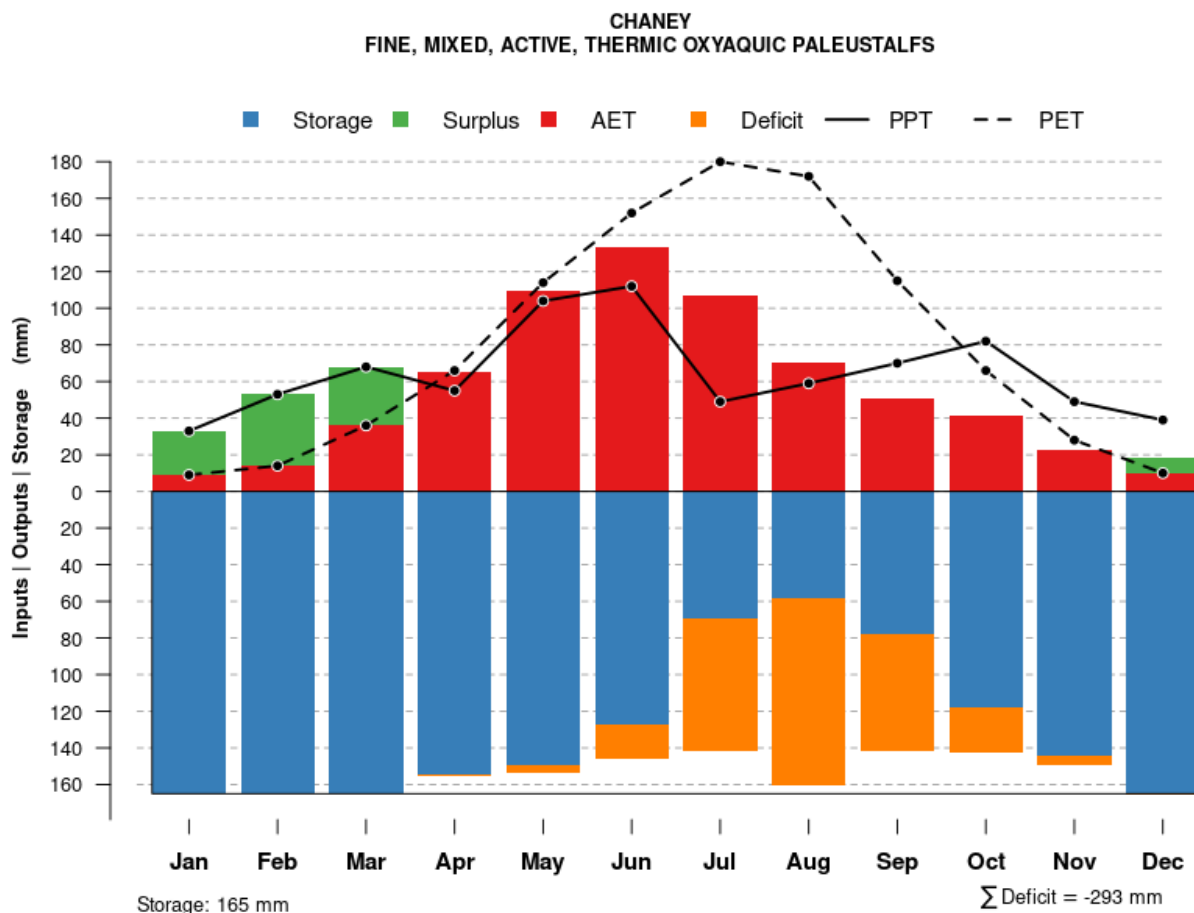






This chart is a **monthly water balance graph** for the **Chaney soil series**, classified as *Fine, mixed, active, thermic Oxyaquic Paleustalfs*. It's based on soil water-holding capacity and climate data, showing how precipitation (PPT), evapotranspiration (PET and AET), soil moisture storage, and deficits interact throughout the year.

Let's break it down clearly:

Key Elements of the Chart

ELEMENT	MEANING
PPT (BLACK LINE WITH DOTS)	Precipitation – actual rainfall per month (mm)
PET (BLACK DASHED LINE)	Potential Evapotranspiration – the theoretical water loss from soil + plants under optimal conditions
AET (RED BARS)	Actual Evapotranspiration – how much water actually evaporates or transpires, based on available moisture
STORAGE (BLUE BARS)	Change in soil water storage – reflects soil moisture in the profile (max 165 mm)
SURPLUS (GREEN BARS)	Excess water beyond storage capacity – likely lost to runoff or deep percolation

DEFICIT (ORANGE BARS)	When $PET > AET$ – plants need more water than is available; stress is likely
Σ DEFICIT = -293 MM	Cumulative annual water deficit (plants could have used 293 mm more than was available)

Interpretation by Season

Winter (Jan–Mar):

- Precipitation exceeds PET.
- Soil moisture builds up (blue bars full), and surplus water appears (green bars in Jan–Feb).
- No deficit—conditions are ideal for recharging the soil.

