

Bord na Móna

Enhanced Decommissioning, Restoration and Rehabilitation Scheme (EDRRS)

Annual Monitoring and Verification Report

EDRRS Year 2

(April 2022 to March 2023)

Appendices - Volume 1

Enhanced Decommissioning, Restoration and Rehabilitation Scheme (EDRRS)

Annual Monitoring and Verification Report

EDRRS Year 2

(April 2022 to March 2023)

Appendices

- Appendix A: EDRRS Year 1 and Year 2 Bogs
- Appendix B: Maps
- Appendix C: Hydrology
- Appendix D: Biodiversity
- Appendix E: Carbon
- Appendix F: Surface Water Monitoring

Appendix A

EDRRS Year 1 (FY22) Bogs

Bog Unit	County	Bord na Móna Works Area
Belmont	Offaly	Blackwater
Clooniff	Roscommon	
Garryduff	Galway	
Kellysgrove	Galway	
Kilmacshane	Galway	
Boora	Offaly	Boora
Derries	Offaly	
Oughter	Offaly	
Pollagh	Offaly	
Turraun	Offaly	
Castlegar	Offaly	Derryfadda
Cavemount	Offaly	Derrygreenagh
Clonad	Offaly	
Esker	Offaly	
Mountlucas	Offaly	
Ummeras	Offaly and Kildare	
Derrycashel	Roscommon	Mountdillon
Derrycolumb	Longford	
Edera	Longford	

EDRRS Year 2 (FY23) Bogs

Bog Name	County	Bord na Móna Works
Bunahinly-Kilgarvan	Westmeath	Blackwater
Clooneeny	Longford	Moundillon
Killaranny	Offaly	Boora
Begnagh	Longford	Moundillon
Carranstown	Meath/Westmeath	Ballivor/Derrygreenagh
Derrinboy	Westmeath	Boora
Prosperous	Kildare	Derrygreenagh
Lodge	Kildare	Derrygreenagh
Derraghan	Longford	Moundillon
Cloncreen	Offaly	Derrygreenagh
Timahoe South	Kildare	Derrygreenagh
Bloomhill	Offaly/Westmeath	Blackwater
Derryfadda	Galway	Blackwater
Glenlough	Longford/Westmeath	Cuil na Gun/Moundillon
Noggusboy	Offaly	Boora
Derrybrat	Offaly	Boora
Knappoge	Longford	Moundillon
Ballycon	Offaly	Derrygreenagh
Blackwater	Offaly	Blackwater
Clooniff	Roscommon	Blackwater

Appendix B

Maps

Bog Site Location Maps

Piezometer and Sampling Locations Maps

Ecology Transect Maps

Appendix B1: Bunahinly

Appendix B2: Clooneeny

Appendix B3: Killaranny

Appendix B4: Begnagh

Appendix B5: Carranstown

Appendix B6: Derrinboy

Appendix B7: Prosperous

Appendix B8: Lodge

Appendix B9: Derraghan

Appendix B10: Cloncreen

Appendix B11: Timahoe South

Appendix B12: Bloomhill

Appendix B13: Derryfadda

Appendix B14: Glenlough

Appendix B15: Noggusboy

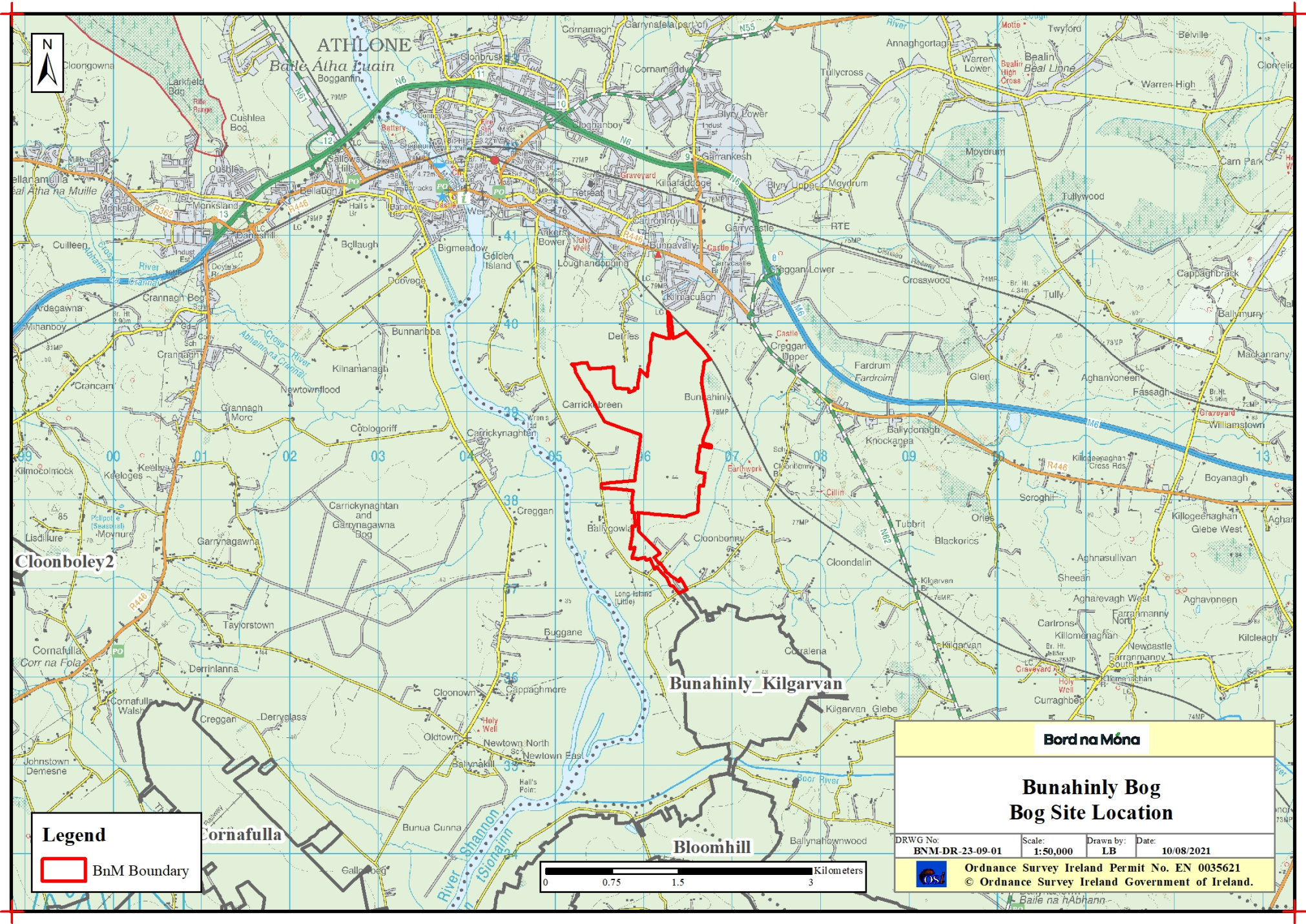
Appendix B16: Derrybrat

Appendix B17: Knappoge

Appendix B18: Ballycon

Appendix B19: Blackwater

Appendix B20: Clooniff



Legend

BnM Boundary



Bord na Móna






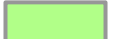




**Bunahinly Bog
Bog Site Location**

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Legend


-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type
 -  Additional Work 2
 -  Constraint
 -  Dry Cutaway 2
 -  Deep Peat Cutaway 2
 -  Deep Peat Cutaway 4
 -  Marginal Land 1
 -  Silt Pond



Bord na Móna



Bunahinly Bog Combined Map

DRWG No: BNM-DR-23-09-33	Scale: 1:13,000	Drawn by: BG	Date: 20/09/2023
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Legend


-  Birds
-  BnM Boundary

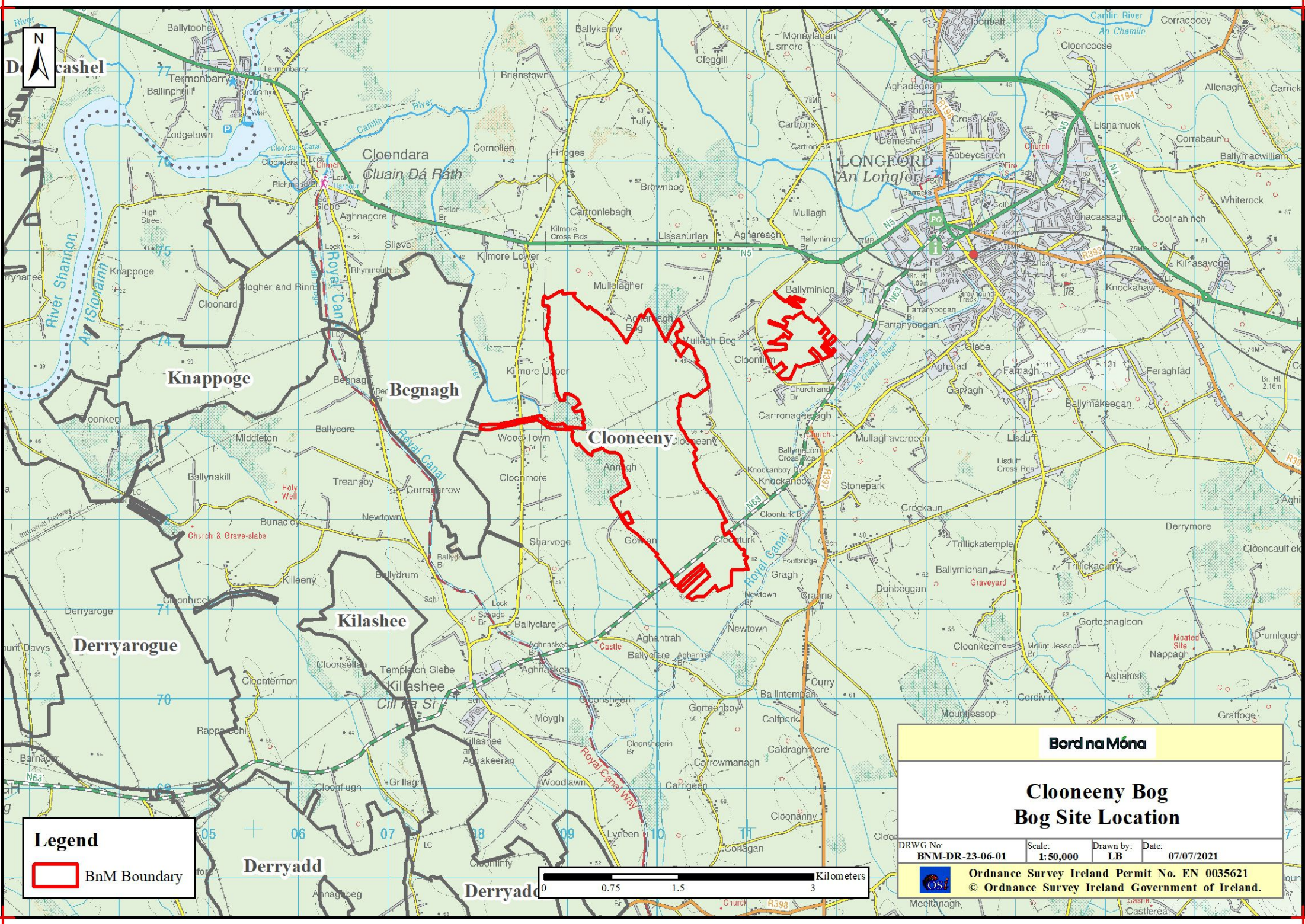


Bord na Móna

**Bunahinly Bog
Ecology Transects**

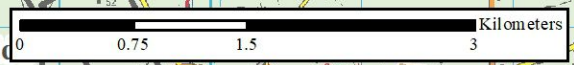
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Legend

BnM Boundary



Bord na Móna




**Clooneeny Bog
Bog Site Location**

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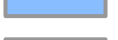

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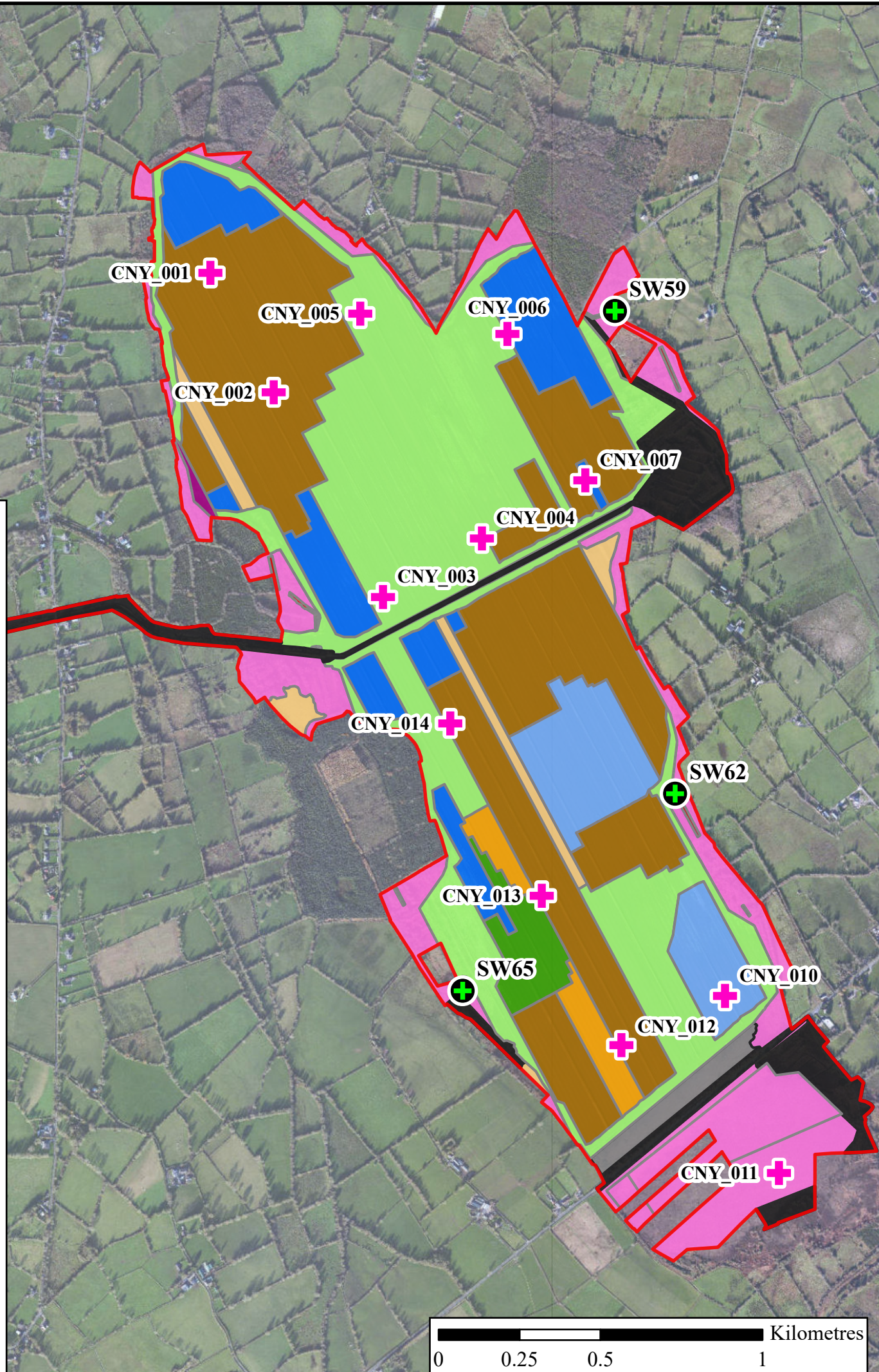


Legend

-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary

Rehab Type


-  Additional Work 2
-  Constraint
-  Dry Cutaway 1
-  Dry Cutaway 2
-  Dry Cutaway 3
-  Deep Peat Cutaway 2
-  Deep Peat Cutaway 3
-  Deep Peat Cutaway 4
-  Marginal Land 1
-  Marginal Land 2
-  Silt Pond
-  Wetland 3
-  Wetland 4

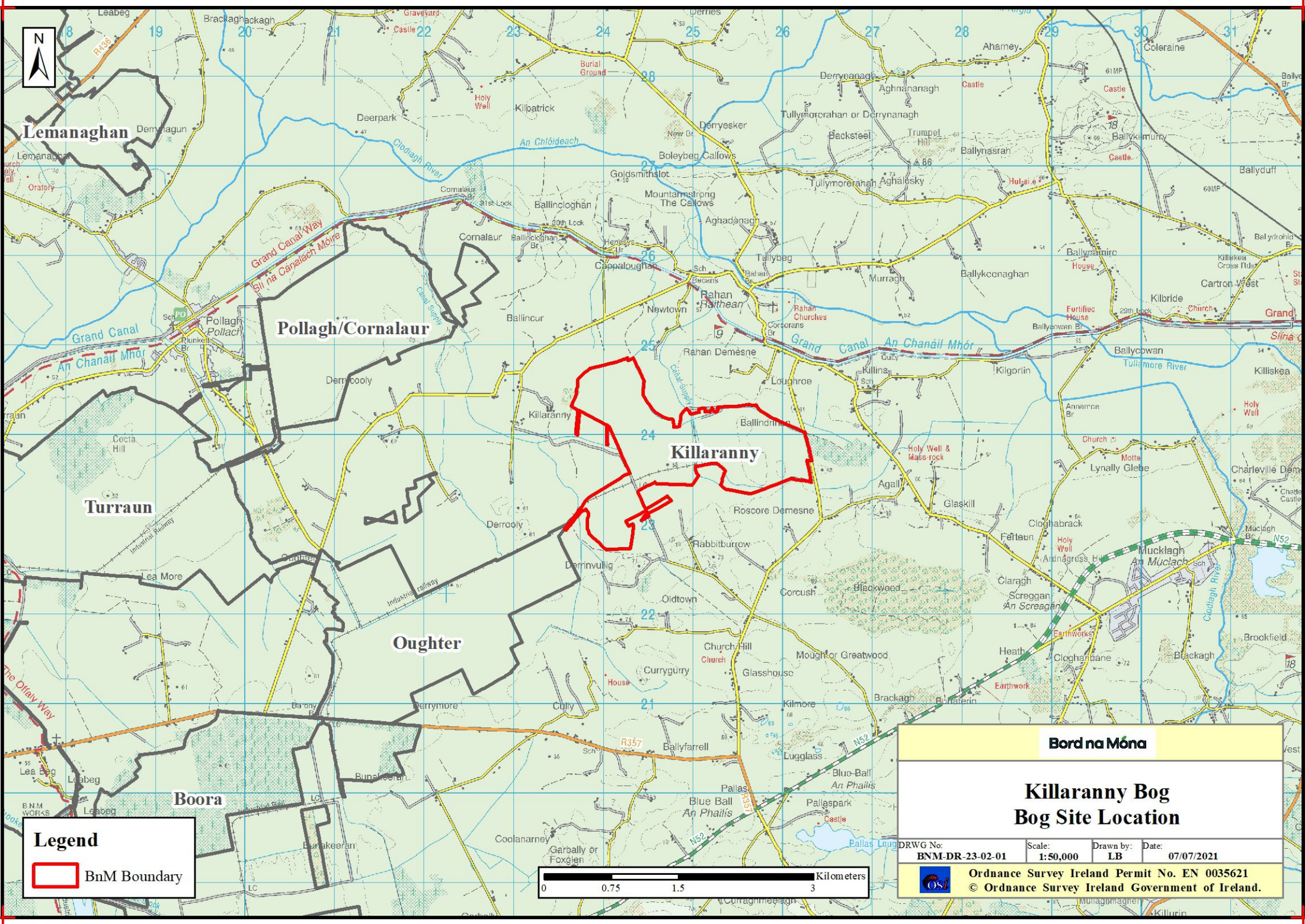


Bord na Móna


**Clooneeny Bog
Combined Map**

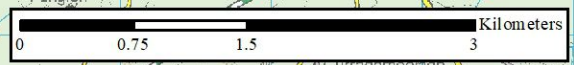
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Legend

 BnM Boundary



Bord na Móna



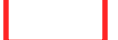








Killaranny Bog Site Location

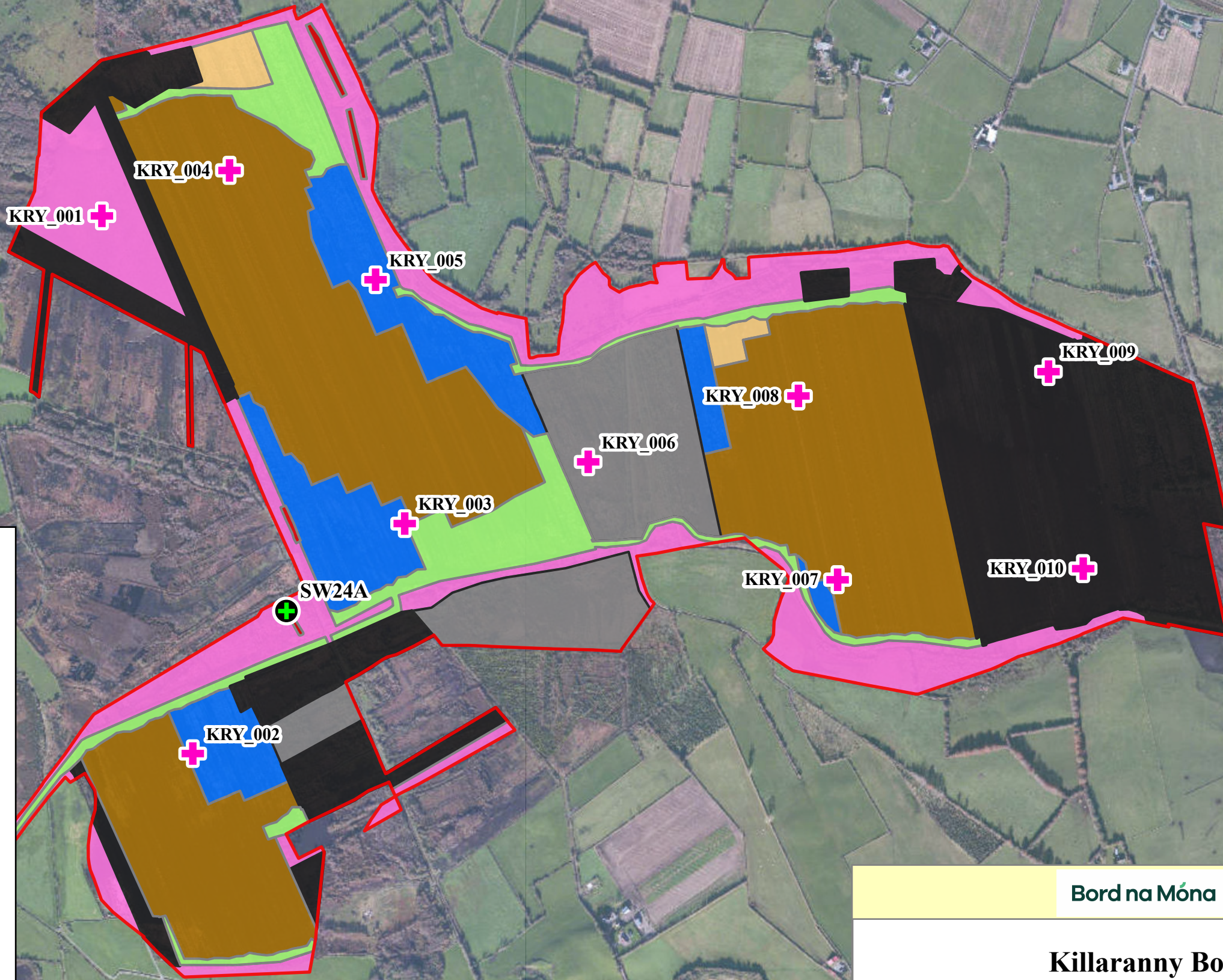
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Legend

-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type
 -  Additional Work 2
 -  Constraint
 -  Dry Cutaway 2
 -  Deep Peat Cutaway 2
 -  Deep Peat Cutaway 4
 -  Marginal Land 1
 -  Silt Pond
 -  Wetland 4



Bord na Móna			
Killaranny Bog Combined Map			
DRWG No: BNM-DR-23-02-33	Scale: 1:10,000	Drawn by: BG	Date: 20/09/2023
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Cloonshannagh Rail Link

Cloonmore

Granaghan Derrycashel

Mountdillon

Derryarogue

Knappoge

Cloondara Cluain Da Rath

Begnagh

Clooneeny

Kilashee

Derryadd2


Derryadd6

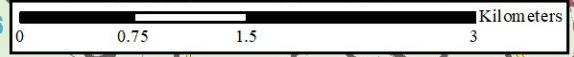
LONGFORD An Longfort


Bord na Móna

Begnagh Bog Bog Site Location

Legend


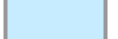
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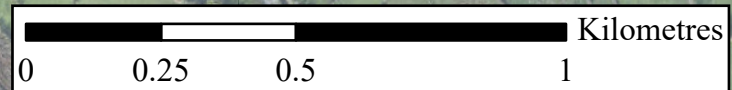
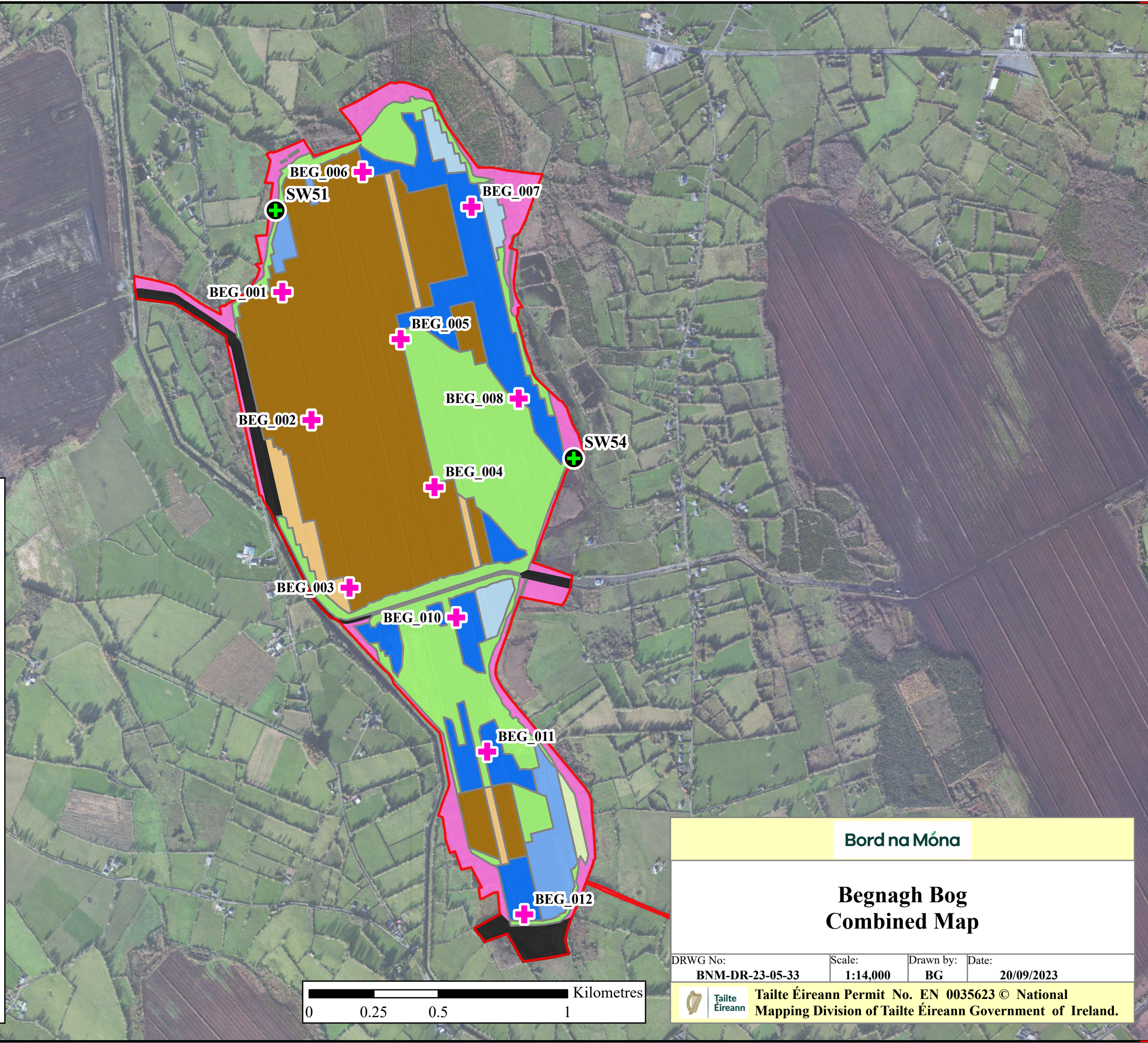



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Legend



-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type
-  Constraint
-  Dry Cutaway 1
-  Dry Cutaway 2
-  Deep Peat Cutaway 2
-  Deep Peat Cutaway 4
-  Marginal Land 1
-  Silt Pond
-  Wetland 2
-  Wetland 3
-  Wetland 4



Bord na Móna			
Bognagh Bog Combined Map			
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Legend


-  Pollinators
-  BnM Boundary

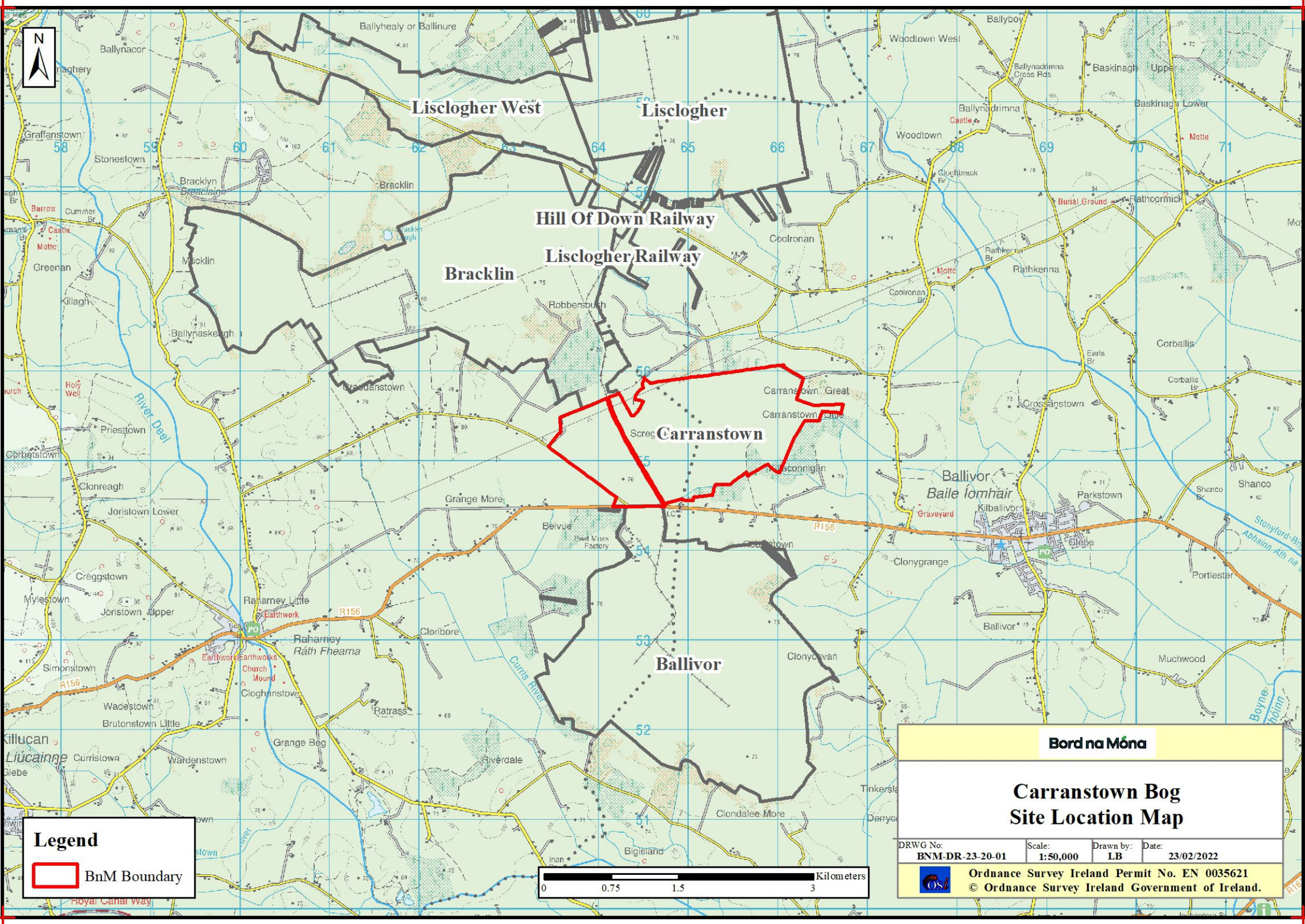


Bord na Móna


Begnagh Bog Ecology Transects

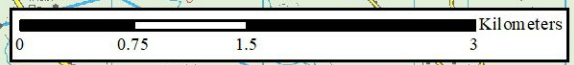
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Legend


 BnM Boundary



Bord na Móna











Carranstown Bog Site Location Map

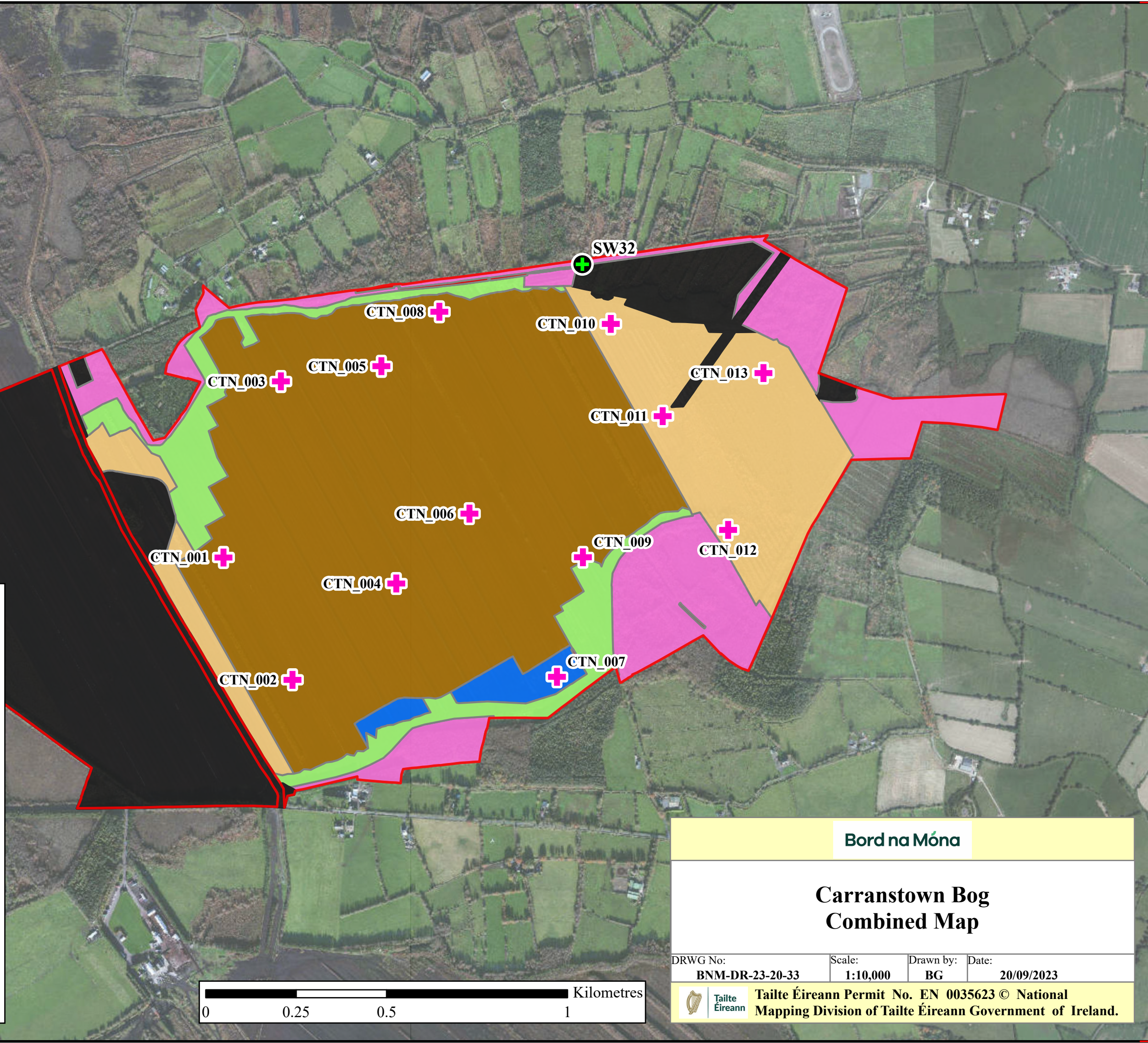
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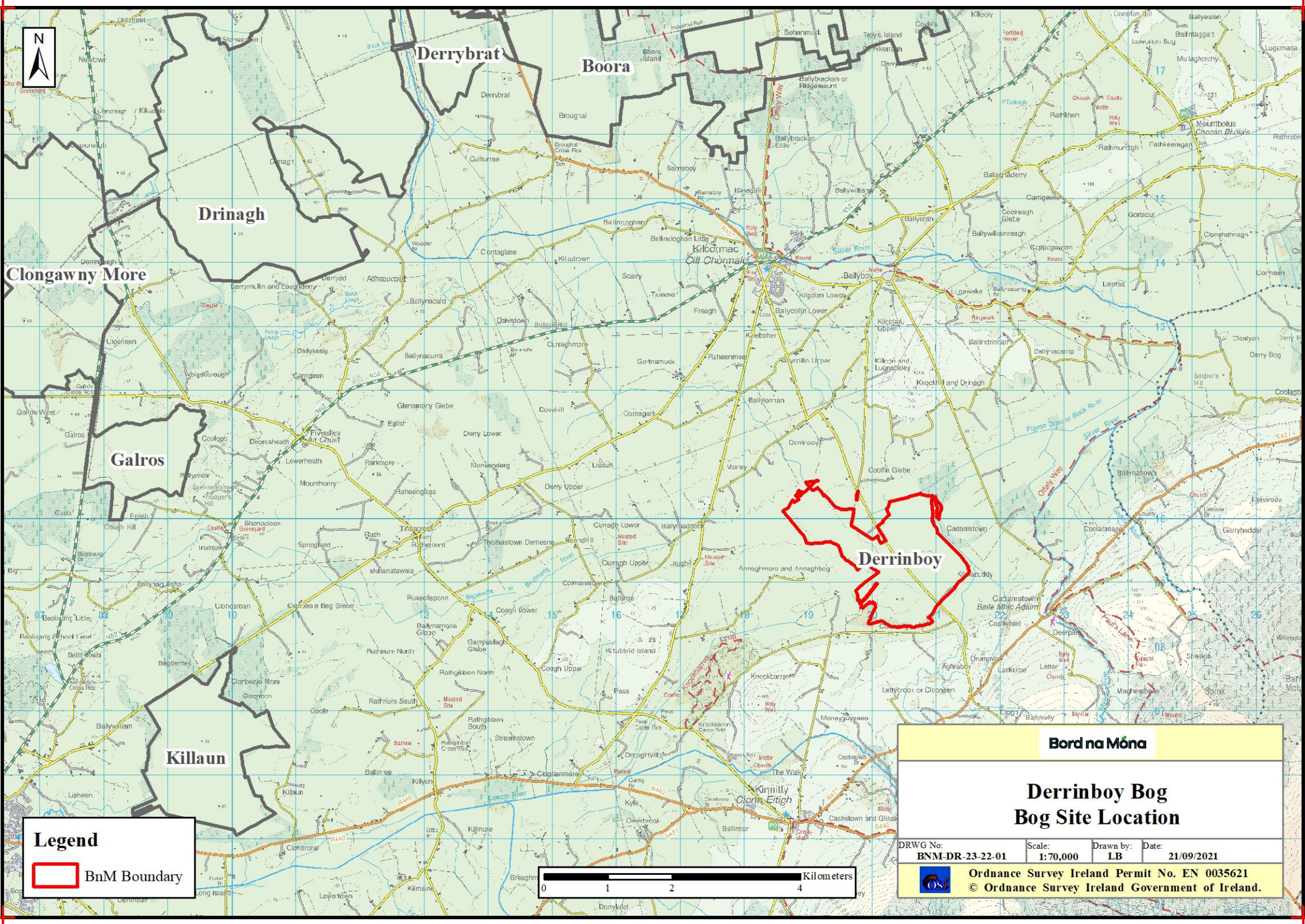


Legend

-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type
-  Constraint
-  Dry Cutaway 2
-  Deep Peat Cutaway 2
-  Deep Peat Cutaway 4
-  Marginal Land 1
-  Silt Pond
-  Wetland 4

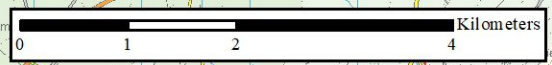


Bord na Móna			
Carranstown Bog Combined Map			
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Legend


 BnM Boundary



Bord na Móna












Derrinboy Bog Bog Site Location

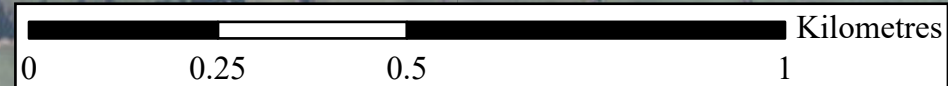
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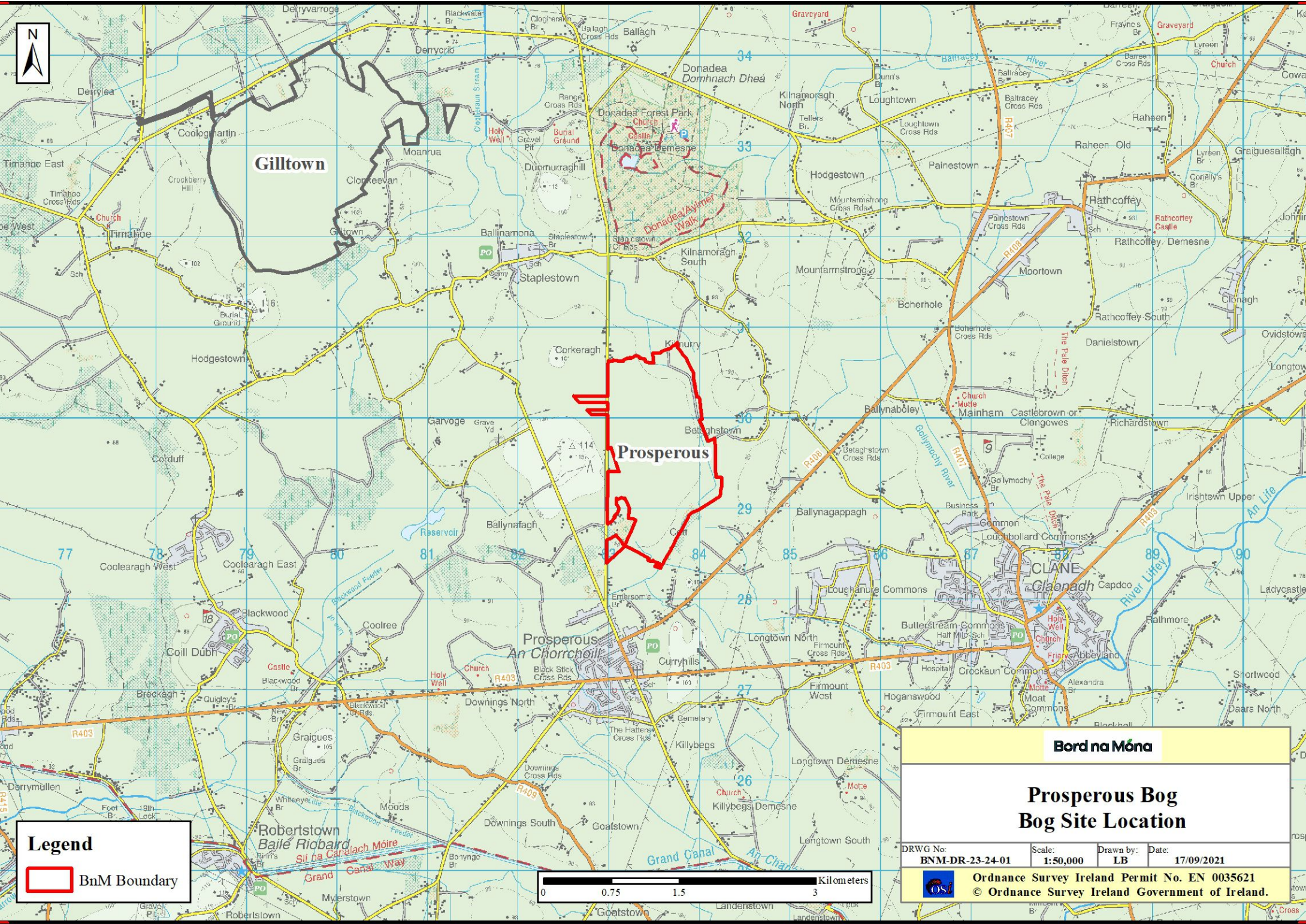


Legend


-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type
 -  Additional Work 2
 -  Constraint
 -  Dry Cutaway 2
 -  Deep Peat Cutaway 2
 -  Deep Peat Cutaway 4
 -  Marginal Land 1
 -  Silt Pond
 -  Wetland 4

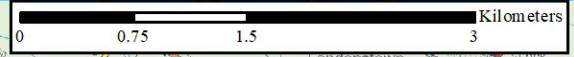


Bord na Móna			
Derrinboy Bog Combined Map			
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Legend

 BnM Boundary



Bord na Móna




Prosperous Bog Site Location

DRWG No: BNM-DR-23-24-01 Scale: 1:50,000 Drawn by: LB Date: 17/09/2021








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Legend

-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary

Rehab Type


-  Additional Work 2
-  Constraint
-  Dry Cutaway 2
-  Deep Peat Cutaway 4
-  Marginal Land 1
-  Marginal Land 2
-  Silt Pond

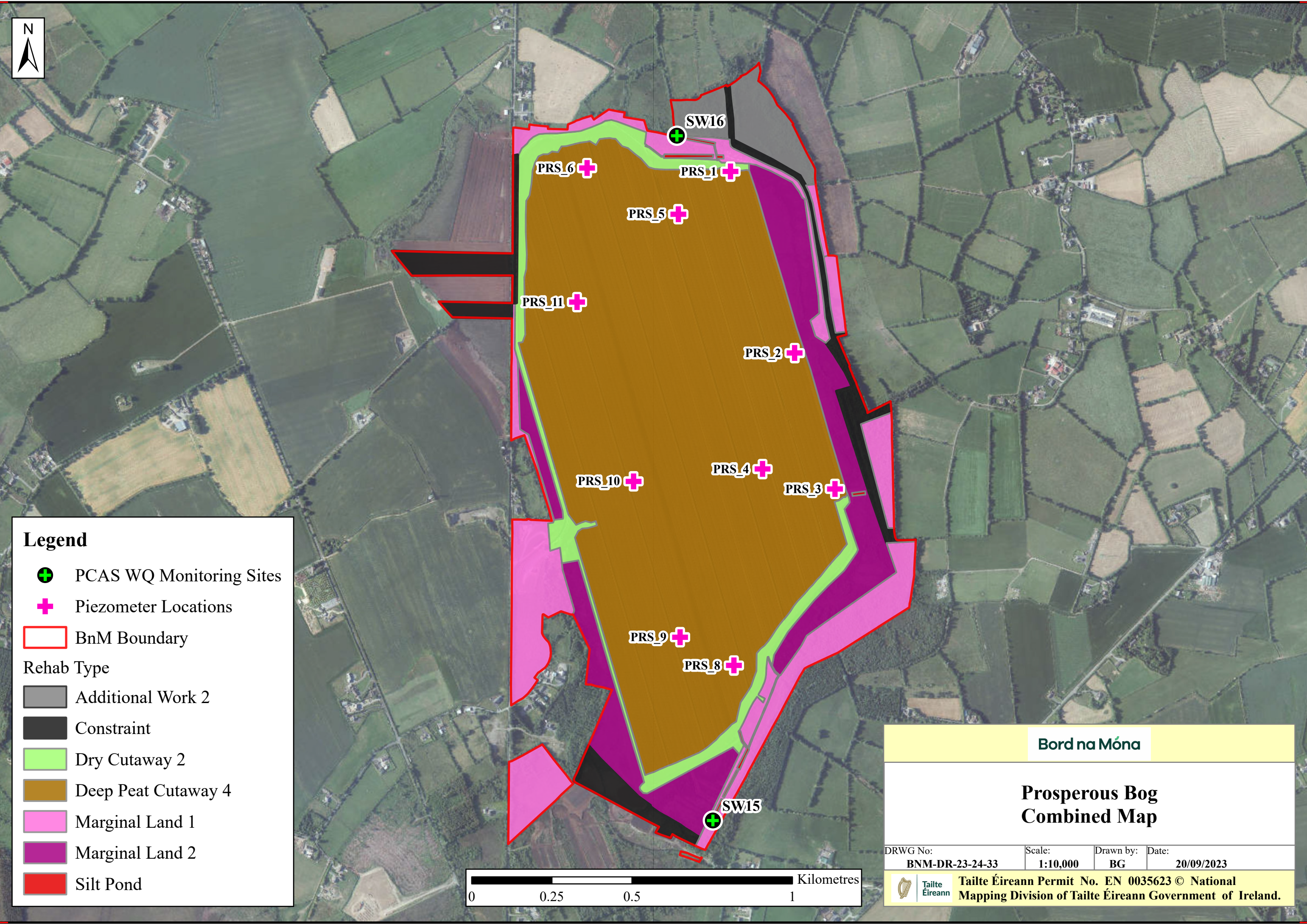


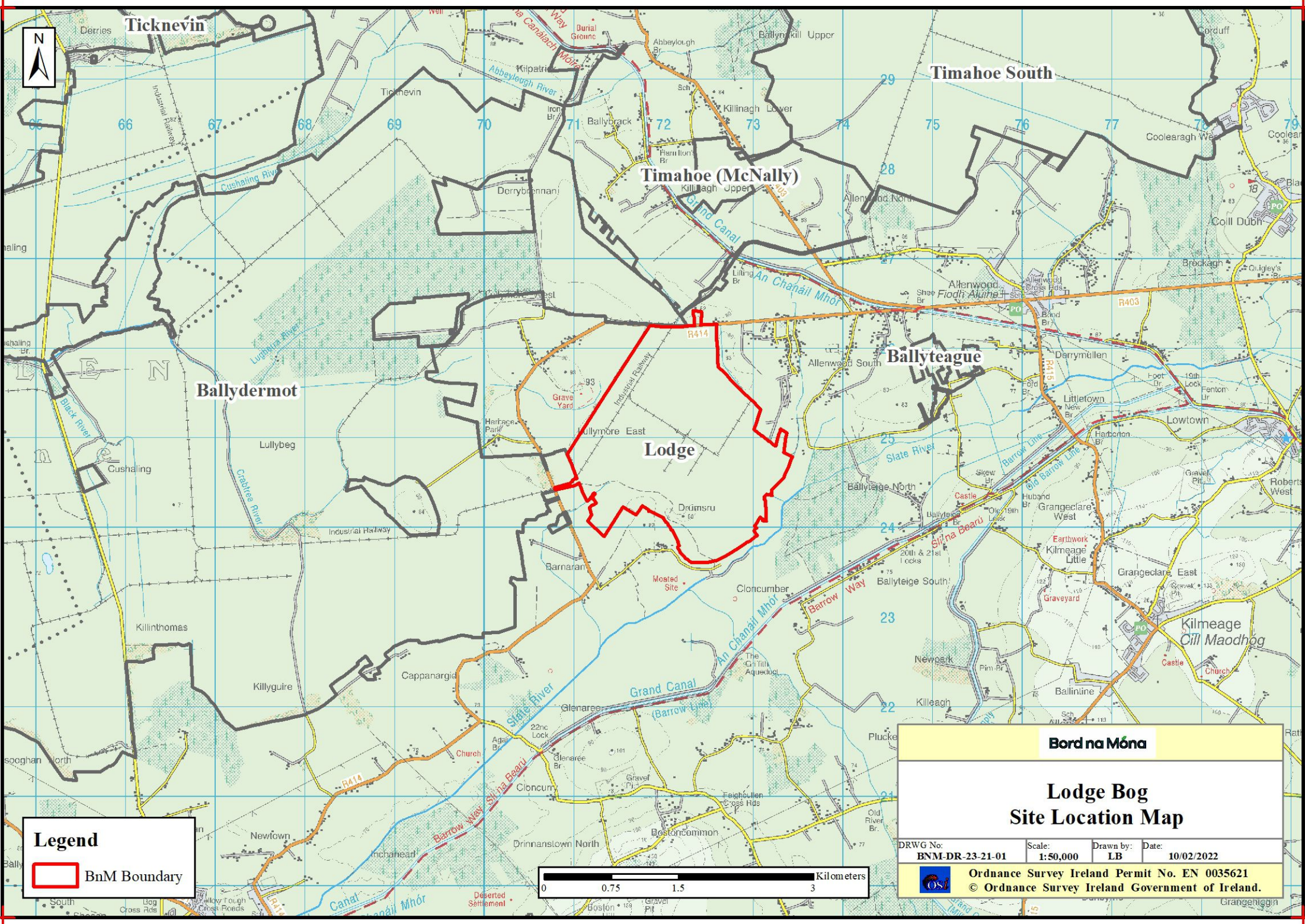
Bord na Móna

**Prosperous Bog
Combined Map**


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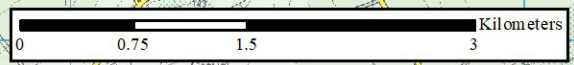
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Legend


 BnM Boundary



Bord na Móna













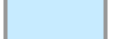

Lodge Bog Site Location Map

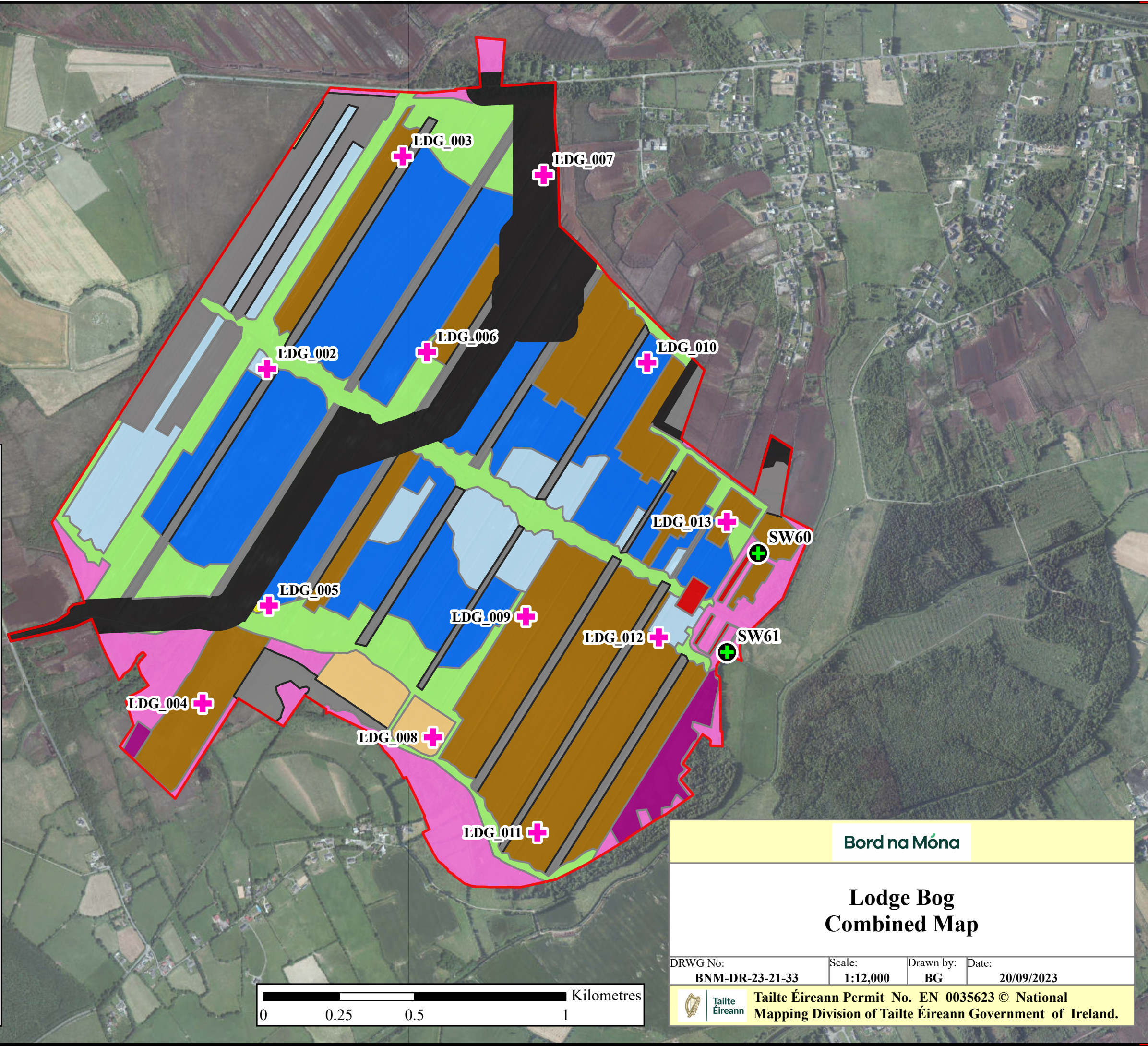
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Legend




-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type
 -  Additional Work 2
 -  Archaeology
 -  Constraint
 -  Dry Cutaway 2
 -  Deep Peat Cutaway 2
 -  Deep Peat Cutaway 4
 -  Marginal Land 1
 -  Marginal Land 2
 -  Silt Pond
 -  Wetland 2
 -  Wetland 4



Bord na Móna			
Lodge Bog Combined Map			
DRWG No: BNM-DR-23-21-33	Scale: 1:12,000	Drawn by: BG	Date: 20/09/2023
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Legend


-  Birds and King
-  Birds-King-Pollinators
-  BnM Boundary



Bord na Móna

Lodge Bog Ecology Transects


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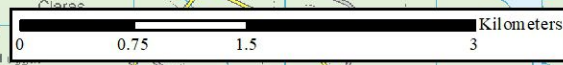
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WIN

Legend


 BnM Boundary

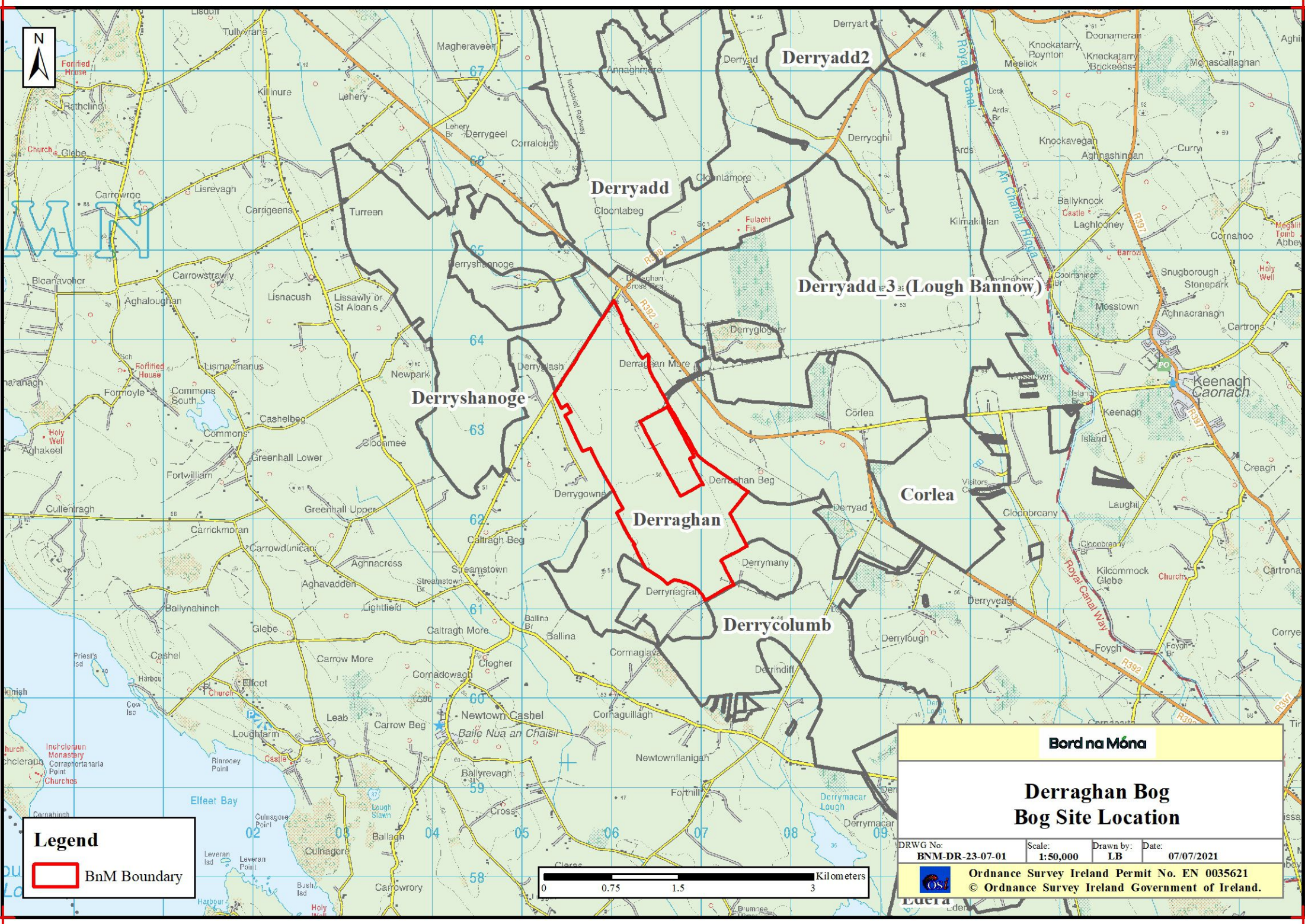


Bord na Móna

Derraghan Bog Site Location















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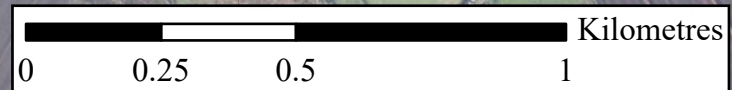
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Legend

-  Piezometer Locations
-  BnM Boundary
- Rehab Type
-  Additional Work 2
-  Archaeology
-  Constraint
-  Dry Cutaway 1
-  Dry Cutaway 2
-  Deep Peat Cutaway 4
-  Marginal Land 1
-  Marginal Land 2
-  Silt Pond
-  Wetland 2
-  Wetland 3
-  Wetland 4



Bord na Móna			
Derraghan Bog Combined Map			
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BNM-DR-23-07-33	1:14,000	BG	20/09/2023
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Cavemount

Esker

Ballycon

Cloncreen

Derrycricket

Clonsast North


Clonsast

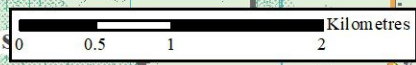
Clonsast

Bord na Móna


Cloncreen Bog Bog Site Location

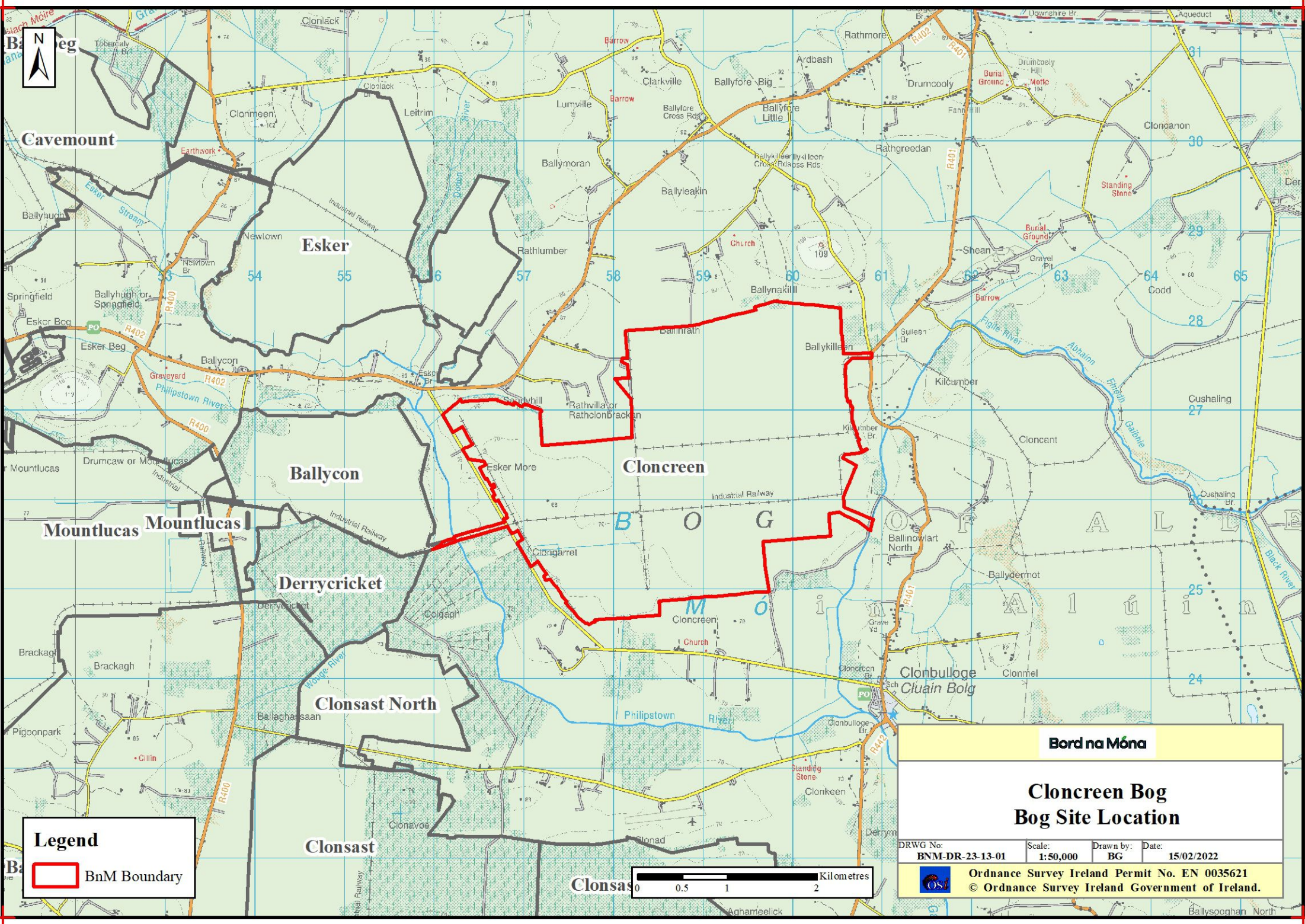
Legend

 BnM Boundary





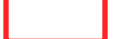






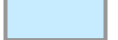

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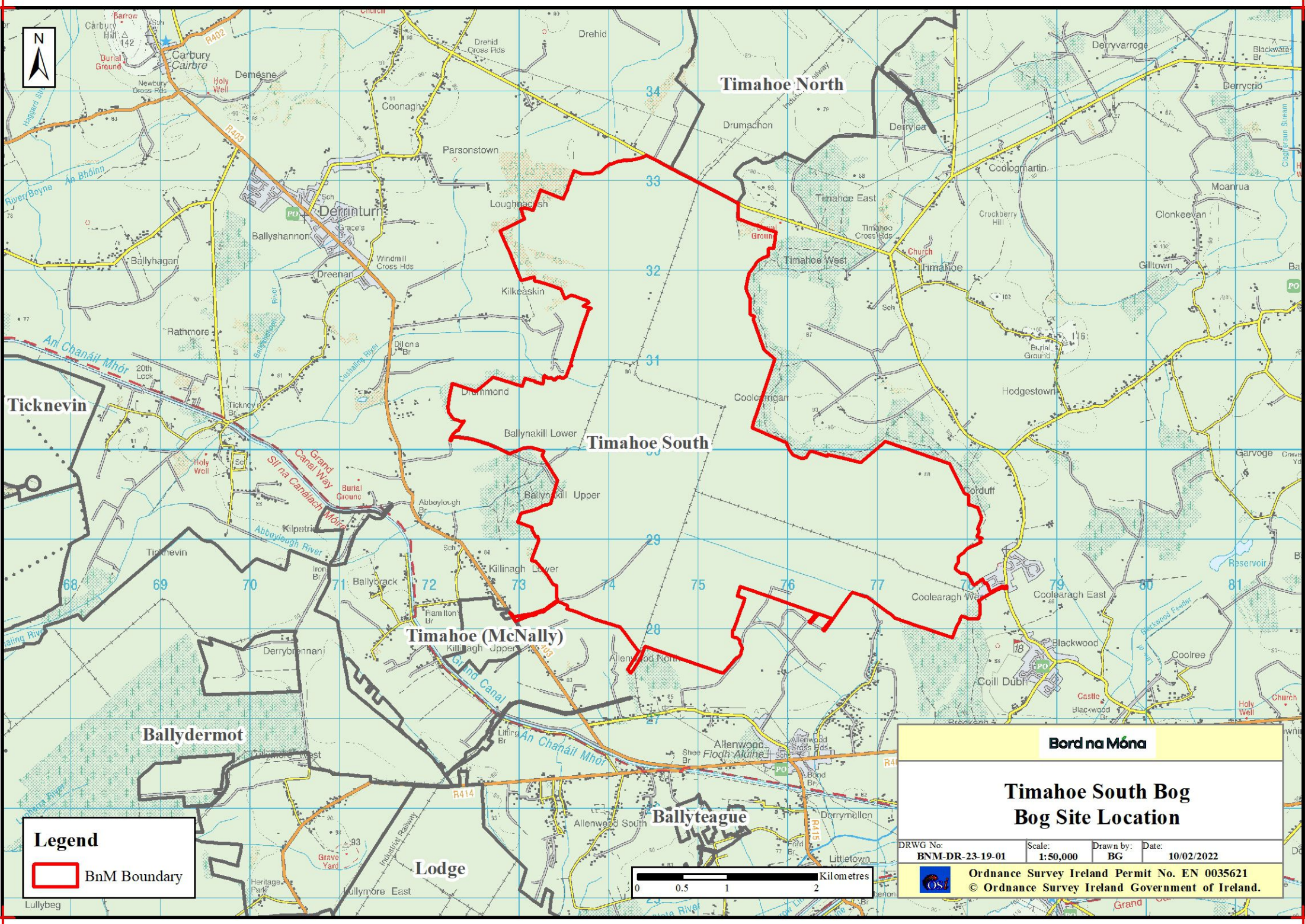


Legend

-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type
 -  Constraint
 -  Dry Cutaway 1
 -  Dry Cutaway 2
 -  Marginal Land 1
 -  Marginal Land 2
 -  Silt Pond
 -  Wetland 2
 -  Wetland 4



Bord na Móna			
Cloncreen Bog Combined Map			
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Ticknevin

Timahoe North

Timahoe South


Timahoe (McNally)

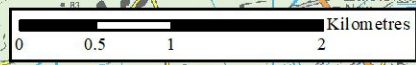
Ballydermot

Ballyteague

Lodge

Legend


 BnM Boundary



Bord na Móna




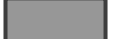








Timahoe South Bog Bog Site Location

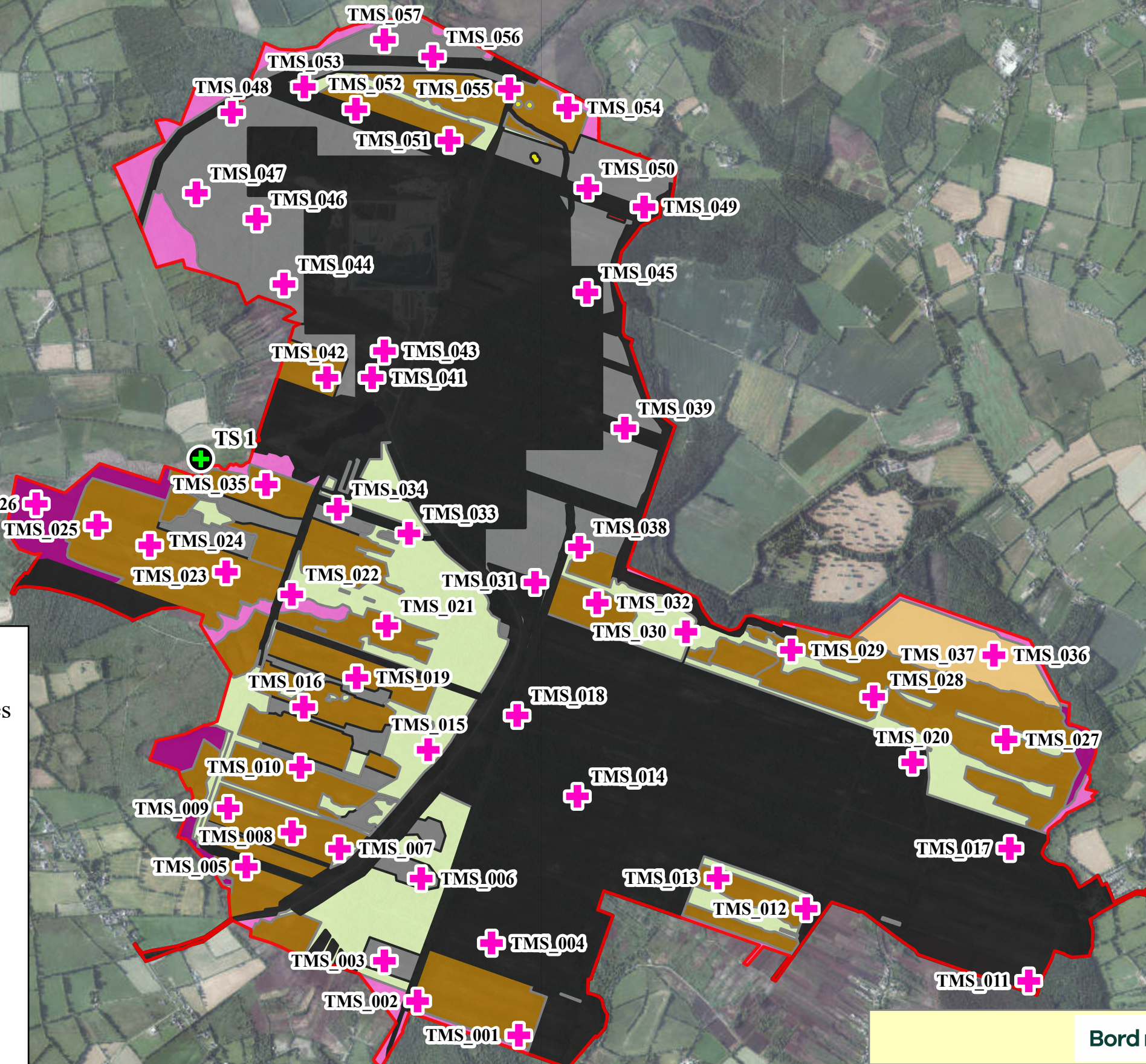
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BNM-DR-23-19-01	1:50,000	BG	10/02/2022

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Legend


-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type
 -  Additional Work 2
 -  Archaeology
 -  Constraint
 -  Dry Cutaway 1
 -  Deep Peat Cutaway 2
 -  Deep Peat Cutaway 4
 -  Marginal Land 1
 -  Marginal Land 2
 -  Silt Pond

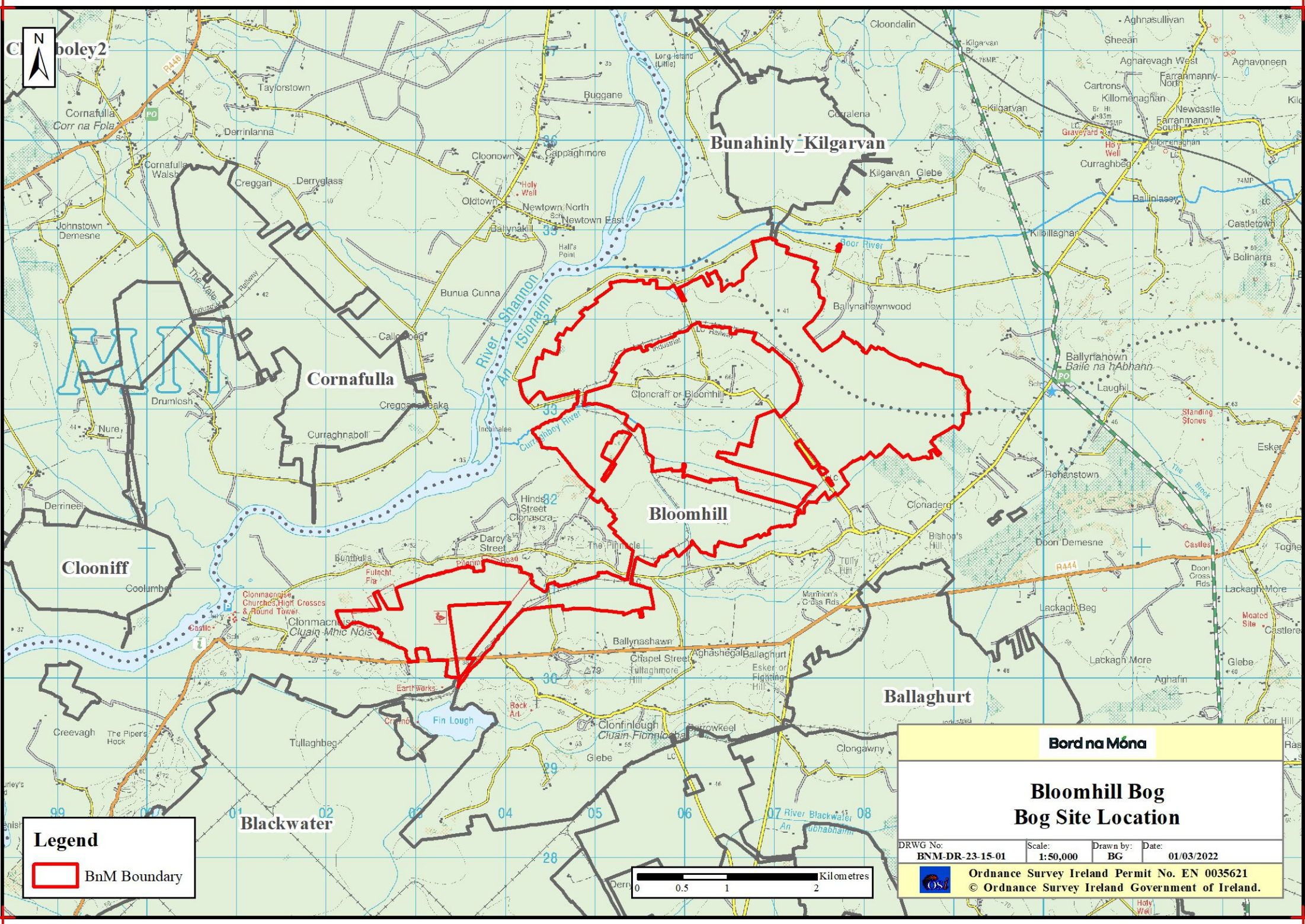


Bord na Móna

Timahoe South Bog Combined Map

DRWG No:	Scale:	Drawn by:	Date:
BNM-DR-23-19-33	1:25,000	BG	20/09/2023

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Legend

BnM Boundary



Bord na Móna














**Bloomhill Bog
Bog Site Location**

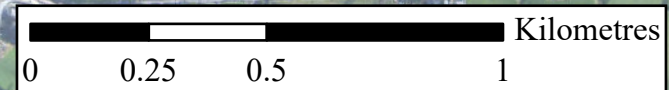
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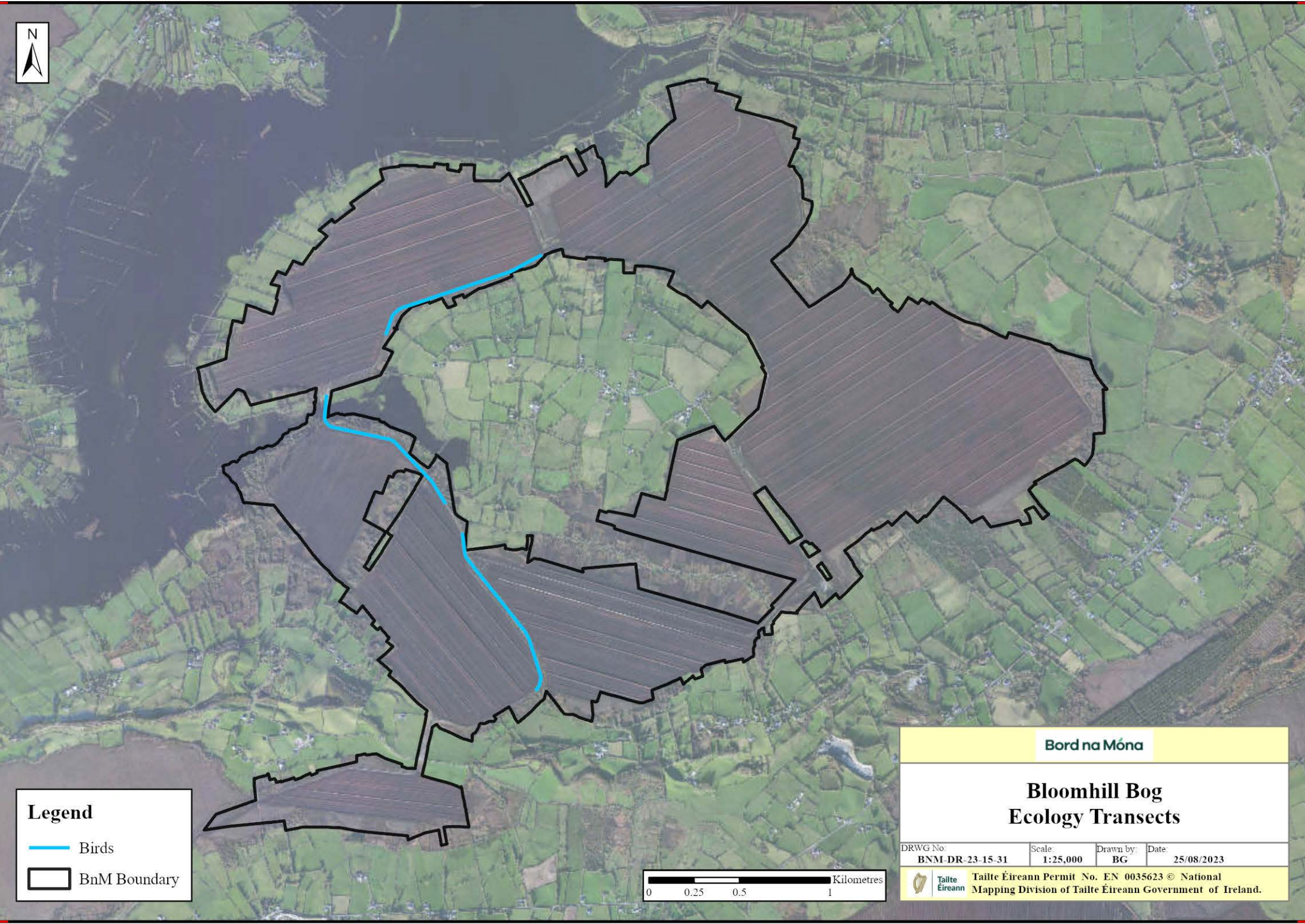


Legend



-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type
 -  Additional Work 2
 -  Constraint
 -  Dry Cutaway 2
 -  Deep Peat Cutaway 2
 -  Deep Peat Cutaway 4
 -  Marginal Land 1
 -  Marginal Land 2
 -  Silt Pond
 -  Wetland 2
 -  Wetland 4



Bord na Móna			
Bloomhill Bog Combined Map			
DRWG No: BNM-DR-23-15-33	Scale: 1:16,000	Drawn by: BG	Date: 20/09/2023
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Legend


-  Birds
-  BnM Boundary

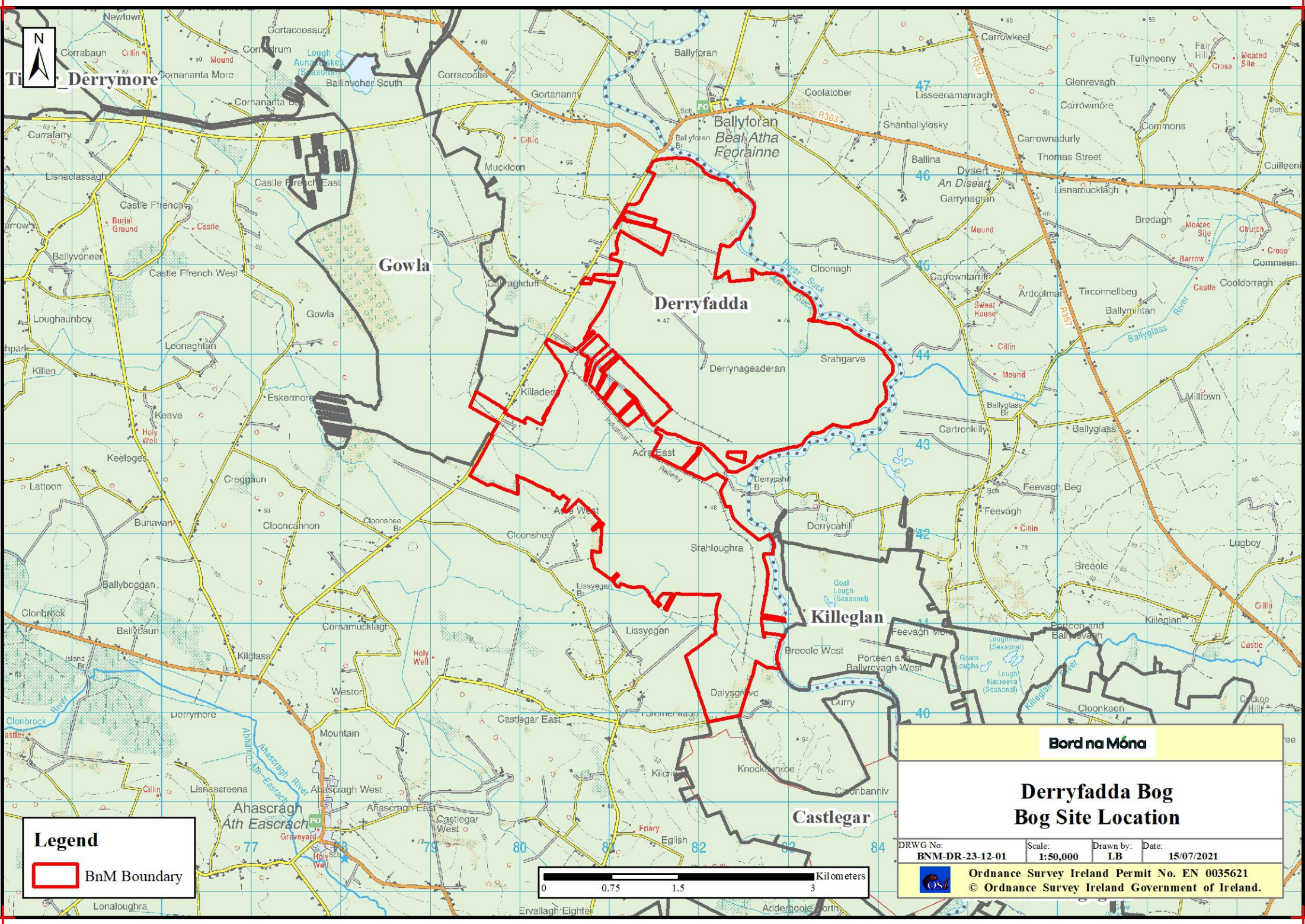


Bord na Móna

**Bloomhill Bog
Ecology Transects**

DRWG No:	Scale:	Drawn by:	Date:
BNM-DR-23-15-31	1:25,000	BG	25/08/2023

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Ti Derrymore

Gowla

Derryfadda

Killegran

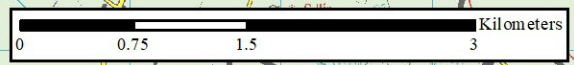
Castlegar

Bord na Móna

**Derryfadda Bog
Bog Site Location**

Legend




BnM Boundary



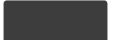
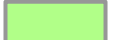

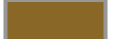


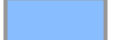
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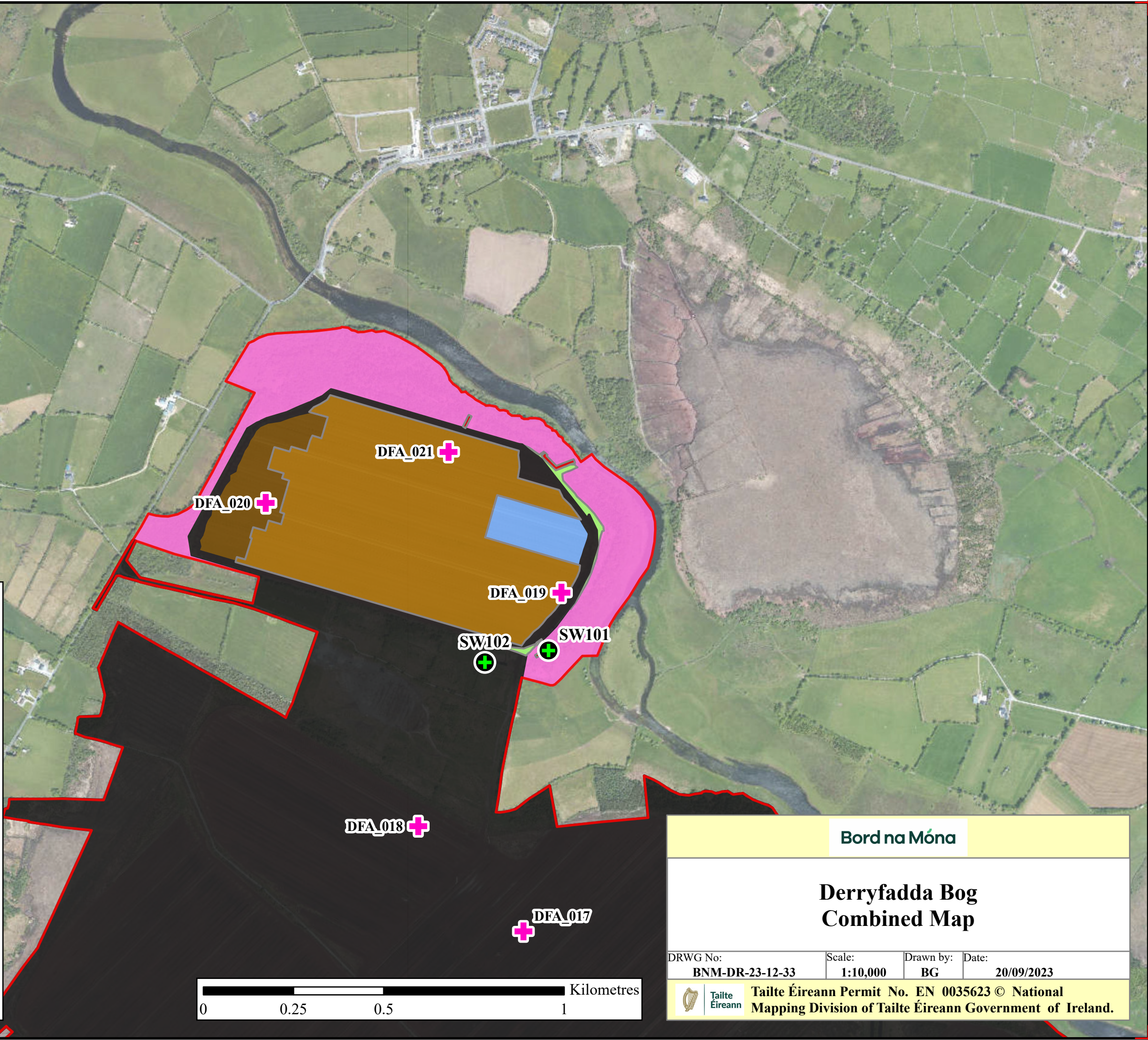



Legend

-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary

Rehab Type



-  Constraint
-  Dry Cutaway 2
-  Deep Peat Cutaway 4
-  Deep Peat Cutaway 5
-  Marginal Land 1
-  Silt Pond
-  Wetland 3



Bord na Móna			
Derryfadda Bog Combined Map			
DRWG No: BNM-DR-23-12-33	Scale: 1:10,000	Drawn by: BG	Date: 20/09/2023
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Legend


-  Birds
-  BnM Boundary



Bord na Móna

Derryfadda Bog Ecology Transects

DRWG No:	Scale:	Drawn by:	Date:
BNM-DR-23-12-31	1:35,000	BG	25/08/2023

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Clonwhelan

Coolnagun


Glenlough

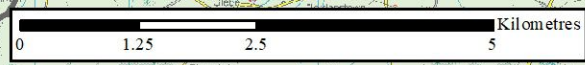
Clynan


Bord na Móna

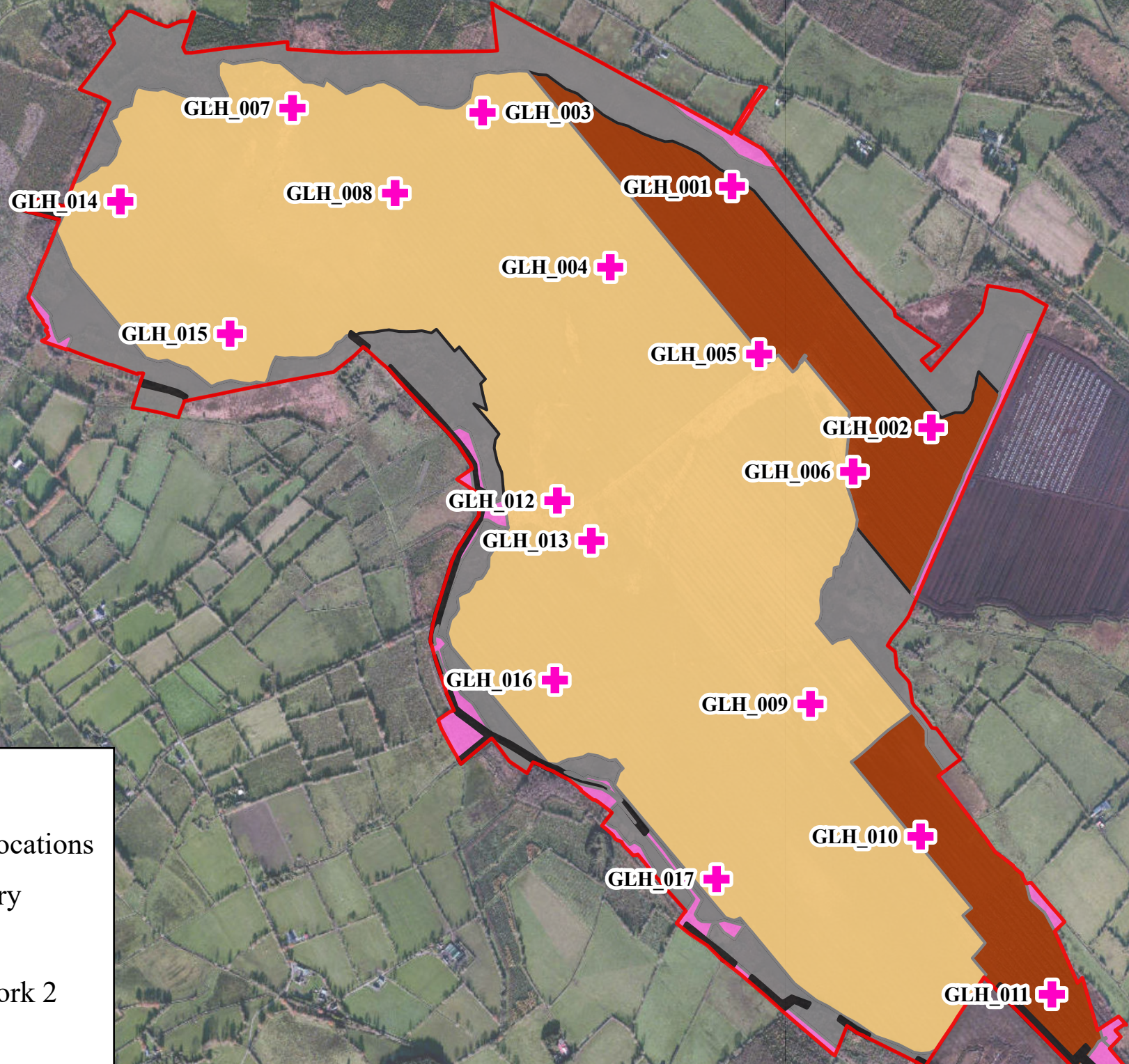
Glenlough Bog Site Location Map

Legend




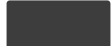




 BnM Boundary

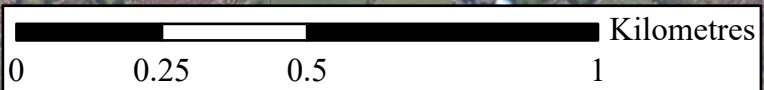


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Legend


-  Piezometer Locations
-  BnM Boundary
- Rehab Type
 -  Additional Work 2
 -  Constraint
 -  Deep Peat Cutaway 2
 -  Deep Peat Cutaway 6
 -  Marginal Land 1
 -  Silt Pond



Bord na Móna

**Glenlough Bog
Combined Map**

DRWG No: BNM-DR-23-17-33	Scale: 1:13,000	Drawn by: BG	Date: 20/09/2023
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Legend


-  Birds
-  BnM Boundary

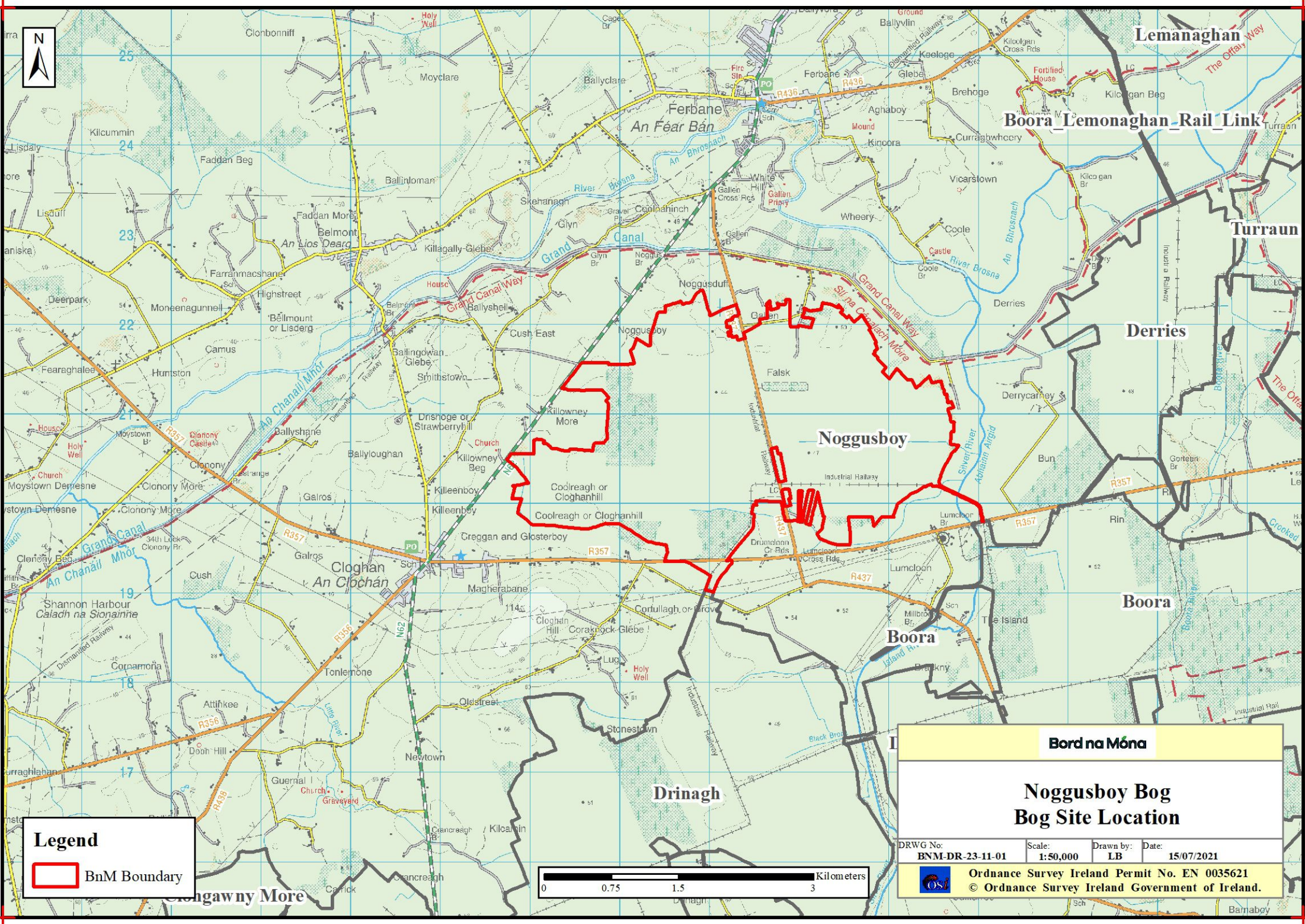


Bord na Móna


Glenlough Bog Ecology Transects

DRWG No:	Scale:	Drawn by:	Date:
BNM-DR-23-17-31	1:18,000	BG	25/08/2023

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Legend


 BnM Boundary



Bord na Móna












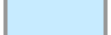


Noggusboy Bog Site Location

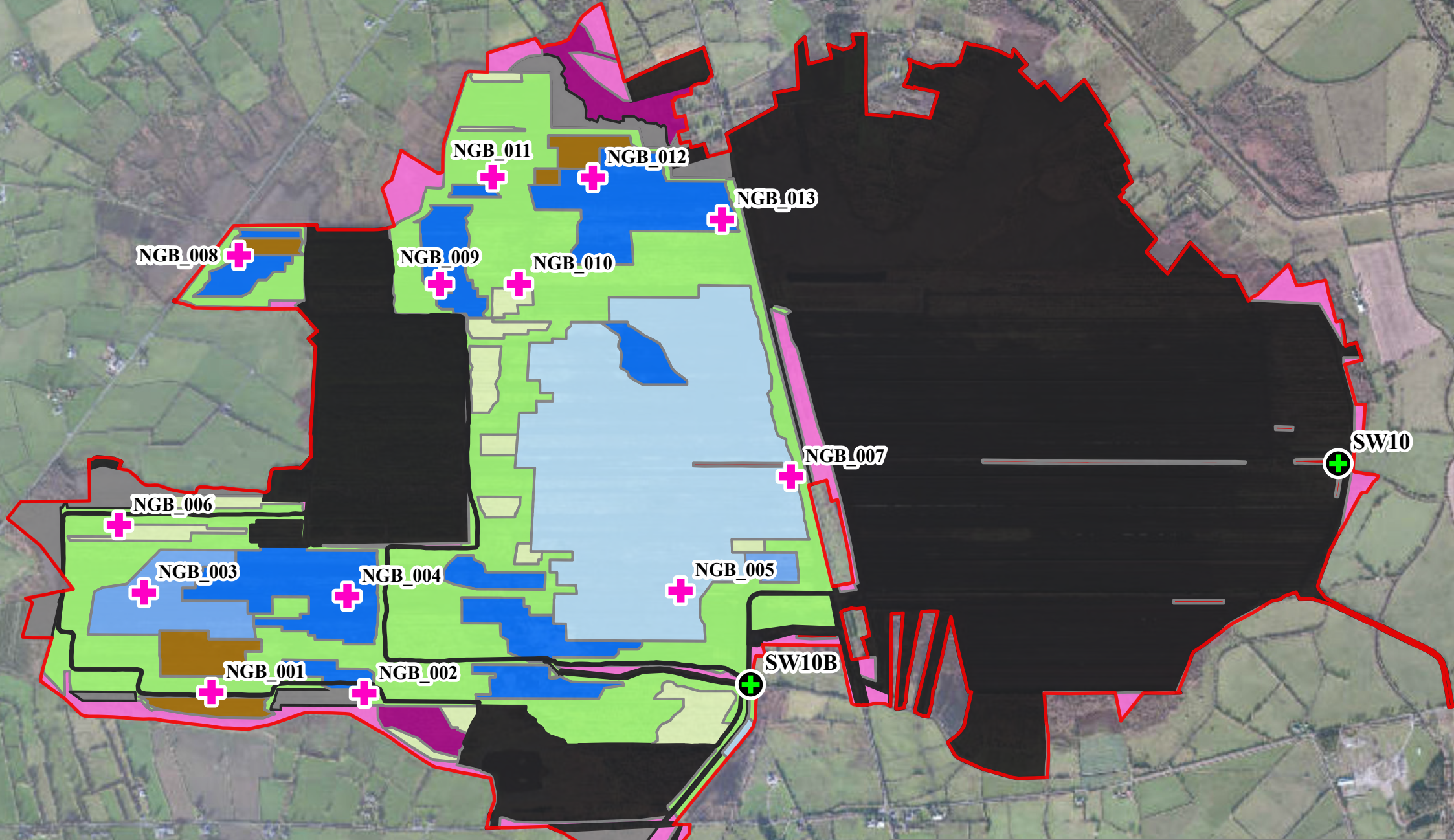
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BNM-DR-23-11-01	1:50,000	LB	15/07/2021

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Legend


-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type**
-  Additional Work 2
-  Constraint
-  Dry Cutaway 1
-  Dry Cutaway 2
-  Deep Peat Cutaway 4
-  Marginal Land 1
-  Marginal Land 2
-  Silt Pond
-  Wetland 2
-  Wetland 3
-  Wetland 4



Bord na Móna



**Noggusboy Bog
Combined Map**

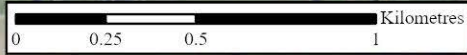
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Legend


-  Birds
-  BnM Boundary

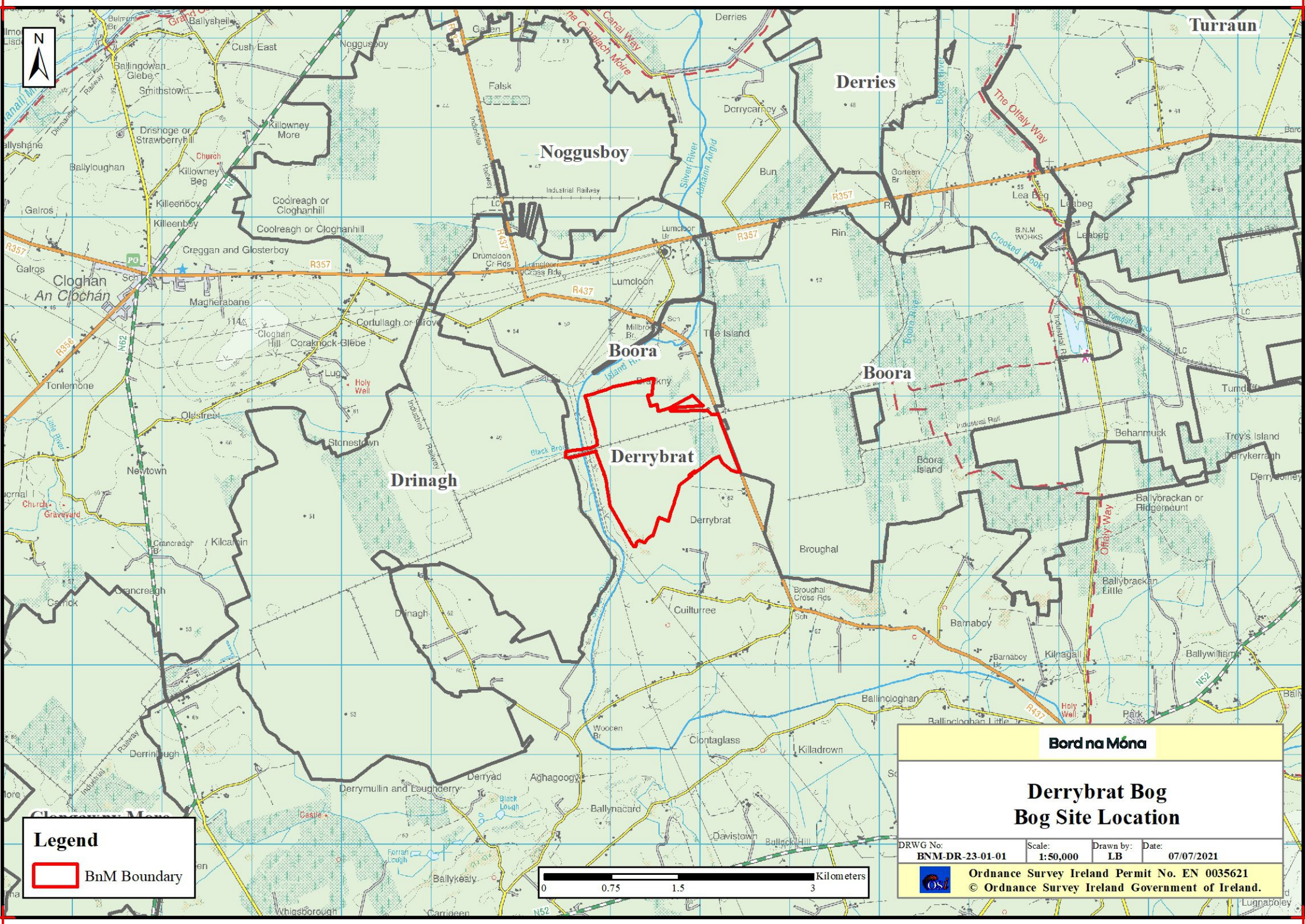


Bord na Móna


Noggusboy Bog Ecology Transects

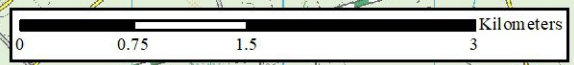
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Legend


 BnM Boundary



Bord na Móna

**Derrybrat Bog
Bog Site Location**

DRWG No:	Scale:	Drawn by:	Date:
BNM-DR-23-01-01	1:50,000	LB	07/07/2021

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Legend

PCAS WQ Monitoring Sites

Piezometer Locations

BnM Boundary

Rehab Type

Additional Work 2

Constraint

Dry Cutaway 1

Dry Cutaway 2

Deep Peat Cutaway 2

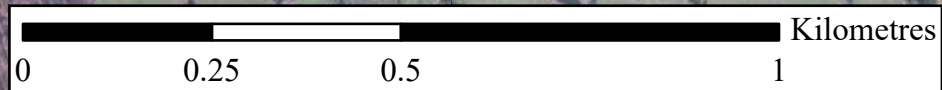
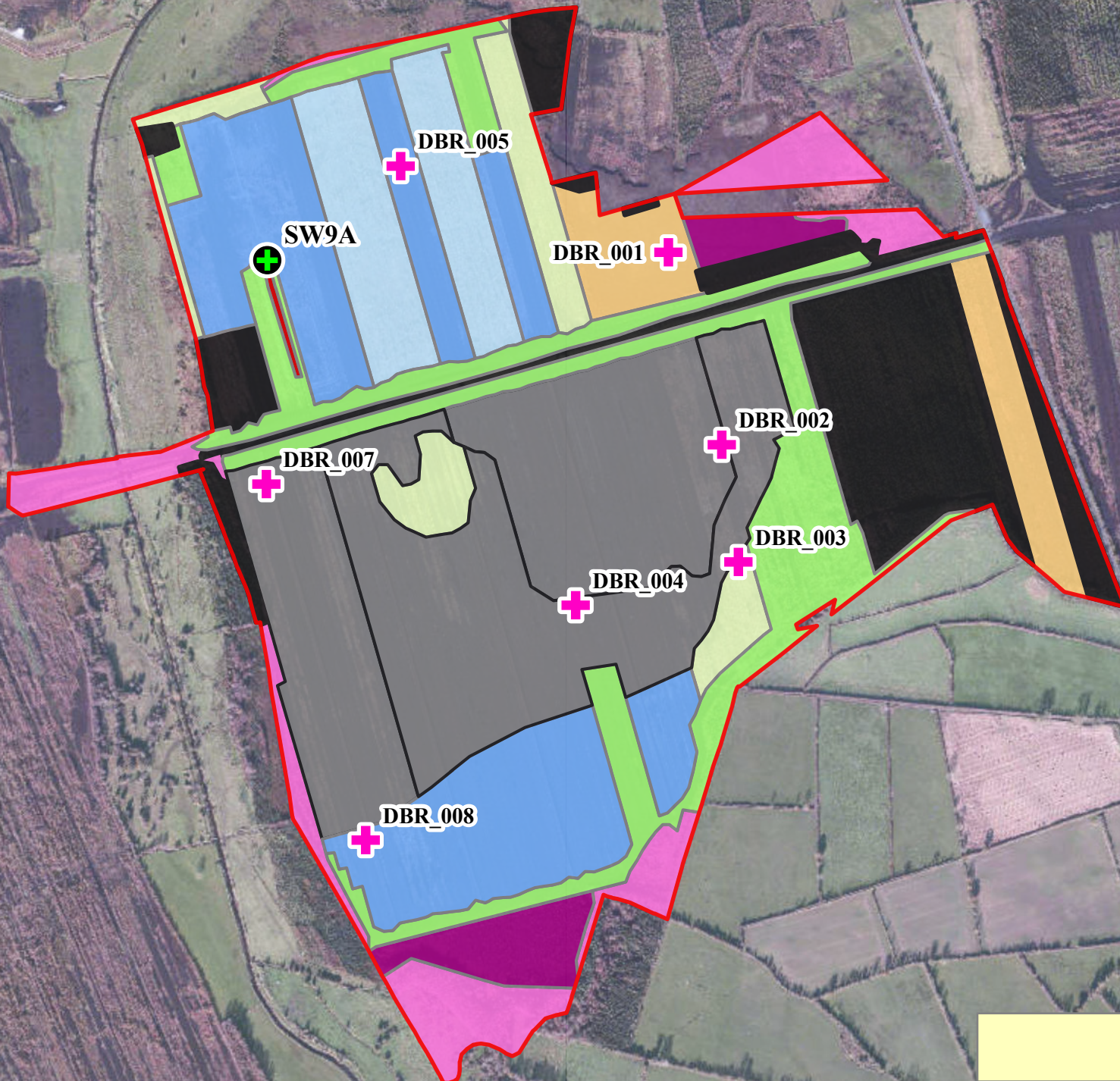
Marginal Land 1

Marginal Land 2

Silt Pond


Wetland 2

Wetland 3





Bord na Móna

**Derrybrat Bog
Combined Map**

DRWG No: BNM-DR-23-01-33	Scale: 1:10,000	Drawn by: BG	Date: 20/09/2023
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Legend


-  Birds
-  BnM Boundary



Bord na Móna

Derrybrat Bog Ecology Transects

DRWG No:	Scale:	Drawn by:	Date:
BNM-DR-23-01-31	1:12,000	BG	25/08/2023

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Cloonshannagh Rail Link

Cloonmore

Granaghan

Derrycashel

Cloondara

Cluain Dá Rath

Mountdillon

Knappoge

Begnagh

Clooneeny

Moher

Derryarogue

Kilashee


Bord na Móna

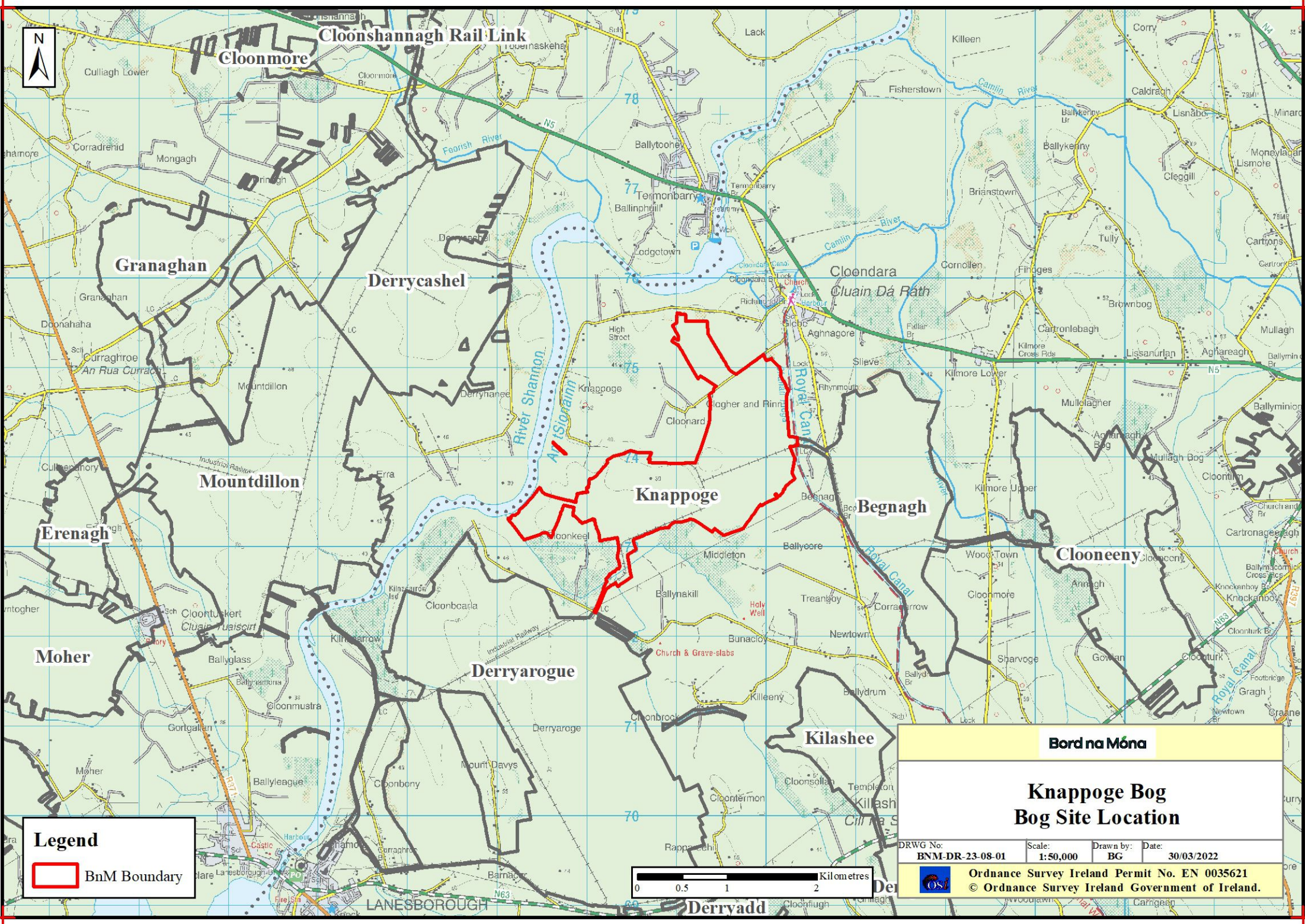
Knappoge Bog Bog Site Location

Legend

 BnM Boundary






DRWG No:	Scale:	Drawn by:	Date:
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




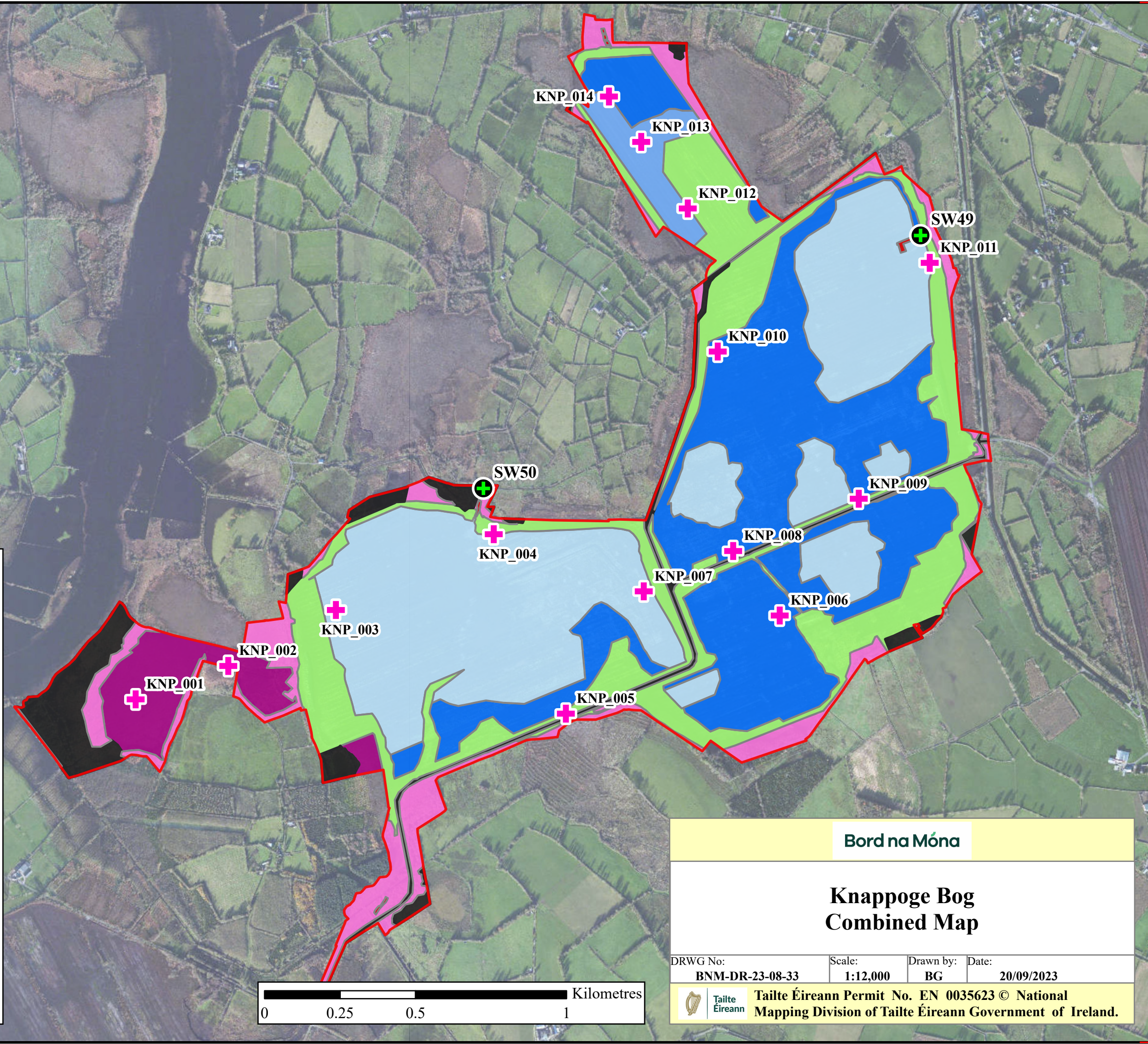


Legend

-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary

Rehab Type


-  Constraint
-  Dry Cutaway 2
-  Marginal Land 1
-  Marginal Land 2
-  Silt Pond
-  Wetland 2
-  Wetland 3
-  Wetland 4

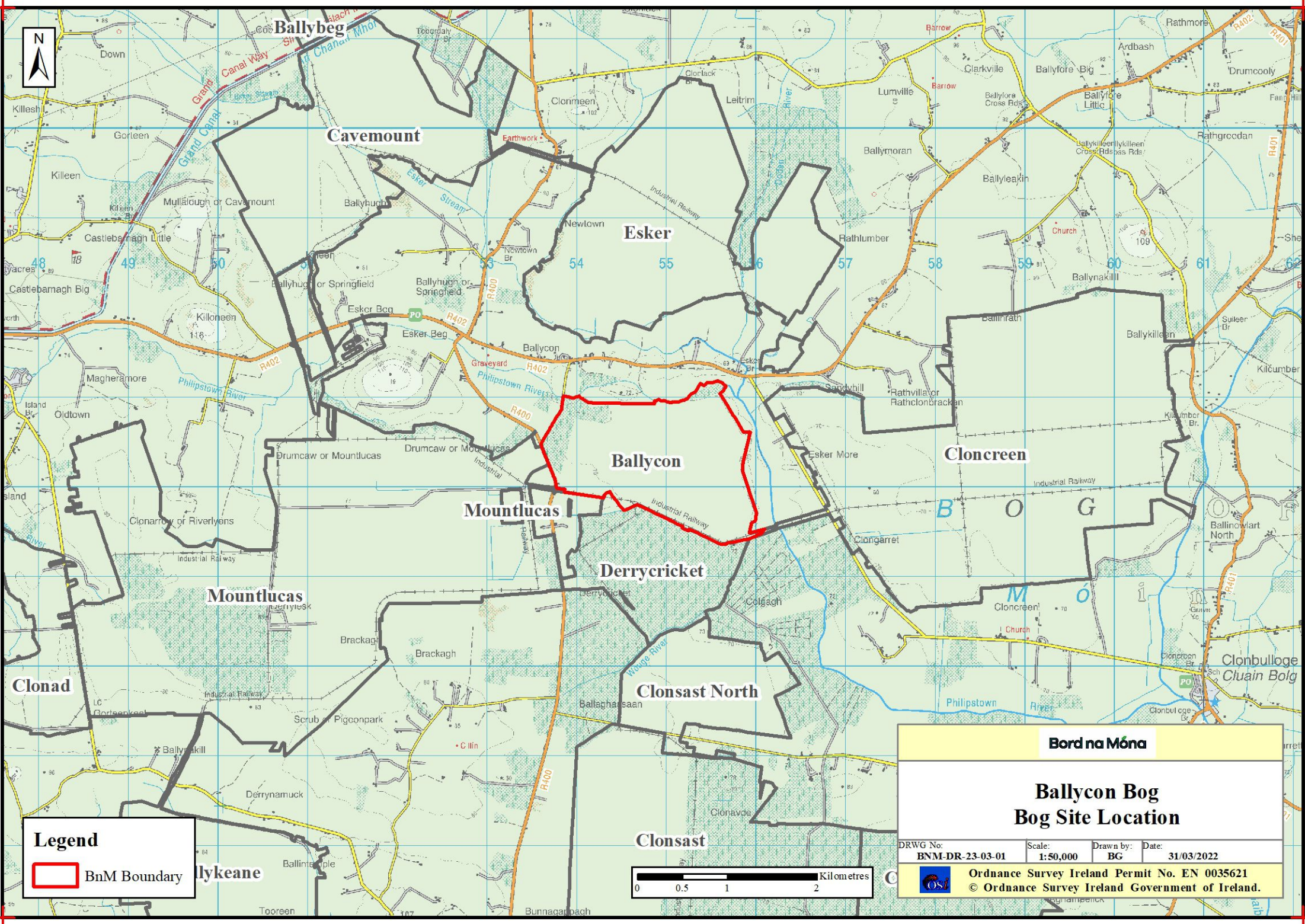


Bord na Móna


**Knappoge Bog
Combined Map**

DRWG No:	Scale:	Drawn by:	Date:
BNM-DR-23-08-33	1:12,000	BG	20/09/2023

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Legend

 BnM Boundary

Bord na Móna

Ballycon Bog Site Location




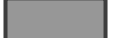

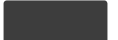






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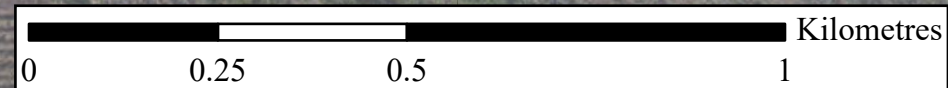
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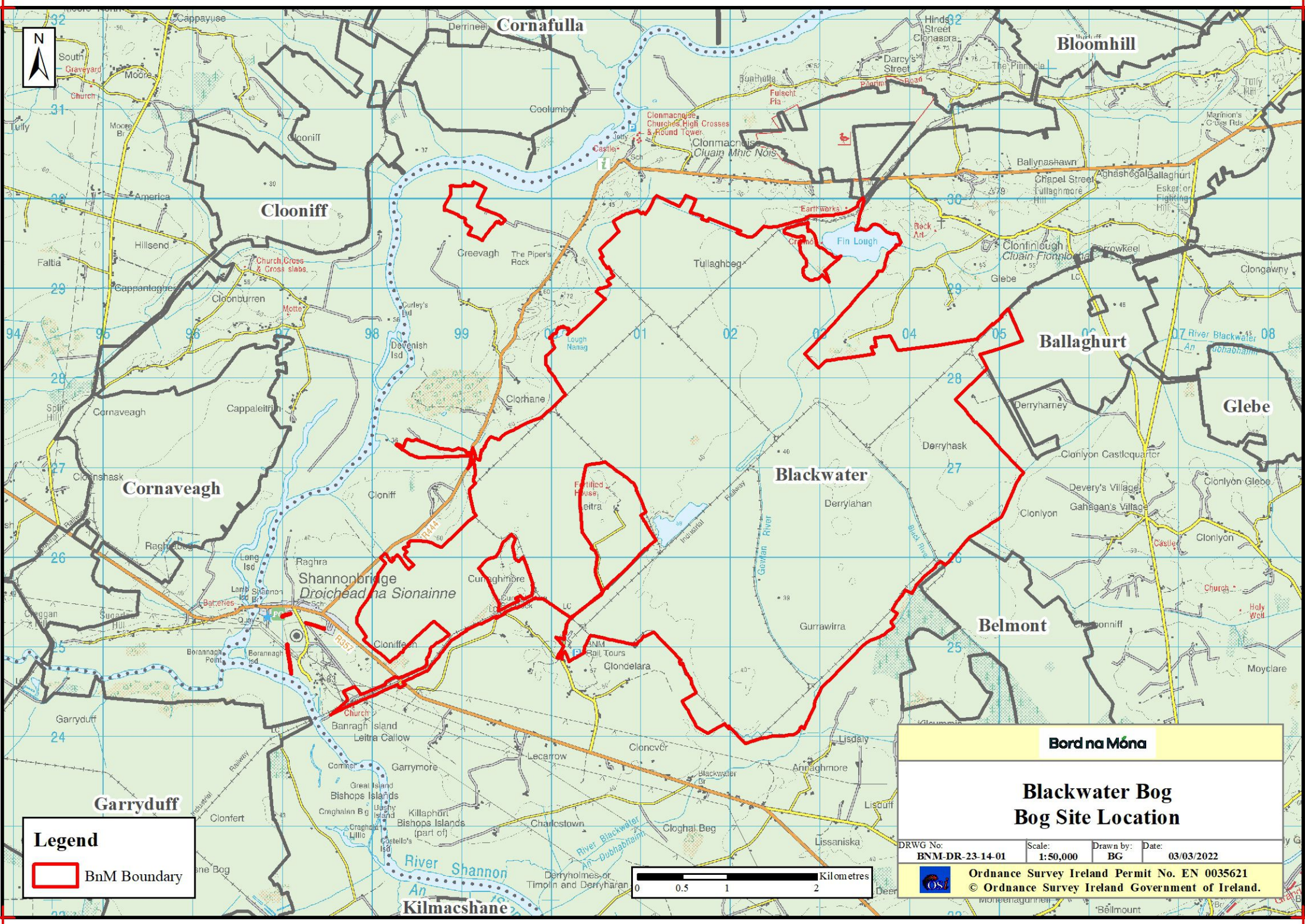


Legend


-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type
-  Additional Work 2
-  Archaeology
-  Constraint
-  Dry Cutaway 1
-  Dry Cutaway 2
-  Deep Peat Cutaway 2
-  Marginal Land 1
-  Silt Pond
-  Wetland 3

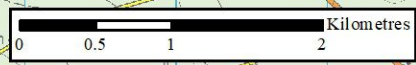


Bord na Móna			
Ballycon Bog Combined Map			
DRWG No:	Scale:	Drawn by:	Date:
BNM-DR-23-03-33	1:10,000	BG	20/09/2023
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Legend


 BnM Boundary



Bord na Móna

Blackwater Bog Site Location

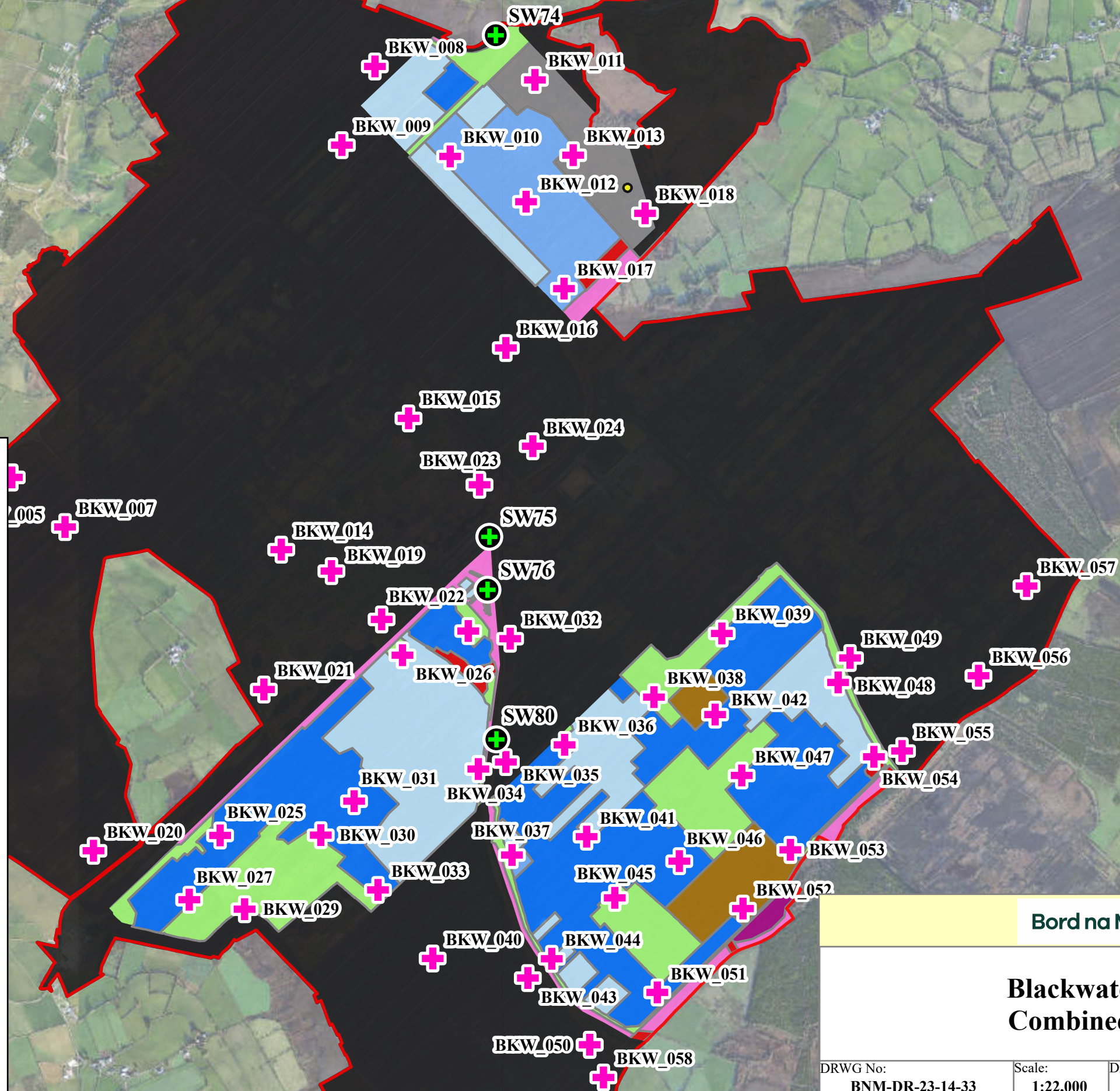
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BNM-DR-23-14-01	1:50,000	BG	03/03/2022

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Legend


-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type
-  Additional Work 2
-  Archaeology
-  Constraint
-  Dry Cutaway 2
-  Deep Peat Cutaway 4
-  Marginal Land 1
-  Marginal Land 2
-  Silt Pond
-  Wetland 2
-  Wetland 3
-  Wetland 4

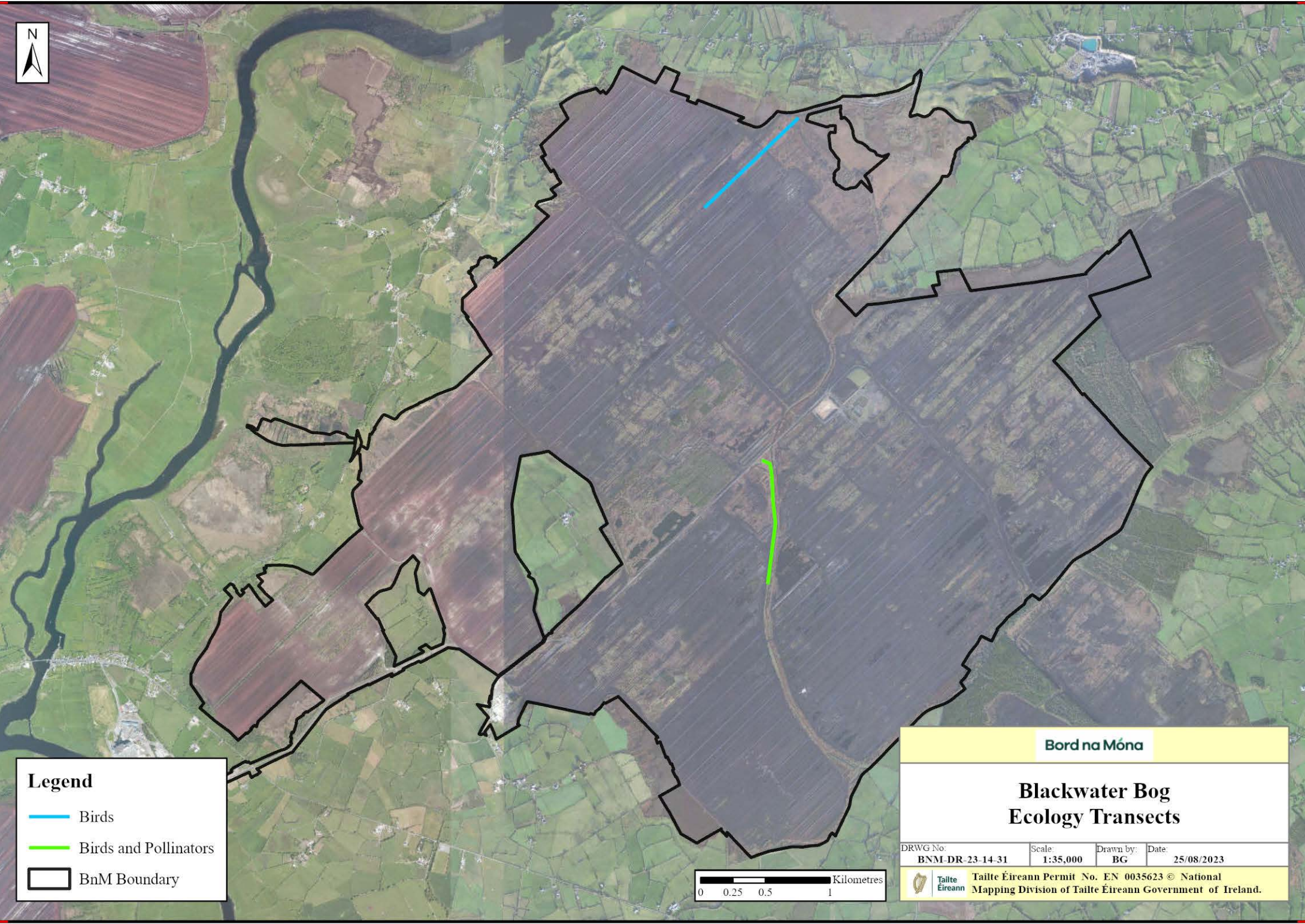


Bord na Móna




Blackwater Bog Combined Map

DRWG No:	Scale:	Drawn by:	Date:
BNM-DR-23-14-33	1:22,000	BG	20/09/2023

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Legend

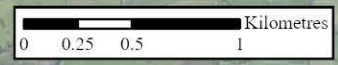
-  Birds
-  Birds and Pollinators
-  BnM Boundary

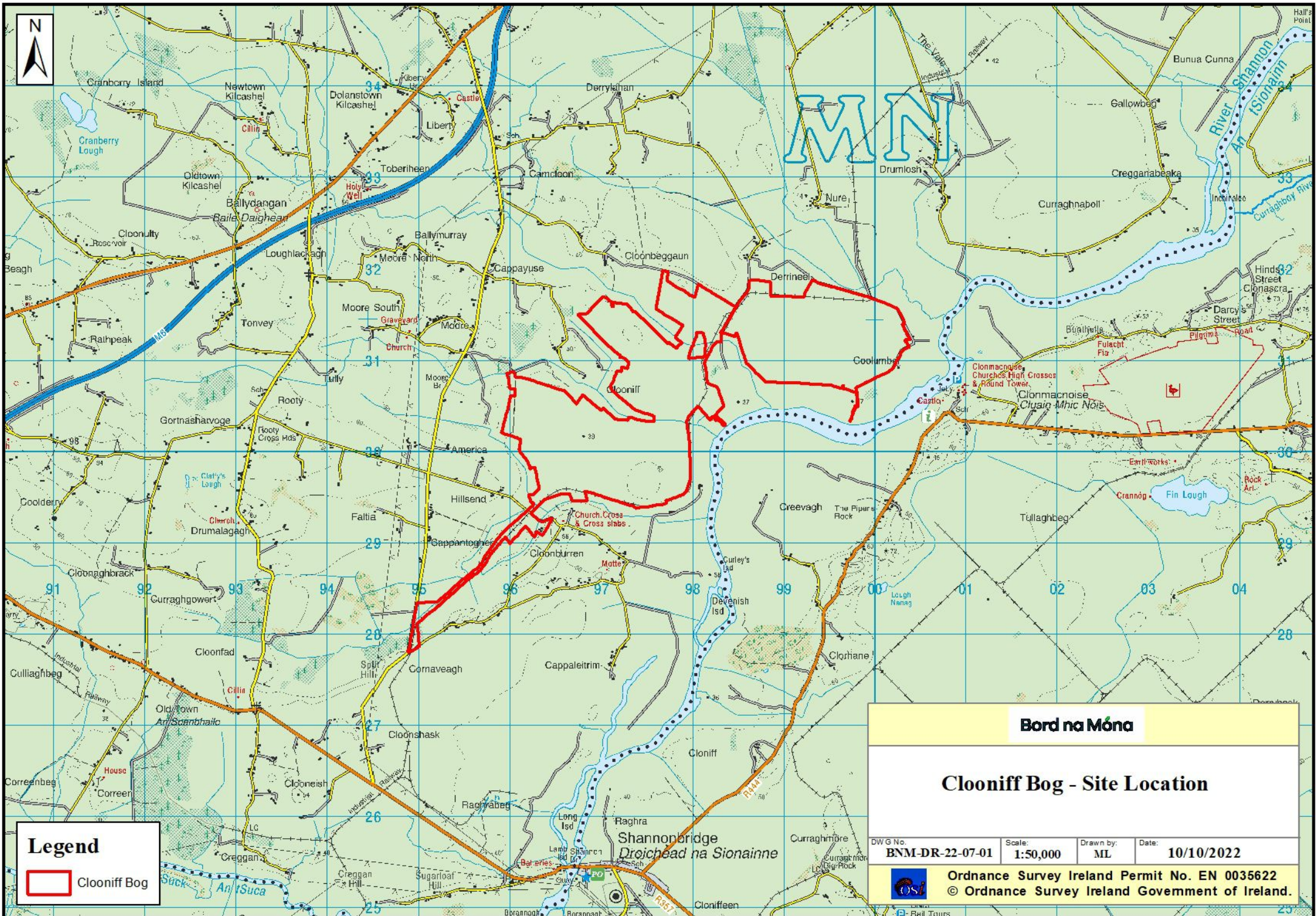
Bord na Móna

Blackwater Bog Ecology Transects

DRWG No:	Scale:	Drawn by:	Date:
BNM-DR-23-14-31	1:35,000	BG	25/08/2023

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MN

Legend

Cloniff Bog

Bord na Móna



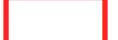










Cloniff Bog - Site Location

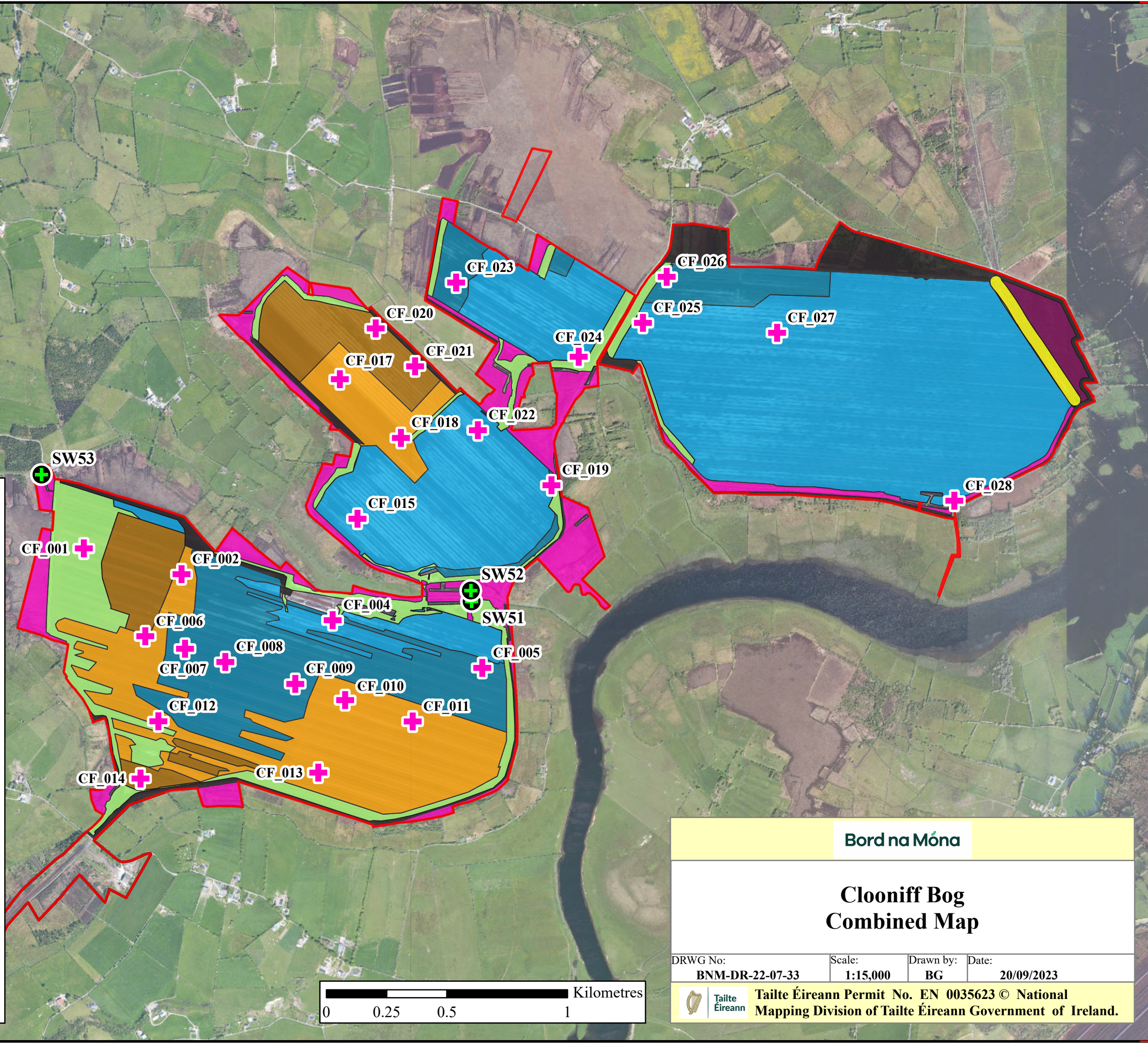
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Legend

-  PCAS WQ Monitoring Sites
-  Piezometer Locations
-  BnM Boundary
- Rehab Type
 -  Archaeology
 -  Constraint
 -  Deep Peat Cutaway 3
 -  Deep Peat Cutaway 4
 -  Dry Cutaway 2
 -  Marginal Land 1
 -  Marginal Land 2
 -  Other
 -  Wetland 3
 -  Wetland 4



Bord na Móna			
Clooniff Bog Combined Map			
DRWG No: BNM-DR-22-07-33	Scale: 1:15,000	Drawn by: BG	Date: 20/09/2023
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Bord na Móna

Enhanced Decommissioning, Restoration and Rehabilitation Scheme (EDRRS)

Annual Monitoring and Verification Report

EDRRS Year 2

(April 2022 to March 2023)

Appendices - Volume 3



Appendix C

Hydrology

Appendix C1: Update on Year 1 (FY22) bogs.

Appendix C2: Update on year 2 (FY23) bogs.

Appendix C3: ANOVA (Analysis of Variation) Data

Appendix C1

Hydrology-Update on Year 1 (FY22) Bogs

C1.1 Belmont

Hydrological monitoring is ongoing at Belmont Bog. A total of 15 Phreatic wells have been installed, where 6 Phreatic wells have been instrumented with automated loggers.. A subset of the deep wells (5 wells) have been instrumented with automated loggers, with the remaining wells monitored manually. A total of six monitoring visits were completed with manual dipping completed in May 2021, Aug 2021, Feb 2022, August 2022, March 2023, and one in early Summer 2023. Monitoring will be ongoing at Belmont bog over the next two years (2024, 2025).

It is important to acknowledge the progress of works at Belmont Bog, several key drainage features that will have an impact on water table levels have not yet been completed, including blocking of old outfalls and construction of raised outfalls. It is envisage that these will lead to positive observations.

A review of the logger data for wells BM_006_S and BM_014_S on Belmont Bog was carried out.

Analysis of the logger data from BM_006_S wells indicates that water levels have increased following the implementation of restoration measures which started on site in Winter 2021. It is clear from the logger data that there was a significant increase in water levels over the Winter 2021/22 period, before water levels dropped rapidly in January 2022. This is associated with the creation of outlets to regulate water levels to enable weir installation. Water levels continued to drop partly due to this event approaching Summer 2022. The overflow mechanisms were installed in the DPT4 cells in Aug 2022. A steep incline in can be observed on the hydrograph shortly after the weir installation. Water levels remained higher in this area when compared with the same time period of the previous year. A drop of in water level can be observed approaching summer 2023. Overall, stabilisation of water levels can be observed following on from the prescribed rehabilitation works (DPT4 cells).

Analysing data from BM_014_S shows very similar observations to BM_006_S. Rehabilitation works were completed in winter 2021, a rise in water table before water levels dropped rapidly in January 2022. This is associated with the creation of outlets to regulate water levels to enable weir installation. Water levels continued to drop partly due to this event approaching Summer 2022. The overflow mechanisms were installed in the DPT4 ponds in Aug 2022. A steep incline can be observed on the hydrograph shortly after the weir installation. Water levels remained higher in this area when compared with the same time period of previous year. A drop of in water level can be observed approaching summer 2023. Overall, stabilisation of water levels can be observed following on from the prescribed rehabilitation works (DPT4 cells).

More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

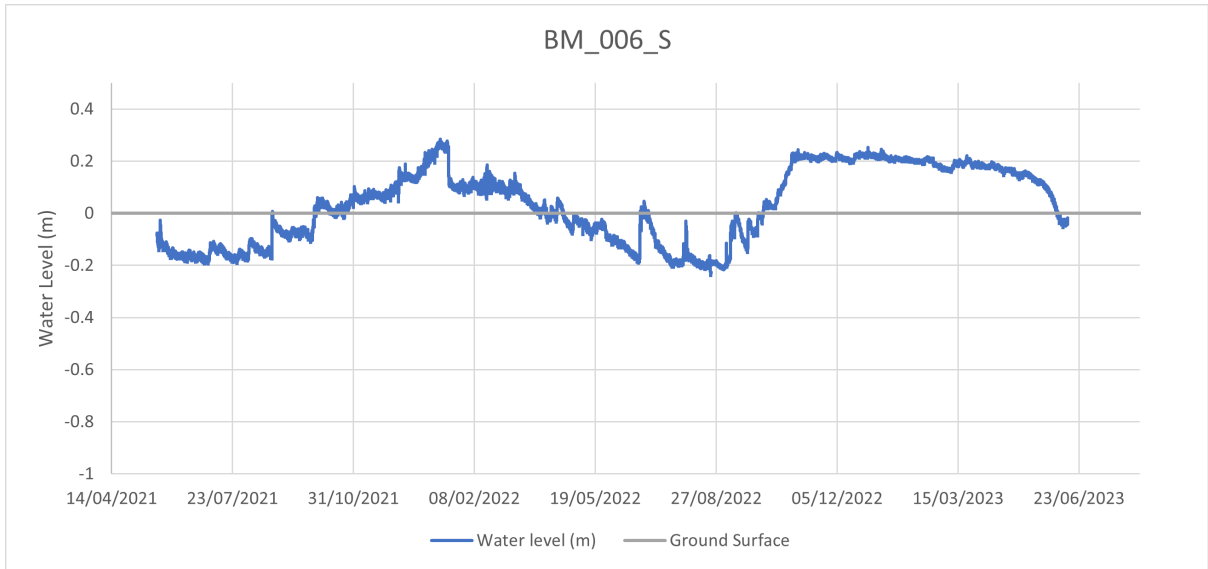


Figure 1 Hydrograph for monitoring well BM_006s

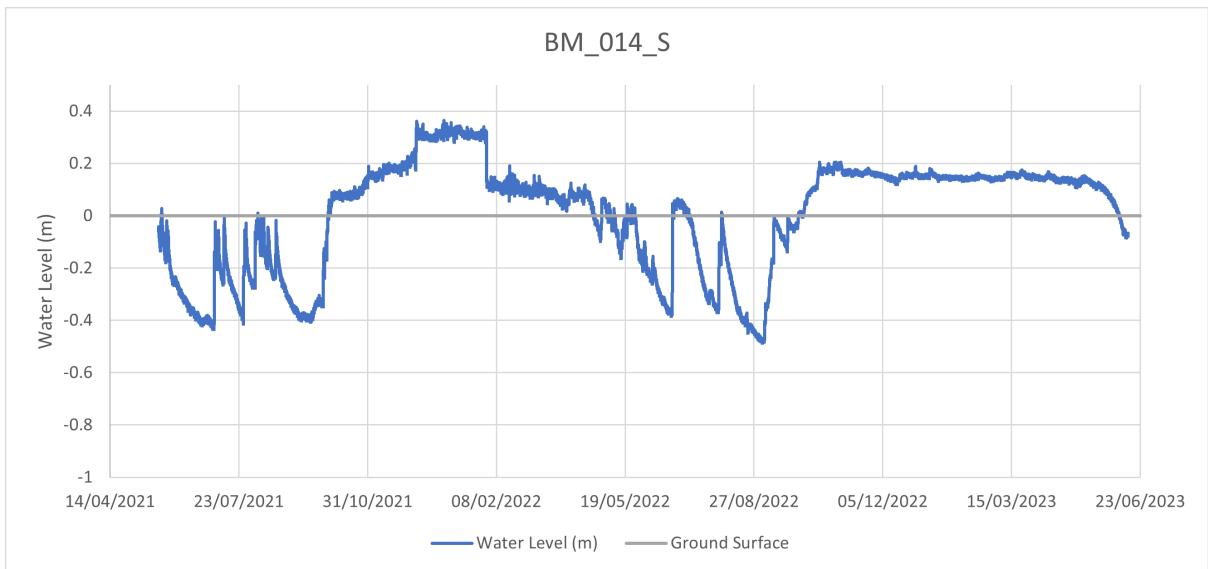


Figure 2 Hydrograph for monitoring well BM_014s

C1.3 Garryduff

Hydrological monitoring is ongoing at Garryduff Bog. A network of 40 piezometer nests have been installed and all 40 phreatic wells have been instrumented with automated loggers. A subset of the deep wells (5 wells) have been instrumented with automated loggers, with the remaining wells monitored manually. A total of six monitoring visits were completed with manual dipping completed in May 2021, Aug 2021, January 2022, August 2022, Feb 2023, and one in early Summer 2023. Monitoring will be ongoing at Garryduff bog over the next two years (2024, 2025). It is important to acknowledge the progress of works at Garryduff Bog, several key drainage features that will have an impact on water table levels have been completed in Summer 2023, including blocking of old outfalls, decommissioning of pumps, and construction of raised outfalls. It is envisaged that these will lead to positive observations.

The initial review of the manual water level data indicates that water levels were higher across most monitoring wells in Summer 2022 than Summer 2021. This round of monitoring does not encapsulate Summer 2023.

In the case of monitoring well GD_014_s, there has been a significant increase in the water table height and stabilisation of the hydrograph. This increase occurs rapidly after the implementation of rehabilitation measures (WLT4) in autumn 2021, with water levels increasing towards the ground surface, before rising further during spring 2022 (to a maximum of 0.38m above ground level). During the summer months water levels remain between 0.2-0.3m above ground surface at this monitoring point. It is important to note that this monitoring well is located in a low-lying area of Garryduff Bog, and despite water levels potentially being too high at this specific location, the data suggests ideal water levels for the surrounding areas which would be between 0-0.1m above ground surface during summer months. The excessively high water levels were partly caused by the pumps not functioning and the proposed outfalls not yet being constructed. Following on from works on key drainage features in Summer 2023, it is expected that further water table rise and stabilisation will be observed from the next round of monitoring.

More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

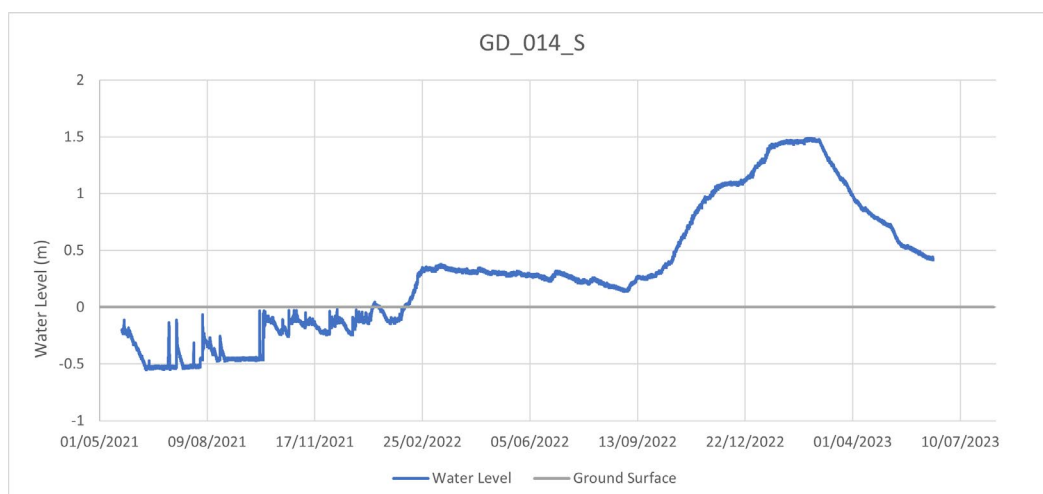


Figure 3 Hydrograph for monitoring well GD_014

C1.4 Kellysgrove

Hydrological monitoring is ongoing at Kellysgrove bog. A total of 5 nests comprised of 5 deep wells and 5 Phreatic wells have been installed and 3 Phreatic wells have been instrumented with automated loggers. The location of these wells are shown on Drawing No. BNM-DR-22-02-32 in Appendix E0. A total of five monitoring visits have been carried out to date at Kellysgrove bog as outlined in Appendix E1 - Kellysgrove Bog - Hydrological Monitoring, with manual dipping completed in July 2021, January 2022, and logger dipping in August 2022, January 2023 and June 2023. Monitoring will be ongoing at Kellysgrove bog over the next two years (2024, 2025).

A summary of manual readings is provided in Appendix E1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were higher at one monitoring well in summer 2022 than summer 2021 and equal at other wells. However, this is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the difference in weather conditions leading up to the monitoring taking place. The data recorded via the logger at well KG_003_S show the water level remained quite consistent throughout the monitoring period, dropping to a maximum of 20cm below ground surface during Summer 2021. Data from 2022 suggests that water levels have followed the same trend as 2022, with water levels dropping to 20-30cm below ground level in summer 2022 before returning to 0-10cm below in winter 2023. Results will become clearer at the next round of downloads, but the data does suggest that water levels are now typically within 10cm of the ground surface at all times. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.



Figure 1.4.1: Hydrograph for monitoring well KG_00

C1.5 Kilmacshane

Hydrological monitoring is ongoing at Kilmacshane Bog. A total of 29 Phreatic wells have been installed, where 11 Phreatic wells have been instrumented with automated loggers. 1 deep pipe well has been installed with a logger. Phreatic wells have been instrumented with automated loggers. A total of six monitoring visits were completed with manual dipping completed in May 2021, Aug 2021, January 2022, August 2022, Feb 2023, and one in early summer 2023. Monitoring will be ongoing at Kilmacshane bog over the next two years (2024, 2025). It is important to acknowledge the progress of works at Kilmacshane Bog, several key drainage features that will have an impact on water table levels have been completed in Summer 2023, including blocking of old outfalls, decommissioning of pumps, and construction of raised outfalls. It is envisaged that these will lead to positive observations.

The initial review of the manual water level data indicates significant variation in water tables between summer 2021 and summer 2022. This round of monitoring does not encapsulate Summer 2023. Water levels are notably deeper at several wells in summer 2022 than summer 2021, although all of these wells are located in the driest and most elevated parts of the site (i.e., towards the south/south-west) suggesting this difference is likely caused by the very dry conditions encountered during August 2022. In contrast, water levels are higher at several wells, particularly in low-lying parts of the site (e.g., KS_015s & KS_023s). This is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the difference in weather conditions leading up to the monitoring taking place.

The logger data from well KS_015_S shows that during summer 2021 water levels were typically within 20cm of the ground surface, before rising rapidly in winter 2021/22. During Summer 2022, water levels remained consistently higher than 2021 at this monitoring well and within 10cm of the ground surface at all times. A similar drop of in water levels can be observed coming out of winter 2022 however a stabilisation in the hydrograph can be observed. The prescribed rehabilitation works prescribed surrounding this piezometer is WLT4 (drain blocking). Following on from works on key drainage features in Summer 2023, it is expected that further water table rise and stabilisation will be observed from the next round of monitoring.

More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

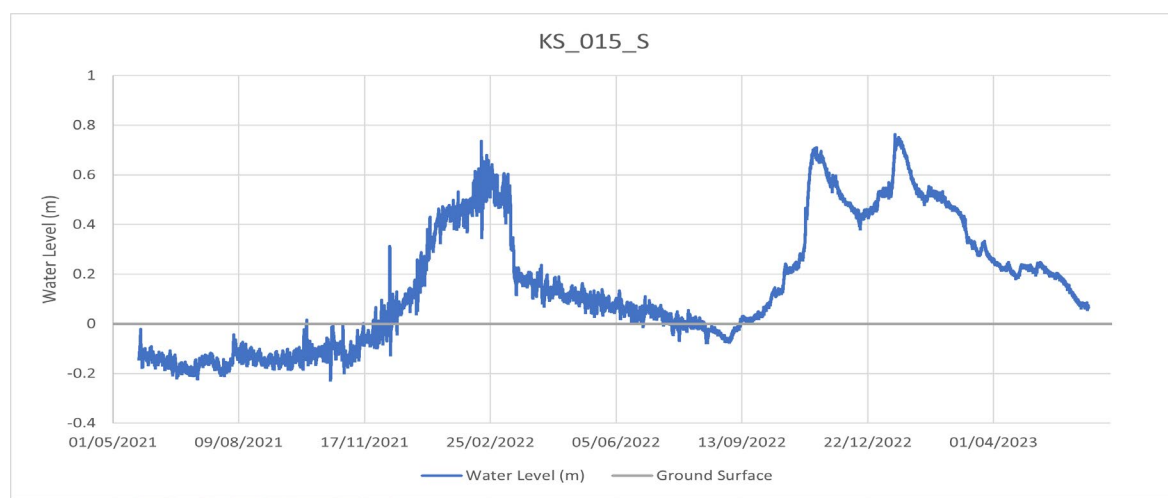


Figure 14 Hydrograph for monitoring well KS_015

C1.6 Boora

Hydrological monitoring is ongoing at Boora Bog. A total of 27 Phreatic wells have been installed, where 12 Phreatic wells have been instrumented with automated loggers. The location of these wells are shown on Drawing No. BNM-DR-22-15-32 in Appendix G0. A total of six monitoring visits have been carried out to date at Boora Bog as outlined in Appendix G1 - Boora Bog - Hydrological Monitoring, completed in May 2021, July 2021, February 2022, July 2022, January 2023 and June 2023. Monitoring will be ongoing at Boora Bog over the next two years (2024, 2025). It is important to acknowledge the progress of works on Boora Bog. Several key drainage features that would have an impact on ground water levels have yet to be completed on Boora Bog. It is envisaged that completion of these measures will have an impact on ground water levels generally.

A summary of manual readings is provided in Table G1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data suggests higher water table levels across most wells in Summer 2022 compared to Summer 2021. There are a small number of exceptions where the water table in summer 2022 was deeper than 2021; however, it is important to note that a single manual reading at a point in time does not consider the different in weather conditions leading up to the monitoring taking place. A review of logger data for a small number of wells indicates that water levels have increased following the implementation of rehabilitation measures. At BO_019s there was an obvious increase in water levels in early October 2021, corresponding to the implementation of rehabilitation measures (DCT1) in this area. Despite water levels remaining deep below ground surface in this area, water levels have consistently remained >15cm higher than prior to rehabilitation. This is an area where it was anticipated that rewetting would be difficult (hence selection of DCT1 measures); however, it is clear that the drain blocking measures have resulted in an increase to the water table height in this area. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

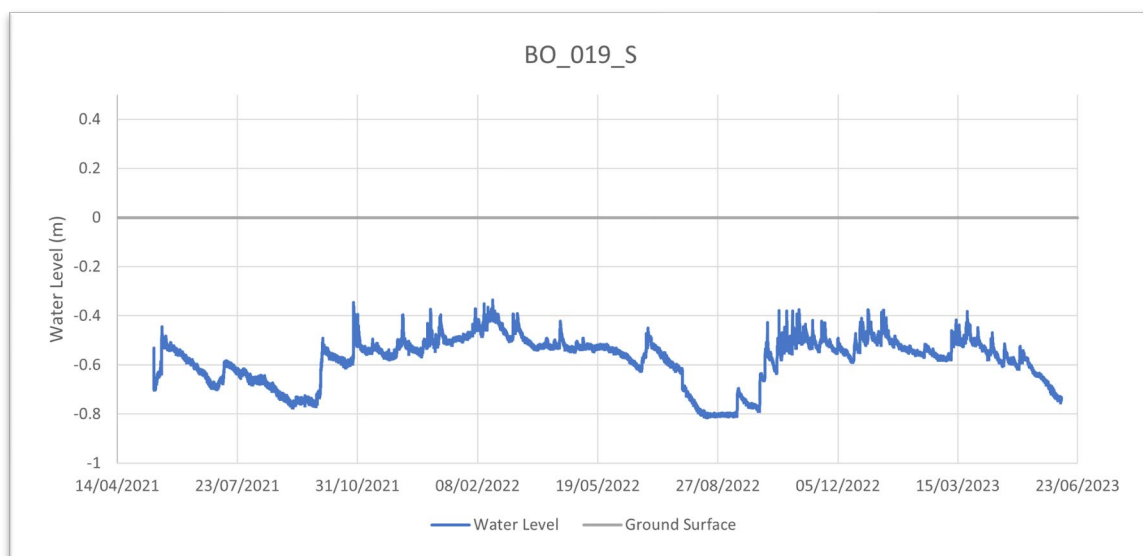


Figure 1.6.1: Hydrograph for monitoring well BO_019s

C1.7 Derries

Hydrological monitoring is ongoing at Derries Bog. A total of 17 Phreatic wells have been installed, where 7 Phreatic wells have been instrumented with automated loggers. The location of these wells are shown on Drawing No. BNM-DR-22-16-32 in Appendix H0. A total of six monitoring visits have been carried out to date at Derries Bog as outlined in Appendix H1 - Derries Bog - Hydrological Monitoring, completed in May 2021, July 2021, January 2022, August 2022, January 2023 and June 2023. Monitoring will be ongoing at Derries Bog over the next two years (2024, 2025).

A summary of manual readings is provided in Table H1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were typically higher in summer 2021 than summer 2022, although there are a number of clear exceptions with deeper water levels at some monitoring wells. However, this is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the difference in weather conditions leading up to the monitoring taking place. Logger data from well DER_010_S shows a marked increase in the water levels in autumn and winter 2021 when cells were being completed in this area. However, water levels decrease in spring and summer 2022 in line with when rehabilitation works were being completed and pipes were installed in cells to regulate cell water levels. A more complete data set would be required to make a complete analysis but there was a clear increase in water levels in winter 2022, following increased rainfall during this period, after which time the water levels appear to have stabilised at close to the bog surface. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

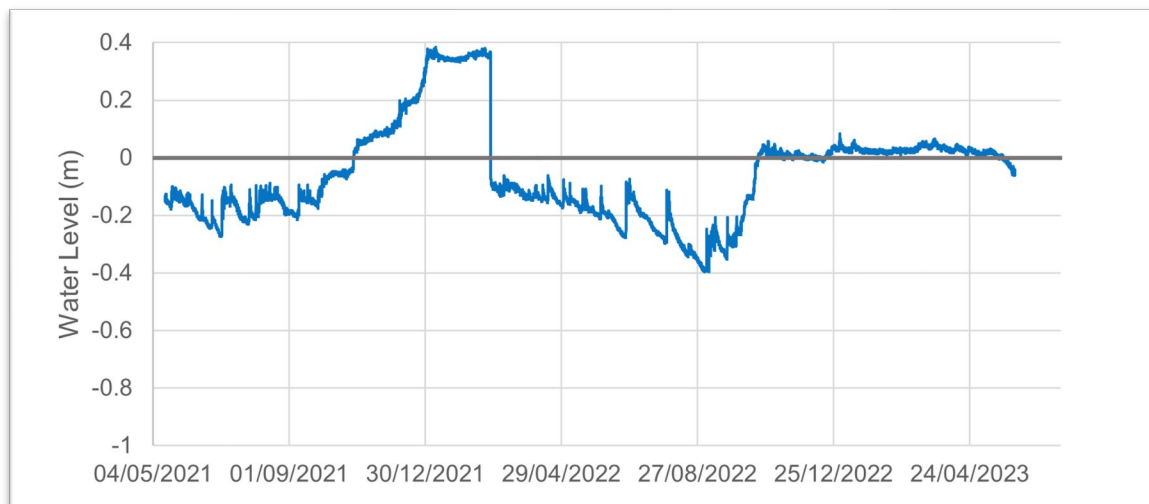


Figure 1.7.1: Hydrograph for monitoring well DER_010s

C1.8 Oughter

Hydrological monitoring is ongoing at Oughter Bog. A total of 17 wells have been installed, where 7 Phreatic wells have been instrumented with automated loggers. The location of the wells are shown on Drg. No. BNM-DR-22-08-32 in Appendix I0. A total of six monitoring visits have been carried out to date at Oughter Bog as outlined in Appendix I1 - Oughter Bog - Hydrological Monitoring, completed in May 2021, July 2021, January 2022, August 2022, January 2023 and June 2023. Monitoring will be ongoing at Oughter Bog over the next two years (2024, 2025).

A summary of manual readings is provided in Table I1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were typically higher in summer 2023 than summer 2022, other than at a small number of monitoring wells. However, this is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the difference in weather conditions leading up to the monitoring taking place. The logger data from well OT_010_S shows the water levels have not changed significantly since 2021, with the water table typically within 10-20cm of the ground surface throughout summer 2022 and summer 2023 but appear to have stabilised at these levels. Given the water table was already close to the surface and within the optimum range of peat accumulating conditions, this corresponds with the selection of minimal intervention in this area through WLT4 measures. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

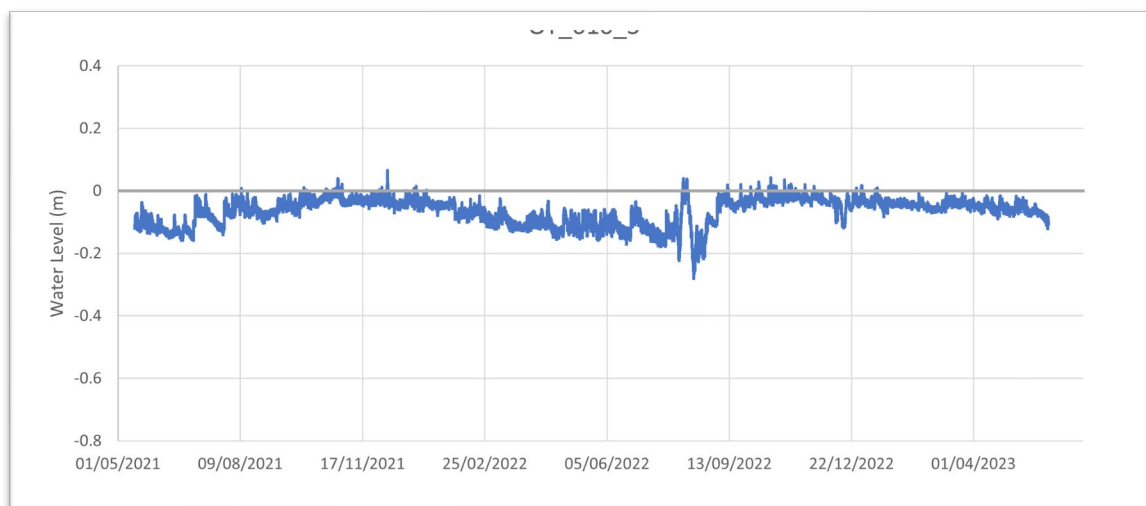


Figure 1.8.1: Hydrograph for monitoring well OT_010s

C1.9 Pollagh

Hydrological monitoring is ongoing at Pollagh Bog. A total of 12 Phreatic wells have been installed, where 5 Phreatic wells have been instrumented with automated loggers. Refer to Drawing No. BNM-DR-22-03-32 for the location of these wells. A total of six monitoring visits have been carried out to date at Pollagh Bog as outlined in Appendix J1 - Pollagh Bog - Hydrological Monitoring, completed in May 2021, July 2021, January 2022, August 2022, January 2023 and June 2023. Monitoring will be ongoing at Pollagh Bog over the next two years (2024, 2025). It is important to acknowledge the progress of works on Pollagh Bog. Several key drainage features that would have an impact on ground water levels have yet to be completed on Pollagh Bog. It is envisaged that completion of these measures will have an impact on ground water levels generally. Works recommenced at Pollagh Bog in June 2023 which aligns with the lowering of water levels locally to this piezometer to facilitate completion of key rehabilitation measures.

