Dublin Bay Bathing Waters
Report by the Bathing Water Task Force
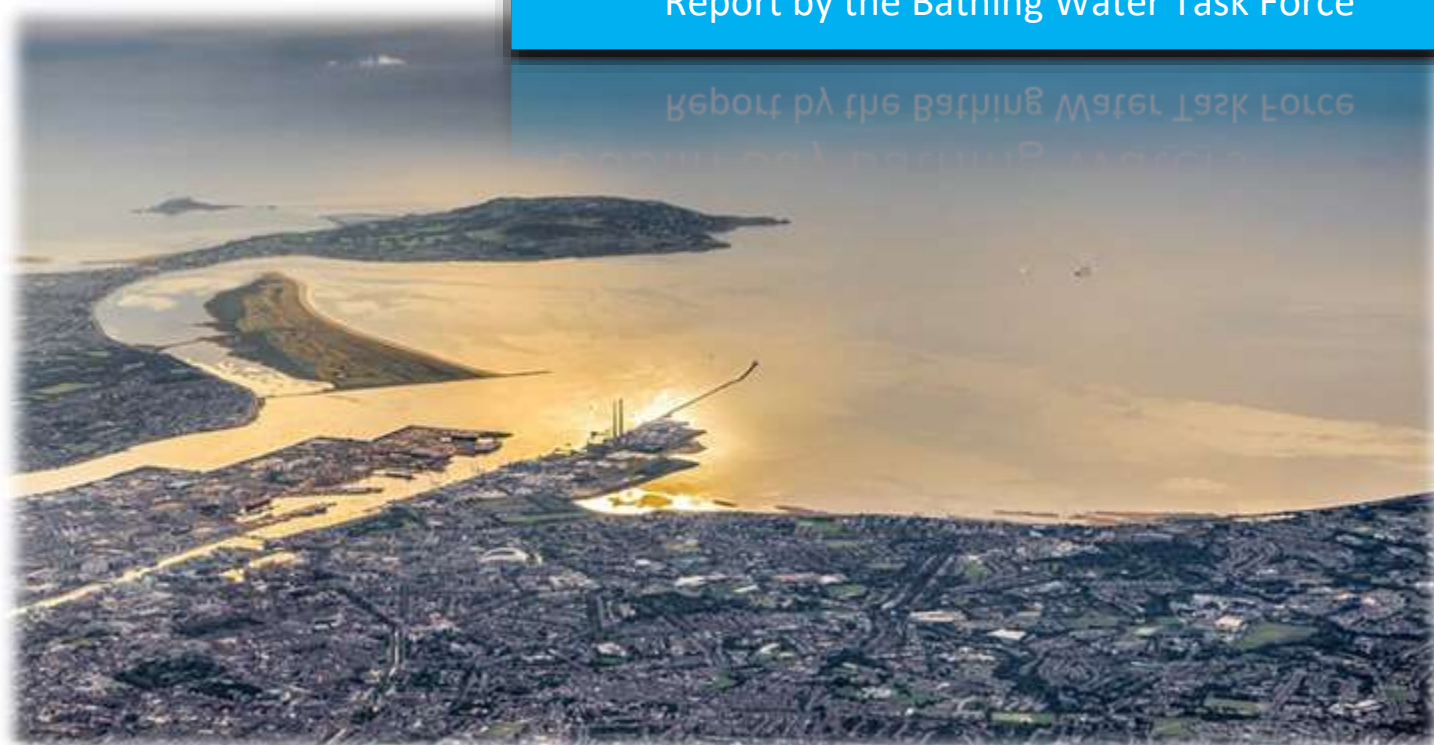
June 2023

Acknowledgements

This Bathing Water Task Force (BWTF) report has been prepared for the purposes of highlighting the impact of the work undertaken by the various agencies involved in protecting our coastal waters of Dublin Bay. In addition, to offer transparency and insight into the ongoing actions being undertaken in order to protect public health and fulfil our regulatory obligations in relation to bathing in Dublin Bay.

This report has been compiled by the following team members;

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Introduction

Dublin Bay is a rich natural resource and fantastic amenity for the public. Covering an area of 300 square kilometres, it is an important asset for the city as it underpins many of the environmental, economic, recreational, cultural and tourism functions of the city. Dublin Bay encompasses coastal landscapes, coastal amenities, natural heritage of international, European and national importance, nature reserves and recreational opportunities, including water based activities such as sea swimming.

There are three significant national and international designations for Dublin Bay, which highlight its natural and ecological significance. Within Dublin Bay we have a Special Area of Conservation, Special Protection Area and a proposed natural heritage site. In 2015, Dublin Bay was designated as a UNESCO Biosphere Reserve, one of only two in Ireland. In addition, Bull Island to the northwest of Dublin Bay, is a significant National Nature Reserve with an abundance of wildlife.

Situated on the edge of our capital city, adjacent to port activity and significant infrastructure, the protection and management of Dublin Bay is of paramount importance. The Environmental Protection Agency (EPA) has recently classified the Bay as having 'good' water quality status (Water Quality Report 2016 - 2021) and noted it is in the 'Not at risk' category in relation to achieving its Water Framework Directive objectives. With such a significant recognition, it is incumbent on us to ensure we manage Dublin Bay responsibly, in a proactive manner to continue to protect the ecosystem, its value as an amenity for the public and importantly, maintaining the water quality which is integral to supporting these functions.

The local authorities of Dublin City and Dun-Laoghaire Rathdown are the designated authorities to oversee the Bathing Water Regulations 2008 as they apply to our bathing areas along Dublin Bay. From Killiney Beach in the south of the Bay, stretching to Dollymount Strand in the north, there are seven designated bathing locations, as well as nine additional 'Other Monitored Waters' (see Figure 1, page 11). In recent years a significant rise in the numbers of sea swimmers at many locations is recognised. The Bathing Water Task Force continues to identify, assess, remediate or eliminate sources of pollution entering Dublin Bay. In particular, we are determined to address sources of faecal contamination which can impact bathing water quality and can put bather health at risk.

Since its establishment, the Dublin Bay Bathing Water Task Force has been committed to identifying all potential sources of faecal pollutants that may affect water quality in Dublin Bay. Consistent with the EU Water Framework Directive and Irish legislation, our focus has been to protect and restore water quality to support our biodiversity and protect public health for everyone interacting with our valuable natural resource. The Bathing Water Task Force is made up with representatives from Dublin City Council (Chair), Dun Laoghaire-Rathdown County Council, Uisce Eireann, Dublin City Central Laboratory, the Department of Housing Local Government & Heritage and Fingal County Council.

This report provides an overview of our progress to date and seeks to convey an interim evaluation of the impact our coordinated actions have had on bathing water quality in Dublin Bay. The BWTF has recorded meaningful successes, nonetheless, various challenges to improve water quality remain which are outlined in this report. The taskforce is committed to overcome these challenges with the support of the relevant agencies.

Roy O'Connor,
Chairperson, Bathing Water Task Force.

Executive Summary

The Bathing Water Task Force (BWTF) was established in 2019 with the objective to reverse the continuing decline of bathing water quality at Merrion Strand.

The purpose of the BWTF is to coordinate and focus our key regulatory responsibilities to identify, assess and remediate sources of pollution affecting vulnerable bathing waters in Dublin Bay. This report will inform the reader as to the progress the agencies of the BWTF have made to date and convey our ongoing activities.

The BWTF is supported by the existing applicable legislation, particularly the Local Government (Water Pollution) Act 1977, as amended, and the Bathing Water Regulations 2008. The remit of the Bathing Water Task Force includes the protection of public health and to ensure that the quality of all bathing waters identified by the authority (in accordance with Regulation 4) shall be classified as having water quality status not less than "sufficient". That status is determined by the EPA from their assessment of the previous four years of bathing water quality data.

Dublin Bay has many significant designations, including the Bull Island Nature Reserve, a Special Area of Conservation, a Special Protection Area and a UNESCO biosphere. These significant environmental accolades have been achieved in a waterbody which is nestled on the doorstep of our capital city, with a busy port and adjacent to where approximately 40% of the country's waste water is treated at Ringsend. The recent achievement of a Water Framework Directive overall 'good' water quality status for Dublin Bay is the result of a sustained effort and collaborative approach across all agencies involved.

This report will explain how we continue to have water quality challenges we need to address, which are collectively described as 'nearshore' pressures, i.e. pollution sources are predominantly emanating from a variety of mostly known, but diffuse, sources along our coastline. Solutions to tackling those pollution sources vary from being relatively easy to address, with others more challenging and costly.

It will present the context for our bathing waters in Dublin Bay, the designated bathing season, the responsibilities of the various agencies involved, and an insight into the activities being undertaken to improve the quality of waters at our designated bathing areas along Dublin Bay's coastline, which briefly include, inter alia;

I. The development of a predictive model to forecast bathing water quality and better inform decision making by Local Authorities with regard to their responsibilities to protect bather health at designated bathing areas. This action has developed our understanding as what impact our wastewater infrastructure may or may not have on designated bathing areas. (Chapter 7.2 & Appendix J - 7.2).

II. An Uisce Eireann pilot project (supported by the BWTF), to monitor the impact of maintaining the operation of Ultra Violet treatment of treated effluent discharging from Ringsend Wastewater Treatment Plant (RWWTP) outside of the bathing season. The 4 month out of season study did not demonstrate any significant improvement to water quality at designated bathing areas arising from the extended use of UV treatment outside of the bathing season (Appendix H).

III. The commissioning of a catchment based assessment of the Elm Park Stream to inform and guide onsite investigations pertaining to Merrion Strand (Chapter 7.7).

IV. The removal of one of the three Storm Water Overflows into the Elm Park Stream (Larchfield SWO) and how the BWTF seek to identify and assess potential solutions the second SWO at

Elm Park Golf Course and the third at Roebuck Castle Estate, just upstream from the UCD campus.

V.   Our commitment to validate of 3rd party potential real-time water quality monitoring proposals (Chapter 7.3 & Appendix D).

VI.   The collaboration between the BWTF and the UCD Acclimatize Project which delivered scientific insights to allow us focus the onsite activities of the local authority site staff in tackling pollution sources. Specifically highlighting the high proportional impact from canine faeces on water quality at Sandymount and Merrion Strand (Chapter 7.13 & Appendix F).

VII.   Ensuring consistency of public messages across all public platforms (Chapter's 7.5 & 7.6) & the importance of continued and improved clear and concise public messaging in regard to Dublin Bay water based activities.

A designated bathing water which does not meet the minimal standard of 'sufficient' for a consecutive period of five years loses its classification as a designated bathing water, in accordance with the Regulations. Our partnership with UCD has undertaken an assessment of bathing water samples which fail to meet an 'excellent' status to understand the likely pollutant sources. When we undertake microbial source tracking of those water samples, we have learned that approximately 50% of these 'poor' results are due to faecal matter from canines being in the water, approximately 25% are attributable to human faecal matter and approx. 20% recorded as being from gulls, (remaining 5% undetermined). This finding is based on an investigation of 250 bathing water samples taken over two bathing seasons (see Appendix F). These initial findings warrant further monitoring.

The BWTF continues to be active in identifying and eliminating sources of human faecal entering our waters via direct discharges, potential infiltration or misconnections and other. As 'near shore' pollutants, the sources are both specific and diffuse which require significant investment in infrastructure or in investigative work.

Gull/bird faecal matter is a pollutant source which is the most difficult to remediate (Dublin Bay is a protected bird sanctuary), however a consideration is that gulls tend to gather in Dublin Bay at locations where water based activities (sea swimming) are least evident, e.g. Merrion Strand.

The initial task for the BWTF was to stop the decline of bathing water quality at Merrion Stand and to bring the water quality back to a 'good' standard. Sampling results have recorded that the water quality has not deteriorated further since 2019 and early signs of incremental overall water quality improvements are met with a cautious welcome, (results record that there are fewer poor quality results and increased excellent results). However, meaningful and enduring positive change requires continued work and time so that Merrion Strand and Dublin Bay can continue to be enjoyed by residents and visitors alike.

Overall, it is important for the public to be aware that pollution events do occur occasionally due to heavy rainfall events and more regularly from beach activities and should heed advice or warnings from the relevant authorities.

The overarching EU Water Framework Directive (WFD) is consistent with the Bathing Water Regulations. The water quality of Dublin Bay has achieved a 'good' WFD status, as determined in the Environmental Protection Agency's updated classifications, reported in 2022. This is positive news which offers reassurance that the overall chemical and ecological status of the waterbody is conducive to safe bathing waters and the protection of our internationally recognised UNESCO biosphere.

Our simple advice to the general public remains as it has been: do not swim for at least 48 hours following a substantial rainfall (> 4mm/hr). For further information, please see beaches.ie for details or the relevant local authority's websites.

1. Establishment of the Bathing Water Task Force - 2019

In 2019 there were serious concerns about downward trends and poor water quality at the designated bathing waters at Merrion Strand and Sandymount Strand in Dublin City. Bathing water quality at Merrion Strand had been classified as 'poor' by the Environmental Protection Agency for the previous five consecutive years.

As required under law, Dublin City Council issued a permanent bathing prohibition at Merrion Strand in accordance with Article 14 (3) of the Bathing Water Regulations. Thus, Merrion Strand was formally declassified from a designated bathing water from the 1st June 2020.

In anticipation of the declassification of Merrion Strand, the bathing water task force was established in November 2019 with a remit to the protect public health at bathing waters and to ensure that the quality of all bathing waters identified by the authority (in accordance with Regulation 4) shall be classified as having water quality status not less than "sufficient".

2. Local Authority Bathing Water Management Responsibilities

Directive 2006/7/EC concerning the management of bathing water quality was transposed into Irish Law as the Bathing Water Quality Regulations SI No. 79 of 2008. The Regulations came fully into effect on the 31st December 2014. The Regulations apply to natural waterbodies, i.e. they do not apply to swimming pools, spas or other artificially confined waterbodies.

The Regulations set out the responsibilities of the Local Authority toward designated bathing areas, inter alia;

- Identification of new bathing waters
- Establish and maintain bathing water *profiles;
- Establish monitoring calendar for the bathing season;
- Monitor waters and have samples analysed in accordance with reference methods;
- Disseminate information to the public;
- Report to the Environmental Protection Agency;
- Achieve *Sufficient* bathing water quality status;
- Implement management measures;
- Hold public participation in the establishment, review or updating of identified bathing waters.

STATUTORY INSTRUMENTS

S.I. No. 79 of 2008

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BATHING WATER QUALITY REGULATIONS 2008

*profile: A bathing water profile should be established in accordance with the Regulations – See Appendix A

3. The Bathing Season, Designated Bathing Waters & Monitoring Requirements

3.1 Bathing Season

The Bathing Water Quality Regulations 2008 (S.I. No. 79/2008) (the Regulations) set out when the formal bathing season is in Ireland. In any year, the Regulations state that the bathing season is the period from 1st June to 15th September, with pre-season sampling commencing in mid-May.

3.2 Designated Bathing Waters

Along Dublin Bay there are number of designated bathing waters and 'other monitored waters'. A 'designated' or 'identified bathing water' is the regulatory term that is used for *all elements of surface water where a large number of people bathe* – (e.g. some rivers are designated waters), see Bathing Water Regulation 4. Local authorities are responsible for identifying bathing waters within their area. 'Designated bathing waters' are generally the most popular beaches in an area. 'Other monitored waters', which are generally smaller, less popular beaches are not formally managed under the Bathing Water Regulations as they can often not meet sufficient and consistent bathing water quality standards. However, local authorities do monitor these bathing waters as a voluntary public health measure.

Table 1 below lists the 'designated bathing waters' and 'other monitored waters' within the Dublin Bay area. The latest information on these bathing sites can be found on www.beaches.ie

Dublin Bay Bathing Waters – listed in order of north to south		
Location	**Local Authority**	**Type**
Dollymount Strand	Dublin City Council	Designated bathing area
North Bull Wall	Dublin City Council	Other monitored water
Half Moon	Dublin City Council	Other monitored water
Shelly Banks	Dublin City Council	Other monitored water
Sandymount Strand	Dublin City Council	Designated bathing area
Merrion Strand	Dublin City Council	Other monitored water
Seapoint	Dun Laoghaire – Rathdown Co.Co.	Designated bathing area
Dun Laoghaire Public Baths	Dun Laoghaire – Rathdown Co.Co.	Other monitored water
Sandycove Beach	Dun Laoghaire – Rathdown Co.Co.	Designated bathing area
Forty Foot Bathing Place	Dun Laoghaire – Rathdown Co.Co.	Designated bathing area
Whiterock Beach	Dun Laoghaire – Rathdown Co.Co.	Designated bathing area
Killiney	Dun Laoghaire – Rathdown Co.Co.	Designated bathing area
Blackrock Baths Shore	Dún Laoghaire – Rathdown Co.Co.	Other monitored water
Beach Gardens Dún Laoghaire	Dún Laoghaire – Rathdown Co.Co.	Other monitored water
Coliemore Harbour	Dún Laoghaire – Rathdown Co.Co.	Other monitored water
Corbawn Strand	Dún Laoghaire – Rathdown Co.Co.	Other monitored water

Table 1

Please note that although Merrion Strand is no longer a designated bathing area, the local authority continues to monitor and report on water quality there as an 'other monitored water'. This ensures that the same data is gathered and presented to the public in the same manner as was done when the location was a designated bathing location. These water quality assessment results are available from Dublin City and Dun Laoghaire's Rathdown Council's websites and at the bathing water information cabinet at identified bathing locations. Furthermore, the EPA's beaches.ie website.

