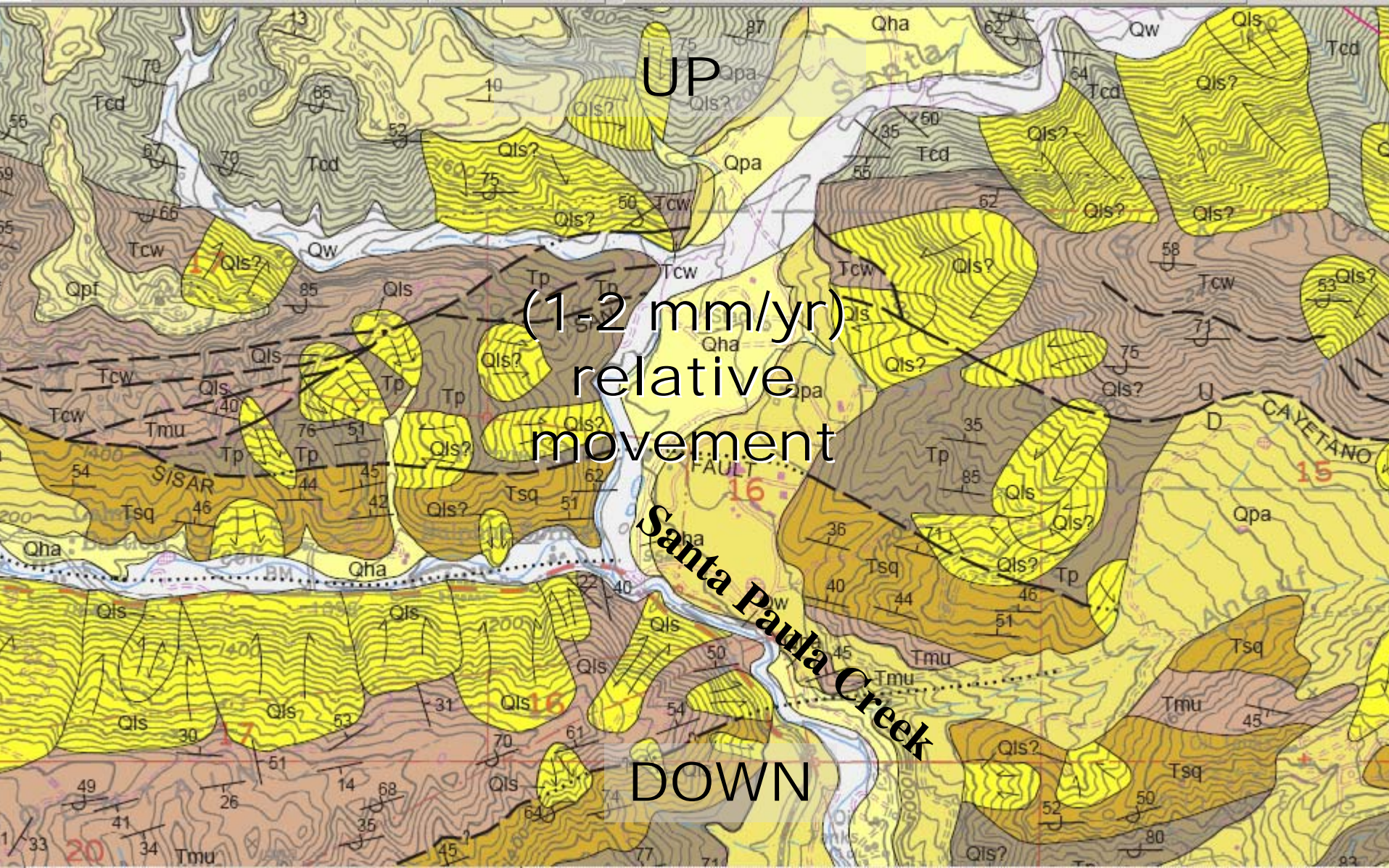


2004

Uplift rate
1 - 2 mm a⁻¹



From Keller and Pinter (2002)



