Sustainable Water Network (SWAN)

- Response to Consultation -

Draft River Basin Management Plan

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Table of Contents

1. INTRODUCTION TO SWAN

The Sustainable Water Network (SWAN) is an umbrella network of 27 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), the Marine Strategy Framework Directive (MSFD) and other water-related policy and legislation. SWAN member groups are listed in Appendix 1. 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, representing the environmental sector on the Irish Water Stakeholder Forum, the Public Water Forum, the National Water Forum, the National Rural Water Services Committee and previously on River Basin District (RBD) Advisory Councils, the South Eastern RBD Management Group, and other water policy-related fora. SWAN has been committed to participation in WFD implementation for 13 years and has made 16 formal submissions specifically relating to the WFD during that time.[1]

2. INTRODUCTION TO THIS SUBMISSION

SWAN welcomes the opportunity to comment on the draft River Basin Management Plan (RBMP). This submission is the result of outputs from dedicated Working Groups, in addition to the outputs of a RBMP workshop of SWAN members in Dublin on May 2nd for which SWAN is grateful to the Department of Housing, Planning, Community and Local Government (DHPCLG) for funding. It reflects the cumulative knowledge of SWAN member organisations working on the ground around the country on a diverse range of environmental issues related to water management and protection, both coastal and inland, and draws on many years of collective experience. It is also informed by independent, commissioned policy analysis and desk research, including in relation to abstraction, agriculture, coastal management and forestry in addition to detailed submissions made by SWAN in the past 3 years on agriculture and water and wastewater services.

Due to the scope of topics to be covered, it was decided by members to prioritise key issues of concern to the network, based primarily on the results of the EPA characterisation in terms of the most significant issues. These are as follows: Agriculture; urban wastewater discharges; physical/hydro-morphological alterations; forestry and peat extraction. Coastal and transitional management was also prioritised due to its omission from the draft Plan. Our response to the draft Plan and recommendations are made in this context and for this reason these sections are more detailed than others.

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[1] First cycle Article 5 Characterisation; Work Programme & Timetable; Monitoring Programme; Draft Plan, first submission: *'SWAN Submission in Response to 'Water Matters – Help Us Plan, Draft River Basin Management Plan'*; Draft Plan, second submission: *'Review of 'Water Matters – Our Plan!' River Basin Management Plans for Ireland's River Basin Districts 2009-2015'*.

Second cycle WFD: Response to Public Consultation - Timetable & Work Programme for the Development of the Second Cycle River Basin Management Plans; SWAN Response to Consultation - Draft Significant Water Management Issues Report, December 2015.

Other: Public Awareness Campaign on Water Blueprint; Submission on Surface Water Regulations; Joint recommendations with NI Freshwater Taskforce on All-Ireland WFD Implementation; Recommendations on Advisory Councils; Water governance proposal; 3-Tier Public Participation Proposal: *SWAN Recommendations for Public Participation Mechanisms in the Department of Environment, Community & Local Government 3*-Tier Water Governance Proposal, August 2013; Public participation proposal, refined: *'Delivering meaningful public participation in water governance and Water Framework Directive (WFD) implementation: SWAN Recommendations'*, July 2015; Public participation proposal, further refined & updated: '*Public Engagement in Water Framework Directive Implementation: A Review of Developments as of September 2016, with Recommendations - SWAN Submission to Department of Housing, Planning, Community and Local Government (DHPCLG)',* October 2016.

3. OVERARCHING ISSUES

3.1. EXCESSIVELY LOW AMBITION AND LACK OF TRANSPARENCY ON THIS

The ambition level of the draft River Basin Management Plan (RBMP) is far too low. This is one of the issues of most serious concern to SWAN. This is compounded by the associated lack of clarity in the RBMP around what, in fact, that ambition level is. Even besides the very specific obligations of the WFD, it is generally accepted that, to be effective, a plan should have clear targets and timelines against which performance can be assessed. This is a key element for public engagement also since, in simple terms, it shows the public what you plan to do and by when, which isn't clear from this draft.

While the format of the draft Plan makes it difficult, it is possible to discern broadly what is being proposed regarding targets and to understand the level of ambition being proposed. It appears that according to the draft Plan, approximately 1,301 water bodies (by our calculation) are failing WFD status, with another 216 'at risk' of failing. The Plan proposes actions for less than half (600-700) of these, and estimates this approach will improve just 150. That's a mere 12% of all the currently unhealthy waterbodies in the State earmarked for restoration during the life of this Plan.[2]

There is very strong and unanimous agreement within SWAN membership that this target is unacceptably low and should be significantly increased in the final Plan.

3.2. OBJECTIVES OF THE PLAN: NON-COMPLIANT WITH WFD; INAPPROPRIATE 'PRIORITISATION' APPROACH

The WFD requires that all waters meet good status by 2021,[3] unless exemptions are applied (under strict conditions). Under the Directive, Ireland is required to implement the necessary measures to achieve the objectives of that directive, which are primarily to ensure that all waterbodies achieve good status, to prevent deterioration of the status of all surface water and groundwater, and to prevent or limit the input of pollutants into groundwater. Exemptions to achieving these objectives, either as time extensions or less stringent objectives, are permitted under limited and tightly defined conditions. These are set out in Article 4 of the Directive, with Articles 4.4 4.5, 4.6 and 4.7 describing the conditions under which exemptions to these objectives can be applied.

In the interests of brevity, the detail of the requirements of the directive regarding exemptions is set out in Appendix II. In summary, it must be demonstrated that it is either disproportionately costly or not technically feasible to restore a waterbody to healthy status or that a proposed modification or alteration to a waterbody is of overriding public interest and there isn't a more environmentally sustainable alternative. Crucially, this justification must be *"set out and explained in the River Basin Management Plan"* for each waterbody to which an exemption is applied.

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[2] To arrive at this, the reader must add up the figures in Table 5.1 on page 40 and then compare it against figures imbedded in the text on page 100

[3] For waterbodies which have not done so by 2015

The draft Plan takes an entirely different approach. It '*sets out priorities'* based on "*broad consideration of resource and resource constraints"* and makes no mention of exemptions.[4] Furthermore, it does not acknowledge that exemptions are being applied, which they demonstrably are, since approximately 40% of rivers, lakes and coastal and transitional waterbodies will remain below good status by the 2021 deadline.[5] The draft Plan simply ignores the obligation to justify deviations from the directive's objective, and uses a prioritisation approach to select a subset of waterbodies for 'supporting measures' in order to restore just 12%. Such an approach is not provided for in the directive and is clearly non-compliant.

Not only is the prioritisation process in the draft Plan contrary to the provisions of the Directive as a procedural and analytical approach, it has the capacity to lead to a substantive failure to apply the Directive to the vast majority of water bodies.

3.3. LACK OF CATCHMENT-BASED SUPPLEMENTARY MEASURES: DISCONNECT BETWEEN IDENTIFIED IMPACTS AND PROPOSED MEASURES TO ADDRESS THEM

As published, the draft Plan fails in one of its key purposes: to set out clearly how the State will restore and protect the waterbodies identified as being at risk of not meeting WFD objectives. It further fails to specify what measures will be taken (and to what timetable) for each waterbody to achieve those objectives. This runs contrary to the requirements of the Directive. While SWAN appreciates that it may be too detailed to set out all measures for every waterbody, the Plan should as a minimum set out a summary as required by the directive,[6] differentiated by significant water management issue.

The Plan contains few new measures for any of the main polluting sectors, and the majority of measures proposed are simply legislation and programmes already in place, e.g. the Urban Wastewater Treatment Regulations; the Good Agricultural Practice for the Protection of Waters Regulations; the Irish Water Water Services Strategic Plan.

While the draft Plan clearly presents most of the pressures and drivers of aquatic degradation, based on the characterisation exercise, it does not take the logical step of proposing the necessary related measures to address each of these, nor even a suite of such measures from which preferred options could be selected. Instead, it presents current regulations, policy and voluntary initiatives in the most positive light possible, emphasising also the resource constraints and proposing hardly any new measures.

The most recent EPA water quality report[7] and the draft Plan both show that current legislation is inadequate; they show little improvement in water status since the last RBMP cycle and continued loss of high ecological river sites. Since half our rivers and lakes are currently unhealthy, it is reasonable to ask how continuing with current measures will achieve healthy waters, even with better coordination under new implementation arrangements.

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[4] Apart from one mention when the provisions of the WFD are being described in Section 6.1

[5] This approximate figure is estimated as follows: From Table 4.1, 1,246 surface waterbodies are at less than GES. If all of the 150 improved waterbodies were in this category (and it is likely it would in fact be fewer) then 1,096 river lakes, estuaries and coastal waters would be failing in 2021. (1246-150 = 1096). This is 41% (Total surface waterbodies = 2669. 1096/2669 = .41)

[6] The Directive states that each River basin Management Plan must contain *"a summary of the programme or programmes of measures adopted under Article 11, including the ways in which the objectives established under Article 4 are thereby to be achieved"*

[7] Byrne, C. and Fanning A (Eds.). *Water Quality in Ireland 2010 – 2012*. Environmental Protection Agency, Ireland

It is worth noting that under the international best practise approach of Integrated Catchment Management, the proposal of measures to address pressures and impacts is a scientific exercise and thus should not be constrained by policy and resource considerations. The role of the Plan is to put forward the best technical solutions for the consideration of stakeholders and government.

SWAN believes that the inclusion of much 'promotional' text, presenting the current situation in the best possible light and highlighting the progress that various sectors and state agencies have made towards reducing their contribution to serious water pollution, is inappropriate and a distraction: such text should be omitted from the final Plan. There is ample opportunity for the Department of Agriculture and the Forest Service, for example, to highlight their good work in their own publications. There are certain sections of the draft Plan which read very much like 'spin', and this undermines the otherwise very solid scientific underpinning provided by the EPA Catchment Science & Management Unit.

There are very significant challenges to water protection in the face of the political imperative for agricultural intensification, as well as forestry, residential and marine development in Ireland. Additionally, there are profound societal questions to be asked about whether such development is consistent with achieving a healthy aquatic environment. In order to inform public engagement on this and to motivate behaviour change, the Plan must clearly set out the scale of these challenges, the risks currently posed by key sectors, and the scale of measures and resources that will be required to address them.

A reader unfamiliar with the issues would be forgiven for coming away from reading the draft Plan with a sense that most of these issues are being well addressed by government already and by dint of working more efficiently together under the new management system, any remaining issues will be tackled with no significant change of practise from any sector or any significant increase in the current rate of state investment. This is not a true reflection of the situation.

SWAN welcomes the proposal for 30 sub-catchment pilot schemes targeting sub-catchments, but it is unclear what exactly is planned for these areas, since no new measures are proposed. The draft Plan does acknowledge that "*it is likely that additional supporting measures will be required for* [at risk] *water bodies to meet the required objectives"* and that the approach for the second cycle will *"ensure that supporting measures are implemented on a prioritised basis, where necessary"*. However:

- This does not translate into concrete proposed new actions in the Plan;
- It is not clear what is meant in the draft by 'supporting measures'. Since few new measures are proposed, it would appear to SWAN that this simply means a more focused approach to implementing current programmes such as GLAS[8];
- It is important to note that these will only be on a 'prioritised' basis, with less than half of waterbodies targeted.

The Indicative flowchart for implementation of local and regional measures in Section 10.3 provides a welcome targeted approach, but critically it only applies to *'priority Water Bodies'*. This is not acceptable in SWAN's view, given that authorities are making decisions regarding prioritisation and feasibility of measures in the absence of any additional funding for them, which clearly rules out many potentially effective options.

[8] The supporting measures for agriculture are: Targeted agri-environment schemes under the RDP; The Agricultural Catchments Programme (ACP); Knowledge Transfer and adoption of best practice and monitoring of sectoral changes and 'modelling' of water quality impacts.

3.3.1. SWAN RECOMMENDATIONS ON AMBITION, COMPLIANCE, OBJECTIVES & MEASURES

COMPLIANCE

In order to come into compliance with the directive, the final Plan should:

- Make a clear commitment to achieve good status for all waterbodies by 2021 (or, with justified time extensions, 2027);
- Commit to implementing supplementary measures over and above what is already in place, in order to achieve this;
- State clearly what the objective is for each waterbody and which waterbodies will not achieve the WFD target of good status; and
- Set out a clear justification as required in the WFD for not restoring to good status the majority (88%) of ailing waterbodies.

AMBITION LEVEL, OBJECTIVES & SUPPLEMENTARY MEASURES

- Even if it is not possible to adhere strictly to the WFD as set out above, the ambition level of the Plan should be significantly increase based on what is technically feasible, as opposed to what is 'affordable'.
- A dedicated chapter should be added that clearly sets out:
    1. The number and percentage of waterbodies failing, and 'at risk' of failing WFD standards;
    2. Targets for the Plan, presented as the number and percentage of these that will be restored by 2021 and 2027; and
    3. Justification for exemptions for extended timelines and failing to achieve GES by 2027;
- The measures chapter then needs to be redrafted (omitting 'promotional' text) to:
    1. Address the disconnection between the pressures and impacts analysis and the measures section so that there is a clearer link between pressures & impacts and concrete proposed measures to address them;
    2. Present the measures that would be needed to achieve GES for all waterbodies by 2021/2027, excluding what is not possible for scientific/technical feasibility reasons or due to knowledge gaps, including the resources that would be needed to do this; and
    3. Clarify what is meant by supporting measures, and make it clear that basic measures will not be sufficient for a significant number of waterbodies.

4. IMPLEMENTATION, GOVERNANCE & PUBLIC ENGAGEMENT

4.1. GOVERNANCE & IMPLEMENTATION

SWAN welcomes the revised, more integrated administrative structures for water governance set out in Section 10 of the draft Plan, and also the clear presentation of these. These should contribute to addressing the primary weakness identified in the last cycle: failure to implement the RBM Plans can be credited to fragmented, ineffective governance, with no one body having ultimate responsibility.

While the proposed structures offer a significant improvement on a previously fragmented system, many challenges remain. It is important to emphasise that by 'governance', as described here, we are not focusing on general implementation arrangements such as technical working groups etc. We mean the governance structures where responsibility for decisions on the selection and implementation of WFD measures (at national and catchment level) resides. The 2014 regulations[9] give responsibility for implementation of the RBM Plans to the Local Authorities. In this context, we welcome the establishment of the National Co-ordination and Management Committee and the Regional Management Committees, although we have concerns regarding the lack of information about, and public engagement in, the implementation work of the regional committees.

Water governance is wider than administrative arrangement, and may be defined as *'the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society.*[10] The OECD defines governance as including administrative systems, formal institutions (incl. laws & policies) and information institutions such as power relationships and practices.[11] According to the OECD, *"Solutions* [to water management issues] *will only be viable if* ***policies are consistent and coherent****; if stakeholders are properly engaged across levels of government, if* ***well-designed regulatory frameworks*** *are put in place, if capacity of institutions and stakeholders is strengthened, and if integrity and transparency are fostered. These goals are all about governance, and require* ***robust and agile institutions that can adapt to new conditions,*** *taking into account the specificities of each community and of its culture and history"* (SWAN's emphasis).[12]

Whilst what is proposed is certainly a more joined-up administrative system with clear benefits which we welcome, there is a strong argument, based on what is presented in the draft Plan, that there has been very little progress towards policy coherence and consistency and that in fact agriculture and marine policy, driven by the political imperative to increase productivity, is diverging further from the ecological goals of the WFD. This is a challenge that the draft Plan either understates (agriculture) or ignores (marine). Such lack of policy coherence, notwithstanding better cooperation between relevant government departments, is at odds with best practise water governance.

In addition, the draft Plan proposes no new measures to contribute to a *'well-designed regulatory framework',* despite the commitment by the DHPCLG to the EU Commission at least 4 years ago to introduce consolidated primary legislation to address the unwieldy and fragmented current legislative framework for water management and protection. Even where regulations have been mandatory under the directive since 2012 (e.g. for abstractions and physical modifications), this second draft Plan does not propose them.

Given the key elements of effective water governance set out above (and in more detail in Appendix 3), which are based on extensive OECD and European Environment Agency (EEA) work in this area, and which are missing in Ireland, SWAN believes there are enormous challenges and impediments facing the new administrative system. To overcome these, several key things are needed:

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9 European Union (Water Policy) Regulations (S.I. No. 350 of 2014).

10 Global Water Partnership (2002) Introducing Effective Water Governance, Mimeo.

11 OECD (2011) OECD Studies on Water: Water Governance in OECD Countries — A Multi-Level Approach. Organisation for Economic Co-operation and Development, Paris.

12 OECD (2015) Draft Principles on Water Governance. Public Governance and Territorial Development. Water Governance Initiative, Directorate Regional Development Policy Committee, Organisation for Economic Co-operation and Development, GOV/RDPC/WGI

- An honest Plan which baldly states the shortcomings of the current programme of measures, the scale of the challenge, and the resources needed to address it;
- A public awareness campaign on water which raises awareness of the value of, and threats to, the water environment; and
- A comprehensive, meaningful and well-resourced public engagement strategy that facilitates societal debate about the policy tension between catchment protection and increased economic growth and productivity.

4.2. PUBLIC PARTICIPATION

SWAN whole-heartedly welcomes the establishment of the National Water Forum and recognises the commitment demonstrated by the DHPLCG in securing its establishment. Participation thus far by SWAN representatives has been a positive experience, with some useful and enlightening exchanges and social learning between a diversity of stakeholders. The potential of the body to model best practise in stakeholder participation is substantial. However, its success is somewhat dependent on the willingness of the governance system and relevant state agencies at various levels to engage with the Forum and to respond to its input. In some cases, this may involve a cultural shift, which it is hoped the Forum may precipitate.

SWAN also welcomes the establishment of the Local Authority Water and Communities Office (LAWCO), which has begun the groundwork of raising awareness of water issues at the local level since its establishment, and which has facilitated a programme of public engagement during the draft Plan consultation period.

While a discussion on the key elements of successful public participation/engagement is beyond the scope of this submission, these are well-rehearsed in the literature and have been set out by SWAN in various submissions to the Department of Environment.[13,14] In July 2015, SWAN made a detailed submission to DECLG in relation to public participation, integrated catchment management and governance,[15] and we followed this with an updated submission in September 2016,[16] refining our proposals and updating our recommendations in light of developments during those 14 months. We attach both of these in full as Appendix 3, in support of this issue, as a formal contribution to the draft RBMP consultation.

A brief summary of the features of an effective public participation programme is as follows:

- Underpinned by a comprehensive and far-reaching public awareness campaign;
- Early engagement that is well-planned & designed and has been well publicised in advance;
- Appropriate mechanisms, structures & processes that *genuinely* facilitate the participation of those affected (stakeholders), and enables them to influence the outcome(s);
- Adequate resources to conduct effective public participation, and to enable stakeholders to fully realise the potential of each engagement opportunity;

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13 Sustainable Water Network (SWAN), 2012. SWAN Recommendations for Public Participation Mechanisms in the Department of Environment Community & Local Government (DECLG) 4-Tier Water Governance Proposal.

14 Sustainable Water Network (2012) Getting It Right or Getting It Right Ticking boxes vs. delivering genuine public participation in water management in Ireland. Presentation to The joint meeting of the Task Force on Public Participation in Decision-making of the Aarhus Convention & the Meeting of the Parties to the Protocol on Water & Health on 'Public Participation in Environmental Decision Making: Focus on Water and Health', June 2012.

15 Sustainable Water Network (SWAN), 2015: *'Delivering meaningful public participation in water governance and Water Framework Directive (WFD) implementation: SWAN Recommendations'*, July 2015.

16 Sustainable Water Network (SWAN), 2016: '*Public Engagement in Water Framework Directive Implementation: A Review of Developments as of September 2016, with Recommendations - SWAN Submission to Department of Housing, Planning, Community and Local Government (DHPCLG)',* October 2016.

- Evaluation of operation and outcomes, to inform improvements in how engagement continues; and
- Specially qualified & trained professionals.

In this context and notwithstanding the establishment of the National Water Forum and LAWCO, several elements of the SWAN recommendations on effective public engagement remain to be addressed:

PUBLIC AWARENESS CAMPAIGN ON WATER

Underpinning all public engagement efforts must be a national public awareness campaign on water, which SWAN has been recommending for 12 years. We would like to re-iterate the importance of this as the basis for all further work on public participation. With only 12 Community Water Officers, it is not feasible to expect LAWCO activities to raise awareness of water issues within every household in the country without the support of a well-resourced public awareness campaign.

TIERS OF ACTIVE PUBLIC ENGAGEMENT: WHAT'S STILL NEEDED

There are three tiers to be considered in water governance and public engagement, and these are at national, regional and local/sub-catchment level. While the NWF is in the process of addressing engagement at the national level, as key decision-making bodies the Regional Committees do not have a corresponding structure to facilitate public engagement at regional level. Since it has emerged that crucial decisions regarding implementation and the selection of measures are being taken here, SWAN believes there should be corresponding stakeholder structures established to feed into their work.

In relation to the community/sub-catchment level, SWAN warmly welcomes and fully agrees with the following statements in the draft Plan:

- *"Community engagement will require real participatory structures … where they can be included in the decision-making process";*
- *"The benefits of community stewardship in relation to water management are also evidenced through the experiences of the Rivers Trusts across the UK and, more recently, in Ireland. For the catchment-based approach to be successful it will require all stakeholders including Local Authorities, Public Authorities, Non- Government Organisations and Communities to cooperate and work together for common goals. LAWCO will have a vital role in making such co-operation a reality on the ground across the country."*

However SWAN has the following concerns regarding translating these principles set out in the draft Plan into workable systems:

- The nature and fora for such cooperation still needs to be determined;
- There are no mechanisms proposed to do this at local level, nor any commitment to support or resource these;
- Stakeholder catchment groups need to be resourced if they are to be serious delivery partners (many of the Rivers Trusts in the UK have several staff); and
- LAWCO also needs to be given the necessary resources[17] to facilitate this process.

These groups have enormous potential to significantly augment the collective capacity to deliver WFD objectives across the State by identifying local issues and participating in collaborative action to address these.

[17] Both to provide LAWCO with an operational budget and to support local groups

It is vital that this potential is recognised, and that their number and efficacy are encouraged to increase over time. In order to be fully effective, these groups need:

A. To be autonomous medium/long-term stakeholder groups;

B. To have the clear primary goal of protecting the aquatic environment, without being compromised by other priorities;

C. To be catchment or sub-catchment focused so as to dovetail with the best-practice, integrated catchment management approach adopted by the Environmental Protection Agency in WFD implementation;

D. To engage active participation from across *all* stakeholder interests in the relevant sub-catchment;

E. To be facilitated and supported with adequate resources by relevant agencies so that they can:

   - Raise awareness locally of the value of their aquatic environments;
   - Identify the pressures on these (including undertaking citizen surveys, monitoring, etc.);
   - Agree actions in response to those pressures to achieve healthy water and WFD objectives;
   - Address issues at a local level to the maximum extent possible; and
   - Secure necessary funding to resource their activities.

F. To receive support for the further development of their capacities including through the hiring of full-time staff; and

G. To have clear, functional links and regular dialogue with the various agencies involved in implementation of the WFD, and to be integrated into the structures and mechanisms for delivery of the Directive.

This last point is vital. If stakeholder groups are to successfully seek solutions to problems that exceed their capacity for local resolution, they will need to be linked to wider structures and systems also working on these issues who can progress such challenges which the group itself cannot. It is equally important that the governance structures in place are responsive when such issues arise at this local level and also that they have the capacity to refer groups efficiently on to other stakeholder bodies working at a national scale on occasions when such bodies are in a better position to address the issue in question. Thus there is a need for a clear communications pathway to be provided and facilitated between grassroots local groups and the proposed National Stakeholder Forum.

The ultimate goal in facilitating these local stakeholder sub-catchment groups is successful collaborative actions to address pressures on aquatic environments. Such collaboration requires constructive dialogue between the sub-catchment groups and the officials of relevant authorities. It is suggested that the newly appointed **community water officers** are ideally placed to broker such liaisons.

Whether or not a single model ("one size fits all" approach) for sub-catchment stakeholder groups is appropriate is unclear. It is important that a number of different models be explored, ideally through pilot projects, to identify successful options and criteria for their operation. In order to develop a better understanding of the optimum approach, it is important that DHPCLP commit to the future of these groups with support both political and financial. Pilot projects would also provide the opportunity to raise awareness among the public of such initiatives, as well as demonstrate the need for them.

There is an immediate and practical challenge facing effective public engagement and that is the present dearth of sub-catchment stakeholder groups (or entities that could fulfil this role). Currently there are very few groups in existence that fit the description of sub-catchment stakeholder groups envisaged by SWAN, and

their assisted establishment will take time. Most significantly, however, this paucity of groups operating at grassroots level means that the base from which the NWF would be informed about issues arising locally is not present.

In response to this, SWAN proposes that the Department reconsider adopting a regional stakeholder forum network (previously proposed by SWAN) *as an interim measure*. This would enable local water officers to bring together stakeholder groups, often more easily identifiable at the larger scale, to begin to look together at the challenges in delivering WFD objectives and how this might be done. Such a mechanism would serve the fourfold purpose of:

A. Raising awareness among stakeholder groups and organisations at that level;

B. Engaging participants in looking at pressures and working collaboratively toward responses to these (modelling how sub-catchment stakeholder groups will ultimately work);

C. Enabling the creation of links between such stakeholder groupings and those at the regional level, i.e. Regional Management Committees (it is envisaged that there may be resistance to this within Local Authority structures and challenging this would play a key part in the necessary change in culture discussed earlier); and

D. Enabling participants to identify intractable issues for referral to the NSF for consideration.

The most unfortunate and avoidable situations of trenchant public opposition in the cases of both the peat harvesting in SACs and water charging demonstrate the extremely damaging consequences of failing to engage meaningfully with the public on water and wetland issues and SWAN would urge competent authorities to continue the work started with the NWF and LAWCO to ensure comprehensive public participation at all levels in WFD implementation as a matter of priority.

4.2.1. Public Engagement in Selection of Measures

SWAN is concerned that, in contrast with the generic nature of what is proposed in the draft Plan, substantive decisions regarding the (prioritised) measures, which, according to the draft Plan, are based on the priorities set out in the Plan, are already being decided well in advance of the Plan being finalised, in the first instance at 'Regional Workshops' and then based on outputs from these, by Regional Committees. This fundamentally undermines the credibility of the consultation process because it reveals the fact that final decisions regarding the prioritisation of measures[18] were to be made before the Plan, on which it is supposedly based, was finalised. SWAN therefore welcomes verbal commitments from DHPLG that there will now be another opportunity for public input to the measures decided on at regional level. However, the nature of this engagement is important. It is crucial that the proposed measures decided at regional level are developed into a draft measures document for each region and issued for public consultation.

4.2.2. SWAN RECOMMENDATIONS ON GOVERNANCE, IMPLEMENTATION & PUBLIC PARTICIPATION

WATER GOVERNANCE, IMPLEMENTATION

[18] Which in itself is not an approach permitted by the Directive

- In order to fulfil the OECD criteria for effective water governance, the Plan needs to propose measures to address the need for better policy coherence and a well-designed regulatory framework, in tandem with the improved administrative structures;
- The Plan should clearly state the challenges presented by a lack of policy coherence and the risk that sectorial expansion poses; and
- Include a commitment with a strict deadline for the introduction of the previously committed-to consolidated Water Resources Bill, along with a statement of the need for this.

PUBLIC PARTICIPATION

- NATIONAL:
  - The Plan must propose a public awareness campaign on water. This forms the baseline for all other public engagement work; and
  - The position of the NWF within governance structures should be clarified.
- REGIONAL:
  - In the immediate term, public workshops should be held in each of the 46 catchments (or at 4-5 in each region) to discuss the proposed measures agreed in the regional workshops and amend accordingly; and
  - The Plan should then also propose the establishment of longer term interim mechanisms for the public and stakeholders to feed into the work of the Regional Committees.
- LOCAL/SUB-CATCHMENT
  - Sub-catchment stakeholder groups (e.g. local river groups/Rivers Trusts) must be facilitated and supported with adequate resources so that they can reach their potential to significantly augment the collective capacity to deliver WFD objectives across the State, including through the hiring of full time staff; and
  - These groups need to be integrated into the structures and mechanisms for delivery of the Directive and LAWCO must facilitate clear, functional links and regular dialogue with the various agencies involved in implementation of the WFD, through the CWOs; and
  - The Plan should propose meaningful operational funding for LAWCO.

5. SECTOR-BASED SIGNIFICANT WATER MANAGEMENT ISSUES

5.1. AGRICULTURE

5.1.1. Introduction

From the draft Plan it is clear that agriculture is by far the most prevalent pressure on the freshwater environment. As a result of the detailed catchment characterisation undertaken by the EPA, agriculture "*has been identified as a significant issue"* in 67% of 'At Risk' river and lake waterbodies. This supports the EPA State of the Environment Report, which, citing the 2015 EPA water quality report,[19] identifies agriculture as one of "*the two most important suspected causes of pollution in rivers accounting for 53% of cases..."* This compares with 34% of cases attributed to municipal sources, the next most significant pressure[20].

As such, 'Agriculture' as a sector needs to be allocated a dedicated, specifically named section in Chapter 7, rather than being included in the 'Rural Diffuse and Point Source Pollution' chapter.

The EPA's characterisation work and Teagasc's Agricultural Catchments Programme (ACP) research both point to the fact that 'one-size-fits-all' measures do not work to mitigate agricultural impacts because solutions must be at a sub-catchment scale, taking into account, amongst others, nutrient loss pathways and critical source areas.

However, in direct contradiction to this, the draft Plan proposes primarily the current basic measure, the Good Agricultural Practises for the Protection of Waters Regulations[21] (the 'Nitrates Regulations') which is a generic national programme to address agricultural pollution. The need to *"ensure the implementation of "the right measures in the right place"'* is recognised in the introduction to the draft Plan as a key learning from cycle one, but this does not translate into any such measures/actions being set out in the 'Measures' section.

The final Plan must reflect this key learning as well as the findings of a substantial body of research by Teagasc and the EPA in the intervening period, or else there will be no improvement in water quality from the last RBMP cycle; in fact, there is a distinct danger of deterioration in light of planned intensification of agriculture under Food Wise 2025.

5.1.2. Nutrients

Nutrient enrichment of surface and ground waters as a result of diffuse emissions is the most significant impact from agriculture on water. In Ireland, agriculture is accountable for an estimated 70% of phosphorus and 82% of nitrogen in surface waters.[22] The draft Plan relies primarily on a generic national measure,

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[19] EPA 2016 Ireland's Environment – An Assessment 2016 Environmental Protection Agency, Wexford

[20] ibid

[21] S.I. No. 31 of 2014. European Union (Good Agricultural Practice For Protection Of Waters) Regulations 2014

[22] Humphreys, J. (2008) Nutrient issues of Irish farms and solutions to lower losses. International Journal of Dairy Technology. 16(1): 36-42.

predicated primarily on agronomic Soil Phosphorous (P) thresholds, to address nutrient pollution from agriculture, stating that "*The Nitrates Regulation is the primary agricultural measure in place to meet the objectives of the WFD.* ***This will remain the case during the second cycle****".* This is wholly inconsistent with research from over the past 20 years, and most recently the findings of both EPA and Teagasc research and monitoring programmes, as we will explain.

5.1.2.1. Inadequacies of the Nitrates Regulations as the Main RBMP Measure

To assess the adequacy of what is proposed in the draft Plan, it is necessary to assess the effectiveness of the Good Agricultural Practises for the Protection of Waters Regulations (Nitrates Regulations) in protecting the aquatic environment, under the requirements of the Nitrates Directive and the Water Framework Directive (WFD). Two significant state-sponsored monitoring and research programmes were developed to do exactly this, and both have found that the Nitrates Regulations are insufficient to protect water from agricultural impacts.

Critical Source Areas, not national Soil P thresholds, must be at the centre of a new strategy to manage agricultural water pollution.

A fundamental flaw in the Regulations, and thus in the draft Plan, 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 test, which was developed as an agronomic indicator of P requirements for crop growth and 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;[23] however, as indicated by Irvine & Ní Chuanaigh,[24] *"The adequacy of soil index 3 as a reasonable threshold to be used for the protection of surface and groundwaters is unproven"*.

The current measures in the Regulations aim to reduce the risk of diffuse nutrient loss to water by primarily setting phosphorous input limits based on the soil P index, while allowing soil phosphorus levels across all catchments to increase to Index 3. A significant omission from the regulations is any 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. The results of tests published by Hooda et al.[25] showed that the amount of P desorbed had no relationship with total soil P content, and that the most significant property was the extent of P saturation. Börling et al.[26] also found that extractable phosphorus could not be used alone for prediction of potential P release.

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 and Teagasc,[27] most recently by the Agricultural Catchments

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[23] Daly, K. (2005) 'Evaluating Morgan's Phosphorus Test as an Environmental Indicator'. Teagasc - Project Report - 4976

[24] 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.

[25] Hooda, P., Rendell, A., Edwards, A., Withers, P., Aitken, M. and Truesdale, V. (2000) 'Relating Soil Phosphorus Indices to Potential Phosphorus Release to Water'. Journal of Environmental Quality, 29,1166-1171.

[26] Börling, K., Otabbonga, E. and Barberisb, E. (2004) 'Soil Variables for Predicting Potential Phosphorus Release in Swedish Noncalcareous Soils'. Journal of Environmental Quality. 33, 99-106.

[27] 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.

Programme Phase II report.[28] There is a high risk of nutrient loss from agricultural soils when pressures from nutrient sources coincide with pathways of nutrient transfer. Schulte *et al.*[29] have identified the elements that influence the risk of nutrient loss from Irish soils: soil nutrient levels, land use, grass growth season and droughts. The key pathway factors are soil drainage capacity and the quantity, seasonality and intensity of rainfall. Reporting the findings of the ACP Phase II, the EPA Article 10 report[30] highlighted a good example: the "*poorly drained grassland catchment had three times higher annual P loss than an arable, mostly groundwater fed catchment despite the latter having higher soil P sources."*

Nutrient source pressures and transfer pathways vary considerably throughout different regions of the country,[31] and Archbold *et al.*[32] have defined hydrological pathway categories for the Irish landscape. Nitrate is highly mobile in soil water and is typically leached from a surface source to groundwater and enters a waterbody via subsurface pathways.[33] Phosphorus transfer pathways are dominated by overland flow, but may also leach into groundwater, and are very much dictated by diffuse sources from rainfall-events.[34,35] Transfer pathways within a catchment depend on soil permeability and geology. 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.[36] 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.[37] 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.[38]

In a study looking at flow paths and phosphorus transfer pathways in two agricultural streams with contrasting flow controls, Mellander[39] found that *"the difference in magnitude of the P loss from the two catchments was*

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28 Teagasc (2017) Agricultural Catchments Programme Phase 2 Report. Teagasc, Wexford

29 Schulte, R.P.O., Richards, K., Daly, K., Kurz, I., McDonald, E.J. and Holden, N.M. (2006). 'Agriculture, Meterology and Water Quality in Ireland: A regional evaluation of pressures and pathways of nutrient loss to water'. Biology and Environment. 106B(2): 117-133.

30 EPA (2016) *Council Directive of 12* December *1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC):* Article 10 Report for Ireland for the Period 2012-2015. Environmental Protection Agency, Wexford

31 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.

32 ibid

33 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.

34 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.

35 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.

36 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.

37 ibid

38 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.

39 Mellander, P.-E., Jordan, P., Shore, M., Melland, A.R., Shortle, G. (2015) Flow paths and phosphorus transfer pathways: comparing two agricultural streams with contrasting flow characteristics. Hydrological Processes (Special Issue), 29, 3504-3518.

not defined by land use, source pressure or discharge volume … but by more basic rainfall-to-runoff partitioning influences that determine proportions of quickflow and slowflow". 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."* [40]

EPA peer-reviewed research, published as part of their catchment characterisation work (Deakin et al., 2016),[41] concludes that "*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".* 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's emphasis)

Supporting this, Shore et al[42] states that **"*Identification of surface hydrological connectivity at scales where critical source areas (CSAs) can be managed is fundamental to achieving effective management of phosphorus loss in agricultural catchments."*** (SWAN's emphasis)

Thus, from the above research it is evident that P indices are not sufficient to indicate the risk of P loss from agricultural soils, and that the aforementioned nutrient sources and transfer pathways must be considered in nutrient loss risk assessment since the management of source pressures alone will not yield the expected reductions in P loss from land to water. Therefore, a requirement for a defined nutrient transport risk assessment to be carried out at farm level should be included in the regulations and also in the draft Plan. This should include a transport risk metric. Jordan et al.[43] recommend the use of a runoff flashiness metric which incorporates flowpath measurement in P transfer risk assessment. The nutrient transport risk assessment should be coupled with an annual fertilisation farm plan. Nutrients should not be applied to land at times when the nutrient transport risk assessment indicates that nutrient loss risk is high. This farm and catchment scale management approach would be more beneficial and effective than a national 'one rule fits all' method.

Other weaknesses in the GAPP Regulations in relation to controlling nutrient pollution:

SWAN is strongly advocating that a suite of supplementary sub-catchment specific measures tailored to the bio-physical conditions is required to address agricultural pressures on water. Nevertheless, we believe that there remains an important continued role for national nitrates regulations to set a robust baseline regarding controls on excessive nutrient inputs from agriculture. However, to provide such protection, the regulations need to be strengthened very significantly. SWAN has made recommendations for doing this (based on independent scientific advice in response to the last three consultations on the GAPP regulations), but we summarise our key points again here.

SOIL TYPE:

40 Teagasc (2017) Agricultural Catchments Programme Phase 2 Report. Teagasc, Wexford

41 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

42 Shore, M., Murphy, P.N.C., Jordan, P., Mellander, P-E., Kelly-Quinn, M., Cushen, M., Mechan, S., Shine, O., Melland, A.R. (2013). Evaluation of a surface hydrological connectivity index in agricultural catchments. Environmental Modelling and Software. 47, 7-15.

43 Jordan, P., Menary, W., Daly, K., Kiely, G., Morgan, G. and Byrne, P. (2005) 'Patterns and processes of phosphorus transfer from Irish grassland soils to rivers-integration of laboratory and catchment studies'. Journal of Hydrology. 304: 20-34.

Soil type was found by Jordan et al.[44] to be an important factor when linking phosphorus transfer process to catchment patterns in three lowland Irish grassland catchments. Daly et al.[45] associated STP levels with river concentrations of MRP and found there was a significant difference between the risk of diffuse P emissions between peatland dominated soils compared with well drained, predominantly brown earth soils. Contrary to the science, the only differentiation between soil types in the Regulations is between those above or below 20% organic matter. Thus, high production grassland on peatland soils poses a more significant risk to water quality. Many high status sites are located in catchments dominated by peatland[46] and in order to prevent deterioration of these waterbodies, SWAN supports the recommendation by Irvine & Ní Chuanaigh[47] that *"Addition of P to peatlands soils[48] should be prohibited unless demonstrated to have minimal potential impact. These should apply especially (under the WFD) to protected areas of peatlands or those areas with drainage waters to high status sites."*

EXCESSIVELY LOW SOIL P THRESHOLD

The current soil test method in the Regulations, Morgan's P, categorises soil P into four levels. The Regulations currently permit application of fertilizer to Index 3 soils (5.1-8 mg/l P). However, Tunney et al. (2010)[49] showed that maximum beef production occurred at 4.1-6.4 mg/l Morgan's P, indicating that for beef at least, the current regulatory threshold is excessive, even for agronomic purposes. Furthermore, according to Irvine & Ní Chuanigh,[50] applications of P to soils with P concentrations towards the upper boundary of Index 3 are incompatible with the protection of high status water.

INADEQUATE SOIL TESTING INTERVAL & FLAWED ASSUMPTION REGARDING UNTESTED SOIL

The presumption made in the Regulations that untested soils are Index 3 is a serious flaw, as is the requirement for soil testing every 5 years. According to Wall et al.,[51] one third (32-34%) of grassland samples (n=45,113) in Ireland fall into the P index 4 category and are thus deemed to have excessive P for agricultural production and to pose a significant risk of P loss to water. Thus, the Regulations must not presume the P index level of soils, and should require the occupier/landowner to provide a soil test inventory for farms since, as Jordan et al.[52] explains, *"the risk with absent soil P test data is high application in already high soil P status soils".*

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44 Jordan, P., Menary, W., Daly, K., Kiely, G., Morgan, G. and Byrne, P. (2005) 'Patterns and processes of phosphorus transfer from Irish grassland soils to rivers-integration of laboratory and catchment studies'. *Journal of Hydrology*. 304: 20-34.

45 Daly, K., Mills, P., Coulter, B. and *McGarrigle*, M., (2002) 'Modelling Phosphorus Concentrations in Irish Rivers Using Land Use, Soil Type, and Soil Phosphorus Data'. Journal of Environmental Quality. 31: 590-599.

46 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.

47 ibid

48 organic content >20%

49 Tunney, H., Kirwan, L., Fu, W., Culleton, N., and Black, A.D. (2010) 'Long-term phosphorus grassland experiment for beef production-impacts on soil phosphorus levels and liveweight gains'. Soil Use and Management. 26: 237-244.

50 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.

51 Wall, D.P., Jordan, P., Melland, A.R., Mellander, P.E., Mechan, S. and Shortle, G. (2013) 'Forecasting the decline of excess soil phosphorus in agricultural catchments'. Soil Use and Management. 29(1): 147-154.

52 Jordan, P., Menary, W., Daly, K., Kiely, G., Morgan, G. and Byrne, P. (2005) 'Patterns and processes of phosphorus transfer from Irish grassland soils to rivers-integration of laboratory and catchment studies'. *Journal of Hydrology*. 304: 20-34.

The regulatory requirement for a 5 year soil P testing interval poses an additional risk in the catchments of 'at risk' waterbodies, as soil P can build up in the intervening time.[53] Teagasc's own Code of Practice for Soil Sampling recommends that soil sampling should be conducted *"every 3 years in intensive farming".*[54] It is therefore recommended that this recommendation be reflected in the regulations and that the soil testing interval in the Regulations be reduced to every three years.

PROVISION TO ALLOW OVER-FERTILISATION NOT BASED IN SCIENCE

The Regulations permit over-fertilisation of soils which are already high in phosphorus, providing, '*Manure produced by grazing livestock on a holding may be applied to Index 4 soils on that holding in a situation where there is a surplus of such manure remaining after the phosphorus fertilisation needs of all crops on soils at phosphorus indices 1, 2 or 3 on the holding have been met by the use only of such manure produced on the holding*.' Since it is a key element of the Soil P system that risk of loss to the aquatic environment increases significantly at phosphorus index 4, this provision allows for the strong likelihood of pollution of waters and clearly is only of benefit to a farmer for the disposal of excess animal waste. Under this provision, there is a strong probability of excess nutrients entering waterbodies, which, if this were to lead to a deterioration in water quality, would be contrary to the aims of the Water Framework Directive. This provision for spreading organic fertiliser on Index 4 soils must be removed from the Regulations.

PROVISION TO ALLOW SPREADING OF MANURE ON UNIMPROVED LAND THREAT TO HIGH STATUS SITES AND FRESHWATER PEARL MUSSEL

Furthermore, the current Regulations also permit, in a situation where there is a surplus of manure remaining after the phosphorus fertilisation needs of all crops on soils at phosphorus indices 1, 2 or 3 on the holding have been met by the use of such manure produced on the holding, that the excess manure be spread on other previously unimproved land. Given that many of the high status sites on watercourses monitored by EPA are clustered in lands of low agricultural intensity of the south-west and west,[55] if previously unimproved lands are allowed to be fertilized in this way, deterioration in water quality caused by nutrient runoff is likely in sensitive catchments. This would represent clear non-compliance with the no-deterioration clause of the WFD. Furthermore, as the majority of the river catchments listed in the First Schedule of the Freshwater Pearl Mussel Regulations 2009 are located in areas of low agricultural intensity in the west and south-west, the fertilising of unimproved lands in these catchments is in direct conflict with the ecological quality objective of High Status for these rivers, as set out in the Fourth Schedule of these regulations.

For compliance with the WFD and the Freshwater Pearl Mussel Regulations 2009, the GAP Regulations 2014 must be changed to prohibit the spreading of fertiliser on previously unfertilised and unimproved soils.

ENFORCEMENT

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.

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53 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.

54 Teagasc (2010) Code of Practice for Soil Sampling. Teagasc, Wexford.

55 McGarrigle, M., Lucey, J. and O Cinneide, M. (2010) Water Quality in Ireland 2007-2009. Environmental Protection Agency, Wexford.

SWAN welcomes the increased targeting of inspections towards at risk waterbodies based on the EPA characterisation. However concerns remain. According to the EPA Article 10 report,[56] *"inspections are carried out to determine the effectiveness of the measures set out in the National Action Programme (NAP)".* 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. Unfortunately, there is limited up-to-date data regarding enforcement and compliance that is transparent and publicly available. However, it would appear that only 1% and 3% of non-derogation and derogation farms, respectively, are currently inspected. The following table from the EPA Article 10 report[57] indicates that there has been a significant drop (9%) in the numbers of inspections between 2012 and 2015 and emphasises the fact that*, "There has been a notable reduction in local authority inspections in 2014 and 2015".*

Press reports also indicate a worrying level of inconsistency in the inspections across Local Authorities. For example, the Farming Independent reported in 2013[58] that *"Between 110 and 120 farmers in the county* [Limerick] *were selected for nitrates inspections by the county council every year from 2010 to 2012".* Whereas *"In contrast, Roscommon, a similar sized county, had just 16-18 farmers selected for local authority nitrates inspections in the same period".* 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. 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.

Table 1. Summary of Nitrates Action Programme Inspections, EPA (2016)

Year	Local Authority Inspections	DAFM Inspections (on behalf of LAs)	Total Inspections
2012	4,011	1,650	**5,661**
2013	3,916	1,669	**5,858**
2014	3,457	1,650	**5,107**
2015	3,500	1,652	**5,152**

There is also little readily available information on compliance rates and the magnitude of the penalties imposed or the specific causes of the breaches. While the draft River Basin Management Plan reports that current *"compliance rates are almost 70%"*, they specify that *"the majority of non-compliance issues relat[e] to management within the farmyard"*. It would seem obvious that this is because the farmyard is a primary focus of farm inspections. The EPA State of the Environment Report highlights this: *"The national farm inspection regime is currently focussed on the farmyard. However, a significant proportion of pollution can arise from agricultural land".*

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56 EPA (2016) *Council Directive of 12* December *1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC):* Article 10 Report for Ireland for the Period 2012-2015. Environmental Protection Agency, Wexford

57 ibid

58 Murphy, C. (2013) *50pc of farmers fail Nitrates test*. Farm Ireland, Irish Independent. Available at: http://www.independent.ie/business/farming/50pc-of-farmers-fail-nitrates-test-29725685.html

In relation to this inadequacy, 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.[59]

The Explanatory Handbook for Good Agricultural Practice for the Protection of Waters Regulations 2014[60] states that "*Compliance infringements of a negligent nature, relating to the agricultural activity of the farmer or the agricultural area of the holding, may incur sanctions of 1%, 3% or 5% depending on the nature of the infringement"* and that "*More serious breaches may incur a higher sanction".* The draft River Basin Management Plan more vaguely says *"problems found during inspection by Local Authorities or other Departments or agencies are cross reported to DAFM and may result in a monetary penalty"*. However, the value of fines in relation to parameters breached is not readily available or clear.

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. Therefore, SWAN strongly recommends that the following requirements be added to the Regulations as follows: An annual compliance assessment report, which is publicly available and which includes data on inspection and compliance rates, including parameters breached, and enforcement sanctions; Provision for additional spot-checks, especially during slurry spreading season, without prior notification to the landowner.

5.1.2.2. Water Quality & Ecology Results of EPA Statutory Monitoring Programme and Agricultural Catchments Programme

As stated in DAFM[61], "*monitoring of the Nitrates Regulations is undertaken primarily through the EPA's annual national water quality monitoring programme"*. In 2008, DAFM also "*established the Teagasc-operated Agricultural Catchments Programme (ACP), for the purpose of monitoring progress in predominantly agricultural catchments" (ibid).* The ACP *"has been monitoring the effectiveness of Ireland's Nitrates Regulations in 4-year phases since 2008" (ibid).* When assessing the effectiveness of the Nitrates Regulations, and thus the draft Plan, it is important to take particular note of the findings of both the EPA monitoring programme and the findings of the ACP.

While publications emanating from both programmes have been widely referenced throughout this submission, it is useful to take a closer look at the findings of both these programmes, particularly as they relate to and complement each other regarding water quality and status. In short, to look at the status and risk category of waterbodies determined by the EPA water monitoring programme, in the areas within the Agricultural Catchments Programme. Examining the areas covered/overlapped by both assessment programmes would seem a sensible approach to obtaining the most accurate assessment to date of the effectiveness of the Regulations.

In the first instance, it is very surprising that this analysis does not appear to have been done to date by either of the agencies overseeing these programmes (or if it has, it is not presented in summary form in the draft Plan to support what it is proposing regarding agricultural measures). It is the SWAN position that this is a serious

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59 Mairead Shore presentation, Teagasc Agri-Environment conference, 2016

60 Department of Agriculture Food and Marine (2014) *The Explanatory Handbook for Good Agricultural Practice for the Protection of Waters Regulations 2014* Department of Agriculture Food and Marine.

61 Department of Agriculture Food and Marine (2017) Protecting and Enhancing Water for Sustainable Agriculture Water-related measures for the agri-food, forestry and marine sectors, Department of Agriculture Food and Marine.

gap in the evidence-base underpinning the draft Plan, and indeed in the Teagasc Phase II report. (We do not yet know if it will be included in the upcoming EPA Water Quality report, which it appears now will not be published before the end of the draft Plan consultation period).

In the absence of this important information, SWAN endeavoured to conduct our own assessment with reference to the ACP report (and papers emanating from it) and the www.catchments.ie water status tool as part of our submission to the GAPP regulations consultation; we reproduce this here. If there are any factual errors we welcome correction, since this exercise was as approximate as the information available, especially regarding the exact locations of the ACP study catchments in relation to their adjacent waterbodies.

Findings of the ACP in relation to water quality and ecological water status

While it would seem clear that the ACP is demonstrating positive results in terms of imports of nutrients to farms and farm nutrient balances, the requirement of the Nitrates Directive and WFD are of course to minimise water pollution and achieve good water status, respectively, focusing on the receptor end of the nutrient transfer continuum. Therefore, in order to assess the efficacy of the Nitrates Regulations, it is important to look carefully at the water quality and ecological status results from the waters in the ACP catchments.

In relation to the most significant agricultural pollutant nationally, P, which is also therefore a key water quality indicator, the ACP Phase II report[62] makes it clear that five out of the 6 ACP catchments are failing WFD standards for P, stating that *"The Grassland D karst catchment was the only catchment with P concentrations consistently below the EQS of 0.035mg/l".*

In relation to ecological status, the information is not as clearly presented and there are no supporting peer reviewed papers that SWAN could source specific to ecological quality. However, the ACP Phase II report[63] does clearly state that *"The Grassland C drumlin catchment was the only catchment to consistently present Good macro-invertebrate status required by the WFD"*. It also reports *"early indications of a decline in the September macro-invertebrate quality in Grassland A and Arable A",* noting longer term monitoring is needed.

In addition, in a focused study of *"phosphorus mitigation measures across the nutrient transfer continuum in a dairy grassland catchment"* in the ACP, despite the fact that *"the results of the water monitoring showed some reductions in concentrations of P*", these decreases were limited to "*near surface quickflow hydrological pathways"* and there was *"no clear evidence of changes in stream biological quality".*

From SWAN's reading of the ACP Phase II report and associated papers, there is little indication that the regulations are effective in achieving Nitrates and WFD objectives for receiving waters in the study areas.

EPA Water Monitoring & Characterisation results for waterbodies in ACP catchments

As mentioned above, it is not entirely clear from the available ACP maps which waterbodies and monitoring points are most closely associated with the waterbodies in the catchment.ie tool. However, SWAN's best assessment from an examination of both is set out in Table 1. below.

62 Teagasc (2017) Agricultural Catchments Programme Phase 2 Report. Teagasc, Wexford

63 ibid

It would appear that for the 5 ACP catchments for which we could discern associated EPA status data, the water status in two of the catchments has declined over the 7 year project period to last year, with the other 3 catchments unchanged in status. There has been no improvement in water status in EPA monitored waterbodies adjacent to the ACP catchments. Three of the catchments have failed WFD standards consistently since the start of the programme: Dunleer, Timoleague and Corduff, with Dunleer declining from moderate to poor; one has dropped from meeting WFD standards to failing (Ballycanew) and one has maintained good status throughout (Castledockerell).