Figure 1: Map of some of the designated and other monitored waters in Dublin Bay
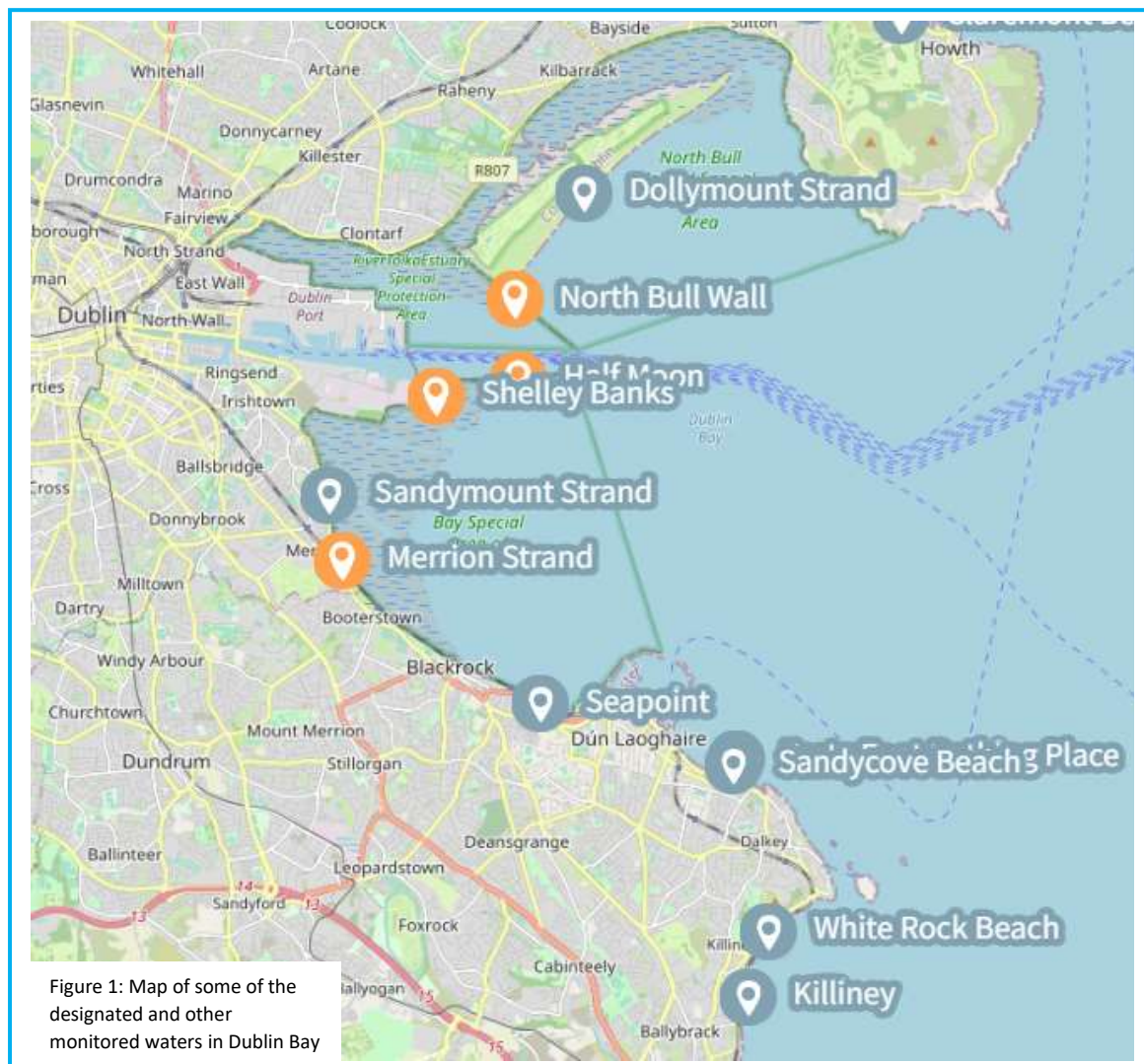
3.3 Monitoring requirements:

The Regulations set out the requirements and responsibilities of local authorities with regard to the monitoring of bathing water quality at designated bathing locations:

The basic regulatory requirement is that **three samples are to be taken and analysed per bathing season at each designated bathing water**, plus one pre-season sample in May of each year. Each local authority is also required to establish a monitoring calendar and submit it to the EPA ahead of the season commencing. Schedule 4, 5 & 6 of the Regulations set out the procedures and requirements for monitoring, inspections and investigations of bathing waters. These schedules include the

parameters and referencing methods for sample analysis and protocols for handling water samples and how these are applied to determine the bathing water classification.

Please note: the Dublin Bay local authorities undertake substantially more bathing water quality monitoring than prescribed in the regulations and continue doing so for the full year recognising the extent of all year round sea based water activities.

Assessment of bathing water quality predominantly includes the analysis of two types of bacteria (*E. coli* and Intestinal Enterococci). The presence of E. coli and Intestinal Enterococci bacteria indicates that the water has been contaminated with faeces. These bacteria are key indicators which are monitored to protect public health and inform how we classify and categorise a bathing water, in accordance with the Bathing Water Directive. Their detection in bathing water indicates the possible presence of other harmful micro-organisms, such as viruses.

Bathing water quality is classified as either 'excellent', 'good', 'sufficient' or 'poor' as detailed on Schedule 6 of the Regulations (Bathing water assessment & classification). While these classifications are applied to each sample assessment, those cumulative results contribute to an overall annual classification of a bathing location as determined by the Environmental Protection Agency;

Figure 2: Source - EPA & (www.beaches.ie

Excellent	• The highest, cleanest class
Good	Generally good water quality
Sufficient	• The water quality meets the minimum standard
Poor	• The water quality has not met the minimum standard

Samplers must adhere to certain requirements when taking water quality samples at bathing sites. For instance, water samples are required to be taken in waters that are 1 meter in depth, approximately 300 millimetres under the waters' surface.

Sampling is typically undertaken at high tide on the pre-scheduled sampling date at a distance of approximately 100 – 150 meters from the shoreline (see Figure 3 above).

Figure 3:

Water quality sampling at Merrion Strand – Spring 2023.

Merrion Strand is a popular location for birds feeding on the sand banks. It is also very popular with the general public and dog walkers on a daily basis.

4. The remit of the Bathing Water Task Force

The purpose for the Bathing Water Task Force (BWTF) is to protect public health and to improve bathing water quality in Dublin Bay, with a focus on the most vulnerable waters. To achieve its objective, the task force requires multi-agency commitment in delivering a set of agreed and coordinated activities. The Bathing Water Task Force is made up of representatives from the following organisations:

- Dublin City Council (DCC) – Chair
- Dun Laoghaire Rathdown County Council (DLRCC)
- Uisce Éireann (UÉ)
- Dublin City Central Laboratory (CL)
- Department of Housing, Local Government & Heritage, (DHLGH)
- Fingal County Council (FCC) (joined in 2022).

Key responsibilities include the identification, assessment, remediation (where necessary) & elimination of pollution entering Dublin Bay. In particular, the identification of potential pollution sources affecting

bathing locations not achieving 'Sufficient' water quality status with a particular focus on Merrion and Sandymount Strands.

The BWTF meets on a monthly basis and meetings are currently chaired by Dublin City Council's Protection of Water Bodies Office. The meetings provide stakeholders with an opportunity to report on progress being made, challenges identified and being addressed, evaluation of improvements made and to coordinate onsite activities with a view to a targeted and consistent approach. It is also a platform for local authorities, Uisce Éireann and the DHLGH to discuss current bathing water management issues and inform policy development.

In that regard the BWTF engages in high-level meetings with the Environmental Protection Agency, Health Service Executive and the Department of Housing, Local Government & Heritage. The BWTF is also a contributing member of the National Bathing Water Expert Group with the purpose of informing a national approach to managing Irelands bathing waters at a policy level.

4.1 Relevant legislation to the BWTF agencies.

The pertinent pieces of legislation to support the activities of the BWTF include the following:

The **Bathing Water Regulations 2008** sets out the responsibilities of the various agencies toward managing designated bathing waters. Local authorities are responsible for managing and monitoring identified bathing waters. They arrange for water samples to be taken and analysed throughout the bathing season and they maintain facilities. Local authorities also report and investigate pollution events and carry out measures to reduce or remove any sources of pollution.

Local Government (Water Pollution) Act 1977 (as amended by the 1990 Act) is an 'Act to provide for the control of water pollution and for other matters connected with water pollution'. The Act provides the principal legal framework for the prevention and control of water pollution, including monitoring of water quality standards and enforcement rights to pursue polluters of water bodies.

The **EU Water Framework Directive (2000/60/EC)** requires all Member States to protect and improve water quality in all waters so that we achieve good ecological status by 2015 or, at the latest, by 2027. It was given legal effect in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003). It applies to rivers, lakes, groundwater, and transitional coastal waters, including Dublin Bay. The Directive requires that management plans be prepared on a river basin basis and specifies a structured method for developing these plans.

The **Wastewater Discharge (Authorisation) Regulations 2007** has the purpose to prevent and reduce the pollution of waters from wastewater discharges by giving effect to Article 6 of the Dangerous Substances Directive and includes the purpose of implementing a range of measures required under the Water Framework Directive.

EU Bathing Water Directive (2006/7/EC) is the legal instrument for managing environment and reducing health risk at bathing in natural waters. Its aim is to protect human health and preserve, protect, and improve the quality of the environment.

The **Urban Wastewater Treatment Regulations, 2001,** as amended, imposes requirements in relation to discharges from urban wastewater treatment facilities.

4.2 Governance & Resources

At its establishment, the BWTF had the primary purpose of delivering a targeted and coordinated effort across the various agencies to improve bathing water quality in Dublin Bay. Existing governance and reporting structures within the individual organisations of the BWTF remain appropriate for the delivery of the various ongoing prioritised activities and support of the BWTF remit.

The aforementioned regulations and legislation provide the appropriate authority for the BWTF agencies to undertake the anticipated necessary actions to achieve its objectives .

The identification of potential pollution sources from private and commercial properties, which directly or indirectly outfall into our streams and rivers (and ultimately our bathing areas) commenced within the Elm Park Stream catchment in 2020. This is despite setbacks with anticipated progress due to the Covid 19 restrictions which were in place.

No additional BWTF resources have been put in place outside of pre-existing resources within the BWTF agencies to date.

It is the BWTF's intention in 2023 to undertake a review of the resources assigned to this work in order to determine the appropriate level of supports required to expedite the delivery of an effective outcome. This includes resources to attain our objectives and support our continued programme of onsite work and scientific investigations.

5. Overview of Ireland's Bathing Water Quality

Generally, surface water quality in Ireland is in decline. The overarching standards which are applied to assessing and classifying our waterbodies are set out by the EU Water Framework Directive, a more comprehensive assessment of all waterbodies in Ireland. The Environmental Protection Agency (EPA) recently highlighted in their 'Water Quality in Ireland 2016-2021' report that *'over half (54%) of our surface waters are in good or better ecological status which means that nearly half (46%) are in unsatisfactory condition. Overall, our water quality is declining and the number of monitored water bodies in satisfactory condition has decreased since the last assessment'.*

However, contrary to that backdrop, Irelands bathing waters continue to improve incrementally year on year. The Bathing Water Regulations are specifically focused on public health and monitoring for presence of bacteria in bathing waters which may affect the public health.

There are currently 148 identified bathing waters that are monitored and managed under the Bathing Water Regulations in Ireland. In their recently published 'Bathing Water Quality in Ireland: A report for the year 2022', the EPA reported that "overall, bathing water quality has continued to improve in 2022. Of the 148 identified bathing waters assessed, 144 (97%) met or exceeded the minimum required standard of Sufficient.

Bathing water quality in Ireland in 2022
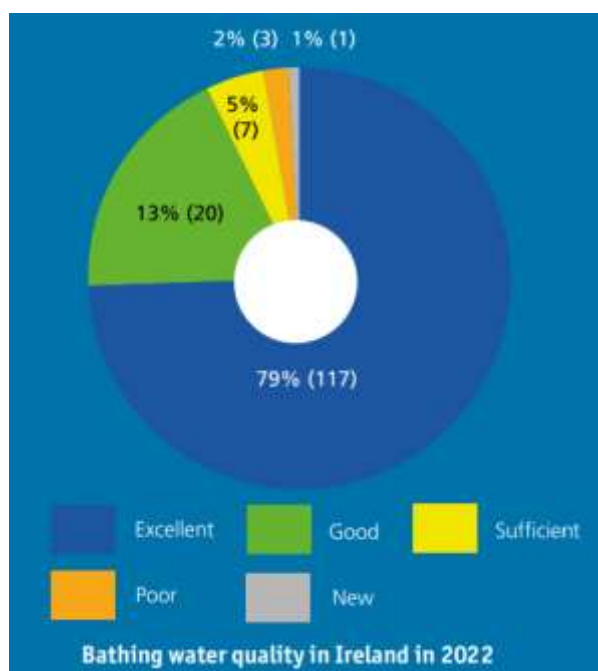
Classification	Number of bathing waters in 2021	Number of bathing waters in 2022
Excellent	115	117
Good	19	20
Sufficient	10	7
Poor	2	3
New/Changes	2	1
Total	148	148

Figure 4: Source: EPA 'Water Quality in Ireland: 2022 Report' – Changes in bathing water classifications between 2021 and 2022

"In 2022, 34 bathing water pollution incidents resulting in beach closures were reported to the EPA, compared to 42 in 2021. The local authorities take a precautionary approach when managing incidents, meaning that not all incidents result in a deterioration in the bathing water quality. This approach is taken to protect bathers' health", (Source EPA).

The EPA has also reported that in 2022 'urban waste water incidents impacted bathing waters most frequently. Agricultural run-off, fouling from dogs on beaches and algal blooms were also reported. Heavy rainfall can lead to run-off from agricultural lands, urban areas and from wastewater overflows, all of which can impact on bathing water quality temporarily'. Additional information is further presented in the Bathing Water in Ireland Report for 2022 (excerpts in Appendix B). The pertinent pressures on bathing waters are identified as being;

Figure 5   Source: EPA 'Water Quality in Ireland: 2022 Report' – Likely causes of reported incidents in 2022

- Urban Waste Water;
- Proliferation of Cyanobactria/Macro-algae;
- Diffuse pollution from agriculture;
- Contamination from animals/birds;
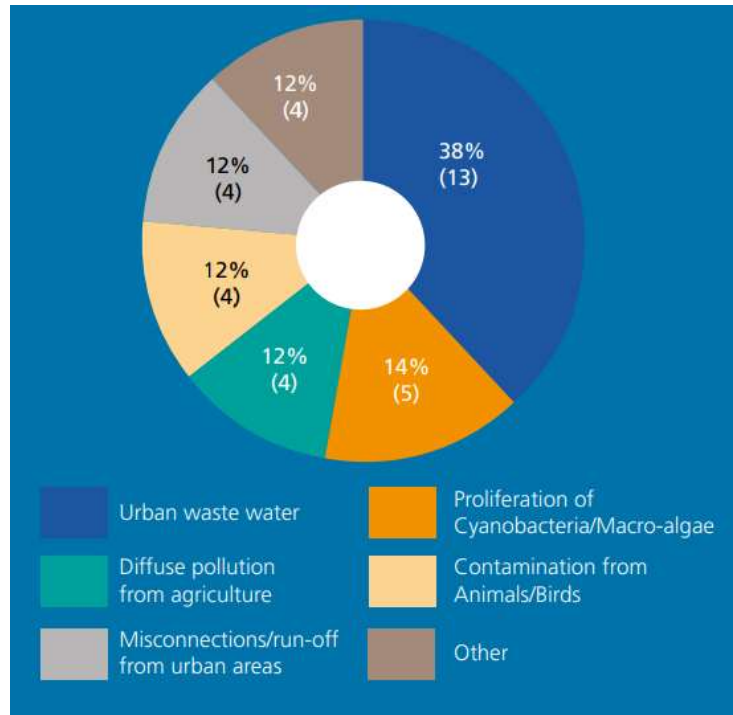- Misconnections/run-off from urban areas, and;
- Other.
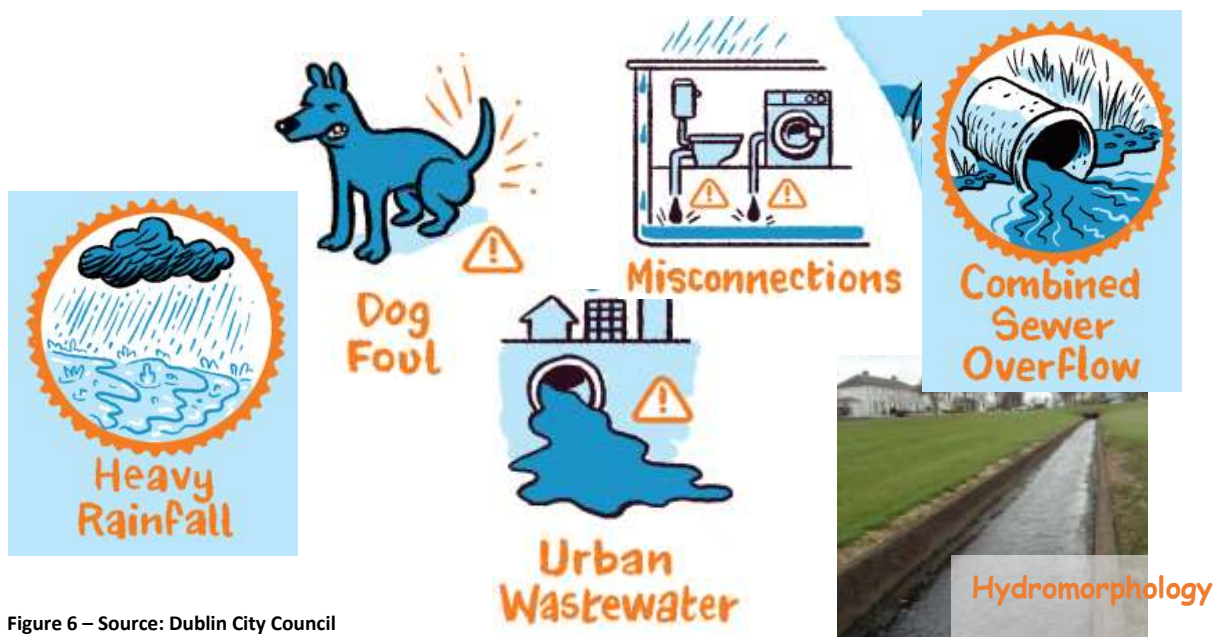
Figure 6 – Source: Dublin City Council

Overarching that EPA Bathing Water Quality report is a positive development in December 2022, whereby the EPA assigned a 'good' WFD water quality status to Dublin Bay as an overall waterbody. Furthermore, the University College of Dublin's (UCD) Acclimatize Project (Section 7.13) undertook a water quality assessment across Dublin Bay over a five year period since 2016 and that project further supports that EPA finding.

