Written evidence submitted by the Environment Agency

1. There are multiple influences on river water quality in England. To make significant improvements will require investment from the water and farming industries and individual behaviour changes.

2. We must continue to tackle a legacy of Victorian drainage systems, historic lack of capital investment in agriculture, sewerage and road infrastructure, and insufficient maintenance of that infrastructure.

3. Since its creation, the Environment Agency has overseen significant reductions in polluting inputs to our waters. Through regulation and investment, waste water treatment works are estimated to discharge 67% less phosphorus and 79% less ammonia into rivers than in 1995 (Annex A). Since the 1990s, there has been a big increase in the numbers of macro-invertebrates in rivers; animals like snails, worms and insects are an indicator of improving health of England's waters.

4. Improved analytical techniques are increasing our understanding of the challenges.

5. The changing climate and growing population make targets harder to reach.

6. Only 16% of water bodies (14% of river water bodies) are at good ecological status. 35% of water bodies are polluted by discharges of waste water from the water industry, including treated and untreated sewage. 18% of water bodies are polluted by diffuse urban pollution. This includes polluted run-off from urban areas, drainage from transport networks, wrongly connected foul water drains, and pollution from contaminated land. 45% of water bodies are impacted by pollution from rural areas. Annex B shows a summary of the issues and sectors whose activities are preventing achieving good ecological status.

7. We need to accelerate our efforts if we are to achieve the Defra 25 Year Plan ambition of clean and plentiful water. Investment and innovation will be needed across the public and private sectors. As our chair, Emma Howard Boyd said recently 'we get the environment we are prepared to pay for'.

Q1: What are the best indicators for river water quality that could be used as targets being developed under the Environment Bill?

8. River basin management plans establish long-term environmental outcomes for England's waters (rivers, lakes, estuaries, coastal and groundwater) and set out measures to meet them. Every surface water body is classified[1] indicating the state of the ecology, physical habitat, water quality and quantity.

9. Good Ecological Status (GES), established in regulations and ministerial directions, is a measure of environmental quality reflecting minimal disturbance by man i.e. near natural. The 'state of the water environment' is an indicator[2] under the 'Clean and Plentiful Water' goal in the 25 Year Environment Plan (25YEP)[3].

10. The Environment Bill water targets[4] under consideration are intended to drive action in sectors responsible for the most significant pressures on the water environment. They will not duplicate existing legislation or statutory commitments. They look to progress the overall aims of the 25YEP and legislative requirements**,** improving our water environment by 2043. Defra is considering four targets: reduce nutrient pollution from agriculture and waste water; reduce water demand; and reduce the impact from metal mines.

11. This work is informed by analysis undertaken for the Challenges and Choices consultation[5] including evidence on the pressures to the water environment (Annex B) and their relative

prevalence. However, impacts on the water environment need to be taken as a whole. The best indicators look at the whole water environment driving action to improve physical habitats as well as water pollution impacting on water quality.

Q2: How could drainage and sewage management plans, introduced by the Environment Bill, play a role in reduced sewer discharges?

12. The requirement for Drainage and Sewerage Management Plans, commonly known as Water Company Drainage and Wastewater Management Plans (DWMPs), to become statutory when the Environment Bill is introduced[6] is a welcome step towards ending pollution from storm overflows.

13. The first tranche of DWMPs will be published for consultation in 2022[a]. DWMPs are intended to be updated continuously and published at least every 5 years. DWMPs link societal needs (e.g. reduced sewer discharges), waste water asset performance/integrity and external pressures such as population growth and climate change.

14. DWMPs require water companies to assess and report performance against six national planning objectives including storm overflow performance, sewer flooding and pollution incidents. Through consultation, stakeholders and decision makers will understand the issues contributing to sewer discharges and measures needed to reduce them.

15. DWMPs will include measures to achieve our collective goal of eliminating harm from storm overflows and form a robust evidence base informing investment priorities within water company five-yearly business plans.

16. Alongside aligning, managing and reducing current risks, DWMPs allow future risks such as external physical risks (for example climate, growth), internal risks (asset degradation) and external societal needs (for example changes in stakeholder expectations) to be accounted for.

17. DWMPs will assess risk at current and 25 year planning scenarios. By having sight of how future risks might develop, there is opportunity to manage these more sustainably than the current five year price review planning horizons allow.

Q3: How adequate are the monitoring and reporting requirements around water company discharges? How can technology improve and assist with transparency and enforcement?

18. Monitoring is fundamental to understanding and improving the environment underpinning our planning, compliance and enforcement work.

19. Event Duration Monitoring (EDM) of how often and for how long storm overflows discharge has become widespread over the last five years, but coverage needs to increase and data communicated and used effectively.

