

Kern Water Bank Authority



Groundwater Basin Management

in Kern County

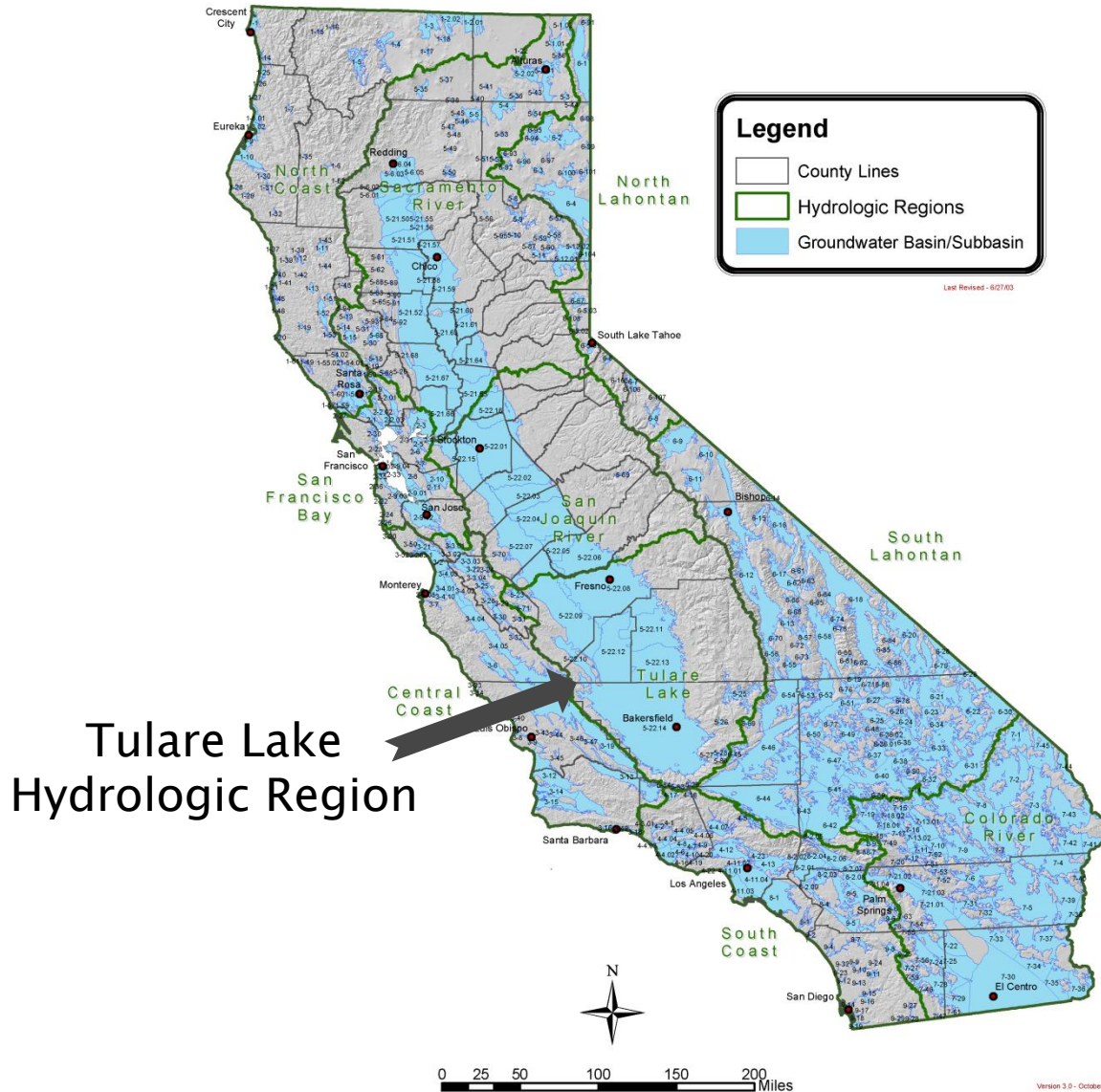
The Questions

- ▶ How is your ground water basin governed and managed? Who is responsible? Who pays? Does this model work? What are the pros and cons? Do you consider this local control or regional control?
- ▶ How are you addressing the new reporting requirements for ground water? Will the data be valuable? What should we know, in order to manage basins?
- ▶ How is your basin recovering during this wetter than average winter?
- ▶ What are you doing now to improve yield, including recharge from various sources?
- ▶ What are your major challenges regarding ground water basin management?

The Basin

- ▶ Kern County Subbasin of the San Joaquin Valley Groundwater Basin
- ▶ 2,000 square miles – about 40 miles wide by 65 miles long
- ▶ Sediments up to 32,000 feet thick, useable groundwater limited to upper 1,500 feet
- ▶ Most of the basin subdivided into an upper unconfined aquifer and a lower confined aquifer – important exception under the Kern River Alluvial Fan