A summary of manual readings is provided in Table J1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were lower in summer 2023 than summer 2022 at most wells that were dipped. However, this is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the difference in weather conditions leading up to the monitoring taking place. The logger data collected from monitoring well PO_012_S demonstrates a relatively deep-water table throughout summer 2021, with water levels dropping to 48cm below ground surface, before rising over the autumn and winter period. During Summer 2022 water levels continue to drop to similar levels despite implementation of rehabilitation measures (WLT2). More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

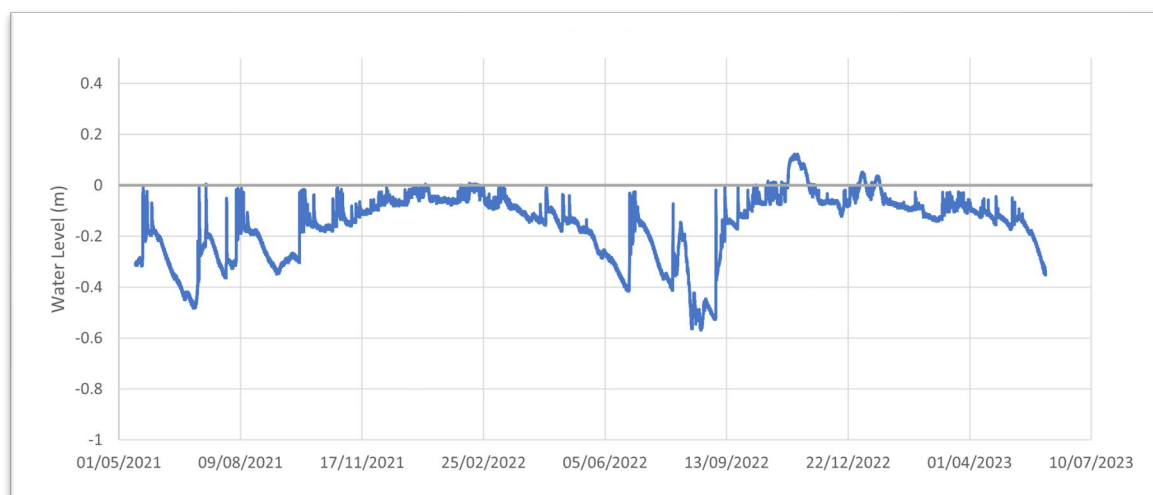


Figure 1.9.1: Hydrograph for monitoring well PO_012s

C1.10 Turraun

Hydrological monitoring is ongoing at Turraun Bog. A total of 13 Phreatic wells have been installed, where 6 Phreatic wells have been instrumented with automated loggers. Refer to Drawing No. BNM-22-09-32 in Appendix K0 for the location of these wells. A total of six monitoring visits have been carried out to date at Turraun Bog as outlined in Appendix K1 - Turraun Bog - Hydrological Monitoring, completed in May 2021, July 2021, January 2022, August 2022, January 2023 and March 2023. Monitoring will be ongoing at Turraun Bog over the next two years (2024, 2025).

A summary of manual readings is provided in Table K1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were similar in summer 2022 when compared to summer 2021, with a higher water table in summer 2022 at a small number of locations. However, this is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the difference in weather conditions leading up to the monitoring taking place. The logger data gathered from well TU_001_S shows the water levels were typically between 20-40cm below ground level throughout summer 2021, before a sharp increase in water level in early October 2021. While water levels were typically 20-30cm below ground level throughout winter 2021/22, water levels remained slightly higher throughout summer 2022, although did decline to 40cm below ground level at the end of July 2022. Rehabilitation measures were completed in Turraun in spring 2023 which aligns with the raising of water levels in proximity to piezometer TU_001_s to within 10-20cm from the bog surface.

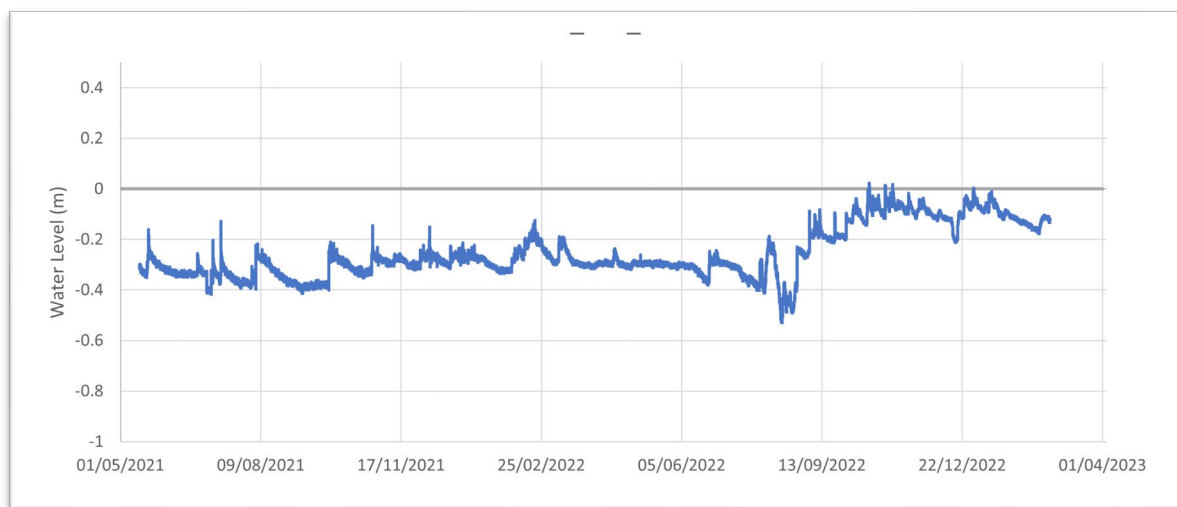


Figure 1.10.1: Hydrograph for monitoring well TU_001s

C1.11 Castlegar

Hydrological monitoring is ongoing at Castlegar bog. A total of 40 piezometer nests have been installed comprised of 37 deep wells, 40 Phreatic wells which have been instrumented with automated loggers, with a subset of the deep piezometers (6) instrumented with automated loggers. Refer to Drawing No. BNM-DR-22-01-32 in Appendix L0 for the locations of these wells. A total of five monitoring visits have been carried out to date at Castlegar bog as outlined in Appendix L1 - Castlegar Bog - Hydrological Monitoring, with manual dipping completed in August 2021, January 2022, and logger dipping in August 2022 (January 2023 and June 2024). Monitoring will be ongoing at Castlegar bog over the next two years (2024, 2025). DPT4 methodology was implemented in the area around CG_033s & CG_025s. The cells around CG_033s were tapped to release water in April 2022 to allow the installation of overflow weirs to control water levels. Similarly, the cells around CG_025s were tapped to release water in April 2022 to allow the installation of overflow pipes to control water levels. Following installation issues with the overflow pipe method, the pipes were removed in February 2023 to allow the installation of sheet pile weirs in their place. Sheet pile weirs were installed in this area in September 2023.

A summary of manual readings is provided in Appendix L1. Overall, there is a broad trend of a higher summer water table in Summer 2022 compared to Summer 2021. There are some exceptions where the water table in summer 2022 was deeper than 2021; however, it is important to note that in some areas of the bog, rehabilitation works had already commenced in 2021, therefore, the readings are not necessarily baseline readings. Furthermore, a single manual reading at a point in time does not consider the different in weather conditions leading up to the monitoring taking place. Monitoring took place at Castlegar in August 2022 which was after a prolonged dry spell. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

Analysis of logger data provides a more robust means of assessing monitoring data. A number of typical examples of logger data are presented below. Well CG_036s is located in an area targeted for Deep peat measures (DTP3-), the data illustrates a deep water table, even during winter months with maximum water levels of >600mm below ground surface. Following implementation of measures in October 2021 in this area, the water table rises rapidly, with the cell filling up over winter months. Water levels do decline during summer months to c. 300mm below ground surface, but there is an obvious change in the hydrological regime at this location. This is a very positive result given the extremely dry Spring and Summer of 2022.

A similar trend is observed at CG_033s which is a location where cell bunding was implemented (DPT5). The measure has been extremely successful with baseline maximum water table depth of >800mm below ground surface. Following bunding in Autumn 2021, water levels risk rapidly, with water levels clearly too high (up to 400mm above ground surface). Channels were then installed in April 2022 to manage water levels. Despite a very dry summer, the water table in summer 2022 remains within 220mm of the ground surface at all times.

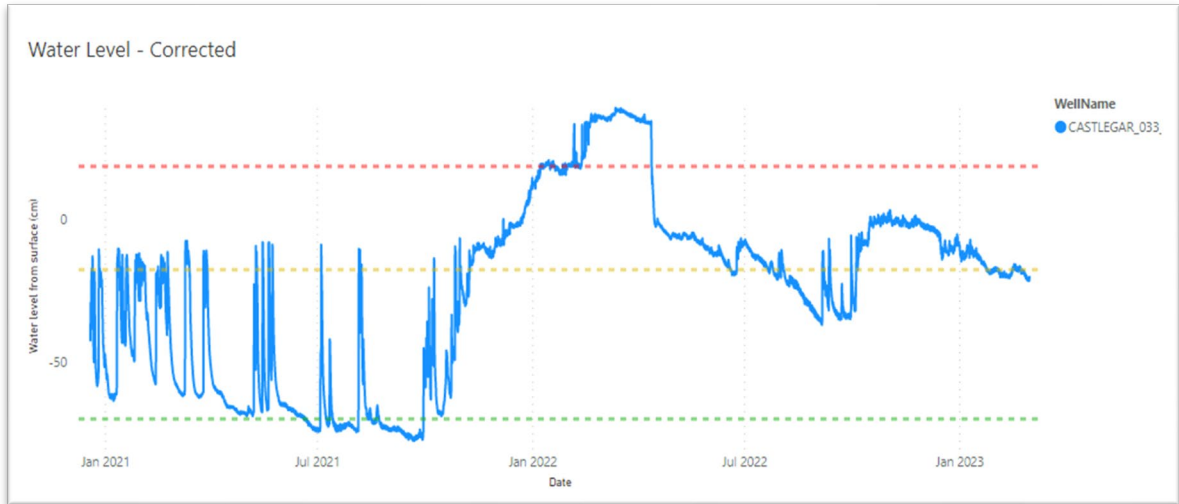


Figure 1.11.1: Hydrograph for monitoring well CG_033s

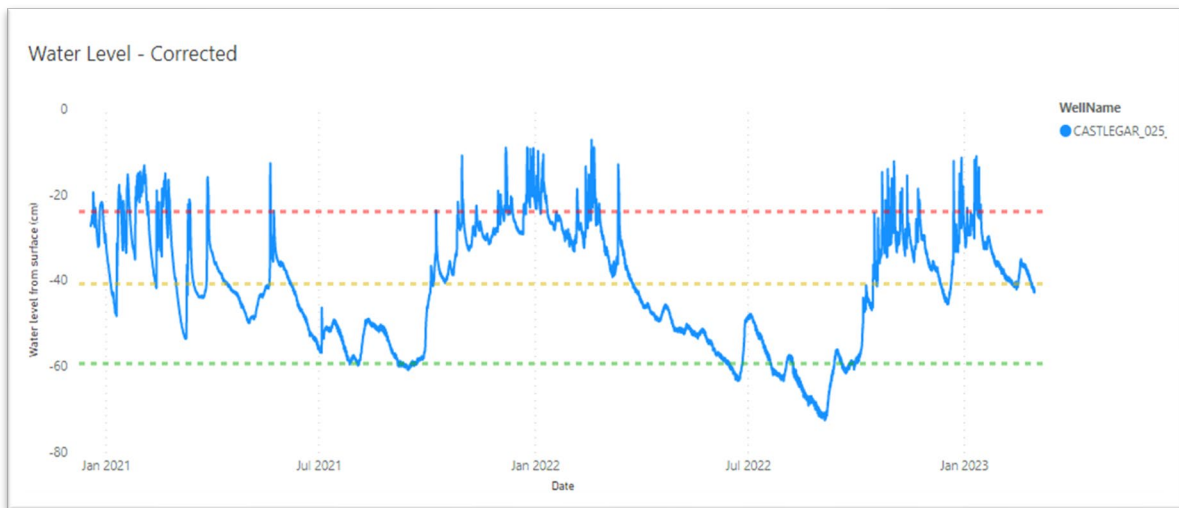


Figure 1.11.2: Hydrograph for monitoring well CG_025s

C1.12 Cavemount

Hydrological monitoring is ongoing at Cavemount bog. A total of 15 locations comprised of 1 deep well and 15 Phreatic wells have been installed. 6 Phreatic wells have been instrumented with automated loggers, with a subset of the deep piezometers (1) instrumented with automated loggers. The locations of the wells are shown on Drawing No. BNM-DR-22-10-32 in Appendix M0. A total of six monitoring visits have been carried out to date at Cavemount bog as outlined in Appendix M1 - Cavemount Bog - Hydrological Monitoring, with manual dipping completed in July 2021, February 2022, and logger dipping in August 2022 (January 2023 and June 2023). Monitoring will be ongoing at Cavemount bog over the next two years (2024, 2025).

A summary of manual readings is provided in Appendix M1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were deeper in Summer 2022 than Summer 2021 at most monitoring wells. However, at monitoring well CM_010s there has been a significant increase in water level following the implementation of rehabilitation measures (DCT2). Water levels were observed to increase over winter 2021/22 but did not drop significantly in Summer 2022 and remained close to the ground surface (within 10cm). This trend continued into summer 2023. In contrast, at other monitoring wells water levels increased over winter 2021/22 but dropped significantly during summer 2022, including CM_012s where WLT3 measures were implemented. This monitoring well was placed in a high field which is elevated above the surrounding area (by c. 0.8m). While further monitoring will be required, this suggests that despite water levels increasing in the surrounding area that water levels did not increase in the high field. Further investigations will be required to determine precise water level regime across the bog. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

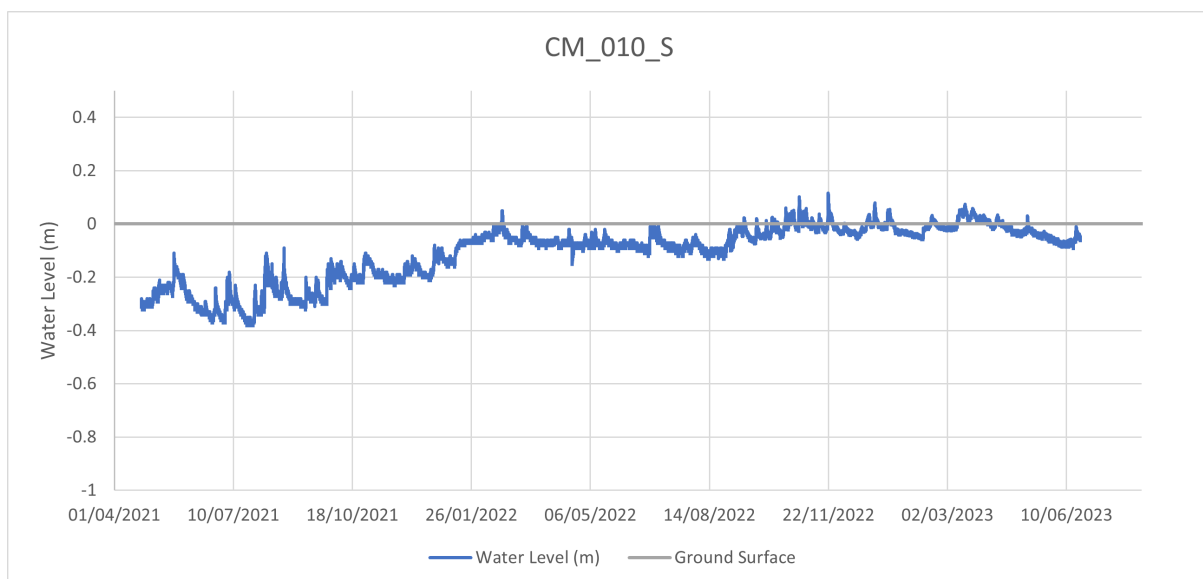


Figure 2.12.1: Hydrograph for monitoring well CM_010s

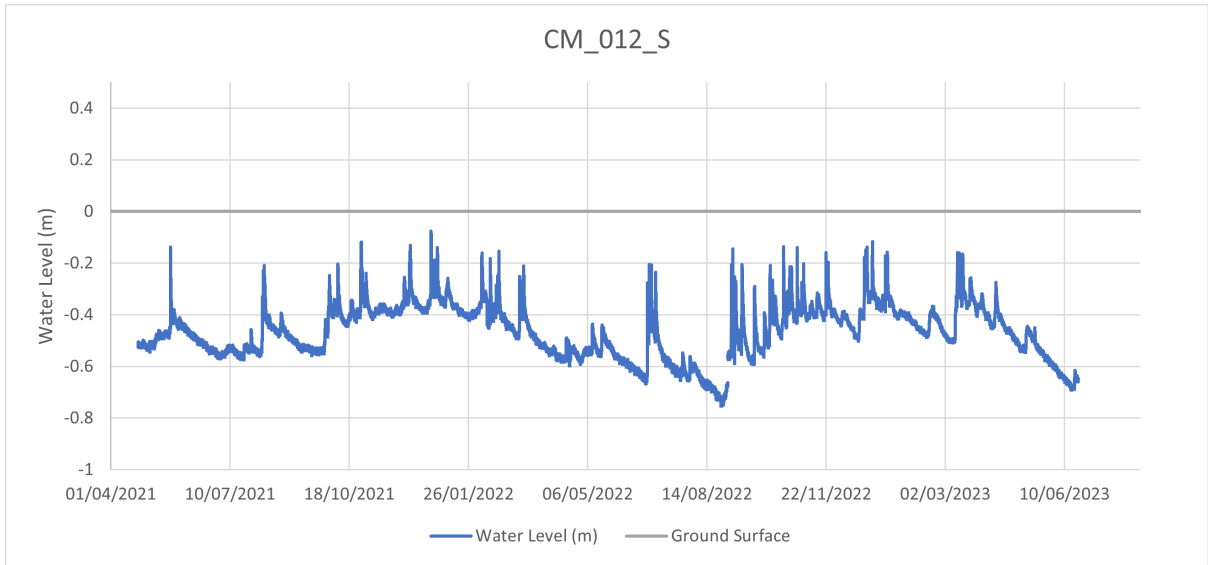


Figure 2.12.2: Hydrograph for monitoring well CM_012s

C1.13 Clonad

Hydrological monitoring is ongoing at Clonad bog. A total of 21 Phreatic wells were installed and 11 Phreatic wells have been instrumented with automated loggers. The location of these wells are shown on Drawing No. BNM-DR-22-19-32 in Appendix N0. A total of six monitoring visits have been carried out to date at Clonad bog as outlined in Appendix N1 - Clonad Bog - Hydrological Monitoring, with manual dipping completed in August 2021, February 2022, and logger dipping in August 2022 (January 2023 and June 2023). Monitoring will be ongoing at Clonad bog over the next two years (2024, 2025). It is important to acknowledge the progress of works at Clonad Bog.

A summary of manual readings is provided in Appendix N1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were higher in Summer 2022 than Summer 2021. However, this is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the different in weather conditions leading up to the monitoring taking place. A review of logger data for a small number of wells indicates that water levels have increased significantly in some areas following the implementation of rehabilitation measures. In the case of monitoring well CD_003s, there has been a significant increase in the water table height (DPT4 measures). This increase occurs rapidly after the implementation of measures in October 2021, with water levels increasing towards the ground surface, before dropping to a maximum of 0.5m below ground surface during Summer 2022. However, this contrasts with maximum water levels of 0.9m below ground level during Summer 2021. Similarly in summer 2023 water levels remained higher with less fluctuation in level. It is important to note that this cell is located towards the top of a catchment and therefore is not expected to be receiving significant flows, highlighting the success of DPT4 measure in significantly increasing the water table height (albeit too low for peat formation to occur). More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

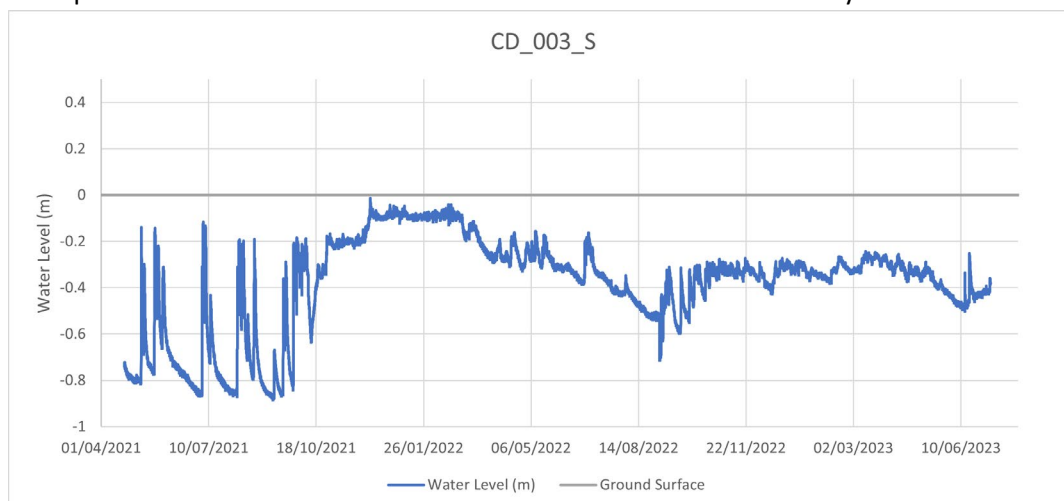


Figure 1.13.1: Hydrograph for monitoring well CD_003

C1.14 Esker

Hydrological monitoring is ongoing at Esker bog. A total 9 deep wells and 25 Phreatic wells have been installed in 25 locations and 10 Phreatic wells have been instrumented with automated loggers, with a subset of the deep piezometers (1) instrumented with automated loggers. The locations of the wells are shown on Drawing No. BNM-DR-22-17-32 in Appendix O-0. A total of six monitoring visits have been carried out to date at Esker bog as outlined in Appendix O1 - Esker Bog - Hydrological Monitoring, with manual dipping completed in July 2021, February 2022, and logger dipping in August 2022 (January 2023 and June 2023). Monitoring will be ongoing at Esker bog over the next two years (2024, 2025). It is important to acknowledge the progress of works at Esker Bog. Several key drainage features that would have an impact on ground water levels have yet to be completed. It is envisaged that completion of these measures will have an impact on ground water levels generally within Esker Bog.

A summary of manual readings is provided in Appendix O1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were typically higher across most monitoring wells in Summer 2022 than Summer 2021, although there are a number of exceptions. This is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the different in weather conditions leading up to the monitoring taking place.

A review of logger data for a small number of wells indicates that water levels have increased significantly in some areas following the implementation of rehabilitation measures. In the case of monitoring well ES_011s, there has been a significant increase in the water table height. This increase occurs rapidly after the implementation of measures (DPT3) in late autumn 2021, with water levels increasing to approximately 0.25m above ground level during winter months. During the summer months water levels remain within 0.25m of the ground surface at this monitoring point. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.



Figure 1.14.1: Hydrograph for monitoring well ES_011s

C1.15 Mountlucas

Hydrological monitoring is ongoing at Mountlucas bog. A total of 29 nests comprised of 1 deep well and 29 Phreatic wells have been installed, 16 Phreatic wells have been instrumented with automated loggers, with a subset of the deep piezometers (1) instrumented with automated loggers. The location of these wells are shown on Drawing No. BNM-DR-22-11-32 in Appendix P0. A total of six monitoring visits have been carried out to date at Mountlucas bog as outlined in Appendix P1 - Mountlucas Bog - Hydrological Monitoring, with manual dipping completed in August 2021, February 2022, and logger dipping in September 2022, (January 2023 and June 2023). Monitoring will be ongoing at Mountlucas bog over the next two years (2024, 2025).

A summary of manual readings is provided in Appendix P1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were considerably higher across all wells dipped in summer 2022 compared to summer 2021. However, this is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the difference in weather conditions leading up to the monitoring taking place.

The logger data from well ML_008_S shows the water levels were extremely deep during summer 2021 (reaching 1.2m below ground level), before gradually rising throughout autumn and winter 2021/22 before steadily declining again in Summer 2022. However, the water level at this monitoring well, does not decline as deep and reaches a maximum of 73cm below ground surface during summer 2022. In winter 2023 the water level rises to ground level with little fluctuation during the winter period. This is located in an area where DPT3 measures were utilised. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.



Figure 1.15.1: Hydrograph for monitoring well ML_008s

C1.16 Ummeras

Hydrological monitoring is ongoing at Ummeras bog. A total of 13 nests have been installed comprised of 5 deep wells and 13 Phreatic wells. Of these, 5 Phreatic wells have been instrumented with automated loggers, with a subset of the deep piezometers (1) instrumented with automated loggers. The location of these wells are shown on Drawing No. 22-06-32 in Appendix Q0. A total of six monitoring visits have been carried out to date at Ummeras bog as outlined in Appendix Q1 - Ummeras Bog - Hydrological Monitoring, with manual dipping completed in July 2021, January 2022, and logger dipping in September 2022 (January 2023 and June 2023). Monitoring will be ongoing at Ummeras bog over the next two years (2024, 2025). It is important to acknowledge the progress of works at Ummeras Bog.

A summary of manual readings is provided in Appendix Q1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were higher across most monitoring wells in summer 2022 compared to summer 2021. However, this is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the difference in weather conditions leading up to the monitoring taking place. The logger data gathered from well UM_009_S shows the water levels were typically between 40-65cm below ground level throughout summer 2021, before increasing throughout autumn and winter 2021/22 and reaching a maximum of 44cm above ground surface. Water levels began to decline throughout summer 2022 channels were cut in the cells to allow for installation of weirs but remained within 20cm of the ground surface during this period before stabilising again at 0-10cm above ground level following installation of weirs. This monitoring well is located within an area where Deep Peat Type 4 rehabilitation measures have been implemented demonstrating that these measures have been very effective in this area. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.



Figure 1.16.1: Hydrograph for monitoring well UM_009s

C1.17 Derrycashel

Hydrological monitoring is ongoing at Derrycashel bog. A total of 16 nests comprised of 16 Phreatic wells were installed, 8 Phreatic wells have been instrumented with automated loggers. The location of these nests are shown on Drawing No. BNM-DR-22-18-32 in Appendix R0. A total of six monitoring visits have been carried out to date at Derrycashel bog as outlined in Appendix R1 - Derrycashel Bog - Hydrological Monitoring, with manual dipping completed in August 2021, February 2022, and logger dipping in August 2022 (January 2023 and June 2023). Monitoring will be ongoing at Derrycashel bog over the next two years (2024, 2025). Pumping is still ongoing on this site to facilitate transport of peat by rail through the bog. This will cease in December 2023 and pumps will then be decommissioned.

A summary of manual readings is provided in Appendix R1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were slightly higher at most monitoring wells in summer 2022 compared to summer 2021, although there are some exceptions with lower water levels recorded in summer 2022. However, this is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the difference in weather conditions leading up to the monitoring taking place. The logger data gathered from well DCa_003S demonstrates a significant change to the hydrological regime following rehabilitation. There is a rapid increase in water levels in September 2021 coinciding with the implementation of rehabilitation measures, with water levels rising to within 10cm of the ground surface over winter 2021/22 before dropping during summer 2022. However, despite water levels dropping to 35cm below ground level, this remains significantly higher than during summer 2021. Water levels remain consistently higher through autumn 2022/ winter 2023 with less fluctuation in levels than previously. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

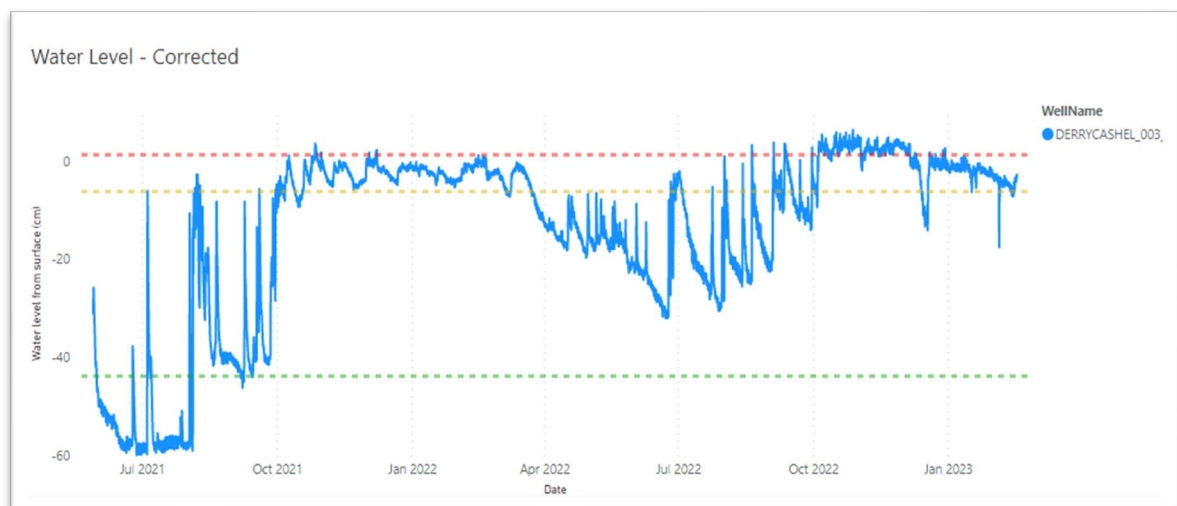


Figure 1.17.1: Hydrograph for monitoring well DCa_003s

C1.18 Derrycolumb

Hydrological monitoring is ongoing at Derrycolumb bog. A total of 20 nests comprised of 2 deep wells and 20 Phreatic wells have been installed, 9 Phreatic wells have been instrumented with automated loggers, with a subset of the deep piezometers (1) instrumented with automated loggers. The location of these nests are shown on Drawing No. BNM-DR-22-12-32 in Appendix S0. A total of six monitoring visits have been carried out to date at Derrycolumb bog as outlined in Appendix S1 - Derrycolumb Bog - Hydrological Monitoring, with manual dipping completed in July 2021, February 2022, and logger dipping in August 2022 (January 2023 and June 2023). Monitoring will be ongoing at Derrycolumb bog over the next two years (2024, 2025).

A summary of manual readings is provided in Appendix S1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were notably higher across all monitoring wells in summer 2022 compared to summer 2021. However, this is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the difference in weather conditions leading up to the monitoring taking place. The logger data gathered from well DCo_12_S demonstrates a significant change to the hydrological regime following rehabilitation. There is a rapid increase in water levels in September 2021 coinciding with the implementation of rehabilitation measures (DPT3), with water levels continuing to rise above ground level during winter 2021/22 and remaining above ground surface throughout summer 2022. This monitoring well is located within an area where DPT3 measures have been carried out, demonstrating that these measures have been very effective in this area. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

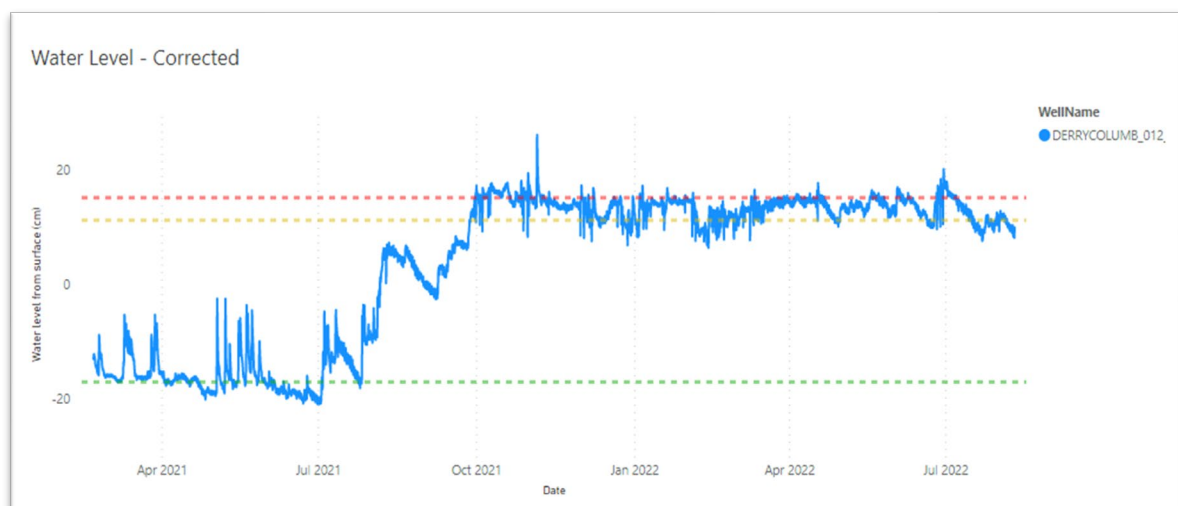


Figure 1.18.1: Hydrograph for monitoring well DCo_012s

C1.19 Edera

Hydrological monitoring is ongoing at Edera bog. A total of 12 nests comprised of 9 deep wells and 12 Phreatic wells have been installed, 5 Phreatic wells have been instrumented with automated loggers, with a subset of the deep piezometers (1) instrumented with automated loggers. The location of these nests are shown on Drawing No. BNM-DR-22-04-32 in Appendix T0. A total of six monitoring visits have been carried out to date at Edera bog as outlined in Appendix T1 - Edera Bog - Hydrological Monitoring, with manual dipping completed in July 2021, February 2022, and logger dipping in July 2022 (January 2023 and June 2023). Monitoring will be ongoing at Edera bog over the next two years (2024, 2025).

A summary of manual readings is provided in Appendix T1. Limited water table measurements were carried out in Summer 2022 as EDRRS Year 1 sites were not originally scheduled for monitoring, with only wells containing loggers dipped in Summer 2022. Further information will become available as monitoring is ongoing throughout future years. An initial review of the manual water level data indicates that water levels were higher at most monitoring wells in summer 2022 compared to summer 2021, although there are some exceptions. However, this is based on a limited set of measurements, and it is important to note that a single manual reading at a point in time does not consider the difference in weather conditions leading up to the monitoring taking place. The logger data gathered from well ED_006_S demonstrates a significant change to the hydrological regime following implementation of rehabilitation measures (DPT4). There is a rapid increase in water levels in October 2021 coinciding with the implementation of rehabilitation measures, with water levels rising above ground surface during winter 2021/22 before dropping during summer 2022. However, despite water levels dropping to 26cm below ground level, this remains significantly higher than during summer 2021 when water levels of 82cm below ground surface were recorded. Levels rise above ground level again through winter 2023. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.



Figure 1.19.1: Hydrograph for monitoring well ED_006s

Appendix C2

Hydrology- Update on Year 2 (FY23) Bogs

C2.1 Bunahinly

Hydrological monitoring is ongoing at Bunahinly/Kilgarvan bog. A total of 37 Piezometers have been installed. Of the 37 Piezometers, seven have been instrumented with automated data loggers. Three deep monitoring locations have also been instrumented with data loggers.

The locations of these piezometers are shown in Figure BnM-DR-23-09-SP01 Bunahinly Bog Piezometer Locations & Figure BnM-DR-23-10-SP01 Kilgarvan Bog Piezometer Locations in the Map Books for each Bog. A total of four monitoring visits have been carried out to date at Bunahinly/Kilgarvan bog as outlined in “*Bunahinly/Kilgarvan Bog - Monitoring and Verification Plan*”, with manual dipping completed in Aug/Sept 2021, Jan/Feb 2022, June/July 2022 & Oct/Nov 2022 and logger downloading in Aug/Sept 2021, Jan/Feb 2022, June/July 2022 & Oct/Nov 2022.

Monitoring will be ongoing at Bunahinly/Kilgarvan bog over the next two years (2024, 2025).

A review of the logger data for wells 007S Bunahinly and 001S on Kilgarvan was carried out. Analysis of the logger data at well BUN_007_S indicates that water levels have increased following the implementation of restoration measures in June 2022, levels initially fluctuated in summer 2022 which could be attributed to a prolonged dry spell however the water level rose during winter 2022 and remained high during spring 2023 with less fluctuations. Kilgarvan restoration works were moved to the FY24 workload and works were completed at KGN_008_S in March 2023. The hydrograph in figure 14 shows the water table pre-restoration and a sharp rise in the water level following restoration in March 2023 which then declines gradually to June 2023. More thorough analysis should be carried out by reviewing details of all the loggers installed on this site over the full time period of this project. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

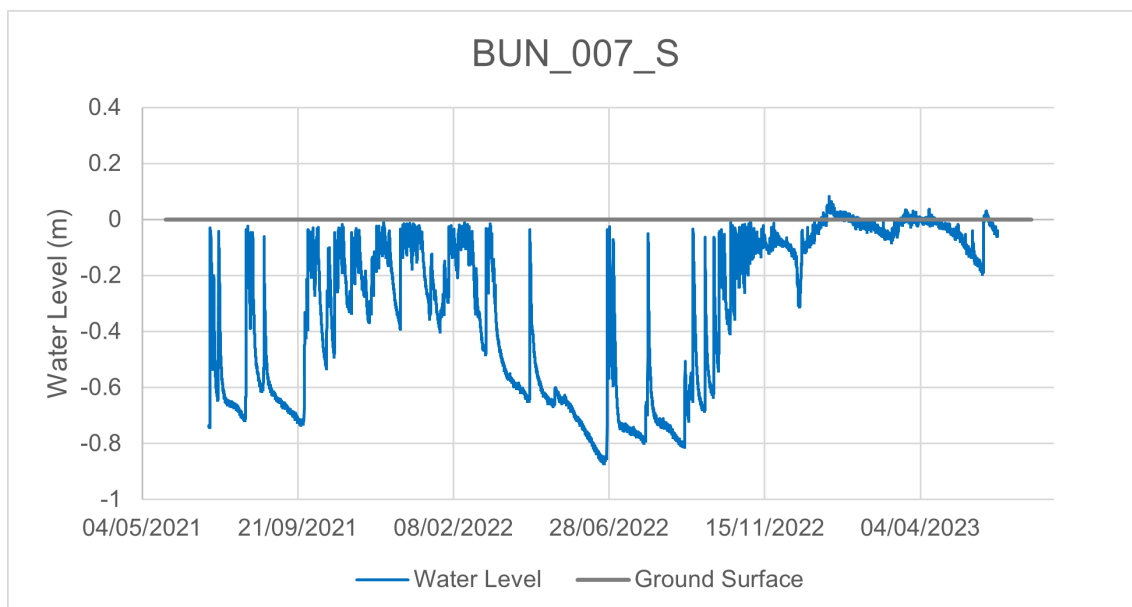


Figure 2.1.1 Hydrograph of the Monitoring Well at BUN_007_S

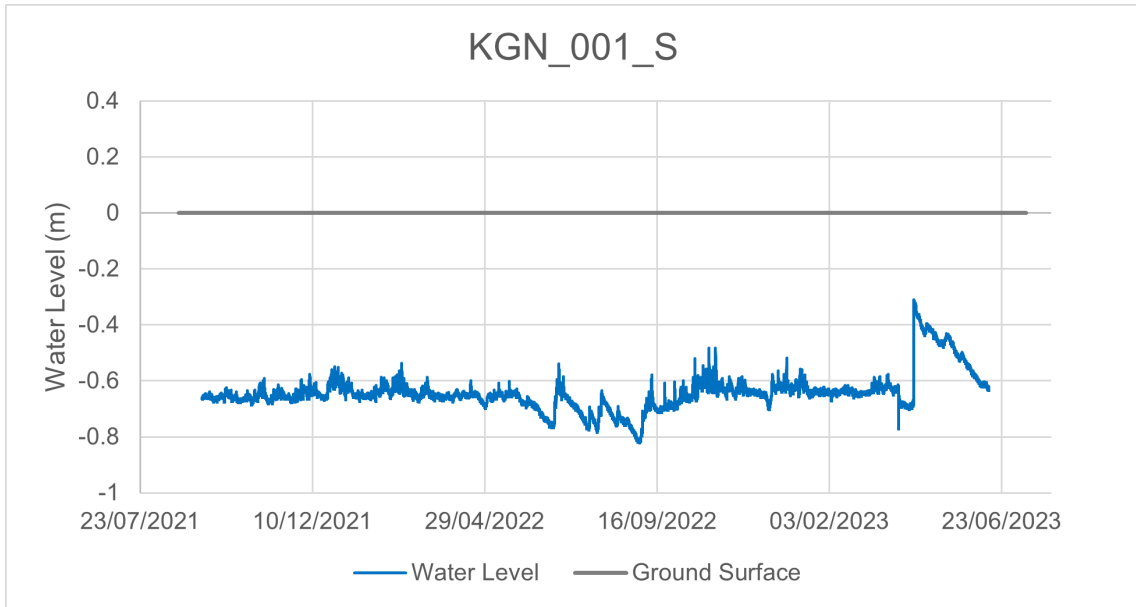


Figure 2.1.2 Hydrograph of the Monitoring Well at KGN_001_S

C2.2 Clooneeny

Hydrological monitoring is ongoing at Clooneeny bog. A total of 14 nests* comprised of 9 deep wells and 14 Phreatic wells, 5 Phreatic wells have been instrumented with automated loggers, with a subset of the deep piezometers (2) instrumented with automated loggers. There have been four rounds of Hydrological Monitoring completed at Clooneeny Bog between summer 2021 & summer 2023. Monitoring will be ongoing at Clooneeny bog over the next two years (2024, 2025). Rehabilitation works commenced around CNY_001_S in Aug 2022 and around CNY_007_S in November 2022. In May 2023 all DPT4 cells were tapped and the drainage pumps were turned on to release water to allow set out and installation of the cell weirs as well as additional works around outfalls. This is evident in both Figure3 & Figure 4.

A review of the logger data for wells 001S and 007S on Clooneeny was carried out. Analysis of the logger data from these wells indicates that water levels have increased following the implementation of restoration measures which started on site in August 2022, with levels in the late spring/early summer 2023 greater than those in the corresponding time periods in 2021 and 2022. In August at CNY_001_S of 2022 there is a nearly continuous rise in water level until February 2023. In February 2023 there is a sharp decline, which can be attributed to the creation of an outlet/weir which regulates water levels. The water level remains above ground surface until June 2023 where they drop below the ground surface but remain above -20cm. CNY_007_S shows a moderate rise in water levels post restoration from November 2022 onwards. Water levels continue to rise from throughout winter 2022 and remain at a steady level throughout spring and early summer of 2022. Water levels begin to fall in June 2023. More thorough analysis should be carried out by reviewing details of all the loggers installed on this site over the full time period of this project. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

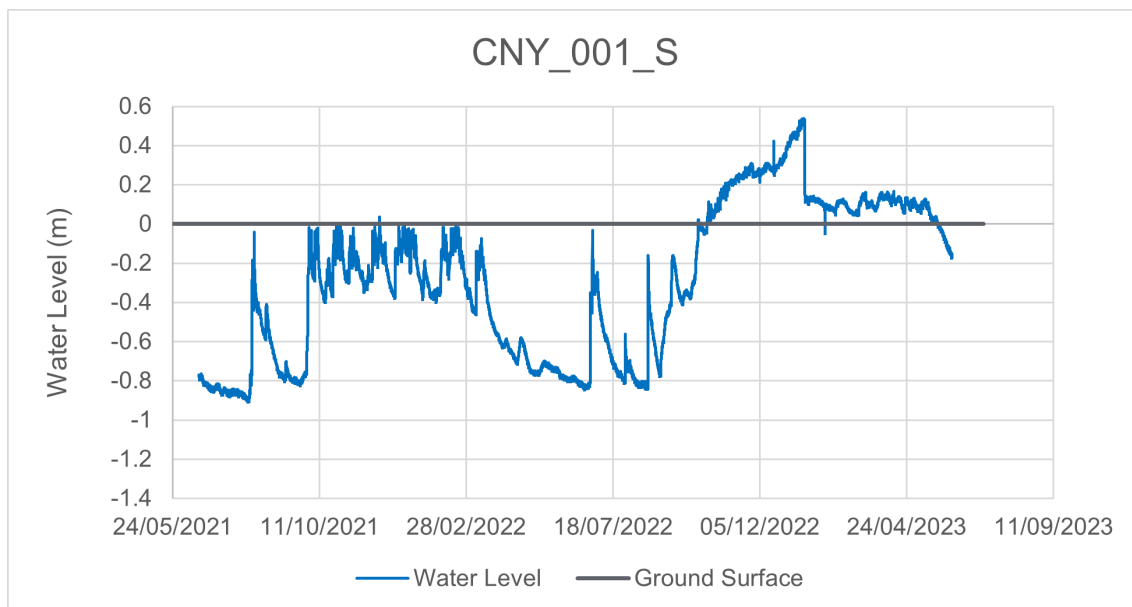


Figure 2.2.1 Hydrograph of the Monitoring Well at CNY_001_S

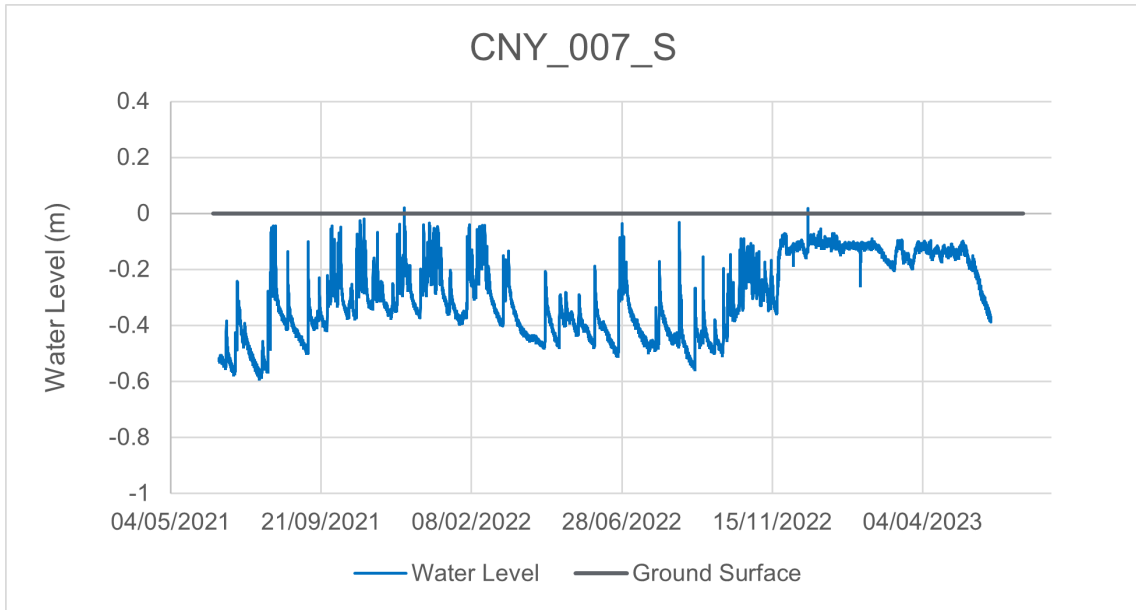


Figure-2.2.2 Hydrograph of the Monitoring Well at CNY_007_S

C2.3 Killaranny

Hydrological monitoring is ongoing at Killaranny Bog. A network of piezometers was installed across Killaranny Bog in June 2021 consisting of ten piezometer nests, five of which consist of phreatic/deep well pairs installed at the interface of the peat and underlying inorganic deposits respectively. Of the ten phreatic monitoring locations across Killaranny Bog, four have been instrumented with automated data loggers (Rugged Troll 100) recording groundwater temperature and water level at 15-minute intervals (Resolution 0.01m), while one of the deep monitoring locations have been installed with a data logger.

There have been four rounds of Hydrological Monitoring completed at Killaranny Bog between summer 2021 & summer 2023. Monitoring will be ongoing at Killaranny bog over the next two years (2024, 2025).

A review of logger data for wells 002s and 010s on Killaranny was carried out. Analysis of the logger data shows that the areas in which rehabilitation works have been carried out have displayed a positive response in the water levels.

Well 002s had fluctuating water levels which peaked at ground level and dropped to around 0.4m below the surface in the summer months and just above 0.2m below the surface in the winter months. This trend continues up until July 22 when the Restoration measures were completed. The water level stabilises at this date at around 0.3m below the surface until January 23 when the water level rises to around 0.1m below the surface. The water level then remains between 0.1-0.2m below the surface up until June 23 when the data was collected. At well 010s there were no rehabilitation works carried out. The water level drops to almost 1m below the surface in summer 21 and 22, with occasional peaks at just below ground level. During the winter periods the base level rises to around 0.6m below the surface and has more frequent spikes to just under ground level. The water levels for summer 23 look as though they are going to continue with this trend as it has dropped to almost 0.8m below the surface when the data was collected in June.

More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

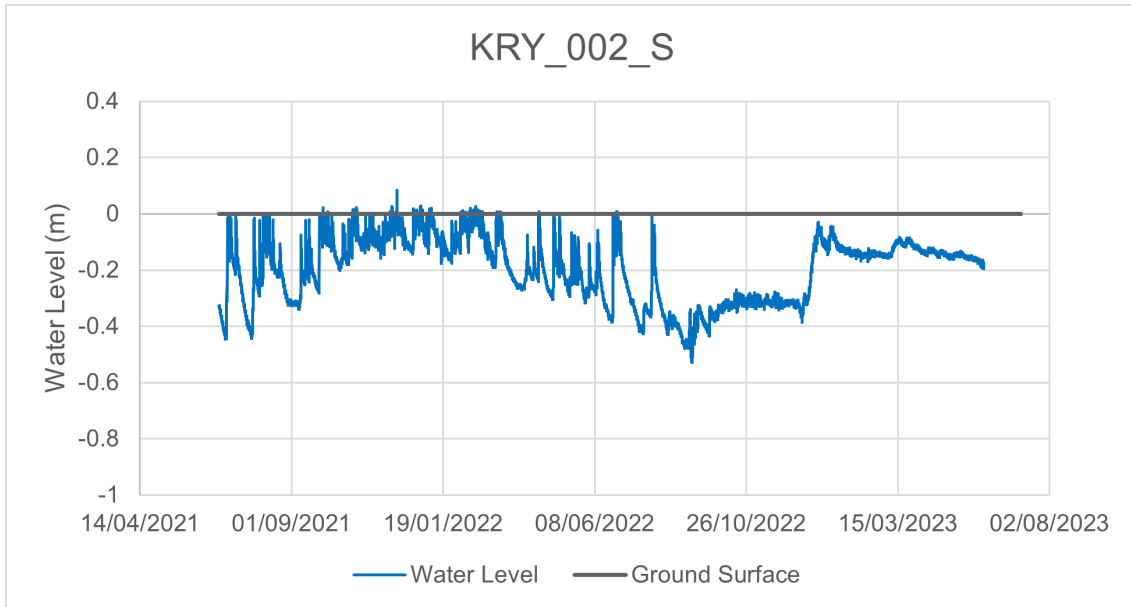


Figure 2.3.1 Hydrograph of the Monitoring Well at KRY_002_S

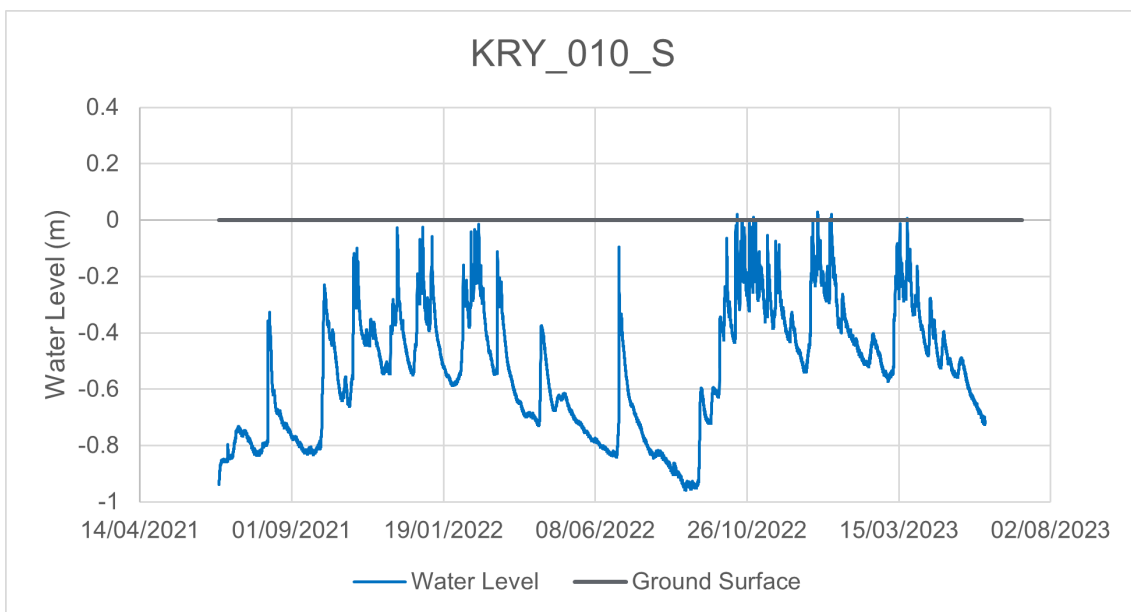


Figure 2.3.2 Hydrograph of the Monitoring Well at KRY_010_S

*No PCAS works carried out at KRY_010_S at time of reporting

C2.4 Begnagh

Hydrological monitoring is ongoing at Begnagh bog. A total of 12 nests* comprised of 6 deep wells and 12 Phreatic wells, 4 Phreatic wells have been instrumented with automated loggers, with a subset of the deep piezometers (2) instrumented with automated loggers. There have been four rounds of Hydrological Monitoring completed at Begnagh Bog between summer 2021 & summer 2023. Monitoring will be ongoing at Begnagh bog over the next two years (2024, 2025). Rehabilitation works commenced around BEG_002_S in June 2022 and around BEG_006_S in August 2022. In April 2023 all DPT4 cells were tapped to release water to allow set out and installation of the cell weirs. This is evident in both Figure1 & Figure 2.

A review of the logger data for wells 002S and 006S on Begnagh was carried out. Analysis of the logger data from these wells indicates that water levels have increased following the implementation of restoration measures which started on site in June 2022, with levels in the summer of 2023 greater than those in the summers of 2021 and 2022. In June 2022 at BEG_002_S water levels begin to rise. Throughout the summer of 2022 there are occasional spikes, but levels follow the trend of a gradual increase. During the winter period of 2022 water levels rise above ground surface and remain there for the remainder of the recording period until the most recent data record in June 2023. BEG_006_S shows an increase in water level starting in June 2022. The water levels at this well shows fewer fluctuations than at BEG_002_S. After the winter period of 2022/2023 water levels remain above the ground surface until June 2022 where a sharp decrease can be observed. This decrease is likely to be attributable to the creation of an outlet/weir within a bund to regulate water levels. More thorough analysis should be carried out by reviewing details of all the loggers installed on this site over the full time period of this project. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

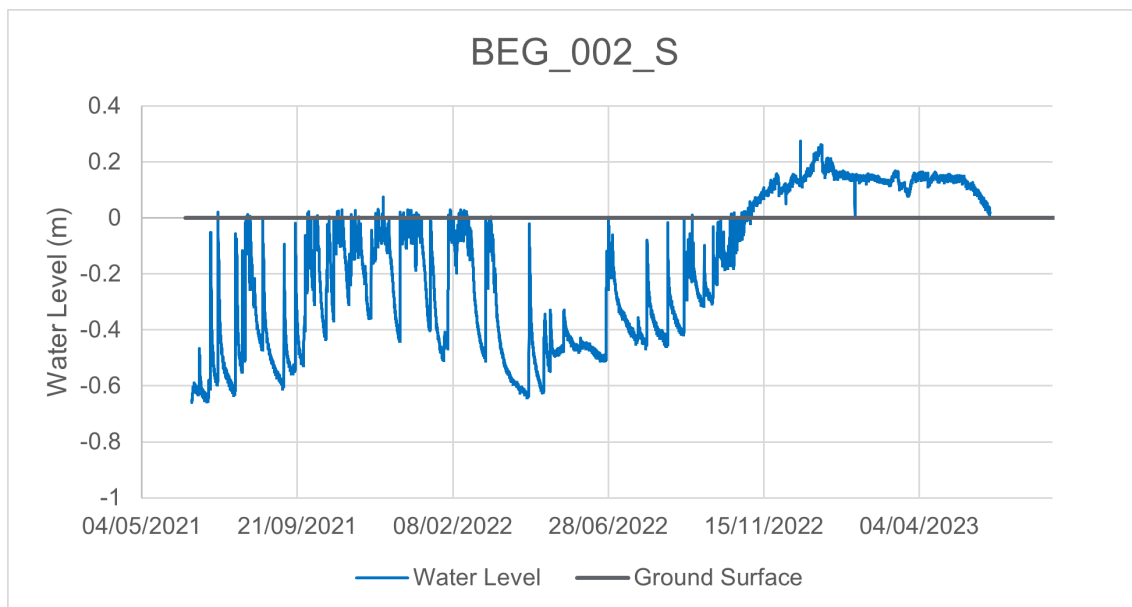


Figure 2.4.1 Hydrograph of the Monitoring Well BEG_002_S

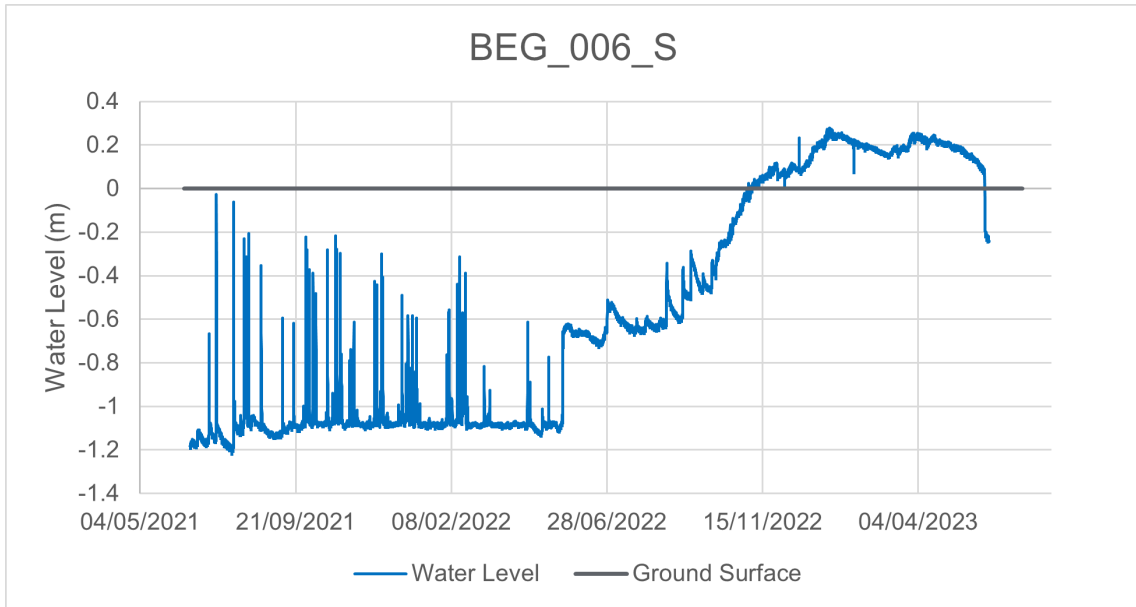


Figure 2.4.2 Hydrograph of the Monitoring Well BEG_006_S

C2.5 Carranstown

Hydrological monitoring is ongoing at Carranstown bog. A total of 13 nests* comprised of 11 deep wells and 13 Phreatic wells, 4 Phreatic wells have been instrumented with automated loggers, with a subset of the deep piezometers (2) instrumented with automated loggers. There have been four rounds of Hydrological Monitoring completed at Carranstown Bog between summer 2021 & summer 2023. Monitoring will be ongoing at Carranstown bog over the next two years (2024, 2025). Rehabilitation works commenced around CTN_004_S in May 2022 and around CTN_012_S in November 2022.

A review of the logger data for wells 004S and 012S on Carranstown was carried out. Analysis of the logger data indicates that water levels have increased following the implementation of restoration measures which started on site in May 2022, with levels in the winter, spring and early Summer of 2023 greater than the corresponding time periods in of 2021 and 2022. Water levels at CTN_004_S in September 2022 following a prolonged dry period through summer 2022 and continue to do so until December 2022. Water levels remain high through spring 2023 at levels greater than spring 2022. CTN_012_S demonstrates more moderate increases in water level, with levels in the winter and spring 2023 remaining high following restoration works in November 2022. There is a decline in the water level in May 2023. More thorough analysis should be carried out by reviewing details of all the loggers installed on this site over the full time period of this project. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

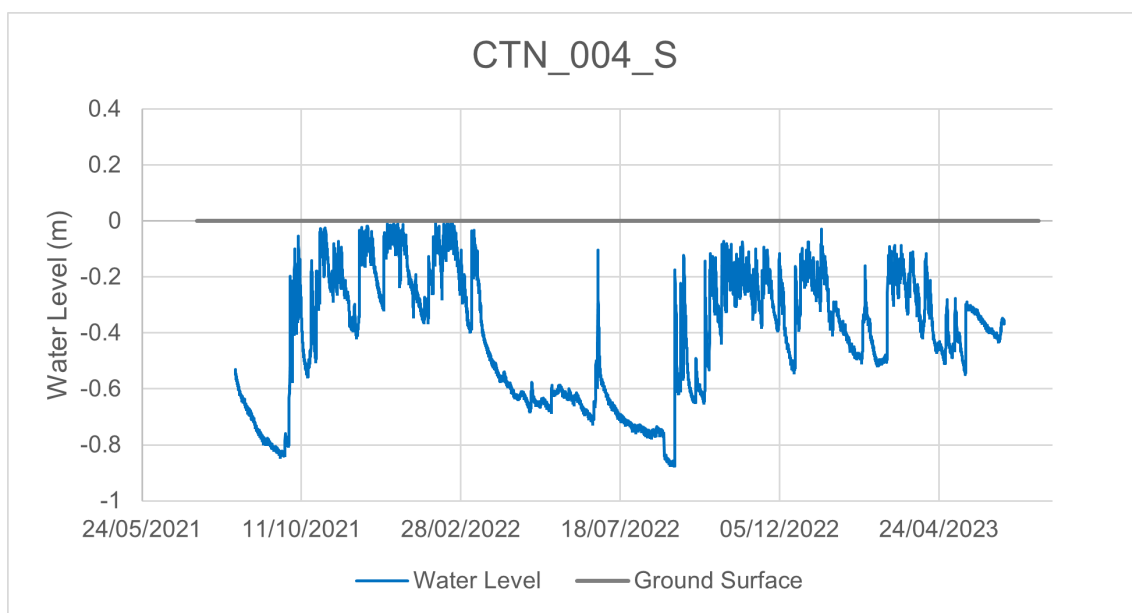


Figure 2.5.1 Hydrograph of the Monitoring Well at CTN_004_S

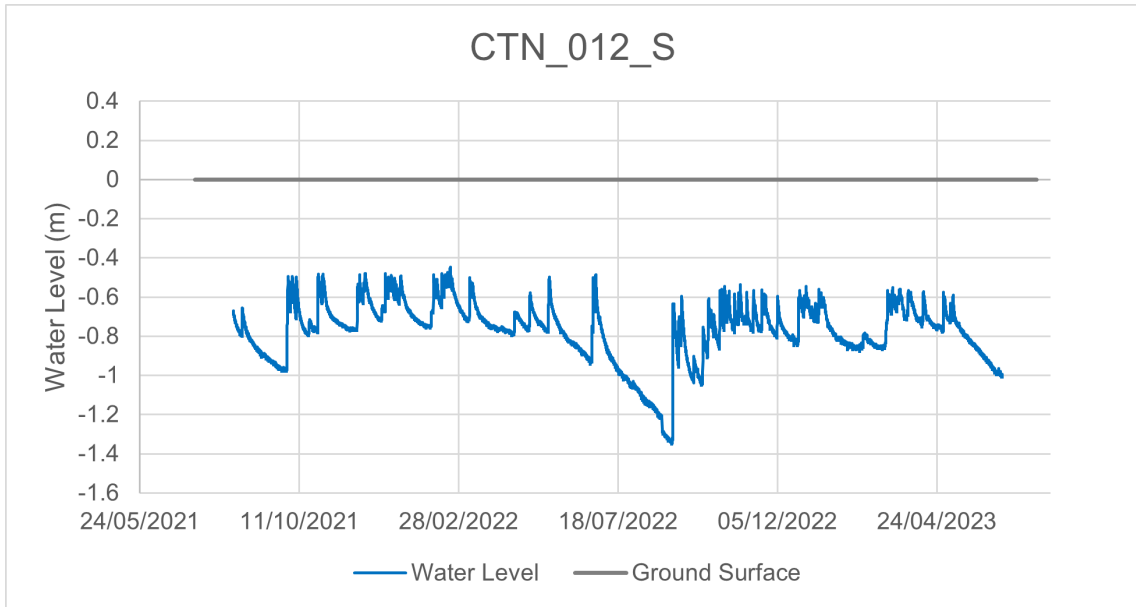


Figure 2.5.2 Hydrograph of the Monitoring Well at CTN_012_S

C2.6 Derrinboy

A review of logger data for wells 008s and 015s on Derrinboy was carried out. Analysis of the logger data shows fluctuating water levels in both well locations which is expected pre-rehabilitation. At well 008s the water levels fluctuate between 1m below the surface and ground level up until around August 2022. It appears this is when rehabilitation measures commenced as the water level gradually stabilises at ground level after this point. The water level then rises to 0.6m above the surface in January 2023 and then drops to 0.2m below the surface in June 2023 when the data range comes to an end. It is important to acknowledge the progress of works on Derrinboy Bog. Several key drainage features that would have an impact on ground water levels in proximity to well 008s were completed in June 2023, which followed the timelines illustrated in the graphs represented below. It is envisaged that the recent completion of these measures will have an impact on ground water levels generally for winter 2023/2024.

Well 015s also shows a similar pattern of high fluctuations up until November 2022, when rehabilitation works commenced in this area of the site as the water levels stabilised and have risen to just over ground level. In March 2023, the water level dropped to 0.4m below the surface in line with when rehabilitation works were being progressed in this area and channels were installed in cells to regulate cell water levels ahead of sheet pile installation.

The rehabilitation works are ongoing with an anticipated completion date of November 2023. As such, the water levels look hopeful for the rehabilitation measures to have a positive impact on this area so far as the water level has already stabilised. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

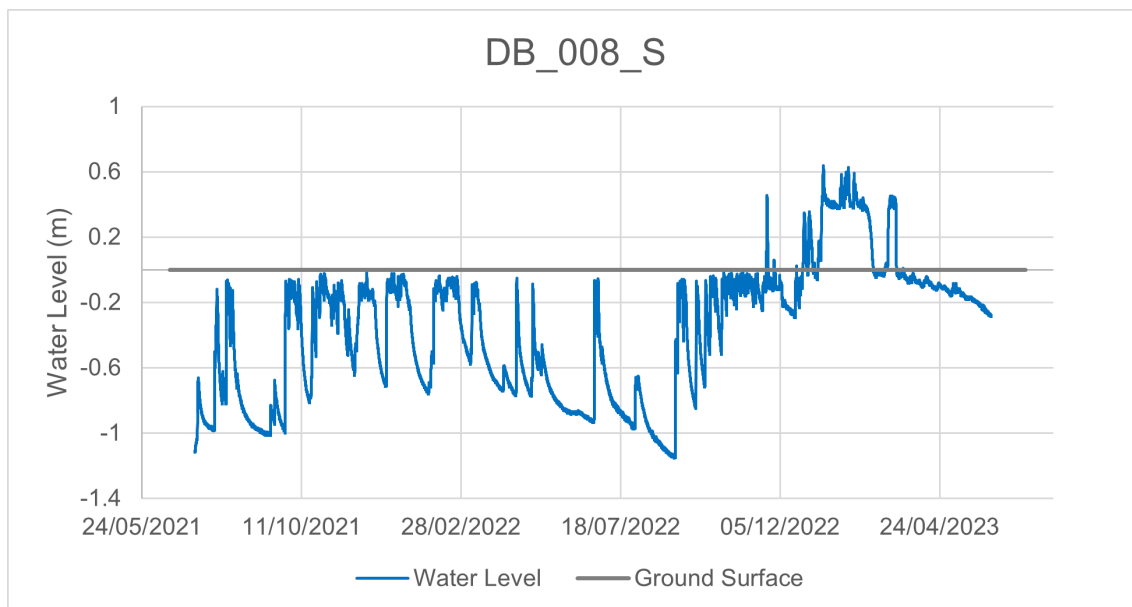


Figure 2.6.1 Hydrograph of the Monitoring Well at DB_008_S

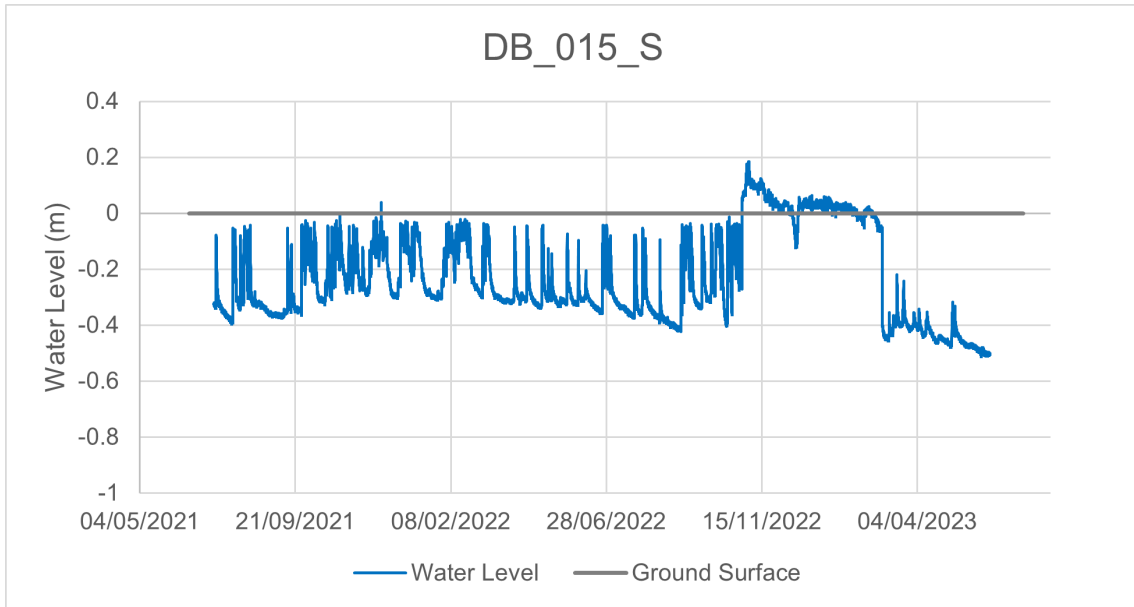


Figure 2.6.2 Hydrograph of the Monitoring Well at DB_015_S

*PCAS works are ongoing in this area. Expected completion date November 2023.

C2.7 Prosperous

Hydrological monitoring is ongoing at Prosperous bog. A total of 11 nests* comprised of 11 deep wells and 11 Phreatic wells, 4 Phreatic wells have been instrumented with automated loggers, with a subset of the deep piezometers (2) instrumented with automated loggers. There have been four rounds of Hydrological Monitoring completed at Prosperous Bog between summer 2021 & summer 2023. Monitoring will be ongoing at Prosperous bog over the next two years (2024, 2025). Rehabilitation works commenced around PPS_002_S and PPS_005_S in June 2022.

A review of logger data for wells 002s and 005s on Prosperous was carried out. Analysis of the logger data shows the rehabilitation works have clearly had an impact on the bog with the logger data in both wells showing the water level becoming more consistent after October 22, after the restoration measures were implemented. Well 002s show the water levels fluctuating between ground level and around 0.3m below the surface during winter 21/22 and then drops to between 0.8-1m below the surface in March 22 and remains there until October 22 when the water level rises. The water levels rose to 10cm above the surface over summer 22 and levelled out and remained at this level until around April 23 when it declined to roughly 10cm beneath the surface level for summer 23. Well 005s shows an obvious change in water level from October 22. In winter 21/22 the water level has peaks of around 10cm below the surface level and the level drops to around 60cm below the surface. During the summer months the water levels have a smaller fluctuation around 40cm below the surface until September 22 when the water level rises very quickly to 0.4m above the surface. The level remained here until the start of July 23 when it drops to ground level. Both of these wells appear to be in bunding and the inlets must have been opened for the cell in September/October 22 to allow the bunded area to flood. This data is showing that the restoration works appear to be successful. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

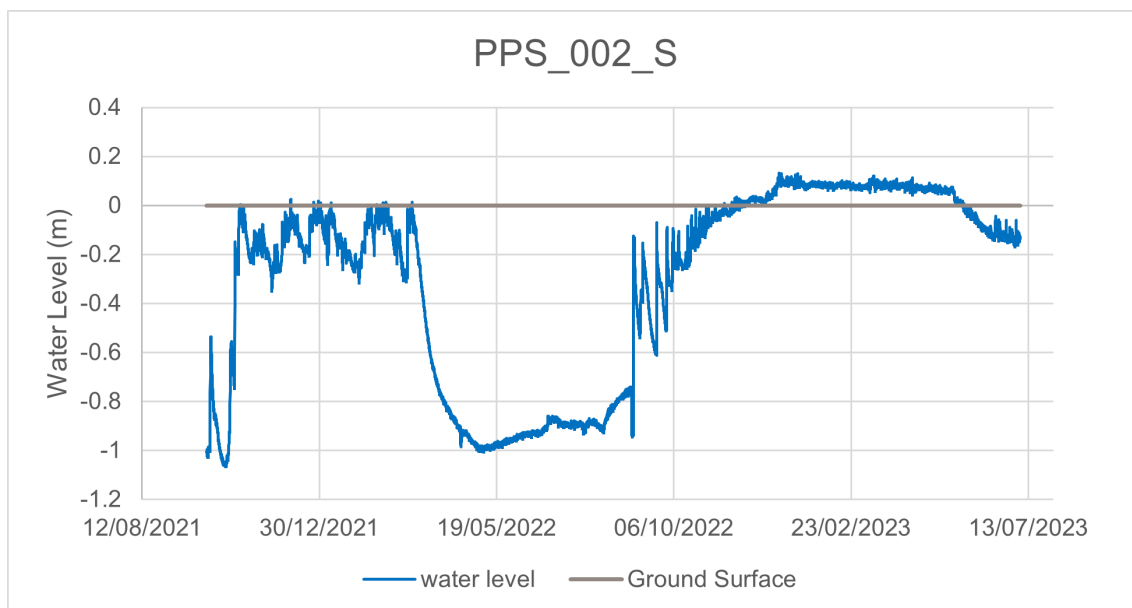


Figure 2.7.1 Hydrograph of the Monitoring Well at PPS_002_S

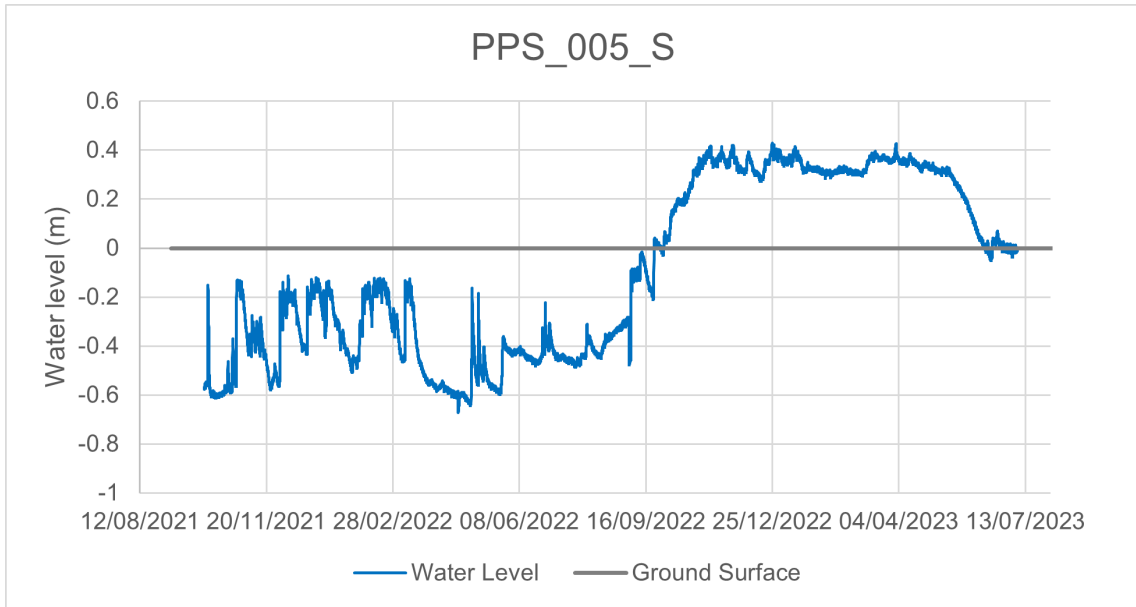


Figure 2.7.2 Hydrograph of the Monitoring Well at PPS_005_S

C2.8 Lodge

Hydrological monitoring is ongoing at Lodge Bog. 13 piezometer nests have been installed, six of which consist of phreatic/deep well pairs installed at the interface of the peat and underlying inorganic deposits respectively. Of the 13 phreatic monitoring locations across Lodge, five have been instrumented with automated data loggers (Rugged Troll 100) recording groundwater temperature and water level at 15 minute intervals (Resolution 0.01m), while two of deep monitoring locations have been installed with data loggers. Manual dipping of piezometers was completed in May 2021, Aug 2021, January 2022, and August 2022 (4nr rounds of dipping). Monitoring will be ongoing at Lodge Bog bog over the next two years (2024, 2025).

A review of the logger data for wells 011S and 013S on Lodge was carried out.

Analysis of the logger data from LDG_011_S indicates that water levels have increased following the implementation of rehabilitation measures, with levels in the winter, spring and early Summer of 2023 greater than the corresponding time periods in of 2021 and 2022. It should be noted that DPT4 rehabilitation works have been implemented in the immediate area surrounding well LDG_011_S. In September 2022 water levels begin to rise and continue to do so until November 2022 where a sharp fall of around 10cm occurs. This can be attributed to the creation of weirs/outlets to regulate water levels. Water levels remain above the ground surface until late May/ early June where a sharp decrease can be seen which a line with the exceptionally dry June of this year.

LDG_013_S demonstrates more moderate increases in water level, with levels in the winter, spring and early Summer of 2023 greater than the corresponding time periods in of 2021 and 2022. In September of 2022 water levels begin to rise and remain within 20cm of the ground surface throughout the winter of 2022 with the exception of a drop in December. The post restoration period also demonstrates reduced frequency and severity of water table fluctuations. A sharp decrease in water levels can be observed in late May/early June 2023.

Rehabilitation works were completed around LDG_011_S in June 2022 and around LDG_013_S in September 2022. It is important to acknowledge the progress of works at Lodge Bog, the pumps and low draining outfalls were decommissioned in late June 2023. It is envisage that further water table rise will be observed following on from this.

More thorough analysis should be carried out by reviewing details of all the loggers installed on this site over the full time period of this project. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

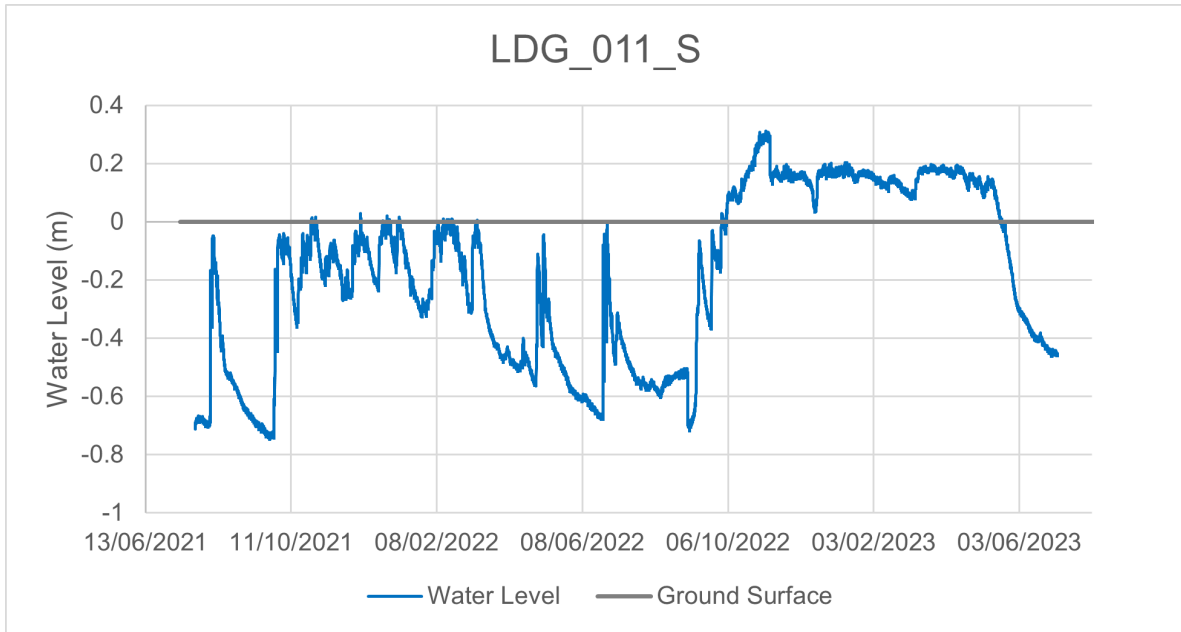


Figure 2.8.1 Hydrograph of the Monitoring Well at LDG_011_S

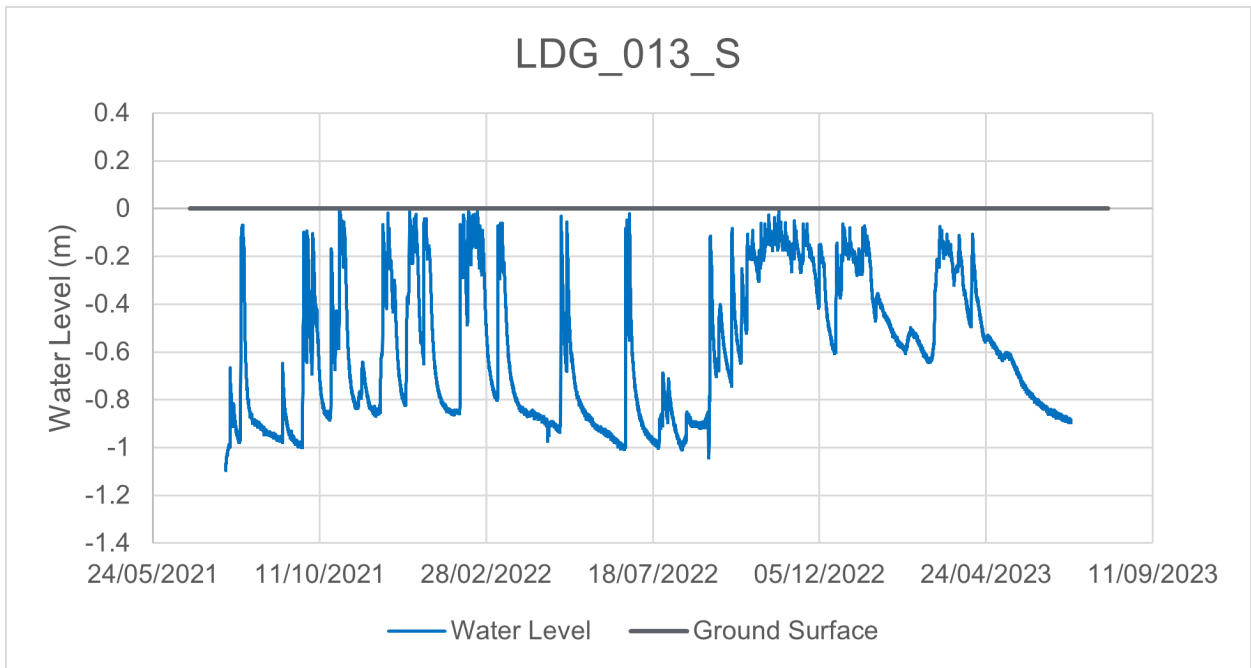


Figure 2.8.2 Hydrograph of the Monitoring Well at LDG_013_S

C2.9 Derraghan

Hydrological monitoring is ongoing at Derraghan bog. A total of 18 nests comprised of 3 deep well and 15 Phreatic wells, 8 Phreatic wells have been instrumented with automated loggers. Rehabilitation works (drain blocking) were completed around DHA_004_S in March 2023 and around DHA_017_S in April 2023 which was followed by a dry period with little rainfall. This is evident in Figure 21 & 22.

A review of logger data for wells 004s and 017s on Derraghan was carried out. Analysis of the logger data shows a lot of fluctuation in the water levels at both wells which is to be expected with pre restoration data.

At well 004s the water level consistently bases at around 0.75m below the surface and during the summer and winter months there are a lot of spikes which show the water rising to around 0.2m below surface level. Restoration works occurred in March 2023 however the water table has continued to lower.

At well 017s the water level fluctuates between 0.3m below the surface and ground level. During the winter months the peaks are more common than in the summer periods but the overall water levels do not change much. Post restoration in April 2023 the water table follows a similar fluctuation pattern to pre restoration however, post restoration data is limited.

More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

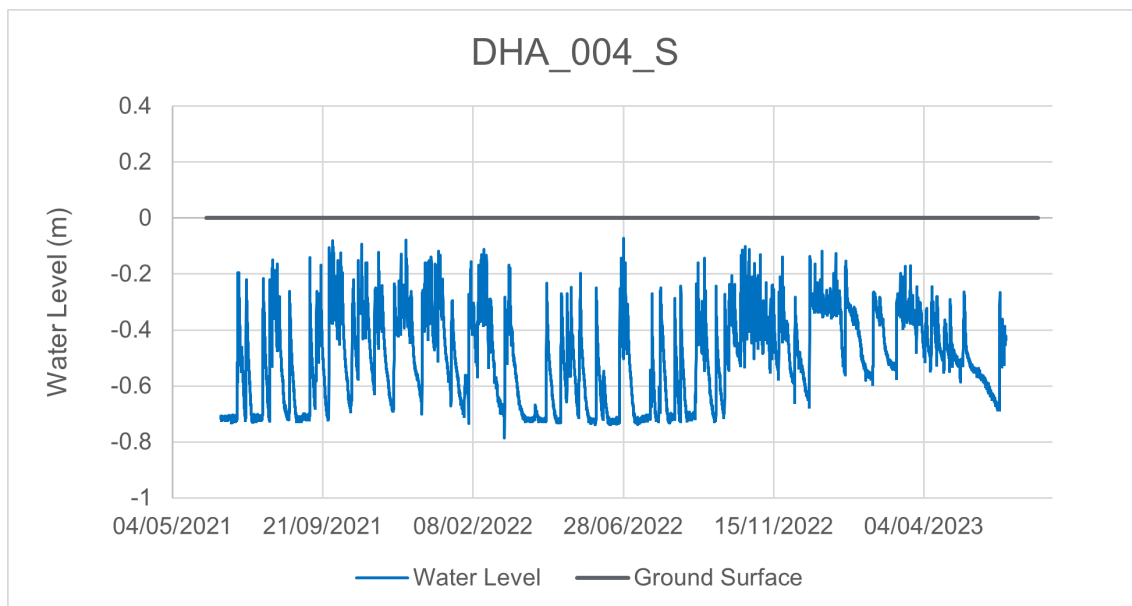


Figure 2.9.1 Hydrograph of the Monitoring Well at DHA_004_S

*PCAS was completed at this Piezometer location in March April 2023

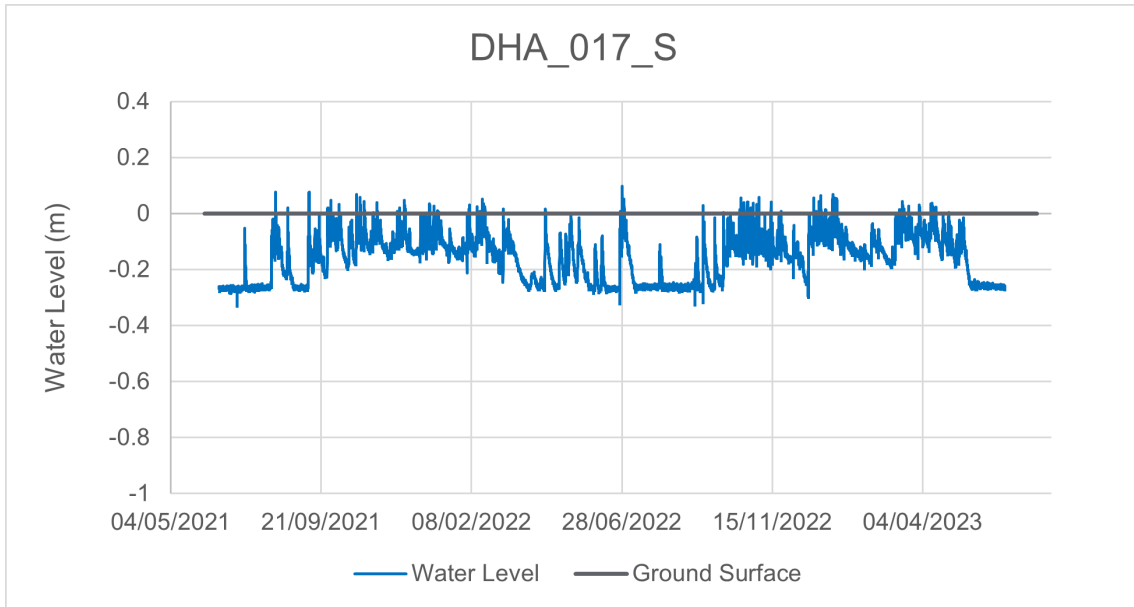


Figure 2.9.2 Hydrograph of the Monitoring Well at DHA_017_S

*PCAS was completed at this Piezometer location in April 2023

C2.10 Cloncreen

Hydrological monitoring is on-going at Cloncreen Bog. 42 piezometer nests have been installed, 2 of which consist of phreatic/deep well pairs installed at the interface of the peat and underlying inorganic deposits respectively. In all remaining locations peat depth was insufficient to install a deep piezometer. Of the 42 phreatic monitoring locations across Cloncreen, twenty-one have been instrumented with automated data loggers (Rugged Troll 100) recording groundwater temperature and water level at 15 minute intervals (Resolution 0.01m), while the two deep monitoring locations have also been installed with data loggers. Manual dipping of piezometers was completed in Oct 2021, Feb 2022, Sept 2022 and one in 2023 (4nr rounds of dipping). Monitoring will be ongoing at Cloncreen Bog bog over the next two years (2024, 2025).

A review of the logger data for wells 020S and 039S on Cloncreen was carried out.

Analysis of the logger data from these wells indicates that water levels have increased following the implementation of restoration measures which started on site in September 2022 and finished in October 2022, with levels in the late spring/early summer 2023 greater than those in the corresponding time periods in 2021 and 2022. CNN_020_S shows a rise in water levels post restoration from September 2022 onwards. Water levels start to decline from March 2023 to summer and then begin to rise again in July 2023.

At CNN_039_S no PCAS restoration works were completed in the immediate vicinity of the piezometer (measure DCT1). The peat depth here is shallow at 20cm and the hydrograph in Figure 18 shows a dry well most of the year with a spike in August/September 2022. More thorough analysis should be carried out by reviewing details of all the loggers installed on this site over the full time period of this project. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

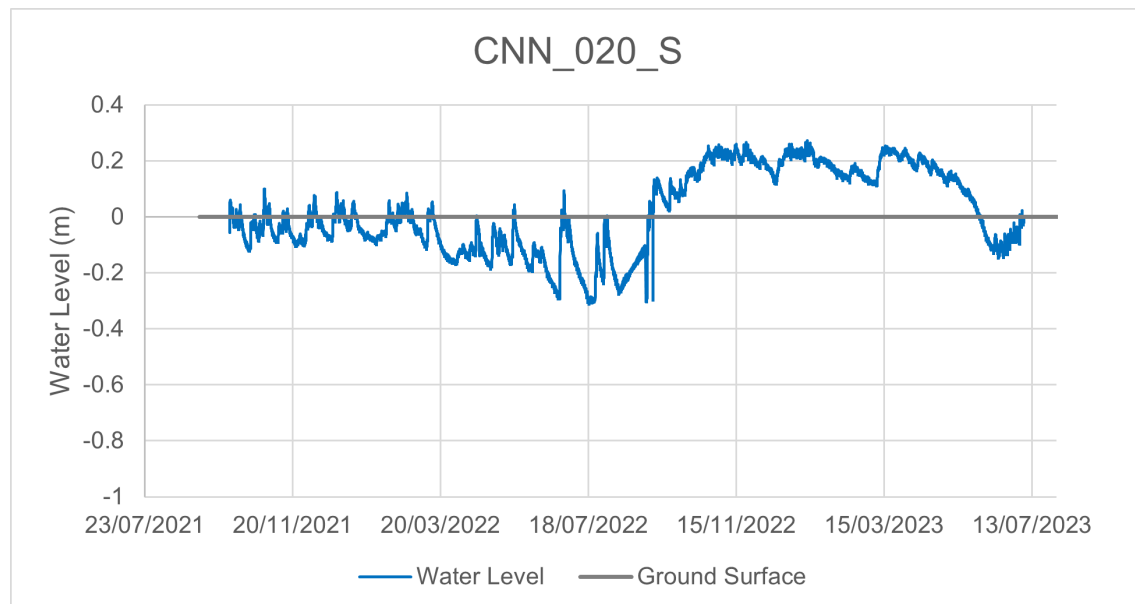


Figure 2.10.1 Hydrograph of the Monitoring Well at CNN_020_S

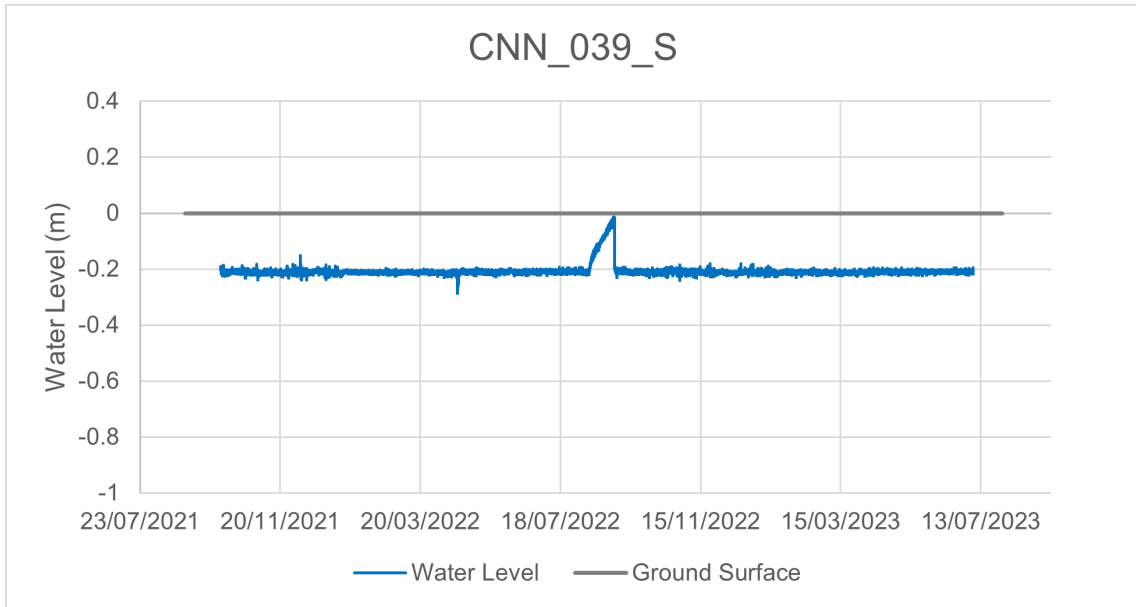


Figure 2.10.2 Hydrograph of the Monitoring Well at CNN_039_S

C2.11 Timahoe South

Hydrological monitoring is ongoing at Timahoe South Bog. 57 piezometer nests have been installed, 30 of which consist of phreatic/deep well pairs installed at the interface of the peat and underlying inorganic deposits respectively. Of the 57 phreatic monitoring locations across Timahoe South, 19 have been instrumented with automated data loggers (Rugged Troll 100) recording groundwater temperature and water level at 15 minute intervals (Resolution 0.01m), while 9 of deep monitoring locations have been installed with data loggers. Manual dipping of piezometers was completed in Sept 2021, Feb 2022, August 2022 and one in 2023 (4nr rounds of dipping). Monitoring will be ongoing at Lodge Bog bog over the next two years (2024, 2025).

A review of logger data for wells 024s and 047s on Timahoe South was carried out.

Analysis of the logger data shows a slight rise in water levels in well 024s by just a couple of cm over winter 2022/23. The previous winter period the water levels are shown to fluctuate around the surface level whereas winter 2022/23 the water levels sit consistently just above surface level. As rehabilitation commenced in November 22 and was completed January 23, this would imply that the restoration measures put in place had a positive impact on the water levels. However, in June 23 the water levels then dropped to over 0.2m below ground level which is the lowest water levels this logger has ever recorded. It is important to acknowledge the progress of works in the vicinity of this piezometer, further works (targeted berm DPT4b) are yet to be completed.

Well 047s Has had no restoration measures carried out in the area around the well however the water levels seem to have a slight rise from November 22 onwards, which is when restoration began in other areas. As this is just a slight rise it could be due to a wetter winter period, however, it could also be due to restoration measures across other areas of the bog having a positive impact on the water levels in this area. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

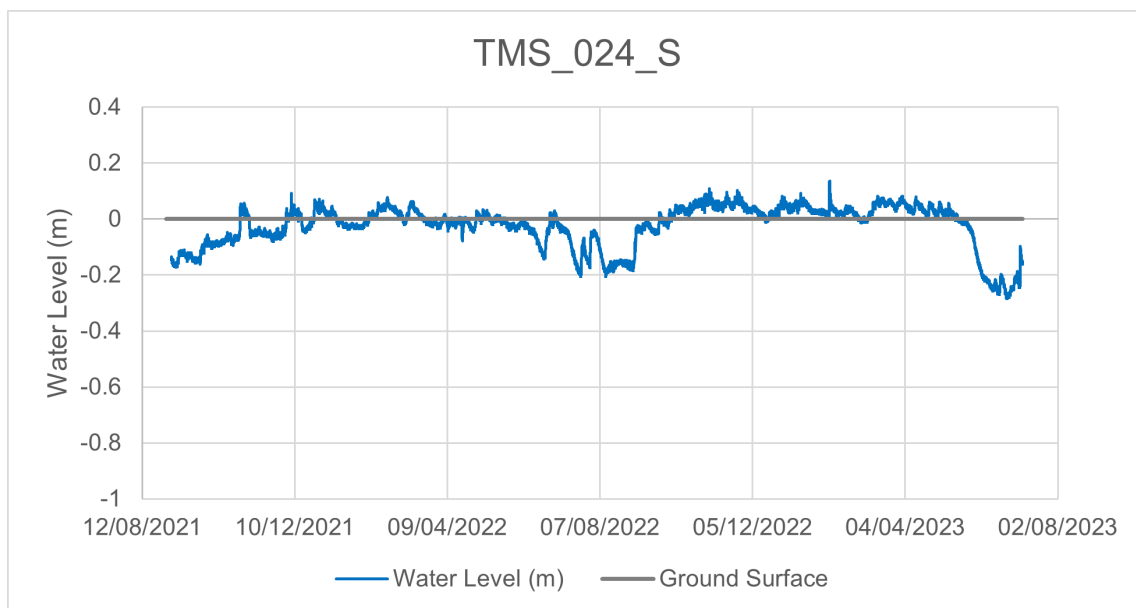


Figure 2.11.1 Hydrograph of the Monitoring Well at TMS_024_S

Rehabilitation works commenced in this area in November '22

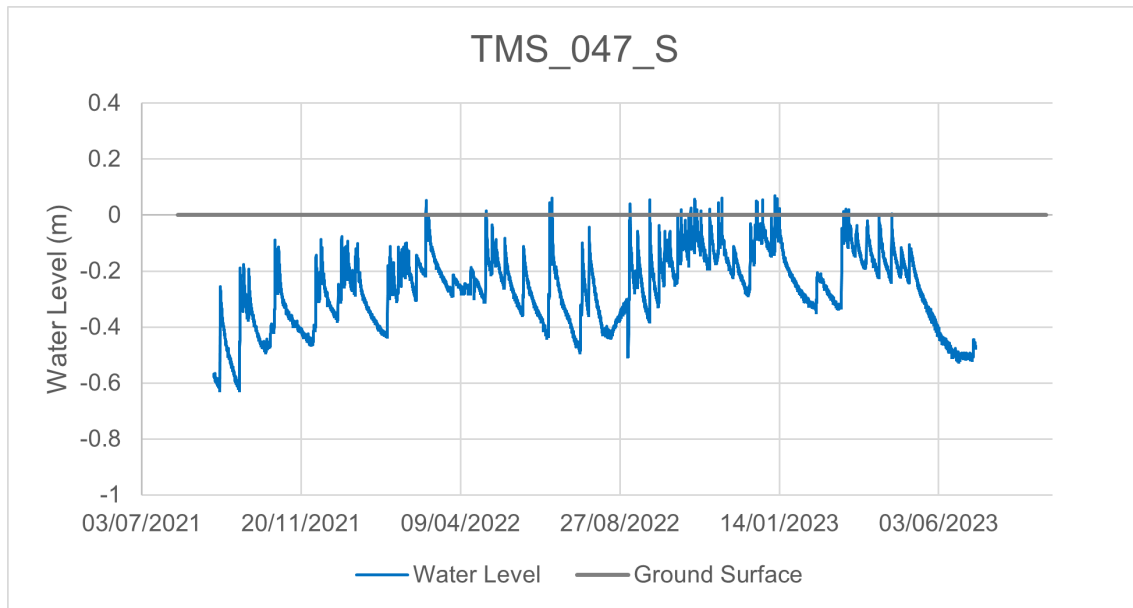


Figure 2.11.2 Hydrograph of the Monitoring Well at TMS_047_S

**No rehabilitation works have been carried out in this area to date.*

C2.12 Bloomhill

Hydrological monitoring is ongoing at Bloomhill bog. A total of 39 Piezometers have been installed. Of the 39 Piezometers, eight have been instrumented with automated data loggers. Three deep monitoring locations have also been instrumented with data loggers.

The locations of these piezometers are shown in figure BnM-DR-23-15-07 Bloomhill Bog Piezometer Locations in the Map Book. A total of four monitoring visits have been carried out to date at Bloomhill bog as outlined in “*Bloomhill Bog - Monitoring and Verification Plan*”, with manual dipping completed in Aug/Sept 2021, Jan/Feb 2022, June/July 2022 & Oct/Nov 2022 and logger downloading in Aug/Sept 2021, Jan/Feb 2022, June/July 2022 & Oct/Nov 2022.

Monitoring will be ongoing at Bloomhill bog over the next two years (2024, 2025). In May 2023 all DPT4 cells were tapped to release water to allow set out and installation of the cell weirs. This is evident in Figure 11.

A review of the logger data for wells 004S and 018S on Bloomhill was carried out. Analysis of the logger data at well BLH_004_S indicates that water levels have increased following the implementation of restoration measures in February 2023, with levels in the late spring/early summer 2023 greater than those in the corresponding time periods in 2021 and 2022. Water levels rose steadily following restoration works. In May 2023 there is a sharp decline, which can be attributed to the creation of an outlet/weir which regulates water levels. BLH_018_S is located in the phase 2 area of PCAS works which were completed in June 2023. The hydrograph in figure 12 shows the water table pre-restoration with significant fluctuations. More thorough analysis should be carried out by reviewing details of all the loggers installed on this site over the full time period of this project. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

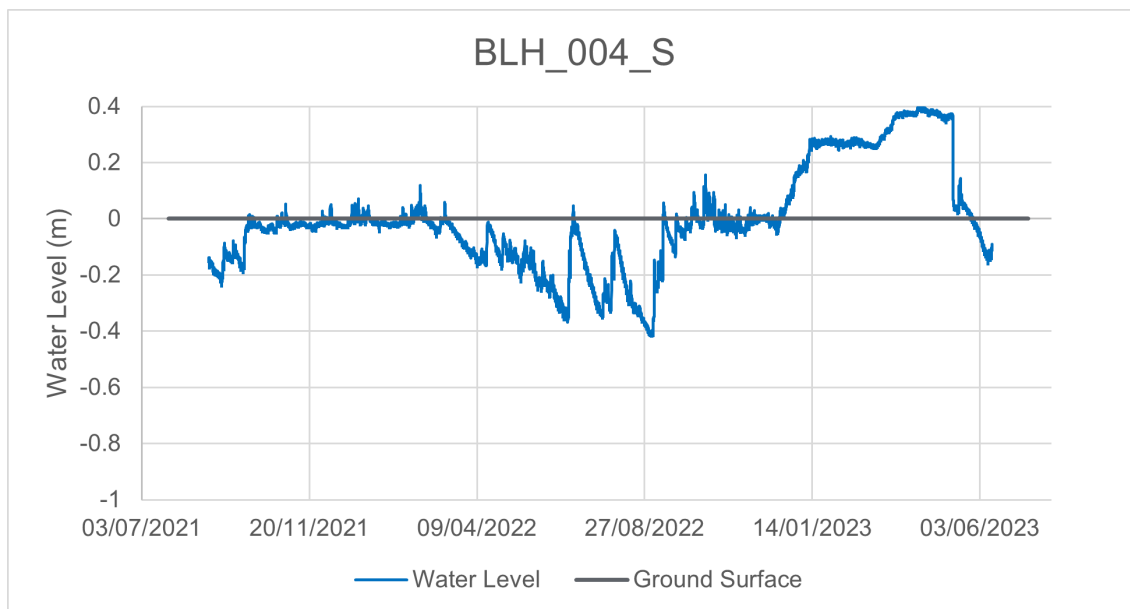


Figure 2.12.1 Hydrograph of the Monitoring Well at BLH_004_S

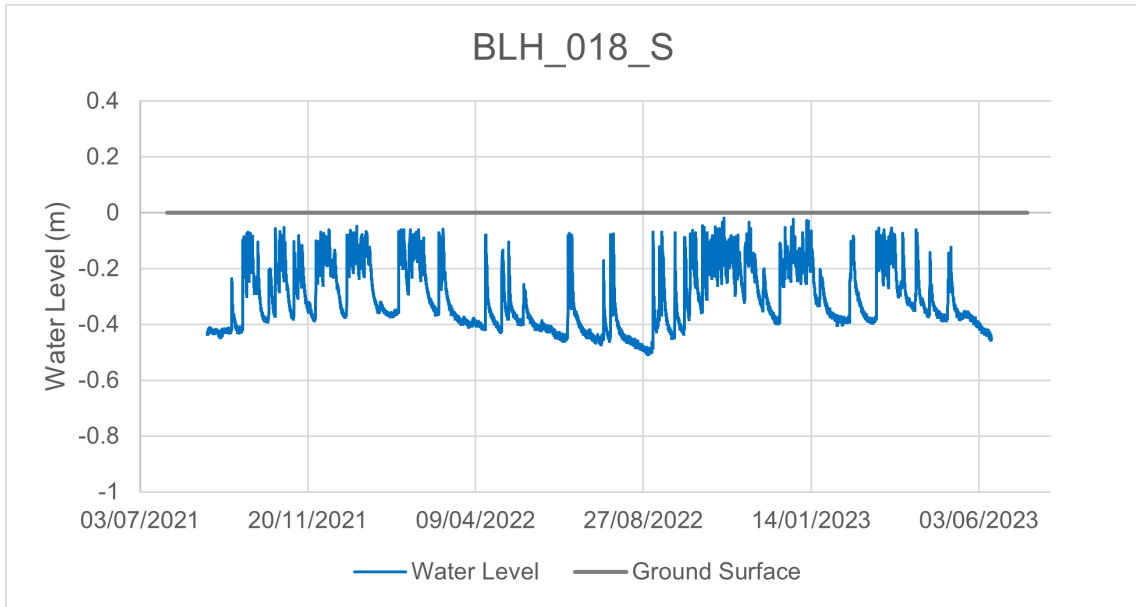


Figure 2.12.2 Hydrograph of the Monitoring Well at BLH_018_S

C2.13 Derryfadda

Hydrological monitoring is ongoing at Derryfadda bog. A total of 38 Piezometers have been installed. Of the 38 Piezometers, seven have been instrumented with automated data loggers. Three deep monitoring locations have also been instrumented with data loggers.

The locations of these piezometers are shown in Figure BnM-DR-23-12-07 Derryfadda Bog Piezometer Locations in the Map Book. A total of four monitoring visits have been carried out to date at Derryfadda bog as outlined in *“Derryfadda Bog - Monitoring and Verification Plan”*, with manual dipping completed in Aug/Sept 2021, Jan/Feb 2022, June/July 2022 & Oct/Nov 2022 and logger downloading in Aug/Sept 2021, Jan/Feb 2022, June/July 2022 & Oct/Nov 2022.

Monitoring will be ongoing at Derryfadda bog over the next two years (2024, 2025). There are no earmarked PCAS Rehabilitation activities in the vicinity of DFA_004_S as this location has been constrained in anticipation of future renewable energy projects.

A review of logger data for wells 004s and 021s on Derryfadda was carried out. Analysis of the logger data shows restoration has impacted some areas of the site but not all. Well 004s shows no change in the water level trend across the data range suggesting restoration has had no impact in this area or hasn't been completed in this area. The water level bases at roughly 0.5m below ground level and some spikes rise to ground level. During the winter months the water level stays closer to the surface and tends to rarely drop more than 0.2m below the surface. The summer months have less regular spikes and the water level sometimes reaches depths of 0.6m. Well 021s has shown a positive reaction to restoration works. From around September 22 onwards the water level can be seen to stabilise and fluctuate less and it also rises to around surface level in the summer months and just under 0.2m above the surface in the winter months. This is a big improvement from previous water levels of 0.4m below the surface and occasionally spiking to just under ground level in the winter and a base of around 0.6-0.7m in the summer months with rare spikes in the water level barely reaching 0.2m below the surface. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

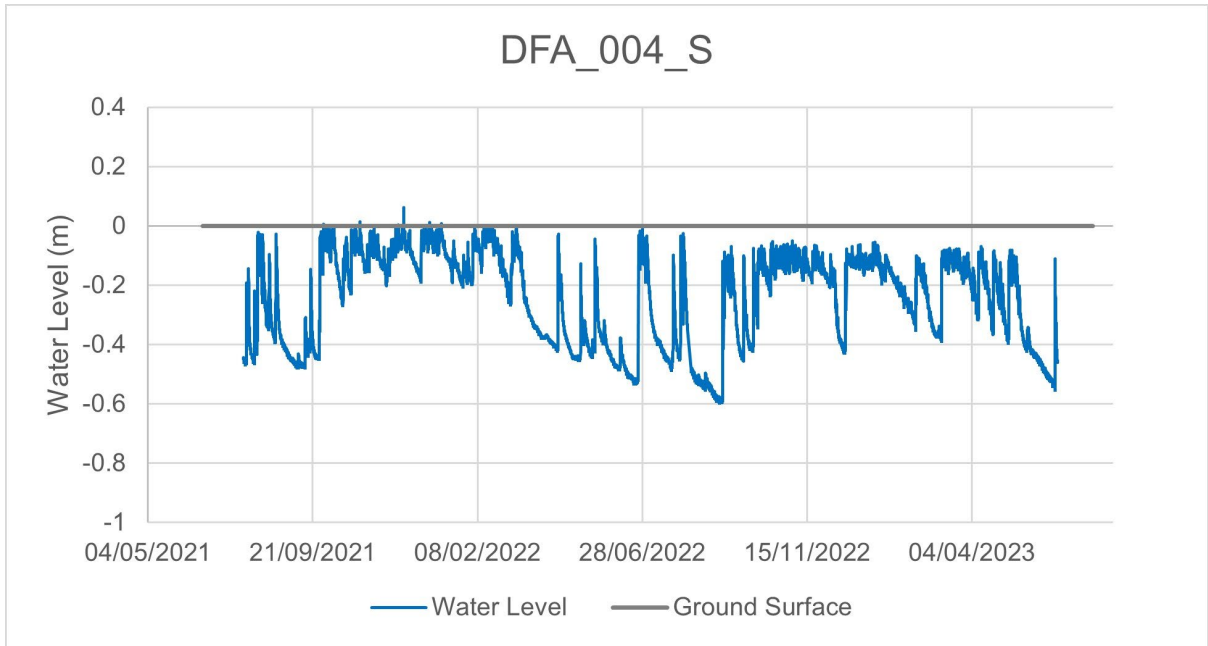


Figure 2.13.1 Hydrograph of the Monitoring Well at DFA_004_S

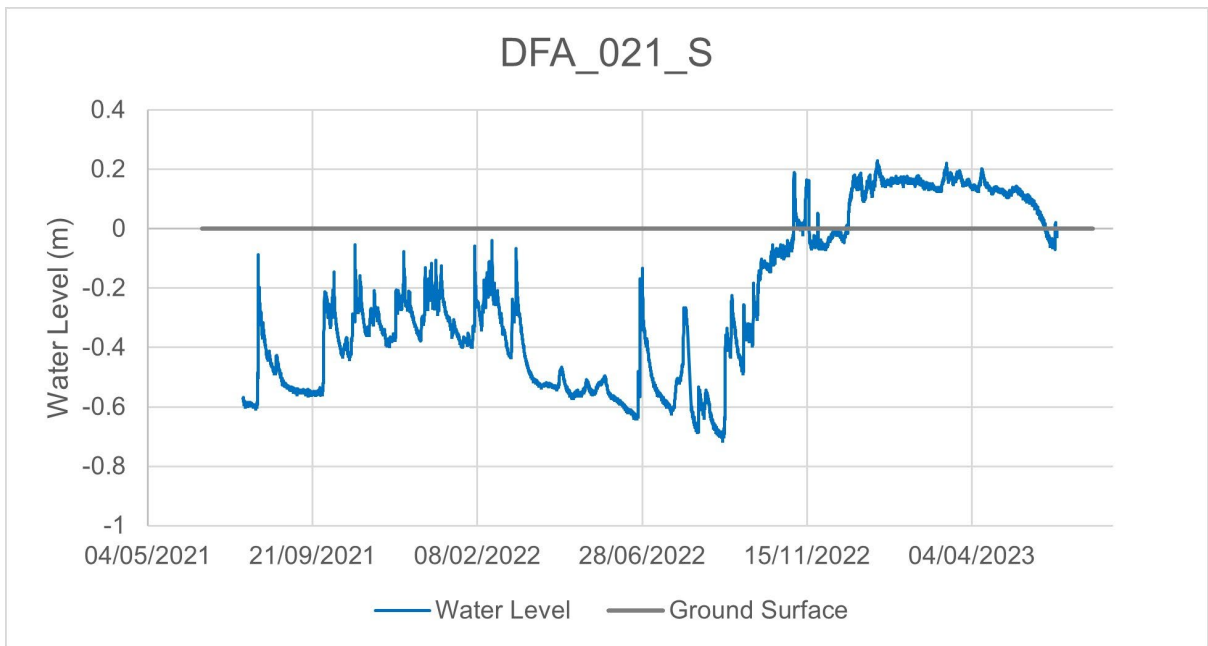


Figure 2.13.2 Hydrograph of the Monitoring Well at DFA_021_S

C2.14 Glenlough

A review of logger data for wells 001s and 011s on Glenlough was carried out. Analysis of the logger data shows the trends in water levels have had no major changes but possibly some minor differences. At well 001s the water levels fluctuated between 0.1-0.3m below the surface in winter 2021/2022 which is around 0.1m deeper than winter 2022/2023. It is important to acknowledge the progress of works on Glenlough Bog. Several key drainage features that would have an impact on ground water levels in proximity to wells 001s and 011s were completed in August 2023, which followed the timelines illustrated in the graphs represented below. It is envisaged that the recent completion of these measures will have an impact on ground water levels generally for winter 2023/2024.

At well 011s the base water level is consistently between 1m and 0.8m below the surface level across the data range. The water levels have very large fluctuations with many spikes rising to just under ground level in the winter months. In the summer months the water levels don't rise as high as in the winter with the peaks reaching 0.2-0.4m in most cases. These peaks are also less common in the summer months. There have been no obvious changes in the water levels as the rehabilitation measures were only completed in August 2023 and the data does not show any information from July 2023 onwards. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

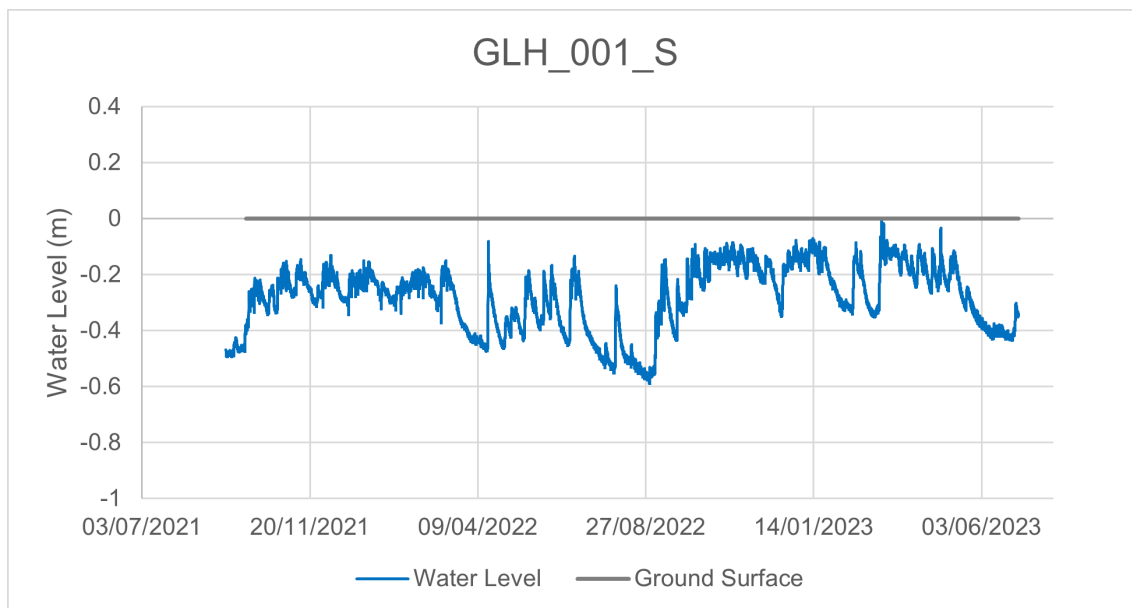


Figure 2.14.1 Hydrograph of the Monitoring Well at GLH_001_S

*PCAS works completed at this Piezometer location in August 2023

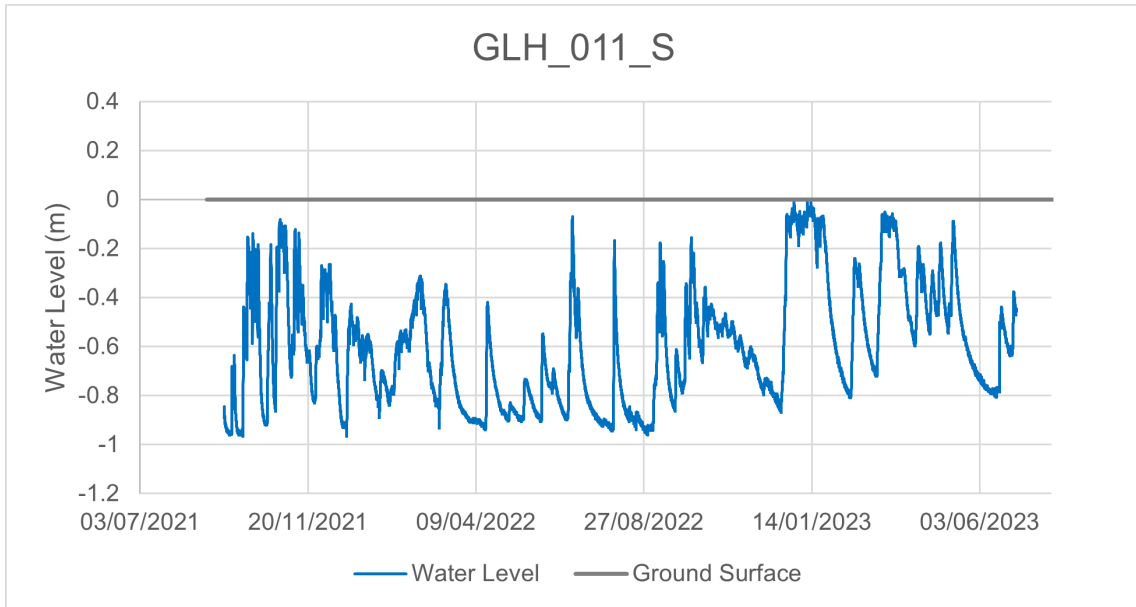


Figure 2.14.2 Hydrograph of the Monitoring Well at GLH_011_S

*PCAS works completed at this Piezometer location in August 2023

C2.15 Noggusboy

Hydrological monitoring is ongoing at Noggusboy Bog. A network of piezometers was installed across Noggusboy Bog in June 2021 consisting of 13 piezometer nests, one of which consist of phreatic/deep well pairs installed at the interface of the peat and underlying inorganic deposits respectively. Of the 13 phreatic monitoring locations across Noggusboy Bog, nine have been instrumented with automated data loggers (Rugged Troll 100) recording groundwater temperature and water level at 15-minute intervals (Resolution 0.01m).

There have been four rounds of Hydrological Monitoring completed at Noggusboy Bog between summer 2021 & summer 2023. Monitoring will be ongoing at Noggusboy bog over the next two years (2024, 2025).

A review of logger data for wells 004s and 009s on Noggusboy was carried out. Analysis of the logger data shows at well 004s the water levels have remained very consistent for the entire period of data. The water level bases at around 0.3m below the surface with spikes in the water level rising up to between 0.1-0.2m below the surface in the winter months. In the summer months these spikes are less common and not as large. The rehabilitation works were completed in November 22 but there is no evidence of this in the logger data. The restoration measures in this area potentially need reviewed.

Well 009s shows the water levels fluctuating around ground level with peaks of 0.2m above the surface during the winter months of 2021/22. Then in March 22 the water levels drops until August 22 when it reaches a low of 0.5m below the surface. The water level then starts to rise to the same levels as the previous winter. The restoration measures were completed in January 23 in this area and the water levels show a clear rise to around 0.3m above the surface at this well location. There is also a more stable water level from this point onwards with a gradual decline to 0.15m above the surface in June 23. The restoration measures in this area appear to have been successful.

More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

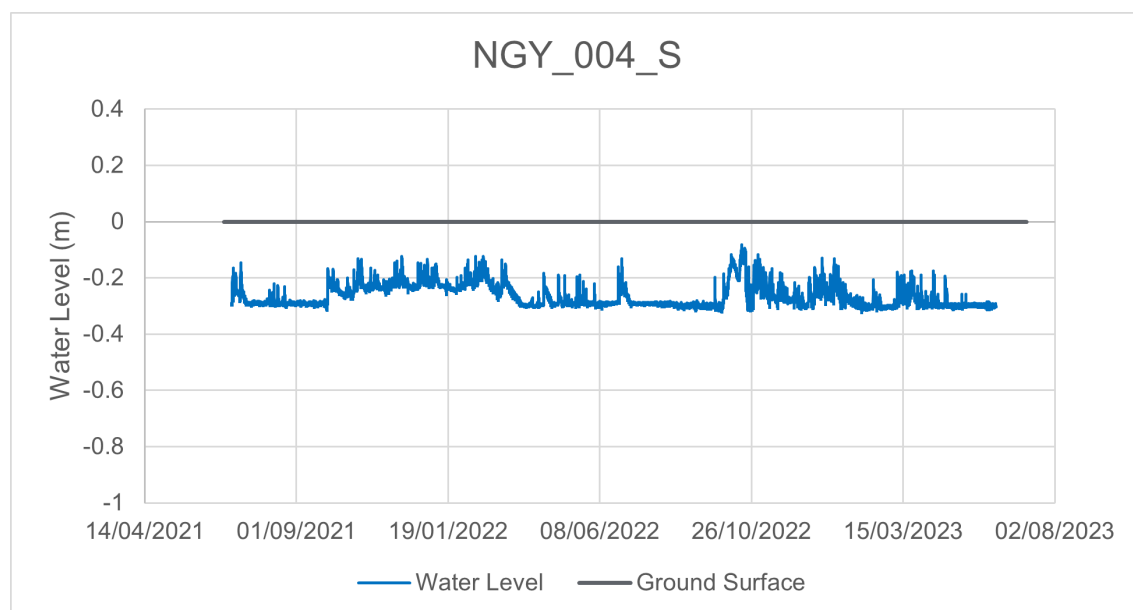


Figure 2.15.1 Hydrograph of the Monitoring Well at NGY_004_S

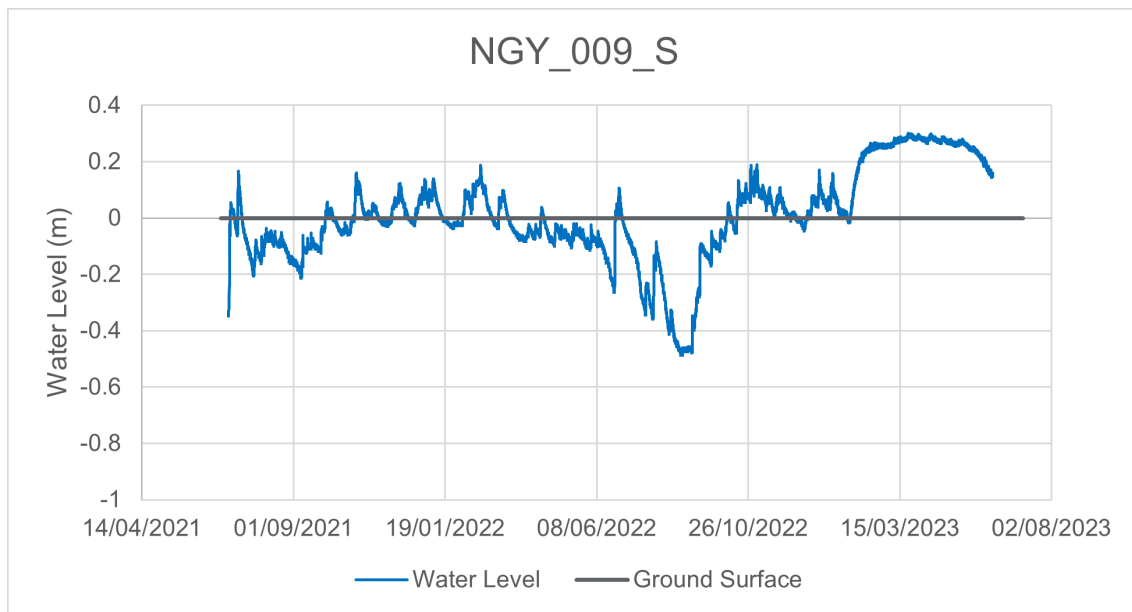


Figure 2.15.2 Hydrograph of the Monitoring Well at NGY_009_S

C2.16 Derrybrat

Hydrological monitoring is ongoing at Derrybrat Bog. A network of piezometers was installed across Derrybrat Bog in July-September 2021 consisting of seven piezometer nests, only one of which consisted of a phreatic/deep well pair installed at the interface of the peat and underlying inorganic deposits as the peat is relatively shallow across the bog. Of the seven phreatic monitoring locations across Derrybrat Bog, four have been instrumented with automated data loggers (Rugged Troll 100) recording groundwater temperature and water level at 15-minute intervals (Resolution 0.01m).

There have been four rounds of Hydrological Monitoring completed at Derrybrat Bog between summer 2021 & summer 2023. Monitoring will be ongoing at Derrybrat bog over the next two years (2024, 2025).

A review of logger data for wells 002s and 003s on Derrybrat was carried out. Analysis of the logger data shows very consistent water levels at well 002s. The water level has remained at ground level for almost the entire data range except for summer 22 when it dropped to 0.3m below the surface.

Restoration was completed in February 23 and so far water levels have remained at ground level with just a couple drops to around 0.1m below the surface. These are ideal conditions, so it appears the restoration measures are working well. At well 003s the water level bases at 0.4m below the surface and during the summer periods it appears to remain at this level. Over the winter periods the water level rises to around 0.2m below the surface and doesn't have many fluctuations. The restoration measures were completed in February 23 but there doesn't appear to be any change in the trend of the water levels at this well location post restoration. When the data was retrieved in June 23 the water level had dropped back down to 0.4m below the surface, similar to previous years. The restoration measures may need reviewed to check how affective they are.

More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

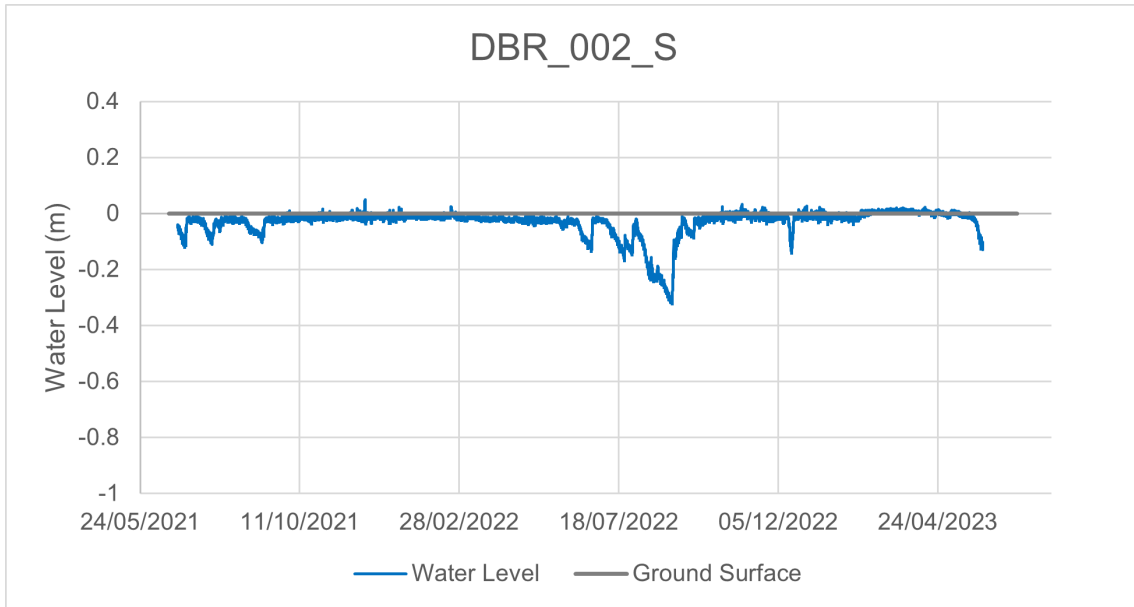


Figure 2.16.1 Hydrograph of the Monitoring Well at DBR_002_S

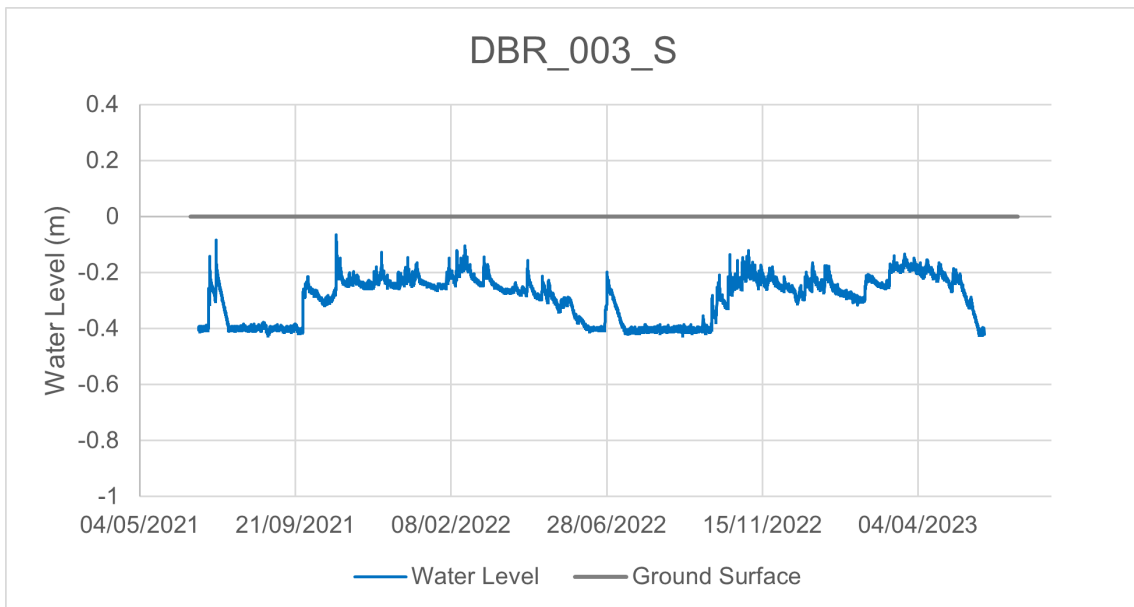


Figure 2.16.2 Hydrograph of the Monitoring Well at DBR_003_S

C2.17 Knappogue

Hydrological monitoring is ongoing at Knappogue bog. A total of 14 nests* comprised of 4 deep wells and 14 Phreatic wells, 7 Phreatic wells have been instrumented with automated loggers, with a subset of the deep piezometers (1) instrumented with automated loggers. There have been four rounds of Hydrological Monitoring completed at Knappogue Bog between summer 2021 & summer 2023. Monitoring will be ongoing at Knappogue bog over the next two years (2024, 2025). Rehabilitation works commenced around KNP_006_S in October 2022 and around KNP_013_S in August 2022. Outfall levels were adjusted and pumps decommissioned in July 2023.

A review of logger data for wells 006s and 013s on Knappogue was carried out. Analysis of the logger data shows no change in the trend of water levels since the completion of restoration measures in these areas. At well 006s the water levels fluctuate between 0.6m below the surface and ground level in summer 21 and 22 and then the water levels stabilise and remain more consistent between the winter months. The restoration measures commenced in October 22 but there appears to be no change in the water levels at this well location. The trend looks as though it will remain the same for the duration of the summer 23 months also as the water levels dropped back down to around 0.6m in June when the logger data was collected. At well 006s there also appears to have been no impact from the rehabilitation works which commenced in August 22. The water levels remained the same with the baseline sitting at around 0.6m below the surface and peaks water levels of 0.2m below the surface in the winter periods and 0.3m below the surface in the summer periods. The restoration measures are not yet completed on this site which is possibly why there has been no impact on the water levels as of yet. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

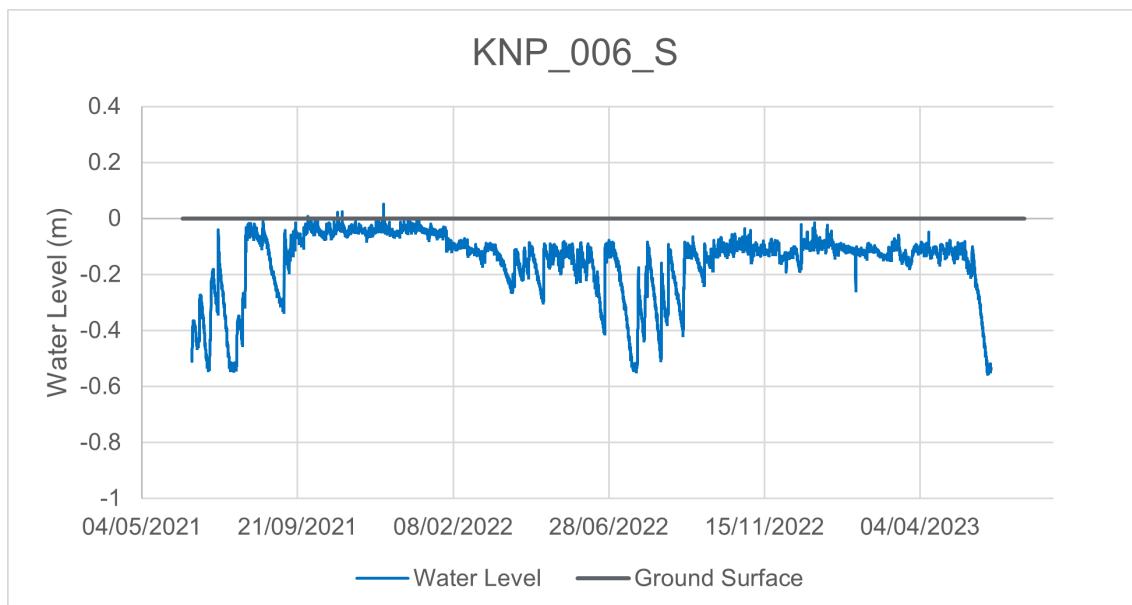


Figure 2.17.1 Hydrograph of the Monitoring Well at KNP_006_S

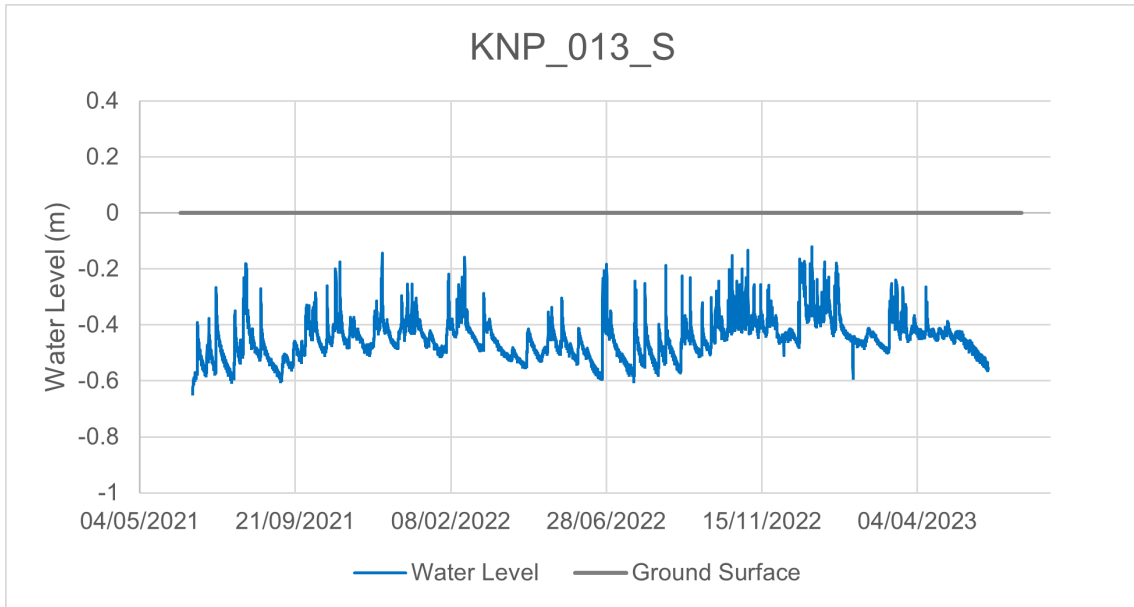


Figure 2.17.2 Hydrograph of the Monitoring Well at KNP_013_S

C2.18 Ballycon

Hydrological monitoring is ongoing at Ballycon Bog. Six piezometer nests have been installed, one of which consist of phreatic/deep well pairs installed at the interface of the peat and underlying inorganic deposits, respectively. Of the 6 phreatic monitoring locations across Ballycon, three have been instrumented with automated data loggers (Rugged Troll 100) recording groundwater temperature and water level at 15-minute intervals (Resolution 0.01m). No deep wells were installed with automated data loggers. Manual dipping of piezometers was completed in Sept 2021, Feb 2022, Aug 2022, and one in 2023. (4nr rounds of dipping). Monitoring will be ongoing at Lodge Bog bog over the next two years (2024, 2025).

A review of the logger data for wells 003S and 006S on Ballycon was carried out.

Analysis of the logger data indicates that water levels have increased following the implementation of restoration measures which started on site in March 2022, with levels in the spring and early Summer of 2023 greater than the corresponding time periods in of 2021 and 2022. . It should be noted that AW2 rehabilitation works have been implemented in the immediate area surrounding well BCN_003_S At BCN_003_S water levels rise in winter 2022 and are maintained into the spring post restoration work which occurred in March 2023, however water levels begin to fall in June 2023 and remain low through summer 2023.

BCN_006_S water levels also rise in winter 2022 and are maintained into the spring post restoration work which occurred in April 2023, however water levels begin to fall in June 2023 and remain low through summer 2023. AW2 measures were implemented in both locations so limited results are expected.

Rehabilitation works were completed around BCN_003_S in April 2023 and around BCN_006_S in April 2023.

More thorough analysis should be carried out by reviewing details of all the loggers installed on this site over the full time period of this project. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

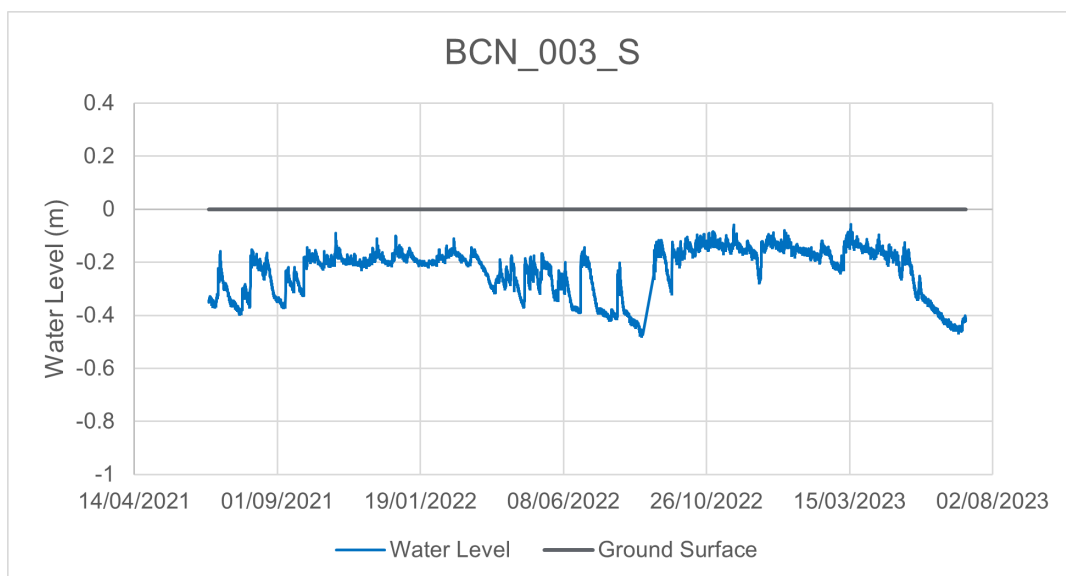


Figure 2.18.1 Hydrograph of the Monitoring Well at BCN_003_S

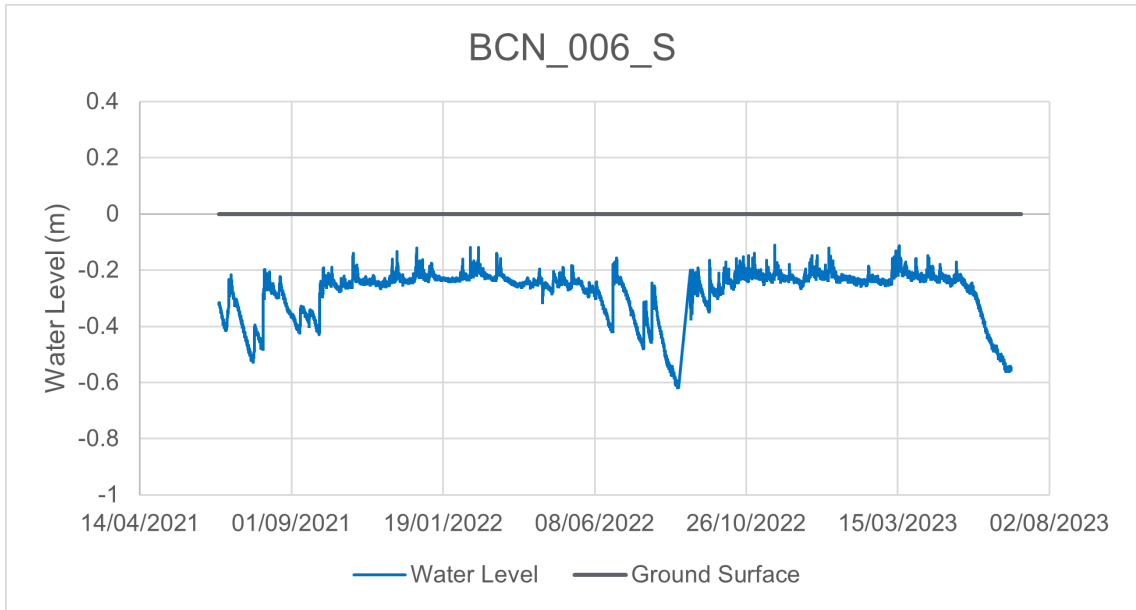


Figure 2.18.2 Hydrograph of the Monitoring Well at BCN_006_S

C2.19 Blackwater

Hydrological monitoring is ongoing at Blackwater bog. A total of 65 Piezometers have been installed. Of the 58 Piezometers, 25 have been instrumented with data loggers. Four deep monitoring locations have also been instrumented with data loggers.

The locations of these piezometers are shown in Figure BnM-DR-23-14-07 Blackwater Bog Piezometer Locations in the Map Book. A total of four monitoring visits have been carried out to date at Blackwater bog as outlined in “Blackwater Bog - Monitoring and Verification Plan”, with manual dipping completed in September 2021, Jan/Feb 2022, June/July 2022 & Oct/Nov 2022 and logger downloading in September 2021, Jan/Feb 2022, June/July 2022 & Oct/Nov 2022.

Monitoring will be ongoing at Blackwater bog over the next two years (2024, 2025). In June 2023 all DPT4 cells were tapped to release water to allow set out and installation of the cell weirs. This is evident in Figure 10.

A review of the logger data for wells 019S and 053S on Blackwater was carried out. Analysis of the logger data from these wells indicates that water levels have increased following the implementation of restoration measures which started on site in February 2023, with levels in the late spring/early summer 2023 greater than those in the corresponding time periods in 2021 and 2022. At BKW_019_S no PCAS restoration works were completed in the immediate vicinity of the piezometer, the closest restoration works took place in February 2023 at approx. 430m from the piezometer and as expected the water level does not show a response to these works and the water table falls as it did the previous year in 2022. BKW_053_S shows a moderate rise in water levels post restoration from February 2023 onwards. Water levels are stable throughout spring 2023. Water levels begin to fall in June 2023. More thorough analysis should be carried out by reviewing details of all the loggers installed on this site over the full time period of this project. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

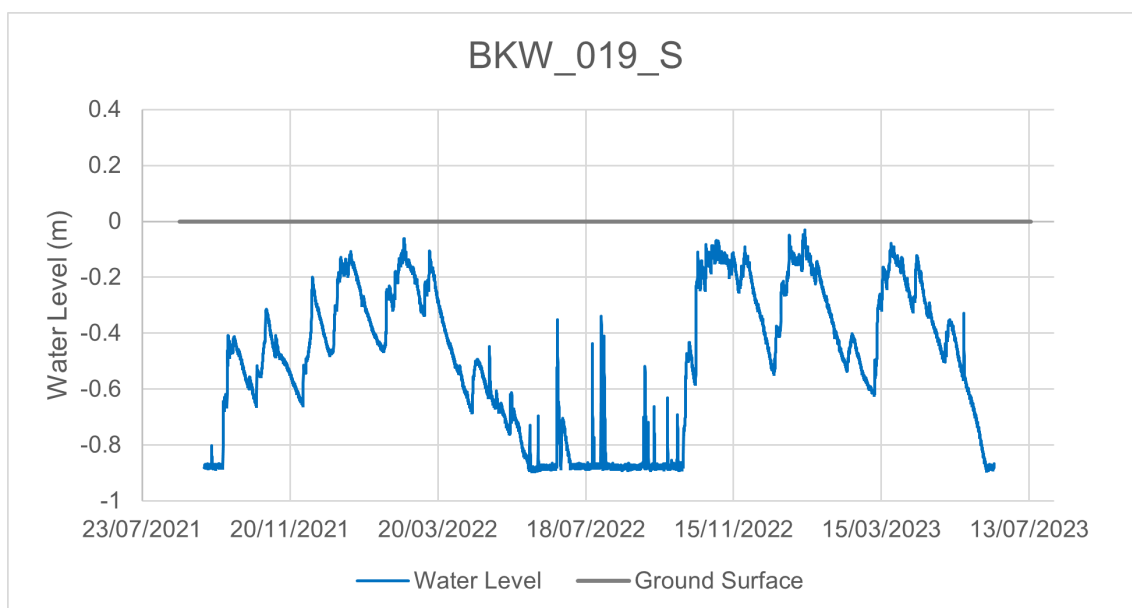


Figure 2.19.1 Hydrograph of the Monitoring Well at BKW_019_S

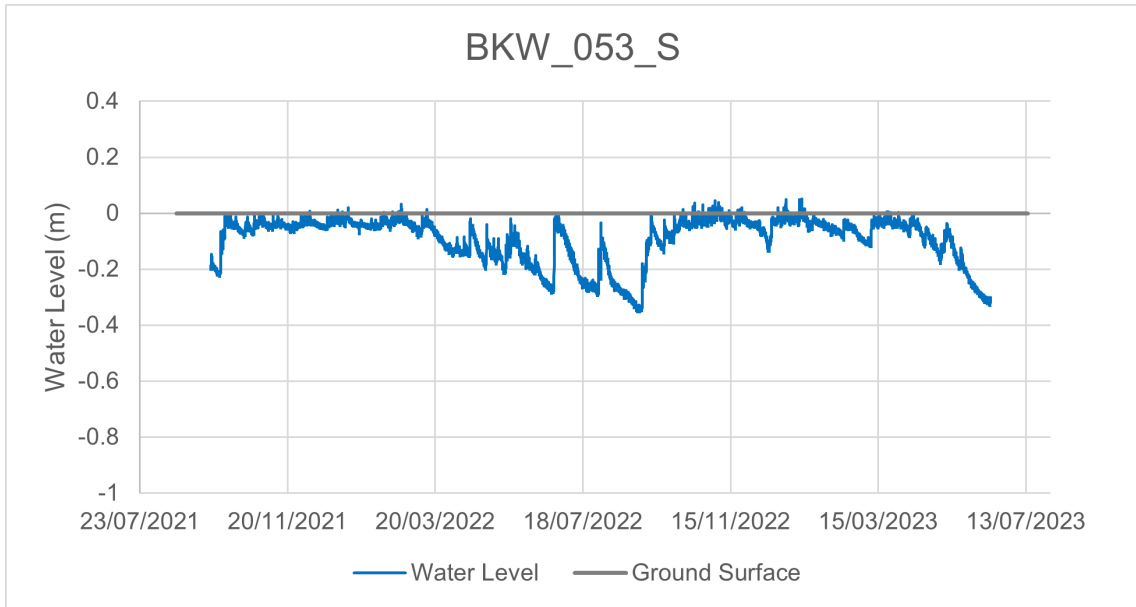


Figure 2.19.2 Hydrograph of the Monitoring Well at BKW_053_S

C2.20 Clooniff

Hydrological monitoring is ongoing at Clooniff bog. A network of 40 piezometer nests have been installed and all 40 phreatic wells have been instrumented with automated loggers. A subset of the deep wells (5 wells) have been instrumented with automated loggers, with the remaining wells monitored manually. Manual dipping of piezometers was completed in May 2021, Jul 2021, January 2022, and August 2022, Mar 2023, and another in Summer 2023 (6nr rounds of dipping). Monitoring will be ongoing at Clooniff Bog bog over the next two years (2024, 2025).

A review of the logger data for wells 001S and 0053S on Clooniff Bog was carried out.

Analysis of the logger data from CF_001_S indicates that water levels have increased following the implementation of the rehabilitation measures (DCT2 drain blocking) in late summer 2022 with levels in the winter, spring and early Summer of 2023 greater than the corresponding time periods in of 2022. As can be seen from figure 11 below, stabilisation of the hydrograph can be observed from late summer/early autumn 2022. This demonstrates the positive impact that the prescribed rehabilitation works has had in the vicinity of the piezometer in question.

An initial review of the manual water level data for piezometer CF_005_S does not provide a clear indication of an increase in water table height. The logger data from well CF_005s shows how the water level at the site increased during winter 2021 only to decrease again to similar levels as summer 2021 during the summer of 2022. The sudden and dramatic increase in water levels in November 2022 and January 2023 can be attributed to flood events on the Shannon. More thorough analysis should be carried out by reviewing details of the logger data which will become available shortly through the project hydrological dashboard. Furthermore, readings are only an indication of results and should be reviewed in subsequent years as water levels are anticipated to take a number of years to stabilise.

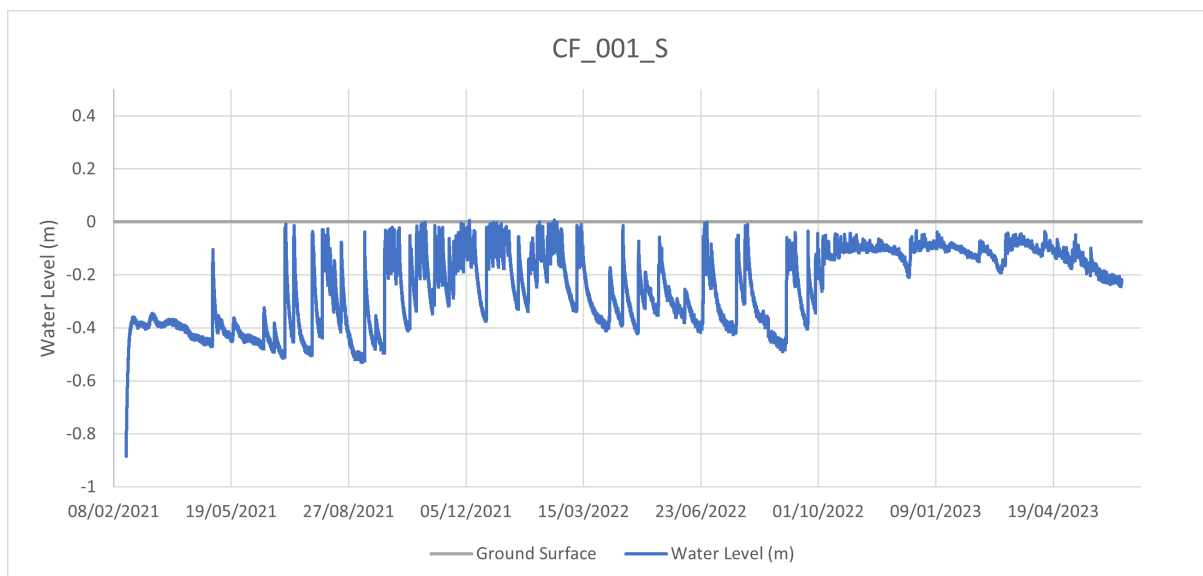


Figure 2.20.1 Hydrograph for monitoring well CF_001s

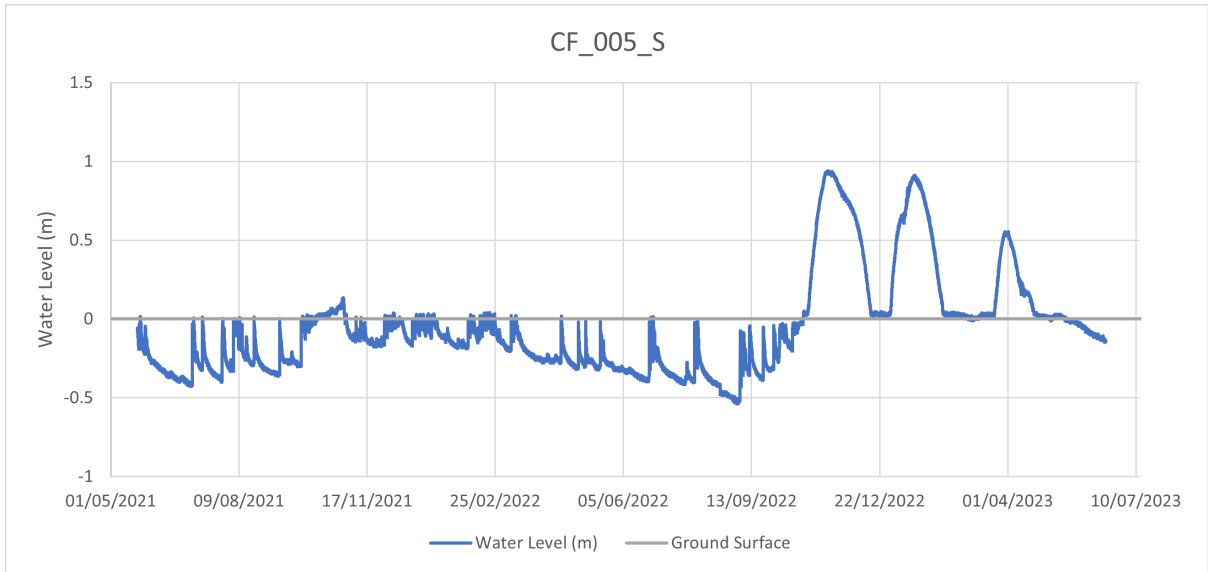


Figure 2.20.2 Hydrograph for monitoring well CF_005s

Appendix C3

ANOVA (Analysis of Variation) Data

Appendix C3 – ANOVA results

Anova: S-Mean – Overall comparison

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	24	-861.5908626	-35.89961927	418.600162
Column 2	24	-570.2340936	-23.7597539	350.7297251

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	1768.515976	1	1768.515976	4.597549128	0.037335344	4.051748692
Within Groups	17694.5874	46	384.6649435			
Total	19463.10338	47				

Anova: S-Med - Overall comparison

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	24	-897.0078301	-37.37532626	467.3595312
Column 2	24	-561.8723369	-23.41134737	383.7888001

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	2339.9125	1	2339.912476	5.498248402	0.023406492	4.051748692
Within Groups	19576.412	46	425.5741656			
Total	21916.324	47				

Anova: S-D90 - Overall comparison

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	24	-1119.227827	-46.63449279	523.7399543
Column 2	24	-833.0650502	-34.71104376	406.4191335

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	1706.023642	1	1706.023642	3.66824055	0.061687949	4.051748692
Within Groups	21393.65902	46	465.0795439			
Total	23099.68266	47				

Figure 1: Overall comparison of water table levels between summer 2021 and summer 2022 for sites where rehabilitation measures have been implemented (sample size 24).

Anova: S-Mean – Deep peat measures

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	14	-484.2338551	-34.58813251	461.3383551
Column 2	14	-276.8068716	-19.7719194	302.6260154

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	1536.641195	1	1536.641195	4.022808535	0.055399609	4.225201273
Within Groups	9931.536817	26	381.9821853			
Total	11468.17801	27				

Anova: S-Med -- Deep peat measures

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	14	-507.5516896	-36.25369212	508.6167059
Column 2	14	-272.4322753	-19.45944824	312.5966234

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	1974.326393	1	1974.326393	4.808315506	0.037466583	4.225201273
Within Groups	10675.77328	26	410.6066647			
Total	12650.09967	27				

Anova: S-D90 -- Deep peat measures

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	14	-649.6267909	-46.40191364	621.588166
Column 2	14	-437.076596	-31.21975686	439.8059509

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	1613.485192	1	1613.485192	3.040313048	0.093035195	4.225201273
Within Groups	13798.12352	26	530.6970585			
Total	15411.60871	27				

Figure 2: Comparison of water table levels between summer 2021 and summer 2022 where deep peat rehabilitation measures have been implemented (sample size 14).

Anova: S- Mean – Dry cutaway measures

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	5	-216.6770204	-43.33540408	564.2532965
Column 2	5	-168.8518607	-33.77037214	454.5968909

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	228.72459	1	228.72459	0.448985715	0.521684903	5.317655072
Within Groups	4075.400749	8	509.4250937			
Total	4304.125339	9				

Anova: S-Med – Dry cutaway measures

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	5	-224.209913	-44.8419826	630.7642122
Column 2	5	-174.2281132	-34.84562263	535.6339633

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	249.8180315	1	249.8180315	0.428358063	0.531157444	5.317655072
Within Groups	4665.592702	8	583.1990877			
Total	4915.410733	9				

Anova: S-D90 – Dry cutaway measures

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	5	-262.7081715	-52.54163429	674.2229209
Column 2	5	-203.7809568	-40.75619137	373.4314979

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	347.2416623	1	347.2416623	0.662893519	0.439101117	5.317655072
Within Groups	4190.617675	8	523.8272094			
Total	4537.859337	9				

Figure 3: Comparison of water table levels between summer 2021 and summer 2022 where dry cutaway rehabilitation measures have been implemented (sample size 5).

**Anova: S-Mean –
Wetland measures**

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	4	-121.869797	-30.46744926	315.4507243
Column 2	4	-92.88491068	-23.22122767	508.8333324

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	105.0154545	1	105.0154545	0.254804042	0.631711693	5.987377607
Within Groups	2472.85217	6	412.1420284			
Total	2577.867625	7				

**Anova: S-Med – Wetland
measures**

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	4	-125.0501	-31.26251322	386.8014682
Column 2	4	-83.29922	-20.82480597	549.819299

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	217.8914652	1	217.8914652	0.46527148	0.520618766	5.987377607
Within Groups	2809.862302	6	468.3103836			
Total	3027.753767	7				

Anova: S-D90 – Wetland measures

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	4	-157.5436794	-39.38591986	291.9051358
Column 2	4	-149.4827219	-37.37068048	563.5186409

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	8.122379532	1	8.122379532	0.018990306	0.89490263	5.987377607
Within Groups	2566.27133	6	427.7118884			
Total	2574.39371	7				

Figure 4: Comparison of water table levels between summer 2021 and summer 2022 where wetland rehabilitation measures have been implemented (sample size 4).

Bord na Móna

Enhanced Decommissioning, Restoration and Rehabilitation Scheme (EDRRS)

Annual Monitoring and Verification Report

EDRRS Year 2

(April 2022 to March 2023)

Appendices - Volume 3

Appendix D

Biodiversity

Appendix D1: Overview Section - Summary tables.

Appendix D2: Scheme Year 1 Bogs - Updated Bog Accounts.

Appendix D3: Scheme Year 2 Bogs - Individual Bog Accounts.

Appendix D4: Biodiversity Information for year 2 bogs including tables.

Appendix D5: Updated Quadrat Data - Year 1 & 2 Bogs.

Appendix D1

Biodiversity Overview Supporting Tables

	Required Biodiversity Monitoring Surveys (EDRRS)					
Bog Name	Habitat Mapping Update	Bog Condition Mapping	Vegetation Quadrats	Breeding Birds	Winter Birds	Pollinators
Belmont	2021 & 2025	2021 & 2025	2021 & 2024	2022 & 2025	2021 & 2023 & 2025	N/A
Boora	2021 & 2025	2021 & 2025	N/A	2022 & 2025	2021 & 2024	N/A
Castlegar	2021 & 2025	2021 & 2025	2021 & 2022 & 2023 & 2024	(2022&2023&2024&2025)	2021 & 2022 & 2023 & 2024	(2022 & 2023 & 2024 & 2025)
Cavemount	2021 & 2025	2021 & 2025	2021 & 2024	(2022&2023&2024&2025)	2021 & 2022 & 2023 & 2024	2021 & 2022 & 2023 & 2024
Clonad	2021 & 2025	2021 & 2025	2021 & 2024	2022 & 2025	N/A	2021 & 2022 & 2023 & 2024
Clooniff	(2022&2025)	2021 & 2025	N/A	(2022 & 2025)	2021 & 2022 & 2023 & 2024	(2022 & 2025)
Derries	2021 & 2025	2021 & 2025	N/A	N/A	N/A	N/A
Derrycashel	2021 & 2025	2021 & 2025	N/A	2022 & 2024 & 2025	2021 & 2025	N/A
Derrycolumb	2021 & 2025	2021 & 2025	2021 & 2024	(2022&2023&2024&2025)	2021 & 2022 & 2023 & 2024	2021 & 2022 & 2023 & 2024
Edera	2021 & 2025	2021 & 2025	2021 & 2022 & 2023 & 2024	(2022&2023&2024&2025)	2021 & 2022 & 2023 & 2024	(2022&2023&2024&2025)
Esker	2021 & 2025	2021 & 2025	N/A	N/A	N/A	N/A
Garryduff	2021 & 2025	2021 & 2025	2021 & 2024	2022 & 2025	2021 & 2024	N/A
Kellysgrove	2021 & 2025	2021 & 2025	2021 & 2024	(2022&2023&2024&2025)	N/A	N/A
Kilmacshane	2021 & 2025	2021 & 2025	N/A	2022 & 2025	2021 & 2023 & 2025	N/A
Mountlucas	2021 & 2025	2021 & 2025	N/A	2022 & 2025	N/A	N/A
Oughter	2021 & 2025	2021 & 2025	2021 & 2024	2021 & 2022 & 2023 & 2024	2021 & 2022 & 2023 & 2024	2021 & 2022 & 2023 & 2024
Pollagh	2021 & 2025	2021 & 2025	2021 & 2024	(2022 & 2025)	2021 & 2024	N/A
Turraun	2021 & 2025	2021 & 2025	N/A	2022 & 2025	2021 & 2024	N/A
Ummeras	2021 & 2025	2021 & 2025	2021 & 2022 & 2023 & 2024	(2022&2023&2024&2025)	2021 & 2022 & 2023 & 2024	(2022&2023&2024&2025)
Lodge	2022 & 2025	2022 & 2025	N/A	2022 & 2025	N/A	2022 & 2023 & 2024 & 2025
Ballycon	2022 & 2025	2022 & 2025	N/A	2022 & 2025	N/A	N/A
Clooneeny	2022 & 2025	2022 & 2025	N/A	N/A	N/A	N/A
Begnagh	2022 & 2025	2022 & 2025	N/A	N/A	2022 & 2025	2022 & 2025
Derraghaun	2022 & 2025	2022 & 2025	N/A	N/A	N/A	N/A
Killaranny	2022 & 2025	2022 & 2025	N/A	N/A	N/A	N/A
Derryfadda	2022 & 2025	2022 & 2025	N/A	2022&2025	2022 & 2023 & 2024 & 2025	N/A
Derrybrat	2022 & 2025	2022 & 2025	N/A	2022&2025	2022 & 2023 & 2024 & 2025	N/A
Knappogue	2022 & 2025	2022 & 2025	N/A	N/A	2022 & 2025	N/A
Noggusboy	2022 & 2025	2022 & 2025	N/A	(2022&2023&2024&2025)	(2022&2023&2024&2025)	N/A
Bloom Hill	2022 & 2025	2022 & 2025	N/A	2022 & 2025	2022 & 2025	N/A
Bunahinly-Kilgarvan	2022 & 2025	2022 & 2025	N/A	2022 & 2025	2022 & 2025	N/A
Carranstown	2022 & 2025	2022 & 2025	2022&2024	N/A	N/A	N/A
Cloncreen	2022 & 2025	2022 & 2025	N/A	N/A	N/A	N/A
Derrinboy	2022 & 2025	2022 & 2025	N/A	N/A	N/A	N/A
Glen Lough	2022 & 2025*	2022 & 2025	2022 & 2025	2022 & 2025	N/A	N/A
Prosperous	2022 & 2025	2022 & 2025	N/A	N/A	N/A	N/A
Timahoe South	2022 & 2025	2022 & 2025	2023 & 2026	N/A	N/A	N/A
Blackwater (Phase 1)	2022 & 2025	2022 & 2025	N/A	2022&2023&2024&2025	2022&2023&2024&2025	2022&2023&2024&2025

Table 1 Required Biodiversity Monitoring Surveys (Enhanced Rehabilitation) in respect of EDRRS Year 1 and Year 2 Bogs (text in red indicates amendments from original proposed regime)

Table 2 EDRRS Monitoring results included in the current report

Scheme Bog Name	Habitats		Birds		Invertebrates
	Habitat Mapping	Vegetation Monitoring	Wintering	Breeding	Pollinators
Belmont	N/A	N/A	YR2:2022/23	N/A	N/A
Clooniff	N/A	N/A	YR2:2022/23	N/A	N/A
Garryduff	N/A	N/A	YR2:2022/23	N/A	N/A
Kilmacshane	N/A	N/A	YR2:2022/23	N/A	N/A
Oughter	N/A	N/A	YR2:2022/23	N/A	N/A
Pollagh	N/A	N/A	YR2:2022/23	N/A	N/A
Turraun	N/A	N/A	YR2:2022/23	N/A	N/A
Castlegar	N/A	N/A	YR2:2022/23	N/A	N/A
Cavemount	N/A	N/A	YR2:2022/23	N/A	N/A
Ummeras	N/A	N/A	YR2:2022/23	N/A	YR1: 2022
Derrycolumb	N/A	N/A	YR2:2022/23	N/A	N/A
Edera	N/A	N/A	YR2:2022/23	N/A	YR1: 2022
Lodge	YR1: 2022	N/A	N/A	YR1: 2022	YR1: 2022
Ballycon	YR1: 2022	N/A	N/A	N/A	N/A
Clooneeny	YR1: 2022	N/A	N/A	N/A	N/A
Begnagh	YR1: 2022	N/A	YR1: 2022	N/A	YR1: 2022
Derraghaun	YR1: 2022	N/A	N/A	N/A	N/A
Killaranny	YR1: 2022	N/A	N/A	N/A	N/A
Derryfadda	YR1: 2022	N/A	YR1: 2022	YR1: 2022	N/A
Derrybrat	YR1: 2022	N/A	YR1: 2022	YR1: 2022	N/A
Knappogue	YR1: 2022	N/A	YR1: 2022	N/A	N/A
Noggusboy	YR1: 2022	N/A	YR1: 2022	YR1: 2022	N/A
Bloom Hill	YR1: 2022	N/A	YR1: 2022	YR1: 2022	N/A
Bunahinly-Kilgarvan	YR1: 2022	N/A	N/A	YR1: 2022	N/A
Carranstown	YR1: 2022	YR1: 2022	N/A	N/A	N/A
Cloncreen	YR1: 2022	N/A	N/A	N/A	N/A
Derrinboy	YR1: 2022	N/A	N/A	N/A	N/A
Glen Lough	YR1: 2022	YR1: 2022	N/A	YR1: 2022	N/A
Prosperous	YR1: 2022	N/A	N/A	N/A	N/A
Timahoe South	YR1: 2022	YR1: 2022	N/A	N/A	N/A
Blackwater (Phase 1)	YR1: 2022	N/A	YR1: 2022	YR1: 2022	YR1: 2022

Table 3 Bord na Móna habitat classification system

Habitat Category	Habitat	BnM habitat code	BnM map category	nearest Phytosociological syntaxa	Fossitt (2000) classification	Fossitt Code
Peatland	Bare peat (0-50% cover)	BP	Bare peat		Spoil and bare ground	ED2
Peatland	pioneer <i>Eriophorum angustifolium</i> community (acidic) <i>Sphagnum cuspidatum</i> - <i>Eriophorum angustifolium</i> community Embryonic bog community (somewhat more diverse and developed)	PBa PBb PBc	Embryonic bog Embryonic bog Embryonic bog	Oxycocco-Sphagnetea Oxycocco-Sphagnetea Calluno-Sphagnion	Bog Bog Bog	PB PB PB
Fen	Pioneer <i>Campylopus</i> dominated community Pioneer <i>Juncus effusus</i> community Pioneer <i>Eriophorum angustifolium</i> community (poor fen) Pioneer <i>Juncus bulbosus</i> community Pioneer <i>Triglochin palustris</i> community Pioneer <i>Juncus</i> with <i>Sphagnum</i> Pioneer rich fen community with <i>Schoenus nigricans</i> (rudimentary rich fen) Pioneer <i>Carex viridula</i> /brown moss community (rich fen) Pioneer <i>Cladium</i> community	pCamp pJeff pEang pJbulb pTrig pJunc Pschon pVir pCladium	Pioneer Poor fen Pioneer Poor fen Pioneer Poor fen Pioneer Poor fen Pioneer Poor fen Pioneer Poor fen Rudimentary Rich fen Rudimentary Rich fen Rudimentary Rich fen	Caricion curto-nigrae Caricion curto-nigrae Caricion curto-nigrae Caricion curto-nigrae Caricion curto-nigrae Caricion curto-nigrae Sphagneto-Juncetum Caricion davallianae	Poor fen Poor fen Poor fen Poor fen Poor fen Poor fen Rich fen Rich fen Rich fen	PF2 PF2 PF2 PF2 PF2 PF2 PF1 PF1 PF1
Emergent communities	<i>Carex rostrata</i> community <i>Carex paniculata</i> community <i>Phragmites australis</i> community <i>Typha</i> community <i>Schoenoplectus</i> community	pRos pPan pPhrag pTyp pSch	Pioneer Poor fen Pioneer Poor fen Reedbeds Reedbeds Reedbeds	Caricion rostratae Caricetum paniculatae Scirpo-Phragmitetum Typhetum latifoliae Scirpo-Phragmitetum	Reed and large sedge swamps Reed and large sedge swamps Reed and large sedge swamps Reed and large sedge swamps Reed and large sedge swamps	FS1 FS1 FS1 FS1 FS1
Open water/aquatic	Permanent pools and lakes Permanent pools and lakes Charophytes Temporary open water	OW OW pChar tOW	Open water Open water Aquatic communities Temporary open water	Isoeto-Litorelletea Isoeto-Litorelletea Charetea	Dystrophic lakes Acid-oligotrophic lakes Limestone/Marl lakes	FL1 FL2 FL3
Woodland and scrub	Emergent <i>Betula</i> -dominated community (A) Open <i>Betula</i> -dominated community (B) Closed <i>Betula</i> scrub community (C) <i>Ulex</i> -dominated community <i>Betula-Salix</i> woodland	eBir oBir cBir eGor BirWD	Birch scrub Birch scrub Birch scrub Gorse scrub Birch - Willow woodland	Salici-Betuletum pubescentis Salici-Betuletum pubescentis Salici-Betuletum pubescentis Salici-Betuletum pubescentis	Scrub Scrub Scrub Scrub Bog woodland	WS1 WS1 WS1 WS1 WN7
Heathland	Dry <i>Calluna</i> community Wet Heath community Dense <i>Pteridium</i>	dHeath wHeath dPter	Dry Heath Wet Heath Bracken	Calluno-Ulicetalia Narthecio-Ericetum Rhamno-Prunetea	Dry heath Wet Heath Dense Bracken	HH1 HH3 HD1
Grassland	Dry calcareous grassland <i>Anthoxanthum -Holcus-Equisetum</i> community <i>Dactylis-Arrhenatherum</i> community <i>Molinia caerulea</i> -dominated community Marsh - <i>Filipendula</i> and other tall herbs	gCal gAn-H-Eq gDact-Arr gMol Mar	Dry grassland Dry grassland Dry grassland Acidic grassland Marsh	Centaureo-Cynosuretum No close affinities to Irish syntaxa Arrhenatheritum elatioris Junco conglomerati-Molinion Filipendulion ulmariae	Dry calcareous and neutral grassland Dry calcareous and neutral grassland Dry meadows and grassy verges Wet grassland Marsh	GS1 GS GS2 GS4 GM1
Ruderal	<i>Tussilago</i> -dominated community (vegetation > 50%) <i>Epilobium</i> -dominated community (vegetation > 50%)	DisCF DisWil	Disturbed & pioneer vegetation Disturbed & pioneer vegetation	Tussilaginetum Tussilaginetum	Recolonising bare ground Recolonising bare ground	ED3 ED3
General	Riparian areas (stream or drain with associated edge habitats, FW2/4) Access (tracks or railways with associated edge habitats, BL3)	Rip Acc			Lowland River/Drainage Ditches Buildings and artificial surfaces	FW2/FW4 BL3

Table 4: Habitat Findings Summary. Comments generally reflect changes since rehab was carried out. Green in the re-wetting column indicates positive re-wetting across the site. Yellow in the re-wetting column indicates rehabilitation was incomplete at the time of reporting. Green in the Trajectory column indicates positive habitat changes or vegetation establishment since rehab was carried out. Yellow in the trajectory column indicates no measurable evidence of changes in vegetation following rehabilitation, in the current reporting period

Bog Name	Rehabilitation Year	Expected Future Habitats	Area (ha)	Re-wetting Progress	Trajectory August 2023 (end of Scheme year 2)	Observations (Aug 2023 based on sentinel June 2023 imagery and/or site visits where applicable)
Belmont	Scheme Year 1	Bog woodland & heathland mosaic	26.30	Green	Yellow	<ol style="list-style-type: none"> 1. Conditions across site significantly changed – re-wetted. 2. One third of Belmont remains as bare peat. 3. Some fresh pioneering vegetation present 4. New vegetation cover is very low. 5. Alkaline indicator species of rudimentary rich fen occur scattered throughout the bog. 6. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 7. Re-wetting has consolidated suitable conditions for expected fen habitat trajectory.
		Bog woodland, areas of open habitats	40.13			
		Degraded raised bog (non-annex quality)	8.67			
		Embryonic bog community	15.52			
		Embryonic raised bog	42.59			
		Marginal land	69.57			
		Oak-Ash-Hazel Bog woodland	0.30			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	101.00			
		Poor fen, rich fen and scrub mosaic	13.73			
Clooniff	Scheme Year 1	Bog woodland & heathland mosaic	0.00	Green	Yellow	<ol style="list-style-type: none"> 1. Conditions across site significantly changed – re-wetted. 2. New pioneer wetlands have been noted. 3. Water levels in existing wetland stabilised over summer. 4. New vegetation cover is very low. 5. No changes in existing vegetation/habitats yet. 6. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 7. Re-wetting has consolidated suitable conditions for expected habitat trajectory.
		Bog woodland & wetland mosaic	4.94			
		Bog woodland, areas of open habitats	59.59			
		Embryonic raised bog	85.60			
		Fen mosaic	18.99			
		Marginal land	79.65			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	279.36			
Garryduff	Scheme Year 1	Bog woodland & wetland mosaic	32.81	Green	Yellow	<ol style="list-style-type: none"> 1. Conditions across site changed somewhat – site was already re-wetting. 2. Some new wetlands with shallow surface water noted. 3. One third of Garryduff remains as bare peat or open water on bare peat. 4. Very little new pioneering vegetation. 5. Alkaline indicator species of rudimentary rich fen present. 6. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 7. Re-wetting has consolidated suitable conditions for expected wetland and fen development.
		Bog woodland, areas of open habitats	65.57			
		Degraded raised bog (non-annex quality)	3.30			
		Embryonic raised bog	42.74			
		Marginal land	183.78			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	641.98			
		Riparian areas	3.54			
Kellysgrove	Scheme Year 1	Access	4.66	Green	Yellow	<ol style="list-style-type: none"> 1. Drain blocking has been very effective – high water levels noted in blocked drains. 2. No changes in established vegetation noted yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 3. The bog is significantly wetter, indicates good future prospects for raised bog restoration.
		Active quarry and mines	0.08			
		Agriculture	2.09			
		Bog woodland	10.99			
		Bog woodland & heathland mosaic	43.73			
		Buildings and artificial surfaces	1.02			
		Canals	3.84			
		Degraded raised bog (non-annex quality)	126.77			
		Mixed broad-leaved woodland	7.04			
		Poor fen and flush	3.13			
Kilmacshane	Scheme Year 1	Bog woodland & wetland mosaic	1.69	Green	Yellow	<ol style="list-style-type: none"> 1. Conditions across site changed somewhat – site was already re-wetting. 2. Very little new pioneering vegetation is present in bare peat areas within the rehab footprint.
		Bog woodland, areas of open habitats	155.96			
		Degraded raised bog (non-annex quality)	32.09			

Bog Name	Rehabilitation Year	Expected Future Habitats	Area (ha)	Re-wetting Progress	Trajectory August 2023 (end of Scheme year 2)	Observations (Aug 2023 based on sentinel June 2023 imagery and/or site visits where applicable)
		Embryonic raised bog	66.98			<p>3. <i>Sphagnum</i> moss inoculation has taken place within parts of Kilmacshane bog (within the area known as Clonfert) and this may influence the trajectory of the habitat establishment.</p> <p>4. No changes in existing vegetation/habitats noted yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes.</p> <p>5. Re-wetting has consolidated suitable conditions for expected wetland and fen development.</p>
		Marginal land	194.17			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	847.17			
Boora	Scheme Year 1	Access	13.82			<p>1. Conditions across targeted area significantly changed – re-wetted.</p> <p>2. No changes in established vegetation noted yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes.</p> <p>3. <i>Sphagnum</i> moss inoculation has taken place within parts of Boora west bog and this may influence the trajectory of the habitat establishment.</p> <p>4. Boora West is one site where there has been rapid change since 2019 when peat extraction ceased from mostly bare peat to mostly pioneer vegetation cover.</p> <p>5. Re-wetting has created suitable conditions for expected habitat development.</p>
		Agriculture	23.52			
		Amenity grassland	6.06			
		Bog woodland	5.01			
		Bog woodland & dry grassland mosaic	6.00			
		Bog woodland & heathland mosaic	86.48			
		Bog woodland & wetland mosaic	180.24			
		Bog woodland, areas of open habitats	347.14			
		Buildings and artificial surfaces	0.60			
		Canals	0.99			
		Conifer plantation	824.60			
		Degraded raised bog (non-annex quality)	2.07			
		Embryonic raised bog	49.79			
		Limestone/marl lake	22.91			
		Mesotrophic lakes	1.21			
		Mixed broad-leaved woodland	11.69			
		Mixed broad-leaved/conifer woodland	15.33			
		Oak-Ash-Hazel Bog woodland	0.38			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	190.89			
		Poor fen and flush	0.00			
		Poor fen, Dry calcareous and neutral grassland & Scrub	7.27			
Poor fen, rich fen and scrub mosaic	24.04					
Rich fen and flush	14.63					
Riparian areas	1.83					
Wetlands & rich fen mosaic	10.17					
Works areas	6.51					
Derries	Scheme Year 1	Bog woodland & dry heath mosaic	4.08			<p>1. Conditions across site changed somewhat. Targeted measures implemented. Re-wetted in part.</p> <p>2. Habitats already established.</p> <p>3. No changes in established vegetation noted yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes.</p> <p>4. More time needed to evaluate planned re-wetting at this site.</p>
		Bog woodland & wetland mosaic	190.34			
		Bog woodland, areas of open habitats	85.02			
		Embryonic raised bog	15.09			
		Marginal land	37.81			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	38.56			
		Transition mire and quaking bog	0.08			

Bog Name	Rehabilitation Year	Expected Future Habitats	Area (ha)	Re-wetting Progress	Trajectory August 2023 (end of Scheme year 2)	Observations (Aug 2023 based on sentinel June 2023 imagery and/or site visits where applicable)
Oughter	Scheme Year 1	Bog woodland & dry grassland mosaic	16.45			<ol style="list-style-type: none"> Conditions across site significantly changed – re-wetted. No indications of recent changes to more established habitats in response to rehabilitation measures yet. Very little new pioneering vegetation yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. Re-wetting has consolidated suitable conditions for expected fen and wetland habitat development.
		Bog woodland & heathland mosaic	9.85			
		Bog woodland & wetland mosaic	15.71			
		Bog woodland, areas of open habitats	64.10			
		Marginal land	77.60			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	173.84			
Pollagh	Scheme Year 1	Bog woodland & heathland mosaic	0.00			<ol style="list-style-type: none"> Conditions across site radically changed – site re-wetted. No indications of recent changes to more established vegetation/habitats in response to rehabilitation measures yet. Almost no new pioneering vegetation is present within the bare peat areas in the rehabilitation extent. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. Re-wetting has created suitable conditions for expected mosaic of wet cutaway habitat development.
		Bog woodland & wetland mosaic	22.97			
		Bog woodland, areas of open habitats	55.55			
		Embryonic raised bog	90.34			
		Marginal land	38.72			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic.	96.79			
Turraun	Scheme Year 1	Bog woodland	39.17			<ol style="list-style-type: none"> Conditions across site changed somewhat. Site re-wetted in part. Targeted measures implemented. Some still left to do. Some new wetlands with shallow surface water noted. No indications of recent changes to more established habitats in response to rehabilitation measures yet No recordable change of vegetation cover noted yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. More time needed to evaluate planned re-wetting across this site.
		Bog woodland & heathland mosaic	186.96			
		Bog woodland & wetland mosaic	44.82			
		Bog woodland, areas of open habitats	20.32			
		Limestone/marl lake	21.02			
		Marginal land	67.86			
		Oak-Ash-Hazel woodland	5.22			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	140.01			
		Reed and large sedge swamps	6.52			
		Wet Willow-Alder-Ash woodland	3.27			
Castlegar	Scheme Year 1	Access	2.13			<ol style="list-style-type: none"> Conditions across site radically changed – site re-wetted. No recordable change of vegetation cover noted yet. <i>Sphagnum</i> moss inoculation has taken place within parts of Carranstown bog and this may influence the trajectory of the habitat establishment. Some drains that have been partially blocked are already beginning to colonise with <i>Sphagnum cuspidatum</i> that was already present on site. Re-wetting has created suitable conditions for expected habitat development.
		Agriculture	12.12			
		Bog woodland	21.02			
		Bog woodland & heathland mosaic	25.29			
		Bog woodland with Lodgepole Pine	6.60			
		Bog woodland, areas of open habitats	0.84			
		Degraded raised bog (non-annex quality)	138.80			
		Depositing/landland rivers	7.79			
		Embryonic bog community	66.90			
		Embryonic raised bog	19.81			
		Oak-Ash-Hazel woodland	0.74			
		Regenerating wet deep peat vegetation	447.87			
		Regenerating wet deep peat vegetation with emerging bog woodland	1.28			
		Riparian areas	0.79			
		Riparian woodland	1.02			
Cavemount	Scheme Year 1	Bog woodland & heathland mosaic	0.74			<ol style="list-style-type: none"> Conditions across site changed somewhat – site re-wetted.

Bog Name	Rehabilitation Year	Expected Future Habitats	Area (ha)	Re-wetting Progress	Trajectory August 2023 (end of Scheme year 2)	Observations (Aug 2023 based on sentinel June 2023 imagery and/or site visits where applicable)
		Bog woodland & wetland mosaic	76.27			<ul style="list-style-type: none"> 2. No indications of recent changes to more established habitats in response to EDRRS measures yet. 3. No recordable change of vegetation cover noted. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 4. Re-wetting has consolidated suitable conditions for expected habitat development.
		Bog woodland, areas of open habitats	77.65			
		Marginal land	118.14			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	223.78			
		Regenerating wet deep peat vegetation	15.06			
		Wetlands & rich fen mosaic	1.92			
Clonad	Scheme Year 1	Bog woodland & wetland mosaic	41.16			<ul style="list-style-type: none"> 1. Conditions across site changed somewhat – site re-wetted in places. Some measures still to implement. 2. No indications of recent changes to more established habitats in response to EDRRS measures yet. 3. No recordable change of vegetation cover noted yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 4. More time needed to evaluate planned re-wetting across this site.
		Bog woodland, areas of open habitats	43.81			
		Degraded raised bog (non-annex quality)	13.96			
		Embryonic raised bog	50.35			
		Marginal land	110.54			
		Oak-Ash-Hazel Bog woodland	34.13			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	153.52			
Esker	Scheme Year 1	Bog woodland & wetland mosaic	41.16			<ul style="list-style-type: none"> 1. Conditions across site radically changed – site re-wetted. 2. No indications of recent changes to more established habitats in response to EDRRS measures yet 3. No recordable change of vegetation cover noted yet. 4. The majority of the bog remains as bare peat. 5. <i>Sphagnum</i> moss inoculation has taken place within parts of Killaranny bog and this may influence the trajectory of the habitat establishment. 6. Some fresh pioneering vegetation is present in the rehabilitation extent in these bare peat areas but new vegetation cover is very sparse. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 7. Re-wetting has created suitable conditions for expected habitat development.
		Bog woodland, areas of open habitats	43.81			
		Degraded raised bog (non-annex quality)	13.96			
		Embryonic raised bog	50.35			
		Marginal land	110.54			
		Oak-Ash-Hazel Bog woodland	34.13			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	153.52			
Mountlucas	Scheme Year 1	Bog woodland & heathland mosaic	34.30			<ul style="list-style-type: none"> 1. Conditions across targeted area radically changed – site re-wetted. 2. Very little new pioneering vegetation is present in the rehabilitation extent in these bare peat areas. 3. No indications of recent changes to more established habitats in response to EDRRS measures yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 4. Re-wetting has created suitable conditions for expected habitat development.
		Bog woodland & wetland mosaic	128.33			
		Bog woodland, areas of open habitats	296.89			
		Conifer plantation	15.65			
		Dry calcareous and neutral grassland	8.02			
		Embryonic raised bog	92.75			
		Marginal land	365.06			
		Oak-Birch-Holly Bog woodland	108.95			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	148.86			
		Wet Willow-Alder-Ash woodland	19.21			
Ummeras	Scheme Year 1	Agriculture	1.47			<ul style="list-style-type: none"> 1. Conditions across site radically changed – site re-wetted. 2. Approximately 90% of Ummeras remains as re-wetted bare peat and scattered patches of shallow surface water.
		Bog woodland	5.15			

Bog Name	Rehabilitation Year	Expected Future Habitats	Area (ha)	Re-wetting Progress	Trajectory August 2023 (end of Scheme year 2)	Observations (Aug 2023 based on sentinel June 2023 imagery and/or site visits where applicable)
		Bog woodland & heathland mosaic	76.34			<ul style="list-style-type: none"> 3. Sphagnum moss inoculation has taken place within parts of Killaranny bog and this may influence the trajectory of the habitat establishment. 4. Very little fresh pioneer vegetation. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 5. Re-wetting has created suitable conditions for expected peatland habitat development.
		Bog woodland, areas of open habitats	38.23			
		Buildings and artificial surfaces	3.80			
		Conifer plantation	0.87			
		Degraded raised bog (non-annex quality)	18.96			
		Embryonic bog community	24.16			
		Embryonic raised bog	124.92			
		Oak-Ash-Hazel Bog woodland	0.41			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	7.28			
Treeline	0.07					
Derrycashel		Bog woodland & wetland mosaic	30.25			<ul style="list-style-type: none"> 1. Conditions across site changed somewhat – site was already re-wetting. Some measures still to implement. 2. No indications of recent changes to more established habitats already present on the bog in response to EDRRS measures yet. 3. No recordable change of vegetation cover noted yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 4. Re-wetting has consolidated suitable conditions for expected wetland habitat development.
		Bog woodland, areas of open habitats	64.07			
		Degraded raised bog (non-annex quality)	39.43			
		Marginal land	34.75			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	220.44			
Derrycolumb		Bog woodland & wetland mosaic	34.98			<ul style="list-style-type: none"> 1. Conditions across site radically changed – site re-wetted. 2. Some new wetlands with shallow surface water have been noted post the implementation of the EDRRS measures. 3. No indications of recent changes to more established habitats in response to EDRRS measures yet. 4. Very little fresh pioneer vegetation. 5. No recordable change of vegetation cover noted yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 6. Re-wetting has created suitable conditions for expected habitat development.
		Bog woodland, areas of open habitats	87.82			
		Degraded raised bog (non-annex quality)	2.91			
		Embryonic raised bog	112.23			
		Marginal land	89.88			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	125.58			
		Regenerating wet deep peat vegetation.	2.42			
Edera		Access	2.11			<ul style="list-style-type: none"> 1. Conditions across targeted area radically changed – site re-wetted. 2. No indications of recent changes to more established habitats in response to these measures yet. 3. Very little fresh pioneer vegetation. 4. <i>Sphagnum</i> moss inoculation has taken place within parts of Edera bog and this may influence the trajectory of the habitat establishment. 5. No recordable change of vegetation cover was noted. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 6. Re-wetting has created suitable conditions for expected habitat development.
		Agriculture	3.68			
		Bog woodland	6.77			
		Bog woodland & heathland mosaic	34.93			
		Bog woodland & wetland mosaic	14.68			
		Bog woodland, areas of open habitats	2.49			
		Conifer plantation	0.03			
		Degraded raised bog (non-annex quality)	20.82			
		Depositing/landland rivers	0.88			
		Embryonic bog community	25.04			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	46.63			
		Regenerating wet deep peat vegetation	0.01			
		Regenerating wet deep peat vegetation with emerging bog woodland	106.17			
		Riparian areas	1.31			
Wet grassland	4.38					
Wet Willow-Alder-Ash woodland	12.32					

Bog Name	Rehabilitation Year	Expected Future Habitats	Area (ha)	Re-wetting Progress	Trajectory August 2023 (end of Scheme year 2)	Observations (Aug 2023 based on sentinel June 2023 imagery and/or site visits where applicable)
Ballycon	Scheme Year 2	Artificial water body (Silt pond)	0.04			<ol style="list-style-type: none"> The restoration of Ballycon bog has increased the extent of re-wetting across the bog and has set the site on a trajectory towards achieving the predicted future peatland habitats. Conditions across the bog have changed post restoration. There is now a greater extent of re-wetted peat, more stable seasonal variations in the extent of rewetting and ultimately optimisation of the hydrological regime. However, more time is required to monitor these changes. Areas of deeper water have been optimised via the installation of high field taps to create shallower water depths that may increase the extent of Reedbeds and poor fen. Site already largely vegetated with no obvious change in vegetation composition to established habitats to date. This is representative of the newly established baseline conditions. Alkaline indicator species of rudimentary rich fen occur throughout the bog, with <i>Cladium mariscus</i> noted at a number of locations along with an abundance of yellow sedges. Re-wetting has consolidated suitable conditions for expected fen and wet woodland habitat trajectory.
		Bog woodland & heathland mosaic	8.34			
		Bog woodland & wetland mosaic	92.94			
		Bog woodland, areas of open habitats	14.87			
		Fen mosaic	4.83			
		Marginal land	47.32			
		Oak-Ash-Hazel Bog woodland	1.94			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	102.74			
		Regenerating wet deep peat vegetation	7.96			
Begnagh	Scheme Year 2	Bog woodland & heathland mosaic	44.72			<ol style="list-style-type: none"> Conditions across the bog have radically changed – site re-wetted. A large proportion of Begnagh remains as re-wetted bare peat with the remainder comprised of establishing wetlands with shallow surface water or dry cutaway on shallow peat with establishing Downy birch dominated scrub. Very little fresh pioneer vegetation. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. Re-wetting has created suitable conditions for expected future peatland habitat development.
		Bog woodland & wetland mosaic	8.96			
		Degraded raised bog (non-annex quality)	1.81			
		Embryonic raised bog	116.57			
		Marginal land	37.30			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	55.71			
Blackwater	Scheme Year 2	Artificial water body (Silt pond)	6.11			<ol style="list-style-type: none"> Conditions across the bog have changed somewhat – site re-wetted. No indications of recent changes to more established habitats in response to EDRRS measures yet. No recordable change of vegetation cover noted. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. Re-wetting has consolidated suitable conditions for the establishment of expected future habitat development.
		Bog woodland & heathland mosaic	14.19			
		Bog woodland & wetland mosaic	86.24			
		Bog woodland, areas of open habitats	124.02			
		Degraded raised bog (non-annex quality)	3.25			
		Marginal land	1789.81			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	127.94			
		Regenerating wet deep peat vegetation	23.58			
		Wetlands & rich fen mosaic	138.61			
Bloomhill	Scheme Year 2	Artificial water body (Silt pond)	1.91			<ol style="list-style-type: none"> Conditions across the bog have radically changed – site re-wetted. No indications of recent changes to more established vegetation/habitats in response to rehabilitation measures yet. Almost no new pioneering vegetation is present within the bare peat areas in the rehabilitation extent. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. Re-wetting has created suitable conditions for expected future peatland habitat development.
		Bog woodland & heathland mosaic	39.37			
		Bog woodland & wetland mosaic	32.07			
		Bog woodland, areas of open habitats	0.70			
		Degraded raised bog (non-annex quality)	14.27			
		Marginal land	535.53			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	43.92			
		Regenerating wet deep peat vegetation	221.27			
Bunahinly	Scheme Year 2	Artificial water body (Silt pond)	1.00			<ol style="list-style-type: none"> Conditions across the bog have radically changed – site re-wetted. Approximately 90% of Bunahinly remains as re-wetted bare peat, with the remainder comprised of establishing wetlands with shallow surface water and small areas of dry cutaway near the bog margins. Very little fresh pioneer vegetation. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes.
		Bog woodland & heathland mosaic	14.45			
		Bog woodland, areas of open habitats	4.68			
		Degraded raised bog (non-annex quality)	3.27			
		Marginal land	24.60			

Bog Name	Rehabilitation Year	Expected Future Habitats	Area (ha)	Re-wetting Progress	Trajectory August 2023 (end of Scheme year 2)	Observations (Aug 2023 based on sentinel June 2023 imagery and/or site visits where applicable)
		Regenerating wet deep peat vegetation	139.54			4. Re-wetting has created suitable conditions for expected future peatland habitat development.
Carranstown	Scheme Year 2	Artificial water body (Silt pond)	0.60			<ol style="list-style-type: none"> 1. Conditions across the bog have radically changed – site re-wetted. 2. Approximately 70% of Carranstown remains as re-wetted bare peat, with the remainder comprised of establishing wetlands with shallow surface water, small areas of dry cutaway near the bog margins and an area of rewetted degraded raised bog (non-annex quality). 3. Very little fresh pioneer vegetation post rehabilitation. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 4. Re-wetting has created suitable conditions for expected future peatland habitat development.
		Bog woodland & heathland mosaic	17.43			
		Bog woodland & wetland mosaic	3.84			
		Bog woodland, areas of open habitats	5.62			
		Constrained Land	74.09			
		Degraded raised bog (non-annex quality)	22.37			
		Marginal land	49.99			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	4.28			
		Regenerating wet deep peat vegetation	128.03			
Cloncreen	Scheme Year 2	Artificial water body (Silt pond)	2.69			<ol style="list-style-type: none"> 1. Conditions across site significantly changed – re-wetted. 2. No indications of recent changes to more established habitats in response to EDRRS rehabilitation measures yet. This is representative of the newly established baseline conditions. 3. Very little new pioneering vegetation yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 4. Re-wetting has consolidated suitable conditions for expected fen and wetland habitat development across much of the bog.
		Bog woodland & heathland mosaic	97.38			
		Bog woodland & wetland mosaic	89.83			
		Bog woodland, areas of open habitats	185.39			
		Degraded raised bog (non-annex quality)	3.37			
		Fen mosaic	311.01			
		Marginal land	275.52			
		Oak-Ash-Hazel woodland	0.69			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	43.62			
Clooneeny	Scheme Year 2	Artificial water body (Silt pond)	0.83			<ol style="list-style-type: none"> 1. Conditions across the bog have radically changed – site re-wetted. 2. A large proportion of Clooneeny remains as re-wetted bare peat with the remainder comprised of establishing wetlands with shallow surface water or dry cutaway on shallow peat with establishing Downy birch dominated scrub. 3. Very little fresh pioneer vegetation. No indications of recent changes to more established habitats in response to EDRRS measures yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 4. Re-wetting has created suitable conditions for expected future peatland habitat development.
		Bog woodland & heathland mosaic	101.65			
		Degraded raised bog (non-annex quality)	26.80			
		Embryonic raised bog	116.67			
		Marginal land	53.96			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	49.05			
		Regenerating wet deep peat vegetation	9.70			
Derraghan	Scheme Year 2	Artificial water body (Silt pond)	0.33			<ol style="list-style-type: none"> 1. Conditions across site significantly changed – re-wetted. 2. No indications of recent changes to more established habitats in response to EDRRS rehabilitation measures yet. 3. Very little new pioneering vegetation yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 4. Re-wetting has consolidated suitable conditions for expected fen and wetland habitat development, along with wetter established Downy birch dominated woodland.
		Bog woodland & heathland mosaic	13.26			
		Bog woodland & wetland mosaic	68.00			
		Bog woodland, areas of open habitats	112.51			
		Degraded raised bog (non-annex quality)	6.14			
		Marginal land	21.32			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	37.09			
		Poor fen dominated by <i>J. effusus</i>	4.92			
		Regenerating wet deep peat vegetation	25.65			
Derrinboy	Scheme Year 2	Artificial water body (Silt pond)	3.58			<ol style="list-style-type: none"> 1. Conditions across the bog have radically changed – site re-wetted. 2. The majority of Derrinboy bog remains as re-wetted bare peat, with the remainder comprised of small areas of rewetted degraded raised bog (non-annex quality) at the bog margins. 3. Very little fresh pioneer vegetation post rehabilitation. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes.
		Bog woodland & heathland mosaic	25.24			
		Bog woodland & wetland mosaic	30.57			
		Degraded raised bog (non-annex quality)	9.81			
		Marginal land	67.27			

Bog Name	Rehabilitation Year	Expected Future Habitats	Area (ha)	Re-wetting Progress	Trajectory August 2023 (end of Scheme year 2)	Observations (Aug 2023 based on sentinel June 2023 imagery and/or site visits where applicable)
		Regenerating wet deep peat vegetation	170.20			4. Re-wetting has created suitable conditions for expected future peatland habitat development.
Derrybrat	Scheme Year 2	Artificial water body (Silt pond)	0.24			<ol style="list-style-type: none"> 1. Conditions across site significantly changed – re-wetted. 2. No indications of recent changes to more established habitats in response to EDRRS rehabilitation measures yet. 3. Very little new pioneering vegetation yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 4. Re-wetting has consolidated suitable conditions for expected fen and wetland habitat development, along with wetter established Downy birch dominated woodland.
		Bog woodland & heathland mosaic	15.55			
		Bog woodland & wetland mosaic	32.05			
		Bog woodland, areas of open habitats	15.91			
		Degraded raised bog (non-annex quality)	9.27			
		Marginal land	35.34			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	61.89			
Derryfadda Phase 1	Scheme Year 2	Artificial water body (Silt pond)	0.48			<ol style="list-style-type: none"> 1. Conditions across Phase 1 (northern lobe) of Derryfadda bog have radically changed – site re-wetted. 2. The majority of Derryfadda bog Phase 1 remains as re-wetted bare peat. 3. Very little fresh pioneer vegetation post rehabilitation. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 4. Re-wetting has created suitable conditions for expected future peatland habitat development.
		Bog woodland & heathland mosaic	7.60			
		Bog woodland & wetland mosaic	0.92			
		Constrained Land	917.98			
		Degraded raised bog (non-annex quality)	9.40			
		Marginal land	75.82			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	13.04			
		Regenerating wet deep peat vegetation	87.70			
Glenlough	Scheme Year 2	Artificial water body (Silt pond)	0.02			<ol style="list-style-type: none"> 1. Drain blocking has been very effective – high water levels noted in blocked drains. 2. No changes in established vegetation noted yet in response to EDRRS measures. However, more time is required to monitor these changes. 3. The bog is significantly wetter, indicates good future prospects for raised bog restoration.
		Bog woodland	3.74			
		Bog woodland & heathland mosaic	35.60			
		Conifer plantation	0.36			
		Degraded raised bog (non-annex quality)	268.25			
		Marginal land	12.70			
		Poor fen and flush	9.94			
		Regenerating wet deep peat vegetation	0.03			
Killaranny	Scheme Year 2	Artificial water body (Silt pond)	0.62			<ol style="list-style-type: none"> 1. Conditions across the bog have radically changed – site re-wetted. 2. The majority of Killaranny bog remains as re-wetted bare peat. 3. <i>Sphagnum</i> moss inoculation has taken place within parts of Killaranny bog and this may influence the trajectory of the habitat establishment. 4. Very little fresh pioneer vegetation post rehabilitation. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 5. Re-wetting has created suitable conditions for expected future peatland habitat development.
		Bog woodland & heathland mosaic	37.36			
		Bog woodland & wetland mosaic	1.35			
		Marginal land	98.64			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	21.73			
		Regenerating wet deep peat vegetation	84.55			
Knappoge	Scheme Year 2	Artificial water body (Silt pond)	0.45			<ol style="list-style-type: none"> 1. Conditions across site changed – re-wetted. 2. No indications of recent changes to more established habitats in response to EDRRS rehabilitation measures yet. 3. Very little new pioneering vegetation yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes. 4. Re-wetting has consolidated suitable conditions for expected fen and wetland habitat development, along with wetter established Downy birch dominated woodland.
		Bog woodland & heathland mosaic	7.42			
		Bog woodland & wetland mosaic	83.13			
		Bog woodland, areas of open habitats	56.58			
		Buildings and artificial surfaces	4.88			
		Degraded raised bog (non-annex quality)	13.74			
		Marginal land	39.31			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	108.68			
Lodge	Scheme Year 2	Artificial water body (Silt pond)	1.59			<ol style="list-style-type: none"> 1. Conditions across the bog have radically changed – site re-wetted. 2. A large proportion of Lodge bog remains as re-wetted bare peat with the remainder comprised of establishing wetlands with shallow surface water
		Bog woodland & heathland mosaic	13.72			
		Bog woodland & wetland mosaic	132.13			

Bog Name	Rehabilitation Year	Expected Future Habitats	Area (ha)	Re-wetting Progress	Trajectory August 2023 (end of Scheme year 2)	Observations (Aug 2023 based on sentinel June 2023 imagery and/or site visits where applicable)
		Bog woodland, areas of open habitats	41.22			<p>or dry cutaway on shallow peat with establishing Downy birch dominated scrub.</p> <p>3. Very little fresh pioneer vegetation in areas of bare peat. No indications of recent changes to more established habitats in response to EDRRS measures yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes.</p> <p>4. Re-wetting has created suitable conditions for expected Poor fen, reedbeds and future peatland habitat development.</p>
		Degraded raised bog (non-annex quality)	11.54			
		Marginal land	70.97			
		Oak-Ash-Hazel woodland	8.01			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	32.23			
		Regenerating wet deep peat vegetation	96.90			
Noggusboy	Scheme Year 2	Artificial water body (Silt pond)	2.30			<p>1. Conditions across site changed – re-wetted.</p> <p>2. No indications of recent changes to more established habitats in response to EDRRS rehabilitation measures yet.</p> <p>3. Very little new pioneering vegetation yet. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes.</p> <p>4. Re-wetting has consolidated suitable conditions for expected fen and wetland habitat development, along with wetter established Downy birch dominated woodland and peatland habitats.</p>
		Bog woodland & heathland mosaic	44.85			
		Bog woodland & wetland mosaic	28.22			
		Bog woodland, areas of open habitats	150.09			
		Degraded raised bog (non-annex quality)	9.95			
		Marginal land	511.40			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	163.90			
		Regenerating wet deep peat vegetation	12.70			
Prosperous	Scheme Year 2	Artificial water body (Silt pond)	0.66			<p>1. Conditions across the bog have radically changed – site re-wetted.</p> <p>2. The majority of Prosperous bog remains as re-wetted bare peat.</p> <p>3. Very little fresh pioneer vegetation post rehabilitation. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes.</p> <p>4. Re-wetting has created suitable conditions for expected future peatland habitat development.</p>
		Bog woodland & heathland mosaic	17.67			
		Degraded raised bog (non-annex quality)	26.83			
		Marginal land	38.99			
		Regenerating wet deep peat vegetation	133.10			
Timahoe South	Scheme Year 2	Artificial water body (Silt pond)	2.59			<p>1. As of the time of reporting, not all of the Phase 1 rehabilitation has been completed. However, the areas in which rehabilitation has been undertaken have changed/ re-wetted.</p> <p>2. These areas remain as partly revegetated peatland.</p> <p>3. This is representative of the newly established baseline conditions. However, more time is required to monitor these changes.</p> <p>4. Re-wetting has created suitable conditions for expected future peatland habitat development.</p>
		Bog woodland & heathland mosaic	298.30			
		Bog woodland & wetland mosaic	17.80			
		Bog woodland with Lodgepole Pine	40.62			
		Bog woodland, areas of open habitats	64.98			
		Degraded raised bog (non-annex quality)	55.02			
		Marginal land	891.62			
		Oak-Ash-Hazel Bog woodland	18.25			
		Open water, Reedbeds, poor fen & scrub/woodland mosaic	3.64			
		Regenerating wet deep peat vegetation	314.61			

Table 5 List of permanent quadrats installed as of this reporting period

Scheme Year	Bog name	No. of Quadrats	Pre-Rehabilitation Installation Date	Post-Rehabilitation Survey Date
2021	Begnagh	5	2022	
2021	Belmont	5	2021	
2022	Carranstown	6	2022	
2021	Castlegar	5	2021	2022
2021	Cavemount	5	2021	
2021	Clonad	5	2021	
2021	Derrycolumb	5	2021	
2021	Edera	5	2021	
2021	Garryduff	5	2021	
2022	Glenlough	8	2022	
2021	Kellysgrove	5	2021	
2021	Oughter	5	2021	
2021	Pollagh/Cornalaur	5	2021	
2021	Ummeras	5	2021	2022
Grand Total	14	74		

Table 6 Wintering Water Bird Species Richness by Study Site – Winter 2021/22 & 2022/23

Bog Name	Species Richness (YR1)	Species Richness (YR2)	Rank (YR1)	Rank (YR2)	Evaluation (YR1)	Evaluation (YR2)
Castlegar	8	5	6 to 10	0-5	Low	Very Low
Cavemount	16	17	16 to 20	16 to 20	High	High
Clooniff	18	16	16 to 20	16 to 20	High	High
Derrycolumb	5	7	0-5	6 to 10	Very low	Low
Edera	7	4	6 to 10	0-5	Low	Very Low
Oughter	9	9	6 to 10	6 to 10	Low	Low
Ummeras	7	7	6 to 10	6 to 10	Low	Low
Begnagh	0	n/a	0-5	n/a	Very low	n/a
Derryfadda	3	n/a	0-5	n/a	Very low	n/a
Derrybrat	5	n/a	0-5	n/a	Very low	n/a
Knappogue	20	n/a	16 to 20	n/a	High	n/a
Noggusboy	19	n/a	16 to 20	n/a	High	n/a
Bloom Hill	2	n/a	0-5	n/a	Very low	n/a
Blackwater	16	n/a	16 to 20	n/a	High	n/a
Bunahinly Kilgarvan	4	n/a	0-5	n/a	Very low	n/a

Table 7 Overall Relative Abundance of Water birds across 15 no. sites monitoring during the winter 2022/23 period. Winter 2021/22 data is shown for comparison but note this reflects differing study sites.

Species	Relative Abundance Winter 2021/22	Abundance Winter 2022/23
GP Golden Plover <i>Pluvialis apricaria</i>	3479	338
WS Whooper Swan <i>Cygnus cygnus</i>	910	357
HG Herring gull <i>Larus argentatus</i>	0	1
GE Green sandpiper <i>Tringa ochropus</i>	0	1
T. Teal <i>Anas crecca</i>	306	455
L. Lapwing <i>Vanellus vanellus</i>	520	91
MA Mallard <i>Anas platyrhynchos</i>	261	248
GJ Greylag Goose <i>Anser anser</i>	401	103
WN Wigeon <i>Anas penelope</i>	33	231
MS Mute Swan <i>Cygnus olor</i>	83	82
SN Snipe <i>Gallinago gallinago</i>	67	83
BH Black-headed Gull <i>Chroicocephalus ridibundus</i>	57	21
RP Ringed Plover <i>Charadrius hiaticula</i>	30	25
LG Little Grebe <i>Tachybaptus ruficollis</i>	16	35
TU Tufted Duck <i>Aythya fuligula</i>	5	46
H. Grey Heron <i>Ardea cinerea</i>	21	27
LB Lesser Black Backed Gull <i>Larus fuscus</i>	0	51
MH Moorhen <i>Gallinula chloropus</i>	17	21
SV Shoveler <i>Anas clypeata</i>	11	23
PT Pintail <i>Anas acuta</i>	4	26
WA Water Rail <i>Rallus aquaticus</i>	12	13
TE Sandwich Tern <i>Sterna sandvicensis</i>	24	0
NW Greenland White-Fronted Goose <i>A.a. flavirostris</i>	17	2
CO Coot <i>Fulica atra</i>	3	15
CU Curlew <i>Numenius arquata</i>	16	1
CA Cormorant <i>Phalacrocorax carbo</i>	6	11
ET Little Egret <i>Egretta garzetta</i>	4	8
JS Jack Snipe <i>Lymnocyptes minimus</i>	4	5
GG Great Crested Grebe <i>Podiceps cristatus</i>	6	1
HW Great White Egret <i>Ardea alba</i>	3	2
RK Redshank <i>Tringa totanus</i>	2	3
CS Common Sandpiper <i>Actitis hypoleucos</i>	3	0
GD Goosander <i>Mergus merganser</i>	3	0
WK Woodcock <i>Scolopax rusticola</i>	2	0
KF Kingfisher <i>Alcedo atthis</i>	1	1
CM Common Gull <i>Larus canus</i>	0	2
Total	6326	2329

Table 8 Winter Bird Monitoring Summary. The Trajectory column indicates if there is any objective trajectory evidence in current reporting period in relation to increasing wintering bird richness or abundance.

Bog Name	Monitoring now complete	Trajectory (Y/N)	Notes
Clooniff	YR1:2021/22 YR2:2022/23	N	<ul style="list-style-type: none"> Some wintering bird usage already established. Both increases and decreases winter 2 in some species but attributable to normal interannual variation. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS. Potential links to EU sites.
Oughter	YR1:2021/22 YR2:2022/23	N	<ul style="list-style-type: none"> No significant wintering bird usage prior to re-wetting Increases in some species in Winter 2 but attributable to normal interannual variation. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS
Castlegar	YR1:2021/22 YR2:2022/23	N	<ul style="list-style-type: none"> No significant wintering bird usage prior to re-wetting Increases in some species utilising the rehabilitated areas in Winter 2 but abundance still low. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS
Cavemount	YR1:2021/22 YR2:2022/23	N	<ul style="list-style-type: none"> Wintering bird usage long established. Both increases and decreases winter 2 in some species but attributable to normal interannual variation. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS
Derrycolumb	YR1:2021/22 YR2:2022/23	N	<ul style="list-style-type: none"> No significant wintering bird usage prior to re-wetting Increases in 2 dominant species in winter 2 may be indicative of positive quality effect but still could be interannual variation. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
Edera	YR1:2021/22 YR2:2022/23	N	<ul style="list-style-type: none"> No significant wintering bird usage prior to re-wetting Wider species range but lower abundance in winter 2. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS. Potential links to EU sites.
Ummeras	YR1:2021/22 YR2:2022/23	N	<ul style="list-style-type: none"> No significant wintering bird usage prior to re-wetting Decrease in Golden Plover in YR2 but attributable to interannual variation It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
Begnagh	YR2:2022/23	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.

Bog Name	Monitoring now complete	Trajectory (Y/N)	Notes
Derryfadda	YR2:2022/23	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS. Potential links to EU sites.
Derrybrat	YR2:2022/23	N	<ul style="list-style-type: none"> Some wintering bird usage already established. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
Knappogue	YR2:2022/23	N	<ul style="list-style-type: none"> Some wintering bird usage already established. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS. Potential links to EU sites.
Noggusboy	YR2:2022/23	N	<ul style="list-style-type: none"> Some wintering bird usage already established. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
Bloomhill	YR2:2022/23	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS. Potential links to EU sites.
Blackwater	YR2:2022/23	N	<ul style="list-style-type: none"> Some wintering bird usage already established. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS. Potential links to EU sites.
Bunahinly-Kilgarvan	YR2:2022/23	No	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS. Potential links to EU sites.

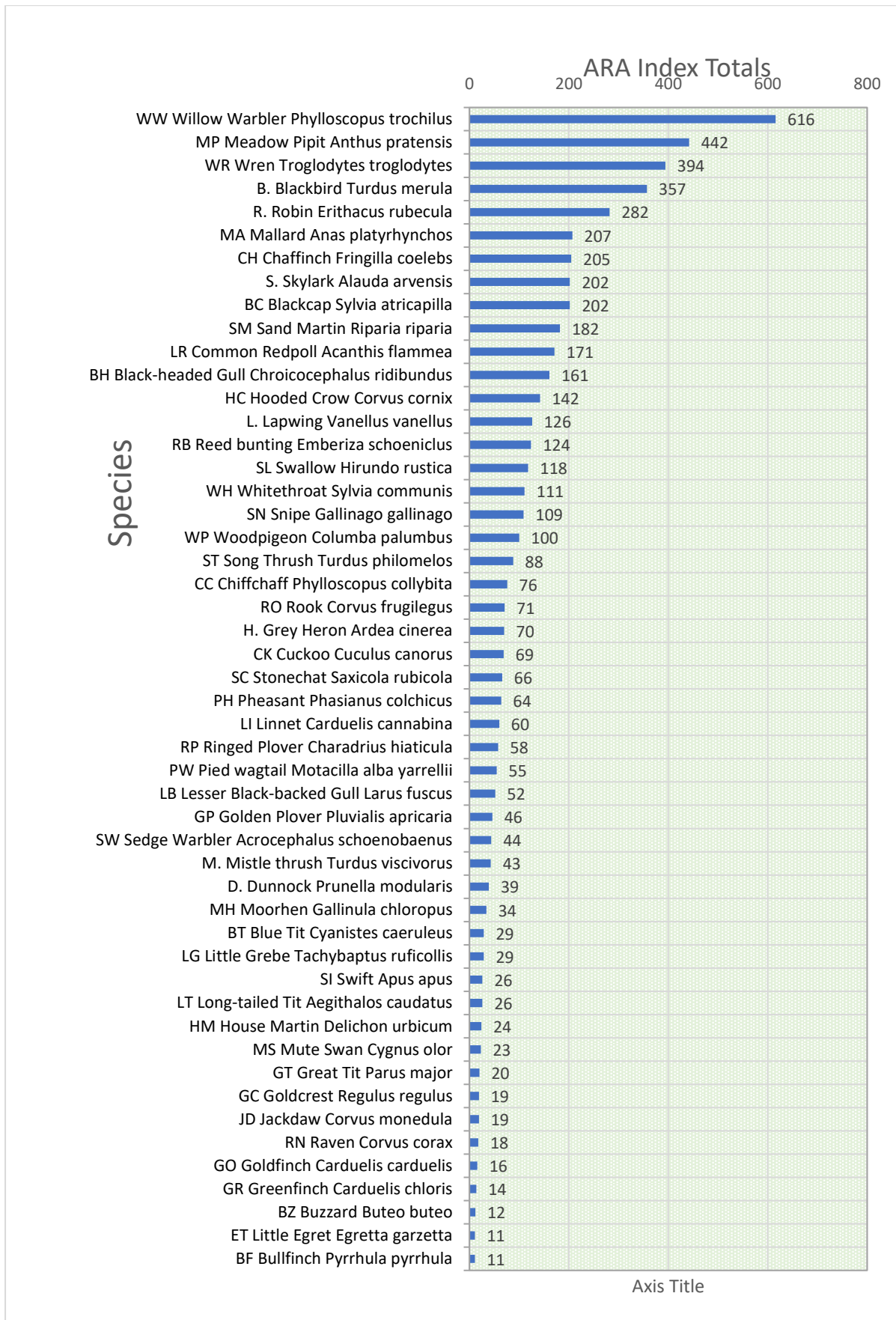


Figure 1 Updated ARA Index Totals Scheme Year 1 and Scheme Year 2 Bogs

Table 9 Breeding Bird Monitoring Summary. The Trajectory column indicates if there is any objective trajectory evidence in current reporting period in relation to increasing wintering bird richness or abundance.

Bog Name	Monitoring now complete	Trajectory (Y/N)	Notes
Belmont	YR1:2022	N	<ul style="list-style-type: none"> Some wetland breeding bird usage already established. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS
Clooniff	YR1:2022	N	<ul style="list-style-type: none"> Some wetland breeding bird usage already established. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS. Potential links to EU sites.
Garryduff	YR1:2022	Y	<ul style="list-style-type: none"> Some wetland breeding bird usage already established. Possible increase in breeding numbers of Snipe since re-wetting. Potential links to EU sites.
Kellysgrove	YR1:2022	N	<ul style="list-style-type: none"> Some breeding peatland bird usage already established. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS
Kilmacshane	YR1:2022	N	<ul style="list-style-type: none"> Some wetland breeding bird usage already established. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS. Potential links to EU sites.
Boora	YR1:2022	Y	<ul style="list-style-type: none"> Some wetland breeding bird usage already established. Black-headed Gull Colony newly established, usage by ██████████ individual
Oughter	YR1:2021 YR2:2022	Y	<ul style="list-style-type: none"> Some wetland breeding bird usage already established. Black-headed Gull Colony newly established, usage by ██████████ individual
Pollagh	YR1:2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS
Turraun	YR1:2022	N	<ul style="list-style-type: none"> Some wetland breeding bird usage already established. Usage by ██████████ individual
Castlegar	YR1:2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS
Cavemount	YR1:2022	N	<ul style="list-style-type: none"> Some wetland breeding bird usage already established. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS
Clonad	YR1:2022	Y	<ul style="list-style-type: none"> Black headed Gull Colony newly established
Mountlucas	YR1:2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS
Ummeras	YR1:2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS
Derrycashel	YR1:2022	N	<ul style="list-style-type: none"> Some wetland breeding bird usage already established.

Bog Name	Monitoring now complete	Trajectory (Y/N)	Notes
			<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
Derrycolumb	YR1:2021 YR2:2022	Y	<ul style="list-style-type: none"> Increase in breeding Ringed Plover. Potential links to EU sites.
Edera	YR1:2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS. Potential links to EU sites.
Lodge	YR1 2022		<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
Derryfadda	YR1 2022		<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
Derrybrat	YR1 2022		<ul style="list-style-type: none"> Some wetland breeding bird usage already established. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
Noggusboy	YR1 2022		<ul style="list-style-type: none"> Some wetland breeding bird usage already established. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
Bloom Hill	YR1 2022		<ul style="list-style-type: none"> Some wetland breeding bird usage already established. It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
Bunahinly Kilgarvan	YR1 2022		<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
Glen Lough	YR1 2022		<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
Blackwater	YR1 2022		<ul style="list-style-type: none"> Some positive indicators in terms of species colonisation but largely outside the sampled area in terms of breeding birds

Table 10 Pollinator Monitoring Summary. The Trajectory column indicates if there is any objective trajectory evidence in current reporting period in relation to increasing pollinator richness or abundance.

Scheme Year	Bog Name	Monitoring year now complete	Trajectory (Y/N)	Notes
EDRSS Year 1	Clooniff	YR1: 2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
	Oughter	YR1:2022 YR2:2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
	Castlegar	YR1:2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
	Cavemount	YR1:2021 YR2:2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
	Clonad	YR1:2021 YR2:2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
	Ummeras	YR1:2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
	Derrycolumb	YR1:2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
	Edera	YR1:2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
EDRSS Year 2	Begnagh	YR 1: 2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
	Blackwater	YR 1: 2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.
	Lodge	YR 1: 2022	N	<ul style="list-style-type: none"> It is too soon to establish any increase in species richness or abundance directly attributable to EDRRS.

Appendix D2

Scheme Year 1 Bogs

Updated Individual Bog Accounts

Winter Birds – Monitoring YR 1

Habitats – Monitoring YR1

Vegetation Quadrats

Breeding Birds – Monitoring YR1

Pollinators

Winter Birds – Monitoring YR2

1. Clooniff
2. Oughter
3. Castlegar
4. Cavemount
5. Ummeras
6. Derrycolumb
7. Edera
8. References

Introduction

This appendix provides information and data relating to Scheme Year 1 Bogs and includes updated, individual bog accounts for bogs which have had scheduled M&V survey data collected in the interim period since the last issued Annual Monitoring Report (namely the Winter period 2022/23). Scheme Year 1 bogs for which there was no M&V survey requirement in the period August 2022 to March are excluded from inclusion.

1. Clooniff

Since the previous reporting period (April 2021 to August 2022), additional wintering bird surveys have been undertaken at Clooniff bog and have been added to this bog account.

Winter Birds – Monitoring YR1

Method

Fixed counts, following I-WeBS methods, were used to count wintering waterfowl at Clooniff over the winter period 2021/22. A total of four counts were undertaken, covering the period December to March inclusive. All surveys were undertaken during optimal weather conditions. The survey results for each count are provided in Table 1-1 below.

Constraints

Extensive wetlands occur at Clooniff bog. However, some parts of these can be difficult to survey due to the linear nature of some old high production fields that have now developed scrub, as well as the extensive reedbeds which fringe the wetlands. As these features can provide shelter for some wintering wildfowl and waders, it is likely that some species have been under recorded, in particular Snipe for example.

Results – Species Richness

A total of 18 water bird species were recorded across all four surveys. Although Sandwich Tern is known to winter in small numbers in Ireland, those recorded during the March visit are likely to be on passage; returning from their wintering grounds in southern Europe and Africa to breed in Ireland. Snipe, Curlew and Lapwing are all BoCCI Red listed species (Gilbert *et al.* 2021). Nine Amber listed species were recorded, namely Mute Swan, Teal, Whooper Swan, Wigeon, Greylag Goose, Tufted Duck, Great Crested Grebe, Sandwich Tern and Cormorant.

Results – Abundance

Teal, Mallard, Wigeon and Whooper Swan were recorded throughout the core winter months, indicating that this site is likely to regularly support these species. Constant numbers of Greylag Goose were recorded but never exceeded 7 individuals, and the species is known to occur at this site all year round, likely a feral population. The threshold for National Importance for this species is 35 individuals.

Tufted Duck, Curlew, Lapwing, Little Grebe, Ringed Plover and Water Rail were each recorded in low numbers and often on only one survey date. This suggests that these species are likely to use the site intermittently during the winter months or in low numbers. Whooper swan was recorded during all visits with a peak count of 161 in December 2021. This indicates that the species uses the extensive wetlands within the east of Clooniff during the core winter months, while likely also foraging in the wider landscape.

The total counts for each visit across the winter period are presented in Table 1-1. It is clear that Clooniff is only used intermittently by some wintering waterfowl species while other species occur throughout the core winter months. However, given the nature of the wetland occurring at Clooniff, which is often difficult to survey due to the extensive nature of the linear strips of established scrub

on old high production fields and established reedbeds, it is likely that some species have been under recorded.

Results – Habitat Associations

Most of the wintering wildfowl records were associated with the extensive wetland in the east of the bog (Coolumper). This, the largest wetland, was regularly used by duck and swan species as and it is likely that the established reedbeds and associated aquatic vegetation likely support greater invertebrate and vegetative feeding opportunities. In addition, the larger wetland and open water provide greater protection from predators. Snipe was found to associate more with vegetated drains at the bog or wetland margins. However, this also likely reflects the species propensity to flush from such habitats when approached during the survey.

Discussion

Overall species richness and abundance reflects the current baseline bog condition, with extensive wetland and reedbed development in the northern/north-eastern lobes of the bog and with much of the remaining southern lobes of the bog still dominated by bare peat. Species richness is considered high. The wetlands and their associated aquatic vegetation offer foraging opportunities for many species of water bird. The large open waterbodies also provide suitable roosting locations for wintering water birds.

Over time, as supporting wetland vegetation continues to develop at Clooniff, it is expected that the bog may also become a refugium for an increasing number of wintering wildfowl species such as those recorded during the 2021-22 winter months. Post rehabilitation and associated revegetation, Clooniff may contribute to further habitat for a variety of wintering bird species of conservation concern occurring in the wider landscape and support conservation objectives for nearby European Sites such as the Middle Shannon Callows SPA, which lies immediately adjacent to the bog along its eastern and southern boundary. Due in part to the close proximity of the bog to the river, parts of Clooniff form part of the Shannon flood plain, regularly flooding during winter and at other times when the water levels on the river are high. Middle Shannon Callows SPA is designated for species such as Whooper Swan, Lapwing, Wigeon and ‘Wetlands and Waterbirds’. In time parts of Clooniff (notably Coolumper) may become an important supporting site for SCI species of this SPA.

No significant change in wintering bird species richness and abundance can be attributed to the rehabilitation so far at Clooniff, but rehabilitation measures have consolidated conditions for wetland habitat to continue to establish to support wintering bird species. In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation under the current scheme on assemblages of wintering birds.

Table Error! No text of specified style in document.-1 Winter 2021/22 – Monitoring YR1 I-WeBS Survey Results

Species	BoCCI STATUS	DEC	JAN	FEB	MAR	Mean	Maximum
MS Mute Swan <i>Cygnus olor</i>	Amber	0	0	0	2	0	2
T. Teal <i>Anas crecca</i>	Amber	10	156	102	0	89.3	156
WA Water Rail <i>Rallus aquaticus</i>	Green	0	0	0	1	0	1

Species	BoCCI STATUS	DEC	JAN	FEB	MAR	Mean	Maximum
WS Whooper Swan <i>Cygnus cygnus</i>	Amber	161	45	50	41	74.2	161
LE Little Grebe <i>Tachybaptus ruficollis</i>	Green	2	0	0	3	0	2
GJ Greylag Goose <i>Anser anser</i>	Amber	7	6	6	0	6.3	7
TU Tufted Duck <i>Aythya fuligula</i>	Amber	0	5	0	1	3	5
GG Great Crested Grebe <i>Podiceps cristatus</i>	Amber	0	0	0	6	0	6
TE Sandwich Tern <i>Sterna sandvicensis</i>	Amber	0	0	0	24	0	24
CA Cormorant <i>Phalacrocorax carbo</i>	Amber	0	0	0	1	0	1
H. Grey Heron <i>Ardea cinerea</i>	Green	0	2	2	1	1.6	2
RP Ringed Plover <i>Charadrius hiaticula</i>	Green	0	0	0	14	0	14
MA Mallard <i>Anas platyrhynchos</i>	Green	0	4	68	38	36.6	68
JS Jack Snipe <i>Lymnocyptes minimus</i>	Green	0	0	2	0	0	2
SN Snipe <i>Gallinago gallinago</i>	Red	13	0	0	1	7	13
L. Lapwing <i>Vanellus vanellus</i>	Red	0	0	0	3	0	3
WN Wigeon <i>Anas penelope</i>	Amber	12	0	28	2	14	28
CU Curlew <i>Numenius arquata</i>	Red	0	0	0	1	0	1

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Clooniff Bog during summer 2022.

Constraints

No constraints were noted.

Results

Clooniff bog is divided into four main sections. Clooniff is mainly composed of bare peat as the entire bog was in active peat extraction until recently (2019). The western most sections are dominated by large expanses of re-wetted bare peat, with the north-eastern and eastern most sections establishing pioneering vegetation. However, these areas still support significant areas of bare peat and some open water. Clooniff had a pumped drainage system which has now ceased, and this will have a very significant influence on the environmental conditions across much of the site.

Sub-soils in wetland areas with shallow peat are dominated by lacustrine and shell marl which exerts a more alkaline influence on water quality. The presence of a drainage ditch that runs along most northerly section of the site supports Black Bog Rush. This species is an indicator of alkaline groundwater influence and potential rich fen development in the future. Areas of deep residual bare peat in the former production area currently have no significant ecological indicators of more acidic water chemistry present (*Sphagnum* or frequent Heather).

The north-eastern section (Coolumper) is developing a mosaic of pioneer poor fen, wetland communities and some scrub on high fields. Significant areas of open water support typical emergent pioneer vegetation communities. There is good cover of establishing Reedbeds dominated primarily

by the community category '*Phragmites australis* community' (pPhrag) and to a lesser extent '*Typha* community' (pTyp). Poor fen/emergent communities occur along the margins of the open water bodies in shallower water, and include communities such as '*Carex rostrata* community' (pRos), pioneer '*Triglochin palustris* community' (pTrig), '*Typha* community' (pTyp) and pioneer '*Eriophorum angustifolium* community (poor fen)' (pEang). Pumping has ceased in this catchment.

The high fields that occur in series through these wetlands are vegetating with emergent '*Betula*-dominated community' (eBir), 'Pioneer *Juncus effusus* community' (pJeff) and 'Pioneer *Eriophorum angustifolium* community' (poor fen) (pEang), see representative photo below.

Within the north-western lobe and the south-western lobes of the bog, there are still extensive areas of bare peat. The north western lobe of the bog contains an area of residual milled deep peat (note the redder appearance in the aerial imagery). This area was previously in milled peat production for a short period and it had re-vegetated with some Heather. Post rehabilitation, this area now consists mainly of bare peat due to the creation of cell bunding.

Pioneer fen communities are beginning to colonise bare peat with community categories including '*Pioneer Eriophorum angustifolium* community (poor fen)' (pEang), '*Pioneer Triglochin palustris* community' (pTrig) and '*Pioneer Juncus effusus* community' (pJeff). Areas of open water occur in the NE corners of these lobes, with emergent communities including the categories '*Typha* community' (pTyp), '*Carex rostrata* community' (pRos), '*Pioneer Eriophorum angustifolium* community (poor fen)' (pEang) and '*Pioneer Triglochin palustris* community' (pTrig).

It is too soon for habitats at Clooniff to reflect post rehabilitation change or succession. Some initial rewetting and new pioneer wetlands have been noted post the implementation of the EDRRS measures, including ceasing pumping, and environmental conditions across the site have changed significantly, meaning that initial wetland development will now be accelerated. These measures will result in a the develop of wetland communities similar to those within the east of the bog (Coolumper).

In conclusion the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site.



Example of bare peat dominated cutover bog .



Establishing *Eriophorum angustifolium* and scattered Birch.



Clooniff (Coolumper) supports large areas of recolonising bare peat .



Eriophorum angustifolium beginning to establish in bare peat dominated cutover bog.

Vegetation Quadrats

No vegetation quadrats were scoped for inclusion in annual Monitoring and Verification at Clooniff.

Breeding Birds – Monitoring YR1

Methods

At Clooniff, two 500 metre transects were selected to provide a representative sample of the breeding bird community. Each transect was placed along an existing headland or rail line corridor for ease of use, but also because these locations will continue to be accessible post rehabilitation, allowing the same route to be repeated. Two visits in the period April to June of 2022 were carried out. See the Appendix C2 figure titled '*Clooniff Bog Ecology Transects*' for transect locations.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with high fields, headlands or rail lines associated with former peat extraction. Due to their location, sampling results may include species which utilise the areas adjacent

to transect routes i.e., areas not subject to rehabilitation. Where relevant this is further addressed in the Discussion section.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10.00-11.00am). CBS recommended timings are early morning, no later than 9.00am 'ideally' but allowance is made to extend this period for sites which require longer travel times or where access is difficult. The timing of some visits may have exceeded the CBS recommended period for surveying but were complete by 11.00am and data are considered acceptable for analysis. Any bias on a per species level is discussed further under Discussion, where relevant.

Results- Species Richness

Species richness is presented as the total number of species recorded across transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 47 no. species were recorded, see Table 1-2. This included five BoCCI (Gilbert *et al.* 2021) Red listed species, Kestrel, Black-headed Gull, Lapwing, Meadow Pipit and Swift. Nine BoCCI Amber listed species were recorded, namely Goldcrest, Grasshopper Warbler, Greylag Goose, Lesser Black-backed Gull, Linnet, Mallard, Skylark, Swallow and Willow Warbler. Remaining species were all Green listed apart from Pheasant which is not assigned a BoCCI status.

Results – Annual Relative Abundance

Annual Relative Abundance (ARA) is presented as the maximum count per species per visit (Early or Late) or as the maximum count for the period April to June inclusive, see Table 1-2. This allows for future comparison with CBS trends which takes the same approach to index species.

Maximum counts of greater than 10 individuals were recorded for 10 species, Grey Heron, Robin, Woodpigeon, Chiffchaff, Blackcap, Mallard, Blackbird, Chaffinch, Wren and Willow Warbler. All remaining species were recorded in low numbers (typically less than 5). Overall abundance was highest for Willow Warbler with a maximum of 57 individuals recorded in the period May to June. The species with the highest relative abundance associating with cutover habitats was Wren (n=28).

Results – Habitat Associations

Habitat associations are broadly grouped in line with other published interpretations and fall into two categories, those species of OPEN or NON-OPEN habitats. Associations are interpreted following Naim & O'Halloran (2012). In general terms however, the category 'OPEN' was applied to those species most strongly associated with open pioneering habitats or mosaics thereof found on cutaway bog (or raised bog) whilst species generally associated with scrub (typically birch, willow or gorse) and closed-canopy woodland (typically birch or willow but also other broadleaf mixes and/ or conifer spp.) are assigned to the 'NON-OPEN' category.

Twenty-four species associated with OPEN habitats, twenty species associated with NON-OPEN habitats, and three species associated with both were recorded, see Table 1-2.

Results – Colonial Species

No colonies were recorded.

Discussion

It is notable that the five Red listed species recorded, Kestrel, Black-headed Gull, Lapwing, Meadow Pipit and Swift are associated with open habitats targeted for rehabilitation in the form of rewetting and would be expected to gain from many of the measures implemented (wetland creation and fertiliser application to high fields for example). The Green listed species, Wren associates with drier open & non open habitats, and had the second highest relative abundance overall (n=28). Overall, the total number of species either Red or Amber listed was 14.

Regarding wading species, breeding is considered likely for Lapwing, Ringed Plover and Common Sandpiper in 2022, with the Coolumper lobe particularly important for these species. All three species have been recorded at Coolumper during both the 2020 and 2021 breeding season (April-June). Other water bird species noted previously during the breeding period include Great Crested Grebe, Mute Swan, Redshank and Snipe.

In general, the abundance estimates reflect the expansive area of wetland habitats currently present at Clooniff, as well as the associated established marginal habitats i.e. scrub, remnant bog and woodland. In time, the extensive areas of bare peat within the Clooniff bog boundary will provide more suitable habitat for many species. Regarding habitat associations, 51% of species recorded are more associated with open habitats. Open habitat species comprise a higher proportion of Red and Amber listed species (12 no. in total), with only two Amber species associated with non-open habitats (Goldcrest, and Willow Warbler). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland, 2009), and this still seems the case. Further analysis on trends in the ratio or relative abundance of these species over time following rehabilitation would be beneficial.

In conclusion, the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds both at Clooniff and across the EDRRS scheme. In addition, the occurrence at Clooniff of many of the species described here is notable given the proximity of the adjacent European Site (the Middle Shannon Callows SPA) which includes 'Wetlands and Waterbirds', along with species such as Lapwing, amongst its Special Conservation Interests. In time parts of Clooniff (notably Coolumper) may become an important supporting site for SCI species of this SPA. No significant change in breeding bird species richness and abundance can be attributed to the rehabilitation so far at Clooniff, but rehabilitation measures have consolidated conditions for wetland habitat and other habitat to continue to establish to support breeding bird species.

Table Error! No text of specified style in document.-2: Monitoring YR1 Countryside Bird Survey Results - 2022

SPECIES	BOCCI STATUS	HABITAT ASSOCIATION	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	19
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	18
BF Bullfinch <i>Pyrrhula pyrrhula</i>	Green	NON-OPEN	2
BH Black-headed Gull <i>Chroicocephalus ridibundus</i>	Red	OPEN	3

SPECIES	BOCCI STATUS	HABITAT ASSOCIATION	ARA
BT Blue Tit <i>Cyanistes caeruleus</i>	Green	NON-OPEN	2
BZ Buzzard <i>Buteo buteo</i>	Green	OPEN	2
CC Chiffchaff <i>Phylloscopus collybita</i>	Green	NON-OPEN	12
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	19
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	4
CS Common Sandpiper <i>Actitis hypoleucos</i>	Green	OPEN	3
D. Dunnock <i>Prunella modularis</i>	Green	NON-OPEN	2
GC Goldcrest <i>Regulus regulus</i>	Amber	NON-OPEN	2
GH Grasshopper Warbler <i>Locustella naevia</i>	Amber	OPEN	1
GJ Greylag goose <i>Anser anser</i>	Amber	OPEN	1
GO Goldfinch <i>Carduelis carduelis</i>	Green	OPEN	2
GR Greenfinch <i>Carduelis chloris</i>	Green	NON-OPEN	4
GT Great Tit <i>Parus major</i>	Green	NON-OPEN	3
H. Grey Heron <i>Ardea cinerea</i>	Green	OPEN	10
K. Kestrel <i>Falco tinnunculus</i>	Red	OPEN	3
L. Lapwing <i>Vanellus vanellus</i>	Red	OPEN	5
LB Lesser Black-backed Gull <i>Larus fuscus</i>	Amber	OPEN	1
LG Little Grebe <i>Tachybaptus ruficollis</i>	Green	OPEN	8
LI Linnet <i>Carduelis cannabina</i>	Amber	OPEN	8
LR Redpoll <i>Acanthis cabaret</i>	Green	NON-OPEN	5
LT Long-tailed Tit <i>Aegithalos caudatus</i>	Green	NON-OPEN	1
M. Mistle thrush <i>Turdus viscivorus</i>	Green	NON-OPEN	1
MA Mallard <i>Anas platyrhynchos</i>	Amber	OPEN	19
MH Moorhen <i>Gallinula chloropus</i>	Green	OPEN	2
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	7
PH Pheasant <i>Phasianus colchicus</i>	N/A	NON-OPEN	2
PW Pied Wagtail <i>Motacilla alba</i>	Green	OPEN	3
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	10
RB Reed Bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	3
RO Rook <i>Corvus frugilegus</i>	Green	NON-OPEN	1
RP Ringed Plover <i>Charadrius hiaticula</i>	Green	OPEN	1
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	3
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	2
SI Swift <i>Apus apus</i>	Red	OPEN	2
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	2
ST Song Thrush <i>Turdus philomelos</i>	Green	NON-OPEN	3
SW Sedge Warbler <i>Acrocephalus schoenobaenus</i>	Green	OPEN/NON-OPEN	3
WA Water Rail <i>Rallus aquaticus</i>	Green	OPEN	2
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	3
WM Whimbrel <i>Numenius phaeopus</i>	Green	OPEN	1
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	10

SPECIES	BOCCI STATUS	HABITAT ASSOCIATION	ARA
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	28
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	57

Pollinators

Methods

The transect at Clooniff is 1km in length. All surveys were completed between 11:55 and 15:00hrs, when the temperature was at least 16°C and during good weather conditions. See the figure in Appendix C2 titled 'Clooniff Bog Ecology Transects' for transect locations. The study period for Year 1 was May 2022 to September 2022.

Constraints

No constraints were identified during the survey. Weather conditions were optimal during all the surveys.

Results- Species Richness

A total of seven species of butterfly were recorded namely, Green-veined White, Large White, Meadow Brown, Orange Tip, Ringlet, Small Copper and Small Tortoiseshell. In addition to butterflies, Buff tailed Bumblebee (n = 1), Bombus sp. (n = 5), Four Spotted Chaser (n = 23), Large Red Damselfly (n = 1), Common Darter (n = 4), Black-tailed Skimmer (n = 4) were also recorded during the surveys.

Results- Abundance

Small Tortoiseshell occurred in the highest abundance (24 overall), with maximum abundances recorded during the August survey. The highest abundance overall per month was recorded in August. No butterfly species were recorded during the surveys in June.

Results- Habitat Associations

The majority of the transect crosses bare peat, with poorly developed vegetation present. In general, little or no pollinator activity was clearly associated with bare peat or recently rehabilitated bare peat areas. Species recorded on bare peat sections of the transect were primarily traversing the transect to nearby vegetated drains, as insufficient vegetation is present on the transect to attract feeding pollinators. A higher proportion of pollinators were encountered at the beginning of the transect (the northern extent) which passes through the vegetated headland.

Discussion

The baseline scenario for Clooniff still reflects habitats comprised largely of bare peat, and on this basis the ongoing monitoring for butterflies and other pollinators may be useful in determining the effects of rehabilitation under the EDRRS scheme on Pollinators. It is likely that species richness and abundance will increase in future surveys along the transect route when the rehabilitated area begins to revegetate.

Table Error! No text of specified style in document.-3 Monitoring YR1 Pollinator Survey Results - 2022

Species	May	June	July	August	September	Total
Green-veined White <i>Pieris napi</i>	3	0	5	0	2	10
Large White <i>Pieris brassicae</i>	0	0	1	0	0	1
Meadow Brown <i>Maniola jurtina</i>	0	0	1	0	0	1
Orange Tip <i>Anthocharis cardamines</i>	1	0	4	0	0	5
Ringlet <i>Aphantopus hyperantus</i>	0	0	2	0	0	2
Small Copper <i>Lycaena phlaeas</i>	0	0	0	1	1	2
Small Tortoiseshell <i>Aglais urticae</i>	0	0	0	19	5	24
Total	4	0	13	20	8	45

Winter Birds – Monitoring YR2

Method

Five counts within the winter period 2022/23 were conducted according to I-WeBS methodology. All counts were undertaken within the period 09:30 to 16:15. Survey dates were 28th of October 2022, 30th of November 2022, 17th of January 2023, 23rd of February 2023 and 14th of March 2023.

Constraints

Counts were undertaken generally on days with no rain however, on one date in March occasional showers (including sleet showers) were noted. Strong winds were also recorded on this date. Visibility was always good and wind speeds were suitable for undertaking the surveys. This site was not surveyed in December 2022 due to adverse weather conditions. No other constraints to the survey were noted.

Results – Species Richness

Overall species richness was high for Clooniff Bog with a total of 16 water bird species recorded across all surveys. Three of these were BoCCI (Gilbert *et al.* 2021) Red listed species namely Golden Plover, Lapwing and Snipe. Nine Amber listed species were recorded namely Greylag Goose, Lesser Black-backed Gull, Mallard, Mute Swan, Pintail, Ringed Plover, Teal, Whooper Swan and Wigeon. Four Green listed species were also recorded namely Grey Heron, Little Grebe, Moorhen and Water Rail.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 1-4 and was highest for Mallard (n=16), although this was influenced by a peak count of 55 in November of 2022. Average abundance across all five counts was <11 for all remaining species.

Results – Habitat Associations

Most of the wintering waterbird records were associated with the extensive wetlands that have developed in the north-eastern lobes of the bog (Coolumper). These wetlands were used regularly as they are longer established, with well-developed reedbeds and aquatic vegetation and thus are likely support greater invertebrate and vegetative feeding opportunities. In addition, these larger wetlands provide greater protection from predators, with more open expanses of water. Snipe was found to associate more with wetland margins. However, this also likely reflects the species propensity to flush from such habitats when approached during the survey. Generally, the southern lobe of the bog did not support high numbers of bird species, this is likely due to the extensive areas of bare peat providing little shelter or feeding opportunities.

A number of species recorded each month were observed utilising habitats outside the bog boundary and were associated with the floodplains of the River Shannon. Whooper Swan showed a strong association with the River Shannon and its associated floodplains including the wet grasslands that occur in the wider area of Clooniff, with flocks recorded roosting in these areas during the January, February, and March surveys. In January an improved agricultural field to the NE of the site supported 71 Whooper swan. In March 2023 the same agricultural field held 227 Whooper swan.

In addition to the species abundances described above, 550 Golden Plover were recorded flying over the site in October 2022 and landing in the Shannon Callows to the NE. These are not included in the records for the bog below but reflects the occurrence of the species in the wider area. These individuals are most likely associated with the Shannon Callows habitats.

Discussion

Overall species richness is considered high during the period studied. No counts were recorded as reaching potentially important thresholds for species of conservation concern. The wintering bird species assemblage is broadly similar to previous bird surveys, in that high species diversity was recorded but the general usage of the bog by these species is intermittent. It is therefore likely that the bog is used opportunistically for roosting, or to a lesser extent foraging.

For the 2023/23 winter period, twelve species recorded were of Red or Amber status. Four species recorded were of Green status. The Middle Shannon Callows SPA lies immediately adjacent to the bog along its eastern and southern boundary. Due in part to the close proximity of the bog to the river, parts of Clooniff form part of the Shannon flood plain, regularly flooding during winter and at other times when the water levels on the river are high. In the context of nearby European Sites which have species such as Whooper Swan, Lapwing, Wigeon and '*Wetlands and Waterbirds*' listed as special conservation interests, it is likely that suitable supporting habitat for SCI bird species will develop at Clooniff in the future and therefore potentially contribute to further habitat for such species and support the conservation objectives for this European Site.

No significant change in species richness and abundance can be attributed to the rehabilitation to date, and more time is needed to record any significant correlation with rehabilitation. Over time, as supporting wetland vegetation continues to develop at Clooniff, it is expected that the bog may also become a refugium for an increasing number of wintering wildfowl species. The data presented here

forms a baseline for further interpretation of the effects of post-industrial peatland rehabilitation to assemblages of wintering birds.

Table Error! No text of specified style in document.-4 Winter 2022/23 – Monitoring YR2 IWeBS Survey Results

Species	BOCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
SN Snipe <i>Gallinago gallinago</i>	Red	3	0	0	0	0	0	1	3
MA Mallard <i>Anas platyrhynchos</i>	Amber	3	55	0	27	0	10	16	55
GP Golden Plover <i>Pluvialis apricaria</i>	Red	1	0	0	0	0	0	0	1
L. Lapwing <i>Vanellus vanellus</i>	Red	0	0	0	0	0	3	1	3
T. Teal <i>Anas crecca</i>	Amber	0	0	0	0	41	3	7	41
MS Mute Swan <i>Cygnus olor</i>	Amber	0	3	0	0	2	2	1	3
WS Whooper Swan <i>Cygnus cygnus</i>	Amber	0	0	0	0	15	35	8	35
GJ Greylag goose <i>Anser anser</i>	Amber	5	0	0	27	2	0	6	27
WA Water rail <i>Rallus aquaticus</i>	Green	1	0	0	0	0	0	0	1
H. Grey heron <i>Ardea cinerea</i>	Green	0	1	0	1	0	2	1	2
RP Ringed plover <i>Charadrius hiaticula</i>	Amber	0	0	0	0	3	14	3	14
LG Little grebe <i>Tachybaptus ruficollis</i>	Green	0	0	0	0	3	3	1	3
MH Moorhen <i>Gallinula chloropus</i>	Green	2	0	0	0	0	0	0	2
WN Wigeon <i>Anas penelope</i>	Amber	0	0	0	0	0	60	10	60
PT Pintail <i>Anas acuta</i>	Amber	0	0	0	0	0	20	3	20
LB Lesser black-backed Gull <i>Larus fuscus</i>	Amber	0	0	0	0	0	29	5	29

1. Oughter

Since the previous reporting period (2022), additional wintering bird surveys have been undertaken at Oughter bog and have been added to this bog account. Note pollinator counts from YR2 of pollinator monitoring have been updated.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Oughter Bog during summer 2021. Habitat mapping consisted of ground truthing previous habitat maps and adding data in the form of point data to represent the habitats encountered.

Constraints

No constraints were identified, and all parts of the bog were accessible during the survey.

Results

Oughter Bog is primarily divided into two main sections, a southern section and a northern section divided by a rail-line orientated NE-SW. Part of the bog formerly owned by Bord na Móna has been developed into a shooting range, in the south of the site.

The majority of the bog is now developing pioneer habitats. There have been significant changes in the cutaway landscape at Oughter in the past 20 years from mostly bare peat to a mosaic of mostly wetland cutaway habitats and Birch scrub/woodland (WS1/WN7).

The southern section of Oughter contains significant areas of developing pioneer fen vegetation forming in wetter areas. This is dominated by mosaics of the community categories 'Pioneer *Eriophorum angustifolium* community (poor fen)' (pEang), 'Pioneer *Triglochin palustris* community' (pTrig) and '*Carex rostrata* community' (pRos). These small wetlands and old production drains also support the community 'Charophytes' (pChar) indicating the base rich conditions within areas of shallow cutaway peat. Together these are indicators of more alkaline ground-water influence and are correlated with the presence of shell marl sub-soil. Other indicators of alkaline influence include *Epipactis palustris*. *Bidens cernua* has also recently been recorded within the shallow cutaway peat within the centre of the site. Reedbeds categorised as '*Phragmites australis* community' (pPhrag) were also commonly recorded, typically in wetter areas of the bog within localised depressions.

The southern section of the bog is also developing pockets of pioneer open habitats and scrub, with mosaics of the vegetation community categories 'Emergent *Betula*-dominated community (A)' (eBir) and 'Pioneer *Eriophorum angustifolium*-dominated community (Poor Fen)' (pEang) developing on wet parts of the bog in the east. Substantial areas of the community 'Bare peat (0-50% cover)' (BP) still remain at Oughter, along headlands, travel passes and many of the former production fields, particularly within the west of the bog. Some vegetation is beginning to colonise, resulting in vegetation communities such as 'Pioneer *Juncus effusus* community' (pJeff) and 'Pioneer *Eriophorum angustifolium* vegetation (poor fen)' (pEang) and there is frequent patches of shallow standing water (not assigned a community category).

Where drier conditions occur across the site, typically within the northern lobe, significant cover of 'Pioneer *Juncus effusus* community' (pJeff) dominated vegetation occurs in association with 'Open *Betula*-dominated community (B)' (oBir) and establishing woodland/'Closed *Betula* scrub community (C)' (cBir). Although this establishing woodland within the north of the site is dominated by *Betula pubescens* some *Salix cinerea* is also establishing. Two *Sorbus hibernica* were also recorded in summer 2022 along the northern railway.

The oldest area of cutaway is located adjacent to the east side of the shooting range. This area has almost completely re-vegetated and contains a diverse mosaic of wetland communities including some indicators of Rich Fen (PF1). This area supports a relatively large area of established vegetation categorised as 'Pioneer *Cladium* community' (pCladium) which appears to have spread from the old production drains. Pioneer rich fen community with *Schoenus nigricans* (rudimentary rich fen) has also been recorded further south of here. Some areas of pioneer *Carex viridula*/brown moss community (rich fen) have also been noted.

The south-eastern lobe (further east of the shooting range) supports a large area of mature 'Dry *Calluna* community' (dHeath) on bare peat occurring in a mosaic with scattered 'Emergent *Betula*-dominated community (A)' (eBir) scrub. This community broadly corresponds to the '*Calluna vulgaris* cutover bog' (LS1) classification under Smith and Crowley, 2020. Some areas of poor fen also occur, dominated by *Eriophorum angustifolium*.

Rehabilitation was carried out at this bog in 2021. It is too soon for habitats at Oughter to reflect post rehabilitation change or succession. However, the measures and significantly changed environmental conditions across the bog with much more re-wetting and optimisation of the water table in general.

Almost no new pioneering vegetation is present within the bare peat areas in the rehabilitation extent (see also Quadrat survey results, below). Some areas of the bog already have well established pioneer vegetation including fen, alkaline fen and scrub/woodland habitats (including *Sphagnum* mosses, see Plates below). These habitats will continue to develop post rehabilitation. In conclusion the habitats recorded in 2022 largely reflect the baseline status of a recently rewetted post-industrial peat extraction bog. These measures will encourage the continued development and consolidation of fen and wetland habitats where suitable habitats occur at this bog. In addition, areas of establishing scrub and woodland have also be rewetted, providing opportunities for the establishment of greater species diversity due to a more stabilised and less seasonally varying water table.



Example of developing open *Betula pubescens* scrub with some *Sphagnum* moss.



Example of pioneering habitats.



Rich Fen and Flush with *Cladium mariscus*.



Pioneer *Juncus effusus* and Birch scrub.

Vegetation Quadrats – Monitoring YR1

Method

Quadrat monitoring was carried out at Oughter bog in June 2021 in accordance with agreed EDRRS Monitoring and Verification. 5 no. quadrats were employed.

Constraints

No constraints were identified.

Results

Quadrats Q1 and Q3 were dominated by bare peat (90-100% cover), with few plants recorded. Quadrat Q2 was located in an area of revegetating shallow peat that has been out of production for a few years and consequently supported a greater cover and diversity of plant species, although significant coverage of bare peat (34-50%) remains. Colonising species comprised mainly of species such as Colts foot, Yorkshire fog, Cat's ear, and Field horse tail. Quadrats Q4 and Q5 were taken in an area of pioneering habitats comprising of a mosaic of poor fen and establishing scrub. Ground cover was dominated by *Eriophorum angustifolium* and *Molinia caerulea*, with some heather. In addition, scattered *Betula pubescens* scrub is becoming established in this area. See Table 1 of Appendix I2 for detailed quadrat information.

Discussion

As with habitats the quadrats reflect the current baseline conditions following rehabilitation. Further time is required before any vegetation is likely to be recorded.



Quadrat Q3 – Bare peat cutover bog.



Quadrat Q4 – Pioneering poor fen and scattered Downy birch and *Salix cinerea* dominated scattered open scrub.

Breeding Birds – Monitoring Pre-Rehabilitation Baseline

Methods

A CBS survey was carried out on April 30, 2021. Conditions on the day were amenable to recording birds with no rain, moderate cloud and light wind. The survey period was 08:10am to 08:57am. See the Figure in Appendix I2 titled '*Oughter Bog Ecology Transects*' for transect location information.

Constraints

No constraints were noted.

Results- Species Richness

A total of 25 no. species were recorded of which 3 were BOCCI Red-listed namely, Lapwing, Meadow Pipit and Snipe. Seven Amber listed species were recorded namely, Linnets, Mallard, Ringed Plover, Skylark, Swallow, Sand Martin, and Willow Warbler.

Regarding waders 2-3 pairs of Lapwing, 1 pair of Ringed Plover and 9 pairs of Snipe are thought to have bred on site. See also Table 2-1.

Results – Annual Relative Abundance

Relative abundance was highest for Meadow Pipit (n=32) followed by Mallard (n=28) and Willow Warbler (n=11). All other species occurred in the order of 10 or less individuals.

Results – Habitat Associations

Habitat associations are broadly grouped in line with other published interpretations and fall into two categories, those species of OPEN or NON-OPEN habitats. Associations are interpreted following Naim and O'Halloran (2012). In general terms however, the category 'OPEN' was applied to those species most strongly associated with open pioneering habitats or mosaics thereof found on cutaway bog (or

raised bog) whilst species generally associated with scrub (typically birch, willow or gorse) and closed-canopy woodland (typically birch or willow but also other broadleaf mixes and/ or conifer spp.) are assigned to the 'NON-OPEN' category.

Thirteen species associated with OPEN habitats were recorded and ten species associated with NON-OPEN habitats were recorded see Table 2-1. Two species associates with both OPEN and NON-OPEN categories (Reed Bunting and Wren).

Results – Colonial Species

No colonies were recorded.

Discussion

The data presented here for 2021 (YR1) suggests Oughter is suitable for a number of species of conservation concern in particular wading species such as Lapwing and perching bird species such as Meadow Pipit.

Table Error! No text of specified style in document.-5 Monitoring YR1 Countryside Bird Survey Results - 2021

SPECIES	BOCCI 2020 - 2026 STATUS	HABITAT ASSOCIATION	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	9
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	1
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	5
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	2
H. Grey Heron <i>Ardea cinerea</i>	Green	OPEN	5
HC Hooded Crow <i>Corvus cornix</i>	Green	OPEN	1
L. Lapwing <i>Vanellus vanellus</i>	Red	OPEN	5
LI Linnet <i>Carduelis cannabina</i>	Amber	OPEN	1
LR Redpoll <i>Acanthis cabaret</i>	Green	NON-OPEN	1
MA Mallard <i>Anas platyrhynchos</i>	Amber	OPEN	28
MG Magpie <i>Pica pica</i>	Green	NON-OPEN	1
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	32
PH Pheasant <i>Phasianus colchicus</i>	N/A	NON-OPEN	1
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	3
RB Reed Bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	6
RP Ringed Plover <i>Charadrius hiaticula</i>	Amber	OPEN	2
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	10
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	9
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	1
SM Sand Martin <i>Riparia riparia</i>	Amber	OPEN	6
SN Snipe <i>Gallinago gallinago</i>	Red	OPEN	9
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	2
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	2
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	2
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	11

Pollinators – YR1

Methods

The transect survey for Oughter is 1km long. All surveys were completed between 11:50am and 05:30pm, when the temperature was at least 16°C and during good weather conditions. Two pollinator surveys were carried out in Year 1 (2021). Dates of surveys were August 28th and September 09th. This survey effort is in line with the proposed survey scope for 2021, which specified that a pollinator transect would be carried out if resources were available. See the Figure in Appendix I2 titled ‘*Oughter Bog Ecology Transects*’ for transect locations.

Constraints

No constraints were identified during the survey. Weather conditions were optimal during all the surveys.

Results- Species Richness

A total of nine species of butterfly were recorded namely, Common Blue, Green-veined White, Meadow Brown, Ringlet, Small Copper, Small Tortoiseshell, Speckled Wood, Peacock and Large White.

In addition to butterflies the following invertebrates were also recorded during the surveys; Green Tiger Beetle (n = 2), Common Darter (n = 7) Common Hawker (n = 1), Blue Tailed Damselfly (n = 2), Common Carder bee (n = 1), *Bombus* spp. (n = 3) and Buff-tailed Bumblebee (n = 2).

Results – Annual Relative Abundance

A total of 24 individual butterflies were recorded during the surveys in 2021. Small Tortoiseshell occurred in the highest abundance (10 overall). The maximum abundance of this species was recorded during the August survey. The highest abundance of all species overall per month was recorded in August.

Results – Habitat Associations

The majority of the transect occurs on an existing rail line located to the west and north of Oughter bog. Much of this rail line supports a good diversity of flowering plant species that attract and support pollinators locally. Along many parts of the transect route, the peatland adjacent to the rail line are devoid of vegetation and largely dominated by bare peat. However, much of the cutover bog is now beginning to revegetate in the wider area. Therefore, in time there is likely to be an increase in abundance and diversity of pollinator species. It is also worth noting that given the somewhat exposed and elevated nature of the transect, this was noted to decrease the numbers of species recorded along the transect, compared with those recorded along more sheltered areas adjacent to the bog margins. In time, increasing vegetation and vegetation structure is likely to increase the numbers of pollinators recorded.

Discussion

The baseline scenario for Oughter still reflects habitats comprised largely of bare peat, and on this basis the ongoing monitoring for butterflies and other pollinators may be useful in determining the effects of rehabilitation under the EDRRS scheme on Pollinators.

Table Error! No text of specified style in document.-6 Monitoring YR1 Pollinator Survey Results - 2021

Species	August	September	Total
Common Blue <i>Polyommatus icarus</i>	2	1	3
Green-veined White <i>Pieris napi</i>	0	0	0
Meadow Brown <i>Maniola jurtina</i>	1	1	2
Ringlet <i>Aphantopus hyperantus</i>	1	0	1
Small Tortoiseshell <i>Aglais urticae</i>	10	0	10
Speckled Wood <i>Pararge aegeria</i>	2	0	2
Peacock <i>Inachis io</i>	1	1	2
Small Copper <i>Lycaena phlaeas</i>	1	0	1
Large White <i>Pieris brassicae</i>	3	0	3
Total	21	3	24

Winter Birds – Monitoring YR1

Method

Fixed counts, following I-WeBS methods, were used to count wintering waterfowl at Oughter. A total of seven monthly counts were undertaken, covering the period September 2021 to March 2022 inclusive.

Constraints

There were no constraints to completing the surveys described herein.

Results – Species Richness

A total of 9 water bird species were recorded across all surveys. Golden plover, Lapwing, Snipe, Black-headed Gull and Curlew are all BoCCI Red listed species (Gilbert *et al.* 2021). Three Amber listed species were recorded, namely Whooper Swan, Greylag Goose and Ringed Plover.

Low numbers of Whooper Swan (max 3 individuals) and Greylag Goose (max 10 individuals) were recorded at this site indicating that it is likely to be of low importance for these species. Lapwing and Ringed Plover were only recorded in February and March indicating that the species does not currently use the site regularly during the winter months. The late records of this species could indicate the arrival to the site of early breeding individuals.

Similarly, Curlew and Ringed plover were only recorded in March (four individuals), although this species was not recorded during the dedicated breeding bird surveys. It is likely therefore that these individuals recorded were on passage.

Small flocks of Golden plover and low numbers of Water rail and Snipe were recorded over the winter months indicating that the site does provide some suitable supporting habitat for these species but is not used by significant numbers locally.

Results – Abundance

Average abundance was highest for Golden Plover (n=11), which was recorded on 3 of 7 no. counts. A maximum of 35 was present in September of 2021. Average abundance was 5 or less for all other species, although maximum counts of both 10 Lapwing and 10 Greylag Goose were recorded in March and October/November respectively.

Results – Habitat Associations

Most of the wintering wildfowl records were associated establishing wetland to the southeast and north of the site. Such areas support established vegetation and associated aquatic invertebrates likely provide feeding opportunities for wildfowl and waders. The low numbers of Snipe recorded is likely to reflect the species propensity to flush from such habitats when approached during the survey.

Discussion

It is clear that Oughter is only used intermittently by some wintering waterfowl species while other species occur throughout the core winter months. There are numerous small wetland features occurring at Oughter bog and thus some parts of these can be difficult to survey due to the linear nature of some former high production fields that developed scrub, as well as the some developed reedbeds.

As these features can provide shelter for some wintering wildfowl and waders, it is likely that some species have been under recorded, in particular Snipe for example. This species is difficult to count accurately due to its cryptic camouflage and fondness for resting in dense vegetation and total counts of all, but the smallest wetland sites are generally underestimates (Smiddy *et al.* 2022). The maximum count for Lapwing was recorded in March of 2022 and may reflect an influx of pre-breeding individuals.

Overall species richness and abundance reflects the current baseline bog condition, with much of the site still dominated by bare peat, establishing scrub and small scattered wetlands. Over time, as supporting wetlands and associated vegetation develop at Oughter it is expected that it may also become a refugium for a greater diversity and increasing numbers of wintering wildfowl and wader species such as those recorded during the 2021-22 winter months. Post rehabilitation and associated revegetation, Oughter is expected contribute to further habitat for a variety of wintering bird species of conservation concern occurring in the wider landscape. No significant change in wintering bird species richness and abundance can be attributed to the peatland rehabilitation so far at Oughter, but measures have consolidated conditions for wetland and other habitat to continue to develop to support wintering bird species already using the site.

In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds, both at Oughter and other bogs rehabilitated under EDRRS.

Table Error! No text of specified style in document.-7 Monitoring YR1 IWeBS Survey Results - 2021/22

Species	BOCCI 2020 - 2026 STATUS	SEP	OCT	NOV	DEC	JAN	FEB	MAR	MEAN	MAX
WS Whooper Swan <i>Cygnus cygnus</i>	Amber	0	2	0	2	3	0	0	1	3
GP Golden Plover <i>Pluvialis apricaria</i>	Red	35	25	15	0	0	0	0	11	35
L. Lapwing <i>Vanellus vanellus</i>	Red	0	0	0	0	0	7	10	2	10
GJ Greylag Goose <i>Anser anser</i>	Amber	0	10	10	8	0	8	0	5	10
SN Snipe <i>Gallinago gallinago</i>	Red	0	0	0	1	0	0	1	0	1
RP Ringed Plover <i>Charadrius hiaticula</i>	Amber	0	0	0	0	0	0	1	0	1
BH Black-headed Gull <i>Chroicocephalus ridibundus</i>	Red	0	0	0	0	0	0	2	0	2
WA Water Rail <i>Rallus aquaticus</i>	Green	0	0	0	0	0	0	1	0	1
CU Curlew <i>Numenius arquata</i>	Red	0	0	0	0	0	0	4	1	4

Breeding Birds – Monitoring YR1

Methods

Three CBS visits were conducted in the period May to July 2022. See the Figure in Appendix I2 titled ‘Oughter Bog Ecology Transects’ for transect location information.

Constraints

CBS recommended timings are early morning, no later than 9:00am ‘ideally’ but allowance is made to extend this period for sites which require longer travel times or where access is difficult. The timing of some visits may have exceeded the CBS recommended period for surveying but were complete by 11:00am and data are considered acceptable for analysis. Any bias on a per species level is discussed further under Discussion, where relevant.

Results- Species Richness

Species richness is presented as the total number of species recorded across transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 44 no. species were recorded, see Table 2-4. This included six BoCCI (Gilbert *et al.* 2021) Red listed species, Black-headed Gull, Lapwing, Meadow Pipit, Kestrel, Swift and Snipe. Eight BoCCI Amber

listed species namely, House Martin, Lesser Black-backed Gull, Linnet, Mallard, Skylark, Swallow, Sand Martin, and Willow Warbler. Remaining species were all Green listed apart from Pheasant which is not assigned a BoCCI status.

A bespoke breeding waders survey was undertaken. Data on wading species recorded is herein presented in line with an interpretation following the O'Brien and Smith 1992 method for censusing lowland breeding wader populations. Breeding waders recorded along the walked transects include; 1-2 pairs of Lapwing, 5 pairs of Snipe and 1 pair of Ringed Plover. This is treated as a minimum estimate for the site.

Results – Annual Relative Abundance

Annual Relative Abundance (ARA) is presented as the maximum count per species per visit (Early or Late) or as the maximum count for the period April to June inclusive, see Table 2-4. This allows for future comparison with CBS trends which takes the same approach to index species.

Maximum counts of greater than 10 individuals were recorded for 11 species, Linnet, Robin, Skylark, Black-headed Gull, Swallow, Sand Martin, Blackcap, Wren, Meadow Pipit, Chaffinch, Blackbird and Willow Warbler. All remaining species were recorded in low numbers (typically less than 7). Overall abundance was highest for Willow Warbler with a maximum of 56 individuals recorded in the period April to July. The species with the highest relative abundance associating with cutaway habitats was Meadow pipit (n=15).

Results – Habitat Associations

Habitat associations are broadly grouped in line with other published interpretations and fall into two categories, those species of OPEN or NON-OPEN habitats. Associations are interpreted following Naim & O'Halloran (2012). In general terms however, the category 'OPEN' was applied to those species most strongly associated with open pioneering habitats or mosaics thereof found on cutaway bog (or raised bog) whilst species generally associated with scrub (typically birch, willow or gorse) and closed-canopy woodland (typically birch or willow but also other broadleaf mixes and/ or conifer spp.) are assigned to the 'NON-OPEN' category.

Twenty-four species associated with OPEN habitats were recorded and eighteen species associated with NON-OPEN habitats were recorded see Table 2-4. Two species associate with both OPEN and NON-OPEN categories (Reed Bunting and Wren).

Breeding Lapwing were generally associated with two wetlands, one located to the northwest of the headland that divides the site (between the shooting range to the east and the mature woodland located to the northwest) and another located to the southeast of the same headland (west of the shooting range). The majority of the Snipe records were also from the small wetland located to the northwest of the headland that divides the site. A pair of Ringed Plover were recorded breeding on open cutaway bog within the northwest of the bog (south of the existing railway near the Derrooly stream).

Results – Colonial Species

A small colony of Black-headed Gulls were recorded within a wetland to the north of the survey area. An estimated six pairs were recorded from the transect survey. However, as suitable wetland habitat exists further to the north of the survey transect, it is likely that a small number of additional pairs also breed on Oughter Bog.

Discussion

It is notable that the six Red listed species recorded, Black-headed Gull, Lapwing, Meadow Pipit, Kestrel, Swift and Snipe are associated with open habitats targeted for rehabilitation in the form of rewetting, and would be expected to gain from many of the measures implemented (wetland creation and fertiliser application to high fields for example). For Kestrel, for example, this species will typically benefit from a greater area of hunting habitat, while nesting in mature trees in the wider area or bog margins. The Red listed species, Meadow Pipit associates with drier open habitats and had the fourth highest relative abundance overall or highest overall for species associated with cutover i.e., open habitats. Overall, the total number of species either Red or Amber listed was 14.

Breeding waders such as Snipe, Ringed Plover and Lapwing may increase over time following peatland rehabilitation measures and the associated increase in area of suitable wetlands. In addition, species such as Common Sandpiper may also colonise the site in the future as suitable habitat develops.

In general, the abundance estimates reflect the current suitability of the existing small wetland features, fen, scrub, establishing woodland and pioneering open habitats present at Oughter for breeding birds. In time, the extensive areas of bare peat within the south of the site will provide more suitable habitat for many species.

Regarding habitat associations, just under 55% of species recorded are more associated with open habitats. Open habitat species comprise a higher proportion of Red and Amber listed species (13 no. in total), with only one Amber species (Willow Warbler) associated with non-open habitats. Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland 2009), and this still seems the case. Further analysis on trends in the ratio or relative abundance of these species over time following rehabilitation would be beneficial.

In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds. The singular notable change in breeding bird species richness and abundance relate to the establishment of a breeding Black-headed Gull colony post rehabilitation. This can be attributed to the peatland rehabilitation so far at Oughter. As regards other species, measures have consolidated conditions for fen and wetland habitat to continue to develop to support the remaining breeding bird species already using the site.

Table Error! No text of specified style in document.-8 Monitoring YR2 Countryside Bird Survey Results 2022

SPECIES	BOCCI STATUS	HABITAT ASSOCIATION	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	24
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	15
BF Bullfinch <i>Pyrrhula pyrrhula</i>	Green	NON-OPEN	2
BH Black-headed Gull <i>Chroicocephalus ridibundus</i>	Red	OPEN	13

SPECIES	BOCCI STATUS	HABITAT ASSOCIATION	ARA
BT Blue Tit <i>Cyanistes caeruleus</i>	Green	NON-OPEN	3
BZ Buzzard <i>Buteo buteo</i>	Green	OPEN	2
CC Chiffchaff <i>Phylloscopus collybita</i>	Green	NON-OPEN	7
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	22
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	2
D. Dunnock <i>Prunella modularis</i>	Green	NON-OPEN	1
ET Little Egret <i>Egretta garzetta</i>	Green	OPEN	6
GO Goldfinch <i>Carduelis carduelis</i>	Green	OPEN	1
GR Greenfinch <i>Carduelis chloris</i>	Green	NON-OPEN	1
H. Grey Heron <i>Ardea cinerea</i>	Green	OPEN	3
HC Hooded Crow <i>Corvus cornix</i>	Green	OPEN	6
HM House Martin <i>Delichon urbicum</i>	Amber	OPEN	2
K. Kestrel <i>Falco tinnunculus</i>	Red	OPEN	1
L. Lapwing <i>Vanellus vanellus</i>	Red	OPEN	5
LB Lesser Black-backed Gull <i>Larus fuscus</i>	Amber	OPEN	1
LI Linnet <i>Carduelis cannabina</i>	Amber	OPEN	9
LR Redpoll <i>Acanthis cabaret</i>	Green	NON-OPEN	7
LT Long-tailed Tit <i>Aegithalos caudatus</i>	Green	NON-OPEN	2
M. Mistle thrush <i>Turdus viscivorus</i>	Green	NON-OPEN	2
MA Mallard <i>Anas platyrhynchos</i>	Amber	OPEN	4
MG Magpie <i>Pica pica</i>	Green	NON-OPEN	2
MH Moorhen <i>Gallinula chloropus</i>	Green	OPEN	1
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	15
PH Pheasant <i>Phasianus colchicus</i>	N/A	NON-OPEN	1
PW Pied Wagtail <i>Motacilla alba</i>	Green	OPEN	4
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	11
RB Reed Bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	5
RP Ringed Plover <i>Charadrius hiaticula</i>	Green	OPEN	2
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	12
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	3
SI Swift <i>Apus apus</i>	Red	OPEN	4
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	14
SM Sand Martin <i>Riparia riparia</i>	Amber	OPEN	14
SN Snipe <i>Gallinago gallinago</i>	Red	OPEN	5
ST Song Thrush <i>Turdus philomelos</i>	Green	NON-OPEN	6
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	4
WM Whimbrel <i>Numenius phaeopus</i>	Green	OPEN	1
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	7
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	15
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	56

Pollinators – YR2

Methods

The transect survey for Oughter is 1km long. All surveys were completed between 11:40am and 4:15pm, when the average temperature was at least 13°C and during good weather conditions. Five monthly pollinator surveys were carried out in Year 2 (2022) spanning the period May to September inclusive. See the Figure in Appendix I2 titled '*Oughter Bog Ecology Transects*' for transect locations.

Constraints

No constraints were identified during the survey. Weather conditions were optimal during all the surveys.

Results- Species Richness

A total of eight species of butterfly were recorded namely, Common Blue, Green-veined White, Meadow Brown, Ringlet, Small Copper, Small Tortoiseshell, Orange Tip, and Speckled Wood. In addition to butterflies the following invertebrates were also recorded during the surveys; Common darter (n = 11), Four spotted chaser (n = 9), Brown Darter (n = 1), Common hawkler (n = 1), Bombus sp. (n = 6), Black tailed skimmer (n = 4), Common Blue damselfly (n = 7), Red Tailed bumblebee (n = 1), Buff tailed bumblebee (n = 1), and Six-spot Burnet moth (n = 1).

Results – Annual Relative Abundance

A total of 34 individual butterflies were recorded during the surveys. Meadow Brown occurred in the highest abundance (9 overall), with the second highest Small Tortoiseshell (7 overall). The maximum abundance of Meadow Brown was recorded during the July survey. The highest abundance of all species overall per month was recorded in July (17 species). The lowest species abundance was recorded during the survey in May.

Results – Habitat Associations

The majority of the transect occurs on an existing rail line located to the west and north of Oughter bog. Much of this rail line supports a good diversity of flowering plant species that attract and support pollinators locally. Along many parts of the transect route, the peatland adjacent to the rail line is devoid of vegetation and is largely dominated by bare peat. However, much of the cutover bog is now beginning to revegetate in the wider area. Therefore, in time there is likely to be an increase in abundance and diversity of pollinator species. In more exposed and elevated sections of the transect, a decrease in the numbers of species recorded was noted, compared with those recorded along more sheltered areas adjacent to the bog margins. In time, increasing vegetation and variation in vegetation structure is likely to increase the numbers of pollinators recorded.

Discussion

It is possible species richness and abundance may increase in future surveys along the transect route when the adjacent bare peat dominated areas begin to revegetate and the site develops more mature habitats. For the moment there is no discernible trend from YR1 to YR2 which can be attributed to rehabilitation.

Table Error! No text of specified style in document.-9 Monitoring YR2 Pollinator Survey Results 2022

Species	May	June	July	August	September	Total
Common Blue <i>Polyommatus icarus</i>	0	0	4	1	0	5
Green-veined White <i>Pieris napi</i>	0	0	0	0	1	1
Meadow Brown <i>Maniola jurtina</i>	0	1	5	3	0	9
Ringlet <i>Aphantopus hyperantus</i>	0	0	5	1	0	6
Small Copper <i>Lycaena phlaeas</i>	0	2	0	0	0	2
Small Tortoiseshell <i>Aglais urticae</i>	0	0	3	1	3	7
Orange Tip <i>Anthocharis cardamines</i>	2	0	0	0	0	2
Speckled Wood <i>Pararge aegeria</i>	0	1	0	0	1	2
Total	2	4	17	6	5	34

Winter Birds – Monitoring YR2

Method

Four counts within the winter period 2022/23 were conducted. All counts were within the period 10:30 to 16:30. Counts were undertaken generally on days with no rain. Visibility was moderate to good and wind speeds ranged from F0-F2. Survey dates were 3rd of November, 16th of November, 28th of January and the 7th of March.

Constraints

Surveys were not carried out at this bog during October and December 2022, and February 2021. However, four counts were carried out over the winter season. These surveys are still considered representative of the time of year and the omission of two surveys dates is not considered significant.

Results – Species Richness

Overall species richness is low. A total of 9 water bird species were recorded across all surveys. Two of these are BoCCI (Gilbert *et al.* 2021) Red listed species namely Golden Plover and Snipe. Four Amber listed species were recorded namely, Greylag Goose, Mallard, Mute Swan, Whooper Swan. Three Green listed species namely Grey Heron Jack Snipe and Water Rail were also recorded on site during the winter period.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 2-6 and was highest for Golden Plover (n=3). Average abundance across all 4 counts was <3 for all remaining species.

Results – Habitat Associations

Most birds across all counts were found to associate with habitats present at Oughter Bog, typically wetland habitats.

Discussion

Overall species richness and abundance is considered low during the period studied. No counts were recorded as reaching potentially important thresholds for species of conservation concern. The

wintering bird species assemblage is broadly similar to the previous wintering bird survey undertaken at the bog, with a small number of new species recorded. The low species diversity and low numbers are likely typical of this revegetating and recently rewetted cutover bog. It is not yet possible to attribute any change in species richness or abundance to rehabilitation.

Six species recorded were of BoCCI Red or Amber status. In the context of nearby European Sites, which have for instance ‘*Wetland and Waterbirds*’ as qualifying interests, it is likely that this site could contribute to further habitat for SCI species and support the conservation objectives for these European Sites following the establishment of more typical wetland and peatland vegetation post-rehabilitation. Other large areas of cutover bog have also been subject to recent rehabilitation in the wider area as part of the scheme, including Pollagh, Killaranny, and Turraun bogs. Combined, these areas may provide suitable supporting habitat for wintering bird species as wetland habitats further develop.

Table Error! No text of specified style in document.-10 Winter 2022/23 – Monitoring YR1 I-WeBS Survey Results

Species	BOCCI 2020 - 2026 STATUS	NOV	NOV	DEC	JAN	FEB	MAR	Mean	Max
GP Golden Plover <i>Pluvialis apricaria</i>	<i>Red</i>	12	0	N/A	0	0	N/A	3	12
SN Snipe <i>Galinago galinago</i>	<i>Red</i>	0	3	N/A	2	2	N/A	2	3
GJ Greylag Goose <i>Anser anser</i>	<i>Amber</i>	0	0	N/A	2	0	N/A	1	2
JS Jack Snipe <i>Lymnocyptes minimus</i>	<i>Green</i>	1	0	N/A	0	0	N/A	0	1
MA Mallard <i>Anas platyrhynchos</i>	<i>Amber</i>	0	0	N/A	0	7	N/A	2	7
MS Mute Swan <i>Cygnus olor</i>	<i>Amber</i>	1	0	N/A	0	0	N/A	0	1
WS Whooper Swan <i>Cygnus cygnus</i>	<i>Amber</i>	0	0	N/A	0	7	N/A	2	7
H. Grey Heron <i>Ardea cinerea</i>	<i>Green</i>	2	0	N/A	1	3	N/A	2	3
WA Water Rail <i>Rallus aquaticus</i>	<i>Green</i>	0	2	N/A	0	0	N/A	1	2

2. Castlegar

Since the previous reporting period (April 2021 to August 2022), additional wintering bird surveys have been undertaken at Castlegar bog and have been added to this bog account. In addition, data from a second round of quadrat visits in 2022 which was omitted from previous reporting is now included.

Vegetation Quadrats – Monitoring YR1

Method

Quadrat monitoring was carried out at Castlegar bog June 2021 in accordance with agreed EDRRS Monitoring and Verification.

Constraints

No constraints to the establishment of quadrats at Castlegar were noted during the survey in June 2021.

Results

All five quadrats were dominated by bare peat (91-100%). This is representative of the post-industrial peat extraction nature of Castlegar bog. Little vegetation occurrence was noted, with the exception of the presence of <4% (few individuals) Ling Heather (*Calluna vulgaris*) within quadrat no. 1.



Example of Quadrat no. 4, dominated by bare peat and cambered former peat extraction field pre-rehabilitation.

Discussion

As with habitats, the quadrats reflect the current baseline conditions following rehabilitation. Further time is required before any vegetation is likely to be recorded.

Winter Birds – Monitoring YR1

Method

Fixed counts, following I-WeBS methods, were used to count wintering waterfowl at Castlegar. A total of six counts were undertaken, at monthly intervals, covering the period September 2021 to February 2022 inclusive.

Constraints

No constraints were noted. In September, some EDRRS activity was still ongoing however this is not considered to have affected the count.

Results – Species Richness

A total of eight water bird species were recorded across all surveys. Three of these were BoCCI (Gilbert *et al.* 2021) Red listed species namely Golden Plover, Snipe and Lapwing. Five Amber listed species were recorded namely Mallard, Teal, Mute Swan, Whooper Swan and Cormorant.

Results – Abundance

Average abundance across the winter period is presented in Table 3-1 and was highest for Golden Plover (n=26). A peak of 150 was noted for this species in October of 2021 but it is noted the species was present on only two of six counts. Lapwing and Snipe both occurred on five of six counts and Teal occurred on three of six counts. A maximum or peak for Lapwing was recorded in February of 2022 when 77 were present. Snipe numbers never exceeded 8, and a maximum of 47 Teal were present in October of 2021.

Results – Habitat Associations

Most birds across all counts were found to associate with the River Suck and its corridor. Peak counts for Teal (47) and Lapwing (77) for instance both involved birds associating directly with the river and not Castlegar nor the rehabilitation extent. Snipe was found to associate with the bog, but this probably reflects its propensity to flush from intact high bog or marginal habitats when approached and on one instance 7 were flushed from bare peat onsite. Mute Swan, Cormorant and Whooper Swan were all recorded in flight over the River Suck. The species which perhaps exhibits the highest association with habitats as presented currently at the site is Golden Plover. In October 150 were recorded in flight near or over the bog and these may utilise the bog for roosting, as 3 were noted on bare peat in the south of Castlegar in December.

Discussion

Overall species richness is considered low during the period studied (6-10 species is below average (n=11) for the 14 bogs where winter surveys were carried out). This reflects the baseline bog condition which is dominated by bare peat which offers little or no foraging opportunities for many species of water bird. Roosting opportunities are provided for two species Lapwing and Snipe, which may also forage onsite. Regarding abundance, species such as Mute Swan and Whooper Swan, which often winter in large numbers at other Bord na Móna bogs (Copland 2009, 2010 and Gittings 2021) were effectively absent and only found to utilise the adjacent corridor of the River Suck in low numbers. Over time, as peatland habitats develop further at Castlegar it is expected that it may also become a refugium for species such as these during the winter months, as the rate of association with the onsite habitats increases.

It is notable that all species recorded were of Conservation concern. In the context of an adjacent European Site (the River Suck Callows SPA) which has Whooper Swan, Golden Plover, Lapwing and ‘*Wetland and Waterbirds*’ as qualifying interests a post rehabilitation Castlegar may contribute to

further habitat for these species and support the conservation objectives for this European Site. Another qualifying interest, Wigeon, along with Mallard and Coot has previously been recorded from a silt pond at Castlegar (JOD Ltd. 2021).

In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds at Castlegar. No significant change in wintering bird species richness and abundance can be attributed to the peatland rehabilitation so far at Castlegar, but measures have consolidated conditions for peatland habitats to continue to develop to support wintering bird species already using the site.

Table Error! No text of specified style in document.-11 Winter 2021/2 – Monitoring YR1 IWeBS Survey Results

Species	BOCCI 2020 - 2026 STATUS	SEP	OCT	NOV	DEC	JAN	FEB	Mean	Max
SN Snipe <i>Gallinago</i>	Red	3	1	7	8	3	0	4	8
MA Mallard <i>Anas platyrhynchos</i>	Amber	3	0	0	0	2	6	2	6
GP Golden Plover <i>Pluvialis apricaria</i>	Red	0	150	0	3	0	0	26	150
L. Lapwing <i>Vanellus</i>	Red	0	12	39	10	7	77	24	77
T. Teal <i>Anas crecca</i>	Amber	0	47	20	0	0	0	11	47
MS Mute Swan <i>Cygnus olor</i>	Amber	0	0	2	0	0	0	0	2
WS Whooper Swan <i>Cygnus</i>	Amber	0	0	0	2	0	0	0	2
CA Cormorant <i>Phalacrocorax carbo</i>	Amber	0	0	0	0	2	0	0	2

Vegetation Quadrats – Monitoring YR2

Method

Quadrat monitoring was carried out at Castlegar bog July 2022 in accordance with agreed EDRRS Monitoring and Verification.

Constraints

Several quadrats now occur within deep peat cells (DPT4) following rehabilitation. Some of these areas were unsuitable for pedestrian access. In this scenario percentage cover of vegetation was observed from the nearest berm or equivalent safe location.

Results

Where quadrats were situated within deep peat cells (DPT4), see quadrats no. Q4 and Q5, these areas were previously dominated by dry bare peat (2021). Following a second year of monitoring these fixed quadrats, the areas were noted to have been transformed, with significant cover (76-90% cover) of standing water following successful alteration in the water table, see example photos below. These areas still lacked any vegetation establishment and more time is needed to record any changes in vegetation. The remainder of the quadrats were similarly dominated by bare peat (91-100%) one year later. However, successful rewetting of the peat was noted. See Table 2 of Appendix D4 for detailed quadrat information for Year 2 of monitoring at Castlegar (now provided for the first time).

Discussion

As with habitats, the quadrats reflect the current baseline conditions following rehabilitation. Due to the bare peat nature of Castlegar post-industrial peat extraction and due to the nature of the rehabilitation, comprising significant deep peat cell construction (DPT4), extensive areas of bare peat occur at Castlegar. More time is required before any vegetation is likely to be recorded.



Example of Quadrat no. 4 pre-rehabilitation in June 2021.



Example of rewetted peat within a DPT4 cell in which Quadrat no. 4 is located - post rehabilitation (July 2022).

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Castlegar Bog during summer 2022.

Constraints

At the time of survey much of the bare peat at Castlegar has been rehabilitated to form banded cells. Many of these areas are not safe for pedestrian access due to standing water or soft conditions and must be avoided. This is not thought to have affected survey results however as there are still high fields present which can be used for access.

Results

Castlegar Bog was drained and developed for industrial peat production in the 1990s and was in active peat production since 2004, ceasing in 2019. The majority of the former peat extraction footprint is bare peat (~75%).

Habitats within the rehabilitated area at Castlegar bog correspond to the Fossitt habitat classification *Cutover bog* (PB4). This is mainly composed of re-wetted bare peat modified with rehabilitation to form banded cells with blocked drains in some sections, while other sections had a variety of drain-blocking. This work was completed in 2021. Some of the former bare peat has shallow surface water.

There is a small amount of pioneer vegetation developing across the site. Vegetation communities recorded during summer 2022 include 'Bare peat (0-50% cover)' (BP), pioneering open cutaway communities dominated mainly by the classification 'Pioneer *Juncus effusus* community' (pJeff), or 'Dry *Calluna* community' (dHeath) or 'Emergent *Betula*-dominated community' (eBir). There were drains noted in some areas that were colonising with *Sphagnum* moss (see images below), which was present prior to rehabilitation.

It is too soon for habitats at Castlegar to reflect post rehabilitation change or succession. Some colonising *Sphagnum* is present, but *Sphagnum cuspidatum* was noted in marginal drains and some field drains prior to intervention in 2021. Nonetheless this is indicative of suitable conditions for *Sphagnum* growth at the site.

Almost no fresh pioneering vegetation is present so far in the rehabilitation extent (see also Quadrat survey results, below). Some final manipulation of banded cells by the insertion of plastic sheet piles and/or overflow pipes is still to be carried out so further time is needed for optimum water levels to potentially develop at the surface of these areas. A pipe through the centre of the bog has been broken to create a more natural riparian corridor, which in time will result in a change in habitats along its extent. In conclusion the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site. Re-wetting will help consolidate changes in environmental condition that continue to encourage the development of pioneer vegetation cover at this site in the future.





Photos showing *Sphagnum* mosses in drains at Castlegar 2022

Breeding Birds – Monitoring YR1

Methods

At Castlegar, three, 1km in length, transects were selected to provide a representative sample of the breeding bird community. In addition, a breeding wader survey was carried out in line with O'Brien & Smith 1992, which comprised walking a predefined route or transect across the bog on each of 4 visits in the period April to July 2022 inclusive. See the figure in Appendix L2 titled 'Castlegar Bog Ecology Transects' for transect locations.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with high fields, headlands or rail lines associated with former peat extraction. Due to their location sampling results may include species which utilise the areas adjacent to transect routes i.e. areas not subject to rehabilitation. Where relevant this is further addressed in the Discussion section.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10-11am). CBS recommended timings are early morning, no later than 9:00am 'ideally' but allowance is made to extend this period for sites which require longer travel times or where access is difficult. The timing of some visits may have exceeded the CBS recommended period for surveying (notably visit 1) but were complete by 11:00am and data are considered acceptable for analysis. Any bias on a per species level is discussed further under Discussion, where relevant. Wind was high on one count (visit 2) but is considered to not have affected the results; in addition, a further count was carried out in the April-June period in better conditions.

Results- Species Richness

Species richness is presented as the total number of species recorded across both transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 33 no. species were recorded, see Table 3-2. This included four BoCCI (Gilbert *et al.* 2021) Red listed species, Black headed Gull, Lapwing, Meadow Pipit and Snipe along with five BOCCI Amber

listed species namely, Goldcrest, Skylark, Mallard, Swallow and Willow Warbler. Remaining species were all Green listed apart from Pheasant which is not assigned a BoOCCI status.

A bespoke breeding waders survey was undertaken, data on wading species recorded is herein presented in line with an interpretation following the O'Brien and Smith 1992 method for censusing lowland breeding wader populations. On this basis 1 pair of Lapwing and 2 pairs of Snipe bred onsite in 2022. The Lapwing nested in the west of the site close to CBS transect 1.

Results – Annual Relative Abundance

Annual relative abundance (ARA) is presented as the maximum count per species per visit (E or L) or as the maximum count for the period April to June inclusive, see Table 2.11.2. This allows for future comparison with CBS trends which takes the same approach to index species.

Maximum counts of greater than 10 individuals were recorded for three species, Rook, Willow Warbler and Meadow pipit. All remaining species were recorded in low numbers (<10). Overall abundance was highest for Rook with a maximum of 25 individuals recorded in the period April to June however these were recorded in flight so are more likely to be associated with surrounding farmland. The species with the highest relative abundance (n=14) associating with cutover habitats was Meadow pipit.

Results – Habitat Associations

Habitat associations are broadly grouped in line with other published interpretations and fall into two categories, those species of OPEN or NON-OPEN habitats. Associations are interpreted following Naim & O'Halloran 2012. In general terms however, the category 'OPEN' was applied to those species most strongly associated with open pioneering habitats or mosaics thereof found on cutaway bog (or raised bog) whilst species generally associated with scrub (typically birch, willow or gorse) and closed-canopy woodland (typically birch or willow but also other broadleaf mixes and/or conifer spp.) are assigned to the 'NON-OPEN' category.

Twelve species considered associated with OPEN habitats were recorded and eighteen species associated with NON-OPEN habitats were recorded see Table 2.11.2. Three species associate with both OPEN and NON-OPEN categories (Reed Bunting, Sedge Warbler and Wren).

Results – Colonial Species

No colonies were recorded.

Discussion

It is notable that the four Red listed species recorded, Black-headed Gull, Lapwing, Meadow Pipit and Snipe are associated with open habitats targeted for rehabilitation in the form of rewetting, and would be expected to gain from many of the measures implemented (wetland creation and fertiliser application to high fields for example) Only a single observation was made of Black headed Gull so it is assumed to not have bred onsite. The Red listed species, Meadow Pipit associates with drier open habitats and had the second highest relative abundance overall or highest overall for species associated with cutover. Overall, the total number of species either Red or Amber listed was 9.

Breeding waders included Snipe (2 pairs) and Lapwing (1 pair). Both are Red listed and breeding numbers may increase over time following rehabilitation.

Relative abundance was highest in 2022 for three species. In general, the abundance estimates reflect the expansive bare peat and the marginal habitats currently present at Castlegar. For instance, both Rook and Willow warbler are more likely to associate with either nearby farmland (in the case of Rook) or marginal unrehabilitated habitats. Abundance is generally low for most species with open habitat associations however the current bare peat extent limits foraging and breeding opportunities for many of these.

Regarding habitat associations, 36% of species recorded are more associated with open habitats. Open habitat species comprise a higher proportion of Red and Amber listed species (7 no. in total), with only two either Red or Amber species associated with non-open habitats (Goldcrest and Willow warbler). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland 2009), and this still seems the case at Castlegar. Further analysis on trends in the ratio or relative abundance of these species over time following rehabilitation would be beneficial. No significant change in breeding bird species richness and abundance can be attributed to the peatland rehabilitation so far at Castlegar, but measures have consolidated conditions for peatland habitats to continue to develop to support breeding bird species already using the site.

Table Error! No text of specified style in document.-12 Monitoring YR1 Countryside Bird Survey Results - 2022

SPECIES	BOCCI 2020 - 2026 STATUS	HABITAT ASSOCIATION	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	6
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	4
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	4
BH Black-headed Gull <i>Chroicocephalus ridibundus</i>	Red	OPEN	1
BT Blue Tit <i>Cyanistes caeruleus</i>	Green	NON-OPEN	1
CC Chiffchaff <i>Phylloscopus collybita</i>	Green	NON-OPEN	5
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	3
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	4
CT Coal tit <i>Periparus ater</i>	Green	NON-OPEN	1
D. Dunnock <i>Prunella modularis</i>	Green	NON-OPEN	5
GC Goldcrest <i>Regulus</i>	Amber	NON-OPEN	1
GO Goldfinch <i>Carduelis carduelis</i>	Green	OPEN	1
GT Great Tit <i>Parus major</i>	Green	NON-OPEN	2
HC Hooded Crow <i>Corvus cornix</i>	Green	OPEN	7
JD Jackdaw <i>Corvus monedula</i>	Green	NON-OPEN	6
L. Lapwing <i>Vanellus</i>	Red	OPEN	2
LT Long-tailed Tit <i>Aegithalos caudatus</i>	Green	NON-OPEN	3
MA Mallard <i>Anas platyrhynchos</i>	Amber	OPEN	5
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	14
PH Pheasant <i>Phasianus colchicus</i>	N/A	NON-OPEN	3

SPECIES	BOCCI 2020 - 2026 STATUS	HABITAT ASSOCIATION	ARA
PW Pied wagtail <i>Motacilla alba yarrellii</i>	Green	OPEN	1
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	6
RB Reed bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	2
RO Rook <i>Corvus frugilegus</i>	Green	NON-OPEN	25
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	3
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	3
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	5
SN Snipe <i>Gallinago</i>	Red	OPEN	2
ST Song Thrush <i>Turdus philomelos</i>	Green	NON-OPEN	1
SW Sedge Warbler <i>Acrocephalus schoenobaenus</i>	Green	OPEN/NON-OPEN	3
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	1
WR Wren <i>Troglodytes</i>	Green	OPEN/NON-OPEN	5
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	14

Pollinators-YR1

Methods

A transect (2km in length) was established across part of Castlegar to record pollinators, indicator species (Butterflies) and other taxa where relevant. Pollinator recording followed guidelines set out by the National Biodiversity Bumblebee Monitoring Scheme. A total of 5 visits within the period April 2022 to August 2022 inclusive are herein reported. The transect route is shown in the Figure titled 'Castlegar Bog Ecology Transects' in Appendix L2.

Constraints

Wind occasionally reached higher than ideal speeds, but this may reflect the open nature of the cutaway and is relatively unavoidable.

Results – Species Richness

A total of five species of butterfly were recorded namely Brimstone, Orange Tip, Peacock, Small White and Speckled Wood. In addition to butterflies, Honeybee *Apis mellifera* (n=6 across all visits) and Bumblebees *Bombus spp.* (n=15 across all visits) were recorded.

Results – Abundance

Speckled Wood and Orange Tip butterflies occurred in the highest abundance (11 overall), however the maximum number per species per visit was for Orange Tip, with 6 recorded in April of 2022. Highest abundance overall per month was for April.

Results – Habitat Associations

In general, little or no pollinator activity was clearly associated with bare peat or recently rehabilitated bare peat areas. Species recorded on bare peat sections of the transect were primarily traversing the transect as insufficient vegetation is present to attract feeding pollinators. In contrast the northern section of the sampling transect, which adjoins the old rail line is already vegetated and this is where a high proportion of pollinators were encountered. Regarding Brimstone, an important food plant for

this species, Purging Buckthorn (*Rhamnus cathartica*), is found in gallery woodland between Castlegar Bog and the nearby River Suck.

Discussion

The importance of regenerating cutaway for Irish butterflies has been described for certain sites such as Lullymore, Co. Kildare (Harding 2008). However, the baseline scenario for Castlegar still reflects habitats comprised largely of bare peat, and on this basis the ongoing monitoring for butterflies and other pollinators may be useful in determining the effects of rehabilitation under the EDRRS scheme on Pollinators. Other species of Butterfly have been recorded on an *ad hoc* basis at Castlegar previously such as Meadow Brown, Small Copper, Ringlet and Silver-washed Fritillary and it is possible these may appear in future sampling survey results.

Table Error! No text of specified style in document.-13 Monitoring YR1 Pollinator Survey Results - 2022

Species	April	May	June	July	August	Total
Brimstone <i>Gonepteryx rhamni</i>	1	0	0	0	2	3
Orange Tip <i>Anthocharis cardamines</i>	6	0	2	0	3	11
Peacock <i>Aglais io</i>	0	0	0	0	2	2
Small white <i>Pieris rapae</i>	4	0	1	1	2	8
Speckled wood <i>Pararge aegeria</i>	4	0	3	1	3	11
Total	15	0	6	2	12	35

Winter Birds – Monitoring YR2

Method

Six counts within the winter period 2022/23 were conducted according to I-WeBS methodology. All counts were undertaken within the period 10:00 to 13:30. Survey dates were 18th October 2022, 30th November 2022, 21st December 2022, 19th January 2023, 14th February 2023, 29th March 2023.

Constraints

Counts were undertaken generally on days with no rain; however, on three dates brief spells of light drizzle/ showers were recorded during the surveys, and on one day (19/01/2023) snow was present on the ground. Visibility was always good and wind speeds were suitable for undertaking the surveys. The weather conditions during the surveys are considered typical of the time of year in Ireland, and there were no access or visibility constraints. No significant constraints to the survey were noted.

Results – Species Richness

Species richness was low. A total of 5 water bird species were recorded across all surveys. Three of the species recorded were BoCCI (Gilbert *et al.* 2021) Red listed namely Curlew, Golden Plover and Snipe. One Amber listed species was recorded, namely Whooper Swan.

Castlegar is bordered on the eastern side by the River Suck and associated wet grassland/callows. This area was surveyed as part of the wider monitoring of this bog. These species have not been included within the data analysis, or presented in Table 3-4 below, given that they were recorded outside of the Castlegar Bog boundary. The area outside the to the east frequently holds a higher species richness than the cutover bog itself currently at least. One of the additional species recorded utilising this habitat is BoCCI (Gilbert *et al.* 2021) Red listed Lapwing. In addition, six BoCCI Amber listed species namely, Cormorant, Mallard, Mute Swan, Teal, Whooper Swan and Wigeon were also recorded using the river corridor. This reflects the occurrence of these species in the wider area.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 3-4 and was highest for Golden Plover (n=12) although this was influenced by peak counts of 23 in October of 2022 and 46 in March 2023. Average abundance across all 6 counts was <2 for all remaining species.

Peak numbers of Lapwing, (118), Wigeon (90), Teal (50) and Golden Plover (37) were recorded associated with the River Suck and the wet grassland habitat here. This data is not included in Table 3-3 below, as these birds were recorded outside of the Castlegar Bog boundary.

Results – Habitat Associations

Most birds recorded across all counts were found not to have an association with habitats present at Castlegar Bog. Golden Plover recorded in March of 2023 were recorded flying above and using Castlegar Bog. As mentioned previously most species recorded each month were observed utilising habitats outside the site boundary associated with the River Suck. Most species showed a strong association with the River Suck and associated wet grasslands to the east of the site.

Discussion

Overall species richness and abundance is considered low during the period studied. No counts were recorded as reaching potentially important thresholds for species of conservation concern. Overall, more species were recorded associating with the habitats in Castlegar during YR2 surveys compared to those carried out in YR1. The wintering bird species assemblage is broadly similar to previous bird surveys, in that low species diversity was recorded and general usage of the bog is intermittent, with the majority of the species recorded using the River Suck and its callows for foraging and roosting. This reflects the baseline bog condition which is dominated by bare peat which offers little or no foraging opportunities for many species of water bird.

No change in species richness and abundance can be attributed to the rehabilitation to date, and more time is needed to record any significant correlation with rehabilitation. The bog is still dominated by bare peat. It is expected that as pioneer vegetation, and wetlands begin to develop, aquatic plants and invertebrate communities will become established, and foraging opportunities for will increase. This will begin to support a greater species diversity and numbers of wintering wildfowl and waders will increase.

For the 2022/23 winter period, four of the bird species recorded were of Red or Amber status. In the context of the adjacent European Site River Suck Callows SPA which has Whooper Swan, Golden Plover, and 'Wetland and Waterbirds' as qualifying interests, in time a post rehabilitation Castlegar may contribute to further habitat for these species and support the conservation objectives for this European Site. The data presented here forms a baseline for further interpretation of the effects of post-industrial peatland rehabilitation to assemblages of wintering birds at this site.

Table Error! No text of specified style in document.-14 Winter 2022/3 – Monitoring YR2 IWeBS Survey Results

Species	BOCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
WS Whooper Swan <i>Cygnus cygnus</i>	Amber	1	0	0	0	0	0	0	1
JS Jack Snipe <i>Lymnocyptes minimus</i>	Green	0	0	1	0	0	0	0	1
SN Snipe <i>Galinago galinago</i>	Red	3	3	1	0	1	2	2	3
GP Golden Plover <i>Pluvialis apricaria</i>	Red	23	0	0	0	0	46	12	46
CU Curlew <i>Numenius arquata</i>	Red	1	0	0	0	0	0	0	1

3. Cavemount

Since the previous reporting period (April 2021 to August 2022), additional wintering bird surveys have been undertaken at Cavemount bog and have been added to this bog account.

Vegetation Quadrats – Monitoring YR1

Method

Quadrat monitoring was carried out at Cavemount bog during summer of 2021 in accordance with agreed EDRRS Monitoring and Verification. 5 no. quadrats were employed.

Constraints

No constraints were identified.

Results

See Table 1 of Appendix M2. All quadrats were dominated by bare peat (91-100% cover). Many areas of Cavemount Bog, particularly those located above gravel ridges on shallow peat, have become vegetated with scattered *Betula pubescens*, *Juncus effusus*, *Eriophorum angustifolium* and *Triglochin palustris*. However, large parts of Cavemount bog are still dominated by bare peat. It is likely that these areas will, in time, develop similar vegetation while also being influenced by the EDRRS rehabilitation measures i.e. rewetting.

Discussion

As with habitats the quadrats reflect the current baseline conditions pre-rehabilitation. Post-rehabilitation, further time is required before any vegetation colonisation or change is likely to be recorded.



Quadrat Q1



Quadrat Q5

Pollinators-YR1

Methods

Two pollinator surveys were carried out in monitoring Year 1 (2021). This survey effort is in line with the proposed survey scope for 2021, which specified that pollinator transects would be carried out if resources were available. The transect carried out in 2021 was approximately 3km in length. The transect commenced at the north of Cavemount and followed the railway line south-east, before

veering west across a high field in the former production area. An additional 500m pollinator transect was carried out in the south-western corner of the bog. All surveys were completed between 10:50am and 02:00pm, when the temperature was at least 13°C and during good weather conditions. See the Figure in Appendix M2 titled ‘Cavemount Bog Ecology Transects’ for transect location information.

Constraints

No constraints were identified during the survey. Weather conditions were optimal during all the surveys.

Results – Species Richness

Species richness was relatively high in year 1. A total of twelve species of butterfly were recorded namely, Common Blue, Green-veined White, Meadow Brown, Ringlet, Small Copper, Small Tortoiseshell, Small White, Large White, Peacock, Wall Brown, Speckled Wood and Red Admiral.

In addition to butterflies the following invertebrates were also recorded during the surveys; Bombus sp. (n = 3), Buff-tailed Bumblebee (n = 2), White-tailed Bumblebee (n=5), Common Darter (n = 23), Common Hawker (n = 4), Common darter (n = 3), Emerald Damselfly (n = 4), Blue-tailed damselfly (n = 1), Common Blue Damselfly (n=2), Four-spotted Chaser (n = 4), Brown Hawker (n = 7), Latticed Heath (n = 2) and Common Heath (n = 5).

Results – Abundance

A total of 133 individuals were recorded during the surveys. Common Blue occurred in the highest abundance (46 overall), with the maximum abundance of this species recorded during the August survey. Small Tortoiseshell and Small White were also recorded in high abundance (21 and 20 respectively). The highest abundance of all species overall per month was recorded in August.

Results – Habitat Associations

The first section of the transect in year 1 (transect A) and the year 1 additional transect in the SW corner of Cavemount crosses pioneer open habitats, open water and bare peat. Butterfly diversity and abundance was low in this section of the transect, due to the poorly developed vegetation and lack of suitable foraging habitat for pollinators. The second section of the transect (transect B) follows the railway track and is vegetated with dry calcareous grassland with a high floristic diversity and abundant Common Knapweed. This section of the transect had the highest species abundance during the surveys in 2021.

Discussion

The baseline scenario for Cavemount established in 2021 still reflects habitats comprised largely of bare peat, pioneering vegetation and on this basis the ongoing monitoring for butterflies and other pollinators may be useful in determining the effects of rehabilitation under the EDRRS scheme on Pollinators. The occurrence of Wall Brown is notable in the Co. Offaly context.

Table Error! No text of specified style in document.-15 2021 – Monitoring YR1 Pollinator Survey Results

Species	July	July	August	Total
Common Blue <i>Polyommatus icarus</i>	0	4	42	46

Species	July	July	August	Total
Green-veined White <i>Pieris napi</i>	0	1	0	1
Cryptic wood white <i>Leptidea juvernica</i>	3	0	0	3
Meadow Brown <i>Maniola jurtina</i>	3	7	0	10
Ringlet <i>Aphantopus hyperantus</i>	5	7	0	12
Small Copper <i>Lycaena phlaeas</i>	0	0	2	2
Small Tortoiseshell <i>Aglais urticae</i>	1	0	21	22
Small White <i>Pieris rapae</i>	0	20	0	20
Large White <i>Pieris brassicae</i>	0	0	8	8
Peacock <i>Inachis io</i>	0	0	1	1
Wall brown <i>Lasiommata megera</i>	0	0	1	1
Speckled wood <i>Pararge aegeria</i>	0	1	5	6
Red admiral <i>Vanessa atalanta</i>	0	1	0	1
Total	12	41	80	133

Winter Birds – Monitoring YR1

Method

Fixed counts, following I-WeBS methods, were used to count wintering waterfowl at Cavemount. A total of six counts were undertaken, covering the period September 2021 to February 2022 inclusive.

Constraints

Given the extent of suitable wetlands occurring at Cavemount bog, often difficult to survey due to the nature of the linear strips of established scrub on old high production fields, it is likely that some species have been under recorded, particularly Snipe, Little Grebe and Moorhen for example. In November, some EDRRS activity was still ongoing. Some limited disturbance was noted, with the occasional tractor commuting through one headland & one excavator working in the northwest corner. However, this is not considered to have affected the count.

Results – Species Richness

A total of 16 water bird species were recorded across all surveys. Five of these were BoCCI Red listed species (Gilbert *et al.* 2021) namely Golden Plover, Snipe, Redshank, Wigeon and Lapwing. Four Amber listed species were recorded, namely Mute Swan, Teal, Whooper Swan and Goosander.

Results – Abundance

Average abundance was highest for Lapwing (mean = 29) and a peak count of 119 recorded in November 2021 comprised of two separate flocks (85 and 34 individuals) occurring within the south and north of the site respectively. The species were recorded in flight on both occasions following being flushed from the bog by soaring buzzards. Average abundance was second highest for Mallard (n= 12) followed by Mute Swan (n=11). Golden Plover had the second highest peak count with 37 recorded in October of 2021. Whooper Swan was recorded in November, December and January indicating that the species uses the extensive wetlands during the core winter months, while likely also foraging in the wider landscape.

Results – Habitat Associations

Most of the wintering wildfowl records were associated with the extensive wetland scattered across the bog. Those located to the north of the site were regularly used by duck and swan species as they are longer established and thus likely support greater invertebrate and vegetative feeding opportunities. In addition, the larger wetlands provide greater protection from predators, with more open expanse of water. Snipe was found to associate more with vegetated drains at the bog or wetland margins. However, this is also likely to reflect the species propensity to flush from such habitats when approached during the survey. Two Redshank were recorded within a small wetland to the southeast of the bog in December 2022.

Discussion

The three Goosander (2 males & 1 female) recorded in wetlands within the north-northeast of Cavemount in February 2022 proved to be a significant record for Co. Offaly and the midlands generally. The only previous record of this species in Co. Offaly was of one male shot near Clonbullogue, Co. Offaly, January 18th, 1963, as per the 2nd Mid Shannon Bird Report 1996-1999 (Heery, S. (ed.), 2000). The only other midlands record was a pair at Lough Owel, Co. Westmeath on 31st March 1947, reported in 3rd Mid Shannon Bird Report 2000-2003 (Heery, S. (ed.), 2004).

Mute Swan, Grey Heron, Snipe and Lapwing were all recorded on all but one date, indicating that this site supports the species throughout the winter months. Two Redshank were recorded within a small wetland to the southeast of the bog in December 2022. This species is likely to use the site intermittently during the winter months. A single Jack Snipe was recorded in December 2021. However, this species is likely to occur on site in greater abundance/frequency, as the species is usually only recorded after being flushed during walkover surveys in suitable vegetation. Similarly, Little Grebe, Moorhen, Wigeon and Ringed plover were all recorded infrequently.

Overall species richness (which is high) and abundance reflects the current baseline bog condition, with much of the south of the site still dominated by bare peat, which offers little or no foraging opportunities for many species of water bird. Over time, as supporting wetland habitats develop at Cavemount it is expected that it may also become a refugium for a diversity of wintering wildfowl species such as those recorded during the 2021-22 winter months. Post rehabilitation and associated revegetation, Cavemount may contribute to further habitat for a variety of wintering bird species of conservation concern occurring in the wider landscape. No significant change in wintering bird species richness and abundance can be attributed to the wetland rehabilitation so far at Cavemount, but measures have consolidated conditions for wetland habitats to continue to develop to support wintering bird species already using the site.

Table Error! No text of specified style in document.-16 Winter 2021/22 – Monitoring YR1 I-WeBS Survey Results

Species	BoCCI 2020 - 2026 STATUS	SEP	OCT	NOV	DEC	JAN	FEB	Mean	Maximum
MS Mute Swan <i>Cygnus olor</i>	Amber	5	10	8	14	17	15	11	17
T. Teal <i>Anas crecca</i>	Amber	4	0	0	0	0	0	0	4

Species	BoCCI 2020 - 2026 STATUS	SEP	OCT	NOV	DEC	JAN	FEB	Mean	Maximum
WA Water rail <i>Rallus aquaticus</i>	Green	0	0	4	0	0	0	0	4
WS Whooper Swan <i>Cygnus cygnus</i>	Amber	0	0	4	6	12	0	7	12
GD Goosander <i>Mergus merganser</i>	Amber	0	0	0	0	0	3	0	3
LE Little grebe <i>Tachybaptus ruficollis</i>	Green	0	0	0	0	0	2	0	2
H. Grey Heron <i>Ardea cinerea</i>	Green	3	1	3	2	1		2	3
RP Ringed Plover <i>Charadrius hiaticula</i>	Green	1	0	0	0	0	0	0	1
MA Mallard <i>Anas platyrhynchos</i>	Green	12	11	8	0	0	16	12	16
MH Moorhen <i>Gallinula chloropus</i>	Green	0	0	1	0	0	0	0	1
JS Jack Snipe <i>Lymnocyptes minimus</i>	Green	0	0	0	1	0	0	0	1
SN Snipe <i>Gallinago gallinago</i>	Red	1	2	2	0	3	5	3	5
GP Golden Plover <i>Pluvialis apricaria</i>	Red	0	37	0	0	0	0	7	37
L. Lapwing <i>Vanellus vanellus</i>	Red	3	15	119	1	0	9	29	119
WN Wigeon <i>Anas penelope</i>	Red	0	0	1	0	0	1	1	1
RK Redshank <i>Tringa totanus</i>	Red	0	0	0	2	0	0	0	2

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Cavemount Bog during summer 2022.

Constraints

At the time of survey some areas of bare peat and pioneering revegetating within the western section of Cavemount had been rehabilitated to form banded cells. Care was taken when surveying these areas due to some areas of open water and soft peat. However, this is not thought to have affected survey results, as there are still high fields present which were used.

Results

Cavemount bog is divided into two main sections, bisected by the Esker Stream, which flows south-east through the site. Much of the eastern side of the site is developing a mosaic of pioneer fen, wetland communities and scrub. This area was largely cutaway, is a shallow basin, has been re-wetting since 2012. Some targeted measures were carried out in this area to improve summer water levels across this section. Both sides are influenced by seasonal inundation when water levels are high in the River Esker.

Significant areas of open water support typical emergent pioneer vegetation communities. There is good cover of establishing reedbeds dominated primarily by the community 'Phragmites australis community' (pPhrag) and to a lesser extent 'Typha community' (pTyp). Pioneer fen occurs along the margins of the open water bodies in shallower water, often dominated by the species *Carex rostrata* or *Eriophorum angustifolium* (pRos/pEang), see representative photo below. Some of the open waterbodies support extensive cover of *Equisetum fluviatile*. The high fields that occur in series through these wetlands are vegetating with the community 'Emergent *Betula*-dominated community (A)' (eBir) and emerging *Juncus effusus* ('Pioneer *Juncus effusus* community' or pJeff) or *Eriophorum angustifolium* dominated poor fen habitats ('Pioneer *Eriophorum angustifolium* community (poor fen)' or pEang), see representative photo below.

The western part of the site has low-lying areas that are re-vegetating relatively quickly since peat extraction ceased in 2015. This is a mosaic of re-wetted bare peat, some shallow surface water and pioneer vegetation. This is beginning to colonise with some *Eriophorum angustifolium* (pEang), *Juncus effusus* (pJeff) and scattered birch scrub (eBir). There is more prominent bare peat towards the western margin. Where the bog is more elevated. This section also has pioneer vegetation, but to a lesser extent. More intensive rehabilitation measures were carried out in this area.

Within the western part of the site, extensive scrub and establishing woodland has developed in a drier part within the northern portion. This is dominated by *Betula pubescens* (eBir/cBir) with some *Salix cinerea*. Ground flora is dominated by *Eriophorum angustifolium* (pEang), *Juncus effusus* (pJeff) and some *Calluna vulgaris*, *Chamaenerion angustifolium*, *Holcus lanatus* and *Rubus fruticosus* agg.

It is too soon for habitats at Cavemount to reflect post rehabilitation change or vegetation succession. Some initial rewetting has been noted post the implementation of the EDRRS measures. The rehabilitation measures that have re-wetted the site will encourage the continued development of fen and wetland pioneer vegetation.

Some areas of the bog already have well established pioneer vegetation including fen, scrub and woodland. The habitats already present are expected to continue to develop and change with time. Some final manipulation of banded cells by the insertion of plastic sheet piles and/or overflow pipes is still to be carried out so further time is needed for optimum water levels to potentially develop at the surface of these areas.



Bare peat recolonising with Pioneer *Eriophorum angustifolium* .



Establishing scrub within the northeast of the bog.



Open water with establishing reedbeds.



Establishing woodland within the northwest of the bog.

Breeding Birds – Monitoring YR1

Methods

At Cavemount, three 500 metre transects were selected to provide a representative sample of the breeding bird community. Each transect was placed along an existing high field, headland or rail line corridor for ease of use but also because these locations will continue to be accessible post rehabilitation, allowing the same route to be repeated. Four visits in the period April 2022 to July 2022 were carried out. In addition, a breeding wader survey was carried out in line with O'Brien & Smith 1992, which comprised walking a predefined route or transect across the bog on each of 4 visits in the period April to July inclusive. The route aligned with the above CBS transects for ease of implementation. See the Figure in Appendix M2 titled '*Cavemount Bog Ecology Transects*' for transect location information.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with high fields, headlands or rail lines associated with former peat extraction. Due to their location sampling results may include species which utilise the areas adjacent to transect routes i.e. areas not subject to rehabilitation. Where relevant this is further addressed in the Discussion section.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10:00am -11:00am). CBS recommended timings are early morning, no later than 9:00am 'ideally' but allowance is made to extend this period for sites which require longer travel times or where access is difficult. The timing of some visits may have exceeded the CBS recommended period for surveying but were complete by 11:00am and data are considered acceptable for analysis. Any bias on a per species level is discussed further under Discussion, where relevant.

Results- Species Richness

Species richness is presented as the total number of species recorded across transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 47 no. species were recorded, see Table 2.12.2. This included six BoCCI (Gilbert *et al.* 2021) Red listed species, Black headed gull, Lapwing, Meadow Pipit, Kestrel, Swift and Snipe. Ten BoCCI Amber listed species were recorded, namely Grasshopper Warbler, House Martin, Lesser Black-backed Gull, Linnet, Mallard, Mute Swan, Skylark, Sand Martin, Teal, and Willow Warbler. Remaining species (n=30) were all Green listed apart from Pheasant which is not assigned a BoCCI status.

A bespoke breeding waders survey was undertaken, data on wading species recorded is herein presented in line with an interpretation following the O'Brien and Smith 1992 method for censusing lowland breeding wader populations. Breeding waders recorded along the walked transects include; 8-9 pairs of Lapwing, 23 pairs of Snipe (recorded in all months and a maximum count of 23 drumming/chipping birds in June 2022), 2 pairs of Ringed Plover and 1 probable pair of Common Sandpiper bred onsite in 2022.

Results – Annual Relative Abundance

Annual Relative Abundance (ARA) is presented as the maximum count per species per visit (Early or Late) or as the maximum count for the period April to June inclusive, see Table 4-3. This allows for future comparison with CBS trends which takes the same approach to index species.

Maximum counts of greater than 10 individuals were recorded for 16 species, Robin, Reed Bunting, Linnet, Snipe, Hooded Crow, Black-headed Gull, Lapwing, Skylark, Blackcap, Mallard, Pied Wagtail, Wren, Sand Martin, Blackbird, Meadow Pipit and Willow Warbler. All remaining species were recorded in low numbers (typically less than 5). Overall abundance was highest for Willow Warbler with a maximum of 63 individuals recorded in the period April to June.

Results – Habitat Associations

Habitat associations are broadly grouped in line with other published interpretations and fall into two categories, those species of OPEN or NON-OPEN habitats. Associations are interpreted following Naim & O'Halloran (2012). In general terms however, the category 'OPEN' was applied to those species most strongly associated with open pioneering habitats or mosaics thereof found on cutaway bog (or raised bog) whilst species generally associated with scrub (typically birch, willow or gorse) and closed-canopy woodland (typically birch or willow but also other broadleaf mixes and/ or conifer spp.) are assigned to the 'NON-OPEN' category.

Twenty-seven species associated with OPEN habitats were recorded and seventeen species associated with NON-OPEN habitats were recorded see Table 4-3. Three species associate with both OPEN and NON-OPEN habitats (Reed Bunting, Sedge Warbler and Wren).

All breeding waders, with the exception of Snipe, were restricted to the large wetland within the north of the railway that bisects the site. It is likely that the numbers of Snipe in particular are underestimated for the entire bog.

Results – Colonial Species

No colonies were recorded.

Discussion

It is notable that the four Red listed species recorded, Black headed Gull, Lapwing, Meadow Pipit, Kestrel, Swift and Snipe are associated with open habitats targeted for rehabilitation in the form of rewetting, and would be expected to gain from many of the measures implemented (wetland creation and fertiliser application to high fields for example). The Red listed species, Meadow Pipit associates with drier open habitats and had the second highest relative abundance overall or highest overall for species associated with cutaway i.e. open habitats. Overall, the total number of species either Red or Amber listed was 16. Although Common Sandpiper were only recorded in May 2022, it is considered likely that the species did breed at the site, given the suitability of the habitat and that the species may have been overlooked on other visits due to the nature of the vegetation. Although Raven, including fledged juveniles were recorded using Cavemount bog for feeding, the species is known to breed on a high voltage pylon located on raised bog outside the northwest of the site boundary.

Breeding waders such as Snipe, Ringed Plover, Common Sandpiper and Lapwing may increase over time following peatland rehabilitation measures and the associated increase in area of suitable wetlands. Current breeding estimates for Snipe are considered high with 23 pairs at minimum breeding on site in 2022.

Regarding habitat associations, 57% of species recorded are more associated with open habitats. Open habitat species comprise 15 of the 16 Red and Amber listed species recorded, with only one Amber species associated with non-open habitats (Willow Warbler). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland 2009), and this still seems the case. Further analysis on trends in the ratio or relative abundance of these species over time following rehabilitation would be beneficial.

In general, the abundance estimates reflect the expansive area of wetland and scrub habitats currently present at Cavemount, as well as the associated marginal habitats i.e., remnant bog, scrub and woodland. In time, the extensive areas of bare peat within the south of the site will provide more suitable habitat for many species. In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds and establishes the potential importance of Cavemount for breeding waders in particular.

Table Error! No text of specified style in document.-17 Monitoring YR1 Countryside Bird Survey Results

SPECIES	BoCCI 2020 - 2026 STATUS	HABITAT ASSOCIATION	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	27
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	18
BH Black-headed Gull <i>Chroicocephalus ridibundus</i>	Red	OPEN	15
BT Blue Tit <i>Cyanistes caeruleus</i>	Green	NON-OPEN	3
BZ Buzzard <i>Buteo buteo</i>	Green	OPEN	1
CC Chiffchaff <i>Phylloscopus collybita</i>	Green	NON-OPEN	1
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	5
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	4
CS Common Sandpiper <i>Actitis hypoleucos</i>	Green	OPEN	2
D. Dunnock <i>Prunella modularis</i>	Green	NON-OPEN	2
ET Little Egret <i>Egretta garzetta</i>	Green	OPEN	1
GH Grasshopper Warbler <i>Locustella naevia</i>	Amber	OPEN	1
GR Greenfinch <i>Carduelis chloris</i>	Green	NON-OPEN	1
H. Grey Heron <i>Ardea cinerea</i>	Green	OPEN	6
HC Hooded Crow <i>Corvus cornix</i>	Green	OPEN	15
HM House Martin <i>Delichon urbicum</i>	Amber	OPEN	3
JD Jackdaw <i>Corvus monedula</i>	Green	NON-OPEN	2
K. Kestrel <i>Falco tinnunculus</i>	Red	OPEN	1
L. Lapwing <i>Vanellus vanellus</i>	Red	OPEN	17
LB Lesser Black-backed Gull <i>Larus fuscus</i>	Amber	OPEN	3
LG Little Grebe <i>Tachybaptus ruficollis</i>	Green	OPEN	5
LI Linnet <i>Carduelis cannabina</i>	Amber	OPEN	12
LR Redpoll <i>Acanthis cabaret</i>	Green	NON-OPEN	9
M. Mistle thrush <i>Turdus viscivorus</i>	Green	NON-OPEN	2
MA Mallard <i>Anas platyrhynchos</i>	Amber	OPEN	21
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	46
MS Mute Swan <i>Cygnus olor</i>	Amber	OPEN	7
PH Pheasant <i>Phasianus colchicus</i>	N/A	NON-OPEN	3
PW Pied Wagtail <i>Motacilla alba</i>	Green	OPEN	21
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	10
RB Reed Bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	10
RN Raven <i>Corvus corax</i>	Green	OPEN	6
RO Rook <i>Corvus frugilegus</i>	Green	NON-OPEN	1
RP Ringed Plover <i>Charadrius hiaticula</i>	Green	OPEN	4
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	18
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	4
SH Sparrowhawk <i>Accipiter nisus</i>	Green	NON-OPEN	4
SI Swift <i>Apus apus</i>	Red	OPEN	2
SM Sand Martin <i>Riparia riparia</i>	Amber	OPEN	26
SN Snipe <i>Gallinago gallinago</i>	Red	OPEN	13

SPECIES	BoCCI 2020 - 2026 STATUS	HABITAT ASSOCIATION	ARA
SW Sedge Warbler <i>Acrocephalus schoenobaenus</i>	Green	OPEN/NON-OPEN	5
T. Teal <i>Anas crecca</i>	Amber	OPEN	2
WA Water Rail <i>Rallus aquaticus</i>	Green	OPEN	2
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	4
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	5
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	22
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	63

Pollinators-YR2

Methods

The transect carried out in 2022 (monitoring Year 2) was 2km in length and overlapped approximately 750m of the 2021 transect along the railway line and then veered west across a high field in the former production area. All surveys were completed between 10:50am and 02:00pm, when the temperature was at least 13°C and during good weather conditions. See the Figure in Appendix M2 titled 'Cavemount Bog Ecology Transects' for transect location information.

Constraints

No constraints were identified during the survey. Weather conditions were optimal during all the surveys.

Results – Species Richness

A total of eight species of butterfly were recorded namely, Common Blue, Green-veined White, Meadow Brown, Orange Tip, Ringlet, Small Copper, Small Tortoiseshell, and Small White.

In addition to butterflies the following invertebrates were also recorded during the surveys; Common darter (n = 18), Four spotted Chaser (n = 36), Common Hawker (n = 2), Brown Hawker (n = 1), Blue Tailed Damselfly (n = 6), Large Red Damselfly (n = 1), Bombus sp. (n = 11), Black Tailed Skimmer (n = 2), Common Blue damselfly (n = 8), Buff Tailed bumblebee (n = 1), Common Heath moth (n = 3) and Six-spot Burnet moth (n = 10).

Results – Abundance

A total of 45 individuals were recorded during the surveys. Common Blue occurred in the highest abundance (20 overall), with the maximum abundance of this species recorded during the August survey. The highest abundance of all species overall per month was recorded in August. The lowest species abundance was recorded during the survey in April.

Results – Habitat Associations

Butterfly diversity and abundance was low in transect A, due to the poorly developed vegetation and lack of suitable foraging habitat for pollinators. The second section of the transect (transect B) follows the railway track and is vegetated with dry calcareous grassland with a high floristic diversity and abundant Common Knapweed. This section of the transect had the highest species abundance during the surveys in 2022.

Discussion

The baseline scenario for Cavemount in YR2 of monitoring still reflects habitats comprised largely of bare peat, pioneering vegetation and on this basis the ongoing monitoring for butterflies and other pollinators may be useful in determining the effects of rehabilitation under the EDRRS scheme on Pollinators. The higher species richness and higher abundance recorded in year 1 relative to year 2 is reflective of the difference in transect length, with year one transects being an additional 1km in length. Weather may have also been an influence.

It is possible species richness and abundance may increase in future surveys along the transect route when the bare peat and pioneer vegetation communities become more established and the rehabilitated area begins to revegetate. The effects of fertiliser application in particular to headlands and high fields may increase the rate of colonisation by some species.

Table Error! No text of specified style in document.-18 2022 – Monitoring YR2 Pollinator Survey Results

Species	April	May	June	July	August	Total
Common Blue <i>Polyommatus icarus</i>	0	0	6	0	14	20
Green-veined White <i>Pieris napi</i>	0	0	0	0	2	2
Meadow Brown <i>Maniola jurtina</i>	0	0	0	9	0	9
Orange Tip <i>Anthocharis cardamines</i>	1	5	0	0	0	6
Ringlet <i>Aphantopus hyperantus</i>	0	0	0	2	0	2
Small Copper <i>Lycaena phlaeas</i>	0	2	0	0	0	2
Small Tortoiseshell <i>Aglais urticae</i>	0	0	1	0	2	3
Small White <i>Pieris rapae</i>	0	0	0	1	0	1
Total	1	7	7	12	18	45

Winter Birds – Monitoring YR2

Method

Six counts within the winter period 2022/23 were conducted according to I-WeBS methodology. All counts were undertaken within the period 10:30 to 16:40. Survey dates were 18 October 2022, 22 November 2022, 05 December 2022, 19 January 2023, 23 February 2023, 30 March 2023.

Constraints

No constraints noted. Counts were undertaken generally on days with no rain, but on one date (30/02/2023) occasional light showers were noted during the survey. Visibility was always good and wind speeds were suitable for undertaking the surveys. The weather conditions during the surveys are considered typical of the time of year in Ireland, and there were no access or visibility constraints. No significant constraints to the survey were noted.

Results – Species Richness

A total of 17 water bird species were recorded across all surveys. Three of these were BoCCI (Gilbert *et al.* 2021) Red listed species namely Lapwing, Redshank and Snipe. Eight Amber listed species were recorded namely Greylag Goose, Kingfisher, Mallard, Mute Swan, Ringed Plover, Teal, Tufted Duck and Whooper Swan. Five Green listed species were recorded namely Little Egret, Grey Heron, Little

Grebe, Moorhen and Water Rail. One species with an undefined BoCCI designation was recorded, namely Great Egret.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 4-5 and was highest for Mute Swan (n=10) which occurred in steady numbers throughout the winter on this site. Average abundance across all 6 counts was <8 for all remaining species.

Results – Habitat Associations

Most birds across all counts were found to associate with the habitats present at Cavemount Bog. Most notably the large wetland areas on both sides of the main railway line running through the bog are important habitats for all species recorded during surveys.

Discussion

Overall species richness and abundance is considered high during the period studied. No counts were recorded as reaching potentially important thresholds for species of conservation concern. The wintering bird species assemblage is broadly similar to previous bird surveys in the overall species diversity that was recorded, and general usage of the bog for many species is intermittent over the winter period. It is therefore likely that the bog is used opportunistically for roosting, or to a lesser extent foraging. No change in species richness and abundance can be attributed to the rehabilitation to date, and more time is needed to record any significant correlation with rehabilitation.

Overall species richness and abundance reflects the current baseline bog condition, with much of the southern part of the bog still dominated by bare peat, with the remainder establishing scrub and large developing wetlands. Over time, as these supporting wetlands and associated vegetation develop, it is expected that it may also become a refugium for a greater diversity and increasing numbers of wintering wildfowl and wader species. For the 2033/23 winter period, eleven of the bird species recorded were of Red or Amber status. Post rehabilitation and associated revegetation, Cavemount may contribute to further habitat for a variety of wintering bird species of conservation concern occurring in the wider landscape.

The data presented here forms a baseline for further interpretation of the effects of post-industrial peatland rehabilitation to assemblages of wintering birds.

Table Error! No text of specified style in document.-19 Winter 2022/23 – Monitoring YR2 I-WeBS Survey Results

Species	BoCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
ET Little egret <i>Egretta garzetta</i>	Green	1	0	0	0	2	0	1	2
GJ Greylag Goose <i>Anser anser</i>	Amber	0	0	0	0	0	2	0	2

Species	BoCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
HW Great Egret <i>Ardea alba</i>	N/A	1	0	0	0	0	0	0	1
H. Grey heron <i>Ardea cinerea</i>	Green	1	0	4	1	2	1	2	4
KF Kingfisher <i>Alcedo atthis</i>	Amber	1	0	0	0	0	0	0	1
L. Lapwing <i>Vanellus vanellus</i>	Red	6	2	0	0	8	7	4	8
LG Little Grebe <i>Tachybaptus ruficollis</i>	Green	0	0	0	0	4	0	1	4
MA Mallard <i>Anas platyrhynchos</i>	Amber	0	0	8	25	2	8	7	25
MH Moorhen <i>Gallinula chloropus</i>	Green	0	0	1	0	5	0	1	5
MS Mute Swan <i>Cygnus olor</i>	Amber	9	7	11	10	13	11	10	13
RK Redshank <i>Tringa totanus</i>	Red	0	0	1	0	0	0	0	1
RP Ringed Plover <i>Charadrius hiaticula</i>	Amber	0	0	0	0	8	1	2	8
SN Snipe <i>Gallinago gallinago</i>	Red	13	0	2	0	1	0	3	13
T. Teal <i>Anas crecca</i>	Amber	0	0	0	0	10	0	2	10
TU Tufted Duck <i>Aythya fuligula</i>	Amber	0	0	0	0	0	1	0	1
WA Water rail <i>Rallus aquaticus</i>	Green	3	0	0	0	0	0	1	3
WS Whooper Swan <i>Cygnus cygnus</i>	Amber	14	4	4	0	13	0	6	14

4. Ummeras

Since the previous reporting period (April 2021 to August 2022), additional wintering bird surveys have been undertaken at Castlegar bog and have been added to this bog account. In addition, data from a second round of quadrat visits in 2022 which was omitted from previous reporting is now included.

Habitats – Monitoring YR1

Since the previous reporting period, additional wintering bird surveys have been undertaken at Castlegar bog and have been added to this bog account. In addition, a second year of quadrat surveys has been compiled (2022) and added.

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Ummeras Bog during summers 2021 and 2022.

Constraints

No constraints were identified, and all parts of the bog were accessible during the survey.

Results

The majority of Ummeras bog comprises re-wetted bare peat-dominated cutover bog. There has been limited recolonisation post cessation of industrial peat extraction. There are frequent patches of shallow surface water. Pioneer vegetation is appearing with communities such as ‘Pioneer *Juncus effusus* community’ (pJeff), ‘Pioneer *Juncus bulbosus* community’ (pBulb) and ‘Pioneer *Eriophorum angustifolium* community (Poor fen)’ (pEng) poor fen communities starting to develop but overall vegetation cover is less than 5% cover. Within the east of the bog, some vegetation cover has established on areas of shallower peat. This is typically dominated by Poor fen vegetation comprising mainly of ‘*Carex rostrata* community’ (pRos) with some sapling Downy birch also present.

Ummeras Bog has a mosaic of different overlapping environmental characteristics influenced by residual peat depths, sub-soils and hydrology. A significant part of the cutover bog is residual deep bare peat, which has not yet developed significant ecological indicator species relating to acidic water chemistry at present. Some sections already have ecological indicators of more alkaline ground-water influence and are beginning to develop poor fen vegetation.

An elevated gravel ridge containing shallow peat occurs within the western portion of the bog and is developing a typical dry cutaway vegetation community with ‘Open *Betula*-dominated community’ (oBir) establishing along the old production drains, along with ‘Pioneer *Juncus effusus* community’ (pJeff) and some *Eriophorum angustifolium* poor fen pioneer vegetation. Vegetation cover in this section is better developed (>50%) in some areas. Some scattered *Eriophorum vaginatum* also occurs but is rare/occasional in abundance.

Within the north-east of Ummeras bog, there are several former industrially drained extraction ‘fields’ that were developed and cleared of vegetation. However, these were not harvested extensively for milled peat. This area has developed extensive cover of ‘Dry *Calluna* community’ (dHeath) dominated

by tall leggy *Calluna vulgaris*. Other typical bog species including frequent *Cladonia* spp. lichen cover, *Hypnum jutlandicum* and *Campylopus introflexus* also occur. There is occasional cover of *Sphagnum papillosum* and *S. capillifolium* present, but these are typically dry. *Sphagnum cuspidatum* has also been recorded in some of the old drainage ditches. These drains have now been blocked.

Rehabilitation was carried out at Ummeras bog in 2021. It is too soon for habitats at Ummeras to reflect post rehabilitation change or succession. Approximately 90% of Ummeras remains as re-wetted bare peat and scattered patches of shallow surface water. The rehabilitation measures have significantly altered and optimised the hydrological regime and now provides suitable conditions of typical peatland vegetation establishment. In addition, Sphagnum moss inoculation has also been implemented at Ummeras bog as part of a trial. This will further influence the likely expected future habitats. The habitats already present will continue to develop post rehabilitation.

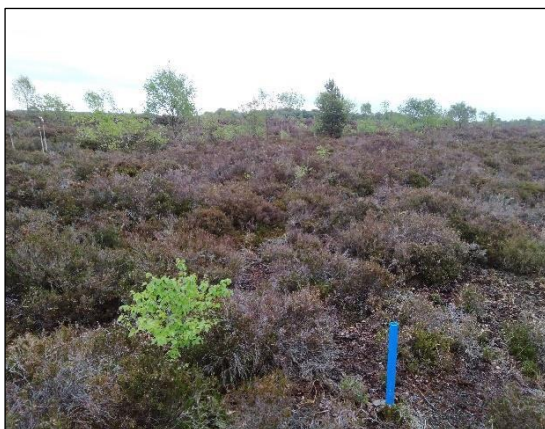
In conclusion the habitats recorded in 2021/2022 largely reflect the baseline conditions of a recently rehabilitated former peat extraction bog. Re-wetting will help consolidate changes in environmental condition that will continue to encourage the development of pioneer peatland vegetation cover in the re-wetted parts of this bog.



Example of extensive drained bare peat pre-rehabilitation June 2021 (Quadtat 2).



Example of extensive drained bare peat post-rehabilitation (DPT4) July 2022 (Quadtat 2).



Example of 'Dry *Calluna* community' (dHeath) within the north east of the bog that was not subject to intensive peat extraction.



Example of deep peat cell bunding 2021.



Example of pioneering dry cutaway vegetation with scattered *Eriophorum vaginatum*.

Vegetation Quadrats – Monitoring YR1

Method

Quadrat monitoring was carried out at Ummeras bog in June 2021 in accordance with agreed EDRRS Monitoring and Verification. 5 no. quadrats were employed.

Constraints

Five quadrats were taken across the site in 2021 that provide a representative sample of the bare peat dominated cutover bog. These areas were then significantly modified during the implementation of the EDRRS rehabilitation measures i.e. creation of deep peat cell bunding. However, they are representative of the environmental conditions pre rehabilitation. These locations were again visited post implementation of the rehabilitation measures in July 2022, see Year 2 monitoring below.

Results

See Table 1 of Appendix Q2. Quadrats Q1, Q2 and Q3 were dominated by bare peat (90-100% cover), with few plants recorded (small numbers of individual plants, such as *Eriophorum angustifolium*, *Eriophorum vaginatum* or *Typha latifolia* were noted – typically spreading from adjacent drains). Quadrat Q4 was taken on a small area of remnant bog (PB1) where drain blocking was planned. This area was dry and dominated by leggy *Calluna vulgaris*. Although *Sphagnum* species were noted in the wider area, the bryophyte layer was dominated by *Hypnum jutlandicum*. Quadrat Q5 was located in an area of Dry cutaway, on shallow peat, and has been out of production for a several years. Consequently, this area supported a greater cover of plant species (typical of this feature) although diversity was limited. This area is still dominated by bare peat.

Discussion

The proposed rehabilitation works proposed as part of EDRRS will transform the baseline through the implementation of deep peat bunding (DPT4) and drain blocking (DPT2 and DCT2). As with habitats, the quadrats reflect the baseline conditions pre-rehabilitation (2021). These quadrats are representative of the bare peat dominated cutover bog at Ummeras.



Quadrat Q5



Quadrat Q3

Winter Birds – Monitoring YR1

Method

Fixed counts, following I-WeBS methods, were used to count wintering waterfowl at Ummeras. A total of six counts were undertaken at monthly intervals, covering the period September 2021 to February 2022 inclusive.

Constraints

No constraints were noted. In September, some EDRRS activity was still ongoing in the northeast corner of the bog. However, this is not considered to have affected the count. Similarly, in October, 2 scramblers appeared at the bog near dusk causing localised disturbance after the count. It did not affect the survey effort.

Results – Species Richness

A total of seven water bird species were recorded across all surveys. Four of these were BoCCI Red listed species (Gilbert *et al.* 2021) namely Golden Plover, Snipe, Pintail and Lapwing. Mute Swan was the only Amber listed species.

Results – Abundance

The total counts for each visit across the winter period is presented in Table 5-1. It is clear that the site is only used intermittently by wintering waterfowl species and this is likely due to the extensive areas of bare peat providing little shelter or feeding opportunities. In addition, there is limited established wetland vegetation, and this associated macroinvertebrates. The highest count was for Golden Plover (n=2,800). This species was only recorded using the site on a single visit. It is considered likely that the species was opportunistically using the site for roosting while foraging in the wider landscape.

Results – Habitat Associations

Most of the wintering wildfowl records were associated with a small wetland located in the southeast corner of the bog. The flock of 2,800 Golden Plover was recorded within the south of the bog roosting on constructed berms within the recently rehabilitated peatland. A number of individuals were also observed washing in the small pools (DPT4 cells).

Snipe was found to associate more with vegetated drains at the bog margins. However, this is also likely to reflect the species propensity to flush from such habitats when approached during the survey. Snipe were the only species recorded in more than one month.

Discussion

Overall species richness is considered medium during the period studied. This reflects the baseline bog condition, dominated by bare peat, which offers little or no foraging opportunities for many species of water bird. Roosting opportunities are provided for Golden Plover, Lapwing and Snipe, which may also forage onsite, and Golden Plover abundance can exceed the All Ireland threshold for National Importance (920). Over time, as supporting wetland habitats develop at Ummeras it is expected that it may also become a refugium for a diversity of wintering wildfowl species such as those recorded during the 2021-22 winter months.

Post rehabilitation and associated revegetation, Ummeras may contribute to further habitat for a variety of wintering bird species of conservation concern and support the conservation objectives for European Site located in the wider landscape. In conclusion, the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds. No significant change in wintering bird species richness and abundance can be attributed to the peatland rehabilitation so far in the re-wetted section at Ummeras, but measures have consolidated conditions for peatland and wetland habitats to continue to develop that are likely to support wintering bird species already using the site.

Table Error! No text of specified style in document.-20 Winter 2021/22 – Monitoring YR1 IWeBS Survey Results

Species	BoCCI STATUS	SEP	OCT	NOV	DEC	JAN	FEB	Maximum
SN Snipe <i>Gallinago gallinago</i>	Red	0	0	0	14	2	0	14
GP Golden Plover <i>Pluvialis apricaria</i>	Red	0	0	2,800	0	0	0	2,800
L. Lapwing <i>Vanellus vanellus</i>	Red	0	0	1	0	0	0	1
MS Mute Swan <i>Cygnus olor</i>	Amber	0	0	0	2	0	0	2
H. Grey Heron <i>Ardea cinerea</i>	Green	0	0	0	0	0	1	1
PT Pintail <i>Anas acuta</i>	Red	0	0	0	0	0	4	4
RP Ringed Plover <i>Charadrius hiaticula</i>	Green	0	0	0	0	0	6	6

Breeding Birds – Monitoring YR1

Methods

CBS surveys, comprised 2 no. transects, were visited four times in the period May to August inclusive in 2022. Breeding waders' surveys were also undertaken on the same dates and followed the same routes. See figure in Appendix O2 titled 'Ummeras Bog Ecology Transects' for transect routes.

Constraints

Health and Safety imperatives required the transect routes to be safe for surveyor access and therefore the locations selected are in line with high fields or headlands associated with former peat

extraction. Due to their location sampling results may include species which utilise the areas adjacent to transects but which are not subject to rehabilitation. Where relevant this is further addressed in the Discussion section.

Regarding visit timings, the first and last visits were both outside their recommended period (April - July). On this basis it is acknowledged that some early breeding species may be omitted from the data. In addition, species recorded in July/August CBS only, are treated with a degree of caution in respect of breeding status. Annual Relative Abundance only includes maxima for the period April to June inclusive as per the master text on materials and methods. Waders are treated separately as there was a bespoke breeding wader survey. All species are still listed in Species Richness estimates as there is some validity around their usage of cutaway during the study period.

Results- Species Richness

Species richness is presented as the total number of species recorded across both transects. For completeness, any additional species recorded off transect, but considered to be associating with habitats on site on any single visit, are included where relevant.

A total of 43 no. species were recorded, see Table 5-2. This included four BoCCI (Gilbert *et al.* 2021) Red listed species Black-headed gull, Curlew, Meadow Pipit, and Snipe along with 11 no. BoCCI Amber listed species namely Greenfinch, Lesser Black-backed gull, Linnet, Mallard, Mute Swan, Ringed Plover, Skylark, Swallow, Sand Martin, Starling and Willow Warbler. Remaining species (n=28) were all Green listed apart from Pheasant, which is not assigned a BoCCI status.

A bespoke breeding waders survey was undertaken in 2022, data on breeding pairs is herein presented in line with an interpretation following the O'Brien and Smith (1992) method for censusing lowland breeding wader populations. On this basis 2 pairs of Ringed Plover bred onsite in 2022. Ringed Plover adults with a single chick were observed on August 22nd. We note that Curlew were recorded in May and June CBS visits however did not breed on site, and observations may be of passage or nearby breeding birds. In addition, Snipe were recorded in July and August CBS visits, but this is considered too late in the season to assign breeding status.

Results – Annual Relative Abundance

Annual relative abundance (ARA) is presented as the maximum count per species across visit #1, #2, or within the period April to June inclusive, see Table 5-2. This allows for future comparison with CBS trends.

Maximum counts of greater than 40 individuals were recorded for a single species, Meadow Pipit. Wren abundance was second highest at 24 individuals. Maximum counts of between 10-19 individuals were recorded for Willow Warbler (n=18), Blackbird (n=13), Redpoll (n=13) and Robin (n=10). Maximum abundance estimates for all other species (n=37) was in the order of 0-9 individuals.

Results – Habitat Associations

Habitat associations are broadly grouped in line with other published interpretations and fall into two categories, those species of OPEN or NON-OPEN habitats. Associations are interpreted following Nairn

& O'Halloran 2012. In general terms however, the category 'OPEN' was applied to those species most strongly associated with open pioneering habitats or mosaics thereof found on cutaway bog (or raised bog) whilst species generally associated with scrub (typically birch, willow or gorse) and closed-canopy woodland (typically birch or willow but also other broadleaf mixes and/ or conifer spp.) are assigned to the 'NON-OPEN' category.

Twenty species considered associated with NON-OPEN habitats were recorded and twenty-one species associated with OPEN habitats were recorded see Table 5-2. Two species associate with both OPEN and NON-OPEN categories (Reed Bunting and Wren).

Results – Colonial Species

No colonies were observed.

Discussion

Of the four Red listed species recorded, three (Black headed gull, Curlew and Snipe) are associated with open habitats targeted for rehabilitation in the form of rewetting and would be expected to gain from measures intended to effectively create wetlands. Meadow pipit would be associated with drier habitats or those areas targeted for fertiliser application such as high fields. Eleven Amber listed species were recorded however abundance was low (0-9) for all except Willow Warbler (ARA=18). Overall, however the total number of species either Red or Amber listed was 15 suggesting the potential importance of Ummeras for species of conservation concern in one form or other, either foraging or breeding or for use as a refugium.

Breeding waders were dominated by Ringed Plover. Two pairs attempted to breed and at least one pair produced chicks. We note that some species recorded utilising Ummeras such as Lesser Black backed Gull, along with Grey Heron, Corvids such as Raven and Raptor species such as Buzzard have the potential to predate breeding wader nests and young. Curlew were recorded utilising the site but did not breed onsite. There are nearby Curlew breeding territories (primarily on wet grassland habitats) within the hinterland of Ummeras and rehabilitation at Ummeras may benefit these through the provision of additional foraging or roosting opportunities. In particular regard to Curlew we would recommend that any further site after use take particular cognisance of minimising the potential for disturbance.

Regarding habitat associations 48% of species recorded are more associated with open habitats. Many of these species breed on or frequently visit open areas of cutaway to forage. Open habitat species comprise 87% of Red and Amber listed species (13 no. in total). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland 2009), and this is borne out at Ummeras. In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds utilising cutaway or rehabilitated cutaway bogs and establishes the potential for Ummeras to support the conservation of several scarce or declining species. No significant change in breeding bird species richness and abundance can be attributed to the wetland rehabilitation so far in the re-wetted section at Ummeras, but measures have consolidated conditions for wetland and peatland habitats to continue to develop to support breeding bird species using the site.

Table Error! No text of specified style in document.-21 2022 – Monitoring YR1 Countryside Bird Survey Results

SPECIES	BOCCI 2020 - 2026 STATUS	HABITAT ASSOCIATION	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	13
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	5
BF Bullfinch <i>Pyrrhula pyrrhula</i>	Green	NON-OPEN	1
BH Black-headed Gull <i>Chroicocephalus ridibundus</i>	Red	OPEN	6
BT Blue Tit <i>Cyanistes caeruleus</i>	Green	NON-OPEN	2
BZ Buzzard <i>Buteo buteo</i>	Green	OPEN	1
CC Chiffchaff <i>Phylloscopus collybita</i>	Green	NON-OPEN	1
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	8
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	1
CT Coal Tit <i>Periparus ater</i>	Green	NON-OPEN	1
CU Curlew <i>Numenius arquata</i>	Red	OPEN	2
D. Dunnock <i>Prunella modularis</i>	Green	NON-OPEN	0
GO Goldfinch <i>Carduelis carduelis</i>	Green	OPEN	0
GR Greenfinch <i>Chloris chloris</i>	Amber	OPEN	4
GT Great Tit <i>Parus major</i>	Green	NON-OPEN	2
H. Grey Heron <i>Ardea cinerea</i>	Green	OPEN	5
HC Hooded Crow <i>Corvus cornix</i>	Green	OPEN	9
LB Lesser Black-backed Gull <i>Larus fuscus</i>	Amber	OPEN	2
LI Linnet <i>Carduelis cannabina</i>	Amber	OPEN	1
LR Redpoll <i>Acanthis cabaret</i>	Green	NON-OPEN	13
LT Long-tailed Tit <i>Aegithalos caudatus</i>	Green	NON-OPEN	5
M. Mistle thrush <i>Turdus viscivorus</i>	Green	NON-OPEN	1
MA Mallard <i>Anas platyrhynchos</i>	Amber	OPEN	5
MG Magpie <i>Pica pica</i>	Green	NON-OPEN	0
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	41
MS Mute Swan <i>Cygnus olor</i>	Amber	OPEN	6
PH Pheasant <i>Phasianus colchicus</i>	N/A	NON-OPEN	0
PW Pied Wagtail <i>Motacilla alba</i>	Green	OPEN	6
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	10
RB Reed Bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	4
RN Raven <i>Corvus corax</i>	Green	OPEN	7
RP Ringed Plover <i>Charadrius hiaticula</i>	Amber	OPEN	7
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	3
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	2
SG Starling <i>Sturnus vulgaris</i>	Amber	NON-OPEN	9
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	3
SM Sand Martin <i>Riparia riparia</i>	Amber	OPEN	9
SN Snipe <i>Gallinago gallinago</i>	Red	OPEN	0
ST Song Thrush <i>Turdus philomelos</i>	Green	NON-OPEN	9
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	7

SPECIES	BOCCI 2020 - 2026 STATUS	HABITAT ASSOCIATION	ARA
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	8
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	24
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	18

Pollinators- Monitoring YR1

Methods

The transect at Ummeras is 2km in length. All surveys were completed between 10:30am and 02:30pm, when the temperature was at least 13°C and during good weather conditions. Monthly counts across the period May 2022 to September 2022 (5 in total) are herein reported. See figure in Appendix O2 titled 'Ummeras Bog Ecology Transects' for transect routes.

Constraints

No constraints were identified during the survey. Weather conditions were optimal during all the surveys.

