



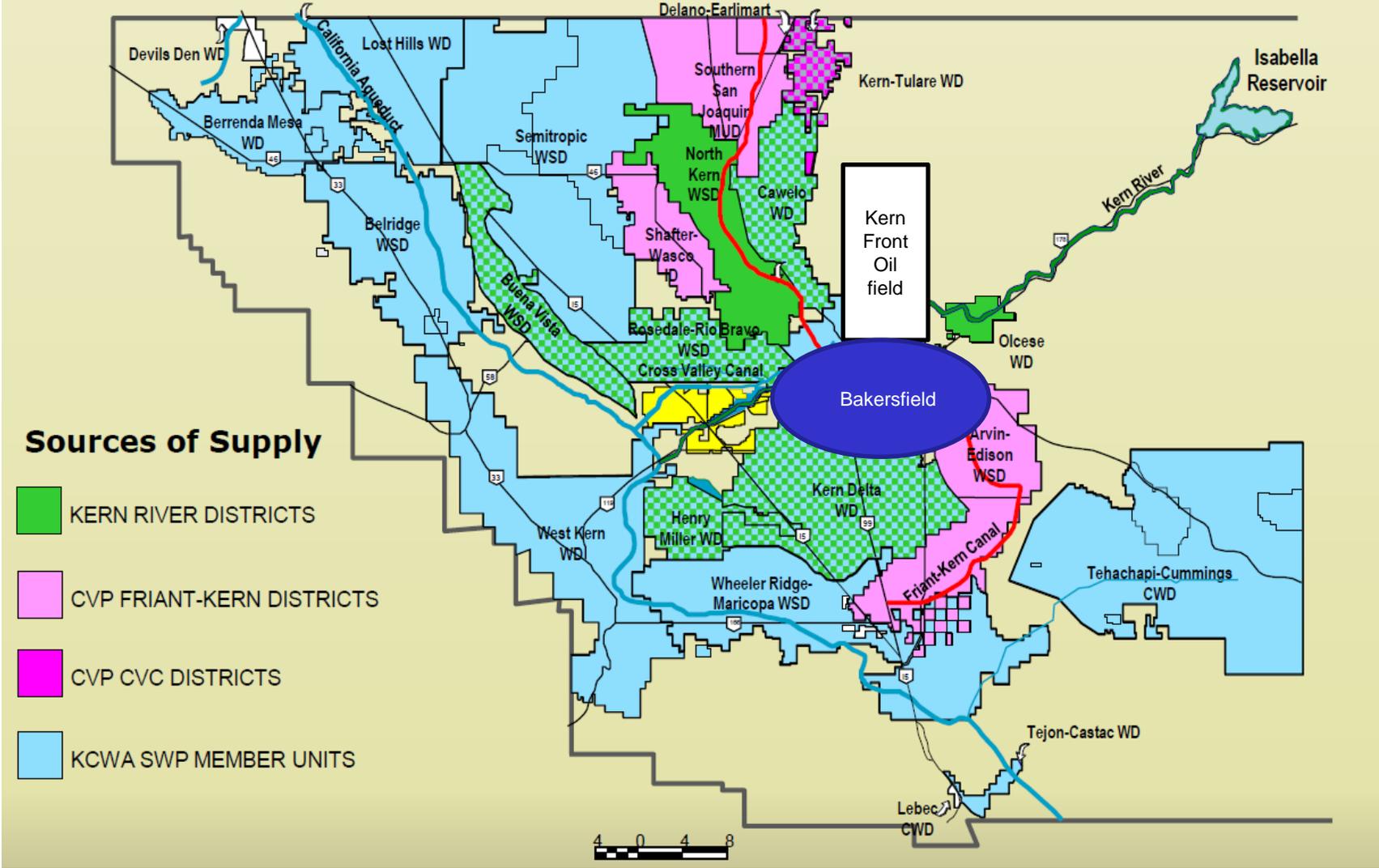
**NORTH KERN WATER  
STORAGE DISTRICT**



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**Central Valley Regional Water Quality Control Board  
Blending Reclaimed Water for Irrigation Water Supply  
January 12, 2016**

