Burland, Brindley & Rookery Brook Diffuse Pollution Project

Catchment Characterisation

March 2018

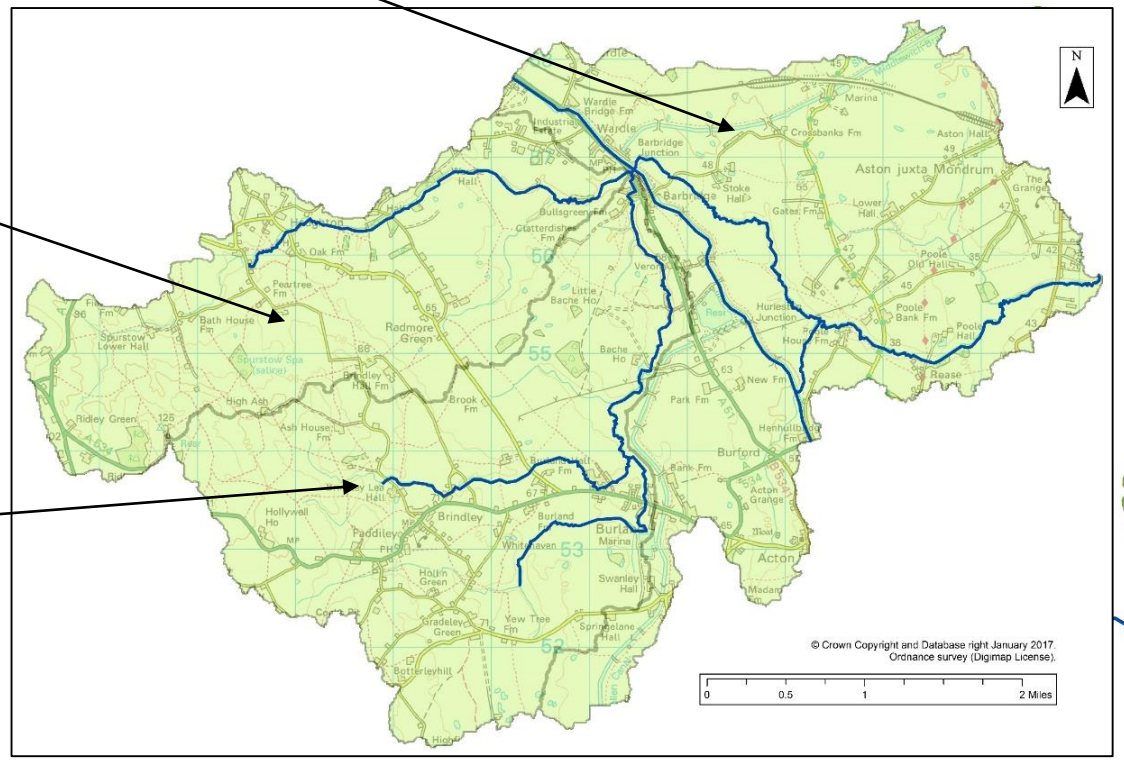
This catchment characterisation provides an overview of the Burland, Brindley and Rookery Brook catchments and summarises findings from catchment walkover surveys, desktop survey and farm advisory work delivered by Reaseheath College advisors during 2016-2017. Associated GIS layers can be requested from the RADA team by contacting hub@reaseheath.ac.uk with permission from the Environment Agency.

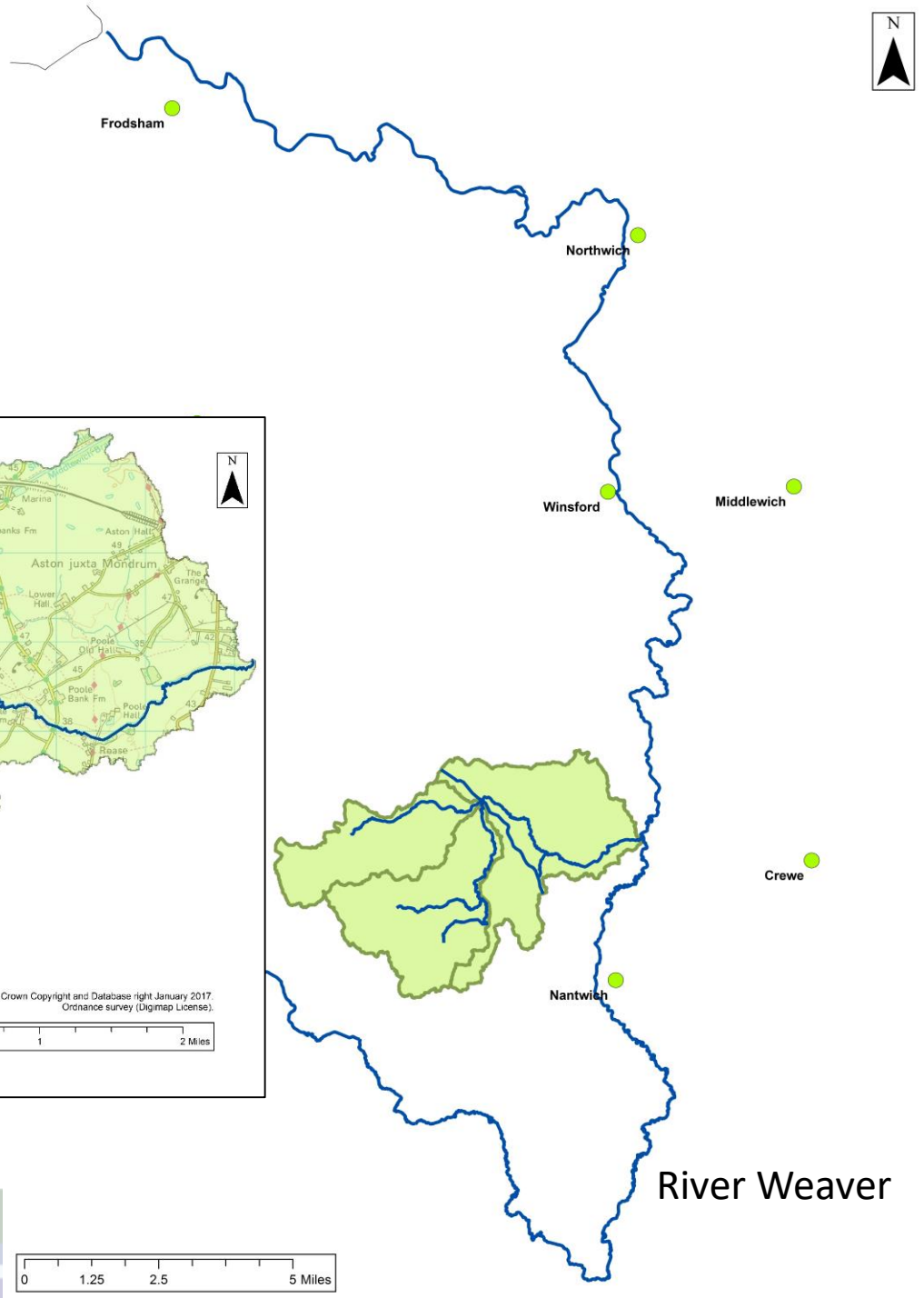
Catchment Overview

- **Lower Rookery Brook**
  ID:GB112068055340
  Area: 18.30km^2
  Length Main River: 7.84 km

- **Upper Rookery Brook**
  ID:GB112068055330
  Area: 10.97 km^2
  Length Main River: 3.24 km

- **Burland & Brindley Brook**
  ID:GB112068055320
  Area: 14.86 km^2
  Length Main River: 5.21 km





Project Overview

Under the European Union (EU) WFD, the Environment Agency (EA) has a requirement to ensure that all water bodies reach 'Good Ecological Potential / Status' by 2027. The North West River Basin Management Plan states that 67% of water bodies in the Weaver Gowy water management catchment are not achieving good ecological status due to agricultural pollution. A large scale focus on Cheshire's agricultural practices is needed if water quality is to improve.

This project extended the activities of a successful CPAF funded project in 2015/16 which focused solely upon Lower Rookery Brook.

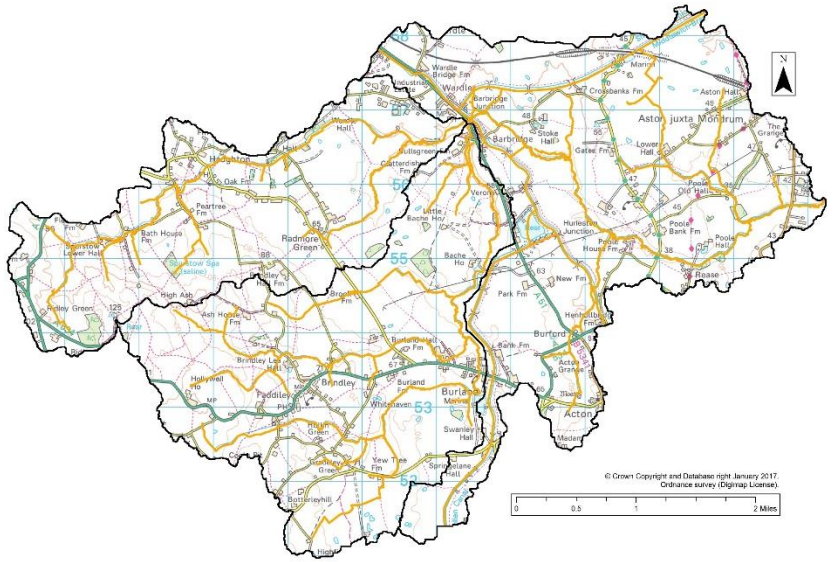
Reaseheath College were funded to work with farmers in the Burland and Brindley, Upper and Lower Rookery Brook catchments to identify mitigation measures for water quality improvements that offer business benefits as well as environment gain. The aim of the project was to:

1. Reduce the amount of phosphate and other pollutants entering Weaver Gowy waterbodies, specifically the Burland and Brindley, Upper and Lower Rookery Brooks, by providing targeted farm advice and mitigation measures.

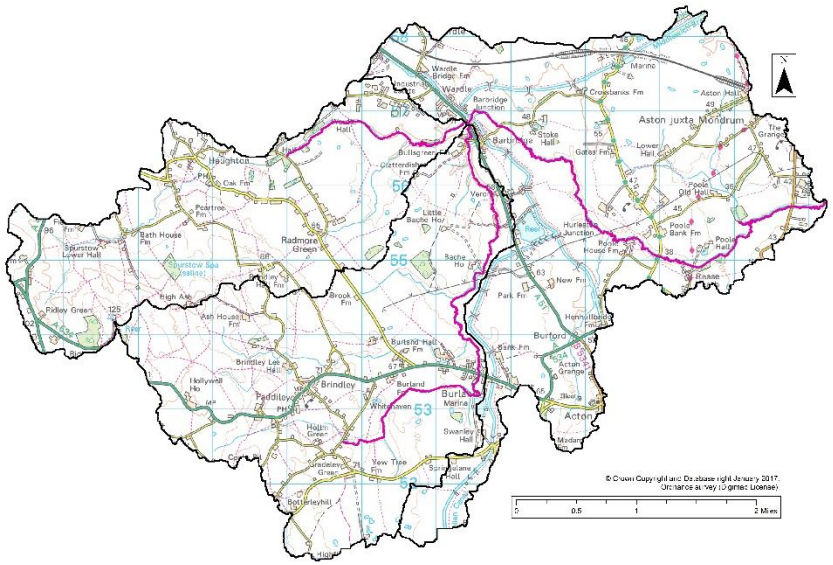
2. Increase biodiversity by prioritising mitigation measures that, in addition to improving water quality, create new habitat on the river corridor.

