An Phríomh-Oifig Staidrimh
Central Statistics Office

# Summary Quality Report

# EPA Bathing Water Quality

# CSO Quality Report

# For

# EPA Bathing Water Quality

This documentation applies to the reporting period:
**2024**

Last edited: 4/9/2025

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## 2. Introduction

Bathing Water Quality statistics are produced by the Environmental Protection Agency (EPA) under the legal framework of the EU Bathing Water Directive 2006/7/EC and the Irish Bathing Water Quality Regulations (S.I. No. 79 of 2008), which transposed the Directive into Irish law. These regulations define the parameters to be tested, the sampling methodology, and the ISO-approved analytical methods used to assess bathing water quality across Ireland.

The principal statistical output is the Annual Bathing Water Quality in Ireland Report, which provides classifications for each designated bathing water site based on microbiological monitoring data. Classifications include “Excellent,” “Good,” “Sufficient,” or “Poor,” determined using statistical methods outlined in the Directive and validated by the EPA. Bathing waters that have been newly identified but do not yet have enough samples for classification are labelled as “New”. Similarly, bathing waters where improvements have been made but insufficient post-change samples are available are labelled as “Changes”.

The main uses of the output include:

- Informing the public about bathing water quality as well as via the EPA’s dedicated bathing water website www.beaches.ie.
- Supporting environmental and public health decision-making.
- Fulfilling statutory reporting obligations to the European Commission and contributing to the European Environment Agency’s annual bathing water report.
- Enabling local authorities to manage bathing waters and respond to pollution incidents.

The EPA also disseminates real-time sample results and information about incidents during the bathing season, ensuring timely and transparent communication with stakeholders and the public.

## 3. Contact


| | |
|---|---|
| **Contact Organisation:** | Environmental Protection Agency |
| **Contact Name:** | EPA Bathing Water Team |
| **Contact email address:** | bathingwater@epa.ie |


## 4. Metadata Update

### 4.1. Metadata last update

4/9/2025

# 5. Statistical Presentation

## 5.1. Data Description

The principal output of the Bathing Water Quality statistical process is the annual Bathing Water Quality in Ireland Report, which classifies each designated bathing water site based on microbiological monitoring data. The classifications—Excellent, Good, Sufficient, or Poor—are determined using statistical methods outlined in the EU Bathing Water Directive 2006/7/EC and the Irish Bathing Water Quality Regulations (S.I. No. 79 of 2008).

The main variables disseminated include:

- Summary statistics of bathing water classifications
- A bathing water quality map of Ireland
- Actions taken by local authorities to address Poor bathing water quality
- Summary of likely causes of incidents at bathing waters

These variables are disseminated via:

- The EPA website and beaches.ie
- Open data APIs (data.epa.ie and data.gov.ie)
- European Environment Agency (EEA) Data Hub

Sample results and incident information is updated in near real-time during the bathing season and archived annually. Metadata and explanatory materials are provided to support interpretation and ensure clarity for users.

## 5.2. Classification System

The Bathing Water Quality data uses the classification system defined in the EU Bathing Water Directive 2006/7/EC and transposed into Irish law via the Irish Bathing Water Quality Regulations (S.I. No. 79 of 2008).

**Main Classifications Used**
Each designated bathing water is assigned an annual classification based on microbiological monitoring data:

- Excellent
- Good
- Sufficient
- Poor
- New
- Changes

These classifications are calculated using the 95th and 90th percentiles of bacterial concentrations (E. coli and Intestinal Enterococci), based on log-transformed data over a four-year period.

**Supporting Variables and Breakdowns**

- Bathing Water Name and Location
- Monitoring Station Code
- Sample Date and Time
- Bacterial Parameters:
    - *Escherichia coli (E. coli)*
    - *Intestinal Enterococci*
- Monitoring Calendar Compliance

These variables are used to assess water quality and compliance with health risk thresholds

**Standards and Methodology**

- Sampling and analysis follow ISO standards including:
  - ISO 7899-1 or 7899-2 for *Intestinal Enterococci*
  - ISO 9308-1, 9308-2, or 9308-3 for *E. coli*
- Classification thresholds and statistical methods are defined in Annex II of the Directive and detailed in the EEA Guidelines for Assessment under the Bathing Water Directive (BWD)

**Links to Publicly Available Standards**

- EU Bathing Water Directive 2006/7/EC
- Irish Bathing Water Quality Regulations (S.I. No. 79 of 2008)
- EEA Guidelines for Assessment under the BWD

**Deviations from ESS or International Standards**

EPA adheres strictly to the EU Directive and ISO methodologies, ensuring comparability across EU Member States.