# Kern County Water Districts



# Typical Steam Flood Process

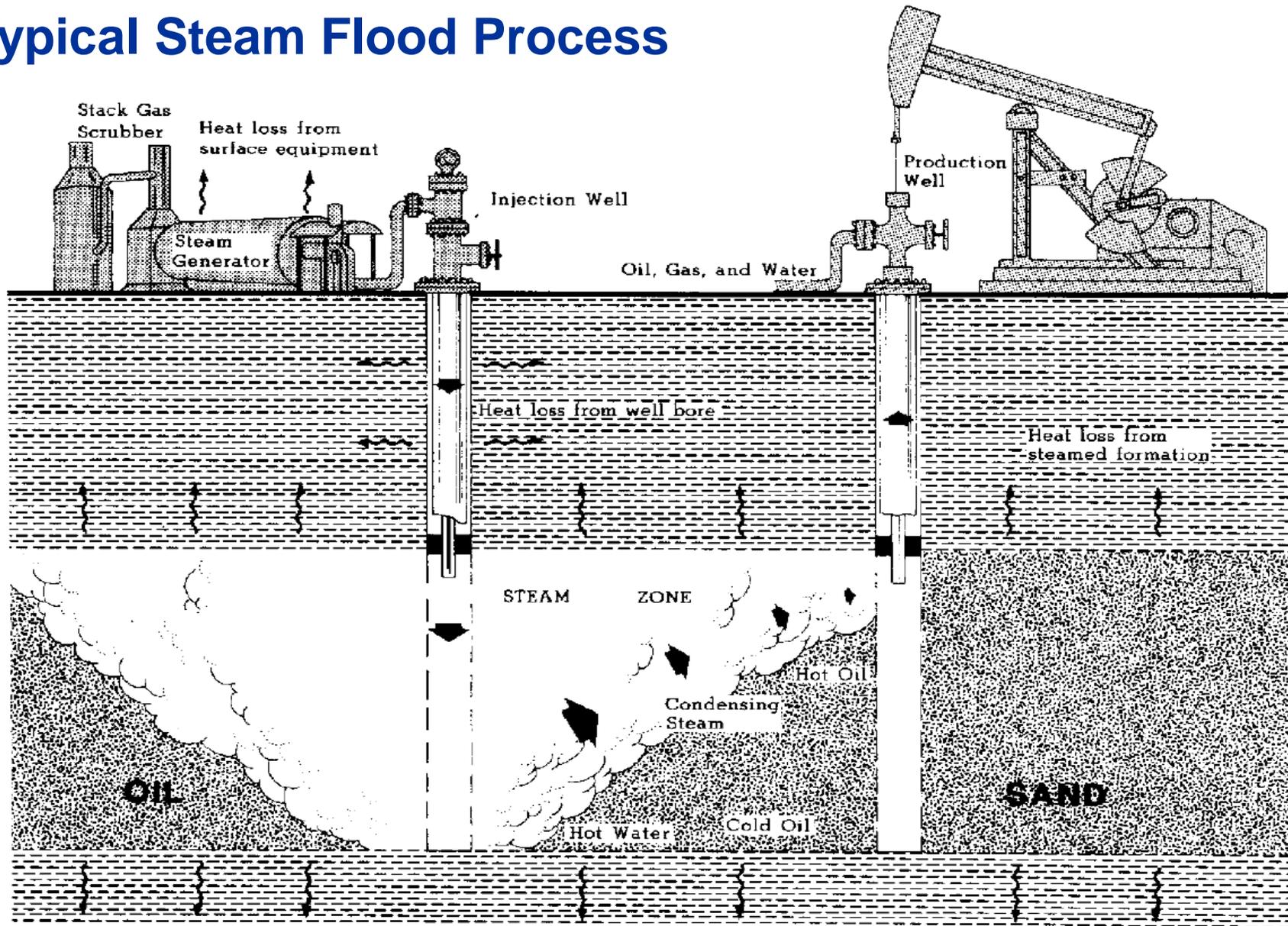


