March 2013

Status and lake management activity in the Broads





The report is a Broads Authority initiative, Compiled by Andrea Kelly, Senior Ecologist, Broads Authority <u>andrea.kelly@broads-authority.gov.uk</u> Produced in Consultation with the Broads Water Quality Partnership

#### Citation:

A. Kelly (2013) Status and lake management activity in the Broads. Broads Authority Report. The Broads, UK.

Published By:

**Broads Authority** 

© Copyright rests with the Broads Authority.

Terms and Conditions for use of maps in this document

i) You are granted a non-exclusive, royalty free, revocable licence solely to view the licensed data for non-commercial purposes for the period during which the Broads Authority makes it available.

ii) You are not permitted to copy, sub licence, distribute, sell or otherwise make available the Licensed Data to third parties in any form iii) Third party rights to enforce the terms of this licence shall be reserved to Ordnance Survey



## Status and lake management activity in the Broads

This report collates a series of information on the ecological status of river and lake waterbodies in the Broads (Figure 1 and Table 1). Figures 2 and 3 summarise the lake management activity and Table 2 sets this out in detail.



Figure 1. Water Framework Directive ecological status

		<u> </u>		
			Protected site	Likely condition of non-WFD and non designated
NAME	AREA Ha	WFD status	<b>status</b> see key at base for notes	BA knowledge <sup>1</sup>
King and Mown fen waters		- <sup>2</sup>	Fav/Un Rec 2	Ŭ
Barton Broad	74.49	Moderate	Un NC/Un Decl 4	
Catfield Broad	1.27	-	Fav/Un Rec 2	
Irstead Holmes	0.43	-	Fav/Un Rec 3	
Alderfen Broad	5.19	-	Fav/Un Rec 2	
Cromes Broad	4.26	-	Un NC/Un Decl 4	
Reedham Water	4.01	-	Fav/Un Rec 3	
Calthorpe Broad	1.10	-	Fav/Un Rec 2	
Horsey Mere	37.44	Moderate	Un NC/Un Decl 5	
Blackfleet	1.56	-	-	Moderate
Hickling Broad	130.04	Poor	Un NC/Un Decl 5	
Heigham Sound	33.94	Poor	Un NC/Un Decl 5	
Martham North	9.00	Moderate	Fav/Un Rec 1	
Martham South	8.32	Moderate	Fav/Un Rec 1	
Womack Water	4.27	-	-	Poor
Norton's Broad	0.67	-	-	Poor
Belaugh Broad	1.91	-	-	Moderate
Bridge Broad	1.78	-	-	Poor
Snape's Water	2.38	-	-	Poor
Wroxham Broad	34.28	Poor	-	
Hudson's Bay	4.39	Poor	Un NC/Un Decl 5	
Hoveton Great Broad	32.22	Poor	Un NC/Un Decl 5	
Salhouse Little Broad	2.33	-	-	Poor
Salhouse Broad	8.53	-	-	Poor
Devil's Hole	1.10	-	-	Poor
Decoy Broad	9.03	-	Un NC/Un Decl 4	
Pound End	4.90	-	-	Poor
Hoveton Little Broad	15.15	-	-	Poor
Burntfen Broad	4.63	-	-	Moderate
Cockshoot Broad	5.42	Moderate	Fav/Un Rec 2	
Ranworth Broad	29.17	Poor	Un NC/Un Decl 6	
Malthouse Broad	10.08	-	-	Poor
Ranworth Flood	3.84	-	Fav/Un Rec 3	
South Walsham Broad	21.15	-	-	Poor
Sotshole Broad	0.77	-	-	Moderate