20. Prior to 2015, only sensitive coastal storm overflows discharging to bathing and shellfish waters were monitored. Working with water companies, we are concluding an EDM programme covering about 13,000 of the 15,000 overflows in England; the plan is for all overflows to be monitored by 2023. Monitoring and reporting of these data by water companies is a legal requirement of the discharge permits we issue.

21. The data we receive from EDM allows identification of those storm overflows spilling most often or having the longest durations with the highest potential risk of causing unsatisfactory

[a] requirement under the periodic review and pre-dates any requirements intended to be enacted through the Environment Bill

environmental impact. This informs prioritisation, investigation and investment through the Water Industry National Environment Programme. Over 800 overflows are being investigated and just under 800 overflows improved during 2020-2025. We encourage water companies to understand the environmental impact of their storm overflows so necessary improvements can be identified.

22. Following recommendations from Defra's Storm Overflows Taskforce water companies will increase transparency around when and how storm overflows are used. Real-time data on overflows at bathing sites will be available all year round. Work to install monitoring devices at all overflows will be accelerated creating a complete picture of storm overflow activity by 2023. Water companies will publish annual monitoring data on storm overflow use enabling progress in reducing their use to be tracked. We will compile this data into an annual report accessible to the public[7].

23. The chemical quality of waste water treatment works' effluent is monitored to ensure discharges meet stringent requirements set out in discharge permits. Compliance with these standards is high at around 98% for the sector (EA, 2020)[8].

24. Operator self-monitoring (OSM), introduced in 2009, requires water and sewerage companies to sample their own effluent, in line with specific monitoring and analytical requirements, and report results to us, flagging any breaches that occur as a priority. Our Operator Monitoring Assessment audits and inspections reinforce the OSM requirement; all breaches are followed up and, where required, lead to formal investigations and enforcement action. This is in line with other industries we regulate. We are confident in the effectiveness of our regulation and our ability to hold the water companies to account.

25. Since 2009 the water and sewerage companies have taken over 800,000 waste water compliance samples. Around 3,500 wastewater treatment works are monitored each year, with an average of 59 failing works per year giving an average annual compliance rate of 98.3%. Final effluent compliance has remained stable between 97-99% over this period.

26. Requiring water companies to monitor and report their own environmental performance, with rigorous checks, increases their responsibility and frees up our resources.

27. New requirements to monitor and report all flows at waste water treatment works are currently being introduced. This will give greater visibility and enable better regulation of the overall environmental impact of these discharges from treatment works.

28. Monitoring of effluents using continuous monitors for quality as well as flow would give better visibility of what is happening at waste water treatment works 24/7 and trigger early warning if effluents were starting to deteriorate. This is something the companies already use at an operational level and we would like to explore its use for regulatory purposes.

Q4: What is the impact of plastic pollution and other materials on drainage and water quality in rivers and what should be done to mitigate it?

29. Plastic[9] and chemical[10] pollution is ubiquitous and increasing. Plastics and chemicals from products used in homes enter the environment via sewers. Waste water treatment cannot always effectively remove these substances. Investment in treatment can help, but this is potentially expensive for customers.

30. Plastic pollution harms wildlife via ingestion and entanglement. Harmful effects of micro plastics are poorly understood and are potentially a vector for chemical pollutants. Source control, preventative measures and waste management improvements are needed to reduce plastic and chemical pollution.

31. Highways England[11] is researching micro-plastic and chemical pollution from highways drainage.

32. Water companies are investigating micro-plastics in waste water and sewage sludge[12], new treatment options and reviewing trade effluent agreements to reduce plastics and chemicals, taking preventative action where possible. For example, water companies have prevented the environmental release of plastic bio-beads used in waste water treatment.

33. We are far from fully understanding the complex nature of chemical pollution, making regulation increasingly challenging. Reducing unnecessary use of chemicals and keeping plastics out of the environment should be a priority, reducing the need for costly end-of-pipe treatment. Innovation in design and manufacture will play a key role enabling citizens to make informed choices and implement change. Managing the legacy of persistent plastics and chemicals is a challenge e.g. ocean plastics[13] and forever chemicals[14].

34. Misuse of the sewerage system, by flushing items that sewerage is not designed to accept causes sewer blockages and backing-up of sewage leading to pollution incidents, sewer flooding and premature spills of storm overflows impacting on people and the environment. Plastic material in the sewerage system can also blind storm overflow screens, designed to prevent discharge of solid material to the environment, again increasing flood and pollution risk.

35. Wessex Water report that 80% of their 13,000 recorded and cleared sewer blockages in 2015 were the result of sewer misuse; of those 70% were assigned to be the result of wipes[15] .

