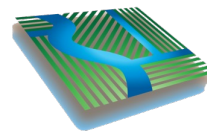


Bridging the Farm-Gate Delivery Data Gap: Fifteen Years of SBx7-7 Implementation

October 3rd, 2024



DAVIDS
ENGINEERING, INC



Outline

- SBx7-7 Background
- RemoteTracker System Overview
- Accuracy - Lab, Turnout, and Canal Level
- RemoteTracker System Implementation (2014 - present)
- Benefits of Accurate Volumetric Measurement
- Questions and Discussion

SBx7-7 Background

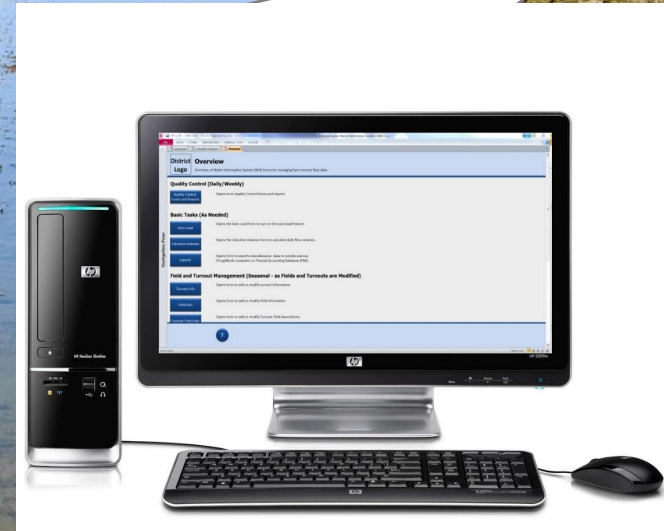
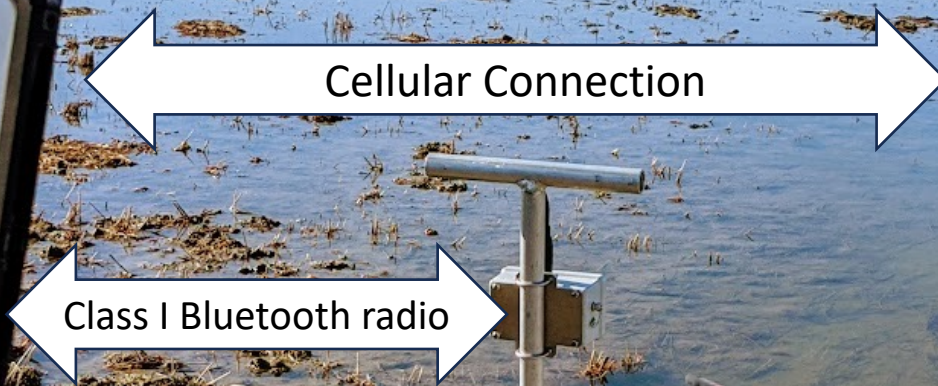
- SBx7-7 or the Water Conservation Act was enacted in November 2009 requiring all water providers to increase water use efficiency.
- Two mandatory Efficient Management Water Practices to be implemented for all districts above 25k AC: (1) were farm gate delivery (5% accuracy for lab-tested devices) and (2) volumetric billing (at least in part).
- Measurement is essential to addressing water scarcity.

