SoNaRR 2025 Technical Annex 1

Most evidence within the SoNaRR 2025 evidence portal references online sources. This document contains additional information that is referred to in the SoNaRR 2025 evidence portal that is not published elsewhere. It is organised around the relevant ecosystem or natural resource.

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shows some of the results from NRW's deterioration due to coastal squeeze project (Oaten, Finch and Frost, 2024). The results shown are for the Representative Concentration Pathway (RCP) 8.5 95th percentile sea-level rise scenario and assume that Shoreline Management Plan (SMP) policies are implemented. This means that as there is a shift in management to no active intervention or managed realignment, this provides space for habitat to develop landward of current defences. The results for 'All Habitat Groups' includes saltmarsh, vegetated shingle, dunes and littoral coarse sediment as well as intertidal sand and mud and intertidal reef which are also shown separately within the table. In the short term, Intertidal sand and mud is expected to move into areas previously occupied by saltmarsh as the saltmarsh is squeezed or may experience gains if accommodation space is opened up as a result of no active intervention or managed realignment policies. As sea-levels continue to rise, we expect to see these short-term gains turning to habitat loss. Intertidal reef is expected to suffer losses in both the short and medium term under this scenario.

Table 2 shows that the Habitats Regulations Assessments for the Shoreline Management Plans in Wales predict a total loss of approximately 330 Ha of saltmarsh, intertidal sand and mudflat habitat around Wales by 2025 due to coastal squeeze (Atkins, 2010; Earlie, Guthrie and Clipsham, 2012; Halcrow Group, 2012b, 2012a).

Table 1 Predicted change in habitat extent within Marine Protected Areas (MPAs), in hectares, as a result of Coastal Squeeze : 95th SLR percentile, SMP policy scenario. (Oaten, Finch and Frost, 2024)

MPA Name	All habitats 2025 to 2055 (Ha)	All habitats 2055 to 2105 (Ha)	Saltmarsh 2025 to 2055 (Ha)	Saltmarsh 2055 to 2105 (Ha)	Intertidal mudflat and sandflat 2025 to 2055 (Ha)	Intertidal mudflat and sandflat 2055 to 2105 (Ha)	Intertidal Reef 2025 to 2055 (Ha)	Intertidal Reef 2055 to 2105 (Ha)
Pembrokeshire Marine / Sir Benfro Forol	-4.16	-9.53	-0.69	-1.68	-0.85	-1.63	-0.56	-1.31
Pen Llyn a'r Sarnau / Lleyn Peninsula and the Sarnau	-25.78	-49.20	-152.79	-25.17	93.58	-19.87	-0.52	-1.52
Cardigan Bay / Bae Ceredigion	-0.67	-1.74	0.00	0.00	28.89	87.07	-0.02	0.00
Dee Estuary / Aber Dyfrdwy (Wales)	-20.23	-129.87	-78.39	-306.21	-11.27	-10.14	0.00	0.00
Y Fenai a Bae Conwy / Menai Strait and Conwy Bay	-21.85	-29.35	0.00	0.00	0.00	0.00	-4.71	-6.22
Glannau Mon: Cors heli / Anglesey Coast: Saltmarsh	-0.12	-0.31	-3.04	-10.97	1.39	5.13	0.00	0.00
Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd	-72.87	-238.60	-39.98	-122.94	-29.62	-67.17	0.00	0.00
Severn Estuary (Wales)	-104.23	-527.66	-46.73	-124.70	-16.86	-258.44	-14.60	-70.17
All MPAs	-249.91	-986.27	-321.62	-591.67	65.25	-265.05	-20.41	-79.22

Table 2 Predictions in the Shoreline Management Plans in Wales of saltmarsh, intertidal sand and mudflat habitat loss around Wales by 2025 at designated Natura 2000 sites due to coastal squeeze (Atkins, 2010; Earlie, Guthrie and Clipsham, 2012; Halcrow Group, 2012b, 2012a)

