State of the Water Environment indicator B3: Supporting evidence pack May 2025

NATURAL ENGLAND

Environment Agency

Contents May 2025

This pack presents data and evidence across the breadth of the water environment to support the published B3 State of the Water Environment indicator: an accessible (HTML) version of this slide pack is published on gov.uk

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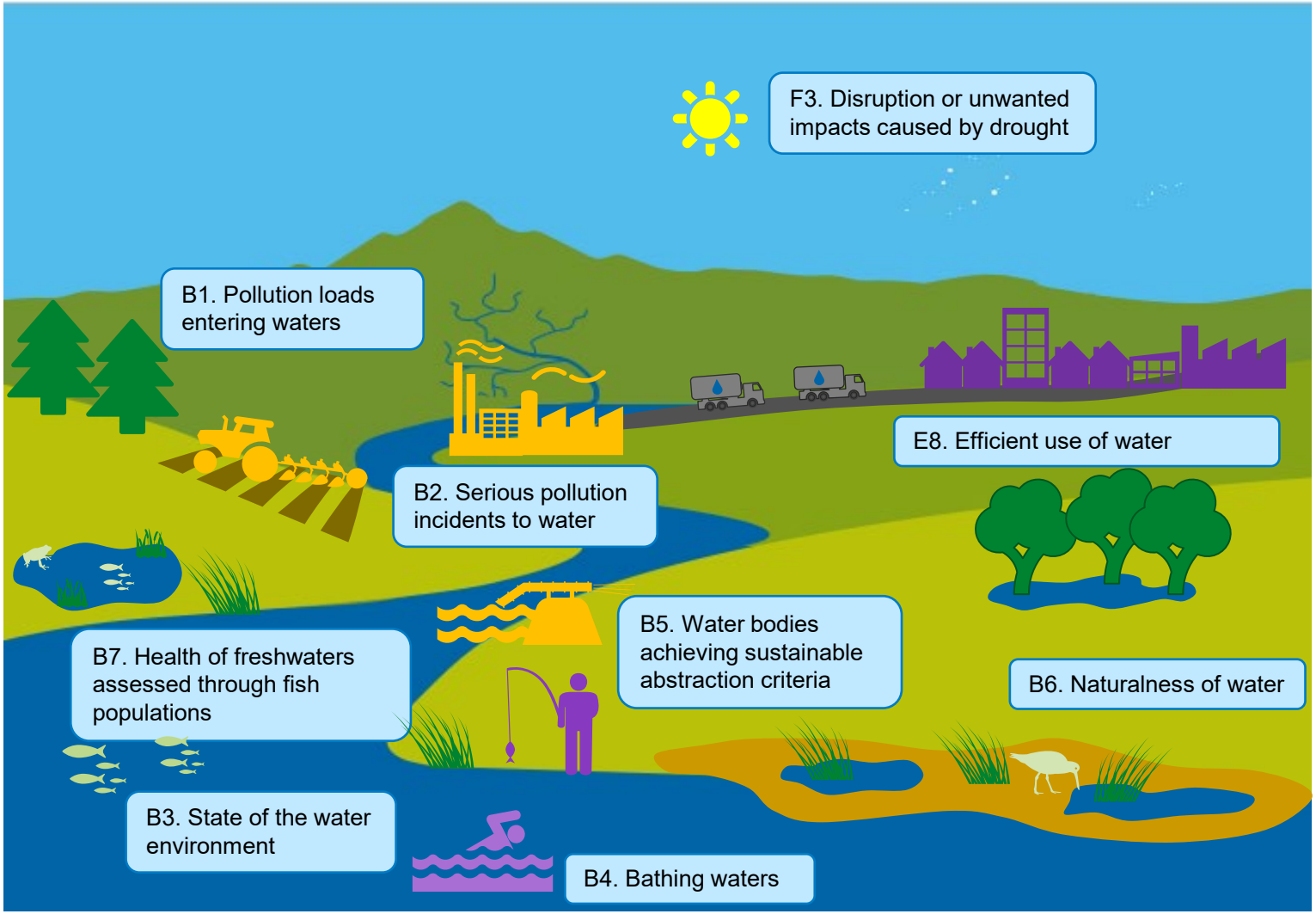
25 Year Environment Plan: Clean and Plentiful Water Indicators



This infographic shows the individual Indicators that form the Water Theme (B1-B7) in the 25 YEP, and two related indicators that relate to water use, quantity and availability (E8 and F3)

