

# **Bude catchment, water vole survey Spring 2014**



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## 1. Introduction:

Following the release of water voles (*Arvicola amphibius*) in the Bude catchment as part of a scheduled large scale whole catchment reintroduction project during 2013, an over wintering survey was conducted by the Derek Gow Consultancy Ltd (DGC) for the project co-ordinators Westland Countryside Stewards (WCS). The survey was undertaken in the spring of 2014 to identify the locations, occupancy and distribution of water voles within both the release locations and also the surrounding habitat. This would inform future release sites locations for the water vole project in the future months. The methodology used for the water vole survey was conducted using field sign searches.

Field signs that are characteristic of water voles are

- D shaped burrows at and above water level. Fresh burrows will have worn runways leading to and from the water/vegetation and can often have feeding remains at the burrow entrance.
- Burrow plugs. Prior to over wintering burrows can be blocked by clumps of woven vegetation, earth and droppings to stopper the entrance.
- Ball nests. Rugby ball sized woven grass nests found in tussock vegetation.
- Territorial 'pat' latrines. These are comprised of distinctive green, blunt tipped droppings which are 'tic tac' size and shape. These will often be patted down and regularly deposited on top.
- Individual droppings. Droppings are not always patted down and can be left in small piles near to feeding stations and along runways.
- Piles of cut vegetation known as feeding stations. These are quite distinct and are identified by the cut vegetation at a 45 degree angle.
- Gnawing on roots and tubers. Signs of gnawing and collections of tubers and root systems can be seen along river banks and in front of burrows.
- Feeding lawns. Burrow network openings which exit at bank top level can have a short cropped lawn where voles pop up and feed around the holes perimeter.
- Tunnels and pathways. Networks of runs throughout the territory underneath the vegetation or along undercut banks.

Transect habitat quality was analysed for its suitability to support water voles based on habitat preferences.

Areas of good quality habitat are categorised by sites with wide swathes of riparian growth with bank side, semi emergent and emergent vegetation. Dense vegetation acts as both food and shelter. Banks with friable penetrable soil are favoured. Slow moving fresh water which is a minimum of 1 metre in depth to aid escape from predators is also preferred. Wetland mosaics which provide a complex of ditch systems, channels and pools provide highly suitable water vole habitats.

Poor habitat is typically banksides which is over shaded by mature trees. This commonly culminates in a bare, limited understory along the river bank. Fast

flowing or shallow water and impenetrable rocky banks are less favoured (Gelling, Moorhouse & Strachan, 2011).

## 2. Aim:

The aim of the 2014 spring survey was to look for field signs of water voles released during the 2013 season – early and late summer - and to assess how well the voles had established and colonised the following areas: Lower Cann Orchard, the River Strat (or Neet) between Helebridge and Bude marshes, and Bude Canal. This report details the findings of the survey.

## 3. Site Layout:

The River Strat runs between Stratton and Helebridge. Near to Helebridge is a council owned fishing lake. As the river runs under the A39 at Helebridge it flows into the tributary of the River Neet. Just after the tributary is a Weir which creates Bude Canal, leaving the run off to continue along the path of the River Strat/Neet. Between the two lies a long stretch of drained agricultural land, which bottle necks and is crossed by a country road known as ‘Rodd’s Bridge.’ (see Figure .1)

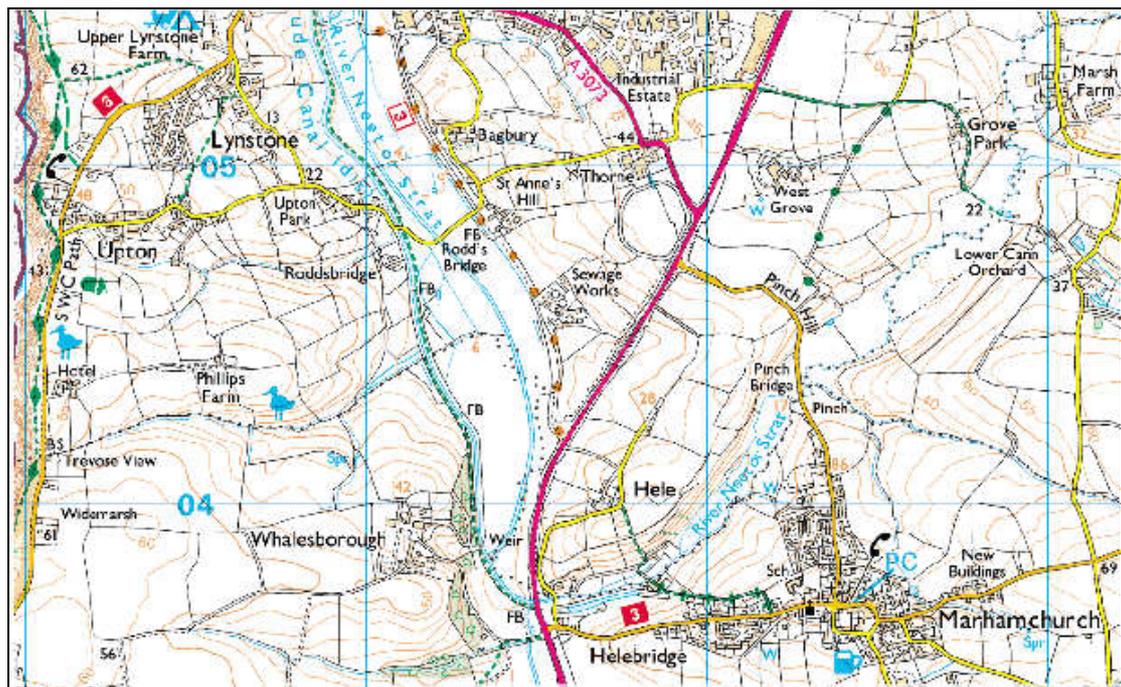
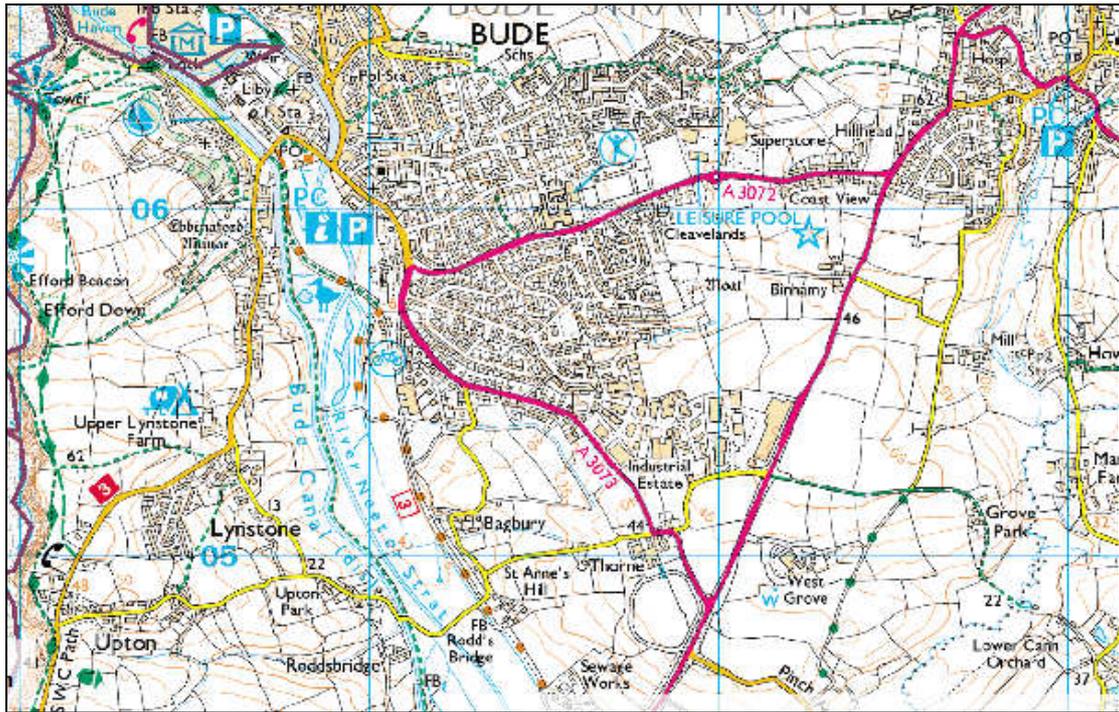


Figure 1 Stretch of catchment from Lower Cann Orchard to Rodd's Bridge



**Figure 2 Stretch of catchment from Rodd's Bridge to Bude Haven**

The river and the canal become separated by a large area of marshland. This area has been designated as a nature reserve and contains various bodies of water. This area of marshland is crossed by the Bencoolen Road and at this point the survey finished due to an artificial embankment, little vegetation and restricted access (see Figure .2). A lack of access permission from different land owners in this part of the catchment meant that it was not possible to survey its entire length.

Lower Cann Orchard is situated north east of Helebridge. The river Neet or Strat runs along the boundary of agricultural land at Lower Cann Orchard and runs down towards Helebridge.

#### **4. Surveyors:**

The ecologists undertaking the water vole survey were Rebecca Northey and Daniella Siddall of the DGC. Both are experienced field ecologists specialising in riparian mammals and have worked for the DGC for 7 and 5 years respectively. The water vole survey was undertaken over 3 days on 29<sup>th</sup> and 30<sup>th</sup> of April and the 1<sup>st</sup> of May 2014. The weather conditions across the three days were ideal for conducting water voles surveys; being lightly over cast (mainly 2/8 cloud cover) and no rain fall prior or during the survey which would wash away field signs. Surveys were conducted by hand along all accessible river banks. As mentioned in the introduction signs looked for were burrows entrance holes, runs, latrines, feeding stations and visual sightings.

## **5. Methodology:**

**On site surveys** – Working with the access granted from land owners the water vole survey was divided into manageable transects.

**Transect 1** - South east of Bude, Lower Cann Orchard was located on the River Strat and was the highest point of the catchment surveyed. The total length of stretch was approx 0.75km long.

**Transect 2** - Helebridge including fishing lake located next to the A39, the southern most part of the survey.

**Transect 3** - The Weir Café which included the stretch of the water course from Helebridge to the canal weir, a recently excavated pond in front of the café, and a small section of the Neet tributary adjacent to the River Strat.

**Transect 4** - The most southerly part of the Bude Canal stretching from the weir to Rodd's Bridge.

**Transect 5** – Canal section heading North of Rodd's Bridge to point of crossing of Bencoolen Road.

**Transect 6** – Section of the River Strat from the weir to the first western field boundary.

**Transect 7** – Section of the River Strat from Rodd's Bridge to the crossing of Bencoolen Road.

**Transect 8** – Bodies of water contained within the Nature Reserve.

On each of the transect surveys the surveyors hand searched the banks of the water course for water vole field signs. The vegetation and predominant habitat type for each transect was recorded. All the promontories along the waters edge were surveyed as these features are commonly used as locations for the territorial spraint sites of riparian mammals. Photos of any visible field signs were recorded and marked on a survey sheet of the site.

## **6. Survey findings:**

### **On-site:**

#### **Transect 1.**

Transect 1 began north on the lands of Lower Cann Orchard with a stream leading into the River Strat, which was the end of the release site conducted in late summer 2013. Along this stretch there were frequent signs of brown rat (*Rattus norvegicus*) and equivocal burrows. As illustrated in Figure 3 the banks consisted of sheer cliffs of earth topped with grassland and tall ruderal herbs. Species recorded included wild

garlic (*Allium ursinum*), Lesser celandine (*Ranunculus ficaria*) and primrose (*primular vulgaris*).



**Figure 3 Typical habitat along Transect 1. Note old burrows**

In the lower section adjacent to the river Strat an abundance of water vole latrines and water vole feeding stations were seen. At the point where the stream met the river there was a feeding station situated right at the top of the bank, approximately 2 meters above the level of the water. The banks here were still sheer earth faces with some semi-emergent vegetation. The bank heads were grassland.

The river itself varied in depth and where possible was accessed so that the promontories along the waters edge could be examined in greater detail. The vegetation remained much the same although the incline of the bank faces differed in relation to the meanders of the river flow.

On the first ox bow of the meandering stretch a water vole burrow and run with a few scattered droppings was identified. On the adjacent ox bow downstream there was another latrine next to the waters edge. Further along equivocal prints were identified which may have been either brown rat or water vole.

Next to the river, below the farm at Lower Cann Orchard was a pond which also made up part of the field boundary. This was inspected as part of the survey and the remains of old burrows were evident. Plant species contained were Frog-Bit (*Hydrocharis morsus-ranae*) and water Hawthorne (*Aponogeton distachyos*). The pond was also bordered by bramble (*Rubus fruticosus*) and rushes (*Juncus sp.*).

Across the field boundary the meanders on the river became much smaller and tighter. On the upper part of this section was an alluvial section of bank inhabited by mature trees. Here on one of the large rocks a spraint was found along with abundant otter prints. Further downstream field signs were identified in the grassy banks leading down to the waters edge, along with a scattering of both water vole and field vole (*Microtus agrestis*) droppings. As the river straightened its course a water vole latrine was found at the waters edge with two burrow entrances. Downstream from this was another entrance hole this time on the top of the bank with an area of cropped, surrounding 'lawn'. After this point no evidence was found to suggest water vole activity.

### **Transect 2.**

Transect 2 was at Helebridge and had two distinct areas; the Fishing Lake and the Strat River from Hele Mill down stream to the tributary point of the River Neet. The fishing lake was intermittently lined with mature trees providing a root system which secured the bank and provided refuge for the water voles. The banks were shallow in accord with the level of the water and were moderately vegetated with a variety of plant species which included bramble, hemlock water dropwort (*Oenanthe crocata*), wild garlic and meadow sweet (*Filipendula Ulmaria*) (see figure 4).

Water Vole activity was dominant throughout the fishing lake with a latrine, feeding station or burrow entrance noted at approximately two metre intervals. (see figure 5 and 6). Two water voles were also seen, one opposite the car park and another was half way up the lake.

The adjacent river had similar vegetation to the fishing lake in the area around the bridge where Hele Road crosses the river. Access to the river was limited and much of it was observed from the bank head using binoculars. The banks were artificially reinforced with old stone block work, which in many places had been washed away revealing the earth behind. It was here that a water vole burrow entrance was observed with attendant feeding signs. Further upstream a water vole latrine was identified half-way up the surveyed section of the river. After this point the tops of the banks were over shaded with little bank side vegetation.



**Figure 4: Vegetation along the banks of the fishing lake.**



**Figure 5: Water vole latrine at the fishing lakes**



**Figure 6: Water vole feeding station at the fishing lake**

### **Transect 3.**

Transect 3 was broken down into three areas. These were the lake at the bottom of the Weir Café, the stretch of river from Helebridge to the weir and a small section of the River Neet tributary.

At the northern end of the lake was a large area of rush. Close to the waters edge there were feeding signs along with water vole droppings. Two large piles of fish scales and bones along with bird legs were also found. These field signs were indicative of the presence of otters. The remaining boundary of the lake had only intermittent sections of rush.

The stretch of water from Helebridge to the weir was noted as having good vegetation for water voles, however the only signs were that of field voles. On the opposite bank were several burrows which looked suitable for water voles, however a field sign survey along here only observed field vole latrines.



**Figure 7 The weir**

The Neet tributary was surveyed from the point where it joins the River Strat (in front of the weir café) and then followed upstream to where it forked and continued under the A39. Access was limited due to heavy bramble along the small section of river Neet which runs adjacent to the weir café car park. A single water vole latrine was found here. Further along the Neet was bordered by pasture. The banks consisted of high earth cliffs over hung by bramble with small areas of semi-emergent vegetation. The tops of the banks were typically grazing land with many Hawthorne (*Crataegus monogyna*) shrubs close to the bank edge. Half way along the surveyed stretch, 3 water vole latrines were noted meters from each other. No other water vole signs were seen.

#### **Transect 4.**

This section of the canal stretching from the weir to Rodd's Bridge had a foot path along one side. The vegetation on this side was limited due to regular up keep and strimming. On the opposite bank there was much denser vegetation and a larger variety of plant growth including comfrey (*Symphytum sp*), water forget-me-not (*Myosotis scorpioides*) and water mint (*Menthe aquatica*).



**Figure 8 Vegetation along southern stretch of canal**

The banks were shallow and in most places approximately 1ft /30cm in height from the level of the water. Water vole feeding stations and burrow entrances were observed slightly north of the weir. Feeding signs and a latrine were also seen adjacent to the centre part of Whalesborough Wood. On the approach and next to the lock were several water vole feeding signs, droppings and a latrine. Below Rodd's Bridge burrow entrances, feeding stations and latrines were all noted. A member of the public that passed by reported two separate sightings of water vole in September 2013 roughly four weeks apart.

#### **Transect 5**

This section of the canal was surveyed from Rodd's Bridge to the crossing point of Bencoolen Road. The foot path continued along the opposite side of the canal after Rodd's Bridge, which was corresponded in the vegetation growth. The vegetation was noted as scrub with species such as bramble and rush. Flag iris (*Iris pseudacorus*) was also present along with hemlock water dropwort. Water vole field signs were observed frequently along the length of the tow path up until the area that connected the tow path to the cycle path. Here the bank opposite the path had well established woodland which afforded little vegetation. Increased human activity; dogs, humans, kayaks and boats became more abundant along the approach to Bencoolen road.



**Figure 9** Vegetation along southern stretch on canal

#### **Transect 6**

This was the section of the River Strat from the weir to the first western field boundary. This survey was conducted from within the shallows of the river using waders. The banks were heavily overgrown and allowed minimal access to the edge with sheer earth cliffs of more than 2 meters high in most places. Vegetation was good with emergent and semi-emergent species with small islands of riparian vegetation located centrally in the river. Evidence from WCS recorded that the water level along this stretch rose dramatically over the winter and in areas went over the banks. Other than a few possible burrow entrances there were no signs of water voles.

#### **Transect 7**

This transect covered the Strat River from Rodd's Bridge to the crossing point of Bencoolen Road. The banks here were bordered by grazing land although there were no access points into the water for the cattle. The banks were lower predominantly no more than a meter in height with some semi emergent vegetation. There was no recorded water vole activity other than an old burrow and further upstream an old water vole run.



**Figure 10 Old water vole run**

**Transect 8** – This covered the bodies of water contained within the Nature Reserve. A characteristic of marshland it offered no banks and was typically tussock and sedge (*Carex sp*) cover with rushes and reeds. The only field signs here belonged to field voles.

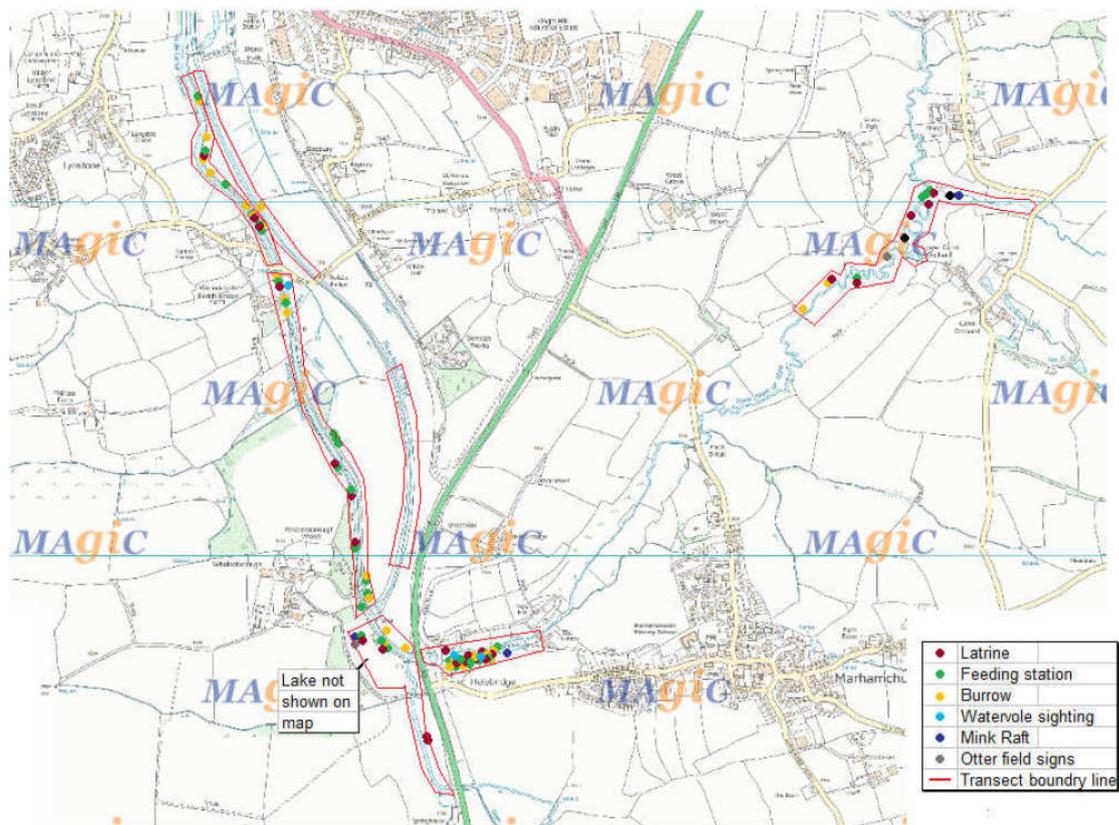
#### **7. Assessment of habitat, presence of survey species and potential for re-colonisation.**

All of the water courses surveyed provided a suitable habitat for water voles. Transect 1 at Lower Cann Orchard although having low levels of water vole activity had many potential feeding sites and provided friable banks for burrowing. A potential threat to water voles present in transect 1 would be a rise in water levels during periods of heavy prolonged rainfall which could be why the population here has dropped significantly from late 2013. Transect 2 was one of the strongholds for the water voles. Activity here at the fishing lake was abundant although vegetation was fairly limited to narrow banks. It would be unlikely that this area could support any more water voles due to the restrictions on space. The Strat adjacent to the fishing lake was over shaded in many areas although 2 latrines were identified. This is downstream from Lower Cann Orchard and provides connectivity for water voles to the lower reaches. Transect 3 the river Neet that runs parallel to the A39 in front of the weir café is occupied by few water voles but is capable of supporting more as the vegetation here is dense with friable banks. Beyond this section the river was followed from a cycle path and the habitat became much more sheltered and shallow with some areas of suitable water vole habitat. Transect 4 from the weir to Rodd's Bridge offers much the same habitat as transect 3 although the vegetation along one side is limited due to the upkeep of the tow path. Transect 5 from Rodd's Bridge to the crossing at Bencoolen road was found to be occupied by water voles and field signs became frequent where vegetation allowed. Transect 6 on the river Strat had no presence of water vole and although vegetation was good it is likely that the fluctuation of the water table has forced water voles to live elsewhere. This would again be the same situation for Transect 7 where the river Strat flowed

alongside the canal and marshes. Transect 8 – the marshes - had a habitat capable of supporting water voles although no evidence was found. There was however an abundance of field vole signs.

Field voles are present throughout transect 1,3,7 and 8. Field voles do co-exist with water voles although they are found in higher densities where water voles are absent (Moorhouse, T personal communication). Brown rat activity was found in the upper reaches of transect 1. While water voles and brown rats can co-exist the latter species is a known predator of both young and adult voles (Gelling et al, 2011 and DGC, personal observation).

A study in the Scottish lowlands by Aberdeen University recorded individual water voles dispersing distances of between 0.3km - 5.2km (Telfer et al, 2003). Although an earlier study (Lambin *et al* 1998) suggested that water voles did not readily re-colonise areas which were greater than 1.1km away from their original site a few individuals did emigrate over distances in excess of 8km. Subsequent studies undertaken by the university have also demonstrated a clear reluctance for closely related individuals to interbreed (Lambin. X. Personal communication). As much of this research is focused on fragmented populations of water voles, widely dispersed through an upland environment, in very low numbers, it is plausible that where water voles exist at higher densities that their potential re-colonisation rates could be also be higher. It is known that single male water voles for example will readily move through significant territorial areas in a day (Eyre.S. Personal communication) and some studies in England of reintroduced populations support this assumption (Reynolds. J. Personal Communication). In view of this it is a reasonable assumption that the water voles from the population at Helebridge could credibly migrate 2000 metres upstream to the available habitats along the river Neet. Likewise the Lower Cann Orchard population relocating upstream approximately 1000 meters along the River Strat, or migrating downstream towards existing water vole populations is achievable.



**Figure 11** Map depicting areas of water vole activity (\*Transect 8 is not featured on this map)

The above map (see figure 11) illustrates water vole activity in the areas surveyed. It is clear that the water voles have colonised across most transects although some areas have minimal activity. The exception to this was 6, 7 & 8 where no water vole activity was recorded.

## 8. Conclusion:

The release areas for the water voles in 2013 were Lower Cann Orchard, the river banks along transect 6 and the banks along the River Neet tributary within Transect 3. Figure 11 depicts the areas occupied by the reintroduced population in spring 2014. Water voles were present in transects 1, 2, 3, 4&5, and of these the most densely populated transects were 2 and 5. No activity was found in transects 6, 7 or 8. The results of the survey have established that the reintroduced water vole population of 2013 has survived overwinter and a limited presence was identified throughout most of the transects. Therefore there is an extant population of water voles throughout the Bude catchment which should continue to expand during the breeding season and utilise the available habitat.

From the survey it is clear that the field sign evidence of water voles does not reflect the number of voles released in an area. This position realistically reflects overwinter mortality due to flooding and predation. It is evident that surviving voles have relocated to other transects and quite probable that they additionally exist in other areas of the river which have to date not been surveyed. The survey was undertaken at a time when the seasonal occupancy of the available riparian habitat would have

reflected the presence of the species at a relatively low time in their seasonal distribution pattern. The survey established that the fishing lake at Helebridge and the northern section of the canal were the areas of greatest water vole activity. No water vole activity was found along the stretch of the river Strat from the weir to the crossing of Bencoolen road despite releases taking place in the upper regions of this stretch.

With regard to future releases it is clear that water level fluctuation has had a significant impact on the areas chosen for colonisation. This factor will be considered when selecting release sites for 2014.

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