Welsh Government Regulatory Measures to tackle agricultural pollution

AVAILABLE EVIDENCE

Prepared by NFU Cymru

Submitted to the
Minister for the Environment, Energy and Rural Affairs
On 10th September 2019

President's Foreword

A clean, reliable source of water is vital to all farms. But water management is about more than ensuring farmers have enough water to meet their business needs. Flood risk management - taking steps to reduce the risk of flooding and managing flood water when flooding does occur - and water quality - taking steps to reduce agriculture's impact on water are also essential elements of the work that farmers do.

Over the past 25-30 years, farmers have been able to reduce the negative impact they have on water quality through a variety of approaches including the use of precision technology, nutrient management planning and ensuring the right nutrients are applied in the right conditions to meet crop needs.

Overall water quality in Wales continues to show general improvement. However, as farmers we recognise there is more that we can and must do to contribute to further improvements going forward. Farmers take their environmental responsibilities seriously; NFU Cymru has long been clear that one pollution incident is one too many and continues to work tirelessly with partners on the development and implementation of a framework that supports farmers to take action to reduce incidences of agricultural point source and diffuse pollution where this is needed.

We are strong advocates of appropriate interventions where poor practices are responsible. Our view remains that approaches to water quality must consider the full range of issues and sectors influencing water quality, be evidence-based, provide local solutions to local problems, and be developed working in partnership with the farming industry. We are clear there is no one single solution and a range of support is required including the provision of advice and guidance and well-resourced investment support, alongside enabling innovation, and the development of voluntary 'earned recognition' approaches all underpinned by a backstop of regulation as last resort.

In the context of increasing public concern, NFU Cymru along with a range of other partners has worked tirelessly to support the farming industry to take action to improve water quality in Wales. This is an area where NFU Cymru is proud to have led the way, leading and co-financing the project to develop voluntary approaches that can provide farmers with the tools to deliver measurable improvements in the way nutrients are managed. In this work we have been strongly supported by the farming community who have shown genuine desire to minimise their impact and improve their environmental credentials in a demonstrable way.

The announcement to introduce regulatory measures for the whole of Wales to protect water quality from agricultural pollution from 1st January 2020 has been a significant source of disappointment and concern.

In January, Welsh Government confirmed to us that the development of the new regulations will be subject to Regulatory Impact Assessment – we are clear that this must include comprehensive analysis of economic, environmental, social and cultural impacts. The full cost-benefit of Welsh Government's regulatory proposals must be clearly understood before moving ahead.

This report fulfils NFU Cymru's commitment to provide available evidence to the Minister. We believe all the areas covered within the report are relevant considerations in a decision that is of critical importance to the industry with far reaching implications. NFU Cymru is absolutely clear that the new regulatory measures proposed by Welsh Government mirror very closely the existing Nitrate

Vulnerable Zone (NVZ) Action programme. Strong evidence exists not only of the cost and complexity of this regulatory approach and the burden it places on those farming within NVZ areas, but also of the very limited positive contribution that NVZs deliver for water quality and the environment. It is an approach we categorically reject. We cannot over-emphasise that the introduction of a whole Wales NVZ approach, particularly at a time of profound uncertainty for the industry is weighing heavily on farmers minds and impacting confidence for the future. The regulatory proposals are not only deeply damaging for farming but will not deliver the water quality improvements we all want to see.

We very much hope, in reaching your decision you will carefully consider the evidence presented here. EU exit provides the opportunity to design a new regulatory landscape with a focus on achieving outcomes that support Welsh farmers to produce the raw materials for a growing and dynamic multi-billion pound Welsh food and drink industry. There are a broad spectrum of approaches available to Welsh Government that will deliver better outcomes for water quality at this time. On behalf of NFU Cymru, I reiterate our commitment to work with government and all those with an interest in water quality in Wales for the benefit of the environment, our rural communities and society.

John Davies
President
NFU Cymru

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1. Introduction

On 14th November 2018, Welsh Government announced that regulations covering the whole of Wales to protect water quality from agricultural pollution would be introduced in the Spring of 2019, coming into force from 1st January 2020 with transitional periods for some elements to allow farmers time to adapt and ensure compliance.

Regulations are to include the following measures:

- Nutrient management planning
- Sustainable fertiliser applications linked to the requirements of the crop
- Protection of water from pollution related to when, where and how fertilisers are spread
- Manure storage standards

On 10th January 2019 the details of the new regulations were shared with industry representatives. The new regulations closely mirror the requirements for Nitrate Vulnerable Zones, which together with some additional measures will apply to the whole of Wales.

For information, the existing NVZ Action Programme which applies to farms in 2.4% of Wales currently can be accessed here. All of the regulatory measures included within the existing NVZ Action Programme are repeated within the proposed new regulatory measures to control agricultural pollution which will adopt a whole Wales approach.

Following discussions between NFU Cymru lawyers, JCP and Welsh Government, Welsh Government confirmed to NFU Cymru that the development of the regulations will be subject to consideration of the available evidence and the findings of a Regulatory Impact Assessment.

This report, prepared by NFU Cymru, presents available evidence to be considered by the Minister for the Environment, Energy and Rural Affairs in the development of the new regulations.

2. Methodology

In preparing this report, NFU Cymru has undertaken desk research to review the economic, environmental, social and cultural context in which new regulatory measure are being introduced and sought to understand the impacts. This includes analysis of a range of qualitative and quantitative sources as well as the research findings of the NFU Cymru survey undertaken in 2016.

This report also includes a number of farmer case studies to ‘bring to life’ the lived experiences of farmers on the ground and to demonstrate the real consequences to farm businesses of the proposed regulatory measures. These have been provided in an anonymised fashion to protect the safety and well-being of the farmers concerned.

The drafting of this report has been guided by the framework established by the Well-Being of Future Generations Act (2015) and includes economic, environmental, social and cultural considerations. Contributions have been arranged broadly around this framework whilst recognising many aspects are highly integrated and overlap.

This report is not intended to replace the comprehensive Regulatory Impact Assessment Welsh Government is required to undertake.

3. NFU Cymru position

Following extensive consultation with our members, NFU Cymru developed our vision for improved water quality in Wales in 2017. This is attached in Annex 1 and considers the role of Welsh agriculture in maintaining and enhancing water quality in Wales, also identifying the immediate opportunities to tackle agricultural pollution in the form of twenty recommendations.

We are clear there is a spectrum of approaches available to deliver improvements in water quality from the farming sector. Positive action at farm level can be facilitated by the provision of advice and guidance as well as appropriate incentive mechanisms recognising the significant investment costs. Participation in assurance schemes and 'earned recognition' as well as novel approaches including trading, off-setting as well as innovative technologies which look beyond formal regulation can also deliver positive environmental outcomes. Adequate time and resources must be provided so that the effectiveness of such approaches can be demonstrated. Regulation should be the backstop.

NFU Cymru's vision for the future of farming 'A regulatory regime that's fit for purpose' sets out our position with respect to regulation in the context of Brexit and our exit from the EU. We believe good regulation balances the fundamental value of an economic activity with appropriate controls which ensure that the risk of harm is minimised. Poor regulation imposes burdens on business which are disproportionate to any benefits derived, these burdens add to costs, place businesses under competitive disadvantage and deter businesses from undertaking activities which are valuable to society.

We believe our departure from the EU must be used as an opportunity to deliver a fairer and more proportionate regulatory framework. Regulation is an issue that time and time again comes up as one of the key factors impacting on farmer confidence, stifling investment and farm business development. NFU Cymru is firmly of the view that science and evidence must be at the heart of policy and decision making with decisions based on the most robust scientific evidence. Where regulation is deemed necessary, it should be proportionate and targeted focussing on outcomes rather than process. It should not be applied in a blanket fashion, especially where better and more cost effective solutions to problems exist.

Brexit and our departure from the EU mean that for the first time in our nation's history we have the opportunity to design, development and implement a 'made in Wales' policy for Welsh farming. Agricultural policy, funding and the regulatory framework, which Welsh Government propose is to be the 'gateway' to future schemes are all matters that are completely intertwined and need to be considered concurrently as a result.

It is in this context that Welsh Government's proposals to introduce regulatory measures to tackle agricultural pollution are considered in the remainder of this report.

4. Executive summary

Welsh Government has proposed new regulatory measures to tackle agricultural pollution. The new regulations are to come into force from 1st January 2020 with transitional periods for some elements to allow farmers time to adapt and ensure compliance. Regulations are to include the following measures:

- Nutrient Management Planning
- Sustainable fertiliser applications linked to the requirements of the crop
- Protection of water from pollution related to when, where and how fertilisers are spread
- Manure storage standards

Details of the new regulations closely mirror the requirements for Nitrate Vulnerable Zones (NVZ) which together with additional measures will apply to the whole of Wales. The EU Nitrates Directive is known as a burdensome piece of legislation that is costly and complex for farmers to comply with. It is an approach that NFU Cymru categorically rejects.

This report prepared by NFU Cymru presents available evidence to be considered by the Minister for the Environment, Energy and Rural Affairs in the development of the new regulations and includes:

- The current state and trends of water quality in Wales
- The political and policy context in which regulations are being introduced
- Progress to date – a sustainable management of natural resources (SMNR) approach
- Proposed regulatory measures to tackle agricultural pollution
- Economic context and affordability
- Social and cultural context

State and trends of water quality in Wales
Analysis of comprehensive monitoring data undertaken by NRW for Water Framework Directive (WFD) over short and long term temporal scales shows an improving situation with respect to water quality in Wales. A high degree of variation in water quality across Welsh catchments also exists.

Based on WFD monitoring data new regulations that extend to the whole of Wales to tackle agricultural pollution cannot be justified. (Page 16 – 18)

Overall at a UK and EU level, the European Environment Agency (EEA) undertook an assessment of the status and pressures of European waters in 2018. Evidence shows the percentage of waterbodies not in good ecological status or potential in Wales compares reasonably well to elsewhere, in the UK and EU even where NVZ regulatory approaches have been in existence for considerable time. (Page 18 – 19)

Additional evidence relating to water quality is provided by the Glastir Monitoring and Evaluation Programme (GMEP). GMEP, which specifically assessed small streams excluded from WFD shows a general ongoing improvement in the condition of small streams since 1990. Monitoring through the programme also shows soil nitrogen levels are stable on improved land and levels of soil phosphorus on improved land were stable and presenting a lower risk to waters. Across Wales, farmers surveyed reported a 9% reduction in applications of inorganic fertilisers with over half undertaking soil nutrient testing. (Page 19 – 20)

NRW State of Natural Resources Report (SoNaRR) states that there is enormous variation in the extent and populations of freshwater species with some species increasing and some decreasing. Abundance of salmon has declined in recent years and is linked to increased mortality at sea. Climate change is expected to bring about changes which may lead to a decline in water quality. (Page 20 - 21)

Gaps in evidence do, however, exist and Welsh Government has not met its commitment under the EU Urban Waste Water Directive to undertake four yearly reporting to assess the extent to which waterbodies are sensitive to effects of sewage discharges. The reason for this is unclear, particularly when sewage discharges are known to be a significant reason for failure of WFD and when Welsh Government strategy is to adopt an integrated approach. (Page 21-22)

In terms of bathing water quality, evidence shows Wales has the best bathing water quality in the UK. The Cemaes Bay case study demonstrates that where classifications for bathing waters fall below standard, an evidence-based targeted approach working with all sectors within the catchment delivers the required positive improvements. (Page 22 - 23)

Analysis undertaken by NRW of WFD failures shows there are a range of factors influencing water quality in Wales, including agriculture. A sole focus on agriculture through the introduction of regulatory measures to tackle agriculture pollution will not on its own deliver WFD objectives, nor does it represent an evidence-based approach given the extent and distribution of waterbodies failing due to agriculture. The single sector focus also puts major pressure on an industry to remedy issues out of their control due to natural processes. (Page 24 - 26)

Analysis of NRW WIRS pollution recording data shows pollution incidents arise from a number of sources and sectors, including agriculture. The total annual number of agricultural pollution incidents over the 18 year period to 2018 shows no discernible upward or downward trend; similar analysis of serious (high; formerly category 1 & 2) agricultural slurry pollution incidents to water over the same period also shows no discernible trend. The geographic distribution of agricultural incidents to water during the period 2010 to 2018 shows wide variation with many water bodies incurring zero incidents. Tackling water pollution using a single sector approach is, therefore, disproportionate for farming and also unlikely to deliver the reduction in pollution necessary to meet WFD objectives of good water quality given broader influences on water quality. (Page 26 – 29)

Overall, analysis of the available evidence provides no justification to introduce regulatory measures to tackle agricultural pollution for the whole of Wales, a single sector approach will also not deliver water quality outcomes in line with WFD.

Political and policy context

Thinking in the area of environmental legislation has evolved significantly away from a single issue focus to a more balanced approach in recent years. This more holistic, balanced approach is reflected in the new legislative framework established through the Environment (Wales) Act 2016 which puts in place the legislation in place to plan and manage Wales' natural resources in a more proactive, joined-up way through the sustainable management of natural resources. In addition, the Well-Being of Future Generations (Wales) Act 2015 places a duty on all public bodies to protect and enhance the economic, environmental, social and cultural well-being of Wales. (Page 30)

The approach adopted by Welsh Government to introduce regulatory measures to tackle agricultural pollution closely mirror the NVZ action programme and reflect an outdated approach to regulation. This approach does not align with the aspiration or ways of working established within Wales's world leading legislative framework, in that economic, social and cultural well-being is not considered alongside the environment. New regulations have not been developed collaboratively, nor are they evidence based or adaptive.

Welsh Government proposals to introduce regulatory measures as they currently stand are not aligned with its own Water Strategy which states it will adopt an integrated and collaborative approach, that also reflects economic considerations and social issues. The evidence on state and trends of water quality provides no basis for Welsh Government to veer from its stated policy position of working collaboratively with farmers to reduce the loss of nitrates from their land to prevent designation under the Nitrates Directive. (Page 31)

It is important to recognise that regulations are being introduced at time of profound uncertainty as a result of Brexit. All the forecasts and evidence points to an extremely bleak picture for many farming sectors in the event of 'no deal' Brexit which is now the 'assumed' position of the UK government. The ability of farmers to meet the costs of requirements of new regulatory measures must be considered in this context. At this time, there is no idea of what sort of trading relationships we are going to have with the EU27 in the future. Securing future trade in agricultural produce cannot, therefore, be used as justification for the introduction of burdensome regulatory measures on the farming sector at this time. (Page 32 - 33)

Welsh Government is currently consulting through its consultation 'Sustainable Farming and Our Land' for how Welsh Government intends to support farmers after Brexit. Proposals include paying farmers annually to deliver outcomes not rewarded by the market such as nutrient management planning and the targeted application of fertiliser to deliver water quality outcomes. Payments will only be made above the regulatory baseline; this will also be the 'gateway' i.e. the threshold farmers must meet, if they are to access any future support. New regulatory measures, in effect, put into the sphere of regulation activity that Welsh Government currently proposes to pay farmers for delivering, severely limiting what farmers can realistically do and be rewarded for over and above this baseline. New regulatory measures also disadvantage some farmers and groups of farmers such as the tenanted sector from accessing future support schemes at all given their highly complex and costly nature. (Page 33 – 34)

Progress to date – a sustainable management of natural resources (SMNR) approach

Welsh Government's proposals to introduce new regulatory measures in their current form do not align with the findings of the NRW Wales Land Management Forum Sub-Group on Agricultural Pollution and Interim Report. Overall, the WLMF sub-group on agricultural pollution has committed significant time and resource to working collaboratively and on the basis of evidence to understand root causes and develop an integrated response to tackle agricultural pollution in Wales in line with SMNR principles. The findings of this group are clear that there is no one simple solution to tackling agricultural pollution. The findings and recommendations of this expert group are presented in the progress report submitted to the Cabinet Secretary in April 2018 and represent the best way route forward if water quality improvements are to be achieved. (Page 35)

Overall, Welsh Government proposals to introduce regulatory measures to tackle agricultural pollution that are, in effect, all Wales NVZ, go against the findings of the expert group established to

consider agricultural pollution in Wales. The report produced by the sub-group establishes a clear way forward for the development of a regulatory regime that is sufficiently robust to achieve the required outcomes. The proposed regulations are not consistent with the principles of good regulation. (Page 36)

In line with the Cabinet Secretary's statement of December 2017 which signalled a willingness to work with stakeholders to explore voluntary approaches to nutrient management, NFU Cymru and partners have devoted significant time and resource to take this forward. This project must be given adequate time to demonstrate its potential. (Page 36 – 40)

The sub-group has identified that an advice led, targeted approach has very significant potential to drive improvements in water quality and reduce agricultural pollution. This is receiving significant focus with good signs emerging of farmers engaging on this issue and taking action as a result. This will take time to translate into reduced pollution incidences and improved overall water quality. We are not confident that the data collect during the NRW dairy visits, to date, is sufficiently robust from which to draw evidence based conclusions. (Page 40 – 43)

We are clear; improving the range of investment opportunities has a key role in reducing incidences of agricultural pollution. The effectiveness of Welsh Government's RDP in supporting on-farm investment in infrastructure at a rate and scale appropriate to industry needs has been limited to date. Regulatory measures are being introduced at a time when future funding mechanisms are far from clear. Farm businesses experience difficulty in demonstrating the business case to secure borrowing for investments in infrastructure associated with environmental improvements. (Page 43 – 45)

Innovation and the application of new technologies and techniques have a key contribution to make in addressing a range of water quality issues on Welsh farms. The legislative framework provides the mechanisms to facilitate innovation through the deployment of experimental powers and powers to suspend regulation. Whilst examples of innovative approaches do exist, there is more that should be done to create the appropriate conditions for farmers and the private sector to have the confidence to make investments of time and money in innovation. Innovative approaches must be enabled; they must be given adequate time to be properly tested recognising that approaches that fail can make a valuable contribution to our understanding going forward. (Page 45 - 46)

Proposed regulatory measures to tackle agricultural pollution

Overall, key concerns relating to the proposed regulatory measures focus in three key areas, namely the costs associated with designation; the bureaucratic nature of the regulation which presents challenges to farmers to demonstrating compliance; together with restriction to day-to-day farming operations.

In 2016, NFU Cymru undertook a survey which found that around one in eight farmers (13%) that are not currently in a NVZ said they would give up farming or would consider giving up if NVZ proposals were introduced. Nearly three quarters of farms that produce slurry (73%) said they did not currently have sufficient slurry storage on their farm to meet proposed NVZ requirements. It will cost those without sufficient slurry storage an estimated average of £79,957 to achieve NVZ slurry storage compliance (2016 figures). (Page 47 – 49)

It is important to note that proposed new regulatory measures mirror NVZ requirements. The EU Nitrates Directive and the methodology underpinning new designations has the very specific objective of protecting waters against pollution caused by nitrates from agricultural sources.

Based on specific evidence gathered in 2016 by NRW through the Nitrates Review which is intended to protect waters against nitrate pollution from agricultural sources, NRW identified that the area of Wales designated as NVZ should increase from 2.4% to 8%. Independent analysis of the NRW evidence presented at that time suggests that even an increase to 8% is questionable.

The evidence provides no justification to introduce regulatory measures to tackle agricultural pollution at whole territory (all-Wales) level. It is not clear what objective Welsh Government is trying to meet in applying NVZ measures when the evidence of nitrate pollution from agricultural sources, is absent from practically all of Wales. An all-Wales approach goes against the principles of science and evidence-based decision making as well as the 'polluter pays' principle. (Page 49 – 50)

The report also considers the extent to which proposed new regulatory measures can be effective by looking at the effectiveness of the existing NVZ Action Programme. Analysis of the evidence provided in the Article 10 reporting of existing NVZ designations provides no substantive evidence of the effectiveness of the NVZ Action Programme in reducing agricultural pollution despite a number of long standing designations dating back to 2002. The Action Programme measures are extremely costly and complex for farmers to comply with. It is a highly unsatisfactory situation that farmers have complied with costly and bureaucratic measures over a prolonged period of time for little or no demonstrable environmental gain. From this evidence, there would appear to be no justification, in terms of environmental benefit, to apply the requirements of the Action Programme, as proposed by Welsh Government, at a whole Wales level. (Page 50 – 52)

Analysis of responses to the Welsh Government consultation in 2016 'Review of Designated Areas and Action Programme to tackle Nitrate Pollution in Wales' also provides insufficient justification for the introduction of regulatory measures for the whole of Wales. Responses from organisations representing many thousands of members have been weighted equally to that of an individual. (Page 53)

The regulatory measures proposed do not adopt an evidence based approach, for example, the closed periods for fertiliser applications. Met Office data shows average temperatures for Wales. Grass measuring data shows continued grass growth and therefore, nutrient uptake into the winter months and during the closed period. Farmers should be empowered to make decisions to apply slurries and manures when weather and field conditions allow and not restricted by regulation which establishes a 'farming by calendar' approach. The closed period approach undermines Wales's natural advantage of producing high quality protein from grass based production systems. Many dairy businesses now operate spring calving herds as a means of reducing costs and maximising milk production off grass. Proposed new regulatory measures directly challenge this farming model. (Page 54 – 56)

Regulatory measures also fail to reflect climate change and national climate projections. National climate projections show that regulatory measures to tackle agricultural pollution through an approach that restricts activity on the basis of calendar dates or a 'farming by calendar' approach would appear increasingly challenged in the context of climate change and will not incorporate the necessary resilience and flexibility for farm businesses or the environment. In the context of growing

consensus that Wales will experience more extreme and challenging weather events in future, it is vital that farmers are allowed the flexibility to undertake field operations appropriate to the conditions. The proposed regulations do not support this. (Page 57)

Evidence shows from the British Survey of Fertiliser Practice that there has been a long-term decline in overall application rates of nitrogen, phosphates and potash since 1983. In particular, the survey identifies the long-term decline in total nitrogen over this period is mainly due to decreased use on grassland. (Page 57 - 58)

Complex regulation is a key source of anxiety to farmers. Demonstrating compliance with NVZ rules through record keeping is widely acknowledged as burdensome and unproductive and is a key concern with the proposed new regulatory measures. Where NVZ rules are applied elsewhere, there is evidence of non-intentional non-compliance and high levels of breach found at inspection. Many farmers resort to the expense of paying for professional help to assist with record keeping. The 2011 Working Smarter Review led by Gareth Williams, recommended that a risk based approach should underpin the application of environmental regulation in Wales. Proposed regulatory measures applied to the whole of Wales do not align with this recommendation. (Page 58 - 60)

Affordability and the ability to meet regulatory requirements is a key concern for farmers. Measures apply to all of Wales so will affect every farm business in Wales. A range of sector specific issues exist. Proposed regulatory measures to tackle agricultural pollution are likely to place an additional burden on suckler cow herds which have already declined significantly. This has impacts not only for farm businesses and employment in rural communities but unintended consequences for the environment and biodiversity as the benefits of cattle and mixed grazing regimes will be threatened. (Page 60 - 61)

Proposals also present particular issues for tenant farmers who may be unable to secure funding to make investments in infrastructure to meet regulatory compliance. Proposals put forward in the recent Welsh Government Consultation on agricultural tenancy reform are unlikely to address the issues in full even with the provision of transitionary periods to allow farmers to adapt. (Page 61 - 62)

Bovine TB affects approximately 6% of farming businesses in Wales at any one time and causes significant stress on the farming families concerned as well as a range of other financial and practical impacts. The ability of farm businesses under TB herd breakdown to meet the requirements of proposed regulatory measures is likely to be extremely challenging, in many cases they will not be able to demonstrate compliance with the rules on slurry storage. (Page 64 - 65)

The extent to which the current planning system enables farmers to take forward construction of infrastructure to meet regulatory requirement is questionable. Anecdotal evidence suggests the planning system is likely to place severe limitations on the ability of farmers to achieve regulatory compliance. (Page 65 - 67)

Economic context

Affordability is a key issue for farmers and information is provided on Welsh farm incomes. All farm businesses in Wales will incur costs as a result of proposed new measures to tackle agricultural pollution whether this is a result of investment in new infrastructure, changes in farming practices which add cost or reduce income, or demonstrating regulatory compliance.

Costs will vary depending sector and scale and the ability of farm businesses to meet additional costs must be considered in the context of falling farm incomes in 2018-2019 and with almost a third of businesses failing to achieve profitability in any of the past three years. (Page 70 - 71)

It is important to recognise that Welsh agriculture is a key source of direct and indirect employment in rural Wales. Many other rural businesses are dependent on farming for all or part of their income through the products and services farmers procure in the ongoing running of their businesses. An example of impact is the closed periods. Agricultural contractors, with no work available for staff during the closed periods, have stated they will be unable to afford to maintain staffing levels. (Page 71 - 72)

Welsh farming also underpins sectors of strategic importance to Wales such as the Welsh food and drink sector and tourism as recognised in Welsh Government's Prosperity for All – The Economic Action Plan for Wales' published in 2017. Overall any moves to introduce regulatory measures that further challenge farm business viability will threaten key sectors and the economy of Wales as a whole.

NFU research shows that regulation and legislation is a key issue affecting farmer confidence. Over the nine year period to 2018, mid-term confidence (three years) the survey shows that farmer confidence is at its lowest ever. Brexit is also impacting on investment plans with more than twice as many farmers decreasing investment as increasing. (Page 72 - 74)

Levels of farm borrowing have continued to rise to almost £19 billion in January 2019, an increase of 3%. This reflects the downturn in profitability during 2018 and NFU research shows that requests for overdraft or overdraft extensions have increased. The extent to which investment support will be available to farm businesses to meet the costs of new regulatory measures to tackle agricultural pollution is a key consideration. Presenting a business case and demonstrating return on investment for what are fundamentally environmental improvements with marginal economic gains in the form of enhanced use of on-farm nutrients is likely to be highly challenging. (Page 74 - 75)

Social and cultural context

In line with the Well-Being of Future Generations Act, social and cultural considerations are important in the development of new policy.

Public awareness and perception of water quality is concerning. A grossly misleading narrative has developed which presents agriculture as an increasingly damaging influence on water quality. The narrative is inaccurate and not reflected in water quality evidence presented elsewhere in this report. Increased and unchecked levels of activism in some areas of Wales now present a very real risk to the mental health and safety of farming families undertaking a perfectly legitimate and environmentally sound business activity. Where pollution has occurred, NRW already possess the powers to take enforcement action. (Page 76 - 78)

Through the On-Farm Health & Safety Charter for Wales, Welsh Government is committed to working together for a safer farming industry in Wales. Impacts to mental health and on-farm safety are key concerns and should be considered in the development of new regulatory measures to tackle agricultural pollution. (Page 79)

Under section 78 of the Government of Wales Act 2006, the Welsh Government must adopt a scheme setting out (inter alia) how the Welsh language will be promoted and how its use will be

facilitated. That scheme recognises the prevalence of Welsh language speaking in farming and rural communities and as such the scheme notes the importance to the Welsh language of sustaining and promoting agricultural interests. The Well-Being of Future Generations Act places a duty on all public bodies to work to enhance the well-being goals which includes 'A Wales of vibrant culture and a thriving Welsh language'.

The costs associated with the introduction of new regulatory measures to control agricultural pollution challenge farm viability and will result in farmers leaving the industry. Evidence shows that this is likely to represent a significant threat to the Welsh language, working against the Welsh Government's duty on all public bodies to enhance the well-being goals. (Page 79 -81)

Overall, analysis of the evidence shows that proposed regulatory measures to tackle agricultural pollution is not an evidence-based, proportionate approach. The extent to which proposed measures in the form of the NVZ action programme is effective in delivering water quality improvements is also highly questionable. Proposals work against Welsh Government's own policies and strategies and the ability of Welsh farms to meet and demonstrate regulatory compliance is a key concern. Affordability is a significant issue and in the context of the profound Brexit uncertainty, many farmers say they will be forced from the industry. The report also summarises the significant progress that has been made through the work of the WLMF sub-group on agricultural pollution. This expert group identify there is no one simple solution. The work they are driving forward must be given time and resources to demonstrate effectiveness.

5. States and trends of water quality in Wales

The stated aim of the proposed regulations for the whole of Wales is to protect water quality from agricultural pollution. This section provides analysis on the state and trends of water quality in Wales and sets the environmental/ water quality context into which proposed regulations are introduced.

5.1 Water Framework Directive (WFD)

The EU Water Framework Directive (WFD) establishes an overarching framework and cycle of river basin planning through which deterioration in quality of waters is prevented and by which waters are restored and sustainably managed.

In Wales, there are a total of 942 waterbodies in Wales, including rivers, canals and surface water transfers, lakes, coastal, estuarine and ground waters, classified by Natural Resources Wales (NRW) as good, moderate, poor or bad for WFD classification on a three yearly cycle.

Figure 5.1.1 shows the NRW interim WFD classification of river waterbody catchments (2018).

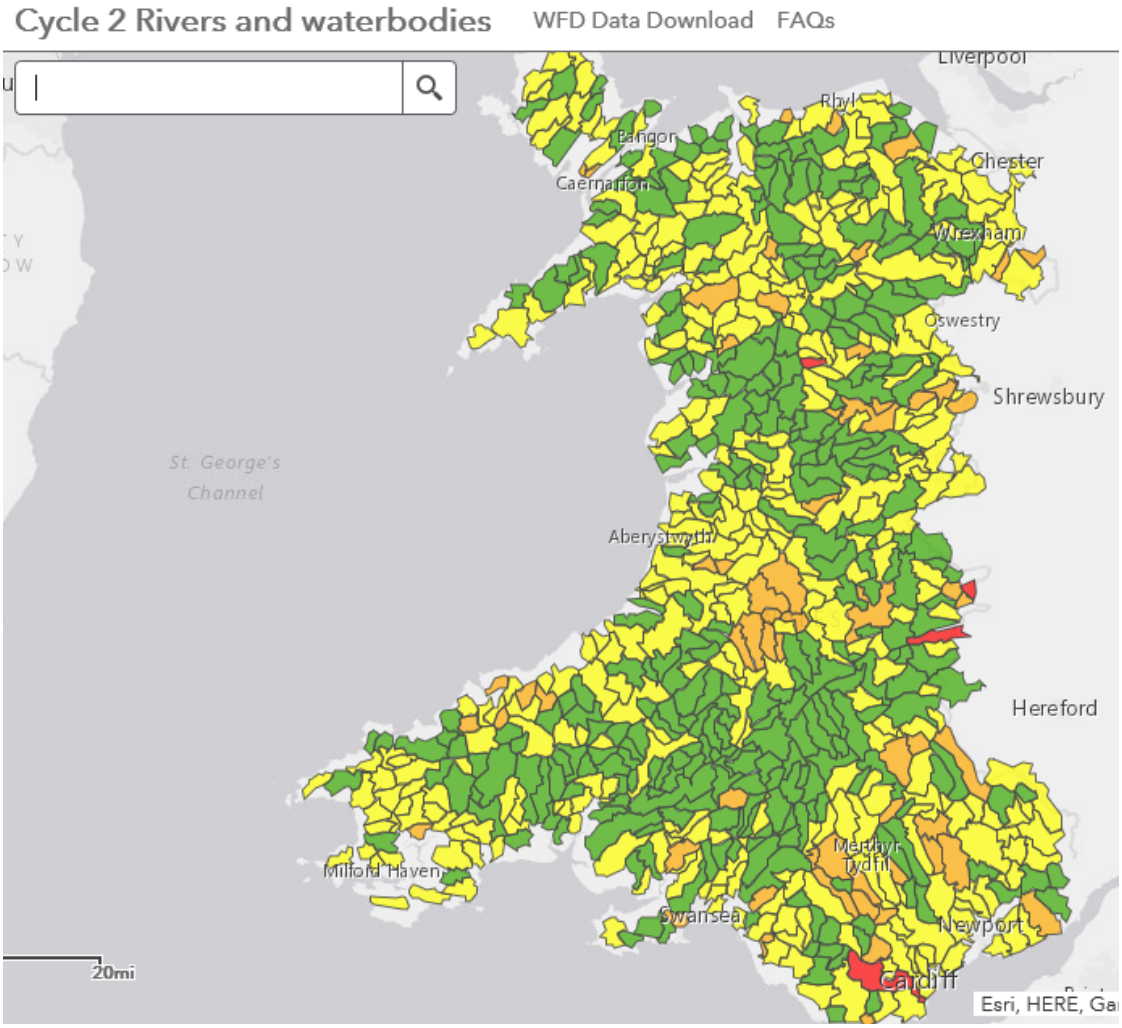
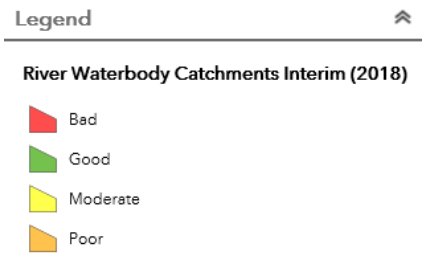


Figure 5.1.1



WFD classification considers a number of elements (25 elements and 127 sub-elements) depending on waterbody type and it is important to note that classification is based on the worst of its ecological or chemical status – the 'one out all out rule' which results in the overall classification of a waterbody reflecting the worst of the range of elements surveyed within the monitoring programme. This can have the effect of masking improvements between WFD cycles.

Figure 5.1.2 shows the NRW Water Watch Wales WFD river catchments classification comparison map between 2015 and 2018 (legend as above).

