

CHAPTER 6. THE NORFOLK GRAZING MARSHES.

Summary.

The summary considers the status of sites, and the presence or absence of *Potamogeton acutifolius*. It also considers the number of duplicate records or new records found within a site. A comparative analysis between all the grazing marsh sites is found in Table 2 and the overall change in status of *Potamogeton acutifolius* is considered in detail in the Discussion.

Overall in Norfolk there were 41, 6 figure BSBI records representing 41 sites. *Potamogeton acutifolius* was not found in 34 of these sites. This represents, overall, a 79% loss of the Norfolk sites. However 11 new sites or new records were found close to the original BSBI sites giving an overall loss for the Norfolk sites of 47%.

At Limpenhoe and Limpenhoe Hill there were 8 BSBI, 6 figure grid reference sites but only one of these sites was found at Limpenhoe Hill. There were, however, two further records for two 1km squares for Limpenhoe Hill. Of the 7 sites at Limpenhoe, only one site contained healthy growths of *Potamogeton acutifolius*. This was the only ditch site managed as a wet fence and one where the grazing marsh was being grazed, albeit by sheep. At the remaining sites the ditches were mainly overgrown with emergent plants. They were no longer managed as wet fences which was probably due to the absence of cattle following the outbreak of Foot and Mouth disease in 2001 (George M pers. comm., 2003). At Limpenhoe Hill *Potamogeton acutifolius* was not found in either the one 6 figure grid reference site or the two 1km square grid references. Thus, at Limpenhoe and Limpenhoe Hill only 12.5% of the BSBI sites were found to contain *Potamogeton acutifolius*.

At Cantley RSPB reserve there were 15 BSBI 6 figure grid reference sites and in the present survey only 6 of these sites were found to contain *Potamogeton acutifolius*. Therefore 60% of the BSBI sites have been lost. However 5 new sites were found in the same 6 figure grid reference as 5 of the BSBI sites, potentially giving a 27% loss. In addition, 3 new sites were found in adjoining 6 figure grid references to 3 of the BSBI sites making a total of 14 possible comparable sites to the 15 originally recorded. The overall loss of *Potamogeton acutifolius* sites at Cantley could be as little as 7%.

At Buckenham, there were 6 BSBI sites and all of these sites have been lost and no new sites could be found. The water quality was different from the nearby Cantley Marshes being distinctly more nutrient rich but having a lower overall conductivity.

At Strumpshaw Fen RSPB reserve there were 4 BSBI 6 figure grid reference and all these sites have been lost. A recent flood of saline and nutrient rich water from the nearby River Yare is considered to be the main reason for the loss of *Potamogeton acutifolius* from the ditches of Strumpshaw Fen. One new site was found.

At Norton there were 8 BSBI 6 figure grid references and all have been lost due, in part, to changing farming practices. This has probably resulted in a reduced need to manage the ditches as wet fences. Where a ditch was not overgrown, in general, algae were abundant suggesting an unsuitable water quality. Six of the sites were on the edge of the grazing marsh and only two were situated in what was considered to be true grazing marsh. Even at these sites the ditches were overgrown and unmanaged. Two new ditch sites for *Potamogeton acutifolius* were found by the main drove bordering true grazing marsh and two new records for these sites were also found.

LIMPENHOE and LIMPENHOE HILL
LIMPENHOE

Site 1. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 39625 03500 (396 035)

BSBI Grid reference: TG 396 035. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 3.0m **Ditch depth:** 1.2m

Water depth: 0.7m **Freeboard:** 0.3m

Sediment Depth: 0.2m. **Sediment type:** Thin layer of alluvium over peat.

pH 7.2. Conductivity: 350 microsiemens

Open water: 0. **Water Clarity:** 4 (Scale 1-5)

Flora:



Site 1. Limpenhoe at TG 39625 03500.

This site was by the main drove, which entered the marsh due south from the village. The ditch was overgrown and unmanaged. The ditch flora was dominated by *Stratiotes aloides*, with abundant growths of *Hydrocharis morsus-ranae* and *Lemna minor* occupied any remaining open water. The edge was dominated by *Sparganium erectum* with occasional growths of *Lycopus europaeus*. *Potamogeton acutifolius* was not recorded here, or for 50m either side of the grid reference.

Management. Not managed for six to seven years.

Shade. No trees shaded the site but the aquatic vegetation was partially shaded by *Sparganium erectum*.

Agricultural use. In grass but not grazed.

Reason(s) for Loss. Site not managed.

Site 2. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 39593 03300 (396 033)

BSBI Grid reference: TG 396 033. Two 1989 BSBI records.

Additional Records, same year: One

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 3.0m **Ditch depth:** 1.2m

Water depth: 0.7m **Freeboard:** 0.3m

Sediment Depth: 0.2m. **Sediment type:** Thin layer of alluvium over peat.

pH 7.2. Conductivity: 350 microsiemens

Open water: 0. **Water Clarity:** 4 (Scale 1-5)

Flora:



Site 2. Limpenhoe at TG 39593 03300.

This site was again by the main drove a little further down from Site 1. The ditch was overgrown and unmanaged. The ditch flora was dominated by *Hottonia palustris* with abundant growths of *Hydrocharis morsus-ranae* and *Lemna minor* occupied any remaining open water. The edge was dominated by *Juncus effusus*, *Sparganium erectum* and occasional growths of *Eupatorium cannabinum*. Dominant growths of *Berula erecta* grew along the ditch edge alongside occasional growths of *Alisma plantago-aquatica*.

Potamogeton acutifolius was not recorded here, or for 50m either side of the grid reference.

Management. Not managed for six to seven years.

Shade. No trees shaded the site but the aquatic vegetation was mostly shaded by *Sparganium erectum*.

Agricultural use. In grass but not grazed.

Reason(s) for Loss. Site not managed.

Site 3. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 39582 03200 (396 032)
BSBI Grid reference: TG 396 032. One 1989 BSBI record.
Additional Records, same year: None
Duplicate Records, different years: None
1 km Square: None
10km Square: None

Ditch width: 3.0m **Ditch depth:** 1.4m
Water depth: 0.8m **Freeboard:** 0.3m
Sediment Depth: 0.3m. **Sediment type:** Alluvium over peat.
pH 7.2. Conductivity: 350 microsiemens
Open water: 0. **Water Clarity:** 4 (Scale 1-5)
Flora:



Site 3. Limpenhoe at TG 39582 03200.

This site was again by the main drove a little further down from Site 2. The ditch was overgrown and unmanaged. The ditch flora was dominated by submerged growths of *Lemna trisulca* with equal and abundant growths of *Hydrocharis morsus-ranae*. *Stratiotes aloides* and *Lemna minor* were frequently found floating on the surface. There were also frequent growths of the filamentous algal species namely *Mougeotia* spp. *Spirogyra* spp. and *Zygnema* spp.. The edge was dominated by *Phalaris arundinacea*, *Carex riparia*, *Carex acutiformis* and *Juncus effusus*. Dominant growths of *Berula erecta* grew inside this fringe of vegetation along the ditch edge. *Potamogeton acutifolius* was not recorded here, or for 50m either side of the grid reference.

Management. Not managed for six to seven years.

Shade. No trees shaded the site but the aquatic vegetation was partially shaded by the edge species.

Agricultural use. In grass but not grazed.

Reason(s) for Loss. Site not managed.

Site 4. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 39622 03076 (396 031)

BSBI Grid reference: TG 396 031. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 3.0m **Ditch depth:** 1.4m

Water depth: 0.8m **Freeboard:** 0.3m

Sediment Depth: 0.3m. **Sediment type:** Alluvium over peat.

pH 7.3. Conductivity: 380 microsiemens

Open water: 0. **Water Clarity:** 3 (Scale 1-5)

Flora:



Site 4. Limpenhoe at TG 39622 03076.

This site was again by the main drove a little further down from Site 3. The ditch was more open but still unmanaged. The ditch flora was dominated by growths of *Hydrocharis morsus-ranae* and *Elodea canadensis*. *Lemna minor* was occasionally found floating on the surface whereas *Lemna trisulca* was occasionally recorded growing below the surface. There were also frequent growths of the filamentous algal species namely *Mougeotia* spp. *Spirogyra* spp. and *Zygnema* spp.. The edge was dominated by *Glyceria maxima* and *Carex riparia* whereas *Sparganium erectum* was recorded growing abundantly in these emergents and *Typha angustifolia* was occasionally seen. Dominant growths of *Berula erecta* grew inside this fringe of vegetation along the ditch edge where *Nasturtium aquaticum* was recorded but rare. *Potamogeton acutifolius* was not recorded here, or for 50m either side of the grid reference.

Management. Not managed for six to seven years.

Shade. No trees shaded the site but the aquatic vegetation partially shaded by the edge species.

Agricultural use. In grass but not grazed.

Reason(s) for Loss. Site not managed.

Site 5. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 39686 03030, "Best fit", (397 030).

BSBI Grid reference: TG 396 030. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 3.0m **Ditch depth:** 1.4m

Water depth: 1.1m **Freeboard:** 0.3m

Sediment Depth: 0m. **Sediment type:** Alluvium over peat.

pH 7.4. Conductivity: 400 microsiemens

Open water: 2. **Water Clarity:** 4 (Scale 1-5)

Flora:



Site 5. Limpenhoe at TG 39686 03030.

This site was again by the main drove a little further down from Site 4. The ditch edge by the drove had a narrow fringe of *Phragmites australis*. *Berula erecta* and *Mentha aquatica* grew sparsely along the ditch edge bordering the grazing marsh as such both were only occasionally recorded. The aquatic flora was dominated by *Hydrocharis morsus-ranae* and *Elodea canadensis*. There was one patch about a metre in diameter of *Callitriche platycarpa*.

Potamogeton acutifolius was not recorded here, or for 50m either side of the grid reference.

Management. Not managed for six to seven years.

Shade. There were no trees but the emergent vegetation partially shaded the site.

Agricultural use. In grass but not grazed.

Reason(s) for Loss. Site not managed.