#### Table 1. Status of lakes in the Broads and groups of measures required

<sup>1</sup> Likely condition: Good, Moderate, Poor

<sup>2</sup> Lakes under 50ha, or under 5ha if designated sites

				Likely condition of non-WFD
				and non
			Protected site	designated
NAME	AREA Ha	WFD status	status see key at	BA knowledge <sup>3</sup>
Upton Great Broad	5.27	Moderate	Fav/Un Rec 1	D, ( Knowledge
Upton Little Broad	1.37	Moderate	-	Moderate
Ormesby Broad	55.92	Moderate	Fav/Un Rec 4	
Rollesby Broad	26.14	Moderate	Fav/Un Rec 4	
Lily Broad	8.32	Moderate	Fav/Un Rec 4	
Ormesby Little Broad	39.96	Moderate	Fav/Un Rec 4	
Filby Broad (inc. Muckfleet				
drain)	44.73	Moderate	Fav/Un Rec 4	
Little Broad	1.30	-	Fav/Un Rec 2	
Mautby Decoy	2.50	-	-	Good
Whitlingham Little Broad	3.57	-	-	Moderate
Whitlingham Great Broad	19.35	-	-	Moderate
Brundall Outer Broad	0.59	-	-	Poor
Brundall Gardens Lake	1.74	-	-	Poor
Brundall Inner Broad	1.62	-	-	Poor
Surlingham Broad	5.24	-	-	Poor
Bargate Broad	7.80	-	Un NC/Un Decl 6	
Strumpshaw Broad	3.71	-	-	Good
Wheatfen Broad & Channels	4.16	-	Un NC/Un Decl 4	
Rockland Broad	21.65	Moderate	Un NC/Un Decl 6	
Buckenham Broad	1.78	-	Fav/Un Rec 2	
Hassingham Broad (inc. Fleet)	2.72	-	Fav/Un Rec 2	
Hardley Flood	26.74	Bad	Un NC/Un Decl 6	
Barnby Broad	2.51	-	Fav/Un Rec 2	
Woolner's Carr	0.12	-	Un NC/Un Decl 5	
Round Water	0.15	-	Un NC/Un Decl 5	
Sprat's Water	0.27	-	Un NC/Un Decl 4	
Oulton Broad	34.64	-	-	Poor
Flixton Decoy	6.85	-	-	Moderate
Fritton Decoy	60.70	Poor	-	
Lound		Moderate	-	

<sup>&</sup>lt;sup>3</sup> Likely condition: Good, Moderate, Poor

### Key for Table 1.

16			
	1	Favourable/ Unfavourable Recovering	Waterbodies with no known issues with water quality or quantity
	2	Favourable/ Unfavourable Recovering	Waterbodies where lake restoration and water quality issues addressed. Largely isolated waterbodies, restoration measures carried out (considered complete for the foreseeable future), and/or sites where water quality issues have been addressed sufficiently to allow recovery.
	3	Favourable/ Unfavourable Recovering	Waterbodies largely important for wintering bird assemblages and not macrophyte communities. These are usually small, shallow waterbodies that play an important role for a wintering waterfowl assemblage. They have some macrophyte interest, but this is balanced against the bird interest.
	4	Unfavourable no change/Unfavourable declining	Waterbodies where lake restoration undertaken and water quality issues remain to be resolved. These are waterbodies where some lake restoration measures have been undertaken. Diffuse water pollution issues remain to be resolved, and it may be that further lake restoration measures will be undertaken following a reduction in DWP.
	5	Unfavourable no change/Unfavourable declining	Waterbodies where lake restoration actions identified but not currently resourced; water quality issues addressed.
	6	Favourable no change/Unfavourable declining	Waterbodies where lake restoration measures will be more challenging to result in success.

Figure 2. Management of broads.

