Shellfish Action Plan

Belfast Lough

December 2019

Department of
Agriculture, Environment
and Rural Affairs
www.daera-ni.gov.uk

INVESTORS
IN PEOPLE

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1.0 Introduction

Pollution Reduction Programmes (now Shellfish Action Plans) were established under Article 5 of the Shellfish Waters Directive (2006/113/EC) which stated that all Member States should establish programmes in order to reduce pollution in designated shellfish waters. Shellfish Action Plans will next be reviewed on a priority basis starting in 2021 which is in line with the third River Basin Cycle under the Water Framework Directive.

The Shellfish Waters Directive was subsumed into the Water Framework Directive (2000/60/EC) in December 2013. Since then all shellfish waters are protected under the Water Framework Directive (WFD) and are hereafter referred to as Shellfish Water Protected Areas. Shellfish Water Protected Areas are afforded the same level of protection under WFD as they were under the Shellfish Waters Directive. The Department will continue to work to deliver effective management of Shellfish Water Protected Areas through the UK's post Brexit Marine Strategy.

Urban Waste Water Treatment Directive Sensitive Area Review

The Sensitive Area Review is carried out under the Urban Wastewater Treatment Directive (UWWTD) and deals primarily with the management actions required by Northern Ireland Water (NIW) to protect the waterways of Northern Ireland.

Under the UWWTD waters may be identified as sensitive areas if found to be eutrophic or likely to become eutrophic if protective action is not taken. The review for the 2015–19 period provided a trophic status assessment of the marine and freshwaters of Northern Ireland using the WFD assessment methods, as agreed by UK Technical Advisory Group (UKTAG). In Northern Ireland the approach for sensitive area identifications is on a catchment basis but the review detail is on a water body basis as defined under the WFD.

The Tidal River Lagan and Inner Belfast Lough were designated as Sensitive Areas (Eutrophic) under the UWWTD in 2001. The River Lagan catchment was recognised as eutrophic and was subsequently designated as Sensitive (Eutrophic) under the UWWTD in July 2006. Outer Belfast Lough is not currently designated as a Sensitive Area.

Additional sensitive areas may be identified for example to protect bathing waters under the Bathing Water Directive (2006/7/EC) or Shellfish Water Protected Areas under the WFD. In 2019, a statistical assessment confirmed an increase in *E. coli* in shellfish flesh, which indicates a decline in quality of the Shellfish Water Protected Area (SWPA) in Belfast Lough Inner. Quality has been shown to have fallen below the target of Class B in part of the area. A possible designation is now being considered under Annex IIAc of UWWTD i.e. those areas where further treatment than that prescribed in Article 4 is necessary to fulfil other Council Directives.

Living With Water Programme (LWWP)

An Interdepartmental Strategic Drainage Infrastructure Plan, entitled the Living with Water Programme, is being developed to support economic growth, protect the environment and address flood risk in Belfast. This plan is required as the drainage infrastructure in parts of Belfast is currently inadequate. The scale of the environmental and flooding problems in Belfast requires a holistic and integrated approach to future drainage provision.

In Belfast, NI Water maintains and operates over 4,800 Km of sewers and Department for Infrastructure (DfI) Rivers maintains around 396 Km of designated watercourses. There are also over 87Km of private drains/sewers that are not being maintained by Government. This drainage infrastructure requires significant future capital investment in order to reduce the risk of flooding, enhance the environment and allow for continued economic growth.

DfI Water and Drainage Policy Division is leading the LWWP and aims to work across Departments and stakeholders in managing our water in a sustainable and holistic way. The LWWP is being progressed via 15 interlinked work packages and is being overseen by a Programme Board which includes representatives from DfI (Water and Drainage Policy Division, DfI Rivers, DfI Roads), NI Water, Belfast City Council, the Department of Agriculture, Environment and Rural Affairs (DAERA), the Department of Finance (DoF) and the Strategic Investment Board (SIB).

2.0 Description of catchment

Belfast Lough, part of the North Eastern River Basin District, is a semi-enclosed sea lough at the mouth of the River Lagan. The catchment area covers approximately 399km2 around Belfast Lough, with the Lough itself covering an area of 130km2. The River Lagan which flows out through the city of Belfast also has an influence on the Lough and it has a catchment area of 606km2. The other main rivers entering Belfast Lough are the Woodburn River, Kilroot River, Ballyholme River, Crawfordsburn River and the Three Mile Water. Numerous smaller streams exist throughout the area and enter the Lough at various points.

The inner region of the Lough contains an inter-tidal area comprising of a series of mudflats, while the outer Lough is dominated by rocky shores, with some sandy bays. The mudflats provide a valuable habitat for a range of bird species and the shallow waters on either side of the main shipping channel, which runs through the middle of the lough, sustain the growing shellfish industry.,

The Belfast Lough Special Protection Area (SPA) qualifies under Article 4.2 of EC Directive 79/409 on the Conservation of Wild Birds by regularly supporting internationally important numbers of redshank in winter. The site also regularly supports nationally important numbers of shelduck, oystercatcher, purple sandpiper, dunlin, black-tailed godwit, bar-tailed godwit, curlew and turnstone. Belfast Lough as a whole is also used by several other waterfowl species including great crested grebe, scaup, eider, goldeneye and red-breasted merganser.

