

Sustainable Water Network (SWAN)

Fourth Review of Ireland's Nitrates Action Programme,

Phase II

- Response to Public Consultation -



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1. Introduction and Context

The Sustainable Water Network (SWAN)¹ welcomes this opportunity to make a submission to the second consultation phase of the 4th review of Ireland's Nitrates Action Programme (NAP). This should be read in conjunction with the SWAN submission on Stage I, included in this submission as Annex I.

We note and welcome the improved information on, and acknowledgement of, the significant impact of agriculture on water. We also welcome the unofficial consolidated Good Agricultural Practice for Protection of Waters (GAPP) Regulations which aids transparency and accessibility.

We note that the consultation was conducted for a short period, primarily over the traditional August holiday. This falls far short of what is required for such a significant piece of environmental and land-use policy/regulation. This poses a disproportionate challenge to smaller organisations with limited resources.

Much of the supporting rationale around the impacts of agriculture on the water environment and the critical need for a far stronger NAP as a key instrument for addressing the urgent challenge of escalating agricultural water pollution is set out in our Stage I submission (Annex I) and our submission on the 2019 Nitrates Derogation Review² and so won't be reproduced here.

Equipped with the scientific evidence, the Government must approach the NAP in terms of an unswerving commitment to act ambitiously on reversing worsening water quality decline. This is essential to ensure that Ireland lives up to its commitments under the WFD. Rather than the transformational change required however, the NAP as proposed does not represent such commitment. It is instead a continuation of the conservative, incremental approach to introducing controls which has led to the current agricultural water pollution crisis.

¹ SWAN is an umbrella network of 25 of Ireland's leading environmental NGOs, national and regional, working together to protect and enhance Ireland's aquatic resources through coordinated participation in the implementation of the Water Framework Directive (WFD), Floods Directive, Marine Strategy Framework Directive (MSFD) and other water-related policy and legislation.

² SWAN (2019) Public Consultation 2019 Nitrates Derogation Review - Response to Public Consultation. Available at: <http://www.swanireland.ie/wp-content/uploads/2017/08/SWAN-Submission-on-Draft-River-Basin-Management-Plan..pdf>

2. Governance, transparency and public engagement

TRANSPARENCY AND PROVISION OF INFORMATION

While we welcome the improved information in the consultation document and the consolidated regulations, critical information needed in order to make a fully informed response is still missing. We set this out in our response to the Stage I, only some of which was partially addressed. The gaps in relation to the impact of intensive farming and the nitrates derogation are particularly significant. (See also Section 3).

IMPROVING PUBLIC ENGAGEMENT

There are clear benefits to implementing effective public engagement in environmental policy making such as the NAP and we reference these in our Stage I submission³. The consultation to date on the current review falls far short of required standards in relation to provision of information, time provided for the public consultation and wider effective engagement.

GOVERNANCE

SWAN supports the recommendations of An Foram Uisce in relation to governance and policy coherence of the NAP. The implementation of the NAP will require a fully integrated approach across multiple Government departments and agencies. It is vital that the roles and responsibilities of Government departments and agencies for implementation, monitoring and evaluation of progress is transparently set out, including the roles of the Nitrates Expert Group. A full implementation plan should be published with the final NAP setting this out. This integrated approach should also include considerations of biodiversity and climate change and the development of measures with multiple co-benefits.

RECOMMENDATIONS

SUPPORTING INFORMATION

- The review should not be completed until the following information and evidence regarding the Nitrates Derogation is provided and considered by the public:
 - The degree to which the granting of the derogation has an impact on the meeting of Nitrates Directive and Water Framework Directive (WFD) obligations
 - How nutrient loss from derogation farms is prevented when no consideration of physical and hydrological conditions are included in the derogation requirements?
 - What is the impact of further expansion in derogation farming on the status of water-bodies in catchments of derogation farms?

³ There is a good reason for prioritising stakeholder participation in water quality issues. Effective engagement with stakeholders in environmental decision-making processes can enhance the robustness and durability of decisions.

- In terms of implementation of the derogation, what is the rate of compliance and what is the nature of non-compliances?

PUBLIC ENGAGEMENT

- A further period of public engagement should be allowed before the NAP is finalised during which time a far more comprehensive programme of public engagement is carried out, including bilateral meetings, workshops and webinars to facilitate multi-stakeholder dialogue and conversation, based on stakeholders' respective submissions.

GOVERNANCE

- As recommended by the EPA in its submission on the Nitrates Directive Derogation⁴, a separate free-standing NAP document should be published with the final programme and GAPP regulations which
 - Provides an clear overview of the revised GAPP Regulations, including the proposed new measures (and how these compare with previous iterations) and how these will achieve WFD requirements
 - Includes an Implementation Plan and sets out the key actions, controls, responsibilities, monitoring and reporting commitments which will ensure the delivery of the outcomes envisaged by the GAP

⁴ Environmental Protection Agency (2019) EPA - Nitrates Directive Derogation Consultation Submission Final. Available at: <https://www.epa.ie/pubs/epasub/EPA%20%20Nitrates%20Directive%20Derogation%20Consultation%20Submission%20Final.pdf>

3. Large herds, the Nitrates Derogation and the impacts of intensification

Ongoing intensification represents a significant threat to inland and transitional waterbodies, especially in areas where water bodies are already at risk (see Stage I SWAN submission) and most recently the EPA catchment report on nitrates.⁵ Analysis from the AGRIBASELINE project also shows a link between a decline in species richness and abundance in aquatic environments and increasing agricultural intensity and associated nutrient/organic pollution^{6,7}

As reported in the COSAINT project⁸, 73% of farms (no. 95,000) have on-farm watercourses and of these, approximately 10% are very intensive farms (>170kgNha⁻¹). While impacts can be catchment-scale, this represents a very direct risk to these watercourses. Furthermore, according to the Nitrates Action Programme Derogation Report⁹, 6,410 farms received a derogation in 2019, 9.6% of the farmed area. Unfortunately, information in relation to the specific spatial relationship between derogation farms and nutrient pollution was not made available as part of this consultation (see Section 2), nor was the spatial data on waterbodies either adjoining intensive farms or in the catchment of such farms.

Until such time as it can be clearly demonstrated that there is no correlation between the location of derogation farms and current upward trends in nutrient pollution, SWAN believes that the nitrates derogation should be suspended. No such evidence has been provided and in fact, information which was submitted to the EU Commission as part of reporting requirements for the Nitrates Directive¹⁰, would strongly suggest otherwise: Maps entitled '*Derogation Herd Locations in 2019*' and '*Percentage of net area encompassed by derogation in 2019 at county level*' tally closely with EPA maps of nitrate exceedances (with the marked exception of areas of Cork where high concentrations of derogation farms appear to be buffered by local geological and topographical conditions.)

SWAN believes that it is highly probable that very intensive farming (>171 kg) is not feasible in certain areas of high N/P susceptibility, even with mitigation measures, and certain sub-catchment areas will need to be zoned ineligible for derogation and sub-derogation intensive farming, due to risk of both and N and P loss. In relation to the application of derogation, the EPA has urged DAFM to consider

⁵ EPA (2021) Assessment of the catchments that need reductions in nitrogen concentrations to achieve water quality objectives

⁶ Kelly-Quinn, M., Feeley, H., & Bradley, C. (2020). Status of freshwater invertebrate biodiversity in Ireland's rivers – time to take stock. *Biology and Environment: Proceedings of the Royal Irish Academy*, 120B(2), 65-82. doi:10.3318/bioe.2020.09

⁷ However, It is not the case that recent EPA work has only just confirmed the link between agricultural intensification and declining water quality. For example, Donohue et al. (2006) found significant inverse relationships between a range of land-use pressures, including agricultural intensity and cattle densities, and ecological status in 797 river catchments in Ireland: Donohue, I., McGarrigle, M. & Mills, P. (2006) Linking catchment characteristics and water chemistry with the ecological status of Irish rivers, *Water Research*, 40, 2006, p91 - 98

⁸ Ó hUallacháin, D., Jennings, E., Antunes, P., Green, S., Kilgarriff, P., Linnane, S., O'Callaghan, P., O'Sullivan, M., Regan, F., Ryan, M. and Kelly-Quinn, M. (2020) COSAINT – Cattle Exclusion from Watercourses: Environmental and Socio-economic Implications. Environmental Protection Agency. Wexford, Ireland. Available at: https://www.epa.ie/pubs/reports/research/water/Research_Report_330.pdf

⁹ Department of Agriculture, Food and Marine (2020) Nitrates Action Programme – Ireland, Derogation Report 2019

¹⁰ This was not made publicly available as part of this consultation but was obtained under Freedom of Information

the physical setting of the farm¹¹ so as to ensure that intensification does not occur in an unsuitable/sensitive catchment areas, including high-status water bodies. We support this recommendation.

RECOMMENDATIONS

- Reform the NAP so that nitrate derogations are no longer granted unless it can be demonstrated that a given catchment area can absorb the totality of nitrates being applied without negative impacts on WFD water status.
- Informed by the EPA PIP maps, the NAP should require risk assessments to be carried out on farms applying for derogation, taking into account catchment-scale cumulative impacts.
- Require a WFD-specific assessment on all intensive farms (greater than 130 kg livestock manure nitrogen/ha) in areas identified by the EPA as Critical Source Areas (CSAs) for nitrate pollution, informed by the PIP maps. If necessary, certain sub-catchment areas will need to be zoned ineligible for certain stocking rates and for the granting of derogation status.

¹¹ Environmental Protection Agency (2019). EPA - Nitrates Directive Derogation Consultation Submission Final.
<https://www.epa.ie/pubs/epasub/EPA%20%20Nitrates%20Directive%20Derogation%20Consultation%20Submission%20Final.pdf>

4. Policy coherence and the need to align the NAP with overarching policy ambition¹²

Achieving greater policy coherence across Ireland's obligations under the Nitrates Directive, National Emissions Ceiling Directive, the Habitats & Birds Directives and its climate commitments as a signatory to the Paris Agreement provides a crucial opportunity to halt and reverse declines in water quality under the WFD, while at the same time reversing trends in GHG emissions, air pollution and biodiversity loss. It would be poor and ineffective governance to develop the measures in the new NAP without considering potential multiple benefits in these related policy areas.

SWAN welcomes acknowledgement in the consultation document of the need for "*greater alignment between different environmental protection policies*" given the context now provided by the EU Farm to Fork Strategy¹³, EU Biodiversity Strategy for 2030¹⁴ and the Zero Pollution Action Plan.¹⁵ However, with the exception of air emission proposals regarding LESS, this has not translated into proposed measures.

RECOMMENDATIONS

- The specific ways in which the proposed changes to the NAP will bring agriculture in line with legal obligations under Birds and Habitat Directives; the National Emissions Ceiling Directive and domestic and international climate commitments should be set out, including in the context of catchment- / landscape- scale management of agricultural impacts
- Include measures to bring the NAP in line with the following EU Farm to Fork Strategy objectives:
 - reduction in the use of fertilisers by at least 20% by 2030;
 - reduction of total nutrient losses by 50% by 2030¹⁶;
 - reductions by 50% the use and risk of chemical pesticides by 2030¹⁷.

N.B. a) As a minimum, include a roadmap for this in the recommended accompanying NAP document; b) If you believe the proposed measures will do this, explain how.

¹² For a detailed discussion on coherence and the intersections between water quality, biodiversity, and climate change / greenhouse gas emissions please see Annex I.

¹³ See: European Commission (2020). Farm to Fork Strategy – for a fair, healthy and environmentally-friendly food system. Available at: https://ec.europa.eu/food/sites/food/files/safety/docs/f2f_action-plan_2020_strategy-info_en.pdf

¹⁴ See: European Commission. (2020) Biodiversity strategy for 2030 - concrete actions. Available at: https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_en

¹⁵ See European Commission (2020) EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil'. Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021DC0400&from=EN>

¹⁶ This is also required by the Towards Zero Pollution Action Plan

¹⁷ This is also required by the Towards Zero Pollution Action Plan

- Include measures to bring the NAP in line with the following 2030 EU Biodiversity Strategy objectives:
 - At least 10% of agricultural area under high-diversity landscape features;
 - At least 25,000 km of rivers restored into free-flowing rivers (incl. *“through the restoration of floodplains and wetlands.”*)

As a minimum, include a roadmap for this in the recommended accompanying NAP document

- Include specific measures to manage and adapt to the risks associated with climate change, including planning for extreme weather events and building landscape resilience
- Decisions regarding final NAP measures should focus on achieving multiple benefits across the above areas (See Table. 1, An Foram Uisce submission for matrix of measures with most multiple benefits.)
- SWAN supports the AFU recommendation that a policy coherence group should be designated to lead coherence and alignment between the national agriculture and environmental policies

5. Measures for the revised NAP

[N.B. Includes measures proposed in the consultation document and measures not proposed but put forward by SWAN]

OVERARCHING COMMENTS

- Regarding the fact that this is the first NAP when not all measures introduced will be incorporated into a new GAPP regulations, SWAN agrees that a *“wider more holistic approach to controlling nutrient and sediment losses from agriculture is needed”*. However, far more information is needed on how such measures will be implemented and controlled if they fall outside the regulatory (GAPP) framework. This is why our earlier recommendation (Section 2) regarding a stand-alone NAP document which clearly sets out the Programme in its entirety is critical.
- SWAN does not believe that the measures as proposed are adequate to address significant nutrient and sediment pollution from agriculture nor break the link between agricultural intensification and declining water quality.

5.1. Chemical Fertiliser Register

SWAN is fully in support of the introduction of a register of chemical fertiliser sales. However, we do not believe that this should take 2½ years to introduce and implement. Furthermore, while the register will provide extremely useful in *“tracking of fertiliser sales and provide a..picture of where fertiliser is being applied to land”* this in itself is not a measure to minimise nutrient input or run-off. In order to assess this proposal, information regarding what is going to be done with this information in terms of controlling nutrient pollution is required.

RECOMMENDATION

- Expedite the introduction of the legislation governing the register of fertiliser sales. Remove the proposed lead in time, since farmers will be tracking the legislative process over more than a year and will be fully aware of it.
- Include in the revised NAP control measures that will be implemented arising from the information obtained via the register, which will reduce N loss to water.

5.2. Improving Compliance

While there is a dearth of publicly accessible data regarding enforcement and compliance, it's clear that there continues to be low levels of compliance with the GAPP regulations, as acknowledged in the consultation document. In particular, SWAN notes that 40% of dairy farms are not compliant with slurry storage requirements and that, according to the recent Teagasc Signpost Series webinar, slurry

spreading during the closed period is a “huge problem” which “seems to be becoming nearly standard practise” in some areas. This is wholly unacceptable and must be urgently addressed.

SWAN welcomes news of “*appropriate reform*” of the sector, including a more integrated transparent approach (See Section 2). However, the authors of the consultation document seem to be pre-empting the findings of the reform and recommendations of the Expert Group by saying that “*it is not expected that there will be significant changes to the enforcement powers of authorised personnel...*” which negates the proposal.

RECOMMENDATIONS:

- Publication of an annual compliance assessment report, which is publicly available and which includes data on inspection and compliance rates, including parameters breached, and enforcement sanctions. This could include spatially mapping at sub-catchment/county scale the findings of GAP inspections
- Establishment a public engagement campaign in rural areas highlighting the requirements of the GAPP regulations and establish a ‘*See it – Say it*’ type reporting mechanism for the public to report non-compliant activities, in particular in relation to slurry spreading.
- The final NAP should provide for reform without pre-emptive constraints. The TOR should be open to public consultation.
- Provision for more robust enforcement of slurry spreading requirements including the application of heavy penalties for spreading in the closed season should be included in the new NAP

INSPECTIONS

- Local authorities should increase their inspection rates and focus inspections in “at risk” areas that are not being addressed by the Local Authority Waters Programme.¹⁸
- The current standardised risk based methodology for the GAPP Regulations farm inspection programme should be reviewed in the context of the EPA WFD characterisation.¹⁹
- The scope of local authority farm inspections should be broadened in catchments of waterbodies at risk from agriculture to cover nutrient management and diffuse nutrients from landspreading, in addition to the farmyard related aspects.”²⁰

¹⁸ From: Environmental Protection Agency (2020) Focus on Local Authority Environmental Enforcement. 2018 Performance Report. Environmental Protection Agency, Wexford, Ireland. Available at: <http://www.epa.ie/pubs/reports/enforcement/performanceframework/EPA%20LA%20ENV%202020%20v6.pdf>

¹⁹ “*Linking the inspection regime with the WFD characterisation work would allow for better targeting of efforts at local authority level, with annual quotas of inspections allocated to each local authority (similar to that for domestic wastewater treatment systems).*” From the EPA submission on the review of the 4th NAP

²⁰ Lunn, L., Lyons, S. & Murphy, M. (2019) Predicting Farms’ Noncompliance with Regulations on Nitrate Pollution. Environmental & Social Research Institute (ESRI)

- Include a provision for additional spot checks, especially during slurry spreading season, without prior notification to the landowner

5.3. Review of ASSAP

SWAN welcomes the external review of ASSAP.

