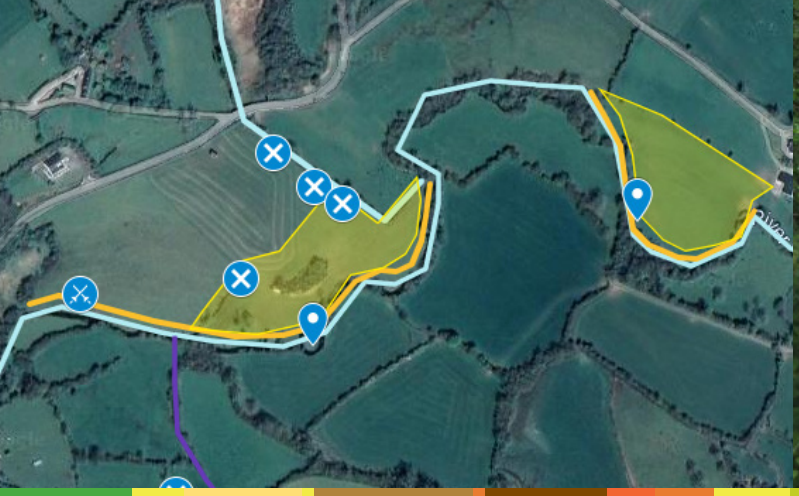


Agricultural Sustainability Support and Advisory Programme (ASSAP)

Interim Report #2 | 2020

teagasc
Agriculture and Food Development Authority

Dairy Sustainability Ireland

ASSAP
Farming for Water Quality


eagasc
Agriculture and Food Development Authority


Local Authority
waters
Programme
vibrant communities | catchment assessment | healthy waters


An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine


An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreachta
Department of Housing,
Local Government and Heritage


Dairy
Sustainability
Ireland


ASSAP
Farming for
Water Quality


dairygold
Golden Valleys, Growing Naturally


Lakeland
DAIRIES


glanbia


CARBERY


Arrabawn


TIPPERARY
COOPERATIVE


North Cork
Creameries


KERRY


Aurivo

Report Content:

Figures: Page

Tables: Page

ASSAP Partners

Funded by:

Department of Housing, Local Government and Heritage
Department of Agriculture, Food and the Marine
Dairy Processing Co-ops - Dairy Sustainability Ireland

Co-ordinated by:

Teagasc
Dairy Processing Co-ops - Dairy Sustainability Ireland
LAWPRO

Supported by:

ICMSA
ICOS
ICSA
IFA
INHFA
Macra na Feirme
Independent Private Agricultural Consultants and the ACA

Acknowledgements:

The ASSAP Co-ordination Team wishes to acknowledge the contribution made to the establishment and implementation of the ASSAP from the farming community and residents farming and living in the selected priority areas for action. Their co-operation and engagement with ASSAP has aided the programme to start the process of improving water quality in their local areas for the betterment of all the community.

The ASSAP Co-ordination Team also wishes to acknowledge the scientific training and expertise provided by the EPA and ongoing support from Bord Bia for the programme.

Edited by:

Noel Meehan, ASSAP Programme Manager, Teagasc

Key ASSAP Data to December 31st 2020

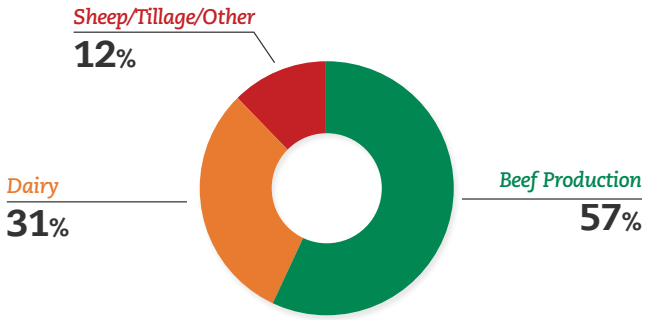
Progress of LAWPRO & ASSAP work in the 190 Priority Areas for Action (PAA's)

Desk studies commenced	163	Field work and report completed in PAA's	81
Desk studies completed and uploaded to EPA WFD app	118	Action plans completed for PAA	81
Field work active in PAA's	127	Community meetings (Led by LAWPRO)	136
Farmer meetings (Led by Teagasc)	111	PAA's active for ASSAP farm visits	98

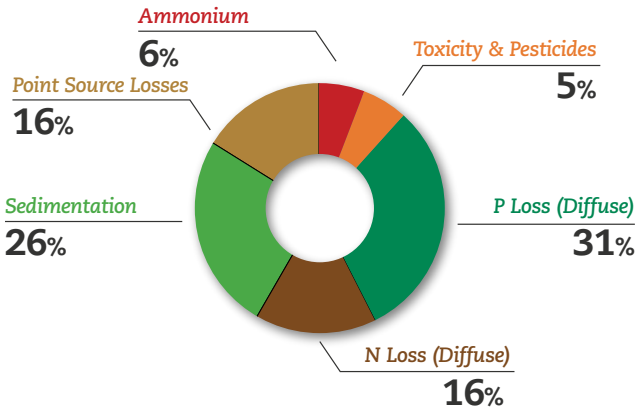
Farmer Engagement

Farm assessments completed	1,810
Follow up farm visits completed	391
Farmer engagement with the programme	96%
Actions agreed between advisor and farmer	92%
Discussion group meetings	222

Farming Enterprise Assessed



PAA Pressures and Issues Identified on Farms



Issues identified	10,233
Ave/farm	5.7
High Risk	44%
Moderate Risk	40%
Low Risk	16%

Implementation of Mitigation Actions

	Top 5 High risk issues identified on farms:	Action Commenced, Complete or On-going
1	P Loss Through Overland Flow	53%
2	Preparation and implementation of NMP	51%
3	Buffers	68%
4	Drinking Points & Stream Fencing	31%
5	Organic Manure Timing, Location & Method	51%

1: Rationale, Aim and Objectives of ASSAP

Under the Water Framework Directive (WFD), Ireland is required to prepare river basin management plans to address national water quality issues every 6 years. Ireland's 2nd cycle river basin management plan was published in April 2018.

Its key innovation was a change in philosophy to move away from dependence on the regulatory-based 'one size fits all' approach, towards being more collaborative, and identifying and implementing 'the right measure in the right place', whilst supporting local communities to get involved in protecting their water resources.

As part of this new thinking, the Agricultural Sustainability, Support and Advisory Programme (ASSAP) was established in a collaborative process between the state and the dairy processing co-ops, to provide an evidence based approach to agri pressure identification. This pilot programme, working with the Local Authorities Water Programme (LAWPRO) offers farmer focused advice in 190 priority areas for action (PAA's) and is a critical, integral and parallel part of this collaborative process.

The funding and support received from the Department of Agriculture, Food and the Marine (DAFM), the Department of Housing, Local Government and Heritage (DHLGH) and the dairy industry (Aurivo, Arrabawn, Carbery, Dairygold, Glanbia, Kerry, Lakeland, North Cork, and Tipperary) has enabled this new approach. Funding from DAFM and DHLGH enabled Teagasc to provide 20 Sustainability Advisors and the Dairy Processing Co-ops have provided 11 advisors as part of the Dairy Sustainability Initiative (DSI) – now known as Dairy Sustainability Ireland.

The ASSAP is fully supported by the DHLGH, DAFM, Local Authorities, Dairy Processing Co-ops, Farming Organisations and Teagasc.

The ASSAP programme enables local landowners to engage positively in seeking solutions to local problems with the support of a confidential sustainability advisory service focused on water quality improvement. Support from the farming organisations for the programme has been very strong and this is vital in communicating and informing farmers about the ASSAP programme and its key messages.

The key operating principles of the ASSAP are:

I. The ASSAP programme provides farm advice and support only
II. It is voluntary and collaborative
III. There is no connection to the regulatory and compliance mechanisms of the state

Aim of ASSAP:

To provide a free and confidential advisory service for farmers located in the 190 priority areas for action (PAA's) identified in the national river basin management plan 2018-2021 and to provide farmers with advice focused on the prevention of contaminant losses to waters with a view to attaining water framework directive water quality targets.

Objectives of the ASSAP:

1. To seek collaboration across all stakeholders; agricultural and environment, as a key measure in the implementation of the programme.
2. To put in place the structures and connections to ensure that the ASSAP engages with farmers and their representative organisations and the wider agricultural industry.
3. To establish a cohort of skilled advisors through the provision of training and technological resources to enable them to provide farmers with the appropriate advice and solutions to attain improvements in water quality.
4. Develop a farm assessment tool for advisors to
   a. identify farm issues impacting water quality
   b. recommend mitigation actions from a suite of possible solutions
   c. provide the farmer with a clear and easy to follow farm plan
   d. monitor implementation of mitigation actions
   e. report to LAWPRO, EPA and both funding departments
5. To co design with stakeholders a suite of mitigation measures.
6. To develop and implement a structured approach to transitioning of a PAA to allow for post ASSAP management by relevant competent authorities.
7. Develop water quality focused information and resources for use by the broader advisory and education services.
8. To disseminate the information and findings of the ASSAP and LAWPRO to the broader advisory and education services.
9. To use the information and findings of the ASSAP and LAWPRO to inform broader water quality and agricultural policy.
10. To use the information and findings of the ASSAP and LAWPRO to inform research.