3. Increase flood attenuation opportunities by identifying areas of rural land that flood during high rainfall resulting in increased sediment loading of watercourses that could be ameliorated by natural measures such as tree breaks, sediment traps and riparian buffer strips.

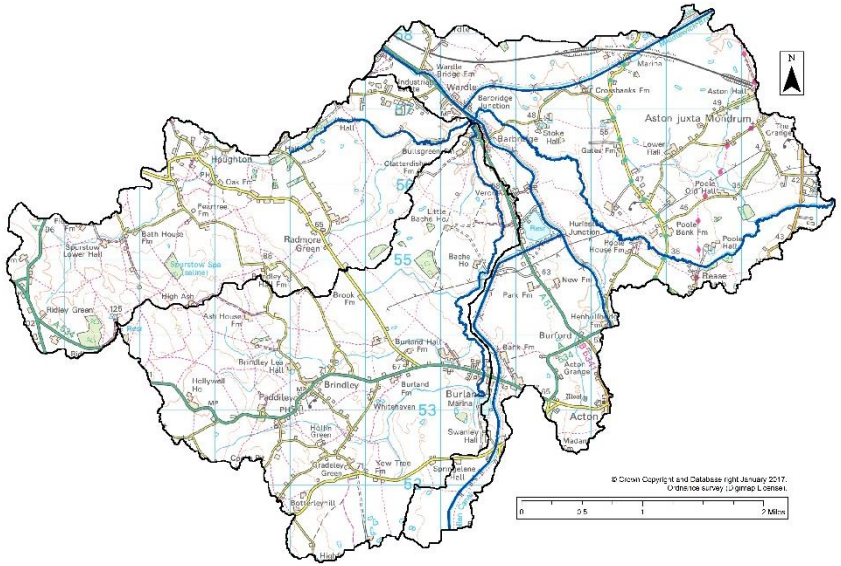
Detailed River Network



EA Main River



WFD River



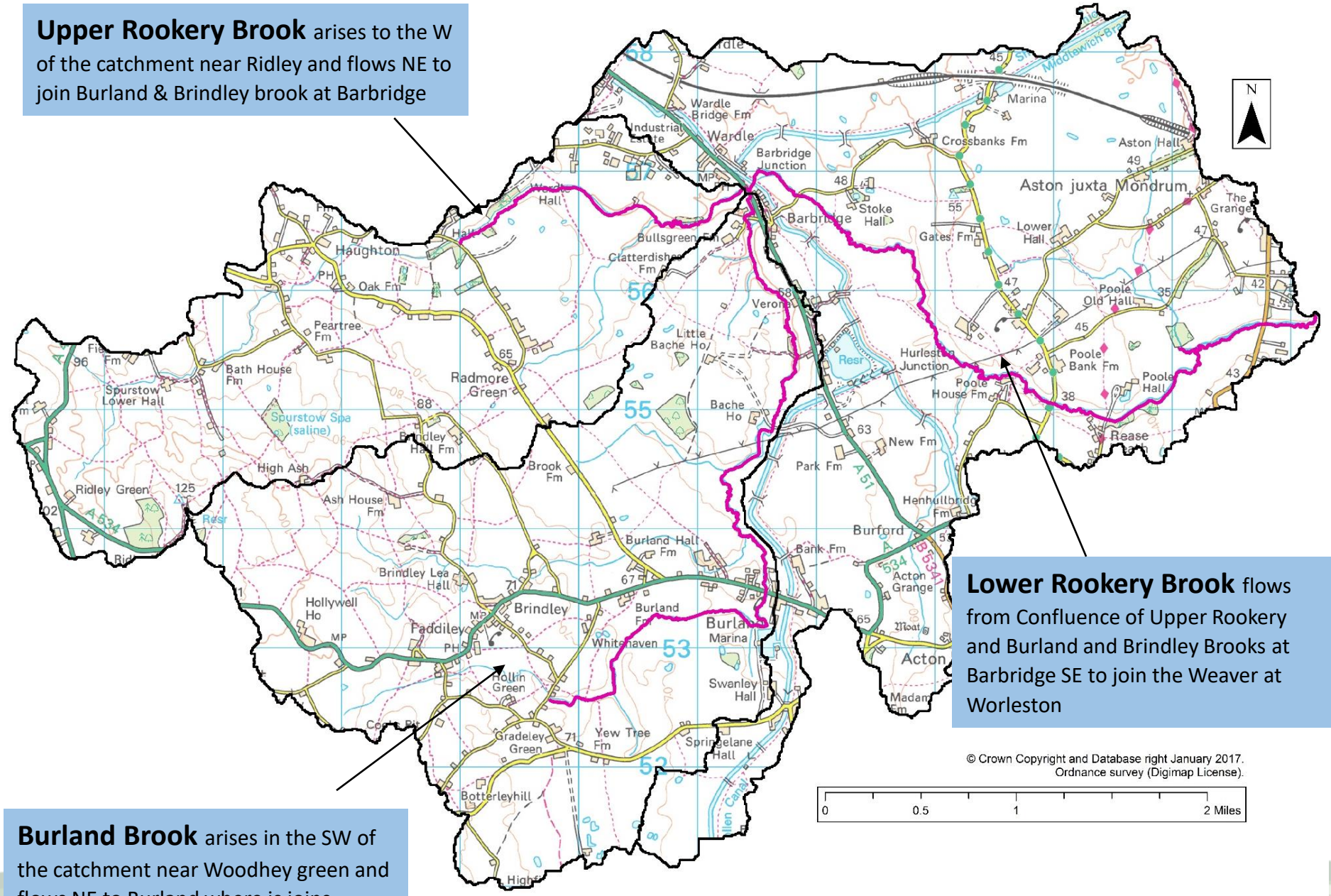
Source: EA Main River, WFD River and DRN (Detailed River Network) from environment.data.gov.uk– note the DRN is under consultation in 2017 but there are no proposed insertions or deletions in the Aldford catchment.

EA main river

The Environment Agency is responsible for carrying out maintenance, improvement or construction work on **EA Main Rivers** shown on the map, to manage flood risk. If landowners want to carry out building or construction work near a main river they may need a Flood Risk Activities permit.

More information on Main River permits is available from *www.gov.uk/guidance/flood-risk-activities-environmental-permits*

Upper Rookery Brook arises to the W of the catchment near Ridley and flows NE to join Burland & Brindley brook at Barbridge



Lower Rookery Brook flows from Confluence of Upper Rookery and Burland and Brindley Brooks at Barbridge SE to join the Weaver at Worleston

Burland Brook arises in the SW of the catchment near Woodhey green and flows NE to Burland where is joins Brindley Brook and continues north to join Rookery Brook at Barbridge.

Current Water Framework Directive Status

Custom Waterbody Summary Report

15 June 2017
13:44:42

Environment Agency

Burland and Brindley Brook

Please be aware that data is based on the best available information as of the date shown above, and may be subject to change

WATERBODY ID	GB112068055320	CYCLE / LATEST VERSION	Cycle 2	2
TYPE	River	DESIGNATION	Not Designated A/HMWB	
LENGTH (km)		EASTING	361627	
AREA (km2)		NORTHING	354819	
Alkalinity		CATCHMENT AREA (Ha)		

Geographical Boundaries	
EA AREA	Greater Manchester Merseyside and Cheshire
RBD	North West
MAN CATCHMENT	Weaver Gowy
OP CATCHMENT	Weaver Upper

Classifications

Yea	Overall	Ecological	Chemical	MMA	Invertebrates	Fish	Macrophytes and Phytobenthos Combined	Phosphate	Ammonia	Dissolved Oxygen	pH	Hydrological Regime
2013	Moderate	Moderate	Good				Moderate					High
2014	Moderate	Moderate	Good		Good		Moderate	Poor	Good	High	High	High
2015	Poor	Poor	Good		Good		Poor	Poor	Moderate	Good	High	High
2016	Moderate	Moderate	Good		Good		Moderate	Poor	Good	Good	High	High

Custom Waterbody Summary Report

15 June 2017
13:42:28

Environment Agency

Rookery Brook, Burland and Brindley Bk. to Weaver

Please be aware that data is based on the best available information as of the date shown above, and may be subject to change

WATERBODY ID	GB112068055340	CYCLE / LATEST VERSION	Cycle 2	2
TYPE	River	DESIGNATION	Not Designated A/HMWB	
LENGTH (km)		EASTING	363501	
AREA (km2)		NORTHING	355276	
Alkalinity		CATCHMENT AREA (Ha)		

Geographical Boundaries	
EA AREA	Greater Manchester Merseyside and Cheshire
RBD	North West
MAN CATCHMENT	Weaver Gowy
OP CATCHMENT	Weaver Upper

Classifications

Yea	Overall	Ecological	Chemical	MMA	Invertebrates	Fish	Macrophytes and Phytobenthos Combined	Phosphate	Ammonia	Dissolved Oxygen	pH	Hydrological Regime
2013	Moderate	Moderate	Good				Moderate					Sup Good
2014	Moderate	Moderate	Good		Moderate		Moderate					DNSG
2015	Moderate	Moderate	Good		Moderate		Moderate	Poor	Good	Good	High	Sup Good
2016	Moderate	Moderate	Good		Moderate		Moderate	Poor	Good	Good	High	Sup Good

Custom Waterbody Summary Report

15 June 2017
13:46:47

Environment Agency

Rookery Brook, Source to Burland and Brindley Bk.

Please be aware that data is based on the best available information as of the date shown above, and may be subject to change

WATERBODY ID	GB112068055330	CYCLE / LATEST VERSION	Cycle 2	2
TYPE	River	DESIGNATION	Not Designated A/HMWB	
LENGTH (km)		EASTING	360274	
AREA (km2)		NORTHING	356628	
Alkalinity		CATCHMENT AREA (Ha)		

Geographical Boundaries	
EA AREA	Greater Manchester Merseyside and Cheshire
RBD	North West
MAN CATCHMENT	Weaver Gowy
OP CATCHMENT	Weaver Upper