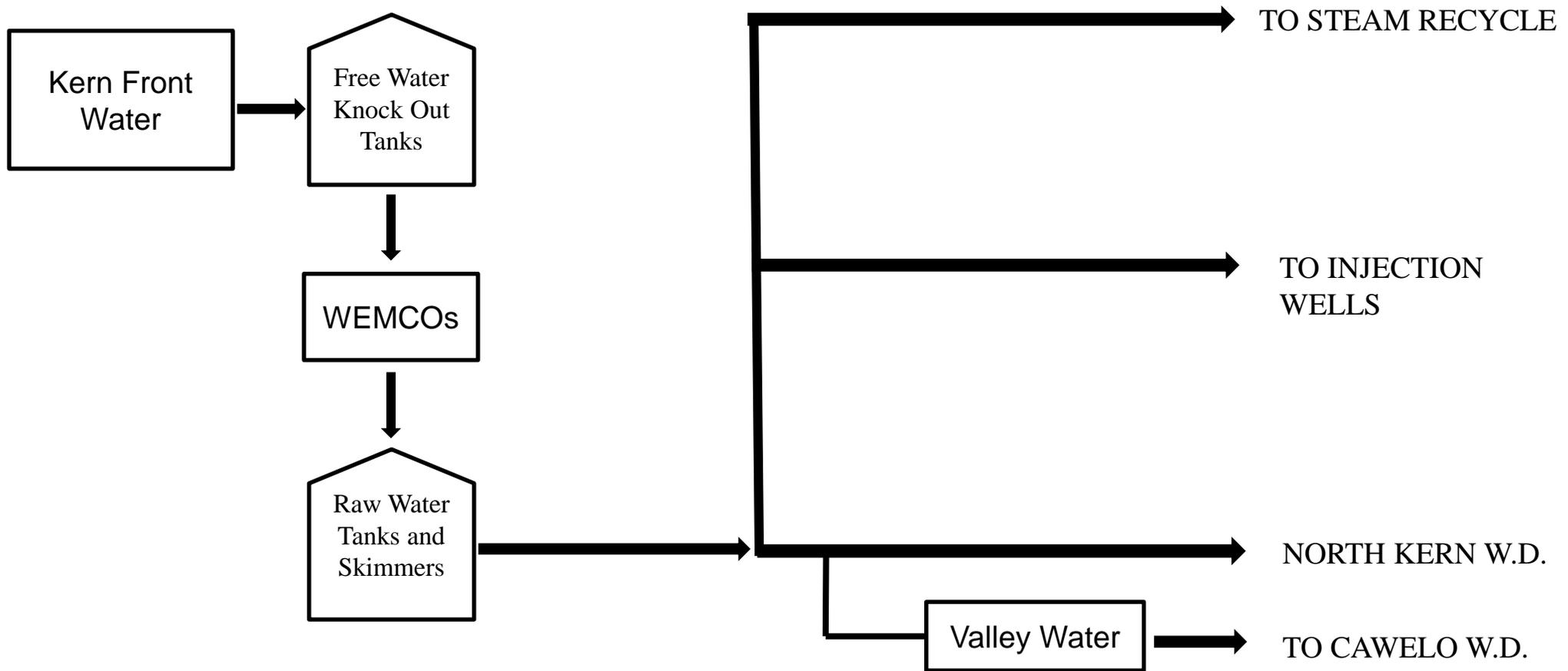
Figure 7. Mechanisms of the steamflood process.