Site 6. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 39727 03030 (397 030)
BSBI Grid reference: TG 397 030. One 1989 BSBI record.
Additional Records, same year: None
Duplicate Records, different years: None
1 km Square: None
10km Square: None

Ditch width: 3.0m **Ditch depth:** 1.4m
Water depth: 0.7m **Freeboard:** 0.3m
Sediment Depth: 0.4m. **Sediment type:** Alluvium over peat.
pH 7.4. Conductivity: 400 microsiemens
Open water: 0. **Water Clarity:** 4 (Scale 1-5)

Flora:



Site 6. Limpenhoe at TG 39727 03000.

This site was again by the main drove a little further to the east from Site 5. The ditch was overgrown and unmanaged. The ditch flora was dominated by growths of *Phragmites australis*. In the gaps between the reed stems *Lemna minor* was occasionally found floating on the surface whereas *Lemna trisulca* was occasionally recorded growing below the surface. The edge had occasional growths of *Carex riparia* and *Juncus acutiflorus*. Dominant growths of *Berula erecta* grew along the ditch edge bordering the grazing marsh where *Phragmites australis* was absent and *Mentha aquatica* was also occasionally recorded.

Potamogeton acutifolius was not recorded here, or for 50m either side of the grid reference.

Management. Not managed for seven years.

Shade. No trees shaded the site but the aquatic vegetation was mostly shaded by the edge species.

Agricultural use. In grass but not grazed.

Reason(s) for Loss. Site not managed.

Site 7. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: TG 39318 03203 (393 032)

BSBI Grid reference: TG 393 032. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: One 1974, Two 1975 and One 1991 record under TG 39- 03-.

10km Square: None

Ditch width: 2.5m **Ditch depth:** 1.2m

Water depth: 0.9m **Freeboard:** 0.3m

Sediment Depth: 0.05m. **Sediment type:** Alluvium over peat.

pH 7.4. Conductivity: 400 microsiemens

Open water: 3. **Water Clarity:** 5 (Scale 1-5)

Flora:



Site 7. Limpenhoe at TG 39318 03203.

This site was along a drove, which went in a south westerly direction (see Map). The ditch had been managed possibly three years ago and the water quality and clarity seemed excellent. The ditch was edged by cut growths of *Carex riparia* and *Juncus effusus*. In the gaps *Berula erecta* grew rarely along the ditch edges bordering the grazing marsh and grazed *Mentha aquatica* was occasionally recorded. The flora had abundant growths of *Hydrocharis morsus-ranae* and submerged growths of *Lemna trisulca*. *Potamogeton obtusifolius* was frequently found and in association with occasional growths of *Potamogeton trichoides* and *Potamogeton acutifolius*. The aquatic flora also contained occasional growths of *Lemna minor*, *Spirodela polyrhiza* and *Zannichellia palustris*.

Potamogeton acutifolius was recorded here until the next drain junction. Thereafter it was found in the drain to the north (see Map).

Management. Managed probably three years ago.

Shade. No trees shaded the site and the emergent vegetation had been partially cut back

Agricultural use. In grass and grazed by sheep.

Reason for Presence. Site managed appropriately.

Site 8. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 395 035 (395 035)

BSBI Grid reference: TG 395 035. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None



Site 8. Limpenhoe at TG 395 035.

It has to be assumed that the grid reference was correct since the site was now occupied by a house of recent construction. There was evidence that a drain had been filled in as a drain started to edge the drove just after the boundary of the property. Here, however the ditch was overgrown by trees and was dry. In addition the grid reference for the drain at this point did not agree with the BSBI record.

Reason(s) for Loss. House built over site.

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Site 9. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 40143 02500 (401 025)

BSBI Grid reference: TG 401 025. One 1974 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: TG 40- 02-; Four 1981, One 1991 BSBI records.

10km Square: None

Ditch width: 5.0m Ditch depth: 1.4m

Water depth: 0.7m Freeboard: 0.3m

Sediment Depth: 0.4m. Sediment type: Alluvium over peat.

pH 7.8. Conductivity: 400 microsiemens

Open water: 0. Water Clarity. 2 (Scale 1-5)

Flora.



Site 9. Limpenhoe Hill at TG 40143 02500.

This site was approximately 800m south-east of the nearest site (Site 6 TG 397 030) for Limpenhoe village. Access to the above site was gained from a track leading down from Limpenhoe Hill. The site was overgrown and dominated by *Glyceria maxima* with frequent growths of *Juncus effusus* and very occasional growths of *Phragmites australis* and. Both *Alisma plantago-aquatica* and *Equisetum fluviatile* grew at the water's edge. There were occasional growths of *Hydrocharis morsus-ranae* floating on the water. Below the surface *Lemna trisulca* was abundant but the dominant species was *Ceratophyllum demersum*. **The ditch seemed polluted and cattle slurry and/or parlour washings have been known to enter the ditch from the farm on the hill (pers. comm. M George, 2003).**

Potamogeton acutifolius was not recorded here, or for 50m either side of the grid reference.

Management. Not managed for seven years.

Shade. There were no trees the emergent vegetation partially shaded the site.

Agricultural use. In grass and grazed by cattle.

Reason(s) for Loss. Site not managed and possible pollution.

Site 10. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 40- 02-.
BSBI Grid reference: TG 40- 02-.
Additional Records, same year: None
Duplicate Records, different years: None
1 km Square: TG 40- 02-; Four 1981, One 1991 BSBI records.
10km Square: None

Ditch width: 5.0m **Ditch depth:** 1.4m
Water depth: 0.7m **Freeboard:** 0.3m
Sediment Depth: 0.4m. **Sediment type:** Alluvium over peat.
pH 7.8. Conductivity: 400 microsiemens
Open water: 0. **Water Clarity.** 2 (Scale 1-5)

This square started some 400m south of the above site, Site 9. Access to the square was gained from the same track leading down from Limpenhoe Hill. The drain was therefore surveyed for 400m from site 9 and the ditch remained unchanged floristically and physically. **The ditch seemed polluted possibly arising from cattle parlour washings or pig slurry** (George M pers. comm. 2003) The site was open with very occasional growths of *Phragmites australis* and *Glyceria maxima*. Both *Alisma plantago-aquatica* and *Equisetum fluviatile* grew at the water's edge. There were occasional growths of *Hydrocharis morsus-ranae* floating on the water. Below the surface *Lemna trisulca* was abundant but the dominant species was *Ceratophyllum demersum*. Since these records related to a square rather than a site no photographs were taken but the photograph of site 9 is also a photograph of the square *Potamogeton acutifolius* was not recorded here, for the 400m length surveyed

Management. Not managed for five to seven years.

Shade. No trees shaded the site and the emergent vegetation had been cut back

Agricultural use. In grass and grazed by cattle.

Reason(s) for Loss. Site not managed and possible pollution from cattle parlour washings or pig slurry.

Site 11. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 39978 03084
BSBI Grid reference: TG 40- 03-.
Additional Records, same year: None
Duplicate Records, different years: None
1 km Square: TG 40- 03-; One 1974, Two 1975 and One 1991 BSBI records.
10km Square: None

Ditch width: 3.0m **Ditch depth:** 1.4m
Water depth: 0.7m **Freeboard:** 0.4m
Sediment Depth: 0.4m. **Sediment type:** Alluvium.
pH 7.8. Conductivity: 400 microsiemens
Open water: 0. **Water Clarity.** 1 (Scale 1-5). Evidence of possible cattle slurry.

Flora.

This square started only 300m due east of the nearest site (Site 6, TG 397 030) in the above block of sites found in the marshes below Limpenhoe village. Access to the start of the square was gained from a track, leading due west from Limpenhoe Hill.

Only one small section of ditch was found in this square but this carried on out into the grazing marsh but into another grid reference square. This section of ditch was surveyed for its whole length, about 100m. The site was open although there were mature trees shading the start of the ditch.



Site 11. Limpenhoe Hill at TG 39978 03084.

Slurry was obviously entering the ditch and green filamentous algae had bloomed and formed mats on the surface. These were mainly species of *Spirogyra* and *Mougeotia* but some *Vaucheria sessilis* was also present. The only other aquatic species recorded was frequent growths of *Hydrocharis morsus-ranae*. The edge had frequent growths of *Sparganium erectum* and occasional growths of *Glyceria maxima*, *Glyceria fluitans*, *Berula erecta*, *Mentha aquatica* and *Alisma plantago-aquatica*.

Potamogeton acutifolius was not recorded here, or for 25m either side of the point chosen

Management. Not managed for five to seven years.

Shade. No trees shaded the site and the emergent vegetation had been cut back

Agricultural use. In grass and grazed by cattle.

Reason(s) for Loss. Site not managed and pollution from slurry.

**NORFOLK GRAZING MARSHES
CANTLEY**

Site 12. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: TG 36586 04729 (366 047).

BSBI Grid reference: TG 366 047. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 4.0m Ditch depth: 1.2m

Water depth: 0.8m Freeboard: 0.1m

Sediment Depth: 0.3m. Sediment type: Silts over peat.

pH 7.0. Conductivity: 700 microsiemens

Open water: 1. Water Clarity. 3 (Scale 1-5)

Flora.



Site 12. Cantley at TG 36586 04729.

At this site *Myriophyllum verticillatum* was dominant and *Potamogeton acutifolius* was occasionally found. These were in association with *Hydrocharis morsus-ranae* (fr) and *Equisetum fluviatile* (r). The edge was dominated on the far side by *Phragmites australis* but on the near side *Carex riparia* was frequent and *Carex actiuiformis* was occasionally found. Several *Molinia* tussocks grew out from this bank.

Management. The ditch had been managed four years ago.

Shade. Emergent vegetation partially shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for Presence. Site managed appropriately but may need managing in near future.

Site 13. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 37450 03521 "Best fit" for 375 035.

BSBI Grid reference: TG 375 035. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 5.0m **Ditch depth:** 1.2m

Water depth: 0.8m **Freeboard:** 0.1m

Sediment Depth: 0.3m. **Sediment type:** Silts over peat.

pH 7.8. Conductivity: 700 microsiemens

Open water: 1. **Water Clarity:** 3 (Scale 1-5)

Flora.



Site 13. Cantley at TG 37450 03521.