Spring (Apr–May):

- PET increases sharply.
- Precipitation is still moderate.
- AET increases, but no major deficit yet.
- Soil begins to lose stored moisture.

Summer (Jun–Aug):

- PET peaks (>160 mm in June/July).
- PPT is much lower than PET.
- Storage drops (blue bar shrinks), and deficit appears (orange bars).
- **This is the critical drought period:** high plant demand but insufficient rainfall. Crops without irrigation will suffer.

Fall (Sep–Nov):

- PET declines.
- PPT rebounds a bit in September but is still insufficient.
- Deficits persist, but not as severe.
- Soil moisture starts to rebuild slowly.

December:

- PET is low again.

- PPT slightly exceeds PET → small surplus.
- Soil moisture mostly restored (blue bar rises again).

Implications for Management

1. Soil Storage Capacity:

- Chaney soils store up to **165 mm of water**—moderate capacity.
- Once filled (spring), this water sustains plants into early summer, but **runs out by July** if no irrigation is applied.

2. Irrigation Planning:

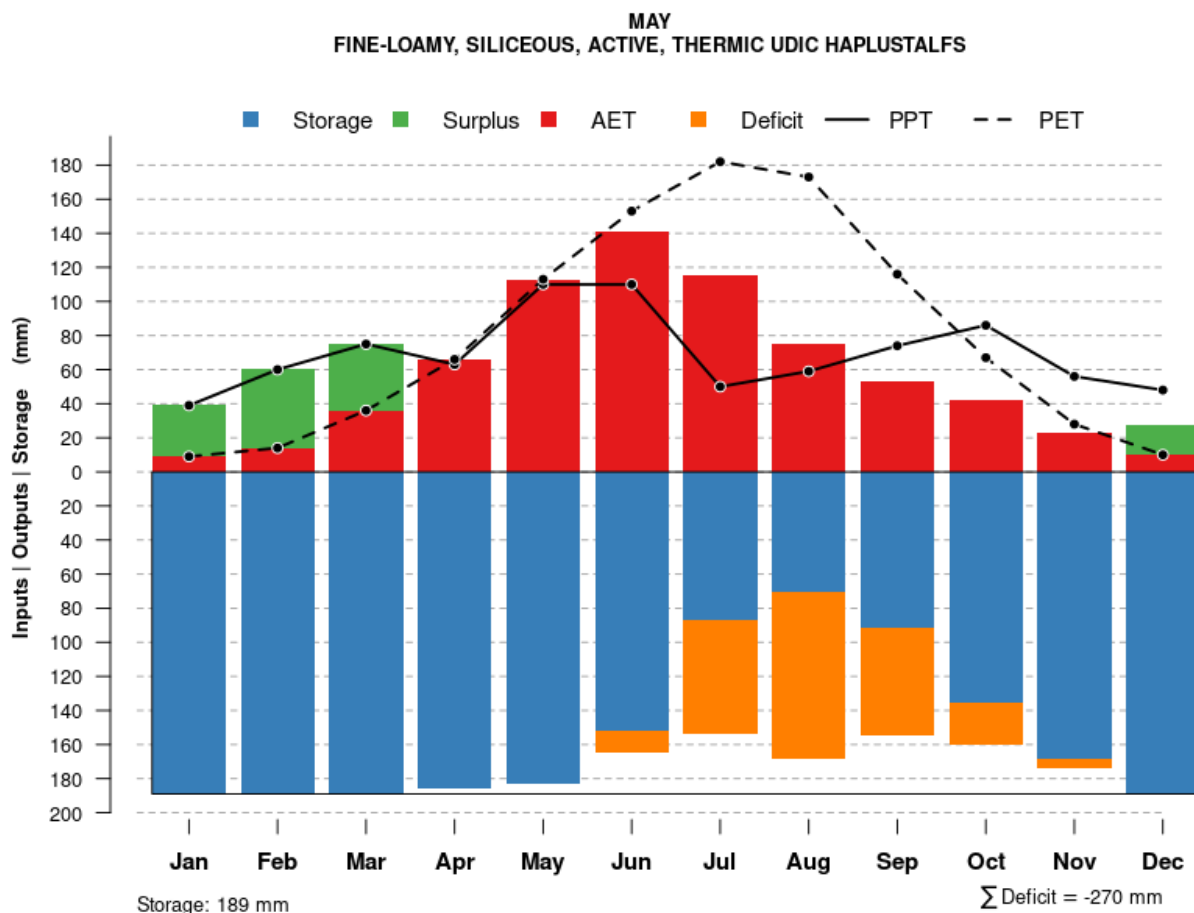
- From **June through September**, supplemental irrigation is essential to avoid yield loss.
- The **Σ Deficit of 293 mm (~11.5")** indicates how much extra water plants would need to meet full growth potential.

