Data Mining for the Development of Scaling Laws in Hydrology

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Mining water data to address

- **Flow**
- **Sediments**
- **Temperature**
- **Access**

Navarro River

Russian River

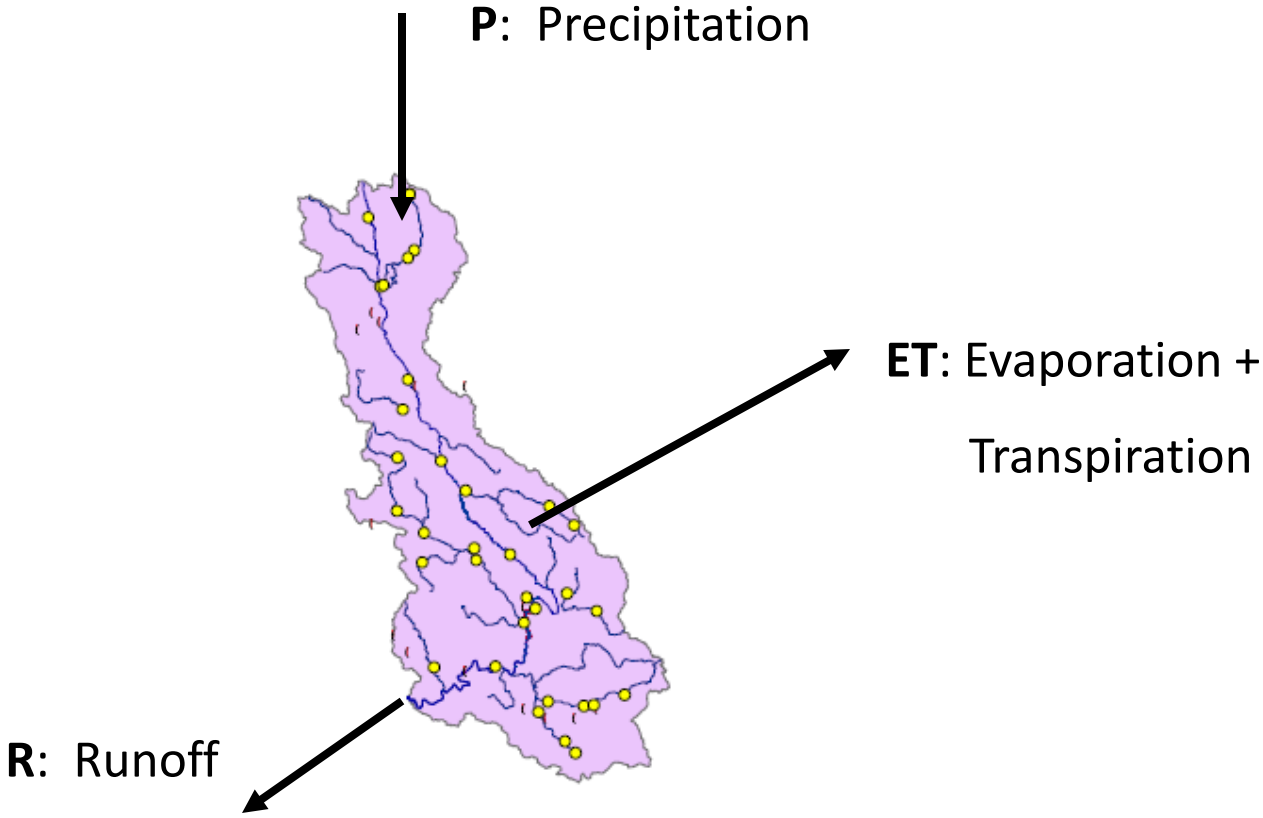
San Gregorio Creek

Sierra Nevada Foothills

Russian River watershed has many important spatial and temporal scales

Coastal watersheds have competing demands for water.