36. When plastics enter the environment they are persistent, have an aesthetic impact and cause environmental harm. In recent years there have been positive campaigns by some water companies and eNGOs. This has led to action by many manufacturers and suppliers of sanitary and wet wipe products to remove plastic content from their products and improve labelling. Such awareness campaigns should continue and increase. The moral responsibility for controlling the environmental impact is shared between the manufacturers and suppliers of such products, those who misuse them and the water companies. They need to work together to develop a sustainable solution.

37. Mitigation needed includes: plastics research[16]; funding for long-term monitoring; designing out hazardous content in products; and improved regulatory controls e.g. for sewage sludge and trade effluent.

Q5: How can consumers be persuaded to change their behaviour to minimise pollution?

38. Everyone has a responsibility to minimise pollution, and we all have a part to play in keeping our rivers healthy. Changing behaviours is extremely difficult. Consumers need help to move from good intention to action. The following examples show where behavioural change is possible.

39. Defra's Catchment Based Approach (CaBA) supports catchment partnerships of local community organisations to protect and improve their water environment and influence behaviour change. Over 2,500 organisations are involved in CaBA, with over 23,000 stakeholders engaged, delivering nearly 1,000 projects a year.

40. CaBA Monitoring and Evaluation[17] outlines evidence of behaviour change, including increasing pollution awareness through citizen science. An example is the 'Citizen Crane' project[18] where trained volunteers assess pollution, monitor chemical and biological water quality and share results.

41. The 2020 CaBA Catchment Data and Evidence Forum[19] focussed on using data and evidence to change behaviours. The CaBA Best Practice Showcase[20] describes projects across the country.

42. We have some evidence linking consumer behaviour to plastic pollution on UK beaches[b]. The #BinIt4Beaches[21] campaign and #Unblocktober[22] raise awareness of not flushing small plastic items down the toilet. Although these campaigns have reached a reasonable number of people[c] they have had limited impact on changing overall behaviours and reducing pollution.

43. A systems level behaviour change approach, involving manufacturers, businesses, government, water companies, and users, where research and behavioural insights work target the interventions effectively at root cause, is needed. A workshop[23] in 2020 started this process.

44. Learning from interventions[24] aimed at reducing household disposal of Fats, Oils and Grease (FOGs) down drains show a mixed approach is needed. Local campaigns emphasising social norms can be effective in cascading information about desired behaviours through social networks, using trusted volunteers from the local community to engage households. Providing flexible, reliable and convenient alternative waste disposal infrastructure (e.g. fat collection) can support householders develop new routines for disposing of FOGs. Increasing visibility of infrastructure 'beyond the plughole' to householders by raising awareness of consequences of blocked drains should be considered. Understanding 'polluting behaviours' helps target interventions.

45. Defra assessed Water Efficiency and Behaviour Change in 2018[25]. Consumer behaviour learning from water efficiency studies can be transferred to water quality: no 'one size fits all'; tailor messages to segmented audiences e.g. socio-demographically; and home visits, education and information improve understanding of an issue.

Q6: What is the required investment level needed to minimise storm overflows vs the scope for sustainable drainage and nature-based solutions?

46. Defra's Storm Overflows Taskforce is gathering evidence to answer this question. The level of investment required will be determined by the objectives of "minimise", i.e. how far it is proposed to go. The industry has invested over £3bn on storm overflows improving over 8,000 overflows (Annex C) over the last three decades to resolve negative environmental impacts focussing mainly on spill reduction protecting chemical and fishery status in inland waters and protecting bathing and shellfish coastal waters.

47. Storm overflows are integral features of combined sewerage systems, which serve most urban areas. Any widespread minimising of storm overflows would require re-sewering of towns and cities or diversion of rainfall runoff away from grey infrastructure[d], whilst managing flood risk. Cost estimates are of a magnitude significantly greater than £10bn.

48. Sustainable drainage solutions have a key role to play, most probably in combination with grey infrastructure solutions. Our experience is that sustainable drainage solutions often become viable when they are combined with redevelopment programmes, where there is open space and the full range of societal benefits (greening urban environments) are accounted for in option costs and benefits.

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[b] 6% of items found on the MCS UK Great British Beach Clean 2018 were associated with flushed items, such as wet wipes, tampon applicators & cotton buds and nearly always contain plastic

[c] Over the 2019 bathing season a total of 622 tweets and retweets carried the #BinIt4Beaches hashtag resulting in 5.35 million impressions

[d] Traditional engineering approach of concrete storage tanks, pipes and associated overflows

49. Delivering sustainable drainage solutions often requires multiple stakeholders and partners working in partnership, with risks/uncertainties around benefits and long term maintenance responsibilities.

Q7: How effective are the planning policy and standards around sustainable drainage systems to reduce urban diffuse pollution in England?

