

16<sup>th</sup> October, 2020

# 11 years High-Resolution Water Monitoring

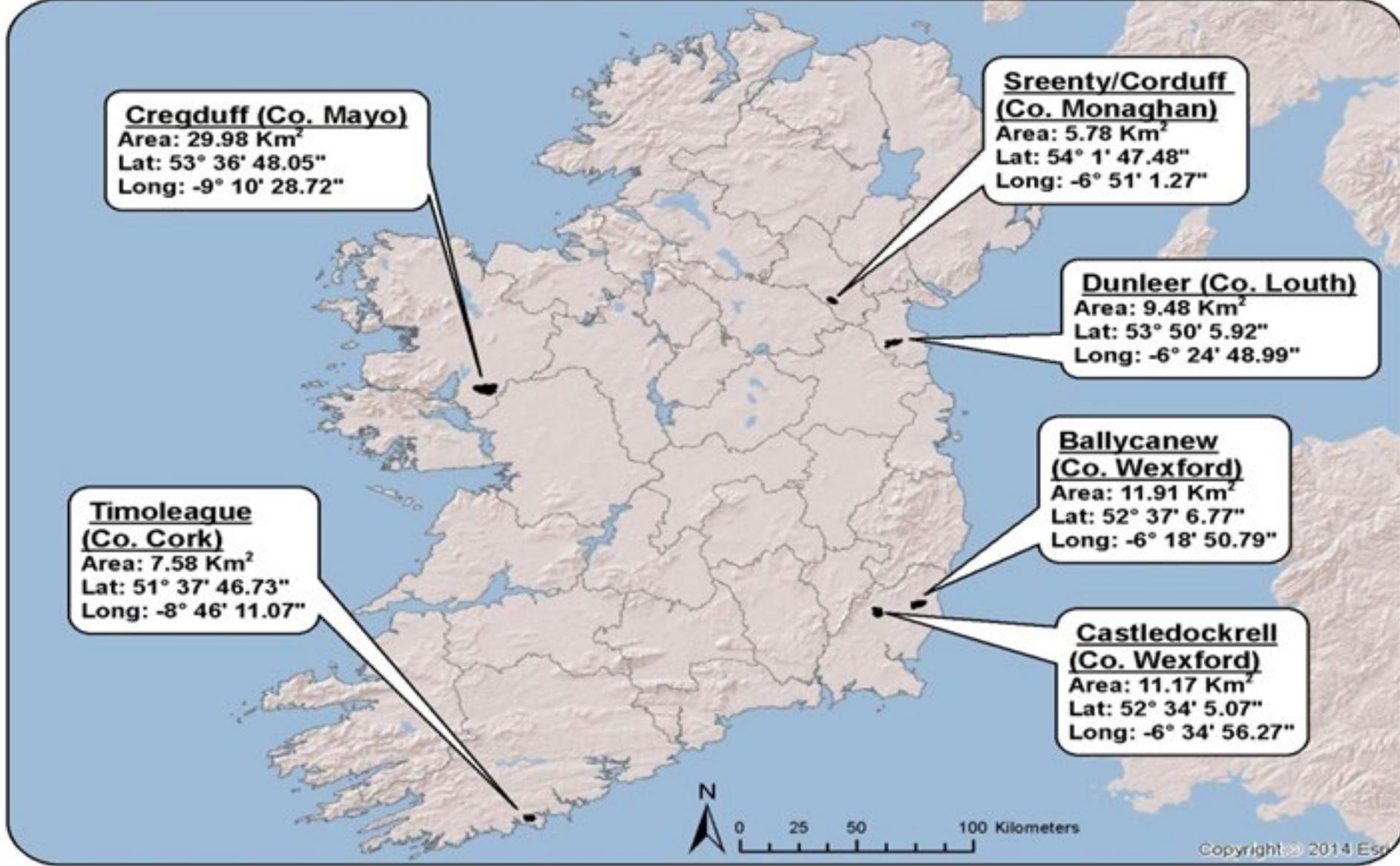
An overview of the equipment and methods undertaken  
by the ACP in six agricultural catchments

