



Bude Catchment Water Vole Survey Spring 2015

**Report Compiled by
Teagen Hill**

Contents

Introduction.....	1
Aim	1
Survey Site Layout	2
Survey Details	2
Methodology and Materials	3
Survey Results	4
Transect 1.....	4
Transect 2.....	5
Transect 3.....	5
Transect 4.....	5
Transect 5.....	5
Transect 6.....	6
Transect 7.....	6
Transect 8.....	6
Transect 9.....	6
Transect 10.....	7
Transect 11.....	7
Transect 12.....	7
Transect 13.....	7
Transect 14.....	7
Discussion	8
Limitations	13
Conclusion	13
Acknowledgements	14
Bibliography/ References	15
Appendices	16
Appendix 1: Water vole survey form	16
Appendix 2: Results	17
Appendix 2a	17
Appendix 2b	18
Appendix 2c.....	19
Appendix 2d	20
Appendix 2e	21
Appendix 2f	22
Appendix 2g	22
Appendix 2h	23
Appendix 2i	24
Appendix 2j	25
Appendix 2k.....	26

Introduction

Water voles (*Arvicola amphibious*) have gone from a widespread species to near extinction in Britain, due to mink finding their way into the catchment. By 1989, 97% of the water vole population had declined, however water voles are now slowly repopulating the land in the Bude catchment, after a release programme funded by BIFFA through the Landfill Communities Trust as well as funding from Westland Countryside Stewards (MacPherson & Bright, 2011). Mink eradication schemes have since been completed in various locations, allowing “mink free” areas to become a safe haven for wildlife again.

Starting in summer 2012, approximately 550 water voles have been released. The water vole reintroduction programme has been a success with many sightings of water voles being recorded. Water voles have been spotted in almost all release sites, as well as sites which they have moved into. Surveys now take place throughout the year to ensure the water vole populations are still thriving.

The summer 2014 survey showed that water vole signs were few and far between in many of the survey sites, with many areas being inaccessible due to thick vegetation cover. The areas where water vole signs were found were clustered. As most of the vegetation will be dying back over the winter months, the spring survey should indicate a larger population due to more areas being accessible. The field signs for water voles over the summer months are “D” shaped burrows, pat latrines, droppings, feeding stations, gnawing on roots and tubers, feeding lawns and runs.

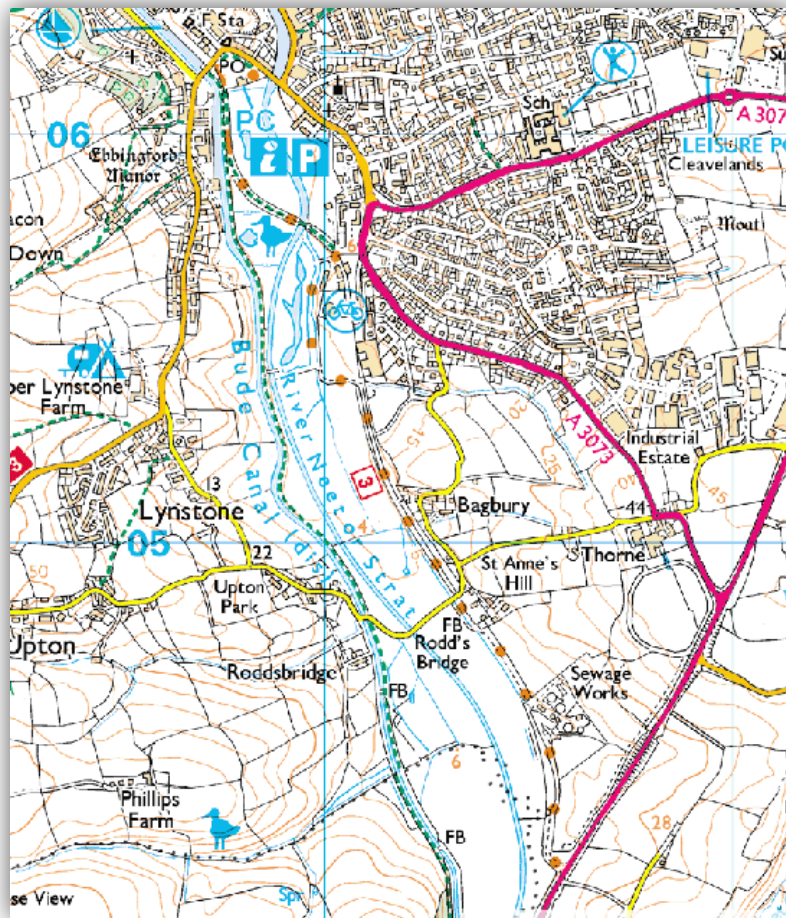
Aim

The aim of the spring 2015 survey was to survey the edges of waterways and ditches, in order to determine if the water voles, that were released throughout the project have reproduced, colonised new areas, and become a stable population. Surveying will include searching along the water body for evidence of water voles, such as burrows, feeding stations, latrines, ball nests and runs.

Survey Site Layout

The River Strat (12.7 miles) and the River Neet (10.5 miles) catchments drain a combined area of approximately 133.5km² (Westcountry Rivers Trust, 2006). The River Strat runs between Stratton and Helebridge, a small fishing pond can be found at the end. The river then flows into the River Neet. The River Strat or Neet is then split at a weir forming Bude Canal and the run off then flows adjacent to the canal with agriculture land in between (Figure 1).

Figure 1: Section of the River Strat / Neet catchment and the Canal



Survey Details

The surveyor that undertook the summer water vole survey was Teagen Hill from the Westland Countryside Stewards, who has been overseeing the water vole project. Volunteers were also conducting the survey. The survey was completed over 5 days; Monday 27th April through to Friday 1st May.

Methodology and Materials

The local catchment was divided into manageable transects, and permission was given by local land owners and organisations in order to access the land.

Transect 1- Bodies of water within Bude Marshes Local Nature Reserve (LNR).

Transect 2- Lower end of the canal from Bencoolen Road and ending at Rodd's Bridge.

Transect 3- Section of the canal, starting at Rodd's bridge and ending at the Underpass, Helebridge.

Transect 4- Closest transect to the mouth of the River Neet or Strat, Bude. Lower end of the river, starting at Bencoolen Bridge and ending at Rodd's Bridge

Transect 5- Section of river upstream from Transect 4, starting at Rodd's Bridge and ending at the Weir/ fish ladder in Marhamchurch.

Transect 6- Starting at the underpass at Helebridge and ending at the top end of the water body/ stock pond at Helebridge.

Transect 7 – Pond adjacent to The Weir Bistro, Marhamchurch.

Transect 8 – Section of river that runs into the canal adjacent to The Weir Bistro.

Transect 9- Lower Cann Orchard, between Marhamchurch and Stratton. A 0.2 km tributary that flows into a section of the River Strat, along with 1.3km of River Strat downstream of the tributary. This will also include the small pond adjacent to the River Strat.

Transect 10 - A section of the River Neet including the Viaduct, between Marhamchurch and Box's Shop.

Transect 11 – Section of river below Langford Hele pond

Transect 12 – Section of stream running into the river below Langford Hele pond

Transect 13 - Langford Hele pond.

Transect 14 -Section of the River Neet at Poundstock, including a stocked fishing pond.

At each transect the surveyors worked together to look through the bank side vegetation and up to the water's edge, searching the habitat for water vole field signs. A water vole survey form was filled out for each site (Appendix 1) with details of the site such habitat type. Field signs were recorded on a map and photographic evidence of field signs were taken. Binoculars were used to view the opposite side of the bank where access was restricted. The survey was completed on foot and the river was accessed where it was safe to do so, in order to get a better view of the banks.