50. The effectiveness of planning policy is determined by its application and enforcement.

51. We provide input to planning policy and planning decisions where we are a consultee. We promote the use of sustainable drainage systems (SuDS) as they can provide multiple environmental benefits including flood risk mitigation, water flow attenuation, and improve water quality alongside habitat creation. Multifunctional SuDS can play an important role in diffuse urban pollution by helping treat run-off before it is discharged into the environment. The National Planning Policy Framework[26] (NPPF) expects 'major' developments (para 165) to incorporate multifunctional SuDS.

52. Whilst the NPPF prescribes circumstances where applications should be supported by a flood risk assessment (footnote 50), it does not include the same for information on SuDS. This leads to many applications being submitted with inadequate supporting information and contributes to SuDS being considered too late in the development design process.

53. Local Planning Authorities could benefit from having powers to require SuDS at smaller as well as major developments, on a risk basis. In 2018 a government review[27] found most approved planning applications stated SuDS would feature in the proposed development. For planning policy to be effective our view is that planning authorities need to ensure proposed SuDS are delivered by developers.

54. We continue to see heavy reliance on underground attenuation storage tanks as part of drainage systems. Whilst these features contribute to flood risk reduction, they do not deliver any significant water quality benefits.

55. The EA/Defra are reviewing the SuDS non-statutory technical standards. The review recommendations are likely to include water quality standards. Stakeholders are currently being consulted on a draft of the proposed new standards. Our view is that technical standards for SuDS should be statutory and the employment of SuDS should become a mandatory requirement for new build and significant redevelopment to reduce the polluting impact from urban drainage.

56. If planning authorities had greater powers to implement relevant targeted planning policies and SuDS become a mandatory requirement then water quality improvements would follow.

Q8: Should local authorities and highways agencies be given a duty to prevent pollution to watercourses without prior treatment?

57. Water pollution from towns, cities and transport[28] is a significant issue. As of March 2019 a total of 18% of English water bodies were impacted by pollution from this sector.

58. Whilst local authorities and highways agencies have no duty to prevent pollution from infrastructure and highway drains for which they are responsible, they may be liable for pollution if it occurs. Introducing a duty to prevent pollution would help reduce the impact from highway drainage.

59. We can permit highway drainage under current legislation but only where there is an unacceptable risk of pollution and a notice has been served on the operator of the highway drain. However, given the number of highway drains and their relatively low individual impact, this would be a cumbersome and bureaucratic approach. We believe pollution from highways

drainage is better managed through best practice and pollution prevention approaches such as SuDS.

60. We have a duty to investigate and take appropriate action against substantiated instances of pollution incidents. Under the Water Environment (Water Framework Directive) Regulations 2017 (Regulation 33) all public bodies have a duty when exercising their functions to have regard to river basin management plans to protect water bodies.

Q9: How effective is Ofwat's remit and regulation of water companies? Does it facilitate sufficient investment in improvements to water quality, including sustainable drainage systems and nature-based solutions such as constructed wetlands?

61. We share a common ambition with Ofwat to ensure water company investment meets the increasing expectations of our citizens. For example, our joint proposals for green recovery from the pandemic, providing a more resilient future, will be announced imminently. Alongside this Ofwat's £200 million Innovation Fund is designed to encourage innovation by the water industry "enabling it to better meet the evolving needs of customers, society and the environment"[29]. These are welcome opportunities to accelerate future investment and implement new ideas.

62. Ofwat's regulatory approach has facilitated water company investment of over £30bn in protecting and enhancing the water environment. This investment comes through the price review process and funds the Water Industry National Environment Programmes of work (WINEP). This has led to substantial reductions in the estimated amount of ammonia (79% compared to 1995), phosphorus (67% compared to 1995) and other pollutants entering rivers and estuaries via the waste water network. It has also improved fish passage and river flows, while allowing companies to meet their legal obligations under the Urban Waste Water Treatment Regulations 1994 and have regard to river basin management plans approved under the Water Environment (Water Framework Directive) Regulations 2017.

63. The 2020-2025 price review has seen an increase in the use of nature based and catchment approaches. There are 550 catchment schemes in the WINEP, 20% of the programme. In addition, there are 93 proposals for Integrated Constructed Wetlands. We expect this to increase during the next price review.

64. One of the biggest challenges water companies report is maintaining and managing the condition of waste water assets. Poor maintenance can lead to poor performance increasing pollution incidents and non-compliance. Funding for maintenance is accounted for outside of the WINEP in other parts of business planning process.

65. Ofwat is seeking to address overall poor performance through its outcomes approach. Companies set ambitious performance commitments in areas such as asset health and pollution. These are linked to financial incentives. This is a welcome initiative but has not yet led to the expected improvements. This is demonstrated by the Environment Agency's 2019 Environment Performance report[30] which rated 4 out of the 9 water companies as poor or requiring improvement in these areas.