This site had abundant growths of the algae *Mougeotia* and *Spirogyra* spp. These grew in association with *Myriophyllum verticillatum*(occ), *Hydrocharis morsus-ranae*(occ), *Mentha aquatica*(occ), *Berula erecta*(occ), *Lemna trisulca*(occ) and *Lemna minor*(occ) *Hydrocotyle vulgaris*(occ). The ditch edges were dominated on one side by a dense stand of *Sparganium erectum* and on the other side by stands of *Sparganium erectum*, *Juncus inflexus* and *Juncus effusus*. There were also occasional growths of *Lycopus europaeus* and *Mentha aquatica*. There was a suggestion that the site was receiving some pollution, possibly cattle slurry, from the nearby farm. *Potamogeton acutifolius* was not recorded here, or for 50m either side of the grid references.

Management. The ditch had been managed four years ago.

Shade. Emergent vegetation partially shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for absence. Possibly water quality.

Site 14. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 37153 03140. "Best fit" for 371 031.

BSBI Grid reference: TG 371 031. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 4.0m **Ditch depth:** 1.2m

Water depth: 0.7m **Freeboard:** 0.3m

Sediment Depth: 0.2m. **Sediment type:** Silts.

pH 8.2. Conductivity: 650 microsiemens

Open water: 2. **Water Clarity:** 4 (Scale 1-5)

Flora.



Site 14. Cantley at TG 37153 03140.

The site had a very simple flora being edged by *Sparganium erectum* and aquatic flora was dominated by *Elodea canadensis* with *Lemna trisulca* being abundant and *Lemna minor* occasionally recorded.

Potamogeton acutifolius was not recorded here, or for 50m either side of the grid reference.

Management. Not managed for four years.

Shade. There were no trees but the emergent vegetation partially shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for absence. Possibly water quality.

Site 15. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 37072 03265 or TG 37089 03300. "Best fit" for TG 371 033. Without a map as a reference point for the record, this site could be one of two points on the same ditch. A corner position was chosen.

BSBI Grid reference: TG 371 033. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 4.0m **Ditch depth:** 1.2m

Water depth: 0.7m **Freeboard:** 0.3m

Sediment Depth: 0.2m. **Sediment type:** Silts.

pH 8.2. Conductivity: 650 microsiemens

Open water: 2. **Water Clarity:** 3 (Scale 1-5)

Flora.



Site 15. TG 37072 03265 or TG 37089 03300. Cantley.

The flora was low in diversity with the edge being a monoculture of *Glyceria maxima*. *Potamogeton natans*, *Elodea canadensis* and *Lemna trisulca* were all abundant and *Lemna minor* was occasionally found. This site was quite close to the embanked River Yare.

Potamogeton acutifolius was not recorded here, or for 50m either side of the grid references.

Management. Not managed for five to seven years.

Shade. There were no trees but the emergent vegetation shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for absence. Lack of management and possibly water quality.

Site 16. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 37002 03505

BSBI Grid reference: TG 370 035. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 3.0m **Ditch depth:** 1.2m

Water depth: 0.75m **Freeboard:** 0.2m

Sediment Depth: 0.25m. **Sediment type:** Silty mud.

pH 8.2. Conductivity: 750 microsiemens

Open water: 0. **Water Clarity:** 3 (Scale 1-5)

Flora. This site was totally overgrown by *Phragmites australis* on one side which overshadowed and half grew into the water of this already narrow ditch. In the much restricted open water *Potamogeton natans* totally dominated the ditch and despite frequent sampling no other plants could be found. This site was close to the embanked River Yare

Potamogeton acutifolius was not recorded here, or for 50m either side of the grid reference.

Management. Not managed for five to seven years.

Shade. Emergent vegetation almost totally shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for absence. Lack of management and possibly water quality.

Site 17. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 37259 03500. (373 035) "Best fit" for TG 372 035.

BSBI Grid reference: TG 372 035. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: Two 1982 BSBI records

1 km Square: None

10km Square: None

Ditch width: 6.0m **Ditch depth:** 1.4m

Water depth: 1.1m **Freeboard:** 0.2m

Sediment Depth: 0.1m. **Sediment type:** Silty mud.

pH 8.2. Conductivity: 650 microsiemens

Open water: 3. **Water Clarity:** 5 (Scale 1-5)

Flora.

The water clarity was excellent and it was evident that the only species present were occasional growths of *Nuphar lutea* and *Stratiotes aloides*. *Lemna minor* was also occasionally recorded. The ditch as the photograph shows was open and edged by *Juncus effusus* occasional intrusions off *Glyceria maxima* and one small clump of *Sium latifolium*. *Potamogeton acutifolius* was not recorded here, or for 50m either side of the grid reference.

Management. A main feeder drain managed every two years, into third year!

Shade. No trees or emergent vegetation shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for absence. A feeder drain, possibly over-management.



Site 17. Cantley at TG 37259 03500.

Site 18. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 37126 03700 (371 037). Only possible and "Best fit" for TG 372 037.

BSBI Grid reference: TG 372 037. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 6.0m **Ditch depth:** 1.4m

Water depth: 1.1m **Freeboard:** 0.2m

Sediment Depth: 0.1m. **Sediment type:** Silty mud.

pH 8.2. Conductivity: 650 microsiemens

Open water: 2. **Water Clarity.** 5 (Scale 1-5)

Flora.

This site was the same ditch length as Site 17 but some 150 metres or so along the drain. A photograph was not taken as the site can be seen in the middle distance. The reference point used coincided with an island of *Stratiotes aloides* and was hence abundant. Outside this island *Nuphar lutea* was occasionally found. The edge had frequent growths of *Sparganium erectum*, *Juncus effusus* and occasional growths of *Phragmites australis*.

Potamogeton acutifolius was not recorded here, or for 50m either side of the grid reference.

Management. A feeder drain the intent is to manage them every two years, into third year!

Shade. No trees or emergent vegetation shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for absence. A feeder drain, possibly over-management.

Site 19. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 37060 03800 (371 038). Only possible and "Best fit" for TG 372 038.

BSBI Grid reference: TG 372 038. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 6.0m **Ditch depth:** 1.2m

Water depth: 0.9m **Freeboard:** 0.2m

Sediment Depth: 0.1m. **Sediment type:** Silty mud.

pH 8.2. Conductivity: 650 microsiemens

Open water: 3. **Water Clarity:** 3 (Scale 1-5)

Flora.



Site 19. Cantley at TG 37060 03800.

In the photograph can be seen submerged growths of *Potamogeton lucens*, an unusual species for the grazing marshes of Norfolk. There are also abundant growths of *Nuphar lutea* and *Stratiotes aloides*. *Hydrocharis morsus-ranae* and *Equisetum fluviatile* were also occasionally recorded. *Sparganium erectum* was abundant along the edge but was grazed as was ungrazed *Juncus effusus*.

Potamogeton acutifolius was not recorded here, or for 50m either side of the grid reference.

Management. A feeder drain the intent is to manage them every two years, into third year!

Shade. No trees or emergent vegetation shaded the site

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for absence. A feeder drain, possibly over-management.

Site 20. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: TG 37104 03951 (371 040) "Best fit" for TG 371 040 to
NEW SITE 37083 03944 (371 039).

BSBI Grid reference: TG 371 040. One 1988 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 6.0m **Ditch depth:** 1.2m

Water depth: 0.9m **Freeboard:** 0.2m

Sediment Depth: 0.1m **Sediment type:** Silts over peat.

pH 7.1. Note shift in pH. **Conductivity:** 650 microsiemens

Open water: 2. **Water Clarity:** 4 (Scale 1-5)

Flora.



Site 20. TG 37104 03951. Cantley.

This was the first site on the Cantley Levels found to contain abundant growths of *Potamogeton acutifolius*. It was associated with abundant growths of *Myriophyllum verticillatum*, *Nuphar lutea* and *Stratiotes aloides*. *Sagittaria sagittifolia* was occasionally recorded and *Lemna minor* was rare. The edge was dominated by *Sparganium erectum* but there were occasional growths of *Mentha aquatica* and *Alisma plantago-aquatica*.

Potamogeton acutifolius was recorded growing in the ditch just out of the photograph to the right up to the grid reference TG 37083 03944.

Management. A feeder drain, the intent is to manage them every two years, into third year!

Shade. No trees or emergent vegetation shaded the site

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for presence. Water quality and by default appropriate management?

Site 21. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: NEW SITE, TG 37110 03941 (371 039)
to NEW RECORD Site 21a, 37129 03954 (371 040, Site 20)
to Site 21b, 37150 03974 (372 040) and other New
Records for 372 040, Sites 23 & 23a)
all sites along one ditch with the continuous presence of
Potamogeton acutifolius.

BSBI Grid reference: TG 371 039. None.
TG 371 040 1988 BSBI record
TG 372 040 1988 BSBI record

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 3.0m **Ditch depth:** 1.2m

Water depth: 0.75m **Freeboard:** 0.2m

Sediment Depth: 0.25m. **Sediment type:** Silts over peat.

pH 7.2. Conductivity: 650 microsiemens

Open water: 1. **Water Clarity:** 2-4 (Scale 1-5)

Flora.



Site 21a. Cantley at TG 37129 03954. *Potamogeton acutifolius* can be clearly seen growing abundantly at the surface as the brown coloured grass-like plant. The water is partly stained by iron ochre.

At TG 37110 03941 (371 039) a NEW SITE, *Potamogeton acutifolius* was recorded abundantly in association with abundant *Lemna trisulca* and frequent growths of *Elodea canadensis* and *Hydrocharis morsus-ranae*. The edge was dominated by overgrowths of *Sparganium erectum* and occasional growths of *Phragmites australis*.

At TG 37129 03954 (371 040) a NEW RECORD for the BSBI 1988 record, *Potamogeton acutifolius* can be clearly seen in the above photograph growing abundantly at the surface as the brown coloured grass-like plant. The other dominant growth is that of *Myriophyllum verticillatum*. *Equisetum fluviatile*, *Hydrocharis morsus-ranae*, *Mentha aquatica* and *Berula erecta* were also recorded occasionally. The edge was dominated by overgrowths of *Juncus effusus* and *Sparganium erectum* and occasional growths of *Lythrum salicaria*.

At TG 37150 03974 (372 040) the proposed site for the BSBI 1988 record *Potamogeton acutifolius* was recorded as frequent to abundant in association with *Elodea canadensis* and *Hydrocharis morsus-ranae*. The edge was dominated by overgrowths of *Sparganium erectum* and occasional growths of *Phragmites australis*.