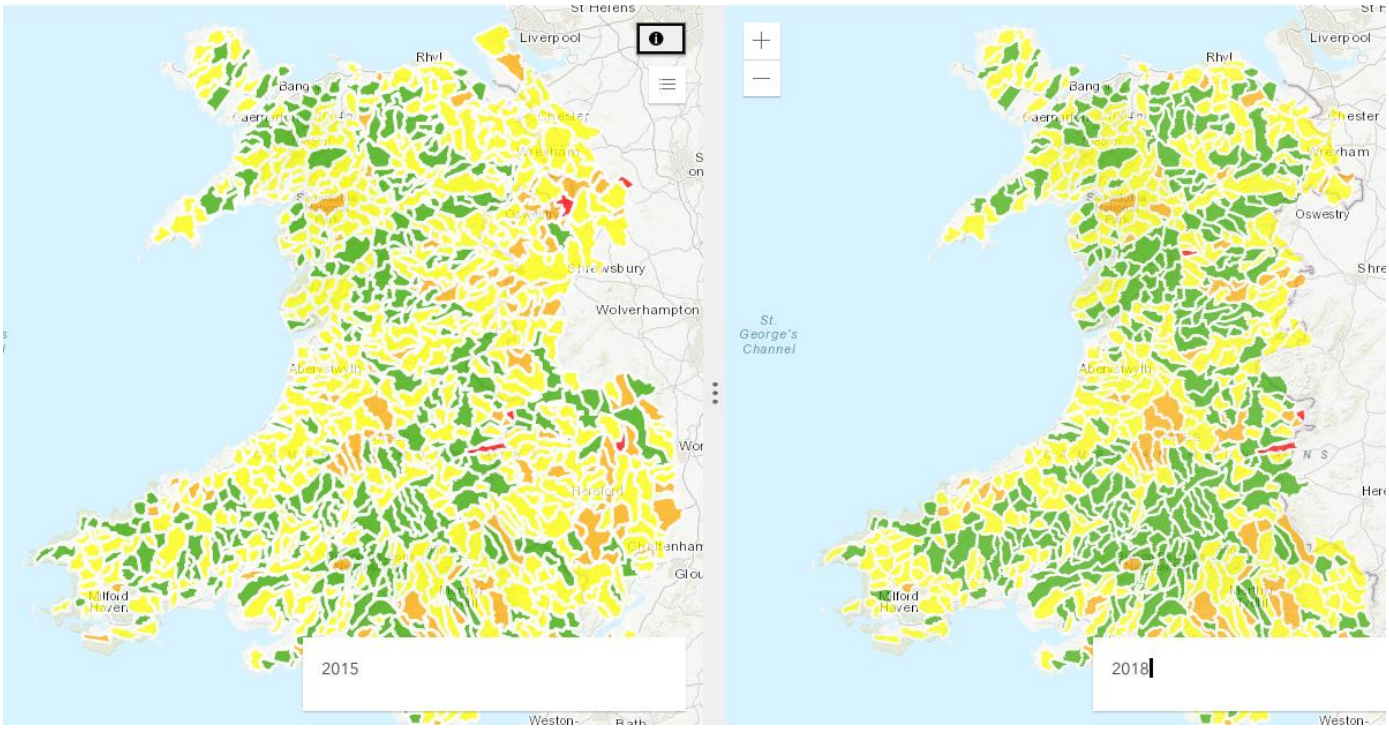


Figure 5.1.2

Overall, NRW identify there has been an increase in waterbodies achieving good or better overall status. 359 waterbodies meet good or better status in 2018 compared with 323 in 2015. This includes 32 rivers meeting good or better status, and the number of river waterbodies at bad status increasing by 1. The number of lakes meeting good or better status has increased by 7, with no lakes now classified as bad. Improvements to water quality reflected in WFD monitoring over relatively short timescales mirror the longer term trend. NRW's State of Natural Resources Report (SoNaRR) published in 2016, for example, states that water quality in rivers has generally improved over the last 25 years.

WFD monitoring data shows a high degree of variation in water quality across Welsh catchments.

Overall, analysis of comprehensive monitoring data undertaken by NRW over short and long term temporal scales shows an improving situation with respect to water quality in Wales. A high degree of variation in water quality across Welsh catchments also exists.

Based on WFD monitoring data new regulations that extend to the whole of Wales to tackle agricultural pollution cannot be justified on the basis of WFD monitoring data.

5.2 European Environment Agency (EEA) – European Waters – Assessment of status and pressures 2018

A perception exists that water quality in Wales is poorer the elsewhere. The European Environment Agency (EEA) produced a report on the state of Europe's waters in 2018. Of note, across Europe, around 40% of surface waters were found to be in good ecological status or potential with 38% in good chemical status. Overall the second round of WFD River Basin Management Plans (RBMP) showed limited change in status, as most water bodies, had the same status in both cycles. However, improvements were usually visible at the level of individual quality elements or pollutants but did not translate to improved status overall. For example, 50-70% of the classified water bodies were shown to have high or good status for several biological quality elements, whilst the overall ecological status is high or good for less than 40% of rivers. This is a result of the 'one out all out rule'.

Figure 5.2.1 shows percentage of water bodies in Europe's River Basin Districts that are not in good ecological status/potential (second RBMP).

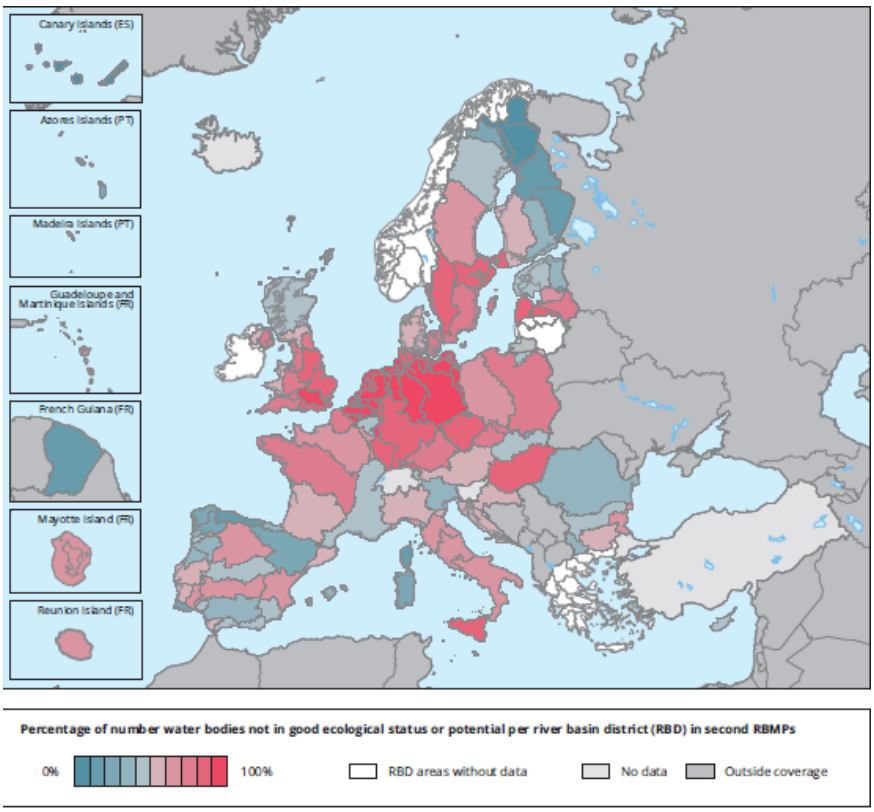


Figure 5.2.1 shows the percentage of waterbodies not in good ecological status or potential per river basin district in the second river basin management cycle. At a UK level Wales performs reasonably well with only Scotland performing better. Agriculture and environmental policy is devolved in each of the UK nations and have adopted differing approaches to improving water quality within the framework of WFD. Approximately 53% of England is designated NVZ currently, in addition basic rules were introduced in April 2018. Northern Ireland has a whole territory NVZ designation introduced over a decade ago. Scotland has a small area of NVZ designation accompanied by General Binding Rules delivered through a targeted advice-led approach. It is also important to note that farming systems vary across the UK also.

Overall at a UK and EU level, the percentage of waterbodies not in good ecological status or potential in Wales compares reasonably well to elsewhere, even where NVZ regulatory approaches have been in existence for considerable time.

5.3 Glastir Monitoring and Evaluation Programme (GMEP)

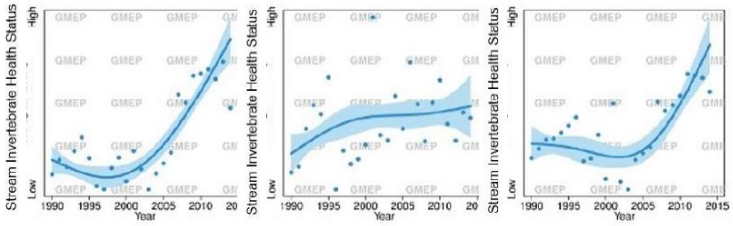
The Glastir Monitoring and Evaluation Programme was funded via the RDP during the period 2012 and 2016. This was one of the most comprehensive monitoring of agri-environment schemes anywhere in Europe.

Improving water quality was an intended outcome of the Glastir agri-environment scheme and the GMEP programme sought to establish a baseline on headwater stream quality from which future impacts of Glastir could be assessed. The methodology included field surveys to provide the main evidence for actual change and allowed comparison with Countryside Survey data to determine long-term trends. The programme surveyed 0.7% of Wales' land area at the scale of 1km square to ensure national trends of change would be detected.

GMEP field data for freshwater focussed on headwater streams, of which there are an estimated 9.5 to 16 thousand km, larger rivers are reported on by NRW as part of the WFD reporting requirements and were, therefore, not included in the survey. 167 streams and 119 ponds were assessed and GMEP was the first survey of its kind to simultaneously monitor freshwater invertebrates, diatoms (streams only) physical habitat, water chemistry in both streams and ponds.

Fig 5.3.1 shows long-term trends in invertebrate indicators in small Welsh streams derived from NRW monitoring.

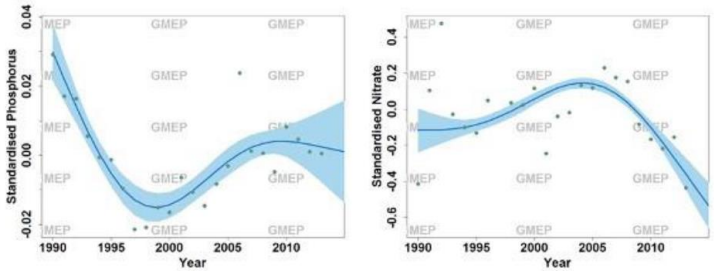
FIGURE-GMEP-FW-OUTCOME-A-1: Long term trends in invertebrate indicators in small Welsh streams derived from NRW monitoring. Figures indicate: WHPT score (left; an index of eutrophication and general degradation), Ntaxa (middle; the number of water quality sensitive taxa that contribute to the WHPT score) and ASPT (right; the sensitivity of the taxa to water quality which contribute to the WHPT score



Source – GMEP

Fig 5.3.2 shows long-term trends in nutrient status of small Welsh streams derived from NRW monitoring.

FIGURE-GMEP-FW-OUTCOME-B-1: Long term trends in nutrient status of small Welsh streams derived from NRW monitoring. Figures indicate: soluble reactive phosphorus (mg/L) and total dissolved nitrogen TDN (mg/l). Note that the average area of drained land for these small streams is 20 times greater than streams sampled in GMEP (1776ha compared to 96ha in GMEP)



Key findings relating to water quality include:

- GMEP invertebrate data showed that 83% of the headwater streams have good or high diversity.
- Based on macroinvertebrate communities and nutrient levels there has been a general ongoing improvement in the condition of small streams sampled by NRW since 1990.
- The GMEP survey also found that soil nitrogen levels were found to be stable on improved land. After recent declines in soil phosphorus, levels in improved land were stable and within the appropriate zone for sustainable production whilst presenting a lower risk to waters.

GMEP also included a Farmer Practice Survey undertaken in 2016 which was used to quantify a range of factors including fertiliser use by farmers participating in the scheme compared with non-scheme farms. Farms participating in Glastir reported a 9% reduction in manufactured nitrogen and phosphate fertiliser use on grassland fields on scheme entry. This reduction in nitrogen fertiliser use on grassland fields was found to be equal to the net reduction occurring on surveyed non-scheme farms, providing an indication of changes to practices on all Welsh farms. Over half (51%) of farmers surveyed carried out soil nutrient testing, increasing to 61% for farmers participating in the Glastir scheme.

In summary GMEP, which specifically assessed small streams excluded from WFD shows a general ongoing improvement in the condition of small streams since 1990. Soil nitrogen levels are stable on improved land and levels of soil phosphorus on improved land were stable and presenting a lower risk to waters. Across Wales, farmers surveyed reported a 9% reduction in applications of inorganic fertilisers with over half undertaking soil nutrient testing.

5.4 NRW State of Natural Resources Report (SoNaRR)

Published by NRW in 2016, SoNaRR sets out the state of Wales' natural resources and considers the extent, condition and trends across natural resources, and across broad habitats or ecosystems.

In terms of animals, plants and other organisms, overall, the report states that trends of extent and population for freshwater species vary enormously with taxonomic group with some species increasing and some decreasing. The report goes on to state that there has been a marked reduction in the abundance of salmon in recent years, particularly in the southern regions of the species' range which is linked to increased mortality at sea.

With respect to freshwater systems, assessment of condition refers to WFD referred to earlier in this report. Of note in the context of water quality and trends over time is the statement that climate change is predicted to affect the amount and distribution of rainfall with subsequent impacts on flows and water levels, drought and flood events and an increase in water temperatures. The report identifies that these changes may lead to a decline in water quality, impact some species negatively, increase the risk from invasive species and lead to changes in the way ecosystems function; for example, there may be an increased likelihood of algal blooms.

In terms of evidence gaps NRW, through SoNaRR, identify, amongst others, understanding the impacts of climate change on water quality and ecological impacts from sediment and hydromorphological changes as well as the impacts of new and emerging chemicals and substances on water quality and ecology.

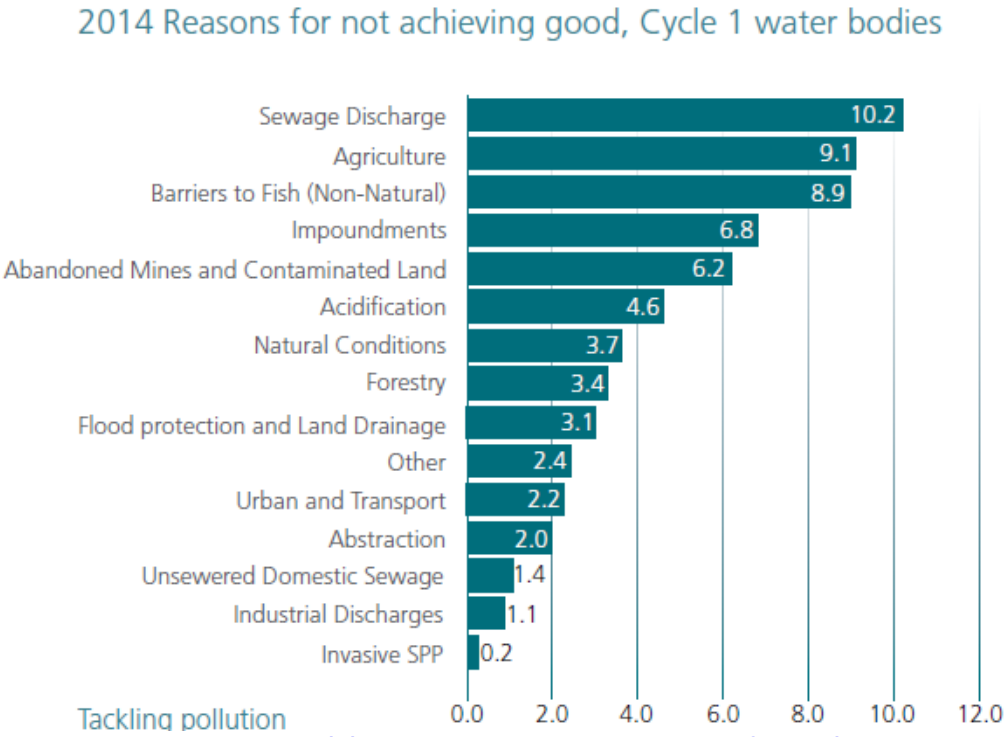
In summary, SoNaRR states that there is enormous variation on the extent and populations of freshwater species with some species increasing and some decreasing. Abundance of salmon has declined in recent years and is linked to increased mortality at sea. Climate change is expected to bring about changes which may lead to a decline in water quality.

5.5 Urban Waste Water Directive

The Urban Waste Water Treatment Directive has an explicit requirement to assess eutrophication and, under the Directive, Member States must review environmental waters every four years to determine whether they are sensitive to the effects of sewage discharges.

No information is provided on the Welsh Government or NRW websites relating to the most recent assessment cycle. Our understanding is that this assessment has not been completed for Wales and now falls well outside if the four year reporting cycle. We are not clear why this is the case, given that the Welsh Government's own water strategy states it will take a more integrated approach to natural resource management and WFD cycle 1 shows that sewage discharge was the most common reason for not achieving good (figure 5.5.1 below).

Figure 5.5.1 showing reasons for not achieving good, Cycle 1 water bodies.



Source – Welsh Government Water Strategy for Wales

In 2017, the water industry was responsible for the highest number of pollution incidents to water; and there were 30,000 combined sewer overflows into rivers and seas, activity permitted by the regulator[1].

It is important to note that the methodology for the identification of polluted waters under the Nitrates Directive is clear that the assessment should lead to comparable and consistent conclusions across the relevant Directives including the Water Framework Directive; the Urban Waste Water Treatment Directive; site condition reports under the Habitats Directive and the Bathing Waters Directive.

In summary, Urban Waste Water Treatment Directive requirements to assess the extent to which waterbodies are sensitive to effects of sewage discharges have not been undertaken within the four yearly reporting cycle. Gaps in evidence do exist and Welsh Government has not met its commitment under the EU Urban Waste Water Directive to undertake four yearly reporting to assess the extent to which waterbodies are sensitive to effects of sewage discharges. The reason for this is unclear, particularly when sewage discharges are known to be a significant reason for failure of WFD.

5.6 Bathing water quality

The methodology for the identification of polluted waters under the Nitrates Directive is clear that the assessment should lead to comparable and consistent conclusions across the relevant Directives including the Bathing Waters Directive.

[1] https://www.bbc.co.uk/news/uk-wales-47577865?intlink_from_url=https://www.bbc.co.uk/news/topics/cnegp3jd4e4t/water-pollution&link_location=live-reporting-story

Welsh Government's Water Strategy for Wales identifies Wales has the best bathing water quality in the UK.

The Bathing Water Directive introduces a comprehensive system of classification with strict water quality standards. This includes monitoring each bathing water for intestinal enterococci and *Escherichia coli* and cyanobacteria; undertaking investigations for macro-algae and marine phytoplankton; and, undertaking visual inspections.

The Directive requires that at least four samples per season are taken. Currently in Wales sixteen samples are taken per season by NRW who are responsible for monitoring and sampling designated bathing waters in Wales. Bathing water classifications are either excellent, good, sufficient or poor

In 2018, all 104 designated bathing waters in Wales met strict European classifications for bathing water quality with:

- 78 achieving the higher European classification of excellent
- 21 achieving good classifications
- 5 achieving sufficient
- 0 classified as poor

Case Study- Cemaes Bay

"NFU Cymru, North Wales Rivers Trust, Natural Resources Wales and local farmers got together to better understand the catchment issues which have caused a poor bathing water status for the beach in 2016/17. NRW described the root cause analysis they have been undertaking to monitor the catchment and the bathing waters. DNA sampling has identified human, dog and ruminant faeces causing the high bacteria levels which affect bathers. The watercourse also suffers from high phosphate levels, causing a Water Framework Directive (WFD) failure status. Upstream work with farmers through NRW and the North Wales Rivers Trust have been fencing off the watercourse and providing drinking troughs for livestock access upstream of the bay to reduce pollution risk. One of the key factors to consider when assessing the nutrient load in Cemaes Bay was how the hydrology of Anglesey has slow flowing streams and rivers which discharge into a bay where the water flows along the harbour wall and circulates at the WFD sampling point. This affects water quality and increases the risk of failure. Alongside this, historic weirs on the Afon Wygyr were slowing the flow and allowing sediment deposits in summer months to develop and risk washing down stream in storm events. This potentially causes further pollution issues. Work was done by the rivers trust to begun to increase flow by notching the weirs, and cost effective solutions such as broad buffer strips, allowing light to the watercourse and grazing for the farmers at certain times of year are reducing vegetation overgrowth, and allowing natural UV treatment to break down bacteria as the river flows downstream. The work to protect bathing water is a partnership between NRW, the Isle of Anglesey County Council, Llanbadrig Community Council, Dwr Cymru, Aberystwyth University and also the Rivers Trust and has been formed following several public meetings."

In summary, evidence shows Wales has the best bathing water quality in the UK. The Cemaes Bay case study demonstrates that where classifications for bathing waters fall below standard, an evidence-based targeted approach working with all sectors within the catchment delivers the required positive improvements.

5.7 Factors influencing water quality in Wales

NRW undertakes analysis of WFD monitoring data to determine reasons for WFD failure in waterbodies in Wales.

Figure 5.7.1 shows reasons for Water Framework Directive Failure.

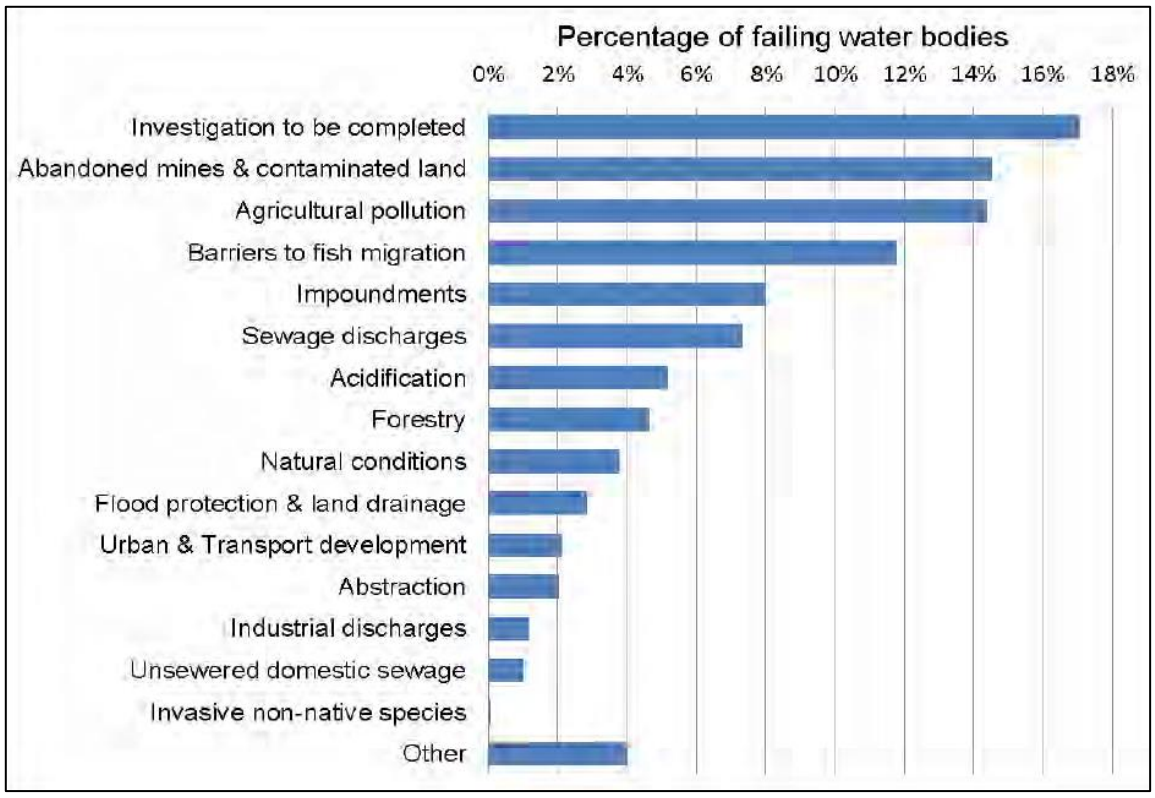


Figure 5.7.1 Source – Welsh Government Consultation 'A Water Strategy for Wales', April 2014, p12

Figure 5.7.1 shows the reasons for WFD failure are complex and varied. There are a range of issues and sectors influencing water quality in Wales and evidence shows that less than 15% of failures were attributable to agriculture in 2014.

The current NRW EA Challenges and Choices consultation which summarises the significant water management issues for Wales (and which includes the Welsh waterbodies in the Severn River Basin District) identifies that 113 waterbodies are failing due to agriculture; approximately 12% of the Welsh total.

Figure 5.7.2 shows WFD river water bodies where agricultural activities have been identified as the reason for not achieving good status (2015).

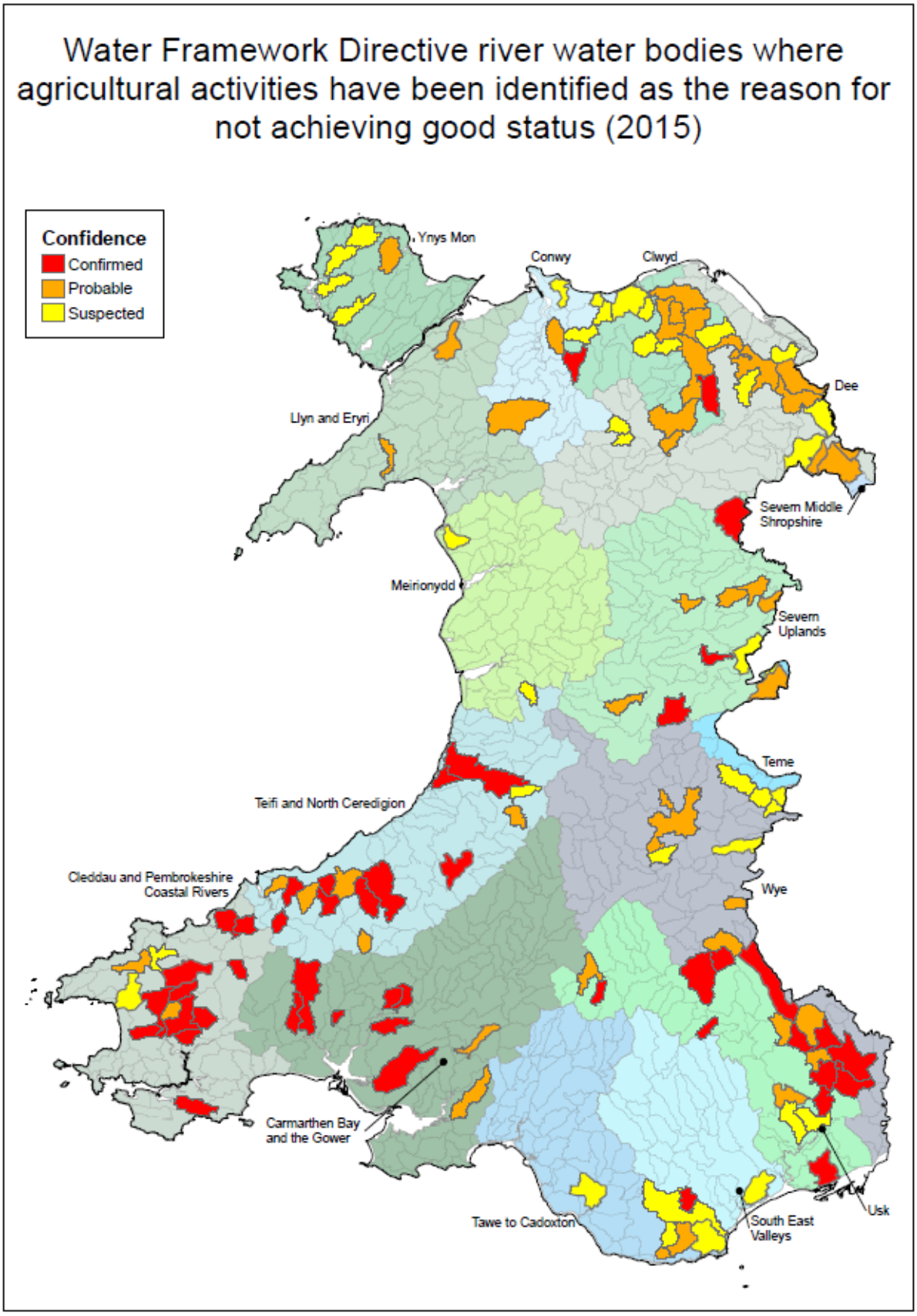


Figure 5.7.2 Source – NRW WLMF sub-group on agricultural pollution progress report 'Tackling Agricultural Pollution'

Figure 5.7.2 shows WFD river water bodies where agricultural activities have been associated with not achieving good status.

Farming clearly has a role to play in contributing to further and sustained improvements in water quality in the years ahead. However, it is also clear that efforts to address water quality using a single sector approach will not deliver WFD goals.

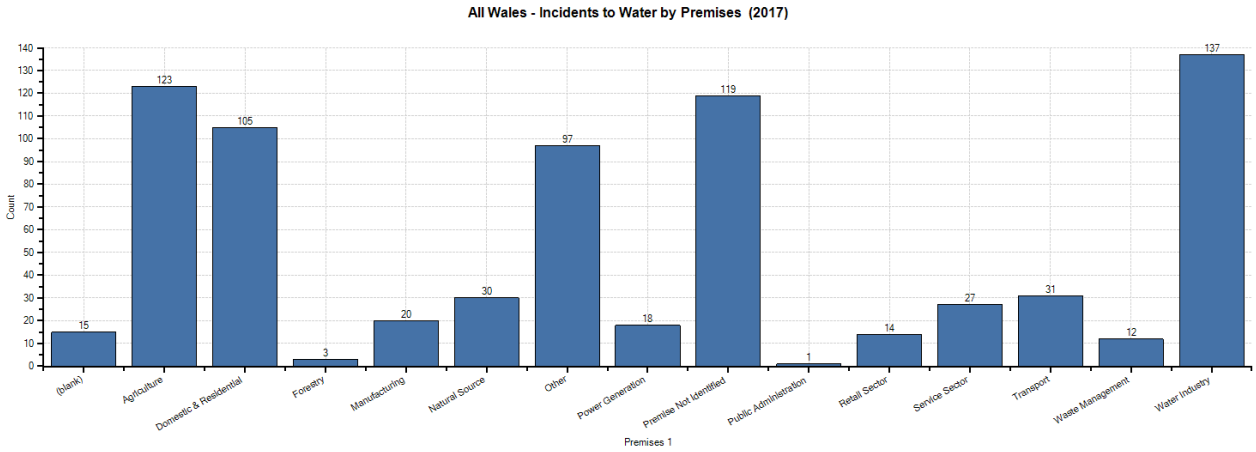
Analysis undertaken by NRW of WFD failures shows there are a range of factors influencing water quality in Wales, including agriculture. A sole focus on agriculture through the introduction of regulatory measures to tackle agriculture pollution will not on its own deliver WFD objectives, nor does it represent an evidence-based approach given the extent and distribution of waterbodies failing due to agriculture. The single sector focus also puts major pressure on an industry to remedy issues out of their control due to natural processes.

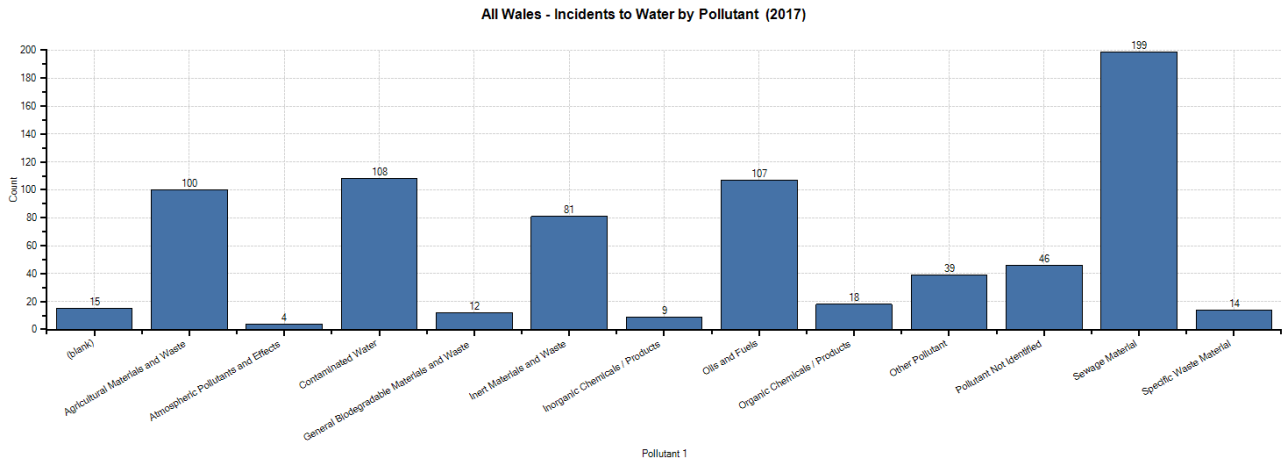
5.8 Agricultural pollution incidents, trends, sector by sector

The frequency of agricultural pollution incidents has been identified by Welsh Government as a key reason for the introduction of additional regulatory measures to control agricultural pollution. In the written statement dated 14th November 2018, the then Cabinet Secretary for Energy, Planning and Rural Affairs stated 'this year we have seen an increase in the number and scale of agricultural pollution incidents damaging both the environment and the reputation of the agriculture industry'.

As environmental regulator, NRW are the body responsible for investigating pollution incidents to land and water. Pollution incidents are recorded on the Welsh Incident Recording System (WIRS).

Figure 5.8.1 shows the number of incidents to water by premises in 2017.





Source – NRW

NRW information on pollution incidents to water shows there are a range of issues and sectors influencing water quality in Wales with pollution incidents arising from a number of sectors and residential sources, this includes agriculture, domestic and residential, forestry, manufacturing, transport, waste and the water industry.

Analysis of WIRS data relating to agricultural incidents with impact to water during the period 2001 to 2018 shows the annual total number of agricultural incidents with impact to water (all categories) has ranged from 96 at its lowest to 194 at its highest. The highest annual total was recorded in 2002 with the second highest total recorded in 2018. The lowest annual total was recorded in 2009 with the second lowest annual total recorded in 2007.

The average number of agricultural pollution incidents with impact to water is 147 per year. The number of incidents has been below average in three of the last five years. Overall, there has been no discernible trend upwards or downwards in the total annual number of agricultural pollution incidents with impact to water during the period 2001 – 2018.

