

Back to the Future

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The management and restoration techniques employed to clear and deepen the dykes that criss-cross Wheatfen has seen the return of some species not recorded on site for several decades. Unfortunately, this is not a case of an instant ecological success story, rather the uncovering of long buried aquatic mollusc remains.

In 2002 and 2003, the mud pumping of Smee Dyke and Middle Marsh Dyke threw up abundant empty white shells, most of which were remarkably intact considering the violence of their exhumation. These were easily seen against the dark spoil piled on the banks, as the remains had been bleached after years in the anaerobic sediments. A few minutes' careful collection in the shelly heaps washed from the silt, with further examination of the material at home, revealed a wealth of species, both small and large. It would take a much more extensive search in the whole Yare valley to locate so many species alive and well today, let alone from one small area.

Effects from eutrophication and changes in traditional fen management have been identified as major influences causing the biodiversity decline witnessed throughout the Broadland waterways. At Wheatfen the dramatic loss of submerged plant communities in the 1950s, as reported by Ted in an EDP article on January 16th, 1980, removed a vital component in the ecological web that supported a rich mix of aquatic invertebrates, including many molluscs. Submerged plant species, or macrophytes, such as the pondweeds *Potamogeton*, hornwort *Ceratophyllum* and water crowfoot *Ranunculus*, provided refuge, egg laying and feeding surfaces within the underwater architecture in the once 'gin clear' dykes and broads. This loss has been not only recorded in the work of many naturalists and keen observers through the decades, but also by the muddy sediments themselves.

Through my studies at University College London, I have been involved with palaeoecological research looking at historical changes in the aquatic ecology of Broadland, through identifying biological remains laid down in the accumulated sediments. The prevalence and range of mollusc species at depth, collected through cores taken at various sites, has provided invaluable data on the past ecological conditions and also important records of which species were once present. This was evident in a core taken in Rockland Broad, where below the dark, organic smelling mud, a paler section rich in marl and shell was found. Mollusc sub-fossils were numerous, including the Large-mouthed valve snail *Valvata macrostoma*, a threatened species, which is currently listed in the Red Data Book, and is now only occasionally found in the quieter channels of Wheatfen. Another species that was found in the spoil of the clearer dykes, and in a core from the Fleet Dyke is the River nerite *Theodoxus fluviatilis*. This species requires clean running water and is usually associated with firm sand and gravel beds, habitats that have now become much less common in the Rockland-Wheatfen complex. Since the 1950s, input of phosphates to the Wensum and Yare from sewage and agricultural run-off have increased algal growth in the water. Such nutrient enrichment, together with soil erosion in the river catchments, has meant more suspended sediment has been deposited in the tidal reaches, smothering many sand and gravel areas. Two other species that were once more prevalent are the Common river snail *Viviparus viviparus* and Lister's river snail *Viviparus contectus*. Although these species prefer a muddy bottom, the environmental conditions in the dykes were such that they too have dramatically declined over the years.

The future may hold some hope as recent technological advances in the treatment of wastewater at Anglian Water's Whitlingham works has considerably reduced the amount of phosphate being discharged into the River Yare. Improvements in water quality combined with the dyke clearance that has happened at Wheatfen, with complete re-digging in some cases, may be just the kick-start many vulnerable species need to regain a stronger foothold within the tidal Yare wetlands. Full restoration of the past ecology and species may be an unrealistic target for conservationists, but if key features, such as a more diverse range of macrophyte and mollusc species return to Wheatfen, then some small success can be said to have been achieved. With powerful European legislation in the form of the Water Framework Directive requiring the UK's waterways to be in a 'favourable' condition by 2010, sites with detailed ecological information such as Wheatfen are vital to assessing the effectiveness of such laws. Recent records of Frogbit and Curled-leaved pondweed in the dykes may mark the beginning of this return, but further improvement in the

flora and fauna of Wheatfen's waterways is none-the-less a vital restoration hurdle remaining to be cleared.