Gale, Smoker and Arley Brooks Diffuse Pollution Project

Catchment Characterisation

June 2017

This catchment characterisation provides an overview of the Gale, Smoker and Arley 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.

Gale, Arley & Smoker 2015-16 Project Overview

- This project extended the activities two successful CPAF funded projects in 2015/16 which focused on other Cheshire catchments.

- Reaseheath College were funded to work with farmers in the Gale, Smoker and Arley 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:

- Reduce the amount of phosphate and other pollutants entering Weaver Gowy waterbodies, specifically the Gale, Smoker and Arley Brooks, by providing targeted farm advice and mitigation measures.

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

- 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 and riparian buffer strips.

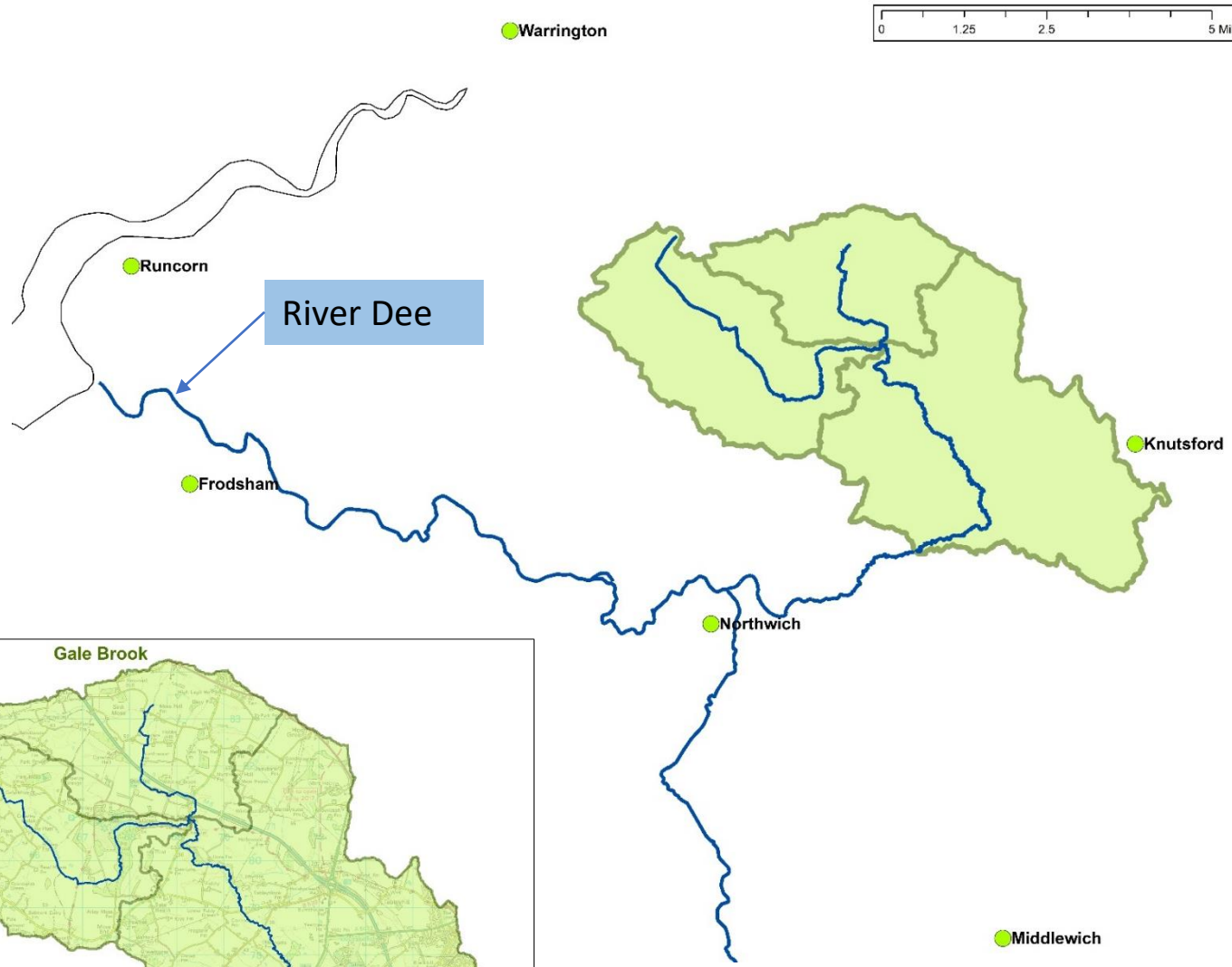
  N.B. Year 1 focused upon Gale Brook with the intent to move on to Smoker and Arley Brooks in year 2.

Catchment Overview

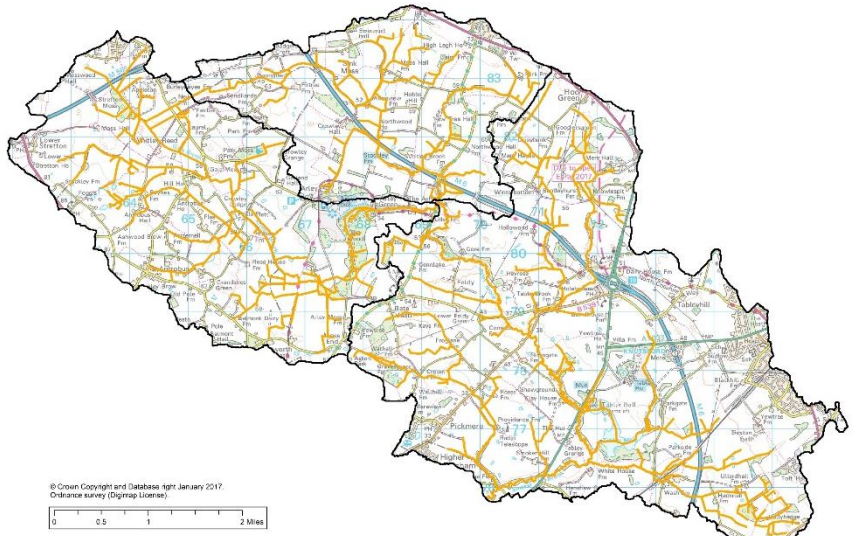
- Gale Brook
  Waterbody ID: GB112068060430
  Catchment Area: 13.48 km^2
  Main River Length: 3.98 km

- Arley Brook
  Waterbody ID: GB112068060420
  Catchment Area: 20.16 km^2
  Main River Length: 9.97 km

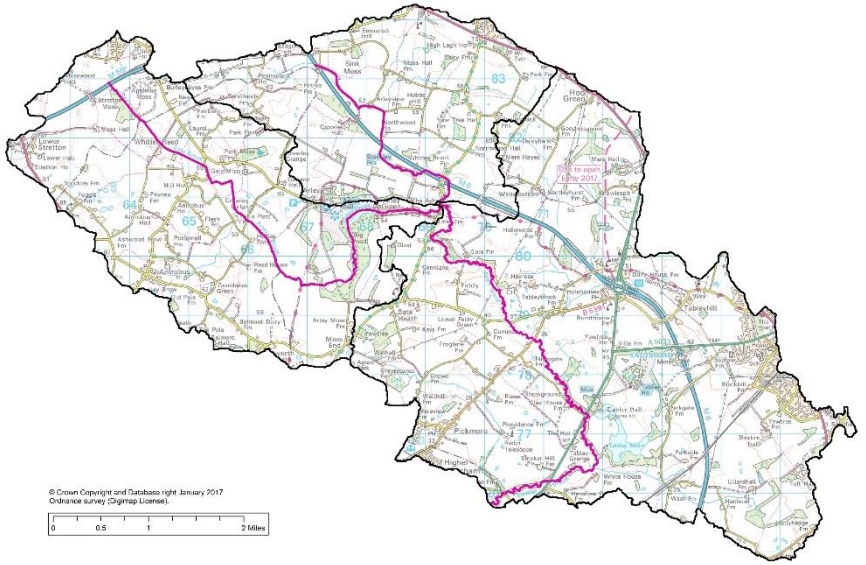
- Smoker Brook
  Waterbody ID: GB112068060410
  Catchment Area: 36.36 km^2
  Main River Length: 10.83 km