2: Review of ASSAP activities in 2020

The ASSAP continued to build on the progress made in visiting and assessing farms and plan preparation in 2020. The collaborative processes established between Teagasc and the dairy processing co-op advisors and the Local Authorities Waters Programme (LAWPRO) is fundamental to the implementation of the programme and facilitated the on-going work in the priority areas for action (PAA's).

By the end of 2020 the ASSAP advisors were visiting farms in 98 of the 190 PAA's. Advisors have carried out 1810 farm assessments since the start of the programme. Advisors also focused attention on establishing the level of implementation of measures recommended to farmers in PAA's and have carried out 391 follow up farm visits to date. Further information on the farm assessments, follow up visits and implementation of measures can be found in section 5 of this report.

The ability of the ASSAP to implement the programme was greatly impacted in 2020 as a result of the various public health restrictions applied to all sectors of society due to the Covid 19 pandemic. The various levels of restrictions prevented both LAWPRO scientists and ASSAP advisors from fulfilling their duties at different times in 2020.

The impacts included the cessation of contact between advisors and the farmers/public. This meant that advisors could not carry out/attend stream walks, farm visits, farmer meetings, discussion groups and training for the periods of the most severe restrictions. The utilisation of web based meeting applications assisted the sharing and discussion of information between LAWPRO and ASSAP which facilitated progress in characterisation of PAA's and provision of referrals for farm visits.

The Covid 19 restrictions did offer some opportunities to ASSAP and LAWPRO to improve and develop the referral, feedback and reporting elements of the process. A joint working group of ASSAP advisors and LAWPRO scientists have examined each part of the process to identify areas where improvements and refinements could be made. This work is on-going and has made progress in improving the clarity and consistency of referrals, feedback and reports while also identifying gaps in the information exchange that can be filled with existing data to improve the understanding of the issues in PAA's. Further information on this work is outlined in section 3 of this report.

The data now being provided by the ASSAP and LAWPRO, and set out in this report, provides significant new detailed insights into the causes and effects of agricultural pressures on water quality.

This detailed data is a new resource to policy makers and stakeholders as to the problems and solutions needed to address these issues in an impactful way to scientific standard, and merit serious examination.

ASSAP has become more established and accepted by all stakeholders during the current reporting period.

The requirement for water quality specific advisory resources was also addressed with advisors developing a library of articles, videos, factsheets and PAA specific newsletters. The resources cover a wide range of water quality issues and provide farmers with advice on how to minimise the impact of farming practices on water quality.

The availability of these resources prompted a revamp of the water quality section of the Teagasc website to facilitate use by the wider advisory and education services. Visit www.teagasc.ie/environment/water-quality/ for more information.

3: Priority Areas for Action (PAA's) – Work flow process & Transition out of PAA's

Work Flow Process:

Each of the 190 priority areas for action (PAA's) selected for the ASSAP were chosen as they were deemed to be 'at risk' waterbodies. This means that the waterbodies are at risk of not meeting the Water Framework Directive (WFD) objectives of good or high status. These PAA's were selected as part of Irelands River Basin Management Plan (RBMP) 2018-2021 and comprise of 726 waterbodies with multiple pressures. Further information on the selection process is available in the ASSAP Interim Report #1.

The identification of the PAA's and the establishment of LAWPRO and ASSAP provided the opportunity to implement a local catchment assessment process which harnesses existing information and farmer/community engagement in assessing the pressures impacting on a waterbody. Further information on the local catchment assessment process is available in the ASSAP Interim Report #1.

The successful implementation of the process to date is based on the strong collaborative effort between LAWPRO, ASSAP and the farming community and this has evolved over time.

The steps of the process is outlined in the graphic below:

Figure 1: Graphic outlining the work flow process for a PAA

Desk study, community and farmer meetings:

The LAWPRO catchment scientist undertakes a comprehensive desk study of the PAA which will help to identify the pressures impacting the PAA, the issues and pathways of concern for nutrient, sediment, pesticide and pathogen losses. LAWPRO and ASSAP organise community and farmer meetings to provide initial information on the programme and likely pressures impacting water quality in the PAA.

LCA/Fieldwork:

The LAWPRO catchment scientist confirms the aspects of agricultural practice impacting the waterbody, i.e. the pressure in so far as is possible. The significant issues are confirmed, (N, P, sediment, etc.), identification of the significant pathway and confirm the reference point in the stream.

Draft referral:

The LAWPRO catchment scientist prepares the draft referral for the spatially defined stream reference point. Confirmation of the pressures, issues and pathways, location of reference point, area impacting and an estimate of the number of farms to be visited is provided the ASSAP advisors.

Farm visits:

Following receipt of the draft referral, the ASSAP advisors visit the farms in the area identified, based on the stream reference point, to carry out farm assessments. The advisors identify the agricultural practices that are related to the significant issues, (N, P, sediment, etc.) highlighted in the draft referral and recommend mitigation actions to alleviate impacts in consultation with the farmer.

ASSAP feedback discussion:

Upon completion of the farm assessments, the ASSAP provides an anonymised report outlining the issues identified on the farms visited and the mitigation actions recommended and agreed by the farmers. This helps to clarify the accuracy of the draft referral, with amendments added if necessary.

WFD App Referrals:

Based on the information gathered and feedback and discussion process the LAWPRO catchment scientist creates a WFD App referral.

Further feedback and final reporting:

A final anonymised report is prepared following a period of follow up visits by advisors and implementation of measures by farmers and consultation with LAWPRO catchment scientists. This is uploaded to the WFD App.

Transition out of PAA's:

As the implementation process is completed in a PAA the information collected provides the basis for a final report to be uploaded to the WFD (Water Framework Directive) App on the EPA Eden portal. This will contain information on the pressures in the PAA, the issues identified on farms, the mitigation actions recommended to farmers and level of implementation of these actions based on each referral received by ASSAP from LAWPRO.

Once required farm visits and reports have been completed all farmers in the PAA will be invited to an event where ASSAP and LAWPRO will provide an opportunity for farmers to engage and discuss the information contained in the final report. This will also provide an opportunity to reinforce the key water quality protection messages and actions required to be implemented by farmers to ensure that impacts on water quality from agriculture are minimised into the future. These key water quality protection messages and actions will also be provided to the relevant local authority/ regulatory body and local advisory services.

4: Proof of Concept Waterbodies

A) Background

Traditionally, agricultural pressures have been addressed through the regulatory framework, with enforcement of legislation carried out by Local Authority staff and other statutory agencies. As ASSAP is a new approach to addressing agricultural pressures on water quality, it is important therefore that the programme can demonstrate its effectiveness in improving water quality.

To demonstrate that this LAWPRO/ASSAP collaborative approach is effective in achieving water quality improvements, a number of waterbodies have been selected for additional intensive monitoring over and above that set out in the national monitoring programme. These are waterbodies where agriculture is the sole or main pressure and they have been selected to cover a range of significant issues, farming activities and catchment conditions.

The monthly results from these waterbodies are being analysed and reviewed by the ASSAP co-ordinating committee to determine the impact of the ASSAP Programme. While it is not expected that water quality would improve from one status reporting category to the next in a short space of time, trends in quality are becoming evident and this supplementary monitoring programme is designed to identify those trends.

Table 1: Proof of Concept Waterbodies

Region	Waterbody name	Waterbody Area (km²)	Significant issue	Soil Type Well draining/ Poor draining Mineral/ Organic	Agriculture type	Approx. no. of farms
Border	Erne_010 and Erne_020	24	Ortho-Phosphate	Predominantly poorly draining with pockets of peat	Suckler, low intensity	43
West	Clooneigh_010 and Clooneigh_020	48	Ammonium, Ortho-Phosphate, Sediment.	Approx. 12% Peat, 27% Poorly drained and 57% well drained. Remaining alluvium.	Agriculture (Pasture)	242
South East	Killenaule_010	23	Ortho-P, Nitrate and Ammonia	Predominantly poorly draining	Predominantly permanent pasture.	31
South East	Nuenna_010 and Nuenna_020	46	Nitrates & Ortho-Phosphate	Mostly a mix of well drained and poorly drained. Alluvial soils close to the waterbody.	Pasture dominant with a small amount of tillage.	118
South West	Tyshe_010	9	Nutrients and sediment	Mainly well drained mineral. Small area of poorly drained to the south	Pasture/dairy and tillage	10
South West	Caha_020	23	Nutrients and sediment	Mix of poorly drained and well drained	Pasture/dairy and beef	17
South West	Milltown_010 and Milltown_020	21	Point sources	Mainly poorly draining peaty soils, but with some well drained mineral soils	Pasture/dairy. Grassland sheep and beef	7
Midlands and East	Dysart_010	15	Nutrients, sediment	Peat organic soils, poor draining along the course of the river, free draining / mineral in rest of catchment	Drystock Dairy	10
Midlands and East	Silver_020	54	Nutrients, BOD, Sediment	Peat organic soils, poor draining along the course of the river, free draining / mineral in rest of catchment	Beef and dairy	20

B) ASSAP farm assessments and feedback

The farmers in the proof of concept waterbodies are provided with the ASSAP advisory service and the farm assessment process and will follow the same procedures and protocols as farm assessments in other waterbodies. Each farm will be assessed based on LAWPRO referrals for the water body and a farm specific plan will be provided to the farmer with measures and actions designed to reduce nutrient, sediment and pesticide losses to waters.

