



Waterford Institute of Technology



Title: Otter Diet Workshop - Waterford November 24th, 2012

A study of the spring diet of otters in the Comeragh Mountains, Co. Waterford

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Abstract

The diet of the upland otter in Co. Waterford has not been previously assessed and very little is known about the long-term stability of the upland otter population in the area. This study aimed to investigate the spring diet of the otter in the Comeragh Mountains Special Area of Conservation (SAC) with the help of citizen scientists during a one day workshop that was attended by 20 members of the general public. Frog (*Rana rana*) and salmonid (*Salmo trutta* and *Salmo salar*) were the most commonly consumed items by otters during this period. No marine items were found in the diet suggesting that the otters were resident in the area at this time.

Introduction

The Mammals in a Sustainable Environment Project (MISE) is a partnership between Waterford Institute of Technology, Waterford County Council and the National Biodiversity Data Centre in Ireland and The Vincent Wildlife Trust, Countryside Council for Wales and Snowdonia National Park Authority in Wales. The project is part funded by the European Regional Development Fund under the Ireland-Wales Programme 2007-2013 (INTERREG IVA). The project aims to foster community involvement in mammal conservation in Ireland and Wales through the involvement of the public in mammal surveying and awareness activities.

Over the last two years, the MISE project has engaged volunteers in otter surveys along the North Welsh coastline and rivers along the Waterford coastline that rise in the Comeragh Mountains, Co. Waterford (MacPherson et al. 2011, O'Meara et al. 2011, Harrington et al. 2012, Morris 2012). The spraints have been used for DNA analysis including species identification, sex allocation and individual identification. During the initial Waterford survey in 2011, otter spraints (faecal material) were found in the upland areas of the Comeraghs (Fig. 1). Very little is currently known about the otter in this part of Ireland, and there are no records of otters in the Comeragh Mountains. This led the MISE team to subsequently organise another upland survey covering both the Coumtay and Nire Valley area in spring of this year, when otters might be expected to visit upland areas more frequently due to the presence of spawning frogs.

Earlier this year, Rob Strachan gave an otter diet workshop in Wales, where volunteers examined 37 coastal otter spraints from Waterford that had been collected in October 2011. The results from that study revealed that coastal otters in Waterford were consuming mostly eel (*Anguilla anguilla*), eelpout (*Zoarces viviparus*), stickleback (*Spinachia spinachia*), salmonid (*Salmo* spp.), rockling (*Ciliata* spp.) and bullrout (*Myoxocephalus scorpius*). Small quantities of goby (*Gobius* spp), gadoid species, flatfish spp., pygmy shrew (*Sorex minutus*), wood mouse (*Apodemus sylvaticus*) and frog (*Rana*

temporaria) were also identified (Morris 2012). To help us analyse otter diet in Ireland, Rob Strachan instructed our diet workshop and taught us the skills needed to identify otter fragments. This also allowed us to directly compare the results from the coastal spraints that were analysed in Wales earlier this year.

The aim of this workshop was to (a) introduce Irish MISE volunteers to otter dietary analysis skills, (b) investigate the spring diet of the upland otter population in Co. Waterford and (c) compare the upland otter diet to the lowland, coastal otter diet.

Materials and Methods

($N = 82$) samples were collected in March 2012 from the areas circled in Fig 1. DNA was previously extracted from these samples for on-going genetic analysis work. The spraints were prepared for dietary analysis following the protocol described by Morris (2012) by soaking the spraints in 1/3 water and 2/3 biological washing powder for one week, stirring occasionally. In this study we also added in extra detergent to spraints that were particularly large and contained a lot of dark material. Liquid biological washing powder was found to be a lot easier to use and we think may be more efficient at cleaning the bone material. Samples were washed by tipping the contents of the cup into a 0.5 mm fine mesh sieve, using a plastic cup underneath to catch the solution. The contents of the sieve were then washed further to remove any remaining mucus and dirt from the particles. The spraint particles were then carefully removed from the sieve and placed in a white plastic tray for sorting. Using forceps and needles, any bone fragments were picked out and sorted in a petri dish (Morris 2012). Using a microscope, particles were identified to species.

