Stop 6. Using Soil Moisture Sensors for Irrigation Management on a Creeping Bentgrass and *Poa annua* Putting Green

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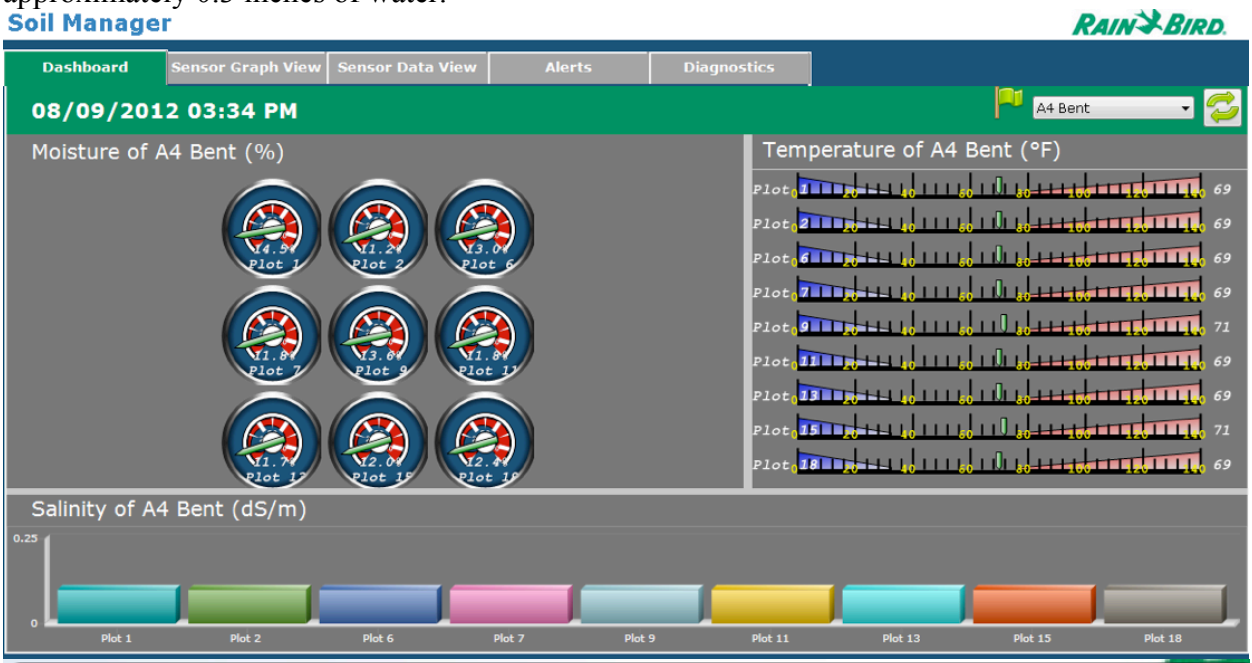
Previous research on this USGA specification A4 creeping bentgrass putting green investigated three different irrigation treatments. The irrigation treatments were daily replacement of 80% evapotranspiration, adjusting irrigation based on root depth, and utilizing soil moisture as determined by a TDR soil moisture probe to schedule irrigation. The TDR irrigation method used a hand-held TDR with a 3 inch depth probe to measure volumetric water content (VWC). For this treatment, irrigation was withheld until VWC was 10%. When 10% was reached then irrigation was applied until the soil reached field capacity (approximately 20% VWC). Overall, the TDR treatment resulted in dramatic drying and wetting cycles of the rootzone with localized dry spot forming and in some areas the turfgrass dying.

In 2012, Rain Bird donated the equipment necessary to use the Rain Bird Integrated Sensor System. A total of eighteen soil moisture sensors were installed in the green, one sensor for each irrigation block. The sensors measure VWC, salinity, and temperature. The sensors integrate with the Rain Bird Central to collect data and schedule irrigation amounts daily. The soil moisture sensors were installed at a 3 inch depth in the green. In the last two weeks we have already gathered a great amount of information. We initially set the target soil moisture value to 12% for both species and programmed one run time at 9 pm. We quickly learned based on the data collected, and irrigation run times that were being calculated automatically that there was indeed a great difference in water use between the two species. Using 12% as the target value, the bentgrass plots were irrigated to achieve approximately 12% VWC and then during the day would decrease to around 10-11% VWC. However, for the *Poa annua* plots VWC was dropping below 10% during the day and one irrigation run time was not able to return enough water to reach our target moisture. After taking some hand held TDR measurements on the *Poa annua* plots during the day and finding VWC in the surface 1.5 inches of 5-6% we decided to increase the target VWC to 15% and add an additional run time. In the last week this strategy appears to be more appropriate for the *Poa annua* plots. Although we are still collecting data and quantifying differences between the species, it appears that the amount of irrigation that is being applied by using the soil sensors to schedule irrigation is significantly less for creeping bentgrass than *Poa annua*, even when using the same soil moisture target. This fall and next year we are planning on adding wetting agent treatments to the irrigation blocks so we will ultimately have two different wetting agents tested and one that is untreated. With the equipment installed in this green we will be able to easily measure soil moisture, and quantify water leaching from the greens.

Thanks to Chad Kempf, Steve Carrier, and Ian Williams from Rain Bird for donating the equipment and assisting in the installation and set-up.

Figure 1. Soil moisture, temperature, and salinity for the A4 creeping bentgrass plots and the table with scheduled irrigation amounts. Our standard run time for each irrigation block applies approximately 0.1 inches of water. The maximum irrigation appled in one run time is 300% or approximately 0.3 inches of water.



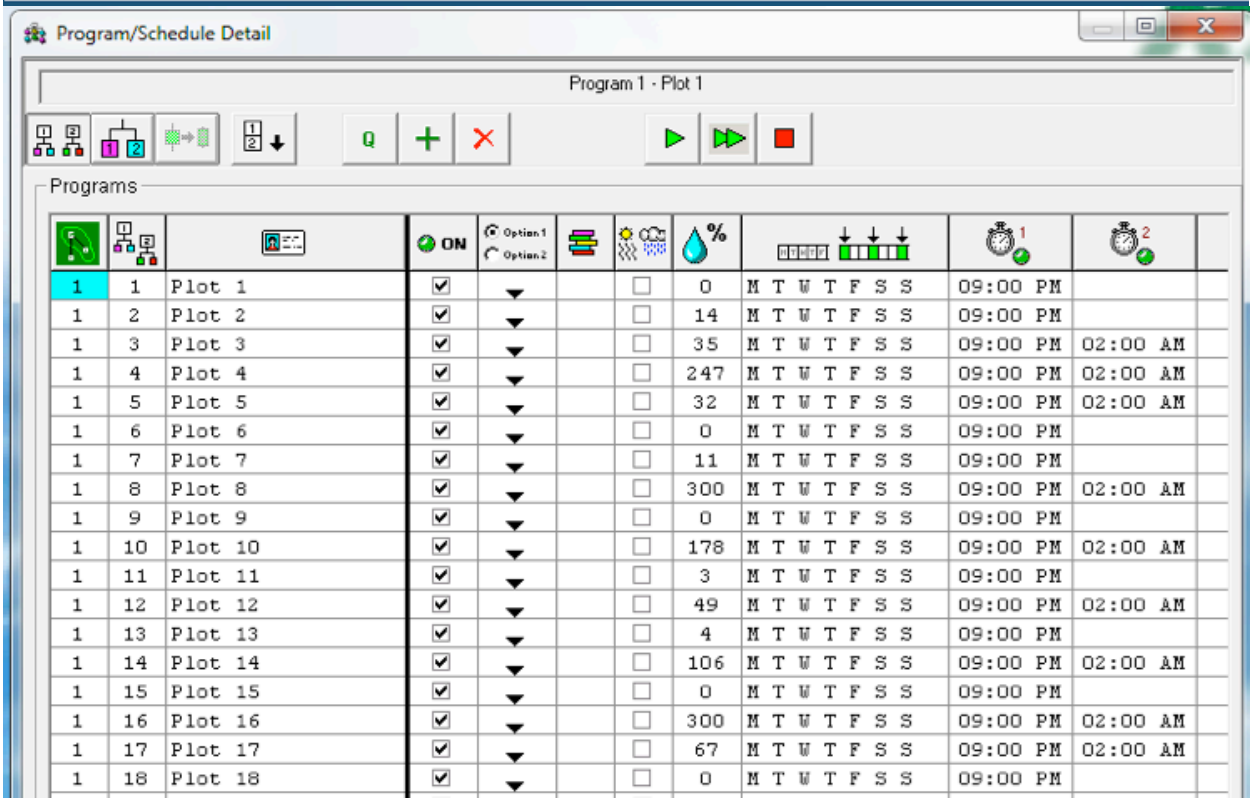


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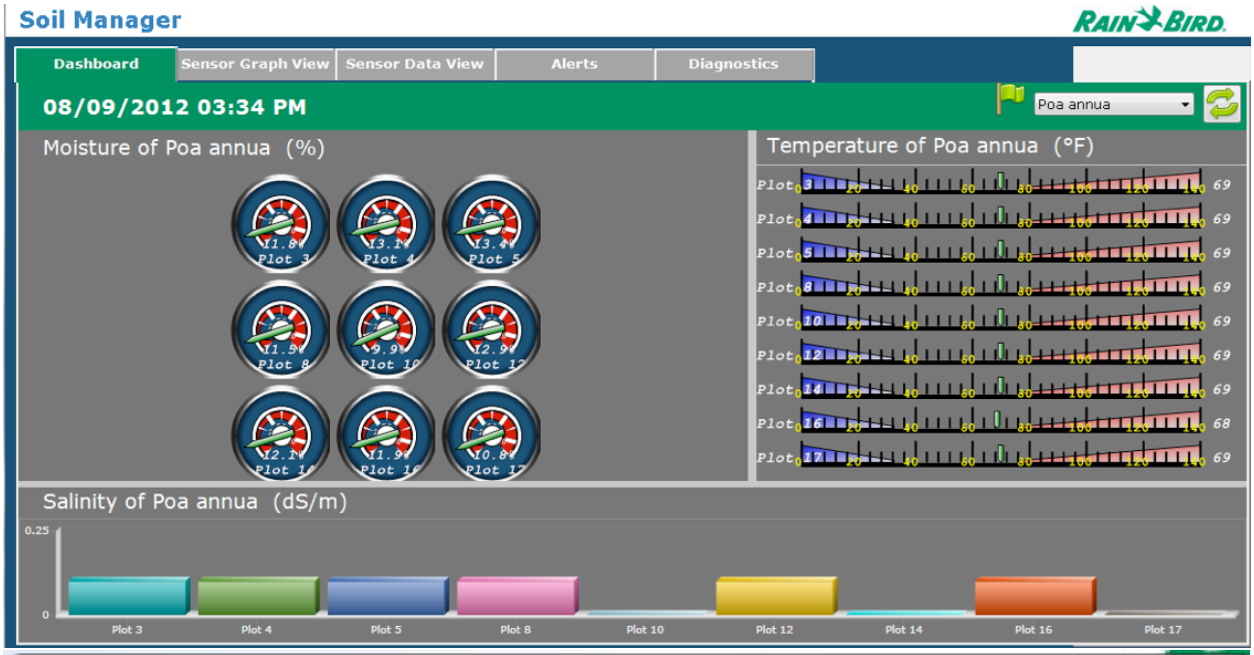
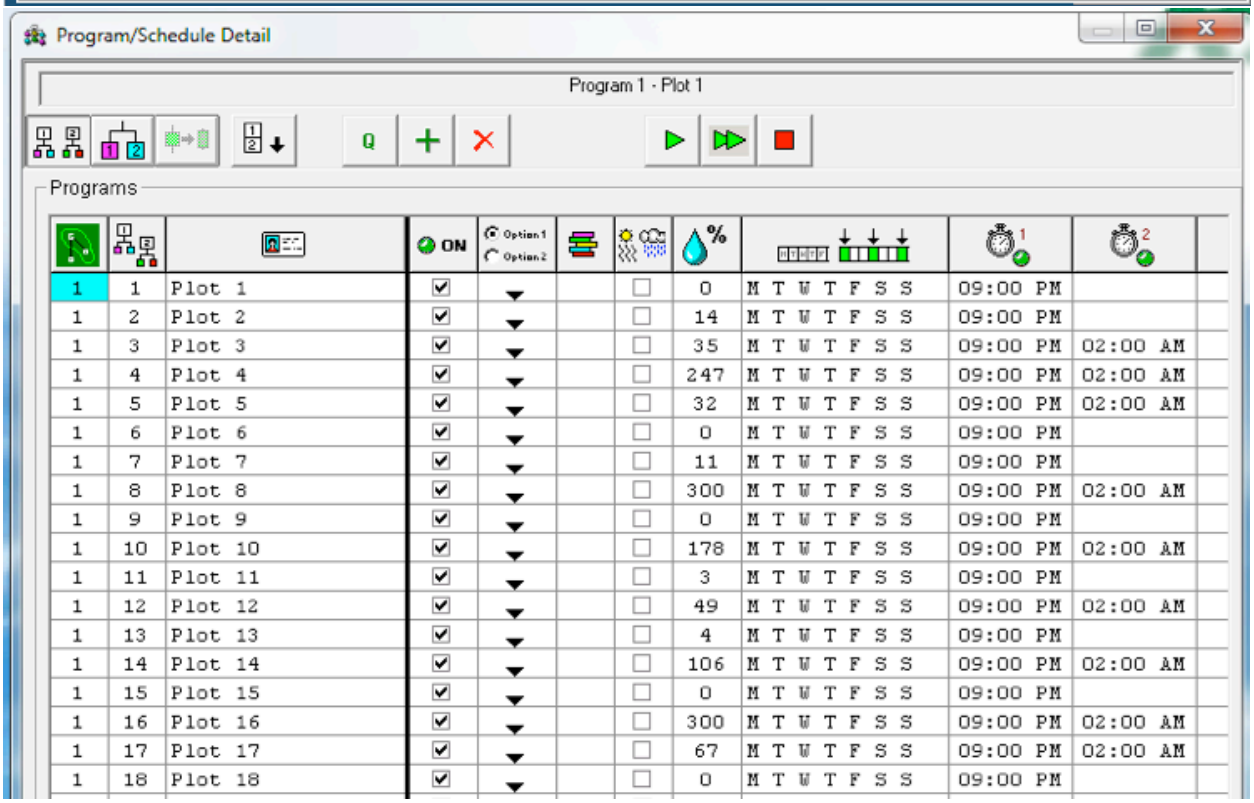
Figure 2. Soil moisture, temperature, and salinity for the *Poa annua* plots and the table with scheduled irrigation amounts. Our standard run time for each irrigation block applies approximately 0.1 inches of water. The maximum irrigation appled in one run time is 300% or approximately 0.3 inches of water.





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