The creation of a floating island of native vegetation at Barton Broad, Norfolk, England

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SUMMARY

An island made of coir pallets supported by PVC floats was created with the objectives of producing an island of emergent vegetation which would also cover a boat navigation hazard. Many of the planted species grew well and resulted in a reasonable cover of emergent vegetation. The island edges needed replanting where eroded by wave action.

BACKGROUND

The Broads is an area of man-made interlinked shallow freshwater lakes in Norfolk and Suffolk, eastern England. There are over 200 km of navigable waterways, with many more connecting small streams and dykes. These link a variety of habitats which support a rich diversity of wildlife, including some of the rarest plants and animals in Britain. The main habitats in the Broads are the rivers and broads (shallow lakes) themselves, fen, carr woodland, drained marshland (grazing marsh) and estuary. There are 63 broads which range in size from tiny isolated lakes to large expanses of water. The lakes formed some 600 years ago when medieval peat diggings were flooded as a result of a rise in the water level. Reeds *Phragmites australis* which grow around the margins of the lakes are still used for thatching.

Much of the water in the Broads has been affected by excessively high levels of phosphates and nitrates draining off from agricultural land, and sewage pollution. Further habitat pressure has come as a result of it being a very popular tourist destination for boating. Boat wash erodes river banks, increasing sediment inputs, exacerbated by the polluted and often turbid water. The silt which has been washed away from the banks gathers at the bottom of the waterways, which increases the need for dredging in order for the rivers and broads to remain navigable. The Norfolk and Suffolk Broads form Britain's largest protected wetland.

The Broads Authority was set up in 1989, with responsibility for conservation, planning, recreation and waterways management.

ACTION

Study site: Barton Broad in Norfolk, is the second largest broad in Broadland, covering an area of 69 ha (170 acres). It is a Nature Reserve which, including marginal habitat, covers 142 ha (350 acres) with access only possible by boat. By the 1970s, Barton had been severely degraded by decades of nutrient enrichment from water running off agricultural land and from the two local sewage treatment works. This nutrient overload led to excessive growth of algae and occasional 'blooms' of blue-green algae, in what had been up to the 1960s, a lake dominated by yellow water lily *Nuphar lutea* and other aquatic plants such as pondweeds *Potamogeton* spp. The algae, growing unchecked in the nutrient-rich water, shaded out all other submergent water plants.

As part of 'The Clear Water Project', beginning in 1995, suction dredging removed 300,000 cubic metres of nutrient rich mud from the bed of the broad in order to reduce phosphorus release which otherwise encourages algal growth. The dredging has resulted in the return of species lost during previously high water nutrient levels, as well as improving access for boating by deepening and widening heavily silted navigation channels.

Creation of the floating island of emergent vegetation: In June 2003 an area of approximately 0.7 ha in area was used to create a floating island of emergent vegetation. The

site was located in the middle of a wind-exposed shallow lake, adjacent to a small-steel plied island, with no surrounding vegetation (either submerged or emergent). It lay over an area of unexcavated peat, with a water depth of less than 0.5 m. Combined with the presence of large pieces of flint and stone, this formed a considerable navigation hazard. The effective fetch distance (the distance that wind can travel over water without intersecting with land) from the site was between 500 and 700 m. Work was carried out by the manufacturers of the modules, under an English Nature contract.

The site was covered with 174 commercially-available modules each consisting of 20 cm diameter UV-protected PVC tubing floats, arranged in a 2 m square, with galvanised mesh grids forming a base within the square. Coir pallets planted with a combination of reedmace *Typha angustifolia* and other emergents, including yellow flag *Iris pseudacorus*, marsh pea *Lathyrus palustris*, bulrush *Scirpus lacustris*, pendulous sedge *Carex pendula* and pond-sedge *Carex riparia* were then installed on top of the metal grids (Fig. 1). Floating goose fencing, comprising plastic-coated 50 mm mesh panels (8 x 0.9 m) with floats, and anchored by chains and weights so that they floated vertically 300 mm above the water, were used to surround the site in order to prevent feral greylag *Anser anser* and Canada geese *Branta canadensis*, and mute swans *Cygnus olor* from grazing and nesting.

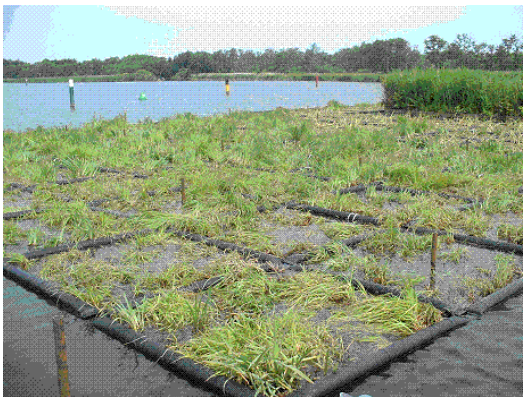

Figure 1. The floating island showing the plastic floats supported by metal grids and recently planted vegetation.

CONSEQUENCES

Success of plant establishment on the floating island: Plants on the outside edge of the floating island were lost during the first winter of 2003/04. This was most likely due to wave action created by strong winds displacing the coir pallets from their metal grids. Additionally, much of the reedmace in the central zone of the island failed to survive the winter, possibly due to failure to develop adequate rhizomes before planting out.

The most successful species were *C. riparia, I. pseudacorus* and *S. lacustris*. As a result, coir pallets replanted with a mixture of *C. pendula, C. riparia, I. pseudacorus* and *S. lacustris* were used to replenish 25 modules, principally where *Typha* had been lost. It is likely that further replacements will be needed for some time to come.

The goose fence was successful at keeping geese and swans out, and there was no evidence of grazing damage.

Ongoing monitoring is carried out quarterly, by visual inspection from boats.

Conclusions: Overall, the use of this technique to establish emergent plants was successful. Additional benefits were an improvement of the landscape by 'softening' of the existing steel-piled island, and covering of a navigation hazard. However, the location of the floating island was not ideal as it was rather exposed. It is believed that a more sheltered area would be more effective as this would reduce the need to continually replant island edges affected by wind and wave action, as was required in this case.