

IPPC Discharges Monitoring Workshop

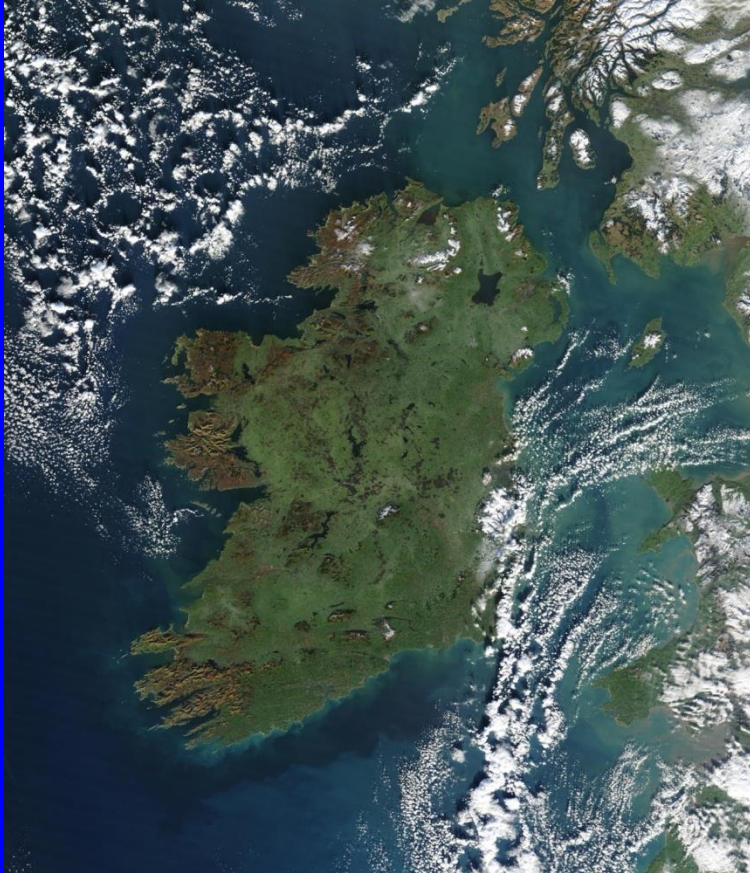
Water Framework Directive Overview (and its implications for Industry)

Peter Webster

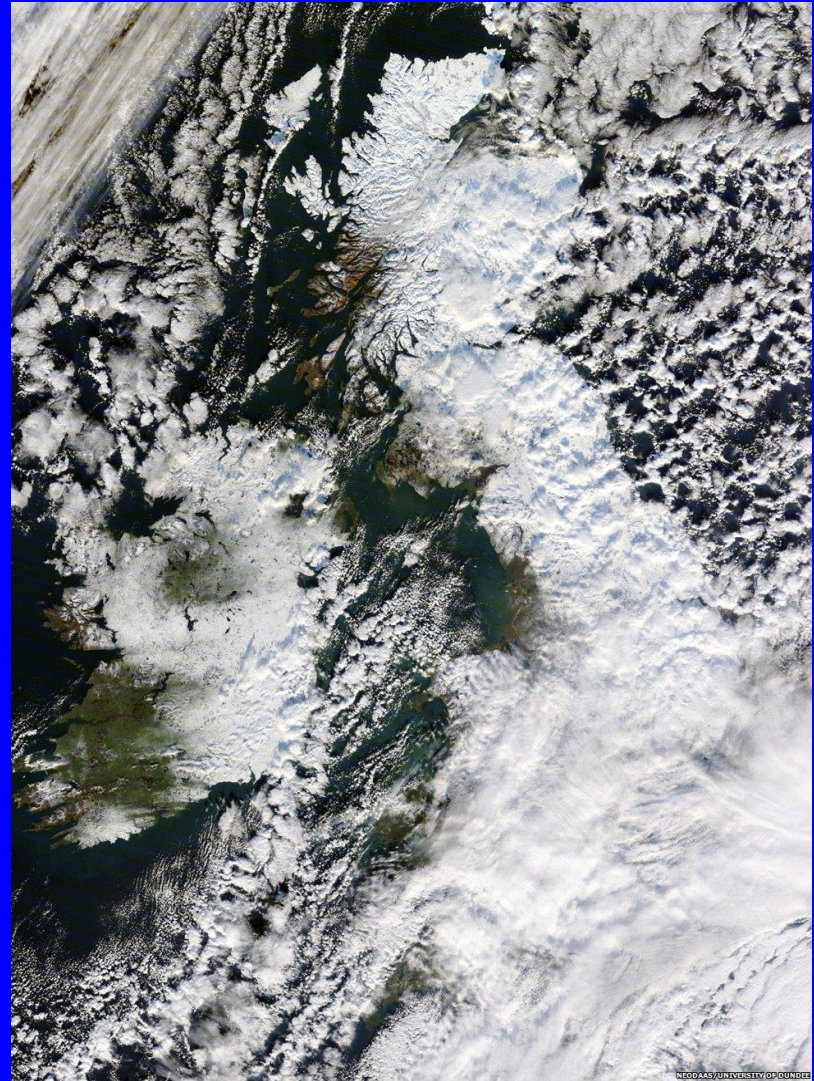
Regional Chemist (EPA Cork)



What are we protecting and why ?