UP

(1-2 mm/yr)
relative
movement

DOWN

Santa Paula Creek

FAULT

SISAR

CAYETANO



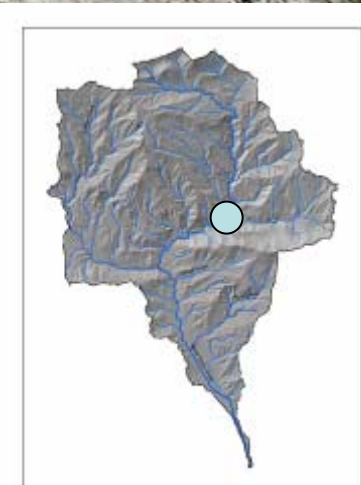


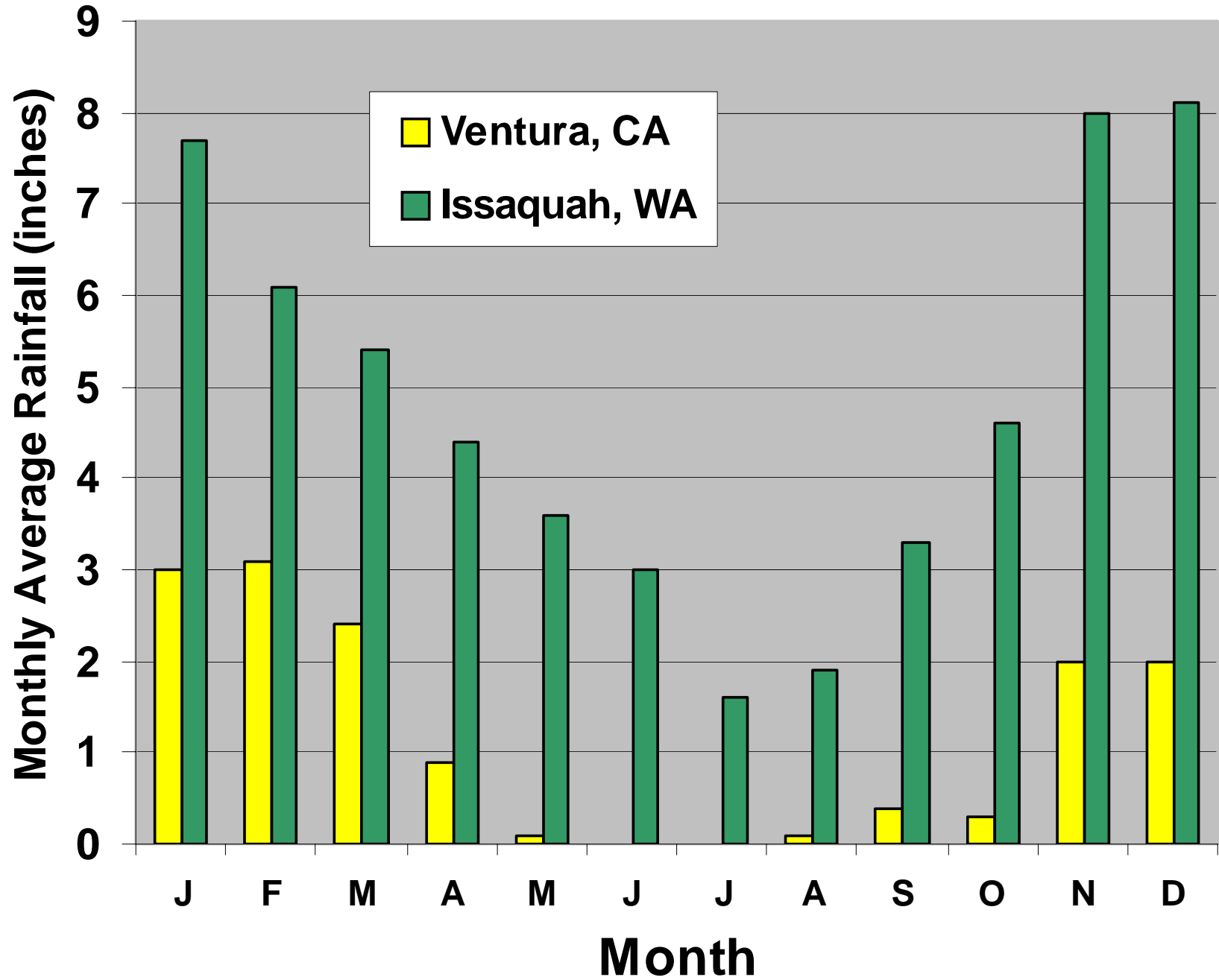




