



## Ireland Groundwater Monitoring Program - Water Framework Directive Success Story

### Bog of the Ring Public Water Supply

#### Background

- The EU Water Framework Directive (WFD) tasked EU member states to achieve good qualitative and quantitative status of all water bodies by 2015. The directive covers surface, coastal, and groundwater.
- To fulfill WFD requirements, a groundwater monitoring program was established by the Environmental Protection Agency of Ireland and includes:
  - Surveillance monitoring network
  - Operational water quality network
  - Quantitative monitoring program
- The monitoring programs focus on providing information to assess the environmental status of surface and groundwater bodies
- Data collected from target monitoring sites is used to validate risk assessments and investigate long-term water level trends

#### Monitoring locations:

The sites were selected based on the conceptual understanding of hydrogeology and anthropogenic pressures within each groundwater body or group of bodies. Examples of site selection criteria include:

- Sites located across groundwater body or group of bodies to achieve a good spatial spread of data
- Recharge and discharge areas
- Areas with current or future planned abstraction
- Assessing the groundwater contribution to rivers from poorly productive aquifers



*WFD groundwater monitoring site: OTT Orpheus Mini installed in the well and OTT KL 010 Contact Gauge for on-site reference measurement. (Photo courtesy of M.Browne, Ireland EPA)*

#### Sites and wells:

- 130 wells (5 with telemetry)
- 24 springs with overflow measurement

## Level Monitoring Solution

- 131 monitoring locations outfitted with OTT Orpheus Mini groundwater level loggers in 2008-09.
- Of which, 5 Orpheus Mini's were outfitted with OTT Intelligent Top Caps for remote data transmission
- 5 Orpheus Mini's were installed to monitor the Bog of the Ring groundwater body, example installation shown in picture below.
- Water levels are measured and stored by the OTT Orpheus Mini every 15 minutes.



**Bog of the Ring monitoring site: Two OTT Orpheus Mini's installed in the well at different depths and OTT KL 010 Contact Gauge used for conducting as reference measurement. (Photo courtesy of M. Browne, Ireland EPA)**

### The Advantages

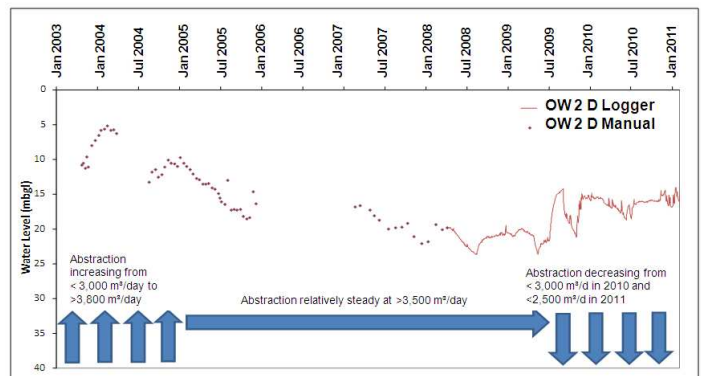
- Hourly/sub-hourly measurements and data recording greatly enhance the understanding of aquifer responses in dynamic aquifer systems and the behaviour relating to abstraction from public supply wells
- OTT Orpheus Mini is a vented pressure probe with automatic barometric and temperature compensation
- High accuracy level measurements ( $\pm 0.05\%$  FS) achieved without additional data post processing
- OTT Orpheus Mini measures and stores water level / pressure and temperature measurements; approx. 500,000 values
- Option to pair OTT Orpheus Mini with Intelligent Top Cap (ITC), for remote data transmission using GSM / GPRS

## Summary

From analysis of the collected water level data, the Bog of the Ring was identified as a groundwater body at risk of declining water levels due to groundwater abstractions.

- 2009 - Groundwater water levels were still declining and the Bog of the Ring was classified as having a Poor Quantitative Status.
- 2010 - Actions to remediate the Bog of the Ring were introduced and included improvements to the public supply network and abstraction regime.
- Abstraction volumes declined from 3,500 m<sup>3</sup>/day to less than 3,000 m<sup>3</sup>/day in 2010 and to 2,500 m<sup>3</sup>/day in 2011

The result was a general recovery in groundwater levels from their lowest levels in 2008 and 2009, refer to figure 1. Based on these results, the Bog of the Ring may meet a Good Quantitative Status in 2015.



**Figure 1: Groundwater level time series with abstraction trends for the Bog of the Ring, monitoring site OW2D. (Graph courtesy of Anthony Mannix, Ireland EPA)**

More information on OTT solutions and products visit [www.ott.com](http://www.ott.com)

### Technology used:

#### OTT Orpheus Mini

An integrated pressure sensor and datalogger for level measurement in surface and groundwater applications.

#### OTT ITC

Intelligent top cap equipped with GSM / GPRS modem, for remote data transmission. For use with Orpheus Mini level logger.

#### OTT KL 010

Essential for manual water level measurements in groundwater, including reference measurements.