PL01 - Time-travelling to inform the future: Reconstructing and resurrecting the past using pond sediments

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Lakes have long been the subject of palaeoecological studies which have used the sub-fossil remains of various species groups to reconstruct past biological structures and human impacts. Further, many resurrection ecology studies in lakes have hatched/germinated dormant crustacean eggs and plant seeds to inform on propagule bank viability and evolutionary responses to recent environmental change. Remarkably, however, despite readily accumulating sediments, ponds have rarely been used for palaeoecological and seedbank analyses and in turn valuable information to inform on long term ecological functioning and nature conservation strategies has been little exploited.

We focus on some small, man-made, farmland ponds in eastern England, UK. Sediment cores from ponds, no matter how small, are shown to be superb archives of aquatic ecological information due to an excellent preservational environment. We show the huge potential of pond palaeoecology for reconstructing the long-term influence of eutrophication, terrestrialisation and past pond management on pond biology and conservation value. Examples of pond resurrection ecology are also given for "Ghost Ponds" – ponds lost from the agricultural landscape due to deliberate in-filling. In these "Ghosts", seeds of several aquatic plants are shown to be viable on centennial timescales, allowing locally lost species to return when ponds are restored. The implications for our understanding of long-term pond ecological functioning and for pond conservation and restoration strategies are discussed. We urge European researchers to consider the valuable stores of information and living biology to be found in pond sediments.