

Hoveton Wetlands Restoration Project: Flood Risk Activity permit application comments by FBG (East Anglia – ENS)

We continue to support the high level objectives (e.g. WFD, Habitats Directive) to restore the ecology of Hoveton Great Broad & Hudson's Bay (herein after referred to as HGB). However, our assessment of the available evidence concludes that that HGB provides uniquely important habitat for fish within the context of the complex inter-connected lowland tidal river environment of the Northern Broads System, of which HGB is an integral part. Activities that may affect HGB cannot therefore be considered in isolation. Moreover, there are a number of non-fisheries objections that require addressing before the permit can be determined.

It follows that the proposed biomanipulation methodology, involving the installation of fish proof barriers to prevent fish accessing the habitats currently found within HGB carries a high risk of detrimental impacts to the fish populations of both HGB and the Northern Broads system. The impacts on fish cannot be mitigated at a waterbody level within HGB. Deteriorations in Fish element Status are not permissible under WFD and the impacts and potential risks to fish arising from the proposed activity are incompatible with the exercise of our statutory fisheries obligations in respect of the Broads fishery resource. Furthermore there remain key evidence gaps, in particular with respect to the presence or absence of protected species and the completeness of the submitted WFD assessment.

In any permitting situation we would therefore advise the applicant that the proposals were unacceptable for the stipulated reasons and advise them to review and change their proposed methodology accordingly or withdraw their application. In this case we would advise the applicant that the permitted activity (proposed methodology) is not appropriate and seek to work with the applicant on alternative ways of achieving restoration objectives for HGB that do not carry significant detrimental risks for fish, WFD and fisheries interests in the Broads.

A summary and (where relevant) evidenced response to the application follows below.

- A) **Objection in principle – WFD fish element deterioration** – Our assessment of the evidence base has highlighted that the permitted activity will cause WFD Fish element deterioration within HGB and carries a significant risk of causing WFD fish element deterioration in other connected WFD waterbodies within the Northern Broads system. The impact of the permitted activity cannot be mitigated within the HGB waterbody as the permitted activity is specifically intended to prevent fish accessing HGB and concurrently the applicant intends to remove most of the fish found to be present within the HGB waterbody once the barriers are installed. We cannot undertake or authorise any activity that may cause a deterioration of the status of a waterbody, which is sufficient grounds to reject the permit application under WFD in accordance with standard practice.

We also would expect any project of this scale to have sufficient (i.e. proportionate to the loss or impact), proven (i.e. evidence-based, effective) mitigation in place prior to being delivered to offset potential risks to the environment, in this case the

impact of isolating the uniquely important fish habitats within HGB from the rest of the Northern Broads system, including several other WFD waterbodies. Despite the evidence gathered by and for the project and previous advice to the applicant e.g.^{1 2 3 4 5}, no viable, proportionate, evidence-based mitigation proposals have been provided within the application. In lieu of this, the precautionary principle must apply and the application should be refused, or the Agency risks significant reputational issues and potentially legal challenges e.g. from where we have previously refused permits or licences on WFD fish deterioration or Fisheries consenting grounds, or may need to do so in the future.

- B) Objection in principle - Conflicts with our Fisheries duties** – The impacts and risks associated with the permitted activity are largely incompatible with our statutory duties to maintain, improve and develop fisheries under e.g. SAFFA 1975, Environment Act 1995 and government guidance with respect to e.g. socio-economic growth, particularly given the paucity of evidence-based mitigation within the application and the socio-economic importance of the Broads fishery resource⁶. A decision to knowingly permit the application against the evidence risks significant reputational damage (e.g. from the Agency’s rod licence customers, the Angling Trust, Fish Legal) and potential legal challenge (e.g. from Broads tourism businesses in the event of deterioration of Broads fishery performance and associated downturn in angling tourism revenue). The precautionary principle must apply, particularly where e.g. a) it would also be extremely difficult to disaggregate the impacts and risks associated from the proposed permitted activity from other pressures on Broads fish stocks that could result in a decline in fishery performance; b) alternative restoration methodologies could be considered and implemented.
- C) Objection – the Water Framework Directive Assessment is incomplete and omits key information that inhibits the determination of the permit** - In neither the originally submitted WFD documentation nor the recent addendum are the Reasons for Not Achieving Good (RNAG’s e.g. diffuse pollution from agriculture) discussed. These are relevant as fish and their associated activities are not listed as an RNAG but the proposal aims to remove fish with a view to achieving good status. The WFD data presented are not the most recent available, with the combination of documents creating ambiguity regarding the baseline condition for assessment. For example, the original WFD assessment lists the macrophyte quality element as moderate but the 2016 classification lists it as poor. The original assessment also states that Hoveton Great Broad is a heavily modified waterbody (HMWB) but also in

¹ September/October 2013 – e.g. Hoveton Great Broad Fisheries Assessment Needs V2, Environment Agency

² Various communications Jan – April 2017, including HGBRP Seasonal Comparative Fish Surveys Summary Report. Fishtrack Ltd for Natural England. April 2017

³ HGB Fish barriers permitting meeting notes Nov 2018 - SL Objections Dec 2018 to AW

⁴ HGB fish barriers permitting meeting notes Nov 2018 - JL&GP objections to AW Dec 2018

⁵ Hoveton Great Broad Restoration final Fisheries position June 2019

⁶ The value of angling in ENS. Lane, S. Environment Agency 2015.

parts refers to it as a non-HWMB. An update-to-date and application-relevant assessment of all WFD quality elements is required. Neither the original WFD assessment nor the additional information consider the impacts of the fish barriers upon WFD quality elements that aren't fish (e.g. hydrological regime, total phosphorous, etc). Since the first WFD assessment was undertaken there has been a deterioration in WFD status of the Hoveton Great Broad waterbody from moderate in 2014 to poor in 2015. In particular the macrophytes, phytobenthos and phytoplankton quality elements have deteriorated. Nearby adjacent Broads (e.g. Wroxham) have also recorded deteriorations. Is there something more fundamental (e.g. diffuse pollution from agriculture and point-source pollution from sewage treatment works) taking place on the Broads that prevents the achievement of good ecological status/potential and does this process undermine aspirations for the proposal to achieve WFD objectives?