Figure 5.8.2 showing agricultural slurry pollution incidents to water 2001 – 2018.

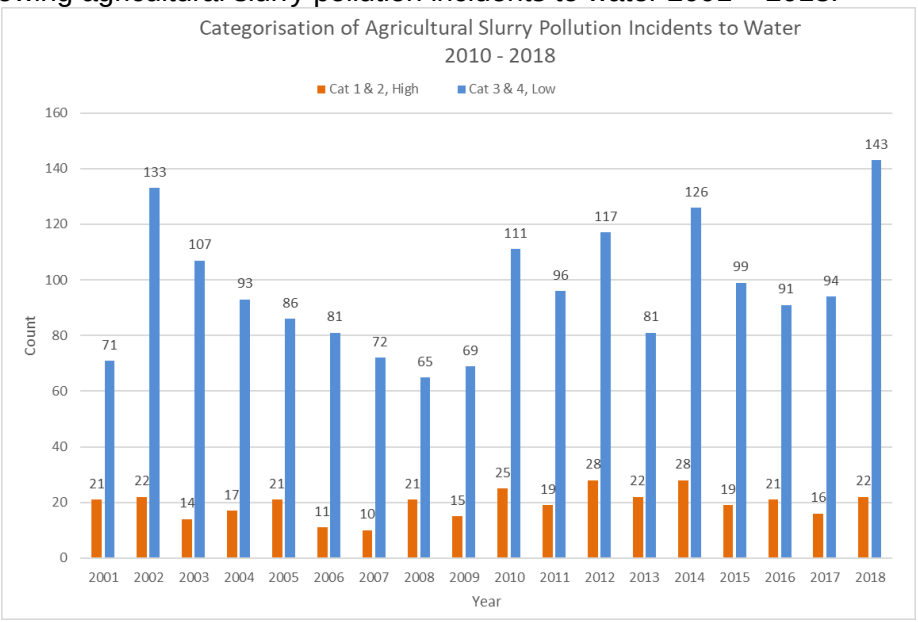


Figure 5.8.2 shows agricultural slurry pollution incidents to water over the period 2001 to 2018. Analysis of high category (formerly category 1 & 2 i.e. the most serious) agricultural slurry pollution incidents to water over this period again show no discernible trend.

The number of high category (formerly category 1 & 2) agricultural slurry pollution incidents to water ranged from 28 at its highest in 2012 and 2014 and 10 at its lowest in 2007. The average number of incidents per year is 20 so a slightly higher than average number of incidents was recorded in 2018, a much lower than average number of incidents was recorded in the previous 12 month period.

Figure 5.8.3: Location of agri-pollution incidents from 2010-2018.

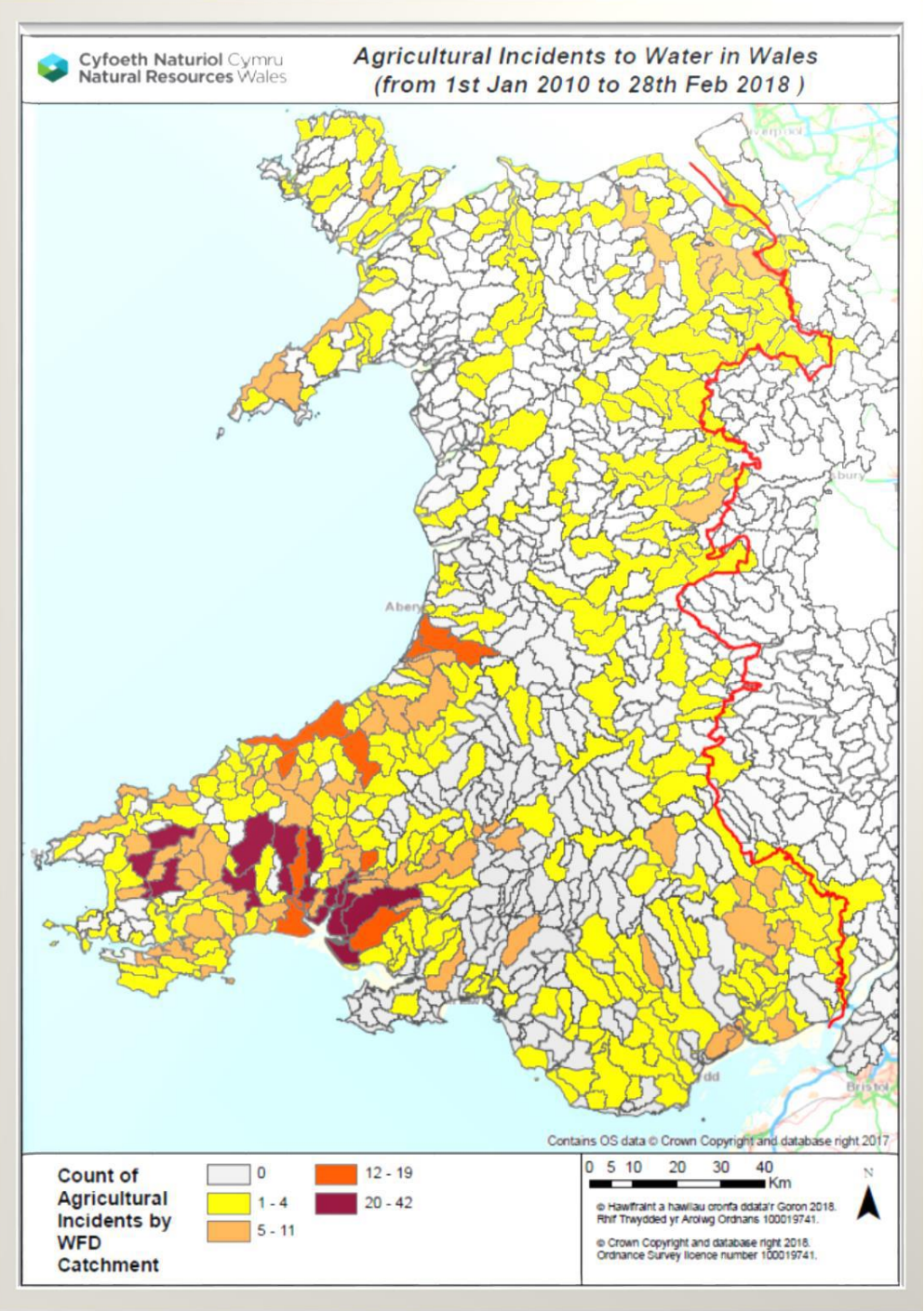


Figure 5.8.3 shows the geographic distribution of pollution incidents to water during the period 2010 to 2018. It is clear that a large proportion of WFD catchments have incurred zero pollution incidents during the period.

Overall analysis of NRW WIRS pollution recording data shows pollution incidents arise from a number of sources and sectors, including agriculture. The total annual number of agricultural pollution incidents over the 18 year period to 2018 shows no discernible upward or downward trend; similar analysis of serious (high; formerly category 1 & 2) agricultural slurry pollution incidents to water over the same period also shows no discernible trend. The geographic distribution of agricultural incidents to water during the period 2010 to 2018 shows wide variation with many water bodies incurring zero incidents. Tackling water pollution using a single sector approach is, therefore, unlikely to deliver the reduction in pollution necessary to meet WFD objectives of good water quality.

6. Political and policy context

This section provides analysis of the political and policy context in which regulations to tackle agricultural pollution are being introduced.

6.1 Legislative Framework

Thinking in the area of environmental legislation has evolved significantly away from a single issue focus to a more balanced approach in recent years. In the context of water quality that includes consideration of all pollution sources within catchments where there are issues, in line with the EU Water Framework Directive (WFD) which also takes into account the cost-effectiveness of actions.

This more holistic, balanced approach is reflected in the new legislative framework established through the Environment (Wales) Act 2016 which puts in place the legislation to plan and manage Wales' natural resources in a more proactive, joined-up way through the sustainable management of natural resources.

The Act establishes a number of principles to underpin the way Welsh Government and Natural Resources Wales (NRW) operate. This includes working together – cooperating and collaborating at the local, regional and national level; being adaptable – planning, monitoring, reviewing and changing as a better understanding is gained through improved evidence and experience; and considering the full range of evidence not only environmental, but also cultural, social and economic evidence from experts, stakeholders and local communities.

In addition, the Well-Being of Future Generations (Wales) Act 2015 places a duty on all public bodies to protect and enhance the economic, environmental, social and cultural well-being of Wales.

By contrast, the EU Nitrates Directive is an out-dated piece of European legislation and represents a blunt, inefficient, bureaucratic and costly instrument with high costs to agriculture with unintended consequences for the environment. The approach set out in the EU Nitrates Directive does not align to the Environment (Wales) Act 2019 and the principles of working it establishes. It represents neither a collaborative or adaptive approach to the sustainable management of our natural resources and applying new water regulations to the whole of Wales, as proposed by Welsh Government, takes no account of the evidence, specifically water quality monitoring data.

The approach adopted by Welsh Government to introduce regulatory measures to tackle agricultural pollution closely mirror the NVZ action programme and reflect an outdated approach to regulation. This approach does not align with the aspiration or ways of working established within Wales's world leading legislative framework, in that economic, social and cultural well-being is not considered alongside the environment. New regulations have not been developed collaboratively, nor are they evidence based or adaptive.

6.2 Water strategy

The Water Strategy for Wales, published in 2015, sets out Welsh Government's long-term policy direction in relation to water. It aims to ensure a more integrated and sustainable approach to managing water and associated services in Wales.

The strategy states 'we will base our policies on the best available evidence to ensure we deliver the right results for the people of Wales'. The strategy further identifies that 'successful action to improve our water environment will require a pooling of expertise and a collaborative approach…' The strategy also recognises the delivery of their vision will need involvement and action by a wide range of stakeholders and much of this will require work at the local level.

The strategy identifies that water is at the heart of Welsh Government's approach to natural resource management and recognises that historically water management issues have been looked at in isolation. The work undertaken on implementing the Water Framework Directive has emphasised the benefits of taking an integrated approach to river catchment management.

WFD also requires that other environmental priorities, economic considerations and social issues be considered and taken into account when setting water management objectives.

Specifically on tackling pollution the strategy states Welsh Government will ensure a joined up approach to land and water management to address diffuse water pollution; also working with construction, forestry and agriculture sectors to understand, review and where appropriate, change current practices and regulatory approaches.

The strategy also states Welsh Government will consider whether a similar approach to that taken in Scotland is appropriate for addressing some of the issues in Wales (in Scotland, the Scottish Government with the Scottish Environmental Protection Agency have introduced general binding rules implemented through a targeted, advice led approach).

The strategy identifies the Nitrates Directive requires monitoring of nitrates in water and where necessary designation of land as NVZ to provide appropriate protection. Less than 3% of land in Wales is designated as NVZ. This is due to the geography of Wales, the farming practices and also the action we are taking to address this issue.

The strategy commits to working collaboratively with Natural Resources Wales and the representatives of the land managers to help farmers reduce the loss of nitrate from their land. In particular, this will identify areas where action can prevent the requirement for designation in the future under the standards set by the Nitrates Directive.

Overall, Welsh Government proposals to introduce regulatory measures as they currently stand are not aligned with its own Water Strategy which states it will adopt an integrated and collaborative approach. Economic considerations and social issues have not been taken into account in the development of new regulations. Based on the evidence on state and trends of water quality in Wales set out in Chapter 5 of this report we can see no basis in fact for Welsh Government to veer from its stated policy position of working collaboratively with farmers to reduce the loss of nitrates from their land to prevent designation under the Nitrates Directive.

6.3 Impact of Brexit

The decision to introduce new regulatory measures to control agricultural pollution from 1st January 2020 must be considered in the context of Brexit and the UK leaving the European Union (EU). The ability of farmers to meet the cost of new regulatory measures is likely to be influenced by a range of factors including future trading scenarios.

Agriculture stands as one of the sectors most heavily shaped by the UK's membership of the EU. This is in terms of not only the support the sector receives under the Common Agricultural Policy and the policies linked to this support, but also in terms of the trading relationship with the EU.

As a result of Brexit, farmers are facing the possible loss of their biggest export market – the EU – within a matter of months, and a dramatic change to policies and government funding streams which could undermine income and productivity for Welsh farming. The unknown future trading relationships, changes to domestic policies along with the lack of clarity on future funding means that short and long term business planning and investment is increasingly difficult and placing increasing pressure on farm profitability.

At the time of writing this submission, the prospect of leaving the EU with 'no deal' on 31st October 2019 is very real, and is the 'assumed' position by the UK government. The impact of a hard Brexit on Welsh agriculture would be catastrophic, since tariffs on exports of agricultural produce to our main markets in the rest of Europe would average around 50%, and supply chains would be severely disrupted.

In 2016, just 5% of red meat bred in Wales was consumed in Wales; 65% was consumed in the rest of the UK with 30% exported. Of the Welsh lamb that is sent out of the UK, around 95% of this goes to the EU, mainly France, Germany, Ireland, Belgium and Italy. Although less in terms of absolute volumes, over 90% of Welsh beef exports and 95% of dairy exports are destined for EU countries.

A report commissioned by HCC, AHDB and QMS published earlier this summer looked at the impact of different Brexit scenarios on the red meat industry. Anderson's Meadow Farm model projects a 27% decline in profitability under a Brexit deal; with the model generating significant losses under 'no deal' with a projected deficit of £45/ha.

For dairy, the possibility of tariff-free imports and a lowering of tariff protections could result in a decline in farm business incomes with some estimates suggesting milk prices at farm gate level could decline by 7% due to competition from other countries with lower costs of production.

Farming is a sector where long term planning is required. The current political and economic uncertainty reduces confidence in the market and is detrimental to the economy as a whole. It is near impossible for farmers to accurately plan for their businesses currently. Many of the factors that cause volatility within the agricultural market such as currency prices and political decisions are beyond the control of farmers.

We note that the Welsh Government has in the past spoken of the need to regulate in relation to water quality in order to avoid creating potential barriers to trade when it comes to future trade deals. Welsh Government has stated that in making this decision (to introduce agricultural pollution measures) it has sought to ensure a number of issues are addressed including trade in agricultural produce. At this moment in time Brexit remains far from resolved, and we do not at present have any indication of the sort of future trading relationship we will have with the EU27, and what sort of level of regulatory alignment might be required of us. Until a clearer picture emerges of the sort of trading

relationship that we are going to have with the EU27, we would consider any action to regulate in anticipation of some future trading arrangement which has not yet realised to be premature.

All the forecasts and evidence points to an extremely bleak picture for many farming sectors in the event of 'no deal' Brexit which is now the 'assumed' position of the UK government. The ability of farmers to meet the costs of requirements of new regulatory measures must be considered in this context. At this time, there is no idea of what sort of trading relationships we are going to have with the EU27 in the future. Securing future trade in agricultural produce cannot, therefore, be used as justification for the introduction of burdensome regulatory measures on the farming sector at this time.

6.4 Sustainable Farming and Our Land

The Welsh Government Sustainable Farming and Our Land consultation sets out revised proposals for how Welsh Government intends to support farmers after Brexit. The proposed Sustainable Farming Payment will replace the Basic Payment Scheme (BPS) and Glastir and provide an annual income for outcomes not rewarded by the market. Welsh Government proposes a set of outcomes that Welsh Government wants to pay farmers to deliver this includes nutrient management planning and the targeted application of fertiliser to deliver water quality outcomes.

The consultation proposals refer to nutrient management planning to reduce nutrient losses by determining current soil nutrient levels and crop growing requirements (including grass) with usage to be monitored to ensure that excess nutrients are not causing wider environmental issues.

Nutrient management planning is also included as a requirement of proposed regulatory measures to tackle agricultural pollution, ensuring that fertiliser applications are linked to the requirement of the crop thereby reducing losses to the environment.

Welsh Government proposes that the Sustainable Farming Scheme is based on a clear and enforceable regulatory baseline. Only actions over and above the legal minimum requirements which deliver sustainable land management outcomes not rewarded by the market will attract payment under the new scheme.

Welsh Government's proposed new regulatory measures, in effect bring into the sphere of regulation nutrient management planning and effectively removes from the future Sustainable Farming Scheme any potential for nutrient management planning to attract support payments.

The regulatory bar established through proposed new regulatory measures which are, in effect, whole territory NVZ place severe limits on the potential of farm businesses to demonstrate sustainable land management actions above this which they could be rewarded for.

Further as the regulatory baseline is expected to be the 'gateway' to accessing future support schemes i.e. it will be necessary to demonstrate compliance with the baseline in order to secure support through the Sustainable Farming Payment, we expect new regulatory measures to place severe limitations on farmers and groups of farmers e.g. tenant farmers in accessing support going forward given the cost and complexity in reaching regulatory NVZ compliance.

The Sustainable Farming and Our Land consultation proposes that Welsh Government will consult separately in future on a new, streamlined regulatory framework for agriculture in Wales with clear

minimum standards, smarter monitoring and proportionate enforcement. Welsh Government want to make is easier and simpler for farmers to understand the minimum requirements they need to meet, also taking the opportunity to consider and evaluate what does and does not work well. The future regulatory framework, Welsh Government propose, aims to be fit for purpose for the long-term, being adaptable, aligned and joined up and developed through collaboration.

Proposals to introduce costly and complex, burdensome new regulatory measures to tackle agricultural pollution undermines government's own objective of developing a new streamlined regulatory framework and sustainable land management actions.

It does not align with NFU Cymru principles of a regulatory regime that is proportionate and evidence based.

In summary, current proposals for how Welsh Government intends to support farmers after Brexit include paying farmers annually to deliver outcomes not rewarded by the market such as nutrient management planning and the targeted application of fertiliser to deliver water quality outcomes. Payments will only be made above the regulatory baseline; this will also be the 'gateway' i.e. the threshold farmers must meet, if they are to access any future support.

New regulatory measures, in effect, put into the sphere of regulation activity that Welsh Government currently proposes to pay farmers for delivering, severely limiting what farmers can realistically do and be rewarded for over and above this baseline. New regulatory measures also disadvantage some farmers and groups of farmers including tenants from accessing future support schemes at all given their highly complex and costly nature.

7. Progress to date – an SMNR approach

7.1 NRW Wales Land Management Forum Sub-Group on Agricultural Pollution and Interim Report (April 2019)

The sustainable management of natural resources (SMNR) approach and ways of working established through the Environment (Wales) Act 2016 have been adopted by stakeholders with an interest in water quality and specifically addressing agricultural pollution through the establishment of sub-group of the NRW Wales Land Management Forum.

Established in early 2017, the focus of the sub-group has been the development of a mutual understanding of the root causes of agricultural pollution problems working collaboratively on the identification of a range of approaches capable of driving environmental improvements.

This expert group, consisting of farming organisations and a range of public, private and third sector organisations have found through their examination of this issue that there is no one simple solution. A programme of education, training, voluntary initiatives by farmers, incentives, investment and innovation that is underpinned with smart regulation and additional resources and monitoring is required.

Following the written statement on the Nitrate Vulnerable Zone consultation in December 2017, the sub-group provided a progress report to the Cabinet Secretary for Energy, Planning and Rural Affairs in April 2018. The report, presented around nine chapters, included a total of forty-five recommendations spanning the five work areas adopted by the sub-group. The sub-group agreed that each of the work themes had a significant role the play and needed to be considered as part of an integrated package:

- Ensuring that the formal regulatory regime is sufficiently robust to achieve the outcomes required;
- Developing a voluntary, farmer-led approach to nutrient management;
- Providing better advice and guidance which can then be taken up by farmers;
- Improving the existing range of investment opportunities;
- Identifying and promoting innovation.

In the intervening period, the sub-group has sought to take forward the implementation of recommendations within the report where it is in their ability to do so. A formal response to the progress report and each of the recommendations it contains is still awaited from Welsh Government.

Each of the work streams will be considered separately in the following sections of this report.

Overall, the WLMF sub-group on agricultural pollution has committed significant time and resource to working collaboratively and on the basis of evidence to understand root causes and develop an integrated response to tackle agricultural pollution in Wales in line with SMNR principles. The findings of this group are clear that there is no one simple solution to tackling agricultural pollution. The findings of this group are clear that there is no one simple solution to tackling agricultural pollution. The findings and recommendations of this expert group are

presented in the progress report submitted to the Cabinet Secretary in April 2018 and represent the best way route forward if water quality improvements are to be achieved.

7.2 The formal regulatory regime

The regulatory review undertaken by the WLMF sub-group on agricultural pollution and presented in the progress report to the Cabinet Secretary in April 2018 included a number of key recommendations and explicitly sought a mandate from Welsh Government for the sub-group to be charged with taking forward work in a number of key areas including building a consensual understanding of the present issues (gaps, enforcement and effectiveness) within the regulatory landscape; further and urgent exploration of regulation around slurry spreading practices; exploration of the potential of basic measures; the Environmental Permitting Regime for intensive farming; and revisiting the SSAFO review.

The introduction of all Wales NVZ as proposed by Welsh Government in the regulatory measures to tackle agricultural pollution was not included as a recommendation by the sub-group. In the broad ranging discussions undertaken as part of the review whole territory NVZ did not even feature as a potential solution to addressing agricultural pollution by any of the stakeholders involved. There was broad consensus that regulatory solutions need to strike the right balance of regulatory measures, voluntary initiatives, investment and innovation; solutions need to be flexible, proportionate and reduce complexity; rules should be outcome focussed and evidence based rather than onerous recording for all.

At a UK level, the Better Regulation Executive with the Department of Business, Energy and Industrial Strategy has issued a code of practice for regulators which provides the framework for how regulators should engage with those they regulate. The progress report by the Wales Land Management Forum subgroup on agricultural pollution states that Welsh Government and Natural Resources Wales must have regard to the code when developing policies and operational procedures that guide their regulatory activities. The five principles of good regulation state that any regulation should be transparent, accountable, proportionate, consistent and targeted. Based on the evidence, proposals to introduce new regulatory measures to tackle agricultural pollution do not meet with the principles of the code.

Overall, Welsh Government's proposals to introduce regulatory measures to tackle agricultural pollution are, in effect, an all Wales NVZ. They go against the findings of the expert group established to consider agricultural pollution in Wales. The groups findings establishes a clear way forward for the development of a regulatory regime that is sufficiently robust to achieve the required outcomes, nor are the proposed regularity measures consistent with the principles of good regulation.

7.3 Developing a voluntary, farmer-led approach to nutrient management

The Cabinet Secretary written statement on NVZs in December 2017 signalled a willingness on behalf of government to work with stakeholders to explore voluntary approaches to nutrient

management to provide land managers with flexibility, where these can achieve the same or better outcomes, than a regulatory approach.

To take forward this work, the WLMF sub-group on agricultural pollution led by NFU Cymru secured funding from NRW in August 2018. NFU Cymru is match funding the project directly and in-kind, with other project partners providing in-kind support and Welsh Government and NRW both contributing to the project in an advisory capacity.

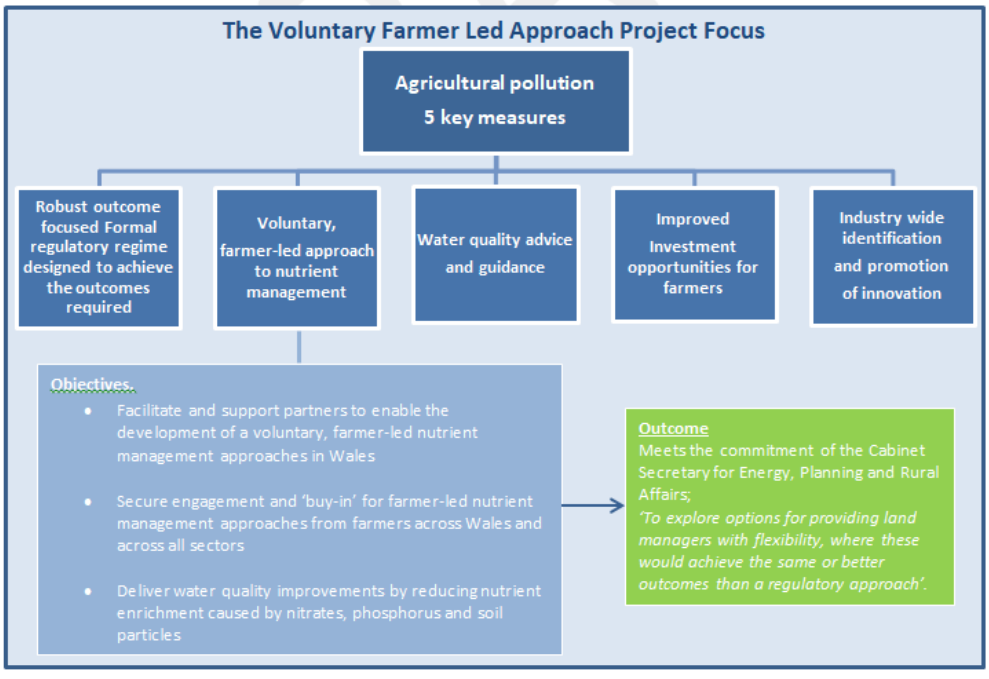
The project aims to explore options and potential to develop a farmer led approach to delivering water quality improvements and reducing nutrient enrichment caused by nitrates, phosphorus and soil particles within the broader framework of advice, investment, regulation and innovation. This approach delivers to water quality objectives whilst also maintaining and enhancing farm business viability in line with the Well-Being of Future Generations Act and the economic, social, cultural and environmental well-being of Wales.

Through working with the regulator and Welsh Government the project seeks to identify "common ground" developing a suite of voluntary measures providing tangible protection to Wales' water environment that can be very widely adopted.

By creating a comprehensive 'water standard' which adopts best farming practices, methods to measure and manage the regulatory and advisory guidance provided to the industry, and support buy in to innovation, 'active' nutrient management planning, and outcomes delivered through this proactive work farmers are empowered to drive and deliver change which creates resilience within their own farm business and delivers environmental outcomes for public good and services.

The original context for the project was to provide farmers with a mechanism to demonstrate effort and progress in the area of water quality, so omitting the need for further regulation. This has been compromised by the announcement of the implementation of the proposed water regulation, so superseding the WLMF sub-group recommendation to, alongside the project, assess existing regulatory gaps and the potential of tools to fill them.

Five key measures are required to address agricultural pollution as shown below.



The project focusses in one of the five key areas and has the benefits of:

- Whole industry engagement into the design and delivery of the 'Voluntary farmer led approach' in line with the ways of working for WBFG Act and the principles of delivering SMNR.
- Raised awareness across all sectors of the benefits of all nutrient management & water quality for business and the environment.
- Improved surface water, groundwater and soil quality across Wales as a result of engagement.
- Improved farm business resilience and viability through resource efficiencies.
- Water quality guidelines provide farmer led input into delivery methods for future land management scheme and Brand Wales.
- Improved data collection and evidence on impacts affecting water quality / quantity.
- Create a nationwide programme through the uptake of the voluntary initiative to reduce the risks of nutrients impacting water courses and ground water supplies.

The project deliverables include;

Guidance	**Outputs**
Assurance scheme requirements	Co-production of the assurance outcomes and the evidence required to demonstrate the management of risk and delivery of water quality improvements on farm. This is accompanied by an agreed method of assessing the voluntary approach through and those suitable to undertake this, as agreed by industry and the regulator. This requires a suitable regulatory floor to allow all farming systems irrespective of scale, location and ownership to access opportunities to develop water quality outcomes on farm.
Accreditation/ verifiability / auditability systems	Through the analysis of existing water assurance standards, methods of measuring performance and engagement and delivery techniques / guidance literature the project is developing water quality guidelines which provide a delivery mechanism for farmers to engage with future land management schemes and Brand Wales.
Data sharing guidance	Develop approaches to data sharing through review of current industry methods of data collection, sharing, ownership, and parameters for quality assurance with existing operators.
Partnership working	
Operator liaison	Complex regulations challenge farmer's ability to deliver compliance effectively without incurring costs of consultancy fees and advice and guidance from 'Operators'. Wales's current operator framework provides a disconnected approach to advice and guidance due to lack of consistency with funding to provide a single point of contact providing consistent advice and guidance on farming's impacts on water quality, and methods to measure and manage this.

	The provision of advice and guidance from Farming Connect.
Farmer buy-in	Engaging with industry through social media, press and engagement events, develop water quality champions within industry in a fortnightly press release, develop awareness raising material for the partners websites, undertake engagement events in the 4 regions of Wales providing a project focus and methods of engaging with water quality. Undertake an innovation and a project summary seminar in November accompanied by a summary video of the projects aim, objectives and achievements.
	Undertaking a series of engagement events to raise awareness of the project and its objectives alongside awareness raising of the risks affecting water quality and the benefits of nutrient management on farm.
Brand Wales	Coordinating with the Brand wales values to identify how evidencing through earned recognition can provide the quality assurance requirements over and above current assurance standards to demonstrate environmental efficacy, provenance and quality across the board.

During the project lifecycle it has engaged with a number of existing water quality projects, operators, engagement officers within NRW and Farming Connect and Welsh Government through the WLMF sub-group and the project Steering board.

These opportunities to present the project and convey the findings of work with the farmer representatives on the NFU Cymru Water Quality Task and Finish group has enabled the project to develop a comprehensive approach to delivering water quality improvements where industry and regulator are working together to develop mutual beneficial outcomes which deliver the following;

1. Sustainable management of natural resources
2. Fewer agricultural pollution incidents and less diffuse pollution
3. Better soil, water and habitat quality
4. Improved resource efficiency of the agricultural sector
5. Improved resilience – Social, environmental, political
6. Potential market advantages

As part of the project objectives the Farmer Led approach has been tasked with working in partnership with individual operational frameworks and industry to secure farmer ‘buy-in’ and embrace learnings from previous projects being undertaken on water quality improvements. To date the project has been presented at;

- NFU Cymru member events (committee meetings, Welsh Council, Board meetings): 10
- County shows: 7
- Farming Connect events: 6
- SMS events: 4
- WLMF sub-group meetings: 2
- Welsh Government meetings: 2

Following on from the work completed so far the project is supporting independent operators within industry and the regulator to develop the following;

Considerate contractor proposal	Create a recognised assurance standard for contractors to evidence best practice and assist industry to improve on its nutrient management awareness, and application methods.
Competencies framework for advisors	Collaborative working with NRW to develop appropriate skills sets for farm advisors to ensure consistency is provided in advice and guidance, understanding of the regulatory framework and provision of support services available to farmers through government funding and potential future markets for goods and services.
Education	Collaborative working with NRW to develop awareness raising material of the value of water, and water quality, as well as food production and the benefits it delivers.
Water Standard Outcomes – Innovation	Breadth of opportunity to include environmental solutions to mitigating risk
Self-reporting - Earned recognition opportunities	Identify the benefits to self-reporting and methods to developing a working relationship with the regulator benefits, process and costs.

In line with the Cabinet Secretaries statement of December 2017 which signalled a willingness to work with stakeholders to explore voluntary approaches to nutrient management, NFU Cymru and partners have devoted significant time and resource to take this forward. This project must be given adequate time to demonstrate its potential.

7.4 Providing better advice and guidance

Welsh farmers operate within an extremely complex regulatory landscape. For example, the Working Smarter Review led by Gareth Williams in 2011 identified that approximately 3000 pages of information about legislative requirements and support schemes from farming regulators could potentially arrive on a farm in any one year.

In more recent times, emphasis has been placed on providing this information to those who are regulated via digital routes placing those farmers who are digitally excluded - through lack of skills or access to broadband services as is the case in many areas of rural Wales – in even greater difficulty when trying to understand and meet legislative requirements.

The Wales Land Management Forum sub-group on agricultural pollution recognise the often bewildering mix of guidelines and regulations farmers can face and have placed emphasis on ensuring better advice and guidance is taken up by farmers as one of its five core themes. The group has been active in delivering in this area working in partnership to develop and implement a national and targeted bespoke campaign in relation to improving water quality through Farming Connect programme funded via the RDP.

This programme commenced in 2018 with 28 targeted waterbodies and will continue into 2019 where a further 35 waterbodies have been identified for focussed intervention. The targeted approach is appropriate in the context of the evidence earlier in this report that shows water quality is highly variable and there are a range of factors within each catchment influencing water quality. It is anticipated that this aspect of the Farming Connect programme is to remain fully funded for the duration of the RDP to the end of 2023.

The aim of the targeted campaign is to bring farmers together within those catchments to understand the specific factors affecting water quality and to support them on an ongoing basis through awareness raising enabling translation to the appropriate action on the ground that will drive water quality improvements.

Subsequent to the 2018 activity, Farming Connect undertook a telephone survey of 110 participating farmers to understand knowledge and intentions.

Key findings can be summarised as follows:

- 94% found participating in the session beneficial.
- 97% of participants understood how the volume of dirty/contaminated water was affecting slurry storage capacity.
- 37% of participants indicated that they had reduced the amount of dirty water on their farm.
- 75% indicated that they had a plan in place to reduce the volume of dirty water on their farm.
- 40% of participants indicated that they had made changes to their farming practices in the last 12 months.
- Of these 41% had repaired guttering and downpipes; 29% had engaged in nutrient management planning.
- In terms of barriers to making improvements in the past 12 months, 59% indicated that they had insufficient time to action changes.

These are positive outcomes but time will be needed to translate farmer actions into water quality improvements in the catchment concerned.

The progress report by the Wales Land Management Forum (WLMF) sub-group on agricultural pollution also identifies that soil testing/nutrient management in line with RB209 recommendations needs to be a key focus. Nutrient management planning (NMP) has a pivotal role to play in the responsible production, storage and application of slurry and other fertilisers.

There are a range of routes through which farmers in Wales currently undertake soil sampling and nutrient management activities including self-funded activity through the private sector and part and fully funded activity through Farming Connect.

The extent to which farmers in Wales undertake soil sampling/nutrient management services through the private sector is not easy to quantify but is not thought to be insignificant. One leading agricultural supplier, for example, employs ten FACTS and/ or BASIS qualified advisors in Wales who undertook over 1400 samples on over 300 farms last year. The GMEP survey of farmers in Wales, undertaken in 2016 (see section 5) found over half of farmers carried out soil nutrient testing increasing to 61% of farmers participating in the Glastir scheme.

