

Chemical Contaminants in Wild Caught Fish and Crustaceans- Northern Ireland 2024/25

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FSA Research and Evidence



Lay Summary

Chemical contaminants can enter aquatic environments from natural and human sources and may accumulate in fish and crustaceans. Monitoring programmes are undertaken to assess the presence of these substances in seafood intended for human consumption and to provide data on contaminant levels in the food supply.

This report presents the findings of a survey of wild caught fish and crustaceans landed in Northern Ireland between April 2024 and March 2025. Samples from a range of commercially harvested species were analysed for selected heavy metals and per- and polyfluoroalkyl substances (PFAS).

The study contributes to ongoing surveillance of chemical contaminants in seafood and provides information on contaminant concentrations in species landed in Northern Ireland. The data generated support the assessment of compliance with food safety requirements and contribute to the evidence base used to monitor contaminant trends over time.

Details of the monitoring programme, analytical methods and study findings are presented in the main body of this report.

Executive Summary

Seventy-eight (78) samples of wild caught fish and crustaceans were collected between April 2024 and March 2025 by authorised sampling officers in Northern Ireland. The samples were collected from the main landing areas and fish processing establishments.

Forty-four (44) samples were analysed for the heavy metal contaminants mercury, lead and cadmium. Thirty-four (34) samples were tested for per- and polyfluoroalkyl substances (PFAS).

Commission Regulation (EU) 2023/915 of 25 April 2023 on maximum levels for certain contaminants in food sets the regulatory limits for these contaminants in the matrices tested.

Concentrations of mercury, lead and cadmium were less than the maximum EU regulatory limits for all samples tested.

Concentrations of PFAS were below the EU regulatory limits for these compounds for all samples tested.

Introduction

Background to study

The public analyst business unit of Eurofins Food Testing Ireland Limited was engaged by the Food Standards Agency (FSA) in Northern Ireland to assess the levels of various heavy metals and per- and polyfluoroalkyl substances (PFAS) chemical contaminants in a number of species of wild caught fish and crustaceans landed in Northern Ireland between April 2024 and March 2025.

Aims and objectives of the study

The official control surveillance programme is undertaken to comply with Article 70 of Commission Implementing Regulation (EU) 2019/627 (EU, 2019) which requires a monitoring programme to be established for wild caught fishery products to control compliance with EU legislation on contaminants. This is an ongoing annual programme.

Regulation (EC) No. 2023/915 (EU, 2023) sets down the maximum levels for certain contaminants in food, including fishery products. The data has the potential to provide support to certifying officers in their attestation of the compliance of wild caught fishery products landed in Northern Ireland with contaminants legislation when signing Export Health Certificates.

The purpose of the work was to determine concentrations of defined chemical contaminants in wild caught fishery products and to assess whether the levels were within the prescribed limits (EU, 2023), and therefore that the products were safe for placing on the market in these respects.

Materials and Methods

Samples

Seventy-eight (78) samples of wild caught fish and crustaceans were collected between April 2024 and March 2025 (Appendix A) by authorised sampling officers in Northern Ireland. Forty-four (44) samples were analysed for the contaminants mercury, lead and cadmium (heavy metals). Thirty-four (34) samples were tested for per- and polyfluoroalkyl substances (PFAS).

The type and number of samples of each species collected for analyses were determined based on the quantity of that species landed in Northern Ireland and any previous exceedances. The species sampled were:

- Bream
- Brown crab
- Norway Lobster
- Eel
- Haddock
- Herring
- Mackerel

On receipt at the laboratory (Eurofins Food Testing Ireland Limited, Dublin, Ireland) each sample was assigned a unique laboratory reference number, and the sample details were logged into a database.

Sample Preparation

For fish (including bream, eel, herring and mackerel), the maximum levels of heavy metals and PFAS apply to the muscle meat of the fish unless the fish are intended to be eaten whole, in which case the maximum levels apply to the whole fish.

For crustaceans other than crabs (including Norway Lobsters), the maximum levels of heavy metals and PFAS apply to muscle meat from the appendages and the abdomen, which means that the cephalothorax of crustaceans is excluded.

In case of crabs (infraorder Brachyura), the maximum levels of heavy metals and PFAS apply to the muscle meat from appendages only.

For king scallops (*Pecten maximus*), a bivalve mollusc, the maximum levels of heavy metals and PFAS apply to the adductor muscle and gonad only.

The relevant tissue for each sample was separated and homogenised in a blender. The aliquots for each analysis were immediately weighed out, and the remaining material was stored in a freezer.