- D) **Objection - protected species** - The operator must undertake and submit for review up-to-date (within the last year) surveys for water vole and otter before the permit can be determined.
- E) **Objection – eel regulations** - the project aims to exclude fish and eels from Hoveton Great Broad by installing 2mm screens across the entrances to the waterbody. From the designs it appears that these screens will prevent any eel present in the Broad from being able to migrate downstream. We understand that the Broad will be electro-fished in order to remove as many fish as possible. Eels, especially small eels, are very difficult to catch by electrofishing as they tend to lie in the silt and are not stunned. It is highly likely, therefore, that potentially high numbers of eels of all age ranges will remain in the Broad and be unable to migrate. To comply with the Eels (England and Wales) Regulations 2009 the operator will have to demonstrate that reasonable measures are being taken to enable silver eels to escape from the isolated Broad to continue their downstream migration. Please liaise with the Fisheries Team for confirmation of acceptance of the methodology that will be used.
- F) **Risk - Uncertainty of biomanipulation success** – There are arguably no biomanipulation projects in the Broads that have demonstrably delivered sustainable ecological improvement (i.e. without further repeated interventions or with restored connectivity) and there appear to be significant uncertainties with the chances of success in the case of HGB.
- G) **Risk - Challenges to the Environment Agency's reputation** – The Environment Agency makes sound, evidence-based decisions to protect and improve the environment. There is considerable potential for challenges associated with HGB and significant risks that some potential outcomes conflict with established Agency positions e.g. WFD and Hydropower permits, Close Season Review (2019)

- H) **Risk - Conflict with established practice to for removal of weirs and barriers to fish migration** – The installation of barriers to fish migration and preventing fish passage to primary spawning and recruitment habitat conflicts with established International practice. The Environment Agency and partners are spending millions of pounds to remove barriers and open up spawning sites within river catchments. e.g. EA Powick Sluice, R. Trent, Nottingham (£5 million EA fish passage project); [Unlocking the Severn Project](#)

Detailed explanation and evidence for specific points raised above:

A) **Objection in principle - WFD fish element deterioration within the HGB waterbody and high risk of WFD fish element deterioration within other inter-connected WFD waterbodies**

1. In considering WFD we refer to [EA Position 1340 16 “Supporting implementation of river basin management plans](#), EA WFD policy and guidance e.g. hydropower⁷ and previous correspondence with National Fisheries colleagues on this matter as it pertains to assessing the impacts of the HGB project on fish, WFD compliance and Agency policy and process in respect of permits and authorisations^{8 9}.
2. [Environment Agency \(1340 16\)](#) states: *“The Environment Agency must not undertake or authorise (that is, issue a permit or licence for) any activity that: -*
 - a. *may cause a deterioration of the status of a waterbody or*
 - b. *will jeopardise the attainment of good status unless the Article 4.7 defence applies”*
3. In light of the available evidence it remains our technical judgement that the proposed biomanipulation of Hoveton Great Broad and Hudson’s Bay will cause WFD fish element deterioration within the HGB waterbody and carries a high risk of causing WFD fish element deterioration in multiple other WFD waterbodies (both lake and river) within the Bure WFD Operational catchment. The impact of the permitted activity on fish cannot be mitigated within the HGB waterbody as the activity will directly lead to a deterioration of the fish community. We cannot undertake or authorise any activity that may cause a deterioration of the status of a waterbody, which is sufficient grounds to reject the permit application under WFD. A non-exhaustive list of concerns is set out below, together with examples of the evidence where relevant:
4. Whilst current legislation (WFD and Habitats Directive) sees HGB as a discrete waterbody with specific ecological targets, in reality HGB forms an inter-connected part of the unique Northern Broads lowland tidal river ecosystem. The Bure catchment (Northern Broads system) does have many of the characteristics of a

⁷ E.g. HEP Fish Passage Supplementary Guidance Approved Version March 2018, E&B Environment Agency

⁸ e.g. Hoveton Great Broad – WFD no deterioration legal questions. Robertson, R. EA National Fisheries Services, August 2019

⁹ E.g. NE Broads Bio-Manipulation Project – WFD Objective failure risks and project objection

more natural lowland river system with significant areas of connected wetland, broads and connecting dykes, which are akin to floodplain lakes and side channels. Conversely, the lower reaches of the system are heavily modified, with embanked, re-sectioned, in some cases straightened channels, no lateral connectivity and limited marginal habitat diversity.