Source: NASA



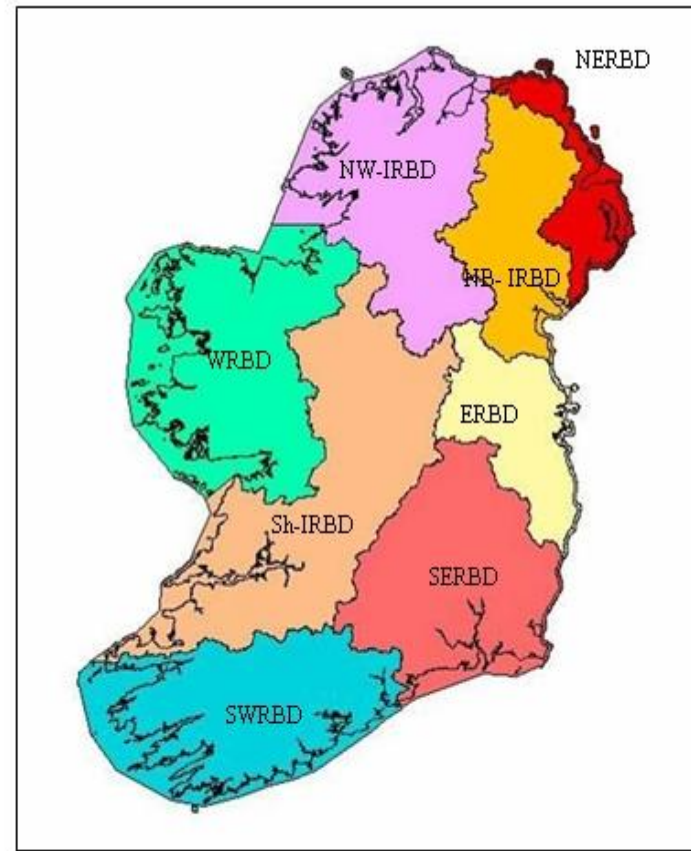
Source: University of Dundee

Presentation outline

- Background to the WFD
- Aims and Objectives
- Monitoring Program Design
- River Basins / Water Management Units
- Data Quality and Interpretation
- Impact for EPA monitored facilities

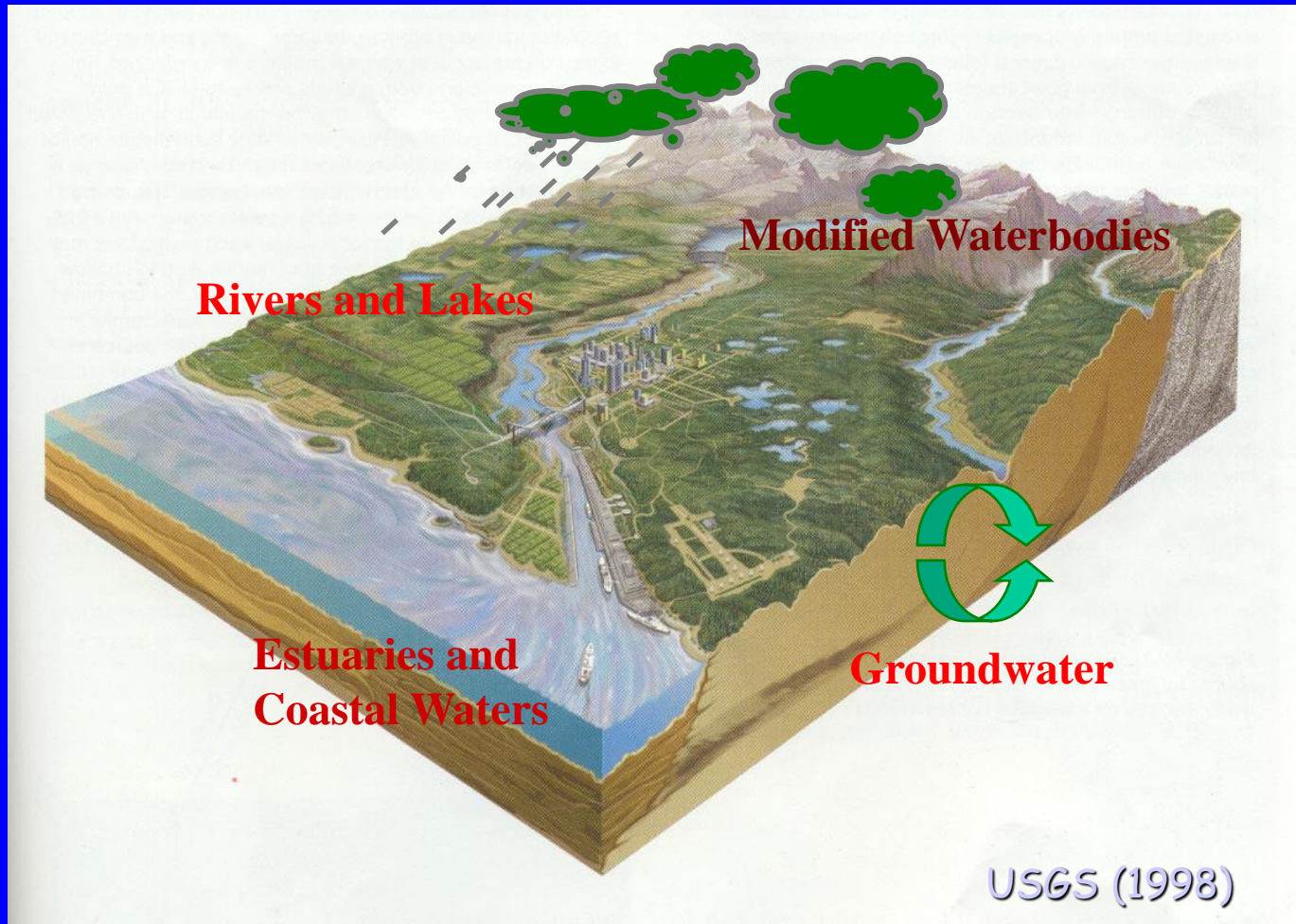
Background to the Water Framework Directive

- WFD came into force on 22nd December 2000
- The Directive aims to establish an integrated approach to water protection, improvement and sustainable use.
- For this to be achieved, eight River Basin Districts have been designated within Ireland as a whole based on natural, environmental units encompassing rivers, lakes, estuaries, coastal waters and groundwater



Map 1-1 – River Basin Districts on the island of Ireland

Objectives apply to all Waters and Protected areas



Aims & Objectives

- Transposed into Irish Law in Dec 2003 (**S.I. No 722 of 2003**). EPA defined as the coordinating body but several Local Authorities and Marine Institute also assigned statutory functions
- Sets ambitious targets to protect/enhance all waters (surface, ground and coastal waters)
 - **To prevent the deterioration of high status waters**
 - **To restore waters to at least "good status" for all waters by Dec. 2015**
 - **To manage water bodies based on river basins (or catchments)**
 - **To involve the public and to streamline legislation**
- Defines Rivers, Groundwater, Coastal and Transitional (estuarine) waters by means of “water bodies” of differing ecological types e.g. flow, slope, chemistry, biota etc. but within the context of River Basin districts

Aims & Objectives contd.