ASSAP advisors will carry out follow up visits to establish the level of implementation of these plans. This will identify the actions that are implemented at farm level and the level of practice and behavioural change that has occurred. It will also help identify actions that have not been adopted and reasons for non-implementation.

C) Monitoring and evaluation of data

An additional monitoring programme carried out by LAWPRO to support the ASSAP proof of concept catchments is being implemented which will help to improve the understanding of the significant issues and will in turn inform the advisory aspect of the work in these waterbodies. A synopsis of the findings from LAWPRO monitoring and evaluation and ASSAP farm assessments thus far are detailed below:

Erne_010 and Erne_020:

- To date the data is not highlighting any clear patterns or trends. Further sampling over a longer period will provide greater clarity.
- Sediment is prevalent at moderate to high levels throughout the waterbodies and ortho-phosphate levels are not reducing.
- Average ammonium concentrations are exceeding the environmental quality status (EQS).
- Spikes in ortho-phosphate and ammonium correspond to rainfall events.
- ASSAP farm assessments have identified the following as the main issues:
  - Overland surface runoff of P and sediment
  - Cattle access to watercourses
  - Management of soiled water and effluent in farmyards
  - Use of nutrients – location, timing, rates of application.

Clooneigh_010 and Clooneigh_020:

- Spikes in ortho-phosphate and ammonium correspond to rainfall events.
- The trend for ortho-phosphate is downwards, however there are significant spikes due to rainfall events.
- The trend for ammonium is upwards, influenced by spikes in concentration related to rainfall events.

- Spikes in ortho-phosphate and ammonium correspond to rainfall events.
- ASSAP farm assessments have identified the following as the main issues:
  - Overland surface runoff of P and sediment – caused by poaching from livestock, supplementary feeding, and land drainage/reclamation works
  - Cattle access to watercourses
  - Management of soiled water and effluent in farmyards
  - Insufficient riparian buffers when applying nutrients in Clooneigh_020.

Killenaule_010:

- To date the data is not highlighting any clear patterns or trends. Further sampling over a longer period will provide greater clarity.
- Monitoring data indicates that ortho-phosphate and ammonium concentrations are above the EQS.
- ASSAP farm assessments have identified the following as the main issues:
  - Overland surface runoff of P and sediment
  - Insufficient riparian buffers when applying nutrients
  - Management of soiled water and effluent in farmyards
  - Use of nutrients – location, timing, rates of application.

Nuenna_010 and Nuenna_020:

- Ortho-phosphate and Total Oxidised Nitrogen (TON) are above the EQS in the waterbodies.
- Ortho-phosphate and TON concentrations in the waterbodies appear to be influenced by rainfall events.
- Decreasing concentrations in TON in autumn/winter may reflect the influence of rainfall in the dilution of TON derived from groundwater sources
- Increasing concentrations of ortho-phosphate in autumn/winter indicates that rainfall is causing overland flow of P and sediment
- ASSAP farm assessments have identified the following as the main issues:
  - Diffuse nitrate losses/leaching
  - Insufficient riparian buffers when applying nutrients
  - Use of nutrients – location, timing, rates of application and type/product.

Tyshe_010:

- Diffuse nutrient loss – P, ammonium, nitrate, and sediment are impacting this waterbody which has been historically in poor condition
- There is also some point source issues in the waterbody
- ASSAP farm assessments have identified the following as the main issues:
  - Management of soiled water and effluent in farmyards

- Diffuse nitrate losses/leaching
- Use of nutrients – location, timing, rates of application and type/product.

Caha_020:

- Has a 'High' status objective and is currently at 'Good' status
- Water body is impacted by nutrients and sediment with forestry, agriculture, and hydro morphology the significant pressures
- Current data is insufficient to identify clear patterns or trends. Further sampling over a longer period will provide greater clarity
- ASSAP farm assessments have identified the following as the main issues:
  - Overland surface runoff of P and sediment
  - Cattle access to watercourses
  - Management of soiled water and effluent in farmyards
  - Use of nutrients – location, timing, rate of application
  - Correct management of high organic matter soils
  - land improvement works and drainage.

Milltown_010 and Milltown_020:

- Both waterbodies are not reaching their WFD status objectives
- The waterbodies are impacted by nutrients, sediment, point sources and a pesticide toxicity issue
- Current data is insufficient to identify clear patterns or trends. Further sampling over a longer period will provide greater clarity
- ASSAP farm assessments have identified the following as the main issues:
  - Management of soiled water and effluent in farmyards
  - Maintenance and cleaning of field drains
  - Management and disposal of sheep dip.

Dysart_010:

- The waterbody flows into Lough Ennell which has a bathing water location at Lilliput that is currently at poor status.
- The waterbody has a wide range of issues including nutrients, ammonia, hydro morphology, sediment and pathogens.
- Chemical monitoring is showing a downward trend in all parameters including total ammonia, ortho-phosphate, E.coli and Intestinal Enterococci and now all values are consistently under the EQS. The last 8 months of sampling have given promising results.
- Biological monitoring shows there has been an improvement in the abundance and diversity of macroinvertebrates, but the site still shows that it is probably impacted.

- Rainfall events cause spikes across all contaminants with summer spikes a concern for pathogens due to the bathing waters at Lough Ennell.
- ASSAP farm assessments have identified the following as the main issues:
  - Cattle access to watercourses and riverbank erosion
  - Maintenance and cleaning of field drains and watercourses
  - Use of organic fertilisers – location, timing, rates of application
  - Insufficient riparian buffers when applying organic fertilisers
  - Management of soiled water and effluent in farmyards.

Silver_020:

- The waterbody is impacted by BOD, nutrients, sediment and hydro morphology
- There is a downward trend in ortho-phosphate and BOD and total ammonia is below the EQS but spikes in concentrations can result from rainfall events
- There has been an improvement in the abundance and diversity of macroinvertebrates in the biological assessment, but there is still evidence of enrichment. It is unclear if the waterbody will achieve its environmental objective of Good Status when it is next assessed by the EPA biologists in July 2021.
- Further sampling over a longer period will provide greater clarity on trends and patterns
- ASSAP farm assessments have identified the following as the main issues:
  - Cattle access to watercourses and riverbank erosion
  - Maintenance and cleaning of field drains and watercourses
  - Use of organic fertilisers – location, timing, rates of application
  - Insufficient riparian buffers when applying organic fertilisers
  - Management of soiled water and effluent in farmyards.

D) Summary

The focus and investigations on the proof of concept catchments is at an early stage and the initial work completed and analysis of data collected is helping to form an understanding of the impact that the ASSAP collaborative approach is having in these waterbodies.

The established protocols and structures of the LAWPRO PAA desk studies, chemical sampling, instream assessments and referrals that identify the pressures, issues and impacts on water quality combined with the greater level of monitoring is providing an insight into the effects that seasonal variations in weather, farming practice and soil type are having.

Farm assessments carried out by the ASSAP advisors largely correspond with the referrals received from LAWPRO and the recommended mitigation actions. Farmers have engaged positively with the ASSAP and the implementation of mitigation actions is at varying levels of completeness.

Where the waterbodies are widely impacted by diffuse pressures and farmers are implementing mitigation actions, improvements in water quality will require a period of time to be realised. Other more locally impacted water bodies appear to be reacting positively to interventions where mitigation actions are being implemented by farmers.

Further monitoring of the proof of concept water bodies over a longer period of time will provide greater evidence of the impact the collaborative approach of ASSAP and the effectiveness of the procedures, scientific assessments and farmer implementation of mitigation actions is having on water quality.

5: Key Performance Indicators and Assessment Information

LAWPRO KPI's:

Activities in 2020 for LAWPRO were significantly impacted by Covid 19. However progress was made in progressing a number of areas of the LAWPRO work programme. LAWPRO embraced the pandemic necessitated web based meetings to continue its vital work in community engagement with the majority of PAA Community meetings held in 2020 being successfully conducted online. Information on LAWPRO activities for 2020 are detailed in table 2.

Table 2: LAWPRO activities to date

KPI	Number
Number of Priority Areas for Action (PAA's)	190
Desk studies commenced	163
Desk studies completed and uploaded to EPA WFD app	118
Field work active in PAA's	127
Field work and report completed in PAA's	81
Action plans completed for PAA	81

Further detail about LAWPRO's work is available from their website at www.lawaters.ie/ and from www.catchments.ie

ASSAP KPI's:

Farmer and Public Engagement:

Maintaining engagement with the farmers in the PAA's and the provision of water quality information and advice to the wider farming community throughout 2020 proved to be challenging. Similar to LAWPRO, ASSAP embraced the Covid 19 prompted advances and utilisation of technology to communicate with farmers. As face to face meetings, particularly group meetings, were largely prohibited in 2020, advisors utilised traditional and digital media to disseminate information to farmers. This included articles and content for Teagasc publications; Today's Farm, client newsletters, Teagasc Daily, Teagasc social media platforms, co-op publications/newsletters as well as contributions to national and local newspapers/magazine articles/radio.

Information on the total number of farmer and public engagements are provided in table 3.

Table 3: Total farmer and public engagement

KPI	Number
Community meetings (Led by LAWPRO)	136
Farmer meetings (Led by Teagasc)	107
Discussion group meetings	222
PAA's active	98

Farm Advisory Engagement:

Fortunately there were periods of 2020 when public health restrictions were not in force or relaxed sufficiently to allow for advisors to visit farms. Information on the advisor engagement with farmers is detailed in table 4.