Metal Analysis

The samples tested for heavy metals (cadmium, mercury and lead) were analysed by Eurofins WEJ Contaminants GmbH in Hamburg, Germany, in line with the requirements of Commission Regulation (EC) No 333/2007 (EU, 2007).

The testing was done using an in-house method based on EN ISO 15763: Determination of trace elements - determination of cadmium, mercury and lead in foodstuffs by Inductively coupled plasma mass spectrometry (ICP MS) after pressure digestion. Aliquots of homogenised test sample material were digested in an acid solution using a high-pressure microwave system. The solution was diluted as required before analysis. Quantification of the four elements was by ICP MS. The method is accredited to ISO 17025 by DAkkS, the German Accreditation Service, and the laboratory is a designated Official Laboratory by the German State of Hamburg.

Per- and polyfluoroalkyl substances analysis

The samples tested for PFAS were analysed at Eurofins GfA Lab Service GmbH in Hamburg, Germany, in line with the requirements of Commission Implementing Regulation (EU) 2022/1428 (EU, 2022a).

The testing was done using an in-house method, reference GLS OC 400 2025-12, using LC-MS/MS. The method is accredited to ISO 17025 by DAkkS, the German Accreditation Service, and the laboratory is a designated Official Laboratory by the German State of Hamburg.

The following analytes were determined:

Table 1. PFAS analytes included in the analytical method and their abbreviations.

Analyte	Abbreviation
Perfluorooctane sulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluorononanoic acid	PFNA
Perfluorohexanesulfonic acid	PFHxS
Perfluorobutanoic acid	PFBA
Perfluoropentane acid	PFPeA
Perfluorohexanoic acid	PFHxA
Perfluorheptanoic acid	PFHpA
Perfluorodecanoic acid	PFDA
Perfluoroundecanoic acid	PFUnDA
Perfluorododecanoic acid	PFDoDA
Perfluorotridecanoic acid	PFTTrDA
Perfluorotetradecanoic acid	PFTeDA
Perfluorohexadecanic acid	PFHxDA
Perfluorooctadecanic acid	PFODA
Perfluorobutanesulfonic acid	PFBS
Perfluoropentanesulfonic acid	PFPeS
Perfluoroheptane sulphonate	PFHpS
Perfluorononanesulfonic acid	PFNS
Perfluorodecanesulfonic acid	PFDS
Perfluoroundecane sulfonic acid	PFUnDS
Perfluorododecane sulfonic acid	PFDoDS
Perfluorotridecane sulfonic acid	PFTTrDS
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	F-53 B Major
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	F-53 B Minor
Hexafluoropropylene oxide dimer acid	HFPO-DA (GenX)
Ammonium 4,8-dioxa-3H-perfluorononanoate	ADONA
Perfluoro-3,7-dimethyloctane acid	PF-3,7-DMOA
1H,1H,2H,2H-Perfluorohexanesulfonic acid	4:2 FTS
6:2 Fluorotelomer sulfonic acid	6:2 FTS (H4PFOS)
8:2 Fluorotelomer sulfonic acid	8:2 FTS
10:2 Fluorotelomer sulfonic acid	10:2 FTS

Results

The concentrations of the contaminants measured in all seventy-eight samples were determined and compared to limits prescribed in Commission Regulation (EU) 2023/915 (EU, 2023).

Certificates of Analysis made under the provisions of the Food Safety (Sampling and Qualifications) Regulations (NI) 2013 were issued to the appropriate sampling officers and the Food Standards Agency. Results were also uploaded electronically to the UKFSS food database operated by the Food Standards Agency.

Metal Analysis

Concentrations of mercury, cadmium and lead were below the regulatory limits for these compounds. Details are provided in [Table 3](#) in Appendix B.

Per- and polyfluoroalkyl substances analysis

Limits for certain PFAS are prescribed in Commission Regulation (EU) 2023/915 (EU, 2023):

- Perfluorooctane sulfonic acid (PFOS)
- Perfluorooctanoic acid (PFOA)
- Perfluorononanoic acid (PFNA)
- Perfluorhexanesulfonic acid (PFHxS)
- Sum of PFOS, PFOA, PFNA and PFHxS

Concentrations of these PFAS were below the regulatory limits for these compounds. Details are provided in [Table 4](#) in Appendix B.

Discussion

This official control surveillance programme examined the presence of selected heavy metals and per- and polyfluoroalkyl substances (PFAS) in fish and crustacean samples and assessed their compliance with the requirements of Commission Regulation (EU) 2023/915.

The results indicate that all seventy-eight samples analysed complied with the applicable maximum levels for mercury, cadmium, lead and regulated PFAS established under Commission Regulation (EU) 2023/915.