The more detailed EPA Catchment Characterisation exercise has also identified at least three of the ACP catchments as having associated waterbodies designated 'At Risk'. It is important to note in this context that the catchment areas were specially selected for being predominantly agricultural so there is a high likelihood that this risk is primarily posed by agriculture.

In summary, it is apparent that 2 of the 6 catchments (or at least the closest waterbodies), rather than improving during the lifetime of the ACP programme so far, have actually declined and those which started off failing WFD standards have not been restored. The EPA data for the ACP catchments would therefore appear to indicate that, even with the higher intensity of engagement with farmers and other dedicated measures in the ACP catchments to optimise implementation of the Nitrates Regulations, the ACP has not succeeded in demonstrating that the Nitrates Regulations are effective in protecting the associated waterbodies from agricultural pollution.

SWAN does not accept that this systemic failure on the part of the ACP to demonstrate water quality/WFD status improvements is wholly due to lag times, and Teagasc has not put forward evidence to support this position. While clearly a contributing factor in the poorly draining catchments, the findings of the ACP itself, discussed extensively above, show that this argument does not hold up for free-draining soils.

Table 1. *EPA Water Monitoring Programme water status results for waterbodies in/near ACP catchments*

ACP Catchment	**Water body**	**WATER STATUS**				
		2007-09	*2010-12*	*2013-2015*	**Risk Status**	
Dunleer, Louth	White (Louth)_030	Moderate	Poor	Poor	**At Risk**	**FAILING** WFD & ***DECLINED***
Castledockerell , Wexford	Slaney_160	Good	-	Good	**Not at risk**	**MEETING WFD:** ***MAINTAINED***
Ballycanew, Wexford	Brackan_010	Good	Moderate	Moderate	**At Risk**	***DECLINED*** FROM GOOD TO **FAILING** WFD
Timoleague, Cork	East Cruary_010 (?)	Poor	Poor	Poor	Review	**FAILING** WFD: *MAINTAINED*
Corduff, Monaghan	Knappagy_020	Poor	Moderate	Poor	**At risk**	**FAILING** WFD: *MAINTAINED*
Cregduff, Mayo	Rathmalikeen_010/Robe_060 (?)	-	-	-	Review	UNCLEAR

These results demonstrate that nutrient pollution from agriculture continues to result in severe water pollution, and that this problem will not be addressed successfully by reliance on the existing generic national measure,

the Nitrates Regulations. There is a high risk that water quality will continue to worsen unless provision for a package of new measures which are tailored to sub-catchment specific bio-physical conditions are brought into place in the final Plan.

5.1.3. Green Low Carbon Agri-Environmental Scheme (GLAS)

SWAN welcomes the fact that GLAS is now more targeted towards water quality and that high status sites and farms within vulnerable catchments comprise one of the five priority environmental assets that give prioritised access to the scheme. We also welcome progress in relation to uptake (e.g. 13,000km of watercourse fencing and planting of catch crops). However the draft Plan does not contain any specific information on what water quality improvements can be reasonably expected through GLAS, there are no specific targets in the Plan (such as the quantitative reduction in nutrient enrichment in waterways or the number of additional water bodies that will be protected from cattle access). The plan does not specify what actions are required of landowners in GLAS and how this will improve water quality. It appears that GLAS in its current form does not contain sufficiently strong measures to tackle the severity and threat of agriculturally derived water pollution, especially in vulnerable catchments. The draft Plan should be able to give estimates of the actual improvements in water quality that will arise from its implementation.

It is SWAN's opinion that GLAS would be of much greater benefit to water quality if it were supported by ecological expertise and capacity from the farm advisor to tailor specific on-farm actions as part of the farm management plan, such as addressing particular nutrient pathways, implementing setback distances where they will have most impact, locating tree-planting where it will intercept nutrients most effectively, and similar measures. Currently GLAS does not have the structure to allow for tailor-made actions, despite the recognition that it will be necessary to *"ensure the implementation of "the right measures in the right place"* in order to improve water quality. Also of concern is that while GLAS has the potential to prevent further deterioration of water bodies because of improved nutrient management, it has limited capacity to bring failing water bodies back to good status. Our rationale for this is set out below:

- The maximum payment of €5,000 per applicant per full calendar year (except where GLAS+ applies) makes it less appealing than was REPS to many farmers and this combined with its non-mandatory nature means that it does not guarantee uptake – and thus the potential additional protection – of farms in high status sub-catchments, despite priority access;
- There is no targeting towards waterbodies 'at risk' from agriculture, nor the specific biophysical setting;
- While a Nutrient Management Plan is required, these are not sufficiently restrictive in terms of nitrogen & phosphorus inputs, and do not contain a more restrictive nutrient threshold than for non-GLAS farms, despite the fact that there is a high likelihood that they will be in catchments sensitive to nutrients; and
- The nutrient management plans focus on the source of nutrients and do not reflect the **degree of hydrological connection** to waterbodies which is the crucial factor in determining nutrient runoff. For this reason a nutrient transport risk assessment resulting in a transport risk metric[64] should be incorporated in the preparation of each Nutrient Management Plan and reflected in the final NMP. NMPs, for all farms, but crucially under GLAS, cannot continue to ignore the scientific evidence that reducing the diffuse source load as a measure on its own is unlikely to result in improved water quality outcomes for many waterbodies. **This demonstrates a clear disconnect between the**

64 Jordan P., May L., and withers P. (2012). Impact of on-site sewage treatment systems on river water quality in UK catchments'. Paper for EPA International Symposium on Domestic Wastewater Treatment & Disposal Systems, Dublin.

nutrient management plans and the scientific understanding of nutrient pathways and critical source areas, and thus raises serious questions about the efficacy of GLAS in reducing nutrient loss to surface and groundwater.

To address this, a new methodology for drawing up the nutrient management plans must be devised which incorporates best available knowledge regarding nutrient transport risk. In particular, and as an example of the improvements that are needed, the degree of hydrological connection must be factored into the field by field allocations of phosphates in the phosphorus maps of the nutrient management plans. This revision is crucial if GLAS is to be aligned in a meaningfully way with WFD objectives.

The other main feature that GLAS depends on to tackle water pollution from agriculture is fencing of watercourses from bovines. In cases where farms were previously in REPS or in AEOS, the schemes that preceded GLAS, this measure simply requires that fences remain in place. This is a very basic requirement which may or may not be effective depending on the biophysical setting (e.g. whether there is over-land or sub-surface flow).[65]

As the 'Riparian Margins' option is in tier 3 of GLAS, it is unknown as to how widely it has been taken up. Riparian Margins can deliver benefits if managed appropriately, however there is no requirement in GLAS to manage these margins, where appropriate, in a way that benefits either water quality or biodiversity. This is an issue because, for example, in cases where an invasive plant such a Himalayan Balsam becomes established in such margins, it could be more damaging to water quality than having no margin.

In summary, the efficacy of GLAS in delivering WFD outcomes has not been assessed nor is there an action proposed in the draft Plan to conduct such an assessment. While the Plan does say that the results of GLAS will be *'monitored and evaluated'* there is no proposals to specifically review or amend the scheme during the current RBMP cycle, in light of WFD objectives and new characterisation results. The commitment to monitoring in the draft Plan is extremely vague, simply stating that the *'cumulative environmental benefits'* will be *'monitored and evaluated'.* If GLAS is to be held up as a measure that contributes at all to the objectives of improving water quality, then indicators must be selected to enable the evaluation and monitoring of water quality/status adjacent to and downstream of an adequately large sample selection of GLAS farms. It is necessary to design water quality/status monitoring parameters immediately and begin baseline monitoring at the outset of the scheme. Water quality indicators must be selected on scientific grounds as the indicators that will be most telling of improvements in siltation and nutrients adjacent to and downstream of a sample selection of participating farms. This is linked to the importance of setting specific and measurable performance targets for GLAS.

5.1.4. Other Agricultural Drivers and Pressures

5.1.4.1. Cattle Access

Cattle access to riparian areas and watercourses is a pressure which can increase both nutrient and sediment input to streams.[66] Conroy et al.[67], cited in Doody et al.[68], observed local-scale impacts of cattle access on

[65] Teagasc (2017) Agricultural Catchments Programme Phase 2 Report. Teagasc, Wexford

[66] EPA 2016 Ireland's Environment – An Assessment 2016 Environmental Protection Agency, Wexford

[67] Conroy, E., Turner, J.N., Rymszewicz, A. *et al*., 2016. 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.

ecological water quality in Irish streams, with these impacts *"most pronounced during the summer and autumn months in rivers that have a high/good status".* They reported significant changes in metrics, such as macroinvertebrate total richness downstream of access points in all four of the studied high-/good-status sites during summer and autumn.

While further research has been commissioned to *"assess the environmental, ecological and socio-economic impact of existing and potential measures that prevent cattle access to watercourses"*[69], the draft Plan should identify this as a pressure and propose a timeline by which to introduce measures to control it, where necessary.

5.1.4.2. Food Wise 2025 and the National Dairy Sustainability Forum

The EPA State of the Environment Report 2016 states that "*The ongoing and planned expansion in the agricultural sector under Food Harvest 20204 and its successor, Food Wise 2025, may threaten improvements in water quality, if not adequately managed"* and that "*Under the expansion plans, increased application of nitrogen and phosphorus to agricultural land is likely to happen in areas of the country where the concentrations of these nutrients in water are already elevated*".

It is clear that increased agricultural intensification represents a very significant threat to inland and transitional waterbodies, especially in areas where waterbodies are already at risk from agriculture. This link has also been proven. Donohue et al.[70] 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. They identified a threshold value of 38% pasture, above which there was a significant decline in the probability of a site having a good ecological status.

The only proposal in the draft RBMP that is 'supplementary' to basic measures already in place, as set out in section 7.1.3, action number 5, is the establishment of a 'National Dairy Sustainability Forum' under the Irish Dairy Industry Association (IDIA). The Plan lacks any clear statement of what the water quality objectives of the National Dairy Sustainability Forum are or if there are any; and there is no reference to any specific actions or expected outcomes from the Forum in relation to water quality. There is a suggestion that further to the establishment of a pilot approach, there will be a promotion programme to support best practice in the management of point source pollution on participating farms. A 'promotion programme' could simply mean publication of brochures for circulation. The absence of specific water quality objectives in the National Dairy Sustainability Forum or targets and actions that will enable a measurable contribution suggests that the Forum may achieve very little in relation to water quality.

From the Plan, it is apparent that the National Dairy Sustainability Forum will not be taking any action to address the risk of N and P loss to water. While the proposed strategy of incorporating best practise from the Agricultural Catchments Programme by dairy farmers has significant potential, it is of extreme concern to SWAN that the focus from the ACP will be "*in particular on soil fertility*" and that it does not anywhere mention consideration of nutrient pathways. One of the key ACP findings is that *"Soil type and geology override soil P level as a predictor of P loss risk'* and that reducing the diffuse source load as a measure on its own is unlikely to result in improved water quality outcomes and this must be incorporated into the NDSF

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[68] Doody, D., Cross, P., Withers, P., Cassidy, R., Augustenborg, C., Pullin, A., Carton, O., Crosse, S. (2016) AgImpact Project: A Systematic and Participatory Review of Research on the Impact of Agriculture on Aquatic Ecosystems in Ireland

[69] EPA 2016 Ireland's Environment – An Assessment 2016 Environmental Protection Agency, Wexford

[70] 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: 91–98.

strategy via the requirement for the incorporation of the Critical Source Area approach on dairy farms supplying cooperatives. The NSDF must engage significant scientific expertise in the design of its required practices if there are to be any real sustainability benefits specific to water quality. SWAN recommends that the ACP findings would likely be best translated into 'on the ground' action by participating farms through a combination of hydrological expertise and peer learning.

In summary, is not clear how the NDSF Initiative will function or what measures it will involve to deliver real improvements in water quality, especially in terms of managing nutrient loss to water. The final Plan should include measurable actions as part of this initiative.

The Plan states that this is to be part of the Origin Green scheme. To date, Origin Green has focused exclusively on monitoring water conservation, and does not have any criteria for tackling the water pollution that arises from agriculture. This omission is not in keeping with the sustainability vision espoused by Origin Green. There is a clear need for Origin Green to positively contribute to the improvement of not only water usage but also water quality. If Origin Green is to effect any real improvements in the environmental performance of Irish farming, it must include measures to reduce nutrient pollution and other agricultural sources of water pollution.

5.1.4.3. Wetland Drainage

The impact of reclamation of land for agricultural purposes, and its impact on WFD status of affected/adjoining waterbodies, is not addressed in the draft Plan. The EIA (Agriculture) Regulations and 2011 Planning & Development (Amendment) (No. 2) Regulations have the potential to provide protection. However, the system is fragmented and confusing for landowners, planning officials and other stakeholders, and for this and other reasons the regulations are ineffectual. Wetland drainage can pose a significant agricultural risk, especially in vulnerable catchments. It is addressed thoroughly in Section 6.1 (Physical Modifications).

5.1.4.4. Pesticides

According to recent research[71], there are 877 different types of pesticides used in Ireland and the control of their use is a significant issue in terms of the water environment, especially the safety of drinking water. In total, about 2 million kilograms of active substances are used each year in Ireland, with the largest quantities used in the agricultural and forestry sectors.[72] Arable land receives greater amounts of pesticide per hectare relative to grassland.[73] Seed treatment chemicals, fungicides, herbicides and insecticides are used to treat seeds, prepare ground for planting and to treat crops; herbicides alone are used in grassland management for

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[71] Zhao Y.Q., Singleton P., Meredith S., and Rennick G.W. (2013) Current status of pesticides application and their residue in the water environment in Ireland. *International Journal of Environmental Studies* 70: 59-72

[72] CDM (2008) Risk to Groundwater from Diffuse Mobile Organics. Dublin City Council Further Characterisation/Programme of measures. CDM, Dublin.

[73] 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.

the spot treatment of weeds.[74] Pesticides reach surface waters via overland flow and leaching through soil to groundwater,[75] and surface waters can also be exposed to direct spray drift.[76]

The main areas of pesticide usage are along the east coast of the country, with County Louth the greatest user of pesticides (it has an average pesticides application rate of 146.7 kg/km).[77] The top six pesticides used in ROI are MCPA, Glyphosate, Chlorothalonil, Mecoprop-P, Chlormequat and Mancozeb. Pesticides become a potential pollutant in water environments following agricultural usage or accidental spills. The rates at which pesticides enter water courses vary according to soil properties, prevailing weather conditions, aspect and slope of the area of application and the chemical makeup of the individual pesticide. A number of cases of pesticide contamination have been monitored in drinking water samples across the country.[78]

The draft Plan says that "*A number of pesticides, including Mecoprop, MCPA (an herbicide used to control the growth of rushes) and 2,4-D have been detected at low concentrations at a large number of river monitoring sites during routine monitoring"* and that *"The significance of the pesticide levels detected is being assessed"*. Archbold et al[79] also stated that more research and monitoring is needed on the ecological impact of pesticides on aquatic biota in order to develop the necessary catchment management tools for pesticides.

Despite this however, the Plan does not give any details or timeline for such an assessment nor make any proposals for its necessity nor how this might translate into proposed catchment management measures.

While the 2012 Sustainable Use Of Pesticides Regulations require that all farmers working with pesticides must train as 'professional users' and have registered by 26th November 2015, they do not restrict sale to registered users only. This represents a potential compliance loophole since anyone can purchase these chemicals. SWAN also believes that that training should be compulsory in order for an individual to be allowed to purchase, not just spray, agricultural chemicals. Furthermore, it is important that the efficacy of agricultural pesticide controls is reviewed in light of water quality and WFD standards and not just EU Sustainable Use of Pesticides legislation.

In relation to protected areas, the use of a given pesticide in an SAC or SPA is permitted by the regulations, following a risk assessment, if the person, can *"show that there was no viable alternative and that appropriate risk management measures were put in place"*. The terms "*risk assessment*" and "*risk management measures*" are not clarified in the Regulations. Assessing the risk of pesticide loss from soils to

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74 ibid

75 Reichenberger S., Hollis J. M., Jarvis N. J., Lewis K. A., Izilivakis J., Mardhol V., Francois O., Cerdan O., Dubus I. O., Real B., Hojberg A. L. and Nolan B. T. (2008) Report on the Identification of Landscape Features and Contamination at Different Scales. Report DL25 of the FP6 EU funded FOOTPRINT Project.

76 CDM (2008) Risk to Groundwater from Diffuse Mobile Organics. Dublin City Council Further Characterisation/Programme of measures. CDM, Dublin.

77 Zhao Y.Q., Singleton P., Meredith S., and Rennick G.W. (2013) Current status of pesticides application and their residue in the water environment in Ireland. *International Journal of Environmental Studies* 70: 59-72

78 ibid

79 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.

waters is notoriously difficult and further research is required to enable the development of catchment management tools for pesticides.[80]

Pesticides and other chemical substances are also used in sheep dip to eliminate pests such as scab, ticks and lice. In the UK, case studies have shown that sheep dips can be a point source of groundwater pollution and similar problems are likely to occur in Ireland.[81] The active ingredient in sheep dip, synthetic pyrethoid (Cypermethrin), is extremely toxic for aquatic environments[82] and was withdrawn from sale in the UK in 2010. Sheep dip is the suspected cause of the loss of some previously high status rivers and there is an urgent need for the complete ban on this substance in Ireland[83]. The *continued* use of this substance in Ireland is highly questionable, especially given that undocumented land-spreading is the current disposal method of synthetic pyrethoid-based sheep dip.[84] Indeed, this is the disposal method recommended in the handbook for farmers participating in the fourth Rural Environmental Protections Scheme (REPS 4). The absence of provisions for the regulation of sheep dip is a serious omission from the Irish regulatory framework and SWAN believes that the RBM Plan should commit to a prohibition on the use of synthetic pyrethroid (Cypermethrin).

5.1.4.5. Upland Burning

An emerging issue which needs a measure to address it in the final Plan is the impact of upland burning on water resources. Illegal and prescribed burning in the mountainous and hilly areas of the uplands has been increasing over the last 15 years, with severe fires in 2017. There is no register of the number of fires that occur each year or the amount and type of habitat burnt or the intensity of the burn. The EPA (2015)[85] has stated that *"the burning of biomass is a threat to (air) and water quality through the generation of pollutants including Polycyclic Aromatic Hydrocarbons (PAHs)"*.

Other impacts on water and hydrology have been documented in a UK research report from the University of Leeds[86] looking at the effects of moorland burning on the ecohydrology of river basins, which has shown that burning on peatlands has "*clear effects on peat hydrology, peat chemistry and physical properties, river water chemistry and river biota*". It also found:

- Rivers draining burned catchments were characterised by lower calcium concentrations and lower pH relative to rivers draining unburned catchments. Rivers draining burned sites had

[80] 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.

[81] CDM (2008) Risk to Groundwater from Diffuse Mobile Organics. Dublin City Council Further Characterisation/Programme of measures. CDM, Dublin.

[82] Jahabakhshi A., Shaluei F. and Baghfalaki M. (2012) Acute toxicity of Cypermethrin on the Great Sturgeon (Huso huso Juveniles). *World Journal of Fish and Marine Sciences* 4: 170-174.

[83] McGarrigle, M., Lucey, J. and O Cinneide, M. (2010) Water Quality in Ireland 2007-2009. Environmental Protection Agency, Wexford

[84] EPA (2008) National Hazardous Waste Management Plan 2008-2012. A Report by the Environmental Protection Agency, Wexford.

[85] EPA submission to NPWS on the review of Section 40 of the Wildlife Act, January 8th, 2015, http://www.npws.ie/sites/default/files/files/Environmental%20Protection%20Agency.pdf

[86] Brown, L. E, Holden, J. and Palmer, S. M. (2014) *Effects of moorland burning on the ecohydrology of river basins*. Key findings from the EMBER project. University of Leeds.

higher concentrations of silica, manganese, iron and aluminium compared to unburned catchments.

- Burning vegetation alters the natural peat hydrology in the upper layers of the peat, affecting the balance of where water flow occurs.

- Macroinvertebrate population diversity was reduced in burned sites where populations were dominated by groups that are commonly found in higher abundance in disturbed river systems, such as Chironomidae and Nemouridae.

- Particulate organic matter (predominantly peat) deposits were increased up to four-fold in the bed sediments of burned rivers compared to unburned rivers. Whilst this research is from the UK, the findings are cause for some concern in Ireland given the prevalence in some areas of widespread upland burning.

To respond to this threat of water quality impacts from upland burning, the draft Plan should highlight the fact that there is a water quality consequence to burning and collaborate with DAFM and other relevant agencies to challenge the prevalence of upland burning. The Plan should aim to develop coordinated actions to tackle this growing problem as part of the new integrated approach to WFD implementation. Research into the impacts of burning on water quality would also be beneficial, although should not delay taking urgent action on this issue.

5.1.5. Overarching Weakness of the Plan in Relation to Agriculture

- It does not clearly state, despite all the evidence, that Basic Measures will be insufficient to address agricultural pressures in certain catchments and does not make any provision/state any requirement for (clearly necessary) targeted supplementary measures (*"the right measures in the right place"*). The draft Plan simply states that "*new targeted initiatives may need to be developed during the course of this 2nd cycle river basin management plan to respond to emerging pressures*". There is a striking disconnection between the research findings and characterisation results and the measures proposed.
- It does not identify what these targeted measures should be and doesn't, even as a minimum, propose a suite of options, from which such measures could be drawn.
- It proposes no means (including resourcing) by which to ensure such targeted measures will be implemented, how, or by whom.
- It presents no new tangible, specific catchment-based measures to address agricultural pressures, especially for nutrients in light of increased fertiliser use and manure production under Food Wise 2025 targets, and despite the fact that all the research is pointing to the need for a new targeted approach which includes the whole nutrient transfer continuum from source to receptor.

5.1.6. SWAN RECOMMENDATIONS ON AGRICULTURE

- Agriculture as a sector must be clearly identified as a significant water management issue in the final Plan in its own right and given a stand-alone section, rather than being subsumed into the 'Rural Diffuse and Point Source Pollution' section.
- The final Plan must contain a clear statement that Basic Measures alone are inadequate to address agricultural pressures (as was included in the 2009-2015 RBMP).

- There must be clear and specific proposals for, and commitment to, the development and implementation of targeted, sub-catchment-specific, supplementary measures and the means to do this, including:
  - who will coordinate this on the ground and liaise with landowners;
  - who will be responsible for overseeing, coordinating and ensuring implementation; and
  - how will it be resourced.

  The Plan should also propose a suite of proposed measures/options e.g. edge-of-field wetlands; buffer zones; riparian fencing; lower nutrient inputs in Critical Source Areas of free-draining soils, etc.
- To support this, the Plan should include a provision to establish a team of 46 state-funded, ecologically trained, agri-environmental advisors to work with farmers in waterbodies at risk from agriculture in each catchment in the country to determine and implement necessary supplementary measures to protect affected waterbodies.
- The Plan should propose the following to make national controls on nutrients more robust and science-based:
  - Mandatory Nutrient Management Plans for ALL farmers, which should include a nutrient transfer risk metric;
  - Soil testing every 3 years (as recommended by Teagasc's Code of Practise);[87]
  - Removal of the provision in the GAPP regulations which allows spreading organic fertiliser on Index 4 soils (as a minimum in farm holdings in catchments of 'at risk' waterbodies);
  - Removal of the provision which allows the spreading of fertiliser on previously unfertilised and unimproved soils (as a minimum in the catchments of High Status waterbodies, SACs and 'at risk' waterbodies);
  - The requirement for the inclusion of a nutrient transfer metric when calculating permitted nutrient loading; and
  - Prohibition on the addition of P to peatlands soils (as a minimum on holdings in the catchment of at-risk and High Status waterbodies).
- Since the Plan is proposing to disseminate "key learnings from the Agricultural Catchments Programme to dairy farmers":
  - it should clearly present the water quality and status outcomes to date in all associated waterbodies and explain the lack of progress so far on these parameters, clearly distinguishing between geophysical (e.g. lag times due to soil type) and other reasons; and
  - The information disseminated should reflect the importance of transport risk and NOT focus on nutrient sources and soil P and N.
- While it is seen as unlikely that GLAS will be revised before 2020, it will be necessary in the meantime to review the programme in light of the findings of the characterisations process to evaluate its effectiveness specifically in delivering WFD objectives and in particular the methodology for developing the nutrient management plans. This review must be carried out by an expert hydrologist/catchment scientist team in order to incorporate the best available knowledge on the degree of hydrological connection determining nutrient pathways and the multiple factors that affect the interactions of nutrient loading and surface water quality. This should also include refinement of the nutrient management plans to target 'at risk' waterbodies.

[87] Teagasc (2010) Code of Practice for Soil Sampling. Teagasc, Wexford.

- The Plan should state that the monitoring and evaluation of GLAS will incorporate an assessment of the effectiveness of GLAS in delivering WFD objectives. It should also set out what the assessment indicators should be and the scientific basis for this. The Plan should also emphasise the need for water quality/status data for the sample farms at the commencement of the scheme. Specifically, the evaluation must assess the extent to which GLAS measures reduce phosphorus and nitrogen in waterbodies, as well as sediment and pesticides.
- The Plan should set out a clear statement of the water quality objectives of the National Dairy Sustainability Forum, as well as targets and actions to match the objectives. In order to address the key challenges of the dairy industry and water quality, the Forum must include a strategy to control diffuse nutrient loss to water with a focus on the importance of nutrient pathways and critical source areas rather than soil fertility. Ample scientific expertise will be required to incorporate the learning from the ACP and translate this into tailored on-the-ground actions for participating farms.
- The Plan should include a proposal to review the dual system for regulating wetland and agricultural drainage, including an assessment of the implementation of the 2 systems[88] and how they can be applied in a more effective and coherent manner in order to protect riparian wetlands and other Groundwater Dependent Terrestrial Ecosystems (GWDTEs) from agricultural pressures, and thus support the achievement of WFD objectives for associated waterbodies.
- Regarding pesticides, the Plan should include a proposal for a comprehensive assessment of the ecological impact of pesticides on aquatic biota, with a focus on high status and at-risk waterbodies and the provision for the necessary catchment management tools for pesticides to be developed based on this.
- The final Plan should propose a ban on synthetic pyrethoid (Cypermethrin) in sheep dip due to its impacts, in particular upon high status waterbodies. This has been done in the UK.
- The Plan should identify upland burning as an issue and propose an assessment of its impacts on WFD objectives and the enhancement of current legislative controls on such burning, in order to protect water resources.

[88] The EIA (Agriculture) Regulations and 2011 Planning & Development (Amendment) (No. 2) Regulations

5.2. URBAN WASTE WATER DISCHARGES

As reported in the draft Plan, wastewater discharges are second only to agriculture as a significant pressure on the aquatic environment, representing a significant pressure in 22% of river and lake waterbodies.

According to the EPA's most recent report '*Urban Waste Water Treatment in 2015*'[89], *"Urban waste water continues to be one of the principal pressures on water quality in Ireland".* It reports that:

- 44 urban wastewater discharges are linked, with a high degree of probability, to river pollution;
- Raw sewage is still being discharged into the water environment from 44 municipal areas;
- Only half (51%) of the *"national waste water load (by population equivalent) complied with the basic quality standards"* required by the Urban Waste Water Treatment Directive (UWWTD); and
- Only 25% of the total wastewater load (in p.e.) *"discharged into nutrient sensitive areas complied with the additional nutrient quality standards".*

The report also found that 29 large urban areas did not meet the relevant effluent quality standards of the directive. Three sites should have been compliant by **31 Dec 2000** (Killybegs; Ringaskiddy/Crosshaven/Carrigaline; Arklow and at least four other larger urban areas should have been compliant by **31 Dec 2005** (Cobh, Clifden; Youghal, Passage West/Monkstown).

Significantly, Ireland's largest wastewater treatment plant at Ringsend in Dublin, which serves a population equivalent of over 1.7 million, is failing to achieve the Urban Waste Water Treatment Directive (UWWTD) standards and has been identified under the European Pollutant Release and Transfer Register (E-PRTR) as one of the top four most polluting wastewater treatment plants in Europe.[90] It is listed for some of the highest levels of nitrogen, phosphorous and total organic carbon release.

In light of the above, it is perhaps not surprising that the European Commission, having initiated infringement proceedings against Ireland in September 2013, followed by warnings in September 2015 and September 2016, announced in February that it is taking a case against Ireland in the European Court of Justice for non-compliance with the UWWTD and *"for its failure to ensure that urban wastewater in 38 agglomerations across the country is adequately collected and treated to prevent serious risks to human health and the environment".* The fact that this case is not mentioned in the draft Plan is a significant and unacceptable omission in light of its potentially far-reaching consequences.

It is important to remember that all the above relates only to the very basic requirements of the Urban Waste Water Treatment Directive and that for vulnerable and at risk waterbodies, including those in freshwater pearl mussel catchments, significantly more stringent emission limits (ELVs) will be required to achieve WFD standards.

5.2.1. Shortcomings in the Current Situation and in the Draft Plan

In the context of the above situation - which the majority of stakeholders agree is unacceptable - it is crucial that compliance with the UWWTD, as an absolute minimum, should be addressed as a matter of the utmost priority, and that the necessary resources are made available to achieve both UWWTD and WFD compliance. The question that the draft Plan does not answer is whether the necessary resources are being made available

89 EPA (2015) Urban Waste Water Treatment in 2014. Environmental Protection Agency, Wexford.

90 The other three offenders are Seine Aval in France and Beckton & Minworth, both in the UK

in order to achieve this, or whether they will be committed in the near future. The Plan does not make the link between the problem and the proposed actions, nor does it assess 'distance to target'.

According to the Irish Water Business Plan,[91] at the beginning of 2015 "*over two-thirds of the sewer network used to transport the country's wastewater was considered to be in need of major repair"* and *"156 wastewater treatment plants are currently undersized"*. According to Irish Water estimates,[92] €5.5 billion needs to be invested in the period 2014 to 2021 to bring water services in Ireland up to an "acceptable" level.

The lack of consistent progress in wastewater infrastructure upgrades and the lack of certainty regarding the funding for this is of extreme concern and is not addressed or adequately highlighted in the draft Plan. It is crucial that the urgency of the situation and the very particular need for significant infrastructure investment is reflected in the draft Plan and that definitive measures are proposed to address the current shortcomings. Unfortunately the current draft of the Plan does not do this.

The EPA's Urban Waste Water report[93] states that ***"The current level of investment in infrastructure is inadequate in order to protect our rivers, lakes and coastal areas*** *from the adverse effects of urban waste water discharges and:*

- *Eliminate the discharge of raw or poorly treated waste water;*
- *Comply with the EU's Urban Waste Water Treatment Directive;*
- *Meet the requirements of EPA waste water discharge authorisations".*

It adds that ***"the pace of progress at resolving environmental priorities is unsatisfactory"*** (SWAN's emphasis).

Furthermore, The EPA's Urban Waste Water Report highlights worrying drops in investment and serious timeline slippages in relation to commitments by Irish Water to address non-compliant discharges. It reports an average slippage of almost 2 years in the planned dates for provision of treatment at 22 of the areas where the discharge of untreated wastewater was previously expected to cease by 2017, and also that *"there are significant delays in carrying out many of the improvements required by waste water discharge licences. Approximately 720 individual improvement works were due to be completed at 216 different urban areas between 2009 and 2015. At the end of 2015 just 39% of these were reported as complete".* It also notes that the annual rate of capital investment in infrastructure since 2014 is approximately 40% lower than annual investment levels during the previous decade.

The principal measure put forward in the Plan is "*Ensuring compliance with the UWWTD and compliance with EPA discharge license Emission Limit Values",* which it states "*will be achieved through the implementation of the Irish Water – Water Services Strategic Plan and the associated Irish Water Investment Programme".* SWAN has several concerns about this:

1. The Irish Water WSSP only has a target of 60% compliance with WFD discharge Emission Limit Values (ELVs) by 2021, with full compliance not planned until 2040, so the draft Plan is inaccurate in saying that compliance with the WFD will be achieved through implementation of the WSSP, since WFD compliance is understood to mean by the directive's deadline of 2021, or with a time extension by 2027.

[91] Irish Water (2015) Irish Water Business Plan. Transforming Water Services in Ireland to 2021. Irish Water, Dublin.

[92] ibid

[93] EPA (2015) Urban Waste Water Treatment in 2014. Environmental Protection Agency, Wexford.

2. In addition, the WSSP is projecting only 90% compliance with UWWTD Requirements by 2021. Therefore, again, it is not appropriate to propose this as the primary measure by which to address this pressure and achieve UWWTD compliance during the term of the Plan, especially without making the time extension clear. It is also important to note that 10% p.e. still represents a large number of small-medium non-compliant discharges over the next 10 years until 2027.

3. The above proposal, as it stands, is reliant on full delivery of the Irish Water WSSP which is in turn reliant on availability of requisite funding. The draft Plan presents figures for investment over the 2017-2021 period, stating that *"Over the period 2017-2021 Irish Water plan to invest approximately 1.7bn in wastewater projects"*. However, it does not indicate whether this will achieve delivery of the WSSP in its entirety and thus how far it will go towards restoring waterbodies that are currently failing WFD standards due to UWWT discharges. Nor is it clear how this figure relates to the Irish Water estimates in their Business Plan[94] that €5.5 billion needs to be invested in the period 2014 to 2021 to bring water services in Ireland up to an "acceptable" level.

4. It has also become apparent in recent months that there is a high level of doubt regarding the funds committed by the state to Irish Water to achieve the targets set in the WSSP and that, in fact, these are by no means certain. There is a deficit of information provided on this in the public domain. Irish Water were reported as saying recently that government funding for water and wastewater projects is committed for this year and next year but *"after that it is a matter for government"*.[95] The Minister is reported as saying in recent media coverage that the €640m and €700m funding Irish Water requires for 2018 and 2019, respectively, will have to be fought for in cabinet.[96] There is a legal duty to meet UWWTD obligations and the draft Plan should be clear about this and the necessary resources which must be provided in order to do it. If, due to the funding situation, what is being proposed in the draft Plan is aspirational rather than definitive, then in the interests of clarity and transparency, this should also be made clear. While it is true, as is stated in the draft Plan, that it is "*the responsibility of Irish Water to comply with the requirements of … licenses and authorisations",* it is the government which is ultimately responsible for compliance with the UWWTD and the WFD and which must therefore ensure that the utility is provided with the necessary funding to achieve this.

5.2.2. Other SWAN Concerns

Irish Water Wastewater Compliance Plan

In relation to the Wastewater Compliance Plan, SWAN agrees that there is a "need to ensure consistency with the development of the RBMPs". It is therefore most regrettable that the Wastewater Compliance Plan was not published in tandem with the draft RBMP. Measures set out in the Wastewater Compliance Plan should inform the final RBMP.

5.2.3. Weaknesses in the EPA Licensing System

The Waste Water Discharge (Authorisation) Regulations of 2007 are a significant improvement on historical non-regulation of local authority discharges. However, SWAN has concerns that this licensing system is compromised by a legacy of poor infrastructure investment in wastewater treatment, which puts the regulator

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94 Irish Water (2015) Irish Water Business Plan. Transforming Water Services in Ireland to 2021. Irish Water, Dublin.

95 Reported by RTE, August 2nd https://www.rte.ie/news/2017/0802/894644-irish-water/

96 Reported Irish Examiner, July 31st http://www.irishexaminer.com/business/water-issues-keep-coming-to-the-surface-456027.html

in the invidious position of having to issues licenses to certain untreated wastewater discharges regardless of the impact on the aquatic environment, on the basis that the discharge cannot go unlicensed, but yet cannot be treated to the requisite standard for the time being, pending investment. This undermines the credibility of the EPA as the regulator in the eyes of some SWAN members.

It has also come to SWAN's attention that the EPA operates a system whereby, when calculating the assimilative capacity of a receiving water for a municipal wastewater discharge, an assumption of no other discharges going to that waterbody is made, and thus that apart from the discharge under consideration, there is zero loading to the water body. This clearly demonstrates a regulatory system not wholly based on science but influenced by a political need for a pragmatic approach. SWAN believes this to be unacceptable and calls for an immediate cessation of this flawed practise.

5.2.4. Cases of Raw Sewage Discharge of Particular Concern

There are some particularly notable and unacceptable cases of raw sewage being discharged into sensitive environments which SWAN wishes to formally submit to the draft Plan consultation, although we understand that the EPA are apprised of them:

- An entire town's sewage is being piped raw into a Special Area of Conservation turlough in County Galway. The sewage from Glenamaddy town - population c.700 - is being piped into Glenamaddy turlough where it enters a swallow hole, before re-emerging at Lettera spring 3.5km west of the town. The primitive, unlicensed sewage unit, which Galway County Council admits is "grossly undersized", has been in place since the 1950s. It has been a subject of internal discussions within various public authorities for the best part of at least 20 years, yet the pollution and public health hazard continues to this day.

- There is a raw sewage outfall onto a rocky beach at Doldrum Bay on the south side of Howth, which serves about 80 houses. When the Ringsend sewage treatment plant received its discharge licence in July 2010, one of the conditions was that the Doldrum Bay untreated outfall be ended by 31st December 2011. This condition has not been complied with and the discharge is occurring within the Howth coast SAC and into the North Dublin Bay area which is a designated SAC, SPA and UNESCO Biosphere reserve. SWAN is also aware that members of the public have been seen gathering shellfish in the immediate vicinity of the discharge pipe.

5.2.5. Sewage Sludge

Irish Water's wastewater treatment plants produced a collective total of 53,543 tonnes of sewage sludge (dry solids) during 2014, with 42,483 (79.3%) being spread on agricultural land. The issue of the disposal of sewage sludge, with associated concerns around land-spreading and resulting potential contamination with heavy metals and endocrine disruptors, should be identified in the Plan in the first instance and measures proposed to address it.

5.2.6. Cross-border Issues

Cross-border inconsistencies regarding UWW discharges and their impacts also cause problems. Northern Irish authorities have agreed on a Grade A Shellfish Water standard in Lough Foyle. This designation was one of the main reasons cited for bringing sewage from the new Magilligan treatment system out of the lough. On the opposite side in Donegal the plan for Moville – Green Castle sewage treatment into the same Foyle waters

is not taking this Grade A Shellfish Waters quality goal into account. Not only is the planned discharge point too far inside the lough, but it is to go through a seagrass bed (*Zostera marina*) which is a priority habitat and highly sensitive to disturbance. While cognisant of the challenges of Brexit, it is important that cross-border issues are recognised in the Plan.

5.2.7. SWAN RECOMMENDATIONS ON URBAN WASTEWATER

1. Redraft this section (7.2) to clearly set out the serious situation regarding non-compliance, the legal requirement to address this urgently, the timeline for addressing this under the current level of projected funding and the level of investment needed to expedite this to 2021 and 2027, taking into account, and clearly stating, levels of confidence, knowledge gaps and issues of technical feasibility. In other words, include the distance to targets in 2021 and 2027 under current funding;
2. Indicate the level of investment[97] needed in order to achieve full UWWTD and WFD ELV compliance by a) 2021; b) 2027;[98]
3. If it is not technically feasible to reach WFD ELVs for 100% of discharges by 2021, then this should be clearly stated and the justification set out;
4. Clearly reflect the EPA UWWT report's concerns and critique - and recommendations -in relation to UWWTD non-compliance and cite their analysis that ***"The current level of investment in infrastructure is inadequate"*** and that ***"the pace of progress at resolving environmental priorities is unsatisfactory"****;*
5. Commit to ceasing the release of all untreated sewage in the next 12 months unless it can be demonstrated that this is not technically feasible;
6. Include as an action, the cessation of the EPA system whereby, when calculating the assimilative capacity of a receiving water for a municipal wastewater discharge, an assumption of zero (other) loading to the water body is made. Following this, review all ELVs for UWW discharges to ensure they do not compromise the meeting of WFD targets, in light of other loadings to the waterbody; and
7. Expedite the publication of the Irish Water Wastewater Compliance Strategy and commit to amending the RBMP in light of its contents.

[97] Provided (with an indicative 'confidence range') by Irish Water

[98] Under the requirements of the WFD this is needed to conduct the requisite disproportionate cost assessment. But even in the absence of this requirement it also necessary information for informed public engagement and forms the basis for a public discussion regarding the value of investment in water services

5.3. FORESTRY

5.3.1. Summary of the Shortcomings of the Measures Proposed to Address Pressures from Forestry

Forestry is the 4th most significant pressure on 'at risk' river and lake water bodies in Ireland. The draft RBMP states that forestry is a significant pressure in 183 (16%) of the water bodies that have been identified as being at risk. This means that 183 sites are not at Good Ecological Status (GES) and that many of these risk further deterioration because of forestry activities.

The forest management issues that have a negative impact on water quality are "*clear-felling, drainage and planting and establishment*'" The plan also states that in relation to forestry the "*pressure is predominantly located in catchment headwaters"*'. This is pertinent because forestry presents a particular threat to the high ecological status water bodies; in fact, it is a significant pressure in 40 (31% of) high ecological status water bodies. **Supplementary measures are urgently needed to address the risk that forestry presents to high status sites, as current measures in the draft Plan are not adequate to prevent their further deterioration.**

In essence, the key challenges presented by forestry operations to water quality are nutrients, silt, acidification and pesticides. These are long standing pressures which are well understood, and unless stronger action is taken than that which is laid out in the Draft RBD Management Plan, these pressures will continue to negatively impact water quality, particularly in upland water bodies and High Status Sites.

It is likely that forestry will continue to grow in areas of the country where it has traditionally been a significant and growing land use, such as the North Western, Western and South Western regions as well upland areas in other parts of the country. The current water quality issues associated with forestry will be exacerbated as forestry expands nationally. This will be a challenge to Ireland meeting our targets under the WFD unless changes in practice are adopted.

The actions proposed in Section 7.3 of the Draft RBMP (Forestry) are widely applicable procedures and policies to improve the environmental performance of forestry which, for the most part, have not been specifically formulated to address the challenges for water quality that have been identified in the characterisation reports. The measures proposed for forestry have not been developed as the best catchment management measures to address the pressures presented by forestry, nor have they been specifically designed to meet the challenges that the characterisation reports have identified. None of the measures even purport to return waters affected by forestry to a healthy state, as required by the directive.

Significant gaps and shortfalls still persist in the draft Plan in terms of requirements for protecting water quality where it is at risk from forestry, and from restoring water quality from deterioration that has occurred as a result of past forest management.

As an example, the draft Plan for forestry and Freshwater Pearl Mussel has been drafted as a response to address the ongoing and hugely problematic pollution that arises from forest management and degrades freshwater pearl mussel habitats. The draft Plan for forestry and Freshwater Pearl Mussel is required because of the compliance issues that have arisen with the Habitats Directive. While benefits to water quality are expected from the implementation of the finalised plan for forestry and Freshwater Pearl Mussel, it is effectively a pre-existing measure and only targets FPM sites. Water bodies that have deteriorated because of past forest management, and water bodies at risk from pending felling, will not be sufficiently protected from forestry-related pollution by the measures cited in the draft Plan, as there are many 'at risk' sites which do not

contain freshwater pearl mussel and thus where the Plan for forestry and Freshwater Pearl Mussel will not apply.

In order to recognise this gap of coverage, the overlap must be quantified in the final RBMP, in that it must identify and state clearly how many of the 183 water bodies where forestry is a significant pressure will be offered some protection by the draft Plan for forestry and Freshwater Pearl Mussel, and by definition, how many of the 183 at risk sites will not gain any protection from this measure and will require alternative protection measures.

Similarly, the Land Types for Afforestation is a 'measure' that has been developed in response to the low productivity of afforestation on poor upland soils and the inability to continue to justify, on economic grounds, subsidised afforestation[99] in upland areas with poor growth rates. That the 'Land Types for Afforestation' process overlaps with sensitive and protected habitats, and that this will also exclude new planting from these areas, is coincidental. Because of the very limited scope of this policy, and the fact that many sensitive upland habitats will still be afforested within the parameters of this policy, it will not prevent deterioration of many water bodies from new afforestation. In addition, it does not protect water bodies in these upland areas from ongoing management of existing forests or felling.

It is also of concern that the 'Land Types for Afforestation' is stated as being a temporary measure to last through 2016. It is unclear if it will continue to be applied as is, be amended, or if it may cease on account of political pressure. The final River Basin Management Plan must commit to the permanent application of the Land Types for Afforestation policy.

The forest and water research, also cited as a measure, is welcome, however the recommendations of the research, such as are described later in this submission, have not been incorporated into the plan and are not being applied in relevant areas of forest management.

The proposed 'Woodlands for Water' measure is a very positive and welcome addition to the suite of supports offered by the Forest Service for afforestation. However, it will primarily benefit new planting and restructuring and will be of limited relevance to mitigating risk to those waterbodies which are a risk from nutrient loading and sedimentation that will result from clear-felling of existing plantations in sensitive or 'at risk' catchments. It is of concern that the Woodlands for Water measure is not being targeted to waterbodies at risk from forestry or from agricultural pollution; there is nothing to suggest that it will deliver any specific protection to waterbodies at risk from forestry. The RBMP states that there is an intention that the 'Woodlands for Water' measure may, in time, be targeted to specific locations where high status sites occur. This intention is welcome and is positive, however there is a need for the system of targeting to be stated and actually in place if this is to be acceptable as an official RBMP measure. It is also important to note that afforestation, even with native woodland buffers, is not appropriate for some locations where other species and habitats would be lost or degraded as a result of afforestation, such as annexed grasslands (under the Habitats Directive) or locations where breeding waders occur. There is a high overlap between high status sites and annexed upland habitats such as heath and grassland and breeding wader sites. Indeed, the Woodland for Water measure is probably more suited to the protection of waterbodies that are at risk from diffuse agricultural pollutants than to waterbodies at risk from forest management. For this measure to be appropriately deployed as a measure to meet the WFD objectives, it must be targeted to those catchments where diffuse pollution is a particular problem.

99 DAFM (2015) *Afforestation Grant and Premium Scheme 2014–2020.* Department of Agriculture, Food and the Marine, Johnstown Castle Estate, Co. Wexford, Ireland.

In summary, the measures listed in the draft RBMP for forestry are not tailored to the needs of water protection and restoration, as required by the directive. The measures listed have been designed to meet objectives other than WFD objectives. While all of these approaches and 'measures' are welcome, they do not on their own represent adequate action to address the pressures that have been identified by the scientific research that is supposed to underpin the development of this Plan.

It is of great concern that the draft Plan does not contain figures stating how many of the waterbodies 'at risk' from forestry will benefit from the measures that are listed in the Plan, and how many of the waterbodies at risk from forestry will not be addressed by any relevant measures - in addition to how many waterbodies are expected to return to Good Ecological Status by 2027.

In order to avert significant further deterioration and to return waterbodies that are failing to meet 'Good Ecological Condition' to a healthy state, there is a need to strengthen several of the existing measures for forestry that are listed in the draft Plan. One of the key recommendations in protecting waterbodies from new planting (not from management of existing forests) is to specify set back distances in all licences for afforestation as part of the Environmental Requirements for Afforestation. This is not being implemented. More on this below.

In developing the final RBMP, there must be an objective quantitative assessment of how many of the 183 sites at risk from forestry will be covered by the measures outlined, and how many will remain without improved levels of protection. This will enable the development and application of targeted actions for all 183 waterbodies at risk from forestry. Targeting action will also be necessary to safeguard the waterbodies from inconsistent application of the existing measures, which aim to protect all waterbodies from pressures associated with forestry.

5.3.2. Summarising the Scientific Evidence Base in Relation to Forestry and Water Quality and Identifying Gaps in the RBMP

HYDROFOR and the Environmental Requirements for Afforestation

The HYDROFOR study was a 7-year assessment of the impacts of forestry operations on the ecological quality of water in Ireland.[100] The investigations carried out as part of this comprehensive study reaffirm the established negative impacts of forestry operations on surface water quality and freshwater ecology. In particular, the study identifies that felling produces elevated episodic inputs of nutrients (mainly phosphorus) and sediment to watercourses that exceeded water quality standards; acidification and sedimentation impacts of commercial forestry during the closed canopy phase; and increased acidification from plantations in acid-sensitive catchments.

Nutrient loss to streams is particularly evident after clearfelling and storm events.[101] The HYDROFOR report states that "*Lakes within forested catchments typically had elevated levels of plant nutrients, heavy metals and DOC and reduced concentrations of dissolved oxygen, especially where clearfelling had occurred. The biological responses to catchment forestry, in terms of planktonic and benthic invertebrate communities and brown trout populations, were consistent with conifer forests exerting a trophic, rather than an acidic or toxic, effect on lake ecosystems*".

[100] Kelly-Quinn, M., Bruen, M., Harrison, S., Healy, M., Clarke, J., Drinan, T., Feeley, H, Finnegan, J., Graham, C., Regan, J., Blacklocke, S. (2016) Research 169: HYDROFOR: Assessment of the Impacts of Forest Operations on the Ecological Quality of Water, (HYDROFOR), (2007-WQ-CD-2-S1), Environmental Protection Agency, Wexford

[101] Rodgers M, O'Connor M, Healy M.G., O'Driscoll C, Asam Z, Nieminen M, Poole R, Müller M and Xiao L. (2010) Phosphorus release from forest harvesting on an upland blanket peat catchment. Forest Ecology and Management. 260: 2241–224

That forestry exerts significant negative impacts on the ecology of lakes where there is a high forest cover is a significant problem that is not being addressed in the Draft RBD Management Plan.

The research also found that "*Lakes within forested catchments had elevated concentrations of phosphorus, nitrogen, dissolved organic carbon (DOC), aluminium, manganese and iron, with the highest concentrations of each recorded from lakes with forest clearfelling compared with the lakes in unplanted blanket bog*". Also, "*in lakes with forested catchments, species characteristic of nutrient-poor waters (including some nationally rare species) are being replaced with species characteristic of nutrient-enriched waters*".

SWAN considers it unacceptable that these pressures are not being specifically catered for in the Draft RBD Management Plan. Improvements must be made to ensure that such impacts of forestry in upland lakes are managed so that **all affected lakes are restored to good status**, in keeping with the requirements of the WFD. The number of lakes facing this suite of challenges should be clearly stated and presented in the final Plan; the final Plan must contain a commitment that lakes in afforested catchments that have been affected by forest management will be restored to Good Ecological Status. The final Plan must also contain a commitment that lakes at risk from nutrient enrichment from clearfelling will be protected from deterioration. See forestry recommendation 5 'Lakes in Forested Catchments'.

Nutrient loaded sediment is a significant problem both during and after felling, with total suspended solids in the rivers measured in study sites being elevated for up to 18 months after clearfelling. Riparian buffer zones can, if appropriately designed and implemented, reduce these impacts, as can appropriately designed and managed silt traps. However, it is crucial to note that management practices such as silt traps, carefully chosen felling sequences, and management of extraction routes did not prevent the release of nutrients from the study sites. The HYDROFOR report recommends that "*with careful design, sediment traps and aquatic buffer zones might reduce sediment exports, but phosphorus retention on peaty soils is more challenging*".

The RBD Management plan must address this problem by incorporating the detail of these findings into the new **'Environmental Requirements for Felling**' which are in currently in draft and by committing to procedures to ensure that they are actually implemented, unlike the current scenario where the 'Environmental Requirements for Afforestation' are not being properly implemented. See forestry recommendation 6: 'Forthcoming Environmental Requirements for Felling'.

According to HYDROFOR, *"Based on the suite of impacts from planting to harvesting, including elevated DOC, nutrient and sediment release, and aquatic biodiversity concerns,* ***cessation of afforestation on peat soils in acid-sensitive headwater catchments*** *is recommended by the project team".*

It does not appear that this recommendation to cease afforesting (new planting) on peat soils has been taken on board in the draft RBMP. While the measure that is cited as **'Land Types for Afforestation'** does describe the exclusion of "*a range of sites from the Afforestation Scheme on timber productivity grounds*", this new (2016) policy only excludes very unsuitable sites on the basis of productivity and economic returns. Land types that are not suited to afforestation on ecological and on water quality grounds are still deemed permissible in this policy for afforestation based on economic grounds. This is reflected in the document itself. It is also important to note that this policy ('Land Types for Afforestation') deals with afforestation only; other pressures arising from forestry in sensitive upland areas are not addressed by the measure, such as pressures that arise from forest restructuring, forest roads, aerial fertilisation, cypermethrin use, clearfelling and windrowing.