Groundwater Basins in California



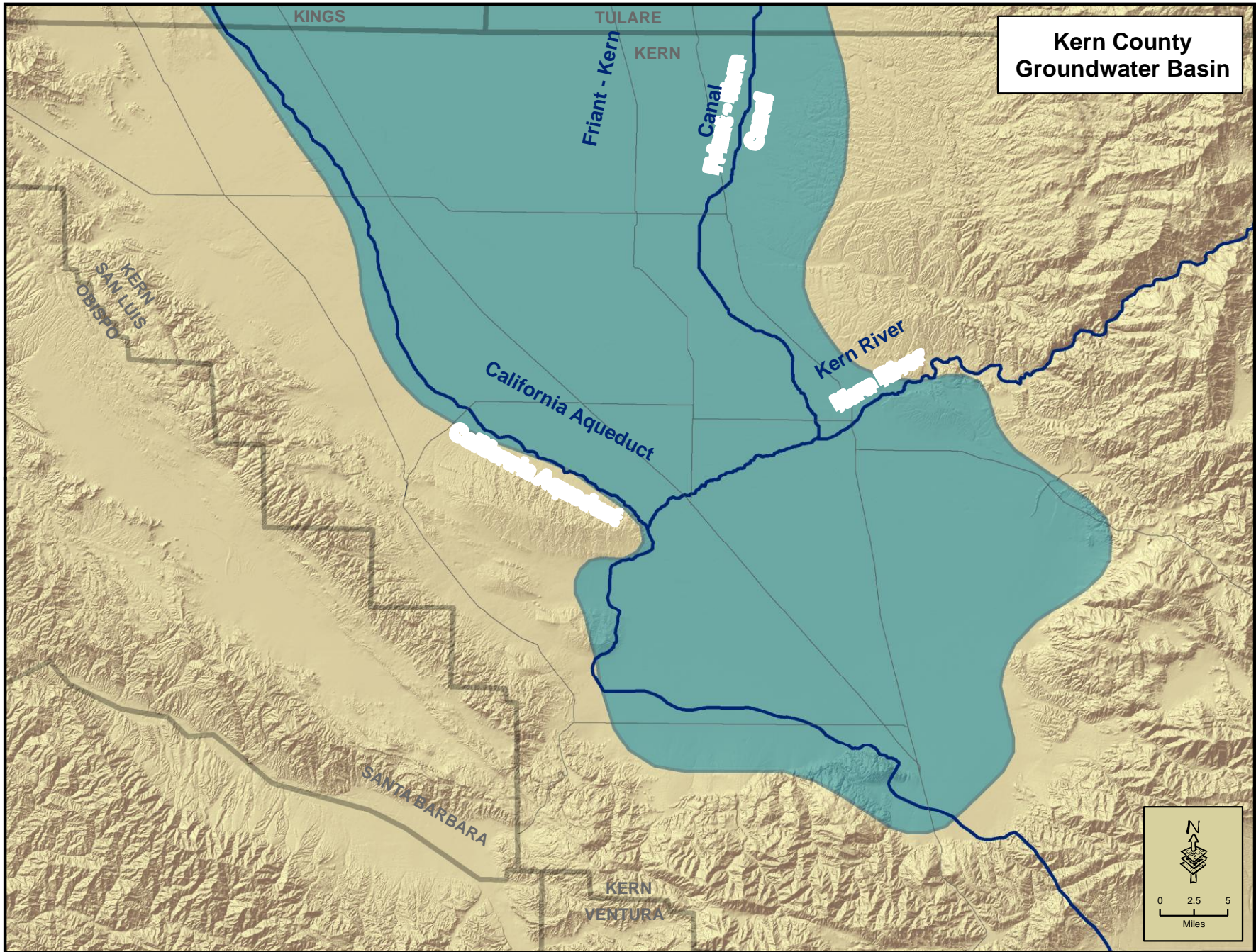
Tulare Lake Hydrologic Region



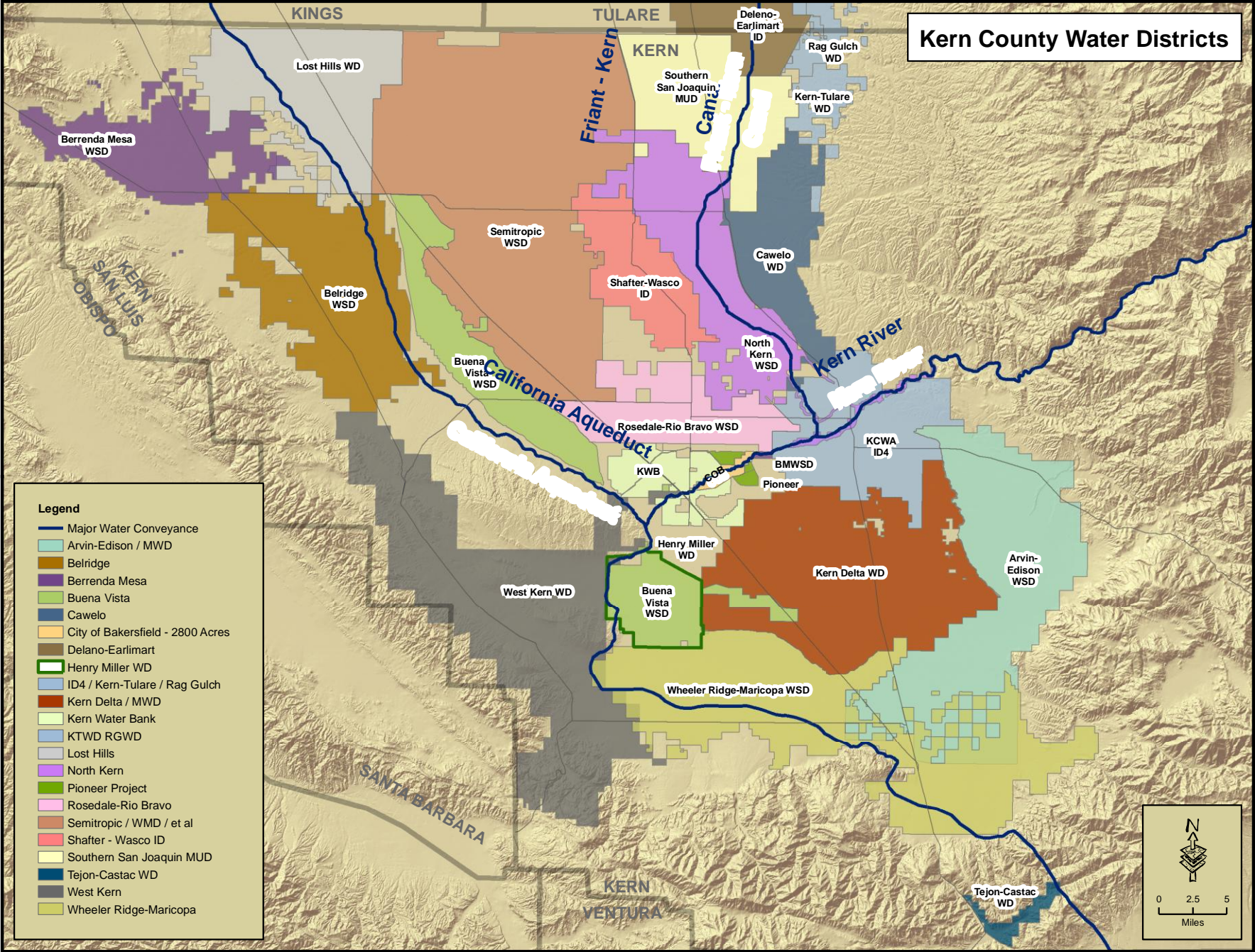
Basin Management – Special Districts

- ▶ Water Storage Districts (8), Water Districts (6), Others (4)
- ▶ Purpose – balance consumptive uses within district
- ▶ Means – provide surface supplies at equal or lower cost than pumping GW
 - Assessments to cover administrative costs and subsidize a portion of water acquisition and delivery costs
 - Set water rates such that groundwater users pay the same as surface water users
- ▶ Effectiveness overall good – some districts in overdraft
- ▶ Districts cannot restrict landowner pumping

Kern County Groundwater Basin

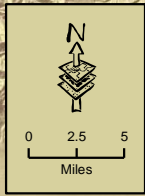


Kern County Water Districts



Legend

- Major Water Conveyance
- Arvin-Edison / MWD
- Belridge
