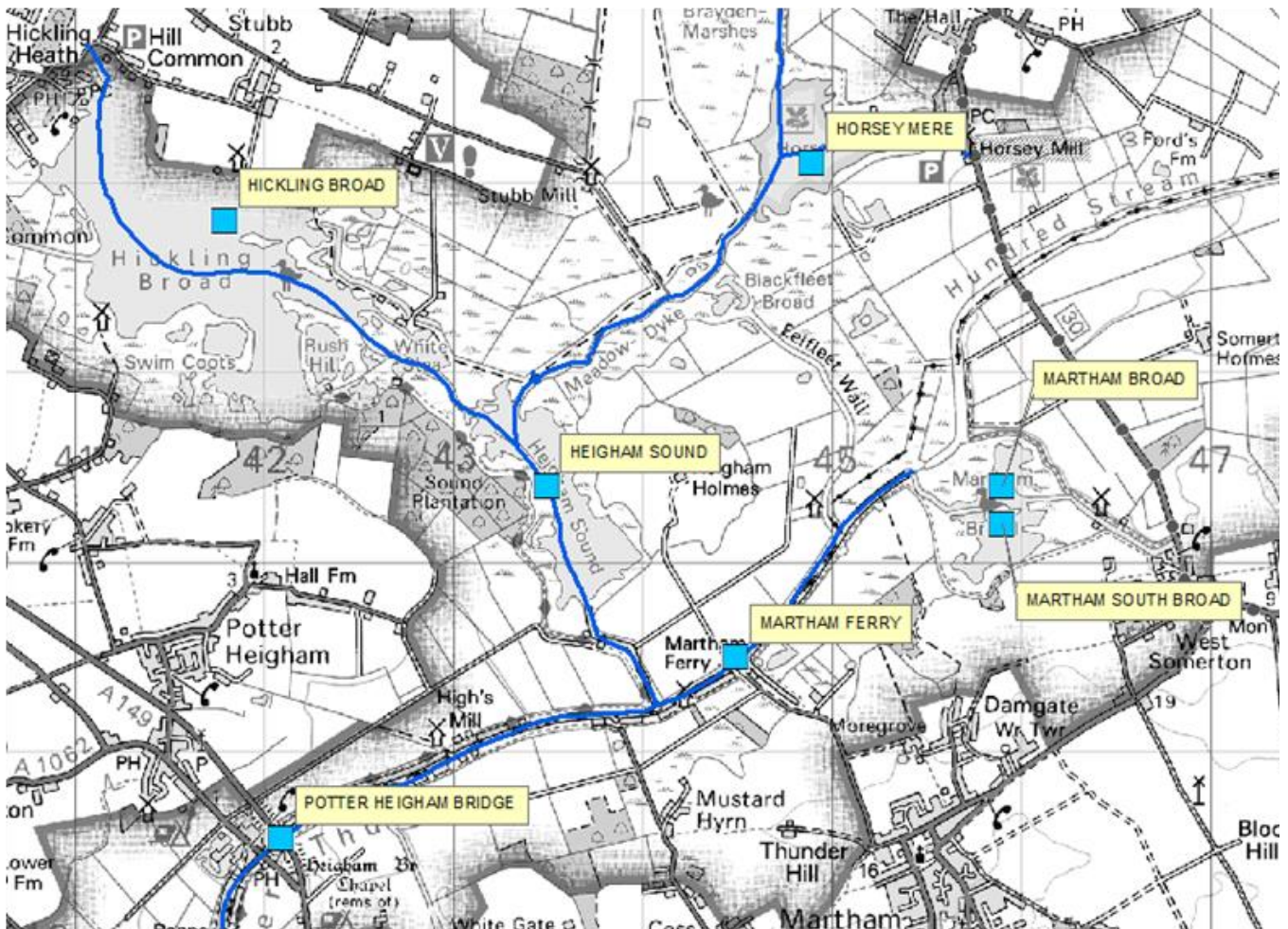


East Anglia Area (Essex, Norfolk and Suffolk)

Broads water quality report: River Thurne 2015

Broads Forum
2 February 2017
Agenda Item 6



Map showing the location of water quality sampling sites in the River Thurne and Broads.

Status

- **River:** Water quality is good for dissolved oxygen, ammonia and nitrate.
- **Broads:** Nutrients (phosphorus and nitrogen – including ammonia and nitrate) are not all meeting the national and international standards
- High nutrient concentrations have a negative effect on the ecology of the broads. Nutrient sources include internal release from sediments, diffuse sources and tidal mixing of water from downstream. It is estimated that 97% of phosphorus in the Upper Thurne Broad and marshes comes from diffuse sources such as agriculture, minor point sources and septic tanks.
- Ammonia levels fail the water quality standards in Horsey Mere where concentrations are noticeably higher than the other broads in the Thurne. This is because there is an input of ammonia to the broad from the surface drains via Brograve drainage pump.
- The water in the Thurne river and broads is brackish. This is caused by sea water percolating through the ground close to the coast which is then drawn through drainage pumps into the broads and rivers.

Actions

- The water catchment around the Thurne is designated as a Nitrate Vulnerable Zone. In this zone limits are set on when and how much nitrogen can be applied to agricultural land to reduce the amount of nitrate reaching the rivers and broads.
<https://www.gov.uk/guidance/nutrient-management-nitrate-vulnerable-zones>
- Following studies done in 2014, the dominant source of ammonia in the Brograve drain is believed to be from agricultural activity. A Diffuse Water Pollution Plan (DWPP) has been written for the Upper Thurne Broad and Marshes SSSI and Shallam Dyke Marshes, Thurne SSSI. While many of the actions in the plan address diffuse sources of phosphorus, it is anticipated that these measures will also help to address diffuse sources of ammonia.
- Actions to improve water quality and aquatic habitats are undertaken by landowners and partners working within the area of the Broadland Rivers Catchment Partnership.
<http://www.catchmentbasedapproach.org/anglian/broadland-rivers>
- The Internal Drainage Board is looking at how land drainage can be improved to lower sea water and ochre input into the catchment. For more information contact info@wlma.org.uk
- Reed margin enhancements continue with recent Broads Authority work in Heigham Sound and Hickling Broad. <http://www.broads-authority.gov.uk/looking-after/projects/upper-thurne/hickling-wetland-creation> and <http://www.broads-authority.gov.uk/news-and-publications/news/world-wetlands-day-a-new-vision-for-hickling>

Water quality

- Full details of the water quality standards used are given in the appendix below.
- Water quality is shown as 'pass/fail' for 2015. The change from 2014 is shown to the right using the following symbols: [=] no change [↓] decline compared to 2014 [↑] improvement compared to 2014 and values are shown in grey

RIVER	Dissolved oxygen	Ammonia	Phosphate	Nitrate	Salinity status
SITE NAME	%sat	mg/l N	mg/l P	mg/l N	conductivity µS/cm
	(average value 2012-2014)				(range 2012-2014)
Martham Ferry	Pass [=] (87.5)	Pass [=] (0.09)	Pass [=] (0.01)	Pass [=] (0.706)	Brackish (2535-6596)
Potter Heigham Bridge	Pass [=] (92.0)	Pass [=] (0.10)	Pass [=] (0.01)	Pass [=] (0.864)	Brackish (1855-6555)

BROAD	Total phosphorus	Ammonia	Total Nitrogen	Salinity status
SITE NAME	µg/l P	mg/l N	mg/l N	conductivity µS/cm
	(average value 2012-2014)			(range 2012-2014)
Hickling Broad	Fail [=] (91)	Pass [=] (0.076)	Fail [=] (1.84)	Brackish (4120-6796)
Horse Mere	Fail [=] (54)	Fail [↓] (0.303)	Fail [=] (2.22)	Brackish (5201-11208)
Heigham Sound	Fail [=] (71)	No monitoring data	No monitoring data	Brackish (2886-7480)
Martham North and South Broad	Fail [=] (41)	Pass [=] (0.071)	No monitoring data	Brackish (1910-5992)

Fish surveys

Environment Agency surveys were carried out in 2015 at Potter Heigham boatyard and Catfield dyke. 7 fish species were recorded: Common bream, perch, pike, roach, rudd, flounder, roach x common bream hybrid.

Angling match results show that eel, gudgeon, ruffe and dace are also present in the Thurne. Furthermore, mullet, bass, sturgeon, carp and wels catfish have occasionally been caught. Carp and wels catfish are nonnative species and are likely to have been introduced illegally. Although European sturgeon are a protected migratory species it is unlikely that the sturgeon caught in the Thurne is one of these. It is probably a different species and should be considered nonnative alongside carp and Wels catfish.

Water plant surveys

The Broads Authority carries out annual plant surveys across the Broads National Park. The table below shows the results of the 2015 Thurne Broads survey.*

Broad name	Number of species found in 2015	2015 compared to 2014
Hickling Broad	15	[↑]
Horse Mere	4	[=]
Heigham Sound	10	[↓]
Martham North Broad	9	[↓]
Martham South Broad	19	[↑]

*Data from: http://www.broads-authority.gov.uk/_data/assets/pdf_file/0010/695827/Broads-Annual-Water-Plant-Survey-Report-2015.pdf

APPENDIX: Water quality standards used to assess the River Thurne and its Broad.

The water quality standards, parameters and levels, set for rivers and lakes (Broad) are not the same because of the difference in the physical characteristics, pressures and ecology of the two water body types. The parameters and standards for each water body type are set to provide a measure of how much catchment pressures affect water quality.

RIVERS water quality standards

Source - The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 http://www.legislation.gov.uk/uksi/2015/1623/pdfs/ukiod_20151623_en.pdf

Element	Statistic	Applies to which sites	PASS	FAIL
Ammonia (mg/l N)	90 %ile	All sites	<0.6	>0.6
Dissolved Oxygen (% sat)	10 %ile	All sites	>60	<60
Nitrate (mg/l N)	mean	All sites	<11.3	>11.3
Phosphate (mg/l P)	Annual Average	Martham Ferry	<0.087	>0.087
		Potter Heigham	<0.087	>0.087

BROADS water quality standards

The most stringent water quality standards that apply to the Broad have been used in this report.

	Total Phosphorus (ug/l P) annual mean		Ammonia (mg/l N) (90%tile)		Total Nitrogen (mg/l N) annual mean	
	Total phosphorus targets for lake Natura 2000 Protected Area Special Areas of Conservation (SACs)*		The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015**		Common Standards Monitoring for Freshwater Lakes Version March 2015***	
Broad Name	PASS	FAIL	PASS	FAIL	PASS	FAIL
Hickling Broad	<30	>30	<0.6	>0.6	<1.5	>1.5
Horse Mere	<30	>30	<0.6	>0.6	<1.5	>1.5
Martham Broad (North and South)	<30	>30	<0.6	>0.6	<1.5	>1.5
Heigham Sound	<30	>30	-	-	-	-

Source: * <http://publications.naturalengland.org.uk/publication/4841829396643840>
 ** http://www.legislation.gov.uk/uksi/2015/1623/pdfs/ukiod_20151623_en_auto.pdf
 *** http://jncc.defra.gov.uk/pdf/0315_CSM_Freshwater_lakes.pdf

Salinity - measured by conductivity (µS\cm)

Freshwater	Brackish	Seawater (North Sea)
700-1000	>1000 and <52000	52000

Where to get more Environment Agency data:

Water quality: access all water quality monitoring data for the period 2000-2015 here:

<http://environment.data.gov.uk/water-quality/view/landing>

Fish monitoring data: access freshwater fish counts for all species for all areas and all years:

https://ea.sharefile.com/share?cmd=d&id=se57eb49f66849b5a#/view/se57eb49f66849b5a?_k=0f6iby

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