One of the issues that arises is that the potential for phosphorus retention is low on peaty soil. This is not limited to peaty soils of greater than 50cm, yet there is a specification in the 'Land Types for Afforestation'

that >50cm depth of peat deems the site unsuitable for afforestation. This indicates that sites with less than 50cm of peat are not excluded by this criteria, so that the water quality pressures such as elevated DOC, nutrient and sediment release associated with afforestation on peat soils will certainly not be addressed by this scheme. Thus the recommendation of HYDROFOR for a *cessation of afforestation on peat soils in acid-sensitive headwater catchments* is not being adhered to in the RBMP. What qualifies as a peat soil should be defined in accordance with the organic content of that soil, its degree of saturation and other factors. The assessment of whether afforestation can proceed should be based on the risks identified in the relevant research. If national forestry policy is to become compliant with the WFD, there must be a clear commitment in the RBMP to exclude afforestation from peat soils, including those less than 50cm in depth, in addition to clear procedures for implementing this.

It should also be noted that there is a history of contention around the **definition of a 'peat soil'** in relation to forestry in Ireland.[102] The European Environment Agency interceded in Ireland's grant-aided afforestation scheme more than 10 years ago because of a difference in the Forest Service's definition of a peat soil and the definitions referred to in the relevant literature. Ecologists refer to a depth greater than 30cm as a peat soil; the limit for the Soil Survey for England and Wales ranges from 30 cm to 50 cm; For the BOGLAND project, a peat soil was defined as "*organic soil materials which have sedentarily accumulated and have at least 30% (dry mass) organic matter over a depth of at least 45 cm on undrained land and 30 cm deep on drained land; the depth requirement does not apply in the event that the peat layer is over bedrock*". This issue does not appear to have been addressed in the RBMP, despite it being of crucial importance to the measures applied to protect water quality from acidification, sedimentation, and nutrient enrichment.

It is clear that the recommendation of HYDROFOR for a "*cessation of afforestation on peat soils in acid-sensitive headwater catchments"* is not being adhered to in the RBMP. What qualifies as a peat soil should be defined in accordance with the risks identified in the relevant research and a commitment to excluding afforestation from such locations is required of the RBMP.

In addition to the required cessation of afforestation on peat soils, significant improvements are needed in how mitigation measures are currently applied where forestry already exists on peat soils. Ground preparations for planting, road and track building, and clearfelling often lead to siltation of waterways, threatening the potential of at-risk waterbodies to return to a healthy state. The **Environmental Requirements for Afforestation**, one of the measures cited in the RBMP, have made significant progress, in theory, in improving the afforestation guidelines in relation to the protection of water quality. The requirements have increased the setback distances from water bodies in new plantations in order to offer greater protection to water quality from forestry. The required setback distances are now to be evaluated based on site-specific conditions, such as soil type, slope and distance to High Status waterbodies under the WFD. This improvement is much needed and very welcome and now attention must be given to procedural issues around the application of these new improved requirements.

SWAN has information that the new system of assigning site-specific setback distances, as described in the Environmental Requirements for Afforestation, is not being applied on new planting sites. Instead, the application for afforestation simply states that the setback distances will be in accordance with the Environmental Requirements for Afforestation and the licence granted also stipulates that the setback distance will be 'in accordance with the Environmental Requirements for Afforestation'. Neither the forester applying for the licence, and the associated grant, nor the licensing agency, the Forest Service, have been stipulating what these setback distances actually are, case by case. An Taisce has investigated this and found that none of the licences examined are stating the new required setback distances. There is no monitoring to examine

[102] https://www.friendsoftheirishenvironment.org/forestry/forestry-network-newsletters/16282-

implementation or to assess whether the setback distances are being applied to comply with the Environmental Requirements for Afforestation. Hence at least one of the provisions designed to address water quality requirements in the new Environmental Requirements for Afforestation is not actually being applied in the licensing procedure adhered to on the ground. This discrepancy demands urgent attention.

The final RBMP must commit to stating site-specific setback distances in each Afforestation approval licence.

In addition to setback distances, the **Environmental Requirements for Afforestation** contain a paragraph that refers to pathways and which identifies key factors that determine the potential risk of sedimentation and nutrient runoff entering receiving waters ("*soil type, slope, available pathways for water, the erodibility of the soil and subsoil, downstream SACs, and the status objective of the waterbody itself*"). However there appears to be no standardised format for a registered forester to conduct this assessment, no requirement to document the assessment, no requirement to standardise conditions applied to eliminate risk, and no requirement to seek additional expertise where there is a knowledge gap or an uncertainty regarding the level of risk posed by various forestry operations to the waterbody achieving the stated status objective. In addition, it is known that nutrient and sediment load is increased in streams both during and after harvesting operations, and management measures to mitigate this are not always implemented or implemented adequately and can be ineffective after a large storm.[103]

In addition, windrowing, the practice of heaping up brash on site after clearfelling, has been identified as having the potential to increase sediment and phosphorus concentrations in receiving streams to levels close to those during felling.[104] There is no stipulation to cease the practice of windrowing alongside watercourses, as recommended by HYDROFOR, in the **Environmental Requirements for Afforestation** or any of the other measures outlined in the Draft RBD Management Plan. There are also detailed recommendations around silt traps during windrowing which are nowhere reflected in the RBMP. These details must be incorporated as specific commitments and actions in the final RBMP.

Thus while **the Environmental Requirements for Afforestation are well formulated, they are undermined by a lack of commitment and lack of action to implement them.** Unless this is addressed in the final RMBP, there will continue to be significant failures and inconsistencies in the application of the Environmental Requirements for Afforestation. This lack of implementation will result in a continuing national failure to raise standards of water protection to the level required in the 183 'at risk' sites.

Of particular concern is that the procedure laid out in the Environmental Requirements[105] for foresters to assess the potential risk of sedimentation and nutrient runoff entering into 'receiving waters' does not require site-specific hydrological details. The procedure is thus likely to fail in many instances where it is not sufficiently tailored to the hydrological characteristics and risks pertaining to that site.

5.3.3. Environmental Requirements for Felling

In addition to the Environmental Requirements for Afforestation, there is an urgent need for **Environmental Requirements for Felling** which reflect the findings of HYDROFOR and other research that has taken place in the 17 years since the 'current' guidelines for felling were produced. There have been sustained and

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103 Clarke J and Bruen M. (2014) Clearfelling impacts in the East. Presentation at HYDROFOR End-of-Project Workshop, 8th April 2014, University College Dublin

104 HYDROFOR: Section 2.3 'Inputs of Sediment and Phosphorus During Replanting Operations

105 Section 2.4 of the Environmental Requirements for Afforestation, Forest Service, DAFM, December 2016

substantiated calls to update the Forest Harvesting and Environmental Guidelines and the Forestry and Water Quality Guidelines since the last round of River Basin Management Plans in 2005. It is a major shortcoming that these guidelines have not been completed at this stage and are not included in the draft RBMP. These should be completed as a matter of urgency and the findings of the HYDROFOR and other relevant research and must be reflected in them if the RBMP is to address the pollution risk from felling operations on water quality in the 183 water bodies 'at risk' from forestry.

5.3.4. Training and Expertise

It is unclear whether the registered forester will in all cases have adequate expertise to identify and assess all the potential negative impacts that may arise from ground preparation, forest management, and felling, throughout the forest cycle.

Many of the stipulations in the Environmental Requirements are positive and indicate progress with regard to sediment and nutrient runoff, such as the requirement that "*new drains end in an appropriately-sized sediment trap or an interceptor drain(*) positioned outside of the water setback*" (section 3.7.1 of the Environmental Requirements relating to Operational Safeguards: Drainage and Cultivation.) However these are not sufficiently tailored or robust enough to safeguard 'at risk' sites, and there is no evidence that they are being applied or that application is being monitored. It is not sufficient to simply issue new guidelines and expect that the industry will upskill and apply them appropriately, without any push from the licencing unit of the Forest Service. The RBMP must commit to there being a programme of training for registered foresters, and the Licencing Unit of the Forest Service must also implement a monitoring and appraisal system to ensure that new **Environmental Requirements for Felling** are to be appropriately implemented.

5.3.5. Woodlands for Water

The '**Woodlands for Water'** is an excellent scheme, and very welcome. However, SWAN understands that this measure is currently offered to all landowners rather than being targeted at at risk areas where it will be most effective in addressing the specific challenges identified in the SWMI report and locations required to meet WFD objectives. As such, the proposed 'Woodlands for Water' measure is a broad brush approach that will not make significant progress in protecting at risk sites from nutrient enrichment and sediment loading. Strategic targeting is required if this measure is to make any of the required improvements in the sites at risk from forestry.

5.3.6. Cypermethrin

One of the most perturbing pressures of Irish forestry on water quality is the widespread use of Cypermethrin. Cypermethrin, a Priority Substance pesticide which is highly toxic to aquatic invertebrates, is widely used by semi-state forestry company Coillte. Of the 6,352ha planted by Coillte in 2016, 69% has been treated with Cypermethrin. Cypermethrin is very toxic even at low concentrations.[106] In various lab experiments, Cypermethrin has been demonstrated to be acutely toxic to an array of freshwater invertebrates and some species of fish.[107] Cypermethrin is acutely toxic to crustaceans and reduces the abundance of rotifers,

[106] Marigoudar, S. R., Nazeer Ahmed, R. & David, M. (2009) Impact of Cypermethrin on Behavioural Responses in the Freshwater Teleost, Labeo rohita. *World Journal of Zoology*, pp. 19-23

[107] Stephenson, R. R. (1982). Aquatic toxicology of cypermethrin. I. Acute toxicity to some freshwater fish and invertebrates in laboratory tests. *Aquatic Toxicology* , pp. 175-185

protozoans, bacteria and the chlorophyll-a concentration of planktonic and periphytic algae.[108] The reduction in predatory crustaceans is likely to lead to fundamental changes in the species composition of lower trophic levels.[109] At high doses, Cypermethrin is lethal to finfish.[110]

Despite the fact that the substance in banned in the EU, Coillte are constantly given derogations to treat saplings before planting. AIE enquiries to Coillte have established that 669 litres of Cypermethrin have been used by Coillte in the Mountshannon-Whitegate neighbourhood in the past ten years. SWAN has been informed that there have been no environmental impact studies or soil analyses relating to the impacts of Cypermethrin on water quality or aquatic life. The RBMP needs to include a commitment to conduct research into the use and impacts of Cypermethrin on water quality and, in the meantime, halt the use of Cypermethrin in forestry in accordance with the precautionary principle.

5.3.7. SWAN RECOMMENDATIONS ON FORESTRY

Forestry Recommendation 1: Applying Environmental Requirements for Afforestation

- In order for the new Environmental Requirements for Afforestation to be implemented appropriately, each licence granted for new planting must contain conditions which reflect the specific conditions and sensitivities of each site. This includes, but is not limited to, assigning site-specific setback distances in every licence that is approved and grant aided for afforestation. This is the level of detail required to implement the WFD and reach GES for all waterbodies that will be potentially affected by new forest planting.

- Targeting existing measures to each of the 183 waterbodies at risk from forestry is necessary, especially for those that fall outside of Freshwater Pearl Mussel sites. This can include application of the Potential Water Risk Scenario as part of the Environmental Requirements for Afforestation and specific conditions in the forest enhancement scheme and conditions in felling licences.

Forestry Recommendation 2: Peat Soils

- The Forest Service should apply the same definition of peat soils as that agreed with the Commission for the 'Nitrates' Regulations 2006, ensuring that this definition forms part of all licencing considerations for afforestation and for felling.

- The Forest Service should follow the scientific recommendation to cease afforestation on peat soils in acid-sensitive headwater catchments, to be implemented through GIS of approval systems, to ensure that no further deterioration results from new planting.

- For the existing forests, many of which pose severe threats to water quality, the Environmental Requirements for Felling (which SWAN has not yet seen) must reflect the findings of HYDROFOR and other relevant research, and the RBMP must commit to a programme of training for registered foresters for the purposes of implementing the new requirements; the Licensing Unit of the Forest Service must also implement a monitoring and appraisal system to ensure that the new Environmental

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[108] Friberg-Jensen, U. Wendt-Rasch, L; Woin, P; Christoffersen, K. (2003) Effects of the pyrethroid insecticide, cypermethrin, on a freshwater community studied under field conditions. I. Direct and indirect effects on abundance measures of organisms at different trophic levels. *Aquatic Toxicology*, 63(4), pp.357 – 371.

[109] ibid

[110] Marigoudar, S. R., Nazeer Ahmed, R. & David, M. (2009) Impact of Cypermethrin on Behavioural Responses in the Freshwater Teleost, Labeo rohita. *World Journal of Zoology*, pp. 19-23

Requirements for Felling are to be appropriately implemented. Particular care needs to be instilled in the felling licence system for peat soils with mineral buffers, multiple sediment traps and other mitigation measures, to minimise further deterioration from felling operations in the 183 'at risk' sites.

Forestry Recommendation 3: Woodlands for Water

- Assurance that this scheme will continue to be rolled out with sufficient funding and support will be required if this is to be included as a measure in the RBMP. Strategic targeting of this measure to at risk sites and to high status objective waterbodies is required if it is to contribute to averting further deterioration of high status sites and to return all 'at risk' waters to a healthy state.

Forestry Recommendation 4: Cypermethrin

- Given the toxicity of Cypermethrin it should be completely banned in Ireland, as it is in other EU countries.

Forestry Recommendation 5: Lakes in Forested Catchments

- For lakes within forested catchments that already have elevated levels of plant nutrients, heavy metals and DOC as a result of forestry and in particular from clearfelling, as identified in HYDROFOR, site-specific management plans are urgently required to restore these lakes to Good Ecological Status. As this will take time, implementation must commence immediately and so that improvements can be achieved by 2021. These required actions should be resourced so as to take place without delay.

- In lakes in forested catchments that are at risk of gaining elevated nutrients as a result of pending felling, mitigation measures must be developed and implemented in accordance with best available knowledge, to prevent any deterioration in water quality before licences are granted for any felling to take place in these catchments. This will also require immediate resourcing, as delays may result in pollution from wind throw if no action is taken.

- For such sites that are in Coillte ownership, they must be exempted from the general felling licenses. The Forest Service must apply stringent conditions derived from the findings of HYDROFOR, regardless of existing felling licences.

Forestry Recommendation 6: Forthcoming Environmental Requirements for Felling

- The Environmental Requirements for Felling, yet to be released, will require strong mechanisms to ensure proper implementation from the outset. There must be a commitment that each felling licence will specify conditions that include site-specific requirements that reflect particular site sensitivities. The Forest Service must, before the final RBMP, determine if additional resources will be needed to implement the new Environmental Requirements for Felling; if so, the plan must commit to this so that implementation will be adequately resourced from the outset. This is to avoid the abovementioned experience of the poor application of the 'Environmental Requirements for Afforestation', where licences issued by the Forest Service, one year after the launch of the requirements, are still not specifying setback distances and other key features that the requirements purport to address.

- The RBMP should commit to running training for foresters to implement the new Environmental Requirements for Felling; the Forest Service should commit to monitoring and assessing the implementation once they are in place.

5.4. PEATLANDS

5.4.1. The Pressure of Peatland Harvesting on WFD Objectives

According to the draft RBMP, "*Peat extraction has been identified as causing a significant risk to ecological status objectives in 112 water bodies (10% of all waterbodies that have been determined as being at risk). The environmental impacts generally relate to suspended solids, ammonia, and hydromorphological alterations*".

In the high status waterbodies, peat extraction is the key pressure in 21 of the 130 river and lake water bodies 'at risk' of not meeting their high ecological status objective, representing 16% of those at risk river and lake waterbodies.

How peat extraction impacts on river and lake water bodies

Prior to extraction, peat bogs are drained. This drainage is maintained and continues during the period of peat extraction, causing degradation and oxidation of the peat; reduction of water storage capacity in the catchment; and the release of polluting nutrients[111] including ammonia,[112] heavy metals,[113] dissolved organic carbon,[114] and sediments[115] into waterways. The sediment transport of silt and suspended solids results in lasting damage to aquatic organisms, e.g. deposition of fine peat silt on river beds (impacting on salmonid spawning beds, clogging gills and their food chain in rivers), increased turbidity in lakes and rivers (resulting in a reduction in light penetration and primary productivity), nutrient enrichment, and the coating of aquatic plant surfaces with fine particles (inhibiting photosynthesis).

Ammonia

Ammonia is a serious pollutant resulting from drained peatlands. It has recently been recognised as a significant threat to waterbodies meeting ecological status objectives of the WFD. The release of ammonia from drained peatlands is particularly problematic because it is not possible to prevent its release from drained peat or to mitigate its impacts on water quality. When peat is drained and air gets in, the peat will inevitably deteriorate and result in emissions of ammonia and DOC to waterbodies.[116] While sediment can, with careful mitigation measures, be controlled, ammonia cannot be controlled unless peat is rewetted. The only way to prevent the deterioration of peat and the associated release of ammonia and DOC to water bodies is to raise the water table. Raising the water table in peatlands takes time and the cessation of ammonia release will follow. **It has become evident that meeting WFD objectives in water bodies threatened by peat**

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111 Bowman J.J., McGarrigle M.L. and Clabby K.J. (1993) Lough Derg an investigation of eutrophication and its causes. Part 1 Water quality assessment, nutrient sources, conclusions and recommendations. A report to the Lough Derg Working Party, Environmental Research Unit.

112 Kennedy, B.,, McLoughlin, D, and Caffrey, J. (2012) 'A physical, chemical and biological assessment of fluvial habitat draining the Oweninny Peatlands, North Mayo with reference to peat siltation'. Inland Fisheries Ireland.

113 Rothwell J., Evansa M.G., Danielsa S. and Allotta T.E.H.(2008) Peat soils as a source of lead contamination to upland fluvial systems Environmental Pollution.153: 582-9.

114 Holden J., Shotboltb L., Bonne A., Burtd T.P., Chapmana P.J., Dougille A.J., Frasere E.J.D., Hubaceke K., Irvinea B, Kirkbya M.J., Reede M.S., Prellf C., Staglg S., Stringerh L.C., Turnera A. and Worralli, F. (2007) Environmental change in moorland landscapes. *Elsevier Earth-Science Reviews* 82: 75–100

115 BanaS K.and GOOS K. (2004) Effect of peat-bog reclamation on the physico-chemical characteristics of the ground water in peat. *Polish Journal of Ecology* 52: 69-74

116 Kennedy, B., McLoughlin, D, and Caffrey, J. (2012) 'A physical, chemical and biological assessment of fluvial habitat draining the Oweninny Peatlands, North Mayo with reference to peat siltation'. Inland Fisheries Ireland.

extraction, particularly in relation to DOC and Ammonia, can only be achieved by full rewetting and a cessation of peat harvesting. Because of the considerable time taken to redress this pollution, it is imperative that harvesting ceases on all peatlands that are causing a risk to the 112 water bodies where peat extraction has been identified as causing a significant risk to ecological status objectives.

Human Health

In addition to the severe damage that can be caused to aquatic life, the harvesting of peatlands has direct impacts on human health. This occurs when peat sediment enters waterways as a direct consequence of peat extraction, and this same water is then used as a potable water. When water that contains high levels of organic matter, including peat sediment and dissolved organic carbon, is chlorinated as part of the treatment process for drinking water, carcinogenic total trihalomethanes (TTHMs) are produced. This is regulated by the European Union Drinking Water Regulations, however Ireland is non-compliant with these regulations because the affected populations are not being informed. This is an issue which will be substantially tackled if harvesting peat (and peat erosion in upland areas caused by burning) is effectively controlled and we achieve a situation in which peat sediment and DOC is no longer entering surface waters in such significant quantities. There is no specific mention or description of these impacts in the RBMP and thus no specified responses as to how these problems will be addressed in the RBMP.

5.4.2. Addressing Pressures from Peat Harvesting

The draft Plan outlines the measures it is proposing to address pressures from peat extraction in Section 7.4.1. All/most of these are measures that are already in place, although some are relatively new.

The challenge of regulating unauthorised peat extraction

Peat extraction has been unregulated in Ireland for decades, leaving the pollution risk unchallenged and unaddressed. Considerable research into identifying unauthorised peat extraction from satellite imagery was carried out by University College Cork on a commission from Friends of the Irish Environment with funding from the (then) Department of the Environment, Community and Local Government. However, it has not led to meaningful action by enforcement authorities. The new regulatory framework for certain peat extraction operators will retrospectively legitimise peat harvesting that has not been regulated to date. The promise of new legislation has delayed the implementation of planning and licensing controls for more than two years, and this has had a deleterious impact on water quality in the water bodies that are affected by peat harvesting.

A strong case has already been put forward by An Taisce and Friends of the Irish Environment[117] that the proposed changes in legislative controls will exempt large-scale peat extraction from planning regulations, thus allowing for the continuation of illegal extraction. This relates to large and small scale industrial extraction.

Mechanical turbary cutting, mostly carried out by contractors, has significant impacts on water quality, however this has not been measured or quantified. The issue of turbary cutting has not been addressed at all in the draft RBMP. The National Peatland Strategy has no actions to tackle this issue either. The Irish Peatland Conservation Council's Site Database lists 318 sites damaged by private mechanical cutting. The RBMP also fails to distinguish between contractors who generally mechanically harvest peat on a commercial basis, and holders of turbary rights/peatland owners, despite this distinction being recognised in the National Peatlands Strategy.

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117 Friends of the Irish Environment submission to Draft European Union (Licensing of Large-scale Extraction of Peat) Regulations 2016 dated 24 October 2016

'Improvements to legislative controls', as stated in the programme of measures (section 7.4.1), have been drafted as a response to the failure to implement existing legislation on peat extraction. The current requirement for EIA under the existing regulatory regime is 30 hectares. The proposed amendment makes no change to this implementation of the EIA Directive, with the threshold remaining at 30 hectares. Thus SWAN challenges how this change to legislative control will bring about any lessening of the problems that arise from extractive industry, or how it is expected to bring about an improvement to water quality in affected water bodies.

Instead, what is needed is the application of the existing legislation to peat extraction operations, many of which are operating without any planning consent. It is not acceptable that the RBMP programme of measures intends to introduce a new regulatory regime instead of applying the existing legal requirements to peat extraction, given that the proposed new system will be weaker than what is already provided for in the current legislation.

The RBMP needs to remove the current measure and replace it with a measure which applies the existing planning framework to the regulation of peat extraction activities in such a way that ensures compliance with the requirements of the WFD and other legal requirements. The Draft RBMP does not cater for these requirements and thus is in itself non-compliant with the WFD with regard to this issue.

Draft European Union (Licensing of Large-scale Extraction of Peat) Regulations 2016

The above-mentioned draft regulations, which are cited in section 7.4.1 of the draft RBMP, are unlikely to introduce improvements to the control of pollutants arising from peat harvesting. Instead, the proposed changes to legislation will bring about a licencing regime that will be weaker than the protection that would arise from the correct application of existing planning law to peat harvesting, which is adequate to control the activity. In addition, the new regime will run contrary to the requirements of the EIA Directive.

The proposal for legislative controls will allow unlicensed operators to operate for 1.5 years whether they are applying for a licence or not, including unlicensed operators on sites of over 50 hectares who are currently in breach of their legal obligations.

In addition, it is not clear how the pollution arising from the 52 companies which are not being adequately regulated at present will be addressed, especially as many of these will fall below the 30ha limit. It is SWAN's opinion that this represents an unacceptable concession to the only licenced operator, Bord na Mona, giving this agency a further 2.5 years to apply.

Friends of the Irish Environment and An Taisce, both SWAN member groups, have raised concerns with the department directly which relate to the proposed Regulations providing a formula of 'retention' permission for more than 60,000 hectares of peat extraction, and both organisations have raised serious concerns about the legality of this approach.[118]

SWAN has serious concerns that this measure, included in the RBMP Programme of Measures, would constitute a weakening of the protection offered to water quality as a result of peat harvesting operations. Instead, peat harvesting should be addressed by existing planning framework, with Guidelines introduced to ensure that the existing legislation is adequately implemented.

[118] An Taisce – The National Trust for Ireland submission to the Draft European Union (Licensing of Large-scale Extraction of Peat) Regulations 2016, Dated 5th October 2016

In addition, SWAN members have serious concerns about the capacity and ability of the EPA to implement regulation of peat harvesting operations. The draft Regulations are being tabled without any parallel legislation or regulations to augment the EPA's legal and technical function and remit. It is a common concern that the EPA does not have the relevant resources and expertise to enable it to consider such matters, given that its historical remit is confined to within the site limits of industrial activities. A clear outline of the additional expertise and resources required for the EPA to meet the requirements of these regulations would be a prerequisite of any legislative change, given the lead in times required for such changes. However, SWAN is strongly recommending against transference of responsibility to the EPA, and strongly recommends that peat extraction be retained within tn the existing planning framework, as outlined above.

Past experience of SWAN member groups in IPPC licencing suggests that the EPA operation of IPPC licencing does not set a sufficiently high bar for WFD compliance. For example, one member group was involved when a licence was granted for a new landfill through the IPCC process, however the same landfill was refused planning permission because of a risk of pollution to waterways. This demonstrates that the IPC licencing system has not been as rigorous as the planning system in delivering effective protection for waterways, and augments the abovementioned arguments against bringing peat harvesting outside of the Planning System and transferring it instead to the EPA.

In addition to the above stated concerns about these proposed regulations and ongoing failures to implement existing legislation for peat extraction, SWAN has additional concerns that regulations are not an effective tool on their own to bring degraded water bodies back to good ecological status. They may, if carefully formulated, help to prevent further deterioration. However, whatever the regulatory regime, specific targeted action to restore water bodies that are already below good ecological status is required. This should include water bodies that have been degraded as a result of sedimentation and ammonia enrichment from peat extraction.

2.2 The RBMP states that once the revised regulatory system for large scale peat extraction is in place, it is intended that **smaller scale commercial peat harvesting will be brought under a new local authority licencing system**. It is submitted that the splitting of regulatory jurisdiction and a process based on an arbitrary threshold is undesirable in principle, and that all peat extraction whether for electricity generation, horticulture or domestic fuel, all of which result in pollution to water bodies, needs to be subject to an integrated regulatory regime, which in turn is integrated with the regulatory regime for all land use change and extraction, including water quality and carbon accounting.

As stated by An Taisce in its submission to the draft European Union (Licensing of Large-scale Extraction of Peat) Regulations 2016, dated 5th October 2016, "*The regulatory regime for any single area of activity should be uniform. Having separate regulatory regimes for peat extraction above and below an arbitrary 30ha threshold is inappropriate in principle. A site under 30ha may have a greater peat depth and greater range of impacts and considerations such as ecology and archaeology if extracted that one over 30ha. The multiplicity of smaller extraction "turbary" sites for domestic cutting have a direct impact on the area of peatland affected as well as cumulative carbon loss, and need to be fully regulated as an extractive activity as much as "larger" scale extraction for power or horticulture*."

It is unacceptable that the Programme of Measures to address pressures from harvesting of peatlands proposes a separate system for smaller scale commercial peat harvesting that has no timeframe for implementation; that has no allocation of resources; and that places responsibility on Local Authorities to regulate complex emissions to water and climate from peat harvesting without assessing the capacity of Local Authorities to operate such a system; and which has no facility for monitoring or appeal.

2.3 The **National Peatland Strategy** is a welcome strategy for the conservation, management, rehabilitation and restoration of Ireland's peatlands. The strategy has a wide scope and an inclusive, multi sectoral approach, which again is welcome, in particular for engaging with those who are contributing most to the pressures from peat harvesting.

The National Peatland Strategy gives a good summary account of the pollutants that arise from peat extraction (see section 4.8.3 'The role of peat run-offs in pollution') and includes a description of the polluting effects of turbidity, acidity, aluminium, ammonia and mercury that arise from peatland drainage and extraction. The actions to address these pressures in the Peatland Strategy are as follows:

> NPS P 29 Policies and decisions relating to the use of peatlands shall take full consideration of potential impacts on water quality and the attainment by the State of mandatory water quality standards.
>
> NPS A 26 An assessment shall be undertaken of the additional costs of treating drinking water arising from peatlands degradation and options proposed for reducing such costs through appropriate peatlands management.

Because action NPS P 29 is a general principle of how other policies and decisions should reflect the pollution arising from peat drainage and harvesting, and has no specific or targeted action arising from it, it is not adequate as a measure under the WFD RBMP.

For example, the National Peatlands Strategy states that the "*evolution of the regulatory framework as regards peat extraction activities should address: [which should include] … Provision for proper reporting, monitoring and compliance systems to ensure application of proper environmental standards and effective national data systems to track the extent and impact of extraction activities, feeding back into policy development".* This is a welcome suggestion, however if the WFD targets are to be met and the pollutants arising from peat extraction stopped, then much **stronger commitments and more specific courses of action are urgently required.** The actions are framed as recommendations as to what should happen, without any attribution to a particular agency, specific targets, or timeframe. The Peatland Strategy also states that:

> *"NPS A 22: All peat extracting companies – both public and private operators – will be brought fully within the relevant applicable regulatory codes.* "

This is a welcome statement of intent, however it is vague and **not appropriate to achieving the targets of the WFD within the required timeframe to restore water quality**.

The National Peatland Strategy actions do not lay out any specific procedures by which the impact on water quality will be addressed; they lack specific allocation of responsibility; there are no specific targets or timeframes; and they do not contain procedures for assessing progress in an structured way and adapting actions accordingly.

For example, the RBMP states that the actions set out in the peatland strategy will be implemented by a "*peatland strategy implementation* group" which "*will develop proposed structures to ensure the stated actions are undertaken*". It is unacceptable that the RBMP could depend on measures that do not yet exist to achieve a reduction in the stated "*significant risk to ecological status objectives in 112 water bodies"* that are at risk from peat harvesting.

It is also not acceptable that these measures will be determined and implemented by a multi-agency working group, as this is in effect leaving the industry to self-regulate. Involvement of the industry is appropriate for

advising and assisting with the formulation of measures required and for garnering support for implementation, however the **responsibility for implementation and oversight of the measures must be with the state**, acting independently of industry. It is SWAN's assertion that the National Peatland Strategy is a welcome initiative but that the absence of specific measureable targets or timeframes to meet the ecological status objectives in the 112 water bodies where peat extraction is a significant risk means that the Strategy is too vague and poorly defined to deliver the necessary improvements as per WFD requirements.

5.4.3. SWAN RECOMMENDATIONS ON PEAT EXTRACTION

Peat Extraction Recommendation 1: A Water Body Specific Action Plan

- In keeping with the requirements of the WFD to restore all water bodies to good status and to prevent deterioration, and in recognition that regulations are not an effective tool on their own to bring degraded water bodies back to good ecological status, SWAN recommends that specific actions be developed for each of the *112 water bodies* where peat extraction is a significant risk. Each of the 112 suite of actions must be scientifically informed, responsibility for each action should be clearly allocated, and actions should be clearly documented and publicly available; in addition, these actions should have clearly described outcomes, set timeframes for delivery, mechanisms to monitor progress, and appropriate resources allocated. Where peat extraction activities are not in compliance with the planning and IPC licensing requirements, actions must include enforcement of legal protections against unauthorised peat extraction.
- Oversight and management of these actions should be allocated to DHPCLG. Immediate priority should be given to the 21 high status water bodies where peat extraction is the key pressure, which may require the involvement of private landowners. In this case additional resources will be needed to develop the actions with the participation of private landowners.

Peat Extraction Recommendation 2: Regulatory Regime

- Instead of the proposed new regulations for large scale peat extraction, SWAN strongly urges the Programme of Measures to commit to retaining peat harvesting in the planning system with an implementation regime that is fully compliant with the WFD, the EIA regulations and other environmental and climate obligations. Reform of the existing system is urgently required. Guidance documents and a programme of resourcing, communication and training for local authorities will be required to support the implementation of adequate controls on peat harvesting. The RBMP should specifically require that all decisions pertaining to planning permission and licencing of peat extraction will take full account of the pathways of silt, ammonia and DOC from peatlands and will ensure that these pollutants will be halted from peat harvesting sites as a result of the management actions that arise from regulation.
- The RBMP will also need to specify what actions will be taken to rectify historic and current failures in the regulation of peat harvesting. The regulatory authority for peat extraction and associated direct and indirect impacts needs to inspire scientific, legal and technical competence in the enforcement of its functions. The RBMP and its Programme of Measures will need to state the intended outcomes of the reform of the regulatory system; the steps and timeframe for reform; clear division of roles and responsibilities; and a clear commitment that all decisions made in relation to peat harvesting will ensure elimination of pollutants such as silt, ammonia and DOC from extracted peatlands.
- The RBMP must also specify that where significant risk exists in terms of ammonia release from harvested peatlands, that harvesting will cease and the peatland will be rewetted to prevent further ammonia release.

5.5. DOMESTIC WASTEWATER TREATMENT SYSTEMS

Whilst Domestic Wastewater Treatment Systems (DSWWTS) may not pose the highest risk at national level, they pose a serious risk locally, especially to vulnerable waterbodies. They are identified in the draft Plan as being a significant issue in 13% of at risk waterbodies.

The previous 2009-2015 Shannon River Basin Management Plan also identified 42 rivers in the Shannon catchment as being at risk of failing to achieve the required standards *"due to unsuitable hydrogeological conditions and the associated high density and location of unsewered properties in these areas".*[119] In addition to the RBM Plans, there are numerous EPA publications and papers identifying DWWTS as a significant water management issue. For example:

- The EPA 2013 Integrated Water Quality Assessment[120] for the Western River Basin District (WRBD) identified *"emissions from domestic waste water treatment systems"* as a *"key pressure"* in the WRBD (along with agriculture, aquaculture & discharges from municipal wastewater works);
- The EPA 2012 State of the Environment Report[121] identifies the particular need to address the risk they pose to high status waterbodies, stating that "*onsite wastewater treatment plants"* are one of the pressures for which *"Special protection measures are needed to protect and restore high-status waterbodies of all types … susceptible to degradation";*
- In a study commissioned by the EPA, Gill *et al.*,[122] stated that "*the prevention of groundwater contamination from on-site domestic sewage effluent is of critical importance"*;
- The 2016 EPA State of the Environment Report highlights the very significant challenge of poorly sited DWWTS: *"Of relevance to water protection is that 16% of all systems inspected failed because either they were unlicensed discharges to surface water or because they had inadequate soil thickness for attenuating pollutants. These types of situations are difficult and/or expensive to correct"; and*
- According to Daly *et al.*,[123] "*the risk arising from MRP and microbial pathogens* [from DWWTS] *is 'very high' in approximately 18% of the country"* (SWAN's emphasis).

Furthermore, in the UK, Jordan *et al.*[124] report that *"P discharges from these sources* [DWWTS] *may have a significant impact on downstream water quality"* and *"when the total number of STS is used in source apportionment calculations, the apparent P input to the drainage system from agricultural sources may be reduced by up to 20%."* Additionally: *"This provides an important insight into where mitigation measures should be focused*".

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119 Shannon International River Basin Management Plan 2009 – 2015. Limerick County Council, July 2010 http://www.shannonrbd.com/pdf/sea/ShIRBD%20RBMP%20Dec2010.pdf

120 EPA (2013) Integrated Water Quality Report - Western River Basin District 2013. Environmental Protection Agency, Wexford

121 EPA (2012) Ireland's Environment – An Assessment 2012. Environmental Protection Agency, Wexford

122 Gill L., Ó Súilleabháin C., Johnston P. and Misstear B. (2005). An investigation into the performance of subsoils and stratified sand filters for the treatment of waste water from on-site systems (2001-MS-15-M1). Synthesis Report. Prepared for EPA by the Environmental Engineering Group, TCD, Dublin.

123 Daly D., Byrne C., Keegan M. and Meehan R. (2012) A risk based methodology to assist in the regulation of domestic waste water treatment systems' Paper for EPA International Symposium On Domestic Wastewater Treatment & Disposal Systems, Dublin.

124 Jordan P., May L., and withers P. (2012). Impact of on-site sewage treatment systems on river water quality in UK catchments'. Paper for EPA International Symposium on Domestic Wastewater Treatment & Disposal Systems, Dublin.

According to Daly *et al.*,[125] 39% by area of the country has "*'inadequate percolation' for some or all of the year due to poorly permeable soil, subsoil and/or bedrock*" and *"These areas present a significant challenge in terms of ensuring that discharges from DWWTS are adequately treated such that they do not pose a risk to human health and the environment".*

5.5.1. Weaknesses in the Current System and in the Draft Plan

The draft Plan does not propose any measures in addition to the National Inspection Plan (NIP) to address the risk from DWWTS, saying only that "*the outputs of catchment characterisation*" will be used *"to further improve the existing risk based approach".* While SWAN welcomes this refinement of the risk-based approach, we are of the position that the NIP and current system is not adequate alone to control impacts of DWWTS on surface and groundwaters for following reasons:

- In the first instance it does not input into planning controls and thus has no role in preventing the construction of single dwellings in sites hydrogeologically unsuitable for traditional DWWTS.
- There is an insufficiency of inspections for compliance with planning conditions for DWWTS for new residential one-off development, which is increasing the threat posed by these systems. A number of Local Authority staff have reported to SWAN (anonymous, pers. comm.) that due to lack of independent inspection, builders and engineers do not consistently build systems in compliance with planning requirements; this results either in correct DWWTS not being put in place, or DWWTS that are not functioning correctly. This is not being addressed since there is no systematic follow-up inspections.
- In relation to existing houses, the NIP relies on a two-strand approach: public engagement and inspection:
    - PUBLIC AWARENESS & ENGAGEMENT: Householders are largely unaware and untrained in how their domestic wastewater treatment systems work. They need to understand how these are effective and require guidance on how to manage them. This information exists (EPA materials), but is not currently being widely used. SWAN fully supports all the public awareness and other initiates put forward in the EPA NIP, and compliments the EPA especially on the 'Eco-Eye' coverage and the innovative multimedia and other material on the EPA website. However, whilst the activities outlined in the draft NIP are entitled '*Engagement'* strategies, SWAN would argue that most of what is described comprises basic communication and awareness-raising. Since the EPA is basing the success of the NIP on a 'two-strand' approach, with one strand being public engagement and the other inspections, then it is important for us to clarify that we do not believe that what is set out in the NIP is for the most part active public engagement. This therefore questions the assumption upon which the success of the dual-strand Plan relies.
    - INSPECTIONS & ENFORCEMENT: In the absence of a comprehensive public engagement programme, we do not believe that 1,000 inspections (which is a rate of less than 1%) is adequate to prompt and incentivise homeowners to ensure their DWWTS are working in accordance with regulations. We believe that economic considerations have led to a system

[125] Daly D., Byrne C., Keegan M. and Meehan R. (2012) A risk based methodology to assist in the regulation of domestic wastewater treatment systems' Paper for EPA International Symposium On Domestic Wastewater Treatment & Disposal Systems, Dublin.

which, notwithstanding the risk-focus, is excessively pared-down in terms of the temporal and spatial frequency of inspections.

- According to the draft Plan, "*Provisional data for 2015 indicates that 1,097 inspections were completed in 2015. Advisory notices were issued with regard to 489 systems which failed the inspection. To date, 249 have implemented the required remedial measures and 240 notices remain open."* In the first instance, this 45% failure rate is of concern, even taking into account the fact that inspections are risk-based. Of even more concern, however, is the fact that half (49%) were yet to bring their system into compliance, a year (or more) after the issuing of the Advisory Notice, at the time of publication of the draft Plan. This does not suggest expeditious implementation of mitigation measures and represents a potentially serious threat to sensitive waterbodies.

- There are also the significant issues of DWWTS on sites where soil conditions are unsuitable for a septic tank but where planning permission for one was granted. As highlighted earlier, the EPA State of the Environment Report 2016 identifies the very significant challenge of poorly sited DWWTS: *"Of relevance to water protection is that 16% of all systems inspected failed because either they were unlicensed discharges to surface water or because they had inadequate soil thickness for attenuating pollutants. These types of situations are difficult and/or expensive to correct."* It would appear from SWAN's own reading and from consultation conversations with the EPA that one of the main challenges for managing DWWTS impacts lies in this category, and neither the NIP nor the draft Plan addresses this.

- It is also unclear what action, and according to what timeline, is being taken for systems which have been inspected and failed, in particular in areas of unsuitable soil conditions highlighted above.

- An extremely high level of oversight and regular auditing of the local authorities on the part of the EPA is required in order to deliver a sufficiently consistent and robust standard across the country. In order to achieve this, SWAN recommends that the Local Authorities' inspection plans be approved and signed off by the EPA. If this is not feasible, then as a minimum, there should be random audits of these, before implementation, to ensure rigorous application of site selection criteria.

- There is no grant available for householders who are not inspected but who are conscientious and wish to carry out necessary maintenance and de-sludging. This has been identified by rural stakeholders as a significant impediment to the implementation of remediation measures.

- ISSUES WITH PROPRIETARY SYSTEMS: Difficulties with biocycle units, which are now commonly installed at the instigation of planners and engineers, are not addressed in the NIP or draft Plan. Biological wastewater treatment systems are completely unsuited to use in irregular habitation situations (i.e. holiday homes), as they are subject to "shock loading" when suddenly used, and then don't function correctly. As holiday homes are often on lakeshore margins or other sensitive sites, this is a particularly significant problem for fisheries, lakes and coastal eutrophication. Moreover, many modern wastewater treatment systems for individual dwellings need an electric pump to operate effectively. There is anecdotal evidence that these are often only switched on for building inspections (of new properties) and thereafter switched off to save money, or in some cases because homeowners did not realise they needed to be switched on. This type of problem needs to be acknowledged and addressed. Research in Monaghan and Armagh[126] found that 43% of proprietary systems were not operating correctly at the time of inspection and had either malfunctioned in some way or were not switched on.

[126] Linnane S., Jordan S., McCarthy V., Jennings E., Carson, A., Sweeney, N., Wynne, C. and McDonald B. (2011) National source protection pilot project final report 2005-2010. Centre for Freshwater Studies Department of Applied Sciences Dundalk Institute of Technology.

5.5.2. SWAN RECOMMENDATIONS ON DOMESTIC WASTEWATER TREATMENT SYSTEMS (DWWTS)

- Measures must be proposed that will ensure that all DWWTS currently posing a risk to waters must be detected and fixed by 2021 and that goal should be clearly stated in the Plan.
- In order to achieve this, SWAN recommends that the final Plan includes the following measures:
    - Increase the rate of inspections in the sub-catchments of all waterbodies at risk from DWWTS in order to expeditiously detect all problematic systems;
    - In tandem, provide the necessary resources to facilitate the necessary investigative assessments to support this work;
    - Provide grants to all systems in the catchments of water bodies deemed to be at risk from DWWTS, if they are deemed to be represent a threat; and
    - Impose rigorous enforcement action for those that have been issued with Advisory Notices and have not complied after 3 months. For those below a certain threshold e.g. unemployed, those on the state pension the remedial work should be grant-aided.
- In relation to planning controls, the Plan should put forward an action plan to ensure:
    - Adequate resources for follow up inspections to ensure that newly built DWWTS are compliant; and
    - Coherence with planning so that planning controls are consistent across the country in prohibiting the construction of single dwellings where traditional DWWTS cannot function or in applying strictly enforced criteria for proprietary systems.
- The Plan should also clearly state the very significant challenge posed by poorly sited DWWTS, evidenced by the fact that during the last NIP *"16% of all systems inspected failed because either they were unlicensed discharges to surface water or because they had inadequate soil thickness for attenuating pollutants",* and propose measures to address it.

5.6. ABSTRACTION

Water abstraction has not been identified as a highly significant issue nationwide by the characterisation process. However, it is an issue in 4% of at risk waterbodies, which includes 3% of rivers (98), 9% of lakes (73) and 4% of groundwater bodies (23). It therefore has the potential to pose a risk locally and in the catchments of sensitive waterbodies and associated groundwater dependent terrestrial ecosystems (GWDTEs). For example, the draft Plan states that *"there are 62 groundwater abstractions (associated with 19 abstraction schemes/activities) being taken from 23 (4%) groundwater bodies that have also been identified where these abstractions may potentially pose a risk to the flow conditions needed to support the ecology in an adjacent river".*

As explained in the South Eastern River Basin Management Plan (2009-2015),[127] "*too much abstraction reduces flow in springs and rivers and lowers water levels in lakes, wetlands and wells. That can make water supplies unsustainable and adversely affect aquatic plants and animals and wetland areas. In extreme cases river beds may dry up, lake shores can become exposed and, in coastal areas, salt water may seep into groundwater".*

In relation to abstraction, the Water Framework Directive requires:

- *"Estimation and identification of significant water abstraction for urban, industrial, agricultural and other uses, including seasonal variations and total annual demand …"*;
- The identification of all waterbodies abstracted for human consumption[128] (Art. 7); and
- The establishment of *"controls over the abstraction of fresh surface water and groundwater, and impoundment of fresh surface water, including a register or registers of water abstractions and a requirement of prior authorisation for abstraction…"* (Art. 11.3(e))[129]

However, SWAN does not believe that what is proposed in the draft Plan fulfils these requirements, and does not represent an effective regulatory system.

In relation to impacts, regions of low groundwater recharge are likely to be more affected by the impacts of abstraction of both groundwater and surface water (if hydraulically connected) in Ireland.[130] Of the 513 designated GWBs in Ireland, 223 are designated either "At risk" or "Probably at risk"[131] (for all factors, not just abstraction), and these waterbodies could potentially be downgraded in future WFD status classification (Figure 3.5). Within these GWBs, 185 intersect with regions of low recharge rate (<50mm / yr), with 130 being "At risk", and 55 "Probably at risk". It is these regions that could be most acutely affected by the impacts of abstraction as water bodies are already experiencing risk of downgrading, and recharge rate is low.

Similarly, SACs could be more sensitive to water abstraction in regions of low GWB recharge rate. 251 of 498 SACs (50%) intersect with regions of low recharge rate (<50mm / yr). Again, in these regions, water abstraction is likely to have increased impact on the environment and increased levels of protection could be

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127 EPA Catchments Unit (2009) South Eastern River Basin District River Basin Management Plan 2009-2015. Environmental Protection Agency, Dublin

128 providing more than 10 m^3/day as an average or serving more than 50 people, and those bodies of water intended for such use

129 Member States *'can exempt from these controls, abstractions or impoundments which have no significant impact on water status'.*

130 Craven, K. Emerson, E.,Kenny, J.,McLoughlin, N., O'Reilly, C. (Draft report) Water Abstractions Interactions with the Water Framework Directive & Groundwater Directive and Implications for the Status of Ireland's Waters. Prepared under contract for SWAN,

131 ibid

beneficial.[132] There can also be significant cumulative and upstream impacts of abstractions, especially on the re-charge implications which may see feeder streams run dry. These may be vital habitats, spawning grounds, etc.[133] Water abstractions are also causing significant pressures on waters within the Eastern River Basin District, due to the population density of the major urban areas in the East.[134]

There are also examples of extractive industries having impact on the groundwater levels of adjacent GWBs. Where quarries abstract large amounts of groundwater from a quarry sump, the water is typically discharged to a receiving watercourse down gradient of the quarry, to avoid recirculation. If the invoked radius of influence extends to the watercourse as it flows adjacent to the quarry, or to sections of the watercourse up gradient of the quarry, then there is a risk of reducing surface water flows to negligible rates. Examples of this include: Bettystown GWB in Co. Louth, which is considered to be 'at risk' due to quarry dewatering[1]; and Midleton GWB, considered 'at risk' by having the failed the water balance test due to groundwater abstractions (>80% recharge; with the actual ratio being 95%)[135] and the potential for saline intrusion from quarry dewatering along the south coast.

The implications of abstraction from the Shannon to supply the greater Dublin area is of particular concern, and merits specific mention in the draft Plan, given the scale of the project and abstraction involved. The draft SWMI report stated that "*The linkages between aquatic ecology and river flow/lake level are not well understood, and research has been initiated to establish criteria for ecological flows and lake levels in our surface waters".* On the basis of this lack of scientific understanding, SWAN would argue that insufficient information is available on which to assess the potential ecological impacts of this project and a final decision on it should not be made until such understanding of the linkages are determined. SWAN believes that the issue of reducing abstractive pressure by reducing demand for water, as required by the Directive,[136] is also important and should be mentioned in the draft Plan, e.g. supporting and promoting rainwater harvesting; grey water use and other water conservation measures in the home and in businesses; pricing incentives to reduce water consumption.

5.6.1. Weakness in the Current System and in the Draft Plan

Controls on abstraction in Ireland are not compliant with the WFD and this has been raised as an issue by the EU Commission. A system of controls was required to be in place by 2012 and is now 5 years late. In addition to an understanding of the likelihood of impacts from water abstraction, the second element of a robust governance system is a strong and effective legislative and regulatory system. It is clear that a coherent regulatory system is effectively non-existent in Ireland and therefore does not provide sufficient protection to ensure compliance with the WFD. Public water supplies are subject to regulation under the 1942 Water Supplies Act, but otherwise no legislative system of abstraction control is in place. Information on large commercial activities (> 25 m3/day) may be captured through planning permissions (if this is an issue which the planning authority wishes to inquire into), Environmental Impact Statements or IPCC licensing, but data

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132 Craven, K. Emerson, H.,Kenny, J.,McLoughlin, N., O'Reilly, C. (draft report) Water Abstractions Interactions with the Water Framework Directive & Groundwater Directive and Implications for the Status of Ireland's Waters. Prepared under contract for SWAN.

133 Eamonn Moore, angler, pers. comm.

134 ERBD (2009) Abstraction Pressures – National POM/Standards Study. The Assessment of Abstraction Pressures in Rivers in Ireland

135 CDM (2009). Groundwater Abstraction Pressure Assessment - Final Report. 39325/PP/DG 43-S, pp102

136 Recital 23; Article 1; Article 9

can only be estimated by examining licensed discharge volumes (as proxies for abstraction values) which are not themselves metered.

SWAN does not believe that what is proposed in the draft Plan is sufficient to address this and that it does not constitute a comprehensive mechanism to manage abstractions in the State for the following reasons:

- An absolute baseline for a management system must be an understanding of the location and volumes of abstractions, i.e. where and how much. The draft Plan acknowledges this, saying, *"a comprehensive and maintained national register of water abstractions is essential in order to assess and manage the potential risk of over-abstraction"*. This is especially the case for a pressure such as abstraction which has the potential to cause cumulative impacts, especially in sensitive and/or high status catchments. However, the Plan then goes on to propose a register under which a substantial proportion of abstractions in the state will remain unaccounted for, due to the fact that the proposed threshold for registration under regulations is far too high at 25 cubic metres per day.

- SWAN believes that this is based on considerations regarding the political response to further water legislation in the context of the water charges debacle and that the emphasis on not *"imposing a regulatory burden"* is excessively influenced by political rather than scientific considerations.

- In preparatory work for the first cycle, it was proposed that following a review process, any waterbodies that are determined to still be at risk of failing to meet WFD objectives due to abstractive pressures may then require supplementary measures to manage the abstraction (or could be candidates for lower objectives if there isn't anything technically or economically feasible that can be done, i.e. the abstraction is necessary and cannot be mitigated to such a level that the environmental objectives will be met).[137]

- However, supplementary measures are not proposed in the current draft Plan for the 194 surface and groundwater bodies assessed to be at risk from abstraction. It simply says that *"Further assessment will be undertaken during the course of this river basin planning cycle up to 2021. Where necessary, the required corrective measures will be identified and steps taken to address such pressures where they arise".* This is very vague. It does not identify what such measures or actions will be and when they will be implemented. In fact, it could be understood as meaning that only further assessment is planned up to 2012, without actions; the timeline is unclear. This is of serious concern in relation to the waterbodies that have been deemed to be at risk from abstraction, including sensitive waterbodies and aquatic and GWDTE SACs, which should be addressed with actions as a priority during this planning cycle.

5.6.2. SWAN RECOMMENDATIONS ON ABSTRACTION

In order to provide an effective and comprehensive system of "*controls over the abstraction of fresh surface water and groundwater" SWAN* recommends the inclusion of the following in the draft Plan.[138]

Establishment of a Coherent National Abstraction Register

[137] CDM (2009). Groundwater Abstraction Pressure Assessment - Final Report. 39325/PP/DG 43-S, pp102

[138] These are based on independent research commissioned by SWAN, currently in draft form: Craven, K. Emerson, E.,Kenny, J.,McLoughlin, N., O'Reilly, C. (Draft report) Water Abstractions Interactions with the Water Framework Directive & Groundwater Directive and Implications for the Status of Ireland's Waters. Prepared under contract for SWAN,

- To comply with the WFD and to be in a position to fully assess the impacts of abstraction to waterbodies, a comprehensive National Abstraction Register must be established. This should be publicly available to permit analysis of abstraction impacts by interested parties. While there is not a WFD requirement to register all abstractions (exempting ones that have *"no significant impact on water status"),* there is an inherent need to assess all abstractions to decide which ones are significant. This should form the basis of a registering process which encompasses all abstraction points.

