



AUSTRALIAN OLIVE
ASSOCIATION_{LTD}

AOA National Conference & Trade Exhibition

Irrigation Performance Review



SWAN
systems

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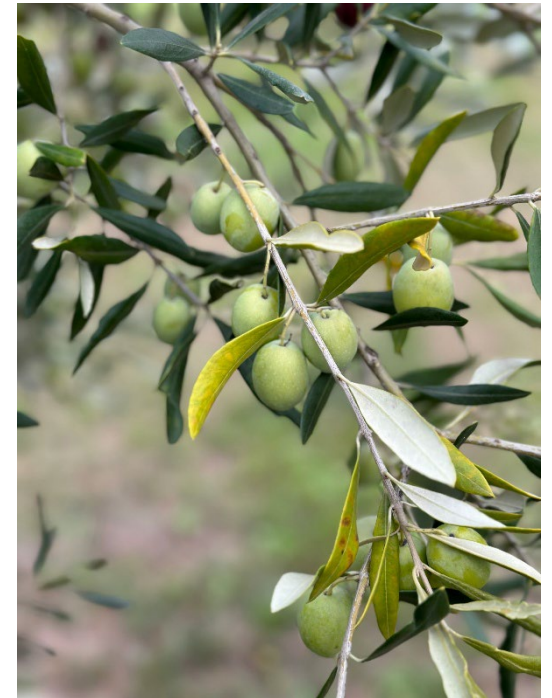
Welcome to SWAN Systems

A season in review at Peninsula Providore



Today I will be presenting the results and insights gained from retrospectively analysing the 24-25 seasonal data provided by Peninsula Providore – Currency Creek and Nangkita groves on the Fleurieu Peninsula of South Australia.

1. **Site Design and Agronomic Objectives** – Site parameters and quality objectives
2. **SWAN Systems Implementation** – How SWAN Systems was setup and used to review irrigation and related data
3. **Outcomes and Seasonal Learnings** – Observed impact on tree physiology and irrigation efficiencies along with implications for future water use strategies



Site Design & Agronomic Objectives

Site Design



Peninsula Providore comprises 2 separate sites – one at Currency Creek, and one at Nangkita.

- **Crop** – Olive varieties grown are Corregiola, Manzanillo, Leccino, Barnea, Frantoio, Kalamata and Koroneiki
- **Soils** – Predominantly sandy soils at the Currency Creek site, duplex soils at Nangkita
- **Hardware Integration** – Talgil controller, soil moisture probes

Quality Objectives

To meet premium quality standards and optimise tree performance, the following key quality objectives guide irrigation management.

- **Tree Canopy Management** – Maintaining a balanced tree canopy is key to utilising leaf area index for optimal photosynthetic capacity without excessive shading preventing air flow and light penetration
- **Uniformity and Ripening** – Promote even oil accumulation and veraison as well as maintaining leaf health while preventing new growth tips in the lead up to harvest
- **Fruit Quality and Specification** – Ensure maximum oil yield/tonne of fruit while maintaining optimal flavour