Table 4: Advisor farmer engagement

KPI	Number
Farm assessments completed 31st December 2020	1,810
Farmer engagement with programme	96%
Actions agreed between advisor and farmer	92%

Water quality pressures in PAA's:

The breakdown of water quality pressures in PAA's has remained relatively stable since the start of the programme. These pressures are identified from fieldwork conducted by LAWPRO and have the potential to cause deterioration in water quality. Once these have been identified advisors can use this information as the basis for preparing mitigation plans for farmers designed to help improve water quality.

To date diffuse P, N and sediment losses account for 73% of the pressures identified in PAA's where investigations have occurred.

Table 5: Water quality pressures identified in PAA's

P Loss (Diffuse)	31%
N Loss (Diffuse)	16%
Sedimentation	26%
Point Source Losses	15%
Toxicity and Pesticides	6%
Ammonium	6%

Farming Enterprise:

The ASSAP advisory service is available to all farmers in a PAA. The breakdown of farms assessed is shown below

Table 6: Farming enterprise assessed

Cattle Breeding	24%
Dairy	31%
Mixed Farming	19%
Cattle Other	14%
Sheep	8%
Tillage	2%
Other Enterprise	2%

Farm Assessment Analysis:

The ASSAP advisor assesses farms under three categories:

- Land management
- Nutrient management
- Farmyard management

The advisor identifies areas of the farm and the farming activities with potential to cause nutrient, sediment or pesticide losses to waters and discusses with farmer's which mitigation actions are most suitable to remedy the issues identified.

Table 7: Issues identified on farm

Total number of issues identified in farm assessments	10,233
Average number of issues per farm	5.7

The issues identified on farm are given a risk rating:

Table 8: Risk rating of issues identified on farms

High	Issues that are likely to have a **high** impact on water quality
Moderate	Issues that are likely to have a **moderate** impact on water quality
Low	Issues that are likely to have a **low** impact on water quality

The assessment of a farm covers 46 different issues. On average there is 6 issues identified per farm. The advisor gives these issues a risk rating, (high, moderate or low), depending on how likely the issue is to impact water quality.

Each of these issues and associated risk are identified per category in tables 9, 10 and 11.

Table 9: Land Management Issues

Land management practices account for 45% of the issues identified. These are practices that contribute to nutrient, sediment pesticide and pathogen losses to waters:

Land Management Issues	High	Moderate	Low	Total
P loss through overland flow	390	295	68	753
Drinking points & stream fencing	297	242	89	628
Buffers	290	287	98	675
N leaching from light soils	190	120	29	339
Sediment loss	139	84	18	241
Farm roads, gateways and underpass	134	89	35	258
Drain cleaning & maintenance	130	101	44	275
Herbicide /pesticide and sheep dip use	116	96	36	248
Rock outcrops/karst features	54	36	5	95
River bank erosion	52	23	11	86
Drinking troughs	50	68	58	176
Culverts/river crossings	39	32	9	80
Unsuitable drainage delivering nutrient and/or sediment	38	29	7	74
Field boundary management	32	23	21	76
Supplementary feeding and sacrifice paddocks	28	57	20	105
Out wintering	27	76	29	132
Bare land - inadequate cover crops	25	12	3	40
Reseeding practices	25	83	23	131
Losses from tillage operations	20	15	11	46
Protection of abstraction points and wells	12	11	10	33
Presence of invasive vegetation	11	9	6	26
Hill land grazing	9	52	18	79
Forestry	8	11	6	25

Table 10: Nutrient Management Issues

Nutrient management practices account for 34% of the issues identified. These are practices that contribute to nutrient, sediment and pathogen losses to waters:

Nutrient Management Issues	High	Moderate	Low	Total
Preparation and implementation of NMP	345	243	112	700
Organic manure timing, location and method	264	237	48	549
Achieving appropriate soil fertility (Lime P&K)	211	199	53	463
Weather and fertiliser management	179	121	45	345
Identify and Manage Critical Source Areas (CSA's)	177	130	15	322
Timing - early & Late N and P	161	120	29	310
Fertiliser type	83	98	70	251
Sloped fields	64	113	46	223
Chemical fertiliser spreading	37	70	25	132
Fertiliser rates	21	30	20	71
Correct management of high OM soils	18	35	35	88
Other	13	9	6	28
Recorded import/export of organic manures	4	5	8	17

Table 11: Farmyard Issues

Farmyard management practices account for 21% of the issues identified. These are practices that contribute to nutrient, sediment, pesticide and pathogen losses to waters:

Farmyard Management Issues	High	Moderate	Low	Total
Clean and grey water management	171	173	107	451
Silage pits and effluent storage	144	72	34	250
Loose housing and FYM storage	134	130	71	335
Round bale storage	116	138	83	337
Dirty yards	100	101	20	221
Slurry storage	91	67	40	198
Drain connection from yard to water	90	42	10	142
Pesticide storage and diesel/oil tanks	17	49	27	93
Cattle and/or sheep handling facilities	16	27	24	67
Other	6	9	4	19

Mitigation Actions and Farm Plan:

Each issue identified has a number of mitigation actions that farmers can implement to alleviate the problem identified. These options will be discussed with the farmer and appropriate mitigation actions selected. These actions form the basis for the farm plan and a time frame for implementation is agreed. Information on the type of mitigation actions recommended to farmers for the 20 most frequent issues identified is outlined in table 12:

**Note advisors may recommend multiple mitigation actions for an issue identified on farm.*

Table 12: Mitigation options for the 20 most frequently selected issues – all risk categories

1	P Loss Through Overland Flow	1,032
	Management of critical source areas (CSA's)	405
	Riparian buffers - fenced/unfenced	236
	In field grass buffers	176
	Implementation of nutrient management plan	59
	Establish field boundaries and hedges	43
	Improved farm road/tracks design and location	24
	Prudent P use on peat soils	21
	No P on sensitive (CSA's) areas	19
	Alleviate compacted areas in fields	14
	Other mitigation measures	35
2	**Preparation and implementation of NMP**	**926**
	Precision application of nutrients at correct rate	403
	Informing and educating farmers	349
	Avoid application at high risk times	94
	Avoid application at high risk places (CSA's)	45
	Use of straight fertilisers	35
3	**Buffers**	**1,082**
	Adhere to buffer zones and safeguard zones	586
	Avoid application at high risk times	148
	Avoid application at high risk places	123
	Informing and educating farmers	121
	Riparian Buffers - fenced/unfenced	61
	Establish field boundaries and hedges	23
	In field grass buffers	20

4	**Drinking Points & Stream Fencing**	**755**
	Prevent livestock access to waters	541
	Informing and educating farmers	214
5	**Organic Manure Timing, Location & Method**	**953**
	Avoid application at high risk times	365
	Avoid application at high risk places (CSA's)	184
	Informing and educating farmers	151
	Adopt latest manure application techniques	124
	Precision application of nutrients at correct rate	70
	Other mitigation measures	59
6	**Achieving Appropriate Soil Fertility (Lime P&K)**	**745**
	Implementation of nutrient management plan	306
	Liming	158
	Informing and educating farmers	151
	Precision application of nutrients at correct rate	81
	No P on index 4 soils	31
	Other mitigation measures	18
7	**Clean & Grey Water Management**	**648**
	Separation of clean, grey, soiled and dirty water in farmyard	369
	Improved management of collection and storage of farm wastes	146
	Informing and educating farmers	123
	Additional storage for farm wastes required	10
8	**Weather and Fertiliser Management**	**533**
	Informing and educating farmers	130
	Avoid application at high risk places (CSA's)	91
	Avoid application at high risk times	246
	Riparian buffers - fenced/unfenced	61
	Other mitigation measures	5

9	N leaching from Light Soils	632
	Avoid application at high risk times	210
	Precision application of nutrients at correct rate	122
	Implementation of nutrient management plan	94
	Urease inhibitors	75
	Avoid application at high risk places (CSA's)	47
	Winter - plant cover or catch crops	29
	Use of clover	20
	Informing and educating farmers	18
	Other mitigation measures	17
10	Round Bale Storage	446
	Improved management of collection and storage of farm wastes	182
	Informing and educating farmers	156
	Separation of clean, grey, soiled and dirty water in farmyard	91
	Additional storage for farm wastes required	16
	Destock/reduce stock for winter	1
11	Loose Housing and FYM Storage	446
	Improved management of collection and storage of farm wastes	269
	Informing and educating farmers	89
	Separation of clean, grey, soiled and dirty water in farmyard	66
	Additional storage for farm wastes required	35
	Destock/reduce stock for winter	3
12	Identify and Mange Critical Source Areas	515
	Management of critical source areas (CSA's)	184
	Avoid application at high risk times	136
	Informing and educating farmers	98
	Precision application of nutrients at correct rate	54
	No P on sensitive (CSA's) areas	40