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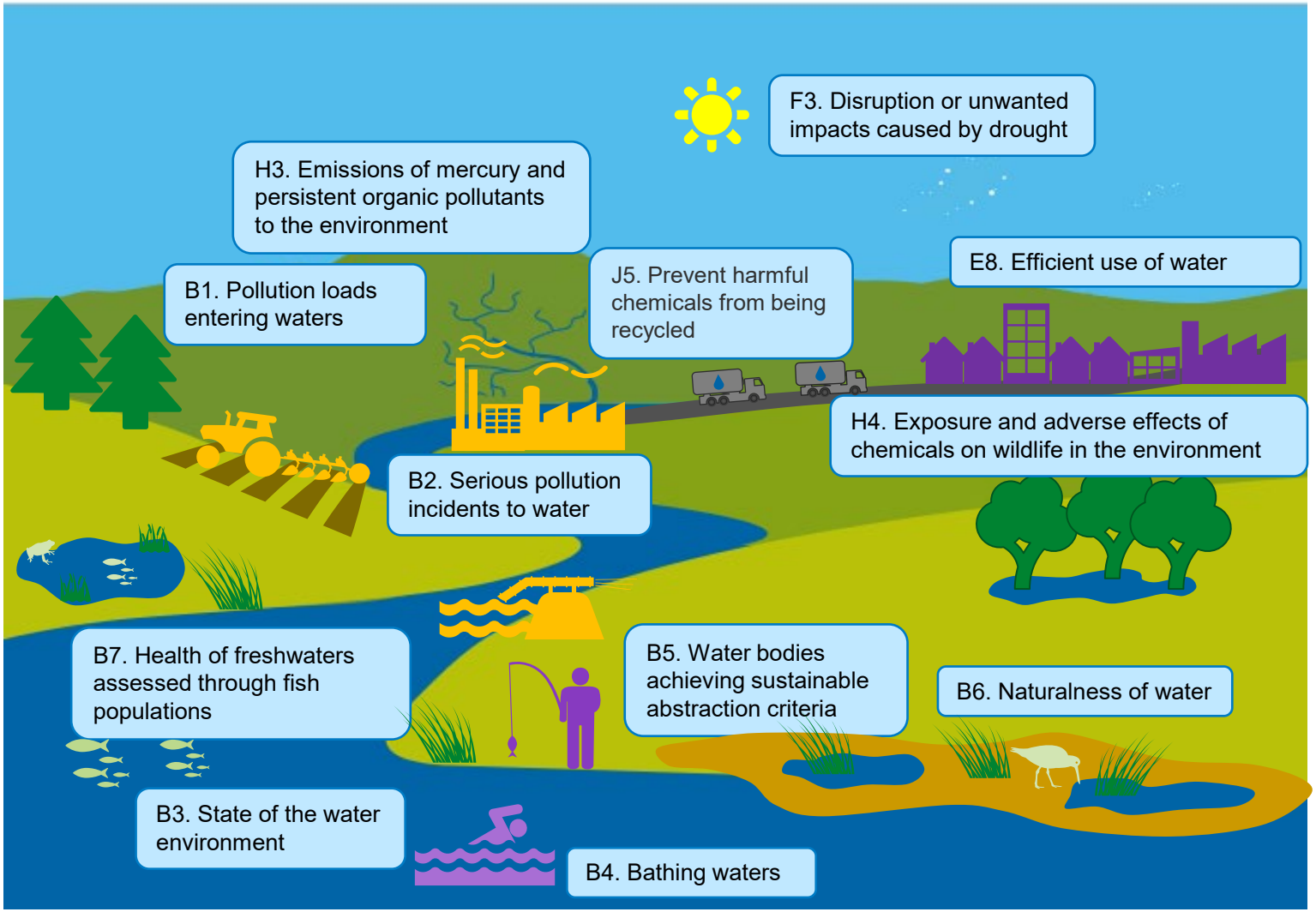
25 Year Environment Plan: Water, Resilience to Natural Hazards and Chemical Theme Indicators



This infographic combines the *Water* Theme Indicators and adds in the other indicators within the *Resilience to natural hazards* (F3), together with those that are under the *Managing exposure to chemicals and minimising waste* (H3, H4 and J5) themes within the framework

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State of the Water Environment in England

16% of surface waters and 79% of individual tests achieve good ecological status

Rivers- 14% of rivers and 77% of individual tests are at good ecological status

Biology

Fish[2022]:
43% at good status

Invertebrates:
76% at good status

Macrophytes and phytobentos:
45% at good status

Physical modification

Inc. canals:
58% support good status

Water quality

Dissolved oxygen:
82% at good status

Ammonia:
92% at good status

Phosphorus:
45% at good status

Hazardous substances

Chemical status:
0% at good status

Chemical status excluding uPBTs:
93% at good status

Lakes- 14% at good ecological status

Biology

Phytoplankton:
52% at good status

Macrophytes & phytobenthos:
29% at good status

Physical modification

51% support good status

Water Quality

Total phosphorus:
25% at good status

Total nitrogen:
45% at good status

Hazardous substances

Chemical status:
0% at good status

Chemical status excluding uPBTs:
100% at good status

Estuaries- 19% at good ecological status

Biology

Fish:
77% at good status

Invertebrates:
67% at good status

Saltmarsh:
36% at good status

Seagrass:
90% at good status

Hazardous substances

Chemical status:
0% at good status

Chemical status excluding uPBTs:
92% at good status

Physical modification

50% support good status

*Eutrophication[2022]