David Ryan, Technologist, Agricultural Catchment Programme



# What is the ACP ?

- **Funded by the Department of Ag. Food & Marine**
- **Established in 2008**
- **Nitrates Directive evaluation**
- **Agricultural impact on water quality**
- **Differing soil and drainage types**
- **Representative of the predominant farming types**
- **Experimental design repeated across six catchments**



# Experimental Design

- Weather Data – Campbell Scientific met station
- Multi – level ground water monitoring
- Monthly snapshot sampling
- High resolution quality & quantity
  - every 10 minutes, < 450,000 data points / year / kiosk
- Bi-annual ecological sampling
- Data management - WISKI



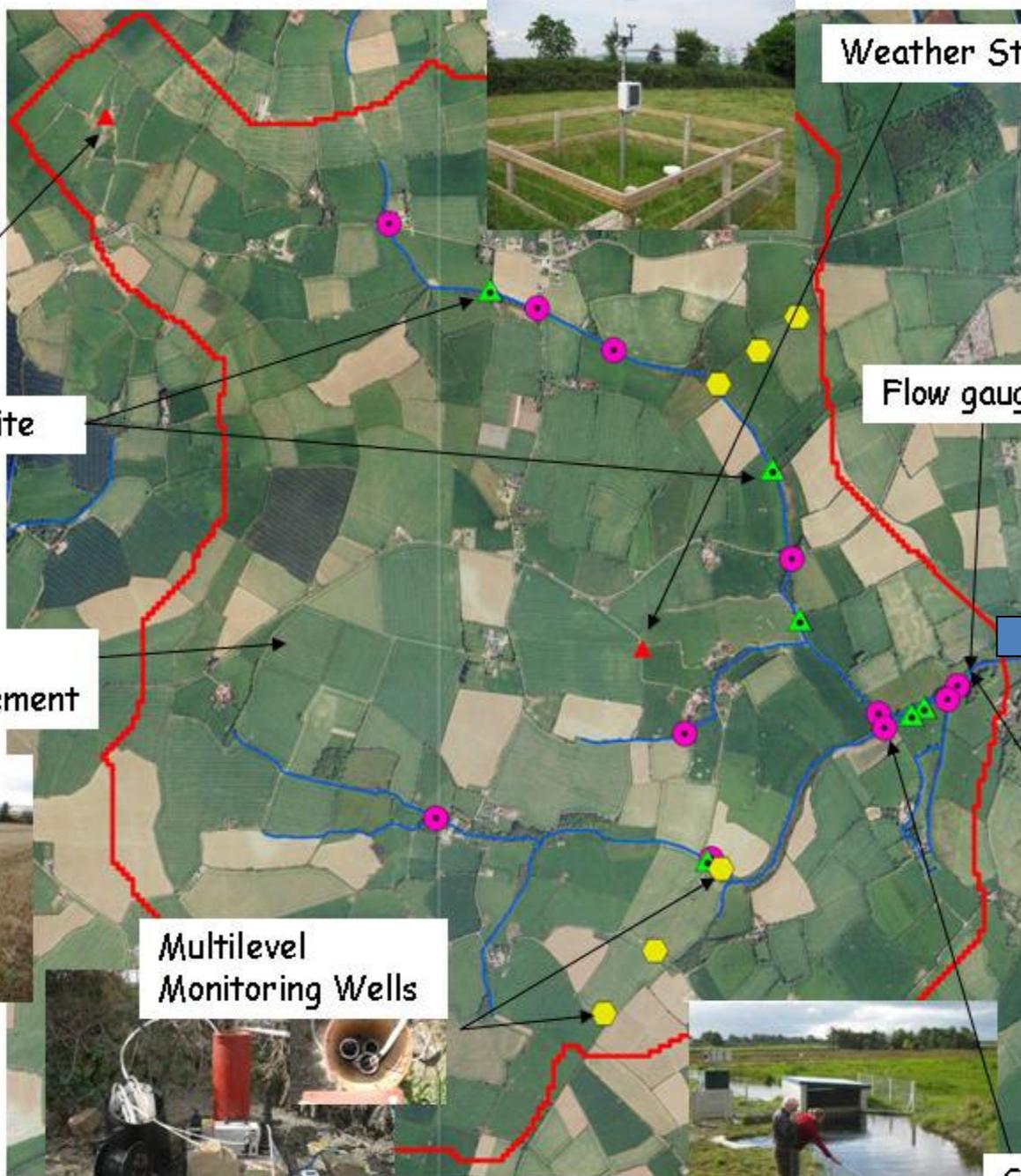
Rain Gauge



Weather Station