Outline

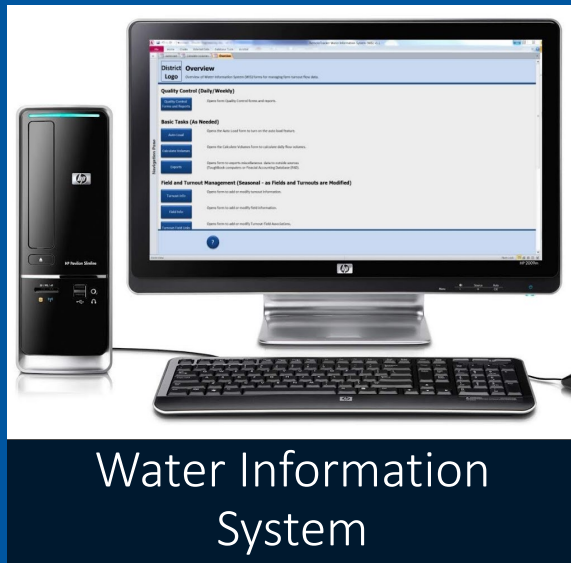
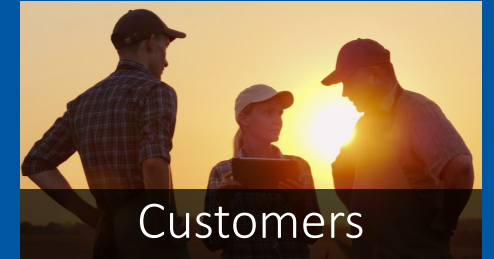
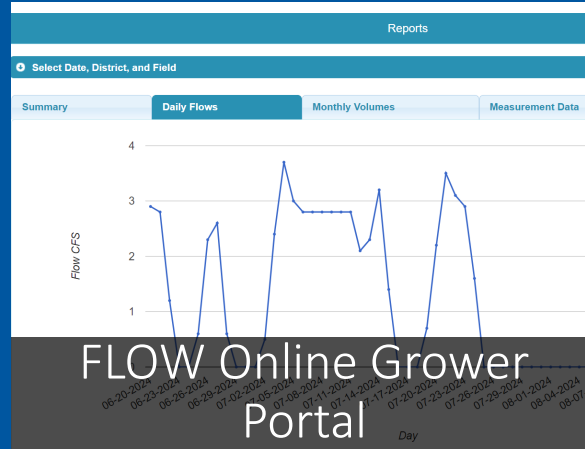
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RemoteTracker Measurement Collection

- Wireless Acoustic Doppler Velocimeter (WADV) connects to Toughbook via Class I Bluetooth connection
- Files are synced to the Water Information System (WIS) in the district office and reports of all measurements and future orders are synced back to the field operators Toughbook.
- Measurements are buffered (saved) locally on the Toughbook until sent via cellular connection to a cloud network.
- Totalizing flowmeters, prop flow totalizer, manual estimates, comments, and future orders can be recorded into the RemoteTracker program.



Field Measurements to Customer Invoices



Invoice Number: 2021 - 776 (Year - InvoiceID)	Invoice Name: 2021 Irrigation (Adopted 2020)
Customer: Grower Name	Invoice Date: 11/9/2022
Grower Address	Volume Period: 3/1/2021 - 2/28/2022
	Volume Finalized: Yes

Balance Summary * (1485 ac; 7824.6 af)	
Item	Amount
Total Charges	\$130,595.99
Total Payments	(\$130,595.99)
Total Adjustments	\$0.00
Balance	\$0.00

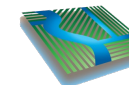
Charge Summary	
Charge Component	Amount
Acre Charge	\$14,850.00
Volumetric Charge	\$115,745.99

Payment Summary **				
PayDate	PayNum	PayAmount	Comments	
8/10/2021	31171	\$98,794.10	1st & 2nd Installment	
11/16/2021	31532	\$31,801.89	3rd Installment	

Notes:
 * Amounts shown in parentheses represent credits.
 ** Blank Payment and Adjustment Summaries mean that no Payments and/or Adjustments have been made.

Adjustment Summary **

Water Accounting Database

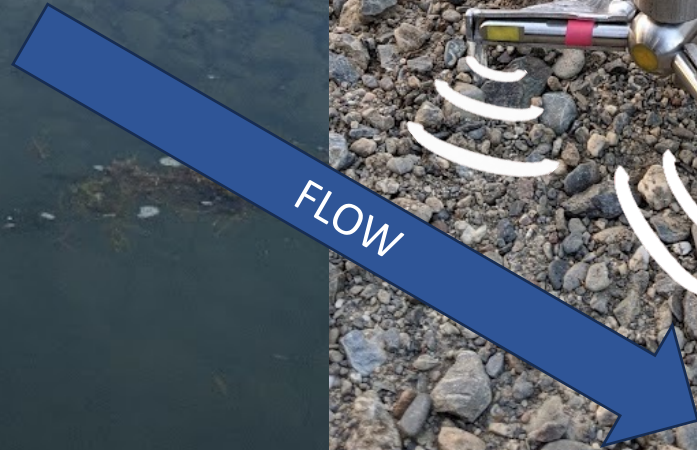


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Accuracy - Lab Certification

- Uses a SonTek Acoustic Doppler Velocimeter (ADV) to measure velocities and calculate flow.
- Accurate to 4.6% meeting SBx7-7 accuracy standards for lab certified devices.

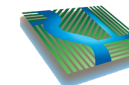


Accuracy - Turnout Scale

- Irrigation Turnout Calibration Unit from the ITRC testing at RD108 in July of 2017.
- Accuracy of the RemoteTracker WADV was found to be within 2% of ITRC flowmeter verification measurements.

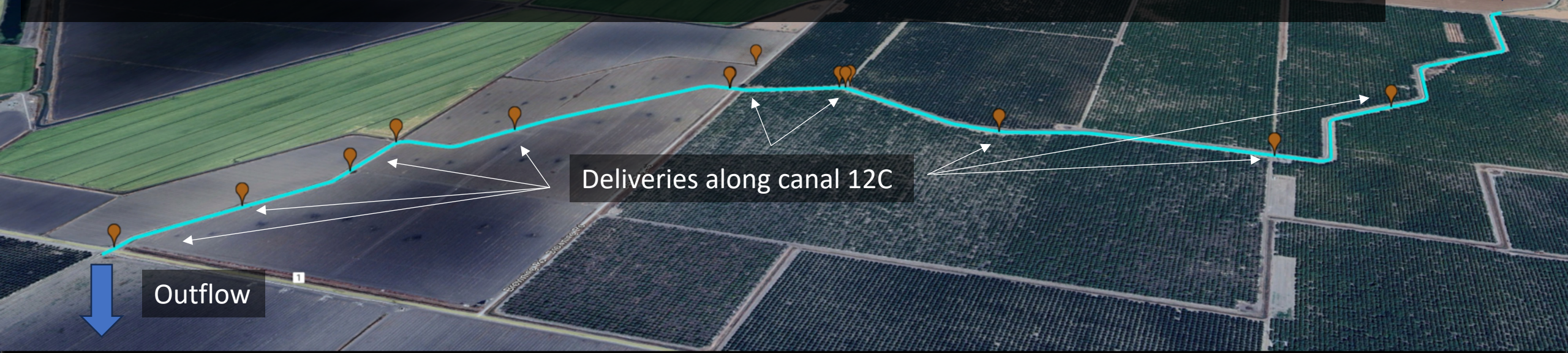


	Flow 1		Flow 2		Flow 3	
	12" Magm'tr Flow Rate (CFS)	16" Magm'tr Flow Rate (CFS)	12" Magm'tr Flow Rate (CFS)	16" Magm'tr Flow Rate (CFS)	12" Magm'tr Flow Rate (CFS)	16" Magm'tr Flow Rate (CFS)
Avg. calibration unit flow rate (CFS)	2.08	1.96	2.96	2.93	3.92	3.75
Leaks (CFS)	0.0	0.0	0.0	0.0	0.0	0.0
Adjusted calibration flow rate (CFS)	2.08	1.96	2.96	2.93	3.92	3.75
Flow rate from RemoteTracker (CFS)	1.96		2.93		3.81	
Absolute error (%)	5.7	0.2	1.1	0.1	2.8	1.7
Avg. instantaneous flow rate error (%)	1.9					



Accuracy - Canal/Lateral Scale

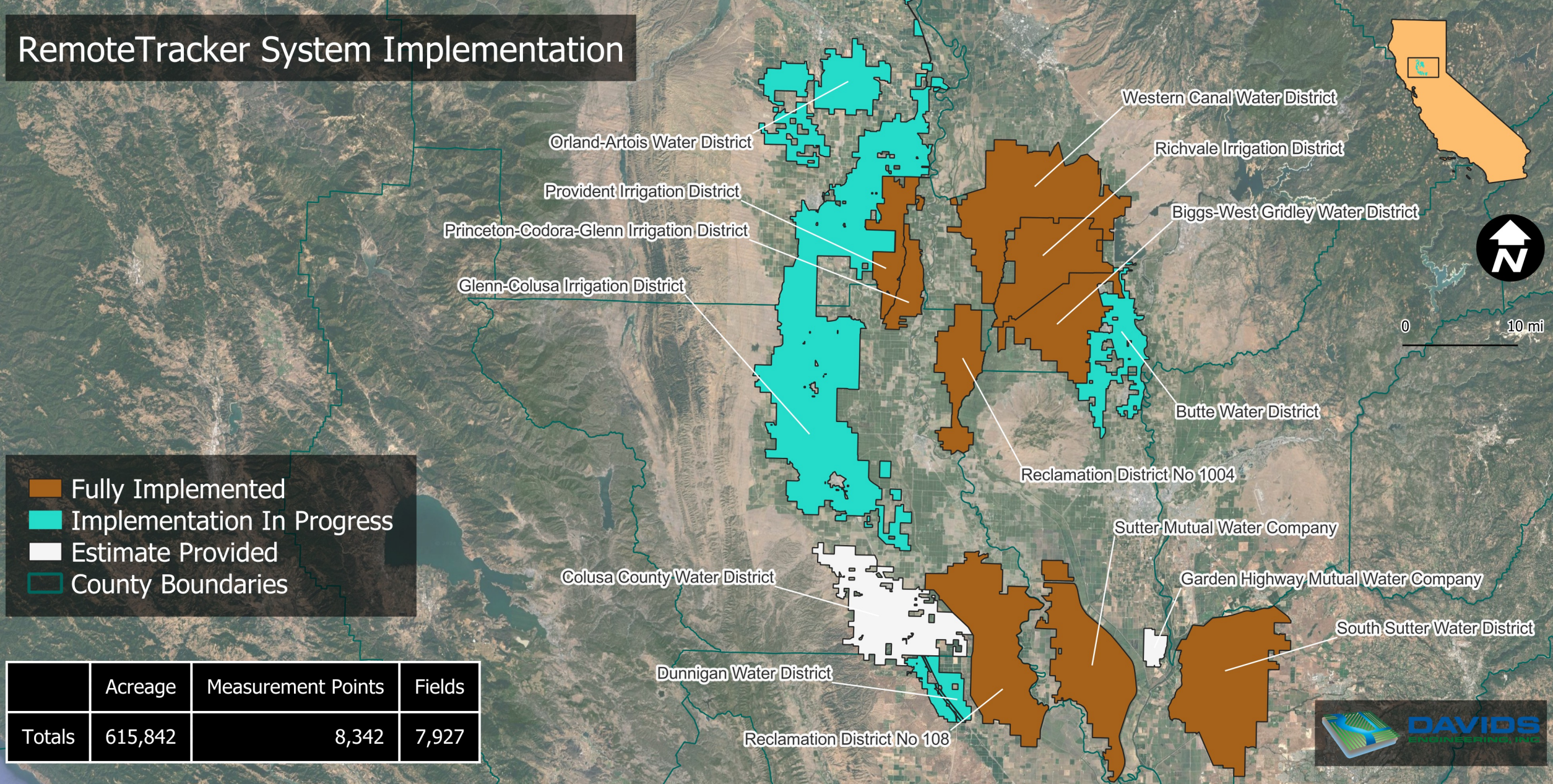
- Inflows and outflows were measured with Rubicon FlumeGates to compute a total volume of deliveries (water budget volumes).
- Deliveries along the canal were measured using three different measurement devices (weir, gate, and RemoteTracker WADV).
- On average, delivery volumes calculated with the RemoteTracker were found to be within 3.7% of the water budget volumes.