SWAN Systems Implementation

SWAN Systems Implementation

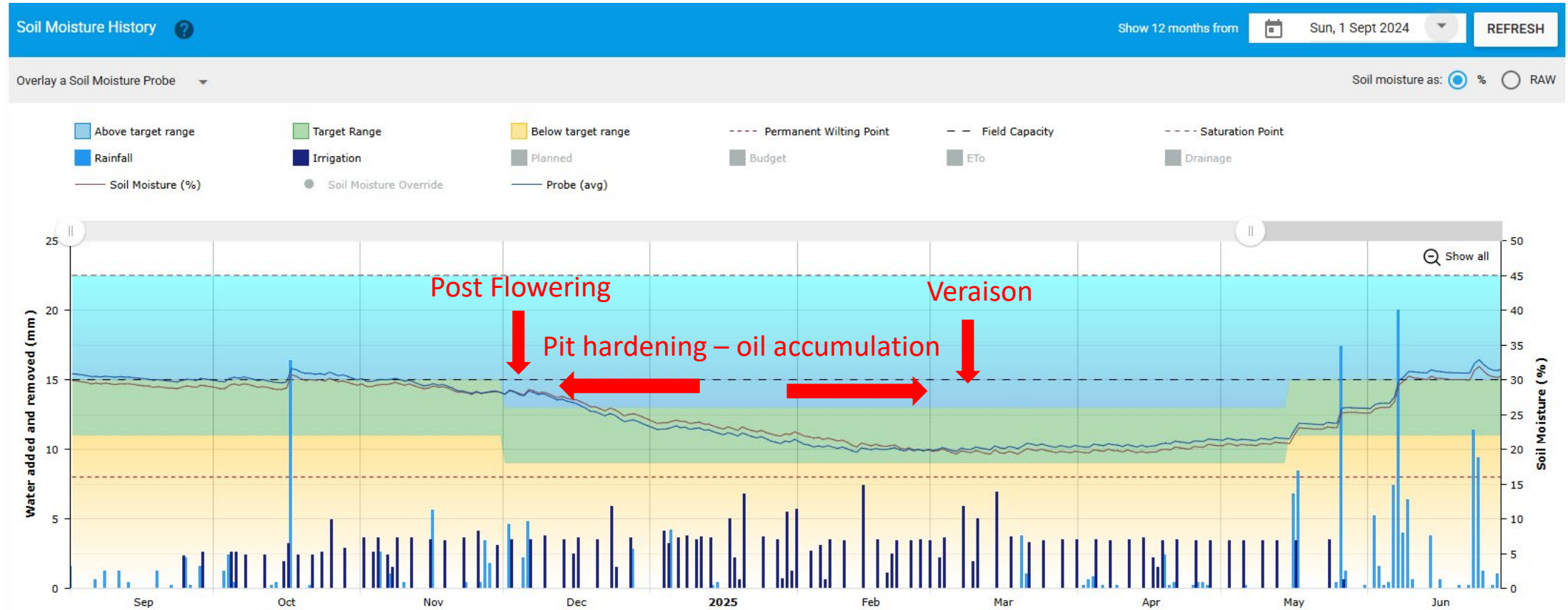


The following setup and calibration of SWAN Systems was implemented to review actual data from the olive grove for the 24-25 season.

- **Data Collection** – Irrigation, weather, satellite imagery and probe data was automatically collected via API and uploaded to the SWAN platform
- **Custom Settings** – Soil types, crop coefficient (Kc) obtained through NDVI imagery, effective root depth set at 600mm tapered to 500mm post flowering for sandy blocks, irrigation target range lowered post flowering
- **Calibration Phase** – SWAN's calculated soil moisture balance monitored against probe data to ensure accuracy of model