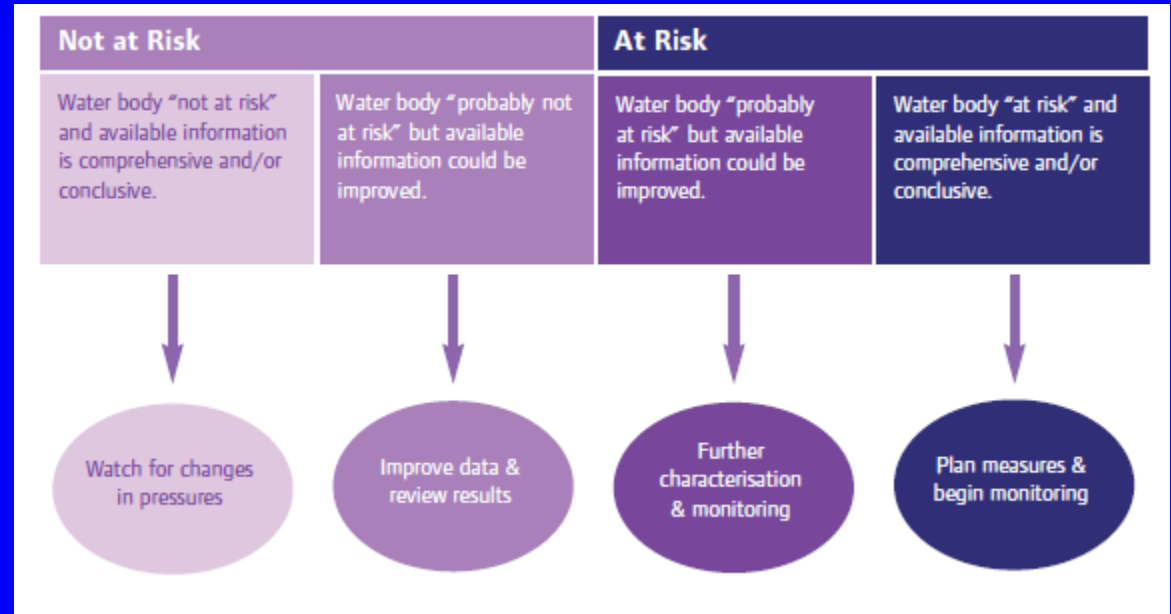
- Adopts a holistic approach using chemistry, biology, ecological assessment
- Classification based on assessment of **risk** of not achieving the desired standards
- Presents a significant challenge for monitoring in the years ahead
- RDBs have been more recently sub-divided into a number of smaller and more manageable Water Management Units (WMUs)
- Catchment Management is based on modelling of probable risks of failing to meet water quality objectives by target date

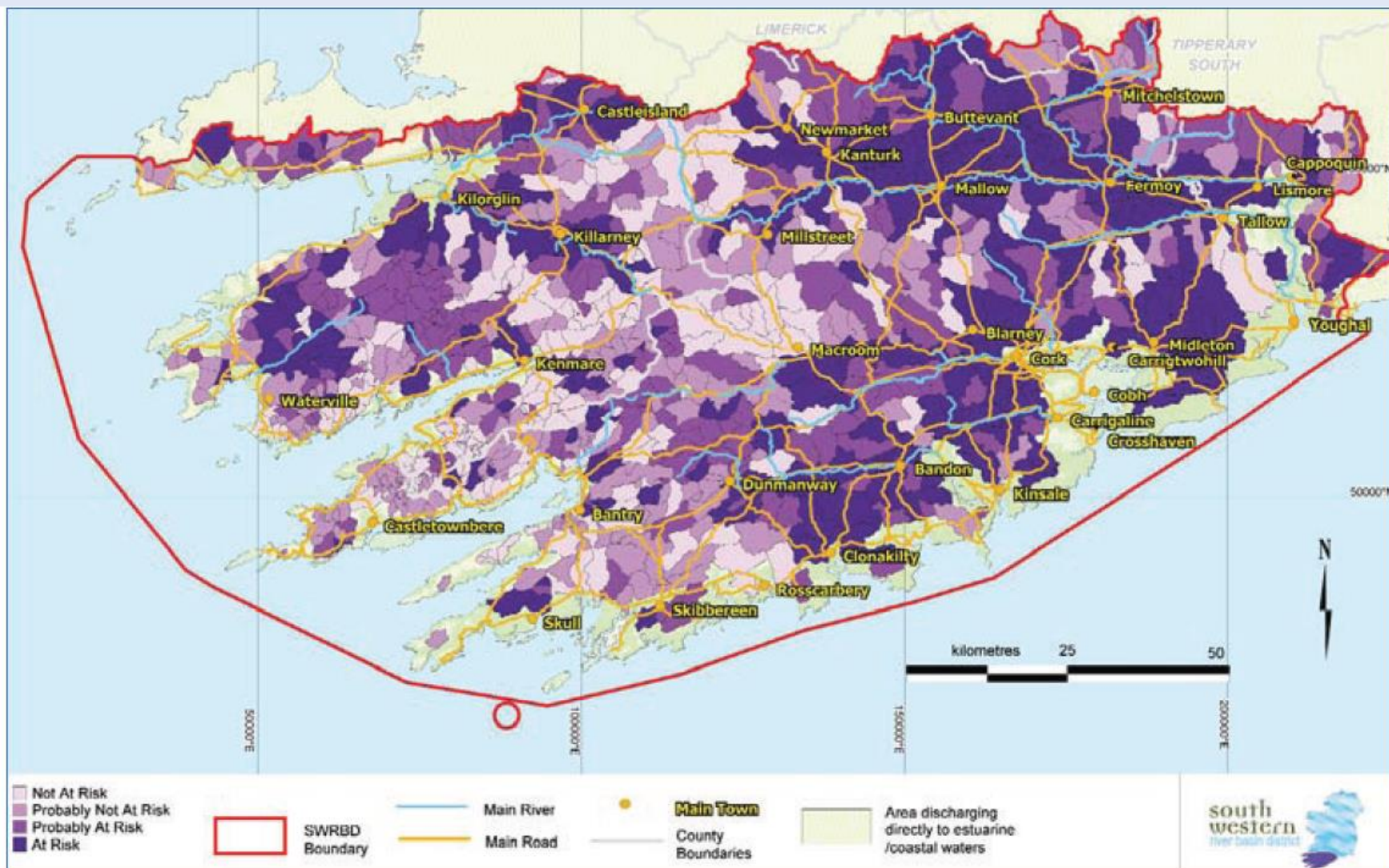
Aims & Objectives contd.