Survey Results

Transect 1

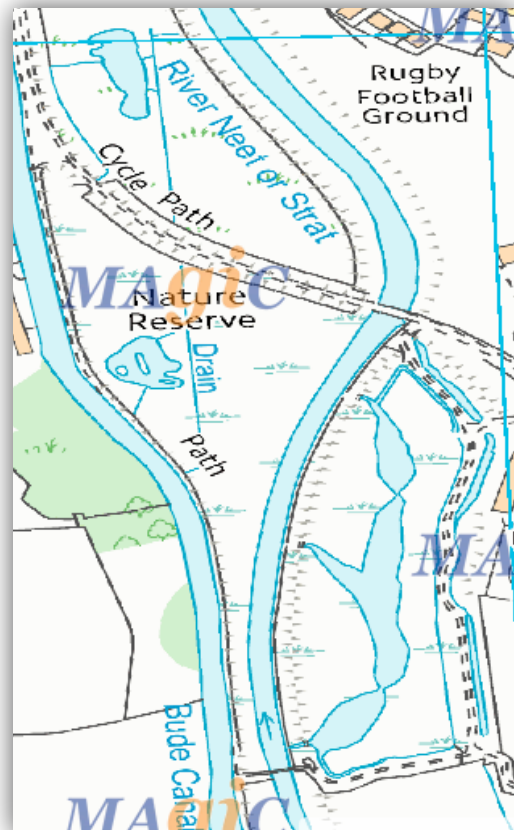
Bude Marshes, Local Nature Reserve (LNR) contains 3 main bodies of water (Figure 2). All bodies of water had a flat/ shallow bank profile ($0 - 45^{\circ}$), however compared to last survey the water level appears to have dropped and therefore some areas showed bank features which are likely to be old water vole runs. The northern water body has a mink raft, and no signs have been seen on this. The island in the middle was not surveyed as it was inaccessible. In this section two individual droppings were found along the small ditch running to the west of the pond area (Figure 2). Three burrows were found on the south east side of the water body (Appendix 2a).

All three water bodies had abundant field vole signs (burrows and latrines) as well as some rat latrines. The water body to the south contained no water vole signs, however the middle pond in front of the bird hide contained one large latrine, 11 burrows and nine feeding signs, including feeding piles, chewed tubas and signs of feeding on the plants which was mainly hemlock water dropwort (*Oenanthe crocata*)

Plate 1: Burrow and feeding signs



Figure 2: Bodies of water within Bude Marshes



Transect 2

Downstream from the wooden bridge the bank was not surveyed due to being unsuitable habitat for water voles because of increased human activity and wooded areas shading the banks. This section, therefore, only covered the wooden bridge to Rodd's Bridge. In this section 30 burrows, 10 feeding signs and a single latrine was found (Appendix 2b). Only the path side of the canal was surveyed, the other side was too overgrown to check with binoculars.

Transect 3

The upper section of the canal between Rodd's Bridge and the underpass at Helebridge contained the most amount of water vole signs. Both sides of the canal were searched, the path side had fewer signs than the other side. Two vole sightings were recorded along this section, along with 156 burrows, 55 feeding signs and 25 latrines (Appendix 2c). The majority of burrows were found between the fish ladder and the underpass (108 burrows) and the majority of feeding signs were found between the fish ladder and Rodd's bridge, which is where the 2 sightings were located; one just downstream of the fish ladder, and a second by the upper loch gate.

Transect 4

Covering the river; Bencoolen Bridge to Rodd's bridge, this was the lowest section surveyed. A large section adjacent to the marshes was not surveyed due to dense vegetation and deep water. The bank profile was mainly steep/ vertical/ undercut and very deep. Otter footprints and spraint were found along this section along with rat droppings. Two burrows were sighted downstream of the wooden bridge. Between the wooden bridge and Rodd's Bridge eight burrows, five feeding signs and 22 latrines were found (Appendix 2d)

Transect 5

This section was surveyed with the use of binoculars and entering the river when it was safe to do so. The earth bank was greater than 2 meters and had tree cover towards the fish ladder. A total of 13 burrows, 22 latrines and five feeding signs were recorded in this stretch (Appendix 2e). As well as this otter prints and spraint was also found. The fields that are adjacent to the fish ladder had four burrows, four latrines and two feeding signs, almost equally split between both banks.

Transect 6

The river that ran between the underpass and the road bridge at Helebridge had a shallow to steep earth bank, the ditch that joins the stock pond with the river had a steep bank which was vegetated with predominantly grass and hemlock water dropwort. The stock pond itself had a steep bank which was, in places, undercut. The river had a total of five latrines and 21 burrows, the ditch had four burrows, and the stock pond had a total of 203 burrows, 11 latrines, 11 feeding signs and a singular sighting (Appendix 2f)

Transect 7

No water vole field signs were found in this transect. A large number of field vole signs were found in this section. Otter signs have also been detected on the mink monitoring raft, from feeding to spraint.

Transect 8

Transect 8 had a steep to vertical/ undercut bank which was greater than two meters in depth and was highly vegetated. Limited access meant that this section was surveyed mainly with the use of binoculars and searching the top of the banks. In this section seven latrines, nine feeding signs and 31 burrows were recorded.

Transect 9

This was the furthest transect upstream of the River Strat. The majority of the bank profile for the stream and the river were steep cliffs and vertical with undercutting. Large stretches of the river were shaded by mature trees. Natural dams from collections of branches and debris create a variety of water depths, from pools to shallow ripples. Very few water vole signs could be seen in this stretch, 12 burrows on the stream and five burrows on the upper stretch of the river. The lower stretch of the river had 15 burrows, three feeding remains and a singular latrine (Appendix 2h).

The pond bank profile was shallow and had a depth of less than 0.5 meters. Around the pond, field vole signs of runs and burrows further back from the water's edge could be seen as well as an otter run leading to the river. One burrow, seven feeding signs and a pat latrine were recorded on the pond (Appendix 2h).

Transect 10

This section of the River Neet had a water vole release summer 2014. Approximately 100 water voles were released along this stretch of river. Before the Viaduct, the river is shaded with mature trees, and a man-made stone bank has been created around the road bridge at the southern section of this transect. The bank profile ranged from flat ($<10^\circ$) to vertical and undercut cliffs. The depth of the river varied from shallow to deep pools. The deeper sections of river were usually directly below the sheer earth cliffs on the tightest meanders. A total of 17 burrows were recorded in this transect, with five feeding signs (Appendix 2i)

Transect 11

Langford Hele is towards the mouth of the river Neet or Strat. The bank profile of the river was mainly vertical and undercut with occasional sections which were steep ($>45^\circ$). The depth of the bank was over 2 meters (m) high and mainly consisted of silt/ earth bare banks with slow flowing water. The only signs found on the river were the footprints of an otter.

Transect 12

The stream runs north-north east into the main river. The bank profile for the stream was mainly steep ($>45^\circ$) with small sections which were undercut. The bank depth was between 1 – 2 meters and was mainly made up of an earth bank with sluggish flowing water. No field signs were recorded in this section.

Transect 13

The body of water at Langford Hele was subject to a release of 75 microchipped voles in summer 2014. The bank profile of the body of water varied from flat to shallow ($<45^\circ$) and was made up of earth banks, and some boggy land. A total of 54 feeding signs and 20 latrines were recorded. Burrows were recorded up until 179, however there are likely to be more.

Transect 14

This transect was located just outside of Poundstock and was the furthest upstream that was surveyed. A large amount of management has been done since the last survey, removing some of the over shading trees. Large sections of the river had vertical bare earth cliffs and lacked vegetation. A total of 15 burrows were recorded along the river, and a singular burrow at the pond. There was also feeding signs on a patch of bluebells.