Combined assessment:

- 43% certain there is no problem
- 41% uncertain there is a problem
- 13% quite certain there is a problem
- 3% very certain there is a problem

Coastal waters- 45% at good ecological status

Biology

Invertebrates:
87% at good status

Saltmarsh:
50% at good status

Seagrass:
83% at good status

*Eutrophication[2022]

Combined assessment:

- 71% certain there is no problem
- 27% uncertain there is a problem
- 0% quite certain there is a problem
- 2% very certain there is a problem

Hazardous substances

Chemical status:
0% at good status

Chemical status excluding uPBTs:
100% at good status

Physical modification

74% support good status

Groundwater

Quantity:
73% at good status

Quality:
45% at good status

Drinking Water Protected Areas

Surface water[2022]:
47% not at risk of deterioration

Groundwater[2019]:
53% not at risk of deterioation

Designated Bathing Waters[2024]

- 64% Excellent
- 21% Good
- 6% Sufficient
- 8% Poor

An increase of 27 new designations must be considered when comparing 2024/2023 classifications

Shellfish Waters[2023]

- 29% Pass
- 71% Fail

Based on 2023 data of 72 assessed shellfish water protected areas, out of 101 designations

Protected Nature Sites[2022]

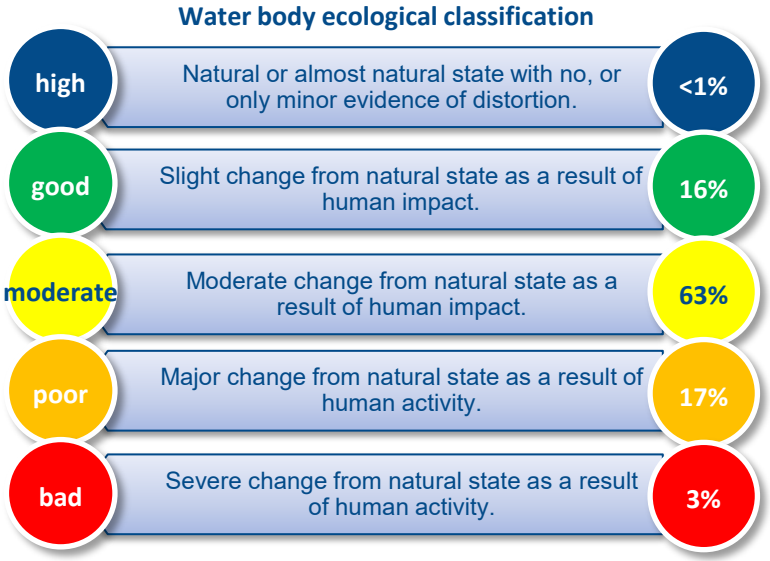
- 45% Favourable condition
- 43% Unfavourable recovering
- 6% Unfavourable no change
- 6% Unfavourable declining

Figures are percentages of water bodies assessed; where referred to as 'at good status', this is good or better status and potential. Non-integer numbers are rounded down to the nearest whole number.
For % figures supporting good status and potential under Physical modification, this data is taken from the RNAG dataset (March 2019)
Not all indicators update annually: unless more recent data is available as stated, all data was sourced 2019
Hazardous substances: uPBTs are substances that are ubiquitous, persistent, bio-accumulative and toxic.
WFD water body classification data is available on data.gov.uk. For other data marked * or for an accessible version of this slide contact enquiries@environment-agency.gov.uk

Surface waters- ecological and chemical classification

Ecological

- **Ecological status** is assigned using various water, habitat and biological quality tests. Failure of any one individual test means that the whole water body fails to achieve good or better ecological status or potential (the “one out all out” rule).
- Data on slide 5 show for each surface water type representative elements that are tested to assess the condition of the water body; reflecting water quality and/or hydromorphology.
- Ecological status is measured in **5 classes (bad, poor, moderate, good and high).**
- 2019 classification results show surface water ecological status has remained stable, and 16% of surface water bodies achieved good or better ecological status or potential, the same as in 2016.



