

Flood Mitigation and Water Conservation

**Flood Control District
County of Los Angeles**

By

Iraj Nasser, P.E., Ph.D

Mission of Flood Control District

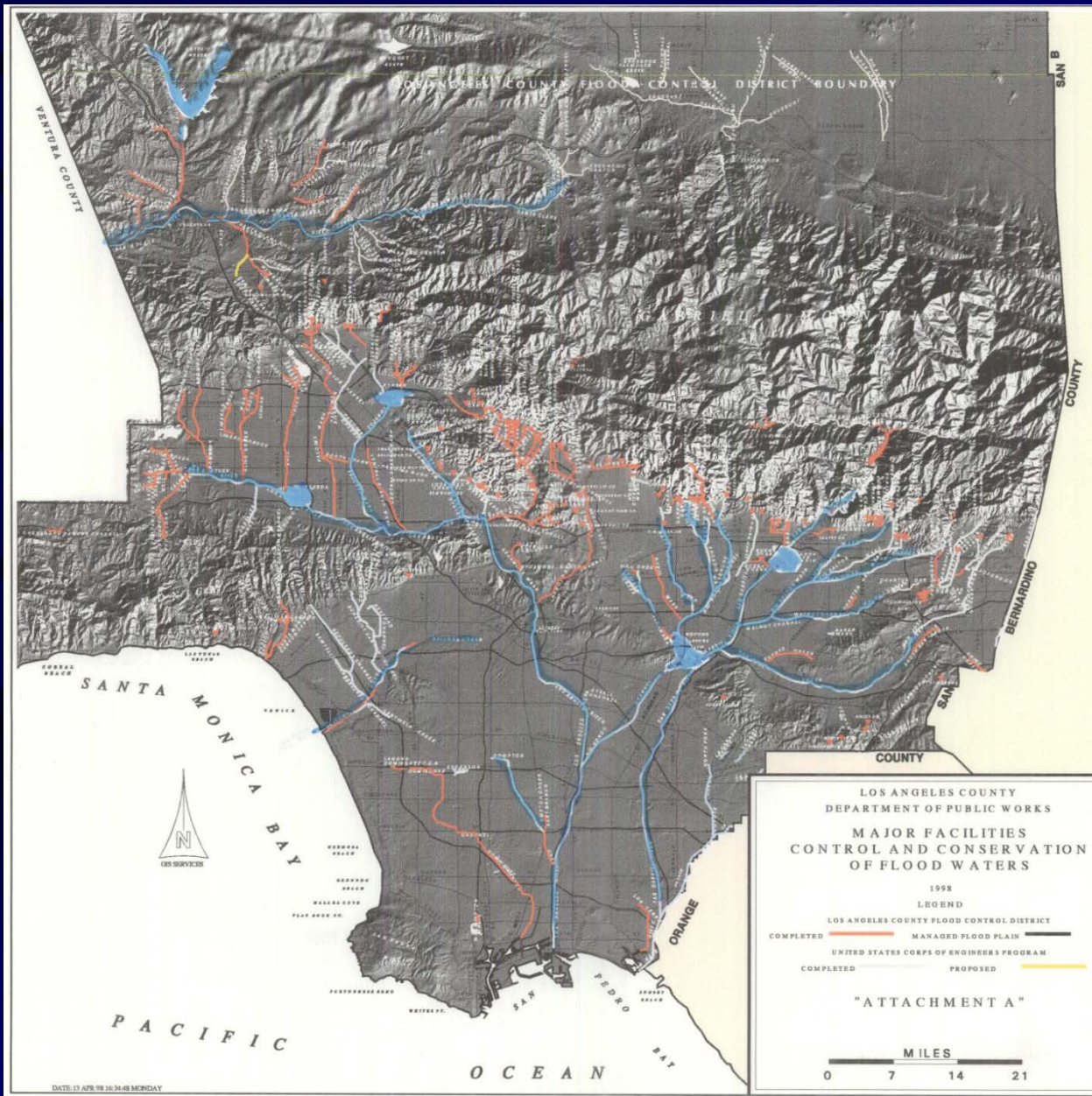
1. Control of Excess Water:

- *Storm Drains*
- *Flood Control Channels*
- *Detention Basins*
- *Debris Basins*
- *Dams and Reservoirs*
- *Pump Stations*

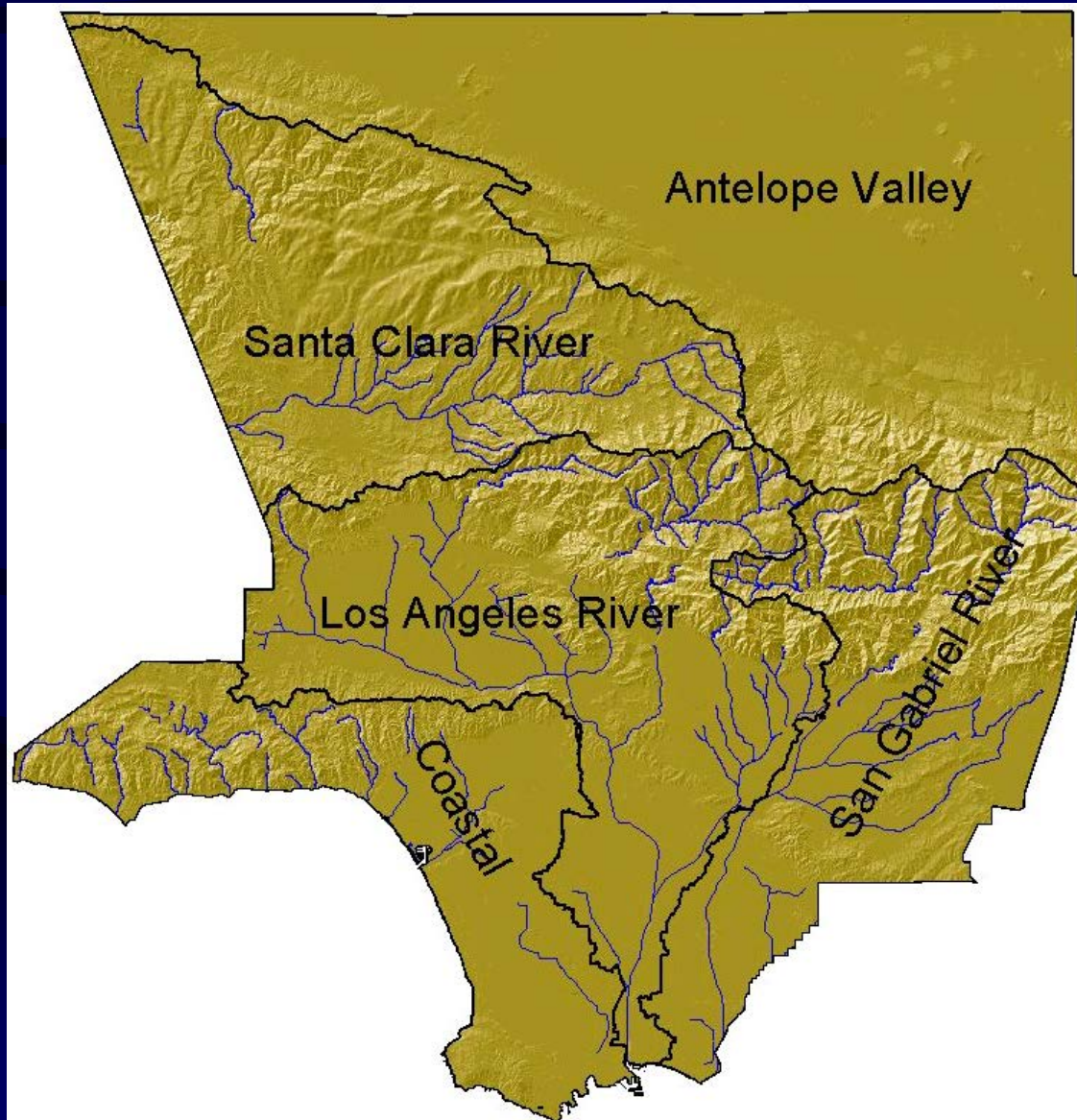
2. Water Conservation (Quantity and Quality):