Flow gauging



Ecology Survey Site

Soil Sampling /  
Nutrient Management



Continuous water  
quality analysis



Multilevel  
Monitoring Wells



Snapshot Site



# Rain Gauge





## Catchments Weather Information

Hourly Update

[Disclaimer](#)

Ballycanew



Castledockerell



Cregduff East



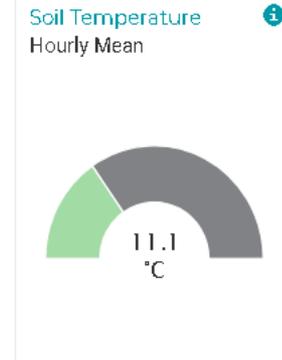
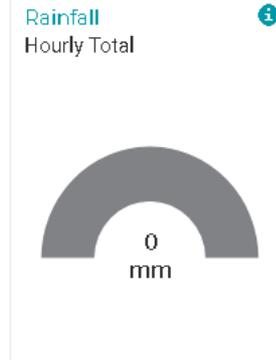
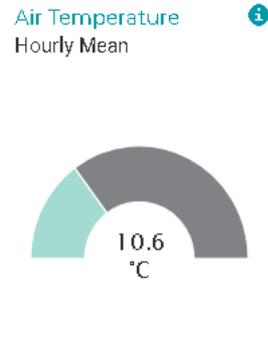
Cregduff West



Dunleer



Tue 13th Oct 2020, 17:00 - 18:00 IST



More Details

Timoleague



Creevy/Corduff



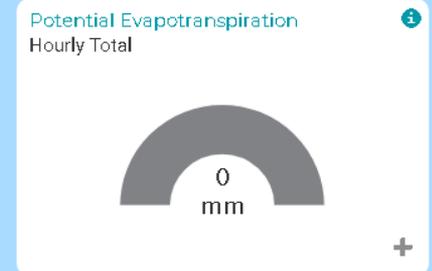
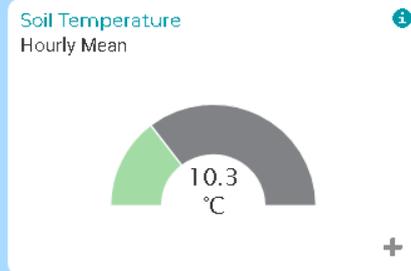
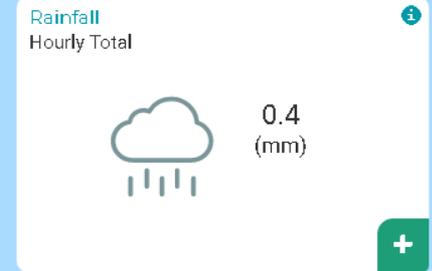
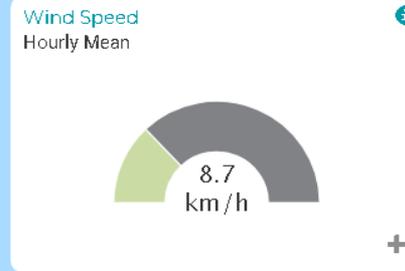
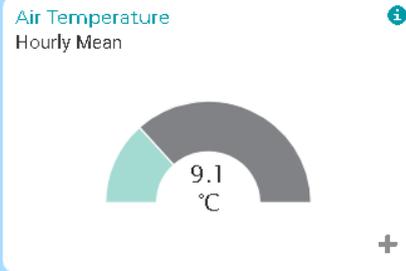
## Sreenty/Corduff, County Monaghan