Classifications

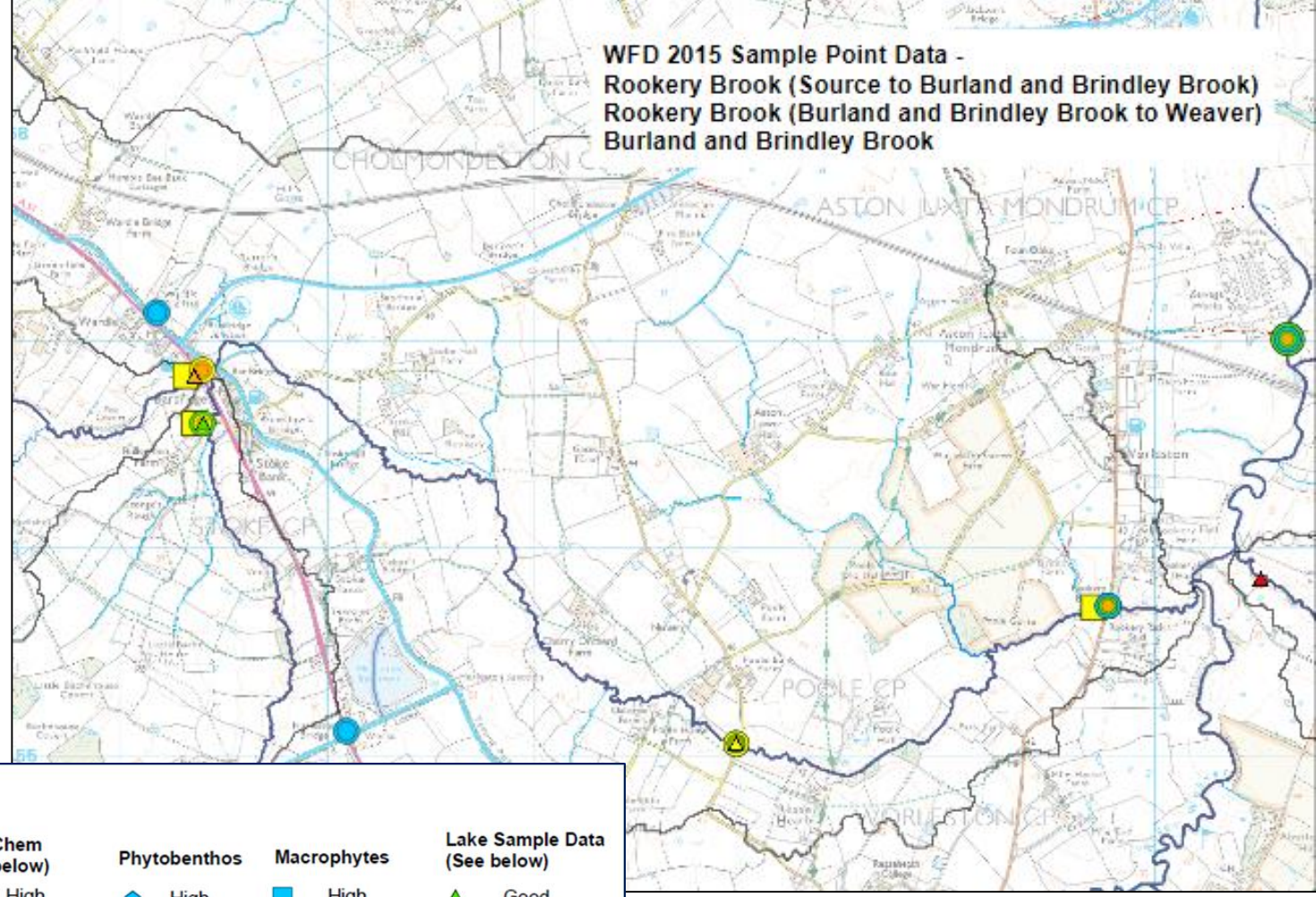
Yea	Overall	Ecological	Chemical	MMA	Invertebrates	Fish	Macrophytes and Phytobenthos Combined	Phosphate	Ammonia	Dissolved Oxygen	pH	Hydrological Regime
2013	Moderate	Moderate	Good				Good	Poor	Poor	Poor	High	High
2014	Poor	Poor	Good		Poor		Moderate	Poor	Poor	Poor	High	High
2015	Poor	Poor	Good		Poor		Poor	Poor	Good	Moderate	High	High
2016	Poor	Poor	Good		Poor		Poor	Poor	Good	Moderate	High	High

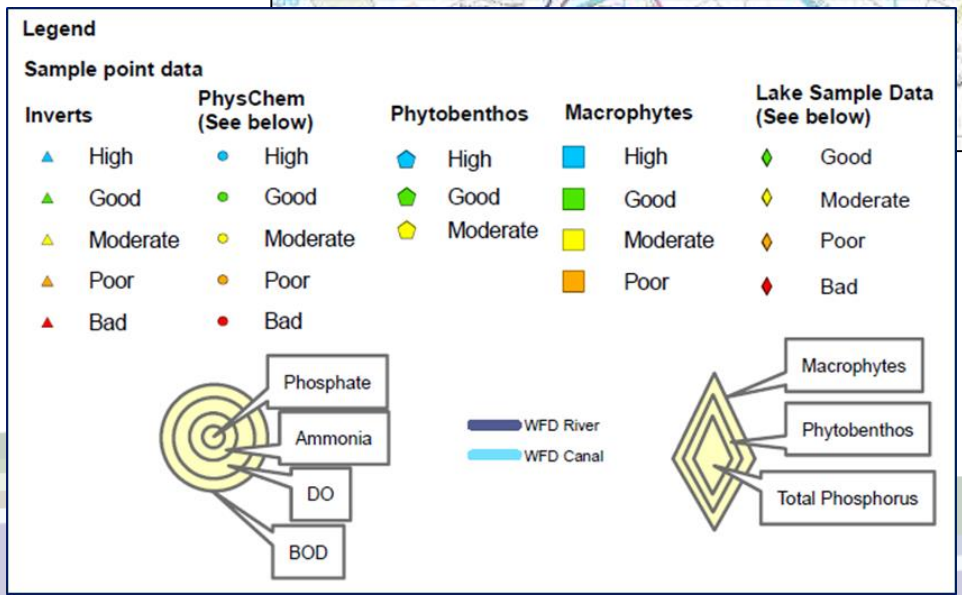
Environment Agency WFD

Monitoring Point Locations

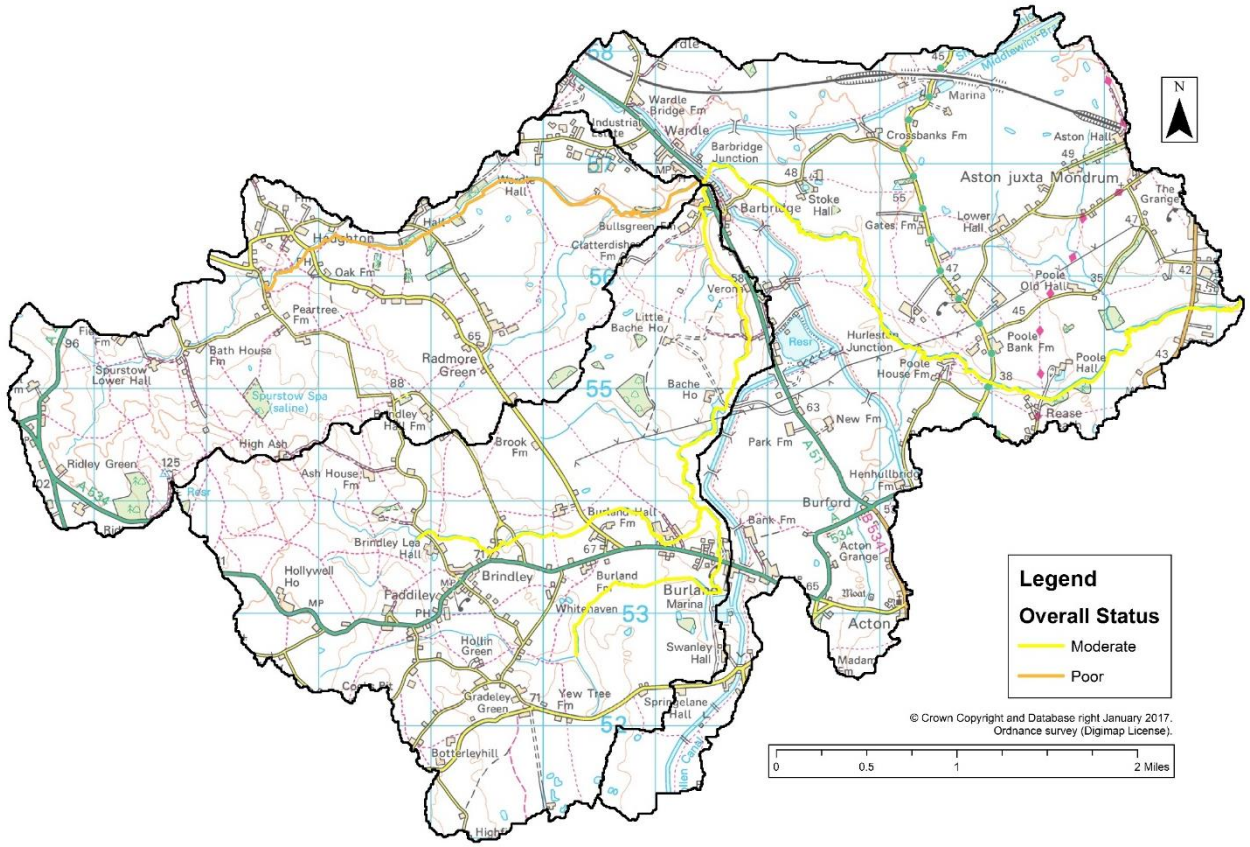
Four main WDF Monitoring points:

- Two at confluence of Upper Rookery and Burland & Brindley Brooks at Barbridge
- One on Lower Rookery Brook NW of Reaseheath College
- One on Lower Rookery Brook close to confluence with River Weaver

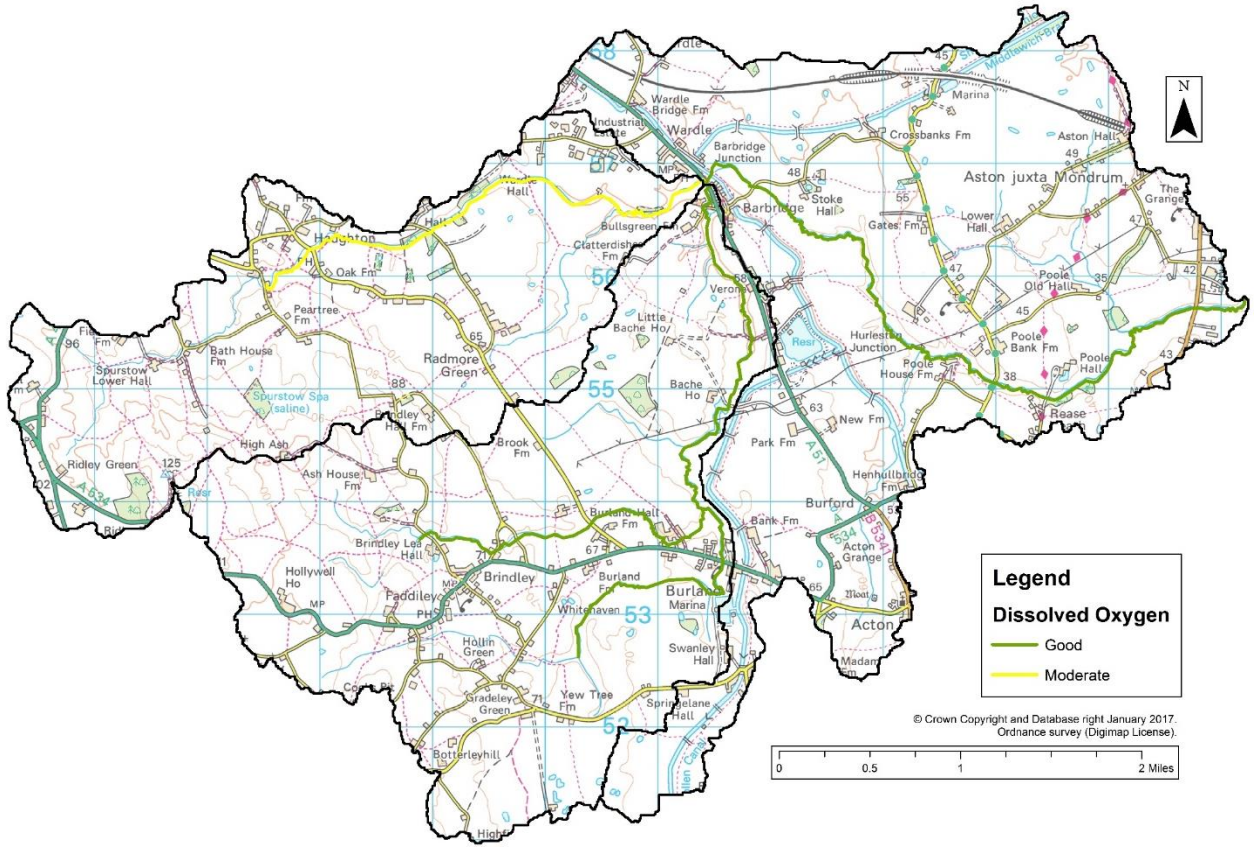




Water Framework Directive Status



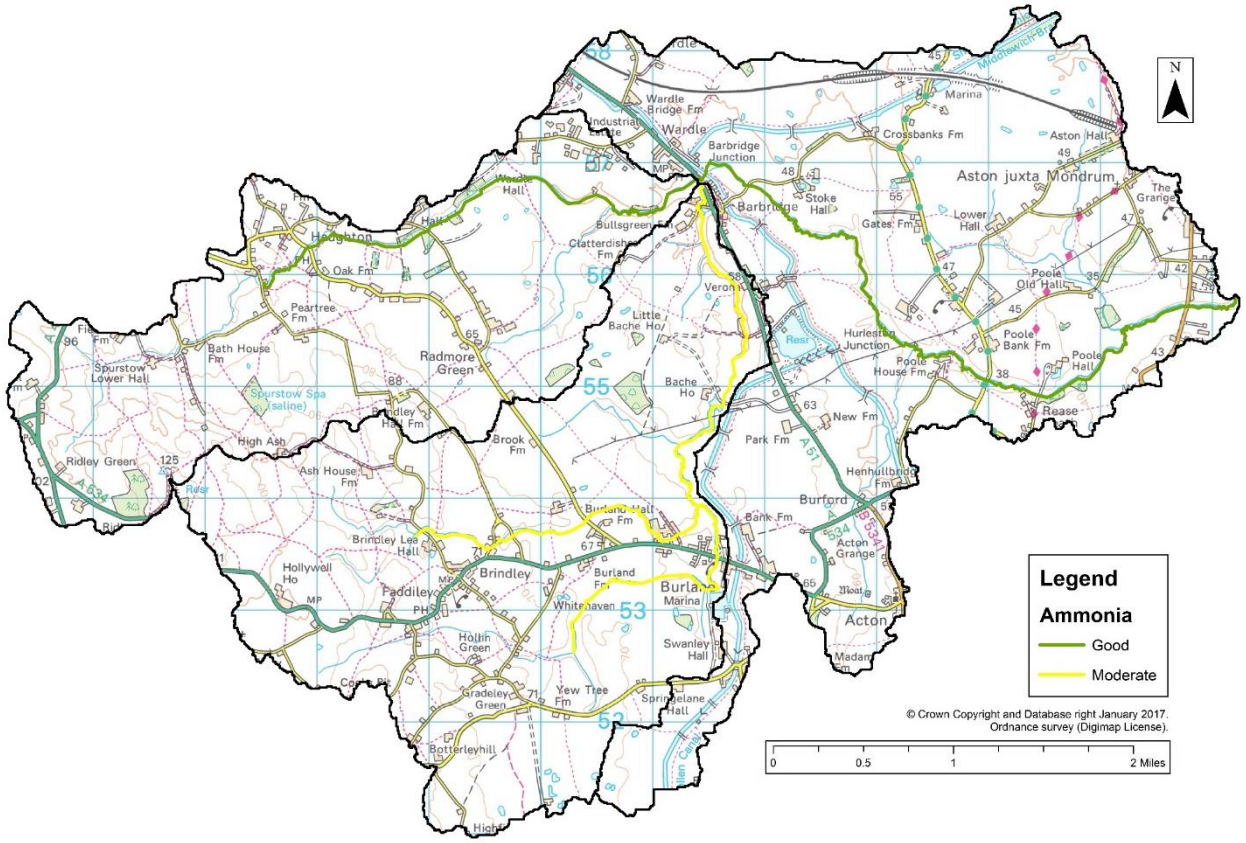
Overall WFD Status



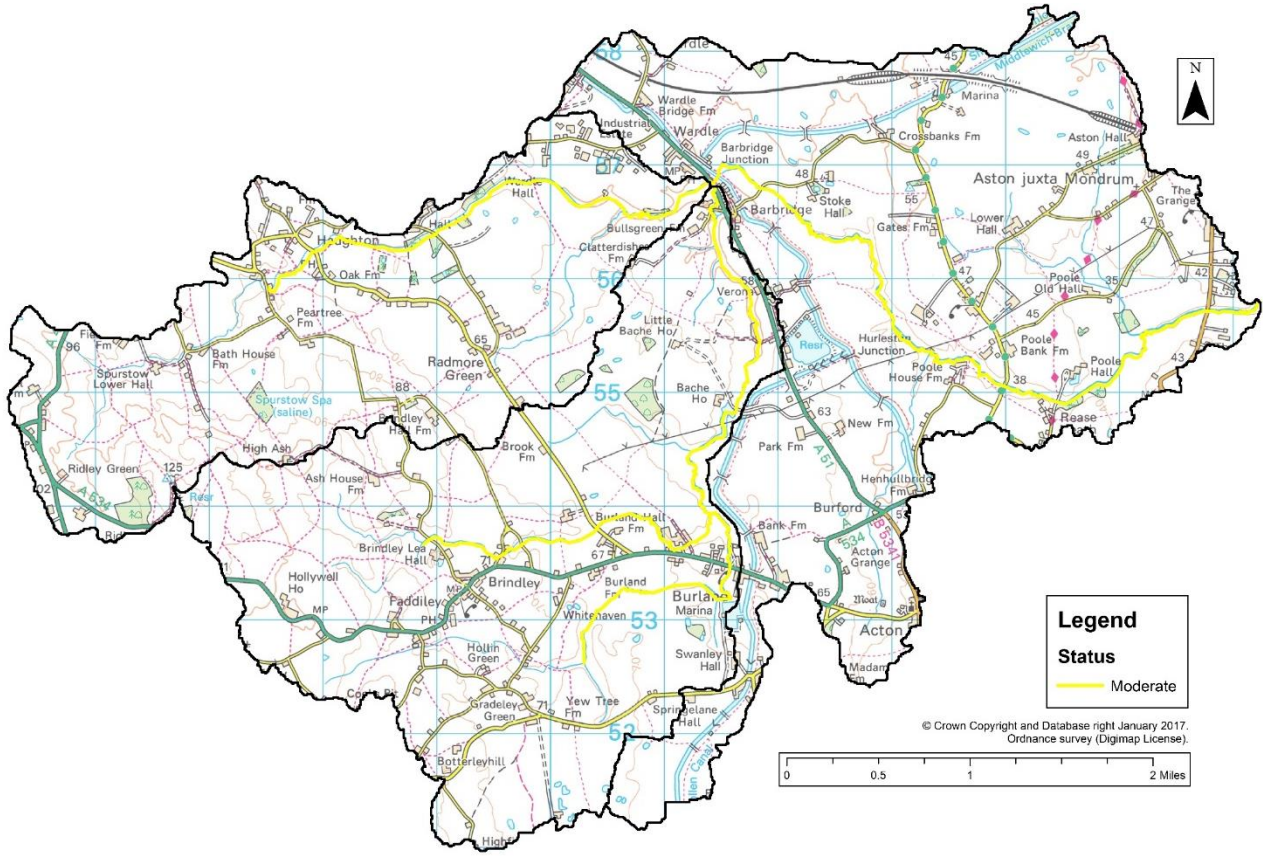
Dissolved oxygen

Source: Environment Agency WFD Data 2015

Water Framework Directive Status



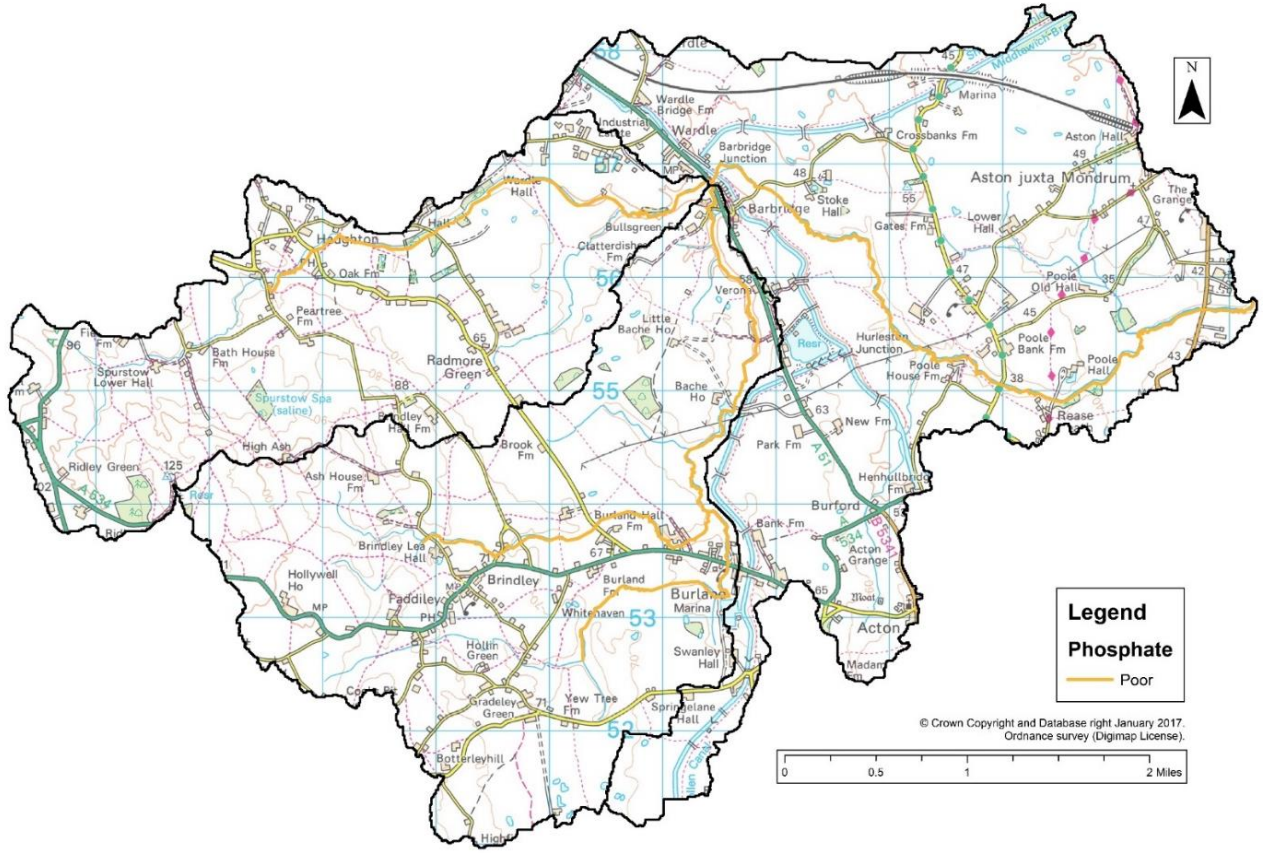
Ammonia



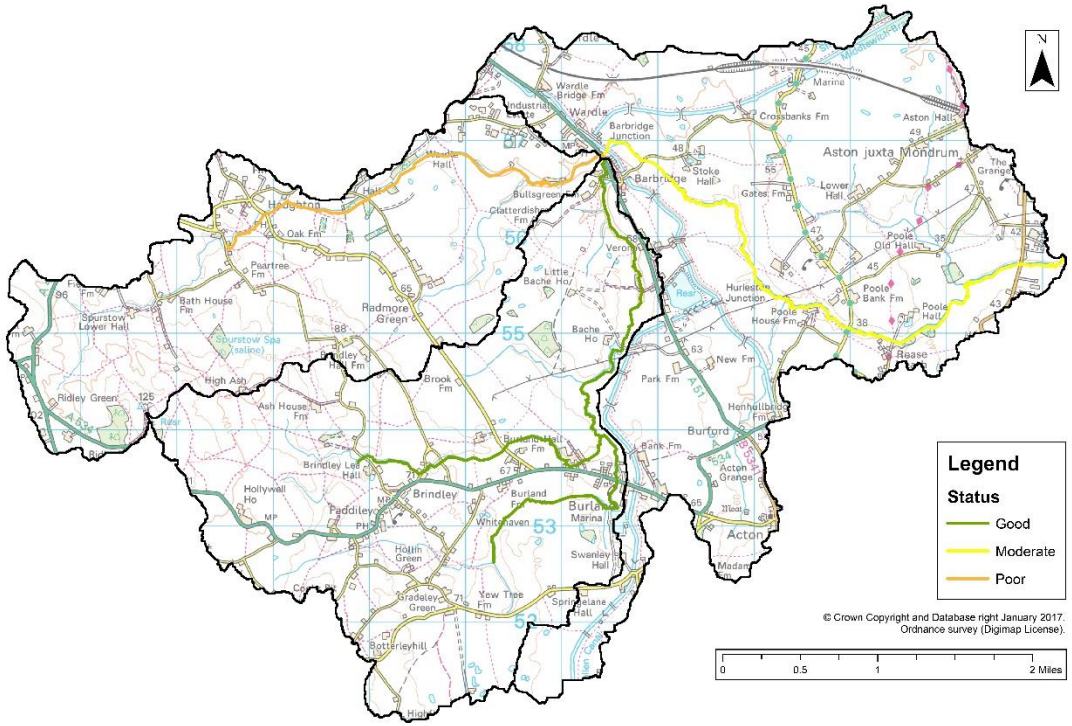
Ecological status

Source: Environment Agency WFD Data 2015

Water Framework Directive Status



Phosphates



Invertebrates

Source: Environment Agency WFD Data 2015

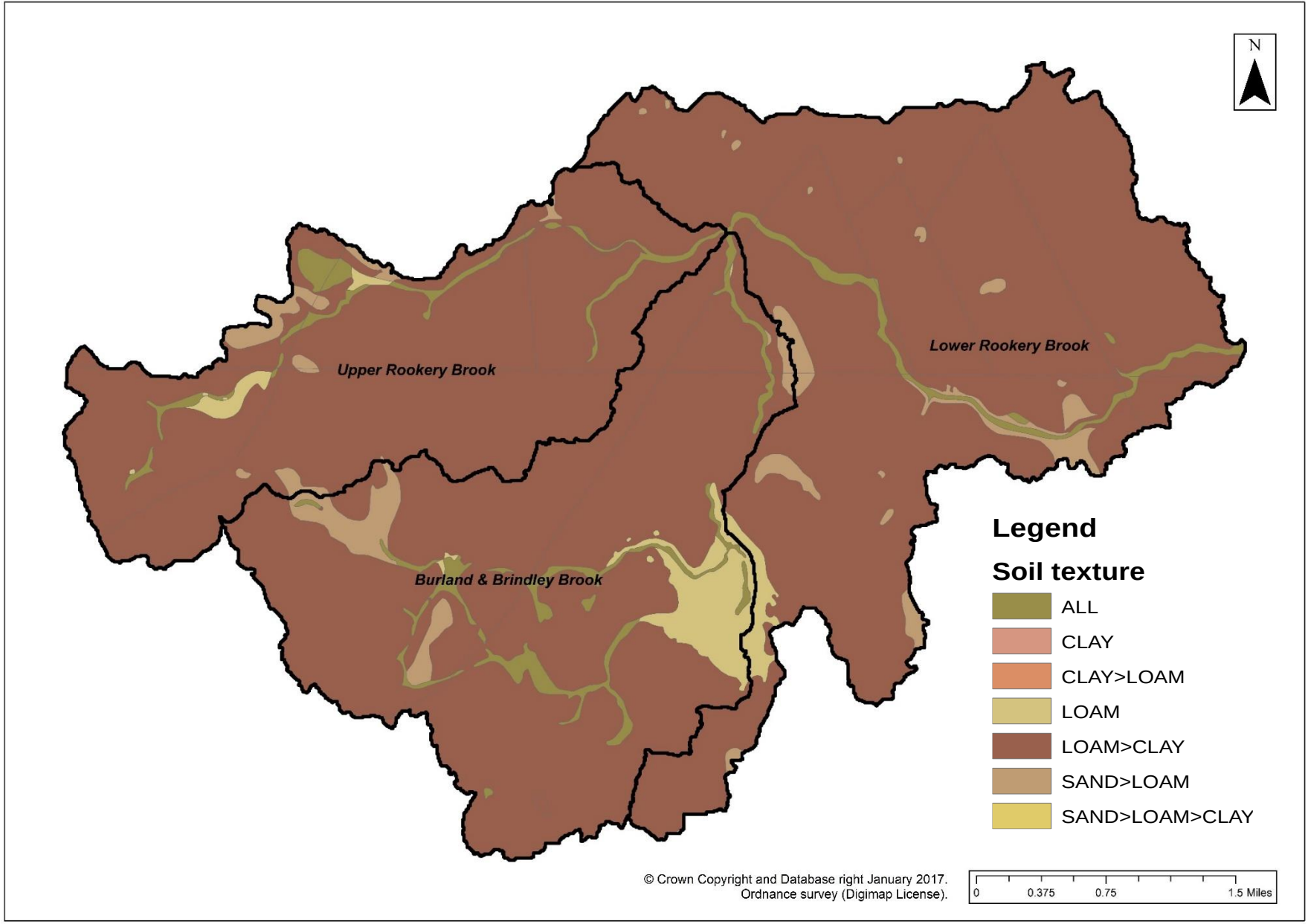
Land Use, Risk Factors and Pressures in Burland, Brindley and Rookery Brook catchments

Soil Types

largely ***clay loams*** – the main risks are associated with overland flow from compacted or poached fields. Organic slurry, dirty water, fertiliser, pathogens and fine sediment can all move in suspension or solution with overland flow or drain water

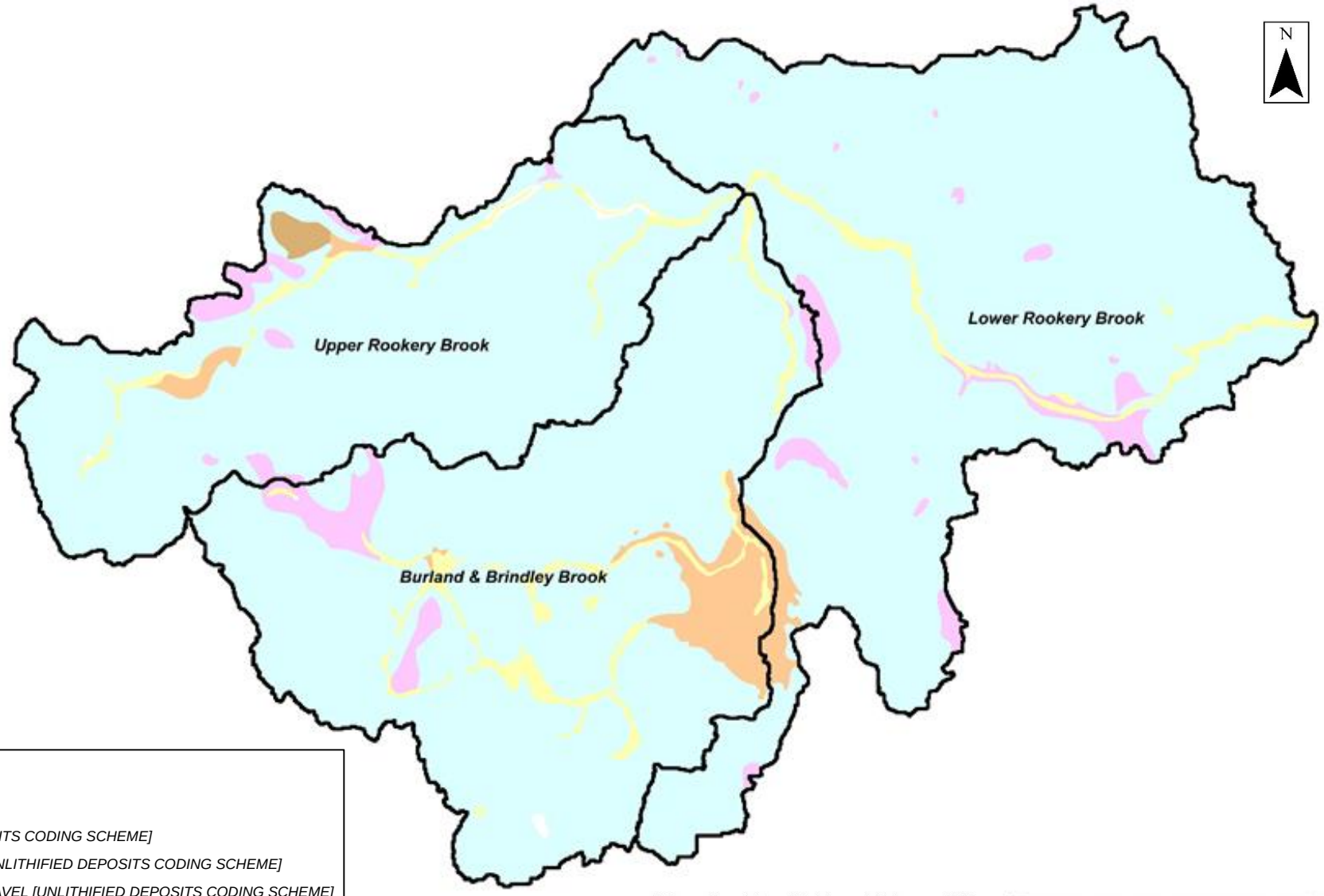
Area of ***loam*** to east of Burland and Brindley catchment - vulnerable to leaching of nitrate and pesticides to groundwater and to wind erosion when cropped. High risk of soil erosion from bare soils.

Localised ***Sandy clay loams*** along brooks



Superficial Geology

largely ***Devensian Till*** *with localised* ***glaciofluvial deposits, river terrace deposits*** *and small area of* ***peat*** *to north of Upper Rookery catchment.*



Legend

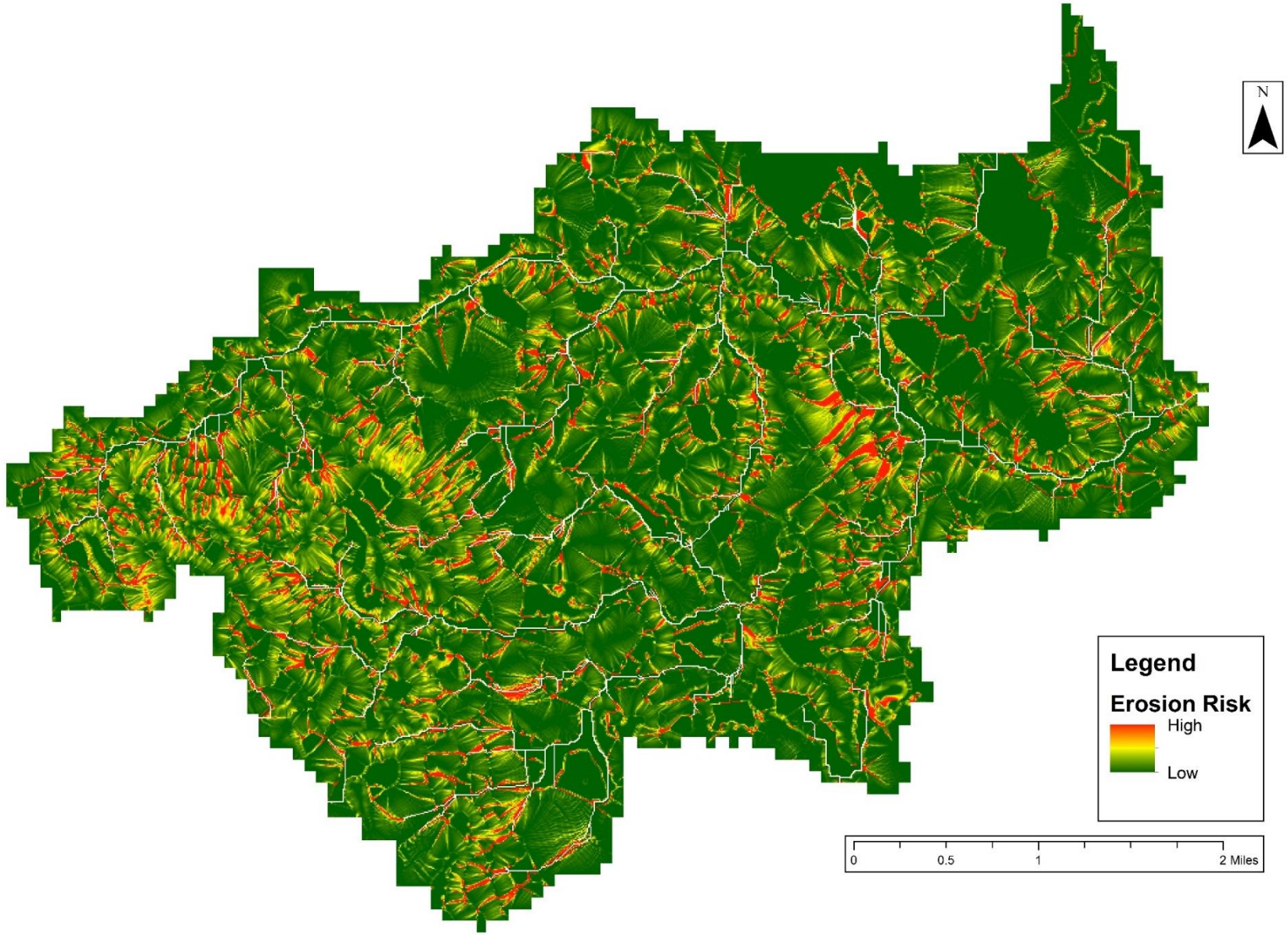
BBR Superficial

	ALV-XCZSV	*ALLUVIUM - CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]*
	GFDUD-XSV	*GLACIOFLUVIAL DEPOSITS, DEVENSIAN - SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]*
	GFSDD-XSV	*GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN - SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]*
	TILLD-DMTN	*TILL, DEVENSIAN - DIAMICTON*
	PEAT-P	*PEAT - PEAT [UNLITHIFIED DEPOSITS CODING SCHEME]*
	RTD1-XSV	*RIVER TERRACE DEPOSITS, 1 - SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]*

SCIMAP
Soil erosion risk

Localised RED and YELLOW areas where there are moderate slopes to the west of Upper Rookery and Burland and Brindley catchments

Majority of catchment is Green with a lower risk of soil erosion as it is mainly flat or very gently sloping.



Source: Created on 'my.Scimap.org.uk' which is open source software created/supported by Durham University

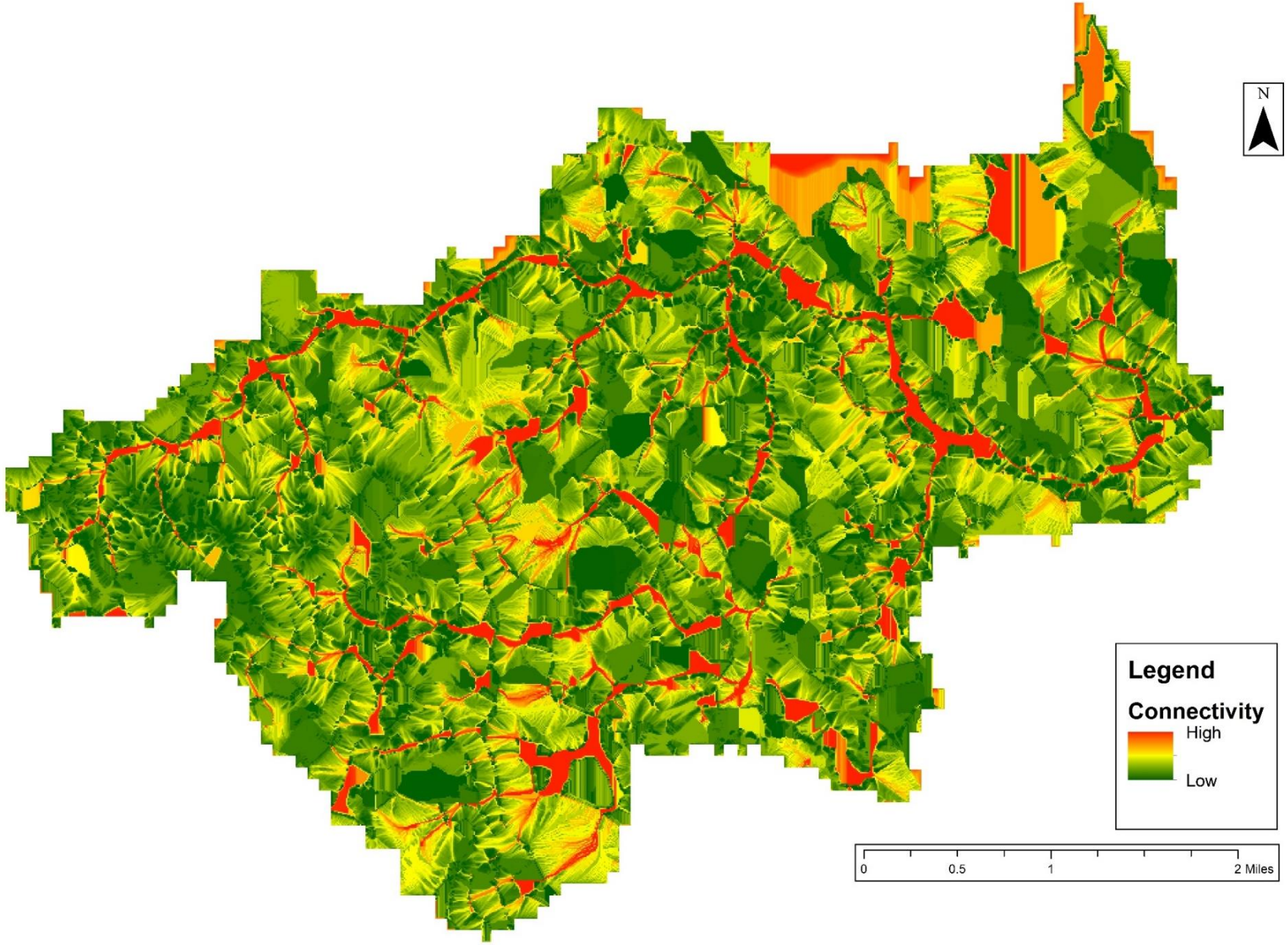
SCIMAP

Connectivity of land to watercourse

The connectivity describes the ease of travel of water (and pollutants) through the landscape, expressed as a measure of the probability of continuous flow to the river channel.

The **RED** areas show areas of high connectivity between land and watercourses, particularly prevalent along the floodplain areas.

YELLOW areas are largely areas of more slowly permeable clay loams and flat topography.



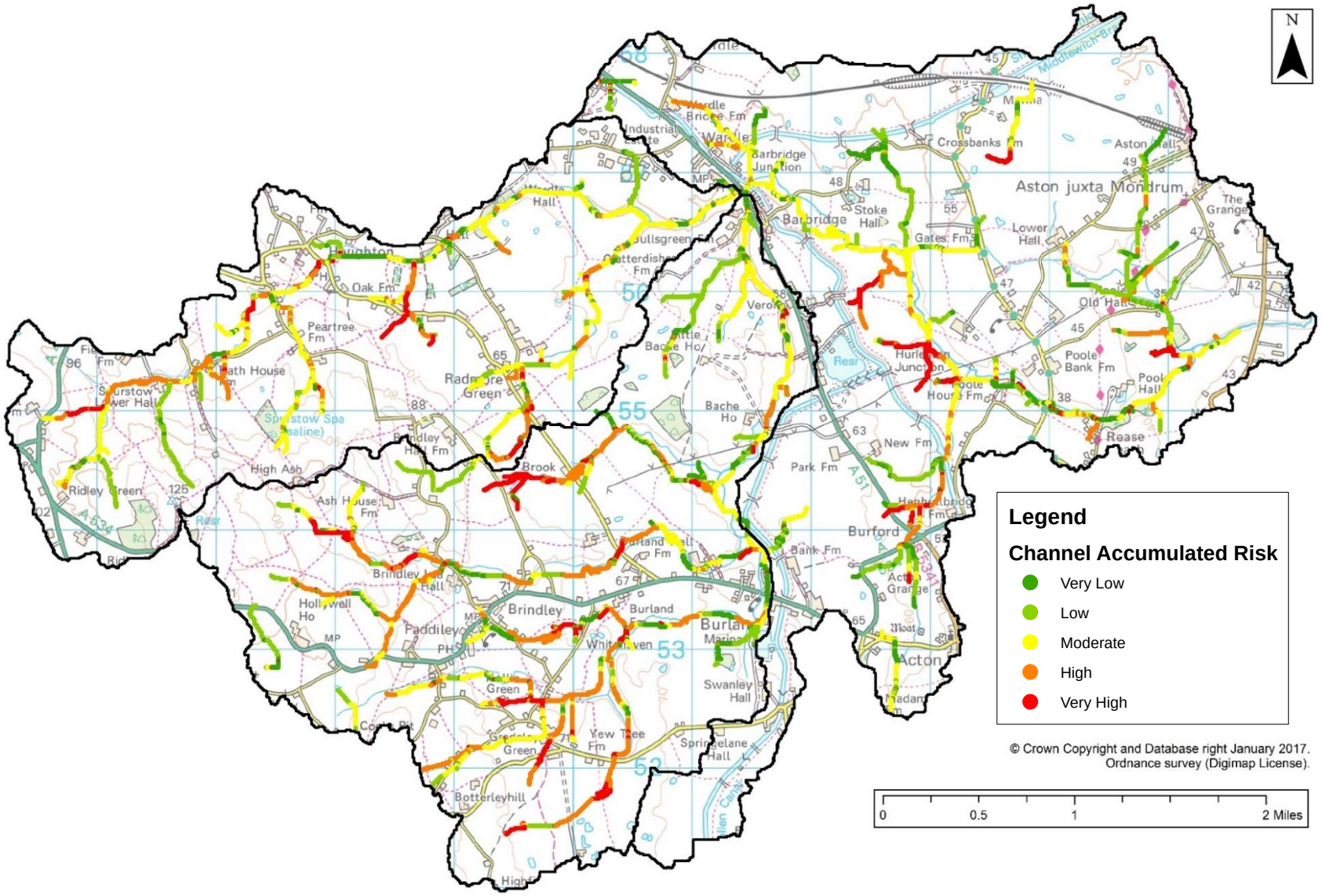
Source: Created on 'my.Scimap.org.uk' which is open source software created/supported by Durham University

SCIMAP

Accumulated channel risk

The accumulated risk of water and pollutant sources in the watercourse channels, based on average annual rainfall, topography, soil erodibility and land cover.