- *Groundwater Recharge Basins*
- *Reservoirs – Rubber Dams*
- *Control of Seawater Intrusion*
- *Capture and Treatment of Storm Runoff Pollutants*
- *Mitigate Hydromodification Impacts*

Major Facilities Control and Conservation of Flood Waters



Major Watersheds in LA County



Los Angeles County Pictures



Coastal Area

Los Angeles County Pictures



Coastal Wetland

Los Angeles County Pictures



Desert Area Near Lancaster

Los Angeles County Pictures



Antelope Valley

Los Angeles County Rivers and Channels



Malibu Creek

Los Angeles County Rivers and Channels



Bouquet Canyon

Los Angeles County Rivers and Channels



Upper Portion of San Gabriel River

Los Angeles County Rivers and Channels



Santa Clara River Downstream of Magic Mountain Parkway

Hydrologic Data Collection

Hydrologic Data Collection

A rain gage is used to measure the amount of rainfall at a point of observation.

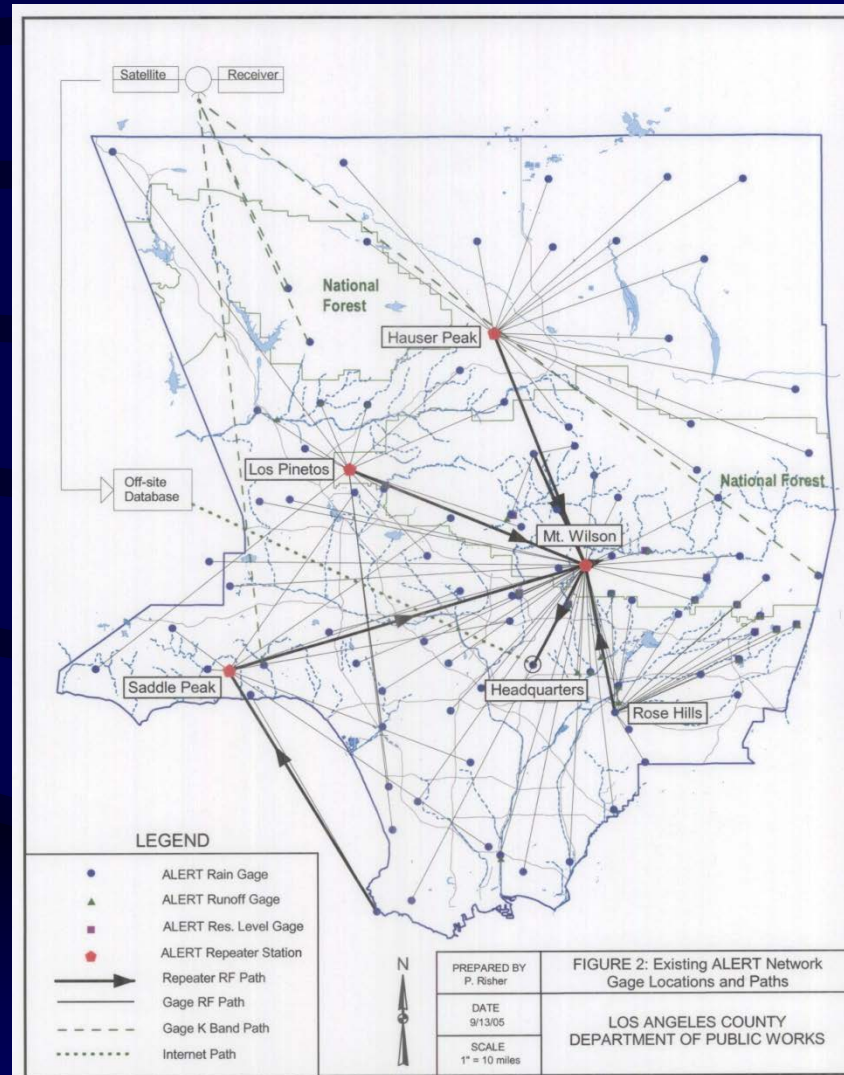


An outflow recorder is used to measure the amount of surface runoff at a point of observation.



The accurate measurement of rainfall and runoff is the essential foundation for quantitative hydrologic analyses.

Hydrologic Data Collection



LA County ALERT Network: Gage Locations and Paths

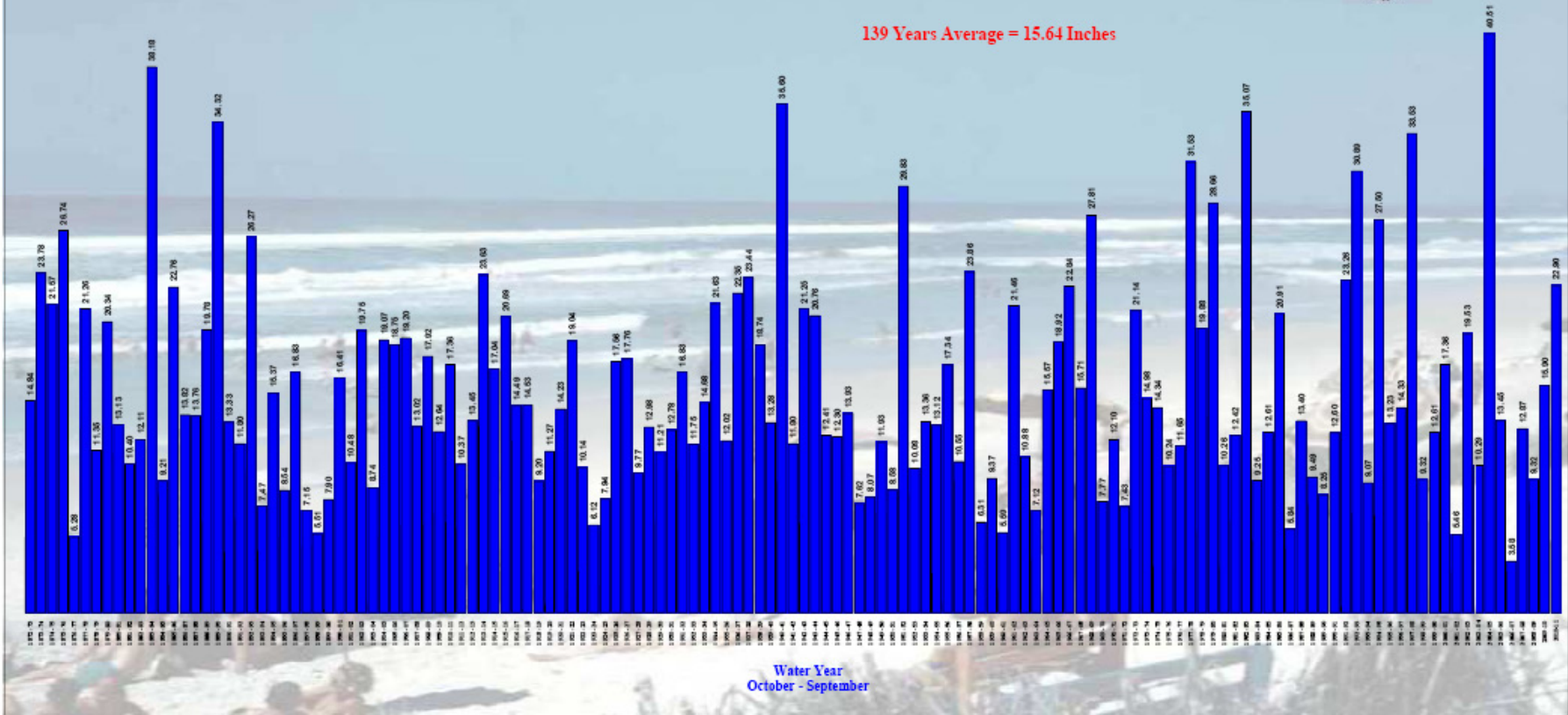
Hydrologic Data Collection

Los Angeles Annual Rainfall 1872 - 2011 (Standard Rain Gage No. 716 , Downtown Los Angeles)



