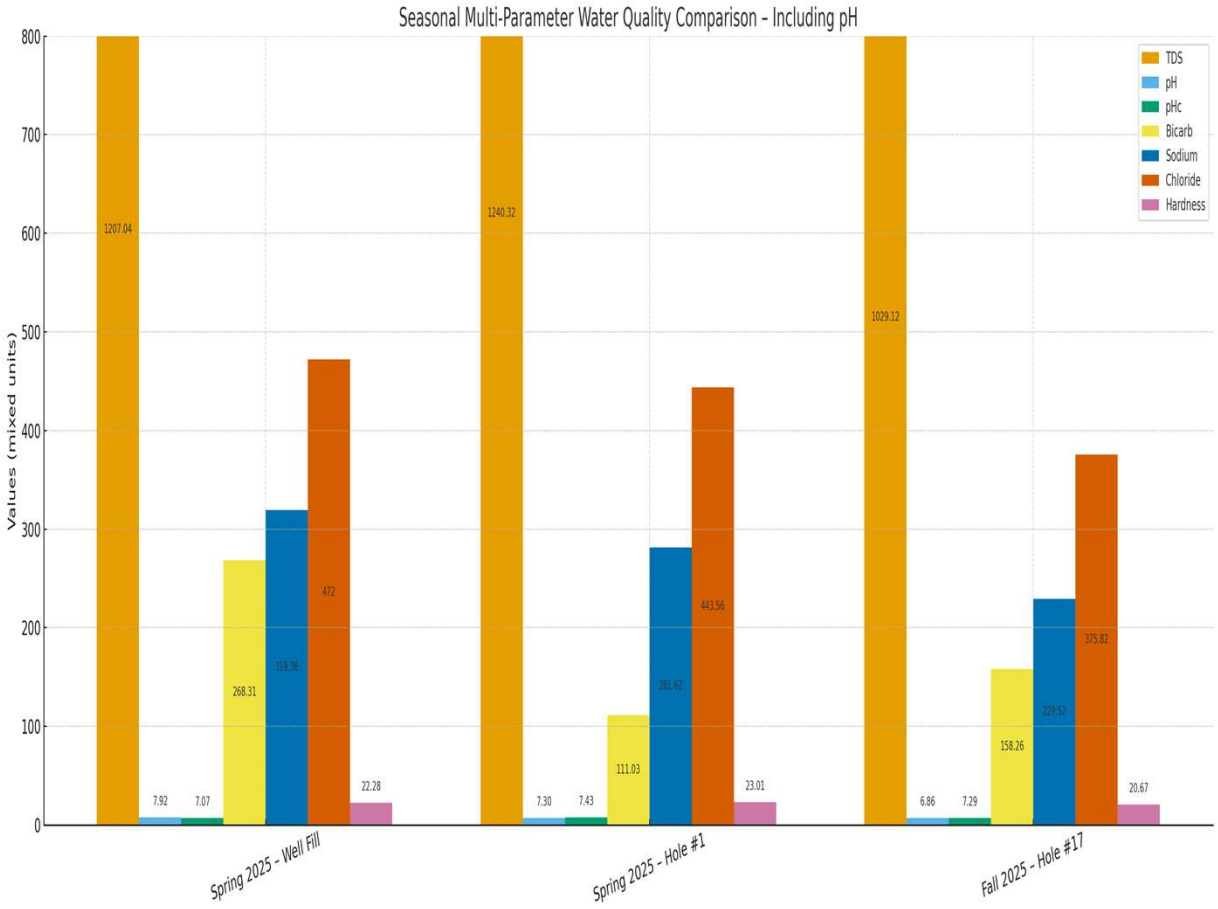