## 5.3. Sector Coverage

The Bathing Water Quality dataset produced by the Environmental Protection Agency (EPA) primarily covers the environmental sector, with a focus on public health and water quality monitoring.

**Main Sector Covered**

- Environmental Protection and Public Health
  The dataset supports compliance with the EU Bathing Water Directive 2006/7/EC and the Irish Bathing Water Quality Regulations (S.I. No. 79 of 2008), focusing on microbiological water quality at designated bathing sites.

**Data Providers**

- Local Authorities are responsible for collecting and reporting sample results and incident information for designated bathing waters.

**Size Classes**

The dataset does not use economic size classes (e.g. number of employees). Instead, it is structured around:

- Geographical units: individual identified bathing water sites
- Temporal units: sample dates and annual classifications

**Breakdowns Used**

- Geographical breakdown: by bathing water site and county
- Temporal breakdown: by sample date and classification year
- Quality classification: Excellent, Good, Sufficient, Poor
- Microbiological parameters: Escherichia coli and Intestinal Enterococci

## 5.4. Statistical Concepts and definitions

The Bathing Water Quality dataset includes both observed and derived statistical variables, primarily focused on microbiological water quality and compliance with public health standards.

**Main Statistical Variables:**

- **Observed Variables:**
  - *Escherichia coli (E. coli)*: in colony-forming units (cfu) per 100 ml of water.
    *(Type: Quantitative, continuous)*
  - *Intestinal Enterococci*: Measured in cfu/100 ml.
    *(Type: Quantitative, continuous* Measured*)*
- **Derived Variables:**
  - *Annual Bathing Water Classification*: Based on statistical analysis of bacterial concentrations over a four-year period.
    Categories: Excellent, Good, Sufficient, Poor
    *(Type: Categorical, ordinal)*

- *Percentile Estimates*: 90th and 95th percentiles of log-transformed bacterial concentrations.
  *(Type: Quantitative, derived)*
- *Compliance Indicators*: Monitoring calendar compliance and action compliance.
  *(Type: Binary/Boolean)*

**Discrepancies from ESS or International Standards:**
All statistical concepts and methods follow:

- EU Bathing Water Directive 2006/7/EC
- ISO standards for microbiological testing:
  - ISO 7899-1 or 7899-2 for *Intestinal Enterococci*
  - ISO 9308-1, 9308-2, or 9308-3 for *E. coli*

Statistical methods such as log transformation and percentile estimation are aligned with the EEA's "Guidelines for Assessment under the Bathing Water Directive".

## 5.5. Statistical Unit

The statistical unit for the Bathing Water Quality dataset is:

- **Identified Bathing Water**: A geographically defined location designated for public bathing under the Bathing Water Directive

Each unit is associated with:

- A sampling location
- A local authority responsible for sampling and reporting
- A unique identifier used in national and EU reporting systems

There is only one type of statistical unit used in this dataset. No enterprise, household, or person-level data is collected.

## 5.6. Statistical Population

The **target population** consists of:

- **All designated (identified) bathing waters in Ireland** that are monitored under the Bathing Water Directive.

This includes:

- Coastal and inland waters officially identified by local authorities and approved by the EPA.

**Commented [JD1]:** I think this bit might be confusing since the target population is clearly defined in this section and there are no differences with the frame population

## 5.7. Reference Area

The data refers to:

- **Ireland**, including all counties with designated bathing waters.

**Specific Exclusions:**

- Non-designated bathing waters are excluded.
- Private or informal swimming areas not officially identified under the Directive are not included.

**Overseas Territories:**

- No overseas territories are covered in this dataset.

## 5.8. Time Coverage

Comparable data is available for the following time period:

- **Annual data from 2011 to present**, with classifications based on a rolling four-year dataset.
- **Sample-level data** is available for each bathing season (typically June to mid-September).