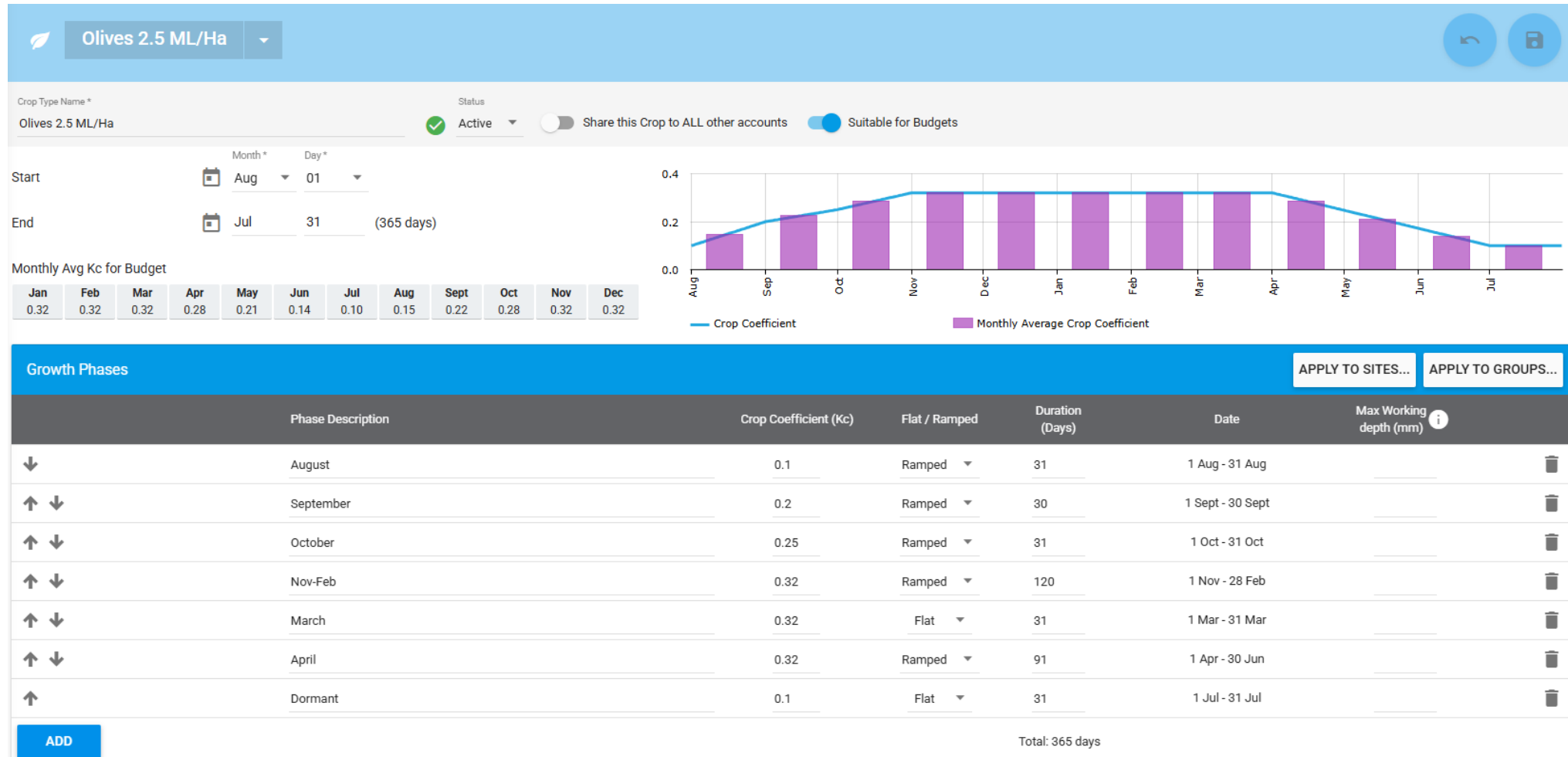
Irrigation Application & Soil Moisture Balance

Nangkita Block 6



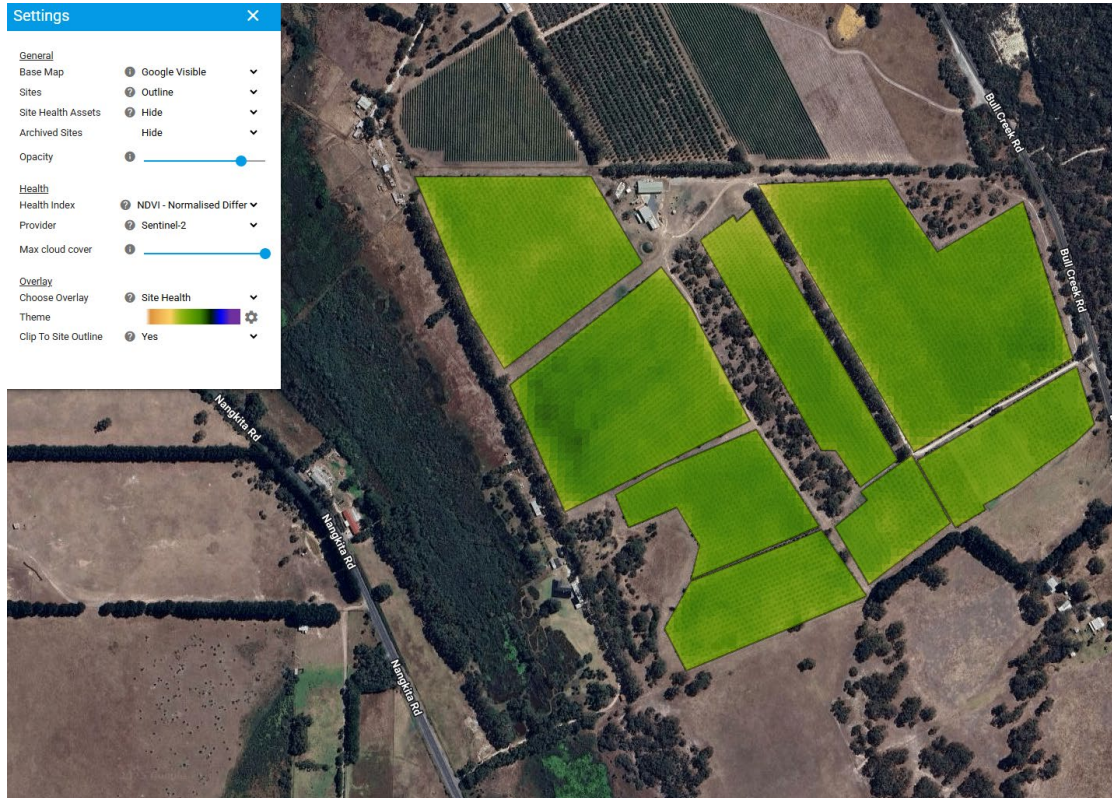
- An overview of the season shows irrigation began in late September to maintain adequate soil moisture leading into flowering
- Irrigation applied throughout pit-hardening into oil accumulation was maintained in the target range zone
- SWAN uses a soil moisture model to calculate how much irrigation needs to be applied over the next 7 days using forecast weather and crop coefficients to calculate exact water requirements