- Berrenda Mesa
- Buena Vista
- Cawelo
- City of Bakersfield - 2800 Acres
- Delano-Earlimart
- Henry Miller WD
- ID4 / Kern-Tulare / Rag Gulch
- Kern Delta / MWD
- Kern Water Bank
- KTWD RGWD
- Lost Hills
- North Kern
- Pioneer Project
- Rosedale-Rio Bravo
- Semitropic / WMD / et al
- Shafter - Wasco ID
- Southern San Joaquin MUD
- Tejon-Castac WD
- West Kern
- Wheeler Ridge-Maricopa



Basin Management – 3030 Plans

- ▶ Groundwater Management Plans
- ▶ Developed as a vehicle to demonstrate effective local management and hopefully preclude state-wide control
- ▶ Voluntary – not used in adjudicated basins or basins otherwise managed
- ▶ Used as a planning tool
- ▶ Provides for rules and regulations, but generally cannot curtail pumping
- ▶ Most districts in Kern County have adopted plans

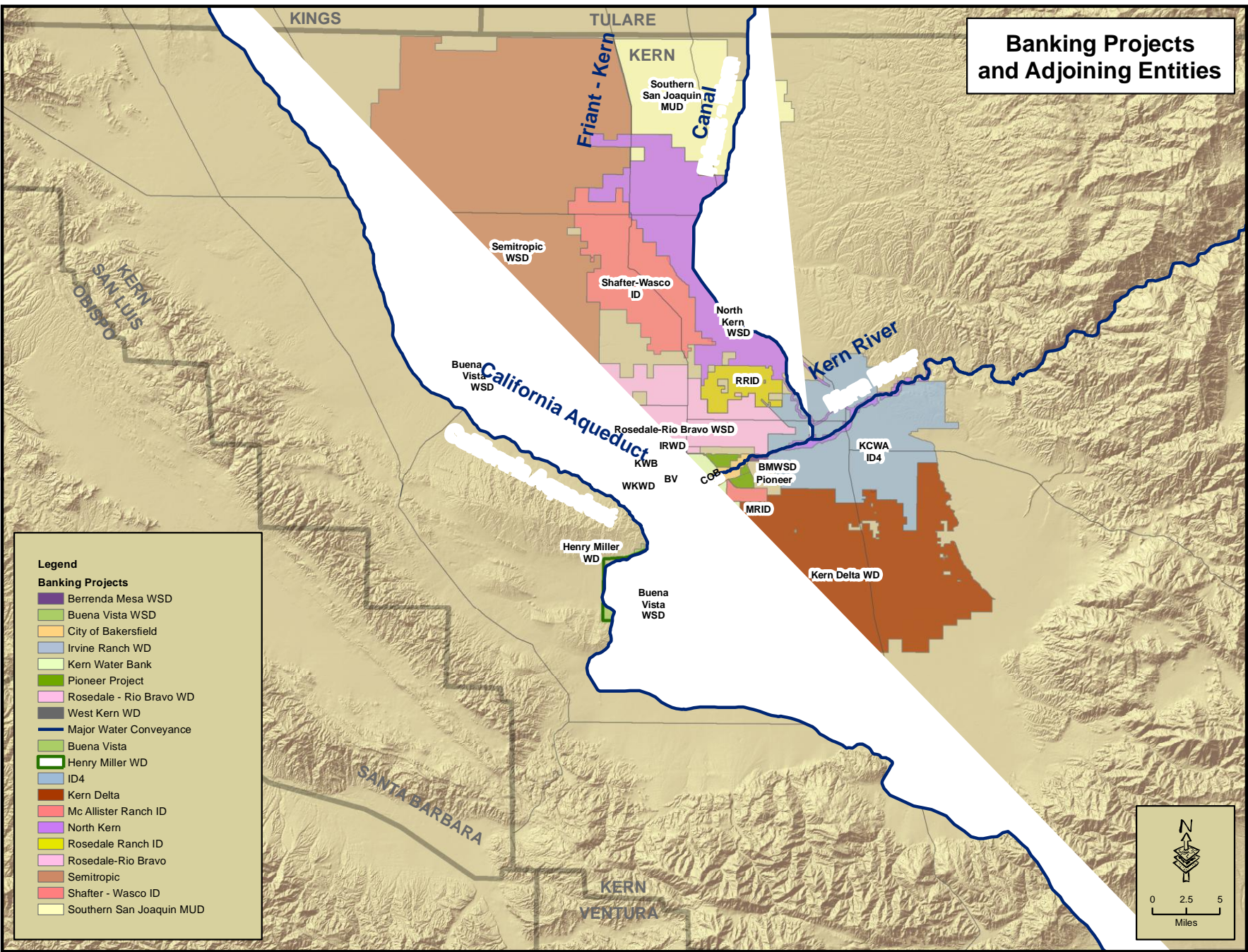
Typical 3030 Plan Objectives:

- ▶ Prevent a return to historical overdraft
- ▶ Maintain groundwater quality
- ▶ Monitor water levels, water quality, and groundwater storage
- ▶ Estimate groundwater use and future demand
- ▶ Update progress on achieving objectives

Basin Management – Monitoring Committees

- ▶ Banking MOU's establish Monitoring Committees
 - Are composed of bankers and adjoining entities
 - Engage an independent consultant
 - Establish a groundwater evaluation methodology and plan
 - Prepare annual reports on water quality and operations
 - Recommend modifications to project operations to minimize project impacts
 - Are the first venue for dispute resolution

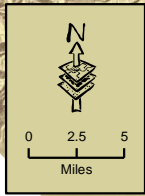
Banking Projects and Adjoining Entities



Legend

Banking Projects

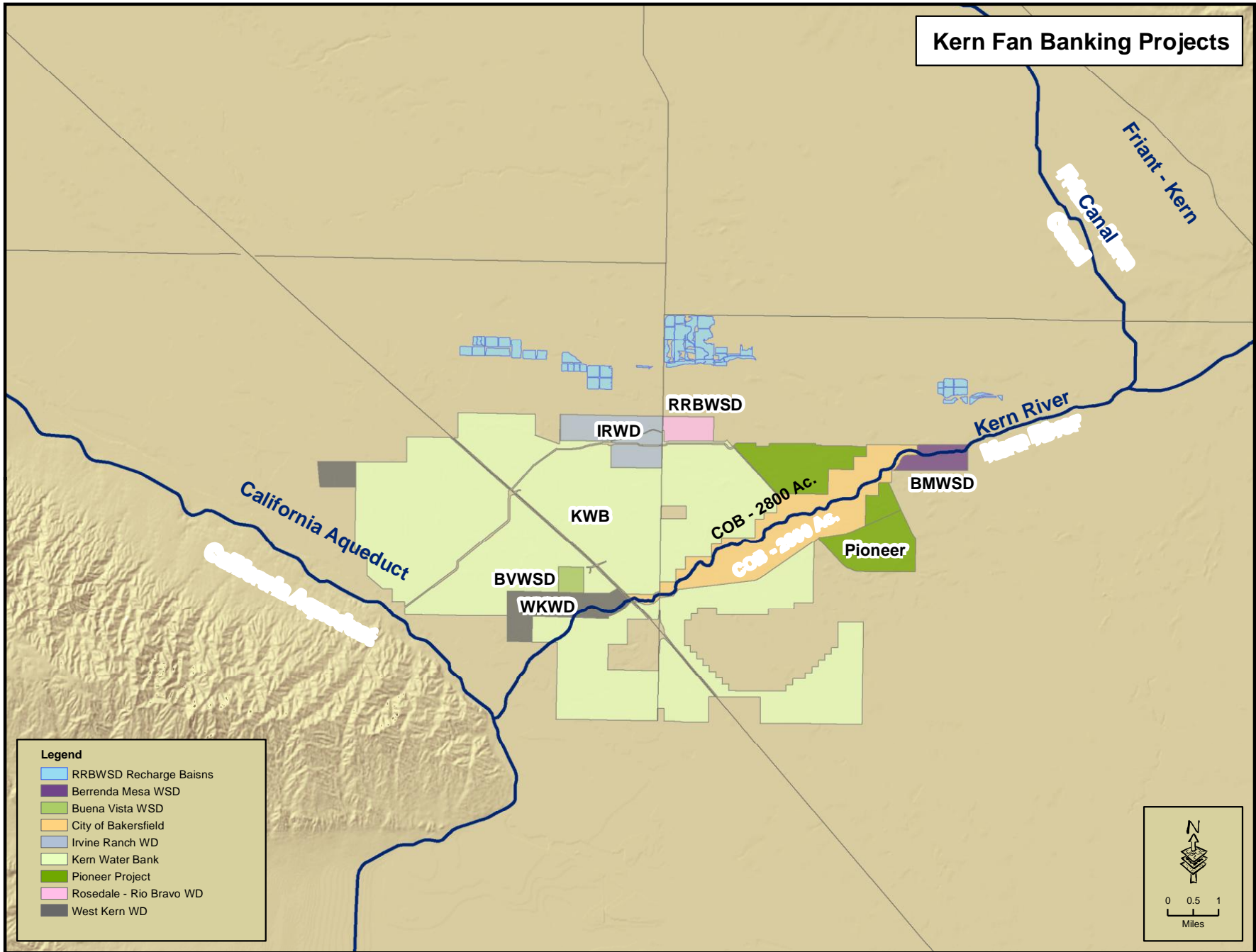
- Berrenda Mesa WSD
- Buena Vista WSD
- City of Bakersfield
- Irvine Ranch WD
- Kern Water Bank
- Pioneer Project
- Rosedale - Rio Bravo WD
- West Kern WD
- Major Water Conveyance
- Buena Vista
- Henry Miller WD
- ID4
- Kern Delta
- Mc Allister Ranch ID
- North Kern
- Rosedale Ranch ID
- Rosedale-Rio Bravo
- Semitropic
- Shafter - Wasco ID
- Southern San Joaquin MUD



New Reporting Requirements

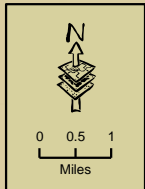
- ▶ Most districts signed up for CASGEM
- ▶ Have been collecting data for years, so nothing new
- ▶ Need to know levels and quality – very well documented in most banking areas
- ▶ Better information on the fringes of the basin and in some districts would be helpful
- ▶ Would be very helpful to know pumping rates – most consumptive use estimated from crop surveys