- This register needs to be placed on a statutory footing with a central designated agency that serves as the focal point for all abstraction and licencing activities and maintains the register. This central agency should address the current deficits in the Register as a matter of urgency.

- Technical Recommendations:

    - All abstractions points, regardless of volume, are included on the register.
- Management Details:

    - The agency in charge of the register needs to be resourced and empowered to collate extant abstraction data from inter alia local authorities, the IPC regime administered by the EPA, Geological Survey and NFGWS;

    - That agency needs to be resourced to investigate non-declared or currently unknown abstraction pressures and to require the compilation of data from those abstraction points in a format agreeable to it;

    - That agency needs to be given enforcement powers and a right of entry to private property in relation to its abstraction and licencing function;

    - Small abstractions of less than 10 m3/day are included on the register, but do not need licensing. Instead, similar to Scotland, users must comply to general binding rules to minimise impacts'

    - Small abstractions of less than 10 m3/day are metered to provide information on extent and duration of abstractions. This information is made available to the agency in charge of the register so that cumulative impacts from these can be assessed; and

    - The database must be made publicly available.

Establishment of a Coherent Licencing Regime

- To comply with the WFD, to accurately measure abstraction volumes, and to be in a position to fully assess the impacts of abstraction to waterbodies, a coherent licencing regime must be established. This licencing regime needs to be placed on a statutory footing and vested in a central designated agency with all abstractions over 10 m3/day level captured within the licencing regime. This *de minimis* level is chosen in the absence of adequate scientific data that can provide a rigorous threshold of safe values. Abstractions from surface water should theoretically adhere to recommendations on environmental flows, and abstractions from groundwater on recharge rates to aquifers, but these will be waterbody specific. The 10 m3/day is chosen as it should capture most significant points of abstraction, and is currently a threshold value for exempted supplies in the Surface Water Regulations. For this licencing regime:
    - Abstractions greater than 10 m3/day should be licensed;

- Information on location of abstraction point and rate of extraction (daily, or at a minimum, monthly rates are required) **must** be provided. This indicates that metering is required;
- This licensing regime should be flexible to permit greater scrutiny where impacts of abstraction are likely to be increased, or knowledge of impacts are unknown;
- This regime should be predicated on bi-annual renewals, allowing regular oversight of the abstraction and licencing pressure on any given waterbody;
- Abstractions greater than 10 m3/day and less than 100 m from a GWDTE would require further technical assessment to determine the specific impact on a given water body and any mitigating measures necessary with input from NPWS or an independent ecologist;
- Proposed abstractions over 100 m3/day to be further reviewed by a competent agency (e.g. local authority/EPA). This should include assessment of potential impact on groundwater flows and levels, surface water flows and levels; and
- All water-bottling plants to be licensed and included on a national register regardless of the abstracted volume.

Assessment of Abstraction Impacts in Ireland

- There is currently very little assessment of the impacts of abstraction in Ireland. During investigations of water bodies, abstraction pressure is usually combined with other pressures such as pollution and nutrient enrichment. If the full impacts of abstraction in Ireland are to be assessed, an improved monitoring strategy of the impacts of abstraction must be developed and implemented. For this to occur:
    - Accurate abstraction data needs to be collated by a central agency. This requires location of abstraction points and rate of abstraction to be collated. Ideally, daily extracted volumes should be collated to understand the temporal nature of water abstraction in Ireland;
    - Newly collated data needs to be utilised by the state (e.g. EPA) academia and industry to assess spatial and temporal impacts due to abstraction in Ireland;
    - Use of electronic portal (similar to FSU portal – opw.hydronet.com) to help collate data, make it easily available to stake holders and to inform management practices such as the calculation of environmental flows based on catchment characteristics;
    - Geographical Information System, risk-based screening for determining GWDTE at risk of abstraction, including:
        - Known zones of contribution to IW and NFGWS sources
        - Licensed abstractions
    - Further collaborative work is needed between hydrologists, hydrogeologists and ecologists in both state agencies and academia to improve knowledge of the links between groundwater characteristics (e.g. flow, pH, temperature) and the ecology of receiving wetlands. This could be achieved with targeted multi-disciplinary funding calls through organisations such as the EPA or GSI.

Stakeholder Engagement

- Stakeholder engagement is absolutely critical for the success of any abstraction regime enacted by the state. Broad categories of stakeholders exist, from individual citizens to large, multi-national corporations, and their specific requirements need to be acknowledged. The Public Awareness Campaign that SWAN is recommending should include information on the potential impacts of abstraction on the local water environment, as well as the complex interdependencies involved, and it should encourage them to engage in the registration process.

5.7. AQUACULTURE

Coastal and transitional issues are dealt with separately in this submission as a 'horizontal issue' in section 6.2. However, we believe that aquaculture, as a growing sector about which there is unanimous agreement regarding the inadequacies of the licensing system, represents a significant pressure and thus merits separate treatment here. Aquaculture production is a source of a range of pressures in the coastal and estuarine environment and was identified as a significant water management issue in the 2009-2015 River Basin Management Plans. The EC commissioned report on sustainable aquaculture development in the context of WFD and Marine Strategy Framework Directive (MSFD)[139] stated that "*high quality aquatic environments and the prevention of their deterioration are fundamental to the sustainable development of European aquaculture*".

Despite this, aquaculture is omitted from the current draft Plan. This is a shortcoming that must not persist in the final Plan if the Irish government is to commit to a programme of measures that represents WFD implementation in the entirety of our catchments, including our coastal waterbodies.

5.7.1. Finfish Farming

Figures available for 2012 put overall production of finfish at 13,880 tonnes, with a gross value of over €86m[140]. Over 90% of the finfish farmed in Ireland (and the value of this sector) is generated by Atlantic salmon farming. Finfish aquaculture is associated with a number of very significant impacts on the aquatic environment. These include:

5.7.1.1. Waste Inputs and Nutrient Enrichment

Finfish farming results in waste inputs in the form of faecal or other excretory wastes and uneaten fish feed that commonly contains carbon-based organic matter, nitrogen and phosphorus. This results in nutrient enrichment that may stimulate or exacerbate algal blooms of phytoplankton or algae, which in turn, when they die and decay, can significantly reduce the oxygen available in the water. This results in the deaths of fish and other aquatic organisms. A recent study of salmon farms in Mulroy Bay, Co. Donegal showed modifications in the benthic community structure and decreased diversity below the fish cages due to organic enrichment.[141]

5.7.1.2. Pathogen Introduction

It is well established that finfish production represents a potential source of pathogens, parasites and other contaminants for wild fish populations. In Ireland, the most significant of these relates to problems of sea lice transfer from farmed fish to wild stocks, particularly to smolts journeying to sea. The Marine Institute's

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139 Jeffery K.R., Vivian C.M.G., Painting, S.J., Hyder K., Verner-Jeffreys D.W., Walker R.J., Ellis T., Rae L.J., Judd A.D., Collingridge K.A., Arkell S., Kershaw S.R., Kirby D.R., Watts S., Kershaw, P.J. and Auchterlonie N.A. (2014) Background information for sustainable aquaculture development, addressing environmental protection in particular. Sustainable Aquaculture Development in the context of the Water Framework Directive and the Marine Strategy Framework Directive. CEFAS.

140 BIM (2013) BIM Strategy 2013-2017. Bord Iascaigh Mhara

141 O'Mahony C., Kopke K., Twomey S., O'Hagan A.M., Farrell E. and Gault J. (2014). Integrated Coastal Zone Management in Ireland - Meeting Water Framework Directive and Marine Strategy Framework Directive targets for Ireland's transitional and coastal waters through implementation of Integrated Coastal Zone Management. Report prepared under contract for Sustainable Water Network (SWAN).

Survey of Fish Farms 2014[142] found that average sea lice levels are increasing, as levels in the first half of 2014 were higher than the same periods in both 2013 and 2012.

A Sea Lice Monitoring Programme was established by the then Department of the Marine in 1991, and the Marine Institute, Bord Iascaigh Mhara and Dept. of Agriculture, Fisheries and Food now undertake a sea lice control and management strategy to limit sea lice amongst farmed fish. However, there is still no universal acknowledgement, or public recognition, amongst key state agencies involved in the regulation and development of aquaculture in Ireland of the causal link between fish farms and increased incidence of lice amongst wild Atlantic salmon and sea trout stocks, despite the fact that this has been well-documented internationally, including in Irish waters.[143, 144, 145, 146, 147]

It has been demonstrated that infestation of young smolts with sea lice will increase fatalities and thus ultimately threaten the survival of the wild stocks.[148] Data shows that control of sea lice on fish farms has been very variable over the past decade[149] and according to the IFI "*Following a sea lice infestation and a resultant collapse in sea trout stocks in western fisheries during the early nineties, sea lice control protocols were introduced in the mid 1990's to control sea lice on salmon farms nationally. However, despite the protocols in place, monthly lice monitoring shows that sea lice levels regularly breach protocol levels*".[150]

A paper published in January 2017, which included scientists from Inland Fisheries Ireland examined sea lice levels over 25 years from more than 20,000 sea trout and sampled from 94 separate river and lake systems in Ireland and Scotland. It found that salmon farming contributes to sea lice infestation on sea trout and that *"sea trout captured closer to salmon farms had significantly higher levels of lice infestation".*[151]

Sea lice resistance to pesticides has now also become an issue for industry and nature. Alternatives such as using wrasse cleaner fish is now also presenting a pressure, as areas of Connemara are being denuded of cleaner fish which are being caught for use on salmon farms, where they do not survive in the unsuitable fish

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142 O'Donohoe P., Kane F, Kelly S, McDermott T, Drumm A and Jackson D. (2015) National survey of sea lice (*Lepeophtheirus salmonis krøyer* and *Caligus elongatus nordmann*) on fish farms in Ireland – 2014 Irish Fisheries Bulletin no. 45. Marine Institute

143 Gargan P.G., Tully O. and Poole W.R. (2002) The relationship between sea lice infestation, sea lice production and sea trout survival in Ireland, 1992-2001. In: Mills, D. (ed.) Salmon on the edge, pp. 119-135. Proceedings of the 6th International Atlantic Salmon Symposium, Edinburgh, UK, 16-18 July 2002. Atlantic Salmon Trust/Atlantic Salmon Federation.

144 McKibben M.A. and Hay D.W. (2002) Planktonic distribution of sea lice Lepeoptheirus salmonis larvae in inter-tidal plankton samples in Lock Shieldaig, Western Scotland in relation to local salmon farm production cycles. ICES Summer Meeting, Theme Session T, Paper 2002/T:06.

145 Penstan M.J., McKibben M., Hay D.W. and Gillibrand, P.A. (2002) (2004) Observations on open-water densities of sea lice larvae in Loch Shieldaig, Western Scotland. *Aquaculture Research* 35: 793-805.

146 Ford J.S. and Myers R.A. (2008) A global assessment of salmon aquaculture impacts on wild salmonids. *PLOS Biology* 6: e33.

147 Thorstad E.B., Todd C.D., Ugle I., Bjorn P.A., Gargan P.G., Vollset K.W., Halttunen E., Kalas M.B. and Finstad B. (2015) Effects of salmon lice *Lepeophtheirus salmonis* on wild sea trout *Salmo trutta*—a literature review. *Aquaculture Environment Interactions* 7: 91-113

148 Krkosek M., Lewis M.A. and Volpe J.P. (2006) Transmission dynamics of parasitic sea lice from farm to wild salmon. Proc. Royal Society.

149 O'Donoghue *et al*. National Sea Lice Surveys from 2003-2014

150 IFI Factsheet on the impacts of fish farms on wild salmon and sea trout stocks (accessed Dec 2015) http://www.fisheriesireland.ie/fisheries-management-1/330-factsheet-on-salmon-farm-impacts-1/file

151 Shephard, S., MacIntyre, C., Gargan, P. (2016) Aquaculture and environmental drivers of salmon lice infestation and body condition in sea trout *Aquaculture environment interactions* 8: 597–610

cage environment. Apart from WFD compliance, this is also a threat to MSFD descriptors on biodiversity and food webs.[152]

5.7.1.3. Chemical Inputs

Chemical inputs, such as antibiotics used for disease control amongst farmed fish, and pesticides to control algae, weeds and parasites, have significant damaging impacts on non-target species.[153] An example of this is the use of copper-based products to prohibit algae which are toxic to shellfish and to humans when residues are found in seafood. The effects of chemicals used in fish farms on other crustaceans including lobster are poorly understood, although recent research has shown that their reproduction may be affected.[154] There is little information on the impacts of food and chemical inputs on the wider aquatic environment and species. The same is true for outputs, particularly waste and dead fish in fish kill situations.

Hydrogen peroxide is commonly used to treat amoebic gill disease in Ireland when freshwater is not available.[155] There is virtually no control on where that is done, no independent monitoring of the effects on other sensitive organisms: e.g. wastewater from well boats which have been using hydrogen peroxide to control amoebic gill disease and sea lice is subsequently dumped into the sea and the waste water can have an effect on other crustaceans.[156]

Cypermethrin, enamectin benzoate and teflubensuron are the active ingredients in the 3 products licensed for use to control sea lice in Ireland. Contamination of wider water and the sea floor with these controversial substances from the open net cages raises issues for the wider environment.

5.7.1.4. Escapees

Escapees present several problems for native wild Atlantic salmon populations, in that they compete for food, spawning areas and space, These escapees dilute and may ultimately replace the genetic and locally-specific gene pool of wild salmon, the characteristics of which may strengthen the species' chances of adapting to environmental changes (such as those related to climate change).[157] Accidental or intentional releases of farmed stock may also increase the risks of disease communication to wild stocks through diseased stock or inoculated stock, which can still be carriers of the diseases. Considerable international research has established these negative impacts and their potential long-term consequences.[158] [159] [160] The problems with

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[152] Karin Dubsky, marine scientist, pers. comm.

[153] Burridge L.E. (2003) Chemical use in marine finfish aquaculture in Canada: a review of current practices and possible environmental effects A scientific review of the potential environmental effects of aquaculture in aquatic ecosystems. Vol. 1., Fisheries and Oceans Canada. 2003. Can. Tech. Rep. Fish. Aquat. Sci. 2450:ix + 131

[154] Burridge L.E. and Van Geest J.L. (2014) A review of potential environmental risks associated with the use of pesticides to treat Atlantic salmon against infestations of sea lice in Canada. Canadian Science Advisory Secretariat (CSAS) Res. Doc. 2014

[155] Ruane M.N and Jones S.R.M. (2013) Amoebic gill disease (AGD) of farmed Atlantic salmon (*Salmo salar* L.) ICES identification leaflets for diseases and parasites of fish and shellfish..Leaflet no. 60. ICES

[156] Karin Dubsky, marine scientist, pers. comm.

[157] McGinnity P., Prodohl P., Ferguson A., Hynes R., O Maoileidigh N., Baker N., Cotter D. O'Hea B., Cooke D., Rogan G., Taggart J. and Cross T. (2003) Fitness reduction and potential extinction of wild populations of Atlantic salmon, *Salmo salar*, as a result of interactions with escaped farm salmon. *Proceedings of the Royal Society Biological Sciences* 270: 2443-2450.

[158] Ford J.S. and Myers R.A. (2008) A global assessment of salmon aquaculture impacts on wild salmonids. *PLOS Biology* 6: e33.

[159] Heggberget, T.G., Bjørn O. Johnsen, B. O., Hindar, K., Jonsson, B., Hansen, L. P., Hvidsten, N. A. & Jensen, A. J. (1993) Interactions between wild and cultured Atlantic salmon: a review of the Norwegian experience. Fisheries Research, Vol. 18, 1-2, pp.123-146.

fin fish escapees and the defects of the regulatory system to address this, including the criteria for Aquaculture Stewardship Council (ASC) accreditation, need to be examined and shortcomings addressed.

The following case study highlights the flaws in the current system:

In February 2014, storm damage to a fish farm at Gerahies in Bantry Bay led to the release of 230,000 adult salmon. The Department of Agriculture, Food and the Marine (DAFM) refused to release information relating to incident. However after a successful appeal by SWAN member Friends of the Irish Environment (FIE) in July 2015, the Information Commissioner ordered the State to release the preliminary reports into the incident and insisted there was a strong public interest in maximising "openness and accountability" in relation to how the Department of Marine and the Marine Institute carried out their functions.

In spite of this ruling and the release of the initial reports to FIE, the Minister told the Oireachtas in reply to a subsequent October 2015 Parliamentary Question that *"in view of the ongoing nature of the examination"* he would not make any information available, effectively undermining the Information Commissioner's decision. A new request at the end of 2015 for the final report was refused again by the Department and again overturned by the Commissioner on 16 January 2017. On this second occasion, the Office of the Information Commissioner again instructed the Department to release the requested reports, determining again that public interest in the information being publicly available would outweigh the interest served by refusal. An important component of this decision was the Commissioner's ruling that he did not agree that "*numerical information about fish ought to be withheld from the public on grounds of commercial sensitivity*".

In dismissing the Department's arguments for the second time, the Commissioner stated *"I do not agree that it would be premature for the public to find out what the Department's engineers and the Marine Institute's scientists, and, indeed, what the Company's own engineering consultants, reported about this important incidence of storm damage almost three years after the event. Similarly, I do not agree that a person aggrieved by the disclosure of the reports could claim that their release was premature. On the contrary, it could reasonably be said that the provision of such information to the public is considerably overdue".*

The Commissioner's 2017 decision noted that *"I consider that there is a very strong public interest in openness and accountability in relation to how the Department and Marine Institute carry out their functions under the legislation governing the aquaculture industry. I am also of the belief that openness and accountability serve the interests of those involved in the industry, like the Company in this instance, since the public trust on which they depend, commercially, relies to a considerable degree on public confidence in the effectiveness of regulatory oversight".*

This case involved significant resources from SWAN's member organisation and took more than 3 years. It illustrates a perturbing lack of transparency[161] within DAFM with regard to aquaculture operations, which must be challenged and resolved in order to facilitate integrated management of transitional and coastal waters in the second RBMP cycle.

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[160] McGinnity P., Jennings E., Deeyto E., Allott N., Samuelsson P., Rogan G., Whelan K. and Cross T. (2009) Impact of naturally spawning captive-bred Atlantic salmon on wild populations: depressed recruitment and increased risk of climate-mediated extinction. *Proceedings of the Royal Society of London* B 276: 3601-3610

[161] It has been described to SWAN as a "culture of secrecy"

5.7.2. Shellfish Farming

Since shellfish production less commonly involves feed inputs, fewer negative impacts tend to be associated with this form of aquaculture. However, while the nature of the impacts and their relative severity may vary, these may be nonetheless significant.[162] These impacts include:

- Increased volumes of production may reduce nutrients in the waterbody available for other aquatic organisms, thus altering the ecology of the waterbody.
- Aggressive harvesting damages inter-tidal habitats and encroaches on wild oyster and other indigenous fisheries.
- Physical concentration of large volumes of production – such as mussel and oyster trestles, may displace other organisms. This may be exacerbated if predators are actively controlled in the area. The impact of oyster trestle tables in areas with flocking seabirds is only beginning to be understood, but studies have shown that there is a significant impact on bird assemblages in Dungarvan Harbour SPA..[163] Increasing the extent of trestles in Special Protection Areas (SPAs) reduces foraging opportunities for birds and increases silt deposition. In addition, traffic associated with servicing these sites leads to damage and disturbance to the sea floor, and will affect seal haul-out areas.
- Where non-indigenous species are farmed, there is a significant danger of introducing invasive species that may ultimately out-compete indigenous ones (as the introduction of Pacific oysters (*Crassostrea gigas*) threatens to take over the indigenous oyster and mussel habitats). Such introductions once made are difficult, if not impossible, to contain. This problem may also be associated with finfish aquaculture. Significantly, around 40% of all known introductions of alien or exotic species to aquatic ecosystems have been related to aquaculture.[164]
- The introduction of imported seed also poses the risk of introducing non-native species that may disrupt aquatic ecosystems. An example of this is *Bonamia ostrea* that devastated the native oyster population in the 1970s. Factors such as climate change and the northward spread of species means that even with controls on imported seed, the risk of such introductions remains worryingly high.[165]

5.7.3. Weaknesses in the Current System and in the Draft Plan

Since aquaculture is not addressed in the draft Plan, a critique of the current system of controls can be taken as a *de facto* critique of the Plan, since the Plan is implicitly proposing the continuation of the current system by not recommending any new measures. The effectiveness of the regulatory system to control the impacts from aquaculture outlined above, including impacts on wild salmonid populations, is dependent on the quality of the monitoring and licensing system in place, including conditions applied to licenses. There is a very significant lack of transparency around this which is of extreme concern to SWAN. In order to ensure that these controls are also ensuring compliance with WFD and Marine Strategy Framework Directive (MSFD) obligations, close cooperation between relevant agencies is also crucial. We will look at these in turn.

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162 Cranford P., Dowd M., Grant J., Hargrave B. and McGladdery S. (2003) Ecosystem level effects of marine bivalve aquaculture. *Canadian Technical Report of Fisheries & Aquatic Sciences* 2450

163 Gittings, T. and O'Donoghue, P.D. (2012). The effects of intertidal oyster culture on the spatial distribution of waterbirds. Marine Institute.

164 Davenport J.,Black K., Burnell G., Cross T., Culloty S., Ekaratne S., Furness B, Mulcahy M and Thetmeyer H. (2003) *Aquaculture: the Ecological Issues*. The British Ecological Society, Ecological Issues Series 11. Blackwell, Oxford.

165 EPA (2003) Climate Change: Scenarios and Impacts for Ireland. Environmental Protection Agency, Wexford

Review of licensing under the WFD-specific requirements of the Surface Water Regulations

Aquaculture is licensed by the Department of Agriculture, Fisheries and the Marine (DAFM) under the Fisheries (Amendment) Act, 1997 and thus is also subject to the requirements of the Surface Water Regulations. Therefore, all aquaculture licenses should have been examined and if necessary reviewed by December 2012, in order to assess compliance with WFD standards, and if necessary to amend conditions in a given license to bring down discharges. There is no information in the public domain as to whether this has been carried out and indications are that it has not. This is particularly pressing given the potentially significant impacts of the targeted increase in aquaculture production set out in the *National Strategic Plan for Sustainable Aquaculture Development* [166] (NSPA), which projects *"an increase of 45,000 tonnes in the output from the sector by 2023".* This is an increase of 122% on the 2012 baseline of 36,700 tonnes. This more than doubling of aquaculture output can also be anticipated to lead to new and increased problems for the environment that are as yet poorly understood and worrying, given the failures of existing regulatory regimes.

Inadequate monitoring of impacts

It is clear from an examination of the NSPA that the correct monitoring is not in place to assess whether aquaculture in Ireland is compromising WFD and MSFD compliance of waterbodies in which it is sited. The fact that the monitoring programme is inadequate is clear from the NSPA Strategic Environmental Assessment SEA, which states that in relation to finfish aquaculture, they "*do not specifically deal with risk to the wider water body as a whole"* (SWAN's emphasis), with shellfish monitoring confined to human health issues. Furthermore, "***there are no monitoring programmes that can define the impact on the level of a water body as defined by the WFD***" (SWAN's emphasis). It is also of concern that, "*as a consequence of the lack of distinct information pertaining to the wider impacts of aquaculture activities on water bodies, at the time of the risk assessments in 2005, and acknowledging that aquaculture activities have inherent risks associated with them, all water bodies having licensed aquaculture activities were classed as 2a -probably not at risk but there is insufficient information to class as not at risk*". It is vital especially with the proposed increase in aquaculture that all current and proposed sites must undergo risk assessment on a regular basis and that monitoring programmes are designed to determine the impact on the level of a water body as defined by the WFD and sufficient resources are made available to do this.

Inadequate regulatory control

In addition to the absence of monitoring to assess environmental impacts, there are other serious flaws in the regulation of aquaculture in Ireland:

- Impacts on the WFD objectives of the waterbodies in which shellfish and finfish farms are sited are not taken into account in the issuing of licences.
- Because there is no monitoring of the environmental impacts of shellfish aquaculture, no enforcement of licence conditions in this regard is possible where operations are licensed. Routine monitoring focusses solely on plankton and shellfish quality for the protection of human health. Furthermore, there is no ongoing reporting of shellfish aquaculture license compliance under either the Fisheries or Foreshore Act.
- The small number of assessments of shellfish farm operations, of which SWAN is aware, in the context of further expansion or Natura statements have found significant incidences of noncompliance.[167] Furthermore, there is no evidence that this data is used for license enforcement. In fact, SWAN is not aware of a single license termination or case taken by any relevant State agency for non-compliance with shellfish aquaculture license conditions in the Republic of Ireland.

166 DAFM (2015) Draft national strategic plan for sustainable aquaculture development. Department of Agriculture, Food and the Marine, Dublin.

167 Karin Dubsky, marine scientist, pers. comm.

- There are a significant number of aquaculture sites currently operating which are unlicensed. These fall into two categories:
    - Sites where there was a license but it ran out, and the application for renewal is still pending up to 12 years later. Operators are allowed to continue to operate as though a license was in place under the specially inserted temporary Article 94a. This is highly irregular and unsatisfactory, especially given that it is now more than 10 years since the ECJ ruling against Ireland for inadequate control of aquaculture in protected sites.
    - Sites in the disputed border areas where aquaculture is expanding rapidly, with significant local seabed damage including into *Zostera* beds. Due to political complexities it is apparently impossible to license or control these operators, although monitoring for other issues such as faecal contamination of shellfish is successfully carried out.
- All applications for licenses refer to blanket appropriate assessments for waters and do not require a re-assessment of the site. This results in individual applications not being considered in terms of the cumulative impacts in a waterbody. This needs to be related to effective implementation of the EIA Directive, in addition to a WFD-specific assessment.
- The environmental impacts of this expanding industry as sketched above are added to by 'novel products' which are encouraged, but with little known about impact assessments prior to release into the wild or contained coastal tanks.
- Freshwater abstraction for treatment of amoebic gill disorder in salmon farm stock is not regulated and needs to be effectively controlled in the planning and licensing systems. For example, the unregulated (i.e. without the required planning or foreshore consents), abstraction of water from two lakes in Connemara by Marine Harvest from Loughaunore Lake in July 2014 and by Braden Bea Teo at An Muileann in July 2015.
- An Taisce are the only statutory environmental NGO consultee for aquaculture licensing. They receive no funding in order to fulfil this role, which could constitute a full-time job with the increased production proposed. Other NGOs who are not statutory consultees find it virtually impossible to get early notice of licence applications as they are not on the web, there is no local site notice and often the local papers where an application is advertised is not the one read locally – e.g. a Lough Swilly case in 2015 in which the application was published in a newspaper with an extremely small circulation and readership.
- In the absence of effective regulations for aquaculture, SWAN questions the 'proxy regulation' which is being carried out by the Aquaculture Stewardship Council for mussels and other aquaculture products. The process by which a food accreditation standard is granted to a state agency (BIM) which then grants it to individual mussel aquaculture operators is highly questionable and obviously completely different from environmental regulation.

Integrated management for WFD and MSFD coherence and compliance

It is the responsibility of member states to ensure WFD and MSFD compliance in the planning, development, licensing and regulation of aquaculture in the overlap zone of these two directives and SWAN believes that this obligation is not being fulfilled in Ireland. The planning and regulatory system for aquaculture is deeply flawed and is not adequately addressing this pressure in terms of its impacts on achieving WFD and MSFD targets. While the draft NSPA states that "*Planning, licensing and regulation of the sector ensures full compliance with relevant European and National legislation, including … legislation seeking to achieve and maintain good environmental status of coastal and marine waters (Water Framework Directive, Marine Strategy Framework Directive)*", SWAN does not believe this to be the case and would robustly challenge it.

It is vital that DAFM liaise very closely with DHPCLG, other Departments, State Agencies and stakeholders to ensure that any aquaculture or other activities proposed in the NSPA are in line with WFD environmental objectives for the transitional and coastal waterbodies in question, and that the formal and transparent processes are established to do this. Currently, such close liaison is not taking place. It is of concern that officials in the Department of Housing, Planning, Community and Local Government, which has responsibility for the WFD and the MSFD, have expressed the view that aquaculture 'is not their area", though it has been identified as a significant water management issue under the WFD in the last cycle of river basin management plans and clearly presents a pressure at local/bay level to transitional and coastal water bodies.

5.7.4. SWAN RECOMMENDATION ON AQUACULTURE

This significant water management issue, because it falls within the remit of another government Department, has been effectively ignored in the WFD implementation process to date. The fact that it is not identified as an issue in the draft Plan suggests that there is an intention in the second cycle to continue to ignore it. This is wholly unsatisfactory and it is the strong position of SWAN that it is imperative that this omission is addressed in final RMBP. This is particularly pressing because the expansion of this industry without adequate monitoring or enforcement of existing licenses is certain to pose a significant risk to the status of our waters under the WFD and the MSFD, especially with the current lack of a coordinated governance approach. SWAN believes that we need strong measures to manage all aquaculture in a coordinated, transparent way, taking into account cumulative impacts.

We therefore recommend the following:

- Aquaculture must be identified as a significant water management issue in the draft Plan, designated its own section as a pressure, and be included in Section 7 on measures where the potential and demonstrated impacts are set out.
- Characterisation must be expanded to coastal water as a matter of utmost priority to address the significant knowledge gap regarding the risk posed by aquaculture and the "*lack of distinct information pertaining to the wider impacts of aquaculture activities on water bodies"* identified in the NSPA SEA. Bays with fish farms especially those in SACs, should be prioritised.
- Licenses for all currently licensed fish farms must be fully reviewed as per the Surface Water Regulations, to ensure that they are not compromising the WFD objectives of the waterbody in which they are sited.
- Propose the establishment of an aquaculture task force with stakeholder participation to develop a suite of management and control measures to be put in place within 6 months. This should consider full reform of the aquaculture licensing system to include:
    - A fully transparent licensing system which makes clear the parameters and criteria for issuing a license.
    - A targeted independent monitoring programme for all fish-farms to assess the risk posed by each farm's risk to achievement of WFD standards in the relevant waterbody.
    - An ex-ante WFD-specific assessment of all aquaculture license applications in order to ensure that the proposed farm will not compromise the meeting of WFD objectives for the relevant waterbody, taking into account cumulative impacts of other pressures in the waterbody.
- A pilot study, led by academics and including stakeholders, to examine the cumulative impacts of multiple aquaculture installations in a bay, and to propose measures to address these. To be

effective it is crucial that there is commitment from all relevant State agencies and Departments to take on board the recommendations from the pilot.

5.8. INVASIVE ALIEN SPECIES

Invasive alien species (IAS) are acknowledged to be a significant cause of degradation of aquatic habitats and extinction of species in aquatic ecosystems. They can impact on native species by competition for resources, e.g. food and space and the alteration of the natural aquatic or riparian habitat. For example, Japanese knotweed *Fallopia japonica* is significantly impacting indigenous native flora and consequently fauna along our rivers. Stream and river banks infested with Japanese knotweed are more prone to erosion as it dies back in winter leaving the soil exposed. It also affects fish life due to the impact on riparian ecology, changes in shading regimes and increased sedimentation due to erosion.

Many of Ireland's freshwater ecosystems are dominated by invasive species, which according to the EPA "*has clear implications for the management of aquatic ecosystems and for the attainment of good ecological status under the Water Framework Directive (WFD)*". The National Biodiversity Data Centre (NBDC) has identified that, since 1980 in Ireland, the rate of introduction of alien species is greatest for freshwater ecosystems and that freshwater alien species are likely to have a high impact where introduced. Professor Joe Caffrey, an expert in invasive alien species, describes the introduction of aquatic non-natives in Ireland as an "*Environmental disaster waiting to happen*". Coastal non-natives are also having a deleterious impact on transitional aquatic ecosystems.

Clear Governance Arrangements and a Coordinated Approach by State Agencies
There are a number of state agencies tackling IAS, including the EPA (primarily through research), the NBDC (monitoring), Local Authorities (education, monitoring and control) and DAHRRGA (ultimate legal responsibility). The programme of measures to address aquatic and riparian IAS describes a measure to develop and implement clear governance arrangements and coordination mechanisms across relevant public bodies. The commitment in the draft Plan to put *"strong governance arrangements in place"* is welcome though belated, given IAS were recognised as a significant water management issue ten years ago in the 2007 SWMI reports. However, it does not give a timeframe for the development of a coherent and coordinated national approach, what the measures will be, which species will be prioritised nor how public participation will be facilitated. The final Plan must do this, as well as including additional details such as how public participation will be facilitated, how the various partners will report on progress and how the delivery of objectives by agencies will be reported to the public.

IAS and Agriculture
That IAS will be included in GLAS training is welcome, however many farmers do not participate in GLAS. The information sheets on the DAFM website that are referred to in the draft Plan are only available for rhododendron. The final Plan should include a commitment from DAFM and Teagasc to develop an IAS action plan to garner greater awareness of IAS among the farming community and to encourage and inform farmers in tackling IAS, for example appropriate control of Japanese knotweed and Himalayan balsam along rivers on their land.

- Although aquatic invasive species are clearly identified as a significant issue, the programme of measures to address the challenges is not sufficient to tackle the threats posed.
- It proposes prioritising *"firstly, the introduction of potential high impact IAS, and secondly, working to eradicate or effectively control IAS at the early stages before they become firmly established."* While SWAN absolutely supports this approach, we are concerned that the Plan does not include concrete measures to address well-established IAS which are causing significant ecological damage to aquatic habitats.
- The Plan should also include measures to control Japanese knotweed and Himalayan Balsam in the management of priority High Status water bodies.

- Furthermore, it should include specific measures to support the development, communication and implementation of biosecurity to control IAS, a measure which will require action by multiple agencies.

Community and Stakeholder involvement

The draft Plan recognises the value of 'community and stakeholder involvement' and includes a recognition of their potential in addressing IAS. This is a welcome recognition, however the final plan should contain stronger commitments to manage IAS in a coordinated way, including supporting catchment-wide multi-community initiatives to tackle IAS. Many voluntary groups are operating with little or no resources at present; their work would be much accelerated if supported and resourced to carry out IAS control.

In this vein, the final Plan should include commitments for Local Authority training and resourcing of volunteer programmes; administrative support for community groups through LAWCO and Local Authorities; funding for NGOs to carry out IAS eradication programmes where they are a particular problem; a national training programme for individuals, communities and NGOs to address IAS; and better online resources. Additionally, groups such as anglers, hunters and outdoor recreational groups could be encouraged to practice appropriate biosecurity and to become more involved in the control of IAS.

There is a discrepancy with the level of attention that Local Authorities are giving to IAS, with some Local Authorities doing good work on IAS while others are doing very little. Each Local Authority should be required to make an IAS action plan for their county, to include identification of the main IAS threats in that county, and to resource the implementation of actions to tackle the most problematic IAS in their county. Funding for clearance work on priority IAS also needs to be clarified as this can be costly and there is no clear outline of how the work is to be resourced.

The EU Commission has passed regulations on Invasive Alien Species which have recently come into force. The legislation includes a list of priority invasive alien species. In this context, the existing list for Ireland of invasive alien species needs to be maintained and updated.

The latest Coastwatch autumn 2016 survey data indicates a spread of Japanese seaweed right around the Irish coast and indications of new other invasives. There appears to be no marine or transitional water IAS control effort and little consideration of marine IASs. For example, when the first mechanical seaweed harvest license was granted (to Bioatlantis in Bantry Bay in 2014) neither the license nor the subsequent monitoring plan had any mention of IAS.

For IAS growing in and along river corridors, water is often a key means of spread. The seeds and dislodged fragments are carried down and these start new colonies, whether the plant lives in the water or on the river banks. While excellent efforts are being made by IFI, LAWCO and some Local Authorities to control the spread, the action is still piecemeal. For example, the latest Coastwatch results on the Shanganagh River in South Dublin show that giant hogweed is rampant on upstream land, supplying seeds to the whole river corridor. Eradication action is slow and concentrates on the receiving banks, not the source.[168]

5.8.1. RECOMMENDATIONS ON INVASIVE ALIEN SPECIES

- The final Plan should include a timeframe for the completion of management plans for priority IAS by DAHRRGA. It should address the need to resource implementation of the actions in these plan,;

[168] Coastwatch unpublished data

state that best practice consultation on the plans will be followed, and the plans should include actions to maximise public participation.

- The Plan should include concrete proposals for urgent action on the species that are most damaging to aquatic ecology. This must include the immediate ban on the import and sale of priority IASs.
- The Gigas oyster, the monitoring of which is the responsibility of the Marine Institute, has been identified at an increasing number of sites. If action is not taken to counter its spread, it will become a problem. The Spanish have introduced restrictions, as has Northern Ireland. Ireland should also take action to monitor and counter the spread of Gigas and this should be included in both management plans and guidelines.
- A timeframe for the clear governance arrangement should be specified in the final Plan, and details of the public participation elements included. The final Plan should include a commitment from DAFM and Teagasc to develop an IAS action plan to garner greater awareness of IAS among the farming community and to encourage and inform farmers in tackling IAS: for example appropriate control of Japanese knotweed and Himalayan balsam along rivers on their land.
- The final Plan should contain strengthened support for community and stakeholder involvement-based management initiatives for the control of IAS, including resourcing, provision of training support to community groups and NGOs involved in IAS control. However, an undue burden must not be placed on the public to manage these in the absence of robust national biosecurity measures, including a prohibition on the import and sale of IASs.
- Each local authority should be required to make an IAS action plan for their county, to include identification of the main IAS threats in that county, and resource the implementation of actions to tackle the most problematic IAS in their county.

5.9. INDUSTRIAL DISCHARGES

Industrial discharges to water are identified as a significant water management issue in 69 (7%) waterbodies at risk. This includes facilities licensed by the EPA (e.g. IPPC: 17) and smaller industries with a Section 4 Discharge to Water licenses (39) which are regulated by Local Authorities. The draft Plan does not propose any measures to address these. In fact, this pressure is not mentioned at all in Section 7, which sets out measures.

As part of Article 5 requirements, Annex II of the directive requires an "*Estimation and identification of significant point source pollution*" and measures are required to address these point sources - including industrial discharges - under Article 11 of the directive. Thus, these must be clearly identified and assessed.

5.9.1. Weakness in the Current System and in the Draft Plan

- Whilst maybe not one of the most significant issues on a national scale, industrial discharges may have significantly detrimental effects locally, especially in the context of cumulative impacts and assimilative capacity of smaller and more vulnerable receiving waters. This issue is not addressed by regulation since there is no assessment of cumulative impacts of industrial discharges on receiving waters and applications for discharge licenses continue to be considered in isolation under Section 4 licensing.
- The requirement for an examination of discharge licensing in the Surface Water Regulations 2009, as required by Art. 11.3 (g) of the WFD, is positive. However, it has become apparent that many

licensing authorities are not amending their licensing activities in line with the objectives of the directive, despite the issuing of training and guidance on this for Local Authorities. A recent survey by SWAN member VOICE, in press, shows a wide disparity in the Local Authorities' understanding of the requirements of the regulations and a lack of resources to review licenses. A number of Local Authorities have not altered any of these licenses ('Section 4 licenses') and continue to issue them, with a policy of not refusing licenses, because they believe that to limit the issuing of licenses or to amend existing licenses, making them more stringent, is not politically palatable as it would (be seen to) curtail development and not support jobs in their functional area.

- In addition, research in relation to priority substances and priority hazardous[169] substances found that not all businesses in the study areas had applied for or secured trade effluent licences, indicating a cohort of unlicensed industries discharging to water and found that these *"unlicensed sources play a significant role in the occurrence of certain pollutant groups."*

- SWAN members are also aware of a serious flaw in the regulatory and planning system in relation to IPPC licensed operation. As SWAN understands it at present, businesses which have been granted planning permission are permitted to operate and to discharge to the environment whilst in the process of applying for a IPPC discharge licence - meaning their discharges are effectively unregulated. This highlights a serious lack of coordination between the planning permission system and discharge licensing system.

- As is identified in the Significant Water Management Issues Report, there will be increased pressure from agri-food processing operations, in terms of its capacity to adequately process its additional waste in the context of the increased output envisaged in FH2020 and Food Wise 2025. This is of significant concern to SWAN. We welcome the SWMI highlighting the fact that "*The location of some existing processing sites could reach a limit where the capacity of receiving water is at or near capacity".* However this issue is not in the draft Plan and there is no measure proposed to address it.

- While information about EPA licensed facilities is to some extent in the public domain via the EPA website, detail regarding Section 4 licenses issued by Local Authorities is not readily accessible.

5.9.2. SWAN RECOMMENDATIONS ON INDUSTRIAL DISCHARGES

In order to ensure that industrial discharges are not compromising WFD objectives in the receiving waters, especially in those waters designated at risk from such sources, SWAN recommends the following:

- A review of all industrial discharge licenses incorporating a WFD-specific assessment must be carried out to ascertain the nature of the effluent and loading of substances likely to compromise WFD status (e.g. nutrients; BOD).

- ELVs set in licenses must then be amended where impact is determined. This must be done taking into account cumulative impacts. This should be done as a matter of priority for industries in at risk waterbodies and in protected areas and HSSs.

- Establish a catchment-based management system for licensed discharges in order to take into account cumulative impacts of various parameters.

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[169] Regan F., Jones L. and Chapman J. (2013) Monitoring of priority substances in waste water effluents. EPA Strive Report No. 117, Wexford

- The draft Plan should clearly identify the increased risk from agri-food processing operations, in terms of its capacity to adequately process additional waste as a result of increased output envisaged in Food Wise 2025. Measures to address this must be proposed.

- A national database of industrial discharge licenses should be made publicly available, including the nature and location of discharges and the WFD status of the receiving water.

5.10. LANDFILL SITES & QUARRIES

The 2009 - 2015 RBM Plans contained a dedicated section which dealt with landfills and quarries (in addition to mining). However, they have been omitted from the draft Plan, with only a brief mention of Historically Polluted Sites which would in some cases include old landfill sites. While not a significant issue nationally, they can have substantial impacts locally and for this reason should be included in the Plan.

Landfill and Contaminated Land

According to the draft 2009 - 2015 RBM Plans, more than 200 groundwater bodies nationally are deemed to be at risk from contaminated sites. It is well documented that leachate from landfills – licensed and illegal - pose a significant threat to some ground and surface waters in Ireland. Many SWAN members have been reporting such sites for many years with inconsistent results, due to authorities often being slow to act in a significant proportion of cases. Many illegal sites persist, despite their existence being highlighted by eNGOs and being well-known to Local Authorities. Despite this, the draft SWMI does not recognise these as significant issues.

According to the 2010 RBM Plans,[170] *"Pollutants (mainly metals and fuel) from landfills and urban areas can seep into the ground and travel through groundwaters to enter surface waters, affecting their quality, damaging aquatic plants and animals and impairing water uses".* There are a significant number of both privately owned landfills and municipal landfills licensed by the EPA and currently operating that have, in breach of their license requirements, polluted groundwater and surface water in the last five years. There are 30 known landfill sites adjacent to the marine environment, some of which include asbestos as in Bray, where monitoring occurs, but others such as Ringsend in Dublin Bay, Coolmore and Lough Foyle are not monitored.

A serious issue of which SWAN is aware is inadequate regulation of waste operators leading to threats to water resources. Small waste collectors are obtaining waste permits through their local authority rather than waste licenses which are issued by the EPA, and these are not being adequately monitored or enforced. These waste permits are attractive as the regulation is less stringent than an IPCC license. Consequently, even when licensed weight limits are exceeded, these may be under-declared. Such small collectors may still collect dangerous materials, some of which are going to landfill unmonitored and untreated. Fines, particularly from cement, limes and other reactive additions to building materials can present serious threats to aquatic environments.

The 2007 Significant Water Management Issues Report stated that *"All Local Authorities must have completed a survey of all contaminated sites in their jurisdiction by the end of 2008 and must have plans developed and in place to address associated threats to water bodies by the end of 2009 to be incorporated into the River Basin Management Plans".* Clarification on the status of these surveys should have been included in the draft SWMI.

Quarrying

Threats from quarrying activities on water status include the discharge of polluted waters contaminated with suspended solids and chemicals, and the lowering of the water table at some quarry sites which can affect nearby wetland areas. Sediment and rock dust emanating from quarrying operations pose a significant local pressure, as can oils used in quarrying equipment and processes. As reported in the 2010 RBM Plans, *"Water table lowering at some quarry sites can affect nearby wetland areas, and the transfer of groundwater to surface waters can change water chemistry".*

[170] EPA Catchments Unit (2009) Shannon River Basin Management Plan 2009-2015 Environmental Protection Agency, Dublin

While new quarrying developments are now restricted and it is now a requirement to register quarrying activities, lack of implementation and enforcement of these regulations means the problems persist and there is an increasing phenomenon of "reclamation" of waste hard materials. Processing and washing of these may present problems for aquatic environments if not managed and regulated carefully.

In light of these issues, with which SWAN members have experience, the draft SWMI should set out how the recent changes has altered their impacts on the water environment. If this information is not available, this should be reported.

In relation to both pressures, the 2010 RBM Plans stated that because the impact of these pressures are 'site specific'; *"knowledge of these sites ... is being updated by the Environmental Protection Agency and local authorities to assess the extent of the pressures and confirm the scale of any problems or impact"* and that inventories and risk assessments for landfills and mining sites were to be conducted.

5.10.1. SWAN RECOMMENDATIONS ON LANDFILL SITES & QUARRIES

- These issues should be included in the final Plan with measures proposed, including mandatory capping and other management of old landfill sites to prevent additional wash through and leaching to groundwater
- It should present summary results of the inventories and risk assessments of 'known sites' committed to in the 2009 -2015 RBMPs and include the following information:
    - A list of the sites and the results of the assessments;
    - A list of sites for which assessments are not complete and the timescale for, completion;
    - Whether mitigation actions have been carried out to address negative impacts of these and by whom? SWAN believes that the EPA or another independent agency should oversee the assessments of contaminated sites by the Local Authorities to ensure that the assessments are of an appropriate standard, the proposed actions appropriate, and that they are carried out

6. HORIZONTAL SIGNIFICANT WATER MANAGEMENT ISSUES

6.1. PHYSICAL MODIFICATIONS, FLOOD MANAGEMENT & PLANNING CONTROL

6.1.1. Overview of Pressures on Water Quality & Status from Physical Modifications

This section discusses the shortfalls in relation to Section 7.6 of the draft Plan 'Measures to protect and improve the physical condition of the water environment'. Because the planning consent system remains the primary control on physical modifications, in the absence of a system of prior authorisation as required by the WFD, this section also deals with 'Land use planning and water' as addressed in Section 7.8.1 of the draft Plan, as these issues are intrinsically linked.

The status of a surface waterbody is determined by assessing both ecological and chemical quality elements. Rivers and lakes have been physically modified in many ways throughout history, however many physical modifications can severely impede ecological health of rivers, lakes, and transitional waters. Because of this, morphological conditions are one of the four quality elements used to assess the ecological status for waterbodies. Morphological conditions include river depth and width variation, structure and substrate of the river bed, and structure of the riparian zone. One of the WFD requirements for achieving good status is through maintaining "*Conditions consistent with the achievement of the values specified for the biological quality elements"*. This recognises that the hydromorphological characteristics support the biological health of a waterbody.

According to the Draft RBMP, "*Hydromorphology is a significant pressure in 220 (19%) of water bodies at risk. The pressure relates to physical modifications or damage to habitat and natural river/lake processes and functions caused by channelization, land drainage, dams, weirs, barriers and locks, overgrazing, embankments and culverts*". In relation to high ecological status waterbodies, hydromorphology is identified in the draft Plan as being the third most significant category of pressures on river and lake waterbodies with high status objectives, affecting 27 (21%) of the high ecological status waterbodies. The draft Plan recognises that "*the physical condition (hydromorphology) of rivers of surface waters is as important to maintaining healthy ecosystems as the quality of the water sustaining them*" and that "*abnormally high siltation levels in particular are cause for concern*".

As we will describe, impacts of a range of physical modifications **are not being assessed for WFD compliance** and measures to mitigate against negative impacts are wholly inadequate. There is no commitment in the draft Plan to address this inadequacy, and consequently physical modifications will continue to negatively impact the WFD status of the waterbodies where they are carried out. This represents a failure in achieving the objectives of the WFD for those waterbodies, unless an exemption is applied, with the justification set out following WFD Article 4 criteria.

This widespread non-compliance is of serious concern and should be addressed through WFD-specific ex-ante assessments for all physical modifications, including flood management, dredging for agricultural purposes, and Local Authority part 8 developments (developments by a local authority itself).

In addition to controls on new physical modifications through regulatory control system to ensure developments do not compromise the WFD status of the affected waterbody, there is also a need to embark on a programme of **river restoration** in order to restore watercourses currently below GES, (where these have not been designated as heavily modified). Where physical modifications have caused changes in water flows,

increasing sediment loading, aquatic habitat deterioration, and obstructions of fish migration, river restoration should be carried out to reinstate natural processes. Accordingly, river, coastal and wetland restoration should be promoted and resourced as part of the RBDMP.

6.1.2. WFD Requirements Regarding Physical Modifications

Under the WFD, a system of prior authorisation for abstraction and physical modification in waterbodies is required to have been put in place by 2012. However, the draft Plan still does not include these or a timeline for them. This system of control, which should be introduced through the planning consent system, is to address the threat of waterbodies not achieving good water status because of physical alterations to the river and adjacent lands. **There is currently no system of consent that protects water bodies from damaging physical modifications, despite a legislative requirement to do so and despite commitments by previous governments and statutory plans to do so.**

There was a commitment to introduce regulatory controls for physical modifications in the last round of River Basin Management plans, which read: "... *proposed authorisation regulations for ... physical modifications ... are under preparation*", addingthat a "*formal legal mechanism*" to address morphological pressures on the coastal environment including "*coastal defence, built structures (urbanisation and ports and harbours) and dredging"* will be provided by a *"proposed amendment to the legislative framework, to regulate physical modifications having an adverse impact on the water environment*".

The SWMI document[171] also acknowledged the need for legislative controls:

> *"Several Irish studies commissioned to support implementation of the WFD have highlighted the need to introduce an authorisation system to control activities involving physical modifications to surface waters (e.g. flood defences, port development, hydropower development, arterial drainage). It is intended to address this deficiency through the establishment, via legislation, of a new single comprehensive regulatory framework.*"

It is important that these 'significant physical changes' are considered in the RBMP, since they potentially impact both hydromorphological and biological conditions of affected waterbodies and hence their WFD ecological status. Any activity that will negatively impact the WFD status of a water body is only permitted under the WFD if the strict conditions, set out in Article 4 and described below, are met.

Article 4.7 of the WFD states that "*Member States will not be in breach of this Directive when:*

- *Failure to achieve good groundwater status, good ecological status or, where relevant, good ecological potential or to prevent deterioration in the status of a body of surface water or groundwater is the result of new modifications to the physical characteristics of a surface water body or alterations to the level of bodies of groundwater, or*
- *Failure to prevent deterioration from high status to good status of a body of surface water is the result of new sustainable human development activities and all the following conditions are met:*

  (a) 'All practicable steps are taken to mitigate the adverse impact on the status of the body of water;

[171] DECLG (2015) *Significant Water Management Issues in Ireland*. Public consultation document. DECLG.

(b) The reasons for those modifications or alterations are specifically set out and explained in the river basin management plan required under Article 13 and the objectives are reviewed every six years;

(c) The reasons for those modifications or alterations are of overriding public interest and/or the benefits to the environment and to society of achieving the objectives set out in paragraph 1 are outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development; and

(d) The beneficial objectives served by those modifications or alterations of the water body cannot for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option.'

There are a number of areas in which Ireland appears to be in breach of these requirements, as it has not implemented any cohesive system of assessment, regulation or control of physical modifications, including flood management, arterial drainage, and Local Authority part 8 developments. **SWAN is extremely concerned that the required regulatory system for the control of physical modifications has still not been introduced and that there is no commitment in the draft Plan to introduce such a system.** Ireland is not taking all practicable steps to prevent deterioration in the status of many waterbodies or to achieve good ecological status or, where relevant, good ecological potential where this relates to physical modifications. These compliance issues are discussed below and recommendations are supplied to address this shortfall.