Management. Managed three or four years ago.

Shade. No trees or emergent vegetation shaded the site

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for presence. At appropriate point in management cycle and possibly water quality?

Site 22. WEST SIDE OF DROVE. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 37288 04066 (373 041) "Best fit" for TG 373 040.
One of two possible sites, alternative Site is 23b.

BSBI Grid reference: TG 373 040. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 3.0 to 4.0m **Ditch depth:** 1.2m

Water depth: 0.75m **Freeboard:** 0.2m

Sediment Depth: 0.25m. **Sediment type:** Silts over peat.

pH 7.6. Conductivity: 650 microsiemens

Open water: 2. **Water Clarity:** 4 (Scale 1-5).

Flora.



Site 22. Cantley at TG 37288 04066, West of the Drove.

The drain in Site 22 appeared to be the 1989 TG 373 040 BSBI site record for *Potamogeton acutifolius*. The photograph is looking north east and the site lay to the west of the drove and contained dominant growths of *Myriophyllum verticillatum*. This grew in association with *Equisetum fluviatile(fr)*, *Hydrocharis morsus-ranae(occ)*, *Mentha aquatica(occ)*, *Persicaria amphibia(occ)*, *Berula erecta(occ)*, *Oenanthe fistulosa(fr)*, *Lemna trisulca(fr)*, *Lemna minor(occ)* and *Hydrocotyle vulgaris(occ)*. The algae, *Mougeotia spp.* and *Spirogyra spp.* were not recorded. The ditch edges were also diverse with frequent growths of *Sparganium erectum*, *Juncus effusus*, *Juncus inflexus*, *Juncus acutiflorus*, *Carex riparia* and *Carex acutiformis*. Prior to this the ditch was dominated by *Stratiotes aloides* but in both ditches ***Potamogeton acutifolius* was absent.** To the left just out of the picture was a recently dredged ditch containing *Chara hispida var hispida* and nothing else.

Reason(s) for absence. Lack of management and possibly water quality.

Site 23. EAST SIDE OF DROVE. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: NEW RECORD, TG 37162 03991(372 040) Site 23.
NEW RECORD, TG 37213 04018 (372 040) Site 23a.
both within BSBI 1988 site, 21b.
TG 37270 04049 (373 040) Site 23b.
NEW SITE, TG 37283 04065 (373 041) Site 23c.
BSBI Grid reference: TG 373 040. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 3.0 to 4.0m **Ditch depth:** 1.2m

Water depth: 0.75m **Freeboard:** 0.2m

Sediment Depth: 0.25m. **Sediment type:** Silts over peat.

pH 7.2. Conductivity: 650 microsiemens

Open water: 2. **Water Clarity:** 2 to 4 (Scale 1-5).

Flora.

The ditch contained abundant *Potamogeton acutifolius* in association with *Myriophyllum verticillatum(ab)*, *Hydrocharis morsus-ranae(occ)*, *Mentha aquatica(occ)*, *Berula erecta(occ)*, *Oenanthe fistulosa (occ)*, *Lemna trisulca(occ)*, *Lemna minor(occ)* and *Hydrocotyle vulgaris(occ)*. There were even occasional growths of the algae *Mougeotia spp.* and *Spirogyra spp.* The ditch edges were also diverse with frequent growths of *Sparganium erectum* and *Juncus effusus*. There were also occasional growths of *Lythrum salicaria*, *Lycopus europaeus*, *Mentha aquatica* and *Typha latifolia*.

Reasons for presence and absence. Why this ditch to the east should contain *Potamogeton acutifolius* and it is absent in the other to the west of the drove (Site 22), is not known. It may be related to the management cycle since the ditch on the west side was similar in all other respects except it contained more *Sparganium erectum* possibly suggesting it was cleaned out two or three years earlier, probably six to seven years ago. It also seemed more nutrient rich and had a slightly higher pH of 7.6 compared with pH 7.2 on the east side.

Site 24. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: NEW RECORD. TG 37349 03985 (373 040) within Site 23b.

BSBI Grid reference: TG 373 040. One 1989 BSBI record.

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 4.0m **Ditch depth:** 1.2m

Water depth: 0.75m **Freeboard:** 0.2m

Sediment Depth: 0.25m. **Sediment type:** Silts over peat.

pH 7.6. Conductivity: 650 microsiemens

Open water: 2. **Water Clarity:** 4 (Scale 1-5).

Flora. This site contained dominant growths of *Potamogeton acutifolius* with occasional growths of *Chara hispida* var *hispida* and *Sagittaria sagittifolia*. The edge had occasional growths of *Alisma plantago-aquatica*, *Phragmites australis* and *Sparganium erectum*.

Management. The ditch had been recently managed possibly three years ago.

Shade. No trees or emergent vegetation shaded the site.

Agricultural USE. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for presence. Appropriate point in the management cycle and water quality.

Site 25. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: NEW RECORD. TG 37283 04065 (373 041 within Site 23c).

BSBI Grid reference: None

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 4.0m **Ditch depth:** 1.2m

Water depth: 0.75m **Freeboard:** 0.2m

Sediment Depth: 0.25m. **Sediment type:** Silts over peat.

pH 7.6. Conductivity: 650 microsiemens

Open water: 2. **Water Clarity:** 4 (Scale 1-5).

This site TG 37283 04065 is not such a good fit for the 1989 BSBI record, TG 373 040 as it translates as TG 373 041. Here *Potamogeton acutifolius* was dominant and it was associated with *Hydrocharis morsus-ranae* (ab), *Lemna trisulca* (fr), *Lemna minor*(occ), *Mentha aquatica* (occ), *Berula erecta* (occ), *Oenanthe fistulosa* (fr), *Alisma plantago-aquatica* (occ) and *Hydrocotyle vulgaris* (occ). *Sparganium erectum* was frequently found at this site. *Juncus effusus*, *Juncus inflexus*, *Juncus acutiflorus*, *Carex riparia* and *Carex acutiformis* were occasionally found at this grid reference.

Management. The ditch had been recently managed possibly three years ago.

Shade. No trees or emergent vegetation shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for presence. Appropriate point in the management cycle and water quality.

Site 26. EAST SIDE OF DROVE. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: NEW SITE. TG 37366 04117 (374 041). Continuation of Site 21 at the bend where it starts to parallel the existing railway line.

BSBI Grid reference: None

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 3.0 to 4.0m **Ditch depth:** 1.2m

Water depth: 0.75m **Freeboard:** 0.2m

Sediment Depth: 0.25m. **Sediment type:** Silts over peat.

pH 7.2. Conductivity: 650 microsiemens

Open water: 1. **Water Clarity:** 4 (Scale 1-5).

Flora



Site 26. Cantley at TG 37366 04117 at the bend where it starts to parallel the railway line was purposefully surveyed as it lay directly opposite Site 26, TG 37339 04114 which was situated on the western ditch.

The ditch contained abundant *Potamogeton acutifolius* in association with *Myriophyllum verticillatum*(ab), *Hydrocharis morsus-ranae*(occ), *Mentha aquatica*(occ), *Berula erecta*(occ), *Oenanthe fistulosa* (occ), *Lemna trisulca*(occ), *Lemna minor*(occ) and *Hydrocotyle vulgaris*(occ). There were occasional growths of the algae *Mougeotia* spp. and *Spirogyra* spp. The ditch edges were also diverse with frequent growths of *Sparganium erectum*, *Juncus inflexus* and *Juncus effusus*. There were also occasional growths of *Lythrum salicaria*, *Lycopus europaeus* and *Mentha aquatica*.

Shade. No trees but emergent vegetation partially shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Management. Managed three to four years ago.

Reason(s) for presence. Appropriate point in the management cycle and water quality.

Site 27. WEST SIDE OF DROVE. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 37339 04114 (373 041).

BSBI Grid reference: None

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 4.0m

Ditch depth: 1.2m

Water depth: 0.75m

Freeboard: 0.2m

Sediment Depth: 0.25m.

Sediment type: Silts over peat.

pH 7.6. Conductivity: 650 microsiemens

Open water: 1. **Water Clarity:** 4 (Scale 1-5).

Flora.



Site 27. Cantley at TG 37339 04114 looking southwest, *Potamogeton acutifolius* was not recorded in this ditch yet opposite, across the drove *Potamogeton acutifolius* was recorded, just opposite, in a ditch of similar diversity at TG 37366 04117

The ditch contained **no** *Potamogeton acutifolius*. *Myriophyllum verticillatum* was dominant and grew in association with *Hydrocharis morsus-ranae*(occ), *Mentha aquatica*(occ), *Berula erecta*(occ), *Oenanthe fistulosa* (occ), *Lemna trisulca*(occ), *Lemna minor*(occ), *Sagittaria sagittifolia* and *Hydrocotyle vulgaris*(occ). The ditch edges were also diverse with frequent growths of *Sparganium erectum*, *Juncus inflexus* and *Juncus effusus*. There were also occasional growths of *Lythrum salicaria*, *Lycopus europaeus* and *Mentha aquatica*

Potamogeton acutifolius was not recorded here, or for 100m from the grid reference.

Management. Managed six to seven years ago.

Shade. No trees but emergent vegetation partially shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for absence. Lack of management and water quality?

Site 28. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 37303 03429 (373 034).

BSBI Grid reference: None

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 7.0m **Ditch depth:** 1.4m

Water depth: 1.0m **Freeboard:** 0.2m

Sediment Depth: 0.2m. **Sediment type:** Silts.

pH 7.6. Conductivity: 650 microsiemens

Open water: 1. **Water Clarity:** 4 (Scale 1-5).

Flora



Site 28. Cantley at TG 37303 03429.

At this site *Potamogeton lucens* and *Stratiotes aloides* were abundant. *Nuphar lutea* was frequent whereas *Hydrocharis morsus-ranae* and *Sagittaria sagittifolia* were occasionally found. The edge contained abundant growths of *Sparganium erectum* some *Sonchus palustris* and *Sium latifolium* was rare. *Nymphaea alba* was recorded up a side ditch just out of the photograph to the right.

Potamogeton acutifolius was not recorded here, or for 50m either side of the grid reference.

Management. A feeder drain, the intent is to manage them every two years. The ditch had been managed possibly three years ago.

