#### Water Quality in Ireland: now is the time for urgent action

## **Environment Ireland Conference 2020**

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Photo: Dr Ruth Little, EPA

#### Structure of the Presentation

- > Water resources in the 21<sup>st</sup> century
- How fares Ireland's freshwaters
- Key water quality pressures, stressors and challenges
- > Are we doing enough?

'The human race is challenged more than ever before to demonstrate our mastery, not over nature, but of ourselves'. From: Rachel Carson (author of Silent Spring).

#### Water Resources in the 21<sup>st</sup> Century!

Over 1500 contaminants have been found in freshwaters Top guns: Nutrients, Organic Waste, Sediment, Pesticides

C.900 contaminants of emerging concern (NORMAN Network)
- industrial compounds, pharmaceuticals, personal-care products, biocides, .....

Surface waters, in particular rivers, have been drained, straightened, over-abstracted, fragmented ......

## Consequences of degraded freshwaters

Impacts the quality and sustainability of ecosystem services from potable water supply to recreation and sense of place



Impacts the biodiversity that underpins the ecosystem services

Freshwater biodiversity is declining at a faster rate than on land or in the sea.

Alarming losses globally since the 1970s (Reid et al. 2018 & Living Planet Report, 2018)



'The Biodiversity crisis in freshwaters has deepened' = 'Invisible tragedy'(Reid et al. 2018)

Pedrazzani et al. 2019. Opinion paper about organic trace pollutants in wastewater...... *Science of the Total Environment* 651, 2, 3202-3221 Living Planet Report - <u>https://c402277.ssl.cfl.rackcdn.com/publications/1187/files/original/LPR2018\_Full\_Report\_Spreads.pdf</u> Reid, A. J. et al. 2018. Emerging threats and persistent conservation challenges for freshwater biodiversity. *Biological Reviews* 94, 840-873.

## Freshwaters across Europe are impacted by several pressures and multiple co-occurring stressors



#### **Pressures**

Diffuse pollution Point source pollution Flow regulation Hydromorphology alterations Invasive species

## Climate change is adding to the suite of stressors

#### **Multiple Stressor Cocktails**



From: European Environment Agency (2018) *European Waters Assessment of Status and Pressures 2018*. EEA Report No. 7/2018 Source: Results based on the WISE-SoW database including data from 25 Member States (EU-28 except Greece, Ireland and Lithuania).

## How are freshwaters faring in Ireland?





Surface water ecological status for rivers, lakes, transitional and coastal waters and groundwater status 2013-2018 (Numbers in parentheses represent the total number of water bodies assessed).

Change in the percentage of each of the five WFD status classes over three assessment periods for all surface waters – key trends highlighted.

- > 47.2% of surface water bodies monitored are in moderate, poor, or bad ecological status.
- Overall net decline of 4.4% since the 2010-2015 reporting period.
- Increase in number of poor-status waterbodies
- Further loss of high-status water bodies

'These findings indicate that water quality is getting worse...' Boyle et al. (2019)

From: Boyle, S., Trodd, W., Bradley, C., Tierney, D., Wilkes, R., Ní Longphuirt, S., Smith, J., Stephens, A., Barry, J., Maher, P., McGinn, R., Mockler, E., Deakin, J., Craig, M. & Gurrie, M. 2019. *Water Quality in Ireland 2013-2018*. Environmental Protection Agency, Wexford.

#### Serious loss of the most pristine river sites



From: Boyle et al. (2019) Water Quality in Ireland 2013-2018. Environmental Protection Agency, Wexford.

Pearl mussel – a flagship species is facing continuing decline



# High-status objective water bodies: improvements?



From: Boyle et al. (2019) Water Quality in Ireland 2013-2018. Environmental Protection Agency, Wexford.

#### Does loss of high-status water bodies matter?

- 1. Important source of fauna for ecological recovery of impacted river sites.
- 2. Many catchments/areas have no high-status water bodies may curtail the potential for recovery to good ecological status.
- 3. Conserve individual species and overall catchment biodiversity reservoirs of Ireland's and Europe's aquatic biodiversity.





We urgently need to protect a network of high-status sites and identify and protect areas with high regional biodiversity

#### STATUS OF FRESHWATER INVERTEBRATE BIODIVERSITY IN IRELAND'S RIVERS – TIME TO TAKE STOCK

Mary Kelly-Quinn, Hugh Feeley and Catherine Bradley

Biology and Environment: Proceedings of the Royal Irish Academy, vol. 120, no. 2, 51-68 (2020).

- > We only have a conservative estimate/no knowledge of how many invertebrate species occur in rivers for almost 40% of the invertebrate groups examined.
- > We don't have adequate information on the distribution/habitat requirements of 66% of the groups examined.

>Some invertebrate species are endangered or vulnerable







Long-term trend in taxonomic richness and categorical abundances associated with suspected pesticide pollution in a river in Co. Donegal (Kelly-Quinn *et al.* 2020)



How we target these stressors will determine the outcome of mitigation measures.











#### Sediment is a Master stressor



## Degraded or no riparian buffer zones leave surface waters open receptors for diffuse pollution

See: www.ucd.ie/reconnect

#### Add to this climate-change

Climate change may act synergistically with nutrients to magnify eutrophication and further degrade water quality and ecosystem services, including impacts on drinking water.

Projected increases in rainfall volumes and intensity have the potential to increase phosphorus transfers to water bodies through increased surface run-off and associated soil erosion (Ockenden et al. 2017).

"Our analysis indicates that we would need to adopt large agricultural changes (e.g., 20–80% reduction in P inputs) to counter the increased winter P losses projected by climate change."

"Currently adopted measures are not likely to be enough to offset the increase expected under climate change"

Major agricultural changes required to mitigate phosphorus losses under climate change

Ockenden, M C; Hollaway, M J; Beven, K J; Collins, A L; Evans, R; et al. Nature Communications; London Vol. 8, (Jul 2017): 1-9. DOI:10.1038/s41467-017-00232-0

## Are we doing enough??

Good work being undertaken by LAWPRO and the ASSAP service – but it may not be enough or show results fast enough.

> Progress made since 2016 on addressing the significant pressures on Ireland's aquatic environment. From Boyle et al. (2019)



- Protection of water quality and associated biodiversity needs to be a high policy priority that is addressed across all Government departments and economic sectors.
- Agricultural intensification challenges water quality protection.
- Communication of the consequences of degraded water quality for human well being and economic activity needs to be improved to stress the urgency of the current declines and what needs to be done.
- It is unacceptable to have raw sewage from 36 towns and villages being released into rivers and coastal waters (31 locations).

#### Thank you for your attention

*We are the first generation that has a clear picture of the value of nature and our impact on it. We may be the last that can do something about it.* 

We all have a role to play in reversing the losses in nature – but time is running out'

It requires governments, businesses and citizens to rethink how we produce, consume, measure success and value the natural environment.

WWF Living Planet Report (2018)