6. 2019 Dublin bathing water status & Identified BWTF activities

At the time the BWTF was established in 2019 the overall designated bathing waters classification were as set out in the following Table 2.0. The annual classifications are determined by the EPA based on the combined single sample assessment results in that year and the three preceding bathing seasons using statistical methods. The classifications are Excellent, Good, Sufficient and Poor.

Table 2.0

'Annual' bathing waters classification at our designated bathing areas on Dublin Bay			
Bathing Water	**Local Authority**	**2018**	**2019**
Dollymount Beach	DCC	Good	Excellent
Sandymount Strand	DCC	Poor	Sufficient
Merrion Strand	DCC	Poor	Poor
Seapoint	DLR	Excellent	Excellent
Sandycove Beach	DLR	undesignated	Good
Forty foot	DLR	undesignated	Excellent
Killiney Beach	DLR	Good	Good
Whiterock Beach	DLR	undesignated	Excellent

The EPA provides high level guidance on a national basis to understand the likely sources of pollution reaching our waterbodies. Notwithstanding upstream pressures, Figure 5 above reports that in urban areas the key issues in addressing poor water quality include hydro-morphology, urban wastewater, surface water run-off, domestic wastewater and industry. Table 3.0 sets out a summary of the potential pressures on bathing water quality in Dublin Bay which guided the initial approach to the investigations undertaken by the BWTF.

Table 3.0

Potential pollution sources	Description/Action
Urban Waste Water	Seek a better understanding of the role of Ringsend WWTP on bathing water quality in Dublin Bay (Potential study). Assess the impact of Storm Water Overflows (SWO's) in the vicinity of bathing waters and, where appropriate, seek interventions to ensure SWOs are operated to limit pollutant pathways to the bathing waters, noting that SWOs play an essential role in the operation of wastewater networks.
Surface water run-off	Surface water runoff is identified as a significant source of pollution in waterbodies discharging to sea and bathing locations in Dublin Bay (see figure 5). Reduction of storm water run-off entering combined sewer systems by reducing the volume and rate of run-off entering the system needs to be a key component of the overall solution to protecting our bathing waters.
Misconnections from private & commercial properties	Local Authority mis-connection investigations seek to identify and remediate incorrect internal drainage in private properties that outfall into the surface water drainage network.
Agricultural activity	Sampling identified traces of contamination with origins in ruminant animals.
Hydro-morphology	Man-made physical alteration or culverting of a river or stream can have a significant and negative affect on the ecological status of a waterbody.
Elm Park & Trimleston Streams	Elm Park Stream which directly outfalls onto Merrion Strand is considered to be a likely source of pollutants entering the bathing waters at Merrion and Sandymount Strands.
Beach activities	Consider the potential negative impacts on bathing water quality from human activities on the affected beaches.
Animal foul	Understand Gull/dog/horse/ruminant impacts on waters

In order to better understand and address the pressures identified in Table 3.0, a series of tasks have been undertaken/commenced by members of the BWTF since 2019, as described in Table 4.0.

Table 4.0

Item	Required Task	Description
1	Baseline Understanding	• Establish a baseline to measure BWFT impact over time & identify knowledge gaps. • Water quality trends - Review previous years sampling to identify potential trends.

2	Dublin Bay tidal and water current effects	• Understand the effect of meteorological and tidal effects on the water circulation patterns in Dublin Bay and how these can affect the impacts of wastewater and riverine discharges on bathing areas.
3	Scientific support	• Continued use of CL as an advisory service to the BWTF. Application of data/information provided by Central Laboratory (CL) to the generation of key trends in relation to water quality assessments and policy development to inform key trends in relation to water quality assessments and policy development.
4	Engage in Scientific assessment	• Collaborate with third level institutes to support and inform the activities of the BWTF in achieving its objectives, i.e. ensure a robust evidence based input into our decision making process.
5	Public engagement	• Review of all bathing water related enquiries received from the public and elected representative and other third parties. • Ensure all public queries are addressed and responded to in a timely and accurate manner.
6	Communications	Review and align communications with the public, including; • Websites, • Onsite information platforms, • Facilities at bathing locations. • Utilise messaging platforms for disseminating information to the public, (Twitter etc.) • Support innovation in communications. • Signage
7	Elm Park Stream	Undertake a study of the river catchment, including; • Drainage infrastructure; • Water quality sampling & analysis; • Misconnection surveys. • Sewer CCTV & manhole surveys
8	Beach activities	• Review bathing water sampling practices and information collected.
9	Wildlife	• Assess impact of wildlife/animals on bathing water quality.
10	Ringsend Wastewater Treatment Plant	• Assess any potential impact of Ringsend wastewater treatment plant on bathing waters • Assess impact of additional treatment of wastewater outside of bathing season (Via existing Ultraviolet Disinfection System).

11	Storm Water Overflows (SWOs)	• Identify and promote prioritisation of any SWOs for assessment which impact on designated bathing waters on Dublin Bay.
12	Supporting innovation	• Ensuring the BWTF supports learning where reasonable from third party innovation.
13	Consideration of applicable legislation.	• Consider the effectiveness or identify shortcomings in the various laws governing bathing waters.
14	Reporting	• Ensure regular reporting of BWTF progress and provide feedback at a national level.

7. Bathing Water Task Force coordinated activities

This chapter will briefly outline the activities being undertaken by the BWTF. Further details of those activities are available in Appendix J.

7.1 Baseline understanding

Actions identified:

- Establish a baseline to measure BWFT impact over time & identify knowledge gaps.
- Water quality trends - Review previous years sampling to identify potential trends.

The priority activities under this BWTF action item included:

- Map all drainage infrastructure along the Elm Park Stream and Sandymount & Merrion Strand bathing locations.
- Establish data gathering requirements and historical data sets of relevant water quality information to support and target BWF performance monitoring.
- Review all historical drainage information within the relevant river catchments.

7.2 Understanding Impacts from Wastewater Discharges

Required actions identified by the taskforce included the commissioning of studies to:

- Improve understanding of the influence of water circulation patterns in Dublin Bay and associated effects on the impacts of wastewater discharges on bathing areas
- Identify and assess SWOs impacting on Dublin Bay

The priority activities under this BWTF action item included:

- A scoping study to examine options for assessment of impacts of wastewater effluent discharges to designated bathing locations, which recommended;
  1. Carry out further analysis using the existing Water Quality Model of Dublin Bay
  2. Consider development of predictive bathing water quality forecasting tool to assist management of bathing waters (see Appendix 7.2.3).
- Modelling the impacts of discharges from Ringsend Wastewater Treatment Plant on bathing areas under a variety of wind, tide and discharge conditions.
- Undertake a trial of the UV treatment of effluent discharges from RWWTP during the winter months to observe potential benefits to bathing water quality at designated bathing areas. This study concluded that the effect of UV treatment had negligible, if any, positive effect on bathing water quality at designated bathing waters in winter months.
- Preparation of Drainage Area Plans supported by drainage network modelling of the multiple sewer catchments in the Greater Dublin Area to inform the prioritisation of future works to the sewer network, with respect to compliance with the Urban Wastewater Treatment Directive and the Bathing Water Quality Regulations and areas with high frequency pollution incidents as identified by the Local Authorities, as well as other investment drivers such as flooding and enabling future growth.
- The identification and inclusion of a programme of works to address the activation/requirement for three Storm Water Overflows (SWO) which discharge into the Elm Park Stream and Sandymount Strand, namely;
  - Elm Park Golf Course & Roebuck Castle – assessment ongoing
  - Larchfield SWO – removed 2022
  - Ailesbury Pumping Station and outfall to Sandymount Strand – Feasibility and optioneering study to be progressed.
- Ongoing upgrade works and investment at Ringsend Wastewater Treatment Plant.

7.3 Scientific support

Actions identified:

- Continued participation of the Central Laboratory on the BWTF to inform key trends in relation to water quality assessments, and support for data interpretation support and policy development.

The priority activities under this BWTF action item have and will include:

- Scientific analysis and reporting of bathing water samples, including advisory services with regard to micro/macro algae and identification of marine invertebrates including nuisance species.
- Provided advice and guidance to the BWTF with regard to complementary/alternative monitoring approaches to bathing water sampling and testing. The CL will continue to work with Local Authorities, 3rd level institution etc. to assess rapid testing/emerging technologies.
- The laboratory will apply its expertise to the evaluation and application of suitable, more rapid, cost effective approaches to bathing water analyses and reporting which complement legislative programmes for monitoring, i.e. validation of any real time water quality monitoring proposals when resources allow.

7.4 Engage in Scientific assessment

Actions identified:

- Collaborate with third level institutes to support and inform the activities of the BWTF in pursuit of its objectives, i.e. ensure a robust evidence based input into our decision making process.

The priority activities under this BWTF action item included:

- Collaborate and partner the UCD Acclimatize project to establish a stronger understanding of the sources of bacterial pollutants at designated bathing areas to better focus on site activities. This collaboration has delivered purposeful scientific insights, which have highlighted the apportionment of bacterial source loading toward poor and sufficient water quality sample assessments, in particular, the significant contribution dog fouling plays in negatively impacting bathing water quality.
- Support the NUIG study on the origins and impacts of ectocarpus (seaweed) on coastal waters.
- Support the DCU Water Blitz 2022 – A Citizens Science initiative to engage members of the public in participating with water quality assessments on a national level.
- Support of a student intern with a study to determine the appropriate surface water management infrastructure required within a public realm.

7.5 Public engagement.

Actions identified:

- Review of all bathing water related enquiries received from the public and elected representative and other third parties.
- Ensure all public queries (representative organisations) are addressed and responded to in a timely and accurate manner.

The priority activities under this BWTF action item included:

- Ensuring consistent and accurate responses to public enquiries and with outgoing public messaging.
- BWTF reporting at a reasonable frequency for transparency.

7.6 Communications

Actions identified:

Review and align communications with the public, including;

- Websites,
- Onsite information platforms,
- Facilities at bathing locations.
- Utilise messaging platforms for disseminating information to the public, (Twitter etc.)

- Support innovation in communications.
- Signage

The priority activities under this BWTF action item included:

- Ensure regular BWTF meetingss are held, that they are focused and productive
- Ensure on-site and online public information is consistent and accurate across all BWTF member platforms.
- Initiate/support an advertising campaign to tackle key near shore pollutants affecting bathing locations, e.g. 'Leave only Paw Prints' campaign to raise awareness of the impact dog fouling on our beaches has on water quality.
- Commitment to continual improve educational material for the public, e.g. Ectocarpus (A type of sea plant) is frequently mistaken as sewerage by members of the public, see Appendix K.
- Identify more efficient and effective communication channels with the public, e.g. smart signage pilot project to raise awareness with the public and poster campaigns (Appendix K).

7.7 Elm Park Stream

Actions identified:

Undertake a study of the river catchment, including;

- Drainage infrastructure review;
- Water quality sampling & analysis;
- Misconnection surveys;
- Sewer CCTV & manhole surveys.

The priority activities under this BWTF action item included:

- Commission a catchment assessment of the Elm Park Stream.
- Undertaking a river walk to map/record all inlets and potential pollution sources for further investigations – Misconnection programme of work undertaken and is ongoing at certain locations.
- Consider options for immediately addressing pollutants entering Dublin Bay form the Elm Park Stream outfall at Merrion Strand. This work concluded that it is best to identify and treat the pollution source/s.

7.8 Beach side activity

Actions identified:

- Review bathing water sampling practices and information collected.

The priority activities under this BWTF action item included:

- Review public information points and facilities (including signage) at bathing areas with a view to establishing a consistent service to the public at all designated bathing areas along Dublin's coastline.

7.9 Wildlife

Actions identified:

- Assess impact of wildlife/animals on bathing water quality.

The priority activities under this BWTF action item included:

- Review polices and laws pertaining to wildlife activity at bathing locations and determine what, if any, reasonable actions may be considered as a proportional response, i.e. Some gulls are a protected species (Brent Geese) in Dublin Bay and contribute a significant impact on poor bathing water quality.
- Public awareness and messaging on this specific challenge to improving bathing water quality.

7.10 Support Innovation

Actions identified

- Ensuring the BWTF supports learning where reasonable from third party innovation.

The priority activities under this BWTF action item included:

- The BWTF local authorities will inform and support third party service providers/innovators whom seek to deliver solutions for rapid identification of bathing water quality with respect to protecting public health, i.e. identification E.coli and intestinal enterococci in bathing water.
- BWTF supports DCU's participation in the SFI National Challenge Fund Programme 2023 (Healthy Environment for All Challenge) 'RESTART'.
  (Rapid bactErial Sensing for a healThy wAter enviRonmenT
- Initiate a Smart Screen trial to efficiently disseminate warning to the public in relation to bathing water quality. The Smart Screen trial is a service run on sustainable power sources (off-grid). Trial ongoing.

7.11 Reporting

Actions identified

- Ensure regular reporting of BWTF progress and provide feedback at a national level.

The priority activities under this BWTF action item included:

- The Chairperson of the BWTF attends and contributes to the agenda of the National Bathing Water Expert Group (BWEG).

7.12 Consideration of applicable legislation

Actions identified

- Consider the effectiveness or identify shortcomings in the various laws governing bathing waters.

The priority activities under this BWTF action item included;

- Support the DHLGH in determining the effectiveness of the Bathing Water Regulations 2008 with regard to protecting public health outside of the Designated bathing season (1st June -15th September).

7.13 The Acclimatize Project:

Overview:

Acclimatize is a joint research project undertaken by University College Dublin (UCD) in Ireland and Aberystwyth University (AU) in Wales. The project, which commenced in 2017 and concluded in June 2023, is part funded by the European Regional Development Fund through the Ireland Wales Cooperation Programme. In addition, the Acclimatize project is in partnership with the agencies of the Bathing Water Task Force. The Ireland Wales Programme focuses on connecting organisations, businesses and communities in the Irish Sea region that face shared economic, environmental and social challenges.

A key objective of the Ireland Wales programme is 'to preserve and enhance the marine and coastal environment for the enjoyment of future generations in the face of the increasing impacts of climate change'

This has been achieved through the Acclimatize Project by examining the concerns and circumstances relating to faecal contamination of rivers and bathing waters as well as assessing the impact of climate change driven effects on water pollution. The main focus of the project in Ireland has been on Dublin Bay bathing waters specifically *Merrion Strand, Sandymount Strand, Dollymount* strand as well as urban rivers and stream considered to impact on bathing water quality, including the Elm Park Stream whose catchment lies over both the DLR and DCC administrative areas.

The outcome of this collaboration are set out in Appendix J.

8. Current status of the bathing waters in Dublin Bay

Bathing water samples are classified as Excellent, Good, Sufficient or Poor depending on the quantity of *E.coli* and intestinal enterococci counted therein. Figure 7 details the thresholds for each classification group.

Indicates excellent water quality – Samples should not exceed 250 MPN E. Coli and 100 CFU Intestinal Enterococci per 100 ml.

Indicates good water quality – Samples should not exceed 500 MPN E. Coli and 200 CFU Intestinal Enterococci per 100 ml.