The number and percentage of species that occurred per spraint was recorded and compiled for analysis. To compare the findings with Morris (2012), the percentage of occurrence of each species was plotted per spraint and secondly the frequency of occurrence per prey item was also calculated by dividing the total occurrence of a particular species by the total occurrence of all prey items by expressing it as the relative frequency of occurrence (RFO%) calculated as

$$\text{RFO \%} = \frac{\text{Number of occurrences of a prey group}}{\text{Sum of occurrences of all prey groups}} \times 100$$

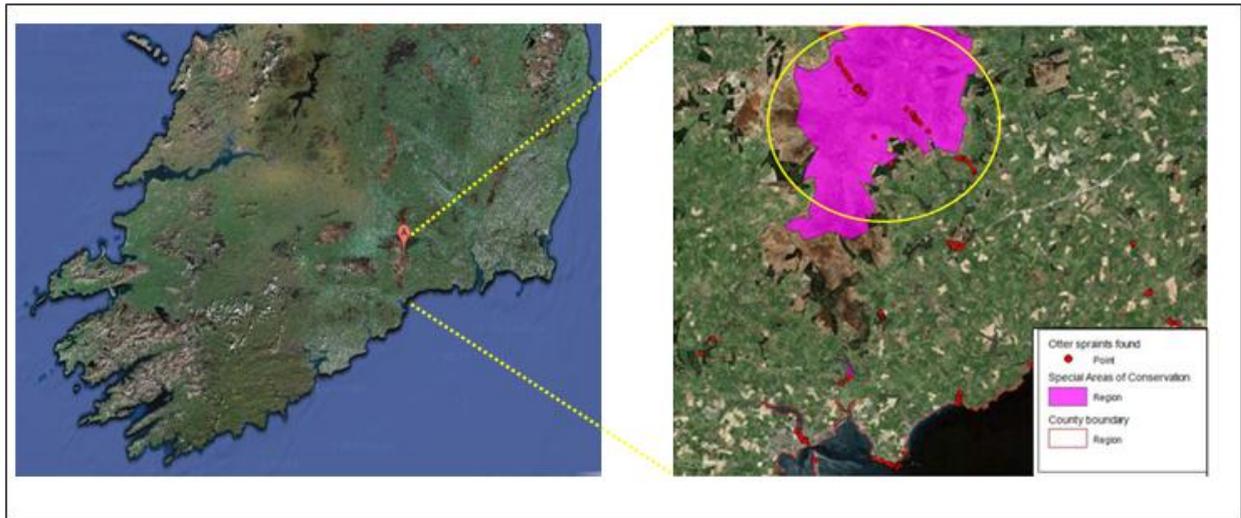


Figure 1: Adapted from Harrington et al. (2012), highlighting the Comeragh upland area and Special Area of Conservation (pink), where samples were collected in March 2012 and used for dietary analysis in this study.

Results

A total of 82 spraints from the Comeragh Mountains were analysed for dietary content by 20 volunteers. The percentage of species per spraint is represented in Fig. 2. The most commonly consumed food item by upland otters in March 2012 was frog, followed by salmonid species (trout and salmon) (Fig. 3). Three spraints also contained frog spawn which was classed as frog for data analysis. The diet of the upland otter consisted of fewer species than the coastal otter (Fig. 4, Morris 2012). There were no marine species found in the upland otter. The most frequently consumed items in the coastal area consisted of eel, eelpout, rockling and salmonid. Less frequent items included bullrout, crab, gadoid, goby, stickleback, flatfish, frog and small mammal (Morris 2012).