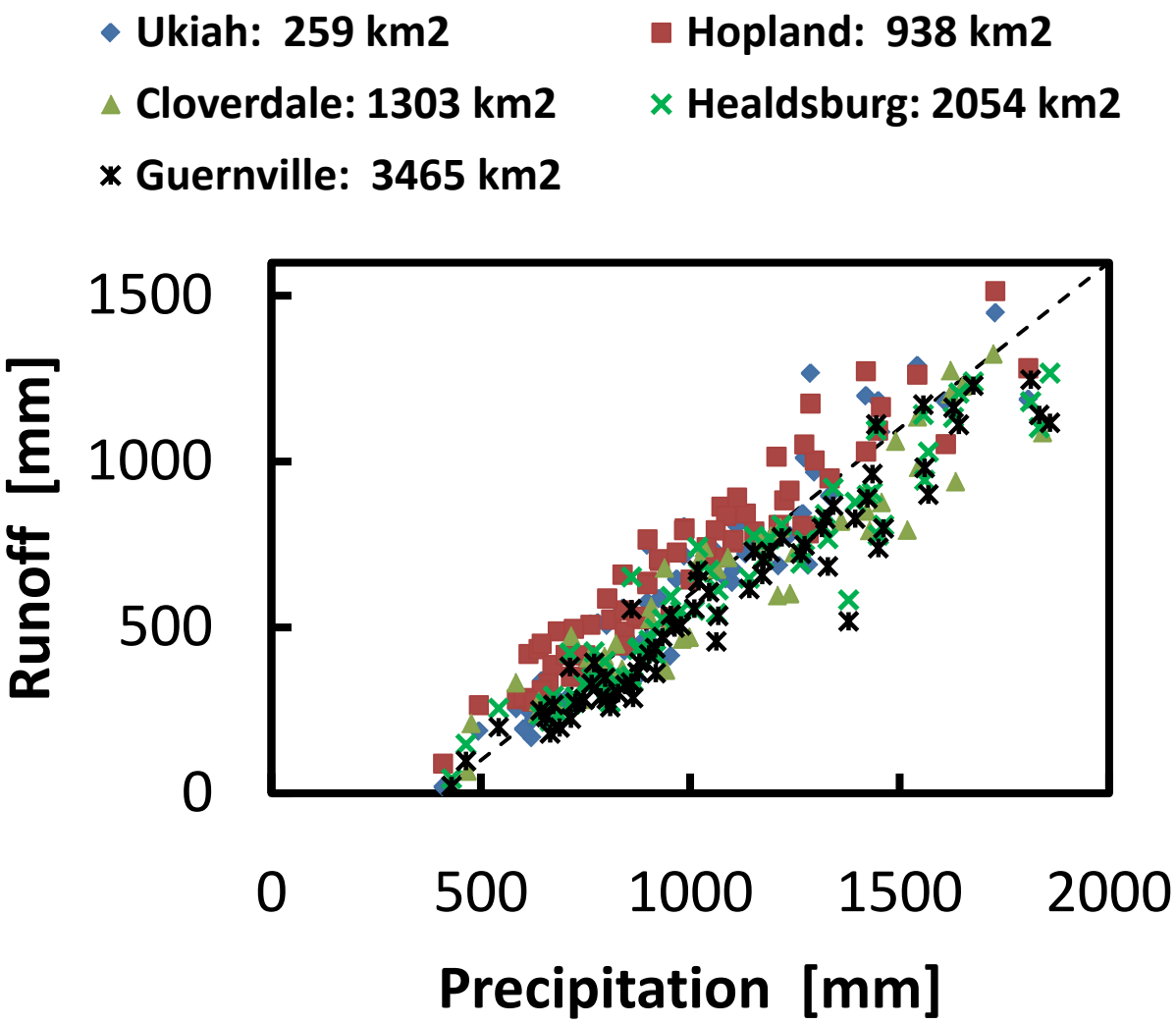
Flow: Russian River Annual Water Balance Model