Discussion

The number of voles released, compared to the number of field signs recorded to date suggests that the water vole population is stable and the project has been successful. Compared to the summer 2014 survey a significant increase in field signs can also be seen. This increase could be due to the removal of the American mink, a change in management from land owners and a less harsh winter. As well as this, banks were easier to access making surveying easier.

Throughout the water vole project, no water voles have been released onto Bude marshes, which was clearly shown in the summer 2014 survey. Bude marshes is not accessible to the public and is managed as a wildlife habitat, which would make perfect habitat for water voles. The closest release to the nature reserve was along the river upstream of the marshes. The southern water body showed no signs of water voles in the survey, however there were once again abundant field vole signs. This is could be due to the habitat being subject to cattle grazing last summer, or more likely, the ground is too wet for burrows. There are cases of ball nests being found, however these are rare, and with the surrounding habitat being better vegetated and better banked it is likely that voles have just used this section to move through.

The water body in front of the bird hide, on the other, had a large number of field signs compared to the last survey, with recent feeding on tubers and hemlock water dropwort and latrines as well as burrowing. This water body has banks which are ideal for burrowing as well as feeding material. It is also not accessible by the public which minimises disturbance. Strimming is carried out on this section however due to the Local Nature Reserve (LNR) classification the management is sympathetic and on a rotational basis. Water voles in this area could also be utilising the reeds and dense vegetation between the water body and the river, which were too dense to survey. Water voles are not designed for water and recently water voles have been discovered living in areas where water is not present. As this area is now being utilised by water voles, management will need to be sympathetic for water voles. The highest conservation value would involve leaving one side of the bank uncut, and the cut side to have a buffer between the bank and the cut land. The larger the buffer the better for the voles as they will still have cover from predators as well

as a food source. If this is not possible, one side of the bank can be completely cut, and the other left uncut. This can however cause heavy predation as burrows are often high up on the bank. Mowing, strimming and weed cutting should not take place during April, May and June, unless health and safety requires the grass to be cut. See Appendix 3 for more details. Mink management is vital for water voles, the raft that is closest to the bird hide will be monitored once a fortnight to ensure that no mink are in the area. So far the raft has shown no signs, and with voles thriving, mink are unlikely to be near, however with the new food source added mink could move into the area.

Some water vole signs were found in the water body to the north. The latrines consisted of a single dropping each and therefore the area is unlikely being utilised by the water voles fully at the moment, however the habitat is suitable for them. There is a chance that water voles are on the island in the middle of the water body, however this was not accessible and vegetated too densely to use binoculars. The mink raft at this location has shown no signs, however it is in an area which is marshier and more shaded and therefore wouldn't pick up water voles. After breeding season there is a chance that water voles will find their way into this area as they are in the water body to the south and there is an easy route between the two.

The canal is showing large numbers of water vole field signs. Transect 2 shows that there has been a significant increase in water vole activity along this stretch. This is likely to be due to the fluctuation in the water levels along the river; the canal offers a stable water level which would be more appealing to the voles. Water voles have been released along the river running adjacent to the canal and could easily have moved across. Less latrines were found in the survey, this is likely to be due to the voles utilising their burrows, and creating latrines within the burrows which is done mainly over winter. The significant increase in feeding signs and burrows along the canal shows that the reintroduction of water voles has been a success; results over future surveys should show an increase in field signs from breeding. Field signs between Rodd's bridge and the fish ladder barely increased on the path side, which is likely due to the increased amount of dog walkers, and dogs entering the water. The signs on the opposite bank, however, increased significantly, as it was walked and surveyed rather than the use of binoculars. With no public access on this bank the voles are left undisturbed, which will allow them to thrive.

The river has increased water vole activity, shown in the field signs surveyed. Once the voles have colonised the canal it is likely that more voles will move into the river. There are historic burrows along the banks which suggests the water voles once thrived in this stretch, and with a bit of time they should do well. Upstream by the weir the field was subject to a hard release of approximately 200 voles in June 2014, which is likely to be the reason for the increased vole signs. The stretch of river immediately after the weir had the fewest signs; trees heavily shade this area which is likely to be the reason for the few vole signs. As well as this, the banks were surveyed using binoculars upstream due to the banks being too steep to access the river. Downstream there are more signs, and these will also expand their territories after breeding, forcing more voles upstream. The large number of latrines shows that the voles are active, which will hopefully result in breeding this year. The river section above the weir adjacent to the Weir Bistro also showed an increase of signs, this is likely to be from the breeding voles last year which have spread from the canal and stock pond.

Helebridge has also shown a significant increase of activity, with a larger quantity of burrows and feeding stations. Prior to the survey two voles had been spotted by the barge workshop and a third spotted on the survey itself. Voles have been thriving here since the beginning of the project and continue to do so. Stable water levels, cover and food are likely to be the main reasons for this population. Although 228 burrows were found, the true number is unknown. The banks were too vegetated on the faces, so the number recorded is representing the burrows at the top of the banks as well as the burrows that could be seen using binoculars in less dense areas. Management of the vegetation beside the path appears to have been completed prior to the survey. The vegetation has been cut up to the edge of the bank, exposing burrows leaving the voles vulnerable to predation. Preferred management of this area would be to have a buffer between the cut area and the edge of the bank to allow some cover. As well as this it is advised that cutting doesn't take place between April and June (inclusive).

Unfortunately no water vole signs were found on the survey of the pond at the Weir Bistro. The pond has little vegetation cover on the main pond which would leave burrows exposed. A large number of field vole signs were located all around the pond, and in the marsh where water voles have previously been released, otter and field vole signs could be seen. Otters

could eat water voles, however it is more likely that the land is unsuitable for burrows. The conditions are similar to those in the southern water body at Bude Marshes.

Although Cann Orchard has been subject to a water vole release signs are still minimal; containing mainly historic signs. The pond was the best site for water vole signs, this is likely to be because of the water stability of the area. As well as this, further downstream on the river a small island held fresh signs. The island was well vegetated and was protected by a meander in the river. Once these water voles start to breed then they should spread into the rest of the river. At the other end of the river, in Helebridge there are signs of water voles. There is a chance that the voles have moved further downstream to better habitat rather than stay at Cann Orchard. Once the water voles along the canal and at Helebridge reproduce then naturally they should spread all the way up the river. There are more signs at Cann Orchard than previous surveys, which suggests that they survived here in small undetectable numbers from the release, or have moved upstream from Helebridge or the canal.

A similar pattern is shown at the viaduct fields. Compared to the number of voles that were released at the viaduct, a disappointing number of field were found, however there was an increase compared to the last survey. Voles are still active along this stretch, however it is likely that they are in small numbers. One possible reason for this could be that the voles have made their way into the pond and lake at Woolstone Manor. For the next survey, it should be looked into that these are also included to see if they have expanded into this area. Another possibility is that the voles have gone downstream. It is unlikely they went upstream as no voles were found in the stretch of river or the stream at Langford Hele. The section of river between Langford Hele and the Viaduct field was briefly looked at but appeared to have no vole signs. This stretch would also be good to survey next time to see if there is expansion in the population of voles.

Even though the river, ditch and stream at Langford Hele showed no signs, the pond showed an abundance of signs. Burrows were counted until 179 when the map became cluttered. The voles on the lake have thrived and only one known case of a deceased water vole has been found. Although no voles were seen, a small splash was heard close to the bank which was thought to be a water vole. As well as this there were field signs on sections of the lake

which were not release areas. When the voles were trapped and scanned there were voles from the release that were on the island, as well as the small section of land which juts into the lake. The island was not surveyed, however the peninsula, which was also not an area which had a release cage was surveyed and showed a large number of signs, which shows the water voles have spread from their original release sites. This year the voles should reproduce and as there are already signs over the entire lake, the voles will have to expand into the ditch, river and potentially the stream. Some minor management such as tree removal may need to be completed to allow the banks of these to vegetate enough to support the vole populations.