- Risk classification involved extensive modelling of ‘Drivers / Pathways / Impacts’ including Forestry, Agriculture, Urban, Sewage and Industrial inputs
- Dec 2004 ... Risk Assessment Maps produced
- June 2006 ... EPA launches Monitoring programs
- June 2010 ... RB Management Plans approved by Minister of Environment
- July 2010 ... RBMPs sent to the European Commission
- **March 2011** ... First tranche of monitoring data to be reviewed and status of waters updated by EPA

Monitoring Program Design

1. Define water body boundaries and characteristics
2. Choose water bodies to be representative of type / geology / chemical / biological characteristics
3. Run risk assessments based on modelled assumptions / data
4. Monitor 2006-2009
5. Review data in 2010 and then classify waters against standards
6. Reassess programs for next cycle

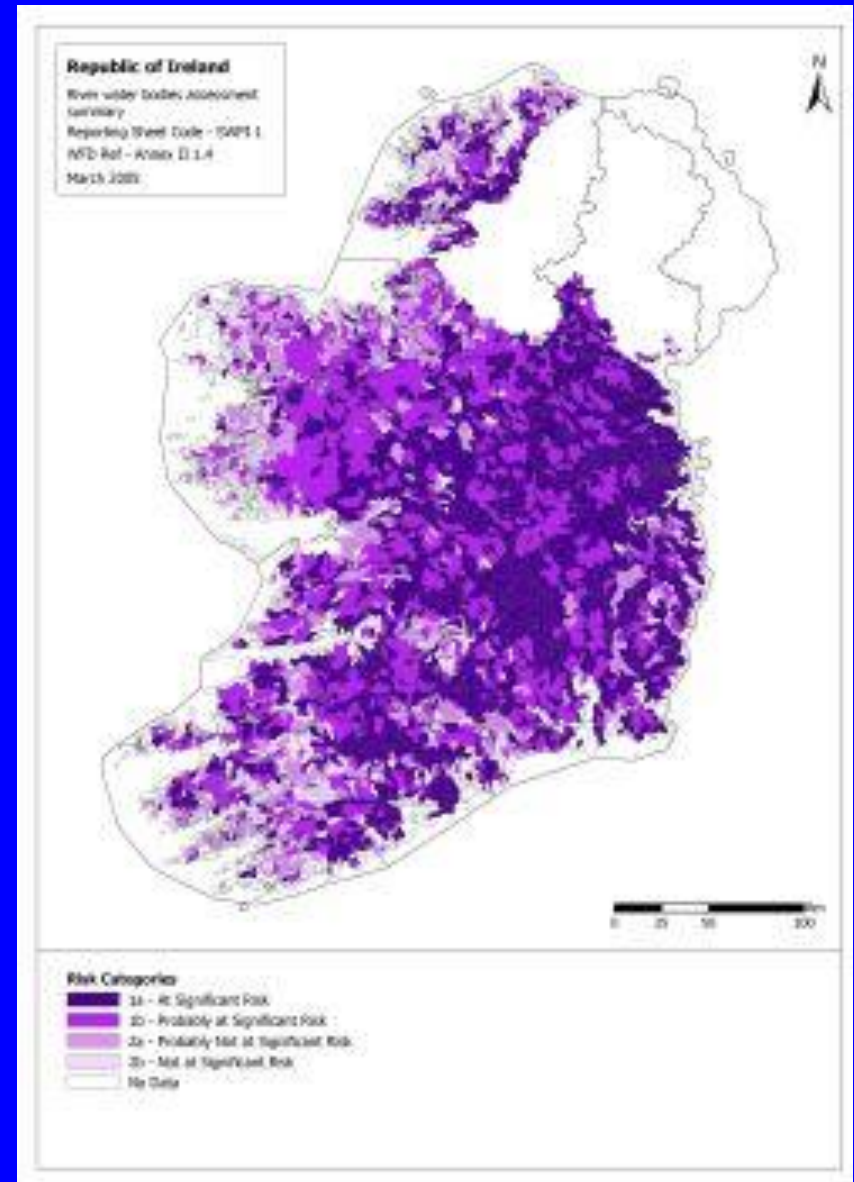




Map 3.3 SWRBD Overall River Risk Assessment Result

Monitoring Program (Rivers)

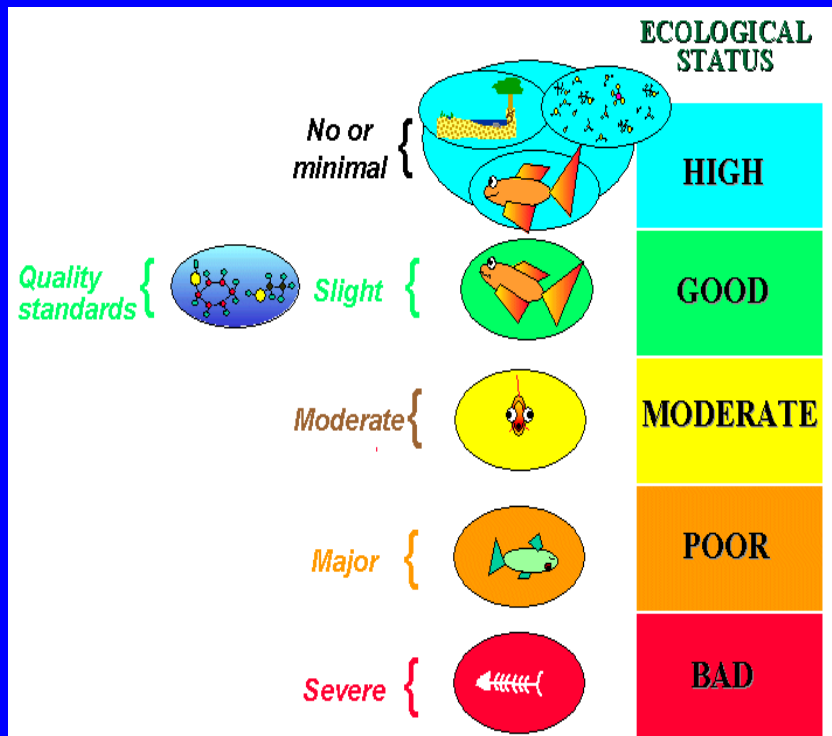
- Nationally **4466** river water bodies based on 3 types / 4 slope profiles !
- Similar categorising of Groundwater, Transitional (Estuarine), Coastal Water, Lakes, Artificial / Modified water bodies
- EPA is coordinating National Working Groups to determine objectives and establish performance criteria in line with previously described principles
- Monitoring programs commenced in June 2007 based on sub-sets representative of differing “pressures”
- **680** River / **200** Lakes Surveillance monitoring sites for long term change, ca. **500** Operational sites (LAs) monitoring for risk assessment, Investigative monitoring for problem sites (LAs)