Metals

Mercury, cadmium and lead were not detected at concentrations exceeding the maximum levels prescribed in Commission Regulation (EU) 2023/915.

Per- and polyfluoroalkyl Substances (PFAS)

The concentrations of PFOS, PFOA, PFNA and PFHxS, as well as the sum of these compounds, were below the relevant regulatory limits in all samples analysed.

In addition, Commission Recommendation (EU) 2022/1431 on the monitoring of perfluoroalkyl substances in food requests EU Member States to test for the presence of compounds which are similar to PFOS, PFOA, PFNA and PFHxS, in order to support a dietary exposure assessment and assess the need to regulate these substances in specific commodities (EU, 2022b).

The concentrations of these additional PFAS are detailed in [Table 5](#) in Appendix B.

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References

EU. (2007). *Commission Regulation (EC) No 333/2007 of 28 March 2007 laying down the methods of sampling and analysis for the official control of the levels of lead, cadmium, mercury, inorganic tin, 3-MCPD and benzo(a)pyrene in foodstuffs.*

EU. (2019). *Commission Implementing Regulation (EU) 2019/627 of 15 March 2019 laying down uniform practical arrangements for the performance of official controls on products of animal origin intended for human consumption in accordance with Regulation (EU) 2017/625 of the European Parliament and of the Council and amending Commission Regulation (EC) No 2074/2005 as regards official controls.*

EU. (2022a). *Commission Implementing Regulation (EU) 2022/1428 of 24 August 2022 laying down methods of sampling and analysis for the control of perfluoroalkyl substances in certain foodstuffs.*

EU. (2022b). *Commission Recommendation (EU) 2022/1431 on the monitoring of perfluoroalkyl substances in food.*

EU. (2023). *Commission Regulation (EU) 2023/915 of 25 April 2023 on maximum levels for certain contaminants in food and repealing Regulation (EC) No 1881/2006.*

Appendices

Appendix A: Sample details

Table 2. Details of wild caught fish and crustacean samples collected between April 2024 and March 2025.

Sample Number	Full Product Text Description	Landing Date	Sampling Area/Point
FSAWF120	Norway Lobster	03/07/2024	East Coast (NI)
FSAWF121	Norway Lobster	03/07/2024	East Coast (NI)
FSAWF122	Norway Lobster	03/07/2024	East Coast (NI)
FSAWF123	Norway Lobster	03/07/2024	East Coast (NI)
FSAWF124	Norway Lobster	03/07/2024	East Coast (NI)
FSAWF125	Norway Lobster	03/07/2024	East Coast (NI)
FSAWF126	Norway Lobster	15/06/2024	East Coast (NI)
FSAWF127	Norway Lobster	01/06/2024	East Coast (NI)
FSAWF128	Norway Lobster	05/06/2024	East Coast (NI)
FSAWF129	Norway Lobster	14/05/2024	East Coast (NI)
FSAWF130	Herring	11/08/2024	East Coast (NI)
FSAWF131	Herring	11/08/2024	East Coast (NI)
FSAWF132	Herring	13/08/2024	East Coast (NI)
FSAWF133	Mackerel	11/08/2024	East Coast (NI)
FSAWF134	Mackerel	11/08/2024	East Coast (NI)
FSAWF135	Mackerel	13/08/2024	East Coast (NI)
FSAWF136	Haddock	04/08/2024	East Coast (NI)
FSAWF137	Herring	20/08/2024	East Coast (NI)
FSAWF138	Herring	26/08/2024	East Coast (NI)
FSAWF139	Herring	28/08/2024	East Coast (NI)
FSAWF140	Mackerel	22/08/2024	East Coast (NI)
FSAWF141	Mackerel	22/08/2024	East Coast (NI)
FSAWF142	Mackerel	28/08/2024	East Coast (NI)
FSAWF143	Herring	29/08/2024	East Coast (NI)
FSAWF144	Herring	23/08/2024	East Coast (NI)
FSAWF145	Brown Crab	11/11/2024	East Coast (NI)
FSAWF146	Brown Crab	18/11/2024	East Coast (NI)
FSAWF147	Brown Crab	19/11/2024	East Coast (NI)
FSAWF148	Brown Crab	19/11/2024	East Coast (NI)
FSAWF149	Brown Crab	15/11/2024	East Coast (NI)
FSAWF150	Brown Crab	17/11/2024	East Coast (NI)
FSAWF151	Brown Crab	15/11/2024	East Coast (NI)
FSAWF152	Brown Crab	20/11/2024	East Coast (NI)
FSAWF153	Brown Crab	18/11/2024	East Coast (NI)
FSAWF154	Brown Crab	14/11/2024	East Coast (NI)
FSAWF155	Brown Crab	24/11/2024	East Coast (NI)
FSAWF156	Brown Crab	24/11/2024	East Coast (NI)