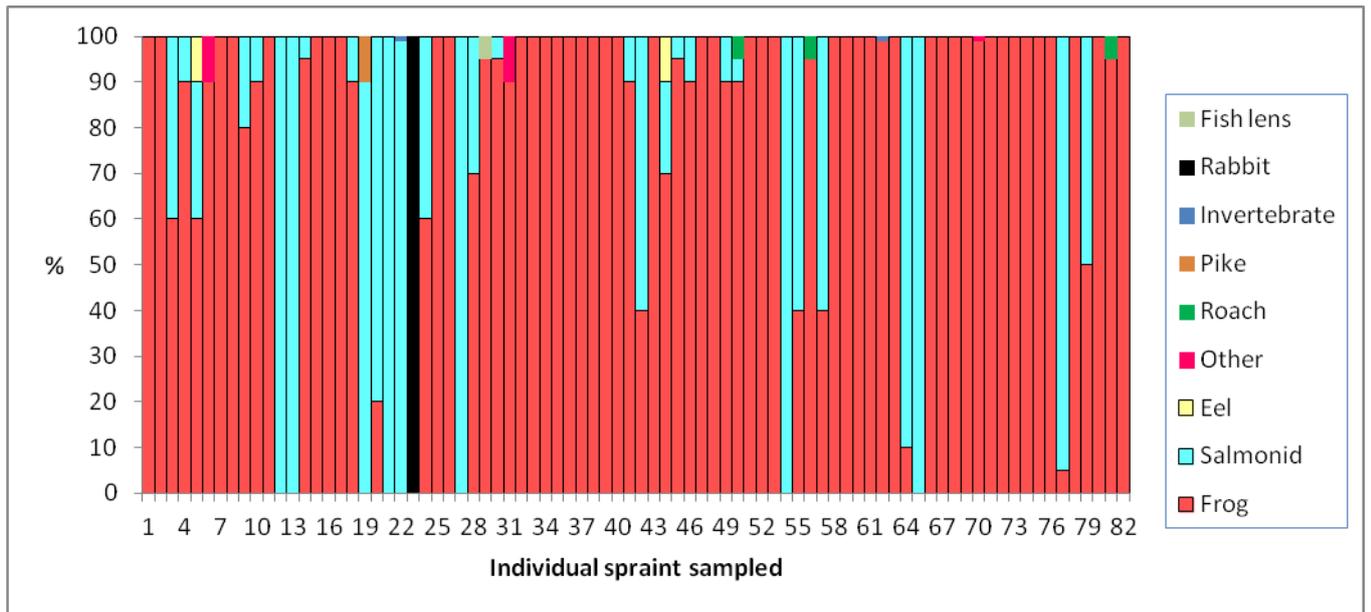


Figure 2. The percentage occurrence of each species per spraint sampled. Each bar represents an individual spraint and with the percentage of species found in that spraint represented by the colour on the right.

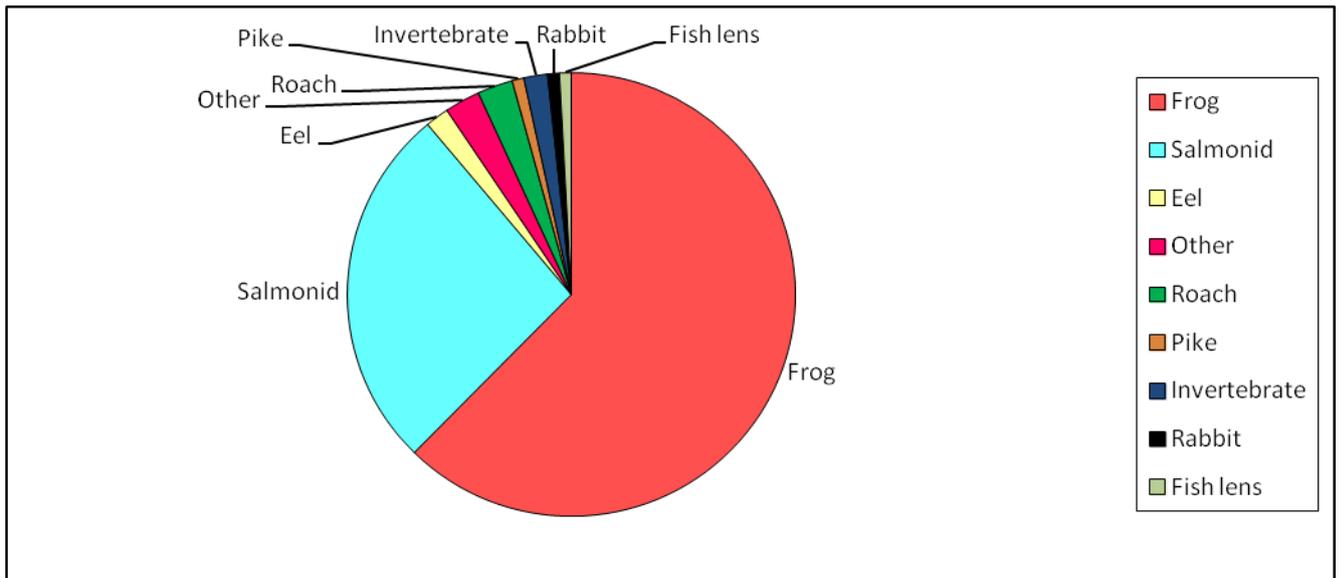


Figure 3. The frequency of occurrence of each prey group in the diet of the upland otter in Co. Waterford (N = 82).