Designated Natura 2000 site	**Habitat loss 2005 – 2025 (Ha)**	**Habitat loss 2025 – 2055 (Ha)**	**Habitat loss 2055 – 2105 (Ha)**	**Habitat loss 2005 – 2105 (Ha)**
Severn Estuary SAC (Welsh section only)	226	463	1,223	1,912
Burry Inlet / Carmarthen Bay SAC	59	163	411	636
Pembrokeshire Marine SAC	2	4	5	11
Pen Llŷn a'r Sarnau SAC	40	150	111	300
Glannau Môn Cors Heli SAC	1	4	11	16
Menai Strait and Conwy Bay SAC	3	12	1	16
Dee Estuary SAC	0	140	454	594
Total across these SACs	331	936	2,216	3,485

Semi-natural grassland

Pressure: Afforestation (future outlook)

Afforestation has been listed as a ‘high pressure’ for ‘species-rich *Nardus* grassland’ for reporting under Regulation 9A of The Conservation of Habitats and Species Regulations 2017 (NRW, 2026). This is a predominantly upland habitat, often occurring as small areas intermixed with upland acid grassland (which is not protected and therefore identified for tree planting). Unmapped areas of ‘species-rich *Nardus* grassland’ could therefore be vulnerable to afforestation or to a loss of connectivity between patches of the habitat.

Pressure: Agricultural intensification (short-term past trend).

Conversion to intensive agricultural grassland has been highlighted as a ‘high pressure’ on ‘*Molinia* meadows’ grassland for reporting under Regulation 9A of The Conservation of Habitats and Species Regulations 2017 (NRW, 2026). The reporting has also listed over-use of fertilisers as a high pressure for one further grassland type, and over-grazing is listed for a further two types; fertiliser over-use and overgrazing are both associated with increased agricultural intensification.

Pressure: Air pollution (short-term past trend)

Reporting under the Conservation of Habitats and Species Regulations 2017 concluded that atmospheric nitrogen deposition was a high ranking pressure for all forms of grassland reported on, which is the same as reported in 2018. Slight reduction in the area exceeding critical load was detected for three grassland types and no change for the other three types (NRW, 2026).

Table 3 Pressures assessed as ‘high’ for grassland European Protected Habitats in Wales *(NRW, 2026)*.

European Protected Habitat listed under Annex 1 of the EU Habitats Directive, 1992 (abbreviated titles)	Extent in hectares (Wales)	Atmospheric nitrogen pollution	Over-grazing	Under-grazing	Abandonment	Natural succession	Fertiliser application	Conversion to intensive agriculture	Invasive native species	Invasive non-native species	Climate change	Conversion to forest	Ground-water pollution	Drainage	Insufficient mowing
Calaminarian grasslands	74.5	High	-	High	-	High	-	-	High	High	-	-	-	-	-
Siliceous alpine and boreal grasslands	84.0	High	High	-	-	-	-	-	-	-	-	-	-	-	-
Alpine and subalpine calcareous grasslands	1.7	High	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-natural dry grasslands	907.1	High	-	High	High	-	High	-	-	High	-	-	-	-	-
Species-rich Nardus grasslands	137.2	High	High	High	-	-	-	-	-	-	-	High	-	-	-
Molinia meadows	515.6	High	-	High	High	High	-	High	High	-	High	-	High	-	-
Lowland hay meadows	10.7	High	-	-	-	-	-	-	-	-	High	-	-	High	High

Pressure: Built development and infrastructure (long-term past trend)

House building rates in Wales remained fairly static between 2014/15 and 2019/20 (at around 6000 to 7000 new dwellings per year) and have slowed thereafter (Welsh Government, 2025). Most impact on semi-natural grassland is in the south and south-eastern part of Wales, where most of the country's house building takes place. There are examples also in other parts of Wales, for example an area of marshy grassland priority habitat at Cefneithin, Carmarthenshire, lost to housing development between 2013/14 and 2019 (Figure 1 and Figure 2).

Figure 1 Area of marshy grassland priority habitat at Cefneithin, Carmarthenshire lost to housing development between 2013 and 2019, Aerial photograph from 2013. *Credit: © Getmapping PLC*

Figure 2 Area of marshy grassland priority habitat at Cefneithin, Carmarthenshire lost to housing development between 2013 and 2019, Aerial photograph from 2019. Credit*: © Getmapping PLC*

Pressure: Changes in intensity and frequency of weather events (future outlook)