65 named broads – 36 (57%) subject to some form of management



Figure 3. Type of management activity by decade



# Table 2. Detail of the management of the broads (lake waterbodies)

Broad	Past restoration and success
Alderfen	Isolation – (1979) reduction in nutrient entering from catchment. 1982-83 macrophytes dominate. 1985 phytoplankton dominate. High nutrients due to internal release and lack of flushing. 1994 - 2007 TP <50ug/l, internal phosphorus release less important. Remains isolated as phosphorus load in diverted inflow stream remains too high to risk reconnection. Review nutrient levels following completion of first time rural sewerage scheme.
	Iron injection – (1995) sediment injected with iron to lock up phosphorus in the silt. Within the mobile sediment the iron was rapidly lost and technique was not successful at binding phosphorus within the sediment.
	Biomanipulation, fish removal – (1990) natural fish kill. (1993) division and partial biomanipulation, perch removed at this time. Occurrence of rudd and roach indicate it is not fully isolated. No plans to remove fish unless zooplanktiverous fish dominate resulting in a deterioration in water clarity.
	Biomanipulation, perch stocking – (1999) Most introduced perch did not survive due to hot temperatures during introduction
	<b>Refugia</b> (May 2000) – cobweb brushes provide excellent habitat for invertebrates in initial stages of restoration. After 2-3 years brushes become encrusted with sponges. Cobweb brushes and all structures removed in 2007.
	Littoral margin scrub removal – (ongoing) 10-30m margin, good for some species but there has been little overall re-growth of emergent plants into water up to 10 years since clearance. Clearance of the inflow dyke was done in 2006 to provide connected dyke habitat and to prepare for connection with the inflow stream once water quality has improved.
	Macrophyte re-introduction – to improve species diversity. Water soldier, from dyke clearance operations, added. None survived.
	Extend open water - Restore and connect adjacent dyke habitats to extend open water habitat into adjacent dykes.
	Bird exclosure - (1993) removed in 2000.
	Inflow and outflow maintained with digger to allow connection once the water quality is improved (2010)
Barnby	Sediment Removal – (1990) southern half mudpumped. (2007) northern half mud pumped.
Barton	Siltex treatment – (1988) applied at c. 1tonne/ha in an attempt to consolidate sediment, unsuccessful.
	Phosphorus stripping at major STWs and industry – (1980-1996) reduced P loading by 90% (data requires sourcing) from Stalham STW since late seventies
	Sediment Removal – (1996-2001) increased water depth by mean of 43cm, 60% lower P loading from dredged sediment in late summer, lake net P retention.
	<b>Biomanipulation, fish removal –</b> (2000-date) in isolated bays, effective if repeated as required. Integrity of barrier essential to success in early stages of the project before macrophytes are established. Once water quality and macrophytes improved barrier integrity appears less important, large barriers reduce blue greens. Biomanipulation review will assess overall success.
	<b>Refugia</b> – (2001) (£12,000) 14,000 cobweb brushes provide excellent habitat for invertebrates in initial stages and 70ha of surface area for periphyton growth thus significant P uptake and less blue green algae. Good technique for initial stages of biomanipulation where no natural habitat structure available. Sponges have colonised the brushes. In larger exclosures with general water quality and macrophyte improvements the success of this technique is doubtful. Refugia removal 2008.
	Island re-creation – (2003) pleasure island secured and rebuilt with piles and backfill. Piles do not provide favorable (favourable?) habitat for aquatic life. This was purely a landscape project.
	Installing floating island – (2003) (£50,000) 0.3ha interlocking free-floating pre-planted pallets abutted to pleasure island and protected from grazing geese. Success in year 1 included good plant growth and increased fish numbers around the structure. After year 3, despite a replanting (£10,000) the structure has few remaining plants. Island relocated to more sheltered site of Bridge Broad in 2009 where it is growing well.
	Littoral margin scrub removal – (ongoing) 20m margin, good for some species but there has been little overall re-growth of emergent plants into water up to five years since clearance. Reed swamp regrowing in some areas where rooted into the lake bed, and protected from boat and wind generated waves. Hover reed swamp remains in decline.