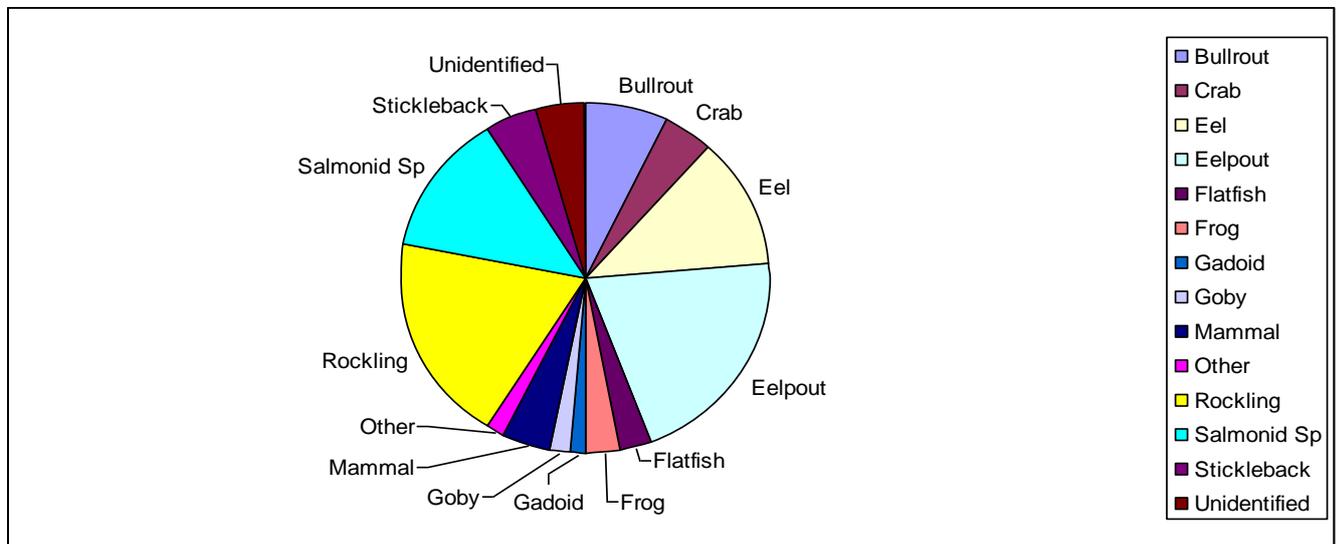


Figure 4. The diet of the coastal otter in Co. Waterford (N = 37), sampled in Wales of this year (Morris 2012).

Discussion

The spring diet of the upland otter in Co. Waterford consists of mostly frog and salmonid. The diet of the coastal otter is more varied and contains more species, especially marine species. There was a low occurrence of eel in the upland sites suggesting that eels are absent or in very low numbers at these locations. Previous dietary analysis of the otter in Northern Ireland revealed that fish (salmonids, stickleback and cyprinids) were the most commonly consumed prey (Preston et al. 2006, 2007). Other common prey items included eel and frog . In the Araglin Valley, on the Cork, Waterford border, south Ireland, salmonids and eels constituted the most favourable prey items (Ottino and Giller 2004). However, in the moorland areas, where the Araglin rises, birds were common components of the diet and frogs became the dominant food item in forests. Ottino and Giller (2004) also noted a lower occurrence of eels in the winter diet of the otter and found that salmonids were common during this period. They suggest that the cold water temperatures reduce the mobility of salmonids, making them easier targets for the otter. Previous studies have shown that frog consumption by otters varies seasonally and is most common in late winter and early spring due to frog spawning (Reid et al. 2013), which is consistent with this study. As mentioned in the results, a number of spraints contained frog spawn, which is likely as a result of the otters predated on breeding frogs (Fairley et al. 1984).

The advantages of engaging with volunteers to conduct this work increased the speed at which these samples were analysed and also allowed volunteers who had previously taken part in otter surveys to conduct further analysis on spraints that they had helped to collect. The skills learned by volunteers will be used for other surveys such as a study that is currently taking place in Cork city with the Cork branch of the Irish Wildlife Trust, who are investigating the diet of the urban otter in the area. In addition, the workshop increased local awareness of the otter's dietary niche in an upland habitat in spring and generated interest in the seasonal and habitat variation of the diet of the otter in Ireland.

Conclusion

The diet of the upland otter did not contain any marine species which suggests that the otters were resident at these upland sites in March and did not need to substitute their diet with marine species at this time. It is possible that otters may be breeding at these locations. Ongoing genetic analysis will reveal the number of individual otters sampled in the upland area during this time. This study has highlighted the importance of the upland habitat for otters and future conservation and management measures for the species should take this into consideration. Future dietary work will

investigate the diet of the upland otter from samples collected last October to investigate how the otter diet varies seasonally and if the diet is substituted by any marine species during this time or if indeed otters are sustaining themselves at these upland sites throughout the year. The notable absence of eels in the upland otter diet may be of concern as eels are nutritionally important for otters and future monitoring of the uplands will continue to assess the diet during other seasons for the presence or absence of eels.

Acknowledgments

We thank Jane Sedgeley for assisting in the identification workshop. We are incredibly grateful to all the volunteers who took part in this workshop and for the great enthusiasm that they exhibited while looking at bone fragments in otter spraints. For photos from the event, see the MISE Facebook page

<http://www.facebook.com/media/set/?set=a.382591845157472.92905.111209228962403&type=3>

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