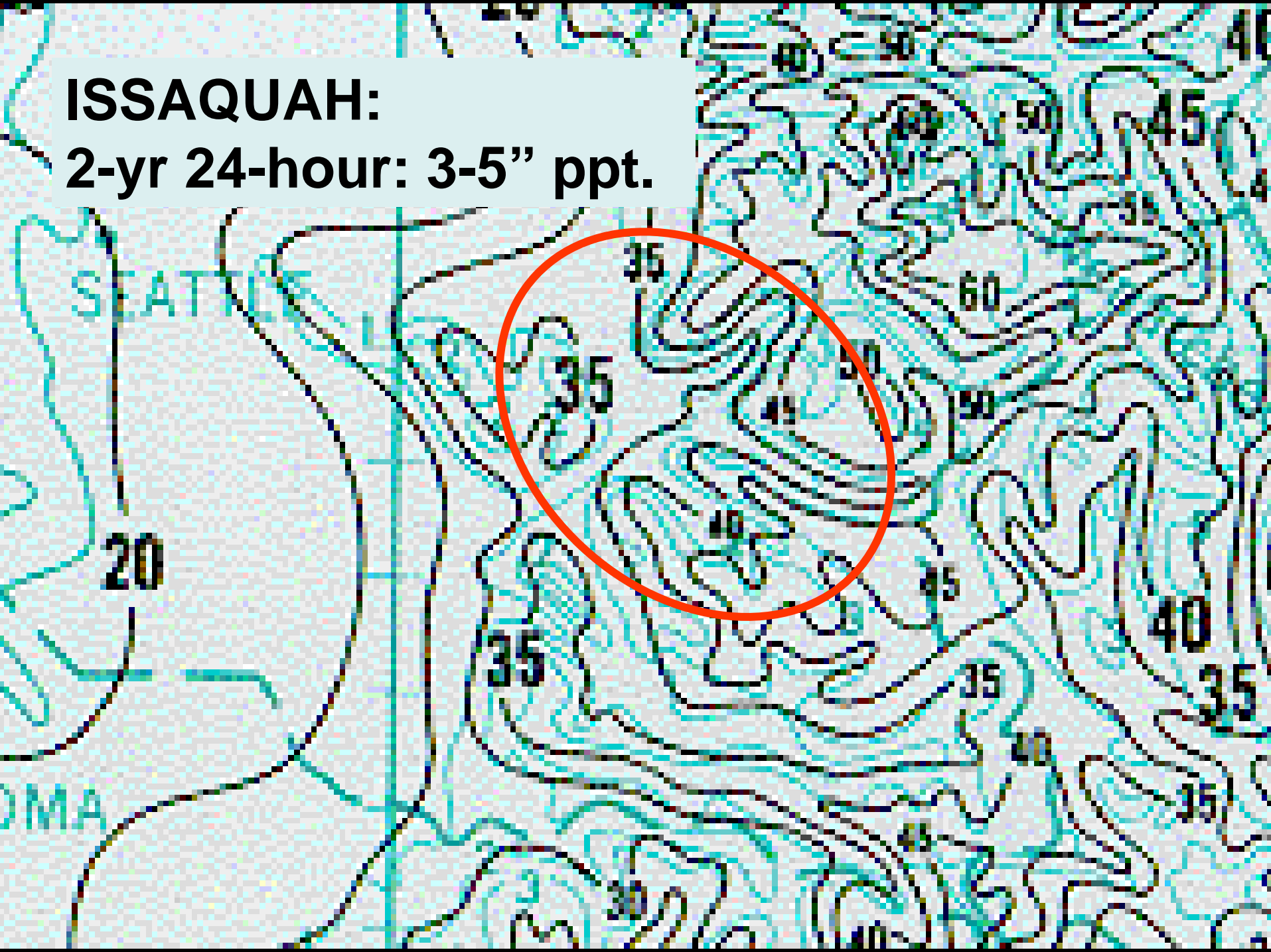


6" notebook
for scale

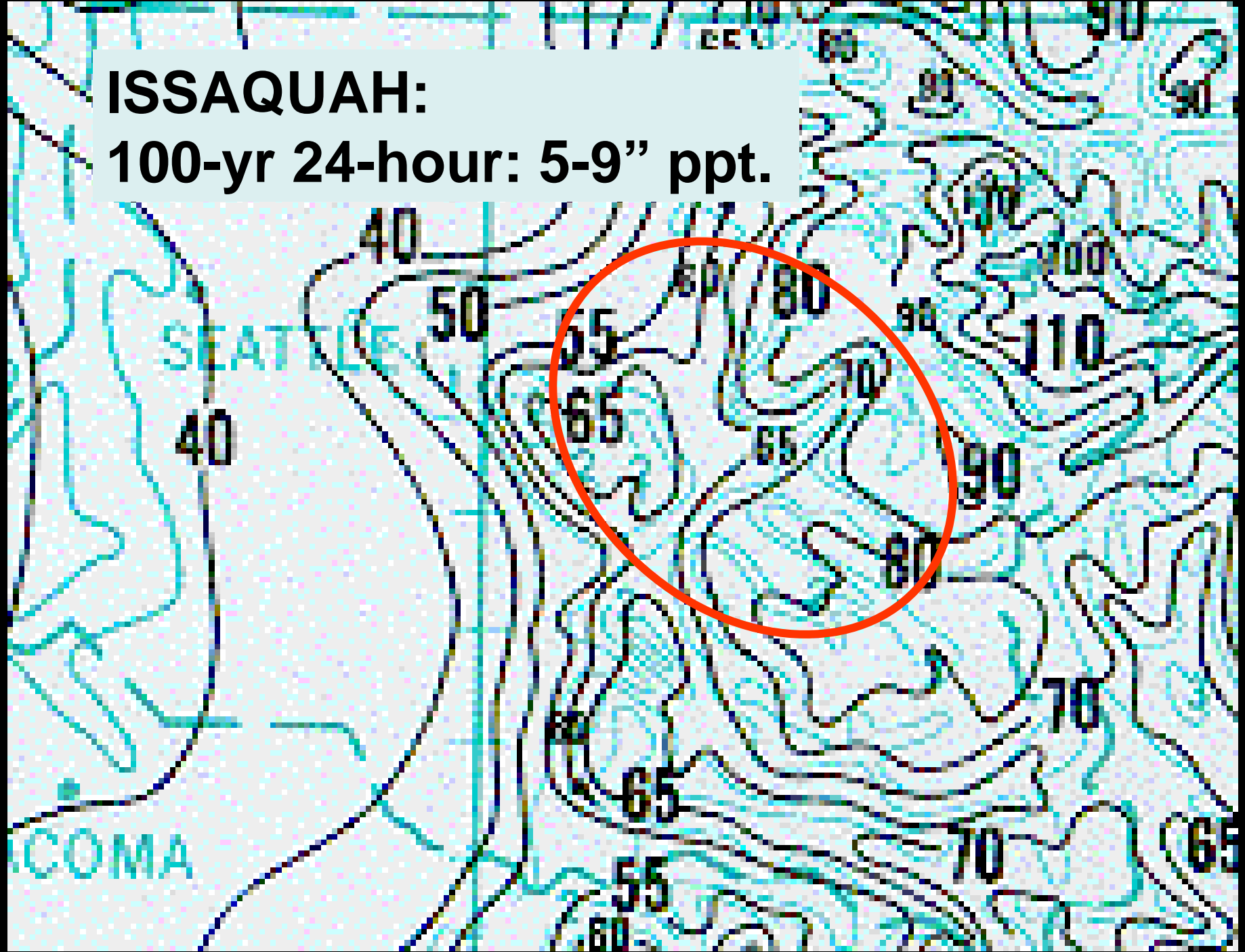




ISSAQUAH:
2-yr 24-hour: 3-5" ppt.