Indicates sufficient water quality - samples should not exceed 1,000 MPN E. coli and 250 CFU Intestinal Enterococci per 100 ml

Indictes poor water quality - samples exceed 1,000 MPN E. coli and 250 CFU Intestinal Enterococci per 100 ml

Date* Additional Investigative Sampling carried out

MPN = Most Probable Number
CFU = Colony Forming Unit

The EPA classifies each designated bathing water on an annual basis. The classification at a particular bathing location is determined from the preceding 4 years of water quality data. The following table 5 sets out the past 4 years of classifications for the designated bathing locations on Dublin Bay;

'Annual' bathing waters classification at our designated bathing areas on Dublin Bay						
Bathing Water	**Local Authority**	**2018**	**2019**	**2020**	**2021**	**2022**
Dollymount Beach	DCC	Good	Excellent	Good		
Sandym't Strand	DCC	Poor	Sufficient			
Merrion Strand	DCC	Poor		Undesignated		
Seapoint	DLR	Excellent				
Sandycove Beach	DLR	undesignated	Good		Excellent	Good
Forty foot	DLR	undesignated	Excellent			
Killiney	DLR	Good		Excellent		
Whiterock	DLR	undesignated	Excellent			

* 2022 classifications not published at time of publication

As the table conveys, Merrion Strand lost designated status for the 2020 bathing season.

While the EPA determines a single overall classification per bathing location each year based on the preceding four years of data from samples taken between June 1st and September 15th.

In addition, the local authorities affronting Dublin Bay continue to frequently sample water quality across the full year at each location. That information is also presented to the public online and at information boards at each bathing site. This essentially recognises that sea swimming and other water based activities continue throughout the year and that continued water quality monitoring and reporting should be available to the public to better inform how they may enjoy Dublin Bay.

Merrion Strand water quality profile 2019-2022:

The declassification of Merrion Strand as a designated bathing area in 2019 was the key development that instigated the establishment of the BWTF. Thereafter, the actions identified by the BWTF had particular focus on ceasing the previous water quality decline at Merrion Strand and improving the water quality status to 'good', in order that the bathing location may return to being a designated bathing area in due course.

The specific water quality profile at Merrion Strand since 2019 is shown in Figure 8 below. This graph displays a slow but steady improvement in water quality over the last four years. Ceasing the decline in water quality in a relatively short time frame is a significant achievement and indicates that the BWTF activities, as set out in Chapter 7, are having a positive impact.

Merrion Strand - Single Sample Assessment Results - 2019-2022

Year	Excellent	Good	Sufficient	Poor
2019	14	1	0	5
2020	15	2	1	2
2021	16	0	2	2
2022	16	0	3	1
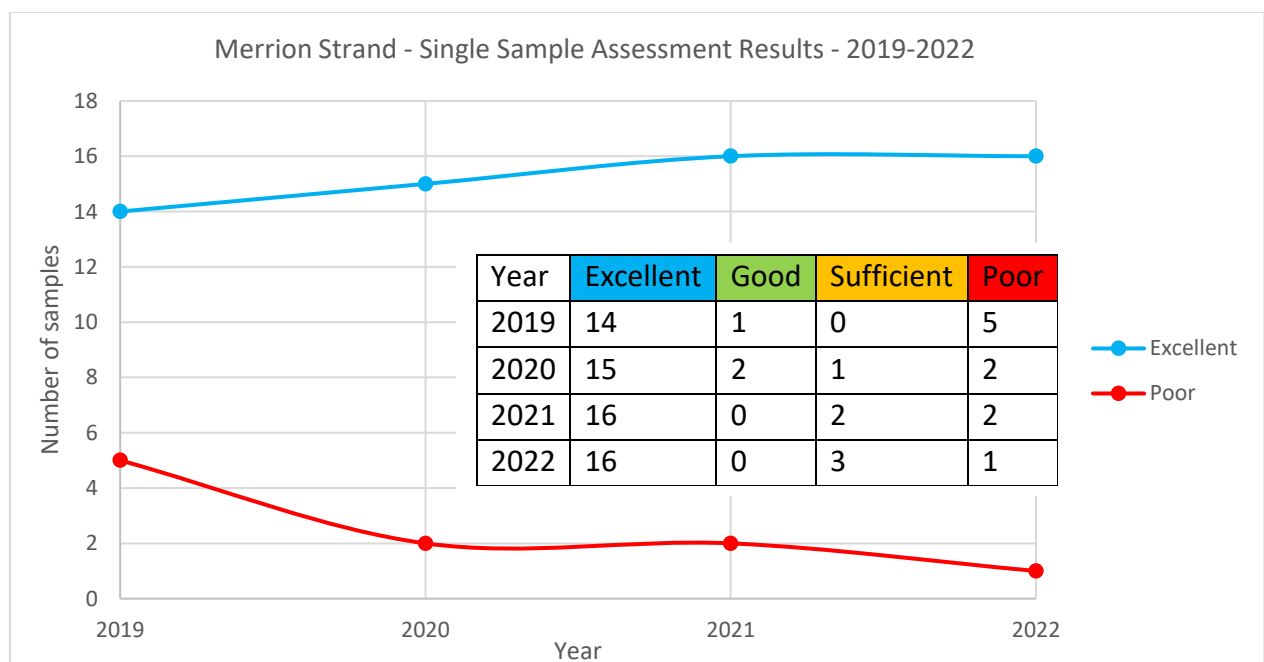
Figure 8 – Source EPA – designated bathing area classification bands.

The BWTF is committed to improving water quality at Merrion Strand to a 'good' standard. While the recent results are encouraging, establishing water quality trends is more accurate over a prolonged period of time and water quality will be continued to be monitored in order to observe any impact our activities have and inform how we direct those activities in the coming seasons. We continue to

publish these individual monitoring results online and post hardcopy versions in the information cabinets at the bathing water locations.

The following graphs show the Dublin Bay sampling undertaken at the various bathing areas along Dublin Bay and the apportionment of water quality classifications as determined by the Central Laboratory.

Summary of 2022 bathing water sampling results

Figure 9 – Source: DLR & DCC

| Excellent | Good | Sufficient | Poor |
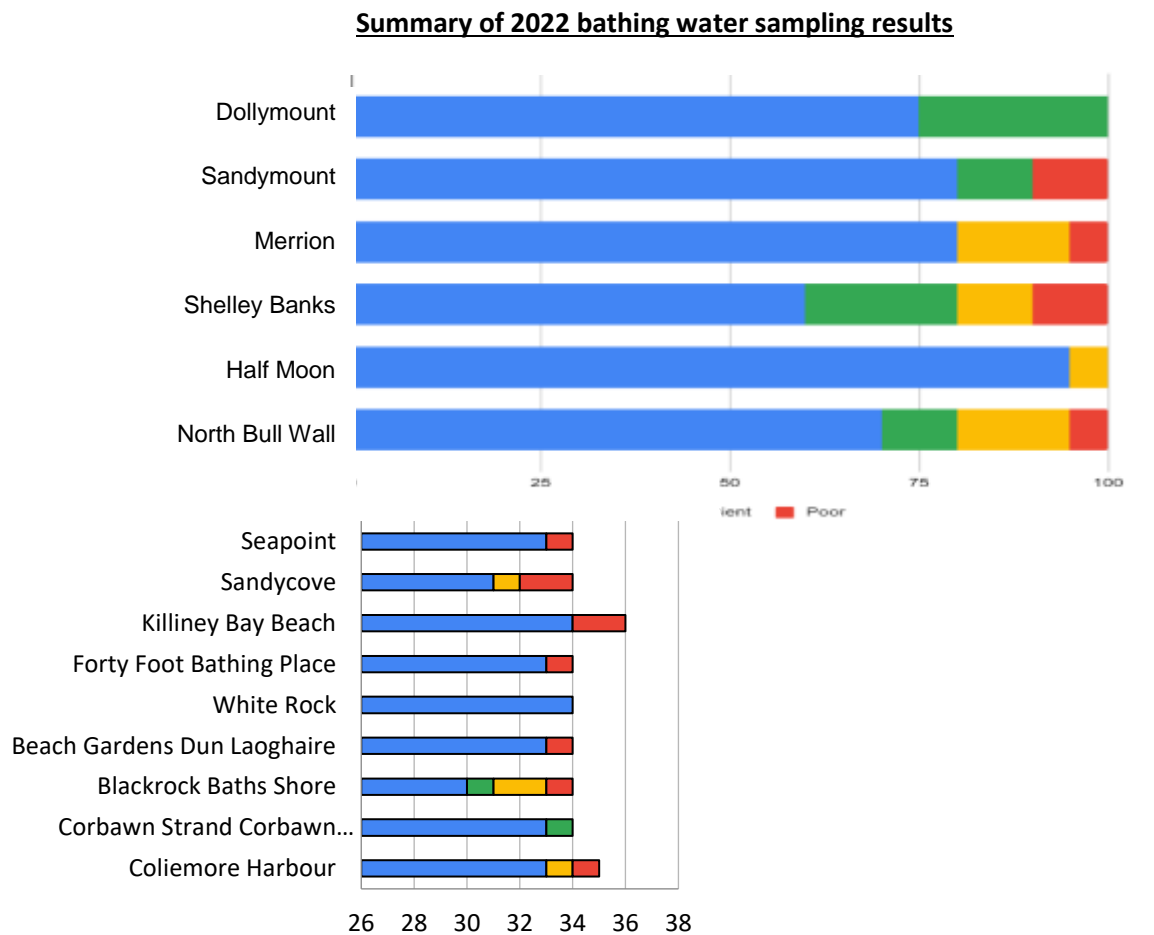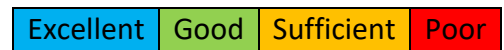
9. Next steps

The aforementioned activities under section 7 of this report are continuing on an ongoing basis.

These activities will inform the decision making process for the pertinent agencies and direct the focus of our activities as appropriate. The BWTF agencies will continue to update all the relevant websites to address public queries and review our 'frequently asked questions' section. The evidence guides us to believe that further focus of our efforts to improve our communications with the public is a key action to further invest in.

The water quality monitoring programmes will continue on an all year around basis and are available to view on the council's website and the EPA's beaches.ie. This data is a key determinate of the success of our activities in returning the Merrion Strand bathing location to a 'good' classification for water quality. It also helps us to protect bathers' health year-round.

Our collaboration with the UCD Acclimatize project concluded in June 2023 and the BWTF is keen to continue to support their essential insights into near shore pollution sources which contribute significantly to focusing the activities of the local authority staff on site, such as the 'Leave only Paw Prints' campaign in response to dog fouling on our beaches.

Significant sources of faecal pollution entering Dublin Bay have been identified, some have been removed. However more challenging sources remain unresolved at this point in time and continue to be prioritised in our programme of work.

As the BWTF continues to meet on a monthly basis, further opportunities to innovate and improve the public services in relation to bathing locations and dissemination of information will be sought, with an aim to deliver a homogeneous public service along County Dublin's coastline to those who wish to enjoy it, including Dublin Bay.

10. Summary

The responsible authorities have been monitoring the quality of the water in Dublin Bay and at designated bathing areas since 1988. The latest EPA report, published in 2022, reported that the overall water quality is of a 'good' standard in accordance with the EU Water Framework Directive classifications. Furthermore, the UCD Acclimatize project further corroborated that classification from their comprehensive water quality assessment across Dublin Bay as part of their project, (based on substantial numbers of samples taken from twenty locations across the bay over a protracted period).

Despite these positive findings, the UCD led Acclimatize project concluded that 'near shore' pollution pressures are present and continue to be the primary pressure on bathing water quality. It is the water quality classification under the Bathing Water Regulations that pertains to the protection of public health and therein lies our challenge to improve water quality by identifying and eliminating where possible the sources of pollution.

To better understand the causes of our 'poor' bathing water quality assessments, samples have undergone a microbial source tracking assessment which scientifically identifies the most likely source of a pollutant in a 'less than excellent' water quality sample, i.e. we have assessed and poor, sufficient and good water quality samples as classified in accordance with the Bathing Water Regulations.

As 'poor' water quality assessments are the results which specifically influence the loss of a bathing locations designation, we prioritise our learning from that specific cohort of results. A significant learning from this work, indicates that approximately 50%+ of 'poor' bathing water quality assessments are as contributed to by dog faeces polluting the bathing waters. This is followed by human origin/faeces (25%), Gull (20%) and the remaining sources (5%) unidentified.

This learning has allowed us better target our activities to address this substantial issue, that includes educating dog owners as to their responsibilities to pick up after their dog fouls the beach. It should be noted that the majority or dog owners (approximately 85%) are responsibly minding their dogs on the beaches. We have initiated a communication campaign which included the 'Leave only Paw Prints' animation campaign that received significant media attention. We wish to build on that momentum and encourage growing awareness on this and associated issues, (including Tweets, short video messages, improved signage, as well as providing free dog litter bags at dispensers adjacent to the onsite information signs). The success of our communication campaign in this regard will be determined over the next bathing seasons.

The initial task for the BWTF was to stop the decline of bathing water quality at Merrion Stand and to bring the water quality back to a 'good' standard. Sampling results have recorded that the water quality has not deteriorated further and early signs of incremental overall water quality improvements are met with a cautious welcome, (results record that there are fewer poor quality results and increased excellent results). However, meaningful and enduring positive change requires continued work and time so that Dublin Bay can continue to be enjoyed by residents and visitors alike.

Overall, it is important to be aware of potential sources of pollution and to follow any advice or warnings from the relevant authorities, for example, during periods of heavy rain, urban runoff and sewage overflows can occur, leading to increased levels of bacteria in the water.

Our advice to the general public remains as it has been: do not swim for at least 48 hours following a significant rainfall and for further information please see beaches.ie for details or the relevant local authority's websites.

Glossary

Assessment - Bathing Waters are classified based on a statistical assessment of monitoring data over a four-year period.

Bathing Water - Waters identified by a local authority in accordance with Regulation 4 of the Bathing Water Quality Regulations 2008;

Bathing Season - In any year means the period from 1 June to 15 September in that year;

Bathing at sites classified as having 'Poor' water quality: The fact that any bathing water has been classified as 'Poor' means that there is a risk of microbiological pollution being present, which could potentially cause illness such as skin rashes or gastric upset. Under the Bathing Water Regulations, local authorities are required to put in place notifications for the entire bathing season advising the public against bathing. This could include a bathing prohibition if a serious pollution incident occurs.

Classification: Bathing areas are classified in one of four categories namely 'Excellent', 'Good', 'Sufficient' or 'Poor'. The minimum mandatory requirement is for 'Sufficient' quality. Any waters graded as 'Poor' require that management measures be put in place to identify and eliminate the sources of pollution.

DCC: Dublin City Council

The Directive - Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC;

DLRCC: Dun Laoghaire Rathdown County Council

The EPA - the Environmental Protection Agency;

Identified Bathing Waters: This is the legal term used for those beaches and lakes managed under the Bathing Water Regulations. Local authorities are responsible for identifying Bathing Waters within their area annually. The 148 identified bathing waters are either coastal or inland waters widely used by the public for bathing and are monitored, managed and assessed under the requirements of the **2008 Bathing Water Quality Regulations**.

Local Authority - means a city council or a county council (Dublin City, Dun-Laoghaire Rathdown and Fingal County Councils);

Management Measures - means the following measures undertaken with respect to bathing water:

(a) establishing and maintaining a bathing water profile;

(b) establishing a monitoring calendar;

(c) monitoring a bathing water;

(d) assessing bathing water quality;

(e) classifying bathing water;

(f) identifying and assessing causes of pollution that might affect bathing waters and impair the health of bathers;

(g) giving information to the public;

(h) taking action to prevent the exposure of bathers to pollution, and;

(i) taking action to reduce the risk of pollution.

The Minister - the Minister for the Housing, Local Government & Heritage;

Permanent restriction- In relation to a bathing prohibition or advice against bathing, lasting for at least one whole bathing season;

Pollution - the presence of microbiological contamination or other organisms or waste affecting bathing water quality and presenting a risk to the health of bathers as referred to in Regulation 15, Schedule 3 and column A of Schedule 4 of the Regulations;

Pollution incident: A pollution incident is an incident that has the potential to cause the bathing water quality to deteriorate, for example when there is a stormwater overflow from a wastewater treatment plant, or when sampling identifies a pollution risk. A precautionary approach is taken when reporting incidents, meaning that not all incidents result in a deterioration in the bathing water quality. This approach is taken to protect bathers' health. When a pollution incident occurs, local authorities apply a swimming restriction at the bathing water. The restriction stays in place until water sampling shows that the water quality has returned to normal.

Prior Warning: Prior Warnings (also known as 'Short-Term Pollution') are used in a precautionary approach to protect bathers' health by advising the public of possible short-term pollution events which usually last for only a few days at most. These are used by many local authorities when heavy rainfall is forecast.

Regulations – The Bathing Water Quality Regulations 2008 S.I. No 79/2008

Set of bathing water quality data - data compiled in accordance with Regulations 7 and 10;

Short-term pollution – when microbiological contamination as referred to in Schedule 4, column A that has clearly identifiable causes, is not normally expected to affect bathing water quality for more than approximately 72 hours after the bathing water quality is first affected and for which the relevant local authority has established procedures to predict and deal with as set out in Schedule 6.