Sample Number	Full Product Text Description	Landing Date	Sampling Area/Point
FSAWF157	Herring	02/11/2024	East Coast (NI)
FSAWF158	Herring	08/11/2024	East Coast (NI)
FSAWF159	Herring	09/11/2024	East Coast (NI)
FSAWF160	Herring	14/11/2024	East Coast (NI)
FSAWF161	Herring	16/11/2024	East Coast (NI)
FSAWF162	Mackerel	16/11/2024	East Coast (NI)
FSAWF163	Mackerel	14/11/2024	East Coast (NI)
FSAWF164	Mackerel	08/11/2024	East Coast (NI)
FSAWF165	Mackerel	02/11/2024	East Coast (NI)
FSAWF166	Mackerel	13/10/2024	East Coast (NI)
FSAWF167	Mackerel	31/10/2024	East Coast (NI)
FSAWF168	Norway Lobster	28/01/2025	East Coast (NI)
FSAWF169	Norway Lobster	28/01/2025	East Coast (NI)
FSAWF170	Norway Lobster	28/01/2025	East Coast (NI)
FSAWF171	Haddock	05/01/2025	East Coast (NI)
FSAWF172	Haddock	08/01/2025	East Coast (NI)
FSAWF173	Haddock	10/01/2025	East Coast (NI)
FSAWF174	Haddock	12/01/2025	East Coast (NI)
FSAWF175	Haddock	12/01/2025	East Coast (NI)
FSAWF176	Haddock	15/01/2025	East Coast (NI)
FSAWF177	Haddock	19/01/2025	East Coast (NI)
FSAWF178	Haddock	22/01/2025	East Coast (NI)
FSAWF179	Haddock	28/01/2025	East Coast (NI)
811CN/A/2619	Eel	25/09/2024	Lough Neagh
811CN/A/2620	Eel	25/09/2024	Lough Neagh
811CN/A/2621	Eel	25/09/2024	Lough Neagh
811CN/A/2622	Bream	25/09/2024	Lough Neagh
811CN/A/2623	Bream	25/09/2024	Lough Neagh
811CN/A/2624	Bream	25/09/2024	Lough Neagh
811CN/A/2647	Bream	23/10/2024	Lough Neagh
811CN/A/2648	Bream	23/10/2024	Lough Neagh
811CN/A/2649	Eel	23/10/2024	Lough Neagh
811CN/A/2650	Eel	23/10/2024	Lough Neagh
811CN/A/2651	Bream	13/11/2024	Lough Neagh
811CN/A/2652	Eel	13/11/2024	Lough Neagh
811CN/A/2653	Eel	13/11/2024	Lough Neagh
811CN/A/2659	Bream	04/12/2024	Lough Neagh
811CN/A/2672	Bream	11/12/2024	Lough Neagh
811CN/A/2673	Bream	11/12/2024	Lough Neagh
811CN/A/2674	Eel	11/12/2024	Lough Neagh
811CN/A/2675	Eel	11/12/2024	Lough Neagh

Appendix B: Tables

Table 3. Mercury, cadmium and lead concentrations in wild caught fish and crustaceans.
(Concentrations are not corrected for recovery.)

Bream

Sample Number	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)
811CN/A/2622	Bream	0.024	0.007	<0.02
811CN/A/2623	Bream	0.026	<0.005	<0.02
811CN/A/2647	Bream	0.058	0.017	<0.02
811CN/A/2651	Bream	0.084	<0.005	<0.02
811CN/A/2672	Bream	0.049	<0.005	0.04
Maximum levels set out in Commission Regulation (EU) 2023/915		0.50	0.050	0.30

Brown Crab

Sample Number	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)
FSAWF145	Brown Crab	0.070	<0.005	<0.02
FSAWF146	Brown Crab	0.039	<0.005	<0.02
FSAWF148	Brown Crab	0.081	<0.005	<0.02
FSAWF150	Brown Crab	0.043	<0.005	<0.02
FSAWF152	Brown Crab	0.057	<0.005	<0.02
FSAWF154	Brown Crab	0.10	<0.005	<0.02
FSAWF156	Brown Crab	0.044	<0.005	<0.02
Maximum levels set out in Commission Regulation (EU) 2023/915		0.50	0.50	0.50

Norway Lobster

Sample Number	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)
FSAWF120	Norway Lobster	0.16	0.006	<0.02
FSAWF121	Norway Lobster	0.16	0.007	0.02
FSAWF122	Norway Lobster	0.18	0.007	0.04
FSAWF124	Norway Lobster	0.59*	0.011	0.05
FSAWF125	Norway Lobster	0.20	0.009	0.08
FSAWF128	Norway Lobster	0.088	<0.005	0.02
FSAWF129	Norway Lobster	0.38	0.014	0.02
Maximum levels set out in Commission Regulation (EU) 2023/915		0.50	0.50	0.50

* The reported concentration exceeded the maximum level of 0.50 mg/kg; however, when measurement uncertainty was taken into account, the result was considered compliant with Commission Regulation (EU) 2023/915.