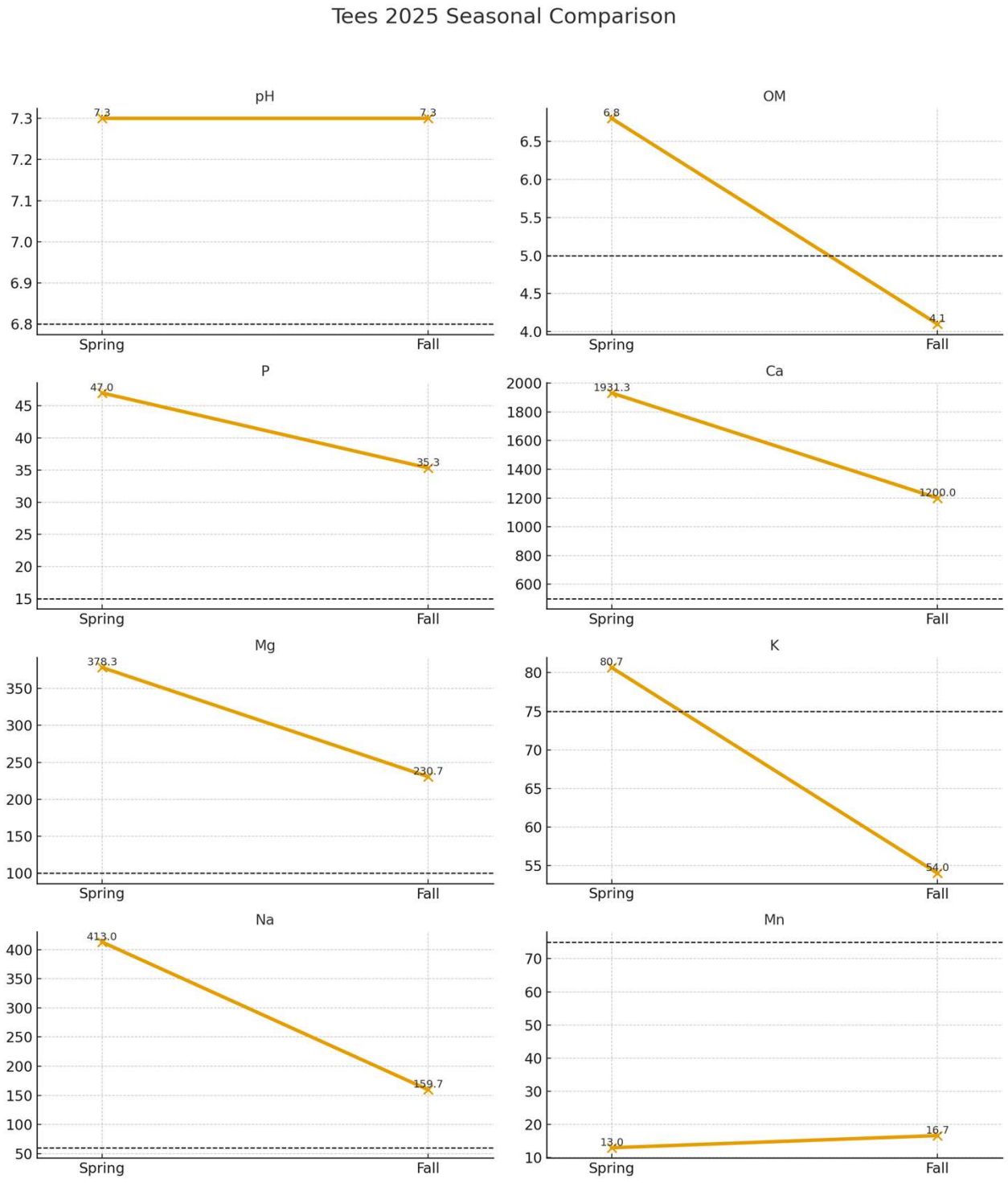
IRRIGATION WATER