As well as the normal tubers and hemlock water dropwort that was eaten at Langford Hele, piles of snail shells and the remains of frogs were also found. It has been known for female water voles to eat these when they are pregnant for the protein value. This suggests that the water voles have started to breed in this area. By the next survey, it would be expected to see water voles in the other water bodies, and with potential trapping and scanning it can be seen if they have bred.

Further up the catchment at Poundstock, there were once again, very few signs. The lack of feeding and latrines suggests that the burrows may have been created when the voles were first released. There were some small feeding signs; an eaten bluebell and an eaten celandine, this would be eaten for protein values, however it cannot be certain that the feeding remains were from a water vole as field voles also eat flowers for protein. There was a burrow on the pond, if voles are on the pond they will now thrive as the pond has been opened up by tree removal, and will now vegetate. Downstream of this transect is Langford Hele, the whole stretch is heavily treed and therefore it may not be ideal habitat for water voles. Surveying the entire stretch would show if the water voles have gone downstream.

No mink have been detected since May 2014. With fortnightly checks of the mink rafts in the catchment it is unlikely that predation from American mink will affect the population in the Bude catchment. There has, however, been an increase in otter signs and sightings which may predate on the water voles, as well as herons along the canal and birds of prey further upstream at Langford Hele.

Overall the water vole population appears to have bounced back after the extreme conditions prior to the last survey. Increased numbers since the summer survey suggests that a large number of voles survived the winter despite the estimated 70% loss. Along the canal public had an interest in the work being done and were keen to talk to us about their sightings. Water voles will breed through to October and therefore with this ideal habitat they will hopefully continue to breed and eventually repopulate all water bodies within the local area without the need of more reintroductions.

Limitations

The survey was undertaken when the vegetation is less dense, compared to the summer survey. By waiting until this time, some of the voles appear to not be as active, and therefore less signs of latrines and feeding were found. In the stock pond the southern bank was only accessible until the barge workshop and from then on binoculars were used from the path on the north side. Both sides were highly vegetated on the bank face and therefore there are likely to be more signs than were recorded. At Langford Hele the map was too small to fit all the signs on and therefore burrows were no longer counted after 179 as no more would fit on the map. To mitigate this, next time a larger map will be used to ensure they can all be marked to show the extent of the water voles.

Conclusion

After the water vole releases on the River Neet and/ or Strat, it is clear to see that the voles have expanded into different areas and have thrived because of it. More field signs is a promising indication that the reintroduction has been successful, and hopefully they will continue to expand their range. Although the results from the summer survey were not promising, the spring survey has shown a more positive result. Follow up surveys in the future should show a pattern of increased activity as the voles breed and continue to thrive.

Acknowledgements

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Appendices

Appendix 1: Water vole survey form

WATER VOLE SURVEY FORM

BACKGROUND INFORMATION
 Site name/river _____
 Site number _____ 10km square _____ Grid ref _____
 County _____ Water Authority _____
 Recorder _____ Date _____

HABITAT INFORMATION (mark features on map)
 Survey distance _____ km

Habitat
☐ Ditch
☐ Dyke
☐ Gravel pit
☐ Pond
☐ Lowland lake
☐ Upland loch
☐ Reservoir
☐ Running water
☐ Marsh/bog
☐ Canal

Shore/bank
☐ Boulders
☐ Sticks
☐ Gravel
☐ Sand
☐ Silt
☐ Earth
☐ Rock cliffs
☐ Earth cliffs
☐ Canalized
☐ Poached
☐ Reinforced (man-made)

Bordering land use
☐ Upland grass
☐ Permanent/temporary grass
☐ Mixed broadleaf woodland
☐ Conifer wood
☐ Peat bog
☐ Arable crop
☐ Salt marsh
☐ Urban/Industrial
☐ Park/garden
☐ Heath
☐ Fen
☐ Cattle/grazing
☐ Bank fenced?

Vegetation (DAFORN)
☐ Bankside trees
☐ Bushes
☐ Herbs
☐ Submerged weed
☐ Reeds/edges
☐ Tall grass
☐ Short grass

Disturbance:

Bank profile
☐ Flat < 10°
☐ Shallow < 45°
☐ Steep > 45°
☐ Vertical/undercut

Depth
☐ < 0.5m
☐ 0.5-1m
☐ 1-2m
☐ > 2m

Width
☐ 5-10m ☐ 1m ☐ 1-2m ☐ 2-5m
☐ 10-20m ☐ 20-40m ☐ > 40m

Current
☐ Slow ☐ Rapid ☐ Fast
☐ Sluggish ☐ Static

WILDLIFE INFORMATION

Water voles
☐ Sightings (count)
☐ Latrines (count)
☐ Burrows (count)
☐ Footprints
☐ Pathway in vegetation
☐ Feeding remains
☐ Cropped grass around tunnel entrance

Flat
☐ Sightings
☐ Droppings
☐ Footprints/runs

Other wildlife
☐ Kingfisher ☐ Heron ☐ Coot ☐ Moorhen
☐ Waterfowl ☐ Dipper

Mink
☐ Sightings
☐ Droppings
☐ Footprints/runs

Identified plants from feeding remains:

SKETCH OF SITE – vole activity indicated (if any)

KEY TO SYMBOLS
 (mark route surveyed and direction of flow)

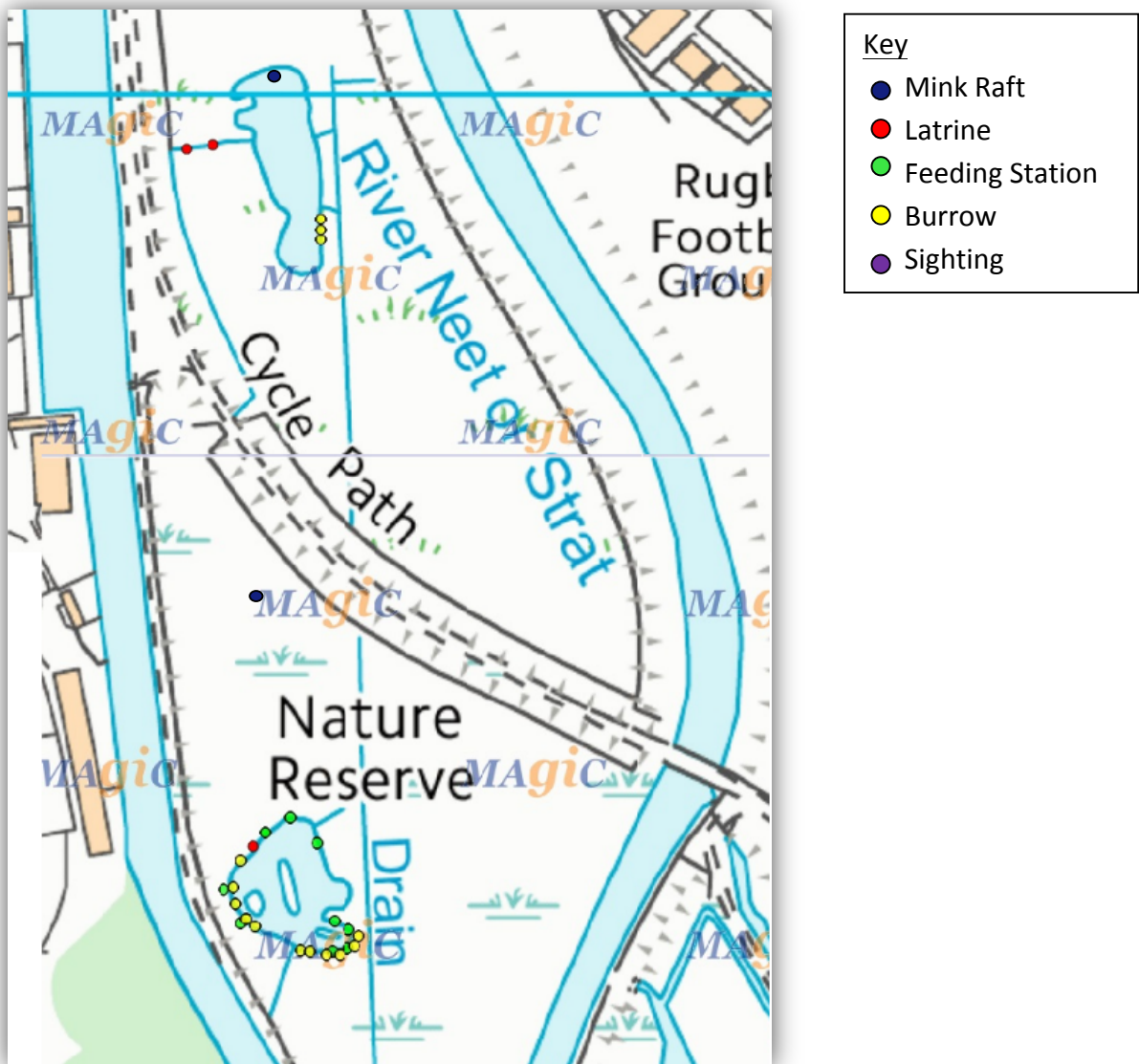
Mature trees	
Over-hanging branches	
Fallen tree	
Exposed roots	
Pollarded tree	
Sapling	
Scrub	
Hedge/row	
Fence	
Reed/hedge bed	
Fluct bank	
Artificial bank	
Earth cliff	