13	**Timing - Early & Late Nitrogen and Phosphorus**	**488**
	Avoid application at high risk times	166
	Precision application of nutrients at correct rate	116
	Informing and educating farmers	105
	Avoid application at high risk places (CSA's)	57
	Adopt latest manure application techniques	44
14	**Drain Cleaning & Maintenance**	**310**
	Ditch drain maintenance and management	122
	Allow grassed waterways and vegetated ditches	95
	Informing and educating farmers	67
	Farm drainage plans	15
	Other mitigation measures	11
15	**Farm Roads and Gateways and Underpass**	**331**
	Improved farm road/tracks design and location	214
	Informing and educating farmers	106
	Suitable gateway location	11
	Adopt latest manure application techniques	34
	Avoid application at high risk places (CSA's)	27
16	**Fertiliser Type**	**384**
	Informing and educating farmers	179
	Implementation of nutrient management plan	88
	Use of straight fertilisers	83
	Liming	17
	Other mitigation measures	17
17	**Silage Pits and Effluent Storage**	**412**
	Improved management of collection and storage of farm wastes	202
	Separation of clean, grey, soiled and dirty water in farmyard	126
	Informing and educating farmers	76
	Additional storage for farm wastes required	8

18	Herbicide/Pesticide and Sheep dip Use	354
	Adhere to buffer zones and safeguard zones	130
	Spraying equipment and operator fit for purpose	44
	Promote integrated pest management	38
	Educate and encourage behavioural change in the use of all herbicides	34
	Avoid application at high risk times and high risk places	33
	Best practice when storing and handling pesticides	31
	Appropriate design and location of sheep dipping tubs	15
	Appropriate disposal of sheep dip	14
	Other mitigation measures	15
19	Sediment Loss	339
	Riparian Buffers - Fenced/Unfenced	70
	In field grass buffers	62
	Prevent livestock access to waters	43
	Establish field boundaries and hedges	35
	Improved farm road/tracks design and location	27
	Appropriate drain maintenance	26
	Use of silt fences	17
	Alleviate compacted areas in fields	14
	Winter - plant cover or catch crops	13
	Other mitigation measures	32
20	Sloped Fields	365
	Informing and educating farmers	104
	Avoid application at high risk times	98
	Avoid application at high risk places (CSA's)	89
	Riparian buffers - fenced/unfenced	36
	Precision application of nutrients at correct rate	28
	Other mitigation measures	10

Implementation of mitigation actions:

For each mitigation action agreed by a farmer, ASSAP tracks the level of implementation of the measures. The tables below show the levels of implementation for the 20 most frequent High Risk issues.

The implementation headings are explained as follows:

Actions Reviewed	The total number of actions reviewed by the advisor
Not Started	The farmer has not started to implement the agreed mitigation action. E.g. fencing off a riparian margin
Not Proceeding	The farmer is not proceeding with implementing the agreed mitigation action
Commenced	The farmer has commenced implementation of the agreed mitigation action. E.g. has commenced fencing off a riparian margin but it is not finished
Complete	The farmer has completed the implementation of the agreed mitigation action. E.g. has finished fencing off a riparian margin
Ongoing	The implementation of the mitigation action is ongoing meaning that it needs to be implemented on a year round basis. E.g. management of critical source areas (CSA's)

Table 13: High Risk issues identified, mitigation actions recommended and implementation of measures

	Mitigation Actions	Risk High	Risk High Agreed	Actions Reviewed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
1	P Loss Through Overland Flow								
	Management of Critical Source Areas (CSA's)	200	190	145	44	2	36	9	54
	Riparian Buffers - Fenced/Unfenced	120	115	91	21	1	12	4	53
	In field grass buffers	76	72	52	7	0	10	3	32
	Establish field boundaries and hedges	28	27	18	5	0	1	3	9
	Implementation of Nutrient Management Plan	27	27	21	4	0	4	4	9
	Improved farm road/tracks design and location	22	21	11	6	0	2	1	2
	Prudent P use on Peat soils	8	7	5	0	0	0	0	5
	Alleviate compacted areas in fields	7	6	6	2	1	3	0	0
	No P on sensitive (CSA's) areas	5	4	4	2	0	0	0	2
	Additional storage for farm wastes required	4	4	4	1	0	0	0	3
	Other mitigation actions	25	24	10	6	1	1	0	2

	Mitigation Actions	Risk High	Risk High Agreed	Actions Reviewed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
2	**Preparation and implementation of NMP**								
	Precision application of nutrients at correct rate	227	207	157	57	0	34	9	57
	Informing and educating farmers	140	129	121	50	1	20	15	35
	Use of straight fertilisers	25	24	24	13	0	8	1	2
	Avoid application at high risk times	23	23	21	8	0	6	0	7
	Avoid application at high risk places (CSA's)	8	8	8	3	0	0	1	4
3	**Buffers**								
	Adhere to buffer zones and safeguard zones	249	241	210	37	2	38	18	115
	Avoid application at high risk times	62	59	54	12	0	9	15	18
	Avoid application at high risk places	56	54	47	12	0	6	13	16
	Informing and educating farmers	44	44	41	12	0	10	10	9
	Riparian Buffers - Fenced/Unfenced	15	15	14	2	0	3	0	9
	In field grass buffers	11	11	8	0	0	2	1	5
	Other mitigation actions	13	13	5	3	0	1	0	1
4	**Drinking Points & Stream Fencing**								
	Prevent livestock access to waters	270	208	202	123	14	25	21	115
	Informing and educating farmers	81	56	69	45	7	10	3	18
	Other mitigation actions	6	6	17	0	0	0	1	16
5	**Organic Manure Timing, Location & Method**								
	Avoid application at high risk times	170	162	134	46	0	19	11	58
	Avoid Application at high risk places	114	111	86	28	0	12	9	37
	Informing and educating farmers	85	81	80	40	2	20	12	6
	Adopt latest manure application techniques	65	56	49	23	2	16	3	5
	Precision application of nutrients at correct rate	48	45	29	7	1	7	4	10
	Other mitigation actions	32	30	28	10	0	12	2	4

	Mitigation Actions	Risk High	Risk High Agreed	Actions Reviewed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
6	**Achieving appropriate Soil Fertility (Lime P&K)**								
	Implementation of Nutrient Management Plan	154	145	126	42	0	33	12	39
	Liming	65	64	57	12	0	35	2	8
	Informing and educating farmers	55	52	52	10	0	33	4	5
	Precision application of nutrients at correct rate	33	32	28	7	0	15	2	4
	No P on index 4 soils	12	12	12	1	0	9	0	2
	Other mitigation actions	9	9	8	0	0	4	0	4
7	**Clean & Grey Water management**								
	Separation of clean, grey, soiled and dirty water in farmyard	127	118	90	39	2	15	11	23
	Improved management of collection and storage of farm wastes	59	51	49	26	2	10	3	8
	Informing and educating farmers	45	43	42	13	1	12	4	12
	Additional storage for farm wastes required	7	6	6	4	2	0	0	0
	Other mitigation actions	3	3	1	1	0	0	0	0
	In field grass buffers	11	11	8	0	0	2	1	5
	Other mitigation actions	13	13	7	3	0	1	0	1
8	**Weather and Fertiliser Management**								
	Avoid application at high risk times	139	132	109	9	0	32	26	42
	Avoid application at high risk places (CSA's)	50	49	47	1	0	24	7	15
	Informing and educating farmers	47	47	45	4	0	10	22	9
	Riparian buffers - fenced/unfenced	42	42	39	1	0	20	1	17
	Other mitigation actions	4	4	4	0	0	0	1	3

	Mitigation Actions	Risk High	Risk High Agreed	Actions Reviewed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
9	**N leaching from Light Soils**								
	Avoid application at high risk times	113	104	102	29	0	14	3	56
	Precision application of nutrients at correct rate	66	64	59	9	0	32	7	11
	Urease inhibitors	54	51	49	18	0	29	0	2
	Implementation of Nutrient Management Plan	47	46	46	6	0	28	4	8
	Avoid application at high risk places (CSA's)	35	34	34	5	0	7	1	21
	Winter - plant cover or catch crops	20	16	18	9	1	4	0	4
	Nitrification inhibitors	12	7	10	10	0	0	0	0
	Use of clover	12	12	12	5	0	7	0	0
	Informing and educating farmers	10	10	10	3	0	5	1	1
	Other mitigation actions	12	10	9	2	0	1	2	4
10	**Round Bale storage**								
	Improved management of collection and storage of farm wastes	51	50	38	24	1	7	1	5
	Informing and educating farmers	31	28	25	19	1	3	0	2
	Separation of clean, grey, soiled and dirty water in farmyard	24	19	15	1	1	1	0	12
	Additional storage for farm wastes required	13	13	13	10	0	0	0	3
	Other mitigation actions	5	5	5	3	0	2	0	0
	In field grass buffers	11	11	8	0	0	2	1	5
	Other mitigation actions	13	13	5	3	0	1	0	1
11	**Loose Housing and FYM Storage**								
	Improved management of collection and storage of farm wastes	96	75	81	51	4	8	6	12
	Separation of clean, grey, soiled and dirty water in farmyard	23	17	19	9	1	6	1	2

	Mitigation Actions	Risk High	Risk High Agreed	Actions Reviewed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
	Informing and educating farmers	21	13	21	14	2	3	1	1
	Additional storage for farm wastes required	16	14	8	6	0	0	2	0
	Other mitigation actions	5	5	3	0	0	1	0	2
12	**Identify and Mange Critical Source Areas**								
	Management of critical source areas (CSA's)	95	91	84	23	0	15	9	37
	Avoid application at high risk times	78	76	67	7	0	12	7	41
	Informing and educating farmers	40	39	38	13	0	9	9	7
	Precision application of nutrients at correct rate	30	28	30	3	1	6	5	15
	No P on sensitive (CSA's) areas	19	19	12	7	0	2	1	2
	Other mitigation actions	4	4	3	0	0	0	0	3
	Informing and educating farmers	10	10	10	3	0	5	1	1
	Other mitigation actions	12	10	9	2	0	1	2	4
13	**Timing - Early & Late Nitrogen and Phosphorus**								
	Avoid application at high risk times	88	85	68	21	0	8	13	26
	Precision application of nutrients at correct rate	74	74	66	17	0	30	9	10
	Informing and educating farmers	68	65	64	15	0	29	17	3
	Avoid application at high risk places (CSA's)	26	25	20	3	0	4	5	8
	Adopt latest manure application techniques	12	12	11	1	0	0	4	6
14	**Drain Cleaning & Maintenance**								
	Ditch/drain maintenance and management	55	47	41	17	0	1	4	19
	Informing and educating farmers	42	38	33	8	0	2	0	23
	Allow grassed waterways and vegetated ditches	38	32	31	6	1	2	3	19
	Farm drainage plans	7	6	5	4	0	0	0	1
	Other mitigation actions	5	4	4	2	1	0	0	1

	Mitigation Actions	Risk High	Risk High Agreed	Actions Reviewed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
15	**Farm Roads, Gateways and Underpass**								
	Improved farm road/tracks design and location	118	101	80	55	2	6	4	13
	Informing and educating farmers	45	36	37	27	2	4	2	2
	Suitable gateway location	6	5	4	4	0	0	0	0
	Other mitigation actions	13	11	4	1	1	1	0	1
16	**Fertiliser Type**								
	Informing and educating farmers	47	41	42	27	0	5	3	7
	Use of straight fertilisers	42	39	34	27	0	3	0	4
	Implementation of Nutrient Management Plan	17	16	16	11	0	3	1	1
	Liming	6	5	6	4	0	1	0	1
	Other mitigation actions	7	6	7	5	0	1	1	0
17	**Silage Pits and Effluent Storage**								
	Improved management of collection and storage of farm wastes	101	95	74	45	2	14	6	7
	Separation of clean, grey, soiled and dirty water in farmyard	73	70	62	40	1	7	2	12
	Informing and educating farmers	27	24	26	20	1	3	1	1
	Additional storage for farm wastes required	5	4	5	4	0	0	1	0
	Other mitigation actions	9	9	2	0	0	2	0	0
18	**Herbicide/Pesticide and Sheep dip Use**								
	Adhere to buffer zones and safeguard zones	79	78	65	5	0	3	2	55
	Avoid application at high risk times and high risk places	13	13	10	2	0	1	1	6
	Educate and encourage behavioural change in the use of all herbicides	12	12	11	7	0	0	0	4
	Best practice when storing and handling pesticides	11	9	7	1	0	1	0	5
	Appropriate disposal of sheep dip	10	10	10	2	0	0	4	4

	Mitigation Actions	Risk High	Risk High Agreed	Actions Reviewed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
	Spraying equipment and operator fit for purpose	9	8	8	3	0	0	0	5
	Appropriate design and location of sheep dipping tubs	8	8	7	2	0	1	0	4
	Promote integrated pest management	6	6	4	1	0	1	0	2
	Other mitigation actions	6	5	5	1	0	1	0	3
19	**Sediment Loss**								
	Riparian Buffers - Fenced/Unfenced	42	35	35	19	0	3	3	10
	Prevent livestock access to waters	28	24	23	18	1	0	3	1
	In field grass buffers	20	18	14	8	0	1	0	5
	Improved farm road/tracks design & location	17	14	13	10	0	0	2	1
	Establish field boundaries and hedges	14	14	8	3	0	2	2	1
	Use of silt fences	12	11	6	4	0	0	0	2
	Appropriate drain maintenance	10	6	8	5	0	2	1	0
	Run off attenuation features	7	6	6	4	1	0	1	0
	Winter - plant cover or catch crops	5	3	2	1	0	1	0	0
	Off line bunds/instream diversion structures	4	4	1	0	0	1	0	0
	Other mitigation actions	19	19	11	4	0	2	2	3
20	**Sloped Fields**								
	Avoid application at high risk places (CSA's)	33	33	31	10	0	4	0	17
	Avoid application at high risk times	21	21	18	0	0	4	0	14
	Informing and educating farmers	12	12	12	6	0	1	0	5
	Riparian buffers - fenced/unfenced	12	11	12	3	0	2	0	7
	Allow grassed waterways and vegetated ditches	5	5	3	1	0	1	0	1
	Precision application of nutrients at correct rate	4	4	2	0	0	0	0	2
	Other mitigation actions	4	4	3	0	0	0	0	3

Analysis of implementation of mitigation actions:

For water quality improvements to be realised through ASSAP interventions there needs to be a high level of implementation of the mitigation actions recommended by advisors and the actions are continually implemented into the future.

Currently, there is variation in the level of implementation of mitigation actions by farmers across the 20 high risk issues identified in table 13. Generally the level of implementation is positive. On average 51% of the mitigation actions recommended are 'commenced, completed' or being implemented on an 'on-going' basis. The non-implementation of actions where farmers have 'not started' or are 'not proceeding' is averaged at 37% with the remaining 12% made up of actions not assigned any implementation status.

The greatest level of non-implementation of measures for the 20 high risk issues identified in table 13 is in actions that require capital investment by farmers. This includes investments in fencing, collection and storage of manures and effluents and farm road infrastructure.

The greatest levels of implementation of actions by farmers are in actions that require the changing of farming practices and behaviours that can impact water quality and include nutrient management actions, implementation of measures to break the pathway of nutrient and sediment loss, management of critical source areas and use of best practice guidance in the use of pesticides.

Although farmer's willingness to take on mitigation actions and the implementation of measures is positive, there is a need for a greater level of implementation of actions across all issues for water quality improvements to occur. Further support for the farmers from the ASSAP advisors is required to help ensure the right measure is used in the right place on farms.

6: Case study PAA's

Dysart_010

Introduction:

The Dysart_010 is a single river waterbody set in the Lough Ennell/Dysart Stream Priority Area for Action and is categorised as At Risk as the 2010-2015 ecological status is Moderate. Hydro morphology and agriculture are the significant pressures on the waterbody. Agriculture is contributing sediment, phosphate and pathogens and these are significant issues impacting water quality. The main pathways for sediment, phosphate and pathogens are similar, with point sources and overland flow pathways being most important.

Agriculture is the dominant land use and both diffuse and point source impacts from agriculture is the focus of the LAWPRO field assessments, particularly within the middle to lower sections of the waterbody where the Phosphorous Pollution Impact Potential (PIP) maps indicates the higher risk categories.

LAWPRO Agricultural Referrals:

Based on LAWPRO Local Catchment Assessment (LCA) work in the Dysart_010 a number of referrals have been passed to the ASSAP advisors for action. The referrals are based on biological and visual assessments, chemistry data, conductivity measurements and sediment prevalence.

The agricultural issues identified as impacting on water quality include:

- diffuse phosphate and sediment loss mainly from poorly draining pasture land adjacent to the main river channel (Critical Source Areas)
- access by livestock to the main river channel
- damage to the river bank
- water troughs and supplementary feeding locations impacting water quality
- non observance of buffer zones when applying organic and chemical fertilisers
- application of organic fertilisers at inappropriate times and locations
- soiled water run-off from farmyards.

ASSAP Farm Assessments:

As per LAWPRO referrals and issues highlighted on the left, the ASSAP advisors focused visits on identifying and mitigating these issues on farms.

In all 23 farms were visited, 4 of the farms were dairy farms with the remainder beef farmers. All farmers agreed to a farm visit.

The issues identified by the advisors were broadly in line with LAWPRO referrals with the majority of issues and mitigation actions targeting diffuse P and sediment losses from various land management practices. P loss through overland flow, drinking points and stream fencing and drain cleaning and maintenance were the issues most frequently identified.

Details on the issues identified, mitigation actions recommended and implementation of mitigation actions for the Dysart _010 are contained in Table 14.

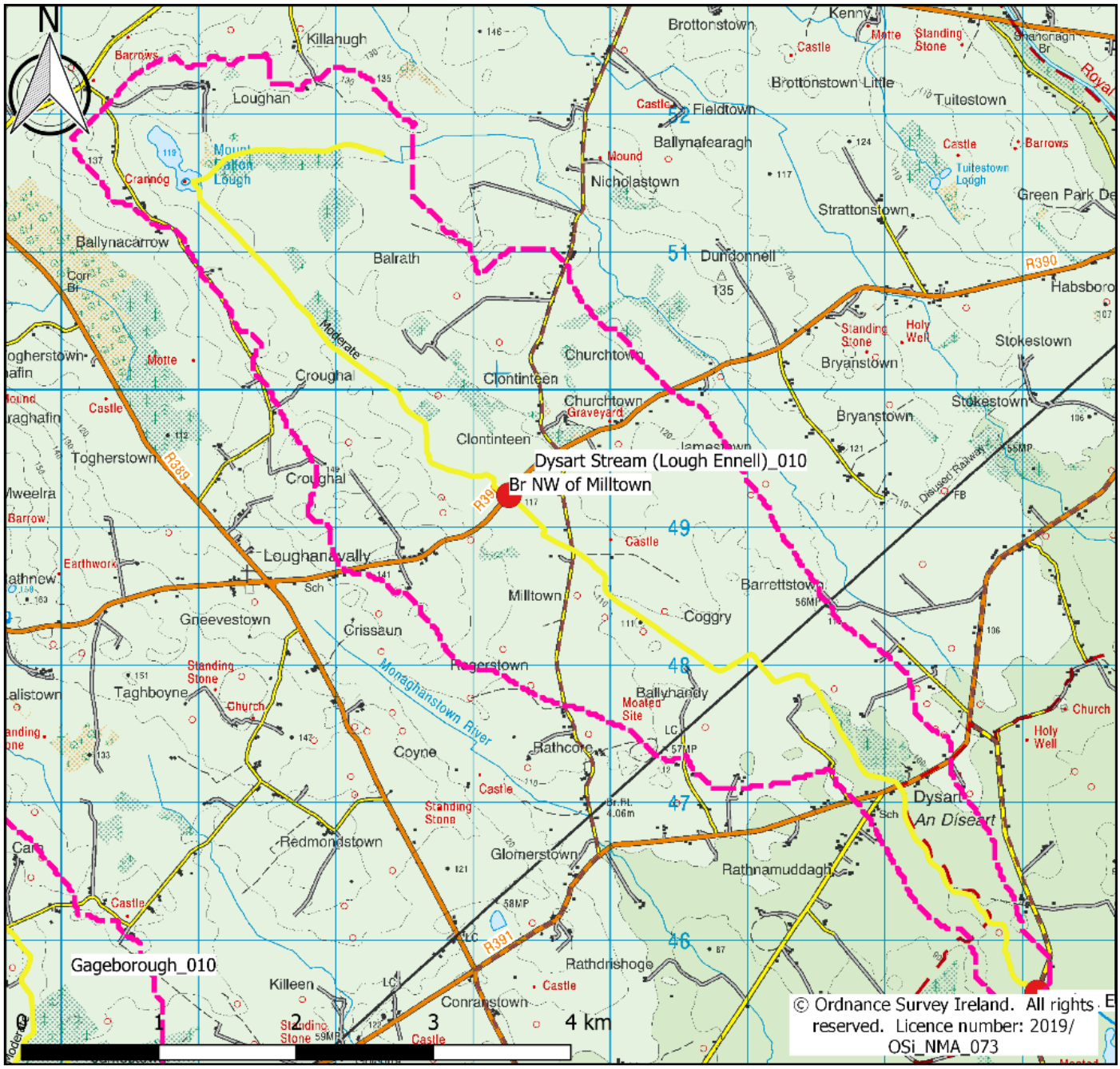
Table 14: Number of issues identified, mitigation actions recommended and implementation of measures for the Dysart_010

Issue Identified	Mitigation Actions	High Risk	High Risk Agreed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
Farmyard Issues								
Slurry Storage	Informing and educating farmers	1	1	0	0	0	1	0
Slurry Storage	Separation of clean, grey, soiled and dirty water in farmyard	1	1	0	0	1	0	0
Silage Pits and Effluent Storage	Additional storage for farm wastes required	1	1	0	0	0	1	0
Silage Pits and Effluent Storage	Improved management of collection and storage of farm wastes	4	4	0	0	0	1	2
Silage Pits and Effluent Storage	Separation of clean, grey, soiled and dirty water in farmyard	1	1	0	0	0	0	1
Loose Housing and FYM Storage	Additional storage for farm wastes required	3	3	1	0	0	0	0
Loose Housing and FYM Storage	Improved management of collection and storage of farm wastes	2	2	0	0	1	0	1
Round Bale storage	Improved management of collection and storage of farm wastes	2	2	0	0	1	0	1
Clean & Grey Water management	Improved management of collection and storage of farm wastes	1	1	0	0	1	0	0
Clean & Grey Water management	Separation of clean, grey, soiled and dirty water in farmyard	1	1	1	0	0	0	0
Drain Connection from Yard to Water	Separation of clean, grey, soiled and dirty water in farmyard	1	1	0	0	1	0	0

Issue Identified	Mitigation Actions	High Risk	High Risk Agreed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
Land Management Issues								
P Loss Through Overland Flow	Improved farm road/tracks design and location	1	1	0	0	0	0	0
P Loss Through Overland Flow	Riparian Buffers - Fenced/Unfenced	19	19	0	0	1	0	13
Sediment Loss	Riparian Buffers - Fenced/Unfenced	6	4	1	0	0	0	4
Sediment Loss	Improved farm road/tracks design and location	1	1	0	0	0	0	1
Drinking Points & Stream Fencing	Informing and educating farmers	4	2	1	1	0	0	1
Drinking Points & Stream Fencing	Prevent livestock access to waters	12	11	3	1	2	1	2
River Bank Erosion	Prevent livestock access to waters	1	1	1	0	0	0	0
Drain Cleaning & Maintenance	Informing and educating farmers	12	12	0	0	0	0	10
Clean & Grey Water management	Improved management of collection and storage of farm wastes	1	1	0	0	1	0	0
Culverts/River Crossings	Improved farm road/tracks design and location	1	1	0	0	1	0	0
Culverts/River Crossings	Improved farm road/tracks design and location	1	1	0	0	0	0	1
Drinking Troughs	Appropriate use of feeders/troughs/ out-wintering	2	2	1	0	1	0	0
Drinking Troughs	Informing and educating farmers	1	1	0	0	0	0	0
Drinking Troughs	Management of Critical Source Areas (CSA's)	2	2	1	0	0	0	0
Farm Roads and Gateways and underpass	Improved farm road/tracks design and location	4	4	0	0	1	0	2

Issue Identified	Mitigation Actions	High Risk	High Risk Agreed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
Land Management Issues								
Field Boundary Management	Establish field boundaries and hedges	1	1	0	0	0	0	0
Out wintering	Appropriate use of feeders/troughs/ out-wintering	2	2	0	0	1	0	1
Herbicide / Pesticide and Sheep dip Use	Adhere to buffer zones and safeguard zones	9	9	0	0	0	0	6
Protection of Abstraction Points and Wells	Adhere to buffer zones and safeguard zones	1	1	0	0	0	0	1
Buffers	Adhere to buffer zones and safeguard zones	18	18	0	0	0	0	12
Nutrient Management Issues								
Identify and Mange Critical Source Areas	Informing and educating farmers	1	1	0	0	0	0	1
Organic Manure Timing, Location & Method	Avoid Application at high risk places	3	3	1	0	0	1	1
Organic Manure Timing, Location & Method	Avoid application at high risk times	1	1	0	0	0	0	0
Weather and Fertiliser Management	Avoid application at high risk times	1	1	0	0	0	0	1
Weather and Fertiliser Management	Riparian buffers - fenced/unfenced	11	11	0	0	0	0	8
Weather and Fertiliser Management	Riparian buffers - fenced/unfenced	11	11	0	0	0	0	8

Figure 2: Map of the Dysart _010



Caha_020

Introduction:

The Caha PAA consists of two waterbodies in North West Cork with the focus on the Caha_020. It is a Blue Dot catchment with a High Status objective. It has been at Good Status since 2012 and is also home to the endangered freshwater Pearl Mussel.

Hydro morphology and nutrient losses from agriculture are significant pressures on the waterbody. Agriculture is contributing sediment, phosphate and ammonium and these are significant issues impacting water quality. The main pathways for sediment, phosphate and ammonium are point sources, overland flow pathways with drainage/land improvement works being most important.

There is some significant areas of forestry in the waterbody but agriculture (relatively extensive) is the dominant land use and both diffuse and point source impacts from agriculture is the focus of the LAWPRO field assessments. In stream assessments at various locations in the Caha_020 indicated that most of the sites were 'probably not significantly impacted'. However this does not necessarily reflect high status. A number of locations did exceed standards for phosphate, ammonium and nitrate with land drainage contributing to these exceedances.

LAWPRO Agricultural Referrals:

Based on LAWPRO Local Catchment Assessment (LCA) work in the Caha_020 a number of referrals have been passed to the ASSAP advisors for action. The referrals are based on biological and visual assessments, chemistry data, conductivity measurements and sediment prevalence.

The agricultural issues identified as impacting on water quality include:

- diffuse phosphate and sediment loss mainly from poorly draining pasture land adjacent to drains and streams (Critical Source Areas)
- access by livestock to drains and streams
- land improvement works and drainage
- non observance of buffer zones when applying organic and chemical fertilisers
- application of organic fertilisers at inappropriate times and locations
- point source discharges and soiled water run-off from farmyards.

ASSAP Farm Assessments:

As per LAWPRO referrals and issues highlighted, the ASSAP advisors focused visits on identifying and mitigating these issues on farms.

In all 24 farms were visited, 9 of the farms were dairy farms, one is a sheep farm with the remainder beef farmers. Two farmers declined the offer of a farm visit.

The issues identified by the advisors were broadly in line with LAWPRO referrals with the majority of issues and mitigation actions targeting diffuse P and sediment losses from various land management practices. P loss through overland flow, drinking points and stream fencing and drain cleaning and maintenance were the issues most frequently identified.

Details on the issues identified, mitigation actions recommended and implementation of mitigation actions for the Caha_020 are contained in Table 15.

