

## **The development and implementation of a Lake Restoration Strategy for the Broads taking into account climate change and sea-level rise**

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The Broads is the UK's largest and most visited lowland wetland. The rivers and lakes provide a significant visitor attraction with over 50% of the tourism income generated by people having water-based holidays. These visitors value a quality water environment and rely upon organisations such as the Broads Authority and other Government agencies to provide this.

Loss of aquatic life in The Broads replicates a pattern seen in most lowland rivers in England and considerable investment has been targeted at lowering nutrient input from sewage treatment works. This has improved water quality dramatically, with 90% decrease in total phosphorus recorded in the water of the River Ant since the late 1970s. These first recovery actions show that improvements in the water environment are effective, realistic and achievable.

Major ecosystem restoration successes have been achieved, developing enhanced water plant communities in locations at relatively low risk of climate change. In addition to wildlife benefits there have been enhanced opportunities for visitors to these sites including deeper water for sailing, provision of boardwalks and canoe trails. Over the past 20 years numerous other broads have begun to be restored with nutrient, sediment or fish removal.

Building in adaptation to climate change will ensure The Broads are more resilient to cope with increasing sea levels and different rainfall and temperature patterns. The ecosystem services provided by the wetlands need to be recognized to justify sufficient investment.

### Overall Lake Restoration Strategy Objective

To provide a framework for the sustainable long-term management and restoration of lakes and rivers within The Broads in terms of achieving ecological quality targets within this internationally important wetland.

Implementation of the strategy takes place through the in-lake broad restoration techniques of sediment removal and biomanipulation, along with reduction in nutrient emissions and management of non-native invasive species. These restoration techniques are effective and they require scaling up to achieve WFD objectives. In tandem with reviewing existing restoration techniques, new techniques are continually evolving as pressures change and understanding of the issue increases.

Prioritisation aims to identify broads where restoration to WFD targets is likely to be achievable at relatively low risk from saltwater flooding, forming the basis of the High priority list. Medium and Low categories represent broads of poorer current ecological condition and thus longer timescale for achieving any improvement. Restoration investments in the 'long-term risk' broads need to take account of the uncertainty of maintaining freshwater in the long-term. Current coastal defence policies aim to protect freshwater habitats for up to 50 years; however saline incursion is likely to increase in frequency in lower river reach broads unless investment in washlands or other water control structures is considered.

However, restoration investment should target not only the less risky, quick wins, which are often small lakes mostly in good condition. Investment also needs to target broads which are low risk sites requiring greater investment. In addition it is also appropriate to invest in broads where the management can improve ecosystem resilience, such as connected wetlands, even though in the long term (50-80 years) there is a greater risk of more frequent saline incursion.

### Lessons for Lake Chapala

- Focus action on the most important sites  
Prioritise on basis of risk from climate change  
Prioritise on basis of probability of success  
Direct investment to quick wins, such as robust larger sites or where resilience can be increased.