Comparability over time is discussed in section S.16

**Commented [JD2]:** Section 16 is Coherence & Comparability

## 6. Unit of Measure

The Bathing Water Quality dataset uses the following units of measure:

- **Colony-forming units (cfu) per 100 millilitres (ml)**
  This is the unit used for both microbiological parameters:
  - *Escherichia coli (E. coli)*
  - *Intestinal Enterococci*
- **Categorical Classifications**
  - *Excellent*, *Good*, *Sufficient*, *Poor*
    These are derived from statistical analysis of bacterial concentrations.
- **Boolean Indicators**
  - Compliance with monitoring calendar
  - Action taken in response to exceedances

## 7. Reference Period

The Bathing Water Quality dataset includes multiple reference periods:

- **Annual Classification Period**
  - Each bathing water is classified annually based on data from the previous **four bathing seasons**.
- **Bathing Season Sampling Period**
  - Sampling typically occurs from **June to mid-September** each year.
- **Incident Reporting Period**
  - Incident data is reported in real-time during the bathing season and may include off-season events.
- **Historical Coverage**
  - Data is available from **2011 to present**, allowing for long-term trend analysis.

Any differences between target and actual reference periods are discussed under accuracy in section S.14.2

**Commented [JD3]:** Section 14 is Accuracy and reliability

## 8. Institutional Mandate

### 8.1. Legal Acts and other agreements

The EPA's mandate to collect, process, and disseminate bathing water statistics is established under both national and EU legislation:

- **EU Bathing Water Directive 2006/7/EC**
  Establishes the framework for monitoring and reporting bathing water quality across Member States.
- **Irish Bathing Water Quality Regulations (S.I. No. 79 of 2008)**
  Transposes the EU Directive into Irish law, assigning responsibility to the EPA for implementation and reporting.
- **Environmental Protection Agency Act 1992**
  Provides the EPA with statutory authority to collect environmental data and report on environmental quality.

These legal instruments collectively assign the EPA responsibility for the development, production, and dissemination of bathing water statistics in Ireland.

### 8.2. Data Sharing

Data sharing within the Irish Statistical System is facilitated through:

- **Memorandum of Understanding (MoU) between the EPA and the Central Statistics Office (CSO)**
  This agreement supports collaboration on statistical standards, process mapping, and ISSCoP/ESCoP certification.

- **Annual Liaison Meetings**
  Held between the EPA and CSO to coordinate statistical activities, review priorities, and support methodological development.

## 9. Confidentiality

### 9.1. Confidentiality – policy

All EPA statistics are subject to strict confidentiality standards. The EPA adheres to:

- **Sections 39 and 40 of the Environmental Protection Agency Act 1992**
  Prohibit the unauthorised disclosure of information obtained during EPA duties.
- **General Data Protection Regulation (GDPR) 2016/679**
  Applies to any personal data processed by the EPA.
- **Freedom of Information Act 2014** and
  **Access to Information on the Environment Regulations 2007 (as amended)**
  Provide structured access to data while protecting confidentiality.
- **Confidentiality Statement**
  Signed by all EPA staff and contractors during onboarding.

The EPA also maintains a **GDPR intranet page** and provides annual **information security awareness training** to all staff.

### 9.2. Confidentiality – data treatment

**Aggregate Outputs:**

- Bathing water classifications and sample results are **not confidential** and are published openly on www.beaches.ie.

**Micro-Level Outputs:**

- Where microdata is considered sensitive (e.g. in waste statistics), the EPA applies:
  - **Anonymisation**
  - **Aggregation**
  - **Confidentiality agreements** for researchers requesting access

**Security Measures:**

- The EPA has implemented a suite of **ICT security policies**, including:
  - Access control
  - Data classification
  - Incident management
  - Secure systems lifecycle
- The EPA is supported by a **Cyber Resilience Team** and a designated **Information Security Officer (ISO)**.
- External audits and penetration tests are conducted annually to ensure compliance.