The DECLG attributed the delay of this legislation to the "*current poor understanding of the relationship between morphological alterations to surface waters and the ecological impacts"* and that "*Work is on-going to improve our understanding of these complex environmental pressures".* The draft Plan instead states that "*a key focus during the second cycle will be to build the evidence base to determine the significance of physical conditions in surface waters to supporting good and/or high ecological status*." That the plan reneges on earlier commitments to address the pressures from physical modifications through a system of legislative control is both unacceptable and non-compliant with the WFD requirement to have legislative controls on physical modifications.

The European Commission has produced a guidance document[172] on the use of WFD exemptions and has also stressed and discussed the importance of the use of 'better environmental options': "*When managing rivers, lakes and coastal areas, the best environmental options need to be identified, especially when new flood defence structures are considered that could lead to a degradation of water resources.*"[173]

While to date there is no case law in relation to the WFD in Ireland to assist in examining the potential implications for flood management activities, the 2015 ECJ ruling on Case C-461/1318[174] on the dredging for navigation of the river Weser in Germany is extremely relevant. It found that:

"*Article 4 (1)(a)(i) to (iii) of [the WFD] must be interpreted as meaning that the Member States are required — unless a derogation is granted — to refuse authorisation for an individual project where it may cause a deterioration of the status of a body of surface water or where it jeopardises the*

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172 EC (2009) Guidance Document No. 20: Guidance document on exemptions to the environmental objectives; Technical Report - 2009 – 027

173 EC (2011) 'Towards Better Environmental Options for Flood Risk Management'. European Commission DG Environment, Brussels, Belgium

174 Case C-461/13 Bund für Umwelt und Naturschutz Deutschland http://curia.europa.eu/juris/documents.jsf?num= C461/13

attainment of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Directive."

Although it is not yet clear how this will translate into project-level consents, there is a strong argument, which has been articulated by the EU Commission Water Unit, that this should lead to **ex-ante WFD-specific assessments for individual projects**, including developments associated with flood protection.

In addition, Article 9 of the Floods Directive (FD) explicitly requires that Member States coordinate the Floods Directive with the WFD:

> "*Member States shall take appropriate steps to coordinate the application of this Directive and that of Directive 2000/60/EC focusing on opportunities for improving efficiency, information exchange and for achieving common synergies and benefits having regard to the environmental objectives laid down in Article 4 of Directive 2000/60/EC.*" (SWAN's emphasis)

It is important to note that this coordination requirement in the Directive does not simply relate to administrative arrangements but to the 'application', and thus operational implementation, of the Directive. Ultimately coordination is vital so as to ensure that *inter alia*:

- All pressures and potential impacts of proposed measures included in these FRMPs are included in the characterisation process for the WFD and thus in the river basin management planning process, with strict application of exemption criteria where proposed measures will compromise WFD mandatory requirements;
- **The project-level measures proposed are subjected to a WFD-specific assessment before proceeding;**
- All catchment-based - and in particular, land management flood management options - are considered, assessed and implemented in an integrated way; and
- Current flood management schemes, including ongoing arterial drainage, are subjected to WFD-specific assessment.

6.1.3. Arterial Drainage

Arterial drainage of rivers is a significant pressure on the physical condition of river catchments in Ireland. Arterial drainage includes dredging to increase the conveyance of the river, raising embankments, clearance of riverside trees and other riparian vegetation and structural elements. These works have significant adverse impacts on the physical characteristics of rivers and can cause significant damage to aquatic ecosystems. The OPW's 'National Arterial Drainage Maintenance List of Activities'[175] recognises the threats that arise from Arterial drainage: "*siltation, disturbance of spawning habitat, changes in water quality, connectivity in flood plains and associated habitats, changes to sediment regime, connectivity to wetland and coastal habitats, alteration of conveyance".*

[175] OPW (2017) 'The National Arterial Drainage Maintenance List of Activities 2016-2021' Volume I- Final Non-Technical Summary February 2017

The Flood Risk Management Plans identify medium to long term moderate impacts arising from dredging and maintenance, where works can result in significant emissions of sediment to the waterbody and downstream, resulting in impacts to water quality, destruction of fish spawning habitat through siltation, and increases in suspended solids in the river disturbing the salmonid populations. In addition, benthic mayfly and other macroinvertebrate populations are impacted from dredging, thus affecting food supplies for fish and bats. Arterial drainage can also destabilise river banks, and material deposited on the bank sides can further damage the streamside habitats.

DHPCLG's SWMI document[176] recognises the impacts of such operations:

> "I*mpoundments and flow regulation change natural flow and sediment conditions that can alter the ecosystem structure and may reduce habitat diversity … Channelization and instream dredging can lead to significant physical changes and reduce biodiversity and damage habitats. They alter natural river flow and can give rise to the accumulation of sediment due to channel widening or erosion of the bed and banks as a result of channel deepening*."

However, the draft Plan lacks acknowledgement of the severe and extensive damage caused to rivers by arterial drainage. The actions contained in the draft RBMP programme of measures downplay the severity of these impacts and present the mitigating measures as being adequate, which they are not. **The draft Plan does not propose any assessment of the national dredging programme and its compatibility with the objectives of the WFD, nor is there any proposal to strengthen the procedures for ex-ante evaluations of arterial drainage works or to address the damage caused to rivers by dredging.** Instead, the plan refers to the need for improved understanding of these issues through monitoring of the activities and impacts up to 2021.

Because damage from dredging and other conveyance work includes significant physical changes, increased siltation, habitat damage and reduction in biodiversity, as described above, **the programme of arterial drainage compromises the WFD objectives in affected waterbodies. The RBMP states that over the second cycle of RBMP the OPW will carry out 'maintenance' on 2000km of channel <u>each year</u>**. Delaying the required action until there is improved understanding of the impacts is not an acceptable level of action for the final plan.

Under the WFD, a system of prior authorisation for physical modifications is required, as described in section 2, above. The SWMI document also recognises the need for "t*he establishment, via legislation, of a new single comprehensive regulatory framework*" to regulate arterial drainage among other forms of physical modification.

According to the SWMI consultation document, *"several Irish studies commissioned to support implementation of the WFD have highlighted the need to introduce an authorisation system to control activities involving physical modifications to surface waters (e.g. flood defences, port development, hydropower development, arterial drainage)*".

According to the Weser case (Case C-461/1318[177]) discussed in section 2 above, there is a requirement under the WFD to *"refuse authorisation for an individual project where it may cause a deterioration of the status of a body of surface water or where it jeopardises the attainment of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Directive.'* It is

[176] DECLG (2015) Significant Water Management Issues in Ireland. Public consultation document. DECLG

[177] Case C-461/13 Bund für Umwelt und Naturschutz Deutschland http://curia.europa.eu/juris/documents.jsf?num= C461/13

SWAN's opinion that this requirement applies to many of the rivers where significant arterial drainage is carried out. Accordingly, there is a **pressing need to assess, regulate and control arterial drainage** so as to ensure that works do not cause deterioration to the physical condition of the water environment in accordance with the requirements of the WFD. Arterial drainage schemes, both ongoing and new, need to be assessed for their impact on the WFD status of affected waterbodies, along with all other proposed measures (cumulative impacts).

It is important to emphasise that the significant physical changes that arise from dredging, as acknowledged in the SWMI document and the National Arterial Drainage Maintenance List of Activities 2016 – 2021, will negatively impact the WFD status of a waterbody and as such are only permitted under the WFD if the strict conditions, set out in Article 4 and described in section 6.1.2 above, are met. **A system of assessment to include assessment of ongoing arterial drainage schemes and their compliance with the WFD, should be outlined in the final RBMP.**

As a mitigation measure for the OPW drainage 'maintenance' programme, the draft Plan refers to the Environmental River Enhancement Programme (EREP), initiated in 2008. The EREP has a very limited extent, covering only 100km of river channel per year. EREP is not a scheme to prevent damage, rather it is a remedial programme, replacing gravel beds along certain sections of salmonid rivers where they have been previously removed by dredging. This is a welcome and positive scheme, but it cannot be considered a proportionate mitigation measure for the ongoing damage caused by dredging to 2000 km of river channel each year. The final plan should recognise EREP as a small-scale remedial measure for limited restoration of river channels which have been degraded by dredging.

The OPW 'National Arterial Drainage Maintenance List of Activities'[178] states that "*To be compliant with the Water Framework Directive maintenance activities must also not result in any deterioration to waterbody status, including hydromorphology*". However, while the draft Plan presents "*Mitigation measures incorporated in the OPW drainage maintenance programm*e" as a measure to protect and improve the physical condition of the water environment and states that the 'Standard Operating Procedures' for OPW dredging activities "*facilitates achieving good or high scores for several ... hydromorphological attributes*", it is important to note that the SOP do not contain a system of assessment or adequate mitigating procedures which avoid deterioration in river morphology and habitats. Dredging operations, even where they are carried out in accordance with the SOP, still cause significant hydromorphological damage to rivers.

The Strategic Environmental Assessment (SEA) of the 'The National Arterial Drainage Maintenance List of Activities 2016-2021'[179] states that:

> *"Any maintenance activity that involves dredging or in-channel works will cause increases in suspended solids and nutrients. It is estimated that in general this will be a short-term local impact. Longer term impact may arise due to changes in the hydromorphology of the channel and the receiving waters. In the long-term the quality of water may also deteriorate due to increases in nutrient loadings to the water bodies. Nutrient loading in excess of the waters assimilative capacity may result in eutrophication of the water body. This would decrease the water quality and impact on the biodiversity of the water."*

178 OPW (2017) 'The National Arterial Drainage Maintenance List of Activities 2016-2021' Volume I- Final Non-Technical Summary February 2017

179 OPW (2017) The National Arterial Drainage Maintenance List of Activities 2016-2021, Volume II- Final SEA Environmental Report

The SEA also states that the WFD River Basin Management Plan objectives are referenced in the Standard Operating Procedures "*in that some of the approaches within the Environmental Drainage Maintenance Guidance Notes allow for maintenance activity to contribute to achieving good or high ecological status*".[180]

Sub-Objective A2 of the SEA for the National Arterial Drainage Maintenance List of Activities is "*Provide no impediment to the achievement of water body objectives and contribute to the achievement of water body objectives"*. The current Standard Operating Procedures and Environmental Protocols reference the WFD River Basin Management Plan objectives, in that some of the approaches within the Environmental Drainage Maintenance Guidance Notes allow for maintenance activity to contribute to achieving good or high ecological status: "*Future development of standard operating procedures and environmental management protocols could incorporate the WFD requirements further*." The SEA also states that "*The planning for maintenance activities does not include a WFD or hydromorphological audit and so it is possible for the maintenance activities to result in moderate negative impacts, which could be long term and at the regional scale".* The report goes on to say that *"Further ecological indicators of water quality status such as macroinvertebrates and fish can be impacted with long recovery times.*"

SWAN is extremely concerned that the negative impacts of dredging on many rivers are moderate to severe. One recent example is severe damage to benthic habitats from dredging of the Bandon River in Cork in 2017. SWAN network members made repeated site visits, engaged in ongoing correspondence with operators, the OPW and IFI, and have photographic evidence of disturbance. It has been reported that these works were carried out in accordance with the Standard Operating Procedures. It is SWANs considered opinion that the mitigation measures outlined in the SOP are insufficient to alleviate the damage from dredging to river morphology or ecology.

The key recommendation of the SEA to mitigate the impact of maintenance activities on hydromorphology and WFD Status is "S*pecific monitoring to build scientific evidence base of impact of different maintenance activities on hydromorphology and WFD Status"* for use in future assessments (mitigation measure M3d). **This is a wholly inadequate mitigation measure as it does nothing to reduce the damage that is admittedly to be caused by dredging operations by the OPW on 2000km of river channel each year.**

There is an implicit reference in the SEA that the WFD came into being when the baseline conditions reflected already drained catchments and ongoing maintenance of such schemes. That catchments were already being drained is not a valid justification for further continuation of these activities, especially in the growing understanding of the wider importance of healthy rivers and the long recovery times after activities such as dredging.

In summary, the National Arterial Drainage Maintenance List of Activities is causing, and will continue to cause, a deterioration in the status of dredged rivers, in contravention of several aspects of the WFD. The damaging impacts are not adequately mitigated against with the stated mitigation measures. There is no clear statement in the draft Plan or the SEA that the SOPs will prevent deterioration. Instead, the SEA states that *"Future development of standard operating procedures and environmental management protocols could incorporate the WFD requirements further*". **It is the considered opinion of SWAN that the National Arterial Drainage Maintenance List of Activities is not compliant with the Water Framework Directive.**

In accordance with Article 4 of the WFD, arterial drainage projects, especially in stream dredging, requires an ex-ante evaluation of its impacts on the river and the decision to proceed could only apply where it would not jeopardise *"the attainment of good surface water status or of good ecological potential and good surface*

[180] Sub-Objective A2 of the OPW (2017) The National Arterial Drainage Maintenance List of Activities 2016-2021, Volume II- Final SEA Environmental Report (p.111)

water chemical status by the date laid down by the Directive". This applies to works carried out by the state (OPW), by Local Authorities or by private individuals.

The economic justification for dredging must also be considered. According to a 2015 report by the Office of the Comptroller and Auditor General,[181] "*The principal objective of arterial drainage schemes carried out in Ireland by the Office of Public Works (OPW) was to bring about a long term improvement in agricultural incomes in river catchments. The work carried out on schemes was designed to allow landholders to install field drainage which reduces waterlogging of land and enables it to carry more livestock or produce higher crop yields. Schemes also have the effect of reducing both the incidence and duration of flooding*". While dredging carried out for agricultural purposes can help to reduce the depth of local flooding, commonly on agricultural land, by increasing the volume that passes through a channel at any given time, it increases flood peak and thus exacerbates downstream flooding. The same report presents a financial argument that the benefits likely to be derived from carrying out arterial drainage are "*likely to be only marginally greater than the costs*".

The ongoing programme of state operated and state funded dredging is causing significant damage to the water quality and ecology of rivers and is in direct conflict with our meeting the objectives of the WFD. The draft Plan simply states that the "*Mitigation measures incorporated in the OPW drainage Maintenance programme will be applied for such works*". This is a totally inadequate and non-compliant measure for the extent of the damage that is to be caused by the OPWs dredging programme.

SWAN recommends that the OPW and other relevant agencies accept without further delay that the benefits of achieving healthy rivers is a basic common good objective, which is supported by the WFD and which they should also be supportive of and compliant with. This should be reflected in the final RBMP by a very different set of measures to deal with the OPWs National Arterial Drainage Maintenance List, measures which recognise the extent of non-compliance and which lead to compliance of the dredging operations with the WFD. **There should be a moratorium of all dredging activities until a review of the compatibility of water quality objectives with the practice of arterial drainage is completed and the new regulatory system is in place.** Alternatives to dredging must be explored, resourced and trialled so that the localised farm interests are considered. A programme of citizen engagement will be an essential component to this, with adequate resources allocated in the 2018 budget for communications and community liaisons.

6.1.4. Flood Management

Flood defence works involve many types of physical modifications which can deteriorate and impair the hydromorphological conditions of water bodies, including structure of the river bed and of the riparian zone. Ecological impacts arise from change in water flow, sediment dynamic impairment and morphological changes. The impacts are outlined in Table 2 below.

[181] http://www.audgen.gov.ie/viewdoc.asp?DocID=544&CatID=5&StartDate=01+January+2015

Table 2. *Ecological impacts due to change in water flow, sediment dynamic impairment and morphological changes.*[182]

Change in water flow	· Change and loss of habitats diversity and quality (due to the modifications of hydraulic conditions and sediments transport, and to the building of structures) · Change in oxygen rate, temperature (increased temperature in zones of low flow), sediments and nutrients loading (accumulation linked with decreased self-purification) · Change in biological communities: decrease of richness and diversity of fish, benthic invertebrates, macrophyte populations; structuration toward lentic communities if long water storage; development of phytoplankton · Disruption of species migration and development
Sediment dynamics impairment	· Change and loss of habitats diversity and quality (due to the removal of bed and banks material and vegetation, and to interrupted sediments transport) · Altered species development and change in biological communities (macrophytes, benthic invertebrates, fish) linked to the alterations of habitats · Ecological impacts of altered dredging regime associated with changes in accretion/erosion
Morphological changes	· Change and loss of habitats diversity and quality (due to the modifications of hydraulic conditions and sediments transport and to the building of structures) · Change in oxygen rate, temperature (increased temperature in zones of low flow), sediments and nutrients loading (accumulation linked with decreased self-purification) · Change in biological communities: decrease of richness and diversity of fish, benthic invertebrates, macrophyte populations; structuration toward lentic communities if long water storage; development of phytoplankton · Disruption of species migration and development

Physical modifications associated with flood management can also result in changes to water flow and morphology and impair sediment dynamics, which in turn has many negative ecological impacts.

The impacts on water status of implementing many of the large Flood Relief projects are assessed through EIA and the applicable planning and/or consent processes, however there are still no regulatory controls on

[182] EC (2006) WFD and Hydromorphological Pressures. Technical report.

related physical modifications to waterbodies. As discussed above, any activity that will negatively impact the WFD status of a waterbody is only permitted under the WFD if the strict conditions, set out in Article 4 are met

It is important to note that the reasons for any exemptions must be set out in the RBMPs.

It is unclear as to whether there has been any legal analysis in preparing the RBMP on the potential application of WFD exemptions to flood protection developments. However, the EU Guidance Documents offer some assistance. The 'Guidance document on exemptions to the environmental objectives' defines 'new modifications' as "*modifications to the hydro-morphological characteristics of the water body*". Since flood management measures may alter hydro-morphological characteristics of waterbodies, it should follow therefore that flood protection works should be considered new modifications and therefore qualify under the Art 4.7 exemption.

The Weser in Germany is extremely relevant again to Flood protection works, especially where the courts find that:

> "*Article 4 (1)(a)(i) to (iii) of [the WFD] must be interpreted as meaning that the Member States are required — unless a derogation is granted — to refuse authorisation for an individual project where it may cause a deterioration of the status of a body of surface water or where it jeopardises the attainment of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Directive."*

Although it is not yet clear how this will translate into project-level consents, there is a strong argument, which has been articulated by the EU Commission Water Unit, that this should lead to ex-ante WFD-specific assessments for individual projects, including developments associated with flood protection.

Natural Water Retention Measures & Natural Flood Management

There has been an enormous amount of work done at EU level on the integration of flood management with Water Framework Directive implementation. Much of this focuses on the multiple benefits for water status, flood protection and biodiversity of natural flood retention measures.

Natural Flood Management (NFM) is landscape scale approach to slowing the flow of water throughout the catchment, working with natural hydrological processes to store flood water temporarily during flood events. Natural flood management is a viable and cost effective approach which can have significant additional benefits for water quality, biodiversity, climate change adaptation, fisheries and landscape amenity. Land-use management and natural water retention measures (NWRMs) are described in Ireland's Flood Risk Management Plans and the merit for flood attenuation and water quality benefits are is recognised, however there is no reference in the draft Plan to advance these approaches in Ireland.

The Commission has identified the many benefits of coordinating the FD with the WFD, and there are many flood risk management measures that have multiple benefits for water quality. In particular, the Commission has identified river and floodplain restoration as providing a "*significant contribution to both FD and WFD objectives*" as floodplains can play an important role in flood risk management and are vital to WFD quality indicators such as fish and invertebrates which are highly dependent on these habitats. A prime example is the reclamation of floodplains, which helps to re-establish their functions as buffer zones and water storage areas during flood and dry periods, and as a purification medium by trapping pollution or water run-off from hill slopes.

In the UK many of the NFM initiatives have taken place as collaborative initiatives between communities and multiple agencies because of the water quality, flood attenuation and biodiversity benefits. The adoption of NFM in Ireland would help to reduce localised flooding, improve water quality, and could help counterbalance the attachment of some in the farm community to dredging.

Changes that have led to a reduction in natural flood attenuation include urban and agricultural expansion and intensification, often onto historic floodplains; dredging (despite its tendency to exacerbate downstream flooding); and drainage and infilling of wetlands. Now, in response to increasing frequency of extreme rainfall events and consequent flooding that is happening because of climate change, and in order to assist meeting WFD objectives, Ireland needs to develop and implement measures for natural flood management. Combinations of catchment-wide measures are now evidenced as good international practice.[183]

However, t**here is no mention in the draft Plan of NFM, despite clear benefits to water quality.** NFM and natural water retention measures are non-exclusive alternatives to many of the practices that are causing ongoing threat to Ireland achieving WFD objectives, such a dredging, wetlands drainage and infilling. The RBMP should acknowledge the benefits of Natural Flood Management to water quality and flood attenuation and set a measure in the Plan to work with other relevant departments and agencies to develop research and pilot NFM in Ireland (see recommendations section below).

In order to implement natural flood retention measures, very close integrated working relations are required between the OPW, the EPA, DECLG and LAs in order that all flood management decisions are made in a collaborative way taking into account catchment-based solutions. Secondly, in order for this to succeed, the dominance of the engineering-led approach in the OPW must be addressed with the recruitment of suitably qualified catchment managers to lead this new approach.

6.1.5. Wetland Drainage

The impact of reclamation of land for agricultural purposes, and its impact on WFD status of affected/adjoining waterbodies, is not addressed in the draft Plan. The EIA (Agriculture) Regulations and 2011 Planning & Development (Amendment) (No. 2) Regulations have the potential to provide protection. However, the system is fragmented and confusing for landowners, planning officials and other stakeholders and for this and other reasons the regulations are ineffectual:

- The separation of responsibilities between the DAFM and DECLG also leads to fragmentation in the system. Under the current system, wetlands are at risk from cumulative effects as there is no centrally administered system in place between DAFM and DHPCLG for cross-reporting and for integrated assessment of proposed drainage works. Because of this, permission may be simultaneously granted for drainage both within a wetland and on adjacent agricultural land, the combined effects of which may seriously damage the site and impact the status of adjoining watercourses.
- The system has a built-in temptation for landowners carrying out drainage works in wetland in areas above 0.1 hectares to deem the land ‘used for agriculture’ and not an actual wetland. While the term ‘wetland’ is defined in the regulations and legally binding guidance, this is sufficiently ambiguous to have facilitated many incidences of unregulated wetland drainage (i.e. without planning consent) of which SWAN members are aware, e.g. adjacent to the Inagh River Estuary SAC in Clare and on Tacumshin Lake in Wexford.

183 Murray, A. (2017) ‘Natural Flood Management: Adopting ecosystem approaches to managing flood risk’ report by Friends of the Earth Ireland.

- There are no measures in the draft Plan to assess the impacts of these activities nor the efficacy of the above regulations to mitigate them, specifically in the context of WFD objectives. Rather, it just states that "*the Agriculture Environmental Impact Assessment Regulations … will continue to be [an] important measure[s] over the period of the second cycle*".

There needs to be a cohesive system of implementation which identifies and prevents potential cumulative effects from wetlands drainage in adjacent plots and/or wetland drainage that is carried out under different regulations. In order to tackle this and to tackle the challenges that have arisen in the implementation of the new regimes, an independent review of wetland protection in Ireland is needed which assesses challenges and poses practical solutions that will reduce wetland loss through proper implementation of existing systems and resources. This review should be provided for in the Plan.

6.1.6. Physical Modifications, the Planning Consent System and Legislative Controls

This broad spectrum of human activities impacting on the hydromorphology of Irish waterbodies underlines the central importance of the planning system in protecting the water environment and meeting new Water Framework Directive (WFD) targets, through the regulation of land-use and physical development. This is especially the case in the absence of the required regulatory controls but greater integration between land and water management policy and practice will still be required once these regulations are introduced.

'High Level Guidance' to integrate planning consent system and WFD objectives
Currently, it is unclear what the requirements are for Local Authorities to assess risks to the physical condition of the water environment through the planning consent system. There is no specific requirement to assess threats of physical modifications to water bodies through the planning consent system. An indicative assessment of County Development Plans by SWAN reveals that some refer to the threat of physical modification and some do not. None of the plans that have been examined by SWAN contain specific procedures for assessing or preventing deterioration of the physical condition of the water environment.

The draft Plan commits to the preparation of "*high level guidance for planning authorities on the relationship between physical planning and river basin management planning*" following the publication of the final River Basin Management Plan (Section 7.8.6). This reiterates earlier commitments (contained in the previous River Basin Management Plan) to *"issue Section 28 guidance to planning authorities on the new Planning Bill and its relationship with the implementation of the RBMPs, after enactment and not later than 2011*" which, in 2017, have still not yet been introduced.

These guidelines will help to address the paucity of information and lack of clarity around Local Authority Planning and obligations under the WFD to protect water quality, including physical modifications. The guidelines must address compliance of 'river maintenance'/dredging with the objectives relating to obligations of restoring and maintaining good physical condition of rivers, as discussed above. The guidelines also should include detailed technical guidance on utilising the SEA process to properly integrate water management planning with development and spatial planning.

More stringent planning requirements should be introduced for catchments of 'high status', pristine rivers and lakes, and these areas should be mapped and included in local authority development plans as well as addressed in the guidelines.

However, guidelines are not a sufficiently robust mechanism to address the severity of impacts from physical modifications, including flood defences, port development, hydropower development, and arterial drainage/dredging. **The final plan must commit to a legislative system for planning control and consent which ensures consistency between all relevant developments and the objectives of the WFD.**

6.1.7. Weakness in the Draft Plan: Legislative Controls for Physical Modifications

The absence of any reference in the draft Plan to a system of legislative control for physical modifications is a regression on earlier commitments and is not in any way commensurate with the risks and damage caused to the water environment from physical modifications. The draft Plan fails to reiterate earlier commitments in the last RBMP and the SWMI document, reverting instead (in Section 7.8 'Overview of measures to address other pressures') to a vague dependence on the planning system, the SEA and the EIA Directives and regulations.

It is still necessary to introduce an authorisation system to control activities involving physical modifications to surface waters (e.g. flood defences, port development, hydropower development, arterial drainage) (as stated in the SWMI document) and this commitment must be reinstated in the final RBMP and resourced accordingly.

Local Authorities and An Bord Plenala must implement a system to assess and regulate the threats to the physical conditions of waterbodies from activities that are licenced under planning regulations. It is not acceptable to wait until the next round of plans to implement this. Activities covered by the consent process which require assessment would include flood defences, coastal defences, dams, river and stream crossings, weirs, dredging, vegetation removal and land restructuring. Part 8 developments (development carried out by Local Authorities which do not require consent because they are carried out by the Local Authority themselves) also need to be assessed for the potential impact on the physical condition of the water environment.

As an immediate action, a Circular Letter should be issued to all local authorities reminding them of their statutory obligations to assess and prevent threats of physical modifications to water bodies, with detail on how the planning consent system and internal Part 8 development procedures will address such threats. Regional Planning Guidelines, County Development Plans, and Local Area Plans must incorporate the threat of physical modifications and address how the physical condition of the water environment shall be protected, among other WFD compliance issues such as threats to pristine waters.

6.1.8. SWAN RECOMMENDATIONS ON PHYSICAL MODIFICATIONS

The draft Plan should include the following commitments:

System of Prior Authorisation

- **A comprehensive system of authorisation for physical modifications** should be implemented as part of the Planning system in the next 2 years. SWAN advises that the system of authorisation include a comprehensive WFD compliance assessment to be carried out on each proposed activity. A standardised methodology will be required for carrying out these assessments. The audit should then recommend which mitigation measures can be implemented to ensure that no negative impacts from dredging arise, and where this cannot be assured the dredging should not proceed. The assessments will need to identify all potential negative impacts, including hydromorphology, and a central body will need to be resourced to vet and approve the assessments. There will need to be transparency and public participation in the assessment and licencing procedure. As a legislative measure to ensure legal compliance with WFD objectives, this will require new WFD planning and development regulations for physical modifications to outline procedures, responsibilities, decision making criteria, and enforcement. SWAN recognises that this system is a significant undertaking and

will take resources to develop, communicate and implement, however it is long overdue, being already 5 years late. The system of authorisation for physical modifications should include dredging and other river 'maintenance', channelization, dams, weirs, barriers and locks, embankments and culverts.

Arterial Drainage

- In the meantime, all river dredging and other 'maintenance activities' carried out under the National Arterial Drainage Maintenance List of Activities 2016-2021 must be halted until this system of legislative control is up and running and can assure compliance with the WFD. Until this system and control is in place, the National Arterial Drainage Maintenance List of Activities will continue to prevent conditions consistent with the achievement of WFD objectives
- SWAN recommends an amendment of the Arterial Drainage Act to remove the legal obligation on the OPW for ongoing dredging

Specific WFD Assessment for Flood Management Works

- Any flood management activity included in the OPW Flood Risk Management Plans (FRMPs) that will negatively impact the WFD status of a water body is only to be permitted under the WFD if the strict conditions, set out in Article 4, are met. Therefore, the Plan should propose the requirement for specific ex-ante WFD-specific assessments to evaluate the compatibility of the flood management schemes with WFD requirements for affected waterbodies, in line with the 2015 ECJ ruling on Case C-461/13.
- Any exemptions and justifications being applied to affected waterbodies must be set out clearly in the final Plan.

Guidelines on Planning and WFD

- High Level Guidance for planning authorities is one of the measures proposed in the draft Plan. This is insufficient to address the problem and should be brought in as a part of the new system of authorisation for physical modifications with a legislative basis and a set of standardised procedures to assess and manage impacts of physical modifications. The guidelines must also address compliance of 'river maintenance'/dredging with the objectives relating to obligations of restoring and maintaining good physical condition of rivers, as discussed above. The guidelines also should include detailed technical guidance on utilising the SEA process to properly integrate water management planning with development and spatial planning. They should also introduce more stringent planning requirements where development may impact 'high status' pristine waterbodies.

Natural Flood Management

- Natural Flood Management can have major benefits to water quality and provide a significant contribution to meeting WFD objectives. Natural water retention measures can also do much to ameliorate localised flooding which is currently addressed by dredging. In recognition of these benefits, a specific national working group for Natural Flood Management should be established to investigate NFM approaches for Ireland and implement several pilot Natural Flood Management approaches, as part of a wider catchment-based approach to flood management. The working group should include the OPW, DAFM, the Forest Service, the EPA, the Department of Communications, Climate Action and Environment, DHPCLG, the NPWS, Local Authorities, and environmental

NGOs. The pilot projects should have strong academic input and involve comprehensive public participation. For more details see Friends of the Earth's report on Natural Flood Management.[184]

Wetland Drainage

- The Plan should propose a review of the confusing dual system for regulating wetland and agricultural drainage, including an assessment of the implementation of the two systems (The EIA (Agriculture) Regulations and 2011 Planning & Development (Amendment) (No. 2) Regulations) and how they can be applied in a more effective and coherent manner in order to protect riparian wetlands and other Groundwater Dependent Terrestrial Ecosystems (GWDTEs) from wetland drainage.

[184] Murray, A. (2017) 'Natural Flood Management: Adopting ecosystem approaches to managing flood risk' report by Friends of the Earth Ireland.

6.2. THE COASTAL & TRANSITIONAL ZONE

The draft Plan indicates that 79 of our coastal and transitional waterbodies are failing WFD standards. That is more than two-thirds (70%) of transitional waters and a quarter (24%) of our coastal waterbodies. The WFD incorporates all elements of the catchment including transitional and coastal (TRAC) waters to within one nautical mile of the coast and requires that the same objectives – and measures to achieve these – be established for these TRAC waterbodies as for inland waters.

Pressures and impacts associated with human activity are recognised as representing a major challenge for coastal management in Ireland,[185] and the level of environmental stress on the coastal zone has increased *"due to coastal development and industrialisation, particularly during the 1990s"*, and "*from the intensification of agriculture and commercial fishing".* These and other pressures have led to *"an increase in the range and magnitude of pressures that have the potential to impact negatively on the quality of Ireland's tidal waters."*[186] The impacts of these may well also be exacerbated by the effects of climate change on the coastal zone.

However despite this, the coastal and transitional zone has been omitted from the draft RBMP and there are no new measures proposed to address the pressures on the 79 transitional and coastal waterbodies (TRAC) falling below GES.[187] This is despite the fact that many of these pressures, especially non-land based pressures, are not addressed elsewhere in the draft Plan either. They are effectively ignored. In order to achieve WFD targets and integrated catchment management through the entirety of the catchment, this situation must not persist in the final Plan.

In addition, there is no mention of the challenge of the currently fragmented system of governance in the coastal zone, nor the need to integrate the implementation of the Marine Strategy Framework Directive (MSFD) with the WFD. The final Plan must address this with actions to achieve integrated management of the coastal and transitional zone, in the context of WFD and MSFD implementation.

A dedicated chapter covering this issue should be added to the final Plan. There are numerous coastal-specific issues which should be highlighted as significant in this chapter, along with an outline of actions to address these.

6.2.1. Pressures & Impacts on Transitional & Coastal Waters

The pressures on Ireland's coastal zone were comprehensively covered in the report prepared for SWAN by the Coastal and Marine Research Centre (CMRC) 'Integrated Coastal Zone Management in Ireland - Meeting Water Framework Directive and Marine Strategy Framework Directive targets for Ireland's transitional and coastal waters through implementation of Integrated Coastal Zone Management'. The following extract from this comprehensive report summarises the range and nature of impacts on the coastal zone:

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185 O'Mahony C., Kopke K., Twomey S., O'Hagan A.M., Farrell E. and Gault J. (2014). Integrated Coastal Zone Management in Ireland - Meeting Water Framework Directive and Marine Strategy Framework Directive targets for Ireland's transitional and coastal waters through implementation of Integrated Coastal Zone Management. Report prepared under contract for Sustainable Water Network (SWAN).

186 EPA (2016) Ireland's Environment – An Assessment 2016 Environmental Protection Agency, Wexford

187 The fact that 52% of coastal waterbodies have been designated for 'review' (compared with 24% of rivers) indicates the high level of uncertainty regarding the characterisations

"The range of human activity within coastal areas will operate at different scales and can have multiple and cumulative effects on coastal natural environments, these typically relate to inappropriate coastal development, impacts and pressures arising from multiple resource-dependent uses, interference with natural processes, as well as point source and diffuse-based pollution,[188] [189] *all of which contribute to the degradation of coastal habitats. Furthermore, sectors of activity may cause specific pressures which can be:*

- ***Physical*** *in nature e.g. direct destruction or reduction in integrity of coastal habitat*[190] [191]
- ***Chemical****, such as introduction of contaminants and nutrients*[192]*;*
- ***Biological****, by removing organisms living in this environment or introducing pathogens or non-native species into the environment; or, a combination of these three categories."*[193] [194] [SWAN's emphasis]

The sectors identified by Crowe *et al.*[195] cited in O'Mahony *et al*.[196] as exerting potential or actual pressure on coastal and marine habitats are: fisheries; aquaculture; waste management (specifically sewage discharge); agriculture (specifically discharge); industry (specifically discharge); construction and development; shipping; recreation and tourism; and energy.[197]

This is supported by the more recent 2016 EPA State of the Environment Report,[198] which emphasises the fact that in relation to the Irish coastal zone, the level of environmental stress has increased *"due to coastal development and industrialisation, particularly during the 1990s"*, and "*from the intensification of agriculture and commercial fishing".* In addition to those identified by Crowe et al.,[199] the EPA report specifically highlights the impacts of marine litter and the effects of climate change. This range of pressures leads to *"an*

188 Connolly, N., Buchanan, C., O'Connell, M., O'Mahony, C., Kay, D. and Buckley, S. (2001). Assessment of Human Activity in the Coastal Zone. Maritime Ireland/Wales INTERREG Report No. 9. Marine Institute, Dublin.

189 Crowe, T.P., Fitch, J.E., Frid, C.L.J. and Somerfield, P.J. (2012). Strategic review of sectoral impacts on coastal marine ecosystems in Ireland. Report prepared as part of the EPA funded SIMBIOSYS project examining sectoral influences on biodiversity and ecosystem services.

190 Conde, S., Jones-Walters, L., Torre-Marin, A. and Romao, C. (2010). EU 2010 Biodiveristy. Baseline. European Environment Agency, Copenhagen, pp. 126.

191 Rees, S.E., Sheehan, E.V., Jackson, E.L., Gall, S.C., Cousens, S.L., Solandt, J., Boyer, M. and Attrill, M.J. (2013). A legal and ecological perspective of 'site integrity' to inform policy development and management of Special Areas of Conservation in Europe. Marine Pollution Bulletin, 72(1): 14-21.

192 Ulén, B., Bechmann, M., Fölster, J., Jarvie, H.P. and Tunney, H. (2007). Agriculture as a phosphorus source for eutrophication in the north-west European countries, Norway, Sweden, United Kingdom and Ireland: a review. Soil Use and Management, 23(1): 5–15.

193 Connolly, N., Buchanan, C., O'Connell, M., O'Mahony, C., Kay, D. and Buckley, S. (2001). Assessment of Human Activity in the Coastal Zone. Maritime Ireland/Wales INTERREG Report No. 9. Marine Institute, Dublin.

194 Crowe, T.P., Fitch, J.E., Frid, C.L.J. and Somerfield, P.J. (2012). Strategic review of sectoral impacts on coastal marine ecosystems in Ireland. Report prepared as part of the EPA funded SIMBIOSYS project examining sectoral influences on biodiversity and ecosystem services.

195 ibid

196 O'Mahony C., Kopke K., Twomey S., O'Hagan A.M., Farrell E. and Gault J. (2014). Integrated Coastal Zone Management in Ireland - Meeting Water Framework Directive and Marine Strategy Framework Directive targets for Ireland's transitional and coastal waters through implementation of Integrated Coastal Zone Management. Report prepared under contract for Sustainable Water Network (SWAN).

197 Table 5.1 in O'Mahony et al., adapted from Crowe et al. clearly sets out the wide range pressures exerted on coastal habitats by individual sector.

198 EPA (2016) Ireland's Environment – An Assessment 2016. Environmental Protection Agency, Wexford

199 Crowe, T.P., Fitch, J.E., Frid, C.L.J. and Somerfield, P.J. (2012). Strategic review of sectoral impacts on coastal marine ecosystems in Ireland. Report prepared as part of the EPA funded SIMBIOSYS project examining sectoral influences on biodiversity and ecosystem services.

increase in the range and magnitude of pressures that have the potential to impact negatively on the quality of Ireland's tidal waters." [200]

In relation specifically to the requirements of the WFD, Mahony et al. looked at the potential impact of sectoral pressures on the WFD quality elements for TRAC waterbodies and these are presented in Table 3.

Table 3: *WFD water quality elements for coastal and transitional waters in relation to the sectors that potentially impact on the specific element.*

Transitional and Coastal Waters	WFD Water Quality Element	Sectors Exerting Pressure with Potential Impact on Element
Biological:	Phytoplankton	Aquaculture; Waste Management, Agriculture; Industry; Shipping; Recreation and Tourism
	Aquatic Flora	Waste Management; Agriculture; Industry; Shipping; Recreation and Tourism; Energy
	Benthic Invertebrate Fauna and Fish	Fisheries; Aquaculture, Waste Management; Agriculture; Industry; Construction and Development; Shipping; Recreation and Tourism; Energy
Hydrological:	Morphology	Aquaculture, Waste Management; Industry; Construction and Development; Shipping; Recreation and Tourism; Energy
	Tidal Regime	Construction and Development
Physico – Chemical:	General (oxygen, Temperature, nutrient, Turbidity)	Aquaculture; Waste Management, Agriculture; Industry; Shipping; Recreation and Tourism
	Synthetic Pollutant	Fisheries; Aquaculture, Waste management; Agriculture; Industry; Construction and Development; Shipping; Recreation and Tourism; Energy
	Non-synthetic Pollutants	Fisheries; Aquaculture, Waste Management; Industry; Construction and Development; Shipping; Energy

Physical Pressures: The most direct and permanent impacts to the coastal environment and habitats are caused by physical pressures from sectors such as the construction industry, especially in relation to coastal development and defences, fisheries and aquaculture.[201] Impacts also include harbour developments, land

[200] ibid

[201] O'Mahony C., Kopke K., Twomey S., O'Hagan A.M., Farrell E. and Gault J. (2014). Integrated Coastal Zone Management in Ireland - Meeting Water Framework Directive and Marine Strategy Framework Directive targets for Ireland's transitional and coastal waters through implementation of Integrated Coastal Zone Management. Report prepared under contract for Sustainable Water Network (SWAN).

reclamation projects, and green energy structures which cause physical changes on the shore and in the coastal zone through associated works, including dredging, sediment mining, wetland infill, erosion/flood control measures, bottom trawling, installation of aquaculture structures and other activities. Physical installations associated with aquaculture, the construction and development industry, as well as shipping and the energy sectors can cause disturbance of habitats by, for example, changing water flow and tidal emergence regimes as well as shading.[202] [203] In addition, there may be knock-on effects on connected habitats, as for example any deepening of estuarine channels to facilitate installations could allow saltwater to penetrate further upstream, affecting the ecological balance of connected ecosystems.[204] Another example: a study of benthic habitat before and after pipeline construction in Clonakilty Bay, West Cork showed major impact on the sediment composition and benthic invertebrates, and led to the conclusion that construction work resulted in the death of most individual invertebrates, and one of the previously three dominant taxa of invertebrates failed to recolonise the area within the timeframe of the study.[205]

In addition, actions by farmers to displace flooding from their lands and also removal of vegetation, land drainage and other land alterations such as infilling of natural coastal reed beds and salt marshes, often to gain eligibility for CAP payments, results in loss of biodiversity, loss of these areas' function as carbon sinks and buffers to water pollution and wave erosion also occurs. There is evidence of farmers increasing the height of coastal embankments in response to water level rises (resulting from climate change), an activity which may render flood risk maps out of date. Along with additional investment in 'hard' coastal protection, modified embankments will also lead to physical changes affecting coastal geomorphology, sediment transport regimes and how water reaches coastal wetlands. There has been no assessment of this, or its subsequent impacts and this must be addressed in the draft Plan.

6.2.1.1. Biological Pressures

Biological pressure includes the removal of species (primarily through unsustainable fishing practises) and through the introduction of non-native species with the potential to become invasive is a threat to all coastal habitats, which is mainly linked to shipping, recreational boating and aquaculture.[206] The recent discovery of a non-native freshwater jellyfish found in small numbers at three locations in Lough Derg[207] underscores how easily non–native species travel and can establish themselves within Irish aquatic environments. Concerning the aquaculture sector, the introduction of non-native species is a major concern relating to imported bivalves.[208] There are numerous examples of non-native as well as invasive species in Irish coastal and marine habitats, such as the brown macro-alga *Sargassum muticum*, a native to Japan and one of the most successful

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202 Connolly, N., Buchanan, C., O'Connell, M., O'Mahony, C., Kay, D. and Buckley, S. (2001). Assessment of Human Activity in the Coastal Zone. Maritime Ireland/Wales INTERREG Report No. 9. Marine Institute, Dublin.

203 Crowe, T.P., Fitch, J.E., Frid, C.L.J. and Somerfield, P.J. (2012). Strategic review of sectoral impacts on coastal marine ecosystems in Ireland. Report prepared as part of the EPA funded SIMBIOSYS project examining sectoral influences on biodiversity and ecosystem services.

204 Connolly, N., Buchanan, C., O'Connell, M., O'Mahony, C., Kay, D. and Buckley, S. (2001). Assessment of Human Activity in the Coastal Zone. Maritime Ireland/Wales INTERREG Report No. 9. Marine Institute, Dublin.

205 Lewis, L.J., Davenport, J. and Kelly, T.C. (2002). A Study of the Impact of a Pipeline Construction on Estuarine Benthic Invertebrate Communities. Estuarine, Coastal and Shelf Science, 55: 213–221.

206 Crowe, T.P., Fitch, J.E., Frid, C.L.J. and Somerfield, P.J. (2012). Strategic review of sectoral impacts on coastal marine ecosystems in Ireland. Report prepared as part of the EPA funded SIMBIOSYS project examining sectoral influences on biodiversity and ecosystem services.

207 Inland Fisheries Ireland. (2013). *Freshwater Jellyfish in Lough Derg – Surely Not!* [Online] Available: http://www.fisheriesireland.ie/Press-releases/freshwater-jellyfish-in-lough-derg-surely-not.html

208 Connolly, N., Buchanan, C., O'Connell, M., O'Mahony, C., Kay, D. and Buckley, S. (2001). Assessment of Human Activity in the Coastal Zone. Maritime Ireland/Wales INTERREG Report No. 9. Marine Institute, Dublin.

introduced seaweed species in Europe. *Sargassum muticum* is thought to have been imported along with the Japanese Oyster and was first found in Ireland in 2001; however, only five years later the species has been recorded in a number of Irish coastal counties[209]

Unsustainable inshore fishing practises persist in Irish inshore waters. SWAN members have evidence of larger fishing vessels fishing within the 1 mile limit, significantly impacting on nursery areas. SWAN, along with many small inshore fishermen, would like this activity restricted. This area is the most productive nursery and spawning area for biodiversity and fisheries is most at risk. It is targeted by both the entire inshore fleet (c. 2000 vessels) pushed to margins and more damagingly by offshore fleet boats over 15m (c 200) in operations such as pair trawling and dredging for seed mussel, scallops and non-quota species. There is a strong argument that these areas should constitute a continuous mile MPA/SAC around the coast, allowing only artisanal and sustainable fisheries operations. Heavy trawling, passive and tangle nets should be excluded from this area as they are most damaging in terms of bycatch and stock recovery.

6.2.1.2. Chemical Pressures: Water Pollution

The main sources of water pollution from the shore and at sea (as opposed to land-based pressures addressed elsewhere) are from harbours, ships and large vessels, aquaculture, recreational craft, dredging and spoil disposal and oil and gas platforms. The pollution is mainly in the form of oils, sewage, port-associated industrial discharges, pesticides, silts and contaminants such as polychlorinated biphenyls (PCBs). Fine silt, faeces, nutrients and fish treatment residues also tend to accumulate under and around aquaculture cages. (See Section 5.7)

Influx of inorganic nutrients and organic matter related to agricultural and industrial discharges and sewage as well as the aquaculture sector lead to eutrophication and deoxygenation of coastal habitats and are especially problematic for habitat types such as muddy sands, seagrass communities and sheltered rocky reefs.[210] According to the EPA 2016 State of the Environment report, untreated sewage is currently discharged at 36 estuarine or coastal locations and O'Mahony *et al*. are of the view that "*As with rivers and lakes, the reduction of nutrient inputs is the key to improving the status of Ireland's transitional and coastal waters".*

In Ireland, run-off and biocides from agriculture are known to impact negatively on biodiversity. However, recent studies (e.g. Sectoral Impacts on Biodiversity and Ecosystem Services (SYMBIOSIS) project, 2008 - 2013) indicate that agriculture as an extensive industry practiced near or at the coast has more capacity potential to affect coastal and marine biodiversity in comparison to other human activities.[211] Although there have been improvements with fewer waterbodies being classed as eutrophic when compared to previous EPA assessments, some water bodies showed a decline directly caused by the negative effects of excessive nutrient enrichment, e.g., such as Rogerstown Estuary and the upper Liffey Estuary.[212] In addition, other agricultural practices such as grazing on dune systems and wetlands can lead to erosion and loss of biodiversity.[213]

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209 Baer J and Stengel DB (2010). Variability in growth, development and reproduction of the non-native seaweed *Sargassum muticum* (Phaeophyceae) on the Irish west coast. *Estuarine Coastal and Shelf Science* 90(4): 185-194.

210 Crowe, T.P., Fitch, J.E., Frid, C.L.J. and Somerfield, P.J. (2012). Strategic review of sectoral impacts on coastal marine ecosystems in Ireland. Report prepared as part of the EPA funded SIMBIOSYS project examining sectoral influences on biodiversity and ecosystem services.

211 ibid

212 Shane O'Boyle, Robert Wilkes, Georgina McDermott and Sorcha Ní Longphuirt *Quality of estuarine and coastal waters*. In: Byrne, C. and Fanning A (Eds.). Water Quality in Ireland 2010 – 2012. Environmental Protection Agency, Ireland

213 Connolly, N., Buchanan, C., O'Connell, M., O'Mahony, C., Kay, D. and Buckley, S. (2001). Assessment of Human Activity in the Coastal Zone. Maritime Ireland/Wales INTERREG Report No. 9. Marine Institute, Dublin.

Macro and micro litter are now recognised as one of the most significant coastal and marine water pollution issues.[214] The main sources of solid macro- and micro- litter and waste are landfill sites, harbours, sewage plants, metal recycling yards, aquaculture, fisheries and diffuse background litter. Landfill sites and sewage treatment are now better controlled, but microplastics from these and other sources have yet to be addressed. According to recent international research, "*Plastic is the primary component of litter and 'forms sometimes up to 95 % of the waste that accumulates on shorelines, the sea surface and the seafloor".*[215] Litter presents a number of problems for wildlife. These include entanglement causing injury, death by starvation, drowning or suffocation. Discarded fishing nets effectively continue "ghost" fishing, just as plastic binders around 6-packs of cans may have the same effect, as can anglers fishing line and similar items.[216] The number of species known to have been affected by either entanglement or ingestion of plastic debris has doubled since 1997, from 267 to 557 species among all groups of wildlife.[217] Increasing levels of microscopic plastic fibres in sand and the water column may leach out toxins which in turn enter the food chain and bioaccumulate in higher organisms, including fish destined for human consumption.

6.2.1.3. Cumulative Impacts of Sectoral Pressures

The identified pressures and associated impacts on Ireland's TRAC waters have the potential to generate cumulative effects. For example, inorganic nutrients and organic matter that lead to eutrophication associated with agricultural and industrial discharges, sewage and aquaculture could potentially be caused by all those sectors simultaneously if they operate in the area at the same time.[218] In addition, a pressure may affect a habitat only once or repeatedly, e.g. siltation events associated with construction of new infrastructure may occur only once, but siltation is recurrent when an area is exposed to regular dredging of a shipping channel.[219] Furthermore, cumulative effects may also occur due to infrastructural development associated with a specific tourism and recreation activity where habitats and species may be subjected to a certain pressure during development, which is compounded by further pressures, when the associated facilities become operational. In some areas, cumulative pressure may be similar and seasonal, e.g. from vehicles, pedestrians and caravan-use associated with recreational users of the coasts during the summer months, leading to increased instability of coastal habitats such as dune systems.[220]

Quantifying cumulative effects and subsequent impacts is very difficult[221] and is acknowledged as being a Europe-wide issue in relation to environmental management and assessment. For instance, a number of minor

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214 Galgani F., Hanke G and Maes, T. (2015) Global distribution, composition and abundance of marine litter. In Bergmann M., ·Gutow L. and Klages M. (eds) (2015) Marine Anthropogenic Litter. Springer International Publishing AG Switzerland. (Open Access)

215 ibid

216 Kühn. S., Bravo-Rebolledo E.L and van Franeker J.A. (2015) Deleterious effects of litter on marine life. In Bergmann M., ·Gutow L. and Klages M. (eds) (2015) Marine Anthropogenic Litter, Springer International Publishing AG Switzerland. (Open Access)

217 ibid

218 Crowe, T.P., Fitch, J.E., Frid, C.L.J. and Somerfield, P.J. (2012). Strategic review of sectoral impacts on coastal marine ecosystems in Ireland. Report prepared as part of the EPA funded SIMBIOSYS project examining sectoral influences on biodiversity and ecosystem services.

219 ibid

220 Connolly, N., Buchanan, C., O'Connell, M., O'Mahony, C., Kay, D. and Buckley, S. (2001). Assessment of Human Activity in the Coastal Zone. Maritime Ireland/Wales INTERREG Report No. 9. Marine Institute, Dublin.

221 Stelzenmüller, V., Lee, J., South, A. and Rogers, S.I. (2010). Quantifying cumulative impacts of human pressures on the marine environment: a geospatial modelling framework. *Marine Ecology Progress Series*, 398: 19-32.

disturbances may have a greater impact compared to one major disturbance event.[222] In general, multiple activities are coinciding in most coastal areas exerting multiple pressures linked to a variety of sectors; the exerted pressures interact and may have greater or lesser impacts as their interaction may have a synergistic (additive) or antagonistic (interactive) effect.[223] While scientific research is underway presenting methods on how to assess cumulative effects and impacts, information for specific coastal areas in terms of interactions between pressures exerted and cumulative effects is mostly absent.[224] [225] Without reliable data and evidence, coastal managers and decision makers should follow a precautionary approach and consider potential additive or synergistic interactions and subsequent impacts;[226] they should simultaneously give consideration to a process such as ICZM, which can bring together data and information from different sources through stakeholder cooperation, while also developing an agenda for research to address data gaps and improve understanding of coastal environments.