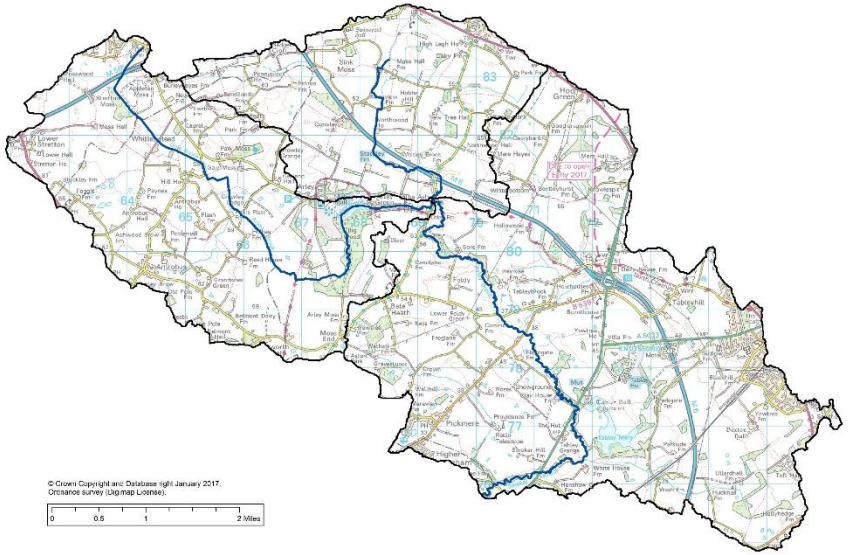
Detailed River Network



EA Main River



WFD River

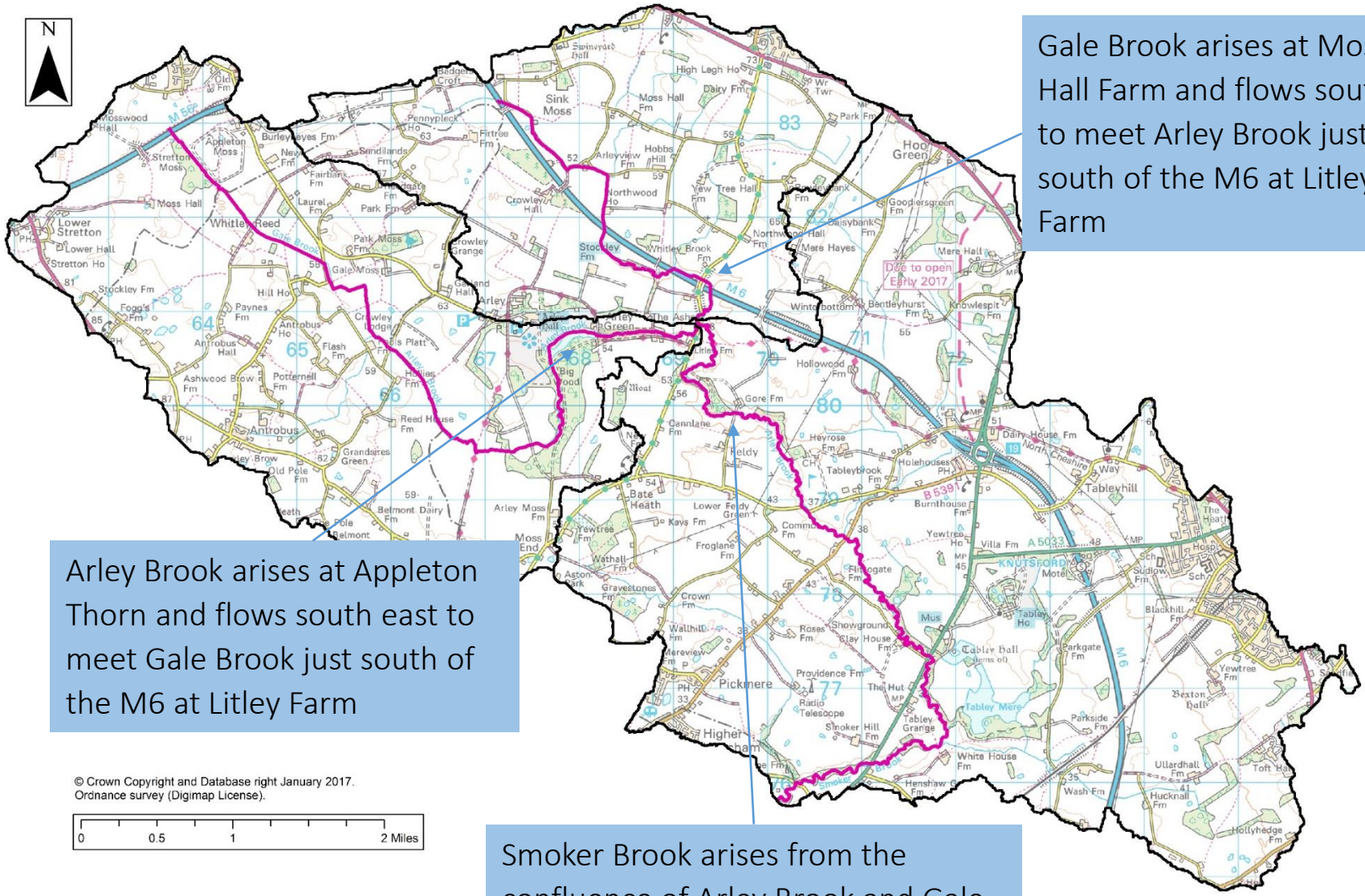


Source: EA Main River, WFD River and DRN (Detailed River Network) from environment.data.gov.uk– note the DRN is under consultation in 2017 but there are no proposed insertions or deletions in the Aldford catchment.

EA main river tributaries

The Environment Agency is responsible for carrying out maintenance, improvement or construction work on main rivers 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*



Custom Waterbody Summary Report

15 June 2017
13:40:12

Environment Agency

Smoker Brook (Gale Brook to Wincham 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	GB112068060410	CYCLE / LATEST VERSION	Cycle 2	2
TYPE	River	DESIGNATION	Not Designated A/HMWB	
LENGTH (km)		EASTING	371140	
AREA (km2)		NORTHING	378047	
Alkalinity		CATCHMENT AREA (Ha)		

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

Classifications

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

Custom Waterbody Summary Report

15 June 2017
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Environment Agency

Gale 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	GB112068060430	CYCLE / LATEST VERSION	Cycle 2	2
TYPE	River	DESIGNATION	Not Designated A/HMWB	
LENGTH (km)		EASTING	368238	
AREA (km2)		NORTHING	381700	
Alkalinity		CATCHMENT AREA (Ha)		

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

Classifications

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

Custom Waterbody Summary Report

15 June 2017
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Environment Agency

Arley Brook (Source to Gale 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	GB112068060420	CYCLE / LATEST VERSION	Cycle 2	2
TYPE	River	DESIGNATION	Not Designated A/HMWB	
LENGTH (km)		EASTING	366377	
AREA (km2)		NORTHING	380186	
Alkalinity		CATCHMENT AREA (Ha)		