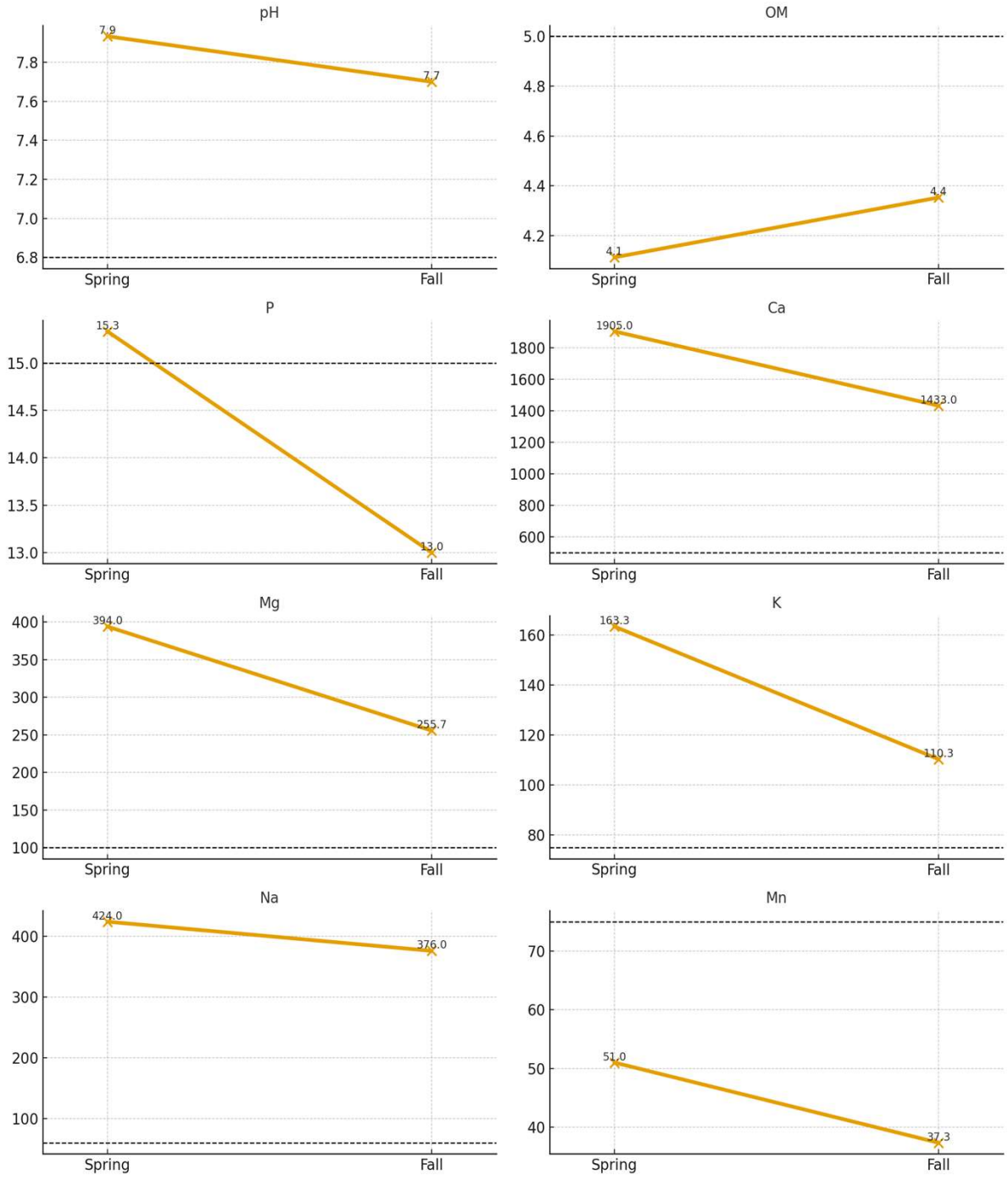
- The ultimate irrigation water is rain. If you think about it through the winter and could catch a rainwater sample from your area, I would be happy to sample it. For now, I can see seasonal changes in your water source. Both samples were collected from sprinkler heads or quick couplers in the field.