Inner Belfast Lough Areas of Special Scientific Interest (ASSI) encompasses the southern part of Belfast Lough and is of Special Scientific Interest primarily because of its fauna. It includes areas of intertidal foreshore, comprising of mudflats and lagoons, and land, both reclaimed and being reclaimed which form important feeding/roosting sites for significant numbers of wintering waders and wildfowl. Of particular note are redshank and oystercatcher.

Outer Belfast Lough ASSI is important for habitat, species and earth science, Birds from Inner Belfast Lough ASSI regularly use Outer Belfast Lough for feeding, and the populations of the two areas are closely linked

The Shellfish Water Protected Area is situated wholly within Belfast Lough Inner water body.

The city of Belfast is located at the south western end of Belfast Lough and is the busiest port in Northern Ireland.

The 2008 Sanitary Survey and 2014 review can be viewed following the links below

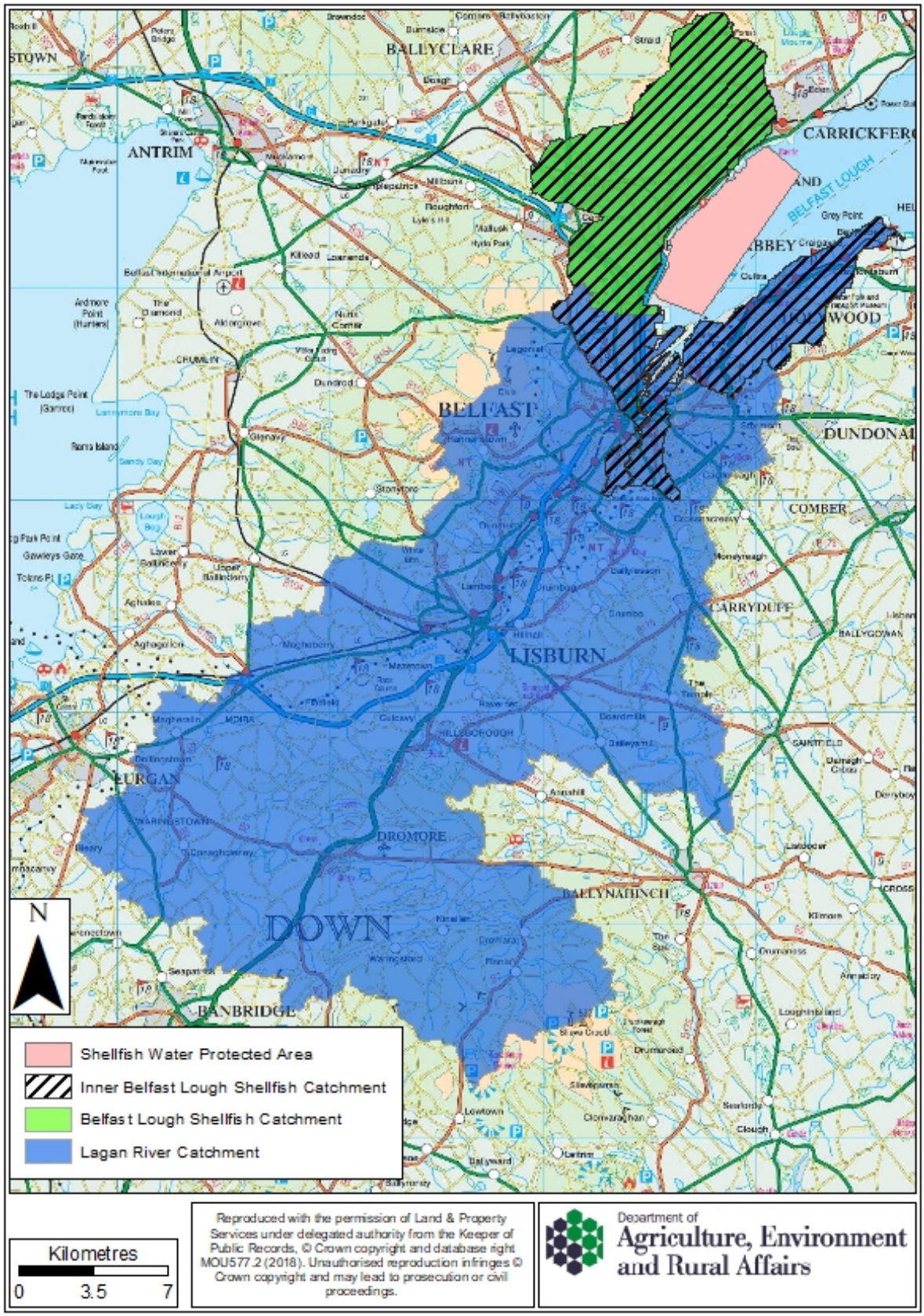
www.food.gov.uk/sites/default/files/multimedia/pdfs/belfastlough.pdf

www.food.gov.uk/sites/default/files/belfast-ss-review-April2014.pdf

The 2008 sanitary survey reported that the dominant land use is improved grassland (33%), suburban and urban development (18%), arable farming (13%) and dense dwarf shrub heath (7%).