## 10. Release Policy

### 10.1. Release Calendar

The EPA maintains a **statistical release calendar** for its certified statistical outputs, including the **Annual Bathing Water Quality in Ireland Report**. This calendar is publicly accessible and regularly updated.
The release calendar includes:

- ISSCoP and ESCoP certified releases
- Releases undergoing accreditation

The Bathing Water Quality Report is also included in the CSO Statistical Work Plan.

### 10.2. Release calendar access

The EPA release calendar is available at:
EPA Release Calendar | Environmental Protection Agency

## 11. Frequency of Dissemination

The **Annual Bathing Water Quality Report** is disseminated **once per year**, typically before **May 31st**, ahead of the bathing season.
During the bathing season (June to mid-September), **sample-level data** and **incident reports** are published **in real time** on www.beaches.ie.

## 12. Quality Management

### 12.1. Quality Assurance

The EPA applies a structured **Quality Management Framework**, aligned with the **European Statistics Code of Practice (ESCoP)** and supported by the **Irish Statistical System Code of Practice (ISSCoP)**.
Key quality assurance procedures include:

- ISSCoP/ESCoP certification for statistical outputs
- Process mapping and documentation
- Annual review of procedures and methodology
- User satisfaction surveys via the Environmental Queries Unit
- Internal audits and external reviews (e.g. OECD, EEA)
- Training and capacity building through seconded CSO statisticians

## 13. Relevance

### 13.1. User Needs

**User Classification:**

- General public
- Local authorities
- NGOs (e.g. Coastwatch Ireland, An Taisce)
- Government departments
- Health Service Executive
- European Commission and EEA

**Uses of the Data:**

- Public health protection
- Environmental monitoring
- Policy development
- Blue Flag beach awards
- Research and education

**Unmet Needs & Plans:**

- Improved clarity on sample vs. annual classifications
- Increased visibility of www.beaches.ie
- Improved machine-readable formats for annual classifications
- Electronic signage and automated alerts for incidents

### 13.2. Data Completeness

The dataset fully meets the requirements of:

- **EU Bathing Water Directive 2006/7/EC**
- **Irish Bathing Water Quality Regulations (S.I. No. 79 of 2008)**

User needs are regularly assessed via:

- Bathing Water Expert Group (BWEG)
- Public surveys
- Direct feedback via EPA websites and contact forms

# 14. Accuracy and reliability

## 14.1. Overall accuracy

The EPA Bathing Water Quality Report is based on a full census of identified bathing waters in Ireland, with response rates consistently at or near 100%. The main potential sources of error are:

- **Random errors**: Minimal due to standardised sampling and laboratory procedures.
- **Systematic errors**: May arise from:
    - Incorrect sample dates or times
    - Misclassification of incidents
    - Inconsistent application of detection limits

**Bias Risk Assessment**:

- **Low**: Due to rigorous validation procedures and automated checks.
- **Actions Taken**:
    - Database queries to identify anomalies
    - Manual verification of classifications
    - Annual sign-off by local authorities
    - Independent verification by the EEA

## 14.2. Non-sampling Error

### 14.2.1. Measurement error

- **Sources**:
    - Lab methods and quality control
    - Data entry to database
    - Deviations from sampling protocols
- **Prevention**:
    - Standardised protocols in the Regulations
    - Training and guidance for local authorities
    - Automated checks in EDEN and MDS systems
- **Assessment**:
    - Internal audits
    - Spot checks
    - Comparison with historical data

### 14.2.2. Item Non-Response Rate

- **Non-response** is rare due to statutory obligations.
- **Variables most affected**: Sample time, incident details.
- **Bias Risk**: Low, due to follow-up procedures.
- **Treatment**:
    - Follow-up emails and calls
    - Escalation to senior management if needed
    - Section 63 of EPA Act used if necessary

# 15. Timeliness and punctuality

## 15.1.Timeliness

- **Annual Report**: Published before May 31st each year.
- **Real-time data**: Sample results published on beaches.ie within hours of submission.
- **Efforts to reduce lag**:
    - Automated data pipelines
    - Improved coordination with local authorities

### 15.2. Punctuality

- **TP3 (on-time delivery rate)**: 100% for the past 5 years.
- **Release schedule**: Included in EPA and CSO calendars.
- **No delays reported**.
- **Future Plans**:
    - Continued inclusion in CSO Statistical Work Plan
    - Publication of release dates on EPA website