139 Years Average = 15.64 Inches

Inches



Los Angeles Annual Rainfall 1872-2011

Hydrologic Data Collection

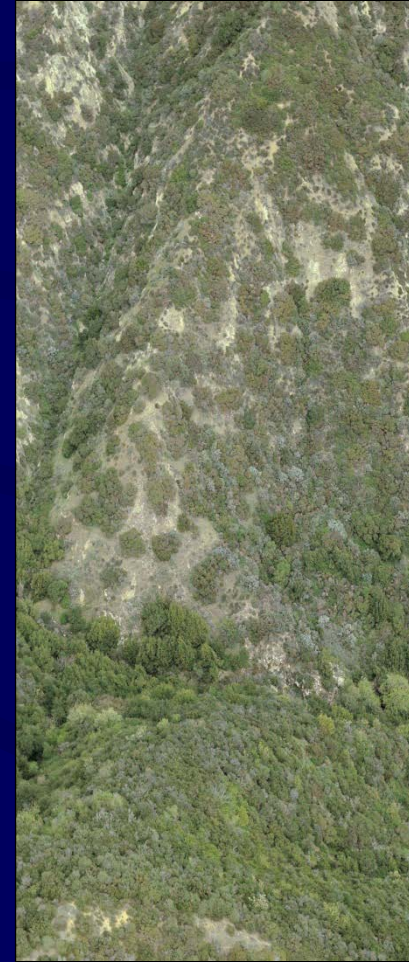
Industrial/Commercial



Residential



Rural



Different Types of Land Use

Hydrologic Data Collection



Street Flow After 1938 Storm

Hydrologic Data Collection



Appian Way in Long Beach After 1938 Storm

Hydrologic Data Collection



*Flooded Sump at Intersection of San Fernando Road and Tuxford Street
After January 2005 Storms*

Control of Debris Flows

Control of Debris Flows



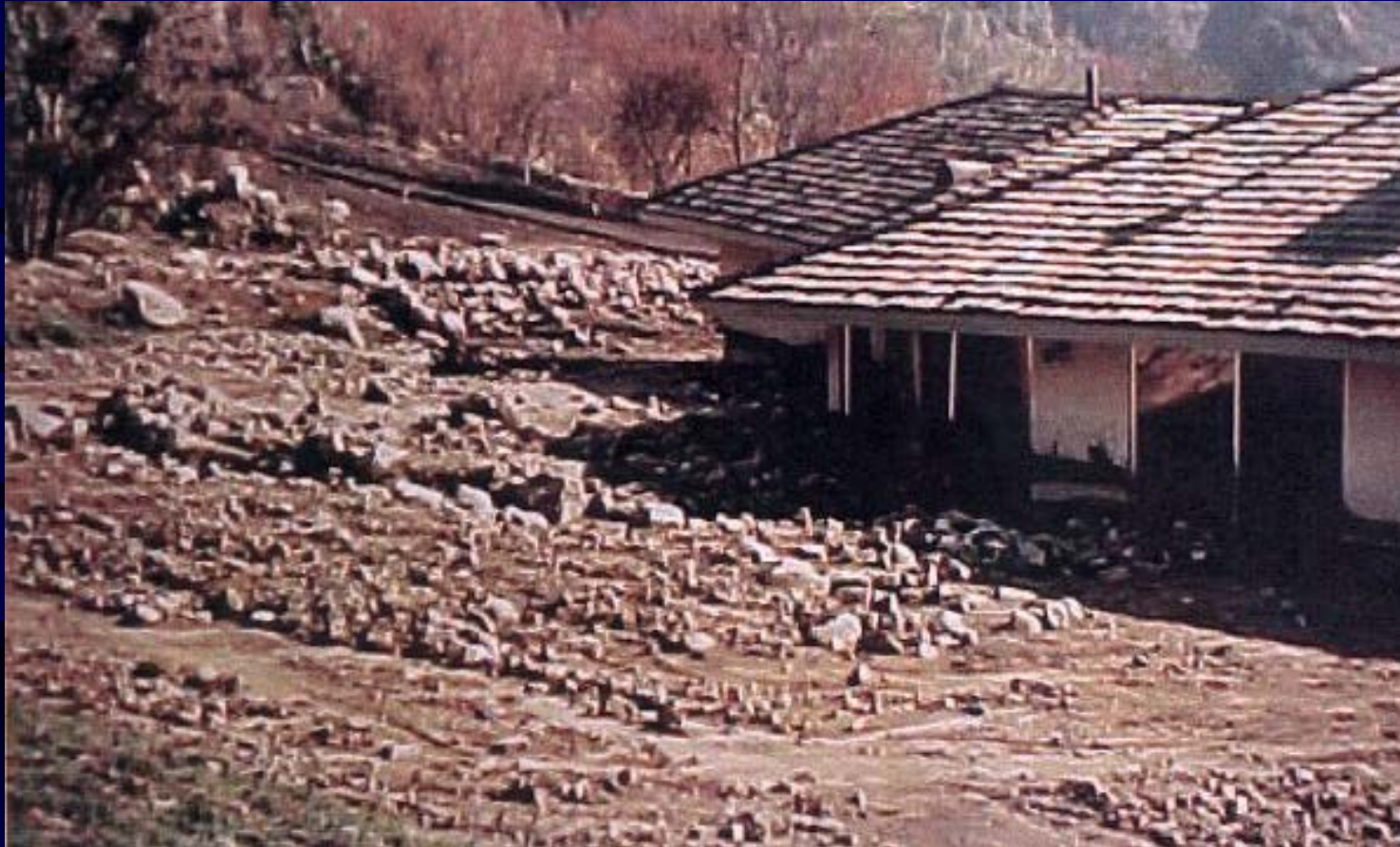
Williams Fire of 2002 in the San Gabriel Mountains, Viewed from Santa Fe Dam