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

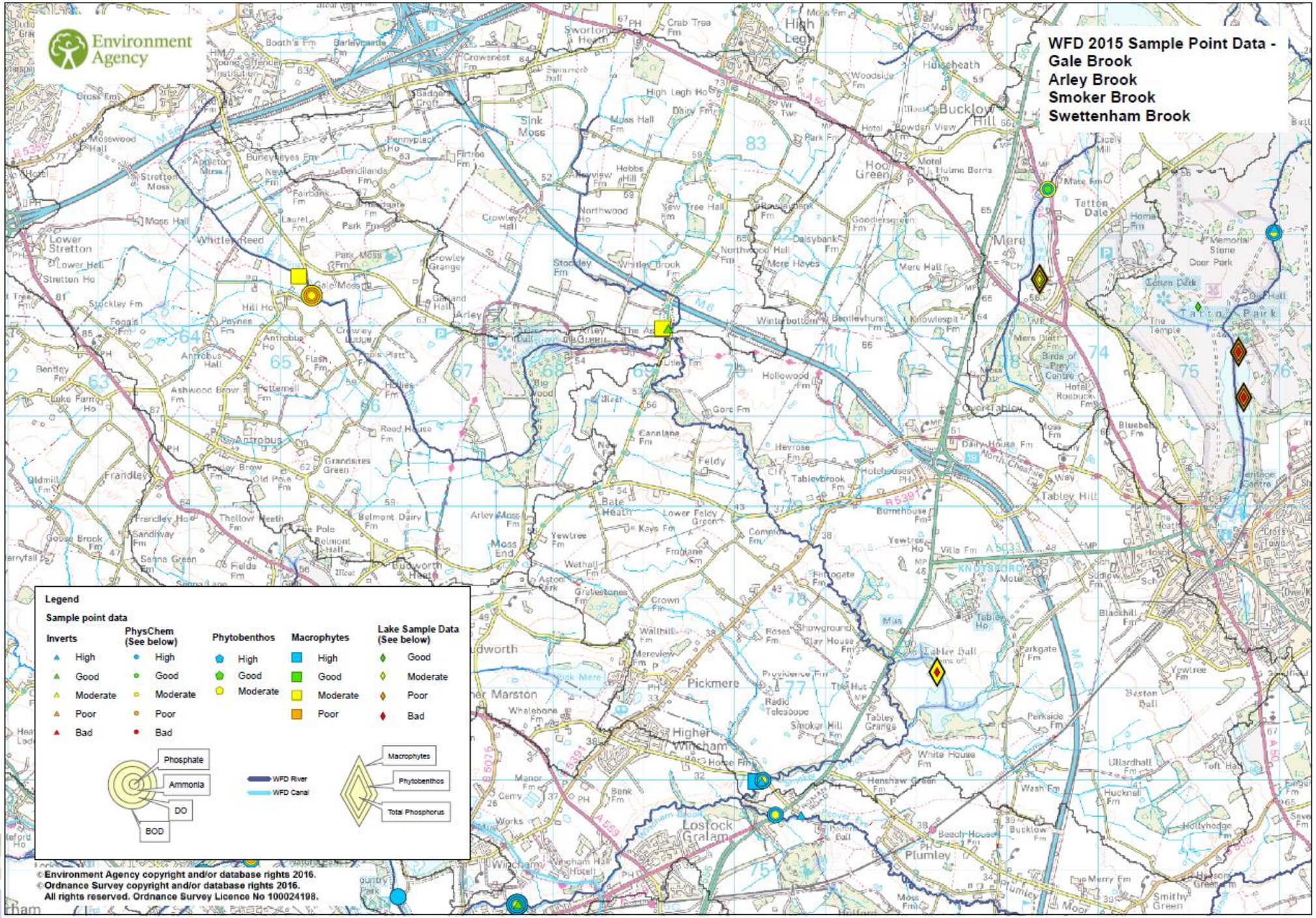
Classifications

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

Environment Agency WFD Monitoring Point Locations

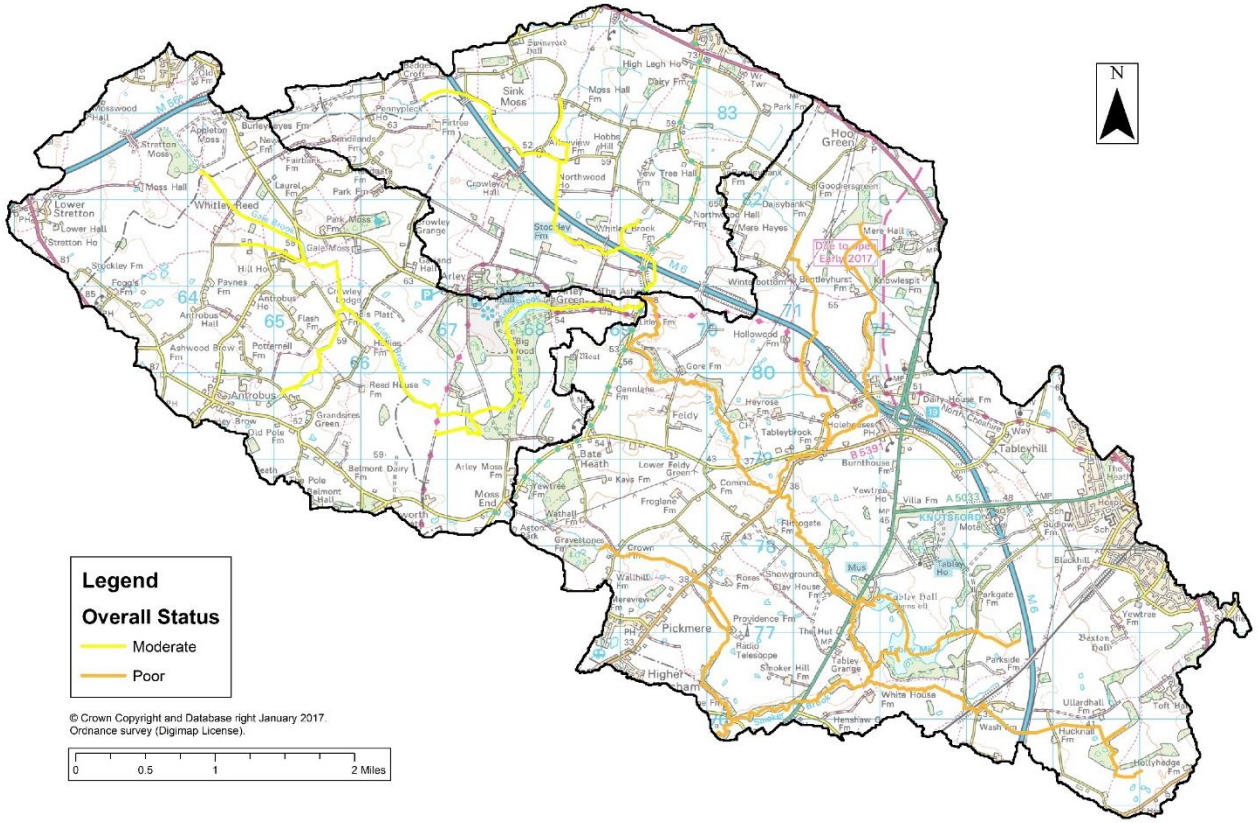
Three main WDF Monitoring points:

- Arley Brook at Gale Moss
- Confluence of Gale and Arley Brook at Litley Farm
- Confluence of Smoker Brook with the Peover Eye near Lostock Gralam