Eel

Sample Number	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)
811CN/A/2619	Eel	0.041	<0.005	<0.02
811CN/A/2621	Eel	0.042	0.008	<0.02
811CN/A/2650	Eel	0.067	0.006	<0.02
811CN/A/2653	Eel	0.11	<0.005	<0.02
811CN/A/2674	Eel	0.25	<0.005	<0.02
Maximum levels set out in Commission Regulation (EU) 2023/915		0.50	0.050	0.30

Haddock

Sample Number	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)
FSAWF136	Haddock	0.14	<0.005	<0.02
FSAWF171	Haddock	0.055	<0.005	<0.02
FSAWF173	Haddock	0.12	<0.005	<0.02
FSAWF175	Haddock	0.11	<0.005	<0.02
FSAWF177	Haddock	0.11	<0.005	<0.02
FSAWF179	Haddock	0.12	<0.005	<0.02
Maximum levels set out in Commission Regulation (EU) 2023/915		0.50	0.050	0.30

Herring

Sample Number	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)
FSAWF130	Herring	0.040	<0.005	<0.02
FSAWF131	Herring	0.041	<0.005	<0.02
FSAWF132	Herring	0.032	<0.005	<0.02
FSAWF138	Herring	0.032	<0.005	<0.02
FSAWF143	Herring	0.030	<0.005	<0.02
FSAWF158	Herring	0.057	<0.005	<0.02
FSAWF160	Herring	0.053	<0.005	<0.02
Maximum levels set out in Commission Regulation (EU) 2023/915		0.30	0.050	0.30

Mackerel

Sample Number	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)
FSAWF133	Mackerel	0.042	<0.005	<0.02
FSAWF134	Mackerel	0.086	<0.005	<0.02
FSAWF135	Mackerel	0.061	<0.005	<0.02
FSAWF142	Mackerel	0.040	<0.005	<0.02
FSAWF163	Mackerel	0.033	0.024	<0.02
FSAWF165	Mackerel	0.027	0.026	<0.02

Sample Number	Species	Mercury (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)
FSAWF167	Mackerel	0.024	0.021	<0.02
Maximum levels set out in Commission Regulation (EU) 2023/915		0.30	0.10	0.30

Table 4. PFAS results for wild caught fish and crustaceans, where limits are prescribed in Commission Regulation (EU) 2023/915 (EU, 2023).
(Concentrations are not corrected for recovery.)

Bream

Sample Number	Species	PFOS µg/kg	PFOA µg/kg	PFNA µg/kg	PFHxS µg/kg	PFAS(4) Total µg/kg
811CN/A/2624	Bream	0.64	< 0.100	< 0.100	< 0.100	0.64
811CN/A/2648	Bream	1.3	< 0.100	0.14	< 0.100	1.44
811CN/A/2659	Bream	1.24	< 0.100	< 0.100	< 0.100	1.24
811CN/A/2673	Bream	0.94	< 0.100	< 0.100	< 0.100	0.94
Maximum levels set out in Commission Regulation (EU) 2023/915		35	8.0	8.0	1.5	45

Brown Crab

Sample Number	Species	PFOS µg/kg	PFOA µg/kg	PFNA µg/kg	PFHxS µg/kg	PFAS(4) Total µg/kg
FSAWF147	Brown Crab	< 0.100	< 0.100	< 0.100	< 0.100	None detected
FSAWF149	Brown Crab	< 0.100	< 0.100	< 0.100	< 0.100	None detected
FSAWF151	Brown Crab	0.17	0.66	0.14	< 0.100	0.97
FSAWF153	Brown Crab	0.18	0.41	< 0.100	< 0.100	0.59
Maximum levels set out in Commission Regulation (EU) 2023/915		3.0	0.70	1.0	1.5	5.0

