

FRAP EPR/RB3557SW: Temporary Fish Barriers at Hoveton Great Broad and Hudson's Bay

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Project Aim and Benefits

The Hoveton project aims to restore the ecological status condition of Hoveton Great Broad (HGB) and Hudsons Bay (HB) which form part of the Bure Broads and Marshes SSSI, Broads SAC and Broadland SPA. It is understood that HGB and HB suffer the effects of eutrophication, have nutrient levels and are algae dominated with too few water plants. The project plans to remove sediment and undertake biomanipulation to reduce nutrients and restore the broads to a favourable status. This will involve isolating the Broads with 2 mm screens at three locations for a period of 10 years+. The removal of bream and roach populations are planned with the aim to reduce predation on zooplankton by these species and to lessen disturbance of sediments by bottom feeding bream populations. This method of biomanipulation has been shown to be effective in restoring macrophyte populations and clear water conditions in some waterbodies, but these have been generally closed systems. Fish removal of bottom feeding species such as bream (and carp) has resulted in improved biodiversity and flourishing of other fish species such as pike, perch, tench and rudd which favour such conditions. Growth rates of fish including remaining roach and bream are improved in the following years, and there may be considerable benefits for biodiversity and fisheries.

Fisheries Issues

Fisheries concerns have been raised about the isolation of HGB and HB for 10 years+. Research has been undertaken by the EA, University of Bournemouth and project partners on the status and movements of bream populations in the Bure system. The study has shown that HGB and HB are the main spawning areas for bream populations in the Bure, Ant and Thurne catchments. There are concerns that if bream cannot access their spawning habitat that there will be long term impacts on bream populations in the wider Broads systems. Bream tend to show site spawning fidelity in specific locations, and recruitment is variable. The studies did not include elements of bream ecology, such as their recruitment, age structure and year class strengths. The exclusion of bream from HGB and HB and their variation in year class strengths may have implications for the survival of this species in the catchment. Analysis of existing data will further understanding of their population dynamics, but further sampling may be required. HGB and HB are also used as overwintering sites for bream and roach populations, so access to alternative sites with favourable conditions for spawning and overwintering will need consideration if these broads are isolated. Saline intrusion and Prymnesium blooms are additional pressures in this system, which may need addressing. Bream are a commercially important angling species and this is a key aspect, which will require further investigations on bream spawning success and population dynamics to ensure the fishery is not impacted long term. Consideration also needs to be given to the provision of eel passage for compliance with eel legislation and it is understood that a structure for downstream passage and an upstream eel pass will be constructed.

Sustainability Considerations of Existing Proposal

The longer term maintenance requirements of the improved condition needs further consideration, especially in an 'open' broad. The 2mm screens are anticipated to be in place for 10 years, but a longer period is not excluded. It would not be considered sustainable to leave a barrier in place permanently and this in itself will require considerable maintenance as they are not self-cleaning screens. In addition there is a facility for the escapement of downstream migrating eels which will need regular checking. An eel pass is also proposed for allowing ingress of eels which will also require maintenance. The composition and density of fish populations within HGB and HB will need to be monitored and managed for long term sustainability even within a closed system.

Alternative Proposal: Seasonal Closures and Phased Approach

The fisheries and sustainability issues could be overcome if a phased partial approach is considered. The gates have been designed to be easily removed for cleaning which provides an opportunity to manage fish populations as their diurnal and seasonal movements have been documented. Management of fish access to the Broads at critical times may allow a sustainable long term solution that benefits fish and improves biodiversity.

- Gates may be opened from November to June (timing to be refined using environmental data) to allow coarse fish spawning migrations, overwintering migrations and eel movements and only closed during the main macrophyte growth season which is during summer.
- Resident bream densities reduced for period of closure by operating gates.
- Management of recruitment if necessary can be controlled by relocation of eggs from artificial spawning habitat (eg nets) or by transfer of 0+ fry.
- Gates to be opened in response to environmental incidents, saline intrusions or Pymnesium blooms.
- Monitoring success of this approach on water quality, macrophytes and fish populations.
- Review after 3 years if further interventions are required based on the data and agreed by all partners.

Future Research

The project presents an opportunity to undertake research to assess the biomanipulation process and further understanding of bream population dynamics and movements which will inform future restoration projects.

A Hoveton Fisheries Advisory Group (HFAG) to be chaired by the Environment Agency will provide advice to the Project Steering Group on research required to protect fisheries interests in the broads.

Natural England have agreed to fund another PhD with University of Bournemouth to continue the research on bream movements. If full closure is permitted, a vital objective of this study will be the behaviour of bream at the barriers and their ability to spawn elsewhere in the system. The outcome of this study should influence the time barriers are left in place.

A baseline needs to be established in 2021/22 to fully inform HFAG in determining the monitoring and research programme before full or partial closure is implemented:

- Review existing data
- Fish population status- density, biomass, growth and year class strength of key species.
- Growth and relative abundance of 0+ fish
- Environmental DNA for rare species
- Biobase for macrophyte abundance
- Monthly water quality and zooplankton samples

Conclusion

This project presents an opportunity to enhance the ecological status of HGB and HB and undertake research to assess the biomanipulation process and improve the status of fisheries.

A monitored phased approach with seasonal barrier closures is recommended rather than full closure to ensure that there are no detrimental effects to fish populations and the outcome is sustainable.



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