Belfast Lough was designated under the Shellfish Waters Directive in 2009.

Figure 2. River Catchment Areas Draining into Belfast Lough



3.0 Objectives for Shellfish Water Protected Areas

Under WFD all Shellfish Water Protected Areas (SWPAs) must be managed to ensure that they meet their ecological and chemical objectives under WFD **AND** meet at least Class B status under the EU Hygiene Regulations. SWPAs must also make progress towards the WFD microbiological guideline standard of ≥75% of samples contain ≤230 *E.coli* in the shellfish flesh and intervalvular liquid[1]. The Food Standards Agency in NI is responsible for the implementation of Classification and monitoring programmes for shellfish for the protection of public health.

3.1 Water Framework Directive status and shellfish classification

Comprehensive monitoring programmes are in place to assess the status of Shellfish Water Protected Areas under the WFD and classification under the EU Hygiene Regulations. A suite of determinands are assessed to determine ecological status and the overall objective under WFD. The Shellfish Water Protected Area lies entirely within the Inner Belfast Lough water body. There are seventeen production areas licensed by DAERA Marine and Fisheries Division for the cultivation of shellfish within the Shellfish Water Protected Area and four licensed sites outside of the Shellfish Water Protected Area.

Table 1 shows the future WFD ecological objective for Belfast Lough Inner water body.

Table 1. WFD Ecological Status and Objectives for Belfast Lough Inner

2021 Objective	2027 Objective
Moderate Ecological Status & Class B under EU Hygiene Regulations	Good Ecological Status & Class B under EU Hygiene Regulations

[1] http://www.legislation.gov.uk/nisr/2015/351/contents/made

Table 2 shows the Classification status at Belfast Lough Inner under WFD (colour) and the licensed shellfish beds under the EU Hygiene Regulations (text).

Table 2. Classification status of shellfish production areas in Belfast Lough Inner

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
C. Fresh (AFFNI 15–B4)	C	B Provisional	C	B	B	B Provisional	B	B	B	B
Dougold Whitehouse (AFFNI 50-B3)	C (01.01.18-30.4.18) B 01.05.18-31.12.18)	B	B	B	B	B Provisional	B	B	B	B
McLoughlin (AFFNI 28 B10)	B	B	B	B	B	B Provisional	B	B	B	B
Dougold Carrickfergus (AFFNI 53-B20)	B	B	B	B	B	B	B	B	B	B

Folly Roads (AFFN I9-B14)	B	B	B	B	B	B	B	B	B	B Provisional
Gallagher (AFFNI 60A-B7)	B	B	B	B	B	B Provisional	B	B	B	B
Henning (AFFNI 37–B8)	C (01.01.18-30.4.18) B 01.05.18-31.12.18)	B	B	B	B	B Provisional	B	B	B	B
Middle Bank (AFFNI 55-B1)	C	B Provisional	C	C	B	B	B	B	C	B Provisional
Ross' Rock (AFFNI 56A-B6)	B	B	B	B	B	B Provisional	B	B	B	B
Steele	C	B Provisional	C	B	B	B Provisional	B	B	B	B

(AFFNI 17B-B5)										
The Moorings **(AFFNI 17A-B11)**	B	B	B	B	B	B Provisional	B	B	B	B
Urey **(AFFNI 54-B12)**	B	B	B	B	B	B	B	B	B	B
Whitehouse Roads **(AFFNI 51 B2)**	C	B Provisional	C	B	B	B Provisional	B	B	B	B Provisional
Emerald Mussels **(AFFNI 85 B9)**	C (01.01.18-30.4.18) B 01.05.18-31.12.18)	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Holywood South (AFFNI 56B B24)	B	B	B	B	B	B	B	B	B	B

A provisional classification is given when a new bed is classified based on a limited number of samples or when a bed is borderline compliant with criteria of a classification.

Key to WFD Status

	High		
	Good		Good Ecological Potential
	Moderate		Moderate Ecological Potential
	Poor		Poor Ecological Potential
	Bad		Bad Ecological Potential

4.0 Monitoring programmes for Shellfish Water Protected areas and shellfish flesh

4.1 Monitoring of *E. coli* in shellfish flesh

FSA conducts monthly analysis of *E. coli* in shellfish flesh as part of its Official Control monitoring. This analysis is used to classify the quality of shellfish production areas. The classification determines the level of post-harvest treatment required before placing shellfish product from that area on the market. The FSA in NI's Official Control monitoring programme is solely for the purpose of classification of shellfish production areas. It is not intended as an indication of the end product standard of shellfish. Responsibility for ensuring the safety of shellfish which are placed on the market for human consumption rests solely with the food business operator (FBO)[2].

[2] https://www.food.gov.uk/business-guidance/biotoxin-and-phytoplankton-monitoring

Table 3. Shellfish classification and post-harvest treatment

Classification of harvesting areas		
Category	**E.coli per 100g flesh and intravalvular liquid**	**Post-harvest treatment required**
A	≤230	May go directly for human consumption if end product standard met.
B	90% results <4600 Remaining 10% results <46000 100% results <46000	Must be subject to purification or cooked by an approved method.
C	<46,000	Must be subject to relaying for a period of at least 2 months or cooked by an approved method.
	>46,000 E.coli/100g of flesh	Prohibited. Harvesting not permitted.

