Waterlife Recovery Trust

NEWSLETTER 6: April 2024

The wonders of science

I am often asked what makes our mink trapping campaign different from the many that have been carried out over the years. There is no one answer. The dedication of our army of volunteers is clearly crucial, as is the role of the coordinators who recruit, advise and support them. The use of remote monitoring devices is transformational in reducing the burden of trap management and improving animal welfare, and our eaux de mink scent lure makes our work more rapid and efficient. Underpinning everything, though, and largely in the background, is the science that guides our strategy. It's what allowed us to design and carry out the Norfolk/Suffolk eradication trial, and to understand why it was successful, and is now guiding both the expansion of our work across the country and plans for the removal of traps from areas which are now free of mink for the first time in living memory.

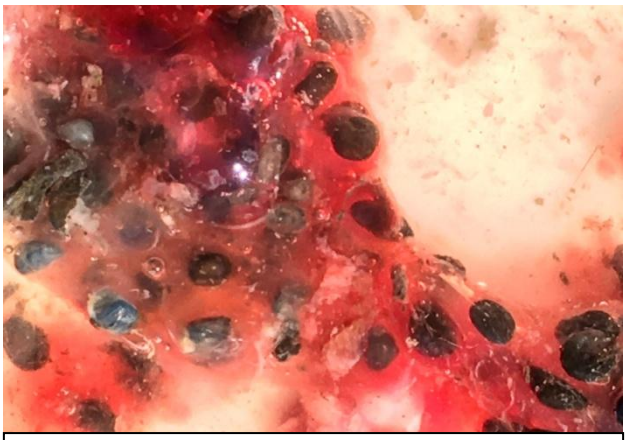
A sheet of canine teeth, four per mink, made ready for an x-ray, which allows us to identify juveniles by measuring the tooth wall thickness. Teeth of adults are sent away to have their age read from lines in the dentine (see below).

A recent influx of new and exciting results is the perfect excuse to highlight the science that we do - science based very largely on the mink that we remove from the British countryside, and which our trappers dedicatedly bag, label and freeze, some no doubt wondering why they are asked to carry out this often distasteful task. I do hope that the insights in this edition of the newsletter go at least some way to reassuring you that your efforts are vitally important, and showing you that every single mink is a unique, invaluable package of knowledge and wonder.

In the early days, when our work was focused on just a few counties, it made sense for our few coordinators to examine and sample the mink captured in their 'patch'. But the scale of our collective operation now - across 21 counties, and accounting for over a hundred mink a month - means that we have to be more efficient and streamlined. Just about all mink now find their way to Cambridgeshire, where Bill Mansfield and I carefully examine, measure, weigh, sex and sample every animal, before sending teeth and tissue to Cambridge University for processing, and hair samples to a collaboration involving Oxford and London Universities. The carcasses are then laid out on grassland, where they are swiftly recycled by a host of mammalian, avian and invertebrate scavengers including, to our surprise, hedgehogs and mice. Nothing is wasted.

More on Lismore and Argyll

I wrote in the last newsletter about a new initiative by local people on Lismore to free their island of mink, and my enthusiasm to find out whether the methodology we use in eastern England could be adapted to work in very different circumstances on the west coast of Scotland. If so, could this small island perhaps act as a catalyst to encourage the removal of mink from adjacent Mull and the nearby mainland? It's clear that the species is abundant across Argyll, but the paucity of roads and the low density of people has meant that trapping is difficult, and has hitherto been patchy and opportunistic, often focussed on limiting damage to precious colonies of seabirds and water voles.



A one-eyed, toothless male mink on Lismore had been feeding on a gravid frog, we discovered!

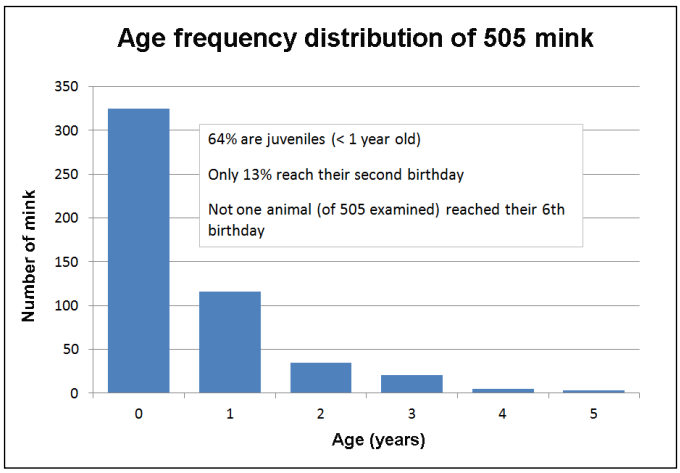
Well, three months on, and thanks mostly to the superhuman efforts of Roger and Gilly Dixon-Spain, we've not only learned that, yes, smart mink trapping works extremely well on the island, but that Lismore mink are unlike any others we've encountered. Not only are (or were) they extremely abundant - a density of more than one per square km, which is unheard of (no wonder the chickens on Lismore were so often attacked) - but they are unususally small and dark. Five mink were caught in one trap over a short period of time on the coast near an offshore island, and my guess was that they may have used the island as a stepping stone from the mainland; that would explain the male bias in the catch, and the crazy numbers being caught. But then Bill and Angela at Cambridge University produced the genetics results, and blew my brilliant theory out of the water. They discovered that the first 15 animals were all highly inbred. The most likely scenario now appears to be that a small number of mink swam to Lismore, reproduced, and then their descendents mated with the only other mink around, which were inevitably close relatives. For some reason (perhaps a plentiful supply of food and minimal trapping), numbers built up to unprecendented levels, escape involved a dangerous sea journey, and the territoriality for which mink are famous must have broken down. It's perhaps not unreasonable to surmise that they know everyone they meet is close kin, and that this reduces aggression.