ADJACENT LAND-USE CODES	
Overgrown wood	HW
Conifer plantation	CP
Moorland/ heath	MH
Rough pasture	RP
Wetland	WS
Improved grass	IG
Tilled land (crop)	TL
Suburban/ urban devel. (no green)	US
OTHER FEATURES	
Road/bridge	
Footbridge	
Weir	
Culvert	
Ford	
Outfall	
Dredgings/ spoil	
Silt bars	
Islands	

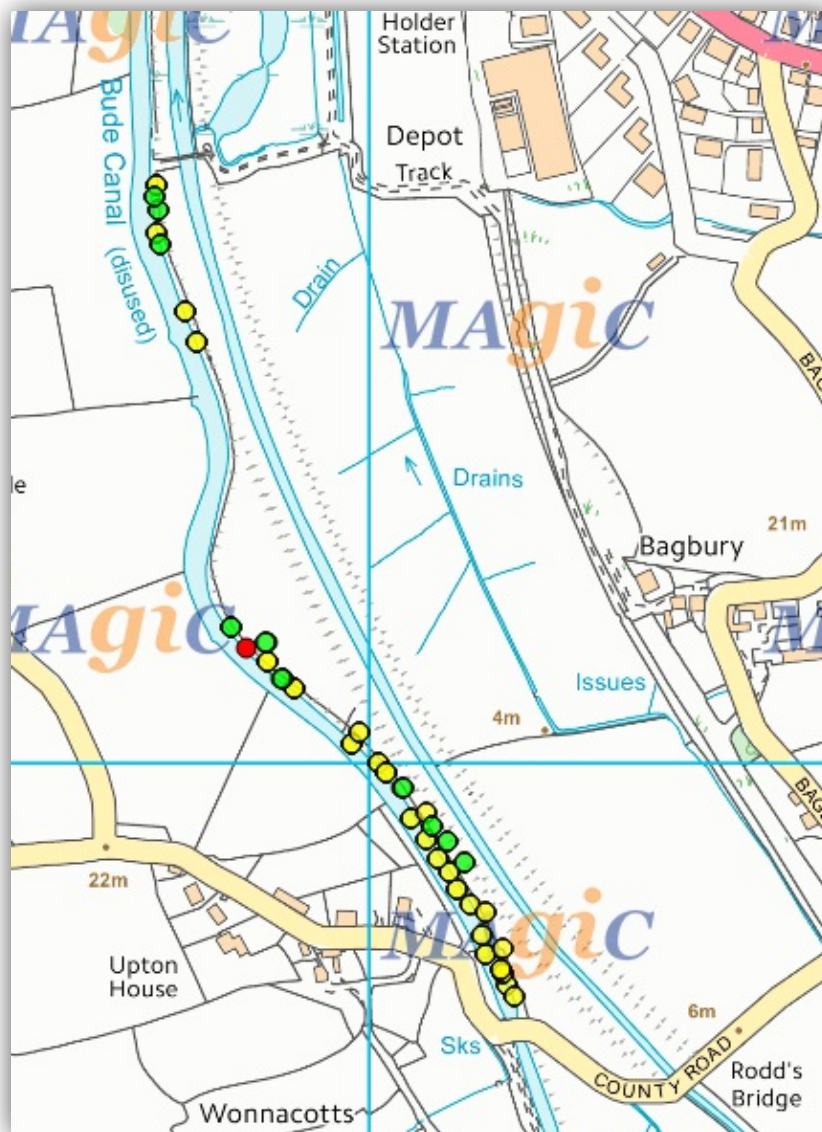
ADDITIONAL COMMENTS:
 water level management
 signs of drying out
 flood debris position
 evidence of pollution

Appendix 2: Results

Appendix 2a: Mapped results for Transect 1 (Magic Interactive Maps, 2015)



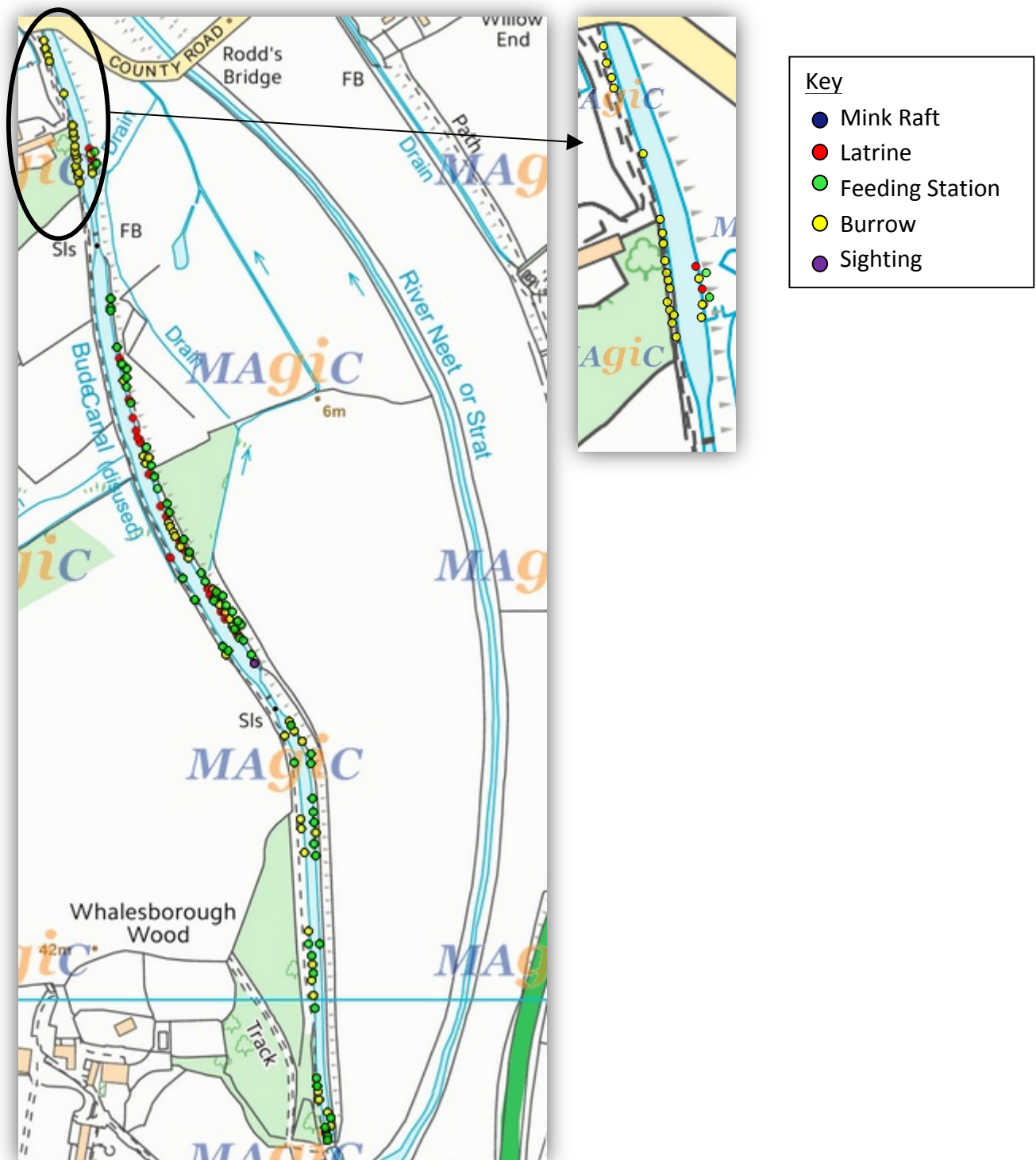
Appendix 2b: Mapped results for Transect 2 (Magic Interactive Maps, 2015)