4.2 Producer responsibility

Shellfish producers and harvesters have obligations under the EU Hygiene Regulations to ensure the quality of the product which they place on the market for human consumption. Producers should have an understanding and awareness of the environment in which product is being produced. Producers should use where possible, their own testing regimes to inform business management decisions. It is acknowledged that in order to make sounds decisions, producers need access to appropriate and timely information relating to the quality of the shellfish water and anything which has the potential to impact upon it.

4.3 Guideline microbiological standard (DAERA)

The shellfish flesh monitoring programme is operated by FSA in NI. The analyses in shellfish flesh are carried out by Northern Ireland Public Health Laboratories and results are reported back to both DAERA and FSA in NI.

In addition to being used for the Official Control monitoring for the microbiological shellfish classification carried out by the FSA in NI, this information is also used by DAERA to determine the status of Shellfish Water Protected Areas against a guideline microbiological standard for shellfish flesh which is set in the Water Framework Directive (Priority Substances and Classification) (Amendment) Regulations (Northern Ireland) 2015. This guideline standard requires that 75% of samples contain ≤ 230 *E. coli* per 100ml of shellfish flesh and intervalvular liquid.

Table 4. shows the status of Belfast Lough against the WFD Guideline standard.

Belfast Lough - guideline microbiological standard

Shellfish Water Protected Area	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Belfast Lough										
Total Number of Samples	60	60	60	72	101	150	120	120	120	138
% Samples Meeting Guideline	47	38	47	53	50	55	57	60	57	56

	Met Guideline
	Did Not Meet Guideline

4.4 Monitoring of contaminants in shellfish flesh

Annual analysis of a suite of contaminants in shellfish flesh is carried out in all seven of the sea loughs/areas in Northern Ireland in which shellfish are cultivated and harvested. This is a joint programme of monitoring currently in place with FSA in NI and DAERA to meet both organisations' requirements under EU legislative requirements and OSPAR (Oslo/Paris Convention *(for the Protection of the Marine Environment of the North-East Atlantic*)) and to enable DAERA to determine compliance with a range of environmental obligations relating to Shellfish Water Protected Areas.

The suite of contaminants tested for includes trace metals, lipids, dioxins, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs). See Annex A.

4.5 Investigative monitoring (DAERA)

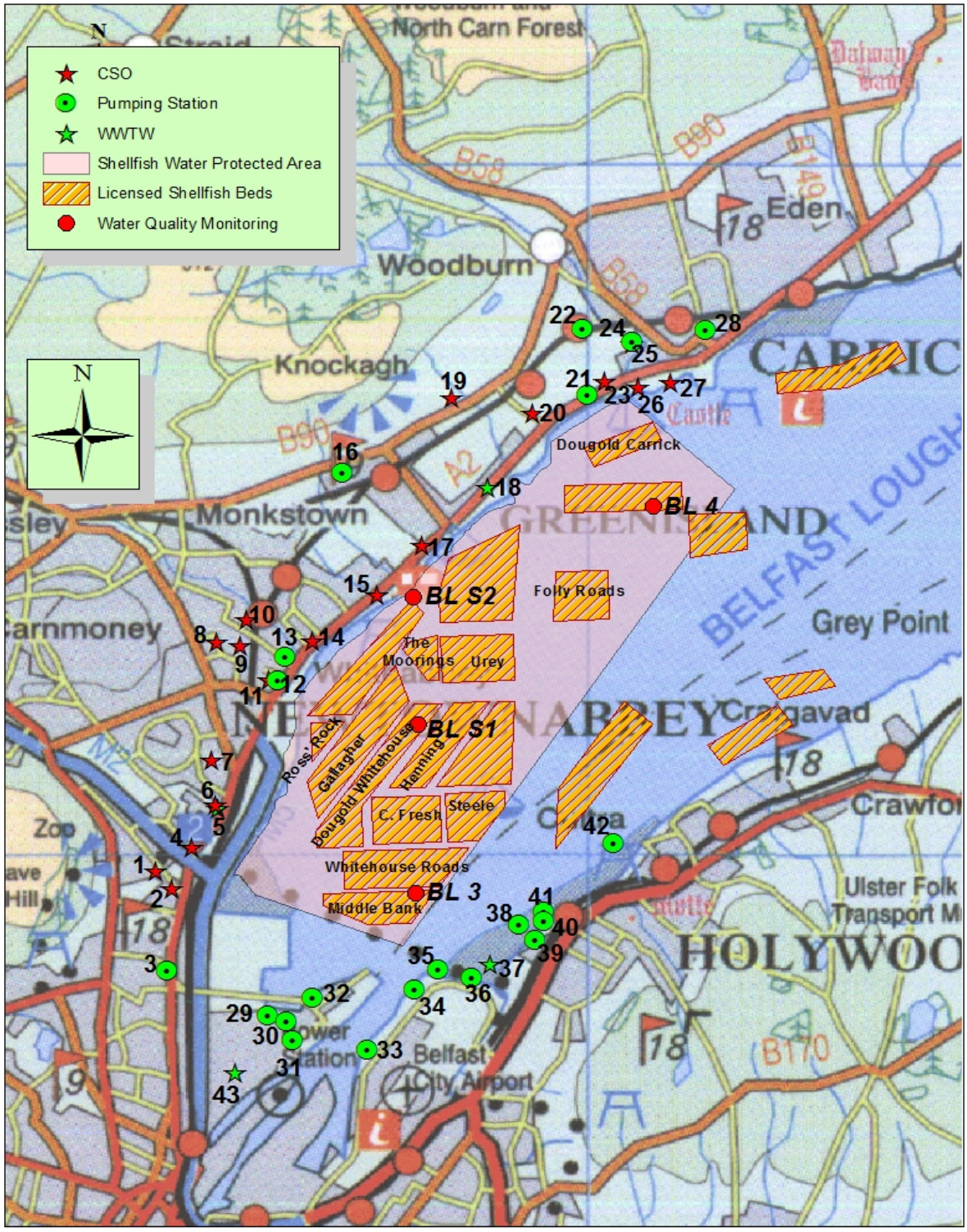
Where Shellfish Water Protected Areas are at risk of failing to meet objectives, specific investigative monitoring is undertaken of the protected areas, rivers and any other potential sources of pollution investigated.