RECOMMENDATIONS:

- Stakeholder consultation on the TOR of the review should be conducted and recommendations from the review should be made public.
- The review must include an assessment of water quality / WFD status results in waterbodies and sub-catchments of participating farms.

5.4. Slurry Storage and Management

SWAN supports the proposed requirements regarding mandatory covers for slurry stores. However we believe a 6 year timeline for existing stores is too long.

RECOMMENDATION:

- The 6 year timeline for requirements regarding mandatory covers for slurry stores should be reduced to 3-4 years. As a minimum, this should happen in catchments of high status waters and those designated at risk by the EPA, with reference to the PIP maps.

5.5. Soiled water Storage and management

We welcome the prohibition on spreading of soiled water between Nov and Jan 15th. SWAN has anecdotal evidence that the supposed spreading of soiled water is used by certain farmers as cover for spreading slurry and this practise must be stopped. However, we are concerned that November 15th is quite late and would welcome further discussion / engagement on this.

RECOMMENDATION:

- While welcoming the proposed prohibition, improved enforcement (Section 5.2) must include measures to ensure permitted soiled water spreading in Sept-Nov and Jan-Feb is not used as cover for slurry spreading.

5.6. Livestock excretion rates

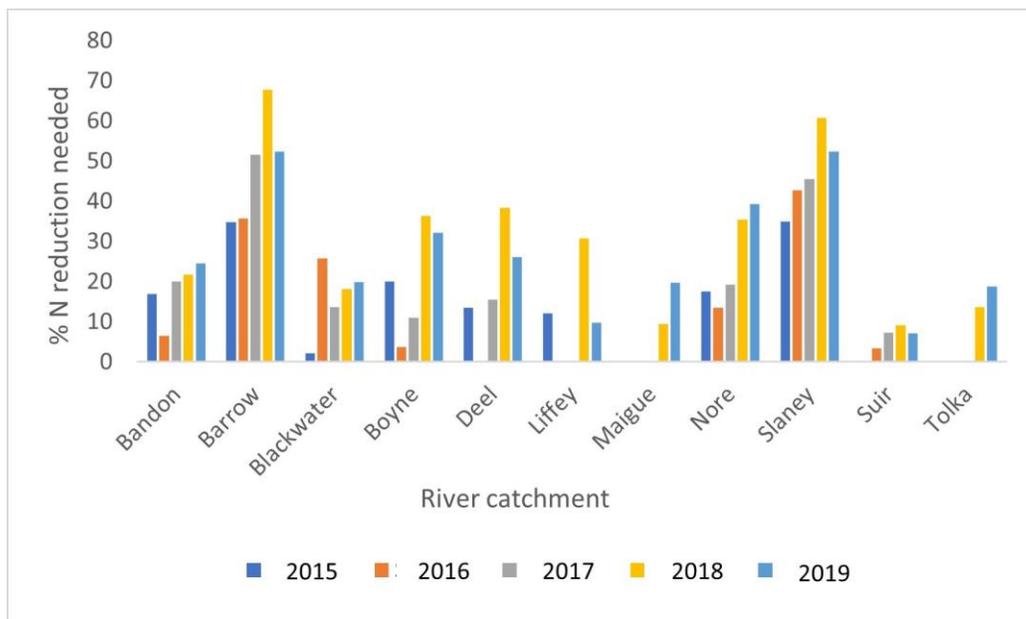
POSITION / RECOMMENATIONS:

- SWAN agrees with the proposal to apply new excretion rates in the banded fashion as set out. SWAN furthermore fully supports the bands being calculated as proposed against annual milk yield (rather than any other metric suggested by stakeholders.)
- We support the introduction of the banding in January 2022 but recommend this should not be phased

5.7. Chemical Fertiliser controls

We note the proposal in the consultation document that *“nitrogen allowances ..will be reduced by 10% nationally and potentially up to 15% in some areas based on the EPA catchment assessment report.”* While SWAN welcomes any reduced nutrient inputs, the question arises as to whether this proposal will deliver the reductions in nitrogen concentrations required to achieve water quality objectives, as set out in the June 2021 EPA report of that name.

SWAN member, An Taisce has calculated the percentage load reduction needed per catchment to achieve the Environmental Water Quality Standard of 2.6 mg/l N in the downstream estuary, based on the Total Load figures provided in the above EPA report. A subset of these results are shown in Figure 2. of the An Taisce submission to this consultation, reproduced below.



Percentage nitrogen (N) load reduction necessary per catchment and year, based on EPA data

It is clear from the total figures in the EPA report, and from the derived percentages above, that the reductions necessary for many catchments far exceed the 10-15% being proposed. For example, the most recent figures for the reductions needed (in 2019) for the Barrow, Blackwater and Boyne rivers are 52%, 20% and 32% respectively. The proposed reductions clearly fall far short of this and must be increased in line with what is required according to EPA catchment analysis.

Teagasc modelling²¹ of the impact of a number of farm nitrogen mitigation measures for delivering the catchment-based nitrate load reductions estimated by the EPA highlighted the linear relationship between N surplus and N leaching. Furthermore, it clearly indicated that this was as a result of chemical N and stocking density. In fact, of the range of policy measures modelled, stocking reduction and reductions in the load of chemical nitrogen were predicted to provide the highest N load reduction.

The modelled increases in N load as a result of high grazing platforms is also notable, in particular as result of urine (See Section 5.10 for more on this).

Since, according to the model, a 20% reduction of chemical N led to a modelled 7% decrease in nitrate loss, it is very important to establish what percentage reduction will be necessary in catchments identified by the EPA as needing anything up to 52% reduction. The proposed 10-15% will not be enough.

Teagasc has the capacity to model load reductions as a result of various measures, and the EPA have indicated how much tonnage of N needs to occur in the polluted catchments. Therefore this analysis should be conducted and presented in support of proposed reductions.

RECOMMENDATIONS

- Load reductions as a result of measures proposed in the new NAP must be modelled and presented before the NAP can be finalised.
- The NAP must provide for the monitoring and strict limiting of total catchment imported N (fertiliser and feed) based on EPA analysis. This must include provision for catchment-based measures.
- This modelling work must be expedited as the matter of urgency, with a view to the addition of a schedule to the GAPP Regulations outlining limits depending on the catchment, similar to the current spatially variable closed season dates.

²¹ Teagasc (2021) The Impact of Nitrogen Management Strategies within Grass Based Dairy Systems

5.8. Phosphorous Build-up, Soil P and managing P loss / pollution

The consultation document reports that one of the main points arising from the Stage I consultation was the *“perceived disproportionate reliance on the soil P test, to determine the risks of nutrient runoff”* that it was *“suggested that the NAP should move away from the reliance on Morgan P testing as a means of assessing run-off risk to waters.”*

This reflects the SWAN position as articulated in our Stage I submission (and previous submissions). However, the presentation of this as “perceived” and “suggested” is inaccurate. It is important to clarify that this reflects the consensus arising from Irish research. Robust rationale, citing a wide range of literature, including that derived for the ACP, is presented in the SWAN Stage I submission (Annex I) and need not be reproduced here.

Rather than acting on the evidence that Soil P is an ineffective and incorrect metric on which to base measurement and management of P loss to water, the consultation document goes on to propose the extending of the soil P build-up facility. While soil P Index 3 may be an agronomically optimum objective, it is not optimum from a water protection perspective since it is only one element in the complex ‘nutrient transfer continuum’²² on which control of P loss to water (pollution) must be based. A clear scientifically-based link between the soil P Index, soil hydrology, drainage category, transfer pathways and LU/ha etc. is required in order to assess whether P build-up is justifiable and possible without P loss to water.

The Stage I consultation document stated that, *“An assessment of the uptake and effectiveness of this measure”* would be undertaken. In response, SWAN recommended that a report of this assessment be included as part of the phase 2 consultation, including water quality trend data for water bodies in sub-catchments where these build-ups have been permitted, and a report on implementation and efficacy of the safeguards in Art. 16(5) of the GAPP regulations. However no such results nor the basis for the proposed extension of the facility are presented in the Stage II consultation document.

In addition to the reliance on Soil P, other significant flaws in the current and proposed NAP include the following:

- Permitting the application of manure to Index 4 soils, which already have excessive P for agricultural production
- The presumption that untested soils are Index 3 (with testing only required every 4 years)²³

²² D. Wall, P. Jordan, A.R. Melland, P.-E. Mellander, C. Buckley, S.M. Reaney, G. Shortle (2011) Using the nutrient transfer continuum concept to evaluate the European Union Nitrates Directive National Action Programme, Environmental Science & Policy, Volume 14, Issue 6, Pages 664-674, ISSN 1462-9011

²³ This provides for gradual enrichment of soils and hence, greater net potential for P emissions to water. The requirement for soil tests only once every 4 years could lead to enhanced loss of P to water because of interim build up of soil P (Irvine & Ní Chuanigh (2011)

- Allowing P addition to peatland soils (>20% organic matter) at a rate equivalent to a soil index 3 soil²⁴

SWAN is cognisant of the limitations of national regulations in controlling P loss, given the site-specific nature of required management. However, the NAP as it stands currently allows for widespread elevated risk of pollution which can and should be addressed at national level. It is in this context that we put forward the following recommendations.

RECOMMENDATIONS

- The P build-up facility should not be expanded. In fact, it should be removed. As a minimum it should be removed from catchments of high status waters
- Prohibit the spreading of slurry on soils of Soil Index 4 or over. Slurry should be exported where necessary to avoid this
- Remove the provision whereby it is assumed that untested soils are Index 3 and require soil testing every 3 years;
- Prohibit P addition to peatland soils (>20% organic matter) unless demonstrated to have minimal potential impact. In particular, and at a minimum this should apply to protected areas of peatlands and those areas with drainage waters to high status sites. OM content must be demonstrated via a soil test
- The provision whereby P load of soils with an index below 3 can be increased must be removed in catchments of high status water bodies as there is substantial evidence that low amounts of P can impact those sites.

5.9. Nutrient management planning

The Stage II consultation document reports that NMP was raised as a significant issue in the stage I consultation and states that *"Mainstreaming the use of these tools and ensuring their regular use will be a key component of any successful NAP."* However this does not then translate into any corresponding proposed measures and currently NMP is only mandatory for derogation farms.

According to the Stage I consultation paper, *"Nutrient Management Planning (NMP) is one of the most efficient means of ensuring a farmer maximises the value of their chemical and organic nutrient inputs."* However, SWAN wishes to emphasise that the maximisation of value of inputs does not necessarily translate into water protection and nutrients losses (N & P) can occur even when good NMP is practised, depending on local conditions (See also Section 5.8)²⁵

²⁴ This provides a high risk of P loss, because of low capacity of peat to hold P.

²⁵ As noted in the Foram Uisce submission, *"Where nitrate is a significant issue in freely draining areas, NMP on intensive farms, is not sufficient to prevent nitrate leaching to underlying groundwater. Where phosphate is a significant issue, NMP is not adequate and pathway interception measures are needed."*

RECOMMENDATIONS

- Mandatory NMP should be rolled out to ALL farms.
- NMP should be revised to not only focus on effective nutrient use and production, but also environmental requirements. Specifically, data from the EPA PIP maps should be incorporated into the online tool

5.10. Grazing Land Management

SWAN welcomes the proposal that the issue of 'map acres' being used to 'reduce' stocking rates must be addressed. The grazing platform is also a key issue for grazing land management. While the limit of 170kgs organic N/ha represents a stocking rate of 2LU/ha, a stocking rate of more than 3.25 LU/ha is common on grazing platforms. It is vital that slurry and fertiliser are spread evenly across the whole land holding in order to abide by the kg/N/Ha threshold and land inaccessible to slurry spreading machinery should be zoned ineligible for land spreading, and removed from the kg/N/Ha calculation.

Additionally, we note from the Teagasc document²⁶ that a significant proportion of N loss in the Teagasc modelling scenario for a farm operating under the current regulations "*originated from urine deposited in paddocks...*" It is not clear how this significant issue will be mitigated for under the new NAP in order to prevent excess leaching.

RECOMMENDATIONS

- SWAN supports the proposal that only land within a certain limit be allowed to be considered in a farm's stocking rate calculation, although we would propose something less than 30km
- Measures to address extremely high stocking rates on grazing platforms, and in particular nitrate leaching from urine deposition, should be included in the NAP. This could include limitation on the grazing window, based on modelling.

5.11. Cattle access to watercourses

SWAN notes that:

1. The initial consultation raised the issue of cattle access and posed the question, "*Should the current requirements of farms be extended and if so, to what extent?*"

²⁶ Teagasc (2021) The Impact of Nitrogen Management Strategies within Grass Based Dairy Systems

2. A significant EPA-funded research project on cattle access to watercourses (COSAIN²⁷) has been completed and published since the last NAP review; the Expert Group report on the 3rd NAP review noted that the COSAIN findings would inform the 4th NAP review.
3. Approximately 95,000 farms have on-farm watercourses of which only 10% are “intensive farms” (>170kgNha⁻¹) and thus subject to prohibition of bovine livestock access to watercourses. This leaves an estimated 85,500 farms with watercourses that have no mandatory controls on animal access.
4. The consultation document reports that the following recommendations emerged in the responses to the Stage 1 consultation: *“The requirement to fence watercourses should be extended to all farms”* and *“All watercourses identified as being at risk from agricultural pressures should be fenced within 3 years.”*

In light of the above, SWAN finds it surprising and less than satisfactory, especially in the absence of an explanation, that no new measures on animal access are proposed.

RECOMMENDATIONS

- The updated NAP should prohibit free bovine access to watercourses on all farms, irrespective of stocking rates.
- This measure should be introduced immediately (allowing reasonable time for farmers to practically comply) for farms in high status catchments and those designated at risk from agriculture.

5.12. Low Emission Slurry Spreading

SWAN welcomes the proposed introduction of compulsory implementation of LESS for all farmers operating above 100 Kg livestock N/ha and for all pig farmers. While this is being proposed in the first instance in order to meet ammonia²⁸ and Agclimatise targets, it is very important to clarify that this measure will also have benefits for watercourses, especially given the risk of ‘drift’, exacerbated by current insufficient buffers and inadequate enforcement of land-spreading requirements. In the

²⁷ hUallacháin, D., Jennings, E., Antunes, P., Green, S., Kilgarriff, P., Linnane, S., O’Callaghan, P., O’Sullivan, M., Regan, F., Ryan, M. and Kelly-Quinn, M. (2020) COSAIN – Cattle Exclusion from Watercourses: Environmental and Socio-economic Implications. Environmental Protection Agency. Wexford, Ireland. Available at: https://www.epa.ie/pubs/reports/research/water/Research_Report_330.pdf

²⁸ it is important to note that low-emissions slurry spreading is frequently presented as the solution to reducing ammonia emissions, but it is only one of a multitude of measures necessary to achieve compliance with the National Emissions Ceiling Directive (NECD) ammonia thresholds.

context of the WFD, it will also have benefits for Groundwater Dependent Terrestrial Ecosystems, such as bogs that are vulnerable to deposition of atmospheric ammonia.²⁹

SWAN notes concerns of the agriculture sector regarding delays in relation to supply of LESS equipment. However, we believe the deadline of 2023 is reasonable. As a minimum, no extensions to this should be granted for farms adjoining high status waters or encompassing Critical Source Areas. Robust enforcement to ensure implementation by derogation farmers should be prioritised in the short term.

RECOMMENDATIONS

- Introduce mandatory implementation of LESS for all farmers above 100 Kg livestock N/ha and for all pig farmers by 2023 as proposed
- Prioritise robust enforcement of the LESS requirement on derogations farms in the short term

5.13. Drinking Water Source Protection

Inadequate drinking water source protection is a significant weakness in the current NAP (see Annex I for detailed SWAN commentary and rationale, including public health risks) because it includes only a blanket exclusion zone for fertiliser application (i.e., chemical, organic or soiled water). While the consultation document, reporting on the Stage I consultation states that, *“A number of submissions suggested that this is an area of the NAP that needs to be strengthened and it also needs to link with ongoing source protection work..”* no proposed measure is put forward to address this. This leaves group water schemes and private wells vulnerable to contamination from agricultural e.g. from land-spreading of slurry³⁰.

RECOMMENDATIONS:

- The NAP should provide for set-back distances that are determined on a scientific basis rather than a ‘blanket’ figure. In particular, set-back distances should be established based on existing GSI Groundwater Protection Schemes, with particular reference to the groundwater protection maps and delineated zones of contribution for drinking water supplies.
- Land-spreading of slurry, fertiliser and soiled water should be prohibited in the zones of contribution of all drinking water supplies
- Where Groundwater Protection Schemes have not yet been developed by the GSI:

²⁹ Kelleghan et al. (2020) Assessment of the Impact of Ammonia Emissions from Intensive Agriculture Installations on Special Areas of Conservation and Special Protection Areas. EPA, Wexford.

³⁰ Private household wells are considered highly susceptible to contamination due to common lack of treatment prior to consumption.

