Jason Uhley

General Manager - Chief Engineer

Local Government Commission

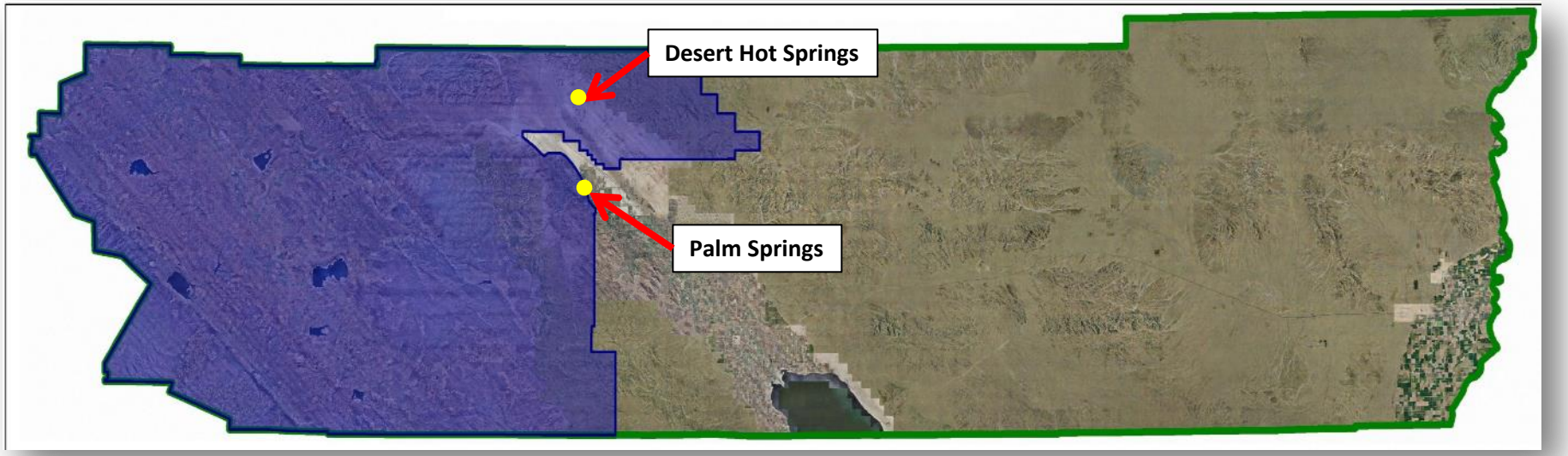
Sept 12., 2019

Today's Presentation

- Who is Riverside County Flood Control?
- Watershed History
- Where next

The District

- Special District Created in 1945
- Purpose: Plan, design, construct, operate and maintain major stormwater management facilities
- 2,700 square miles – western 40% of county
  - > Jurisdiction within cities (unlike some county depts.)

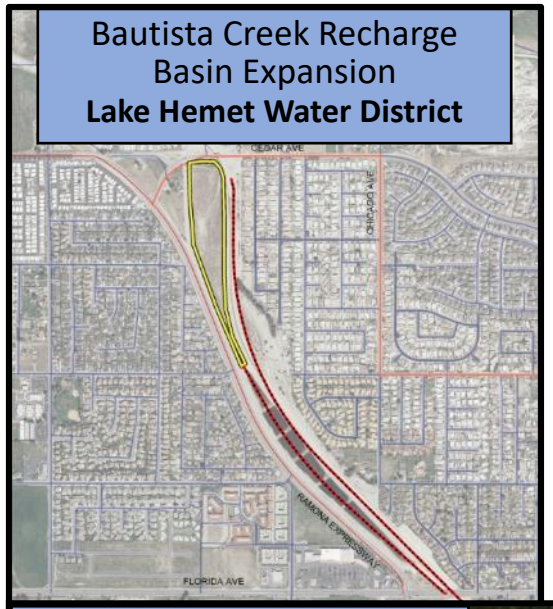


RCFC District Boundary

Flood Control

Storm Drains,Channels, Levees, Dams

Conserving stormwater… and other water supplies



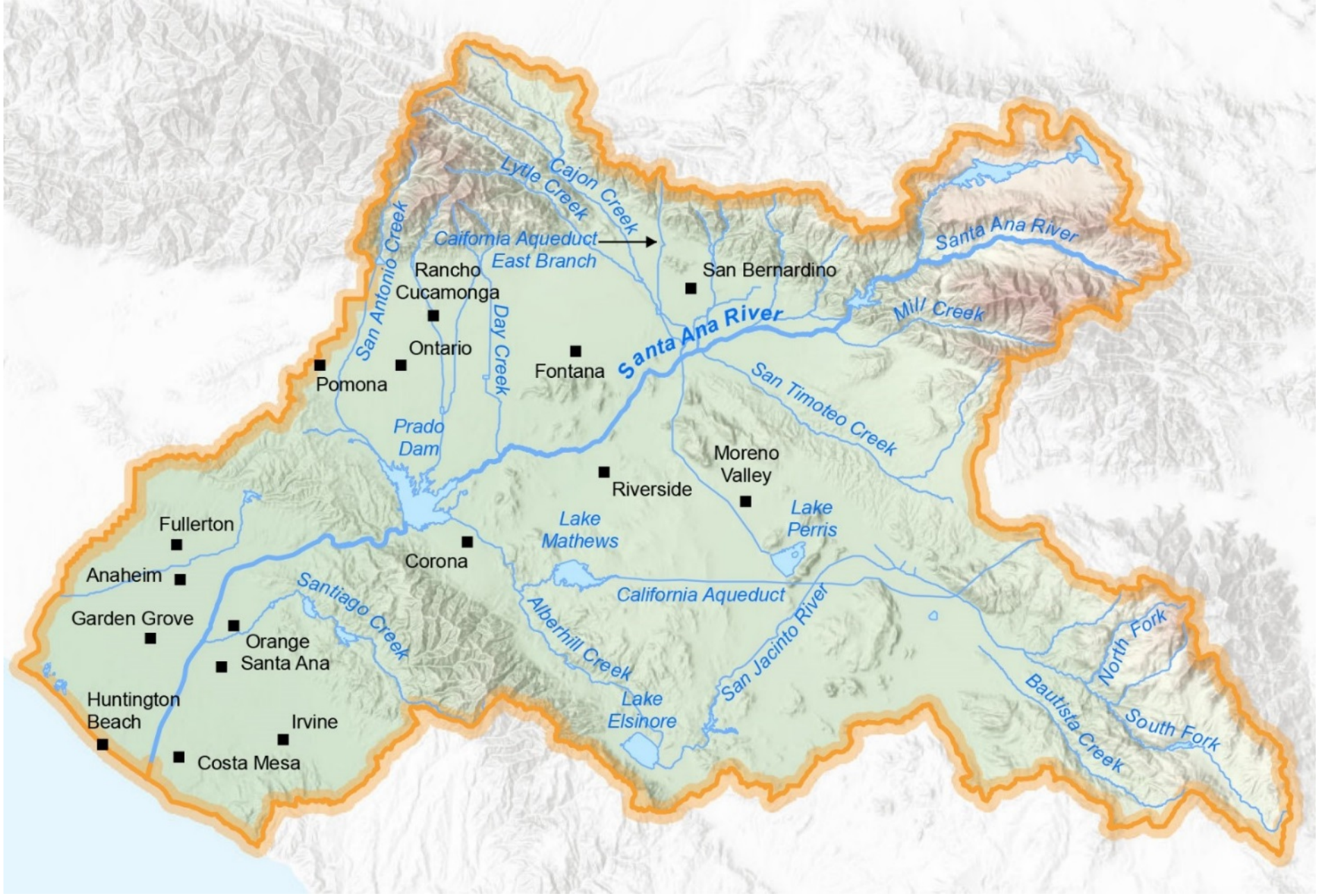
- **Groundwater Enhancement Studies**
  - Temescal Groundwater Master Plan (Corona/EVMWD)
  - Coldwater Creek Groundwater Master Plan (Corona)
  - Arlington Groundwater Desalter Expansion (WMWD)
- **Enhanced Flood Control Master Drainage Plans**
  - West Desert Hot Springs (MSWD)
  - Moreno
  - Lakeland Village
- **Recharge Projects**
  - Arlington Desalter Recharge Expansion Phase II (WMWD)
  - Bautista Creek Recharge Basin Expansion (LHWD)
  - Coldwater Creek Recharge Basin Rehabilitation (Corona)
  - Lincoln/Cota Street Recharge Basin Diversion (Corona)
  - Elsinore Line A Debris Basin (EVMWD)
  - Little Lake Basin Expansion (LHWD)
  - Meridian Channel Diversion Project (EMWD)
  - Mockingbird Reservoir Dredging Project (Riverside)
  - Noble Creek Recharge Basin Expansion (BCVWD)
  - Riverside / Corona Dams Reoperation (Riverside/Corona)
  - San Jacinto River Recharge Basin (EMWD)