66. Greater company accountability for their performance targets would help, and this could, in part, be effected through greater cooperation between regulators to police standards more effectively. We are working closely with Ofwat and the DWI to address this.

Q10: Is adequate investment being made in adapting water treatment systems to future climate change?

67. Waste water treatment and sewerage infrastructure must adapt to predicted warmer wetter winters, hotter drier summers and more frequent intense rainfall.

68. Water quality planning uses historic flow, quality and temperature data to set treatment standards to meet objectives. In future this will not be adequate. Reduced dilution in summer and warmer water temperatures will necessitate more stringent treatment, requiring more energy and carbon emissions. The Environment Agency has proposed collaborative water industry trials of low carbon treatment technologies. Investment in trialling and implementing these is essential.

69. Adapting waste water treatment systems to 2°C temperature change using current planning approaches and supported by necessary investment is likely to be achievable, although more evidence is needed to validate this. It will be more difficult and costly to adapt to a 3-4°C increase. We need improved understanding of the scale and timing of changes to be able to better estimate the required investment.

70. Investment in decarbonisation of power sources, including water companies using their own renewable energy sources, is beginning and must increase. Similarly companies are investing in nature based solutions (NBS); low energy treatment solutions which, in the right circumstances, can achieve water quality objectives and bring additional benefits such as reduced flood risk. More investment is required to implement NBS more widely and in understanding how to maximise these benefits.

71. Drainage and Wastewater Management Plans will provide the process to adapt sewerage infrastructure to meet the challenge of more intense rainfall and wetter winters, but increased investment over the long-term will be needed to ensure sewerage remains adequate.

72. The Environment Agency supports the work Water UK has underway to answer many of these questions, create a sustainable water industry and achieve 'net zero' by 2030.

Q11: How could the designation of inland bathing waters by water companiese affect the costs of achieving the associated water quality standards?

73. Until now, river water quality standards have been set to protect wildlife rather than for public health protection. Controlling levels of faecal indicator organisms (bacteria) to meet standards set by the Bathing Water Regulations[31] inland will require significant planning and investment.

74. Bacteria enter rivers from agricultural and urban land run off, and directly from discharges of sewage from storm overflows and waste water treatment plants. The relative contribution from these sources depends on the nature of the river catchment and its land use. It is unlikely that water industry investment alone will be sufficient to meet bathing water standards in most locations.

75. Where water company sewage discharges are made upstream of designated bathing waters, additional investment to reduce discharges from storm overflows and to disinfect continuous discharges from waste water treatment plants will be required. Such investment has been common practice in managing estuarine and coastal bathing water quality with water industry investment of £2.5bn between 1990 and 2020 (Environment Agency, 2019) [32] specifically to help achieve the high bathing water quality we see today (98.3% meeting at least sufficient standards in 2019[f]; 71.4% meeting excellent standards[33]). This investment has been on top of significant expenditure (consisting of a reported £12.9 billion investment to 2015 and a further planned investment of £5.8 billion up to 2025)[34] to meet Urban Wastewater Treatment Regulations' requirements.

[e] Water companies do not designate bathing waters. Designation is undertaken by the Secretary of State.
[f] Bathing waters in England were not classified in 2020 due to the impact on monitoring and analysis caused by the Coronavirus pandemic and the necessary adherence with government guidelines to prevent the spread of the virus

76. England's first river bathing water, the River Wharfe at Ilkley, was designated by Government on 22 December 2020[35]. More applications may be received in the future as interest in wild swimming continues to increase[36].

77. Whilst there are costs associated with designating inland bathing waters, there will also be benefits, including an improved amenity value of the local environment. We will help achieve society's ambitions for inland bathing waters.

February 2021

Annex A

Figure 1 and Table 1 show actual and modelled loads discharged from water company sewage treatment works in England and Wales over the period 1995 to 2015, and England only from 2020 onwards. Measured data is used for the period 1995 to 2015; modelled estimates are used for 2020 and 2027 based on Water Industry National Environment Programmes measures.