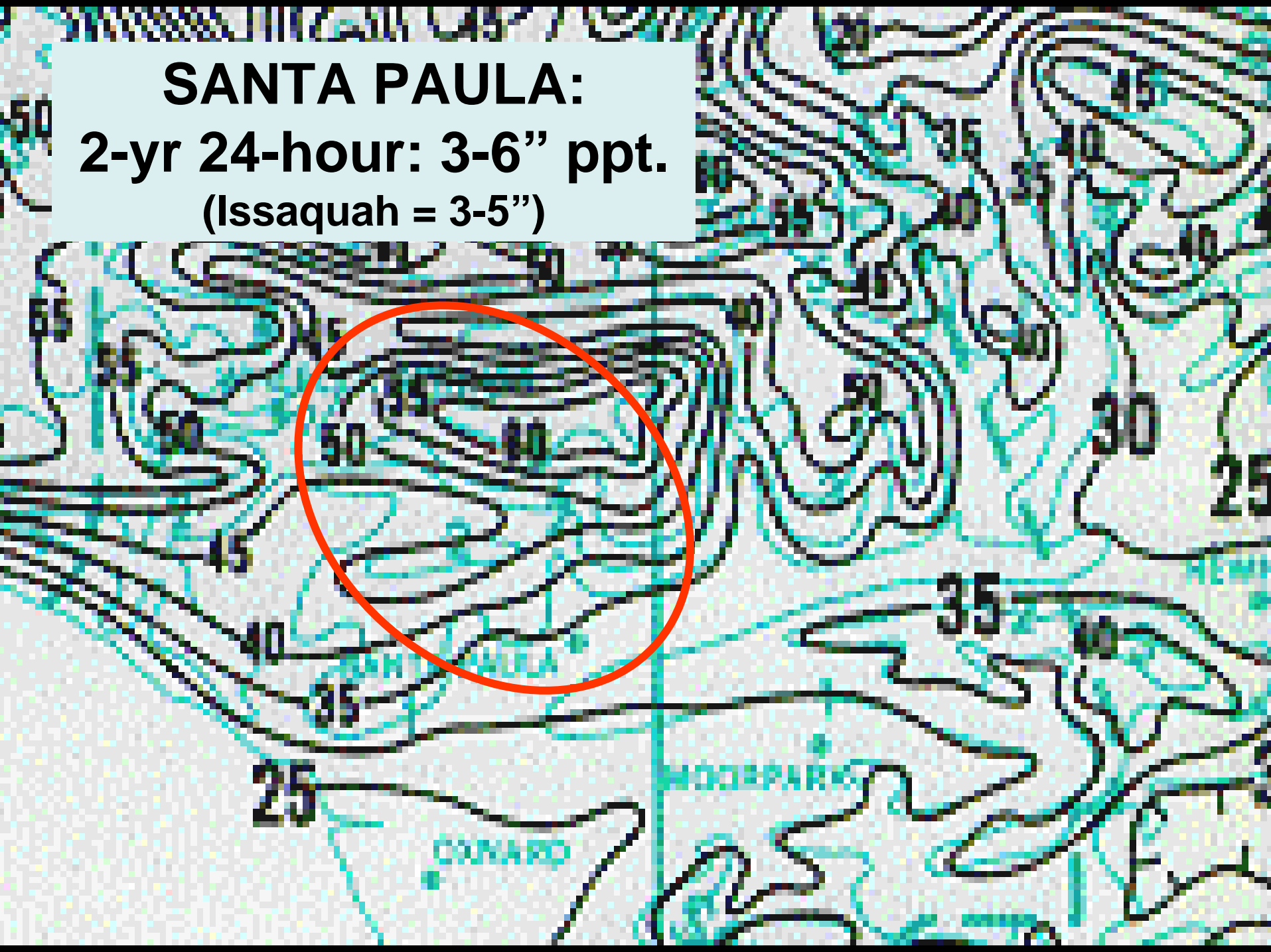


**ISSAQUAH:
100-yr 24-hour: 5-9" ppt.**

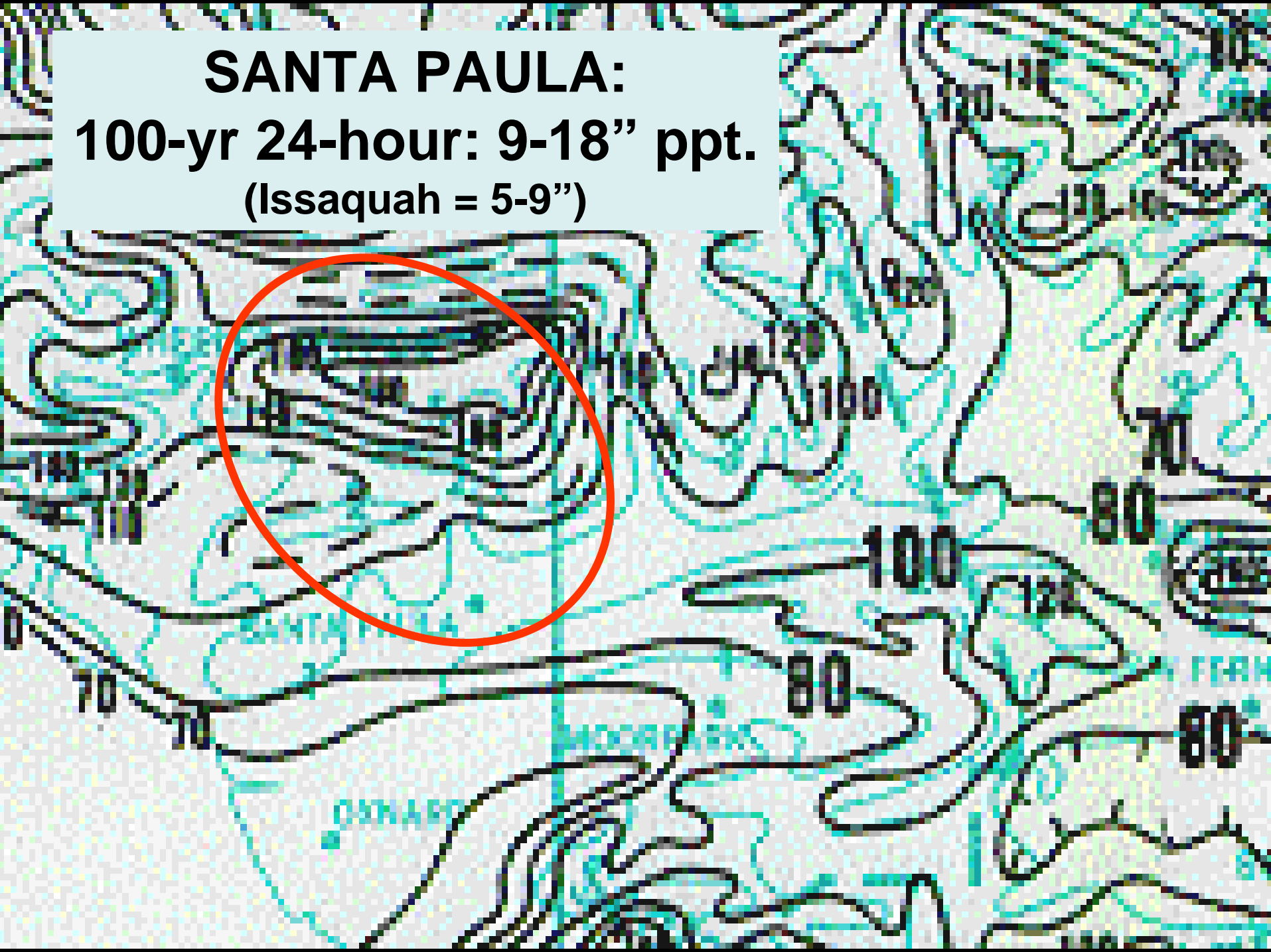


SANTA PAULA:

2-yr 24-hour: 3-6" ppt.
(Issaquah = 3-5")



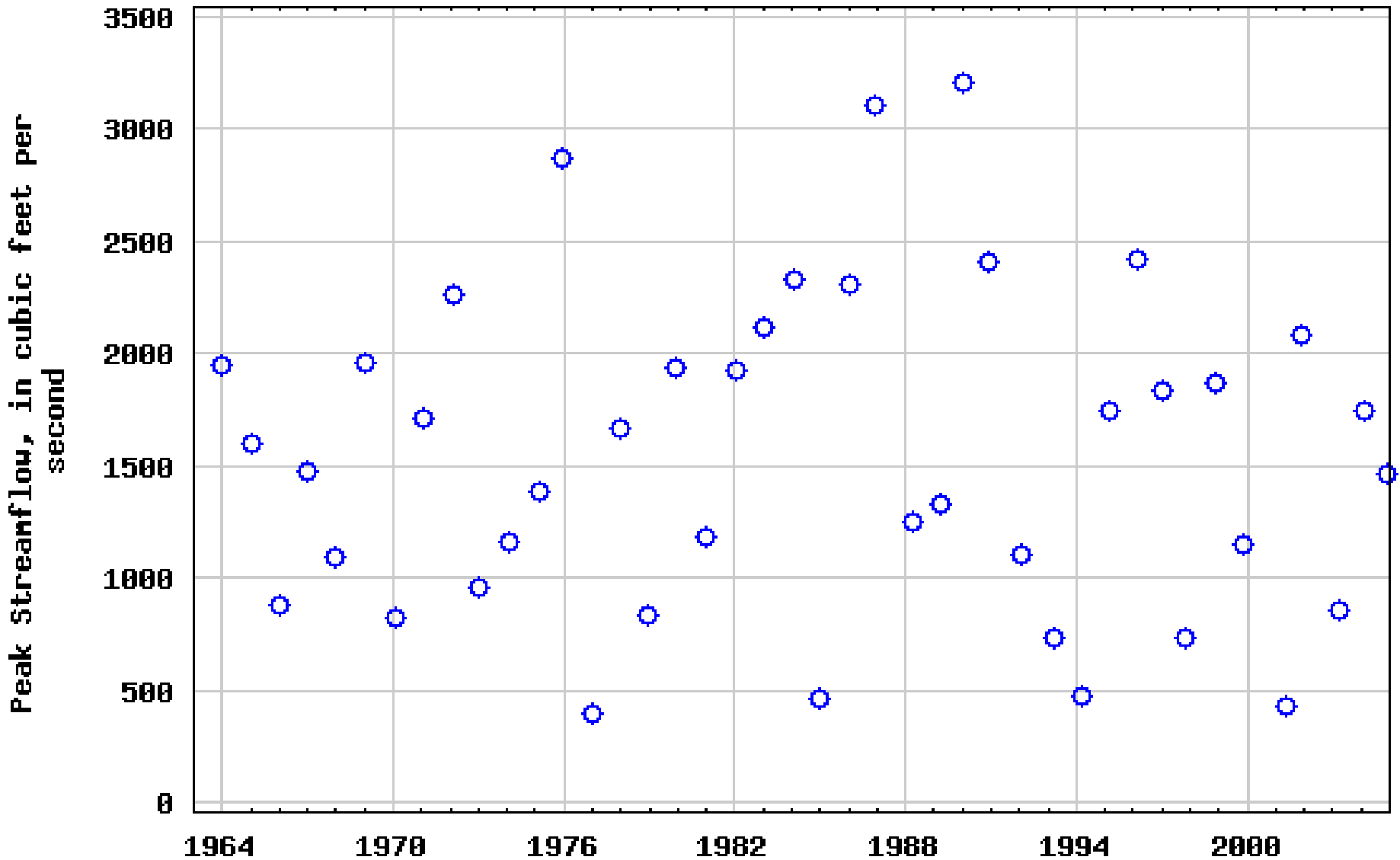
SANTA PAULA:
100-yr 24-hour: 9-18" ppt.
(Issaquah = 5-9")