	Macrophyte re-introduction – (1984/5) mesh enclosure (365m long) stocked with macrophytes and refuge unsuccessful in long term.
	Water Space Management plan (2006-11) - developed with stakeholders to ensure sustainable future use of broad for all.
	First Time Rural Sewerage (2006-12) – Neatishead.
Belaugh	Phosphorus stripping at major STWs – (1986) reduced P loading by around 90% since late seventies.
	Sediment Removal – (1987) increased water depth for macrophyte regrowth. Regrowth of a low number of species in occasional years. Assess to determine if further sediment removal is required (2013).
	Macrophyte re-introduction – (1988) water lilies generally and variety of species into bird protection cages.
	Bird grazing protection – (1988) installing mesh cages to protect macrophytes from grazing birds. Cages removed in 2007.
Bridge	Phosphorus stripping at major STWs – 1986-reduced P loading by around 90% since late seventies.
	Installing floating island – (2007) 0.2ha interlocking free-floating pre-planted pallets in sheltered area and protected from grazing geese.
Burntfen	Macrophyte harvesting – (ongoing) removal of <i>N.lutea</i> to keep open water for boating and swimming (not for ecological restoration).
	Sediment Removal – (2009) 8600m3 nutrient rich surface mud removed. Feasibility for isolation and biomanipulation needs to be considered.
Brundall	Sediment Removal – (1975)
Buckenham	Sediment Removal – (1980) to 2m deep. Improving
Calthorpe	Chalk application – (1977/8 plus other times) attempt to reduce acidity.
	<b>Isolation</b> – (between late 1960s to 1970) following extensive drainage in the catchment for agriculture, water control structures were installed to prevent complete drainage of the broad itself, resulting in a perched water table. The structures also acted to prevent input of acid and ochreous water to the broad, which was produced as a result of the deep drainage on the surrounding peat soils.
	Bark chips – (late 90s) to precipitate the ochre from the water in adjoining dykes.
	Sediment Removal - (2009) successful removal of 2500m3 of sediment and lily rhizomes with growth of stoneworts in 2011 and 2012.
Cockshoot	Phosphorus stripping at major STWs – reduced P loading by 90% since late seventies.
	Emergent macrophyte re-introduction – (2002/3) coir pallets planted with emergent vegetation (T. latifolia, S. lactustris) laid over shallow mud to form hover, protected by coir goose protection nets. Success in years 1 and 2, low water and high temperatures resulted in failure of most plants.
	Submerged macrophyte re-introduction – (2000-03) coir pallets with plugs of rooted broad and fine-leaved macrophyte species introduced to areas around the broad. Failure to colonise due to smothering with filamentous algae.
	Sediment Removal – (1982) increased water depth.
	Isolation – (1981) dam built to isolate the lake from the nutrient rich River Bure. Maintained annually.
	Biomanipulation, fish removal – (1989 to date) Effective if repeated as required.
	Scrub clearance – (1982) scrub removed along dyke and parts of the lake, some of which have been ongoing. (2002) scrub removed along dyke and parts of the broad. (2011) scrub removal along parts of the broad shore.
	Sediment Removal – (2012) increased water depth in dyke.
Cromes	Phosphorus sediment treatment – (1988) Siltex applied at c. 1tonne/ha in an attempt to consolidate sediment, unsuccessful. Another sediment treatment to lock phosphorus is required.
	Isolation – (1992) reduction in nutrient entering from main catchment.
	Sediment Removal – (1988) south broad, (2005) north broad, increased water depth allowed regrowth of macrophytes. Successful in southern basin with regrowth of hornwort mainly. Northern basin algae domination remains.