Chemical

- **Chemical status** is calculated by assessing 52 different chemical elements (both individual and groups of chemicals). Water bodies are classified as **either good or failing**.
- For 2019 chemical classifications, new assessments for uPBTs (ubiquitous, Persistent, Bioaccumulative, Toxic substances) were included, as well as new standards and improved techniques and methods.
- This resulted in 0% surface water bodies meeting the criteria for achieving good chemical status in 2019 (compared to 97% pass rate in 2016).
- If we exclude the new assessments for uPBTs, 6.2% of surface water bodies fail the chemical tests and 93.8% pass.
- Current data is shown as ‘Hazardous substances’ on slide 5. This shows the water body results for rivers, lakes, estuaries and coastal waters for chemical status with and without the uPBTs.

The 2019 water body classification data are published on data.gov.uk

Accessing information in the river basin management plans, updated 2022 on gov.uk

Explore catchment data in the Catchment Data Explorer (CDE)

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New monitoring approach and data for future reporting

- Under our previous approaches to monitoring and reporting the state of the water environment, it has proven challenging to separate out the evidence of environmental change over time from the targeted monitoring evidence designed to identify pressures and solutions. In addition, we have not been measuring some aspects of the water environment which are anticipated to change, or which are important in providing goods and services on which the economy and people rely.
- As a result, we were missing vital information required to measure progress against and meet the dual aspiration in the Defra 25YEP/EIP23 of improving the environment whilst ensuring it continues to support the economy.
- A fresh approach to assessing change in the water environment is needed. To enable us to do that, the government has funded the Natural Capital and Ecosystem Assessment programme (NCEA). The NCEA will design and deliver an unbiased and holistic view of the state of our water environment, how it changes over time and the benefits it provides society.

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New monitoring approach and data for future reporting cont.

- The NCEA programme is delivering a set of national scale surveillance monitoring networks that will enable us to assess the state of and trends in the water environment over time. These networks complement our pressure-specific local monitoring programmes, allowing us to track and evaluate national-scale changes to the water environment.
- New water surveillance networks include: Rivers, Groundwater, Small Streams, Lakes, River Temperature, Estuaries and Coasts. In addition, we are trialling innovative techniques and methodologies, including eDNA and acoustic monitoring.
- The NCEA programme will develop indicators and metrics to assess the capacity of the water environment to deliver benefits to society, and how these are affected by changes to the state of our water environment.
- The data and evidence from these new networks will be included in 25YEP/ EIP23 reporting on the state of the water environment in future.
- This is a large and complex programme which is taking time to develop and phase in over the next few years.

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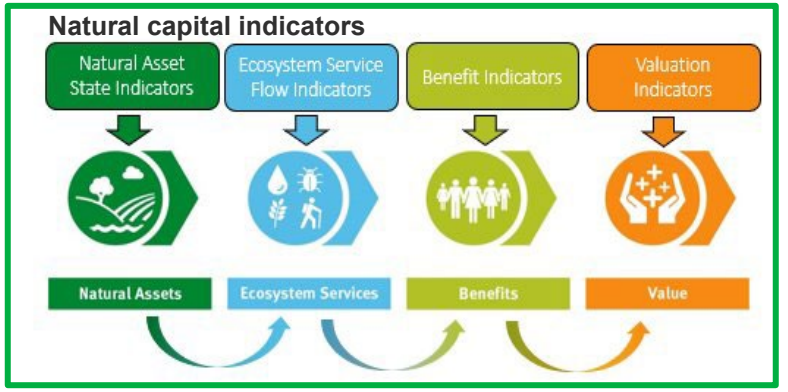
Developing natural capital indicators to sustainably manage the water environment

- A healthy water environment provides many goods and services which benefit people and the economy, such as clean water, flood protection or places for recreation. However, we are lacking information about the importance of the water environment to society which, if available, would help us understand the trade-offs between the state of the environment and the benefits derived from it, helping us to manage the environment sustainably, ensuring it continues to support people and the economy.
- Natural capital indicators address this gap by focussing on the contribution of the environment to society and the economy, including:
  - the **state** of the environment and its ability to provide **goods & services**,
  - the **benefits** gained by society, **who benefits** and the **value** of those benefits,
  - the **risks** to flows of goods and services caused by changes in natural assets, and the **consequences** to people and the economy.



- **Natural capital indicators** are being developed to complement traditional ways of reporting on the state of the water environment. In addition, we can put existing indicators into a natural capital context (slide 10), so we can better understand the impact and consequences to society of changes in the state of the water environment.
- In many cases natural capital indicators can be developed from existing monitoring data. However, in some cases they will require a shift to monitoring those properties of the environment which are most closely related to their ability to deliver services to people (e.g. extent of active floodplain contributing to flood protection), or will involve combining environmental, social and economic data (e.g. to assess the improvements in physical and mental health of people using bathing waters).