Kern Fan Banking Projects

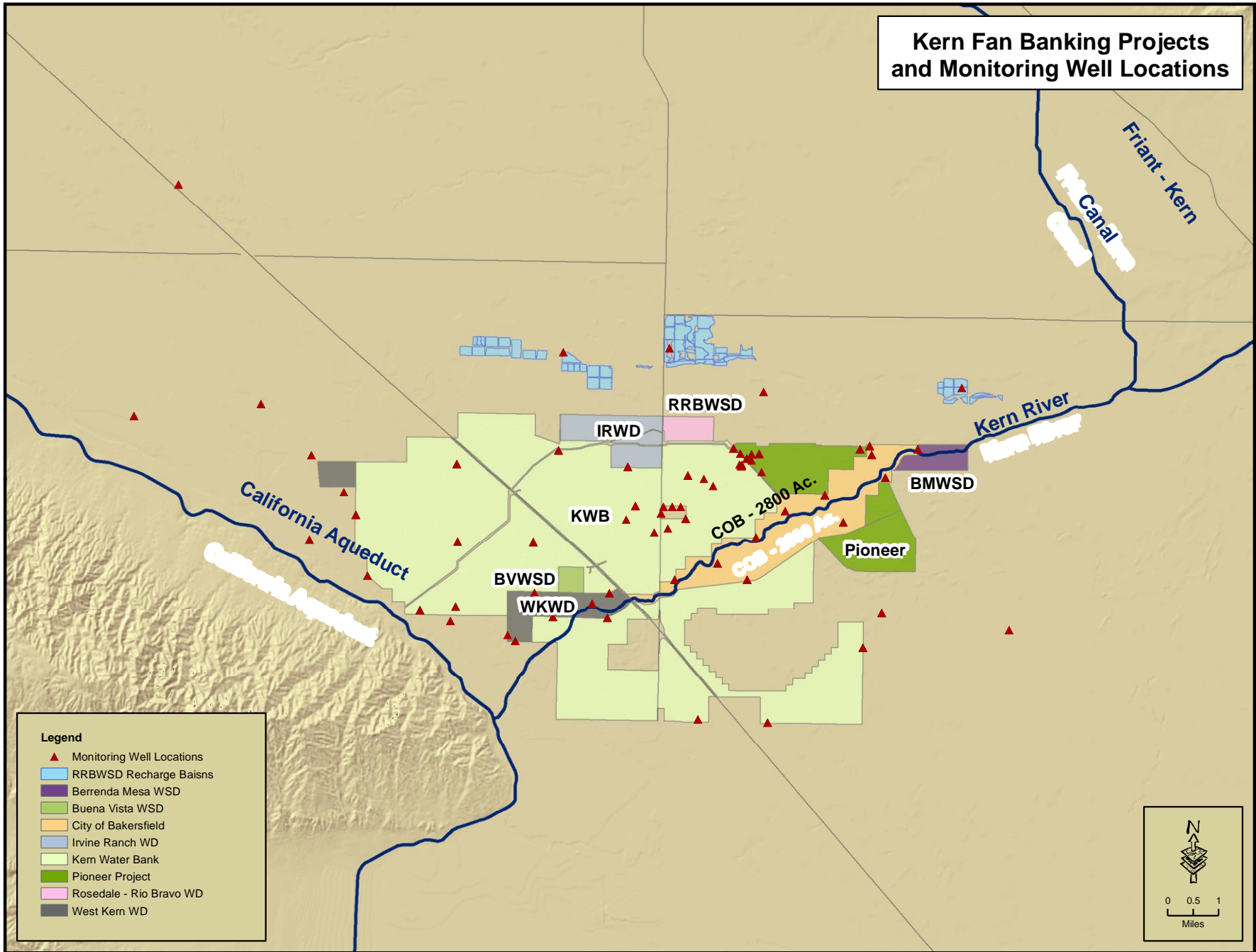


Legend

- RRBWSD Recharge Basins
- Berrenda Mesa WSD
- Buena Vista WSD
- City of Bakersfield
- Irvine Ranch WD
- Kern Water Bank
- Pioneer Project
- Rosedale - Rio Bravo WD
- West Kern WD



Kern Fan Banking Projects and Monitoring Well Locations



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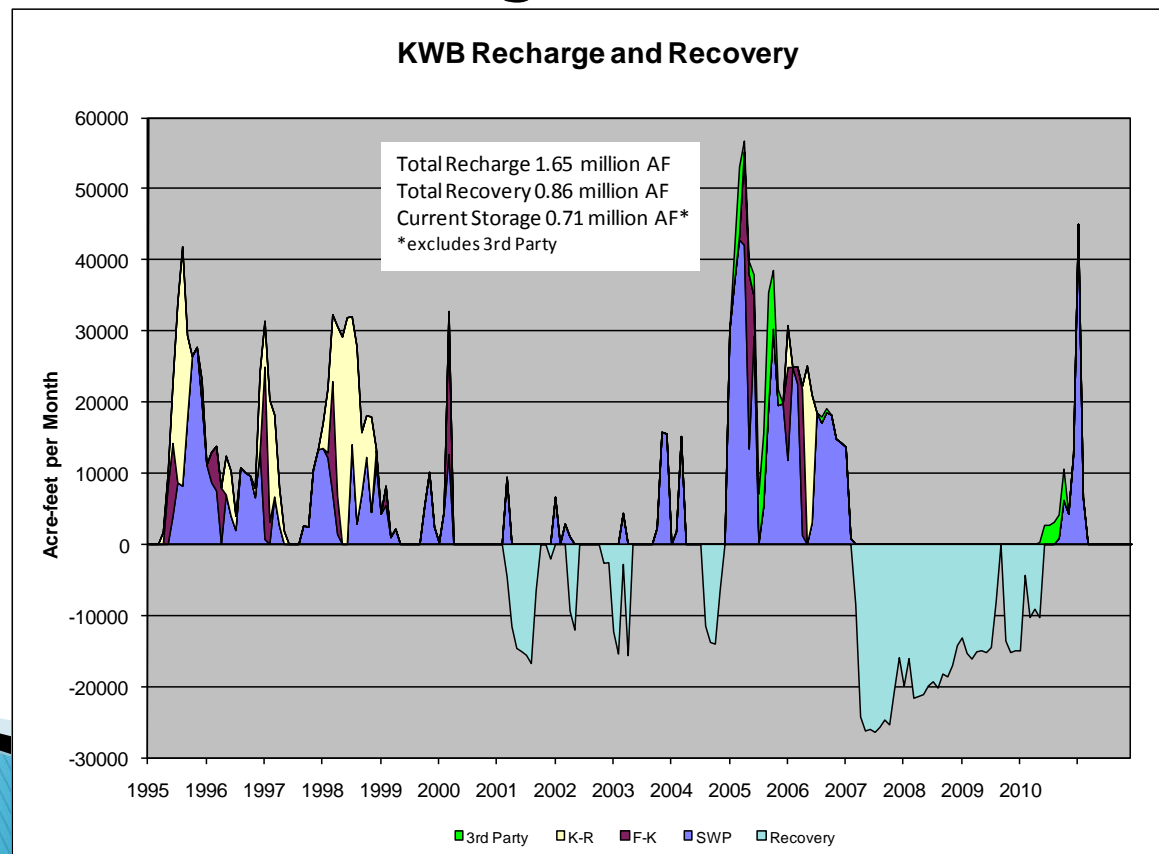
- ▲ Monitoring Well Locations
- RRBWSD Recharge Basins
- Berrenda Mesa WSD
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- Rosedale - Rio Bravo WD
- West Kern WD