High risk areas on Upper Rookery and Burland and Brindley Brooks and tributaries. Majority low to moderate risk due to relatively flat topography and clay loam soils.



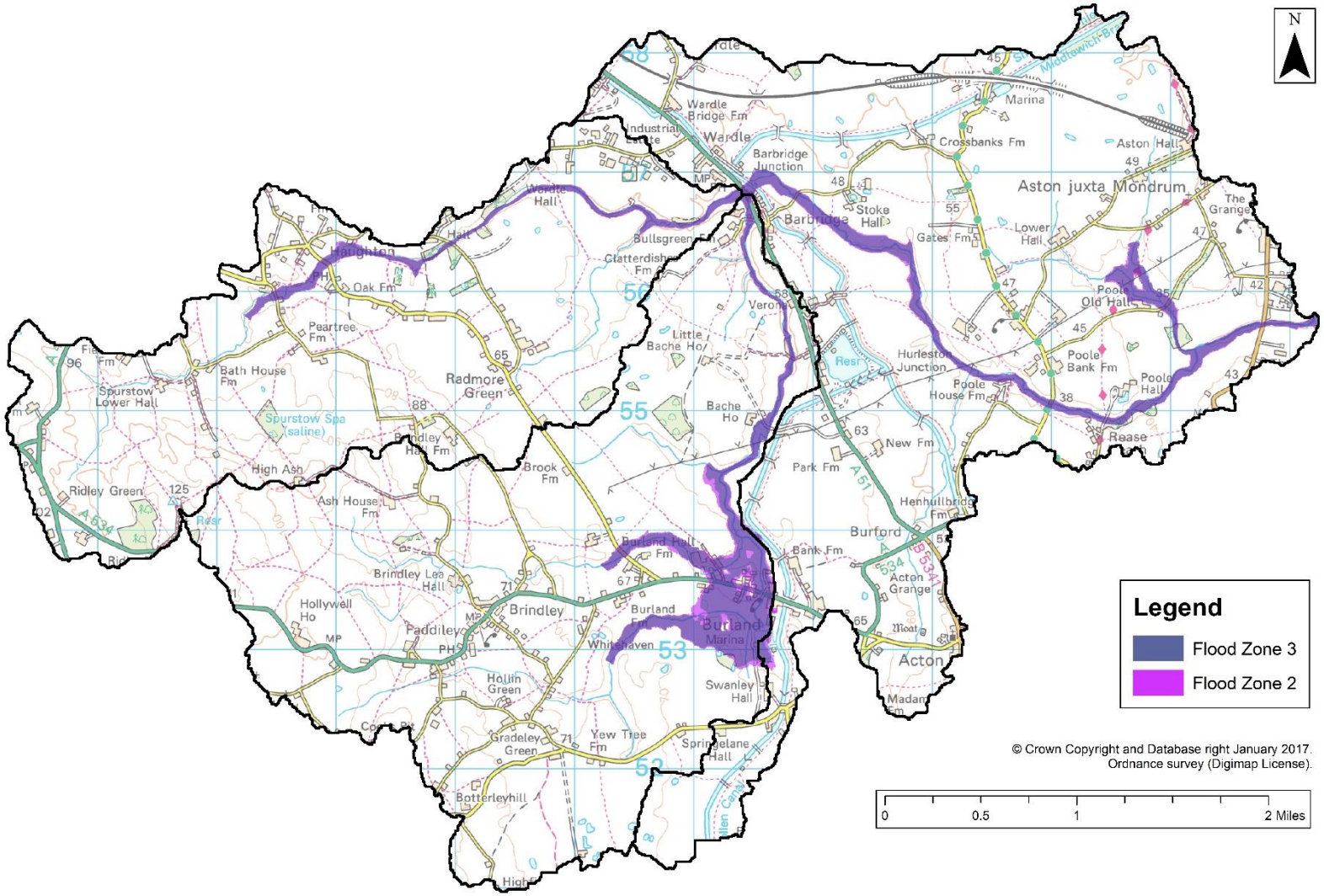
Source: Created on ‘my.Scimap.org.uk’ which is open source software created/supported by Durham University

Flood Risk Map

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements.

Flood Zone 3 (Higher risk) - area that could be affected by flooding from a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year.

Flood Zone 2 (Lower risk) shows the additional extent of an extreme flood from rivers with up to a 0.1 per cent (1 in 1000) chance of occurring each year.

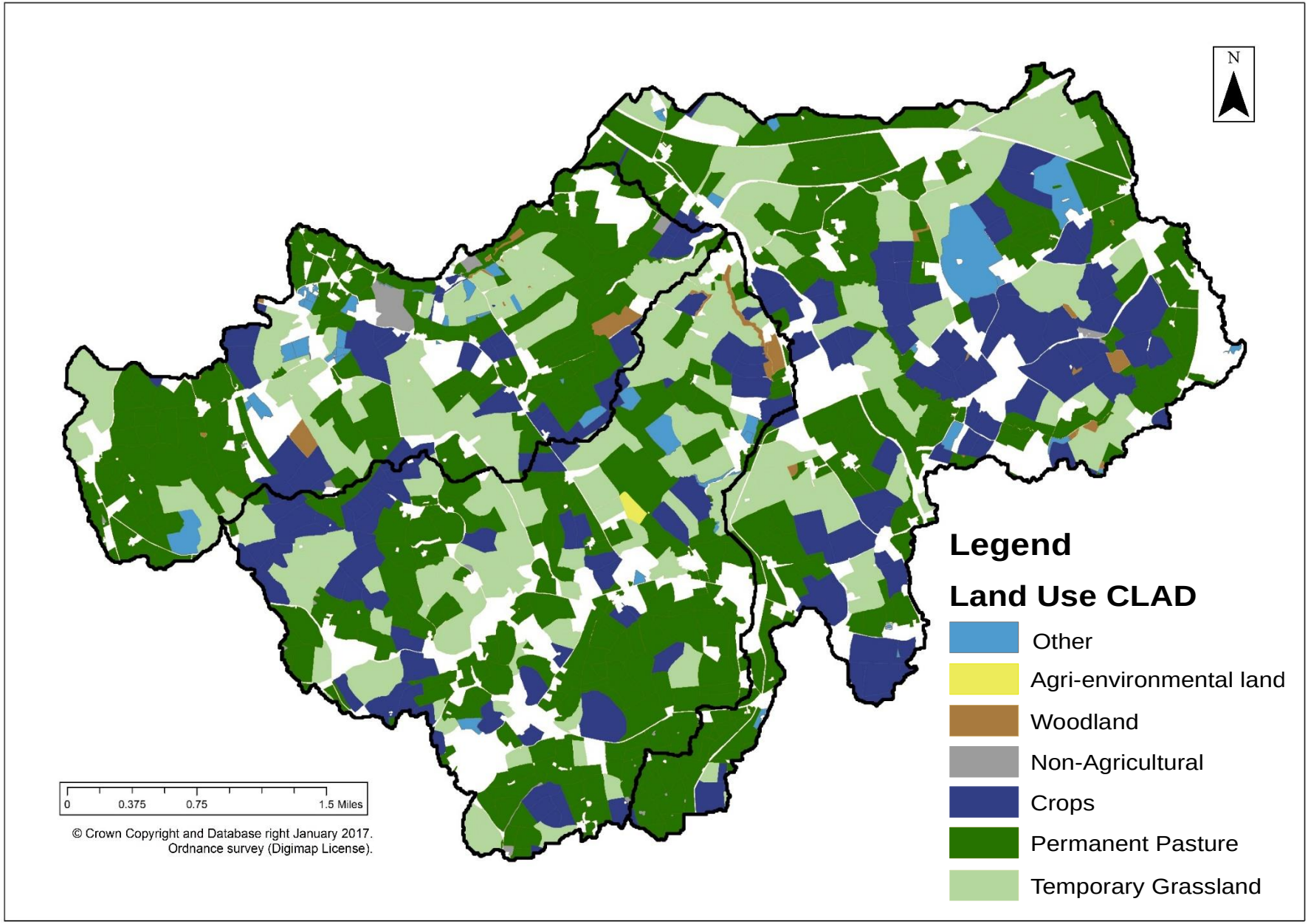


Source: EA Flood Map for planning from 'http://environment.data.gov.uk' as a partner

Land Use

Dataset based on CLAD 2014 Single Farm Payment land use code, ground checked with catchment walkover observations during 2015/2016.

Majority of land permanent or temporary grassland. Approximately 20/25% cropped land; mainly maize and winter cereals to feed dairy cattle.