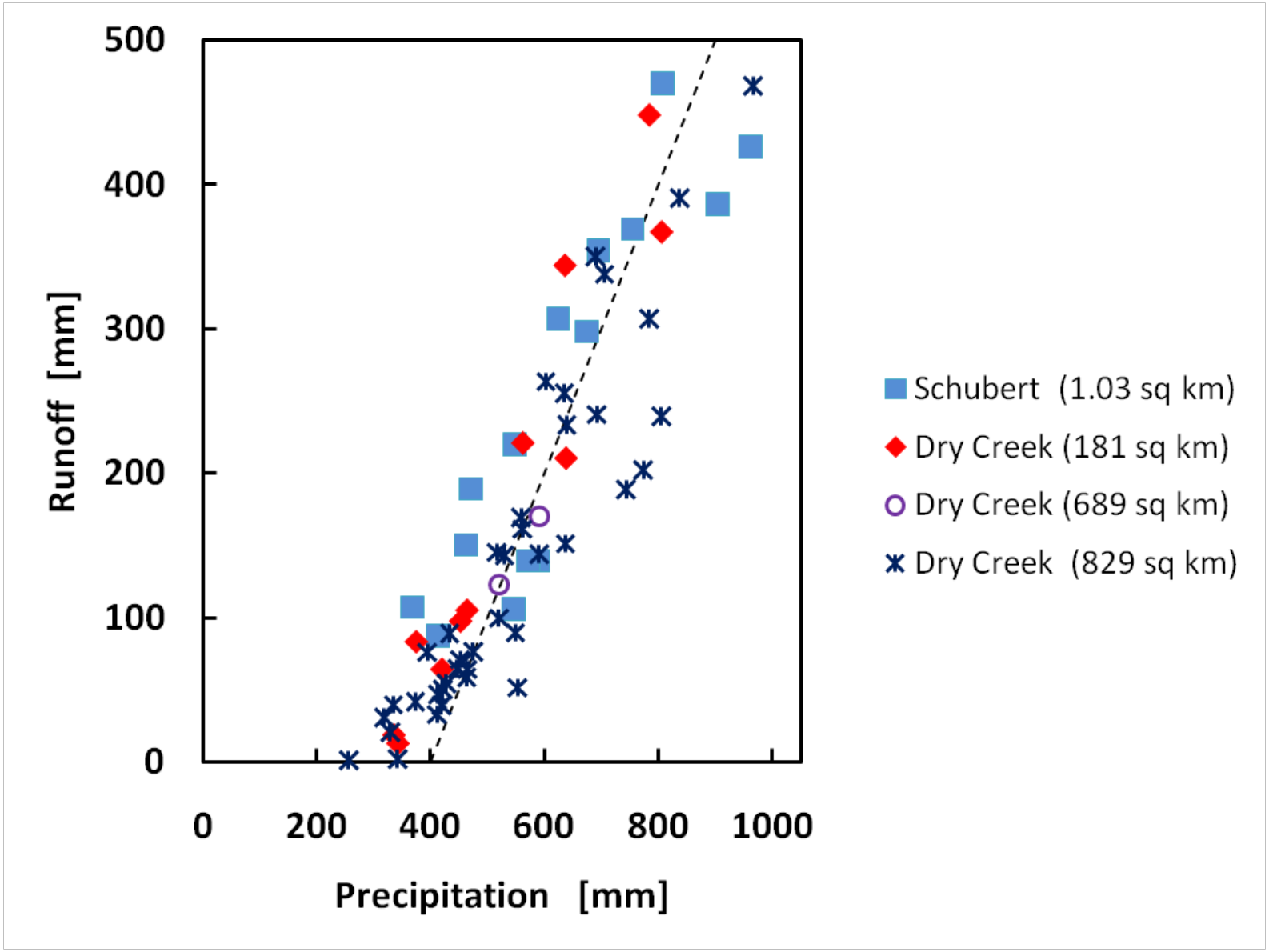
Water Balance: $P = R + ET + \Delta S$

Annual Water Balance: $\Delta S \approx 0$ and $R = P - ET$

Annual Flow Model Applied to the Main Stem of the Russian River



Annual Flow Model Applied to the Sierra Nevada Foothills



Tonzi Ranch, Sierra Nevada Foothills has Flux Tower that Measured Annual ET of 400 mm