- the NAP should include a specific reference to the need to expedite these (led by GSI)
- The minimum distance for the application of organic fertilizer or soiled water set out in the current NAP for abstractions of $\geq 10\text{m}^3$ /day or serving ≥ 50 persons, should be applied in the interim to all drinking water abstractions of lower volumes

5.14. Buffer zones

RECOMMENDATIONS:

Buffer zones for use of chemical fertilisers

- The buffer zone of 2m specified between watercourses and areas for spreading chemical fertilisers should be increased to a minimum of 10m along surface watercourse. (See Annex I for supporting rationale, which include details on the provision for buffers of 10m-25m in the Forest and Water Quality Guidelines)

Buffer zones for use of organic fertilisers

The distances from watercourses for the spreading of organic fertilisers should be increased³¹ as follows:

- Plots with a slope less than 10% should have a minimum distance of 10m ³² and
- with a slope of greater than 10%, a minimum distance of 20m between a watercourse and spreadlands should be imposed
- Provision for wider and vegetated buffer zones should be included for lands adjacent to high status waterbodies and deemed vulnerable by EPA characterisation.

Buffer Zones for Lake

- The distance of 20m that must be kept from lake shorelines (or a turlough) when applying organic fertiliser or soiled water should be clarified. The Regulations should specify that what is meant by the 'shoreline' is the normal high water level.

³¹ From 5m and 10m (for land with an average incline greater than 10% towards the water)

³² Results from the ACP Phase II provide a strong rationale for maintaining this increased minimum spreading distance throughout the open season rather than the currently required "two weeks preceding and two weeks following" the closed period: One of the key findings of the ACP Phase II was that "Concentrations of P in streams ... don't show pulses of increased losses at the start of the open period.." but rather can be "linked to losses from manure/slurry spreading due to high-rainfall summer storms".

5.15. Other recommendations

Definition of poaching

- A precise definition of 'severe poaching' should be included in the Regulations. The Regulations should clarify whether poaching-related damage refers to the average over the entire plot, or within given areas. The degree of poaching should be specified by the percentage of bare soil, for which there could be a classification system or a stated unacceptable percentage cutoff point.
- The following cut-off points for plots adjoining watercourses, lakes or wells are recommended: 30% bare soil over an entire plot and 50% bare soil in a 100m² area.

ANNEX I

Sustainable Water Network (SWAN)

Fourth Review of Ireland's Nitrates Action Programme - Response to Public Consultation -



January 2020

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1. Introduction and Context

The Sustainable Water Network (SWAN) welcomes this opportunity to make a submission to the initial consultation phase of the 4th review of Ireland's Nitrates Action Programme (herein referred to as NAP).³³ SWAN is an umbrella network of 25 of Ireland's leading environmental NGOs, national and regional, working together to protect and enhance Ireland's aquatic resources through coordinated participation in the implementation of the Water Framework Directive (WFD), Floods Directive, Marine Strategy Framework Directive (MSFD) and other water-related policy and legislation.³⁴

The recently published assessment of Ireland's Environment from the Environmental Protection Agency (EPA) explicitly called attention to the need to restore and protect water quality as one of the key environmental actions for Ireland.³⁵ As a key instrument for protecting waters from agricultural pressures, the Nitrates Directive (ND) and associated NAP are central to addressing this urgent challenge. It is for this reason that, as acknowledged by the EPA, the fourth review of the NAP (in addition to the new Common Agricultural Policy Strategic Plan and the full implementation of the EU Farm to Fork Strategy and Biodiversity Strategy) provide a crucial and timely opportunity to deliver urgent and essential improvements in water quality to ensure compliance with the Water Framework Directive.³⁶

³³ The EU Nitrates Directive (Directive 91/676/EEC) requires the designation of vulnerable zones, adoption of a mandatory code of good practice and implementation of action plans to prevent eutrophication and water pollution. The objective of the directive is: "reducing water pollution caused or induced by nitrates [and phosphates] from agricultural sources and preventing further such pollution." and it requires that "Member States, "...establish action programmes..." in order to achieve these objects. Member States draw up 'Nitrates Action Programmes' aimed at protecting water quality by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices. This includes periods when fertilisation is prohibited and regulation to control the spread of nutrients near water or on slopes to reduce the risk of contamination. The Good Agricultural Practice for Protection of Waters (GAP) Regulations are the national regulations that give statutory effect to the Nitrates Action Plan in Ireland and also (via SI 65 2018) provide for exemptions to the Nitrates Directive requirement regarding the above livestock and input limits (i.e, underpins Ireland's derogation from the Nitrates Directive).

³⁴ SWAN has been actively engaged in Water Framework Directive (WFD) and other water policy implementation at both national and River Basin District (RBD) level since 2004, responding to water-related public consultations and representing the environmental sector on the Irish Water Stakeholder Forum, the National Rural Water Services Committee and the National Water Forum.

³⁵ Environmental Protection Agency (2020) *Ireland's Environment – An Integrated Assessment 2020*. Environmental Protection Agency, Ireland. Available at: www.epa.ie/pubs/reports/indicators/04654-EPA-SoE-Report-2020-Proof-26-FINAL.pdf

³⁶ Environmental Protection Agency (2020) *Water Quality in 2019: An Indicators Report*. Environmental Protection Agency, Ireland. Available at: <https://www.epa.ie/pubs/reports/water/waterqua/Water%20Quality%20in%202019%20-%20an%20indicators%20report.pdf>

This submission to the initial stage of the review builds on previous submissions made by SWAN to the second and third reviews of Ireland's Nitrates Action Programme³⁷ and the 2019 Nitrates Derogation Review.³⁸

2. The need for effective public engagement

As an advocate of effective engagement in water-related policy, SWAN welcomes the opportunity that Stage 1 of the consultation process provides in helping to increase the credibility and effectiveness of policy measures. However, whilst we appreciate plans for a second round of consultation to take place later in 2021, we are nevertheless disappointed by the inadequate approach and unclear scope of the current phase, and absence of critical, contextual information to help facilitate an informed and accessible engagement process.

There is a good reason for prioritising stakeholder participation in water quality issues. Effective engagement with stakeholders in environmental decision-making processes can enhance the robustness and durability of decisions.³⁹ SWAN has consistently outlined its concerns about inadequate water policy related public engagement. Unfortunately, little progress has been made in this regard with regard to agriculture policy.⁴⁰

Equipped with the scientific evidence and knowledge of the implications of a failure to act, the Government must frame public participation in terms of a clear and unwavering commitment to act ambitiously on reversing worsening water quality decline. This is essential to ensure that Ireland lives up to its commitments under the WFD. An important part of this framing is to provide access to all relevant contextual information and data regarding the links between agricultural policy and activity and trends in water status, in order to facilitate full understanding and informed participation.

³⁷ SWAN (2017) Third Review of Ireland's Nitrates Action Programme - Response to Public Consultation. Available at: http://www.swanireland.ie/wp-content/uploads/2019/10/SWAN-Response-Public-Consultation-Third-Review-of-NAP_.pdf

³⁸ SWAN (2019) Public Consultation 2019 Nitrates Derogation Review - Response to Public Consultation. Available at: <http://www.swanireland.ie/wp-content/uploads/2017/08/SWAN-Submission-on-Draft-River-Basin-Managment-Plan..pdf>

³⁹ Reed, M. and Buckmaster, S. (2018). Public perceptions and behaviours towards the water environment Lessons for theory, communication and action. Available at: https://catchmentbasedapproach.org/wp-content/uploads/2018/07/03_COMPLETE_Public_Perceptions_Water_Environment.pdf

⁴⁰ For example, see SWAN (2019) Public Consultation 2019 Nitrates Derogation Review – Response to Public Consultation.

SWAN recommends that the following information gaps be addressed in order to improve the second consultation round.

- Agriculture is the most significant pressure on the Irish water environment, and thus the top contributor to Ireland’s continued failure to meet the legal requirements of the WFD.⁴¹ Absent from the Stage 1 public consultation document is an overview of the current water status trends in Ireland as they relate to agriculture. It is essential that the necessary briefing material, including relevant and current information and data, is prepared and provided as part of the second consultation stage.
- The Stage 1 consultation document rightly acknowledges the need to develop links between water quality plans and programmes, biodiversity strategies and climate adaptation plans “to ensure we are achieving multiple benefits for as many implementation measures as possible.” It signals the direction of travel set by the Farm to Fork Strategy, the EU 2030 Biodiversity Strategy, domestic climate and biodiversity policy, yet there is no information provided on the overarching objectives and targets of these strategies, the implications for the direction of Irish agriculture and the transformative and immediate changes that need to take place in order to bring agriculture in line with these policies and plans. This information would provide an important context in which to position the issues raised for consideration within the consultation document, and the level of overarching ambition now required.
- Clarification should be provided on how Ireland’s NAP and the Nitrates Directive more broadly, impact on water body status and help achieve the WFD “no deterioration” obligation. Also required are key findings from the EPA annual national water monitoring programme and the DAFM funded Teagasc Agricultural Catchments Programme. The latter was put into place to analyse the efficacy of the Good Agricultural Practice (GAP) measures in meeting the water quality requirements of the Nitrates Directive.
- It is noted that the Stage 1 document provides a starting point for delivering on the commitments made in the 2020 Programme for Government. These commitments are a review of the effects of the nitrates derogation on water quality, and to work with farmers who avail of the nitrates derogation to improve environmental outcomes on their farms. Absent however, is important contextual information providing an adequate explanation of what exactly the nitrates derogation is, how it fits within the context of the NAP, and the relevant under-pinning legislative and policy framework (e.g. GAP Regulations; Nitrates Directive; Commission Implementing Decision). In SWAN’s submission to the 2019 Nitrates Derogation Review, we

⁴¹ River Basin Management Plan for Ireland 2015-2021. Available at: https://www.housing.gov.ie/sites/default/files/publications/files/rbmp_report_english_web_version_final_0.pdf

recommended that it is essential to position any review related to the nitrates derogation within its policy context.⁴² As pointed out in that submission, information fundamental to this include:

1. What impact will the further expansion in derogation farming have on the state of Ireland's waters generally, and on the status of water-bodies in catchments of derogation farms?
 2. Does the granting of the derogation have an impact on the meeting of Nitrates Directive and Water Framework Directive (WFD) obligations?
 3. How is nutrient loss from derogation farms prevented when no consideration of physical and hydrological conditions are included in the derogation requirements?
 4. In terms of implementation of the derogation, what is the rate of compliance and what is the nature of non-compliances?
- The EPA (2019) noted in their submission on the Nitrates Directive Derogation that the review of policy and measures would benefit from a strengthened evidence base, including the development of comprehensive information on manure management and the uptake of low emission spreading techniques, and nutrient management of manures and slurries.⁴³ Because of their relevance to the NAP, the delivery of a strong evidence base underpinning these measures would help facilitate a better assessment of their effectiveness, and should be included, if possible, within the next stage of the review.
 - SWAN re-states the EPA recommendations from the above submission here also: In the interests of clarity, a separate NAP document be published which provides an overview of the revised GAP Regulations, including the proposed new measures, and clearly sets out the key actions, controls, responsibilities, monitoring and reporting commitments which will ensure the delivery of the outcomes envisaged by the GAP Regulations..

⁴² SWAN (2019) Public Consultation 2019 Nitrates Derogation Review - Response to Public Consultation.

⁴³ Environmental Protection Agency (2019) EPA - Nitrates Directive Derogation Consultation Submission Final. Available at: <https://www.epa.ie/pubs/epasub/EPA%20-%20Nitrates%20Directive%20Derogation%20Consultation%20Submission%20Final.pdf>

3. Agricultural Impacts on Water Status and Pollution

An overview of worsening water status trends

The link between agricultural pressures and declining water status is well documented in the international literature, reflecting the extent of the problem globally. Significant agricultural pressures include point source pollution associated with manure storage, farmyard drains and animal feedlots, and diffuse (nonpoint) pollution from nutrient (phosphorus and nitrogen) and pesticide applications to crops, and animal grazing fields, which can runoff from land⁴⁴ and/or infiltrate in the soil and reach local groundwater bodies. Pressures also include physical (hydromorphological) alterations to water bodies and wetlands which could ultimately change their hydrology and morphology. Agricultural diffuse sources of pollution are widely recognised as the principal polluters of many rivers and lakes worldwide including those in the Baltic,⁴⁵ Mediterranean,⁴⁶ North America,⁴⁷ Europe,⁴⁸ Australia and New Zealand.⁴⁹

In Ireland, agriculture covers over 67% of the land area and presents the most significant pressure on the country's water environment, responsible for a large proportion of water bodies failing to achieve good status as required by the Water Framework Directive (WFD). Detailed catchment characterisation undertaken by the EPA (2020) highlights that agricultural activities are the most significant suspected source of pollution into Irish water environments, with a direct impact on 53% of the 1,460 water bodies monitored.⁵⁰

⁴⁴ Runoff excess nutrients from fertilised farmland cause elevated nitrogen and phosphorus concentrations in surface waterways, contributing to decline in the ecological health of aquatic habitats. When nutrients are found in excess, in particular phosphorus and nitrogen, eutrophication in rivers, lakes and marine waters can occur, and the associated oxygen losses from the water column leads to negative impacts to the natural biota.

⁴⁵ K. Elofsson, H. Folmer, I.-M. Gren. (2003) Management of eutrophicated coastal ecosystems: a synopsis of the literature with emphasis on theory and methodology. *Ecol. Econ.*, 47 (2003), pp. 1-11

⁴⁶ Y. Panagopoulos, C. Makropoulos, A. Gkiokas, M. Kossida, L. Evangelou, G. Lourmas, S. Michas, C. Tsadilas, S. Papageorgiou, V. Perleros, S. Drakopoulou, M. Mimikou

Assessing the cost-effectiveness of irrigation water management practices in water stressed agricultural catchments: the case of Piniós. *Agric. Water Manag.*, 139 (2014), pp. 31-42

⁴⁷ D.B. Kramer, S. Polasky, A. Starfield, B. Palik, L. Westphal, S. Snyder, P. Jakes, R. Hudson, E. Gustafson. A comparison of alternative strategies for cost-effective water quality management in lakes. *Environ. Manag.*, 38 (2006), pp. 411-425

⁴⁸ E.M. Mockler, J. Deakin, M. Archbold, L. Gill, D. Daly, M. Bruen. Sources of nitrogen and phosphorus emissions to Irish rivers and coastal waters: estimates from a nutrient load apportionment framework. *Sci. Total Environ.*, 601–602 (2017), pp. 326-339

⁴⁹ R.W. McDowell, D. Nash. A review of the cost-effectiveness and suitability of mitigation strategies to prevent phosphorus loss from dairy farms in New Zealand and Australia. *J. Environ. Qual.*, 41 (2013), pp. 680-693

⁵⁰ This is followed by urban wastewater, which impacts 22% of Irish water bodies. See: Environmental Protection Agency (2020) *Water Quality in 2019: An Indicators Report*.

The latest assessment of water quality in Ireland (2013-2018) shows the continuing decline in high status water bodies and an increase in the number of water bodies in poor ecological health. Also observed is a dramatic reduction in the number of pristine rivers, which over a thirty year period, has decreased from over 500 sites to only 20. Such declines are in contravention of the WFD.

Agriculture is specifically linked with recent increases in water pollution from nutrients,^{51, 52} elevated pesticide levels,⁵³ physical alterations to water bodies, and widespread unregulated wetland and riparian drainage⁵⁴ causing sedimentation impacts. Of these issues, nutrients (e.g., nitrate and phosphate) leaching into water bodies are of particular concern, as these are present in slurry, manure and chemical fertilisers widely used in agriculture, and can lead to the eutrophication of rivers, lakes and transitional and coastal waters with serious adverse consequences to the innate biome.

Nitrate and phosphate levels in river sites have risen dramatically since 2015, with recent EPA reports highlighting that the upward trend of nitrate concentrations in nearly half of surface and groundwaters monitored; this is the most alarming issue in water quality at present. High levels of phosphorus in the north-east of the country are impacting on lake biological quality, and high nitrogen concentrations in the south and southeast are damaging the quality of Ireland's estuaries. Concerns from both environmental and human health perspectives are escalating as recent reports show upward trends in nitrate and phosphate concentrations in 44% and 26% of rivers, respectively, and increasing nitrate concentrations in 49% of groundwaters monitored from 2013 to 2019. Issues with nitrates are exacerbated in the south and southeast of the country, due to high intensity agriculture, associated with dairy farming.⁵⁵

Also observed in Ireland's water bodies is the widespread presence of low levels of herbicides (2,6-dichlorobenzamide, MCPA (2-methyl-4-chlorophenoxyacetic acid - widely used in agriculture, MCPA is used to control rushes) and mecoprop (methylchlorophenoxypropionic

⁵¹ Nitrogen pollution is a particular concern in the south and southeast of Ireland where nitrate losses are closely correlated with increasing farm intensity. Environmental Protection Agency (2019) *Water Quality in Ireland. 2013-2018*. Also Environmental Protection Agency (2020) *Water Quality in 2019. An Indicators Report*.

⁵² Ibid., and Environmental Protection Agency (2020) *Ireland's Environment – An Integrated Assessment 2020*.

⁵³ Pesticide-contamination has been identified as an issue in drinking water supplies: http://www.epa.ie/pubs/reports/water/drinking/DW%20Quality%20in%20Public%20Supplies%202019_web.pdf.