# Typical Steamflood Field

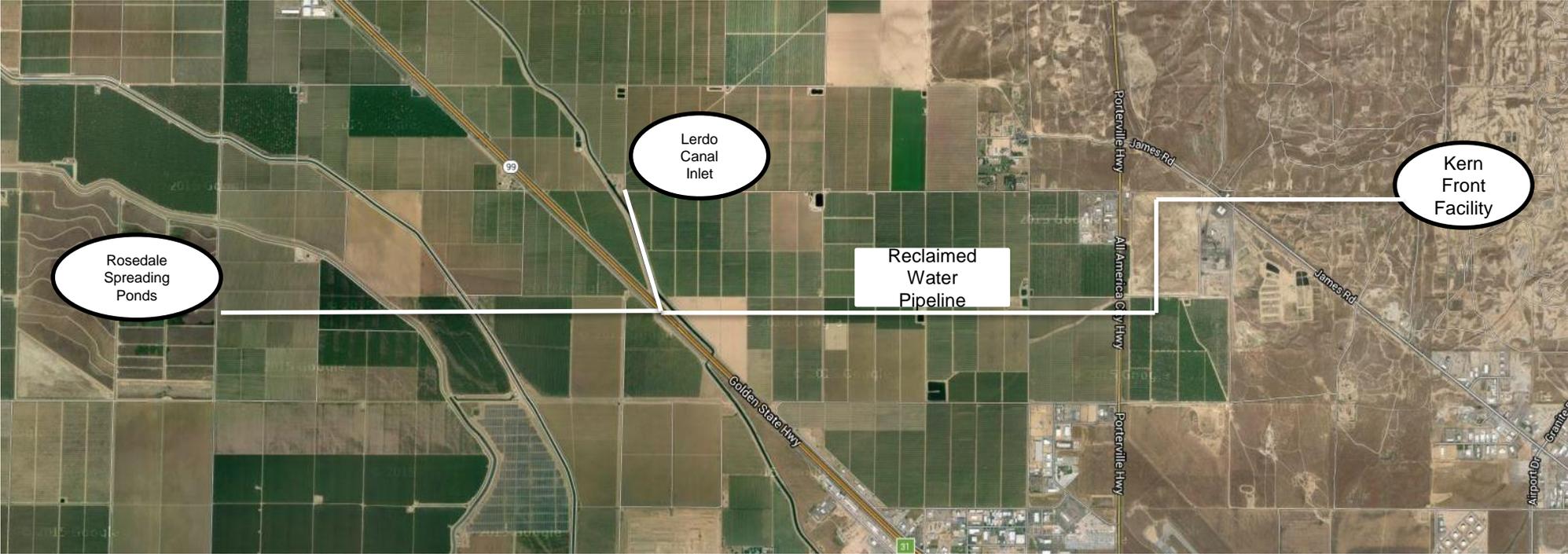


Kern Front

# Kern Front Oil Field - Reclaimed Water Treatment



# North Kern Water Project Layout



# North Kern Water Project Summary

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- Supply up to 58 Ac-ft/day (21,200 Ac-ft/year) of reclaimed water to the NKWSD irrigation and spreading basin system for blending with other North Kern Water supplies
- The Project provides approximately 10% - 15% increase in water supply
- Water is considered “new” water for water balance purposes
- Water quality is suitable for both irrigation and groundwater recharge
- Reclaimed water helps protect farmers from variations in surface and ground water supplies



# North Kern Water Storage District

- Formed in 1935
- 60,000 gross acres/55,000 irrigated acres
- District formed to provide reliable long-term water supply for agriculture
- District Project in early 1950's
  - Acquisition of 17 historical Kern River water rights
  - “Conjunctive Use” project developed to manage acquired water rights
- Isabella Reservoir
- Conveyance and distribution
- Groundwater recharge
- Groundwater recovery
- No service to adjacent cities
- Utilized produced water from Kern River field from 1980 to 2001



NORTH KERN WATER  
STORAGE DISTRICT

# NKWSD Operations

- High variability in surface water supplies – 350,000 acre-feet to <10,000 acre-feet
- Conjunctive use project maximizes use and absorption of available surface water supplies
  - Wet year – most or all demands met with surface water; additional surface water recharged to groundwater basin
  - Average year - both surface water and groundwater used
  - Dry year – little surface water available, significant groundwater pumping
- Surface water is of very high quality
- Groundwater quality is generally good
- Project includes canals (mostly unlined), recharge basins (1,500 acres) and wells (100)
  - Lerdo Canal is District’s primary canal (850 cfs capacity)
  - Rosedale spreading/recharge basins – 600 acres/150 cfs capacity