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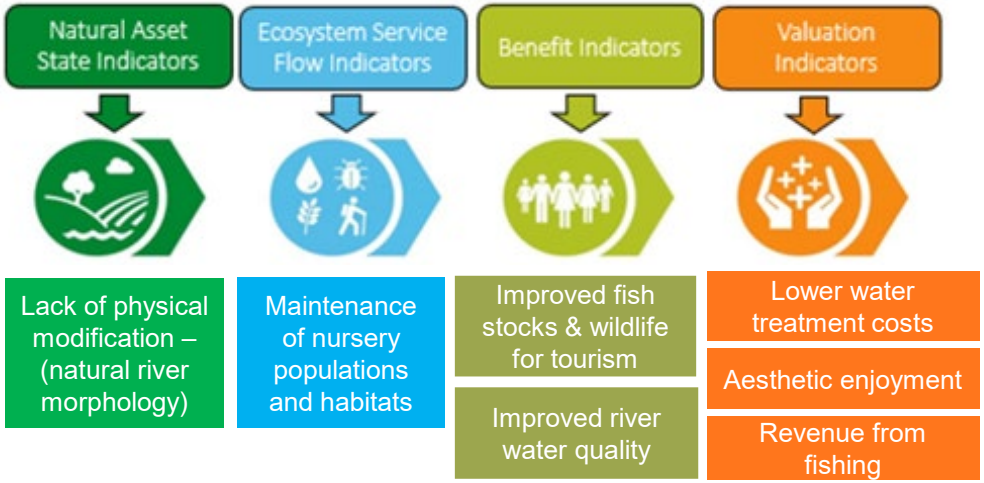
Natural capital indicators example: Physical modification of rivers

Traditional indicator: WFD River morphological condition (% supporting good status and potential)

Natural capital indicators:
Natural capital indicators demonstrate benefits to the environment and people.



A large proportion of our lowland rivers have been straightened, dredged or enclosed in a culvert for reasons that include creating larger, better drained fields for agriculture, reducing flood risk, and making space to build homes or roads. These changes in the morphology of the river channel and surrounding vegetation have detrimental consequences for wildlife that live in and around the river. We assess this level of morphological change and report it through the Water Framework Directive as 'percentage of rivers supporting good status and potential, in relation to morphological condition.'

We can develop natural capital indicators that tell us about the consequences of river morphology for the river ecology and the subsequent benefits to people. The more natural a river's morphology, the more the river can support diverse and resilient plant and invertebrate ecological communities, which in turn support higher fish stocks and produce more water purification ecosystem services. These provide benefits to people, including opportunities for recreation, fishing, lower water treatment costs, some of which can be valued. By taking into account these benefits when deciding how to maintain the river, we can manage it to maximise benefits for both wildlife and society.

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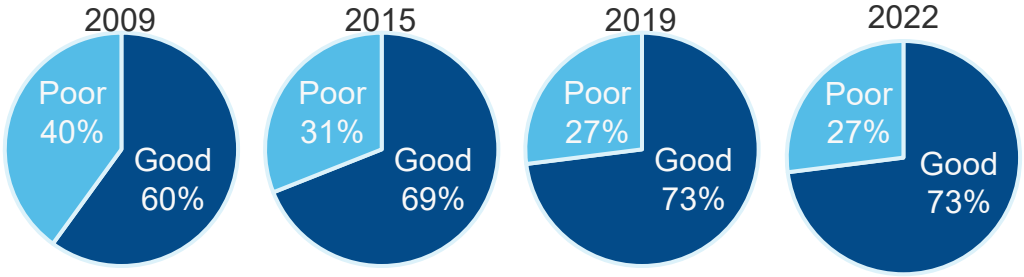
Groundwater

Nitrate is the most common cause of groundwater test failure

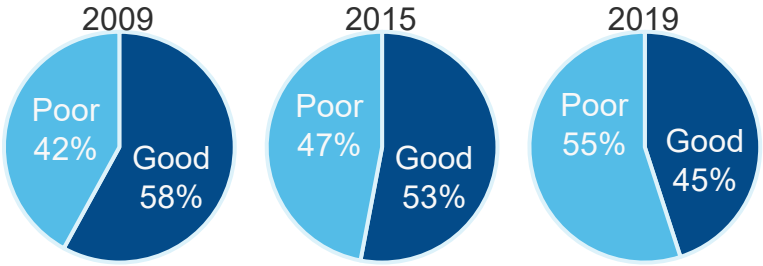
Groundwater quantitative classification

Net **increase** in the number of groundwater bodies meeting **Good quantitative status**



Groundwater chemical classification

Net **decrease** in the number of groundwater bodies meeting **Good chemical status**



Substances causing failure for 2019 across all tests and groundwater bodies

Other:
Solvents (12), Lead (11), Electrical conductivity (9), Aluminium (9), Pesticides (8), Cadmium (8), Arsenic (8), Boron (6), Sodium (3), Other metals (2), Mecoprop (2), Hydrocarbons (2), Bromate (2), PAHs (1), PFAs (1), Fluoride (1), Chromium (1), Antimony (1)

The Groundwater classification status and objectives data are published on data.gov.uk

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Drinking water protected areas (DrWPAs)

Reservoirs, lakes, rivers and groundwater, from which raw water is abstracted for human consumption at a rate of 10 m3/day or more or serving more than 50 people, are classified as Drinking Water Protected Areas (DrWPAs). These criteria are defined in the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Safeguard zones are areas connected to the DrWPA where pollution needs to be reduced to protect the drinking water resource.