5. A significant proportion of the Northern Broads system is affected by saline incursion and *Prymnesium* events, which can cause catastrophic fish kills and are a significant existing threat to fish populations within the Northern Broads System e.g. ¹⁰. There is a risk that these impacts will get worse in the medium term with climate change. It is therefore critical that fish and other aquatic organisms can access, move and migrate between the habitats of HGB WFD waterbody and the other aquatic habitats and WFD waterbodies with the Northern Broads system, unhindered by barriers or obstructions e.g. ^{11 12}. As a result, activities on HGB that affect fish also have the potential to have impacts far beyond the HGB waterbody.
6. Evidence from hydroacoustic surveys consistently identify the Bure reach from Horning to Wroxham as the most prolific in the entire tidal river, reflecting the connectivity and lateral habitat available for fish, which is poor in the lower system. This formed a key driver for the selection of comparative Broad fish survey strategy, as impacts on the fish community within this section of the system are likely to have a consequential effect on the wider fish community of the River Bure e.g. ¹³.
7. The application of archetypal lake ecological theory to HGB and the other Northern Broads WFD waterbodies is not appropriate in determining likely changes in WFD fish status as these waterbodies are not closed lakes ¹⁴. Accordingly, there is no appropriate fish ecological status assessment tool for this system ¹⁵. The baseline used for assessing WFD fish element deterioration risk is the current conditions within HGB and the Northern Broads system, not aspirational targets for isolated, shallow lakes, reflecting established principles and guidance e.g. WFD TAG ¹⁶.
8. The baseline for the current fish assemblage is provided by the primary evidence (i.e. site specific, direct observation etc) gathered to date, including but not limited to:

¹⁰ e.g. FIP 2017_18 Broads Fish Migration V5 Project Description FINAL AREA SUBMISSION, Environment Agency

¹¹ ARIS multibeam FSSA baseline monitoring e.g. diel intra-WFD waterbody fish migrations, November 2014 Foxburrow Dyke 'The fish motorway'. Environment Agency & Fishtrack Ltd 2014

¹² [Investigating the fish stocks of Hoveton Great Broad A multimethod approach to a complex system](#), Presentation to IFM Conference. Lane (Environment Agency) and Hindes (Fishtrack Ltd), 2016

¹³ HGBRP Seasonal Comparative Fish Surveys Summary Report. Fishtrack Ltd for Natural England. April 2017

¹⁴ Hoveton project creating a sustainable future. Lyons, J. Environment Agency November 2019

¹⁵ Peirson, G. Principle Fisheries Scientist, Environment Agency November 2019

¹⁶ [WFD UKTAG](#) in respect of hydropower (Dec 2013).

- a. Baseline multi-method fish monitoring on HGB ^{17 18 19 20}
 - b. Comparative multi-method surveys of the Bure Broads ²¹
 - c. Bure Broads pike spawning assessment ^{22 23}
 - d. Bure Broads bream spawning assessment ^{24 25 26}
 - e. Northern Broads fish tracking studies ^{27 28 29 30}
 - f. Hydroacoustic fish surveys 2004-2018. Environment Agency
9. Advice from National Fisheries colleagues is that our primary evidence base is significant and more than that usually available to make WFD permitting decisions in respect of fish element impacts e.g. for hydropower ³¹
10. Primary baseline and comparative survey evidence gathered by and for the project indicates that HGB is the dominant Broad for fish within the Bure Broads group. There are clear and significant diel and seasonal migrations of fish between HGB and the wider system for foraging and loafing ³², spawning and recruitment ³³. This primary evidence confirms our position that HGB must be assessed as a significant habitat component of the Northern Broads system, rather than a fully enclosed lake. This reinforces the requirement to consider the possible impacts of the project on other WFD waterbodies within the Northern Broads catchment area.
11. The inference that fish biomass figures e.g. 250kg/Ha bream within HGB are ‘too high’ or ‘excessive’ appear to be based on closed lake ecological theory, where a high fish biomass is assumed to be bad for the purposes of lake restoration. This is not appropriate in an open system, where fish freely move between habitats and the

¹⁷ HGB Seasonal baseline multi-method fish monitoring 2013-2015, Environment Agency & Fishtrack Ltd

¹⁸ Hoveton Great Broad Fisheries Assessment Needs V2. Sept 2013, Environment Agency

¹⁹ Hoveton Great Broad Restoration – Fisheries baseline monitoring & impact assessment – Business justification Aug 2014

²⁰ HGBRP BASG ESG meeting outcomes, 2013. Fishtrack Ltd for Natural England

²¹ HGBRP – Seasonal Comparative Fish Surveys Summary Report V2.1 Fishtrack Ltd for Natural England April 2017

²² Pike spawning habitat assessment, Fishtrack Ltd for Natural England 2015

²³ Pike spawning assessment, Feb-March 2015. Environment Agency 7 Fishtrack Ltd

²⁴ Bream spawning Habitat Assessment V1.3. Fishtrack Ltd for Natural England

²⁵ Bream spawning habitat assessment methodology, Fishtrack Ltd for Environment Agency April 2019

²⁶ Interim summary of findings from bream spawning assessment, Northern Broads system – Rivers Bure, Ant and Thurne & associated Broads April/May 2019. Environment Agency, June 2019

²⁷ FIP 2017_18 Broads Fish Migration V5 Project description FINAL AREA SUBMISSION, Environment Agency

²⁸ Year 1 Annual Report for PhD Steering Group Nov 2018, Winter, E. Bournemouth University

²⁹ Ant tagged bream tracking detections Jan-July 2018, Winter, E. Bournemouth University for Environment Agency

³⁰ Thurne tagged bream tracking detections Jan-July 2018, Winter, E. Bournemouth University for Environment Agency

³¹ E.g. Hoveton Great Broad – WFD no deterioration legal questions. Robertson, R. E&B Fisheries, August 2019.