◀ Change Catchment



Description Of Catchment Area

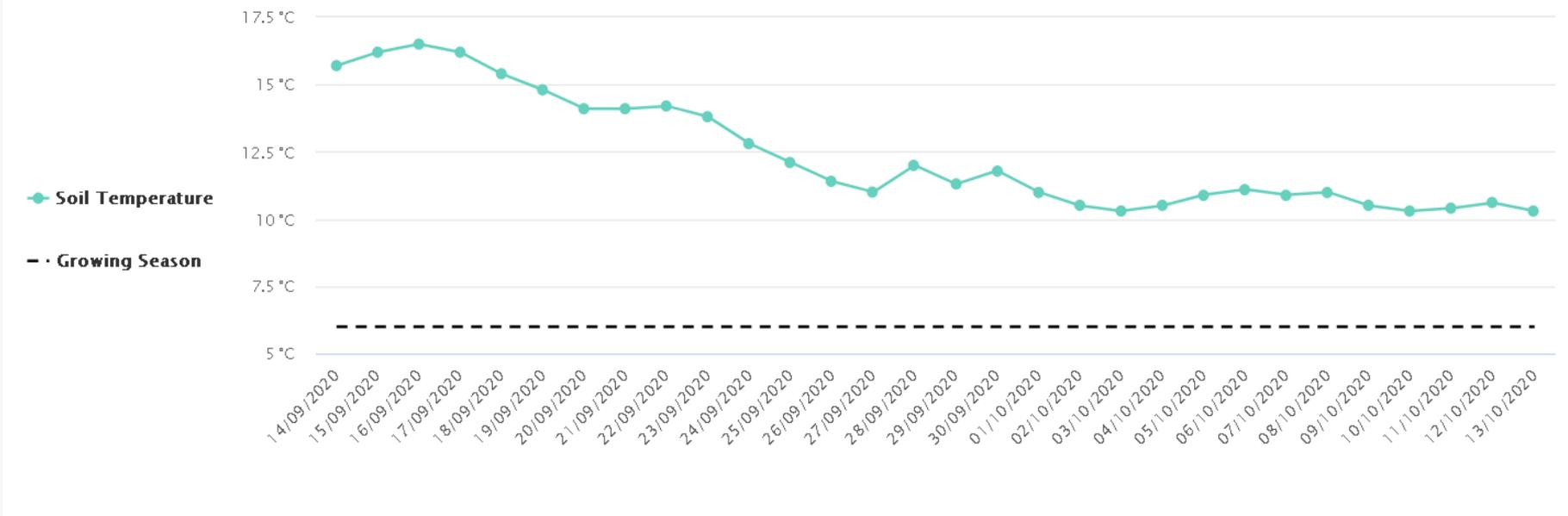
Tue 13th Oct 2020, 14:00 - 15:00 IST ⓘ



30 days ▼

[▲](#)  
Back to top

### Soil Temperature Daily Mean



**Growing Season:** The grass growing season closely approximates to the period during which the soil temperature is consistently above 6°C, at a depth of 100 mm (4 inches). Below this critical temperature little or no appreciable grass growth.

Date	Daily Mean (°C)	Daily Max (°C)	Daily Min (°C)
14/09/2020	15.7	16.4	15.2
15/09/2020	16.2	17	15.7