Crop Coefficient (Kc) Curve



- Canopy size and leaf area index determines the Kc curve which is one of the main drivers in calculating crop water demand
- SWAN uses NDVI data to calculate accurate crop coefficients
- Phenological dates can be adjusted throughout the season to reflect seasonal phenological stages

NDVI Imagery



Date	ET ₀ (mm)	Rainfall (mm)	Temp Max (°C)	Temp Min (°C)	Temp Mean (°C)	Humidity Max (%)	Humidity Min (%)	Humidity Mean (%)	Windspeed Mean (km/h)	Solar Radiation (MJ/m ² /day)
Wed, 12 Feb 2025	10.6	0	42.9	18.3	31.4	55.0	11.0	29.5	12.01	26.76
Tue, 11 Feb 2025	8.6	0	38.5	16	27	74.0	12.0	42.4	9.67	27.29

- A reduction in trending NDVI recordings was observed from mid November after an initial soil moisture balance drop
- Near peak NDVI is observed from December
- A drop in NDVI is observed mid February due to heat stress, the 12th February saw an ET₀ of 10.6 with a maximum temperature of 42.9

Water Budget



- Water budgets are created as a notional guide for irrigation application
- Using the assigned Kc and historical weather data, SWAN allocated the water when it was needed the most, as determined by the phenological growth stage of the tree and ETo