Control of Debris Flows



Downstream of Hook Canyon in Glendora After 1969 Storms

Control of Debris Flows



Glencoe Heights After 1969 Storms

Control of Debris Flows



Buena Vista Debris Basin

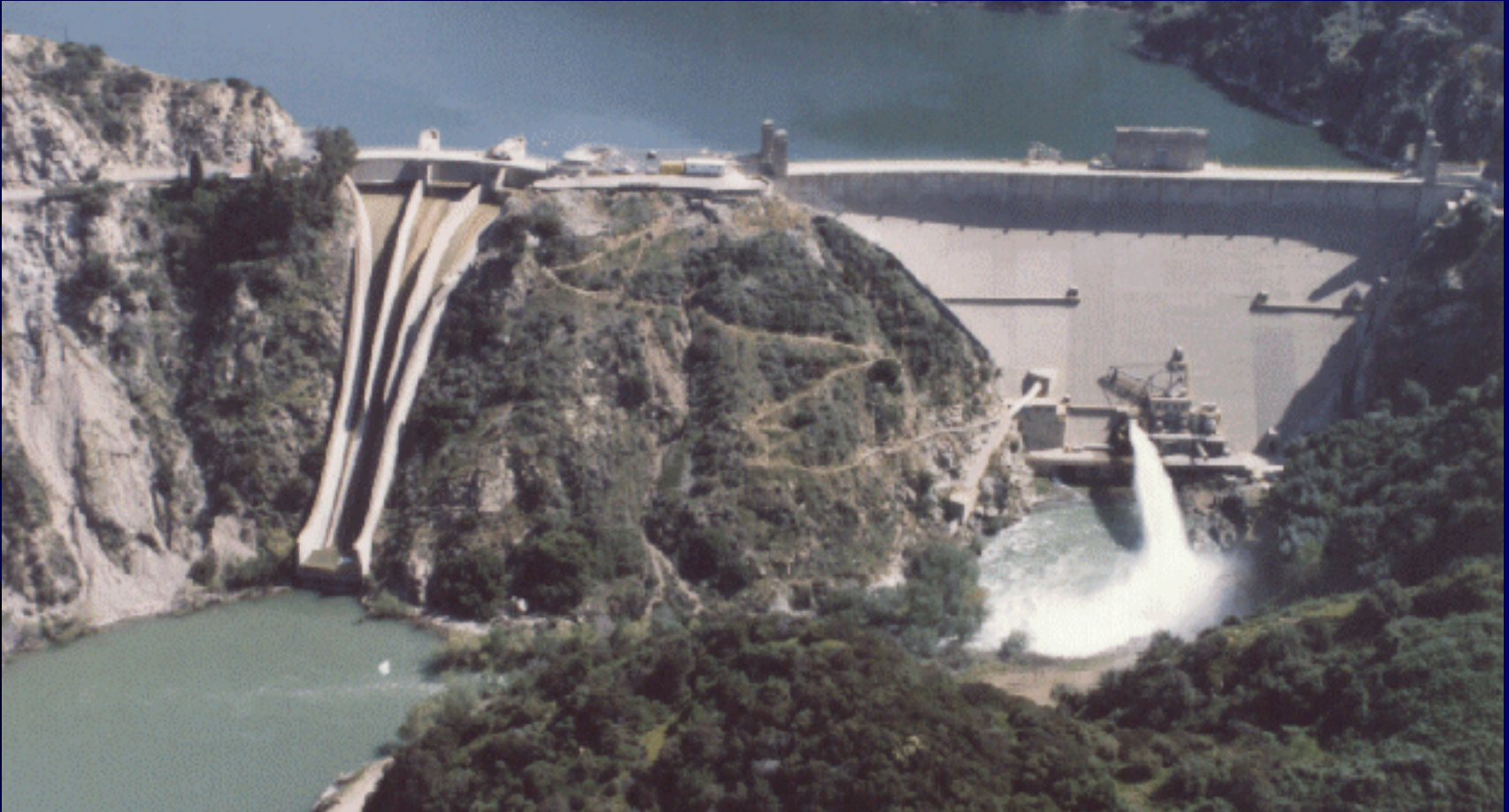
Dams and Reservoirs

Dams and Reservoirs



Big Dalton Dam and Reservoir

Dams and Reservoirs



Morris Dam

Dams and Reservoirs



San Gabriel Reservoir

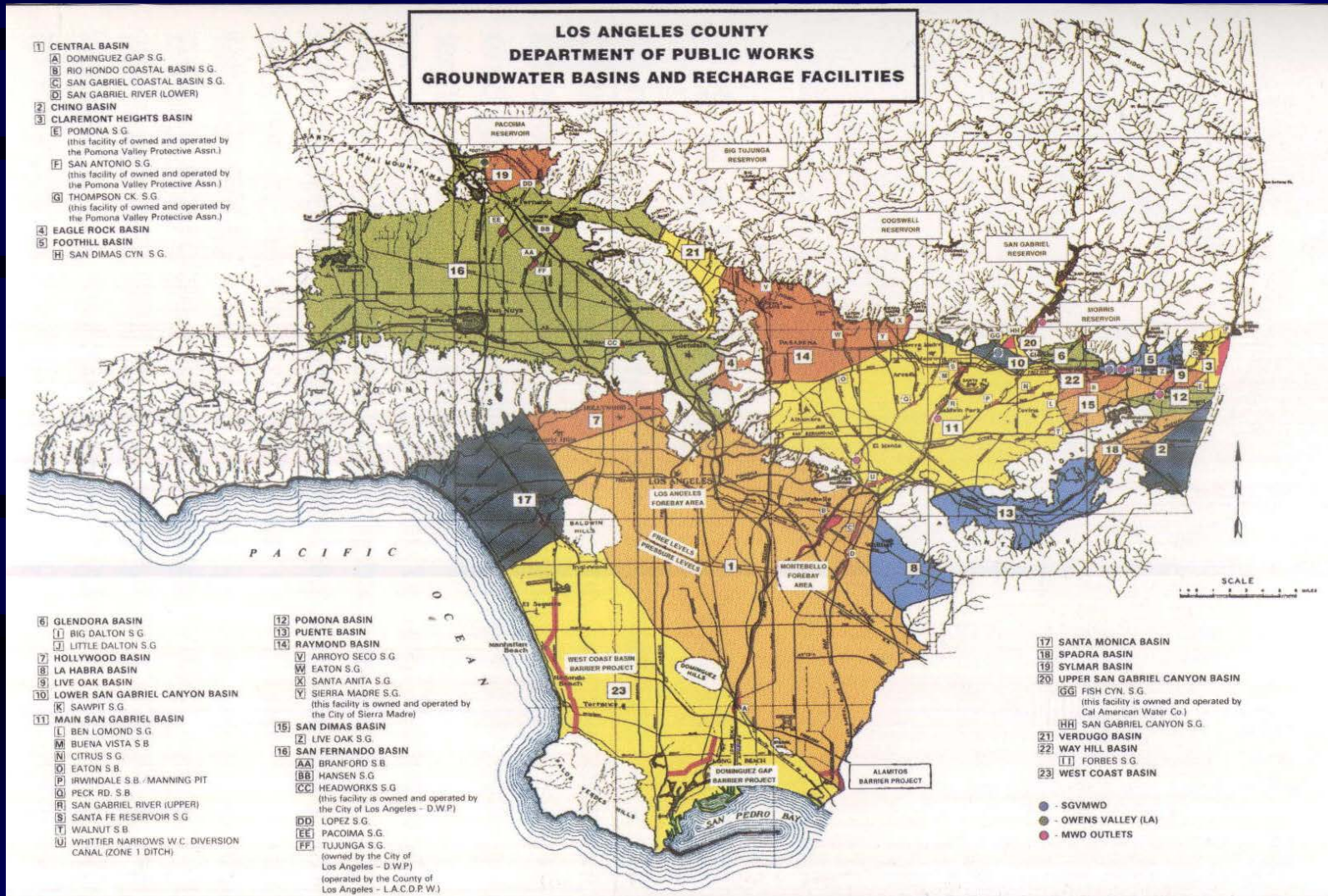
Dams and Reservoirs



Rubber Dam Located in the Lower Portion of the San Gabriel River

Water Conservation (Quantity and Quality)

Water Conservation (Quantity and Quality)



Map of Groundwater Basins and Recharge Facilities in LA County

Water Conservation (Quantity and Quality)



Major Aqueducts in California

Water Conservation (Quantity and Quality)



Arroyo Seco Spreading Grounds in Pasadena

Water Conservation (Quantity and Quality)

Seawater Barriers

PURPOSE:

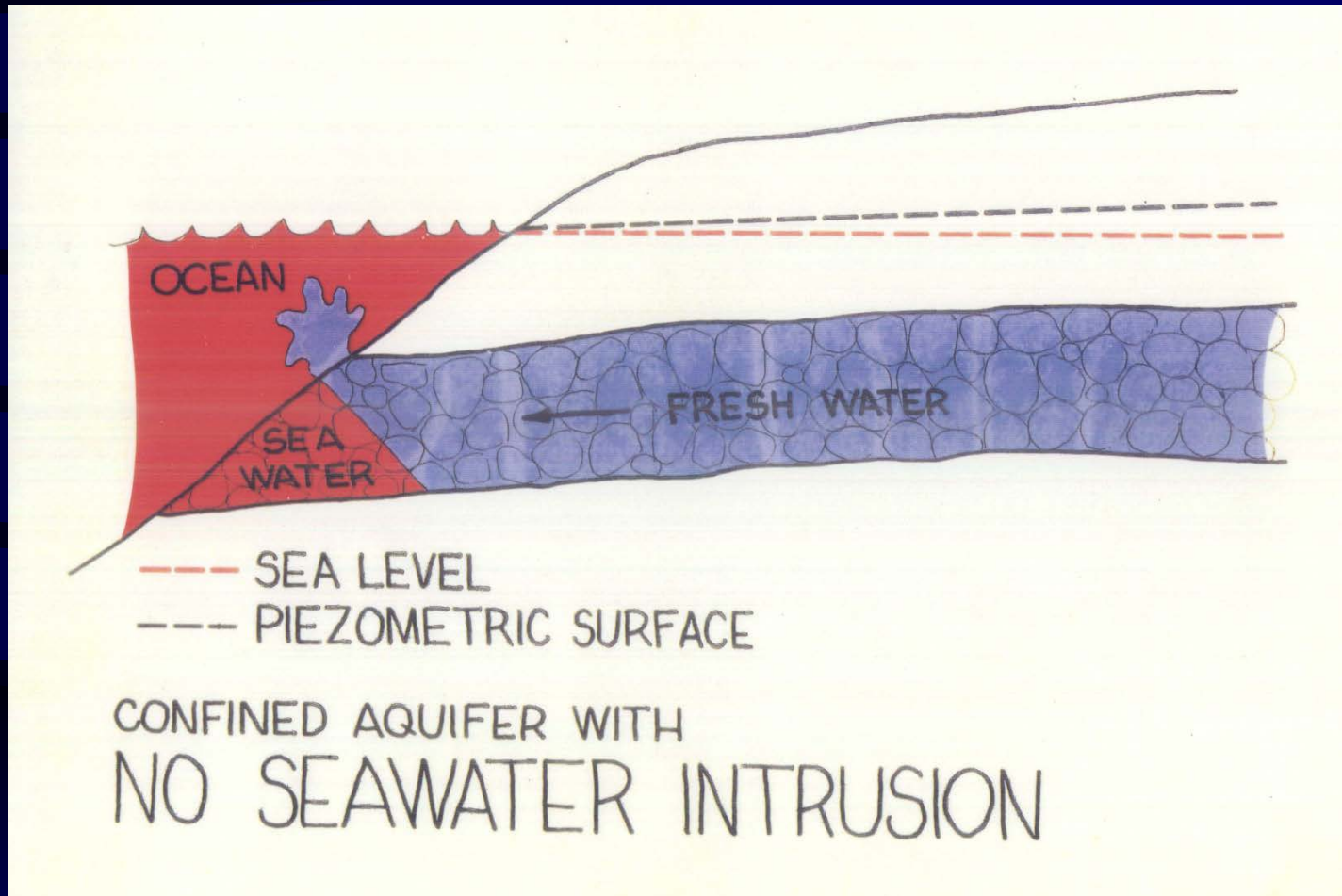
Seawater Barriers protect a significant portion of the area's drinking water supply by essentially forcing out ocean water which constantly attempts to migrate into existing aquifers. Treated reclaimed and imported water is injected deep into geologic formations.

LADPW – Water Resources Division operates and maintains 3 Seawater Barriers along the California coastline:

- 1) Alamitos Barrier**
- 2) West Coast Basin Barrier**
- 3) Dominguez Gap Barrier**

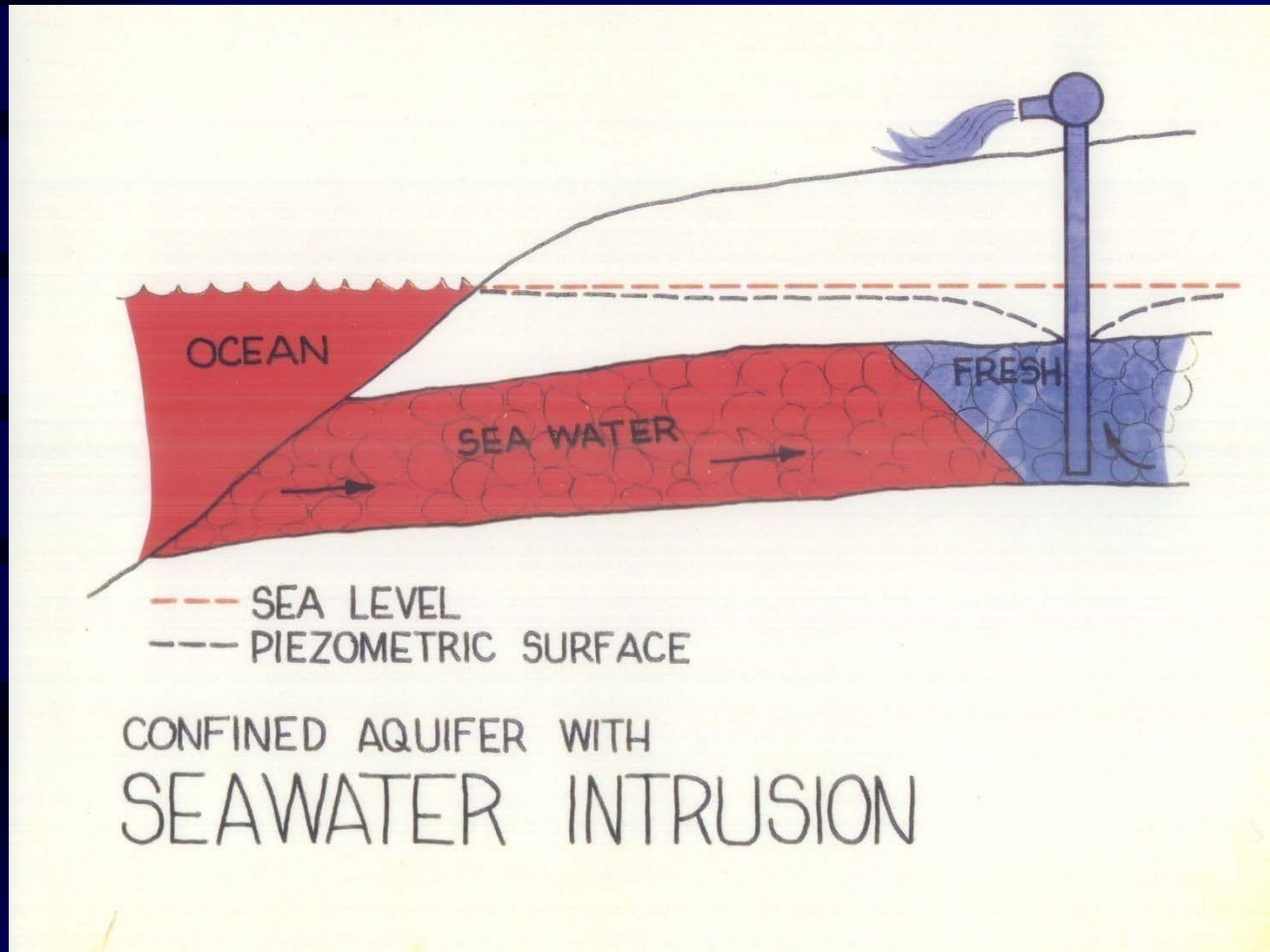


Water Conservation (Quantity and Quality)



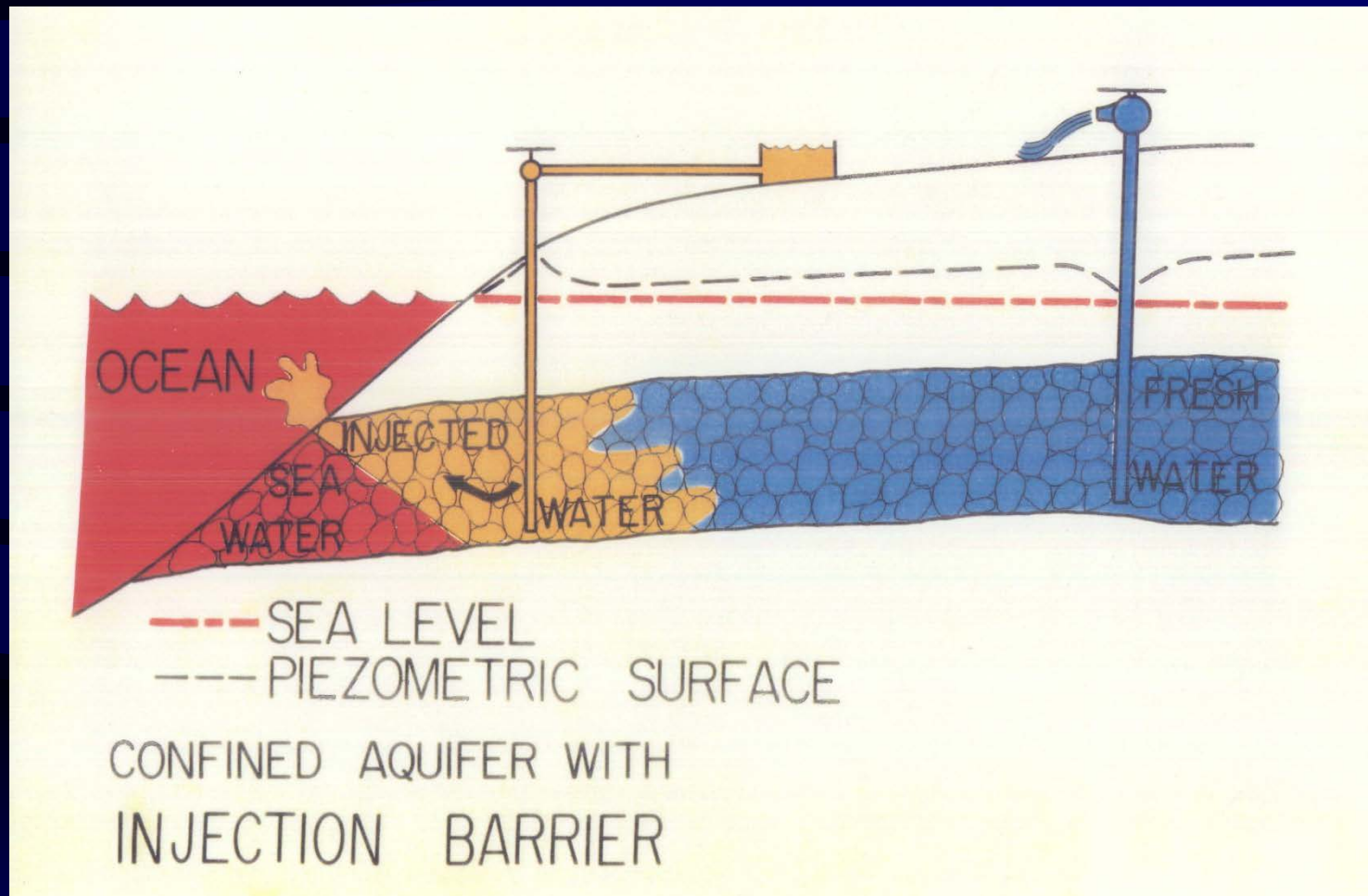
Confined Aquifer with no Seawater Intrusion

Water Conservation (Quantity and Quality)



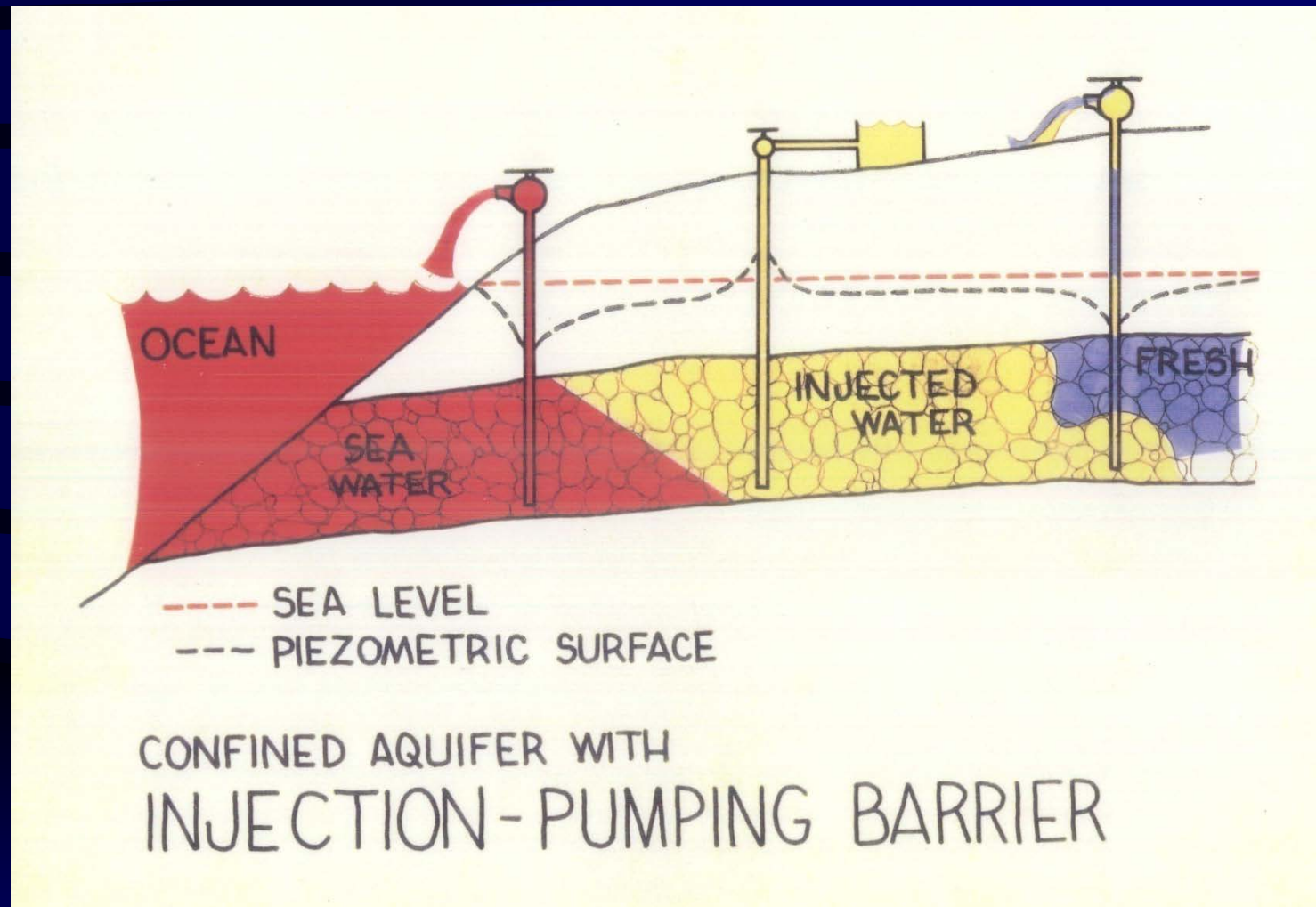
Confined Aquifer with Seawater Intrusion

Water Conservation (Quantity and Quality)



Confined Aquifer with Injection Barrier

Water Conservation (Quantity and Quality)