North arrow pointing up.

Scale bar: 0, 0.5, 1 Miles.

Basin Recovery

- ▶ KWB alone has recharged ~90,000 AF of water since December
- ▶ Water levels starting to recover:



Improving Yield

- ▶ Water Banking
 - Has greatly improved Kern County's ability to capture surplus supplies
 - Infrastructure built by partners improves water conservation
 - Banking program loss factors and other provisions insure water is left behind to benefit basin
 - "2 for 1" Banking

Types of Water Banking

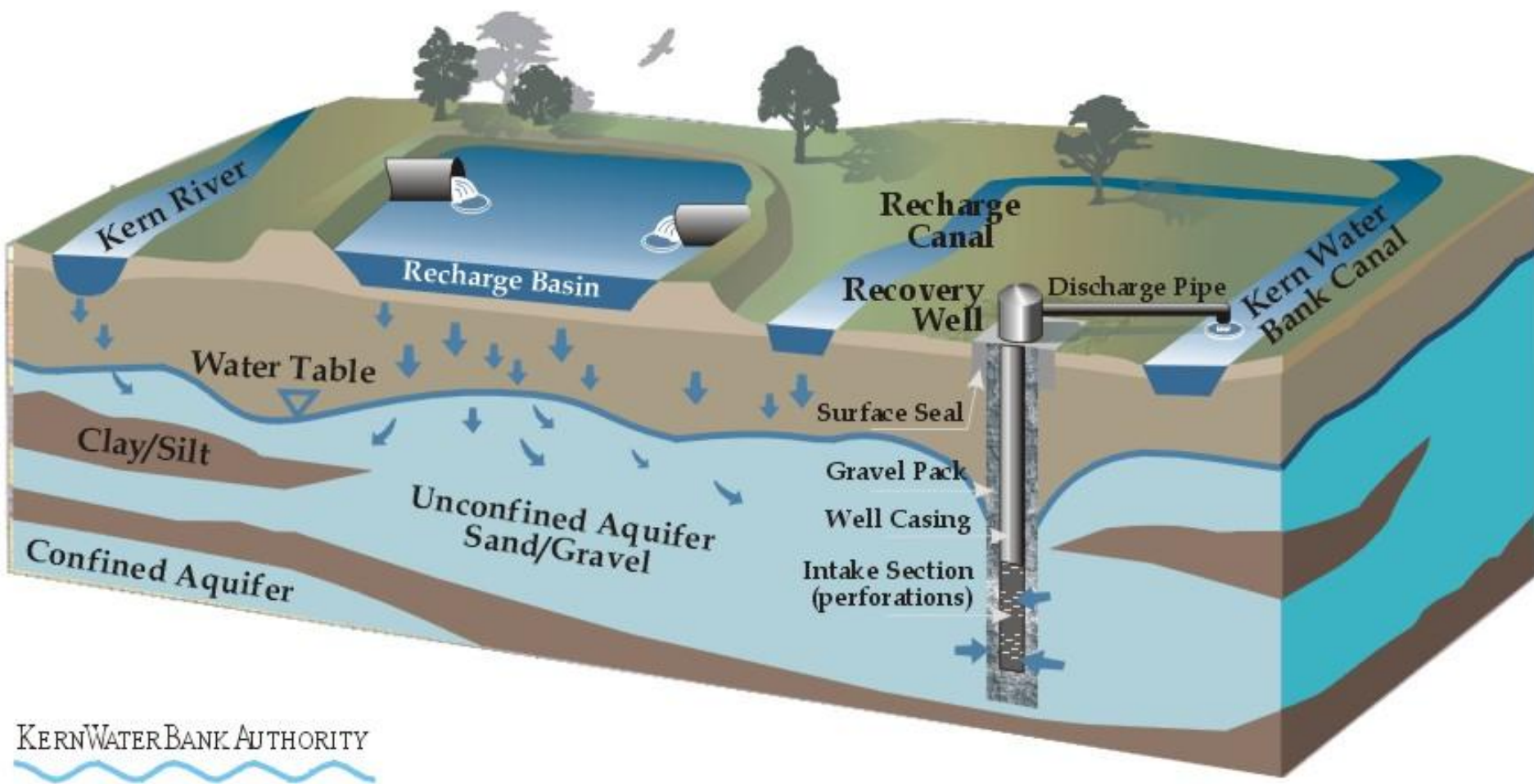
- ▶ In lieu
 - Surface supplies provided in lieu of groundwater pumping
- ▶ Direct recharge
 - Water is physically stored in aquifer for later recovery