Norway Lobster

Sample Number	Species	PFOS µg/kg	PFOA µg/kg	PFNA µg/kg	PFHxS µg/kg	PFAS(4) Total µg/kg
FSAWF123	Norway Lobster	< 0.100	< 0.100	< 0.100	< 0.100	None detected
FSAWF126	Norway Lobster	< 0.100	< 0.100	< 0.100	< 0.100	None detected
FSAWF127	Norway Lobster	< 0.100	< 0.100	< 0.100	< 0.100	None detected
FSAWF170	Norway Lobster	< 0.100	0.18	< 0.100	< 0.100	0.18
FSAWF168	Norway Lobster	< 0.100	< 0.100	< 0.100	< 0.100	None detected
FSAWF169	Norway Lobster	< 0.100	0.12	< 0.100	< 0.100	0.12

Sample Number	Species	PFOS µg/kg	PFOA µg/kg	PFNA µg/kg	PFHxS µg/kg	PFAS(4) Total µg/kg
Maximum levels set out in Commission Regulation (EU) 2023/915		3.0	0.70	1.0	1.5	5.0

Eel

Sample Number	Species	PFOS µg/kg	PFOA µg/kg	PFNA µg/kg	PFHxS µg/kg	PFAS(4) Total µg/kg
811CN/A/2620	Eel	1.6	0.10	< 0.100	< 0.100	1.7
811CN/A/2649	Eel	0.57	< 0.100	< 0.100	< 0.100	0.57
811CN/A/2652	Eel	1.1	0.17	0.14	< 0.100	0.41
811CN/A/2675	Eel	0.86	< 0.100	< 0.100	< 0.100	0.86
Maximum levels set out in Commission Regulation (EU) 2023/915		35	8.0	8.0	1.5	45

Haddock

Sample Number	Species	PFOS µg/kg	PFOA µg/kg	PFNA µg/kg	PFHxS µg/kg	PFAS(4) Total µg/kg
FSAWF172	Haddock	0.56	< 0.100	0.16	< 0.100	0.72
FSAWF174	Haddock	0.42	< 0.100	0.12	< 0.100	0.54
FSAWF176	Haddock	0.50	< 0.100	0.13	< 0.100	0.63
FSAWF178	Haddock	0.34	< 0.100	0.11	< 0.100	0.45
Maximum levels set out in Commission Regulation (EU) 2023/915		2.0	0.20	0.50	0.20	2.0

Herring

Sample Number	Species	PFOS µg/kg	PFOA µg/kg	PFNA µg/kg	PFHxS µg/kg	PFAS(4) Total µg/kg
FSAWF137	Herring	< 0.100	< 0.100	< 0.100	< 0.100	None detected
FSAWF139	Herring	< 0.100	< 0.100	< 0.100	< 0.100	None detected
FSAWF144	Herring	< 0.100	< 0.100	< 0.100	< 0.100	None detected
FSAWF157	Herring	< 0.100	< 0.100	< 0.100	< 0.100	None detected
FSAWF159	Herring	< 0.100	< 0.100	< 0.100	< 0.100	None detected
FSAWF161	Herring	< 0.100	< 0.100	< 0.100	< 0.100	None detected
Maximum levels set out in Commission Regulation (EU) 2023/915		2.0	0.20	0.50	0.20	2.0

Mackerel

Sample Number	Species	PFOS µg/kg	PFOA µg/kg	PFNA µg/kg	PFHxS µg/kg	PFAS(4) Total µg/kg
FSAWF140	Mackerel	0.91	< 0.100	< 0.100	< 0.100	0.91
FSAWF141	Mackerel	0.95	< 0.100	< 0.100	< 0.100	0.95
FSAWF162	Mackerel	< 0.100	< 0.100	< 0.100	< 0.100	None detected
FSAWF164	Mackerel	0.23	< 0.100	< 0.100	< 0.100	0.23
FSAWF166	Mackerel	< 0.100	< 0.100	< 0.100	< 0.100	None detected
Maximum levels set out in Commission Regulation (EU) 2023/915		2.0	0.20	0.50	0.20	2.0

Table 5. PFAS results for wild caught fish and crustaceans, where no limits are prescribed in Commission Regulation (EU) 2023/915 (EU, 2023).