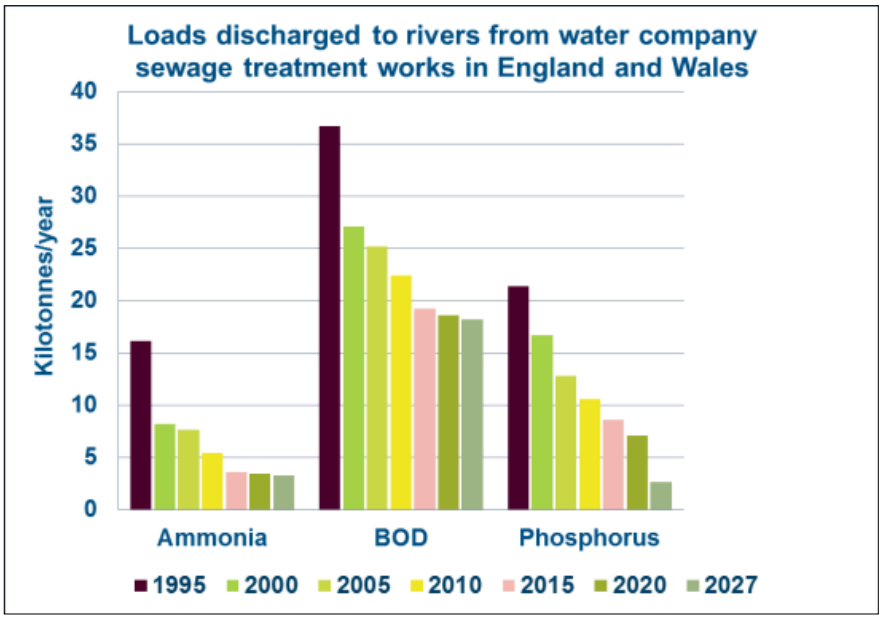

Figure 1: Ammonia, BOD and phosphorus load discharged to rivers from water company sewage treatment works in England and Wales (measured data (England and Wales): 1995 – 2015; modelled data (England only): 2020 to 2027)

Table 1: Percentage load reductions from water company sewage treatment works in England and Wales over the period 1995 to 2015, and England only from 2020 onwards.

Data	Year	Percentage load reduction compared to 1995		
		Ammonia	BOD	Phosphorus
Actual	1995	0	0	0
Actual	2000	49	26	22
Actual	2005	53	31	40
Actual	2010	66	39	50
Actual	2015	72	43	61
Estimate	2020	79	49	67
Estimate	2027	80	50	88

Figure 2 displays annual average phosphorus (P) concentration from 1974 to 2018 at Harmonised Monitoring Scheme sampling points in English rivers (pooling all results). The river phosphorus concentrations have reduced from about 0.5 mg/l in 1997 to about 0.1 mg/l in 2018 coinciding with the introduction of P reduction measures at sewage treatment works.

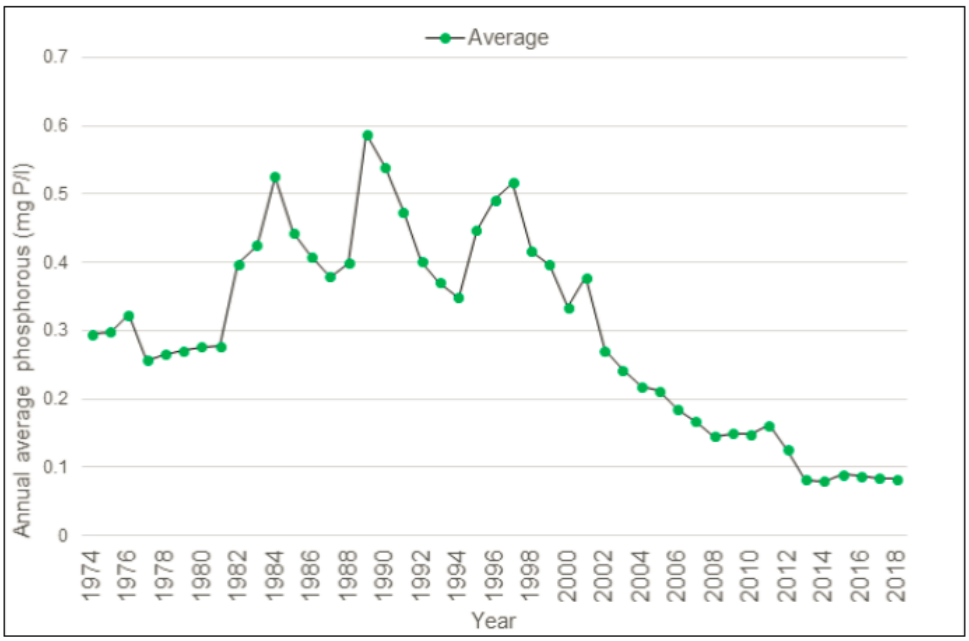

Figure 2: Annual average concentration of phosphorus in rivers, 1974 to 2018. Courtesy of Professor Fred Worrall, Durham University.

Figure 3 displays annual average nitrate (N) concentration from 1974 to 2019 at Harmonised Monitoring Scheme sampling points in English rivers (pooling all results). River nitrate concentrations in England have in general been declining since 1998 (when Nitrate Vulnerable Zone measures began) but this trend appears to have faltered in the last 2-3 years.

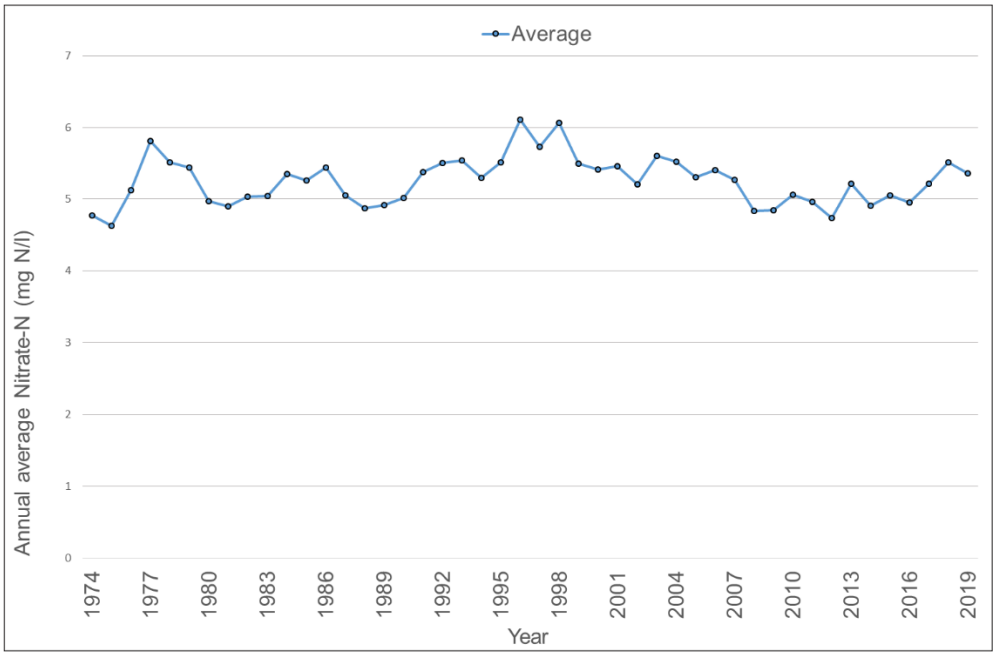

Figure 3: Annual average concentration of nitrate in rivers, 1974 to 2019. Courtesy of Professor Fred Worrall, Durham University.

Annex B

Sectors and challenges preventing good water quality (October 2020)

Introduction

The following table shows the issues preventing water bodies in England reaching good status (ecological status/potential, chemical status and groundwater status) and the sectors whose activities are causing those issues. The percentages are based on the total number of water bodies in England; not just those not achieving good status.

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.

Data sources

Most of the data used to produce the tables is taken from the 2019 set of probable and confirmed reasons for not achieving good status (RNAGs) linked to 2016 classifications, with the exception of:

1. Changes to the natural flows and levels of water. The data is 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 is 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 RNAGs where the sector responsible is still under investigation. Around 5% of water bodies have one or more RNAGs caused by a different sector to those listed in the table. These are mainly where the issue is physical modification.

Summary for 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%	

Where:

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

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

Annex C

Summary of storm overflow improvements delivered/planned as part of the Water Industry National Environment Programme (WINEP) for each 5 year Asset Management Plan (AMP) investment for the period 1990 to 2025

(data correct January 2021)

Delivered during 1990 to 2020

	AMP Improvement Period					
	AMP1 (1990 to 1995)	**AMP2 (1995 to 2000)**	**AMP3 (2000 to 2005)**	**AMP4 (2005 to 2010)**	**AMP5 (2010 to 2015)**	**AMP6 (2015 to 2020)**
No. of storm overflow improvements	984	1298	3174	1849	395	489

Total number improvements = **8189**

Planned during 2020 to 2025

	AMP Improvement Period
	AMP7 (2020 to 2025)
No. of storm overflow improvements	798

Total number of planned improvements = **798**

[1] https://data.gov.uk/dataset/4d28e5c2-dc05-4945-9574-002fa71db22f/wfd-cycle-2-overall-classification

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/923203/25-yep-indicators-2020.pdf.pdf

[3] https://www.gov.uk/government/publications/25-year-environment-plan

[4] https://www.gov.uk/government/publications/environment-bill-2020/august-2020-environment-bill-environmental-targets

[5] https://prdldnrbm-data-sharing.s3.eu-west-2.amazonaws.com/Challenges+and+choices+2020+links.pdf

[6] https://www.gov.uk/government/news/taskforce-sets-goal-to-end-pollution-from-storm-overflows

[7] https://www.gov.uk/government/news/taskforce-sets-goal-to-end-pollution-from-storm-overflows

