

Soil Moisture Monitoring for Irrigators in Sierra Valley

December 16, 2024



Soil Moisture Monitoring & Irrigation Efficiency

Utility of real-time monitoring field soil moisture:

1. Tracking Soil Water Depletion and irrigation performance
2. Informing Irrigation Scheduling and Application Rate
 - Seasonal start of irrigation
 - Optimize irrigation for cuttings
 - Pivot scheduling and speed

Informs “management” of the Soil Water Reservoir

Application of Soil Moisture Monitoring in Sierra Valley

Correctly placed and implemented soil moisture monitoring, on all types of irrigated fields, can provide benefits to on-farm and basin water efficiency.

- Pivots
- Wheel-lines
- Flood irrigation

Soil Moisture Monitoring Implementation

- Site Selection – Representative field/farm location(s)
- Sensor Type and Data Platform Selection
 - Ease of Installation
 - Data Accessibility
 - Utility of Data Platform
 - Costs, initial and maintenance
- Installation and Setup
 - Install Station
 - Collect soil profile samples – Define water holding capacity (in/ft)
 - Setup soil moisture interface to meet Management Needs
 - Defining AWHC Management Allowable Depletion (MAD)
 - Soil rooting depth
 - Potential integration of other available resources, weather forecasts and ET resources
- Utilization
 - Improvements to irrigation efficiency are seen through the application of the SM information in water management decisions and tracking performance.

Soil Moisture Monitoring Options

Stetson review of Technologies & Vendors

Brands utilized in the valley:

SoilScout – McGinley (Roberti)

METER – Bachand (Goodwin & Grandi)

Watermark – UCCE (Bar One)

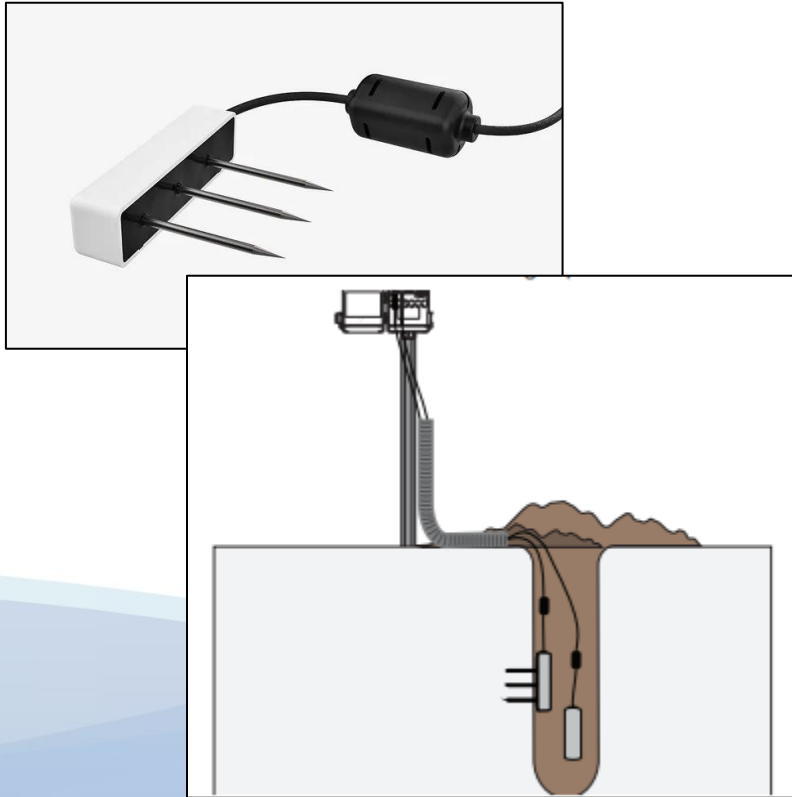
Sentek – DRI (Roberti & Grandi)

Recommendation - **Sentek *Drill&Drop*** Sensors

- Relatively easy to install and setup
- Determined to be most cost effective
- Provides continuous profile to 48” without multiple installations
- Sensors can be utilized in various modes:
 - Direct reading
 - Bluetooth
 - Various vendor cloud platforms