The Farming Connect programme provides a range of services within its programme to engage and support farmers in active nutrient management planning. This includes the Farm Advisory Service one-to-one activity funded at 80% and one-to-many activity which is fully funded. Up to 16 June 2019 the number of Advisory Service applications approved under the Technical Grassland and Crop Management (this advice category includes advice on Nutrient Management Planning, Grassland Management and infrastructure) was 454. A further 516 groups including 1975 individuals accessed the service through the one-to-many fully funded service.

In addition, as a form of promoting the benefits of NMP via the advisory service, the Farming Connect programme has been arranging soils and grassland clinics across Wales, offering fully funded sampling and consultation from a grassland consultant. This approach has attracted significant interest and participation by farmers.

Farming Connect currently has 45 consultants approved to deliver advice under the Technical Grassland and Crop Management category, of which 33 are FACT qualified and are able to deliver NMPs.

In addition to Farming Connect, in 2018, NRW received funding from Welsh Government to employ eight advisers to undertake agricultural pollution prevention visits through the NRW dairy adviser visits programme. Visits to dairy farms have been prioritised based on evidence that shows that the majority of pollution incidents in Wales involve the dairy sector.

As of 1st May 2019, NRW Dairy Project Officers had visited 374 dairy farms (approximately 22% of all dairy farms in Wales). NRW aims to visit all dairy farms within three years and the number of NRW Dairy Project Officers is currently being increased from eight to twelve.

Data collected from the visits includes information that relates to slurry production and storage infrastructure, clean-dirty water separation, silage storage, oil tanks, and other potential pollution issues. Information is also collected so advice can be provided to farmers on farm nutrients with N and P loadings to determine if sufficient land bank is available for spreading of farm derived manures and slurries. This data is entered on a recording system.

At the WLMF sub-group on agricultural pollution on 23rd May 2019 a presentation on preliminary analysis of data undertaken by NRW based on data collected from 259 visits was received. The presentation has not been shared with the sub-group subsequently. This is because NRW wish to undertake further statistical work on the data before they are satisfied it can be published.

NFU Cymru has concerns with the validity of the data collected during the visits. We believe the data collected during visits is not comprehensive, impacting on overall findings, for example:

- It was not until the project was established and visits were well underway that basic information relating to land tenure was collected. Specific issues exist for farmers who do not own the land that they farm in meeting regulatory requirements for farm infrastructure (see section 8.10).
- No information is collected related to the TB status of the herd which directly impacts on livestock held on the holding and therefore slurry storage capacity (see section 8.11)
- Reports from our members, suggest farm visits have been undertaken where farm infrastructure is perceived by the Dairy project adviser to be up to standard, the results are

limited or no data has been collected for these farms.

In addition, we would highlight the original purpose of the dairy visits i.e. to provide proactive advice to farmers with the aim of reducing agricultural pollution has been diminished by the Welsh Government announcement to introduce regulatory measures to tackle agricultural pollution. This has had the effect of delaying the reporting back to farmers following visits as regulatory requirement on slurry storage is now expected to change. Farmers, as a result, continue to be unaware of the key findings - requirements and recommendations – determined though the dairy visit.

It is also important to note that many improvements to farm infrastructure can only be reasonably undertaken at certain times of year when livestock is not housed.

Overall an advice led, targeted approach has the very significant potential to drive improvements in water quality and reduce agricultural pollution. This is receiving significant focus with good signs emerging of farmers engaging on this issue and taking action as a result. This will take time to translate into reduced pollution incidences and improved overall water quality. We are not confident that the data collected during the NRW dairy visits, to date, is sufficiently robust from which to draw evidence based conclusions.

7.5 Improving the range of investment opportunities

The WLMF sub-group on agricultural pollution progress report identifies that whilst there are a range of actions farmers can take to help reduce pollution or the likelihood of pollution incidences, those which are most effective often require significant investments in infrastructure such as slurry and manure storage.

The cost of investment remains a significant barrier for many in the context of farm incomes, uncertainty brought about by Brexit. Those in the tenanted sector face additional barriers which are referred to in section 8.10.

NFU Cymru has long called for Welsh Government to provide capital support in the form of grants to incentivise investment in slurry and manure infrastructure. In 2014, the NFU Cymru consultation response to the Rural Development Programme (2014-2020) Final Proposals consultation suggested range of items to enhance nutrient management and water quality for inclusion in the proposed investment support scheme. NFU Cymru also called for a much greater budget allocation than the 15% proposed be allocated to investment measures.

In 2013, Welsh Government was unique in the EU in opting to apply the maximum rate of pillar transfer (15%) from Pillar 1 to Pillar 2, with the domestic co-financing rate set at 57% this resulted in an overall RDP budget of £957m.

Farmers experiences of RDP implementation has been frustrating; characterised by low levels of ambition and a ‘business as usual’ approach, a slow rate of implementation, a costly and bureaucratic application process, sporadic application windows and low levels of funding allocations to those windows.

As of 30th April 2019, actual spend for the RDP 2014-2020 stood at just 37%. The total budget allocation to the Sustainable Production Grant Scheme was £34m of which just £9.4m had been spent with £13.6m of the total fund committed.

It was not until the fifth year of the programme (autumn 2018) that RDP funds were made available to support investment in infrastructure to improve water quality. Up until that point just 73 farm businesses in Wales had successfully secured investment support through SPG in its first three application windows.

In the 4th window for SPG the number of applications for investment support to improve water quality greatly exceeded the available budget of £6m at the Expression of Interest (EOI) stage with just 43% (194 of the 450 eligible EOI received) invited to the full application stage. EOI application levels demonstrate the genuine desire within the farming community to invest in infrastructure and equipment to drive water quality improvements on Welsh farms.

The 5th window earlier this year was also oversubscribed. The budget allocation was £8m and 280 EOIs were submitted with a potential grant value of almost £9.7m. The level of oversubscription in the fifth window has reduced and possibly reflects evidence gathered by NFU and presented in section 9 of this report that in the context of Brexit and other factors farmer confidence is diminishing and this is impacting on their investment plans.

Moving forward, whilst the current RDP includes an N+3 provision and facilitates expenditure until end of 2023, the position of the UK Treasury Guarantee is understood to guarantee funding for projects approved up to the point of the UK leaving the EU. It is also important to recognise that within current rural development regulations it is not possible for Member States to provide grant support to meet regulatory requirements.

For information, in Northern Ireland, which applied whole territory NVZ designation in 2006/2007, the Northern Ireland Department for Agriculture, Environment and Rural Affairs (DAERA) provided a generous grant scheme from domestic funds of £140m at a 60% grant rate. Northern Ireland also have a 'reasonable excuse' clause included in their regulation which allows some flexibility in spreading in very difficult years from a weather perspective.

Farmer case study

"I am concerned about the increased storage capacity in the proposed regulations. This doesn't happen overnight. Our current slurry store went in in 2006 at a cost of £78,000 for 300,000 cubic litres. This is the biggest the tower could go without planning permission but does currently give 5 months storage. Our storage is only sufficient if rainfall is not excessive and our herd numbers do not increase a problem for us as we are currently shut down with TB. However we have no more than 5 months storage, and we needed storage for 6.5 months in 2017/18. It is possible to reduce the impact of rainfall by covering more yards, but current costings suggest a minimum spend of £60k for one yard, coving all yards on our farm would mean a spend of £210k. We would be unable to demonstrate a decent return on investment business model to justify this. Also, getting planning permission is a lengthy process in this county."

Improving the range of investment opportunities has a key role in reducing incidences of agricultural pollution. The effectiveness of Welsh Government's RDP in support on-farm

investment in infrastructure at a rate and scale appropriate to industry needs has been limited to date. Regulatory measures are being introduced at a time when future funding mechanisms are far from clear. Farm businesses experience difficult in demonstrating the business case to secure lending for investment in infrastructure associated with environmental improvements.

7.6 Identifying and promoting innovation

Innovation – the application of new technologies or techniques, or their application in new places and contexts – has significant potential to make positive contributions to a range of environmental issues we face. In the context of water quality a broad range of opportunities exist including the use of new and emerging technologies for precision farming; the use of constructed wetlands as a means to manage dirty water from farmyards; the use of 'real-time' data to develop risk-based messaging systems to guide the application of slurries and manures in appropriate conditions.

The WLMF sub-group on agricultural pollution identify that an appropriate policy and regulatory framework can create the conditions to encourage and promote innovation within the private sector and farming community. The new legislative framework provides the enabling framework to facilitate innovation. The Environment (Wales) Act 2016 includes both experimental powers and powers to suspend regulation.

Some examples of innovation do exist. This includes the project led by NFU Cymru and joint funded with NRW in partnership with FUW and Welsh Water to take forward the development of the voluntary farmer led approach to nutrient management (described in 7.3) and Prosiect Slyri scheme at Coleg Sir Gar's Gelli Aur agricultural campus.

Such approaches need adequate time and resources to be able to demonstrate their effectiveness and contribution to improved water quality in Wales.

Within Wales a number of initiatives do exist to promote and enable farmers to become innovators. The European Innovation Partnership (EIP) funded via the RDP and delivered via the Farming Connect Programme aims to solve common agricultural and forestry problems by bring people from practical and scientific backgrounds together.

In the context of water quality we are aware that EIP have received an application for reed bed construction and the development of a constructed wetlands blueprint that could be used to treat dirty water. This would help reduce the burden on slurry storage so delivering improved water quality, also providing benefits for biodiversity and achieve compliance with regulation in Wales. Despite the significant efforts of the farmers concerned Farming Connect has rejected this approach.

Overall, innovation and the application of new technologies and techniques have a key contribution to make in addressing a range of water quality issues on Welsh farms. The legislative framework provides the mechanisms to facilitate innovation through the deployment of experimental powers and powers to suspend regulation. Whilst examples of innovative approaches do exist, there is more that should be done to create the appropriate conditions for farmers and the private sector to have the confidence to make investments of time and money in innovation. Innovative approaches must be enabled, they must be given

adequate time to be properly tested, recognising that approaches that fail can make a valuable contribution to our understanding going forward.

8. Regulatory measures to tackle agricultural pollution

8.1 Proposed regulatory measures

On 14th November 2018, Welsh Government confirmed regulations covering the whole of Wales to protect water quality from agricultural pollution would be introduced in spring 2019, coming into force on 1st January 2020 with transitional periods for some elements to allow farmers time to adapt and ensure compliance. Regulations are to include the following measures:

- Nutrient management planning.
- Sustainable fertiliser applications linked to the requirements of the crop.
- Protection of water from pollution related to when, where and how fertilisers are spread.
- Manure storage standards.

Information on the proposed new regulations was provided to stakeholders on 10th January 2019. Analysis of the proposed regulatory measures against the requirements of the existing NVZ action programme which applies to 2.4% of Wales land area currently and the Slurry, Silage, and Agricultural Fuel Oil Regulations (SSAFO) is shown in Annex 2 attached.

Areas highlighted in yellow translate directly from the NVZ Action Programme, with areas highlighted pink taken from the existing SSAFO Regulations. NFU Cymru is clear that the proposed regulatory measures are, in effect, a 'cut and paste' of the NVZ action programme to be applied to the whole of Wales together with the slurry, silage requirements in SSAFO. Separate regulations relating to oil storage were introduced in March 2016.

Specifically rules are included on:

- Nutrient management planning with farmers required to determine the optimum amount of nitrogen that should be spread on a crop (including grassland), taking into account the soil nitrogen supply with a plan for the spreading of nitrogen fertiliser for each calendar year;
- The amount of nitrogen available for crop uptake from organic manure must be determined using standard figures or analysis.
- Risk maps will be needed for each field.
- Application limits are established for organic manures.
- Crop limits are specified for the total amount of nitrogen from manufactured nitrogen fertiliser and that available for crop uptake from organic manure.
- Field inspections for spreading fertiliser and spreading accuracy.
- Retaining N within the soil on bare soils and stubble unless precision spreading equipment is used.
- Closed periods for spreading fertiliser.
- Recording keeping related to the above requirements, imported and exported livestock manure, details of crops sown, details of spreading nitrogen fertiliser, keeping information and advice.
- Separation of slurry.
- Storage of organic manures including slurry storage capacity.
- Making or storage of silage.
- Construction standards.

8.2 NFU Cymru Survey

The proposed new regulatory measures mirror the requirements of Nitrate Vulnerable Zones and apply those rules to all farms in Wales.

Welsh Government undertook a review of Nitrates Directive in 2016. At that time, NFU Cymru, concerned by the fact that Welsh Government opted not to provide a Regulatory Impact Assessment alongside the consultation proposals, carried out research to gather information on the impacts and costs of proposals contained in the Review of the Designated Areas and Action Programme to tackle Nitrate Pollution in Wales.

The fact that proposed regulatory measures replicate NVZ requirements means that the findings of this research remain relevant. The context into which regulations are being introduced has changed in the period between 2016 and the current day with impacts due to Brexit and other economic factors referred to in other sections of this report.

This survey took the form of an online questionnaire circulated between 11th November 2016 and 11th December 2016 and resulted in 293 farmer responses from across Wales. Key findings include:

- Around one in eight farmers (13%) ***that are not currently in a NVZ*** said they would give up farming or would consider giving up if NVZ proposals were introduced.
- Nearly three quarters ***of farms that produce slurry*** (73%) said they did not currently have sufficient slurry storage on their farm to meet proposed NVZ requirements.
- It will cost ***those without sufficient slurry storage*** an estimated average of £79,957 to achieve NVZ slurry storage compliance .

At that time, levels of awareness of proposals were low, particularly in the case of the option to take forward the Whole Territory designation. The survey found:

- 83% of respondents were aware of either option 1 or option 2 and ***17% had not heard of either option.***
- Less than half, only ***46% were aware that option 2 (whole territory)*** had been included as a proposal within the consultation.
- Only ***10% of those that were aware of either option found out about the NVZ proposals via Welsh Govt. and only 3% via NRW***. Most (75%) found out via NFU Cymru.

(Note - respondents could select more than one option i.e. options are not mutually exclusive).

In terms of the NVZ Action Programme, key areas of concern for farmers are summarized in 8.2.1 below:

Note - proposed regulatory measures to tackle agricultural pollution mirror the existing NVZ Action Programme and do not incorporate the changes that were subject to consultation in 2016 (i.e g), f), h), e) above)

With respect to changes that farmers would make to their farming system subsequent to designation, the survey found that that:

- 34% would change their farming system (93 respondents) and we asked this group what changes they would make. (Note - figures below are based on all 274 respondents not in NVZ for ease or reference)
- 13% would give up farming or would consider it.
- 16% would fully change their type of enterprise or would consider it (beef to sheep generally).
- 2% would keep more livestock or would consider it.
- 27% would keep fewer livestock or would consider it .

With respect to a voluntary approach, in line with the sustainable management of natural resources, the NFU Cymru survey demonstrated strong support from the industry with 75% prepared to consider a voluntary approach.

Overall, key concerns relating to the proposed regulatory measures focus in three key areas, namely the costs associated with designation; the bureaucratic nature of the regulation which presents challenges to farmers to demonstrating compliance; together with restriction to day-to-day farming operations. The NFU Cymru Survey undertaken in 2016 found that around one in eight farmers (13%) that are not currently in a NVZ said they would give up farming or would consider giving up if NVZ proposals were introduced. Nearly three quarters of farms that produce slurry (73%) said they did not currently have sufficient slurry storage on their farm to meet proposed NVZ requirements. It will cost those without sufficient slurry storage an estimated average of £79,957 to achieve NVZ slurry storage compliance

It should also be recognised that the EU Nitrates Directive and the methodology underpinning new designations has the very specific objective of protecting waters against pollution caused by nitrates from agricultural sources.

8.3 Nitrates Review 2016

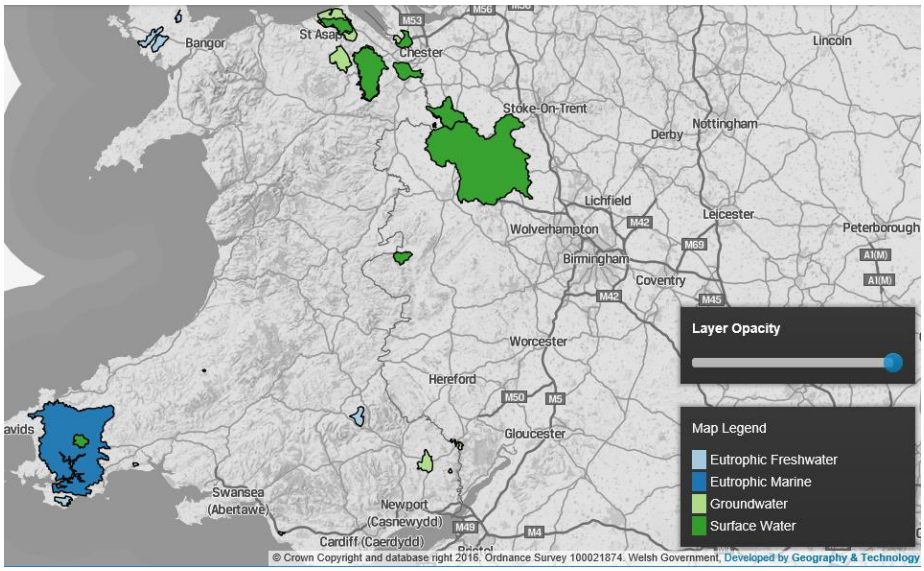
In line with the EU Nitrates Directive, Welsh Government is required to review NVZ designations using specific tests on a four yearly cycle. The Directive requires that the Action Programme of measures for farmers to follow is applied either throughout Wales (whole territory designation) or to specific areas designated as areas of land that drain into polluted waters and that contribute to the pollution of those waters.

The specific tests require the designation as NVZ of land draining into:

- Ground waters or surface fresh water systems that contain, or could contain, (e.g. due to an upward trend) if protective action (i.e. applying the Action Programme measures) is not taken, nitrate concentrations above 50mg/litre; a significant part of which comes from agricultural sources;
- Freshwaters (e.g. lakes, rivers), estuaries, coastal waters and marine waters that are (or may become so in the near future if protective action is not taken) eutrophic when Nitrogen compounds (e.g. nitrate from fertiliser or manure) enrich the waters and cause accelerated growth of higher forms of plant life and algae. This produces an undesirable disturbance to the balance of organisms and to the quality of water.

In 2015, NRW, as the environmental regulator in Wales, undertook the Review applying the specific tests and following detailed methodology to make recommendations for NVZ designations.

Figure 8.3.1 shows areas recommended by NRW for NVZ designation



Source – [Welsh Government]

In summary, based on the evidence gathered through the application of detailed methodology and applying the specific tests set out in the EU Nitrates Directive, the Review undertaken by NRW resulted in recommendations to increase the total area of land designed as NVZ from 2.4% to 8%.

Specifically:

Eutrophic Freshwater Recommendations	Llyn Maelog, Anglesey Llyn yr Wyth Eidion, Anglesey Llyn Pencarreg, Carmarthenshire
Eutrophic Marine Recommendations	Milford Haven Inner Waterbody
Groundwater Recommendation	Llanmiloe, Carmarthenshire
Surface water Recommendation	River Alyn and Worthenbury Brook, Wrexham Deepford Brook, Pembrokeshire

At that time NFU Cymru commissioned in depth analysis of the evidence underpinning the proposed new designations. This was undertaken by independent specialists who identified a number of gaps and shortcomings within the evidence based that undermined the recommendations for new NVZ designations made by NRW. This analysis is provided in Annex 3. Overall many of the recommendations for new designations at that time were not due to high nitrate levels but provisional eutrophic areas with very low nitrate levels between 1 and 2 mg N/litre.

Based on specific evidence gathered by NRW through the Nitrates Review which is intended to protect waters against nitrate pollution from agricultural sources, NRW identified that the area of Wales designated as NVZ should increase from 2.4% to 8%. Independent analysis of the NRW evidence suggests even an increase to 8% is questionable. On the basis of the evidence no justification exists for the introduction of regulatory measures to tackle agricultural pollution applied at a whole territory (all-Wales) level. It is not clear what objective Welsh Government is trying to meet in applying measures intended to protect waters against agricultural pollution caused by nitrates from agricultural sources when the evidence of nitrate pollution from agricultural sources, is in reality absent from practically all of Wales. An all-Wales approach goes against the principles of science and evidence-based decision making as well as the 'polluter pays' principle.

8.4 Water quality data from existing NVZ designations and the effectiveness of the Action Programme

The Nitrates Review undertaken by NRW in 2015 included existing NVZ designations. At that time NRW identified that all four eutrophic lakes designated continued to meet the criteria for designation as did all the existing groundwater and surface water designations.

No monitoring data was provided by NRW to underpin this conclusion, despite a number of long-standing NVZ designations dating back to 2002 with farmers in those areas following the Action Programme of measures, NRW concluded that all designations met the criteria and warranted continued designation.

Article 10 of the EU Nitrates Directive states that Member States shall, in respect, of the four year period following the notification of this Directive and in respect of each subsequent four year period, submit a report to the Commission containing the information outlined in Article V. This includes information on the assumptions made by the Member States about the likely timescale within which the waters identified are expected to respond to the measures in the Action Programme, along with an indication to the level of uncertainty incorporated into these assumptions. Article 10 reporting was subject to information request by NFU Cymru in February 2017.

Figure 8.4.1 shows a summary of trends monitored at existing NVZ sites:

Site (NVZ Number)	Type	Date of designation	Statistical Trend	Non statistical observations	Preliminary expert judgement summary of trend
Glanfyddion (623)	Surface Water	2002	No upward trend	Data does not suggest any upward or downward trend in N since designation	↔
Pulford Brook (707)	Surface Water	2002	No upward trend	Data does not suggest any upward or downward trend in N since designation. Dip in concentrations in 2001/2002 maybe a result of meterological factors	↔
River Alyn (626)	Surface Water	2002	No upward trend	Data does not suggest any upward or downward trend in N since designation	↔
Bosherston (207)	Lake	2008	Not available	Uncertain decrease in N concentration, uncertain ecological improvement	↔
Llyn Coron (206)	Lake	2008	Not available	N no change, ecological deterioration	↑
LLangorse (219)	Lake	2012	Not available	Decrease in N and ecological improvement	↓
Hanmer Mere (220)	Lake	2012	Not available	Upward trend in N, no ecological change.	↑
Raglan (161)	Groundwater	2012	Upward trend	Data trends suggest a continued upward trend in nitrate	↑
Prestatyn (134, 135, 137)	Groundwater	2009	Upward trend	Statistical analysis predicts an upward trend in future	↑
Ruthin (1)	Groundwater	2009	Upward trend	Monitoring points show polluted groundwater and concentrations predicted to increase in future	↑
Ty Tanglwyst Farm (159)	Groundwater	2012	Downward trend	Groundwater currently polluted but predicted to be below designation threshold by 2027	↓

Source – Welsh Government letter dated 2nd March 2017 in response to NFU Cymru information request dated 3rd February 2017.

Based on NRW monitoring, preliminary expert judgement identified a downward trend in nitrates at just two out of the eleven designated sites.

The paper identifies that for the three surface water designations at Glanfyddion, Pulford Brook and River Alyn, all designated since 2002, *'data for surface waters does not suggest any upward or downward trend in N since designation'*. For ground waters, the paper identifies that *'for every national scale conclusion about the current state of, and trends in, ground water nitrate concentrations, there will be significant contradictory monitoring evidence'.*

In eutrophic waters, the paper states *'the relationships between nutrient use, nutrient delivery, biological response and ecosystem resilience in space and time are highly complex making it difficult accurately predict recovery trajectories'.*

The paper also refers to the range of sources of river pollution in Wales and refers to research that identifies that *'agriculture contributes an estimated 60-80% of total nitrogen to freshwater in Wales'*. This appears to be a justification for the continued application of the NVZ Action Programme yet this conclusion was drawn from a paper looking at pollutant loadings from all sectors which specifically notes that nitrate data is only available for 235 STW in England and Wales out of a total 6790 (just 3.5%).

Farmer Case Study

"My farm was designated in an NVZ zone in 2012. Being in an NVZ brings with it costs, including employing a consultant to do the nutrient management planning to ensure everything is correct. This is a burdensome exercise. Also since the designation we have not received ANY documentation whatsoever from NRW on water sample results to illustrate how such stringent regulations have improved water quality in the area, this is inexplicable. Given this lack of evidence base, we feel that a whole Wales territory is ill thought out when it cannot be justified what the existing NVZ regulations have done to improve water quality in already designated areas. There is no evidence forthcoming on what has been achieved for the designation, and no evidence baseline to show that regulations such as NVZ can improve water quality."

The 2016 Review of Nitrates consultation stated that *'Welsh Government considers it too early to meaningfully analyse the success of the existing Action Programme'.*

Welsh Government has provided no Article 10 assessment for whole of Wales in line with proposals to introduce new regulatory measures which replicate the NVZ Action Programme.

Analysis of the evidence provided in the Article 10 reporting provides no substantive evidence of the effectiveness of the NVZ Action Programme in reducing agricultural pollution despite a number of long standing designations dating back to 2002. The Action Programme measures are extremely costly and complex for farmers to comply with. It is a highly unsatisfactory situation that farmers who have complied with costly and bureaucratic measures over a prolonged period of time for little or no demonstrable environmental gain. From this evidence, there would appear to be no justification, in terms of environmental gain to apply the requirements of the Action Programme, as proposed by Welsh Government, at a whole Wales level.

8.5 Welsh Government Nitrate Vulnerable Zones in Wales – Summary of Responses

In December 2017, Lesley Griffiths AM, Cabinet Secretary for Energy, Planning and Rural Affairs issued a Written Statement in which she referred to the 2016 Review of Designated Areas and Action Programme to Tackle Nitrate Pollution in Wales. The statement refers to 256 responses from individuals and organisations with nearly 60% of responses supporting whole territory designation.

The Summary of Responses was not published until February 2018 and is clear a variety of viewpoints were received and no consensus or unanimous agreement emerged.

In the context of the Cabinet Secretary Written Statement, the Summary of Responses shows that 240 respondents provided comments to question 1 relating to continuing with discrete NVZ designations or whole Wales designation with 151 of those respondents stating they would prefer to see whole territory designation.

However, through this process of analysis, the responses from individuals appear to have been afforded the same weighting as the responses from farming membership organisations. This is disappointing and fails to recognise the comprehensive engagement programme undertaken by such organisations with the stakeholder group most affected by consultation proposals. Further, no analysis has been provided on whether respondents were based within or outside Wales.

As a result the headline conclusions drawn from the consultation which have gone on to provide the apparent justification for Welsh Government to move forward with new regulatory measures covering the whole of Wales in the absence of evidence that this is needed or indeed can be effective is deeply flawed.

We highlight again, our concerns with the very poor quality of the consultation process from start to finish. This includes fundamental weaknesses in the evidence underpinning new designations; the lack of evidence to support the efficacy of the existing and proposed new Action Programme of Measures as well as the failure to provide comprehensive Regulatory Impact Assessment which resulted in all respondents commenting on proposals for which they could have no idea of costs, benefits or impacts.

The structure of the consultation and framing of the consultation questions were often leading and presented proposals as a *fait accompli*. The consultation also included a number of misleading statements which could have influenced respondents.

The analysis of responses to the 2016 Review of Designated Areas and Action Programme to tackle Nitrate Pollution in Wales provides insufficient justification for the introduction of regulatory measures for the whole of Wales.

Farmer Case Study

""The new proposed Water Quality Legislation will have a significant impact in my sector of horticulture and potatoes. This sector is made up mainly by larger specialist producers who rely on long rotations for sustainable business models. This means that a lot of their land is rented in on a range of different lengths of tenancies and licences. It tends to be very quality focused because that is what the consumer demands so nitrogen rates are specifically targeted at individual fields and varieties, let alone crop types.

The new legislation is going to create a significant bureaucratic burden of obtaining in depth information for a constantly changing land base. It will create a large amount of paper work to justify current best practice to an ill-informed regulator that does not have the knowledge to challenge the decisions made.

The level of use of organic manures is relatively low due to the need to provide a safe period between application of organic manures and a crop being grown because contamination of a crop has the possibility of severe consequences to human health. A lot of the information is already collected and inspected annually by Red Tractor Fresh Produce Assurance, but it is held in different ways to answer different questions. It will take a significant amount of time and resources to rerecord it in a system demanded by this Water Quality Legislation, but for no benefit to water quality.

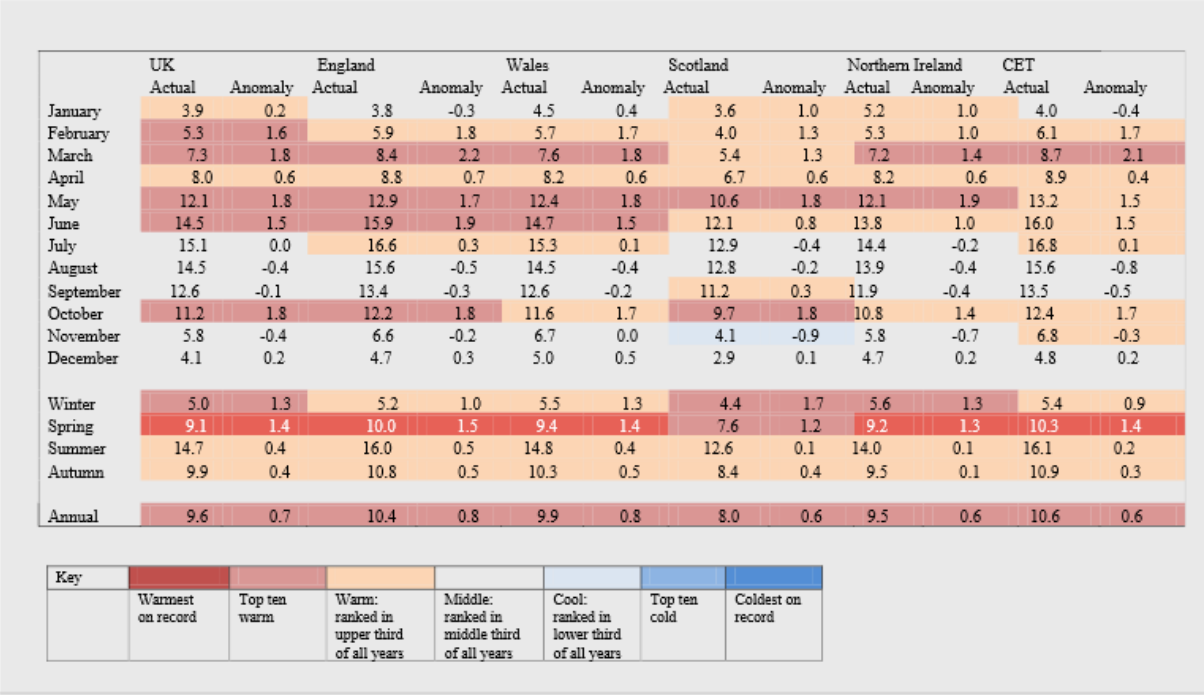
The increasing use of cover crops, both over winter and in the spring is not mentioned, do we need to consider these as crops in themselves and produce more paperwork for them when they are encouraged to be used for many reasons, including water quality. This legislation will put growers off making changes like this because we will have to produce plans and justifications maybe three times in a year for some fields."

8.6 Nutrient uptake by crops during proposed closed periods

The NFU Cymru Survey in 2016 identifies restriction on day-to-day farming operations as a key concern with new regulatory proposals. The decision to introduce closed periods for the spreading of organic manures with high readily available nitrogen and manufactured nitrogen fertiliser, for example, assumes that there is no uptake of nutrients from crop growth during this period.

However, evidence does exist to show that nutrient uptake by grass and other crops occurs into the winter months, particularly to the west of the country. Indeed the natural advantage of the ability to grow early grass has led many dairy farmers to move to spring calving herds. Growth and therefore nutrient uptake is correlated with temperature. Grass growth, for example, occurs at 5 degrees C.

Figure 8.6.1 shows monthly, seasonal and annual mean temperature and anomaly values (degrees C) relative to 1981-2010 average for the UK, countries and CET (Central England Temperature) for the year 2017.



	UK		England		Wales		Scotland		Northern Ireland		CET	
	Actual	Anomaly	Actual	Anomaly	Actual	Anomaly	Actual	Anomaly	Actual	Anomaly	Actual	Anomaly
January	3.9	0.2	3.8	-0.3	4.5	0.4	3.6	1.0	5.2	1.0	4.0	-0.4
February	5.3	1.6	5.9	1.8	5.7	1.7	4.0	1.3	5.3	1.0	6.1	1.7
March	7.3	1.8	8.4	2.2	7.6	1.8	5.4	1.3	7.2	1.4	8.7	2.1
April	8.0	0.6	8.8	0.7	8.2	0.6	6.7	0.6	8.2	0.6	8.9	0.4
May	12.1	1.8	12.9	1.7	12.4	1.8	10.6	1.8	12.1	1.9	13.2	1.5
June	14.5	1.5	15.9	1.9	14.7	1.5	12.1	0.8	13.8	1.0	16.0	1.5
July	15.1	0.0	16.6	0.3	15.3	0.1	12.9	-0.4	14.4	-0.2	16.8	0.1
August	14.5	-0.4	15.6	-0.5	14.5	-0.4	12.8	-0.2	13.9	-0.4	15.6	-0.8
September	12.6	-0.1	13.4	-0.3	12.6	-0.2	11.2	0.3	11.9	-0.4	13.5	-0.5
October	11.2	1.8	12.2	1.8	11.6	1.7	9.7	1.8	10.8	1.4	12.4	1.7
November	5.8	-0.4	6.6	-0.2	6.7	0.0	4.1	-0.9	5.8	-0.7	6.8	-0.3
December	4.1	0.2	4.7	0.3	5.0	0.5	2.9	0.1	4.7	0.2	4.8	0.2
Winter	5.0	1.3	5.2	1.0	5.5	1.3	4.4	1.7	5.6	1.3	5.4	0.9
Spring	9.1	1.4	10.0	1.5	9.4	1.4	7.6	1.2	9.2	1.3	10.3	1.4
Summer	14.7	0.4	16.0	0.5	14.8	0.4	12.6	0.1	14.0	0.1	16.1	0.2
Autumn	9.9	0.4	10.8	0.5	10.3	0.5	8.4	0.4	9.5	0.1	10.9	0.3
Annual	9.6	0.7	10.4	0.8	9.9	0.8	8.0	0.6	9.5	0.6	10.6	0.6

Colour coding relates to the relative ranking in the full series which spans 1910–2017 for all series except CET which is 1659–2017.