For surface water DrWPAs the safeguard zones cover the upstream catchment areas which can include more than one DrWPA. For groundwaters, the DrWPA is a large underground aquifer which may include multiple safeguard zones to protect springs or boreholes.

Safeguard zones can cover more than one pollutant type, and are established when raw water quality is deteriorating, or is likely to deteriorate in the future i.e. is 'at risk of deterioration'. Measures aiming to avoid deterioration, reducing the level of water treatment required to produce drinking water, are set out in Safeguard Zone Action Plans.

There are **450** surface water DrWPAs

There are **240** at risk of deterioration

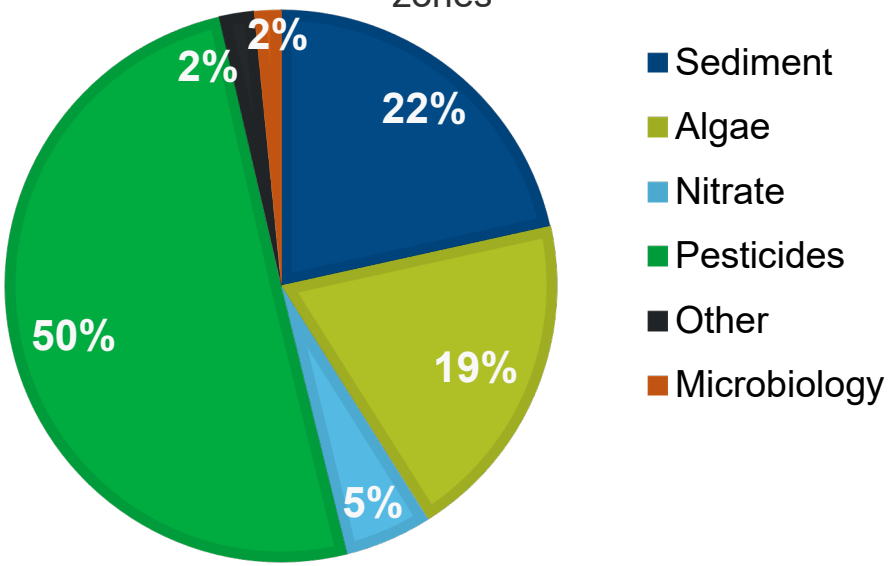
There are **271** groundwater DrWPAs

There are **127** at risk of deterioration

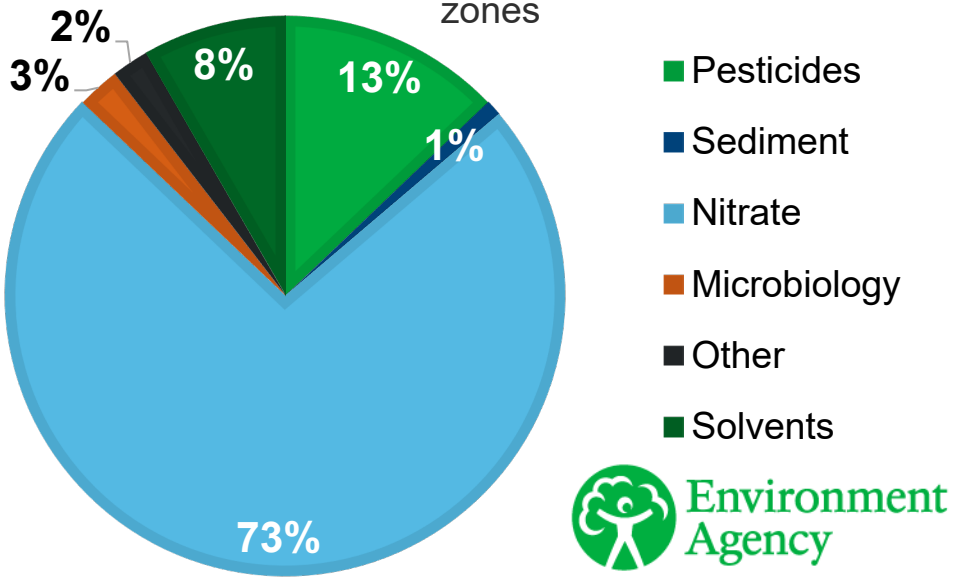
There are 148 surface water safeguard zones