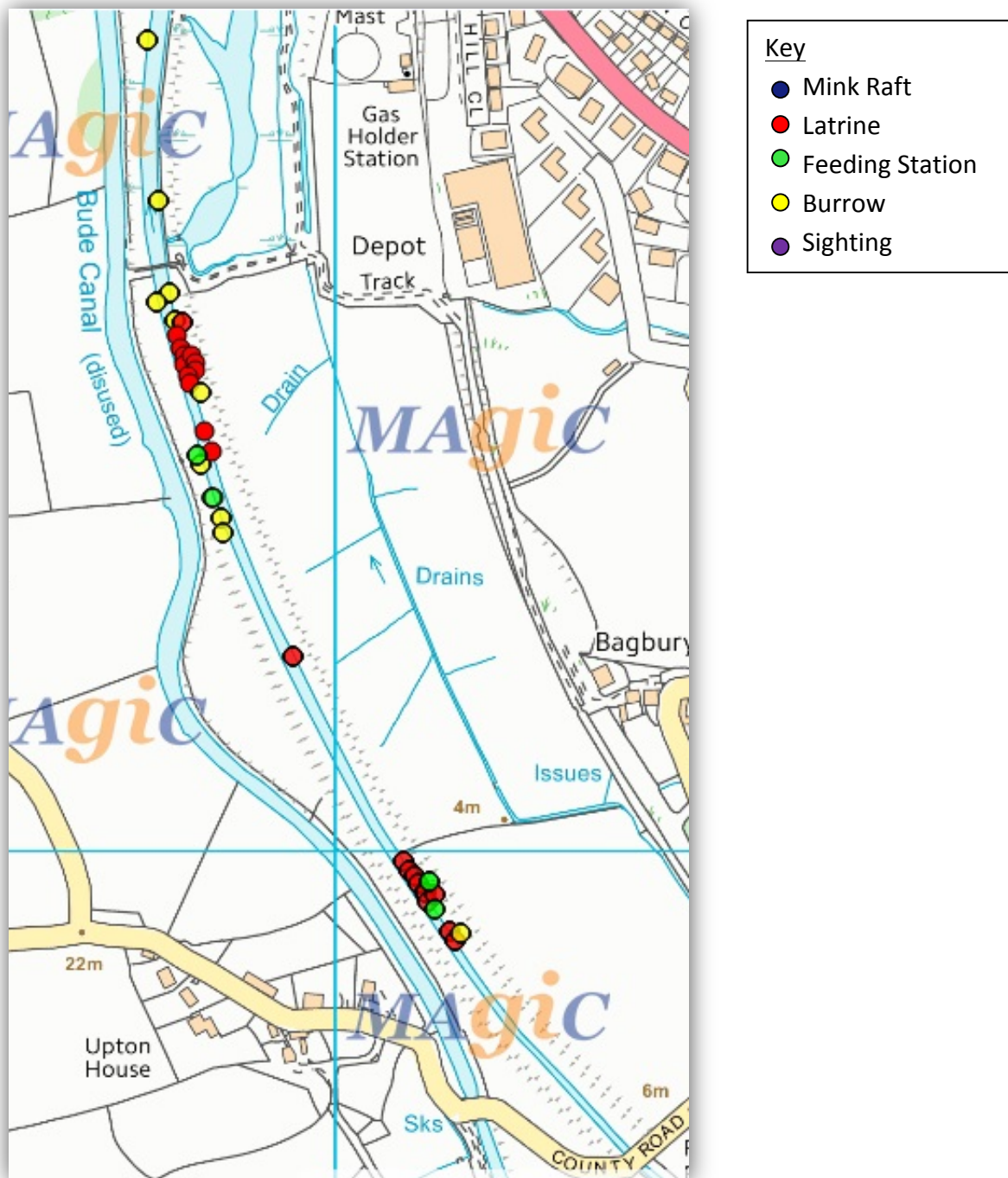
Key

- Mink Raft
- Latrine
- Feeding Station
- Burrow
- Sighting

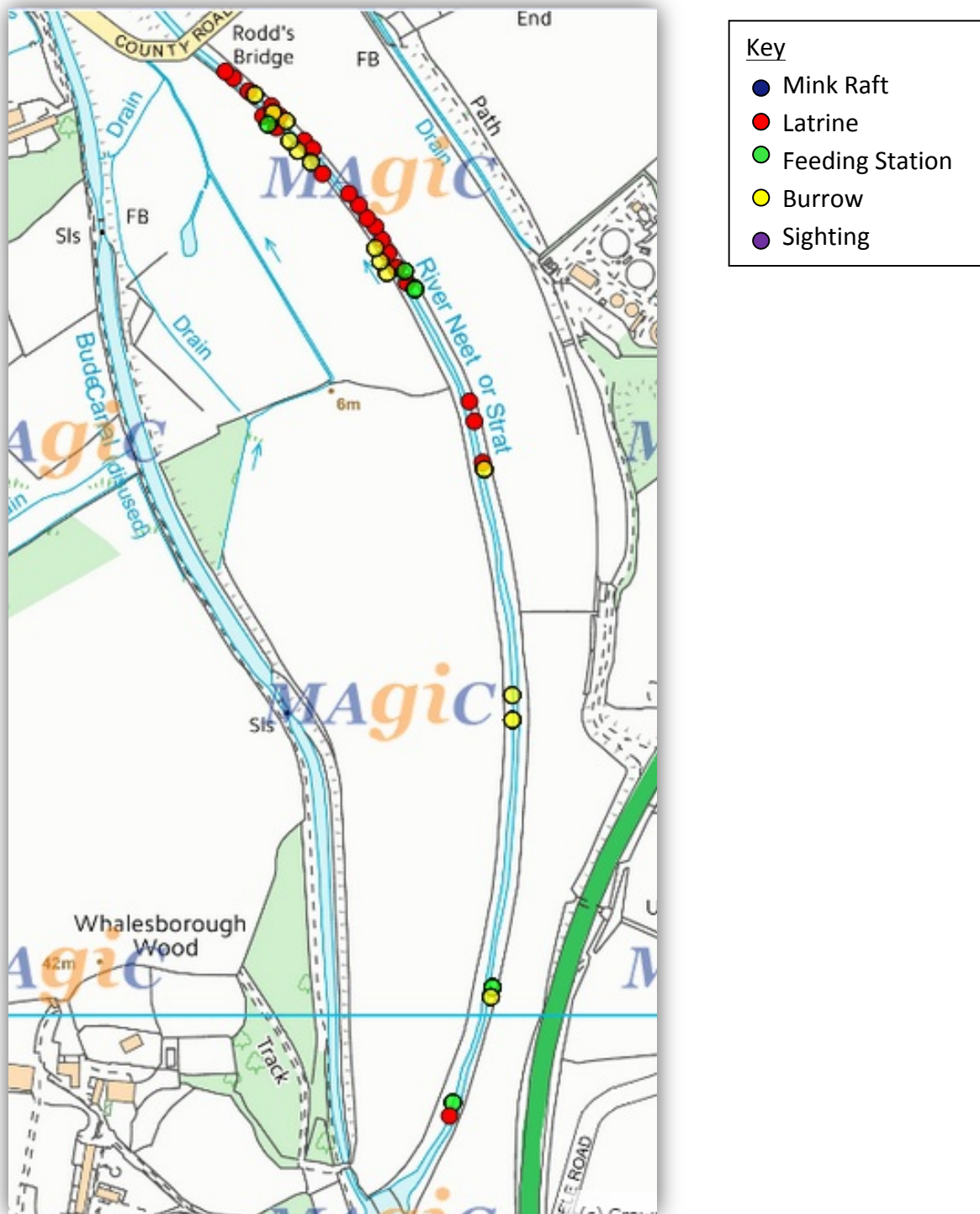
Appendix 2c: Mapped results for Transect 3 (Magic Interactive Maps, 2015)