Outcomes & Learnings

Outcomes & Learnings

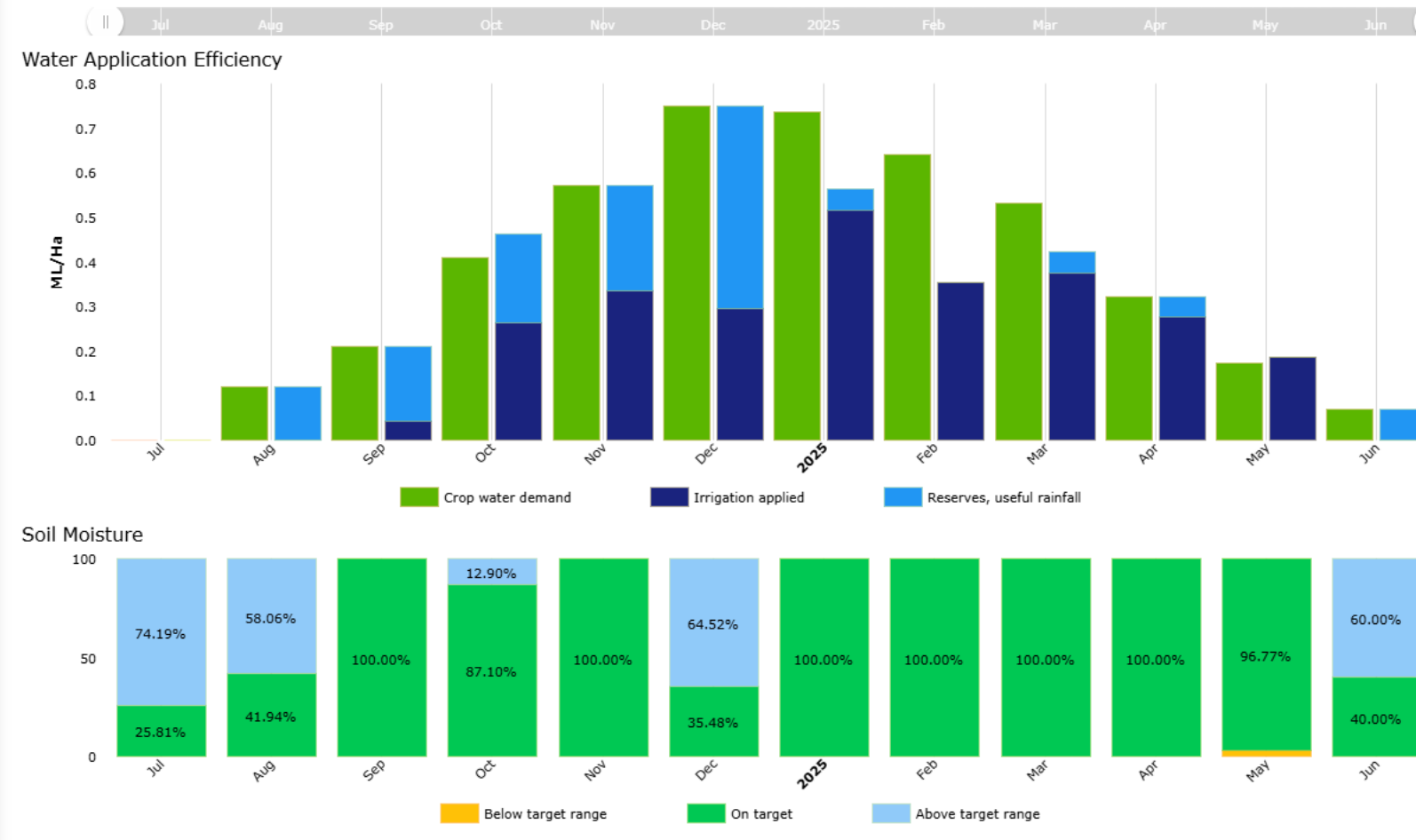


After reviewing the data from the 24-25 season the following observations were made.

- **Water Application Efficiency and Water Budget** – A close alignment between crop water demand and applied irrigation and useful rainfall was observed leading into oil accumulation