Bream

Sample Number	Species	PFDA µg/kg	PFUnDA µg/kg	PFDoDA µg/kg	PFTTrDA µg/kg	PFBS µg/kg	PFBA µg/kg	PFPeA µg/kg	PFHxA µg/kg	PFHpA µg/kg	PFTeDA µg/kg	PFHxDA µg/kg
811CN/A/ 2624	Bream	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
811CN/A/ 2648	Bream	0.251	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
811CN/A/ 2659	Bream	0.195	0.174	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
811CN/A/ 2673	Bream	0.14	0.14	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100

Sample Number	PFODA µg/kg	PFPeS µg/kg	PFHpS µg/kg	PFNS µg/kg	PFDS µg/kg	PFUnDS µg/kg	PFDoDS µg/kg	PFTTrDS µg/kg	F-53 B Major µg/kg	F-53 B Minor µg/kg	HFPO-DA µg/kg	ADONA µg/kg
811CN/A/ 2624	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
811CN/A/ 2648	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
811CN/A/ 2659	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
811CN/A/ 2673	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100

Sample Number	PF-3,7-DMOA µg/kg	4:2 FTS µg/kg	6:2FTS µg/kg	8:2 FTS µg/kg	10:2 FTS µg/kg	PFAS (32) Total µg/kg
811CN/A/2624	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	0.64
811CN/A/2648	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	1.69
811CN/A/2659	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	1.6
811CN/A/2673	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	1.2

Brown Crab

Sample Number	Species	PFDA µg/kg	PFUnDA µg/kg	PFDoDA µg/kg	PFTrDA µg/kg	PFBS µg/kg	PFBA µg/kg	PFPeA µg/kg	PFHxA µg/kg	PFHpA µg/kg	PFTeDA µg/kg	PFHxDA µg/kg
FSAWF147	Brown Crab	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF149	Brown Crab	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF151	Brown Crab	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF153	Brown Crab	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100

Sample Number	PFODA µg/kg	PFPeS µg/kg	PFHpS µg/kg	PFNS µg/kg	PFDS µg/kg	PFUnDS µg/kg	PFDoDS µg/kg	PFTrDS µg/kg	F-53 B Major µg/kg	F-53 B Minor µg/kg	HFPO-DA µg/kg	ADONA µg/kg
FSAWF147	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF149	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF151	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF153	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100

Sample Number	PF-3,7-DMOA µg/kg	4:2 FTS µg/kg	6:2FTS µg/kg	8:2 FTS µg/kg	10:2 FTS µg/kg	PFAS (32) Total µg/kg
FSAWF147	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected
FSAWF149	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected
FSAWF151	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	0.97
FSAWF153	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	0.59

Norway Lobster

Sample Number	Species	PFDA µg/kg	PFUnDA µg/kg	PFDoDA µg/kg	PFTTrDA µg/kg	PFBS µg/kg	PFBA µg/kg	PFPeA µg/kg	PFHxA µg/kg	PFHpA µg/kg	PFTeDA µg/kg	PFHxDA µg/kg
FSAWF123	Norway Lobster	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF126	Norway Lobster	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF127	Norway Lobster	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF170	Norway Lobster	< 0.100	0.20	0.16	0.44	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF168	Norway Lobster	< 0.100	0.16	0.14	0.40	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF169	Norway Lobster	< 0.100	0.22	0.20	0.58	< 0.100	< 0.300	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100

Sample Number	PFODA µg/kg	PFPeS µg/kg	PFHpS µg/kg	PFNS µg/kg	PFDS µg/kg	PFUnDS µg/kg	PFDoDS µg/kg	PFTTrDS µg/kg	F-53 B Major µg/kg	F-53 B Minor µg/kg	HFPO-DA µg/kg	ADONA µg/kg
FSAWF123	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF126	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF127	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF170	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF168	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF169	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100

Sample Number	PF-3,7-DMOA µg/kg	4:2 FTS µg/kg	6:2FTS µg/kg	8:2 FTS µg/kg	10:2 FTS µg/kg	PFAS (32) Total µg/kg
FSAWF123	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected
FSAWF126	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected
FSAWF127	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected
FSAWF170	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	0.98
FSAWF168	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	0.7
FSAWF169	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	1.1

Eel

Sample Number	Species	PFDA µg/kg	PFUnDA µg/kg	PFDoDA µg/kg	PFTTrDA µg/kg	PFBS µg/kg	PFBA µg/kg	PFPeA µg/kg	PFHxA µg/kg	PFHpA µg/kg	PFTeDA µg/kg	PFHxDA µg/kg
811CN/A/2620	Eel	0.17	0.29	0.11	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
811CN/A/2649	Eel	0.12	0.16	0.18	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
811CN/A/2652	Eel	0.18	0.17	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
811CN/A/2675	Eel	0.10	0.12	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100

Sample Number	PFODA µg/kg	PFPeS µg/kg	PFHpS µg/kg	PFNS µg/kg	PFDS µg/kg	PFUnDS µg/kg	PFDoDS µg/kg	PFTTrDS µg/kg	F-53 B Major µg/kg	F-53 B Minor µg/kg	HFPO-DA µg/kg	ADONA µg/kg
811CN/A/2620	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
811CN/A/2649	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
811CN/A/2652	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
811CN/A/2675	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100