⁵⁴ McCarthy, C. (June 17th, 2020) 'Two years on the ground: identifying problems and fixing them', EPA, National Water Event. Available at: https://www.youtube.com/watch?v=MgqW3UwD4KE&ab_channel=EPAlreland

⁵⁵ Environmental Protection Agency (2020) *Water Quality in 2019: An Indicators Report*. See also: Environmental Protection Agency (2020) *Ireland's Environment – An Integrated Assessment 2020*. See also: Environmental Protection Agency (2019). *Water Quality in Ireland 2013-2018*. EPA, Wexford, Ireland. Available at: [https://www.epa.ie/pubs/reports/water/waterqua/Water%20Quality%20in%20Ireland%202013-2018%20\(web\).pdf](https://www.epa.ie/pubs/reports/water/waterqua/Water%20Quality%20in%20Ireland%202013-2018%20(web).pdf)

acid)), with negative implications for sensitive aquatic wildlife and safe drinking water sources. The first two substances occurred in over half of the rivers surveyed and mecoprop was present in over one-third sites (surveyed).⁵⁶ In one project, site specific results from a suspected pesticide release showed a halving in macroinvertebrate richness (from on average 18 taxa to only 10 taxa after three-minutes kick sampling).⁵⁷

The threats posed by agricultural intensification

Undeniably, ongoing intensification represents a very significant threat to inland and transitional waterbodies, especially in areas where water bodies are already at risk. As reported in the EPA-funded COSAINT (Cattle exclusion from watercourses: environmental and socio-economic implications) project: Seventy three percent of farms (95,000 from a total of 129,600) have on-farm watercourses.⁵⁸ Of this proportion, approximately 10% are intensive farms (>170kgNha⁻¹). The EPA report that almost 7000 intensively stocked farms availed of the derogation in 2018. It is estimated that these 7000 farms represent 11 per cent of the farmed area and 20 per cent of bovine livestock. A further 5000 farms representing 13 per cent of bovine livestock exceed the 170 kg of livestock manure nitrogen/hectare limit but these farms either export manure or take other actions to comply with the limit.⁵⁹

This link between intensification and declining water status has been proven, even before the lifting of milk quotas in 2015 and the significant increase in farm animals in recent years. Donohue et al. (2006) found significant inverse relationships between a range of land-use pressures, including agricultural intensity and cattle densities, and ecological status in 797 river catchments in Ireland.⁶⁰

More recent analysis from the AGRIBASELINE project shows a link between a decline in species richness and abundance in aquatic environments and increasing agricultural intensity and associated nutrient/organic pollution. Project findings note that “*Most of the taxa missing from the higher agricultural intensity catchments are known pollution-sensitive species or rare and less common species of Ephemeroptera (e.g. Centroptilum luteolum Müller, 1776, Paraleptophlebia*

⁵⁶ Environmental Protection Agency (2019). *Water Quality in Ireland 2013-2018*.

⁵⁷ Kelly-Quinn, M., Feeley, H., & Bradley, C. (2020). Status of freshwater invertebrate biodiversity in Ireland's rivers – time to take stock. *Biology and Environment: Proceedings of the Royal Irish Academy*, 120B(2), 65-82. doi:10.3318/bioe.2020.09

⁵⁸ Ó hUallacháin, D., Jennings, E., Antunes, P., Green, S., Kilgarriff, P., Linnane, S., O’Callaghan, P., O’Sullivan, M., Regan, F., Ryan, M. and Kelly-Quinn, M. (2020) COSAINT – Cattle Exclusion from Watercourses: Environmental and Socio-economic Implications. Environmental Protection Agency. Wexford, Ireland. Available at: https://www.epa.ie/pubs/reports/research/water/Research_Report_330.pdf

⁵⁹ Environmental Protection Agency (2020) *Ireland’s Environment – An Integrated Assessment 2020*.

⁶⁰ Donohue, I., McGarrigle, M.L. and Mills, P., (2006) Linking catchment characteristics and water chemistry with the ecological status of Irish rivers. *Water Research* 40, pp. 91–98

cincta (Retzius, 1783), *Ephemera danica* Müller, 1764), *Coleoptera* (various) and *Trichoptera* (e.g. *Chaetopteryx villosa* (Fabricius, 1798), *Limnephilus lunatus* Curtis, 1834, *L. marmoratus* Curtis, 1834), amongst others.”⁶¹

These deteriorating trends have been driven by changing agricultural pressures (in animal numbers, stocking density, and related inputs (animal feed and fertiliser) and output (animal manure)).⁶² Over the past decade, total area farmed (crops and pasture) in Ireland increased by 1.0%, with the total numbers of cattle, pigs, and sheep in the country also increasing by 4.4%, 4.1% and 2.8%, respectively.⁶³ Despite 12.2% decrease in fertiliser sales in Ireland from 2013 to 2018,⁶⁴ efforts to lower nitrate and phosphate emissions from agriculture have been insufficient.

Worryingly, despite the alarming trends in water quality detailed here, the Teagasc Strategy for the dairy sector (launched in November, 2020) envisages a further increase in dairy cow numbers to 1.65 million by 2027. As consistently emphasised by the EPA, delivering continued agricultural expansion, especially in the dairy sector, while protecting our water environment presents a very significant challenge for Ireland.

The implications for public health

Where found in large quantities in drinking waters, these contaminants can lead to serious illnesses in humans⁶⁵, a notable issue in groundwaters as over 170,000 private and unregulated household wells are used for drinking across the country, mostly with no specific nitrate treatment.⁶⁶ Faecal

⁶¹ Kelly-Quinn, M., Feeley, H., & Bradley, C. (2020). Status of freshwater invertebrate biodiversity in Ireland's rivers – time to take stock. *Biology and Environment: Proceedings of the Royal Irish Academy*, 120B(2), 65-82. doi:10.3318/bioe.2020.09

⁶² Nitrogen and phosphorous fertiliser use increased by 38% between 2011 and 2018. 45 million tonnes (Mt) of animal manures is produced annually and spread on grasslands, along with nitrogen fertilisers (369,000 tonnes in 2017). An average dairy farm uses about three times the nitrogen input per hectare compared to an average beef cattle farm.

⁶³ Central Statistics Office (2020) *Statistical Yearbook of Ireland 2020. Crops and Livestock*.

Available at: <https://www.cso.ie/en/releasesandpublications/ep/p-syi/statisticalyearbookofireland2020/agri/cropsandlivestock/>

⁶⁴ Central Statistics Office (2020) *Environmental Indicators Ireland 2020 - Land Use*. Available at:

<https://www.cso.ie/en/releasesandpublications/ep/p-eii/environmentalindicatorsireland2020/landuse/>

⁶⁵ HPSC (Health Protection Surveillance Centre) (2017). Annual Epidemiological Report 2017. Health Protection Surveillance Centre, Dublin, Ireland. Available at: <https://www.hpsc.ie/a-z/gastroenteric/vtec/publications/annualreportsonepidemiologyofverotoxigenicecoli/VTEC%20infection%20in%20ireland%202017.pdf>

⁶⁶ O'Neill, E., Devitt, C., Waldron, R., and Bullock, C. (2016). Relay Risk: Examining the Communication of Environmental Risk through a Case Study of Domestic Wastewater Treatment Systems in the Republic of Ireland. EPA, Ireland. Available at:

contamination of waterbodies rapidly increases after rainfall events, as pathogens can remain viable and survive on grass and in the upper layers of soil for greater than one week.⁶⁷ This will become increasingly problematic under climate changing conditions and extreme weather events. It is estimated that up to 30% of private wells in operation in Ireland are contaminated with E. coli. Indeed, Ireland reports one of the highest crude incidence rates of verotoxigenic Escherichia coli2 (VTEC) infection in the European Union, with evidence showing a link between infection, private well use and cattle density.^{68, 69}

Greater efforts now required by the NAP

In 2014, the main reasons for breaches of the GAP Regulations in 2014 related to poor collection of organic manures (37%), poor management of clean water (18%), storage structural defects (16%), poor storage of organic manures (15%) and stockpiling in a prohibited period (9%).⁷⁰

Of the breaches found in 2018, 56% were due to the poor management of livestock manures and other organic fertilisers, 16% were due to failure to minimise soiled water contamination and 12% were due to structural defects in manure storage facilities.⁷¹

These figures show that there is clearly room for significant improvement in the management of manures and organic fertilisers (breaches for poor management of soiled waters can be solved by reasonably straightforward changes in the management of farmyards).

The stark findings on water quality indicators detailed in this section of the submission must be met with further efforts by the NAP to ensure compliance with the Regulation. As such, urgent measures must be implemented to meet targets set in Ireland's River Basin Management Plan 2018-2021 and the WFD. It is also important to emphasise that the capacity and resilience of Ireland's waters to recover from the impacts of further pollution is being greatly reduced. The

<https://www.epa.ie/researchandeducation/research/researchpublications/researchreports/EPA%20167%20final%20web%20Essentra%20LC%20amended.pdf>

⁶⁷ (Cormican et al., 2012), (Fenlon et al., 2000)

⁶⁸ HPSC (2017) Annual Epidemiological Report 2017.

⁶⁹ Óhaiseadha, C., Hynds, P., Fallon, U. and O'Dwyer, J. (2017). A geostatistical investigation of agricultural and infrastructural risk factors associated with primary verotoxigenic E. coli (VTEC) infection in the Republic of Ireland, 2008-2013. *Epidemiology and Infection*. 145(1):95-105. Doi: 10.1017/S095026881600193X.

⁷⁰ Environmental Protection Agency (2016) *Ireland's Environment – An Integrated Assessment 2016*. Available at: http://www.epa.ie/pubs/reports/indicators/SoE_Report_2016.pdf

⁷¹ Environmental Protection Agency (2020) *Ireland's Environment – An Integrated Assessment 2020*.

impacts of climate change and extreme weather events will only exacerbate pollution risks and water quality vulnerabilities.^{72, 73, 74}

SWAN welcomes the amendments included in the 3rd NAP that go in some way to intercepting and breaking nutrient transport pathways, and preventing sediment and nutrient losses to waters. These measures include the requirement applying to more intensive farms that bovine livestock are excluded from watercourses ((Art. 17(18)), the ban of direct runoff of soiled water to waters from i) farm roadways and ii) poaching ((Art. 17(20)), and that supplementary drinking points are set back at least 20 m from watercourses (Art. 17(19)). **We recommend the application of these water protection measures to all farms, with a particular emphasis on farms in high status catchments and in sub-catchments with waterbodies deemed to be at risk from agriculture.**

Despite these amendments, SWAN reiterates its serious concerns regarding the failure of the GAP regulations as they currently stand, to control nutrient run-off as evidenced by recent agriculture-related water pollution trends. Evidence previously presented by the EPA Catchment Characterisation Programme (and associated EPA Water Quality monitoring) and the Teagasc Agricultural Catchments Programme shows that the Nitrates Regulations are insufficient to protect water from agricultural impacts.^{75, 76}

⁷² Environmental Protection Agency (2020) *Ireland's Environment – An Integrated Assessment 2020*.

⁷³ Environmental Protection Agency (2019) *The impacts of climate change on Irish groundwater resources*. Available at: <https://www.catchments.ie/the-impacts-of-climate-change-on-irish-groundwater-resources>

⁷⁴ Ockenden, M et al. (2017). Major agricultural changes required to mitigate phosphorus losses under climate change. *Nature Communications* 8 (161), <https://doi.org/10.1038/s41467-017-00232-0>

⁷⁵ Archbold, M., Bruen, M., Deakin, J., Doody, D., Flynn, R., Kelly-Quinn, M., Misstear, B. and Offerdinger, U. (2010) Contaminant movement and attenuation along pathways from the land surface to aquatic receptors - A Review. *STRIVE Report No. 56*. Environmental Protection Agency, Wexford. Available at: https://www.epa.ie/pubs/reports/research/water/STRIVE_56_Archbold_ContaminantsPathwaysReview_web.pdf

⁷⁶ Teagasc (2017) *Agricultural Catchments Programme Phase 2 Report*. Teagasc, Wexford. Available at: https://www.teagasc.ie/media/website/publications/2018/ACP_Phase_2_Report.pdf

4. The need to align with overarching policy ambition

SWAN welcomes acknowledgement in the Stage 1 consultation document of the need for better policy alignment across water, biodiversity, and climate, given the context now provided by the EU Farm 2 Fork Strategy and EU Biodiversity Strategy for 2030.

These EU-wide strategies signpost a new target-driven pathway to lower agri-chemical dependence, ensure better diets, increase food security and look to a better future for farmers and rural communities. As noted earlier in this submission, absent from the consultation document is an account of these overarching strategies, their implications for Ireland, and critically, the role of the GAP Regulations, if any, in helping to achieve the objectives set by these Strategies.

What is clear is that a step-change in domestic policy is now required in response to the direction of travel set by the EU Green Deal,⁷⁷ the Farm to Fork Strategy,⁷⁸ and EU 2030 Biodiversity Strategy.⁷⁹ EU member states, including Ireland, will be required to set national values for the relevant targets set out in these Strategies.

The EU Farm to Fork Strategy⁸⁰ proposes a reduction in the use of fertilisers by at least 20% by 2030 and a reduction of total nutrient losses by 50%. It is expected that national policies of Member States will be in line with these targets. Under the same Strategy, Member States are required to implement far-reaching measures to fully implement existing legislation on nutrient pollution, to avoid the associated nutrients leakages that pollute air and water. The Commission will develop with Member States an integrated nutrient management action plan to reduce and prevent further pollution from excessive use of fertilisers and to foster the recycling of nutrients from different kinds of organic waste as fertilisers. This will contribute to deliver the “zero pollution ambition” of the EU Green Deal. Targets contained within the Farm to Fork Strategy include:

⁷⁷ Communication from the Commission to the European Parliament, the European Council, The Council, the European Economic and Social Committee and the Committee of the Regions. The European Green Deal. COM/2019/640 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52019DC0640>

⁷⁸ Communication from the Commission to the European Parliament, the European Council, The Council, the European Economic and Social Committee and the Committee of the Regions. A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system. COM/2020/381 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0381>

⁷⁹ See: European Commission. (2020) Biodiversity strategy for 2030 - concrete actions. Available at: https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_en

⁸⁰ The Strategy aims to “guarantee a fair, healthy and environmentally friendly food system, whilst ensuring farmers’ livelihoods. It covers the entire food supply chain, from cutting the use of pesticides and sales of antimicrobials by half and reducing the use of fertilisers to increasing the use of organic farming”. See: European Commission (2020). Farm to Fork Strategy – for a fair, healthy and environmentally-friendly food system. Available at: https://ec.europa.eu/food/sites/food/files/safety/docs/f2f_action-plan_2020_strategy-info_en.pdf

- Reduce by 50% the overall use of – and risk from – chemical pesticides by 2030 and reduce by 50% the use of more hazardous pesticides by 2030;
- The reduction of use of fertilisers by at least 20%;
- At least 10% of agricultural area is under high-diversity landscape features;
- At least 25% of agricultural land is under organic farming management, and the uptake of agro-ecological practices is significantly increased.

The EU Green Deal also introduced a Biodiversity Strategy for 2030. The Strategy aims to protect nature, reverse the degradation of ecosystems and halt biodiversity loss. Specific agricultural and direct water quality related targets include:

- At least 10% of agricultural area under high-diversity landscape features.
- At least 25% of agricultural land under organic farming management, and the uptake of agro-ecological practices is significantly increased.
- At least 25,000 km of free-flowing rivers are restored.
- The losses of nutrients from fertilisers are reduced by 50%.

The proposed EU legislative initiative for a framework for a sustainable food system could indeed lead to a much needed systemic change in the direction of Irish agriculture. However, to achieve this, SWAN emphasises that it is imperative that the goals and requirements of EU’s water legislation, in particular, the WFD and the Nitrate Directive must be fully realised and that the next NAP is fully aligned with the WFD and EU Farm to Fork and Biodiversity Strategies.

5. Responses to issues for consideration in the 4th review of the NAP

The following sections of the submission addresses some of the key issues for consideration presented in the Stage 1 consultation document.

5.1. Cattle access, and preventing pollution caused by silt runoff

Allowing livestock to poach land and unrestricted access to drink from watercourses is contrary to Codes of Good Agricultural Practice and constitutes a significant risk to the ecological status of the waterbody. In Ireland, where over 90% of agricultural land is devoted to grassland, most of the phosphorus from fertilizers and animal manures tends to accumulate in the top couple of centimetres of soil.⁸¹

Erosion of this top layer can add significant amounts of nutrients to waters, with causes of erosion related to unrestricted cattle access to watercourses or by a feeding point being located close to a watercourse. These variables, in addition to siltation, can cause direct runoff of manure. Increased stream sediments as a result of cattle access can act as reservoirs for faecal bacteria and phosphorus, and evidence shows an increase in total phosphorus, *Escherichia coli*, turbidity and suspended sediment when cattle are in the stream.^{82, 83} Furthermore, the overgrazing of river banks can increase bank instability.

The review of the NAP Expert Group to the 3rd review noted that the findings of the EPA-funded COSAINT project will be considered in the 4th review. This project reported the following:⁸⁴

- Ireland has 129,600 farms comprising 2.9 million fields in Ireland; 95,000 of these farms and 382,000 fields adjoin a watercourse.

⁸¹ Tunney, H., Kurz, I., Bourke, D., O'Reilly, C., Jeffrey, D., Dowding, P., Foy, B., Kilpatrick, D. and Haygarth, P., (2007). *Eutrophication from Agricultural Sources: The Impact of the Grazing Animal on Phosphorus, Nitrogen, Potassium and Suspended Solids Loss from Grazed Pastures – Field-Plot study*. Environmental Protection Agency, Wexford, Ireland.

⁸² Conroy, E., Turnet, J.N., Rymaszewicz, A., O'Sullivan, J.J., Bruen, M., Lawler, D., Lally, H. and Kelly-Quinn, M., (2015). The impact of cattle access on ecological water quality in streams: examples from agricultural catchments within Ireland. *Science of the Total Environment* 547: 17–29, <https://doi.org/10.1016/j.scitotenv.2015.12.120>

⁸³ Bragina, L., Sherlock, O., van Rossum, A.J. and Jennings, E., (2017). Cattle exclusion using fencing reduces *Escherichia coli* (*E. coli*) level in stream sediment reservoirs in northeast Ireland. *Agriculture, Ecosystems and the Environment* 239: 349–358.

⁸⁴ Ó hUallacháin et al. (2020) *COSAINT – Cattle Exclusion from Watercourses: Environmental and Socio-economic Implications*.

- 73% of farms therefore have on-farm watercourses, and of these farms, 10% are “intensive farms” (>170kgNha⁻¹). Notably, the share of farms with watercourses is disproportionately higher for intensive farms.
- Cattle access had an impact on sediment deposition and turbidity, stream habitats and associated biodiversity, on nutrient parameters, and E. coli levels in sediment and water.
- The driver of change in macroinvertebrate communities was associated with direct impacts on habitat and associated higher levels of sediment deposition at access points, rather than nutrient-driven change.
- The threat to animal and human health as a result of unrestricted cattle access to watercourses is not confined to the grazing period.
- A correlation exists between the (projected) level of use of the access point (i.e. stocking rate per hectare) and the degree of impact.
- Socio-economic, demographic and psychological variables influence farmers’ intentions to fence off watercourses. Improving farmer knowledge can help improve their confidence in their ability to carry out water protection measures, including fencing off watercourses.
- Fencing/exclusion of cattle from watercourses can contribute to an improvement (particularly in bed sediment mass and macroinvertebrate community health) in ecological quality of watercourses over the short and long term. However, as mitigation measures, fencing and cattle exclusion alone may not be sufficient in restoring the ecological health of the watercourse.
- A combination of multiple, targeted mitigation measures are recommended for future policy, including targeted riparian buffer management, the provision of an alternative water source and grazing management. These measures in turn will help deliver multiple ecosystem benefits, including biodiversity value and carbon sequestration.⁸⁵
- Additional, more frequent monitoring of short-term and long-term cattle exclusion sites, across a broader range of geographies and farming intensities, would be beneficial to further characterize changes in in-stream biotic.

Ideally all cattle should be watered with a piped supply to drinking troughs. However, for some farmers, their animals need access to the watercourse, and fencing is not always feasible.⁸⁶

⁸⁵ The authors note that this approach could be facilitated under revisions of the Common Agricultural Policy. The quantity of the mitigation measure could be incentivised under Pillar 1 payments, but the performance (linked with targeting and management) of associated measures could be incentivised under the results-based approaches within Pillar 2 payments.

⁸⁶ Ó hUallacháin et al. (2020) *COSAINT – Cattle Exclusion from Watercourses: Environmental and Socio-economic Implications*.

Alternative sources of water supply and avenues to incentivise their implementation must be explored. Options include the provision of: i) mains fed drinking troughs (where available); ii) pasture pumps; iii) solar pump fed water troughs; iv) other pump fed troughs, or solar/nose pumps in more extensive areas. In practice, these options can be difficult to achieve on some farms. In such instances, the Regulations should only allow for use of restricted drinking points on water bodies, and access points must be fenced off to prevent animal movement upstream or downstream.

In light of these considerations and the findings of the COSAINT project, SWAN recommends that:

- The regulations should prohibit free bovine access to watercourses on all farms, irrespective of stocking rates. We support the recommendation made by the EPA in their response to the 4th draft NAP that particular attention be applied to farms located within sensitive catchments.⁸⁷ For instance, this could be: i) pearl mussel water bodies, ii) high status WFD objective water bodies, where there is unlikely to be a high density of intensive farms and iii) upstream of drinking water sources. Access by bovines must be prevented by fencing to within 1.5m from the top of the bank of a watercourse.
- Any amendments to the regulations should include the provision of information and knowledge/capacity-building material on appropriate approaches to prohibit livestock accessing watercourses.
- More broadly (out of the remit of the NAP), Ireland's CAP Strategic Plan should include incentives for the provision of alternative water supplies, and as suggested by the COSAINT project, multiple interacting mitigation measures (such as field buffer zones) could be facilitated under the CAP Pillar 1 and Pillar 2 payments.

5.2. Phosphorous Build-up (including wider comments on P and N impact assessment)

As highlighted repeatedly by SWAN in previous submissions on water quality, a fundamental flaw in the Regulations is that the assessed risk of nutrient loss from soils to water is based almost entirely on soil phosphorus levels measured by the standard soil Phosphorus (P) test, Morgan's P.

⁸⁷ Environmental Protection Agency (2017) EPA submission on the Draft 4th Nitrates Action Programme (NAP). Available at: <https://www.epa.ie/pubs/epasub/SCP170901.2%20EPA%20Submission%204th%20Nitrates%20Action%20Programme%2028-11-2017.pdf>

This test was developed as an agronomic indicator (from samples taken to 10cm depth for agronomic recommendations) of P requirements for crop growth, not for assessing the desorption of phosphorus from soils. Over time, it has come to be used to indicate risk of P loss from agricultural areas. However, with regard to sample depth and extraction solution, its suitability as an environmental indicator has been questioned⁸⁸ and there is a significant body of recent research demonstrating that soil P tests are not an efficient means of testing for phosphorus runoff risk.

The current measures in the Regulations and in the derogation conditions aim to reduce the risk of diffuse nutrient loss to water by primarily setting phosphorus input limits, linked to livestock units and based on the soil P index, while allowing soil phosphorus levels across all catchments to increase to Index 3, and indeed to Soil P 4 in certain conditions. The lack of linkage between Soil P and water quality is also highlighted in the Natura Impact Statement For Ireland's Nitrates Action Programme.^{89,90} There is a high risk of nutrient loss from agricultural soils when pressures from nutrient sources coincide with pathways of nutrient transfer. A significant omission in the Regulations is any consideration of pathway risks.

There needs to be a clear scientifically-based link between the soil P Index, soil drainage category and LU/ha in order to assess whether P build-up is justifiable. While soil P Index 3 may be an agronomically optimum objective, it is not optimum from a water quality perspective – in poorly draining areas, P index 3 soils pose a threat to water quality which needs to be mitigated by pathway interception measures. Furthermore, the pressure (or livestock units (LUs)) is not the primary driver in areas susceptible to P loss. This highlights the fact that the nitrates derogation, which is based on LUs, will not adequately deal with the impact on water bodies of phosphate arising from farming and that mitigation measures need to focus on pathway interception, particularly in the focussed flow delivery zones or ‘hot spots’ for phosphate runoff in critical source areas.

Transfer pathways have been highlighted as a major factor in determining the risk of nutrient loss to waters by research over many years by the EPA, Teagasc,⁹¹ and most recently by the Agricultural Catchments Programme Phase II report.⁹² One of the key findings in this latter report

⁸⁸ Daly, K. (2005) Evaluating Morgan’s Phosphorus Test as an Environmental Indicator. Teagasc Project Report, 4976. Available at: <https://t-stor.teagasc.ie/handle/11019/1243>

⁸⁹ Government of Ireland (2018) Natura Impact Statement For Ireland's Nitrates Action Programme. Dublin

⁹⁰ As indicated by Irvine & Ní Chuanaigh, “The adequacy of soil index 3 as a reasonable threshold to be used for the protection of surface and groundwaters is unproven”. See: Irvine, K. and Ní Chuanigh (2011) Management Strategies for the Protection of High Status Water Bodies: A Literature Review. STRIVE Report (2010-W-DS-3). Environmental Protection Agency, Wexford

⁹¹ Archbold, M. et al. (2010) Contaminant movement and attenuation along pathways from the land surface to aquatic receptors-a review. STRIVE Report No. 56.

⁹² Teagasc (2017) Agricultural Catchments Programme Phase 2 Report.

was that soil type and geology are better predictors than soil P level for predicting phosphorus loss from agricultural land.⁹³

P indices are not sufficient to indicate the risk of P loss from agricultural soils. Currently, the regulations include measures that are inadequate and, in some circumstances, place further pressures from nutrient sources on water bodies. These measures include:

- Sole use of the soil test method Morgan's P to characterise the potential for phosphorus loss from agricultural soils;
- Only one soil type differentiation of less than or greater than 20% organic matter;
- Allowing all soils to increase to Index 3;
- Allowing application of manure to Index 4 soils,
- Allowing previously unimproved land to be subject to fertilization,
- Inadequate soil testing intervals,
- Inadequate buffer zones,
- Inadequate specifications of definitions pertaining to fertilizer application regarding rainfall events, soil conditions and sloping lands.

Nutrient source pressures and transfer pathways vary considerably throughout different catchments and regions of the country, and depend on soil permeability and geology.⁹⁴ SWAN recommends that measures to address this variability especially in relation to nutrient loss risk should be provided for in the GAP Regulations.

- Highly mobile in soil water, nitrate typically leaches from a surface source to groundwater and enters a waterbody via subsurface pathways. This occurs in free-draining soil.⁹⁵
- Phosphorus transfer pathways are dominated by overland flow on poorly draining soil. dictated by diffuse sources from rainfall-events, these may also leach into groundwater.⁹⁶

⁹⁷

⁹³ Ibid.

⁹⁴ Archbold, M., Bruen, M., Deakin, J., Doody, D., Flynn, R., Kelly-Quinn, M., Misstear, B. and Ofterdinger, U. (2010) Contaminant movement and attenuation along pathways from the land surface to aquatic receptors-a review. STRIVE Report No. 56. Environmental Protection Agency, Wexford.

⁹⁵ Jiao, P., Xu, D., Wang, S., Wang, Y., Lin, K., and Tang, G. (2012) 'Nitrogen loss by surface runoff from different cropping systems'. Soil Research. 50: 58-66.

⁹⁶ Jordan, P., Arnscheidt, A., McGrogan, H. and McCormick, S. (2007) 'Characterising phosphorus transfers in rural catchments using a continuous back-side analyzer'. Hydrology and Earth System Sciences. 11(1): 372-381

⁹⁷ Jordan, P., Melland, A.R., Mellander, P.E., Shortle, G. and Wall, D. (2012) 'The seasonality of phosphorus transfers from land to water: Implications for trophic impacts and policy evaluation'. Science of the Total Environment. 434: 101-109.

In a study of five Irish catchments of varying soil type and P and N transfer risk, significant differences were found in P attenuation and loss between catchments. The less intensive catchments that had a lower proportion of Index 4 fields, and which therefore may be considered less risky, in conjunction with their soil hydrology properties actually posed a greater risk to waterbodies.⁹⁸ The catchments with permeable soils were dominated by subsurface N transfer pathways and those of poor-moderate drained soils were characterized by near-surface and surface P pathways.^{99, 100}

As highlighted by Deakin et al. (2016), in order to successfully achieve the objectives of the WFD, a site-specific, three dimensional understanding of contaminant transfer pathways is necessary. In addition, the authors conclude that:

“where P is the limiting nutrient, as it is in the majority of Irish freshwaters, reducing the diffuse source load as a measure on its own is unlikely to result in improved water quality outcomes... Characterising the nature of the hydro(geo)logical pathway linkages, and the nature of that pathway, provides a critical part of the evidence base for selecting the most effective measures.”¹⁰¹

A significant omission from the current GAP regulations is any substantial provision for the consideration of nutrient loss risk from these soils based on a range of other, more pertinent factors, including soil hydrology and transfer pathways. Nutrient sources and transfer pathways must be considered in nutrient loss risk assessment because the management of source pressures alone will not yield the expected reductions in P loss from land to water.¹⁰²

⁹⁸ Wall, D.P., Murphy, P.N.C., Melland, A.R., Mechan, S., Shine, O., Buckley, C., Mellander, P.E., Shortle, G. and Jordan, P. (2012) Evaluating nutrient source regulations at different scales in 5 agricultural catchments. *Environmental Science and Policy*. <http://dx.doi.org/10.1016/j.envsci.2012.06.007>.

⁹⁹ Mellander, P.E., Melland, A.R., Jordan, P., Wall, D.P., Murphy, P.N.C and Shortle, G. (2012) Quantifying nutrient transfer pathways in agricultural catchments using high temporal resolution data. *Environmental Science and Policy*. <http://dx.doi.org/10.1016/j.envsci.2012.06.004>

¹⁰⁰ The ACP Report states that “A grassland catchment with a flashy hydrology had three times higher annual P loss than an arable, mostly groundwater fed catchment despite the latter having higher soil P sources prone to losses.” See: Teagasc (2017) Agricultural Catchments Programme Phase 2 Report. Teagasc, Wexford

¹⁰¹ Deakin, J., Flynn, R., Archbold, M., Daly, D., O'Brien, R., Orr, A., and Misstear, B. (2016) Biology and Environment: Proceedings of the Royal Irish Academy, Vol. 116B, No.3 pp. 233-243

¹⁰² There is a high risk of nutrient loss from agricultural soils when pressures from nutrient sources coincide with pathways of nutrient transfer. The interception of these pathways offers a more effective solution (rather than the primary focus on the management of nutrient sources) to halt the loss of nutrients from farms. Variables that contribute to the risk of nutrient loss from Irish soils include type of land use, soil nutrient levels, the grass growth season, and drought occurrence. The key pathway factors are soil drainage capacity and the quantity, seasonality and intensity of rainfall. See: Schulte, R.P.O., Richards, K., Daly, K., Kurz, I., McDonald, E.J. and Holden, N.M. (2006). 'Agriculture, Meteorology and Water Quality in Ireland: A regional evaluation of pressures and pathways of nutrient loss to water'. *Biology and Environment*. 106B(2): 117-133

According to the EPA, “*achieving successful WFD outcomes depends on having a site-specific, three dimensional understanding of contaminant transfer pathways*” and that “*Where P is the limiting nutrient, as it is in the majority of Irish freshwaters, reducing the diffuse source load as a measure on its own is unlikely to result in improved water quality outcomes*”.¹⁰³ This paper also concludes that “*One of the key principles adopted for the river basin management planning process in Ireland, moving into the second cycle, is putting ‘the right measure in the right place’ ... Characterising the nature of the hydro(geo)logical pathway linkages, and the nature of that pathway, provides a critical part of the evidence base for selecting the most effective measures.*”

SWAN recommends that Critical Source Areas and the interception of the nutrient transport pathway, not Soil P thresholds, must be at the centre of any strategy to manage agricultural water pollution, including on derogation farms.

Looking specifically at P build-up, SWAN has significant concerns regarding potential impacts on the water environment. There is still a risk of P loss from fields with Soil P 1 and 2 and we do not believe that the safeguards provided in the NAP address this risk.

SWAN welcomes the commitment in the consultation document that an assessment of the effectiveness of this measure will be undertaken as part of this review of the NAP and we recommend that a full report of this assessment be included as part of the phase 2 consultation. This assessment must present water quality trend data for water bodies in sub-catchments where these build-ups have been permitted. Furthermore it must provide a report of the implementation and efficacy of the safeguards in Art. 16(5) of the GAP regulations in preventing P runoff to waters.

We also recommend that information and specific details of the knowledge transfer measure be set out in the explanatory NAP document we are recommending.”

5.3. Record keeping

Record keeping and monitoring activities is an essential part of farm life for reasons ranging from tax return and regulatory reasons to improving farm performance. With that, a lot of the data which must be recorded due to nitrates regulations is already recorded as part of other farm-related needs.¹⁰⁴ As such, it is reasonable to conclude that the addition of record keeping for nitrate

¹⁰³ Deakin, J., Flynn, R., Archbold, M., Daly, D., O'Brien, R., Orr, A., and Misstear, B. (2016) Biology and Environment: Proceedings of the Royal Irish Academy, Vol. 116B, No.3 pp. 233-243

¹⁰⁴ For example, “data on livestock numbers on all farms in the country are already recorded as part of the Cattle Movement Monitoring System (CMMS) and these are related to records of farm areas for the making of direct payment to farms.” See: Lally B., Riordan B. & van Rensburg, T. M., (2007) *Controlling Agricultural Emissions of*

management reasons, does not represent as large of an onus for the farmer, while being essential to ensure compliance with the GAP Regulations.