Direct Recharge



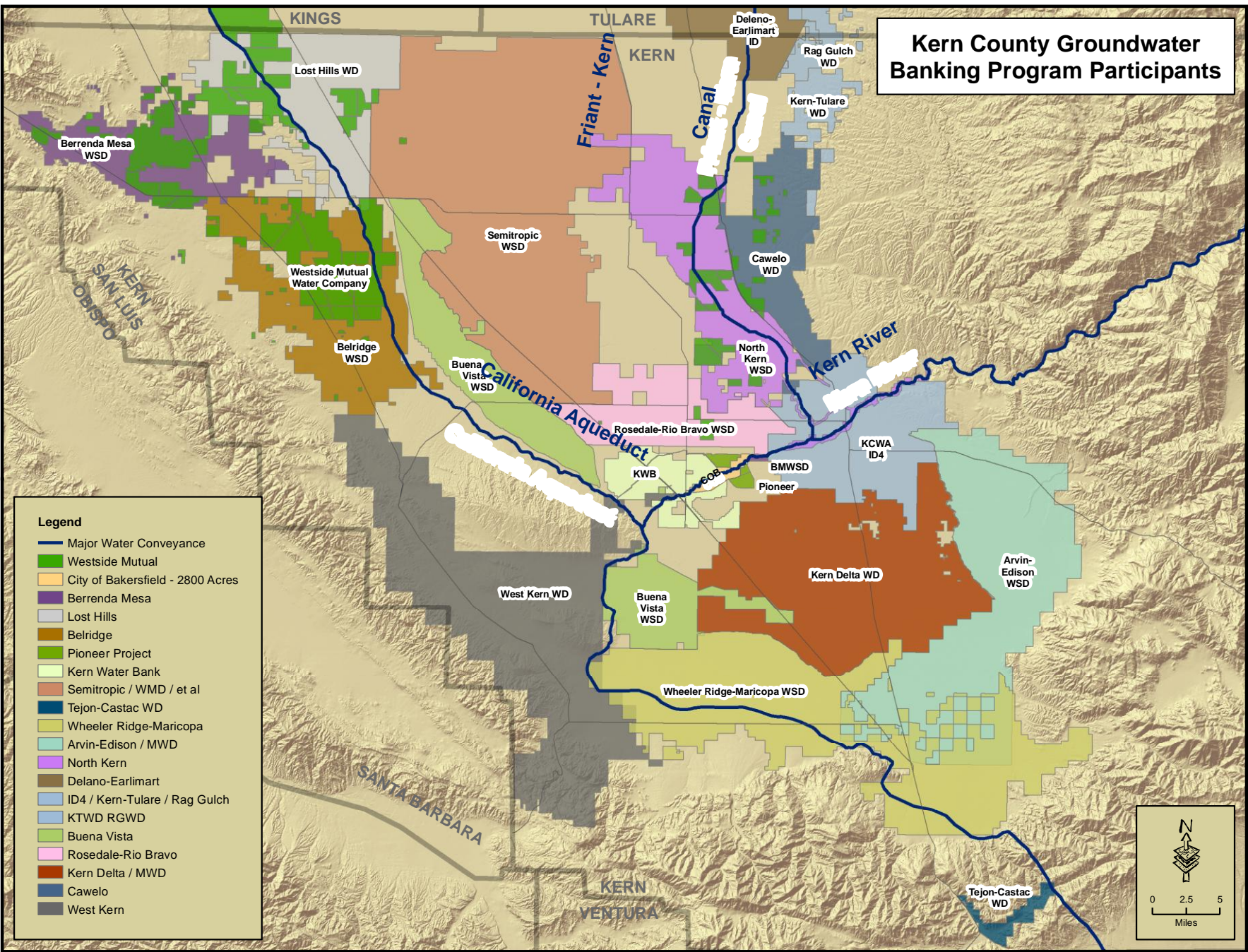
In-Lieu Recharge





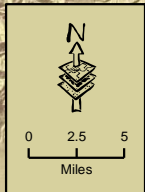
KERN WATER BANK AUTHORITY

Kern County Groundwater Banking Program Participants



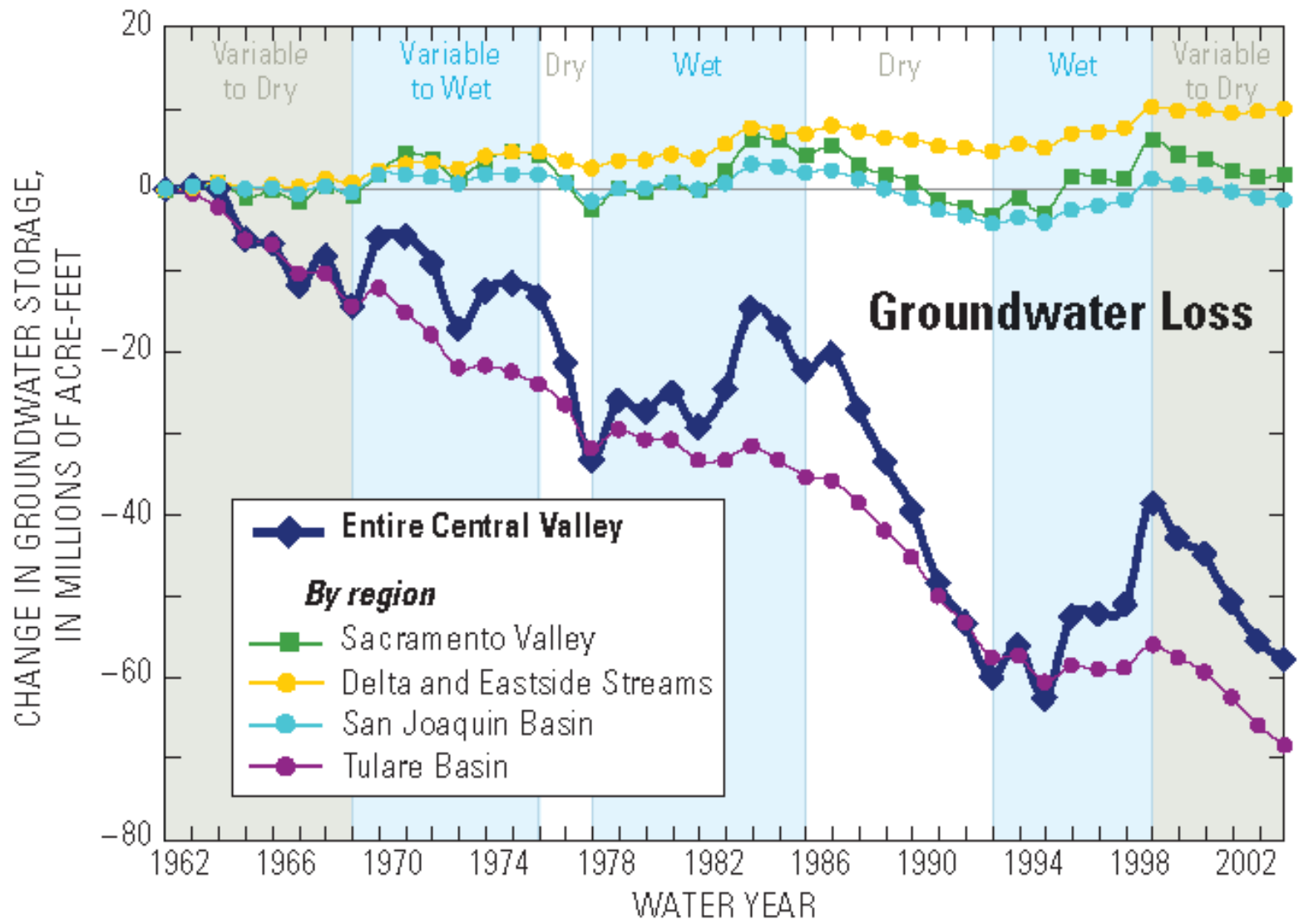
Legend

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- Westside Mutual
- City of Bakersfield - 2800 Acres
- Berrenda Mesa
- Lost Hills
- Belridge
- Pioneer Project
- Kern Water Bank
- Semitropic / WMD / et al
- Tejon-Castac WD
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- North Kern
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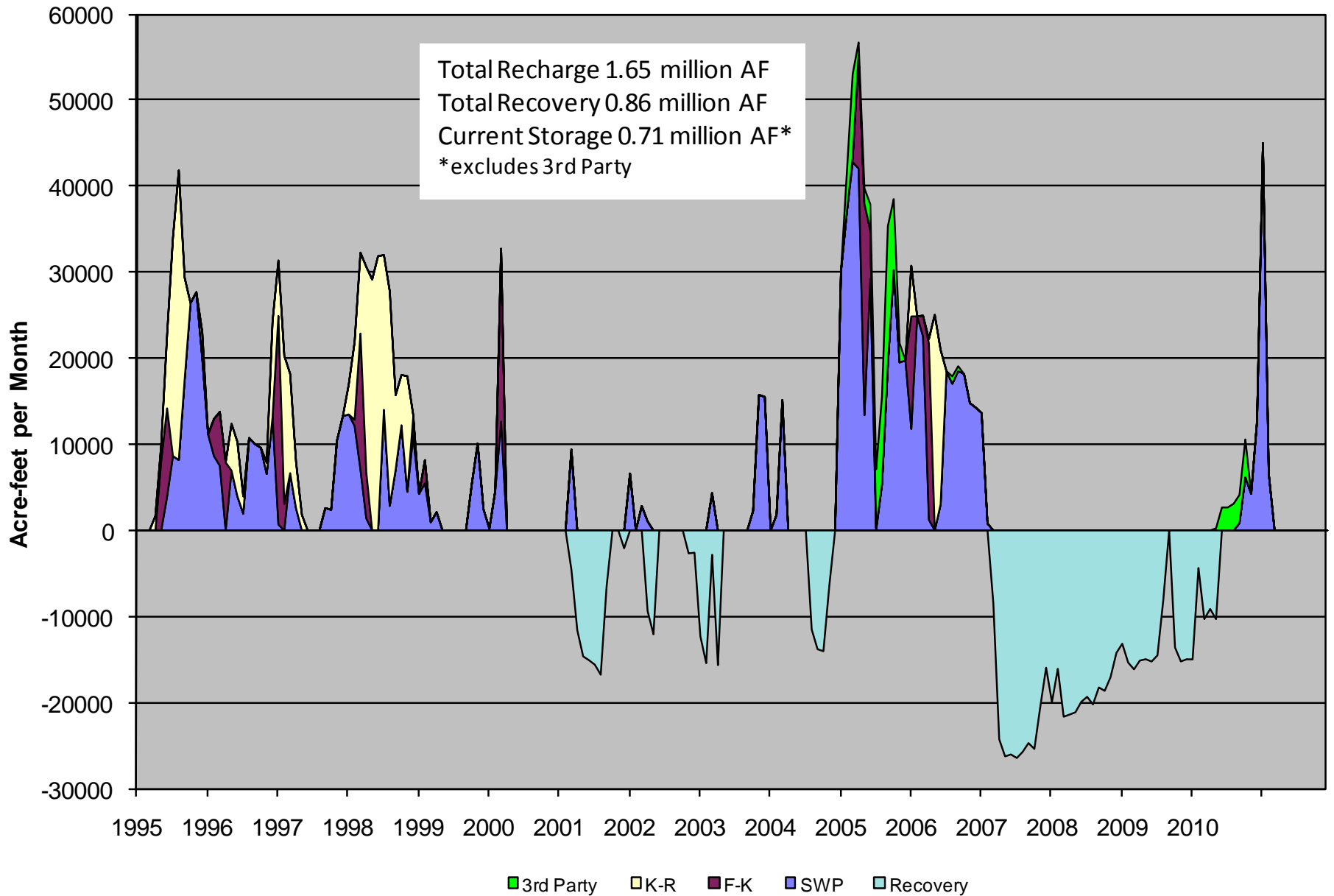


Major Basin Management Challenges

- ▶ Water supply limitations caused by regulatory constraints in the Delta
 - Increases reliance on groundwater pumping
- ▶ Overdraft
 - Some districts in surplus, most close to balance, some in chronic overdraft
- ▶ Water levels
 - Some older wells not deep enough for current water levels
- ▶ Water quality
 - Salinity challenges from using the basin
 - 0.3 tons salt per AF of imported SWP water
 - Salinity benefits of banking
 - About 1.8 tons of salt exported per ton of salt imported



KWB Recharge and Recovery



Kern Water Bank Authority