Storm Water Overflow (SWO) – A Storm Water Overflow is a necessary component of a combined sewer system to release effluent from surcharging sewers, which have insufficient capacity for both foul and surface water run-off (rainwater). These systems are no longer being built, however many of the existing SWOs are required to prevent flooding incidents.

Appendices

Appendix A - Bathing Water Profile

BATHING WATER PROFILE

1. The bathing water profile referred to in Regulation 5 is to consist of:

(*a*) a description of the physical, geographical and hydrological characteristics of the bathing water, and of other surface waters in the catchment area of the bathing water concerned, that could be a source of pollution, which are relevant to the purpose of this Directive and as provided for in Directive 2000/60/EC;

(*b*) an identification and assessment of causes of pollution that might affect bathing waters and impair bathers' health;

(*c*) an assessment of the potential for proliferation of cyanobacteria;

(*d*) an assessment of the potential for proliferation of macro-algae or phytoplankton;

(*e*) if the assessment under point (*b*) shows that there is a risk of short-term pollution, the following information:

— the anticipated nature, frequency and duration of expected short-term pollution;

— details of any remaining causes of pollution, including management measures taken and the time schedule for their elimination;

— management measures taken during short-term pollution and the identity and contact details of bodies responsible for taking such action;

(*f*) the location of the monitoring point.

Appendix B - Bathing Water in Ireland Report for 2022

78% of Ireland's bathing sites have excellent water quality (Source: EPA)

13 May 2022: The Environmental Protection Agency (EPA) has today published the Bathing Water in Ireland report for 2021, which shows that 78 per cent of bathing sites have excellent water quality, while 97 per cent meet the minimum standard. This is attributed to improved management of bathing waters over many years, combined with investments in treatment of urban waste water.

However, while bathing water quality has continued to improve overall, there are still issues which need to be addressed, to protect and further improve bathing waters. Agriculture, urban waste water and fouling from dogs on beaches still impact the quality of bathing waters. In addition, heavy rainfall can also quickly impact by washing pollution into our bathing waters. Swimmers should always check **www.beaches.ie** for the latest water quality information for their local bathing site.

Commenting on the report, Dr Eimear Cotter, Director of the EPA's Office of Evidence and Assessment, said:

"Bathing water quality in Ireland is high and last year saw further improvements compared with 2020. This is good news as we approach the summer when we can enjoy our local beaches and bathing areas, which are an important natural amenity for health and wellbeing. The EPA recognises that swimming is increasingly becoming a year-round activity and encourages the provision of information that will help winter swimmers to make informed choices to protect their health. The findings and outcome of the multi-stakeholder National Bathing Water Expert Group, due later this year, will provide important information in this regard and help identify potential options to better protect bathers who swim year-round."

The EPA report specifically highlights improvements at Lilliput, Lough Ennell in Westmeath after three years at poor quality. During 2020 and 2021, the bathing water quality improved significantly due to actions taken by farmers in the surrounding area. This was driven by evidence and science generated by Westmeath County Council, the Local Authority Waters Programme and the Agricultural Sustainability, Support and Advisory Programme working together. As a result, the restriction on swimming has been removed.

The EPA encourages swimmers to engage with Local Authorities to officially identify additional local bathing sites which will ensure they are managed to protect bathers' health. Further information on bathing water and updates on monitoring results during the bathing water season (1st June to 15th September) are available at **www.beaches.ie**.

- The quality of Ireland's bathing water continued to improve in 2021, with 97 per cent (144 of 148) of sites meeting or exceeding the minimum standard.
- Of these, 115 bathing sites (78 per cent) had excellent water quality (which is the most stringent standard). This increased from 111 in 2020.
- These improvements are a result of enhanced management of bathing waters over many years, combined with investments in treatment of urban waste water.
- The number of beaches with poor bathing water quality reduced to two, compared with four in 2020.
- Swimmers are encouraged to ask their local authorities to officially identify additional local bathing sites. This will ensure they are managed to protect bathers' health.

Bathing Water Quality in Ireland 2022

97% of Ireland's bathing waters met or exceeded the minimum standard of 'sufficient'

97%

79% of Ireland's bathing waters are 'excellent' quality

79%

79% Excellent
13% Good
5% Sufficient
2% Poor
1% New

4 categories calculated on a four year rolling basis

EXCELLENT 117
GOOD 20
SUFFICIENT 7
POOR 3

1 Check the latest bathing water quality on beaches.ie
2 Remove your rubbish
3 Clean up after your dog

To report an incident, contact the National Environmental Complaints Line 1800 365 123 or download the 'See it, Say it' app

Check out the latest information we have on over 200 bathing waters at
beaches.ie

Follow @EPABeaches on Twitter for bathing water news and updates

Appendix C - Temporary Bathing Prohibitions, Advisory and Prior Warning Notices

To protect bather health, it may be necessary to advise against or prohibit bathing at designated bathing areas. Bathing water quality is particularly impacted by weather conditions, with factors such as rainfall amount and intensity, temperature, sunlight and tidal conditions being the main influences. Faecal matter from dogs and birds on a beach can significantly impact on water quality as can temporary overflows from urban drainage infrastructure.

Additionally, if a local authority receives information which indicates a risk of deterioration in bathing water quality, a precautionary advisory or prohibition notice may be issued. Examples of such include a prediction of an extreme weather event or an exceedance/non-compliance from the Wastewater Treatment Works (i.e. effluent quality fails to meet the conditions of discharge as set out in the Wastewater Discharge Licence issued by the EPA for the Works).

The Environmental Protection Agency (EPA) and Health Service Executive (HSE) have established a protocol outlining various recommended actions to be taken by local authorities where, levels of bacteria in the bathing water exceed the satisfactory standard. In such circumstances, the local authority consults with the HSE in the first instance before proceeding with an agreed action. The public is informed of the short term pollution event through social media, web notifications and by erecting temporary signage at the locations affected. The website www.beaches.ie shares the latest information on national bathing water quality. Swim restrictions and annual water quality ratings can be found here.

In addition, local authority's advise the public at onsite information boards of the status of bathing waters. Once an event has passed and water quality returned to a satisfactory standard, the public is immediately informed via online media platforms and on site notices.

Appendix D – Real time bathing water quality information

Real Time Water quality monitoring - A regular enquiry received by local authorities is why can we not provide real time water quality monitoring, whereby bathers and sea swimmers can be informed of the water quality at their preferred bathing location as they arrive for a swim. In short, the science or technology has not yet been developed to provide levels of sensitivity and reliability that detect, enumerate and assess the significance of bacterial presence in bathing waters in real time.

The key purpose of monitoring bathing water quality is to protect public health. All natural waters contain bacteria, usually as a result of contact with the soil. Most of these bacteria are quite harmless however some types of bacteria which can be found in faeces, both animal and human, can cause illness. The two organisms, Escherichia coli (known as E. coli) and Intestinal Enterococci, occur in very large numbers in the gut of warm-blooded animals and humans faeces.

E. coli and Intestinal Enterococci are analysed in assessing bathing waters compliance and are used as 'indicator' organisms where their presence in large numbers in bathing waters is a warning of a possible health risk from other harmful bacteria and viruses which might be present. E. coli provide a good indicator of pollution in fresh waters while in seawater Intestinal Enterococci are a better indicator of pollution as they survive for longer periods. E. coli and Intestinal Enterococci can survive for extended periods of time in marine waters.

The Local Authority councils of the BWTF endeavour to report results of analysis within the 48 hour window post sampling. They broadly support the use of complimentary rapid tests/analysis for the determination of public health risk and to support routine monitoring. They are also working in partnership with 3rd Level institutions as well as Industry specialists to evaluate the suitability of complimentary methodologies for testing bathing waters (se item 7.4.3.). It is important to note that alternative approaches to sampling and testing of bathing waters needs to be considered with reference to the standard methodologies in order to demonstrate equivalence

Further information on real time water temperature, wave height and wind direction can be find on the following external website: https://cilpublic.cil.ie/metocean/

Appendix E – Frequently Asked Questions

What are 'identified' bathing waters?

Identified bathing waters are bathing waters (sea, river or lake surface waters) which Dublin City Council consider to be widely suitable by the public for bathing. Identified bathing waters are monitored, managed and assessed under the requirements of the 2008 Bathing Water Quality Regulations. Dublin City Council also monitor a number of other waters which are not formally identified. We refer to these as 'other monitored waters'.

How are identified bathing waters chosen?

Each year Dublin City Council is required for the upcoming bathing season to identify bathing waters (sea, river or lake surface waters) within their area which they consider to be widely used by the public for bathing. At present, 18 local authorities have identified 148 bathing waters which is approximately 1 for every 40 km of coastline. Please find further information on public participation at the attached link.

How can I suggest my favourite beach for identification?

Public participation is generally sought during the preceding bathing season. The EPA has produced guidance for the public on what information is required to nominate bathing areas and how this should be assessed, both of which are available to download from the Resources page of the EPA www.beaches.ie website. Please find further information on public participation at the attached link. If your particular beach is not identified by Dublin City Council this could be for various reasons such as low numbers of bathers, accessibility issues, poor water quality or limited amenities.

How long is the bathing season?

The bathing season in Ireland runs from 1st June to 15th September. All identified bathing waters are monitored, assessed and managed under the requirements of the 2008 Bathing Water Quality Regulations during this period. All bathing water monitoring results are available on the Dublin City Council website, posted in hardcopy at the beaches or on the EPA website Beaches.ie during the bathing season.

How is bathing water quality monitored?

Bathing waters are sampled on a regular basis from the end of May to mid-September to assess the microbiological quality of the water and to minimise any public health risk. The minimum number of samples required to be taken during the bathing season is 4. Dublin City Council take many more samples than this with 20 samples taken across 6 bathing water locations. In recognition of year round swimming, Dublin City Council continues to monitor and publish results outside of the bathing season.

Samples are tested for two types of faecal bacteria, Escherichia coli (also known as E. coli) and Intestinal Enterococci. The Central Laboratory count the number of each these bacteria, which may indicate the presence of pollution, usually originating in sewage or animal waste. The results of the analysis are assessed against the standards defined in the 2008 Bathing Water Quality Regulations and on a four-year data set using a statistical approach.

How can I find out if my favourite beach is monitored?

All formally identified (designated) bathing waters are reported on Dublin City Councils bathing water website www.dublincity.ie/bathingwater or on the EPA website Beaches.ie. All bathing water monitoring results are available on the Dublin City Council website, posted in hardcopy at the beaches or on the EPA website Beaches.ie during the bathing season.

Where are samples taken at the bathing waters?

Samples are taken in the bathing waters where there is greatest risk of pollution or where there are the most bathers, usually where the lifeguards are stationed. Samples are taken in water about 1 metre deep (if safe to do so). The location of the sampling point is shown on the notice boards at bathing waters, in the bathing water profiles and on maps in Beaches.ie.

What are E.coli and intestinal enterococci?

All natural waters contain bacteria, usually as a result of contact with the soil. Most of these bacteria are quite harmless however some types of bacteria which can be found in faeces, both animal and human, can cause illness. The two organisms, Escherichia coli (known as E. coli) and Intestinal Enterococci, occur in very large numbers in the gut of warm-blooded animal and human faeces.

E. coli and Intestinal Enterococci are analysed in assessing bathing waters compliance and are used as 'indicator' organisms where their presence in large numbers in bathing waters is a warning of a possible health risk from other harmful bacteria and viruses which might be present. E. coli provide a good indicator of pollution in fresh waters while in seawater Intestinal Enterococci are a better indicator of pollution as they survive for longer periods. E. coli and Intestinal Enterococci can survive for several days up to several weeks in waters.

How long does it take to analyse a bathing water sample for E.coli and intestinal enterococci?

E.coli results are available the following day (21-24h) following receipt of the sample. The exception to this would be where a sample is taken but held over night before being analysed e.g. a Sunday or weekend sample. The Intestinal Enterococci result is then issued the following day (48h +) once the various confirmation tests have been completed. Occasionally the Enterococci test can take a little longer depending on the bacteria and this can delay the issuing of the result although this occurs quite rarely. Both result are required for compliance with the 2008 Regulations and HSE Guidelines.

Why isn't there real time analysis or alternative 'rapid' methods used in bathing water sampling?

The Local Authority members of the BWTF endeavours to report results of analysis within the 48hour window post sampling. We broadly support the use of complimentary rapid tests/analysis for the determination of public health risk and to support routine monitoring. We are also working in partnership with 3rd Level institutions as well as Industry specialists to evaluate the suitability of complimentary methodologies for testing bathing waters. It is important to note that alternative approaches to sampling and testing of bathing waters needs to be considered with reference to the standard methodologies in order to demonstrate equivalence.

What are the major sources of pollution for faecal bacteria in bathing waters?

Faecal contamination makes water unsafe for recreational activities such as swimming. There are five major sources of pollution responsible for the faecal bacteria in our bathing waters. These sources increase when it rains, washing more pollution into rivers, lakes and seas and in times of very heavy rain

can overwhelm sewage systems. The impacts of these events are generally very short-lived lasting 1-2 days.

- **Pollution from wastewater treatment plants & sewage systems** – bacteria from sewage can enter our waters as a result of system failures or storm overflows or directly from sewage works.

- **Water draining from urban areas** - water draining from urban areas via street drains and culverts following heavy rain can contain pollution including animal and bird faeces from roads and other paved surfaces.

- **Domestic sewage** – misconnected drains and poorly located and maintained septic tanks can pollute surface and ground water systems.

- **Animals and birds on or near beaches** - dog, bird, and other animal faeces can affect bathing water as they often contain high levels of bacteria (much higher than treated human waste).

What do the bathing water sample results mean?

The two organisms, E. coli and Intestinal Enterococci, tested for in assessing bathing waters compliance are used as 'indicator' organisms where their presence in large numbers in bathing waters is a warning of a possible health risk from other harmful bacteria and viruses which might be present.

Bathing water samples are currently assessed against the standards defined in the 2008 Bathing Water Quality Regulations. All bathing water monitoring results are available on the Dublin City Council website, posted in hardcopy at the beaches or on the EPA website Beaches.ie during the bathing season.

The likely water quality status of each individual sample is assessed as either 'Excellent', 'Good', 'Sufficient' or 'Poor'. In the case of 'Excellent' water quality the risk of contracting gastro-intestinal illness is predicted to be ca. 3%, in Good waters ca. 5%, in Sufficient waters 8-9% and in Poor waters ca. >10%.

How do I know it is safe to swim and when is it not?

There are different ways you can use to find out what is the latest quality status of bathing waters and if there are any current warnings or advice against bathing:

- www.dublincity.ie/bathingwater, https://www.dlrcoco.ie/beaches/bathing-water-quality and www.fingal.ie/bathing-water-quality-results- The dedicated local authority bathing water webpage regularly publishes results of bathing water sampling carried out at bathing water locations, inside and outside the bathing season.

- **www.beaches.ie** – Only applicable during the bathing season. Before going to the bathing water you can check the EPA national bathing water website to see the latest water quality (excellent, good, sufficient or poor) and find out if there are any current warnings or advice against bathing notices in relation to water quality.

- **At the bathing water** - lifeguards will fly the red flags when bathing waters are considered unsafe for bathing. You can check out the notice boards to see the latest water quality and if any warnings or advice against bathing notices have been posted by the local authorities.

- **Heavy rain** - swimming after heavy rainfall carries an added risk of pollution from surface runoff and is best avoided for 48 hours. Further information can be found on https://www.beaches.ie/protect-your-health-with-the-48-hour-rule/

- **@EPABeaches**– You can follow us on EPA Beaches Twitter account and receive tweets of news and information on bathing waters and tweets of when bathing water incidents start and are over.

Should I swim after heavy rain?

Heavy rain can wash pollution into rivers, lakes and our seas and in some instances overwhelm sewage systems giving rise to the operation of storm overflows. The impacts of these events are generally very short-lived lasting typically 1 - 2 days. Swimming after heavy rainfall is best avoided as it carries an added risk of pollution as well as a likely increase in the amount of sediment and turbidity in the water which would make it visually unappealing. Please find more information at the following link https://www.beaches.ie/protect-your-health-with-the-48-hour-rule/

Should I swim if the lifeguard red flag flying?

Never swim where a sign says not to or when the red flag is flying. The red flag is flown when there is a water safety risk e.g. the presence of dangerous under-currents. The red flag can also be flown when there is an increased risk of illness if you go into the water or where pollution has been identified.

How good is our bathing water quality?

The majority of bathing waters have Excellent or Good quality.

97% of the 148 identified bathing waters met or exceeded the minimum required standard.

117 bathing waters (79%) were Excellent quality.

Two bathing waters have shown significant improvement to Excellent from a Poor classification in recent years – Portrane, The Brook Beach in Fingal and Trá na bhForbacha, Na Forbacha, Galway.

 3 bathing waters were Poor (up 1 from 2021) and will have a swimming restriction for the 2023 season. These were Balbriggan (Front Strand Beach), Lady's Bay, Buncrana and Trá na mBan, An Spidéal.

Is there anything I can do to help?

- Follow the instructions of lifeguards, they are there for your safety.

- Report any missing or damaged lifebuoys to Dublin City Council or www.ringbuoys.ie.