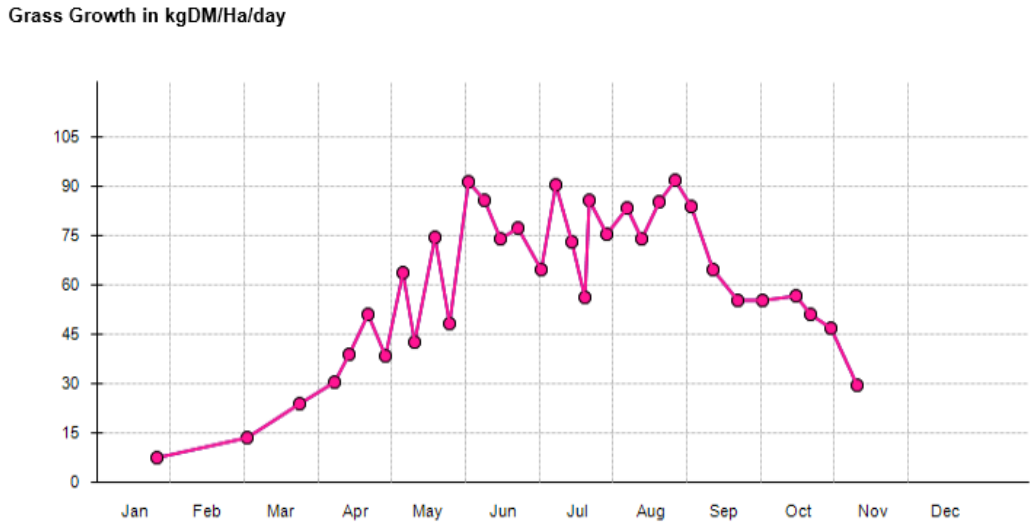
Figure 8.6.1

The table shows actual temperature for Wales in November, December and January as 6.7, 5.0 and 4.5 degrees C respectively – above the temperature for grass growth in two of the three months. These monthly temperatures in 2017 ranked in the middle third of all years so can be regarded as 'typical'.

The Met Office State of UK Climate Report 2017 shows that the number of air frosts in 2017 was well below average for the year overall, and the number of ground frosts was the fourth lowest in a series from 1961. The most recent decade 2008-2017 has had 5% few days of air frost and 9% fewer days of ground frost compared to the 1981-2010 average and 15%/14% fewer compared to 1961-1990.

Farmers who undertake grass measuring on their farms are able to demonstrate grass growth and, therefore, nutrient uptake continues albeit at a reduced rate, throughout the winter period.

Fig 8.6.2 shows the levels of grass growth on a Welsh farm in 2017.



Met Office data and grass measuring data shows continued grass growth and therefore, nutrient uptake into the winter months and during the closed period. Farmers should be empowered to make decisions to apply slurries and manures when weather and field conditions allow and not restricted by regulation which establishes a 'farming by calendar' approach.

Farmer case study

"My biggest concern is the calendar control window for getting slurry out. Our farm, like everyone else, operates by the weather forecast. Winter 2018/19 was very mild and opportunities to get slurry onto grass & arable ground in the spring were excellent. This led to an earlier than normal and heavier silage cut (very welcome with winter stocks running from the 2018 drought). This eventually also meant less bought in fertiliser because grass responded so well to slurry early in the season, and then to a second slurry dressing, the need to top up with artificial fertiliser was reduced. Referring back to drought 2018, our farm is committed to injecting 95% slurry with Glastir however the ground became so hard the injector could not work and slurry application was held up since splash plate wasn't an option. Referring back to wet summer 2017, cows were housed a month earlier than normal because the ground got too wet. This wet weather meant slurry application prior to housing was only partially achieved and storage was under stress because of extra housing time. I am at a loss to work out exactly how much slurry storage is enough if opportune windows for spreading are cut off simply because someone decides to farm by paper not climatic conditions. I feel if the proposed regulations come into place the optimal opportunities to use our own natural fertiliser will be missed, and our business will lose out as a result, if a spreading window in imposed on us. If we consider the weather extremes just over the past 3 years it's easy to see that using a calendar date is not going to encourage appropriate spreading, only desperate spreading as soon as a window opens. I respect that slurry accidents may happen but they are in a minority and penalising farms like mine because of it are unjustified. If there is a slurry accident use resources to help that farmer. If there is a deliberate breach of regulation use resources to prosecute where needed. Do not cause stress and cost to the majority of farming businesses that are not causing a pollution problem.

If you take the example of the hedge cutting window - when the weather is bad many hedges never get cut. This causes a certain amount of hassle and cost we all learn to deal with and often there is a hedge cutting frenzy in the next window. However if there is a slurry spreading window and the weather prevents us from using it we cannot simply 'learn to deal with it' because you can't turn slurry from cows on and off like a tap. And a slurry spreading frenzy is not helpful either."

8.7 National climate projections

The UKCP18 project provides the most up-to-date assessment of how the climate of the UK may change over the 21st Century.

The headline result suggests 'a greater change of warmer, wetter, winters and hotter, drier summers'. This is broadly consistent with earlier projections (UKCP09).

However, it is important to note that in terms of UK precipitation, this study identifies that total rainfall from extremely wet days has increased by around 17% in the most recent decade (2008-2017). Moving forward, in summer, rainfall is expected to decrease significantly but when it rains in summer there may be more intense storms and precipitation in winter is expected to increase.

UKCP18 identifies 'variability in rainfall is increasing: wet winters will get wetter, but we can still expect to see dry winters. This means that we will need to be resilient to a wider range of conditions than we are used to'.

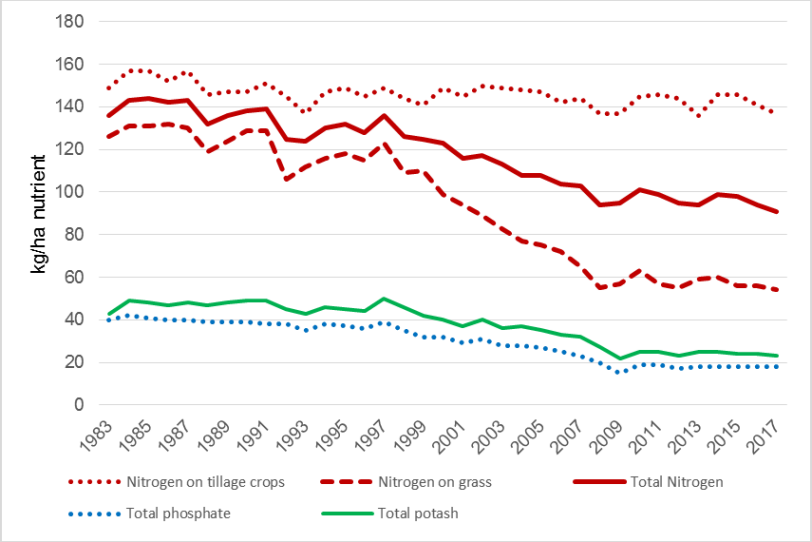
Regulatory measures to tackle agricultural pollution through an approach that restricts activity on the basis of calendar dates or a 'farming by calendar' approach would appear increasingly challenged in the context of climate change and will not incorporate the necessary resilience and flexibility for farm businesses or the environment.

In the context of growing consensus that Wales will experience more extreme and challenging weather events in future, it is vital that farmers are allowed the flexibility to undertake field operations appropriate to the conditions.

8.8 Survey of Fertiliser Practice

The British Survey of Fertiliser Practice is an annual survey that collects information on usage and application rates of nitrogen, phosphate, potash, sulphur, organic manures and lime on the major crops and grass grown in mainland Britain. It also includes the official statistics on annual fertiliser consumption in the UK.

Figure 8.8.1 shows overall fertiliser use (kg/ha) on all crops and grass, Great Britain during the period 1983 to 2017.



The figure shows overall application rates of nitrogen (N), phosphate (P2O5) and potash (K2O) on crops and grass on tillage land and grass from 1983 to 2017. Maximum usage was seen in the 1980s with a general downward trend since then. The survey identifies that the long-term decline in total nitrogen over this period is mainly due to decreased use on grassland.

Evidence shows a long-term decline in overall application rates of nitrogen, phosphates and potash since 1983. In particular, the survey identifies the long-term decline in total nitrogen over this period is mainly due to decreased use on grassland.

8.9 Farm Inspections

A key issue identified by farmers to the proposed regulatory measures to tackle agricultural pollution relates to the increased bureaucracy and regulatory burden as shown in the NFU Cymru Survey undertaken in 2016.

The NVZ action programme is known to be costly and complex to comply with. Demonstrating compliance with NVZ rules through record keeping is widely acknowledged as burdensome and unproductive.

In Wales, the NVZ action programme falls under the cross compliance regime that farmers are required to follow if they receive the Basic Payment Scheme (BPS). Verifiable standards extend to 120 pages in total and are subject to inspection. The verifiable standard for SMR 1 – NVZs against which farmers are inspected extends to 12 pages of detailed requirements including record keeping as follows:

You must keep the following records up-to-date for at least 5 years and produce them for inspection when requested (see the NVZ guidance and workbook for information on how to fulfil these requirements):

- A calculation showing your existing manure storage capacity;
- The area of your holding;
- by 30th April each year, the number and type of livestock kept on your holding and the amount of time the livestock spent on the holding during the previous calendar year;
- By 30th April each year, a calculation of total amount of nitrogen produced by the specified livestock kept on your holding during the previous calendar year;
- Any livestock manure moved onto or off the farm including quantities, dates and details of recipients;
- Dates when field sites are used for the temporary storage of poultry and solid manure and the location;
- Your nitrogen fertiliser plan (showing for each crop, in each field: the calculated soil nitrogen supply (SNS); the
- Anticipated month the crop will be planted; the calculated crop nitrogen requirement; the calculated nitrogen supply
- From any planned application of organic manure; and the calculated amount of manufactured nitrogen fertiliser required;
- Field records of arable yields and grassland management;
- If you intend to spread nitrogen fertiliser, field records of your crop planting dates and a copy of any advice received from a Fertiliser Advisers Certification and Training Scheme (FACTS) qualified adviser;

- Field records of actual applications of manufactured nitrogen fertiliser and organic manure including dates of application, quantities applied and types. Exemptions apply for low intensity, grassland farms;
- If you spread organic manure, a risk map of the holding; and
- By 30th April each year, for holdings with livestock, a record for the previous storage period, the number and type of livestock in a building or hard standing during the storage period.

Evidence exists elsewhere of high levels of non-intentional non-compliance. In England, for example, where approximately 58% of the land area is designated NVZ, statistics released by the Rural Payments Agency on cross compliance inspections shows that between 15-16% of all cross compliance breaches related to the NVZ Action Programme in 2015. More recent figures for 2017 show that SMR1 was identified as the reason for 13.8% of total failures with the main reason for failure being current year records incomplete/not presented or do not exist and historic records incomplete/not presented or do not exist.

The difficulties associated with demonstrating NVZ compliance leave many farmers resorting to the expense of professional help which they can ill-afford. During that last Nitrates Review in England Charles Daniell, Rural Surveyor and land agenda provided comment on NVZs to the letters page of the Farmers Weekly as follows. Mr Daniell identified *"he is one of the advisers that charges farming clients to produce compliant records. It is not in his interest to see these rules removed as his business benefits directly, however, he resents having to charge clients for undertaking a service that he views as totally unnecessary"*. Mr Daniell observed that *"whilst the objective of reducing nitrate pollution is important and worthwhile, the record keeping requirements are not fit for purpose and all they test is whether a farmer, or more likely their paid adviser, can produce compliant records"*. In his view *"the rules are so complex that is it unrealistic to expect that farmers will be able to dedicate the time and effort to interpret them themselves and produce the relevant records. The overwhelming focus of the regulation and their enforcement is to oblige farmers to produce records and NVZ regulations could be removed or substantially over-hauled with no ill effect*".

The requirement placed on farmers to adhere to and demonstrate compliance with ever increasing levels of complex regulation has long been a source of intense anxiety and concern to farmers. Farm businesses in Wales, in the main SME micro businesses, find themselves operating in a highly complex regulatory environment of which water quality is just one of a number of important priorities. The Working Smarter Review led by Gareth Williams in 2011 recommended that a risk based approach should underpin the application of environmental regulation in Wales. It identified that in any one year approximately 3000 pages of information about legislative requirements and support schemes from farming regulators could arrive on a farm.

Prevention of water pollution on farm was prioritised within Working Smarter with the avoidance of 'gold plating' of NVZ regulations in Wales promoted. During evidence gathering for the Working Smarter review, concerns were expressed about the risk of gold plating of environmental legislation in Wales. Concern was also expressed that there was insufficient risk based and targeted approaches, for example, in the implementation of Nitrate Vulnerable Zones (NVZ) legislation.

The Working Smarter Review outlined a number of recommendations. Recommendation 44 stated that "the application/implementation of environmental regulations in Wales (including NVZ) must be reviewed to ensure that flexibility has been considered; gold plating avoided and the Defra approach had not been routinely adopted when a different approach may be more appropriate in Wales".

Recommendation 45 stated “a risk based and targeting approach should underpin the application of environmental regulations in Wales.”

Demonstrating compliance with NVZ rules through record keeping is widely acknowledged as burdensome and unproductive. Where NVZ rules are applied elsewhere, there is evidence of non-intentional non-compliance and high levels of breach found at inspection. Many farmers resort to the expense of paying for professional help to assist with record keeping.

Complex regulation is a key source of anxiety to farmers. The 2011 Working Smarter Review led by Gareth Williams, recommended that a risk based approach should underpin the application of environmental regulation in Wales. Proposed regulatory measures applied to the whole of Wales do not align with this recommendation.

Farmer case study
“The proposals are draconian and will produce a disproportionate amount of paperwork compared to the risk of pollution. Paperwork in its self does not prevent pollution. The paperwork burden is already too great and this extra work will achieve little and cause great mental strain to many farmers.
Our farm is mainly sheep, which produce minimum manure. The cattle, which are kept to optimise grass utilization, provide manure for fertilizer and to help manage the farm’s biodiversity are an important management tool. Many farmers now keeping cattle may decide to disperse of their suckler cow herds if these rules are instigated as keeping cattle is already onerous with the worry of TB.
It is unreasonable to roll out such a serous amount of paperwork and cost on every farmer, most of whom are not polluting.”

8.10 Welsh beef sector

The total cattle number in Wales show a general long-term downward trend. In 2004 total cattle numbers were in the region of 1,266,000 compared to total cattle numbers of 1,134,000 in June 2018.

The number of beef cow holdings also show downward trends from 10816 in 2004 to 7207 in 2018. The average beef herd size in 2018 was 23.

Changes to agricultural policy during this period, the viability of suckler cow herds and wider issues such as bovine TB are all factors that have challenged farmers ability to remain in the sector. In other countries such as Ireland and Scotland, specific programmes of support for the beef sector funded via the RDP have been put in place. No similar packages exist in Wales currently.

The additional costs and regulatory burden associated with proposed new regulatory measures to tackle agricultural pollution are likely to place increase pressure on the sector at a time when the latest figures from HCC show that farm-gate beef price is now 22p/kg below the five year average with farmers getting £200-£300 per animal less than a few months ago.

New regulations not only have consequences for farm businesses, the sector and the rural economy but also for the environment.

The benefits to biodiversity of cattle grazing has been the subject of academic research. Cattle grazing is an important factor in the ongoing maintenance and enhancement of a range of habitats and species. Research undertaken by M D Fraser and R Rosa Garcia of Pwllpeirian Upland Research Centre, for example, refers to the loss of cattle grazing from the uplands of Wales as being instrumental in the spread of invasive hill grass species linked to the loss of heathland habitats of international conservation importance. Further research work undertaken by IBERS has demonstrated that mixed upland grazing systems not only improve livestock production but also benefit biodiversity.

Farmer case study
"We are an extensive hill-farm of more than 1,000 hectares, running 1,000 plus sheep and some 60 head of cattle. The farm runs from 450 feet to 2,200 feet above sea-level. The majority of our farm is unimproved mountain pasture with a small amount of unimproved ffridd (80 hectares), woodland and a small area of fields around 30 hectares. We use around 6 tonnes of artificial fertiliser a year plus we spread manure where and when it is practical and will give us the greatest benefit.
We farm in an area with a very high rainfall, the water catchment area is classed as good (the best rating). Intensive agriculture is not an option on our farm and never will be. We have rivers on our land which are already protected by the existing regulations i.e. no muck spread within 10 metres, and no artificial fertiliser within 2 metres. Introducing new regulations will not make any difference to the already good quality of the water, but the burden of the regulations on us will be immense. There is also a possibility on farms such as ours that keeping cattle will become unviable. This does not seem to support the Welsh Governments position to encourage more mixed grazing (more cattle) on the hill land."

Proposed regulatory measures to tackle agricultural pollution are likely to place an additional burden on suckler cow herds which have already declined significantly. This has impacts not only for farm businesses and employment in rural communities but unintended consequences for the environment and biodiversity as the benefits of cattle and mixed grazing regimes will be threatened.

8.11 Tenanted sector

In Wales, around a third of agricultural land is rented through both formal and informal agreements. The opportunity to rent agricultural land offers a means of entry into farming from people with no family connections to land or capital to buy land.

Welsh Government has recently consulted on agricultural tenancy reform with the aim of:

- Providing an enabling environment for sustainable productivity improvements and investment.
- Facilitating structural change and supporting new entrants and the next generation.
- Enabling tenant farmers to access new agricultural and land management schemes.

In 2017, the Tenancy Reform Industry Group (TRIG) which is an advisory group to Defra and Welsh Government identified that there were several areas of agricultural tenancy legislation that presented barriers to productivity and structural change.

In the context of proposals to introduce regulatory measures to tackle agricultural pollution which include slurry storage capacity policy/legislative issues of particular relevance include:

- The fact that some landlords may be discouraged from investing in holdings due to the current rent review provisions.
- Restrictive clauses in AHA tenancies can prevent the tenant from undertaking activities to change landlords fixed equipment or land use on the holding without landlords consent. For example, going out of milk production.
- The length of many FBT tenancies, averaging four years, means that tenants do not have the security they need to make long-term investments.

Wider issues include the fact that tenant farmers are often unable to lever capital through lending to make investments (in this case to meet regulatory requirements) due to lack of security and the limited time to realise return on investment where the tenancy term is relatively short.

Some estates including local authority council farms estates may not have the resources to make the necessary investments in their holdings to meet regulatory compliance. The unintended consequence of sale of holdings could potentially arise which will limit opportunities for new entrants to the industry.

Anecdotal evidence exists, as shown in our case study below, and highlights that proposals to introduce new regulatory measures involving investment on the holding can also weaken the position of the tenant and further imbalance landlord-tenant relations. Some landlords use the lever of new regulatory requirements which the tenant is unable to meet on their own as a means to bring about the surrender of an AHA tenancy and replacement with FBT where tenants' rights are much weakened.

Legislative proposals do not remedy the issues identified in full. The timeline by which legislative reforms can realistically be achieved also needs to be determined in the context of new regulations, given that previous reforms to Model Clauses are yet to be passed into law by Welsh Government.

Proposals present particular issues for tenant farmers who may be unable to secure funding to make investments in infrastructure to meet regulatory compliance. Proposals put forward in the recent Welsh Government Consultation on agricultural tenancy reform are unlikely to address the issues in full even with the provision of transitionary periods to allow farmers to adapt.

Farmer case study

"I am writing on behalf of a farming family which I have been assisting through a difficult period, exacerbated by current NVZ and TB regulations. They have dairy enterprise farming on tenanted farm on a full agricultural tenancy for many years. The farm was designated in the 2012 round of NVZ's. They have heavily relied on exporting slurry to comply with NVZ regulations. They are well aware of their water quality responsibilities and sought to upgrade their existing store using the SPG. On attending a Farming Connect meeting, they were informed that upgrading 'existing' facilities would not be permissible. They approached their landlord for consent and help with the situation – looking to build a completely new storage facility in order to qualify for the SPG. They were informed that the Estate from which they rented the farm would partially assist in terms of financing the project but they would wish to revoke the AHA tenancy agreement and replace it with a shorter term. 10 year FBT. A further condition was that the tenant would also ensure that any loan taken out to build the facility would be cleared within the timeframe of the replacement tenancy.

The farm has also suffered a TB breakdown, where herd numbers have exceeded maximum capacity and this is putting pressure on existing storage and also means they cannot export slurry. They are either in breach of NVZ rules or TB rules, and are left in an impossible situation."

Farmer case study

"On reading the proposed water quality regulations it would appear to be an NVZ regulation, which is something that we have felt in the farming industry to be a very draconian way to deliver regulation. The outcome required will never be achieved using this approach. A farmer led Water Quality programme has already been shown to work successfully through the First Milk Initiative where nitrates have been reduced in the water course.

As a tenant farmer my first conversation will be with our landlords, a County Council, who have implied that their budget will not stretch to a 5 month slurry storage system, nor are they willing for me to spend this sum as they may not be able to compensate tenants at the end of the tenancy if we have to leave. We have been quoted a 5 month slurry storage system to be in excess of £85,000, and at present government funding for these projects are unknown.

The greatest threat and concern to our business is the proposed closed period, which will have a crippling impact on a grass-based system such as ours. In our area of Wales we have a temperate climate where grass grows 12 months of the year. Being able to apply nutrients at appropriate times has a huge financial and welfare benefit to our farm. We are told by Welsh Government and our bank that we need to be efficient and resilient in the future especially with Brexit knocking on the door. Our cheapest source of food is grass and applying our own nutrients through slurry to make it grow is the best solution to our carbon footprint. Restricting this with a closed period is absolutely ludicrous and the effect of emptying slurry stores prior to a closed period and immediately after this period has a detrimental effect on grass growth as opposed to a little and often approach. It has already been demonstrated that spikes in pollution are seen prior a closed period and post. The pressure on farmers and contractors to work to a calendar date rather than work around the weather conditions will also have health and safety implications.

Our aim every year is to turn cows out to grass in February/March to make the most of the early spring grass which we have grown by applying nutrients in Autumn and early winter. The last thing we want to do is apply slurry to grazing fields just as cows are going out which would be the case if there was a closed period.

We are all well aware that storage is an issue and without support to deliver this farmers will leave the industry and other farmers will take on bigger herds to compensate for their added costs. Therefore as is proven in other NVZ regions, concentrating the problem on larger farms is not the way forward."

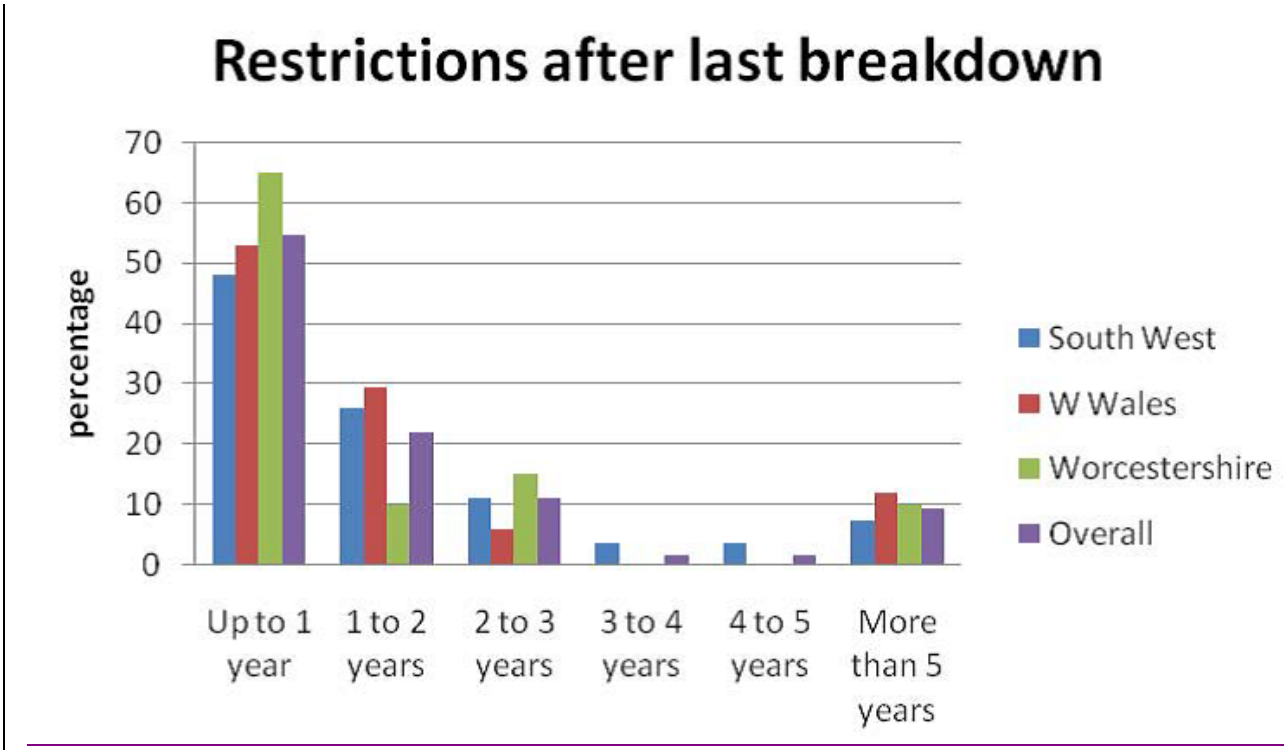
8.12 Bovine TB

Latest available data from the TB Dashboard shows in Wales there are currently 699 open incidents of TB. This represents 6% of live herds. In the high TB area in west Wales there are currently 370 open incidents which equates to 11% of farms within that area.

New regulatory measures to control agricultural pollution include requirements for nutrient management with N limits placed on the application of organic manures; closed periods for spreading; as well as slurry storage capacity.

Farms under a TB herd breakdown are likely to face very significant difficulties achieving compliance with the proposed new regulatory measures. Farms in such circumstances, through no fault of their own, often fail to meet the storage requirements of SSAFO which sets the standards for slurry storage currently. This is because the movement of cattle within TB breakdown herds is heavily restricted. This can result in significant numbers of additional cattle on farm, for an unknown period of time with associated impacts to slurry storage capacity.

Research undertaken by Farm Crisis Network is shown in 8.12.1 below.



There are examples of restrictions continuing to apply for more than five years.

A TB herd breakdown also challenges farm viability with higher variable costs associated with increased feed, forage, and casual labour, at the same time farm income through sales of milk and store animals can be heavily restricted. Welsh Government within their own 2012 document “A Strategic framework for Bovine TB eradication in Wales” estimate that the average cost per confirmed breakdown in an Intensive Action Area in North Pembrokeshire at £53,759. We can see no reason to consider why these costs would have decreased and in all probability may well have increased. In this context it is unrealistic to assume that farmers will be able to invest to reach compliance with new regulations.

New regulatory measures will further challenge compliance on slurry storage capacity as well as overall nitrogen loading. The closed periods for slurry spreading place severe limitations of the ability of farmers to 'manage' the slurry impacts of a TB herd breakdown by placing restrictions on their ability to spread under appropriate conditions in the winter months. It is possible that there could be an increase in slurry storage breaches and overspills and an associated increase in agricultural pollution incidents as an unintended consequence of new regulatory measures.

While the new regulatory measures to control agricultural pollution refers to rules relating to the import and export of livestock manures, this is likely to be prevented as it undermines the objectives of Wales TB Eradication Programme. Research shows that *M. bovis*, the bacterium which causes Bovine TB, is shed in the faeces of cattle in the advanced stages of infections and can survive stored in slurry up to six months. The Animal & Plant Health Agency publication *'Dealing with TB in your herd'* refers to the disposal of slurry and manure and states that the BT5 Notice will specify if you require a licence to remove manure, slurry or other animal waste from the premises under restriction. A further challenge is presented to all farm businesses seeking to calculate slurry storage volumes for their herd to meet the storage requirements of new regulatory measures. Put simply, how much storage is enough? Building in some assessment of risk of TB breakdown into storage calculations is likely to significantly increase costs and be highly inefficient, however, in the event of TB breakdown they are likely to be found in breach of regulations.

Proposed new regulatory measures are an added stress to the farming families affected when the impacts of the TB breakdown are already having a severe and detrimental impact on the mental health of those concerned.

TB affects approximately 6% of farming businesses in Wales at any one time and causes significant stress on the farming families concerned as well as a range of other financial and practical impacts. The ability of farm businesses under TB herd breakdown to meet the requirements of proposed regulatory measures is likely to be extremely challenging.

8.13 The planning system

Feedback received from the NFU Cymru NVZ Proposals Survey of 293 farmers identified planning as a key concern in the context of proposals. Respondents concerns relating to the cost and difficulties of obtaining planning permission include:

- Options to diversify or change farming enterprise are limited as dependent on planning consent which can be difficult to achieve.
- The planning system would need to be changed to help the industry.
- Planning would lead to delays in reaching compliance and would be an issue.
- If planning permissions could not be afforded or obtained for additional storage then farm businesses would need to be restructured and staff made redundant.
- Issues for farm businesses within national park planning authorities.

Proposals to introduce new regulatory measures to tackle agricultural pollution which increases to slurry storage capacity are likely to result in significant increases in the number of planning applications bought forward. This is associated with application costs and consultancy fees for farm businesses as well as time delays as applications go through the planning system. There is no guarantee that applications will be granted.

Welsh Government's Technical Advice Note 6 (TAN 6) 'Planning for Sustainable Rural Communities identifies that the overall goal of the planning system is to support living and working rural communities in order that they are economically, socially and environmentally sustainable. Whilst permitted development rights are granted for a range of agricultural buildings and operations, limitations are placed on the scale of buildings and TAN 6 identifies that permitted development rights also do not, generally, extend to buildings to be used for the accommodation of livestock or to associated structures such as slurry tanks and lagoons when these are built within 400m of the curtilage of a protected building – which includes most residential and other permanent buildings.

TAN 6 encourages planning authorities to consider sympathetically development proposals aimed at meeting the requirements of SSAFO regulations, however, the experience of our members with planning applications for farm infrastructure including slurry storage is that it is a costly and complex process with applications frequently the subject of local opposition in spite of the improvements in environmental performance they can deliver.

In recent months, Welsh Government has established an Intensive Agriculture Working Group aimed at supporting the drafting of guidance (Technical Advice Note) on planning for Intensive Agriculture. This has been established in the context of increasing numbers of enquiries to Public Health Wales, NRW, WG and local authorities about potential health impacts arising from intensive farming.

At the time of writing, a working definition of 'intensive farming' has not been determined by the Working Group so it is not possible to understand whether the new TAN will impact on the capacity of farm businesses to meet new regulatory requirements or not.

In addition to TAN 6 Farmers are required to respond to TAN 15 – Development and Flood risk. This influences decision making on the feasibility of developing new infrastructure within existing yard areas. Restrictions to development due to perceived risk illustrated by the map could restrict the ability for farmers to deliver solutions within the timescales specified to storage capacity issues. This could further add to the stress and costs of a project aimed at 'betterment' within the industry.

Alongside the above, farmers are now being asked to address water management through the 'statutory national standards for sustainable drainage systems' (SuDs). This document provides design advice and guidance for developers delivering in an urban context but not a rural context.

Further costs to the farmer will be incurred due to the pre planning application fees, design and delivery costs of a drainage solution which attenuates water, improves quality and provides environmental enhancements in a potentially low risk environment generating low flows. At present clear guidance on the application process, costs involved and delivery of Rural SuDS systems which appreciate the context and existing environmental value of their surroundings has yet to be developed fully.

Overall, the planning system is likely to place severe limitations on the ability of farmers to achieve regulatory compliance.

Farmer case study

"If these regulations come into place there will also be the issue of a substantial increase in planning applications going forward to the council for approval. My county is highly dependent on tourism and the thought of large slurry stores appearing in the countryside is of great concern to the wider community."

Farmer case study

"The main problems I have faced with the planning process have been with NRW. They wouldn't discuss my application with me or give any advice whatsoever. The only response they gave was to liaise with my National Park. This was not at all helpful when my questions were 'where to locate' or even if NRW would even support a sediment pond that SuDS Gwynedd requested for improved water quality in my planning application. I strongly believe it is more than reasonable to get an answer to these questions from NRW themselves. Instead I felt stuck in the middle while NRW liaised with the National Park, taking pointless time for them to just propose something else and send me back to the drawing board.

Also, NRW have computer generated flood zones that bear no resemblance to the actual terrain of the land, and they are unwilling to review or even visit the site to resolve it. Instead I was instructed to take pictures of everything to prove water levels with measurements and submit with my planning application because they can't discuss anything with me and even refused to tell me if I needed a flood consequence evaluation or not. From my measurements there is almost 6 meters of height from water level to the top of the slurry store walls, I am located right at the top of a valley near the source of the river so flooding is impossible. It is because of these reasons that my planning application has been on the go for over 12 months now.

I designed my whole farm yard and slurry system around the prospect of a nationwide NVZ zone, with 12 months slurry storage capacity and creating three totally new woodland habitats surrounding the site with the addition of a sediment pond to create even more additional habitat. I was hoping for some kind of recognition from NRW for going the extra mile but I found no encouragement.

As a young farmer with ambition not only for farming but the environment and the future, I have found guidance and encouragement from my National Park and SuDS Gwynedd but none from NRW. I am proud of the water quality here on the farm and I feel we as farmers are all painted with the same brush "polluters" by NRW."

