HOUSE OF LORDS

Environment and Climate Change Committee

Corrected oral evidence: Nitrogen

Wednesday 7 May 2025

10.00 am

Watch the meeting

Members present: Baroness Sheehan (The Chair); Lord Jay of Ewelme; Lord Krebs; Lord Layard; Lord Mancroft; Lord Rooker; Earl Russell; Lord Trees; Baroness Whitaker.

Evidence Session No. 13 Heard in Public Questions 95 - 104

Witnesses

I: Helen Wakeham, Director for Water, Environment Agency; Chris Walters, Senior Director for the Price Review, Ofwat; Paul Hickey, Managing Director of RAPID, Ofwat; Nicola Riley, Deputy Director for Agriculture and Land, Environment Agency.

Examination of witnesses

Helen Wakeham, Chris Walters, Paul Hickey and Nicola Riley.

Q95 **The Chair:** Good morning and welcome to the Lords Environment and Climate Change Committee. Today, we continue our inquiry into the efficient use and management of nitrogen in the environment. We will be taking evidence today from two of our regulators, the Environment Agency and Ofwat. I take this opportunity to extend a very warm welcome to our panellists and to say a very grateful thank you to them for being with us today. It is much appreciated.

Before we start, I remind everyone that the session will be webcast live on parliamentlive.tv and a transcript will be taken and made public. Witnesses will have the opportunity to review the transcript and may, if necessary, make very minor amendments.

Members are reminded that they should declare any relevant interests the first time they speak. That should also apply to panellists. I will take the opportunity to say that I am the director of Peers for the Planet, which is an unpaid role. Panellists, please introduce yourselves the first time you speak.

My question is to all of our panellists. We are one of the most nature-depleted countries in the world. One inescapable reason is the dire state of our waters, overfilled as they are with nitrogen and phosphate, with the excessive deposition of nitrogen from air into sensitive ecosystems. Given the evidence that we have heard about the ecological impact of nitrogen pollution, which I am sure you have been following, I want to ask this question to each of you. Is nitrogen management sufficiently integrated into your work and responsibilities?

Helen Wakeham: Good morning. I am the Environment Agency's director of water. That means I run the teams who are responsible for water quality, water resources, water planning, groundwater and bathing waters. One of my hats is water resources. Where I should also be this morning is chairing the national drought group, as we move towards dry weather and drought. I have quite wide-ranging responsibilities.

Nitrogen management cuts across an awful lot of what the Environment Agency does. We are responsible for regulating discharges to water, applications of materials to land and emissions to air.

Nitrogen is fairly well integrated in relation to water. We have fairly robust controls on different nitrogen substances entering our water. We have less control over nitrogen emissions to air. Most of those emissions fall outwith our control.

You will probably have seen the CEH's nitrogen balance diagram, and I think CEH has spoken to you already. That diagram is a really good place to start in understanding the complexities of nitrogen management. Nitrogen is a little different from some of the other pollutants that we manage, in that it is vital for biological systems. Our whole economy, the

number of people that we have and the way our agriculture operates is all dependent on reactive nitrogen. That is very different from a substance such as mercury, which we can ban. We need nitrogen for our biological systems.

That really means that it is difficult to manage. It is difficult to manage for two reasons. We apply it deliberately, particularly in agriculture. We need it to power our arable systems. It is also very leaky, as I am sure you have heard. Once it is reactive, nitrogen moves between environmental compartments and changes form from ammonia to nitrate to nitrite to nitrous oxides. That makes it very difficult to manage.

That was quite a long intro, but I am trying to describe quite a complex system. The Environment Agency has some agency but is not in control of the whole cycle.

The Chair: You are highlighting some gaps in the way the Environment Agency is able to manage nitrogen. We will come on to that. You have various levers at your disposal. It will be interesting, further down the line, to see how well those levers are being applied.

Nicola Riley: Good morning. I am deputy director for agriculture and land at the Environment Agency. My team covers the regulation of agriculture, the Environment Agency's role in environmental land management schemes, intensive farming and the agri-food sector, as well as land contamination issues and materials spread to land.

I would support the comments that Helen has already made. Particularly for agriculture, nitrogen is intentionally added and introduced into the environment. It is essential for the growth of crops and for farmers to be able to produce food, but it requires us to take regulatory approaches. We would aspire to see a broader systematic solution for the management of nitrogen that brought together the whole nitrogen cycle, not just the end point when nitrogen is applied to crops.

The Chair: You would support a broader management system for nitrogen.

Nicola Riley: Yes, to manage the quantity of nitrogen in the system as a whole.

The Chair: The reason why the committee is looking into nitrogen is that there is excessive use of nitrogen. We fully understand that nitrogen has a crucial role to play in agriculture, growing food and our food security. That is not the issue that we are concerned about. We are concerned about the very large, unnecessary volumes of nitrogen that escape from the agricultural sector into water bodies and on to land, which are destroying vital habitats. We need to be very clear that it is the exceedances that we are interested in.

Paul Hickey: Good morning. I am a senior director at Ofwat with responsibility for water resources, major infrastructure schemes and the environment. I want to make three points and will then pass on to my

colleague, who will talk about the price review process that we have just completed.

First, the process of treating wastewater generates greenhouse gas emissions, including nitrate compounds. One of the things that we have done is to ensure that there is robust reporting around that. Many sectors have to do that reporting. We have an annual performance review process where we capture that information and make sure it is robust. There is a carbon accounting framework to make sure that the data is robust.

Secondly, we have recognised that the step change in investment and the more intensive processes that may arise from that—my colleague Chris will elaborate on that—have the potential to increase greenhouse gas emissions, so we have put in additional funding to manage that.

Thirdly, we have introduced a challenge fund to stimulate new thinking, to bring in new technologies and to increase process understanding and controls to reduce greenhouse emissions.

The second point is about addressing nutrient pollution. One of the things that we and our colleagues at the Environment Agency are keen to explore, when it is appropriate, is not just conventional technologies but nature-based solutions and catchment solutions. We are keen on that—I am sure we will go on to this a bit more—because not only does it control nutrients with the impacts that you have described but it has the potential to bring wider benefits in nature recovery and amenity. It can help control impacts and bring benefits as well.

The third thing I wanted to touch on was around discharges of wastewater that contains nutrients, both phosphorus and nitrate compounds. We have made a step change in our understanding of those emissions. All overflows from the sewer network, of which there are some 1,500, now have real-time monitors that give a transparent understanding of reporting. The remaining emergency overflows will have similar monitors in the coming review. Linked to that, there will be real-time monitoring of water quality. That will give us a very accurate picture of how wastewater infrastructure is impacting the aquatic environment.

I will pass on to my colleague, having made those three points.

The Chair: Before we go any further, I should just say that we are very pleased that Ofwat is here today. We understand that you are facing some extreme challenges. We hope that they will be historic. We would really like to understand whether you absolutely accept that your role and your statutory functions with respect to water companies include managing both wastewater treatment and environmental impacts. It is those environmental impacts that I hope we are going to get some reassurance on.

Chris Walters: Good morning, everyone. I am a senior director at Ofwat, and I am responsible for price reviews. I have a small correction before I go on: I think Paul said there were 1,500 combined sewer overflows in England and Wales; there are 15,000. That was a small infelicity of expression.

Our price reviews are the principal tool that Ofwat uses for the economic regulation of water and wastewater companies. Reducing nitrogen pollution is very important to our price reviews. They occur once every five years. They set the amount of revenue that water and wastewater companies are allowed to recover from their customers through bills and the levels of service for customers and the environment that society can expect in return.

Our latest price review, which we call PR24, was published in December. It green-lit a record level of investment—the most in any five-year period since privatisation—to safeguard the health of our rivers, streams and waterways, to improve the resilience of our water supplies, and to get water companies to raise their game on their performance in the areas that matter for the environment and for customers.

Of particular relevance to nitrogen pollution, we are backing record progress on reducing spills from combined sewer overflows. Of that record level of investment, £12 billion is to reduce spills from CSOs by 45% from their 2021 levels by 2029. That is principally by increasing storage in the network, but not exclusively, as Paul mentioned. It also includes expanding monitoring, so that there are continuous water quality monitors upstream and downstream of CSOs, and providing record levels of funding for so-called green solutions, such as natural drainage solutions.

