REPORT

River Clun SAC Addendum

Prioritised restoration areas mapping

Client: Shropshire Council

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1 Introduction

1.1 Restoring the River Clun SAC

The River Clun is a tributary of the River Teme and drains a predominantly rural catchment in Shropshire. The River Clun SAC is notified solely for the presence of freshwater pearl mussels *Margaritifera margaritifera*, and contains one of the few lowland populations left in the UK. Freshwater pearl mussels are particularly sensitive to changes in water quality, with nutrient enrichment impacting long term adult survival and juvenile recruitment.

The SAC designation corresponds with Unit 6 of the River Teme Site of Special Scientific Interest (SSSI), and only includes the lower reaches where the freshwater pearl mussels are found. Unit 6 extends from Broadward Bridge near Marlow to the confluence with the River Teme, and was assessed in March 2014[1] as being in unfavourable declining condition for the following reasons:

- Inappropriate water levels;
- Inappropriate weirs dams and other structures;
- Invasive freshwater species;
- Siltation; and
- Water pollution – agriculture / run off.

These existing pressures within the catchment need to be addressed through the implementation of restoration measures by Natural England and partner organisations. This means that the use of land within the catchment for the construction of new residential developments and the delivery of measures to mitigate any increases in nutrient supply resulting from changes to land use and increased population pressures must not prevent the delivery of the measures identified by Natural England as being required to achieve favourable condition in the SSSI (and, by extension, the SAC).

Natural England is yet to establish a full restoration plan and undertake mapping of the priority restoration areas. As a result, there is uncertainty on the scale and location of restoration measures. However, Natural England has provided some indication of the prioritised restoration actions and the catchments where certain interventions are required. The purpose of this report is to identify indicative locations of the land needed for restoration (i.e. actions to address existing pressures), in order to provide more clarity on land which can be used for mitigation (i.e. actions to address the pressures associated with new residential development).

Section 2 provides an overview of the prioritised restoration actions outlined by Natural England. **Section 3** presents the findings of the GIS mapping exercise.

1.2 Overview of the catchment

The River Clun operational catchment is divided into eight river water bodies in the Severn River Basin Management Plan (RBMP)[2], which are presented in **Table 1** and

[1] *Unit detail (naturalengland.org.uk)*
[2] *Clun River Operational Catchment | Catchment Data Explorer*

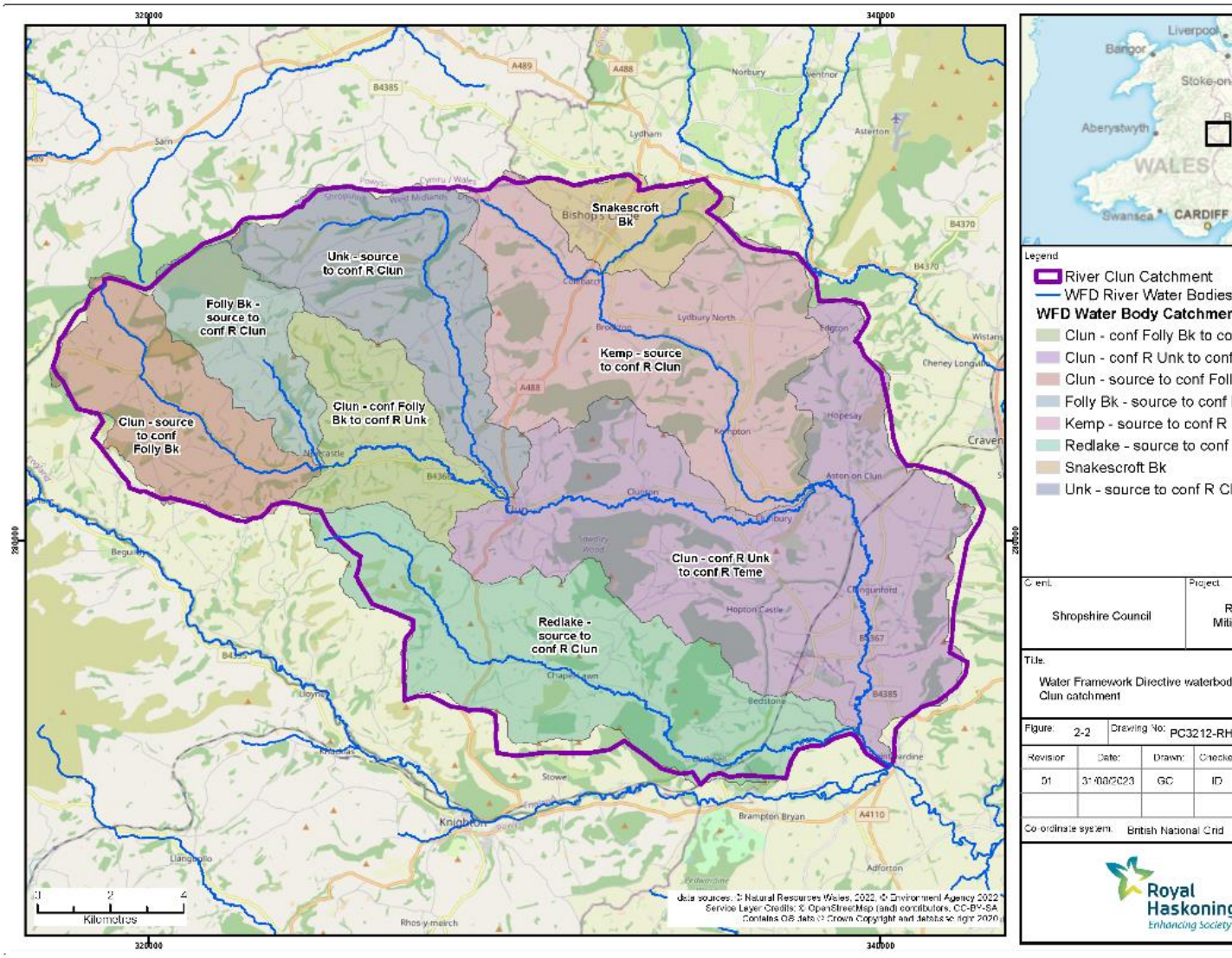

Figure 1. The River Clun SAC is situated in the lower reaches of the Clun – conf R Unk to conf R Teme water body.

Table 1: *River water bodies in the River Clun operational catchment body*

River water body	Water body ID	Catchment area (km²)
Clun – conf Folly Brook to conf R Unk	GB109054043980	19.26
Clun – conf R Unk to conf R Teme	GB109054043990	27.12
Clun – source to conf Folly Brook	GB109054044000	23.34
Folly Brook – source to conf R Clun	GB109054044020	14.39
Kemp – source to conf R Clun	GB109054044060	51.01
Redlake – source to conf R Clun	GB109054043950	47.22
Snakescroft Brook	GB109054044061	10.13
Unk – source to conf R Clun	GB109054044040	29.31

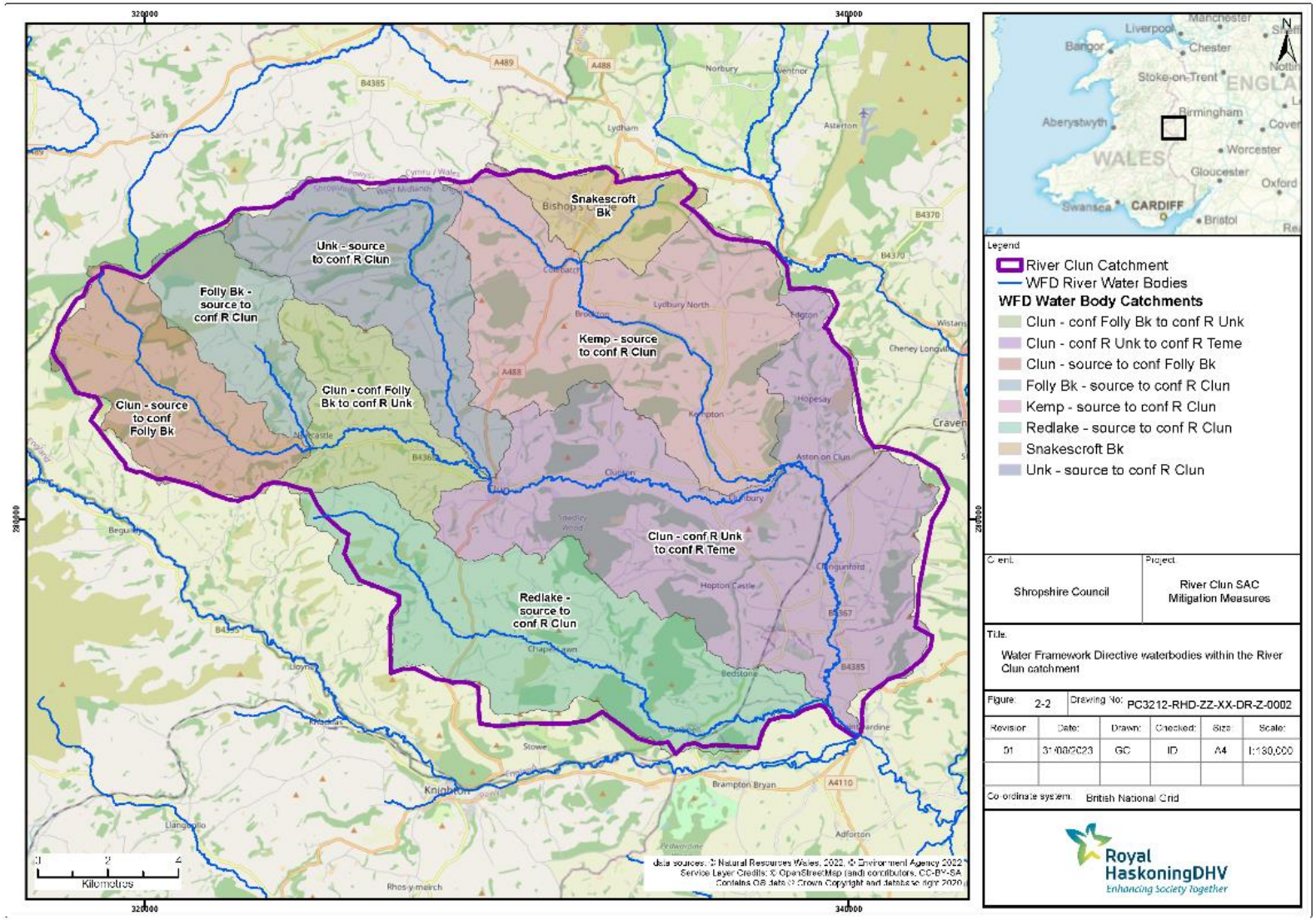

Figure 1: *River water bodies in the River Clun catchment*

2 River Clun Restoration Actions

A River Clun restoration workshop, run by Natural England, was held in June 2022 in which a list of restoration actions was established. The following actions were drawn up in order to restore the River Clun SAC to favourable condition:

1. **Upland restoration**
    a. Peat restoration (restores hydrology)
    b. Upland habitat restoration (e.g. heathland) above 300m

2. **Riparian corridor restoration: Clun and all tributaries**
    a. Functioning riparian corridor
    b. Ravine woodland
    c. Slow the flow

3. **Wider agricultural landscape (prioritised on upland and slopes)**
    a. Drain blocking & slow the flow to restore hydrology (priority in the upper Clun and Folly Brook sub-catchments)
    b. Arable impact reduction (reversion) (in the River Unk sub-catchment specifically)
    c. Livestock de-intensification (dairy in the Kemp sub-catchment, beef and sheep in the whole River Clun catchment)
    d. Increase infiltration
    e. Reduce fertiliser application/liming
    f. Conifer management
    g. Buffer/ecotones to habitats – natural infrastructure

4. **Transport infrastructure**
    a. De-link highways drainage
    b. Constructed wetlands

5. **Water companies**
    a. Water company Combined Sewer Overflows (CSOs)

6. **In-channel restoration**
    a. River crossings & tracks
    b. Remove in channel man made obstructions
    c. De-canalisation in lower reaches

7. **FWMP restoration strategy**

The prioritised restorations actions are shown on **Figure 2**.

Figure 2: *River Clun prioritised restoration actions*

3 GIS mapping

A desk-based mapping exercise was undertaken using GIS, using freely available catchment data to map locations that are likely to be required to meet the prioritised restoration actions identified by Natural England. Not all of the prioritised restoration actions can be assigned a specific location (e.g. slow the flow, increase infiltration) and are expected to be carried out across the entire catchment. Some of the other actions require in-channel interventions and will not necessarily affect the adjacent floodplain. The implementation of mitigation land is also likely to deliver some of the restorations actions as an additional benefit. The prioritised restoration actions included in the mapping are presented in **Table 2**.

Table 2: *Prioritised restoration actions included in mapping*

Prioritised restoration action	Actions included in mapping	Actions not included in mapping
Upland restoration	1a, 1b	
Riparian corridor restoration	2a, 2b	2c
Wider agricultural landscape	3b, 3c, 3e	3a, 3d, 3f, 3g
Transport infrastructure		4a, 4b
Water companies	5a	
In-channel restoration		6a, 6b, 6c
FWMP restoration strategy		7

Table 3 below outlines the various layers used in the mapping and how the layers relate to the prioritised restoration actions.

Table 3: *Layers used in the GIS mapping*

Layer	Description	Restoration action addressed	Source
Peaty soils locations (England)	Location of deep peaty soils, shallow peaty soils and soils with peaty pockets in England. The Peat Layer was produced for the purposes of the Partnership Project to Protect and Enhance Peat Soils (aka. The Peat Project).	1a	Natural England ARM Team (2008) - Peaty Soils Location (England) - Overview (arcgis.com)
Priority habitats Inventory – lowland heathland & upland Heathland	Land mapped as either lowland or upland heathland by the priority habitats inventory.	1b	Natural England (2023) - Priority Habitats Inventory (England) - data.gov.uk
WWNP riparian woodland potential locations	Areas mapped as suitable for riparian buffer strips and wet woodlands (floodplain woodlands).	2a	Environment Agency (2020) mapping potential for Working with Natural Processes (WWNP)
Unk catchment + arable land	Any land within the Unk – source to conf R Clun which overlaps with arable land within the CORINE land use.	3b	Environment Agency (2021) WFD river, canal and surface water transfer water bodies cycle 2 - WFD River, Canal and Surface Water Transfer Waterbodies Cycle 2 - data.gov.uk

Layer	Description	Restoration action addressed	Source
			CORINE land cover (2018) Version 2020_20u1 - CLC 2018 — Copernicus Land Monitoring Service
Arable land at risk of erosion	CORINE arable land located on very high, high, moderate and low erosion risk (excluding low risk) identified using SCIMAP. Low risk defined as lowest quarter (25%) of SCIMAP risk map results.	3b / 3e	SCIMAP sediment risk map - SCIMAP – Diffuse Pollution and Flood Water Source Mapping CORINE land cover
Kemp catchment + pasture land	Any land within the Kemp – source to conf R Clun catchment which overlaps with pasture land within the CORINE land use.	3c	River water bodies CORINE land cover
Livestock land at risk of erosion	CORINE pasture land located on very high, high, moderate and low erosion risk (excluding low risk) identified using SCIMAP.	3c / 3e	CORINE land cover SCIMAP sediment risk map
CSO locations + 50m buffer	All Severn Trent Water CSO locations with a 50m buffer to account for any adjacent interventions.	5a	Sewage Map | The Rivers Trust

Figure 3 below presents the findings of the GIS mapping exercise. **Table 4** provides an overview of the outcomes of mapping exercise.

Table 4: *Overview of outcomes of GIS mapping*

Restoration action addressed	Outcome of mapping
1a	Peaty soils are predominantly found in the northwest of the catchment and in the upland areas. The dominant areas are the upper reaches of the Clun – source to conf Folly Bk, Folly Bk – source to conf R Clun and Unk – source to conf R Clun water bodies. Smaller pockets of peaty soils are found further downstream.
1b	Small areas of heathland are found in the northwest of the catchment, predominantly in the Clun – source to conf Folly Bk water body.
2a	Riparian woodland areas are found throughout the catchment, typically 25-50m width from the main rivers and ordinary watercourses.
3b / 3e	Arable land is predominantly found within the lower reaches of the Unk – source to conf R Clun water body. Other areas of arable land at risk of pollution are predominantly found in the Kemp – source to conf R Clun and the Clun – conf R Unk to conf R Teme water bodies.
3c / 3e	Pasture land at risk of pollution is found throughout the catchment.
5a	CSOs are located around Bishop's Castle, Clun and Bucknell.

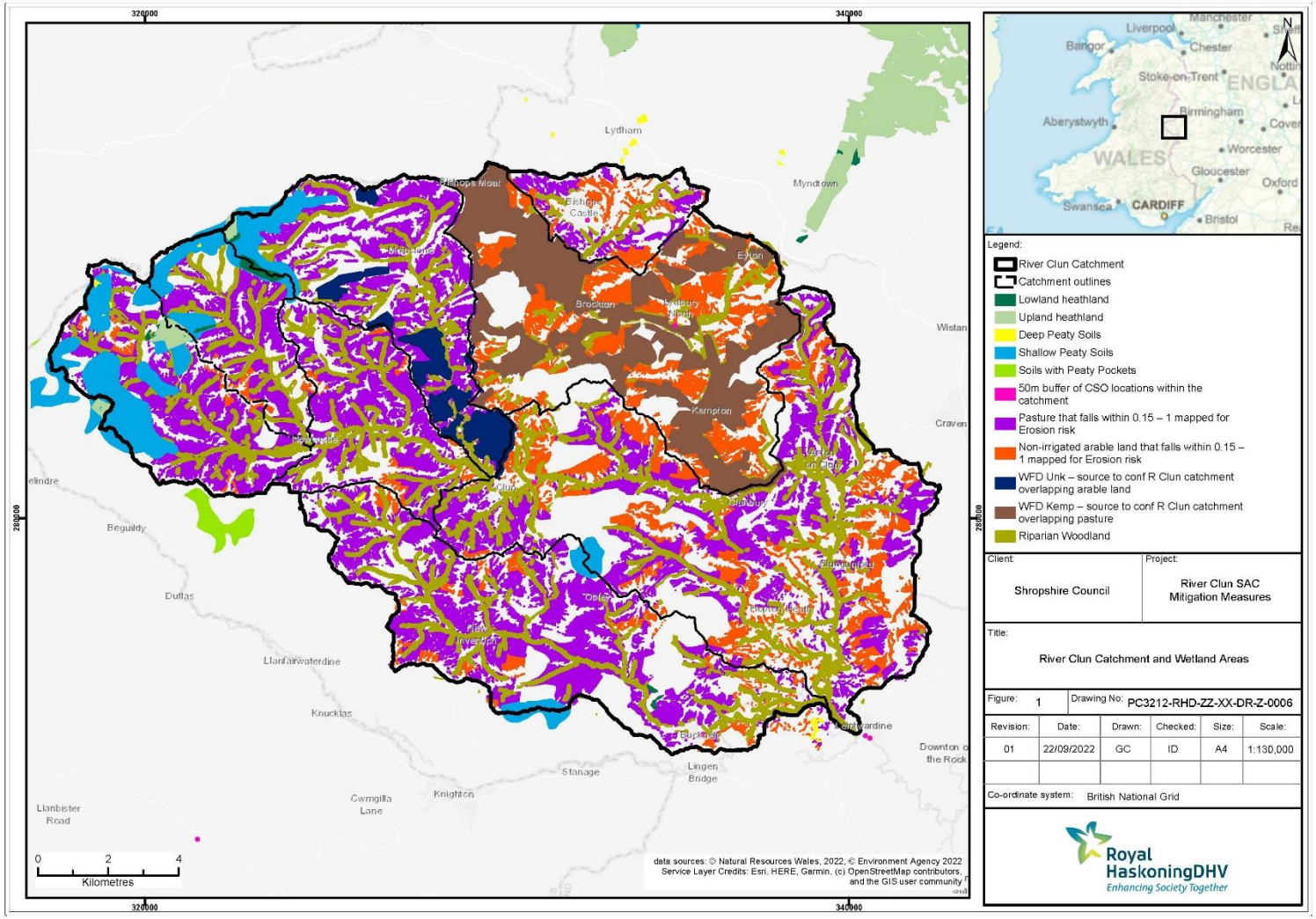

Figure 3: *River Clun prioritised restoration actions areas*

Table 5 below outlines the various layers used in the mapping and total area (in ha) suitable for each layer within the catchment.

Table 5: *Suitable area in the catchment for each layer*

Layer	Restoration action addressed	Area within catchment (Ha)
Peaty soils locations (England)	1a	1,238
Priority habitats Inventory – lowland heathland & upland Heathland	1b	109
WWNP riparian woodland potential locations	2a	3,569
Unk catchment + arable land	3b	476
Arable land at risk of erosion	3b / 3e	1,141
Kemp catchment + pasture land	3c	2,227
Livestock land at risk of erosion	3c / 3e	4,344
CSO locations + 50m buffer	5a	3

4 Conclusions

The following conclusions can be drawn:

- The River Clun SAC is designated for the population of freshwater pearl mussels in its lower reaches. The SAC is in unfavourable condition for various reasons, including excessive nutrient concentrations.
- A full restoration plan is required to restore the SAC to Good condition but is yet to be established. However, a list of prioritised restoration actions has been provided.
- A GIS mapping exercise was undertaken to provide indicative locations where the prioritised restoration actions are likely to be required.
- This mapping provides greater clarity of the locations suitable for mitigation measures, which must not inhibit the ability to restore the River Clun SAC to Good condition.