Shade. No trees or emergent vegetation shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for absence. Ditch too deep, too wide or managed too frequently.

Site 29. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: TG 37629 03307 (376 033). "Best fit".

BSBI Grid reference: TG 376 034. One 1989 BSBI record

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 4.0m

Ditch depth: 1.2m

Water depth: 0.9m

Freeboard: 0.2m

Sediment Depth: 0.1m.

Sediment type: Silts over peat.

pH 7.0. Conductivity: 700 microsiemens

Open water: 2. **Water Clarity:** 3 (Scale 1-5).

Flora



Site 29. Cantley at TG 37629 03307.

At this site *Nymphaea alba* and *Lemna trisulca* were abundant. *Potamogeton acutifolius*, *Hydrocharis morsus-ranae*, *Lemna minor* and *Sagittaria sagittifolia* were occasionally found. The edge contained abundant growths of *Phragmites australis* some *Sparganium erectum*(fr) *Carex acutiformis*(occ), *Mentha aquatica* (occ) and a tussock of *Carex pseudocyperus*.

Management. The ditch had been managed probably four years ago.

Shade. No trees or emergent vegetation shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for presence. Water quality and at an appropriate point in the management cycle.

Site 30. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 36389 04704 (364 047).
BSBI Grid reference: TG 364 047. One 1989 BSBI record
Additional Records, same year: None
Duplicate Records, different years: None
1 km Square: None
10km Square: None

Ditch width: 6.0m **Ditch depth:** 1.2m
Water depth: 0.9m **Freeboard:** 0.2m
Sediment Depth: 0.1m. **Sediment type:** Silts over peat.
pH 7.0. Conductivity: 700 microsiemens
Open water: 1. **Water Clarity:** 3 (Scale 1-5).
Flora.



Site 30. Cantley at TG 36389 04704.

Exactly at TG 36389 04704 *Potamogeton acutifolius* was not found. *Stratiotes aloides* was dominant, in association with *Lemna trisulca* (occ), *Hydrocharis morsus-ranae* (ab) and *Lemna minor* (r). The edge contained frequent growths of *Sparganium erectum* (fr) and occasional growths of *Berula erecta*. *Potamogeton acutifolius* was not recorded here, or for 50m either side of the grid reference.

Reason(s) for absence. Ditch needing management?

Site 31. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: TG 36389 04678 (364 047 alternative fit, see Site 30).

BSBI Grid reference: TG 364 047. One 1989 BSBI record

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: None

10km Square: None

Ditch width: 4.0m

Ditch depth: 1.2m

Water depth: 0.9m

Freeboard: 0.2m

Sediment Depth: 0.1m.

Sediment type: Silts over peat.

pH 7.0. Conductivity: 700 microsiemens

Open water: 1. **Water Clarity:** 3 (Scale 1-5).

Flora



Site 31. Cantley at TG 36389 04678.

Only 10 metres away from Site 30, in a side ditch at TG 36389 04678 the above photograph was taken. At this site *Potamogeton acutifolius* was clearly dominant but as can be seen in the photograph the algae, *Mougeotia* spp. *Spirogyra* spp. and *Enteromorpha intestinalis* were frequent. In association with these species grew *Potamogeton freisii* (occ), *Lemna trisulca* (occ), *Hydrocharis morsus-ranae* (fr), *Elodea canadensis* (fr), *Stratiotes aloides* (occ) and *Lemna minor* (r). The edge contained frequent growths of *Sparganium erectum* (fr) and *Lycopus europaeus* (r).

Further along after some 80 metres of such growth, at TG 36468 04649, *Potamogeton acutifolius* was no longer recorded and the flora mirrored that at the beginning of the site at TG 36389 04704

Management. The ditch had been managed three years ago.

Shade. No trees or emergent vegetation shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for presence. Appropriate point in management cycle.

Site 32. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 36508 04624 (365 046).
BSBI Grid reference: TG 365 046. One 1989 BSBI record
Additional Records, same year: None
Duplicate Records, different years: None
1 km Square: None
10km Square: None

Ditch width: 4.0m **Ditch depth:** 1.2m
Water depth: 0.8m **Freeboard:** 0.1m
Sediment Depth: 0.3m. **Sediment type:** Silts over peat.
pH 7.0. Conductivity: 700 microsiemens
Open water: 0. **Water Clarity:** 3 (Scale 1-5).

Flora



Site 32. Cantley at TG 36508 04624.

At this site *Stratiotes aloides* was clearly dominant but surprisingly there were rare growths of *Hydrocharis morsus-ranae* and *Enteromorpha intestinalis* was occasionally recorded. At the edge *Equisetum fluviatile* and *Berula erecta* occasionally were recorded. *Sparganium erectum* formed a dense fringe on one side of the ditch but was not shading the site. *Potamogeton acutifolius* was not found. *Potamogeton acutifolius* was not recorded here, or for 25m either side of the grid references.

Management. The ditch had not managed for seven to ten years.

Shade. No trees or emergent vegetation shaded the site.

Agricultural use. As grazing marsh and grazed by cattle. This site formed part of the RSPB reserve at Cantley Marshes.

Reason(s) for absence. Ditch needing management.

**NORFOLK GRAZING MARSHES
BUCKENHAM**

Site 33. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 34900 05420 (349 054).
BSBI Grid reference: TG 349 054. One 1988 BSBI record
Additional Records, same year: None
Duplicate Records, different years: None
1 km Square: TG 35- 05-, Two 1972, One 1974 and One 1991 BSBI records.
10km Square: TG 3 - - 0 - - , One 1974 and One 1979 BSBI record.

Ditch width: 5.0m **Ditch depth:** 1.4m
Water depth: 0.7m **Freeboard:** 0.3m
Sediment Depth: 0.4m. **Sediment type:** Alluvium over peat.

pH 7.8. Conductivity: 400 microsiemens

Open water: 3. **Water Clarity.** 1 (Scale 1-5). Turbid due to swans and defaecation.

Flora.



Site 33. Buckenham at TG 34900 05420.

The edge species found along this ditch were dominated by *Glyceria maxima* with *Epilobium hirsutum* occasionally recorded. The water lacked clarity and the algae *Mougeotia* spp and *Spirogyra* spp formed mats on the surface. There were occasional growths of *Lemna minor* and *Lemna trisulca*. **The vegetation was grazed by swans.** *Potamogeton acutifolius* was not recorded here, or for 25m either side of the grid reference.

Management. Ditch managed two years ago.

Shade. There were no trees but the emergent vegetation partially shaded the site.

Agricultural use. As grazing marsh and grazed by cattle.

Reason(s) for absence. Water quality, swan grazing.

Site 34. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 35503 05381 (355 054).

BSBI Grid reference: TG 355 054. One 1989 BSBI record

Additional Records, same year: None

Duplicate Records, different years: None

1 km Square: TG 35- 05-, Two 1972, One 1974 and One 1991 BSBI records

10km Square: TG 3 - - 0 - - , One 1974 and One 1979 BSBI record.

Ditch width: 9.0m **Ditch depth:** 1.3m

Water depth: 0.6m **Freeboard:** 0.2m

Sediment Depth: 0.5m. **Sediment type:** Alluvium over peat.

pH 8.2. Conductivity: 600 microsiemens

Open water: 2. **Water Clarity.** 0 or 5 (Scale 1-5).

Flora



Site 34. Buckenham at TG 35503 05381.

A large shallow drain on alluvium. *Lemna minor* was dominant but *Spirodela polyrrhiza* (fr) was also recorded. In the open water areas were occasional growths of *Ceratophyllum demersum*. The edge was dominated by abundant growths of *Sparganium erectum*, and there were occasional growths of *Lycopus europaeus*, *Eupatorium cannabinum*, *Myosotis scorpioides*, *Juncus effusus*, *Juncus inflexus*, *Rumex conglomeratus* and some fragments of *Glyceria maxima*.

The site was surveyed for 50 metres from the grid reference, which started at the entrance to this grazing marsh compartment and no *Potamogeton acutifolius* was found.

Management. Main feeder drain, managed two years ago.

Shade. There were no trees and the emergent vegetation resulted in some very local shading.

Agricultural use. As grazing marsh and grazed by cattle.

Reason(s) for absence. Water quality.

Site 35. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 35083 05600 (351 056). "Best fit"
BSBI Grid reference: TG 350 056. One 1988 BSBI record. The grid reference fell on the railway line so the ditches on the grazing marsh side were surveyed.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width:	3.0m	Ditch depth:	1.2m
Water depth:	0.7m	Freeboard:	0.3m
Sediment Depth:	0.2m.	Sediment type:	Alluvium over peat.

pH 7.8. **Conductivity:** 400 microsiemens
Open water: 2. **Water Clarity.** 3 (Scale 1-5).

Flora.



Site 35. Buckenham at TG 35083 05600.

The ditch was totally overgrown by *Glyceria maxima* with *Iris pseudacorus* occasionally recorded and *Juncus effusus* being frequent. The aquatic flora contained occasional growths of *Hydrocharis morsus-ranae*, *Lemna minor*, *Ceratophyllum demersum* and *Callitriche stagnalis*. *Lemna trisulca* was recorded frequently and the filamentous algal species *Mougeotia spp* and *Spirogyra spp* were abundant. *Potamogeton acutifolius* was not recorded here, or for 25m either side of the grid reference.

Management. Ditch managed seven to ten years ago.

Shade. There were no trees but the emergent vegetation shaded the site.

Agricultural use. As grazing marsh and grazed by cattle.

Reason(s) for absence. Lack of management.

Site 36. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 36590 05048 (366 051).

BSBI Grid reference: TG 366 051. One 1985 BSBI record. The grid reference fell on the railway line so the ditches on the grazing marsh side were surveyed.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 3.0m **Ditch depth:** 1.2m

Water depth: 0.7m **Freeboard:** 0.3m

Sediment Depth: 0.2m **Sediment type:** Alluvium over peat.

pH 7.8. Conductivity: 400 microsiemens

Open water: 3. **Water Clarity:** 3 (Scale 1-5).

Flora



Site 36. Buckenham at TG 36590 05048.

A *Phragmites australis* overgrown ditch with *Nymphaea alba* (ab) and *Hydrocharis morsus-ranae* (occ). No other plants were found.

The site was surveyed for 25 metres either side of the grid reference and no *Potamogeton acutifolius* was found.