- **Yield forecast for 25-26 season** – With a balanced tree canopy maintained throughout the 24-25 season, bud fruitfulness for the 25-26 season should be optimal
- **Future Irrigation Management strategies** – The SWAN crop water demand model provides a framework that could support irrigation decisions aligned with key phenological stages.

Water Application Efficiency

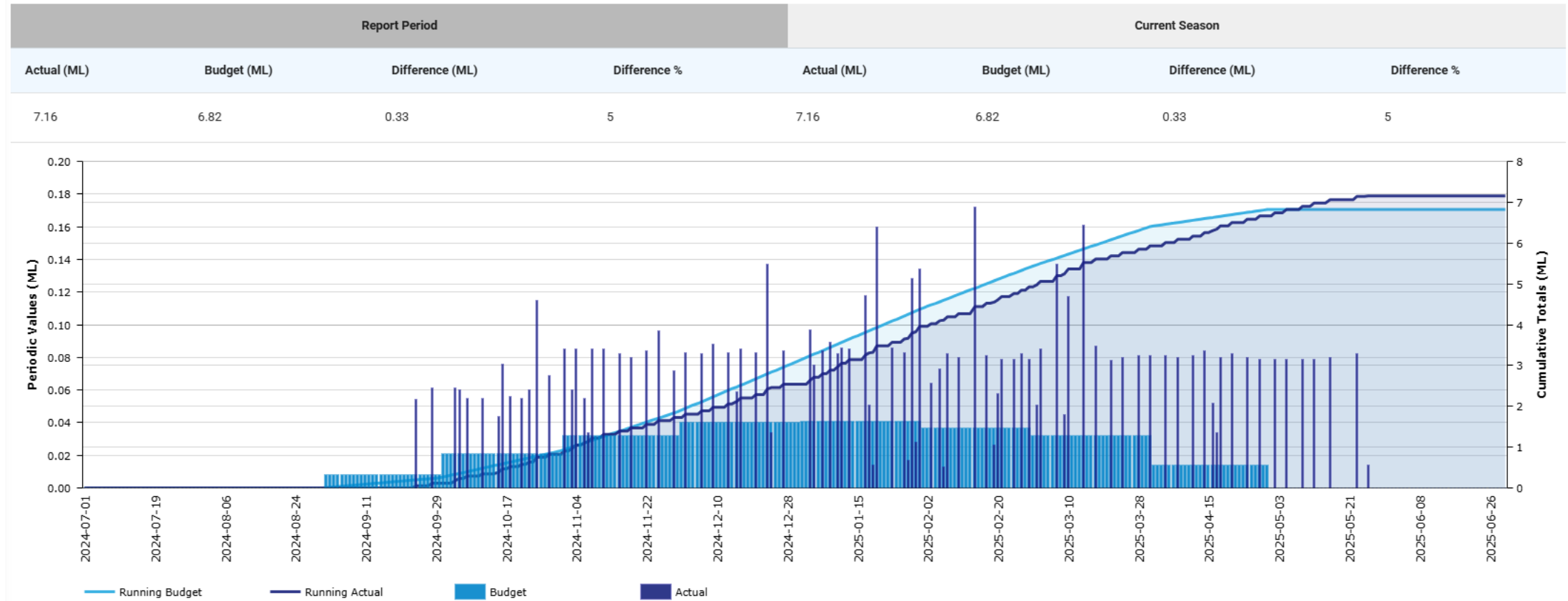
Report Period: Mon, 1 Jul 2024 to Mon, 30 Jun 2025