In England, those ambitions align with the Government's 2050 target to reduce to zero spills that cause ecological harm other than in exceptionally heavy rainfall. They also align with the Welsh Government's targets, expressed through our own Wales forum, to target 60% of storm overflows causing low or no harm by 2030. If companies fail to meet those expectations, they will automatically be penalised. That money will be returned to customers in the form of lower bills. If they fail to meet their legal obligations, we will enforce. We will not hesitate to take enforcement action against them. That 45% reduction in spills that I have mentioned is targeted at 3,000 of the 15,000 CSOs that have the most impacts and the highest harm.

Q96 **Baroness Whitaker:** Good morning. I should declare that I live in a national park and that I used to work for a regulator, the Health and Safety Executive, quite a long time ago.

I would like to ask about the regulatory ecology. We heard from several witnesses that there is a lack of co-ordination. Tony Juniper thinks there should be an overarching framework because dealing with nitrogen is too piecemeal. The OEP is discussed in the Corry review. There is an overlap with Natural England, the Environment Agency and Ofwat.

How do you co-ordinate with Defra, local authorities and the other stakeholders on nitrogen management? Are there plans to consider nitrogen pollution more holistically across the sectors—namely, Tony Juniper's overarching framework?

Chris Walters: From the perspective of the economic regulator, our job is to scrutinise the proposals that are made to us by water companies to ensure they are fair value for customers and the environment, and then to hold them to account for those proposals in the way that I described. We do not get to say what is in those proposals, as has already been explained. That depends in very large part on what our fellow regulators—the Environment Agency and its Welsh equivalent, Natural Resources Wales, and Natural England—and the UK and Welsh Governments want water companies to do.

We recognise that the system is complex. There are hand-offs between different institutions and there are gaps and overlaps in areas of responsibility. That is why the Government have launched an independent commission into the regulation of water chaired by Sir Jon Cunliffe. We very much welcome that because we and the EA can see the opportunity to streamline the complexity of the process that I have just described so that we are better aligned in future.

Baroness Whitaker: By "streamline", do you mean an overarching framework or a holistic approach, or do you just mean tidying up?

Chris Walters: It should be something more substantial than tidying up. Certainly, our submission to the Cunliffe review talks about the need for what we call an overall system planner that has responsibility for deciding, further into the future than has been possible at present, what the investment needs are for customers and the environment. It talks about ways to streamline gaps and overlaps in responsibilities, in particular between Ofwat and the Environment Agency.

It also talks about streamlining the process more generally. That includes streamlining our approach to some of the major water resilience projects that Paul was talking about; streamlining the process for companies to object to our final determinations, if they want to—not that I think they should; and streamlining our process for enforcement.

Helen Wakeham: Do we need an overarching strategy for nitrogen? Yes, we do. We are describing quite a complex regulatory picture. A strategy for nitrogen may not just be end-of-pipe regulation. The starting point for a strategy should be some kind of source control and producer responsibility. Ultimately, if we are importing more reactive nitrogen into the UK or England than we are exporting, we will always have a surplus. Having a strategic top-down approach, which might help us to manage the amount of nitrogen coming in and give the nitrogen that we have a value, will help. This will not just be end-of-pipe environmental regulation. There must be something more holistic and thought-through around how nitrogen moves through our system.

At the moment, because nitrogen is in excess, it does not have a value, so applications to land and losses to water go unregarded. We need to create a system in which the value of nitrogen to our society is properly recognised.

To answer your question about how we work together, the regulators work very closely together on nitrogen as we do on other pollution issues, but we work most particularly with Natural England. Where special sites are affected by diffuse pollution, we are working with Natural England on diffuse water pollution plans. That helps all the players in an area to understand what those pollution problems might be and how best to address those, including with local planning authorities. We have a suite of local, very specific plans for places and we have generic advice for local planning authorities, which helps them to understand where diffuse pollution problems might arise.

We work with Natural England and the other regulators, including the Forestry Commission, right from the chair down to officers. We have daily contact with our fellow regulators.

Baroness Whitaker: That is helpful, but where should this overarching framework be lodged? Who or what is the top in this top-down framework?

Helen Wakeham: Defra commissioned a nutrient management expert group, which made recommendations for how nitrogen might better be managed. That direction or strategy needs to come from government. As Chris and I have described, this is not just an issue for the environmental and economic regulators of water.

Baroness Whitaker: From Defra.

Helen Wakeham: Yes. It is a government job because it is multi-sectoral and the regulators do not have the overview of all the sectors.

Baroness Whitaker: I do not know whether anybody has anything else to add. That really answers my question quite well.

The Chair: I wonder whether you could both write to us, Ofwat and the Environment Agency, about your joint working with the water industry national environment programme. It would be interesting for me to hear about that. I do not want to take up the committee's time unnecessarily in this session. If you could do that, I would be very grateful.

Helen Wakeham: Do you want us to describe the water industry national environment programme?

The Chair: I understand that both regulators work on the water industry national environment programme.

Helen Wakeham: We do.

The Chair: That is about the actions that water companies must

undertake to comply with environmental regulations, such as the Water Framework Directive. Some more detail on that would be good. It would be good to understand where that regulator, WINEP, fits in and how you work with it.

Chris Walters: WINEP is a programme of work, not a separate regulator.

The Chair: If you could write to us, that would be really appreciated.

Q97 **Lord Jay of Ewelme:** Thank you very much for being with us today. It is really helpful.

I wanted to drill down a little on some of the things you have already said on water. I wonder whether you could tell us who is responsible for monitoring nitrogen emissions across the wastewater process. In particular, is the level of monitoring and regulation enough to hold actors accountable for progress on environmental targets? Having targets is clearly important, but as important, if not more so, is implementing and enforcing the targets. How confident are you that that is happening?

Helen Wakeham: That is probably one for me. The headline responsibility is on the operators. The water companies are responsible for monitoring discharges. If I talk about discharges to water specifically to start with, the water companies are responsible for monitoring discharges and reporting the results to us. It is known as operator self-monitoring. That will include data on nitrogen compounds, where limits are set for nitrogen compounds, most commonly for ammonia. The Environment Agency's role is then to assure and verify the data that we get from the water industry and to take action if they are not meeting the standards that are set in their permits.

The process is reasonably robust. If we look at our environmental performance assessment of water industry performance, we can see that discharge compliance is above 98% across the industry. We have a great deal of confidence in what is happening on discharges from wastewater treatment works. Chris has already described the now very thorough monitoring approach to storm overflows, which means we have a much better understanding of the duration of untreated storm overflows. We understand that.

We do not regulate emissions to air of nitrous oxide from the water industry. We recognise that that is a gap. It is not part of our environmental permitting regulation for water. There is quite a lot of work going on between us, Ofwat and Defra to understand emissions to air from the wastewater treatment process. We are working with Defra research and our own research teams to design a national monitoring plan for nitrous oxides.

Lord Jay of Ewelme: I have one question on the operating self-monitoring, as you described it. How good is it? Does that vary from one water company to another? Are there some that you are constantly having to keep up to the mark and others that are okay? I am not asking for names; I am just asking for a general view.

Helen Wakeham: We produce an environmental performance assessment of the water industry every year. There is a table associated with that, which gives a very quick understanding of how well the water companies perform across a variety of regulations within the Environment Agency's control.

Performance varies. None of the companies is perfect. All of them have work to do to improve their operations for the environment. What we can do, because we are now very data-rich in understanding what the water companies are doing, is take a digitised and intelligence-led approach to our regulations.

We have increased our inspections of water industry sites. Over the business year to the end of March, we inspected 4,000 sites. We found something wrong at around one-quarter of those and serious breaches at a handful. The data that the water industry gives us, combined with our own inspection and auditing, gives us a really clear indication of how the water industry is performing.

Lord Jay of Ewelme: What is a serious breach?

Helen Wakeham: That might be something that is having or is likely to have a significant impact on the environment. That would be something going seriously wrong at a site. Our regulations cover a number of issues. There may be minor breaches around reporting, for example, but we may find things that are seriously wrong, and we have in a handful of cases.