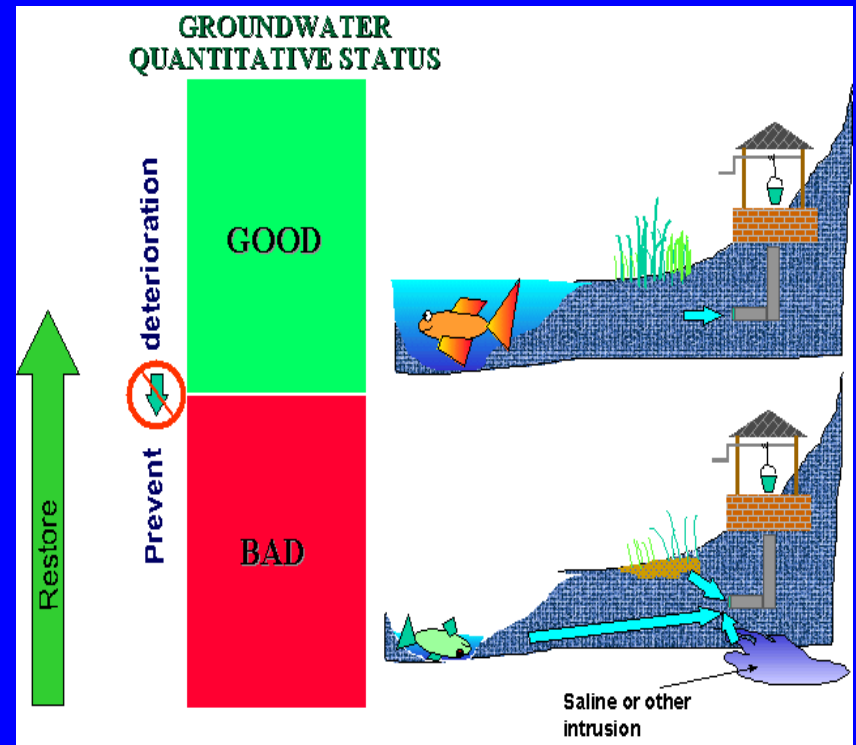
Monitoring Programs ... Classifications

Definition of water body status

Rivers / Surface waters

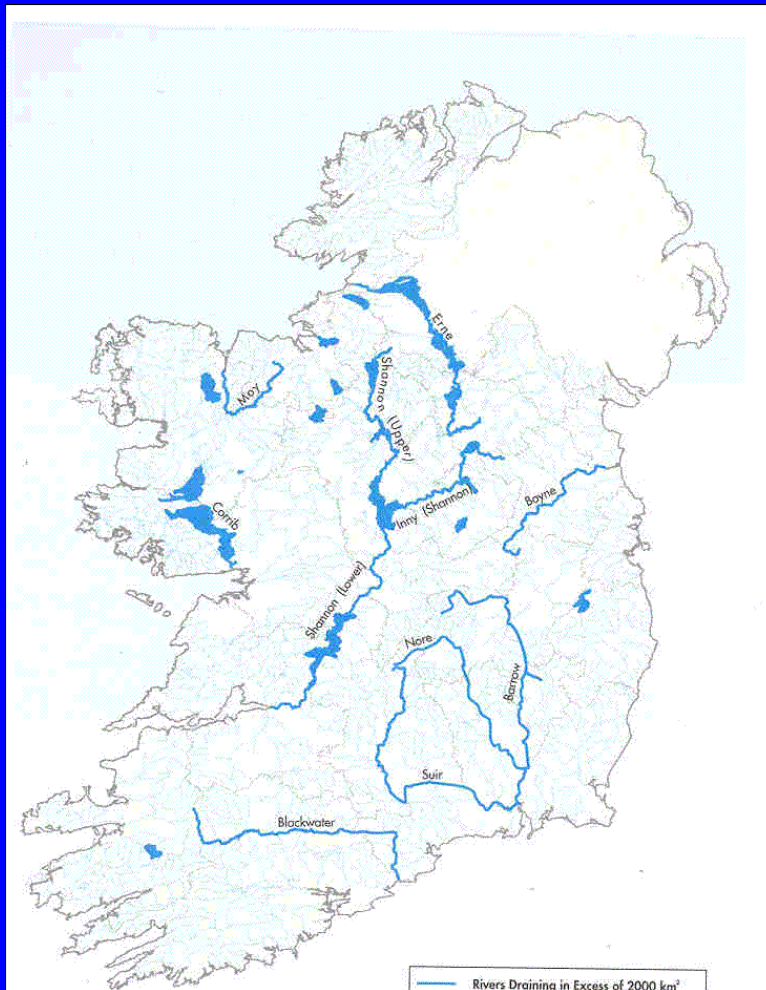


Groundwater



Monitoring Programs ... A challenge for all of Europe

Rivers draining >200km² in Ireland

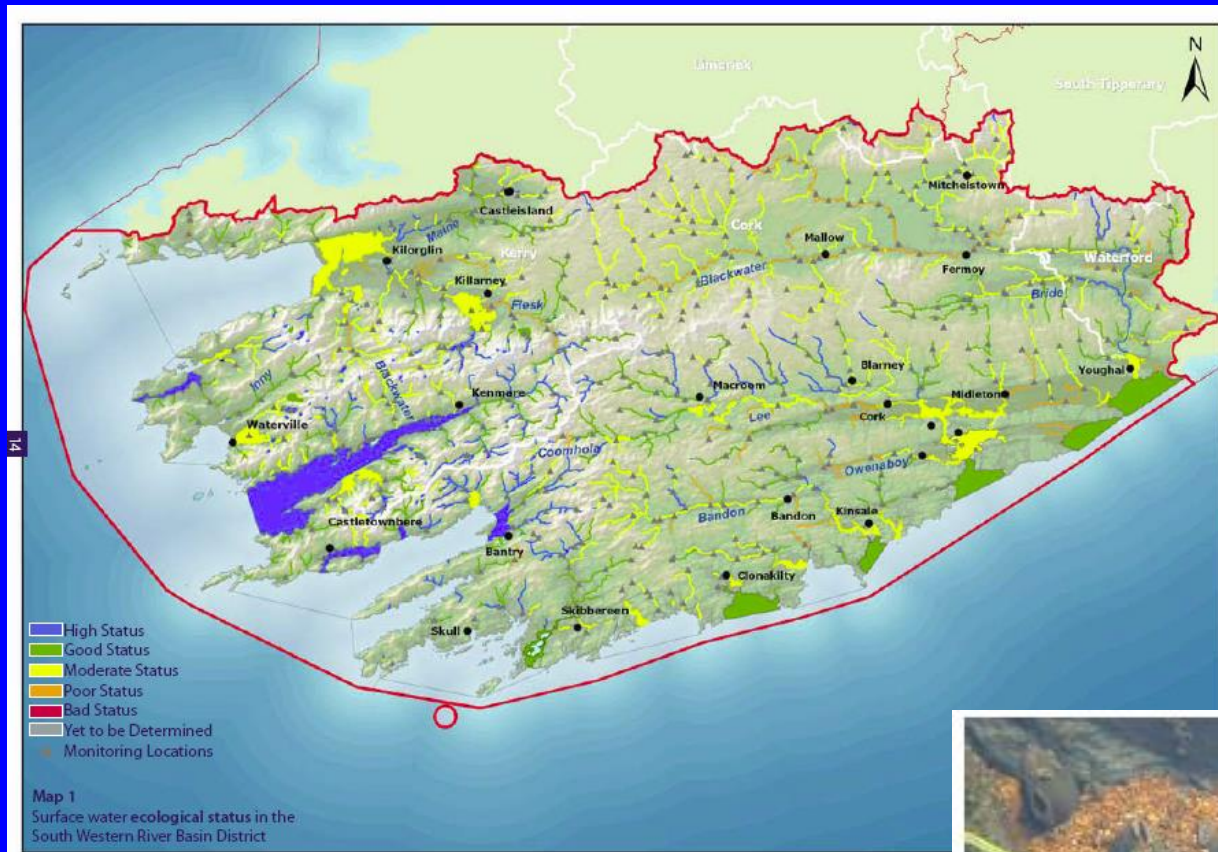


compared to the

Danube basin



Monitoring Programs ... Classification



Overall the picture is fairly good but varies widely at National level and there are some problem areas.

R. Blackwater is designated as Moderate due to pressures on the Freshwater Pearl Mussel (*Margaritifera margaritifera*)

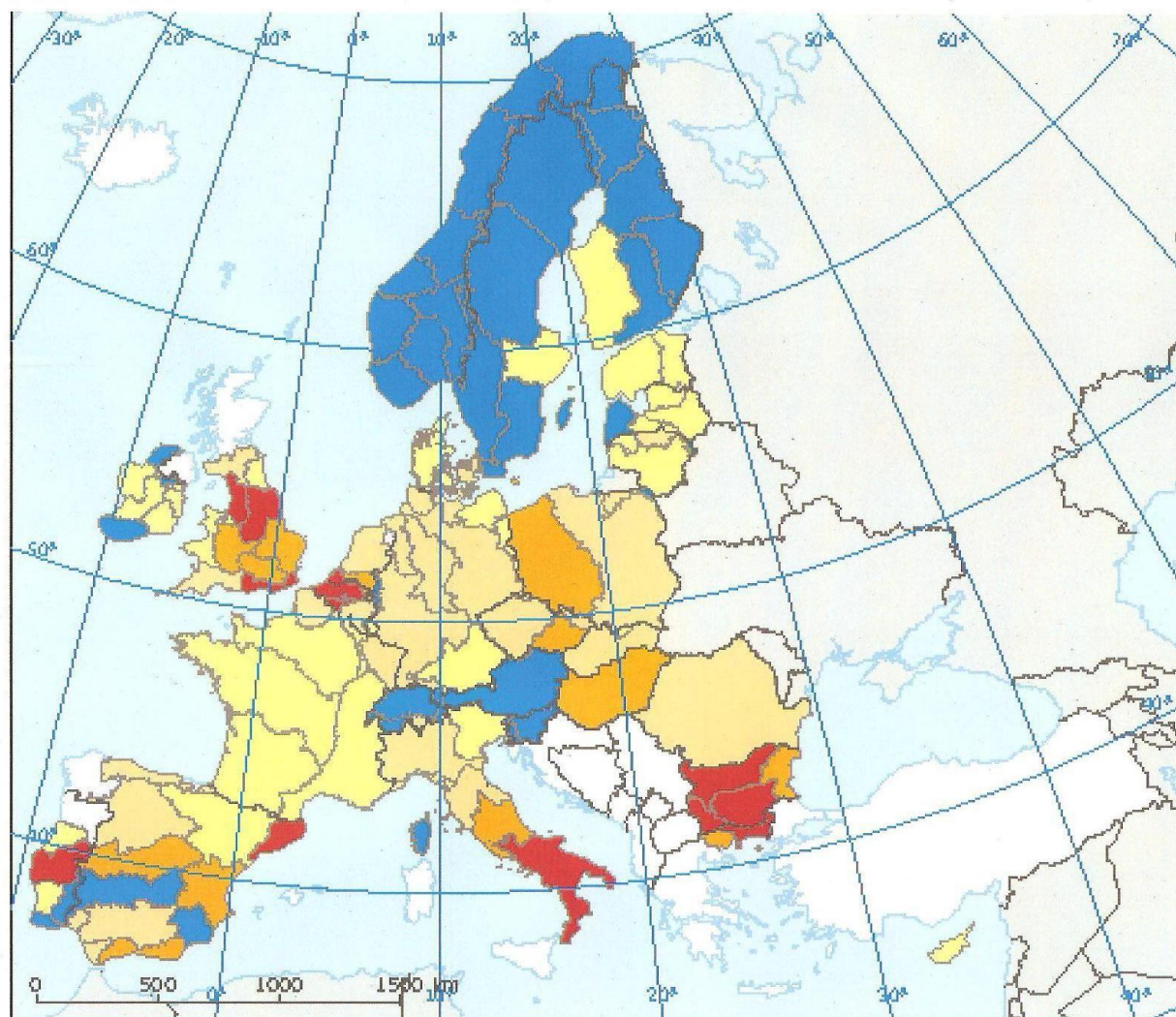


Sampling for Macroinvertebrates



- Macro-invertebrates are the larger invertebrates visible to the eye and usually defined as those that are retained by a net or sieve of mesh size 0.6mm. These organisms best fulfill the criteria for a biological system of water quality
- Equipment is simple and inexpensive.
- Sampling+assessment of a river site can be completed in about 20 minutes.