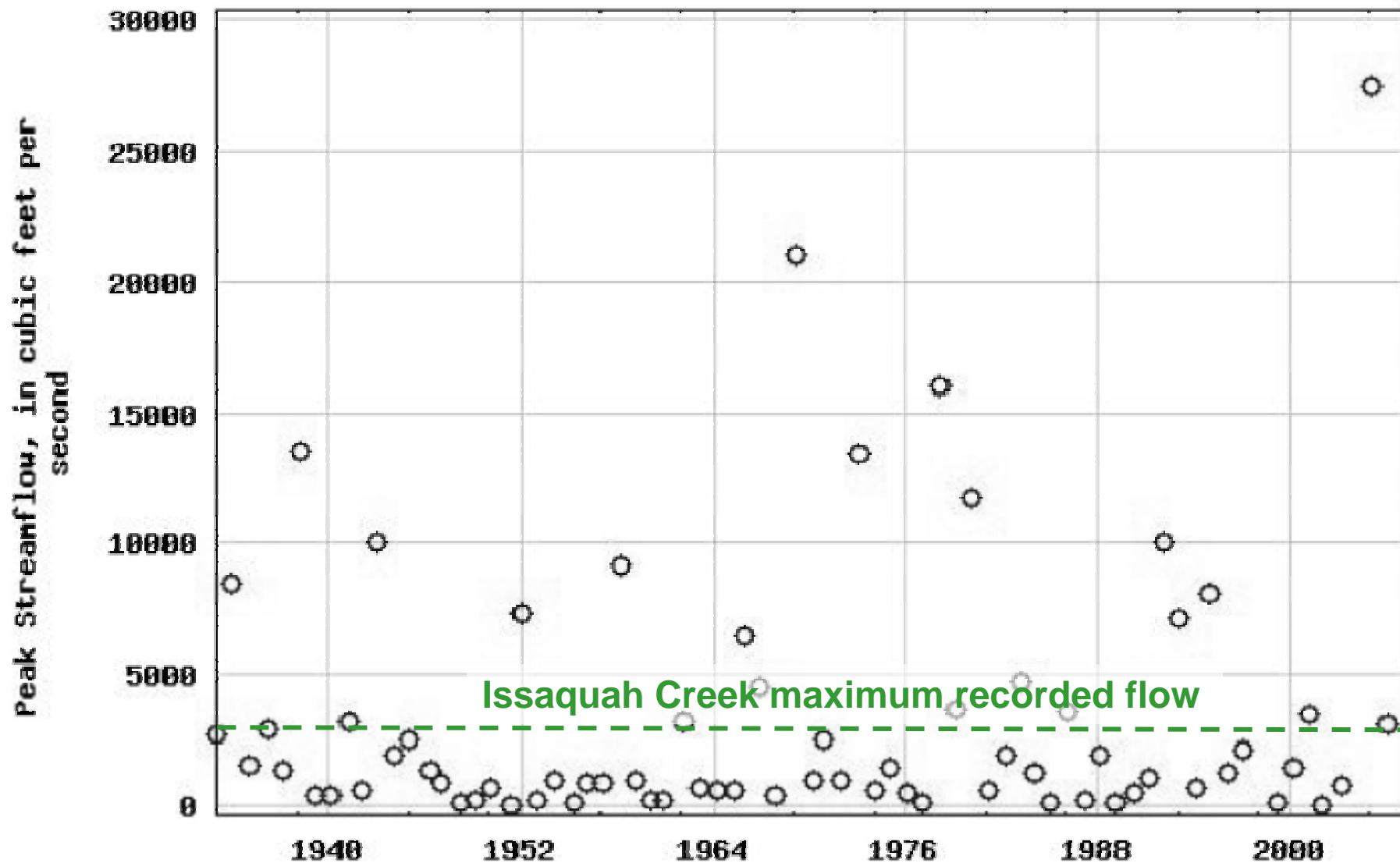
“The maximum intensity of precipitation...at intervals of 10 to 100 years is greater in portions of the San Gabriel and San Bernardino Mountains in southern California than anywhere else in the continental United States.”

Western Regional Climate Center
(<http://www.wrcc.dri.edu/>)

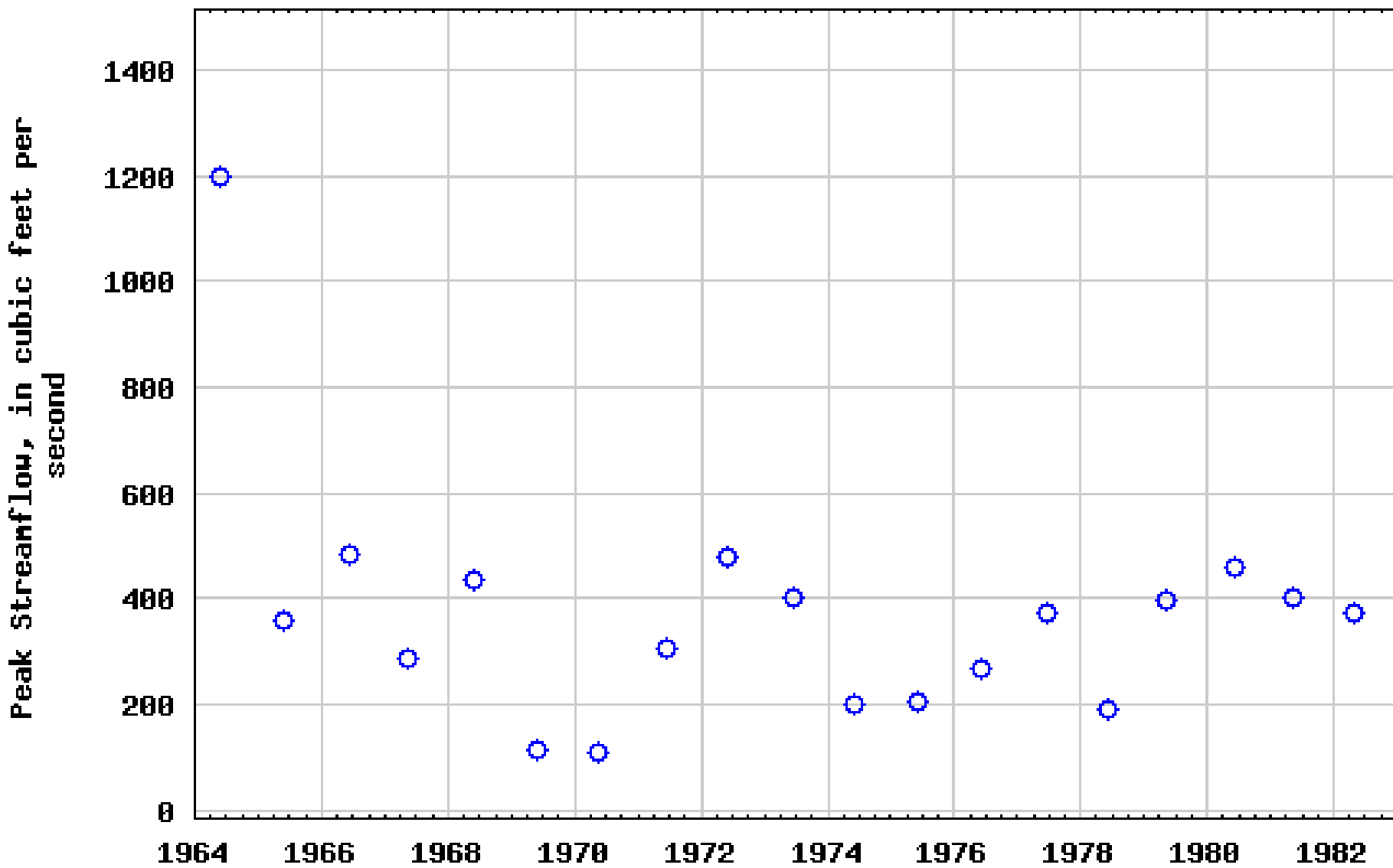
USGS 12121600 ISSAQUAH CREEK NEAR MOUTH NEAR ISSAQUAH, WA



USGS Station 11113500 annual maximum recorded discharges



USGS 15208100 SQUIRREL C AT TONSINA AK (70 sq mi)









**2. Stream management needs
a watershed understanding.**

Why?