Management. Ditch managed seven to ten years ago.

Shade. There were no trees but the emergent vegetation shaded the site.

Agricultural use. As grazing marsh and grazed by cattle.

Reason(s) for absence. Lack of management.

Site 37. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 36200 05108 (362 051).

BSBI Grid reference: TG 362 051. One 1989 BSBI record.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 3.0m **Ditch depth:** 1.2m

Water depth: 0.7m **Freeboard:** 0.3m

Sediment Depth: 0.2m. **Sediment type:** Alluvium over peat.

pH 7.8. Conductivity: 400 microsiemens

Open water: 1. **Water Clarity.** 2 (Scale 1-5).

Flora.



Site 37. TG 36200 05108. Buckenham.

This ditch as the above photograph shows was overgrown by *Sparganium erectum* and *Phragmites australis*. The only open water had been kept open by a pair of breeding swans and the ditch was polluted with their excreta and the only plants found were the occasional *Lemna trisulca* and *Hydorcharis morsus-ranae*. The site was surveyed for 25 metres either side of the grid reference and no *Potamogeton acutifolius* was found.

Management. Ditch managed possibly more than ten years ago.

Shade. There were no trees but the emergent vegetation shaded the site.

Agricultural use. As grazing marsh and grazed by cattle.

Reason(s) for absence. Lack of management and swan grazing.

Site 38. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 36000 05078 (360 051). "Best fit".

BSBI Grid reference: TG 360 050. One 1989 BSBI record.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 6.0m

Ditch depth: 1.4m

Water depth: 0.7m

Freeboard: 0.4m

Sediment Depth: 0.3m.

Sediment type: Alluvial silt mixed with peat.

pH 8.2. Conductivity: 600 microsiemens

Open water: 0 or 4. **Water Clarity.** 0 or 5 (Scale 1-5).

Flora



Site 38. Buckenham at TG 36000 05078.

The open water in this drain was dominated by the algal species *Vaucheria sessilis* which grew abundantly on the bottom sediments. There were occasional surface growths of *Cladophora glomerata* and *Lemna minor*. Along the open water section of the drain the edge vegetation was dominated by *Sparganium erectum* but further along it was infilled with *Phragmites australis*.

The site was surveyed for 25 metres either side of the grid reference and no *Potamogeton acutifolius* was found.

Management. Ditch managed seven to ten years ago.

Shade. There were no trees and the emergent vegetation resulted in extensive shading.

Agricultural use. As grazing marsh and grazed by cattle.

Reason(s) for absence. Lack of management and water quality.

NORFOLK GRAZING MARSHES
STRUMPSHAW

Site 39. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 33915 06113 (339 061).
BSBI Grid reference: TG 339 061. One 1988 BSBI record.
Additional Records, same year: None.
Duplicate Records, different years: None.
1 km Square: None.
10km Square: None.

Ditch width: 3.0m **Ditch depth:** 1.2m
Water depth: 0.6m **Freeboard:** 0.4m
Sediment Depth: 0.2m. **Sediment type:** Alluvial silt mixed with peat.
pH 8.8. Conductivity: 1050 microsiemens
Open water: 1. **Water Clarity:** 3 (Scale 1-5).

Flora.



Site 39. Strumpshaw Fen RSPB reserve at TG 33915 06113.

This site was very close to the River Yare and had been flooded the previous winter by River Yare water. The site was totally overgrown by *Phragmites australis* with abundant growths of *Hydrocharis morsus-ranae* and frequent to abundant growths of *Lemna trisulca*.

The site was surveyed for 25 metres either side of the grid reference and no *Potamogeton acutifolius* was found.

Management. Ditch managed ten years ago.

Shade. There were no trees and the emergent vegetation resulted in extensive shading.

Agricultural use. As grazing marsh but mown. This site was part of the Strumpshaw Fen RSPB reserve.

Reason(s) for absence. Lack of management and water quality due to winter flooding from River Yare water.

Site 40. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 33851 06244 (339 062). "Best fit".

BSBI Grid reference: TG 338 062. One 1989 BSBI record.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 3.0m **Ditch depth:** 1.2m

Water depth: 0.6m **Freeboard:** 0.4m

Sediment Depth: 0.2m **Sediment type:** Alluvial silt mixed with peat.

pH 8.5. Conductivity: 1000 microsiemens

Open water: 1. **Water Clarity:** 3 (Scale 1-5).

Flora



Site 40. Strumpshaw Fen RSPB reserve at TG 33851 06244.

The dominant aquatic plant was *Ceratophyllum demersum* but there were frequent growths of *Hydrocharis morsus-ranae* and occasional growths of *Lemna trisulca*. The edge was dominated by growths of *Phragmites australis* with frequent growths of *Berula erecta*.

The site was surveyed for 25 metres either side of the grid reference and no *Potamogeton acutifolius* was found.

Management. Ditch managed 4 years ago.

Shade. There were no trees and the emergent vegetation resulted in partial shading.

Agricultural use. As grazing marsh but mown. This site was part of the Strumpshaw Fen RSPB reserve.

Reason(s) for absence. Water quality due to winter flooding from River Yare water.

Site 41. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: NEW SITE, TG 34138 06126 (341 061).

BSBI Grid reference: None.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 3.0m **Ditch depth:** 1.2m

Water depth: 0.6m **Freeboard:** 0.4m

Sediment Depth: 0.2m. **Sediment type:** Alluvial silt mixed with peat.

pH 8.4. Conductivity: 900 microsiemens

Open water: 1. **Water Clarity.** 5 (Scale 1-5).

Flora.



Site 41. Strumpshaw Fen RSPB reserve at TG 34138 06126.

Potamogeton acutifolius was frequent to occasional at this new site for the species. *Ceratophyllum demersum* was abundant but there were frequent growths of the charophyte, *Chara hispida* var. *hispida* and *Lemna trisulca*. Occasional growths of *Hydrocharis morsus-ranae*, the algae *Mougeotia* spp, *Spirogyra* spp. and *Cladophora glomerata*. The edge was dominated by growths of *Sparganium erectum*, frequent growths of *Berula erecta* occasional growths of *Phragmites australis*, *Carex paniculata*, *Epilobium palustre*, *Eupatorium cannabinum*, *Juncus acutiflorus*, *Juncus bulbosus* var. *fluitans*, *Lythrum salicaria*, *Mentha aquatica* and *Alisma plantago-aquatica*.

Management. Ditch managed 3 years ago.

Shade. There were no trees and the emergent vegetation resulted in partial shading.

Agricultural use. As grazing marsh but mown. This site was part of the Strumpshaw Fen RSPB reserve.

Reason(s) for presence. Management cycle?

Site 42. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 34000 06326 (340 063).
BSBI Grid reference: TG 340 063. One 1988 BSBI record.
Additional Records, same year: None.
Duplicate Records, different years: None.
1 km Square: None.
10km Square: None.

Ditch width: 3.0m **Ditch depth:** 1.2m
Water depth: 0.6m **Freeboard:** 0.4m
Sediment Depth: 0.2m. **Sediment type:** Alluvial silt mixed with peat.
pH 8.4. Conductivity: 1000 microsiemens
Open water: 1. **Water Clarity.** 3 (Scale 1-5).

Flora.



Site 42. Strumpshaw Fen RSPB reserve at TG 34000 06326.

The dominant aquatic plant was *Ceratophyllum demersum* but there were frequent growths of the charophyte, *Chara hispida* var. *hispida* and occasional growths of *Stratiotes aloides* and *Hydrocharis morsus-ranae*. The algae *Mougeotia* spp, *Spirogyra* spp. were locally dominant growing as mats on the surface but *Lemna trisulca* was rare. The edge was dominated by fragmented stands of *Phragmites australis* and frequent growths of *Eupatorium cannabinum*, *Sparganium erectum* and *Berula erecta*. There were occasional growths of *Carex riparia*, *Carex acutiformis* and *Juncus acutiflorus*.

The site was surveyed for 25 metres either side of the grid reference and no *Potamogeton acutifolius* was found.

Management. Ditch managed three to four years ago.

Shade. There were no trees and the emergent vegetation resulted in partial shading.

Agricultural use. As grazing marsh but mown. This site was part of the Strumpshaw Fen RSPB reserve.

Reason(s) for absence. Management cycle or water quality due to winter flooding from River Yare water.

Site 43. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 33972 06238 (340 062). "Best fit".

BSBI Grid reference: TG 339 062. One 1989 BSBI record.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 4.0m **Ditch depth:** 1.2m

Water depth: 0.8m **Freeboard:** 0.2m

Sediment Depth: 0.2m **Sediment type:** Alluvial silt mixed with peat.

pH 8.4. Conductivity: 1000 microsiemens

Open water: 1. **Water Clarity:** 3 (Scale 1-5).

Flora



Site 43. Strumpshaw Fen RSPB reserve at TG 33972 06238.

The aquatic flora was dominated by *Stratiotes aloides* and in between there were abundant growths of *Hydrocharis morsus-ranae*. The edge was dominated either by mown or tall stands of *Sparganium erectum*.

The site was surveyed for 25 metres either side of the grid reference and no *Potamogeton acutifolius* was found.

Management. Ditch managed five to seven years ago.

Shade. There were no trees and the emergent vegetation resulted in partial shading.

Agricultural use. As grazing marsh but mown. This site was part of the Strumpshaw Fen RSPB reserve.

Reason(s) for absence. Management cycle and/or water quality due to winter flooding from River Yare water.

Site 44. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 34024 06163 (340 062) close to Site 41.

BSBI Grid reference: None, additional site.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 4.0m **Ditch depth:** 1.2m

Water depth: 0.8m **Freeboard:** 0.2m

Sediment Depth: 0.2m **Sediment type:** Alluvial silt mixed with peat.

pH 8.4. Conductivity: 1000 microsiemens

Open water: 1. **Water Clarity:** 3 (Scale 1-5).

Flora.

This ditch was situated running to the right at the bottom of the photograph of Site 43.

The aquatic flora was locally dominated by *Stratiotes aloides* and in between there were frequent growths of *Hydrocharis morsus-ranae* and *Lemna trisulca*.