- **But this needs a trained biologist for accuracy and comparability**





**Annual average river
orthophosphate
concentration by river
basin district**

mg/l as $\text{PO}_4\text{-P}$

- < D.02
- \geq D.02 and < D.05
- \geq D.05 and < D.1
- \geq D.1 and < D.2
- \geq D.2 and < D.4
- \geq D.4
- River basins without data or data excluded due to quality criteria
- Outside coverage

Source: WISE

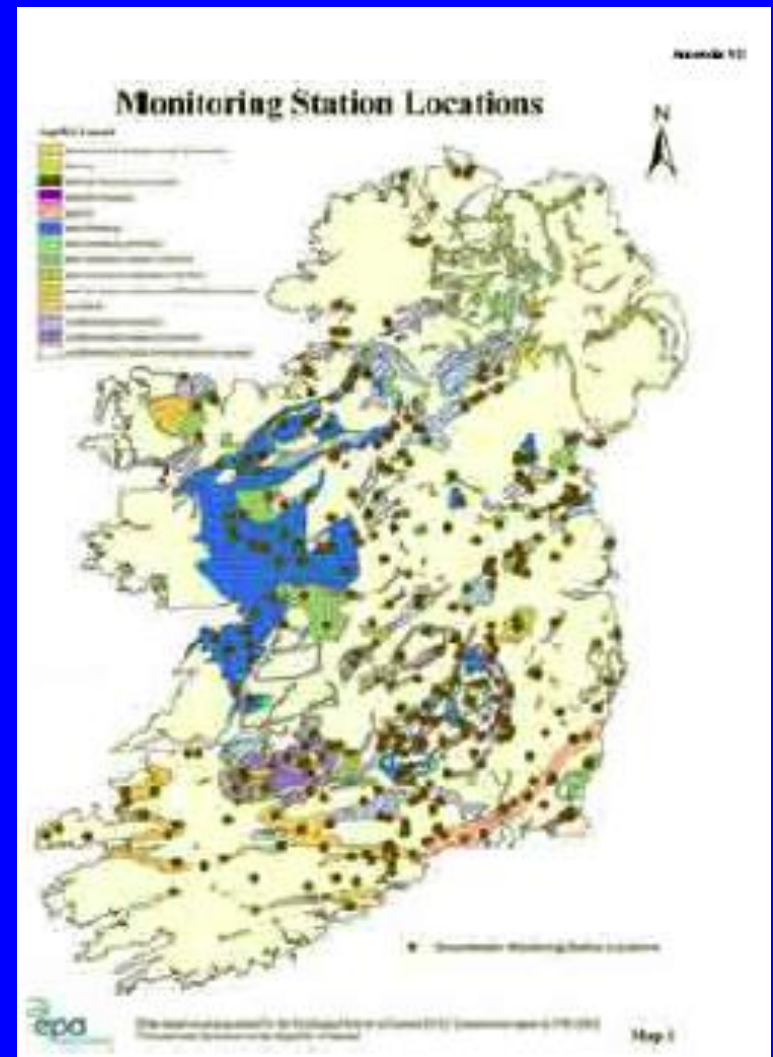
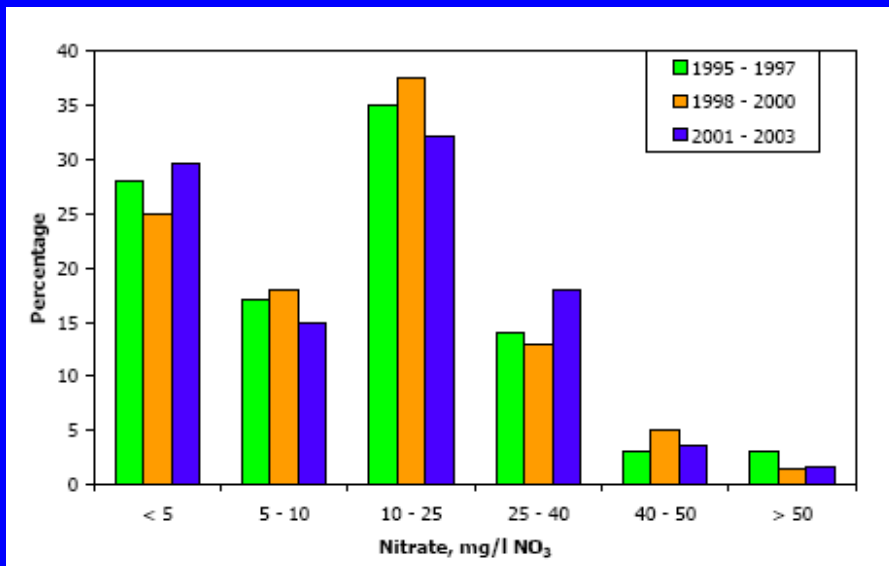
National Groundwater monitoring program