³² ARIS multibeam FSSA baseline monitoring e.g. diel intra-WFD waterbody fish migrations, November 2014 Foxburrow Dyke ‘The fish motorway’. Environment Agency & Fishtrack Ltd 2014

³³ e.g. [Investigating the fish stocks of Hoveton Great Broad A multimethod approach to a complex system](#), Presentation to IFM Conference, Lane and Hinds, 2016

primary evidence shows significant patterns of diel, seasonal and spawning migrations of fish between HGB and the wider Northern Broads system. These fish represent the population of the Northern Broads system, as opposed to solely resident within the area of HGB – for example during the 2019 spawning assessment, no significant shoals of bream were recorded in any of the other Broads, so the actual density of spawning fish across the Northern Broads system is actually many magnitudes lower than quoted in the applicants' WFD assessment³⁴. The dynamic variation of recorded biomass estimates within the evidence is an indicator of the importance of HGB to fish at different times and life stages.

12. Further, the applicant's assumption that presence infers negative impact is not appropriate, as this does not account for actual fish behaviour whilst present in HGB, shown by the evidence. For example, multi-beam ARIS sonar data from autumn surveys confirm large shoals of bream are present in HGB. However our application of sonar technology also allows us to assess their natural behaviour in situ and confirms these fish are typically dormant in HGB during the day in the autumn and therefore have no impact. FSSA ARIS multi-beam monitoring has shown these fish moving out into the wider Northern Broads system to forage at night. Direct observation (Lane, S. EA. Pers. obs) also confirms clear water conditions within the Broad coincide with these 'high' densities of bream. Whilst densities in HGB are high during the day, these data confirm that high densities of bream cannot be assumed to have an impact on the Broad. Likewise, repeated MHRSA monitoring surveys during darkness just hours later demonstrate that there were few bream present in the Broad (Lane, S. & Reeds, J. Pers Obs, in prep).
13. There is significant evidence in the historic literature³⁵ that the Broads supported abundant populations of roach, bream and other fish species including pike, perch, tench, rudd and eel. Bream and roach are also noted in the rivers and Broads by Browne (1658). Bream and roach were extensively netted, even during spawning time in the C19th, with fish sold on for food, manure and unwanted fish were simply left to rot on the banks e.g. Everitt (1902). The established angling custom and practice of the time was to remove all fish caught, leading to the establishment of the Norfolk and Suffolk Broads Act in 1877 in an effort to protect fish stocks and fisheries from exploitation.
14. The primary evidence, including recent data from fish tracking studies of the Northern Broads system³⁶, demonstrates that HGB is the principle broad for fish within the Bure Broads group and is uniquely important habitat for spawning,

³⁴ Interim summary of findings from bream spawning assessment, Northern Broads system – Rivers Bure, Ant and Thurne and associated Broads April/May 2019

³⁵ References available from Lane, S. Environment Agency on request

³⁶ e.g. Year 1 Annual Report for PhD Steering Group Nov 2018. Winter, E. Bournemouth University

recruitment and refuge for bream within the catchment^{37 38 39 40 41}. The evidence that bream show sophisticated behaviour and marked fidelity to discrete and localised areas of the Northern Broads system is supported by evidence from other lowland systems in the UK (Reeds, J, EA Lincs & Northants; Lyons, J)^{42 43}. The evidence that bream form large spawning aggregations and spawn in specific, extremely localised habitats in the Broads ties in to evidence on other cyprinid species cited in the recent Environment Agency Close Season review^{44 45 46}. The importance of HGB as a key habitat for spawning, recruitment and resilience of Broads fish populations is also backed-up by observations within the literature^{47 48}.

15. The primary evidence shows that bream spawn preferentially in HGB, despite there being apparently suitable physical habitats elsewhere in the system e.g. as assessed during the April/May 2019 bream spawning survey. No significant aggregations of adult bream were observed outside of HGB, despite side-imaging sonar and mobile acoustic tracking coverage of multiple Broads on the same day during the survey period. The tracking evidence confirms multiple spawning migrations from the furthest extent of the catchment e.g. away from the Upper Thurne, which comprises open, extensive macrophyte-dominated habitats – (e.g. Page 7: Broads Authority macrophyte monitoring data show some of the highest plant species richness and abundance scores from open Broads that have not been biomanipulated e.g. Martham North and South Broads, Heigham Sounds and Hickling Broad).
16. Direct observation of extensive bream spawning activity in HGB was undertaken during the baseline fish surveys e.g. May 2015⁴⁹ and April – May 2019⁵⁰. There were so many fish within HGB in May 2015 that male bream were observed intensively

³⁷ Bream Spawning Habitat Assessment v1.3. 2018. Fishtrack Ltd for Natural England

³⁸ Baseline fish surveys and comparative fish survey reports for Natural England. Fishtrack Ltd.

³⁹ Interim summary of findings from bream spawning assessment, Northern Broads system – Rivers Bure, Ant and Thurne and associated Broads April/May 2019

⁴⁰ Observations, video and ARIS multibeam PAS sampling of a major bream spawning event on HGB. Lane, S. May 2015

⁴¹ Northern Broads Fish tracking Project/PhD fish tracking data 2017-2019. Environment Agency, Bournemouth University, Fishtrack Ltd, Natural England

⁴² Lincolnshire bream study, Reeds, J. Environment Agency A&R Fisheries Technical Specialist Pers. comm 2019

⁴³ Hoveton Project comments, Reeds, J. Environment Agency December 2019

⁴⁴ Close_season_rationale, Environment Agency 2015

⁴⁵ Coarse_fishing_close_season_outcome_briefing, Environment Agency 2019

⁴⁶ Response to HGB Document. Alan Henshaw EA National Fisheries 2 December 2019

⁴⁷ *'On the other hand, large numbers of [bream and roach] regularly congregate in off river sites such as Hoveton Great Broad at spawning time, and such waters probably form an important breeding refuge for these, and perhaps other species'*. George, M. 1992. The land use, ecology and conservation of Broadland

⁴⁸ *'Hoveton Great Broad – In one of the backwaters off this Broad I saw the biggest shoal of bream of my life. It was at spawning time and the fish had congregated in a small area. The fish, up to 4lb, were so numerous that they appeared to be jammed solidly together and created the impression that it might have been possible to walk to the shore across their backs'*. Colliins, P. 1967. Fishing the Norfolk Broads

⁴⁹ MHRSA PASE sampling of spawning habitats, Lane, S. Environment Agency 2015

⁵⁰ Interim summary of findings from bream spawning assessment, Northern Broads system – Rivers Bure, Ant and Thurne and associated Broads April/May 2019

competing for territory in apparently sub-optimal physical habitats (e.g. lilly beds where egg adhesion is poor, so initial egg mortality is far higher) within HGB, when apparently 'better quality' physical spawning substrates are available elsewhere in the system, e.g. trailing willow roots in the adjacent River Bure.

17. Our tracking evidence shows that some fish have undertaken this same migration multiple times in the same month and in successive years.
18. The applicant infers that bream will simply spawn elsewhere when barriers to fish migration are installed in HGB, yet provides no primary evidence to support this. Evidence suggests that interruption of the natural reproductive cycle, including spawning migrations, will cause significant stress to the pre-spawning adults. This in turn can result in Artesia or gonadal regression e.g. when females may reabsorb eggs rather than spawning later or elsewhere. This has few physiological penalties for individual fish, but there are population-scale medium to long-term penalties due to lack of recruitment ⁵¹.
19. The applicant suggests the presence of tagged fish in Broads other than HGB during the spawning season could indicate that they spawn elsewhere. This cannot be inferred in the absence of any confirmed evidence spawning actually took place at a specific location. Primary evidence⁵² within the Northern Broads catchment suggests that no significant spawning took place in 2019 on similar physical habitats to those found within HGB (e.g. willow roots, sedge roots, lilly fronds). This infers that other factors are critical in determining spawning and recruitment site selection by fish (e.g. thermal advantages, site fidelity, homing and social structure/learning ⁵³) that are poorly understood ⁵⁴. Whilst there are few studies on bream, other fish species are known to show spawning site fidelity, as cited by Alan Henshaw (2 December 2019⁵⁵). Further, this confirms that other aspects such as temperature and thermal stability of the environment and food resource availability are also critical to egg development, hatching, fry survival and recruitment.
20. Evidence including water temperature monitoring data taken as part of the 2019 bream spawning assessment ⁵⁶ shows distinct thermal advantages within Hudson's Bay (elevated, stable water temperatures) compared to other locations in the system e.g. Woodbastwick Marsh dyke, which are demonstrably colder with a higher

⁵¹ Response to HGB Document. Alan Henshaw EA National Fisheries 2 December 2019

⁵² Interim summary of findings from bream spawning assessment, Northern Broads system – Rivers Bure , Ant and Thurne and associated Broads April/May 2019

⁵³ Hoveton Project comments, Reeds, J. Environment Agency December 2019

⁵⁴ Lincolnshire bream study, Reeds, J. Environment Agency A&R Fisheries Technical Specialist Pers. comm 2019

⁵⁵ Response to HGB Document. Alan Henshaw EA National Fisheries 2 December 2019

⁵⁶ Interim summary of findings from bream spawning assessment, Northern Broads system – Rivers Bure , Ant and Thurne and associated Broads April/May 2019

daily water temperature variance. These areas are significantly less favourable for successful fish spawning and recruitment ⁵⁷.

21. Hudson's Bay water temperature data confirm an additional significant direct impact on fish associated with the permitted activity, in that summer water temperatures within HGB can exceed the lower lethal thresholds for some fish species, e.g. pike ⁵⁸. The installation of barriers to fish migration would also prevent pike migrating off HGB to cooler parts of the system to survive. It is noted that the applicant infers that pike should form part of the expected fish community within HGB, however their survival and welfare within HGB as an isolated waterbody is not certain. This impact also affects the ability of pike to migrate to other connected habitats following similar thermal responses, seasonal or other changes in prey fish distribution.
22. Work by the Environment Agency (Reeds, J. and Gardner, C) in lowland rivers of Lincolnshire shows clear evidence of spawning site fidelity in bream, even where apparently more suitable physical habitats are available elsewhere within the catchment and the primary site habitat quality is thought to be deteriorating⁵⁹. Thus the provision of additional physical spawning habitat elsewhere in the system is unlikely to provide adequate mitigation for the loss of HGB.
23. Mitigation measures cannot be considered adequate if their efficacy has not yet been demonstrated (e.g. do the fish find them and use them successfully). We would expect any project of this scale to ensure that evidence-based mitigation is in place before undertaking works with a significant environmental impact. It must also be noted that monitoring in and of itself does not constitute mitigation.
24. Disturbance of spawning fish is known to carry significant risks (e.g. stress, reabsorption of eggs and failure of spawning and recruitment)⁶⁰. Such factors form an important component of the Environment Agency's recent decision (2019) to retain the coarse fish close season^{61 62}. Displacing fish from known spawning sites at a waterbody scale therefore carries significant risk to spawning and recruitment.
25. The evidence base confirms that HGB is important for the continuity, abundance and resilience of fish populations at a catchment scale, given the established existing environmental factors on fisheries e.g. variable spawning success and existing environmental threats and pressures in the Northern Broads system that are already known to cause significant fish kills e.g. [saline incursions](#) and [prymnesium](#). These are

⁵⁷ Response to HGB Document. Alan Henshaw EA National Fisheries 2 December 2019

⁵⁸ E.g. Guidance on optimal temperature regimes for protecting pike in catch and release activities. Cowx, I. hull International Fisheries Institute (HIFI) for Pike Anglers Club. 2019

⁵⁹ Lincolnshire bream study, Reeds, J. Environment Agency A&R Fisheries Technical Specialist Pers. comm 2019

⁶⁰ Response to HGB Document_Alan Henshaw EA National Fisheries 2 December 2019

⁶¹ Close_season_rationale, Environment Agency

⁶² Coarse_fishing_close_season_outcome_briefing

known to impact a large part of the Northern Broads system and multiple WFD waterbodies (Lane, S. pers. obs. 1992-2019)⁶³ ⁶⁴. The importance of HGB in respect of resilience for fish populations is also cited within historic record ⁶⁵ ⁶⁶. However the applicant does not acknowledge the potential in-combination impact of these existing environmental risks to fish and the medium-long term loss of HGB as the primary fish habitat within the Northern Broads catchment ⁶⁷.

26. Where a WFD Fish Deterioration Risk is identified, we require a technical solution to alleviate that risk. For fish migration concerns, for example in the case of hydropower applications, usually this means installing a fish pass, if there is enough space and flow to do so. If not, then we would reject the application because the risk could not be mitigated. In the case of habitat losses, the requirement for mitigation to offset WFD Deterioration Risk is well established. Identified impacts must be at the waterbody level and not at a local impact level.
27. Where a plan or project is likely to lead to environmental impacts, it is standard practice to ensure that adequate evidence-based mitigation is in place prior to works taking place, in this case the installation of barriers to fish passage between HGB and the wider Northern Broads catchment. No viable mitigation proposals have been presented by the project to date and there is no agreed (between the applicant and the Environment Agency) fisheries improvement programme.
28. All WFD lakes and approximately half of all River WFD water bodies do not have any WFD fish monitoring and thus no formal set Fish Objectives in the River Basin Management Plan (RBMP). However, this does not make such sites exempt from WFD Fish No Deterioration or Set Fish Objectives risk assessments prior to us making permitting decisions. In such scenarios, e.g. for hydropower applications, the Agency relies on expert judgement from Area Fisheries specialists and any other available monitoring information to inform our decision making. We rely on the expert judgement of local area fisheries officers to determine if there is 1) a Fish Status No Deterioration risk or 2) any risks to achieving set WFDS objectives for Fish Status e.g. good status by 2027.
29. It is not uncommon in other parts of the Environment Agency e.g. Water Quality or Water Resources to refuse permit applications on the grounds of a WFD elemental

⁶³ e.g. FIP 2017_18 Broads Fish Migration V5 Project Description FINAL AREA SUBMISSION

⁶⁴ EA/NRA records of saline incursion incidents, inc. evidence of fish kills in Horning on the River Bure, February 1993, South Walsham Broad etc.

⁶⁵ Correspondence between A.J. Rudd (Sec.) and E. J. Trafford. Jan 1910. Yare and Bure Preservation Society. Norfolk County Archive

⁶⁶ *'Sufficient to say it fulfils an important function while remaining closed [to the public], for it is sanctuary where fish can live and breed. While areas like this remain in Broadland the fish stocks of the whole area are secure. The huge shoals of bream as well as tench, perch and roach, can filter out into the Bure via a number of dykes'*. Collins, P. (1967) Fishing the Norfolk Broads

⁶⁷ e.g. FIP 2017_18 Broads Fish Migration V5 Project Description FINAL AREA SUBMISSION

deterioration risk, if WFD exemption clauses (Article 4.6 or 4.7) are not applicable and where a technical solution to mitigate the risk of WFD elemental deterioration is not feasible. In such cases it is standard practice to refuse the application.

30. It is our understanding that WFD objectives are time-bound (2015, 2027), whereas Habitats Directive objectives, such as restoring the site to Favourable Condition, are not. It is noted that water quality and rooted macrophytes have generally improved in the tidal Bure system over the last two decades – (Peirson, G. pers. comm.; Lane, S. pers. obs). Not undertaking the proposed biomanipulation methodology will not cause HGB to deteriorate and will not prevent the consideration, or development, of alternative methodologies for aiding restoration now or in the future, such as those suggested by National Fisheries colleagues⁶⁸. The delivery of Habitats Directive objectives would not be constrained in the event we refuse the permitted activity.

B) Objection in principle - Conflicts with our Fisheries duties

31. The applicant has suggested a perceived conflict between the achievement of the Conservation and WFD Objectives for HGB and the interests of the wider Broadland fishery for angling, suggesting that fish are a secondary consideration. However, fish are a key part of the ecology of aquatic habitats and are, as a consequence, one of the constituent biological elements for which risks, impacts and mitigation measures must be considered within WFD.
32. Fish provide one of Broadland's most significant and obvious ecosystem services through angling⁶⁹, for which abundant, healthy and resilient fish stocks and the environment that supports them are essential⁷⁰.
33. It follows that in addition to WFD and Habs Regs, the potential impacts and risks of the proposed biomanipulation methodology on fish must also be considered by the competent authority in accordance with the Agency's statutory duties under e.g. SAFFA 1975, the Environment Act 1995 and Statutory guidance e.g. to increase the socio-economic benefit of fisheries in rural areas and areas with low income etc
34. The impacts and risks associated with the permitted activity are largely incompatible with our statutory duties to maintain, improve and develop fisheries under e.g. SAFFA 1975, Environment Act 1995 and government guidance with respect to e.g. socio-economic growth, particularly given the paucity of evidence-based mitigation within the application and the socio-economic importance of the Broads fishery resource.

⁶⁸ Robertson, R. E&B Fisheries, Environment Agency August 2019

⁶⁹ The value of angling in ENS. Lane, S. Environment Agency 2015.

⁷⁰ [Broads Angling Strategy](#). BASG

- C) **Objection – incomplete WFD assessment** – as detailed above, no further comments
- D) **Objection – protected species** – as detailed above, no further comments
- E) **Objection – eels regulations** – as detailed above, no further comments
- F) **Risk - Uncertainty of biomanipulation success**

35. There are arguably no biomanipulation projects in the Broads that have demonstrably delivered sustainable ecological improvement (i.e. without continued interventions or following restored connectivity following isolation) and there remain significant uncertainties with the chances of success in the case of HGB.
36. Reasons for Not Achieving Good Status (RNAG) for most WFD Broads waterbodies including HGB are driven by P failures, not fish, confirming the underlying reason why these Broads have poor water clarity and hence poor macrophyte assemblages is cultural eutrophication caused by excessive nutrient loads⁷¹. No consideration appears to be given to the nutrient impact of the significant gull roost on HGB, or the potential via wildfowl, particularly given that it was highlighted by anglers during the original consultation process and observed by fisheries staff undertaking baseline fish surveys.
37. The document infers that ‘all the sites with a high probability of success have already had restoration management and indeed some recovery’. However, the connectivity of sites such as Ormesby and Cockshoot has not yet been restored and in many cases ongoing management interventions are still required. There does not appear to be an example of a successful, sustainable biomanipulation project within the Broads area.
38. Natural England are ‘hopeful’ that 10 years ‘should’ provide sufficient time for the clear water and plant dominated state to be recreated. The document notes that it has taken 15-20 years in the ‘successful’ biomanipulated Cockshoot and Ormesby Broads, inferring a sustainable, stable clear water state has been delivered. However, neither of these Broads can yet be considered successful – Cockshoot is still isolated from the wider Bure system, as is Ormesby from the wider Trinity Broads group and fish interventions are still being undertaken on Ormesby some 20+ years later.
39. Clear water and macrophytes have not been sustained on other biomanipulated Broads following the removal of barriers e.g. Pound End. Anglers have expressed concern that fish populations, bream spawning and associated pike activity within Pound End and Hoveton Little Broad have not recovered since the biomanipulation was undertaken^{72 73}. NRA records show targeting of spawning fish was considered

⁷¹ Reasons for Not Achieving Good Status (RNAG) in the waterbodies that are likely to be impacted by the Hoveton Great Broad biomanipulation (fish removal) project. Robertson, R. EA National fisheries Services

⁷² 5_HGBRP BASG ESG meeting outcomes. Fishtrack Ltd, for Natural England

⁷³ Page, M. Pers. comm to Environment Agency. February 2020.

as part of the Pound End biomanipulation methodology, however no significant bream spawning activity was recorded on PE or HLB during 2019, which may suggest long term impacts e.g. disruption of site fidelity/natal homing.

40. The applicant has proposed to extend the lifespan of the barriers for an additional 10 years. This signifies uncertainty around the chances of sustainable restoration success. The project has not consulted key stakeholders, such as the angling community, on this basis of barriers remaining in HGB for more than 10 years ⁷⁴.
41. Given the stated importance of propagule availability within the seed bank for the re-establishment of macrophytes, there does not appear to be any evidence of monitoring results during and after the extensive dredging operations on HGB that shows that the seedbank still remains in situ.
42. It is worth noting that the risk of increasing saline incursion with climate change (e.g. over the proposed 10 - 20 year life of HGB isolation) also poses an additional major threat to the resilience of Broads fish populations, particularly when they are displaced from key habitat within the system and are already at risk from catastrophic and chronic impacts elsewhere in the system ^{75 76}.
43. None of the information submitted discusses the impacts of dredging in affecting phosphate nor other possible methods to reduce nutrient input from the wider Bure catchment, for example reducing sediment disturbance caused by wind fetch.
44. The assertion that bream foraging behaviour is significantly detrimental to macrophyte growth does not appear to be supported by the evidence from the historic record eg. C17 – C20th, which confirms abundant roach and bream populations coexisted with clear water and macrophyte-dominated habitats ⁷⁷. Baseline ARIS multibeam sonar transect evidence also shows extremely delicate, precise benthic feeding action of bream foraging in the open water of HGB at night. Assessment of the distribution and extent of bream 'feeding pits' (Hindes & Lane, pers. obs, Reeds, J. in collaboration with Loughborough University - pers comm) suggests that bream can exhibit extremely targeted foraging activity that is unlikely to be purely random.
45. Significant declines in the eel population have been noted internationally and cannot be attributed directly to shifts in the fish population due to eutrophication effects. Sampling method efficacy (e.g. electric fishing is poor at catching large mobile fish such as bream in open water – ARIS assessment of PASE, Lane, Hindes and Reeds, in prep.), water clarity, timing of surveys (significant differences observed during the

⁷⁴ 5_HGBRP BASG ESG meeting outcomes. Fishtrack Ltd, for Natural England

⁷⁵ e.g. FIP 2017_18 Broads Fish Migration V5 Project Description FINAL AREA SUBMISSION

⁷⁶ [Broads Angling Strategy](#). Broads Angling Services Group (BASG)

⁷⁷ Peirson, G. Principle Fisheries Scientist, Environment Agency November 2019

day c.f. sampling at night in open water), season and isolation of Broads can all affect the observed fish assemblage (for example bream cannot recolonize isolated, formerly connected Broads in the event of a fish kill e.g. Alderfen (Peirson, pers. comm.).

G) Risk - Challenges to our reputation (e.g. hydropower, Statutory Close Season)

46. Further risks for the fisheries function have previously been highlighted e.g. from perceived setting of precedents in respect of fisheries permitting decisions e.g. HGB vs. EA permitting guidance, policies and process and application to permitting decisions resulting in refusal e.g. hydropower^{78 79}. Our view is that knowingly permitting the activity would result in directly contradicting the organisation's position on the Statutory Close Season as it applies to rivers and the Broads.

47. Risks of disturbance to spawning fish were evaluated as part of the recent Environment Agency consultation and review into the Close Season on English rivers^{80 81}. The legal basis for the statutory close seasons is to protect fisheries from the impacts of angling during the breeding season. Coarse fish close seasons byelaws prohibit angling on rivers and the Broads between 15 March to 15 June, with the aim of protecting spawning fish. Most river fisheries are in multiple ownership, with fish free to move between stretches owned by different people. Fisheries management actions taken by one owner will have an impact on the neighbouring waters; this is of particular importance with regard to spawning sites on rivers, which are often very localised. The risks to fish highlighted by the HGB project tie in with these principles.

48. In response to the 2000 Salmon & Freshwater Fisheries review, Government supported our view that any changes to the statutory Close Season should be based on sound science. The Agency's position was that in the absence of scientific evidence, we must take a precautionary approach towards rivers and the Broads, retaining the current close season.

49. In August 2019, the Environment Agency concluded a consultation and review into the close season on rivers and the Broads. The review concluded that the close season should be retained on English rivers and the Broads.

50. Experience from the Environment Agency's own coarse fish broodstock collection and coarse fish rearing over 20 years supports the experience of others that some species, notably chub and barbel, form large spawning aggregations and that these

⁷⁸ e.g. HEP Fish Passage Supplementary Guidance Approved Version March 2018, E&B Environment Agency

⁷⁹ e.g. Hoveton Great Broad – WFD no deterioration legal questions. Robertson, R. EA National Fisheries Services, August 2019

⁸⁰ Close_season_rationale, Environment Agency 2015

⁸¹ Coarse_fishing_close_season_outcome_briefing. Environment Agency 2019

can be very sensitive to disturbance while spawning. Where disturbed, spawning females may reabsorb their eggs and defer spawning to the following season rather than spawning elsewhere or later⁸². Access to suitable spawning habitats is limited in many of our morphologically altered rivers.

51. The evidence base from our monitoring and tracking in the Broads demonstrates that bream also form large spawning aggregations and migrate to specific habitats for spawning and recruitment (principally HGB). This ties directly in to the evidence cited by the Environment Agency to retain the close season.
52. A decision to continue with the proposed biomanipulation would directly contradict the decision taken in respect of the Close Season, opening up potential significant reputational challenges for the Environment Agency and our legal position e.g. we would continue to prosecute anglers for disturbing fish in the close season on the rivers and Broads, but we would concurrently and knowingly be causing significant disturbance to spawning fish and preventing fish spawning by preventing them reaching their chosen spawning grounds.

H) **RISK - Conflict with established practice for removal of weirs and barriers to fish migration**

53. The installation of barriers to fish migration and preventing fish passage to primary spawning and recruitment habitat conflicts with established International practice⁸³⁸⁴⁸⁵. The Environment Agency and partners are spending millions of pounds to remove barriers and open up spawning sites within river catchments. e.g. EA Powick Sluice, R. Trent, Nottingham (£5 million EA fish passage project). Knowingly permitting the creation of new barriers to fish migration despite the evidence would risk significant reputational challenges e.g. from project partners in the case of partnership projects to install fish passes, or where the regulatory or permitting decisions by the organisation have or may result in significant financial or other burdens on third parties to install fish passes as mitigation for proposed activities e.g. hydropower, land drainage activities etc.

⁸² Response to HGB Document. Alan Henshaw EA National Fisheries 2 December 2019

⁸³ [How weirs & barriers affect fish migration, Gardner, C. South East Rivers Trust](#)

⁸⁴ [Trent Gateway Project – Britain’s largest fish pass. Environment Agency](#)

⁸⁵ [Unlocking the Severn Project – Removing barriers to fish migration](#)