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RemoteTracker System Implementation

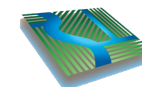
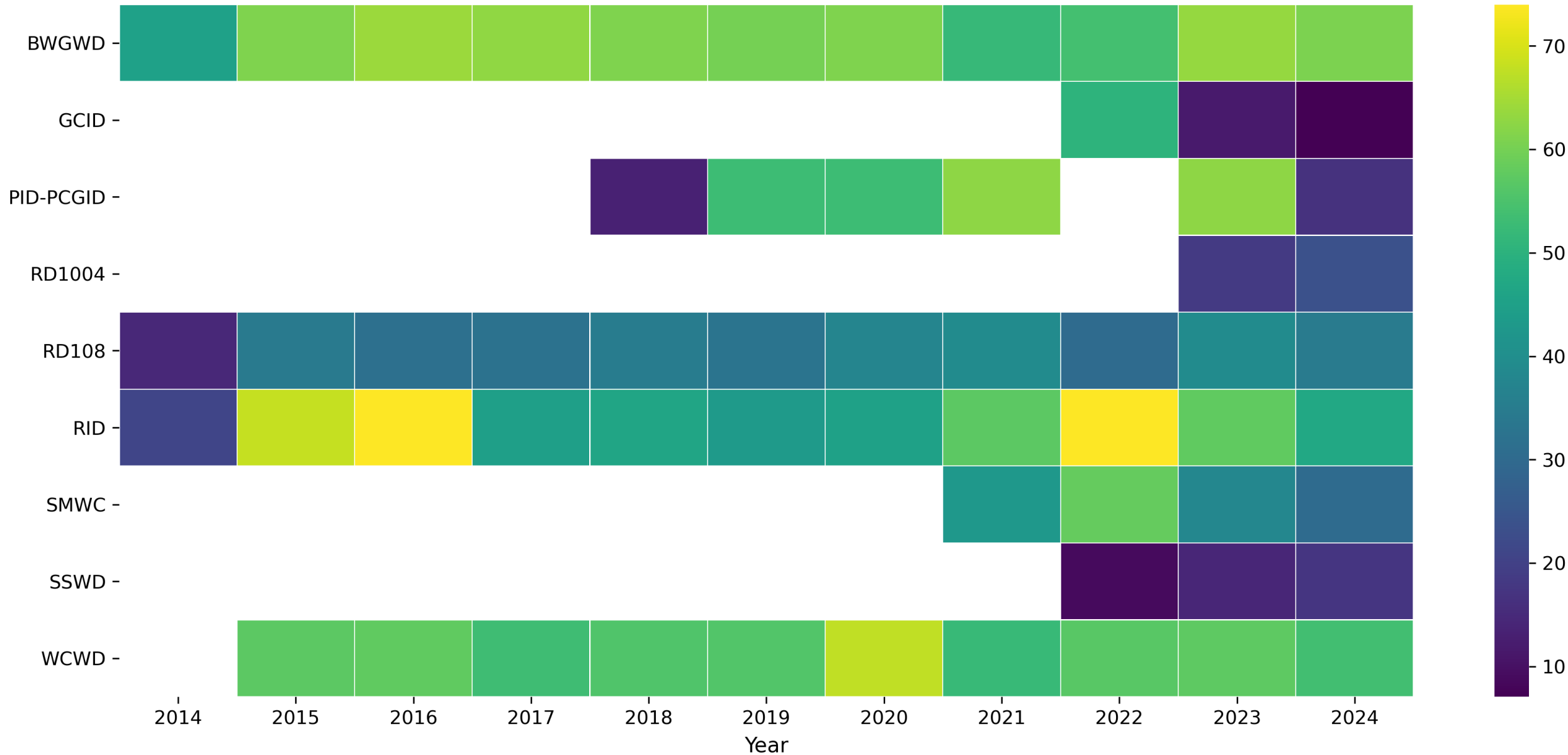


- Fully Implemented
- Implementation In Progress
- Estimate Provided
- County Boundaries