- A close alignment of irrigation applied (blue bars) and crop water demand (green bars) was observed throughout the early stages of the season
- A slight increase in irrigation application in January, February and March would have seen application match crop water demand

Irrigation Applied vs Water Budget

Total Area: 2.340 (Ha)



- After reviewing a full season of irrigation data and the actual crop water demand for each block, an adjustment in the water budget should be made for subsequent seasons
- A shortfall of roughly 0.5 ML/Ha was observed in crop water demand and actual irrigation applied with a water budget set to 2.5 ML/Ha

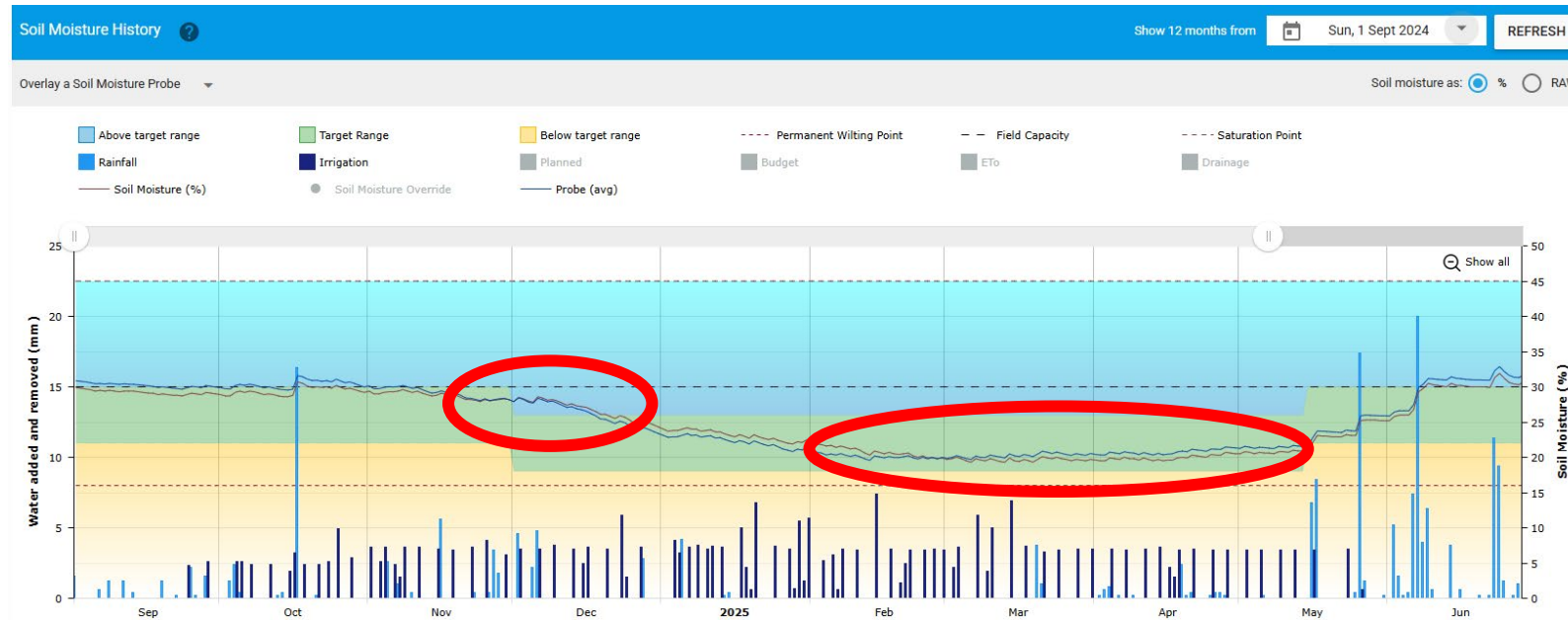
Future Irrigation Management Strategies

What can be done to ensure the trees receive the required amount of irrigation at the right time?

- **Using NDVI to calculate crop coefficients and monitor crop health** – NDVI imagery can be used to calculate crop water demand for individual blocks and monitor canopy condition
- **Modifying soil moisture target range zones** – Previous seasons' yield and quality data can be analysed to identify high-performing blocks and adjust soil moisture targets
- **Predictive 7-day irrigation scheduling** – By using SWAN's irrigation scheduling tool, there would be fewer unnecessary irrigations and less water stress leading into hot, dry spells leading to better fruit set and oil stability year to year



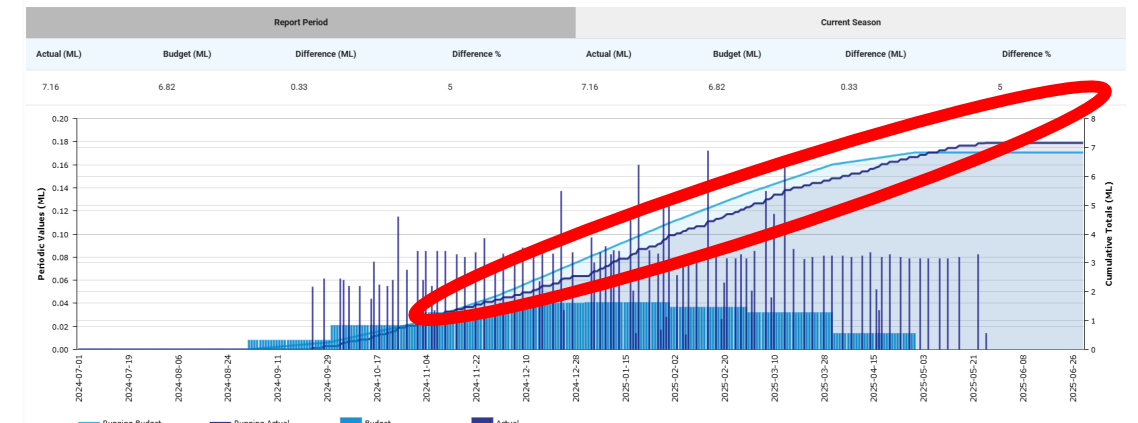
Why Bother?



Report Period: Mon, 1 Jul 2024 to Mon, 30 Jun 2025



Total Area: 2,340 (Ha)



Calculating Value of Increasing Yield & Crop Quality

Scenario Inputs

Crop

Total crop

Baseline

Price per

Price per

Crop class

(Optional)

3,000

15

(Optional) Water cost (AU\$/kL)

2

Detailed View

Parameter	Baseline	Improved	Change
Economic water productivity (AU\$/kL)	3	4	1
Water cost (AU\$/kL)	6,000	5,100	-900

Key Results (Calculated)

Income increase (AU\$/ha)	217	Income increase - total crop (AU\$)	10,840
Net income increase after water costs (AU\$/ha)	1,117	Net income increase - total crop after water costs (AU\$)	55,850

Disclaimer: This tool provides indicative estimates based on your inputs. It excludes capex/opex, labour, financing, and risk; not a full ROI analysis or a performance guarantee.

Thank you

Questions?



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