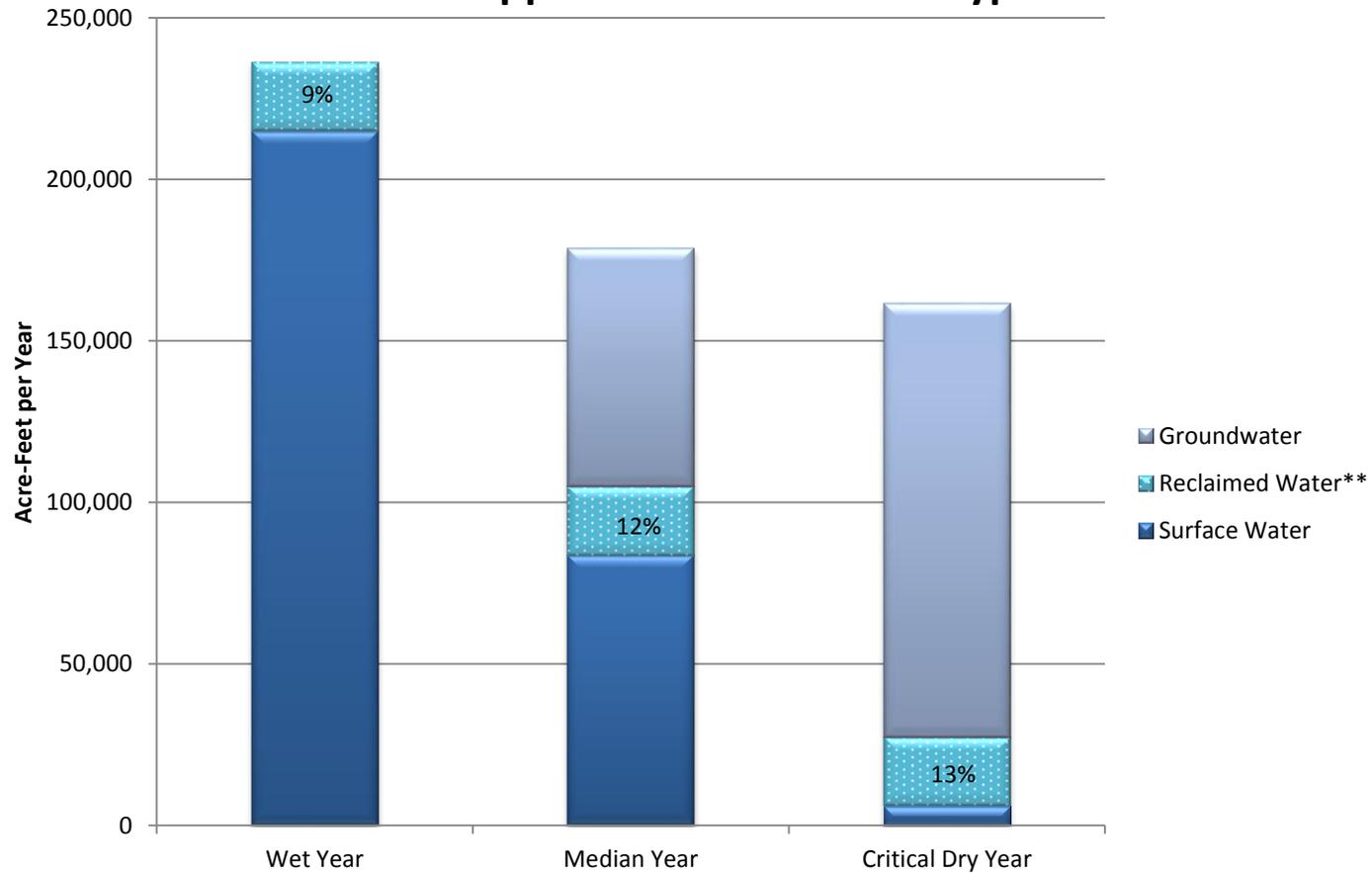
## 2014 Crop Summary

Crop	Approx. Acreage	% of Total District Acreage
Almonds	35,000	59%
Table Grapes	6,600	11%
Pistachios	3,900	7%
Alfalfa	3,700	6%
Other Ag	7,000	12%
Non Ag	3,800	5%



# NKWSD Operations

## North Kern Water Storage District Water Supplies for Various Year Types



\*\*Maximum contract amount of reclaimed water, minimum amount would result in lower percentages.



# North Kern Management/Use of Reclaimed Water

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- Delivery of up to 58 Ac-ft/day of reclaimed water
- Blend with surface/groundwater available in the Lerdo Canal for irrigation use
- CRC and District staff inspect flow and water quality of reclaimed water daily
- CRC/District follow monitoring and reporting requirements as required in the Regional Board Waste Discharge Requirements (WDR)
- Under normal operations North Kern will use blended reclaimed water for direct irrigation (in Lerdo Canal)
- During low demand periods and during the annual canal maintenance period reclaimed water will be diverted to Rosedale Spreading for groundwater recharge. Reclaimed water will also be diverted to Rosedale during high flow periods



# Water Quality Monitoring and Reporting Requirements

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- Waste Discharge Requirements (WDR) require CRC and the District monitor water quality at:
  - CRC's Kern Front inlet which is representative of oilfield reclaimed water quality
  - Lerdo Canal which is representative of blended water quality
  - Rosedale Spreading which is representative of quality of water that will be recharged
  - District wells at Rosedale Spreading which is representative of groundwater quality beneath Rosedale Spreading
- Monthly monitoring for water quality performed at the above mentioned locations
- Quarterly reports submitted to the Regional Board



# Water Quality of NKWSD Supplies

Constituent	CRC Reclaimed Water	Surface Water	Groundwater	Irrigation Water Measured Blend (3 <sup>rd</sup> Qtr 15)	Regional Board Water Permit Objectives
Arsenic, mg/l	0.072	< 0.020	0.002	0.0095	-
Boron, mg/l	0.8	0.2	0.12	0.21	1.0
EC, $\mu$ S/cm	790	170	635	705	1,000
Sodium, mg/l	159			123	175
Chloride, mg/l	82	6.4	69	82	200
Oil and Grease mg/l	9.5	-	-	0.0	35



# Suitability for Irrigation

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- Reclaimed water has been used safely and successfully for decades by NKWSD and Cawelo Water District to supplement other available water supplies with Regional Board authorization, monitoring and oversight



# North Kern Water Project Questions?