Results – Species Richness

A total of four species of butterfly were recorded namely Green-veined White, Meadow Brown, Ringlet and Speckled wood. In addition to butterflies, White-tailed Bumblebee *Bombus lucorum* (n=15), Red-tailed Bumblebee *Bombus lapidarius* (n=8), Dark European Honey Bee *Apis mellifera* (n=6), Orange-legged Furrow Bee *Halictus rubicundus* (n= 1), Four-spotted Chaser Dragonfly *Libellula quadrimaculata* (n = 4), Common Darter Dragonfly *Sympetrum striolatum* (n = 2), Common Hawker Dragonfly *Aeshna juncea* (n = 1), Emerald Damsel fly *Lestes sponsa* (n = 1) and Black-tailed Skimmer Dragonfly *Orthetrum cancellatum* (n = 1) were also recorded during the surveys.

Results – Abundance

Generally low numbers were recorded, with a total of 11 individual butterflies recorded during the surveys. Green-veined White occurred in the highest abundance (5 overall), with the highest abundance recorded during the July survey (3). The highest abundance overall per month was recorded in July. The lowest was in May, with no species recorded.

Results – Habitat Associations

The majority of the transect crosses bare peat, with some pioneering vegetation in the wider area of the transect. In general, little or no pollinator activity was clearly associated with bare peat or recently rehabilitated bare peat areas. Species recorded on bare peat sections of the transect were primarily traversing the transect to nearby vegetated drains, as insufficient vegetation is present on the transect to attract feeding pollinators.

Discussion

The baseline scenario for Ummeras still reflects habitats comprised largely of bare peat, and on this basis the ongoing monitoring for butterflies and other pollinators may be useful in determining the effects of rehabilitation under the EDRRS scheme on Pollinators. It is possible species richness and abundance may increase in future surveys along the transect route when the rehabilitated area begins

to revegetate. The effects of fertiliser application in particular to headlands and high fields may increase the rate of colonisation by some species.

Table Error! No text of specified style in document.-22 2022 – Monitoring YR1 Pollinator Survey Results

Species	May	June	July	August	September	Total
Green-veined White <i>Pieris napi</i>	0	1	3	1	0	5
Meadow Brown <i>Maniola jurtina</i>	0	0	1	2	0	3
Speckled Wood <i>Pararge aegeria</i>	0	0	1	0	0	1
Ringlet <i>Aphantopus hyperantus</i>	0	0	1	1	0	2
Total	0	1	6	4	0	11

Vegetation Quadrats – Monitoring YR2

Method

Quadrat monitoring was carried out at Ummeras bog in July 2022 in accordance with agreed EDRRS Monitoring and Verification. 5 no. quadrats were employed.

Constraints

Five quadrats were taken across the site in the same areas as those originally deployed in 2021. Three of the five quadrats were located in areas where DPT4 cell bunding was undertaken, thereby significantly altering the ground conditions during the implementation of the EDRRS rehabilitation measures. However, they are representative of the environmental conditions present post rehabilitation. As anticipated, these areas still retained significant areas of bare peat, with no significant vegetation changes from the baseline i.e. bare peat.

Results

See Table 1 of Appendix D4 for the second-year surveys (2022) of the quadrats (post-rehabilitation) originally installed in summer 2021 (pre-rehabilitation). Quadrats Q1, Q2 and Q3 were dominated by bare peat (90-100% cover). Quadrat Q4 was located on a high bog remnant. No significant changes in vegetation were recorded, however, slightly more *Sphagnum rubellum* and *Eriophorum vaginatum* were recorded in this quadrat in 2022. Quadrat Q5 was located in an area of dry cutaway (DCT2) that had been subject to drain blocking. Although no significant change in vegetation was observed, the adjacent drain blocking appears to be retaining more water within the former drains. The only notable change at this quadrat was the presence of Cocksfoot grass (*Dactylis glomerata*) in YR2.

Discussion

As with habitats, the quadrats reflect the baseline conditions both pre-and post-rehabilitation. As described above, post-implementation of the rehabilitation measures, the majority of Ummeras bog has been significantly altered for the creation of deep peat measures (DPT4). However, this reflects the post-rehabilitation baseline, with no significant change in vegetation composition given the bare peat dominated nature of the bog. Some newly created DPT4 cells now also contain a significant percentage cover of standing water. There will be less change in areas located dry cutaway or vegetated cutover bog where less ground disturbance was undertaken during regular drain blocking. Further time is required before significant changes in vegetation composition is likely to be recorded.



Quadrat no. 3 Ummeras bog (2022) post implementation of DPT4 cell bunding. Note that at the time, not all weirs had been installed nor the hydrological management finalised.

Winter Birds – Monitoring YR2

Method

Five counts within the winter period 2022/23 were conducted. All counts were within the period 10:20 to 15:30. Counts were undertaken on days with no rain. Visibility was always good and suitable wind speeds. Survey dates were 18 October 2022, 30 November 2022, 19 January 2023, 08 February 2023, and 30 March 2023.

Constraints

During the October survey EDRSS activities were still ongoing, near the south-eastern corner with some localised disturbance to the south of the wetland. This was not considered significant and did not significantly alter the survey findings. This site was not surveyed in December 2022 due to adverse weather conditions. No wildfowl or waders were recorded on site during January 2023 surveys; however, this is considered representative of the extensive bare peat dominated cutover peatland.

Results – Species Richness

A total of 7 water bird species were recorded across all surveys. Two of these were BoCCI (Gilbert *et al.* 2021) Red listed species namely Golden Plover, and Snipe. Three Amber listed species were recorded namely Herring Gull, Lesser Black-Backed Gull, and Mallard. Two Green listed species namely Grey Heron and Green Sandpiper, were also recorded on site during the winter season.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 5-4 and was low for all species recorded. Golden Plover (n=2), Lesser Black-Backed Gull (n=2) and Grey Heron (n=1) are the only species with a mean abundance score across all species recorded. The average abundance number for Golden Plover was influenced by a maximum, and only count, of 12 birds in November 2022. Average abundance across all 5 counts was 0 for all remaining species.

Results – Habitat Associations

Most birds, across all counts listed in table 5-4, were found to associate with habitats present at Ummeras Bog. In addition to the species listed in table 5-4, surveyors also noted incidental

observations of 13 Golden Plover and 4 Mute Swan flying over the site in October 2022, with 370 Golden Plover flying over the site in October 2022. This indicates the presence of the species using the wider area around the bog. However, surveys indicate that only low number of Golden Plover use the site on an intermittent basis.

Discussion

Overall species richness and abundance is considered low during the period studied. No waterbirds or wildfowl were recorded during January survey, and only one species, Grey Heron, was recorded during the February survey. This is compounded by absence of a survey in December 2022, although it is likely the similarly low diversity and numbers would have been recorded. No counts were recorded as reaching potentially important thresholds for species of conservation concern. The wintering bird species assemblage is generally similar to previous winter bird surveys. No change in species richness and abundance can be attributed to the rehabilitation so far and more time is needed to monitor any trends.

For the I-WeBS survey period 2022-2023, five species of Red or Amber status were recorded. Post rehabilitation and associated revegetation, Ummeras may contribute to further habitat for a variety of wintering bird species of conservation concern occurring in the wider landscape. The data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds at this site.

Table Error! No text of specified style in document.-23 Winter 2022/23 – Monitoring YR2 I-WeBS Survey Results

Species	BOCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
GP Golden Plover <i>Pluvialis apricaria</i>	Red	0	12	N/A	0	0	0	2	12
HG Herring gull <i>Larus argentatus</i>	Amber	1	0	N/A	0	0	0	0	1
SN Snipe <i>Gallinago</i>	Red	1	0	N/A	0	0	0	0	1
GE Green sandpiper <i>Tringa ochropus</i>	Green	0	1	N/A	0	0	0	0	1
LB Lesser black-backed gull <i>Larus fuscus</i>	Amber	8	0	N/A	0	0	0	2	8
MA Mallard <i>Anas platyrhynchos</i>	Amber	0	0	N/A	0	0	2	0	2
H. Heron <i>Ardea Cinerea</i>	Green	0	0	N/A	0	1	3	1	3

5. Derrycolumb

Since the previous reporting period (April 2021 to August 2022), additional winter bird surveys were undertaken in the winter period 2022/23. In addition, updated pollinator and breeding bird data is presented herein in respect of previously reported monitoring.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Derrycolumb Bog during summer 2021 and 2022.

Constraints

No constraints were identified, and all parts of the bog were accessible during the survey.

Results

Derrycolumb Bog can be divided into two separate lobes north and south of a dividing local road. The Bilberry River flows in an easterly direction along the northern boundary of the bog.

The majority of Derrycolumb Bog (approximately (approximately 80%) is classified as the community 'Bare peat (0-50% cover)' (BP). Pioneer cutaway vegetation is beginning to develop in bare peat areas across Derrycolumb Bog, forming mosaics with pioneering poor fen and Birch/Willow scrub. There are frequent patches of shallow surface water.

The following vegetation communities were recorded during the surveys carried out in 2021. Open habitats recorded forming mosaics with bare peat included 'Pioneer *Juncus effusus* community' (pJeff), 'Pioneer *Triglochin palustris* community' (pTrig), 'Pioneer *Eriophorum angustifolium* community (poor fen)' (pEang), '*Typha* community' (pTyp) and '*Phragmites australis* community' (pPhrag) with 'Open *Betula*-dominated community (B)' (oBir) beginning to develop in places. The ruderal habitat based '*Tussilago*-dominated community' (DisCF) was recorded frequently on the small gravel mounds of sub-soil in the eastern part of the bog.

In the northern section of the bog there are areas of more established vegetation pioneer open habitats and scrub dominated by 'Pioneer *Juncus effusus* community' (pJeff) and the grassland communities '*Anthoxanthum-Holcus-Equisetum* community' (gAn-H-Eq) and '*Molinia caerulea* dominated community' (gMol). 'Open *Betula*-dominated community' (oBir) forms pockets of scrub in these areas.

Closer to the northern boundary '*Betula-Salix* woodland' (BirWD) is beginning to develop with an understory of *Juncus effusus*. Small areas of remnant raised bog habitat remain along the margins of Derrycolumb Bog. Remnant raised bog around the south-eastern part of the bog includes a small area of active raised bog. The communities present in remnant raised bog include 'Dry *Calluna* community' (dHeath) and 'Open *Betula*-dominated community (B)' (oBir).

Derrycolumb Bog has a mosaic of different overlapping environmental characteristics influenced by residual peat depths, sub-soils and hydrology. Areas of deep residual peat in the south-eastern lobe

of the bog have not yet developed significant ecological indicator species relating to acidic water chemistry at present, and these areas remain dominated by bare peat (black fen peat/red acidic peat). Some areas of Derrycolumb have ecological indicators (*Typha* community) of more alkaline groundwater or sub-soil influence developing in drains.

Rehabilitation was carried out at Derrycolumb in 2021. It is too soon for habitats at Derrycolumb Bog to reflect post rehabilitation change or succession. Approximately 80% of Derrycolumb remains as re-wetted bare peat.

Almost no new pioneering vegetation is present in the rehabilitation extent in these bare peat areas (see also Quadrat survey results, below). Some areas of the bog already have well established pioneer vegetation including poor fen, scrub and Birch woodland. The habitats already present will continue to develop post rehabilitation. Re-wetting will help consolidate changes in environmental condition that continue to encourage the development of peatland and wetland habitat development in the re-wetted parts of this site in the future.



Example of extensive areas of drained Bare peat occurring at Derrycolumb pre rehabilitation.



Example of Pioneer open habitats establishing on bare peat.



Example of remnant raised bog at Derrycolumb.



Example of closed Downy birch dominated Birch Woodland occurring on dry ridge.

Breeding Birds – Pre-Rehabilitation Baseline

Methods

A single breeding wader visit was undertaken on May 14th, 2021. No CBS visits were undertaken in 2021. The survey was carried out under good conditions and covered the period 06:10am to 01:26pm.

Constraints

There were no constraints noted.

Results- Species Richness

A single pair of the BOCCI (Gilbert *et al.* 2021) Amber listed Ringed Plover *Charadrius hiaticula* was recorded. On this basis 1 pair is assumed to have attempted to breed onsite in 2022.

Results – Annual Relative Abundance

Two Ringed Plover were recorded.

Results – Habitat Associations

The recorded Ringed Plover were associating with was an open area of bare peat (pre-rehabilitation).

Results – Colonial Species

No colonial species were recorded.

Discussion

The occurrence on cutaway of Ringed Plover been previously described in unpublished reports such as Copland 2009, 2010 where it has been suggested that broken peat extraction infrastructure such as concrete pies, act as a surrogate for the pebbles which this species normally nests amongst to better conceal its eggs. Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland 2009), and this was supported by observations at Derrycolumb in 2021. Survey effort was limited in 2021 and further monitoring will determine whether rehabilitation under the scheme alters the assemblage of breeding waders at this bog. No significant change in breeding bird species richness and abundance can be attributed to the wetland rehabilitation so far in the re-wetted section at Derrycolumb, but measures have consolidated conditions for wetland habitats to continue to develop to support breeding bird species using the site.

Vegetation Quadrats – Monitoring YR1

Method

Quadrat monitoring was carried out at Derrycolumb bog in June 2021 in accordance with agreed EDRRS Monitoring and Verification. Five quadrats were employed.

Constraints

No constraints were identified.

Results

Quadrats Q1, Q3, Q4 & Q5 were dominated by bare peat (91-100% cover). Quadrat Q2 was located in an area of pioneering open habitats transitioning to open *Betula pubescens* scrub. However, this area

still contains by extensive bare peat. The pioneering vegetation in the area comprised mainly of *Juncus effuses* and *Molinia caerulea*. See Table 1 of Appendix S2 for detailed quadrat data.

Discussion

As with habitats the quadrats reflect the current baseline conditions pre-rehabilitation. Post-rehabilitation, further time is required before any vegetation colonisation or change is likely to be recorded.



Quadrat Q2



Quadrat Q4

Pollinators- YR1

Methods

Two counts were carried out, one each in June and August of 2021. All surveys were completed between 10:00am and 4:00pm, when the temperature was at least 13°C and during good weather conditions. Transect length was 2km. See the Figure in Appendix S2 titled '*Derrycolumb Bog Ecology Transects*' for transect route location.

Constraints

Wind occasionally reached higher than ideal speeds, but this may reflect the open nature of the cutaway and is relatively unavoidable.

Results- Species Richness

A total of ten species of butterfly were recorded namely Common Blue, Green-veined White, Large White, Meadow Brown, Small copper, Small tortoiseshell Peacock and Speckled wood. In addition to butterflies, White Tailed Bumblebee (n = 14), Emperor dragonfly (n = 5), Four Spotted Chaser (n=3), Brown Hawker (n = 1) and Common Darter (n = 8) were recorded during the surveys.

Results – Abundance

Small tortoiseshell occurred in the highest abundance (19 overall), with this maximum abundance recorded during the survey in August. This species was not recorded during the July Survey. Meadow Brown was recorded in the highest abundance during the July Survey (8 individuals). The highest abundance overall per month was recorded in August.

Results – Habitat Associations

The section of the transect veering west follows the route of the former decommissioned railway line and this area has some established vegetation either side. The section of the transect in the western lobe of the bog, generally follows the headland and a high field, both dominated with bare peat.

Discussion

The baseline scenario for Derrycolumb in 2021 reflected a suite of pre-rehabilitation habitats comprised largely of bare peat, and on this basis the ongoing monitoring for butterflies and other pollinators may be useful in determining the effects of rehabilitation under the EDRRS scheme on Pollinators.

Winter Birds – Monitoring YR1

Method

Six no. counts were completed at approximately monthly intervals. The count period included the months September 2021 to February 2022 inclusive. All surveys covered the period 10:00 to 14:10 and were carried out in conditions with no rain and good visibility.

Constraints

Certain scheme related activities and separate activity connected to an under-construction greenway were noted as potential sources of disturbance or visual intrusion during counts.

Results – Species Richness

A total of five water bird species were recorded across all surveys. One of these was a BOCCI (Gilbert *et al.* 2021) Red listed species namely Golden Plover. Two Amber listed species, Mallard and Whooper Swan were noted.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 6-1 and was highest for Golden Plover (n=50), followed by Mallard (n=4). Little Egret, Grey Heron and Whooper Swan were present on single counts only and in numbers <5 (range 1-2).

Results – Habitat Associations

Most birds across all counts were found to associate with habitats present at Derrycolumb Bog. Golden Plover were noted day roosting on recently rehabilitated high fields near the public roadway which transects the bog.

Discussion

Overall species richness is considered low during the period studied. A previous study (Delichon Ecology, 2021), which utilised 3 visits in the winter period of 2020/21 recorded a similar assemblage of species (Whooper Swan, Mallard, Grey Heron and Golden Plover) in similarly low numbers. On this basis the data presented here is considered indicative of baseline conditions.

In the context of an adjacent European Sites (such as Lough Ree SPA) which has wintering Whooper Swan, and ‘Wetland and Waterbirds’ as special conservation interests a post rehabilitation Derrycolumb may contribute to further habitat for SCI species, act as a winter refugium for water birds

of conservation concern and support the conservation objectives for these European Sites, although distance may be a limiting factor. In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds at this any other sites subject to rewetting under the current EDRRS Scheme.

No significant change in wintering bird species richness and abundance can be attributed to the wetland rehabilitation so far in the re-wetted section at Derrycolumb, but measures have consolidated conditions for wetland habitats to continue to develop to support wintering bird species using the site.

Table Error! No text of specified style in document.-24 Winter 2021/2 – Monitoring YR1 IWeBS Survey Results

Species	BOCCI 2020 - 2026 STATUS	SEP	OCT	NOV	DEC	JAN	FEB	Mean	Max
MA Mallard <i>Anas platyrhynchos</i>	Amber	0	0	4	0	0	0	1	4
ET Little Egret <i>Egretta garzetta</i>	Green	0	0	1	0	0	0	0	1
WS Whooper Swan <i>Cygnus cygnus</i>	Amber	0	0	2	0	0	0	0	2
H. Grey Heron <i>Ardea cinerea</i>	Green	0	0	1	0	0	0	0	1
GP Golden Plover <i>Pluvialis apricaria</i>	Red	0	50	0	0	0	0	8	50

Breeding Birds – Monitoring YR1

Methods

CBS surveys comprised 2 no. transects were visited 3 times in the period April to July 2022 inclusive. Breeding waders' surveys were undertaken on four dates between April and July. CBS counts covered the period 08:45am – 10:15am across all visits. Breeding wader surveys generally covered the same period. See the Figure in Appendix S2 titled '*Derrycolumb Bog Ecology Transects*' for transect route location.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with high fields or headlands associated with former peat extraction. Due to their location sampling results may include species which utilise the areas adjacent to transects but which are not subject to rehabilitation. Where relevant this is further addressed in the discussion section. Due to unforeseen circumstances one CBS count in June was omitted, however data from two counts in the typical CBS period plus an additional count in July are available.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10:00am-11:00am). CBS recommended timings are early morning, no later than 9:00am 'ideally' but allowance is made to extend this period for sites which require longer travel times or where access is difficult. Data are

considered acceptable for analysis in the current instance based on timings presented above. Any bias on a per species level is discussed further under Discussion, where relevant.

Results- Species Richness

Species richness is presented as the total number of species recorded across both transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 36 no. species were recorded, see Table 6-2. This included four BOCCI (Gilbert *et al.* 2021) Red listed species: Black Headed Gull, Lapwing, Meadow Pipit, and Snipe along with eight BOCCI Amber listed species namely Goldcrest, Lesser Black Backed Gull, Mallard, Ringed Plover, Skylark, Swallow, Sand Martin and Willow Warbler. Remaining species (n=24) were all Green listed apart from Pheasant which is not assigned a BOCCI status.

A bespoke breeding waders survey was undertaken in 2022, data on breeding pairs is herein presented in line with an interpretation following the O'Brien and Smith (1992) method for censusing lowland breeding wader populations. On this basis 0-1 pairs of Lapwing, 1 pair of Ringed Plover and 2 pairs of Snipe bred onsite in 2022.

Results – Annual Relative Abundance

Annual relative abundance (ARA) is presented as the maximum count per species across visit 1, visit 2, or visit 3 or within the period April to June inclusive, see Table 6-2. This allows for future comparison with CBS trends which takes the same approach to index species.

Maximum counts of greater than 10 individuals were recorded for six species, Wren (n=18), Redpoll (n=15), Robin (n=15), Blackbird (n=12) and Chaffinch (n=11). All remaining species never exceeded a maximum count of 7.

Results – Habitat Associations

Habitat associations are broadly grouped in line with other published interpretations and fall into two categories, those species of OPEN or NON-OPEN habitats. Associations are interpreted following Naim & O'Halloran 2012. In general terms however, the category 'OPEN' was applied to those species most strongly associated with open pioneering habitats or mosaics thereof found on cutaway bog (or raised bog) whilst species generally associated with scrub (typically birch, willow or gorse) and closed-canopy woodland (typically birch or willow but also other broadleaf mixes and/ or conifer spp.) are assigned to the 'NON-OPEN' category.

Seventeen species considered associated with NON-OPEN habitats were recorded and sixteen species associated with OPEN habitats were recorded see Table 6-2. Three species associate with both OPEN and NON-OPEN categories (Reed Bunting, Sedge Warbler and Wren).

Results – Colonial Species

No colonies were observed.

Discussion

The occurrence on cutaway, cutover or raised bog of many of the species recorded in this study have been previously described in literature such as Wilson 1990, Bracken *et al.* 2008 and in unpublished reports such as Copland 2010.

All four Red listed species recorded are associated with open habitats targeted for rehabilitation in the form of rewetting and would be expected to gain from measures intended to effectively create wetlands or stabilised areas of drier vegetating cutaway. Black-headed Gull, Lapwing and Snipe have been shown to associate with cutaway wetlands in the past (Copland 2009), and it is notable that despite there being only a single visit in 2021 for comparison, all three species may have colonised Derrycolumb post rehabilitation.

Breeding waders comprised Snipe (2 pairs), Lapwing (0-1 pairs) and Ringed Plover (1 pair). In 2021, only Ringed Plover was recorded at Derrycolumb although we note that breeding wader estimates are based on 1 visit only. Some species recorded utilising Derrycolumb such as Lesser Black-backed Gull, along with Corvids and Raptor species such as Buzzard have the potential to predate breeding wader nests and young, and future management could be required to optimise breeding wader success.

Regarding habitat associations 44% of species recorded are more associated with open habitats. Many of these species breed on or frequently visit open areas of cutaway to forage. Open habitat species comprise a higher proportion of Red and Amber listed species (12 no. in total). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland 2009), and this still seems the case. It must be noted that species more associated with non-open habitats dominated abundance in 2022, however this may reflect transect location which inevitably samples adjacent hedgerows/woodland. Over time as birds utilising cutaway increases this proportion may change.

In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds utilising cutover bogs such as Derrycolumb.

Table Error! No text of specified style in document.-25 Monitoring YR2 Countryside Bird Survey Results - 2022

SPECIES	BOCCI 2020 - 2026 STATUS	HABITAT ASSOCIATION	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	12
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	4
BT Blue Tit <i>Cyanistes caeruleus</i>	Green	NON-OPEN	1
BF Bullfinch <i>Pyrrhula pyrrhula</i>	Green	NON-OPEN	1
BH Black-headed Gull <i>Chroicocephalus ridibundus</i>	Red	OPEN	2
BZ Buzzard <i>Buteo buteo</i>	Green	OPEN	1
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	11
CT Coal Tit <i>Periparus ater</i>	Green	NON-OPEN	1
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	1
D. Dunnock <i>Prunella modularis</i>	Green	NON-OPEN	0

SPECIES	BOCCI 2020 - 2026 STATUS	HABITAT ASSOCIATION	ARA
GC Goldcrest <i>Regulus regulus</i>	Amber	NON-OPEN	2
PW Pied Wagtail <i>Motacilla alba</i>	Green	OPEN	3
GO Goldfinch <i>Carduelis carduelis</i>	Green	OPEN	2
H. Grey Heron <i>Ardea cinerea</i>	Green	OPEN	1
HC Hooded Crow <i>Corvus cornix</i>	Green	OPEN	6
JD Jackdaw <i>Corvus monedula</i>	Green	NON-OPEN	2
J. Jay <i>Garrulus glandarius</i>	Green	NON-OPEN	1
L. Lapwing <i>Vanellus vanellus</i>	Red	OPEN	1
LT Long-tailed Tit <i>Aegithalos caudatus</i>	Green	NON-OPEN	0
LB Lesser Black-backed Gull <i>Larus fuscus</i>	Amber	OPEN	0
LR Redpoll <i>Acanthis cabaret</i>	Green	NON-OPEN	15
MA Mallard <i>Anas platyrhynchos</i>	Amber	OPEN	1
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	6
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	15
RB Reed Bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	2
RP Ringed Plover <i>Charadrius hiaticula</i>	Amber	OPEN	0
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	4
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	2
SM Sand Martin <i>Riparia riparia</i>	Amber	OPEN	3
SN Snipe <i>Gallinago gallinago</i>	Red	OPEN	2
ST Song Thrush <i>Turdus philomelos</i>	Green	NON-OPEN	4
SH Sparrowhawk <i>Accipiter nisus</i>	Green	NON-OPEN	0
SW Sedge Warbler <i>Acrocephalus schoenobaenus</i>	Green	OPEN/NON-OPEN	1
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	7
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	18
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	12

Pollinators- YR2

Methods

The transect at Derrycolumb is 2km in length. All surveys were completed between 10:00 and 16:00hrs, when the temperature was at least 13°C and during good weather conditions. Five counts were carried out, one each in April, May, June, July and August of 2022. See the Figure in Appendix S2 titled 'Derrycolumb Bog Ecology Transects' for transect route location.

Constraints

Wind occasionally reached higher than ideal speeds, but this may reflect the open nature of the cutaway and is relatively unavoidable.

Results – Species Richness

A total of ten species of butterfly were recorded namely Common Blue, Green-veined White, Large White, Meadow Brown, Orange Tip, Ringlet, Small Copper, Small Heath, Small Tortoiseshell and Small White. In addition to butterflies, White Tailed Bumblebee (n = 2), Emerald damselfly (n = 1) Four Spotted Chaser (n=1) were recorded during the surveys.

Results – Abundance

Meadow Brown occurred in the highest abundance (26 overall), with this maximum abundance recorded from the July survey. This species was not recorded during any of the other monthly surveys. Ringlet and small tortoiseshell were also recorded in high abundance in the later months of the summer. The highest abundance overall per month was recorded in July (56 individuals).

Results – Habitat Associations

The south-eastern end of the transect follows the route of the former decommissioned railway line and this area has some established vegetation either side. A higher proportion of pollinators were encountered along this section of the transect.

In general, little or no pollinator activity was clearly associated with bare peat or recently rehabilitated bare peat areas. Species recorded on bare peat sections of the transect were primarily traversing the transect to nearby grassy verges, as insufficient vegetation is present to attract feeding pollinators.

Discussion

The importance of regenerating cutaway for Irish butterflies has been described for certain sites such as Lullymore, Co. Kildare (Harding 2008). However, the baseline scenario for Derrycolumb still reflects habitats comprised largely of bare peat, and on this basis the ongoing monitoring for butterflies and other pollinators may be useful in determining the effects of rehabilitation under the EDRRS scheme on Pollinators.

Table Error! No text of specified style in document.-26 Monitoring YR2 Pollinator Survey Results - 2022

Species	April	May	June	July	August	Total
Common Blue <i>Polyommatus icarus</i>	0	0	0	3	3	6
Green-veined White <i>Pieris napi</i>	0	0	0	6	0	6
Large White <i>Pieris brassicae</i>	1	0	0	0	1	2
Meadow Brown <i>Maniola jurtina</i>	0	0	0	26	0	26
Orange Tip <i>Anthocharis cardamines</i>	1	1	2	0	0	4
Ringlet <i>Aphantopus hyperantus</i>	0	0	0	16	0	16
Small copper <i>Lycaena phlaeas</i>	0	1	0	0	2	3
Small heath <i>Coenonympha pamphilus</i>	0	0	0	5	0	5
Small tortoiseshell <i>Aglais urticae</i>	0	0	0	0	12	12
Small white <i>Pieris rapae</i>	0	2	1	0	0	3
Total	2	4	3	56	18	83

Winter Birds – Monitoring YR2

Method

Six counts within the winter period 2022/23 were conducted. All counts were within the period 10:00 to 16:45. Counts were undertaken generally on days with no rain. Visibility was always good and wind speeds ranged from F1-F5 with no constraints to the surveys. Survey dates were 27th of October 2022, 15th of November 2022, 21st of December 2022, 20th of January 2023, 15th of February 2023, and 30th of March 2023.

Constraints

No constraints were noted during surveys. In January 2023 light snow was recorded on site and all ground and standing water was frozen. However, this is still considered representative of the time of year and there were no access or visibility constraints.

Results – Species Richness

A total of 7 water bird species were recorded across all surveys. Two of these were BoCCI (Gilbert *et al.* 2021) Red listed species; namely Golden Plover and Snipe. Five Amber listed species were recorded namely Cormorant, Ringed Plover, Lesser Black-Backed Gull, Mallard and Whooper Swan.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 6-4 and was highest for Golden Plover (n=30), although this was influenced by a peak count of 179 individuals in March 2023. Average abundance for Whooper Swan was (n=11). Average abundance across all 6 counts was <2 for all remaining species.

Results – Habitat Associations

Most birds across all counts were found to associate with habitats present at Derrycolumb Bog. In October 2022, 20 Golden Plover were noted outside, but close to the bog boundary. These are not included in the records for the bog below but reflects the occurrence of the species in the wider area. In February 2023, a Cormorant was recorded flying over the site and is likely to be associated with habitats outside of the bog.

No waders or wildfowl were recorded on site in October or November 2022. This likely reflects the bare peat dominated nature of the former cutover bog.

Discussion

Overall species richness and abundance is considered low during the period studied. No counts were recorded as reaching potentially important thresholds for species of conservation concern. The wintering bird species assemblage is broadly similar to previous bird surveys, in that low species diversity was recorded and although good numbers of individuals were observed for some species on occasion, their usage of the bog is intermittent. It therefore is likely that the bog is used opportunistically for roosting or to a lesser extent foraging. No change in species richness and abundance can be attributed to the rehabilitation to date and more time is needed to record any significant correlation with rehabilitation. As the bog is dominated by bare peat, it is expected that as

aquatic plants and invertebrate communities establish, this will begin to support a greater species diversity and numbers of wintering wildfowl and waders.

Seven species recorded were of Red or Amber status. In the context of nearby European Designated Sites (i.e., the nearby Lough Ree SPA), which have for instance ‘Wetland and Waterbirds’ as qualifying interests, a post rehabilitation Derrycolumb bog may contribute to further supporting habitat for SCI species outside of designated sites and contribute to supporting the conservation objectives for such sites. The data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds at this bog.

Table Error! No text of specified style in document.-27 Winter 2022/23 – Monitoring YR2 I-WeBS Survey Results

Species	BOCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
GP Golden Plover <i>Pluvialis apricaria</i>	Red	0	0	0	0	0	179	30	179
SN Snipe <i>Gallinago gallinago</i>	Red	0	0	0	0	0	1	0	1
WS Whooper Swan <i>Cygnus cygnus</i>	Amber	0	0	19	48	0	0	11	48
MA Mallard <i>Anas platyrhynchos</i>	Amber	0	0	0	0	0	9	2	9
LB Lesser Black- backed Gull <i>Larus fuscus</i>	Amber	0	0	0	0	1	5	1	5
RP Ringed Plover <i>Charadrius hiaticula</i>	Amber	0	0	0	0	3	1	1	3
CA Cormorant <i>Phalacrocorax carbo</i>	Amber	0	0	0	0	1	0	0	1

6. Edera

Since the previous reporting period (2022), additional wintering bird surveys have been undertaken at Edera bog and have been added to this bog account.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Edera Bog during summer 2021 and 2022.

Constraints

No constraints were identified, and all parts of the bog were accessible during the survey.

Results

Edera Bog can be divided into two separate lobes one smaller northern lobe and a larger southern lobe, south of the Bilberry River, which divides the two. The Bilberry River flows west to east through the site and is surrounded on both sides by relatively extensive areas of wetgrassland that are subject to flooding.

The majority of Edera Bog (approximately 90%) within the former peat extraction area is re-wetted bare peat ('Bare peat (0-50% cover)' or BP). There is scattered colonisation of pioneer species including *Calluna vulgaris* and *Molinia caeruleae*. At present, vegetation cover is still too low to classify as pioneer communities yet. There are frequent patches of scattered shallow water present.

Edera bog is underlain with both marl and gravel. Some areas of Edera Bog are cutaway exposing the shell marl substrate, particularly in the north-western corner of the southern lobe. These areas are generally wet and subject to seasonal inundation. Pioneer poor fen communities are beginning to develop in these areas, forming mosaics with bare peat, including '*Phragmites australis* community' (pPhrag), '*Pioneer Juncus effusus* community' (pJeff), '*Carex rostrata* community' (pRos) and '*Pioneer Triglochin palustris* community' (pTrig). The ruderal community '*Tussilago*-dominated community' (DisCF) occurs frequently on the exposed marl also.

A significant area of scrub (WS1), raised bog (PB4) and wet grassland (GS4) is located in the west of the site outside of the former production fields. This area is located next to Lough Ree and has never been in industrial peat production; however, some domestic turf cutting has been carried out in this area. The remnant section of raised bog does not appear to contain deep peat and is located in the transitional zone between what was the former intact raised bog (Edera) and the wet grassland that borders Lough Ree. Purple Moorgrass is dominant across much of this section of raised bog. This area, immediately adjacent to Lough Ree, can flood in winter of lake water levels are high.

A small area of remnant raised bog (PB1) and cutaway bog (PB4) is also located along the north-eastern boundary of the site. This area is used extensively for domestic turf production under licence to Bord na Móna. The most common habitats found around the margins of Edera Bog include Marginal raised bog (PB1), Cutover bog (PB4), Scrub (WS1), Dry heather dominated vegetation, Birch woodland (WN7), Wet grassland (GS4) (privately managed farmland) and Improved agricultural grassland (GA1).

There are ecological indicators (Bulrush, Bottle Sedge, Milfoil) of ground-water influence or alkaline sub-soil influence on water-chemistry in the cutaway zone located adjacent to the Bilberry River. This indicates less acidic water chemistry influence on this zone. This zone is also prone to seasonal winter inundation via the Bilberry River and this reflects seasonal water fluctuations in Lough Ree. In areas of residual deep bare peat groundwater is unlikely to have a significant influence on the vegetation and water chemistry is likely to be influenced by rainwater and by the more acidic residual peat.

Rehabilitation has been carried out at Edera Bog in 2021. It is too soon for habitats at Edera to reflect post rehabilitation change or vegetation/habitat succession. Approximately 90% of the former peat extraction area of Edera remains as re-wetted bare peat.

Only small areas of the former peat extraction area subject to rehabilitation have begun to recolonise with pioneering vegetation (see also Quadrat survey results, below). These habitats are developing best on cutaway areas with an exposed marl substrate that are subject to seasonal inundation. The habitats already present are expected to continue to develop post rehabilitation.

Some final manipulation of banded cells by the insertion of plastic sheet piles and/or overflow pipes is still to be carried out so further time is needed for optimum water levels to potentially develop at the surface of these areas.

In conclusion the habitats recorded in 2021/2022 largely reflect the baseline status of a recently transformed peat extraction site. Re-wetting will help consolidate changes in environmental condition that continue to encourage the development of peatland and wetland habitat development in the re-wetted parts of this site in the future.



Bare peat (PB4) in the former production area



Pioneer poor fen



Pioneer *Eriophorum angustifolium* vegetation



The Bilberry River divides the northern and southern lobe

Vegetation Quadrats – Monitoring YR1

Method

Quadrat monitoring was carried out at Edera bog during summer of 2021 in accordance with agreed EDRRS Monitoring and Verification. Five quadrats were employed.

Constraints

No constraints were identified.

Results

Quadrats Q1, Q2 & Q5 were dominated by bare peat (91-100% cover). Quadrats Q3 & Q4 were located in an area of pioneering open habitats that was subject to seasonal inundation and was therefore establishing as a wetland. However, these areas were still dominated by extensive areas of bare peat. The pioneering vegetation in the area in which these two quadrats were located comprised mainly of *Triglochin palustris* or *Carex rostrata*, with *Tussilago farfara*, *Hippuris vulgaris*, *Molinia caerulea* and *Potentilla erecta* also occurring. Some *Betula pubescens* was also beginning to establish in the area. This area was also located in relatively shallow peat. See Table 1 of Appendix T2 for detailed quadrat data.

Discussion

As with habitats the quadrats reflect the current baseline conditions pre-rehabilitation. Post-rehabilitation, further time is required before any vegetation colonisation or change is likely to be recorded.

Winter Birds – Monitoring YR1

Method

Six monthly counts were completed in line with the methodology as described in Section 1.2. The count period included the months September 2021 to February 2022 inclusive.

Constraints

Some parts of Edera post rehabilitation, particular headlands, were difficult to access due to unstable peat, but otherwise no constraints were noted.

Results – Species Richness

A total of seven water bird species were recorded across all surveys. One of these was a BOCCI (Gilbert *et al.* 2021) Red listed species namely Common Snipe. Four Amber listed species were recorded namely Mallard, Mute Swan, Whooper Swan and Kingfisher.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 7-1 and was highest for Common Snipe (n=7), followed by Whooper Swan (n=6). Common Snipe was present on five of six counts whilst Whooper Swan was present or recorded on four of six counts. Remaining water bird species were recorded in low numbers (range 1-2).

Results – Habitat Associations

Most birds across all counts were found to associate with habitats present at Edera Bog. One observation of Whooper Swan in November was a flyover record but otherwise this species was recorded associating with habitats on site. Common Snipe were recorded from pioneering cutaway habitats and bog margins and observations of Kingfishers were birds associating with the River Bilberry whose corridor traverses the bog.

Discussion

Overall species richness is considered low during the period studied given the proximity of Edera to Lough Ree. A previous study (JOD, 2021), which utilised 3 visits in the winter period of 2020/21 recorded a similar assemblage of species but additionally noted the presence of Coot, Little Grebe, Grey Heron and Water Rail. Interannual variation in winter water levels at Lough Ree and consequently the corridor of the Bilberry River may account for differences between years. In 2020/21 Common Snipe also had the highest abundance and were recorded in numbers of 10 or more per visit (range = 10-29). This species is difficult to count accurately due to its cryptic camouflage and fondness for resting in dense vegetation and total counts of all, but the smallest wetland sites are generally underestimates (Smiddy *et al.* 2022), this is also likely the case at Edera.

In the context of an adjacent European Sites (Lough Ree SPA) which has wintering Whooper Swan, and ‘Wetland and Waterbirds’ as qualifying interests a post rehabilitation Edera may contribute to further habitat for SCI species, act as a winter refugium for water birds of conservation concern and support the conservation objectives for these European Sites.

In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds at both Edera and other bogs in the EDRRS scheme. No significant change in wintering bird species richness and abundance can be attributed to the wetland rehabilitation so far in the re-wetted section at Edera, but measures have consolidated conditions for wetland habitats to continue to develop to support wintering bird species using the site.

Table Error! No text of specified style in document.-28 Monitoring YR1 IWeBS Survey Results - 2021/22

Species	BOCCI 2020 - 2026 STATUS	SEP	OCT	NOV	DEC	JAN	FEB	Mean	Max
MA Mallard <i>Anas platyrhynchos</i>	Amber	1	2	1	0	0	0	1	2
MS Mute Swan <i>Cygnus olor</i>	Amber	1	0	2	1	1	0	1	2
SN Common Snipe <i>Gallinago gallinago</i>	Red	0	2	4	7	7	1	4	7
WS Whooper Swan <i>Cygnus cygnus</i>	Amber	0	6	1	4	4	0	3	6
KF Kingfisher <i>Alcedo atthis</i>	Amber	1	0	0	0	0	0	0	1
MH Moorhen <i>Gallinula chloropus</i>	Green	0	1	0	0	0	0	0	1
JS Jack Snipe <i>Lymnocyptes minimus</i>	Green	0	0	1	0	0	0	0	1

Breeding Birds – Monitoring YR1

Methods

CBS surveys comprised 3 no. (1km in length) transects were visited four times in the period April to July inclusive of 2022. Breeding waders’ surveys were also undertaken on the same dates. See the figure titled ‘Edera Bog Ecology Transects’ in Appendix T2 for transect route location.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with high fields or headlands associated with former peat extraction. Due to their location sampling results may include species which utilise the areas adjacent to transects but which are not subject to rehabilitation. Where relevant this is further addressed in the Discussion section.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10:00am-11:00am). CBS recommended timings are early morning, no later than 9:00am 'ideally' but allowance is made to extend this period for sites which require longer travel times or where access is difficult. The timing of the visit in June exceeded the CBS recommended period for surveying in June but was complete by 11:20am and data are considered acceptable for analysis. Any bias on a per species level is discussed further under Discussion, where relevant.

Results- Species Richness

Species richness is presented as the total number of species recorded across both transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 49 no. species were recorded, see Table 7-2. This included five BOCCI (Gilbert *et al.* 2021) Red listed species Black headed gull, Cormorant, Lapwing, Meadow pipit, Snipe and Swift along with 12 no. BOCCI Amber listed species namely Goldcrest, Lesser Black backed gull, Linnets, Mallard, Mute swan, Ringed plover, Skylark, Swallow, Sand Martin, Common Tern and Willow warbler. Remaining species (n=34) were all Green listed apart from Pheasant which is not assigned a BOCCI status.

A bespoke breeding waders survey was undertaken in 2022, data on breeding pairs is herein presented in line with an interpretation following the O'Brien and Smith (1992) method for censusing lowland breeding wader populations. On this basis 2 pairs of Lapwing, 2 pairs of Ringed Plover and 7 pairs of Snipe bred onsite in 2022. Ringed Plover chicks were observed in May and June visits (n=1 per visit).

Results – Annual Relative Abundance

Annual relative abundance (ARA) is presented as the maximum count per species across visit #1, #2, or #3 or within the period April to June inclusive, see Table 7-2. This allows for future comparison with CBS trends which takes the same approach to index species.

Maximum counts of greater than 20 individuals were recorded for three species, Lesser Black backed Gull (n=40), Wren (n=34) and Meadow pipit (n=33). Maximum counts of between 10 and 20 individuals were noted for 5 species, Blackbird, Sand Martin, Blackcap, Hooded Crow and Skylark. All remaining species never exceeded a maximum count of 9.

Results – Habitat Associations

Habitat associations are broadly grouped in line with other published interpretations and fall into two categories, those species of OPEN or NON-OPEN habitats. Associations are interpreted following Naim & O'Halloran 2012. In general terms however, the category 'OPEN' was applied to those species most strongly associated with open pioneering habitats or mosaics thereof found on cutaway bog (or raised bog) whilst species generally associated with scrub (typically birch, willow or gorse) and closed-canopy woodland (typically birch or willow but also other broadleaf mixes and/or conifer spp.) are assigned to the 'NON-OPEN' category.

Twenty-two species considered associated with NON-OPEN habitats were recorded and twenty-five species associated with OPEN habitats were recorded see Table 2.19.2. Two species associate with both OPEN and NON-OPEN categories (Reed Bunting and Wren).

Results – Colonial Species

No colonies were observed.

Discussion

Of the five Red listed species recorded, three (Black-headed Gull, Lapwing, and Snipe) are associated with open habitats targeted for rehabilitation in the form of rewetting and would be expected to gain from measures intended to effectively create wetlands. Meadow pipit would be associated with drier habitats or those areas targeted for fertiliser application such as high fields, whilst Swift will forage over open water (Cramp *et al.* 1985) and at low altitude over raised bog in certain conditions. Twelve Amber listed species were recorded of which one, Lesser Black-backed Gull had the highest abundance overall (peak of 40); this gull was recorded on three of four visits and in all instances was utilising a constructed cell in the east of Edera for roosting and loafing. In the context of proximity to a European Site (Lough Ree SPA) where Lesser Black backed Gull are known to be breeding then a rehabilitated Edera Bog may serve to support the conservation status of this species. Overall, however the total number of species either Red or Amber listed was 17 suggesting the importance of Edera for species of conservation concern in one form or other, either foraging or breeding or for use as a refugium.

Breeding waders were dominated by Snipe (7 pairs). Two pairs of Lapwing bred onsite. Ringed Plover successfully fledged young within a constructed wetland. We note that some species recorded utilising Edera such as Lesser Black-backed Gull, along with Corvids and Raptor species such as Buzzard have the potential to predate breeding wader nests and young.

Regarding habitat associations 51% of species recorded are more associated with open habitats. Many of these species breed on or frequently visit open areas of cutaway to forage. Open habitat species comprise a higher proportion of Red and Amber listed species (15 no. in total). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland 2009), and this still seems the case.

In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds utilising cutover bogs and establishes the potential importance of Edera post rehabilitation in respect of breeding birds of conservation concern, notably wading species, and gulls. No significant change in breeding bird species richness and abundance can be attributed to the wetland rehabilitation so far in the re-wetted section at Edera, but measures have consolidated conditions for wetland habitats to continue to develop to support breeding bird species using the site.

Table Error! No text of specified style in document.-29 Monitoring YR1 Countryside Bird Survey Results - 2022

SPECIES	BOCCI 2020 - 2026 STATUS	HABITAT ASSOCIATION	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	16
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	11

SPECIES	BOCCI 2020 - 2026 STATUS	HABITAT ASSOCIATION	ARA
BF Bullfinch <i>Pyrrhula pyrrhula</i>	Green	NON-OPEN	1
BH Black-headed Gull <i>Chroicocephalus ridibundus</i>	Red	OPEN	4
BT Blue Tit <i>Cyanistes caeruleus</i>	Green	NON-OPEN	1
BZ Buzzard <i>Buteo buteo</i>	Green	OPEN	1
CA Cormorant <i>Phalacrocorax carbo</i>	Amber	OPEN	2
CC Chiffchaff <i>Phylloscopus collybita</i>	Green	NON-OPEN	5
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	8
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	7
CN Common Tern <i>Sterna hirundo</i>	Amber	OPEN	1
CT Coal tit <i>Periparus ater</i>	Green	NON-OPEN	1
D. Dunnock <i>Prunella modularis</i>	Green	NON-OPEN	1
ET Little Egret <i>Egretta garzetta</i>	Green	OPEN	1
GC Goldcrest <i>Regulus regulus</i>	Amber	NON-OPEN	3
GO Goldfinch <i>Carduelis carduelis</i>	Green	OPEN	4
GT Great Tit <i>Parus major</i>	Green	NON-OPEN	3
H. Grey Heron <i>Ardea cinerea</i>	Green	OPEN	1
HC Hooded Crow <i>Corvus cornix</i>	Green	OPEN	10
J. Jay <i>Garrulus glandarius</i>	Green	NON-OPEN	3
JD Jackdaw <i>Corvus monedula</i>	Green	NON-OPEN	3
L. Lapwing <i>Vanellus vanellus</i>	Red	OPEN	4
LB Lesser Black-backed Gull <i>Larus fuscus</i>	Amber	OPEN	40
LI Linnet <i>Carduelis cannabina</i>	Amber	OPEN	5
LR Redpoll <i>Acanthis cabaret</i>	Green	NON-OPEN	7
LT Long-tailed Tit <i>Aegithalos caudatus</i>	Green	NON-OPEN	1
M. Mistle thrush <i>Turdus viscivorus</i>	Green	NON-OPEN	2
MA Mallard <i>Anas platyrhynchos</i>	Amber	OPEN	6
MH Moorhen <i>Gallinula chloropus</i>	Green	OPEN	1
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	33
MS Mute Swan <i>Cygnus olor</i>	Amber	OPEN	1
PH Pheasant <i>Phasianus colchicus</i>	N/A	NON-OPEN	5
PW Pied Wagtail <i>Motacilla alba</i>	Green	OPEN	6
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	8
RB Reed Bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	4
RN Raven <i>Corvus corax</i>	Green	OPEN	5
RO Rook <i>Corvus frugilegus</i>	Green	NON-OPEN	7
RP Ringed Plover <i>Charadrius hiaticula</i>	Amber	OPEN	5
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	9
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	1
SI Swift <i>Apus apus</i>	Red	OPEN	1

SPECIES	BOCCI 2020 - 2026 STATUS	HABITAT ASSOCIATION	ARA
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	4
SM Sand Martin <i>Riparia riparia</i>	Amber	OPEN	16
SN Snipe <i>Gallinago gallinago</i>	Red	OPEN	5
ST Song Thrush <i>Turdus philomelos</i>	Green	NON-OPEN	7
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	4
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	10
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	34
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	22

Pollinators YR1

Methods

All surveys were completed between 10:40am and 01:00pm, during good weather conditions. Four visits spanning May 2022 to August 2022 inclusive were made and on each occasion the 1km transect was walked from south to north. See the figure titled '*Edera Bog Ecology Transects*' in Appendix T2 for transect route location.

Constraints

The majority of the surveys were carried out when the temperature was at least 13°C, with the exception of the June and July surveys when the temperatures were 11°C and 12.5°C respectively. Weather conditions were optimal during all the other surveys.

Results- Species Richness

Species richness was very low, with only a single butterfly recorded, during only one of the surveys. This record was of a Peacock butterfly recorded during the July survey. Records for incidental species were also low, with only the moth species (Pale-streak Grass-veneer) recorded during the July survey. Bombus sp. (n = 12) and Honeybee (n = 2) were recorded during the August survey.

Results – Abundance

Species abundance was very low. Peacock butterfly was the only species recorded during the surveys with a single individual recorded during the July survey. No other butterfly species were recorded during any of the other surveys.

Results – Habitat Associations

Overall species richness and abundance was extremely low during the survey period. This reflects the baseline bog condition which is dominated by bare peat with little vegetation present to provide foraging opportunities for butterfly species. The majority of the transect crosses bare peat, with some scattered poorly developed vegetation present in the wider area of the transect. In general, little or no pollinator activity was clearly associated with bare peat or recently rehabilitated bare peat areas.

Discussion

The baseline scenario for Edera still very much reflects habitats comprised largely of bare peat, and on this basis the ongoing monitoring for butterflies and other pollinators may be useful in determining the effects of rehabilitation under the EDRRS scheme on Pollinators.

It is possible species richness and abundance may increase in future surveys along the transect route when the rehabilitated area begins to revegetate. The effects of fertiliser application in particular to headlands and high fields may increase the rate of colonisation by some species.

Table *Error! No text of specified style in document.*-30 Monitoring YR1 Pollinator Survey Results - 2022

Species	May	June	July	August	Total
Peacock <i>Aglais io</i>	0	0	1	0	1
Total	0	0	1	0	1

Winter Birds – Monitoring YR2

Method

Six counts within the winter period 2022/23 were conducted. All counts were within the daytime period 11:30 to 15:00. Counts were undertaken generally on days with no rain, however, on one date showers were noted. Visibility was always good and wind speeds ranged from F1-F5, with surveys generally falling within optimal conditions. Survey dates were 27th of October 2022, 15th of November 2022, 21st of December 2022, 20th of January 2023, 15th of February 2023, and 30th of March 2023.

Constraints

On two visits in January and March 2023 gunshots were heard on the south-eastern section of the site therefore surveys were curtailed to the north-western section only for safety reasons.

Results – Species Richness

A total of 4 water bird species were recorded across all surveys. One of these was a BoCCI (Gilbert *et al.* 2021) Red listed species, namely Snipe. Two Amber listed species were recorded namely Cormorant and Lesser Black-Backed Gull. One Green listed species namely Grey Heron was also recorded on site.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 7-4 and was highest for Snipe (n=4) although this was influenced by a peak count of 23 in February of 2023. Average abundance across all 6 counts was 0 for all remaining species.

Results – Habitat Associations

Most birds across all counts were found to associate with habitats present at Edera Bog. No birds were recorded on the site in October, November or December of 2022, indicating that foraging opportunities are likely to be limited due to the current extensive bare peat nature of the bog. In March 2023 an individual Snipe was the only observation recorded on site.

Discussion

Overall species richness and abundance is considered low during the period studied. No counts were recorded as reaching potentially important thresholds for species of conservation concern. The wintering bird species diversity is similarly low in comparison to previous bird surveys. Although fewer and different species were recorded over the 2022-23 winter period, this is likely typical of the bare peat dominated habitats occurring at Edera bog.

Three species recorded were of Red or Amber status. One species was Green status. In the context of the adjacent European Site Lough Ree SPA, which has wintering Whooper Swan, and 'Wetland and Waterbirds' as qualifying interests, a post rehabilitation Edera may contribute to further habitat for SCI species, act as a winter refugium for water birds of conservation concern and support the conservation objectives for this European Sites. The data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds at this site.

No significant change in wintering bird species richness and abundance can be attributed to the peatland rehabilitation so far at Edera, but measures have consolidated conditions for wetland and other habitat to continue to develop to support wintering bird species already using the site. This site is likely to support more suitable wildfowl and wader habitats as vegetation and invertebrate assemblages establish.

Table Error! No text of specified style in document.-31 Winter 2022/23 – Monitoring YR2 I-WeBS Survey Results

Species	BoCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
SN Snipe <i>Gallinago gallinago</i>	Red	0	0	0	1	23	1	4	23
CA Cormorant <i>Phalacrocorax carbo</i>	Amber	0	0	0	1	0	0	0	1
LB Lesser Black-Backed Gull <i>Larus fuscus</i>	Amber	0	0	0	0	1	0	0	1
H. Heron <i>Ardea cinerea</i>	Green	0	0	0	1	0	0	0	1

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Appendix D3

Scheme Year 2 Bogs

Individual Bog Accounts

Habitats – Monitoring YR1

Winter Birds – Monitoring YR 1

Vegetation Quadrats

Breeding Birds – Monitoring YR1

Pollinators

Winter Birds – Monitoring YR2

1. Bunahinly
2. Clooneeny
3. Killaranny
4. Begnagh
5. Carranstown
6. Derrinboy
7. Prosperous
8. Lodge
9. Derraghan
10. Cloncreen
11. Timahoe South
12. Bloomhill
13. Derryfadda
14. Glenlough
15. Noggusboy
16. Derrybrat
17. Knappoge
18. Ballycon
19. Blackwater

1. Bunahinly-Kilgarvan

Bunahinly-Kilgarvan is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Bunahinly-Kilgarvan Bog during summer 2022.

Constraints

No constraints were identified, and all parts of the bog were accessible during the surveys.

Results

Bunahinly-Kilgarvan Bog is located south of Athlone, Co. Westmeath. It is adjacent to the River Shannon, which is located 50-150m away from the western boundary of the site. Bunahinly-Kilgarvan comprises two separate bogs that are connected via a narrow strip of peatland with Bunahinly to the north and Kilgarvan to the south.

Bunahinly-Kilgarvan comprises a total area of 393 ha and the majority of the bog is dominated by ‘bare peat (0-50% cover)’ (BP) and corresponds to cutover bog (PB4). No significant vegetation regeneration has yet occurred in the formerly active production areas since the cessation of peat production (2018), and habitats of biodiversity interest are therefore largely confined to the margins of the bog.

At Bunahinly pioneering open cutaway vegetation is beginning to develop in the northwest ‘arm’ of the former peat production area, dominated primarily ‘pioneer *Juncus effusus* community’ (pJeff) and ‘dry *Calluna* community’ (dHeath).

An area in the north of Bunahinly was subject to some previous rehabilitation and now comprises a mosaic of pioneering ‘dry *Calluna* community’ (dHeath) with wetter areas dominated by ‘pioneer *Eriophorum angustifolium* community (poor fen)’ (pEang), along with *Sphagnum* mosses (predominantly within blocked drains).

Marginal habitats around the boundaries of Bunahinly-Kilgarvan include raised bog (PB4) remnants, cutover bog (PB1) and woodland/scrub including the communities ‘*Betula-Salix* woodland’ (BirWD), ‘closed *betula* scrub community (C)’ and ‘*Ulex*-dominated community’ (eGor).

The River Shannon and its associated corridor forms the main ecological feature proximal to Bunahinly-Kilgarvan. The habitat corridor which connects Bunahinly and Kilgarvan is subject to periodic flooding from the Shannon during the winter months. A number of tributary watercourses including the Cloonbonny River and the Boor River (along the southern margin) drain Bunahinly-Kilgarvan.

Rehabilitation works commenced at Bunahinly-Kilgarvan in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2022 largely

reflect the baseline status of a recently transformed peat extraction site. The areas of Bunahinly-Kilgarvan that have already begun to establish pioneer vegetation communities will continue to develop post rehabilitation.



Pioneering vegetation on Cutover Bog at Bunahinly.



Rehabilitated cutover Bog at Bunahinly (northern end).



Mosaic of pioneering 'dry Calluna community' (dHeath) with wetter areas dominated by 'pioneer Eriophorum angustifolium community (poor fen)' (pEang) at rehabilitated area of Bunahinly.



Sphagnum mosses developing at the northern end of Bunahinly.



Pioneering Heath along margin of former production area at Kilgarvan.



Bare Peat and extant stock at Kilgarvan.

Vegetation Quadrats – Monitoring YR1

Vegetation quadrats are not included in the scheme monitoring scope for Bunahinly-Kilgarvan Bog.

Breeding Birds – Monitoring YR1

Methods

At Bunahinly-Kilgarvan, two 1km metre transects were selected to provide a representative sample of the breeding bird community. Each transect was placed along an existing headland or rail line corridor for ease of use, but also because these locations will continue to be accessible post rehabilitation, allowing the same route to be repeated. Two visits in the period May to July of 2022 were carried out. See the Appendix B1 figure titled '*Bunahinly-Kilgarvan Bog Ecology Transects*' for transect locations.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with high fields, headlands or rail lines associated with former peat extraction. Due to their location, sampling results may include species which utilise the areas adjacent to transect routes i.e., areas not subject to rehabilitation. Where relevant this is further addressed in the discussion section.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10.00-11.00am). CBS recommended timings are early morning, no later than 9.00am 'ideally' but allowance is made to extend this period for sites which require longer travel times or where access is difficult. CBS recommended survey protocols also specify that the two survey visits be carried out between April and June. The timing of the May visit fell within the CBS recommended period for surveying; however, the second visit was carried out on the 15th of July 2022, which is outside of the recommended survey period. The data from the second survey visit has therefore not been considered as part of the analysis. Surveys were carried out during suitable weather conditions, avoiding heavy rain, poor visibility and strong winds. Any bias on a per species level is discussed further under Discussion, where relevant.

Results- Species Richness

Species richness is presented as the total number of species recorded across transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 11 no. species were recorded, see Table 1.1. This included a single BoCCI (Gilbert *et al.* 2021) Red listed species, Meadow Pipit. Two BoCCI Amber listed species were recorded i.e. Skylark, and Willow Warbler. Remaining species were all Green listed.

Results – Annual Relative Abundance

Annual Relative Abundance (ARA) is presented as the maximum count per species per visit (in this case maximum count per species for the May survey visit), see Table 1.1. This allows for future comparison with CBS trends which takes the same approach to index species.

All species were recorded in relatively low numbers (all less than 9). Overall abundance was highest for Willow Warbler with a maximum of 8 individuals recorded during May. The species with the highest relative abundance associating with cutover habitats was Meadow Pipit (n=7).

Results – Habitat Associations

Habitat associations methodology has already been described within Section 1.2. Four species associated with OPEN habitats, six species associated with NON-OPEN habitats, and one species associated with both were recorded, see Table 1.1.

Results – Colonial Species

No colonies were recorded.

Discussion

It is notable that the single Red listed species recorded, Meadow Pipit, is associated with open habitats targeted for rehabilitation in the form of rewetting and would be expected to gain from many of the measures implemented (fertiliser application to high fields for example). The Amber listed species Willow Warbler associates with drier non-open habitats and had the highest relative abundance overall (n=8). Overall, the total number of species either Red or Amber listed was 3. No evidence of breeding wading species was recorded at Bunahinly-Kilgarvan in 2022.

In general, the abundance estimates reflect the vegetation cover and established marginal habitats i.e., scrub, remnant bog and woodland present at Bunahinly-Kilgarvan, as well as the lack of wetland habitat currently present at the site. In time, the extensive areas of bare peat within the Bunahinly-Kilgarvan bog boundary will provide more suitable habitat for many species. Regarding habitat associations, less than 50% of species recorded are more associated with open habitats; however open habitat species comprise a higher proportion of Red and Amber listed species (4 no. in total), with only one Amber species associated with non-open habitats (Willow Warbler). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland 2009), and this still seems the case. Further analysis on trends in the ratio or relative abundance of these species over time following rehabilitation would be beneficial.

In conclusion, the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds both at Bunahinly-Kilgarvan and across the EDPRS scheme. In time, parts of Bunahinly-Kilgarvan may develop suitable supporting wetland habitat for SCI species of the adjacent Middle Shannon Callows SPA. No significant change in breeding bird species richness and abundance can be attributed to the rehabilitation so far at Bunahinly-Kilgarvan, but rehabilitation measures have consolidated conditions for wetland habitat formation and for other habitat to continue to establish to support breeding bird species.

Table Error! No text of specified style in document.-32: 2022 – Monitoring YR1 Countryside Bird Survey Results

Species	BOCCI status	Habitat association	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	6
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	1
CC Chiffchaff <i>Phylloscopus collybita</i>	Green	NON-OPEN	1
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	1
HC Hooded Crow <i>Corvus cornix</i>	Green	OPEN	5
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	7
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	7
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	2
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	4
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	8

Winter Birds – Monitoring YR1

Method

Five counts within the winter period 2022/23 were conducted. All counts were within the period 10:30 to 16:05. Counts were undertaken generally on days with no rain but on one date showers were noted. Visibility was always moderate and wind speeds ranged from F1-F3. Survey dates were 02 November 2022, 01 December 2022, 17 January 2023, 22 February 2023, 04 April 2023.

Constraints

On several visits EDRSS activities were still ongoing. However, disturbance was restricted to extensive areas of bare peat and the survey results are considered to be representative of the habitats present on site and the time of year. Bunahinly–Kilgarvan bog was not surveyed in October 2022.

Results – Species Richness

A total of 4 water bird species were recorded across all surveys. One of these was a BoCCI (Gilbert *et al.* 2021) Red listed species namely Snipe. Two Amber listed species were recorded namely Mallard, and Teal.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 1.2 and was highest for Snipe (n=2) although all species were recorded in low numbers overall. Average abundance across all 5 counts was <2 for all species.

Results – Habitat Associations

Most birds across all counts were found to associate with habitats present at Bunahinly-Kilgarvan Bog.

Discussion

Overall species richness and abundance is considered to be very low during the period studied given the proximity of Bunahinly-Kilgarvan to Middle Shannon Callows SPA. This is typical of the bare peat

dominated nature of this cutover bog. No counts were recorded as reaching potentially important thresholds for species of conservation concern. No change in species richness and abundance can be attributed to the rehabilitation so far.

Three of the four species recorded were of Red or Amber status. In the context of nearby European Designated Sites (i.e., the nearby Middle Shannon Callows SPA) which have for instance ‘*Wetland and Waterbirds*’ as qualifying interests a post rehabilitation Bunahinly-Kilgarvan may contribute to further supporting habitat for SCI species and thus support the conservation objectives for these European Sites.

Table Error! No text of specified style in document.-33: Winter 2021/22 – Monitoring YR1 I-WeBS Survey Results

Species	BoCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
MA Mallard <i>Anas platyrhynchos</i>	Amber	0	1	0	0	0	0	1	1
T Teal <i>Anas crecca</i>	Amber	0	0	0	2	4	0	1	4
JS Jack Snipe <i>Lymnocyptes minimus</i>	Green	0	1	0	0	0	0	0	1
SN Snipe <i>Galinago galinago</i>	Red	0	0	5	2	3	2	2	5

Pollinators

Pollinators are not included in the scheme monitoring scope for Bunahinly-Kilgarvan Bog.

2. Clooneeny

Clooneeny is a Scheme Year 2 Bog. Habitat mapping was undertaken at the site in 2021 and represents the baseline habitat mapping and associated descriptions pre rehabilitation.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Clooneeny Bog during summer 2021.

Constraints

No constraints were identified, and all parts of the bog were accessible during the surveys.

Results

Clooneeny Bog is located approximately 5km to the west of Longford Town, Co. Longford. The site is located in two separate sections, the former peat production area to the north and a smaller extant section of raised bog (PB1) to the south, which is divided from the former peat production area by the N63 Longford to Roscommon Road.

Clooneeny comprises a total area of 358 ha and the majority of the bog is dominated by 'bare peat (0-50% cover)' (BP) and corresponds to cutover bog (PB4). Some vegetation regeneration has occurred in the formerly active production areas since the cessation of peat production (2018) and a significant area of cutaway has developed into pioneering open habitats and scrub, primarily in elevated shallow peat areas. Natural colonisation of pioneer vegetation communities has progressed quite well across some parts of Clooneeny Bog.

Habitats recorded during summer 2021 (according to the Bord na Móna classification system) predominantly comprised bare peat ('Bare peat (0-50% cover)' or BP), and the pioneer open community, 'Pioneer *Juncus effusus* community' (pJeff). Emergent *Betula*-dominated community (A) (eBir) was frequent in drains in the northern half of the site. A large area dominated by Soft Rush 'Pioneer *Juncus effusus* community' (pJeff) and emergent Birch scrub 'Emergent *Betula*-dominated community (A)' (eBir) is also present in the southeast of the site.

The margins of the site are bordered by habitats such as scrub 'Open *Betula*-dominated community (B)' (oBir), Birch Woodland '*Betula-Salix* woodland' (BirWD), and pioneer *Eriophorum angustifolium* community (poor fen) (pEang), silt ponds (FL8) and agricultural grassland (GA1)/wet grassland (GS4). Drier habitats include pioneer dry heath 'Dry *Calluna* community' (dHeath) (mainly in mosaic with Birch scrub), dry pioneer Purple Moor-grass dominated grassland '*Molinia caerulea*-dominated community' (gMol), calcareous grassland 'Dry calcareous grassland' (gCal) and '*Dactylis-Arrhenatherum* community' (gDact-Arr) particularly along the western boundary of the site.

The southern section of the main production bog contains a relatively large area of remnant raised bog (PB1), '*Sphagnum cuspidatum-Eriophorum angustifolium* community' (PBb). A section in the south of this area of remnant bog was partially drained by a private individual several years ago. Rehabilitation was then carried out by the private individual to block this drainage when this

encroachment was discovered. This area has responded well to rehabilitation and now broadly corresponds to sub-marginal ecotope, with some areas quaking and *sphagnum* rich areas corresponding to sub-central ecotope. Moving north and west of this rehabbed area to bog becomes dryer and corresponds with marginal ecotope. The high bog margins are actively used for domestic turf production and there is extensive cutaway bog along its margins (PB4), that is used as spread ground. Habitats in this area include Bare peat (0-50% cover) (BP), *Molinia caerulea*-dominated community (gMol), emergent *Betula*-dominated community (A) (eBir), open *Betula*-dominated community (B) (oBir) and *Ulex*-dominated community (eGor).

Remnants of raised bog (PB1) are also located around the margins of the northern section of the bog. A strip of raised bog remains along the northern border of the N63. Only a small portion of the original raised bog remains along the north-eastern margins of the bog, and the area is largely cutover bog (PB4) as a result of domestic turf cutting. Areas where more recent cutting has taken place are dominated by bare peat ('Bare peat (0-50% cover)' or BP) with pioneer communities including pioneer *Eriophorum angustifolium* community (poor fen) (pEang) and pioneer *Juncus effusus* community (pJeff). Pioneer open habitats and scrub communities have formed in areas of former turbary that have now revegetated and are in various stages of recolonisation and are vegetated by a mix of 'Open *Betula*-dominated community (B)' (oBir) and Soft Rush 'pioneer *Juncus effusus* community' (pJeff).

A relatively long (1km) travel pass connects Clooneeny Bog with Bagnagh Bog to the west. This pass crosses mineral soil and is fringed with a mix of Scrub (WS1) and Oak Ash Hazel woodland (WN2). This pass crosses a public road and the Fallan River (FW2).

Rehabilitation works commenced at Clooneeny in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site. The areas of Clooneeny that have already begun to establish pioneer vegetation communities will continue to develop post rehabilitation.



Pioneering vegetation on cutaway including Scrub (oBir/cBir) and pioneer Juncus effusus community.



Bare peat (0-50% cover) at Clooneeny.



High Bog at Clooneeny (section south of N63) (July 2021)



Mosaic of Pioneering Grassland and Birch Scrub at Clooneeny Bog (July 2021).

Vegetation Quadrats – Monitoring YR1

Vegetation Quadrats not included in the scheme monitoring scope for Clooneeny Bog.

Winter Birds – Monitoring YR1

Winter bird surveys are not included in the scheme monitoring scope for Clooneeny Bog.

Breeding Birds – Monitoring YR1

Breeding bird surveys are not included in the scheme monitoring scope for Clooneeny Bog.

Pollinators

Pollinators are not included in the scheme monitoring scope for Clooneeny Bog.

3. Killaranny

Killaranny is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Killaranny Bog during summer 2022.

Constraints

The survey work was carried out in accordance with relevant best practice guidelines, and habitats and species on the site were readily identifiable during the field visits. All parts of the bog were accessible during the surveys. No significant constraints or limitations to the YR1 monitoring survey have been identified.

Results

Killaranny is large bog (244 ha) in Co. Offaly that has is now mostly cutaway. A stream dissects the site into two main eastern and western sections, while a bog track further separates the south-western area from the rest of the site.

Killaranny East

The majority of the eastern section of Killaranny is dominated by bare peat ‘Bare peat (0-50% cover)’ (BP), with some development of birch scrub communities, including emergent ‘*Betula*-dominated community (A)’ (eBir) and ‘open *Betula*-dominated community (B)’ (oBir). In the easternmost section of Killaranny bog private turf cutting is ongoing. This area is classified as cutover bog (PB4). The cutover plots are of differing peat depths and are in varying states of use and therefore have formed a mosaic of bare peat and pioneer cutover vegetation communities.

Areas where more recent peat extraction has taken place are dominated by bare peat (‘Bare peat (0-50% cover)’ (BP) with pioneer communities including ‘pioneer *Eriophorum angustifolium* community (poor fen)’ (pEang) and ‘pioneer *Juncus effusus* community’ (pJeff). Grassland, heath, scrub/woodland and wetland communities have formed in areas of former turbary that have now revegetated and are in various stages of recolonisation. Grassland communities include ‘*Anthoxanthum-Holcus-Equisetum* community’ (gAn-H-Eq) and ‘*Molinia caerulea*-dominated community’ (gMol). Heath communities include ‘dry *Calluna* community’ (dHeath). Small wetlands occur in scrubby areas with fen and emergent communities including ‘pioneer *Cladium* community’ (pCladium), ‘*Carex rostrata* community’ (pRos) and ‘*Typha* community’ (pTyp). Woodland and scrub communities occur along the margins of this section and also form a boundary between the central and eastern part of the bog and include ‘*Betula-Salix* woodland’ (BirWD), closed ‘*Betula* scrub community (C)’ (cBir) and ‘*Ulex*-dominated community’ (eGor).

Central Area

The central area of the bog is dominated by cutover bare peat. Some pioneer cutover grassland, poor fen and scrub vegetation communities are establishing along the margins of the former production area, forming mosaics of vegetation communities including ‘*Anthoxanthum-Holcus-Equisetum*

community' (gAn-H-Eq), '*Molinia caerulea*-dominated community' (gMol), 'pioneer *Eriophorum angustifolium* community (poor fen)' (pEang), 'pioneer *Juncus effusus* community' (pJeff) and 'open *Betula*-dominated community (B)' (oBir).

A strip of '*Betula-Salix* woodland' (BirWD) and scrub communities including 'open *Betula*-dominated community (B)' (oBir) and 'closed *Betula* scrub community (C)' (cBir) exists immediately to the west of the silt ponds. An area of remnant raised bog (PB1) occurs along the north-western margin of the central area. The railway track running along the southern boundary of the site is dominated by 'dry calcareous grassland' (gCal).

Southwest Area

The southwestern area of Killaranny is dominated by bare peat, with pioneer poor fen and emergent vegetation communities beginning to form, including 'pioneer *Juncus effusus* community' (pJeff), 'pioneer *Triglochin palustris* community' (pTrig) and '*Phragmites australis* community' (pPhrag). A scrub and grassland mosaic occurs in the eastern part of this area with 'closed *Betula* scrub community (C)' (cBir), '*Molinia caerulea*-dominated community' (gMol) and '*Ulex*-dominated community' (eGor). An area of revegetated cutover occurs along the northern boundary of this area, with communities including '*Molinia caerulea*-dominated community' (gMol), 'dry *Calluna* community' (dHeath) and 'emergent *Betula*-dominated community' (A) (eBir).

Rehabilitation works commenced at Killaranny in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site. The areas of Killaranny that have already begun to establish pioneer vegetation communities will continue to develop post rehabilitation.



Pioneer open habitats 'Molinia caerulea-dominated community' (gMol) and 'pioneer Juncus effusus community' (pJeff) in the central section of Killaranny.



Heath and scrub communities including 'Molinia caerulea-dominated community' (gMol) and 'dry Calluna community' (dHeath) in the northern section



Cutover bog with 'dry Calluna community' (dHeath) and scrub community 'open Betula-dominated community (B)' (oBir) in the central section of Killaranny.



Southwestern area of Killaranny dominated by 'Bare peat (0-50% cover)' (BP) with some development of vegetation in the drains.



Cutover bog (PB4) with dominated by bare peat ('Bare peat (0-50% cover)' (BP) with pioneer communities including 'pioneer Eriophorum



angustifolium community (poor fen)' (pEang) in the eastern section.

Eastern section dominated by bare peat ('Bare peat (0-50% cover)' (BP).

Vegetation Quadrats – Monitoring YR1

Vegetation quadrats are not included in the scheme monitoring scope for Killaranny Bog.

Breeding Birds – Monitoring YR1

Breeding bird surveys are not included in the scheme monitoring scope for Killaranny Bog.

Winter Birds – Monitoring YR1

Wintering bird surveys are not included in the scheme monitoring scope for Killaranny Bog.

Pollinators

Pollinator surveys are not included in the scheme monitoring scope for Killaranny Bog.

4. Begnagh

Begnagh is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Begnagh Bog during summer 2022.

Constraints

No constraints were identified, and all parts of the bog were accessible during the surveys.

Results

Begnagh Bog is large bog (265.1 ha) in Co. Longford that is now mostly cutaway bog (PB4). The bog is bisected into a northern and southern section by a railway line, oriented east to west through the centre of the bog. Begnagh has a pumped drainage system (to be decommissioned on a gradual basis).

The majority of the northern area of Begnagh is dominated by bare peat ('Bare peat (0-50% cover)' or BP), with some sections of more well-developed pioneer vegetation communities occurring where peat extraction ceased due to the shallow nature of the peat or presence of a glacial ridge. An area of exposed glacial sub-soil is also present within the southeast corner of this section that is being colonised predominantly by pioneer poor fen and scrub communities including 'Pioneer *Juncus effusus* community' (pJeff) and Birch (*Betula pubescence*) scrub 'emergent *Betula*-dominated community (A)' (eBir).

A small area of wetland/poor fen occurs in the north-eastern corner of Begnagh with emergent and poor fen communities including '*Carex rostrata* community' (pRos), 'pioneer *Eriophorum angustifolium* community (poor fen)' (pEang) and 'pioneer *Juncus effusus* community' (pJeff) along with scrub community 'emergent *Betula*-dominated community (A)' (eBir).

The majority of the southern section of Begnagh is dominated by bare peat ('Bare peat (0-50% cover)' or BP), with pioneer poor fen, scrub and grassland vegetation communities beginning to establish including 'pioneer *Juncus effusus* community' (pJeff), 'emergent *Betula*-dominated community (A)' (eBir) and '*Anthoxanthum-Holcus-Equisetum* community' (gAn-H-Eq). Small areas of permanent open water (OW) occur in the southern area of this section, with poor fen and emergent wetland communities developing, including 'pioneer *Juncus effusus* community' (pJeff) and '*Triglochin palustris* community' (pTrig). In wetter areas the pioneer poor fen communities appear in mosaics with emergent vegetation communities including pioneering '*Carex rostrata* community' (pRos), '*Typha* community' (pTyp) and pioneer '*Phragmites australis* community' (pPhrag). Willows (*Salix* sp.) and emergent Birch ('emergent *Betula*-dominated community (A)' (eBir)) are also becoming established in this area.

Marginal habitats include remnant Raised bog (PB1), Bog Woodland (WN7), Scrub (WS1) and Wet Grassland (GS4). A number of small remnant Cutaway Bog (PB4) parcels exist at the bog margins and are very degraded, now supporting establishing birch and lodgepole pine woodland (mixed broadleaved/conifer woodland (WD2)). Some of the marginal lands, particularly along the eastern boundary contain dry grassland that supports a diverse range of plants. The Royal Canal flows along the western boundary of the site and the Falan River flows alongside the eastern boundary of the site.

Rehabilitation works commenced at Bagnagh in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2022 largely reflect the baseline status of a recently rehabilitated peat extraction site. The areas of Bagnagh that have already begun to establish pioneer vegetation communities will continue to develop post rehabilitation.



View of the milled peat surface across the north of Bagnagh bog.



View of wetland habitat and emergent vegetation within the south of Bagnagh Bog.



View of wetland habitat and emergent vegetation within the south of Bagnagh Bog.



View of pioneering vegetation on gravel ridge that runs south-east to north-west in the eastern part of Bagnagh Bog.



'Pioneer open habitats and scrub including 'pioneer luncus effusus community' (pJeff) and emergent Birch 'eBir) in the southern lobe.



Open water (OW) occurs in the southern lobe, with emergent vegetation communities including pioneering 'Carex rostrata community' (pRos), 'Typha community' (pTyp).

Vegetation Quadrats – Monitoring YR1

Method

Quadrat monitoring was carried out at Begnagh bog in June 2022 in accordance with agreed EDRRS Monitoring and Verification. 5 no. quadrats were employed.

Constraints

No constraints were noted.

Results

See Table 1 of Appendix D4. All quadrats were taken on the cutover bog (PB4) and are representative of this bare peat dominated peatland. As shown in the quadrat data, all locations sampled contained 100% bare peat, with no vegetation observed, see representative photos below. This is representative of the majority of Begnagh bog, with vegetation restricted largely to drainage ditches, a number of small wetlands within the northeast and south of the bog and some pioneering Downy Birch scrub establishing on shallow peat located on a gravel ridge to the east of the site.

Discussion

As with the description of the habitats above and the accompanying habitat map, the quadrats reflect the current baseline conditions prior to the commencement of restoration at Begnagh bog. Begnagh bog comprises of a relatively large area of bare peat post-industrial peat extraction. Further time is required before any significant changes is likely to be recorded, particularly given the extensive nature of the deep peat measures (DPT4) implemented at this bog. However, subsequent surveys undertaken after the initial quadrat monitoring has shown that the bog has become significantly wetter post rehabilitation/drain blocking.



Begnagh bog Quadrat Q1



Begnagh bog Quadrat Q4

Breeding Birds – Monitoring YR1

Breeding bird surveys are not included in the scheme monitoring scope for Begnagh Bog.

Winter Birds – Monitoring YR1

Method

Six counts within the winter period 2022/23 were conducted. All counts were within the period 13:50 to 16:45. Counts were undertaken generally on days with no rain but on one date occasional showers were noted. Visibility was always good and wind speeds ranged from F1-F5. Survey dates were 27th of October 2022, 15th of November 2022, 21st of December 2022, 20th of January 2023, 15th of February 2023 and 30th of March 2023.

Constraints

No constraints were noted by surveyors.

Results – Species Richness

No waders or wildfowl were recorded during any of the surveys carried out during the winter of 2022/2023.

Results – Abundance

No waders or wildfowl were recorded during winter 2022/2023 surveys.

Results – Habitat Associations

No waders or wildfowl were recorded during winter 2022/2023 surveys.

Discussion

Overall species richness and abundance is considered very low during the period studied, with no wintering waders or wildfowl recorded using the habitats at Begnagh during any of the surveys. This

reflects the baseline bog condition which is dominated by bare peat which offers little or no foraging opportunities for many species of water bird.

In the context of nearby European Sites such as Lough Ree SPA (located approximately 7km south-west of Bagnagh) which has a range of waders and waterfowl, and ‘Wetland and Waterbirds’ listed as special conservation interests, post rehabilitation Bagnagh may contribute to further habitat for SCI species, act as a winter refugium for water birds of conservation concern and support the conservation objectives for this European Sites, although distance may be a limiting factor.

In addition, Ballykenny-Fisherstown Bog SPA is located 300m north of Bagnagh bog and is designated for Greenland White-Fronted Goose (*Anser albifrons flavirostris*). According to the site synopsis (NPWS, 2012), at the time this site was designated it was being used by part of the Loughs Kilglass and Forbes Greenland White-fronted Goose population. However, the geese appear to have since abandoned the peatland sites in favour of grassland sites elsewhere.

In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds at Bagnagh and at other sites in the wider Moundillon area that are also subject to rewetting under the current EDRRS Scheme.

Pollinators YR1

Methods

The pollinator transect survey carried out for Bagnagh in 2022 was 2km long. All surveys were completed between 10:30 and 15:15hrs, when the temperature was at least 13°C and during good weather conditions.

The transect carried out in 2022 commenced at the decommissioned railway at the SE extent, and then veered north, through a high field of the former production field.

Details of the survey effort and weather conditions for surveys carried out in 2022 are shown in Table 4-1 with results provided in Table 4-2.

Table Error! No text of specified style in document.-34 2022– Monitoring YR1 Pollinator Survey Dates and weather

Survey Effort and Weather Conditions- Pollinators	
	July
Average temperature (°C)	28
Wind direction	N/A
Wind speed	F1
Date	22.07.22
Start time	10:30
Finish time	11:00

Constraints

No constraints were identified during the surveys. Weather conditions were optimal during all the surveys.

Results YR1

Table Error! No text of specified style in document.-2: 2022– Monitoring YR1 Pollinator Survey Results

Species	July
Wall brown <i>Lasiommata megera</i>	1
Ringlet <i>Aphantopus hyperantus</i>	6
Green-veined White <i>Pieris napi</i>	1
Orange tip <i>Anthocharis cardamines</i>	1
Large White <i>Pieris brassicae</i>	1
Total	10

Results YR1 – Species Richness

Overall species richness during the 2022 survey was low. A total of five species of butterfly were recorded namely, Wall Brown, Ringlet, Green-veined White, Orange Tip and Large White.

Results YR1 – Abundance

Overall species abundance during the 2022 survey was low. A total of 10 individuals were recorded during the survey. Ringlet occurred in the highest abundance (6 overall).

Results YR1 – Habitat Associations

Overall species richness and species abundance was low during the surveys. This reflects the baseline bog condition which is dominated by bare peat with little vegetation present to provide foraging opportunities for butterfly species.

Discussion

The baseline scenario for Beggagh still reflects habitats comprised largely of bare peat, and on this basis the ongoing monitoring for butterflies and other pollinators may be useful in determining the effects of rehabilitation under the EDRRS scheme on Pollinators. It is possible species richness and abundance may increase in future surveys along the transect route when the rehabilitated area begins to revegetate. The effects of fertiliser application in particular to headlands and high fields may increase the rate of colonisation by some species.

5. Carranstown

Carranstown is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Carranstown Bog during summer 2022.

Constraints

No constraints were identified, and all parts of the bog were accessible during the surveys.

Results

Carranstown is large bog (306.24 ha) located in Co. Westmeath. The majority of the bog corresponds to the Fossitt habitat classification Cutover bog (PB4) and is dominated by bare peat. Some pioneer poor fen/grassland and scrub communities are beginning to develop along the margins of the former production area including pioneer '*Juncus effusus* community' (pJeff), '*Anthoxanthum-Holcus-Equisetum* community' (gAn-H-Eq), '*Molinia caerulea*-dominated community' (gmol), 'emergent *Betula*-dominated community (A)' (eBir), 'open *Betula*-dominated community (B)' (oBir), 'dry *Calluna* community' (dHeath) and 'dense *Pteridium*' (dPter)

Heath and scrub communities occur in the north-west of the bog dominated by 'dry *Calluna* community' (dHeath) with 'open *Betula*-dominated community (B)' (oBir) also present.

There are extensive areas of dry heath ('dry *Calluna* community' dHeath) that remain along the eastern and western margins of Carranstown. These areas were initially developed for milled peat production but have never been put fully into production and now have re-vegetated or have some remnant vegetation dominated by dry heather. Scrub is encroaching into dry heath habitat dominated by 'emergent *Betula*-dominated community (A)' (eBir), 'open *Betula*-dominated community (B)' (oBir) and '*Ulex*-dominated community' (eGor) with Pine (*Pinus* sp.) also becoming established. A large area of remnant raised bog (PB1) occurs along the eastern boundary of Carranstown.

Former cutaway areas associated with domestic turf cutting along the south-eastern and north-eastern margins of the bog have now developed as relatively large areas of '*Betula-Salix* woodland' (BirWD) with mosaics of 'closed *betula* scrub community (C)' and 'dry *Calluna* community' (dHeath).

Two small mineral islands are located on the bog; these areas contain woodland that is dominated by Hazel, Birch and Oak and corresponds to Fossitt habitat Oak-Ash-Hazel woodland (WN2). Mixed broad-leaved/conifer woodland (WD2) occurs along the bog margins.

Rehabilitation works commenced at Carranstown in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site. The areas of Carranstown that have already begun to establish pioneer vegetation communities will continue to develop post rehabilitation.



Pioneering vegetation on cutaway including Scrub and Soft Rush dominated pioneer vegetation (pJeff).



Drone image of extensive Bare Peat cutaway at Carranstown.



Sphagnum recolonization within Dry Heather dominated vegetation (dHeath) at Carranstown.



Birch dominated Bog woodland (WN7/BirWD) and Scrub (WS1/cBir) at Carranstown Bog.

Vegetation Quadrats – Monitoring YR1

Method

Quadrat monitoring was carried out at Carranstown bog on the 22nd of July 2022 in accordance with agreed EDRRS Monitoring and Verification. 6 no. quadrats were employed.

Constraints

No constraints were noted.

Results

See Table 2 of Appendix D4. Four of the six quadrats were taken on the industrially cutover bog and are representative of the bare peat dominated cutover peatland. One quadrat was installed on an area of drained raised bog (PB1) located within the northeast of the bog. A single quadrat (Q6) was

installed within an area of dry Downy birch dominated woodland (WN7), non-Annex I habitat, within the southeast of the bog.

As shown in the quadrat data, the four quadrats located on the former industrially cutover bog were dominated by bare peat (91-100%) with no other vegetation recorded. This is typical of such intensively managed industrial peatlands.

The quadrat located on the drained Raised Bog (PB1) (Q3) also contained a significant proportion of bare peat (34-50%) with the vegetation comprising mainly Ling Heather (*Calluna vulgaris*). Representative photos are provided below. *Sphagnum capillifolium* was also recorded as present in this quadrat (<4% (several individuals)). The quadrat located within the woodland was dominated by Downy birch (*Betula pubescens*), with the understory dominated by Ling Heather and Bramble (*Rubus fruticosus* agg.), with some Gorse (*Ulex europaeus*) and Bracken (*Pteridium aquilinum*). No *Sphagnum* moss was present due to the dry conditions and bryophytes were limited to typical species including *Hypnum jutlandicum* and *Polytrichum commune*.



Carranstown Quadrat Q5



Carranstown Quadrat Q3

Discussion

As with the description of the habitats above and the accompanying habitat map, the quadrats reflect the current baseline conditions prior to the commencement of restoration at Carranstown bog. Carranstown bog comprises of a relatively large area of cutover bog dominated by dry bare peat. Further time is required before any significant changes in the current vegetation composition is likely to be recorded. However, subsequent surveys undertaken since the initial quadrat monitoring has shown that the bog has become significantly wetter post rehabilitation/intensive cell bunding, see representative image below.



Example of pre and post rehabilitation showing significant rewetting (image left taken September 2021 and image right taken March 2023).

Breeding Birds – Monitoring YR1

Breeding bird surveys are not included in the scheme monitoring scope for Carranstown Bog.

Winter Birds – Monitoring YR1

Winter bird surveys are not included in the scheme monitoring scope for Carranstown Bog.

Pollinators

Pollinators are not included in the scheme monitoring scope for Carranstown Bog.

6. Derrinboy

Derrinboy is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Derrinboy Bog during summer 2022.

Constraints

The survey work was carried out in accordance with relevant best practice guidelines, and habitats and species on the site were readily identifiable during the field visits. All parts of the bog were accessible during the surveys. No significant constraints or limitations to the YR1 monitoring survey have been identified.

Results

Derrinboy Bog is located in Co. Offaly. A local road passes through the centre of Derrinboy bog and divides it into two main sections, east and west of the road. Derrinboy comprises a total area of 306 ha and the majority of the bog is dominated by ‘bare peat (0-50% cover)’ (BP) and corresponds to cutover bog (PB4). No significant vegetation regeneration has yet occurred in the formerly active production areas since the cessation of peat production, and habitats of biodiversity interest are therefore largely confined to the margins of the bog.

Small areas of remnant Raised Bog (PB1) and Cutover Bog (PB4) occur around the margins of Derrinboy. Areas of high bog are dry and in poor condition being quite disturbed from the adjacent areas that have been subject to extensive domestic turf cutting. Some of the older cutover bog around the bog margins has revegetated and is now developed Birch-dominated woodland (WN7)/‘*Betula-Salix* woodland’ (BirWD) and Scrub (WS1) vegetation communities including ‘closed *Betula* scrub community (C) (cBir)’, ‘Open *Betula*-dominated community (B) (oBir) and ‘*Ulex*-dominated community’ (eGor). There is also a band of well-established Birch Woodland (WN7) along the southern boundary.

Round-leaved Wintergreen (*Pyrola rotundifolia subsp. rotundifolia*) was recorded at this bog for the first time in 2023 within the north-east of the bog in an area of open scrub and poor fen. This is likely to be the most westerly record of the species in Co. Offaly.

Rehabilitation works commenced at Derrinboy in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site. The areas of Derrinboy that have already begun to establish pioneer vegetation communities will continue to develop post rehabilitation.



Bare peat Derrinboy.



Remnant raised bog (PB1) Derrinboy.

Vegetation Quadrats – Monitoring YR1

Vegetation quadrats are not included in the scheme monitoring scope for Derrinboy Bog.

Breeding Birds – Monitoring YR1

Breeding bird surveys are not included in the scheme monitoring scope for Derrinboy Bog.

Winter Birds – Monitoring YR1

Wintering bird surveys are not included in the scheme monitoring scope for Derrinboy Bog.

Pollinators

Pollinator surveys are not included in the scheme monitoring scope for Derrinboy Bog.

7. Prosperous

Prosperous is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Prosperous Bog during summer 2022.

Constraints

All parts of the bog were accessible during the surveys. No significant constraints or limitations to the YR1 monitoring survey have been identified.

Results

Prosperous is large bog (217.3 ha) in Co. Kildare that is now mostly cutaway. The majority of the site is classified as 'bare peat (0-50% cover)' (BP) as this site was in peat production until 2020. No significant vegetation regeneration has yet occurred in the formerly active production areas, and biodiversity interest is therefore largely confined to the margins of the site.

Remnant raised bog (PB1) remains around the margins of the bog, the largest area of which is in the south-western corner and an additional narrow band (<30m) running along the eastern margins of the former production area. These bog remnants have a typical high bog species assemblage and are dominated with 'Dry *Calluna* community' (dHeath) and are very degraded and dried out.

Cutover bog (PB4) occurs around the margins of the bog. The cutover in the eastern and north-eastern part of the site has been abandoned for some time and has developed some well-developed secondary peatland habitats including dry heather dominated vegetation ('dry *Calluna* community' (dHeath)). Some of these secondary cutover communities could be classified as secondary wet heath (HH3) (or regenerating raised bog community - PB1) due to the presence of *Sphagnum* cover and species assemblages which is similar to that found on raised bogs. There is some active domestic peat-cutting in the south-west corner of the site. This area is dominated by bare peat and corresponds to 'bare peat (0-50% cover)' (BP).

Mature '*Betula-Salix* woodland' (BirWD) and closed '*Betula* scrub community (C)' (cBir) occurs around the margins of the bog. Some treelines (WL2) have been planted in the north-western corner of the site as a shelterbelt. A works area is located along the western edge of the site which corresponds to buildings and artificial surfaces (BL3).

Rehabilitation works commenced at Prosperous in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site. The areas of Prosperous that have already begun to establish pioneer vegetation communities will continue to develop post rehabilitation.



Bare Peat is the main habitat at Prosperous Bog.



Cutover bog along the eastern margin of Prosperous.



Turbary area adjacent to the south-western boundary of Prosperous bog



*Heather (*Calluna vulgaris*) dominated community established on the former cutover areas in the south-east of the site.*

Vegetation Quadrats – Monitoring YR1

Vegetation quadrats are not included in the scheme monitoring scope for Prosperous Bog.

Breeding Birds – Monitoring YR1

Breeding bird surveys are not included in the scheme monitoring scope for Prosperous Bog.

Winter Birds – Monitoring YR1

Wintering bird surveys are not included in the scheme monitoring scope for Prosperous Bog.

Pollinators

Pollinator surveys are not included in the scheme monitoring scope for Prosperous Bog.

8. Lodge

Lodge is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Lodge Bog during summer 2022.

Constraints

A relatively large part of the bog previously recorded as containing remnant high bog, Birch woodland and some scrub along the western margin was gifted to the IPCC by Bord na Mona in 2005. The IPCC are located nearby in Lullymore at the Bog of Allen Nature Centre. This section of bog had been used by the IPCC for amenity and education. It is now managed by the IPCC as a nature reserve and is intensively monitored. There has been some raised bog restoration works including drain blocking and scrub removal since 2005. The IPCC produced a conservation management plan for Lodge Bog in 2011. This area is considered to be outside of the EDRRS with respect to Lodge Bog and was not surveyed during the 2022 survey.

The survey work was carried out in accordance with relevant best practice guidelines, and habitats and species on the site were readily identifiable during the field visits. All parts of the bog within the EDRRS rehabilitation footprint were accessible during the surveys. No significant constraints or limitations to the YR1 monitoring survey have been identified.

Results

Lodge Bog is located adjacent to Lullymore in Co. Kildare and covers an area of 408 ha. The majority of the bog is cutaway dominated by Bare peat (0-50% cover) (BP) and corresponds to the Fossitt habitat classification Cutover bog (PB4). The former production bog is divided into two main sections to the north and south, and these are separated by a headland with a railway orientated southeast-northwest.

Much of the central and western parcels of Lodge bog have developed pioneering cutaway vegetation (production-related cutaway). In some areas within the central and western part of the site, the ends of several production fields have revegetated where peat has been exhausted and the mixed till sub-soil is now exposed. These fields are colonising with a range of pioneer communities, dominated by poor fen.

Vegetation communities recorded during summer 2022 (according to the Bord na Móna classification system) primarily comprise bare peat ('Bare peat (0-50% cover)' or BP), forming mosaics with pioneer poor fen communities including 'Pioneer *Triglochin palustris* community' (pTrig), 'Pioneer *Juncus effusus* community' (pJeff) and 'Pioneer *Eriophorum angustifolium* community' (pEang).

In addition to poor fen habitats, there is also some development of pioneer dry grassland communities in association with drains, high fields and along the central headland adjacent to the railway; these

comprise Sweet Vernal-grass dominated vegetation ('*Anthoxanthum-Holcus-Equisetum* community' (gAn-H-Eq)), 'Dry calcareous grassland' (gCal), rank grassland '*Dactylis-Arrhenatherum* community' (gDact-Arr) and Purple Moorgrass-dominated vegetation '*Molinia caerulea*-dominated community' (gMol). Marsh Helleborine (*Epipactis palustris*) was recorded within vegetation on sub-soil associated with both Purple Moorgrass (*Molinia caerulea*) and the more calcareous grassland community. In places where exposed till is present within the cutaway, the colonising vegetation present corresponds to the '*Tussiligo*-dominated community (vegetation > 50%)' (DisCF).

Some Saw Sedge (*Cladium mariscus*) has colonised the site (at the pump site). This is rare at present but would be expected to spread naturally and is an indicator of calcareous sub-soil and calcareous ground-water influence.

Part of the western margin of Lodge bog has been re-wetted (30 ha) as part of a rehabilitation trial in 2017. Field drains were blocked, edges of high fields re-profiled, berms constructed to increase wetland area and the outfall was modified to raise overall water-levels. This has been quite successful initially at increasing wetland cover and re-wetting cutaway. Within this area standing open water was recorded as 'Permanent pools and lakes' (OW) with associated poor fen communities and emergent communities '*Carex rostrata* community' (pRos) in addition to other pioneer poor fen communities described above.

Large trench drains run north-south through the site. Along high fields, bog margins and some of the drainage ditches within the site, areas of dry heath, bracken and birch scrub mosaics had become established including the communities 'Dense *Pteridium*' (dPter), 'Emergent *Betula*-dominated community (A)' (eBir), 'Open *Betula*-dominated community (B)' (oBir) and 'Dry *Calluna* community' (dHeath). Other marginal peatland habitats include a mosaic of birch woodland (BirWD), active cutover bog (PB4) (used by private turf cutters) and some remnant raised bog (PB1) along the southern margin.

Basil thyme (*Clinopodium acinos*) was noted at a number of locations along the railway track that divides the site and at the southern end of the site. This species is listed on the Flora Protection Order. Basil thyme would not be a typical species of cutaway bog. The exposed gravel along the railway embankments is a perfect habitat for this species.

Rehabilitation works commenced at Lodge in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession, and the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site. It is expected that the overall ecological value of this site will increase in the future as the site re-vegetates, matures and forms semi-natural habitats.



Example of cutaway bare peat occurring within the east of the site.



Example of developing pioneering cutaway vegetation on former cutaway production bog.



Example of large trench drains that run north-south through the site.



Example of remnant sections of raised bog (PB1) occurring within the south and east of the site.

Vegetation Quadrats – Monitoring YR1

Vegetation quadrats are not included in the monitoring scope for Lodge Bog.

Breeding Birds – Monitoring YR1

Methods

At Lodge, two 1 kilometre transects were selected to provide a representative sample of the breeding bird community. Each transect was placed along an existing headland or rail line corridor for ease of use, but also because these locations will continue to be accessible post rehabilitation, allowing the same route to be repeated. Kingfisher surveys were also carried out on the same day as CBS surveys. Two visits in the period April to July of 2022 were carried out. See the Appendix B8 figure titled ‘Lodge Bog Ecology Transects’ for transect locations.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with high fields, headlands or rail lines associated with former peat extraction. Due to their location, sampling results may include species which utilise the areas adjacent

to transect routes i.e., areas not subject to rehabilitation. Where relevant this is further addressed in the Discussion section.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10.00-11.00am). CBS recommended timings are early morning, no later than 9.00am 'ideally' but allowance is made to extend this period for sites which require longer travel times or where access is difficult. The timing of some visits may have exceeded the CBS recommended period for surveying but were complete by 11.00 am and data are considered acceptable for analysis. Any bias on a per species level is discussed further under Discussion, where relevant.

The second visit to this site took place in July and is therefore excluded from the analysis presented in this report.

Results- Species Richness

Species richness is presented as the total number of species recorded across transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 32 no. species were recorded, see Table 8-1. This included three BoCCI (Gilbert *et al.* 2021) Red listed species, Lapwing, Meadow Pipit and Snipe. Five BoCCI Amber listed species namely, Grasshopper Warbler, Linnets, Skylark, Swallow, and Willow Warbler. The remaining 23 species were all Green listed apart from Pheasant which is not assigned a BoCCI status. No Kingfisher was recorded from bespoke transect effort.

Results – Annual Relative Abundance

Annual Relative Abundance (ARA) is presented as the maximum count per species per visit (Early or Late) or as the maximum count for the period April to June inclusive, see Table 8-1. This allows for future comparison with CBS trends which takes the same approach to index species. As the second visit was carried out in July only the first visit is accounted for in this analysis.

Maximum counts of greater than 10 individuals were recorded for six species, Skylark, Willow Warbler, Blackbird, Robin, Chaffinch and Hooded Crow. All remaining species were recorded in low numbers (typically less than 10). Overall abundance was highest for Skylark and Willow Warbler with a maximum of 28 individuals recorded in the May for both species. The species with the highest relative abundance associating with cutover habitats was Skylark (n=28).

Results – Habitat Associations

Habitat association methodology has already been described in section 1.2 of the Annual Monitoring Report.

Thirteen species associated with OPEN habitats, seventeen species associated with NON-OPEN habitats, and two species associated with both OPEN and NON-OPEN were recorded see Table 8-1.

Results – Colonial Species

No colonies were recorded.

Discussion

It is notable that the Red listed species recorded, Meadow Pipit, and the Amber listed species Skylark are associated with open habitats targeted for rehabilitation in the form of rewetting, and would be expected to gain from many of the measures implemented (wetland creation and fertiliser application to high fields for example). The Amber listed species Skylark is associated with open habitats and had a max ARA of 28. Willow Warbler are associated with NON-OPEN habitats and also had an ARA of 28. Swallow are associated with OPEN habitats and have an ARA of 1. Overall, the total number of species either Red or Amber listed was 8.

Regarding wading species, breeding could be considered for Lapwing and Snipe in 2022 but these species were only recorded in May. No other waders were recorded during surveys in May.

In general, the abundance estimates reflect the established and localised area of wetland habitats currently present at Lodge, particularly within the west of the bog, as well as the associated established marginal habitats i.e. scrub, remnant bog and woodland. In time, the extensive areas of bare peat within the Lodge bog boundary will provide more suitable habitat for many species. Regarding habitat associations, over 40% of species recorded are more associated with open habitats. Open habitat species comprise a higher proportion of Red and Amber listed species (7 no. in total), with only one Amber species associated with non-open habitats (Willow Warbler). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland 2009), and this still seems the case. Further analysis on trends in the ratio or relative abundance of these species over time following rehabilitation would be beneficial.

In conclusion, the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds both at Lodge and across the EDRRS scheme. In time parts of Lodge may become an important supporting site for many of the Red and Amber listed species recorded. No significant change in breeding bird species richness and abundance can be attributed to the rehabilitation so far at Lodge, but rehabilitation measures have consolidated conditions for wetland habitat and other habitat to continue to establish to support breeding bird species.

Table Error! No text of specified style in document.-35 : 2022 – Monitoring YR1 Countryside Bird Survey Results

Species	BOCCI 2020 - 2026 status	Habitat association	ARA
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	28
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	28
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	26
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	15
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	13

Species	BOCCI 2020 - 2026 status	Habitat association	ARA
HC Hooded Crow <i>Corvus cornix</i>	Green	OPEN	12
ST Song Thrush <i>Turdus philomelos</i>	Green	NON-OPEN	10
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	10
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	8
CC Chiffchaff <i>Phylloscopus collybita</i>	Green	NON-OPEN	7
LR Redpoll <i>Acanthis cabaret</i>	Green	NON-OPEN	7
PH Pheasant <i>Phasianus colchicus</i>	N/A	OPEN	7
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	6
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	5
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	5
BT Blue Tit <i>Cyanistes caeruleus</i>	Green	NON-OPEN	4
GO Goldfinch <i>Carduelis carduelis</i>	Green	OPEN	4
D. Dunnock <i>Prunella modularis</i>	Green	NON-OPEN	2
GH Grasshopper Warbler <i>Locustella naevia</i>	Amber	OPEN	2
GR Greenfinch <i>Carduelis chloris</i>	Green	NON-OPEN	2
GT Great Tit <i>Parus major</i>	Green	NON-OPEN	2
JD Jackdaw <i>Corvus monedula</i>	Green	NON-OPEN	2
LI Linnet <i>Carduelis cannabina</i>	Amber	OPEN	2
PW Pied wagtail <i>Motacilla alba yarrellii</i>	Green	OPEN	2
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	2
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	1
J. Jay <i>Garrulus glandarius</i>	Green	NON-OPEN	1
L. Lapwing <i>Vanellus vanellus</i>	Red	OPEN	1
RB Reed bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	1
RO Rook <i>Corvus frugilegus</i>	Green	NON-OPEN	1

Species	BOCCI 2020 - 2026 status	Habitat association	ARA
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	1
SN Snipe <i>Gallinago gallinago</i>	Red	OPEN	1

Winter Birds – Monitoring YR1

Wintering bird surveys are not included in the scheme monitoring scope for Lodge Bog.

Pollinators

Methods

A transect (1km in length) was established across part of Lodge to record pollinators, indicator species (Butterflies) and other taxa where relevant. All surveys were completed between 12:00 and 17:00hrs, when the temperature was at least 13°C and during good weather conditions. Pollinator recording followed guidelines set out by the National Biodiversity Bumblebee Monitoring Scheme. A total of 4 visits within the period May 2022 to August 2022 inclusive are herein reported. The transect route is shown in the Figure titled ‘Lodge Bog Ecology Transects’ in Appendix B8.

Constraints

No constraints were identified during the survey. Weather conditions were optimal during all surveys. A survey was not carried out in June; however, two surveys were carried out in July, an early and late survey. These are considered representative of the time of year.

Results – Species Richness

A total of twelve species of butterfly were recorded namely Common Blue, Green-veined White, Large White, Meadow Brown, Orange Tip, Ringlet, Speckled Wood, Small Copper, Small Tortoiseshell, Red Admiral, Cryptic wood-white and Small white.

In addition to butterflies, the following invertebrates were also recorded during the surveys; White-tailed Bumblebee (n = 7), Red-tailed Bumblebee (n = 2), Common darter (n = 2), Common hawkler (n = 1), Brown Hawkler (n = 2), Dronefly (n = 1), Cinnabar moth (n = 1) and Six spot Burnet moth (n = 1).

Results – Abundance

Meadow Brown occurred in the highest abundance (18 overall), with the highest number recorded during the survey in late July. Ringlet and green-veined white were the next most abundantly recorded species with 10 individuals of each species recorded overall. The highest abundance overall per month was recorded in late July (28 individuals).

Results – Habitat Associations

The majority of the transect crosses bare peat, with some section of the transect occurring bare peat that is beginning to develop pioneer vegetation on and in the wider area of the transect. The beginning sections of the transect (SW end) occurs on bare peat with a mosaic of pioneer soft rush (*Juncus*

effusus) and pioneer *Triglochin palustris*-dominated community. Communities occurring towards the end of the transect (NE) include bare peat and Pioneer *Anoxanthum-Holcus-Equisetum* community (gAn-H-Eq).

In general, little or no pollinator activity was clearly associated with bare peat or recently rehabilitated bare peat areas. Species recorded on bare peat sections of the transect were primarily associated with the pioneer vegetation communities.

Table Error! No text of specified style in document.-36: 2022 – Monitoring YR1 Pollinator Survey Dates and weather

Survey Effort and Weather Conditions- Pollinators				
	May	July	July	August
Average temperature (°C)	16	19	24	26
Wind direction	SE	W	SW	W
Wind speed	1	2	1	1
Date	03.05.22	06.07.22	22.07.22	11.08.22
Start time	12:20	14:22	15:50	14:10
Finish time	12:50	14:45	16:42	14:48

Table Error! No text of specified style in document.-37: 2022 – Monitoring YR1 Pollinator Survey Results

Species	May	July	July	August	Total
Common Blue <i>Polyommatus icarus</i>	0	0	1	2	3
Green-veined White <i>Pieris napi</i>	8	0	1	1	10
Large White <i>Pieris brassicae</i>	0	0	6	0	6
Meadow Brown <i>Maniola jurtina</i>	0	0	16	2	18
Orange Tip <i>Anthocharis cardamines</i>	6	0	0	0	6
Ringlet <i>Aphantopus hyperantus</i>	0	9	1	0	10
Speckled wood <i>Pararge aegeria</i>	1	0	0	0	1
Small copper <i>Lycaena phlaeas</i>	0	1	0	1	2
Small tortoiseshell <i>Aglais urticae</i>	0	0	0	3	3
Red admiral <i>Vanessa atalanta</i>	0	0	1	0	1
Cryptic wood white <i>Leptidea juvernica</i>	0	0	2	0	2
Small white <i>Pieris rapae</i>	0	0	0	4	4
Total	15	10	28	13	66

Discussion

The baseline scenario for Lodge still reflects habitats comprised largely of bare peat, and on this basis the ongoing monitoring for butterflies and other pollinators may be useful in determining the effects of rehabilitation under the EDRRS scheme on Pollinators. The effects of fertiliser application in particular to headlands and high fields may increase the rate of colonisation by some species.

9. Derraghan

Derraghan is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Derraghan Bog during summer 2022.

Constraints

No constraints were identified, and all parts of the bog were accessible during the surveys.

Results

Derraghan Bog is a long, relatively narrow section of bog that is located approximately 7km southeast of Lanesborough. The bog is bisected in two parts, a northern and southern section, by a BnM rail line running in an east-west orientation through the site.

The northern section of Derraghan has been almost entirely out of production since 1995. Natural colonisation of pioneer vegetation has progressed well across this part of the bog and the majority of the northern and central sections of the bog have now developed *Betula-Salix* woodland (BirWD). Pockets of open areas of dry heath 'Dry *Calluna* community' (dHeath) occur within the woodland. An area of potential rich fen 'Pioneer *Cladium* community' (pCladium) is located close to the western edge of the woodland. This area is small but has the potential to develop and expand over time.

The northern section of woodland is flanked on both sides by areas that were taken out of production more recently. Bare peat (0-50% cover) (BP) remains in these areas and forms a mosaic with developing pioneer open habitats, grassland and dry heath communities including 'Pioneer *Juncus effusus* community' (pJeff), 'Pioneer *Triglochin palustris* community' (pTrig), 'Pioneer *Eriophorum angustifolium* community' (poor fen) (pEang), '*Molinia caerulea*-dominated community' (gMol), 'Dry *Calluna* Community' (dHeath) and 'Emergent *Betula*-dominated community (A)' (eBir).

The southern third of the site was in active peat production until more recently (2020) and is predominantly bare peat (0-50% cover) (BP) with pioneer open habitats and scrub developing. Communities include 'Pioneer *Juncus effusus* community' (pJeff), and 'Emergent *Betula*-dominated community (A)' (eBir). Other pioneer open habitats, emergent communities and grassland communities forming in this area include 'Pioneer *Triglochin palustris* community' (pTrig), '*Phragmites australis* community' (pPhrag), and '*Anthoxanthum-Holcus-Equisetum* community (gAn-H-Eq). A stand of *Betula-Salix* woodland (BirWD) occurs in the south of this section.

Pockets of remnant raised bog (PB1) occur around the margins of Derraghan. These remnants were in poor condition overall and were dry with a dominance of tall leggy Heather throughout.

The railway line ('access' Acc) bisecting the bog into a northern and southern section is bordered on both sides by a mixture of 'Dry calcareous grassland' (gCal), 'Bare peat (0-50% cover) (BP) and 'Emergent *Betula*-dominated community (A)' (eBir). An ash land-fill site (buildings and artificial

surfaces, BL3) is located close to the middle of the site. This facility was used to store ash that was produced from the nearby power station in Lanesborough.

Rehabilitation works commenced at Derraghan in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site. The areas of Derraghan that have already begun to establish pioneer vegetation communities will continue to develop post rehabilitation.



Pioneering vegetation on cutaway Closed Betula scrub community (C) (cBir) and 'Pioneer Juncus effusus community' (pJeff).



Bare peat and with pioneer vegetation (pEang) developing along drains.



'Pioneer Juncus effusus community' (pJeff), 'Molinia caerulea-dominated community' (gMol) on cutaway in the northern section.



Pioneering scrub and Birch woodland (WN7)

Vegetation Quadrats – Monitoring YR1

Vegetation Quadrats not included in the scheme monitoring scope for Derraghan Bog.

Breeding Birds – Monitoring YR1

Breeding bird surveys are not included in the scheme monitoring scope for Derraghan Bog.

Winter Birds – Monitoring YR1

Winter bird surveys are not included in the scheme monitoring scope for Derraghan Bog.

Pollinators

Pollinators are not included in the scheme monitoring scope for Derraghan Bog.

10. Cloncreen

Cloncreen is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Cloncreen - Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Cloncreen Bog during summer 2022.

Constraints

The survey work was carried out in accordance with relevant best practice guidelines, and habitats and species on the site were readily identifiable during the field visits. All parts of the bog were accessible during the surveys. No significant constraints or limitations to the YR1 monitoring survey have been identified.

Results

Cloncreen Bog is situated approximately 5 km southwest of Edenderry, Co Offaly. Cloncreen bog is part of the within the Allen - Clonsast bog group. The former peat production footprint now comprises bare peat, mosaics of pioneer vegetation and some emergent scrub habitats. Active drainage channels are present on site. Cloncreen Bog is a shallow peat cutaway bog as the majority of the peat has been cutaway. A small former Bord na Mona gravel pit (Rathvilla) is located in the northern section of the site. This gravel pit was located on a large glacial mound that was originally overlain by the bog. This is currently in use again for the construction of Cloncreen wind farm and will be reinstated following completion of the windfarm. An Ash repository facility in the south of the site is used to store ash from the nearby Edenderry power station. This ash repository facility is still in active use.

The majority of the former production bog is now becoming vegetated with pioneer cutaway habitats. There are some sections of older cutaway with Birch scrub (WS1), minor Birch woodland (WN7) and pioneer poor fen (PF2) habitats. The margins around the production bog contain various habitats including active cutover bog (PB1), birch scrub and woodland (WN7), and small remnant patches of high bog (PB1).

Poor fen communities on site are generally dominated by 'Pioneer *Juncus effusus* community' (**pJeff**) or 'Pioneer *Eriophorum angustifolium*' (**pEang**) community, in association with bare peat. Some small patches of poor fen are dominated by Pioneer '*Triglochin palustris*' (**pTrig**) community in association with the other plant communities and some minor cover of reedmace '*Typha* community' (**pTyp**). The majority of the south-eastern section of the site is also largely re-vegetated with scrub and poor fen vegetation. A small section of the south-eastern corner had been planted with a mixture of broad-leaved and conifer trees (WD2). However, a section of this had been recently cleared to make way for a power line.

The boundary of Cloncreen is typically surrounded by a narrow fringe of birch woodland '*Betula-Salix* woodland' (**BirWD**), birch scrub '*Closed Betula* scrub community (C)' (**cBir**) and remnant patches of high bog (PB1). There are also some sections of intact high bog remnants dominated by heather along the margins that are now quite narrow and being dried out and colonised by trees and scrub. Pockets of established Birch woodland '*Betula-Salix* woodland' (**BirWD**) occur along the western boundary of the site. The largest of these is located in the northwest corner of the site. These sections of woodland

were well developed and were dominated by Scot's pine, along with birch, oak, Rowan (*Sorbus aucuparia*) and holly.

An Ash repository facility in the south of the site is used to store ash from the nearby Edenderry power station. This facility contains several cells of varying age. Two of these cells have now been capped and have re-vegetated with grassland and scrub. A mixture of habitats occur around the repository including scrub and grassland.

A small former Bord na Mona gravel pit (Rathvilla) is located in the northern section of the site. The gravel pit was located on a large glacial mound that was originally overlain by the bog. A large depression has now been created, partially filled with water, and is developing as a lake with a fringe of emergent vegetation dominated by Reedmace 'Typha community' (pTyp). This is surrounded by banks of scrub (WS1), patches of bracken 'Dense *Pteridium*' (dPter), disturbed vegetation 'Tussiligo-dominated community (vegetation > 50%)' (DisCF), 'Epilobium-dominated community (vegetation > 50%)' (DisWil) and exposed gravel (ED1).

Rehabilitation works under EDRRS commenced at Cloncreen in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession, and the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site, albeit with relatively well-developed recolonising habitats in some areas given that the site underwent partial rehabilitation in 2005-2006, with additional measures also implemented in 2015 and 2018. It is expected that the overall ecological value of this site will increase in the future as the site continues to re-vegetate, mature and form semi-natural habitats. Recent site visits indicate that significant rewetting has been achieved in areas previously dominated by bare peat and pioneering poor fen vegetation. This rewetting will further stabilise the cutover bog and accelerate the formation of secondary habitats such as poor fen.

Vegetation Quadrats – Monitoring YR1

Vegetation Quadrats not included in the scheme monitoring scope for Cloncreen Bog.

Breeding Birds – Monitoring YR1

Breeding bird surveys are not included in the scheme monitoring scope for Cloncreen Bog.

Winter Birds – Monitoring YR1

Winter bird surveys are not included in the scheme monitoring scope for Cloncreen Bog.

Pollinators

Pollinators are not included in the scheme monitoring scope for Cloncreen Bog.

11. Timahoe South

Timahoe South is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Timahoe South Bog during summer 2022.

Constraints

The area proposed for rehabilitation in this phase excludes two large areas of land in the northwest and in the west of Timahoe South. The results of the habitat surveys exclude the habitats found within these areas. No significant constraints or limitations to the YR1 monitoring survey have been identified.

Results

Timahoe South is a large bog (approx. 1700 ha) in Co. Kildare that comprises mostly cutaway; industrial peat extraction at the site ceased 30-40 years ago, allowing the majority of the cutaway to revegetate with a mosaic of habitats in this period.

The majority of the bog has already re-vegetated, although habitat development is at different stages, and there is still some bare peat associated with turf cutting. Most habitats present at Timahoe South are secondary habitats that have developed from bare peat after peat extraction ceased, or residual/remnant habitats that were present or have developed around the margins of the former industrial peat extraction area.

Dry heather-dominated communities on cutaway bog (HH1/PB4) have developed over large areas of Timahoe South, mainly in mosaic with areas of 'Pioneer *Eriophorum angustifolium* community (poor fen)' (pEang) and also with various stages of scrub (WS1). This is equivalent to *Calluna vulgaris* cutover bog (LS1) (Smith & Crowley 2020). In most areas where this habitat occurs trees are establishing, forming scrub mosaics, reflecting the generally drier conditions.

Birch scrub (WS1) is present at emergent, open and closed stages of development with communities including 'Emergent *Betula*-dominated community (A)' (eBir), 'Open *Betula*-dominated community (B)' (oBir) and 'closed *Betula* scrub community (C)' (cBir). Some sections have developed sufficiently to be classified as Birch woodland (WN7) – '*Betula-Salix* woodland' (BirWD). Some of the best developed woodland is found along the main drains that have been wooded for some time.

Some areas of bare peat remain and are generally recolonising with Poor fen (PF2) vegetation including comprising 'Pioneer *Eriophorum angustifolium* community (poor fen)' (pEang). This is generally equivalent to *Eriophorum angustifolium* cutover bog (LS2) (Smith & Crowley 2020). One feature of interest is the presence also of more typical bog species such as White Beak Sedge (*Rhynchospora alba*) and Hare's-tail Bog Cotton (*Eriophorum vaginatum*) indicating the presence of

more acidic peat than typical of cutaway sites. Some of these areas had well developed hummocks of *Sphagnum spp.* present especially where ground conditions are wetter.

Some areas of *Sphagnum*-rich vegetation have already developed in localised basins where drainage was naturally impeded. Embryonic bog communities (PBc) are developing in several small wet hollows and old riparian zones towards the west side of the site. Communities included pioneer *Eriophorum angustifolium* community (acidic) (PBa) and *Sphagnum cuspidatum*-*Eriophorum angustifolium* community (PBb). This habitat was dominated by Common Bog Cotton (*Eriophorum angustifolium*) around the margins with significant emergent re-wetted vegetation. However, associated with it were fringing carpets of *S. cuspidatum* and other typical raised bog species such as Cross-leaved Heath (*Erica tetralix*), Hare's-tail Bog Cotton (*Eriophorum vaginatum*), *Polytrichum spp.* and White-beaked Sedge (*Rhynchospora alba*). There are some extensive and well-developed hummocks of *S. palustre* associated with these areas in the drier sections as well as *S. subnitens* and *S. papillosum*. This community seems quite well-developed. This is generally equivalent to high *Sphagnum* or Moderate *Sphagnum* habitat types described by Smith and Crowley 2020) (e.g. *Sphagnum cuspidatum*–*Eriophorum vaginatum* cutover bog - HS2).

Other communities present include more typical pioneer poor fen (PF2) with pioneering rush and sedge dominated cutaway communities including 'Pioneer *Juncus effusus* community' (pJeff) and 'Carex rostrata community' (pRos). Areas of open water and wetland are currently limited at this site; however areas of 'Temporary open water' (tOW) are present in some areas; these have poor fen wetland communities associated with them including 'Pioneer *Juncus effusus* community' (pJeff) and 'Pioneer *Eriophorum angustifolium* community (poor fen)' (pEang), as well as the emergent wetland communities 'Carex rostrata community' (pRos), 'Typha community' (pTyp) and 'Phragmites australis community' (pPhrag).

Grassland habitats are present along the main railway embankments which occur through the site and include 'Dactylis-Arrhenatherum community' (gDact-Arr) and 'Molinia caerulea-dominated community' (gMol) which forms a transitional zone between the embankments and the cutaway in these areas. This community is also present on some low mounds within the site, as is 'Dense *Pteridium*' (dPter).

Timahoe South Bog was originally drained by a series of wide trench drains which are classified as 'Riparian areas (drains with associated edge habitat)' (RIP) and are fringed by Scrub (WS1) and Birch Woodland (WN7). Areas of remnant raised bog (PB1) occur around the margins of Timahoe. Active turf cutting is encroaching on these areas and there are also extensive areas of cutover bog (PB4).

Rehabilitation works commenced at Timahoe South in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession, and the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site. Extensive areas of Timahoe South already have well established pioneer vegetation including dry heath, fen and Birch woodland/scrub. Fen and wetland habitats will continue to spread and develop post rehabilitation as the implemented measures have consolidated wetland conditions across the majority of the site. It is expected that the overall ecological value of this site will increase in the future as the site continues to re-vegetate, mature and form semi-natural habitats.



Poor fen (PF2) on Cutover Bog at Timahoe South with 'Pioneer Juncus effusus community' (pJeff) and 'Pioneer Eriophorum angustifolium community (poor fen)' (pEang).



Embryonic (Sphagnum-rich) peat-forming habitat at Timahoe South - Sphagnum cuspidatum-Eriophorum angustifolium community (PBb).



Recolonising Trackway with grassland community 'Dactylis-Arrhenatherum community' (gDact-Arr).



Typical Recolonised Cutover at Timahoe South.

Vegetation Quadrats – Monitoring YR1

Vegetation quadrats are not included in the scheme monitoring scope for Timahoe South Bog.

Breeding Birds – Monitoring YR1

Breeding bird surveys are not included in the scheme monitoring scope for Timahoe South Bog.

Winter Birds – Monitoring YR1

Wintering bird surveys are not included in the scheme monitoring scope for Timahoe South Bog.

Pollinators

Pollinator surveys are not included in the scheme monitoring scope for Timahoe South Bog.

12. Bloomhill

Bloomhill is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Bloomhill Bog during summer 2022.

Constraints

The survey work was carried out in accordance with relevant best practice guidelines, and habitats and species on the site were readily identifiable during the field visits. Some areas are not safe for access due to standing water or soft conditions and have to be avoided. However, this is not thought to have affected survey results however as there are still high fields present which can be used for access and these areas are at present entirely bare peat with little to no vegetation present.

Results

Bloomhill Bog is located in Co. Offaly, approximately 4km south-west of Ballynahown in County Offaly. Some sections of Bloomhill Bog are already rehabilitated/stabilised. The River Shannon flows within 0.5 km of the western edge of the site. The site is dominated by bare peat. Several areas of remnant raised bog remain along the margins of the site. These areas are small, fragmented and quite degraded. There are also areas of scrub, immature woodland and mature birch dominated woodland in the site margins.

Bloomhill bog can be sub-divided into four main sections for the purpose of reporting, east, north and two distinct sections to the south. One southern section is directly connected to the larger former production area. The second southern section (referred to hereafter as the Bloomhill extreme south) is situated further to the south and west of the main Bloomhill bog ring. It is connected to the main body of the site via machine pass and railway. It contains a large portion of remnant raised bog and a smaller former production area. There are some drainage ditches in the western portion of this bog but by in large it was never developed for peat harvesting. A small portion of the Bloomhill extreme south section in the east was developed and used for peat harvesting. This is now largely a bare peat former production area surrounded by a thin, degraded ring of bog remnant. A number of small water bodies pass through or in close proximity to the site. The Boor River passes along the northern boundary of the former production area. The Curraghboy River and a tributary of the same pass through the south of the site. The River Shannon passes within 0.5Km of the western boundary of the site.

The majority of the former production bog is currently featureless bare peat. Some pioneer vegetation communities are starting to develop in areas that have been out of production for some time. The margins of the BnM property include some habitat areas including remnant raised bog (PB1), scrub 'Emergent *Betula*-dominated community (A) (eBir), 'Open *Betula*-dominated community (B) (oBir), 'Closed *Betula* scrub community (C)' (cBir), and Bog woodland '*Betula-Salix* woodland' (BirWD).

Bloomhill East

The eastern lobe of Bloomhill Bog is dominated by bare peat habitats ('Bare peat (0-50% cover)' or BP). Some small waterbodies have developed in topographical depressions (Permanent pools and lakes' (OW). Open pioneer cutaway vegetation communities including 'Pioneer *Eriophorum angustifolium* community (poor fen)' (pEang), 'Pioneer *Juncus effusus* community' (pJeff), 'Emergent *Betula*-dominated community (A)' (eBir) are developing in wet areas and close to some drains. The margins of the eastern lobe of Bloomhill bog are dominated by scrub habitats such as 'Closed *Betula* scrub community (C)' (cBir) or 'Open *Betula*-dominated community (B)' (oBir), '*Molinia caerulea*-dominated community' (gMol), and some more mature woodland habitats '*Betula-Salix* woodland' (BirWD), '*Ulex*-dominated community' (eGor) and mixed broadleaved/conifer (WD2) woodland. Silt ponds are present and riparian vegetation has developed around them. Some small, degraded bog remnants exist in parts of the margins of the eastern lobe of Bloomhill Bog with 'Dry *Calluna* community' (dHeath) and 'Open *Betula*-dominated community (B)' (oBir) vegetation.

Bloomhill North

The northern area of the bog is dominated by cutover bare peat 'Bare peat (0-50% cover)' (BP). Some pioneer cutover vegetation and scrub communities 'Open *Betula*-dominated community (B)' (oBir), 'Pioneer *Juncus effusus* community' (pJeff) and '*Ulex*-dominated community' (eGor) are establishing in the west of this portion of the site. Two silt ponds and the associated riparian vegetation (Rip) communities exist in the extreme northeast and southwest, with scrub habitats 'Open *Betula*-dominated community (B)' (oBir), and '*Ulex*-dominated community' (eGor) occurring outside the zones frequently worked for silt pond maintenance. Wetland communities are emerging in the western section of the northern lobe containing '*Phragmites australis* community' (pPhrag), 'Typha community' (pTyp) and 'Pioneer *Juncus effusus* community' (pJeff). Pioneer open habitats and scrub communities 'Pioneer *Juncus effusus* community' (pJeff), 'Pioneer *Triglochin palustris* community' (pTrig), 'Closed *Betula* scrub community (C)' (cBir) are also present in this section. Heath and scrub communities exist along the southern border of the northern section with 'Dry *Calluna* community' (dHeath), '*Molinia caerulea*-dominated community' (gMol), '*Ulex*-dominated community' (eGor) and 'Open *Betula*-dominated community (B)' (oBir). Fen communities comprising of 'Pioneer *Triglochin palustris* community' (pTrig), 'Typha community' (pTyp) and 'Open *Betula*-dominated community (B)' (oBir) are emerging in the eastern section of the northern lobe.

Bloomhill South

The southwest area of the bog is dominated by bare peat 'Bare peat (0-50% cover)' (BP). In some areas close to drains and areas where surface water is present in topographical hollows, pioneering open habitat and fen vegetation communities including 'Pioneer *Eriophorum angustifolium* community (poor fen)' (pEang), '*Phragmites australis* community' (pPhrag), 'Pioneer *Triglochin palustris* community' (pTrig) are establishing. Small, degraded bog remnants exist along the margins of this section. To the north of the southern portion of the bog, well developed mosaics of wet woodland/scrubland 'Closed *Betula* scrub community (C)' (cBir), '*Ulex*-dominated community' (eGor) Open *Betula*-dominated community (B)' (oBir). can be found. There are also silt ponds (no. -7) in this area surrounded by scrubby grassland '*Anthoxanthum-Holcus-Equisetum*' community (gAn-H-Eq) habitats. Some patches of drier woodland/scrubland and acid grassland '*Molinia caerulea*-dominated community' (gMol) can be found in higher areas. A canalised stream flows through the central area of the southern portion of the bog. This is fringed by scrub and stands of dense bracken 'Dense *Pteridium*'

(dPter). In the western region of the southern section a mosaic of woodland, scrub and heavily degraded remnant bog exists (PB1). This area has been subject to private turf cutting in the past. The railway track running along the site boundary is dominated by calcareous grassland 'Dry calcareous grassland' (gCal) and scrub habitat. A small lobe of the bog occurs at the extreme southwest and is dominated by bare peat 'Bare peat (0-50% cover)' (BP) in the former production area with raised bog (PB1), cutover bog (PB4), scrub (WS1) and wet grassland (GS4) around the margins.

It is too soon for habitats at Bloomhill to reflect post rehabilitation change or vegetation/habitat succession. Extensive areas of Bloomhill already have well established pioneer vegetation including Reedbeds, fen and Birch woodland/scrub. The habitats will continue to develop post rehabilitation as the implemented measures have consolidated wetland conditions across the majority of the site.



Sphagnum mounds present in remnant high bog in Bloomhill



View of typical silt ponds in Bloomhill



View of wetland at Bloomhill



Bare peat and wetland habitat at Bloomhill former production area

Vegetation Quadrats – Monitoring YR1

Vegetation quadrats are not included in the scheme monitoring scope for Bloomhill Bog.

Breeding Birds – Monitoring YR1

Methods

At Bloomhill, three 1km transects were selected to provide a representative sample of the breeding bird community. Each transect was placed along an existing headland or rail line corridor for ease of

use, but also because these locations will continue to be accessible post rehabilitation, allowing the same route to be repeated. Two visits in the period May to June of 2022 were carried out. See the Appendix B12 figure titled 'Bloomhill Bog Ecology Transects' for transect locations.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with high fields, headlands or rail lines associated with former peat extraction. Due to their location, sampling results may include species which utilise the areas adjacent to transect routes i.e., areas not subject to rehabilitation. Where relevant this is further addressed in the discussion section.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10.00-11.00am). CBS recommended timings are early morning, no later than 9.00am 'ideally' but allowance is made to extend this period for sites which require longer travel times or where access is difficult. The timing of some visits may have exceeded the CBS recommended period for surveying but were complete by 11.00am and data are considered acceptable for analysis. All surveys were carried out during suitable weather conditions, avoiding heavy rain, poor visibility and strong winds. Any bias on a per species level is discussed further under discussion, where relevant.

Results- Species Richness

Species richness is presented as the total number of species recorded across transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 22 no. species were recorded, see Table 12-1. This included two BoCCI (Gilbert *et al.* 2021) Red listed species i.e., Lapwing and Meadow Pipit. Four BoCCI Amber listed species were recorded: Mallard, Skylark, Swallow and Willow Warbler. Remaining species were all Green listed apart from Pheasant which is not assigned a BoCCI status.

Results – Annual Relative Abundance

Annual Relative Abundance (ARA) is presented as the maximum count per species across visits (Early or Late) or as the maximum count for the period April to June inclusive, see Table 12-1. This allows for future comparison with CBS trends which takes the same approach to index species.

Maximum counts of greater than 10 individuals were recorded for 3 species i.e., Mallard, Robin and Willow Warbler. All remaining species were recorded in low numbers (typically less than 6). Overall abundance, and relative abundance associating with cutover habitats, was highest for Mallard with a maximum of 24 individuals recorded in the period May to June.

Results – Habitat Associations

Habitat associations methodology has already been described within Section 1.2. Ten species associated with OPEN habitats, eleven species associated with NON-OPEN habitats, and one species associated with both were recorded, see Table 12-1.

Results – Colonial Species

No colonies were recorded.

Discussion

It is notable that the two Red listed species recorded, Lapwing and Meadow Pipit are both associated with open habitats targeted for rehabilitation in the form of rewetting, and would be expected to gain from many of the measures implemented (wetland creation and fertiliser application to high fields for example). The Amber listed species, mallard also associates open habitats, and had the highest relative abundance overall (n=24). Overall, the total number of species either Red or Amber listed was 6. Although no dedicated breeding wader surveys were undertaken for the bog, breeding is considered likely for Lapwing, which was recorded at Bloomhill in 2022. Mallard were also considered to be breeding within the bog.

In general, the abundance estimates reflect the vegetation cover and established marginal habitats i.e., scrub, remnant bog and woodland present at Bloomhill, as well as the limited wetland habitats currently present. In time, the extensive areas of bare peat within the Bloomhill bog boundary will provide more suitable habitat for many species. Regarding habitat associations, just under 50% of species recorded are more associated with open habitats. Open habitat species comprise a higher proportion of Red and Amber listed species however (4 no. in total), with only one Amber species associated with non-open habitats (Willow Warbler). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland, 2009), and this still seems the case. Further analysis on trends in the ratio or relative abundance of these species over time following rehabilitation would be beneficial.

In conclusion, the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds both at Bloomhill and across the EDRRS scheme. In addition, the occurrence at Bloomhill of many of the species described here is notable given the proximity of the adjacent European Site (the Middle Shannon Callows SPA) which includes ‘*Wetlands and Waterbirds*’, along with species such as Lapwing amongst its Special Conservation Interests. In time parts of Bloomhill may become an important supporting site for SCI species of this SPA. No significant change in breeding bird species richness and abundance can be attributed to the rehabilitation so far at Bloomhill, but rehabilitation measures have established conditions for wetland habitat to further develop and other habitat to continue to establish to support breeding bird species.

Table Error! No text of specified style in document.-38: 2022 – Monitoring YR1 Countryside Bird Survey Results

Species	BOCCI status	Habitat association	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	7
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	9
BZ Buzzard <i>Buteo buteo</i>	Green	OPEN	2
CC Chiffchaff <i>Phylloscopus collybita</i>	Green	NON-OPEN	6
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	5
D. Dunnock <i>Prunella modularis</i>	Green	NON-OPEN	5
JS Jack Snipe <i>Lymnocyptes minimus</i>	Green	OPEN	1

Species	BOCCI status	Habitat association	ARA
L. Lapwing <i>Vanellus vanellus</i>	Red	OPEN	3
LT Long-tailed Tit <i>Aegithalos caudatus</i>	Green	NON-OPEN	1
MA Mallard <i>Anas platyrhynchos</i>	Amber	OPEN	24
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	0
PH Pheasant <i>Phasianus colchicus</i>	N/A	OPEN	1
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	13
RO Rook <i>Corvus frugilegus</i>	Green	NON-OPEN	5
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	1
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	4
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	3
ST Song Thrush <i>Turdus philomelos</i>	Green	NON-OPEN	1
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	4
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	3
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	10
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	21

Winter Birds – Monitoring YR1

Method

Five counts within the winter period 2022/23 were conducted. All counts were within the period 10:30 to 17:10. Counts were undertaken generally on days with no rain but on one date showers were noted. Visibility was always moderate and wind speeds ranged from F1-F3. Survey dates were 02 November 2022, 01 December 2022, 17 January 2023, 22 February 2023, 04 April 2023.

Constraints

No constraints were identified, and all part of the bog were accessible during the surveys.

Results – Species Richness

A total of 2 water bird species were recorded across all surveys: Lapwing and Snipe. Both of these species are BOCCI (Gilbert *et al.* 2021) red listed.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 12.2 and was highest for Lapwing (n=6). Snipe were only recorded on one survey, a total of three birds were recorded on that occasion.

Results – Habitat Associations

Both species were found to associate with habitats present at Bloomhill Bog. Both species were only recorded on site sporadically. Lapwing were recorded on Bloomhill in the months of December, January and February. Snipe were recorded on site in November.

Discussion

Only two species were recorded, Snipe and Lapwing, both of which are BOCCI red listed (Gilbert *et al.* 2021). Overall, species richness and abundance is considered very low during the period studied. No counts were recorded as reaching potentially important thresholds for species of conservation concern.

This reflects the baseline bog condition, which is dominated by bare peat, with only small wetlands on the bog, which offer little foraging opportunities for many species of water bird. It is too early for to see the results of the EDRRS rehabilitation at this stage and no change in species richness and abundance can be attributed to the rehabilitation so far.

There are a number of EU designated sites in proximity to Bloomhill. Middle Shannon Callows SPA partially overlaps part of the western boundary of Bloomhill. Lough Ree SPA is located approximately 8km upstream of Bloomhill. Lapwing are listed as a special conservation interest of both of these SPAs. In addition, '*Wetland and Waterbirds*' are also listed as SCIs of these EU designated sites.

These nearby European Sites have a range of waders and waterfowl, and '*Wetland and Waterbirds*' listed as special conservation interests (NPWS, 2022a). Post rehabilitation Bloomhill may contribute to further habitat for SCI species, act as a winter refugium for water birds of conservation concern, although distance may be a limiting factor in the case of Lough Ree SPA.

A significant part of Bloomhill is expected to develop as wetland habitat (76 ha), the extent of which will be determined by seasonal inundation and by enhanced measures on shallow cutaway peat. Water levels will be optimised to create emergent cutaway wetland vegetation. The improved condition of the bog and new vegetation will support and improve the status of wintering waders and waterfowl species such as Lapwing, and Snipe, which have habitat preferences for wet cutaway vegetation. In time parts of Bloomhill may become an important supporting site for SCI species of the aforementioned SPAs. Post rehabilitation Bloomhill may support the conservation objectives for these European Sites, in particular in conjunction with the adjacent Bogs which are being rehabbed under PCAS.

The data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds at this site.

Table Error! No text of specified style in document.-39: Winter 2022/23 – Monitoring YR1 IWeBS Survey Results

Species	BOCCI 2020 - 2026 STATUS	Oct	Nov	Dec	Jan	Feb	Mar	Mean	Maximum
SN Snipe <i>Galinago galinago</i>	Red	0	3	0	0	0	0	1	3
L Lapwing <i>Vanellus vanellus</i>	Red	0	0	8	15	12	0	6	15

Pollinators

Pollinators are not included in the scheme monitoring scope for Bloomhill Bog.

13. Derryfadda

Derryfadda is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for species surveys for this bog. Baseline habitat mapping and assessment was undertaken in 2021 in advance of rehabilitation.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Derryfadda Bog during summer 2021.

Constraints

The area proposed for rehabilitation in this phase consists of two discrete parcels of land within the wider Derryfadda Bog boundary; a northern and southern subsection which are approximately 3.3km apart. The results of the habitat surveys discuss the habitats found within these two parcels of land only. No constraints were identified, and all lands within these areas were accessible during the surveys.

Results

Derryfadda Bog is large bog (610 ha) located on the banks of the River Suck, in Co. Roscommon, that is now mostly cutaway. Only two discrete sub-sections of Derryfadda Bog are included in the EDRRS 2022 extent; a northern sub-section, which is bounded on its north/north-eastern boundary by the River Suck, and a southern sub-section which lies 3.3km south. The southern subsection has generally a north-south orientation and the River Suck flows outside its eastern boundary. Derryfadda bog forms part of the flood plain of the River Suck, regularly flooding during winter and occasionally at other times when the water levels on the river are high.

Habitats are hereafter described in respect of the northern and southern sub-section of the proposed 2022 EDRRS extent.

Northern section

The majority of this section of Derryfadda is now cutaway bog (PB4) and is dominated by bare peat ('Bare peat (0-50% cover)' or BP). Development of vegetation on the former production area is negligible and is generally localised to scattered pioneer species and localised to drainage ditches. Marginal habitats include conifer woodland (WD4) fringing the former production area, Riparian Woodland (WN5) and Wet Grassland (WS4) as callows along the River Suck (Depositing River (FW2)). Bog woodland (WN7) occurs along the western bog margin.

Southern section

The majority of this section is dominated by bare peat (0-50% cover) (BP), although there is some minor development of pioneer vegetation particularly along headlands and high fields. Pioneer open communities include 'pioneer *Juncus effusus* community' (pJeff), 'pioneer *Eriophorum angustifolium* community (poor fen)' (pEang). Pioneer 'dry *Calluna* community' (dHeath) is forming along high fields.

A strip of pioneer grassland '*Anthoxanthum-Holcus-Equisetum* community' (gAn-H-Eq) occurs in the eastern part of the bog.

Areas of 'temporary open water' (tOW) have also formed in this subsection, with development of emergent vegetation '*Phragmites australis* community' (pPhrag).

The Killaderry stream (a Lowland River (FW2)) flows through this section of the site. This stream is mainly bounded by Scrub (WS1) and Wet Grassland (GS4). Habitats along the margins of this section of Derryfadda include dry heather dominated vegetation 'Dry *Calluna* community' (dHeath) and '*Molinia caerulea*-dominated community (gMol). Birch woodland (WN7), Riparian Woodland (WN5), Scrub (WS1), remnant sections of Raised Bog (PB1), Lowland Depositing River (FW2) and Wet Grassland (GS4) also occur along the bog margins. The Wet Grassland (GS4) adjacent to the River Suck is callows grassland and is managed for agriculture by local farmers.

Rehabilitation works commenced at Derryfadda in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2021 largely reflect the baseline status of a recently transformed peat extraction site. The areas of Derryfadda that have already begun to establish pioneer vegetation communities will continue to develop post rehabilitation.



Bare peat with temporary open water in the northern section of the site.



Northern section dominated with Bare peat with sparse development of vegetation..



Pioneer grassland (gDact-Arr) in the southern sub-section of Derryfadda.



'Phragmites australis community' (pPhrag) in the southern sub-section of Derryfadda.



Temporary open water (tOW) and Bare peat in the southern section of Derryfadda.



Bare peat in the southern section.

Vegetation Quadrats – Monitoring YR1

Vegetation quadrats are not included in the scheme monitoring scope for Derryfadda Bog.

Breeding Birds – Monitoring YR1

Methods

Breeding bird surveys utilised a transect method generally following the existing Countryside Bird Survey or CBS (Lewis et al. 2019). At Derryfadda, two, 1km in length, transects were selected to provide a representative sample of the breeding bird community. Each transect was placed along existing travel paths of 'headlands' for ease of use but also because these locations will continue to be accessible post rehabilitation, allowing the same route to be repeated.

An early (April to mid-May) and late (mid-May to late June) season visit was conducted. The early season visit was carried out on May 12th, 2022 and covered the period 07:20 to 08:57. Conditions were amenable to recording birds with medium cloud cover, light wind and zero rain. Visibility was good. The late season visit took place on June 16th, 2022 and covered the period 09:28 to 11:27. Conditions were amenable but with occasional showers. Cloud cover was medium, and winds were light, with good visibility.

Each transect was walked by a single observer equipped with binoculars and bird species registered in line with CBS Guidelines (e.g., no juvenile birds were recorded, any colonies were recorded separately etc.). Transect locations are shown in the figure titled 'Derryfadda Bog Ecology Transects' within Appendix B13. Note: For ease of reading scientific names of species are not presented in the main text, see Table 13-1 for a complete list.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with traditionally used access i.e., the headlands or travel paths associated with former peat extraction. Due to their location along the margin of the cutover this means that sampling results may include species which utilise the margin of cutover or those areas

adjacent to cutover i.e. areas not subject to rehabilitation. Where relevant this is further addressed in the Discussion section.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10-11am). CBS recommended timings are early morning, no later than 9am 'ideally' but allowance is made to extend this period for sites which require longer travel times or where access is difficult. The timing of the late season visits in June exceeded the CBS recommended period for surveying but were complete by 11:27am and data are considered acceptable for analysis. Any bias on a per species level is discussed further under Discussion, where relevant.

Results- Species Richness

Species richness is presented as the total number of species recorded across both transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included.

A total of 34 no. species were recorded, see Table 13-1. This included two BoCCI (Gilbert *et al.* 2021) Red listed species Meadow pipit and Snipe along with five BoCCI Amber listed species namely Goldcrest, Swallow, Sand martin, Mallard and Willow warbler. Remaining species were all Green listed apart from Pheasant which is not assigned a BoCCI status.

Results – Annual Relative Abundance

Annual relative abundance (ARA) is presented as the maximum count per species per visit (E or L) or as the maximum count for the period April to June inclusive, see Table 13-1. This allows for future comparison with CBS trends which takes the same approach to index species. Maximum counts of greater than 10 individuals were recorded for six species, Wren, Willow warbler, Blackbird, Blackcap, Robin, and Chiffchaff. All remaining species were recorded in low numbers (<10).

Results – Habitat Associations

Twenty-two species considered associated with NON-OPEN habitats were recorded, ten species associated with OPEN habitats and two species associated with both were recorded, see Table 13-1.

Results – Colonial Species

No colonies were recorded.

Discussion

The occurrence on cutover or raised bog of many of the species recorded in this study have been previously described in literature such as Wilson 1990, Bracken *et al.* 2008 and in unpublished reports such as Copland (2010). Common Crossbill is perhaps an exception but mature coniferous woodland bounding the northern EDRSS extent is obviously attractive to this species, and breeding cannot be ruled out onsite (Crossbill breed as early as January). It is notable that the two Red listed species recorded, Meadow pipit and Snipe are associated with open habitats targeted for rehabilitation. Three of the five Amber listed species, Mallard, Swallow and Sand martin are also associated with open habitats. Sand martin breed at many BNM cutover sites in either exposed face bank or suitable drains

and the absence of colonies on transects does not preclude a nesting colony or multiple individual nesting burrows elsewhere on the bog.

Relative abundance was highest in 2022 for six species, however these are some of the commonest occurring species in Ireland (Crowe *et al.* 2014), and the results are not unexpected. Variation between these and other published data on raised bog breeding bird communities may reflect the differing habitat mosaics typically found on cutaway in contrast to the more homogenous raised bog habitats previously studied. Wading species are almost absent currently within the EDRSS extent, but this reflects the baseline conditions – open water is limited, associated emergent vegetation is sparse, and habitat is generally less suitable. Additionally, previous studies have shown wader numbers to fluctuate between years (Copland, 2008).

Regarding habitat associations 65% of species recorded are more associated with non-open habitats. Many of these species frequently visit open areas of cutaway to forage. This percentage also reflects the sampling nature of the transect locations where marginal woodland and scrub was present within the distance sampling ranges. Open habitat species comprised 29% of those recorded but has a higher proportion of Red and Amber listed species (5 no. in total). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland, 2009), and this still seems the case. Further analysis on trends in the ratio or relative abundance of these species over time following rehabilitation would be beneficial.

In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds utilising cutover bogs.

Table Error! No text of specified style in document.-40: 2022 – YR1 Countryside Bird Survey Results

Species ¹	BOCCI 2020 - 2026 status	Habitat association	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	17
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	16
BF Bullfinch <i>Pyrrhula pyrrhula</i>	Green	NON-OPEN	1
BT Blue Tit <i>Cyanistes caeruleus</i>	Green	NON-OPEN	1
CC Chiffchaff <i>Phylloscopus collybita</i>	Green	NON-OPEN	10
CD Collared Dove <i>Streptopelia decaocto</i>	Green	NON-OPEN	4
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	4
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	2
CR Crossbill <i>Loxia curvirostra</i>	Green	NON-OPEN	8
CT Coal tit <i>Periparus ater</i>	Green	NON-OPEN	1
D. Dunnock <i>Prunella modularis</i>	Green	NON-OPEN	4
GC Goldcrest <i>Regulus</i>	Amber	NON-OPEN	4
GH Grasshopper Warbler <i>Locustella naevia</i>	Green	OPEN	1
HC Hooded Crow <i>Corvus cornix</i>	Green	OPEN	7
JD Jackdaw <i>Corvus monedula</i>	Green	NON-OPEN	1
LR Lesser Redpoll <i>Carduelis flammea</i>	Green	NON-OPEN	1
M. Mistle thrush <i>Turdus viscivorus</i>	Green	NON-OPEN	5

¹ BTO Code, Common name, Scientific name

Species ¹	BOCCI 2020 - 2026 status	Habitat association	ARA
MA Mallard <i>Anas platyrhynchos</i>	Amber	OPEN	1
MG Magpie <i>Pica</i>	Green	NON-OPEN	1
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	3
PH Pheasant <i>Phasianus colchicus</i>	N/A	NON-OPEN	3
PW Pied Wagtail <i>Motacilla alba</i>	Green	OPEN	2
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	16
RB Reed Bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	1
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	1
SK Siskin <i>Carduelis spinus</i>	Green	NON-OPEN	1
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	6
SM Sand Martin <i>Riparia riparia</i>	Amber	OPEN	1
SN Snipe <i>Gallinago</i>	Red	OPEN	1
ST Song Thrush <i>Turdus philomelos</i>	Green	NON-OPEN	5
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	1
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	5
WR Wren <i>Troglodytes</i>	Green	OPEN/NON-OPEN	51
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	25

Winter Birds – Monitoring YR1

Method

Six counts within the winter period 2022/23 were conducted. All counts were within the period 12:20 to 16:15. Counts were undertaken generally on days with no rain but on three dates showers were noted. Visibility was always good and wind speeds ranged from F0-F5. Survey dates were 18th of October 2022, 30th of November 2022, 20th of December 2022, 19th of January 2023, 14th of February 2023, and 29th of March 2023.

Constraints

No birds were recorded on site during the months of November 2022, December 2022 and February 2023. However, this is considered representative of this bare peat dominated cutover bog.

Results – Species Richness

A total of 3 water bird species were recorded across all surveys. Two of these were BOCCI (Gilbert *et al.* 2021) Red listed species namely Golden Plover and Snipe. One Green listed species was recorded namely Little Egret.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 13-2 and was highest for Golden Plover (n=50). Although 97 Golden Plover were recorded flying over the bog in March 2023, these are not included in the below table as they were not considered to be associated with the bog habitats and likely occurring along the nearby River Suck to the west. Average abundance across all 6 counts was <3 for the two remaining species.

Results – Habitat Associations

The species which perhaps exhibits the highest association with habitats as presented currently at the site is Golden Plover. Flocks of these species were recorded on three occasions in flight near or over the bog and these may utilise the bog for roosting. Golden plover recorded in March 2023 were observed flying low over the site but did not land and may have come from another bog to the north (Castlegar).

Snipe was found to associate with the bog, but this probably reflects its propensity to flush from intact high bog or marginal habitats when approached.

In addition to the surveys of Derryfadda bog a section of the River Suck and flooded agricultural grassland adjacent to the site is also surveyed during surveys. During these surveys Lapwing, Common gull, Cormorant, Mallard, Mute Swan, Teal, Wigeon and Grey heron were recorded over the winter period. These birds across were found to associate with the River Suck and its corridor. Peak counts for these species involved birds associating directly with the river (or flying over the river) and not Derryfadda Bog nor the rehabilitation extent.

Discussion

Overall species richness is considered to be very low during the period studied. This reflects the baseline bog condition which is dominated by bare peat which offers little or no foraging opportunities for many species of water bird. Roosting opportunities are provided for two species recorded during the survey, Golden plover and Snipe, which may also forage onsite.

Regarding abundance, species such as Lapwing, Mute Swan and Whooper Swan, which often winter in large numbers at other Bord na Móna bogs (Copland, 2009 & 2010; Gittings 2021) were effectively absent and only found to utilise the adjacent corridor of the River Suck in low numbers. Over time, as peatland habitats develop further at Derryfadda it is expected that it may also become a refugium for species such as these during the winter months, as the rate of association with the onsite habitats increases.

In the context of the adjacent European Site (the River Suck Callows SPA) which has Whooper Swan, Golden Plover, Lapwing and '*Wetland and Waterbirds*' as qualifying interests, post rehabilitation Derryfadda may contribute to further habitat for these species and support the conservation objectives for this European Site.

In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds at Derryfadda. No significant change in wintering bird species richness and abundance can be attributed to the peatland rehabilitation so far at Derryfadda, but measures have consolidated conditions for peatland habitats to continue to develop to support wintering bird species already using the site.

Table Error! No text of specified style in document.-41: Winter 2021/2 – Monitoring YR1 IWeBS Survey Results

Species	BOCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
Golden Plover <i>Pluvialis apricaria</i>	Red	19	0	0	50	0	0	12	50
Common Snipe <i>Gallinago gallinago</i>	Red	0	0	0	0	0	16	3	16
Little Egret <i>Egretta garzetta</i>	Green	1	0	0	0	0	0	0	1

Pollinators

Pollinator surveys are not included in the scheme monitoring scope for Derryfadda Bog.

14. Glenlough

Glenlough is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecotope survey of raised bog habitats at Glenlough Bog during summer 2022. Field surveys were undertaken on the 2nd, 10th, 16th and 22nd of March and 17th of May 2022. Surveys for raised bog ecotopes is broadly based on methodology developed by Fernandez et al. (2014). Marginal and cutover habitats were also surveyed, and habitats were classified in accordance with Fossitt (2000) or Smith and Crowley (2020) methodology, where relevant.

Constraints

The survey work was carried out in accordance with relevant best practice guidelines, and habitats and species on the site were readily identifiable during the field visits. All parts of the bog were accessible during the surveys. No significant constraints or limitations to the YR1 monitoring survey have been identified.

Results

Glenlough Bog is located in counties Longford and Westmeath, straddling the Longford - Westmeath county boundary in the northern/north-eastern part of the site and is approximately 5km south of Edgeworthstown. The majority of the high bog component supports raised bog habitat (PB1).

Although the bog was drained in the 1980's most of the raised bog remains intact and vegetated. A small part of the site was used for horticultural peat or sod moss peat during 2000-2018. Glenlough Bog can broadly be divided into two separate sections (northern and southern); a Poor fen/flush (PF2) bisects the centre of the site following a natural drainage feature that runs in a west – east direction. An ecotope survey of Glenlough was carried over several dates in March and May 2022. In total, the high bog supports four ecotope community complexes; sub-central ecotope (ARB), sub-marginal ecotope (DRB), marginal ecotope (DRB) and facebank ecotope (DRB).

Out of a total of 210.8 ha of raised bog (excluding poor fen and areas of cutover), 4.35 ha (2%) comprises Annex I 'active raised bog' (7110). Eco-hydrological modelling and ecotope surveys estimated the potential area of the Annex I habitat 'Degraded raised bogs still capable of natural regeneration' (7120) to be 38.4 ha. Annex I EU Habitats Directive habitat 'Depressions on the peat substrates of the *Rhynchosporion*' (7150) also occurs at Glenlough, associated with parts of wettest sections of the active raised bog, where damaged pool systems remain.

Active Raised Bog Ecotope Communities

The sub-central ecotope community complexes and the areas of active flush all correspond to 'active raised bogs (7110)'. The sub-central ecotope is confined to two areas within the bog, the biggest of which is located within the north/northwest of the bog (3.97 ha) (associated with an undrained area) and a smaller area within the southern lobe (0.32 ha). The various sub-central ecotope communities

recorded on the high bog correspond to the following complexes: Complex 9/7/10 + Pools, Complex 9/7/10, Complex 9/7/4 + Pools, Complex 9/7 + Pools, Complex 9/10, Complex 10/4 and Complex 6 + Pools. The micro-topography was relatively well developed in some sections, comprising low hummocks and pools. Ground conditions were soft to very soft and occasionally quaking. A small area of active flush was located within the east of the bog within an area previously subject to peat extraction.

Inactive Raised Bog Ecotope Communities

Inactive raised bog ecotope communities comprise mainly of marginal (133 ha) and sub-marginal (34.5) and facebank (32 ha) ecotopes.

Marginal ecotope areas were characterised as having 10% *Sphagnum* cover or less, with dry ground conditions. The main community complex recorded was Marginal 7 (*Calluna vulgaris*). Other community complexes less commonly recorded included 3/6/9 (*Carex panicea*, *Narthecium ossifragum* and *Calluna vulgaris* dominated vegetation), 7/6 (*Narthecium ossifragum* and *Calluna vulgaris* dominated vegetation) and 7/2 (*Calluna vulgaris* and *Trichophorum germanicum* dominated vegetation) for example.

Sub-marginal areas typically comprise between 10-35% *Sphagnum* cover with soft ground conditions and in general, poorly developed micro-topography with occasional hummocks and hollows. The main community complexes recorded within sub-marginal areas include Complex 9/7 (*Eriophorum vaginatum* and *Calluna vulgaris* dominated vegetation).

Facebank ecotope communities were prominent along the margins of the bog at the high bog/cutover interface. This ecotope typically comprises dense stands of *Calluna vulgaris* and is characterised by dry conditions and very firm underfoot.

The marginal habitats at Glenlough bog are dominated by scrub, immature woodland and some more mature woodland habitats and small, degraded bog remnants.

Rehabilitation works commenced at Glenlough in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2022 largely reflect the baseline status of a recently rehabilitated raised bog.

Table Error! No text of specified style in document.-42: Overview of the area of each ecotope recorded at Glenlough.

Ecotope type	Extent (ha)
Facebank	32.0
Marginal	133.5
Marginal/Sub Marginal Mosaic	6.4
Sub Marginal	34.5
Sub Central	4.3
Active Flush	0.2
Total	210.8 ha

Table Error! No text of specified style in document.-43: Area of each ecotope recorded at Glenlough.

Annex I habitats	Extent (ha)
Active raised bogs (7110)	4.35
Degraded raised bogs still capable of natural regeneration (7120)	38.4
Depressions on peat substrates of the <i>Rhynchosporion</i> (7150)	Not determined – Occurs in an intimate mosaic in sub-central ecotope vegetation types – notably community complex 10/4 and 9/7/4+P.
Total	42.75 ha



View of large trench drain present in Glenlough.



Example of sub-central ecotope occurring at Glenlough Bog with a series of *Sphagnum* moss dominated pools.



Example of small area of active flush containing good cover of *Sphagnum* species.



Example of Marginal ecotope at Glenlough – Ecotope community Marginal 7

Vegetation Quadrats – Monitoring YR1

Method

Quadrat monitoring was carried out at Glenlough bog on the 17th of May 2022 in accordance with agreed EDRRS Monitoring and Verification. 8 no. quadrats were employed.

Constraints

No constraints were noted.

Results

See Table 3 of Appendix D4. Seven of the eight quadrats were taken on drained high bog (PB1) that supported typical raised bog plant species, and one located on an area of formerly industrially milled raised bog. The areas selected are representative of this drained raised bog vegetation. As shown in the quadrat data, all locations sampled contained varying *Sphagnum* cover.

No *Sphagnum* was recorded in quadrat Q1 located within the east of the bog, see example photo below. This area was subject to some industrial milled peat extraction and comprised of revegetating bare peat (up to 50% in places) and vegetation comprising mainly of establishing Hares-tail Cottongrass (*Eriophorum vaginatum*) and Ling Heather (*Calluna vulgaris*). Quadrats Q2 and Q8 had low overall *Sphagnum* cover i.e., 0-10% in areas mapped as Marginal ecotope. Quadrat no. Q2 is located on drained and dried raised bog dominated by heather in close proximity to a “collector” drain.

On the southern side of the collector drain is an area of inactive flush dominated by *Molinia caerulea*. Quadrat Q8 is located within the southwest of the raised bog in an area that is drained and dominated by heather. Two quadrats (Q3 & Q4) containing good *Sphagnum* cover i.e., 51-75%. Both quadrat Q3 and Q4 are located within an area of sub-central ecotope within the northern lobe of the bog. The best parts of this area have not previously been subject to drainage and support good hummock hollow features, see photograph below showing Quadrat Q4. Quadrats Q5, Q6 & Q7 containing low *Sphagnum* cover i.e. 11-25% and were located in Marginal ecotope vegetation typically dominated by Ling Heather. *Sphagnum capillifolium*/subsp. *rubellum* and *S. papillosum* were most commonly represented, with *Sphagnum cuspidatum*, *Sphagnum magellanicum*, *Sphagnum papillosum* and *Sphagnum subnitens* also present across the majority of quadrats.

Discussion

As with the description of the habitats above and the accompanying habitat map, the quadrats reflect the current baseline conditions prior to the commencement of restoration at Glenlough bog. Glenlough bog comprises of a relatively large area dominated by mainly non-active raised bog. ARB accounts for 4.35 ha (2%) of the high bog at Glenlough, and this is represented in the quadrat data, see Quadrats Q2 & Q8.

As the bog was subject to historic industrial drainage, and a significant proportion never brought into peat extraction, the bog is noted to be dry in many places and this is reflected in the accompanying Ecotope map for the bog. An ecotope survey report has been prepared for Glenlough Bog (BnM, 2022²), for which an ecotope map was prepared. Further time is required before any significant changes in the current vegetation composition is likely to be recorded. However, subsequent surveys undertaken after the initial quadrat monitoring has shown that the bog has become significantly wetter post rehabilitation/drain blocking, see representative image below.

Ecotope Survey and Cutover Bog Survey 2022.



Quadrat Q4



Quadrat Q7



Example of significant rewetting post restoration (30.03.2023).



Quadrat Q1 - Example of former industrial milled peat area now revegetating

Breeding Birds – Monitoring YR1

Methods

At Glenlough, two 1km transects were selected to provide a representative sample of the breeding bird community. Each transect was placed along easily accessible sections of the bog for ease of use; these areas will likely continue to be accessible post rehabilitation, allowing the same route to be repeated. Two visits in the period May to June of 2022 were carried out. See the Appendix B14 figure titled ‘Glenlough Bog Ecology Transects’ for transect locations.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with high fields, headlands or rail lines associated with former peat extraction. Due to their location, sampling results may include species which utilise the areas adjacent to transect routes i.e., areas not subject to rehabilitation. Where relevant this is further addressed in the Discussion section.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10.00-11.00am). CBS recommended timings are early morning, no later than 9.00am ‘ideally’ but allowance is made to extend this period for sites which require longer travel times or where access is difficult. The timing of

some visits may have exceeded the CBS recommended period for surveying but were complete by 10.00am and data are considered acceptable for analysis. All surveys were carried out during suitable weather conditions, avoiding heavy rain, poor visibility and strong winds. Any bias on a per species level is discussed further under Discussion, where relevant.

Results- Species Richness

Species richness is presented as the total number of species recorded across transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 23 no. species were recorded, see Table 14-3. This included three BoCCI (Gilbert *et al.* 2021) Red listed species: Meadow Pipit, Skylark and Snipe. The remaining species were all Green listed apart from Pheasant, which is not assigned a BoCCI status.

Results – Annual Relative Abundance

Annual Relative Abundance (ARA) is presented as the maximum count per species per visit (Early or Late) or as the maximum count for the period April to June inclusive, see Table 14-3. This allows for future comparison with CBS trends which takes the same approach to index species.

Maximum counts of greater than 10 individuals were recorded for 6 species: Meadow Pipit, Robin, Rook, Skylark, Wren and Willow Warbler. All remaining species were recorded in low numbers (typically less than 5). Overall abundance, and relative abundance associating with cutover habitats, was highest for Meadow pipit, with a maximum of 33 individuals recorded in the period May to June.

Results – Habitat Associations

Habitat associations methodology has already been described within Section 1.2. Eight species associated with OPEN habitats, thirteen species associated with NON-OPEN habitats, and two species associated with both were recorded, see Table 14-3.

Results – Colonial Species

No colonies were recorded.

Discussion

Meadow Pipit, Skylark, Wren and Willow Warbler were recorded in high abundance. This aligns with previous studies on raised bogs, in Bracken *et al.* (2008) for instance Meadow Pipit comprised 61.7% of the community proportion of raised bog species recorded, and in the same study Skylark comprised 30.2%. Wrens will breed on raised bogs see Nairn & O'Halloran (2012). In this case the occurrence of Willow Warbler is related to the transect location as it allowed marginal scrub habitat to be included in the survey.

Breeding waders comprised Snipe only, however this is reasonably expected. The only other waders likely to occur would be Redshank and or/ Curlew. Seven pairs were noted based on observations in June. In a study of Clara Bog, Co. Offaly (modified from Wilson (1990) in Nairn & O'Halloran 2012) a density of 7.5 individuals per km² was found.

Regarding habitat, all three of the red listed species recorded (Snipe, Skylark and Meadow pipit) are open habitat species. Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland, 2009) on cutaway, and it is reasonable to assume the same for raised bog.

In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds utilising raised bogs subject to restoration. No significant change in breeding bird species richness and abundance can be attributed to the bog restoration so far at Glenlough but drain-blocking has consolidated conditions for raised bog habitat to continue to improve condition to support breeding bird species already present on site. In time, parts of Glenlough may also develop suitable supporting habitat for SCI species of SPAs in the surrounding area, including the adjacent Glen Lough SPA, designated for Whooper Swan.

Table Error! No text of specified style in document.-44: 2022 – Monitoring YR1 Countryside Bird Survey Results

Species	BOCCI status	Habitat association	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	10
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	8
BZ Buzzard <i>Buteo buteo</i>	Green	OPEN	1
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	3
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	2
GT Great Tit <i>Parus major</i>	Green	NON-OPEN	2
HC Hooded Crow <i>Corvus cornix</i>	Green	OPEN	5
JD Jackdaw <i>Corvus monedula</i>	Green	NON-OPEN	1
LI Linnet <i>Carduelis cannabina</i>	Green	OPEN	2
LR Redpoll <i>Acanthis cabaret</i>	Green	NON-OPEN	2
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	33
PH Pheasant <i>Phasianus colchicus</i>	n/a	NON-OPEN	1
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	13
RB Reed Bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	1
RO Rook <i>Corvus frugilegus</i>	Green	NON-OPEN	14
S. Skylark <i>Alauda arvensis</i>	Red	OPEN	11
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	1
SN Snipe <i>Gallinago gallinago</i>	Red	OPEN	5
ST Song Thrush <i>Turdus philomelos</i>	Green	NON-OPEN	9
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	2
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	1
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	20
WW Willow Warbler <i>Phylloscopus trochilus</i>	Green	NON-OPEN	21

Winter Birds – Monitoring YR1

Wintering bird surveys are not included in the scheme monitoring scope for Glenlough Bog.

Pollinators

Pollinator surveys are not included in the scheme monitoring scope for Glenlough Bog.

15. Noggusboy

Noggusboy is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Noggusboy Bog during summer 2022. A small area within the west of the bog, not surveyed in 2022 was completed in summer 2023.

Constraints

The eastern section of Noggusboy was identified as constrained land and is excluded from EDRRS rehabilitation. The habitat surveys carried out in 2022 were therefore confined to the western section of the bog. No constraints were identified in the western section of the bog, and all parts of this area were accessible during the surveys.

Results

Noggusboy Bog is located in Co. Offaly and comprises a total area of 923 ha. This bog is bisected into an eastern and western section by a regional road. Habitats and vegetation communities in the western section are outlined below.

The western side of Noggusboy Bog has been out of peat production for some time and has thus begun to revegetate with pioneer open habitats and scrub which are at different stages of development. Bog woodland and scrub occurs extensively across drier areas of the bog, with vegetation communities including ‘emergent *Betula*-dominated community (A)’ (eBir), ‘open *Betula*-dominated community (B)’ (Obir), ‘closed *Betula* scrub community (C)’ (CBir), ‘*Betula-Salix* woodland (BirWD)’.

Scrub communities occur in mosaics with pioneer scrub, pioneer open habitat and pioneer poor fen vegetation communities which include ‘pioneer *Eriophorum angustifolium* community (poor fen)’ (pEang), ‘pioneer *Juncus effusus* community (pJeff)’, ‘pioneer *Triglochin palustris* community (pTrig)’ and ‘bare peat (0-50% cover)’ (BP). Rudimentary Rich fen and flush habitat (PF1) has also been recorded at Noggusboy, with the pioneer community ‘pioneer *Carex viridula*/brown moss community (rich fen)’ (pVir) and ‘*Molinia caerulea*-dominated community’ (gMol) also present.

Large areas of open water (OW) and wetlands have formed in the central area of the bog, in low lying depressions. These wetlands are developing emergent vegetation communities including ‘pioneering *Carex rostrata* community (pRos)’, ‘Typha community’ (pTyp), ‘*Schoenoplectus* community’ (Psch) and ‘pioneer *Phragmites australis* community’ (pPhrag).

The Cloghan Community Development Association have leased part of Noggusboy, mainly in the south and mid-west of the site and have created man-made lakes (artificial lakes and ponds FL8) and amenity areas including car parks, footpaths and cabins classified as buildings and artificial surfaces (BL3). The southern end of the site is also managed by the community group and comprises the oldest area of

cutaway bog. This area has some well-established wetlands and mature birch scrub, some of which is developing to birch woodland. A large area of Conifer plantation (WD4), occurs close to the middle of the site, planted by Coillte.

Marginal habitats include small areas of remnant raised bog (PB1) some of which have been encroached on by domestic turf cutting and are classified as cutover bog (PB4). Marginal habitats also include Birch woodland (WN7)/'Betula-Salix woodland' (BirWD), Scrub (WS1) and small pockets of Agricultural Grassland (GA1).

Rehabilitation works commenced at Noggusboy in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site. Some areas of the bog already have well established pioneer vegetation including poor fen, wetlands, scrub and woodland. These habitats are expected to continue to develop post rehabilitation. The rehabilitation measures that have re-wetted the site will encourage the continued development of fen, wetland and peatland pioneer vegetation at this site.



Example of cutaway bare peat and pioneering cutaway vegetation occurring within the west of the site.



Example of developing pioneering cutaway vegetation on former cutaway production bog.



Example of pioneering bog woodland (WN7) within the west of the site with Sphagnum recurvum, S. palustre and S. capillifolium occurring in the ground layer.



Example of remnant sections of raised bog occurring within the northwest of the site.



Example of developing pioneering cutaway vegetation (i.e. scrub, developing woodland, poor fen) and wetland habitats occurring on former cutaway production bog within the north east of the western portion of Noggusboy.



Cloghan fishing lake and public amenity area within the area leased by the Cloghan Community Development Association (southwest of the site).

Vegetation Quadrats – Monitoring YR1

Vegetation quadrats are not included in the scheme monitoring scope for Noggusboy Bog.

Breeding Birds – Monitoring YR1

Methods

At Noggusboy, two 1 kilometre transects were selected to provide a representative sample of the breeding bird community. Each transect was placed along an existing headland or rail line corridor for ease of use, but also because these locations will continue to be accessible post rehabilitation, allowing the same route to be repeated. Two visits in the period April to July of 2022 were carried out. See the Appendix B15 figure titled ‘*Noggusboy Bog Ecology Transects*’ for transect locations.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with high fields, headlands or rail lines associated with former peat extraction. Due to their location, sampling results may include species which utilise the areas adjacent to transect routes i.e., areas not subject to rehabilitation. Where relevant this is further addressed in the Discussion section.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10.00-11.00am). CBS recommended timings are early morning, no later than 9.00am ‘ideally’ but allowance is made to extend this period for sites which require longer travel times or where access is difficult. The timing of some visits may have exceeded the CBS recommended period for surveying but were complete by 11.00am and data are considered acceptable for analysis. Any bias on a per species level is discussed further under Discussion, where relevant.

The second visit to this site took place in July and is therefore excluded from the analysis presented in this report.

Results- Species Richness

Species richness is presented as the total number of species recorded across transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 39 no. species were recorded, see Table 15-1. This included seven BoCCI (Gilbert *et al.* 2021) Red listed species, Black-headed Gull, Lapwing, Redshank, Snipe, Meadow Pipit, Grey Wagtail and Swift. Ten BoCCI Amber listed species namely, Willow Warbler, Swallow, Sand Martin, Herring Gull, Mallard, Mute Swan, Ringed Plover, Skylark, Common Tern and Goldcrest. Remaining species were all Green listed apart from Pheasant which is not assigned a BoCCI status.

Results – Annual Relative Abundance

Annual Relative Abundance (ARA) is presented as the maximum count per species per visit (Early or Late) or as the maximum count for the period April to June inclusive, see Table 15-1. This allows for future comparison with CBS trends which takes the same approach to index species. As the second visit was carried out in July only the first visit is accounted for in this analysis.

Maximum counts of 10 individuals or greater were recorded for 9 species, Lapwing, Wren, Whitethroat, Swallow, Blackcap, Robin, Blackbird, Willow Warbler and Black-headed Gull. All remaining species were recorded in low numbers (typically less than 10). Overall abundance was highest for Black-headed Gull with a maximum of 31 individuals recorded in May. The species with the highest relative abundance associating with cutover habitats was also Black-headed Gull (n=31).

Results – Habitat Associations

Habitat association methodology has already been described in section 1.2 of the Annual Monitoring Report.

Twenty-three species associated with OPEN habitats, fourteen species associated with NON-OPEN habitats, and two species associated with both OPEN and NON-OPEN were recorded see Table 15-1.

Results – Colonial Species

A colony of 24 Black-headed Gull were recorded on Transect 2 within Noggusboy. This species was recorded as breeding within the bog.

Discussion

It is notable that the six Red listed species recorded, Black-headed Gull, Lapwing, Redshank, Snipe, Meadow Pipit, Grey Wagtail and Swift are associated with open habitats targeted for rehabilitation in the form of rewetting, and would be expected to gain from many of the measures implemented (wetland creation and fertiliser application to high fields for example). The Amber listed species, Willow Warbler associates with closed habitats, and had the second highest relative abundance overall (n=19). Overall, the total number of species either Red or Amber listed was 17.

Regarding wading species, breeding is considered likely (based on observations alone and professional judgement) for Lapwing, Redshank, Snipe, and Ringed Plover in 2022. Other water bird species noted previously during the breeding period include Black-headed Gull, Herring Gull, Little Egret, Mallard, Mute Swan and Common Tern.

In general, the abundance estimates reflect the expansive area of wetland habitats currently present at Noggusboy, as well as the associated established marginal habitats i.e. scrub, remnant bog and woodland. In time, the extensive areas of bare peat within the Noggusboy bog boundary will provide more suitable habitat for many species. Regarding habitat associations, 59% of species recorded are more associated with open habitats. Open habitat species comprise a higher proportion of Red and Amber listed species (15 no. in total), with only two Amber species associated with non-open habitats (Goldcrest, and Willow Warbler). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland, 2009), and this still seems the case. Further analysis on trends in the ratio or relative abundance of these species over time following rehabilitation would be beneficial.

In conclusion, the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds both at Noggusboy and across the EDRRS scheme. In addition, the occurrence at Noggusboy of many of the species described here is notable given the proximity within 8km of the adjacent European Site (the Middle Shannon Callows SPA) which includes 'Wetlands and Waterbirds', along with species such as Black-headed Gull and Lapwing, amongst its Special Conservation Interests. No significant change in breeding bird species richness and abundance can be attributed to the rehabilitation so far at Noggusboy, but rehabilitation measures have consolidated conditions for wetland habitat and other habitat to continue to establish to support breeding bird species.

Table Error! No text of specified style in document.-45: 2022 – Monitoring YR1 Countryside Bird Survey Results

species	BOCCI 2020 - 2026 status	habitat association	ARA
BH Black-headed Gull <i>Chroicocephalus ridibundus</i>	Red	OPEN	31
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	19
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	18
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	13
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	12
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	11
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	11
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	11

species	BOCCI 2020 - 2026 status	habitat association	ARA
L. Lapwing <i>Vanellus vanellus</i>	Red	OPEN	10
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	9
H. Grey Heron <i>Ardea cinerea</i>	Green	OPEN	9
MH Moorhen <i>Gallinula chloropus</i>	Green	OPEN	8
RK Redshank <i>Tringa totanus</i>	Red	OPEN	8
LR Redpoll <i>Acanthis cabaret</i>	Green	NON-OPEN	7
SN Snipe <i>Gallinago gallinago</i>	Red	OPEN	6
ST Song Thrush <i>Turdus philomelos</i>	Green	NON-OPEN	6
BT Blue Tit <i>Cyanistes caeruleus</i>	Green	NON-OPEN	5
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	5
RB Reed bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	5
SM Sand Martin <i>Riparia riparia</i>	Amber	OPEN	5
CC Chiffchaff <i>Phylloscopus collybita</i>	Green	NON-OPEN	4
HC Hooded Crow <i>Corvus cornix</i>	Green	OPEN	4
HG Herring Gull <i>Larus argentatus</i>	Amber	OPEN	4
ET Little Egret <i>Egretta garzetta</i>	Green	OPEN	3
MA Mallard <i>Anas platyrhynchos</i>	Amber	OPEN	3
GL Grey Wagtail <i>Motacilla cinerea</i>	Red	OPEN	2
GT Great Tit <i>Parus major</i>	Green	NON-OPEN	2
M. Mistle thrush <i>Turdus viscivorus</i>	Green	NON-OPEN	2
MS Mute Swan <i>Cygnus olor</i>	Amber	OPEN	2
RP Ringed Plover <i>Charadrius hiaticula</i>	Amber	OPEN	2

species	BOCCI 2020 - 2026 status	habitat association	ARA
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	2
SI Swift <i>Apus apus</i>	Red	OPEN	2
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	1
CN Common Tern <i>Sterna hirundo</i>	Amber	OPEN	1
GC Goldcrest <i>Regulus regulus</i>	Amber	NON-OPEN	1
GO Goldfinch <i>Carduelis carduelis</i>	Green	OPEN	1
PH Pheasant <i>Phasianus colchicus</i>	N/A	OPEN	1
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	1
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	1

Winter Birds – Monitoring YR1

Method

Four counts within the winter period 2022/23 were conducted. All counts were within the period 10:00 to 16:30. Counts were undertaken generally on days with no rain but on two dates showers were noted. Visibility was moderate to good and wind speeds ranged from F2-F5. Survey dates were 27 October 2022, 23 November 2022, 31 January 2023, and 24 March 2023.