Today's Presentation

- Who is Riverside County Flood Control?
- Watershed History
- Where next

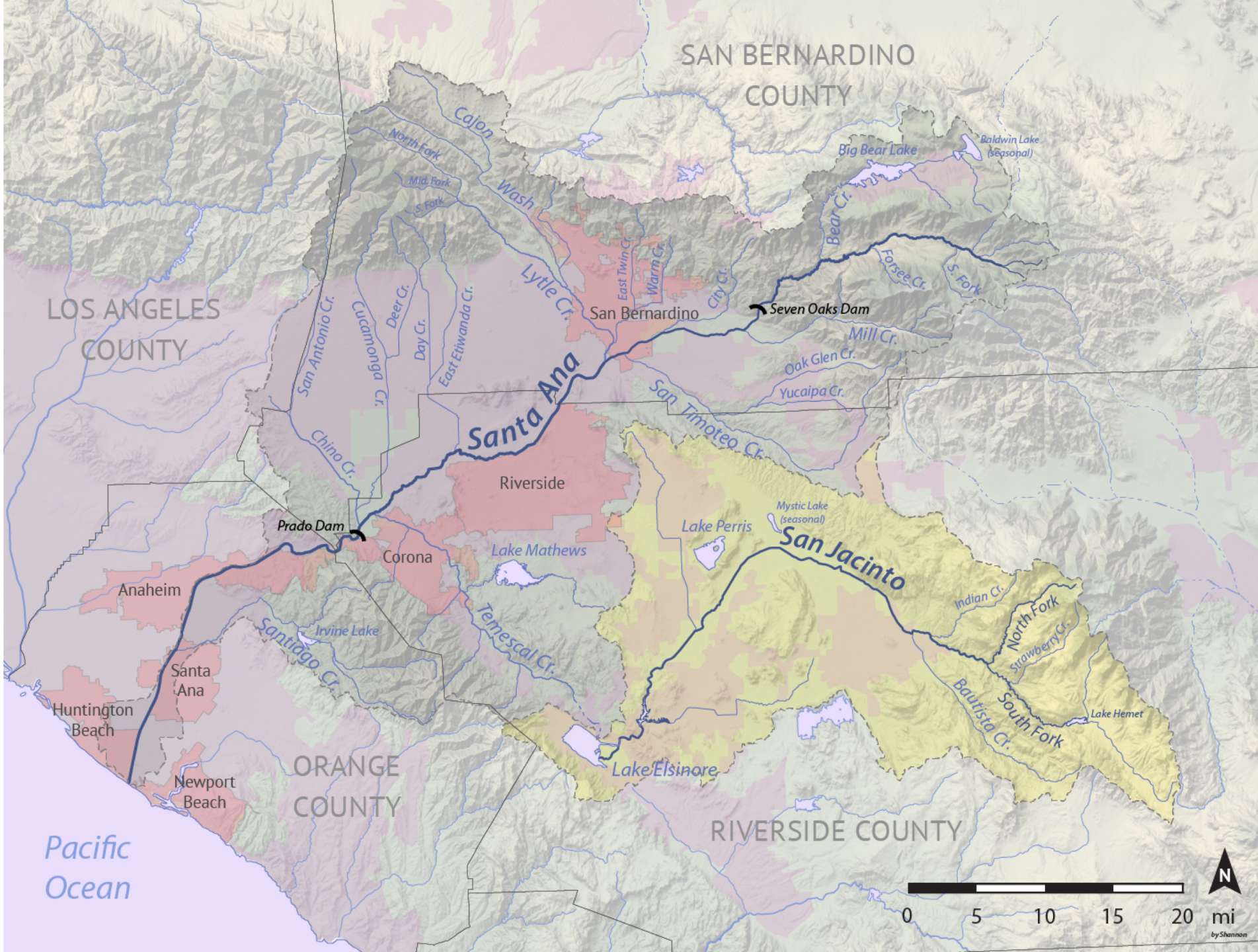
Santa Ana Watershed

- 2,650 sq mi.
- 6 million residents
- 4 counties
- Largest watershed in southern California



Early History

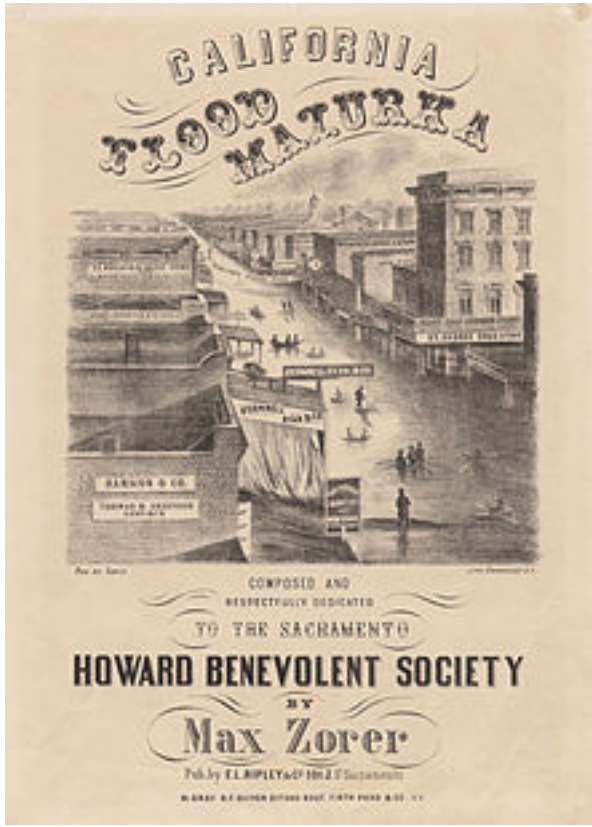
- Early Man – ~9,000 B.C.
- Mission Period – Circa mid 1700s
- Rancho Period – Circa early 1800s
  - Primarily cattle ranches
- Citrus Period – Circa 1870's
  - Transcontinental railroad, refrigerated rail cars
- Urban period – Starting 1950's
- Getting Complicated Period – 1970's
- Integration period – starting 2000's



1862 Changed Everything

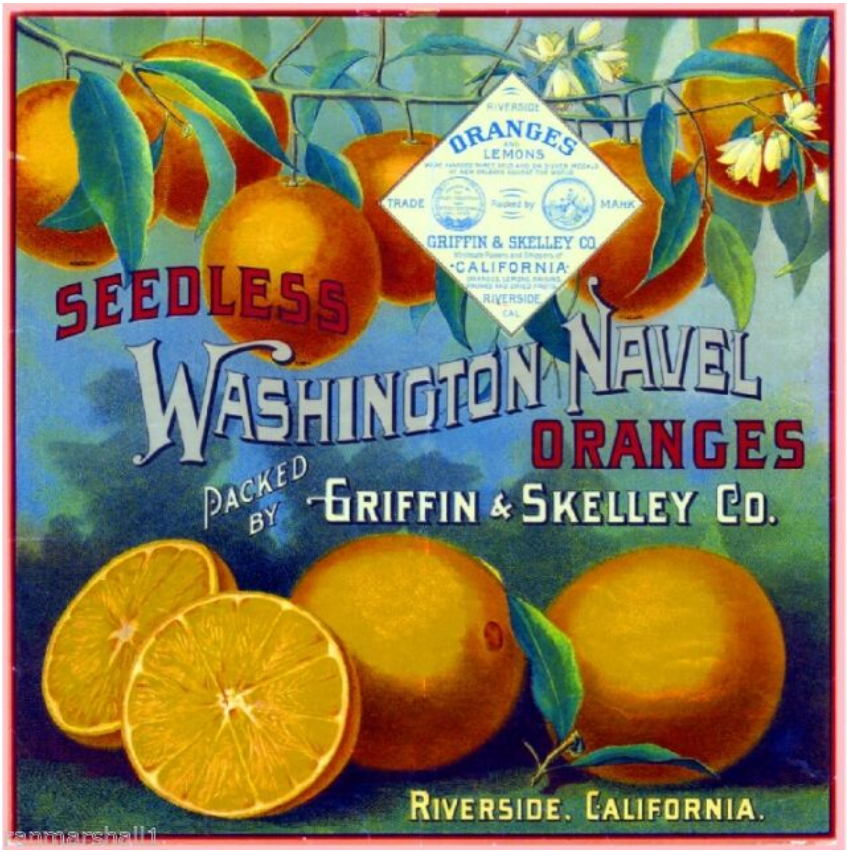
- Great Flood of 1862
  - 10 Feet of rain in 28 days
  - Impact from Washington to San Diego
  - The Los Angeles, San Gabriel and Santa Ana River Deltas MERGED.
    - Govt surveys indicated solid expanse of water from Signal Hill to Huntington Beach
  - Arkstorm event