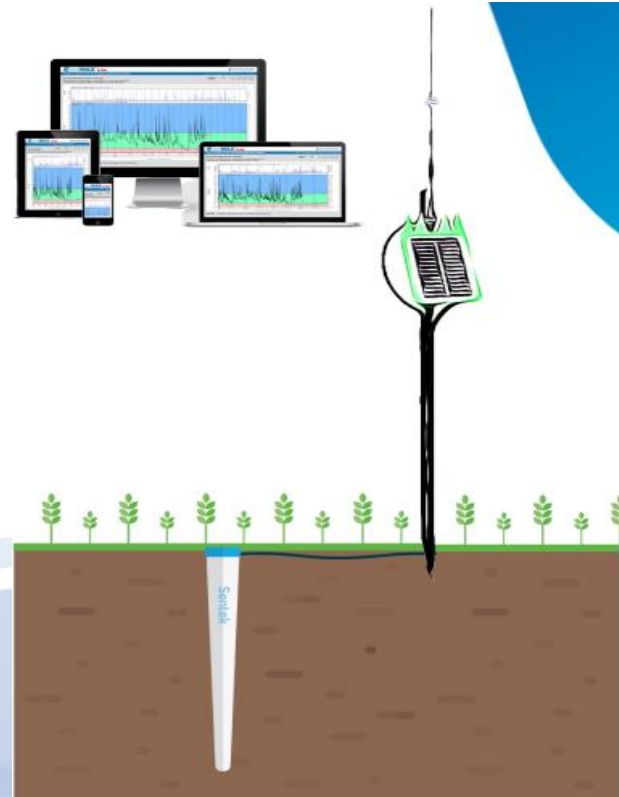
Sensor Types

Discrete level sensors



METER

Multi-level Probe sensors

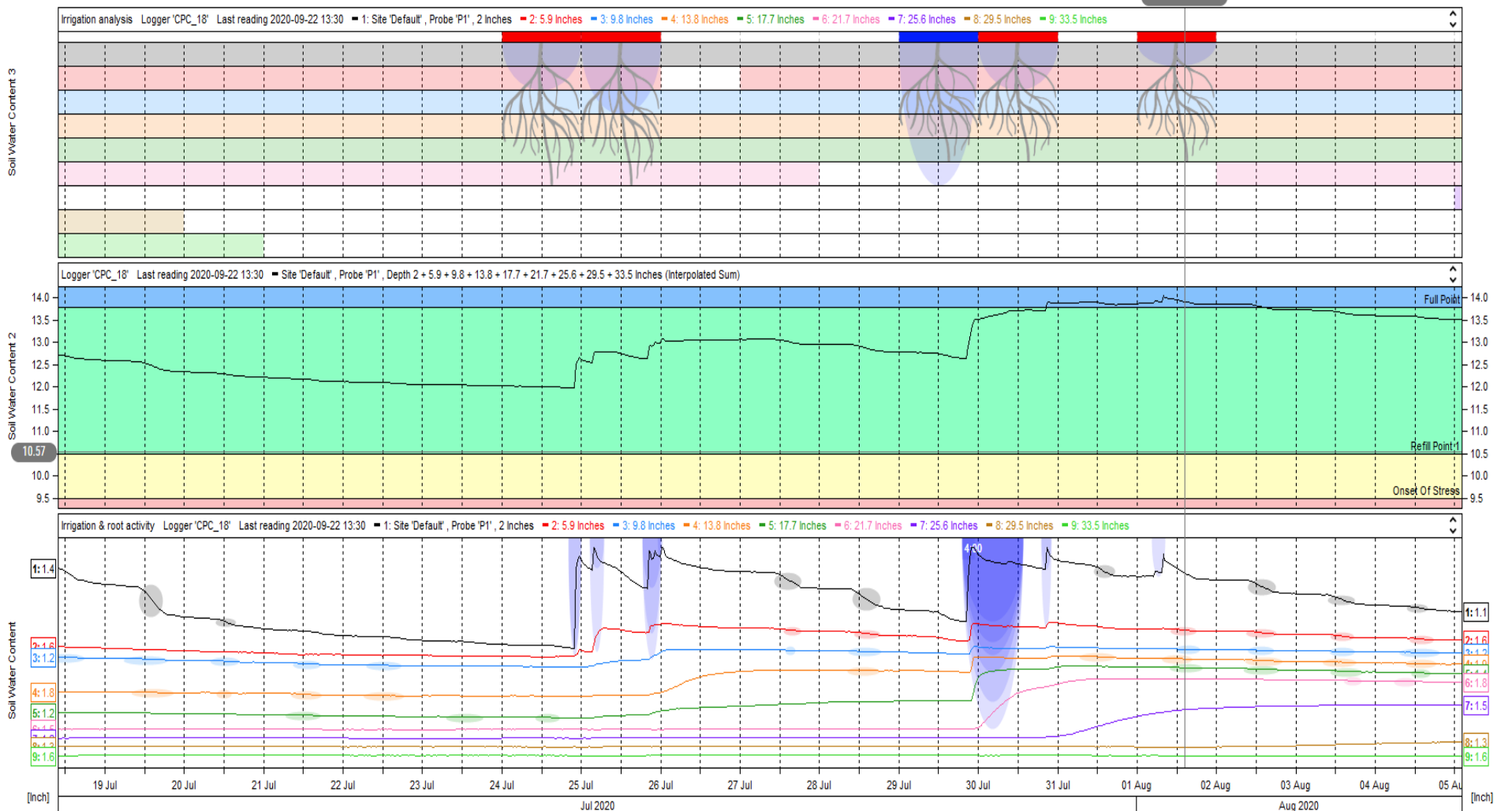


Sentek

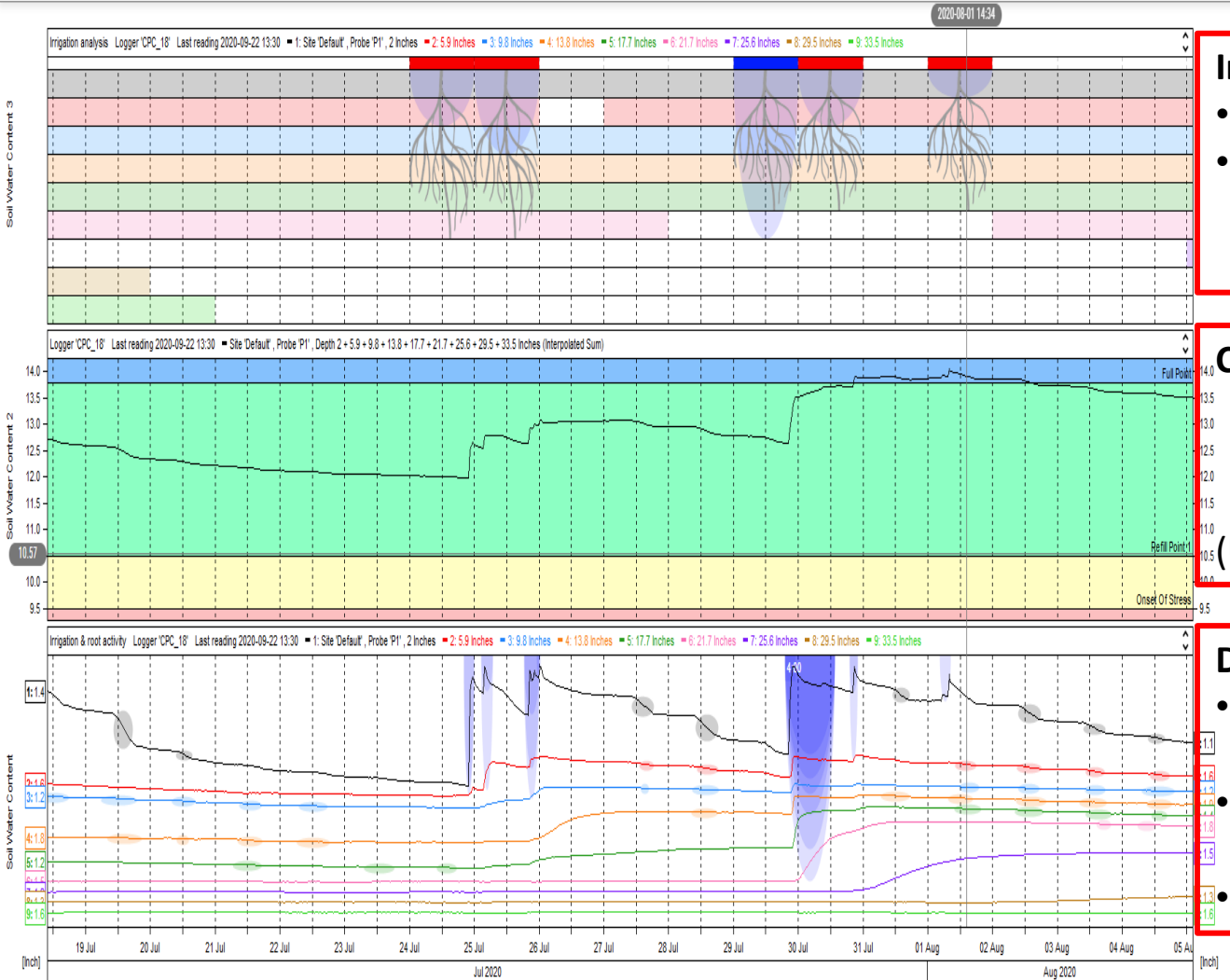
Platform Example

SENTEK Data Software (IrriMAX) Dashboard

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SENTEK Data Software (IrriMAX) Dashboard



Irrigation Analysis :

- Root depths
- Recognize Over/Under irrigation

Composite Soil Water Content:

- Full** – Holding Capacity
- Refill** – (MAD%)
- Stress** – Wilting Point

(User defined in the software)

Discrete Depth Water Content:

- Soil water content at various sensor depths
- Displays irrigation events and depth of infiltration
- Recognize soil rooting depth

Next Steps for Implementation...

January 2025 Board meeting

- Final recommendations equipment and cloud platform for DWR Irrigation Efficiency Project
- Stetson will submit recommendation for turn-key solution(s) for board approval

January - February

Stetson will continue soliciting interested parties through outreach and assessment work

February – March

Begin installation and set up of soil moisture monitoring systems for Irrigators