In addition to the measures set out in this Shellfish Action Plan, DAERA will investigate any pollution incident and/or deterioration in water quality. Formal arrangements are

in place between DAERA, NI Water and the FSA in NI to investigate and respond to incidents relating to water quality at Shellfish Water Protected Areas. This includes responding to requests for investigation of FSA in NI microbiological official control sample results which are outwith the classification of the shellfish production area and any pollution incident in the proximity of a Shellfish Water Protected Area.

It is an offence under the terms of the Water (Northern Ireland) Order 1999 to cause pollution to a waterway. Pollution incidents will be investigated in accordance with the DAERA Enforcement and Prosecution Policy, which can be found at; https://www.daera-ni.gov.uk/sites/default/files/publications/daera/emfg-enforcement-policy.pdf

Figure 3. Licensed shellfish production areas in Belfast Lough, showing sampling points for microbiological analysis, the Shellfish Water Protected Area and potential point pollution sources.



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Key – Belfast Lough

1: Whitewell St Ninians Combined Sewer Overflow

2: Shore Road Whitewell Combined Sewer Overflow

3: Greencastle Belfast Wastewater Pumping Station

4: Mill Road Newtownabbey Combined Sewer Overflow

5: Merville Mews Two Combined Sewer Overflow

6: Whitehouse Wastewater Treatment Works

7: Altmore Green Combined Sewer Overflow

8: Fernagh Combined Sewer Overflow

9: Glenabbey Combined Sewer Overflow

10: Ards Drive Viaduct Combined Sewer Overflow

11: Shore Road Whiteabbey Combined Sewer Overflow

12: Coastguard Row Wastewater Pumping Station

13: Whiteabbey Wastewater Pumping Station

14: Shore Road Jordanstown Combined Sewer Overflow

15: Greenisland (1)

16: Farm Lodge Wastewater Pumping Station

17: Greenisland (2)

18: Greenisland Wastewater Treatment Works

19: Greenisland (4)

20: Old Shore Road Combined Sewer Overflow

21: Lower Woodburn Wastewater Pumping Station

22: Albany Wastewater Pumping Station

23: Belfast Road Carrickfergus Combined Sewer Overflow

24: Minorca Drive Wastewater Pumping Station

25: Minorca Drive South Combined Sewer Overflow

26: Marine Highway Combined Sewer Overflow

27: Irish Quarter South Combined Sewer Overflow

28: Joymount Carrickfergus Wastewater Pumping Station

29: Dargan Drive Wastewater Pumping Station

30: Dargan Road Wastewater Pumping Station

31: Herdman Channel 2

32: West Bank Wastewater Pumping Station

33: Moscow Road Wastewater Pumping Station

34: BHC Airport Road West Four Wastewater Pumping Station

35: BHC Airport Road West Three Wastewater Pumping Station

36: BHC Airport Road West Five Wastewater Pumping Station

37: Kinnegar Wastewater Treatment Works

38: Kinnegar Avenue Wastewater Pumping Station

39: Clarehill Mews Wastewater Pumping Station

40: Holywood B Wastewater Pumping Station

41: Holywood A Wastewater Pumping Station

42: Farmhill Road Wastewater Pumping Station

43: Belfast Wastewater Treatment Works

5.0 Programme of Measures to Protect Shellfish Water Protected Areas

A North Eastern River Basin Management Plan was published in December 2009, identifying where the water environment needed to be protected or improved, the timeframe to make these improvements and how this could be achieved through a Programme of Measures.

Since this first Plan was published in 2009, the Department has been working with others to make improvements detailed within the Plan. Progress has been made and there are signs of improvement throughout the North Eastern River Basin District water environment. NIEA has updated the Programme of Measures taking into consideration existing measures and identifying new measures which are required to meet the objectives for 2021 and 2027.

