# Interpreting Watermark Sensor / Hansen AM 400 Data Logger Readings

Dr. Howard Neibling, P.E.
Extension Water Management Engineer
University of Idaho

## Introduction

The Watermark granular matrix sensor is essentially an electrical resistance block, surrounded by sand of a specific size, contained by a stainless steel mesh. Water in the soil comes to equilibrium with the pores in the sand and the

The third method, which is effective for moist soil in shallow installations, is to drive a pointed steel rod with a diameter slightly smaller than that of the sensor into the ground. The rod is removed, a small amount of water added to the hole to help establish good soil contact, and the sensor inserted to the correct depth. Again, local compaction due to insertion of the rod may modify soil properties. Additional information on sensor installation is available in University of Idaho CIS 1140 “Sugarbeet Irrigation Management Using Watermark Moisture Sensors”

**Data Interpretation**

**Current values:** Watermark readings of near zero are common in the top foot following an irrigation. The soil is nearly saturated and will drain to field capacity in about 1 day on sandy soils and in 2-3 days for silt loam and clay soils. Field capacity for sandy soils is about 10 cb and 25-30 cb for silt loam, etc. Relationships between watermark readings, percent available water, and water required to refill 1 ft to field capacity are shown in Tables 1-5. General interpretations of watermark or tensiometer readings for water-sensitive and other crops are given on the right side of Tables 1-5.

## Trends Over Time

One of the advantages of having multiple readings over a short period of time is the ability to detect additional soil water information.  A number of examples are shown below for June 2003 winter wheat data at Kimberly. Note that soil moisture stayed constant in the second and third foot until about June 18, indicating no water use or recharge until that time. Irrigation was stopped on this plot on June 24, so the crop began using water from the second foot as the first foot dried out.

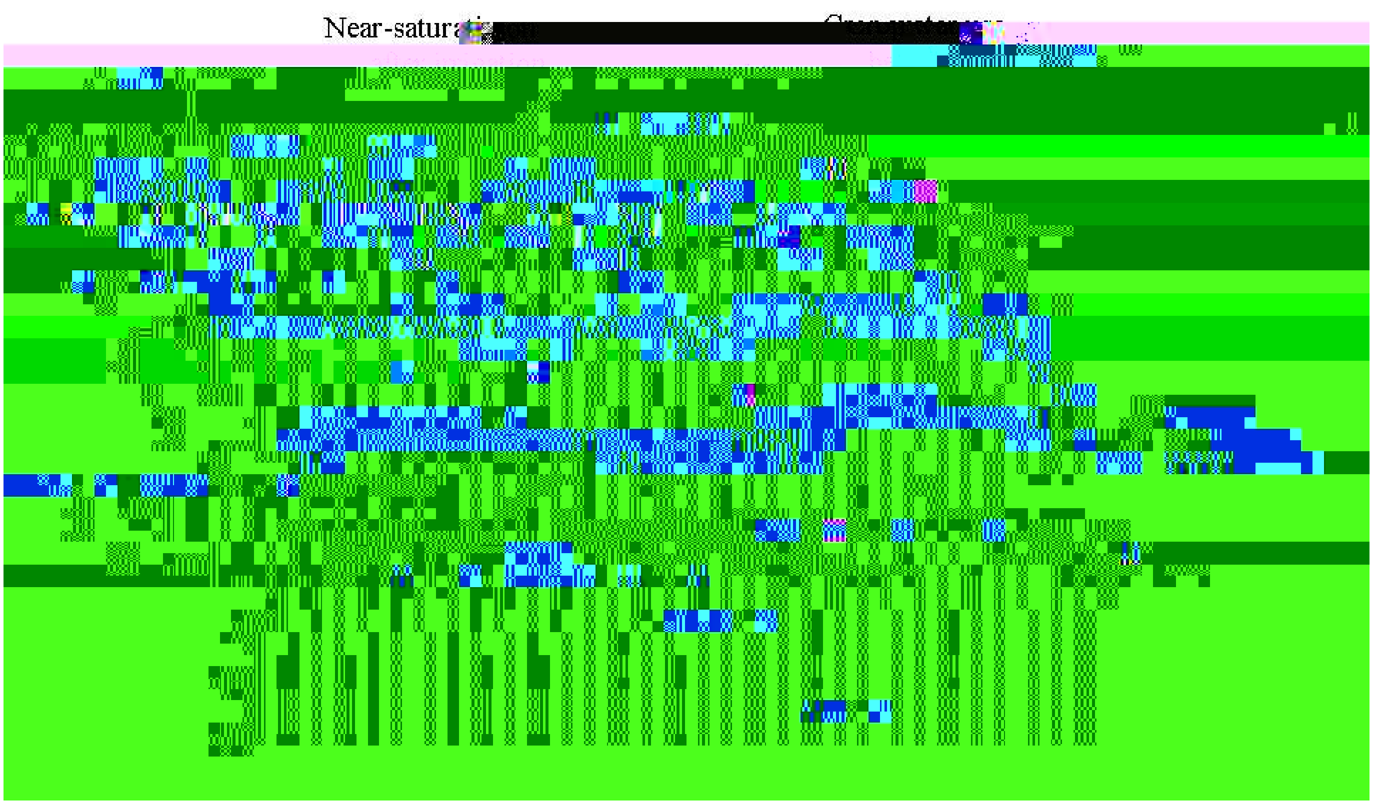

Table 1. Relationship between watermark or tensiometer readings and percent available soil water for a sandy loam soil.

**Sandy Loam (1.67 in/ft):**

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**(Potatoes, Mint, Onions, Dry Beans)**
0 Saturated soil
0-10 Leaching Possible
10-24 Best Crop Growth
>24 Crop Water Stress

**Sandy Loam (1.67 in/ft):**
**(Alfalfa, Beets, Grain, Corn, Pasture)**
0 saturated soil
0-10 Leaching Possible
10-30 Best Crop Growth
>30 Crop Water Stress

Table 2. Relationship between watermark or tensiometer readings and percent available soil water for a Light-Textured Silt Loam soil.

**Light-Textured Silt Loam (1.97 in/ft):**

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Table 3. Relationship between watermark or tensiometer readings and percent available soil water for a Heavier-Textured Silt Loam soil.

**Heavier-Textured Silt Loam (2.25 in/ft):**

Table 5. Relationship between watermark or tensiometer readings and percent available soil water for a Fine Sand.

**Fine Sand (0.6 in/ft):**

| Percent Available Soil Water | Water-mark Reading |
|---|---|

**Fine Sand (0.6 in/ft):**
**(Potatoes, Mint, Onions, Dry Beans)**
0 Saturated soil
0-10 Leaching Possible
10-18 Best Crop Growth
>18 Crop Water Stress

**Find Sand (0.6 in/ft):**
**(Alfalfa, Beets, Grain, Corn, Pasture)**
0 Saturated soil
0-10 Leaching Possible
10-25 Best Crop Growth
>25 Crop Water Stress