There are 251 groundwater safeguard zones

Reasons for establishing surface water safeguard zones



Reasons for establishing groundwater safeguard zones



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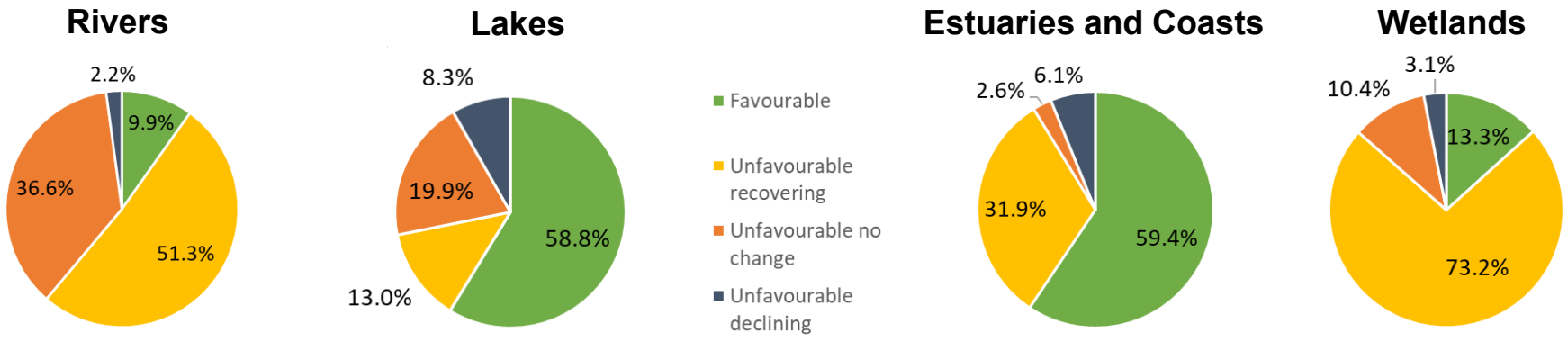
European protected nature sites for water and wetlands

Underlying Site of Special Scientific Interest (SSSI) unit condition by habitat



Condition change – All SSSI units underlying water-dependent habitats

Favourable
240,179 hectares 45%

Unfavourable recovering
229,298 hectares 43%

Unfavourable no change
29,860 hectares 6%

Unfavourable declining
32,229 hectares 6%

- Includes rivers, lakes, wetlands, estuaries and coasts, and other water-dependent habitats
- Sites designated for birds may be in favourable condition without assessment of water quality
- Excludes Adverse Condition Reasons that are unrelated to Water Framework Directive drivers
- Data retrieved: **November 2022**
- Bespoke data analysis – not a published dataset
- Further information: Natural England Enquiries 0300 060 3900

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Key issues and sectors affecting water bodies in England

Issue	Agriculture and rural land management	Industry	Mining and quarrying	Navigation	Urban and transport	Water Industry	Local and Central Government	Domestic General Public	Recreation	Waste treatment and disposal	No sector responsible	% of water bodies impacted by each issue
Physical modifications	12.9%	1.9%	0.1%	1.9%	10.9%	7.9%	14.3%	0.3%	2.9%		0.1%	41%
Pollution from waste water	0.1%	0.5%			0.6%	35%	0.2%	1.1%		0.1%		36%
Pollution from towns, cities and transport	0.1%	3.4%	0.1%		10.1%	0.8%		6.4%	0.2%	0.3%	0.1%	18%
Changes to natural flow and levels of water	1.3%	0.4%		0.1%		9.8%	0.2%		0.1%			15%
Non-native invasive species											23%	23%
Pollution from rural areas	40.0%											40%
Pollution from abandoned mines			3.2%									3%
% of water bodies impacted by each sector	45%	6%	3%	2%	18%	44%	14%	8%	3%	0.3%	23%	

Note: the bottom row and right hand column are not summations of the rows and columns in the main table – see Introduction

Where:

	High (>30%)
	Medium (<30% and >10%)
	Low (<10% and >1%)
	Very Low (<1% and >0.1%)
	Insignificant (<0.1%)

The figures in the separate row at the bottom of the table '% *of water bodies impacted by the activity of each sector*', and those in the separate column on the right of the table *'% of water bodies impacted by each issue*' are not summations of the figures displayed in the main table. These percentages have been calculated by only counting any particular water body once per sector or per issue, and so avoid including multiple entries as outlined above.