Ceratophyllum demersum and the algae *Mougeotia spp.* and *Spirogyra spp.* were recorded occasionally. The edge was dominated by fragmented stands of *Phragmites australis* and frequent growths of *Eupatorium cannabinum* and occasional growths of *Carex riparia*, *Carex acutiformis* and *Juncus acutiflorus*.

The site was surveyed for 50 metres either side of the grid reference and *Potamogeton acutifolius* was not found.

Management. Recent ditch management probably in the previous year.

Shade. There were no trees and the emergent vegetation resulted in partial shading.

Agricultural use. As grazing marsh but mown. This site was part of the Strumpshaw Fen RSPB reserve.

Reason(s) for absence. Management cycle and/or water quality due to winter flooding from River Yare water.

NORFOLK GRAZING MARSHES.

NORTON MARSHES.

Site 45. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TM 41000 99846 (410 998).
BSBI Grid reference: TM 410 998, Two 1989 BSBI records.
Additional Records, same year: One.
Duplicate Records, different years: None.
1 km Square: None.
10km Square: None.

Ditch width: 4.0m Ditch depth: 1.2m

Water depth: 0.3m Freeboard: 0.9m

Sediment Depth: 0.2m Sediment type: Alluvial silt mixed with peat and an iron rich layer.

pH 7.6. Conductivity: 600 microsiemens

Open water: 1. Water Clarity. 4 (Scale 1-5).

Flora.



Site 45. Norton Marshes at TM 41000 99846.

This site was dominated by *Juncus bulbosus* var. *fluitans* with the algae *Mougetia* spp. and *Spirogyra* spp. being co-dominant. *Glyceria fluitans* grew in from the edge where *Agrostis stolonifera*, *Sparganium erectum*, *Alisma plantago-aquatica* and *Persicaria amphibium* were all occasionally recorded. A *Rubus* spp. grew at the corner of the ditch which was situated on slightly higher ground at the edge of the grazing marsh.

The site was surveyed for 25 metres either side of the grid reference and no *Potamogeton acutifolius* was found.

Management. A derelict ditch, managed perhaps seven years ago.

Shade. There were no trees and the emergent vegetation resulted in partial shading.

Agricultural use. Cattle grazed fields but partially abandoned and unkempt.

Reason(s) for absence. Lack of management and/or low water table.

Site 46. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 41011 00505 (410 005) "Best and only fit".
BSBI Grid reference: TG 410 006, Four 1972 and one 1991 BSBI records.
Additional Records, same year: Three in 1972.
Duplicate Records, different years: None.
1 km Square: None.
10km Square: None.

Ditch width: 4.0m **Ditch depth:** 1.2m
Water depth: 0.5m **Freeboard:** 0.7m
Sediment Depth: 0.2m. **Sediment type:** Alluvial silt mixed with peat.
pH 8.6. Conductivity: 1150 microsiemens
Open water: 1. **Water Clarity.** 3 (Scale 1-5).
Flora.



Site 46. Norton Marshes to the south west of drove at TG 41011 00505.



Site 46. Norton Marshes to the north east of the drove at TG 41011 00505.

This site on the south west was dominated and overgrown by *Glyceria maxima*. What open water there was contained *Lemna trisulca* (fr) and *Spirodela polyrrhiza* (occ).

To the north west of the drove the site was dominated totally by *Phragmites australis*. The site was surveyed for 50 metres either side of the grid reference and no *Potamogeton acutifolius* was found.

Management. A grazing marsh ditch managed seven to ten years ago and a low water table.

Shade. There were no trees but the emergent vegetation shaded the site.

Agricultural use. Cattle grazed fields or ones cut for silage.

Reason(s) for absence. Lack of management and/or low water table and /or water quality.

Site 47. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TG 41063 00217 (411 002).

BSBI Grid reference: TG 411 002, One 1989 BSBI record, recorded as being found at Heckingham

Additional Records, same year: None

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 5.0m **Ditch depth:** 1.4m

Water depth: 0.8m **Freeboard:** 0.4m

Sediment Depth: 0.2m. **Sediment type:** Alluvial silt mixed with peat.

pH 8.6. Conductivity: 1150 microsiemens

Open water: 1. **Water Clarity.** 3 (Scale 1-5).

Flora.



Site 47. Norton Marshes at TG 41063 00217.

The aquatic flora was dominated by an almost total overgrowth of *Lemna minor*, *Lemna trisulca* and *Spirodela polyrhiza*. *Nasturtium aquaticum* had invaded the ditch from the edge which was dominated by *Sparganium erectum*.

The site was surveyed for 50 metres to one side of the grid reference and no *Potamogeton acutifolius* was found.

Management. A grazing marsh ditch managed perhaps seven to ten years ago.

Shade. There were no trees but the emergent vegetation shaded the site.

Agricultural use. Cattle grazed fields or ones cut for silage.

Reason(s) for absence. Lack of management and/or water quality.

Site 48. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TM 41696 99489 (417 995), "Best fit".

BSBI Grid reference: TM 417 994, One 1989 BSBI record.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 5.0m **Ditch depth:** 1.4m

Water depth: 0.8m **Freeboard:** 0.4m

Sediment Depth: 0.2m. **Sediment type:** Alluvial silt mixed with peat.

pH 8.6. **Conductivity:** 1150 microsiemens

Open water: 1. **Water Clarity.** 3 (Scale 1-5).

Flora.



Site 48. Norton Marshes at TM 41696 99489.

This ditch was dominated by *Lemna minor* and the edge was dominated by *Sparganium erectum* with occasional growths of *Glyceria maxima*. The site was heavily shaded by 8 metre high *Alnus glutinosa*, the dead leaves of which can be seen floating on the *Lemna minor*.

The site was surveyed for 25 metres either of this point which was the only unshaded section of the length surveyed and no *Potamogeton acutifolius* was found.

Management. A ditch, by a tree lined lane, leading towards the grazing marsh, managed perhaps seven years ago and a low water table.

Shade. This site was heavily shaded by trees and the only open area was shaded by emergent vegetation.

Agricultural use. At the edge of the village, field to the west grazed by horses.

Reason(s) for absence. Lack of management and shade from trees.

Site 49. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TM 41486 99747 (415 998), "Best and only fit".

BSBI Grid reference: TM 415 997, One 1989 BSBI record.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 3.0m **Ditch depth:** 1.4m

Water depth: 0.8m **Freeboard:** 0.4m

Sediment Depth: 0.2m. **Sediment type:** Alluvial silt mixed with peat.

pH 8.6. Conductivity: 1150 microsiemens

Open water: 1. **Water Clarity:** 3 (Scale 1-5).

Flora



Site 49. Shallow ditch with water partially polluted by diesel fuel from the nearby farm but also stained with iron ochre at TM 41486 99747.

The water was generally turbid from recent management breaking an iron layer but it was also polluted by diesel fuel from the nearby farm. The only aquatic flora found was occasional growths of *Hydrocharis morsus-ranae*, *Lemna minor* and the alga *Enteromorpha intestinalis*. The edge was dominated by *Juncus effusus* with the very occasional growth of *Sparganium erectum* (r). *Glyceria fluitans* occasionally grew from the edge.

The site was surveyed for 50 metres to the north east of the grid reference and no *Potamogeton acutifolius* was found.

Management. A grazing marsh ditch, managed the previous year and a lower than expected water table.

Shade. There were five trees, one in the photograph and the others to the rear of the photograph by a culvert. The effect of shade on the flora was therefore minimal. No emergent vegetation shaded the site.

Agricultural use. Cattle grazed fields on the "high" ground at the edge of grazing marsh.

Reason(s) for absence. Recent management and pollution?

Site 50. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TM 41900 99220 (419 992), "Perfect fit".

BSBI Grid reference: TM 419 992, One 1989 BSBI record.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 4.0m **Ditch depth:** 1.4m

Water depth: 0.3m **Freeboard:** 0.9m

Sediment Depth: 0.2m. **Sediment type:** Alluvial silt mixed with peat.

pH 7.8. Conductivity: 800 microsiemens

Open water: 0. **Water Clarity:** 3 (Scale 1-5).

Flora.



Site 50. By the side of the drove at TM 41900 99220, looking north-east with a field recently cut for hay or silage. The next site (Site 51) can be seen to the left of the dead tree

The site was overgrown by *Sparganium erectum* (dom), *Glyceria maxima* (fr), *Typha latifolia* (occ) and *Polygonum hydropiper* (fr). There were only small amounts of open water which had been invaded by *Agrostis stolonifera*.

The site was surveyed for 25 metres either side of the grid reference and no *Potamogeton acutifolius* was found.

Management. A grazing marsh ditch managed 10 to 15 years ago and a low water table.

Shade. Emergent vegetation shaded the site.

Agricultural use. Cattle grazed and mown fields on the "high" ground at the edge of grazing marsh.

Reason(s) for absence. Both the lack of management and the low water table despite an acceptable water quality precluded the return of *Potamogeton acutifolius*.

Site 51. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TM 42001 99300 (420 993), "Best and only fit".

BSBI Grid reference: TM 419 993, One 1989 BSBI record.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 4.0m **Ditch depth:** 1.4m

Water depth: 0.3m **Freeboard:** 0.9m

Sediment Depth: 0.2m. **Sediment type:** Alluvial silt mixed with peat.

pH 7.8. Conductivity: 800 microsiemens

Open water: 0. **Water Clarity.** 2 (Scale 1-5).

Flora.



Site 51. The same ditch further down the drove from Site 50 at TM 42001 99300.

The aquatic flora was dominated by the algae *Mougeotia spp.* and *Spirogyra spp.* but there were occasional growths of *Hydrocharis morsus-ranae* and frequent growths of *Lemna trisulca*. In addition *Myriophyllum verticillatum* (occ) and *Nasturtium aquaticum* were also recorded. The edge flora which grew into and shaded the aquatic flora was dominated by *Sparganium erectum* and there were occasional growths of *Alisma plantago-aquatica*, *Juncus inflexus* and *Juncus effusus*.

Management. A grazing marsh ditch managed 10 to 15 years ago and a low water table

Shade. Emergent vegetation shaded the site.

Agricultural use. Cattle grazed and mown fields on the edge of grazing marsh.

Reason(s) for absence. Both the lack of management and the low water table despite an acceptable water quality precluded the return of *Potamogeton acutifolius*.

Site 52. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TM 41500 99500 (415 995).