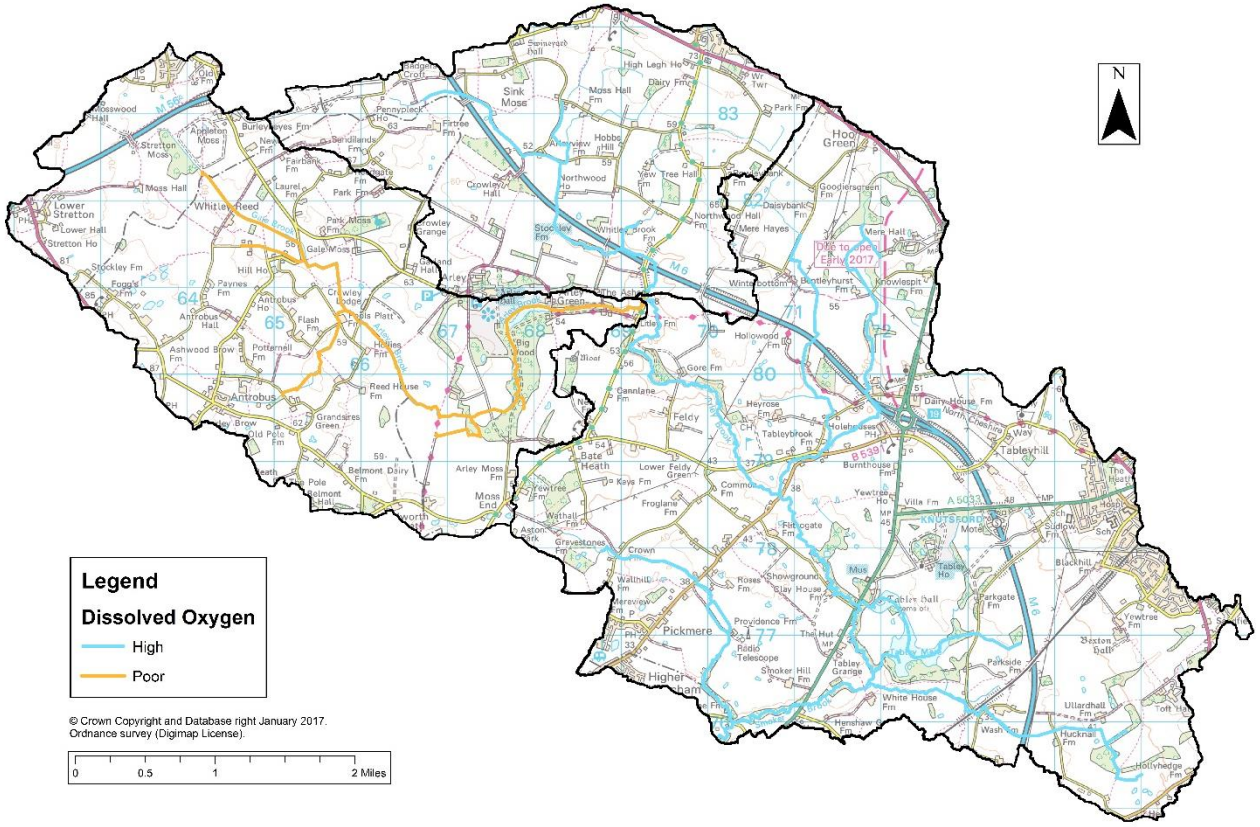


Water Framework Directive Status

Overall WFD Status



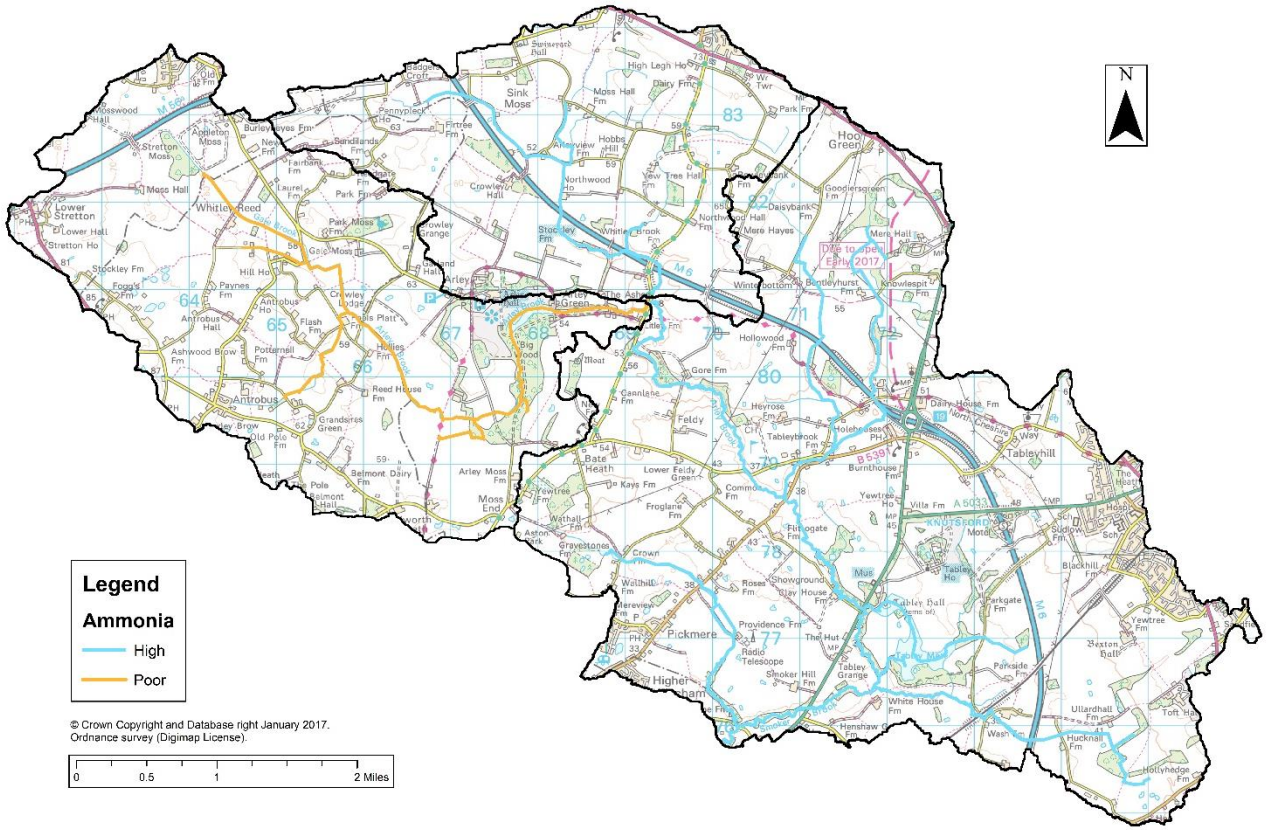
Dissolved oxygen



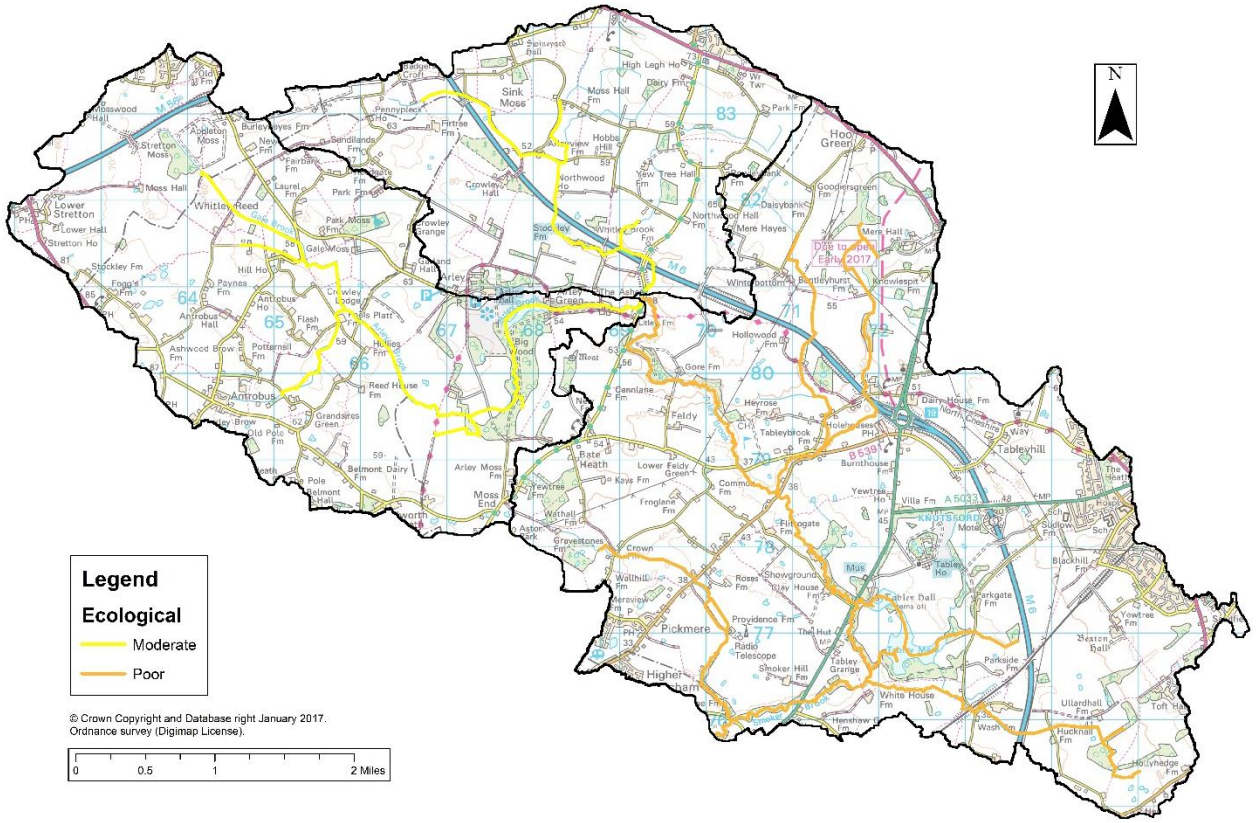
Source: Environment Agency WFD Data 2015