Table 3. illustrates that the range of identified pressures, and associated sectors can be linked in turn to a variety and combination of the descriptors and elements that define the status of associated waters. This shows that the WFD would benefit from an assessment of cumulative effects given that the majority of elements and descriptors are potentially impacted by several sectors of activity.[227] In relation to the management of a specific coastal area and the previously mentioned absence of required data and information on cumulative impacts, the need for a precautionary approach is essential, which is specifically recognised in the preamble of WFD.

6.2.1.4. Projected Pressures on Ireland's Coast

In 2012 the Irish Government published a roadmap titled 'Harnessing Our Ocean Wealth - An Integrated Marine Plan (IMP) for Ireland', describing high level goals and the government's vision to supports a diverse maritime economy.[228] The policy document emphasises the scope to expand the Irish ocean economy by setting significant targets to double the ocean economy via a boost in related sectoral activity such as fisheries; aquaculture; seafood processing; maritime commerce and ship leasing; marine and coastal tourism and leisure; marine ICT and biotechnology; ports and maritime transport services; manufacturing; engineering; offshore oil and gas, and other marine industries.[229] These are many of the sectors of activity identified in the previous sub-sections of this submission which currently exert pressures on the coastal and marine habitats of Ireland and which have potential to negatively impact on WFD quality elements (see Table 3).

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[222] Crowe, T.P., Fitch, J.E., Frid, C.L.J. and Somerfield, P.J. (2012). Strategic review of sectoral impacts on coastal marine ecosystems in Ireland. Report prepared as part of the EPA funded SIMBIOSYS project examining sectoral influences on biodiversity and ecosystem services.

[223] ibid

[224] Stelzenmüller, V., Lee, J., South, A. and Rogers, S.I. (2010). Quantifying cumulative impacts of human pressures on the marine environment: a geospatial modelling framework. *Marine Ecology Progress Series*, 398: 19-32.

[225] Crowe, T.P., Fitch, J.E., Frid, C.L.J. and Somerfield, P.J. (2012). Strategic review of sectoral impacts on coastal marine ecosystems in Ireland. Report prepared as part of the EPA funded SIMBIOSYS project examining sectoral influences on biodiversity and ecosystem services.

[226] ibid

[227] There is also an explicit requirement for this in the MSFD, which also covers the coastal waters which fall under the WFD

[228] Inter-Departmental Marine Coordination Group (2012) Harnessing Our Ocean Wealth: An Integrated Marine Plan for Ireland. Inter-Departmental Marine Coordination Group

[229] ibid

The individual as well as overall economic targets, such as the significant 78% increase in volume of aquaculture production by 2020[230] are anticipated by the Department to move Ireland to a position where it will use more of its extensive marine resources. These projections have to be scrutinised within the context of the pressures which sectors are already exerting on the Irish coastal and marine environment (see Table 3) and which will subsequently wield, under the projected growth scenarios. These targets viewed in the context of WFD and MSFD requirements emphasise the necessity for an integrated approach to managing transitional and coastal waters.

6.2.2. Lack of Integrated Governance & Management of the Transitional & Coastal Zone

Part of the challenge of achieving WFD standards in the Coastal Zone is the large body of legislation which relates to its use and protection. At present, Ireland does not have an overarching marine and coastal policy, and numerous statutory bodies continue to have a management and/or planning remit in the Irish coastal environment.[231] Responsibility for marine activities is currently spread across six Government Departments and in excess of 17 organisations, with little formalised integration taking place at the institutional level in terms of either marine or coastal management.

The MSFD and the WFD are both based on integrative management elements and on a high level seem complementary; however the operational integration of the objectives of both Directives will be a challenge for Ireland.[232] Recent scientific publications are providing valuable information on how status assessment and monitoring could be integrated and reconciled.[233] However, to make best use of this research in the context of WFD and MSFD implementation, and to effectively apply new forms of management to coastal settings, certain essential criteria are required. These include political support for more integrated approaches to the management of coasts (which many argue is lacking in a European context[234]) and institutional capacity (in Ireland it can be argued that the absence of a national policy undermines institutional capacity building).

The combination of this absence of an integrated approach, with the lack of adequate and accessible baseline information of coastal quality, lends itself to uninformed and fragmented decision-making. Even for state authorities, it can be almost impossible to obtain a quick and accessible overview of which agencies are managing certain activities or combinations of activities in different areas of the coastal zone and under whose jurisdiction they fall. While some regulations are effective and well-publicised and implemented, like sea bass fishing controls, too often laws are ineffective due to lack of enforcement, in addition to a lack of integrated management, with no one overarching body with ultimate responsibility for the coastal zone.

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230 ibid

231 O'Mahony, C. (2009). Applying Indicators to Aspects of Coastal Management in Ireland. In: Hynes, S. (Ed.) 1st Annual Beaufort Marine Socio-Economic Workshop, 3rd November 2009, Marine Institute, Oranmore, Galway. 29pp.

232 O'Hagan, A.M. (2013). Comprehensive review of law, policy and institutional frameworks that cover the current approaches to interactions between aquaculture, fisheries and other sectors and identifying barriers and opportunities for more efficient management. Report prepared as part of the EU 7th Framework project - Interaction in coastal waters: A roadmap to sustainable integration of aquaculture and fisheries (COEXIST), Project number: 245178, 94pp.

233 e.g. Borja, A., Elliott, M., Carstensen, J., Heiskanen, A.S. and van de Bund, W. (2010). Marine management – Towards an integrated implementation of the European Marine Strategy Framework and the Water Framework Directives. *Marine Pollution Bulletin*, 60(12): 2175-2186

234 e.g. Moksness, E., Dahl, E. and Støttrup, J. (2012). *Global Challenges in Integrated Coastal Zone Management*. Wiley & Sons, Ltd., Oxford, UK.

There is also a lack of easily accessible information and a low level of public awareness on many coastal issues. Although our coastal waters are largely in public ownership, public information and participation is much weaker than on land. Many local authority field staff and citizens alike, for example, are not familiar with the implications of TRAC Special Areas of Conservation or Special Protection Areas, nor even where they are located. In contrast with the Bathing and Shellfish waters, which often have information signage by the shore, coastal Nature designation is rarely sign-posted or explained.

In that context, the 2012 Department of Agriculture, Fisheries, and Marine (DAFM) document '*Our Ocean Wealth-Towards an Integrated Marine Plan for Ireland*,' compounds these problems as it envisages a range of further economic developments without putting forward any mechanisms or strategies to improve implementation of current environmental legislation and compliance.

The implementation of both the WFD the Marine Strategy Framework Directive (MSFD) offer an ideal opportunity to foster coordinated planning and adaptive management for coastal and inshore marine waters. However, the omission of coastal issues from the draft Plan suggests that there are no plans to take this approach, and SWAN strongly proposes that this is redressed in the final Plan.

Unless suitable methodologies are developed and implemented within management & planning practices, the projected increases in the use of Ireland's coastal and marine domain are likely to exacerbate the environmental impacts, especially when considered in a cumulative context. An integrated approach to coastal management and planning, including harmonisation of agencies and resources, would ensure best use of available data and knowledge, and has the potential to overcome existing data gaps and improve our understanding of coastal systems, which would include the management of existing and projected pressures in a way that facilitates achieving the objectives set out under the WFD and MSFD.

This could be somewhat addressed by the upcoming reform of the Foreshore Act. While access to foreshore license information has improved greatly (once a license is granted), several foreshore act amendments are overdue for applications and decision-making and if well-developed, could have potential to streamline the current system.

6.2.3. Seaweed: A Particular Issue of SWAN Concern

The EPA 2016 State of the Environment report highlights *"the importance of the intertidal seaweed communities for biodiversity and coastal protection and as nursery grounds for a wide variety of marine life"* and states that *"proposals for large-scale seaweed harvesting will require careful scrutiny and regulation to prevent damage to intertidal biodiversity, to maintain sustainability and to protect the marine environment".* The draft Plan does not address this issue, which SWAN believes is an omission due to its value as a WFD descriptor and its central role in the ecology status of coastal waterbodies.

6.2.4. SWAN KEY RECOMMENDATIONS FOR THE COASTAL & TRANSITIONAL ZONE

- A dedicated chapter covering the coastal and transitional zone should be added to the final Plan. This must identify the pressures specific to the coastal waterbodies, including the following, which are omitted from the draft Plan, and propose actions to address them:
    - Aquaculture (See Section 5.7)
    - Unsustainable inshore fishery practises;
    - Green energy structures
    - Shipping

- Marine litter

- In support of this, the final Plan should also, as a minimum, propose an immediate review to assess the efficacy of current controls in the coastal zone in ensuring such pressures are not compromising WFD targets for TRAC waterbodies.
- This new chapter in the final Plan should also acknowledge the current fragmented nature of coastal governance and management and put forward the following measures to address this and to integrate WFD and MSFD implementation through an Integrated Coastal Zone Management approach:
    - The development of a national coastal policy and strategy to progress integrated management of coastal resources which as a minimum should meet the requirements set out in the EC Recommendation on ICZM;[235] and
    - The designation of a statutory body with responsibility for coordinating the implementation of ICZM in Ireland.
- More detailed monitoring and characterisation of transitional and coastal waterbodies must be included in the final Plan, to the same level of detail as the current characterisation on rivers and lakes in order to improve confidence in current characterisation. This should be done in consultation with the academic and NGO community with expertise in this area.
- The Plan should identify the need for methodologies for assessing cumulative impacts of coastal developments and propose additional resources within the EPA to deliver appropriate long-term data and ecological monitoring to fully assess sectoral and cumulative impacts on transitional and coastal waterbodies.
- Given that Ireland has not commenced discussion regarding MPA designation and does not have the necessary legislation in place to designate MPAs under the MSFD, SWAN proposes:
    - That the inshore waters within the 1 mile limit should be designated as an interim measure, as a continuous MPA/SAC around the coast, in the forthcoming marine bill, allowing only artisanal and sustainable fisheries operations. Unsustainable inshore fishing practises should be prohibited within, due to the significant impact on nursery areas. This includes pair trawling, dredging for seed mussel, scallops and non-quota species. It should also prohibit dredging outside shipping lanes.
    - This would then break down into Natura 2000 sites, OSPAR sites, Ramsar sites and MPAs under the MSFD.
- In order to improve Foreshore Licensing in the context of WFD implementation, the Plan should propose WFD-specific, ex-ante assessments of potential impacts of a development or activity before the granting of a foreshore consent In the interests of transparency and public participation, it should also recommend:
    - Publication of a given license application within days of being lodged with the department – just like planning permission for a house.
    - Publication on the government website, with an alert in the national media (rather than a late alert in local media and information in a local garda station, but no website information).

[235] European Commission (2002) Recommendation of the European Parliament and of the Council of 30 May 2002 concerning the implementation of Integrated Coastal Zone Management in Europe (2002/413/EC)

- An affordable appeal mechanism as access to justice if one wants to appeal a government license or condition (rather than the present high court judicial review as the only option).

- In relation to seaweed harvesting, the Plan should identify this as an issue and propose:

  - That all seaweed reference sites monitored by the EPA should be protected as MPAs and seaweed harvesting prohibited to ensure the integrity of monitoring results.

  - The identification of seaweed MPAs where the qualifying interests include a high seaweed diversity.

  - A national seaweed protection, harvest and aquaculture policy should be drafted to ensure that our high value seaweed resources are used wisely and that GES is not jeopardised by clear felling of essential buildings blocks of transitional and coastal water ecosystems.

6.3. HIGH STATUS SITES

SWAN welcomes the focus on high status sites in the draft Plan, and the statement that *"The protection of high status waters is one of the main priorities of this River Basin Management Plan".* This is vitally important in light of their dramatic loss since the 1987[236] and SWAN fully supports such prioritisation. The EPA report on High Status sites[237] emphasises the importance of this issue by stating that "the degradation of high status sites merits *"high priority"* and points out that *"To date, the key focus in the implementation of the WFD has largely been on the objective that all water bodies meet at least good status by 2015. The WFD environmental objective that specifies no deterioration has received far less attention".*[238] This may be one of the greatest challenges of the next cycle.

The majority of Ireland's habitats listed under the Habitats Directive, including water and wetland habitats, are reported to be of poor or bad conservation status.[239] Only 7% of listed habitats are considered to be in a favourable state. In Ireland 61% of species listed under the Habitats Directive are in an unfavourable state. Species particularly of wetland and freshwater environments are reported to be of poor or bad conservation status, including a number of species of fish (e.g. Atlantic salmon), molluscs (e.g. freshwater pearl mussel) and the natterjack toad.

While it is true that "*The Department of Agriculture, Food and the Marine is giving priority access to the GLAS agri-environmental scheme to farmers in areas with high status waters"* there do not appear to be any nutrient input restrictions beyond current regulations (GAPP regs), and low emission slurry spreading is optional. Also while the scheme does have water protection measures, e.g. 'Protection of Watercourses from Bovines', it was designed with minimal input from catchment or aquatic scientists/ecologists and its exact water quality and water status targets are unclear in relation to controlling nutrient and other pollution in high status catchments. It is therefore difficult to assess how successful this scheme will be in preventing the deterioration of further high status sites.

As highlighted in the Plan, small-scale pressures, which can be extensive in nature, have a greater impact in high status catchments and it is important to conduct investigative monitoring of existing high status sites, with the aim of identifying impacts or sources of potential impacts that could lead to the loss of the high status classification for that site in order to come up with mitigation measures.[240] It is also crucial that an integrated sub-catchment management approach is taken.

The draft report references the excellent EPA commissioned Ni Chaithain report and states that actions that it is proposing for High Status sites are *'in response to'* the report, including the 'Blue Dot' programme. SWAN is strongly in favour of this approach. However, we are unclear as to whether all of the recommendations from the Ni Chathain report are being proposed, or if not which ones. It is absolutely vital

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236 Bradley C., Byrne C., Craig M., Free G., Gallagher T. , Kennedy B., Little R., Lucey J., Mannix A., McCreesh P., McDermott G., McGarrigle, M. Ní Longphuirt S., O'Boyle S., Plant C., Tierney D., Trodd W., Webster P., Wilkes R. and Wynne C. (2012) *Water Quality in Ireland 2010-2012*. Environmental Protection Agency.

237 Ní Chatháin B., Moorkens E. and Irvine K. (2012) Management strategies for the protection of high status water bodies. Environmental Protection Agency

238 Ní Chatháin B., Moorkens E. and Irvine K. (2012) Management strategies for the protection of high status water bodies. Environmental Protection Agency

239 EPA (2012) State of the Irish Environment 2012. Environmental Protection Agency

240 Ní Chatháin B., Moorkens E. and Irvine K. (2012) Management strategies for the protection of high status water bodies. Environmental Protection Agency

that there is a very high level of sophisticated expert-led public participation in the development of management strategies of these sites or it will be met with strong resistance.

6.3.1. SWAN RECOMMENDATIONS ON HIGH STATUS SITES

SWAN highly commends the EPA commissioned report[241] referred to in the Plan and recommends the inclusion in full of its recommendations in the draft Plan. In addition to this 'overall recommendation' we make the following recommendations:

- Because these waterbodies are very sensitive they can be responding to a very particular combination of local measures. Therefore the Plan must propose the development of targeted sub-catchment management plans for all current High Status sites and those identified for restoration. These will need :
    - To be adequately resourced with additional funding;
    - The support of the ecologically trained agri-environmental advisors recommended in Section 5.1.;
    - A high level of sophisticated expert-led public participation in the development of management strategies of these sites; and
    - Development of a policy for unregulated activities within high status catchments.
- Designate high status catchments as protected areas, i.e. establish a spatial network of high status sites. This would need to be done with a very high level of stakeholder engagement.
- It is also vital to integrate protection of high status sites into planning controls as recommended by Ní Chathain:
    - Each application for planning/licensing should be screened to see if it is located within the catchment of a high status surface water body or high status river site.
    - Consideration of the application of an AA style screening approach could be adopted for high status catchments to improve the assessment of cumulative impacts within these catchments, and to trigger the requirements for EcIA or EIA.
    - Each local and public authority should review existing environmental assessment guidelines which they have in place to account for the protection of high status waters, and to 'WFD-proof' such guidelines.

[241] Ní Chatháin B., Moorkens E. and Irvine K. (2012) Management strategies for the protection of high status water bodies. Environmental Protection Agency

6.4 ECONOMIC ANALYSIS

The Directive requires that the Plan contains *"a summary of the economic analysis of water use as required by Article 5 and Annex III"*. The absence of this analysis renders the Plans clearly non-compliant and also means that the necessary information is not available to fulfil the additional requirements for economic analysis in the Directive. The section on economics emphasises the 'vital contributions to economic activity" of various sectors. However, under the WFD this is only relevant in the context also of the environmental costs posed by those sectors. This is especially pertinent given that there is little mention of the 'economic analysis of water use' required under Article 5 of the WFD which is now nearly 12 years overdue. The timeline for delivery of this analysis should be set out. Under Annex II, this analysis *"shall contain enough information in sufficient detail ... in order to ... make judgements about the most cost-effective combination of measures in respect of water uses to be included in the programme of measures ..."*

Only after this is done, with the inclusion of environmental and resource benefits and costs, and the characterisation and risk assessment has been carried out, can the discussion regarding the application of exemptions or *'prioritisation'* take place. Furthermore this must be fully transparent, actively involving the public as part of the environmental objective-setting process, with full public participation during the public engagement on the draft RBM Plans, and it is imperative that it be conducted for each waterbody in full compliance with the provisions of Article 4.

There is no attempt in the draft Plan to provide an estimate of the costs of meeting the objectives of the WFD, or how, or from whom, the authorities intend to recover those costs. Unfortunately, it is mostly limited to costs in relation to the narrowest definition of water services. The WFD requires the integration of economic analysis in its implementation. The key areas and aspects where such application is called for are setting exemptions (through disproportionate cost analysis), calculating cost recovery, and determining the cost-effectiveness of supplementary measures. Setting heavily modified designation also requires an economics analysis. This review will briefly cover each of these components.

Cost Recovery

Article 9 states that Member States must *"take account of the principle of recovery of the costs of water services, including environmental and resource costs ... in accordance ... with the polluter pays principle"*. The main policy focus of Article 9 is on the role of pricing as a tool to enhance the protection of the environment. The Plans reference water pricing policy in section 5.2.4 where they refer to non-domestic and domestic pricing policies for water services, focusing primarily on financial cost recovery. They do not demonstrate the impact of the pricing policies on the ecological status of waterbodies, nor relate the pricing policies to the recovery of environmental and resource costs. While the application of pricing policies to the recovery of environmental and resource costs is a challenging exercise, no attempt has been made in the Plans to demonstrate that the planners are attempting to bridge this gap.

In the absence of any economic assessment in the Plans, it is not possible to work out the costs of the provision of water services (other than the obvious provision of drinking and wastewater services) and thus to develop a system for recovering those costs from water users.

Disproportionate Cost Analysis

Disproportionality, as referred to in Article 4.4 and 4.5, is a political judgement informed by economic information, and an analysis of the costs and benefits of measures is necessary to enable a judgement to be

made on exemptions. The EU CIS Guidance document[242] cited in SWAN's submission on the draft Plans and also by Goodbody's 'Guidance Manual on the Economic Analysis Required by the Water Framework Directive' offers a number of guidelines regarding disproportionality (although it stops short of providing a definition), including that disproportionality should not begin at the point where measured costs simply exceed quantifiable benefits, and the assessment of costs and benefits should include qualitative costs and benefits as well as quantitative. Both the CIS and Goodbody Guidance emphasise the importance of identifying and taking into account the qualitative benefits of high water quality, despite the fact that these may be difficult to quantify, or may not be expressible in money terms. In applying time exemptions, the Plans completely ignore any consideration of environmental or resource benefits or costs.

The plans state that *"economic analysis has not been used to justify deferral of measures or extension of objectives in the district."* Nevertheless, the extension of the deadline for mines (see table 4.5 in the RBM Plans) references disproportionate cost analysis without giving any additional information on the methodology or findings of this analysis.

Cost Effectiveness Analysis

The concept of cost-effectiveness is primarily aimed at selecting the least-cost option for achieving good ecological status. It can also help prioritise measures in the context of exemptions. When lower environmental objectives are proposed, results of the cost- effectiveness of assessments can be used to select priorities for implementation. For example, if a programme of measures is judged to be disproportionately expensive, it will be necessary to review the programme of measures by removing measures that are the least cost-effective or by choosing the next most cost-effective programme of measures.

6.4.1. SWAN RECOMMENDATIONS ON ECONOMICS

- The Plans must include *"a summary of the economic analysis of water use"* that contains "*enough information in sufficient detail"* in order to conduct calculations regarding cost recovery of water services including environmental and resource costs in accordance with the polluter pays principle.
- Key to conducting either a cost-effective analysis of a disproportionate cost assessment is a baseline valuation of the Irish aquatic resource, including non-quantifiable benefits in addition to the externalised costs incurred by the state from land use and industry which impacts the water environment. This work must be proposed in the Plans and should be initiated as soon as possible.
- The Plans must relate any pricing policies to the recovery of environmental and resource costs and demonstrate the impact that they have/will have on the ecological status of waterbodies. SWAN acknowledges that this is a challenging exercise. At a minimum, we propose that a timeline and commitment to a set of actions be set out in the Plans to complete this analysis.

[242] Common Implementation Strategy for the Water Framework Directive (2000/60/EC). *Guidance document no. 1* Economics and the environment - The Implementation Challenge of the Water Framework Directive

6.5. CLIMATE CHANGE

Climate change is the greatest global environmental threat facing humanity. Ireland's climate is changing and the impacts are already being felt. Over the last century our average temperatures have risen and regional rainfall patterns have changed,[243,244] with more significant changes predicted by scientists in the coming years.[245] Extreme weather events are expected to become more frequent and more intense. Climate change and water management are inextricably linked: increased flooding in some areas and longer droughts in others, rising sea levels and a decline in water quality all pose significant challenges for Ireland. Water management planning requires a long-term approach which must consider climate change projections, particularly with regard to infrastructure development. The reform of water management required by the Water Framework Directive (WFD), which focuses on an integrated catchment management approach, presents the ideal opportunity to build resilience to climate change, cut energy consumption and protect our water resources.[246,247]

Key Issues of Concern Regarding Climate Change and Water Management

- *Flooding*: Average annual national rainfall is increasing,[248] with the west, southwest and north of the country experiencing more frequent and intense rainfall.[249] Winter rainfall is projected to increase by 10% by 2050, leading to a rise in river flow.[250] Many densely populated areas of high economic activity are located in floodplains. These will be increasingly exposed to flooding, resulting in higher damages and re-construction costs. Extreme weather events increase the risk of environment and social stress. Wetlands, lake and river systems will be disturbed - either through flooding or drying out[251] - and could result in some loss of their related tourism and amenity benefits. [252]
- *Decline in water quality and quantity*: increased winter rainfall leading to increased run-off will cause soil erosion and washing of pollutants from farming and forestry into rivers and lakes. Flood run-off from urban areas and more frequent overflows of drainage systems will cause pollution if raw sewage overflows from sewage treatment plants. Incursion by seawater into groundwater reserves due to sea level rise will also be a threat.

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243 Sweeney J., Donnelly A., McElwain L.. and Jones M. (2002) *Climate Change: Indicators for Ireland*, EPA, Wexford.

244 McElwain L. and Sweeney J. (2007) *Key meteorological indicators of climate change in Ireland*. EPA, Wexford.

245 Sweeney J., Albanito F, Brereton A., Caffarra A, Charlton R, Donnelly A, Fealy R, Fitzgerald J, Holden N, Jones M & Murphy C. (2008) *Climate Change-Refining the Impacts for Ireland*. EPA, Wexford.

246 WRBD/ESBI (2008) *Draft River Basin Management Plans-Adapting the Plans to Climate Change. WRBD, Galway*

247 EC (2009) *River Basin Management in a Changing Climate*. Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance Document No. 24. Technical Report-2009-040.

248 Walsh S. (2012) *A summary of climate averages for Ireland 1981-2010*. Met Éireann, Dublin.

249 McElwain L. & Sweeney J. (2007) *Key meteorological indicators of climate change in Ireland*. EPA, Wexford.

250 Sweeney J., Albanito F, Brereton A., Caffarra A, Charlton R, Donnelly A, Fealy R, Fitzgerald J, Holden N, Jones M & Murphy C. (2008) *Climate Change-Refining the Impacts for Ireland*. EPA,Wexford.

251 ibid

252 Bullock C., Stack M. & Mathews P. (2008) Implications for tourism and amenity in Ireland. In Kelly B. & Stack M. (eds.) *Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways*. The Heritage Council, Kilkenny.

- *Increasing temperatures*[253] will mean warmer summers, which in turn will increase water demand, leading to higher water extraction pressure during periods of low water levels.[254] This along with a projected decrease in summer rainfall (12-17% by 2050) will lead to water shortages. Lower water levels and higher water temperatures will result in reduced dissolved oxygen in water, with associated algal blooms and increased concentrations of pollutants and bacterial content. The warming of lake and river waters may also endanger species that require cooler water such as salmon and Arctic Char.
- *Conservation status of protected species*: Atlantic salmon is legally protected under the EU Habitats Directive and is classed as vulnerable in Ireland under the ICUN Red List of species. Climate change effects on Atlantic salmon are: reduced marine survival because of food chain effects, reduced survival and growth in summer because of poorer feeding conditions resulting from increased summer temperatures and reduced flows, possible adult migration delays due to reduced flows and increased temperatures and decreased spawning success because of increased sedimentation and scouring.[255]
- *Climate change-driven extreme weather* is also likely to threaten the quality of drinking water supplies, resulting in increased rates of water-borne illnesses (e.g. Cryptosporidium) and pushing up the costs of water treatment.
- *Coastal areas:* The waters around Ireland are rising by 3.5cm per decade and studies have predicted a rise in global sea levels of up to 60cms by the end of the 21st century.[256] The flood impacts of this will be most felt in the major coastal cities of Cork, Dublin, Galway and Limerick along with other low-lying areas. Increasing water temperatures[257] may result in algal blooms in coastal bays and on beaches, and pollution will affect wildlife and a range of economic and leisure activities such as bathing, angling, water-sports and aquaculture.
- *Invasive species:* Climate change is likely to trigger species migration across the globe. As an island, Ireland's ecosystems are particularly vulnerable to an influx of alien species and pathogens, which can rapidly invade aquatic ecosystems, destabilising habitats and threatening human economic activity.

6.5.1. SWAN RECOMMENDATIONS ON CLIMATE CHANGE AND WATER MANAGEMENT

Measures to mitigate climate change, but also to adapt to it, must be fully integrated with water management. The 2009-2015 RBM Plans missed the opportunity to do this, so it is imperative that this cycle of Plans do so. To achieve this, SWAN proposes the following suite of measures (including an Action Plan to meet multiple objectives from flood and drought risk alleviation and adaptation to water quality and biodiversity) to be proposed in the Plan:

253 Walsh S. (2012) *A summary of climate averages for Ireland 1981-2010*. Met Éireann, Dublin.

254 Murphy C. and Charlton R. (2006) The impact of climate change on catchment hydrology and water resources for selected catchments in Ireland. In *Proceedings of the National Hydrology Seminar, Water Resources in Ireland and Climate Change*, Tullamore

255 The Heritage Council, (2009) *Climate change, heritage and tourism: implications for Ireland's coast and inland waterways*, In Kelly B. & Stack M. (eds.) *Climate Change, Heritage and Tourism: Implications for Ireland's Coast and Inland Waterways*. The Heritage Council, Kilkenny.

256 IPCC (2007) Climate change 2007. *Fourth Assessment Report. A Report of the Intergovernmental Panel on Climate Change*

257 Olbert A.I., Dabrowski T., Nash S. & Hartnett M. (2012) Regional modelling of the 21st century climate changes in the Irish Sea. Continental Shelf Research 41: 48-60

1. **Monitoring**

- A strategic national network of continuous aquatic monitoring stations to measure the nature and rate of climate-derived change in water systems must be urgently put in place, focusing on indicators of climate change e.g. lake and river temperatures. This information is necessary to detect changes and as the basis for future planning.
- A '*Strategy to Alleviate the Impacts of Climate Change on Ireland's Water Resources'* should be developed as a matter of urgency. This should contain:
  - A list of measures already in place for the mitigation of climate change-related pressures on water resources and the associated monitoring programme;
  - Targets for climate impact alleviation measures to be achieved by 2021;
  - **Cost/benefit analysis** to select measures for dealing with both intermittent and long-term impacts of climate change on aquatic ecosystems. The analysis should be done with public participation and should include environmental and resource costs to ensure that selected options are in the best interests of society as a whole; and
  - Details of all the **responsible agencies**, their respective roles and mechanisms for coordination and integration of work.

2. **Action Plan to Integrate Climate Change Adaptation and Mitigation with Water Management**

- Using the cost-benefit analysis above, and informed by full public participation, the Action Plan should prioritise the following measures:
  - **Increase natural water retention and cleaning capacities:**
    - Protect and restore wetlands, especially in floodplains;
    - Ensure the establishment of optimum river bank vegetation cover to increase resistance to water flow in river channels and floodplains;
    - Promote soil conservation best practice in agriculture and forestry, which assist in decreasing erosion and run-off and increasing water retention;
    - Remove or block obsolete drainage systems to further promote attenuation;
    - Prohibit construction on floodplains or areas at risk of inundation;
    - Improve the regulation of private road construction in rural areas (such as to access forestry, peat, and mobile phone masts, etc.), as these have the capacity to reduce natural attenuation and increase sediment run-off in high rainfall;
    - Implement better slurry management practices to lower the risk of nutrient and bacterial contamination from run-off; and
    - Expand the use of Sustainable Drainage Systems (SuDS) to manage stormwater and minimise the risk of overflow from sewer systems. SuDS ponds can provide the added benefit of creating amenities for local communities, e.g. Camac Valley in Dublin.
  - **Increase ecosystem resilience and manage invasive species:** In order to increase the resilience of ecosystems, the landscape must offer functioning habitats. Aquatic habitats, if in 'good status' will provide refuges for native wildlife and crucial migration corridors. Actions to promote this objective:

- Protect wetlands and riparian ecosystems, which support species threatened by climate change;
- Prohibit the construction of new barriers to migration like dams and require the removal or modification of obsolete barriers to facilitate the passage of fish; and
- Actively manage invasive species via measures to minimise the risk of new arrivals and to prevent their spread.

- **Integrate water, climate and energy policy objectives:** Tackling water scarcity and floods is best done by reducing water use and adapting land use particularly in floodplains. Such strategies help reduce our exposure to water scarcity and extreme flood events and at the same time help to achieve legal environmental targets. Reducing water and energy use is the most cost-effective approach to achieving multiple objectives. Therefore, SWAN proposes the following actions:
  - Plan for extreme weather conditions when planning or upgrading existing water and wastewater systems, and also identify the means to flood-proof current wastewater treatment plants;
  - Urgent attention must be given to under-capacity/non-compliant waste water treatment plants;
  - Introduce measures to reduce pressures on water supplies and to encourage water conservation including a public awareness campaign; promote the uptake of efficient devices and the introduction of metered domestic water charges as soon as possible (which are designed sensitively to address social concerns); identify and implement wide measures to effect behavioural change;
  - Support ambitious water and energy standards for buildings;
  - Support rainwater harvesting which could feed into domestic non-drinking water supplies for toilet flushing and would reduce run-off from buildings;
  - Investigate the feasibility of dry toilets;
  - Conduct analysis of all locations for which engineering works for flood protection are proposed and investigate the feasibility of better environmental alternatives e.g. floodplain reclamation, especially when flood protection works will impair the wildlife or amenity value of a waterway; and
  - Introduce measures to ensure that the water sector itself reduces greenhouse gas emissions. The water and energy saving potential is very significant. There is potential to reduce the carbon footprint and energy bill of water treatment plants as up to 40% of water is being lost from the distribution network.

7. CONCLUSIONS AND RECOMMENDATIONS

SWAN welcomes the improved water governance system presented in the draft Plan, incorporating more integrated administrative structures and better public participation in water management through the establishment of the National Water Form (NWF) and the Local Authorities Water and Communities Office (LAWCO). However, no matter how effective the new governance arrangements, these cannot bring about successful restoration of the majority of our unhealthy waterbodies if the Plan itself does not set out to do this with a sufficient level of ambition.

The WFD requires that:

- all waterbodies reach 'good status' by 2021, or 2027 with time extensions under strict conditions and
- supplementary measures are applied in order to achieve this.

In contrast, the draft Plan relies heavily on measures and initiatives that are already in place, extending the deadline for waterbodies if it is deemed that these measures won't achieve WFD targets. This approach is not compliant with the directive and will result in the majority of our waters still falling below mandatory WFD standards at the end of this cycle.

It is clear that to address impacts from the most significant pressures, *'the right measure in the right place is needed*'. Whilst referring to this principle, the Plan proposes measures that are not guided by this and no proposals are made as to how this targeted sub-catchment approach will be supported, as it needs to be, by the State.

SWAN believes that the final Plan must be far more ambitious and clear about its targets and the specific actions and resources required to achieve these and fulfil the obligations of the directive a) during this cycle of this Plan, and, b) if necessary between 2021 and 2027. It must also include a chapter on the Coastal and Transitional zone if it is to present a whole-catchment plan for Ireland's waters.

To build on the establishment of the National Water Forum, the Plan must also commit to supporting and resourcing the establishment and operation of sub-catchment stakeholder groups to engage in water management at a local and catchment level and to establish mechanisms for the public to participate in WFD implementation at regional level.

The Plan also needs to address the issue of lack of policy coherence and alignment and the very significant threat to the water environment and WFD objectives posed by national targets for increased agricultural and marine growth. It is important to acknowledge that agricultural intensification cannot take place in some areas of the country if vulnerable waterbodies are to be protected.

Below is a summary of the recommendations from this submission. However we would caution the reader not to read these in isolation as they are only a summary of our comprehensive recommendations, which are best understood in the context of the detailed supporting arguments presented in the rest of the submission.

7.1 Ambition, Compliance, Objectives & Measures

RECOMMENDATIONS: COMPLIANCE

In order to come into compliance with the directive, the final Plan should:

- Make a clear commitment to achieve good status for all waterbodies by 2021 (or, with justified time extensions, 2027);

- Commit to implementing supplementary measures over and above what is already in place, in order to achieve this;
- State clearly what the objective is for each waterbody and which waterbodies will not achieve the WFD target of good status; and
- Set out a clear justification as required in the WFD for not restoring to good status the majority (88%) of ailing waterbodies.

RECOMMENDATIONS: AMBITION LEVEL, OBJECTIVES & SUPPLEMENTARY MEASURES

- Even if it is not possible to adhere strictly to the WFD as set out above, the ambition level of the Plan should be significantly increase based on what is technically feasible, as opposed to what is 'affordable'.
- A dedicated chapter should be added that clearly sets out:
    1. The number and percentage of waterbodies failing, and 'at risk' of failing WFD standards;
    2. Targets for the Plan, presented as the number and percentage of these that will be restored by 2021 and 2027; and
    3. Justification for exemptions for extended timelines and failing to achieve GES by 2027;
- The measures chapter then needs to be redrafted (omitting 'promotional' text) to:
    1. Address the disconnection between the pressures and impacts analysis and the measures section so that there is a clearer link between pressures & impacts and concrete proposed measures to address them;
    2. Present the measures that would be needed to achieve GES for all waterbodies by 2021/2027, excluding what is not possible for scientific/technical feasibility reasons or due to knowledge gaps, including the resources that would be needed to do this; and
    3. Clarify what is meant by supporting measures, and make it clear that basic measures will not be sufficient for a significant number of waterbodies.

7.2 Governance, Implementation & Public Participation

SWAN welcomes the new more integrated administrative structures for water governance. However many challenges remain. Water governance is wider than administrative arrangements, and to be effective also requires policies that are consistent and coherent; a well-designed regulatory framework; robust and agile institutions that are willing and able to adapt to new conditions and stakeholder engagement at all levels from national down to catchment level, which allows the public to influence decisions regarding water management.

What is proposed is a more joined-up administrative system, and the NWF will facilitate stakeholder engagement at national level, there has been very little progress towards policy coherence and the draft Plan proposes no new measures to contribute to a *'well-designed regulatory framework',* despite an earlier commitment to introduce consolidated water legislation. Neither are there structures to facilitate stakeholder engagement at regional level where significant decisions about water management are being made. The lack of a public awareness campaign on water also means that notwithstanding the work of LAWCO, levels of public awareness about issues facing the water environment are low.

RECOMMENDATIONS

WATER GOVERNANCE, IMPLEMENTATION

- The Plan should clearly state the challenges presented by a lack of policy coherence and the risk that sectorial expansion poses; and propose actions to achieve better policy alignment and to develop a coherent regulatory framework, including through a consolidated Water Act.

PUBLIC PARTICIPATION

NATIONAL:

- Central to the Plan must be a public awareness campaign on water. This forms the basis for all other public engagement work;
- The position of the NWF within governance structures should be clarified.

REGIONAL:

- Public workshops should be held in each of the 46 catchments to discuss the proposed measures agreed in the regional workshops and the Plan should also propose the establishment of longer term mechanisms for the public and stakeholders to feed into the work of the Regional Committees.

LOCAL/SUB-CATCHMENT:

- The establishment and operation of sub-catchment stakeholder groups (e.g. Rivers Trusts) must be facilitated and supported financially; this will significantly augment their collective capacity to assist in delivering WFD objectives
- These groups need to be integrated into WFD/water governance structures and this should be done through LAWCO Community Water Officers facilitating clear, functional links and regular dialogue between them and the various agencies involved in WFD implementation
- The Plan should propose significantly increased operational funding for LAWCO to do this.

7.3 Agriculture

Agriculture is by far the most prevalent pressure on the freshwater environment. It has been identified as a significant issue in 67% of 'At Risk' river and lake waterbodies.

Recent EPA and Teagasc research point to the fact that 'one-size-fits-all' measures do not work to mitigate agricultural impacts because solutions must be tailored at the sub-catchment scale, taking into account, amongst others, local biophysical factors that dictate the risk of nutrient loss to water. However, in direct contradiction to this, the draft Plan proposes current controls (the 'Nitrates Regulations') which are a generic national programme to address agricultural pollution which does not *"ensure the implementation of "the right measures in the right place"'*, the need for which is the key finding from all recent research.

The final Plan must reflect this key learning or there will be no improvement in water quality and in fact, there is a risk of deterioration due to planned intensification under Food Wise 2025.

RECOMMENDATIONS

- Agriculture as a sector must be clearly identified as a significant water management issue in its own right and given a stand-alone section, rather than being subsumed into the *'Rural Diffuse and Point Source Pollution'* section.
- The final Plan must contain a clear statement that Basic Measures alone are inadequate to address agricultural pressures;
- There must be clear and specific proposals for, and commitment to, the development and implementation of targeted, sub-catchment-specific, supplementary measures and the means to do this, including:
  - who will coordinate this on the ground and liaise with landowners;
  - who will be responsible for overseeing, coordinating and ensuring implementation; and
  - how it will be resourced.

  The Plan should also propose a suite of proposed measures/options e.g. edge-of-field wetlands; buffer zones; riparian fencing; lower nutrient inputs in Critical Source Areas of free-draining soils, etc.
- To support this, the Plan should include a provision to establish a team of 46 state-funded, ecologically trained, agri-environmental advisors to work with farmers in waterbodies at risk from agriculture in each catchment in the country to determine and implement necessary supplementary measures to protect affected waterbodies.
- The Plan should propose the following to make national controls on nutrients more robust and science-based:
  - Mandatory Nutrient Management Plans for ALL farmers, which should include a nutrient transfer risk metric;
  - Soil testing every 3 years, as recommended by Teagasc's Code of Practise;
  - Removal of the provision in the GAPP regulations which allows spreading organic fertiliser on Index 4 soils (as a minimum in farm holdings in catchments of 'at risk' waterbodies);
  - Removal of the provision which allows the spreading of fertiliser on previously unfertilised and unimproved soils (as a minimum in the catchments of High Status waterbodies, SACs and 'at risk' waterbodies);
  - The requirement for the inclusion of a nutrient transfer metric when calculating permitted nutrient loading; and
  - Prohibition on the addition of P to peatlands soils (as a minimum on holdings in the catchment of at-risk and High Status waterbodies).
- Since the Plan is proposing to disseminate *"key learnings from the Agricultural Catchments Programme to dairy farmers"*:
  - The information disseminated should reflect the importance of transport risk and NOT focus on nutrient sources and soil P and N.
  - It should clearly present the water quality and status outcomes to date in all associated waterbodies and explain the lack of progress to date on these parameters, clearly distinguishing between geophysical (e.g. lag times due to soil type) and other reasons; and
- The Plan should state that the monitoring and evaluation of GLAS will incorporate an assessment of the effectiveness of GLAS specifically in delivering WFD outcomes, in light of the findings of the characterisations process (focusing on 'at risk' waterbodies) and in particular the methodology for developing the nutrient management plans. It should also set out what the assessment indicators should be and the scientific basis for this. The Plan should also emphasise the need for water quality/status data for

the sample farms at the commencement of the scheme. Specifically, the evaluation must assess the extent to which GLAS measures reduce phosphorus and nitrogen in waterbodies, as well as sediment and pesticides.

- The Plan should set out a clear statement of the water quality objectives of the National Dairy Sustainability Forum, as well as targets and actions to match the objectives. In order to address the key challenges of the dairy industry and water quality, the Forum must include a strategy to control diffuse nutrient loss to water with a focus on the importance of nutrient pathways and critical source areas rather than soil fertility.
- The Plan should include a proposal to review the dual system for regulating wetland and agricultural drainage, including an assessment of the implementation of the two systems (The EIA (Agriculture) Regulations and 2011 Planning & Development (Amendment) (No. 2) Regulations) and how they can be applied in a more effective and coherent manner in order to protect riparian wetlands and other Groundwater Dependent Terrestrial Ecosystems (GWDTEs) from agricultural pressures.
- Regarding pesticides, the Plan should include a proposal for a comprehensive assessment of the ecological impact of pesticides on aquatic biota, with a focus on high status and at-risk waterbodies and the provision for the necessary catchment management tools for pesticides to be developed based on this, as recommended by EPA research.
- The final Plan should propose a ban on synthetic pyrethoid (Cypermethrin) in sheep dip due to its impacts, in particular upon high status waterbodies. This has been done in the UK.
- The Plan should identify upland burning as an issue and propose an assessment of its impacts on WFD objectives and the enhancement of current legislative controls on such burning, in order to protect water resources.

7.4 Urban Wastewater Discharges

The lack of consistent progress in wastewater infrastructure upgrades and the lack of certainty regarding the funding for this in the draft Plan is of serious concern to SWAN. There is a legal duty to meet Urban Wastewater Treatment Directive (UWWTD) obligations and the draft Plan should propose definitive measures to do this and be clear about the resources which must be provided in order to do it, and also to achieve WFD compliance.

However, the draft Plan does not make it clear whether the necessary resources are being made available and does not make the link between the problem and the proposed actions, nor does it assess 'distance to target'.

The principal measure put forward in the Plan is "*Ensuring compliance with the UWWTD and compliance with EPA discharge license Emission Limit Values",* which it states "*will be achieved through the implementation of the Irish Water – Water Services Strategic Plan.."* However, the Irish Water WSSP only has a target of 60% compliance with WFD discharge Emission Limit Values (ELVs) by 2021, so it is inaccurate to state that WFD compliance will be achieved via the WSSP. In addition, the WSSP is projecting only 90% compliance with UWWTD Requirements by 2021.

Crucially, even these unsatisfactory targets are not guaranteed, but are reliant on availability of requisite funding. The Plan lacks clarity on whether what is being proposed is definitive or only aspirational and contingent on funding. This is of extreme concern given recent reports that funding for Irish Water water and wastewater services activities is only guaranteed to the end of 2017.

RECOMMENDATIONS

1. Redraft this section (7.2) to clearly set out the serious situation regarding non-compliance, the legal requirement to address this urgently, the timeline for addressing this under the current level of projected funding and the level of investment needed to expedite this to 2021 and 2027, taking into account, and clearly stating, levels of confidence, knowledge gaps and issues of technical feasibility. Include the distance to targets in 2021 and 2027 under current funding. In other words, indicate the level of investment needed in order to achieve full UWWTD and WFD compliance by a) 2021 and b) 2027;
2. If it is not technically feasible to reach WFD Emission Limit Values for 100% of discharges by 2021, then this should be clearly stated and the justification set out;
3. Clearly reflect the EPA UWWT report's concerns and critique - and recommendations -in relation to UWWTD non-compliance and cite their analysis that ***"The current level of investment in infrastructure is inadequate"*** and that ***"the pace of progress at resolving environmental priorities is unsatisfactory"***;
4. Commit to ceasing the release of all untreated sewage in the next 12 months unless it can be demonstrated that this is not technically feasible;
5. Include as an action, the cessation of the EPA system whereby, when calculating the assimilative capacity of a receiving water for a municipal wastewater discharge, an assumption of zero (other) loading to the water body is made. Following this, review all ELVs for UWW discharges to ensure they do not compromise the meeting of WFD targets, in light of other loadings to the waterbody; and
6. Expedite the publication of the Irish Water Wastewater Compliance Strategy and commit to amending the RBMP in light of its contents.

7.5 Forestry

The key challenges presented by forestry operations: nutrients, silt, acidification and pesticides, present a particular threat to the high ecological status water bodies. Supplementary measures are urgently needed to address the risks posed to these sites, and current measures in the draft Plan are not adequate to prevent their further deterioration.

The current water quality issues associated with forestry will be exacerbated as forestry expands nationally. This will be a challenge to Ireland meeting our targets under the WFD unless changes in practice and supplementary measures are adopted.

The actions proposed in the Draft RBMP are widely applicable procedures and policies to improve the environmental performance of forestry and have not been specifically designed to meet the particular challenges to the water environment that the characterisation exercise has identified.

RECOMMENDATIONS

Environmental Requirements for Afforestation

- In order for the new Environmental Requirements for Afforestation to be effective, each licence granted for new planting must contain conditions which reflect the specific conditions and sensitivities of each site. This includes, but is not limited to, assigning site-specific setback distances in every licence that is approved and grant aided for afforestation.

- Targeting existing measures to each of the 183 waterbodies at risk from forestry is necessary, especially for those that fall outside of Freshwater Pearl Mussel sites. This can include application of the Potential Water Risk Scenario as part of the Environmental Requirements for Afforestation and specific conditions in the forest enhancement scheme and conditions in felling licences.

Peat Soils

- The Forest Service should apply the same definition of peat soils as that agreed with the EU Commission for the 'Nitrates' Regulations 2006, ensuring that this definition forms part of all licencing considerations for afforestation and for felling.
- The Forest Service should follow the scientific recommendation to cease afforestation on peat soils in acid-sensitive headwater catchments, to be implemented through GIS of approval systems, to ensure that no further deterioration results from new planting.
- For the existing forests, many of which pose severe threats to water quality, the Environmental Requirements for Felling (which SWAN has not yet seen) must reflect the findings of HYDROFOR and other relevant research, and the RBMP must commit to a programme of training for registered foresters for the purposes of implementing the new requirements; the Licensing Unit of the Forest Service must also implement a monitoring and appraisal system to ensure that the new Environmental Requirements for Felling are to be appropriately implemented. Particular care needs to be instilled in the felling licence system for peat soils with mineral buffers, multiple sediment traps and other mitigation measures, to minimise further deterioration from felling operations in the 183 'at risk' sites.

Woodlands for Water

- This scheme must continue to be implemented with sufficient funding and support. Strategic targeting of this measure to sites at risk from forestry and to high status objective waterbodies is required if it is to contribute to averting further deterioration of high status sites and to return all 'at risk' waters to a healthy state.

Cypermethrin

- Given the toxicity of Cypermethrin tot the aquatic environment, it should be completely banned in Ireland, as it has been in the UK.

Lakes in Forested Catchments

- For lakes within forested catchments that already have elevated levels of plant nutrients, heavy metals and DOC as a result of forestry and in particular from clearfelling, as identified in HYDROFOR, site-specific management plans are urgently required to restore these lakes to Good Ecological Status. As this will take time, implementation must commence immediately so that improvements can be achieved by 2021.
- In lakes in forested catchments that are at risk of gaining elevated nutrients as a result of pending felling, mitigation measures must be developed and implemented in accordance with best available knowledge, to prevent any deterioration in water quality before licences are granted for any felling to take place in these catchments. This will also require immediate resourcing, as delays may result in pollution from wind throw if no action is taken.
- For such sites that are in Coillte ownership, they must be exempted from the general felling licenses. The Forest Service must apply stringent conditions derived from the findings of HYDROFOR, regardless of existing felling licences.

Forthcoming Environmental Requirements for Felling

- The Environmental Requirements for Felling (yet to be released) must include a commitment that each felling licence will specify site-specific requirements that reflect particular site sensitivities;
- The Forest Service must, before the final RBMP, determine if additional resources will be needed to implement the new Environmental Requirements for Felling; if so, the plan must commit to this so that implementation will be adequately resourced from the outset. This is to avoid the abovementioned experience of the poor application of the 'Environmental Requirements for Afforestation', where licences issued by the Forest Service, one year after the launch of the requirements, are still not specifying setback distances and other key features that the requirements purport to address.
- The RBMP should commit to running training for foresters to implement the new Environmental Requirements for Felling; the Forest Service should commit to monitoring and assessing the implementation once they are in place.

7.6 Peat Extraction

Peat extraction has been effectively unregulated in Ireland for decades, leaving the pollution risk unaddressed. What is proposed in the draft Plan is inadequate to address the risk posed by peat extraction to the water environment, primarily because firstly it does not bring down the current threshold for an EIA below 30has. Furthermore it indicates that a separate Local Authority licensing system with be introduced for smaller scale commercial peat harvesting below this threshold, but it gives no details regarding what exact controls this will involve, no timeframe for implementation and no indication of a review or allocation of Local Authority resources. Furthermore the draft Plan does not address the issue of turbary cutting.

This splitting of regulatory jurisdiction and a process based on an arbitrary threshold is undesirable in principle, and all peat extraction whether for electricity generation, horticulture or domestic fuel, should be subject to an integrated regulatory regime.

RECOMMENDATIONS

A Water Body Specific Action Plan

- In recognition of the fact that regulations are not an effective tool on their own to bring degraded water bodies back to good ecological status, SWAN recommends that specific sub-catchment action plans be developed for each of the 112 water bodies where peat extraction has been identified as a significant risk as follows:
    - Each of the 112 suite of actions should have clearly described outcomes, set timeframes for delivery, mechanisms to monitor progress, and appropriate resources allocated.
    - The Action Plans must be scientifically informed, with responsibility for each action clearly allocated and publicly documented;
    - Where peat extraction activities are not in compliance with the planning and IPC licensing requirements, actions must include enforcement of legal protections against unauthorised peat extraction
- Oversight and management of these actions should be allocated to DHPCLG. Immediate priority should be given to the 21 high status water bodies where peat extraction is the significant pressure, which may require the involvement of private landowners. In this case additional resources will be needed to develop actions with their participation.

Regulatory Regime

- Instead of the proposed new regulations for large scale peat extraction, SWAN recommends that the Plan commits to retaining peat harvesting in the planning system with an implementation regime that is fully compliant with the WFD and the EIA regulations. This should include WFD-specific ex-ante assessments to ensure that operations do not compromise the WFD objectives of waterbodies in the catchment. Guidance documents and a programme of resourcing, communication and training for local authorities will be required to support the implementation of adequate controls on peat harvesting.
- The RBMP should specifically require that all decisions pertaining to planning permission and licencing of peat extraction will take full account of the pathways of silt, ammonia and DOC from peatlands and will ensure that these pollutants will be halted from peat harvesting sites as a result of the management actions that arise from regulation.
- The RBMP will also need to specify what actions will be taken to rectify historic and current failures in the regulation of peat harvesting. The regulatory authority for peat extraction and associated direct and indirect impacts needs to incorporate scientific, legal and technical competence in the enforcement of its functions.
- The final RBMP must state the intended outcomes of the reform of the regulatory system; the steps and timeframe for reform; clear division of roles and responsibilities; and a clear commitment that all decisions made in relation to peat harvesting will ensure elimination of pollutants such as silt, ammonia and DOC from extracted peatlands.
- The RBMP must also specify that where significant risk exists in terms of ammonia release from harvested peatlands, that harvesting will cease and the peatland will be rewetted to prevent further ammonia release.

7.7 Domestic Wastewater Treatment Systems (DWWTS)

SWAN believes that the current system alone, even with a refined risk-based National Inspection Plan (NIP) is not adequate to control impacts of DWWTS. Firstly, it does not input into planning controls and thus has no role in preventing the construction of single dwellings in sites unsuitable for traditional DWWTS; Secondly, there are insufficient systematic follow-up inspections for compliance with DWWTS planning conditions for new residential one-off development, leading to increased risk from new builds.