A second North Eastern River Basin Management Plan was published in 2015 which builds on the positive work already being carried out. It details changes and new measures for the second river basin planning cycle 2015-2021. The Programme of Measures aims to address the key pressures through concentrated efforts targeted at greatest threats to the water environment. From assessments conducted, two significant sources of pressure have been identified that are preventing water bodies from achieving good status in the North Eastern River Basin District. These are diffuse pressures and point source pressures from both agricultural, urban wastewater and development.

A summary of some of the existing and planned measures is below. More detail can be found at https://www.daera-ni.gov.uk/sites/default/files/publications/doe/water-report-north-eastern-river-basin-plan-2015.pdf and https://www.daera-ni.gov.uk/sites/default/files/publications/daera/NIEA%20-%20WFD%20Statistics%20Report%202018.pdf

Key Sector – Agriculture – General

Specific actions for Belfast Lough are highlighted in the report card below.

Pressure Type – Diffuse and Point Source Pollution

Improvements required – Reduction in nutrient inputs and reduction in organic waste, reduction in pollution from sediment, education and awareness.

A **Memorandum of Understanding** has been signed between NIEA and the Ulster Farmers' Union. It is hoped that the MOU will assist in improving environmental outcomes, including improving water quality through addressing diffuse pollution.

One new incentive the Department has introduced is the **Environment Farming Scheme** (EFS) Launched in February 2017, this is a voluntary scheme that will support farmers and land managers to carry out environmentally beneficial farming practices on agricultural land. Agriculture pollution can have potentially damaging effects on rivers and shellfish growing waters. Many of our shellfish waters are in rural catchments and can therefore be susceptible to agricultural pollution. The scheme includes elements to improve and enhance water quality through both individual and group catchment improvement actions. Measures to improve water quality include buffer strips around rivers and riverine fencing.

The **Catchment Care Project,** which will be funded under INTERREG VA, will look at a range of agricultural issues across three catchments which have the potential to cause water pollution. The project will also examine measures to mitigate against water pollution impacts. The catchments are the Arney, Finn and Blackwater.

A **Strategic Agricultural Land Management Strategy** was launched by Minister McIlveen on 21st October 2016. Some of the recommendations within the Strategy are now being progressed by a pilot scheme in the Upper Bann catchment. A report on the effectiveness of the pilot, which will influence future management of agricultural land use incorporating better protection of waterways.

Although both the Catchment Care Project and the Strategic Land Management Strategy pilot are not within shellfish water catchments, the methodology and findings will be transferable to other sites.

Knowledge Advisory Service – A knowledge focussed service, managed by CAFRE which will deliver proactive programmes and drive innovation to improve the economic and environmental performance and resilience of the land based and food processing industries. Early indications are that interactions with the Knowledge Advisory Service

and NIEA will help to provide advice to farmers on the linkages between their agricultural practices and impacts on water quality.

Compliance and Enforcement Visits – DAERA to enforce closed spreading period for slurries and application on land restrictions. Encourage and advise on good land management practices such as; riverbank fencing and riparian buffers.

Key Sector – Sewage and Industry – General.

Specific actions for Belfast Lough are highlighted in the report card below.

Pressure Type – Diffuse and Point source pollution

Improvements required – Reduction in pollution from sewage, reduction in nutrient and dangerous substances, reduction in pollution from un-sewered properties, reduction in pollution from industry.

Actions – Northern Ireland Water Price Control (PC) process ensures investment in infrastructure. DAERA continue work on microbial source tracking to identify sources of bacterial contamination. Reviews of discharge consents on a catchment basis and comply with discharge standards in quality and quantity. Also improvements to existing controls on septic tanks, develop models and catchment based approaches to protect areas. NI Water presently do not have telemetry installed at network CSOs. There is funding in the PC15 business plan to deliver event and duration monitors at all CSO's within 2km of designated bathing and shellfish waters. The project is underway and 20 trial sites have equipment installed, which is currently being tested. Upon successful completion of the trial, the full scale roll out of monitor installation will proceed with Belfast Lough as a prioritised area, as agreed with NIEA, throughout the remainder of the PC15 period.

Key Sector – Urban Catchment

Pressure Type – Diffuse and point source pollution

Improvements required – Control of diffuse and point source pollution, reduction in pollution and flood risk,

Actions – Promote and adopt good practice with respect to storage, use and disposal of hazardous chemicals. Promote wider use of Sustainable Urban Drainage Systems (SuDs) and buffer strips.

The water environment in the North Eastern River Basin District is being managed at a local level through Local Management Area action plans, including the Belfast Lough Local Management Area action plan. In 2017 and 2018, activities have focussed on targeted catchments to best utilise resources.

Catchment Stakeholder groups provide forums for stakeholders to discuss water management issues in their local area and to work in partnership to address them.