Reason for Download

**Download Soil Temperature Data**

# Monthly Ground Water Sampling



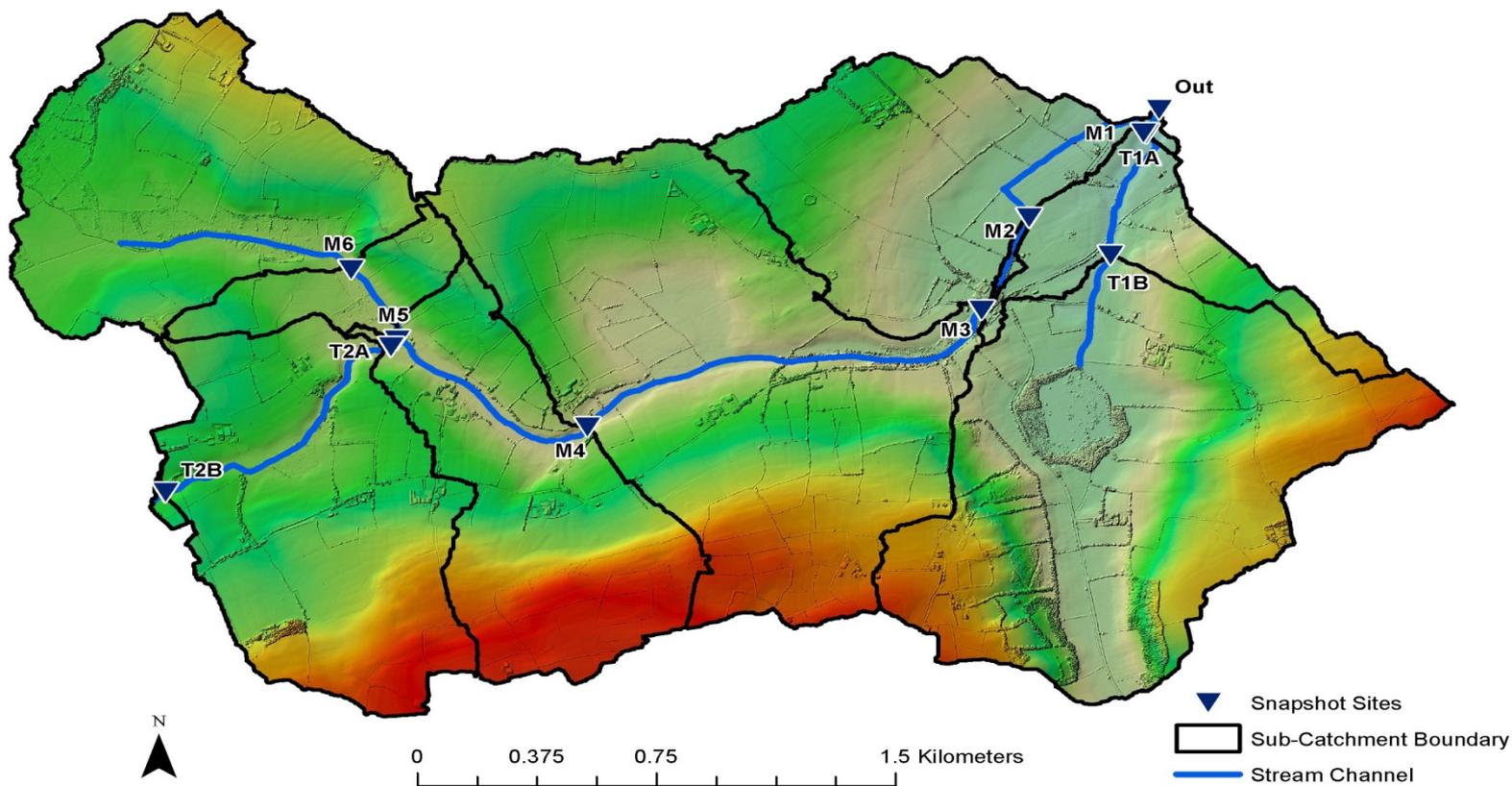
- Aquaread

# Monthly Surface Water Sampling



- Total P
- Total Reactive P
- Total N
- Nitrate N
- Bi-annual Ecology
  - Aquaread
  - BOD
  - Alkalinity

# Timoleague Catchment Snapshot Sites





**Bi-Annual Ecological Survey**

# Outlet Hi-Res Monitoring - Kiosk



# Outlet Hi-Res Monitoring - Kiosk

- **Hach Phosphax Sigma:**      **Total & Ortho P (mg/L)**
- **Hach Nitratax:**              **Nitrate N (mg/L)**
- **Hach Solitax:**                **Turbidity (NTU) Sediment**
- **Hach UVAS TOC:**            **Total Organic Carbon**
- **Hach 3400 sc:**                **Conductivity (uS/cm)**  
**& Temp.(°C)**