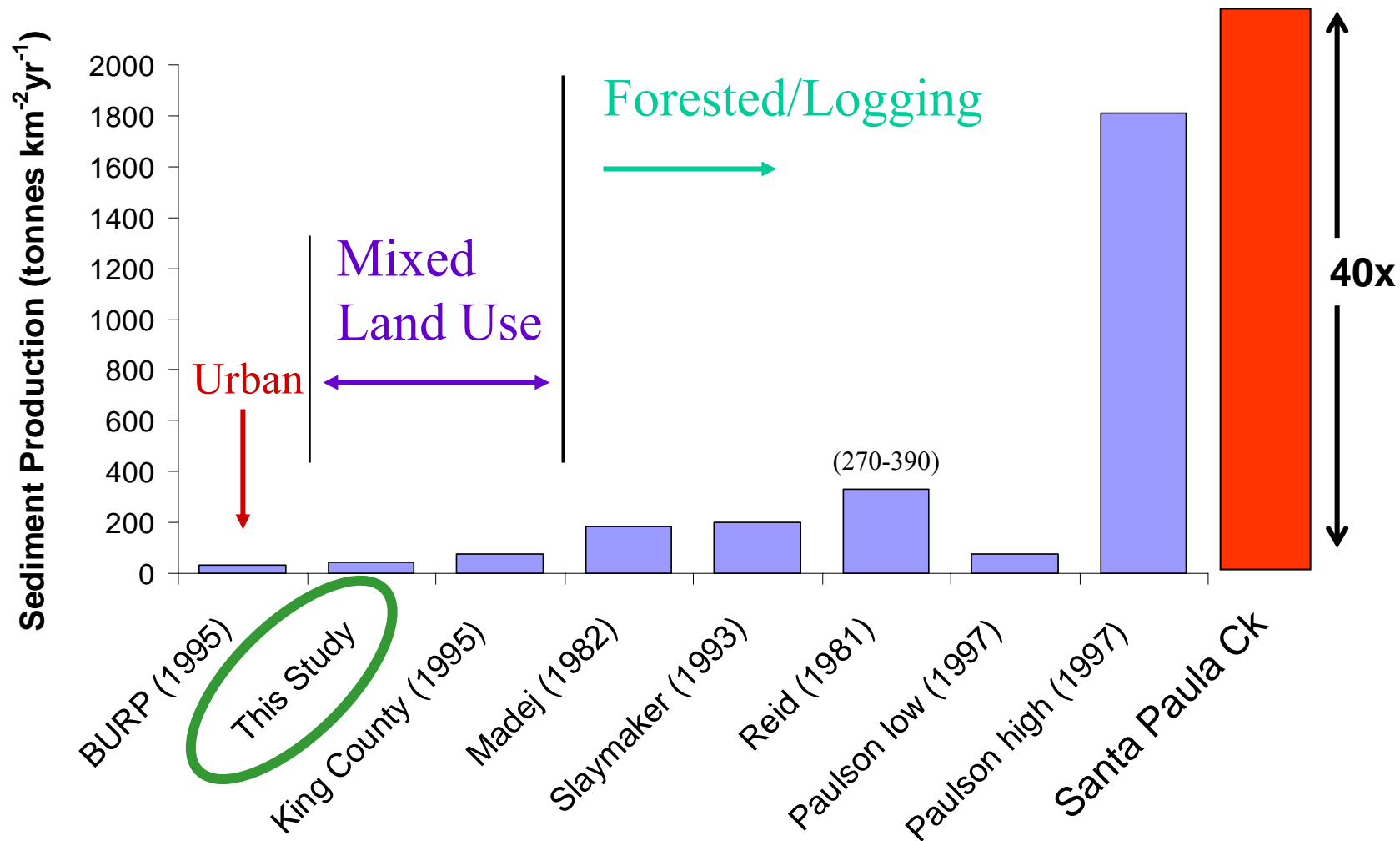








Comparison to Other PNW Studies



ISSAQUAH

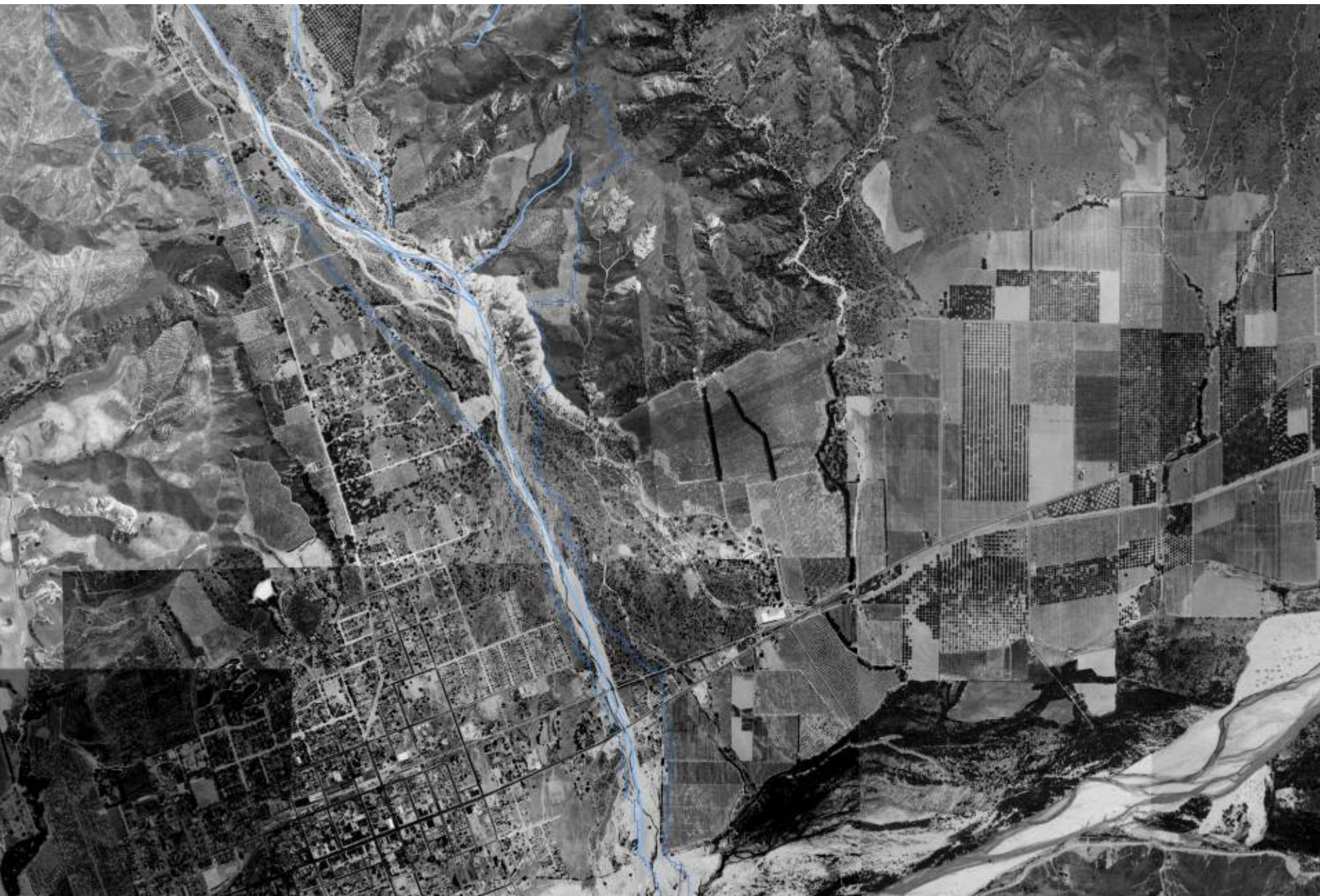


GREYLING