## 16. Coherence & Comparability

### 16.1.Comparability – Geographical

- No major issues: All local authorities follow the same Regulations.
- Minor discrepancies:
    - Sampling frequency may vary slightly
    - Incident reporting practices differ
- Effect on output: Minimal

### 16.2. Comparability over time

- **Minor changes**:
    - Updates to EC reporting formats
    - Improvements in IT systems
- **Impact**: No significant effect on comparability

#### 16.2.1. Length of Comparable Time series

**11 years**: Comparable data available from 2014 to 2024.

## 17. Revisions

### 17.1.Data Revision Policy

The EPA's Bathing Water Quality statistics follow a structured revision policy aligned with the principles of the **European Statistics Code of Practice (ESCoP)** and the **Irish Statistical System Code of Practice (ISSCoP)**. The EPA's **Revision and Dissemination Policy for Bathing Water Quality Statistics** is available on the beaches.ie website at EPA-Revision-Dissemination-Policy-for-Bathing-Water-Report-2.pdf.
**Types of Revisions Covered**:

- **Planned revisions**: e.g. updates to classifications following late sample submissions.
- **Unplanned revisions**: e.g. corrections to sample dates or bacterial counts.
- **Benchmark revisions**: not applicable to this dataset.
- **Conceptual/methodological revisions**: e.g. changes in EC reporting schema or classification thresholds.

### 17.2. Data Revision Practice

- **Planned revisions**: Occur annually when local authorities review and sign off on preliminary classifications. These are incorporated before the final report is published.

- **Unplanned revisions**: Rare, but may occur due to:
  - Incorrect sample dates
  - Misclassification of incidents
  - Data entry errors

**Average Size of Revisions**:

- **Qualitative assessment**: Very small, typically affecting 1–2 bathing waters per year. Direction is neutral or corrective.

**Prevention Measures**:

- Automated validation checks
- Manual review of anomalies
- Annual feedback to local authorities

# 18. Statistical processing

## 18.1. Source Type

The Bathing Water Quality statistics are based on **primary data collected by local authorities**, not administrative or survey data. The process is a **full census** of all designated bathing waters.

**Source Characteristics**:

- Sample results for E. coli and Intestinal Enterococci
- Incident reports (e.g. pollution events)
- Monitoring calendars

## 18.2. Data Collection

### 18.2.1. Data Capture

- **Method**: Manual data entry via the EPA's **Environmental Data Exchange Network (EDEN)** and **Monitoring Data System (MDS)**.
- **Checks at Entry**:
  - Format validation (e.g. date/time)
  - Parameter completeness
  - Station/sample code verification
- **IT Tools Used**:
  - EDEN
  - MDS
  - SQL-based validation queries

## 18.3. Data Validation

- **Procedures**:
  - Automated checks during data entry
  - Manual review of anomalies
  - Monthly and end-of-season audits
- **Aggregate Validation**:
  - Comparison with previous years
  - Spot checks of classification calculations
  - Sign-off by local authorities
- **Related Datasets**:
  - EEA bathing water classifications
  - CSO Sustainable Development Indicators

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### 18.4. Data Compilation

Operations performed on data to derive new information according to a given set of rules.

- **Derived Variables**:
  - Annual classification (Excellent, Good, Sufficient, Poor)
  - Sample-level quality ratings
- **Aggregation Procedures**:
  - Log-transformation of bacterial counts
  - Calculation of 90th and 95th percentiles
  - Back-transformation for classification thresholds

### 18.5. Adjustment

- **No macro-level adjustments** are applied.
- **No seasonal adjustment** is relevant.
- All data are processed according to the methodology defined in the **Bathing Water Directive** and **Irish Regulations**.

## 19. Additional Notes

- The EPA has developed a **Summary Methodology** document for Bathing Water Quality Statistics which is published on the beaches.ie website at EPA-Summary-methodology-for-Bathing-Water-Report.pdf
- The EPA is committed to **ISSCoP/ESCoP certification** for its statistical outputs, with a rolling programme in place.
- Improvements planned for 2025 include:
  - Publication of more accessible machine-readable classification data
  - Enhanced signage and public alert systems
  - Annual workshops with local authorities

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