# Dexdyne Ltd. Netrix SQL server –

- Real time data
- Text notification
- Remote monitoring

## Measurement Reading

Total Phosphorus	<input type="text" value="0.03"/>	Flow Rate	<input type="text" value="0"/>
Ortho PhosphateP	<input type="text" value="0.02"/>	Flow Velocity	<input type="text" value="0"/>
Nitrate	<input type="text" value="7"/>	Flow Level	<input type="text" value="0"/>
Turbidity	<input type="text" value="1.75"/>	Temperature	<input type="text" value="10.68"/>
Conductivity	<input type="text" value="179.75"/>	Total Org Carbon	<input type="text" value="14.26"/>

## Alarm Status

Phosphate Analyzer	<input checked="" type="radio"/>	<input type="radio"/>
SC1000 System	<input checked="" type="radio"/>	<input type="radio"/>
Low Tank Alarm	<input checked="" type="radio"/>	<input type="radio"/>
Pump Run Alarm	<input checked="" type="radio"/>	<input type="radio"/>

## Controls

Reset	<input type="text" value="Off"/>
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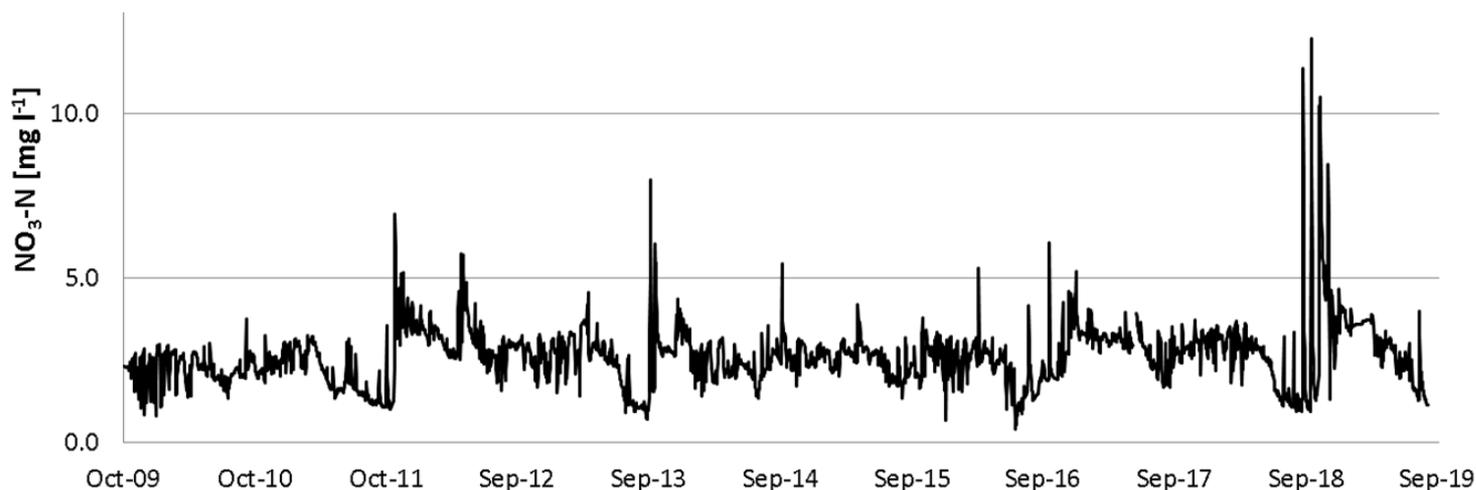


# Data collection since 2009

- Phosphax (TP and TRP) - **fortnightly**
- Nitrate, Turbidity, Total Organic Carbon, Temperature and EC data collected by SC1000 - **monthly**
- Solinst level loggers - **monthly**
- Flowlink & OTT (Orpheus mini & ecoLog) - **monthly**