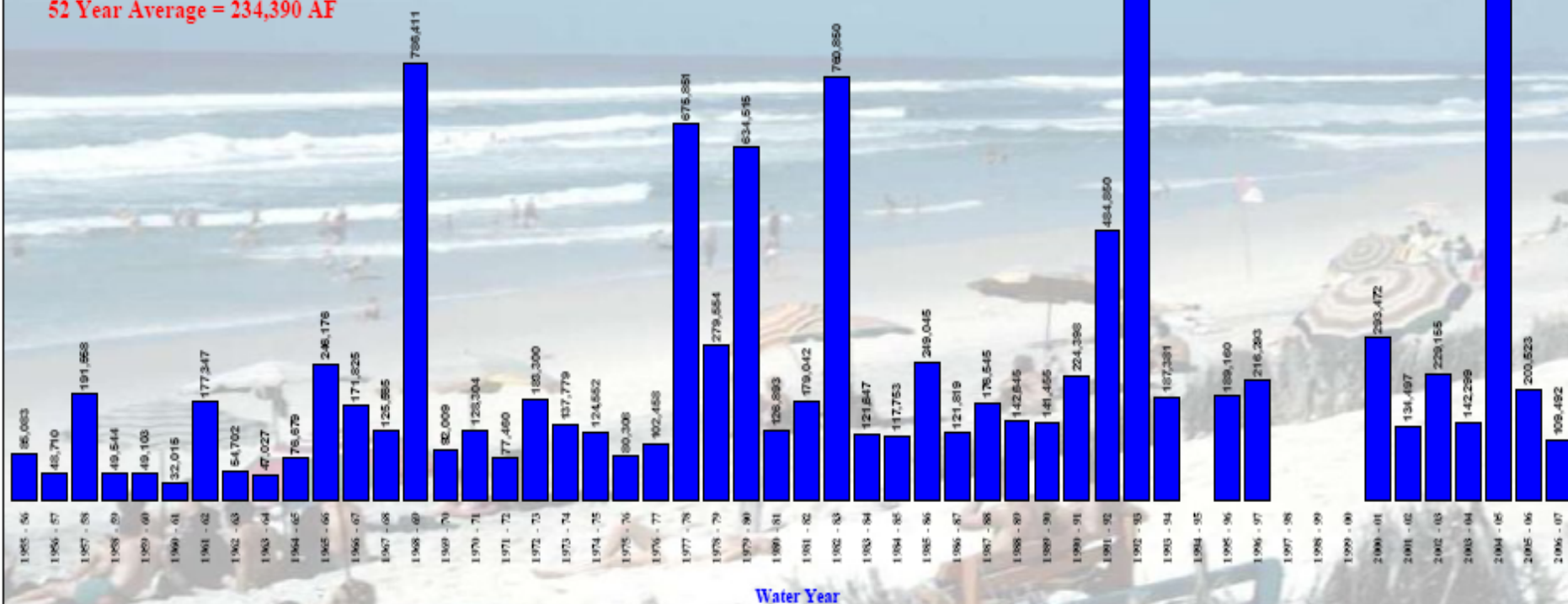
Confined Aquifer with Injection-Pumping Barrier



Los Angeles River Annual Runoff Volume (Ac-Ft) 1955 -2007

(Station F319, L.A. River below Wardlow Rd.)

52 Year Average = 234,390 AF



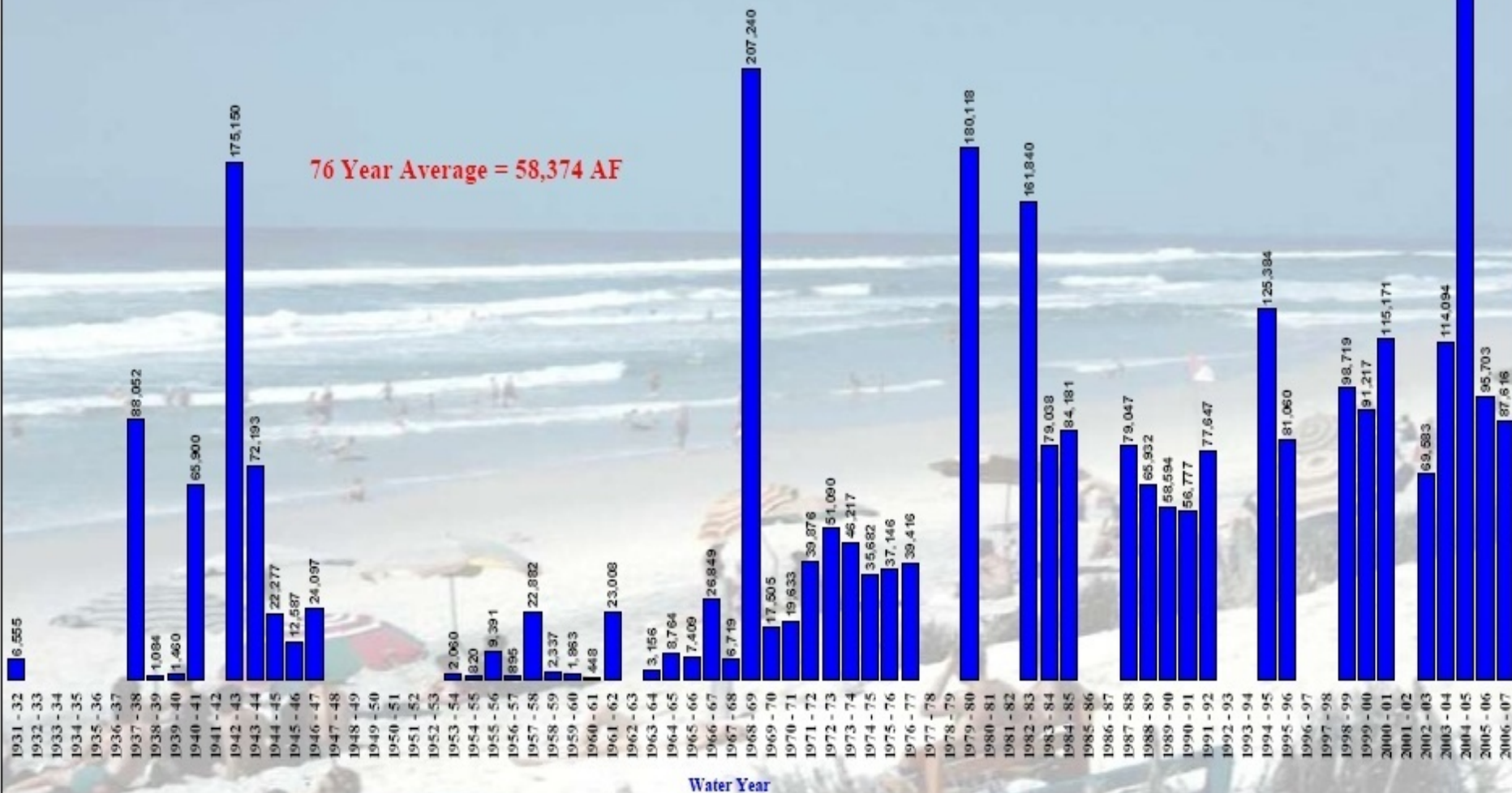
Water Year



San Gabriel River Annual Runoff Volume (Ac-Ft) 1931 -2007

(Stations F42 & F42B, San Gabriel River Above Spring St.)