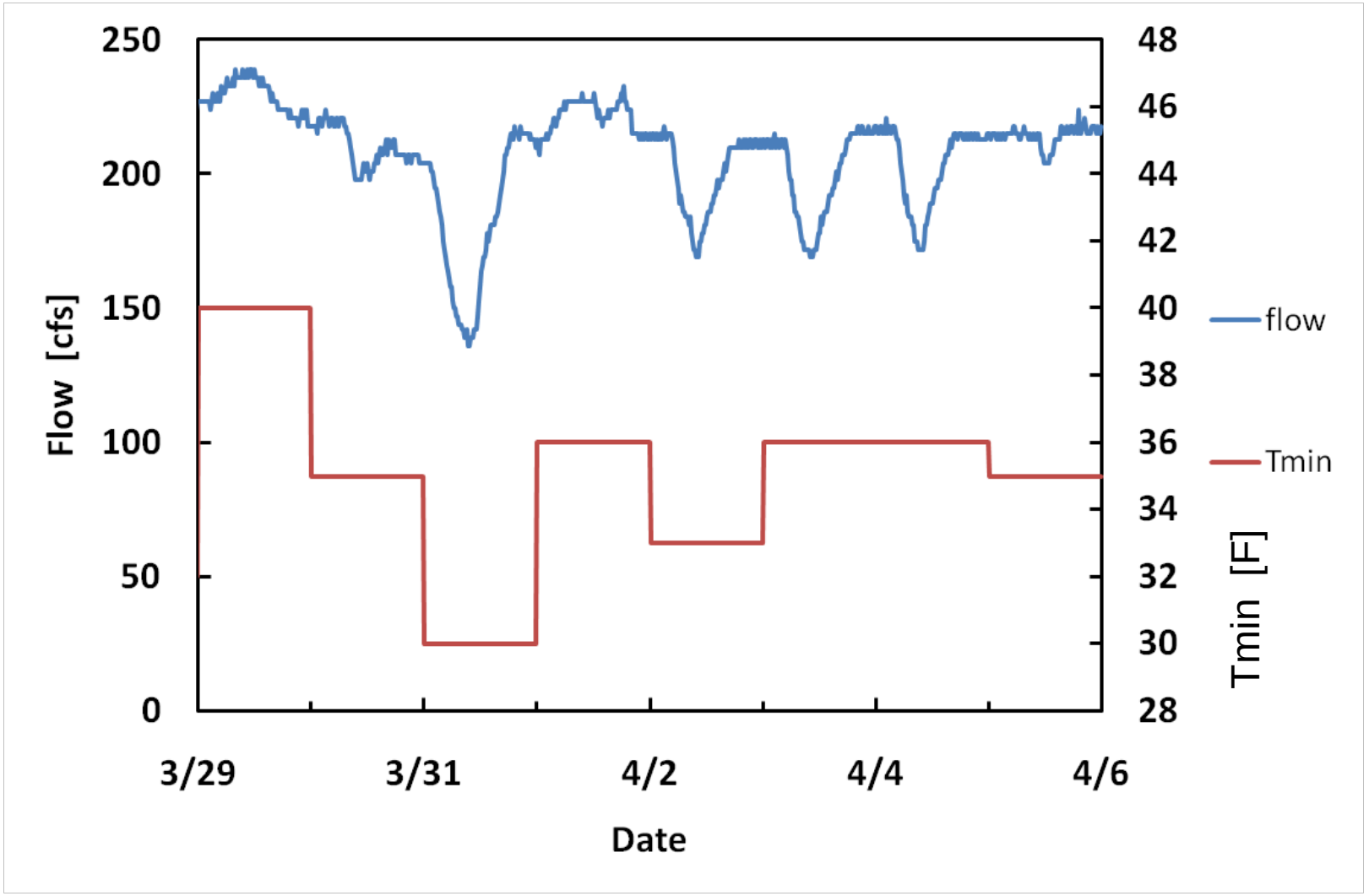
Dennis Baldocchi, UC Berkeley

Russian River watershed landuse impacts flows through episodic water diversion to protect grape vines from frost.

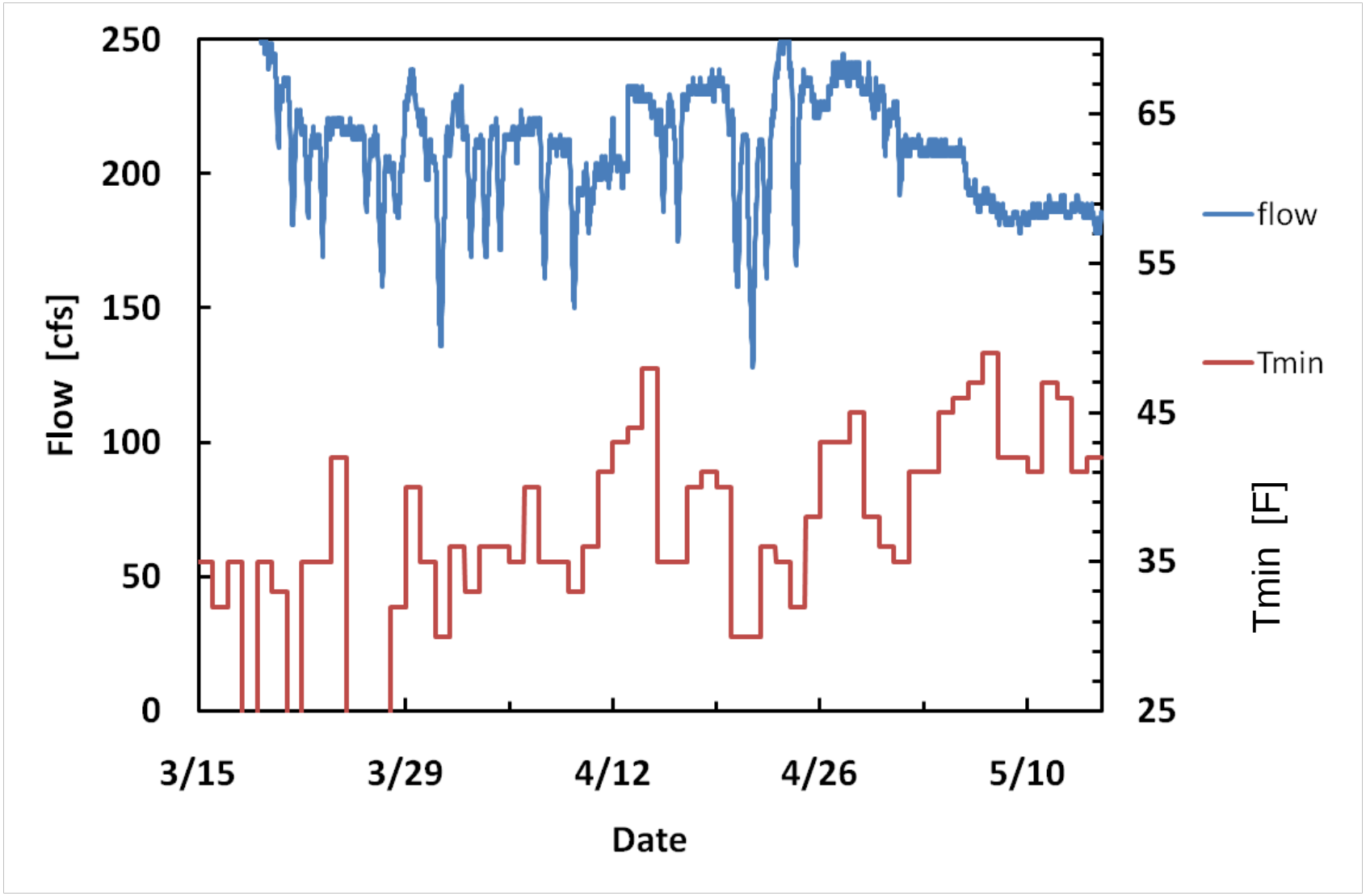
WATER and WINE

Trout Unlimited California

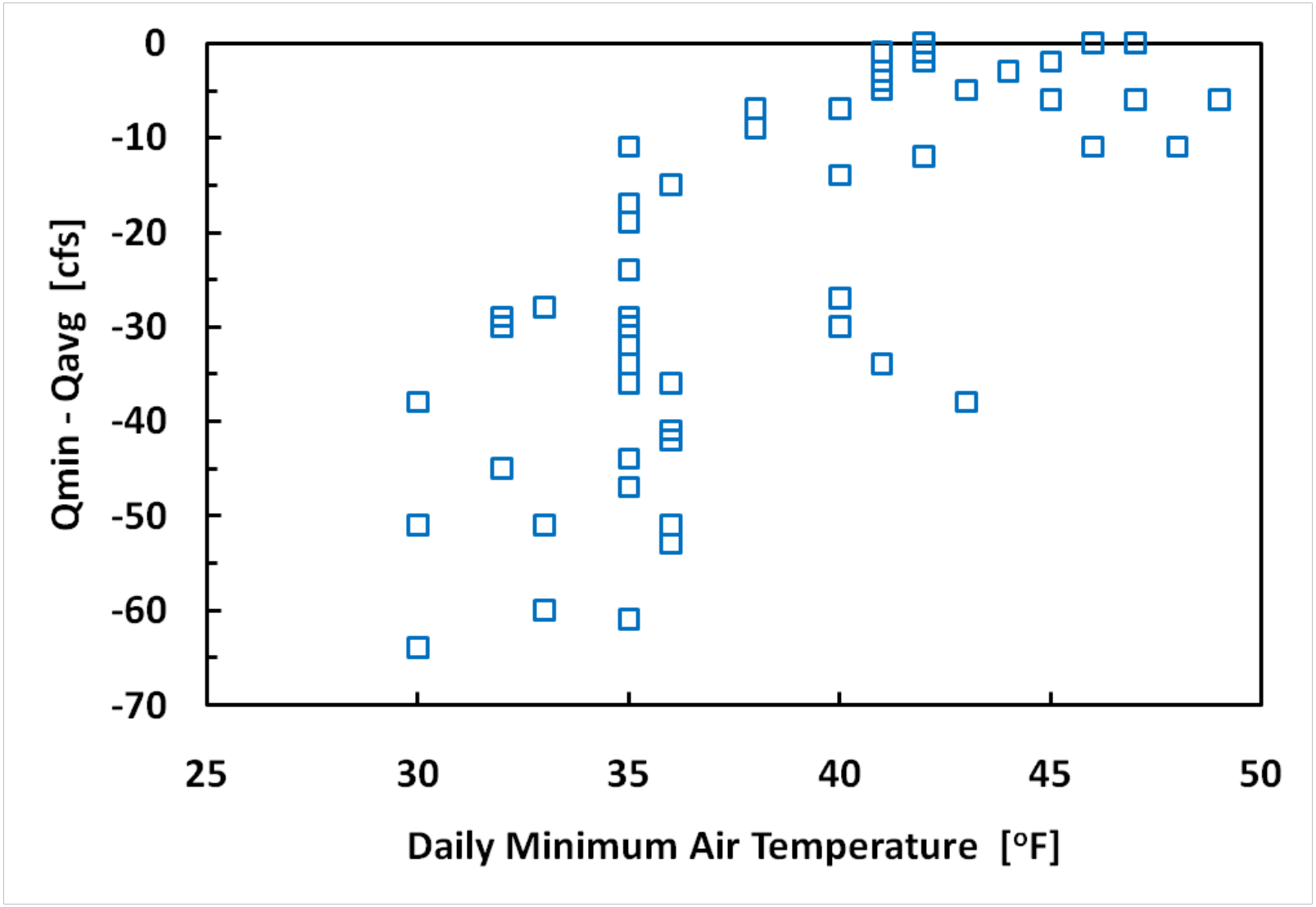
2008 Russian River Flow and Minimum Air Temperature at Hopland