	Acreage	Measurement Points	Fields
Totals	615,842	8,342	7,927



RemoteTracker Measurements per 100 AC

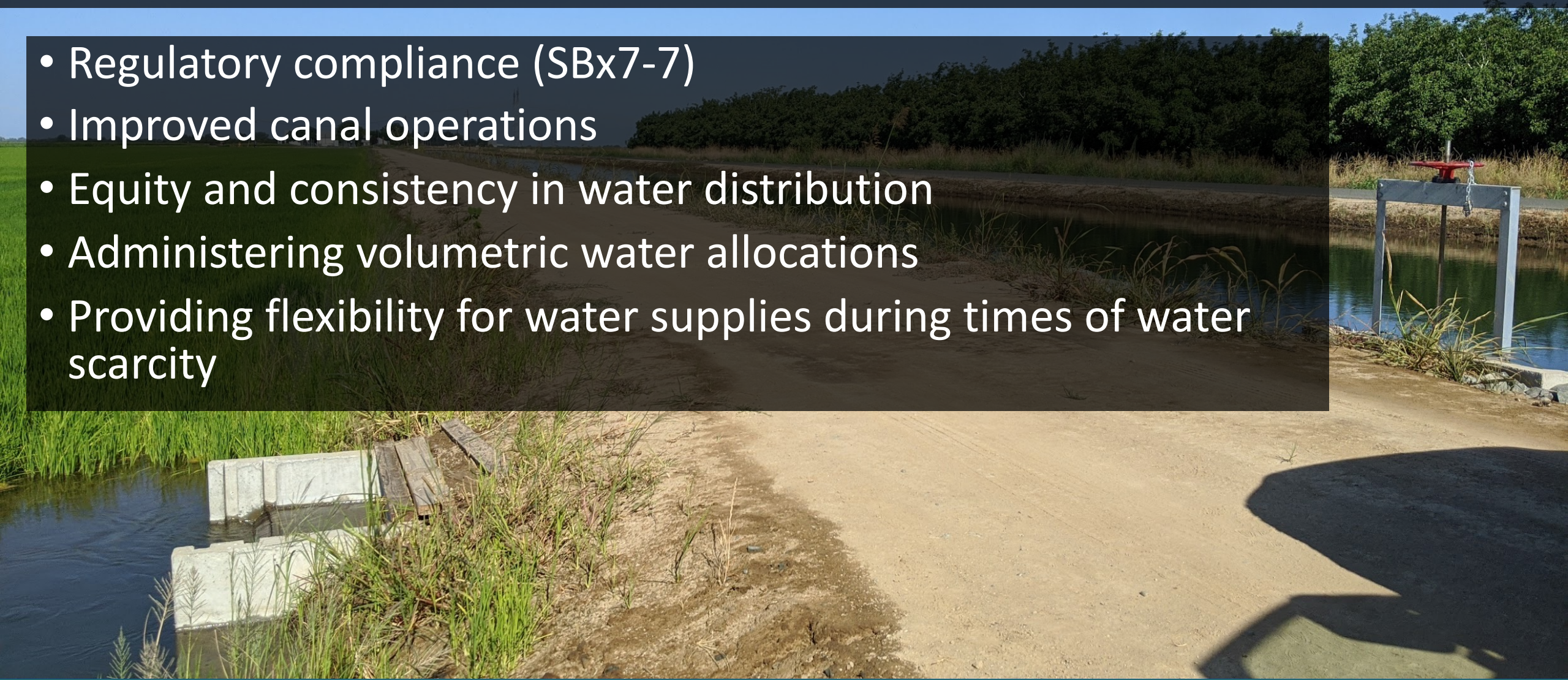


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Benefits of Accurate Volumetric Measurement

- Regulatory compliance (SBx7-7)
- Improved canal operations
- Equity and consistency in water distribution
- Administering volumetric water allocations
- Providing flexibility for water supplies during times of water scarcity

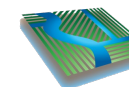


Improved Decision Making at the Field Scale



Measurement - A Drought Mitigation Tool

- Without measurement, during water-short years, districts historically limited acreage planted to a certain percentage of fields.
- With measurement, a volumetric allocation is possible during water-short years.
- Measurement also enabled districts to allow growers to wield groundwater through district canals.



Conclusions

- RemoteTracker System is widely used throughout the Sacramento Valley
- Accurate volumetric measurement at the turnout level is critically important for:
 - Regulatory compliance (SBx7-7)
 - Improved canal operations
 - Equity and consistency in water distribution
 - Administering volumetric water allocations
 - Providing flexibility for water supplies during times of water scarcity



Questions and Discussion