- Take all your litter home with you - several hundred beach users on a sunny weekend can generate a lot of rubbish.

- Do a 2 Minute Beach Clean every time you go to the beach see https://cleancoasts.org/our-initiatives/2minutebeachclean/.

- Keep your dog under control and always bag & bin your dog's mess - don't bury it in the sand!

- Do not walk on the dunes - vegetation is a valuable filter of pollutants, prevents erosion, and reduces runoff.

- Get involved in a local Coastcare group – check out https://cleancoasts.org/getting-involved-with-clean-coasts-right-now/.

- Don't feed seabirds - one seagull poo contains millions of bacteria!

- Don't bury soiled nappies or rubbish in the sand, your child could be the next one to dig it up!

What are Algal Blooms of Phaeocystis species and can I still go swimming?

Algal blooms of *Phaeocystis* species have occurred several times along the east coast of Ireland, over the summer months, in recent years. *Phaeocystis* forms part of the natural cycle of phytoplankton in Irish waters and often occurs after the initial seasonal spring bloom. In the North Sea dense blooms of this species have been associated with nutrient enriched continental coastal waters but this is unlikely to be a factor in the low nutrient waters of the western Irish Sea.

The *Phaeocystis* species causes water discolouration and foaming along the shore in windy conditions. According to experts in the Marine Institute this species is not harmful to humans either through swimming or from consuming fish that have been exposed to the bloom. The beaches remain safe despite any discolouration of water. In some cases, oxygen depletion can occur when the bloom decays and this can result in fish and shellfish mortalities, but this has not occurred with previous blooms of *Phaeocystis* in Irish waters.

Blooms of *Phaeocystis* species usually dissipate within a few weeks. The progress of any current blooms of *Phaeocystis* and other potentially harmful algal blooms can be viewed on the Marine Institute's website http://www.marine.ie/Home/site-area/data-services/interactive-maps/weekly-hab-bulletin.

What do the Bathing Water Classifications mean?

From 2014 on, the annual classification of bathing waters uses the new assessment specified in the 2008 Bathing Water Quality Regulations. Bathing water samples are assessed against stricter criteria for the parameters, Escherichia coli and Intestinal Enterococci, with different criteria for coastal/transitional waters and inland waters.

The annual water quality of bathing waters are assessed and classified as 'Excellent', 'Good', 'Sufficient' or 'Poor'. In the case of Excellent water quality, the risk of contracting gastro-intestinal illness is predicted to be ca. 3%, in Good waters ca. 5%, in Sufficient waters 8-9% and in Poor waters ca. >10%.

The annual water quality status is now determined from results covering a four-year period rather than just the past season's results and using statistical methods rather than simple percentage compliance. This approach is more robust, as it averages out the impacts of seasonal variations and takes account of the spread of results.

Annual Bathing Water Classifications include:

★★★ **Excellent**

★★ **Good**

★ **Sufficient**

‾ **Poor**

New classification not possible

A new bathing water identified for monitoring and assessment under the 2008 Bathing Water Quality Regulations will remain classed as 'New' until 16 samples are available following identification to allow for assessment of its water quality classification.

The latest EPA Bathing Water Quality Report is available to download from the EPA Website.

Appendix F – Polymerase Chain Reaction Testing

<u>Dog fouling and Public Information</u>

In 2022, the UCD Acclimatize project sought to determine the impact of dog fouling on bathing water quality. Dog faeces contains many dangerous pathogens that can pose a significant threat to public health. Their studies found that one dog poo has the potential to pollute a volume of water the size of a tennis court. Dog faeces is multiple times more potent/risk to public health than a human equivalent.

Unlike other sources of pollution, dog foul can be easily removed by the pet owner to prevent contamination of a nearby waterbody. Furthermore, in an effort to encourage responsible dog management, Dublin City Council installed poo bag dispensers on bathing water cabinets located at bathing water entrances in 2021.

<u>PCR testing 2022</u>
Since 2020, Dublin City Council, in collaboration with the UCD School of Biomolecular and Biomedical Science, has included novel testing methodologies as part of its investigative monitoring programme to differentiate between faecal contamination of human and animal origin. This information has been particularly useful in identifying possible sources of pollution not attributable to the drainage infrastructure system.

Both humans and animals, including marine birds, have gut bacteria which are specific to the species. By identifying and quantifying these bacteria it is possible to determine whether the source of faecal contamination might be attributable to human or non-human sources (or a combination of both).

Polymerase Chain Reaction or PCR testing looks for species specific genetic markers. During the bathing seasons samples were taken to identify human, canine and marine bird markers. This work was investigative and complemented the scheduled monitoring programme. This valuable additional information has allowed DCC to identify the likely source or contributing factors to a poor bathing water sample.

A designated bathing water which does not meet the minimal standard of 'sufficient' for a consecutive period of five years loses its classification as a designated bathing water, in accordance with the Regulations. This happened to Merrion Strand in 2020. Our partnership with UCD and their Acclimatize Project has undertaken an assessment of bathing water samples which fail to meet an 'excellent' status to understand the likely pollutant sources. When we undertake microbial source tracking (MST) of those water samples, we have learned that approximately 50% of these 'poor' results (as opposed to poor+sufficient+good samples) are due to faecal matter from canines being in the water RELATIVE only to the other 3 sources which we can track, ie. approximately 25% is attributable to human faecal matter and approx. 20% recorded as being from gulls, (remaining 5% undetermined). (Gulls being all birds to the best of my understanding, yes that includes Brent geese but not to single one breed out over any other).

It's important to qualify that stat of 50% dog faecal matter being identified from the 'poor' water quality samples.The analysed samples were taken over 2 bathing seasons (2022 & 2021) and approximately involved the assessment of circa 250 samples.

This bio molecular study is susceptible to interrogation as pollution sources are diffuse and water sample assessments are indicative only and concentrations relative to the sampling point may be relevant too. What this finding really says to our team is that we need to ensure we work with a proportionate response to tackle the dog owner behaviours on our beaches and along our coastline.

When we carry out MST on the three classifications (poor+good+sufficient), overall dog foul contributed to about 20% of the source of pollutant, we conclude that if a dog faecal matter is present in a sample, it results in poor water quality and not sufficient or good status. i.e. dog foul is multiple times more impactful on public health that human foul, with a more highly concentrated bacteria.

As reported by **Acclimatize Project Lead, Professor Wim Meijer, (Head of School / Professor of Microbiology UCD School of Biomolecular and Biomedical Science**):

What we can say if the levels of these markers are high or low in comparison to for example the levels we find in feces or sewage. In quite a few of the failing DCC water samples we analysed the levels of the dog marker were very high whereas those of the gull and human were absent (the table below gives a few examples). Therefore we're quite certain that dog fouling was the main contributor.

Location	Date	Sample	E. coli MPN/100 ml	MST Results* (gene copies/100ml)		
				Human Faecal Marker	Gull Faecal Marker	Dog Faecal Marker
Sandymount	15/06/2021	1845907	9208	BQL[1]	BDL[2]	15,755
Half Moon	13/07/2021	1857132	1785	BDL[2]	BDL	119,040
Merrion Strand	13/07/2021	1857134	2014	BDL	BDL	79,024
Dollymount	20/07/2021	1859638	836	BQL	BDL	14,663

In addition, we noted up to 2.2 kg of dog faeces per day on Sandymount and Merrion Strands, which contributes 80 billion E. coli CFU. Our calculations using experimentally determined loadings assuming homogenous distribution showed that dog fouling in general contributes around 33% of E. coli on Sandymount and Merrion. However, this is assuming homogenous distribution; in reality, the local concentrations due to dog fouling can be much higher. On average dog poo has 3 billion E. coli CFUs, so if that's deposited close to a compliance point then it may cause failure. We calculated that one dog poo in a water body the size of a tennis court and half a meter deep will cause failure.

The number of dogs on Sandymount 200-324 (250 dogs per day). Max poos per day has been 30 stools, approx. 30 dogs foul the beach per day on average during the bathing season. Based on 9 full days of surveying Sandymount Beach.

Appendix G – Overview of Dublin City Council Central Laboratory

Dublin City Council Central Laboratory (CL), established in 1984, is the largest Local Authority water testing service in Ireland. The Laboratory has been accredited to the ISO 17025 quality standard by the Irish National Accreditation Board (INAB) since 1997. CL is staffed by chemists, microbiologists, biologists and laboratory technicians. The Laboratory undertakes chemical, microbiological and biological analyses on a range of water matrices as required by drinking water and environmental legislation (including bathing water).

CL and Bathing Water Monitoring:

With regard to bathing waters, CL provides an analytical, reporting and advisory service to Dublin City Council, Fingal, Dun Laoghaire-Rathdown, Louth, Meath and Wicklow County Councils. We work closely with our LA partners to coordinate sampling and report results of analysis in a timely manner. Bathing water samples are analysed for the presence of faecal indicator bacteria, specifically *E.coli (Escherichia coli)* and Intestinal Enterococci. *E.coli* is regarded an indicator of faecal contamination because it occurs in the intestinal flora of both animals and humans. Intestinal Enterococci are more resistant to environmental stress than *Escherichia coli* bacteria. As such they are regarded as secondary indicators of faecal pollution.

Although the suitability of a bathing water for the purpose of immersive activities including swimming is primarily based on the presence of key faecal indicator species, the aesthetic condition of the water is also considered to be most important. The presence of floating materials and debris may also be an indicator of pollution as can certain chemical indicators like pH and levels of salinity. CL reports the condition of the bathing water on the day of sampling and this includes mineral Oils, floating materials, surfactants (detergents/foams) and phenolic compounds.

Our team of scientists are also trained in the identification of macro/micro algae species and marine invertebrates including jelly fish.

Sample Turnaround:

In general samples are analysed on the day of sampling. However, it can happen that they need to be held over and analysed the following day particularly if there is a late tide or weekend sampling requirement (e.g. Sunday). The maximum holding time between sampling and analysis is 24h (where stored in the dark at 4^0C). On receiving of the sample, it is immediately analysed and the *E.coli* result is available after 24h (next morning). The Intestinal Enterococci parameter is reported by 48h post sampling.

The laboratory provides a testing and reporting service for bathing waters throughout the year. Weekly during the bathing season, and fortnightly during the autumn to spring period.

Overview

Since the 1970s, the EU has had rules in place to safeguard public health and clean bathing waters. The revised Bathing Water Directive (BWD) of 2006 updated and simplified these rules. It **requires Members States to monitor and assess the bathing water for at least two parameters of (faecal) bacteria**.

Bathing water quality can be impacted by a number of factors, including urban wastewater, run-off from agricultural land and roads, nearshore pressures (such as dog and bird fouling) and misconnections from houses and businesses. The EU Bathing Water Directive is implemented in Ireland by the Bathing Water Regulations and the EPA, Local Authorities and the HSE all have a statutory role in the implementation of the Bathing Water Regulations.

In Ireland the Bathing Water Season, as defined in the bathing water regulations, runs from **1 June to 15 September** each year.

As the competent authority for the provision of public wastewater services in Ireland, Uisce Eireann is a significant stakeholder in the context of bathing water quality in Dublin Bay. Particularly with respect to the Ringsend Wastewater Treatment Plant (WwTP), which provides over 40% of Ireland's wastewater treatment capacity and discharges to the Lower Liffey Estuary in Dublin Bay.

In response to concerns raised by both swimmers and public representatives about the quality of bathing water outside of the bathing season in Dublin Bay, Uisce Eireann undertook an investigation during which the UV system was operated outside of the designated bathing season for a test period of four months. This pilot winter operation of the UV system was supported by an intensive microbial sampling programme and water quality modelling to assess the likely impacts of the winter operation of the UV system on the bacterial water quality at bathing sites in Dublin Bay.

Methods, Data and Analysis

Water Quality Modelling

Uisce Eireann utilised an existing calibrated water quality model of Dublin Bay to carry out an assessment of the impacts of the winter operation of UV system on bacterial water quality in Dublin Bay.

The results were used to identify the most appropriate locations for bacterial sampling during the UV pilot operation period.

Pilot Operation of the UV System at Ringsend WWTP

Uisce Eireann carried out a four-month operational trial of the UV system from September 16th 2021 until January 12th 2022 in order to measure the real-world impacts on bathing waters of operating the UV system in winter months.

Dublin Bay Microbial Sampling Programme

Uisce Eireann undertook the Dublin Bay Microbial Sampling Programme which involved the collection and laboratory analysis of 3,130 bacterial samples from 15 key locations including popular bathing areas (both designated and non-designated) and rivers.

Twice weekly routine sampling commenced in July 2021 and ended in March 2022. In addition, a number of event-based sampling efforts were undertaken to better understand the effects of tidal, rainfall and UV switch-on/off processes.

Prior to undertaking this work Uisce Eireann engaged with the Dublin Bay Bathing Water Taskforce, UCD Acclimatize project and the SOS Dublin Bay Group on the sampling strategy including methods and locations for inclusion in the programme.

3rd Party Data

In addition to the data collected by Uisce Eireann, historic and current bathing water quality sampling data was obtained from Dublin City Council and Dun Laoghaire Rathdown County Council. These datasets included the weekly samples collected during the bathing season (used to determine the official Bathing Water Quality under the Bathing Water Regulations) as well as the additional routine out-of-season bathing water data collected by both local authorities. This data included samples taken at designated and non-designated bathing waters and rivers.

Further sampling data was also obtained from the UCD Acclimatize project. The Acclimatize project is an EU funded project which aims to work out how bathing waters at the seaside become polluted, in a way that can impact on public health, and how climate change may affect the quality of these waters in the future. This data included samples taken at designated and non-designated bathing waters and rivers as well as flow data for rivers.

Finally hydro-meteorological data was downloaded from Met Eireann, EPA and OPW websites to provide insight into the prevailing weather and flow conditions historically and during the UV pilot operational period and control sampling period.

Analyses

The various datasets were categorised, cleansed and combined into a single database.

Using this database, a statistical assessment of the bathing water quality at various beaches in Dublin Bay was made using the criteria specified in the bathing water regulations.

Statistical assessments were completed for three scenarios as follows:

- Winter Baseline
- UV Pilot Operation Period
- Control Period (No UV)

Event-based sampling data was assessed visually to identify any changes in bacterial concentrations in response to:

- UV Switch Off (Jan 2022)
- UV Switch On (May 2022)
- Storm Barra (Dec 2021)

Conclusion

Uisce Eireann has completed a detailed analysis of the impact of the operation of the UV disinfection system on winter bacterial concentrations at bathing sites in Dublin Bay.

Water quality modelling demonstrated that potential effects of winter operation of the UV system were most likely to be limited to the Lower Liffey Estuary. A four-month trial operation of winter UV was carried out in conjunction with a comprehensive water quality monitoring campaign. Over 3000 bacterial samples were collected from the Ringsend treatment plant, rivers and bathing sites. Analysis of the collected data failed to demonstrate any material improvement in bathing sites in Dublin Bay as a result of the winter operation of the UV Disinfection System.

These findings are consistent with the analyses carried out by UCD Acclimatize and Dublin City Council, which have identified near-shore pressures on bathing waters as the primary reason for failures in Bathing Water Quality at Designated Bathing Waters.

Appendix J – Bathing Water Task Force Actions

7.1 Baseline understanding

Actions identified:

- Establish a baseline to measure BWFT impact over time & identify knowledge gaps.
- Water quality trends - Review previous years sampling to identify potential trends.