76 Year Average = 58,374 AF



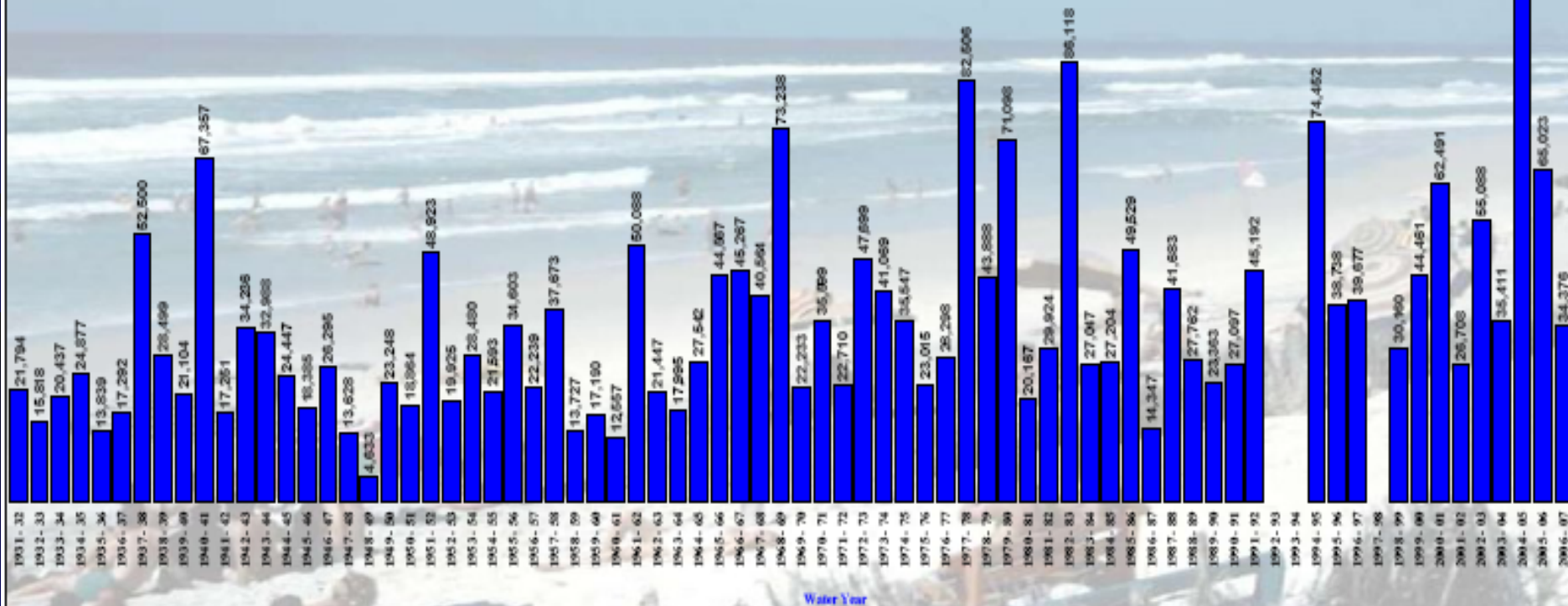
Water Year



Ballona Creek Annual Runoff Volume (Ac-Ft) 1931-2007

(Stations F38, F38B, & F38C, Ballona Creek Above Sawtelle Blvd.)

76 Year Average = 35,433 AF



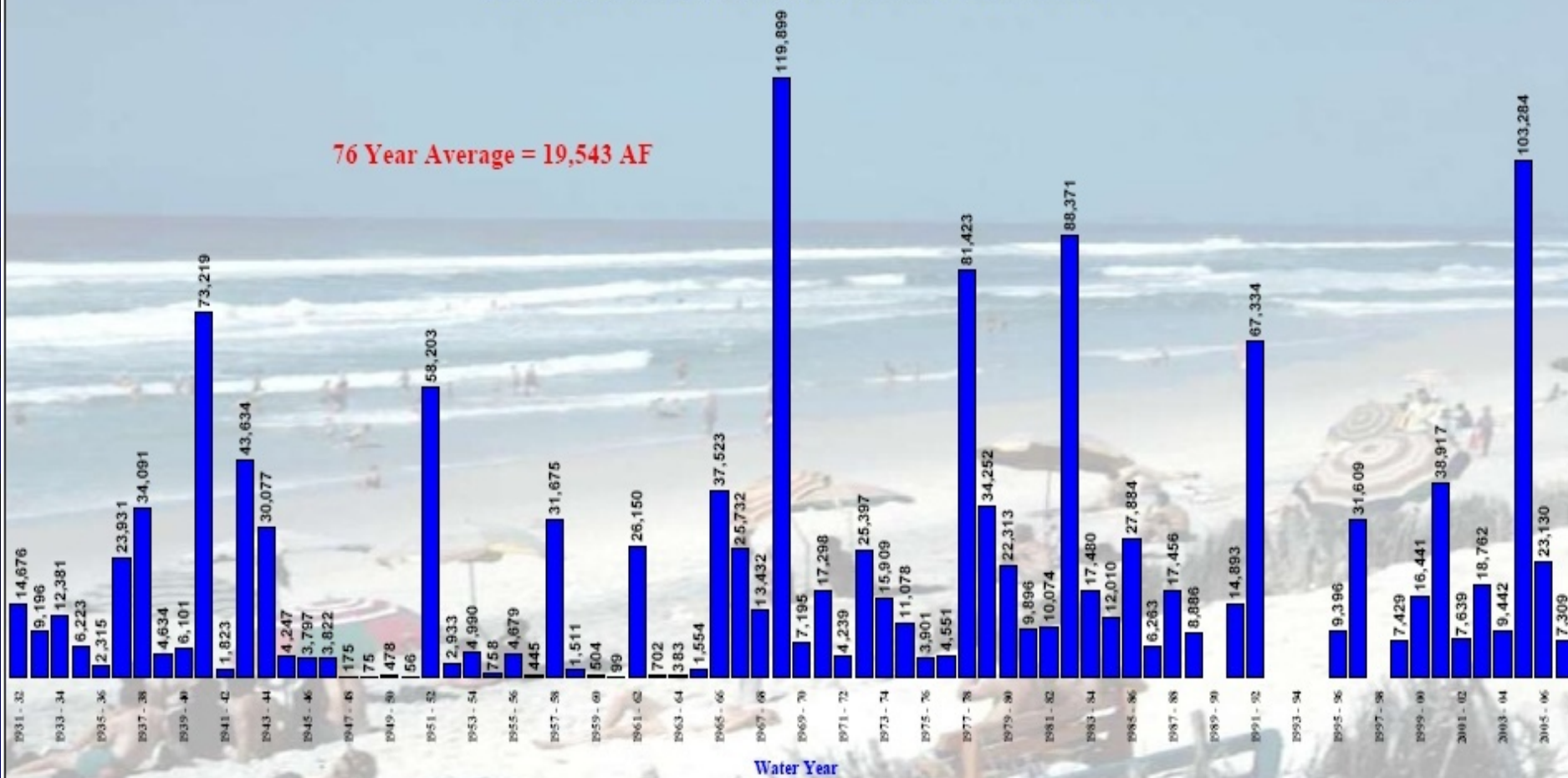
Water Year



Malibu Creek Annual Runoff Volume (Ac-Ft) 1931-2007

(Station F130, Malibu Creek below Cold Creek)

76 Year Average = 19,543 AF



Water Year

LONG TERM STORAGE POTENTIAL OF SURFACE WATER IN LOS ANGELES COUNTY

LOS ANGELES RIVER	234,390 AC-FT/YR
SAN GABRIEL RIVER	58,374 AC-FT/YR
BALLONA CREEK	35,433 AC-FT/YR
MALIBU CREEK	19,543 AC-FT/YR
TOTAL	347,740 AC-FT/YR

LONG TERM STORAGE POTENTIAL FOR CONJUNCTIVE USE IN LOS ANGELES COUNTY

SAN FERNANDO VALLEY BASINS	150,000 AC-FT
RAYMOND BASIN	144,000 AC-FT
SAN GABRIEL BASIN	400,000 AC-FT
COASTAL BASIN	1,089,000 AC-FT
TOTAL	1,783,000 AC-FT

Hydrologic Cycle