Constraints

On several visits EDRSS activities were still ongoing. However, the works were restricted in their extent and did not significantly influence the likely bird assemblages during the surveys. This site was not surveyed in December 2022 due to adverse weather conditions. This site was not surveyed in February 2023.

Results – Species Richness

A total of 19 water bird species were recorded across all surveys. Five of these were BoCCI (Gilbert *et al.* 2021) Red listed species namely Golden plover, Lapwing, Redshank, Snipe and Shoveler. Nine Amber listed species were recorded namely Black-headed gull, Cormorant, Greylag goose, Greenland white-fronted goose, Mallard, Mute swan, Teal, Wigeon and Whooper swan. Five Green listed species namely Jack Snipe, Little egret, Little Grebe, Grey Heron and Moorhen were also recorded on site.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 15.2 and was highest for Mallard (n=19). Golden plover (n=13) and Teal (n=10). Average abundance across all 4 counts was <8 for all remaining species.

Results – Habitat Associations

Most birds across all counts were found to associate with habitats present at Noggusboy Bog.

Discussion

Overall species richness and abundance is considered to be high during the period studied. No counts were recorded as reaching potentially important thresholds for species of conservation concern. No change in species richness and abundance can be attributed to the rehabilitation so far. A pair of Redshank were present in March may have been early arriving breeders as opposed to wintering birds.

Fourteen species recorded were of Red or Amber status. Five species recorded were of Green status. In the context of nearby European Sites which have for instance ‘*Wetland and Waterbirds*’ as qualifying interests a post rehabilitation Noggusboy may contribute to further habitat for SCI species and support the conservation objectives for these European Sites. The data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds at this site.

Table Error! No text of specified style in document.-46: Winter 2021/2 – Monitoring YR1 IWeBS Survey Results

Species	BOCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
GP Golden Plover <i>Pluvialis apricaria</i>	Red	0	0	N/A	0	N/A	50	13	50
L Lapwing <i>Vanellus vanellus</i>	Red	0	0	N/A	0	N/A	3	1	3
RK Redshank <i>Tringa Totanus</i>	Red	0	0	N/A	0	N/A	2	1	2
SN Snipe <i>Galinago galinago</i>	Red	0	0	N/A	2	N/A	2	1	2
SV Shoveler <i>Anas clypeata</i>	Red	0	0	N/A	6	N/A	0	2	6
BH Black Headed gull <i>Chroicocephalus ridibundus</i>	Amber	0	0	N/A	0	N/A	16	4	16
CA Cormorant <i>Phalacrocorax carbo</i>	Amber	0	0	N/A	6	N/A	2	2	6
GJ Greylag Goose <i>Anser anser</i>	Amber	12	11	N/A	0	N/A	4	7	12
Greenland White Fronted Goose <i>Anser albifrons flavirostris</i>	Amber	2	0	N/A	2	N/A	0	1	2

Species	BOCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
Jack Snipe <i>Lymnocyptes minimus</i>	Green	0	0	N/A	1	N/A	0	0	1
LG Little Grebe <i>Tachybaptus ruficollis</i>	Green	0	0	N/A	1	N/A	4	1	4
MA Mallard <i>Anas platyrhynchos</i>	Amber	32	8	N/A	34	N/A	2	19	34
MS Mute Swan <i>Cygnus olor</i>	Amber	3	0	N/A	0	N/A	2	1	3
T Teal <i>Anas crecca</i>	Amber	0	0	N/A	30	N/A	11	10	30
WN Wigeon <i>Anas penelope</i>	Amber	4	6	N/A	16	N/A	0	7	16
WS Whooper Swan <i>Cygnus cygnus</i>	Amber	0	4	N/A	27	N/A	0	8	27
ET Little egret <i>Egretta garzetta</i>	Green	0	0	N/A	1	N/A	2	1	2
H Grey Heron <i>Ardea cinerea</i>	Green	1	1	N/A	0	N/A	1	1	1
MH Moorhen <i>Gallinula chloropus</i>	Green	2	3	N/A	0	N/A	2	2	3

Pollinators

Pollinator surveys are not included in the scheme monitoring scope for Noggusboy Bog.

16. Derrybrat

Derrybrat is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Derrybrat Bog during summer 2021.

Constraints

The survey work was carried out in accordance with relevant best practice guidelines, and habitats and species on the site were readily identifiable during the field visits. All parts of the bog were accessible during the surveys. No significant constraints or limitations to the YR1 monitoring survey have been identified.

Results

Derrybrat bog is small in comparison to the neighbouring BnM bogs in Boora group. It is located between Drinagh and Boora Bog. The Silver River flows close to its northern and western edges, while the R437 Ferbane to Kilcormac road runs along much of its eastern boundary. A BnM railway line runs in an east west direction through the middle of the site and divides the site into two main sections.

Northern section

The majority of this area has been re-vegetating for some time apart from several high fields that have been kept open for access and are less densely vegetated. The re-vegetating fields contain several pioneer habitats including Birch scrub 'Closed *Betula* scrub community (C)' (cBir), open *Betula*-dominated community (B) (oBir), emerging birch scrub 'Emergent *Betula*-dominated community (A)' (eBir), 'Dry *Calluna* Heath' (dHeath), poor fen communities 'Pioneer *Juncus effusus* community' (pJef), 'Pioneer *Triglochin palustris* community' (pTrig) and 'Dry calcareous grassland' (gCal). This area is relatively dry with only minor development of other vegetation communities associated with wetland areas such as tall reed '*Phragmites australis* community' (pPhrag) or Bog Cotton 'Pioneer *Eriophorum angustifolium* community (poor fen)' (pEang) dominated poor fen vegetation. Silt-ponds, a small portion of Raised bog (PB1) and old Cutover Bog (PB4) along the eastern margin are also present in this area.

Southern Section

This is the largest section and is also largely re-vegetated. Habitats in this section include scrub and pioneer open habitats 'Open *Betula*-dominated community (B)' (oBir), 'Pioneer *Eriophorum angustifolium* community (poor fen)' (pEang), '*Phragmites australis* community' (pPhrag) and grassland '*Anthoxanthum-Holcus-Equisetum* community' (gAn-H-Eq). There are two large bodies of open water 'Permanent pools and lakes' (OW), immediately south of the railway. A Conifer plantation (WD4) has been planted on the eastern side of the site. There is a small area of Raised Bog (PB1) (high bog) located along the southern margin. Part of the adjacent cutover to this high bog (and within the BnM boundary) has also been planted with Scot's Pine (WD4) and another section contains improved grassland (GA1).

The areas of Derrybrat that have already begun to establish pioneer vegetation communities will continue to develop post-rehabilitation. Rehabilitation works commenced at Derrybrat in late 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2022 largely reflect the baseline status of a recently rehabilitated peat extraction site. However, significant rewetting has been achieved as part of the scheme at Derrybrat, with areas of previously dry woodland now successfully rewetted, with shallow or near surface water levels notable.



View of the revegetating milled peat surface (2021).



View of wetland habitat and emergent vegetation at Derrybrat Bog with the conifer plantation in the background (2021).



Open Betula-dominated community (B) (oBir) in the northern section of Derrybrat.



Area of open water 'Permanent pools and lakes' (OW), in the southern section of Derrybrat.

Vegetation Quadrats

Vegetation quadrats are not included in the scheme monitoring scope for Derrybrat Bog.

Breeding Birds – Monitoring YR1

Methods

At Derrybrat, two 1 kilometre transects were selected to provide a representative sample of the breeding bird community. Each transect was placed along an existing headland or rail line corridor for ease of use, but also because these locations will continue to be accessible post rehabilitation, allowing the same route to be repeated. Two visits in the period April to June of 2022 were carried out. See the Appendix B16 figure titled ‘*Derrybrat Bog Ecology Transects*’ for transect locations.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with high fields, headlands or rail lines associated with former peat extraction. Due to their location, sampling results may include species which utilise the areas adjacent to transect routes i.e., areas not subject to rehabilitation. Where relevant this is further addressed in the Discussion section.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10.00-11.00am). CBS recommended timings are early morning, no later than 9.00am ‘ideally’ but allowance is made to extend this period for sites which require longer travel times or where access is difficult. The timing of some visits may have exceeded the CBS recommended period for surveying but were complete by 11.00am and data are considered acceptable for analysis. Any bias on a per species level is discussed further under Discussion, where relevant.

Results- Species Richness

Species richness is presented as the total number of species recorded across transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 27 no. species were recorded, see Table 16-1. This included four BoCCI (Gilbert *et al.* 2021) Red listed species, Black-headed Gull, Meadow Pipit, Snipe and Whinchat. Five BoCCI Amber listed species namely, Willow Warbler, Swallow, Cormorant, Kestrel and Skylark. Remaining species were all Green listed apart from Pheasant which is not assigned a BoCCI status.

Results – Annual Relative Abundance

Annual Relative Abundance (ARA) is presented as the maximum count per species per visit (Early or Late) or as the maximum count for the period April to June inclusive, see Table 16-1. This allows for future comparison with CBS trends which takes the same approach to index species.

Maximum counts of greater than 10 individuals were recorded for 2 species, Willow Warbler and Swallow. All remaining species were recorded in lower numbers (typically 8 or less). Overall abundance was highest for Willow Warbler with a maximum of 17 individuals recorded in the period May to June. The species with the highest relative abundance associating with cutover habitats was Swallow (n=13).

Results – Habitat Associations

Habitat association methodology has already been described in section 1.2 of the Annual Monitoring Report.

Twelve species associated with OPEN habitats, twelve species associated with NON-OPEN habitats, and three species associated with both OPEN & NON-OPEN habitats were recorded see Table 16-1.

Results – Colonial Species

A colony of 25 Rook were recorded during the first CBS visit in April.

Discussion

It is notable that the four Red listed species recorded, Black-headed Gull, Meadow Pipit, Snipe and Whinchat are associated with open habitats targeted for rehabilitation in the form of rewetting, and would be expected to gain from many of the measures implemented (wetland creation and fertiliser application to high fields for example). The Amber listed species Willow Warbler had the highest relative abundance (n=17). The Hirundine species Swallow had the second highest relative abundance (n=13). Overall, the total number of species either Red or Amber listed was 9. Of all Red and Amber listed species recorded, eight of those species are associated with OPEN habitats with the aforementioned Willow Warbler associated with NON-OPEN habitats.

Regarding wading species, breeding is considered likely for Snipe (based on professional judgement) as suitable habitat exists on this site. No other wading species were recorded during surveys although it should be noted that wader specific surveys were not carried out and CBS surveys may under record this group of species as it is less intensive. Other water bird species noted previously during the breeding period include Black-headed Gull, Cormorant and Mallard.

In general, the abundance estimates reflect the expansive area of wetland habitats currently present at Derrybrat, as well as the associated established marginal habitats i.e. scrub, remnant bog and woodland. In time, the extensive areas of bare peat within the Derrybrat bog boundary will provide more suitable habitat for many species. Regarding habitat associations, over 44% of species recorded are more associated with open habitats. Open habitat species comprise a higher proportion of Red and Amber listed species (8 no. in total), with only one Amber species associated with non-open habitats (Willow Warbler). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland, 2009), and this still seems the case. Further analysis on trends in the ratio or relative abundance of these species over time following rehabilitation would be beneficial.

In conclusion, the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds both at Derrybrat and across the EDRRS scheme. In addition, the occurrence at Derrybrat of many of the species described here is notable given the proximity. In time parts of Derrybrat may become an important supporting site for the European Site (the Middle Shannon Callows SPA) which includes '*Wetlands and Waterbirds*', along with species such as Black-headed Gull, amongst its Special Conservation Interests SCI species of this SPA and is within 12km distance. No significant change in breeding bird species richness and abundance can be

attributed to the rehabilitation so far at Derrybrat, but rehabilitation measures have consolidated conditions for wetland habitat and other habitat to continue to establish to support breeding bird species.

Table Error! No text of specified style in document.-47: - 2022 – Monitoring YR1 Countryside Bird Survey Results

Species	BOCCI 2020 - 2026 Status	Habitat Association	ARA
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	17
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	13
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	8
SW Sedge Warbler <i>Acrocephalus schoenobaenus</i>	Green	OPEN/NON-OPEN	8
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	7
BH Black-headed Gull <i>Chroicocephalus ridibundus</i>	Red	OPEN	6
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	4
MA Mallard <i>Anas platyrhynchos</i>	Green	OPEN	4
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	3
CA Cormorant <i>Phalacrocorax carbo</i>	Amber	OPEN	3
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	3
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	3
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	3
CC Chiffchaff <i>Phylloscopus collybita</i>	Green	NON-OPEN	2
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	2
PH Pheasant <i>Phasianus colchicus</i>	N/A	NON-OPEN	2
RB Reed Bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	2
RO Rook <i>Corvus frugilegus</i>	Green	NON-OPEN	2
SN Snipe <i>Gallinago gallinago</i>	Red	OPEN	2

Species	BOCCI 2020 - 2026 Status	Habitat Association	ARA
WC Whinchat <i>Saxicola rubetra</i>	Red	OPEN	2
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	2
D. Dunnock <i>Prunella modularis</i>	Green	NON-OPEN	1
JD Jackdaw <i>Corvus monedula</i>	Green	NON-OPEN	1
K. Kestrel <i>Falco tinnunculus</i>	Amber	OPEN	1
M. Mistle thrush <i>Turdus viscivorus</i>	Green	NON-OPEN	1
MH Moorhen <i>Gallinula chloropus</i>	Green	OPEN	1
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	1

Winter Birds – Monitoring YR1

Winter Birds – Monitoring YR1

Method

Five counts within the winter period 2022/23 were conducted. All counts were within the period 08:40 to 17:30. Counts were undertaken generally on days with no rain but on three dates showers were noted. Visibility was always good and wind speeds ranged from F1-F3. Survey dates were 26 October 2022, 05 December 2021, 01 January 2023, 17 February 2023, and 16 March 2023.

Constraints

On several visits EDRSS activities were still ongoing. This was not considered significant and did not significantly alter the survey findings.

Results – Species Richness

A total of 14 water bird species were recorded across all surveys. Two of these were BoCCI (Gilbert *et al.* 2021) Red listed species namely Snipe and Lapwing. Six Amber listed species were recorded namely Mallard, Teal, Mute Swan, Cormorant, Coot, and Black-headed Gull.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 16.2 and was highest for Teal (n=5) although this was influenced by a peak count of 19 in March of 2023. Lapwing had an

average abundance of (n=4) which was influenced by a peak count of 17 in January 2023. Average abundance across all 7 counts was <4 for all remaining species.

Results – Habitat Associations

Most birds across all counts were found to associate with habitats present at Derrybrat Bog.

Discussion

Overall species richness is considered to be Medium during the period studied. The species recorded are typical of a revegetating cutover bog supporting small establishing wetlands. No counts were recorded as reaching potentially important thresholds for species of conservation concern. The wintering bird species assemblage is similar to previous bird observations undertaken at the site by Bord a Mona. No change in species richness and abundance can be attributed to the rehabilitation so far.

Eight species recorded were of Red or Amber status. In the context of nearby European Designated Sites which have for instance ‘*Wetland and Waterbirds*’ as qualifying interests (i.e., Middle Shannon Callows SPA located over 9km to the north-west), a post-rehabilitation Derrybrat may contribute to further habitat for SCI species and support the conservation objectives for these European Designated Sites. Derrybrat could also be considered cumulative in conjunction with the adjacent rehabilitated Boora Bog to the east, which has also been rehabilitated as part of the Scheme. The data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds at this site.

Table Error! No text of specified style in document.-48: Winter 2022/23 – Monitoring YR1 I-WeBS Survey Results

Species	BoCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
SN Snipe <i>Gallinago gallinago</i>	Red	0	0	N/A	1	2	1	1	4
MA Mallard <i>Anas platyrhynchos</i>	Amber	0	0	N/A	2	2	8	2	12
L. Lapwing <i>Vanellus vanellus</i>	Red	0	0	N/A	17	0	3	4	20
T. Teal <i>Anas crecca</i>	Amber	0	0	N/A	0	8	19	5	27
MS Mute Swan <i>Cygnus olor</i>	Amber	2	1	N/A	2	2	1	2	8
H. Grey Heron <i>Ardea cinerea</i>	Green	0	0	N/A	1	1	3	1	5
LG Little Grebe <i>Tachybaptus ruficollis</i>	Green	1	0	N/A	2	4	3	2	10
MH Moorhen <i>Gallinula chloropus</i>	Green	0	0	N/A	1	1	2	1	4

Species	BoCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
CA Cormorant <i>Phalacrocorax carbo</i>	Amber	1	0	N/A	0	0	0	0	1
CO Coot <i>Fulica atra</i>	Amber	0	0	N/A	0	1	0	0	1
BH Black-headed Gull <i>Chroicocephalus ridibundus</i>	Amber	0	0	N/A	0	0	2	0	2
WA Water Rail <i>Rallus aquaticus</i>	Green	1	0	N/A	0	0	1	0	2
Little Egret <i>Egretta garzetta</i>	Green	1	1	N/A	0	0	0	0	2
Great Egret <i>Ardea alba</i>	N/A	1	0	N/A	0	0	0	0	1

Pollinators

Pollinator surveys are not included in the scheme monitoring scope for Derrybrat Bog.

17. Knappoge

Knappoge is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Knappoge Bog during summer 2022.

Constraints

Some areas are not safe for access due to standing water or soft conditions and have to be avoided. However, this is not thought to have affected survey results however as there are still high fields present which can be used for access and these areas are at present entirely bare peat with little to no vegetation present.

Results

The River Shannon forms a boundary to the west of Knappoge Bog while the Royal Canal forms a boundary along the eastern edge.

Knappoge had a partially pumped drainage system. Since these pumps have been turned off there has been significant natural re-wetting and development of pioneer habitats at this site. Large areas of open water and wetland have now developed in the western central and north-eastern part of the site, with pioneer flush and fen communities (PF2) fringing wetlands.

The majority of the former peat production footprint is a mosaic of open water ('Permanent pools and lakes' or OW), wetland habitat, or pioneering bare peat ('Bare peat (0-50% cover)' or BP) and contains active drainage channels. These bodies of open water are subject to inundation from the Shannon during the winter period which increases their respective extent. Water levels reduce naturally in the summer. Due to the undulating nature of the surface of the former production bog, small hills and ridges with gravel-based sub-soil have been exposed and many of these features are impeding the original drainage on the bog resulting in smaller areas of open water also developing.

Pioneer open habitats have developed in more elevated drier parts of the site and include 'pioneer *Eriophorum angustifolium* community' (poor fen) (pEang) and 'pioneer *Juncus effusus* community' (pJeff) becoming established along the drains, along with the scrub communities 'emergent *Betula*-dominated community (A)' (eBir), open *Betula*-dominated community (B) (oBir) and *Ulex*-dominated community (eGor).

The most northern lobe of the bog is predominantly Bare peat (0-50% cover) (BP) with some 'Pioneer *Juncus effusus* community' (pJeff) vegetation emerging in drains along with pioneer 'Pioneer *Eriophorum angustifolium* community (poor fen)' (pEang). To the south of the northern lobe an area of poor fen

and flush (PF2) is developing comprising of ‘pioneer *Juncus* with *Sphagnum*’ (pJunc) and ‘emergent *Betula*-dominated community (A)’ (eBir).

A network of railway lines (Access, Acc) exists which are elevated above the level of the surrounding former production bog, some sections of which have hedgerows (WL1) at either side.

The western extremity of Knappoge contains an area of intact Raised Bog (PB1) which forms part of a larger bog (a small portion of the raised bog is not in BnM ownership). A small section on the eastern edge of this habitat has been ditched but the majority of the raised bog has never been extensively drained.

The wet grassland (GS4) adjacent to the River Shannon is dominated by Purple Moor Grass (*Molinia caerulea*) (‘*Molinia caerulea*-dominated community’ or gMol) on the higher ground that slopes towards the river while a band of Reed Canary-Grass (*Phalaris arundinacea*) dominated grassland occurred on the lower lying, flood prone ground. Reed beds (FS1) dominated by Common Reed (*Phragmites australis*) (‘*Phragmites australis* community’ or pPhrag) bordered the river’s edge. The wet grassland (GS4) does not appear to have been grazed in recent years and as a consequence scrub is encroaching in this area.

In conclusion the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site. It is too soon for habitats at Knappoge to reflect post rehabilitation change or vegetation/habitat succession. Extensive areas of Knappoge already have well established pioneer vegetation including Reedbeds, fen and Birch woodland/scrub. The habitats will continue to develop post rehabilitation as the implemented measures have consolidated wetland conditions across the majority of the site.



Pioneering vegetation on cutaway including Scrub and ‘pioneer *Juncus effusus* community’ (pJeff) (Oct 2021).



Open water (OW) and wetland habitats developing at Knappoge Bog west (October 2020).



Open water (OW) and wetland habitats developing at Knappoge Bog west (Oct 2020).



'Pioneer Eriophorum angustifolium community (poor fen)' (pEang) within the north-western part of Knappoge Bog.



Remnant Raised Bog (PB1) at Knappoge (October 2020).



View of bare peat (BP) with 'Pioneer Eriophorum angustifolium community (poor fen)' (pEang) in the northern arm of Knappoge Bog (2021).

Vegetation Quadrats – Monitoring YR1

Vegetation quadrats are not included in the scheme monitoring scope for Knappoge Bog.

Breeding Birds – Monitoring YR1

Breeding bird surveys are not included in the scheme monitoring scope for Knappoge Bog.

Winter Birds – Monitoring YR1

Method

Five counts within the winter period 2022/23 were conducted. All counts were within the period 11:00 to 17:00. Counts were undertaken generally on days with no rain but on one date in March 2023 snow and rain were noted. Visibility was always good and wind speeds ranged from F1-F4. Survey dates were 04 November 2022, 31 November 2022, 25 January 2023, 09 March 2023 and 28 March 2023.

Constraints

On several visits EDRSS activities were still ongoing. However, machinery activity was localised, and it was considered that there were no significant changes in bird assemblages recorded as a result. This site was not surveyed in October 2022.

Results – Species Richness

A total of 20 water bird species were recorded across all surveys. Two of these were BOCCI (Gilbert *et al.* 2021) Red listed species namely Lapwing and Shoveler. Thirteen Amber listed species were recorded namely Cormorant, Common gull, Coot, Great Crested Grebe, Lesser Black-Backed Gull, Mallard, Mute Swan, Pintail, Teal, Tufted Duck, Wigeon and Whooper Swan. Five Green listed species namely Little Egret, Little Grebe, Grey Heron, Moorhen and Water Rail were also recorded.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 17-1 and was highest for Wigeon (n=86) which were present in good numbers each month. The maximum count of Wigeon in any given month was 150 birds recorded in December 2022. Average abundance across the winter period was also relatively high for Mallard (n=22), Mute Swan (n=27) and Tufted Duck (n=37). Average abundance across all 7 counts was <12 for all remaining species.

Results – Habitat Associations

Most birds across all counts were found to associate with habitats present at Knappoge Bog.

Discussion

Overall species richness and abundance is considered to be High during the period studied. No counts were recorded as reaching potentially important thresholds for species of conservation concern. No change in species richness and abundance can be attributed to the rehabilitation so far.

The location of Knappoge Bog adjacent to the River Shannon floodplain and the resulting annual cycle of inundation generally influences the water bird species richness on site, hence the occurrence of several species of conservation concern. Sixteen species recorded were of Red or Amber status. Four species recorded were of Green status.

In the context of nearby European Designated Sites, such as Lough Ree SPA (located approximately 2.7km south) which has a range of waders and waterfowl, and 'Wetland and Waterbirds' listed as special conservation interests (NPWS, 2022a), a post-rehabilitation Knappoge bog may contribute to further habitat for SCI species. The site may provide supporting foraging and roosting habitat for winter water birds of conservation concern and support the conservation objectives for this European Sites.

In conclusion the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of wintering birds at Knappoge and at other sites in the wider Mountdillon area that are also subject to rewetting under the current EDRSS Scheme.

Table Error! No text of specified style in document.-49 Winter 2022/23 – Monitoring YR1 IWeBS Survey Results

Species	BoCCI 2020 - 2026 STATUS	OCT	NOV	DEC	JAN	FEB	MAR	Mean	Max
L Lapwing <i>Vanellus vanellus</i>	Red	N/A	9	0	23	0	28	12	28
SV Shoveler <i>Anas clypeata</i>	Red	N/A	6	7	4	2	15	7	15
BH Black Headed gull <i>Larus ridibundus</i>	Amber	N/A	0	0	2	0	3	1	3
CA Cormorant <i>Phalacrocorax carbo</i>	Amber	N/A	0	2	0	1	1	1	2
CM Common Gull <i>Larus canus</i>	Amber	N/A	0	0	0	0	2	0	2
CO Coot <i>Fulica atra</i>	Amber	N/A	10	10	12	5	0	7	12
GG Great Crested Grebe <i>Podiceps cristatus</i>	Amber	N/A	0	1	0	0	1	0	1
LB Lesser Black Backed Gull <i>Larus fuscus</i>	Amber	N/A	0	0	0	0	8	2	8
LG Little Grebe <i>Tachybaptus ruficollis</i>	Green	N/A	0	0	2	1	3	1	3
MA Mallard <i>Anas platyrhynchos</i>	Amber	N/A	30	20	21	35	5	22	35
MS Mute Swan <i>Cygnus olor</i>	Amber	N/A	32	37	42	17	8	27	42
PT Pintail <i>Anas acuta</i>	Amber	N/A	0	6	0	0	0	1	6
T Teal <i>Anas crecca</i>	Amber	N/A	0	0	40	20	6	13	40
TU Tufted Duck <i>Aythya fuligula</i>	Amber	N/A	40	30	35	45	36	37	45
WN Wigeon <i>Anas penelope</i>	Amber	N/A	110	150	80	40	48	86	150
WS Whooper Swan <i>Cygnus cygnus</i>	Amber	N/A	0	15	0	0	0	3	15
ET Little egret <i>Egretta garzetta</i>	Green	N/A	0	0	0	0	1	0	1
H Grey Heron <i>Ardea cinerea</i>	Green	N/A	0	2	2	1	0	1	2
Mh Moorhen <i>Gallinula chloropus</i>	Green	N/A	1	2	2	1	2	2	2
WA Water Rail <i>Rallus aquaticus</i>	Green	N/A	0	0	0	1	2	1	2

Pollinators

Pollinator surveys are not included in the scheme monitoring scope for Knappoge Bog.

18. Ballycon

Ballycon is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out a baseline ecological survey of habitats at Ballycon Bog during summer 2022.

Constraints

The survey work was carried out in accordance with relevant best practice guidelines, and habitats and species on the site were readily identifiable during the field visits. All parts of the bog were accessible during the surveys. No significant constraints or limitations to the YR1 monitoring survey have been identified.

Results

Ballycon Bog, located within County Offaly, covering an area of 281.1 ha. It is considered a shallow peat cutaway bog; the majority of peat having been removed.

Ballycon Bog was partially rehabilitated in 2005-2006. Works at this time consisted of drain blocking and bund construction. The restoration works have resulted in the development of a mosaic of wetland, scrub, woodland and pioneering cutaway bog habitats. Additional rehabilitation works have also been carried out since then; some headlands were fertilised in 2015 to encourage the development of pioneer dry cutaway habitats and there was follow-up drain blocking in 2018.

The majority of Ballycon is currently considered as a biodiversity area, apart from the western/north-western section of the site, which was developed for commercial conifer forestry plantation in the 1980s and is leased to Coillte. The section adjacent to the conifer plantation is older cutaway with some Birch scrub (WS1) developing to immature bog woodland (WN7) (Birch Woodland - BirWD). A very small section of this woodland is becoming analogous to Annex I bog woodland (91D0). This Birch woodland has a *Sphagnum*-rich ground flora. However, it is very small in extent (< 0.1 ha). There are also small areas that have become *Sphagnum*-rich with carpets of *Sphagnum*. These patches are still relatively small in extent (< 1 ha). This is equivalent to High *Sphagnum* cutover bog vegetation community (Smith and Crowley, 2020).

Given the previous rehabilitation efforts implemented at Ballycon, together with natural colonisation, as much as 90% of the former peat production area has now revegetated to some degree. The western side of the site has been out of production for a longer period of time and therefore has more well-developed habitats; the ground is also somewhat higher and drier in this area, meaning that scrub/woodland habitats predominate.

The majority of the site is developing a mosaic of wetlands with pioneer poor fen vegetation and emerging scrub. Areas of pioneer poor fen mosaic primarily comprise 'Pioneer *Eriophorum angustifolium* community (poor fen)' (pEang); this is commonly found in a mosaic with bare peat ('Bare peat (0-50% cover)' (BP) and open birch scrub 'Open *Betula*-dominated community (B) (oBir). Other emergent poor fen communities present to a lesser extent include '*Carex rostrata* community' (pRos),

'Pioneer *Juncus effusus* community' (pJeff) and 'Pioneer *Campylopus* dominated community' (pCamp). 'Tussiligo-dominated community (vegetation > 50%)' (DisCF) was also occasionally recorded in association with drainage ditches within the site.

Extensive areas of wetland are present in the central and eastern parts of the Ballycon; these comprise 'Permanent pools and lakes' (OW) which form mosaics with fringing and emergent poor fen communities, primarily '*Phragmites australis* community' (pPhrag), '*Typha* community' (pTyp), '*Schoenoplectus* community' (Pschon) and '*Carex rostrata* community' (pRos). The pPhrag community was also recorded fringing a wet drainage ditch within the eastern part of the site as riparian vegetation.

Ecological indicators of alkaline water chemistry and rich fen are also present at Ballycon. These include clumps of Saw Sedge (*Cladium mariscus*) along with typical species such as Marsh Pennywort, Water Mint, Common Marsh-bedstraw and a range of short sedges (*Carex demissa*). Brown mosses such as *Scorpidium scorpiodes*, *Drepanocladus* spp. and *Campylium stellatum* are present on the site with one particular area adjacent to the conifer plantation developing fen like characteristics. Stoneworts are a prominent part of the vegetation in places, particularly along the south-east margin where there is underlying shell marl influence.

Within the north-western part of the site grassland '*Molinia caerulea*-dominated community' (pMol) was present. A railway network runs east to west across the bog along the southern bog margins. In localised areas along railway embankments, as well as other locations where calcareous sub-soil is exposed or the peat very shallow, the conditions supported 'Dry calcareous grassland' (gCal). On drier parts of both the eastern and western margins of the site dry heath corresponding to 'Dry *Calluna* community' (dHeath) was also recorded. These habitats were all found in association with scrub.

The majority of scrub cover within the site corresponds to 'Emergent *Betula*-dominated community (A) (eBir) or 'Open *Betula*-dominated community (B) (oBir)'. Areas of more developed 'Closed *Betula* scrub community (C)' (cBir) are present in the western part of the site. 'Dense *Pteridium*' (dPter) was also recorded occasionally at the site margins.

Rehabilitation works commenced at Ballycon in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession, and the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site, albeit with relatively well-developed recolonising habitats in some areas given that the site underwent partial rehabilitation in 2005-2006, with additional measures also implemented in 2015 and 2018. It is expected that the overall ecological value of this site will increase in the future as the site continues to re-vegetate, mature and form semi-natural habitats.



View of the typical wetland habitat and emergent vegetation present at Ballycon Bog.



Pioneer fen vegetation at Ballycon Bog.



Open water, poor fen and flush.



Pioneer/open birch (eBir/oBir), with wetland habitat in the background.



Mosaic of dry Calluna-dominated vegetation (dHeath) and emergent Betula-dominated scrub (eBir) habitat on the headland at Ballycon.



Wetland with emergent horsetails in the southern section of the site.

Vegetation Quadrats – Monitoring YR1

Vegetation quadrats are not included in the scheme monitoring scope for Ballycon Bog.

Breeding Birds – Monitoring YR1

Breeding bird surveys are not included in the scheme monitoring scope for Ballycon Bog.

Winter Birds – Monitoring YR1

Wintering bird surveys are not included in the scheme monitoring scope for Ballycon Bog.

Pollinators

Pollinator surveys are not included in the scheme monitoring scope for Ballycon Bog.

19. Blackwater

Blackwater is a Scheme Year 2 Bog, and as such 2022 comprised the first year for which monitoring data is presented for this bog.

Habitats – Monitoring YR1

Method

As part of EDRRS Monitoring and Verification, Bord na Móna carried out baseline ecological surveys of habitats at Blackwater Bog during summer 2022.

Constraints

The area proposed for rehabilitation in this phase consists of three discrete parcels of land within the wider Blackwater Bog boundary. The habitat surveys carried out in 2022 were therefore confined to these parcels of land. No constraints were identified, and all of these areas were accessible during the surveys.

Results

Blackwater Bog is located in Co. Offaly. The three discrete parcels of land proposed for rehabilitation in this phase have a total footprint of 554 ha. The main habitats within these parcels of land are described below.

Tullaghbeg

The rehabilitation area includes 115 ha of land in the northern part of Blackwater and lies adjacent to Fin Lough (Offaly) SAC. The Gowlan River (Depositing/Lowland River (FW2)) flows along the north and east side and demarcates the boundary. Wetland habitats have developed in the south-eastern corner, dominated by pioneer '*Phragmites australis* community' (pPhrag) and open water classified as 'permanent pools and lakes' (OW) with emergent communities including '*Carex rostrata* community' (pRos). Extensive areas of 'Bare peat (0-50% cover)' (BP) remain. The former production area along the northern margin has now revegetated with pioneer open habitats and scrub vegetation communities including 'pioneer *Eriophorum angustifolium* community (poor fen)' (pEang), 'open *Betula*-dominated community (B)' (oBir) and 'emergent *Betula*-dominated community (A)' (eBir).

The adjacent Fin Lough area (the SAC) contains a mosaic of Rich Fen (PF1), Raised Bog (PB1), Reedbeds (FS1), Scrub (WS1) and some Wet Grassland (GS4) around an infilling Limestone Lake (FL3). Fringe habitats around the margins include raised Bog Remnants (PB1, PB4) Scrub developing on high bog (WS1), Bracken (HP1) and Birch Woodland (WN7).

Derrylahan-Blackwater

This area comprises 270 ha bounded on the south west by the Gowlan River and the north east by the Derryhask stream. This section extends to the boundary of Blackwater Bog where the Blackwater River forms the demarcation between Blackwater and the adjacent Belmont Bog (rehabilitated in 2021).

The majority of this area is re-vegetating with a mixture of Open Water, Pioneer Poor Fen, Reedbeds and Birch Scrub, although some areas of bare peat still remain. A significant portion of this section is

quite wet and Wetland habitats have developed at either end of this parcel of land, dominated by 'Phragmites australis community' (pPhrag) and Open Water classified as 'permanent pools and lakes' (OW). It is subject to annual flooding or high-water levels during the winter months, due to its proximity to the corridor of the Blackwater River, a Depositing/Lowland River (FW2). Pioneer open habitat/poor fen communities are extensive throughout this section and include the communities 'pioneer *Eriophorum angustifolium* community (poor fen)' (pEang), 'pioneer *Juncus effusus* community' (pJeff), 'pioneer *Triglochin palustris* community' (pTrig), forming mosaics with scrub communities including 'emergent *Betula*-dominated community (A)' (eBir) and 'open *Betula*-dominated community (B)' (oBir).

Clondelara-Blackwater

This rehabilitation area consists of 170 ha of land and is the most westerly parcel of land proposed for rehabilitation. The Gowlan River flows to its east, whilst the main access road into the centre of Blackwater and the ash deposition facility demarcates its western boundary.

The majority of this section was in active peat production until relatively recently and is now starting to revegetate with pioneer open and scrub communities including 'pioneer *Juncus effusus* community' (pJeff), pioneer *Eriophorum angustifolium* community (poor fen) (pEang), 'emergent *Betula*-dominated community (A)' (eBir) and 'open *Betula*-dominated community (B)' (oBir) forming mosaics with 'bare peat (0-50% cover)' (BP).

Large areas of open water occur along the northern boundary of this section classified as Permanent Pools and Lakes (OW) with extensive 'Phragmites australis community' (pPhrag) forming adjacent to the Gowlan River. These bodies of more permanent water are subject to increased inundation during the winter period. Emergent communities include '*Carex rostrata* community' (pRos) and '*Typha* community' (pTyp). Well-developed scrub and woodland communities occur in the south-east of this section, including closed '*Betula* scrub community (C)' (cBir) and '*Betula-Salix* woodland' (BirWD).

Rehabilitation works commenced at Blackwater in 2022. It is too soon for this bog to reflect post rehabilitation change or vegetation/habitat succession and the habitats recorded in 2022 largely reflect the baseline status of a recently transformed peat extraction site. Some areas of the bog already have well established pioneer vegetation including poor fen, wetlands, scrub and woodland. These habitats are expected to continue to develop post rehabilitation.



Wetland, Poor Fen and Reedbed habitat (pPhrag) in the north-eastern part of Blackwater (Derrylahan-Blackwater section).



Wetland, fringed by Reedbed (pPhrag) habitat in the south-western part of Blackwater (Clondelara-Blackwater).



Bare peat and Poor Fen habitat in the north-eastern part of Blackwater (Derrylahan-Blackwater section).



Bare peat and Poor Fen habitat in the south-western part of Blackwater (Clondelara-Blackwater).



Dry heather dominated vegetation (dHeath) and Birch Woodland (BirWD) along marginal land in the north-eastern part of Blackwater (Derrylahan-Blackwater section)



Dry Heather dominated vegetation (dHeath) and Birch Woodland (BirWD) occurs in drier areas (Derrylahan-Blackwater section).

Vegetation Quadrats – Monitoring YR1

Vegetation quadrats are not included in the scheme monitoring scope for Blackwater Bog.

Breeding Birds – Monitoring YR1

Methods

At Blackwater, two 1km transects were selected to provide a representative sample of the breeding bird community. Each transect was placed along an existing headland or rail line corridor for ease of use, but also because these locations will continue to be accessible post rehabilitation, allowing the same route to be repeated. Two visits in the period May to June of 2022 were carried out. See the Appendix B19 figure titled '*Blackwater Bog Ecology Transects*' for transect locations.

Constraints

Health and Safety imperatives required the transect routes to be safe for human access and therefore the locations selected are in line with high fields, headlands or rail lines associated with former peat extraction. Due to their location, sampling results may include species which utilise the areas adjacent to transect routes i.e., areas not subject to rehabilitation. Where relevant this is further addressed in the Discussion section.

The British Trust for Ornithology (www.bto.org) advises that the ideal time of day to count birds (BBS) in the breeding season is roughly one hour after sunrise until mid-morning (10.00-11.00am). CBS recommended timings are early morning, no later than 9.00am 'ideally' but allowance is made to extend this period for sites which require longer travel times or where access is difficult. The timing of the June visits may have exceeded the CBS recommended period for surveying but was complete by 11.00am and data are considered acceptable for analysis. The May visit was carried out outside of the BTO recommended timings for CBS survey. However, weather conditions were optimal, and the open nature of the habitats considered suitable for open habitat utilisation species such as Meadow Pipit and Skylark. It is therefore considered that a representative sample of the breeding bird assemblages was recorded during the visit. All surveys were carried out during suitable weather conditions, avoiding heavy rain, poor visibility and strong winds. Any bias on a per species level is discussed further under Discussion, where relevant.

Results- Species Richness

Species richness is presented as the total number of species recorded across transects. For completeness, any additional species recorded off transect but considered to be associating with habitats on site on any single visit are included where relevant.

A total of 31 no. species were recorded, see Table 19-1. This included four BoCCI (Gilbert *et al.* 2021) Red listed species: Lapwing, Meadow Pipit, Snipe and Shoveler. Six BoCCI Amber listed species were recorded: Goldcrest, Mallard, Ringed Plover, Skylark, Swallow and Willow Warbler. Remaining species were all Green listed apart from Pheasant, which is not assigned a BoCCI status.

Results – Annual Relative Abundance

Annual Relative Abundance (ARA) is presented as the maximum count per species per visit (Early or Late) or as the maximum count for the period April to June inclusive, see Table 19-1 This allows for future comparison with CBS trends which takes the same approach to index species.

Maximum counts of greater than 10 individuals were recorded for 5 species, Meadow Pipit, Skylark, Whitethroat, Wren and Willow Warbler. All remaining species were recorded in low numbers (typically less than 5). Overall abundance, and relative abundance associating with cutover habitats, was highest for Whitethroat with a maximum of 16 individuals recorded in the period April to June.

Results – Habitat Associations

Habitat associations methodology has already been described within Section 1.2. Fourteen species associated with OPEN habitats, fourteen species associated with NON-OPEN habitats, and three species associated with both were recorded see Table 19-1.

Results – Colonial Species

No colonies were recorded.

Discussion

It is notable that the four Red listed species recorded i.e. Lapwing, Meadow Pipit, Snipe and Shoveler are associated with open habitats targeted for rehabilitation in the form of rewetting, and would be expected to gain from many of the measures implemented (wetland creation and fertiliser application to high fields for example). The Amber listed species Skylark associates with drier open habitats and had the third highest relative abundance overall (n=13). Overall, the total number of species either Red or Amber listed was 10. Regarding wading species, breeding is considered likely (based on professional judgement) for Lapwing, Snipe and Ringed Plover in 2022.

In general, the abundance estimates reflect the wetland habitats currently present at Blackwater, as well as the associated established marginal habitats i.e. scrub, remnant bog and woodland. In time, the extensive areas of bare peat within the Blackwater Bog boundary will provide more suitable habitat for many species. Regarding habitat associations, over 45% of species recorded that display a clear preference for open or non-open habitat are more associated with open habitats. Open habitat species comprise a higher proportion of Red and Amber listed species (7 no. in total), with only two Amber species associated with non-open habitats (Goldcrest, and Willow Warbler). Openness of habitat has previously been suggested as an important habitat feature benefitting species of conservation concern (Copland, 2009), and this still seems the case. Further analysis on trends in the ratio or relative abundance of these species over time following rehabilitation would be beneficial.

In conclusion, the data presented here forms a baseline for further interpretation of the effects of rehabilitation to assemblages of breeding birds both at Blackwater and across the EDRRS scheme. In addition, the occurrence at Blackwater of many of the species described here is notable given the proximity of the adjacent European Site (the Middle Shannon Callows SPA) which includes '*Wetlands and Waterbirds*', along with species such as Lapwing, amongst its Special Conservation Interests. In time parts of Blackwater may become an important supporting site for SCI species of this SPA. No significant change in breeding bird species richness and abundance can be attributed to the

rehabilitation so far at Blackwater, but rehabilitation measures have consolidated conditions for wetland habitat and other habitat to continue to establish to support breeding bird species.

Table Error! No text of specified style in document.-50: 2022 – Monitoring YR1 Countryside Bird Survey Results

Species	BOCCI status	Habitat association	ARA
B. Blackbird <i>Turdus merula</i>	Green	NON-OPEN	6
BC Blackcap <i>Sylvia atricapilla</i>	Green	NON-OPEN	2
BT Blue Tit <i>Cyanistes caeruleus</i>	Green	NON-OPEN	2
CH Chaffinch <i>Fringilla coelebs</i>	Green	NON-OPEN	4
CK Cuckoo <i>Cuculus canorus</i>	Green	OPEN	4
D. Dunnock <i>Prunella modularis</i>	Green	NON-OPEN	2
GC Goldcrest <i>Regulus regulus</i>	Amber	NON-OPEN	1
H. Grey Heron <i>Ardea cinerea</i>	Green	OPEN	2
HC. Hooded Crow <i>Corvus cornix</i>	Green	OPEN	3
L. Lapwing <i>Vanellus vanellus</i>	Red	OPEN	4
LR Redpoll <i>Acanthis cabaret</i>	Green	NON-OPEN	9
LT Long-tailed Tit <i>Aegithalos caudatus</i>	Green	NON-OPEN	4
MA Mallard <i>Anas platyrhynchos</i>	Amber	OPEN	1
MH Moorhen <i>Gallinula chloropus</i>	Green	OPEN	1
MG Magpie <i>Pica pica</i>	Green	NON-OPEN	1
MP Meadow Pipit <i>Anthus pratensis</i>	Red	OPEN	12
PH Pheasant <i>Phasianus colchicus</i>	N/A	NON-OPEN	2
R. Robin <i>Erithacus rubecula</i>	Green	NON-OPEN	1
RB Reed Bunting <i>Emberiza schoeniclus</i>	Green	OPEN/NON-OPEN	9
RP Ringed Plover <i>Charadrius hiaticula</i>	Green	OPEN	1
S. Skylark <i>Alauda arvensis</i>	Amber	OPEN	13
SC Stonechat <i>Saxicola rubicola</i>	Green	OPEN	7
SL Swallow <i>Hirundo rustica</i>	Amber	OPEN	2
SN Snipe <i>Gallinago gallinago</i>	Red	OPEN	4
SV Shoveler <i>Anas clypeata</i>	Red	OPEN	1
SW Sedge Warbler <i>Acrocephalus schoenobaenus</i>	Green	OPEN/NON-OPEN	10
WA Water Rail <i>Rallus aquaticus</i>	Green	OPEN	2
WH Whitethroat <i>Sylvia communis</i>	Green	NON-OPEN	16
WP Woodpigeon <i>Columba palumbus</i>	Green	NON-OPEN	1
WR Wren <i>Troglodytes troglodytes</i>	Green	OPEN/NON-OPEN	11
WW Willow Warbler <i>Phylloscopus trochilus</i>	Amber	NON-OPEN	15

Winter Birds – Monitoring YR1

Method

Six counts within the winter period 2022/23 were conducted. All counts were within the period 09:50 to 16:30. Counts were undertaken generally on days with no rain but on two dates showers were noted. Visibility was always good and wind speeds ranged from F1-F2. Survey dates were 27 October 2022, 02 November 2022, 22 December 2022, 31 January 2023, 22 February 2023, 28 March 2023.

Constraints

On several visits EDRSS activities were still ongoing, particularly around cells in the SW of the ash pit and the blackwater railway line.

Results – Species Richness

A total of 16 water bird species were recorded across all surveys. Three of these were BOCCI (Gilbert *et al.* 2021) Red listed species namely Lapwing, Shoveler and Snipe. Eight Amber listed species were recorded namely Coot, Greylag Goose, Mallard, Mute swan, Ringed plover, Teal, Wigeon, Whooper swan. The remaining five species are green listed namely Grey Heron, Jack Snipe, Little Grebe, Moorhen and Water rail.

Results – Abundance

Average (mean) abundance across the winter period is presented in Table 19.2 and was highest for Whooper swan (n=126) although this was influenced by low counts in February and March of 2023. Teal also had a high average abundance (n=72) followed by Mallard (n=27) and Greylag goose (n=17). Average abundance across all 6 counts was <7 for all remaining species.

Results – Habitat Associations

Most birds across all counts were found to associate with habitats present at Blackwater Bog.

Discussion

Overall species richness and abundance is considered to be High, and relatively typical for a bog like Blackwater bog that supports a variety of wetland habitats, some of which have establishing vegetation. Whooper Swan was recorded in Nationally Important numbers. Blackwater has also provided records of other species such as Pochard in recent years and is counted as part of I-WeBS.

Eleven species recorded were of Red or Amber status. In the context of nearby European Designated Sites (i.e., the nearby Middle Shannon Callows SPA) which have for instance ‘*Wetland and Waterbirds*’ as qualifying interests a post rehabilitation Blackwater bog may contribute to further supporting habitat for SCI species. It may also therefore support the conservation objectives for these European Designated Sites.

Table Error! No text of specified style in document.-51: Winter 2022/23 – Monitoring YR1 IWeBS Survey Results

Species	BOCCI 2020 - 2026 STATUS	Oct	Nov	Dec	Jan	Feb	Mar	Mean	Max
WS Whooper Swan <i>Cygnus cygnus</i>	Amber	175	210	197	158	10	4	126	210
MA Mallard <i>Anas platyrhynchos</i>	Amber	14	6	26	68	40	10	27	68

Species	BOCCI 2020 - 2026 STATUS	Oct	Nov	Dec	Jan	Feb	Mar	Mean	Max
MH Moorhen <i>Gallinula chloropus</i>	Green	0	0	0	1	5	1	1	5
H. Grey Heron <i>Ardea cinerea</i>	Green	3	0	0	6	4	3	3	6
WN Wigeon <i>Anas penelope</i>	Amber	5	0	0	2	2	0	2	5
GJ Greylag Goose <i>Anser anser</i>	Amber	0	60	0	30	11	0	17	60
MS Mute Swan <i>Cygnus olor</i>	Amber	12	3	8	6	3	2	6	12
LG Little Grebe <i>Tachybaptus ruficollis</i>	Green	0	0	0	3	11	1	3	11
T Teal <i>Anas crecca</i>	Amber	0	0	10	119	303	0	72	303
SV Shoveler <i>Anas clypeata</i>	Red	0	0	0	2	0	0	0	2
JS Jack Snipe <i>Lymnocyptes minimus</i>	Green	0	0	0	1	0	0	0	1
SN Snipe <i>Galinago galinago</i>	Red	5	4	1	1	4	6	4	6
CO Coot <i>Fulica atra</i>	Amber	0	0	0	0	2	0	0	2
L. Lapwing <i>Vanellus vanellus</i>	Red	0	0	0	14	4	7	4	14
WA Water Rail <i>Rallus aquaticus</i>	Green	3	0	0	0	0	0	1	3

Pollinators

Methods

The pollinator transect survey at Blackwater Bog is 1km in length. All surveys were completed between 10:30 and 16:30hrs, when the temperature was at least 12.5°C and during good weather conditions. See figure titled 'Blackwater Bog Ecology Transects' for transect locations. Details of the survey effort and weather conditions for surveys carried out are shown in Table 19-3 below.

Table Error! No text of specified style in document.-52: 2022 – Pollinator Survey Dates and weather

Survey Effort and Weather Conditions- Pollinators					
	May	May	June	July	August
Average temperature (°C)	14	13	12.5	17	19
Wind direction	SW	NW	SW	SE	SW
Wind speed	F1	F1	F5	F1	F5
Date	04/05/2022	31/05/2022	10/06/2022	27/07/2022	22/08/2022
Start time	13:02	13:40	10:30	12:45	15:30
Finish time	13:32	14:10	11:00	13:30	16:30

Constraints

Wind occasionally reached higher than ideal speed, but this may reflect the open nature of the cutaway and is relatively unavoidable. A survey was not carried out in April; however, two surveys were carried out in May, an early and late survey.

Results

Table Error! No text of specified style in document.-53:2022 – Pollinator Survey Results

Species	May	May	June	July	August	Total
Dark Green Fritillary <i>Speyeria aglaja</i>	0	0	1	0	0	1
Green-veined White <i>Pieris napi</i>	1	0	0	1	1	3
Meadow Brown <i>Maniola jurtina</i>	0	0	0	59	8	67
Orange Tip <i>Anthocharis cardamines</i>	2	0	0	0	0	2
Peacock <i>Aglais io</i>	0	0	0	2	1	3
Ringlet <i>Aphantopus hyperantus</i>	0	0	0	4	0	4
Small Copper <i>Lycaena phlaeas</i>	0	0	0	1	0	1
Small Tortoiseshell <i>Aglais urticae</i>	1	0	0	0	7	8
Small White <i>Pieris rapae</i>	6	0	0	0	0	6
Speckled Wood <i>Pararge aegeria</i>	2	0	0	0	0	2
Wall <i>Lasiommata megera</i>	1	0	0	0	0	1
Total	13	0	1	67	17	98

Results – Species Richness

A total of eleven species of butterfly were recorded namely, Dark Green Fritillary, Green-veined White, Meadow Brown, Orange Tip, Peacock, Ringlet, Small Copper, Small Tortoiseshell, Small White, Speckled Wood and Wall.

In addition to butterflies the following invertebrates were also recorded during the surveys; Bombus sp. (n = 28) and Honeybee (n = 9).

Results – Abundance

A total of 98 individual butterflies were recorded across the course of the surveys. Meadow Brown occurred in the highest abundance (67 overall). The maximum abundance of Meadow Brown was recorded during the July survey.

The highest abundance of all species overall per month was a maximum of 67 and was recorded during the July survey. The lowest species abundance was recorded during the surveys in May, with no species recorded.

Results – Habitat Associations

Overall species richness and species abundance was relatively high during the surveys, compared to other cutaway bog sites. This reflects the baseline bog condition. Blackwater bog is an older production bog and there has been extensive development of pioneer cutaway vegetation communities and wetlands across the former production area. The route of the pollinator transect follows the decommissioned railway and is has developed as a grassy track with vegetation fringing and therefore provides foraging opportunities for butterfly species.

Discussion

The ongoing monitoring of butterflies and other pollinators may be useful in determining the effects of rehabilitation under the EDRRS scheme on Pollinators. The baseline scenario for Blackwater comprises largely revegetated habitats including pioneer cutaway vegetation communities and well-developed wetlands. Nevertheless, areas of bare peat remain within the bog.

It is possible species richness and abundance may increase in future surveys along the transect route when these rehabilitated bare peat areas begin to revegetate. In addition, there are other species which are known to occur at Blackwater, including a colony of Grayling which is potentially of County Importance. The effects of fertiliser application in particular to headlands and high fields may increase the rate of colonisation by some species. In addition, as more established pioneer habitats begin to develop and succeed to scrub and woodland habitats the species assemblage may change.

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Appendix D4

Biodiversity Quadrat Data

Appendix D4.1: Begnagh

Appendix D4.2: Carranstown

Appendix D4.3: Glenlough

Appendix D4.4: Ummeras

Appendix D4.5: Castlegar

D4.1 Begnagh

Table 54: Begnagh Bog Quadrat Data 2022

Name	Begnagh	Begnagh	Begnagh	Begnagh	Begnagh
Surveyor	JOS	JOS	JOS	JOS	JOS
Survey Date	17/06/2022	17/06/2022	17/06/2022	17/06/2022	17/06/2022
Quadrat	1	2	3	4	5
BnM General Cutaway Habitat	bare peat	bare peat	bare peat	bare peat	bare peat
Current Habitat Description	100% bare peat	100% bare peat	100% bare peat	100% bare peat	100% bare peat
Sphagnum Cover%	0%	0%	0%	0%	0%
Bare Peat%	91-100%	91-100%	91-100%	91-100%	91-100%
Open Water	0%	0%	0%	0%	0%

D4.2 Carranstown

Table 55: Carranstown Bog Quadrat Data 2022

Name	Carranstown	Carranstown	Carranstown	Carranstown	Carranstown	Carranstown
Surveyor	JOS	JOS	JOS	JOS	JOS	JOS
Survey Date	22.07.2022	22.07.2022	22.07.2022	22.07.2022	22.07.2022	22.07.2022
Quadrat	1	2	3	4	5	6
BnM General Cutaway Habitat	Bare peat	Bare peat	Bog	Bare peat	Bare peat	Woodland
Current Habitat Description	100% bare peat	100% bare peat	Dry Heather dominated vegetation	Bare peat, some soft rush and birch in the drain nearby. Heather and <i>Eriophorum angustifolium</i> on highfield	Bare peat	Birch woodland with dry Heather understory
<i>Sphagnum</i> Cover %	Not Observed	Not Observed	<4% (several individuals)	Not Observed	Not Observed	0
Bare Peat %	91-100%	91-100%	34-50%	91-100%	91-100%	04-10%
Open Water	Not Observed	Not Observed	Not Observed	Not Observed	Not Observed	0
Vegetation Height (cm)	<Null>	<Null>	40cm average	<Null>	<Null>	100cm (gr)
<i>Andromeda polifolia</i>	Not Observed	Not Observed	Not Observed	Not Observed	Not Observed	Not Observed
<i>Betula pubescens</i>	Not Observed	Not Observed	<4% (few individuals)	Not Observed	Not Observed	51-75%
<i>Calluna vulgaris</i>	Not Observed	Not Observed	11-25%	Not Observed	Not Observed	11-25%
<i>Campylopus atrovirens</i>	Not Observed	Not Observed	<Null>	Not Observed	Not Observed	Not Observed
<i>Campylopus introflexus</i>	Not Observed	Not Observed	<4% (few individuals)	Not Observed	Not Observed	Not Observed
<i>Cladonia portentosa</i>	Not Observed	Not Observed	<4% (several individuals)	Not Observed	Not Observed	Not Observed
<i>Erica tetralix</i>	Not Observed	Not Observed	04-10%	Not Observed	Not Observed	Not Observed
<i>Eriophorum angustifolium</i>	Not Observed	Not Observed	04-10%	Not Observed	Not Observed	Not Observed
<i>Hypnum jutlandicum</i>	Not Observed	Not Observed	<4% (several individuals)	Not Observed	Not Observed	<4% (several individuals)
<i>Molinia caerulea</i>	Not Observed	Not Observed	<4% (few individuals)	Not Observed	Not Observed	<4% (several individuals)

<i>Polytrich commune</i>	Not Observed	Not Observed	Not Observed	Not Observed	Not Observed	<4% (few individuals)
<i>Pteridium aquilinum</i>	Not Observed	Not Observed	Not Observed	Not Observed	Not Observed	11-25%
<i>Rubus Fruticosus</i>	Not Observed	Not Observed	Not Observed	Not Observed	Not Observed	11-25%
<i>Rhynchospora alba</i>	Not Observed	Not Observed	<4% (several individuals)	Not Observed	Not Observed	Not Observed
<i>Sphagnum capillifolium</i>	Not Observed	Not Observed	<4% (several individuals)	Not Observed	Not Observed	Not Observed
<i>Trichophorum cespitosum</i>	Not Observed	Not Observed	<4% (few individuals)	Not Observed	Not Observed	Not Observed
<i>Ulex</i>	Not Observed	Not Observed	Not Observed	Not Observed	Not Observed	04-10%
Additional Species 1						<i>Quercus</i> sp. <4 few
Additional Species 2						<i>Hypnum</i> sp.
Comment				No vegetation in quadrat		
Note1					No vegetation	

D4.3 Glenlough

Table 56: Glenlough Bog Quadrat Data 2022

Name	Glenlough	Glenlough	Glenlough	Glenlough	Glenlough	Glenlough	Glenlough	Glenlough
Surveyor	JOS	JOS	SC	JOS	SC	SC	JOS	SC
Survey Date	17/05/2022	17/05/2022	17/05/2022	17/05/2022	17/05/2022	17/05/2022	17/05/2022	17/05/2022
Quadrat	Q1	2	8	3	7	6	4	Q5
BnM_General Cutaway Habitat	cutover bog	bog	bog	bog	bog	bog	bog	bog
Current Habitat Description	Area of cutover between trench drains. Would correspond to BP1. Piezometer at SE corner due to drain.	Marginal ecotope dominated by leggy Heather. Piezometer at SE corner next to drain. very dry underfoot.	Marginal ecotope, tall leggy heather, extensive Cladonia portentosa cover, some Sphagnum	Sub central ecotope.	<Null>	Raised bog - marginal ecotope	Sub central ecotope. pools, and hummocks. Inter pool area quite dry	<Null>
Sphagnum Cover%	Not Observed	04-10%	04-10%	51-75%	11-25%	11-25%	51-75%	11-25%
Bare Peat%	34-50%	<4% (few individuals)	Not Observed	<4% (few individuals)	<4% (few individuals)	<4% (many individuals)	<4% (several individuals)	04-10%
Open Water	Not Observed	Not Observed	Not Observed	Not Observed	Not Observed	Not Observed	11-25%	Not Observed

Vegetation Height(cm)	25cm	40	60cm max	50cm max	35cm av.	60cm max.	60cm max	<Null>
<i>Andromeda polifolia</i>	Not Observed	<4% (few individuals)	<4% (few individuals)	<4% (several individuals)	<4% (many individuals)	<4% (several individuals)	<4% (several individuals)	<4% (few individuals)
<i>Calluna vulgaris</i>	04-10%	76-90%	51-75%	26-33%	26-33%	51-75%	11-25%	26-33%
<i>Campylopus atrovirens</i>	Not Observed	Not Observed	<4% (few individuals)	<4% (few individuals)	Not Observed	Not Observed	Not Observed	Not Observed
<i>Campylopus introflexus</i>	<4% (several individuals)	Not Observed	<4% (few individuals)	<4% (many individuals)	<4% (several individuals)	Not Observed	Not Observed	Not Observed
<i>Cladonia portentosa</i>	Not Observed	04-10%	04-10%	04-10%	<4% (several individuals)	<4% (several individuals)	04-10%	<4% (few individuals)
<i>Drosera anglica</i>	Not Observed	Not Observed	Not Observed	Not Observed	Not Observed	Not Observed	<4% (several individuals)	Not Observed

<i>Drosera rotundifolia</i>	Not Observed	Not Observed	<4% (few individuals)	<4% (several individuals)	<4% (few individuals)	<4% (several individuals)	<4% (several individuals)	Not Observed
<i>Erica tetralix</i>	Not Observed	<4% (several individuals)	04-10%	04-10%	04-10%	04-10%	04-10%	04-10%
<i>Eriophorum angustifolium</i>	Not Observed	Not Observed	<4% (many individuals)	04-10%	<4% (few individuals)	<4% (few individuals)	Not Observed	<4% (few individuals)
<i>Eriophorum vaginatum</i>	26-33%	04-10%	<4% (few individuals)	11-25%	11-25%	11-25%	04-10%	11-25%
<i>Hypnum jutlandicum</i>	<4% (several individuals)	Not Observed	<4% (many individuals)	<4% (several individuals)	<4% (several individuals)	<4% (several individuals)	<4% (several individuals)	<4% (several individuals)
<i>Narthec ossifragum</i>	Not Observed	<4% (few individuals)	<4% (several individuals)	<4% (several individuals)	04-10%	<4% (many individuals)	<4% (several individuals)	<4% (several individuals)
<i>Rhynchospora alba</i>	Not Observed	Not Observed	Not Observed	<4% (several individuals)	<4% (few individuals)	<4% (many individuals)	04-10%	<4% (several individuals)

<i>Sphagnu m capillifoli um</i>	Not Observed	11-25%	Not Observed	11-25%	04-10%	04-10%	11-25%	11-25%
<i>Sphagnu m cuspidatu m</i>	Not Observed	Not Observed	04-10%	<4% (several individu als)	Not Observ ed	<4% (few individual s)	26-33%	04-10%
<i>Sphagnu m magellani cum</i>	Not Observed	Not Observed	Not Observed	Not Observ ed	Not Observ ed	<4% (several individual s)	04-10%	<4% (few individu als)
<i>Sphagnu m papillosu m</i>	Not Observed	<4% (few individuals)	<4% (few individuals)	11-25%	04-10%	04-10%	11-25%	11-25%
<i>Sphagnu m subnitens</i>	Not Observed	<4% (several individuals)	<4% (few individuals)	<4% (several individu als)	<4% (several individu als)	Not Observed	Not Observed	04-10%
<i>Trichopho rum cespitosu m</i>	Not Observed	Not Observed	<4% (few individuals)	Not Observ ed	Not Observ ed	<4% (few individual s)	Not Observed	<4% (several individu als)
<i>Ulex</i>	Not Observed	Not Observed	Not Observed	Not Observ ed	Not Observ ed	Not Observed	Not Observed	Not Observ ed

Additional Species1				<i>Cladonia</i> <i>a</i> <i>species</i>			<i>Dicranium scoparium</i>	
Note1			piezo in SW corner of quadrat		piezo at SW corner	piezo marks SW corner		

D4.4 Ummeras

The below table represents the data collected at Ummeras bog in the second year of monitoring (2022), post-restoration.

Table 57: Ummeras Bog Quadrat Data 2022

Name	Ummeras	Ummeras	Ummeras	Ummeras	Ummeras
Surveyor	SD	SD	SD	SD	SD
SurveyDate	27/07/2022	27/07/2022	27/07/2022	27/07/2022	27/07/2022
Quadrat	1	2	3	4	5
BnM_General Cutaway Habitat	bare peat	bare peat	bare peat	bog	Scrub & pioneer open habitats
Current Habitat Description	bp	bp	bp, cell	dry raised bog, marginal	cutover bog
Sphagnum Cover	Not Observed	Not Observed	Not Observed	04-10%	0%
Bare Peat	Not Observed	Not Observed	91-100%	Not Observed	76-90%
Vegetation Height				30	0
<i>Betula pubescens</i>	Not Observed	Not Observed	Not Observed	<4% (few individuals)	<4% (many individuals)
<i>Calluna vulgaris</i>	Not Observed	Not Observed	Not Observed	76-90%	Not Observed
<i>Cladonia portentosa</i>	Not Observed	Not Observed	Not Observed	11-25%	Not Observed
<i>Dactylis glomerata</i>	Not Observed	Not Observed	Not Observed	Not Observed	<4% (few individuals)
<i>Eriophorum angustifolium</i>	Not Observed	Not Observed	<4% (few individuals)	<4% (few individuals)	11-25%
<i>Eriophorum vaginatum</i>	Not Observed	Not Observed	Not Observed	11-25%	11-25%
<i>Holcus lanatus</i>	Not Observed	Not Observed	Not Observed	Not Observed	<4% (many individuals)
<i>Hypnum jutlandicum</i>	Not Observed	Not Observed	Not Observed	04-10%	Not Observed
<i>Rhynchospora alba</i>	Not Observed	Not Observed	Not Observed	<4% (few individuals)	Not Observed
<i>Sphagnum capillifolium</i>	Not Observed	Not Observed	Not Observed	04-10%	Not Observed
<i>Sphagnum papillosum</i>	Not Observed	Not Observed	Not Observed	<4% (few individuals)	Not Observed
Comment	Bare peat cell	Bare peat cell	Bare peat cell, very little colonisation yet	Very dry, <i>Calluna vulgaris</i> dominated high bog	
Note1			3 <i>Eriophorum angustifolium</i> plants growing in DPT4 cell wall		

D4.5 Castlegar

The below table represents the data collected at Castlegar bog in the second year of monitoring (2022), post-restoration.

Table 58: Castlegar Bog Quadrat Data 2022

Name	Castlegar	Castlegar	Castlegar	Castlegar	Castlegar
Surveyor	SC	SC	SC	SC	SC
Survey Date	06/07/2022	06/07/2022	06/07/2022	06/07/2022	06/07/2022
Quadrat	1	2	3	4	5
BnM Cutover Habitat	bare peat	bare peat	bare peat	bare peat	Not surveyed
Sphagnum Cover	Not Observed	Not Observed	Not Observed	Not Observed	Not surveyed
Bare Peat	4-10	4-10	91-100%	91-100%	Not surveyed
Open Water	76-90%	76-90%	Not Observed	Not Observed	Not surveyed
<i>Calluna vulgaris</i>	<4% (few individuals)	Not Observed	Not Observed	Not Observed	Not surveyed

Appendix E

Carbon

Appendix E1: Carbon Flux Tower Data

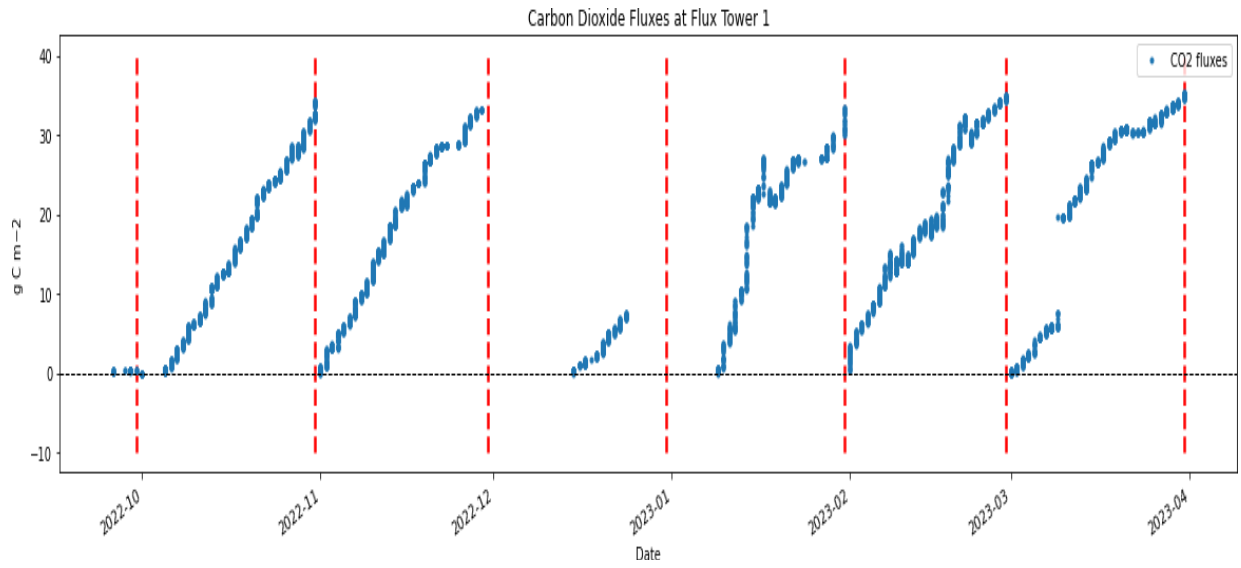


Figure 1: Carbon Dioxide Flux Data from Tower 1

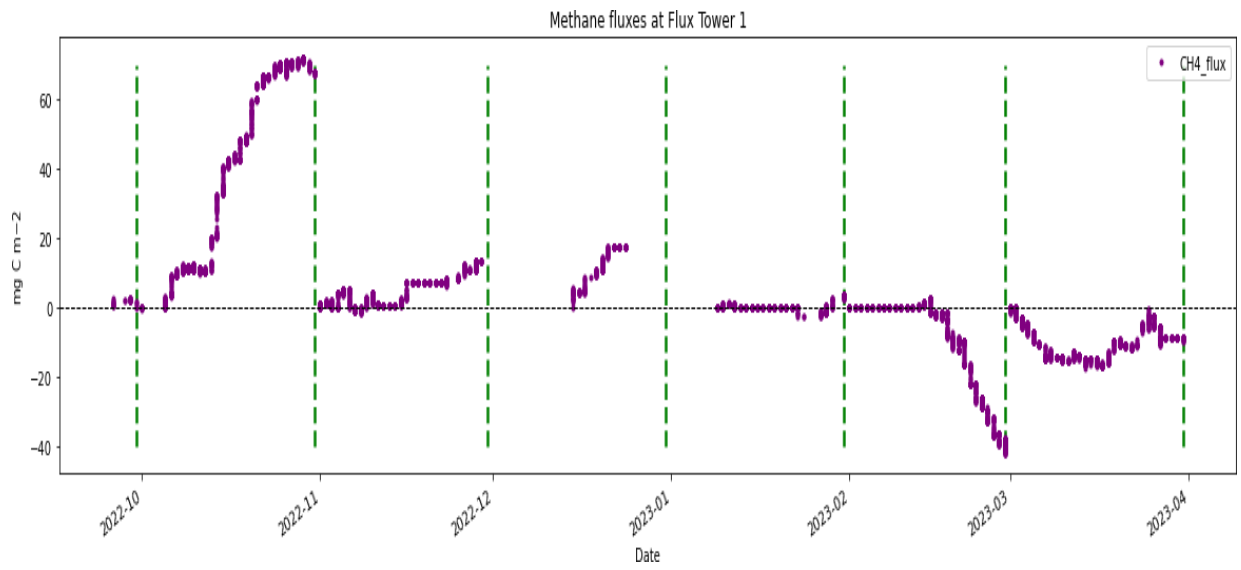


Figure 2: Methane Flux Data from Tower 1

Bord na Móna

Enhanced Decommissioning, Restoration and Rehabilitation Scheme (EDRRS)

Annual Monitoring and Verification Report

EDRRS Year 2

(April 2022 to March 2023)

Appendices - Volume 4

Appendix F

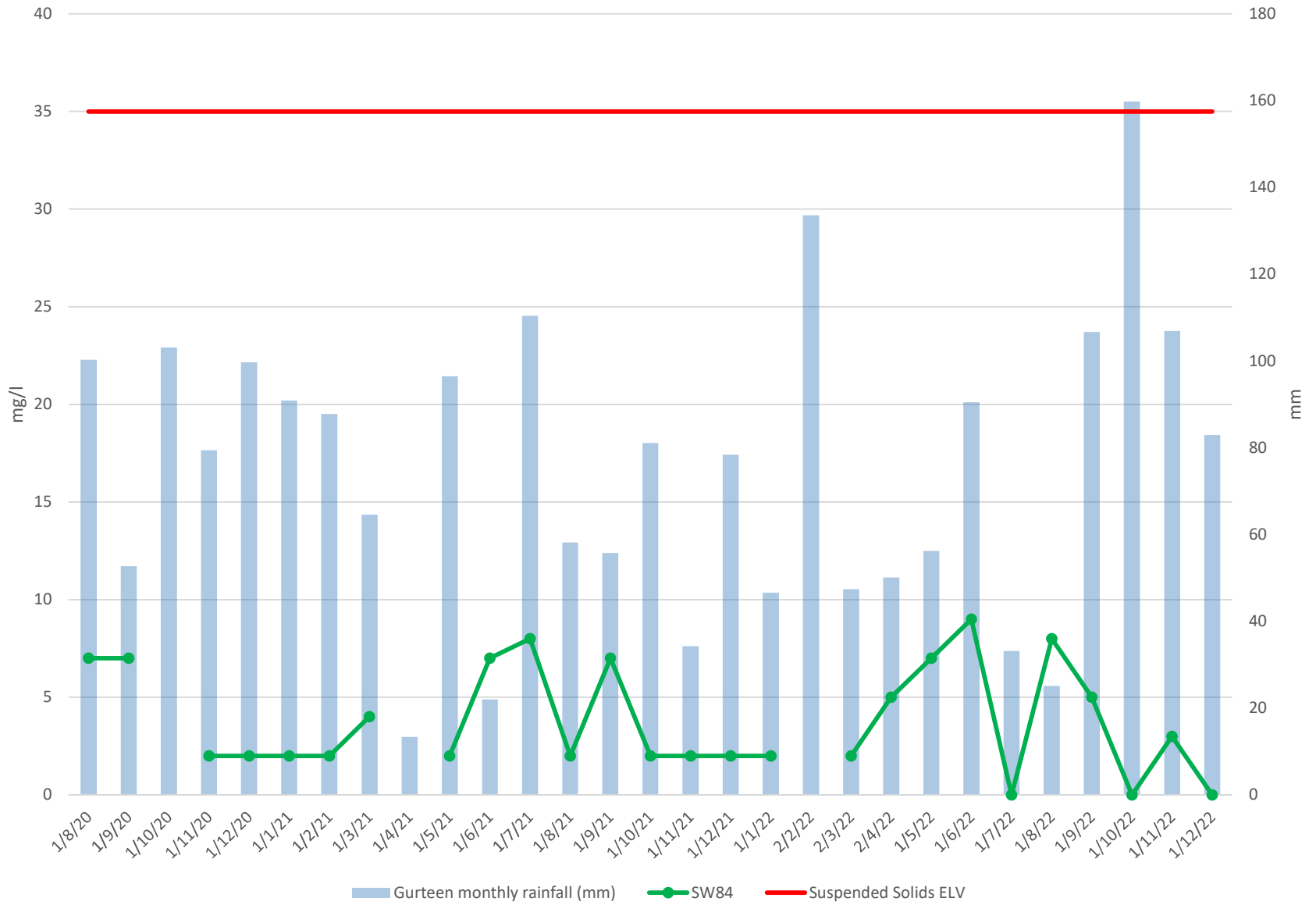
Surface Water Monitoring

Appendix F1: Year 1 (FY22) bogs.

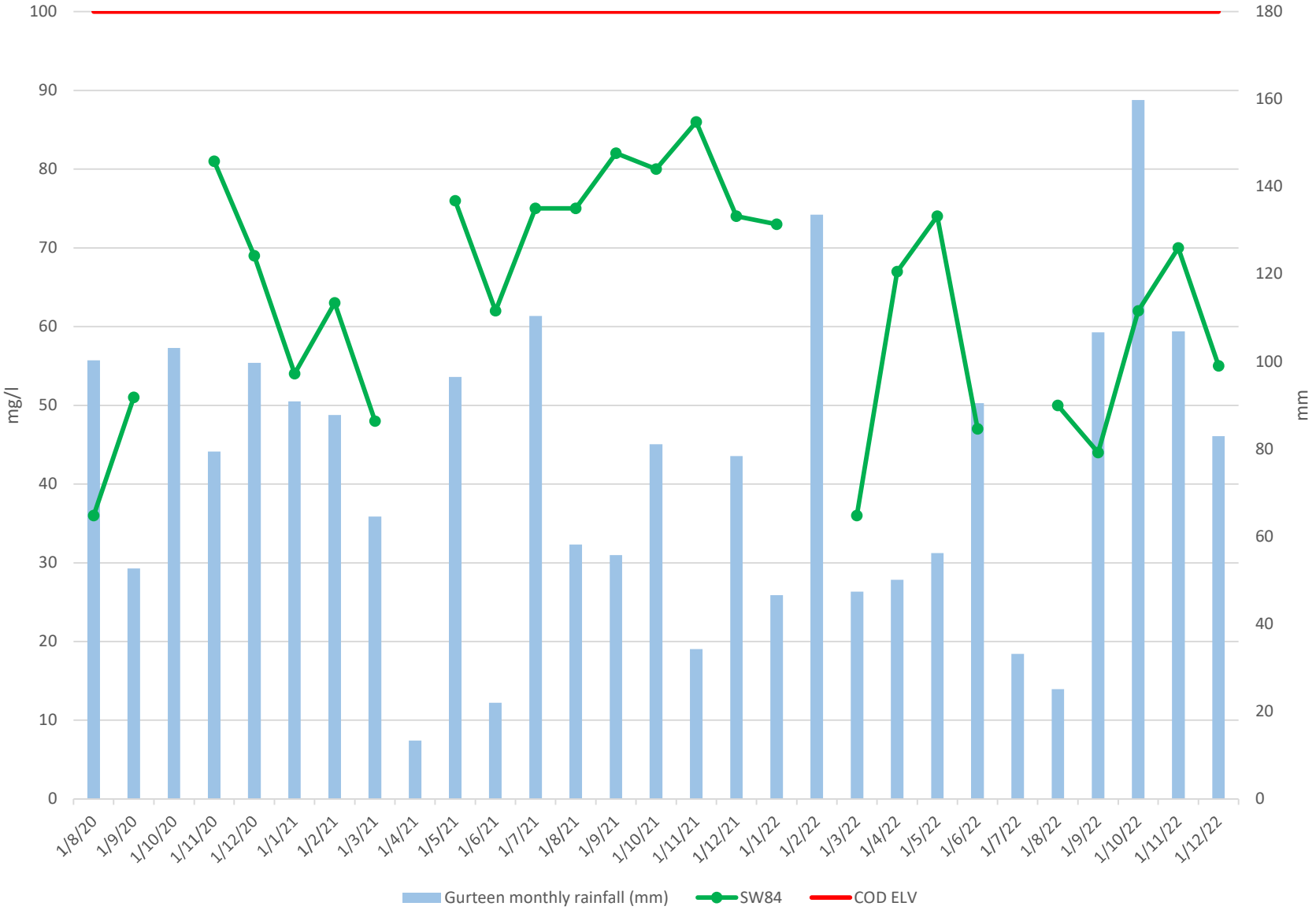
Appendix F2: Year 2 (FY23) bogs.

Appendix F1
Surface Water Monitoring
Year 1 (FY22) Bogs

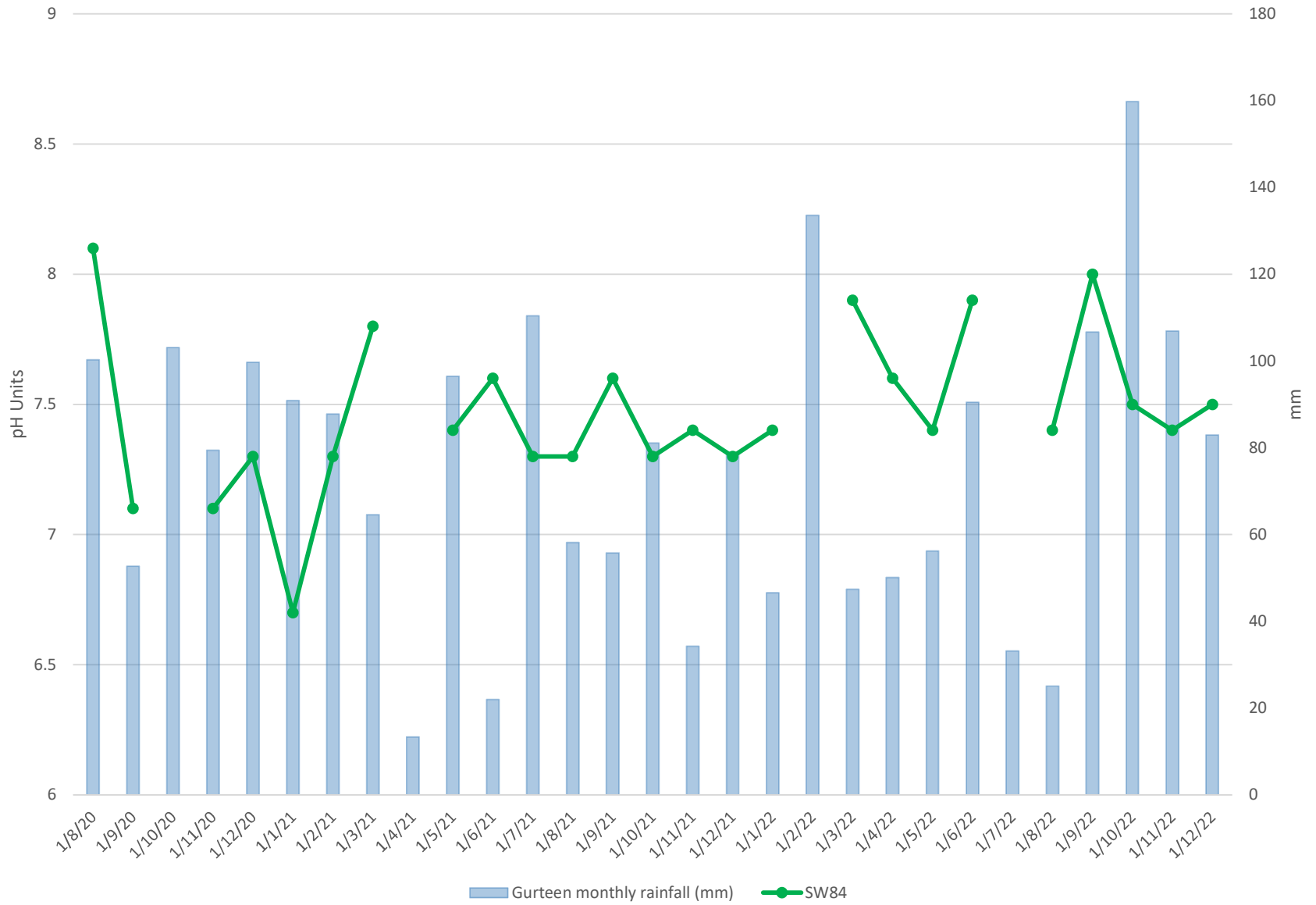
Belmont Suspended Solids mg/l



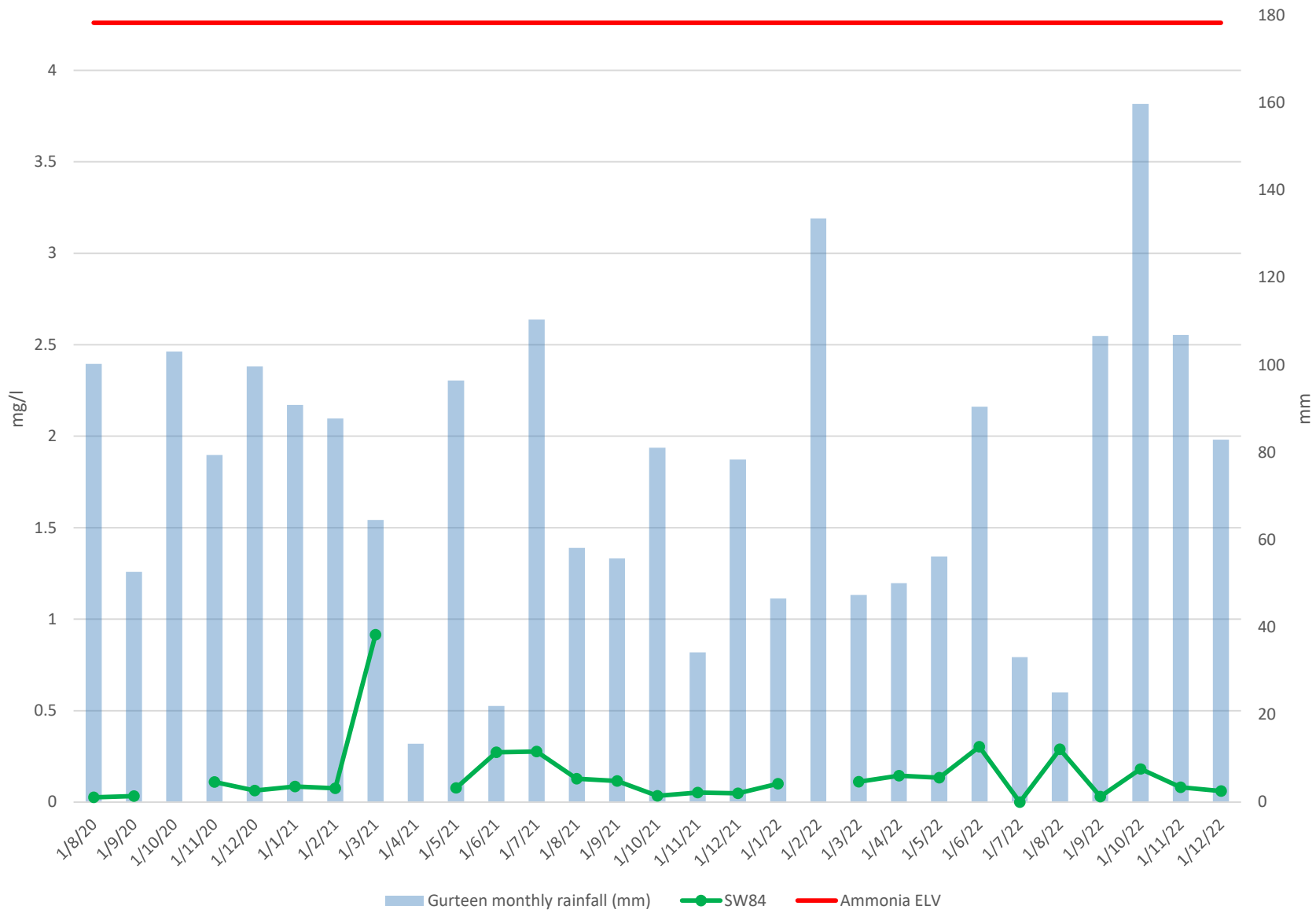
Belmont COD mg/l



Belmont pH



Belmont Ammonia as N mg/l



Garryduff Bog

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	2/2/22	2/3/22	2/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Garryduff	SW11	2	2	5	7	2	22	5	3	2	4		2	2	2	2	2	4	5	11	2	4	2	2	3	2	2	
Blackwater	P0502-01	Garryduff	SW12	2	8	21	5	2	5	4	2	2	2		2	2	10	3	6	3	6	19	49	4	2	2	4	2		
			Surtean monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	
			Suspended Solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	

PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Garryduff	SW11	218	183	114	114	163	493	134	99.4	144	139		190	135	213	167	185	156	136	151	104	90.4	82.6	73	124	95	100	
Blackwater	P0502-01	Garryduff	SW12	186	318	183	234	184	105	96.1	92.2	112	105		138	137	215	166	181	153	137	147	720	104	81.8	71	95.4	89.1	103	
			Surtean monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	

PCAS SW Sampling Scheme				COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Garryduff	SW11	56	47	45	48	49	191	55	47	67	64		56	47	47	48	48	43	59	75	55	61	58	58	61	51	50	
Blackwater	P0502-01	Garryduff	SW12	44	60	51	46	43	35	45	42	56	55		51	48	48	47	47	50	55	74	76	61	60	57	58	49	48	
			Surtean monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

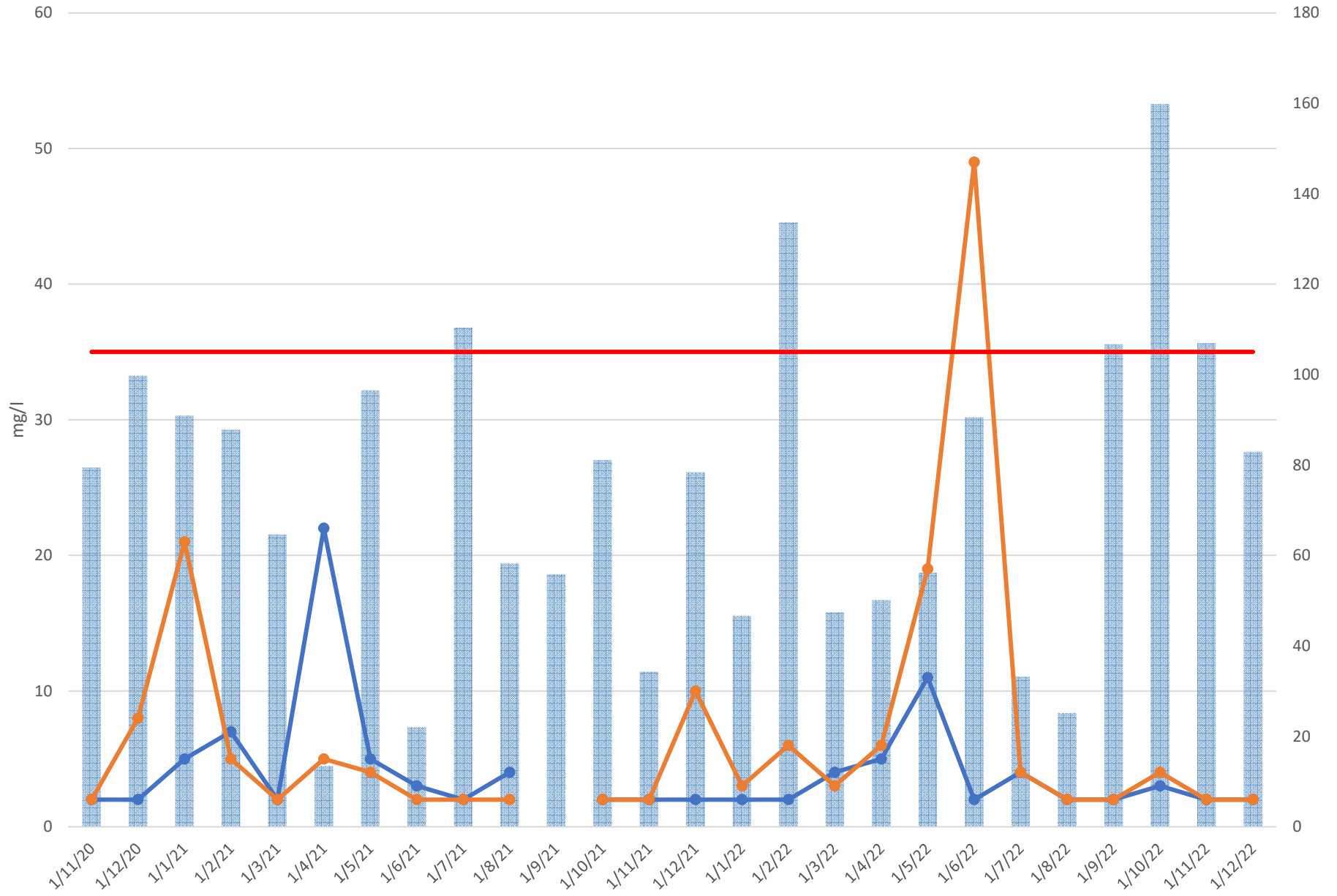
PCAS SW Sampling Scheme				pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
Bog Group	Licence No	Bog Name	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Garryduff	SW11	7.5	7.8	7.8	8.1	7.5	6.6	7.8	7.8	7.8	8		7.8	7.8	7.9	7.7	7.8	7.7	7.6	7.8	8.1	8.1	8.2	8.2	8	7.8	7.7	
Blackwater	P0502-01	Garryduff	SW12	7.8	7.5	7.5	7.9	8	8.2	8.3	8.2	8.1	8		7.8	7.7	7.8	7.7	7.9	7.7	7.9	7.8	7.5	8.1	8.2	8.2	8.1	7.9	7.7	
			Surtean monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	

PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Garryduff	SW11	<0.05	<0.05	<0.05	<0.05	<0.05	0.13	<0.05	0.05	0.07	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	0.07	0.13	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Blackwater	P0502-01	Garryduff	SW12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.12	0.19	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	
			Surtean monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	

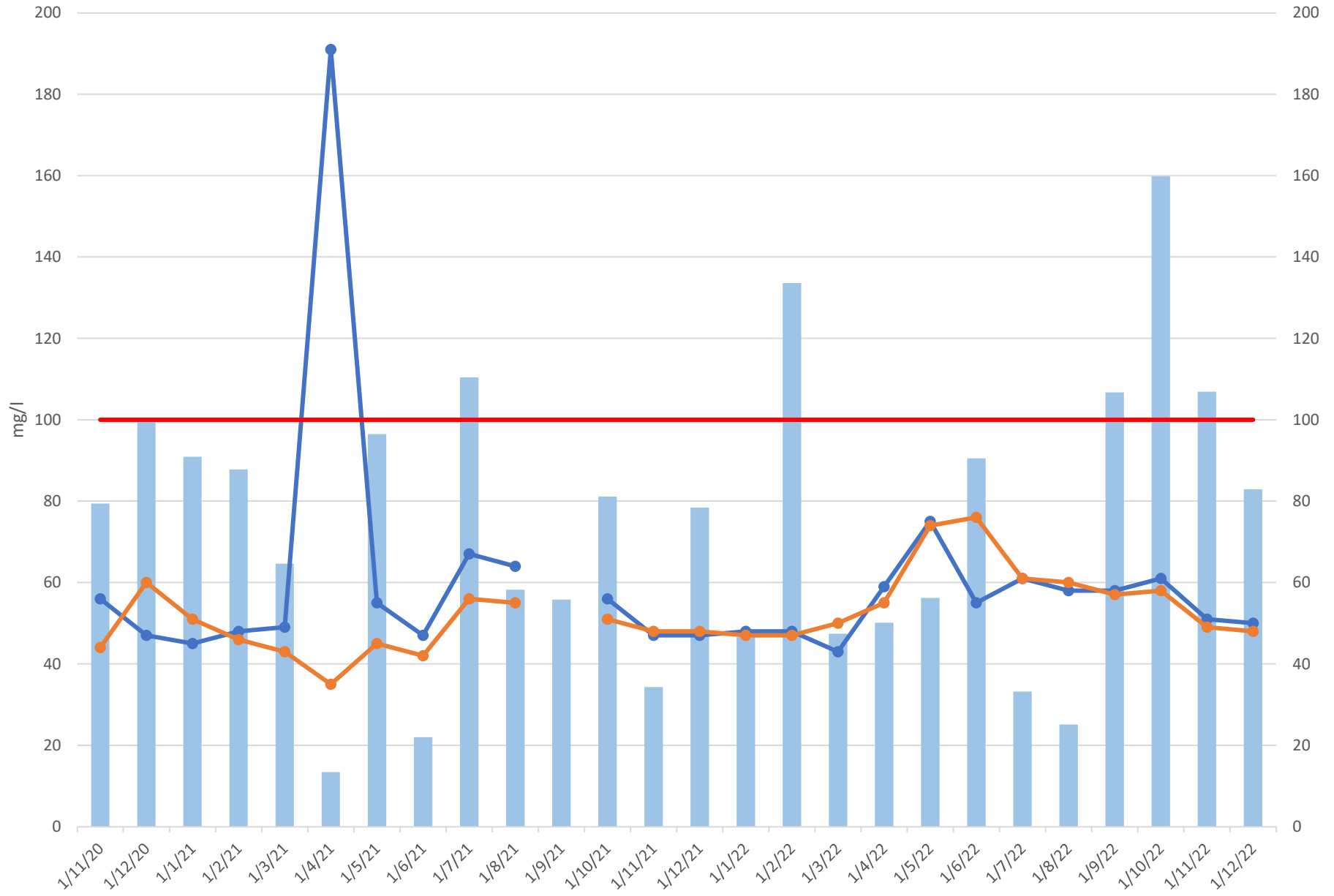
PCAS SW Sampling Scheme				TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Garryduff	SW11	294	310	313	335	315	266	360	422	440	374		288	354	198	339	322	299	410	497	304	411	467	462	328	394	386	
Blackwater	P0502-01	Garryduff	SW12	117	221	259	225	193	465	414	471	494	475		452	277	251	324	247	258	375	517	511	404	509	403	328	393	364	
			Surtean monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	

PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Garryduff	SW11	0.320	0.329	0.493	0.045	0.573	0.037	0.334	0.659	1.110	0.507		0.302	0.693	0.411	0.549	0.356	0.187	0.209	0.137	0.078	0.130	0.042	0.048	0.356	0.158	0.323	
Blackwater	P0502-01</																													

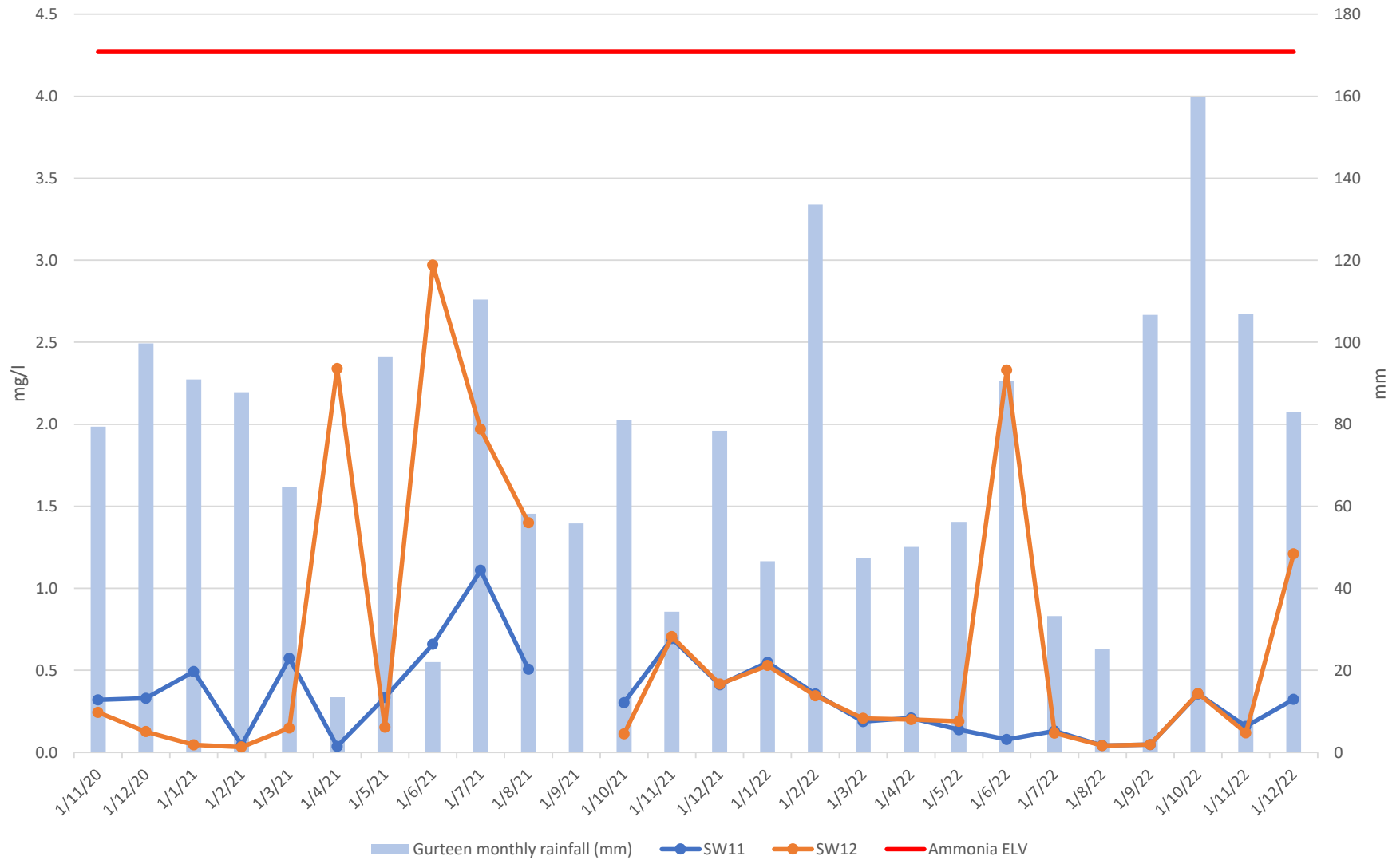
Garryduff Suspended Solids mg/l



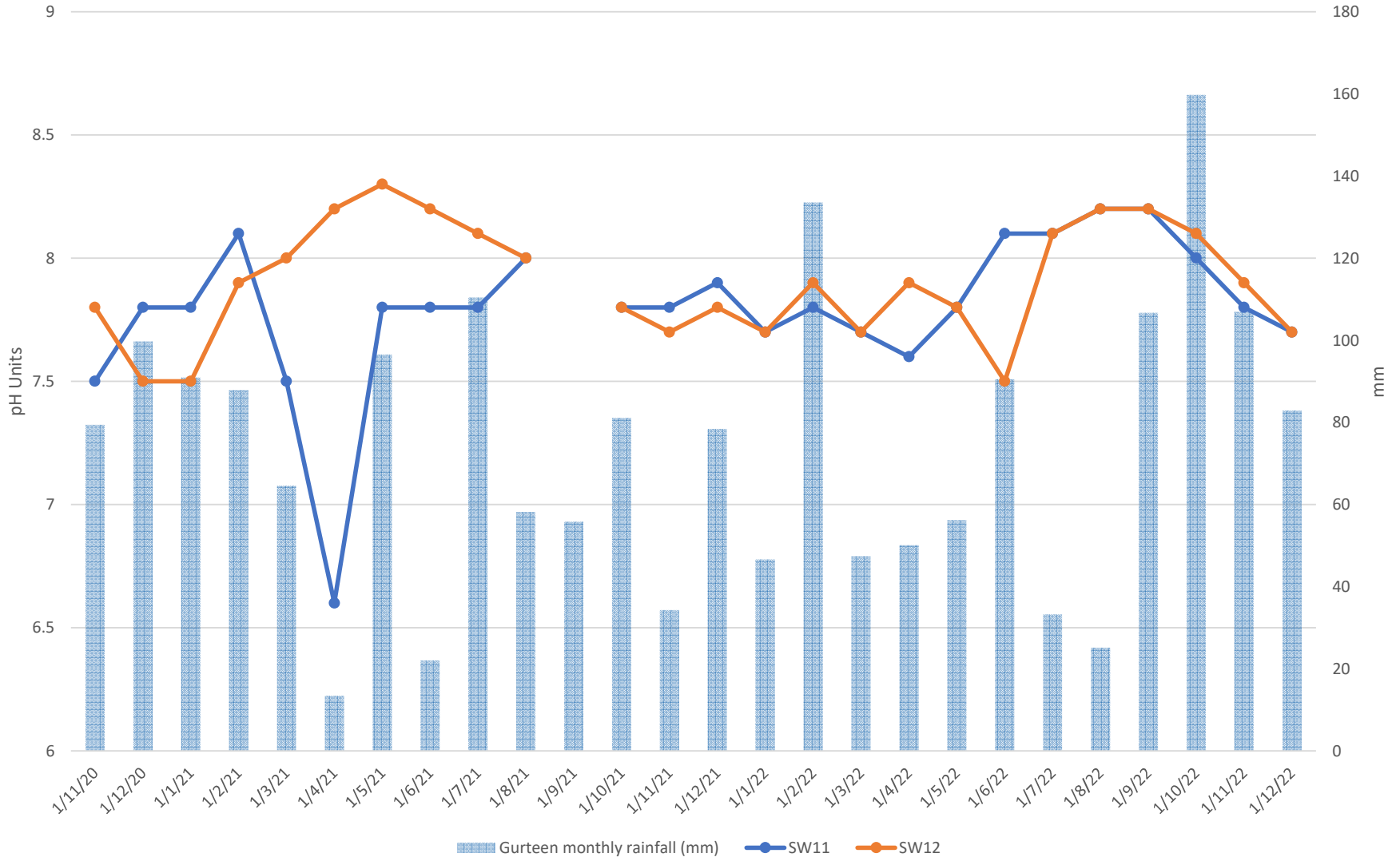
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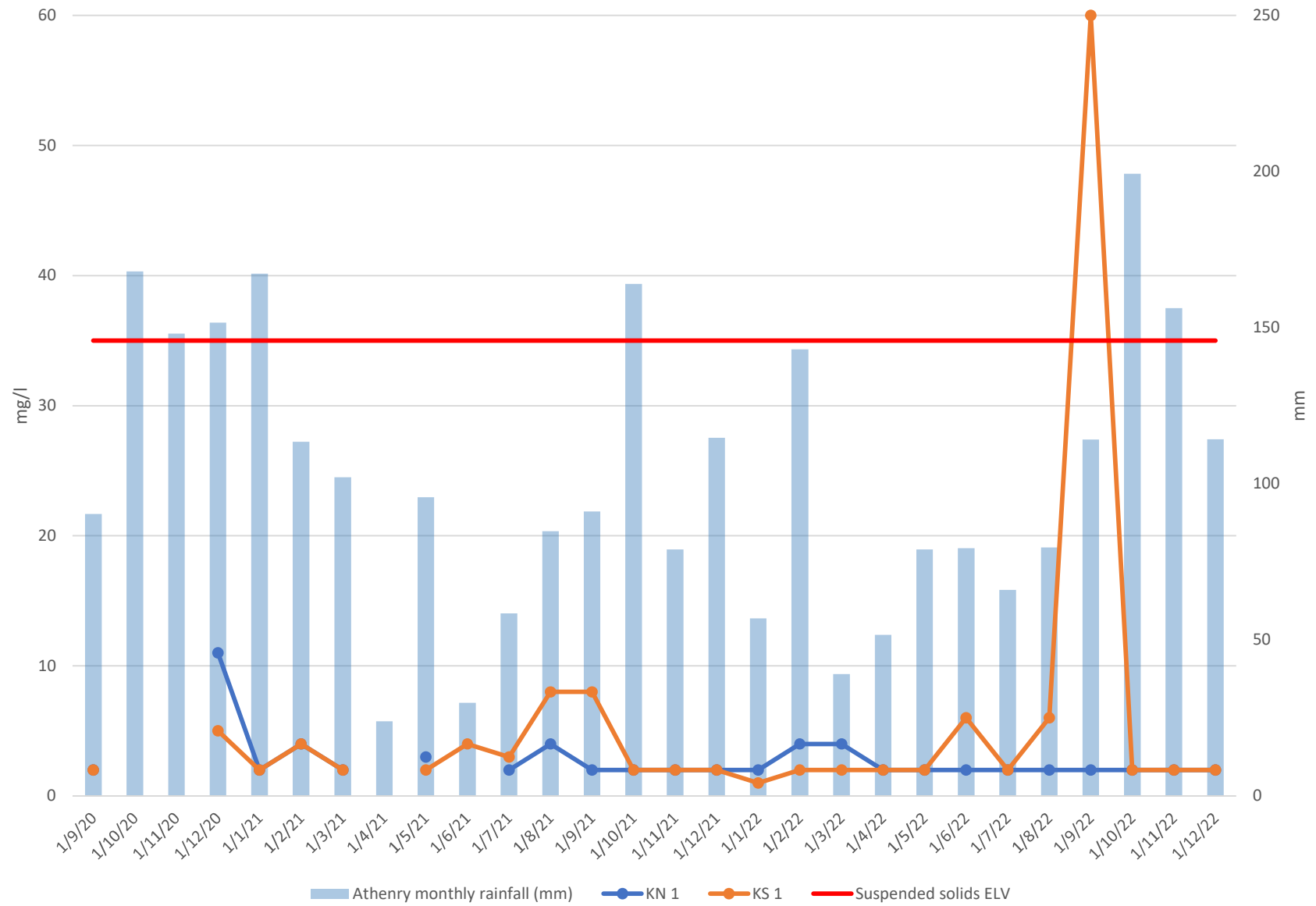
Garryduff Ammonia as N



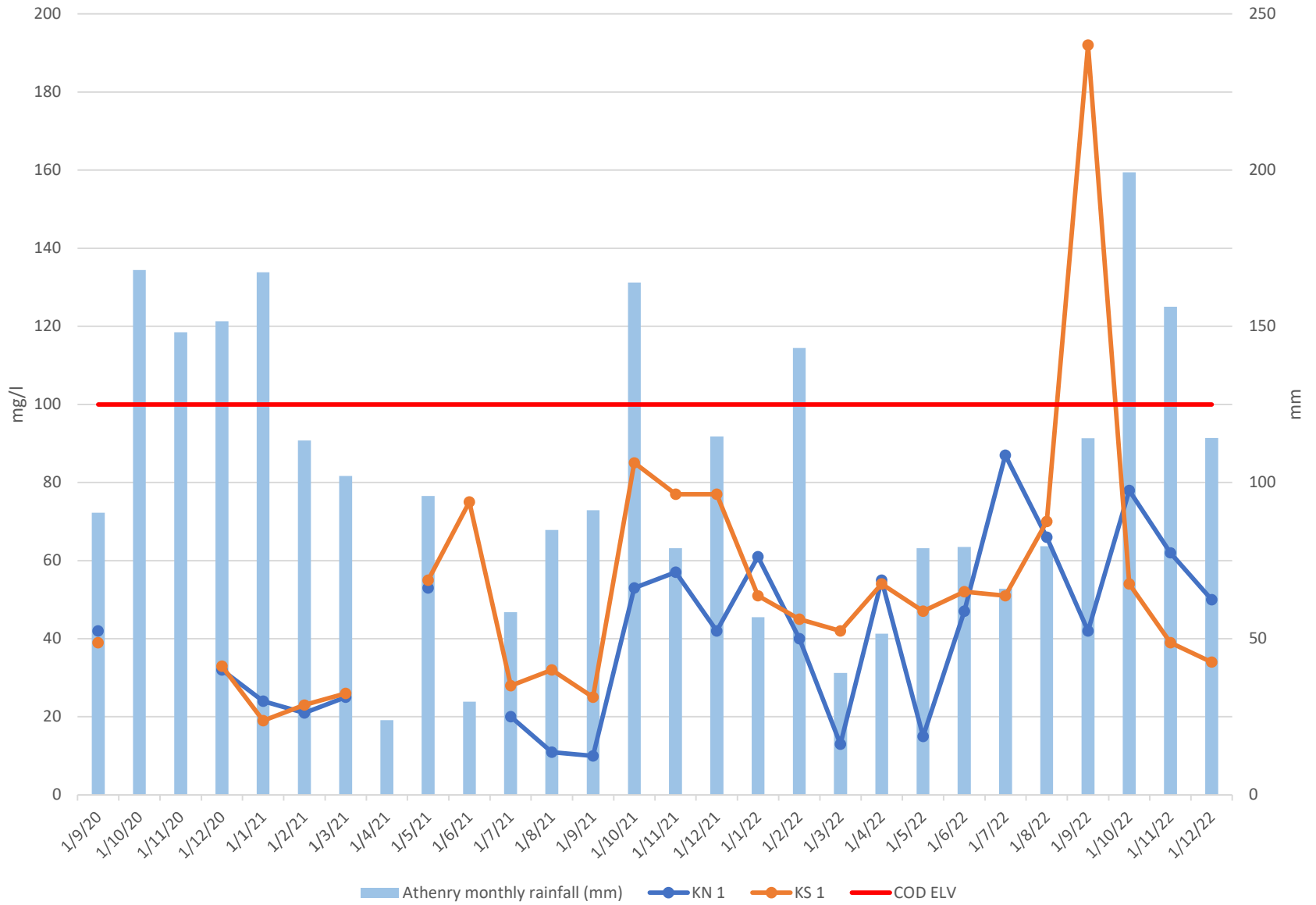
Garryduff pH



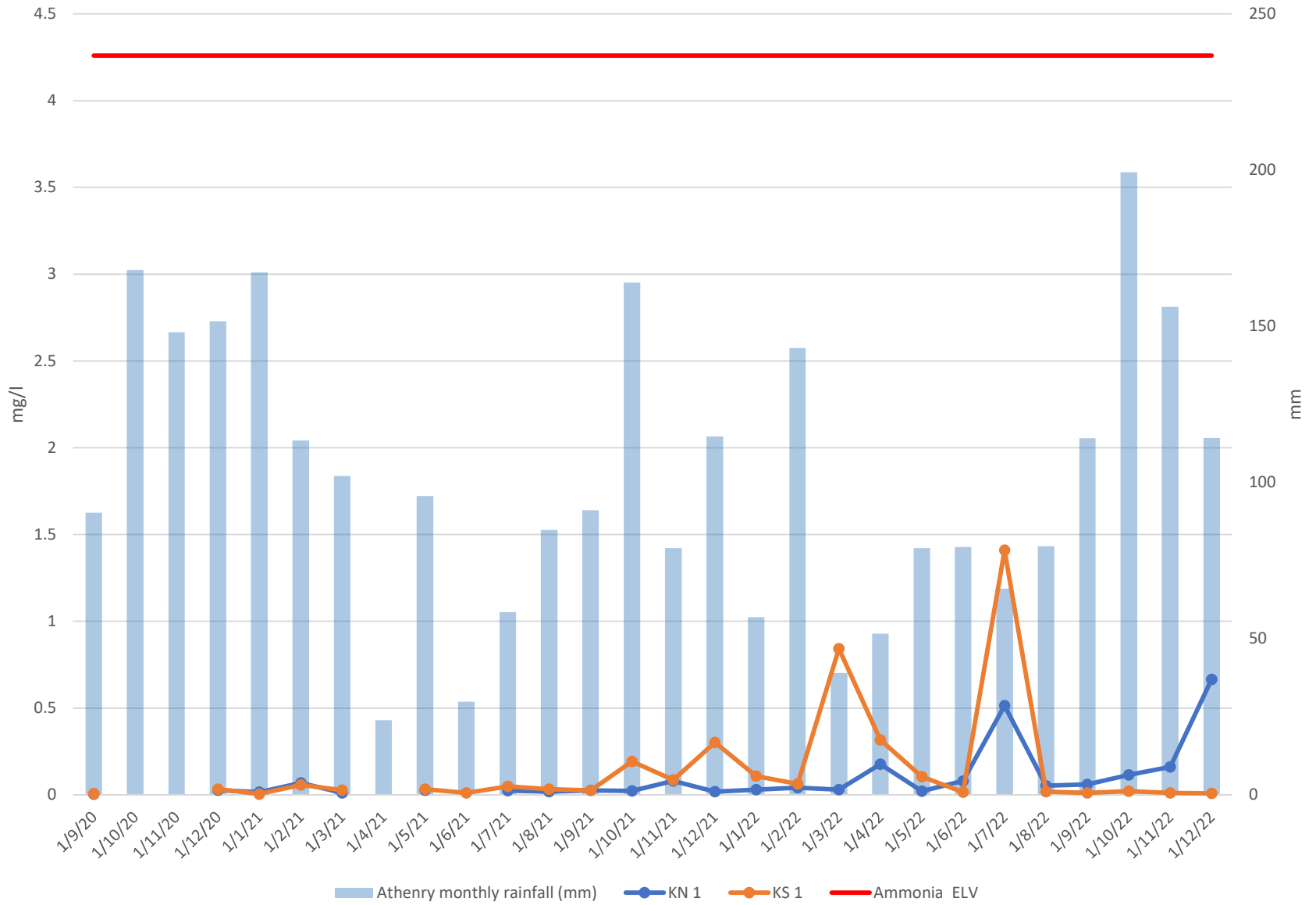
Kellysgrove Suspended Solids mg/l



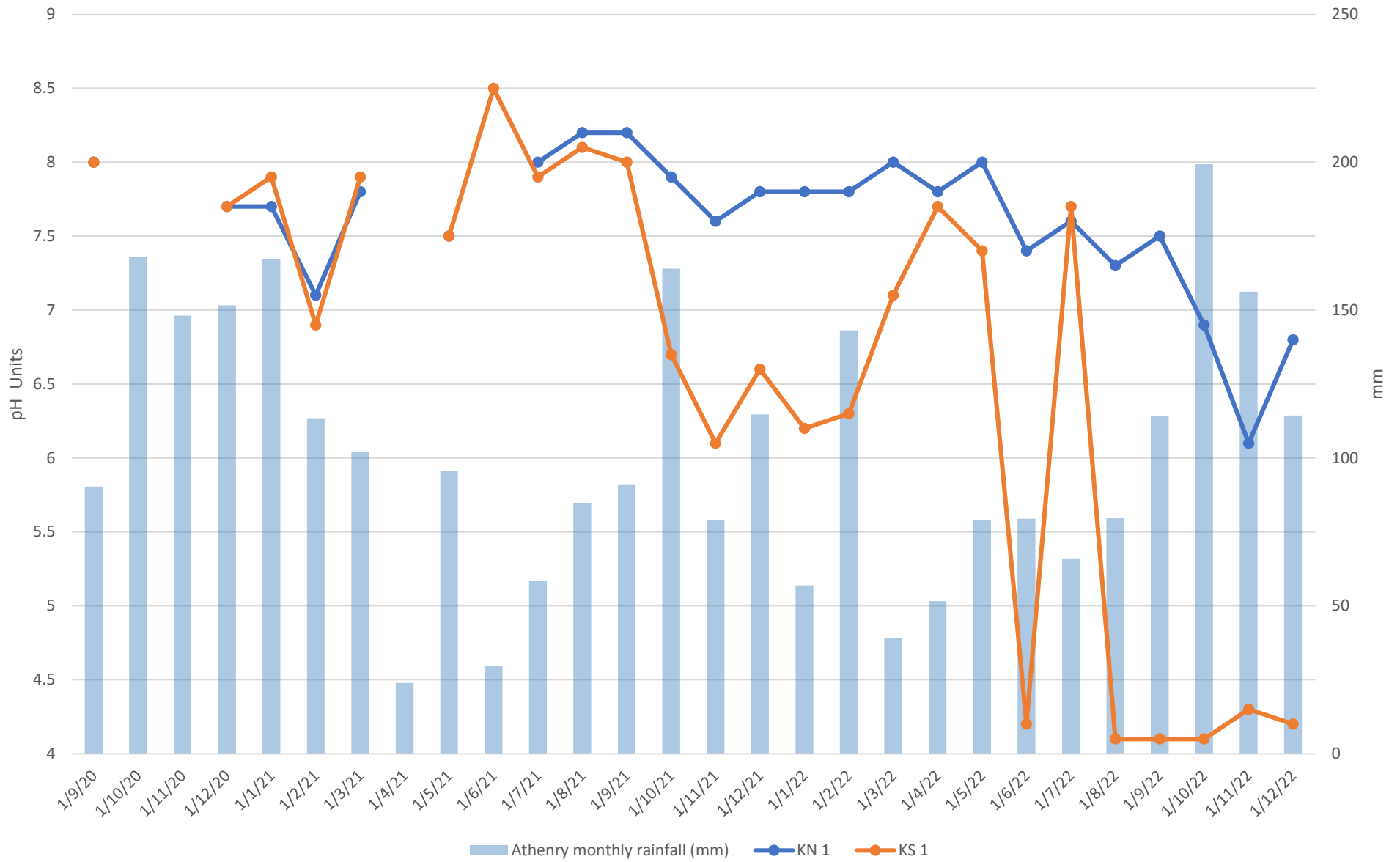
Kellysgove COD mg/l



Kellysgrove Ammonia as N mg/l



Kellysgrove pH

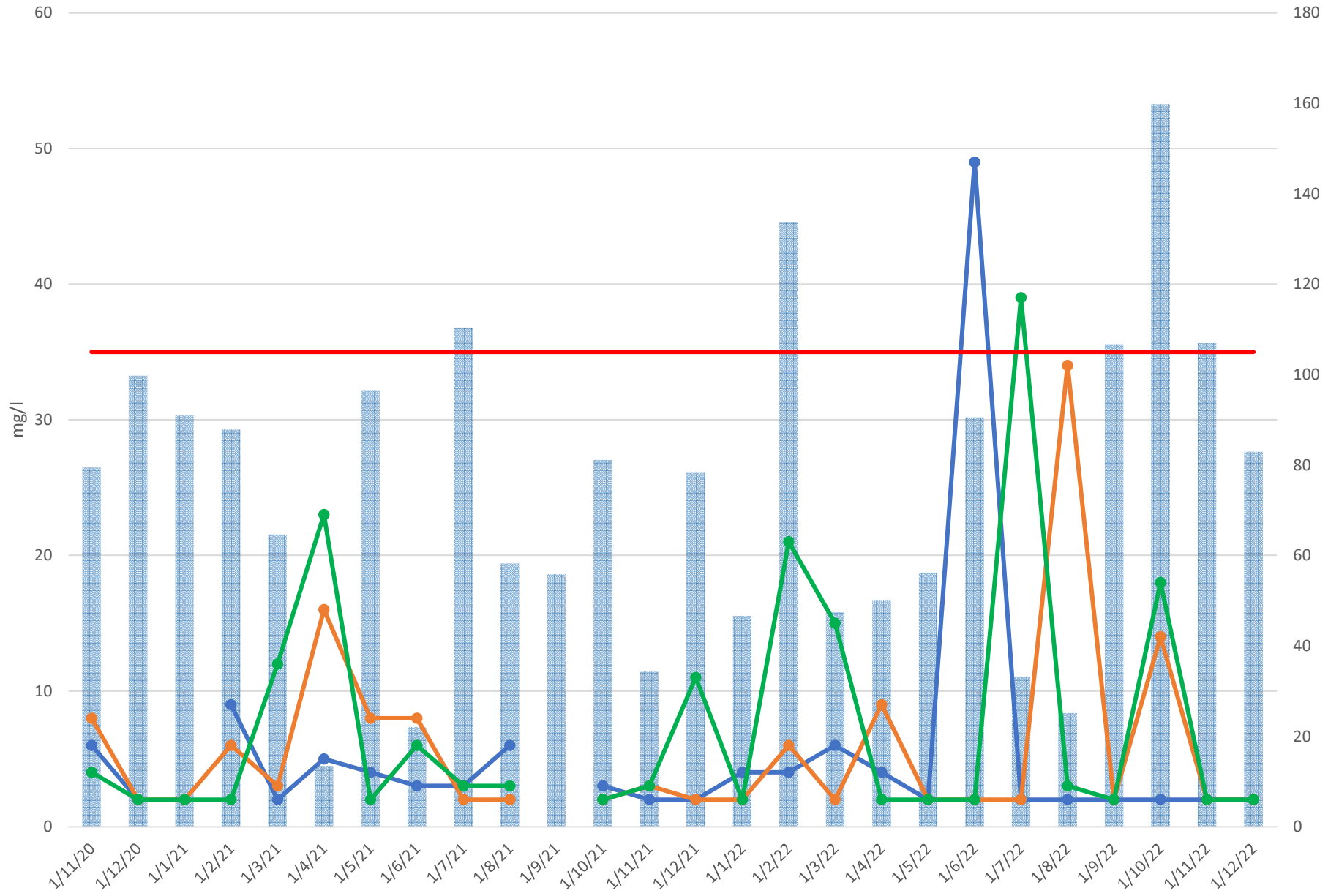


PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	2/2/22	2/3/22	2/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22		
Blackwater	P0502-01	Kilmacshane	SW16	0.497	0.354		0.309	0.169	0.226	0.023	0.011	0.050	0.013		0.404	0.234	0.170	0.099	0.206	0.143	0.285	0.012	2.370	0.074	0.046	0.533	0.467	0.303	0.48			
Blackwater	P0502-01	Kilmacshane	SW17	0.399	0.463	0.344	0.084	0.541	0.065	0.043	0.085	0.080	0.035		0.044	0.733	0.665	0.697	0.589	0.386	0.020	0.134	0.091	0.034	0.059	0.120	0.126	0.384	0.518			
Blackwater	P0502-01	Kilmacshane	SW18	0.178	0.177	0.09	0.098	0.130	0.020	0.019	0.247	0.266	0.020		0.132	0.354	0.066	0.038	0.294	0.154	0.009	0.054	0.065	0.388	0.016	0.120	0.533	0.031	<0.005			
			Gurteen monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9			
			Ammonia ELV	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26		

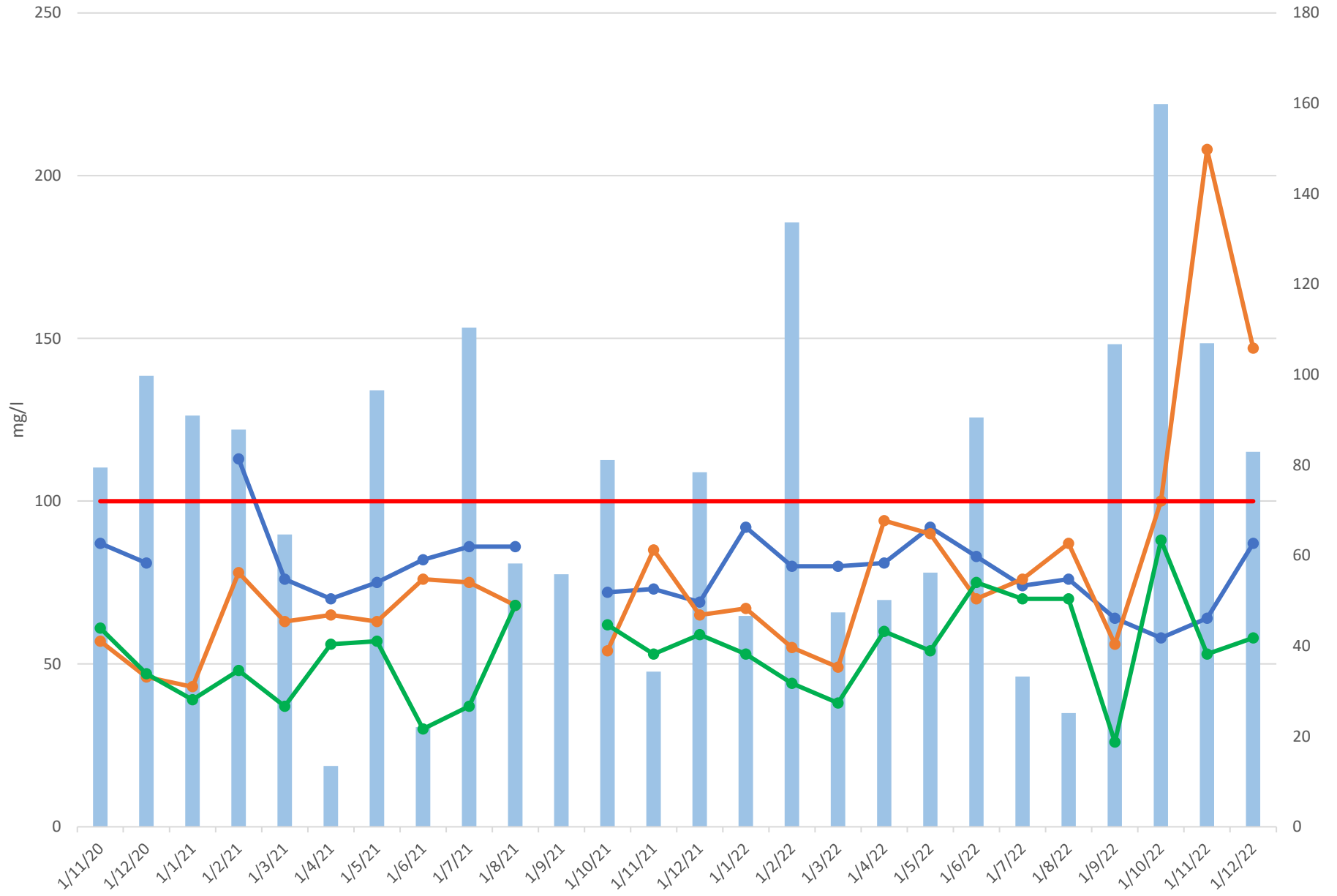
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	2/2/22	2/3/22	2/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Kilmacshane	SW16	30.1	32.2		39.5	28.6	26.8	26.8	28.1	27.9	70.4		27.6	27	29.6	37.3	32.6	35.8	32.4	32.1	23.1	28.6	25.7	25.4	34.8	32.9	36.5		
Blackwater	P0502-01	Kilmacshane	SW17	20.3	19.2	15.6	31.5	22.9	20.7	19.4	26	22.1	62.3		20.1	31.7	29.2	25.8	20.4	23.2	32.6	32.4	28.3	29.3	25.6	20.1	30.4	70.2	70.4		
Blackwater	P0502-01	Kilmacshane	SW18	22.7	20	15.3	16.4	13	17.8	20	10.9	11.2	68		23.1	18.8	24.3	23	18.8	18.2	24.1	18.3	29.5	22.8	25.2	23.8	18.8	20.5	26.4		
			Gurteen monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9		

Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

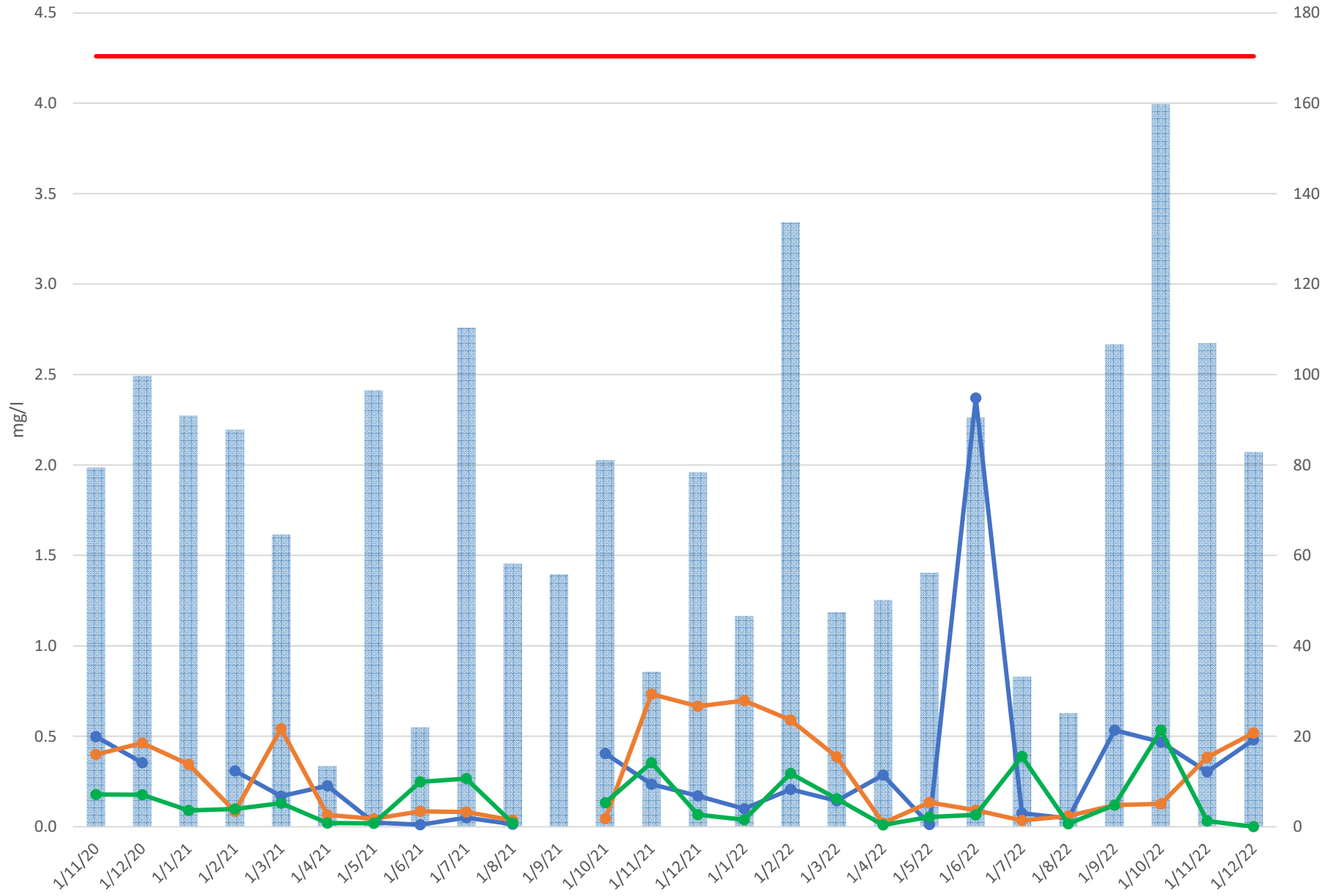
Kilmacshane Suspended Solids mg/l



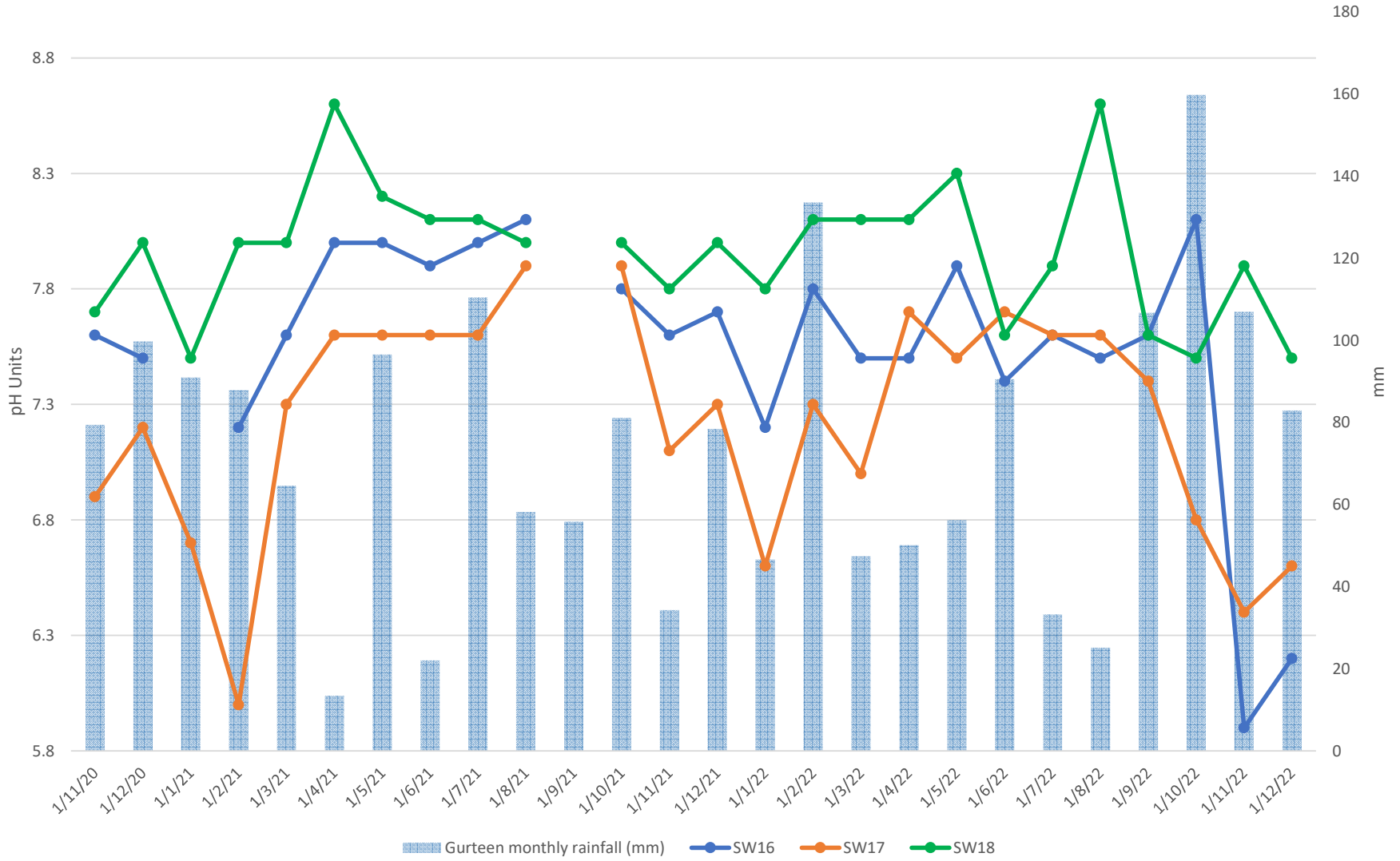
Kilmacshane COD mg/l



Kilmacshane Ammonia as N mg/l



Kilmacshane pH



West Boora

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Bog Group	P0500-01	West Boora	SW11	15	15	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			Guurteen monthly rainfall (mm)	52.7	103.1	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1
			Suspended Solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
				mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
Bog Group	P0500-01	West Boora	SW11	106	106	183	261	356	83.4	60.2	154	172	158	112	105	160	229	203	194	285	396	44.8	41.9	41.9	95.7	96.4	
			Guurteen monthly rainfall (mm)	52.7	103.1	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Bog Group	P0500-01	West Boora	SW11	55	55	47	69	73	34	17	52	65	59	51	39	66	77	65	58	78	87	15	11	11	52	45		
			Guurteen monthly rainfall (mm)	52.7	103.1	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
				pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
Bog Group	P0500-01	West Boora	SW11	7.7	7.7	7.8	7.5	7.4	7.7	8.1	7.8	7.7	7.8	7.9	7.6	7.5	7.6	7.5	7.4	7.3	8	8.2	8.2	7.9	8	7.8	
			Guurteen monthly rainfall (mm)	52.7	103.1	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Bog Group	P0500-01	West Boora	SW11	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
			Guurteen monthly rainfall (mm)	52.7	103.1	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1

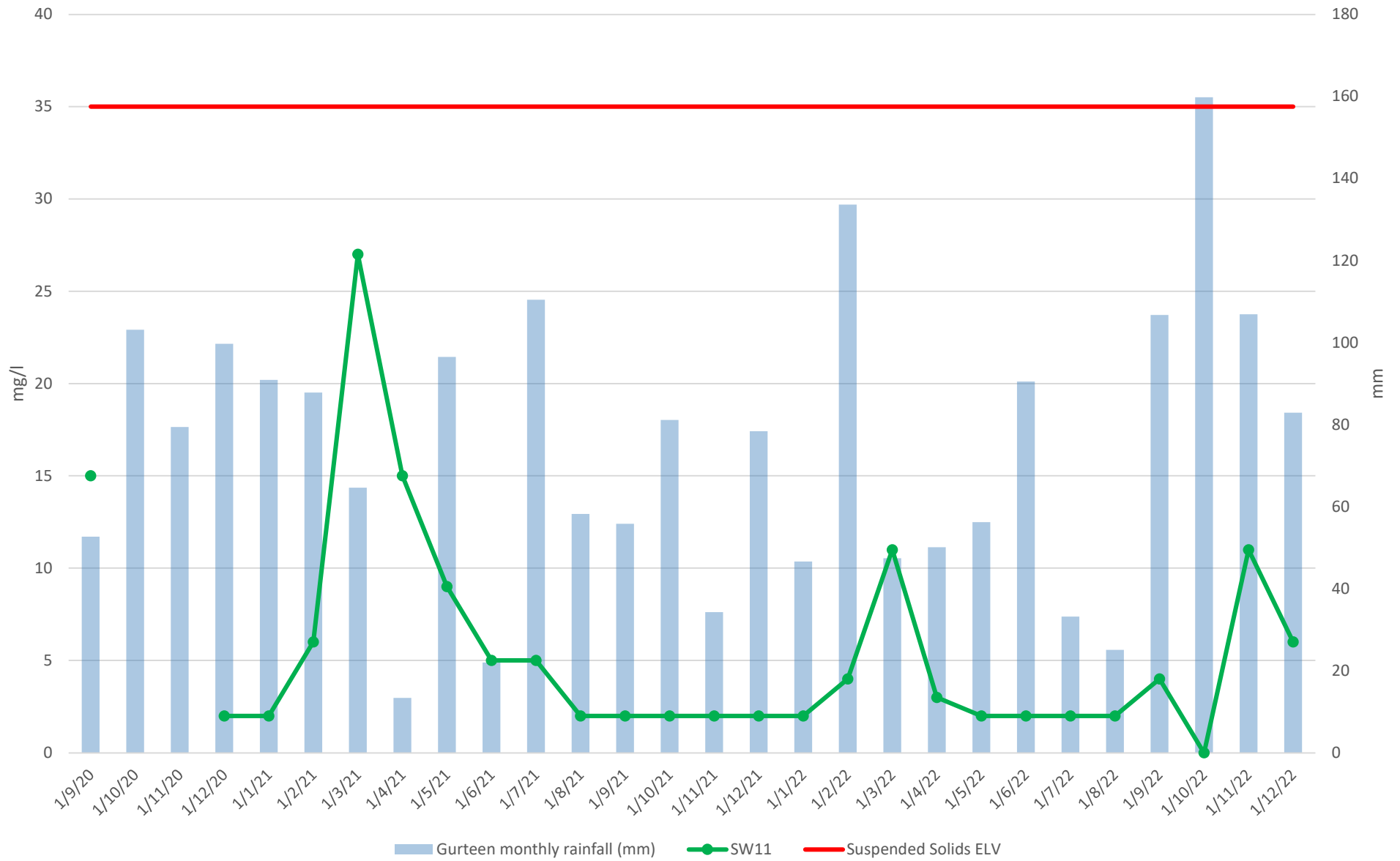
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS	TSS
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Bog Group	P0500-01	West Boora	SW11	428	428	310	431	250	491	439	468	483	359	468	442	353	415	425	425	359	276	396	417	417	440	407	
			Guurteen monthly rainfall (mm)	52.7	103.1	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Bog Group	P0500-01	West Boora	SW11	0.075	0.075	0.329	0.613	0.259	0.038	0.038	0.551	0.584	0.353	0.095	0.100	0.189	0.393	0.476	0.586	0.377	0.468	0.025	0.022	0.022	0.042	0.033	
			Guurteen monthly rainfall (mm)	52.7	103.1	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1
			Ammonia ELV	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7

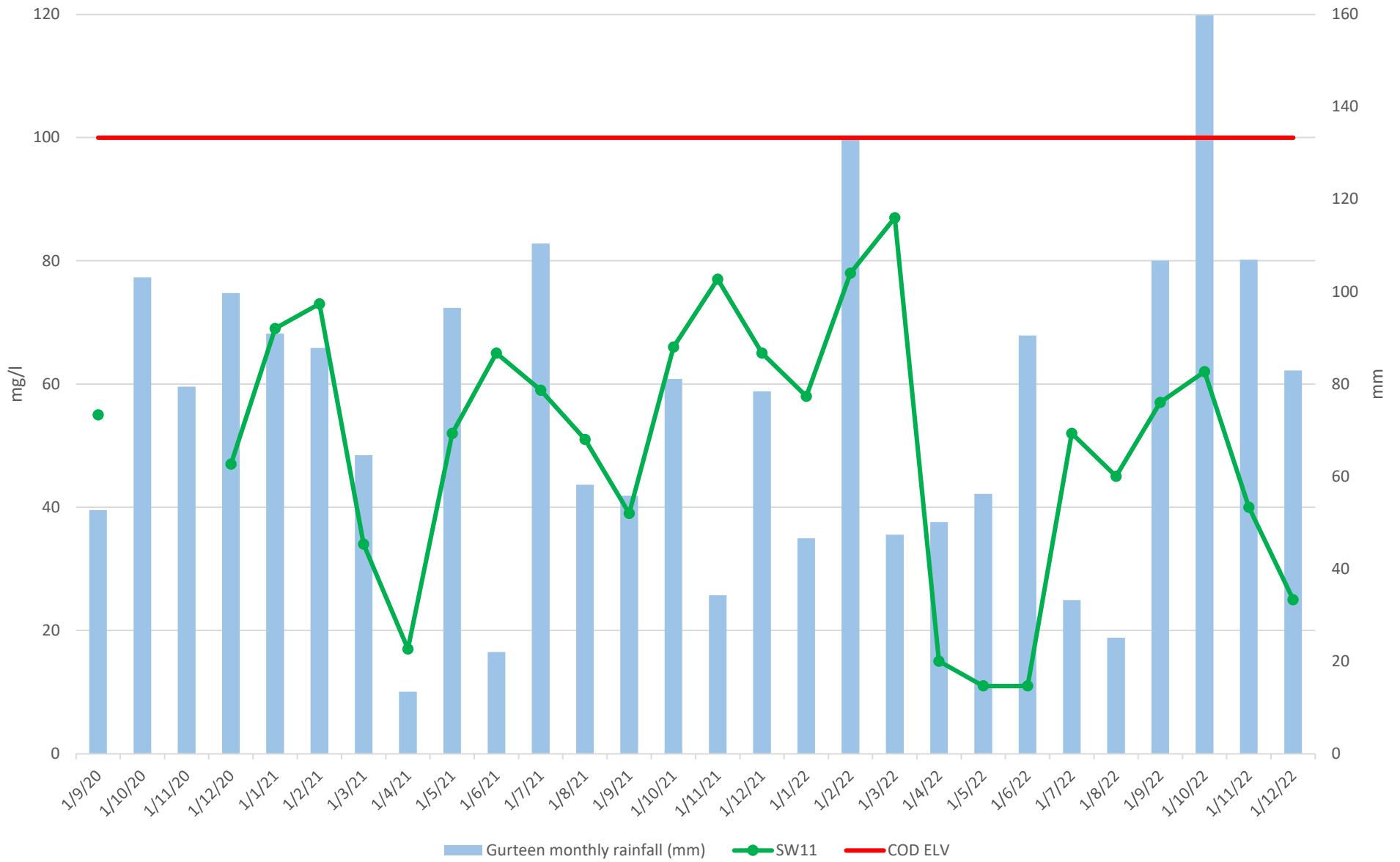
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Bog Group	P0500-01	West Boora	SW11	16.5	16.5	20.4	29.7	28.4	7.32	5.32	19.5	84	20.1	71.2	79.3	24	27.5	24.7	23.8	28.4	33.8	6.79	5.85	5.85	18.3	17.7	
			Guurteen monthly rainfall (mm)	52.7	103.1	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1

Blank spaces - No results available during times of year when rivers are in flood or during extended dry spells

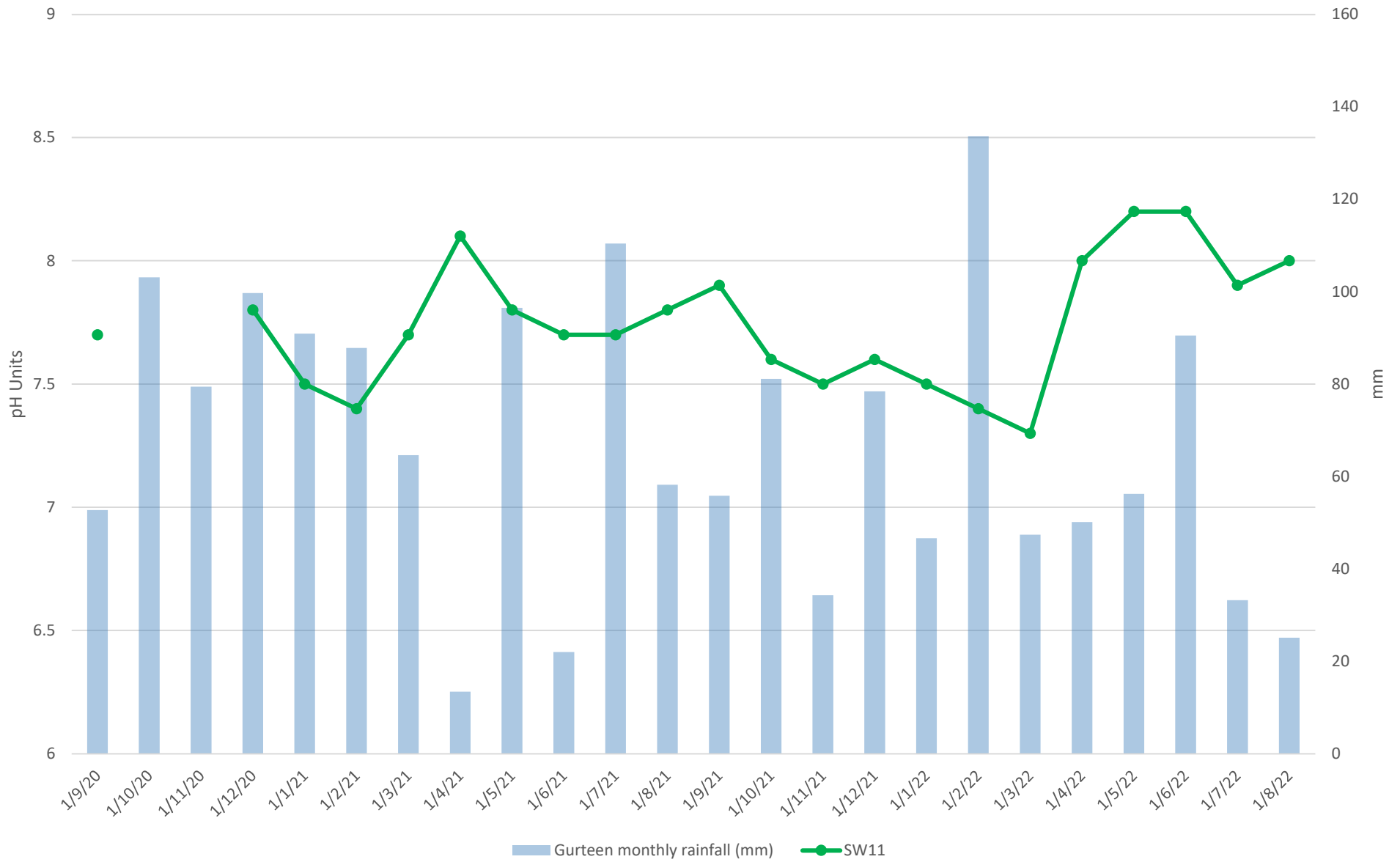
West Boora Suspended Solids mg/l



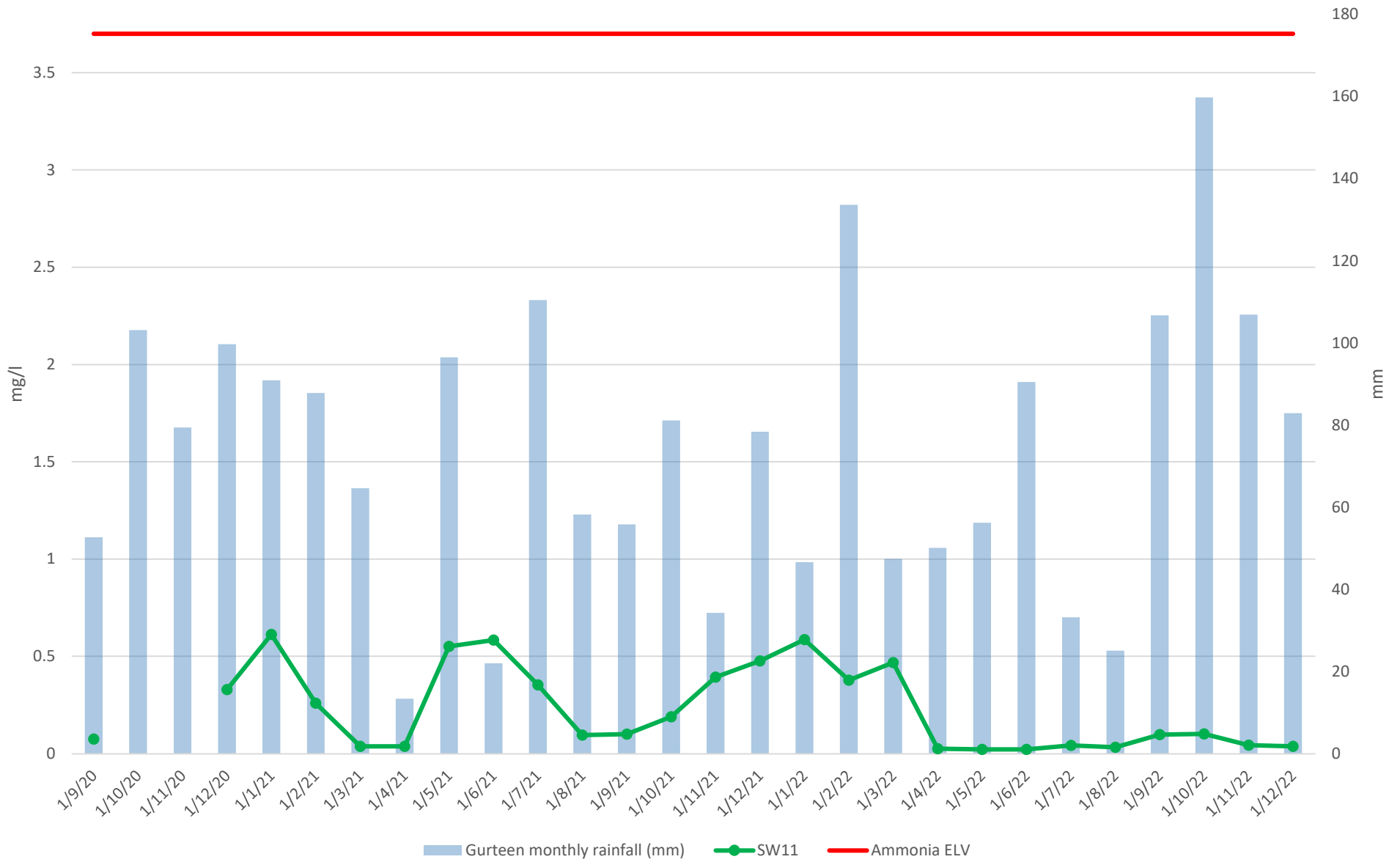
West Boora COD mg/l



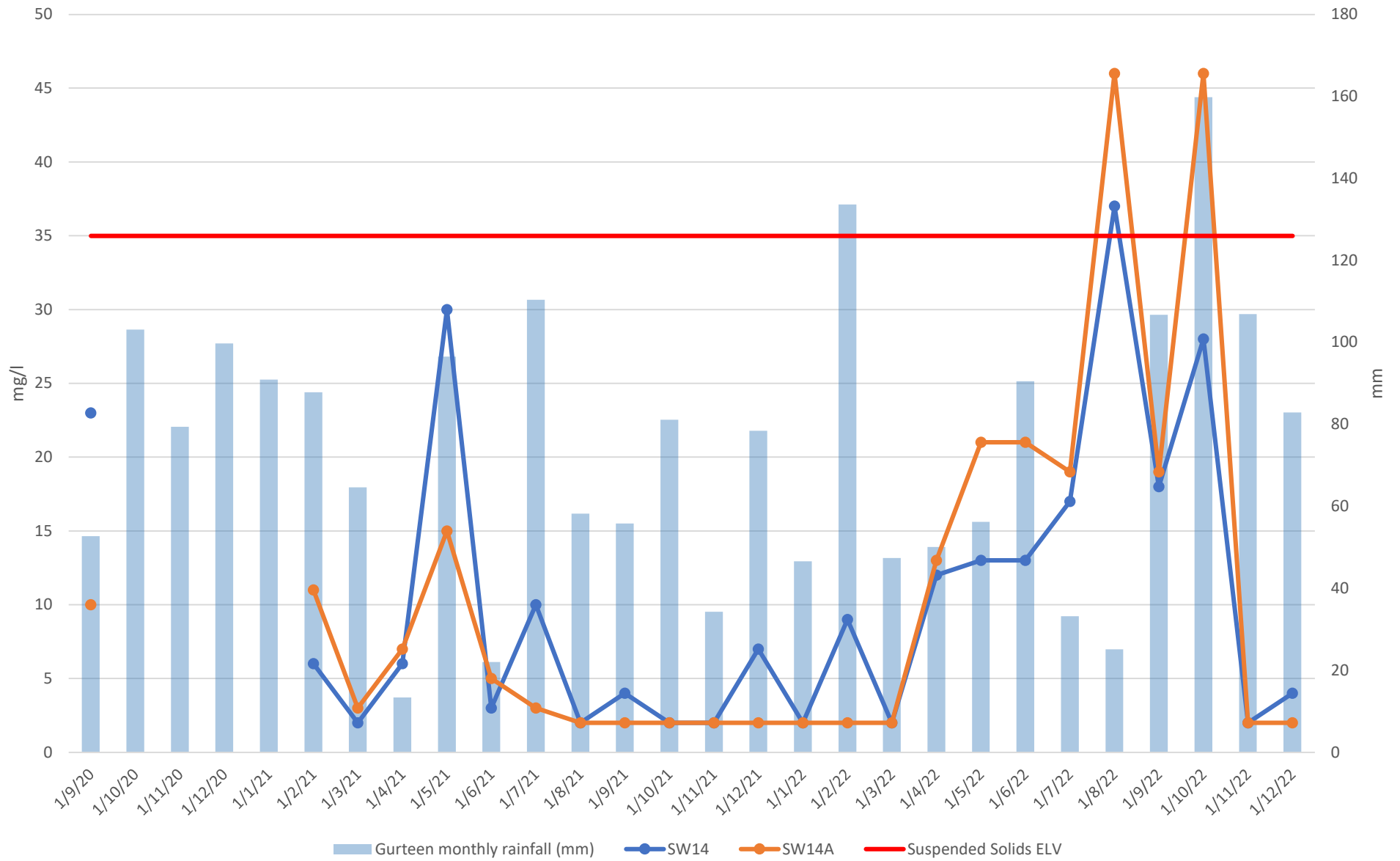
West Boora pH



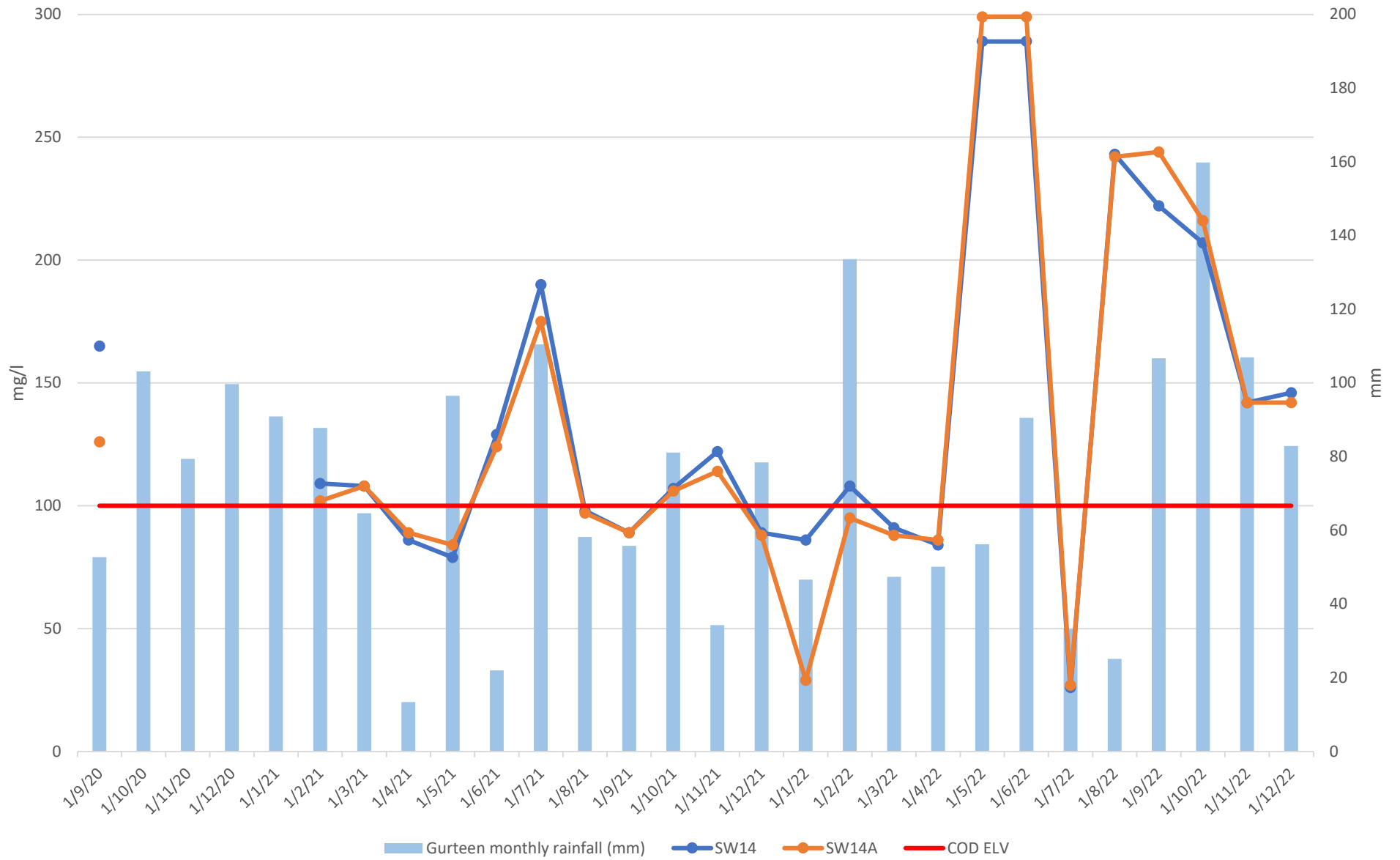
West Boora Ammonia as N mg/l



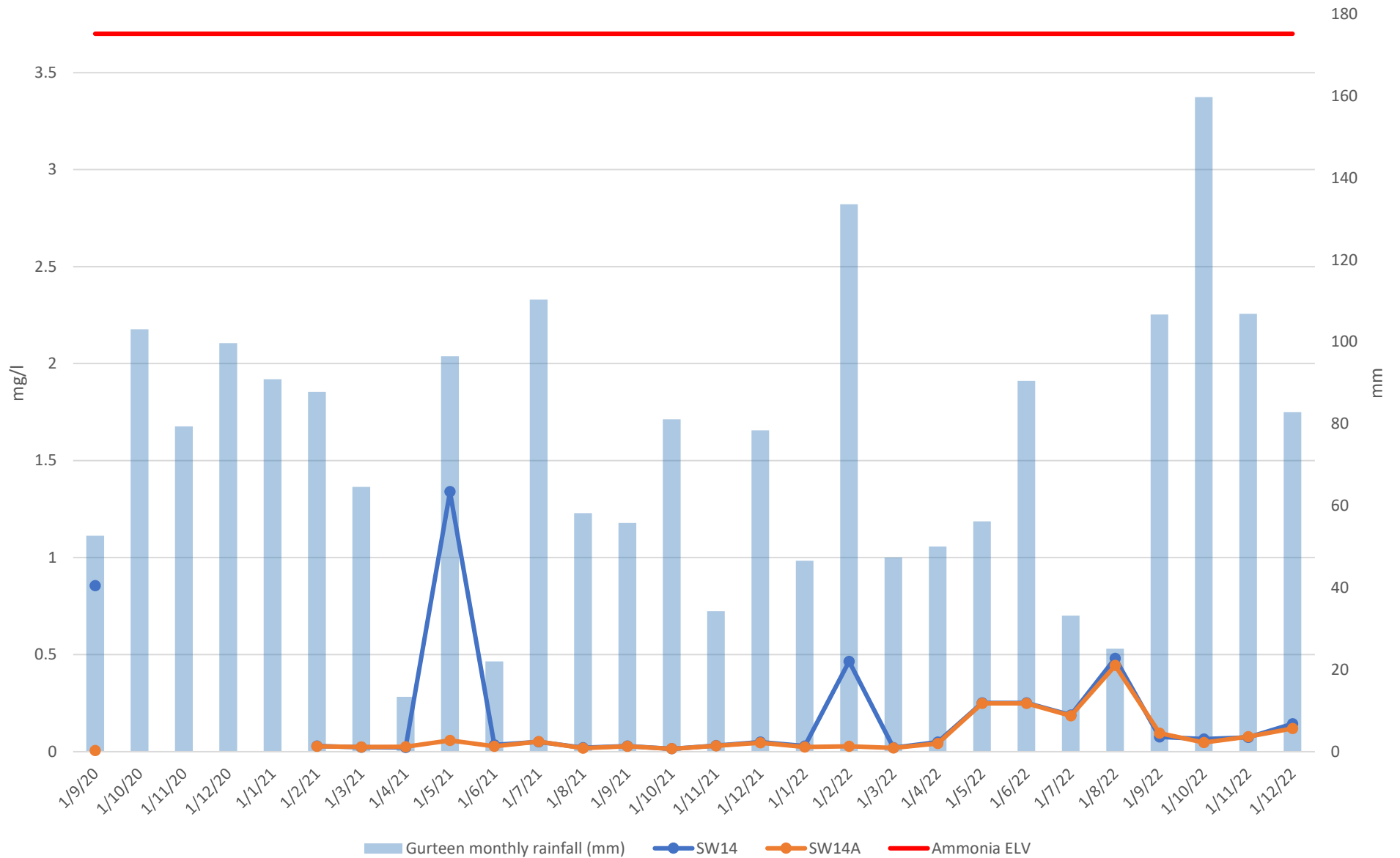
Derries Suspended Solids mg/l



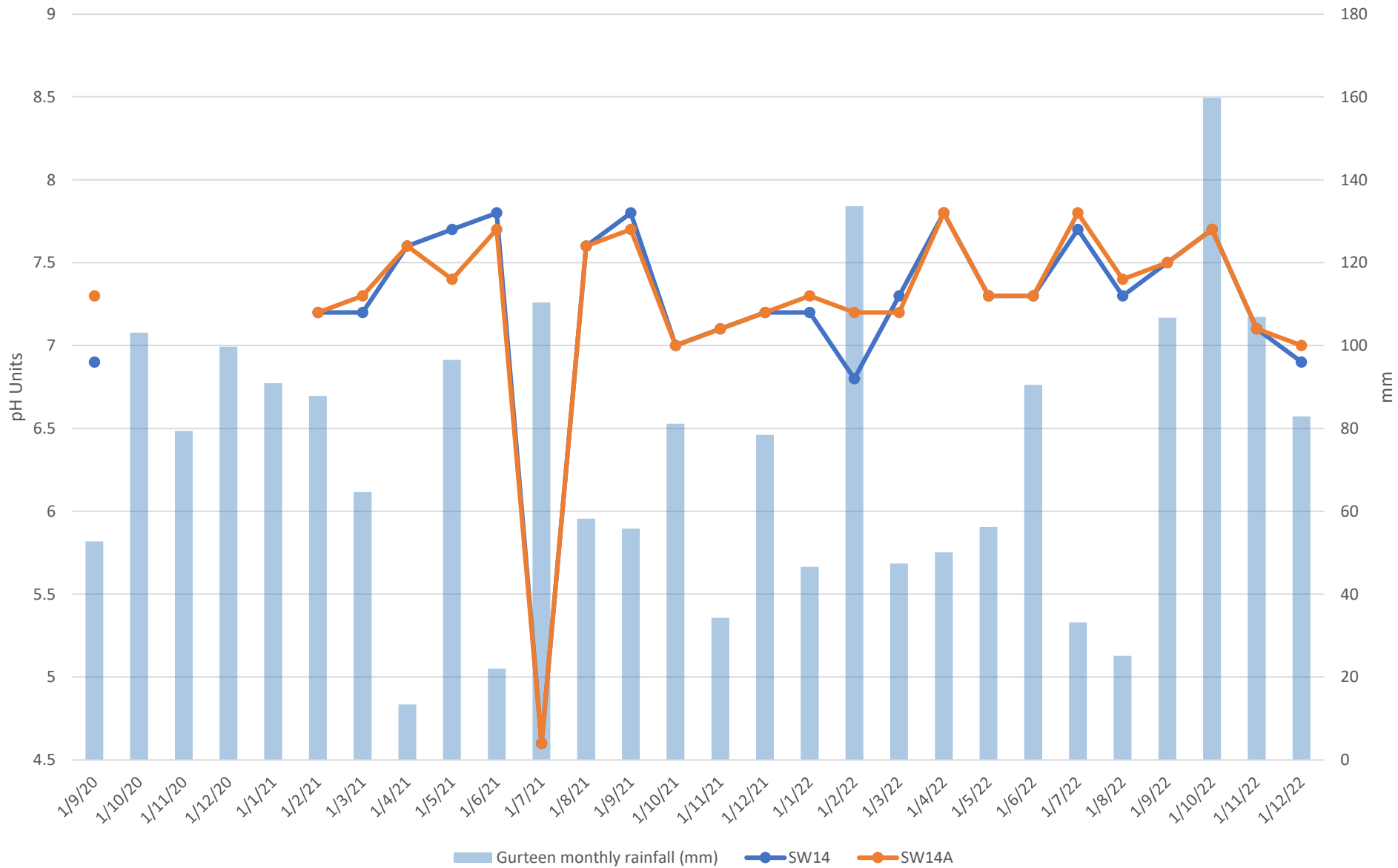
Derries COD mg/l



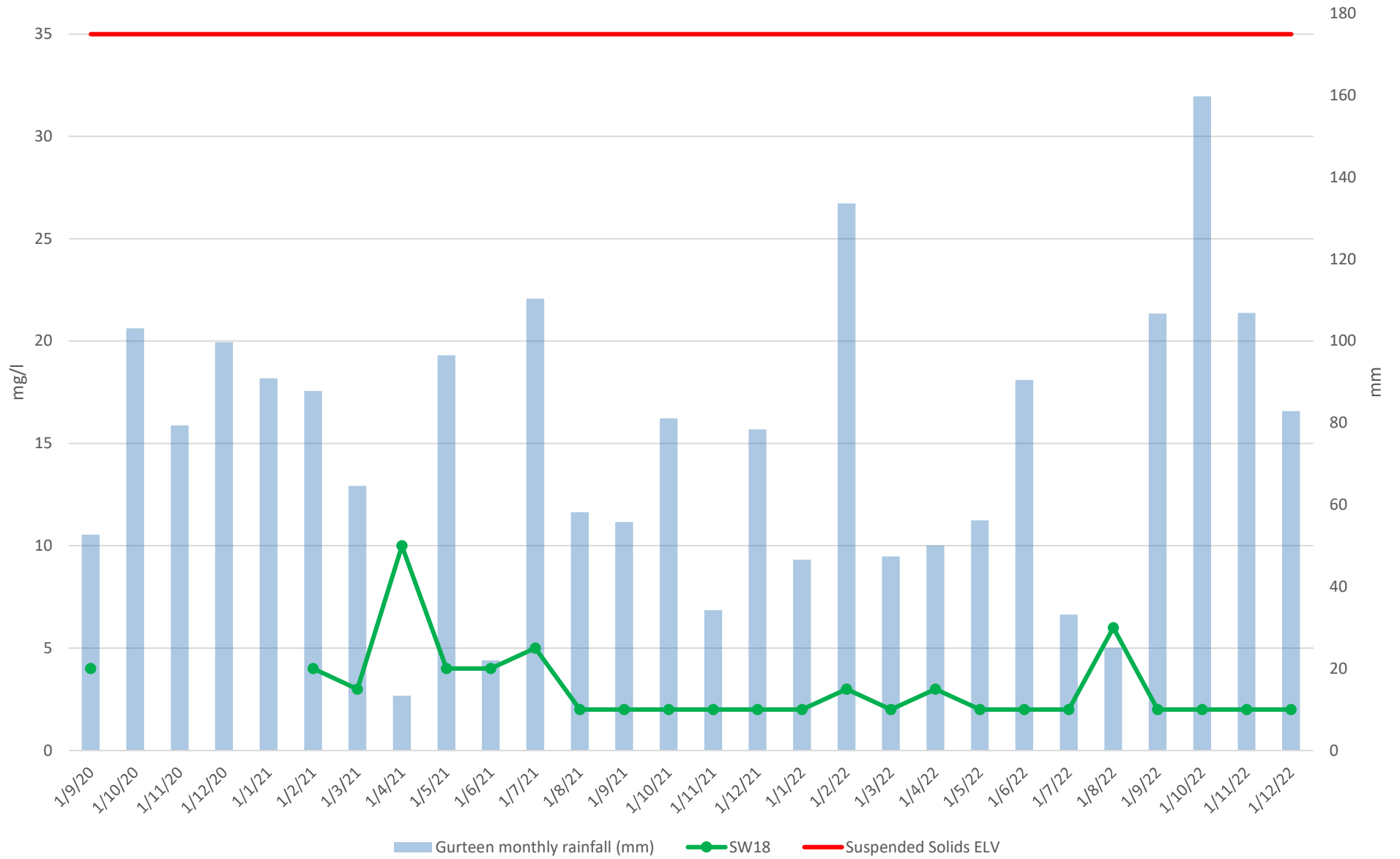
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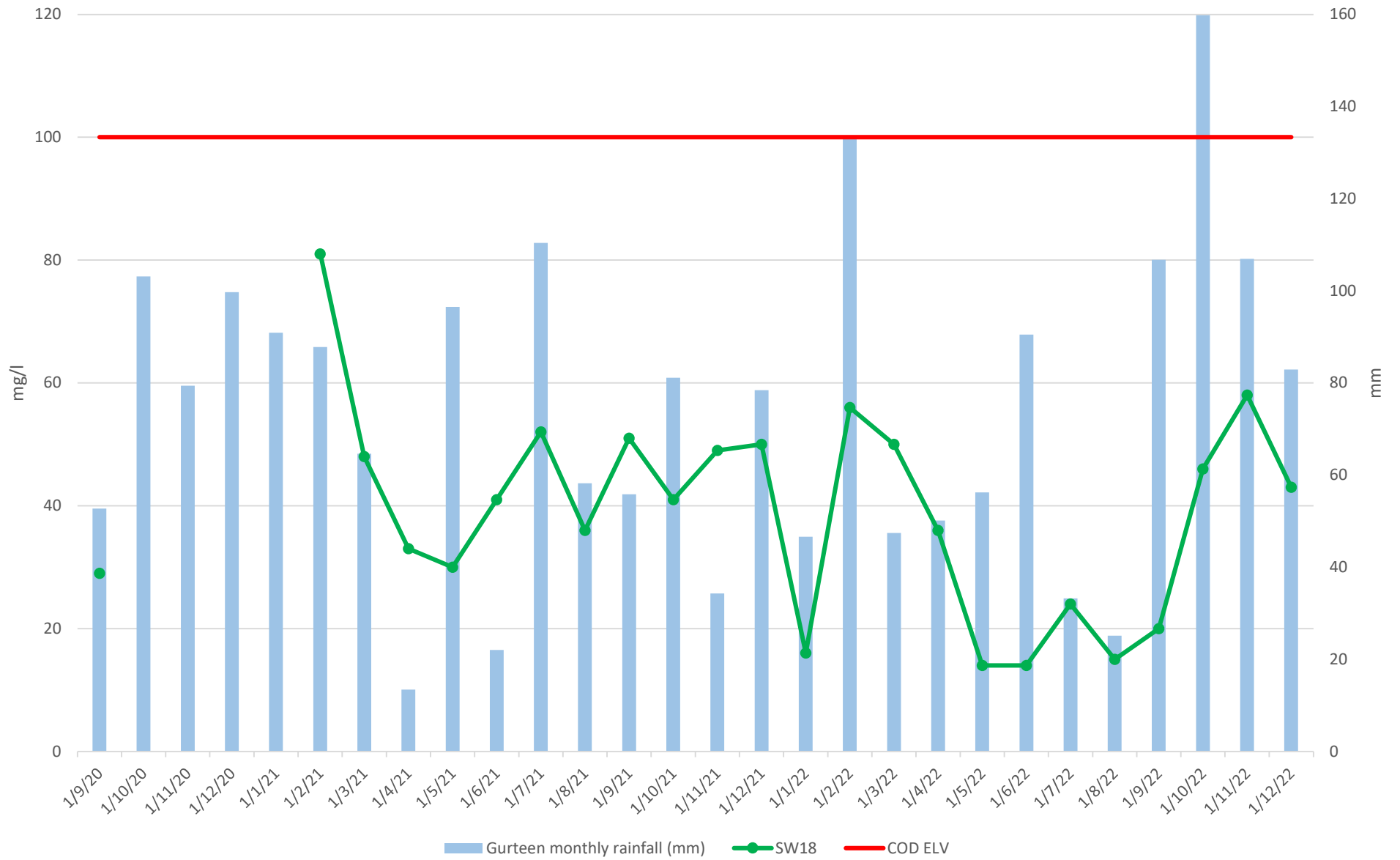
Derries pH