Item	Actions taken and in progress:	Status
7.1.1.	Review bathing water assessment results and establish a water quality profile for each bathing location in order identify effectiveness of any actions over time.	Complete
7.1.2.	Data to gather includes previous reports, catchment maps, drainage infrastructure drawings, rainfall data and misconnection surveys records.	Complete
7.1.3.	Map all public drainage structure within the Elm Park Stream environs.	Complete
7.1.4.	Assess existing telemetry data available and identify necessary telemetry as required to gather data to inform.	Complete & ongoing
7.1.5.	GIS mapping of Trimleston and Elm Park Stream catchment, including misconnection surveys carried out in period.	Complete & ongoing
7.1.6.	Continue undertaking bathing water quality monitoring and analysis.	Ongoing
7.1.7.	Both local authorities, along with UCD, have started an enhanced programme of grab sampling in both streams. This involves sampling more sites than previously and further additional sites will be added depending on results from this sampling. Two 24 hour sample surveys (with dry and wet weather conditions) have been carried out at one location on the Elm Park. The local authorities and UCD intend to carry out more composite sampling, at multiple simultaneous locations. The exact locations will be guided by results of the grab sampling. Details of proposed UÉ surveys in these catchments are undertaken. Local authorities will assess the potential for adding to these surveys in co-operation with Uisce Éireann. These water quality surveys will be used to identify areas where further investigation is required. Further investigations are likely to include misconnection surveys, manhole and CCTV surveys.	Ongoing

7.2 Understanding Impacts from Wastewater Discharges

Required actions identified by the taskforce included the commissioning of studies to:

- Improve understanding of the influence of water circulation patterns in Dublin Bay and associated affects on the impacts of wastewater discharges on bathing areas

- Identify and assess SWOs impacting on Dublin Bay

Item	Actions taken and in progress:	Status
7.2.1	Scoping Study: Bathing Water Studies for Greater Dublin Area At the request of the taskforce Uisce Éireann commissioned a scoping study (undertaken by UK based consultancy Intertek) to examine options to undertake further assessment of impacts of wastewater discharges in Greater Dublin Area to potentially provide beach managers with a better understanding to manage beaches with respect to prior warnings/prohibitions etc. Outputs included a 37 page report which made two key recommendations which were; 3. Carry out further analysis using the existing Water Quality Model of Dublin Bay 4. Consider development of predictive bathing water quality forecasting tool to assist management of bathing waters	Complete
7.2.2	Additional Modelling of Impacts of Ringsend WWTP on Bathing Waters At the request of the taskforce and in line with recommendations of the scoping study, Uisce Éireann carried out a suite of modelling exercises looking at the potential effects of the primary discharge and the Storm Tanks at Ringsend. This included assessment of impact under different combinations of discharge flow rate and bacterial concentration, bacterial decay, tide and onshore wind conditions. A storm tank discharge of 100,000m3 was simulated (equivalent to what might be expected under Met Eireann Yellow Alert Rainfall Conditions. This assessment confirmed there is very limited connectivity between the Ringsend WWTP and any of the Designated Bathing Waters even under storm tank discharge conditions, due to the favorable dilution and tidal flushing characteristics of Dublin Bay.	Complete

7.2.3	Predictive modelling System	Model preliminary design complete, now being validated, anticipated completed in 2023.
	The Dublin Bay Taskforce is developing a predictive system to aid Local Authority Beach Managers to assess the daily pollution risk at designated bathing waters in Dublin Bay.	
	The project is joint-funded by Dublin City Council, Dun Laoghaire Rathdown County Council and Uisce Éireann. Uisce Éireann is managing the procurement and delivery of the forecasting system on behalf of the Taskforce. Development of the Bathing Water Predictive Model is by UK based consultants Intertek.	
	This system will combine daily rainfall forecasts from Met Eireann with a suite of river, sewer and coastal models to provide a forecast of the bathing water quality at designated bathing waters. While the system will provide useful information regarding rainfall events, it will not account for operational issues such as blockages or pumping station power outages, nor transient sources of pollution from birds/dogs.	
	The system is currently undergoing calibration and verification and will be available to the beach managers during the 2023 bathing season. The local authority beach managers will utilise the modelled prediction along with local knowledge and understanding of any operational issues to determine is any management action is required.	
7.2.4	Dublin Bay Microbial Sampling Programme and Winter UV Pilot	
	In response to concerns raised by both swimmers and public representatives about the quality of bathing water outside of the bathing season in Dublin Bay, Uisce Éireann undertook an investigation during which the Ultraviolet Disinfection system was operated outside of the designated bathing season for a test period of four months. This pilot winter operation of the UV system was supported by an intensive microbial sampling programme and water quality modelling to assess the likely impacts of the winter operation of the UV system on the bacterial water quality at bathing sites in Dublin Bay.	
	Uisce Éireann has completed a detailed analysis of the impact of the operation of the UV disinfection system on winter bacterial concentrations at bathing sites in Dublin Bay. Water quality modelling demonstrated that potential effects of winter operation of the UV system were most likely to be limited to the Lower Liffey Estuary. A four-month trial operation of winter UV was carried out in conjunction with a comprehensive water quality monitoring campaign. Over 3000 bacterial samples were collected from the Ringsend treatment plant, rivers and bathing sites. Analysis of the	

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	collected data failed to demonstrate any material improvement in bathing sites in Dublin Bay as a result of the winter operation of the UV Disinfection System. These findings are consistent with the analyses carried out by UCD Acclimatize and Dublin City Council, which have identified near-shore pressures on bathing waters as the primary reason for failures in Bathing Water Quality at Designated Bathing Waters. The sampling programme provided a greater understanding of the bacterial loading to Dublin Bay from riverine sources. The Technical report is available on the Uisce Éireann website and a Non-technical summary is included in **Appendix H** of this report.	
7.2.5.	**Uisce Eireann National Drainage Area Plan Programme** Uisce Éireann is progressing with a Drainage Area Plan (DAP) Programme to investigate the performance of sewerage networks. There are approximately 50 DAPs nationally. The focus of the work under the DAP programme is to: • Identify where, how often and the scale of problems impacting the public (such as flooding) and the environment; • Identify solutions to remedy the above based on whole life cost assessment and climate change impact. The solutions considered would generally fall under the following headings, either as standalone measures or in combination: • Operational measures • Capital maintenance • Capital upgrades The DAP Programme is being prioritised in the programme in areas of concern, such as areas that do not comply with the Urban Wastewater Treatment Directive and the Bathing Water Quality Regulations and areas with high frequency pollution incidents as identified by the Local Authorities. Stormwater removal is a key consideration, and this is reflected in the hierarchy of potential solutions with Sustainable Drainage Systems (SUDs) and storm water separation being considered ahead of upsizing or providing additional storage. The specifics at each problem location dictate which solutions are the most practical and effective. The DAP Model is used to generate concept design solution to address the problems while also taking account of future risks such as Urban Creep, Climate Change & Growth. There are four stages to a DAP:	

Stage 1: Information/Data Gathering, including scoping Asset Surveys / Monitoring programmes.

Stage 2: Undertake surveys / monitoring and build the models.

Stage 3: Test the existing network against current design flows and future predicted flows out to a 25-year design horizon. We see where the network is deficient, we identify the needs in terms of compliance, flooding and growth.

Stage 4: Develop design solutions to meet these needs. Examples of these solutions could be in the form of: Storm Water Separation and its feasibility, Implement Sustainable urban Drainage Systems (SuDS), resizing the network or storage capacity.

Within the wider Dublin Region, there are seven Drainage Area Plans. These plans will help to improve the performance of the wastewater networks, protect the environment and facilitate social and economic development over the coming years.

Drainage Area Plans
Greater Dublin Area
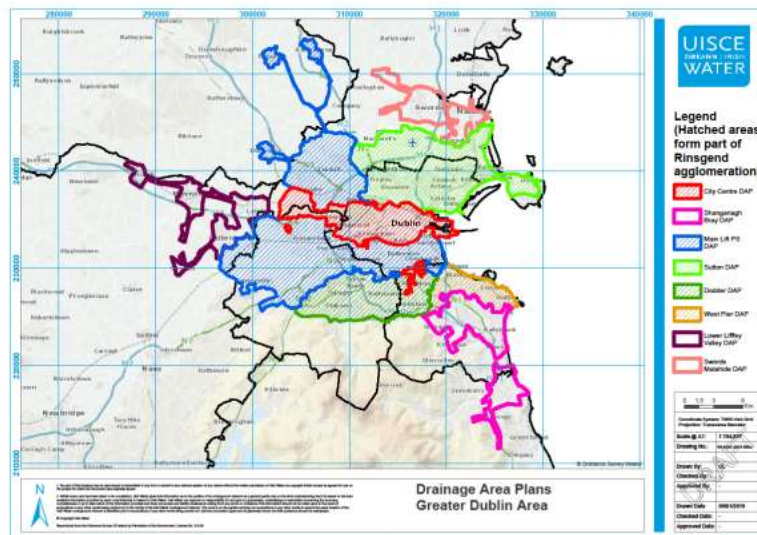
- City Centre DAP is complete.
- Shanganagh-Bray DAP is at stage 4
- West Pier DAP is at Stage 3
- Main Lift DAP is entering Stage 2
- Dodder DAP is at stage 3
- Sutton DAP is in stage 2
- Balbriggan DAP stage 1

In addition to the studies listed above a number of infrastructure improvements where identified by the Taskforce and prioritised for action as per below.

Item	Actions taken and in progress:	Status
7.2.6	Elm Park Stream Two Storm Water Overflows (SWOs) that discharge to the Elm Park Stream during heavy rainfall were identified as pressures by the Taskforce: Larchfield Road SWO In collaboration with the Taskforce UÉ identified hydraulic issues within the network building on the tracing and sampling data from the DLRCC field works. Collectively these efforts identified that the Larchfield Road SWO in Goatstown was frequently overflowing to the Elm Park Stream and ultimately reaching Merrion Strand. UÉ prioritised the removal of this SWO through the Local Network Reinforcement Programme in 2021. Elm Park Golf Course SWO UÉ is undertaking an assessment of the impacts of the Elm Park Golf Course SWO as part of the Main Lift DAP which is currently at stage 2. In this stage, Uisce Éireann are currently building a hydraulic model of the drainage catchment. Once stage 3 is completed the verified model will be used to determine the SWO's level of compliance and with a working model, the optioneering phase can be started to develop likely solutions and costs for SWO's that do not meet current criteria.	Complete Ongoing
7.2.7	Ailesbury Pumping Station SWO: Ailesbury SWO Outfall is a critical flood defence mechanism for the locality. The pumped Storm Water Overflow discharges to the Sandymount Strand area. Interim upgrades to the Ailesbury pumping station, which included equipment upgrades to reduce the risk associated with pump failures, were completed in 2021. These will serve to reduce **low rainfall** spill events to Sandymount Strand but will not fully eliminate them". In addition to the upgrades to the pumping station, UÉ has committed to carrying out an advanced optioneering and feasibility study in parallel to the completion of the model to understand requirements around the improvement of potential flooding and overflows. A key element of this study will be to assess the impacts Storm water entering the system from public and private areas and determine methods for its removal and discharge without causing a flood risk. Better management of storm water in this area with sustainable drainage methods and further up stream in the drainage local catchment area, from public and private areas is key, to reducing	ongoing

	the impact on bathing water quality from the Ailesbury SWO. This work will begin in Q3 2023 Currently UÉ is undertaking an assessment of the impacts of Ailesbury SWO Outfall as part of the Main Lift DAP which is currently at stage 2. This study encompasses a large area and includes significant surveying and monitoring in order to build a drainage catchment model of the network. This model will be used to analyse the current and expected future flows and compare current and future performance to UE targets.	
7.2.8	<u>Uisce Éireann Infrastructure Improvements via Capital Investment Plan</u> In addition to the specific measures set out above, there are a range of ongoing infrastructure improvements to both wastewater treatment plants and wastewater networks which will serve to improve water quality in Dublin Bay and the Greater Dublin Area. Further information on these works are provided in Appendix I.	Ongoing

7.3 Scientific support

Actions identified:

- Ensure participation of the Central Laboratory on the BWTF to inform key trends in relation to water quality assessments, and support for data interpretation support and policy development.

The Central Laboratory (CL) has worked as part of the BWTF team since its inception in 2019. It contributes scientific knowledge and experience gleaned from over 20 years of bathing water monitoring and investigative work.

Item	Actions taken and in progress:	Status
7.3.1.	Participation in monthly BWTF meetings	Ongoing
7.3.2.	The CL informs investigations into sources of pollution affecting water quality at the various bathing locations where sampling takes place, providing chemical analysis and interpretation of results to inform the BWTF.	Ongoing
7.3.2.	Contributed to investigations into sources of pollution affecting water quality at Dublin City and County beaches by providing analysis and interpretation.	Ongoing
7.3.3.	Provided analysis and expertise to the UCD Acclimatize Programme.	Ongoing

7.3.4.	Provided advice with regard to complementary/alternative monitoring approaches to bathing water sampling and testing.	Ongoing

In the context of the bathing water directive and the evolving and unpredictable nature of the climate change crisis, the laboratory will continue to provide scientific services to our customers and to the benefit of the public who avail of bathing water amenities. This will include meeting the challenges arising from any required changes to future testing and sampling regimes.

The laboratory will apply its expertise to the evaluation and application of suitable, more rapid, cost effective approaches to bathing water analyses which complement legislative programmes for monitoring.

The laboratory will continue to provide an analytical and investigative service to LA's who sample bathing waters during the winter/spring periods and in particular at locations used by the public.

Emerging issues including cyanobacterial and nuisance algae have been added to the laboratory's analytical repertoire and are available to our LA customers.

For a further overview of the Central Laboratory and its work in relation to bathing water monitoring please see Appendix G.

7.4 Engage in Scientific assessment

Actions identified:

- Collaborate with third level institutes to support and inform the activities of the BWTF in pursuit of its objectives, i.e. ensure a robust evidence based input into our decision making process.

Item	Actions taken and in progress:	Status
7.4.1.	University College Dublin: UCD Acclimatize Research Project has/are carrying out studies on: • River morphology; • Dog Fouling and Gull/Bird impacts on beaches/bathing waters; • Pollutant Tracer study (See Appendix F); • Dublin Bay model and water quality; • Faecal Indicator Bacteria (FIB) from sediments.	Acclimatize project to conclude in June 2023.
7.4.2.	National University of Ireland Galway study: NUIG is undertaking a research project on understanding the origins and impacts of ectocarpus (seaweed) on coastal waters.	Outstanding

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	This study can inform our understanding of pressures on the water quality in Dublin Bay.	
7.4.3.	Dublin City University: 2022 Water Blitz – A citizens science initiative to promote community engagement in monitoring water quality across the country, predominantly focusing on nitrate and phosphate content in freshwaters. Reports available from the DCU website: https://dcuwater.ie/water-blitz/ A repeated demand from the public and representatives is the provision of 'real-time' water quality monitoring and reporting for the public. While there is no definition or common understanding as to what real-time water quality may be, the BWTF does support any reasonable proposals to innovate for this service, see Appendix D for further explanation. In this regard the BWTF supports DCU recent application to develop 'near real-time' water quality monitoring technology. Supporting DCU application to Science Foundation of Ireland National Challenge Fund Programme 2023 (Healthy Environment for All Challenge) "RESTART (Rapid bactErial Sensing for a healThy wAter enviRonmenT)" (Feb 2023). This project aims to accelerate the time required to determine bacterial presence in a bathing water sample to real time or near real time monitoring. Local authorities are supportive towards validating such scientific advancements with consideration towards the Regulatory requirements.	2022 Water DCU Blitz supported by the BWTF (DCC) Completed Support provided
7.4.4.	VU Amsterdam: Student internship 2023 – a study to determine the appropriate surface water management infrastructure required within a public realm location - including a modelling or urban surface water run-off.	Commences 2023

7.5 Public engagement

Actions identified:

- Review of all bathing water related enquiries received from the public and elected representative and other third parties.
- Ensure all public queries (representative organisations) are addressed and responded to in a timely and accurate manner.

Item	Actions taken and in progress:	Status
7.5.1.	Review past year's correspondence from the public. Elected representatives and third parties in relation to water activities in Dublin Bay; Categorise and address any actionable requests or miscommunications	Complete Ongoing
7.5.2.	Ensure communications and factual representations to the public are consistent and comprehensive across all BWTF agencies.	Ongoing

7.6 Communications

Actions identified:

Review and align communications with the public, including;

- Websites,
- Onsite information platforms,
- Facilities at bathing locations.
- Utilise messaging platforms for disseminating information to the public, (Twitter etc.)
- Support innovation in communications.
- Signage

Item	Actions taken and in progress:	Status
7.6.1.	Monthly BWTF meetings. Coordination of operational activities @BWTF monthly meeting Ensure consistency on information and reporting across various platforms.	Ongoing. Websites review complete.
7.6.2.	Onsite signage at bathing locations. Reporting on general communication approaches (Beach Front Digital Signage & Social Media Platforms) used to convey important water quality messages to the general public	Complete
7.6.3.	Smart Signage Project see item 7.12.3	Ongoing trial

7.6.4.	Website content review, including 'Frequently Asked Questions' section, see appendix E. Websites: www.beaches.ie EPA, Department, UÉ, LA's	Complete
7.6.5.	Improved dog fouling signage. Signage erected at Ailesbury pumping station overflow outfall (at request of local community group)	Complete 2020, due for review. Complete 2022
7.6.6.	Consistent and coherent message. Reporting on Bathing Notices erected during the Bathing Season	Complete. Annual bathing season reports prepared.
7.6.7.	Coordinated monitoring programme across local authorities	Ongoing on an annual basis from 2023.
7.6.8.	Participating in the Acclimatize Dog Fouling Campaign. Dog fouling production (Acclimatize). Acclimatize in conjunction with BWTF produced a short animation to highlight the impact of dog fouling on water quality. The campaign called 'Leave only Paw Prints' was supported and shared by the BWTF representatives across various social media platforms. Further information can be found here - https://www.acclimatize.eu/dogs/.	Complete

7.7 Elm Park Stream

Actions identified:

Undertake a study of the river catchment, including;

- Drainage infrastructure review;
- Water quality sampling & analysis;
- Misconnection surveys;
- Sewer CCTV & manhole surveys.