8.14 Environmental Permitting Regime (intensive farming)

The perception that farmers are not subject to regulation currently is inaccurate. A baseline of regulation already exists to tackle agricultural pollution via a number of existing inter-related mechanisms such as SSAFO, Cross Compliance, EPR (Intensive Farming), the Code of Good Agricultural Practice and industry standards. NRW can and take enforcement action where rivers are polluted.

Intensive farming systems are subject to increased levels of regulation.

The pig and poultry sector in Wales is regulated by NRW through the Environmental Permitting (EPR) Regime (Intensive Farming). Farms that exceed capacity thresholds require an environmental permit to operate and are regulated on the release of a range of pollutants to the environment including ammonia, nutrients from manure, litter and slurry, effluent discharges, dust, odour and noise.

Farmer case study

"We run a 64,000 free range egg business. Two sheds of 32,000 birds on the same site so we are currently under EPR regulations and are regularly assessed by the Environmental Agency on air pollution and water pollution. Also under current IPPC permits we have to keep an account of volumes of slurry spread and field numbers as well as what is used at home and also sold off farm. The poultry litter quality in the shed is also assessed.

We are very concerned with the introduction of new legislation as of January 2020. It is nothing but a copy of an all Wales NVZ. However, there is no evidence that the massive increase in regulation will have a positive effect on water quality.

Our industry is facing so much uncertainty due to Brexit and a no deal situation. Increasing the burden of legislation and reducing us to farming by dates will increase pollution incidences either side of the closed periods. Where is the money going to come from to pay for improvements to storage facilities and covering of muck heaps?

Where I farm there is a mild climate, where grass grows 11 months of the year so utilizing muck when weather and ground conditions allow is good farming practice.

Our sheds are multi-tier, so are cleaned out 3 times a week. Some muck is utilized on our own grassland. 60% of our chicken muck is exported off farm to arable and grass farms, which they store and spread as required. The change of legislation will mean that muck heaps would have to be moved every year and covered. This would not always be practically possible and would also incur expense.

If this legislation is introduced in its current format it is our belief that this would cause some farmers to be driven from the industry. It is ill thought out and will not achieve its aim of improving water quality and could actually make the problem worse."

8.15 Agricultural contractors – impacts and capacity

Farm businesses underpin the vibrancy of many rural areas with each farm business shown to trade with between 40 and 80 other local businesses. The services procured by farmers provide important sources of local employment.

Proposed regulatory measures to tackle agricultural pollution which include closed periods for the application of fertilisers (organic and inorganic), will result in agricultural contracting businesses involved in the spreading of slurries having to lay off their staff as they will have no work and they will be unable to pay them.

Fears have also been expressed that the re-employment of skilled employees to undertake this work at the end of the closed period will be challenging given that only seasonal employment will be available to them in the future. This is as well as the harassment being experienced by farmers and

their contractors in some areas of Wales as well as health and safety concerns are referred to in other sections of this report.

The closed periods are likely to result in specific impacts to rural employment with no work available for staff during these periods resulting in redundancies.

Farmer case study

"We are agricultural contractors employing 10 full time staff and 4 part time staff. The proposed NVZ that Welsh Government want to introduce would have a catastrophic impact on our business.
We have invested heavily into "environment friendly" equipment e.g. trail & shoe, dribble bar, flow meters etc, to help improve accuracy and avoid run off. As a company we care passionately about the environment that we work and live in.
As a family run business, which employs local people a closed period would prove devastating to us and would lead to potential redundancies causing great hardship and mental health worries to us, our staff and their families.
When the closed period window opens, this I'm afraid to say would become "Wales Slurry Day" and every farmer will want to spread, therefore there wouldn't be enough machinery staff or equipment in the country to accommodate their needs. We work by the weather, November and January have these latter years have been dry and perfect weather for spreading, whilst March and August (which would be within the open period) have been extremely wet. Wales has its own climate and varies vastly to other areas in the United Kingdom where the NVZ is in place.
Working with contractors and farmers to a develop a good working practice would be the best and safest environmentally way forward, If the proposed regulation is introduced it would have huge implications for us as contractors, our staff and local services due to job losses, mental health issues and family lives, also I do believe strongly in the fact that it would massive negative implications on our environment."

Farmer case study

"Our local contractor spreads slurry for my farm and 14 other farms. When he arrives on farm he brings £150k tractor, £30k slurry pipe, £80k slurry pump £38k injector and 2 operators. We book him up a month in advance and can never quite guarantee when he will get to us because it depends on weather, other farms, breakdowns and a variety of other matters. My business cannot justify owning our own kit. A slurry window would mean all of us farms would need this contractor at the same time. It's not feasible. It's also extremely worrying because if our slurry does not get put out in time we will miss the window as the grass will be too strong. This will further narrow the spreading window since we would have to wait to take a crop off."

9. Economic context

In line with WFD and the requirement to consider the cost effectiveness of actions, the ability of farmers to meet the cost of proposed new regulatory measures to tackle agricultural pollution is an important consideration. This section presents the economic context of farming in Wales into which proposed regulatory measures are being introduced.

9.1 Welsh Farm Incomes

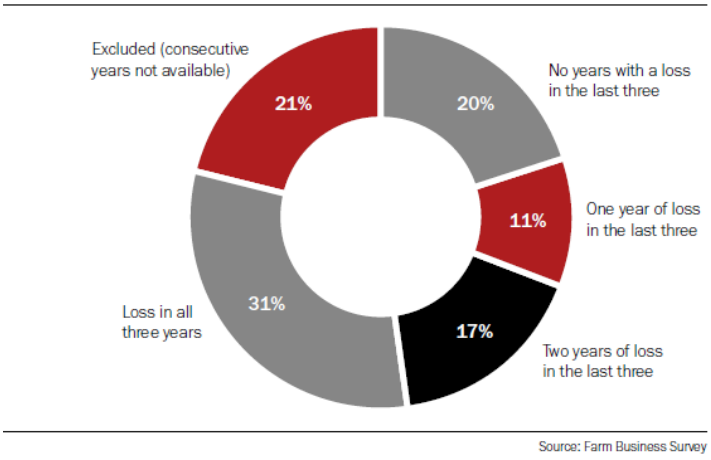
Every farm in Wales will be affected by the proposed new regulatory measures, the cost and degree of regulatory burden will vary according to farm type, scale and location.

Welsh Government's Farm Business Survey forecasts for farm incomes in Wales, 2018-2019. The average farm business income for 'all farm types' is expected to decrease by 15 per cent (at current prices) to £29,500 per farm from the previous year.

Average farm business income for cattle and sheep (LFA) farms is forecast to decrease by 9 per cent to £24,500 per farm from the previous year; a significant decrease of 29 percent to £17,000 per farm from the previous year for cattle and sheep (lowland) farms; average farm business income is expected to drop to £64,500 per farm for dairy farms.

This forecast demonstrates just how challenging the past year has been for all farming sectors in Wales. The decrease in income is due, in part, to pressure on farm gate prices, particularly in the dairy sector, but mainly as a result of significant additional input costs, particularly feed.

Figure 9.1.1 shows farm businesses by years with a loss in agriculture over the past 3 years in Wales, from 2013-14 to 2016-2017 (%).



Across farm types, 59% of farms made a loss in 1, 2 or 3 of the past three years. 31% of farms did not make a profit from agriculture in any of the last three years. 20% made a profit in every year.

Overall farm incomes show volatility from year to year, influenced by prevailing agricultural (including weather related) and market conditions. The level of income at farm level can also be influenced by a range of physical, social and economic factors.

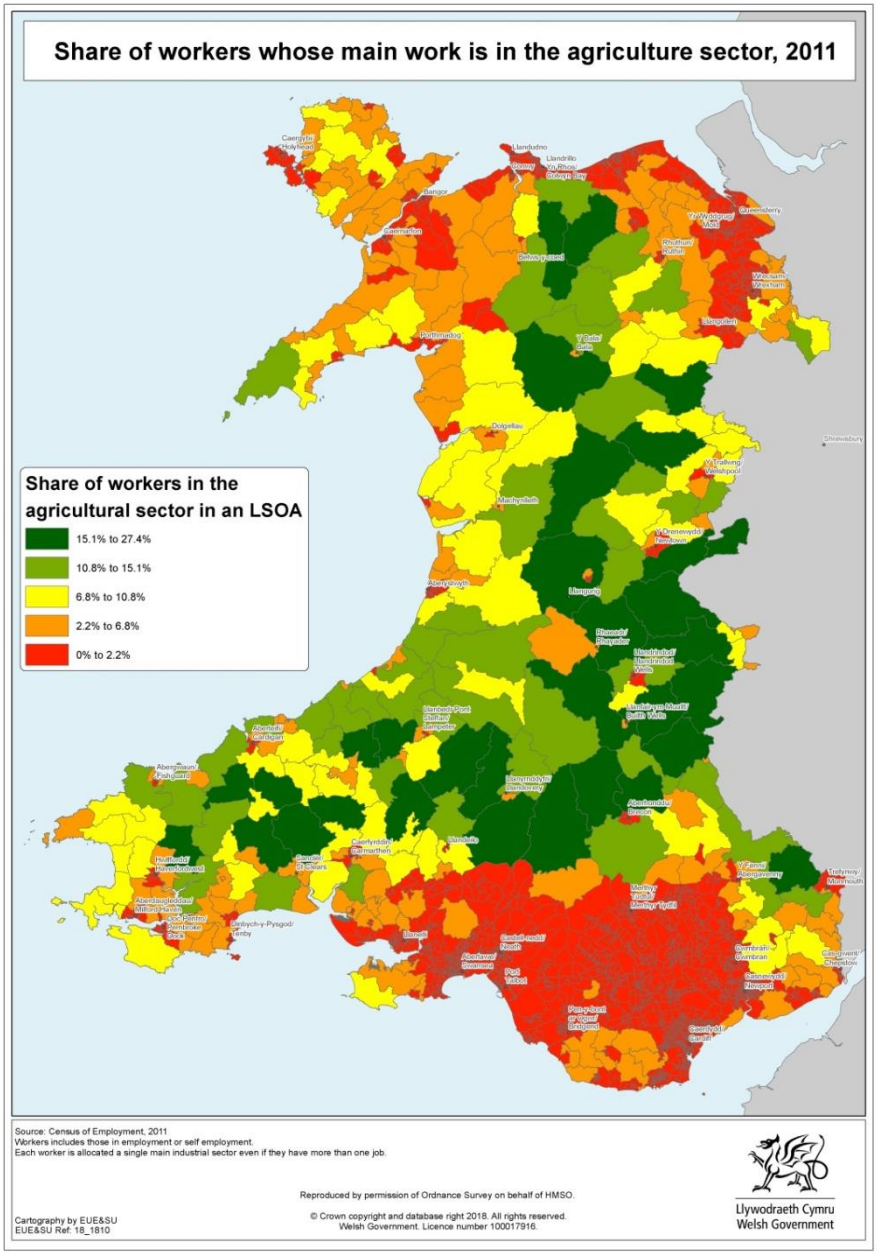
All farm businesses in Wales will incur costs as a result of proposed new measures to tackle agricultural pollution. Costs will vary depending sector and scale and the ability of farm businesses to meet additional costs must be considered in the context of falling farm

incomes in 2018-2019, with almost a third of businesses failing to achieve profitability in any of the past three years.

9.2 Agriculture and employment and rural economy

In September 2018, agriculture, forestry and fishing represented 3.2% of workforce jobs in Wales. This is higher than the UK average of 1.1%. This masks the importance of agricultural employment in rural Wales which is home to a third of Wales's population. In rural areas agriculture is significant source of employment, employing up to 28% of workers at sub-local authority level in some areas as shown in Figure 9.2.1 below.

Figure 9.2.1 shows share of workers whose main work is in the agriculture sector, 2011.



It is important to recognise that employment in the allied industries and wider supply chain in rural areas is also very important. This is in areas where other key employment opportunities are limited and where there is also a heavy reliance on public sector employment which has been impacted by austerity measures and cuts to public funding in recent years.

Welsh farming businesses are the backbone of the Welsh rural economy, the axis around which rural communities turn. The raw ingredients that we produce are the cornerstone of the £6.9 billion Welsh food and drink industry which is Wales' largest employer employing 217,200 people. Welsh farmers, through their role managing 80% of the land area of Wales, deliver the landscape good which provides the backdrop for Wales's tourism and recreation sector work an estimated £2.8 billion annually.

Agriculture also supports Wales through consumption of materials and goods necessary in running the farm business. 2017 saw agriculture generate a forecasted intermediate consumption of £1,138 million. Intermediate consumption in agriculture in Wales increased by 9% in 2017.

Welsh agriculture is a key source of direct and indirect employment in rural Wales. Many other rural businesses are dependent on farming for all or part of their income through the products and services farmers procure in the ongoing running of their businesses. Welsh farming also underpins sectors of strategic importance to Wales such as the Welsh food and drink sector and tourism as recognised in Welsh Government's Prosperity for All – The Economic Action Plan for Wales' published in 2017. Any moves to introduce regulatory measures that further challenge farm business viability will threaten key sectors and the economy of Wales as a whole.

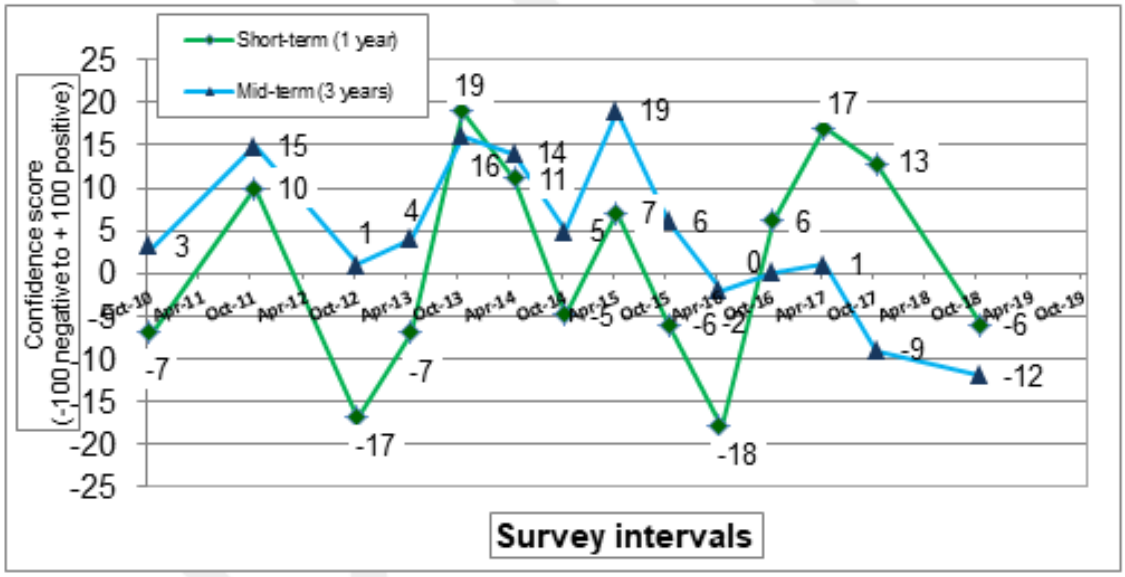
9.3 Farmer confidence

A strong correlation exists between farmers' confidence, farm profitability and investment activity. Confidence is critical for all businesses and is an early indicator of profitability and influences investment and production intentions.

For nine years, the NFU Economics and Research teams have collected business confidence data looking that farmers' confidence in their business prospects for the short (1 year) and mid-term (3 years). The survey considers a range of factors including external factors that may impact agri-businesses in the coming year; farm business profitability and investment intentions.

The 2018 Survey included over 750 interviews of farmers from all sectors and regions of England and Wales and took place between 29th October and 25th November 2018. Note, the Cabinet Secretary statement to introduce new regulatory measures was made on 14th November 2018.

Figure 9.3.1 shows business confidence time series – 1 year and 3 year outlook.



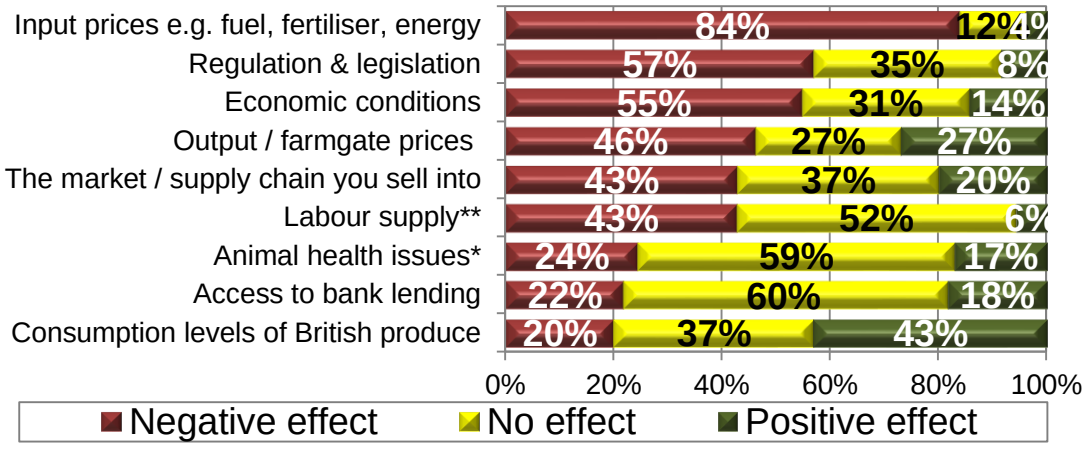
Source – NFU Economics and Research teams

The survey finds that until 2016, mid-term confidence has tended to be more resilient than short-term confidence, but tended to track short-term confidence. Post 2016, mid-term confidence has been lower than short-term confidence.

Short-term confidence (1 year outlook) for 2018 as decreased 19 points since last year from +13 to -6. Mid-term confidence (3 year outlook) has decreased by 3 points since last year from -9 to -12 which is the lowest level ever.

On a sector by sector basis, short-term confidence was found to be down sharply from +30 in 2017 to –2 in 2018, whilst for beef/sheep short-term confidence has fallen from +9 to -16 and mid-term confidence has reduced from -11 to -17 points.

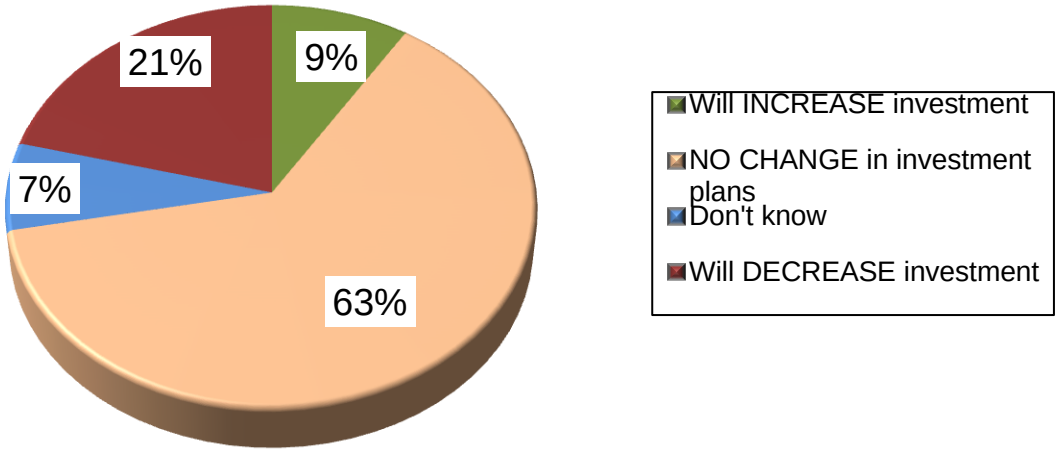
Figure 9.3.2 shows issues shaping the year ahead



Source – NFU Economics and Research teams

The decision to introduce new regulatory measures occurred midway through the surveying period and possibly too soon to assess impact on confidence. Regulation and legislation, however, continues to be a consistent issue and is identified as the second most important factor affecting farm businesses over the next twelve months.

Figure 9.3.3 shows how the EU Referendum result has changed investment intentions over the next 12 months, if at all.



Source – NFU Economics and Research teams

Figure 9.3.3 provides a general view of investment intentions after the EU referendum. Whilst the majority continue to report no change in investment plans, more than twice as many of those surveyed indicated they will be decreasing investment plans as increasing (21% compared to 9%).

NFU research shows that regulation and legislation is a key issue affecting farmer confidence. Over the nine year period to 2018, mid-term confidence (three years) the survey shows that farmer confidence is at its lowest ever. Brexit is also impacting on investment plans with more than twice as many farmers decreasing investment as increasing.

9.4 Farm borrowing

Falling profitability over the past year and rising input costs have kept farm finances under pressure, affecting not only farmers but the prospects for the wider rural economy. Figure 9.4.1 showing data from the Bank of England shows a continuation of the previous trend with borrowing reaching £18.95 billion in the twelve months to January 2019. This represented an increase of over 3%. Given the downturn in farming profitability experienced by farm businesses it is not surprising that borrowing figures have continued to rise. The financial damage caused by volatile markets over the past year is expected to take longer to repair.

Figure 9.4.1 shows levels of agricultural borrowing during the period of July 20019 to November 2018.

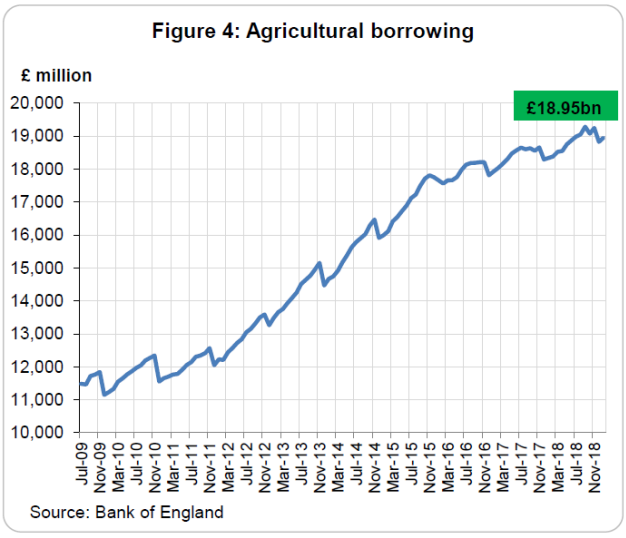
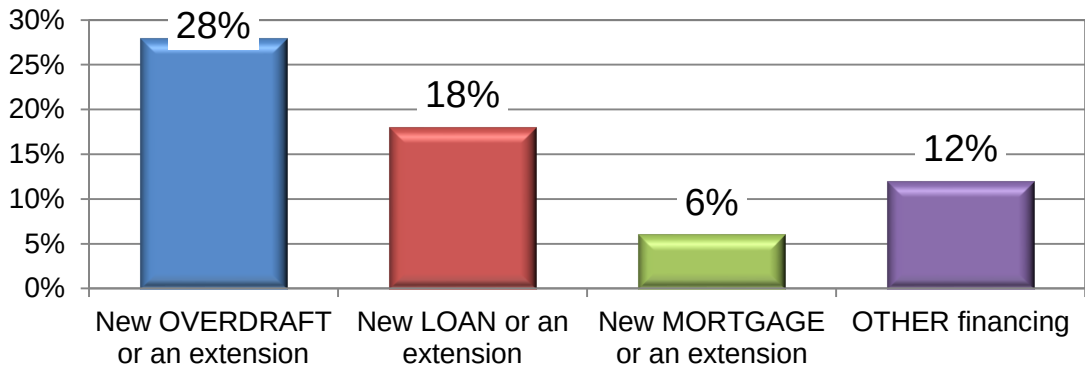


Figure 9.4.1

Levels of borrowing are also reflected in the NFU Confidence Survey which provides time series data on business confidence including finance and banking.

Figure 9.4.2 shows requests for lending over the last 2 years.



Source – NFU Economics and Research teams

50% of respondents were found to have requested lending over the past two years compared with 43% the previous year. 28% have requested an overdraft or overdraft extension compared to 23% last year.

Levels of farm borrowing have continued to rise to almost £19 billion in January 2019, an increase of 3%. This reflects the downturn in profitability during 2018 and NFU research shows that requests for overdraft or overdraft extensions have increased. The extent to which investment support will be available to farm businesses to meet the costs of new regulatory measures to tackle agricultural pollution is a key consideration. Presenting a business case and demonstrating return on investment for what are fundamentally environmental improvements with marginal economic gains in the form of enhanced use of on-farm nutrients is likely to be highly challenging.

10. Social and cultural context

10.1 Public awareness and perception

There can be no doubt that public awareness of agricultural pollution in Wales has increased considerably in recent years. This has led to increased levels of political lobbying, reporting of farmers to NRW and increased levels of media interest in agricultural pollution.

In reality, it is important to note that evidence shows (see chapter 5) that despite the public perception being one of increasing levels of agricultural pollution, the rate of agricultural pollution incidents has shown no discernible trend upwards or downwards during the period 2001-2018 despite increased scrutiny and latest WFD monitoring shows some improvement in water quality.

Evidence is also clear that there are a range of factors influencing water quality in Wales, including agriculture. Despite this a narrative has now emerged framing agriculture as 'the problem'.

It is interesting to observe that from end June 2017 to the present day, of all the references made by the Minister to Senedd (Plenary and committees) on water quality, 93.75% (15 out of 16) link water quality and agriculture. Whilst 73% refer to water quality in the context of new agricultural schemes, 27% link water quality to agricultural pollution. During the same period, the Minister mentioned agricultural pollution 17 times. This information was derived from a key word search of the 'The Record' on the National Assembly for Wales website.

In recent months we have also observed an Assembly Member name an individual farm business in First Ministers Questions referring to nuisance side effects of agricultural activities such as slurry spreading. Slurry spreading is a legitimate, beneficial activity when carried out under appropriate conditions to meet crop needs.

Press and media continue to afford a high level of reporting to agricultural pollution and social media posts now frequently publically attack farmers. Farmers in certain parts of Wales are now subjected to ongoing intimidation and harassment. Farming families suffer in silence in fear of the consequences.

Figure 10.1.1 shows a social media tweet by TV Presenter Iolo Williams relating to slurry spreading.

Mr Williams, one of Wales's leading environmental figures, has a strong following on social media with 17,700 followers and the farming family featured were absolutely devastated by this tweet. It caused them great upset and harm.

The activity being portrayed in this picture resulted in no agricultural pollution and was undertaken following an assessment by the farmer on whether it was appropriate to spread, in damp conditions, dirty water on a field located four fields from the river, when ground conditions were favourable and crop nutrient uptake was at its maximum following the offtake of a crop of silage. The field is flat with no slope. The farming family concerned operate to extremely high standards, have and continue to invest in infrastructure and equipment and undertake nutrient management planning so nutrient applications are applied to meet crop needs. The farm has also participated in agri-environment schemes which have included fencing off the river.

The WFD status of the waterbody concerned is classified as good under the NRW WFD interim 2018 classification, improving from moderate in the 2015 classification. This is testament to the efforts of all within the catchment to drive improvements in water quality, yet farmers continue to be the subject of sustained attack.

It is also important to recognise that regulatory powers exist to enable NRW to take action where agricultural pollution has occurred.

There is also a relentless campaign to use of images to portray farmers' wrong-doing to politicians and other stakeholders which are often grossly misleading.

Figure 10.1.2 used as an example of bad practice to the Minister, showing a tractor and slurry tanker moving along a main road.

This picture portrays perfectly legal activity. The portrayal of farming by some activists in some areas of Wales is not only unjust but it has led to the sector and those farmers who take their environmental

responsibilities seriously feeling harassed, Whilst increased scrutiny of the sector may play some role in assisting in driving improvements in farm practice through an increased focus, there is also need to recognise that the perception of the issue amongst the public and the narrative that has been allowed to develop is now leading to behaviours from some that is unacceptable and potentially harmful.

The actions of a few individuals are a risk to both the mental health and safety of farmers and there is a responsibility for all involved to ensure that communications and engagement on the issue of agricultural pollution is accurate, proportionate, evidence based and grounded in reality.

Case study

"As someone who works closely with farmers in the Towy Valley I can testify that farmers are suffering sustained abuse and bullying by a small number of activists. These farmers are following the regulations closely, are not polluting and are farming in a totally proper manner. It is unacceptable that a livestock farmer who is lawfully spreading his slurry on his land in a controlled manner is bullied and harassed.

Lobbyists are regularly taking photos of lawful slurry spreading. Many of these videos and photos are obviously being taken by an individual driving at the time, which is an illegal offence, or whilst trespassing on to farmer's private land.

Agricultural Contractors are finding it increasingly difficult to get drivers as they are fearful of being photographed during their normal working day. Contractor's drivers are often fairly young men who feel very intimidated by the bullying and threats and continuous photos of them being taken whilst at work. An individual jumping out in front of a moving tractor wearing camouflage outfit is not just unacceptable it is highly dangerous. Professional drivers are reluctant to work in such an unpleasant environment. I have also heard reports of assaults taking place against farmers. This is now reality of rural life in the Towy Valley. It sickens me.

Farmers feel depressed whilst their wives are scared of these individuals. There is a feeling in the community that little is being done to protect farmers who are lawfully following regulations.

The proposed regulation, specifically having a closed period will, I believe, increase pollution and make it ever easier for extreme individuals to locate, monitor and victimise the farmer. Currently spreading is managed according to weather and nutrient requirements of the field. However, if the new regulation comes into place every slurry tank in the valley will have to spread as soon as the window opens and this pressure will inevitably lead to decisions to spread in less than suitable weather windows."

A grossly misleading narrative has developed which presents agriculture as an increasingly damaging influence on water quality. The narrative is not reflected in water quality evidence (see chapter 5). Increased and unchecked levels of activism in some areas of Wales now present a very real risk to the mental health and safety of farming families undertaking a perfectly legitimate and environmentally sound business activity. Where pollution has occurred, NRW possess the power to take enforcement action.

10.2 Health, safety and well-being

This is a time of significant change for the farming industry with many farmers concerned over Brexit, future policy, legislation and finances (see section 6.3). Whilst farmers take great care looking after their livestock and their land they can sometimes overlook the importance of looking after themselves. The agricultural industry already has a high suicide rate with one farmer per week in the UK taking their own life.

Poor mental health is a key concern in rural communities, especially men in the agricultural sector. This has been recognised recently by Welsh Government through the recent announcement by the Minister for Environment, Energy and Rural Affairs that the DPJ Foundation is to benefit from nearly £50,000 of funding in recognition of its role in breaking the stigma of farmers talking about struggling with their mental health.

Respondents to the 2016 NFU Cymru NVZ proposals survey identified that record keeping and paperwork were associated with increased levels of stress and impacts to mental health. A number of respondents also referred to being worried about the impacts that new regulations and restrictions would have on farming practice.

Farming is also a hazardous occupation. HSE figures state that the industry represents approximately 1.8% of the workforce in Great Britain but accounts for about 19% of the reported fatalities each year. In 2018/19 there were 39 fatalities in agriculture, forestry and fishing in Great Britain. There are many more injuries in agriculture which do not result in death.

In Northern Ireland, where there is whole territory NVZ designation, slurry is identified as one of the four main causes of death and serious injury on Northern Ireland farms. Whilst deaths due to slurry may not be related to NVZ designation per se, it is interesting to observe HSE Northern Ireland issuing communications messages to the sector urging farmer to take extra care when mixing slurry ahead of the closed period. We are aware of anecdotal evidence from our Northern Ireland counterparts that the closed period is identified as putting a lot of additional pressure on farmers to get slurry out in October and there is a lot of stress on farmers with increased levels of accidents on-farm occurring as a result of slurry mixing on farm etc.

Through the On-Farm Health & Safety Charter for Wales, Welsh Government is committed to working together for a safer farming industry in Wales. Impacts to mental health and on-farm safety are key concerns and should be considered in the development of new regulatory measures to tackle agricultural pollution.

10.3 Welsh Language

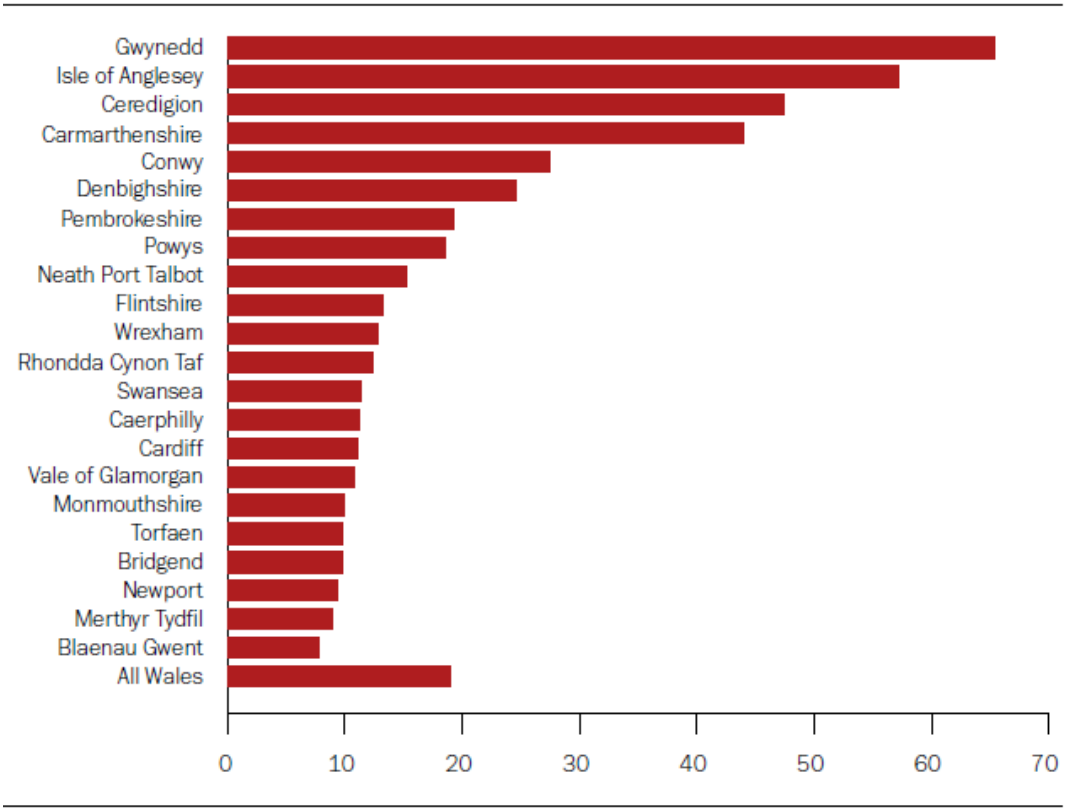
Under section 78 of the Government of Wales Act 2006, the Welsh Government must adopt a scheme setting out (inter alia) how the Welsh language will be promoted and how its use will be facilitated. That scheme recognises the prevalence of Welsh language speaking in farming and rural communities and as such the scheme notes the importance to the Welsh language of sustaining and promoting agricultural interests.