3. Cover Cropping & Mulch:

- Helps reduce surface evaporation during high PET months.
- Extends stored water deeper into the summer.

4. Crop Selection Timing:

- **Early planted crops** (e.g., winter cereals or early forage) can capitalize on full soil moisture and lower PET.
- **Later crops** (e.g., silage corn) must be irrigated or managed carefully to prevent stress during June–August.



This is the **monthly water balance chart for the May soil series**, classified as *Fine-loamy, siliceous, active, thermic Udic Haplustalfs*. It provides a snapshot of how water enters, moves through, and is lost from the soil profile throughout the year under local climate conditions.

Let's walk through this chart in the same way we did for Chaney, and then compare them at the end.

May Soil Water Balance – Chart Interpretation

Key Chart Elements

ELEMENT	MEANING
STORAGE (BLUE BARS)	Soil water stored in the root zone (max ~189 mm or 7.4")
SURPLUS (GREEN BARS)	Water above storage capacity → runoff or deep percolation
AET (RED BARS)	Actual Evapotranspiration – plant and soil water use
DEFICIT (ORANGE BARS)	PET exceeds AET – plants under water stress
PPT (SOLID BLACK LINE)	Actual precipitation per month
PET (DASHED BLACK LINE)	Potential evapotranspiration – climatic demand for water

Seasonal Water Dynamics

Winter (Jan–Mar):

- Precipitation (PPT) exceeds evapotranspiration (PET).
- Soil water storage fills to capacity (blue bars at max).
- Surplus water appears (green bars), indicating runoff or recharge.
- Ideal conditions for deep-rooted perennials or fall cover crops.

Spring (Apr–May):

- PET begins rising sharply.
- Rainfall keeps pace into May.
- No major deficit yet; soil moisture is still strong.
- Excellent period for vegetative growth of early-planted crops.

Summer (Jun–Aug):

- PET peaks (exceeds 160 mm/month).
- PPT drops below PET, causing **soil moisture depletion**.
- Deficit (orange bars) increases each month, peaking in August.
- Indicates **significant crop water stress without irrigation**.

Fall (Sep–Nov):

- PET falls, but still exceeds PPT through October.
- Deficit continues in September–October, tapering off in November.
- Soil moisture begins to recover in November.

December:

- PET drops, PPT exceeds PET.
- Soil water storage begins refilling; small surplus appears.
- Prepares the soil for winter recharge.

Key Water Use Insights

<i>Factor</i>	<i>Value</i>	<i>Interpretation</i>
Max Soil Water Storage	189 mm (~7.4 inches)	Higher than Chaney (165 mm) – more drought resilience
Cumulative Deficit	270 mm (~10.6 inches)	Slightly lower than Chaney (293 mm) – indicates better seasonal water use
Summer Deficit Depth	~3 months (Jul–Sep)	Still a stress period, but storage lasts longer
Recharge Period	Jan–Mar + Dec	Reliable moisture for early crop stages or perennial establishment
Drainage Class	Well-drained	No perched water table – ideal for deeper rooting

Agronomic Evaluation of May Soil for Water

Strengths

- **Better moisture-holding capacity** than Chaney: 189 mm vs. 165 mm
- **Longer growing season before irrigation is needed**
- **Well-drained, no saturation stress** – supports root development year-round
- **Efficient recharge cycle** – December to March refills the profile
- Supports **deep-rooted crops** (e.g., alfalfa, sorghum, corn) with longer root uptake window

Limitations

- Still experiences **summer water deficit** (Jul–Sep), so **irrigation is essential** for summer crops
- High PET in June–August means stored water alone is not enough for max yield
- Deficits mean **timing of irrigation is critical**—wait too long, and crop stress sets in

Comparison to Chaney Soils

Category	May	Chaney
Max Soil Water Storage	189 mm (7.4")	165 mm (6.5")

Category	May	Chaney
Annual Deficit	270 mm	293 mm
Summer Deficit Duration	Slightly shorter	Slightly longer and deeper
Drainage Class	Well-drained	Moderately well-drained (perched WT)
Risk of Spring Wet Feet	Lower	Higher
Water Use Efficiency	Higher – better soil structure	Lower – heavier textures may limit movement

Summary for Irrigated Systems

The **May soil series is the better performer** under both dryland and irrigated systems:

- It gives **more buffer against drought**,
- Holds more usable water,
- Recovers moisture more easily,
- And poses **less disease risk** from saturation or perched water tables.

If you're allocating compost, water, or even different varieties, the **May areas of your pivot are your high-response zones**. They're where your yield potential will be highest, especially in organic production where moisture management is critical.