Item	Actions taken and in progress:	Status
7.7.1.	Elm Park Catchment Stream Walk to find polluted surface water drainage pipes entering the stream	Complete
7.7.2.	Commissioning of CDM Smith Consulting Engineers to carry out a Catchment Study for the Elm Park Stream which highlighted that potential sources of pollution for in the catchment.	Complete
7.7.3.	Catchment based investigations informed by CDM Smith study: • Manhole survey in the Mulvey catchment of the Elm Park Stream to assess clean and polluted surface water sewers to find polluted lines. • Misconnection Surveys of properties on polluted lines in the Mulvey Stream Tributary (on going). • Meeting and Inspections in Dundrum Mental Hospital to find misconnections. • Engagement with Taney Court Apartment Management Company for the removal of a misconnection from 2 apartments. • After ruminant E.coli were found in bathing water samples at Merrion Strand, engagement with Carmelite Convent on Roebuck Rd to fence the stream from their cattle. • Both the Acclimatize Project and the CDM Smith Catchment study identified UCD Campus at Belfield as a source of pollution in the catchment. UCD has since engaged a consultant to trace pollution in the catchment and CCTV surveyed the Elm Park Culvert within the boundaries of UCD. After consultation between DLRCC, UCD and their Consultant, Phase 2 of this study has now been completed.	Investigations complete. Remediation activities ongoing.
7.7.4.	A potential site for an Integrated Constructed Wetland has been identified at the bottom of the Elm Park stream within the Elm Park golf club. This could remove a significant bacteria load prior to discharge to the bathing waters. Issues in relation to recent morphological changes to the Elm Park Stream within the Golf Club have been identified and need to be addressed.	Outstanding

7.7.5.	In collaboration with UCD review opportunities for improved drainage management within the curtilage of their campus.	Initiated
7.7.6.	Misconnection surveys – Elm Park Stream catchment: There are likely to be significant misconnected drains/ sewers within the catchment. These are not the sole cause of problems at the beaches but they are significant and need to be removed from a Water Framework Directive perspective. There are approximately 8,000 premises in the catchment.	Approx. 20% complete
7.7.7	An option to introduce UV treatment at a downstream location on the Elm Park Stream was identified as a potential solution of consideration. On consideration by the BWTF, the implications on all ecology on the river were and early consideration and an environmental cost to the River that was unacceptable, regardless of the option being on a temporary or permanent basis). The solution was deemed inappropriate on an environmental level while not addressing the source of the pollution.	Complete

7.8 Beach side activity

Actions identified:

- Review bathing water sampling practices and information collected

Item	Actions taken and in progress:	Status
7.8.1.	Review data collection at bathing locations. Include a record of number of bathers visible at all sites when collecting water samples. This can help to inform the risks to public safety.	Initiated in 2022. Data collection ongoing.
7.8.2.	Assess consistency of Bathing Waters information sites. Consider the opportunity to invest in providing a potentially higher quality of service and information to the public.	Outstanding
7.8.3.	Install dog poo-bag dispensers at appropriate location to encourage better dog owner behaviour.	Complete

7.9 Wildlife

Actions identified:

- Assess impact of wildlife/animals on bathing water quality

Item	Actions taken and in progress:	Status
7.9.1.	Complimentary microbial source tracing (MST) analysis to identify the animal marker origins of identified E-coli and/or Enterococci in poor water quality samples (also referred to as Polymerase Chain Reaction testing (PCR)) – See appendix F.	Commenced in 2021, ongoing on a yearly basis.
7.9.2.	Assess the gull faeces contribution to poor water quality. Note that the bird species which feed at Merrion Strand are protected and they are recognised habitants of the protected area and biosphere at certain times of the year). Assess potential risk to Merrion Strand bathers.	Ongoing
7.9.3.	Currently our MST assessments conclude the following distribution of the source of bacterial pollution originates from three significant sources, namely; Human, Dog, Gull and other. For further details see Item 7.13 the Acclimatize Project	Initiated in 2021, ongoing.
7.9.4.	Enhanced measures to restrict dog use of the beaches may need to be considered. Options include, substantial investment on resourcing dog warden presence and a legal office in the back end to support enforcement of existing bye-laws. A second consideration would be a change to the bye-laws to ban dogs from the vicinity of bathing areas. Note: bye-laws are a 'Reserved function', i.e. any changes need to be approved by Council.	Outstanding

7.10 Support Innovation

Actions identified

- Ensuring the BWTF supports learning where reasonable from third party innovation.

Item	Actions taken and in progress:	Status
7.12.1.	Standing position by the BWTF local authorities to inform and support innovation in third party service providers/innovators to rapidly identify bathing water quality with respect to protecting public health, i.e. identification E Coli and enterococci in bathing water.	Open
7.12.2.	Dublin City University: BWTF supports DCU's participation in the SFI National Challenge Fund Programme 2023 (Healthy Environment for All Challenge) "RESTART (Rapid bactErial Sensing for a healThy wAter enviRonmenT	Commenced February 2023
7.12.3.	On-site communications: To further improve the dissemination of information to the public, DCC initiated a pilot during the bathing season, trialling two self-powering digital screens at Sandymount and Dollymount Strands. The screens are self-sustainable and powered by renewable energy generated by a turbine and solar panel fitted on the installation. They utilise e-ink technology (similar to a kindle) and are updated remotely by DCC staff (see photograph 1 below). Statutory information including bathing water results and warnings are published on the screens and supplemented by water safety campaigns, weather forecasts and tides. The pilot has been extended for a further 6 months with minor adjustments to establish the feasibility of their operation during winter months. Further digital screens have been installed at busy bathing locations in the DLR area, including at Seapoint, DLR Baths, Sandycove and Killiney Beach. Those particular screens are mains powered and can be updated remotely with new data making them an ideal communication tool to inform the public about recent bathing water results, weather forecasts, tide times or important safety tips for swimmers.	Trail commenced in Q1 2022 and remains under trial status.

Image: Sustainable self-powered information signage trial ongoing at Sandymount Beach

7.11 Reporting

Actions identified

- Ensure regular reporting of BWTF progress and provide feedback at a national level.

Item	Actions taken and in progress:	Status
7.11.1.	Prepare and report on the activities of the BWTF as appropriate.	2023 report complete
7.11.2.	The Chairperson of the BWTF attends and contributes to the agenda of the National Bathing Water Expert Group (BWEG). The key functions of the Bathing Water Expert Group (BWEG), which is chaired by DHLGH, are to: • Advise the Minister for Housing, Local Government & Heritage on matters relating to Bathing Water Directive policy; • Advise the relevant implementation bodies regarding the implementation of the Bathing Water Directive in Ireland; • Develop guidance for the implementation of the BWD; • Evaluate priority actions critical to delivering Ireland's obligations under the BWD; • Provide a national view with respect to developments relating to the BWD and feed this through to the EU Commission and the EU Bathing Water Expert Group.	Active - Ongoing

7.12 Consideration of applicable legislation

Actions identified

- Consider the effectiveness or identify shortcomings in the various laws governing bathing waters.

Item	Actions taken and in progress:	Status
7.12.1.	Support the DHLGH in determining the effectiveness of the Bathing Water Regulations 2008 with regard to protecting public health outside of the Designated bathing season (1st June -15th September).	Actioned
7.12.2	Examine beach bye-laws and their appropriateness to effect clean beaches and protect public health in the context of water based activities. (This should include understanding of the Dog Warden role).	Initial review ongoing

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7.13 The Acclimatize Project:

Overview:

Acclimatize is a joint research project undertaken by University College Dublin (UCD) in Ireland and Aberystwyth University (AU) in Wales. The project, which commenced in 2017 and concluded in June 2023, is part funded by the European Regional Development Fund through the Ireland Wales Cooperation Programme. In addition, the Acclimatize project is in partnership with the agencies of the Bathing Water Task Force. The Ireland Wales Programme focuses on connecting organisations, businesses and communities in the Irish Sea region that face shared economic, environmental and social challenges.

A key objective of the Ireland Wales programme is 'to preserve and enhance the marine and coastal environment for the enjoyment of future generations in the face of the increasing impacts of climate change'

This has been achieved through the Acclimatize Project by examining the concerns and circumstances relating to faecal contamination of rivers and bathing waters as well as assessing the impact of climate change driven effects on water pollution. The main focus of the project in Ireland has been on Dublin Bay bathing waters specifically *Merrion Strand, Sandymount Strand, Dollymount* strand as well as urban rivers and stream considered to impact on bathing water quality, including the Elm Park Stream with a catchment across both the DLR and DCC administrative areas.

Outcome:

At a time when the BWTF is focusing on the identification and amelioration of waters impacted upon by faecal contamination, this project has contributed to;

- An improved understanding of factors effecting water quality within the catchment influencing Dublin Bay Bathing Waters.

- The management (and contingency) planning for Bathing waters; thereby adding to their amenity value. For example, microbial source tracking (MST), an investigative tool used to identify sources of faecal pollution, has been applied to catchment investigations This approach has been highly beneficial in terms of planning ameliorating actions designed to reduce the impact of contamination in the Elm park and Trimleston streams.

- Identification of animal specific pressures (particularly dogs and birds) on bathing water quality using genomic based technologies has greatly benefited the BWTF agencies and the public who avail of these amenities. These assessment of bathing water samples concluded that the proportionate sources of faecal pollution may be broadly identified as;

  - Approximately 50% of 'poor' water quality assessments are as a result of dog faeces polluting the bathing waters
  - Approximately 25% of 'poor' water quality assessments are as a result of human/infrastructure polluting the bathing waters
  - Approximately 20% of 'poor' water quality assessments are as a result of gull faeces polluting the bathing waters

- o   Approximately 5% of 'poor' water quality assessments are unknown/unquantified pollutants entering the bathing waters

- A greater understanding of the likely impacts of climate change and also helped inform the decision making process with regard to the designation of new beaches. This is likely have continued positive implications for the City in terms of adding to the perception of Dublin as a clean urban environment. This has been extended into the assessment of the Grand Canal Basin as an amenity for immersive water based recreational activities.

- The project has also led to the creation of meaningful and evolving knowledge based predictive models that considers the frequency and likely impact of rain events on short term pollution, particularly where the drainage infrastructure has been breached. This information is of benefit to local authorities in terms of prioritising works designed to improve and monitor the regions drainage infrastructure.

- The project also undertook a comprehensive water quality assessment across twenty locations across Dublin bay to determine the likely overall classification of the water quality in accordance with the EPA criterion. The image below conveys the locations from where water samples were taken in Dublin Bay. The outcome of this assessment concluded that the water quality in Dublin Bay has 'good' status, consistent with the EPA 2022 classification. This assessment predominantly assesses the chemical and ecological status of the water samples taken.
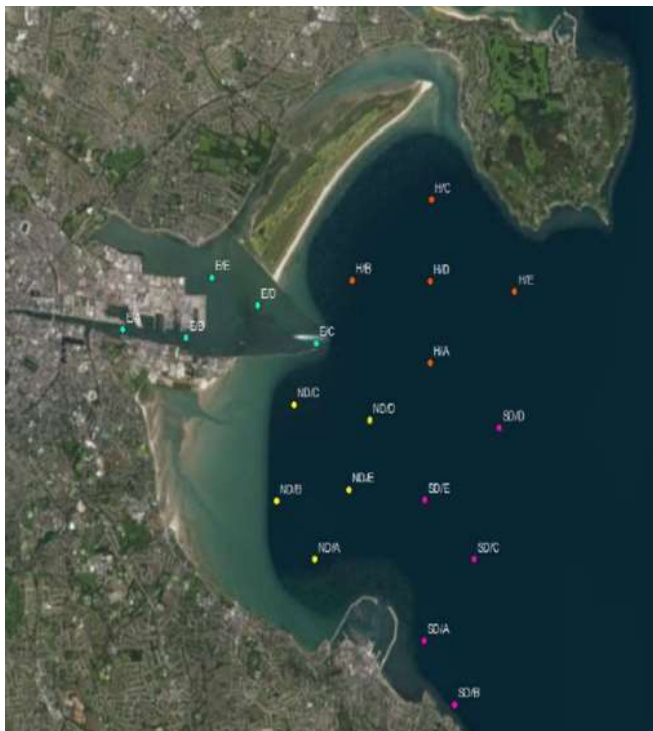
Dublin Bay sampling locations:

4 clusters containing 5 sampling sites each

Each site sampled every hour for 12 hours

Dry & wet conditions: neap & spring

Sampling indicators monitored:
- *E. coli*
- Intestinal Enterococci
- C. perfringens
  - o   (Cryptosporidium proxy)
- Coliphages

Dublin Bay – The presence of Ectocarpus along our shoreline.

The Environment & Transportation Department has received a number of complaints in recent weeks with regard to a nuisance algae washing up on our coastal beaches. Mistakenly, these complaints typically identify this nuisance algae as sewage effluent and associate it with discharge from the Ringsend Waste Water Treatment Plant. We wish to take this opportunity to inform Dublin City Council staff as to the lifecycle and nature of this plant life in Dublin Bay, and provide you with a reference for any future queries which members of the public may raise.

Dublin Bay biosphere has a various vegetation types growing on its sea bed, much of which is within a Special Area of Conservation. This particular material is currently both floating in the sea water and washing up onto coastal marshes and beaches during high tides. It is a naturally occurring seaweed or macro algae called Ectocarpus. Toward the end of its lifecycle Ectocarpus quickly progresses through various stages of decay and it is at this time of year the decaying ectocarpus presents itself with characteristics not too dissimilar to foul effluent or sewage.

Ectocarpus siliculosis is considered to be a naturally occurring nuisance species. Typically growing on the seabed from early springtime until the end of its lifecycle in the autumn when it dies out. At this time of year the seaweed is decaying and becoming uprooted from the sea bed and washing ashore at various locations along Dublin Bay.

When ectocarpus begins to physically degrade, it can produce a malodour (not dissimilar to sewage), as experienced by the public whom have contacted our Department. Also its colour dissipates from a healthy green colour to light then dark brown as it continues to decay in the water or beaches or marsh, (visually not dissimilar to sewage either). Furthermore, when the weed washes ashore onto the beach after a high tide, the seaweed dries out and may be incorrectly identified as caked sewage. This is a natural process within Dublin bay's rich bio-diversity and for environmental reasons the algae may not be removed from its environment.

Please note that Merrion, Sandymount and Dollymount Strands are among the various beaches and bathing areas which are inspected by Dublin City Council staff on an ongoing basis throughout the year, with water samples taken up to 20 times during the bathing season between June and mid-September and on a fortnightly basis throughout the remainder of the year. The water sample results are updated on the Dublin City Council website and **www.beaches.ie** for the public's information.

Furthermore, we are aware that after the recent heavy rainfall, combined with high tides, decaying ectocarpus can be washed up on the various footpaths or promenades adjacent to the coastline. Our Waste Management Department does tend to these incidents so as to make pedestrian footways safe and ensuring minimal relocation of this natural material from its environment.

Photographs of Ectocarpus for reference purposes.

Shelly Banks – Brown ectocarpus washing ashore in the seawater, (Sept. 2019)

Causeway Road, Bull Island – Green ectocarpus floating on high tide waters, (Sept. 2019)

Bull Island – (Light brown) Dried ectocarpus resting on top of the marshes once high tide waters recede, (Sept. 2019).

Merrion Strand – (Dark brown) recently washed up ectocarpus on the beach once tidal waters recede, (Sept. 2018).

Sandymount Promenade – Ectocarpus washed onto the rocks footpaths during a combination of heavy rainfall and high tides, (Oct. 2019).

Sandymount Beach – Ectocarpus at various stages of decay, (Oct. 2016).

Appendix M – Agency Contacts

Dublin City Council

Email;   waterquality@housing.gov.ie

Website;   https://www.gov.ie/en/publication/38dae-bathing-water-quality/

Address;   Custom House, Dublin, D01 W6X0 or contact us in the Water Quality section on LoCall 1890 20 20 21 or +353 (0)1 888 2000.

Dublin City Council

Email;   waterpollution@dublincity.ie

Website;   https://www.dublincity.ie/residential/environment/protection-water-bodies

Address;   Protection of Water Bodies Office, Environment & Transportation Department, 14 Lower Bridge Street, Floor 1, Usher's Quay, Dublin City, D08 XHF1

Dun Laoghaire Rathdown County Council

Email;   info@dlrcoco.ie

Website;   https://www.dlrcoco.ie/beaches/bathing-water-quality

Address;   Bathing Waters Section, County Hall, Marine Road, Dun Laoghaire, A96 K6C9

Uisce Eireann

Contact information;   https://www.water.ie/contact/general-enquiry/form/

Address;   Colvill House, 24-26 Talbot St, Mountjoy, Dublin, D01 NP86

Fingal County Council

Email: Environment@fingal.ie

Website;   https://www.fingal.ie/council/service/bathing-waters-quality-monitoring

Address;   County Hall, Main Street, Swords, Co Dublin, K67 X8Y2

Appendix N – Useful links

Environmental Protection Agency: Beaches and the Bathing Water Directive | Environmental Protection Agency (epa.ie)

Health & Safety Executive: Bathing Water and Health - HSE.ie

Bathing Water Results: www.beaches.ie

Report a pollution incident: Email - Waterpollution@dublincity.ie

Weather forecast at Met Eireann: Www.met.ie

Dublin Bay water temperature, wave height and wind speeds on Twitter: @DublinBayBuoy

Dublin Bay Tide tables; https://www.tide-forecast.com/locations/Dublin-Ireland/tides/latest

EU Water Framework Directive introduction: https://environment.ec.europa.eu/topics/water/water-framework-directive_en

Bathing Water Regulation: S.I. No. 79/2008 - Bathing Water Quality Regulations 2008 (irishstatutebook.ie)

Water Pollution Act 1977: https://www.irishstatutebook.ie/eli/1977/act/1/enacted/en/html