Water Framework Directive Status

Ammonia



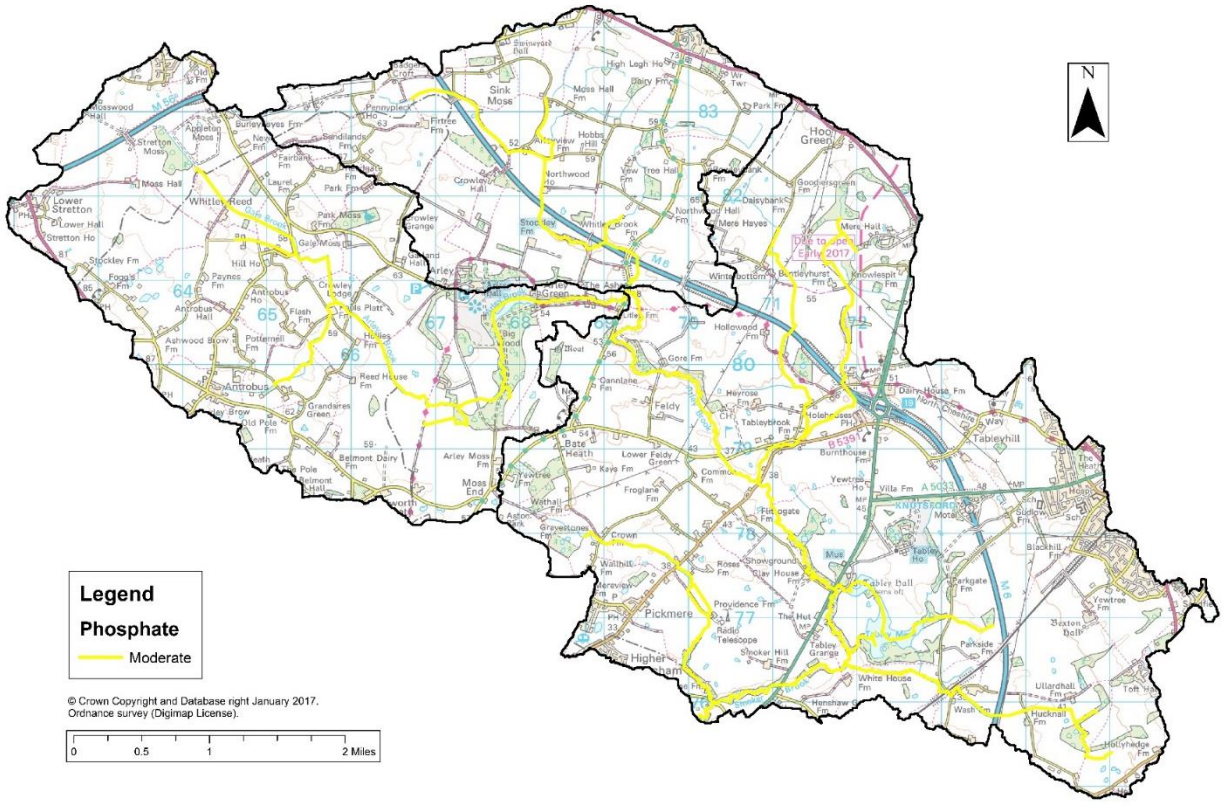
Ecological



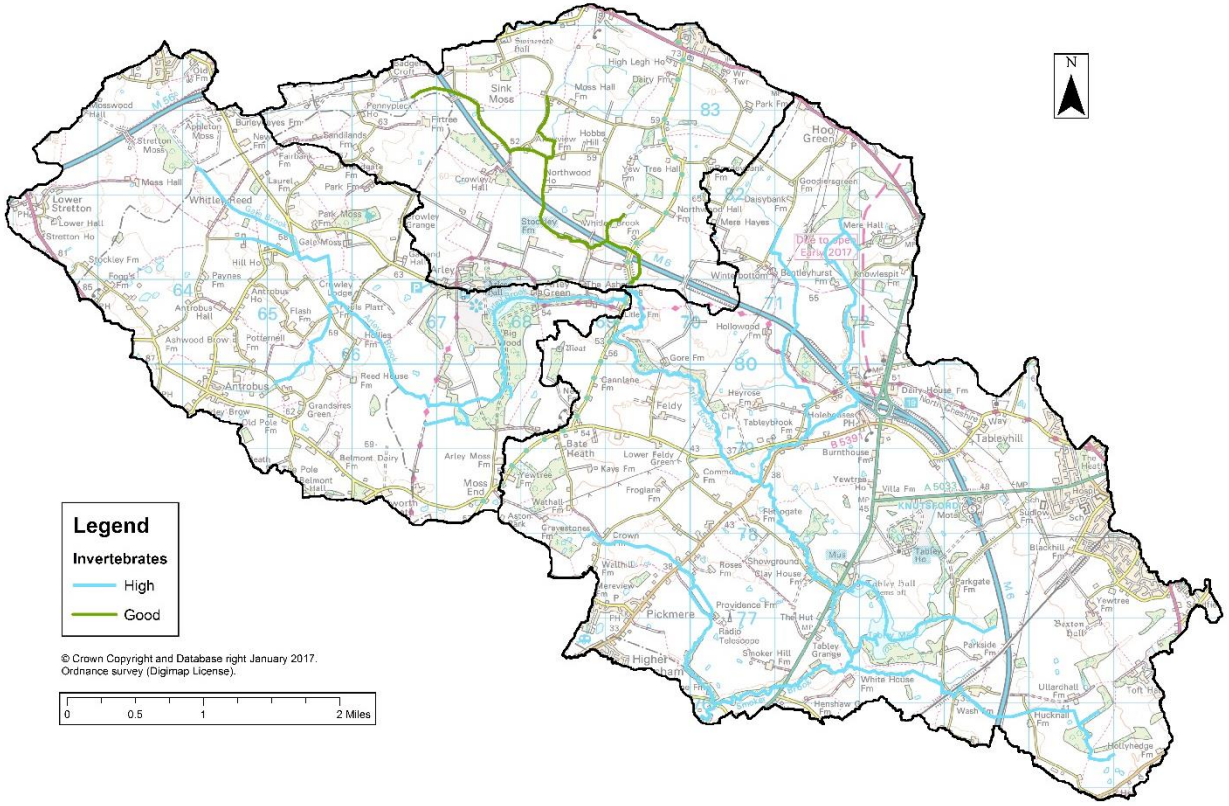
Source: Environment Agency WFD Data 2015

Water Framework Directive Status

Phosphates



Invertebrates



Source: Environment Agency WFD Data 2015

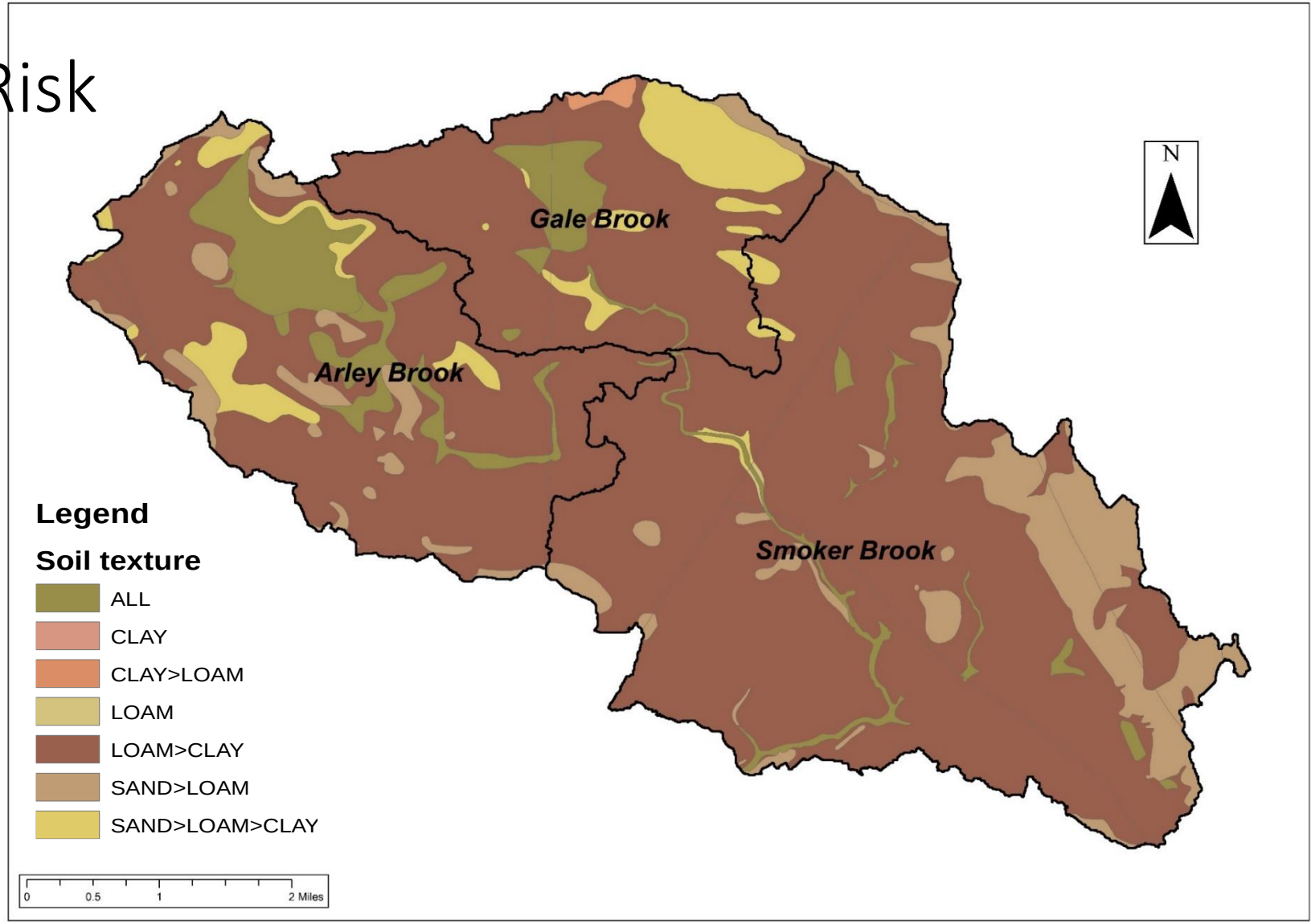
Land Use, Risk Factors and Pressures in Gale, Arley and Smoker Brook catchments

Soil Type and Erosion Risk

- 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

- Some *sandy loams* to east of Smoker Brook catchment - vulnerable to leaching of nitrate and pesticides to groundwater and to wind erosion when cropped. High risk of soil erosion from bare soils.

- *Sandy clay loams* to north of Gale Brook and Arley Brook



SCIMAP
Soil erosion risk

Localised RED and YELLOW areas where there are moderate slopes or sandier soils.