## Ballycanew nitrate-N high resolution time series



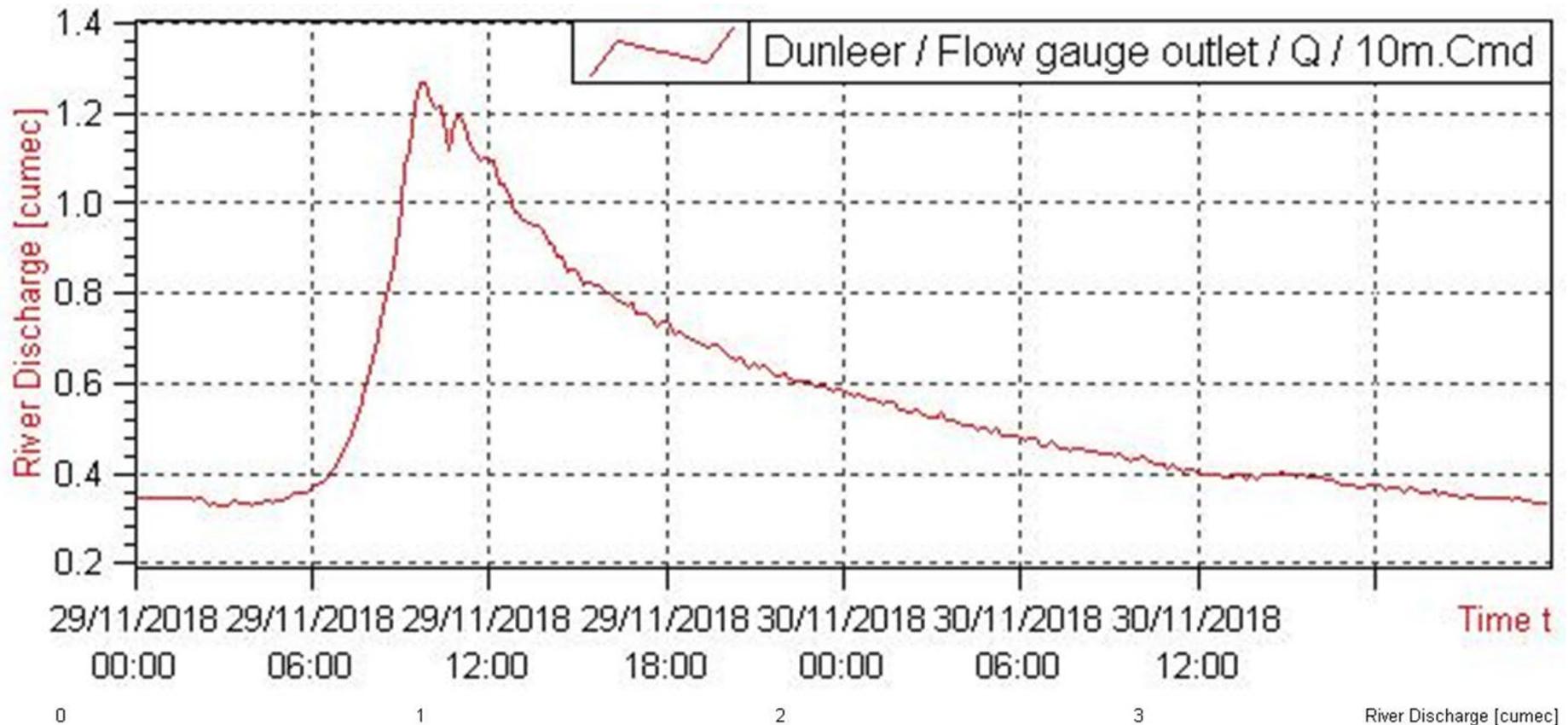
*Eleven year daily average nitrate-N concentration in Ballycanew*