The Well-being of Future Generations Act places a duty on all public bodies to work to enhance the well-being goals which includes 'A Wales of vibrant culture and a thriving Welsh language.'

The costs associated with the introduction of new regulatory measures to control agricultural pollution challenge farm viability and will result in farmers leaving the industry. This has consequences for direct and indirect employment and it is reasonable to assume that this has the potential to undermine the essential contribution of agriculture to the preservation of the Welsh language.

A comparison of figure 10.3.1 shows that four of the top six counties in terms of the proportion of people speaking Welsh are also four of the top six counties in terms of the proportion of the population employed in agriculture, forestry and fishing (these being Gwynedd, Anglesey, Ceredigion and Carmarthenshire).

Figure 10.3.1 shows the Welsh language skills by local authority in Wales, 2011 (% able to speak Welsh).



Source: 2011 Census of Population

Figure 10.3.2 shows workers who can speak Welsh by sector, Wales, 2011.

	Workers (000)		Share
	Speaks Welsh	All workers	Speaks Welsh
Education	37.0	138.5	27%
Health	32.0	198.2	16%
Retail	30.6	213.9	14%
Public admin	20.0	108.6	18%
Construction	18.3	111.9	16%
Manufacturing	14.4	144.6	10%
Accommodation and food	13.6	85.5	16%
Agriculture, forestry & fishing	10.6	25.0	43%
Professional	9.0	59.0	15%
Transport	7.1	53.6	13%
Admin & Support	6.5	54.7	12%
Arts & Recreation	6.2	30.7	20%
Info & communications	5.0	31.2	16%
Finance	5.0	41.8	12%
Power & Water	4.6	26.6	17%
Real estate	2.6	17.2	15%
Others	5.4	31.8	17%
All sectors	**227.8**	**1,372.7**	**17%**

Sectors ranked by number of Welsh speaking workers in the sector.

Source: Census of Population, 2011

Throughout Wales, those who speak Welsh within the agriculture employment category make an essential contribution to the preservation of the language in terms of numbers, and in particular, in terms of the proportion within the category who speak Welsh. Figure 10.3.2 shows the share of workers by employment sector that are Welsh speakers compared to the number of speakers in that sector. In 2011 227,800 workers in Wales could speak Welsh, 17% of all workers. Agriculture, forestry and fishing had an estimated 10,600 Welsh speakers, representing 43% of the total working population for the sector and is the highest share across sectors.

The Welsh Government paper 'Farming in Wales and the Welsh Language', August 2016 states 'that the contribution of the agricultural category to the preservation of the language, in terms of numbers of Welsh speakers, and in particular the use of the language within the category, is most important in communities where the overall proportion of Welsh speakers *is low or intermediate, communities where the language is most likely to be under threat'.* The report goes onto state that *'moves to undermine with the viability of Welsh agriculture are likely to represent a significant threat to the Welsh language, particularly in communities where the overall proportion of the population who speak Welsh is low or intermediate'*.

The costs associated with the introduction of new regulatory measures to control agricultural pollution challenge farm viability and will result in farmers leaving the industry. Evidence shows that this is likely to represent a significant threat to the Welsh language, working against the Welsh Government's duty on all public bodies to enhance the well-being goals including 'A Wales of vibrant culture and thriving Welsh language'.

Annex 1 – NFU Cymru vision for improving water quality in Wales

Introduction

NFU Cymru champions Welsh farming and represents farmers throughout Wales and across all sectors. Our vision is for a productive, profitable and progressive Welsh agricultural industry that delivers jobs, growth and investment for Wales through a growing and dynamic multi-billion pound Welsh food and drink industry; also underpinning the delivery of a broader suite of landscape and environmental goods and services for society.

Farming is a sector of critical importance to Wales, its contribution to the economic, environmental, cultural and social well-being of Wales is unparalleled. Welsh farming delivers the continued supply of safe, affordable, high quality food and provides the raw materials for a Welsh food industry that employs nearly a quarter of a million people and is worth over £6 billion to the economy of Wales – Wales' biggest employer. Welsh farming provides direct and indirect employment in rural areas, drives economic growth in rural communities and underpins other strategically important sectors to Wales such as tourism. Farmers also have a key role in maintaining and enhancing our natural environment and landscape, managing as they do, 80% of the land area of Wales.

This paper considers the role of Welsh agriculture in maintaining and enhancing water quality in Wales and identifies the immediate opportunities to tackle agricultural pollution issues. It is the culmination of extensive consultation with our members, including facilitated workshops with the NFU Cymru Milk, Livestock, Rural Affairs and Combinable Crops Boards. Throughout the consultation process, the willingness of farmers to play their part and take positive steps to enhance the quality of the environment and address water quality issues has been unequivocal. NFU Cymru is clear that one pollution incident is one incident too many.

Water quality in Wales

All human activity has the potential to impact on our environment and this includes agriculture. Water is a key resource that underpins the viability and profitability of farming and analysis of the Water Framework Directive (WFD) investigations programme for 2015 shows that agricultural practices are contributing to the failure of 110 of the 953 water bodies in Wales. In addition, each year, there are in the region of 100-150 Category 1/2/3 pollution incidents from agriculture – 20-25 are classified as category 1 and 2 – the more serious type.

This evidence shows that diffuse and point source pollution from agriculture must be addressed parallel to efforts from other sectors. Other reasons for Water Framework Directive failures include abandoned mines and contaminated land; sewage discharges, acidification and forestry; urban and transport development as well as industrial discharges.

It is also important to recognise the significant efforts of farmers across Wales to reduce point source and diffuse pollution that have contributed to improved water quality in recent decades. The quantity of nitrogen based fertilisers has reduced by 45% between 1990 and 2013 as use has become more targeted to the needs of the growing crop; pesticide use is now highly targeted with 50% less active ingredient applied since 1990; farmers in Wales have also sought to enhance water quality through their participation in successive iterations of agri-environment schemes in Wales.

However, we acknowledge, there is more that can be done. This requires addressing the dual issues of point source and diffuse pollution at a practical level on-farm through a focus on:

- Provision of slurry and silage stores which are fit for purpose
- Effective nutrient management with applications targeted to meet crop needs and applied under appropriate conditions
- Good soil husbandry to reduce sediment run-off
- Responsible utilisation of pesticides

As NFU Cymru, we recognise our role in creating the right conditions and ensuring that the framework, mechanisms and support are appropriate to assist farmers to take pro-active steps. Our ongoing commitment to the work of the NRW Wales Land Management Forum Agri-Pollution Sub-Group is seen as central to this.

NFU Cymru supports appropriate interventions where poor practices are responsible and has long-established principles for the development of approaches that are:

- Voluntary versus regulatory
- Evidence-based
- Provide local solutions to local problems
- Developed by working in partnership with industry

We are keen to see greater alignment of the full range of mechanisms and tools available currently. Successes as well as the opportunities available should be widely promoted to encourage engagement and uptake of positive actions.

In our view the principles described above resonate strongly with Wales' new legislative framework and the ways of working enshrined in the Environment (Wales) Act 2016 including adaptive management, evidence-based decision making, working at the appropriate spatial scale for action together with collaboration and engagement. We are clear all will be important if we are to deliver the sustainable management of natural resources and secure the best outcomes for water quality. Such improvements must also be delivered through the lens of the Well-Being of Future Generations Act which seeks to improve the economic, environmental, social and cultural well-being of Wales.

The need to care for and enhance the quality of our environment and use our natural resources sustainably must also be set in the context of the future challenges to our global food production system. These are now well documented and include a growing world population, increasing demand for meat and dairy products, greater competition for land, water and energy and the increasing impact of climate change. These are significant factors which combine to significantly threaten our global food production systems. Globally, the importance of maintaining sustainable agricultural production has been brought into increasing focus. As a 'globally responsible' Wales, the Welsh farming sector has a key contribution to make, in summary we will need to produce more, whilst impacting less. Farmers are ready to embrace this challenge.

Delivering water quality improvements

NFU Cymru identifies there are a spectrum of approaches available to deliver improvements to water quality from the farming sector. This should start with providing advice and guidance together with appropriate incentive mechanisms including grants, recognising the significant investment costs, to facilitate positive action at farm level. There is also participation in assurance schemes and earned recognition as well as novel approaches including trading, off-setting or payment for ecosystem services mechanisms which look beyond formal regulation to deliver the desired outcomes. NFU Cymru believes the best outcomes will be delivered by adopting a range of approaches alongside a backstop of regulation. We are clear regulation should be seen as the last resort.

Here we examine the spectrum of approaches in more detail in the context of improving water quality, we are pleased to provide key recommendations to Government and Regulator on what can be done now utilising current mechanisms including the Rural Development Programme. It is important to acknowledge that in the context of Brexit, many of these mechanisms are now time limited:

- **Advice & Guidance**

NFU Cymru would highlight that farm businesses in Wales – which tend to be SME micro businesses – find themselves operating in a highly complex regulatory environment of which water quality is just one of a number

of important priorities. The Working Smarter Review led by Gareth Williams in 2011 identified that approximately 3000 pages of information about legislative requirements and support schemes from farming regulators could potentially arrive on a farm in any one year.

The Regulators Code identifies that regulators should ensure clear information, guidance and advice is available to help those they regulate to meet their responsibilities to comply. Legal requirements should be distinguished from suggested good practice.

In addition, the Environment (Wales) Act 2016 now establishes the framework and ways of working for Wales' resources to be managed in a more pro-active, sustainable and joined up way. Given that farmers manage 80% of the land area of Wales, they are likely to be important delivery partners moving forward. Key to this will be achieving high levels of engagement, partnership working together with the provision of high quality advice and guidance on both regulatory obligations and best practice together with a focus on the development of an appreciation of risk.

We identify a number of mechanisms exist to facilitate information provision currently. This includes Natural Resources Wales as regulator as well as the RDP funded Farming Connect and other projects. We, of course, have our own well established mechanisms for supporting our members ranging from one-to-one guidance via NFU CallFirst, the County Adviser/Group Secretary network through to our Farming Wales and member e-bulletins.

We understand that Farming Connect has a budget allocation of £45m over the programme period to increase the emphasis on business focussed behaviour and therefore improve the profitability, competitiveness and environmental performance of farm, forestry and food businesses through knowledge transfer, innovation and advice.

This programme, first established in 2001, must now move on from its current approach of 'awareness raising' of generic issues relating to water quality and soil management, to providing advice to support farmers to take action in targeted areas in conjunction with the other measures available. This requires the concerted effort and co-ordination of all parties including Natural Resources Wales, Welsh Government and contractors. We are pleased that a key output of the NRW Agri-Pollution Sub-Group has been the development of the Farming Connect Concept Paper which, if implemented, will see water quality issues and soil management increasingly prioritised in Farming Connect delivery and targeted to catchments where action is required. In addition, Farming Connect through its delivery should actively promote best practice across Wales and actively facilitate widespread uptake of the latest technologies/approaches such as GPS soil mapping, full soil analysis, mainstreaming of slurry and manure analysis. NFU Cymru is committed to supporting the roll-out of this programme of work by promoting and encouraging our members to become involved. We would also be pleased to convene meetings in targeted catchments to aid the development of farmer-led solutions which are likely to facilitate greater buy-in.

Farming Connect must also develop a specific strategy to engage 'hard to reach' farmers in key areas where catchments are failing WFD objectives.

With respect to NRW as regulator, we identify, the key challenge remains how to effectively engage with the 18,000 or so SME farm businesses across Wales. We are concerned that the amalgamation of three organisations and subsequent restructuring has led to the loss of a number of key personnel. Others with suitable expertise and experience, whilst still employed within NRW, appear to be consigned to different roles and are less accessible to farmers who would have, in the past, approached them for advice on regulation and best practice. The NRW website requires significant improvement if is it provide the necessary clarity on regulatory compliance to farm businesses. There is also a need to recognise that many farm businesses remain digitally excluded and a specific communications/engagement plan is required for this group.

We further identify that there are a range of other projects funded via RDP or other sources that seek to work with farmers to improve water quality. Farmers in Wales have a good track record of engaging with such approaches, however, project based approaches can add complexity with farmers uncertain as to where they should go for advice and guidance, and on occasions with differing projects competing for farmers attention. The 'stop-start' project approach can also run counter to the long-term thinking required to deliver meaningful outcomes, not least because experience shows that farmers develop long lasting trusted relationships with their key advisers. In addition, NFU Cymru is also keen to ensure that where public funds are deployed, that advisers are suitably qualified and that adequate quality assurance mechanisms are in place.

Recommendations:

1. Measurable improvement in water quality should be prioritised within Farming Connect delivery in line with the Farming Connect concept paper developed by the NRW WLMF Agri-Pollution Group. Farmer representation should be secured on the Farming Connect Strategic Advisory Board to ensure that this work stream is prioritised and is relevant to industry needs.
2. Farming Connect should actively promote and support uptake of the latest technologies and innovations, for example, the Advisory Service should fund GPS soil mapping and FULL soil analysis
3. The Farming Connect Skills Development Programme should offer equivalent levels of funding (80%) for machinery and equipment use as these courses have the greatest potential to deliver water quality improvements, for example, pesticides training
4. The Farming Connect Skills Development Programme should develop 'environmental management' courses for intensive farming systems and this training should be funded at 80%. An enhanced soil management training course would also be highly beneficial and NFU Cymru would be pleased to take forward a workshop of farming experts to identify the key components for both training modules as a basis for their development.
5. The Farming Connect Skills Development Programme should fund agricultural contractor training and an accredited course should be developed on the environmental risks associated with slurry spreading
6. There should be enhanced strategic oversight of projects funded via the RDP by, for example, the NRW Agri-Pollution Sub-Group. A quality assurance mechanism should be developed to ensure projects aimed at working with farmers on the issue of water quality are appropriate and employ suitably qualified individuals
7. Natural Resources Wales should appoint a pan-Wales Farm Liaison Team, along similar lines to that established within Welsh Government, to ensure there is a network of staff on the ground with appropriate skills to provide advice and guidance to the sector on regulation and good practice.
8. Welsh Government and Natural Resources Wales should urgently consider information provision to farmers to ensure there is clarity on regulatory obligations. Environmental Regulation Fact Sheets should be developed along the same principles of the Cross Compliance Fact Sheets and guidance on best practice should also be provided as well as information on next steps i.e where farmers can access advice and support.

- **Investment support**

In addition to raising awareness and providing farmers with the skills and knowledge to take steps to improve water quality, NFU Cymru is clear that investment support and incentives are integral to making progress.

Our members identify that a good, well-resourced and realistic grant scheme that supports investment in slurry/manure storage infrastructure is central to addressing agricultural pollution – 'good nutrient management starts with having adequate storage'.

The RDP funded Sustainable Production Grant Scheme offers opportunities for measureable improvements in water quality through supporting investment in farm infrastructure with 40% funding for a range of capital investments including slurry/manure/silage storage, covering of yards as well as clean/dirty water separation.

The environmental benefits of such investments are clear and since they leave a legacy beyond the lifespan of the current programme, farmer participation should be actively encouraged recognising the high costs of such investments without support together with the fact that dairy farmers are still recovering from a sustained period of very depressed market prices for milk.

We highlight that the lack of windows for this scheme together with the very low numbers of farmers that have successfully accessed funding is a source of significant disappointment to our members. The few farmers – less than one hundred - that have been successful in previous windows have been frustrated by the application process which is disproportionate in terms of time, complexity and costs. This requires urgent review.

NFU Cymru has welcomed the introduction of the Farm Business Grants which provides 40% funding for investment in the latest technologies and equipment including precision farming equipment and the application of nutrients and pesticides. Through the NRW Agri-Pollution Sub-Group the list of eligible items has been considered with the view to increasing the number of eligible items to deliver water quality improvements. It is imperative that Welsh Government adopt a pro-active approach to adopting a wider range of water quality improvement items in future windows and the scheme should be actively promoted in catchments where issues have been identified.

Specifically on water quality, the Glastir Small Grants Scheme Water theme prioritises measures such as clean/dirty water separation and reducing farmyard run-off. There are limitations to the options available so this would merit prompt review and modification as well as targeted communications and marketing campaign to promote uptake from dairy and other intensive farming sectors who don't traditionally engage with agri-environment schemes.

Recommendations:

9. Welsh Government to recognise the importance of RDP investment measures by prioritising budget allocations to the SPG and FBG schemes
10. Welsh Government to open a window for the Sustainable Production Grant without delay. This window must receive a much greater financial allocation, the number of farmers that have been successful across three EOI windows so far is wholly inadequate in the context of water quality and supporting investment in slurry/manure storage
11. Welsh Government to review the SPG application process with a view to reducing costs and complexity
12. Welsh Government to explore options to amend the list of eligible items for the Farm Business Grant to facilitate greater investment in water quality measures; the £1m turnover restriction should be removed and collaborative applications from groups of farmers should be allowed.
13. Welsh Government to publish the dates of all future scheme windows to allow for forward business planning
14. RDP scheme windows to be co-ordinated and actively promoted by Farming Connect (in line with recommendation 1) to be targeted in failing catchments to promote uptake.

- **Innovation**

NFU Cymru identify there are clear opportunities to explore innovative approaches to improving water quality in Wales, indeed, such approaches are actively promoted via the Environmental (Wales) Act 2016. Our experience, to date, suggests that Natural Resources Wales remain relatively risk adverse when it comes to the

deployment of their experimental powers and powers to suspend regulation to explore the potential of innovative approaches.

NFU Cymru has identified a number of opportunities including, for example:

- exploring options to develop an alternative approach to NVZ designation that will deliver better outcomes for the environment, such as the Pembrokeshire farmer-led Blue Flag concept
- trialling the use of constructed wetlands as a means to manage lightly soiled yard run-off
- the use of data 'real-time' to develop a risk-based messaging system for applying slurries and manures in appropriate conditions
- the potential of farm assurance standards to deliver reduced inspections through 'earned recognition' and also a meaningful advantage in the market place
-
- NFU Cymru is also supportive of the development of markets which seek to recognise and value the full range of goods and services, such as clean water, provided by farmers alongside their core food production role. Whilst payment for ecosystem services (PES) approaches have been increasingly emphasised in recent years, the evidence thus far suggests that connecting beneficiaries and providers is far from straightforward. We believe that a concerted effort is required now if PES is to become a reality and we are clear that where there are changes to current land management practices beyond regulation, these measures will have to be fully costed and appropriately funded in line with the 'Beneficiary Pays' principle.

Recommendations:

15. Welsh Government and key partners to actively explore options to develop an alternative approach to the NVZ Action Programme that will deliver better environmental outcomes. The 'Blue Flag' concept developed by farmers provides an alternative blueprint to reduce nitrates and NFU Cymru restate our commitment to providing the expertise and resources to take forward its development.
16. NRW Agri-pollution Sub-Group to explore and actively champion innovative approaches and break down barriers to exploring their potential

- **Regulation**

There are a number of EU Directives to address water quality and wider environment in Wales including the Water Framework Directive, Nitrates Directive, Bathing Waters Directive, Groundwater Directive, Habitats and Birds Directive. Farmers in Wales are also regulated through SSAFO, EPR (Intensive Farming) and CAP support is underpinned by Cross Compliance and subject to penalties if the conditions set out in GAEC are not met.

Our members also identify a range of regulatory barriers which hinder progress in the area of water quality. The planning system across Wales, for example, is highly variable and does not enable farmers to develop the on-farm infrastructure needed to improve the environmental performance of their businesses.

Farmers in Wales are also currently awaiting the outcome of three very significant consultations which could result in significant impacts to farm viability. In 2016 Welsh Government undertook a review of designated areas and action programme to tackle nitrate pollution in Wales which sought views on the designation of further discrete NVZ areas or Whole Territory designation.

The NVZ Action Programme adds costs and reduces farmers' ability to make good management decisions relating to resource management based on their knowledge of their own farm, prevailing weather and ground conditions for little environmental benefit. NFU Cymru would highlight the clear opportunities and willingness to

explore an alternative sustainable management of natural resources approach (as per recommendation 15). Building on the First Milk off-set scheme which forms part of their operating permit approved by the regulator, the farmer-led 'Blue Flag' concept will deliver measureable reductions in nitrates based on the ADAS FarmScoper model. NFU Cymru has committed to providing the expertise and resources required to support the development of such a sustainable management of natural resources approach.

In 2015, Welsh Government consulted on the slurry and silage elements of the SSAFO Regulations. The Oil Storage Regulations were subject to separate consultation and the subsequent regulations introduced in 2016 have been poorly communicated to the sector. With respect to slurry and silage storage we believe the same principles should be applied to farming as to the water sector i.e. replacement decisions should be driven by the performance rather than the age of the asset.

More recently, the Welsh Government 'Taking Forward Wales' Sustainable Management of Natural Resources' consultation sought views on the introduction of Basic Measures to provide direct conditions or minimum standards for undertaking specified, low-risk activities.

Overall there is a need to recognise that regulation adds cost and complexity and hinders business confidence and economic growth. We also highlight that it is clear from the evidence that a focus which imposes costly regulation on one sector will not, on its own, deliver good chemical or ecological status in line with WFD.

In the context of our transition out of the EU which has resulted in uncertainty for farmers in terms of the future of CAP, future trading arrangements and also in the area of environmental regulation, NFU Cymru does not support the introduction of additional regulation at this time. It is also imperative that farmers in Wales are not placed at a competitive disadvantage to their counterparts in the UK and EU.

Instead, the Environment (Wales) Act 2016 presents the opportunity and the flexibility to move forward and make progress on water quality issues on a different basis. The aim should be to co-develop an 'enabling framework' to assist farmers to make informed choices so they can contribute to improved water quality in Wales through their actions. Regulation should be the backstop.

Recommendations:

17. In the context of EU transition, no additional regulation should be introduced at this time.
18. Improved guidance should be developed for Local Planning Authorities to provide a more 'enabling development framework' to facilitate the development on on-farm infrastructure that enhances environmental performance.
19. Future regulatory requirements should be evidenced-based (i.e. consider how effective and what gaps exist in the framework and complimentary actions currently) and considered alongside the development of the future Domestic Agricultural Policy

- **Governance**

NFU Cymru has been pleased to contribute time and resource to the NRW Agri-Pollution Sub-Group with the aim of working collectively to co-produce a framework by which farmers can be supported to take positive action to improve water quality through reducing pollution incidents and minimising diffuse pollution.

We identify this group is making progress and identifying a number of key work areas and recommendations. It is vital that both Welsh Government and NRW work to enact the group's recommendations in order that measurable outcomes can be achieved.

Recommendations:

20. Given the significance of the Wales Rural Development Programme we recommend that the RDP Managing Authority be represented on the NRW Agri-Pollution Sub- Group. Appropriate representation from Welsh Government Planning Division should also be invited to attend the NRW Agri-Pollution Sub-Group to address planning barriers

Conclusion

To conclude, NFU Cymru recognises the key role that farmers have to play in contributing the enhanced water quality in line with WFD objectives in the years ahead. We are also clear that one agricultural pollution incident is one incident too many. This paper has considered the issue of water quality from an agricultural perspective and makes 20 key recommendations on measures to deliver improvements. These are immediate steps and we are clear that the cumulative impact of the implementation of all measures offer the greatest opportunity to make progress at this time.

We also recognise the need for a longer term-approach to be developed and we would welcome the opportunity to work in partnership with Welsh Government, Natural Resources Wales and other partners on the development and implementation of further measures to support improvements in water quality in Wales over the longer term.

For further information please contact Rachel Lewis-Davies, NFU Cymru's Environment & Land Use Adviser via email: Rachel.lewis-davies@nfu.org.uk or telephone: 01982 554200.

2017.

Annex 2 – Analysis of proposed regulatory measures to tackle agricultural pollution against the NVZ Action Programme and SSAFO

Wording highlighted in yellow translates from Welsh Government's NVZ Action Programme.

Wording highlighted in pink translates from SSAFO regulations.

Agricultural Pollution Measures

Introduction

On 14 November 2018 the Cabinet Secretary for Energy, Planning and Rural Affairs issued a statement outlining a whole Wales approach to tackling agricultural pollution. This document provides further information on that announcement.

THE DETAILS OF THE MEASURES PROVIDED IN THIS DOCUMENT ARE FOR INFORMATION PURPOSES ONLY. THE INTENDED REGULATIONS WILL NOT APPLY UNTIL 1 JANUARY 2020.

In making this decision the Welsh Government has sought to ensure a number of issues are addressed, including agricultural pollution, trade in agricultural produce and providing baseline standards above which payments can be made to farmers for public goods outcomes (subject to the Welsh Government's response to the *Brexit and our Land* consultation).

Agricultural pollution is damaging the environment and the reputation of Welsh farming. The regulations will be part of a suite of measures needed to address this issue, including the support already being offered through Farming Connect and the Rural Development Programme for Wales.

The measures will secure our ability to trade with the European Union and internationally based on high standards because they meet our statutory and international obligations. Meeting our obligations is essential if we are to continue to trade effectively and failing to do so would put the future of the Welsh agriculture industry in jeopardy.

The alternative to a whole Wales approach would mean applying different but similar measures in different areas of Wales, which would then need to be reviewed and changed every 4 years. The approach we are taking means the regulations will be the same for all farmers in Wales, providing a level playing field, greater certainty and making the rules easier to understand and comply with.

The measures will be the initial step in forming a comprehensive baseline regulation which will underpin proposed CAP replacement schemes, Brand Wales and Payments for Ecosystem Services. In particular, a clear and coherent regulatory baseline is an important foundation for payments linked to public goods outcomes. It also responds to the need for a level playing field to be applied to all within Wales.

Over time there will no longer be another tier of rules for recipients of farming scheme payments, once cross compliance ceases to exist. The complete regulatory baseline underpinning future schemes will be developed through further consultation. The measures are compatible with the development of CAP replacement schemes and are designed to avoid unintended consequences, achieving key aims including reduced emissions of greenhouse gases and ammonia.

Glastir and RDP contracts will be unaffected in the interim period as payments are based on activities which exceed the new requirements.

The regulations will apply to all holdings from **1 January 2020**, with transitional periods for some elements to allow farmers time to adapt and ensure compliance.

The regulations will replicate good practice measures focussed on good nutrient management, which many farmers across Wales are already implementing routinely, and include the following requirements:

- Nutrient management planning;
- Sustainable fertiliser applications linked to the requirement of the crop;
- Protection of water from pollution related to when, where and how fertilisers are spread; and
- Manure storage standards.

Further information on what will need to be done and by when will be provided in the near future. The Welsh Government will be working with the Wales Land Management Forum sub-group on agricultural pollution on the development of a support package for farmers, including advice services, guidance documents and finance and on communicating the requirements as part of the implementation of the regulations. We will also be working with the sub-group to take advice on the length of the transitional period for the slurry storage requirements and the closed periods which will apply to the spreading of certain fertilisers.

Details of the initial regulations

Guiding Principles

The following measures are centred around nutrient management planning, ensuring fertiliser applications are linked to the requirement of the crop, thereby reducing losses of valuable nutrients to the environment to the detriment of public goods.

The measures related to when, where and how fertilisers are spread are supported by evidence to reduce losses of nitrates, phosphates, greenhouse gases and ammonia. Reducing these losses ensures those nutrients are available to the crop and reduces the need for manufactured fertilisers to be purchased.

Having sufficient storage for livestock manure is one of the most important measures to ensure nutrients can be retained when the crop requirement is reduced over the winter period, when losses to the environment are their highest. This means those nutrients can be retained and applied when they will be taken up by the crop.

The definitions provided in Annex 1 and the tables in Annex2 should be referred to alongside the information provided below.

Nutrient Management Planning

Nutrient Management Plans (NMP)

You will need to determine the optimum amount of nitrogen that should be spread on the crop (including grassland), taking into account the soil nitrogen supply and produce a plan for the spreading of nitrogen fertiliser for each calendar year.

The NMP must provide:

- a field reference
- area of the field
- type of crop
- soil type
- previous crop
- the soil nitrogen supply and the method used to establish this figure
- the anticipated month the crop will be planted
- the anticipated yield (if arable)
- the optimum amount of nitrogen that should be spread on the crop taking into account SNS
- Area on which the organic manure will be spread
- Amount of manure to be spread
- Planned date for spreading (month)
- Type of organic manure
- Total N content and available N
- Amount of manufactured fertiliser required
- Total nitrogen spread on a holding

Calculating the amount of nitrogen available for crop uptake from organic manure

Total amount of nitrogen in livestock manure must be determined using standard figures in Table 1 or sampling and analysis.

Sampling and analysis

For liquids, at least five 2 litre samples must be taken and slurry should be thoroughly mixed beforehand. Samples must be taken from different locations. If a tanker used for spreading is fitted with a suitable valve, the samples may be taken while spreading, and each sample must be taken at intervals during the spreading. These samples should be mixed and 2 litres sent for analysis.

For solids, at least ten 1kg samples must be taken from different locations within a manure heap and at least 50cm from the surface.

Amount of N available to crop

To establish the amount of nitrogen from livestock manure which is available for crop uptake the percentages in Table 2 must be used.

Risk Maps

Risk maps must be produced which are designed to enable you to comply with other measures.

Risk maps will need to show each field, with its area in hectares; all surface waters; any boreholes, springs or wells on the holding or within 50 metres of the holding boundary; areas with sandy or shallow soils; land with an incline greater than 12°; land within 10 metres of surface waters; land drains (other than a sealed impermeable pipe); sites suitable for temporary field heaps if this method of storing manure is to be used; land that has a low run-off risk (this is optional if spreading manure on low run-off risk land during the storage period is not intended); and if spreading organic manure using precision spreading equipment up to 6 metres from surface water, land within 6 metres of surface waters.

Fertiliser Applications

Application limits for organic manure

Total amount of nitrogen from livestock manure applied to the spreadable areas of the holding must not exceed 170 kg/ha. Standard figures will apply for N in livestock manure – example figures provided in Table 1.

250kg/N/ha limit for an individual field.

250kg/N/ha limit for the entire holding for grassland farms where additional measures take place to reduce risk of pollution. Additional measures will be to include phosphate in nutrient management plans including soil testing, ensuring 80% of the holding is grassland, ploughing restrictions and seeding in terms of timings and N fixing properties. An application will need to be submitted.

1000 kg/N/ha from PAS 100 compost (not contaminated with animal manure) can be applied in any four-year period as mulch to orchard land (crops listed in Table 3) or 500 kg/N/ha in any two year period if it is applied to any other land.

Crop limits

The total amount of nitrogen from manufactured nitrogen fertiliser and that *available* for crop uptake from organic manure must not exceed the crop limits specified in Table 4.

Spreading fertiliser

Before spreading fertiliser, a field inspection should be carried out to consider the risk of surface water pollution. Fertiliser must not be spread on that land if there is a significant risk of pollution, taking into account in particular the slope of the land, particularly if the slope is more than 12°; any ground cover; the proximity to surface water; the weather conditions; the soil type; and the presence of land drains.

Fertiliser must not be spread if the soil is waterlogged, flooded or snow covered, is frozen or has been frozen for more than 12 hours in the previous 24 hours.

Manufactured nitrogen fertiliser must not be spread within 2 metres of surface water. Organic manure must not be spread within 50 metres of a borehole, spring or well or 10 metres of surface water (5m if precision spreading).

Spreading accuracy

Slurry spreading must be carried out using spreading equipment with a trajectory which is below 4 metres from the ground. Spreading fertiliser must be done in as accurate a manner as possible.

Retaining N within the soil

Poultry manure, slurry and liquid digested sewage sludge applied onto the surface of bare soil or stubble (but not sown) must ensure that it is incorporated into the soil as soon as practicable, and within 24 hours at the latest, unless precision spreading equipment is used. Any other organic manure (other than organic manure spread as a mulch on sandy soil) must be incorporated into the soil as soon as practicable, and within 24 hours at the latest, if the land is within 50 metres of surface water and slopes in such a way that there may be run-off to that water.

Closed periods for spreading fertiliser

Organic manure with high readily available nitrogen (30% or more available N – see Table 2 and supporting text) must not be spread on land between dates specified in Table 5. THIS MEASURE WILL BE INCLUDED WITHIN A TRANSITIONAL PERIOD AND WILL NOT APPLY ON 1 JANUARY 2020. THE LENGTH OF THE TRANSITIONAL PERIOD IS STILL TO BE DECIDED BUT IT IS EXPECTED TO BE BETWEEN 2 AND 4 YEARS.

Spreading organic manure with high readily available nitrogen on tillage land with sandy or shallow soil is permitted between 1 August and 15 September inclusive provided that the crop is sown on or before 15 September.

Registered organic producers may spread organic manure with high readily available nitrogen at any time on crops listed in column 1 of table 6 or other crops in accordance with written advice from a person who is a member of the Fertiliser Advisers Certification and Training Scheme, provided that each hectare on which organic manure is spread does not receive more than 150 kg total nitrogen between the start of the closed period and the end of February.

Manufactured nitrogen fertiliser must not be spread on grassland, from 15 September to 15 January, or tillage land, from 1 September to 15 January other than up to the maximum rate in column 2 for crops in table 6. For crops not in the table spreading is permitted on the basis of written advice from a person who is a member of the Fertiliser Advisers Certification and Training Scheme.