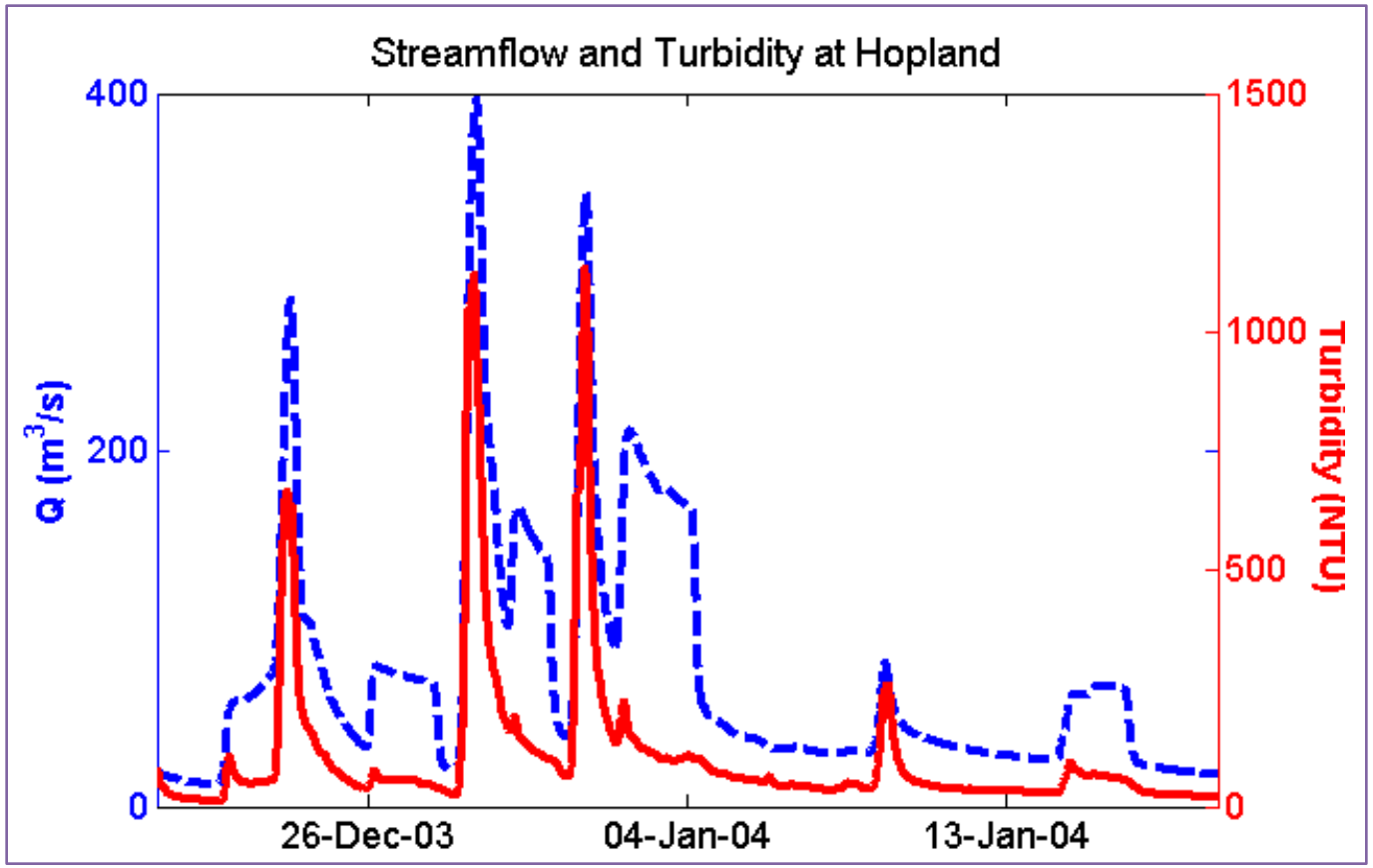
2008 Russian River Flow and Minimum Air Temperature at Hopland