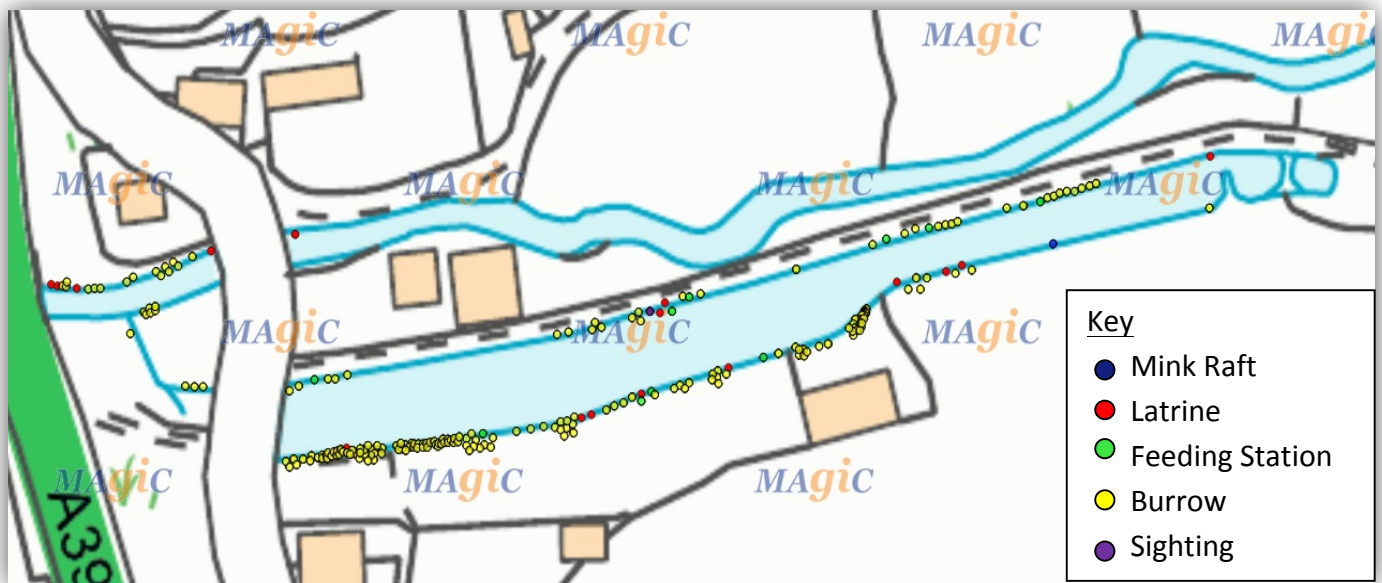
Appendix 2d: Mapped results for Transect 4 (Magic Interactive Maps, 2015)



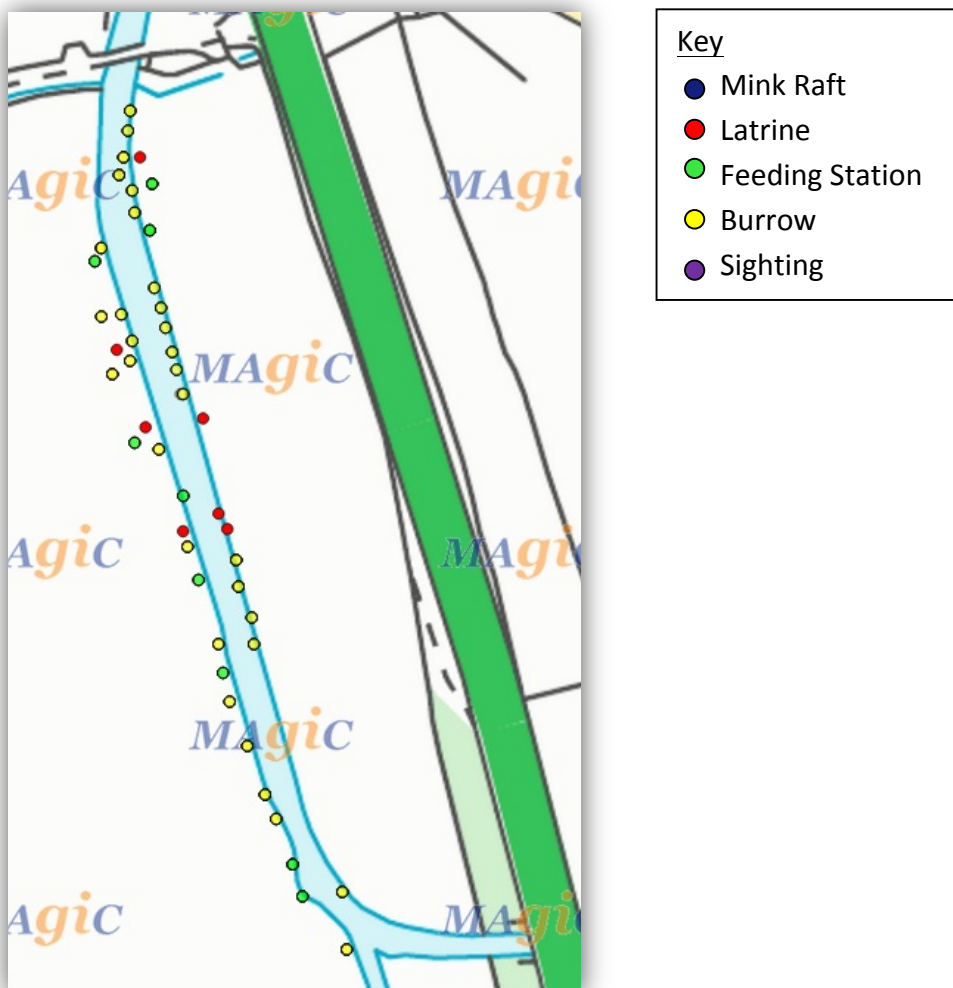
Appendix 2e: Mapped results for Transect 5 (Magic Interactive Maps, 2015)