In relation to existing houses, the NIP relies on a two-strand approach: public engagement and inspection. However, the '*Engagement'* strategies outlined in the NIP, mostly comprise basic communication and awareness-raising and in the absence of a comprehensive public engagement programme, we do not believe that 1,000 inspections (a rate of less than 1%) is adequate to prompt homeowners to ensure their DWWTS are working in accordance with regulations.

The 45% NIP failure rate is of concern, as is the fact that half (49%) of these were yet to bring their system into compliance, a year (or more) after the issuing of an Advisory Notice. This does not suggest expeditious implementation of mitigation measures and represents a potentially serious threat to sensitive waterbodies.

There are also the significant issues of DWWTS on sites where soil conditions are unsuitable for a septic tank but where planning permission for one was granted. One of the main challenges for managing DWWTS impacts lies in this category, and neither the NIP nor the draft Plan addresses this.

Finally, there is no grant available for householders who are not inspected but who wish to carry out necessary maintenance and de-sludging. This has been identified by rural stakeholders as a significant impediment to the implementation of remediation measures.

RECOMMENDATIONS

- Measures must be proposed that will ensure that all DWWTSs currently posing a risk to waters must be detected and fixed by 2021, unless demonstrated not to be technically feasible, and that goal should be clearly stated in the Plan.

- In order to achieve this, SWAN recommends that the final Plan includes the following measures:
    - Increase the rate of inspections in the sub-catchments of all waterbodies at risk from DWWTSs in order to expeditiously detect all problematic systems;
    - In tandem, provide the necessary resources to facilitate the required investigative assessments to support this work;
    - Extend the grant programme to all systems in the catchments of water bodies deemed to be at risk from DWWTSs, if they are deemed to be represent a threat; and
    - Impose rigorous enforcement action for those that have been issued with Advisory Notices and have not complied after 3 months. For those below a certain threshold e.g. unemployed, those on the state pension, the remedial work should be grant-aided.

- In relation to planning controls, the Plan should put forward an action plan to ensure:
    - Adequate resources for follow up inspections to ensure that newly built DWWTSs are compliant; and
    - Coherence with planning so that planning controls are consistent across the country in prohibiting the construction of single dwellings where traditional DWWTSs cannot function or in applying strictly enforced criteria for proprietary systems.

- The Plan should also clearly state the very significant challenge posed by poorly sited DWWTSs, evidenced by the fact that during the last NIP *"16% of all systems inspected failed because either they were unlicensed discharges to surface water or because they had inadequate soil thickness for attenuating pollutants",* and propose measures to address it.

7.8 Abstraction

It is clear that a coherent regulatory system for abstraction is effectively non-existent in Ireland and therefore sufficient protection to ensure compliance with the WFD is absent. SWAN does not believe that what is proposed in the draft Plan addresses this, especially in relation to high status sites and aquatic and GWDTE SACs.

The basis for a management system must be an understanding of the location and volumes of abstractions, and this is especially the case for a pressure such as abstraction which has the potential to cause cumulative impacts, especially in sensitive and/or high status catchments. However, the Plan proposes a register under which a substantial proportion of abstractions in the state (less than 25 cubic metres per day) will remain unaccounted for.

Furthermore, supplementary measures are not proposed in the current draft Plan for any of the 194 surface and groundwater bodies assessed to be at risk from abstraction. It simply says that *"Further assessment will be undertaken during the course of this river basin planning cycle up to 2021. Where necessary, the required corrective measures will be identified and steps taken to address such pressures where they arise".* This is too vague. It does not identify what such measures or actions will be and when they will be implemented. In fact, it could be understood to mean that only further assessment is planned up to 2012, without actions because the timeline is unclear. This is of concern in relation to the waterbodies that have been deemed to be at risk from

abstraction, including sensitive waterbodies and aquatic and GWDTE SACs, which should be addressed with actions as a priority during this planning cycle.

RECOMMENDATIONS

In order to provide an effective and comprehensive system of "*controls over the abstraction of fresh surface water and groundwater",* SWAN recommends the inclusion of the following in the draft Plan.

Establishment of a Coherent National Abstraction Register

- To comply with the WFD and to be in a position to fully assess the impacts of abstraction to waterbodies, a comprehensive, publicly accessible National Abstraction Register must be established. While there isn't a WFD requirement to register all abstractions (exempting ones that have *"no significant impact on water status"),* there is an inherent need to assess all abstractions to decide which ones are significant. This should form the basis of a registering process which encompasses all abstraction points.

- This register needs to be placed on a statutory footing with a central designated agency that serves as the focal point for all abstraction and licencing activities and maintains the register. This central agency should address the current deficits in the Register as a matter of urgency.

- Technical Recommendations: All abstractions points, regardless of volume, should be included on the register.
- Management Recommendations:
    - The agency in charge of the register needs to be resourced and empowered to collate extant abstraction data from inter alia local authorities, the IPC regime administered by the EPA, Geological Survey and NFGWS;
    - That agency needs to be resourced to investigate non-declared or currently unknown abstraction pressures and to require the compilation of data from those abstraction points in a format agreeable to it;
    - That agency needs to be given enforcement powers and a right of entry to private property in relation to its abstraction and licencing function;
    - Small abstractions of less than 10 m3/day are included on the register, but do not need licensing. Instead, similar to Scotland, users must comply to general binding rules to minimise impacts
    - Small abstractions of less than 10 m3/day are metered to provide information on extent and duration of abstractions. This information is made available to the agency in charge of the register so that cumulative impacts from these can be assessed; and
    - The database must be made publicly available.

Establishment of a Coherent Licencing Regime

- To comply with the WFD, to accurately measure abstraction volumes, and to be in a position to fully assess the impacts of abstraction to waterbodies, a coherent licencing regime must be established.

This licencing regime needs to be placed on a statutory footing and vested in a central designated agency with all abstractions over 10 m3/day level captured within the licencing regime. This *de minimis* level is chosen in the absence of adequate scientific data that can provide a rigorous threshold of safe values. Abstractions from surface water should theoretically adhere to recommendations on environmental flows, and abstractions from groundwater on recharge rates to aquifers, but these will be waterbody specific. The 10 m3/day is chosen as it should capture most significant points of abstraction, and is currently a threshold value for exempted supplies in the Surface Water Regulations. For this licencing regime:

- Abstractions greater than 10 m3/day should be licensed;
- Information on location of abstraction point and rate of extraction (daily, or at a minimum, monthly rates are required) **must** be provided. This indicates that metering is required;
- This licensing regime should be flexible to permit greater scrutiny where impacts of abstraction are likely to be increased, or knowledge of impacts are unknown;
- This regime should be predicated on bi-annual renewals, allowing regular oversight of the abstraction and licencing pressure on any given waterbody;
- Abstractions greater than 10 m3/day and less than 100 m from a GWDTE would require further technical assessment to determine the specific impact on a given water body and any mitigating measures necessary with input from NPWS or an independent ecologist;
- Proposed abstractions over 100 m3/day to be further reviewed by a competent agency (e.g. local authority/EPA). This should include assessment of potential impact on groundwater flows and levels, surface water flows and levels; and
- All water-bottling plants to be licensed and included on a national register regardless of the abstracted volume.

Assessment of Abstraction Impacts in Ireland

- If the full impacts of abstraction in Ireland are to be assessed, an improved monitoring strategy of the impacts of abstraction must be developed and implemented. For this to occur:
    - Accurate abstraction data needs to be collated by a central agency. This requires location of abstraction points and rate of abstraction to be collated. Ideally, daily extracted volumes should be collated to understand the temporal nature of water abstraction in Ireland;
    - Newly collated data needs to be utilised by the state (e.g. EPA) academia and industry to assess spatial and temporal impacts due to abstraction in Ireland;
    - Use of electronic portal (similar to FSU portal – opw.hydronet.com) to help collate data, make it easily available to stake holders and to inform management practices such as the calculation of environmental flows based on catchment characteristics;
    - Geographical Information System, risk-based screening for determining GWDTE at risk of abstraction, including:
        - Known zones of contribution to IW and NFGWS sources
        - Licensed abstractions
    - Further collaborative work is needed between hydrologists, hydrogeologists and ecologists in both state agencies and academia to improve knowledge of the links between groundwater characteristics (e.g. flow, pH, and temperature) and the ecology of receiving wetlands. This could be achieved with targeted multi-disciplinary funding calls through organisations such as the EPA or GSI.

Stakeholder Engagement

- Stakeholder engagement is critical for the success of any abstraction regime enacted by the state. Broad categories of stakeholders exist, from individual citizens to large, multi-national corporations, and their specific requirements need to be acknowledged. The Public Awareness Campaign that SWAN is recommending should include information on the potential impacts of abstraction on the local water environment, as well as the complex interdependencies involved, and it should encourage them to engage in the registration process.

7.9 Aquaculture

This significant water management issue has been effectively ignored in the WFD implementation process to date and the fact that it is not identified as an issue in the draft Plan suggests that there is an intention to continue to ignore it in the second cycle. This is not acceptable and it is the strong position of SWAN that it is imperative that this omission is addressed in final RMBP. This is particularly pressing because the expansion of this industry without adequate monitoring or enforcement of existing licenses is certain to pose a significant risk to the status of our waters under the WFD and the MSFD, especially with the current lack of a coordinated governance approach. SWAN believes that we need strong measures to manage all aquaculture in a coordinated transparent way, taking into account cumulative impacts.

RECOMMENDATIONS

- Aquaculture must be identified as a significant water management issue in the draft Plan, designated its own section as a pressure, and be included in Section 7 with measures.
- Characterisation must be expanded to coastal water as a matter of utmost priority to address the significant knowledge gap regarding the risk posed by aquaculture and the "*lack of distinct information pertaining to the wider impacts of aquaculture activities on water bodies"* identified in the National Strategic Plan for Sustainable Aquaculture Development (NSPA) SEA. Bays with fish farms especially those in SACs, should be prioritised.
- Licenses for all currently licensed fish farms must be fully reviewed as per the Surface Water Regulations, to ensure that they are not compromising the WFD objectives of the waterbody in which they are sited.
- Propose the establishment of an aquaculture task force with stakeholder participation to develop a suite of management and control measures to be put in place within 6 months. This should consider full reform of the aquaculture licensing system to include:
    - A fully transparent licensing system which makes clear the parameters and criteria for issuing a license.
    - A targeted independent monitoring programme for all fish-farms to assess the risk posed by each farm's risk to achievement of WFD standards in the relevant waterbody
    - An ex-ante WFD-specific assessment of all aquaculture license applications in order to ensure that the proposed farm will not compromise the meeting of WFD objectives for the relevant waterbody, taking into account cumulative impacts of other pressures in the waterbody
- A pilot study, led by academics and including stakeholders, to examine the cumulative impacts of multiple aquaculture installations in a bay, and to propose measures to address these. To be effective it is crucial that there is commitment from all relevant State agencies and Departments to take on board the recommendations from the pilot.

7.10 Invasive Alien Species

The commitment in the draft Plan to put *"strong governance arrangements in place"* to manage Invasive Aline Species (IAS), is welcome, though belated, given that IAS were recognised as a significant water management issue ten years ago in the 2007 SWMI reports. However it does not give a timeframe for the development of a coherent and coordinated national approach, what the measures will be, which species will be prioritised nor how public participation will be facilitated.

Furthermore, the Plan proposes prioritising *"firstly, the introduction of potential high impact IAS, and secondly, working to eradicate or effectively control IAS at the early stages before they become firmly established."* While SWAN supports this approach, we are concerned that the Plan does not include concrete measures to address well-established IAS which are causing significant ecological damage to aquatic habitats.

Furthermore, we are concerned that it does not include explicit proposals to prohibit the import and sale of any IAS.

RECOMMENDATIONS

- The final Plan should include a timeframe for the completion of management plans for priority IAS by DAHRRGA. It should address the need to resource implementation of the actions in these plan, state that best practice consultation on the plans will be followed, and the plans should include actions to maximise public participation.
- The Plan should include concrete proposals for urgent action on the species that are most damaging to aquatic ecology. This must include the immediate ban on the import and sale of priority IASs.
- A timeframe for the clear governance arrangement should be specified in the final Plan, and details of the public participation elements included. The final Plan should include a commitment from DAFM and Teagasc to develop an IAS action plan to garner greater awareness of IAS among the farming community and to encourage and inform farmers in tackling IAS: for example appropriate control of Japanese knotweed and Himalayan balsam along rivers on their land.
- The Gigas oyster, the monitoring of which is the responsibility of the Marine Institute, has been identified at an increasing number of sites. If action is not taken to counter its spread, it will become a problem. The Spanish have introduced restrictions, as has Northern Ireland. Ireland should also take action to monitor and counter the spread of Gigas and this should be included in both management plans and guidelines.
- The final Plan should contain strengthened support for community and stakeholder involvement-based management initiatives for the control of IAS, including resourcing, provision of training support to community groups and NGOs involved in IAS control. However, an undue burden must not be placed on communities to control these in the absence of a) robust national biosecurity measures, and b) catchment-based management measures.
- Each local authority should be required to make an IAS action plan for their county, to include identification of the main IAS threats in that county, and resource the implementation of actions to tackle the most problematic IAS in their county.

7.11 Industrial Discharges

Industrial discharges may have significant detrimental effects locally, especially in the context of cumulative impacts and assimilative capacity of smaller and more vulnerable receiving waters. This issue is not addressed by current regulation, and by association the draft Plan. There is currently no assessment of cumulative impacts of industrial discharges on receiving waters and applications for discharge licenses continue to be considered in isolation under Section 4 licensing. In fact, the draft Plan does not propose any measures to address these and this pressure is not mentioned at all in Section 7, which sets out measures.

SWAN is furthermore aware that many licensing authorities are not amending their licensing activities in line with the objectives of the directive, despite the issuing of training and guidance on this for Local Authorities.

Also, while the Significant Water Management Issues Report acknowledged the increased pressure from agri-food processing operations, in the context of the increased output envisaged in Food Wise 2025, this issue is omitted from the draft Plan.

RECOMMENDATIONS

In order to ensure that industrial discharges are not compromising WFD objectives in the receiving waters, especially in those waters designated at risk from such sources, SWAN recommends that the following be proposed in the final Plan:

- A review of all industrial discharge licenses incorporating a WFD-specific assessment must be carried out to ascertain the nature of the effluent and loading of substances likely to compromise WFD status (e.g. nutrients; BOD).
- ELVs set in licenses must then be amended where impact is determined. This must be done taking into account cumulative impacts. This should be done as a matter of priority for industries in at risk waterbodies and in protected areas and HSSs.
- Establish a catchment-based management system for licensed discharges in order to take into account cumulative impacts of various parameters.
- The draft Plan should clearly identify the increased risk from agri-food processing operations, in terms of its capacity to adequately process additional waste as a result of increased output envisaged in Food Wise 2025. Measures to address this must be proposed.
- A national database of industrial discharge licenses should be made publicly available, including the nature and location of discharges and the WFD status of the receiving water.

7.12 Landfill Sites & Quarries

The 2009-2015 RBMPs contained a dedicated section which dealt with landfills and quarries (in addition to mining). However, they have been omitted from the draft Plan and no measures are proposed to address their impacts on water. While these may not be significant on a national scale, they can pose a significant risk locally and for this reason they should be addressed in the Plan.

RECOMMENDATIONS

- These issues should be included in the final Plan with measures proposed, including mandatory capping and other management of old landfill sites to prevent additional wash through and leaching to groundwater

- It should present summary results of the inventories and risk assessments of 'known sites' committed to in the 2009 -2015 RBMPs and include the following information:
    - A list of the sites and the results of the assessments;
    - A list of sites for which assessments are not complete and the timescale for completion;
    - Whether mitigation actions have been carried out to address negative impacts of these and by whom? SWAN believes that the EPA or another independent agency should oversee the assessments of contaminated sites by the Local Authorities to ensure that the assessments are of an appropriate standard, the proposed actions appropriate, and that they are carried out.

7.13 Physical Modifications

Despite the fact that hydromorphology is a significant pressure in 19% of water bodies at risk and 21% of the high ecological status waterbodies, activities involving physical modifications to waterbodies in Ireland are not being adequately assessed for WFD compliance and there is no commitment in the draft Plan for such an assessment; consequently physical modifications will continue to negatively impact the WFD status of the waterbodies where they are carried out.

The process by which such an assessment would take place is a clear obligation under the WFD, which requires a system of prior authorisation for physical modification of waterbodies to have been put in place by 2012. However, the draft Plan still does not propose this, or a timeline for introducing it.

In addition to lack of conformance in relation to this obligation, there are a number of areas in which Ireland appears to be operationally in breach of these requirements, as it has not implemented a cohesive system of assessment, regulation or control of physical modifications, including flood management, arterial drainage, and Local Authority part 8 developments.

Arterial drainage is of particular concern. Because damage from this work includes significant physical changes, disturbance of spawning habitat, changes in water quality, connectivity in flood plains and associated habitats, changes to sediment regime, connectivity to wetland and coastal habitats and alteration of conveyance, arterial drainage work compromises the WFD objectives in affected waterbodies. However, rather than proposing measures to address this, the RBMP states that over the second cycle of RBMP the OPW will continue to carry out 'maintenance' on 2000km of channel each year and does not propose ex-ante WFD-specific assessments for any of the schemes. Delaying the required action until there is improved understanding of the impacts, as proposed in the Plan, is not acceptable.

This also runs counter to the 2015 ECJ ruling on Case C-461/1318 on the dredging of the river Weser in Germany which found that unless a derogation is granted authorities must *"refuse authorisation for an individual project where it may cause a deterioration of the status of a body of surface water or where it jeopardises the attainment of good surface water status or of good ecological potential and good surface water chemical status .."*

There is a **pressing need to assess, regulate and control arterial drainage** so as to ensure that works do not cause deterioration to the physical condition of the water environment in accordance with the requirements of the WFD.

Physical modifications associated with flood management can also significantly impact WFD status and under the directive such alterations are only permitted if the strict conditions are met and the reasons for any exemptions set out in the RBMPs. The Weser ruling equally applies to such works.

Furthermore, there is no mention in the draft Plan of natural flood management (NFM), despite clear multiple benefits in terms of WFD, biodiversity and flood management outcomes. NFM and natural water retention measures are non-exclusive alternatives to many of the practices that are causing ongoing threats to Ireland achieving WFD objectives, such a dredging, wetlands drainage and infilling. The RBMP should acknowledge the benefits of Natural Flood Management to water quality and flood attenuation and set a measure in the Plan to work with other relevant departments and agencies to develop research and pilot NFM in Ireland

RECOMMENDATIONS

The draft Plan should include the following commitments in relation to physical modifications:

System of Prior Authorisation

- A comprehensive system of authorisation for physical modifications should be implemented as part of the Planning system in the next 2 years. SWAN advises that this system include a comprehensive ex-ante WFD compliance assessment to be carried out on each proposed project. A standardised methodology will be required for carrying out these assessments.
- The audit should then recommend which mitigation measures can be implemented to ensure that no negative impacts from dredging arise, and where this cannot be assured the dredging should not proceed, or an exemption, under strict criteria applied
- The assessments will need to identify all potential negative impacts, including hydromorphology, and a central body will need to be resourced to vet and approve the assessments. There will need to be transparency and public participation in the assessment and licencing procedure. As a legislative measure to ensure legal compliance with WFD objectives, this will require new WFD planning and development regulations for physical modifications to outline procedures, responsibilities, decision making criteria, and enforcement.
- SWAN recognises that this system is a significant undertaking and will take resources to develop, communicate and implement, however it is long overdue, being already 5 years late. The system of authorisation for physical modifications should include dredging and other river 'maintenance', channelization, dams, weirs, barriers and locks, embankments and culverts.

Arterial Drainage

- In the meantime, all river dredging and other 'maintenance activities' carried out under the National Arterial Drainage Maintenance List of Activities 2016-2021 must be halted until this system of legislative control is up and running and can assure compliance with the WFD. Until this system and control is in place, the National Arterial Drainage Maintenance List of Activities will continue to prevent conditions consistent with the achievement of WFD objectives.

Specific WFD Assessment for Flood Management Works

- Any flood management activity included in the OPW Flood Risk Management Plans (FRMPs) that will negatively impact the WFD status of a water body is only to be permitted under the WFD if the strict conditions, set out in Article 4, are met. The Plan should propose the requirement for specific ex-ante WFD-specific assessments to evaluate the compatibility of the flood management schemes with WFD requirements for affected waterbodies, in line with the 2015 ECJ ruling on Case C-461/13.
- Any exemptions and justifications being applied to affected waterbodies must be set out clearly in the final Plan.

Guidelines on Planning and WFD

- High Level Guidance for planning authorities is one of the measures proposed in the draft Plan. This is insufficient to address the problem and should be brought in as a part of the new system of authorisation for physical modifications with a legislative basis and a set of standardised procedures to assess and manage impacts of physical modifications. The guidelines must also address compliance of 'river maintenance'/dredging with the objectives relating to obligations of restoring and maintaining good physical condition of rivers, as discussed above. The guidelines should also include detailed technical guidance on utilising the SEA process to properly integrate water management planning with development and spatial planning. They should also introduce more stringent planning requirements where development may impact 'high status' pristine waterbodies.

Natural Flood Management

- Natural Flood Management can have major benefits to water quality and provide a significant contribution to meeting WFD objectives. Natural water retention measures can also do much to ameliorate localised flooding which is currently addressed by dredging.
- In recognition of these benefits, a specific national working group for Natural Flood Management should be established to investigate NFM approaches for Ireland and implement several pilot Natural Flood Management approaches, as part of a wider catchment-based approach to flood management. The working group should include the OPW, DAFM, the Forest Service, the EPA, the Department of Communications, Climate Action and Environment, DHPCLG, the NPWS, Local Authorities, and environmental NGOs.
- The pilot projects should have strong academic input and involve comprehensive public participation.

Wetland Drainage

- The Plan should propose a review of the confusing dual system for regulating wetland and agricultural drainage, including an assessment of the implementation of the two systems (The EIA (Agriculture) Regulations and 2011 Planning & Development (Amendment) (No. 2) Regulations) and how they can be applied in a more effective and coherent manner in order to protect riparian wetlands and other Groundwater Dependent Terrestrial Ecosystems (GWDTEs) from wetland drainage.

7.14 The Coastal & Transitional Zone

The WFD incorporates all elements of the catchment including transitional and coastal (TRAC) waters to within one nautical mile of the coast and requires that the same objectives – and measures to achieve these – be established for these TRAC waterbodies as for inland waters. However despite this, the coastal and transitional zone has been omitted from the draft RBMP and there are no new measures proposed to address the pressures on the 79 transitional and coastal waterbodies (TRAC) falling below GES. This is despite the fact that many of these pressures, especially non-land based pressures, are not addressed elsewhere in the draft Plan either. They are effectively ignored. Furthermore, there is no mention of the challenge of the currently fragmented system of governance in the coastal zone, nor the need to integrate the implementation of the Marine Strategy Framework Directive (MSFD) with the WFD.

In order to achieve WFD targets (and coherence with MSFD) and integrated catchment management through the entirety of the catchment, this situation must not persist in the final Plan.

RECOMMENDATIONS

In order to address the above shortcomings and achieve a whole-catchment management approach to WFD implementation, SWAN recommends the following:

- A dedicated chapter covering the coastal and transitional zone should be added to the final Plan. This must identify the pressures specific to the coastal waterbodies, including the following, which are omitted from the draft Plan, and propose actions to address them:
    - Aquaculture (See Section 5.7)
    - Unsustainable inshore fishery practises;
    - Green energy structures
    - Shipping
    - Marine litter
- In support of this, the final Plan should also, as a minimum, propose an immediate review to assess the efficacy of current controls in the coastal zone in ensuring such pressures are not compromising WFD targets for TRAC waterbodies.
- This new chapter in the final Plan should also acknowledge the current fragmented nature of coastal governance and management and put forward the following measures to address this and to integrate WFD and MSFD implementation through an Integrated Coastal Zone Management approach:
    - The development of a national coastal policy and strategy to progress integrated management of coastal resources which as a minimum should meet the requirements set out in the EC Recommendation on ICZM; and
    - The designation of a statutory body with responsibility for coordinating the implementation of ICZM in Ireland.
- More detailed monitoring and characterisation of transitional and coastal waterbodies must be included in the final Plan, to the same level of detail as the current characterisation on rivers and lakes in order to improve confidence in current characterisation. This should be done in consultation with the academic and NGO community with expertise in this area.
- The Plan should identify the need for methodologies for assessing cumulative impacts of coastal developments and propose additional resources within the EPA to deliver appropriate long-term data and ecological monitoring to fully assess sectoral and cumulative impacts on transitional and coastal waterbodies.
- Given that Ireland has not commenced discussion regarding MPA designation and does not have the necessary legislation in place to designate MPAs under the MSFD, SWAN proposes:
    - That the inshore waters within the 1 mile limit should be designated as an interim measure, as a continuous MPA/SAC around the coast, in the forthcoming marine bill, allowing only artisanal and sustainable fisheries operations. Unsustainable inshore fishing practises should be prohibited within, due to the significant impact on nursery areas. This includes pair trawling, dredging for seed mussel, scallops and non-quota species. It should also prohibit dredging outside shipping lanes;
    - This would then break down into Natura 2000 sites, OSPAR sites, Ramsar sites and MPAs under the MSFD.
- In order to improve Foreshore Licensing in the context of WFD implementation, the Plan should propose WFD-specific, ex-ante assessments of potential impacts of a development or activity before the granting of a foreshore consent In the interests of transparency and public participation, it should also recommend:

- Publication of a given license application within days of being lodged with the department, similar to planning permission for a house.
- Publication on the government website, with an alert in the national media (rather than a late alert in local media and information in a local garda station, but no website information).
- An affordable appeal mechanism as access to justice if one wants to appeal a government license or condition (rather than the present high court judicial review as the only option).

- In relation to seaweed harvesting, the Plan should identify this as an issue and propose:
  - That all seaweed reference sites monitored by the EPA should be protected as MPAs and seaweed harvesting prohibited to ensure the integrity of monitoring results.
  - The identification of seaweed MPAs where the qualifying interests include a high seaweed diversity.
  - A national seaweed protection, harvest and aquaculture policy should be drafted to ensure that our high value seaweed resources are used wisely and that GES is not jeopardised by clear felling of essential buildings blocks of transitional and coastal water ecosystems.

7.15 High Status Sites

SWAN welcomes the focus on high status sites in the draft Plan, and the statement that *"The protection of high status waters is one of the main priorities of this River Basin Management Plan"* especially given that the majority of Ireland's habitats listed under the Habitats Directive, including water and wetland habitats, are reported to be of poor or bad conservation status.

In relation to agricultural impacts on HSS, the efficacy of GLAS remains to be demonstrated. While it is true that priority access to the GLAS agri-environmental scheme is given to farmers in areas with high status waters, there do not appear to be any nutrient input restrictions beyond current regulations (GAPP regs) and low emission slurry spreading is optional.

As highlighted in the Plan, a diversity of small-scale pressures, which can be extensive in nature, have a greater impact in high status catchments and it is important that an integrated sub-catchment management approach is taken to tackle these.

SWAN welcomes the fact that the draft report proposes actions for High Status sites are *'in response to'* the excellent EPA-commissioned Ní Chaitháin report, including the 'Blue Dot' programme. However, we are unclear as to whether all of the recommendations from the Ní Chaitháin report are being proposed, or if not which ones.

In order to learn from previous mistakes, it is absolutely vital that there is a very high level of expert-led public participation in the development of management strategies of these sites or it will be met with strong resistance.

RECOMMENDATIONS

SWAN highly commends the EPA commissioned Ní Chaitháin report referred to in the Plan and recommends the inclusion in full of its recommendations in the draft Plan. In addition to this 'overall recommendation' we propose the following:

- Because these waterbodies are very sensitive they can be responding to a very particular combination of local measures. Therefore the Plan must propose the development of targeted sub-catchment management plans for all current High Status sites and those identified for restoration. These will need :
    - To be adequately resourced with additional funding;
    - The support of the ecologically trained agri-environmental advisors recommended in Section 5.1.;
    - A high level of sophisticated expert-led public participation in the development of management strategies of these sites; and
    - Development of a policy for unregulated activities within high status catchments.
- Designate high status catchments as protected areas, i.e. establish a spatial network of high status sites. This would need to be done with a very high level of stakeholder engagement.
- It is also vital to integrate protection of high status sites into planning controls as recommended by Ní Chathain:
    - Each application for planning/licensing should be screened to see if it is located within the catchment of a high status surface water body or high status river site.
    - Consideration of the application of an AA style screening approach could be adopted for high status catchments to improve the assessment of cumulative impacts within these catchments, and to trigger the requirements for EcIA or EIA.
    - Each local and public authority should review existing environmental assessment guidelines which they have in place to account for the protection of high status waters, and to 'WFD-proof' such guidelines.

7.16 Economic Analysis

The Directive requires that the Plan contains *"a summary of the economic analysis of water use as required by Article 5 and Annex III"*. The absence of this analysis renders the Plans non-compliant with the directive and also means that the necessary information is not available to carry out disproportionate cost assessment and cost recovery analysis.

The section on economics emphasises the 'vital contributions to economic activity" of various sectors. However, under the WFD this is only relevant in the context also of the costs to the water environment posed by those sectors. The timeline for delivery of this analysis, now 12 years overdue should be set out. Under Annex II, this analysis *"shall contain enough information in sufficient detail ... in order to ... make judgements about the most cost-effective combination of measures in respect of water uses to be included in the programme of measures ..."*

There is no attempt in the draft Plan to provide an estimate of the costs of meeting the objectives of the WFD, or how, or from whom, the authorities intend to recover those costs. Unfortunately, it is mostly limited to costs in relation to the narrowest definition of water services. Only after this is done, with the inclusion of environmental and resource benefits and costs, and the characterisation and risk assessment has been carried out, can the discussion regarding the application of exemptions or *'prioritisation'* take place.

RECOMMENDATIONS

- The Plans must include *"a summary of the economic analysis of water use"* that contains "*enough information in sufficient detail"* in order to conduct calculations regarding cost recovery of water services including environmental and resource costs in accordance with the polluter pays principle.

- Key to conducting either a cost-effective analysis of a disproportionate cost assessment is
    - a baseline valuation of the Irish aquatic resource, including non-quantifiable benefits, in addition to
    - the externalised costs incurred by the state from land use and industry which impacts the water environment.

  This work must be proposed in the Plans and should be initiated as soon as possible.

- The Plans must relate any pricing policies to the recovery of environmental and resource costs and demonstrate the impact that they have/will have on the ecological status of waterbodies. SWAN acknowledges that this is a challenging exercise. At a minimum, we propose that a timeline and commitment to a set of actions be set out in the Plans to complete this analysis.

7.17 Climate Change

The reform of water management required by the Water Framework Directive (WFD), which focuses on an integrated catchment management approach, presents the ideal opportunity to build resilience to climate change, cut energy consumption and protect our water resources. Measures to mitigate climate change, but also to adapt to it, must be fully integrated with water management. The 2009-2015 RBM Plans missed the opportunity to do this, it is imperative that this cycle does not repeat this. SWAN proposes the following suite of measures (including an Action Plan to meet multiple objectives from flood and drought risk alleviation and adaptation to water quality and biodiversity) to be include in the final Plan.

RECOMMENDATIONS

Monitoring

- A strategic national network of continuous aquatic monitoring stations to measure the nature and rate of climate-derived change in water systems must be urgently put in place, focusing on indicators of climate change e.g. lake and river temperatures. This information is necessary to detect changes and as the basis for future planning.

Strategy to Integrate Climate Change Adaptation and Mitigation with Water Management

- A Strategy to Integrate Climate Change Adaptation and Mitigation with Water Management should be developed as a matter of urgency. This should contain:
    - A list of measures already in place for the mitigation of climate change-related pressures on water resources and the associated monitoring programme;
    - Targets for climate impact alleviation measures to be achieved by 2021;
    - **Cost/benefit analysis** to select measures for dealing with both intermittent and long-term impacts of climate change on aquatic ecosystems. The analysis should be done with public

participation and should include environmental and resource costs to ensure that selected options are in the best interests of society as a whole; and

- Details of all the **responsible agencies**, their respective roles and mechanisms for coordination and integration of work.

Action Plan to Integrate Climate Change Adaptation and Mitigation with Water Management

- Using the cost-benefit analysis above, and informed by the strategy and by comprehensive public participation, the Action Plan should prioritise the following measures:
  - **Increase natural water retention and cleaning capacities:**
    - Protect and restore wetlands, especially in floodplains;
    - Ensure the establishment of optimum river bank vegetation cover to increase resistance to water flow in river channels and floodplains;
    - Promote soil conservation best practice in agriculture and forestry, which assist in decreasing erosion and run-off and increasing water retention;
    - Remove or block obsolete drainage systems to further promote attenuation;
    - Prohibit construction on floodplains or areas at risk of inundation;
    - Improve the regulation of private road construction in rural areas (such as to access forestry, peat, and mobile phone masts, etc.), as these have the capacity to reduce natural attenuation and increase sediment run-off in high rainfall;
    - Implement better slurry management practices to lower the risk of nutrient and bacterial contamination from run-off; and
    - Expand the use of Sustainable Drainage Systems (SuDS) to manage stormwater and minimise the risk of overflow from sewer systems. SuDS ponds can provide the added benefit of creating amenities for local communities, e.g. Camac Valley in Dublin.

  - **Increase ecosystem resilience and manage invasive species:** In order to increase the resilience of ecosystems, the landscape must offer functioning habitats. Aquatic habitats, if in 'good status' will provide refuges for native wildlife and crucial migration corridors. Actions to promote this objective:
    - Protect wetlands and riparian ecosystems, which support species threatened by climate change;
    - Prohibit the construction of new barriers to migration like dams and require the removal or modification of obsolete barriers to facilitate the passage of fish; and
    - Actively manage invasive species via measures to minimise the risk of new arrivals and to prevent their spread.

  - **Integrate water, climate and energy policy objectives:** Tackling water scarcity and floods is best done by reducing water use and adapting land use particularly in floodplains. Such strategies help reduce our exposure to water scarcity and extreme flood events and at the same time help to achieve legal environmental targets. Reducing water and energy use is the most cost-effective approach to achieving multiple objectives. Therefore, SWAN proposes the following actions:

- Plan for extreme weather conditions when planning or upgrading existing water and wastewater systems, and also identify the means to flood-proof current wastewater treatment plants;
- Urgent attention must be given to under-capacity/non-compliant waste water treatment plants;
- Introduce measures to reduce pressures on water supplies and to encourage water conservation including a public awareness campaign; promote the uptake of efficient devices and the introduction of metered domestic water charges as soon as possible (which are designed sensitively to address social concerns); identify and implement wide measures to effect behavioural change;
- Support ambitious water and energy standards for buildings;
- Support rainwater harvesting which could feed into domestic non-drinking water supplies for toilet flushing and would reduce run-off from buildings;
- Investigate the feasibility of dry toilets;
- Conduct analysis of all locations for which engineering works for flood protection are proposed and investigate the feasibility of better environmental alternatives e.g. floodplain reclamation, especially when flood protection works will impair the wildlife or amenity value of a waterway; and
- Introduce measures to ensure that the water sector itself reduces greenhouse gas emissions. The water and energy saving potential is very significant. There is potential to reduce the carbon footprint and energy bill of water treatment plants as up to 40% of water is being lost from the distribution network.

APPENDIX I: SWAN Member Organisations & Board of Directors

SWAN National Groups		SWAN Regional & Local Groups	
1	An Taisce	16	Carra Mask Corrib Water Protection Group
2	Bat Conservation Ireland	17	Cavan Leitrim Environmental Awareness Network
3	Birdwatch Ireland	18	Celebrate Water
4	Coastwatch Europe Network	19	Cork Environmental Forum
5	Coomhola Salmon Trust Ltd.	20	Dodder Action
6	Eco-UNESCO	21	Longford Environmental Alliance
7	Friends of the Earth	22	Macroom District Environmental Group
8	Friends of the Irish Environment	23	Save Our Lough Derg
9	Irish Doctor's Environmental Association	24	Save Our Lough Ree
10	Irish Peatland Conservation Council	25	Save The Swilly
11	Irish Seal Sanctuary	26	Shannon Whale & Dolphin Foundation
12	Irish Water and Fish Preservation Society	27	Slaney River Trust
13	Irish Whale and Dolphin Group		
14	Irish Wildlife Trust		
15	Voice Of Irish Concern for the Environment (VOICE)		

SWAN Board of Directors:	
Mark Boyden, Chair	Coomhola Salmon Trust
Mindy O'Brien, Vice-Chair	Voice of Irish Concern for the Environment (VOICE)
Karin Dubsky, Director	Coastwatch Europe
David Healy, Director	Friends of the Irish Environment
David Lee, Director	Cork Environmental Forum
Elaine Nevin, Director	EcoUNESCO

APPENDIX II: Requirement of the WFD regarding exemptions from achieving the objectives of the directive.

The main objectives of the WFD are:

- To protect and, where necessary, to improve the quality of all our inland and coastal waters, groundwaters and associated wetlands, and to prevent their further deterioration;
- To achieve 'good status' for all these waters by 2015 (or 2021 or 2027 under certain conditions);
- To promote the sustainable use of water;
- To reduce the pollution of water by particularly hazardous 'priority' substances; and
- To lessen the effects of flooding and drought.

Under Article 4 of the Directive, Member States are required to implement the necessary measures to achieve the above objectives of the WFD. Exemptions to achieving these objectives are however permitted under strict conditions and these are also set out in Article 4 of the Directive, with Articles 4.4 4.5, 4.6 and 4.7 describing the conditions under which exemptions to these objectives can be applied.

Firstly, Member States can extend the deadline (Article 4 (4)) by which good status is to be reached to 2021 or 2027 provided that no further deterioration occurs in the status of the affected body of water and the following conditions are met:

i) The necessary improvements cannot be achieved within the timescale due to reasons of technical feasibility, disproportionate expense or prohibitive natural conditions

ii) The deadline extension; reasons for this and a summary of the measures necessary to bring the bodies of water progressively to the required status are set out in the RBMP.

Secondly, they can achieve less stringent objectives under certain conditions (Article 4 (5)):

- When a body of water is affected by a human activity and the environmental and socioeconomic needs of the activity cannot be achieved by other means, which are a significantly better environmental option, not entailing disproportionate costs;
- No further deterioration occurs;
- The highest ecological and chemical status possible is achieved for surface waters and the least possible changes to good groundwater status are caused, given impacts that could not reasonably have been avoided due to the nature of the human activity; and
- The reasons are specified in the River Basin Management Plan.

Thirdly, Member States can have a temporary deterioration in status arising from natural causes or "*force majeure*" (Article 4.6). These include droughts, floods, earthquakes, etc.

Finally, under Article 4.7, Member States are not in breach of the Directive when:

- *"Failure to achieve good groundwater status, good ecological status or, where relevant, good ecological potential or to prevent deterioration in the status of a body of surface water or groundwater is the result of* ***new modifications to the physical characteristics of a surface water body*** *or* ***alterations to the level of bodies of groundwater****; or*

- *Failure to prevent deterioration from high status to good status of a body of surface water is the result of **new sustainable human development activities**"* (authors' emphasis).

And ALL the following conditions are met:

- The reasons for the modifications or alterations are of **overriding public interest;** and/or the **benefits to the environment** and to society of achieving the environmental objectives are **outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development**;
- The benefits served by the modifications or alterations cannot for reasons of **technical feasibility** or **disproportionate cost** be achieved by other means, which are a significantly **better environmental option**;
- All practical steps are taken to mitigate the adverse impacts; and
- The reasons for those modifications or alterations are set out and explained in the River Basin Management Plan.

In summary, under Article 4.7, exemptions can be applied to a development that has the potential to prevent the achievement of WFD objectives, if it entails new physical modifications or '*sustainable human development activities*' (the latter applies to deterioration from high to good status only) and fulfils the requirements above. Flood protection works potentially fall under both of these. We will return to this in the next section.

APPENDIX III: Two SWAN proposals to Department of Housing, Planning and Local Government on water governance and public participation

Appendix III (A): Delivering meaningful public participation in water governance and Water Framework Directive (WFD) implementation: SWAN Recommendations (2015)

SWAN has been making the case for meaningful public engagement in water management and the implementation of the Water Framework Directive (WFD) for almost a decade, and it is regrettable that there is less provision for this public participation now than there was nine years ago.

The constituent characteristics of good public participation have not changed over this period (Jansky & Uitto, 2006; OECD, 2011a; Nabatchi & Leighninger, 2015; Smith *et al*, 2015), although new techniques may be employed to deliver it (Goldsmith & Crawford, 2014). However, for it to take place, the public must have the genuine ability to influence outcomes. This did not happen in the first round of River Basin Management Plan development and implementation in Ireland. SWAN sees the current finalisation of arrangements for governance and public engagement in Water Framework Directive (WFD) implementation as the "last chance saloon" for the agencies concerned to ensure effective engagement in the second and future cycles. This paper presents the basis for why and how it can be done, given the administrative arrangements SWAN understands have already been agreed.

There are 4 objectives in this paper. These are to explain:

1. What meaningful (worthwhile) public participation can contribute to securing Water Framework Directive (WFD) objectives;
2. SWAN's recommendations for how this can be done alongside the known 3 Tier administration structure;
3. By example, how this would work and support delivery of Integrated Catchment Management;
4. What governance challenges need to be addressed, and what is needed, for this public participation to be successful.

Before proceeding, it is important to be clear that public participation in relation to state implementation of the EU's WFD relates to all those outside the administration of the state who have a "stake" in the issues; otherwise known as the "stakeholders". In relation to aquatic environments this includes the general public, although many may be unaware of their own interest or stake in these issues. This wider citizenry can be reached through groupings that exist; voluntary, community, environmental, groups etc. (as the Public Participation Networks in Local Authorities are intended to identify), but "stakeholders" also includes interest groups representing industry, business, agriculture, and so forth. What is put in place to deliver public participation must accommodate all of these, and strive to do so fairly.

1. What meaningful public participation can contribute to securing WFD objectives

SWAN has repeatedly highlighted the overarching benefits of public participation, drawn from international experience[258]. In brief summary these include:

1. Increased public awareness of issues;
2. Better outcomes and management decisions, as more perspectives are addressed;
3. Encouragement of positive action by citizens;
4. Increased public support for (and engagement in) outcomes/ decisions taken;
5. Creating a culture of co-operation, embedding longer-enduring outcomes, and delivering sustainable change.

A recent Organisation for Economic Co-operation and Development publication (OECD, 2015) on water governance principles captures effectively the huge potential for involving the public: *"Engaging stakeholders provides them with opportunities to be part of the solution and share views and priorities, which can help increase the willingness to pay, raise awareness on water risks and costs, …… and prevent or solve conflicts over water use……. Participation of informed stakeholders is a condition sine qua non to ensuring trust. Stakeholders can act as third-party mechanisms to ensure that decisions with significant infrastructural and economic consequences are shielded from short-term political considerations and not captured by specific interests."* (emphasis added).
In relation to costs and benefits, the report says *"Proper stakeholder engagement may be costly (in terms of logistics, process, reputation, delays in decision-making), especially at the beginning, but evidence shows it can lead to more effective implementation of water policies and projects. By allowing testing and refining decisions, stakeholder engagement is likely to yield short and long-term benefits in terms of acceptability and sustainability (e.g. enforcement of regulation, political acceptability, ownership of decision and outcomes); in terms of social equity and cohesion (e.g. trust, confidence, customers' satisfaction, corporate social responsibility); in terms of capacity development (e.g. awareness-raising, information sharing, opinion forming, and social learning); and in terms of economic efficiency (e.g. cost saving, value for money, time saving, broader economic benefits as policy coherence, synergies across projects). Managing the trade-offs between different costs and benefits accruing to different stakeholder groups at different times is key to ensure successful stakeholder engagement processes and outcomes."* (p.30, OECD, 2015).
This potential fully applies to WFD implementation in Ireland. However because some of these benefits may appear rather generic, it is possible to focus on some of the explicit and concrete 'services' of real value that stakeholders can collectively contribute specifically to WFD implementation and Integrated Catchment Management. These beneficial roles fall into two categories:

1. Local Action and
2. Policy input.

These roles are not mutually exclusive. A single stakeholder group may be involved in both, but as will be apparent, certain types of stakeholder groups may tend to lend themselves to one more than the other. Vitally BOTH categories must be supported by the administration to enable meaningful

[258] See SWAN paper "SWAN Recommendations for Public Participation Mechanisms in the Department of Environment, Community & Local Government 3-Tier Water Governance Proposal." (attached as appendix) for further details and references.

and effective engagement and importantly to secure the optimum results possible for delivery of WFD objectives.

Local Action

The European Environment Agency (2014) review of case studies of public participation in WFD implementation indicates that the public's knowledge about and interest in water management issues tend to be focused locally, and the activities that appear to have been most successful in engaging members of the public have been at the local scale. Capturing maximum benefits in water management from the widest possible number of stakeholders therefore requires that people have the opportunity to become involved at the local level.

Local action requires autonomous stakeholder initiatives focused on aquatic environments at catchment or sub-catchment level, such as the Rivers Trusts. Stakeholders involved are empowered to come together in an organised way at local level to identify and raise awareness locally of the value of their local river stretch, lake or bay, identifying the pressures on it and agreeing actions in response to those pressures to achieve healthy water and WFD objectives. They would also involve citizen surveys and monitoring such as those organised by several SWAN members, for which training would be provided.[259] Such groups would engage in, amongst other things:

- engagement with, and openness to, all stakeholders in the sub-catchment (including land-owners), seeking to secure buy-in from all parties to address pressures;
- engagement/collaboration with relevant authorities/agencies through clear channels;
- flora & fauna surveys and water quality monitoring;
- identifying pressures on waters within the relevant sub-catchment/ Water Management Units WMU(s) through, for example, land use surveys;
- actions to achieve and/or maintain good ecological status;
- clear identification of resource allocations of voluntary support and commitment, e.g. local volunteer working parties, FÁS workers, monitoring and recording duties, etc. and staff time where required (possibly shared between groups);
- training (in aquatic environment ecological, water quality, sampling, SSRS (Small Stream Risk Score), macro-invertebrate index, etc.); and
- communication and awareness-raising efforts, including links with schools and media.

The ***benefit*** of this type of stakeholder work and participation is of direct economic value and genuine benefit to all those agencies tasked with delivering WFD objectives, since it is effectively doing work which could not otherwise be done. Firstly because the resources are not available, and secondly because, by its very nature, this community-based catchment work can only be delivered by members of the community. With effective communications, adequate support, guidance and training, the quality and consistency of the work of these groups can be assured and represents a tangible contribution of voluntary resources to supplement those of the state agencies involved in implementation. These projects are effective "delivery partners" for implementing agencies, and as such are worthy of investment and support. There is a now wide body of work that looks at what is

[259] See SWAN paper "SWAN Recommendations for Public Participation Mechanisms in the Department of Environment, Community & Local Government 3-Tier Water Governance Proposal." (attached as appendix) for further details and references.

necessary for such local action to be effective (Muro & Jeffery, 2012; Rees *et al*, 2005; Soriani *et al*, 2015).
Such local initiatives are based on local people's appreciation for what they have – their local river, lake or bay and their knowledge of it. People's ongoing interest in their local environment, means such initiatives are likely to endure and generate sustainable and increasing benefits. These are the people most immediately concerned with the local environment, and often they have the capacity to undertake the positive management actions needed to restore, maintain or enhance it.
While such groups often carry out work that there simply are no other resources to do, there will be issues that they cannot address. However, having directly engaged with tackling their local situation, these local groups are in an ideal position to distil persistent or intractable challenges clearly and identify what policy or regulatory areas need to be addressed at another level.

Policy input

Policy input is the other main area of stakeholder engagement. Stakeholder representatives facilitated to do so in appropriate fora can make extremely constructive contributions to deliberations on water related policy and regulations assisting in the understanding of complex significant water management issues. The ***benefits*** of this type of engagement are that:

- The depth and breadth of stakeholders' extensive sector-specific expertise and specialist policy knowledge are harnessed.
- Engaged stakeholder groups develop a thorough understanding of the issues and what needs to happen to address these, through which they can be part of designing and negotiating optimum measures, and will have a greater acceptance of the "asks" that may be made of them, thus securing greater support from within their constituencies.
- Providing the opportunity for stakeholder groups to discuss matters amongst themselves (i.e. not within a wider committee of officials, etc.), enables them to
    - develop an understanding of one another's interests and concerns and reach agreed positions on the issues arising (whether consensus or qualified agreement) which they can then
    - communicate to the relevant state agencies involved in WFD implementation **AND** to their own constituency
- Where focused and productive dialogue between the WFD staff and stakeholder policy groups (or forums) takes place, it contributes a clear understanding of what the regulatory challenges are for implementation, and allows the stakeholders to take this into consideration in their deliberations.

(Participants would include environmental NGOs, academics, civil society/community, agriculture, industry/commerce, SMEs, marine interests, recreation, consumers, youth, that have demonstrable experience, expertise and interest in water issues.)
The "win-win results" of such policy input are also very well-articulated in the recent OECD report (2015) on water governance: *"On the one hand, participative and engaged stakeholders understand*

better the solutions that need to be adopted and the compromises that need to be made to overcome various conflicting interests that are the essence of many water resources management decisions. This means that by participating, stakeholders become less "self-centred" and understand better the full range of the problems at stake. On the other hand, stakeholders contribute with a type of on-the-ground and experienced knowledge that no institution can acquire by itself, as they tend to be the most direct beneficiaries of water policies. Obviously, this knowledge needs to be blended and enlarged by broader views and long-term considerations that direct and immediate experience does not always reveal." (p.30, OECD, 2015)

SWAN's communications with various agencies suggests that there is a broad agreement regarding the benefit of stakeholder groups engaging in local action. However, there also appears to be active resistance at senior level to the establishment of stakeholder fora for policy input. It is regrettable that the potential for stakeholder groups to contribute specialist policy inputs to WFD implementation deliberations is so underestimated particularly at national level and in light of the OECD findings above. SWAN hopes to make the case convincingly that both elements are equally important and need to be supported.

2. What are SWAN's recommendations for stakeholder engagement in the second WFD cycle in order to achieve these benefits?

Given the accepted 3 Tier governance strucuture being applied, what is necessary for stakeholders to contribute fully in the sort of ways outlined above? (This section is based on a paper submitted by SWAN to DECLG and the EPA in August 2013.[260]) The following outlines how stakeholder engagement structures could work alongside this three tier structure, in the simplest possible ways starting at the most grassroots level.

[260] "SWAN Recommendations for Public Participation Mechanisms in the Department of Environment, Community & Local Government 3-Tier Water Governance Proposal." (attached as appendix)

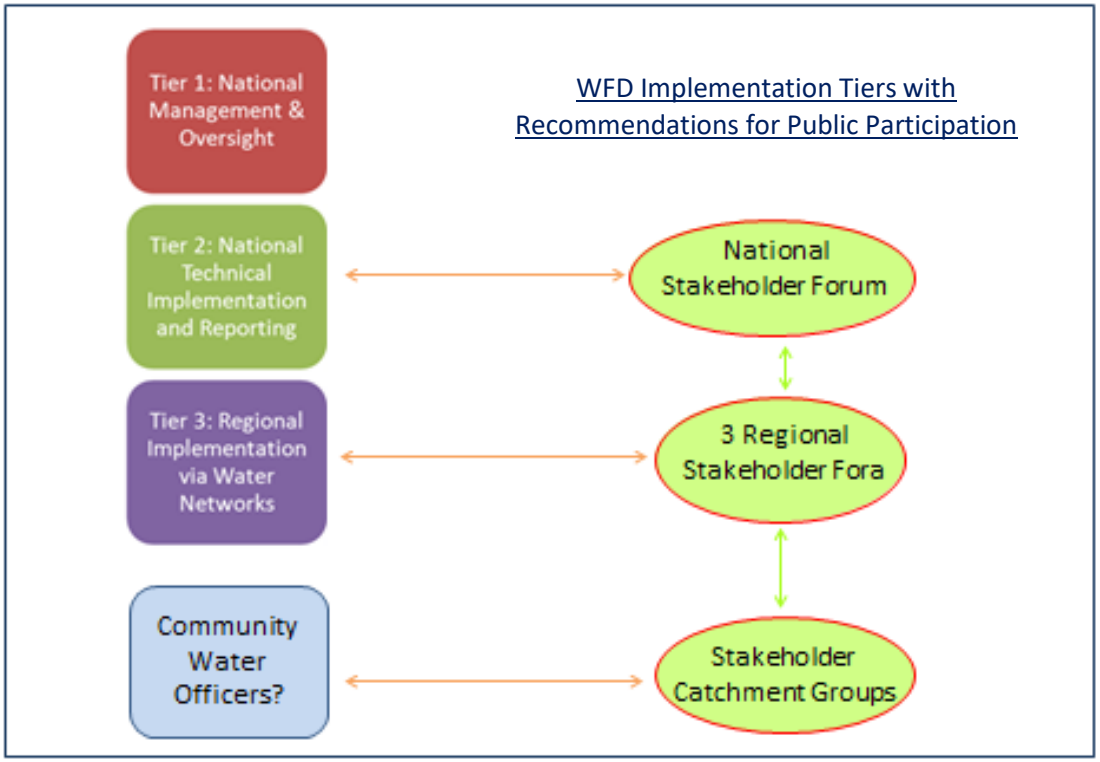

Figure 1 WFD implementation tiers with SWAN recommendations for public participation

Below Tier 3

SWAN recommends support from the administration for the establishment of Stakeholder Catchment/sub Catchment Groups. At this grass roots sub-catchment level stakeholders are able to carry out the most effective direct local action for their immediate environment as described above Groups, pilot schemes, or other initiatives may be initiated and supported in a number of ways, but local stakeholder buy-in is key to their success.