From the end of the closed period until the end of February the maximum amount of slurry that may be spread at any one time is 30 cubic metres per hectare and the maximum amount of poultry manure that may be spread at any one time is 8 tonnes per hectare. There must be at least three weeks between each spreading. THIS MEASURE WILL BE INCLUDED WITHIN A TRANSITIONAL PERIOD AND WILL NOT APPLY ON 1 JANUARY 2020. THE LENGTH OF THE TRANSITIONAL PERIOD IS STILL TO BE DECIDED BUT IT IS EXPECTED TO BE BETWEEN 2 AND 4 YEARS.

Storage of slurry and silage

MEASURES RELATING TO THE CAPACITY OF SLURRY STORES AND THE SEPARATION OF SLURRY WILL BE INCLUDED WITHIN A TRANSITIONAL PERIOD AND WILL NOT APPLY ON 1 JANUARY 2020. THE LENGTH OF THE TRANSITIONAL PERIOD IS STILL TO BE DECIDED BUT IT IS EXPECTED TO BE BETWEEN 2 AND 4 YEARS. EXISTING RULES WILL CONTINUE TO APPLY IN THE INTERIM.

Separation of slurry

Separation of slurry into its solid and liquid fractions must either be carried out mechanically or on an impermeable surface where the liquid fraction drains into a suitable receptacle.

Storage of organic manure

Organic manure (other than slurry), or any bedding contaminated with any organic manure, must be stored in a vessel; in a covered building; on an impermeable surface; or in the case of solid manure in a field heap.

Field heaps must not be located in a field liable to flooding or becoming waterlogged, within 50m of a spring, well or borehole or within 10m of surface water or a land drain (other than a sealed impermeable pipe). The heap must not be located in any single position for more than 12 consecutive months or in the same place as an earlier one constructed within the last two years.

Solid poultry manure that does not have bedding mixed into it and is stored in a field heap must be covered with an impermeable material.

Topsoil must not be removed from the ground upon which a field heap is to be constructed A field heap must not be located within 30m of a watercourse on land identified on the risk map as having an incline of greater than 12° and the surface area should be as small as reasonably practicable to minimise the leaching effect of rainfall.

Slurry storage capacity

Slurry must be stored in a system that satisfies the following requirements, except when it is stored temporarily in a tanker used for transporting slurry.

Storage facilities are not necessary for slurry or poultry manure sent off the holding or spread on land that has a low run-off risk (provided that this is done in accordance with the other measures on spreading). However, storage facilities for an additional one week's manure must be provided as a contingency measure in the event of spreading not being possible on some dates.

Sufficient storage must be provided for pigs and poultry manure produced on the holding between 1 October and 1 April, and, for other manures produced in a yard or building on the holding, 1 October and 1 March. This is referred to as the 'storage period' in this document.

The volume of the manure produced by the animals on the holding must be calculated in accordance with standard figures in Table 1.

The store must also have the capacity to store any rainfall, washings or other liquid which enters the vessel (either directly or indirectly) during the storage period. Average monthly rainfall figures for 1971 to 2000 from the Met Office can be used but more accurate data can be used where available.

SSAFO 1991 exemption

The construction requirements below will not apply to a store built before 1 March 1991, which was being used for storing slurry or, where it was not in use, it was constructed for that purpose or a contract for its construction, substantial enlargement or substantial reconstruction was entered into before 1 March 1991, or such work was commenced before that date, and in either case the work was completed before 1 September 1991 (the 1991 exemption).

Making or storage of silage

Other than silage stored temporarily in a container, trailer or vehicle in connection with its transport about the farm or elsewhere, a person who has custody or control of silage must ensure that it is kept in a silo that satisfies the following requirements:

The base of the silo must extend beyond any walls of the silo, be provided at its perimeter with channels designed and constructed so as to collect any silage effluent that escapes from the silo, and have adequate provision for the drainage of that effluent from those channels to an effluent tank through a channel or pipe.

The capacity of the effluent tank must not be, in the case of a silo with a capacity of less than 1,500 cubic metres, 20 litres for each cubic metre of silo capacity. Where a silo has a capacity of 1,500 cubic metres or more, the capacity, must be 30 cubic metres plus 6.7 litres for each cubic metre of silo capacity in excess of 1,500 cubic metres.

The base of the silo must be designed in accordance with the code of practice for design of concrete structures for retaining aqueous liquids published by the British Standards Institution and numbered BS 8007: 1987; or constructed using appropriate hot-rolled asphalt in accordance with the code of practice for selection and use of construction materials published by the British Standards Institution and numbered BS 5502: Part 21: 1990.

The base of the silo, the base and walls of its effluent tank and channels and walls of any pipes must be impermeable. The base and walls of the silo, its effluent tank and channels and the walls of any pipes must, so far as reasonably practicable, be resistant to attack by silage effluent.

No part of the silo, its effluent tank or channels or any pipes may be situated within 10 metres of any inland freshwaters or coastal waters into which silage effluent could enter if it were to escape.

OR

The silage is compressed into bales that are wrapped and sealed into impermeable membranes, or enclosed in impermeable bags; and are stored at least 10 metres from any inland freshwaters or coastal waters that effluent escaping from the bales could enter. If the silage is a crop being made into field silage (that is, silage made on open land by a method different from the baling method) or silage that is being stored on open land Natural Resources Wales must be notified of the place where the silage is to be made or stored at least 14 days before the place is first used for that purpose and the place is at least 10 metres from any inland freshwaters or coastal waters, and at least 50 metres from the nearest relevant water abstraction point of any protected water supply source that silage effluent could enter if it escaped.

A person who has custody or control of a silage bale must not open or remove the wrapping of the bale within 10 metres of any inland freshwaters or coastal waters which silage effluent could enter as a result.

Notice requiring works etc.

Natural Resources Wales may serve, on a person who has custody or control of silage or slurry or is responsible for the silo or slurry storage system a notice requiring the person to carry out works, or take precautions or other steps, specified in the notice.

The works, precautions or other steps must be, in the opinion of Natural Resources Wales, appropriate, for reducing to a minimum any significant risk of pollution of controlled waters.

The notice must–

- specify or describe the works, precautions or other steps that the person is required to carry out or take;
- state the period within which any such requirement is to be complied with; and
- inform the person of the right to appeal.

The period for compliance with the notice will be 28 days or longer if reasonable in the circumstances.

Natural Resources Wales may at any time (including a time after the period for compliance has ended) withdraw the notice, extend the period for compliance with any requirement of the notice or with the consent of the person on whom the notice is served, modify the requirements of the notice.

Appeals against notices

A person served with a notice may, within the period of 28 days beginning on the day after the date on which the notice is served (or such longer period as the Welsh Ministers allow), appeal to the Welsh Ministers against the notice.

An appeal must be made by the appellant serving notice on the Welsh Ministers. The notice must contain or be accompanied by a statement of the grounds of appeal.

Before determining an appeal under this regulation, the Welsh Ministers must, if requested to do so by the appellant or Natural Resources Wales, afford them an opportunity of appearing before and being heard by a person appointed by the Welsh Ministers for the purpose.

On determining an appeal, the Welsh Ministers may direct Natural Resources Wales to withdraw the notice; modify any of its requirements; extend the period for compliance with any requirement; or dismiss the appeal.

The period for compliance with a notice against which an appeal has been made can be extended so that it expires on the date on which the Welsh Ministers finally determines the appeal.

Notice requiring works etc.

NRW will be able to serve a notice requiring works to be carried out, or take precautions or other steps, which are appropriate for minimising any significant risk of pollution. The notice must specify or describe the works, precautions or other steps that must be carried out and by when. There will be an appeals process.

NRW may at any time withdraw the notice, extend the period for compliance with any requirement of the notice; or with the consent of the person on whom the notice is served, modify the requirements of the notice.

The 1991 exemption will cease to apply where the conditions of a notice have not been met.

14 days notice must be issued to NRW before construction begins.

Other construction standards

The base of the slurry storage tank, the base and walls of any effluent tank, channels and reception pit, and the walls of any pipes, must be impermeable.

The base and walls of the slurry storage tank, any effluent tank, channels and reception pit, and the walls of any pipes, must be protected against corrosion in accordance with paragraph 7 of the code of practice on buildings and structures for agriculture published by the British Standards Institution and numbered BS 5502: Part 50: 1993(9).

The base and walls of the slurry storage tank and of any reception pit must be capable of withstanding characteristic loads calculated on the assumptions and in the manner indicated by paragraph 5 of the code of practice on buildings and

structures for agriculture published by the British Standards Institution and numbered BS 5502: Part 50: 1993.

The slurry storage tank and any effluent tank, channels, pipes and reception pit must be designed and constructed so that with proper maintenance they are likely to continue to satisfy the three preceding paragraphs for at least 20 years.

Any facilities used for the temporary storage of slurry before it is transferred to a slurry storage tank must have adequate capacity to store—

- the maximum quantity of slurry that (disregarding any slurry which will be transferred directly into a slurry storage tank) is likely to be produced on the premises in any two-day period; or
- a lesser capacity that Natural Resources Wales agrees in writing is adequate to avoid any significant risk of pollution of controlled waters.

Where slurry flows into a channel before discharging into a reception pit and the flow of slurry out of the channel is controlled by means of a sluice, the capacity of the reception pit must be adequate to hold the maximum quantity of slurry that can be released by opening the sluice.

At least 750 millimetres of freeboard in the case of a tank with walls made of earth and 300 millimetres of freeboard in all other cases must be provided

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No part of the slurry storage tank or any effluent tank, channels or reception pit may be situated within 10 metres of any inland freshwaters or coastal waters into which slurry could enter if it were to escape unless precautions are taken that NRW agrees in writing are adequate to avoid any significant risk of pollution of controlled waters.

If the walls of the slurry storage tank are not impermeable, the base of the tank must

- extend beyond the walls;
- be provided with channels designed and constructed so as to collect any slurry that escapes from the tank;
- have adequate provision for the drainage of the slurry from those channels to an effluent tank through a channel or pipe.

If the slurry storage tank or any effluent tank or reception pit is fitted with a drainage pipe there must be two valves in series on the pipe with each valve separated from the other by a minimum distance of 1 metre. This does not apply where a slurry storage tank drains through the pipe into another slurry storage tank if the other tank is of equal or greater capacity or if the tops of the tanks are at the same level. Each valve must be capable of shutting off the flow of slurry through the pipe and must be kept shut and locked in that position when not in use.

In the case of a slurry storage tank with walls made of earth the tank must not be filled to a level that allows less than 750 millimetres of freeboard.

Further measures for nutrient management

Details related to the above requirements

A record of the total size of the holding must be made and update any changes within 1 month.

The record must contain the amount of manure that will be produced by the anticipated number of animals that will be kept in a building or on hardstanding during the storage period using standard figures in table 1.

The storage existing storage capacity which is available and the amount of storage capacity needed (slurry vessels and hardstanding) must be recorded, taking into account—

- the amount of manure intended to be exported from the holding;
- the amount of manure intended to be spread on land that has a low run-off risk; and
- in the case of a slurry vessel the amount of liquid other than slurry likely to enter the vesse

If animals are brought onto a holding for the first time adjustments to calculations must be made within 1 month. Storage capacity changes must be recorded within one week

Before 30 April each year, for the previous storage period, the number and category of animals in a building or on a hardstanding during the storage period must be recorded.

Sites used for field heaps and the dates of use must be recorded.

Before 30 April every year the amount of nitrogen in the manure produced by the animals on the holding during that year must be recorded along with the number and category of animals on the holding during the previous calendar year, and the number of days that each animal spent on the holding.

Alternatively, in the case of permanently housed pigs or poultry, software approved by the Welsh Ministers can be used; or in the case of a system of keeping livestock that only produces solid manure, sampling and analysis.

If software approved by the Welsh Ministers has been used a printout of the result must be kept.

Imported and exported livestock manure

If livestock manure is imported, if the nitrogen content is known, it should be within one week, alongside:

- the type and amount of livestock manure;
- the date it is brought on to the holding;
- the nitrogen content; and
- the name and address of the supplier

If the nitrogen content is not known, it must be determined as soon as possible and recorded within 1 week using standard figures or sampling and analysis.

If livestock manure is exported the following should be recorded within 1 week:

- the type and amount of livestock manure;
- the date it is sent off the holding;
- the nitrogen content;
- the name and address of the recipient; and
- details of a contingency plan to be used in the event that an agreement for a person to accept the livestock manure fails.

Details of crops sown

Where spreading of nitrogen fertiliser is intended within one week of sowing a crop the crop sown and the date of sowing must be recorded.

Details of spreading nitrogen fertiliser

Within one week of spreading organic manure the following must be recorded:

- the area on which organic manure is spread;
- the quantity of organic manure spread;
- the date or dates;
- the methods of spreading;
- the type of organic manure;
- the total nitrogen content; and
- the amount of nitrogen that was available to the crop.

Within one week of spreading manufactured nitrogen fertiliser the date of spreading and the amount of nitrogen spread must be recorded.

Fertiliser spreading records do not need to be made for holdings in which 80% of the agricultural area of a holding is sown with grass, and the total amount of nitrogen in organic manure applied to the holding, whether directly by animal or a result of spreading, is no more than 100 kg per hectare and the total amount of nitrogen in manufactured nitrogen fertiliser applied to the holding is no more than 90 kg per hectare and organic manure is not brought onto the holding.

Where nitrogen fertiliser is used the yield achieved by an arable crop must be recorded within one week of ascertaining it.

Before 30 April each year how any grassland was managed in the previous calendar year must be recorded.

Keeping of information and advice

Records and advice from a person who is a member of the Fertiliser Advisers Certification and Training Scheme that is relied on for any purpose in relation to the above requirements must be kept for five years.

Enforcement

Offences and penalties

Any person who breaches the Regulations will be guilty of an offence and liable on summary conviction, to a fine not exceeding the statutory maximum, or on conviction on indictment, to a fine.

Where a body corporate is guilty of an offence under these Regulations, and that offence is proved to have been committed with the consent or connivance of, or to have been attributable to any neglect on the part of any director, manager, secretary or other similar person of the body corporate, or any person who was purporting to act in any such capacity, that person, as well as the body corporate, is guilty of the offence and liable to be proceeded against and punished accordingly.

Revocations

Regulations to be repealed:

Nitrate Pollution Prevention (Wales) Regulations 2013

Control of Pollution (Water Resources) (Silage, Slurry and Agricultural Fuel Oil) (Wales) Regulations 2010

Cross compliance requirements over time

Annex 1

Definitions

Agricultural area - means any agricultural land used for agricultural purposes;

Agriculture - has the same meaning as in section 109(3) of the Agriculture Act 1947;

Crop with high nitrogen demand - includes, but not limited to, grass, potatoes, sugar beet, maize, wheat, oilseed rape, barley, brassicas, rye and triticale;

Grass – means:

(a) permanent grassland or temporary grassland (temporary means for less than four years);

(b) that exists between the sowing and ploughing of the grass; and

(c) includes crops under-sown with grass,

(d) but does not include grassland with 50% or more clover;

Holding - means all the land and its associated which are used for the growing of crops in soil or rearing of livestock for agricultural purposes;

Land that has a low run-off risk - means land that:

(a) has an average slope of less than 3° (3 degrees);

(b) does not have land drains (other than a sealed impermeable pipe); and

(c) is at least 50 metres from a watercourse or conduit leading to a watercourse;

Livestock - means any animal (including poultry) specified in Table 1

Manufactured nitrogen fertiliser - means any nitrogen fertiliser (other than organic manure) manufactured by an industrial process;

Manufactured phosphate fertiliser - means any phosphate fertiliser (other than organic manure) manufactured by an industrial process;

Nitrogen fertiliser - means any substance containing one or more nitrogen compounds used on land to enhance growth of vegetation and includes organic manure;

Non-grazing livestock - means any animal specified in Table 1

Organic manure - means any nitrogen fertiliser or phosphate fertiliser derived from animal, plant or human sources and includes livestock manure;

Phosphate fertiliser - means any substance containing one or more phosphorus compounds used on land to enhance growth of vegetation and includes organic manure;

Poultry - means poultry specified in Table 1

Sandy soil - means any soil over sandstone, and any other soil where—

(a) in the layer up to 40 cm deep, there are—

(i) more than 50 % by weight of particles from 0.06 to 2 mm in diameter,

(ii) less than 18 % by weight of particles less than 0.02 mm diameter, and

(iii) less than 5 % by weight of organic carbon, and

(b) in the layer from 40 to 80 cm deep, there are—

(i) more than 70 % by weight of particles from 0.06 to 2 mm in diameter;

(ii) less than 15 % by weight of particles less than 0.02 mm diameter;

(iii) less than 5 % by weight of organic carbon;

Shallow soil - is soil that is less than 40 cm deep;

Slurry - means excreta produced by livestock (other than poultry) while in a yard or building (including any bedding, rainwater or washings mixed with it) that has a consistency that allows it to be pumped or discharged by gravity (in the case of excreta separated into its liquid and solid fractions, the slurry is the liquid fraction);

Spreading - includes application to the surface of the land, injection into the land or mixing with the surface layers of the land but does not include the direct deposit of excreta on to land by animals.

Table 1

Amount of manure and nitrogen produced by grazing livestock and non-grazing livestock

Grazing livestock			
Category		*Daily manure produced by each animal (litres)*	*Daily nitrogen produced by each animal (grams)*
Cattle			
Calves (all categories except veal) up to 3 months:		7	23
Dairy cows—	From 3 months and less than 13 months:	20	95
	From 13 months up to first calf:	40	167
	annual milk yield more than 9000 litres:	64	315

	After first calf and—	annual milk yield more than 9000 litres:		53	276
		annual milk yield between 6000 and 9000 litres		42	211
		annual milk yield less than 6000 litres:		20	91
Beef cows or steers[a]—		From 3 months and less than 13 months:		26	137
		From 13 months and less than 25 months:		32	137
	From 25 months—	females or steers for slaughter:		32	167
		females for breeding—	weighing 500kg or less:	45	227
			weighing more than 500kg:	26	148
Bulls		Non-breeding, 3 months and over:		26	137
		Breeding—	from 3 months and less than 25 months:	26	132

Sheep					
	From 6 months up to 9 months old:			1.8	5.5
	From 9 months old to first lambing, first tupping or slaughter:			1.8	3.9
	After lambing or tupping[b]—	weight less than 60kg:		3.3	21
		weight from 60kg:		5	33
Goats, deer and horses					
Goats:				3.5	41
Deer—	breeding:			5	42
	other:			3.5	33
Horses:				24	58

Non-grazing livestock

Category		*Daily manure produced by each animal(litres)*	*Daily nitrogen produced by each animal (grams)*
Cattle			
Veal calves:		7	23
Poultry(a)			

Chickens used for production of eggs for human consumption—	less than 17 weeks:	0.04	0.64
	from 17 weeks (caged):	0.12	1.13
	from 17 weeks (not caged):	0.12	1.5
Chickens raised for meat: Chickens raised for breeding—	less than 25 weeks:	0.026	1.06
	from 25 weeks:	0.04	0.86
Turkeys—	male:	0.16	3.74
	female:	0.12	2.83
Ducks:		0.10	2.48
Ostriches:		1.6	3.83
Pigs			
Weight from 7kg and less than 13kg:		1.3	4.1
Weight from 13kg and less than 31kg:		2	14.2
Weight from 31kg and less than 66kg	dry fed:	3.7	24
	liquid fed:	7.1	24
Weight from 66kg and—	intended for slaughter—	5.1	33
	liquid fed:	10	33
sows intended for breeding that have not yet had their first litter:		5.6	38
sows (including their litters up to a weight of 7kg per piglet) fed on a diet supplemented with synthetic amino acids:		10.9	44
sows (including their litters up to a weight of 7kg per piglet) fed on a diet without synthetic amino acids:		10.9	49
breeding boars from 66kg up to 150kg:		5.1	33
breeding boars from 150kg:		8.7	48

(a) Castrated male.

(b) In the case of a ewe, this figure includes one or more suckled lambs until the lambs are aged six months.

Note: all figures for poultry include litter.

Table 2:

*Type of livestock manure**	*Amount of nitrogen available for crop uptake*
Cattle slurry	40%
Pig slurry	50%
Poultry manure	30%
Other livestock manure	10%

*For all other organic manures technical analyses provided by the supplier, RB209 values or sampling and analysis (same methodology as above) can be used.

Table 3:

Botanical Name	Common Name
Cydonia oblonga	Quince
Malus domestica	Apple
Mespilus germanica	Medlar
Morus spp.	Mulberry
Prunus armenaica	Apricot
Prunus avium	Sweet cherry
Prunus cerasus	Sour (cooking) cherry
Prunus ceracifera	Cherry plum
Prunus domestica	Plum
Prunus domestica subsp. insititia	Damson, Bullace
Prunus persica	Peach
Prunus persica var. nectarina	Nectarine
Prunus x gondouinii	Duke cherry
Prunus spinosa	Sloe
Pyrus communis	Pear
Pyrus pyrifolia	Asian pear

Table 4:

Crop	*Permitted amount of nitrogen (kg)(a)*	*Standard yield(tonne/ha)*
Asparagus	150	n/a
Autumn or early winter sown wheat	220**(b)(c)(d)**	8.0
Beetroot	350	n/a
Brussels sprouts	350	n/a
Cabbage	350	n/a
Calabrese	350	n/a
Cauliflower	350	n/a
Carrots	150	n/a
Celery	250	n/a
Courgettes	250	n/a
Dwarf bean	250	n/a
Field beans	0	n/a
Forage maize	150	n/a
Grass	300**(f)**	n/a
Leeks	350	n/a
Lettuce	250	n/a
Onions	250	n/a
Parsnips	250	n/a
Peas	0	n/a
Potatoes	270	n/a
Radish	150	n/a
Runner beans	250	n/a

(a) An additional 80 kg per hectare is permitted to all crops grown in fields if the current or previous crop has had straw or paper sludge applied to it. **(b)** An additional 20 kg per hectare is permitted on fields with shallow soil (other than shallow soils over sandstone). **(c)** An additional 20 kg per hectare is permitted for every tonne that the expected yield exceeds the standard yield. **(d)** An additional 40 kg per hectare is permitted to milling wheat varieties. **(e)** This is inclusive of any nitrogen that is applied as an exemption to the closed period for manufactured nitrogen fertiliser. The permitted amount may be increased by up to 30 kg per hectare for every half tonne that expected yield exceeds the standard yield. **(f)** An additional 40 kg per hectare is permitted to grass that is cut at least three times a year.

Table 5:

Soil type	*Grassland*	*Tillage land*
Sandy or shallow soil	1 September to 31December	1 August to 31December
All other soils	1 October to 15January	1 October to 31January

Table 6:

Crop	*Maximum nitrogen rate (kg/hectare)*
Oilseed rape, winter**(a)**	30
Asparagus	50
Brassica**(b)**	100
Grass**(a)(c)**	80
Over-wintered salad onions	40
Parsley	40
Bulb onions	40

(a) Nitrogen must not be spread on these crops after 31 October.

(b) An additional 50kg of nitrogen per hectare may be spread every four weeks during the closed period up to the date of harvest.

(c) A maximum of 40kg of nitrogen per hectare may be spread at any one time.

Annex 3 – Part of NFU Cymru response to the Welsh Government to NVZ consultation

- **Trophic Status of the Milford Haven Waterway**

In the case of the Trophic Status of the Milford Haven Waterway, NFU Cymru has a number of concerns that some fundamental aspects are missing or not adequately considered through the application of the methodology and in the decision-making process. This includes:

The NVZ Methodology (2012) requires criteria in three categories to be assessed for the designation of transitional and coastal waters. Category I relates to causative parameters (elevated nutrients); Category II relates to response parameters – Plants/algae – including increased abundance of and biomass of algae (phytoplankton, macroalgae, benthic diatoms) and/or higher plants, changes to species composition, exceptional algal blooms; Category III relates to secondary and other effects – including changes in dissolved oxygen, occurrence of toxic/harmful algal blooms, effects on other flora and fauna, information on impacts on water use.

A case for identification is considered to exist where it is found (i) that the Category I criteria are exceeded and (ii) some (or all) of the Category II and III criteria are exceeded or may be exceeded taking into account the influence of relevant environmental factors…. In the context of the Nitrates Directive, a water body is only considered to be polluted if sufficient nitrate is present to promote eutrophication in addition to any phosphorus enrichment. The NVZ Methodology is clear that not only does nitrogen have to be present above the threshold levels, it also has to be found to be the sole cause of eutrophication.

NRW recommend that a case for designation under the Nitrates Directive should be made for the catchment area of the Milford Haven Inner Water body on the basis of Category I - WFD Dissolved Inorganic Nitrogen (DIN) failure; Category II - WFD Opportunistic Macroalgae failure; and Category III - High percentages of anoxia in surface sediments; impacts of eutrophication on water use i.e fishing activities, navigation and cooling water processes at Pembroke Power Station; evidence of localised impacts to seagrass and pioneer saltmarsh – however, these are not reflected in WFD water body level classifications.

Category I

From the evidence presented, NFU Cymru remains unconvinced that nitrates are the cause of eutrophication as required for designation by the Nitrates Directive. This is because the graphs provided in the Evidence Review show that DIN is in the order of 20 times greater than Dissolved Inorganic Phosphorus (DIP). It is widely accepted that at ratios of >17 the waterbody is P limited, ratios of <10 suggest N limited. There is also uncertainty expressed in the CEFAS modelling study over whether the Milford Haven is nitrogen or phosphorous limited which requires further analysis.

We would further highlight that downward trends were reported for DIN at most of the monitoring points in the NRW report “Environmental Pressures on the Milford Haven Waterway”.

Source apportionment undertaken by NRW considers the diffuse loading from Sewerage Treatment Works (STW) and other consented discharges. It does not, however, include analysis of septic tank discharges, smaller unconsented STWs, drainage from urban areas, combined sewer outfall discharges, significant caravan/leisure sites. These also require assessment within the Evidence Review.

Category II

Failure of the Milford Haven Inner is based very heavily on the perceived failure of macroalgae alone. NFU Cymru would highlight the significant weaknesses here. Macroalgal growth, for example, should be assessed in the summer months and for sites with excessive growth, the % cover identified. Excessive growth is considered when areas are greater than 10ha in which the average algal cover exceeded 25%. Measurements of algal cover have been made on four occasions by NRW since 2009. However, only in 2012 did coverage exceed 25% of the intertidal area – and this was based on a partial survey.

The NVZ methodology identifies that concern is focussed on the consequences of excess algal coverage, for example, whether the macroalgae overwinter making the underlying mud anoxic. The Evidence Review considers quadrat sampling undertaken by NRW and identifies the general absence of overwintering macroalgae.

The suite of WFD measures has not been completed including assessment of Benthic Invertebrate Fauna. Few details of the phytoplankton assessment are included in the Evidence Review but the WFD status is known to be High (i.e Better than Good). Monitoring of chlorophyll a is also Better than Good.

Category III

Routine monitoring results for dissolved oxygen have not been provided or assessed within the Evidence Review.

Whilst the methodology states that both quantitative and qualitative evidence can be considered as part of the review, the evidence presented is anecdotal in the extreme. We would suggest that details of date, location, duration and extent should be a minimum requirement and this data is missing in most instances.

A number of the concerns identified and shared by NFU Cymru are reaffirmed by the Scientific Review undertaken by Professor Mike Elliott.

With respect to Category I Evidence, Professor Elliott refers to the NRW conclusion “that N limitation is more likely than P limitation and that calculations for the latter should be treated with caution”. Professor Elliott suggests that this requires further analysis and discussion within the Evidence Review.

For Category II, Professor Elliott identifies that “the omission of benthic quality data (macroinvertebrates) is unusual in such an assessment – this is the greatest omission given its value in showing adverse sedimentary changes and organic/enrichment/eutrophication”. Similarly, he identifies, that fish community data is not presented. He also identifies the requirement for the need for more complete data for the prevailing water quality, especially turbidity. Spatial and temporal Dissolved Oxygen (DO) sags.

Professor Elliot asks what ground-truthing has been done for the growth of macroalgal mats. In a similar assessment in the Humber Estuary aerial photographs were indicative of macroalgal mats but ground-truthing found this not to be the case.

Professor Elliot also suggests the need for a tick-list of signs and symptoms of eutrophication to allow the weight of evidence of undesirable symptoms to be rigorously presented. Concluding Professor Elliott identifies the need to use all the available evidence to make this more objective. In our view, such an analysis would be useful in highlighting the deficiencies and failure to present a complete assessment of available data to underpin the designation.

Finally, he suggests that NRW should consider the validity of separating the Milford into two separate areas through further analysis of spatial and temporal trends.

Whilst, overall, Professor Elliott indicates that there is good, substantial and defendable evidence that the Milford Haven Waterway is eutrophic or likely to become eutrophic, he makes no reference to whether this is due to nitrates. Our confidence is further undermined by the fact that the Panel, in the Terms of Reference provided by NRW, were not instructed to provide advice specifically on the scientific evidence linking elevated levels of nutrient nitrogen to evidence of eutrophic disturbance. This is a fundamental flaw in the context of the Nitrates Directive.

Professor Elliott also suggests that it would be beneficial to show relative percentages for both concentrations and loadings for DIP and DIN – this could then cross-refer to the eventual measures to be taken i.e what are the most cost-effective measures. Through this statement Professor Elliott appears to assume that phosphates can be a material consideration in designation. This is not the case.

In summary NFU Cymru remains unconvinced, after consideration of the evidence presented, that nitrates are the cause of eutrophication within the waterway. Whilst evidence of eutrophication appears to be based solely on macroalgae, there are deficiencies in the data here. On only one occasion (2012) did coverage exceed the required threshold and that was a partial survey. Category III evidence is limited in the extreme and some is of very poor quality.

Overall, it appears that throughout the Evidence Review process the objective of NRW has been to make a case for designation of the Milford Haven Inner Waterway rather than presenting a balanced review of all evidence.

- **Eutrophic Freshwater Recommendation - Llyn Maelog, Anglesey**

Our analysis would suggest that insufficient data is presented, and this has been collected over insufficient time (monthly over a two year period 2013-2014) to make a case for designation within the report. NFU Cymru would highlight that the proposed update to the method statement (dated 17th July 2015) mentions that assessment will cover the period 2010-2014 for existing designations and any other lakes which have sufficient data available. In our view an adequate dataset over the defined assessment period should be a prerequisite for designation.

In addition, the role of nitrogen in eutrophication is not presented and NRW has made no analysis of whether the lake is N or P limited. The impact sewage discharges within the catchment are not adequately considered within the Evidence Review as no source apportionment has been undertaken or presented for this lake. We would highlight that the lake is surrounded by properties in Rhosneigr, as shown in the image below, the failure to include source apportionment is, therefore, a very significant omission.

- **Eutrophic Freshwater Recommendation - Llyn yr Wyth Eidion, Anglesey**

This lake has an annual mean Total Nitrogen (TN) concentration over 2 N mg/l threshold above which there is a presumption to designate. However, this is based on analysis of a small dataset – just five samples were collected from the lake itself within the sampling period.

Our ground-truthing suggests that these samples were collected prior to NRW funded work that resulted in the diversion of sewage away from the eastern side of the catchment. We ask NRW to confirm if this is the case.

The report also indicates that the catchment has been altered by drainage modifications carried out in the 19th century which have contributed to long-term damage to the lake. The Palaeolimnological Study lends support to the conclusion that the lake is damaged but suggests that other causes than nutrient enrichment are contributing to the damage. The Evidence Review identifies that the 'best chance' of restoring the lake could be achieved by other measures. These measures are not specified, except for one which would be to divert the present inflow stream away from the lake.

NFU Cymru is concerned that the recommendation for designation is driven by the fact that the waterbody adjoins a SSSI designated sites and does not objectively consider the evidence which is severely undermined by the poor dataset. In addition, NRW does not appear to have considered the 'current understanding of the impact of preventative action' as specified in the Nitrates Directive. We would highlight that this is a lake of 1.4ha and the catchment has been identified to extend to 370ha and this area was previously part of the Anglesey Fens project which attracted European funding and good co-operation from surrounding landowners. The alternative measures **should be actively pursued.**

- **Eutrophic Freshwater Recommendation- Llyn Pencarreg, Carmarthenshire**

The lake has a TN of 0.86mg N/l, well below the 2 N mg/l threshold above which there is a presumption to designate and below the 1 N mg/l threshold where designation is at the discretion of the Expert Panel. TON levels were also noted to be low in winter (TON 75%ile is 0.26 N mg/l) whilst phosphorus concentrations were high. It is clear, therefore, that NRW have not applied the methodology.

We would further highlight that designation is being taken forward on the basis of just 10 water samples from November 2011 to November 2014 coupled with biological data. The dataset is identified as too small to assess whether the lake is nitrogen or phosphorus limited.

NFU Cymru would emphasise that the Nitrates Directive required designation on the grounds elevated levels of nitrates and evidence to link this with eutrophication. The Evidence Review is incomplete without this analysis.

- **Groundwater Recommendation – Llanmiloe, Carmarthenshire**

NRW identify that the groundwater methodology has highlighted the area around the groundwater quality network sampling point at Westmead Farm as a candidate for Nitrate Vulnerable Zone.

The data source includes water samples from private water supplies and other water features obtained through engaging with farmers in the area. NFU Cymru has obtained Groundwater Nitrate (mg/l) data for the Westmead site up to the most recent sample on 10 September 2016. This is shown in Graph 2 below and shows an overall downward trend going below the 11.3mg/l threshold during 2016. NFU Cymru has subsequently requested monitoring data for all eight sites up to the current day, however, we understand that only Westmead Farm is part of the NRW groundwater quality network and sampled regularly. The other locations have only been subjected to ad-hoc sampling with the most recent samples collected in 2015 during NVZ classification work.

Our ground-truthing shows that there has been significant investment made within the area in new slurry storage facilities in 2014 which suggests that the downward trend is likely to be maintained. The terms for designation are that water is polluted or is likely to become pollution should action not be taken. This proposed designation fits neither of these requirements since clearly there is a downward trend based on the available monitoring data.

Graph 2 showing Groundwater Nitrate (mg/l) at Westmead site