Streamlining the record keeping process, where possible, is always beneficial as it can facilitate compliance by farmers, and may decrease the burden on farm advisers. However, SWAN cautions that this should not be done to the detriment of necessary records which must be available to the Department of Agriculture, Food and the Marine (DAFM) to ensure compliance with the GAP.

A streamlining option that takes the above into account would be the development of shorter forms applicable to low intensity farms (which represent over one third of all farms in Ireland).¹⁰⁵ These farms are correlated with lower nutrient loss to waters than high agricultural intensity.¹⁰⁶ This is already done in the UK. There, low intensity farms do not have to keep records of actual slurry applications in each field, instead they must have recorded information proving that they are a low-intensity farm. It is important to note, however, that they must still plan their nitrogen use by keeping a fertilisation plan¹⁰⁷ – inappropriately managed low intensity activities can still cause deterioration in water quality. An additional upside to this approach comes from the indirect support to low intensity farming activities, which are more economically vulnerable.

SWAN recommends that if this approach is chosen, appropriate care must also be placed in ensuring that registered low intensity farms can indeed be classified as such by implementing audits, etc.

SWAN agrees with the proposed implementation of a similar regimen to that for pesticides, where records describing pesticide purchase, disposal and use must be kept.¹⁰⁸ Especially as many of the forms used require information which is already available to farmers due to other record keeping needs. One key goal of this methodology within the Pesticide Registration & Control Division is facilitating traceability, which ensures that only authorised products may be sold or supplied.¹⁰⁹ A similar approach would indeed be valuable if incorporated in the next NAP based on the same goal.

Nitrates: Regulation versus Taxes. Department of Economics, National University of Ireland, Galway, Ireland. Available at https://aran.library.nuigalway.ie/bitstream/handle/10379/955/paper_0122.pdf?sequence=1

¹⁰⁵ Teagasc (2017) *Teagasc National Farm Survey: The Sustainability of Small Farming in Ireland.* Available at <https://www.teagasc.ie/publications/2017/small-farms-survey.php>

¹⁰⁶ Environmental Protection Agency (2016). *Chapter 12: Environment and Agriculture.* Available at http://epa.ie/media/Chapter12_Environment_Agriculture.pdf

¹⁰⁷ Hermann and Hermann (2018) *Report on regulations governing AD and NRR in EU member states.* Available at https://systemicproject.eu/wp-content/uploads/2018/07/D-2.1_Reg_governing_AD_and_NRR_in_EU_MS_final_report.pdf

¹⁰⁸ Department of Agriculture food and the Marine (DAFM), 2020. Record Keeping. Available at: <https://www.pcs.agriculture.gov.ie/sud/professionaluserssprayeroperators/recordkeeping>

¹⁰⁹ Teagasc, 2013. National Action Plan for the Sustainable Use of Pesticides. Available at: https://www.teagasc.ie/media/website/crops/crops/NationalActionPlan_SustainableUsePesticides.pdf

5.4. Training and knowledge transfer

Mandatory training tends to have a positive influence in the implementation of nutrient management practices by farmers, with evidence showing subsequent positive impact in local water quality, as it improves both technical knowledge and farmers' confidence in their own abilities.^{110, 111, 112}

A brief review of the research shows:

- Engagement with formal advice as well as contact with available support systems can also help “stimulate interest, responsibility and a sense of personal and social norm¹¹³, as well as improve control over following a nutrient management plan.¹¹⁴
- Local community involvement in training programmes can increase farmers' levels of social pressure to adopt sustainable nitrate management practices.¹¹⁵
- The Agricultural Sustainability Support and Advisory Programme (ASSAP) report showed that support and engagement with not only farmers but also the wider community has led to high farmer engagement in the programme. The ASSAP report also states that advisors' knowledge formed one of the basis for advisor engagement with farmers to maintain water-friendly practices. Well-informed advisers can also benefit farmers' implementation of GAP by providing one-to-one consultations, which has been a successful knowledge transfer methodology in previous engagement programmes such as the Agricultural Catchments Programme.¹¹⁶

Negative reactions to (new) water quality-related regulations by farmers may rise from scepticism regarding their scientific basis, as well as beliefs that regional resource requirements for

¹¹⁰ Daxini, A., Ryan, M., O'Donoghue, C. and Barnes, A.P., 2019. Understanding farmers' intentions to follow a nutrient management plan using the theory of planned behaviour. *Land Use Policy*, 85, pp.428-437.

¹¹¹ Osmond, D.L., Hoag, D.L., Luloff, A.E., Meals, D.W. and Neas, K., 2015. Farmers' use of nutrient management: lessons from watershed case studies. *Journal of environmental quality*, 44(2), pp.382-390.

¹¹² Environmental Protection Agency (EPA), 2014. COSAINT – Cattle Exclusion from Watercourses: Environmental and Socio-economic Implications. Available at https://www.epa.ie/pubs/reports/research/water/Research_Report_330.pdf

¹¹³ Mills, J., Gaskell, P., Ingram, J., Dwyer, J., Reed, M. and Short, C., 2017. Engaging farmers in environmental management through a better understanding of behaviour. *Agriculture and Human Values*, 34(2), pp.283-299.

¹¹⁴ Osmond et al. (2015) and Daxini et al. (2019).

¹¹⁵ Zeweld, W., Van Huylbroeck, G., Tesfay, G. and Speelman, S., 2017. Smallholder farmers' behavioural intentions towards sustainable agricultural practices. *Journal of environmental management*, 187, pp.71-81.

¹¹⁶ Teagasc, 2020. Agricultural Sustainability Support and Advisory Programme (ASSAP) Interim Report 2018 - 2019. Available at <https://www.teagasc.ie/media/website/news/2020/ASSAP-Interim-Report---1.pdf>

agricultural production are being ignored.¹¹⁷ Consequently, Barnes et al. (2011) recommend that as part of training efforts, an engagement strategy could soften resistance towards regulations, provide support for administration, and dedicate emphasis on the resource saving aspects of the regulation.¹¹⁸

SWAN welcomes and support the requirement in the 4th Nitrates Programme that farmers wishing to avail of build up rates of P application will be required to take part in a Knowledge Transfer (KT) programme. As such, requiring all farmers and advisers to participate in training courses and/or knowledge transfer events should have a positive impact on water quality, particularly those engaged with high-intensity farming activities.

SWAN recommends that training courses and/or knowledge transfer events should focus not only on actionable steps towards better nutrient management, but also the importance of water source protection to safeguard the environment at large, individuals' health and the farms own long-term well-being. This is the case as risk perception (i.e., perception of how likely and how serious an adverse outcome is) directly influences engagement with risk management strategies.¹¹⁹

In relation to trainers, Larkin (2020) recommended that all farm advisors are trained as part of a national scheme, to evaluate the environmental needs of farms, and that each catchment would have a specialist advisor to advise on complex cases.¹²⁰ Evidence from the Agricultural Catchments Programme suggests that there is poor understanding of the Good Agricultural Practices (GAP) regulations among farmers and that more direct one-to-one advisory support is needed to assist farmers to understand and comply with the regulations. Well-informed advisers can also benefit farmers' implementation of GAP by providing one-to-one consultations, which has been a successful knowledge transfer methodology in previous engagement programmes such as the ACP.

This echoes recommendations by the EPA in their submission to the draft 4th NAP (2017) that the role and responsibilities of farm advisors be expanded within the GAP Regulations, and that a cohort of advisors with specialist environmental training is now required to

¹¹⁷ Macgregor, C. J. and Warren, C. R. 2006. Adopting sustainable farm management practices within a Nitrate Vulnerable Zone in Scotland: the view from the farm. *Agriculture, ecosystems & environment*, 113: 108–119

¹¹⁸ Barnes, A.P., Willock, J., Toma, L. and Hall, C., 2011. Utilising a farmer typology to understand farmer behaviour towards water quality management: Nitrate Vulnerable Zones in Scotland. *Journal of Environmental Planning and Management*, 54(4), pp.477-494.

¹¹⁹ Meraner, M. and Finger, R., 2019. Risk perceptions, preferences and management strategies: evidence from a case study using German livestock farmers. *Journal of Risk Research*, 22(1), pp.110-135.

¹²⁰ Larkin, 2020. Optimising Water Quality Returns from the Reform of the Common Agricultural Policy (CAP): A Rapid Evidence Assessment Report. A report to The Water Forum. Available at https://thewaterforum.ie/app/uploads/2020/11/CAP-Reform-Report-to-An-Foram-Uisce_FINAL-1.pdf

engage with farmers not just on water, but also issues relating to biodiversity and climate change. SWAN supports this recommendation.

As suggested by Larkin (2020) and the EPA (2019),¹²¹ this could take place within the ASSAP programme, and enhancing the service provided by this programme could form part of a non-legislative action under the NAP. **SWAN also suggests the need for “knowledge exchange between farmers, scientists, and policy makers (as opposed to top down transfer). Vital to this is scientific input from catchments scientists in the EPA Catchments Unit and LAWPRO.**

Other important points worth noting as part of the broader context for knowledge transfer include the following:

- The Expert Group of the 3rd NAP Review highlighted that a number of submissions recommended simplification of the regulation in order to facilitate the better understanding of requirements thereby improving farmer implementation. The group also **recommended the implementation of *comprehensive knowledge transfer programmes* based on (1) nutrient management, (2) gauging P loss and NMP adoption and implementation, (3) farmer training and (4) annual advisory visit. Disappointedly, recommendations 1, 2, and 4 were not explicitly adopted in the GAP. However, it is stated that that (3) farmers in derogation are required to show proof of participation in approved training - Schedule 5 Article 15 updated in SI Amendment 40. We urge that gaps in the implementation of the Expert Group recommendation be addressed.**
- **To increase transparency, broader knowledge transfer, and improve overall accessibility to and engagement with the legislation, SWAN re-iterates its recommendation here, also made by the EPA in their submission on the draft 4th review that a separate free standing document, be developed to support the phase 2 NAP consultation and ultimately to accompany the final GAP Regulations. (See Section 2) This should detail the actions proposed, and responsibilities, with respect to Knowledge Transfer and training programmes and the role of farm advisors.**

¹²¹ Environmental Protection Agency (2019) EPA - Nitrates Directive Derogation Consultation Submission Final. Available at: <https://www.epa.ie/pubs/epasub/EPA%20-%20Nitrates%20Directive%20Derogation%20Consultation%20Submission%20Final.pdf>

5.5. Low Emission Slurry Spreading

In light of the newest EPA report, which found that nitrate levels have increased in over 50% of monitored rivers and groundwaters in 2019¹²², SWAN **recommends that Low-Emission Slurry Spreading (LESS) practices should be extended to all intensive farms (>130kgN/Ha) and all farms in catchments of waterbodies determined to be at risk from agriculture.**

In addition, it is SWAN's view that it is a priority that this is fully implemented by derogation farmers, which are responsible for the highest emissions and that an assessment of the level of implementation and efficacy of this measure be conducted and presented as part of the phase 2 NAP consultation. This is important because availability of LESS equipment and grants for their purchase may be limited.¹²³ It is still to be reported how many of the almost 6,500 farmers who applied for derogation in 2020 have been able to adhere to the new regulation for use of LESS equipment, with Teagasc surveys reporting that just 3% of slurry applications having used LESS from 2016-2018.¹²⁴

As mentioned previously, training courses and knowledge transfer events should seek to increase farmers' risk perception (i.e., perception of how likely and how serious the adverse outcomes of not implementing LESS methods are).

A recent report commissioned by the Water Forum, suggests the implementation of soil testing prior to slurry spreading as a means to prevent the application of excessive and polluting amounts of slurry to the land.¹²⁵

More broadly (and in terms of achieving policy coherence), it is important to point out that low-emissions slurry spreading is frequently presented as the solution to reducing ammonia emissions, but it is only one of a multitude of measures which would be necessary to achieve compliance with the National Emissions Ceiling Directive (NECD) ammonia thresholds. DAFM have produced a Code of Good Agricultural Practice for reducing ammonia, which is a range of voluntary measures which farmers can implement, with no clear funding stream to support action. According to previous MACC modelling by Teagasc every single possible abatement measure would need to be

¹²² Environmental Protection Agency (EPA), 2020. Water Quality in 2019: An Indicators Report.

¹²³ Irish Farmers Journal, 2019. Expecting 12,000 farmers to use LESS slurry equipment 'unworkable'. <https://www.farmersjournal.ie/expecting-12-000-farmers-to-use-less-slurry-equipment-unworkable-481978> [Accessed 24 December 2020]

¹²⁴ Teagasc, 2020b. A Report on Bovine Manure Management, Application and Storage Practices in Ireland. Available at: <https://www.teagasc.ie/media/website/publications/2020/Manure-Management-Practices-Report.pdf>

¹²⁵ Larkin (2020). Optimising Water Quality Returns from the Reform of the Common Agricultural Policy (CAP): A Rapid Evidence Assessment Report. Institute for Policy Research, University of Bath, UK.

A Report to An Fóram Uisce. Available at https://thewaterforum.ie/app/uploads/2020/11/CAP-Reform-Report-to-An-Foram-Uisce_FINAL-3.pdf

implemented to even come close to reducing ammonia emissions sufficiently, and even then it is likely to be impossible.

5.6. Nutrient management planning

According to the Stage 1 public consultation paper, “Nutrient Management Planning (NMP) is one of the most efficient means of ensuring a farmer maximises the value of their chemical and organic nutrient inputs.” Whilst there is some truth to this statement, the maximisation of the value of nutrient inputs does not necessarily translate into the protection of water quality. For example: where nitrate is a significant issue in freely draining areas, NMP on intensive farms, while of some benefit, is not sufficient to prevent nitrate leaching resulting in high nitrate concentrations in underlying groundwater. Similarly, where phosphate is a significant issue, nutrient management planning is inadequate, and pathway interception measures are required.¹²⁶

SWAN supports and recommends the use and mandatory roll out of NMP to ALL farmers. However, but it is important to explicitly make clear that losses of nutrients (N and P) can occur even when appropriate NMP is practiced. We recommend that the second stage of the public consultation include an overarching section on managing nutrient loss to water, with a particular focus on loss risk. We further recommend that protection and mitigation measures are included as part of the NMP and recommend the suite of measures set out in the NFGWS handbook, categorised as follows¹²⁷:

1. Measures to reduce or eliminate pollutants at source.
2. Measures to reduce mobilisation of pollutants on land.
3. Measures to intercept pollutants along pathways to receptors.
4. Receptor/instream works.

These phrases have an explicit focus on water quality. In contrast, most farmers do not associate NMP with environmental protection.

The usage of online nutrient management planning tools must be accompanied by “appropriate advisory support for farmers in the interpretation and implementation of the plans.”^{128, 129} Age can be a determining factor influencing usage and farm management planning. Recent studies of online tools in farming in the United States found that they are mostly employed by persons under 45

¹²⁶ Mockler, E. and Bruen, M. (2018) Catchment Management Support Tools for Characterisation and Evaluation of Programme of Measures.

¹²⁷ NFGWS, 2019. A framework for drinking water source protection. Published by the National Federation of Group Water Schemes. Available at this link: <https://nfgws.ie/wp-content/uploads/2019/06/NFGWS-A-Framework-for-Drinking-Water-Source-Protection.pdf>

¹²⁸ Daxini, A., Ryan, M., O’Donoghue, C. and Barnes, A.P., 2019. Understanding farmers’ intentions to follow a nutrient management plan using the theory of planned behaviour. *Land Use Policy*, 85, pp.428-437;

Teagasc, 2017. Agricultural Catchments Programme Phase 2 Report. Available at https://www.teagasc.ie/media/website/publications/2018/ACP_Phase_2_Report.pdf

years of age,¹³⁰ and as such, older farmers (i.e., >45 years of age) would benefit instead from close advisory support. Moreover, further simplification of NMPs may also be beneficial, with a recent Teagasc survey finding that many farmers find the “use of tables of figures, difficult to use... [farmers] favoured a simpler, flexible NMP approach combining a durable map with a table”.¹³¹

It has been suggested that policy makers can make the development of a NMP mandatory by using policy compliance as a tool and imposing financial penalties on those farmers who fail to develop a plan if required to do so. Nonetheless, monitoring the use of NMPs is difficult and hard to regulate.¹³² In the Irish context one way to combine the use of financial penalties and ease of regulation would be the mandatory use of NMP (and indeed NMP tools) by all farms in receipt of CAP payments, where these farms would need to provide proof of NMP implementation. This would include annual field-level soil testing and an assessment of the risk of loss to waterways by incorporating a defined nutrient transport risk assessment.

Farmers subject to mandatory policy requirements may benefit from additional education and training regarding the use of NMPs. This in turn will have a positive influence on usage because of improved technical ability and confidence.¹³³ It is important to note however that it remains inconclusive as to whether or not the mandatory development of NMPs is the most effective tool for farmer compliance. It has been found through ACP surveys that the plans on their own will not meet the farmer’s needs and to increase their effectiveness, advisory support is required to help with interpretation. To be most effective, this support should extend to decisions on manure and fertiliser spreading regarding timing, soil type, application method and location.