[8] https://www.gov.uk/government/publications/water-and-sewerage-companies-in-england-environmental-performance-report-2019/water-and-sewerage-companies-in-england-environmental-performance-report-for-2019

[9] https://prdldnrbm-data-sharing.s3.eu-west-2.amazonaws.com/Challenge+narratives/Plastics_challenge.pdf

[10] https://prdldnrbm-data-sharing.s3.eu-west-2.amazonaws.com/Challenge+narratives/Chemicals+in+the+Water+Environment+Challenge+RBMP+2021.pdf

[11] https://s3.eu-west-2.amazonaws.com/assets.highwaysengland.co.uk/Knowledge+Compendium/Investigation+of+microplastics+from+brake+and+tyre+wear+in+road+runoff.pdf

[12] https://ukwir.org/sink-to-river-river-to-tap-a-review-of-potential-risks-from-nano-particles-microplastics-0

[13] https://www.eea.europa.eu/signals/signals-2018-content-list/articles/close-up-2014-an-ocean

[14] https://www.bbc.co.uk/news/science-environment-39738582

[15] https://www.wessexwater.co.uk/-/media/files/wessexwater/your-home/help-and-advice/wet-wipe-evidence-report.pdf

[16] http://cdm21005.contentdm.oclc.org/cdm/singleitem/collection/ClosedWorkq/id/4703

[17] Catchment Based Approach, (2020), *Monitoring and Evaluation 2018/19*, https://catchmentbasedapproach.org/wp-content/uploads/2020/02/CaBA-Benefits-Report-2018-19-FINAL.pdf

[18] Collins, R., Johnson, D., Crilly, D., Rickard, A., Neal, L., Morse, A., Walker, M., Leare, R., Deasy, C., Paling, N., Anderton, S., (2020), *Collaborative water management across England – An overview of the Catchment Based Approach,* Environmental Science & Policy Volume 112, October 2020, Pages 117-125, Collaborative water management across England – An overview of the Catchment Based Approach - ScienceDirect

[19] https://catchmentbasedapproach.org/learn/catchment-data-and-evidence-forum-2020/

[20] https://issuu.com/westcountryriverstrust/docs/2014-11-17_caba_compendium_v3_-_web

[21] https://www.water.org.uk/news-campaigns/campaigns/binit4beaches/

[22] https://www.lanesfordrains.co.uk/global/news/lanes-survey-reveals-uks-habits-attitudes-drainage-use-complete-data/

[23] https://www.research.manchester.ac.uk/portal/en/publications/unflushables-2030-mapping-change-points-for-intervention-for-sewer-blockages(6099911f-bba2-410c-b39c-7c38a068a117).html

[24] Foden, M, A Browne, D Evans, L Sharp, M Watson (2017) *Fats, oils, grease and kitchen practices: implications for policy and intervention*. University of Sheffield, UK. https://nexusathome.files.wordpress.com/2017/10/fog-report-and-kitchen-practices-nexus-at-home.pdf

[25] Orr, P., Papadopoulou, L. and Twigger-Ross, C. (2018) *Water Efficiency and Behaviour Change Rapid Evidence Assessment (REA)*. Final report WT1562, project 8. http://randd.defra.gov.uk/Document.aspx?Document=14194_WT1562p8_Water_Efficiency_and_Behaviour_Change_REA_FINAL.docx

[26] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

[27] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734684/Review_of_SuDS_Report.pdf

[28] https://prdldnrbm-data-sharing.s3.eu-west-2.amazonaws.com/Challenge+narratives/Pollution+from+towns,+cities+and+transport+Challenge+RBMP+2021.pdf

[29] https://www.ofwat.gov.uk/regulated-companies/innovation-in-the-water-sector/water-innovation-competitions/

[30] https://www.gov.uk/government/publications/water-and-sewerage-companies-in-england-environmental-performance-report-2019

[31] https://www.legislation.gov.uk/uksi/2013/1675/regulation/1/made

[32] Environment Agency (2019) Regulating for people, the environment and growth, 2018 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/865277/Regulating_for_people_the_environment_and_growth_2018.pdf

[33] Defra (2019) Statistics on English coastal and inland bathing waters. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/870176/EMBARGOED_STATS_bathing-water-release-2019v2_access.pdf

[34] Publications Office of the European Union (2020) 10th technical assessment on the Urban Waste Water Treatment Directive (UWWTD) implementation 2016 European review and national situation https://op.europa.eu/en/publication-detail/-/publication/d90014c6-c578-11ea-b3a4-01aa75ed71a1

[35] https://www.gov.uk/government/consultations/bathing-waters-designation-of-an-area-of-the-river-wharfe-ilkley/outcome/summary-of-responses-and-government-response#government-response

[36] https://www.swimming.org/swimengland/key-swimming-statistics/