Paul Hickey: To complement what Helen has just said, there is compliance with the existing requirements, but, as Chris outlined, we are about to embark on a step change in investment to enhance treatment. We work very closely with the Environment Agency to monitor delivery of enhancement expenditure, to make sure that the investment that customers are paying for to bring tighter standards and environmental improvements is being delivered in a timely manner.

Given the scale of the investment that is now being proposed, we have a joint delivery monitoring framework. That is not just to police delivery but to make that information transparent and visible to the public. That is a really important part of this. People need to have confidence that what they are paying for is being delivered.

Lord Jay of Ewelme: How soon can we expect to see real change as a result of these new processes that you are introducing?

Paul Hickey: There have been successive programmes of investment to bear down on pollution from wastewater discharges, particularly on phosphorus. There has been a step change in the reduction in phosphorus. As Chris mentioned, we are about to embark on another five-year programme to improve both intermittent or storm overflows and treatment processes with continuous discharges. We will be monitoring that on a routine basis through the five-year period and making that data visible to people.

Helen Wakeham: The other nitrogenous example of success through this process is ammonia. In the 1990s, when the urban wastewater treatment regulations were new, the biggest issue in ecology arising from wastewater treatment was probably ammonia, which is toxic to wildlife. Between 1990 and 2023, the amount of ammonia released from wastewater treatment works reduced by 80% due to investment and regulation. We can see that tracking through into the environment in our lowland rivers. The amount of ammonia we find through our harmonised monitoring scheme is down by 80%.

The Chair: It is the first time that we have had those figures. Could you write to the clerks team with those?

Helen Wakeham: There is a very nice graph that shows a comparison of the reduction in loads and the impact on lowland ecology[1].

Lord Krebs: I just wanted to get clear in my mind some of the figures that you have quoted, Helen and Chris. Helen, you talked a few minutes ago about 98% compliance. Is that right?

Helen Wakeham: For wastewater treatment discharge permit compliance, yes.

Lord Krebs: Earlier on, I think Chris said that there had been 15,000 untreated discharges.

Chris Walters: There were 15,000 combined sewer overflows.

Lord Krebs: That is not the same as an untreated discharge. Are those 15,000 within the 98% compliance?

Helen Wakeham: No, it is outwith. The 98% compliance is the quality of the discharge from a wastewater treatment works. What comes out of a storm overflow will be the discharge that has not got to the treatment works.

Lord Krebs: The 98% compliance does not tell us how well the environment is protected because it excludes these 15,000 events that Chris told us about.

Helen Wakeham: It tells us something about how the environment is protected, given that the vast majority of the polluting load goes to the sewage works.

Lord Krebs: It is a partial picture.

Helen Wakeham: It is.

Lord Krebs: The figure of 98% compliance sounded terribly good, but then I thought, gosh, how does that fit with the 15,000?

[1] Note by the witness: It shows the equivalent reduction in nitrate in lowland rivers.

Helen Wakeham: The purpose of investment in the monitoring storm overflows has been exactly to better understand that untreated discharge. That has led, as Chris says, to investment through this price review, which will enable us to tackle the issue.

Chris Walters: A storm overflow is effectively a pipe at a sewage treatment works or somewhere else on the network from which water, if the network is exceeding the limit at which it can operate, weirs over and is spilled into the environment. There are 15,000 of those pipes, effectively. Our investment programme should upgrade 3,000 of the highest-spilling and therefore most harmful of those pipes to reduce those spills by 45% from their 2021 levels.

Lord Krebs: I live in Oxford, close to the River Thames, which, as you know, is notorious for untreated discharges by Thames Water. Are they part of the 15,000 that we are talking about?

Chris Walters: Yes.

Lord Krebs: They probably account for 14,900 of them. Can I just ask one other question about numbers? You said you had visited 4,000 sites.

Helen Wakeham: Yes.

Lord Krebs: How many is that out of? Is that a big or small percentage of the total?

Helen Wakeham: Paul might correct me, but there are around 2,400 substantial wastewater treatment works. We also visit pumping stations, storm overflows and other facilities operated by the water industry.

Lord Krebs: What is the total number of sites that you could have visited, out of which the 4,000 is a proportion?

Helen Wakeham: We would have to write to you on that. There are 2,400 substantial wastewater treatment works. There will be many very small works and storm overflows, many of which may just be a manhole in a road. We can give you a summary of the numbers of different types of facility, certainly.

Earl Russell: Good morning. I declare my interests as set out in the register.

As a supplementary to Lord Jay's question, while we are on monitoring, I want to ask you about your collaborations and your relationships with citizen science and how important citizen science is to your overall picture and understanding of the impacts on the wider environment.

While you are talking about it, could you say a word about monitoring? We need proper monitoring. Monitoring is expensive to deliver. Over time, the Government's response has been to concentrate monitoring resources where they are needed most strongly. Is citizen science a useful addition to you? Does it have its own deterrence value because you do not quite know where it is going to pop up? Is it a useful way of

broadening your monitoring understanding? I hope that makes sense.

Helen Wakeham: That is another one for me. It is a great question. The interest in citizen science is growing. We are working hard to harness its potential. It really helps us to gain a better understanding, particularly in localities. This is not about delegating our monitoring responsibilities to citizen science but using citizen science data to provide supplementary insights.

We have recruited some citizen science co-ordinators, who are embedded in our local teams, to make sure we can make best use of that intelligence. We have a citizen science page on the Environment Agency Water Hub, which is our subset of the GOV.UK website. That has some technical advice associated with it, to make sure that citizen science is as useful as it can be. I quote it quite a lot, actually.

Earthwatch does something called WaterBlitz, which is a nationwide citizen science initiative. It released some really interesting statistics on caffeine, for example, showing that caffeine is now ubiquitous in the water environment, which demonstrates that our society and the way we live has an impact on water. It is really useful stuff.

There is also a deterrence value. We respond to pollution incidents, which are largely sent to us by members of the public through our pollution incident line. We have seen an uptick in those since Covid, which gave people an opportunity to look harder at their local environments.

We should not underestimate the value of citizen science. It complements the work that we do.

Paul Hickey: To add to Helen's comments, Ofwat is very keen, as I mentioned in my opening comments, to promote nature-based solutions and, with that, an integrated approach to water management. We see citizen science as a really important glue in that. Some years ago, in the last price review, we launched something called the Ofwat innovation fund, which is designed to stimulate different tools and techniques to enable the sector to face up to its long-term challenges.

You will have heard from colleagues from the Rivers Trust in a previous session that one of the larger projects within that programme is around citizen science and how we can bring national co-ordination to that and give it the robustness that means it can then be brought to bear.

The other project that we are doing under that banner—again, this is with the Rivers Trust and many other actors, including the Environment Agency, companies and other stakeholders—is to look at mainstreaming nature-based solutions. Again, that is about harnessing best practice and making sure we replicate that and learn from experience. A really important part of that is the evidence base that these solutions are effective, which uses citizen science. We very much see it as an important part of that work.

Earl Russell: Both organisations would like to see more of that included

within your work and your remit.

Helen Wakeham: Yes.

Paul Hickey: Yes.

Nicola Riley: I was just going to add that some of the farmers' groups have reached out to us. The Environmental Farmers Group, which is made up of clusters of like-minded farmers working towards more environmentally and climate change sustainable practices, has reached out about some of the work that they're doing.. We are going to start engaging with them on how we could work more closely with some of the monitoring they are doing.

Earl Russell: That could be particularly pertinent to the nitrogen we are considering today.

Nicola Riley: Absolutely, yes.

Q98 **Lord Mancroft:** Are concentrations of nitrogen and phosphorus in discharge permits set at appropriate levels to meet water quality targets and avoid diverse effects? Would there be any benefit in increasing the requirements for tertiary treatment of wastewater in order to reduce nitrate levels in discharge?

Helen Wakeham: For the majority of discharges into freshwater, there are controls on phosphorus but not on nitrogen. The reason for that is that, for most freshwater systems, the eutrophication, the impact on ecology, is driven by the amount of phosphorus in the water.

The simple answer to your question is that we will have a handful of permits for nitrogen where those discharges are into wetland systems, lakes or coastal or estuarine waters, but not for most freshwater systems because reducing the amount of nitrogen will not improve the ecology substantially. That is the simple answer to the question.