In order to secure state support, such groups MUST have the quality of aquatic environments as their clear priority. In other words, whilst other groups e.g. Tidy Towns may be supported in other ways to enhance the water environment, such structured Catchment Groups must exist with the clear goal of protecting the water environment. The stakeholders themselves conduct the work at this level, with additional inputs from public authorities where needed and sought. This might include surveys, training and direct interventions, on, for example a local pollution source, as agreed by the group.

In such groups hard work goes into building relationships, and a genuine understanding of the needs and interests of different stakeholders. This is the basis for effective collaborative work; to identify issues that need addressing, to consider the ways this may be done, and reach agreement on how to do this, before finally carrying out agreed actions, and evaluating the success of measures taken (Koontz & Thomas, 2006; Carr *et al*, 2012). These groups are likely to become increasingly sophisticated over time, as expertise, experience and knowledge grows. Those involved become powerful and effective advocates and deliverers of WFD objectives, and can wield considerable local influence. The Community Water Officers that we understand are being recruited should be in an ideal position to support these groups, if they are equipped with the appropriate skills.

As we have hinted at already these local action groups can only fully contribute to WFD implementation and Integrated Catchment Management if they are part of a wider integrated stakeholder engagement structure. For this reason, SWAN makes the following further proposals.

At Tier 3

SWAN recommends **Regional Stakeholder Fora**. At this level stakeholders can consider responses to persistent significant water management issues (SWMI) issues that are not able to be successfully resolved at grass-roots sub catchment level and which may be common across a region. Such fora represent the opportunity for divergent interests - in terms of both sectors and geographical area - to develop a clear understanding of one another's positions and concerns, and to work ***together*** to identify the optimum ways in which issues can be addressed.

These groups importantly also represent a forum for stakeholder participation in areas where no Stakeholder Catchment Group may exist, which at present is most of the country, a situation which is likely to remain the case for the majority of the country for the coming RBM Plan cycle. Work at this level is likely to focus particularly on the practical implementation of the WFD by various state agencies, in addressing significant water management issues (SWMIs). Stakeholders, having reached agreed positions amongst themselves, would communicate issues of concern and through brokered dialogue with agencies, suggest ways of addressing them, collaboratively where possibly. Where issues arise that fall within the remit of national policy/regulation (e.g. Aquaculture licensing or planning regulations) and thus cannot be resolved at regional level these would need to be referred further to a national stakeholder forum.

At Tier 2

A **National Stakeholder Forum** would provide a high level policy advisory group, focusing on issues at the national scale whether referred upwards from the Regional Fora or from the EPA/WFD office. Here the best sector-specific policy expertise in the country from stakeholder representative groups with in-depth policy knowledge come together to generate options to address SWMIs that have the support of all stakeholder groups.

Consensus on all issues will not be possible, but the extent of agreement between stakeholders that can be established is also a valuable contribution to inform policy decision makers. Organisations engaging at this national stakeholder level bring with them infrastructure and communications networks which can help to engage increasing numbers of stakeholders from within their respective sectors and raises the potential to win wider support for agreed policy options and WFD measures within those sectors.

It is important to understand that this group is not proposed as a political lobby-type structure where each representative's objective is to 'defend the turf' of their interest group and fend off the requirement for action from their sector. The group's terms of reference would be clearly focused on the agreed common goal of WFD delivery, it would need to be facilitated by an independent expert and it would be designed and integrated to work with the administrative structures.

The precise articulation of these structures for active stakeholder engagement, and how they can be integrated with planned governance structures etc. must be left to the administration, providing they meet widely accepted criteria for effective public participation that are identified in the literature.

Finally in this section, SWAN also recommends that annual regional and national meetings or conferences of involved stakeholders are held to ensure that the stakeholder elements of implementation are themselves integrated, communicate well, understand one another's roles and support these effectively.

3. How would such structures work and support delivery of WFD and Integrated Catchment Management?

A hypothetical case of a significant water management issue can be used to illustrate how these structures for stakeholder engagement might work.

High Status Sites example

High Status Sites, the loss of which has been highlighted in several EPA reports as a serious issue, has had a clear set of management recommendations identified in the EPA STRIVE Management Strategies for the Protection of High Status Water Bodies Report (EPA, 2012). This report examined the challenges for Ireland in preventing the loss of any more of our High Status Water Bodies and managing them so as to maintaining them in this state. As we begin to tackle this issue, it is possible to imagine the following scenario, under SWAN's recommended structure:

Here two of the possible management recommendations which have been identified in the STRIVE report as necessary to secure the protection/ maintenance of High Status Sites are considered.

In some cases it may be necessary to prevent livestock access to waterbodies. At individual catchment levels, looking at specific High Status Sites, this could be effectively tackled through the local Stakeholder Sub-Catchment Group, with communications between group members and relevant landowners. It might subsequently be possible, or considered necessary, for Bye-Laws to be brought in formalising this, which could be achieved through collaborative work between the stakeholder group, landowners and Local Authorities, with appropriate measures taken to deal with exceptions of non-co-operation, etc. Whilst it is not suggested that this would definitely be the case, there is the potential at least for this to be dealt with at catchment level in this way, co-ordinated through the WFD office Community Water Officer.

In other instances, it may be necessary to prevent the introduction and/or spread of invasive alien species, and the principal sources of concern may be recreational activities (such as canoeing and angling boats, etc.) and road works (where contaminated gravel is introduced to an area). The local Stakeholder Catchment Group may get agreement from the local authority on protocols to prevent introduction of contaminated gravel, etc., and may also engage in extensive voluntary removal efforts, depending on the species, but it may become apparent that the issue cannot be dealt with in isolation and that it is necessary for them to refer the issue to the Regional Stakeholder Forum for a more strategic engagement with the Regional National Roads Authority (NRA) Office and/or Forest Service on the same issue. This may be successfully addressed at that point, and an agreement effectively be adopted by the NRA or Forest Service with national effect. If this were not to happen, then the matter could be referred to the National Stakeholder Forum.

Similarly, while the relevant local Stakeholder Catchment Group may secure agreement from local recreational groups to ensure preventive measures are taken with canoes, boats, etc. and put up signs at key points to reduce the risk of alien species being brought into the water body, this may not fully address the problem. They cannot effectively communicate with all potential visitors, which is a national, even international issue when tourist visitors are considered. This might be referred up

to the Regional Forum and then the National Forum and specifically to the relevant stakeholder groups represented there for example Canoeing Ireland and the angling and coarse fishing national bodies, who can work on how best to communicate the risks, and change behaviours, and if necessary to regulate (and enforce) appropriate conduct amongst their constituents. In this way considerable work is done at the appropriate level on how the problem may most effectively be addressed by those who are best equipped to facilitate the solution.

While it may well require that an issue at national level is referred to the EPA and ultimately the Water Policy Advisory Group (WPAC) and the Minister, the preferred options to effectively deal with a situation will have been identified more efficiently, and outcomes are likely to have far greater support amongst relevant stakeholders who can have been kept informed by their representative bodies. The key here is that issues are dealt with at the lowest appropriate level, in keeping with the bottom-up approach and only those issues requiring a national response will be filtered up to the National Stakeholders Forum. This represents the most resource and time efficient for both stakeholders and officials.

Stakeholder engagement as part of Integrated Catchment Management

What is described and illustrated above can deliver the meaningful public participation which it appears is agreed by all to be vital, and can meet the public participation requirements of the WFD. Crucially, it also provides the vital public engagement element of Integrated Catchment Management (ICM). ICM is now the internationally accepted best practice model for managing our aquatic environment and 'Building Partnerships' is the very first of 6 recognised steps[261] in ICM (as set out in the *'US EPA Handbook for Developing Watershed Plans'* (USEPA, 2015)). Its basic principles are to:

- take a holistic and integrated approach to the management of land, biodiversity, water and community resources at the water catchment scale;
- involve communities in planning and managing their landscapes and aquatic resources; and
- find a sustainable balance between resource use and resource conservation.

The ICM approach has been adopted by the Irish EPA, which has invested significantly, with the support of the Department of the Environment, in the new EPA WFD Integration and Coordination Unit which is working to the ICM model and delivering the science needed to achieve WFD objectives using this model. This is an extremely welcome development.

Since the EPA is already working this way, if the stakeholder structures proposed here that conform to the ICM model are added, why might this participative ICM approach not work in Ireland? In considering this question, what emerges is that the third leg of the stool - one that must function in a complementary manner for ICM to work - is missing. This is the governance element, where responsibility for the actual management and implementation of River Basin Management Plans rests. *"Solutions* [to water management issues] *will only be viable if policies are consistent and coherent; if stakeholders are properly engaged across levels of government, if well-designed regulatory*

[261] 1. Build Partnerships; 2. Characterize the Watershed; 3. Set Goals and Identify Solutions; 4. Design Implementation Program; 5. Implement Watershed Plan; 6. Measure Progress and Make Adjustments. (US *EPA Handbook for Developing Watershed Plans)*

frameworks are put in place, if capacity of institutions and stakeholders is strengthened, and if integrity and transparency are fostered. These goals are all about governance[262]*, and require robust and agile institutions that can adapt to new conditions, taking into account the specificities of each community and of its culture and history."* (p. 5 OECD (2015).

Concerns over the adequacy of governance provisions are now considered in the last section of this paper which asks whether the governance arrangements are fit for this purpose.

4. What governance challenges need to be addressed, for this public participation to be successful?

For Integrated Catchment Management to work, and the stakeholder engagement to be worthwhile, governance must support and integrate them. It is worth re-iterating that by governance here we are not focusing on general implementation arrangements such as technical working groups etc. We mean the governance structures where responsibility for decisions on the selection and implementation of WFD measures, resides. The 2014 regulations[263] give responsibility for implementation of the RBM Plans to the Local Authorities.

The very busy diagram (below) is the latest information shared with SWAN as to the proposed governance structures for WFD implementation.

[262] Water governance may be defined as *'the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society.'* (The Global Water Partnership (GWP)) The OECD sees governance as including administrative systems, formal institutions (incl. laws & policies) and information institutions such as power relationships and practices. (OECD, 2011b)

A recent European Environment Agency Report states *that"…water governance is about the relationships for water management within the RBM system rather than simply about government-led processes. Moreover, stakeholders are not simply 'water users' or 'interests': some are major elements of local economies and societies, as in the case of agricultural interests in farming areas, and as such are part of water governance. Moreover, the 'active involvement' of these stakeholders — as per the WFD — is a key element in terms of integrating water management across economic sectors and consequently for the success of water management goals."* (EEA, 2014, p.31)

[263] European Union (Water Policy) Regulations (S.I. No. 350 of 2014).

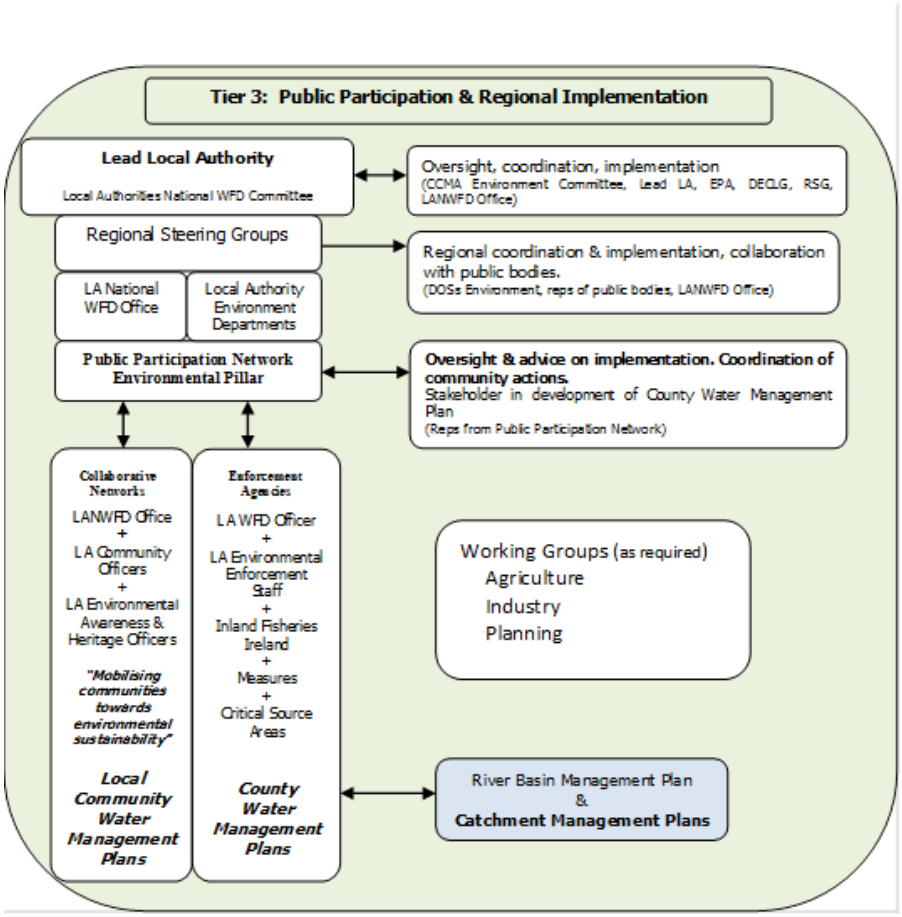

Figure 2. Public participation and Regional Implementation (Source: CCMA)

This represents part of what many have been wondering about for the past number of years: which is just how this new revised governance system is going to deliver integration, and how it is going to work in practise. No details being available, this critique must necessarily be general, but it is nonetheless valid. Looking at the diagram, several fundamental issues emerge that SWAN is extremely concerned will persist in whatever the final governance details are, undermining stakeholder engagement and ICM overall, and these must be addressed. They can be categorised broadly as problems for delivering both the *catchment* and *integration* aspects of the ICM approach.

A. The catchment focus is missing

Looking at the diagram in Figure 2 above the first striking issue of concern is that there is no evidence of a catchment focus. Apart from a reference to the feeding in of Catchment Management Plans, none of the structures or arrangements within the administration tasked with implementation of the WFD at this Tier 3 reflect or apply a catchment approach. There are no evident structures, vested with the necessary authority which will provide catchment based management, where decisions are taken regarding the selection and implementation of measures, at a catchment level. Furthermore it is not apparent how this can be done in collaboration with stakeholders.

There is a fundamental challenge, specific to WFD implementation, to successfully mesh together environmentally determined catchment and sub-catchment areas, when responsibility for the implementation of measures falls to local authorities whose boundaries are not coincident with these catchments. Similarly, the administrative boundaries applied by other state agencies involved

are not determined by catchment. If WFD is to be delivered on a catchment basis, this challenge has to be acknowledged and adequately addressed (OECD, 2015).

Rather than any meaningful attempt to introduce structures that can work on a catchment basis, there is evidence that the catchment units are in fact to be broken down to reflect the existing administrative boundaries. This can be seen in the introduction of County Water Management Plans, which have been explained to SWAN as articulations of the River Basin and Catchment Management Plans.

The questions that this retrograde step throws up are numerous and some very profound: Who produces which Plan? Who executes which measures in each? How is synchronisation ensured and who ensures it? In the event that it isn't, which Plan trumps which? This has all the appearance of a bureaucratic fudge to get the square peg of river basin management to fit into the round hole of traditional government administration structures, and it is the antithesis of the ICM and WFD approach. This creates challenges for officials working in implementation and is likely to frustrate, any attempt to allow the public to contribute meaningfully. Perhaps most worryingly it implies that the reality of planned WFD implementation in Ireland for the second cycle will NOT be integrated catchment management.
In the case where a Stakeholder Catchment Group is initiated, whose catchment boundaries cross local authority boundaries, there will be multiple relevant local administrations each working to their own separate County Water Management Plans, none of which align with the catchment of concern to the local action group. The Community Water Officer who has to liaise with this group whilst navigating 2-3 County Water Management Plans and a Catchment Management Plan would not be in an enviable position.

B. The lack of integration

The second major cause for concern is the messy, fragmented and "structure heavy" nature of the governance arrangements this diagram outlines. Despite acknowledged criticism regarding the persistent lack of integration in the first iteration of River Basin Management Plans, what is proposed is not a streamlined, integrated or fit to incorporate stakeholder engagement.

As stressed previously, if there is to be no change to the fundamental administrative structures, then the challenges of these structures and boundaries NOT aligning with catchment units mean there MUST be radical institutional cultural changes from public authorities' to their current ways of working to implement Integrated Catchment Management and effectively deliver WFD objectives.

The structures proposed need to ensure that all relevant Government Departments, public authorities and other agencies are **tasked** from the highest level and adequately resourced to actively co-operate in water management issues, including those raised by stakeholder groups. Fundamentally, this involves a collaborative culture of working, which is not always evident even *within* local authorities or other state bodies, and is even rarer *between* them. This cultural change is vital if we are to successfully implement the WFD. Specifically the following are required:

- collaborative engagement of neighbouring authorities in managing shared catchments (for example, when a river flows across local authority boundaries the catchment involved requires more than the separate and individual work of the 2 or more local authorities; it necessitates their collaborative work to deliver management of the river catchment);
- positive collaborative engagement between state agencies (for example, local authorities and NPWS working together to manage High Status Sites)

with clear direction to staff at all levels of all relevant state agencies that an important element of their work and responsibilities is now to participate in WFD delivery and to respond to significant water management- issues where appropriate when requested. For example DAFM staff in the Forest Service and Aquaculture & Foreshore Management Division should be directed to fully co-operate with the EPA, DECLG and Local Authorities in relation to measures applying to these sectors. Such increased institutional integration is already being led by public participation requirements of the WFD in France and Germany (EEA, 2014);and

- necessary resources to do the above.

SWAN has four further recommendations to make in order to improve governance for stakeholder engagement:

1. Hire staff with appropriate skill-sets and equip existing staff with appropriate skills and support

To support this cultural shift towards real integrated collaborative working, including with stakeholders, staff will need support to establish the necessary close productive relationships between agencies. Similarly, if WFD staff in the WFD National office and local authorities are to integrate stakeholder engagement, such as Stakeholder Catchment Groups, they will need a very specific social science/community development skill set to support these initiatives; and to act as an effective link between these groups and official implementation structures. The extent of the communication and conflict resolution skills that will need to be provided here should not be underestimated. Similarly, neutral facilitation and advice and expertise on engagement structures and processes must be engaged from the beginning, and as necessary thereafter.

The challenges of developing capacities for effective water governance are real and widely recognised: *"Developing and strengthening capacity throughout the policy cycle can be a daunting and resource intensive task. A primary challenge is that organisations often fail to recognise the wide range of characteristics that make up effective capacity. Among these are 'hard' aspects related to tangible 'deliverables' and associated technical skills. But there are also softer, more intangible aspects, such as leadership, staff motivation, shared values, integrity, coordination, social expertise, communication, facilitation, and knowledge. Both hard and soft capacities*[264] *should receive attention….. Special attention should also be devoted to capacity needs of the civil society and the support that governments can bring in this regards"* (OECD, 2015, p. 20).

Within the WFD Implementation Office and amongst all those tasked with implementation, the role of these staff in engaging stakeholders needs to be seen as an integral element of the process.

2. Adopt a culture of openness & transparency

Transparency and openness at all levels both between agencies and with stakeholders is vital (OECD, 2015). This is not a naïve proposal to disclose sensitive information, but to keep people in the loop, reduce the risk of conspiracy theories developing, support collaborative working and a growing partnership between officials and stakeholders. It will require leadership, which must come from the

[264] The OECD includes inter-agency communication, negotiation and consensus-building among "soft" capacities.

top (WPAC level) down starting with WPAC releasing information about its workings such as committee membership, its terms of reference and meeting agendas and outputs.

3. Review the new governance structures put in place

Whatever governance arrangements are put in place represent a new and relatively complex attempt to integrate agencies and structures and are the result of more than 2 years of bureaucratic negotiations. Therefore SWAN recommends that an independent review of implementation structures is scheduled at 5 years, midway through the River Basin Management cycle, to identify strengths and weaknesses and to ensure they are fit for purpose, including for facilitating and responding to stakeholder engagement.

4. Raise awareness and provide information

A strong strategy to develop and deliver enhanced public awareness must be a priority and the clear responsibility of a single entity, with an emphasis on encouraging stakeholders to engage. Easy access to clear information is vital and an important first step is provision of a comprehensive website providing information, updates and notifications from both the administrative agencies involved, but also from the stakeholder groups, at catchment, regional and national level. Such a website, that is easily navigable but nonetheless allows users to explore detailed background and technical information, is achievable and of immense value to all concerned with WFD implementation.

The rapid development of information technologies and social media significantly enhance the possibilities for communicating with citizens. There are many techniques and approaches that can be employed, but it is vital that these are planned well in advance, appropriate to task, and fully integrated into the wider task of WFD implementation.

One other issue very specific to public participation emerges in the complex diagram of structures that are currently proposed, which needs to be addressed. This involves the incorporation and reliance on the new Public Participation Networks established (or being established) by Local Authorities.

Public Participation Networks – a powerful resource for public participation, but not sufficient for WFD implementation

There is an over-reliance on the new Public Participation Networks at local authority level which illustrates well the challenges of ensuring an integrated catchment approach to aquatic environmental management and deserves special comment.

The Public Participation Networks (PPN) were established to facilitate the engagement of citizens with local government. They consist of a nominating network from which stakeholder representatives would be nominated onto LA committees and other local government bodies, and are based on the three pillars of community and voluntary, social inclusion and environmental organisations. According to the 'Guidelines for Public Participation Networks' issued by the Department in its May 2014 Circular Letter "*The PPN facilitates input by the public into local government through a structure that ensures public participation and representation on decision-making committees and bodies within local government*". (emphasis added).

However, there are severe limitations to the role that the PPN can fulfil in relation to public participation in WFD implementation:

- While the PPN represent an entirely appropriate source of representatives from the 3 pillars to stakeholder bodies such as our recommended Regional Stakeholder

Fora, we need to stress that they cannot constitute, replace or be nominated to local citizen action groups, such as Stakeholder Sub-catchment Groups since this is not a function of PPNs, which are purely representative.

- The PPN are Local Authority bodies and so don't align with catchment units, which constitutes a fundamental mismatch between the PPN as a source of stakeholder representatives and the focus of concern, namely the catchments.

- The PPN do not represent all stakeholders. PPNs can represent the community and voluntary, social inclusion and environmental organisations, but does not fulfil this function for commercial interests such as business, industry and farming. Provision must be made to integrate all stakeholder elements, in a fair and transparent manner – so reliance on PPN is insufficient in this regard.

While the proposed reliance of Public Participation Networks may reflect a genuine desire not to re-invent the wheel, it is vital to recognise that the PPN are **not** what is required under WFD for public engagement; limiting engagement to these groups **will effectively limit** the public stakeholder engagement and **cannot** deliver what is envisaged in WFD or ICM.

Conclusion

SWAN's aim is not to discourage senior officials by highlighting the serious challenges and risks evident in the proposals for governance for supporting effective stakeholder engagement and ICM.

However, it is necessary to challenge key decision-makers to ensure that the governance structures proposed are fit for this purpose. What has been presented are not, not least because there is no clear provision for autonomous stakeholder structures. The very simple recommendations for 3 Tiers of stakeholder engagement that have been outlined above, and the benefits that these can bring both for officials, for stakeholders, and for the aquatic environment, remain achievable. The question that remains is, "Is there a genuine commitment to meaningful public participation in the administration or simply an abstract notion that it's probably a good idea?" And even more fundamentally, "Is there the necessary commitment to delivering integrated catchment management in governance, of which stakeholder engagement is a key part?"

Unless the governance structures address the shortcomings outlined here in relation to catchment-based management and integration, - and it is not too late to do so - then putting in place the 3 Tier stakeholder proposals made by SWAN cannot deliver optimal stakeholder and will lead to immense frustration on the part of stakeholders and, very probably, staff tasked with implementation of ICM also.

Integrated Catchment Management is a simple concept to grasp; it is being applied by the EPA, and it is straightforward to deliver the public participation element - that is the stakeholder structures encompassing both local action AND policy input that SWAN is proposing, if the commitment is there to do so. It is not appropriate or acceptable that State agencies responsible for WFD implementation (or similar) respond to requests and proposals for public participation by identifying flaws or pointing to the complexities of government and administration which make delivering this challenging. The onus should not be on stakeholders to present an unassailable or perfect model/proposal for public participation. Rather it is the State's responsibility to look at the key characteristics of the public participation that require to be delivered and to facilitate its delivery by setting up a structure and mechanisms that allow and support it to happen. In addition to the

extensive literature on engaging the public, there are increasing studies specifically related to the experience of WFD implementation (Pahl-Wostl *et al*, 2008; Van der Heijden & ten Heuvelhof, 2012; WRc plc, 2012). The test for any structure/processes that ARE put in place is whether they DO deliver the key characteristics or not. If they do not, the prime responsibility must rest with the authorities as they have the power to enable effective public participation to occur.

There is a significant challenge in addressing the mismatch between existing traditional administrative structures and the natural boundaries needed for a catchment management approach and it is an effective response to that challenge that is needed for success.

Failure to provide the opportunity to capture the benefits of stakeholder engagement reduces Ireland's capacity to achieve WFD objectives with maximum efficiency and effectiveness. SWAN has have provided robust recommendations - and the basis for these - on how to implement public participation in catchment management and WFD implementation in Ireland in a variety of forms and fora over the past 10 years. The choice now rests with the State agencies involved, to enable participative catchment-based management to take place.

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APPENDIX III (B): Public Engagement in Water Framework Directive Implementation: A Review of Developments as of September 2016, with Recommendations. SWAN Submission to Department of Housing, Planning, Community and Local Government (DHPCLG), October 2016

Since the transposition of the EU Water Framework Directive (WFD) into Irish law in 2003, SWAN has supported its implementation with energy and commitment, participating whenever opportunities have arisen. Further, SWAN has consistently made the case for meaningful public engagement, in which stakeholders realise their full potential to contribute to achieving the objectives of the WFD.
Several earlier SWAN documents (2009; 2012; 2014) as well as the wider literature (Deli-Priscoli 2004, Meadowcroft 2004, HARMONICOP 2005, OECD 2015) have illustrated the diverse benefits of effective public participation. SWAN welcomes the commitment to developing a genuine engagement strategy on the part of the Department of Housing, Planning, Community and Local Government (DHPCLG). However, ultimately a Department-wide commitment to stakeholder engagement, in which other government Departments and agencies with a role in WFD delivery also demonstrate their willingness to adjust plans in light of stakeholder input, remains underdeveloped.
SWAN welcomes the recent proposals from the DHPCLG to improve public (stakeholder) engagement in WFD implementation, as well as the fact that these include some of the recommendations made by SWAN. These developments are in keeping with the international "move towards more structural forms of stakeholder engagement" currently taking place in water management (Ahkmouch & Clavreul, 2016, p.204), and such systemic, inclusive and foresighted approaches to water policymaking are more likely to result in better outcomes and returns on investment, in terms of time and money (OECD, 2015). The conditions necessary for inclusive water governance that such initiatives seek to deliver have been well-documented (OECD, 2015) and can be achieved through committed action and good design.
To support the success of DHPCLG's initiatives, this document, a follow-up to our 2015 *Delivering meaningful public participation in water governance WFD implementation, SWAN Recommendations.'*, presents a number of matters that remain to be addressed. This is done in two parts:

I. Regarding the public engagement measures that DHPCLG has indicated it will put in place, this document identifies what will be necessary for these measures to deliver effective engagement, and what challenges to success are likely to arise.
II. This document also examines what else, in addition to current DHPCLG proposals, remains to be addressed in order for the proposed public engagement provisions to be effective.

1. Public Engagement Measures Planned by DHPCLG

The Department of Housing, Planning, Community and Local Government has indicated that it proposes to:

- Promote and support **sub-catchment-based stakeholder groups** throughout the country; and

- Establish a **National Stakeholder Forum**.

SWAN supports both these mechanisms for stakeholder engagement providing they are enabled to fulfil meaningful and effective roles: if it is worth doing, it is worth doing well. Simply put, this means that these initiatives must demonstrate certain characteristics, the most essential of which we outline below.

1.1 Sub-Catchment-based Stakeholder Groups

There is a risk that these local grassroots groups are mostly limited to river walks, clean-ups and "balsam bashing" exercises. In reality, they have the potential to significantly augment the collective capacity to deliver WFD objectives across the State by identifying local issues and participating in collaborative action to address these. It is vital that the potential of these groups is recognised, and that their number and efficacy are encouraged to increase over time. In order to be fully effective, these groups need:

A. To be autonomous medium/long-term stakeholder groups;

B. To have the clear primary goal of protecting the aquatic environment, without being compromised by other priorities;

C. To be catchment or sub-catchment focused so as to dovetail with the best-practice, integrated catchment management approach adopted by the Environmental Protection Agency in WFD implementation;

D. To engage active participation from across *all* stakeholder interests in the relevant sub-catchment;

E. To be facilitated and supported with adequate resources by relevant agencies so that they can:

   i. Raise awareness locally of the value of their aquatic environments;

   ii. Identify the pressures on these (including undertaking citizen surveys, monitoring, etc.);

   iii. Agree actions in response to those pressures to achieve healthy water and WFD objectives;

   iv. Address issues at a local level to the maximum extent possible;

   v. Secure necessary funding to resource their activities;

F. To receive support for the further development of their capacities including through the hiring of full-time staff; and

G. To have clear, functional links and regular dialogue with the various agencies involved in implementation of the WFD, and to be integrated into the structures and mechanisms for delivery of the Directive.

This last point is vital. If stakeholder groups are to successfully seek solutions to problems that exceed their capacity for local resolution, they will need to be linked to wider structures and systems also working on these issues who can progress such challenges which the group itself cannot. It is equally important that the governance structures in place are responsive when such issues arise at this local level and also that they have the capacity to refer groups efficiently on to other stakeholder bodies working at a national scale on occasions when such bodies are in a better position to address the issue in question. Thus there is a need for a clear communications pathway to be provided and facilitated between grassroots local groups and the proposed National Stakeholder Forum.

The ultimate goal in facilitating these local stakeholder sub-catchment groups is successful collaborative actions to address pressures on aquatic environments. Such collaboration requires constructive dialogue between the sub-catchment groups and the officials of relevant authorities. It

is suggested that the newly appointed **community water officers** are ideally placed to broker such liaisons.

Whether or not a single model ("one size fits all" approach) for sub-catchment stakeholder groups is appropriate is unclear. It is important that a number of different models be explored, ideally through pilot projects, to identify successful options and criteria for their operation. In order to develop a better understanding of the optimum approach, it is important that DHPCLP commit to the future of these groups with support both political and financial. Pilot projects would also provide the opportunity to raise awareness among the public of such initiatives, as well as demonstrate the need for them.

These local initiatives must be flexible so that they may grow organically, actively and continually seeking to engage and include all interested stakeholders within the sub-catchment. Those involved may be local groups, individuals, or formal community structures whose common interest is the protection of the aquatic environment. It is inappropriate and inadequate to attempt to prescribe the membership of such groups, and reliance on structures such as the Public Participation Networks (PPNs) demonstrates a fundamental failure to understand both the limitations of the PPNs' role and the active role of stakeholder sub-catchment groups.[265]

1.2 National Stakeholder Forum

While it has enormous potential, there is a risk that a National Stakeholder Forum could be an ineffectual talking shop if it is simply 'bolted on' alongside the governance structures set up for WFD delivery and other structures already in place. In addition, it requires very careful design so that it is not a political lobby-type structure but instead delivers the significant potential of a high-level policy advisory group, benefiting from extensive specialist sector-specific expertise.[266] To be effective, such a national forum must be:

A. **Established with support from independent expert(s)** and with the clear goal of achieving the objectives of the WFD, which is enshrined in the Terms of Reference;

B. Clearly tasked to explore means of addressing **issues that either by their nature (e.g. national regulations) are clearly not appropriate to be tackled at local level,** or which are referred from sub-catchment stakeholder groups for this or other reasons (e.g. intractable issue with the relevant public authority). The Forum would be required to **explore possible solutions**, assessing the extent of agreement possible amongst stakeholders;

C. Have a **specific, participatory, working role** rather than 'overarching' remit, in order to consider and address matters of substance (as described in B. above) and meet as regularly as is necessary (either in plenary or sub-committee) in order to do this effectively, and not less than once every two months;

[265] While The PPN are an entirely appropriate *source* of representatives to WFD stakeholder bodies, they cannot constitute or replace local citizen action groups such as the stakeholder sub-catchment groups, since this is not a function of PPNs, which are purely representative. Moreover, the PPN are Local Authority bodies and so do not align with catchment units. In addition, the PPN do not represent all stakeholders: they represent the community and voluntary, social inclusion and environmental organisations, but not commercial interests, such as business, industry and farming. Therefore the PPNs cannot be the default engagement mechanism.

[266] Involving stakeholders through a high-level policy advisory group can secure a range of benefits, which include: the contribution of extensive sector-specific expertise and specialist policy knowledge; the opportunity for stakeholders to discuss matters among themselves (i.e. not within a wider committee of officials, etc.), so that they can develop an understanding of one another's interests and concerns and reach agreed positions (whether consensus or qualified agreement), which they can then communicate to the relevant state agencies AND to their own constituencies; enabling focused and productive dialogue between the WFD staff and stakeholder policy groups, contributing a clear understanding of what the regulatory challenges are for implementation and allowing the stakeholders to take this into consideration in their deliberations; the possibility to secure support for measures that might otherwise prove difficult to implement and enforce.

D. Made up of **balanced representation of stakeholder groups** through participation of national representative organisations, each of which commits to work as tasked;

E. Allowed **autonomous operation**, so that stakeholder representative groups can **work separately from officials** while they explore possible policy responses that are mutually acceptable;

F. Equipped with **independent, skilled facilitation** and agreed terms of engagement (e.g. consensus/ qualified consensus, Chatham House rules/ confidentiality, protocols for communications between representatives and their constituent members, etc.) and

G. Supported with **clear mechanisms for integration with the regulatory and administrative frameworks**, and linked with the proposed stakeholder sub-catchment initiatives in ways that allow for two-way communication and dialogue.

There are two immediate and practical challenges facing delivery and effective operation of both the stakeholder sub-catchment groups and the National Stakeholder Forum, and they are mutually reinforcing. The first of these is the almost total lack of public awareness of the Water Framework Directive, and the second is the present dearth of sub-catchment stakeholder groups (or entities that could fulfil this role).

Lack of public awareness: Since there is little or no public awareness of the WFD or, more importantly, of what it is trying to achieve, citizens have not had the opportunity to identify their interest in its implementation. In this situation it is extremely difficult to encourage engagement. This undermines the possibilities of initiating sub-catchment stakeholder groups and involving the necessary range of stakeholders. (The development of pilot schemes as recommended above would positively reinforce attempts to raise public awareness.)

Provision of a comprehensive website on WFD implementation in Ireland (www.catchments.ie) is to be welcomed, but without a significant and effective accompanying national initiative to raise public awareness, it cannot be successful or sufficient. There are existing proposals (SWAN 2009) and ever-evolving innovative and cost-effective ways in which this could be done (e.g. Guimaraes-Pereira et al, 2003, Jonsson 2005) that merit attention.

Present lack of sub-catchment stakeholder groups: Currently there are very few groups in existence that fit the description of sub-catchment stakeholder groups envisaged here, and their assisted establishment will take time. Most significantly, however, this paucity of groups operating at grassroots level means that the base from which a national stakeholder forum would be informed about issues that cannot be resolved locally is not present.

In response to this, SWAN proposes that the Department reconsider adopting a regional stakeholder forum network (previously proposed by SWAN) *as an interim measure*. This would enable local water officers to bring together stakeholder groups, often more easily identifiable at the larger scale, to begin to look together at the challenges in delivering WFD objectives and how this might be done. Such a mechanism would serve the fourfold purpose of:

A. Raising awareness among stakeholder groups and organisations at that level;

B. Engaging participants in looking at pressures and working collaboratively toward responses to these (modelling how sub-catchment stakeholder groups will ultimately work);

C. Enabling the creation of links between such stakeholder groupings and those at the appropriate regional level within the relevant authorities; and

D. Enabling participants to identify intractable issues for referral to the national stakeholder forum for consideration.

2. Additional Conditions Necessary for Success of Public Engagement

In addition to the above**,** delivering meaningful public engagement will require that the structures and procedures established for WFD implementation to incorporate certain additional elements and measures in order to be effective and secure the public's confidence.

The following recommendations are supported by current best practice in the management of aquatic environments (US EPA, 2015) and public administration (Cooper *et al* 2006, Yang *et al* 2011).

2.1 Technical Support in Process Design

Whatever the structures put in place for public engagement, it is vital that the Department employ skilled engagement expertise in order to ensure that the operational processes set up are serviceable, robust and efficient. This would involve details such as integrating the tiers of engagement, communication systems, and setting out clearly the facilitation role in support of the National Forum and the necessary provisions for support of local stakeholder catchment groups.

2.2 Consistent Application of Integrated Catchment Management Approach

Integrated Catchment Management (ICM) is the internationally accepted best-practice model for managing the aquatic environment. This has been reflected in the shift from traditional top-down administrative approaches to those that are more deliberative, inclusive and bottom-up (OECD, 2011). While the EPA has adopted the ICM model, the details of Tier 3 (see Figure 1 below) of the present governance structure for WFD implementation which relate to the local authorities, who are responsible for implementation, do not reflect or apply a catchment approach. Nor is it clear how the EPA Programme of Measures Working Group or National Implementation Group can fulfil this function.

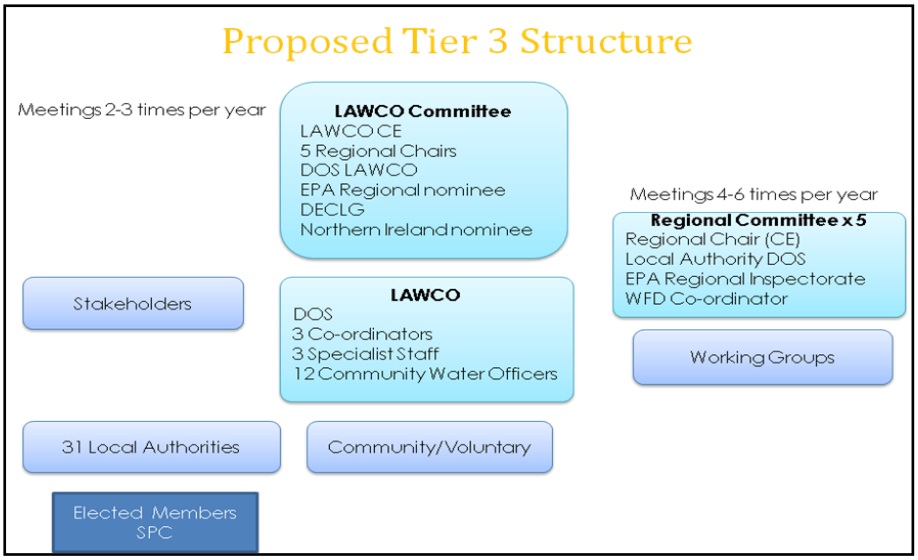

Figure 1. Proposed structure of Tier 3 in present governance arrangements (LAWCO presentation to SWAN, 11-02-2016)

Absolute clarity is needed as to which structures are vested with the necessary authority to provide catchment-based management, and where decisions are taken regarding the selection and implementation of measures at a catchment level. Similarly, details are needed as to how those proposed structures which are not coincident with catchments can effectively deliver catchment-management plans, and how they will mediate between these and other non-catchment based administrative provisions, such as development plans. Finally, stakeholder groups operating (appropriately) with a sub-catchment focus need to be clear on how they can relate to such structures in a meaningful or effective way.

It is imperative that the governance structures demonstrate the consistent application of ICM. If the proposed structures continue as presently set out, and do not reflect such an approach, then convincing provisions must be made (and made public) as to how they can adequately support an ICM approach.

	Prediction and control regime	***Integrated, adaptive regime***
Management paradigm	Prediction and control based on a mechanistic systems approach	Learning and self-organization based on a complex systems approach
Governance	Centralized, hierarchical, narrow stakeholder participation	Polycentric, horizontal, broad stakeholder participation
Sectoral integration	Sectors separately analysed resulting in policy conflicts and emergent chronic problems	Cross-sectoral analysis identifies emergent problems and integrates policy implementation
Scale of analysis and operation	Transboundary problems emerge when river sub-basins are the exclusive scale of analysis and management	Transboundary issues addressed by multiple scales of analysis and management
Information management	Understanding fragmented by gaps and lack of integration of information sources that are proprietary	Comprehensive understanding achieved by open, shared information sources that fill gaps and facilitate integration
Infrastructure	Massive, centralized infrastructure, single sources of design, power delivery	Appropriate scale, decentralized, diverse sources of design, power delivery
Finances and risk	Financial resources concentrated in structural protection (sunk costs)	Financial resources diversified using a broad set of private and public financial instruments
Environmental factors	Quantifiable variables such as BOD or nitrate concentrations that can be measured easily	Qualitative and quantitative indicators of whole ecosystem states and ecosystem services

Table 1. Comparison between the current system and an integrated, adaptive water management regime (Pahl-Wostl, 2007)

The international paradigm shift away from traditional predict-and-control models of resource management towards adaptive management regimes requires an integrated approach to the human, physical, biological, and biogeochemical components of the water system and their interactions (Pahl-Wostl 2007; see table 1. above for a summary of differences in approach and the subsequent diagram overleaf that illustrates the integrated and iterative nature of adaptive management). Such a management approach is focused on increasing the adaptive capacity of water systems[267], so that they are more ecologically and socially resilient and better equipped to handle stresses that are increasingly complex and difficult to predict. So, just as the scientists consider factors related to aquatic resources in an integrated way, the administration and management of those resources must reflect this integration also in order to enable effective, future-proofed management.

[267] Including water management systems

The enhanced features of the adaptive model shown in Table 1. enable improved responsiveness and a better ability to cope with increasingly complex and challenging pressures. Figure (2) below illustrates how adaptive management operates cyclically, rather than in a linear and sequential approach. This can be seen in particular in the 'Response (R)' stage of the DPSIR model (see especially the emphasis on assessment and monitoring). It also demonstrates the need for an effective integrated approach to governance of water management in order that all the relevant variables can be considered and addressed cohesively, as is required for successful integrated catchment management.

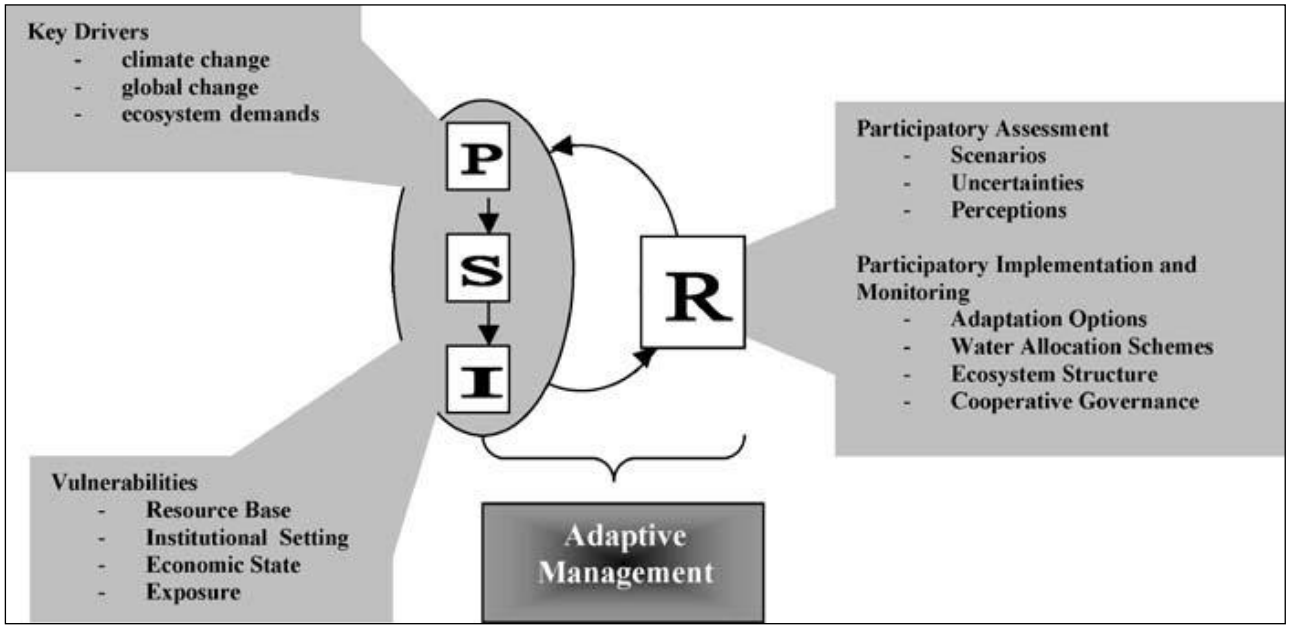

Figure 2. Adaptive management represented in an extended PSIR (Pressure-State-Impact-Response) framework (Pahl-Wostl. C., 2007). (The boxes indicate the type of variables and processes that are of importance.)

In addition to the importance of clarity of roles and collaboration within governance to deliver results, it is vital to develop and sustain the capacity of all parties (authorities, experts, interest groups and the public) to effectively manage their (sub-) catchments. This social learning embraces "collective action and the resolution of conflicts require[ing] that people recognize their interdependence and their differences and learn to deal with them constructively. The different groups need to learn and increase their awareness about their biophysical environment and about the complexity of social interactions." (Pahl-Wostl 2007, p.56).

2.3 Culture of Openness and Transparency

As highlighted by the OECD (2015), transparency and openness at all levels both between agencies and with stakeholders is vital in water governance. Moreover it is also a fundamental prerequisite of the adaptive management approach, as outlined above.

While the minutes of WPAC meetings are now available and this is welcomed, this practice is not being applied consistently across the various elements of the governance structure. There is no public information about the membership or work of key structures, such as the National Implementation Group and Programme of Measures (and other) Working Groups, which now appear to be making key decisions regarding the contents of the PoMs, the central tool for WFD implementation. The lack of transparency around their operation is emblematic of a traditional, outdated and ineffective 'Centralized [and] hierarchical' (Pahl-Wostl, 2007) command-and-control approach to water governance.

Building successful collaborative relationships demands an open approach. This requires a commitment within implementation structures whereby the sharing of information becomes standard practice rather than the exception.

2.4 Appropriate Staff Skills and Resources

It is SWAN's understanding that the full staffing complement under the existing structures are now in place. It is to be hoped that these individuals have skill sets suited to their roles. It remains important that they are provided with opportunities for additional training where this is found to be necessary, particularly in relation to establishing successful relationships with stakeholders and facilitating the work of the stakeholder sub-catchment groups, including providing conflict resolution.

2.5 Elucidate Operation of Governance Structures and Undertake Regular Reviews

SWAN has repeatedly made clear its contention that appropriate, fit-for-purpose governance structures are a necessary prerequisite for both the successful delivery of WFD objectives and for meaningful public participation in this. The vital importance of effective governance in water management has been clearly recognised by the EU and OECD among others; these bodies also see the need for accountability as contributing to a compelling imperative to evaluate stakeholder engagement in governance of water management (OECD, 2015).

For engagement processes to be relevant and effective, they must balance what they are trying to achieve, the resources they require and the degree to which they succeed in reaching the intended objectives (Akhmouch & Clavreul, 2016). It is therefore vital to critically review the design and performance of engagement structures and outcomes to ensure that this balance is achieved.

These engagement structures are of course part of the wider governance system. SWAN maintains that the governance overhaul necessary to secure the active integrated collaboration of diverse government departments and relevant state agencies, and to earn the confidence of stakeholders, has only very partially been achieved in the 3 Tier "operational structure" which is now established.

The information provided publicly on this operational structure fails to give adequate details of how the various tiers relate to one another, how the structures within individual tiers relate, or on the functions of the structures concerned. Nor is there any articulation of how these structures will engage with other state agencies and with stakeholders. This information is necessary in order to assess whether the structures have the potential to function effectively. (The proposal in 2.1 above for technical support in process design is proposed so as to ensure that these structures can operate as intended.)

If in practice this wider governance system is not serviceable, the public engagement structures discussed above cannot function as intended and effective participative governance cannot be delivered. It is therefore of equal importance that the performance of the overall water governance provisions is also critically reviewed.

The OECD (2015) has identified the five key obstacles for effective stakeholder engagement, namely;

1. a lack of political will and leadership;
2. a lack of clarity on the use of stakeholder inputs;
3. institutional fragmentation;
4. lack of funding to sustain the engagement process; and

5. conflict of interest and consultation "capture".[268]

It is clear that each of these have been present in the Irish context. In light of this, SWAN proposes that DHPCLG commit to a regular review (every 5 years) of the governance provisions for WFD delivery, including public engagement provisions, in order to assess how effectively these obstacles have been addressed. The review would identify lessons learned and adjust for future improvements, consistent with social learning and adaptive management best practice (Ahkmouch & Clavreul, 2016).

2.6 Willingness to Adapt and Incorporate / Respond to Stakeholder Inputs

A crucial determinant of the success of public engagement, once the opportunity for it has been adequately provided, is the ability of stakeholders to influence outcomes. This is determined by the willingness (or otherwise) of those involved in the relevant agencies and structures, both technical and administrative in capacity, to allow the adjustment or adaptation of plans in light of significant quality inputs from stakeholders. Without this, investment in good structures and processes of engagement can be no more than window dressing.

Experience has demonstrated that such change represents a significant challenge for individuals and institutional culture, and demands an appreciation of, and exposure to, the superior results that can be achieved by effective engagement. Having adopted the OECD Principles on Water Governance (OECD, 2015b), there is now a real opportunity for Ireland to demonstrate its commitment to promoting stakeholder engagement for informed and outcome-oriented contributions to water policy design and implementation in the delivery of the Water Framework Directive. This represents not only an opportunity to bring about enhanced water management, but it would also "trial-run" an integrated approach, potentially very useful in future for other resource management challenges and administrative functions in Ireland.

Conclusion

SWAN welcomes the recent undertakings of DHPCLG to embrace stakeholder engagement, and will support related initiatives. However, we issue the stiff caution that this approach needs to be wholehearted and committed, addressing the issues raised above (among others) to ensure success. Without institutional change and the necessary resources devoted to growing and supporting stakeholder groups, the DHPCLG risks establishing a structure that look good on the outside but is ultimately lacking in substance, thus rendering its own best efforts toothless.

Ireland in now ideally placed to learn from the mistakes of other Member States and to benefit from the significant work done by reputable bodies like the EEA and OECD very recently in order to design a modern and cost-effective public engagement strategy that contributes significantly to achieving WFD objectives and to securing a sustainable future for Ireland's water resources.

When combined with well-designed and well-delivered mechanisms which enable stakeholders to participate in a constructive way that generates high-quality contributions to a collaborative process, the possible gains from public engagement, both for the aquatic environment and for civic relationships, will be immense.

[268] Consultation capture includes the challenges in handling differences of opinions and positions from diverse stakeholder interests and how these are to be adequately collected, understood, communicated, and used constructively, avoiding the temptation simply to collect responses and do nothing with them.

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