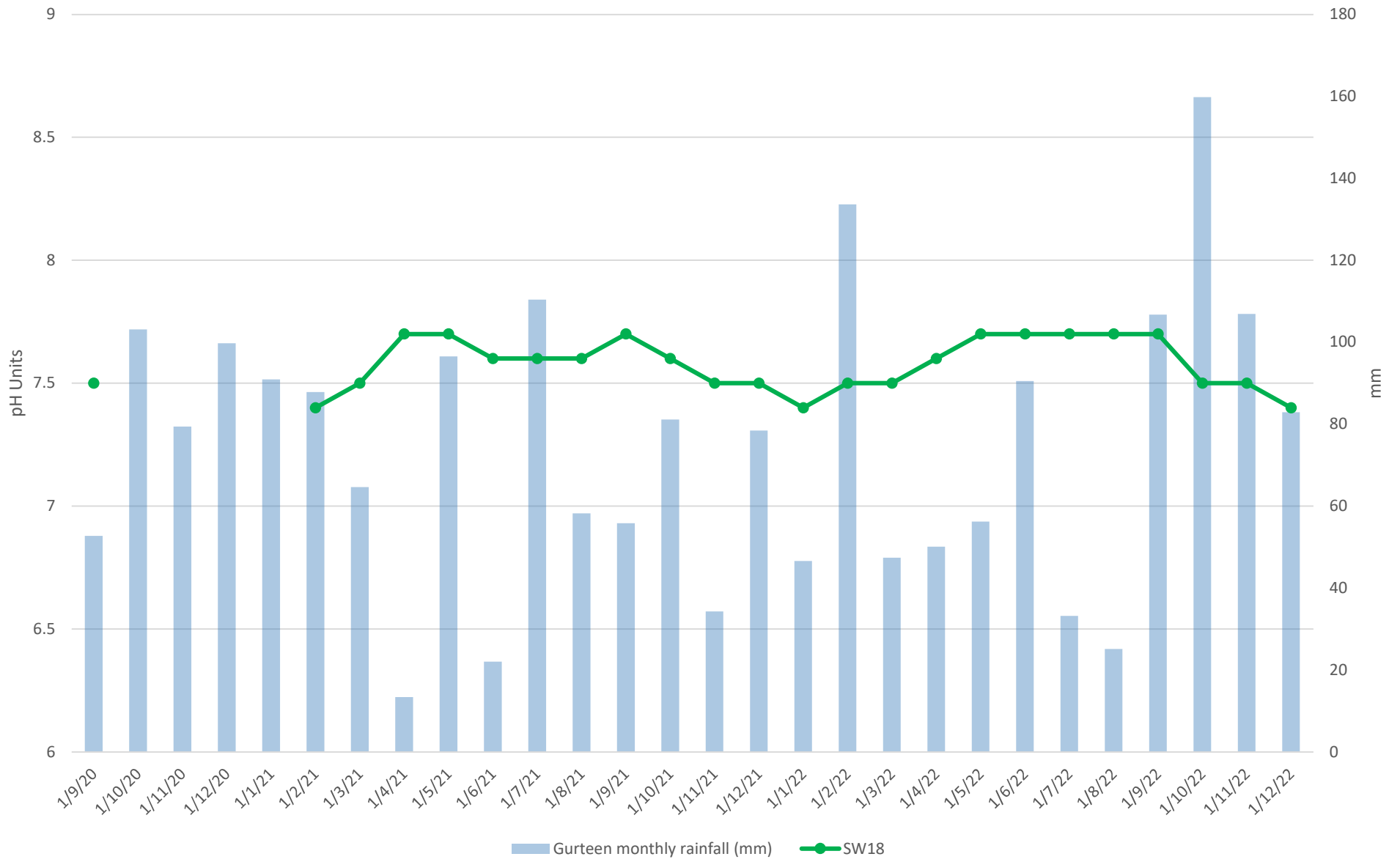
Oughter Suspended Solids mg/l



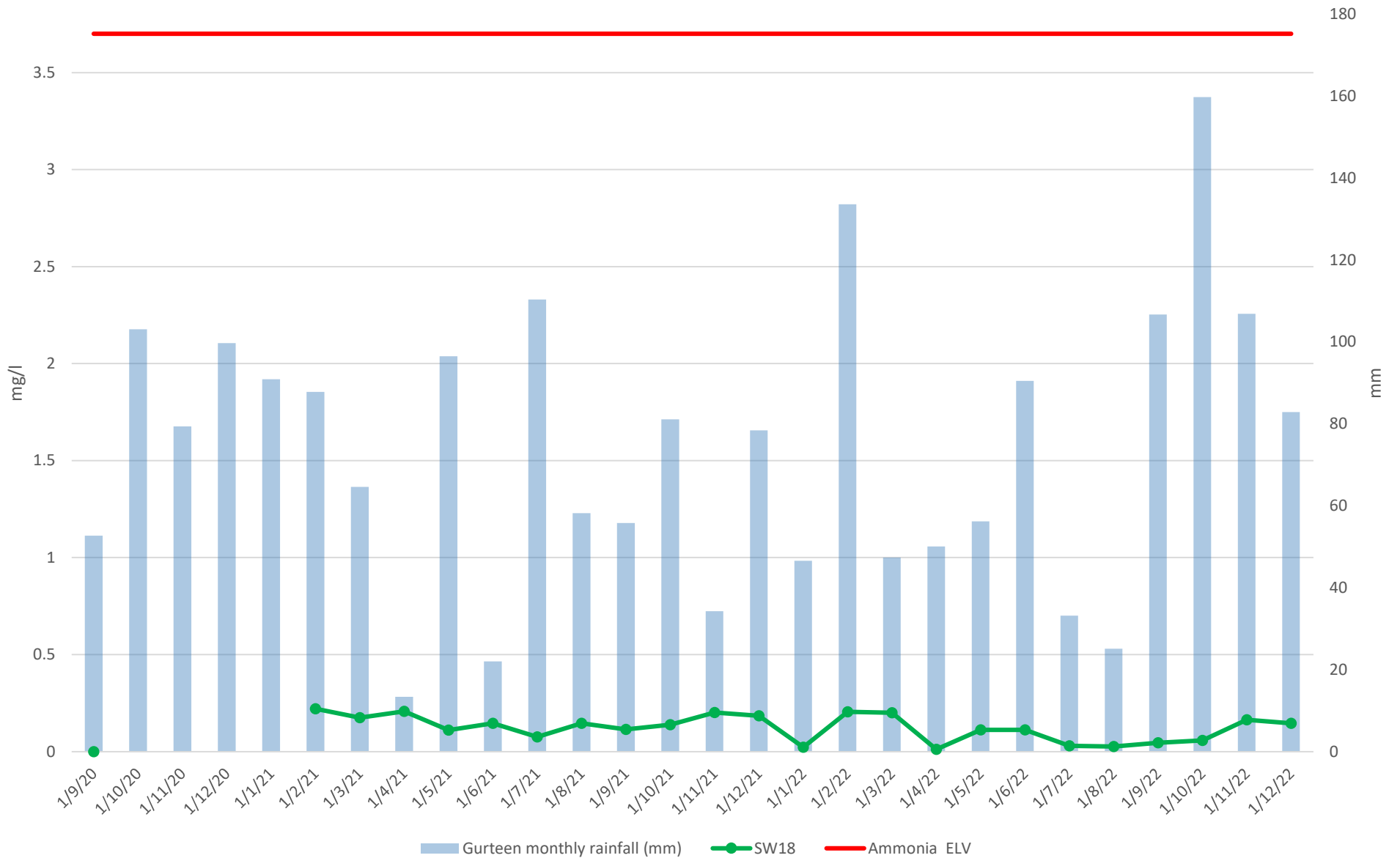
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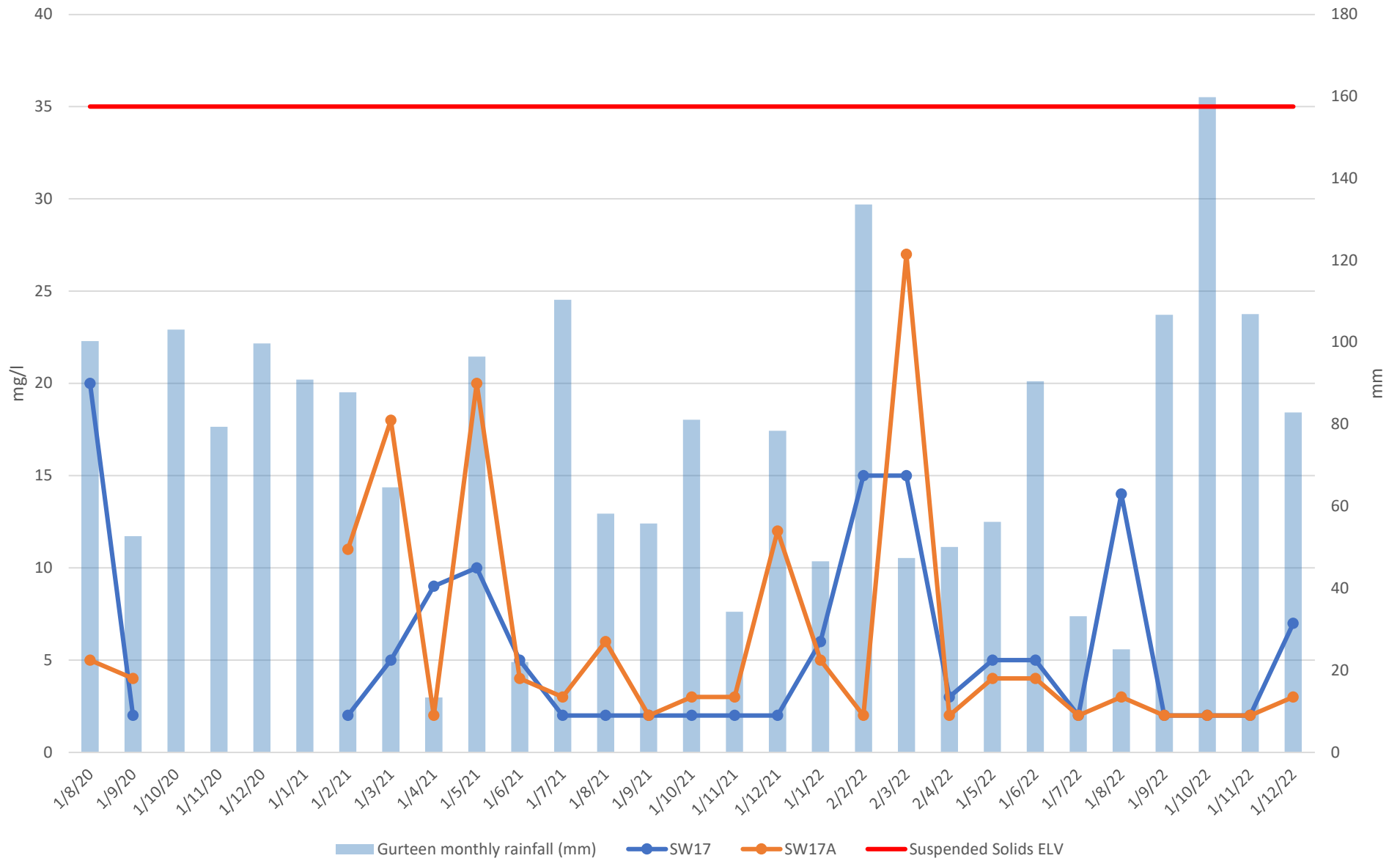
Oughter pH



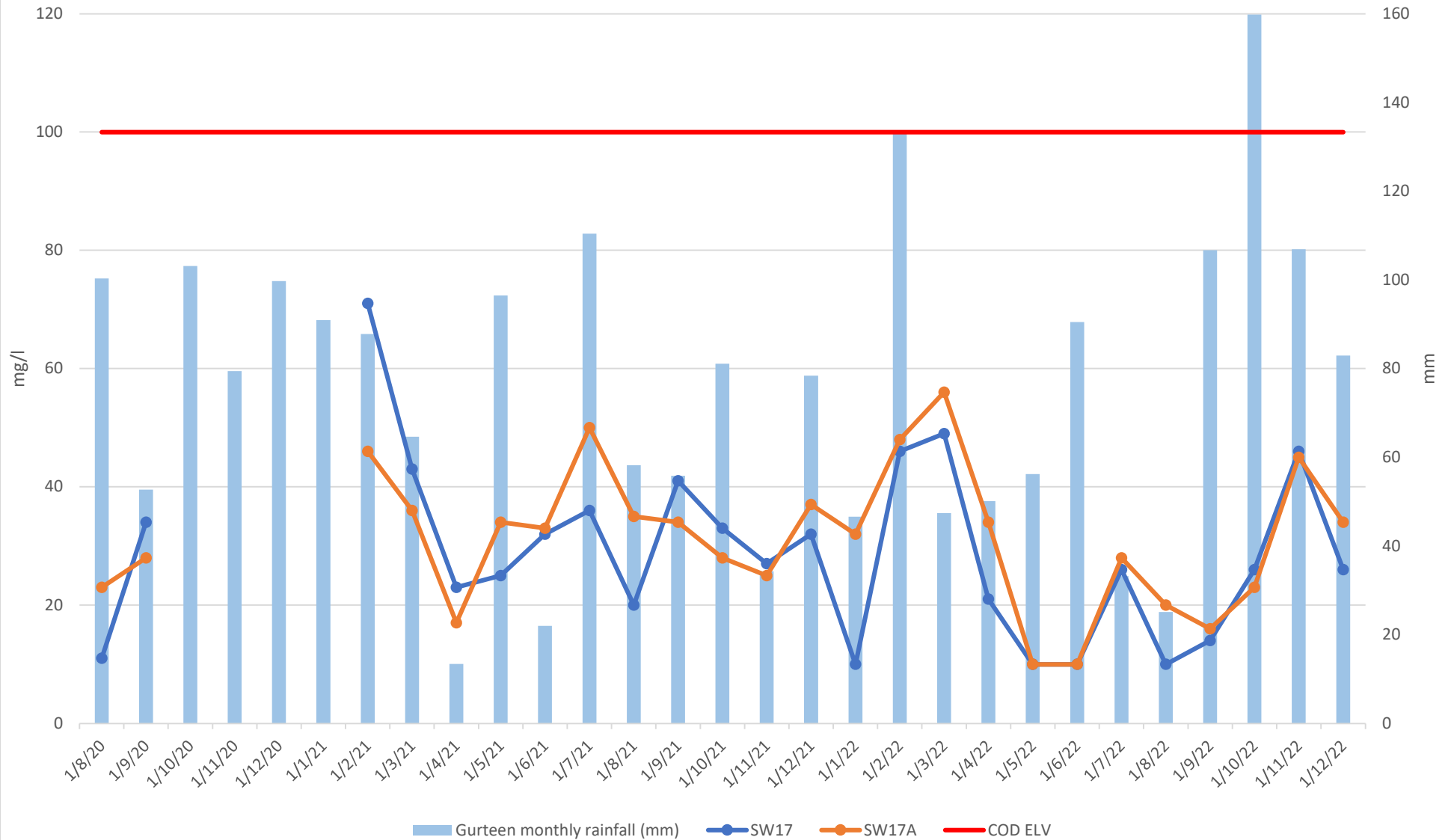
Oughter Ammonia as N mg/l



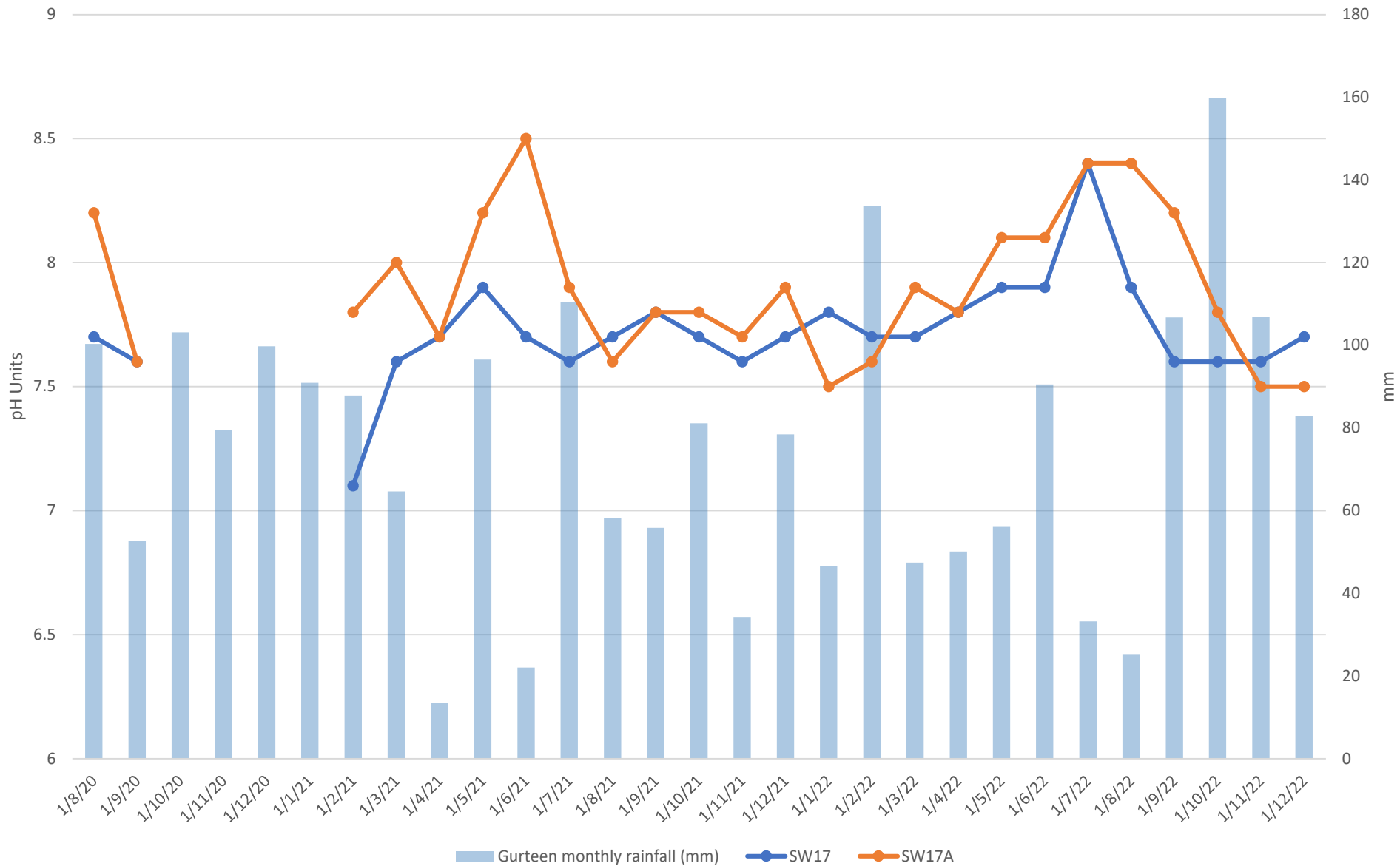
Pollagh Suspended Solids mg/l



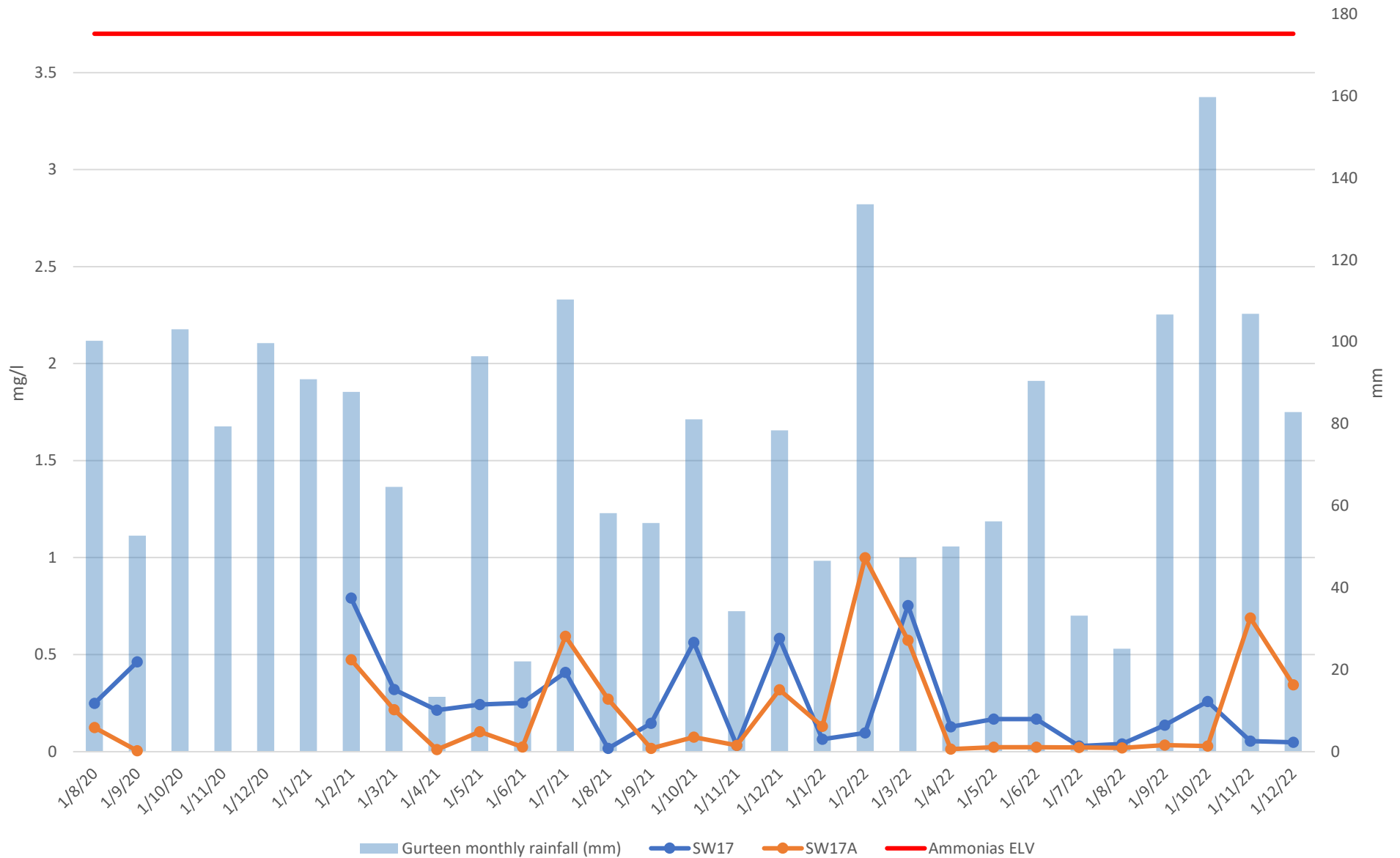
Pollagh COD mg/l



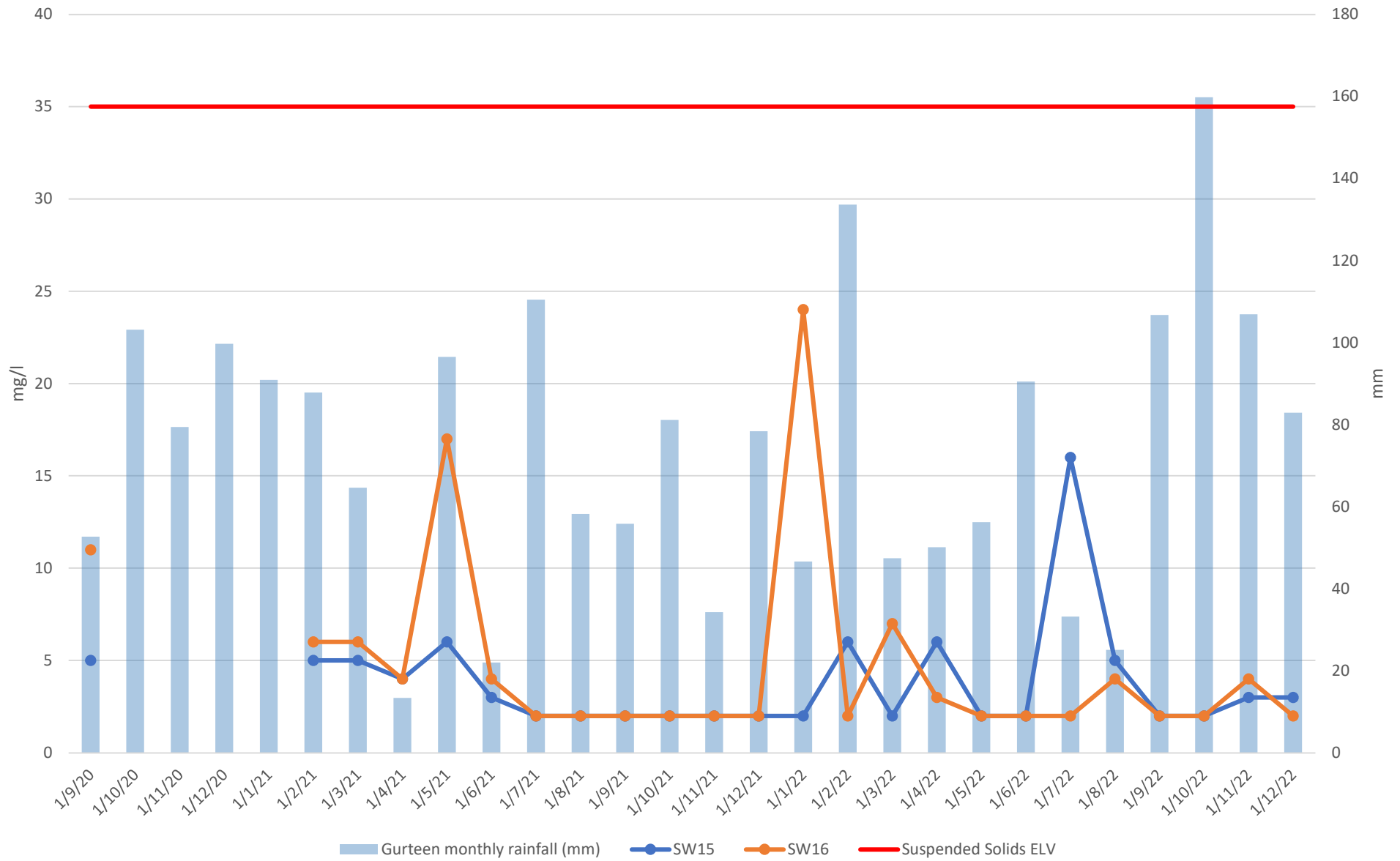
Pollagh pH



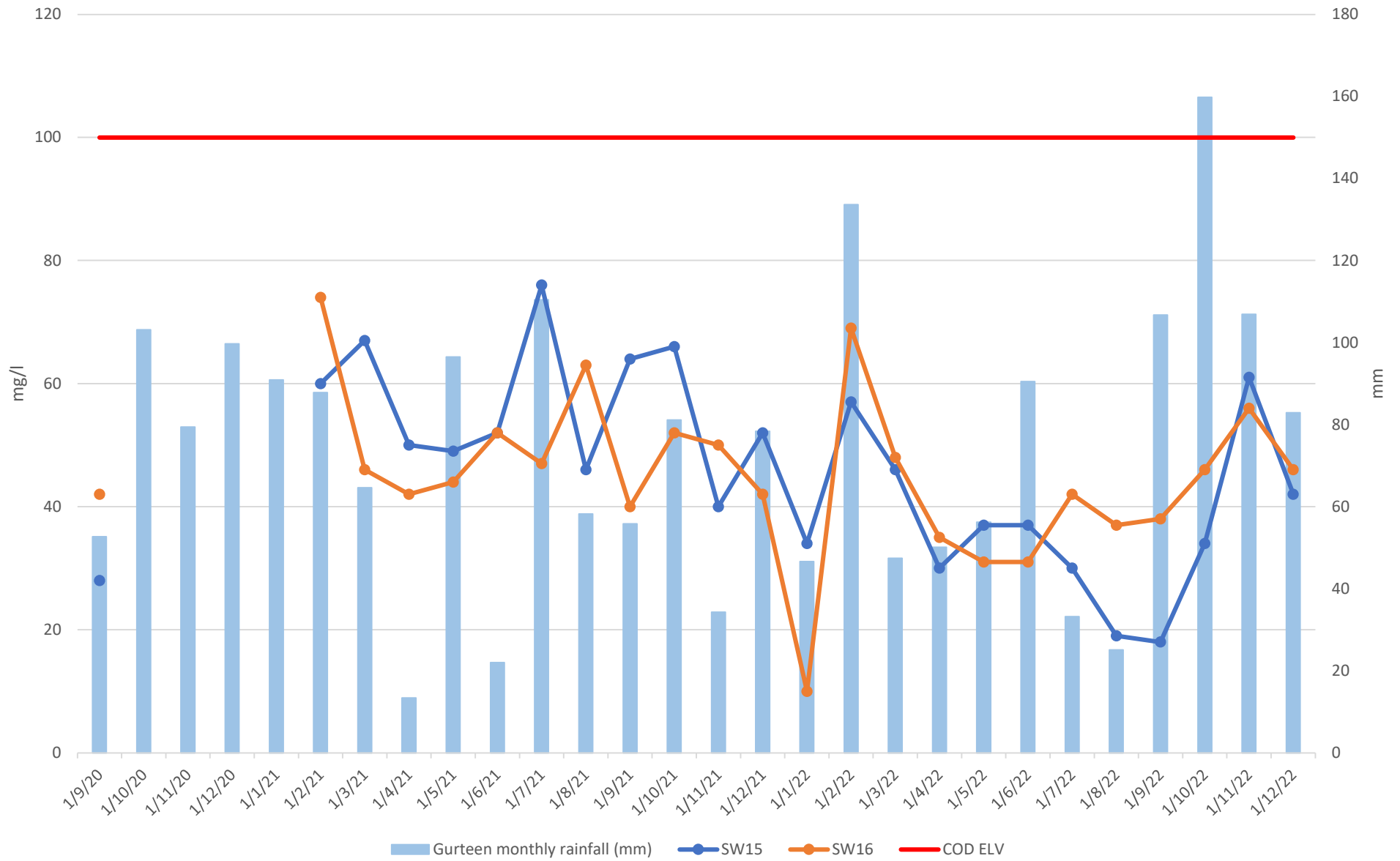
Pollagh Ammonia as N mg/l



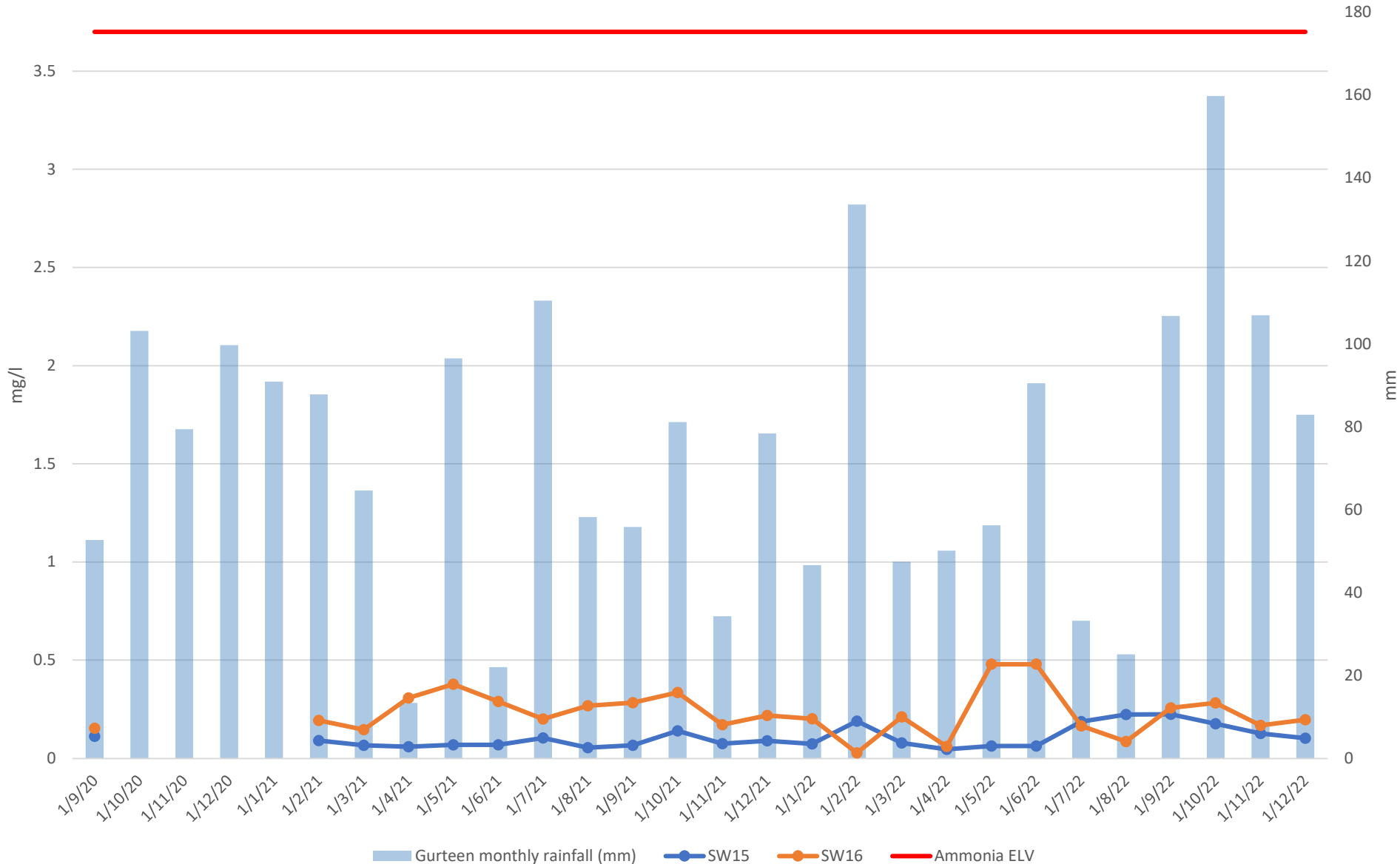
Turraun Suspended Solids mg/l



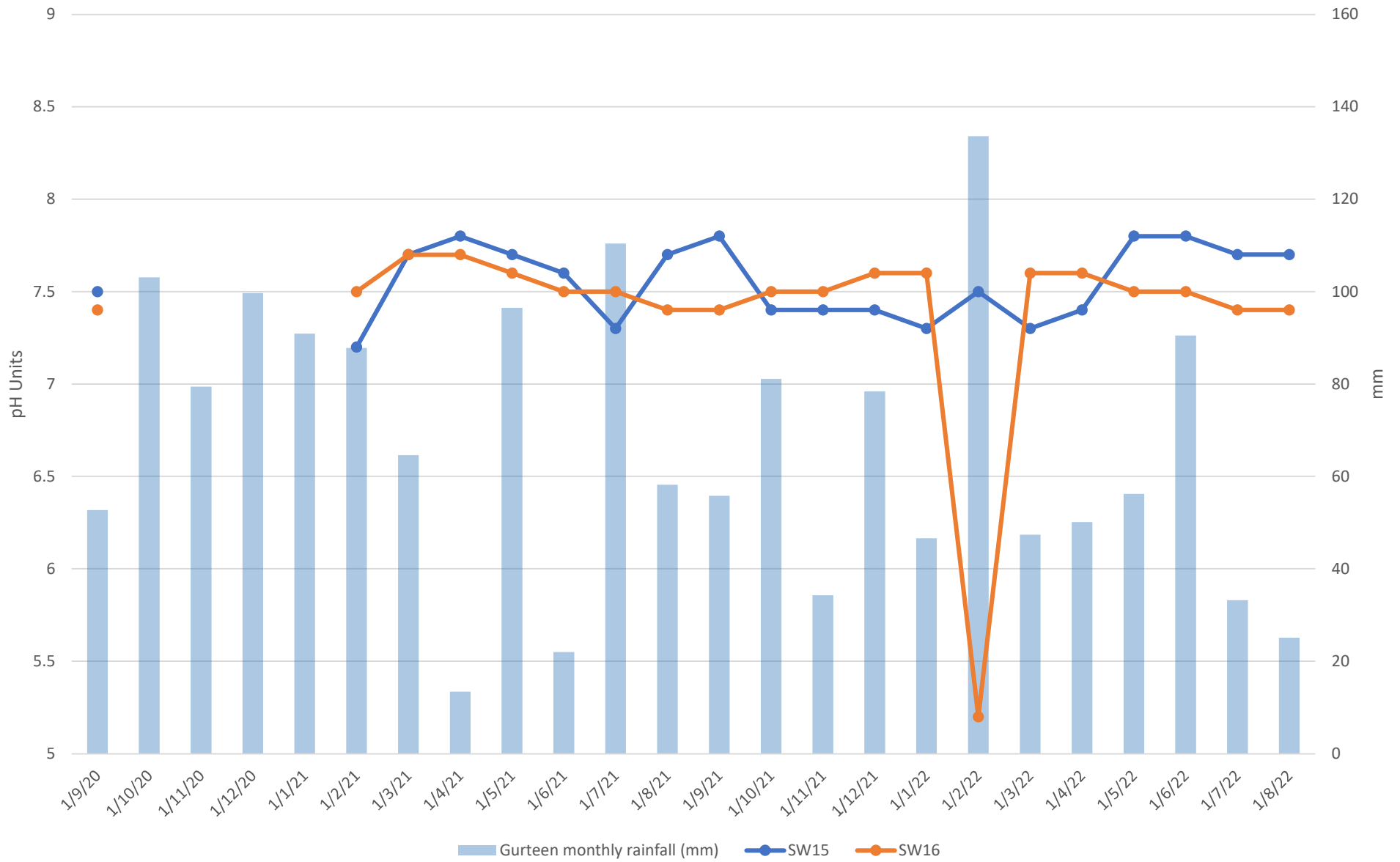
Turraun COD mg/l



Turraun Ammonia as N mg/l



Turraun pH



Castlegar Bog

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids		
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Bog Group	Licence No	Bog Name	SW Code -GIS	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	2/2/22	2/3/22	2/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Castlegar	SW118		3	2	2	2	2	4	2	2	2	3	2	2	10	11	2	5	2	2	2	2	5	2	2	2	2	
Blackwater	P0502-01	Castlegar	SW123							2	5	2	2	2	2	2	7	11	3	2	2	2	3	3	3	3	2	10	2	
Blackwater	P0502-01	Castlegar	SW124			6	13	5	2	13	4	3	2	2	2	2	6	2	2	2	2	2	2	2	2	2	2	2	2	
			Athenry monthly rainfall (mm)	148.1	151.6	167.3	113.4	102.1	23.9	95.7	29.8	58.5	84.8	91.1	164	78.9	114.7	56.9	143.1	39	51.6	78.9	79.4	66	79.6	114.2	199.3	156.2	114.3	
			Suspended Solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
				mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
Bog Group	Licence No	Bog Name	SW Code -GIS	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Castlegar	SW118		277	275	271	279	166	218	196	224	269	193	265	265	282	231	261	170	112	187	123	180	134	119	113	195	185	
Blackwater	P0502-01	Castlegar	SW123						152	182	190	224	430	260	301	270	332	432	321	175	130	166	121	309	231	237	260	504	194	
Blackwater	P0502-01	Castlegar	SW124		257	270	272	307	402	252	202	204	267	168	361	368	238	300	275	211	245	200	166	289	186	171	193	342	318	
			Athenry monthly rainfall (mm)	148.1	151.6	167.3	113.4	102.1	23.9	95.7	29.8	58.5	84.8	91.1	164	78.9	114.7	56.9	143.1	39	51.6	78.9	79.4	66	79.6	114.2	199.3	156.2	114.3	

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Bog Group	Licence No	Bog Name	SW Code -GIS	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Castlegar	SW118		42	48	48	51	47	67	65	76	83	72	81	76	62	65	52	42	55	56	35	63	43	44	27	48	38	
Blackwater	P0502-01	Castlegar	SW123						44	65	58	65	94	73	84	78	79	66	46	51	56	47	77	72	65	23	77	47		
Blackwater	P0502-01	Castlegar	SW124		45	67	44	56	72	72	69	63	66	72	81	93	56	73	43	51	70	55	46	64	52	55	10	75	71	
			Athenry monthly rainfall (mm)	148.1	151.6	167.3	113.4	102.1	23.9	95.7	29.8	58.5	84.8	91.1	164	78.9	114.7	56.9	143.1	39	51.6	78.9	79.4	66	79.6	114.2	199.3	156.2	114.3	
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
				pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
Bog Group	Licence No	Bog Name	SW Code -GIS	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Blackwater	P0502-01	Castlegar	SW118		6.5	7	7.2	7.1	7.7	7.4	7.3	7.3	7.4	7.3	6.8	6.9	6.6	7.4	7.2	7.6	7.6	7.5	7.7	7.7	7.8	7.6	7.6	6.8	7
Blackwater	P0502-01	Castlegar	SW123						7.6	7.4	7.6	7.5	7.3	7.6	7	7.1	6.7	6.1	7.4	7.6	7.6	7.7	7.5	7.4	7.6	7.3	7.2	4.4	7.3
Blackwater	P0502-01	Castlegar	SW124		6.5	6.6	6.6	6.6	7.1	6.7	7.7	7.5	7.6	7.8	7.1	7.2	5.5	7	6.9	7.1	7.4	7.3	7.8	7.5	7.7	7.6	7.6	6.3	7
			Athenry monthly rainfall (mm)	148.1	151.6	167.3	113.4	102.1	23.9	95.7	29.8	58.5	84.8	91.1	164	78.9	114.7	56.9	143.1	39	51.6	78.9	79.4	66	79.6	114.2	199.3	156.2	114.3

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Bog Group	Licence No	Bog Name	SW Code -GIS	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Blackwater	P0502-01	Castlegar	SW118		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Blackwater	P0502-01	Castlegar	SW123						<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.16	0.06	<0.05	0.14	0.06	<0.05	0.1	<0.05	<0.05
Blackwater	P0502-01	Castlegar	SW124		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.05
			Athenry monthly rainfall (mm)	148.1	151.6	167.3	113.4	102.1	23.9	95.7	29.8	58.5	84.8	91.1	164	78.9	114.7	56.9	143.1	39	51.6	78.9	79.4	66	79.6	114.2	199.3	156.2	114.3

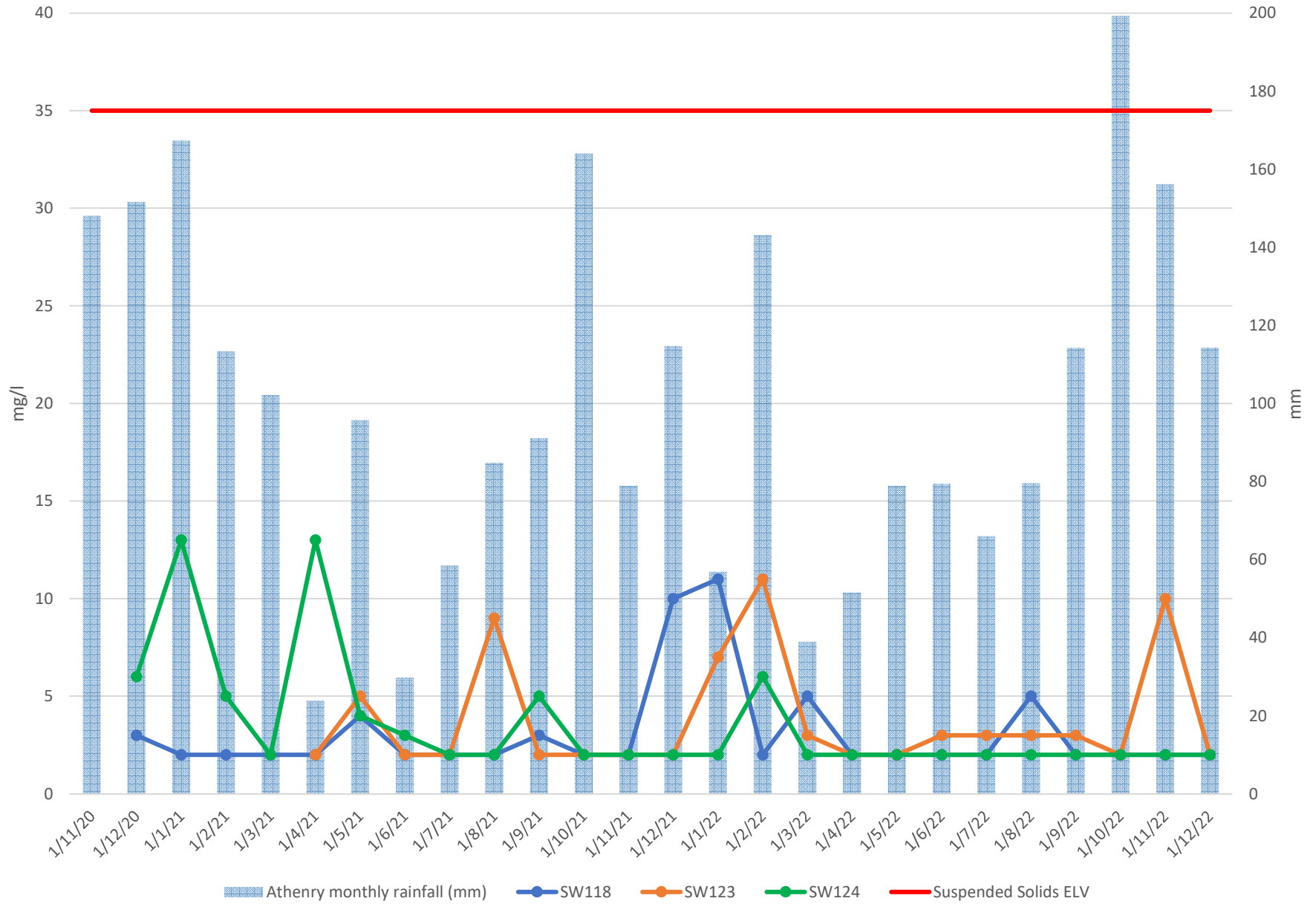
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Bog Group	Licence No	Bog Name	SW Code -GIS	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Blackwater	P0502-01	Castlegar	SW118		89	65	156	144	274	196	232	197	178	245	158	110	133	91	154	244	333	244	343	313	333	364	326	120	448
Blackwater	P0502-01	Castlegar	SW123						256	206	264	224	198	215	459	211	6.3	77	146	221	301	268	246	275	231	209	214	76	168
Blackwater	P0502-01	Castlegar	SW124		73	104	96	97	173	111	255	216	215	202	285	254	136	90	139	168	195	288	272	245	277	176	136	201	
			Athenry monthly rainfall (mm)	148.1	151.6	167.3	113.4	102.1	23.9	95.7	29.8	58.5	84.8	91.1	164	78.9	114.7	56.9	143.1	39	51.6	78.9	79.4	66	79.6	114.2	199.3	156.2	114.3

PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22					
Blackwater	P0502-01	Castlegar	SW118		0.336	0.352	0.432	0.406	1.110	1.090	2.650	2.200	1.550	2.280	0.883	0.812	0.402	0.216	0.281	0.924	0.725		1.110	0.530	0.589	0.580	1.250	0.317	0.606					
Blackwater	P0502-01	Castlegar	SW123					0.627	0.399	0.967	1.180	1.500	1.570	0.441	0.645	0.145	0.210	0.696	0.863	1.050		0.440	0.168	0.055	0.103	0.391	0.027	6.09						
Blackwater	P0502-01	Castlegar	SW124		0.183	0.606	0.231	0.224	0.575	0.325	0.397	0.457	0.273	0.049	0.208	0.269	0.594	0.140	0.421	0.667	0.451		0.344	0.245	0.179	0.141	0.226	0.116	0.49					
			Athenry monthly rainfall (mm)	148.1	151.6	167.3	113.4	102.1	23.9	95.7	29.8	58.5	84.8	91.1	164	78.9	114.7	56.9	143.1	39	51.6	78.9	79.4	66	79.6	114.2	199.3	156.2	114.3					
			Ammonia ELV	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27

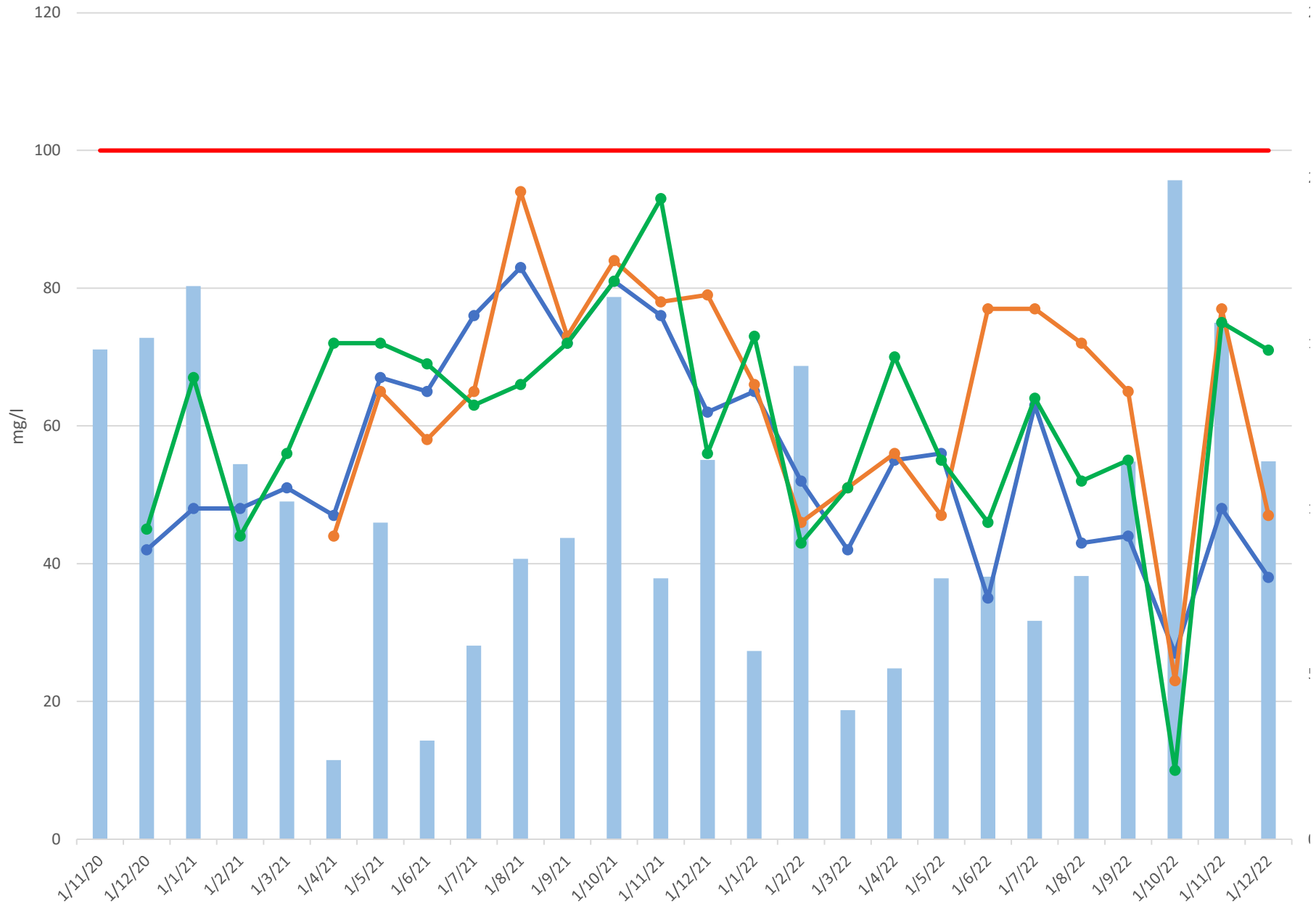
PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22				
Blackwater	P0502-01	Castlegar	SW118		16.4	16.9	17.4	17	16.5	23.1	18.4	20.1	42.2	22	26.2	21.9	18.4	18.5	21.00	16.00	15.50	19.40	18.20	18.90	18.00	15.80	16.00	19.5	16.4				
Blackwater	P0502-01	Castlegar	SW123						15.3	21.2	18.5	21.2	46.5	24.9	28.4	24.3	17.7	19.8	15.10	15.80	15.30	16.60	27.20	25.90	25.70	25.50	25.50	24.3	18.9				
Blackwater	P0502-01	Castlegar	SW124		18.1	17.7	16.9	18.4	20.1	25.4	19.6	21.7	44.7	20	33.5	30	27.5	26.9	15.20	18.50	20.90	20.10	19.40	23.10	20.10	19.50	18.60	27.9	25.8				
			Athenry monthly rainfall (mm)	148.1	151.6	167.3	113.4	102.1	23.9	95.7	29.8	58.5	84.8	91.1	164	78.9	114.7	56.9	143.1	39	51.6	78.9	79.4	66	79.6	114.2	199.3	156.2	114.3				

Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

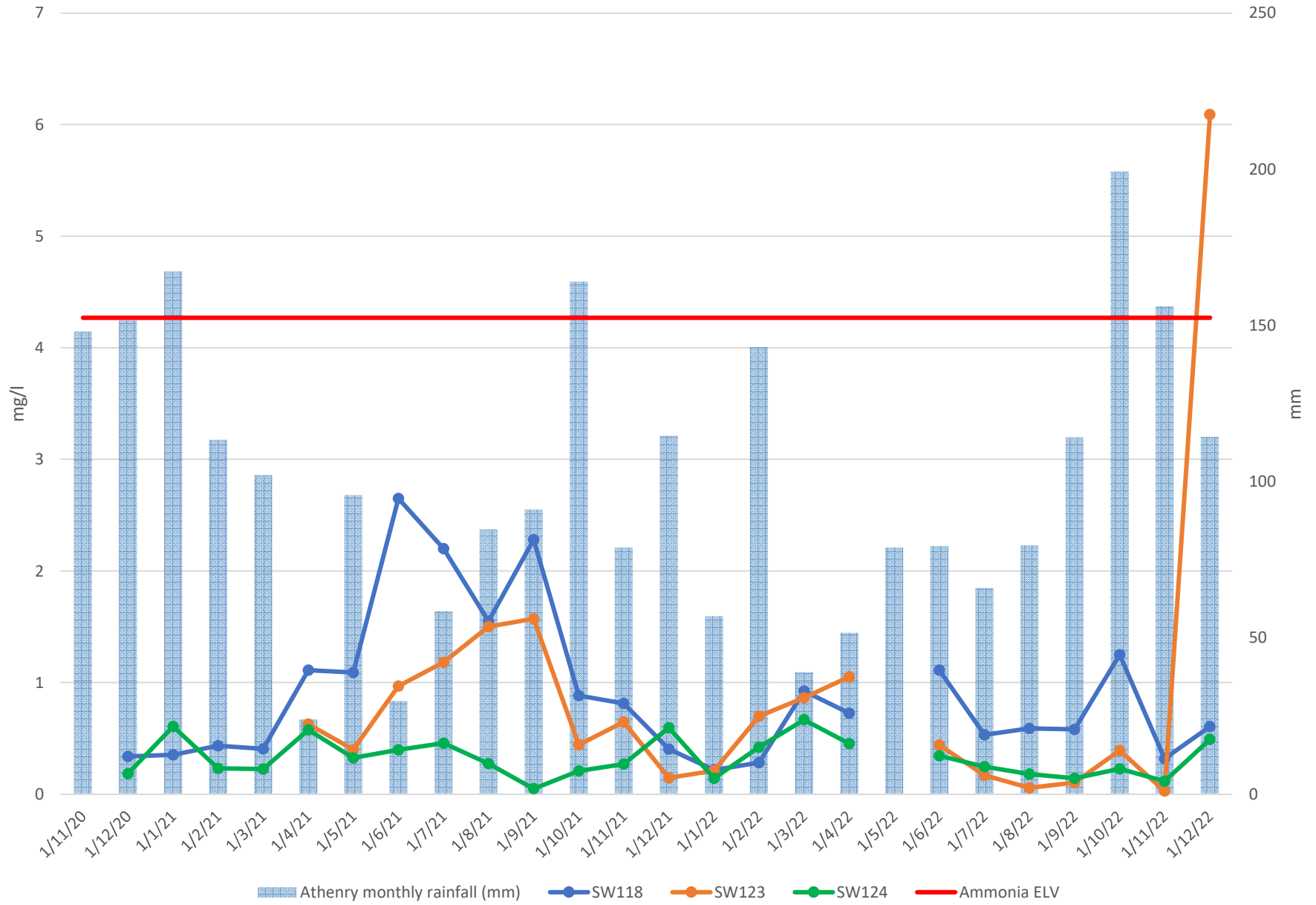
Castlegar Suspended Solids mg/l



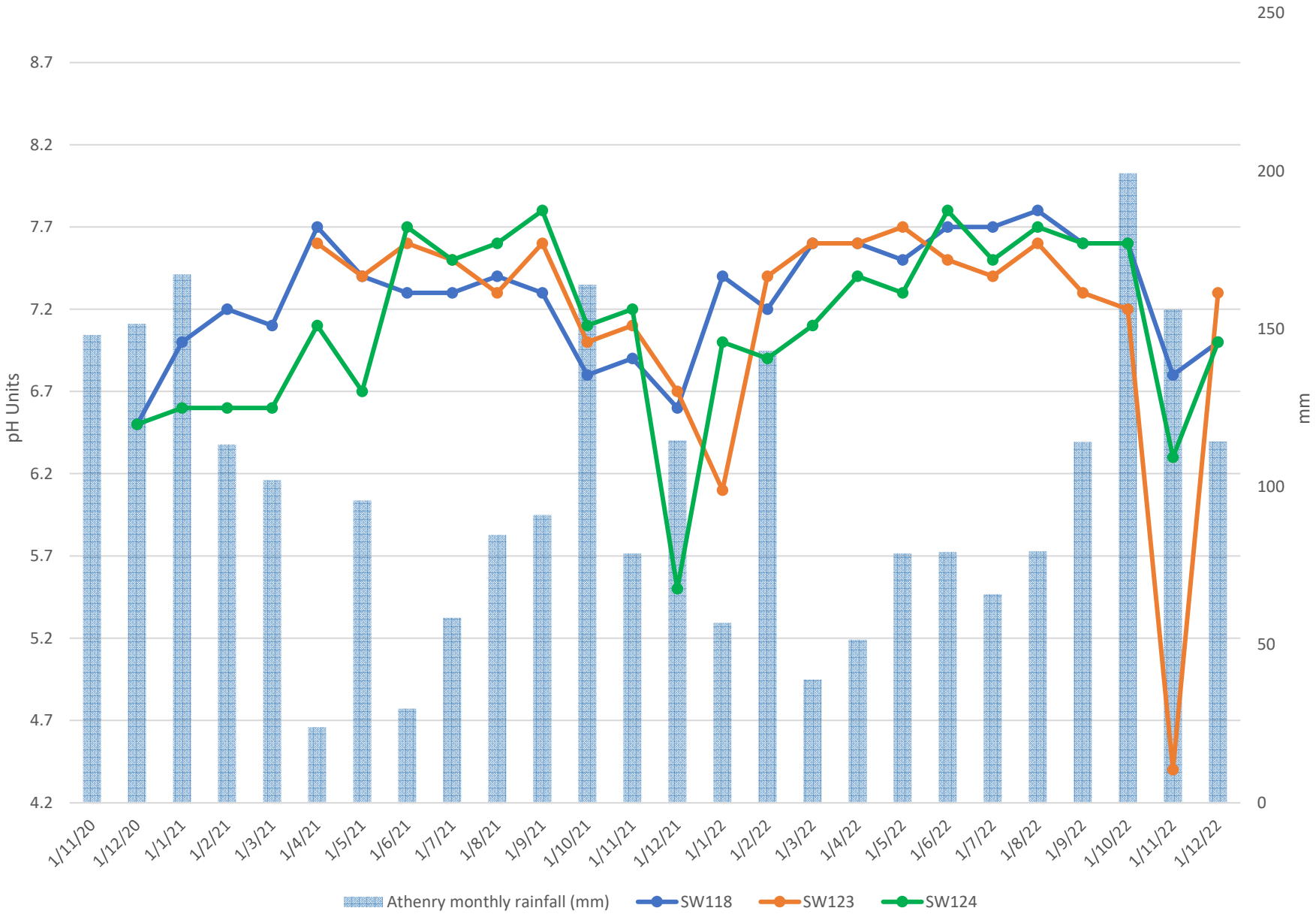
Castlegar COD mg/l



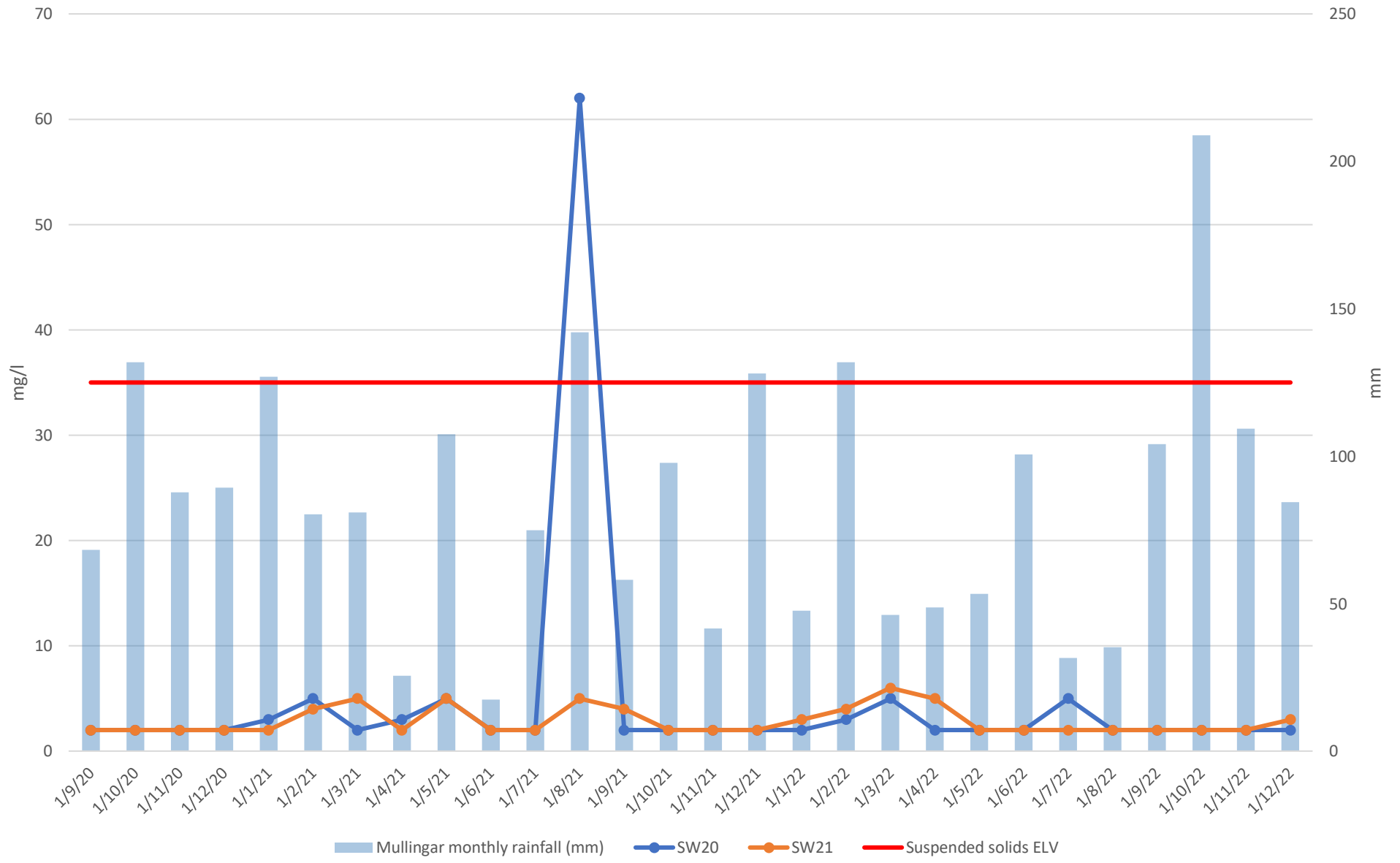
Castlegar Ammonia as N mg/l



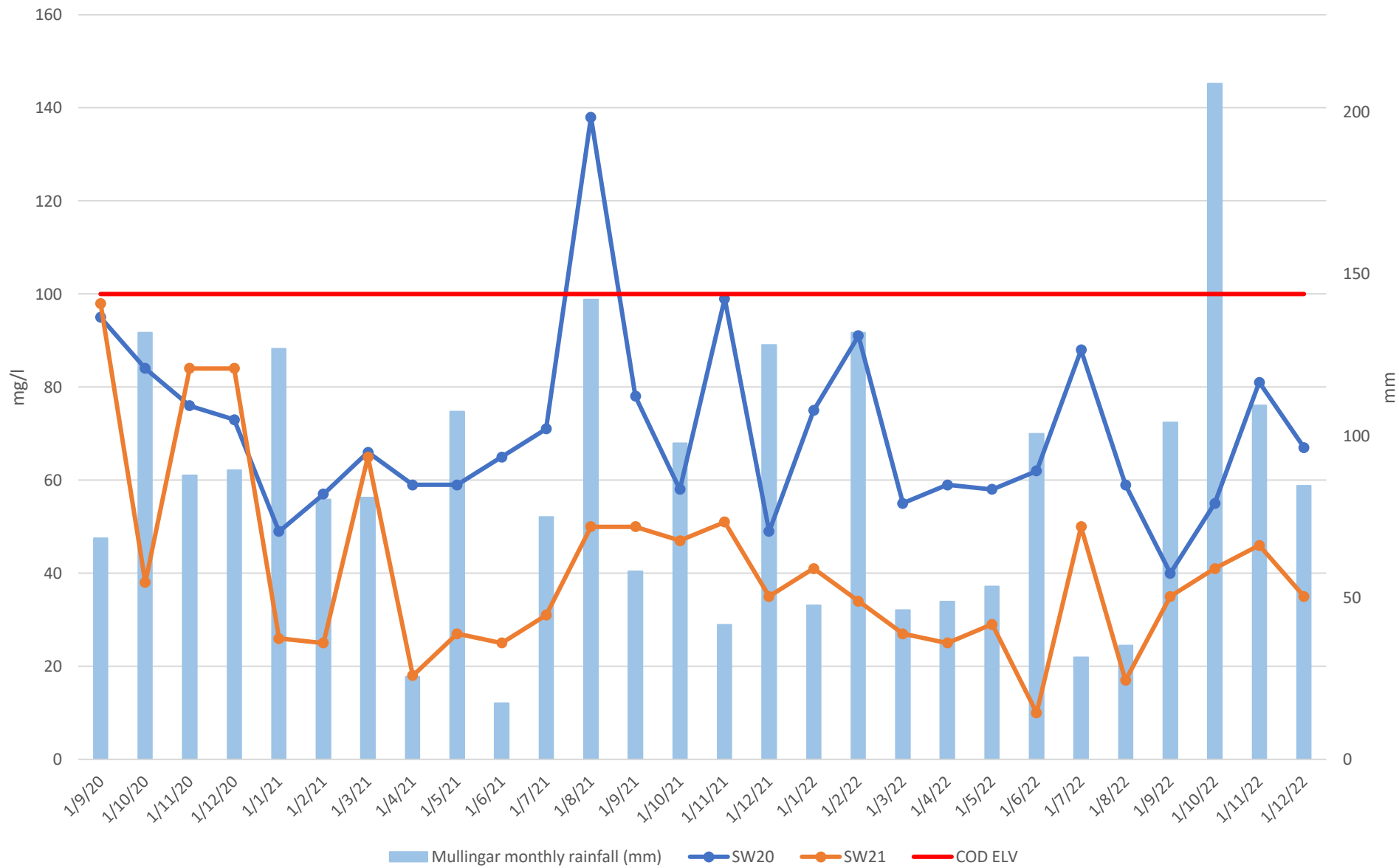
Castlegar pH



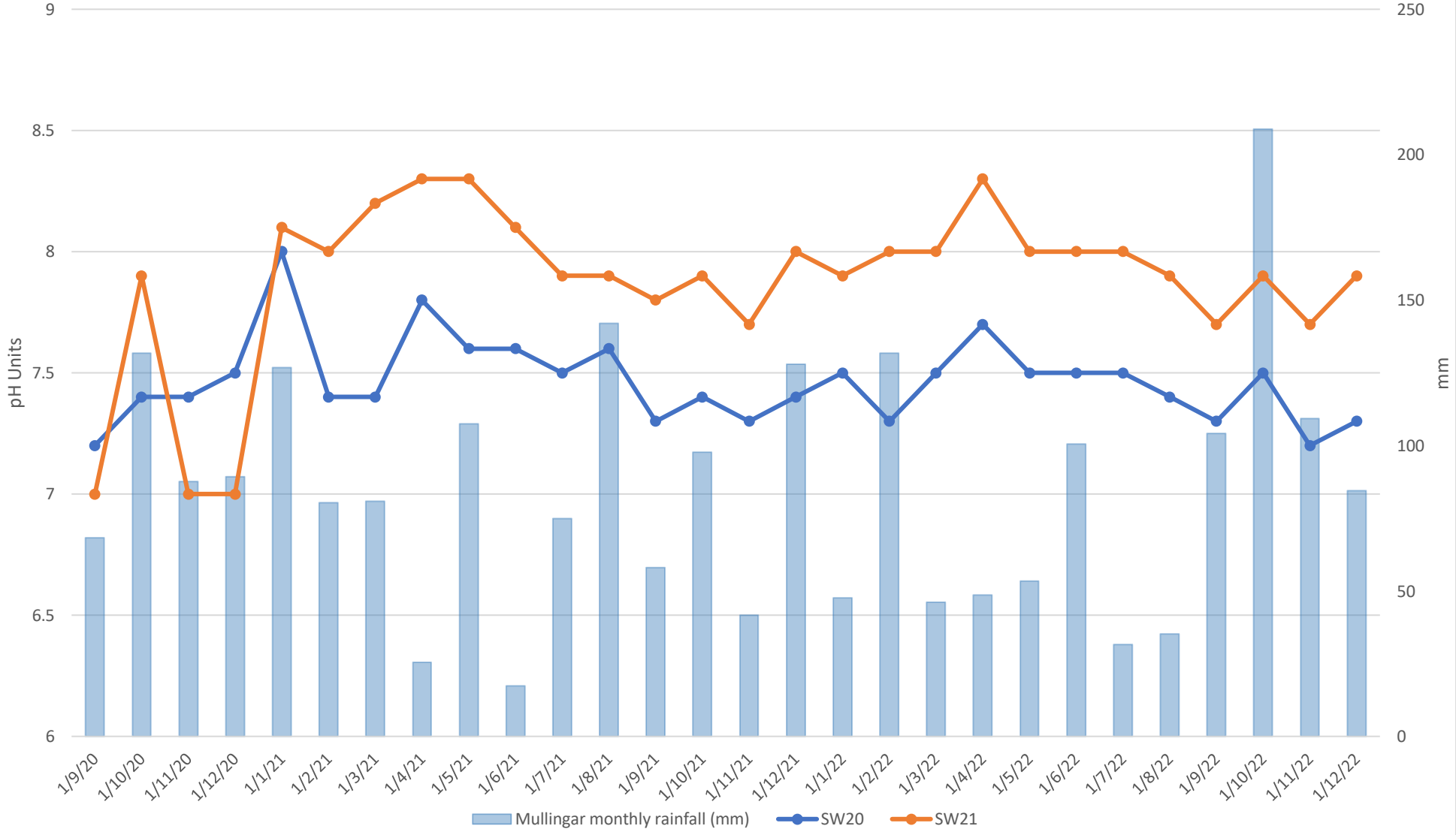
Cavemount Suspended Solids mg/l



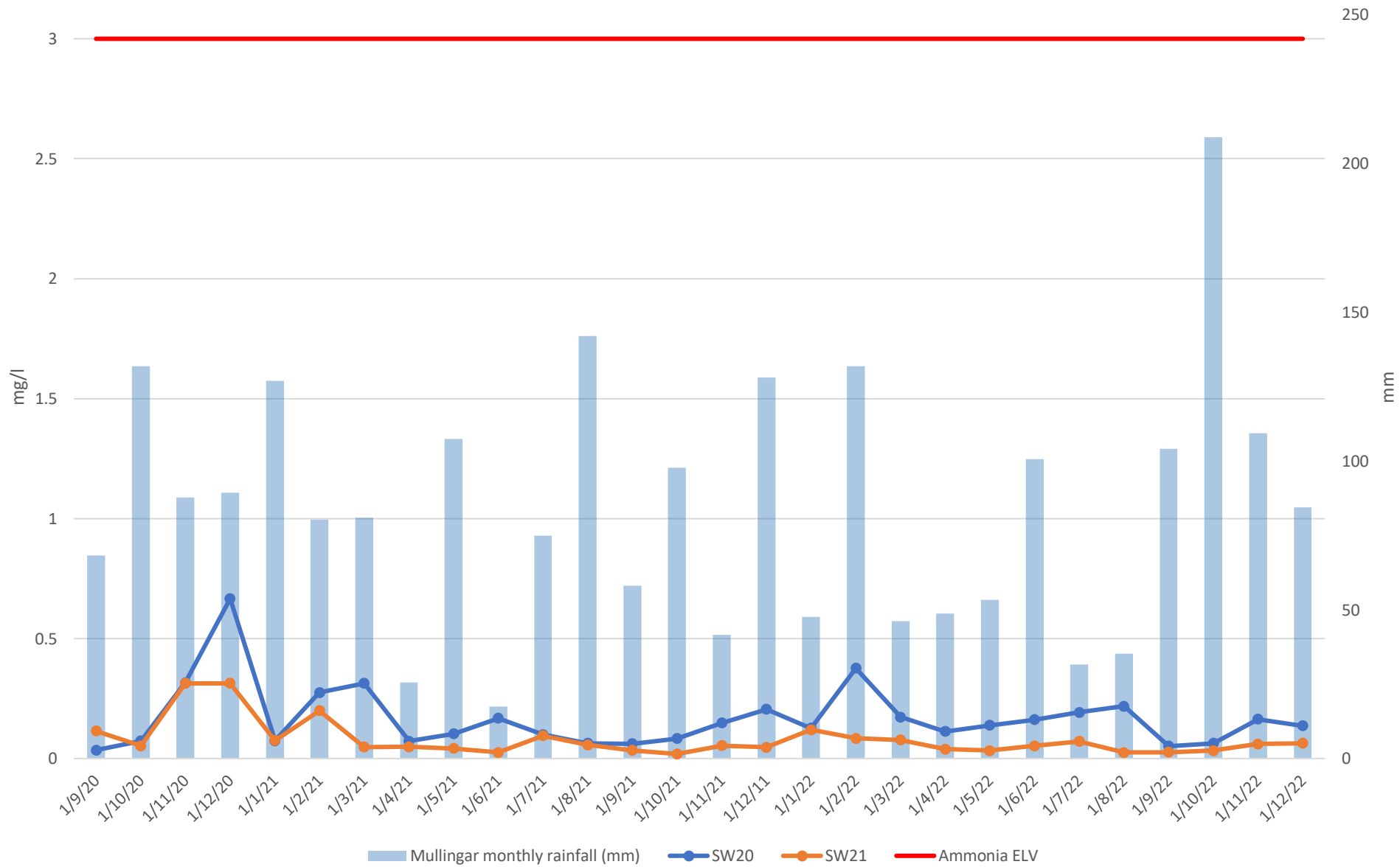
Cavemount COD mg/l



Cavemount pH



Cavemount Ammonia as N mg/l

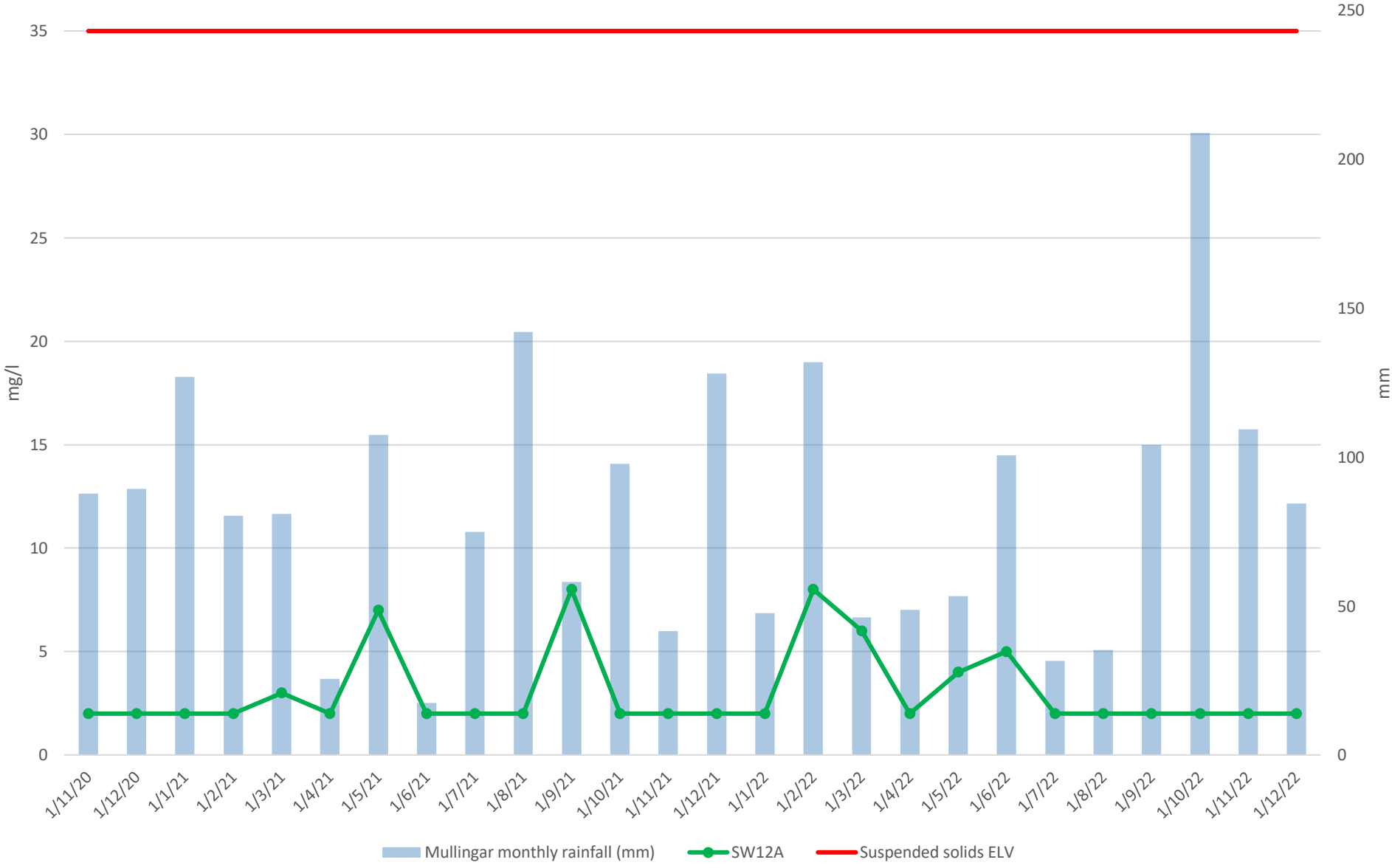


Clonad Bog

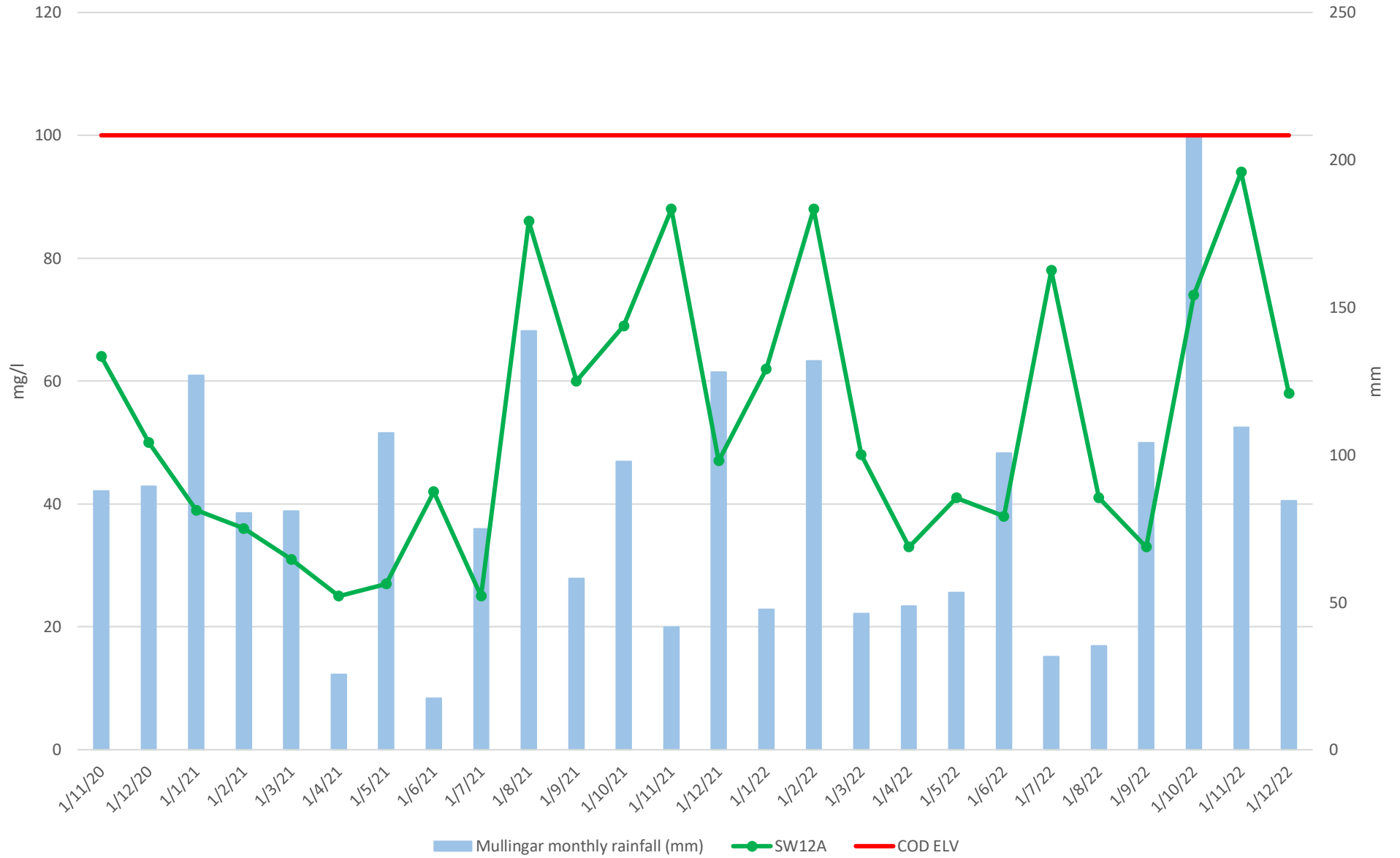
PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	
Bog Group	Licence No	Bog Name	SW Code - GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Allen Group	P0503-01	Clonad	SW12A	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8
			Suspended solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	
Bog Group	Licence No	Bog Name	SW Code - GIS	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	
Allen Group	P0503-01	Clonad	SW12A	216	148	115	130	93	82.7	76	100	100	240	114	193	247	161	184	324	179	98.9	129	114	219	103	103	
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8
PCAS SW Sampling Scheme				COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	
Bog Group	Licence No	Bog Name	SW Code - GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Allen Group	P0503-01	Clonad	SW12A	64	50	39	36	31	25	27	42	25	86	60	69	88	47	62	88	48	33	41	38	78	41	33	
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PCAS SW Sampling Scheme				pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	
Bog Group	Licence No	Bog Name	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	
Allen Group	P0503-01	Clonad	SW12A	7.7	7.8	7.8	7.9	7.9	8	8.2	8	7.7	8	7.5	7.5	7.8	7.6	7.5	7.7	8.1	7.8	7.7	8	7.8	7.7	7.4	
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	
PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Allen Group	P0503-01	Clonad	SW12A	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	
PCAS SW Sampling Scheme				TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Allen Group	P0503-01	Clonad	SW12A	273	338	358	259	389	389	392	345	336	252	290	307	313	266	342	283	312	379	356	317	345	277	293	
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	
PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Allen Group	P0503-01	Clonad	SW12A	0.44	0.462	0.358	0.297	0.288	0.193	0.088	0.07	0.079	0.377	0.05	0.209	0.521	0.459	0.498	0.841	0.636	0.255	0.28	0.178	0.352	0.023	0.074	
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	
			Ammonia ELV	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Allen Group	P0503-01	Clonad	SW12A	25.6	20.7	14.1	14.1	14.9	10.2	10.6	9.7	17.4	11.5	49.4	64	28	34.6	22	22.2	26.1	19.9	13.4	14.6	17.2	25.9	16.7	
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	

Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

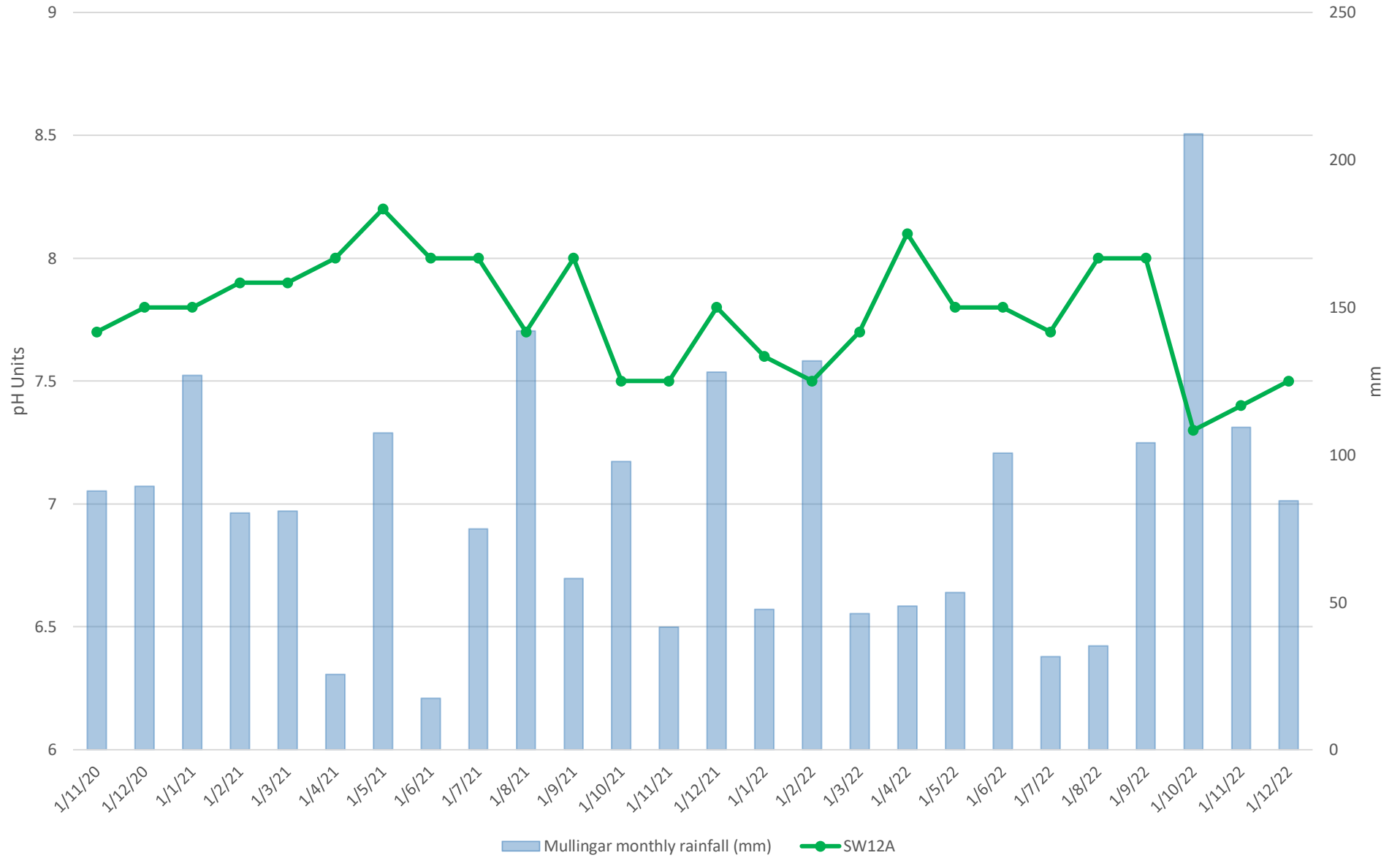
Clonad Suspended Solids mg/l



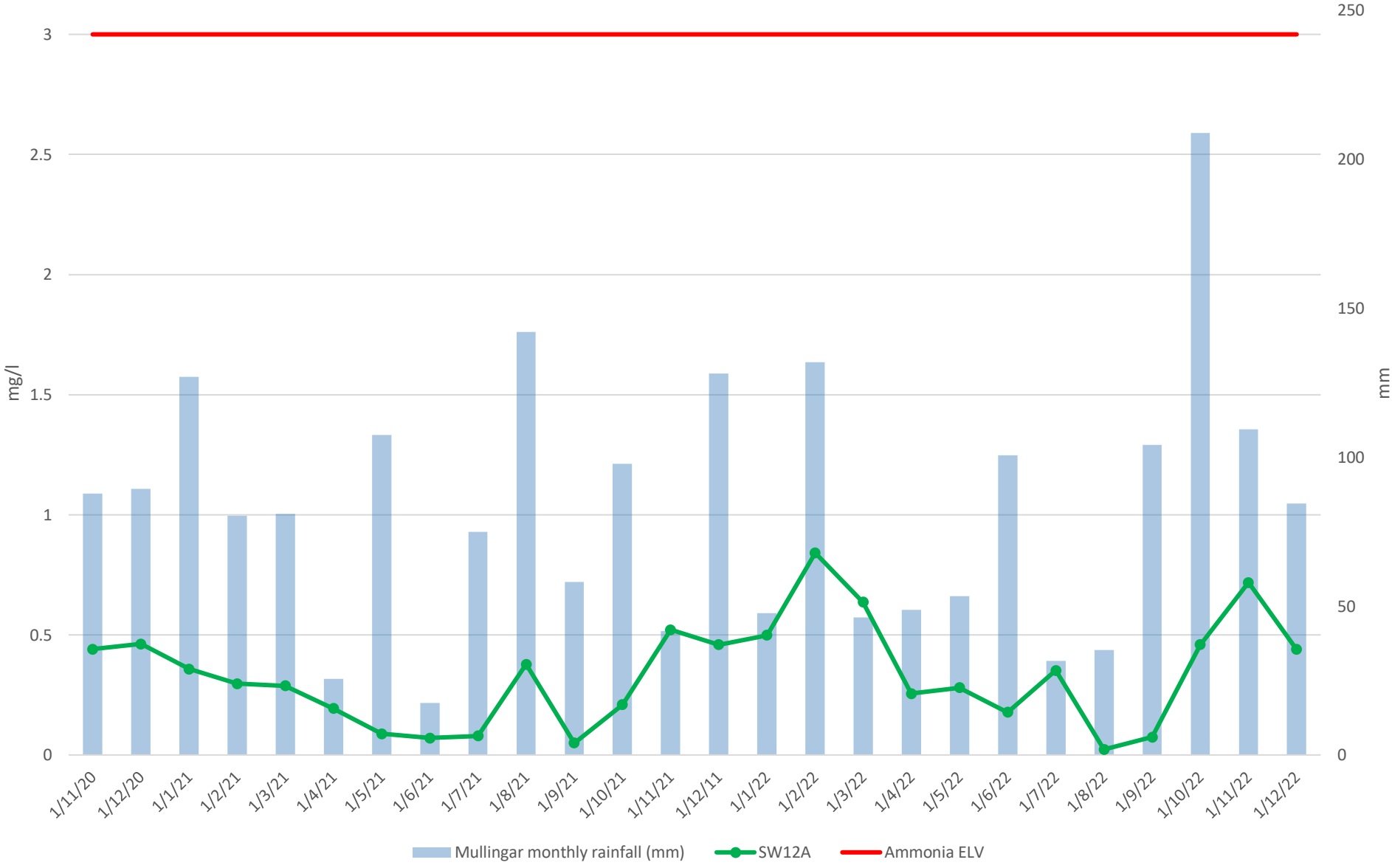
Clonad COD mg/l



Clonad pH



Clonad Ammonia as N mg/l



Esker Bog

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code - GIS	Suspended Solids																															
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22						
Allen Group	P0503-01	Esker	SW24	2	2	12	5	2	4	6	10	3	2	2	5	2	2	2	2	14	5	8	2	2	2	2	2	2	6						
Allen Group	P0503-01	Esker	SW26	2	2	2	6	2	13	15	9	2	3	6	5	2	6	9	21	39	30	9	5	4	2	2	2	7	2						
Allen Group	P0503-01	Esker	SW27	2	5	2	3	14	5	21	9	5	3	7	2	2	9	6	24	12	15	5	3	3	3	2	2	3	3						
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3	84.5						
			Suspended solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35						

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code - GIS	Colour																															
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22						
Allen Group	P0503-01	Esker	SW24	152	316	151	325	241	218	153	254	577	149	138	205	220	235	269	251	495	215	148	65.3	112	84.4	88.3	114	255	344						
Allen Group	P0503-01	Esker	SW26	225	228	144	184	131	142	107	125	269	332	84	343	329	220	453	359	1240	560	258	157	189	81.5	190	317	498	370						
Allen Group	P0503-01	Esker	SW27	171	125	257	256	307	154	267	129	128	176	68.8	148	142	214	140	378	235	134	99.6	89.2	105	50.7	89	135	223	178						
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3	84.5						
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100						

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code - GIS	COD																															
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22						
Allen Group	P0503-01	Esker	SW24	70	66	57	63	53	49	54	64	12	62	63	49	68	50	60	63	70	56	33	10	47	39	37	36	78	76						
Allen Group	P0503-01	Esker	SW26	59	54	35	39	29	26	28	43	68	92	25	79	80	57	86	60	101	72	47	20	51	24	55	62	91	75						
Allen Group	P0503-01	Esker	SW27	48	36	54	47	44	49	63	11	14	49	29	46	55	25	56	39	26	32	10	33	14	24	31	68	40							
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3	84.5						
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100						

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code - GIS	pH																															
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22						
Allen Group	P0503-01	Esker	SW24	7.5	7.6	7.5	7.3	7.5	8.1	8.3	7.9	7.8	8	8	7.9	7.7	7.9	7.3	7.7	7.9	7.8	7.8	8.2	8.3	8.7	8.2	7.5	7.2							
Allen Group	P0503-01	Esker	SW26	7.5	7.4	7.9	7.9	8	8.2	8.3	7.9	7.5	7.3	8.2	6.9	7.7	7.7	7.3	7.6	7.1	7.7	7.8	8	8	8.1	7.9	6.9	6.5							
Allen Group	P0503-01	Esker	SW27	7.8	8	7.3	7.5	7.6	8.1	8.2	8.1	8.3	8	8.3	7.9	7.7	8	7.7	7.6	7.7	8.2	7.8	8	8.1	8	8	7.6	7.7							
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3	84.5						

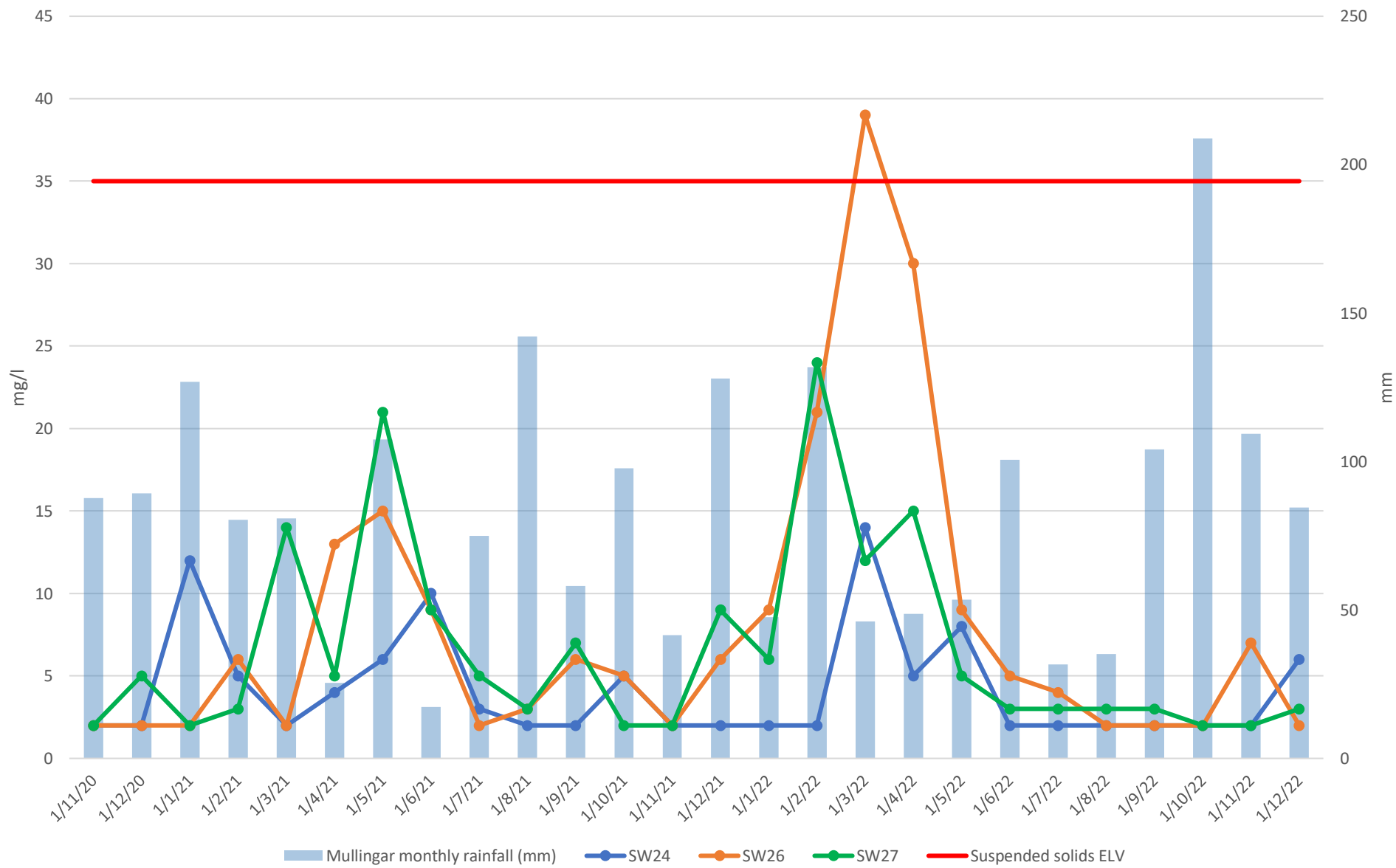
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code - GIS	TP as P																															
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22						
Allen Group	P0503-01	Esker	SW24	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05							
Allen Group	P0503-01	Esker	SW26	0.05	0.05	0.05	0.08	0.05	0.08	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.08	0.08	0.05	0.05	0.1	0.05	0.05	0.05	0.05							
Allen Group	P0503-01	Esker	SW27	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.1	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05						
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3	84.5						

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code - GIS	TS																															
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22						
Allen Group	P0503-01	Esker	SW24	515	164	503	169	181	247	275	264	411	233	289	249	275	201	169	208	152	195	441	412	417	387	248	284	339	230						
Allen Group	P0503-01	Esker	SW26	290	170	445	292	448	426	443	323	216	175	431	232	272	91	191	339	222	272	323	316	342	315	360	306	498	149						
Allen Group	P0503-01	Esker	SW27	387	392	207	174	234	271	245	438	397	345	441	397	253	367	413	278	235	493	427	386	436	394	373	388	526	417						
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3	84.5						

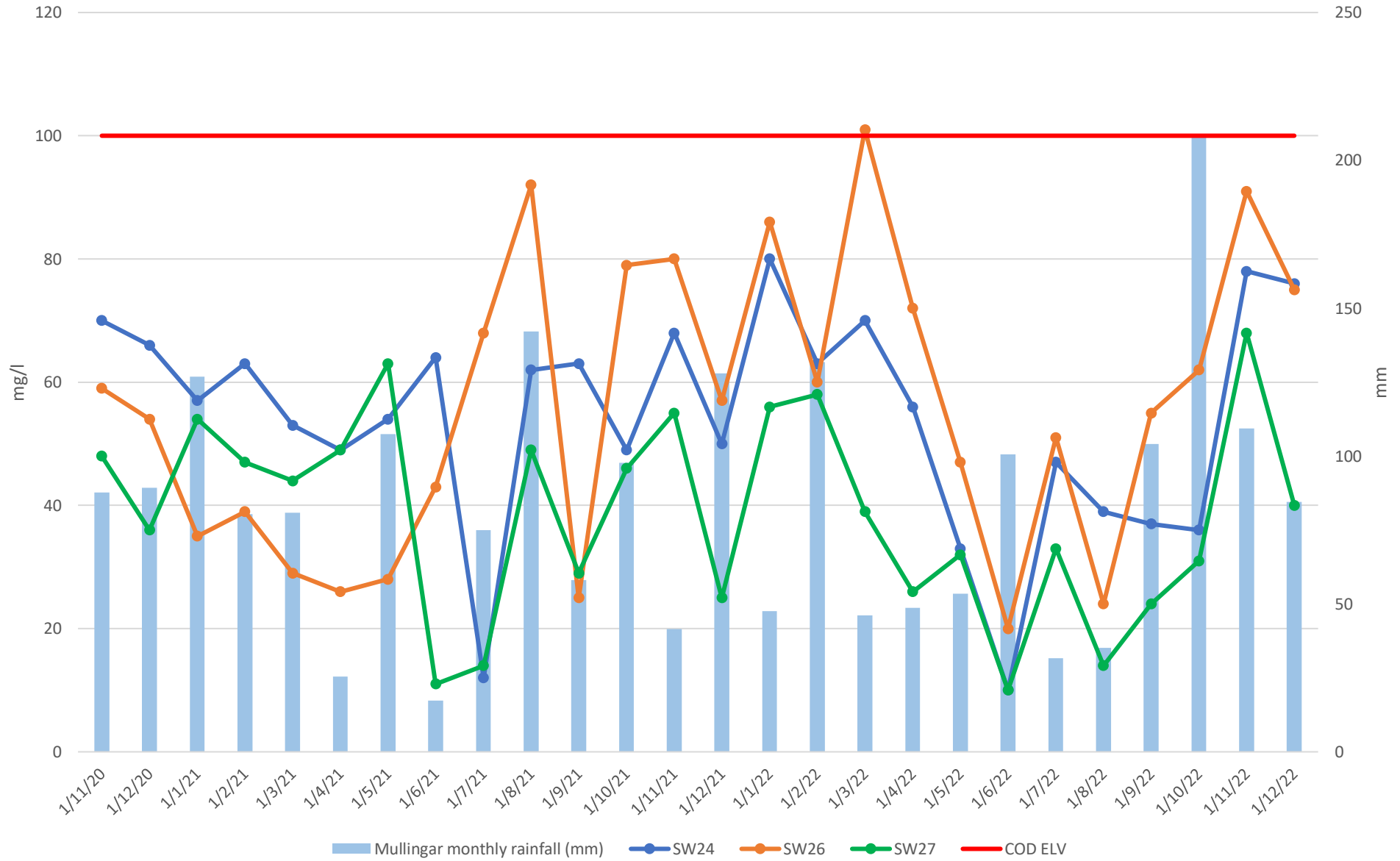
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code - GIS	Ammonia as N																															
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22						
Allen Group	P0503-01	Esker	SW24	0.067	0.62	0.1	0.358	0.435	0.167	0.036	0.053	0.041	0.053	0.019	0.069	0.143	0.128	0.457	0.264	0.551	0.086	0.018	0.016	0.029	0.01	0.007	0.021	0.24	0.41						
Allen Group	P0503-01	Esker	SW26	1.13	1.96	0.372	0.676	0.298	0.214	0.158	0.396	1.86	0.05	0.166	2.2	2.5	2.26	2.25	1.27	2.14	2.19	0.842	0.373	0.955	0.078	1.19	3.1	2.71	2.73						
Allen Group	P0503-01	Esker	SW27	0.341	0.349	1.71	1.58	1.95	0.789	1.43	0.174	0.239	0.418	0.056	0.195	0.343	0.4	0.508	1.35	0.449	0.238	0.126	0.13	0.162	0.045	0.085	0.133	0.23	0.4						
			Mullingar monthly rainfall (mm)	87.7	89.3	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3	84.5						
			Ammonia ELV	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3						

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code - GIS	DOC																															
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22						
Allen Group	P0503-01	Esker	SW24	28.8	24.6	20	20.7	17	17.6	19.2	24.5	6.47	48.9	54	20.6	23.5	24.3	28.1	23.9	20.8	21.7	14.4	8.01	17.3	16.5	15.2	15.4	30.3	25.7						
Allen Group	P0503-01	Esker	SW26	24.1	20.1	13.6	18.7	9.41	7.54	7.75	15.8	24.2	38.8	63.6	29.8	29.8	22.4	27.2	16.6	22.3	18.9	13.2	14.8	18	10.8	21.1	26.2	32.6	27.9						
Allen Group	P0503-01	Esker	SW27	20.4	14.7	19.1	17.9	13.8	17.1	16.7	10.3	9.83	60.8	68.1	16.2	20.3	14.1	19.1	16.8	15.4	9.61	11.9	9.68	10.8	6.55	11.1	15.1	26.5	17.9						
			Mullingar monthly rainfall (mm)	87.7																															

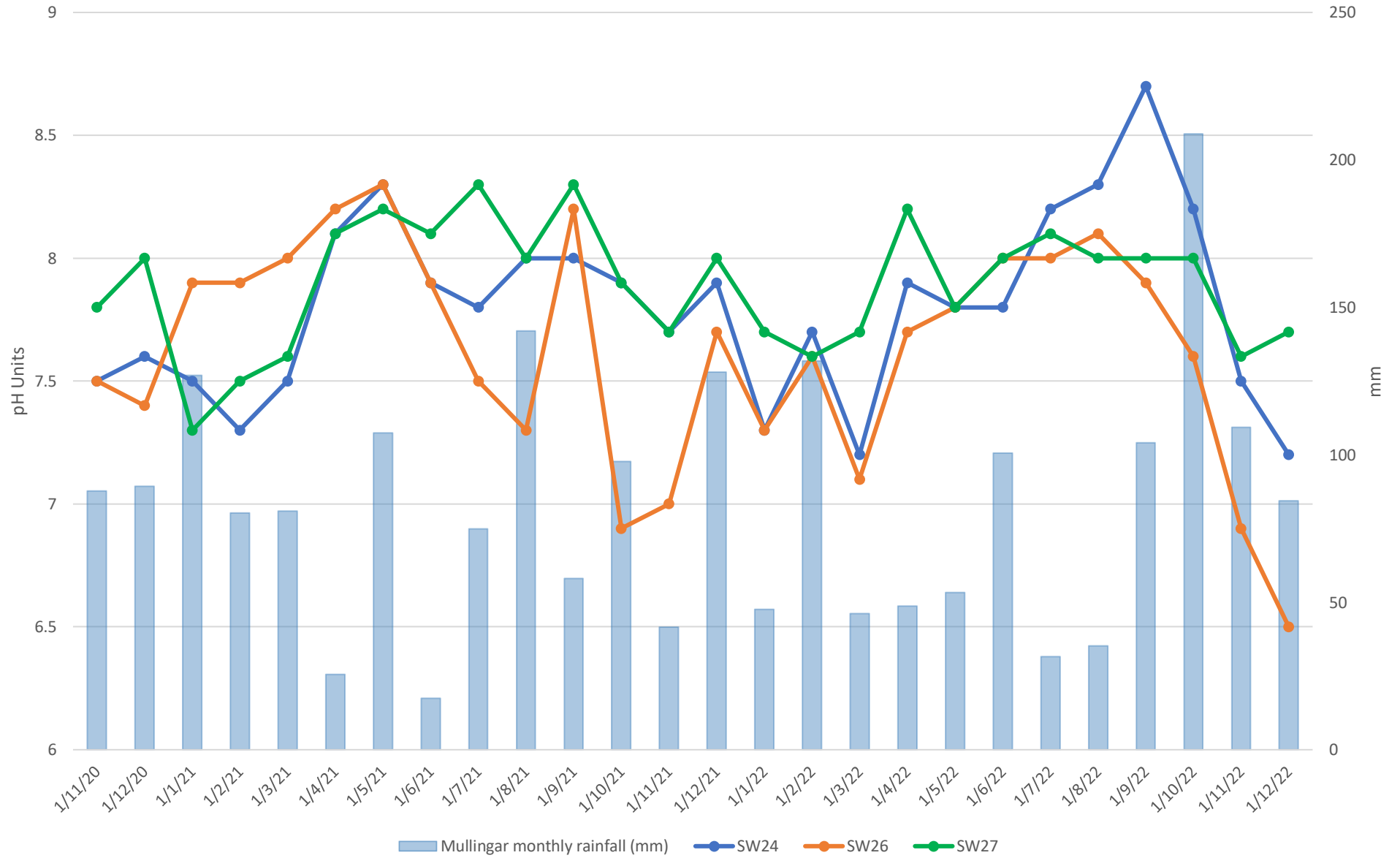
Esker Suspended Solids mg/l



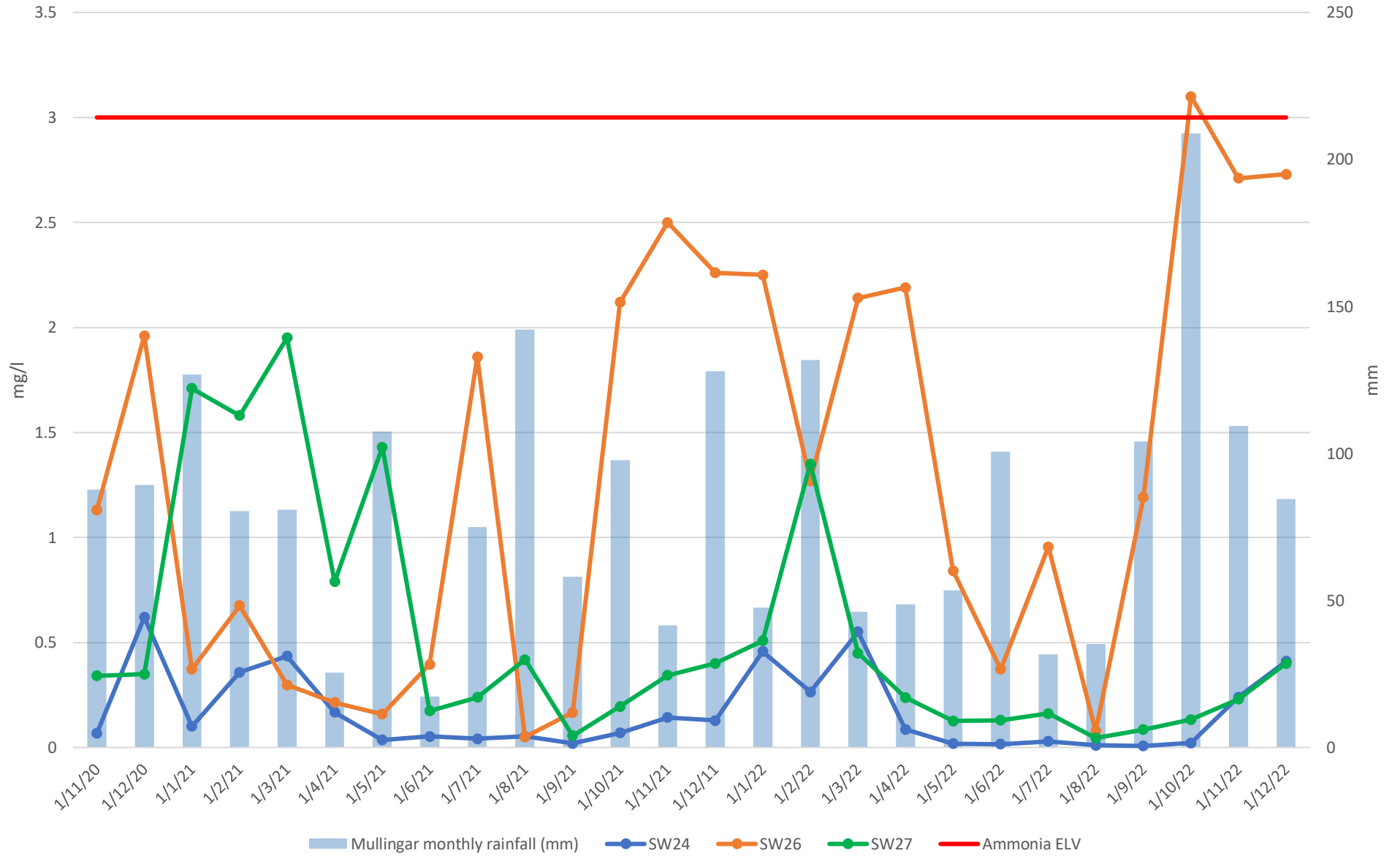
Esker COD mg/l



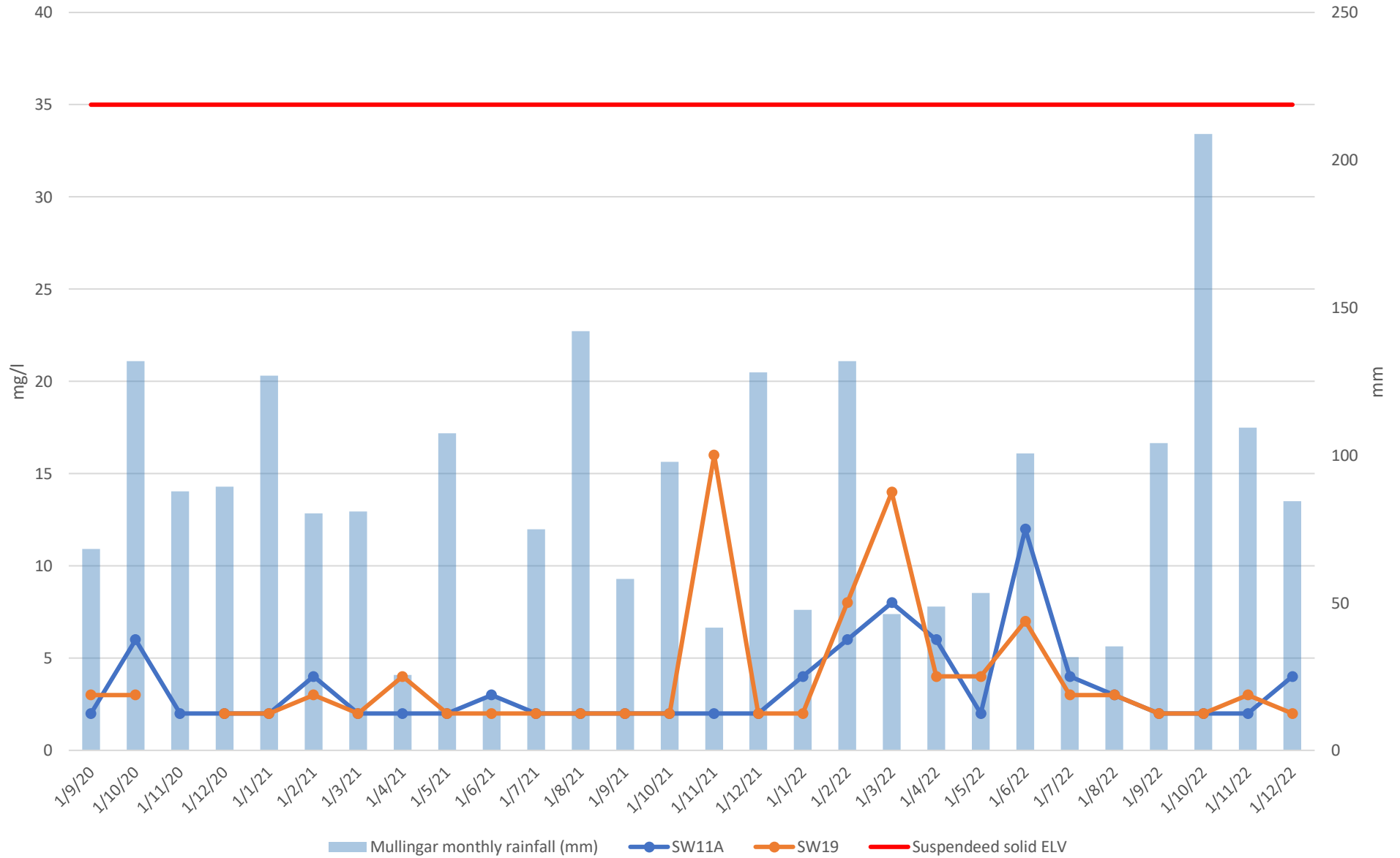
Esker pH



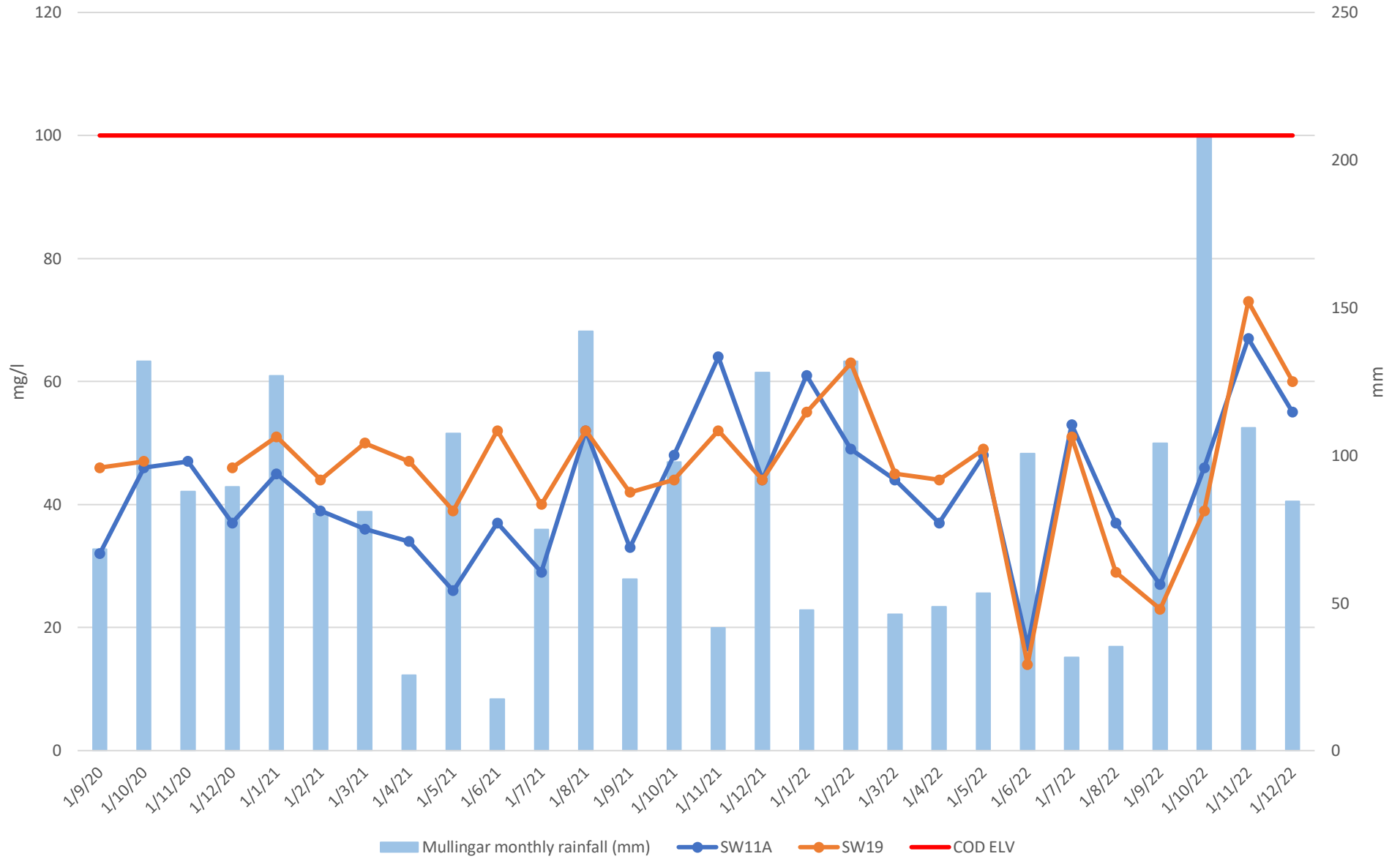
Esker Ammonia as N mg/l



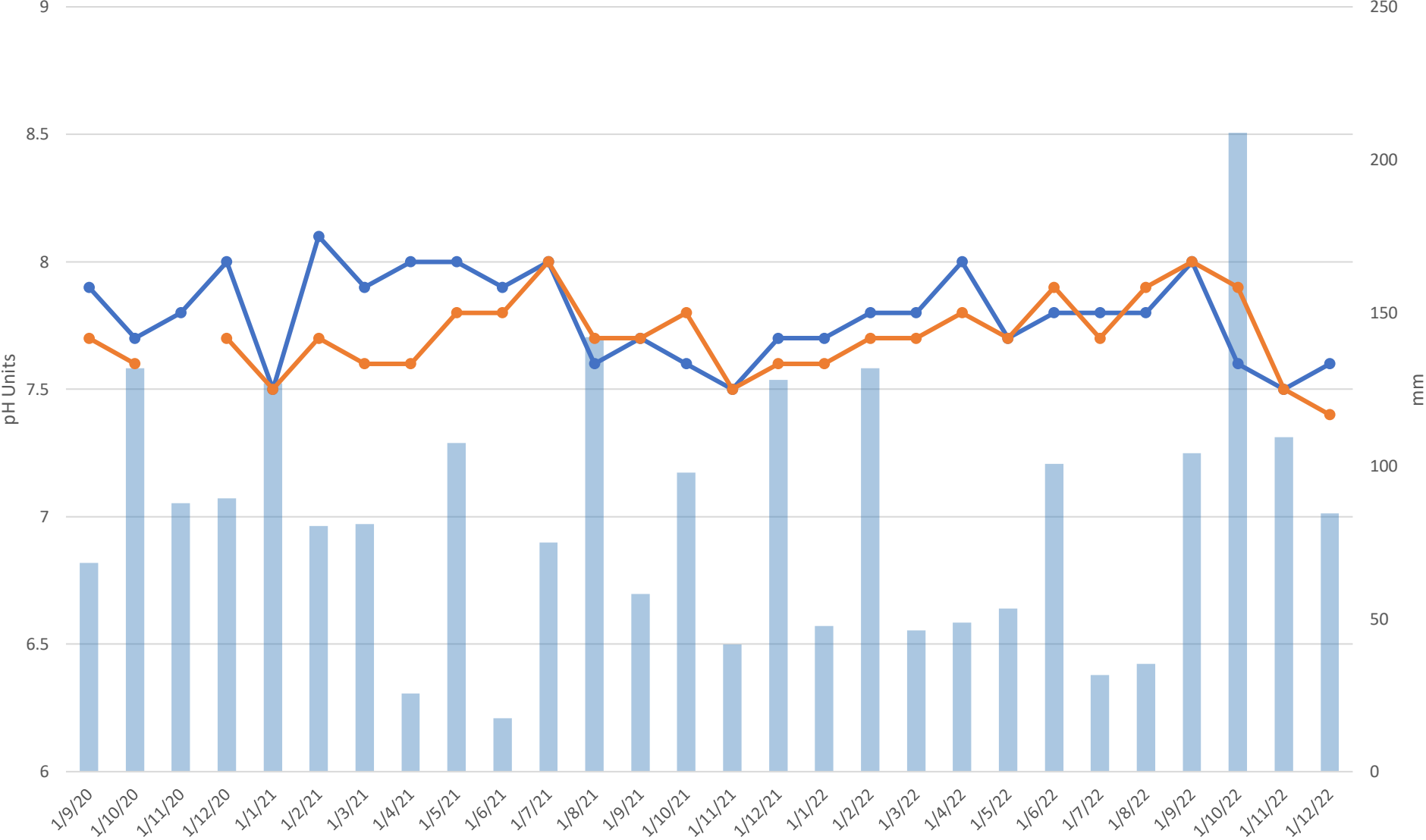
Mountlucas Suspended Solids mg/l



Mountlucas COD mg /l

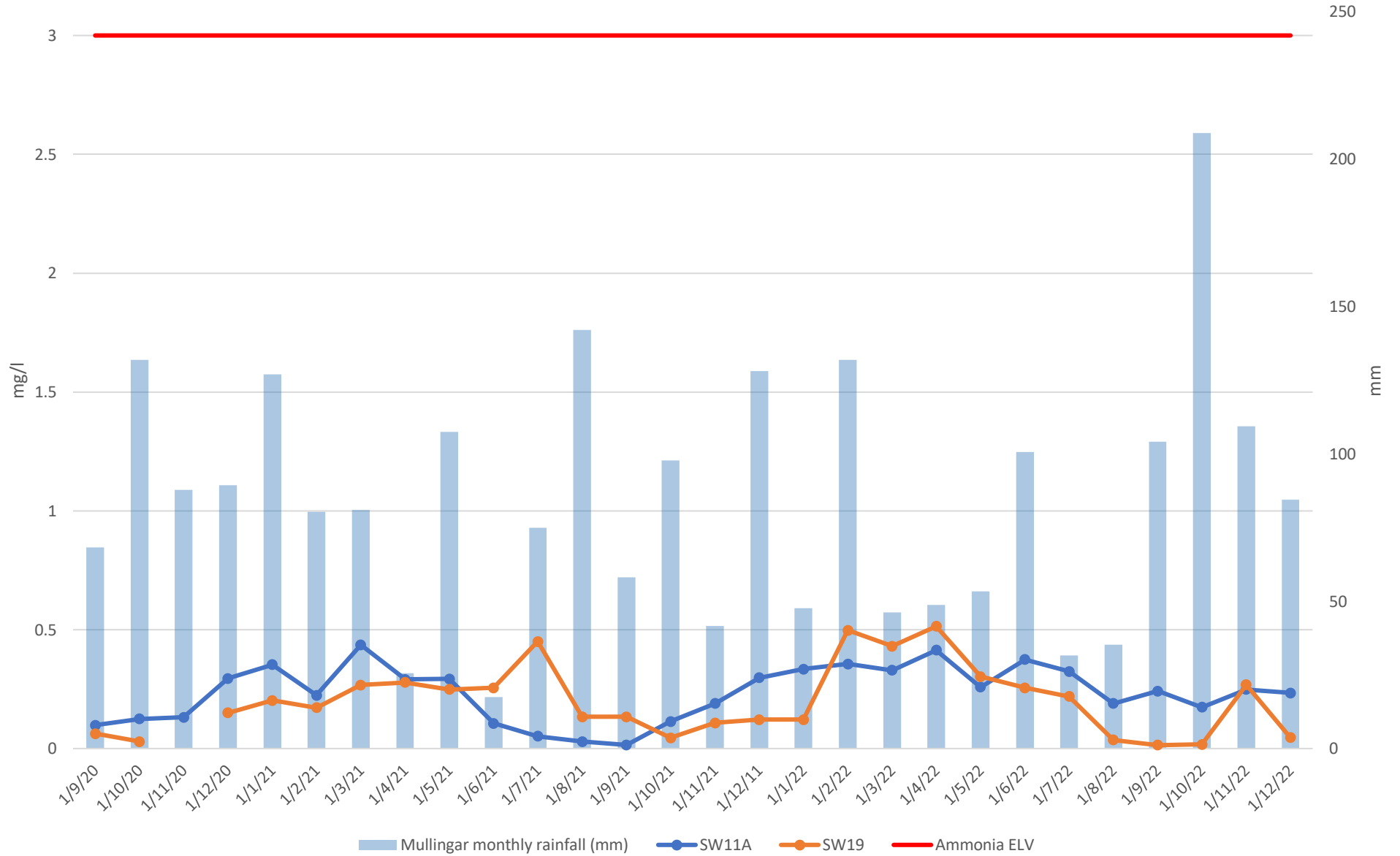


Mountlucas pH

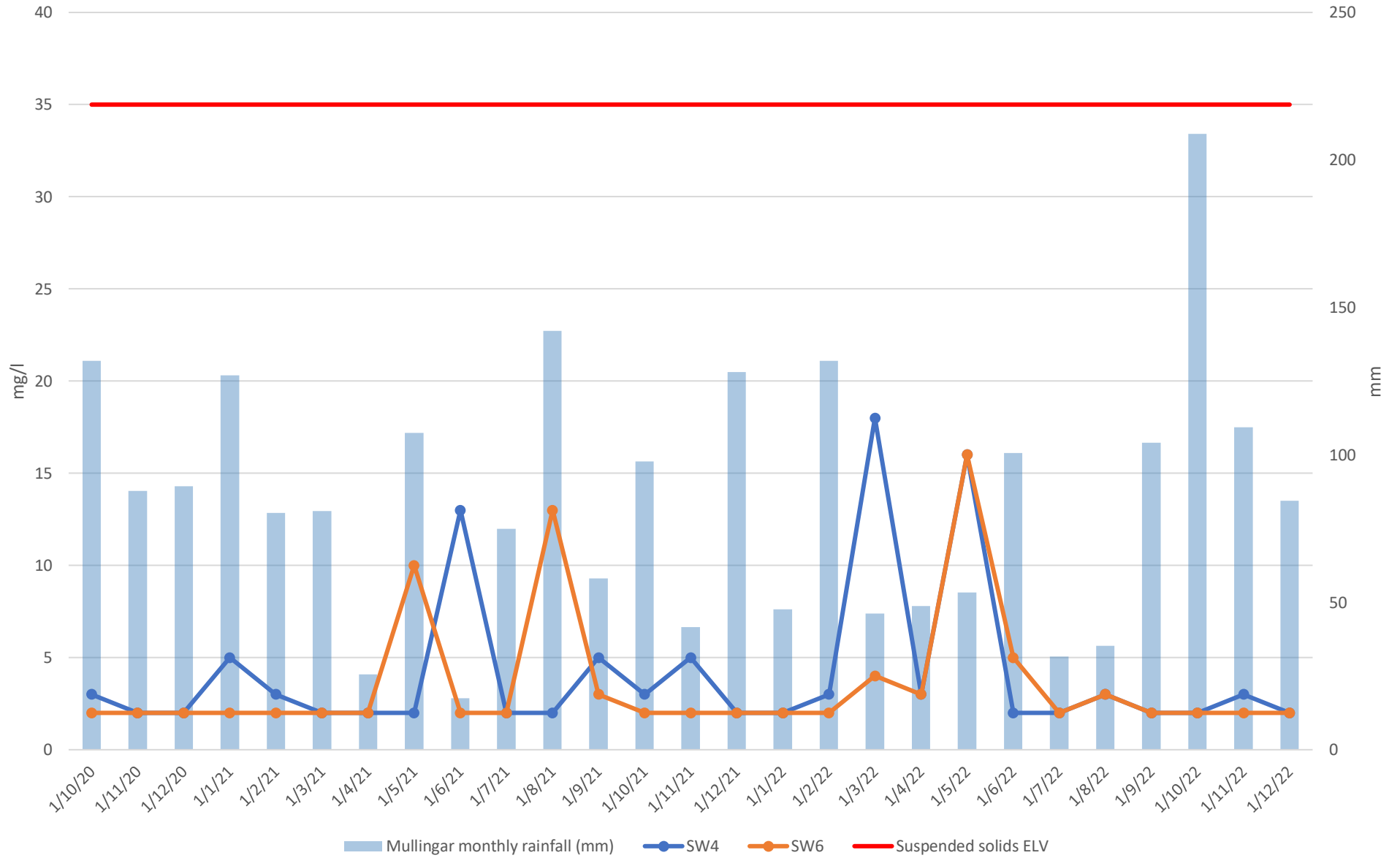


Mullingar monthly rainfall (mm) SW11A SW19

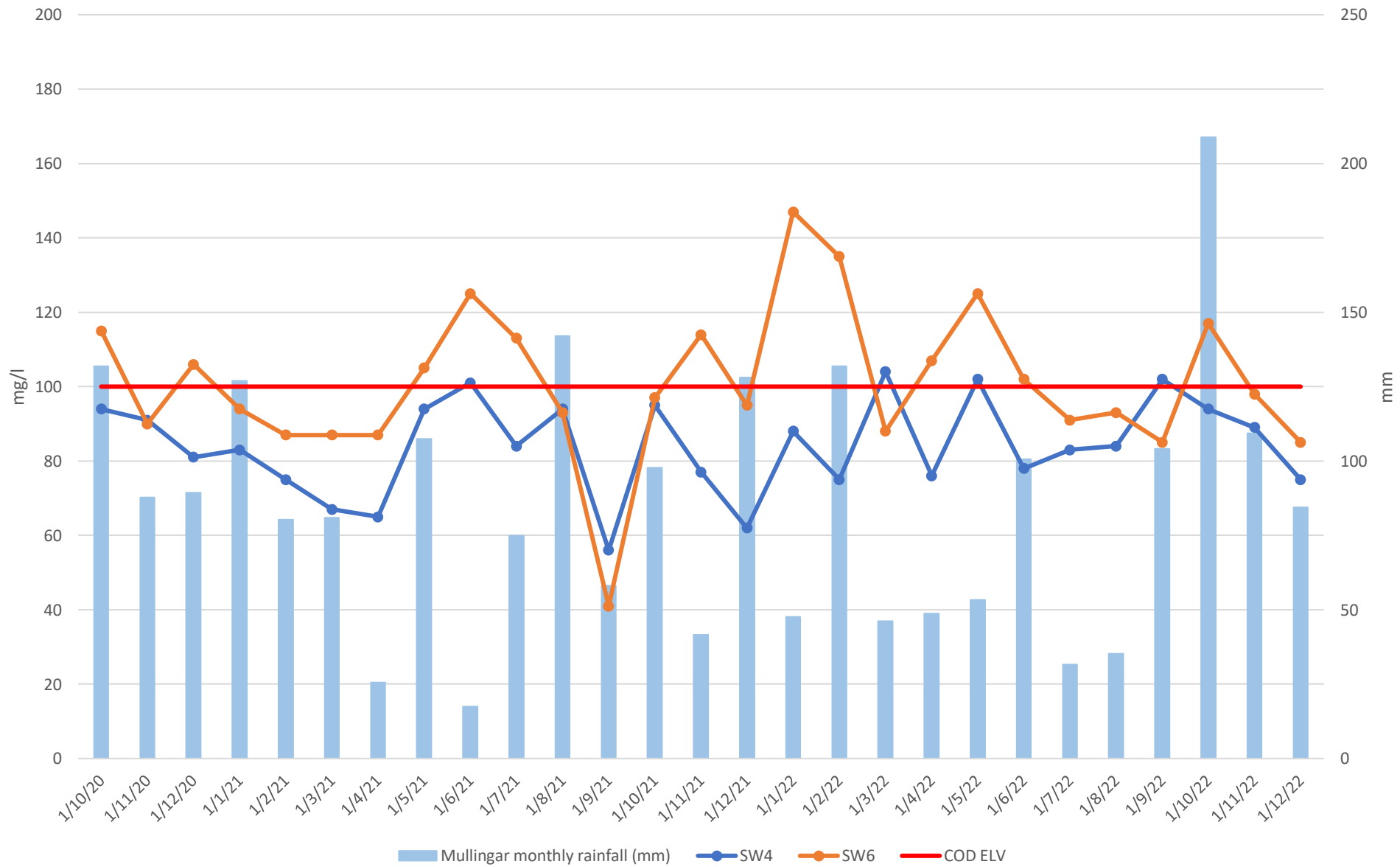
Mountlucas Ammonia as N mg/l



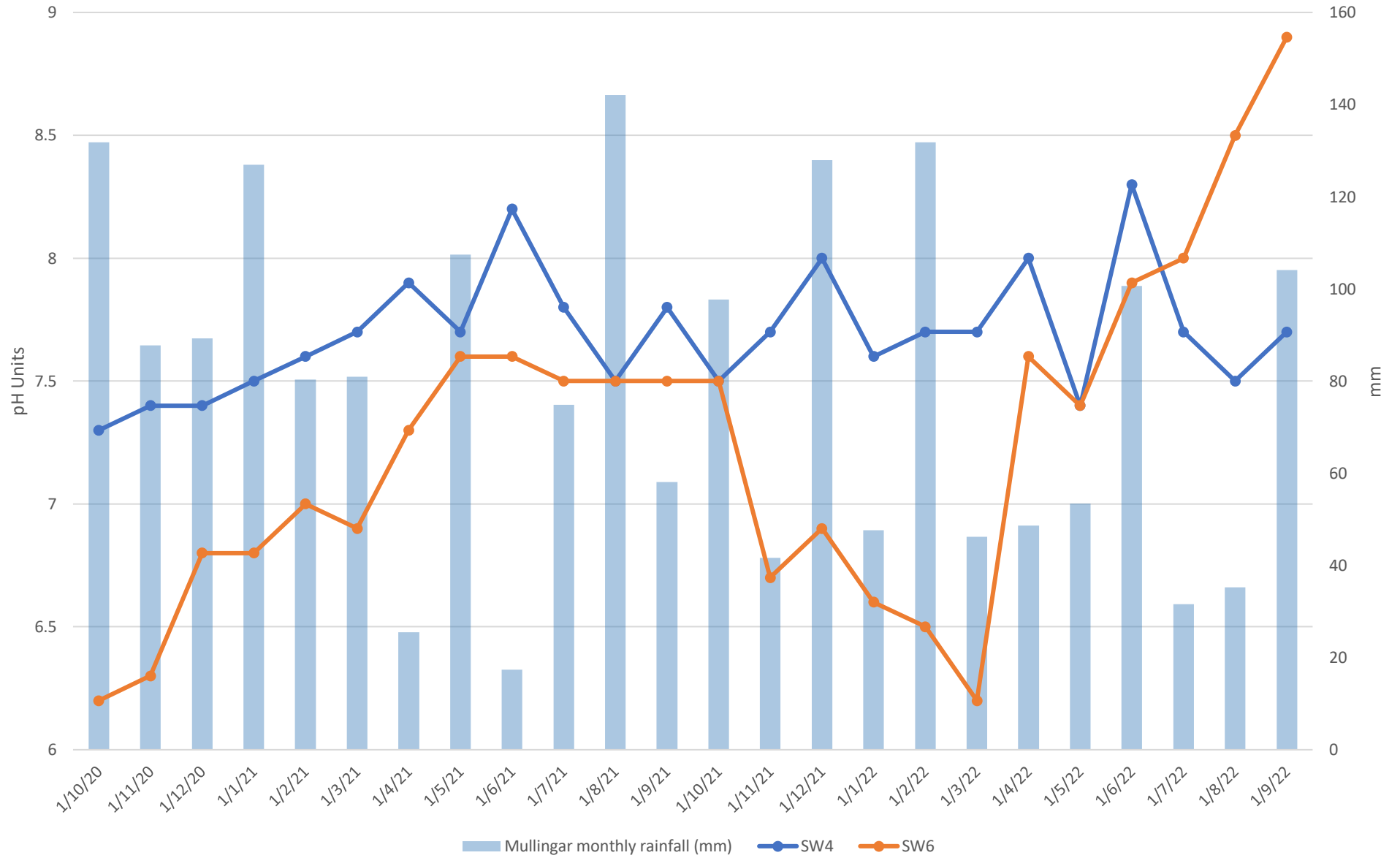
Ummeras Suspended Solids mg/l



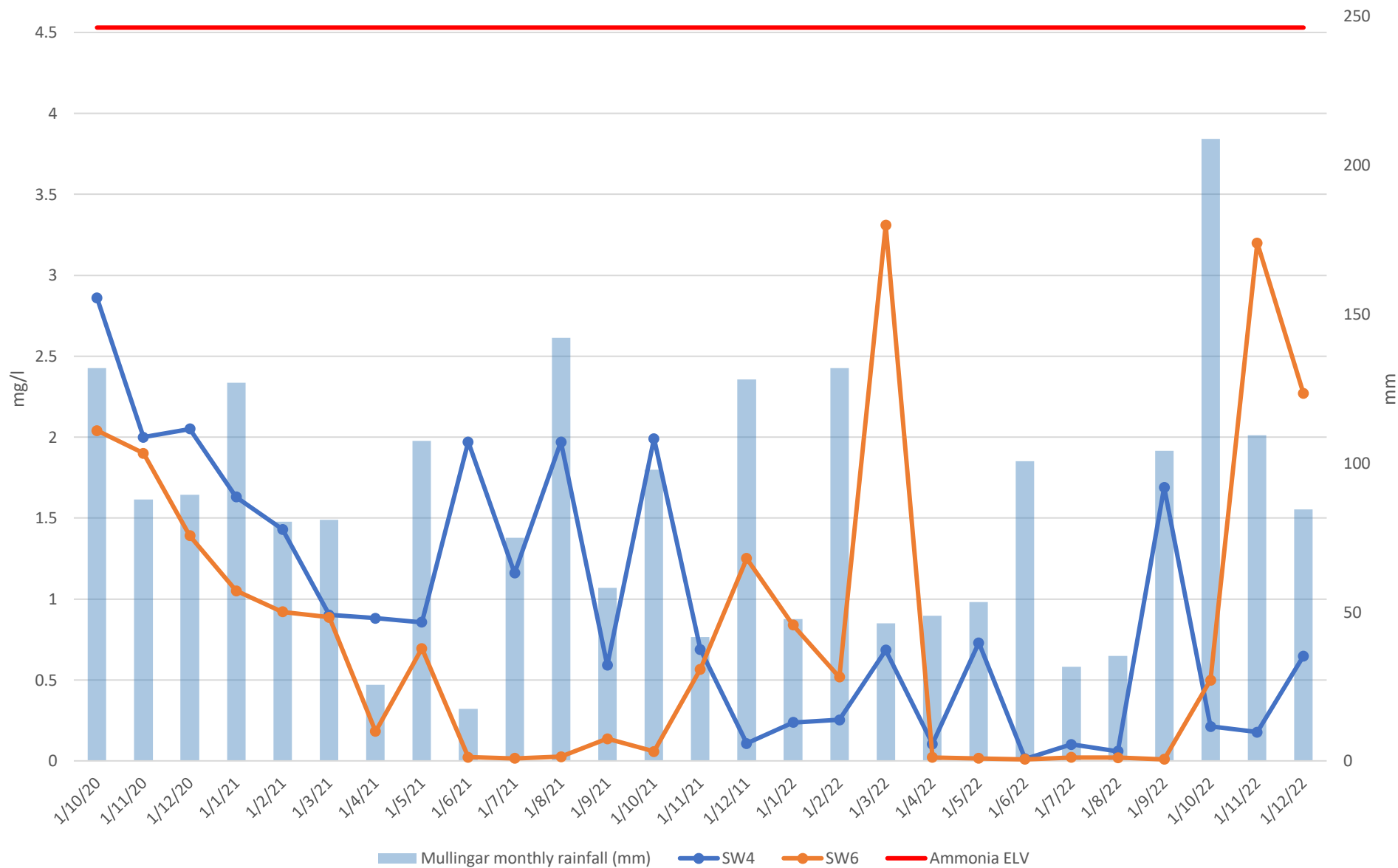
Ummeras COD mg/l



Ummeras pH



Ummeras Ammonia as N mg/l

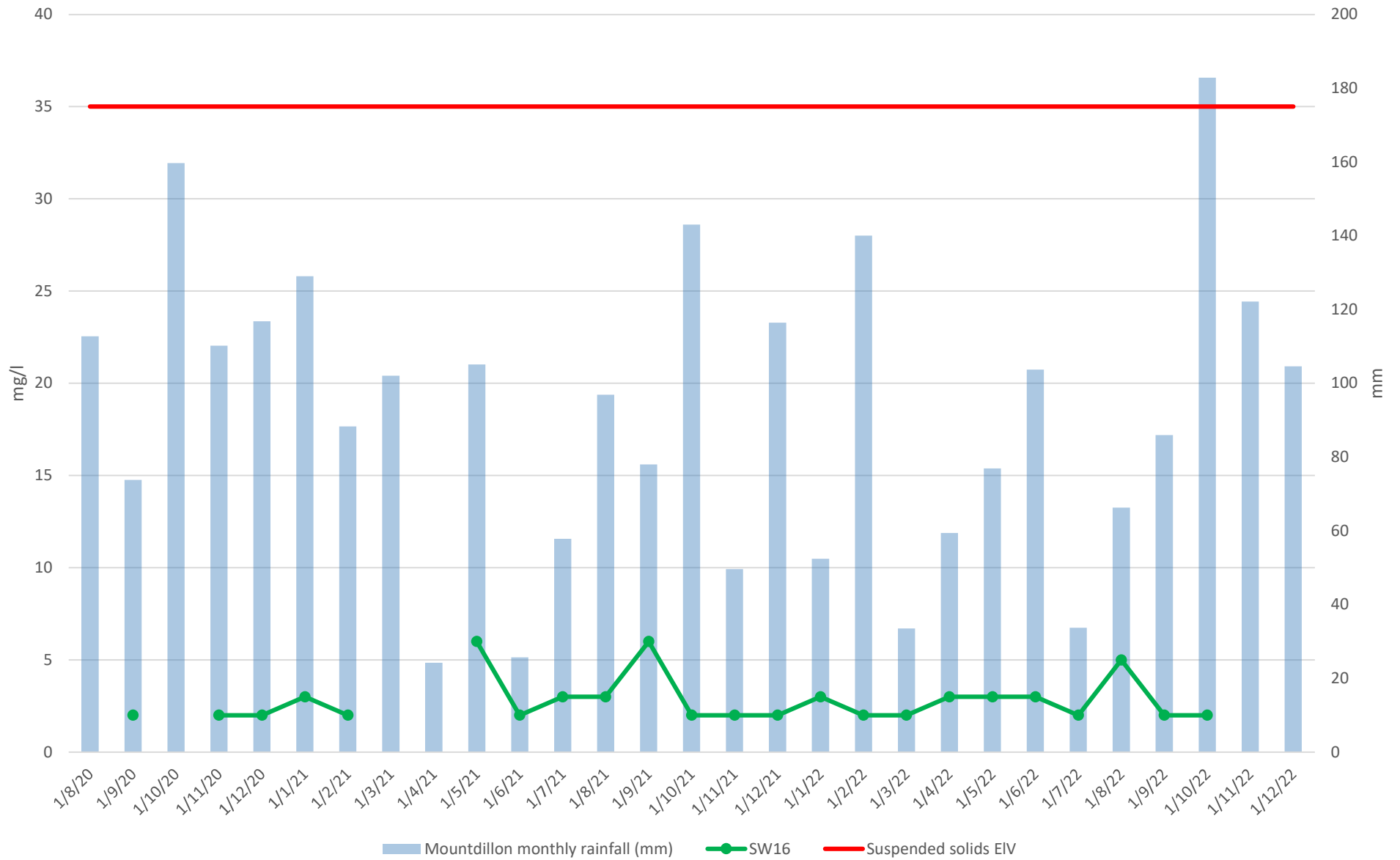


Derrycashel Bog

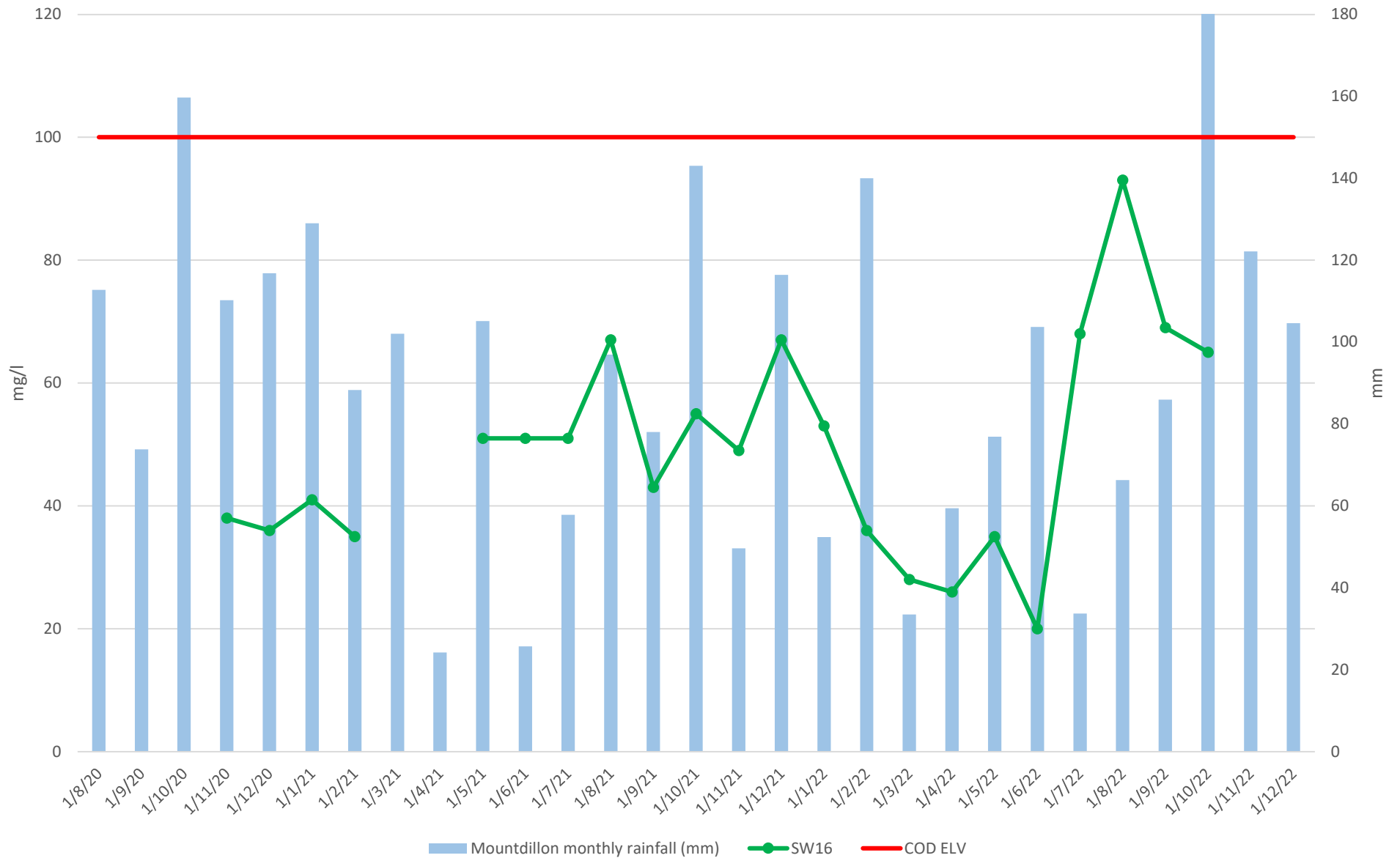
PCAS SW Sampling Scheme																																																	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l																			
				1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/13/20	1/14/21	1/15/21	1/16/21	1/17/21	1/18/21	1/19/21	1/10/21	1/11/21	1/12/21	1/13/22	1/14/22	1/15/22	1/16/22	1/17/22	1/18/22	1/19/22	1/10/22	1/11/22	1/12/22																					
Mountdillon	P0504-01	Derrycashel	SW16		2		2		2		2		2		2		2		2		2		2		2		2		2																				
				Mountdillon monthly rainfall (mm)																																													
				112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6																	
				Suspended solids ELV																																													
				35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35																		
				Colour																																													
				1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/13/21	1/14/21	1/15/21	1/16/21	1/17/21	1/18/21	1/19/21	1/10/21	1/11/21	1/12/21	1/13/22	1/14/22	1/15/22	1/16/22	1/17/22	1/18/22	1/19/22	1/10/22	1/11/22	1/12/22																					
Mountdillon	P0504-01	Derrycashel	SW16		142		157		105		189		117		92.7		100		189		110		162		157		132		148		75		93		99.5		271		354		378		NF		NF				
				Mountdillon monthly rainfall (mm)																																													
				112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6																	
				COD																																													
				1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/13/21	1/14/21	1/15/21	1/16/21	1/17/21	1/18/21	1/19/21	1/10/21	1/11/21	1/12/21	1/13/22	1/14/22	1/15/22	1/16/22	1/17/22	1/18/22	1/19/22	1/10/22	1/11/22	1/12/22																					
Mountdillon	P0504-01	Derrycashel	SW16		38		36		41		35		51		51		67		45		55		49		67		53		36		28		26		68		93		69		65								
				Mountdillon monthly rainfall (mm)																																													
				112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6																	
				pH																																													
				1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/13/21	1/14/21	1/15/21	1/16/21	1/17/21	1/18/21	1/19/21	1/10/21	1/11/21	1/12/21	1/13/22	1/14/22	1/15/22	1/16/22	1/17/22	1/18/22	1/19/22	1/10/22	1/11/22	1/12/22																					
Mountdillon	P0504-01	Derrycashel	SW16		7.5		7.4		7.4		7.7		7.8		7.9		7.8		7.7		7.8		7.7		7.6		7.4		7.9		7.1		7.2		6		6.5		6		6.5								
				Mountdillon monthly rainfall (mm)																																													
				112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6																	
				TP as P																																													
				1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/13/21	1/14/21	1/15/21	1/16/21	1/17/21	1/18/21	1/19/21	1/10/21	1/11/21	1/12/21	1/13/22	1/14/22	1/15/22	1/16/22	1/17/22	1/18/22	1/19/22	1/10/22	1/11/22	1/12/22																					
Mountdillon	P0504-01	Derrycashel	SW16		0.05		0.05		0.05		0.05		0.05		0.06		0.11		0.05		0.06		0.11		0.08		0.05		0.05		0.05		0.08		0.06		0.05		0.07		0.05		0.05		NF		NF		
				Mountdillon monthly rainfall (mm)																																													
				112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6																	
				TS																																													
				1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/13/21	1/14/21	1/15/21	1/16/21	1/17/21	1/18/21	1/19/21	1/10/21	1/11/21	1/12/21	1/13/22	1/14/22	1/15/22	1/16/22	1/17/22	1/18/22	1/19/22	1/10/22	1/11/22	1/12/22																					
Mountdillon	P0504-01	Derrycashel	SW16		413		333		247		427		444		411		356		360		305		394		232		277		270		368		398		384		304		201		151		200		106		NF		NF
				Mountdillon monthly rainfall (mm)																																													
				112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6																	
				Ammonia as N																																													
				1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/13/21	1/14/21	1/15/21	1/16/21	1/17/21	1/18/21	1/19/21	1/10/21	1/11/21	1/12/21	1/13/22	1/14/22	1/15/22	1/16/22	1/17/22	1/18/22	1/19/22	1/10/22	1/11/22	1/12/22																					
Mountdillon	P0504-01	Derrycashel	SW16		1		0.16		0.964		0.477		0.035		0.207		0.248		0.168		0.179		0.089		0.157		0.103		0.138		0.214		0.271		0.172		0.112		0.237		0.021		0.071		0.34		0.293		
				Mountdillon monthly rainfall (mm)																																													
				4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	
				DOC																																													
				1/8/20	1/9/20	1/10/20	1/11/20	1/12/20	1/13/21	1/14/21	1/15/21	1/16/21	1/17/21	1/18/21	1/19/21	1/10/21	1/11/21	1/12/21	1/13/22	1/14/22	1/15/22	1/16/22	1/17/22	1/18/22	1/19/22	1/10/22	1/11/22	1/12/22																					
Mountdillon	P0504-01	Derrycashel	SW16		19.2		15.1		14.7		13.9		17.5		11.1		14.9		197		17.4		20.3		18.5		13.6		14.3		13.9		14.9		12.9		26.4		33		32.5		27.1		NF		NF		
				Mountdillon monthly rainfall (mm)																																													
				112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6																	

*Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

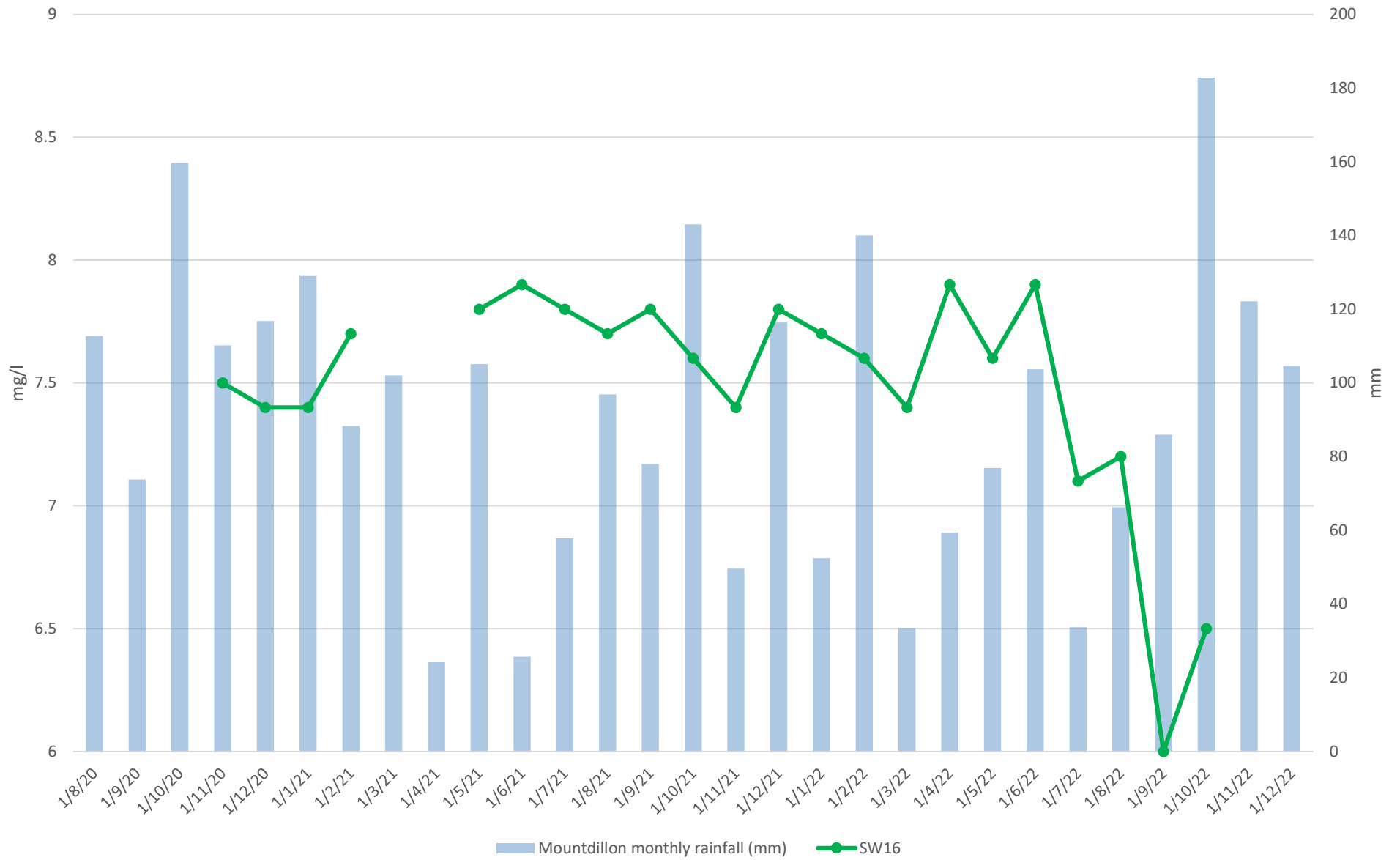
Derrycashel Suspended Solids mg/l



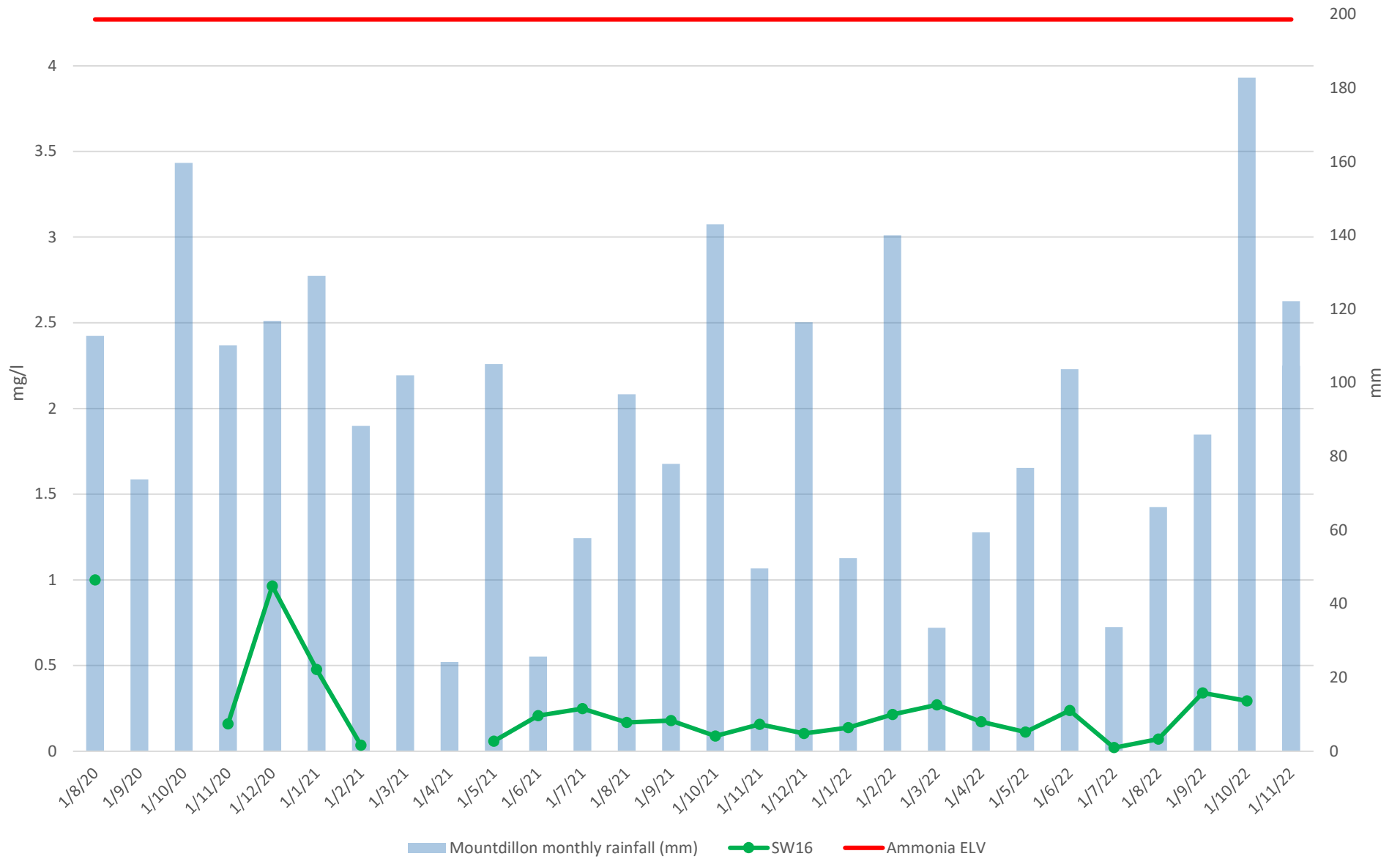
Derrycashel COD mg/l



Derrycashel pH



Derrycashel Ammonia as N mg/l



Derrycolumb Bog

PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids			
					mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
Mountdillon	P0504-01	Derrycolumb	SW88A		1	2	2	2	4	4	7	2	2	9	6	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Mountdillon	P0504-01	Derrycolumb	SW90		5	2	5	2	4		2	3		2	2	8	2	8	2	4	2	2	3	4	2	5	2	2	2	2	2	2	2	2	2	2	2	2	2	
Mountdillon	P0504-01	Derrycolumb	SW91		4	3	4	2	2		2	3		3	2	2	2	2	2	2	2	2	4	7	4	4	2	2	2	2	2	2	2	2	2	2	2	2	3	
				Mountdillon monthly rainfall (mm)	112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6							
				Suspended solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35

PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	
					mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt
Mountdillon	P0504-01	Derrycolumb	SW88A		197	64	197	160		158		136	154	166	107	211	120	162	115	176	NF	264	182	87.2	100	106	172	106	173	106	172	240	299	172					
Mountdillon	P0504-01	Derrycolumb	SW90		200	137	200	185		182		168	285	NF	73	345	320	225	247	257	172	195	165	130	140	309	318	124	117	197	235	250							
Mountdillon	P0504-01	Derrycolumb	SW91		185	121	185	252		200		169	280	NF	217	327	59.5	280	257	234	190	218	213	221	179	210	313	263	144	325	401	163							
				Mountdillon monthly rainfall (mm)	112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6						

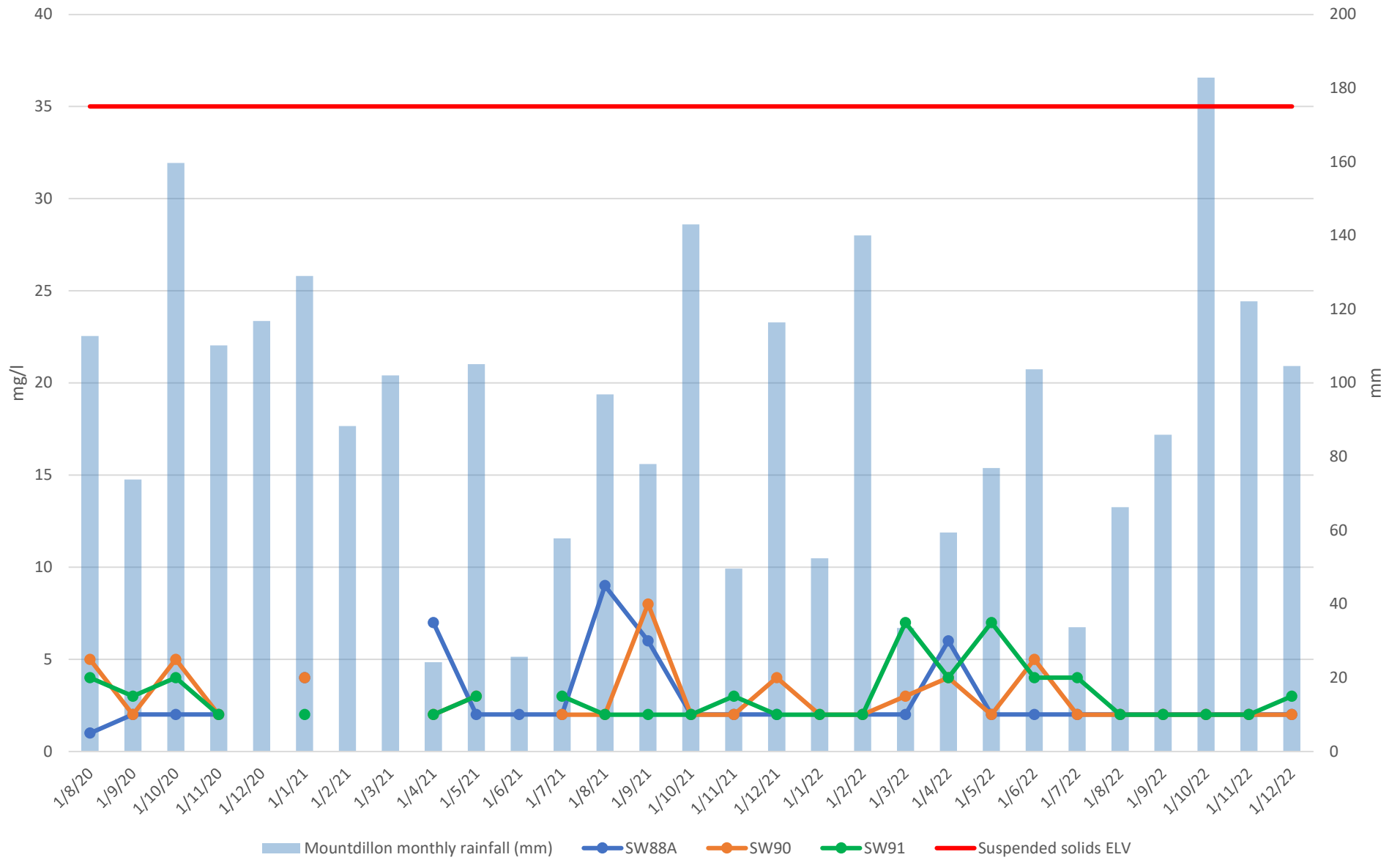
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD		
					mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		
Mountdillon	P0504-01	Derrycolumb	SW88A		59	22	59	49		48		39	51	52	35	69	48	60	44	72		66	48	33	39	21	63	49	44	80	84	52								
Mountdillon	P0504-01	Derrycolumb	SW90		59	40	59	54		47		43	56		41	89	84	52	35	60	76	35	26	15	33	70	73	42	30	77	63	59								
Mountdillon	P0504-01	Derrycolumb	SW91		10	46	10	64		65		12	63		69	82	42	64	56	49	43	45	37	39	46	74	61	35	90	82	44									
				Mountdillon monthly rainfall (mm)	112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6							
				COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	
					pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
Mountdillon	P0504-01	Derrycolumb	SW88A		7.7	7.7	7.7	7.7				7.8	7.9	8.1	7.9	7.8	7.9	7.8	8.1	8		6.4	8	7.8	7.9	8	7.9	7.9	7.9	7.5	7.4	7.7							
Mountdillon	P0504-01	Derrycolumb	SW90		7.5	7.8	7.5	7.6		7.6		7.4	7.2		7.9	6.8	7.4	7.6	7.5	7.3	6.6		7.5	7.1	7.8	8	7.2	7	7.9	7.5	7.6	7.4	7.1						
Mountdillon	P0504-01	Derrycolumb	SW91		7.3	7.6	7.3	7.1		7		7.9	7.5		8.2	7.2	7.8	7.4	7.3	7.5	7.3		7.8	7.6	7.9	8.1	7.6	7.5	7.7	7.5	6.9	6.8	7.6						
				Mountdillon monthly rainfall (mm)	112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6						

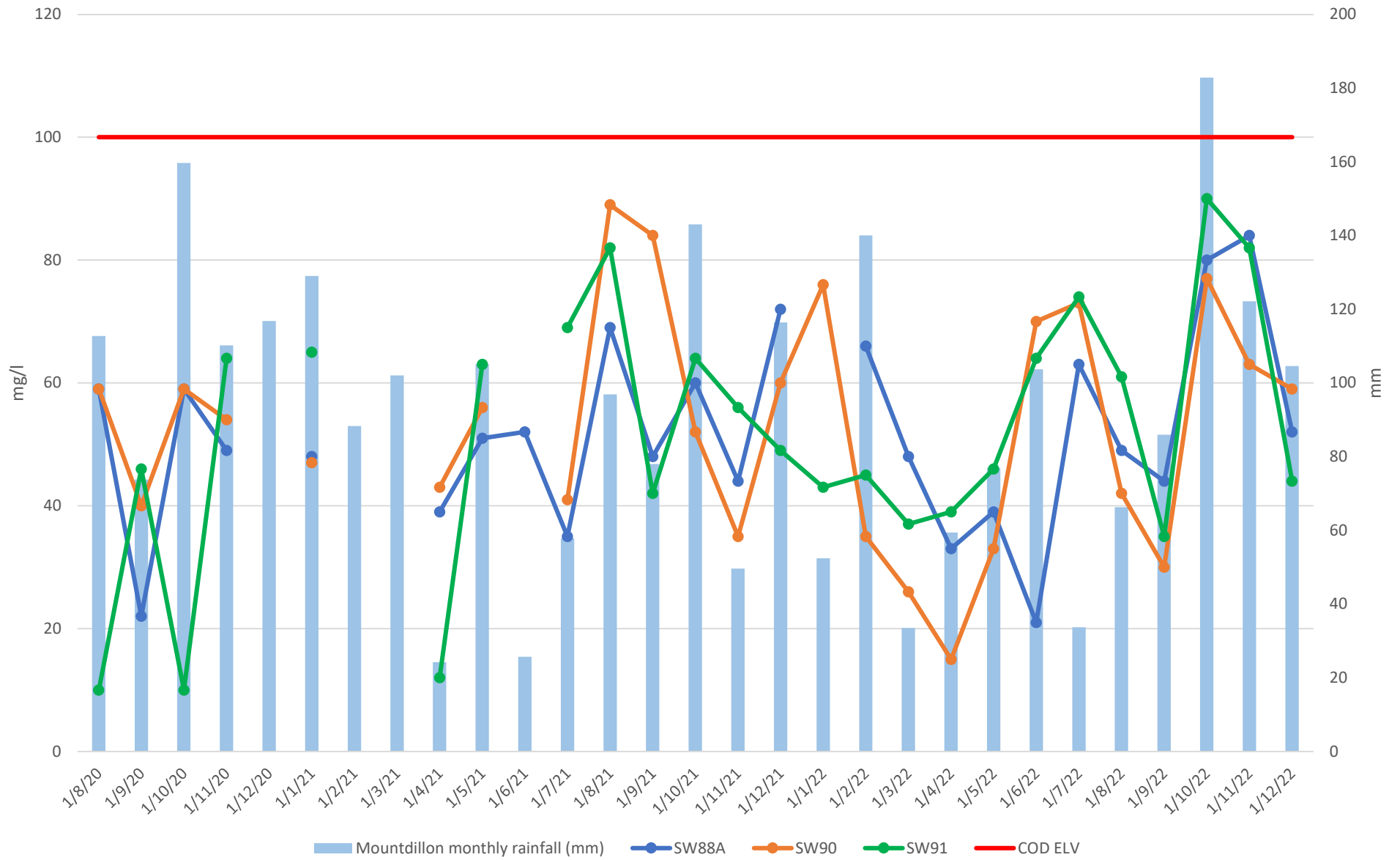
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P
					mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mountdillon	P0504-01	Derrycolumb	SW88A		0.05	0.05	0.05	0.05		0.05		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Mountdillon	P0504-01	Derrycolumb	SW90		0.05	0.11	0.05	0.05		0.05		0.05	0.05	NF	0.05	0.05	0.05	0.05	0.05	0.05		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Mountdillon	P0504-01	Derrycolumb	SW91		0.05	0.09	0.05	0.05		0.05		0.05	0.05	NF	0.05	0.05	0.05	0.05	0.05	0.05		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
				Mountdillon monthly rainfall (mm)	112.7	73.8	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6					

PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS	YS
					mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mountdillon	P0504-01	Derrycolumb	SW88A		294	293	294	512		442		108	231	355	293	356	326	202	163	239	NF	132	240	319	326	332	289	323	698	442	374	429					
Mountdillon	P0504-01	Derrycolumb	SW90		241	424	241	345		281		233	134	NF	448	133	269	305	242	104	131	153	36	159	265	198	383	305	386	281	223						
Mountdillon	P0504-01	Derrycolumb	SW91		159	361	159	227		233		343	169	NF	328	237	462	184	196	176	128	194	25	192	262	291	252	267	243	298	163	397					
				Mountdillon monthly rainfall (mm)	112.7	73.																															