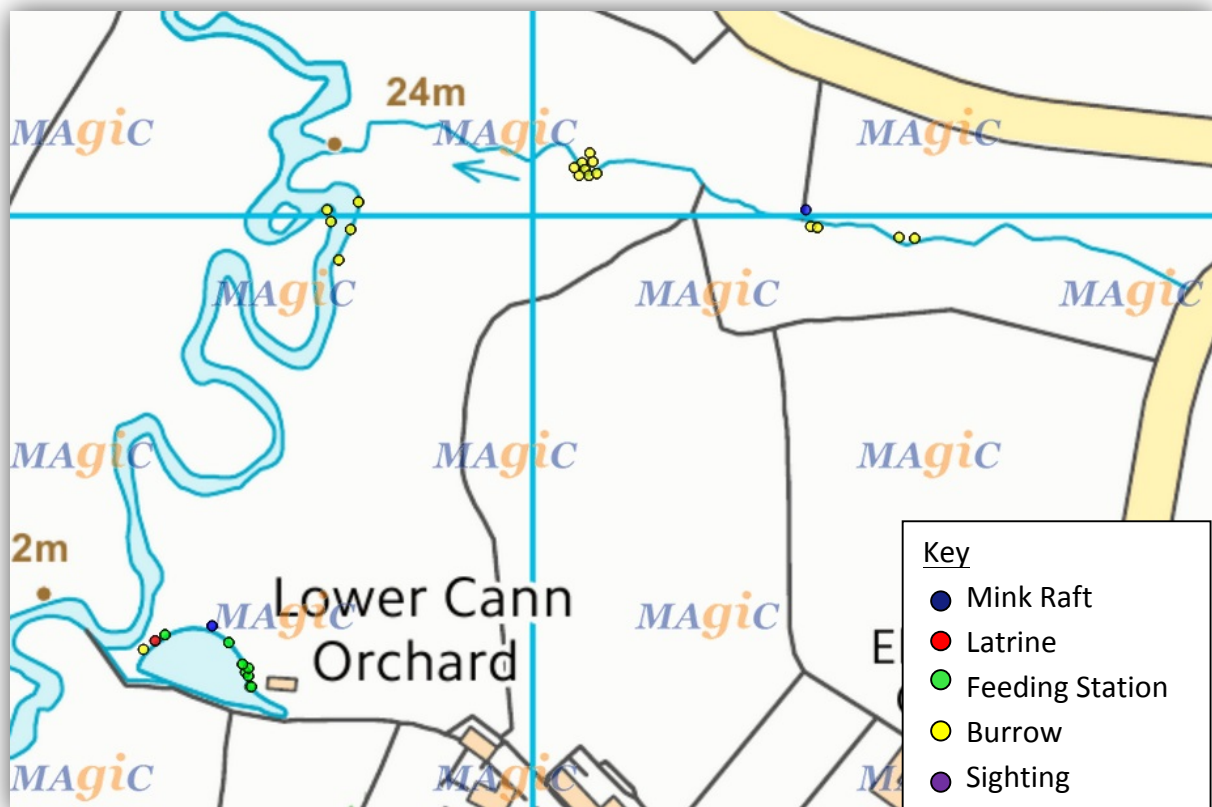
Appendix 2f: Mapped results for Transect 6 (Magic Interactive Maps, 2015)



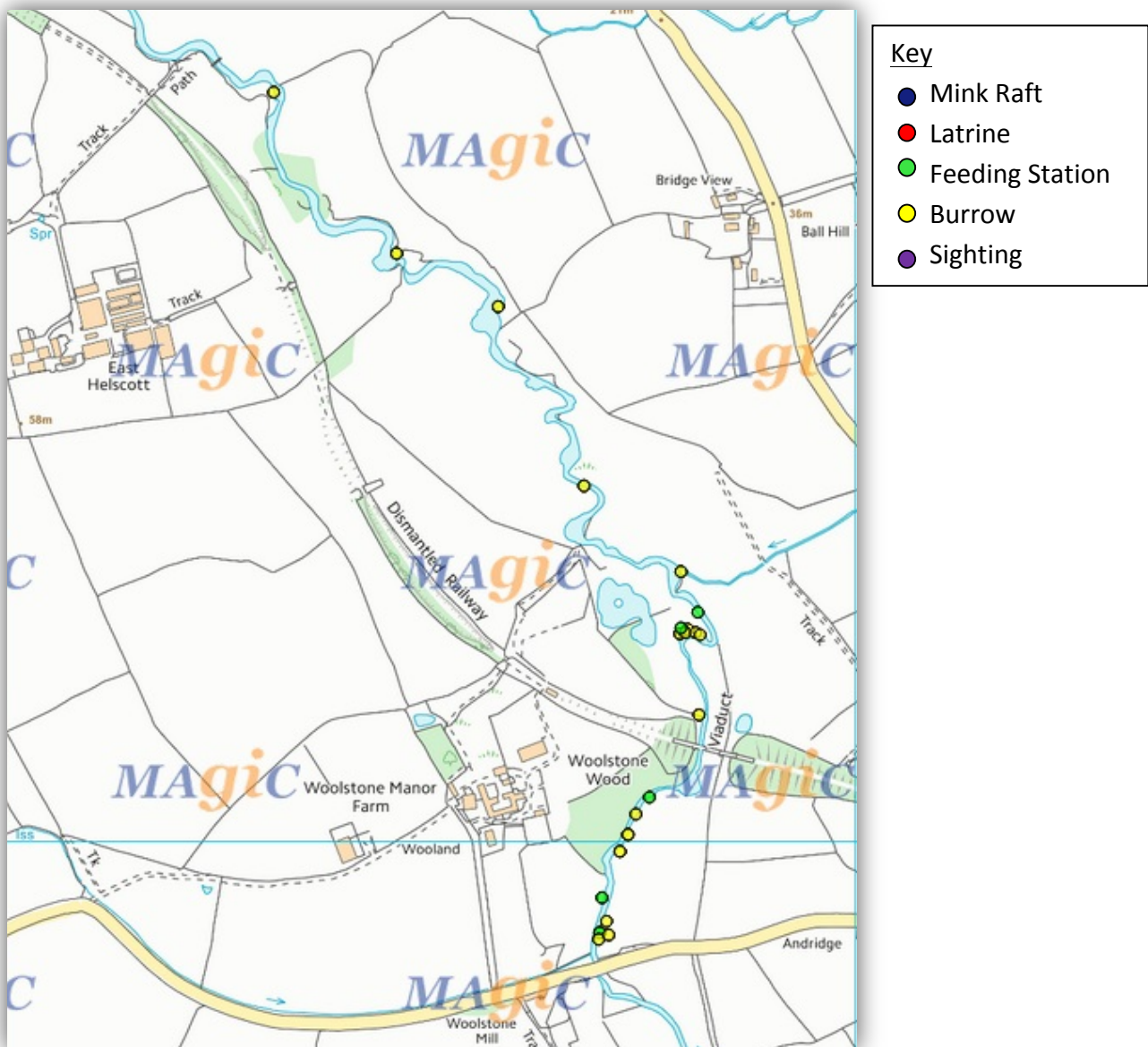
Appendix 2g: Mapped results for Transect 8 (Magic Interactive Maps, 2015)



Appendix 2h: Mapped results for Transect 9 (Magic Interactive Maps, 2015)



Appendix 2i: Mapped results for Transect 10 (Magic Interactive Maps, 2015)



Appendix 2j: Mapped results for Transect 13 (Magic Interactive Maps, 2015)



Appendix 2k: Mapped results for Transect 14 (Magic Interactive Maps, 2015)