Reference: Environment Agency Challenges & Choices 2019.
Further reports supporting river basin management plans: River Basin Planning: Challenges for the water environment
An accessible version of this table is published on gov.uk

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Key issues preventing good water quality in England – notes for slide 11

- The majority of the data used to produce the table are taken from the 2019 set of probable and confirmed reasons for not achieving good status (RNAGS) linked to 2016 WFD classifications, with the exception of:
    1. Changes to the natural flows and levels of water. The data are for those water bodies that do not have sustainable levels of abstractions. The sector contributions include suspected, probable and confirmed RNAGs.
    2. Invasive non-native species. This uses Environment Agency monitoring data and are for water bodies that have specific invasive non-native species present which we consider to be contributing to the water body not achieving good ecological status.
- 'No sector responsible' covers those situations where it is not possible to assign the failure to achieve good status to the activities of a specific sector. We have used this category mainly for invasive non-native species. Whilst the speed of their spread can be increased by poor practice, it is not possible to say whether their presence in a particular water body is 'natural' or due to someone's actions.
- Around 6% of water bodies have one or more RNAGSs where the sector responsible is still under investigation. Around 5% of water bodies have one or more RNAGSs caused by a different sector to those listed in the table. These are mainly where the issue is physical modification.
- For further information please contact: enquiries@environment-agency.gov.uk

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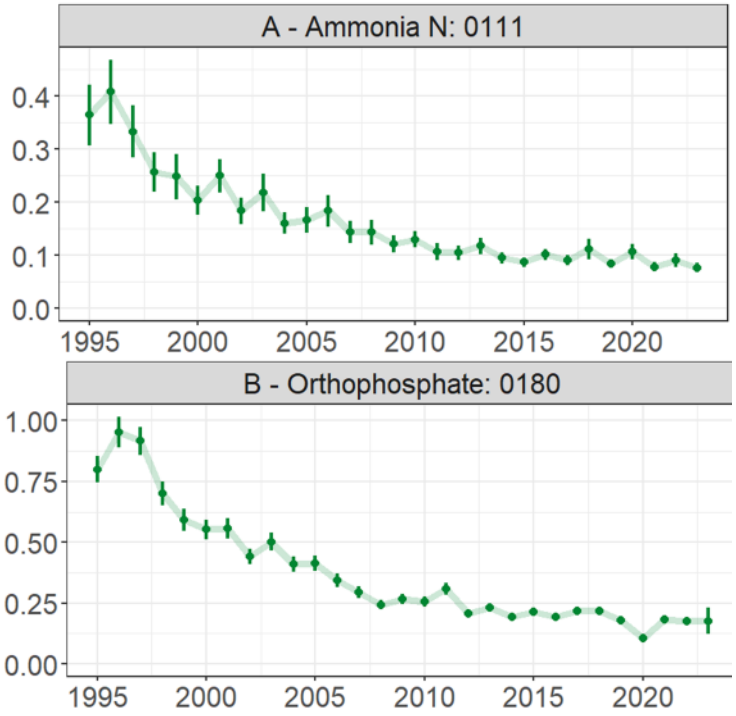
Long-term trends in river quality in England

The Harmonised Monitoring Scheme (HMS) network provides a reliable and consistent data set for assessing how the water quality of England's principal rivers has changed over time. In 2024, new analysis across 135 HMS sites in England has been conducted on data dating back from 1980 for river concentrations of nutrients, ammonia and biochemical oxygen demand (BOD), and river concentrations of dissolved metals dating back to 1990. Though the network extends before this, data is more variable before 1980/90. Pollution incidents are also excluded, giving a focus on longer term trends in water quality.

All dissolved metals and many concentrations of these components indicative of water quality have substantially reduced over the period 1990 to 2023: as shown below, arithmetic mean ammonia concentrations have reduced by 85%, and orthophosphate concentrations by 83%. Concentrations have continued to decrease in the period from 2000 and from 2010, though some have also risen.

For further component results and graphics, **see the full report.**

The locations of the 135 HMS sites in England included in the analysis. One site on the River Carnon was excluded in the calculation of concentrations for metals.



HMS Trends from 1995 to 2023 in arithmetic mean annual concentration (mg/l) with 95% confidence interval of A: ammonia as N, and B: orthophosphate.

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Updates to B3 Indicator supporting pack

The changes made between the previous B3 supporting pack (May 2024) and this refreshed version (May 2025) are given below:

Slide 5, State of the Water Environment in England:

- **Designated Bathing Waters tile:** 2024 classifications updated from previous 2023 results:
  - Excellent, from 66% to 64%
  - Good, from 24% to 21%
  - Sufficient remaining at 6%
  - Poor, from 4% to 8%
  - Caveat text added for the 2024 results: "An increase of 27 new designations must be considered when comparing 2024/2023 classifications."
- **Shellfish Waters tile:** 2023 classifications updated from previous 2022 results:
  - Pass, from 35% to 29%
  - Fail, from 65% to 71% fail.
  - Shellfish protected area sites updated, from 74 sites assessed out of 101 designation in 2022, to 72 in 2023.

Slide 16, Long-term trends in river quality in England

- New slide, describing completed 2024 analysis results of a long-term water quality and chemical monitoring project in England.

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