We have 41 nitrogen permits currently, which are at the technically achievable limit for nitrogen. We are taking nitrogen down as far as we can. They are linked usually to special sites rather than most rivers.

That was possibly not an answer that you were expecting.

Lord Mancroft: I was not expecting any answer.

Helen Wakeham: There is a difference between how nitrogen and phosphorus behave in the environment. There are exceptions to this. I can almost see Andrew Johnson from CEH cringing at my oversimplification, but in marine and coastal systems it is usually nitrogen that drives eutrophication and impacts on wildlife. In freshwater systems and in rivers, it is generally phosphorus. You will see that we have 1,400 permits for phosphorus in the freshwater environment but only a handful, 41, for nitrogen.

Lord Mancroft: Do you want to have more of them? Should you have

more permits for nitrogen?

Helen Wakeham: This is possibly where it is helpful to hear from Ofwat. The risk is that widespread permits for nitrogen in freshwater would cost a lot around treatment but would not result in significant improvements in ecology.

Paul Hickey: I will add a couple of thoughts that build on what you have said.

I mentioned the Ofwat innovation fund. A lot of what I have described so far has been about the softer elements of the projects, encouraging collaborative behaviour and citizen science, but there is also quite a strong emphasis on technology. There are a number of themes of work looking at how we can innovate the way that we treat wastewater discharges to manage loads and recover nutrients from the sludge treatment processes.

On increasing the number of nitrogen permits, we want to see that the treatment is linked to environmental outcomes. It would not be in the environment's or the customer's best interest if the treatment did not yield benefit.

When I joined the sector some years ago, the key issue was ammonia pollution and limiting and putting in treatment to avoid that. That exposed the issues around eutrophication. There was a step change in investment to control phosphorus. As Helen described, the science is very complex, but the wisdom is that phosphorus is primarily the limiting nutrient in most inland systems.

There is a broader question about nitrogen discharge to sea. That has been subject to quite a lot of studies. Again, the evidence is that it is a relatively small contribution for the cost versus what you will get in wider greenhouse gas emissions and other impacts.

Helen Wakeham: For freshwater, the overwhelming majority of nitrogen in the system—70% or 80%—arises from agriculture. The place to focus the controls on rivers and groundwater is agriculture.

Lord Mancroft: Just to be clear, as far as you are concerned, the discharge permits are set at the right levels, in so far as they exist. You do not want to see any great change in that area.

Helen Wakeham: Paul has described some trials through the Ofwat innovation fund. We are running 38 trials for different nitrogen technologies. They may include the Test and Itchen trials for nutrient-neutrality areas. We are experimenting and testing different ways of controlling nitrogen in the wastewater system. For phosphorus, we are greatly increasing the number of sites for which tertiary treatment for phosphorus is required. There were 800 five years ago. There will be 1,400 by the end of this year. There will be 2,200 sites with phosphorus removal by 2030.

Lord Mancroft: To the second question about whether there would be any benefit to increasing the requirements, the answer is that the jury is out. You are researching that at the moment.

Paul Hickey: The only longer-term observation I would make is that the environment is a dynamic system. As we look into the future, because of climate change and other environmental effects, our water system will behave differently. As Helen mentioned, we are likely to experience dry weather conditions this year. We can expect that to increase and happen more frequently going forward.

The science behind the standard-setting will evolve. It may well be that, in the future, we will need to tighten standards as our environment becomes more susceptible to these things. It is a live process.

Lord Mancroft: It is currently a, "We don't know".

Helen Wakeham: For nitrogen, it is currently, "We are continuing to research". I think that is fair to say.

Lord Krebs: I have a very brief question for you, Helen. In its report in December 2024, the OEP concluded that the Environment Agency had failed to comply with environmental law and its guidance on permit conditions and set permit conditions that were insufficient. What is your response to that?

Helen Wakeham: We are still talking to the OEP about the final conclusions. That is the report into our regulation of storm overflows. We are still discussing the outcome with them.

The Chair: In water treatment, there is no target for nitrates in wastewater, but the EU is doing things differently. Could you comment on that? In 2024, the EU adopted a revised version of their regulations on tertiary treatment practices. By 2045, there will be a requirement for wastewater from smaller agglomerations over 10,000 people to be treated. The outcome will be that water discharge must contain nitrogen concentrations below 8 to 10 milligrams per litre. Would that be a sensible way for the UK to go?

The OEP's latest annual progress report concluded that the Government remain largely off track in meeting their water quality targets. They have been consistent. In December 2024, the OEP's inquiry on discharges concluded that Ofwat had not exercised its duty to make enforcement orders. Is it a lack of enforcement or a lack of targets? Something does not seem to add up here.

Paul Hickey: The Urban Wastewater Treatment Directive, which was implemented in the 1990s in England and Wales, targeted nutrient removal for larger agglomerations. That has been implemented in successive rounds. Alongside that we have domestic policy targeting smaller agglomerations where that is seen as causing harm. That targets much lower levels, particularly for phosphorus, where that is seen as needed.

Going forward—I am now straying into the Environment Agency's remit—if there is an environmental need to tighten permits, that will be something that we would support.

The Chair: Is it enforcement that is lacking? Is it that the rules are in place but they are not being enforced? In March 2023, the Lords Industry and Regulators Committee concluded, "Ofwat and the Environment Agency must go further to hold water companies to account for environmental pollution through penalties and prosecution". Is that recommendation being delivered?

Helen Wakeham: There were two questions there. The first one was around nitrogen standards. Within European law and the law that we still use related to the Water Framework Directive, there is not an environmental quality standard for nitrogen in freshwater. There is something called a technically achievable limit, or sometimes a uniform emission value limit, which is around 10 milligrams per litre. Where we see that nitrogen is having an impact on water systems, that is the limit that we apply. We have 41 nitrogen permits for sensitive areas, which will be set at that technically achievable limit.

The other question was around enforcement. The Environment Agency has hugely increased its compliance assessment and enforcement effort in the last few years. As I described, we undertook 4,000 inspection visits last year. This year, it will be 10,000. We have taken enforcement action. We have prosecuted water companies more than 150 times[2] since 2015. We continue to take enforcement action where it is required.

Of course, we want water companies to comply with the law. Again, we work with Ofwat to make sure there are performance incentives and penalties to help them to do that.

Chris Walters: I mentioned earlier that there are areas where our responsibilities overlap. This is one of those areas. In 2021, Ofwat opened its biggest ever investigation into all 11 water and wastewater companies as to whether they had properly managed their sewerage systems. Because of the size and complexity of that work, it has taken a number of years to come to fruition. In March this year, we concluded the first of those investigations with Yorkshire Water. Yorkshire Water has provided undertakings under the relevant section of the law and is committed to investing an additional £40 million, entirely funded by Yorkshire Water's shareholders, not its customers, to improve the quality of rivers in its regions under what is called the Great Yorkshire Rivers initiative.

That demonstrates our commitment to enforcement. One domino having toppled, as it were, I anticipate the other investigations that we have had will come to fruition in due course.

The Chair: That is good to hear.

[2] Note by the witness: 53 times

Lord Rooker: Good morning. I want to follow up Lord Krebs's supplementary question about the Office for Environmental Protection. The answer was, "We are having chats about it". When Glenys Stacey came here, she said you were having productive conversations on areas for improvement. You are having discussions about improving your performance, not general discussions. Is that correct?

Helen Wakeham: We are having discussions with the OEP about the next steps for storm overflow regulation, yes, but the process of the OEP investigation is not yet complete. That was the point I was making.

We are working very closely with the OEP. The investigation hinged on the performance of storm overflows and when storm overflows require improvement. We are working with Ofwat and the OEP to set out how we are going to do that in the future, which will be about how we identify which storm overflows require investment. As Chris described, it is £13 billion of investment in the next five years, which will improve storm overflows.

I should also say that this level of monitoring of storm overflows is pretty much unique to England. Other countries in the world do not monitor to the degree that we do.

Q99 **Lord Layard:** Could we look again at the effect of water treatment on the emission of greenhouse gases in the form of nitrogen compounds? How much progress has been made on the monitoring and reduction of those emissions? For example, we have been told that the Climate Change Committee is saying that we should roll out technologies such as advanced anaerobic digestion. Could you tell us what progress has been made on monitoring and reduction? Secondly, should companies be required to report these greenhouse gas emissions?

Helen Wakeham: I touched on this a little earlier. At the moment, our environmental permitting regulation permits for wastewater treatment plants do not include any requirements to monitor, mitigate or report on nitrous oxide emissions to air. We are funding work, through Ofwat, at about 200 works to look at how we would monitor and mitigate. That work is going on. That should help inform future policy development. We are also working with Defra on a national monitoring plan for nitrous oxide from the wastewater industry. It is work in progress.

Paul Hickey: I touched on emissions in my opening statement. Companies report annually on the emissions from the wastewater treatment process through our annual performance reports. They do that in accordance with a sector-wide carbon accounting framework, to ensure that the information is robust.

Due to the level of increase in treatment, as Chris described, there is the potential for those emissions to increase as we put more intensive processes in to mitigate the impacts to the water environment. One of the things that we have put in this price review is a performance commitment to incentivise companies to minimise those increases by putting in additional process controls.

There is a whole range of things that companies are doing. You can cover tanks; you can optimise the way that the treatment processes run to minimise emissions. There is some exciting work looking at combining real-time monitoring of processes with digital twins, to see how you can really bear down on that issue. There are a number of trials looking at more innovative technologies, so that we really minimise the impact of greenhouse emissions going forward.

The Chair: In the written evidence submitted by Ofwat, you mentioned that you have introduced an operational greenhouse gas emissions performance commitment. Can you clarify whether that includes nitrous oxide emissions from denitrification and other processes? Are those also monitored, or is it just the operational emissions?

Paul Hickey: This is a little technical and I do not want to elaborate too much, but what I just described was that metric. It is designed to capture the breadth of emissions, including nitrous oxide. We want to see monitoring. We have set targets to track performance over the review and incentivise minimisation of those emissions.

In parallel, we have two things. We have a fund to stimulate new technologies, as I described, in minimising process emissions and exploring new technologies. Under the banner of the Ofwat innovation fund, we are bringing in international experiences. There are a number of quite exciting projects that companies are doing to explore novel technologies that may well minimise emissions even further.

The Chair: Just to double-check, when you talk about greenhouse gas emissions, we are not talking about fossil fuel emissions from combustion and the transport-related operations of the wastewater companies. We are talking about nitrous oxide emissions from the wastewater treatment.

Paul Hickey: It is the whole breadth. We are interested in the footprint of the operations as a whole, but you can then dive into the sources of that, whether that is through, as you say, running plant machinery, using fossil fuels or process emissions from wastewater treatment.

Chris Walters: This is the first time Ofwat has had that service-level commitment for operational greenhouse gases. If there is learning from our monitoring of that and tracking of it that means we need to change that commitment in future, we will do that.

The Chair: That is helpful.

Q100 **Lord Trees:** Thank you very much for coming and speaking to us. In Ofwat's price review last year, which you mentioned earlier, Chris, funds were earmarked both for nature-based solutions, catchment approaches to prevent pollution and infrastructure upgrades. What is your assessment of the comparative value and effectiveness of those two approaches in reducing nutrient pollution? To what extent do you encourage water companies to invest in nutrient-recovery technologies to reuse resources? We are talking about prevention compared to

intervention.

Chris Walters: We allowed for £3.3 billion of expenditure on catchment and nature-based solutions in the expenditure and investment proposals that we green-lit back in December. That is a record level. There is no limit to our ambition to support nature-based solutions. We have also allowed companies an avenue to switch away from so-called traditional or grey solutions to nature-based solutions, if we are able to satisfy ourselves that they are just as effective at reducing pollution as the grey solutions.

As well as seeing a step change in investment in those areas to emphasise our support for them, we have also introduced as much flexibility as we can so that, when companies learn more about these processes and how effective they are, they are able to switch away from pouring concrete towards other nature-based solutions.

Paul Hickey: Helen may also wish to come in, but one of the things I will say is that it is not either nature-based solutions or conventional solutions. You can get a blend. A treatment works that may deploy conventional technology for treatment might have a reed bed or a managed wetland to polish the effluent. There is a blend. We also have a mechanism, as Chris said, to encourage movement between those.

Even conventional technology provides benefits. I deal with major new water resource infrastructure. A programme of new reservoirs or other strategic infrastructure would be classed as conventional hard engineering, but it provides enormous benefits at landscape scale for nature recovery, amenity and wider community benefits.

There is sensitivity in the way that we appraise those projects and work with local communities, but the picture is sometimes portrayed as being nature-based solutions or grey technology. It is about a blend and maximising the benefits, whatever the intervention may be.

Helen Wakeham: There were two questions in there. There was one about nature-based solutions and one about nutrient recovery.

I entirely agree with Paul. Nature-based solutions have an important role to play, blended with traditional solutions. One of the aspects that frequently gets overlooked is that the best place for a nature-based solution is often upstream. That might be a nature-based solution that retains rainwater close to where it falls and takes pressure off wastewater treatment works and drainage systems. There is a huge amount of opportunity there.

The Environment Agency's chief scientist's group has a relatively recent report on the multiple benefits of nature-based solutions and what the evidence looks like, which we can share with the committee, if you do not already have it.

Nature-based solutions need to be the right solution in the right place at the right time. We still have a lot to learn. The investment in the next five

years will help us to learn about how nature-based solutions perform long term for nutrients. Some of them do trap nutrients; some of them release them again. They have some of the same issues that conventional treatment systems have. If some of those nitrogenous products in the water are converted to gas, they sometimes emit the things that we are very carefully trying to control. Again, there is so much opportunity in the next five years through the investment to explore that properly.

The other part of the question was about nutrient recovery. Ofwat is also funding some trials into phosphorus recovery, usually through struvites, which will be interesting to watch. The simplest nutrient recovery we have is the recycling of sewage sludges to agricultural land. Some 95% of sewage sludge, which is nutrient-rich, goes to agricultural land.

There are two points to make about that. First, we need better controls around how that is spread. We need to make sure that the nutrient value of those sludges is properly taken into account so they do not just contribute to an overapplication problem. Secondly, we need to make sure there is nothing in the sludge that we would not want applied to agricultural land. Again, there is something around that source control--controlling what is coming into a sewage works--so that the sewage sludge is reusable.

Lord Trees: You are dealing with two problems, really: nutrient recovery and so on and disposal into the environment. It may be above your pay grade, but to what extent do you feed back to the policymakers, who would be in Defra, I suppose, and government, about the resources that you feel should be devoted to those two situations?

I am a vet, and I see parallels with sickness and disease. We have a terrible problem with disease and pollution of the environment, and you guys are trying to treat that, but, ultimately, we need to prevent the issue happening in the first place. Do you have any feedback for policymakers to try to change that balance? Most of the money is going to the infrastructure and the downstream stuff, rather than prevention. It is a big question, I know.

Helen Wakeham: It is a perfectly reasonable question. I have been involved in water policy and regulation for 30 years and agricultural regulation for 30 years. The emphasis and the public debate is still very much on controlling things that come out of pipes. Certainly, for rainfall, for chemicals and for nutrients, the answer wherever we can is source control and producer responsibility, so that we are actually controlling the amount of these substances in the system. Then we are dealing with the consequences at the end of pipe as a last resort.

Nitrogen is a really good example of how difficult that can be to do. We have not talked at all about nitrogen in groundwater. We know that there is a sink of nitrogen in groundwater, which has been sitting there since the end of the Second World War. We were applying nitrogen at higher and higher levels, up until about 1980. Since then, we have reduced our nitrogen applications, but that nitrogen is still sitting there. It is waiting

to come through the system, affecting our groundwater, affecting our public water supply, and ultimately affecting the rivers and the sea when it comes out. The one thing I have learned in 30 years of water policy is source control wherever we can.

Chris Walters: I agree with that. This is something that is relevant to the Independent Water Commission. In a number of areas—and this is one—it is not obvious in the current system. It is everyone's overall responsibility to grip an issue like that and to drive it forwards. The commission, this inquiry and other things that are going on present a golden opportunity to reset that.

Q101 **Lord Krebs:** One of the things that has come across to us in written and oral evidence is the low level of compliance. This is really addressed to the Environment Agency, primarily. Based on your experience, why is compliance with the environmental regulations for farming so low? How are you working to address it? Just to give some figures, data from 2023-24 shows that 42% of inspected farms were non-compliant with environmental regulations. The Corry review found that only 28% of farmers fully understood the purpose of the regulations that applied to their farm. Perhaps you could kick off by telling us why compliance is so low.

As a supplementary to that, why has enforcement action primarily been limited to advice? Why have farm inspection rates been low? Are those contributing factors to the low compliance level?

Nicola Riley: The low compliance rate has been picked up by the fact that we have started to increase our number of inspections on farms. We gained some additional resource in 2022, which enabled us to increase the number of officers who inspect farms from 27 to just over 100. That has enabled us to deliver 4,000 farm inspections or above per year since that date.

Lord Krebs: What proportion of farms is that?

Nicola Riley: There are 100,000 farms.

Lord Krebs: That represents 1%.

Nicola Riley: Yes.[3] Of those, around 1% are permitted pig and poultry farms under the environment permitting regulations. The 4,000 farm inspections that I was mentioning were about regulating and inspecting the non-permitted part of the sector. We have found non-compliance, or at least one element of non-compliance, in around 50% of the farms that we have inspected.

It is worth saying that we do target higher-risk areas, such as geographically higher-risk catchments where there are protected areas or nutrient-neutrality catchments. We also target higher-risk farm activity. That typically is where nutrient handling and storage is a major factor on

[3] Note by the witness: 4000 inspections represent 4% of farms inspected per year.

the farm. You would see the dairy and beef sector fall into that category. That means that, based on the targeting, there are 34,000 farms that fall into that higher-risk targeted inspection area. Of the 100,000, we are focusing on the 34,000 that are in the higher-risk areas, because of the potential impact on water, particularly around nutrient issues.

There are many reasons cited for why compliance is low from farmers. A lack of understanding of the regulations is one. Time and the costs involved are also things that we hear when we undertake our farm inspections, but those would not particularly stand up as mitigating circumstances associated with running a farm business. They need to be compliant with the regulations. That is what we try to do through our advice-led approach. We talk through the reasons why we are asking for certain actions to be taken.

Compliance is good for business. It is also good for the environment. We do not want to see excess nutrients in the environment, because it causes an environmental impact, but that is also waste and often comes at a cost to farmers. That is why we focus on our advice-led approach, to try to educate and help farmers to understand the reasons why certain activities will cause an impact on the environment.

Lord Krebs: I can see the benefits of giving advice rather than a rap on the knuckles, but have you fined any farms for non-compliance?

Nicola Riley: Yes. I am sorry; I did not answer the second part of the question. To support the advice-led approach, we have a series of enforcement actions that we can take, which range from civil penalties up to criminal penalties and prosecution. The first step would be a warning to a farmer. We have found that, in the majority of cases, this has been enough to instigate the action to be taken. Then we would prioritise that follow-up.

We are also able to enforce through anti-pollution works notices and other mechanisms of warning, right up to prosecutions. The number of prosecutions is low. We are still fairly early on in our process of the farm inspections and returning to farms where we have found non-compliance, but we are very prepared to use our full enforcement capabilities where we need to and where the non-compliance is found to be particularly severe or the risk is particularly severe.

Lord Krebs: Do you have a target to achieve a certain level of compliance by a certain date?

Nicola Riley: We do not have a target as such. The target is to have visited the farms within the highest-risk category in the most efficient way that we can. As I say, we have a target of 4,000 inspections per year. What is that roughly? It would take eight and a half years to visit those 34,000 farms. Within those, we will ultimately be aiming to drive compliance and achieve compliance with the regulations at all the farms.

Lord Krebs: You have a target for how many farms you are going to

inspect, but not a target for how much compliance you would like to reach.

Nicola Riley: We would like to achieve as high a rate of compliance as we possibly can. We enforce various regulations, including the farming rules for water, the storage of silage, slurry and fuel oil regulations and the nitrate vulnerable zones, but, unlike a permit, there is no specific target that the farm is operating within. The requirements of different farms can be varied when we are not working within the permitted sector.

Earl Russell: You have given really interesting replies there. Basically you are visiting 1% of farms and you are finding a 50% rate of non-compliance. Could I ask you, over time, how you reassess that basket of farms at high risk, if your site visits are restricted to such a small amount?

I completely agree with the advice-led approach. In what ways you are seeking to be innovative and reach out to farmers through different methods? Prevention is better than cure.

Nicola Riley: On how we target, we use a variety of data around, as I said, protected areas.[4] We would also look at bathing water data. We also have our own monitoring data. Within area teams, an assessment would be made at the start of the year, to plan out where farms are going to be inspected.

We also work closely with catchment-sensitive farming colleagues. They are a really important part of our approach to farm regulations. They are trusted advisers. When we give advice, they are able to help support farmers through access to grants, et cetera. We continually review that targeting approach and make sure that we build in enough time to be able to go back and revisit farms where actions have not been completed.

We want to make sure we are seeing that through. It is not just about chasing a targeted number of inspections. It is about the outcomes that we achieve as a result of those inspections.

Earl Russell: That is the most efficient targeting of your limited resources, while having those feedback loops in place.

Nicola Riley: It absolutely is, yes.

On the other approaches, we completely recognise that additional levers are needed to be able to drive compliance. Regulation is just one tool. We are working with the agri-food sector itself to look at how the sector can drive compliance, through things like the dairy road map and working with supermarkets, producers and growers.

Within our own remit, we have an approach to remote inspections. We are trying to maximise the benefit that we can get from our on-farm

[4] Note by the witness: We visit 4 per cent of farms per annum.

inspections. We will use geospatial mapping information to help us with that targeting as well, and we are exploring where that can support our on-farm inspections and where we could adopt approaches using that in place of our on-farm inspections, particularly around some of the lower-risk activities.

We have done this around some of the soil monitoring that we have done, particularly over the winter period. We are just starting to explore that.

Lord Mancroft: Could I ask you a specific question? How many prosecutions have you mounted in the last time period for which you have figures available? How many convictions resulted from that?

Nicola Riley: The actual prosecution numbers are low, it is fair to say. Over the last 12-month period, we had two prosecutions. As I say, we try to invest a lot of our time into advice and guidance, but we will use our full enforcement powers where necessary. It does take a long time to get prosecutions through into court.

Lord Mancroft: I understand that. Have you had any convictions?

Helen Wakeham: There was a conviction.

Lord Mancroft: There were two prosecutions and one conviction. What time period is that over?

Nicola Riley: That is in the last 12 months.

The Chair: I will bite my lip because we are short of time.

Q102 **Lord Rooker:** You have been incredibly helpful this morning. My question follows on from Lord Krebs. It is about compliance by the farms under the environmental permitting regulations. I am sorry but, in answer to Lord Krebs, you gave a figure for the number of those farms, and I missed it.

Nicola Riley: It was 1,300 pig and poultry farms permitted.

Lord Rooker: Given the compliance there—for a relatively small number, it is true—are there any lessons you could learn? Would there be value in extending the regulations to the smaller pig and poultry farms, as well as the other dairy farms?

I understand, for example, on the poultry side, that those under permitted regulations have over 40,000 places. It is a long time since I went to a poultry farm, but it was bloody huge—and 40,000 was one shed of several sheds. Would there be an advantage? By the way, who is doing the inspections? Is it your staff or are you using contractors?

Nicola Riley: It is a combination. We have our staff, but we also operate an assurance scheme in the pig and poultry sector. Businesses that come under EPR are able to join an assurance scheme. If their compliance levels are good, they can benefit from a reduction in the number of

inspections or have an inspection from part of the assurance scheme. It is a combination of our own officers and the assurance scheme officers.

Lord Rooker: Would there be a benefit in widening the use of the regulations to the smaller places?

Nicola Riley: Potentially, yes. Having a permit creates a more detailed relationship between us and the farmer, where we can set requirements specific to the individual farm. It enables us to have tighter and closer regulation and a better understanding of the farm type, the number of animals or the farm in general. It would enable us also to bring in performance across other aspects of the farm. The pig and poultry scheme focuses on emissions to air, but we would be able to bring in water, land and air into that.

We are working with Defra to support its policy around ammonia and methane reduction in the sector. We would recommend a flexible and scalable approach that is proportionate to the farm size, recognising that there is cost associated with a permitting scheme. We would recommend something that was scalable and flexible within that.

Lord Rooker: I am sorry, but I do not understand the way the regulations work these days. What is stopping you extending it to smaller locations? Is it a policy issue for Defra or is it a resource issue for yourself?

Helen Wakeham: It is a policy issue for Defra. It is the way the regulations are set.

Lord Rooker: I thought so. Thank you.

Helen Wakeham: We talked a little about extending to more pig and poultry units. The majority of ammonia emissions from farming arise from dairy and beef. We would be in favour of revisiting the environmental permitting regulations to include dairy and beef, but, as Nicola has described, making sure that we have a scalable and proportionate approach.

Lord Mancroft: It may be a slightly unfair question, but I am going to ask it anyway and you can tell me to buzz off if it is unfair. The River Wye is one of our greatest rivers, and possibly the greatest river in Wales. It is now a virtually dead river. We are told—there has been enormous publicity on the fact—that that is mainly caused by poultry pollution. In other words, that has killed one of our greatest rivers. Are you aware of that? Could you comment on that at all?

Nicola Riley: We are very aware of that. We have been working with the sector within our area teams that the River Wye comes within. We have a programme of communications and engagement with a group of farmers in the area. We are also working closely with Defra as it reviews aspects of agricultural regulation around this.

We are aware that there has been a judicial review in the catchment in the Herefordshire area as well. We are also working with Defra and with legal colleagues around what the outcomes of that might tell us and what we might need to do differently.

Lord Mancroft: Is that making progress? Are we going to see some positive results from that at some point?

Nicola Riley: It is a really difficult and challenging situation in the Wye. There is a complexity of issues around the number of units that are in the catchment, which we are working really closely with the area to try to address.

Lord Rooker: Are the poultry farms we are talking about here covered by the permitted regulations or not? Are they the smaller ones?

Nicola Riley: Some will be covered, but some will not. Some will fall below the thresholds for being covered by EPR.

Lord Rooker: What percentage are not covered by the regulation?

Nicola Riley: I would have to come back to you on that figure, sorry.

The Chair: That is a crucial figure to have.

Earl Russell: Can I just add a very quick supplementary to Lord Rooker's question? I was really interested by your answer around the regulations framing some of the work that you do and extending your work. I wanted to ask you a question from your personal point of view. Do you feel that you have the scope, if you wanted to, to go out and do sampling into other sizes or types of farm, to do a small sample to check if there might be broader problems? Are the regulations limiting your ability to do that? Is there a need for further regulations? Do you have the freedom you require to do that kind of work or are the regulations limiting you?

Helen Wakeham: The regulations do not constrain where and how we monitor. To a degree, resources constrain where and how we monitor. We put a great deal of effort into making sure that the monitoring that we do reflects the local geography and the local issues. For example, we will focus monitoring and regulatory activity around bathing waters that are failing. We certainly have the freedom to do that, yes.

The Chair: Before we move on, it is very clear that permitting works. Would you support any recommendation to reform the EPR as recommended in the Corry review, given that the current permitting regime is not fit for purpose because it does not extend far enough?

Helen Wakeham: We are looking now at the recommendations of the Corry review, which are for changes to EPR and increasing flexibility. Nicola has already described that a regulatory regime that is flexible and scalable is really of benefit to us. We are certainly looking at that, yes.

The Chair: You would support it. His finding is that it is not currently fit

for purpose. Presumably, you have read the Corry review in a great more detail than I have, and so will have a view on it. Can we hear those views?

Helen Wakeham: There is a lot to it. We are working our way through all the recommendations of Corry, which are very wide-ranging as relates to the Environment Agency and go far beyond water and farming. The direction of travel for Corry, which is for regulators to work better together and to give a degree of flexibility to the way that we regulate, is really welcome. we are looking at that in some detail.

Nicola Riley: I mentioned earlier the main regulations that we would be looking at when we go on to farms are around NVZs, SSAFO and the farming rules for water. SSAFO—the storage of silage, slurry and fuel oil regulations—and NVZs are fairly old. We would welcome a review of those regulations.

Q103 **Lord Mancroft:** We have looked at and you have talked about regulations for nitrogen pollution in water. Is there work being undertaken to regulate and reduce agricultural emissions, such as ammonia and nitrous oxide, into the air?

Nicola Riley: I mentioned the work that we are supporting Defra on around the policy for ammonia and methane reduction. Our primary regulatory remit for agriculture focuses on water pollution, but also protects soils through the direct legislation that I already mentioned. That may have some indirect supporting benefits for air quality or climate change—for example, around slurry management and storage, and nutrient efficiency—but we directly regulate ammonia emissions only at the pig and poultry farms through the environmental permitting regulations.

That accounts for only 5% of the total agricultural ammonia emissions in the UK. Clearly, there is a gap that we see there around our ability to regulate.

Lord Mancroft: There is nothing specifically to do with air.

Nicola Riley: Only through the pig and poultry EPR.

Helen Wakeham: That is just associated with the housing.

The Chair: This committee, last week, visited the Netherlands, and we heard that they have taken measures to enforce impermeable covers over slurry stores, which has had a good impact. They have mandated new housing requirements for livestock and low-emission spreading techniques. The first two of those—the slurry covers and the low-emission spreading techniques—are very cost-effective and have had a huge impact on nitrogen deposition from the air, particularly in dealing with ammonia emissions.

Why can that not be done here? I understand that the clean air strategy in 2019 did recommend that, but the most recent statement from Defra

on, for example, slurry covers is that it is not going to be happening.

Nicola Riley: Those are government policy areas. The slurry infrastructure grant has been made available to a large proportion of farmers. As part of that, if a farmer applies for a slurry grant, they can also apply for costs to cover the cover as well. You are correct that they cannot do that independently. They cannot apply for a cover for a separate slurry store.

The Netherlands is in a more advanced state than we are in both the impact and the severity of the situation there, but also in the approaches that it is taking to address that, because of those reasons. There are things that we should be looking at that other countries are doing, which we could adopt as policy in due course.

The Chair: It is pretty low-hanging fruit, is it not? As Lord Trees was saying, is it advice you can give to government—that tackling the upstream emissions would make you job much easier downstream?

Nicola Riley: It is part of our conversations as we are working with Defra on development of its policies. We will be part of that advice process to Defra.

Earl Russell: These are also ideas that have been around for quite a while. I fully support your approach of giving advice to government. My question is whether, with a change of Government, you are seeing more opportunities to give government advice on these areas.

Nicola Riley: Speaking personally, we have a very good relationship with the policy teams within Defra. That has been consistent for a number of years now. That is part of the reason why we secured additional funding to be able to increase our farm inspection resource, but also why Defra has been able to grant us some funding to look at innovation in agriculture and how we might improve the way that we regulate. We continue to work constructively with Defra, and we have done for a number of years now.

Earl Russell: I appreciate the diplomacy of your answer. Will that innovation funding cover some of the areas that the Chair has mentioned? Do you have ongoing projects that can be fed by that?

Nicola Riley: Yes. There are various innovation funds. They would be hosted and managed by Defra, rather than by us. We do not manage any funds ourselves. The work is done within our team around where we could adapt our approaches to regulation in an innovative way.

Lord Trees: Can I ask about nitrate vulnerable zones? How do you know how much fertiliser a given farmer has put on the ground?

Nicola Riley: Nutrient management plans are part of the requirements there. On a farm inspection, we would ask the farmer to see their nutrient management plan. If that is not something that they have

available, that may be one of the reasons for non-compliance. That should be part of their nutrient management planning.

Lord Trees: It is a commitment in their permit as well, presumably.

Nicola Riley: They would not necessarily have a permit. It would be the non-permitted part of the sector primarily that we would be inspecting. It would be a requirement through the nitrate vulnerable zone regulation, but also through the farming rules for water, for them to have some sort of nutrient management plan.

Lord Trees: Only 1% of farmers are inspected and half of them are non-compliant. There could be a lot of misuse of fertiliser, could there?

Nicola Riley: Nutrient management planning, or lack of, is one of the most common improvement actions that we give to farmers as a result of our inspections.

Lord Krebs: We have a map here of the exceedance of critical loads for nitrogen in the UK; it is a pretty grim picture. In spite of all we have heard this morning about regulation, enforcement and so on, the fact is that most of the country has too much nitrogen falling on it. What is the obstacle? If you had a magic wand that you could wave that would sort out this problem, what would it look like? Is it more rules, better enforcement of rules, more money, more technology? What is your answer? Clearly, whatever you are doing now, even though you are putting your best efforts into it, is not sorting the problem.

Helen Wakeham: Alongside the map, the nitrogen balance chart, which I am sure CEH and the Sustainable Nitrogen Alliance have shared with you, really illustrates the problem. We are bringing more reactive nitrogen into England than we are using, so there is a surplus. We will control the parts of the system that we can but, if there is too much nitrogen coming in—and nitrogen is leaky, reactive and moves between air, land and water—there will always be too much.

My magic wand is to have a strategy, taking an overview of the issue, to look at how we properly manage the amount of nitrogen coming into the UK. If there is less nitrogen in the system, nitrogen has a higher value, which will then help the better reuse and recycling of nitrogen.

I should say that the Environment Agency regulates some things, but it does not regulate the whole. Certainly, for air, Environment Agency-regulated sites account for only something like 10% of UK emissions of nitrogenous compounds. The biggest emitter of NOx is the transport sector, where the Environment Agency does not really have a regulatory remit. Most of the ammonia—87%—arises from agriculture, but that is from the non-regulated part of the sector. There is a line of thought that says we permit everything everywhere, but, ultimately, the starting point is that there is too much nitrogen coming in. If your bath is overflowing, the first thing you do is turn the tap off, rather than run around with a bucket.

For us, we have set off with the best of intentions in environmental regulation in the UK, but we now have layers and layers of regulations that are difficult for everyone to navigate. A centralising strategy for nitrogen would be really helpful in this instance.

Paul Hickey: The only thing I would add is that such a strategy would allow you to have integrated actions across sectors. We have spoken about action on the wastewater sector in particular and we have talked about agriculture, but there is an interplay between those. A strategy would allow us to optimise the interventions across those to get the outcomes desired in a most effective manner. That would be the only addition to what Helen said.

Helen Wakeham: I agree with you, Paul.

Lord Rooker: Do you have access to the quantity that is coming in from different importers?

Helen Wakeham: Not as a regulator, no.

Lord Rooker: Does anybody have access, or is it classed as commercially confidential between competitors?

Helen Wakeham: I am sure elements of it are, but the work that the Sustainable Nitrogen Alliance did does give an indication of kilotonnes of nitrogen in different parts of the system. They have a kilotonnes figure for the amount coming in.

Lord Layard: Could you say more about what you mean by turning off the tap? How are you going to control the amount coming in?

Helen Wakeham: At the moment, because nitrogen fertilisers are cheap and sewage sludge is very cheap, there is not really any incentive for anybody in the system to try to capture nitrogen. It does leak, but there is not any incentive to try to control it. For farmers, often disposal of farm waste is a disposal activity, rather than a recovery activity to get the nutrient value. The only way to start to control the problem is to reduce the amount coming in, which then creates a better market and value for the nitrogen that is here.

Lord Layard: Would that mean a tax on nitrogen? What kind of controls do you have in mind?

Helen Wakeham: I am not thinking that far ahead, but we do import more than we export. Therefore, there is a surplus. A strategy would start with that policy development, to look at where the levers may be in the system to reduce the need for import.

Nicola Riley: That would go back to the point around the compliance being low in the farm inspections. We are seeing the endpoint of a cycle, where the nutrients are applied to the land. What we need to see is that there is a need for that—the crops and soil need that. There needs to be something within the system that enables that to happen, so some sort of

a nutrient balance so we can see what is needed and what is coming off, such that there is not that waste in the middle of it.

Lord Trees: You slightly pre-empted my question. Following the Russian invasion and of Ukraine and so on, I understood that fertiliser prices had gone up a huge amount for the farming sector. I was going to ask whether you have seen that create any degree of incentive to encourage innovation in recycling and recovery. But if the price really has not really changed that much—

Helen Wakeham: I have not seen any evidence of it. Maybe you have, Nicola.

Nicola Riley: There may have been a small amount but, because the prices have fluctuated, it has not been sustained enough to be able to drive that innovation more deeply.

Lord Jay of Ewelme: We have heard from others during the course of this inquiry that a lot of farmers put much more nitrogen on their fields than is needed. Even if it is not hugely expensive, that means they are paying an awful lot more than they need to pay to get the sort of nitrogen effect on their crops that they need. Do you share that view? How does one get people to use less nitrogen than they are at the moment, but as much nitrogen as they need to allow their crops to grow?

Nicola Riley: This is why nutrient management planning is absolutely essential and why that is one of the most frequent things that, through our advice-led approach, we will be advising farmers on. We are trying to educate around the benefit to the environment, the fact that excess nitrogen will need somewhere to go and also, like you say, about the cost to the farm. It is efficient for the farm business to be using only the nitrogen that you need on your field.

Earl Russell: One option is to tax the nitrogen and the polluter pays. The other option could be to incentivise farmers to try to use only the nitrogen that they need to use. Is that incentivisation something that anybody has ever looked at as a different option?

Helen Wakeham: It is an interesting question, which might encourage me to reminisce, having previously held the role that Nicola holds. In the 2000s and 2010s, there was a huge amount of work and thinking that went into nutrient taxes. Some countries in Europe did try nutrient taxes. I am not sure that any of them still do. Again, the overwhelming problem that we have is that nitrogen is cheap and ubiquitous, which makes it very hard to create market incentives for it.

Earl Russell: Then you deal with the consequences.

Helen Wakeham: Yes.

Lord Rooker: You cannot go via those who purchase from the farmers, to put pressure on them, to insist that their supply chain is less polluting. The complaint has always been that the supermarkets, the big

purchasers, are controlling the prices, the distribution and everything else. Why can they not control the pollution aspect of the crops that they are buying?

Nicola Riley: This is central to the point of the conversations that we are having with supermarkets and the supply chain around a greater level of responsibility within the supply chain. It is fair to say that they are working on initiatives around this. There is one fairly new one, with Tesco, which is looking at how it operates in a more sustainable way with its farms. There is also the dairy road map that I mentioned previously. There are sector-led initiatives as well that we are engaging with, to see if we can achieve more through that route.

Q104 **Lord Layard:** I wanted to ask a question about sensitive habitats. We know that critical loads of ammonia and nitrogen oxides are exceeded in the majority of sensitive habitats. What plans do you have to address this? In your view, what would be the impact of extending the environmental permitting regulations to smaller industrial installations?

Helen Wakeham: What plans do we have to address this? We are working really closely with Natural England on the issue of nitrogen deposition, mostly related to the agricultural sources that we regulate. We are the chair of something called the air quality technical advisory group, which Natural England also sits on, and that gives advice to government on habitats directive implementation for air quality. We provide technical guidance on air emissions from the sites that we regulate and for all of our regulated processes.

That membership of the TAG includes all of the regulators and conservation agencies. That helps us to understand the problem. It does not necessarily help us to manage that problem. What we then do is give advice to government on the majority of emissions to air that we do not regulate. We have talked already about extending environmental permitting regulations. We certainly could, and, as Nicola has described, that permitting approach would enable us to provide more controls.

The real issue for us is that the majority of ammonia emissions are arising from applications to land. It might be something that the Defra land use framework takes a look at. We do not have control of emissions from road transport. All of those things in a place will have an impact on special sites.

The Chair: Can I just ask you about one piece of evidence that we received from Natural England? I think it was Tony Juniper who pointed out that, under the habitats regulation, agricultural developments and activities are not considered to be plans or projects in the same way, so are not regulated at all. Is that something that you would like to see rectified?

Helen Wakeham: Yes. It is certainly true that much agricultural development is not subject to planning control. If, ultimately, we are going to manage the impact of agriculture on the environment, we need

more control over what happens where. The environmental regulator might say that about any sector, but it is especially true of agriculture.

The Chair: Thank you very much. Thank you very much, colleagues, as well. Thank you very much to the panel. We look forward to receiving those extra bits of evidence that you have undertaken to provide to us. Thank you very much. With that, I formally bring this session to an end.