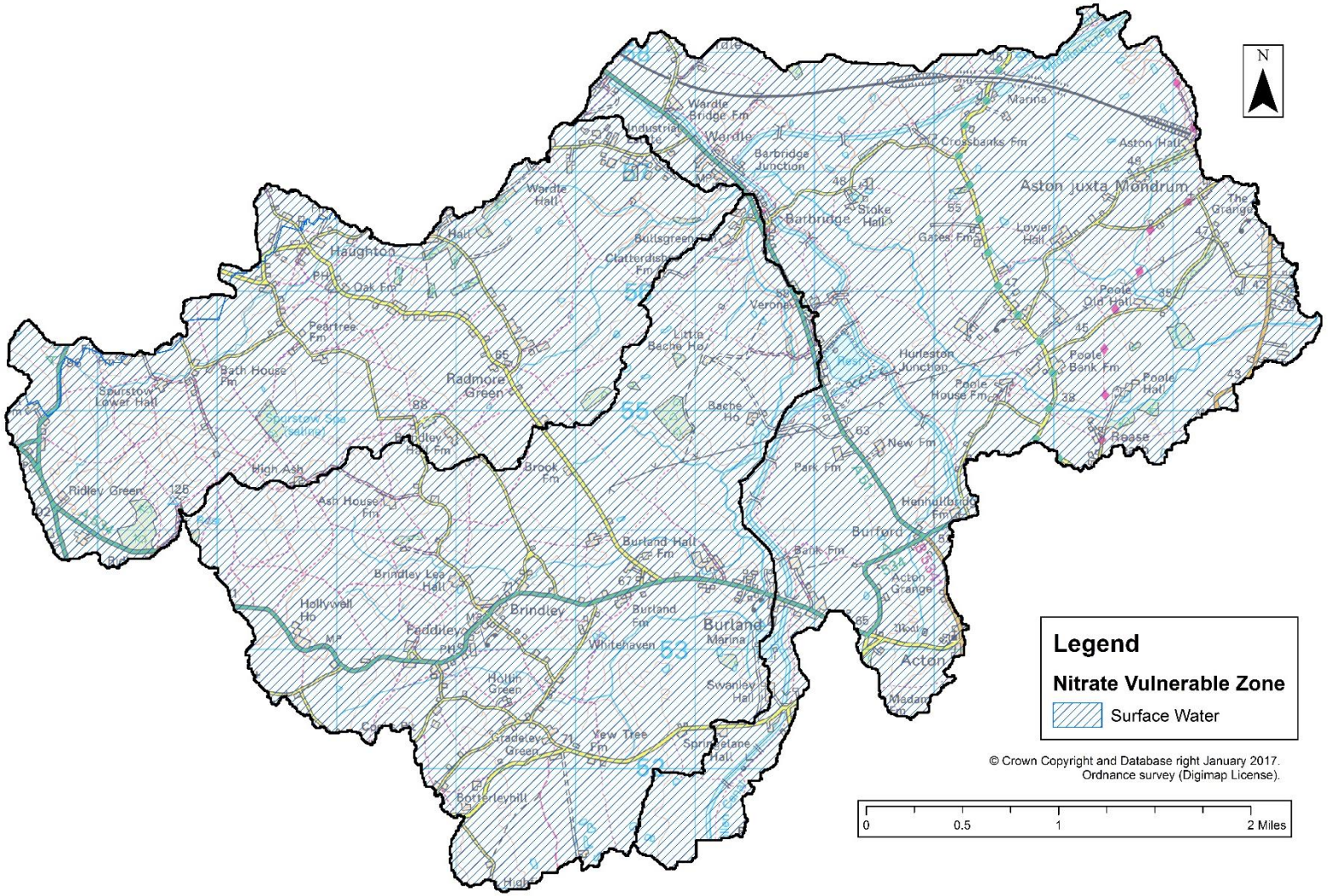


Source: RPA CLAD 2014 used as primary data source, amended with walkover survey information.

Nitrate Vulnerable Zones

100% surface water NVZ

The surface water catchment remains a designated NVZ after the 2017 NVZ review. Monitoring assessment shows water quality has remained stable, but modelling assessment shows water quality has deteriorated and overall our analysis shows the water is still affected by pollution or could become affected by pollution, therefore it was proposed the existing designation is retained



Source: Map downloaded from www.magic.defra.gov.uk

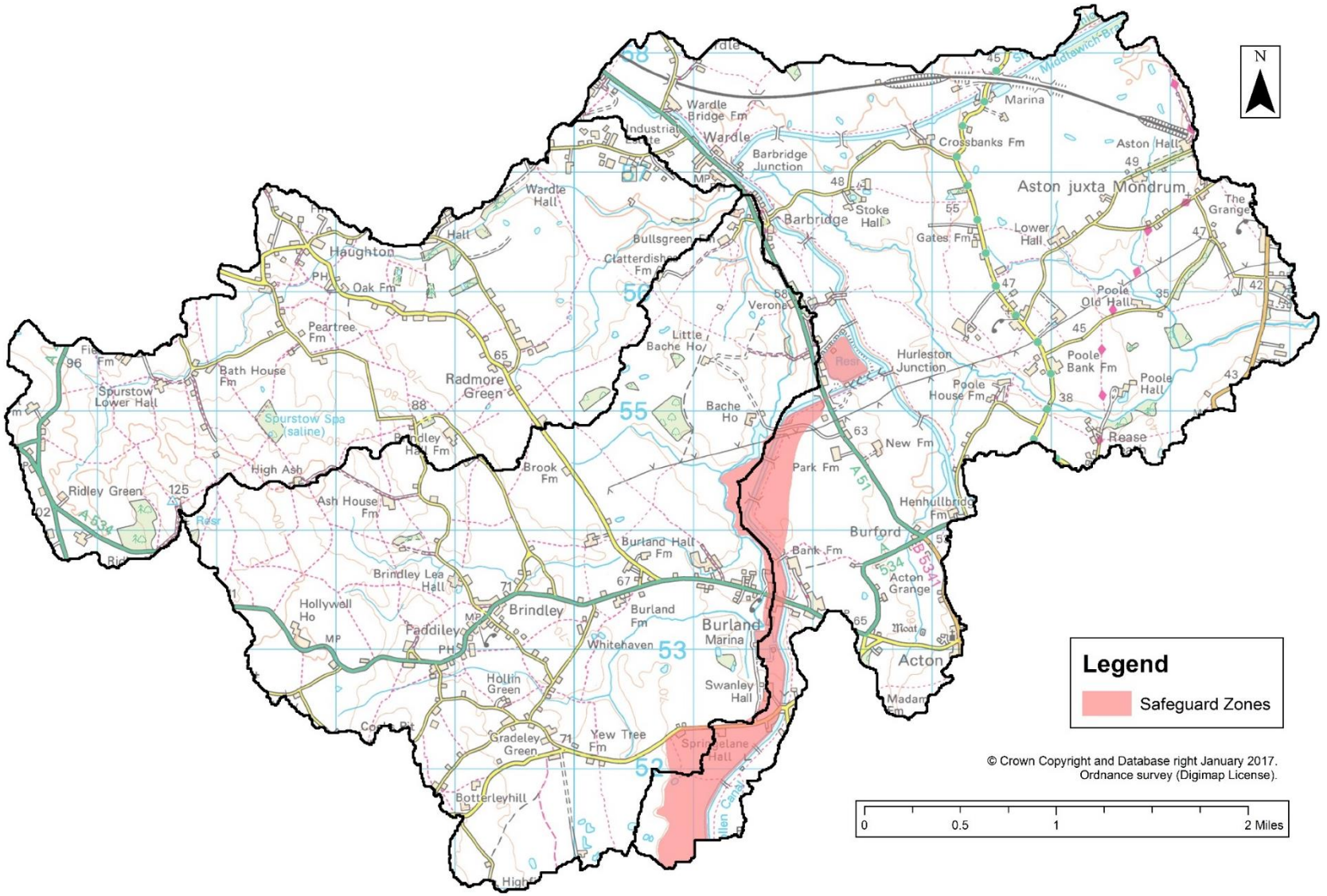
DATASHEET: Nitrate Vulnerable Zone (NVZ) designation June 2016 - Surface Water NVZ ID: S636 NVZ Name: River Weaver (Dane to Frodsham) NVZ

Safeguard Zones

Designated drinking water safeguard zone along Llangollen Canal, due to issues with agricultural pollutants in the raw water supply to Hurleston water treatment plant, which supplies Crewe and Nantwich.

United Utilities SCAMP programme
Have an advisory programme working with farmers and landowners to protect the water.

David Jones
07495 292 561
david@welshdeetrust.com

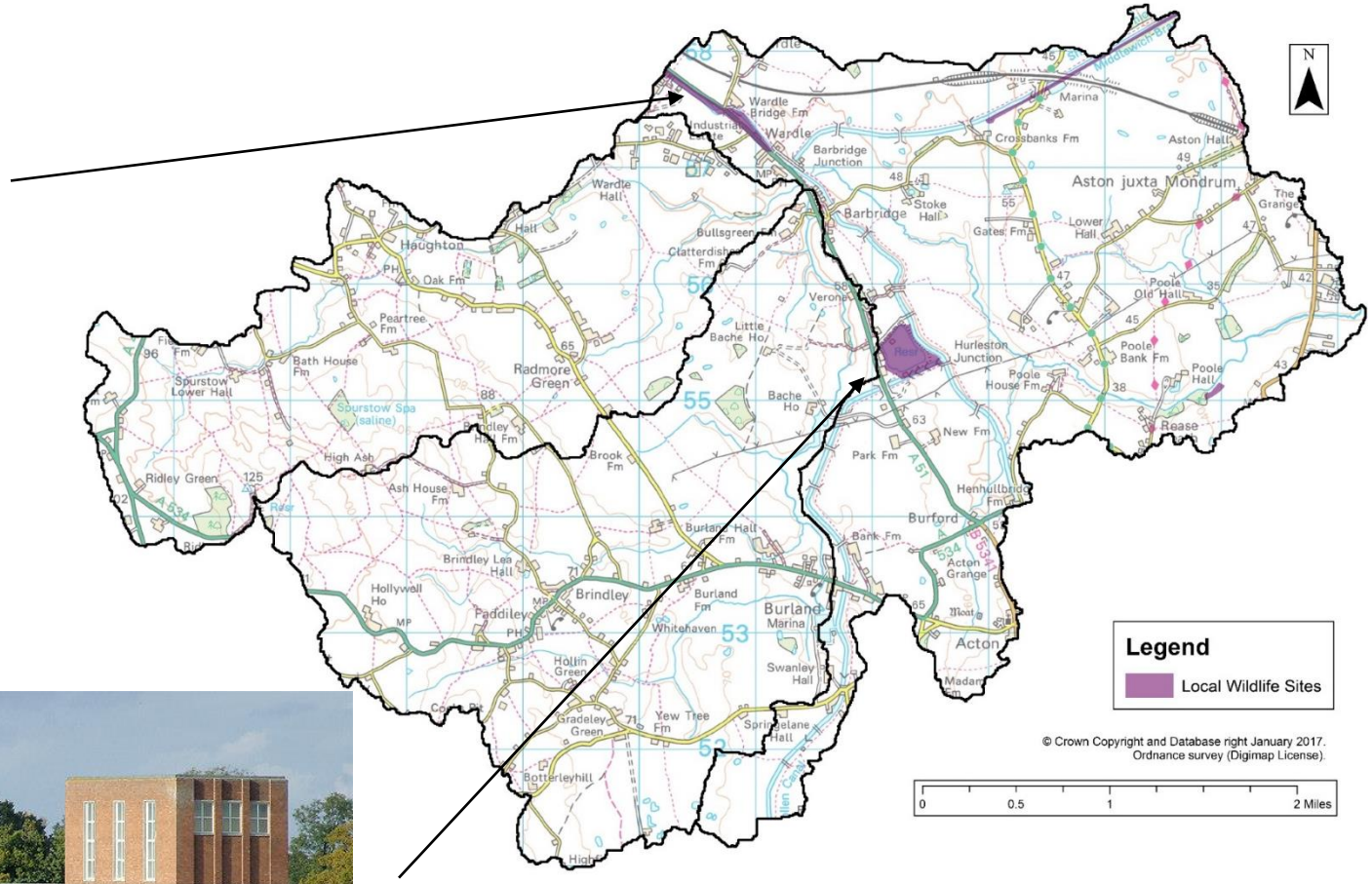


Source: Safeguard zones from www.environment.data.gov.uk under the CABA partnership agreement

Local Wildlife Sites

The Shropshire Union Canal at Wardle
cc-by-sa/2.0 - © M J Richardson - geograph.org.uk/p/3679793

Wardle Canal Banks



Hurleston Reservoir, Cheshire
cc-by-sa/2.0 - © Roger Kidd - geograph.org.uk/p/3198558

Hurleston Reservoir

Interventions funded in Lower Rookery Brook through CPAF

1. Large off-line sediment trap

2. Small off-line sediment trap

3. in-line sediment trap

Drain Interceptions

Burland, Brindley and Rookery Brooks Pollution Prevention Project

For further information on project outcomes contact Reaseheath Farm Environmental Services on 01270 613 195 or email hub@reaseheath.ac.uk