Local Management Area Plan and 2013 update for Belfast Lough[3]

[3] https://www.daera-ni.gov.uk/sites/default/files/publications/doe/water-information-belfast-lough-local-management-area-action-plan-and-update-2013.pdf

6.0 Summary of Outputs (Expanded at Annex A)

Actions in Improving Sewerage Network and Waste Water Treatment Works
Monitoring and Investigations
Actions in Reducing Agricultural Inputs
Overall Management Actions

How much did we do #	How well did we do it %
Actions in improving Sewerage Network and Waste Water Treatment Works	
Sewerage network improvements	Modelling of the sewer networks discharging to Belfast Lough are currently being undertaken by Northern Ireland Water as part of the Living with Water Program (LWWP)
Upgrades of WWTW	Modelling of the Waste Water Treatment works effluent discharging to Belfast Lough are currently being undertaken by Northern Ireland Water as part of the Living with Water Program (LWWP).
Monitoring and investigations	
WFD classification (2015/21)	The current status for Belfast Lough Inner is Moderate (which is also the 2021 classification objective).
FSA E coli in flesh programme (from 2012)	Full statistical analysis of the raw data is presented in Annex A There has been shown to be significant deteriorating trends at C Fresh, Steele and Moorings beds in certain months, whilst RMP1 has seen a significant overall deterioration in this period.
Actions in reducing Agricultural Inputs	
Inspection and enforcement of the NAP Regulations carried out by NIEA	Around 300 farm businesses annually assessed for compliance with the Nitrates Directive. Levels of non-compliance decreased in 2014-16, but increased in 2017 and 2018.

Overall Management Actions	
Urban Waste Water Treatment Directive Sensitive Area Reviews 2001-2019.	Inner Belfast Lough designated as Sensitive Area (Eutrophic) under the UWWTD in 2001. Assessment of the Shellfish Water Protected Area (SWPA) in 2019 has confirmed an increase in E. coli in shellfish flesh, which is a decline in quality, Possible designation being considered under Annex IIAc of UWWTD
Proposed Adaptive Management Measures regime and possible new licence conditions for aquaculture growers.	DASSHH – A further option being explored by FSA within the whole of the UK, is a project to look at adaptive management i.e. limiting to harvesting of shellfish to times when quality is likely to be good. This requires research on how rainfall, tides and other factors effect quality and a number of trial are being progressed across the UK, including one by AFBI in Belfast Lough. The UK authorities as a whole are supportive of this approach. However, this would still need to be accepted by the European FSA before wide implementation.
Statistical calculations using Seasonal Kendall test (SK test) were investigated for all data available from FSA E-coli monitoring programme.	This process is quality assured to the ISO9001:2008 standard.

Is anyone better off as a result #/%

It is not possible to measure temporal trends using shellfish flesh classifications alone. Full statistical analysis of raw data is required (See Annex A).

The current RMP 1 has an overall significant upward trend in *E. coli* in shellfish flesh. It also has statistically significant upward trends in e-coli in flesh in February, March, April and September across C-Fresh and Steele beds. RMP 2, specifically Moorings bed, has statistically significant upward trends in e-coli in flesh in November and December but not overall. These is no significant statistical trends proven in shellfish result in other beds, this could be due to a number of reasons including; lack of data or no evidence of trend.

UWWTD Sensitive Area Review - Possible designation of Inner Belfast Lough SWPA is now being considered under Annex IIAc of UWWTD - In Belfast Lough Inner, an assessment of the Shellfish Water Protected Area (SWPA) in 2019 has confirmed an increase in E. coli in shellfish flesh, which is a decline in quality. Quality has fallen below the target of Class B in part of the area. I.e. those areas where further treatment than that prescribed in Article 4 is necessary to fulfil other Council Directives.

Inspection and enforcement of the NAP Regulations is carried out by NIEA. Around 300 farm businesses are now selected for scheduled inspection each year and all are assessed for compliance with the Nitrates Directive. **The levels of non-compliance were found to be reducing from 2014 to 2016. However in 2017 and 2018 the levels of non-compliance increased.** NIEA have increased the number of identified risk farms to visit in 2019 and will increase the number of inspections in selected priority water bodies this year.

Conclusion - Whilst significant efforts have been devoted to continued work in Belfast Lough catchment, there has been inadequate improvements in measured elements and unfortunately a continued decrease in shellfish quality to date. Belfast Lough has been identified as a "Priority Catchment" and will continue to be investigated and reviewed on an ongoing basis. It will continue to be highlighted on risk registers to emphasise the importance of the continued work ongoing by many teams within DAERA and other organisations.

The key delivery mechanism for improvements in this area is the Living with Water Programme. The real-time measuring combined with modelling will assist managers to make the most cost-effective mechanisms to improve water quality. The LWWP also provides a mechanism to highlight the issues around the funding of NI Water, which is likely to be responsible for the delivery of many of the required improvements in this area.