The different forms of semi-natural grassland are evaluated for their sensitivity to climate change projections by Staddon *et al*. (2023). Wet meadows and marshy grasslands are given a high rating and are among the most sensitive of all habitats to climate change. This is reflected in recent habitat reporting under Regulation 9A of The Conservation of Habitats and Species Regulations 2017, where a ranking of High for the effects of climate change is allocated to the two forms of wet/damp grassland reported under the regulations. (NRW, 2026)

Pressure: INNS (short-term past trend)

Invasive non-native species have been ranked as a ‘high pressure’ for two grassland habitat types in Wales during reporting under Regulation 9A of The Conservation of Habitats and Species Regulations 2017. (NRW, 2026)

Pressure: Reduced land use/ management intensity (short-term past trend)

An assessment of the condition of qualifying features on protected sites was undertaken by NRW in 2020. A total of 471 grassland SSSI features (plus 11 SAC features for calaminarian grassland) were assessed, the results of which are presented in Table 4. Overall, 37% of these grassland features were recorded as unfavourable and only 9% favourable (condition of 54% was recorded as unknown) (NRW, 2023).

Table 4 Number and percentage of Wales grassland SSSI feature name assessed across each condition category (SAC qualifying features for calaminarian grassland) from NRW Protected Sites Baseline Assessment 2020

SSSI feature name	Total Qualifying features	Number Favourable	Percentage favourable	Number Unfavourable	Percentage unfavourable	Number Unknown	Percentage unknown	Number Destroyed	Percentage destroyed
Marshy grassland	176	9	5	63	36	102	58	2	1
Neutral grassland	180	23	13	65	36	92	51	0	0
Acid grassland	68	7	10	17	25	44	65	0	0
Calcareous grassland	47	1	2	28	60	17	36	1	2
Calaminarian grassland	11	1	9	3	27	7	64	0	0
All grassland SSSI features	482	41	9	176	37	262	54	3	1

Soil

Pressure: Built development and infrastructure (short-term past trend)

There has been an increase in amount of soil that is being reused through the Definition of Waste Code of Practice (DoWCoP) through CL:AIRE (a UK charity working on sustainable land use) (CL: AIRE, no date). This may include uncontaminated material or material that has been treated. For the period 2012 to 2020, declarations remained relatively stable at around 20-25 per year. There was then a sharp rise in the number of declarations in 2021 to around.50 declarations, to a peak in 2023 of around.85 declarations, and around.65 in 2024 (Figure 2). The sharp increase from 2021 is likely due to a combination of factors such as: the changes made to DoWCoP, including a new online portal streamlining the process and making it easier for operators; increased industry awareness of the DoWCoP; and evolving sustainability requirements.

See SoNaRR 2025 Aim 4 Annex: Waste evidence for further information on waste soil.