Above all, evidence points to the importance of **appropriate support from advisors, as these have been found to be the “main influencers of farmers’ nutrient management decisions”, followed by family members and other farmers**, according to Teagasc survey¹³⁴ and other published research.¹³⁵ Subsequently, as acknowledged by Teagasc (2017) this has implications for the dissemination of agri-environment advice within the Nitrates Regulations.

Overall, SWAN takes the position that nutrient management planning will not be effective in protecting water quality until there is a policy change within the DAFM to recognise what both Teagasc and the EPA research has highlighted, which is to reduce nutrient runoff to water, the pathway must be intercepted, and this will require site specific on farm assessments to identify these nutrient transfer pathways, followed-up by specific measures to break the nutrient transfer pathways and intercept the nutrients.

¹³⁰ Easton, Z.M., Kleinman, P.J., Buda, A.R., Goering, D., Emberston, N., Reed, S., Drohan, P.J., Walter, M.T., Guinan, P., Lory, J.A. and Sommerlot, A.R., 2017. Short-term forecasting tools for agricultural nutrient management. *Journal of Environmental Quality*, 46(6), pp.1257-1269

¹³¹ Teagasc (2017)

¹³² Daxani et al. (2019)

¹³³ Ibid. and Osmond et al. (2015).

¹³⁴ Teagasc (2017)

¹³⁵ Daxani et al. (2018)

The EPA Catchments Unit has developed two extremely pertinent maps that show the susceptible areas, the critical source areas and the flow delivery paths for phosphate loss to surface water: the Susceptibility of Surface Water Impact by Phosphate maps and Pollution Impact Potential Maps (PIP) for Phosphate to Surface Water. These provide robust information on the potential critical source areas at sub-catchment scale which should be used to make the NAP much more effective. The NAP SEA recommended that “the Teagasc online NMP system is updated to link with the EPA’s WFD web application” to facilitate “detailed assessment.” We support this recommendation but would further recommend that the NMP system links to the surface water P impact and PIP maps. We urge that it is considered as part of the 4th Review.

5.7. Drinking Water Source Protection

Inadequate drinking water source protection is a significant weakness in the NAP and SWAN welcomes the acknowledgement in the consultation document that this needs to be strengthened.

According to current regulations (**Article 17(2b,c)**; GAP, 2017) no fertiliser application (i.e., chemical, organic or soiled water) is allowed within 100m of surface or groundwater (e.g., borehole, spring or well) abstraction points for human consumption supplying 10m³ or more of water per day or serving 50 or more persons (these may be group schemes or small private suppliers as classified by the EPA),¹³⁶ or 25m from any other groundwater abstraction point used for human consumption (these are private household wells as classified by the EPA).

Conditions described under the second provision above include private household wells which are used for drinking by over 170,000 families in Ireland. The Review Group to the 3rd NAP recommended that amendments be made to Article 17 clarifying the roles of Irish Water and local authorities in relation to the establishment of alternative setback distances to the default ones specified based on technical assessment. Article 17(4) states that “These guidelines are only valid where local authority or Irish water has completed a technical assessment of conditions surrounding abstraction points.” This is impractical as there are over 170,00 such abstraction points located around Ireland. **Minimum distances should be respected regardless of assessments, and these assessments if anything could be used to raise minimum required distances.**

Many private wells are at risk of contamination from sources such as septic tanks, land-spreading of slurry, animals grazing near the wellhead, and chemical and fuel storage tanks. Individual household wells must be protected from agricultural contamination, particularly because they are considered highly susceptible to contamination due to lack of regulation and common lack of treatment prior to consumption.¹³⁷

¹³⁶ Environmental Protection Agency (2020. Focus on Private Water Supplies 2018.

¹³⁷ “Household wells and group schemes serving <50 people or 10,000 litres per day which are not supplying any public/commercial activity, are not covered by the drinking water regulations and therefore are not monitored by the local authorities. Responsibility for looking after these supplies rests with the householder or scheme. There is very little information on the quality of the water in these supplies, but it is estimated that between 15% and 30% of all wells are contaminated by E. coli and that around two-thirds of wells could be at risk of contamination”

SWAN recommends that the distance of application of organic fertilizer or soiled water from a drinking water abstraction point should be the same regardless of the number of people the drinking water scheme serves. It is crucial that private household wells are protected from agricultural contamination just as much as abstractions of volumes of 10m³ and above and supplying over 50 persons. The risk of contamination to a drinking water source and to an individual's health does not increase as the volume of water being abstracted increases.

This much decreased distance (i.e., from 250m in relation to water schemes to 50m to private wells) should be changed, in line with recommendations by the Institute of Geologists of Ireland for well distances to farmyards.¹³⁸ These vary depending on local hydrogeology and gradient differences, however **SWAN recommends higher distances of 200m should be demanded where slurry storage is up-gradient of the abstraction well used for human consumption. Article 17(2) should also include chemical fertilisers in addition to organic fertilisers and soiled water. These changes (at least to 200m for all abstraction points for human consumption) should be incorporated in the regulations to protect these more vulnerable drinking supplies and group water schemes; not only to prevent illness among households who rely on these water sources, but also to protect underlying aquifers at risk of contamination via well entry points.**

The National Federation of Group Water Schemes (2019) '*A Framework for Drinking Water Source Protection*' proposed a number of measures for drinking water source protection. Recommended agri-related measures, many of which are discussed in this submission relate to ensuring adequate water quality, include:¹³⁹

- Weed wiping for the control of rushes, to prevent contamination of drinking water sources with herbicides;
- Fencing along streams and rivers for upland surface water sources to prevent direct access by livestock to water;
- Planting buffer zones to promote nutrient uptake, prevent riverbank erosion and enhance local biodiversity;
- Providing alternative drinking water sources for livestock denied access to rivers and streams.

Environmental Protection Agency (EPA), 2020. Focus on Private Water Supplies 2018. Available at <http://www.epa.ie/pubs/reports/water/drinking/Focus%20on%20Private%20Water%20Supplies%202018.pdf>

¹³⁸ Institute of Geologists of Ireland (IGI), 2007. Guidelines on Water Well Construction. Available at <https://igi.ie/publications/guidelines/>

¹³⁹ Other measures recommended include installing traps to collect sediment from sinking streams, desludging of septic tanks as part of a community-led initiative; and awareness raising measures within communities, including information meetings, working with primary schools and newsletters. See: NFGWS, 2019. A framework for drinking water source protection. Published by the National Federation of Group Water Schemes. Available at this link: <https://nfgws.ie/wp-content/uploads/2019/06/NFGWS-A-Framework-for-Drinking-Water-Source-Protection.pdf>

These mitigation options can be addressed by the NAP in addition to incentivised voluntary measures (such as GLAS).

5.8. Large herds and growing concerns related to the impacts of intensification on water quality

This issue needs to be positioned within the growing concerns related to the impacts of intensification on water quality, in addition to climate change and biodiversity loss. It should also be assessed in the context of geographical differences. Nutrient losses to waters are not uniform across the country and losses correlate with areas of higher agricultural intensity. Recent EPA reports highlight the upward trend of nitrate concentrations particularly in the south and southeast of the country, where agricultural activities are more intense.¹⁴⁰

All parts of the country are not equal in the context of intensification, and the potential for larger herds and intensification is greater in certain areas. Because nutrients behave differently depending on soil type and setting, measures needed to mitigate the risks associated with intensification will need to vary and be targeted depending on the physical context of the farm.¹⁴¹ As outlined in the EPA report from the CatchmentTools project, poorly draining heavy soils require interventions that break the pathway between farmland and the receiving waters. Examples of these measures include buffer zones, hedges, farm ponds and management of ditches. In the case of freely draining soils, location source control measures are more likely required to address diffuse losses of nitrogen. In these areas the solutions need to centre on using less nitrogen fertiliser and using it more efficiently.

Very intensive farming (>171 kg) may not be feasible in areas of high P susceptibility, even with mitigation measures, and certain sub-catchment areas may need to be zoned ineligible for derogation farming. **In relation to the application of derogation, the EPA has urged DAFM to consider the physical setting of the farm.¹⁴² This is to ensure that intensification does not occur in an unsuitable/sensitive catchment areas, including high-status water bodies. We support this recommendation.**

¹⁴⁰ Environmental Protection Agency (2020) *Ireland's Environment – An Integrated Assessment 2020*. See also: Environmental Protection Agency (2020) *Water Quality in 2019. An Indicators Report*.

¹⁴¹ Mockler, E. and Bruen, M. (2018) Catchment Management Support Tools for Characterisation and Evaluation of Programme of Measures. Environmental Protection Agency, Wexford, Ireland. Available at: http://www.epa.ie/researchandeducation/research/researchpublications/researchreports/Research_Report_249.pdf

¹⁴² Environmental Protection Agency (2019). EPA - Nitrates Directive Derogation Consultation Submission Final. Available at: <https://www.epa.ie/pubs/epasub/EPA%20-%20Nitrates%20Directive%20Derogation%20Consultation%20Submission%20Final.pdf>

In relation to monitoring of derogation farms and adjoining water bodies, SWAN does not believe that current water quality monitoring carried out by the EPA and Local Authorities is at a sufficient spatial and temporal scale to determine whether there is an impact on water quality and WFD status from nitrates derogation farms. In other words, we do not have the information we need to determine whether or not the application of the derogation is compromising WFD obligations and causing water pollution. This information must be attained, made publicly available and closely analysed as part of the NAP review.

Overall, it is worth emphasising that on-farm best practice techniques and on-farm regulatory compliance are limited if taking place within a flawed system where there may well be a fundamental mis-match between a policy drive towards farm intensification, the carrying capacity of the land, and ecological thresholds including those set by worsening climate impacts. Fundamental questions must be raised with respect to how the continued intensification of Irish agriculture in parts of the country, can be reconciled with the need to prevent further deterioration of Ireland's water bodies, the need to protect Ireland's natural environment more broadly, and our continued failure to meet legal commitments under the WFD.¹⁴³

5.9. Grazing intensity/zero-grazing

The consultation notes that a review on best practice for grazing and nutrient management will be undertaken as part of the 4th NAP Review. Considering the possible implications of zero-grazing for land requirements, SWAN welcomes this commitment.

Key questions going into this review include: i) will the animals be primarily grass-fed? ii) or, will an increase in imported animal feed be required?, iii) is there an adequate landbank for slurry spreading?

Whilst zero grazing may offer benefits for improving soil fertility and structure (through reduced soil compaction from livestock trampling and less devegetation due to regular movement of the livestock), evidence shows a higher potential exists for phosphorus losses to watercourses in systems where cattle are confined (as is the case with zero-grazing) than grazing based systems. This is attributed to higher off-farm nitrate and phosphorus losses arising from the application of inorganic fertiliser used for the production of concentrate feed ingredients. In confinement systems, nitrate and phosphorus loss following the application of inorganic fertiliser and manure

¹⁴³ In New Zealand, where dairy has expanded at the expense of sheep and beef farming, conflicts have been greatest where intensive farming occurs or was expected to expand in catchments with nutrient sensitive water bodies. In the case of some iconic catchments, this has resulted in a cap and trade scheme for nitrogen discharge from pastoral farming. See: Quin et al. (2009) Grassland farming and water quality in New Zealand. *Tearmann:Irish Journal of Agri-Environmental research*,7, 69-88

for forage production is a significant on-farm contributor to the eutrophication potential.¹⁴⁴ Evidence shows that in comparison to intensive grazing, zero-grazing farms perform significantly worse from an ecological and economic point of view. Less efficient use of concentrates and by-products explains this difference.¹⁴⁵

SWAN recommends that a comprehensive sustainability evaluation of grazing intensity and zero-grazing underpin the review of best practice.

5.10. Compliance with the Birds & Habitats Directives

SWAN recommends that for any works to streams and rivers that take place within a proposed or designated Special Area of Conservation, the National Parks and Wildlife Service must be consulted. In any event, such works should not take place from October to April, inclusive.

The GAP Regulations must give effect to Directive 2000/60/EC of 23 October 2000 (the Water Framework Directive). Under Article 11 (3) of this Directive, the basic programme of measures to be complied with includes those measures required under the EU Habitats Directive (92/43/EEC), which include, in Article 2 (2): Measures taken pursuant to this Directive shall be designed to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest.¹⁴⁶ A number of these habitats and species are extremely vulnerable to siltation and eutrophication, with the major cause of decline being deterioration of water quality.

In their submission to the 3rd review of the NAP, the EPA drew attention to “...some 58 mitigation measures/ recommendations [which] are proposed in the SEA Environmental Report and Natura Impact Statement but [which] do not appear to have been integrated into the GAP Regulations.” These measures are set out in Table 4-2 of the SEA Statement where it is clear that only 3-4 recommendations resulted in even slight changes to the GAP Regulations.¹⁴⁷ The EPA goes on in

¹⁴⁴ Arnott, G., Ferris, C., & O'Connell, N. (2015). A comparison of confinement and pasture systems for dairy cows: What does the science say? AgriSearch. Available at:

https://pureadmin.qub.ac.uk/ws/portalfiles/portal/127810644/Arnott_et_al._2015a.pdf

¹⁴⁵ Meul, M. Et al. (2012). Higher sustainability performance of intensive grazing versus zero-grazing dairy systems. *Agronomy for Sustainable Development* 32(3), DOI: 10.1007/s13593-011-0074-5

¹⁴⁶ Species of Community interest, listed in Annex II of the Habitats Directive, include the freshwater pearl mussel (*Margaritifera margaritifera* and *M. margaritifera durrovensis*), Atlantic salmon (*Salmo salar*), sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*), brook lamprey (*Lampetra planeri*), Twaite shad 25 (*Alosa fallax*) and Allis shad (*Alosa alosa*), all of which are found in Irish waters and all of which could be negatively affected by siltation.

¹⁴⁷ Government of Ireland (2018) Strategic Environmental Assessment Statement For Ireland's Nitrates Action Programme. Dublin.

their submission to recommend “..that the mitigation measures and other recommendations in the SEA Environmental Report and Natura Impact Statement should be reviewed and integrated into the GAP Regulations/NAP as appropriate.” It is extraordinary to SWAN that of the 58 measures recommended in a comprehensive Environment Report, and endorsed by the state’s environmental agency, almost none were reflected in the final GAP regulations, despite a thorough rationale for their inclusion being presented.

In light of this, as DAFM commence the process of forming the 5th NAP, it is essential that any recommended mitigation measures that arise in the relevant SEA Environmental Report and Natura Impact Statement be fully reviewed and integrated into the GAP Regulations/NAP as appropriate. A schematic should also be included in both documents, showing how the SEA and AA processes have informed the NAP/GAP Regulations.

5.11. Improving Inspections and Enforcement

Despite ongoing efforts by regulatory authorities, there is significant noncompliance with the EU Nitrates Directive among farms in Ireland, with 2000 farmers found to be violating the Nitrates Directive annually.¹⁴⁸ Although this number is small when expressed as a proportion of the total 130,000 farms in Ireland, the rate of noncompliance has remained fairly constant in recent years.

A recent study conducted by the ESRI found that noncompliance was associated with:¹⁴⁹

- Farms that exceeded regulatory limits in the past, with violations of the regulations often reflecting substantial (rather than minor) changes to business practice from year to year. This often reflects a “failure to observe the regulatory limit when increasing stocking rates or when changing the size of the land holding”;
- Smaller farms;
- Farmers with previous violations;
- Younger farmers, than those in older age categories.

While SWAN has much sympathy with farmers regarding onerous multiple and disjointed reporting requirements, given the significant impact of agriculture on water demonstrated by the EPA-led catchment characterisation work, it is clear that the provisions in relation to water protection not only need to be broadened, strengthened and clarified but also rigorously enforced.

¹⁴⁸ Lunn, L., Lyons, S. & Murphy, M. (2019) Predicting Farms’ Noncompliance with Regulations on Nitrate Pollution. Environmental & Social Research Institute (ESRI), Dublin. Available here: <https://www.esri.ie/current-research/noncompliance-with-nitrates-regulations>

¹⁴⁹ Lunn, L., Lyons, S. & Murphy, M. (2019) Predicting Farms’ Noncompliance with Regulations on Nitrate Pollution. Environmental & Social Research Institute (ESRI), Dublin. Available here: <https://www.esri.ie/current-research/noncompliance-with-nitrates-regulations>

DAFM carries out nitrates inspections, mostly on intensive farms, on behalf of the Local Authorities from early January. Cross-compliance checks are carried out later in the year.

Compliance levels among farm holdings have not improved since the introduction of the NAP. The Expert Group on the 3rd Review of the NAP acknowledged that a more direct one-to-one advisory support is needed to assist farmers to understand and comply with the regulations. The Group recommended that an environmental inspection protocol for farm holdings to be followed by local authorities be developed by the Minister for Housing Planning and Local Government in consultation with the Minister for Agriculture, Food and the Marine and other parties, as appropriate. This recommendation was incorporated (Article 29(6)), whereby State agencies “shall, from time to time as it considers appropriate, make recommendations and give directions to a local authority in relation to the monitoring and inspections to be carried out, or other measures to be taken, by the authority.” However, there is no mention of a “collaborative approach” between State agencies and the farming sector.

Unfortunately, there is limited up-to-date data regarding enforcement and compliance that is transparent and publicly available. SWAN recommends the publication of an annual compliance assessment report, which is publicly available and which includes data on inspection and compliance rates, including parameters breached, and enforcement sanctions.