EPA monitors at 334 stations but only 42 Groundwater bodies defined for WFD

Estimated 200K wells in Ireland

GW accounts for 16% of all water supplies

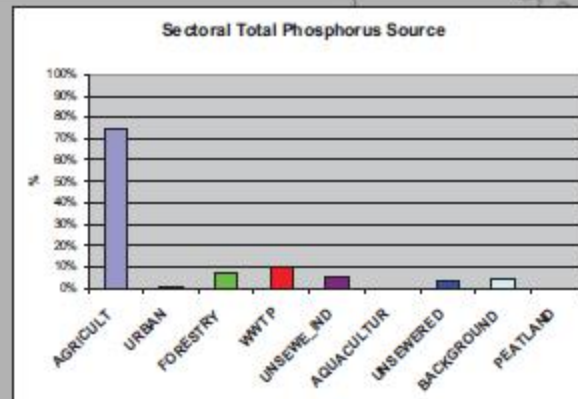
Most problems with Nitrate and Microbiology



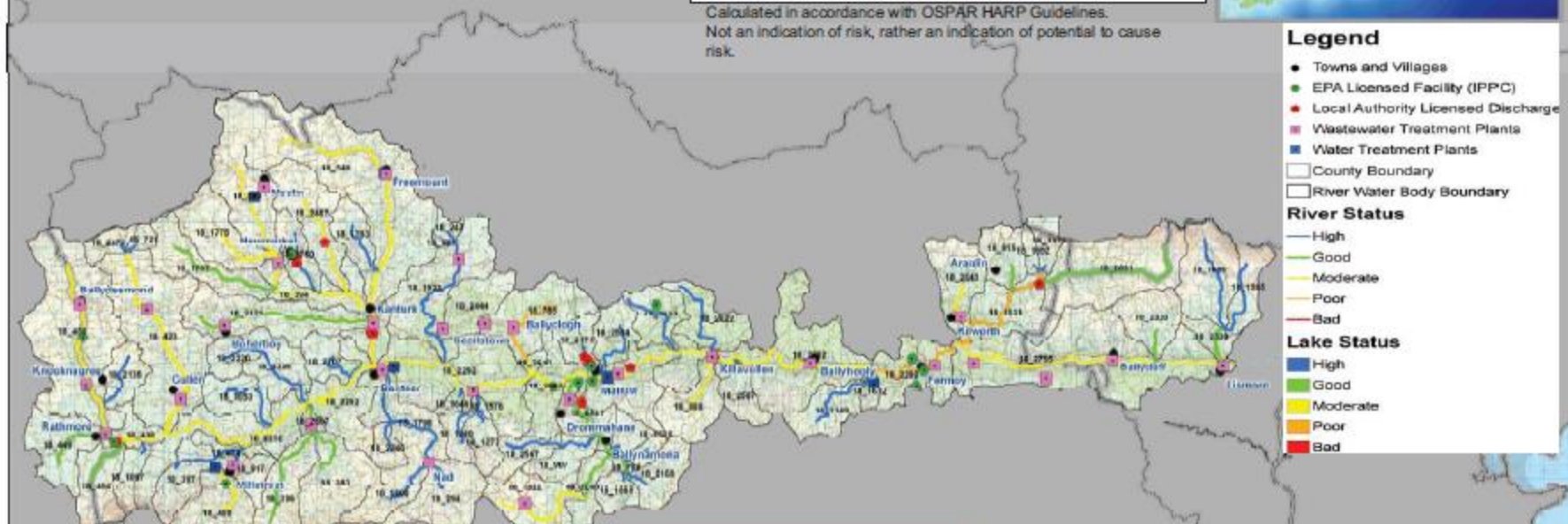
Blackwater WMU



Limerick



Calculated in accordance with OSPAR HARP Guidelines.
Not an indication of risk, rather an indication of potential to cause risk.



Legend

- Towns and Villages
- EPA Licensed Facility (IPPC)
- Local Authority Licensed Discharge
- Wastewater Treatment Plants
- Water Treatment Plants
- County Boundary
- River Water Body Boundary

River Status

- High
- Good
- Moderate
- Poor
- Bad

Lake Status

- High
- Good
- Moderate
- Poor
- Bad

Name	Blackwater
Area	1703km ²
River Basin District	SWRBD
Main Counties	Cork, Waterford, Kerry
Protected Areas	6 Surface Drinking Water Rivers: Allow (River) Tanyard (Stream) Glenakeefe (River) Blackwater (River) Clyda (River) Blackwater (River), Mallow Fiddane stream/reservoir. UWWTD - Blackwater River downstream of Railway Bridge; 2 SAC: Blackwater River (Cork/Waterford); Killarney National Park - MacGillycuddy's Reeks and Caragh River 1 SPA: Blackwater Callows; 2 FPM: Allow; Munster Blackwater

WFD Standards (Chemical)

- **SI 272 of 2009** (Surface Water Regs.)
 - Defines High, Good and Moderate status
 - Prescribes the biological elements to be used in classification
 - Prescribes those Hydromorphology elements to be included
 - Prescribes the Physico-Chemical elements to be included in determining status, including PAS
 - Sets Q value indices for status boundaries for water types
 - Sets acceptable oxygenation conditions for waters
 - Prescribes Nutrients concentrations boundaries for water types
 - Sets EQS values for range of Organic / Inorganic pollutants
- EQS standards for groundwater are still under assessment

Implications for IPPC / WWTP facilities

- Diffuse pollution (esp. Nutrients) from land is still regarded as the biggest challenge especially in intensively cultivated areas **but** point source pollution from WWTPs / IPPC discharges is responsible for localised downgrading of river status below some outfalls
- Licence limits are based on the ‘Assimilative capacity’ of the receiving water. Reviews will take into account of existing discharges and data on background concentrations **using WFD EQS criteria**
- Greater EPA focus on compliance of IPPC / WWTPs facilities to minimize potential impacts
- Licensing of 540 Urban WWTPs now under way with WFD POMs study outcomes being used to influence the WSWWIP

Implications for IPPC / WWTP facilities

- Discharges to Coastal / Estuarine zones area may be limited in relation to Nitrogen loads
- Probable tightening of standards for discharges to waters in the areas of Pearl Mussel populations e.g. R. Blackwater
- Discharges to Surface waters will take into account of existing discharges and background concentrations using WFD EQS criteria
- Groundwater contamination may increase the risk of EPA prosecution and enforcement of sanctions under the Environmental Liability Directive

Information Sources on WFD

- www.wfdireland.ie
- www.swrdb.ie
- http://ec.europa.eu/environment/water/water-framework/index_en.html
- www.inbo-news.org
- www.epa.ie