	Scrub clearance – (2012) scrub removed along parts of the broad.
Decoy	Scrub Clearance - adjacent to broad in 2001-02, then some more in 2004.
	Phosphorus stripping at major STWs – reduced P loading by % since late seventies.
Filby	Scrub clearance – scrub removed along shore on ongoing rotational basis.
	Sediment Removal - feasibility study for removal of some sediment in progress.
Flixton Decoy	Sediment Removal - feasibility for removal being discussed with landowner.
Hassingham	Partial Sediment Removal from channels - 2000
Hickling and Heigham Sound	Macrophyte cutting – (up until 1997) to lower the height of <i>M.spicatum</i> for boats.
	Macrophyte cutting – (2000, 2003) experimental approach to investigate impact of lowering height for <i>C. intermedia</i> for boats (for navigation purposes).   Hickling Channel dredging – (1968 and 74) main channel, (2002) Catfield channel (both for navigation purposes) little benefit for conservation. Some loss of <i>C. intermedia</i> due to uprooting as a result of barge movements.
	Goose grazing protection – (2000-03) Heigham Sound 2km of floating fences and bundles of brushwood faggots installed. Both effective at minimizing grazing from feral geese, but require maintenance. Due to be replaced in 2012.
	Feral geese montoring - (2012) neck collars attached to greylag geese to determine the distribution.
	Heigham Sound Channel dredging – (2012) for navigation purposes, whilst creating a new reed island for disposal and conservation purposes.
Horsey	Channel dredging – (mid-1960) channel to Waxham cut (for navigation purposes).
Horsey Hoveton Great	Channel dredging – (mid-1960) channel to Waxham cut (for navigation purposes).   Biomanipulation, fish removal – (1990) ridged structure, 1.5 ha exclosure, tidal scour undercut structure, fish gained assess within first year, unsuccessful.   Structure removed in 2003.
Horsey Hoveton Great	Channel dredging – (mid-1960) channel to Waxham cut (for navigation purposes).   Biomanipulation, fish removal – (1990) ridged structure, 1.5 ha exclosure, tidal scour undercut structure, fish gained assess within first year, unsuccessful. Structure removed in 2003.   Biomanipulation, fish removal – (sporadic from 2001) in isolated bays, effective if repeated as required. Integrity of barrier essential to success. Tidal water level change over barriers may result in fish overtopping barriers.
Horsey Hoveton Great	Channel dredging – (mid-1960) channel to Waxham cut (for navigation purposes).   Biomanipulation, fish removal – (1990) ridged structure, 1.5 ha exclosure, tidal scour undercut structure, fish gained assess within first year, unsuccessful. Structure removed in 2003.   Biomanipulation, fish removal – (sporadic from 2001) in isolated bays, effective if repeated as required. Integrity of barrier essential to success. Tidal water level change over barriers may result in fish overtopping barriers.   Littoral margin scrub removal – (ongoing) 20m margin, good for some species but there has been little overall re-growth of emergent plants into water up to five years since clearance
Horsey Hoveton Great	Channel dredging – (mid-1960) channel to Waxham cut (for navigation purposes).   Biomanipulation, fish removal – (1990) ridged structure, 1.5 ha exclosure, tidal scour undercut structure, fish gained assess within first year, unsuccessful. Structure removed in 2003.   Biomanipulation, fish removal – (sporadic from 2001) in isolated bays, effective if repeated as required. Integrity of barrier essential to success. Tidal water level change over barriers may result in fish overtopping barriers.   Littoral margin scrub removal – (ongoing) 20m margin, good for some species but there has been little overall re-growth of emergent plants into water up to five years since clearance   Bird exclosures - (1993) Removed in 2003.
Horsey Hoveton Great Hoveton Little	Channel dredging – (mid-1960) channel to Waxham cut (for navigation purposes).   Biomanipulation, fish removal – (1990) ridged structure, 1.5 ha exclosure, tidal scour undercut structure, fish gained assess within first year, unsuccessful. Structure removed in 2003.   Biomanipulation, fish removal – (sporadic from 2001) in isolated bays, effective if repeated as required. Integrity of barrier essential to success. Tidal water level change over barriers may result in fish overtopping barriers.   Littoral margin scrub removal – (ongoing) 20m margin, good for some species but there has been little overall re-growth of emergent plants into water up to five years since clearance   Bird exclosures - (1993) Removed in 2003.   Sediment Removal – (1989-90) nutrient rich surface mud removed by mud pumping, no noticeable improvement in macrophyte growth or P levels.
Horsey Hoveton Great Hoveton Little Lady/Lily	Channel dredging – (mid-1960) channel to Waxham cut (for navigation purposes).   Biomanipulation, fish removal – (1990) ridged structure, 1.5 ha exclosure, tidal scour undercut structure, fish gained assess within first year, unsuccessful. Structure removed in 2003.   Biomanipulation, fish removal – (sporadic from 2001) in isolated bays, effective if repeated as required. Integrity of barrier essential to success. Tidal water level change over barriers may result in fish overtopping barriers.   Littoral margin scrub removal – (ongoing) 20m margin, good for some species but there has been little overall re-growth of emergent plants into water up to five years since clearance   Bird exclosures - (1993) Removed in 2003.   Sediment Removal – (1989-90) nutrient rich surface mud removed by mud pumping, no noticeable improvement in macrophyte growth or P levels.   Scrub clearance – (ongoing) scrub removed along shore.