Sample Number	PF-3,7-DMOA µg/kg	4:2 FTS µg/kg	6:2FTS µg/kg	8:2 FTS µg/kg	10:2 FTS µg/kg	PFAS (32) Total µg/kg
811CN/A/2620	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	2.3
811CN/A/2649	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	1.0
811CN/A/2652	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	0.79
811CN/A/2675	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	1.1

Haddock

Sample Number	Species	PFDA µg/kg	PFUnDA µg/kg	PFDoDA µg/kg	PFTTrDA µg/kg	PFBS µg/kg	PFBA µg/kg	PFPeA µg/kg	PFHxA µg/kg	PFHpA µg/kg	PFTeDA µg/kg	PFHxDA µg/kg
FSAWF172	Haddock	0.11	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF174	Haddock	0.10	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF176	Haddock	0.11	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF178	Haddock	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100

Sample Number	PFODA µg/kg	PFPeS µg/kg	PFHpS µg/kg	PFNS µg/kg	PFDS µg/kg	PFUnDS µg/kg	PFDoDS µg/kg	PFTTrDS µg/kg	F-53 B Major µg/kg	F-53 B Minor µg/kg	HFPO-DA µg/kg	ADONA µg/kg
FSAWF172	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF174	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF176	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF178	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100

Sample Number	PF-3,7-DMOA µg/kg	4:2 FTS µg/kg	6:2FTS µg/kg	8:2 FTS µg/kg	10:2 FTS µg/kg	PFAS (32) Total µg/kg
FSAWF172	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	0.83
FSAWF174	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	0.64
FSAWF176	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	0.64
FSAWF178	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	0.45

Herring

Sample Number	Species	PFDA µg/kg	PFUnDA µg/kg	PFDoDA µg/kg	PFTTrDA µg/kg	PFBS µg/kg	PFBA µg/kg	PFPeA µg/kg	PFHxA µg/kg	PFHpA µg/kg	PFTeDA µg/kg	PFHxDA µg/kg
FSAWF137	Herring	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF139	Herring	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF144	Herring	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF157	Herring	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF159	Herring	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF161	Herring	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100

Sample Number	PFODA µg/kg	PFPeS µg/kg	PFHpS µg/kg	PFNS µg/kg	PFDS µg/kg	PFUnDS µg/kg	PFDoDS µg/kg	PFTTrDS µg/kg	F-53 B Major µg/kg	F-53 B Minor µg/kg	HFPO-DA µg/kg	ADONA µg/kg
FSAWF137	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF139	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF144	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF157	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF159	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF161	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100

Sample Number	PF-3,7-DMOA µg/kg	4:2 FTS µg/kg	6:2FTS µg/kg	8:2 FTS µg/kg	10:2 FTS µg/kg	PFAS (32) Total µg/kg
FSAWF137	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected
FSAWF139	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected
FSAWF144	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected
FSAWF157	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected
FSAWF159	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected
FSAWF161	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected

Mackerel

Sample Number	Species	PFDA µg/kg	PFUnDA µg/kg	PFDoDA µg/kg	PFTTrDA µg/kg	PFBS µg/kg	PFBA µg/kg	PFPeA µg/kg	PFHxA µg/kg	PFHpA µg/kg	PFTeDA µg/kg	PFHxDA µg/kg
FSAWF140	Mackerel	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF141	Mackerel	< 0.100	0.10	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF162	Mackerel	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF164	Mackerel	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100
FSAWF166	Mackerel	< 0.100	< 0.100	< 0.100	< 0.300	< 0.100	< 0.300	< 0.300	< 0.100	< 0.100	< 0.300	< 0.100

Sample Number	PFODA µg/kg	PFPeS µg/kg	PFHpS µg/kg	PFNS µg/kg	PFDS µg/kg	PFUnDS µg/kg	PFDoDS µg/kg	PFTTrDS µg/kg	F-53 B Major µg/kg	F-53 B Minor µg/kg	HFPO-DA µg/kg	ADONA µg/kg
FSAWF140	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF141	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF162	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF164	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100
FSAWF166	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.500	< 0.100

Sample Number	PF-3,7-DMOA µg/kg	4:2 FTS µg/kg	6:2FTS µg/kg	8:2 FTS µg/kg	10:2 FTS µg/kg	PFAS (32) Total µg/kg
FSAWF140	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	0.91
FSAWF141	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	1.05
FSAWF162	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected
FSAWF164	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	0.23
FSAWF166	< 0.100	< 0.100	< 0.300	< 0.300	< 0.500	None detected