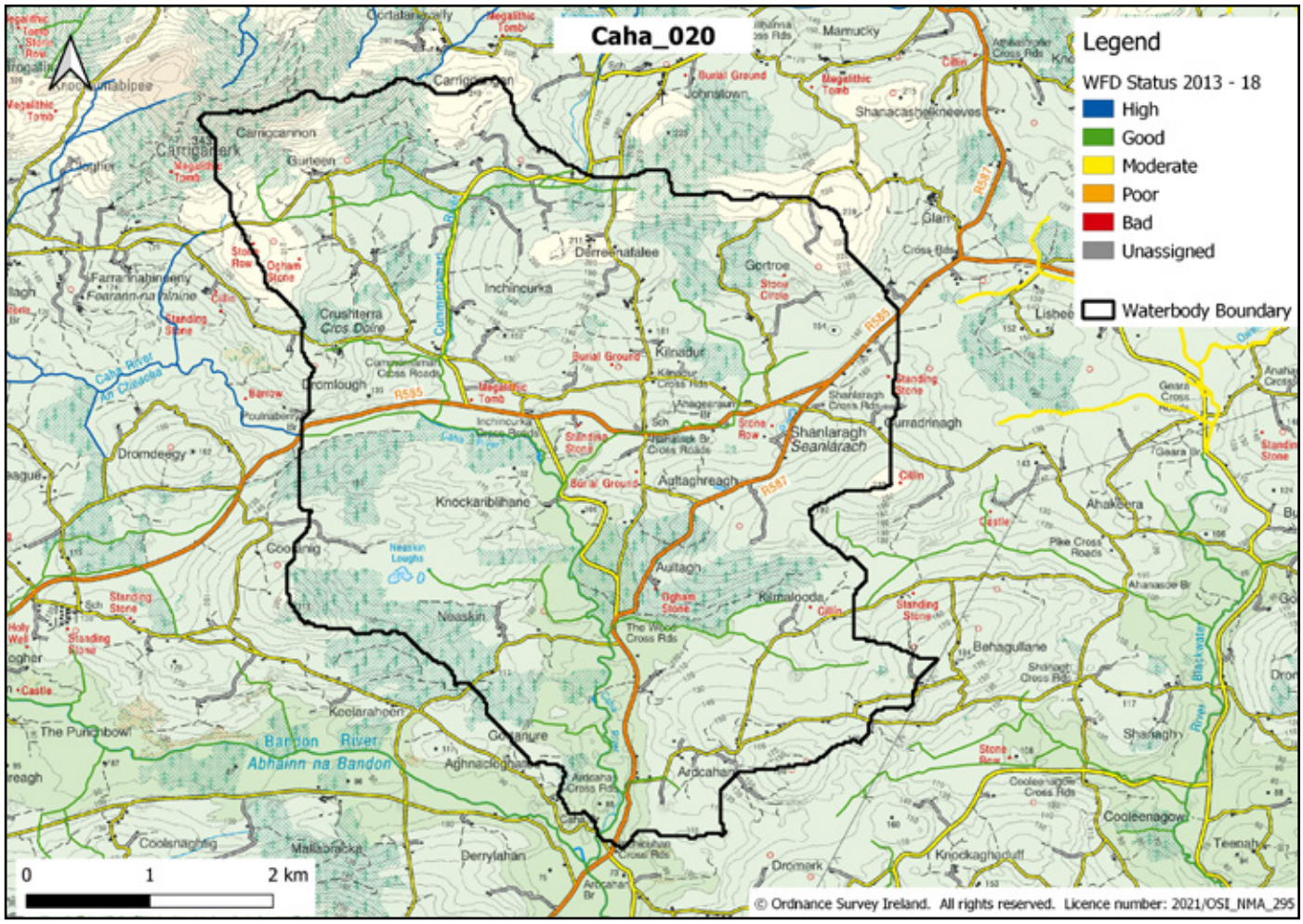
Table 15: Number of issues identified, mitigation actions recommended and implementation of measures for the Caha_020

Issue Identified	Mitigation Actions	High Risk	High Risk Agreed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
Farmyard Issues								
Slurry Storage	Additional storage for farm wastes required	1	1	0	0	1	0	0
Slurry Storage	Destock/reduce stock for winter	1	1	0	0	1	0	0
Slurry Storage	Separation of clean, grey, soiled and dirty water in farmyard	1	1	0	0	1	0	0
Dirty yards	Additional storage for farm wastes required	1	1	0	0	1	0	0
Dirty yards	Destock/reduce stock for winter	1	1	0	0	1	0	0
Dirty yards	Separation of clean, grey, soiled and dirty water in farmyard	1	1	0	0	1	0	0
Silage Pits and Effluent Storage	Improved management of collection and storage of farm wastes	1	1	0	0	0	0	0
Dirty yards	Improved management of collection and storage of farm wastes	1	1	0	0	0	0	1
Clean & Grey Water management	Separation of clean, grey, soiled and dirty water in farmyard	1	1	1	0	0	0	0
Clean & Grey Water management	Improved management of collection and storage of farm wastes	1	1	1	0	0	0	0
Land Management Issues								
P Loss Through Overland Flow	Management of Critical Source Areas (CSA's)	3	3	0	0	0	0	3
P Loss Through Overland Flow	Riparian Buffers - Fenced/Unfenced	2	2	0	0	0	0	2
N leaching from Light Soils	Avoid application at high risk times	2	2	0	0	0	0	2

Issue Identified	Mitigation Actions	High Risk	High Risk Agreed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
Land Management Issues								
Drinking Points & Stream Fencing	Prevent livestock access to waters	1	1	0	0	1	0	0
Drain Cleaning & Maintenance	Allow grassed waterways and vegetated ditches	2	2	0	0	0	0	2
Drain Cleaning & Maintenance	Ditch/drain maintenance and management	2	2	0	0	0	0	2
Unsuitable drainage delivering Nutrient and/or Sediment	Allow field drainage system to deteriorate	1	1	0	0	0	0	1
Unsuitable drainage delivering Nutrient and/or Sediment	Reduced field drainage and backfill amendment	1	1	0	0	0	0	1
Reseeding Practices	Appropriate land reclamation management	1	1	0	0	0	0	1
Supplementary Feeding and Sacrifice Paddocks	Appropriate use of feeders/troughs/ out-wintering	1	1	0	0	0	0	1
Supplementary Feeding and Sacrifice Paddocks	Extensification	1	1	0	0	0	0	1
Supplementary Feeding and Sacrifice Paddocks	Maintain/improve soil structure	1	1	0	0	0	0	1
Forestry	Management of Critical Source Areas (CSA's)	1	1	0	0	0	0	1
Forestry	Run off attenuation features	1	1	0	0	0	0	1
Forestry	Use of silt fences	1	1	0	0	0	0	1

Issue Identified	Mitigation Actions	High Risk	High Risk Agreed	Not Started	Not Proceeding	Commenced	Complete	Ongoing
Nutrient Management Issues								
Preparation and implementation of NMP	Avoid application at high risk places (CSA's)	1	1	0	0	0	0	1
Preparation and implementation of NMP	Avoid application at high risk times	1	1	0	0	0	0	1
Organic Manure Timing, Location & Method	Avoid application at high risk times	2	2	0	0	0	0	2
Organic Manure Timing, Location & Method	Precision application of nutrients at correct rate	1	1	0	0	0	0	1
Organic Manure Timing, Location & Method	Avoid Application at high risk places	1	1	0	0	0	0	1
Organic Manure Timing, Location & Method	Change from slurry to solid manure	1	1	0	0	0	0	1
Correct Management of High OM soils	Avoid application at high risk places (CSA's)	1	1	0	0	0	1	0
Correct Management of High OM soils	Avoid application at high risk times	4	4	1	0	0	1	2
Correct Management of High OM soils	Precision application of nutrients at correct rate	2	2	1	0	0	0	1
Correct Management of High OM soils	Prudent P use on peat soils	4	4	2	0	0	1	1
Sloped Fields	Avoid application at high risk times	2	2	0	0	0	0	2
Sloped Fields	Riparian buffers - fenced/unfenced	1	1	0	0	0	0	1
Sloped Fields	Allow grassed waterways and vegetated ditches	1	1	0	0	0	0	1
Sloped Fields	Avoid application at high risk places (CSA's)	1	1	0	0	0	0	1
Fertiliser Type	Liming	2	2	1	0	1	0	0
Fertiliser Type	Implementation of Nutrient Management Plan	1	1	0	0	1	0	0
Fertiliser Type	No P on index 4 soils	1	1	0	0	1	0	0

Figure 3: Map of the Caha_020



Contributors:

- ASSAP Advisors – Teagasc and Dairy Processing Co-ops
- Joe Crockett – Dairy Sustainability Ireland
- LAWPRO – Catchment Assessment Teams
- Yvonne Maher – Teagasc
- Carol McCarthy – LAWPRO
- Noel Meehan – Teagasc
- Pat Murphy – Teagasc
- Ray Spain – LAWPRO

NOTES

Contact Details:

Teagasc, Head Office, Oak Park, Carlow.

Tel: **059 9170200** | **Email:** **info@teagasc.ie** | **Web:** *www.teagasc.ie*

Teagasc
Agriculture and Food Development Authority

Dairy Sustainability Ireland

ASSAP
Farming for Water Quality