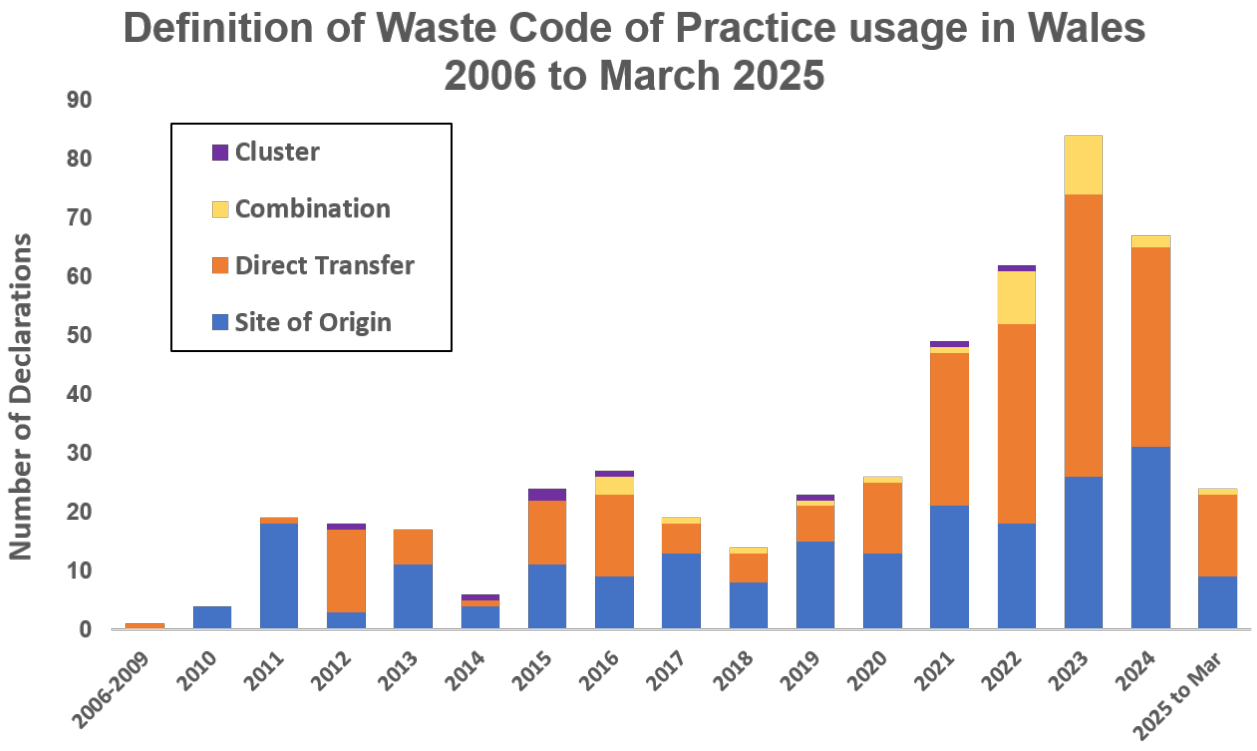

Figure 3 Number of declarations of Soil that that has been reused through the Definition of Waste Code of Practice (DoWCoP)Source: personal communication from CL:AIRE

Water

Pressure: Water abstraction and demand (short-term past trend)

Since SoNaRR2020, total licensed abstraction has increased from 10.6 million megalitres per year to 11.9 million megalitres per year. See Table 5 for all licensed abstractions by sector, including non-consumptive water use, comparison of 2019 (as reported in SoNaRR2020 (NRW, 2021)) and 2024 (NRW, 2025).

Table 5 Licensed abstraction quantities in megalitres per year by sector (including non-consumptive water use), comparison of 2019 and 2024. *(NRW, 2025)*

Sector	Ml/y SoNaRR 2020 (2019)	% of Total Abstraction	Ml/y SoNaRR 2025 (2024)	% of Total abstraction	Ml/y change	% change 2019 to 2024
Water	1,684,859	16	1,537,238	13	-147,621	-9
Energy Production	8,286,004	78	9,629,231	81	1,343,227	14
Amenity	75,252	>1	127,939	1	52,687	12
Industry	528,800	5	428,617	4	-100,183	-11
Environment	36,580	>1	48,416	>1	11,836	25
Agriculture	63,494	>1	118,671	1	55,207	53
Crown and Government	Not reported	Not reported	105	>1	-	100
All sectors	10,615,575	100	11,890,217	100	1,274,642	12

A large proportion of the licensed water abstracted in Wales is returned to the local environment. These abstractions are considered to be non-consumptive and are mostly made up of water abstracted for hydropower (81% of all water abstracted) and flow through for fisheries ponds. Since SoNaRR2020, consumptive abstraction has reduced from 2.3 million megalitres per year to 2.1 million megalitres

per year (NRW, 2025). The quantities and proportionality of consumptive water abstractions have changed for some sectors. Some of these changes are as a result of the introduction of new authorisations, licensing of existing abstractions that were previously exempt.

Since SoNaRR 2020, 112 abstractions (above 20m3/d) for previously exempt purposes have been licensed. These are part of the SoNaRR 2025 assessment, including a new category for Crown and Government owned licences (NRW, 2025).

See Table 6 for data on proportional changes in consumptive abstractions between 2019 (as reported in SoNaRR 2020) and 2024.

Table 6 Proportional changes in consumptive abstractions from SoNaRR 2020 to SoNaRR 2025, in megalitres per year. (personal communication)

Sector	Ml/a SoNaRR 2020 (2019)	% of all Consumptive abstractions	Ml/a SoNaRR 2025 (2024)	% of all Consumptive abstractions	% change 2019 to 2024
Water	1684859	73	1537238	73	0
Amenity	14883	>1	14455	>1	0
Industry	526694	23	428617	21	-19
Environment	36580	>1	48416	2	7
Agriculture	63116	2	67040	3	6
All sectors	2293202	100	2095870	100	-9

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