In previous submissions on water quality, SWAN highlighted the level of inconsistencies in nitrates inspections across Local Authorities, in addition to the worryingly low number of inspections taking place (only 1% and 3% of non-derogation and derogation farms, respectively, are currently inspected). Notwithstanding the fact that the inspections are purportedly increasingly risk-based, this disparity would appear to be resource- rather than science-driven and of serious concern to SWAN.

Indeed, in the Focus on Local Authority Environmental Enforcement Report for 2018, the EPA noted that farm inspection rates related to water quality vary across the country and the overall number of farm inspections have fallen nationally. **Recommendations which SWAN supports include:**

- that local authorities increase their inspection rates and focus inspections in “at risk” areas that are not being addressed by the Local Authority Waters Programme.¹⁵⁰

¹⁵⁰ Environmental Protection Agency (2020) Focus on Local Authority Environmental Enforcement. 2018 Performance Report. Environmental Protection Agency, Wexford, Ireland. Available at: <http://www.epa.ie/pubs/reports/enforcement/performanceframework/EPA%20LA%20ENV%202020%20v6.pdf>

- that the current standardised risk based methodology for the GAP Regulations farm inspection programme be reviewed in the context of the WFD characterisation work being led by the EPA.¹⁵¹
- that the scope of local authority farm inspections be broadened in catchments of waterbodies at risk from agriculture to cover nutrient management and diffuse nutrients from landspreading, in addition to the farmyard related aspects.”¹⁵²

As highlighted by the ESRI, there is potential to increase compliance by using a combination of statistical modelling, trials, and targeted behavioural interventions to target farmers most at risk of noncompliance, drawing on the at-risk farmer categories listed above.¹⁵³

Whilst we recognise the important role of education and awareness-raising, a baseline level of robust inspections and associated enforcement must be consistently implemented if the standards set down in the Regulations are to meaningfully translate into protection of the aquatic environment as required by the Nitrates Directive and WFD.

Furthermore, it is now widely agreed that the nitrates inspections are inadequate for detecting poor slurry spreading practices. It is impossible to enforce the spreading ‘set-back’ requirement unless an inspection occurs either at the immediate time and location the spreading is taking place, or within 48 hours of slurry spreading. In fact, researchers from the ACP project have publicly stated that the regulations regarding land-spreading are extremely difficult to enforce for this reason. **SWAN calls for the provision for additional spot checks, especially during slurry spreading season, without prior notification to the landowner in addition to the establishment of an anonymous ‘See it – Say it’ type reporting mechanism for the public to report non-compliant activities, in particular in relation to slurry spreading.**

There is also little readily available information on compliance rates and the magnitude of the penalties imposed. The lack of annual reporting on regulation compliance and on the application of compliance penalties seriously hinders effective assessment of the implementation of the GAP Regulations in Ireland. In their submission on the draft 4th NAP, the EPA recommended the **publication of an annual report on the findings of farm inspections, the purpose being to**

¹⁵¹ “Linking the inspection regime with the WFD characterisation work would allow for better targeting of efforts at local authority level, with annual quotas of inspections allocated to each local authority (similar to that for domestic wastewater treatment systems).” Reference

¹⁵² Lunn, L., Lyons, S. & Murphy, M. (2019) Predicting Farms’ Noncompliance with Regulations on Nitrate Pollution. Environmental & Social Research Institute (ESRI)

¹⁵³ Lunn, L., Lyons, S. & Murphy, M. (2019) Predicting Farms’ Noncompliance with Regulations on Nitrate Pollution. Environmental & Social Research Institute (ESRI), Dublin. Available here: <https://www.esri.ie/current-research/noncompliance-with-nitrates-regulations>

increase awareness of best practice among the farming community and the general public, and help influence improvements in compliance with the regulations and water quality.¹⁵⁴

Guidance and communications/awareness campaigns aimed at helping farmers improve in these areas should also be developed and implemented.

We further recommend that spatially mapping the findings of GAP inspections would be useful for public information and national work on improving water quality. This could include for example interactive sub-catchment/county maps showing farm inspection compliance rates, fertiliser application rates and areas where the nitrate derogations are exceeded. This information could potentially be hosted on the WFD Application and made publicly available via the Catchments.ie website.

6. Other SWAN recommendations

This section restates other key SWAN recommendations that were proposed in the consultation of the 3rd review of the NAP but which were not included in amendments to the Regulations.¹⁵⁵ (and have not been addressed already in this submission)

The need for a precise definition of poaching

SWAN reiterates the recommendation that a precise definition of ‘severe poaching’ should be included in the Regulations.¹⁵⁶ SWAN has proposed this change in the last three reviews of the NAP.

The Regulations should clarify whether poaching-related damage refers to the average over the entire plot, or within given areas. The degree of poaching should be specified by the percentage of bare soil, for which there could be a classification system or a stated unacceptable percentage cutoff point. For an unacceptable degree of poaching in plots adjoining watercourses, lakes or

¹⁵⁴ EPA (2017) Submission on Draft 4th Nitrates Action Programme and associated SEA Environmental Report. Wexford.

¹⁵⁵ For the full submission, see: SWAN. Third Review of Ireland’s Nitrates Action Programme - Response to Public Consultation.

¹⁵⁶ In Part 2, under Reduced Storage Capacity in Certain Circumstances, Article 3(d) states that poaching of land must not be severe:

*(3) Sub-article (2) shall apply only in relation to a holding where all the following conditions are met— (a) all the lands used for out-wintering of the livestock are comprised in the holding, (b) the out-wintered livestock have free access at all times to the required lands, (c) the amount of manure produced on the holding does not exceed an amount containing 140kg of nitrogen per hectare per annum, (d) **severe damage to the surface of the land by poaching does not occur**, and (e) the reduction in storage capacity is proportionate to the extent of out-wintered livestock on the holding.*

wells, the following cut-off points are recommended: 30% bare soil over an entire plot and 50% bare soil in a 100m² area.

Set appropriate buffer zones for use of chemical fertilisers

In Part 4, Prevention of Water Pollution from Fertilisers and Certain Activities, under Article 17(1) the buffer zone specified between watercourses and areas for spreading chemical fertilisers is too small. SWAN reiterates the recommendation that distances from watercourses and lakes for the spreading of chemical fertilisers need to be amended to protect water quality in aquatic habitats. Specifically:

17. (1) Chemical fertiliser shall not be applied to land within 2m of any surface waters.

SWAN recommends that the Regulations should specify a buffer zone of a minimum of 10m along surface watercourse, within which inorganic fertiliser should not be spread. This recommendation is based on the evidence,^{157,158} as well as moves by public bodies,¹⁵⁹ showing that buffer zones of at least 10m width are necessary for effective control of N losses to water courses.

Buffer Zones for Lake

We note that following on from our recommendation in the 3rd NAP review, Article 17(2)(d) was amended to include turloughs likely to flood in addition to the “lake shoreline”. This is intended to ensure that setback distances for the prevention of water pollution from fertilisers also apply to turloughs.

In Part 4, Prevention of Water Pollution from Fertilisers and Certain Activities, under Article 17(2)(d) the distances that must be kept from lake shorelines when applying organic fertiliser or soiled water to land is 20m.

SWAN reiterates the recommendation that distance from lakes (including turloughs) for the spreading of organic fertilisers and soiled water need to be clarified. This is because lake surface

157 Partinson et al. (2000)

158 Irvine, K. and Ní Chuanigh (2011) *Management Strategies for the Protection of High Status Water Bodies: A Literature Review. STRIVE Report (2010-W-DS-3)*. Environmental Protection Agency, Wexford.

159 Stream-side buffer zones of 10m width, in which activities including application of inorganic fertiliser are prohibited, are also specified in the Forestry and Water Quality Guidelines (Forest Service, 2000) for moderate slopes (0-15%), with the width increasing for highly erodible soils and steeper slopes. These buffers have been further increased to up to 25m for peat soils and catchments of High Status waterbodies in the new Environmental Requirements for Afforestation (Forest Service, 2016), depending on slope.

levels in Ireland can fluctuate considerably. The Regulations should specify clearly that what is meant by the shoreline is the normal high water level.

Buffer Zones for use of Organic Fertilisers beside Watercourses

SWAN recommends that distances from watercourses for the spreading of organic fertilisers need to be amended to provide adequate protection to the water quality of aquatic habitats.

In Part 4, Prevention of Water Pollution from Fertilisers and Certain Activities, under Article 17(2)(f) the distances that must be kept from watercourse when applying organic fertiliser or soiled water to land is 5m. The Regulations also state that ‘Notwithstanding sub-article 2(f), organic fertiliser or soiled water shall not be applied to land within 10m of any surface waters where the land has an average incline greater than 10% towards the water’.¹⁶⁰

The specification in Article 17(9) of the Regulations needs to be revised. Plots with a slope less than 10% should have a minimum distance of 10m and those with a slope of greater than 10%, a minimum distance of 20m between a watercourse and spreadlands should be imposed.

Results from the ACP Phase II also suggest that rather than focusing on a very limited period on either side of the closed period, there is a strong rationale for maintaining an increased minimum spreading distance throughout the open season.¹⁶¹ SWAN reiterates the recommendation of this minimum distance of 10m for the entire year outside the closed season.

Finally, SWAN recommends vegetated buffer strips of at least 20 m for lands adjacent to high status waterbodies. It is important to also note in relation to buffer strips and the application of

¹⁶⁰ Kronvang et al. (2003), examined runoff from grassland in Denmark with slopes varying from 2% to 20%, with an average of 7%. The median buffer zone width between grassland and watercourses was 8.3m and resulted in median dissolved phosphorus concentration in surface runoff being 0.18 mg/l P. Therefore, a designated buffer strip should also include land with a slope of less than 10%. Heathwaite et al. (1998) found that a 10m buffer strip between a watercourse and grassland plots with a 10% slope on which slurry was applied only resulted in a 10% reduction in export of phosphorus. Irvine and Ní Chunaigh (2011) state that “grass and forested buffers have been shown to reduce nitrogen and phosphorous as long as there is a sufficient width, ranging from ca 10-20m’. See: Kronvang, B., Anker Laubel, S., Larsen, H., Andersen, H. and Djurhuus, J. (2003) ‘Buffer Zones as a Sink for Sediment and Phosphorus between the Field and Stream: Danish Field Experiences’. Diffuse Pollution Conference Dublin 2003 3A: Agriculture. Online, www.ucd.ie/dipcon/docs/theme03/theme03_02.PDF

¹⁶¹ one of the key findings of the ACP Phase II was that “Concentrations of P in streams ... don’t show pulses of increased losses at the start of the open period..” but rather can be “linked to losses from manure/slurry spreading due to high-rainfall summer storms”.

inorganic or organic fertilisers near waterbodies, that their effectiveness is dependent on a variety of landscape and hydrological factors in addition to the buffer zone width, including the nutrient transfer pathway within that catchment.¹⁶² In catchments with permeable soils and geology, separate mitigation measures of both diffuse N and P delivery for subsurface pathways will need to be considered as measures that target surface transfer pathways, such as buffer strips, may be ineffective.

7. The intersections between water quality, biodiversity, and greenhouse gas emissions

SWAN welcomes the acknowledgement in the Stage 1 public consultation document for the need for better policy alignment between water quality plans and programmes, biodiversity strategies and climate adaptation. This should also include climate mitigation, considering the agricultural sector is the single largest sectoral emitter of greenhouse gas emissions in Ireland. Nitrous oxide and methane emissions have been increasing steadily since the ending of milk quotas in 2015, and are projected to grow over the next decade in line with an increase in animal numbers and fertilizer usage.¹⁶³

Under the Programme for Government and the EU Green Deal, Ireland will be required to achieve a minimum of a 51% reduction in overall emissions by 2030, which is expected to be binding in law by the end of 2020 or soon after. A significantly larger reduction in agricultural emissions will be mandated in the sectoral allocation under the carbon budget for 2021-25, associated with the draft Climate Amendment Bill which is currently undergoing pre-legislative scrutiny in the Oireachtas. **This will have considerable implications for the direction of the sector, including its impacts on water quality.**

Achieving greater policy coherence across Ireland's obligations under the National Emissions Ceiling Directive, the Water Framework Directive, and its climate commitments as a signatory to the Paris Agreement provides a crucial opportunity to halt and reverse declines in water quality, and reverse trends in GHG emissions and air pollution. Experience from the Netherlands on the implementation of nitrates policy emphasise the need for better coordination of policies between the Water Framework Directive, the Nitrates Directive, and the

¹⁶² Mellander, P.E., Melland, A.R., Jordan, P., Wall, D.P., Murphy, P.N.C and Shortle, G. (2012) 'Quantifying nutrient transfer pathways in agricultural catchments using high temporal resolution data'. *Environmental Science and Policy*. <http://dx.doi.org/10.1016/j.envsci.2012.06.004>.

¹⁶³ Environmental Protection Agency (2020) *Ireland's Environment – An Integrated Assessment 2020*.

National Emissions Ceiling Directive.¹⁶⁴ This not only involves strict national policies that are better enforced and regionally differentiated mitigation options, but also financial compensation for affected farmers, and the need to make potentially difficult political choices around trade-offs between costs and benefits for agricultural and society more broadly. Indeed, climate benefits would be a minor component – the overall benefits of reducing nitrogen pollution would come mainly from avoided water and air pollution.

SWAN recommends that the risks associated with climate change, including planning for extreme weather events, will require significant consideration in the NAP and associated SEA Environmental Report. On-farm tools can include for example, real time links to weather forecasting for fertiliser application. Amendments to the specific land management practices and farming practices should focus on achieving multiple benefits across climate mitigation and adaptation, air and water quality, and biodiversity conservation.

Nitrous oxide (N₂O) contributes up to 35% of Ireland’s agricultural GHG emissions. The Expert Review group to the 3rd Review of the NAP noted that improving soil fertility and optimising the nutrients in organic fertilisers are critical to driving improvements in N use efficiency and reducing N₂O emissions.

However, as outlined earlier in this submission, **the effectiveness of measures that aim to promote on-farm efficiencies aimed at climate and pollution mitigation are limited if taking place within a flawed system where there is a fundamental mis-match between the volume of nutrient outputs, the carrying capacity of the national agricultural land-bank, broader strategic objectives of the sector, and the scale of response required to address wider environmental challenges and legislative commitments.**

The current Teagasc Marginal Abatement Cost curves, which drive policy responses for ammonia and greenhouse gases reductions, contain assumptions that have not been tested. For Ireland, achieving its water, climate and air quality obligations may require a reversal of an increase in the livestock herd below the legal thresholds in sensitive catchments and catchments with high cumulative concentrations of intensive and very intensive at a catchment scale. SWAN accepts that this approach requires challenging political decisions and trade-offs which require careful consideration and timely planning to protect farmer livelihoods. However, ongoing delay to make these decisions will keep certain farming sectors locked into a highly polluting activity.

¹⁶⁴ Wiering, M.; Liefferink, D.; Boezeman, D.; Kaufmann, M.; Crabbé, A.; Kurstjens, N. The Wicked Problem the Water Framework Directive Cannot Solve. The Governance Approach in Dealing with Pollution of Nutrients in Surface Water in the Netherlands, Flanders, Lower Saxony, Denmark and Ireland. Water 2020, 12, 1240

Rather than wait until the need to impose tough, top-down strict regulations (as signalled by the direction now set by EU policy) which may have considerable social implications), with appropriate planning and foresight now, decision makers can ensure that the appropriate mix of policy *carrot and stick* and broader support measures to facilitate the transition to a more sustainable sector.

APPENDIX I: SWAN Member Organisations and Board of Directors

SWAN National Groups		SWAN Regional & Local Groups	
1.	An Taisce	14.	Carra Mask Corrib Water Protection Group
2.	Bat Conservation Ireland		
3.	Birdwatch Ireland	15.	Cavan Leitrim Environmental Awareness Network
4.	Coastwatch Europe Network		
5.	Coomhola Salmon Trust Ltd.	16.	Celebrate Water
6.	Eco-UNESCO	17.	Coastal Concern Alliance (Associate)
7.	Friends of the Earth	18.	Cork Environmental Forum
8.	Friends of the Irish Environment	19.	Cork Nature Network
9.	Irish Peatland Conservation Council	20.	Dodder Action
10.	Irish Seal Sanctuary	21.	Longford Environmental Alliance
11.	Irish Whale and Dolphin Group	22.	Macroom District Environmental Group
12.	Irish Wildlife Trust	23.	River Shannon Protection Alliance
13.	Voice Of Irish Concern for the Environment (VOICE)	24.	Save The Swilly
		25.	Slaney River Trust

SWAN Board of Directors:	
Mark Boyden, Chair	Coomhola Salmon Trust
Mindy O'Brien, Vice Chair	VOICE
John Armstrong	Cork Nature Network
Karin Dubsky, Director	Coastwatch Europe
Ignatius Egan, Director	Carra Mask Corrib Water Protection Group
David Lee, Director	Cork Environmental Forum
Elaine McGoff, Director	An Taisce
Keith Scanlon, Director	Dodder Action