SANTA PAULA



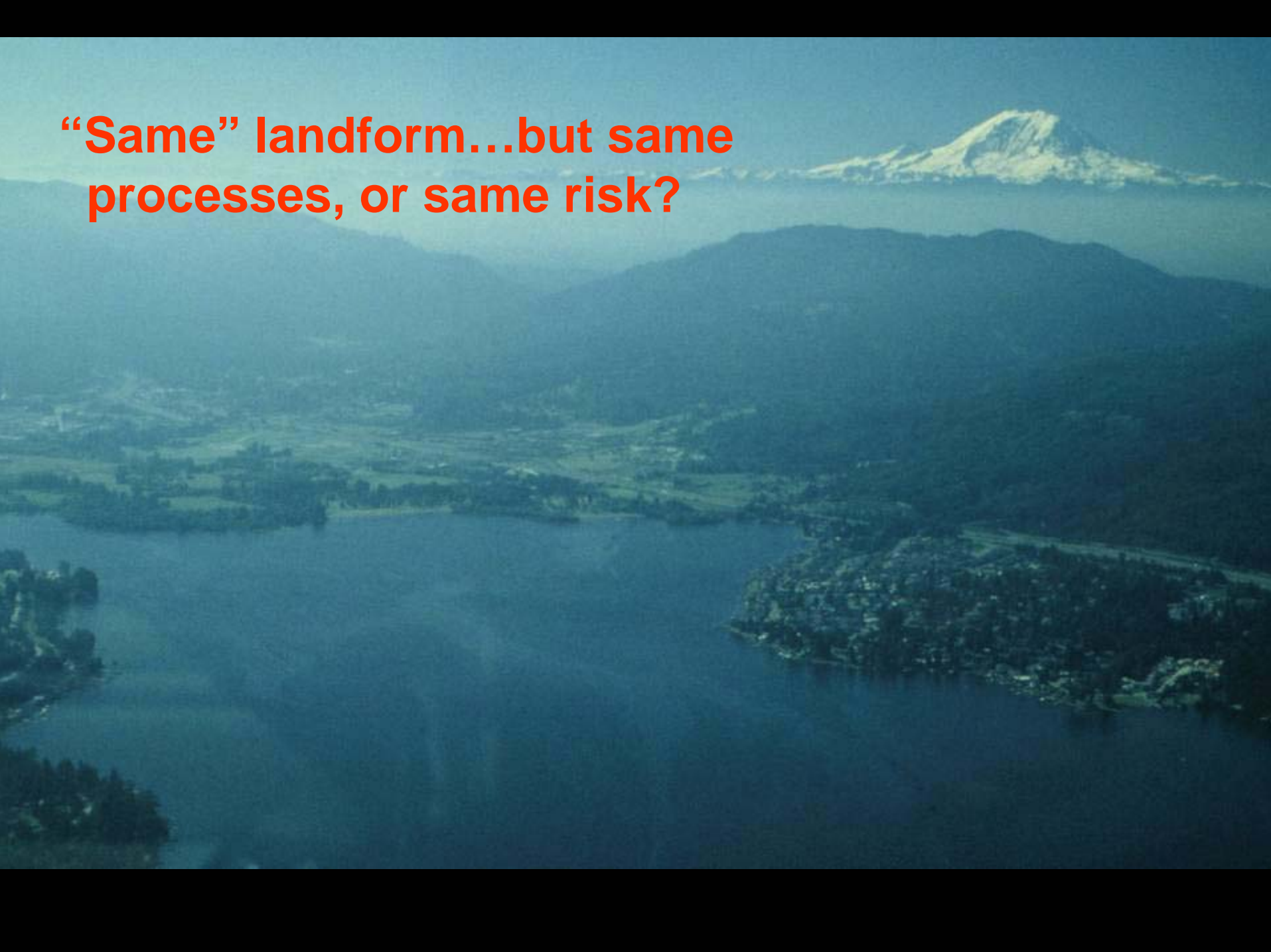








“Same” landform...but same processes, or same risk?





**...only the watershed
knows for sure!**