TEES



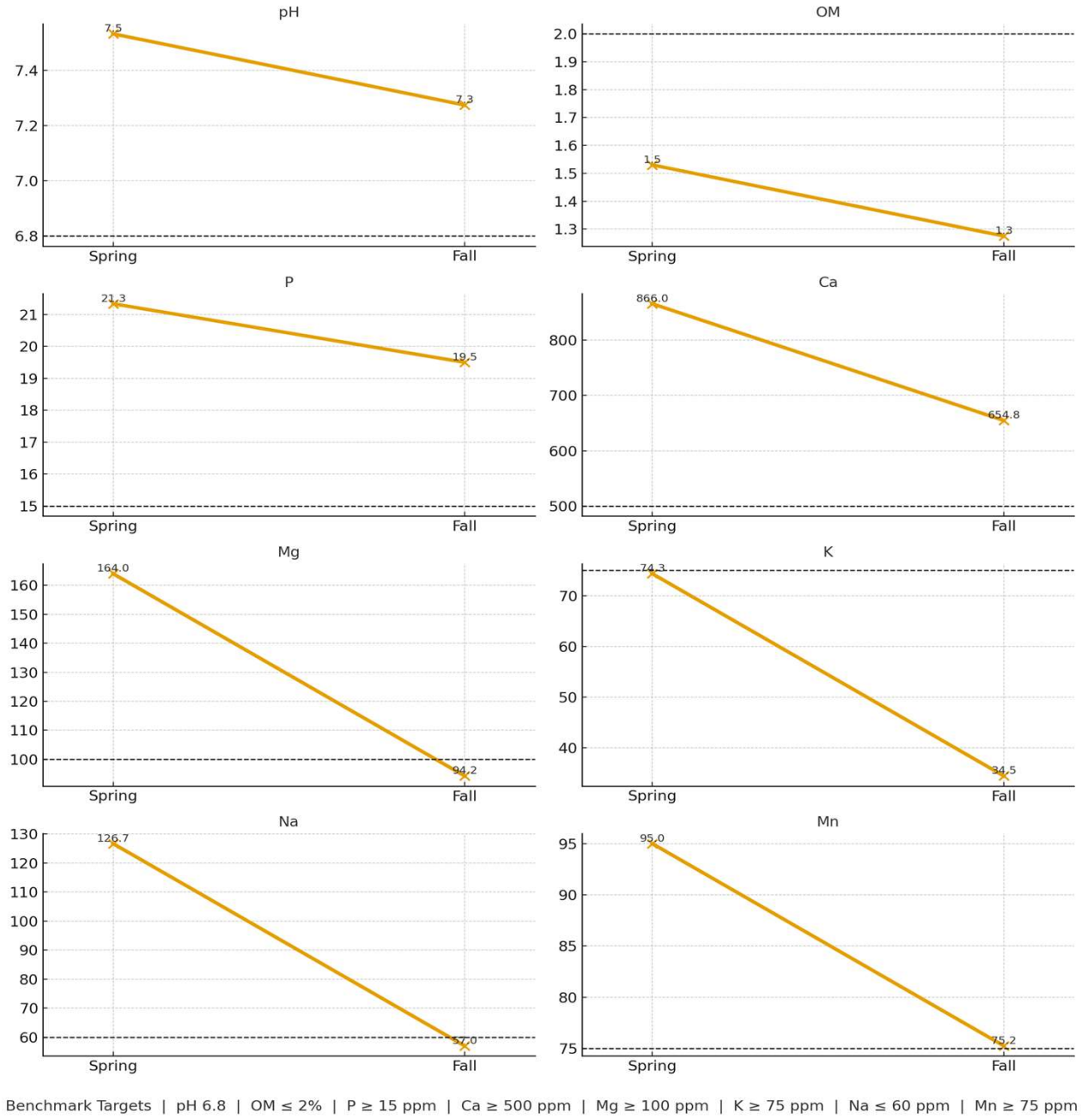
- You did a nice job this summer on the course at keeping sodium levels on the downward trend. On the Tees, potassium is slightly low and now would be a great time to make an application of 0-0-50 going into winter. It will help the plant withstand the colder temperatures and hope to offset the sodium availability.