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

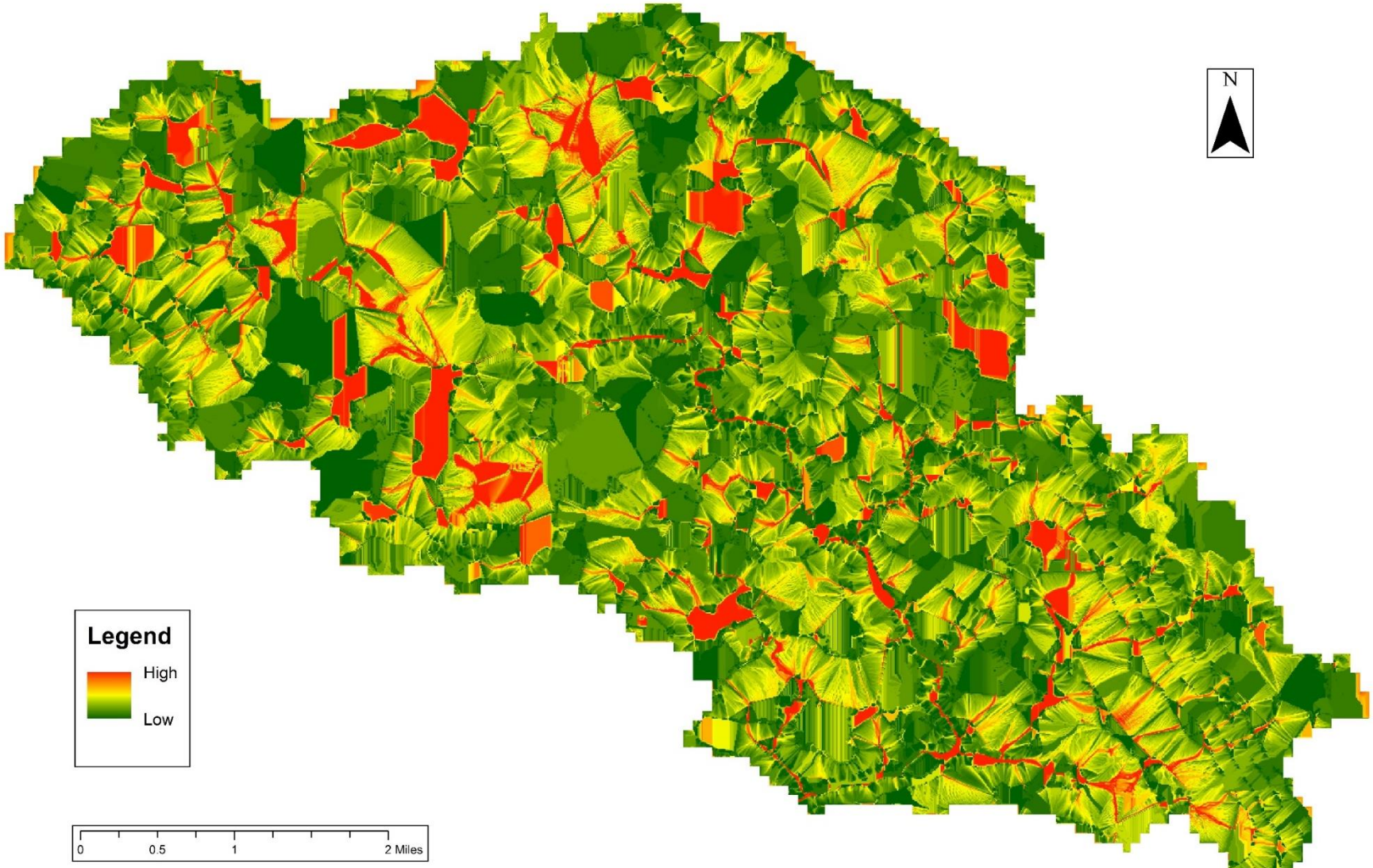
SCIMAP

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.



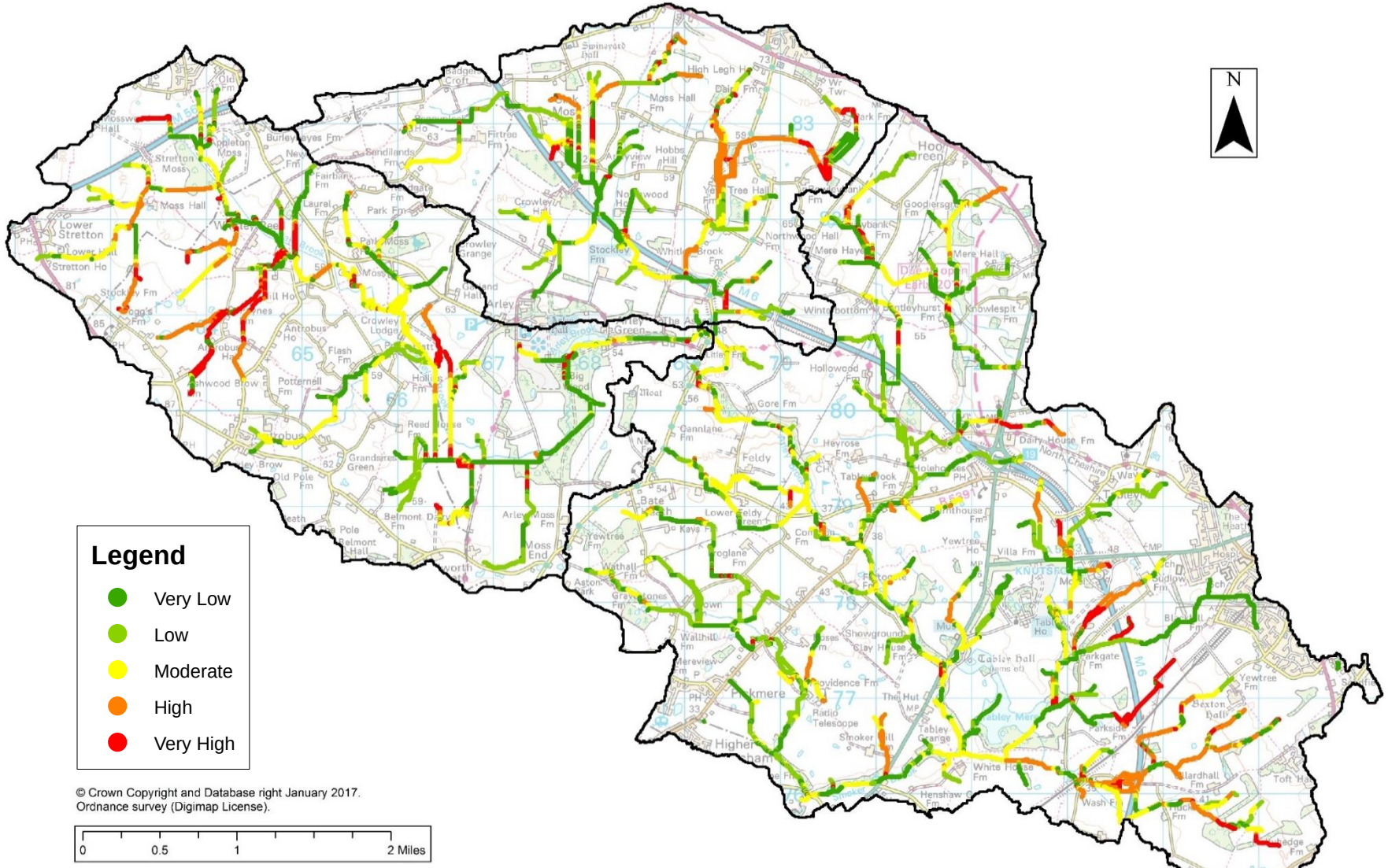
Source: Created on 'my.Scimap.org.uk' which is open source software created/supported by Durham University

SCIMAP

Accumulated channel risk

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

Very localised high risk on small tributaries of Arley Brook and Smoker Brook. Majority low to moderate risk due to relatively flat topography and clay loam soils.



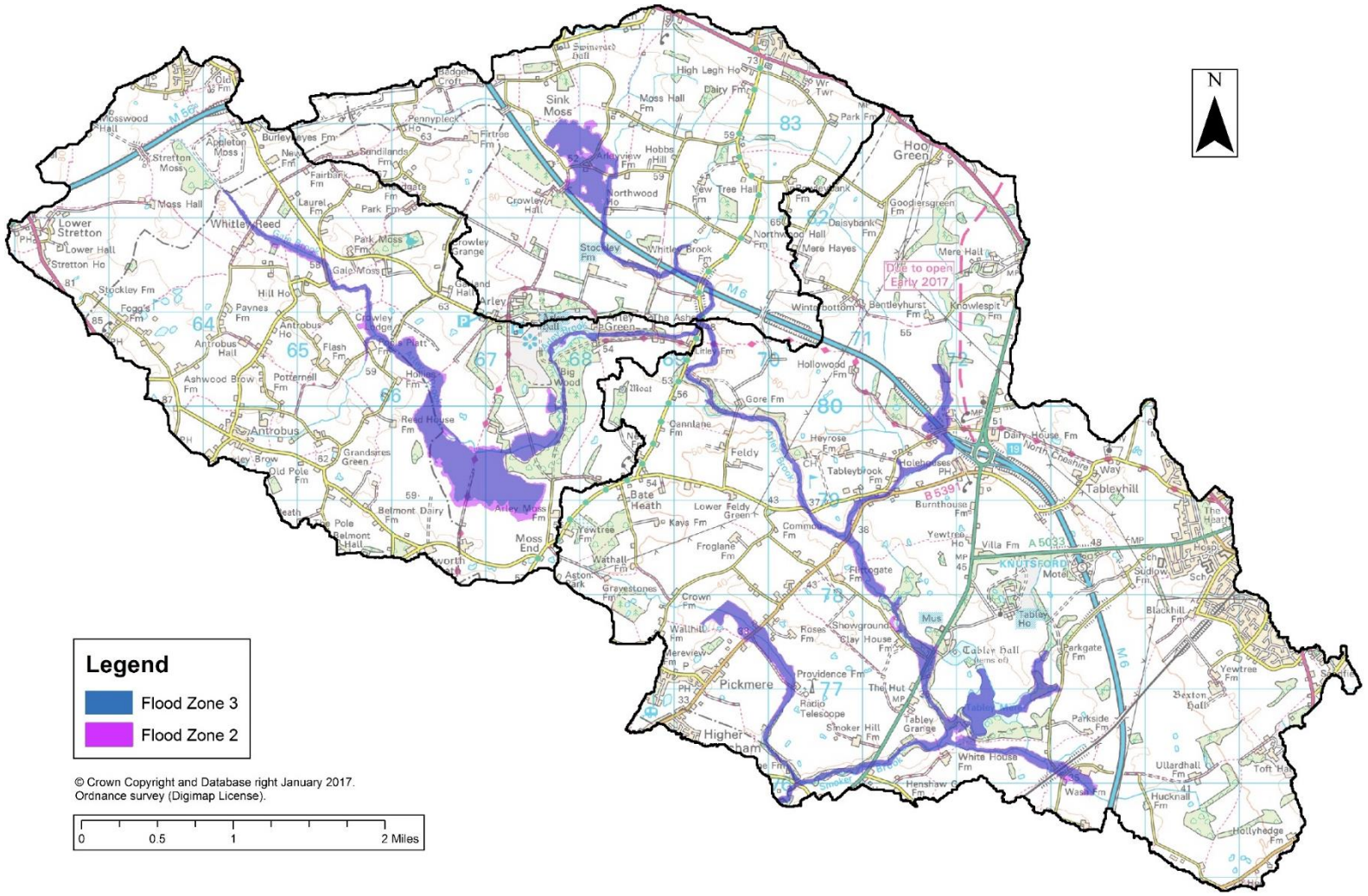
Source: Created on 'my.Scimap.org.uk' which is open source software created/supported by Durham University

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.

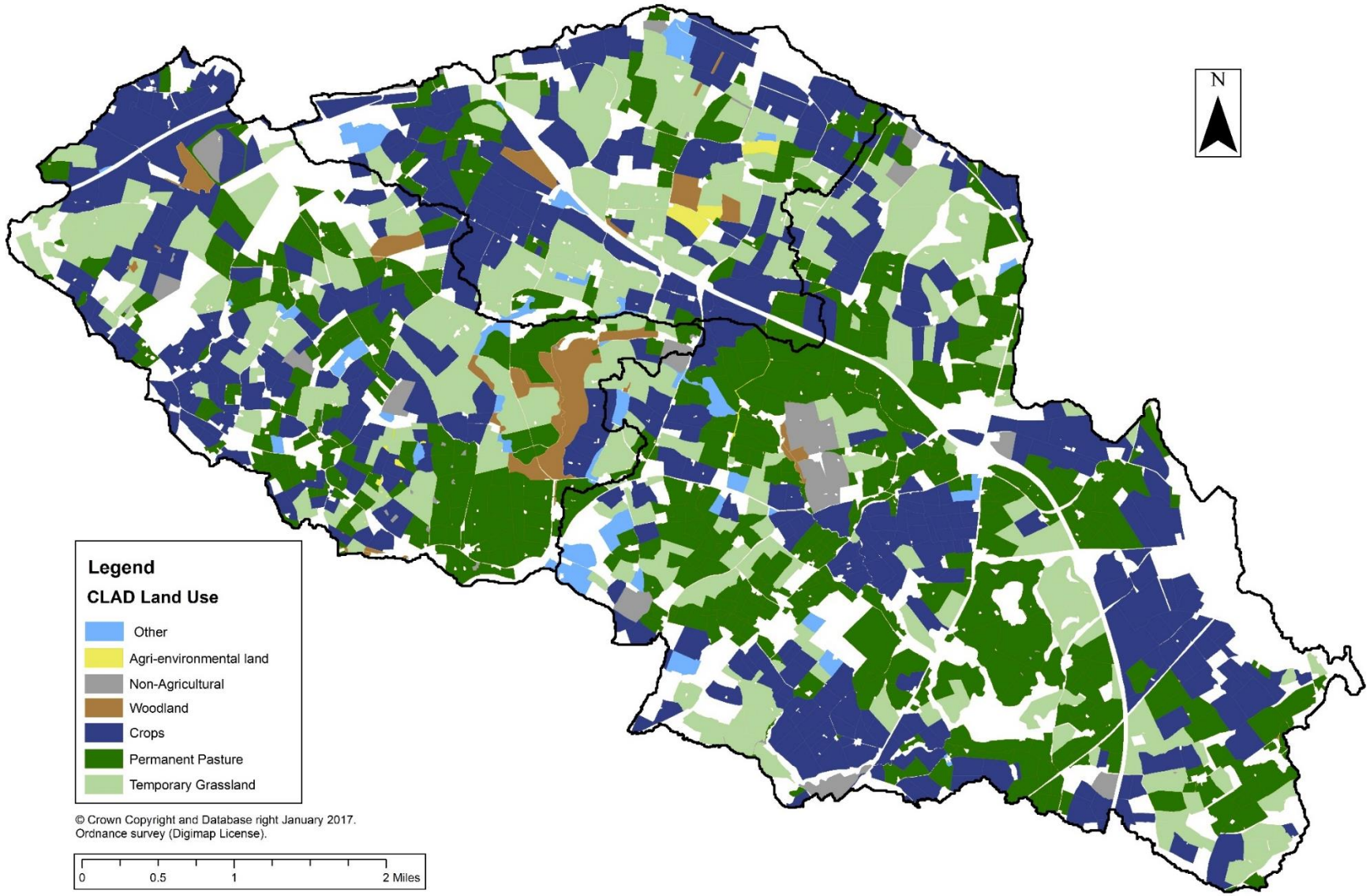


Source: EA Flood Map for planning from 'http://environment.data.gov.uk' as a partner

Land Use

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

Majority of catchment cropped or temporary grassland. Permanent pasture around Arley and Tabley estates and south of Arley catchment. Very little agri-environment coverage.



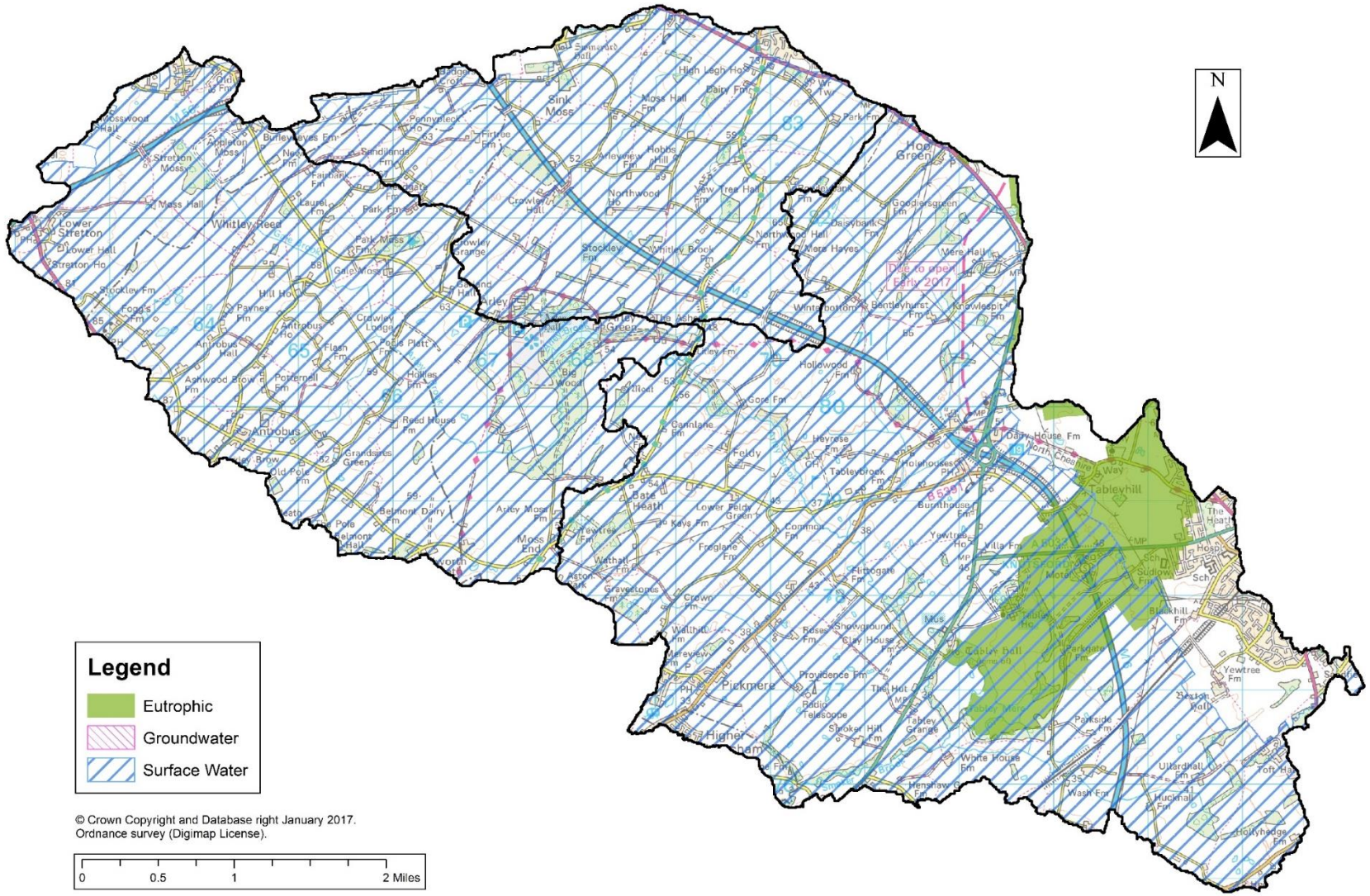
Source: RPA CLAD 2014 used as primary data source, amended with walkover survey information.

Nitrate Vulnerable Zones

Gale and Arley Catchments 100% surface water NVZ

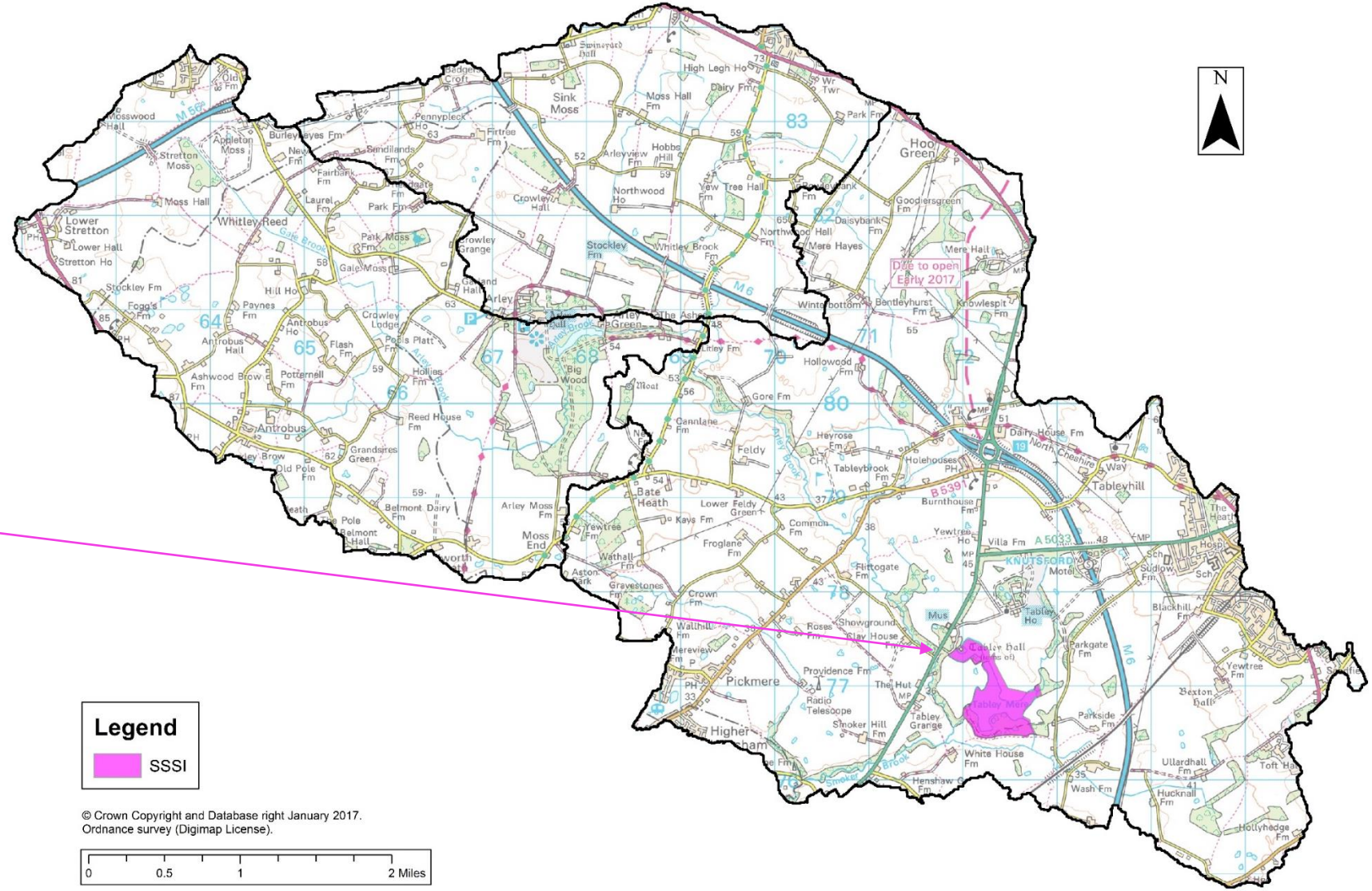
Majority of smoker catchment surface water NVZ, area around Tabley Mere Eutrophic NVZ.

Small area east of Smoker catchment on outskirts of Knutsford with no NVZ designation



Source: Downloaded from www.magic.defra.gov.uk

Sites of Special Scientific Interest

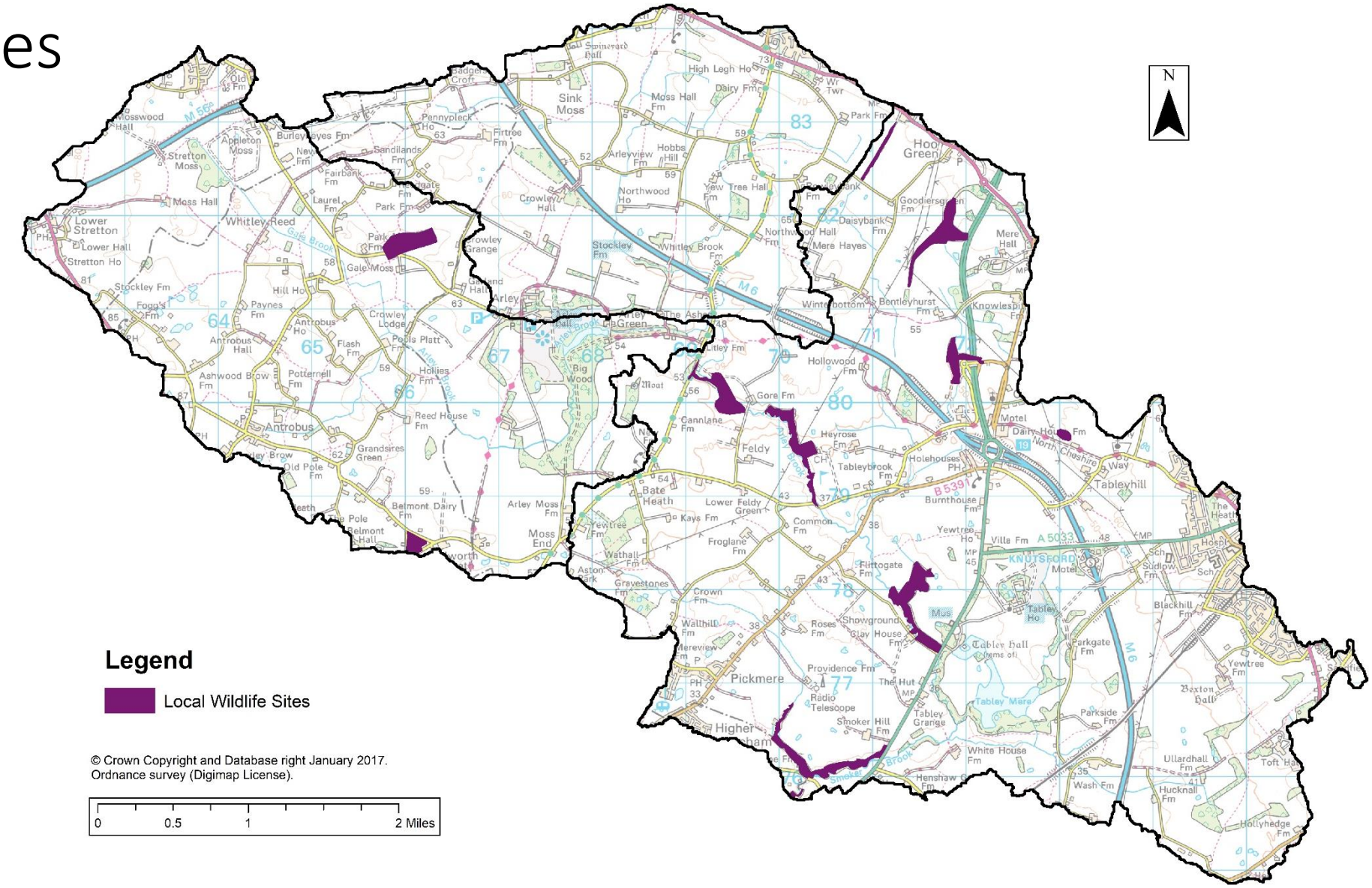


Sources: © Natural England copyright, data sourced from MAGIC

Local Wildlife Sites

Local Wildlife Sites (formerly known as SBIs, Sites of Biological Importance)

There are 10 Local Wildlife sites in the Gale, Arley and Smoker catchments which include a number of small species rich grassland sites, and clough woodland.



Gale, Smoker and Arley Brooks
Diffuse Pollution Project

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