2008 Russian River Daily Flow Depression at Hopland from 3/15 to 5/14



Sediments transport along Russian River during dam releases causes riverbed erosion



Water Temperature

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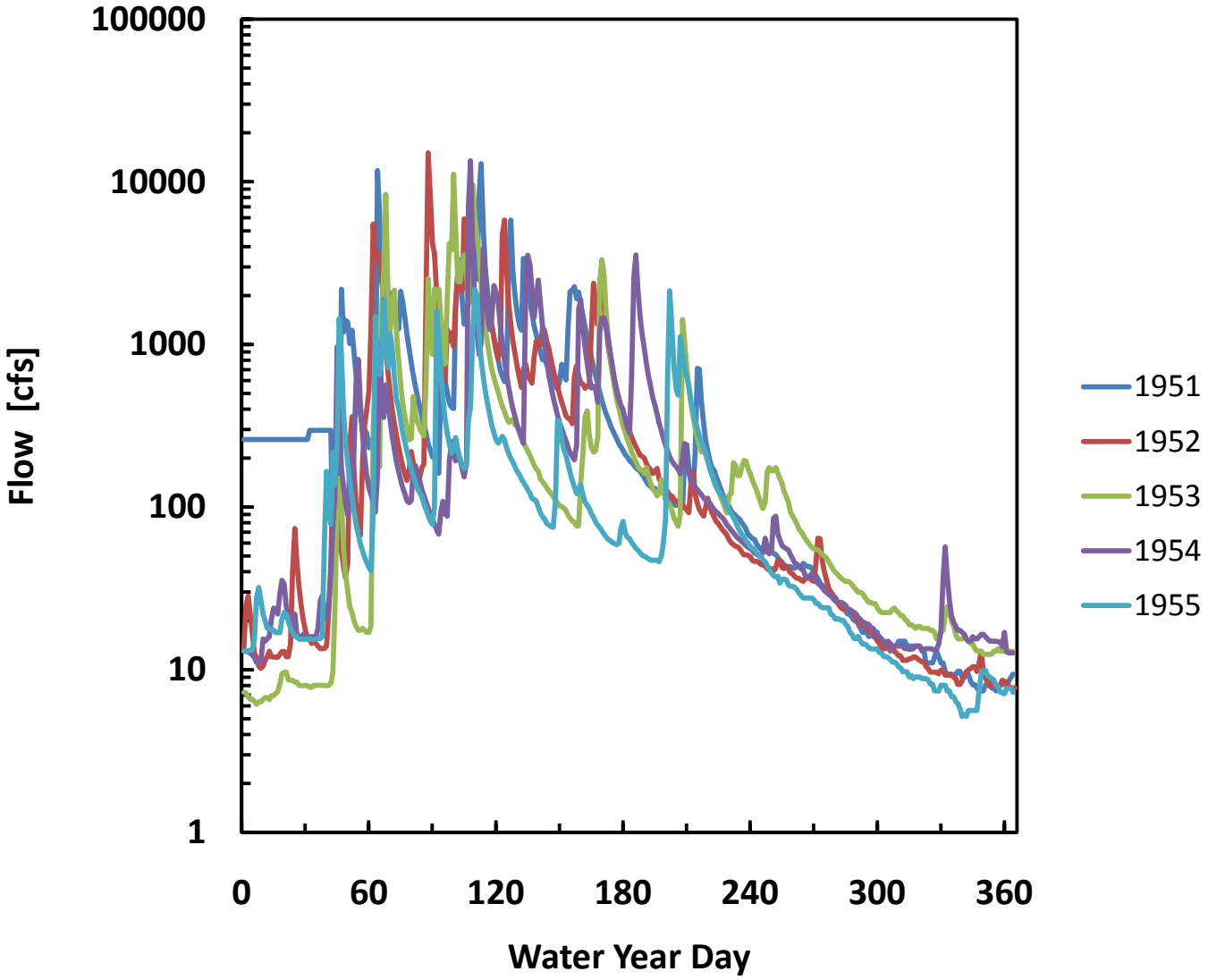
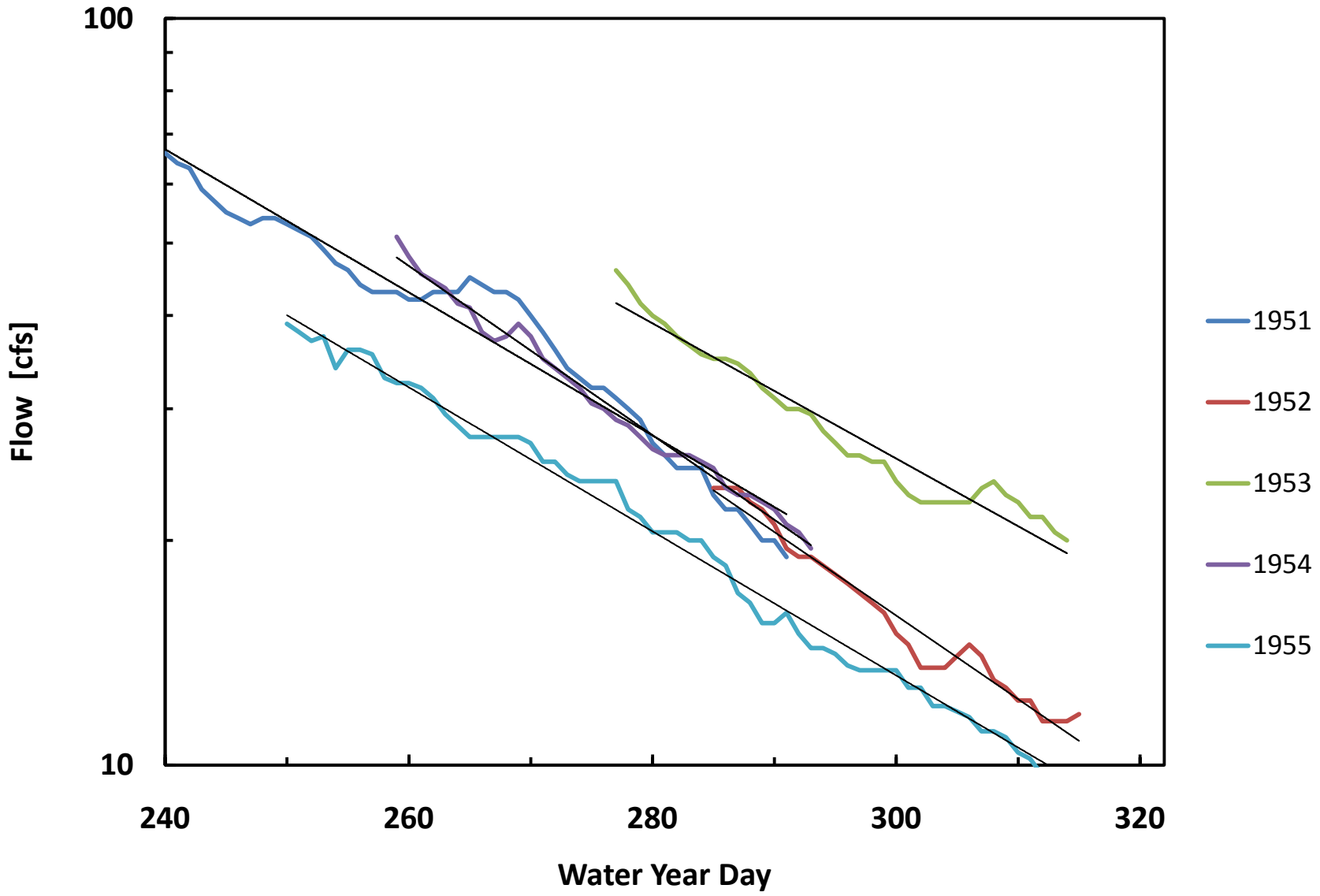
Flow and Access: Navarro River during 1951 - 1955



Flow and Access: Navarro River during 1951 - 1955



Access to the Ocean through Coastal Lagoons: San Gregorio Creek

Summary: Hydrologic processes operate at multiple spatial and temporal scales that determine Flow, Sediment, Temperature (?) and Access:

- Annual evapotranspiration was invariant over 10^4 range in watershed area
- High frequency variations in flow quantify water diversions for frost protection
- Fine sediment dynamics approached with dam releases
- Possible accelerated groundwater depletion through long-term analysis of summer flow recession
- Coastal lagoons as watershed integrators