FAIRWAYS



- Overall, the values are very good on the fairways except for bicarbonates and sodium. It is impossible to leach these through that soil, but Bermudagrass can certainly handle that better than a cool season grass can. Continue using the sulfur burner which will help turn the tide on what is getting into the soil from the irrigation water. Reducing organic material in the fairways but also be helpful.

GREENS



Benchmark Targets | pH 6.8 | OM ≤ 2% | P ≥ 15 ppm | Ca ≥ 500 ppm | Mg ≥ 100 ppm | K ≥ 75 ppm | Na ≤ 60 ppm | Mn ≥ 75 ppm

- The greens need 2-3 applications of 0-0-50 through the late Fall and Winter. As watering slows down, sodium sits there. Although sodium is at a good level it should be half as much as the potassium levels, ideally.

SUMMARY

The Heights GC – 2025 Soil Health Summary

Tees – Overall Soil Health

- Organic matter trending downward toward ideal levels.
- Sodium levels elevated but improving from spring to fall.
- Calcium and magnesium remain strong and balanced seasonally.
- Potassium showing slight decline; may require supplemental K.
- pH stable and within workable range for cool-season turf.
- Micronutrient levels (Mn) remain adequate for turf vigor.

Fairways – Overall Soil Health

- Organic matter slightly high but trending correctly.
- Sodium remains the biggest limiting factor; requires monitoring.
- Calcium strong; favorable Ca:Mg ratio across sampled zones.
- Potassium declining; potential deficiency looming heading into 2026.
- pH stable and not of concern at this time.
- Manganese low; potential for improved enzyme activity with Mn support.

Greens – Overall Soil Health

- Organic matter above ideal (<2%) but showing downward trend.
- Nutrient holding capacity strong due to elevated Ca and Mg.
- Potassium trending downward—a key performance nutrient; consider boosting K.
- Sodium manageable but still something to keep an eye on.
- pH slightly above target but acceptable for bentgrass/poa mix.

How Water Titrations Help You Choose the Right Acid Product

1. Show the water's alkalinity and how strongly it resists changes in pH — higher alkalinity means more acid is required.

2. Identify whether bicarbonate or carbonate is the dominant contributor, helping predict how the water will react to different acids.

3. Guide product choice: mild acids fit low-alkalinity water, while stronger acids or acid blends are needed for higher alkalinity.

4. Prevent over-acidification by revealing how quickly pH drops, helping avoid corrosive or turf-damaging conditions.

5. Connect directly to scaling risk by linking alkalinity to the water's saturation index, ensuring the chosen acid reduces deposits without creating corrosion.

6. Save money by matching acid strength to the chemistry — avoiding underpowered acids and overly aggressive options.

What you're measuring

- • Alkalinity is the water's ability to neutralize acid, mostly from bicarbonate and carbonate compounds, and sometimes hydroxides.
- • A standard acid, such as sulfuric acid or hydrochloric acid, is added to the sample while tracking pH to defined endpoints.
- • Results are expressed as milligrams per liter as calcium carbonate, based on the titrant volume and acid strength (normality).

Step-by-step (pH-meter method)

- • Calibrate the pH meter using standard pH 7.00 and pH 4.01 buffer solutions.
- • Measure an exact sample volume between 50 and 100 milliliters. Keep it at room temperature and stir gently.
- • Titrate the sample using a standard acid (typically 0.02 normal for normal water or 0.1 normal for more alkaline water).
- • Stop at pH 8.3 and record the phenolphthalein alkalinity volume — this indicates the carbonate and hydroxide portion.
- • Continue to pH 4.5 and record the total volume — this represents total alkalinity (bicarbonate, carbonate, and hydroxide).
- • To calculate total alkalinity: multiply the total acid volume by the acid's normality and by 50,000, then divide by the sample volume.
- • Tips: avoid aerating the sample, always add acid to water (not the reverse), rinse all glassware with deionized water, and run a blank or check standard regularly.

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