  - 200,000 cattle drowned in Anaheim
  - Sacramento abandoned from Dec 1861-March 1862
  - Factoid: Los Angeles Population ~5,000 people
  - Severe statewide drought followed, effectively wiped out state's cattle industry



Citrus Period

- From Backwater to 90210
  - Wiping out cattle industry set stage for citrus
  - Shift to increased irrigated agriculture
  - Transcontinental railroad Act - 1862
  - Transcontinental railroad completed - 1869
  - First refrigerated railcar – 1870
  - City of Riverside Founded – 1870
  - Gage Canal Completed - 1870
  - Seedless Oranges introduced to Riverside - 1873
  - Also beginning of shift from wheat to citrus - 1880
  - Santa Fe Railroad reaches Riverside - 1888
  - Riverside wealthiest city per capita - 1893
  - First refrigerated orange shipments - 1896



Flood Control Act of 1936

- Depression Era Legislation
  - Significant commitment to protect people and property from flooding;
  - Established US Army Corps of Engineers as lead for federal flood protection projects
  - Los Angeles County Receives $70 million for LA River Project – almost ¼ of total available funds under the Act
  - Authorized Prado Dam

1938 Floods

Santa Ana River flooding – March 1938

1941- Prado Dam

162 ft high

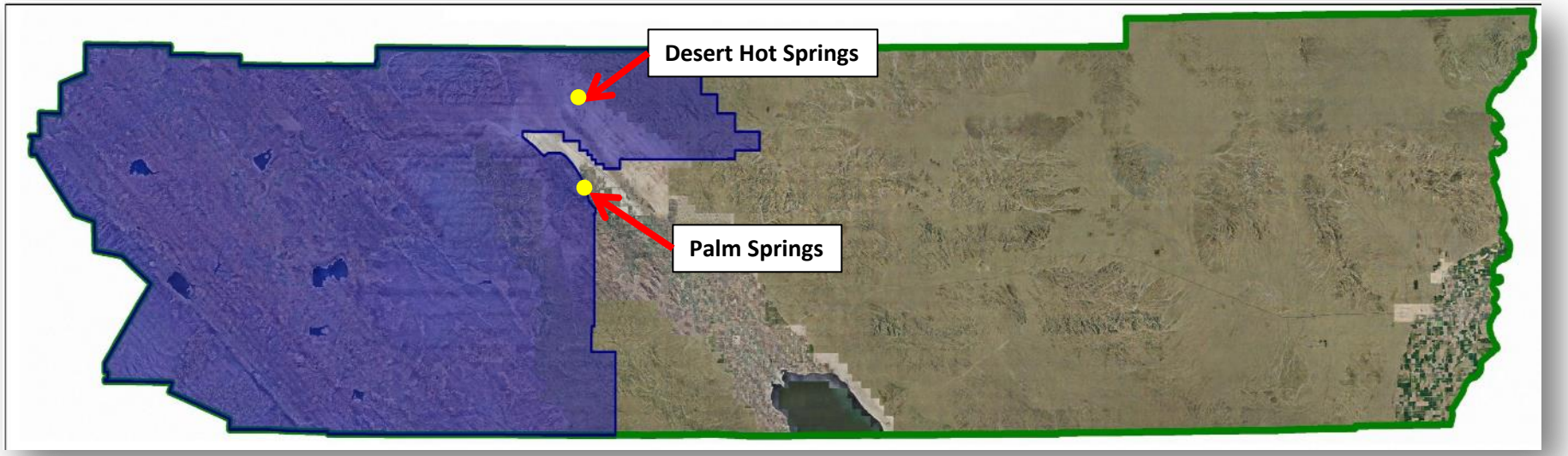
2,280 ft long

314,000 AF of storage

Controls 2,230 sq mi

Riverside Flood – Created 1945

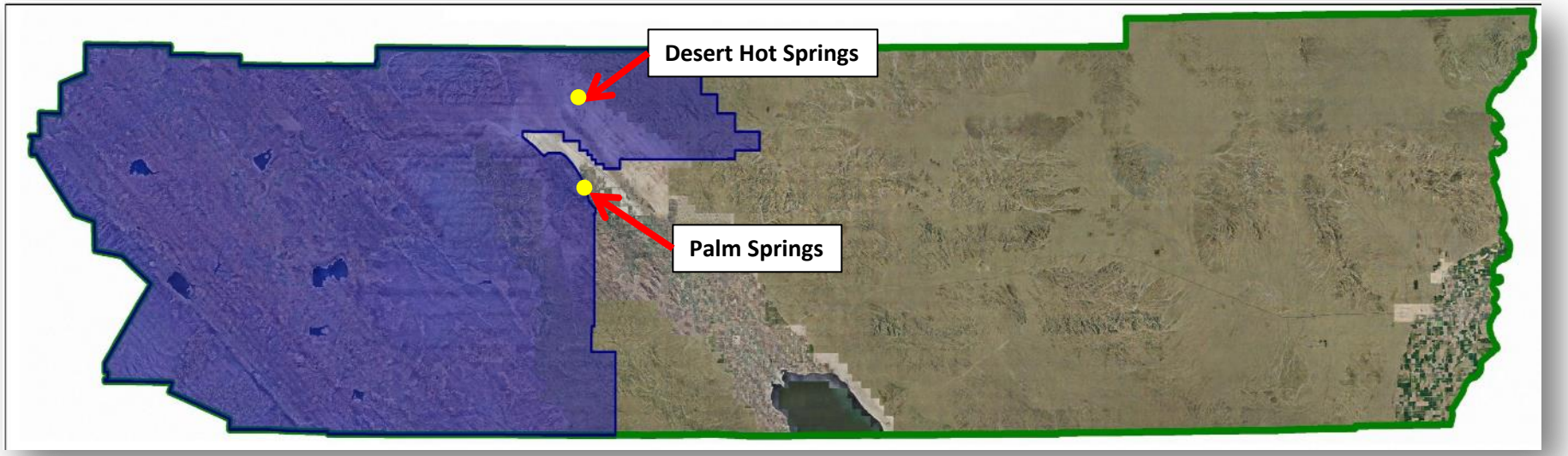
- Federal Flood Control Act of 1936 –
  - Empowers US Army Corps of Engineers to pursue flood projects
  - Provides federal funding for flood control projects
  - USACE favors projects in areas with dedicated flood control districts
- County Surveyor AC Fulmor recommends formation of flood control district in 1944



RCFC District Boundary

Riverside Flood – Created 1945

- Began work in 1953 on 6 earthfill dams in riverside
- 1955 – first county in state to adopt 100-year flood protection standard
- 1956 -Began work with USACE on Santa Ana River Levees



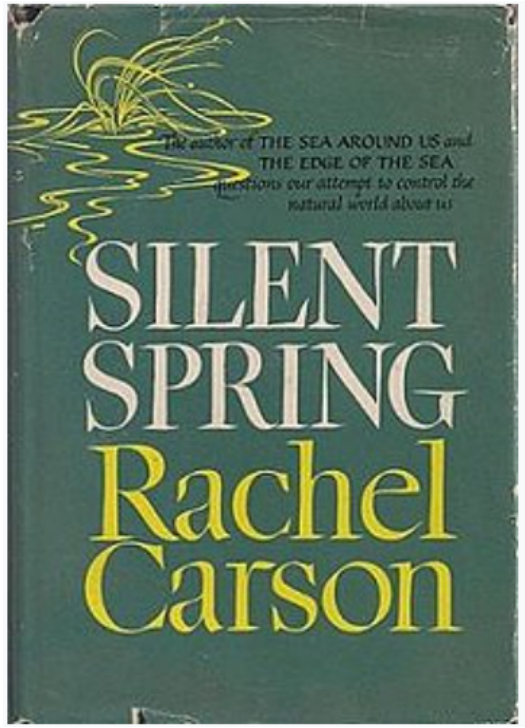
RCFC District Boundary

It’s Getting Complicated Period

January 1969 – Van Buren Bridge

1969 Also Known For:

- Cuyahoga River Fire in Ohio
- National Environmental Protection Act 1969
- California Environmental Quality Act 1970
- California Endangered Species Act 1970
- Environmental Protection Agency 1970
- Federal Clean Water Act 1972
- Federal Endangered Species Act 1973










Over 146 listed, threatened or endangered species in Riverside County

Evolution of the Western Riverside County Multiple Spe

1973: Congress passes the Federal Endangered Species Act.