Horsey Hoveton Great Hoveton Little Lady/Lily Little should this go with Hoveton Little above?	Channel dredging – (mid-1960) channel to Waxham cut (for navigation purposes).   Biomanipulation, fish removal – (1990) ridged structure, 1.5 ha exclosure, tidal scour undercut structure, fish gained assess within first year, unsuccessful. Structure removed in 2003.   Biomanipulation, fish removal – (sporadic from 2001) in isolated bays, effective if repeated as required. Integrity of barrier essential to success. Tidal water level change over barriers may result in fish overtopping barriers.   Littoral margin scrub removal – (ongoing) 20m margin, good for some species but there has been little overall re-growth of emergent plants into water up to five years since clearance   Bird exclosures - (1993) Removed in 2003.   Sediment Removal – (1989-90) nutrient rich surface mud removed by mud pumping, no noticeable improvement in macrophyte growth or P levels.   Scrub clearance – (ongoing) scrub removed along shore.   Sediment Removal – (2008) 8000m3 nutrient rich surface mud removed by mud pumping, marked improvement in macrophyte growth.
Horsey Hoveton Great Hoveton Little Lady/Lily Little should this go with Hoveton Little above? Martham North and South	Channel dredging – (mid-1960) channel to Waxham cut (for navigation purposes).   Biomanipulation, fish removal – (1990) ridged structure, 1.5 ha exclosure, tidal scour undercut structure, fish gained assess within first year, unsuccessful. Structure removed in 2003.   Biomanipulation, fish removal – (sporadic from 2001) in isolated bays, effective if repeated as required. Integrity of barrier essential to success. Tidal water level change over barriers may result in fish overtopping barriers.   Littoral margin scrub removal – (ongoing) 20m margin, good for some species but there has been little overall re-growth of emergent plants into water up to five years since clearance   Bird exclosures - (1993) Removed in 2003.   Sediment Removal – (1989-90) nutrient rich surface mud removed by mud pumping, no noticeable improvement in macrophyte growth or P levels.   Scrub clearance – (ongoing) scrub removed along shore.   Sediment Removal – (2008) 8000m3 nutrient rich surface mud removed by mud pumping, marked improvement in macrophyte growth.   IDB pump outflow – Somerton North Pump installed (TG 4572 2080) to divert flow of polluted water from Somerton South Pump (TG 4657 2022) which discharges directly to the broads.
Horsey Hoveton Great Hoveton Little Lady/Lily Little should this go with Hoveton Little above? Martham North and South	Channel dredging – (mid-1960) channel to Waxham cut (for navigation purposes).   Biomanipulation, fish removal – (1990) ridged structure, 1.5 ha exclosure, tidal scour undercut structure, fish gained assess within first year, unsuccessful. Structure removed in 2003.   Biomanipulation, fish removal – (sporadic from 2001) in isolated bays, effective if repeated as required. Integrity of barrier essential to success. Tidal water level change over barriers may result in fish overtopping barriers.   Littoral margin scrub removal – (ongoing) 20m margin, good for some species but there has been little overall re-growth of emergent plants into water up to five years since clearance   Bird exclosures - (1993) Removed in 2003.   Sediment Removal – (1989-90) nutrient rich surface mud removed by mud pumping, no noticeable improvement in macrophyte growth or P levels.   Scrub clearance – (ongoing) scrub removed along shore.   Sediment Removal – (2008) 8000m3 nutrient rich surface mud removed by mud pumping, marked improvement in macrophyte growth.   IDB pump outflow – Somerton North Pump installed (TG 4572 2080) to divert flow of polluted water from Somerton South Pump (TG 4657 2022) which discharges directly to the broads.   Goose grazing protection – (1990s) alder poles and wire mesh installed. Effective at minimizing grazing from feral geese.
Horsey Hoveton Great Hoveton Little Lady/Lily Little should this go with Hoveton Little above? Martham North and South	Channel dredging – (mid-1960) channel to Waxham cut (for navigation purposes).   Biomanipulation, fish removal – (1990) ridged structure, 1.5 ha exclosure, tidal scour undercut structure, fish gained assess within first year, unsuccessful. Structure removed in 2003.   Biomanipulation, fish removal – (sporadic from 2001) in isolated bays, effective if repeated as required. Integrity of barrier essential to success. Tidal water level change over barriers may result in fish overtopping barriers.   Littoral margin scrub removal – (ongoing) 20m margin, good for some species but there has been little overall re-growth of emergent plants into water up to five years since clearance   Bird exclosures - (1993) Removed in 2003.   Sediment Removal – (1989-90) nutrient rich surface mud removed by mud pumping, no noticeable improvement in macrophyte growth or P levels.   Scrub clearance – (ongoing) scrub removed along shore.   Sediment Removal – (2008) 8000m3 nutrient rich surface mud removed by mud pumping, marked improvement in macrophyte growth.   IDB pump outflow – Somerton North Pump installed (TG 4572 2080) to divert flow of polluted water from Somerton South Pump (TG 4657 2022) which discharges directly to the broads.   Goose grazing protection – (1990s) alder poles and wire mesh installed. Effective at minimizing grazing from feral geese.   Goose grazing protection – (2006) fencing replaced, faggots and coir roll installed as erosion protection. Effective at minimizing grazing from feral geese and locally protecting unhealthy reed swamp. Reed swamp growth vigorous in 2012 in many areas. Goose grazing remains active in other areas.