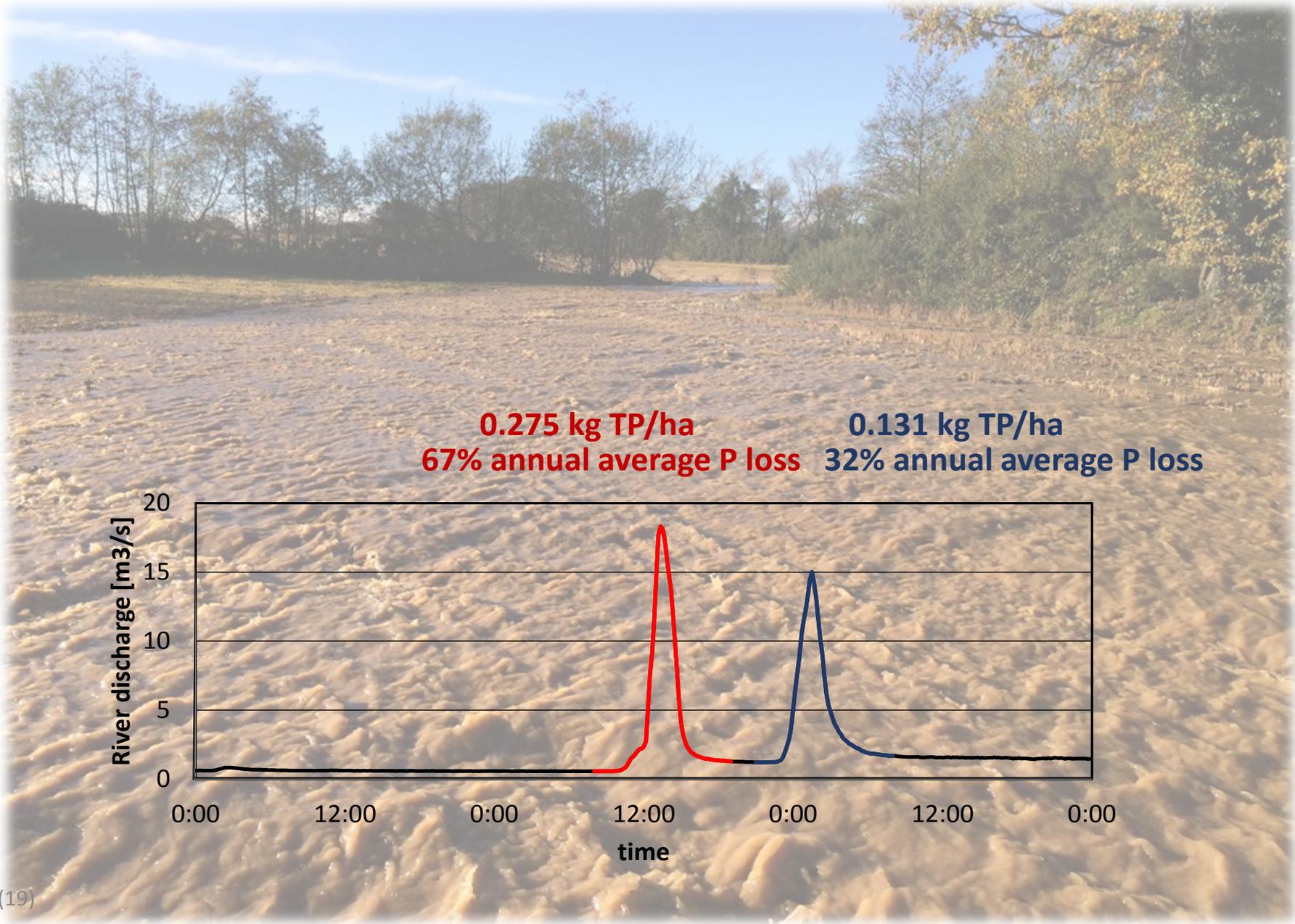
- Flow gauging – discharge rating curve



# Hydrometrics combined with Nutrient Concentration



# “N risky” catchment becoming “P risky” 13-14<sup>th</sup> Nov 2014



enced since 2009



# Mobile water quality instrumentation for site specific measurements.



- ISCO Auto-samplers and velocimeters
- EXO1 multi-parameter sondes
- Aquaread units
- Solinst level loggers



# Teamwork and Training