1984: The California Endangered Species Act (CESA) is administered by the California Department of Fish and Game and prohibits the take of plant and animal species designated by the Fish and Game Commission as being either threatened or endangered in California.

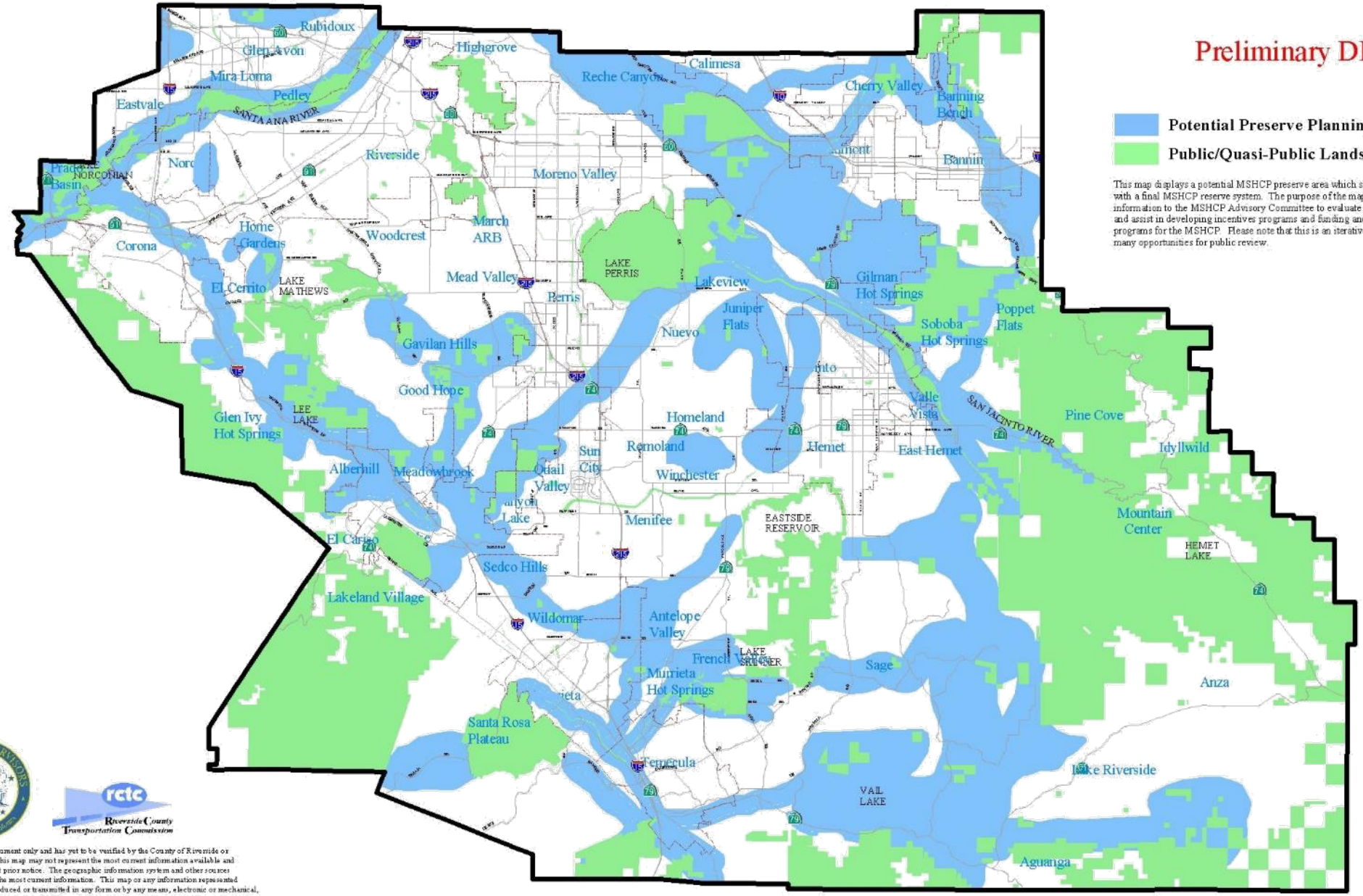
1988: A real estate boom in the late 1980's contributed to a rapid decline in Stephen's Kangaroo Rat (SKR) habitat and prompted the U.S. Fish and Wildlife Service to place the SKR on the endangered species list, delaying development projects in Western Riverside County.

1989: Residential and commercial development accounted for a significant portion of total economic activity in Western Riverside County.

1990: Riverside County and eight cities formed the Joint Powers Authority (JPA) to address SKR protection and development on a regional level. Under the JPA, the Riverside County Habitat Conservation Agency (RCHCA) was created to develop and implement a long-term plan.

1991: The Natural Community Conservation Planning Act (NCCP) supports broad-based planning to provide protection and conservation of California's wildlife while allowing for appropriate development and growth.

1996: The
and Wildlif
approved a lo
HCP and gr
incidental tak
(ITP) for
County cov
estimated 30,(
of occupied


Preliminary DRAFT
Potential Preserve Planning Area
Public/Quasi-Public Lands
This map displays a potential MSHCP preserve area which should not be confused with a final MSHCP reserve system. The purpose of the map display is to provide information to the MSHCP Advisory Committee to evaluate MSHCP alternatives and assist in developing incentives programs and funding and implementation programs for the MSHCP. Please note that this is an iterative public process with many opportunities for public review.
Rubidoux
Glen Avon
Mira Loma
Pedley
Eastvale
SANTA ANA RIVER
Highgrove
Reche Canyon
Calimesa
Cherry Valley
Banning
Bench
Riverside
Moreno Valley
Bannin
Home Gardens
Woodcrest
March ARB
Corona
LAKE PERRIS
Mead Valley
Lakeview
Gilman Hot Springs
El Cerrito
LAKE MATHEWS
Perris
Juniper Flats
Soboba Hot Springs
Poppet Flats
Nuevo
Gavilan Hills
Good Hope
Glen Ivy Hot Springs
LEE LAKE
Homeland
Romoland
Sun City
Hemet
East Hemet
Valle Vista
SAN JACINTO RIVER
Pine Cove
Idyllwild
Alberhill
Meadowbrook
Quail Valley
Winchester
Lake
Menifee
EASTSIDE RESERVOIR
Mountain Center
El Cariso
HEMET LAKE
Sedco Hills
Lakeland Village
Wildomar
Antelope Valley
Sage
Murrieta Hot Springs
Anza
Santa Rosa Plateau
Temecula
Lake Riverside
VAIL LAKE
Aguanga
This map is a draft document only and has yet to be verified by the County of Riverside or their representatives. This map may not represent the most current information available and may be revised without prior notice. The geographic information system and other sources should be queried for the most current information. This map or any information represented on it, shall not be reproduced or transmitted in any form or by any means, electronic or mechanical, including photo copying and recording.
1 0 1 2 3 Miles
August 14, 2000
Potential Preserve Planning Area

Benefits

Transportation

The MSHCP will satisfy certain federal and state environmental requirements to help expedite construction of new highway routes. In doing so, the MSHCP will help minimize traffic congestion, maximize mobility within Riverside County and the Southern California region, and ensure the transportation of goods and services inside and outside the country.

Highway expansion will not only help shorten daily commutes, it will greatly benefit the local, state and national economies. Each year, more than 2 million trucks carrying goods from Southern California ports to the rest of the nation, travel the major highways in Riverside County.

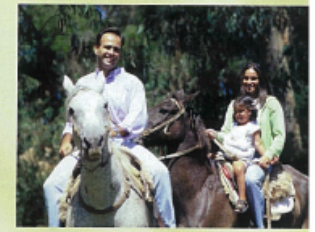
Economic Growth

The MSHCP provides an important step in ensuring certainty and economic growth. With establishment of environmental protection up front, the MSHCP provides certainty for future industrial/commercial development and lowers the financial risk and uncertainty of business relocation — encouraging future business growth throughout the region.

Housing

As population growth continues, the Southern California Region faces a housing shortage. The MSHCP will help ensure an ample supply of housing and helps provide the greatest variety of housing options to accommodate all segments of the region's growing home buying market.

By proactively meeting the requirements of the Endangered Species Acts, the MSHCP will enable developers to build new homes for our growing region, helping scores of families achieve the "American Dream" of homeownership.



Recreational Activities

By helping to preserve over 500,000 acres of open space, and protecting natural resources, the MSHCP will ensure that Western Riverside County remains an outdoor destination for all to enjoy.

The MSHCP will help protect scenic landscapes, provide safe habitat for plants and animals and preserve lands for fishing, camping, hiking and horseback riding.

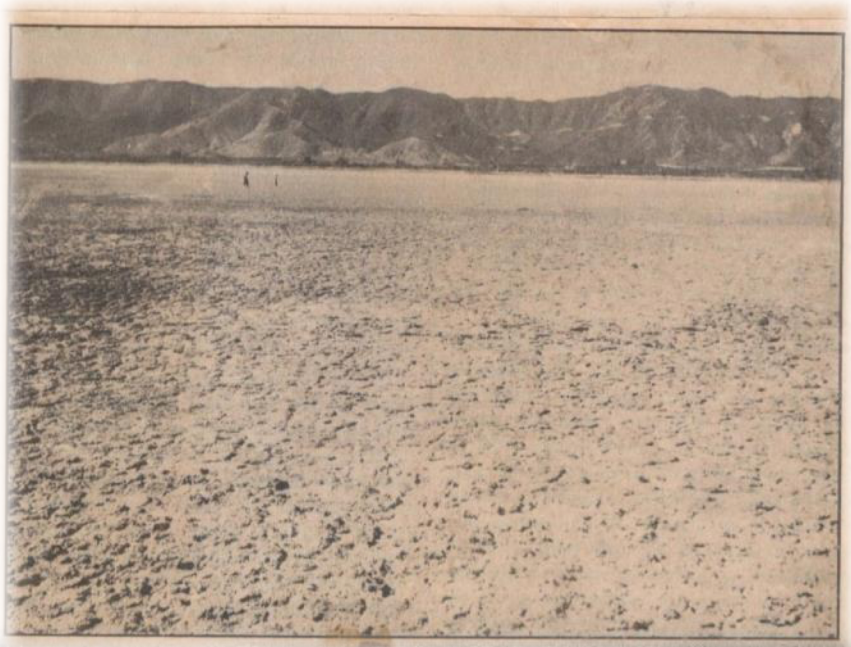
Federal Clean Water Act

Restore integrity of nations waters and make all waters of the U.S. Fishable and Swimmable

Assumes all waterbodies can be Lake Tahoe

Lake Elsinore

1950 - 1964



Thousands of Fish Dying at Lake Elsinore : Ecology: The stench has angered residents and is driving away tourists. The die-off is a natural event but is the worst since 1972.

By JENIFER WARREN
TIMES STAFF WRITER

AUG. 17, 1990 | 12 AM

LAKE ELSINORE — Tens of thousands of fish are dying in Lake Elsinore, turning the popular Riverside County boating spot into a smelly bouillabaisse and angering residents and business owners dependent on the region's summer tourist trade.

Biologists say that fish die-offs--which occur when rising water temperatures promote the growth of algae that rob fish of oxygen--are a natural phenomenon at many of Southern California's inland lakes.

But this year's event is the worst at Lake Elsinore since 1972 and threatens to wipe out most of the lake's fishery. Already, more than 225 tons of dead carp, catfish and largemouth bass have washed ashore, and thousands more fish can be seen bobbing on the lake's surface.

Sept 7, 1972

THERE IS A GIGANTIC COMMUNITY effort going on at Lake Elsinore to clean up the thousands of dead fish that have covered the surface of the lake and part of the shoreline recently.

The drive to clean up the mess is being spurred by two factors, namely, the citizens don't like the smell of dead fish and they certainly don't like the looks of the shoreline and water.

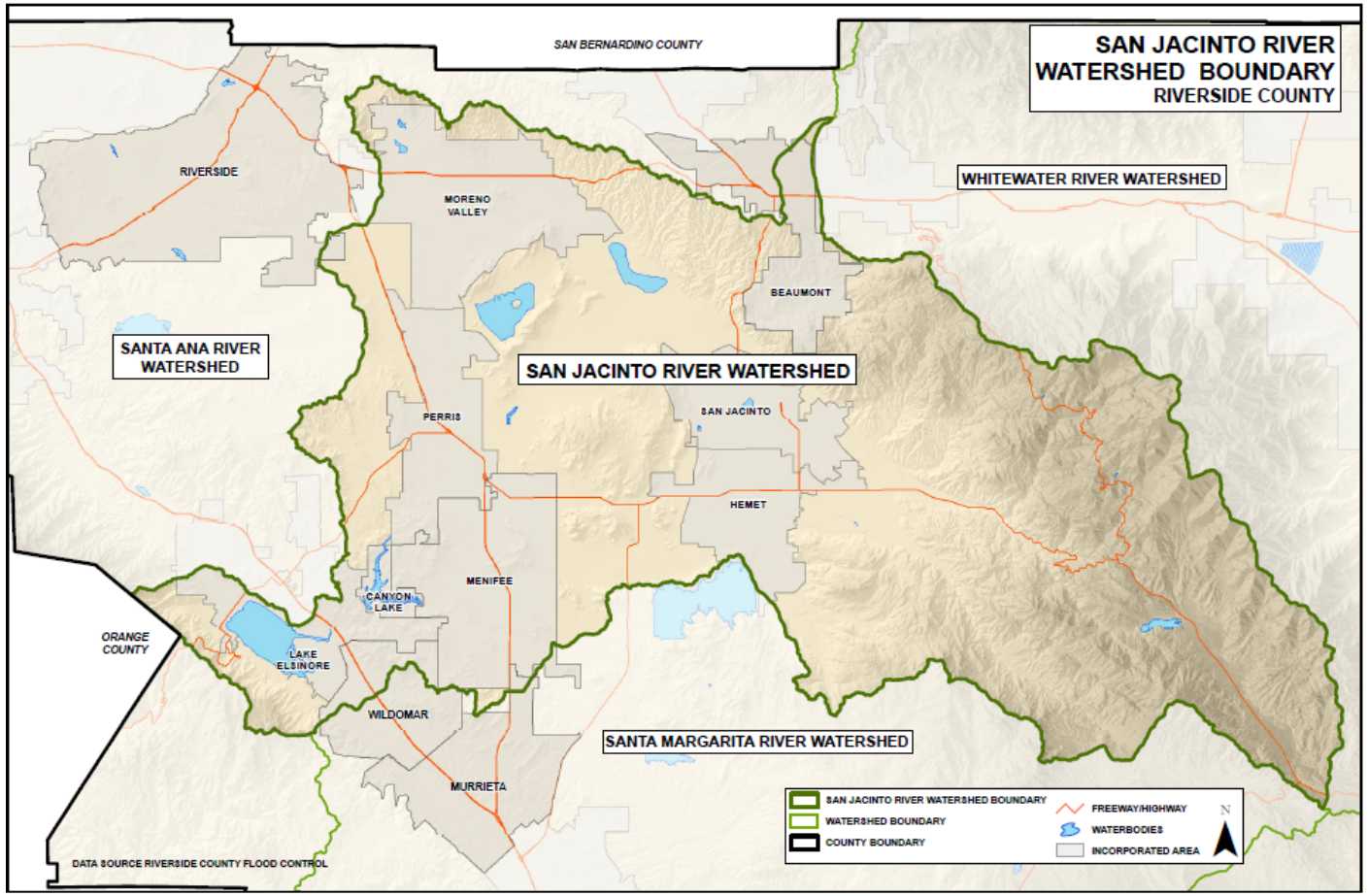
Also, the Elsinore 500, which has become one of the top marathon events of the boating scene in the Southland, is scheduled for the 16th and 17th of this month. The STP Corporation will have time trials on Saturday and the 500 will go the next day.

The fish kill was caused by lack of oxygen in the water and there was nothing that anybody could do to save the fish, most of which were small silver-colored shad. Lack of oxygen was caused by excessive algae in the lake.

The shad, food fish for the larger ones like bass and other warm-water species, simply couldn't take it. There has been no report of the larger game fish dying. Cooler weather will help put an end to the algae problem.

The drought in Southern California, plus the fact that water for recreational purposes is in short supply, has given Elsinore residents a memory they don't like to recall—when the lake went dry.

San Jacinto River watershed
Drains to Lake Elsinore and Canyon Lake

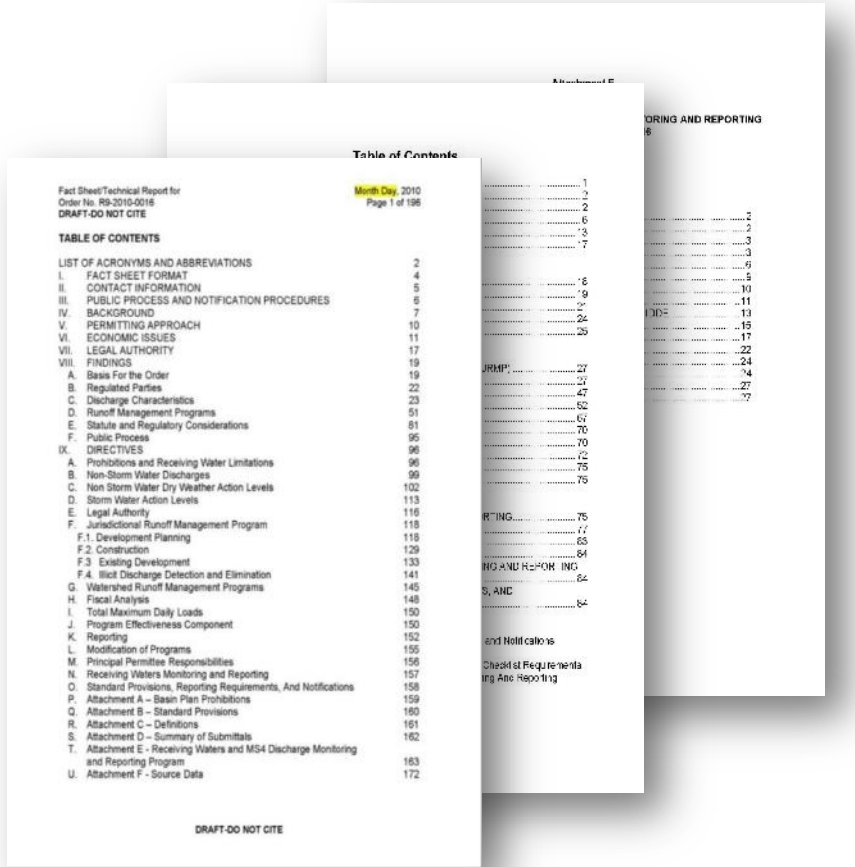


Riverside County*
Beaumont
Canyon Lake
Hemet
Lake Elsinore*
Menifee*
Moreno Valley*
Murrieta*
Perris
Riverside*
San Jacinto
Wildomar*

* Only applies to portions of the City/County within the San Jacinto Watershed

Clean Water Act Stormwater Permits expanding in scope

1990 Permits: ~ 40 pages
2010 Permits = ~400 pages



Fact Sheet/Technical Report for
Order No. R9-2010-0016
DRAFT-DO NOT CITE

Month Day, 2010
Page 1 of 196

TABLE OF CONTENTS

DRAFT-DO NOT CITE

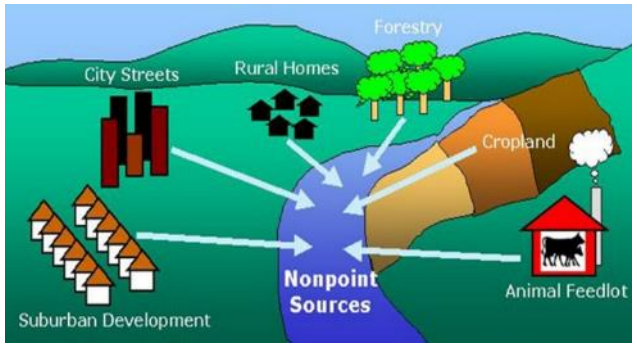
New Permit Compliance Programs

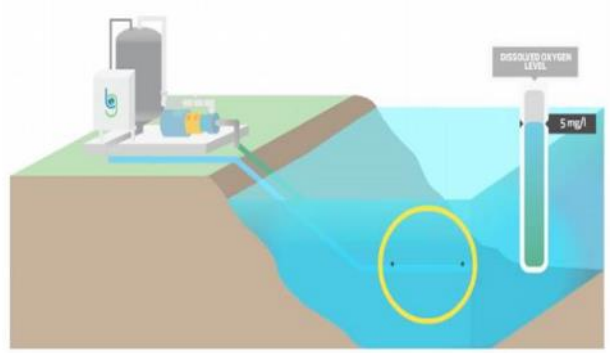
- Complex
- Prescriptive
- Numeric

LE/CL TMDL Task Force

- **March Air Reserve Base**
- **March JPA**
- **State of California**
  - Santa Ana Regional Water Quality Control Board
  - Department of Fish and Game
  - Department of Transportation
- **County of Riverside**
- **Riverside County Flood Control District**
- **Cities**
  - Beaumont
  - Canyon Lake
  - Hemet
  - Menifee
  - Lake Elsinore
  - Moreno Valley
  - Murrieta
  - Wildomar
  - Perris
  - Riverside
  - San Jacinto
- **Water Agencies:**
  - Eastern Municipal Water District
  - Elsinore Valley Municipal Water District
  - Lake Elsinore and San Jacinto Watersheds Authority
- **Western Riverside County Agricultural Coalition**
  - Dairy Operators (25+)
  - Agricultural Operators (Over 475)

- Looking to the Future
  - Formalized in 2006
  - Administered by LESJWA
  - Evaluating Water Quality
  - Co-Funding LEAMS
  - Contributing to fishery management
  - Evaluating lake water addition optimization





Watershed Controls

- Where Feasible
- Multiple benefits

Alum Treatment

- Alum Treatment
- Aeration
- Fishery Mgmt

Phase 2 Projects

- CL: Oxygenation?
- LE: Reclaimed Water?
- LE: Alum?

Compliance Strategy

$300,000,000 Parcel Tax Approved in Los Angeles

L.A. County asking property owners to support stormwater runoff tax

By Christina Villacorte, Staff Writer
Posted: 12/06/2012 09:31:56 PM PST
Updated: 12/06/2012 10:10:46 PM PST

This is the Tujunga Wash at Vanowen Street and Fulton Avenue in Valley Glen, Calif. (Dean Musgrove/Staff Photographer)

2.2 million properties

$300,000,000 annually

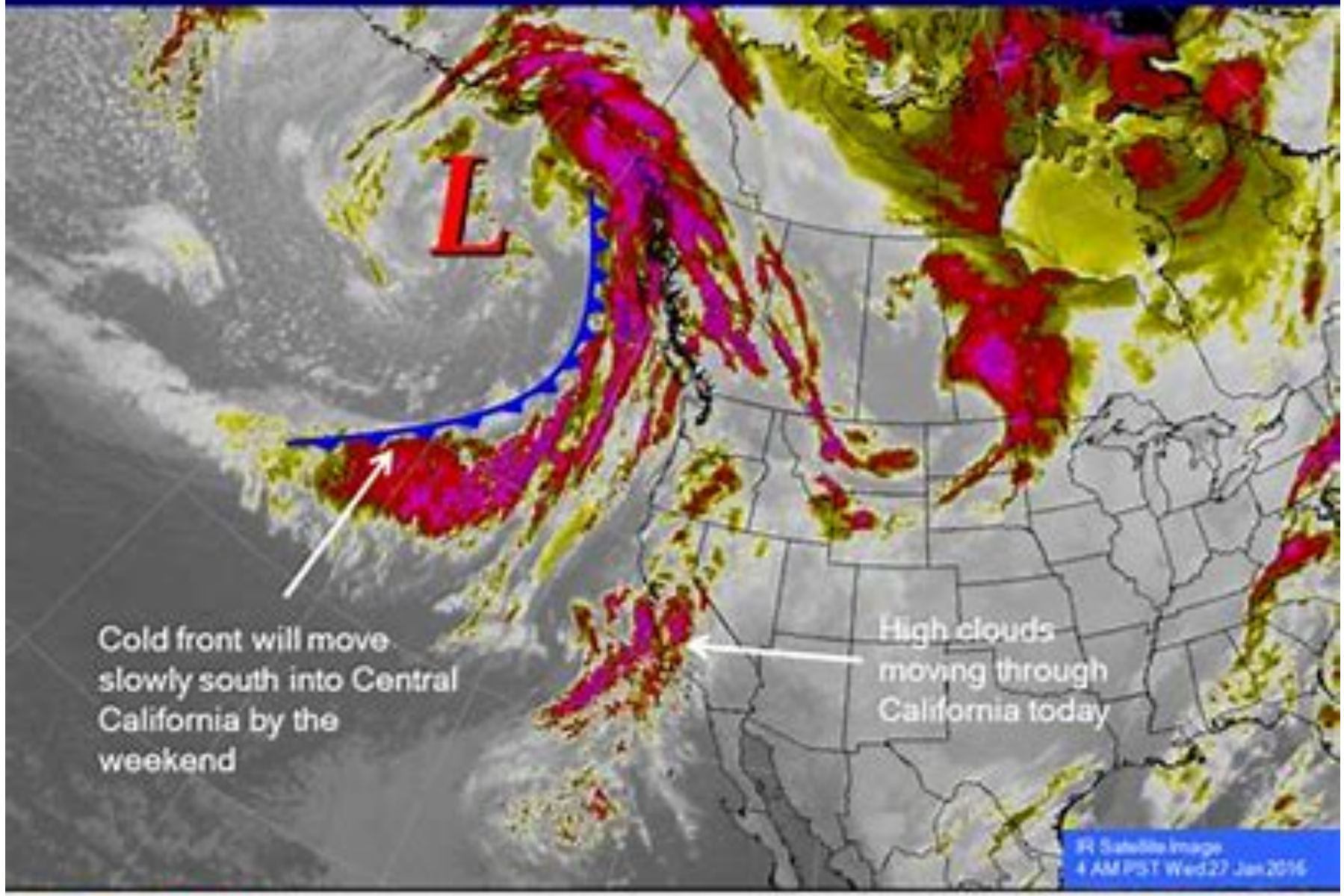
$100/home

$10,000+ for business

Conclusions

- The past, particularly the 1960's was founded in a period of low trust and cooperation
- Future dependent on trust, integration, streamlining, communication
- Santa Ana Watershed is one of the most collaborative watersheds in California
- Regional Task Forces, such as those that SAWPA has promoted and coordinated are key to our future

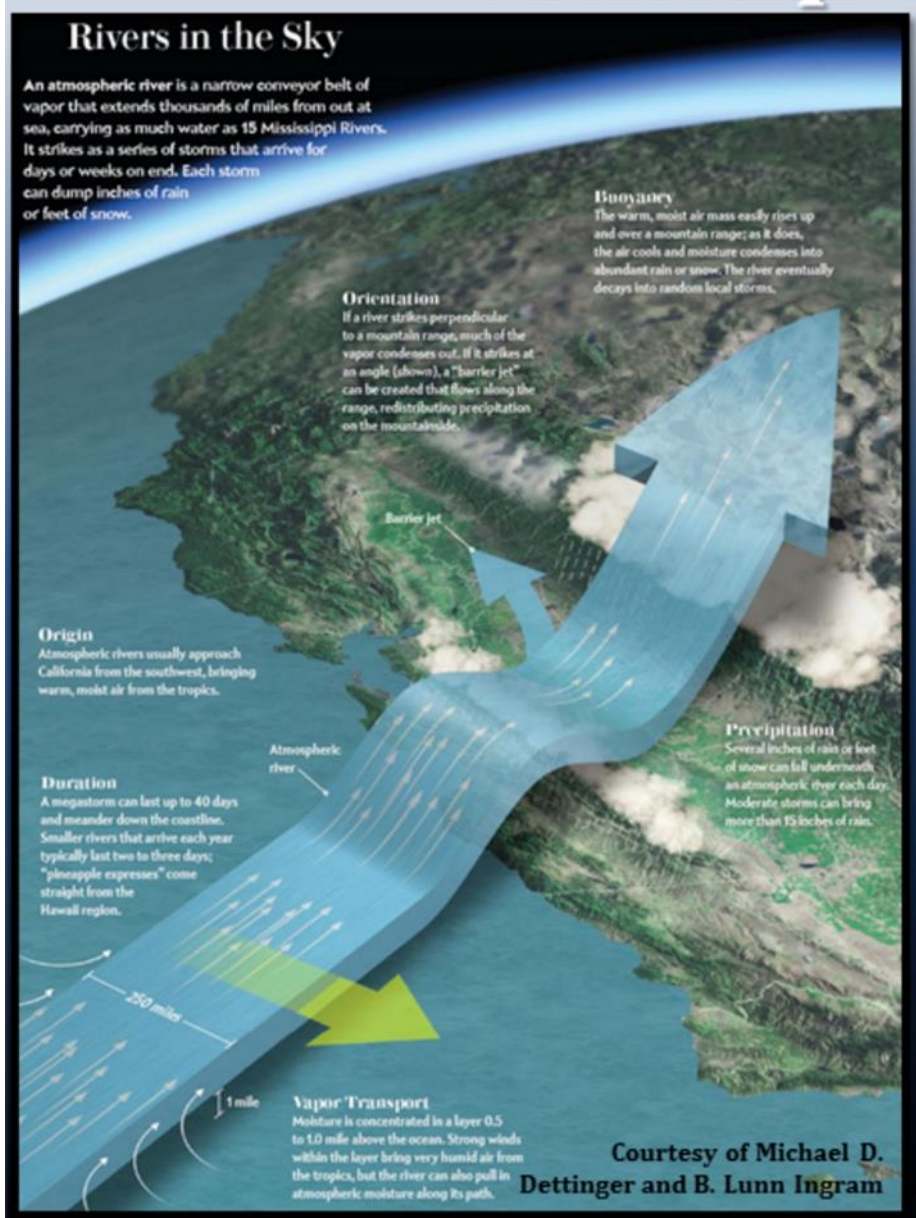
Unsettled Weather This Weekend

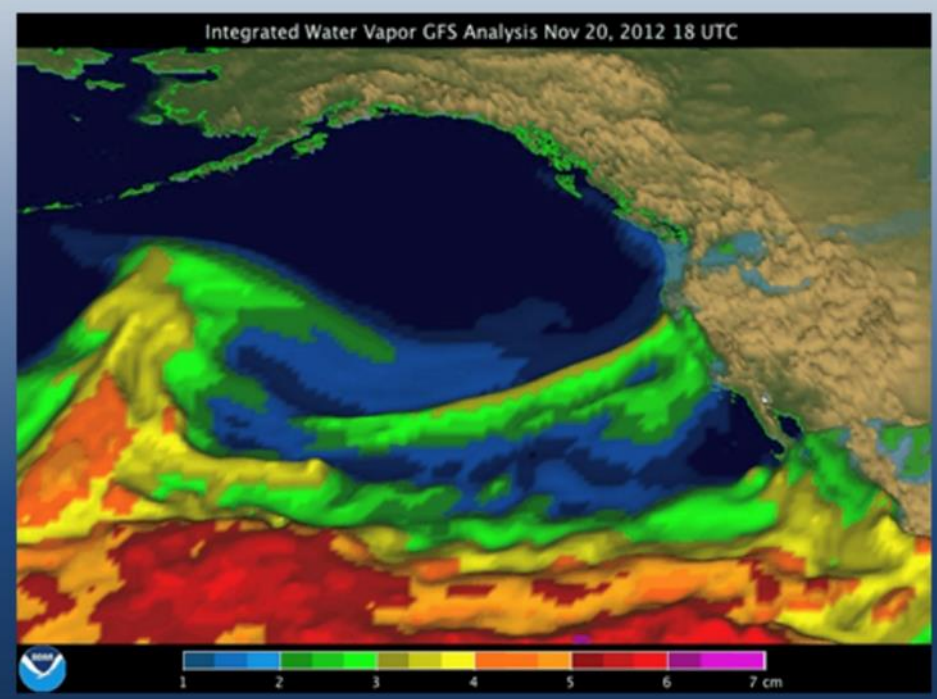


Weather Forecast Office
Hanford, CA

Follow Us:

Atmospheric Rivers

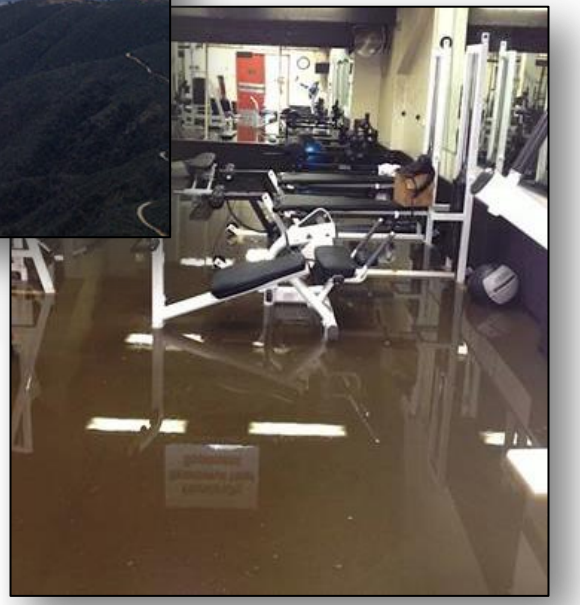




Quick Facts

- On average, about 30-50% of annual precipitation for west coast states occurs in a few AR events; contributing to water supply.
- In the strongest cases ARs can create major flooding when they make land-fall and stall over an area.
- On average ARs are 400-600 km wide.

Monsoonal Flooding



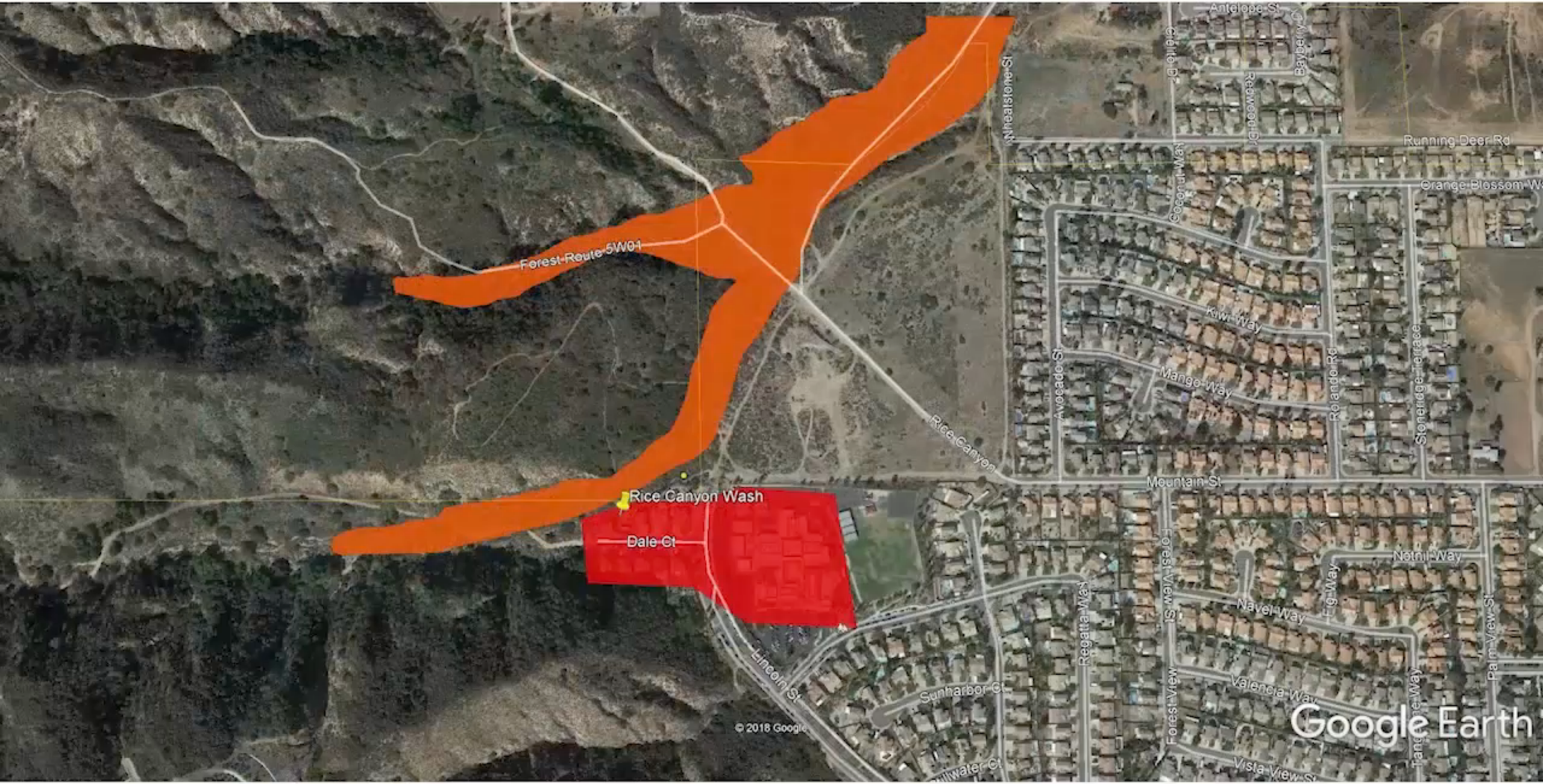
2013

Localized Thunderstorm Floods

Riverside Community College

Riverine Flooding

Urban Flooding


Forest Route 5W01
Rice Canyon Wash
Dale Ct
Rice Canyon
Mountain St
Antelope St
Running Deer Rd
Orange Blossom Wa
Kiwi Way
Mango Way
Avocado St
Roland Rd
Stoneridge Terrace
Navel Way
Valencia Way
Lincoln St
Sunharbor Ct
Regatta Way
Forest View St
Palm View St
Vista View St
© 2018 Google
Google Earth

Riverside Flood and Water Conservation

- **Mission**

  We responsibly manage stormwater in service of safe, sustainable and livable communities.

- **Vision**

  To be a leader in the field of stormwater management, to achieve extraordinary results for our customers and be known for high quality teams and returned value to our community.

- **Values**

  - Integrity – Speak honestly and follow through
  - Transparency – Our actions will be visible and understandable
  - Trust – We can count on each other and others can count on us
  - Teamwork – Shared purpose, shared values, shared goals
  - Accountability – We are responsible for results
  - Excellence – We deliver outstanding results and exceed expectations

Evolution

Day Creek Channel - North of the 60 Freeway…Old School Uni-tasker

Evolution

Wolf Creek Channel In Temecula – Nice to have even when it’s not raining

Multi-Use

Eastvale – Harada Park/Basin

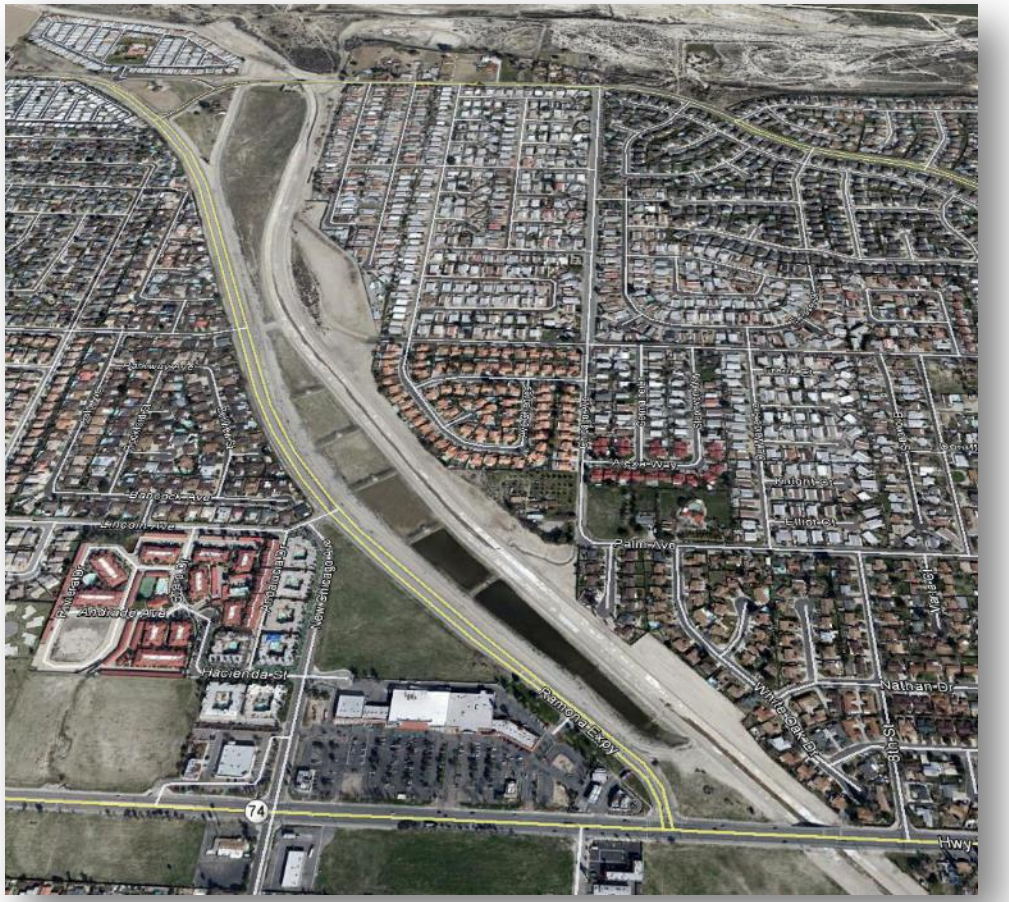
Multi-Use

Eastvale – Harada Park/Basin

Multi-Use

Santa Ana River Bike Trail

Conserving stormwater… and other water supplies



Capture stormwater in the winter, excess imported water supplies in summer

Other Thoughts

- Need to work closer together with land use planners, engineers
  - Small drainages often overlooked, can become significant risk areas
  - City/County General Plans out of alignment with Flood Control Plans
  - Integrating mitigation into flood control projects is tricky business