What is IT?

A Water Level Monitor used to measure shallow ground/surface water levels. The Ecotone WM is a Data Logger and Sensor combined in one device which is accompanied by a custom made, slotted well pipe.

Does the Ecotone WM measure water quality or temperature?

No, the Ecotone WM is strictly a water level measurement instrument.

Can the Battery be Replaced?

Yes, the user can replace the battery. Also, when replacing the battery, it is recommended that all four enclosure screws and the sealing ring be replaced to ensure a water tight seal. Note: These items are included with the Battery Kit when purchased from Remote Data Systems, Inc.

What Type of Battery Does the Ecotone WM Use?

The Ecotone WM uses an industrial lithium battery. This is a special battery and the circuitry of the Ecotone WM was designed specifically for this battery.

Where do I purchase a replacement Battery

Since the battery is a special industrial battery it can not be purchased at the usual retail outlets. While it resembles a lithium camera battery, it is **NOT** interchangeable with off the shelf lithium batteries. The Battery Kit is available for purchase from Remote Data Systems, Inc.

What is a Slotted Well Pipe?

A slotted well pipe is also commonly referred to as a monitoring well, well screen, or screened pipe. A slotted well pipe is simply a pipe with slots cut around the circumference. In the case of the Ecotone WM, the slotted pipe provided with each instrument is made of PVC and has 0.010" wide slots which are spaced 0.19" (3/6") apart.

Is the Ecotone WM a piezometer?

No, The Ecotone WM uses a monitoring well. Piezometers are perforated only at the bottom portion of the pipe. They are typically installed with an impermeable bentonite seal above the perforated zone so water cannot flow down the outside of the pipe. Water levels inside the pipe result from the water pressure over the narrow zone of perforation at the bottom of the pipe. (Definition from Army Corp of Engineers document ERDC TN-WRAP-00-02 July 2000)

- Monitoring wells have perforations extending from just below the ground surface to the bottom of the pipe. Water levels inside the pipe result from the integrated water pressures along the entire length of perforations. (Definition from Army Corp of Engineers document ERDC TN-WRAP-00-02 July 2000)

Who uses the Ecotone WM instruments?

Our water level monitors are used by a diverse group of scientist, private consultants and government agencies who study shallow water levels. Here is a sample:

- Wetland Professors and Scientist – Researching wetland characteristics of all varieties.
- Environmental Consultants - performing wetland/stream mitigation, restoration, and delineation.
- Soil scientist - Characterizing soil types and studying septic and gray water fields.

On what technology is the Ecotone WM based?

The Ecotone WM, as our previous versions, is based on capacitance sensor technology.

How do I get my Data from the Ecotone WM?

The Ecotone WM is designed to work in conjunction with a PDA. There is a custom software kit required that is loaded on a PDA using a Palm Operating System. The PDA is taken in to the field and is used to retrieve the water level data from the Ecotone WM instruments.

How does the Ecotone WM work?

The Ecotone WM is a battery powered instrument designed to be left in the field for an extended period of time. The user is required to configure the instrument before installation with a custom software program designed for a PDA. Configuration of the Ecotone WM is very simple and requires the user to set the following parameters:

1. Current Time and Date
2. Measurement Time and Date
3. Interval Time between Measurements
4. Measurement Units (in, mm, cm)

Once the Ecotone WM is successfully configured, the device is simply inserted in the slotted well pipe provided with each instrument. The Ecotone WM remains in

a low power sleep mode until the measurement time and date arrives. At which time, the instrument wakes from sleep mode for a brief period and reads the capacitance value of the water level sensor. The capacitance value is translated in to a water level measurement by a mathematical calculation.

After the capacitance value is translated in to a water level measurement, the time, date and water level data is stored in flash memory for later retrieval with a PDA.

How do you interpret the Ecotone WM data?

To best understand the water level data, one must know that the Ecotone WM predecessor was originally designed for shallow ground water level measurements in wetlands. In wetland ground water measurements, the measurement of concern is not the depth of the ground water but the distance from the ground surface to the ground water level. With this concept in mind, the slotted well pipe was originally intended to be installed in the ground with the "Calibration Point" at the ground surface. The calibration point corresponds with zero water level measurement by the Ecotone WM (meaning zero distance to the ground water from the ground surface or simply the ground water is at the ground surface).

If the ground water is below the ground surface then the Ecotone WM measurement will be negative. A negative measurement indicates that the ground water is below the calibration point. This concept was conceived from the algebraic number line. Using this concept, the user can survey the calibration point elevation of each Ecotone WM and a simple algebraic addition of the water level measurement will yield the ground water elevation.

Example 1: If the ground water level is ten inches below the ground surface, the water level measurement will read "-10 in". Note: the negative sign in front of the water level measurement indicates that the water level is below the calibration point. If the calibration point is at ground surface and the calibration point elevation is +100 inches, then a simple algebraic addition of the water level measurement yields the elevation of the ground water (+90 inches).

Example 2: If the water level rises above the calibration point, the Ecotone WM will measure the distance from the calibration point to the water surface in "+" units. However, the Ecotone WM measurement capability in the positive direction is limited to approximately 4 inches (this varies with each instrument) above the calibration point. Also, the accuracy of the Ecotone WM is not guarantied above the calibration point. If the situation arises where the water level exceeds the positive measurement capability of the Ecotone WM, the measurement will be recorded at the maximum positive value which the instrument is capable of measuring.

Note: Due to the original design concept of placing the calibration point at the ground surface, many users incorrectly believe the Ecotone WM instrument will not function properly if the well pipe is not fully inserted in the ground. This is Not True! In fact, the Ecotone WM will function in surface water applications equally well as in ground water applications. However, one must consider the measurement being performed by the instrument. The Ecotone WM Always measures the distance from the calibration point at the top of the well pipe to the water surface, even in surface water applications. This can not be changed by the user!

What do you mean by three sizes?

The Ecotone WM is available in three sizes:

- ½ meter or 20"
- 1 meter or 40"
- 2 meter or 80"

These sizes refer to the maximum range of water level fluctuations that each particular instrument is capable of measuring. Example: The 1 meter instrument can measure the level fluctuations from the calibration point to the water's surface over the range of 0 mm to -1 meter (0" to -40").

What happens if the ground water level is deeper than the sensor?

If the water level falls below the sensor, the sensor will read the maximum "-" depth for that particular sensor size. It must be noted that this is not the actual water level. When the sensor is not in contact with the water, the sensor is not capable of measuring the actual distance to the water level.

Example: If an Ecotone WM 1 meter (40") instrument is installed in the ground, with the calibration point located at ground surface, and the actual water level is 60" beneath the ground surface, the Ecotone WM instrument will record the water depth at approximately -41.5". In this situation, the sensor is not capable of measuring the actual distance to the water's surface since the water depth is greater than the measuring range of the instrument.