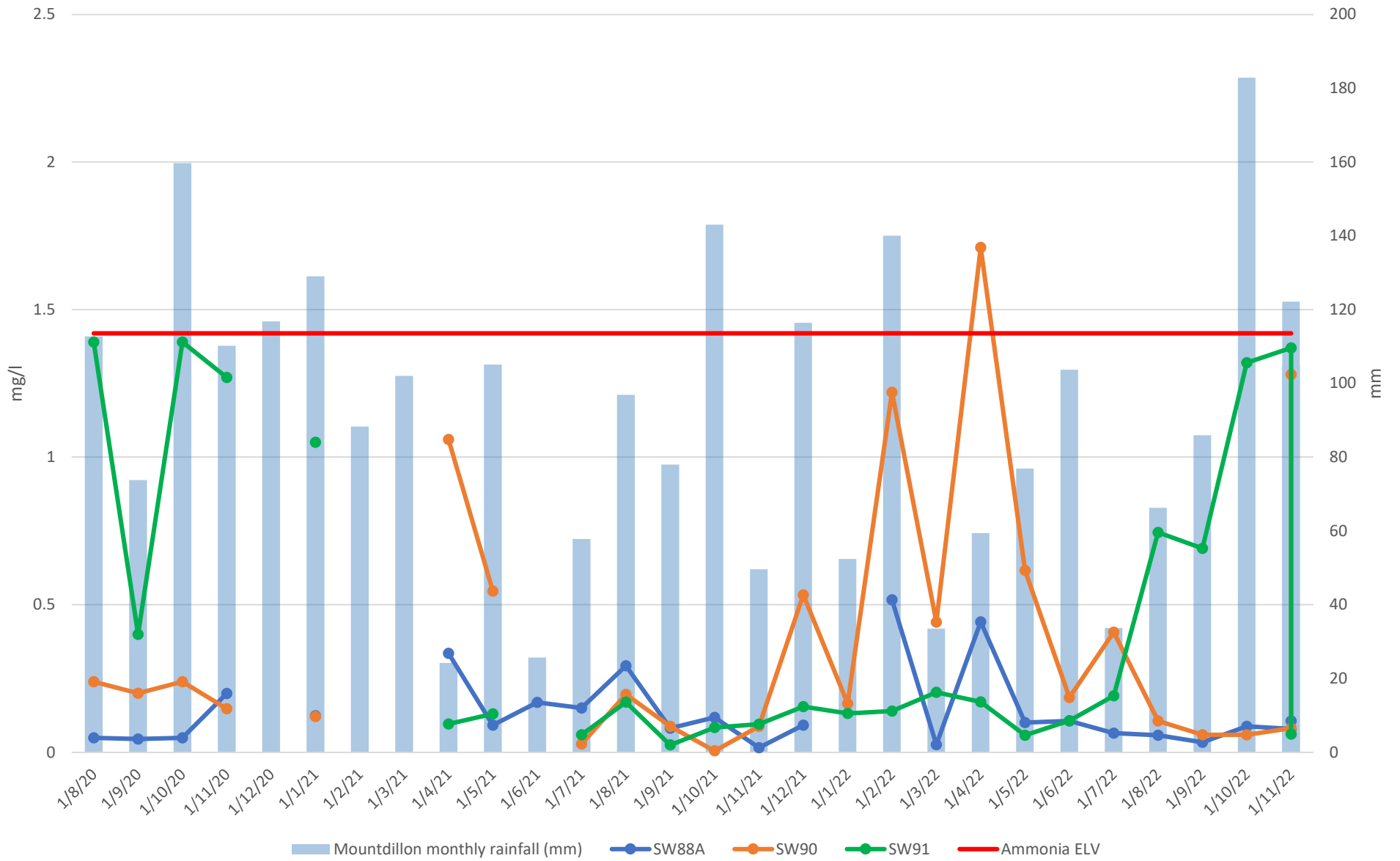
Derrycolumb Suspended Solids mg/l



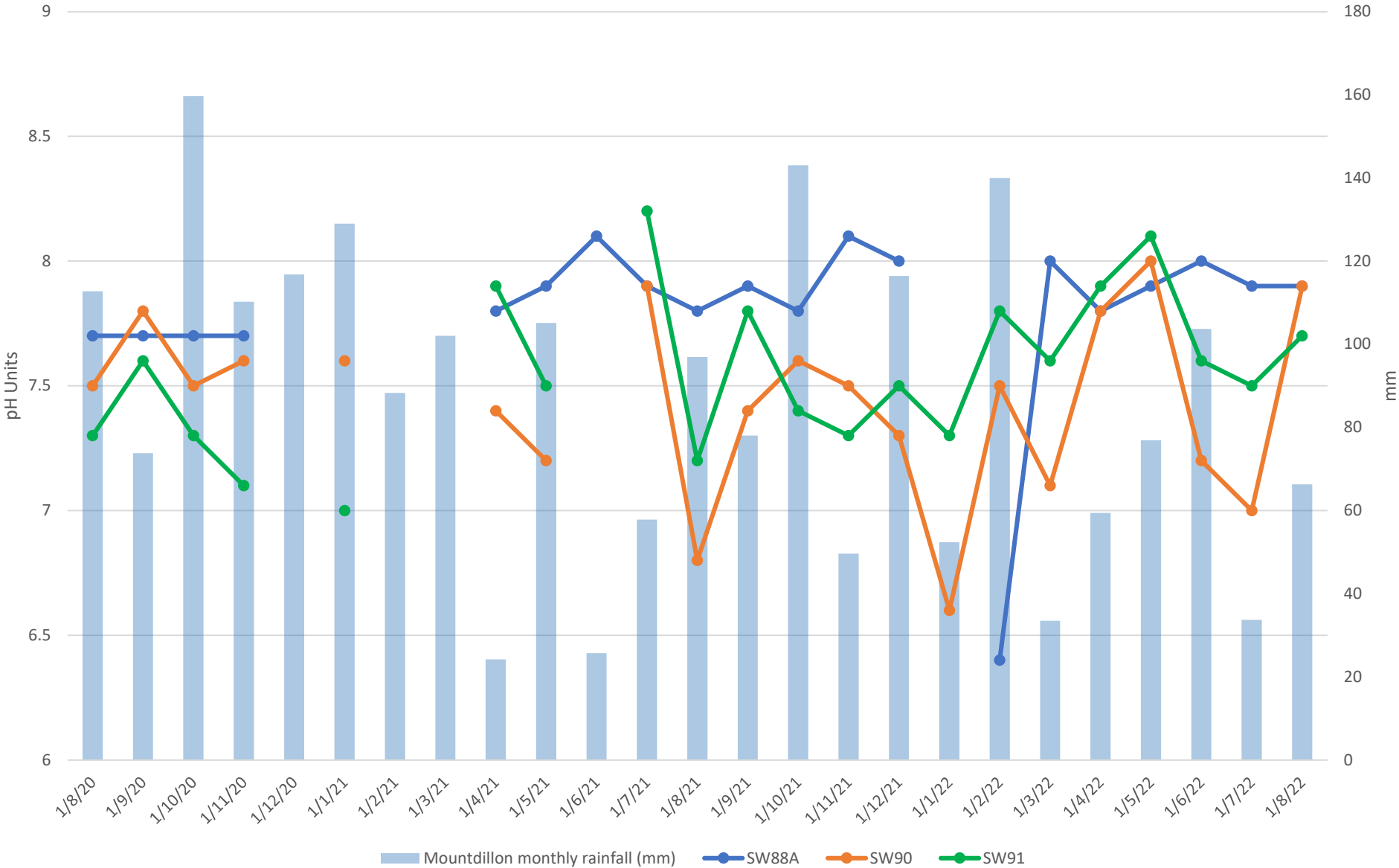
Derrycolumb COD mg/l



Derrycolumb Ammonia as N mg/l



Derrycolumb pH



Edera Bog

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids		
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
				1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Edera	SW98							5	7		4	8	6		4					2	2	2	2	5	2	2	NF	NF
Mountdillon	P0504-01	Edera	SW95	5	2		3			2	2	2	2	4	2	2	3	2	3	2	5	2	2	2	2	2	2	2	2	2
Mountdillon	P0504-01	Edera	SW97	2	2		2			2	2	2	2	2	2	2	2	3	5	13	2	8	3	10	2	2	14	2	2	2
			Mountdillon monthly rainfall (mm)	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6
			Suspended solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35

PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
				1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Edera	SW98							174	172		160	249	114		532				187	115	197	357	354	238	340	NF	NF	
Mountdillon	P0504-01	Edera	SW95	276	162		129			102	121	65.6	107	98.8	83.5	177	296	120	225	230	80.1	68.6	66.2	70.4	300	305	119	187	257	274
Mountdillon	P0504-01	Edera	SW97	359	451		303			382	292	337	158	236	237	218	686	457	376	470	409	455	290	263	95.2	223	246	184	246	133
			Mountdillon monthly rainfall (mm)	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

PCAS SW Sampling Scheme				COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Edera	SW98							62	59		51	61	54		135				54	41	37	87	93	44	79			
Mountdillon	P0504-01	Edera	SW95	71	51		41			37	40	37	39	37	43	66	83	45	65	62	24	43	30	13	72	79	28	67	65	70
Mountdillon	P0504-01	Edera	SW97	84	98		64			78	69	86	42	74	84	73	201	114	87	72	96	117	77	66	37	52	80	64	65	42.6
			Mountdillon monthly rainfall (mm)	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

PCAS SW Sampling Scheme				pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	
Bog Group	Licence No	Bog Name	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
				1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Edera	SW98							7.4	7.7		7.5	7.7	7.9		7				7.9	7.7	7.7	6.3	7.2	7.7	7.2			
Mountdillon	P0504-01	Edera	SW95	7.5	7.6		7.6			7.6	7.7	7.8	7.8	7.6	7.9	7.6	7.4	7.7	7.5	7.4	7.6	7.7	7.7	7.8	7.5	7.2	7.9	7.2	6.1	6.1
Mountdillon	P0504-01	Edera	SW97	7.1	6.2		6.1			6.8	7.3	7.4	7.7	7.5	7.9	7.3	6	6.9	6.3	5.9	6.2	6.7	7.4	7.1	7.8	7.2	7.5	7.5	7.3	7.6
			Mountdillon monthly rainfall (mm)	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Mountdillon	P0504-01	Edera	SW98							0.05	0.05		0.07	0.07	0.08		0.05				0.05	0.08	0.06	0.05	0.07	0.06	0.05	NF	NF		
Mountdillon	P0504-01	Edera	SW95	0.05	0.05		0.05			0.05	0.05	0.05	0.05	0.05	0.07	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.06	0.05	0.07	0.08	0.06	0.05	0.07	0.05	
Mountdillon	P0504-01	Edera	SW97	0.05	0.05		0.05			0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.12	0.06	0.13	0.07	0.11	0.27	0.11	0.08	0.05	
			Mountdillon monthly rainfall (mm)	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6	

PCAS SW Sampling Scheme				TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Mountdillon	P0504-01	Edera	SW98							269	245		286	303	396		408				434	335	247	191	161	218	162	NF	NF		

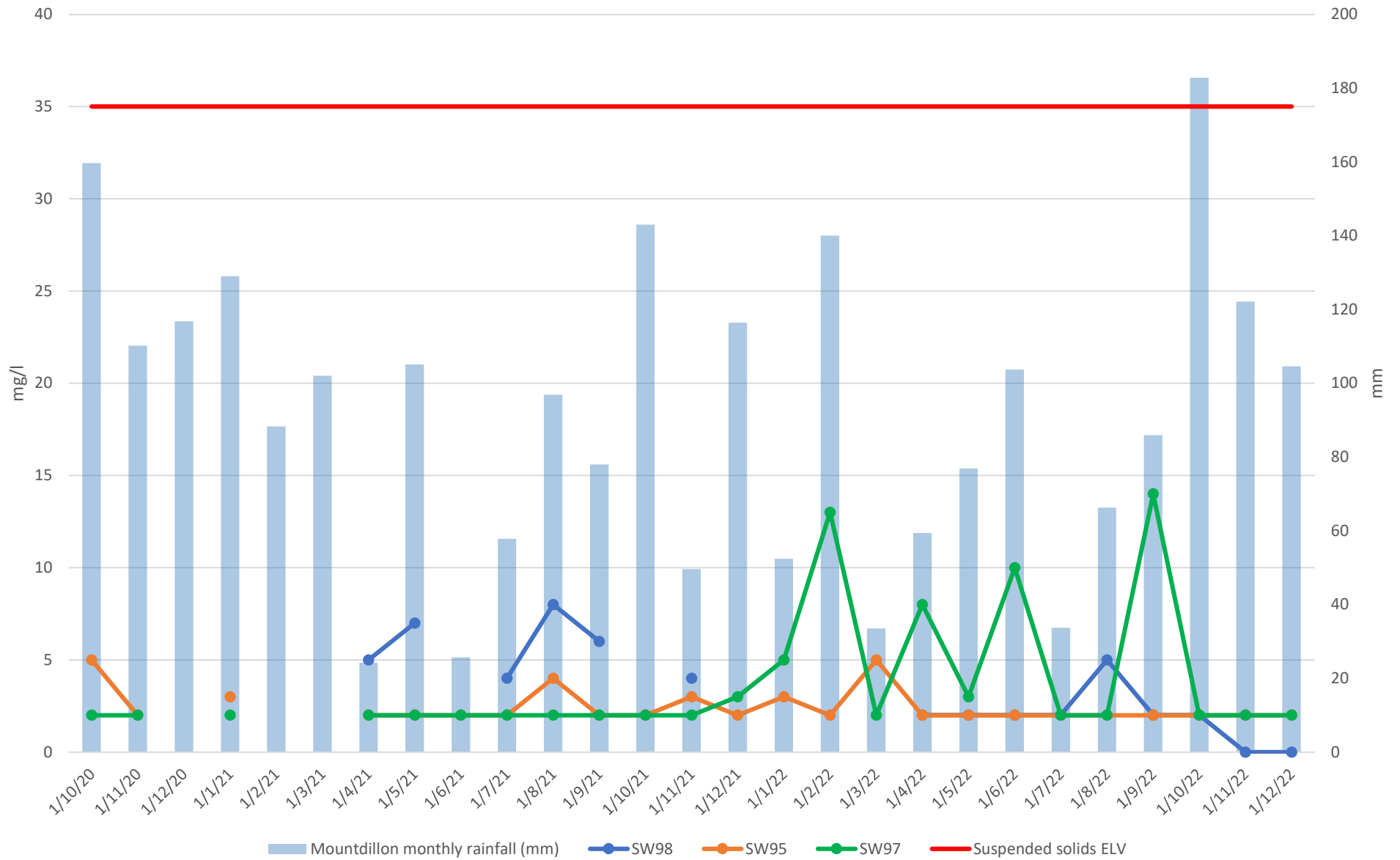
Mountdillon	P0504-01	Edera	SW95	328	416		462			431	429	507	455	495	469	569	409	459	395	207	437	487	502	505	254	274	455	340	102	118
Mountdillon	P0504-01	Edera	SW97	164	163		116			161	183	212	239	311	301	258	319	233	150	115	175	235	266	246	474	316	297	473	374	405
			Mountdillon monthly rainfall (mm)	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/11/22
Mountdillon	P0504-01	Edera	SW98				0.044			0.724	1.62		0.113	0.036	0.119		0.097			0.232	0.051	0.029	0.326	0.071	0.019	0.107	NF	NF		
Mountdillon	P0504-01	Edera	SW95	0.081	0.046					0.025	0.022	0.016	0.081	0.801	0.074	0.163	0.203	0.54	0.129	0.026	0.059	0.021	0.016	0.019	0.068	0.017	0.059	0.012	0.13	0.092
Mountdillon	P0504-01	Edera	SW97	0.25	0.092		0.098			0.129	0.098	0.407	0.032	0.47	0.092	0.331	0.029	0.111	0.233	0.47	0.143	0.44	0.019	0.018	0.042	0.211	0.039	0.308	0.146	0.056
			Mountdillon monthly rainfall (mm)	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6
			Ammonia ELV	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27

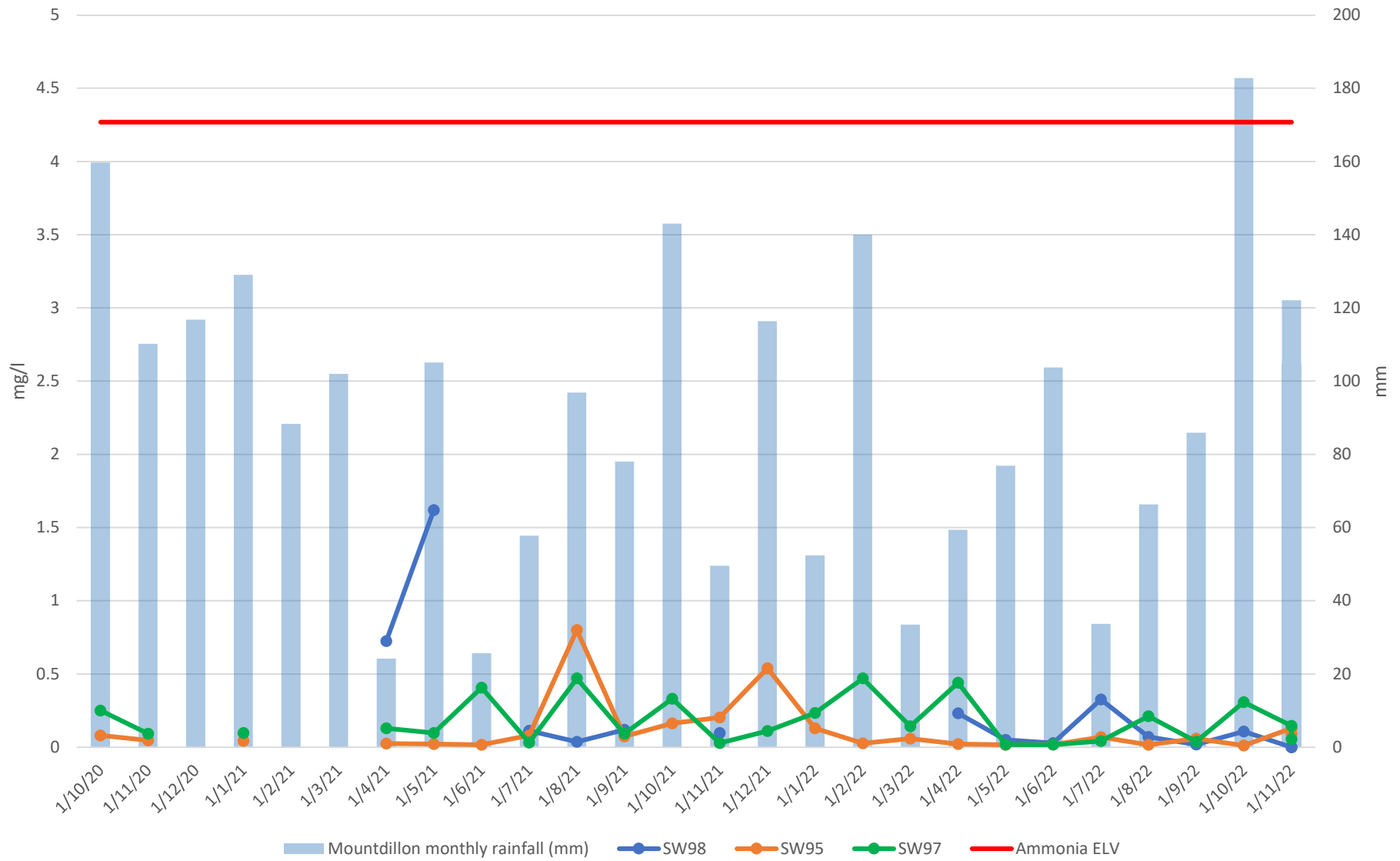
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/10/20	1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Edera	SW98							20.7	20.1		16.2	22.4	66.7		60			17.9	16.5	20.1	30.8	33	19	29.9	NF	NF		
Mountdillon	P0504-01	Edera	SW95	27.2	19.1		17.1			13.5	16.8	11.3	13	14.2	11.6	24	36.2	17.5	23.5	24.2	13	12.3	14.5	11.7	27.3	29.8	16.6	22.8	23.7	27.7
Mountdillon	P0504-01	Edera	SW97	31.9	39.2		22.6			28.9	25.8	29.9	23.4	25.9	25.4	25.3	81.9	42.1	28.4	20.2	38	39.8	30.7	27.1	16.1	19.2	24.8	24.4	34.8	16.4
			Mountdillon monthly rainfall (mm)	159.7	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

*Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

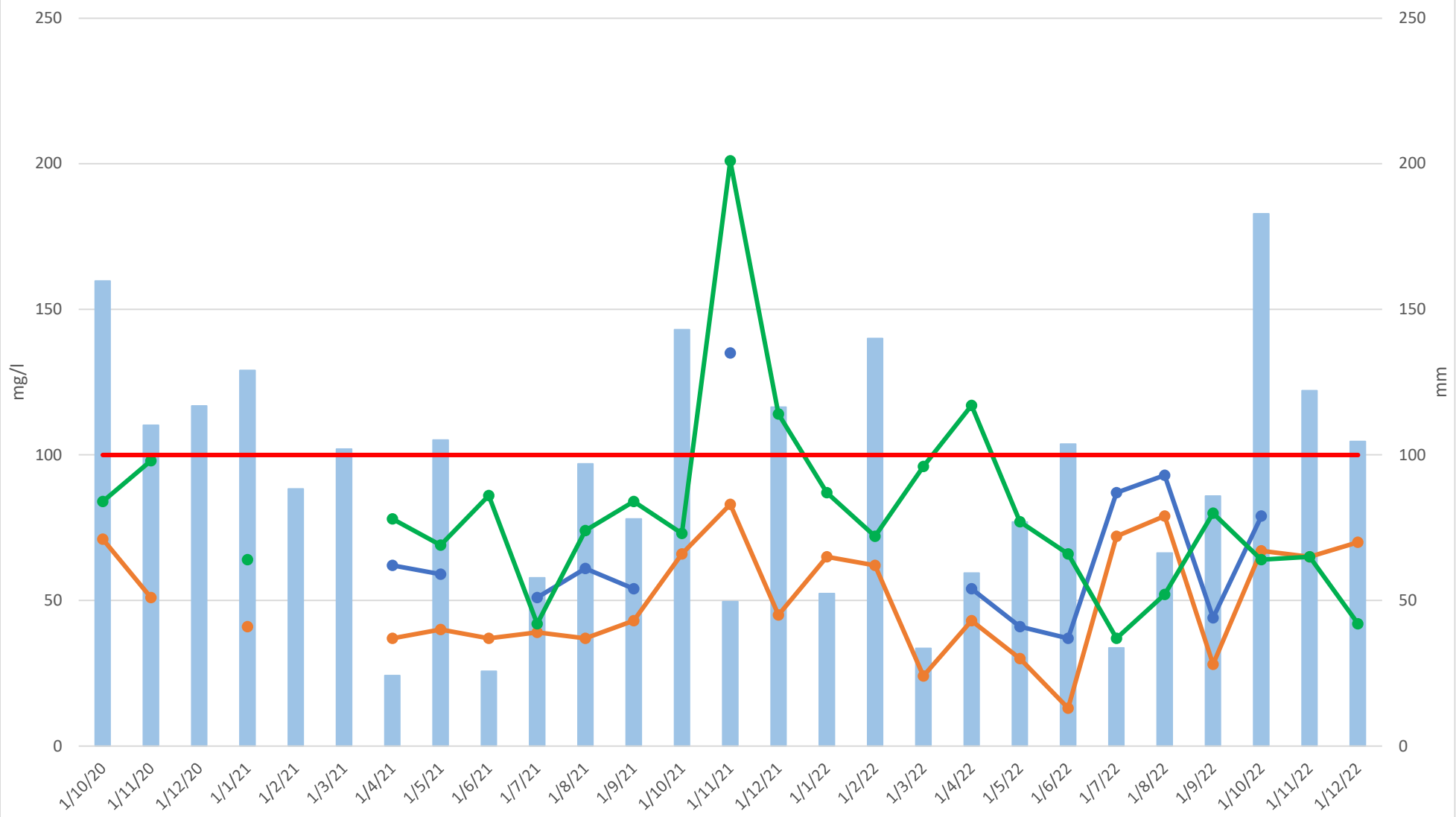
Edera Suspended Solids mg/l



Edera Ammonia as N mg/l

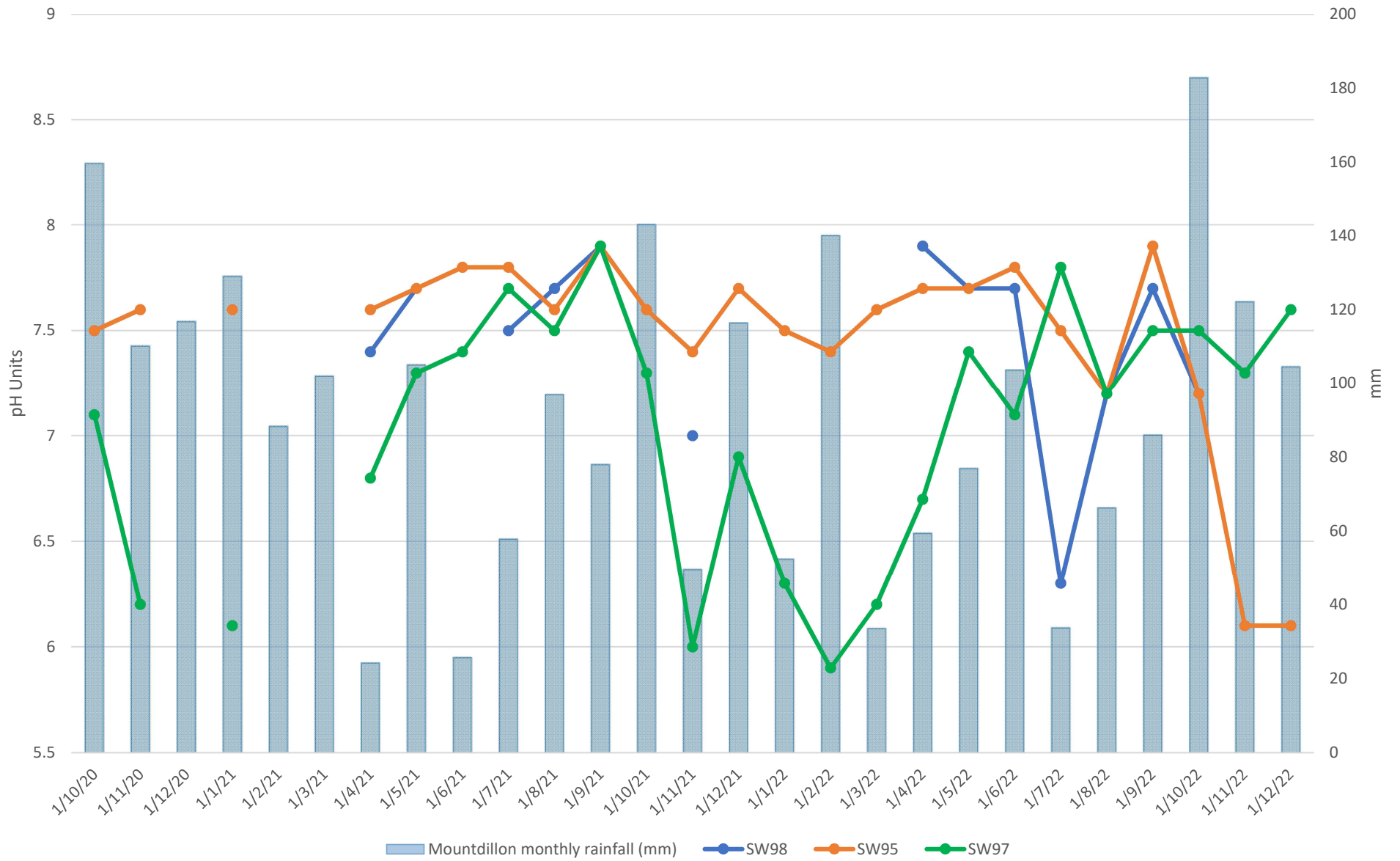


Edera COD mg/l



■ Mounddillon monthly rainfall (mm) ● SW98 ● SW95 ● SW97 — COD ELV

Edera pH



Bunahinly Bog

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	2/3/22	2/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22			
Blackwater	P0502-01	Bunahinly	SW92	4	6	17			2	5	4	2	19	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Blackwater	P0502-01	Bunahinly	SW93	13	2	5			2	3	2		5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Blackwater	P0502-01	Bunahinly	SW94	6	3	2			2	2	2		2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
			Surteen monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9		
			Suspended Solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35

PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Bunahinly	SW92	293	284	N/S	289	N/S	339	347	360	N/S	325	276	327	211	193	192	212	246	228	179	294			190	297	362	309	
Blackwater	P0502-01	Bunahinly	SW93	320	307	N/S	217	N/S	250	348	358	N/S	361	300	326	212	197	188	211	239	228	245	290			189	299	356	342	
Blackwater	P0502-01	Bunahinly	SW94	255	235	N/S	221	N/S	265	284	300	N/S	309	316	286	212	198	187	212	240	229	259	288			189	304	357	344	
			Surteen monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	

PCAS SW Sampling Scheme				COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22		
Blackwater	P0502-01	Bunahinly	SW92	66	65	54			78	84	94		42	81	80	58	54	58	60	66	64	51	83			71	69	66	76		
Blackwater	P0502-01	Bunahinly	SW93	78	76	25			71	97	94		59	85	78	62	57	54	59	68	64	69	84			72	69	65	73		
Blackwater	P0502-01	Bunahinly	SW94	50	50	19			71	83	83		44	37	75	61	50	55	59	68	66	48	84			69	69	63	74		
			Surteen monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9		
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

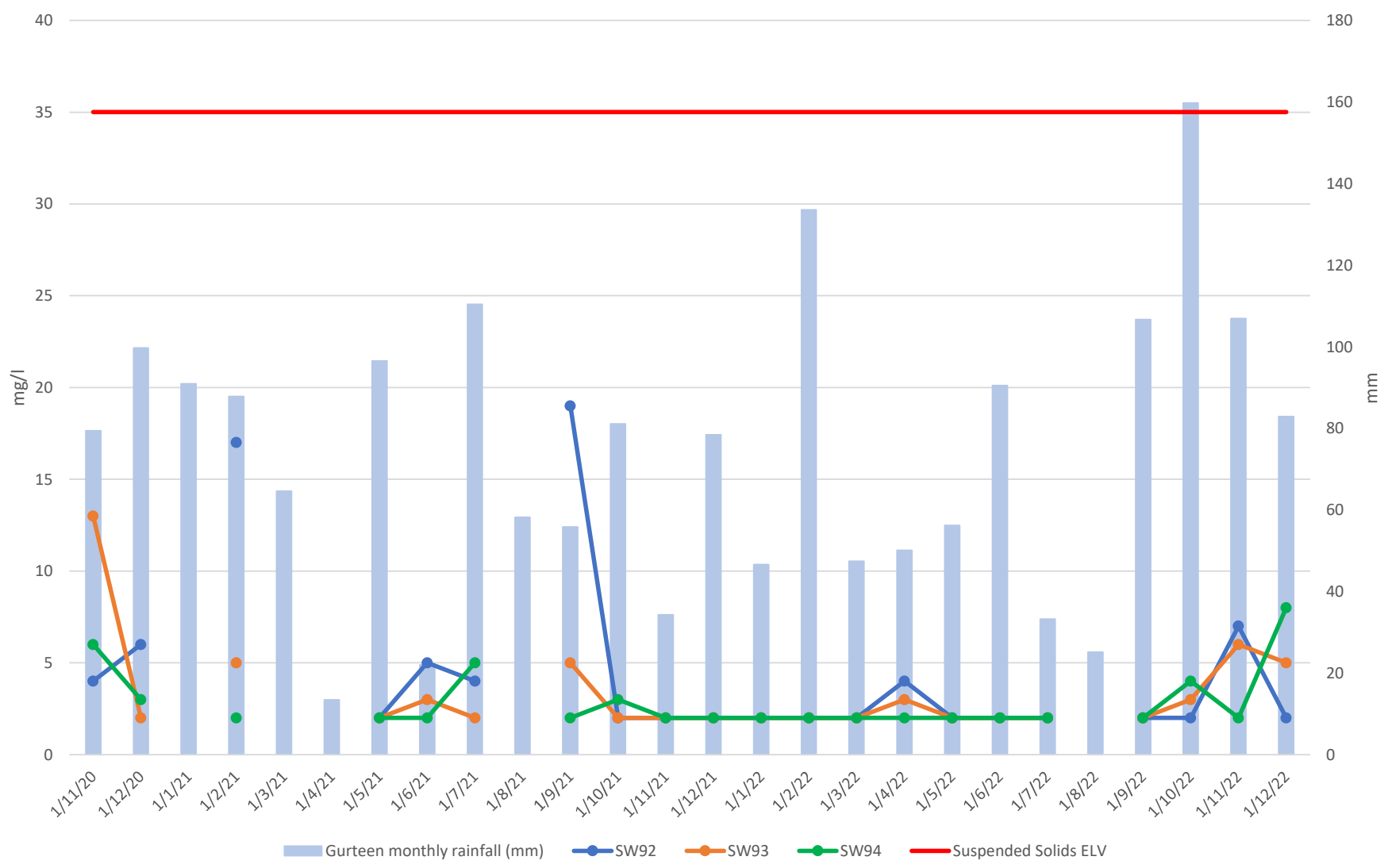
PCAS SW Sampling Scheme				pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
Bog Group	Licence No	Bog Name	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Bunahinly	SW92	6.1	6		5.9		3.1	6.5	6.6		6.6	6.5	5.3	5	6.4	6.3	7.4	7.1	7.3	7.5	7.4			8	6.6	6.1	6.8	
Blackwater	P0502-01	Bunahinly	SW93	5.3	5.2		5.1		4.8	5.9	6		6	5.4	5.6	4.9	6.3	6.3	7.4	7	7.2	7.2	7.3			8	6.6	6.2	6.9	
Blackwater	P0502-01	Bunahinly	SW94	6.1	6.1		6.1		6.1	7.2	7.7		7.5	7.5	6.9	6.3	6.3	7.4	7	7.2	7.2	7.4			8	6.6	6.1	6.9		
			Surteen monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	

PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Bunahinly	SW92	<0.05	<0.05	N/S	<0.05	N/S	N/S	<0.05	0.05	0.05	N/S	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	<0.05	<0.05	<0.05	
Blackwater	P0502-01	Bunahinly	SW93	<0.05	<0.05	N/S	<0.05	N/S	N/S	<0.05	<0.05	0.06	N/S	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	<0.05	<0.05	<0.05	
Blackwater	P0502-01	Bunahinly	SW94	<0.05	<0.05	N/S	<0.05	N/S	N/S	<0.05	<0.05	<0.05	N/S	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	<0.05	<0.05	<0.05	
			Surteen monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	

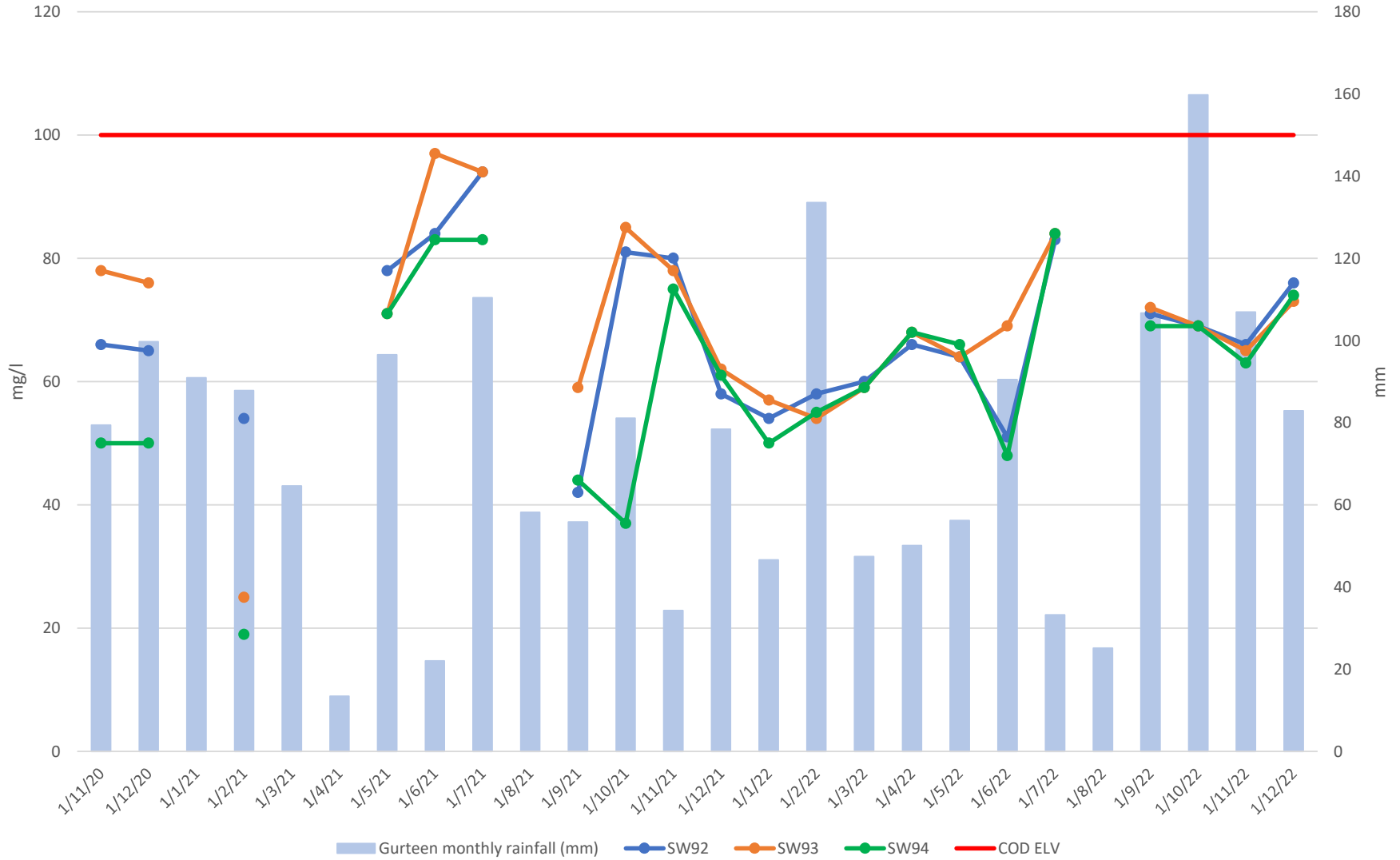
PCAS SW Sampling Scheme				TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22		
Blackwater	P0502-01	Bunahinly	SW92	114	129	N/S	73	N/S	N/S	97	157	157	N/S	177	63	139	125	92	62	95	149	133	127	221			330	130	56	261	
Blackwater	P0502-01	Bunahinly	SW93	114	63	N/S	56	N/S	N/S	62	117	124	N/S	158	101	77	57	98	68	121	125	125	115	122			266	138	65	110	
Blackwater	P0502-01	Bunahinly	SW94	92	72	N/S	43	N/S	N/S	89	169	211	N/S	171	124	25	97	147	127	130	125	136	175	186			280	188	95	58	
			Surteen monthly rainfall (mm)	79.4																											

Appendix F2
Surface Water Monitoring
Year 2 (FY23) Bogs

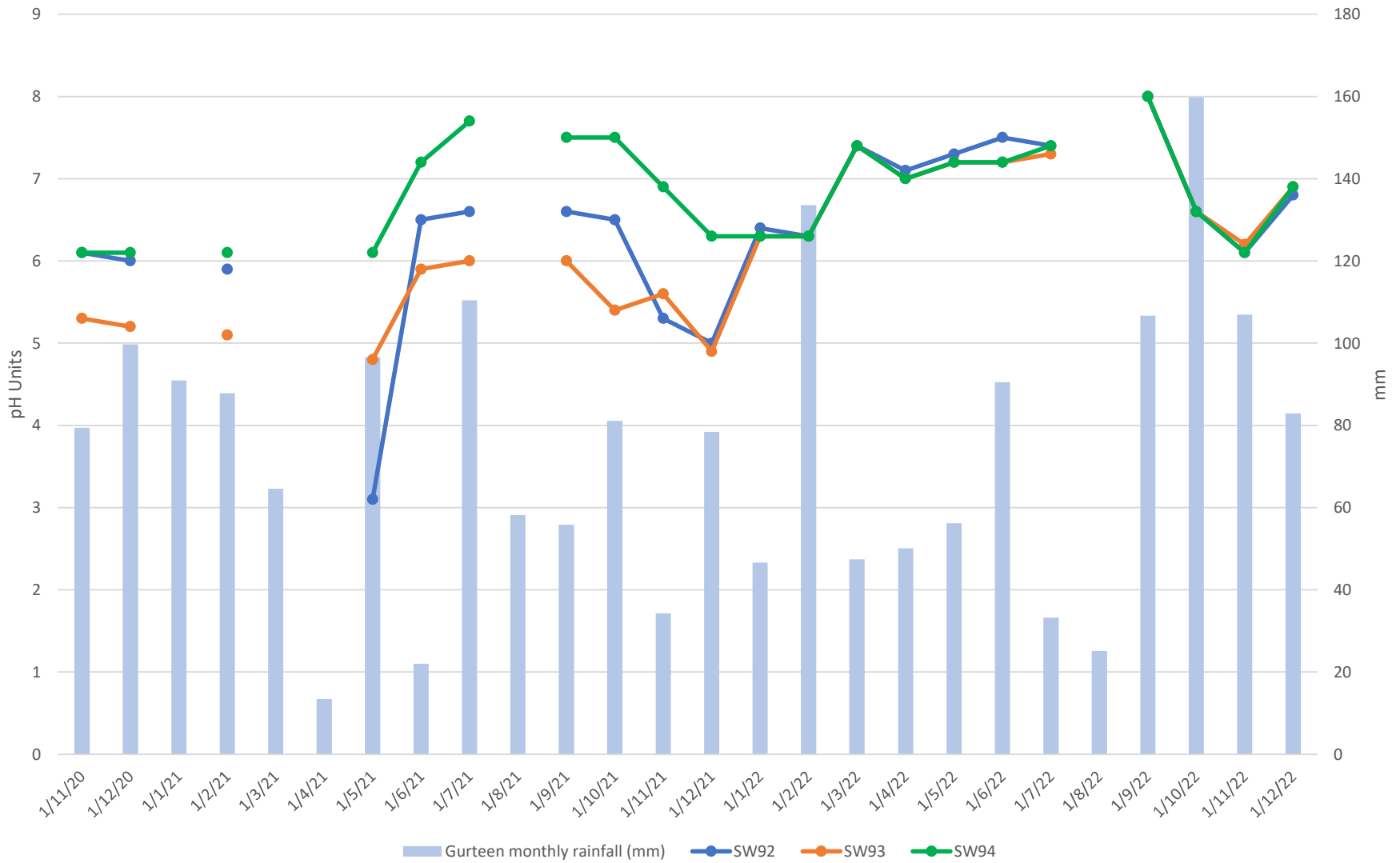
Bunahinly Suspended Solids mg/l



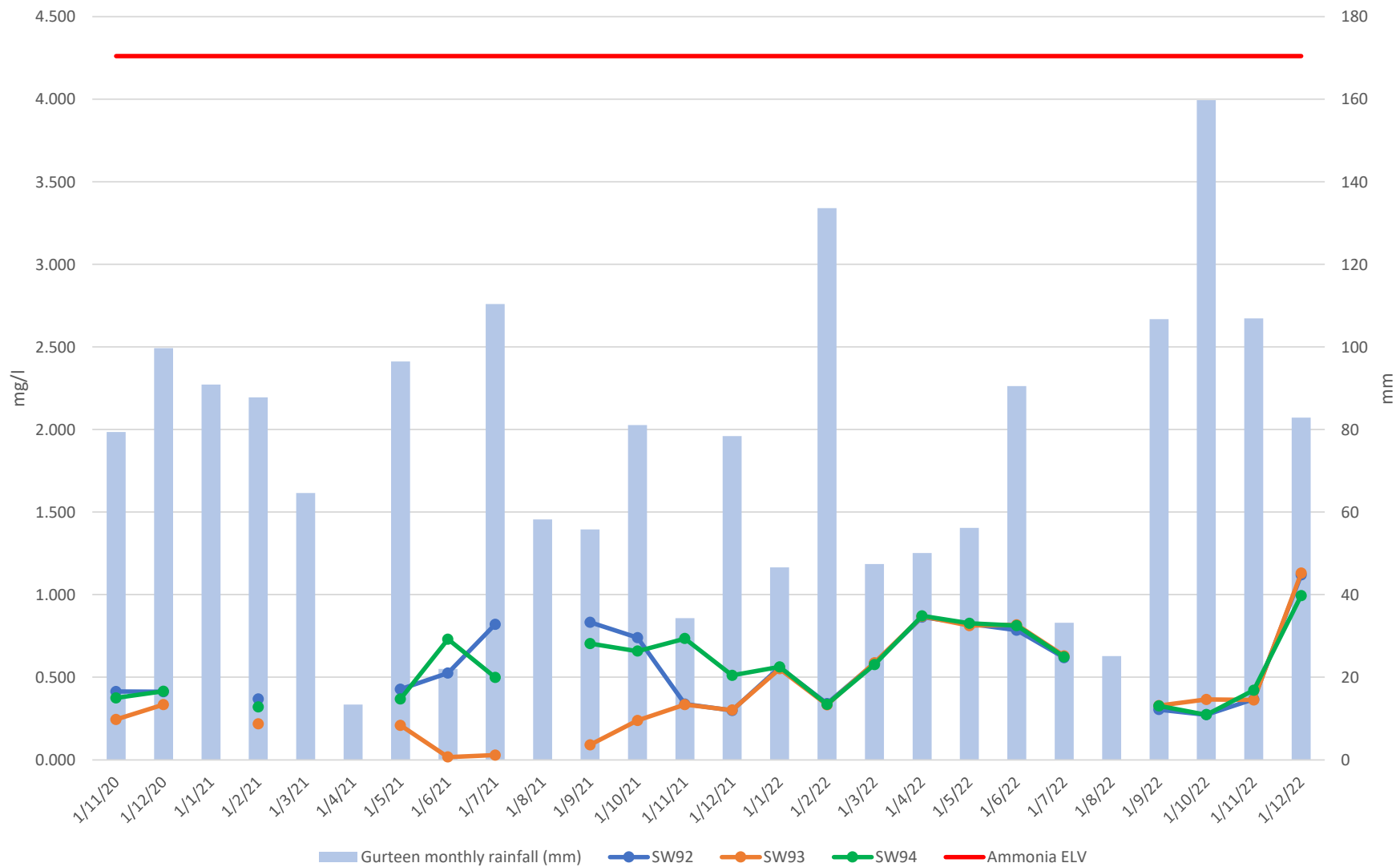
Bunahinly COD mg/l



Bunahinly pH



Bunahinly Ammonia as N mg/l



Clooneeny Bog

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Clooneeny	SW59	2	3	2	2	2	2	10	9	5	2	3	2	2	2	2	2	2	2	2	6	2	2	2	11	3	
Mountdillon	P0504-01	Clooneeny	SW62	6	2	3	4	2	4	7	2	5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	12	4	
Mountdillon	P0504-01	Clooneeny	SW65	3	3	2	2	2	2	2																			
			Mountdillon monthly rainfall (mm)	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6
			Suspended solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35

PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Clooneeny	SW59	249	298	338	377	206	217	268	267	299	283	377	226	176	121	171	136	157	121	353	306	362	105	400	363	666	391
Mountdillon	P0504-01	Clooneeny	SW62	288	167	200	139	181	432	189	151	396	421	354	136	138	150	130	136	140	81.3	NF	256	415	NF	207	358	698	417
Mountdillon	P0504-01	Clooneeny	SW65	261	343	328	141	175	322	NF	NF	NF	233	NF	NF	NF	193	174	161	138	193	309	227	364	213	323	258	492	502
			Mountdillon monthly rainfall (mm)	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

PCAS SW Sampling Scheme				COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Mountdillon	P0504-01	Clooneeny	SW59	66	70	70	70	54	55	74	69	81	80	50	29	52	42	48	33	35	37	31	67	80	33	83	85	118	109	
Mountdillon	P0504-01	Clooneeny	SW62	66	37	31	33	44	75	43	50	95	81	63	41	60	44	67	32	30	33	63	76	65	84	128	117			
Mountdillon	P0504-01	Clooneeny	SW65	71	75	70	28	42	64			61					51	35	50	53	48	41	60	72	80	72	70	126	132	
			Mountdillon monthly rainfall (mm)	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6	
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

PCAS SW Sampling Scheme				pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
Bog Group	Licence No	Bog Name	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Clooneeny	SW59	7.8	7.5	7	6.8	7.3	7.4	7.3	7	7	7.3	7.3	7.2	7.6	7.5	7.3	7.7	7.4	7.9	7	7.2	6.7	8	6.7	7.2	6.7	6.9
Mountdillon	P0504-01	Clooneeny	SW62	7.5	7	7.4	7.3	7.7	7.2	7.2	7.5	6.6	6.3	6.8	7.3	7.3	6.8	6.8	7.1	6.9	7.9	7.5	7.2	7.5	7.2	7.2	7.3	6.7	7.2
Mountdillon	P0504-01	Clooneeny	SW65	7.5	6.8	6.8	6.2	7.8	7.6			7.8					7.9	6.4	7.3	7.3	7.8	7.2	7.3	7.3	7.3	7	7.4	6.3	7.1
			Mountdillon monthly rainfall (mm)	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Clooneeny	SW59	0.05	0.07	0.05	0.11	0.05	0.05	0.05	0.05	0.18	0.05	0.14	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Mountdillon	P0504-01	Clooneeny	SW62	0.05	0.05	0.05	0.05	0.05	0.07	0.05	0.05	0.05	0.09	0.15	0.05	0.05	0.05	0.05	0.05	0.06	0.05	NF	0.05	0.07	NF	0.1	0.21	0.05	0.05
Mountdillon	P0504-01	Clooneeny	SW65	0.05	0.09	0.05	0.05	0.05	0.05	NF	NF	NF	0.05	NF	NF	NF	0.05	0.05	0.07	0.08	0.06	0.11	0.11	0.07	0.05	0.06	0.14	0.06	0.05
			Mountdillon monthly rainfall (mm)	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

PCAS SW Sampling Scheme				TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Clooneeny	SW59	226	165	164	116	201	221	200	270	208	246	164	197	198	1521	196	176	130	421	197	229	98	311	169	213	194	328
Mountdillon	P0504-01	Clooneeny	SW62	249	114	149	111	310	190	123	265	146	124	211	244	185	39	109	141	75	295	NF	248	233	NF	354	233	162	346

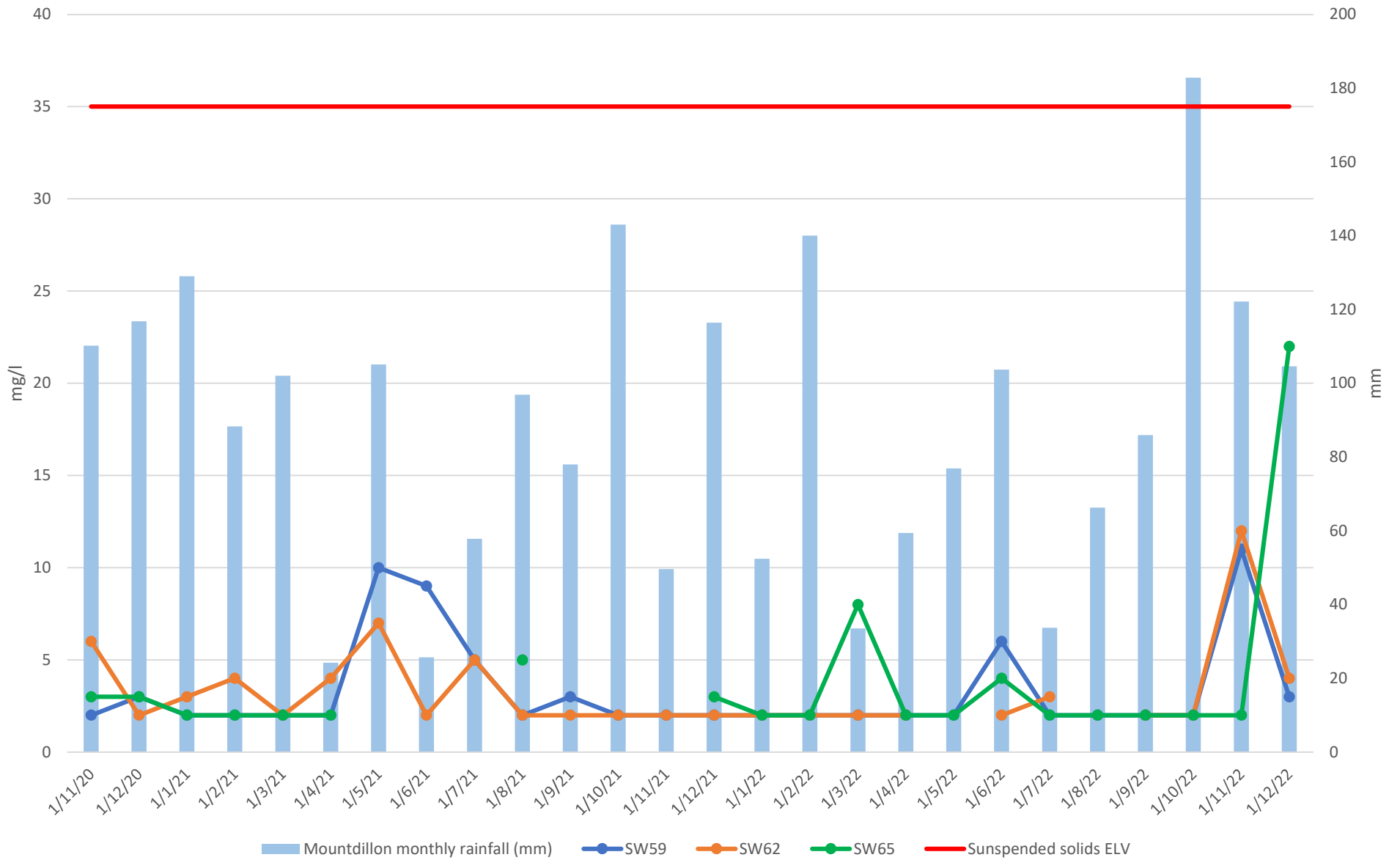
Mountdillon	P0504-01	Clooneeny	SW65	317	138	80	123	292	206	NF	NF	NF	386	NF	NF	NF	222	57	287	262	272	191	272	182	304	215	368	157	344
			Mountdillon monthly rainfall (mm)	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	Ammonia as N																											
					mg/l 1/11/20	mg/l 1/12/20	mg/l 1/1/21	mg/l 1/2/21	mg/l 1/3/21	mg/l 1/4/21	mg/l 1/5/21	mg/l 1/6/21	mg/l 1/7/21	mg/l 1/8/21	mg/l 1/9/21	mg/l 1/10/21	mg/l 1/11/21	mg/l 1/12/21	mg/l 1/1/22	mg/l 1/2/22	mg/l 1/3/22	mg/l 1/4/22	mg/l 1/5/22	mg/l 1/6/22	mg/l 1/7/22	mg/l 1/8/22	mg/l 1/9/22	mg/l 1/10/22	mg/l 1/11/22	mg/l 1/12/22		
	Mountdillon	P0504-01	Clooneeny	SW59	0.116	0.122	0.104	0.178	0.041	0.094	0.182	1.24	0.426	0.014	0.089	0.093	0.123	0.051	0.116	0.519	0.375	0.109	0.161	0.356	0.023	0.044	0.479	0.262	0.472	0.181		
	Mountdillon	P0504-01	Clooneeny	SW62	0.187	0.91	0.357	0.064	0.11	0.17	0.342	0.45	0.795	0.226	0.332	0.137	0.092	0.687	0.789	0.728	0.611	0.506		0.133	0.118		0.16	0.328	0.355	0.291		
	Mountdillon	P0504-01	Clooneeny	SW65	0.064	0.116	0.043	0.304	0.145	0.063				0.216				0.142	0.851	0.396	0.065	0.147	0.073	0.011	0.104	0.022	0.426	0.343	0.089	0.17		
				Mountdillon monthly rainfall (mm)	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6		
				Ammonia ELV	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42		

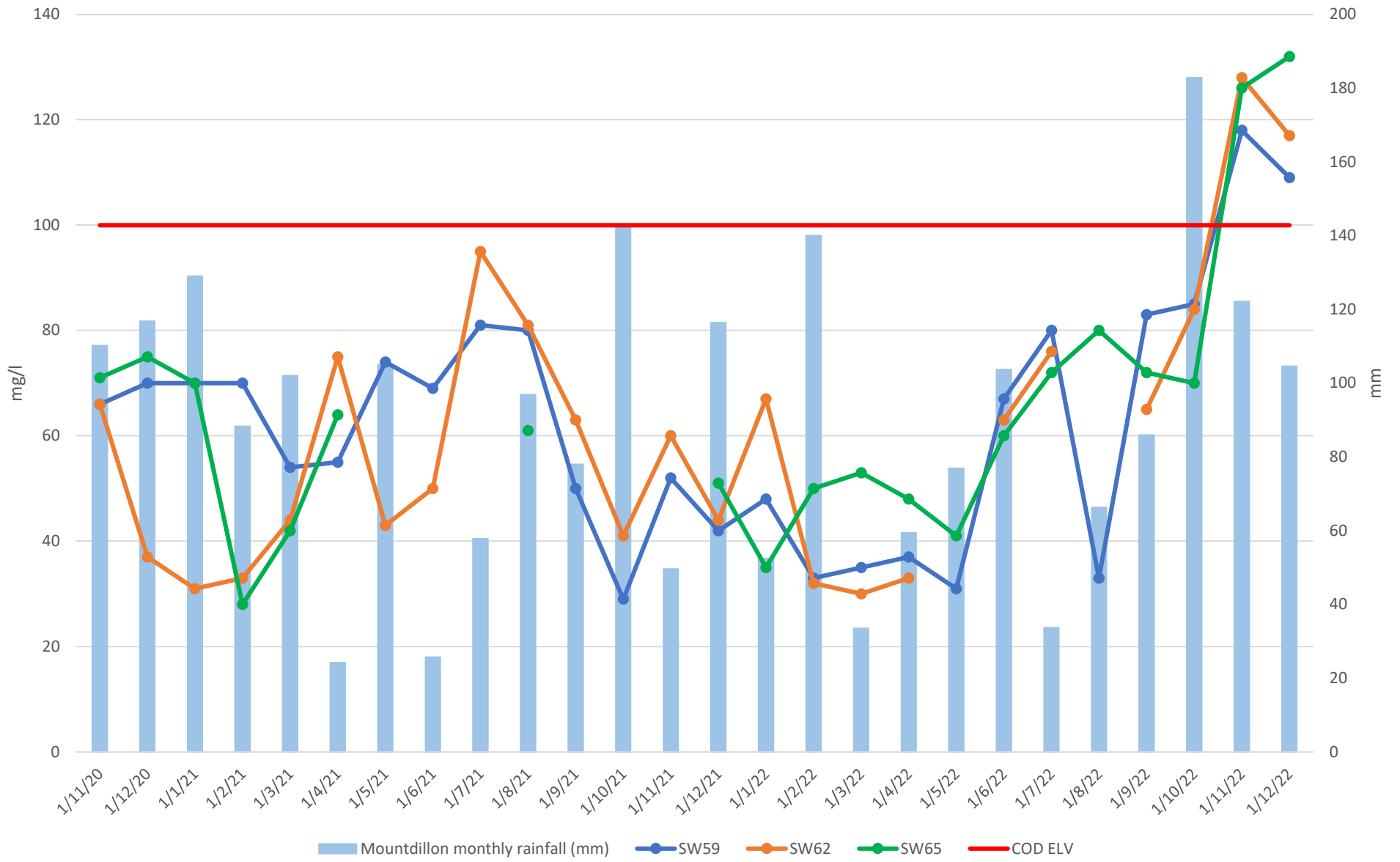
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	DOC																											
					mg/l 1/11/20	mg/l 1/12/20	mg/l 1/1/21	mg/l 1/2/21	mg/l 1/3/21	mg/l 1/4/21	mg/l 1/5/21	mg/l 1/6/21	mg/l 1/7/21	mg/l 1/8/21	mg/l 1/9/21	mg/l 1/10/21	mg/l 1/11/21	mg/l 1/12/21	mg/l 1/1/22	mg/l 1/2/22	mg/l 1/3/22	mg/l 1/4/22	mg/l 1/5/22	mg/l 1/6/22	mg/l 1/7/22	mg/l 1/8/22	mg/l 1/9/22	mg/l 1/10/22	mg/l 1/11/22	mg/l 1/12/22		
	Mountdillon	P0504-01	Clooneeny	SW59	26.7	23	26.2	24.7	19.7	20.9	25.9	21.2	27.3	55.5	34.1	25.6	18.8	14.8	18.8	13.2	13.1	17.1	28.6	29.1	28.4	12.6	39.1	34.6	41.1	43.3		
	Mountdillon	P0504-01	Clooneeny	SW62	23.4	13.5	15	10.2	17.8	29.3		17.4	31.6	39.2	34.9	21.4	19.1	15.7	13.1	12.7	10.5	15.2	NF	31.3	29	NF	30	35.5	42.1	44.8		
	Mountdillon	P0504-01	Clooneeny	SW65	26.9	24.3	28.8	8.78	16.4	26.7	NF	NF	NF	58.9	NF	NF	NF	21.1	14.4	19.1	16.8	21.4	25.5	29.4	25.9	30.4	33.6	29.1	48.9	48.8		
				Mountdillon monthly rainfall (mm)	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6		

*Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

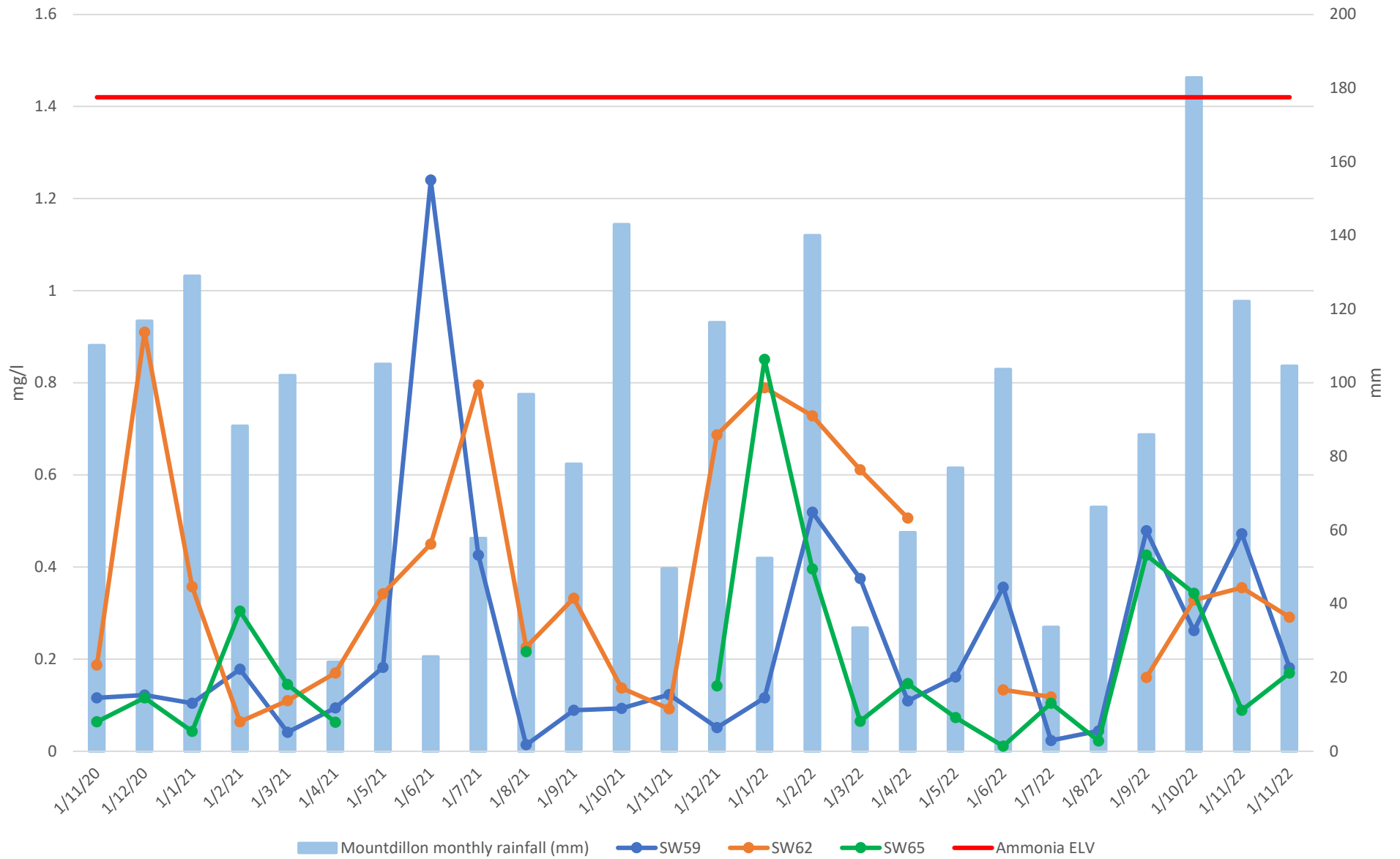
Cloneeny Suspended solids mg/l



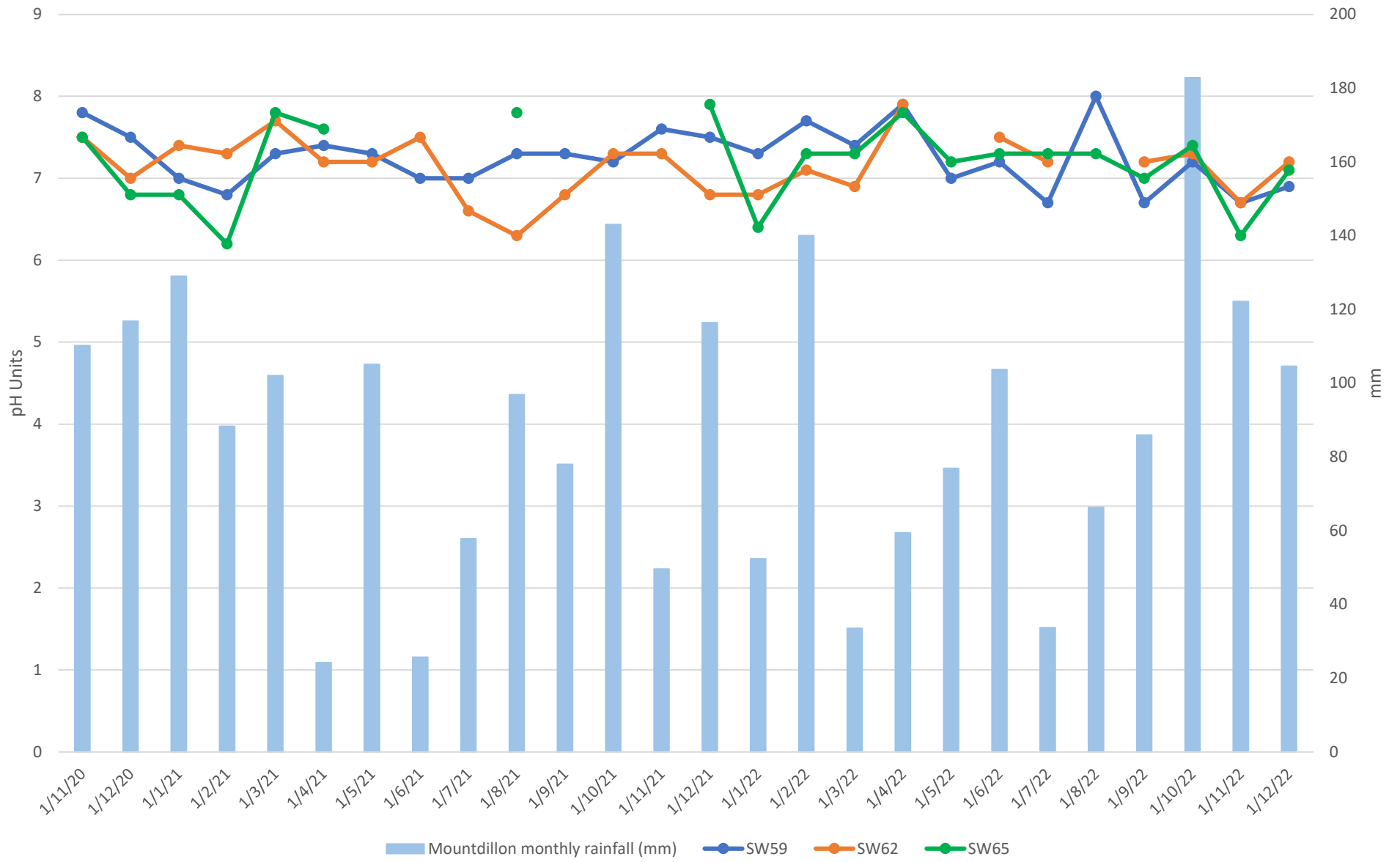
Clooneeny COD mg/l



Clooneeny Ammonia as N mg/l



Clooneeny pH



Kilaranny Bog

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Boora	P0500-01	Kilaranny	SW24A	6	4	2	10	4	2	3	6	2	2	11	7	2	2	3	8	2	2	3	2	2	4	3
			Surteen monthly rainfall (mm)	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9
			Suspended Solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35

PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	
Boora	P0500-01	Kilaranny	SW24A	358	115	92.5	101	98.4	172	97.7	84.5	117	124	197	127	199	177	90.9	93	93	74.7	75.7	70.2	105	293	148
			Surteen monthly rainfall (mm)	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9

PCAS SW Sampling Scheme				COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Boora	P0500-01	Kilaranny	SW24A	74	41	32	33	47	51	42	60	40	44	57	45	45	54	35	28	28	32	28	26	46	72	49
			Surteen monthly rainfall (mm)	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

PCAS SW Sampling Scheme				pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	
Bog Group	Licence No	Bog Name	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	
Boora	P0500-01	Kilaranny	SW24A	7.4	7.7	7.9	7.8	7.8	7.6	7.9	7.9	7.7	7.7	7.6	7.6	7.7	7.8	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.6	
			Surteen monthly rainfall (mm)	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9

PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Boora	P0500-01	Kilaranny	SW24A	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
			Surteen monthly rainfall (mm)	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9

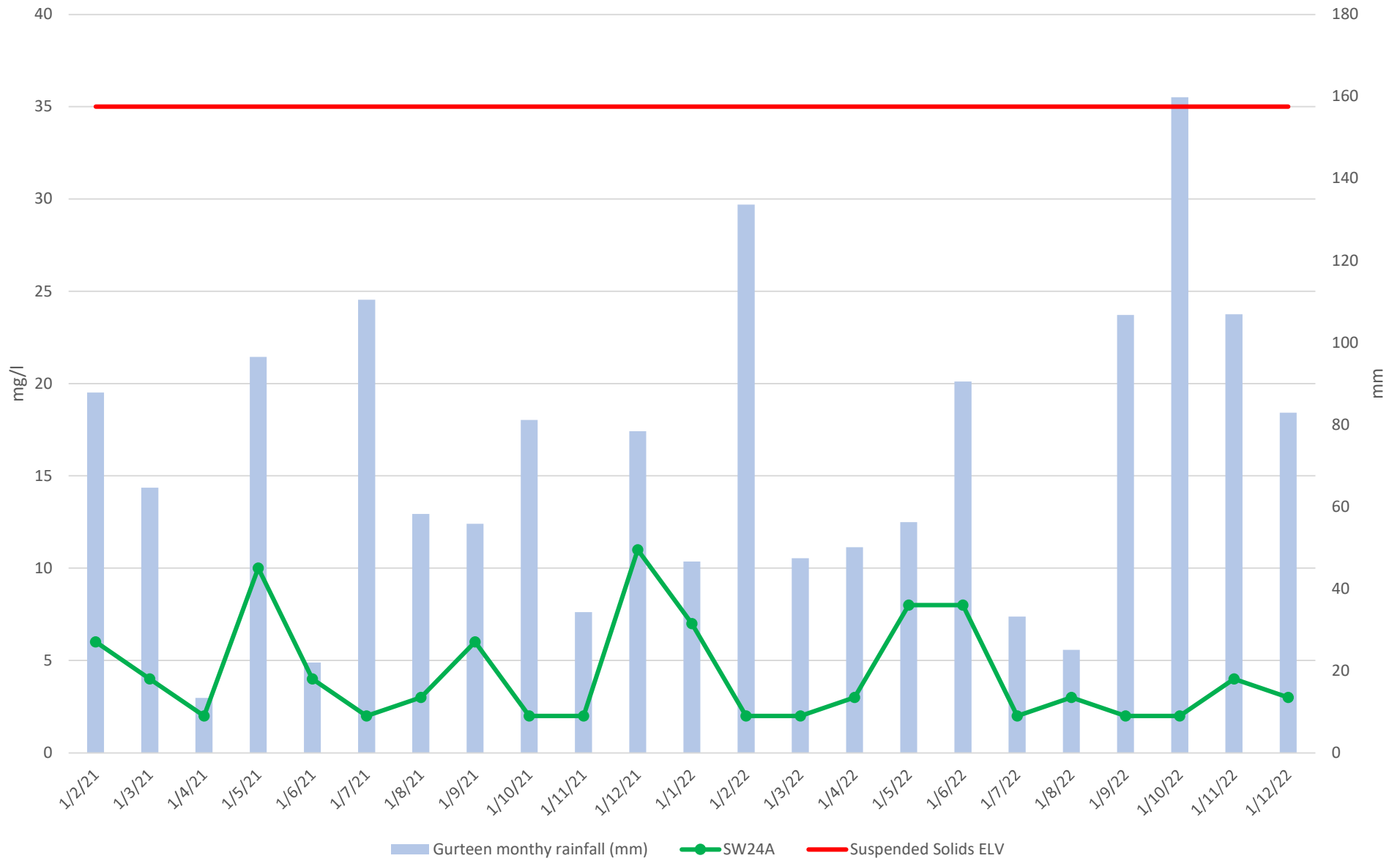
PCAS SW Sampling Scheme				TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Boora	P0500-01	Kilaranny	SW24A	368	438	396	480	422	403	531	412	415	443	332	427	289	422	448	508	508	476	388	535	455	405	434
			Surteen monthly rainfall (mm)	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9

PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Boora	P0500-01	Kilaranny	SW24A	0.422	0.141	0.096	0.087	0.042	0.614	0.214	0.034	0.585	0.376	0.797	0.049	1.860	0.257	0.083	0.047	0.047	0.044	0.020	0.050	0.079	0.702	0.417
			Surteen monthly rainfall (mm)	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9
			Ammonai ELV	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7

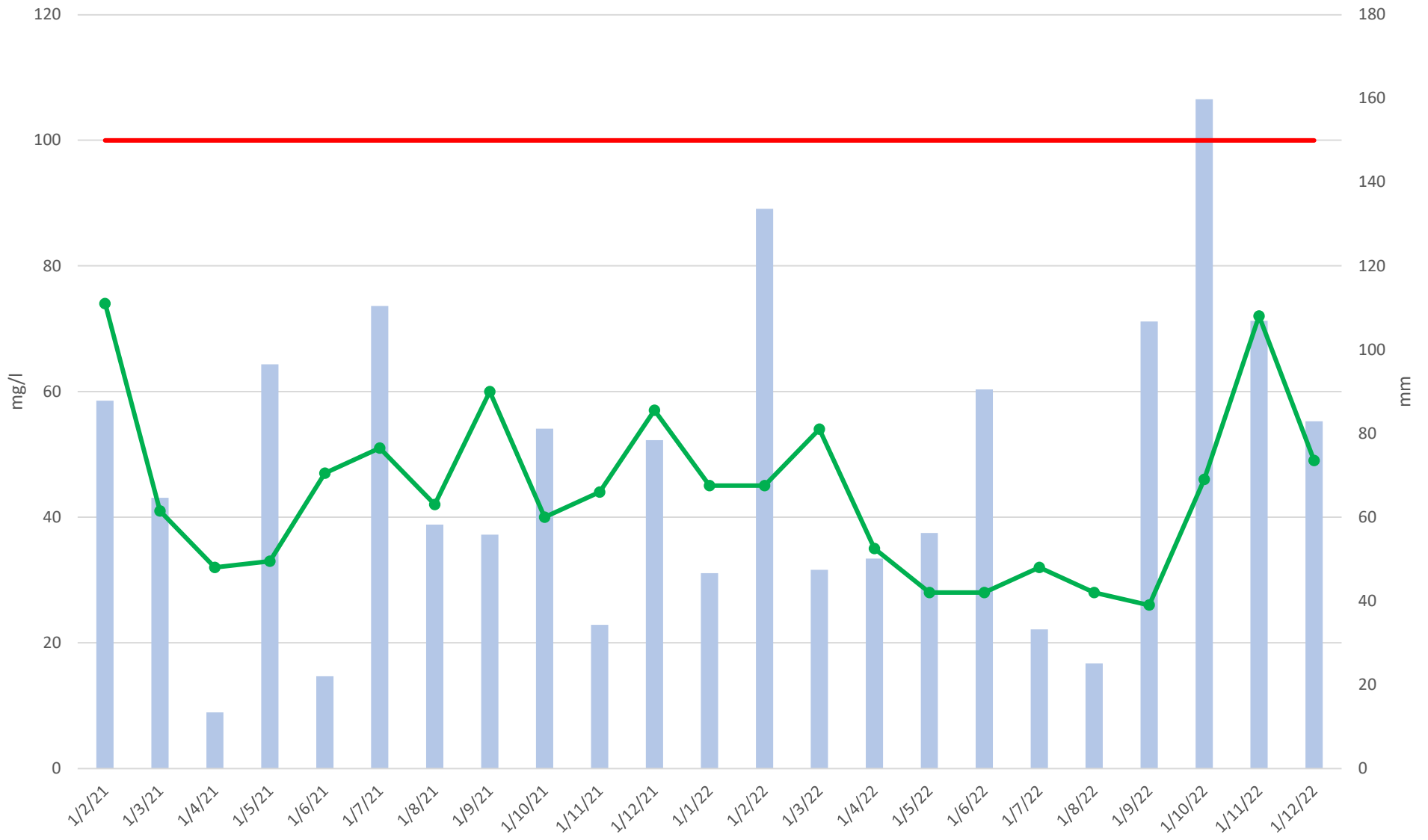
PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Boora	P0500-01	Kilaranny	SW24A	28.9	13.8	11.5	11.5	82.7	20.2	76.7	84.7	17.5	15	16.3	15.4	16.4	22.6	14.7	12.6	12.6	11.8	11	10.4	28.7	29.2	19.9
			Surteen monthly rainfall (mm)	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9

Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

Killranny Suspended Solids mg/l

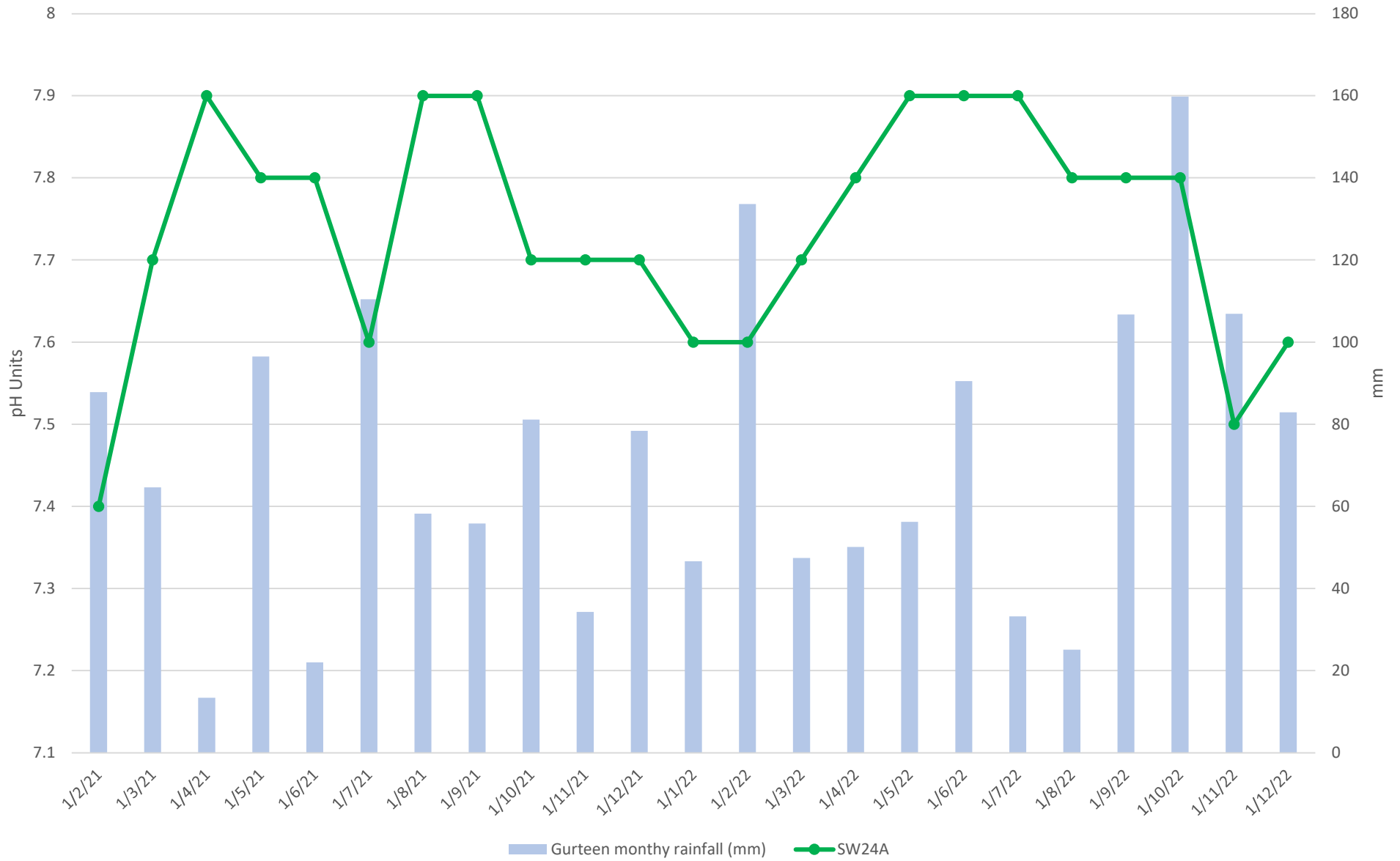


Killaranny COD mg/l

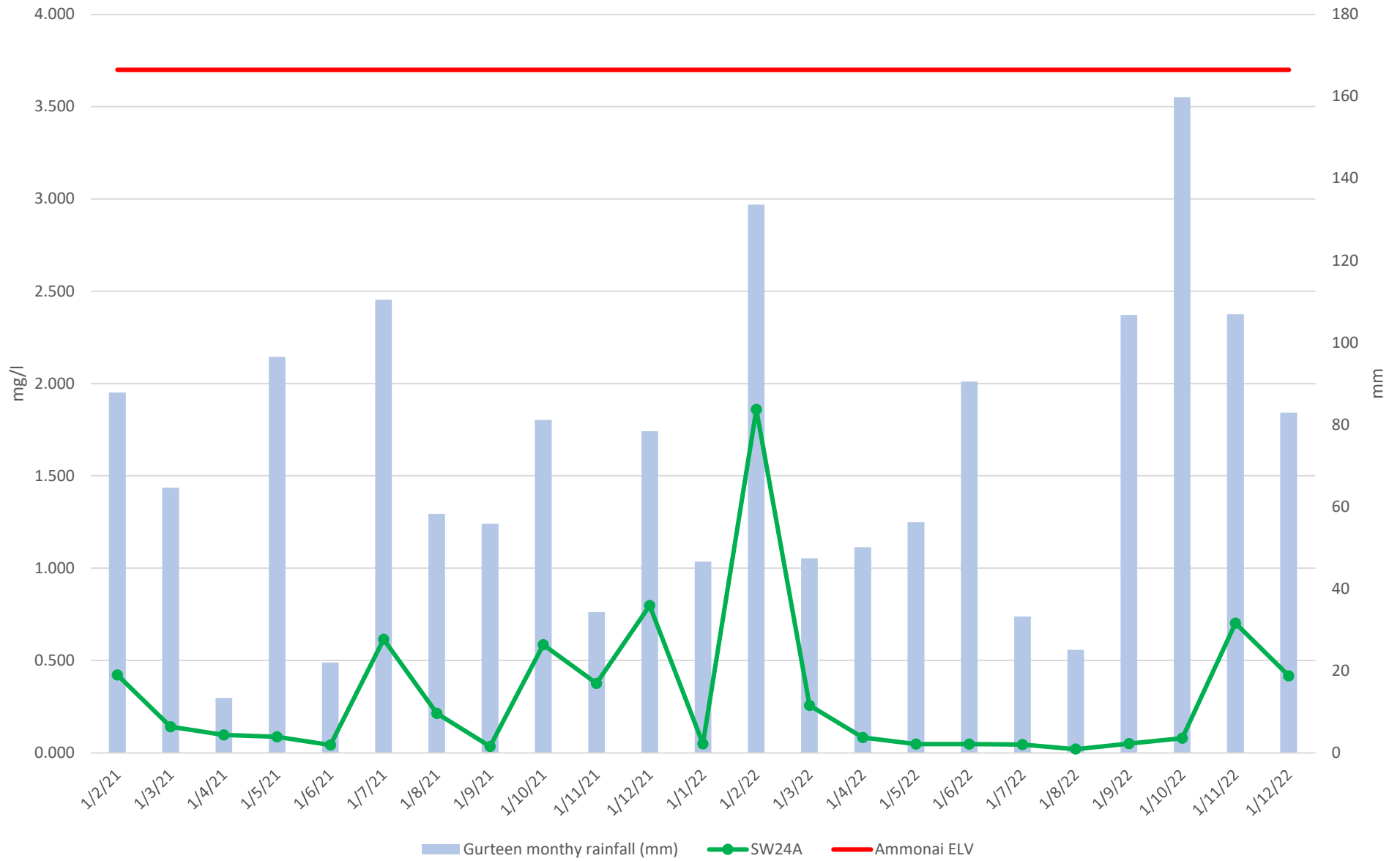


■ Gurteen monthly rainfall (mm) ● SW24A — COD ELV

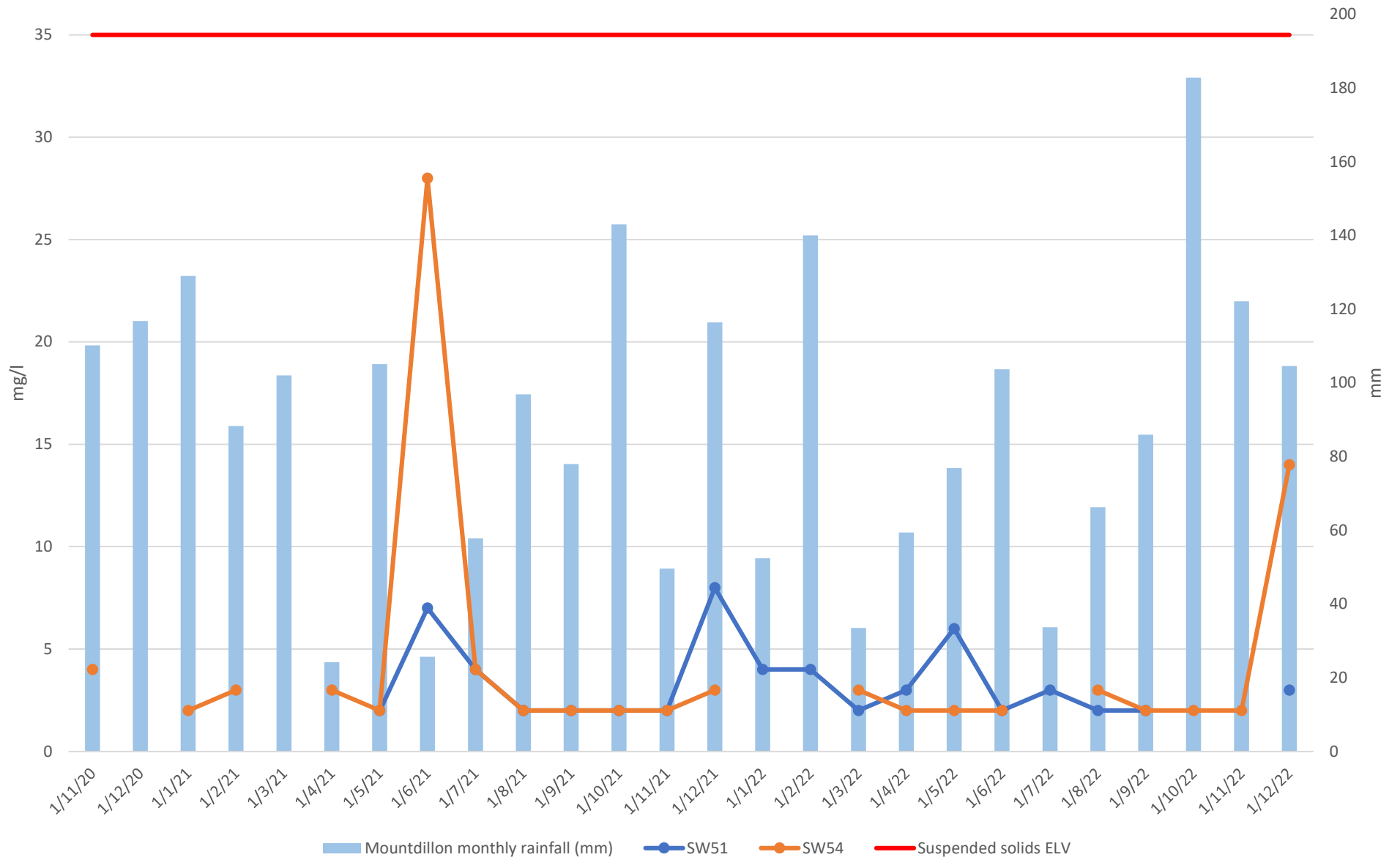
Killaranny pH



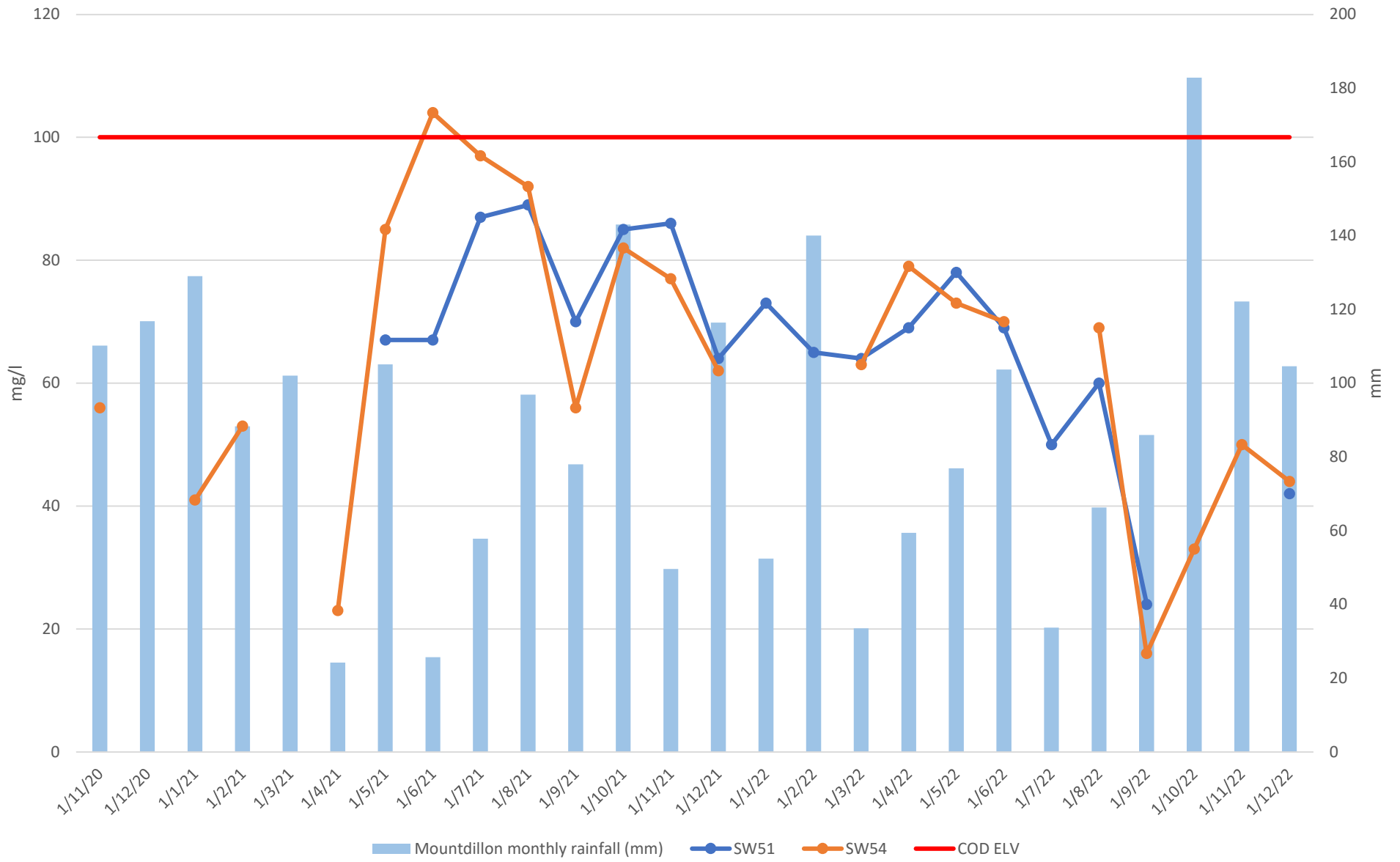
Killaranny Ammonia as N mg/l



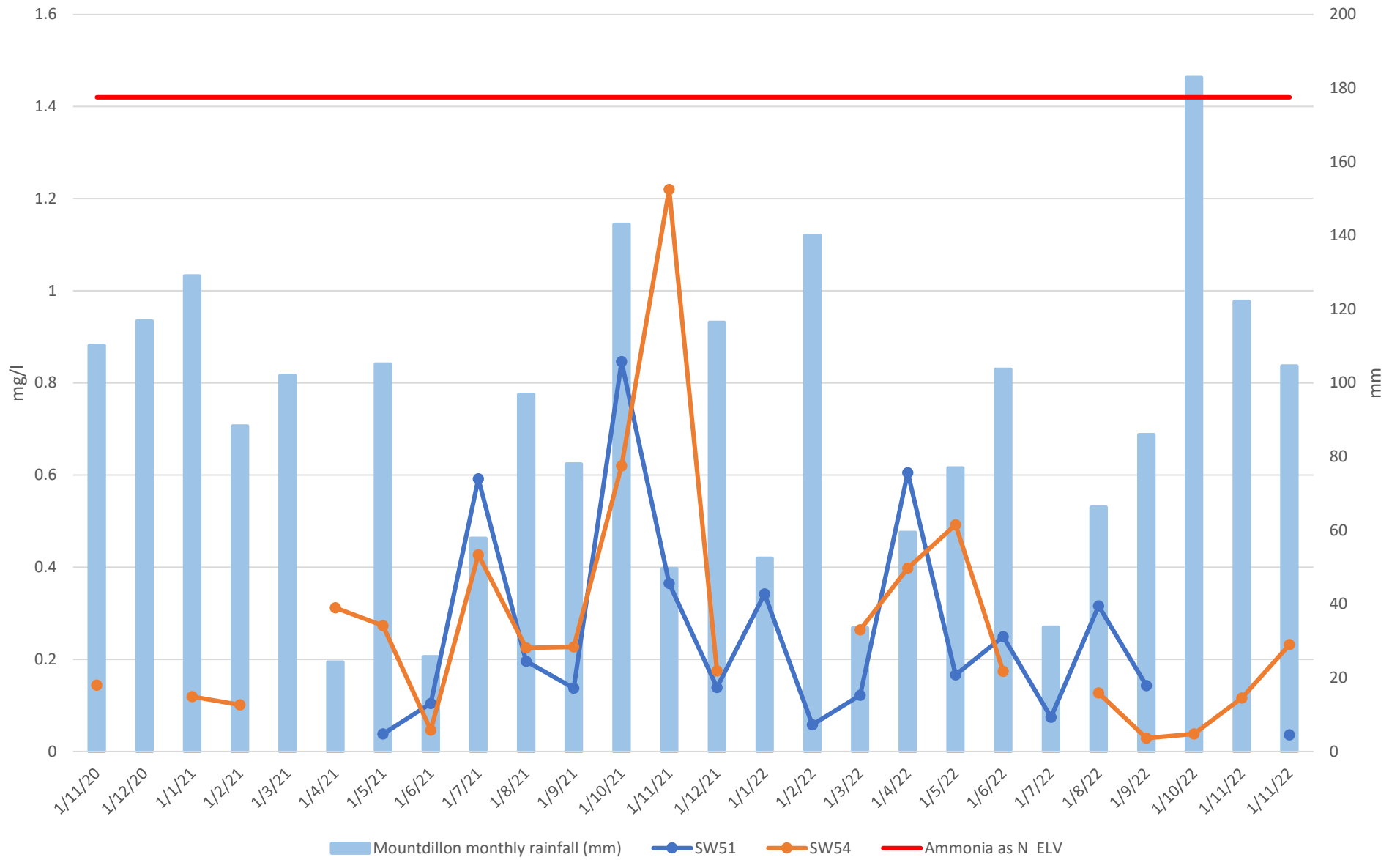
Begnagh Suspended solids mg/l



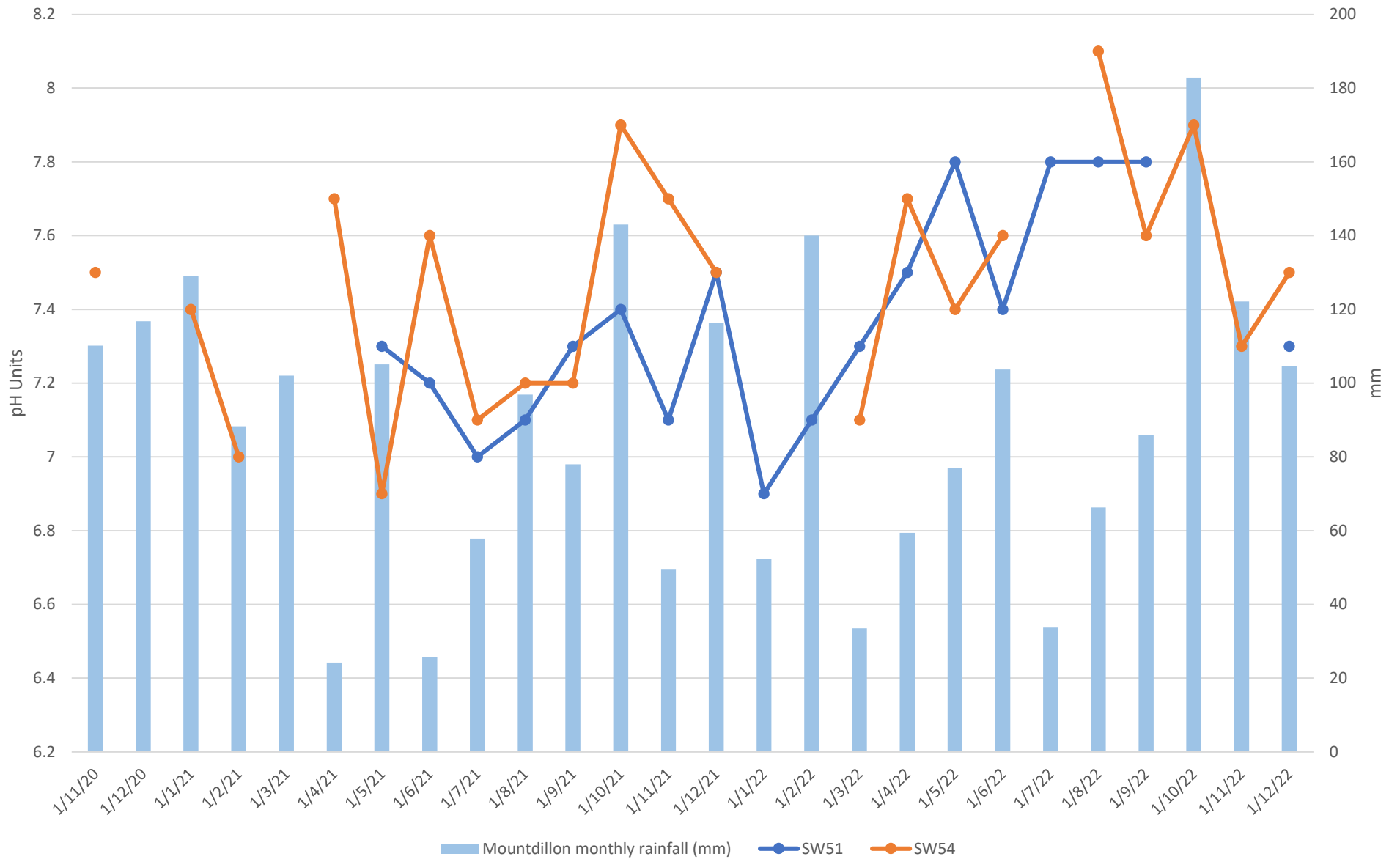
Begnagh COD mg/l



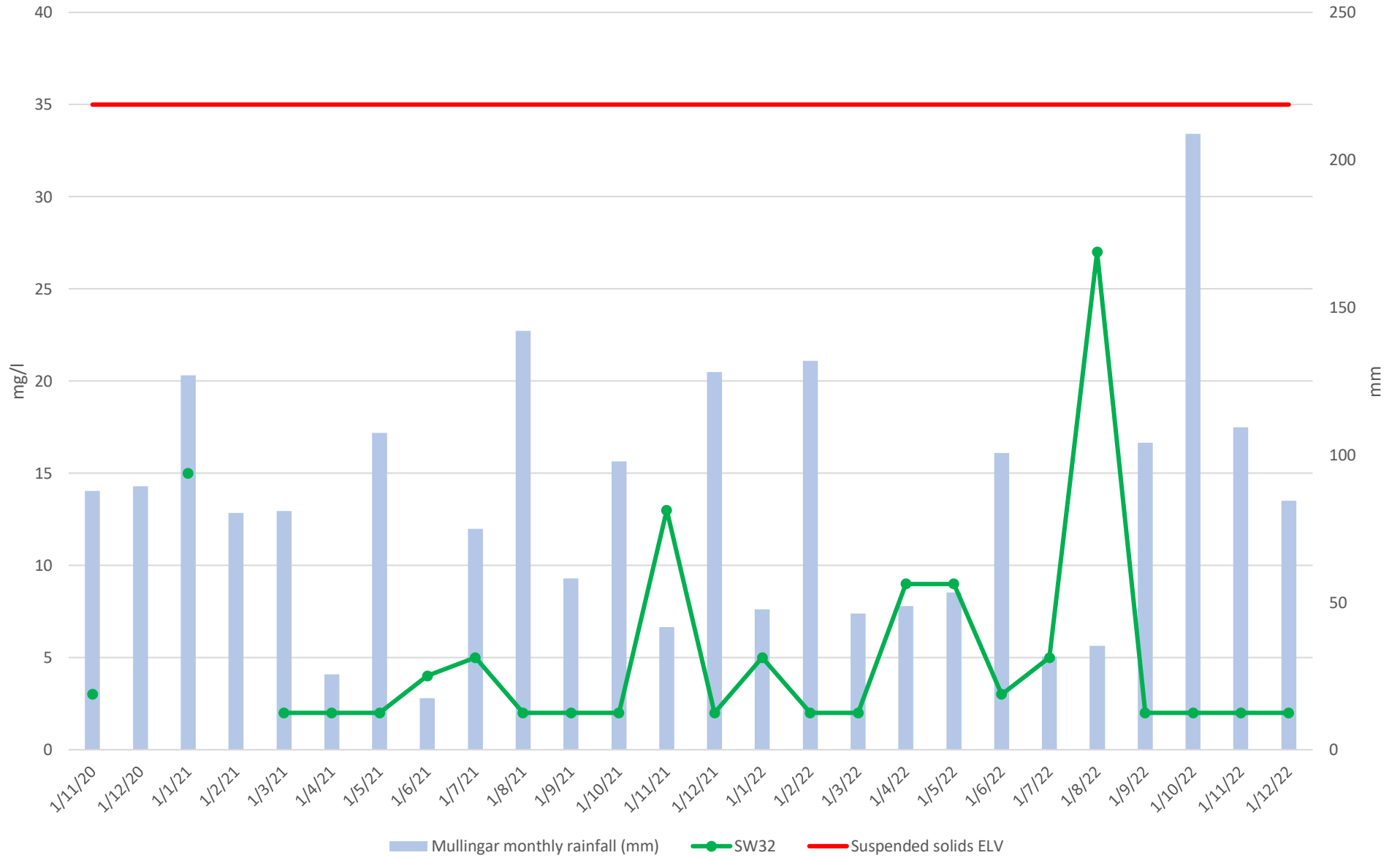
Begnagh Ammonia as N mg/l



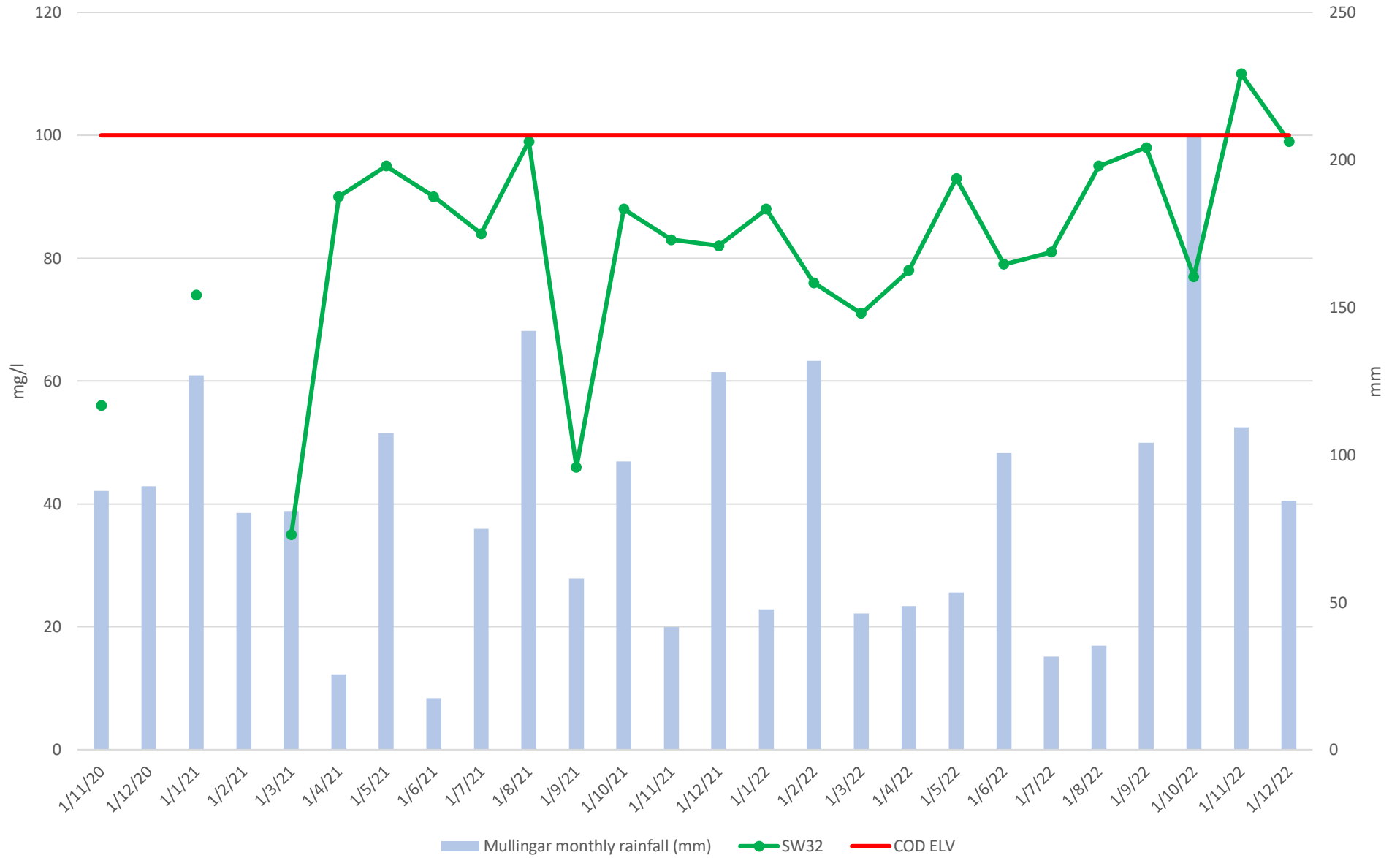
Begnagh pH



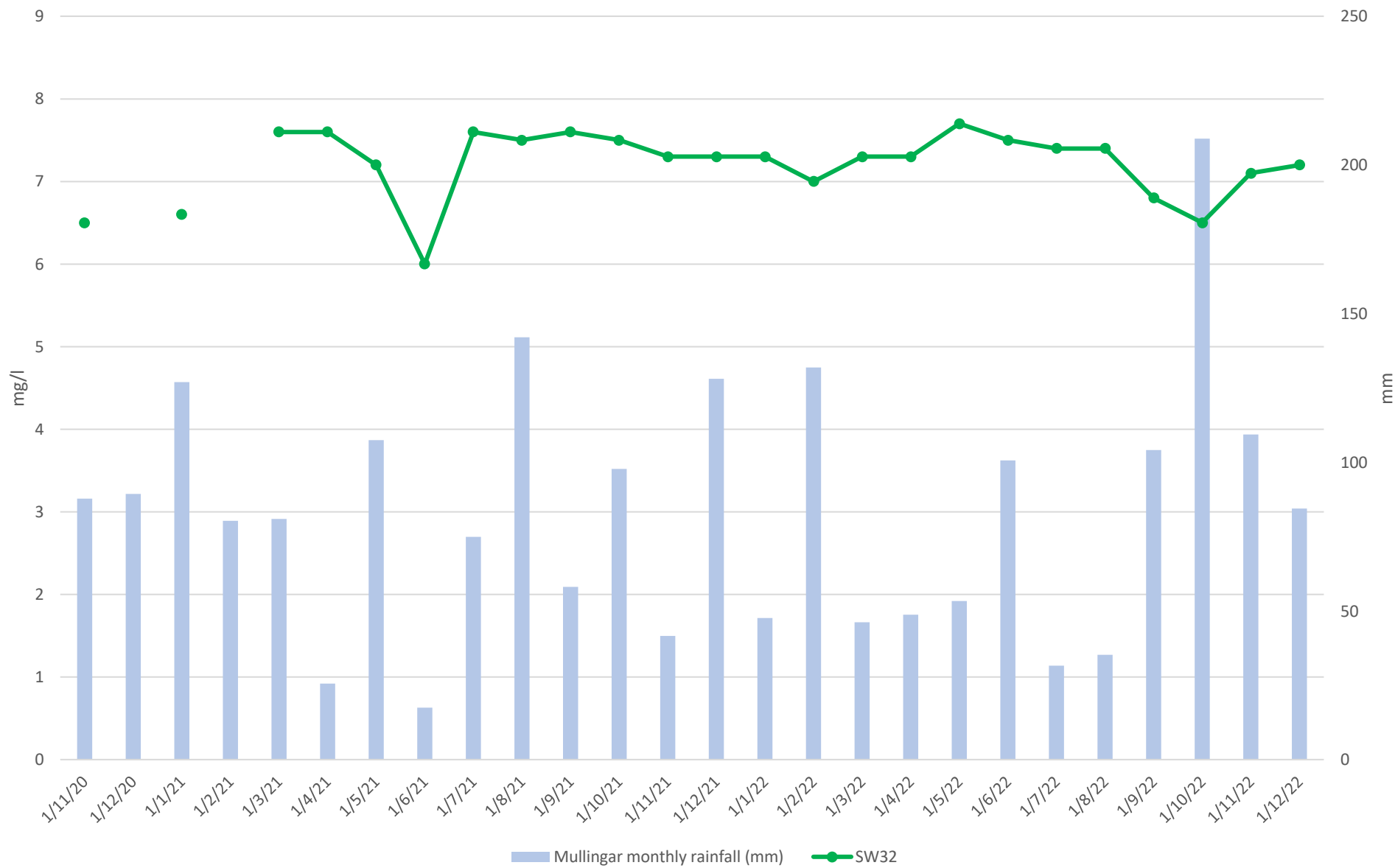
Carranstown Suspended solids mg/l



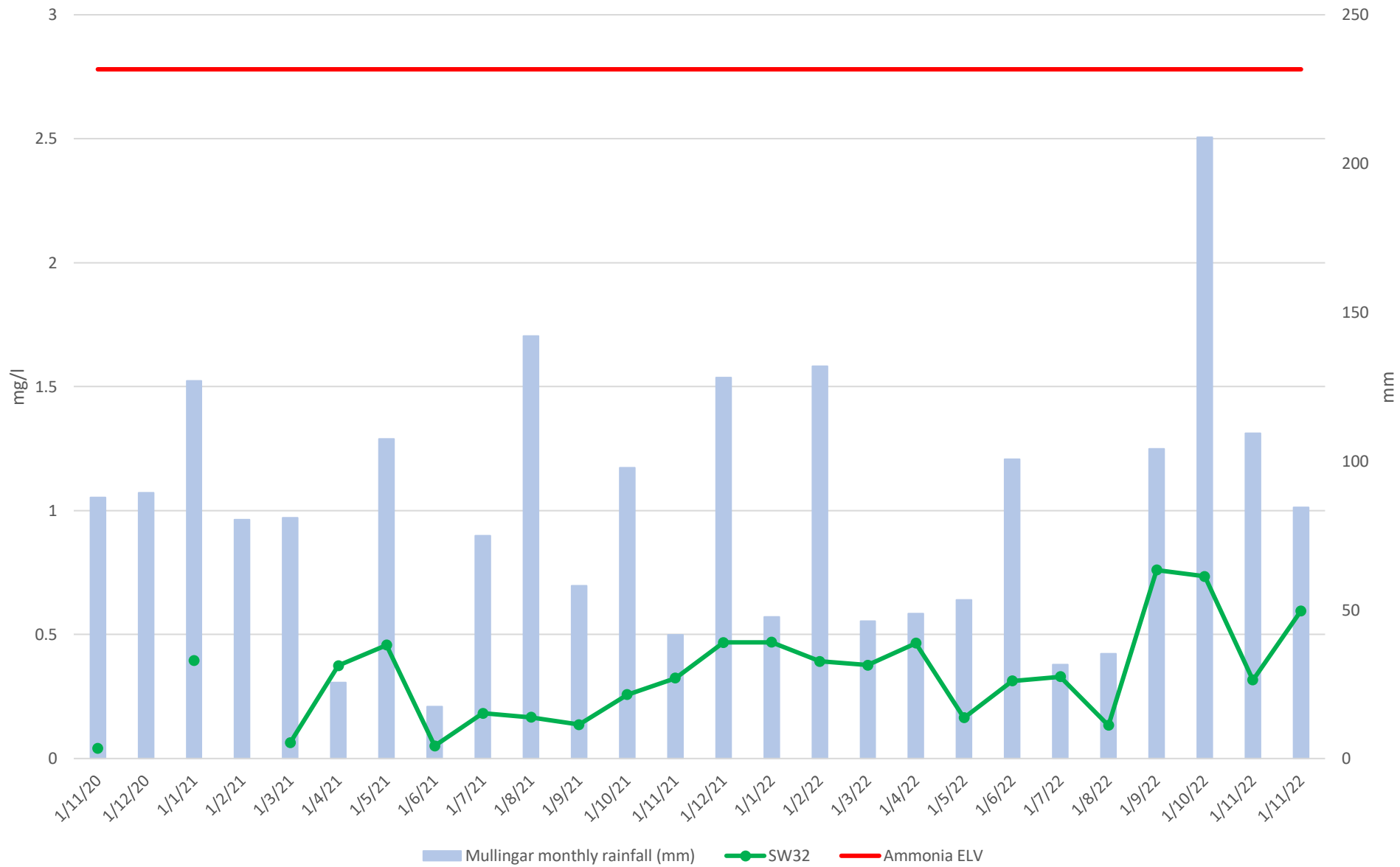
Carranstown COD mg/l



Carranstown pH



Carranstown Ammonia as N mg/l



Derrinboy Bog

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/21	1/12/21	1/1/22	2/2/22	2/3/22	2/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22		
Boora	P0500-01	Derrinboy	SW38	2		5	1		9	16	4	13			3	5	6		
Boora	P0500-01	Derrinboy	SW39	2		8	2		8	13	4	13			2	5	7		
Boora	P0500-01	Derrinboy	SW40	2		5	2	7	7		5	14	9			6	4		
			Gurteen monthly rainfall (mm)	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9		
			Suspended Solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35		

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	
				mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
				1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22		
Boora	P0500-01	Derrinboy	SW38	186	N/S	262	180	N/S	238	209	147	264	N/S		223	355	232		
Boora	P0500-01	Derrinboy	SW39	183	N/S	257	181	N/S	231	194	150	269	N/S		222	355	230		
Boora	P0500-01	Derrinboy	SW40	262	N/S	265	183	253	262		143	273	194			355	239		
			Gurteen monthly rainfall (mm)	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9		

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22		
Boora	P0500-01	Derrinboy	SW38	56		21	16		35	45	32	42			45	50	36		
Boora	P0500-01	Derrinboy	SW39	47		40	32		32	36	34	37			44	51	35		
Boora	P0500-01	Derrinboy	SW40	46		35	20	41	34		33	39	32			49	35		
			Gurteen monthly rainfall (mm)	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9		
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100		

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	
				pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
				1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22		
Boora	P0500-01	Derrinboy	SW38	7.4		7.2	6.9		7.5	7.7	7.7	7.5			7.4	7.1	7.3		
Boora	P0500-01	Derrinboy	SW39	7.4		7.2	6.9		7.5	7.6	7.7	7.5			7.4	7.1	7.2		
Boora	P0500-01	Derrinboy	SW40	7.3		7.2	7	7.2	7.4		7.7	7.5	7.4			7.2	7.1		
			Gurteen monthly rainfall (mm)	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9		

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22		
Boora	P0500-01	Derrinboy	SW38	<0.05	N/S	<0.05	<0.05	N/S	<0.05	0.05	<0.05	0.08	N/S		<0.05	<0.05	<0.05		
Boora	P0500-01	Derrinboy	SW39	<0.05	N/S	0.05	<0.05	N/S	<0.05	<0.05	<0.05	0.07	N/S		<0.05	<0.05	<0.05		
Boora	P0500-01	Derrinboy	SW40	<0.05	N/S	0.07	<0.05	0.06	<0.05		<0.05	0.11	0.09		<0.05	<0.05	<0.05		
			Gurteen monthly rainfall (mm)	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9		

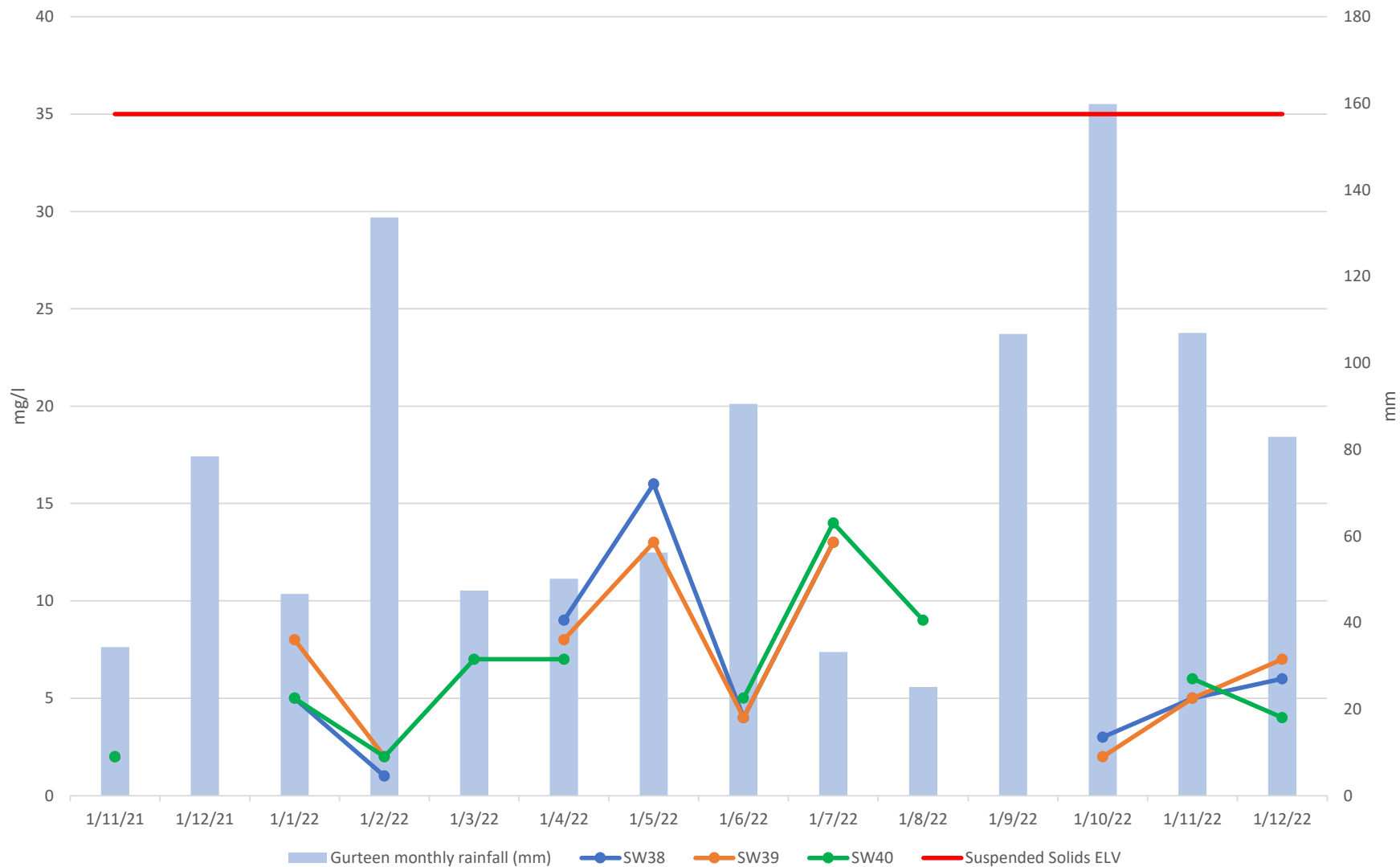
PCAS SW Sampling Scheme				TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Boora	P0500-01	Derrinboy	SW38	N/S	N/S	N/S	68	N/S	363	376	N/S	416	N/S		282	210	269	
Boora	P0500-01	Derrinboy	SW39	N/S	N/S	N/S	78	N/S	343	387	N/S	417	N/S		295	204	253	
Boora	P0500-01	Derrinboy	SW40	N/S	N/S	355	86	354	407		398	426	436			207	300	
			Gurteen monthly rainfall (mm)	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	

PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Boora	P0500-01	Derrinboy	SW38	1.38		2.07	0.531		1.8	1.49	1.86	1.54			2.14	1.76	2.310	
Boora	P0500-01	Derrinboy	SW39	3.49		2.1	0.529		1.75	1.6	1.86	1.54			2.12	1.78	2.250	
Boora	P0500-01	Derrinboy	SW40	1.59		1.93	0.536	2.42	1.91		1.86	1.58	2.08			1.84	2.360	
			Gurteen monthly rainfall (mm)	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	
			Ammonia ELV	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	

PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Boora	P0500-01	Derrinboy	SW38	17.1	N/S	13.2	10.6	N/S	13.5	12.7	12.2	11.5	N/S		16.9	14.7	13	
Boora	P0500-01	Derrinboy	SW39	16.6	N/S	13.2	10.5	N/S	12.9	12.1	11.8	11.3	N/S		18.8	14.9	13.2	
Boora	P0500-01	Derrinboy	SW40	17.1	N/S	12.9	10.6	13.6	13.4		10.7	11.5	10.8			15.3	13.9	
			Gurteen monthly rainfall (mm)	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	

Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

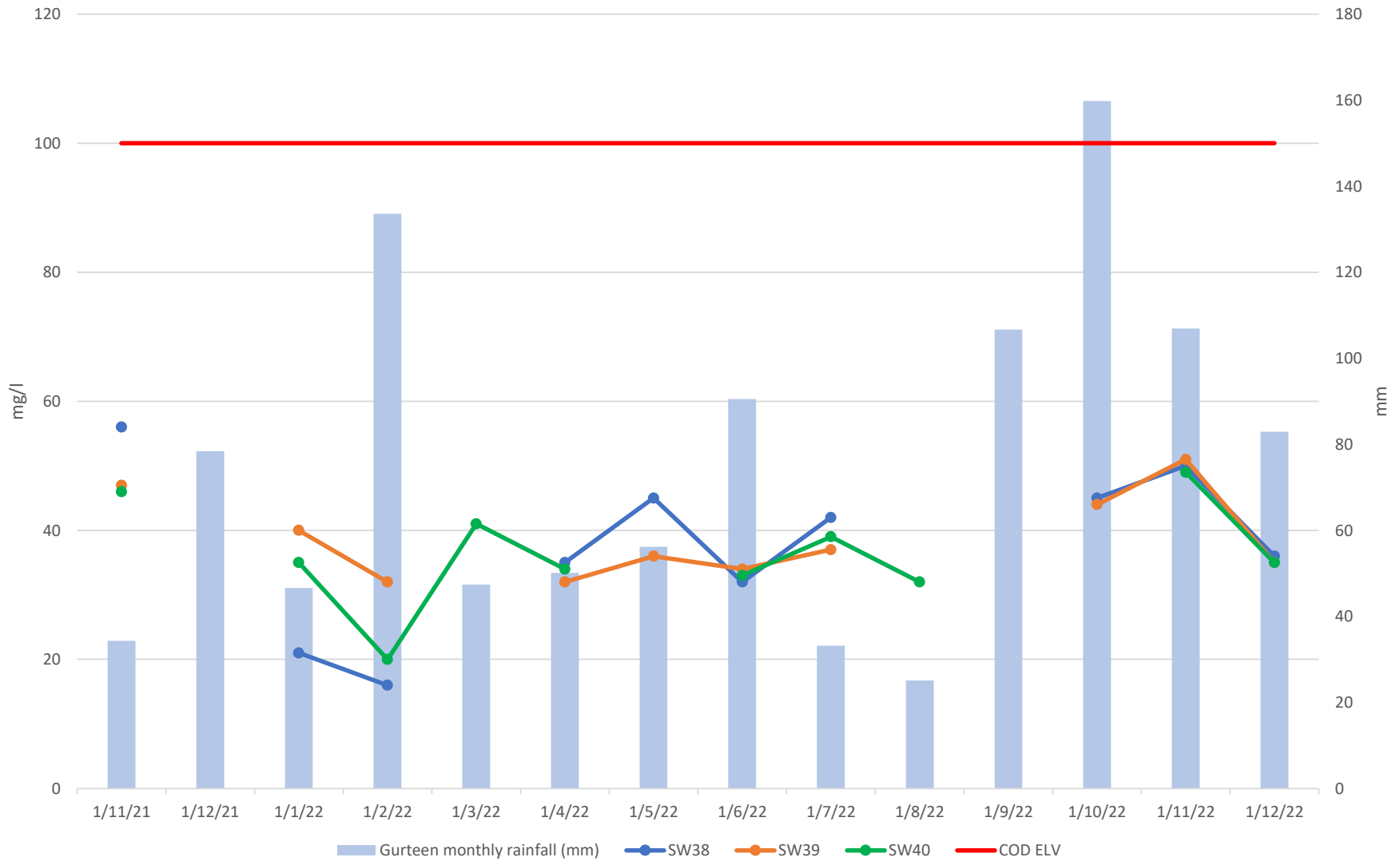
Derrinboy Suspended Solids mg/l



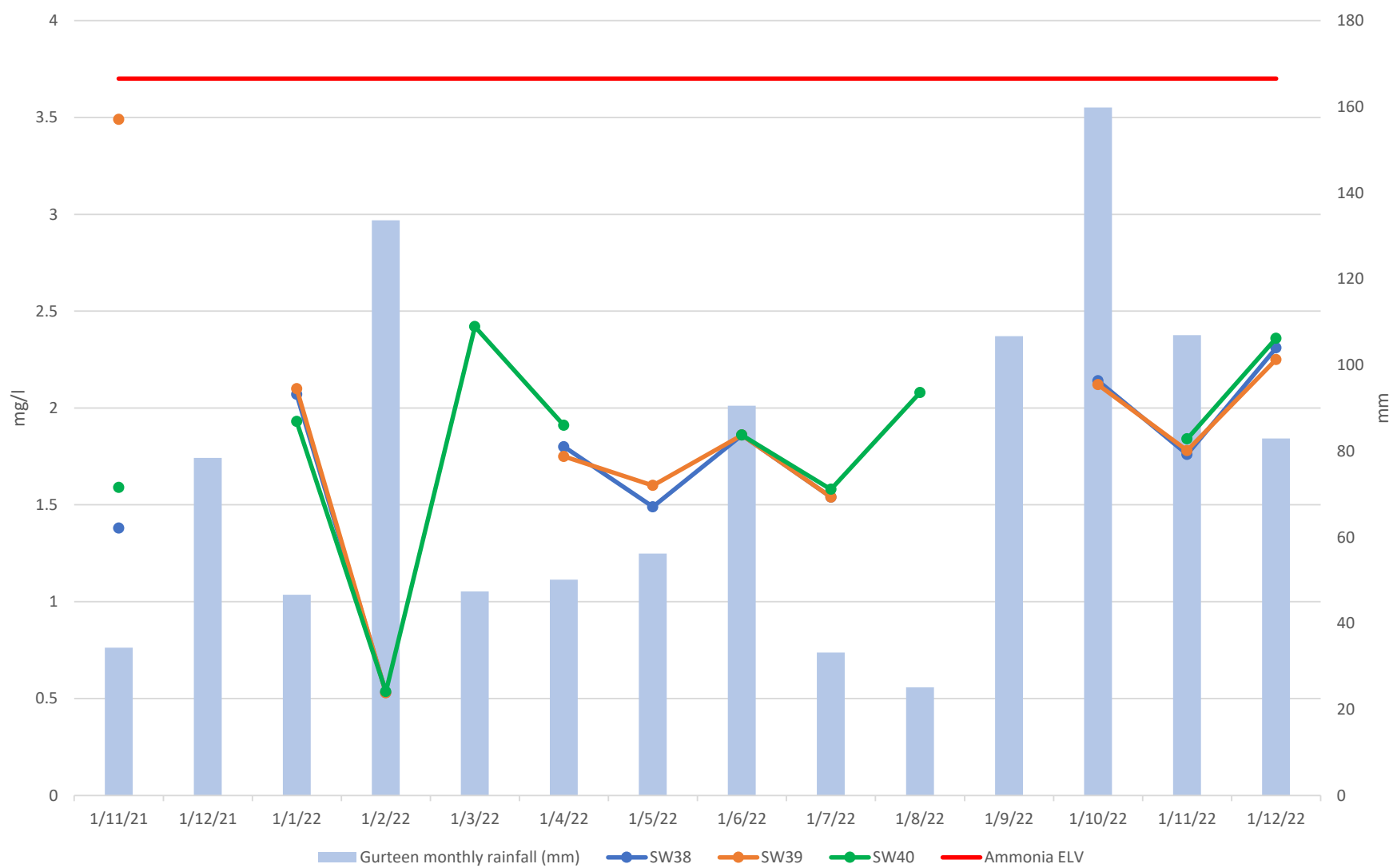
Derrinboy pH



Derrinboy COD mg/l



Derrinboy Ammonia as N mg/l



Prosperous Bog

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Kilberry Group	P0506-01	Prosperous	SW15	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Kilberry Group	P0506-01	Prosperous	SW16	2	2	2	2	2	2	3	4	3	2	4	2	6	5	8	3
			Casement monthly rainfall (mm)	77.2	16.4	76.4	21	99.3	40.1	46.9	59.6	78.3	40.4	18.7	119.2	100.6	51.9	92.2	
			Suspended solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
				mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt
				1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Kilberry Group	P0506-01	Prosperous	SW15	296	241	205	202	194	216	252	249	344	430	406	413	463	301	244	
Kilberry Group	P0506-01	Prosperous	SW16	343	255	217	192	194	219	283	286	306	324	252	186	311	424	378	
			Casement monthly rainfall (mm)	77.2	16.4	76.4	21	99.3	40.1	46.9	59.6	78.3	40.4	18.7	119.2	100.6	51.9	92.2	

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Kilberry Group	P0506-01	Prosperous	SW15	74	68	61	59	54	62	71	84	99	122	124	128	118	75	53	
Kilberry Group	P0506-01	Prosperous	SW16	77	71	61	63	49	55	69	74	79	83	80	103	112	92		
			Casement monthly rainfall (mm)	77.2	16.4	76.4	21	99.3	40.1	46.9	59.6	78.3	40.4	18.7	119.2	100.6	51.9	92.2	
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	
				pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	
				1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Kilberry Group	P0506-01	Prosperous	SW15	7.1	6.7	6.7	6.8	6.5	6.7	7	7	6.8	6.4	7.2	6.9	6.8	5.2	4.8	
Kilberry Group	P0506-01	Prosperous	SW16	7	6.9	6.8	6.6	6.6	6.9	7.3	7.1	7.2	7.4	7.5	7.6	7.3	7	7	
			Casement monthly rainfall (mm)	77.2	16.4	76.4	21	99.3	40.1	46.9	59.6	78.3	40.4	18.7	119.2	100.6	51.9	92.2	

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Kilberry Group	P0506-01	Prosperous	SW15	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.08	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
Kilberry Group	P0506-01	Prosperous	SW16	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.09	0.05	0.05	0.05	0.05	
			Casement monthly rainfall (mm)	77.2	16.4	76.4	21	99.3	40.1	46.9	59.6	78.3	40.4	18.7	119.2	100.6	51.9	92.2	

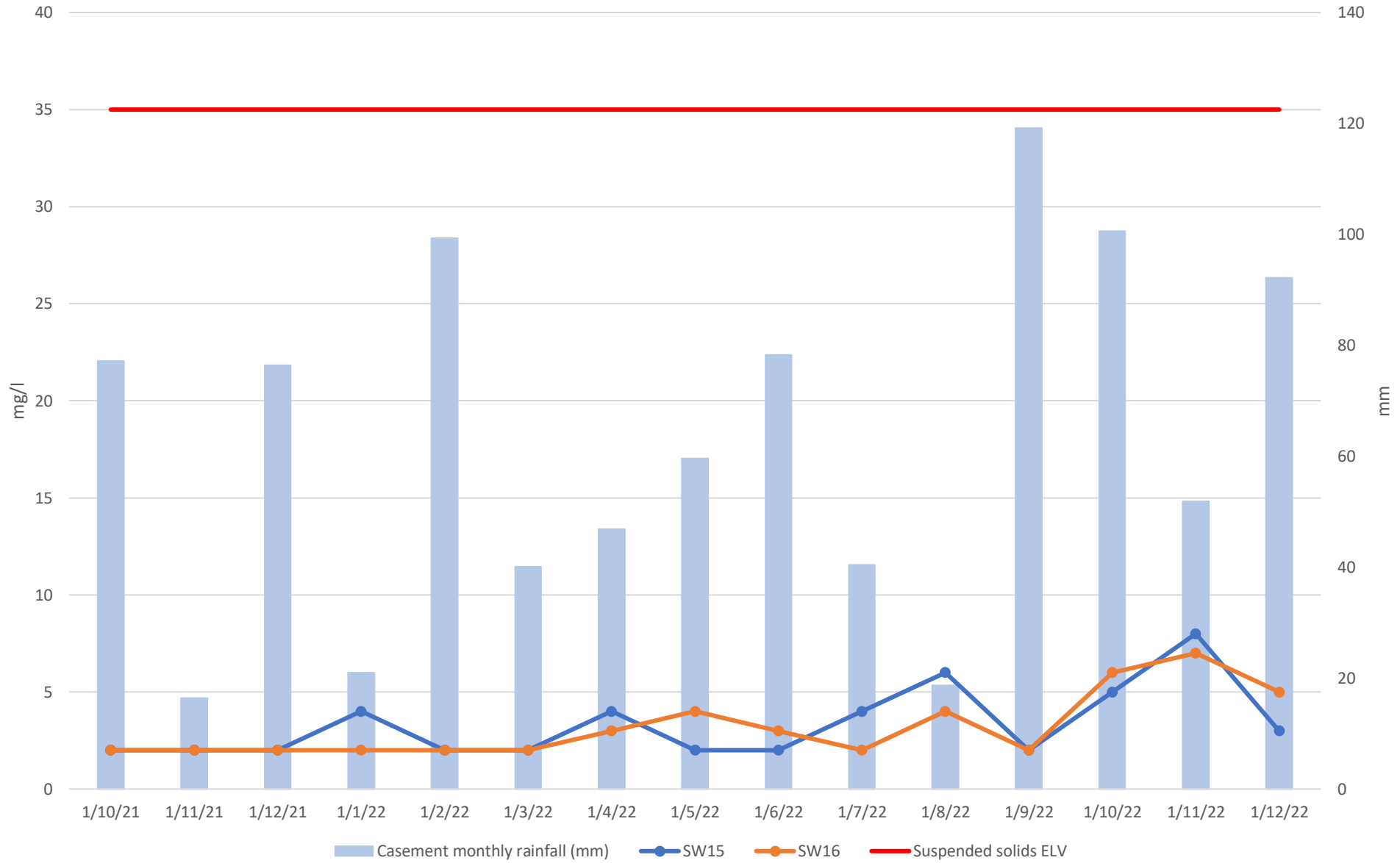
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Kilberry Group	P0506-01	Prosperous	SW15	184	123	94	72	98	132	105	173	166	177	215	218	189	141	60	
Kilberry Group	P0506-01	Prosperous	SW16	157	109	84	75	77	119	178	189	193	248	250	253	262	158	184	
			Casement monthly rainfall (mm)	77.2	16.4	76.4	21	99.3	40.1	46.9	59.6	78.3	40.4	18.7	119.2	100.6	51.9	92.2	

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Kilberry Group	P0506-01	Prosperous	SW15	1.69	1.18	1.51	1.52	0.982	1.36	1.34	1.3	1.47	2.01	2.3	1.14	0.771	1.56	1.44	
Kilberry Group	P0506-01	Prosperous	SW16	1.5	1.05	1.17	1.1	0.703	0.971	1.31	1.15	1.99	2.1	0.925	0.323	0.629	0.649	0.749	
			Casement monthly rainfall (mm)	77.2	16.4	76.4	21	99.3	40.1	46.9	59.6	78.3	40.4	18.7	119.2	100.6	51.9	92.2	
			Ammonia ELV	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53

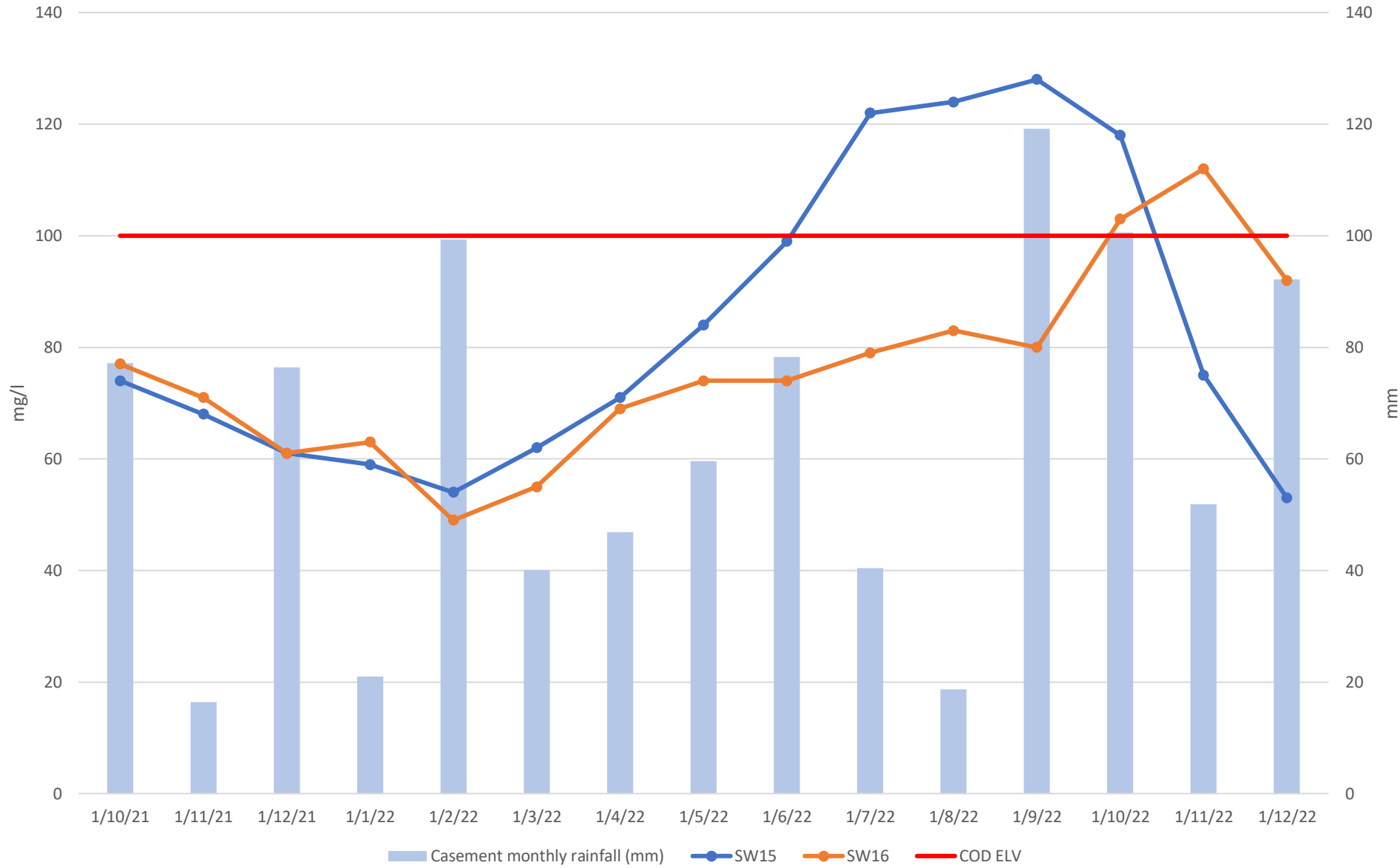
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Kilberry Group	P0506-01	Prosperous	SW15	29.5	23.5	21.6	21.1	19.4	20	25.7	26.5	33.3	40	41.6	46.5	43.1	22.5	20.5	
Kilberry Group	P0506-01	Prosperous	SW16	30.4	24.2	22.3	21.1	18.5	20	24.8	26.2	27.3	30.7	32.6	29.1	37.1	37.9	34.6	
			Casement monthly rainfall (mm)	77.2	16.4	76.4	21	99.3	40.1	46.9	59.6	78.3	40.4	18.7	119.2	100.6	51.9	92.2	

*Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

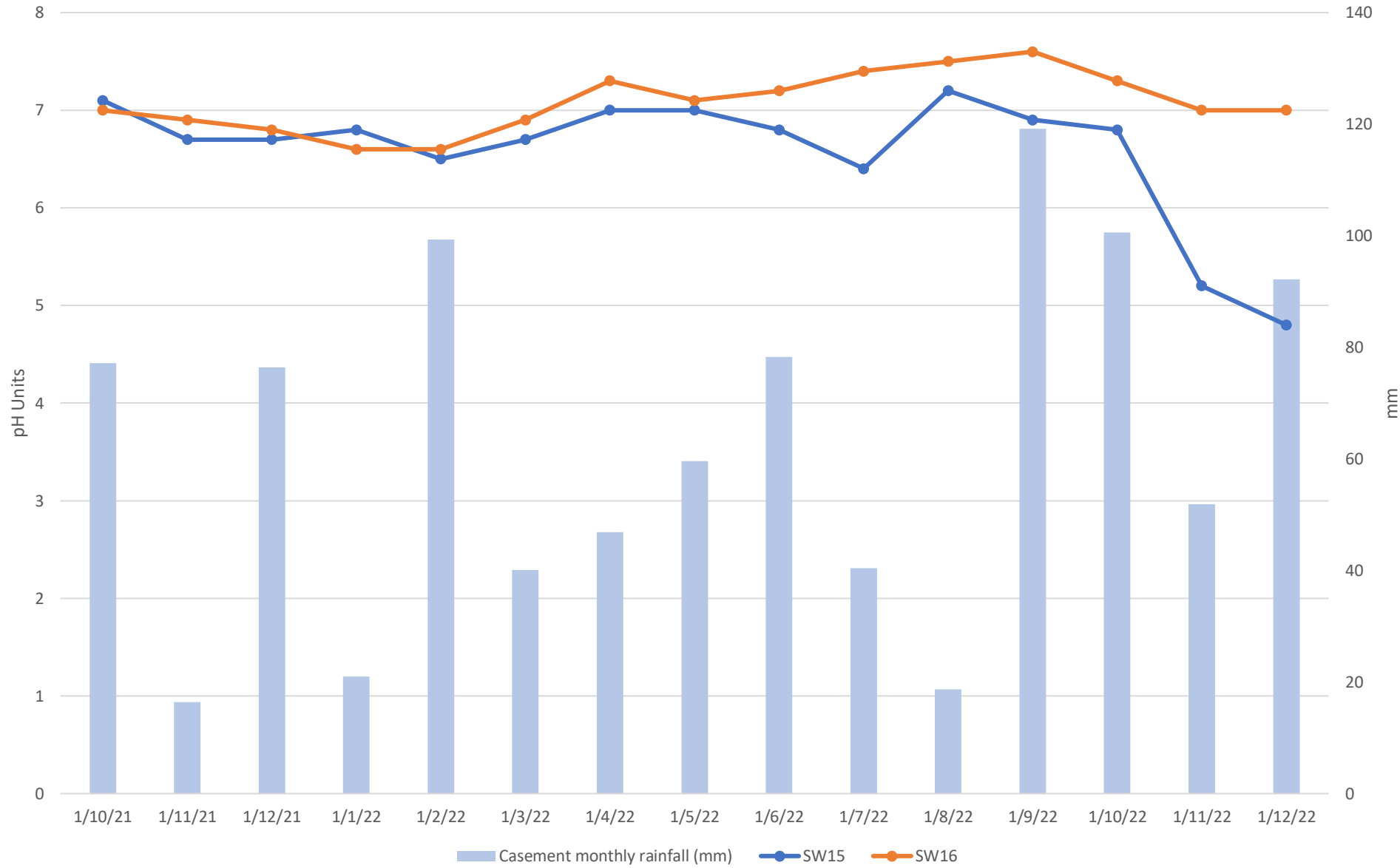
Prosperous Suspended solids mg/l



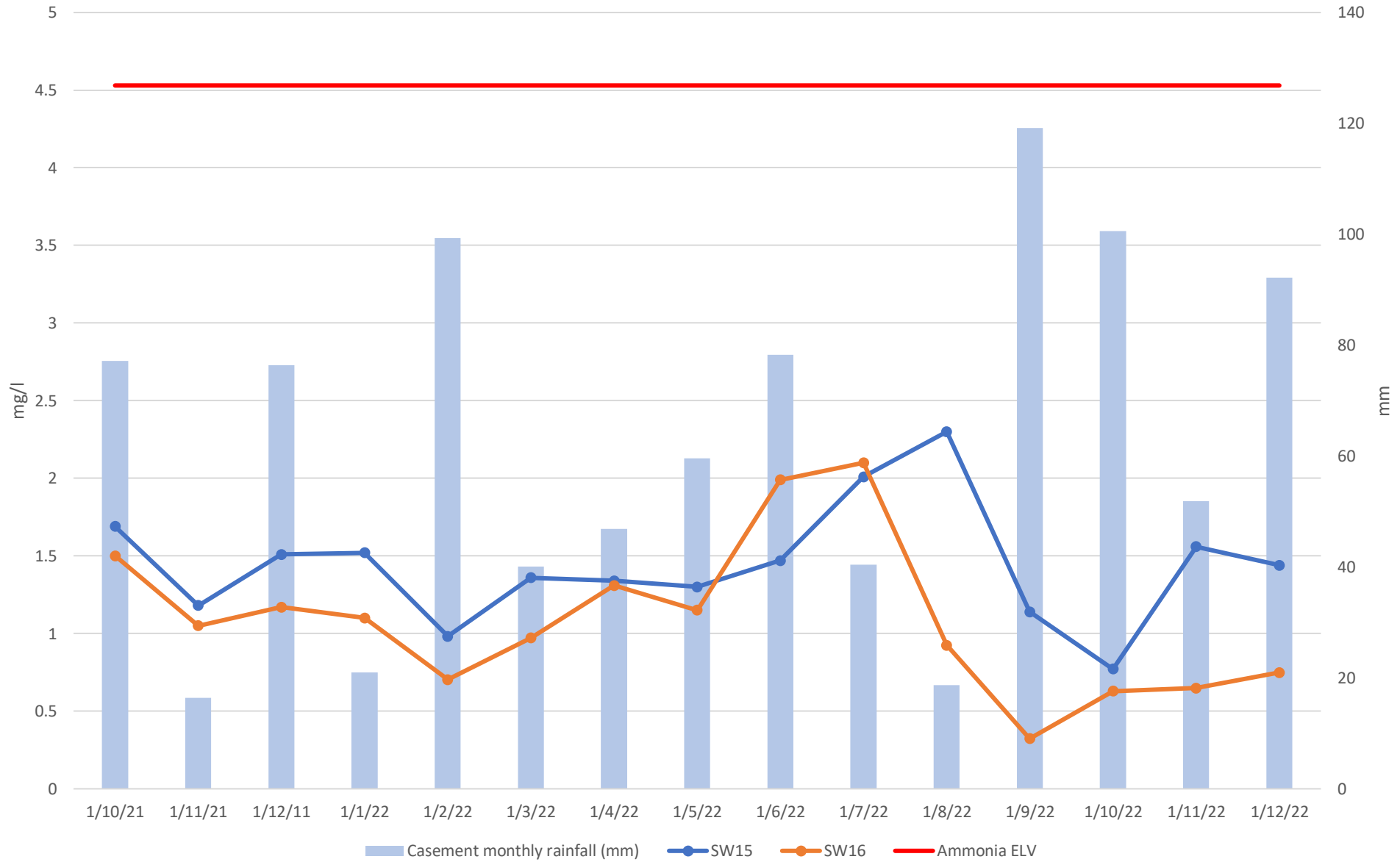
Prosperous COD mg/l



Prosperous pH



Prosperous Ammonia as N mg//l



Lodge Bog

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Suspended Solids																											
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Bog Group				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22		
Allen Group	P0503-01	Lodge	SW60	4	12	8	9	2	2	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
Allen Group	P0503-01	Lodge	SW61	4	13	7	7	2	4	6	2	5	2	6	2	2	2	2	2	2	2	2	7	2	2	3	2	5	4		
			Dunsany monthly rainfall (mm)	73.4	89	104.7	100.4	46	11.8	106.7	12.6	96.1	53.3	37.7	101.7	30.2	114.6	29.5	118.1	38.2	35.3	63.8	64	34.7	14.1	126.4	141.1	81.9	81		
			Suspended solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35		

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Colour																											
				mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	
Allen Group	P0503-01	Lodge	SW60	351	323	409	235	263	194	211	202	138	193	154	226	378	400	269	239	195	170	165	113	176	86.4	211	355	403	288		
Allen Group	P0503-01	Lodge	SW61	361	342	409	231	215	185	222	177	124	190	141	229	366	68.2	271	242	172	147	125	91.6	90.8	67.6	94.3	358	136	130		
			Dunsany monthly rainfall (mm)	73.4	89	104.7	100.4	46	11.8	106.7	12.6	96.1	53.3	37.7	101.7	30.2	114.6	29.5	118.1	38.2	35.3	63.8	64	34.7	14.1	126.4	141.1	81.9	81		

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	COD																											
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Allen Group	P0503-01	Lodge	SW60	101	99	85	33	75	57	62	65	58	57	60	68	83	55	69	73	45	55	49	47	56	48	65	100	87	62		
Allen Group	P0503-01	Lodge	SW61	109	103	89	35	88	59	68	64	55	53	54	70	87	56	69	71	38	49	38	39	41	49	42	107	44	44		
			Dunsany monthly rainfall (mm)	73.4	89	104.7	100.4	46	11.8	106.7	12.6	96.1	53.3	37.7	101.7	30.2	114.6	29.5	118.1	38.2	35.3	63.8	64	34.7	14.1	126.4	141.1	81.9	81		
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	pH																											
				pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	
Allen Group	P0503-01	Lodge	SW60	7.5	7.4	7.7	7.6	7.5	8.2	7.9	8.3	8.1	8.1	8.1	8.2	7.8	7.6	7.7	7.5	7.6	7.5	8	8.1	8.1	8.1	7.9	6.8	7.2	7.5		
Allen Group	P0503-01	Lodge	SW61	7.5	7.4	7.1	7.6	7.8	8	8.2	8.2	8	8.2	7.8	7.6	7.6	7.5	7.6	8.1	8.1	8.2	8.5	8.3	8.3	8.4	6.8	8.3	8.1	8.1		
			Dunsany monthly rainfall (mm)	73.4	89	104.7	100.4	46	11.8	106.7	12.6	96.1	53.3	37.7	101.7	30.2	114.6	29.5	118.1	38.2	35.3	63.8	64	34.7	14.1	126.4	141.1	81.9	81		

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TP as P																											
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Allen Group	P0503-01	Lodge	SW60	0.09	0.11	0.09	0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.08	0.05	0.05		
Allen Group	P0503-01	Lodge	SW61	0.12	0.1	0.08	0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.11	0.05	0.05	0.05	0.05	0.06	0.05	0.08	0.05	0.05		
			Dunsany monthly rainfall (mm)	73.4	89	104.7	100.4	46	11.8	106.7	12.6	96.1	53.3	37.7	101.7	30.2	114.6	29.5	118.1	38.2	35.3	63.8	64	34.7	14.1	126.4	141.1	81.9	81		

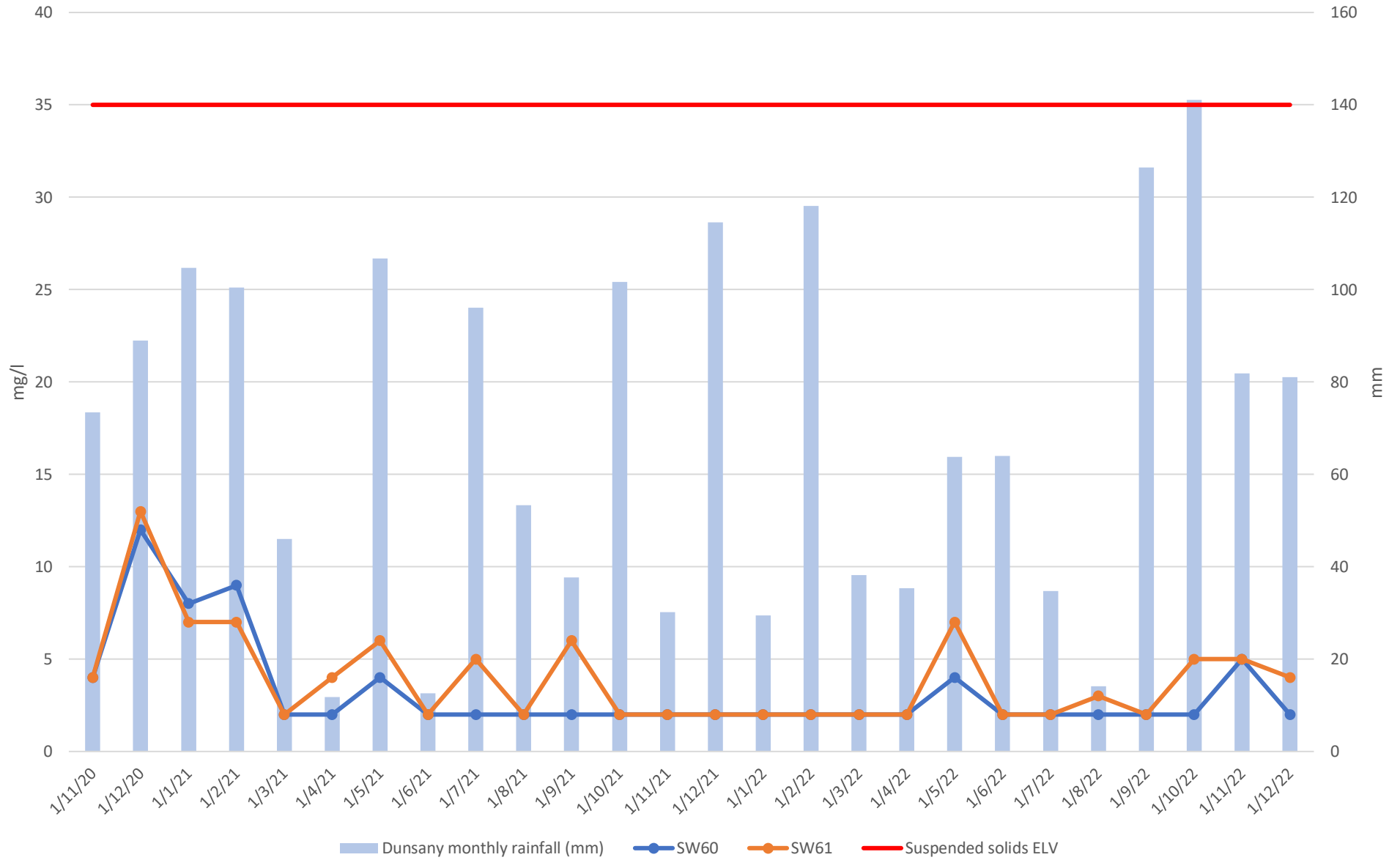
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TS																											
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Allen Group	P0503-01	Lodge	SW60	285	282	207	213	178	333	246	371	369	294	317	270	242	228	159	167	177	303	294	399	327	435	206	248	198	158		
Allen Group	P0503-01	Lodge	SW61	324	328	198	79	257	316	262	383	392	324	405	276	268	176	171	176	163	189	192	286	398	285	282	334	286	127		
			Dunsany monthly rainfall (mm)	73.4	89	104.7	100.4	46	11.8	106.7	12.6	96.1	53.3	37.7	101.7	30.2	114.6	29.5	118.1	38.2	35.3	63.8	64	34.7	14.1	126.4	141.1	81.9	81		

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Ammonia as N																											
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Allen Group	P0503-01	Lodge	SW60	0.205	0.462	0.332	0.38	0.027	0.664	0.483	0.186	0.343	0.21	0.201	0.295	0.349	0.445	0.289	0.319	0.33	0.528	0.387	0.419	0.307	0.136	0.259	0.147	0.329	0.471		
Allen Group	P0503-01	Lodge	SW61	0.205	0.464	0.327	0.192	0.027	0.561	0.515	0.467	0.469	0.367	0.291	0.331	0.341	0.45	0.292	0.315	0.055	0.019	0.218	0.011	0.005	0.06	0.015	0.047	0.005	0.006		
			Dunsany monthly rainfall (mm)	73.4	89	104.7	100.4	46	11.8	106.7	12.6	96.1	53.3	37.7	101.7	30.2	114.6	29.5	118.1	38.2	35.3	63.8	64	34.7	14.1	126.4	141.1	81.9	81		
			Ammonia ELV	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		

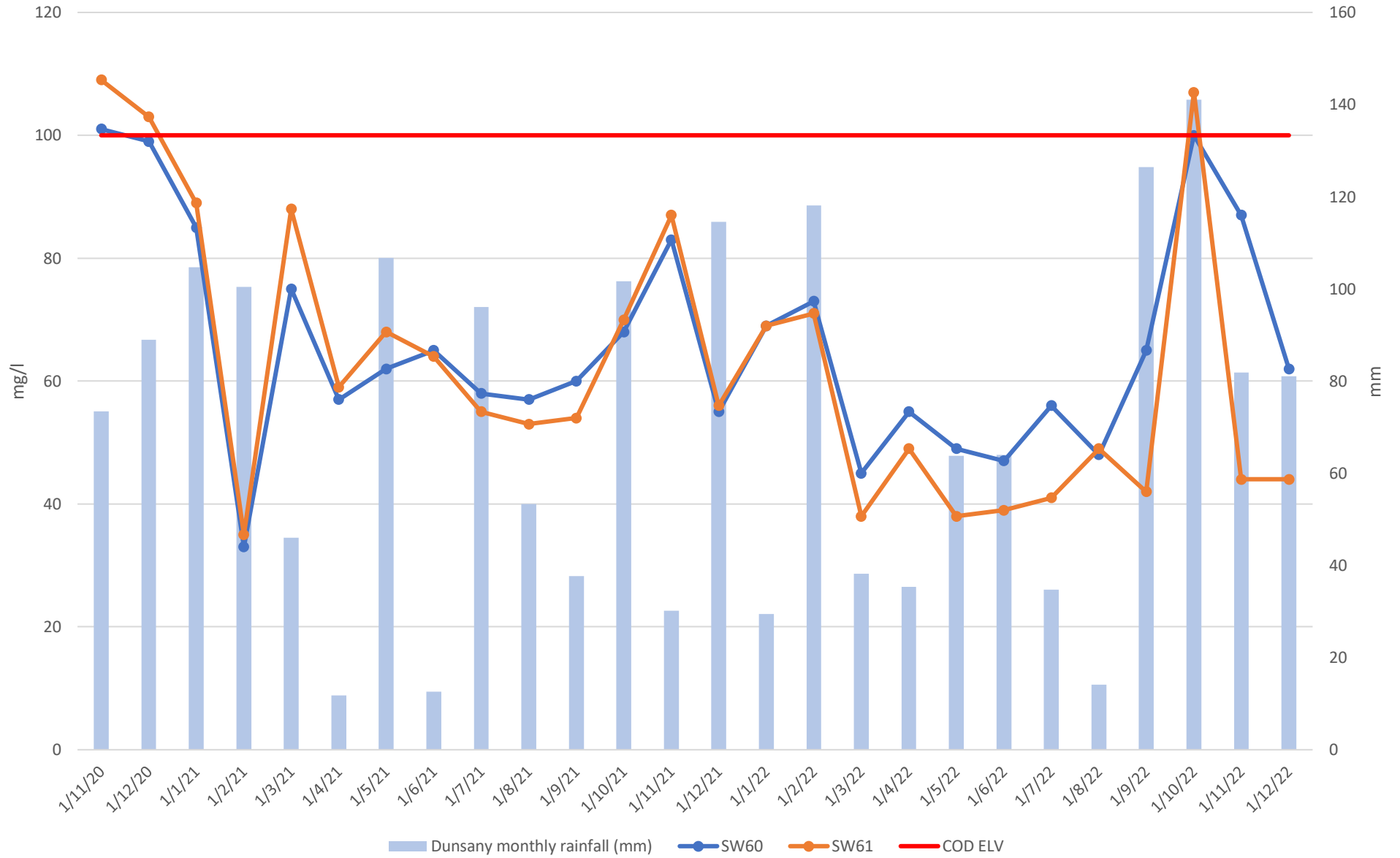
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	DOC																											
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Allen Group	P0503-01	Lodge	SW60	42.2	38.2	30.2	21.8	27.6	17.8	22.2	20.9	20.1	62.5	72.3	26.1	29.7	14	25.9	20.8	18.9	20.7	20	19	21.2	18.9	25.1	40.4	27.5	24.1		
Allen Group	P0503-01	Lodge	SW61	42.2	37.9	30.8	21.6	33.1	17.9	22.2	20.1	18.9	65.8	75.7	26	31.2	21.6	26.2	20.8	15.5	15.5	15	15.4	15	16.7	16.1	40.9	16.7	17.8		
			Dunsany monthly rainfall (mm)	73.4	89	104.7	100.4	46	11.8	106.7	12.6	96.1	53.3	37.7	101.7	30.2	114.6	29.5	118.1	38.2	35.3	63.8	64	34.7	14.1	126.4	141.1	81.9	81		

Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

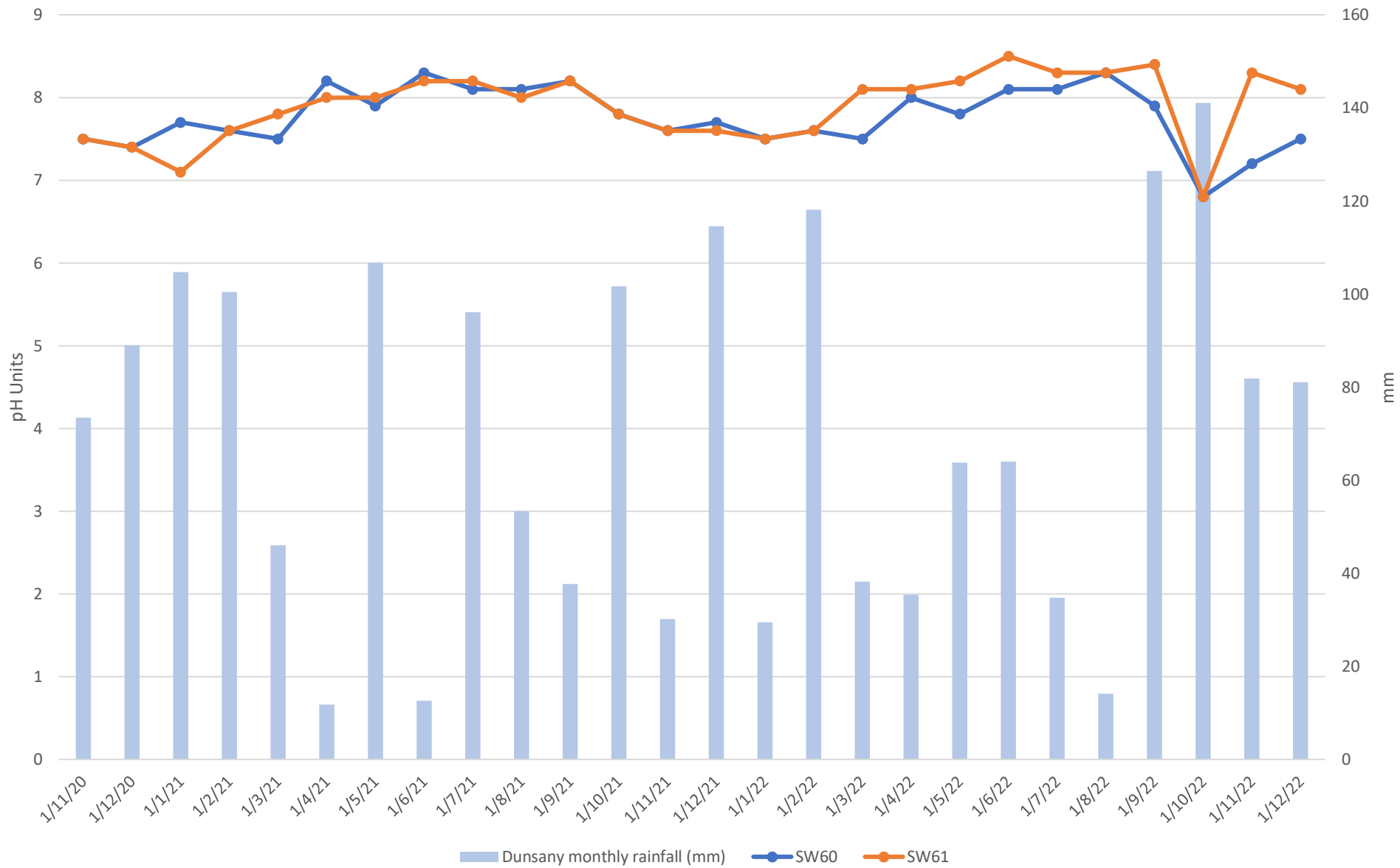
Lodg Suspended Solids mg/l



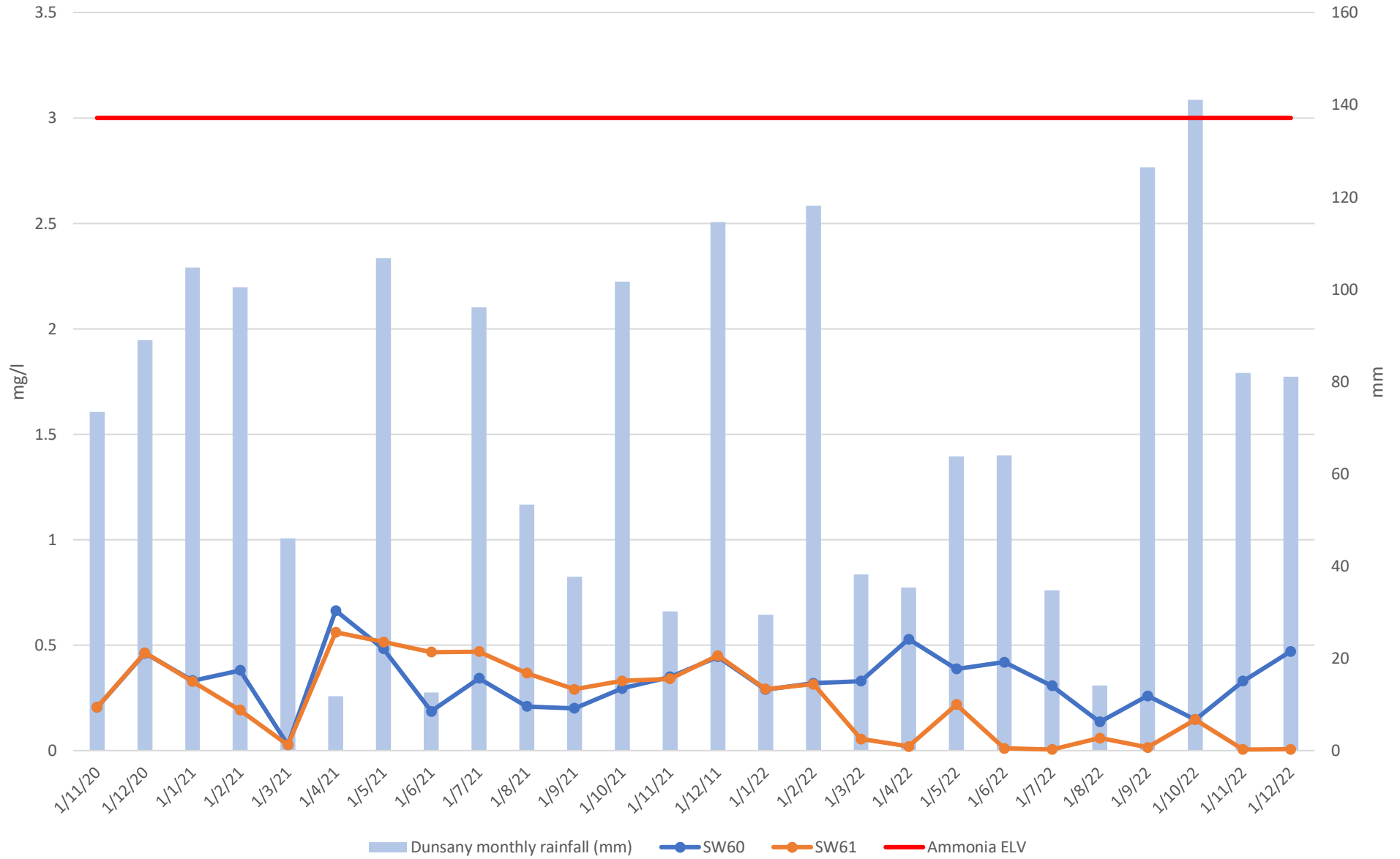
Lodge COD mg/l



Lodge pH



Lodge Ammonia as N mg/l



Derraghan Bog

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Derraghan	SW88A (Derrycolumb)	2	2	2	9	6	2	2	2	2	2	2	6	2	2	2	2	2	2	2	2
Mountdillon	P0504-01	Derraghan	SW84 (Derryshannoge)	5	2	2	5	8	2	2	2	2	2	3	2	3	2	2	2	3	2	2	5
			Mountdillon monthly rainfall (mm)	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6
			Suspended solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35

PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt	mg/l Pt
				1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Derraghan	SW88A (Derrycolumb)	154	166	107	211	120	162	115	176	NF	264	182	87.2	100	106	173	106	172	240	299	172
Mountdillon	P0504-01	Derraghan	SW84 (Derryshannoge)	339	301	424	297	350	376	391	296	233	175	263	237	182	256	228	329	312	266	261	112
			Mountdillon monthly rainfall (mm)	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

PCAS SW Sampling Scheme				COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Derraghan	SW88A (Derrycolumb)	51	52	35	69	48	60	44	72		66	48	33	39	21	63	49	44	80	84	52
Mountdillon	P0504-01	Derraghan	SW84 (Derryshannoge)	75	77	85	72	102	101	92	83	61	59	53	60	64	63	66	86	57	66	50	43
			Mountdillon monthly rainfall (mm)	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

PCAS SW Sampling Scheme				pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
Bog Group	Licence No	Bog Name	SW Code -GIS	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
				1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Derraghan	SW88A (Derrycolumb)	7.9	8.1	7.9	7.8	7.9	7.8	8.1	8	1/1/22	6.4	8	7.8	7.9	8	7.9	7.9	7.9	7.5	7.4	7.7
Mountdillon	P0504-01	Derraghan	SW84 (Derryshannoge)	7.4	7.6	7	7.6	7.4	7.1	6.7	7.4	7.2	7.4	7.3	7.6	7.5	7.5	7.2	7.5	7.7	7.3	7.3	7.8
			Mountdillon monthly rainfall (mm)	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/22	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Derraghan	SW88A (Derrycolumb)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	NF	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05
Mountdillon	P0504-01	Derraghan	SW84 (Derryshannoge)	0.12	0.15	0.12	0.17	0.32	0.08	0.08	0.08	0.15	0.06	0.06	0.05	0.09	0.1	0.11	0.17	0.05	0.05	0.05	0.05
			Mountdillon monthly rainfall (mm)	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

PCAS SW Sampling Scheme				TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/11/22
Mountdillon	P0504-01	Derraghan	SW88A (Derrycolumb)	231	355	293	356	326	202	163	239	NF	132	240	319	326	332	289	323	698	442	374	429
Mountdillon	P0504-01	Derraghan	SW84 (Derryshannoge)	185	287	157	239	243	212	136	201	161	181	231	223	230	267	237	232	284	310	181	498
			Mountdillon monthly rainfall (mm)	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

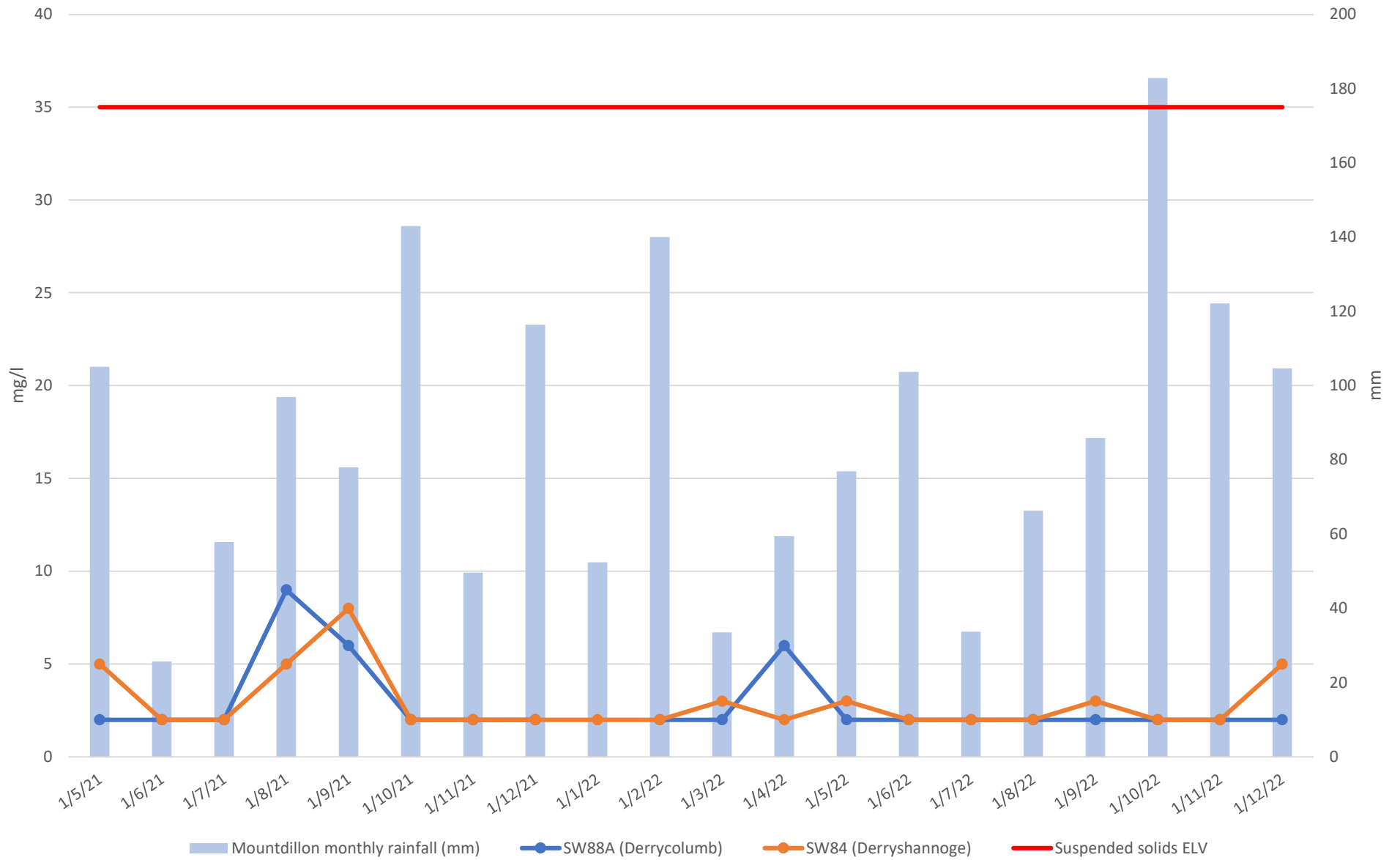
PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/11/22
Mountdillon	P0504-01	Derraghan	SW88A (Derrycolumb)	0.092	0.169	0.15	0.293	0.082	0.118	0.016	0.092		0.517	0.026	0.442	0.101	0.106	0.065	0.058	0.034	0.088	0.079	0.106
Mountdillon	P0504-01	Derraghan	SW84 (Derryshannoge)	0.07	0.092	0.101	0.078	0.351	0.03	0.063	0.061	0.085	0.143	0.059	0.063	0.032	0.087	0.134	0.093	0.117	0.142	0.109	0.179
			Mountdillon monthly rainfall (mm)	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6
			Ammonia ELV	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42

PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Mountdillon	P0504-01	Derraghan	SW88A (Derrycolumb)	21.6	13.3	18.5	33.9	20.3	22.8	16.9	23.9	NF	24.7	20	14.9	17.8	18.6	26	19.6	21.2	30.3	30.9	21.1
Mountdillon	P0504-01	Derraghan	SW84 (Derryshannoge)	27.9	28.4	27.2	27.6	53.7	34.7	36.5	28.9	20.7	20.4	25.4	26.1	24	25	24.6	29.2	27.7	25.2	18.7	14.5
			Mountdillon monthly rainfall (mm)	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6

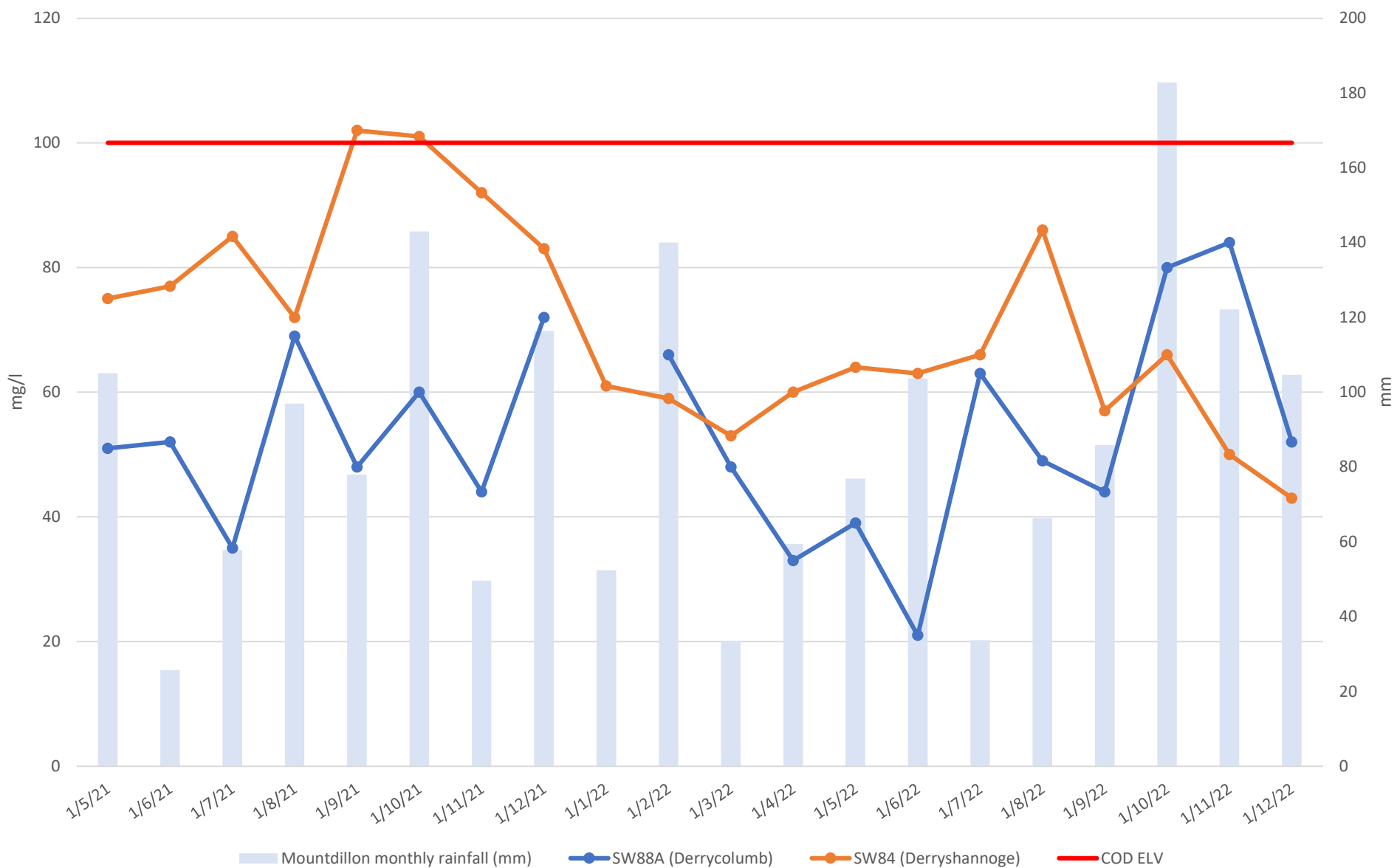
*Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

*Derraghan bog has two silt pond that discharge via Derrycolumb and Derryshannoge

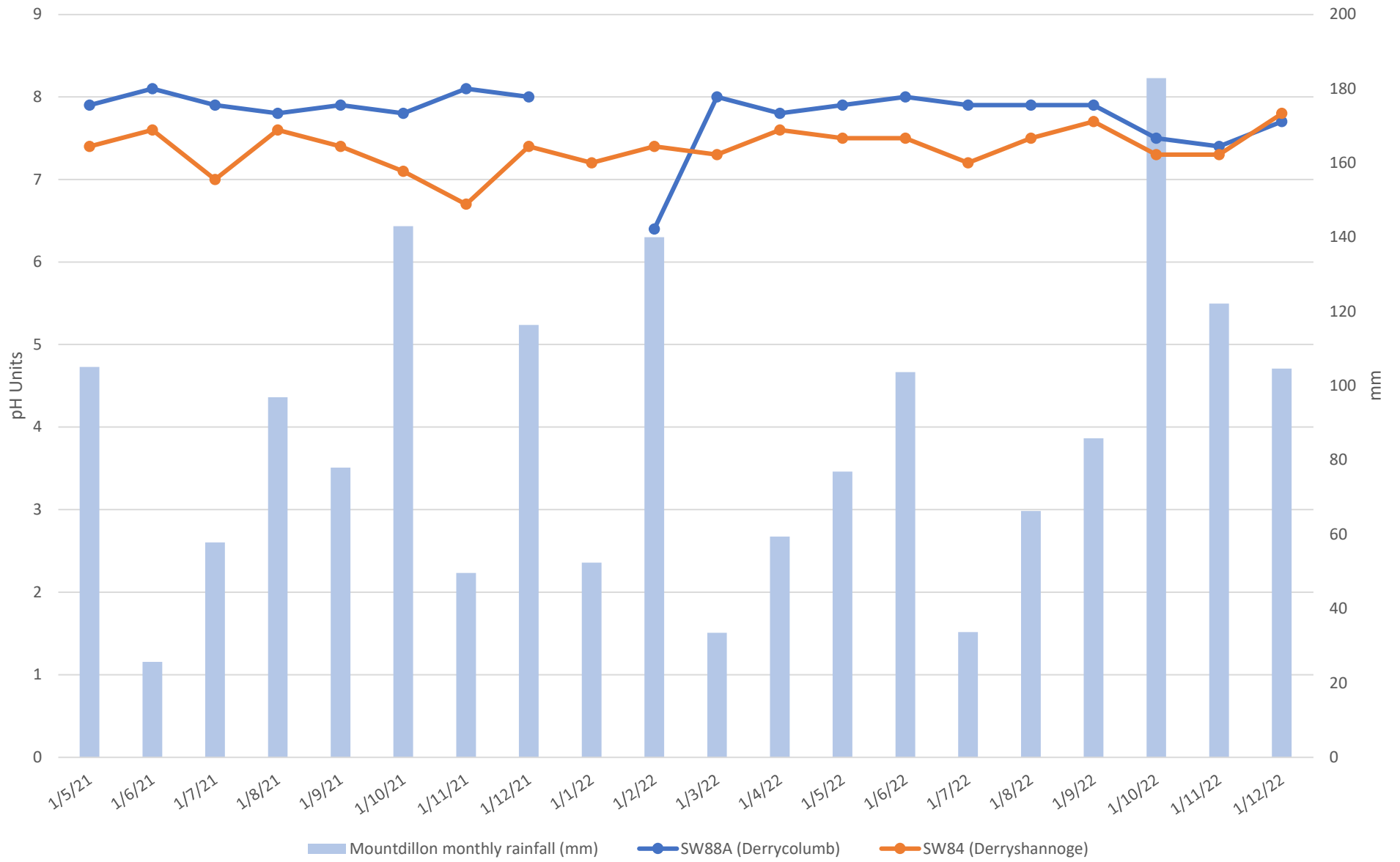
Derraghan Suspended solids mg/l



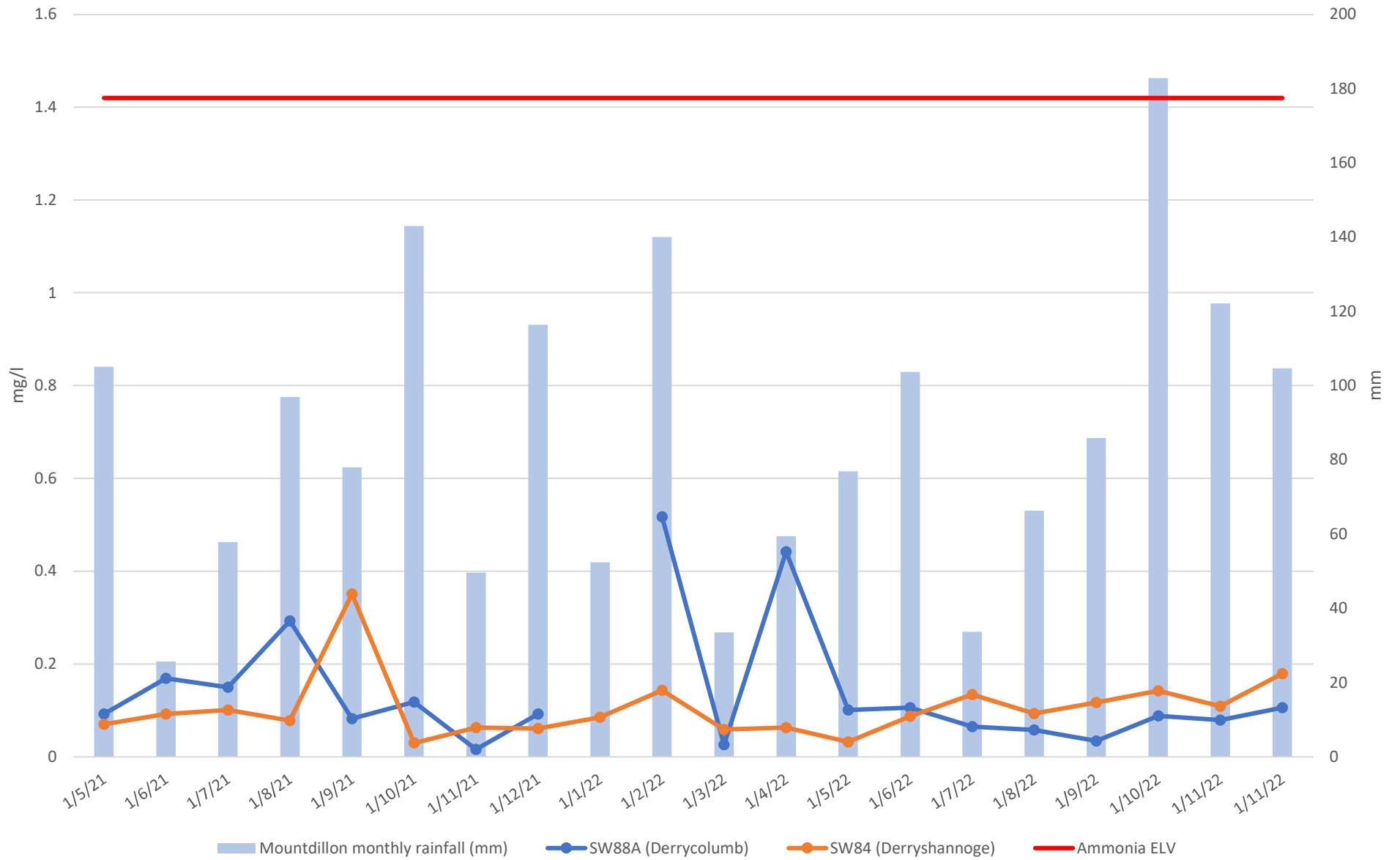
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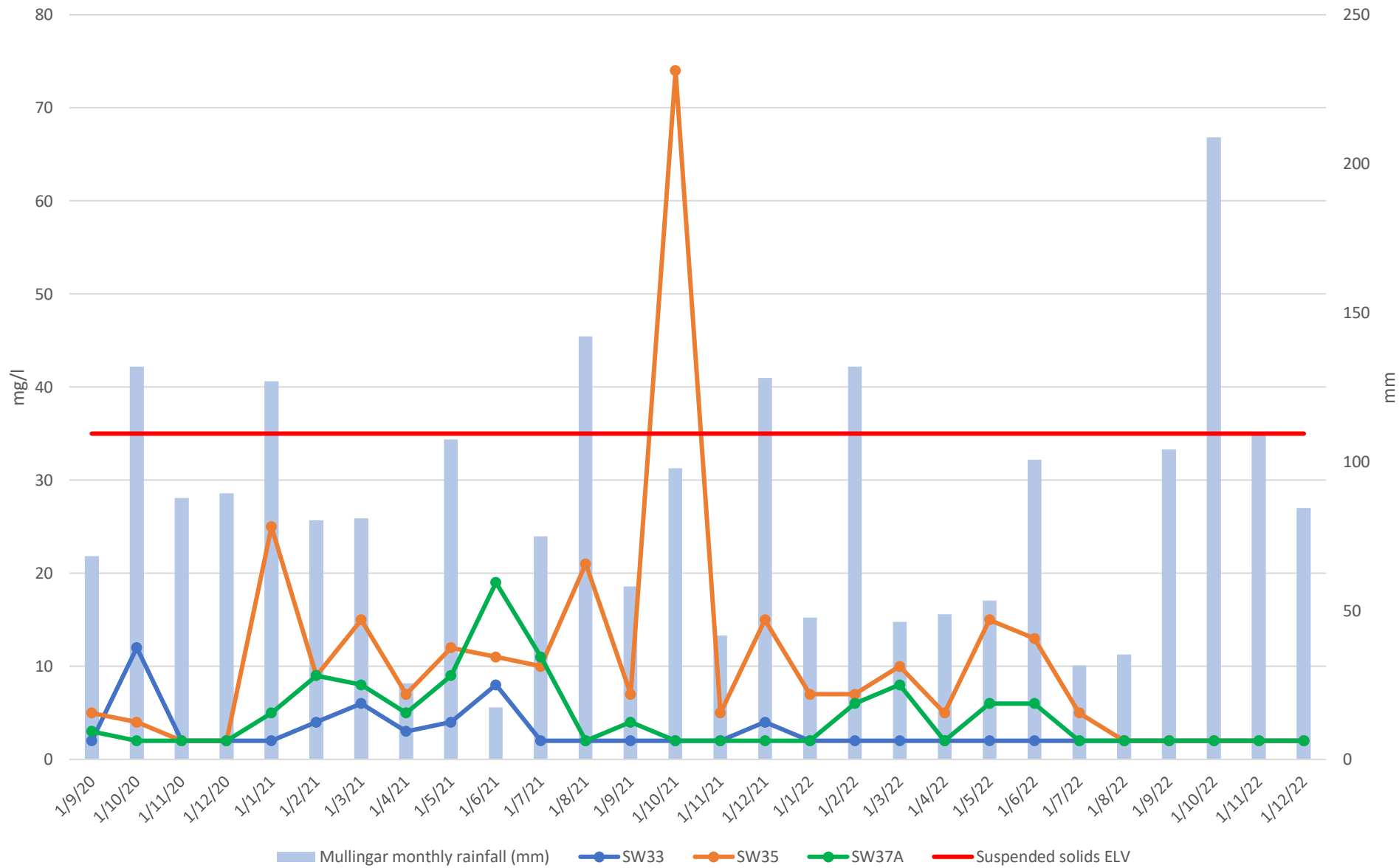
Derraghan pH



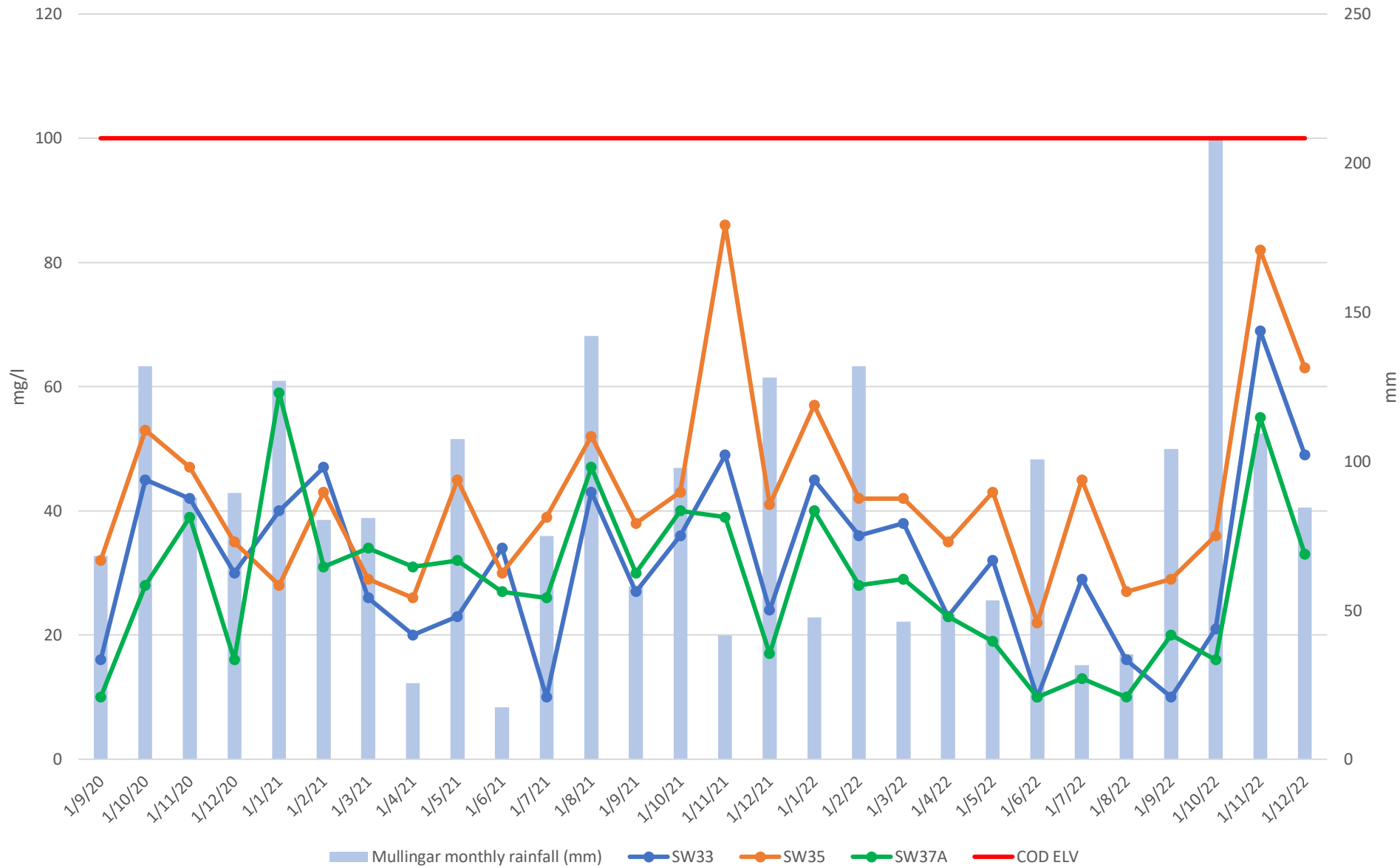
Derraghan Ammonia as N mg/l



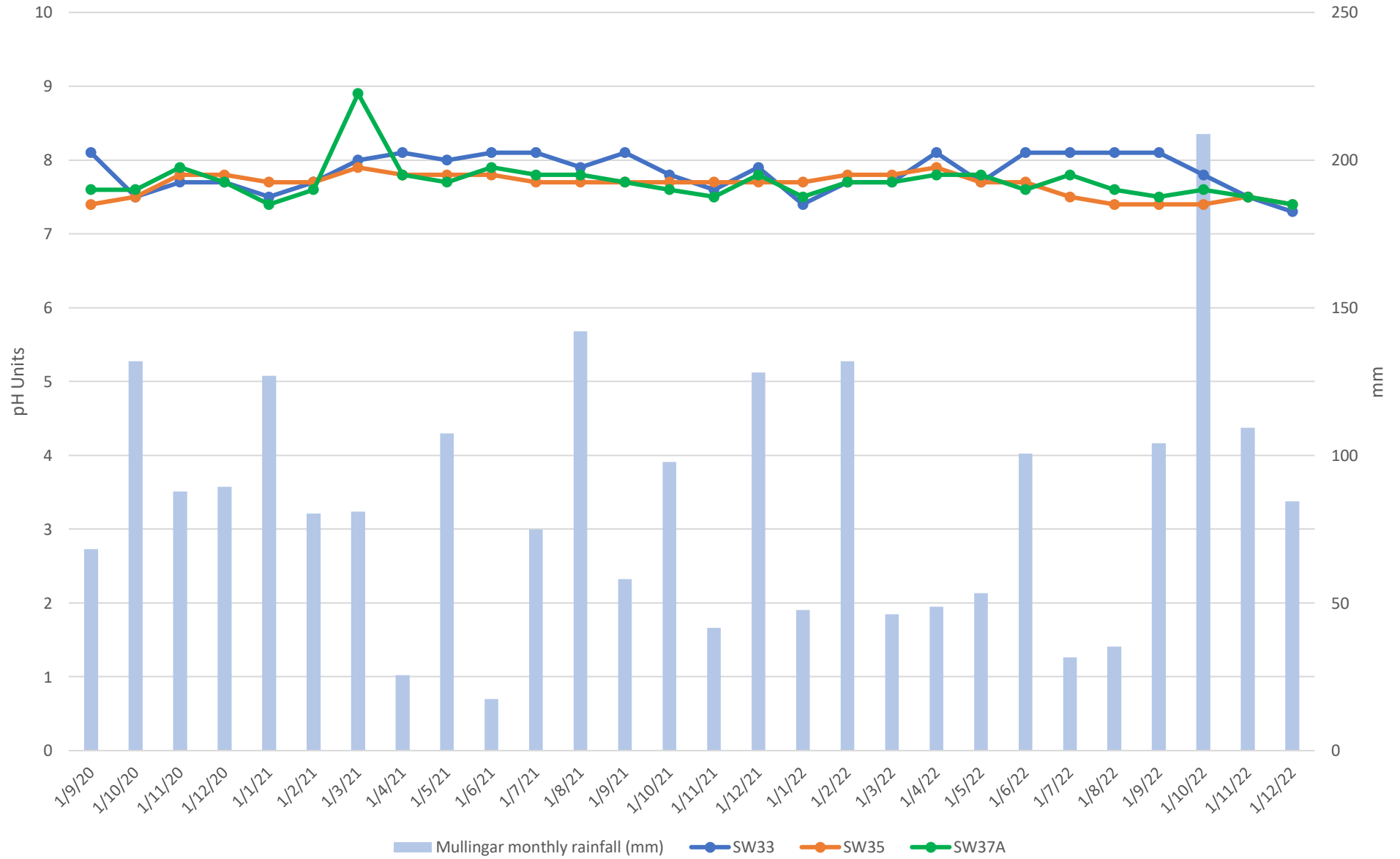
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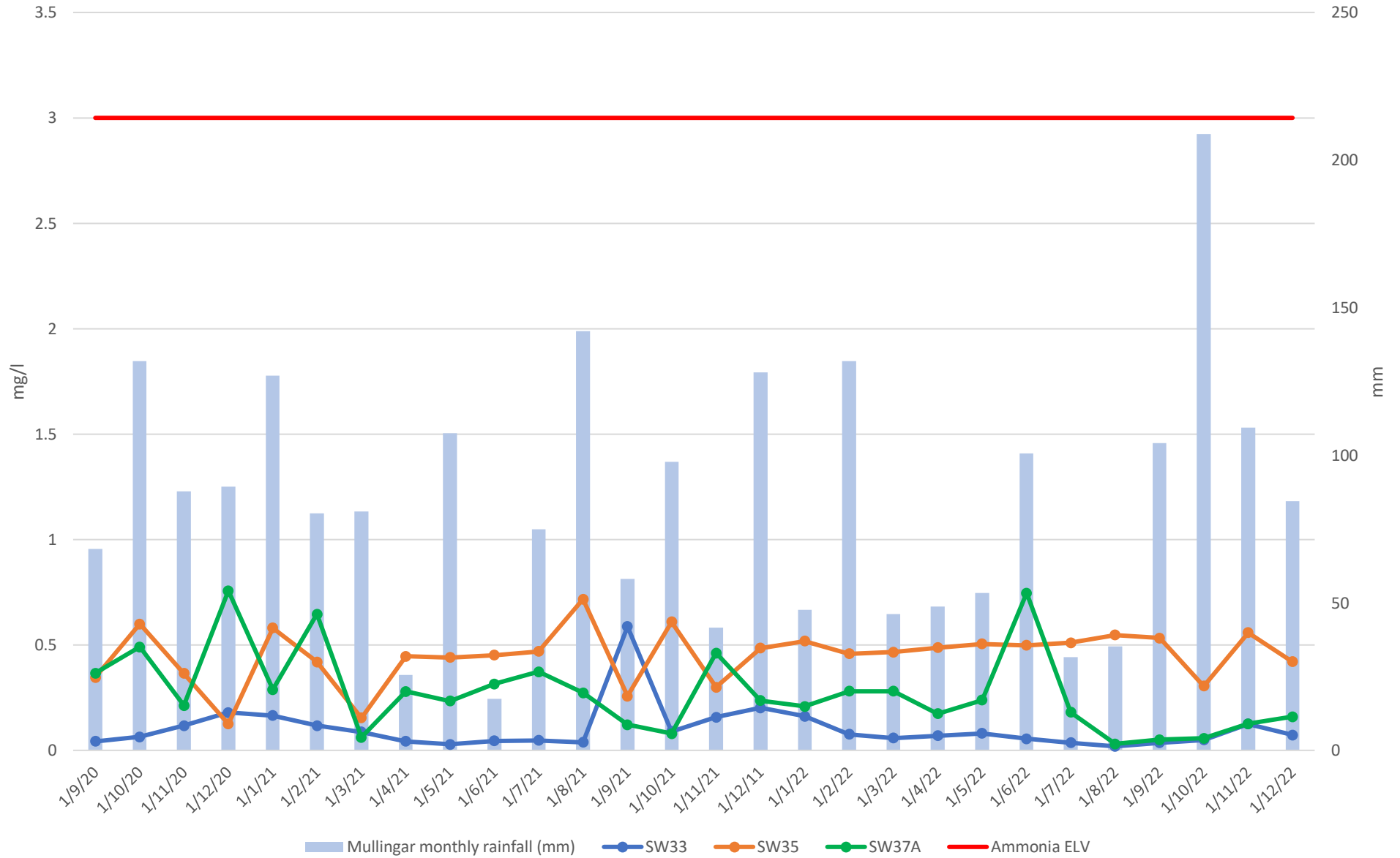
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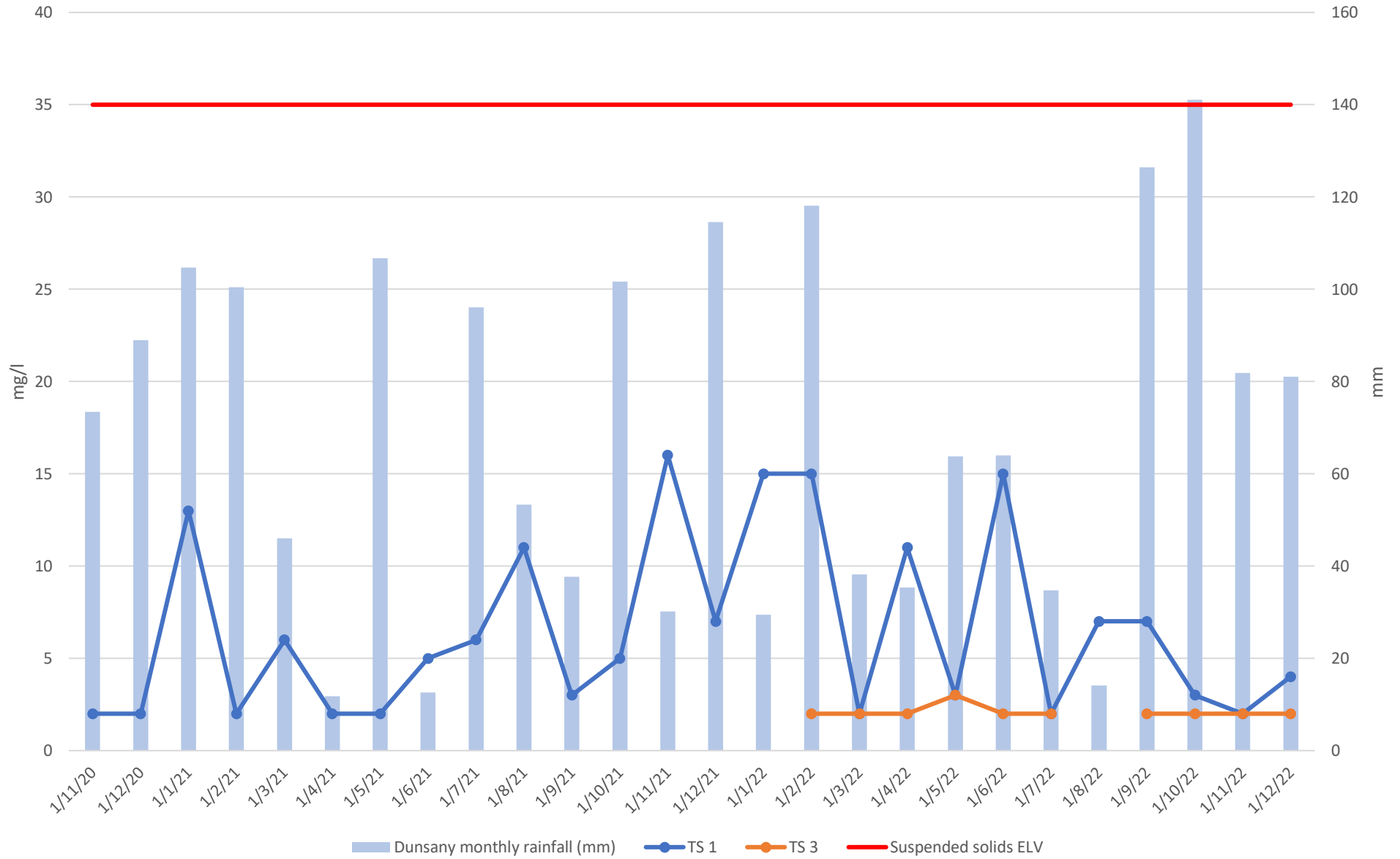
Cloncreen pH



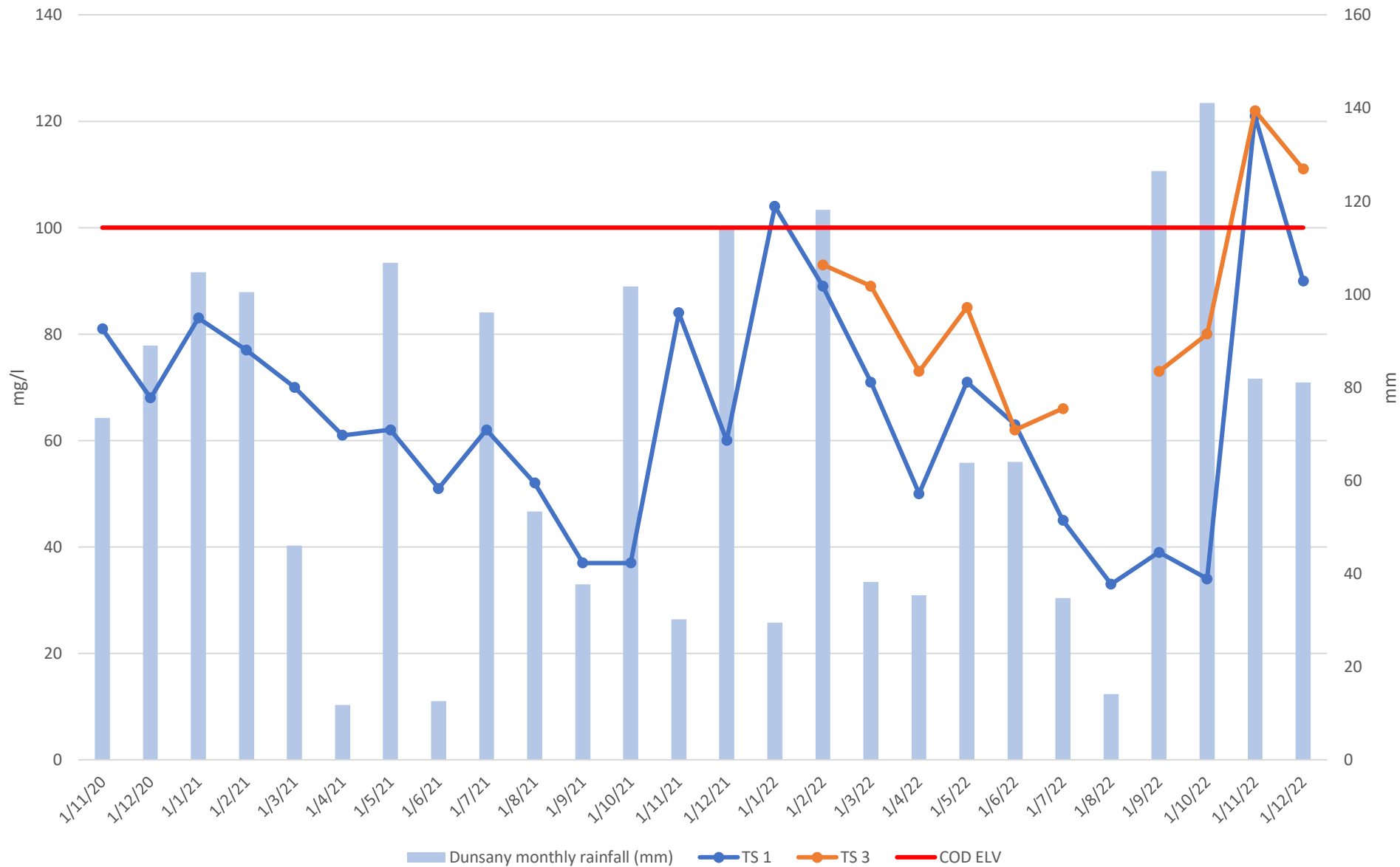
Cloncreen Ammonia as N mg/l



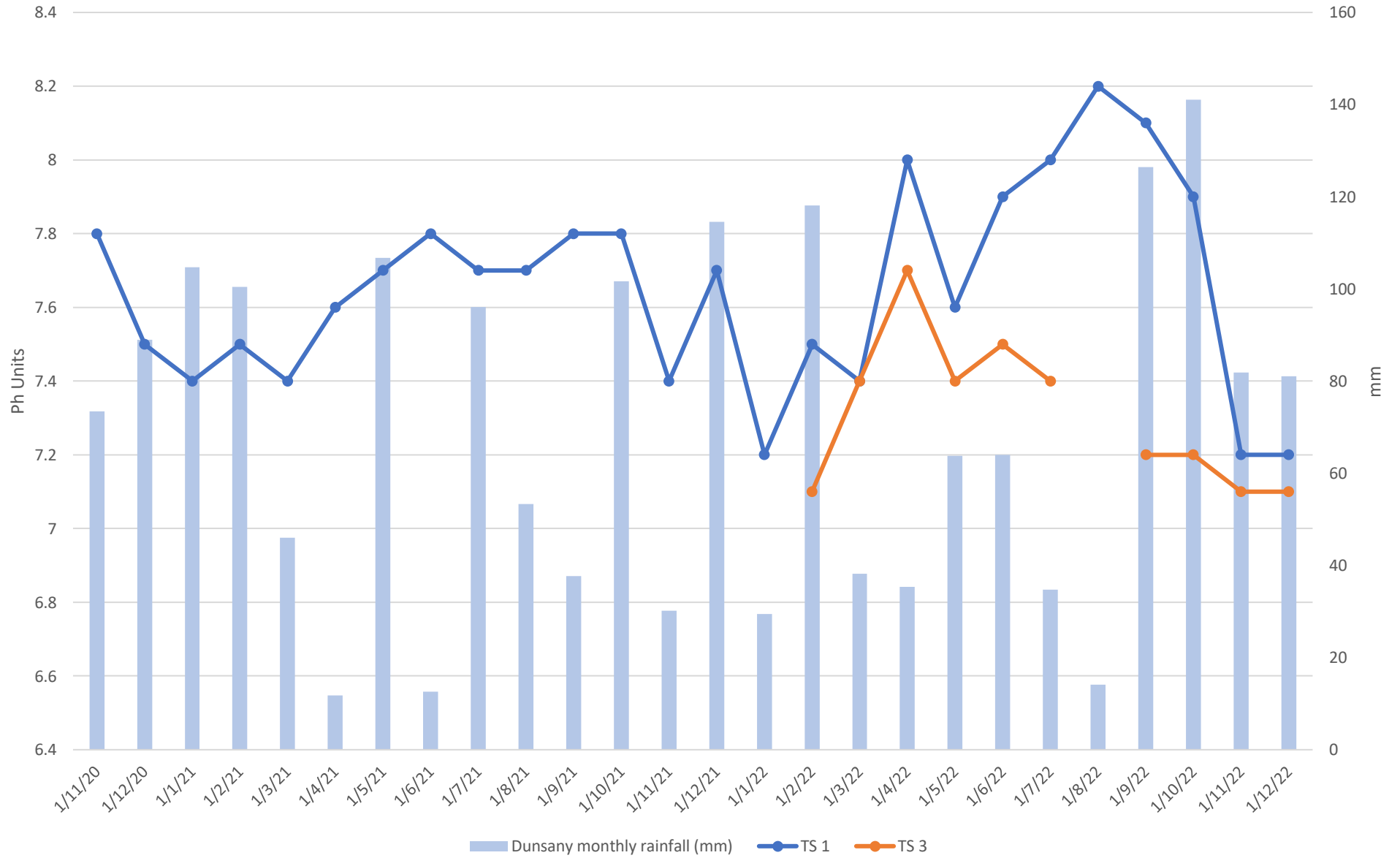
Timahoe South suspended solids mg/l



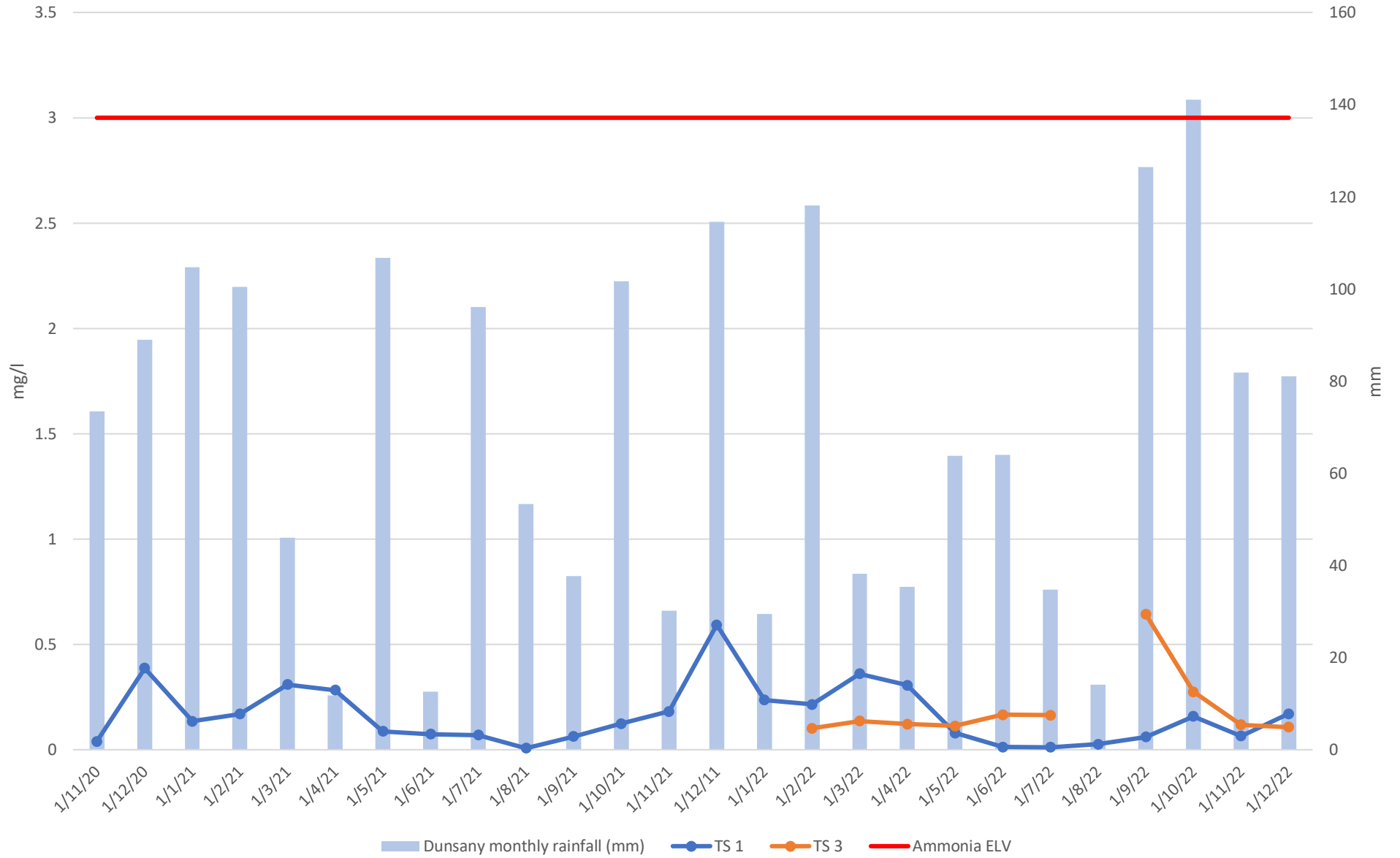
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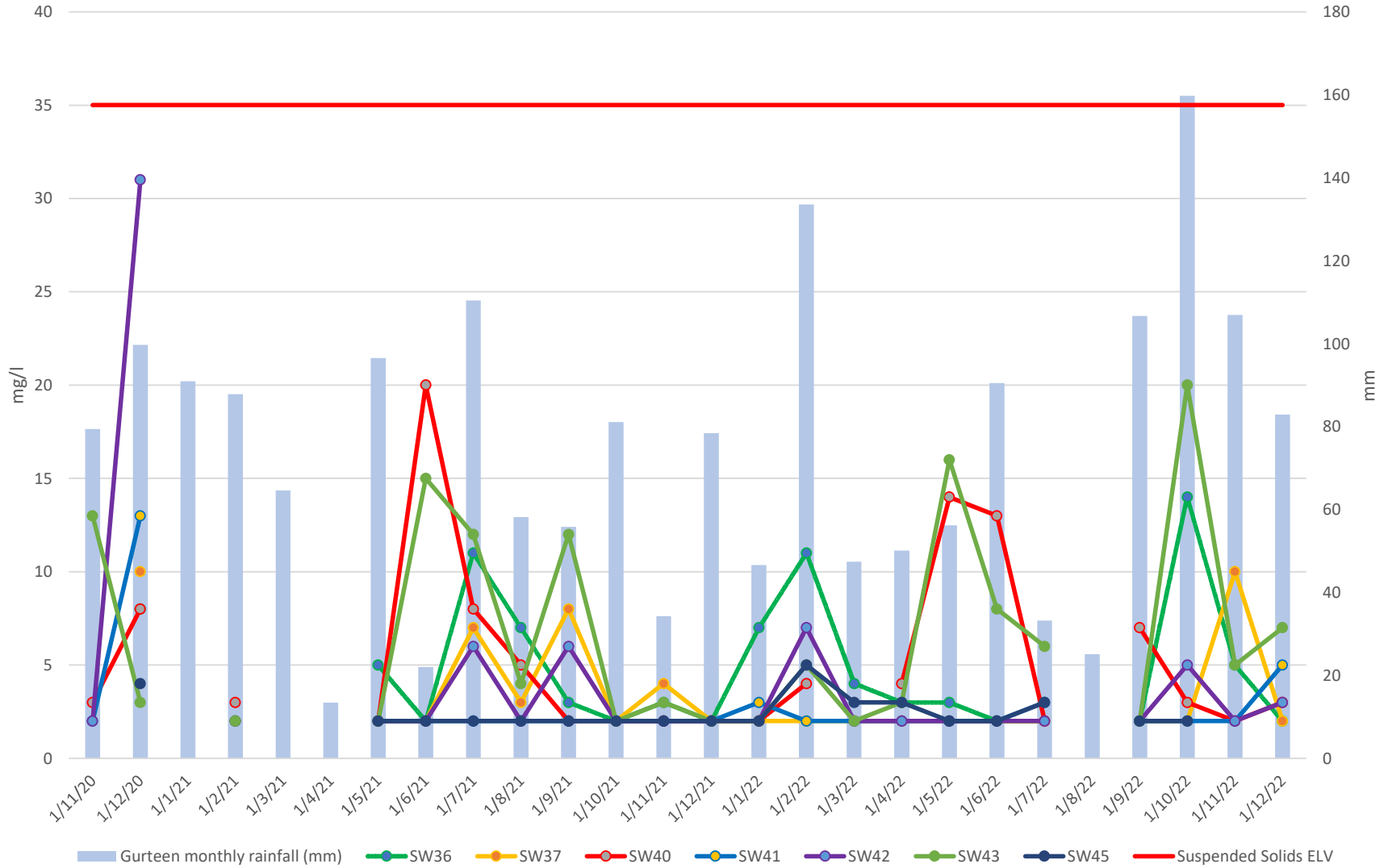
Timahoe South pH



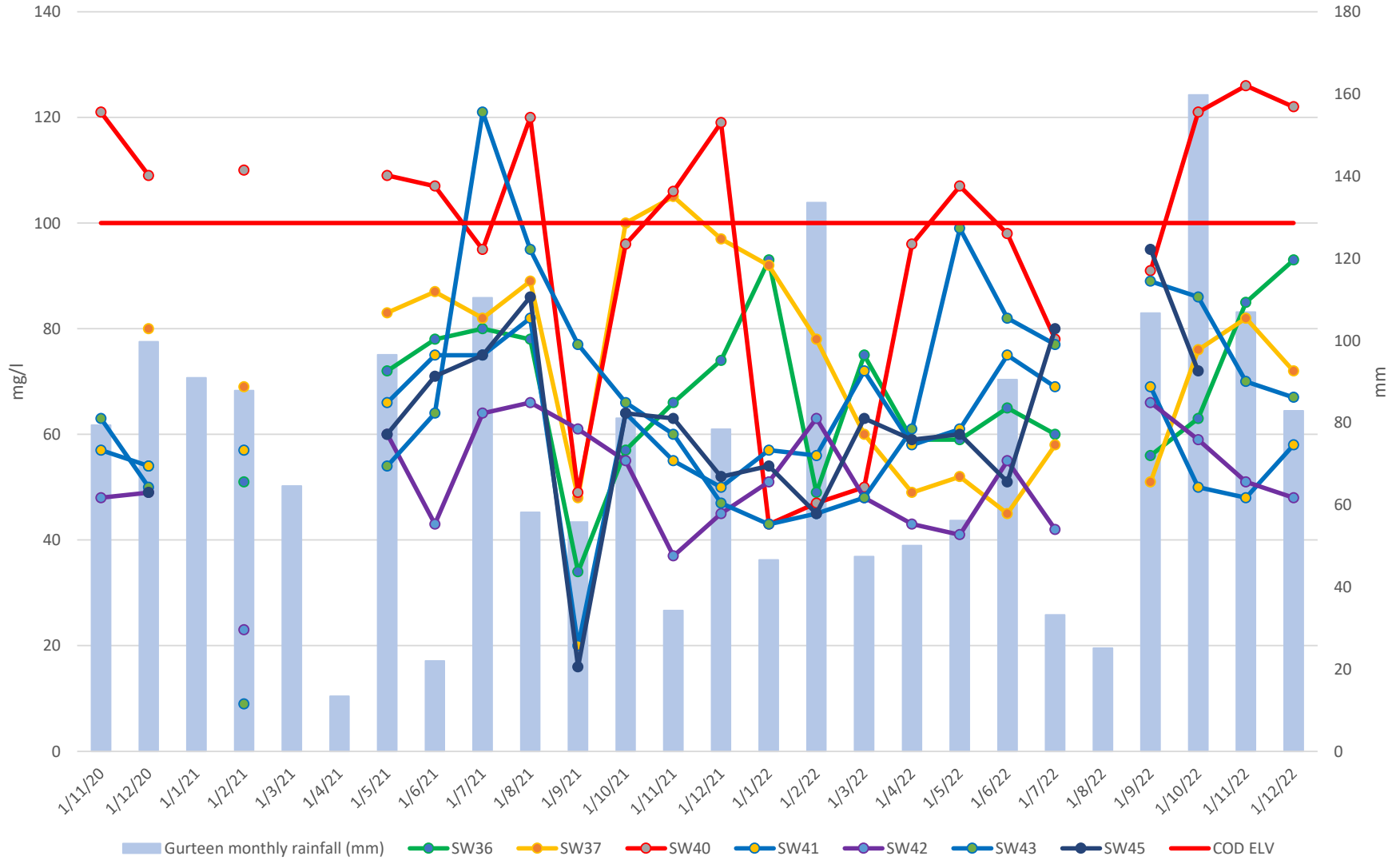
Timahoe South Ammonia as N mg/l



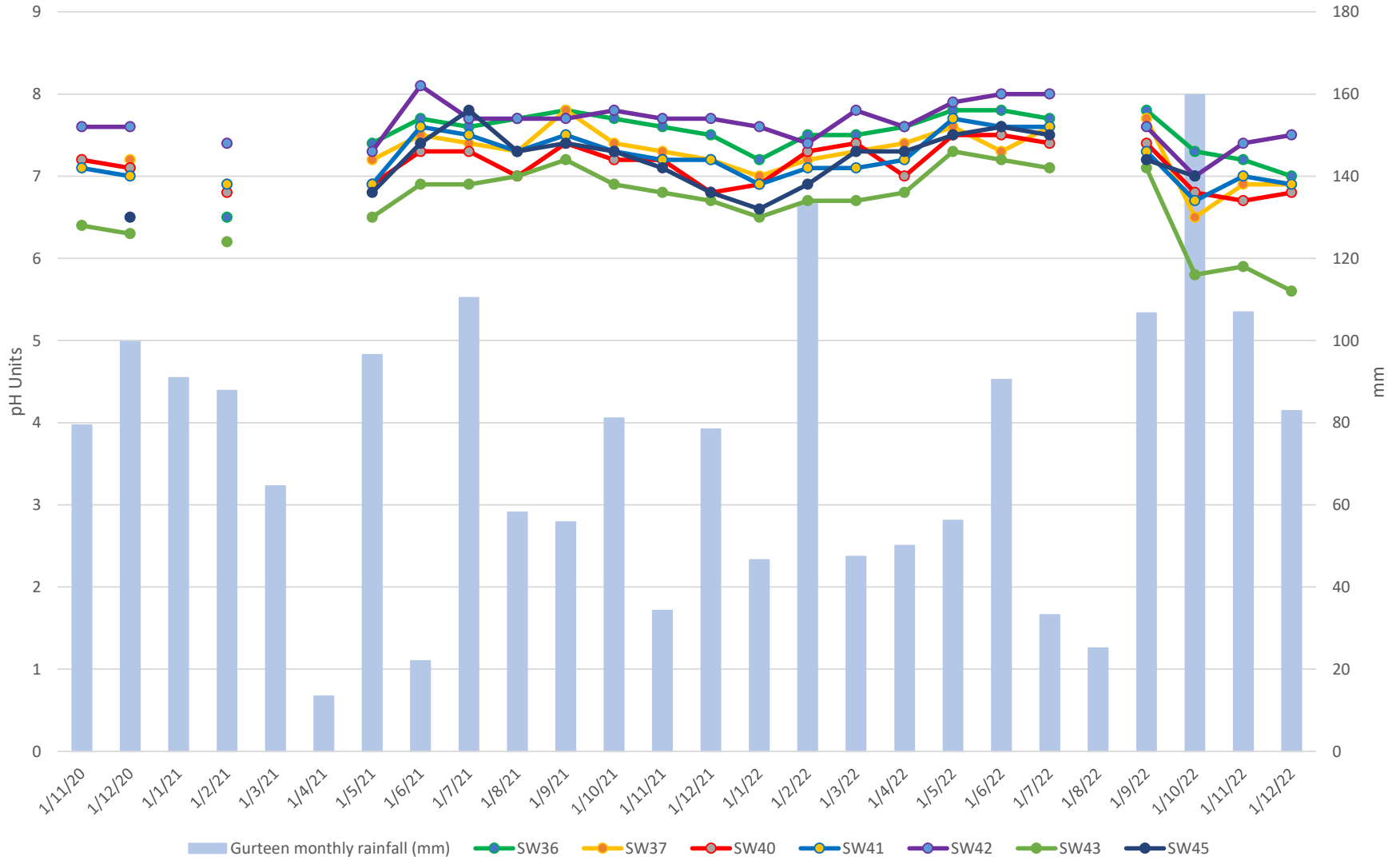
Bloomhill Suspended Solids mg/l



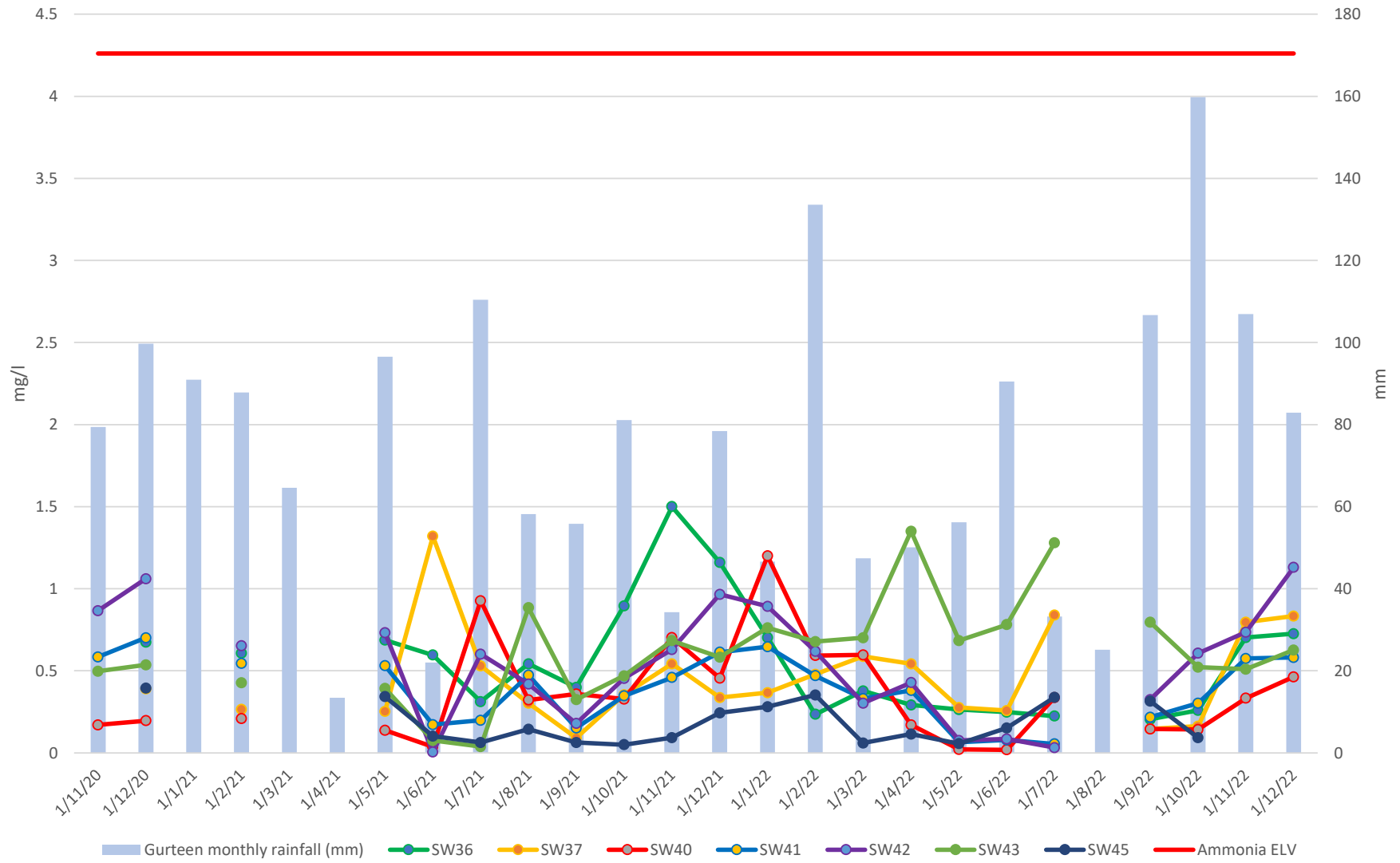
Bloomhill COD mg/l



Bloomhill pH



Bloomhill Ammonia as N mg/l



Derryfadda Bog

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Blackwater	P0502-01	Derryfadda Bog	SW99	4	2	3	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	14
Blackwater	P0502-01	Derryfadda Bog	SW100	2	2	5	2	2	2	2	2	2	2	2	2	11	19	2	2	2	2	3	7
Blackwater	P0502-01	Derryfadda Bog	SW102	7	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	16
Blackwater	P0502-01	Derryfadda Bog	SW105	7	6	4	2	2	2	3	3	9	2	2	2	20	2	4	2	2	2	2	2
Blackwater	P0502-01	Derryfadda Bog	SW107				7	2	7	2	2	2	2	2	4	2	2	2	2	2	2	2	2
			Surteen monthly rainfall (mm)	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	
			Suspended Solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour
				mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
Blackwater	P0502-01	Derryfadda Bog	SW99	373	300	200	335	256	242	192	194	154	184	218	236	273	299	347	361	336	353	624
Blackwater	P0502-01	Derryfadda Bog	SW100	247	246	343	263	255	244	208	155	167	141	141	161	201	236	251	395	259	229	355
Blackwater	P0502-01	Derryfadda Bog	SW102	387	304	235	371	368	332	302	241	233	210	224	222	223	279	277	193	250	218	487
Blackwater	P0502-01	Derryfadda Bog	SW105	238	263	377	147	333	355	291	244	387	189	142	139	246	244	343	380	254	331	321
Blackwater	P0502-01	Derryfadda Bog	SW107	N/S	N/S	N/S	152	303	250	237	224	235	148	140	150	131	153	378	397	275	298	241
			Surteen monthly rainfall (mm)	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Blackwater	P0502-01	Derryfadda Bog	SW99	105	83	68	95	75	61	51	37	24	58	71	77	86	94	99	94	32	115	129
Blackwater	P0502-01	Derryfadda Bog	SW100	85	68	105	77	73	61	49	43	33	31	44	49	60	79	82	107	25	51	55
Blackwater	P0502-01	Derryfadda Bog	SW102	91	62	65	71	91	81	79	74	48	43	65	61	61	70	86	60	68	51	68
Blackwater	P0502-01	Derryfadda Bog	SW105	77	89	104	49	97	114	59	36	59	48	62	53	63	62	99	107	10	86	86
Blackwater	P0502-01	Derryfadda Bog	SW107				55	76	65	48	78	41	34	56	42	35	68	87	87	50	60	47
			Surteen monthly rainfall (mm)	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	
				pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units
Blackwater	P0502-01	Derryfadda Bog	SW99	5.9	5.4	7.6	5.9	5.3	4.9	5.4	6.9	5.2	5.2	5.6	5.9	6.1	5.7	6	6.1	6.1	5.4	4.7
Blackwater	P0502-01	Derryfadda Bog	SW100	7.7	7.1	6.1	7	6.4	6.2	6.8	6.7	6.6	7	7.5	7.3	7.5	7.2	7.7	6.8	7	7.3	6.4
Blackwater	P0502-01	Derryfadda Bog	SW102	7.4	7.2	7.1	7.3	6.2	5.5	5.6	5.9	5.9	6.7	6.9	7.2	7.4	7.2	6.7	7.2	6.9	5.7	6.7
Blackwater	P0502-01	Derryfadda Bog	SW105	7.9	7.7	7.8	8	7.2	6.6	7.4	7	7.5	7.7	8	8	7.9	7.2	7.8	7.7	7.7	6.7	6.2
Blackwater	P0502-01	Derryfadda Bog	SW107				7.6	7.3	7.3	6.6	7	7.3	7.7	7.8	7.6	7.7	4.2	7.4	7.3	7.5	6.7	7
			Surteen monthly rainfall (mm)	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9

PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22

Blackwater	P0502-01	Derryfadna Bog	SW99	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
Blackwater	P0502-01	Derryfadna Bog	SW100	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Blackwater	P0502-01	Derryfadna Bog	SW102	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Blackwater	P0502-01	Derryfadna Bog	SW105	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.18	<0.05	<0.05	0.05	<0.05	<0.05	0.07	<0.05	<0.05
Blackwater	P0502-01	Derryfadna Bog	SW107	N/S	N/S	N/S	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.12	0.05	<0.05	<0.05	<0.05	<0.05
			Surteen monthly rainfall (mm)	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9

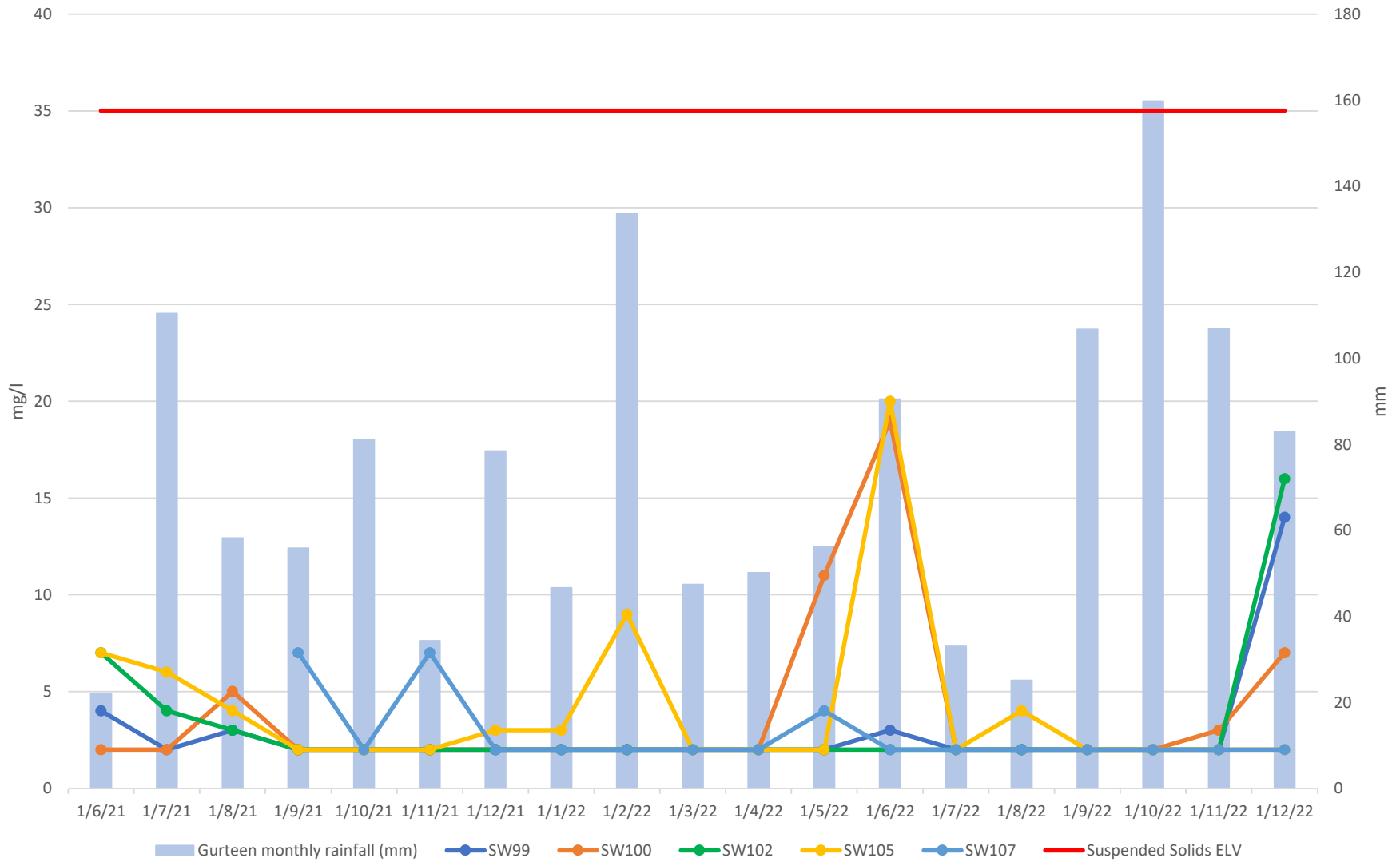
PCAS SW Sampling Scheme				TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Blackwater	P0502-01	Derryfadna Bog	SW99	220	122	210	134	110	77	95	65	72	109	151	148	172	153	155	220	159	235	225
Blackwater	P0502-01	Derryfadna Bog	SW100	320	164	114	152	103	97	63	62	76	154	254	228	232	273	302	205	222	217	190
Blackwater	P0502-01	Derryfadna Bog	SW102	349	252	276	223	128	168	111	114	55	192	238	261	265	239	173	217	175	84	356
Blackwater	P0502-01	Derryfadna Bog	SW105	248	280	215	300	252	263	236	139	389	287	317	310	346	193	166	287	286	190	252
Blackwater	P0502-01	Derryfadna Bog	SW107	N/S	N/S	N/S	308	246	200	120	108	155	305	255	298	393	165	267	181	287	60	221
			Surteen monthly rainfall (mm)	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9

PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Blackwater	P0502-01	Derryfadna Bog	SW99	0.329	0.279	0.269	0.16	0.255	0.194	0.35	0.163	0.287	0.323	0.225	0.215	0.039	0.193	0.027	0.02	0.063	0.198	0.386
Blackwater	P0502-01	Derryfadna Bog	SW100	0.592	0.346	0.111	0.77	0.187	0.126	0.271	0.152	0.248	0.456	0.445	0.354	0.161	0.416	1.18	0.842	0.45	0.122	0.398
Blackwater	P0502-01	Derryfadna Bog	SW102	0.020	0.017	0.039	0.047	0.039	0.048	0.125	0.120	0.122	0.204	0.035	0.014	0.009	0.009	0.146	0.021	0.044	0.229	0.51
Blackwater	P0502-01	Derryfadna Bog	SW105	1.100	0.815	0.690	0.421	0.442	0.196	0.483	0.022	0.414	0.729	0.721	1.820	1.010	0.093	0.620	0.910	0.160	0.05	0.33
Blackwater	P0502-01	Derryfadna Bog	SW107	N/S	N/S	N/S	2.21	0.782	1.14	0.606	0.521	0.675	1.51	1.88	0.46	2.14	0.011	0.971	1.06	1.16	0.54	1.07
			Surteen monthly rainfall (mm)	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9
			Ammonia ELV	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26

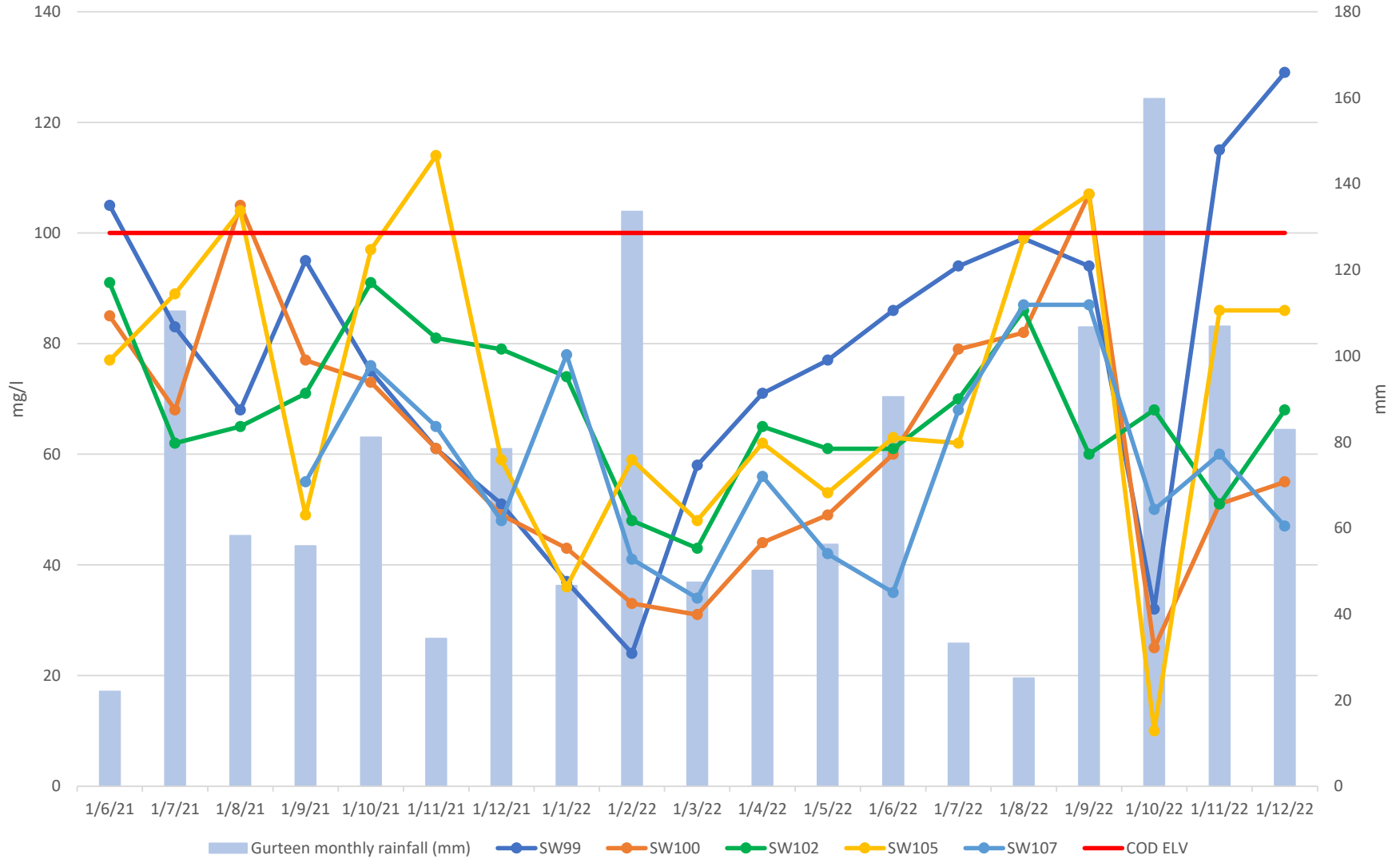
PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Blackwater	P0502-01	Derryfadna Bog	SW99	42	33.9	25.6	38.6	25.5	21.9	20.9	13	16.30	23.60	28.60	30.50	32.40	31.60	33.70	35.30	35.50	44.4	38.4
Blackwater	P0502-01	Derryfadna Bog	SW100	57.2	24	36.5	47.7	24.8	20	19.4	13.4	13.80	14.30	16.20	21.20	22.80	28.40	28.80	40.10	31.70	17.6	16.6
Blackwater	P0502-01	Derryfadna Bog	SW102	31.6	25.7	25	55.4	33.7	31.1	28.6	21.3	20.40	22.40	26.10	25.10	24.90	25.00	28.60	22.40	24.40	16.1	31.7
Blackwater	P0502-01	Derryfadna Bog	SW105	69.9	31.3	50.7	19	31.4	39	21.9	24.1	18.50	20.60	18.60	20.90	22.80	22.70	37.70	40.90	26.10	30.7	33.7
Blackwater	P0502-01	Derryfadna Bog	SW107				15.7	25.7	20.3	18.9	16.2	16.80	14.50	14.70	15.10	17.00	20.10	31.10	33.10	2.40	21.4	18
			Surteen monthly rainfall (mm)	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9

Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

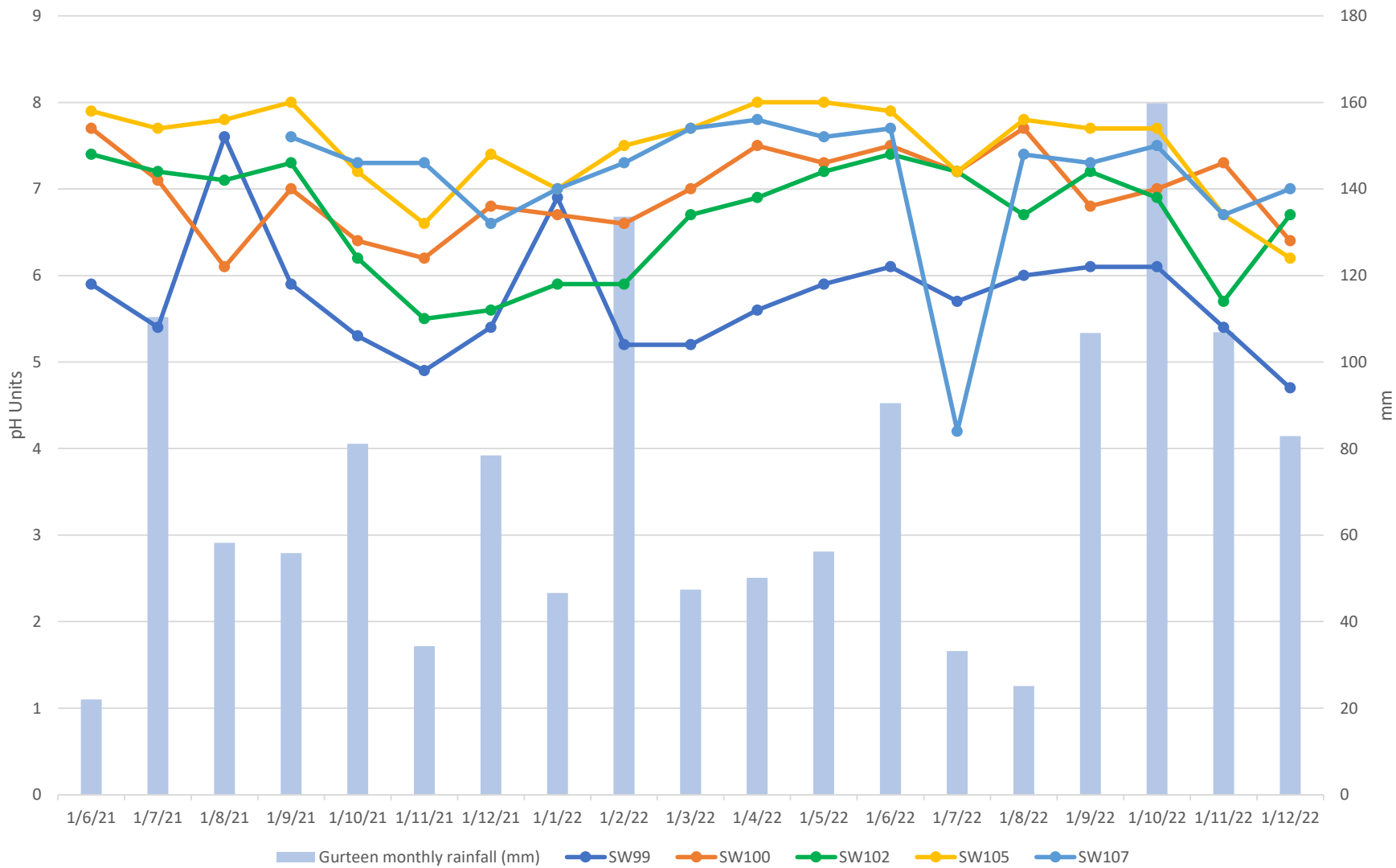
Derryfadda Suspended Solids mg/l



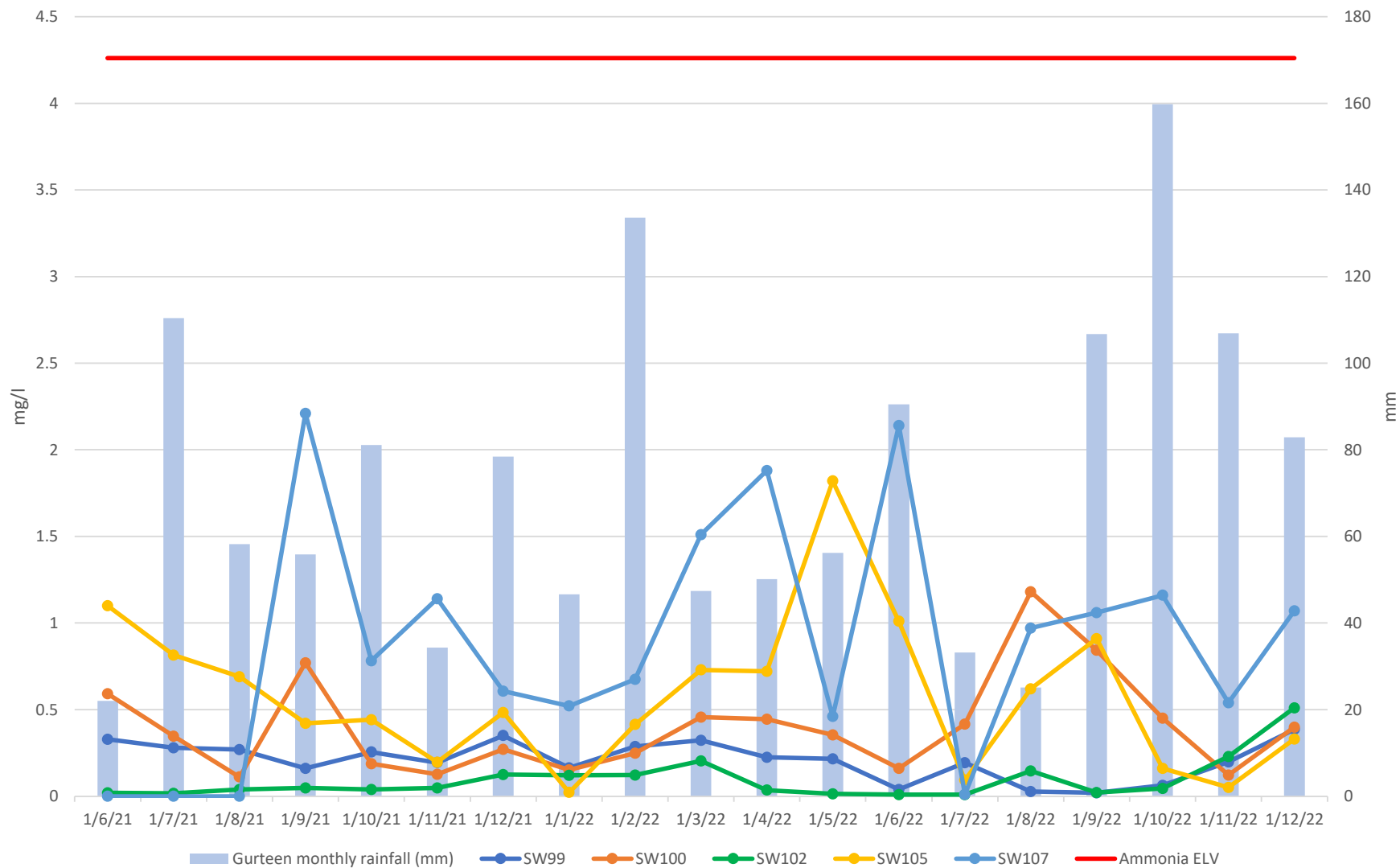
Derryfadda COD mg/l



Derryfadda pH



Derryfadda Ammonia as N mg/l



Glenlough Bog

PCAS SW Sampling Scheme				Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l
				1/1/23	1/2/23	1/3/23	1/4/23
Mountdillon	P0504-01	Glenlough	SW129	9	2	2	3
			Mountdillon monthly rainfall (mm)	102.9	21.7	169.8	89.4
			Suspended solids ELV	35	35	35	35

PCAS SW Sampling Scheme				Colour	Colour	Colour	Colour
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co
				1/1/23	1/2/23	1/3/23	1/4/23
Mountdillon	P0504-01	Glenlough	SW129	329	266	221	302
			Mountdillon monthly rainfall (mm)	102.9	21.7	169.8	89.4

PCAS SW Sampling Scheme				COD	COD	COD	COD
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l
				1/1/23	1/2/23	1/3/23	1/4/23
Mountdillon	P0504-01	Glenlough	SW129	66	60	51	69
			Mountdillon monthly rainfall (mm)	102.9	21.7	169.8	89.4
			COD ELV	100	100	100	100

PCAS SW Sampling Scheme				pH	pH	pH	pH
Bog Group	Licence No	Bog Name	SW Code -GIS	pH Units	pH Units	pH Units	pH Units
				1/1/23	1/2/23	1/3/23	1/4/23
Mountdillon	P0504-01	Glenlough	SW129	6.4	4.3	4.5	4.4
			Mountdillon monthly rainfall (mm)	102.9	21.7	169.8	89.4

PCAS SW Sampling Scheme				TP as P	TP as P	TP as P	TP as P
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l
				1/1/23	1/2/23	1/3/23	1/4/23
Mountdillon	P0504-01	Glenlough	SW129	0.06	0.05	0.05	0.05
			Mountdillon monthly rainfall (mm)	102.9	21.7	169.8	89.4

PCAS SW Sampling Scheme				TS	TS	TS	TS
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l
				1/1/23	1/2/23	1/3/23	1/4/23
Mountdillon	P0504-01	Glenlough	SW129	147	84	146	82
			Mountdillon monthly rainfall (mm)	102.9	21.7	169.8	89.4

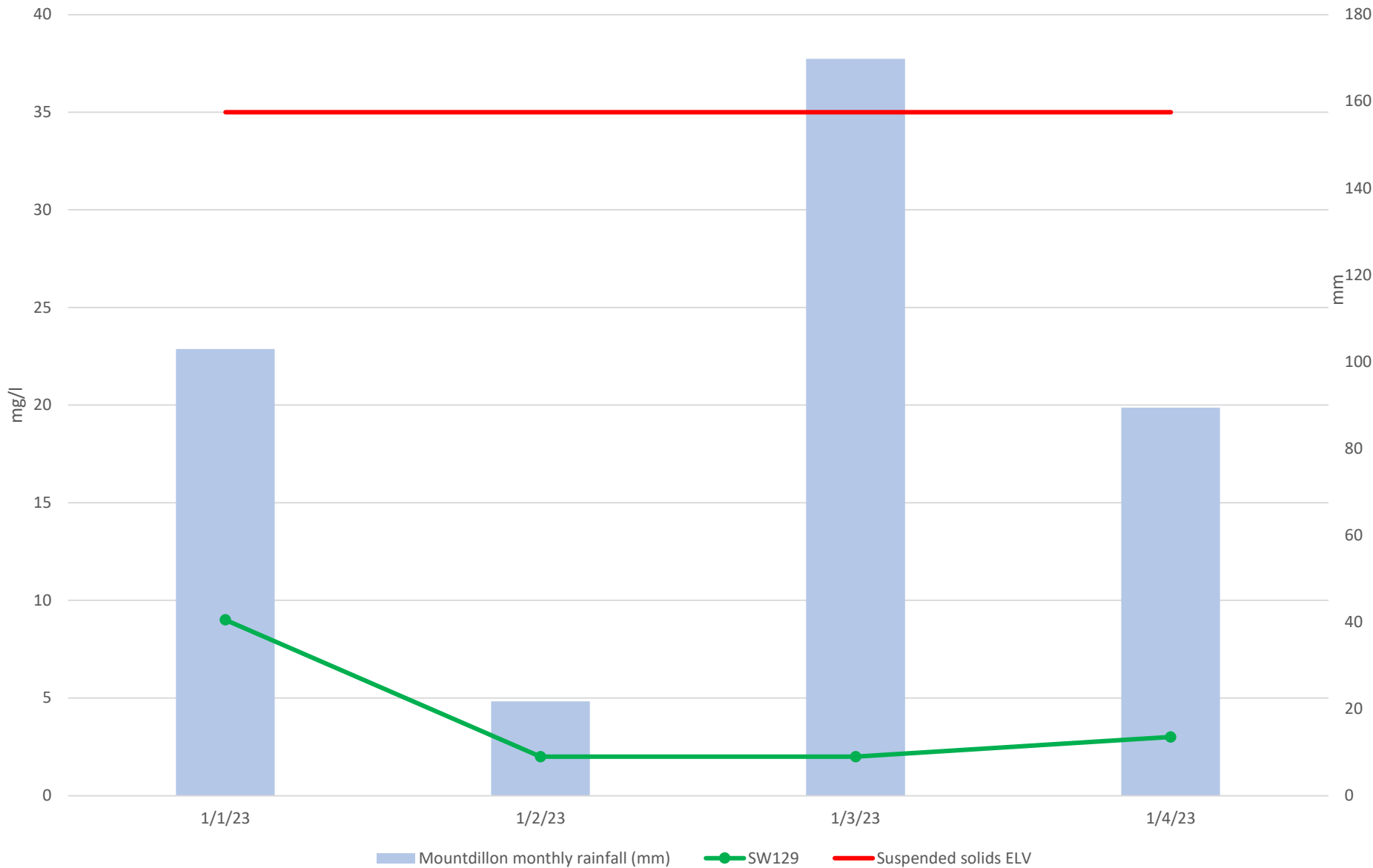
PCAS SW Sampling Scheme				Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l
				1/1/23	1/2/23	1/3/23	1/4/23
Mountdillon	P0504-01	Glenlough	SW129	0.164	0.386	0.072	0.124
			Mountdillon monthly rainfall (mm)	102.9	21.7	169.8	89.4
			Ammonia ELV	1.42	1.42	1.42	1.42

PCAS SW Sampling Scheme				DOC	DOC	DOC	DOC
Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l
				1/1/23	1/2/23	1/3/23	1/4/23
Mountdillon	P0504-01	Glenlough	SW129	20.3	20.2	17.9	25
			Mountdillon monthly rainfall (mm)	102.9	21.7	169.8	89.4

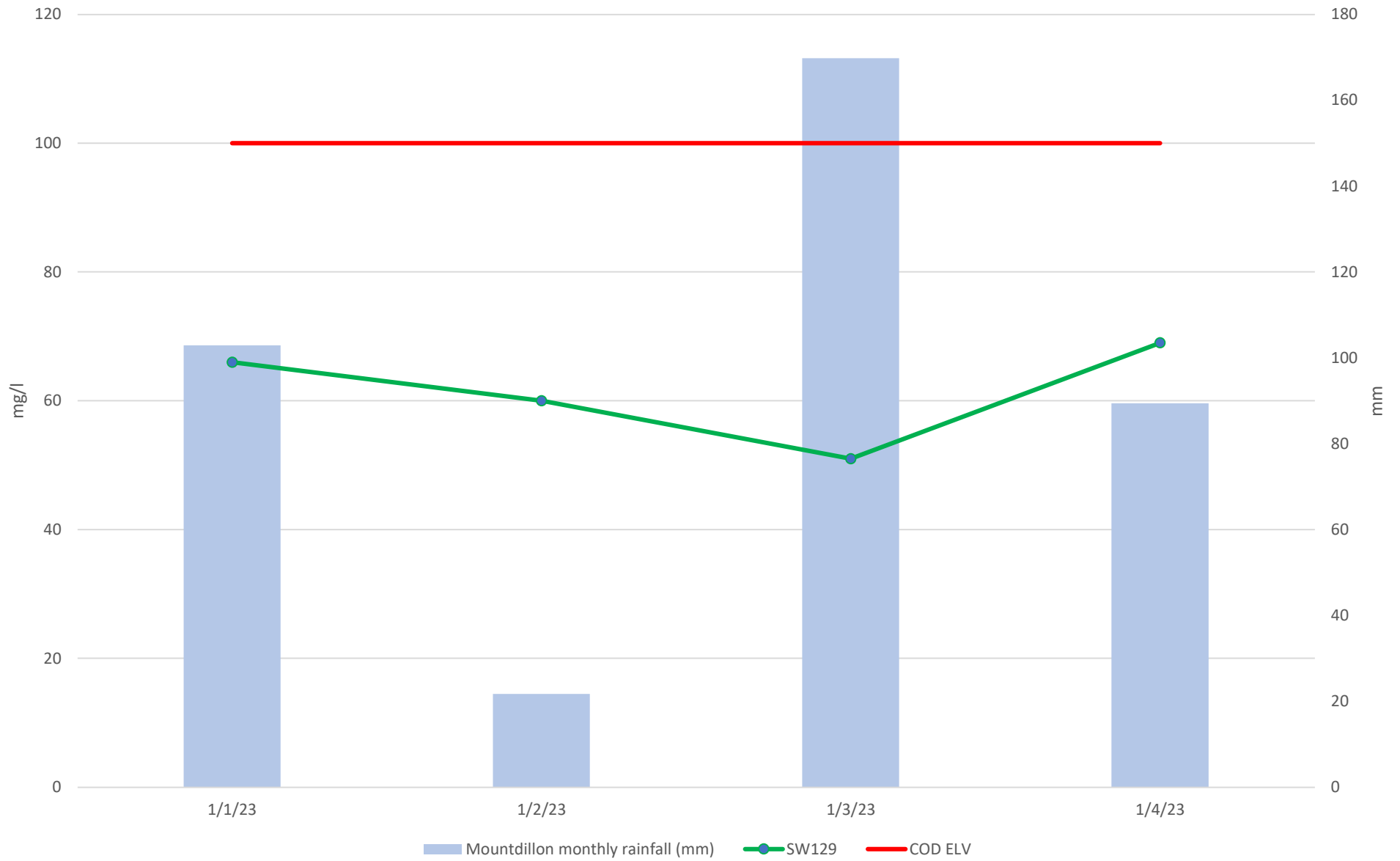
*Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

*No baseline data available for Glenlough as it was never in active production

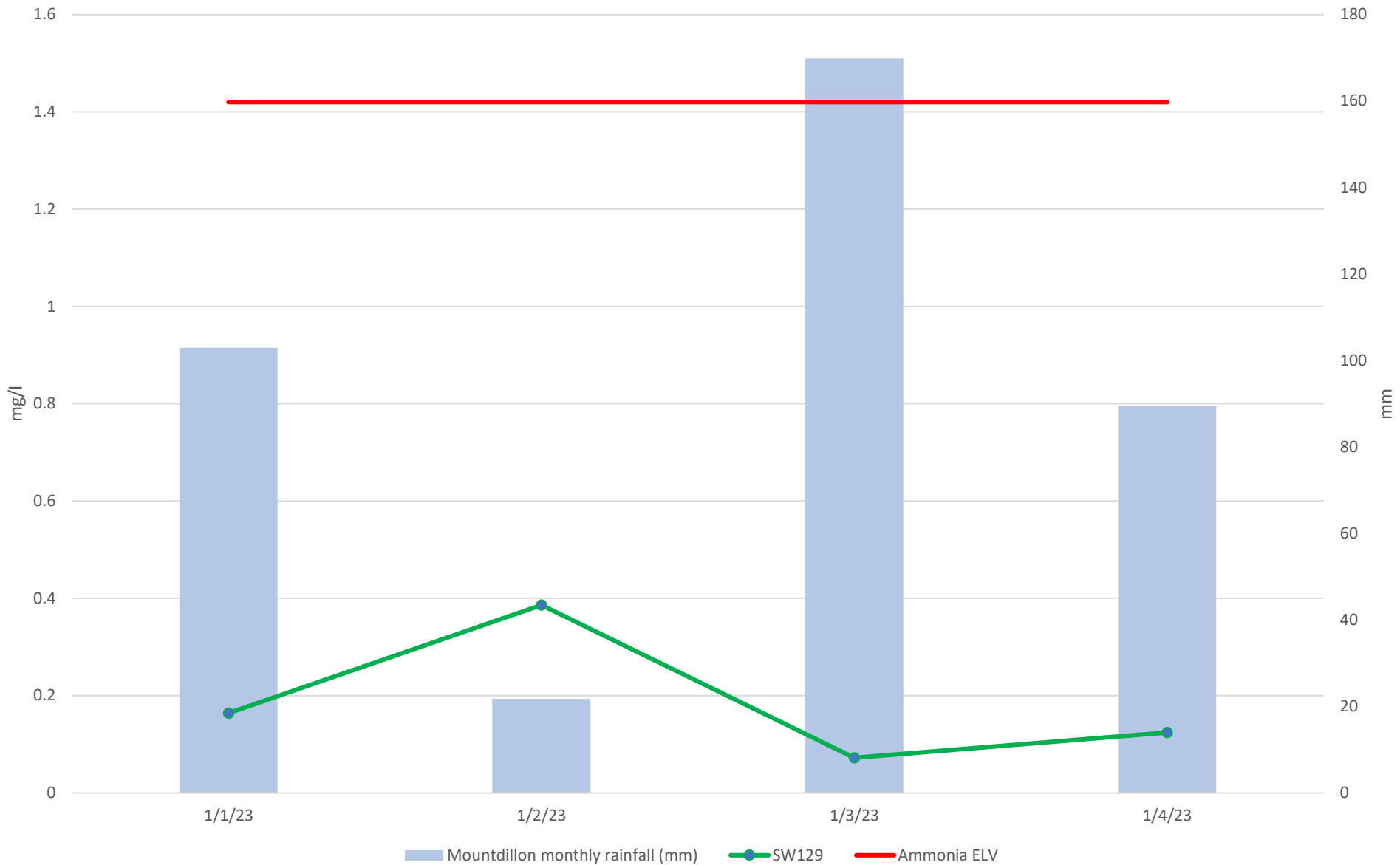
Glenlough Suspended solids



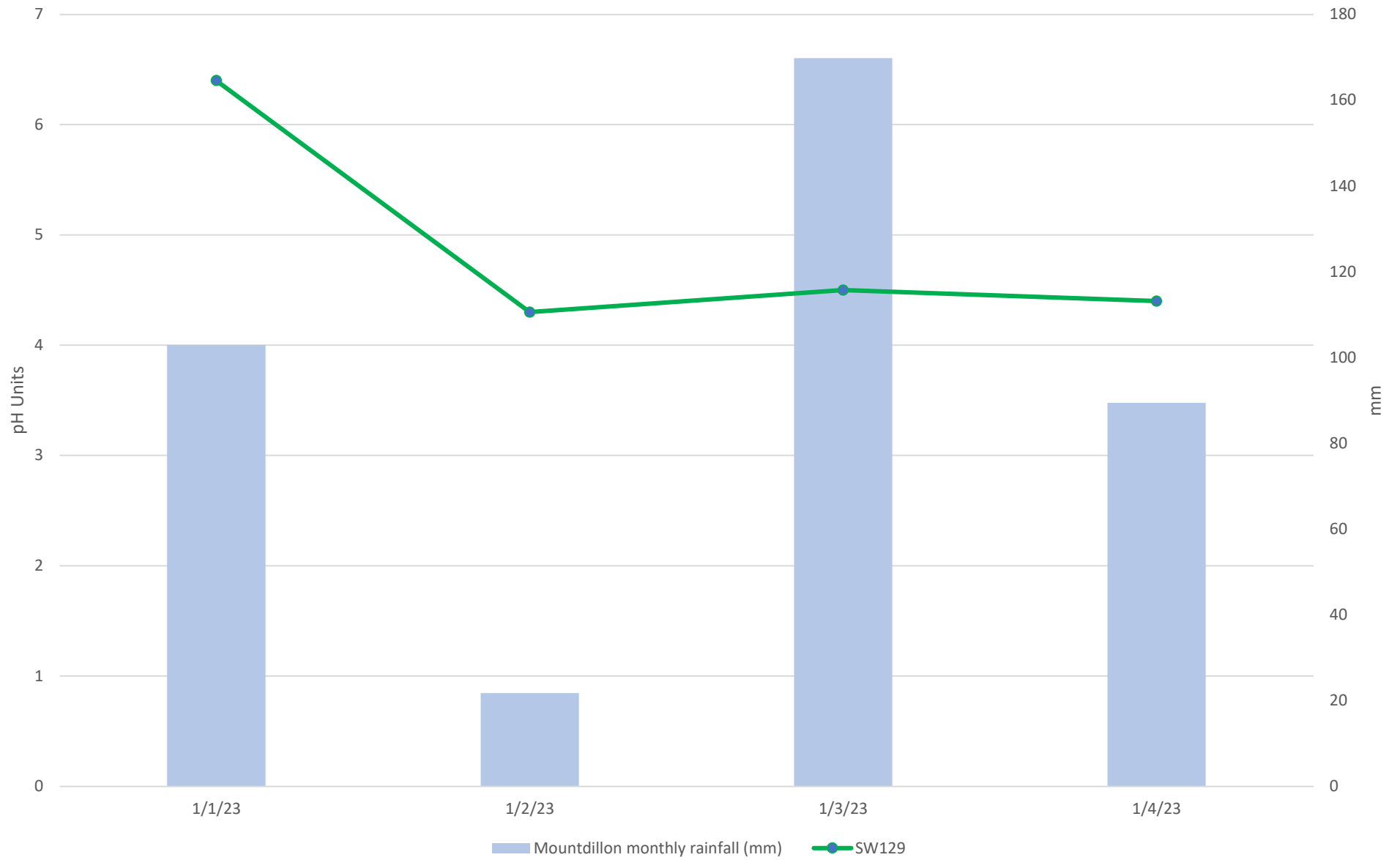
Glenlough COD



Glenlough Ammonia as N



Glenlough pH

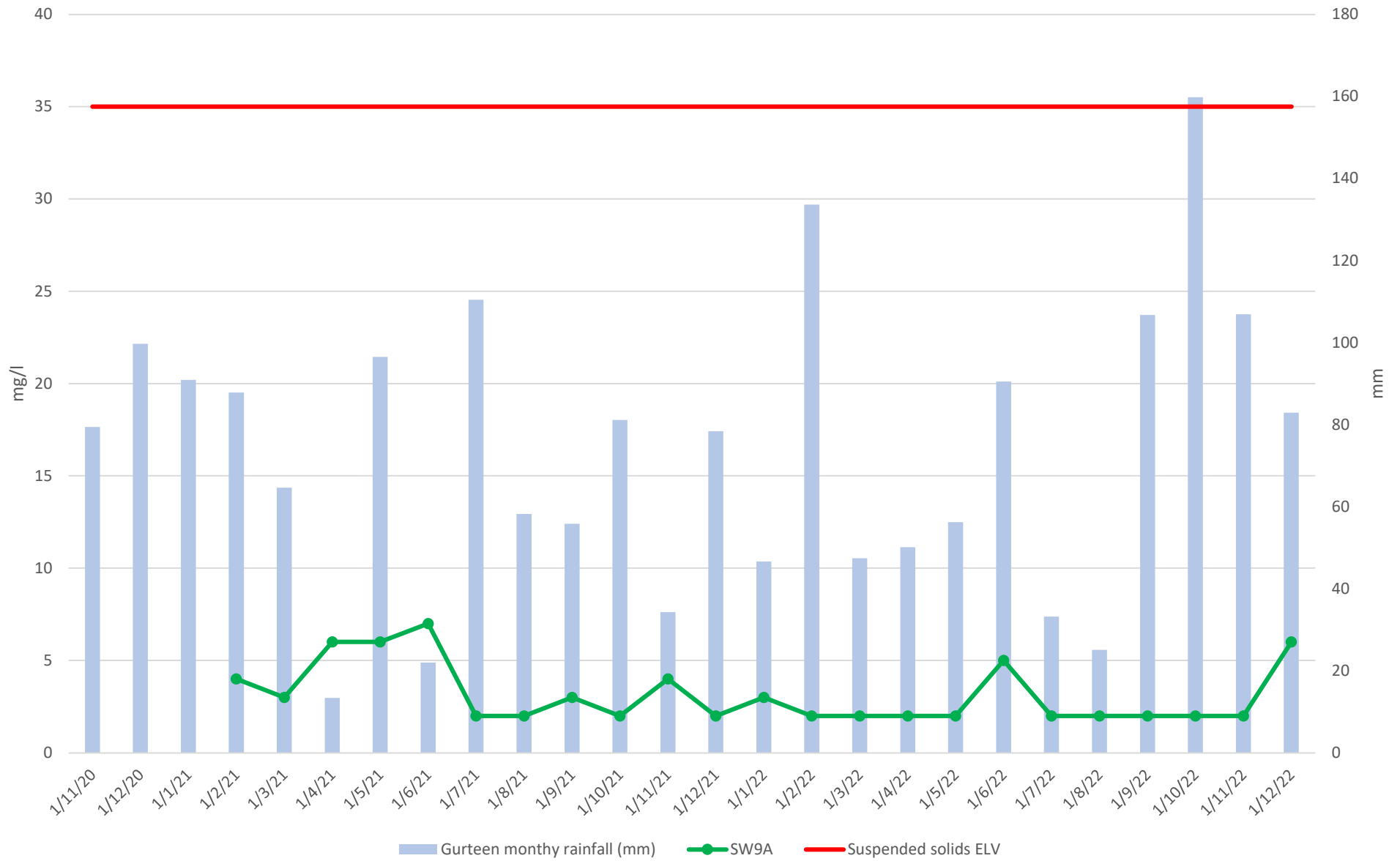


Derrybrat Bog

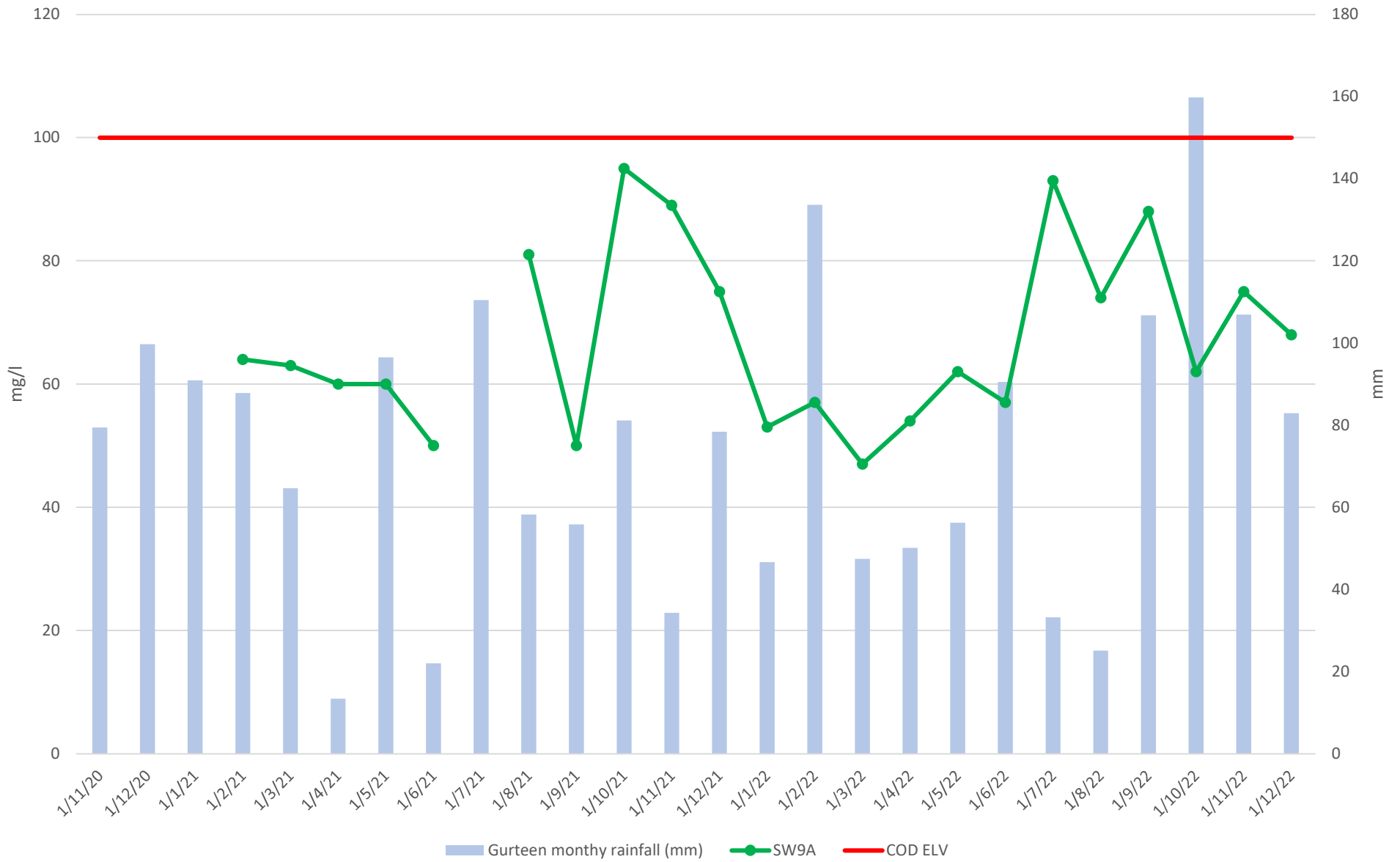
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	Suspended Solids	
Bog Group	P0500-01	Derrybrat	SW9A	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
			Gurteen monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	106.9	82.9			
			Suspended solids ELV	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	Colour	
Bog Group	P0500-01	Derrybrat	SW9A	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	mg/l Pt Co	
			Gurteen monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	106.9	82.9			
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	COD	
Bog Group	P0500-01	Derrybrat	SW9A	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
			Gurteen monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	106.9	82.9			
			COD ELV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	
Bog Group	P0500-01	Derrybrat	SW9A	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	pH Units	
			Gurteen monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	106.9	82.9			
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	TP as P	
Bog Group	P0500-01	Derrybrat	SW9A	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			Gurteen monthly rainfall (mm)	79.4	99.7	90.9	<0.05	<0.05	<0.05	<0.05	<0.05	N/S	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	0.05	<0.05		
			Ammonal ELV	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	
Bog Group	P0500-01	Derrybrat	SW9A	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			Gurteen monthly rainfall (mm)	79.4	99.7	90.9	196	304	366	414	222	N/A	371	316	393	311	278	176	246	324	302	333	361	276	407	464	703	253	316				
			Ammonal ELV	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	
Bog Group	P0500-01	Derrybrat	SW9A	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			Gurteen monthly rainfall (mm)	79.4	99.7	90.9	0.064	0.048	0.090	0.065	0.267	N/S	0.123	0.582	0.054	N/S	0.070	0.145	0.048	0.049	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052
			Ammonal ELV	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
Bog Group	P0500-01	Derrybrat	SW9A	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
			Gurteen monthly rainfall (mm)	79.4	99.7	90.9	23.2	20.1	21.3	21.9	18	N/S	74.2	N/S	37.2	N/S	27.8	18	22.2	22.1	20.8	22.5	22.9	30	27	28	41.3	28.9	26.7				
			Ammonal ELV	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7

Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

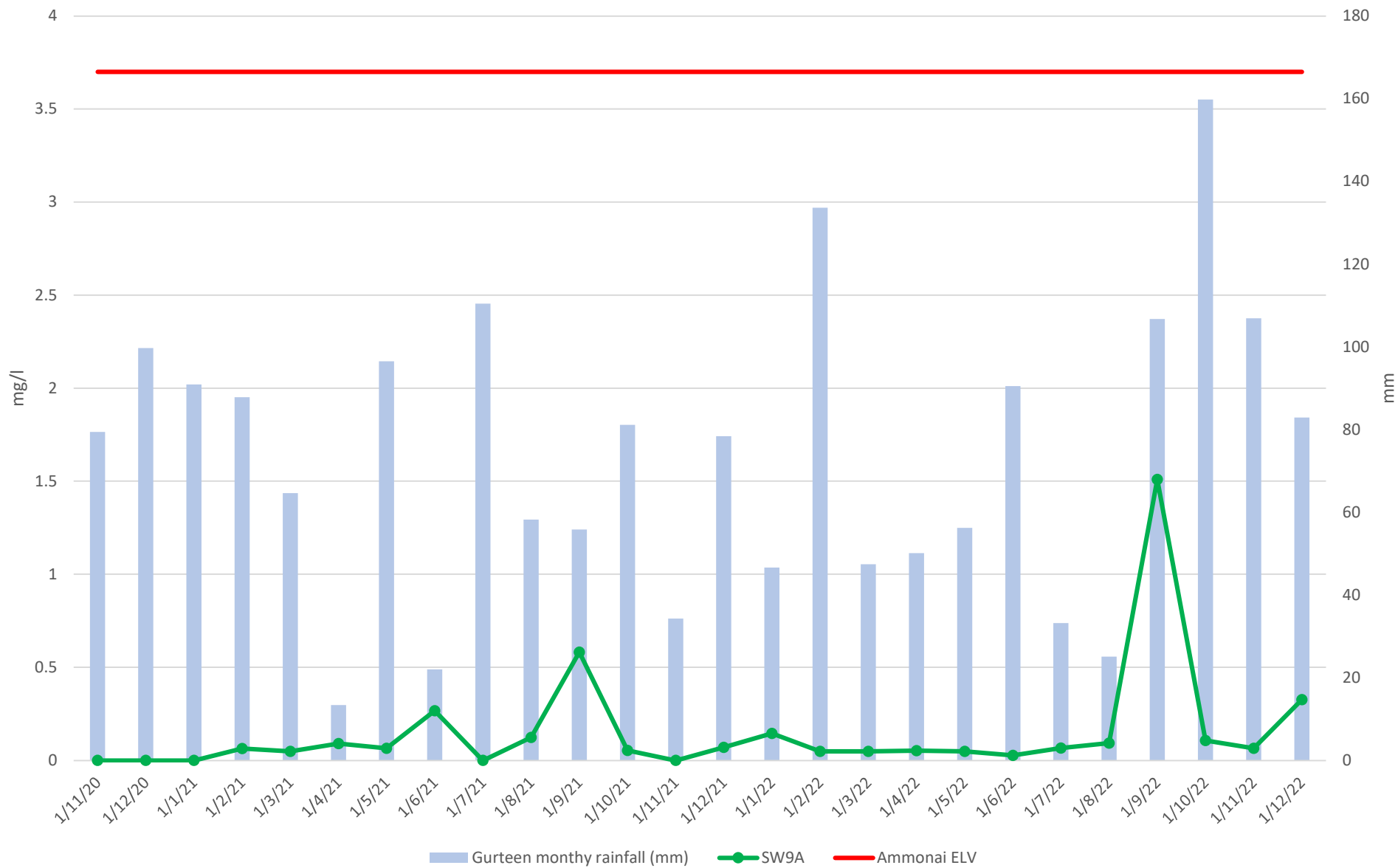
Derrybrat Suspended Solids mg/l



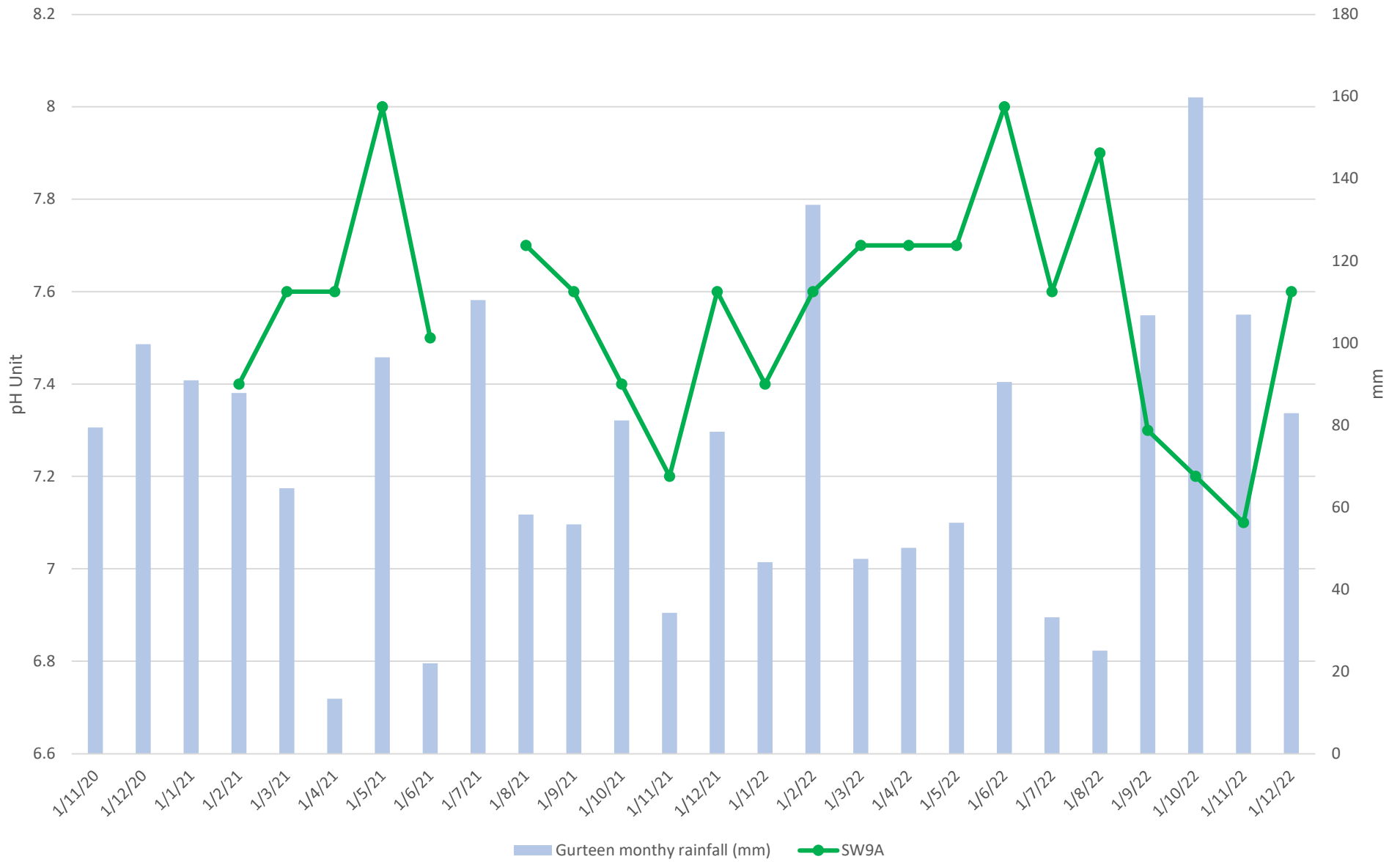
Derrybrat COD mg/l



Derrybrat Ammonia as N mg/l



Derrybrat pH

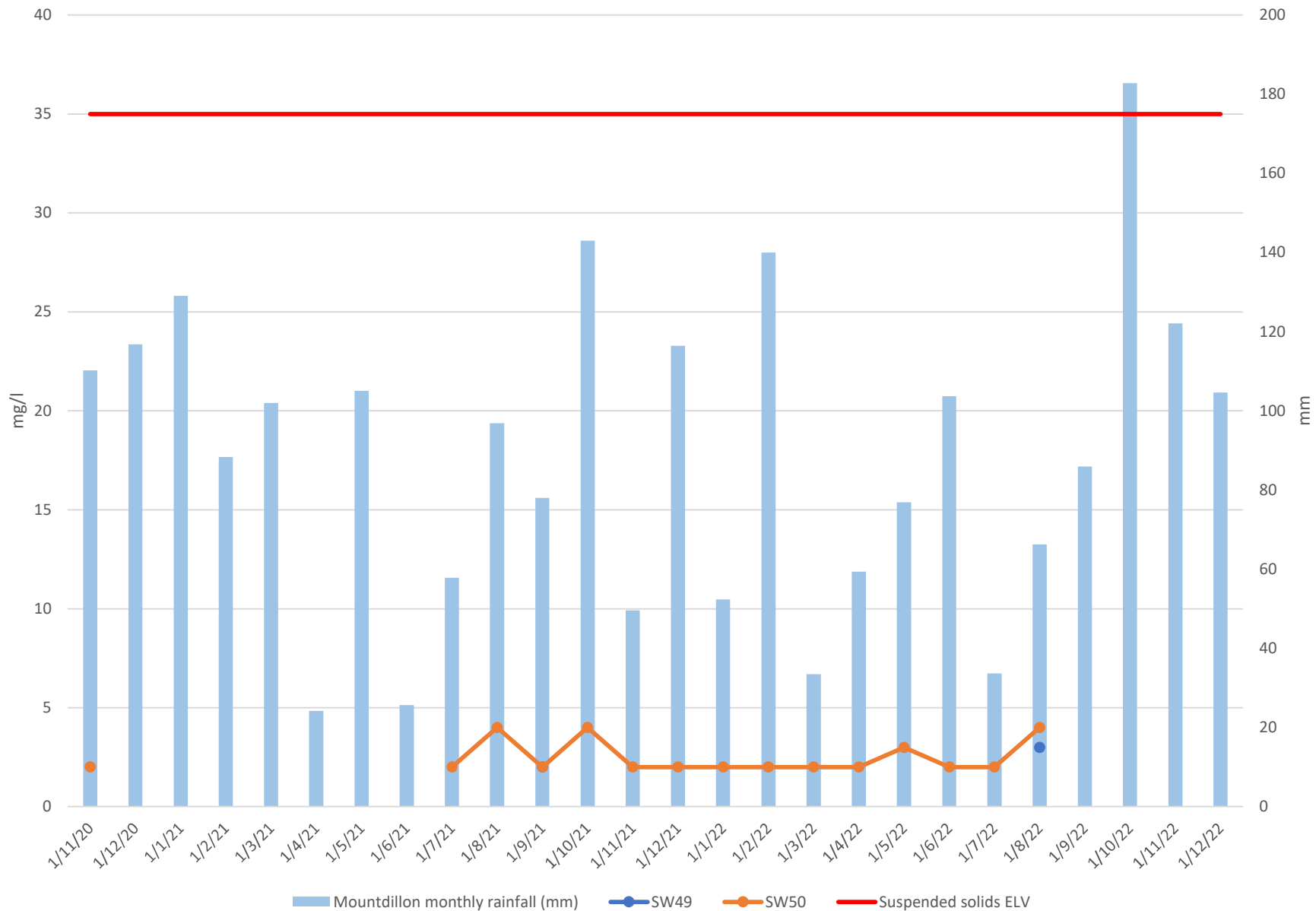


Bog Group	Licence No	Bog Name	SW Code -GIS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l					
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22					
Mountdillon	P0504-01	Knappoge	SW49																															
Mountdillon	P0504-01	Knappoge	SW50	1.54										0.075	2.03	0.111	1.3	0.95	0.15	1.29	0.189	0.035	0.685	2.26	0.029	0.029	0.059							
			Mountdillon monthly rainfall (mm)	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6					
			Ammonia ELV	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42

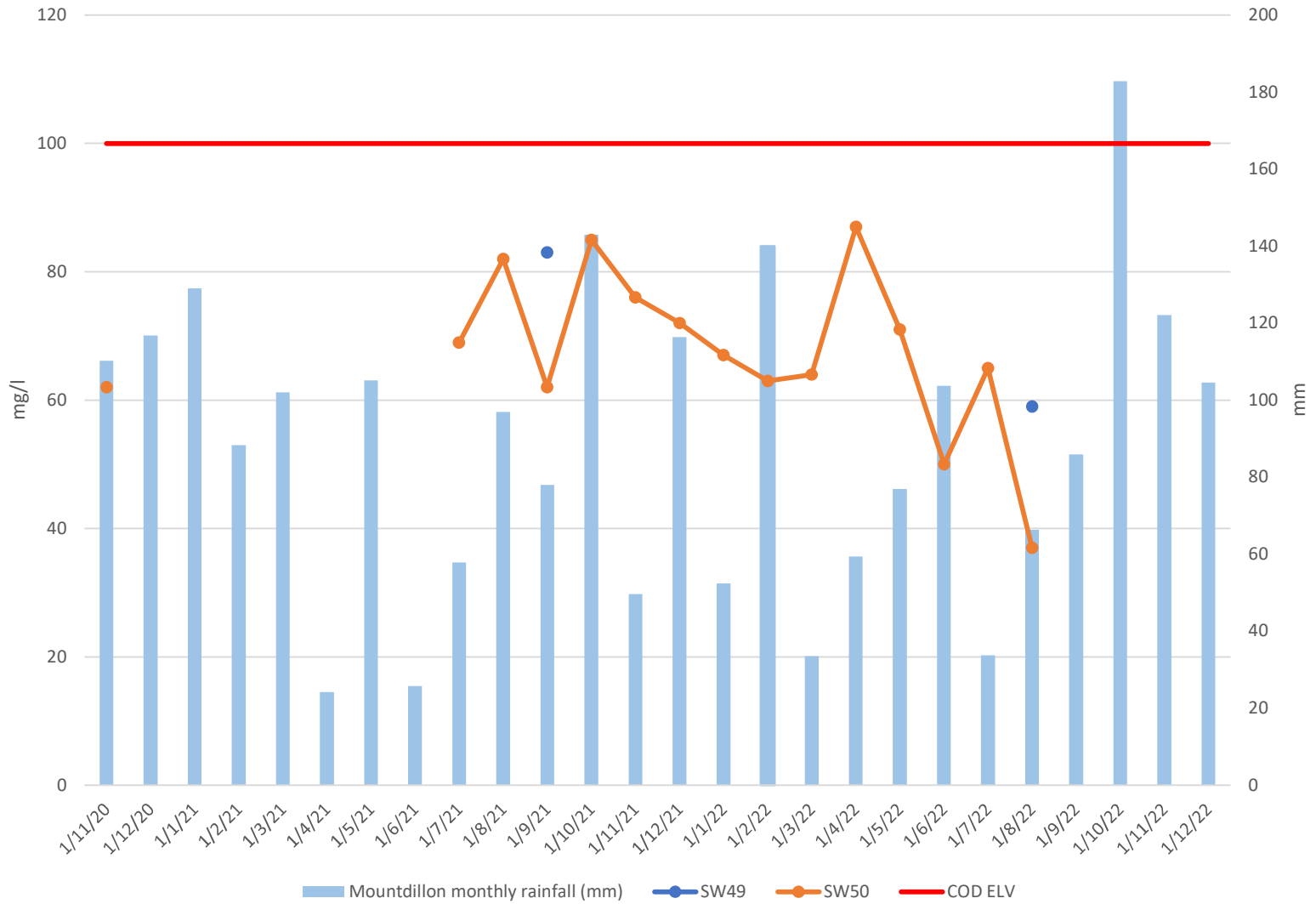
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC		
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22								
Mountdillon	P0504-01	Knappoge	SW49																																			
Mountdillon	P0504-01	Knappoge	SW50	23.1											28.6	60	23	26.2	28.6	28.7	23.8	25.4	27.9	25.7	22	21.5	23.9	15.2	NF	NF	NF	NF						
			Mountdillon monthly rainfall (mm)	110.2	116.8	129	88.3	102	24.2	105.1	25.7	57.8	96.9	78	143	49.6	116.4	52.4	140	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6									

*Blank spaces - No discharges and associated samples available during times of the year when rivers are in flood, during extended dry spells or when rehabilitation has been completed and water is no longer being pumped off the bog

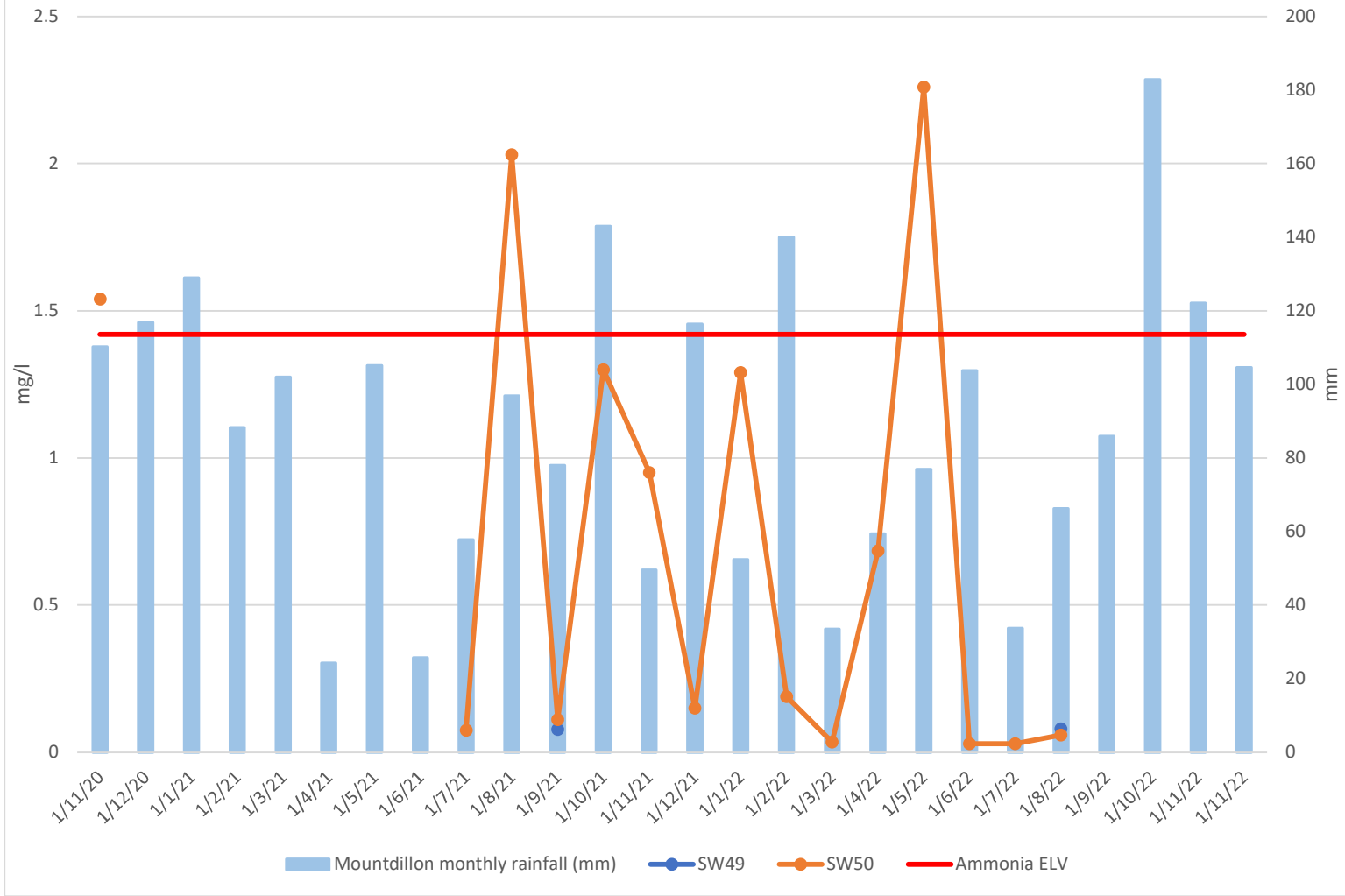
Knappogue Suspended solids mg/l



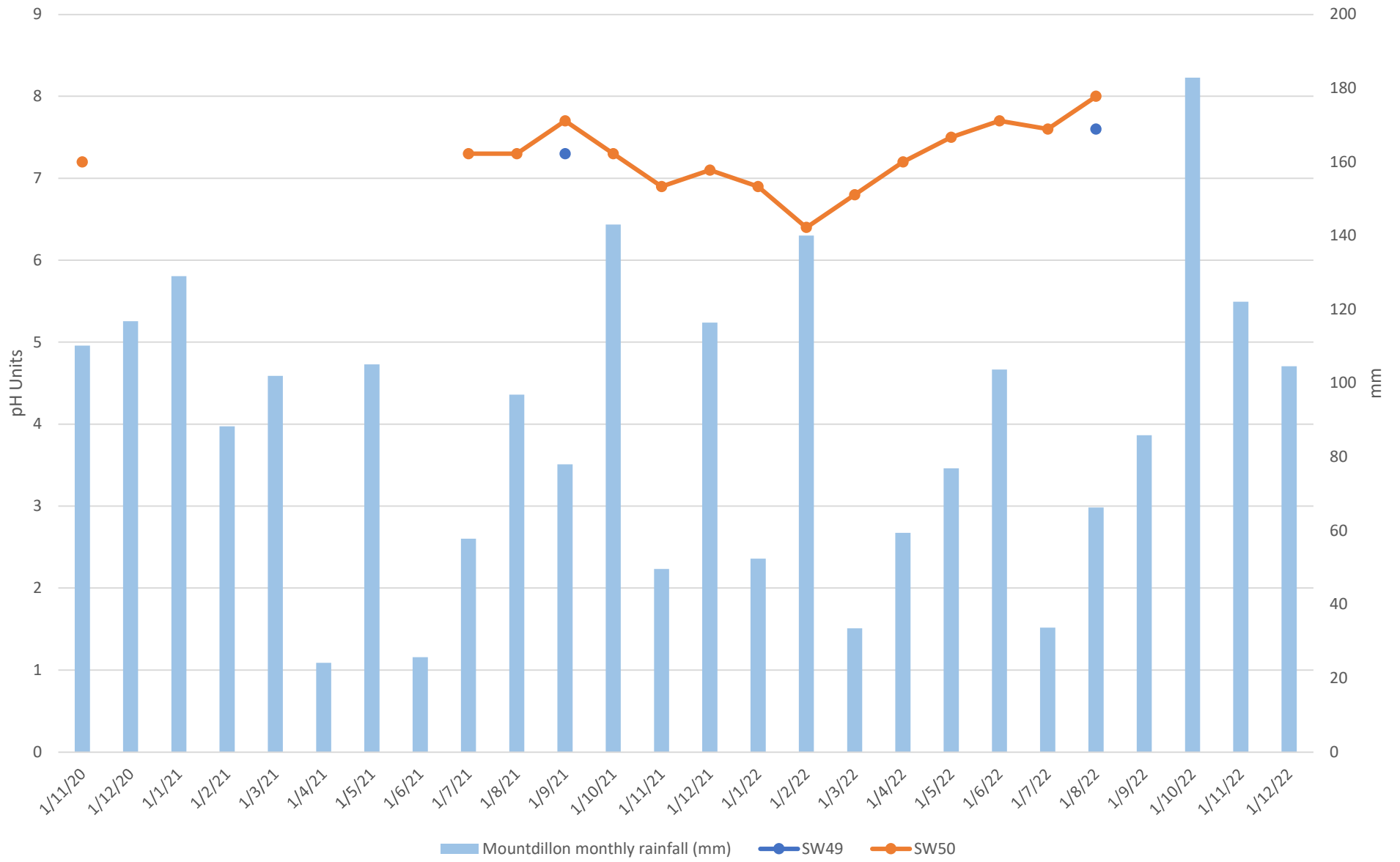
Knappogue COD mg/l



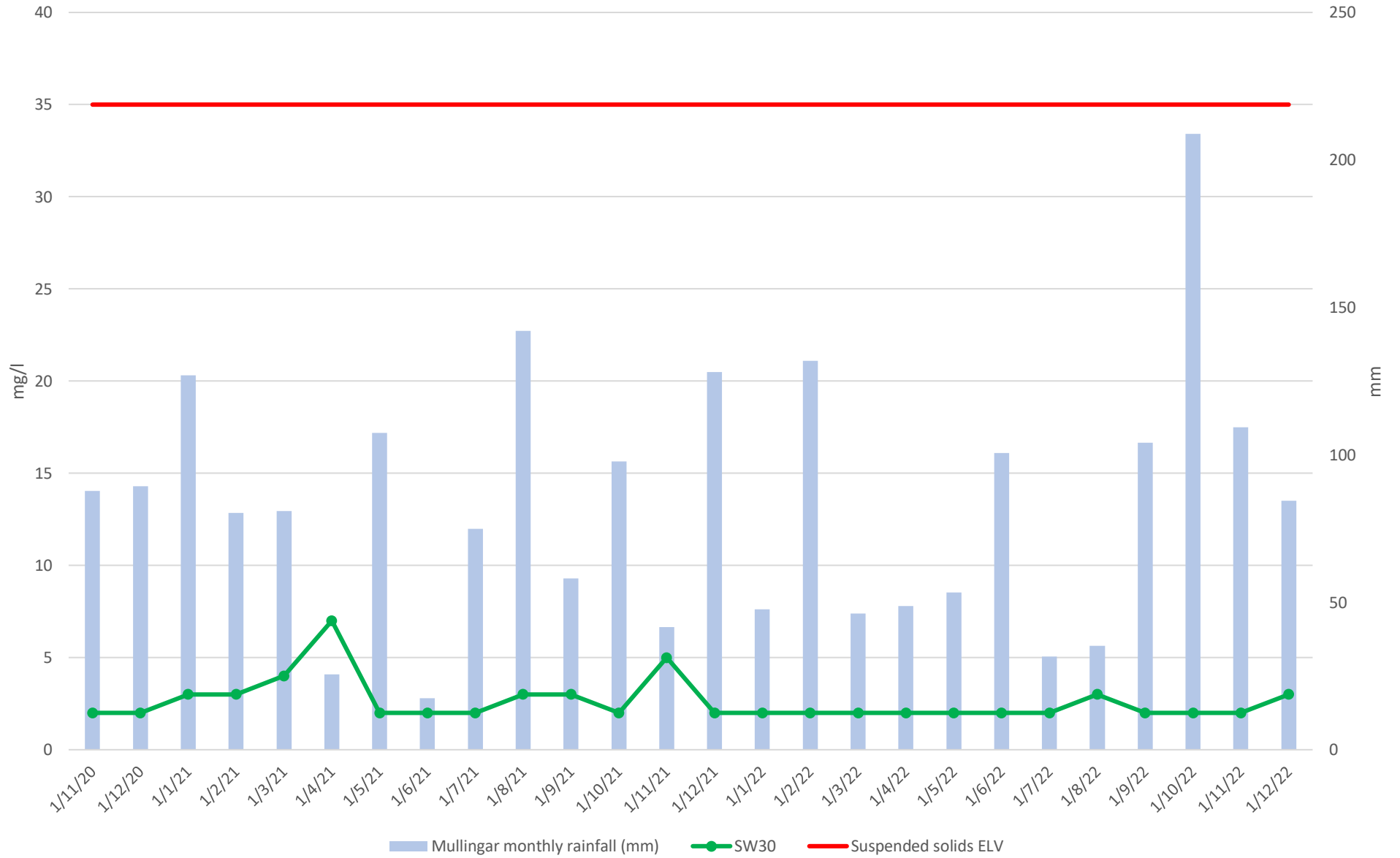
Knappogue Ammonia as N



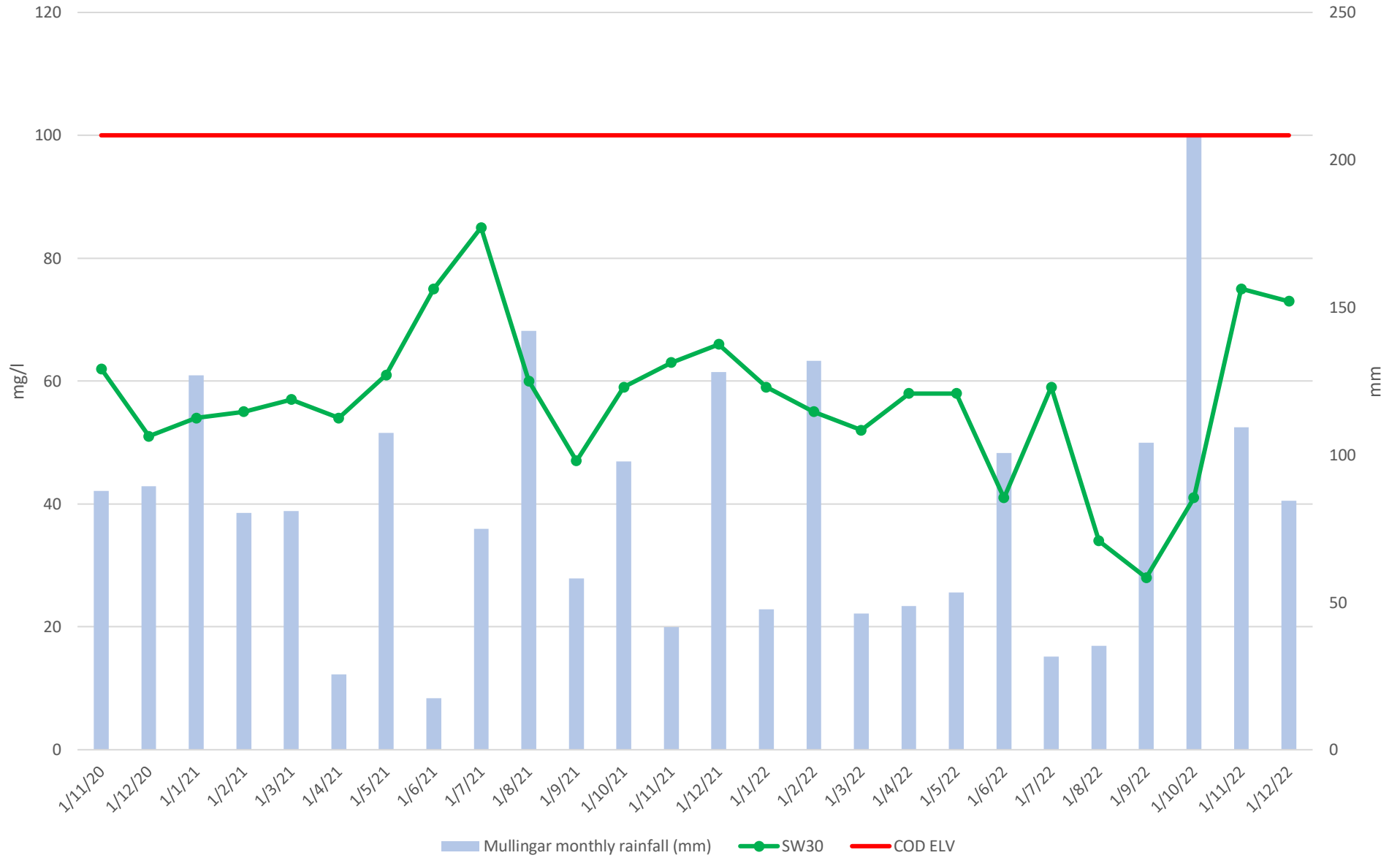
Knappogue pH



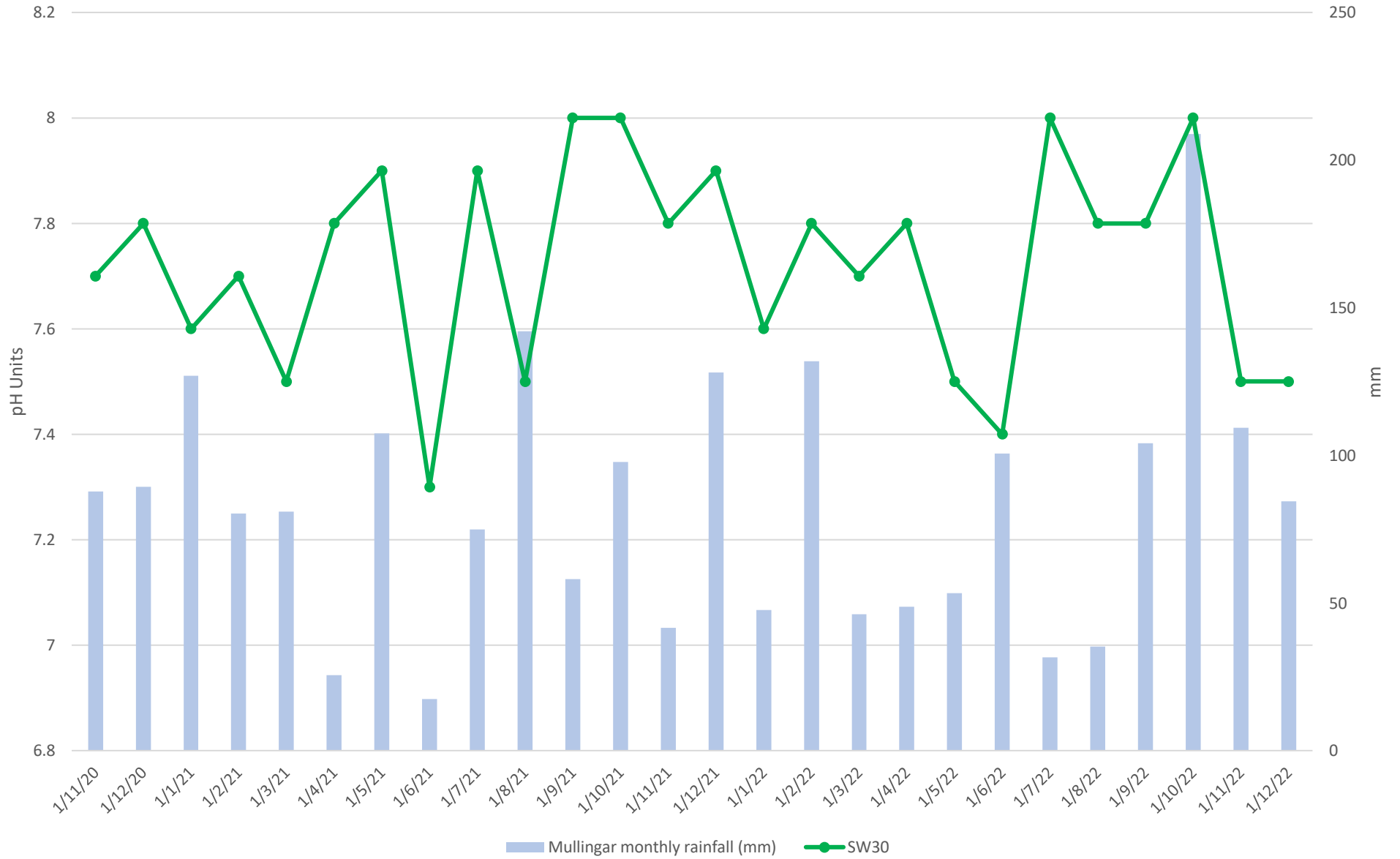
Ballycon Suspended solids mg/l



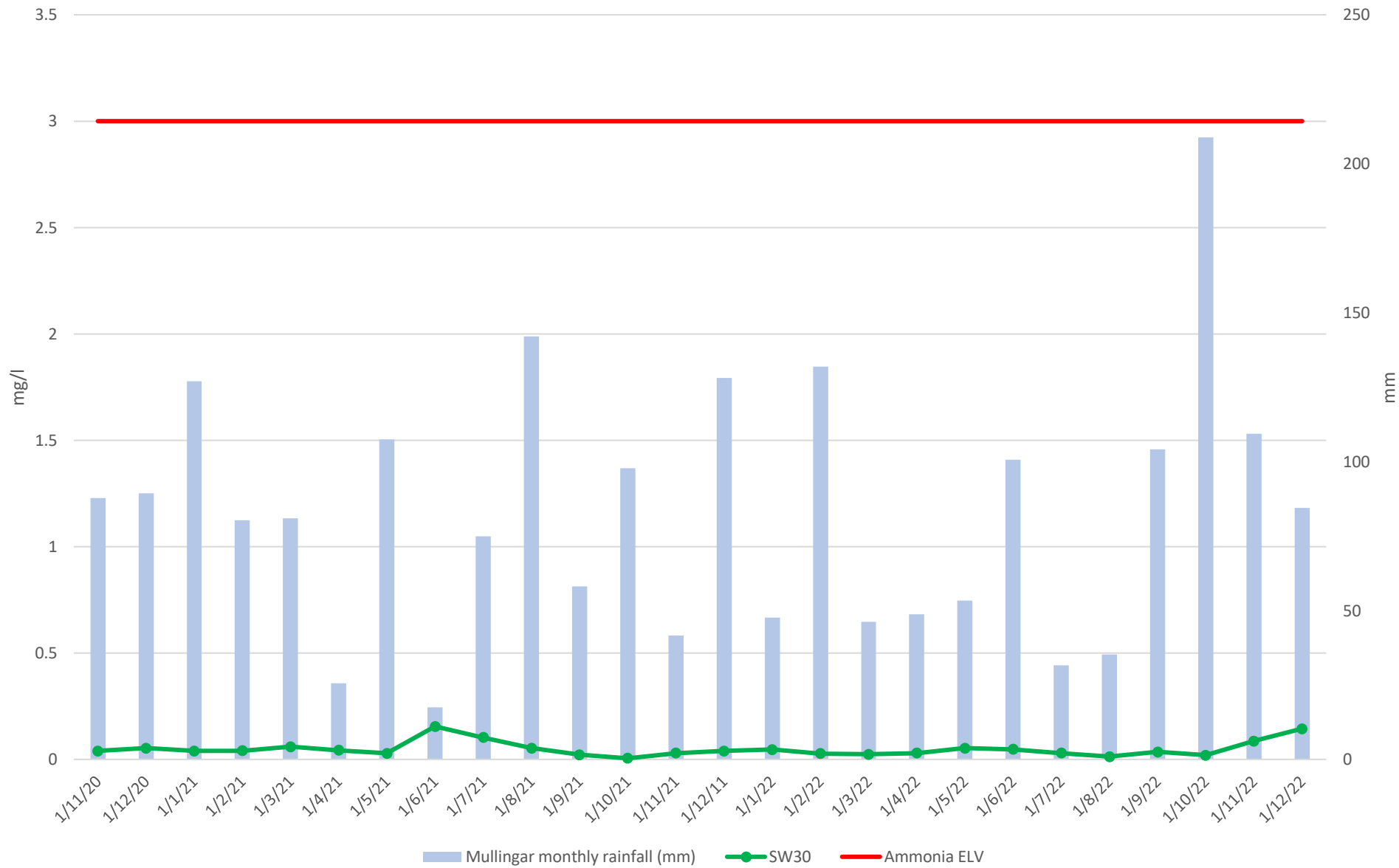
Ballycon COD mg/l



Ballycon pH



Ballycon Ammonia as N mg/l



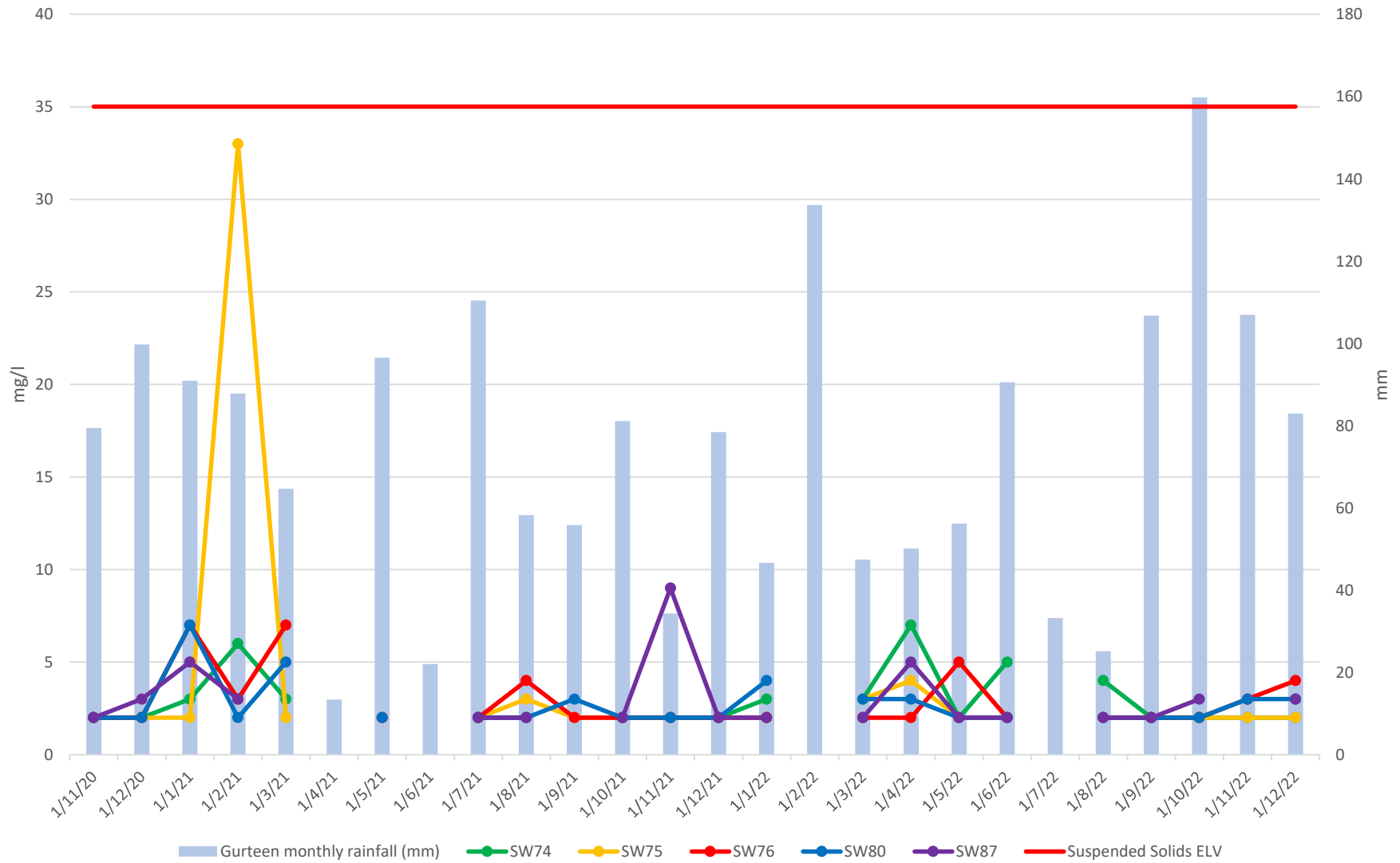
Blackwater	P0502-01	Blackwater Bog	SW87	253	263	N/S	308	N/S	N/S	N/S	N/S	N/S	395	N/S	218	461	203	N/R	N/S	287	344	331	349	N/S	328	254	220	N/S	336
			Gurteen monthly rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9

PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	Ammonia as N																											
					mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22		
Blackwater	P0502-01	Blackwater Bog	SW74		0.140	0.202	0.176	0.171	0.110			0.081	0.539		0.121	0.286	0.081	0.102		0.135	0.112	0.162	0.304		0.300	0.119	0.063	0.064	0.068			
Blackwater	P0502-01	Blackwater Bog	SW75		0.054	0.092	0.126	0.068	0.102		0.073	0.136	0.141	0.068	0.065	0.129		0.076		0.093	0.075	0.177	0.303		0.297	0.112	0.054	0.059	0.071			
Blackwater	P0502-01	Blackwater Bog	SW76		0.045	0.162	0.179	0.085	0.108		0.064	0.126	0.139	0.067	0.063	0.119	0.025	0.067		0.095	0.082	0.113	0.211		0.216	0.110	0.053	0.047	0.084			
Blackwater	P0502-01	Blackwater Bog	SW80		0.021	0.091	0.127	0.088	0.104		0.067	0.127	0.115	0.075	0.068	0.089	0.096	0.068		0.092	0.071	0.114	0.300		0.245	0.111	0.052	0.057	0.078			
Blackwater	P0502-01	Blackwater Bog	SW87		0.213	0.186	0.464	0.132				0.138	0.158	0.034	0.222	0.105		0.046	0.032	0.019	0.055			0.045	0.033	0.368		0.089				
			Gurteen monthly rainfall (mm)		79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9		
			Ammonia ELV		4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26		

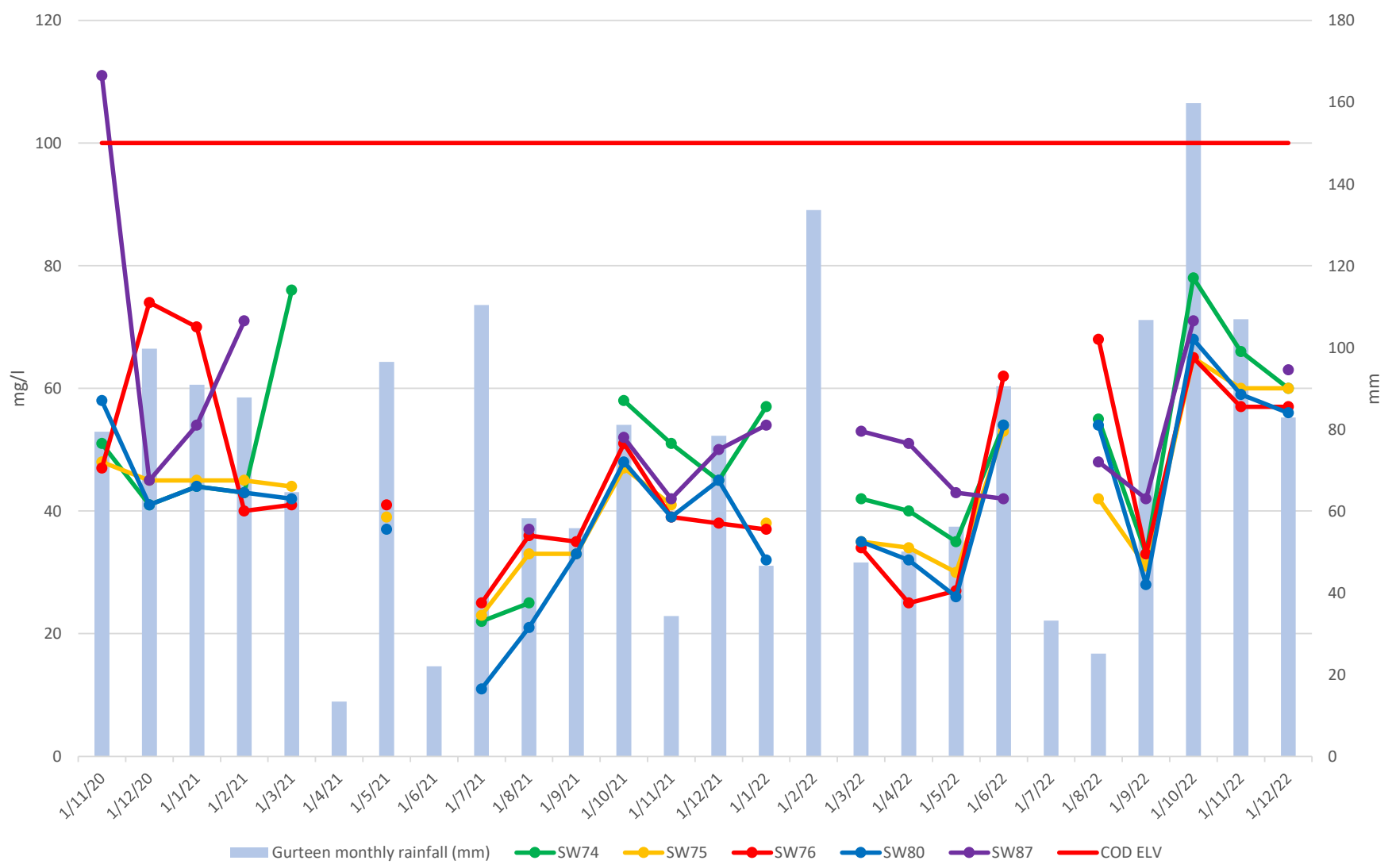
PCAS SW Sampling Scheme	Bog Group	Licence No	Bog Name	SW Code -GIS	DOC																											
					mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
					1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22		
Blackwater	P0502-01	Blackwater Bog	SW74		21	19	16.6	13.7	24.7	N/S	N/S	8.18	75	N/S	22.3	18.3	18.8	22	Note1	15.8	16	14	20	N/S	22	10.3	28.8	27.5	20.6			
Blackwater	P0502-01	Blackwater Bog	SW75		19.8	18.4	16.8	14.8	13	N/S	15.6	N/S	8.33	76.6	8.95	19.4	14.1	N/S	14	Note1	12.5	13	11.4	20.5	N/S	21.6	9.87	25.1	22.3	18.4		
Blackwater	P0502-01	Blackwater Bog	SW76		22.1	32.2	29.2	14.1	12.9	N/S	15.5	N/S	8.77	76.9	9.43	18.7	14.1	15	13.7	Note1	12.5	13.1	10.8	23.1	N/S	22.8	9.67	25	22.1	18.4		
Blackwater	P0502-01	Blackwater Bog	SW80		23.5	18.7	17.9	14.2	12.8	N/S	15.7	N/S	8.36	75.5	8.84	19.2	14.1	18.3	13.5	Note 1	12.70	13.40	11.20	21.20	N/S	21.60	9.90	25.50	22.2	18.5		
Blackwater	P0502-01	Blackwater Bog	SW87		47.5	19.4	20.4	25	N/S	N/S	N/S	N/S	71.5	N/S	20.6	11.6	12.2	21.7	Note 1	19.8	18.5	16.9	16.9	N/S	16.8	14	26.9	N/S	24.8			
			Gurteen monthly rainfall (mm)		79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9		

Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

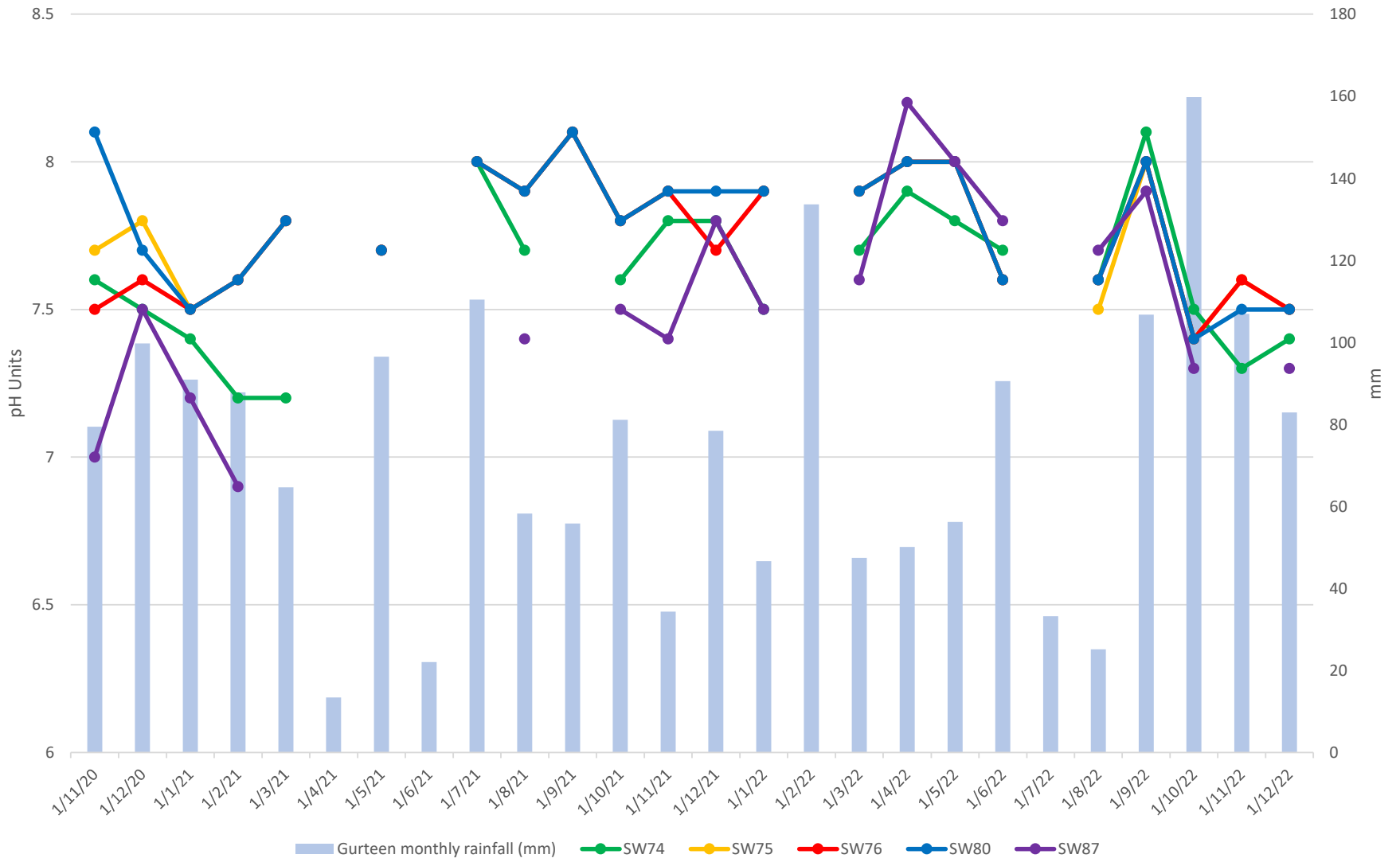
Blackwater Suspended solids mg/l



Blackwater COD mg/l



Blackwater pH

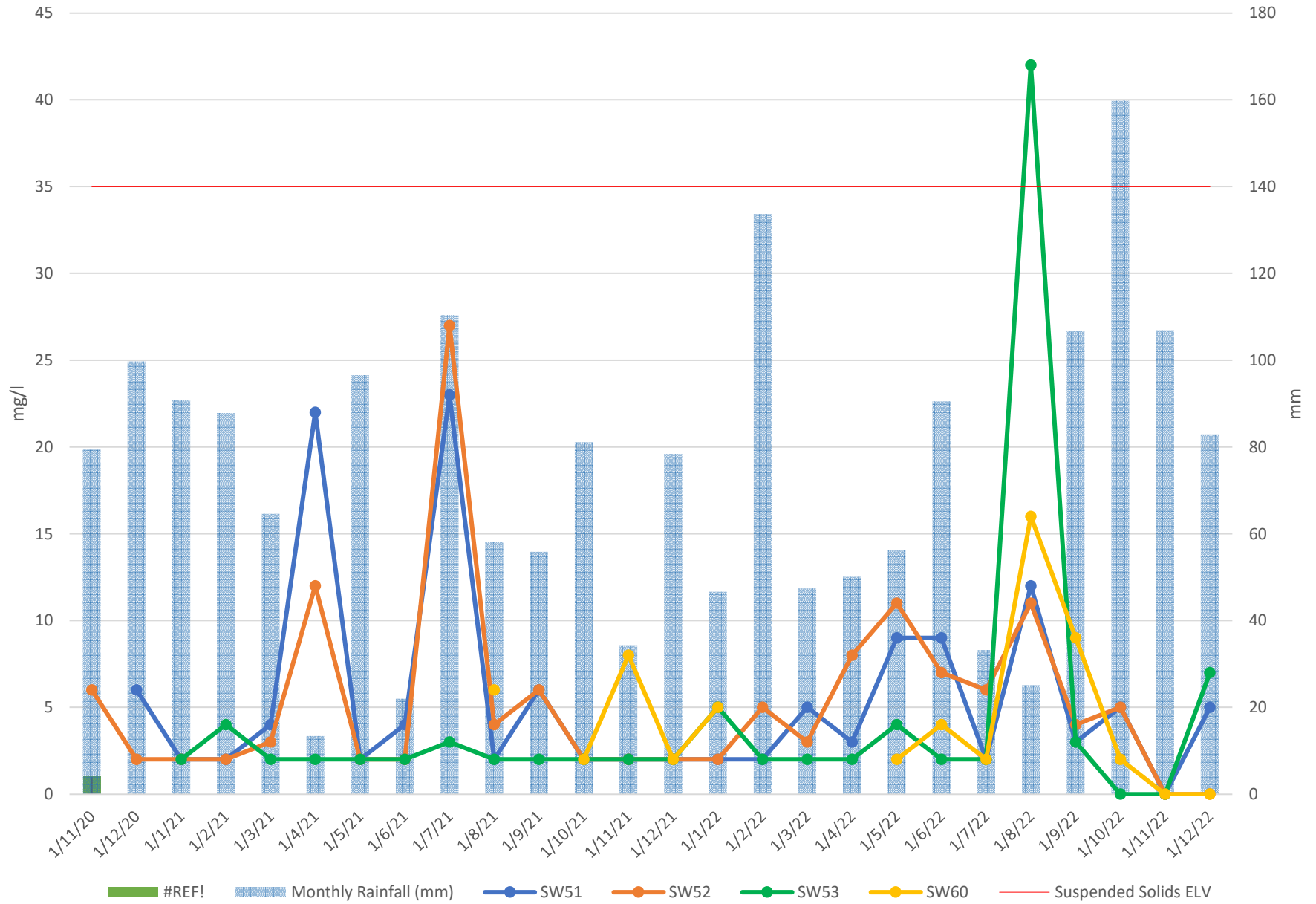


PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N	Ammonia as N
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22	
Blackwater	P0502-01	Clooniff	SW51		0.589	0.037	0.224	2.330	0.044	0.141	0.086	0.061	0.060	0.162	0.417	0.090	0.056	0.045	0.028	0.047	0.075	0.029	0.094	0.055	0.134	0.029	2.580	N/S	0.063	
Blackwater	P0502-01	Clooniff	SW52	0.172	2.190	0.032	0.027	1.950	0.179	2.040	0.083	0.059	0.061	0.211	0.474	0.100	0.059	0.053	0.031	0.065	0.101	0.028	0.070	0.105	0.150	0.027	1.600	N/S	0.063	
Blackwater	P0502-01	Clooniff	SW53			0.020	0.029	0.035	0.012	0.023	0.024	0.034	0.017	0.026	0.029	0.024	0.031	0.032	0.024	0.049	0.023	0.018	0.027	0.028	0.026	0.036	0.031	N/S	0.024	
Blackwater	P0502-01	Clooniff	SW60										1.02	0.485	0.411	0.067	0.055				0.126	0.039	0.809	1.98	2.05	0.705	N/S	N/S		
			Monthly Rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9	
			Ammonia Trigger Level	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	

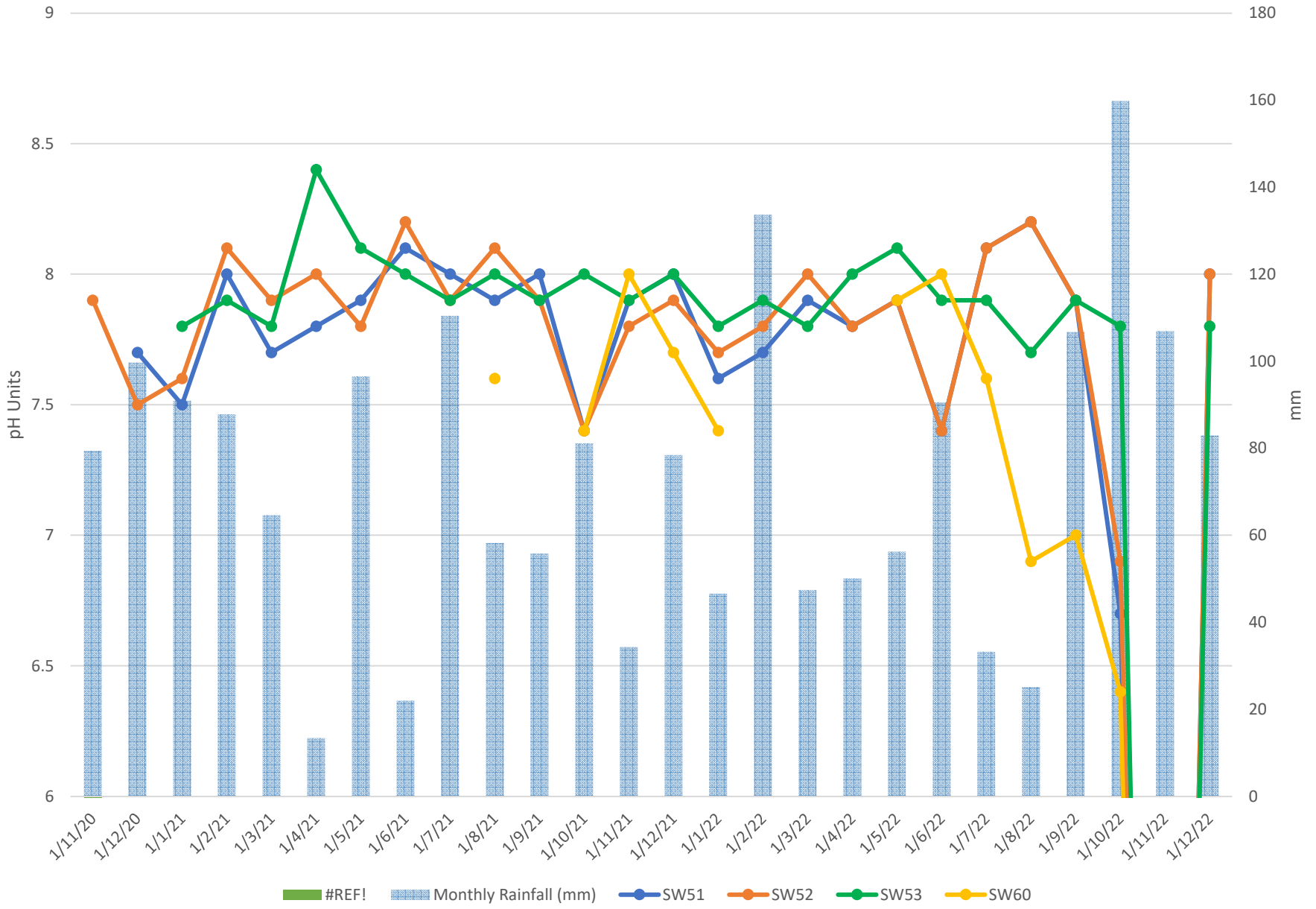
PCAS SW Sampling Scheme	Licence No	Bog Name	SW Code -GIS	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC	DOC
				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
				1/11/20	1/12/20	1/1/21	1/2/21	1/3/21	1/4/21	1/5/21	1/6/21	1/7/21	1/8/21	1/9/21	1/10/21	1/11/21	1/12/21	1/1/22	1/2/22	1/3/22	1/4/22	1/5/22	1/6/22	1/7/22	1/8/22	1/9/22	1/10/22	1/11/22	1/12/22
Blackwater	P0502-01	Clooniff	SW51		17.2	11.5	12.5	15.5	22.2	19.4	6.85	10.7	61.9	7.05	25.6	15.6	14.6	14.9	16.6	12	21.9	24.3	27.3	11.3	3.88	75.5	27.5	N/S	16.8
Blackwater	P0502-01	Clooniff	SW52	16.1	18.8	10.9	11	14.9	9.96	20.2	6.97	10.4	79.2	9.22	25.8	15.3	14.3	15.2	17.7	12.3	21.9	23.8	27.2	8.4	3.84	5.13	24.8	N/S	17.2
Blackwater	P0502-01	Clooniff	SW53			10.1	7.17	11.4	5.55	6.72	4.97	8.71	80.7	4.91	11.9	7.55	11.6	10.5	10.7	8.92	5.4	7.27	4.83	6.82	0.351	4.89	15.2	N/S	9.69
Blackwater	P0502-01	Clooniff	SW60										54.3		25.6	24.5	18.1	15.9			16.6	30.1	23.7	20.5	23.4	21.6	N/S	N/S	
			Monthly Rainfall (mm)	79.4	99.7	90.9	87.8	64.6	13.4	96.5	22	110.4	58.2	55.8	81.1	34.3	78.4	46.6	133.6	47.4	50.1	56.2	90.5	33.2	25.1	106.7	159.8	106.9	82.9

Blank spaces - No results available during times of the year when rivers are in flood or during extended dry spells

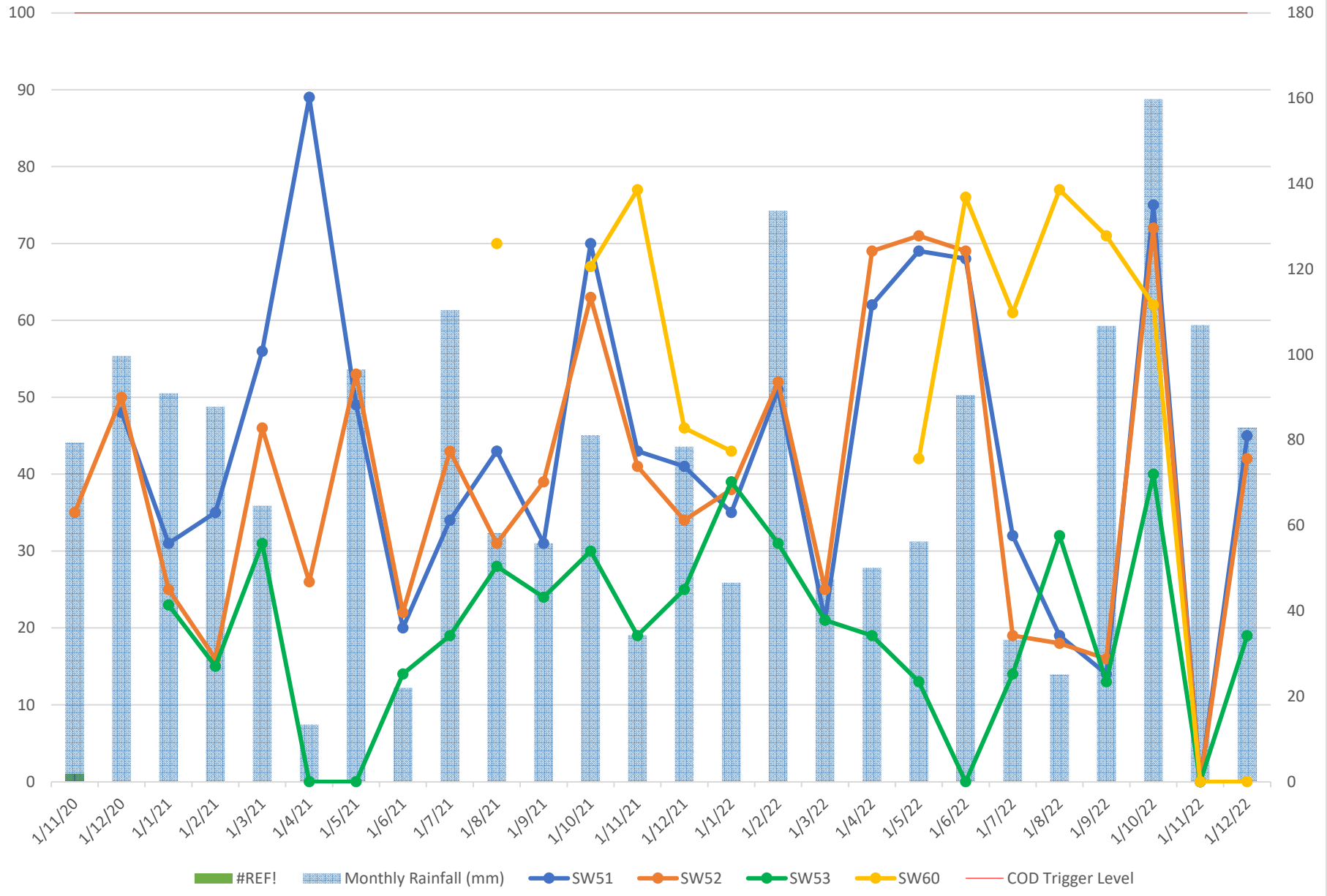
Clooniff Suspended Solids mg/l



Clooniff pH



Clooniff COD mg/l



Clooniff Ammonia as N mg/l