BSBI Grid reference: TM 415 995, One 1989 BSBI record.

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 0m **Ditch depth:** 0m

Water depth: 0m **Freeboard:** 0m

Sediment Depth: 0m.



Site 52. The present use of the land at TM 41500 99500

The grid reference for this site suggested that it should have been a roadside ditch. The area had been “sanitised” by the farmer and the ditch filled in.

Reason(s) for absence. Ditch filled in.

All the BSBI records for the Norton Marshes failed to re-discover *Potamogeton acutifolius*. The ecological conditions for most of the ditches were clearly counter to the survival of *Potamogeton acutifolius*. Site 53 (illustrated on the next page) was chosen to illustrate some of these problems. However in trying to locate some of the BSBI sites some ditches seen, appeared to have an appropriate water quality and water table for the continued survival of *Potamogeton acutifolius* and so these were surveyed as additional sites. These ditches were generally found in one area of the Norton Marshes (see Map of Norton Marshes).

Site 53. Status of *Potamogeton acutifolius*: ABSENT

Present Grid Reference: TM 41834 99622 (418 996), "Best and only fit".
BSBI Grid reference: None. Extra site to show some of the problems at the Norton Marshes
Additional Records, same year: None.
Duplicate Records, different years: None.
1 km Square: None.
10km Square: None.

Ditch width: 5.0m **Ditch depth:** 1.4m
Water depth: 0.8m **Freeboard:** 0.4m
Sediment Depth: 0.2m. **Sediment type:** Alluvial silt mixed with peat.
pH 8.6. Conductivity: 1150 microsiemens
Open water: 1. **Water Clarity.** 3 (Scale 1-5).
Flora.



Site 53. General view of Norton Marsh at TM 41834 99622.

This site was chosen as it typified the conditions in certain sections of the marsh. The water was too enriched to expect to find *Potamogeton acutifolius* and none was found. The aquatic flora was dominated by surface growing mats of the algae *Mougeotia spp.*, *Spirogyra spp.* and *Cladophora glomerata*. Both *Callitriche stagnalis(fr)* and *Nasturtium aquaticum (ab)* were recorded. One edge was dominated by *Sparganium erectum* with frequent intrusions of *Epilobium hirsutum*. The mown edge held similar species.

The site was surveyed for 50 metres along the length of the ditch and no *Potamogeton acutifolius* was found.

Management. A grazing marsh ditch managed perhaps five to seven years ago.

Shade. There were no trees and the emergent vegetation because of its west to east alignment did not shade the site.

Agricultural use. Cattle grazed fields on the "high" ground at the edge of grazing marsh.

Reason(s) for absence. The lack of management and/or pollution.

Site 54. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: NEW SITE, TM 41536 99954 (415 000).

NEW SITE, TM 41565 99986 (416 000).

BSBI Grid reference: None

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 4.0m **Ditch depth:** 1.3m

Water depth: 0.9m **Freeboard:** 0.2m

Sediment Depth: 0.2m. **Sediment type:** Alluvial silt mixed with peat.

pH 7.2. Conductivity: 600 microsiemens

Open water: 3. **Water Clarity.** 5 (Scale 1-5).

Flora.



Site 54. A brimful ditch with an appropriate water quality for *Potamogeton acutifolius* at TM 41536 99954.

This site was by a main drove and contained abundant *Elodea canadensis* and *Potamogeton acutifolius*. There were occasional growths of *Hydrocharis morsus-ranae*, *Hydrotyle vulgaris*, *Lemna trisulca* and the algae *Mougeotia* spp. *Spirogyra* spp. but *Lemna minor* was rare. The edge had frequent growths of *Berula erecta*, *Juncus effusus* and *Sparganium erectum*. *Potamogeton acutifolius* was recorded along this ditch having the same species associations for approximately 45 metres.

Management. A grazing marsh ditch probably managed three years ago.

Shade. There were no trees but the emergent vegetation shaded the site from the north west.

Agricultural use. Cattle grazed and mown fields within the grazing marsh.

Some cereal crop were being grown close to the site.

Reasons for presence. A brimful ditch at the correct point in the management cycle and having an appropriate water quality.

Site 54. Status of *Potamogeton acutifolius*: PRESENT

Present Grid Reference: NEW SITE, TM 41589 99867 (416 999).

NEW RECORD, TM 41580 99884 (416 999).

BSBI Grid reference: None

Additional Records, same year: None.

Duplicate Records, different years: None.

1 km Square: None.

10km Square: None.

Ditch width: 4.0m **Ditch depth:** 1.3m

Water depth: 0.9m **Freeboard:** 0.2m

Sediment Depth: 0.2m. **Sediment type:** Alluvial silt mixed with peat.

pH 7.2. Conductivity: 600 microsiemens

Open water: 3. **Water Clarity:** 5 (Scale 1-5).

Flora.



Site 55. A brimful ditch with an appropriate water quality for *Potamogeton acutifolius* at TM 41580 99884.

The photograph seems to show more clear water but there were frequent growths of *Elodea canadensis* and *Potamogeton acutifolius* growing just beneath the surface. There were occasional growths of *Hydrocharis morsus-ranae*, *Hydrotyle vulgaris*, *Lemna trisulca* and the algae *Mougeotia* spp. *Spirogyra* spp. but *Lemna minor* was rare. The edge had dominant growths of *Sparganium erectum* and frequent growths of *Berula erecta*. *Potamogeton acutifolius* was recorded along this ditch having the same species associations for approximately 20 metres but it was still occasionally seen for another 50 metres.

Management. A grazing marsh ditch probably managed three years ago.

Shade. There were no trees but the emergent vegetation shaded the site from the north west.

Agricultural use. Cattle grazed and mown fields within the grazing marsh.

Some cereal crop were being grown close to the site

Reasons for presence. A brimful ditch at the correct point in the management cycle and having an appropriate water quality.



Main drove looking south-west away from the grazing marsh towards the “high” ground and the outlying houses of Norton Subcourse. The fields to the left and right, in the middle distance, were growing a cereal crop. Site 54 at TM 41536 99954 is immediately to the left of the photograph.

Summary of Results.

Overall 118 Sites and Records were surveyed in the present survey. Since the BSBI Sites given in Appendix 1 have duplicate records of the same six figure grid reference for any one year and for separate years an analysis of these and the results of the present day survey are presented in Table 2. In addition 14 squares were visited in which 4 sites were found containing *Potamogeton acutifolius*.

Site Descriptions.

The plant descriptions for each site give a detailed account of both those aquatic plants found and the inner ditch edge species found. These descriptions include a DAFOR assessment. In many cases there were too many bankside species recorded to give a full description of the species found at any one site. A complete list of these species including a DAFOR assessment is given in Appendices 2 to 7 where they are presented as spreadsheets. It is important in any analysis that there is a clear picture of what plants are present as aquatic species. Even so there could be several interpretations as what constitutes the immediate associates for *Potamogeton acutifolius*, for example *Oenanthe fistulosa* was occasionally found close to even growing through beds of *Potamogeton acutifolius* and yet it is not a true aquatic plant and is considered to be (and often was at many sites,) an inner edge species not associated in any way with *Potamogeton acutifolius*. Equally, both the site descriptions and the appendices refer to bankside species that invade the ditch during plant succession. Thus, one example would be *Sparganium erectum*, which is described and recorded as a **"bankside"** species and as an **"in water"** species. Both are given a separate DAFOR assessment. It was thus decided not to divide up the plant lists in the appendices into aquatic and bankside plants thus subsequent divisions of species lists may be required for further analysis. Any division therefore for the report, it was felt, would be arbitrary. So the plants are listed in alphabetical order. Overall Appendices 2 to 7 give a summary not only of the plant species found at any one site including the DAFOR assessments but they also include the physical and chemical variables measured for any one site.

Use of GPS.

Reading the above Site Descriptions it is evident that for some sites it was extremely difficult to find the exact BSBI site. This was particularly true for those located in extensive grazing marsh areas such as the Pevensey Levels, East Sussex and the Cantley Levels, Norfolk. This is because a site could be found at any point in a 100m square when using the 6 figure BSBI grid reference. In the above grazing marsh areas ditches were often spaced at distances less than 100m. Maps would have pinpointed the ditch system for which the 6 figure grid reference was intended. Thus, in the present report, maps of all the major grazing marsh systems are included on which the sites visited are marked (Appendix 8) even though the GPS used is accurate to 1m.

Table 2. A Summary of the past BSBI Records and the present day Records

Area	No of BSBI Sites and Records having a 6 figure grid reference	Duplicate BSBI Sites for different years and records within the same year. Duplicate Records in brackets are for the same year	Possible number of Sites	Number of sites found containing <i>Potamogeton acutifolius</i>	Number of New Records found in the same BSBI 6 figure grid reference	Number of New Sites and Records, in brackets, all found nearby	Squares Searched in addition to those represented by 6 figure grid reference	<i>Potamogeton acutifolius</i> found in the following squares
Staines	3	2	1	0	0	0		
Dorset	10	1 (1)	8	2	4	3		
Amberley Wild Brooks	5	0	5	2	0	2	C,D,F,G,H.	In Square C, 4 sites. In Square D, 1 site.
Houghton	2	0	2	0	0	0		
North Stoke	1	0	1	0	0	0	TQ 02 01 TQ 02 08	None
Pulborough	5	2	3	3	1	5(1)	TQ 05 17	1 Site
Lancing	5	3	2	0	0	0		
Berwick	1	0	1	0	0	0		
Pevensey	10	1	9	4	2	6	A,B,C,D,E, F,G,H.	In Squares B&E counted as 6 figure grid references
Rother Area	6	0(3)	3	0	0	0		
Romney	1	0	1	0	0	0		
Newnham	2	0(1)	1	0	0	0		
Stodmarsh	1	0	1	0	0	1		
Norton	12	2(2)	8	0	0	2(2)		
Buckenham	6	0	6	0	0	0		
Cantley	17	1(1)	15	6	5	3		
Limpenhoe	9	0(1)	8	1	0	0	TG40 02 TG 40 03	None
Strumpshaw	4	0	4	0	0	1		
Total	100	12(9)	79	18	12	23(3)		6

NOTE. A site is one 6 figure grid reference and a record is another record within the same 6 figure grid reference: