

# Water Voles



Wonderful water voles, their life and struggles.



## Water Voles (*Arvicola amphibius*)



- Water voles are the largest member of the vole family and can be confused with brown rats, which are about the same size.
- In England they have a red-brown coat, but in Scotland water voles have a black coat.
- Ears, nose and eyes show some adaptation for swimming and they have 2 types of guard hair.
- No foot webbing.
- Water voles have orange fronted forward facing incisors.

# Ecology

- Population expands rapidly in the summer with females having over 25 babies in a breeding season (April-Sept).
- Survival strategy used to influence the sex of their offspring.
- Early litter female offspring can breed in their first year of birth.
- Captive life-span is greater than wild, at 2.5 years.
- Wild life-expectancy is half that length.
- Water voles are very territorial and mark their boundaries with latrines, which are padded down and reinforced by scent markings.





- The size of the territory will depend on the quality of the habitat.
- Water voles are herbivores but females eat aquatic snails when pregnant or lactating
- Water voles do not hibernate and need good quality and diverse food sources year round.
- Water vole numbers in winter decline by nearly 80% due to starvation and hypothermia.
- They become less territorial in the winter and will share burrows in sibling and family groups.

## Where do they live?



- Burrows are found at the water's edge, usually on a steep bank of 45° or more, above and below water, and up to 6m into the bank. They develop a complex system of burrows with many chambers at different heights in the bank.
- Water voles prefer to burrow in soft earth and use their forward-pointing orange teeth to make tunnels.

# Habitat



- Ideal water vole habitat is slow flowing clean permanent water, where it does not flood for more than a week or so at a time. Ideally at least 3 metres wide and at least a 1 metre deep.
- They are found along the banks of ditches, reedbeds, streams, canals, marshes, ponds and rivers.
- Much more unusually they can be found in arable fields.

# Feeding



- Water voles are herbivores and eat almost any available lush green vegetation - over 227 different species.
- They are very good climbers and will go into trees for buds and clamber up brambles for fruit.
- In winter their diet changes to tree bark and roots.
- They feed sitting on their haunches and cut vegetation to lengths of about 6 -10cm long with a 45° angle cut.
- These feeding stations are one of the clues they leave about their presence.

## Role in the ecosystem



- Water voles play an important function in keeping waterways clear, preventing the domination of single plant species and encouraging biodiversity.
- Water voles spread seeds through their faeces.
- Water voles feed on rhizomes, particularly in the winter, breaking them up and helping their distribution downstream.
- Water voles are an important food for many predators – they are the perfect protein parcel!



# Predators

(most animals eat water voles!)



## **How do you know if water voles are present? Looking for evidence...**



- Need to understand water vole behaviour to be able to survey for them.
- Non-intrusive surveys required, in line with the Wildlife and Countryside Act.
- Water voles leave unique signs of their presence.

# Latrines

- Water voles are very territorial and mark their territories with piles of poo, called latrines.
- Like to put them in prominent positions – stones, planks of wood, litter and ledges.



## Feeding stations

- Water voles store food by chopping it up and leaving it in piles – not small grasses but reeds, whole yellow flag iris plants etc.



## Cut ends

Look out for 45° angle cut ends of vegetation stems.



## Burrows and runs



- Water vole burrows are about the size of a tennis ball – so they are quite big.
- They do not tend to have a pile of loose earth outside.
- Water voles follow runs along the edge of the water near the base of the waterways – under vegetation.

## Other signs



- Bank burrow holes closed-up during winter.
- Bark stripped on trees.
- Above ground nests, like giant harvest mice nests, seen where the ground substrate is not ideal.

## Other signs

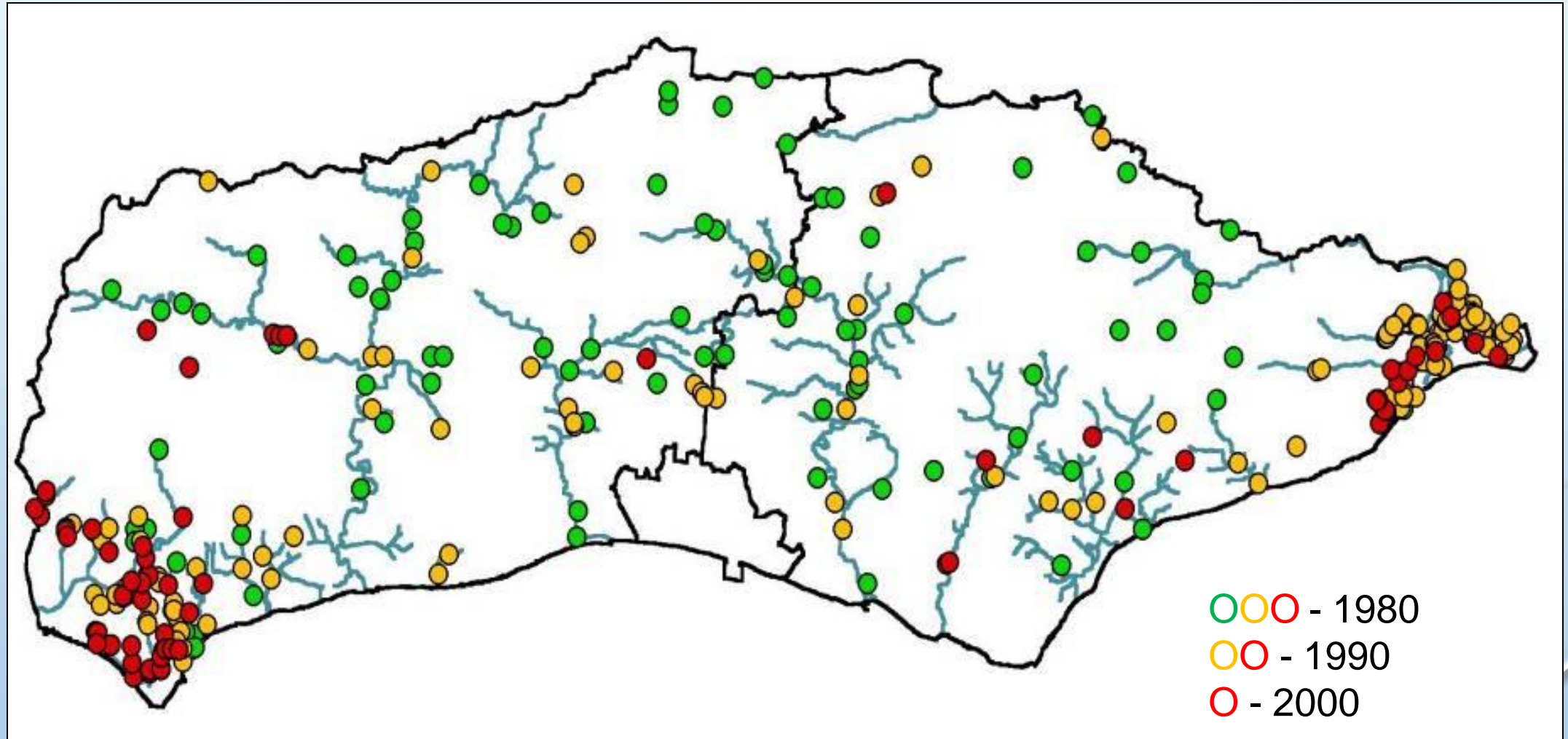
- The classic 'plop noise', when water voles enter the water.

- Footprints.





# Water Vole decline in West Sussex



# **Why are they special?**

## **A Flagship species in national decline**

- National surveys from 1989 – 1998 showed 75% decline.
- In 2006, when MWHG published the Biodiversity Action Plan, the population was approximately 1.2 Million.
- By 2010 population numbers were estimated at 400,000 nationally.
- In 2013 EA announced since 2011 there had been a further 20% decline in water vole numbers.
- 2015, EA announced another 20% decline

## **Survival based on population linkage**

- Water vole population survival is dependent on links between colonies that make up a meta-population.
- Water voles have the ability to re-colonise rapidly, if links to the network are in place, and can recover after a one-off event.
- Meta-populations are critical.
- Groups of colonies exchange individual animals to:
  - Bolster population numbers.
  - Interchange genetic material.
  - Form new populations.
- As gaps between colonies get larger, potential for exchange is reduced.

# Water Voles and the Law

**2008: Gained Full Legal Protection**

## **Section 9, Schedule 5 Wildlife & Countryside Act**

- Illegal to - Kill, injure or take wild water voles
- Intentional or reckless damage, destruction, obstruction or disturbance of habitat
- £5000/6 month imprisonment per offence

**Ignorance is not a defence**

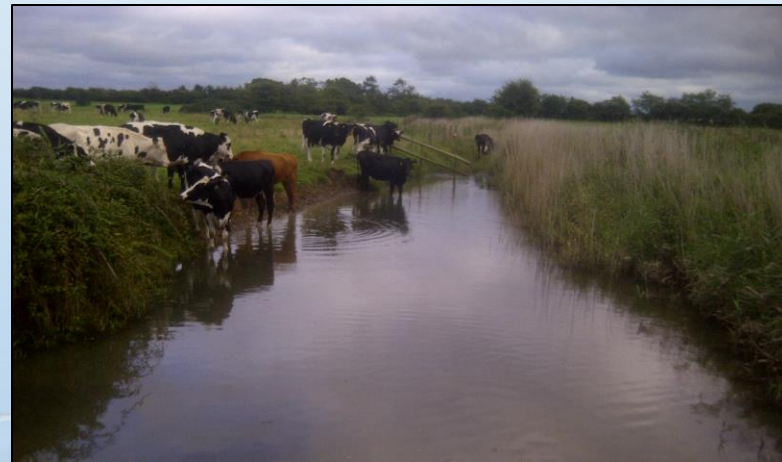


# Why are water vole numbers declining?

Many factors in combination...

1. Habitat Loss – this is a barrier to genetic dispersal, as water voles cannot travel safely without sheltered habitats.

Examples of poor habitats with no vegetation and a farm animal presence (which damages the banks and vegetation).



# Non-native invasive species which harm water vole populations



American mink –  
**direct predation**



Himalayan  
Balsam

**Habitat degradation**

Floating  
Pennywort



Monkey  
flower

## Why the decline?



3. The effect of pollution reducing breeding success
4. Knock on effect of disease / external parasites
5. Accidental poisoning – rat control
6. Inbreeding - require continuous genetic exchange for stability and good health
7. General predation by cats and dogs, accidental destruction, population fragmentation or loss due to human development
8. Lack of legal enforcement
9. Changing climate causing drier weather conditions



## **Why do water vole populations persist on the Manhood Peninsula?**

- A variety of linked habitats that form a network of riparian habitat that totals hundreds of kilometres.
- Drainage ditches are the predominant habitat that allow water voles to move across the area – particularly dispersing young and males looking for females.
- Farm and village ponds are an extremely important resource as they are often stream or water table fed and will remain wet during periods of drought when the ditches have dried up.
- Chichester canal and some of the larger rivers hold populations that we suspect then disperse out and feed the other small colonies.
- Medmerry realignment with 6kms of newly created water vole habitat with ditches joining it to the wider area, and Pagham Harbour Nature Reserve
- Active mink control





**Drainage Ditches**



**Reedbeds**

**Rifes**



**Specialist habitat**



**Canal**



**Village and Farm Ponds**

# MWHG water vole survey sites



## Ongoing research



Hair tubing across multiple sites for DNA analysis

# Ongoing research



Water vole trapping to look at dispersal and territory length.

# Water voles still very much under threat locally



# FLOW Project: Landscape wetland improvement work



# FLOW Project - Recreating natural flood management



- Previously, the European Beaver would remove willow and other trees and water would be held back on flood plains. The water quality would improve, and water vole numbers and biodiversity would surge.
- European Beaver re-introduction programmes active in Scotland, Wales, Devon and Cornwall and soon West Sussex.
- Natural Flood Management a growing area of study.

# What can you do to help?

Record everything!  
Put species records and surveys on iRecord



[www.brc.ac.uk/irecord/](http://www.brc.ac.uk/irecord/)

National Biodiversity Records database



# Volunteers – join in, get work experience, get training, get skills, have fun, and eat cake!



**Learn more at [www.mwhg.org.uk](http://www.mwhg.org.uk)**