Norton's	Sediment Removal – (2008) 2000m3 nutrient rich surface mud removed, no noticeable improvement in macrophyte growth.		
Ormesby	Biomanipulation, fish removal – (1995) Integrity of barrier essential to success. Ongoing fish survey and some spawn removal during late 1990s and early 2000s.		
-	Sediment Removal – (2010) 13000m3 nutrient rich surface mud removed, significant improvement in macrophyte growth and less algal growth.		
	Scrub clearance – (ongoing) scrub removed along shore.		
Ormesby Little	Scrub clearance – (ongoing) scrub removed along shore.		
Pound End	Biomanipulation, fish removal – (1990) effective if repeated as required. Integrity of barrier essential to success.		
	Sediment Removal – (1990) nutrient rich surface mud removed, no noticeable improvement in macrophyte growth or P levels.		
	Bird exclosures - (1993) removed in 2007.		
Ranworth	<b>Iron dosing</b> – (March 1992) 1ha of sediment dosed with ferric chloride to lock up phosphorus in the silt. Within the mobile sediment the iron was rapidly lost and technique was not successful at binding phosphorus within the sediment.		
	Bird exclosures - (1993)		
	Biomanipulation areas - (2012) small fish free fish free areas created.		
Rockland	Installing floating island – (2011-12) 0.2ha interlocking free-floating pre-planted pallets in sheltered area and protected from grazing geese		
Round Water and Woolners Carr	<b>Round Water Sediment Removal</b> – (1985) nutrient rich surface mud removed. No noticeable improvement in macrophyte growth or P levels. Sediment removal to be investigated in 2013.		
	Scrub clearance – (2012) scrub removed along shore		
Sotshole	Sediment Removal – (2012) nutrient rich surface mud removed by landowner.		
Strumpshaw	Sediment Removal – (1983) nutrient rich surface mud removed. No noticeable improvement in macrophyte growth or P levels.		
	Reed growth removal - cutting back reed growth to retain open water and channels.		
Upton Little	Sediment Removal – (2011) 4500m3 nutrient rich surface mud removed by mud pumping, marked improvement in macrophyte growth		
Wheatfen	Sediment Removal – (1995) nutrient rich surface mud removed. No noticeable improvement in macrophyte growth or P levels.		
	Sediment Removal – (2002) nutrient rich surface mud suction dredged from Mystery Pool and adjoining dyke network. (2009) 500m3 sediment removed from channels.		

Number of lakes having had significant restoration projects = 36