Any incident should be reported to the NIEA Water Pollution Hotline on
0800 80 70 60

7.0 Further Information:

Further Information is available at: www.daera-ni.gov.uk

Or by Emailing:

MarineDivision.InfoRequests@daera-ni.gov.uk

Annex A

Action/Output	Group	Completed, Ongoing or Planned
Upgrades to Sewerage Network		
Combined Sewer Overflow (CSO) monitor installation due to be completed by mid-2019. Pilot project completed 2018, to be rolled out to CSOs within 2km of identified bathing waters and Shellfish Water Protected Areas.	NI Water	Ongoing
Upgrades to Wastewater Treatment Works		
Modelling of the Waste Water Treatment works effluent discharging to Belfast Lough are currently being undertaken by Northern Ireland Water as part of the Living with Water Program (LWWP).	NI Water	Ongoing
Monitoring and Investigations		
Water Framework Directive ecological objectives Overall status for the waterbody is Moderate (2021 classification objective). Status has been Moderate since 2009 (apart from in 2014 when this dropped to Poor due to seagrass decline).	DAERA	Ongoing
E. coli in shellfish flesh monthly Official Control monitoring and classification programme Increased knowledge and better understanding of what's happening in the Inner Belfast Lough Catchment It is not possible to measure temporal trends using shellfish flesh classifications alone. Full statistical analysis of raw data is required. **Statistical calculations using Seasonal Mann-Kendall test (SM-K test).** SM-K is a nonparametric test that analyses data for monotonic trends in seasonal data. It is the most popular trend test in environmental studies. "Monotonic" means a consistent upwards or downwards trend. "Seasonal" means that data is collected for periods where trends can are upwards or downwards. While it can refer to Spring, Summer etc., "seasonal" can also refer to other time periods, such as months. This will allow analysis of monthly trends over all the years' data alongside an overall annual trend. Using SM-K tests, it was found; • C Fresh and Steele (included in the current RMP1) have statistically significant upward trends in e-coli	FSA in NI	Ongoing

in flesh in February, March, April and September. There is an overall significant upward trend in e-coli in flesh.

- Moorings bed, has statistically significant upward trends in e-coli in flesh in November and December but not overall.
- These are no significant statistical trends proven in shellfish result in other beds, this could be due to a number of reasons including; lack of data or no evidence of trend.

See table below.

	C Fresh	Steele	Moorings
January	NS	NS	NS
February	NS	**	NS
March	*	NS	NS
April	*	NS	NS
May	NS	NS	NS
June	NS	NS	NS
July	NS	NS	NS
August	NS	NS	NS
September	NS	*	NS
October	NS	NS	NS
November	NS	NS	*
December	NS	NS	**
Overall Significant Trend	**	***	NS

Seasonal Mann Kendall Monotonic trends were investigated for all data available from FSA E-coli monitoring programme and found as above.
Key:
NS – not a significant probability of a trend
* - significant probability of trend <5%
** - high significant probability of trend <1%
*** - very high significant probability of trend <0.1%

Actions In Reducing Agricultural Inputs		
Inspection and enforcement of the NAP Regulations is carried out by NIEA. Around 300 farm businesses are now selected for scheduled inspection each year and all are assessed for compliance with the Nitrates Directive. **The levels of non-compliance were found to be reducing from 2014 to 2016. However in 2017 the levels of non-compliance increased and the same increased level of non-compliance was found in 2018.** The main non-	Water Management Unit	Ongoing

compliances found over the period were nitrate pollution and defective effluent storage, with N loading in 2017 and spreading issues last year due to the exceptionally wet winter in 2017-2018.		
Overall Management Actions		
UWWTD Sensitive Area Review - The Tidal River Lagan and Inner Belfast Lough were designated as Sensitive Areas (Eutrophic) under the UWWTD in 2001. In Belfast Lough Inner, an assessment of the Shellfish Water Protected Area (SWPA) in 2019 has confirmed an increase in E. coli in shellfish flesh, which is a decline in quality. Quality has fallen below the target of Class B in part of the area. A possible designation is now being considered under Annex IIAc of UWWTD i.e. those areas where further treatment than that prescribed in Article 4 is necessary to fulfil other Council Directives.	DAERA	Ongoing
Proposed Adaptive Management Measures regime and possible new licence conditions. DASSH		

Annex B

Contaminants in shellfish flesh monitored by DAERA and FSA in NI

Metals	Polycyclic aromatic Hydrocarbons
Arsenic	Naphthalene
Silver	Phenanthrene
Cadmium	Anthracene
Chromium	Fluoranthene
Copper	Pyrene
Iron	Benzo (a) Anthracene
Mercury	Chrysene
Nickel	5 Methyl Chrysene
Lead	Benzo (b) Fluoranthene
Zinc	Benzo (k) Fluoranthene
Selenium	Benzo (j) Fluoranthene
	Benzo (c) Fluorene
	Benzo (a) Pyrene
	Indeno (123,cd) Pyrene
	Dibenzo (a,h) Anthracene
	Benzo (ghi) Perylene
	Dibenzo (a,l) Pyrene
	Dibenzo (a,e) Pyrene
	Dibenzo (a,i) Pyrene
	Dibenzo (a,h) Pyrene
	Cylcopenta (c,d) Pyrene

Polychlorinated Biphenyls
PCB 28
PCB 52
PCB 101
PCB 118
PCB 138
PCB 153
PCB 180

Dibenzo-p-dioxins (PCDDs)
2,3,7,8-TCDD
1,2,3,7,8-PeCDD
1,2,3,4,7,8-HxCDD

1,2,3,6,7,8-HxCDD
1,2,3,7,8,9-HxCDD
1,2,3,4,6,7,8-HpCDD
OCDD

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