Roger setting up a trap on land, near to a small stream. This trap alone has caught four Lismore mink since December.

I've now made contact with a number of enterprising trappers and would-be trappers across Argyll, all with the preservation of local native wildlife as their goal, and have been impressed by their enthusiasm to replicate the Lismore success in their own patch of this glorious county. Meanwhile, Roger and Gilly continue to mop up what are now surely the last remnants of the mink on Lismore, and look forward to a productive season with their flock of free-range, organic poultry. Meanwhile, we will continue the sample analysis of their mink, with the aim of undertanding just how a small island could support such a high density of this remarkable predator.

How long do feral mink live?

Eradication of any pest organism, whether it be a mammal, bird, invertebrate, plant or even a virus is unlikely unless first you understand how it 'works' - the field of population dynamics. Among the most important characteristics of a population is how long individuals within it live, yet very little is known about the longevity of feral American mink anywhere in the world. We quickly realised that this was a gap we had to fill, and I've written something about this quest in earlier newsletters. In short, the canine teeth of a mink contain growth rings that can be read in the same way as tree rings.



We've just received a big batch of new tooth readings from the Matson lab in Montana, bringing our total to over 500 mink for which age is known. The picture is now clear (see histogram). Almost two-thirds don't reach their first birthday, and none were older than five years. We had expected that mink in areas with no history of trapping might live to 7 or even 8 years of age, but that doesn't appear to be the case. In all likelihood, the tooth wear we see in older animals eventually reduces their hunting capacity, so they weaken and eventually die. Certainly, many older mink are in poor condition.

This broad picture conceals some interesting insights. Twice as many females (18%) reach their second birthday as do males (only 9%). This may well be at least partly due to the fact that males are easier to catch than females (as shown by the number of each sex caught in their first year of life (194 males, 129 females), which necessarily leaves fewer to grow to old age. All this begs the question as to what the sex ratio is when kits leave the den, and the answer is that no-one knows. In mink farms, the sex ratio in mink litters can vary from slightly male biased to very female biased, so that's not much help. What we do know is that the sex ratio in a feral mink population changes through time if it is subjected to significant trapping effort. In Norfolk, for example, where no mink now remain to our knowledge, early catches were more than 90% male, and ended at just 16% male in 2023, so the sex ratio in a catch is a pretty good indication of how much the population has been reduced by. When you're catching as many females as males, the chances are that you are well on the way to eradicating the population.

Few of this newly-emerged brood of mink will live to their first birthday, and most will not travel far from their mother's territory, as we are now discovering.

...and how far do they move?

We are now at the stage when we have large numbers of animals with good genetic data **writes Prof. Bill Amos**. One thing these data allow us to do is to assign parentage. In most species, genetic parentage is quite easy to assign because most pairs of animals are either unrelated or parent-offspring. Mink are vastly more challenging because of the large numbers of full-siblings we have sampled. Full-siblings are so closely related that they often match each other as parent-offspring pairs. There is also the problem of how to tell

which is the parent and which the offspring. The first problem we overcome by using lots of genetic markers, now around 80, but even this is not perfect. The second problem we can usually solve if we know the age of the animal from its teeth - something we routinely now obtain but which is missing from many mink at the start of the study.

Distance (Km)	Age	Sex	Date of capture	Location	Code no.
		Male	05/08/2021	Geldeston Farm	WRE0202
13		Male	14/03/2020	Oulton	WRE0003
13.7		Female	16/03/2021	Geldeston	WRE0039
1.4	3 - 4 yrs	Female	10/07/2021	Geldeston	WRE0118
0.8	<1 year	Female	25/07/2021	Geldeston	WRE0201
1.6	<1 year	Male	05/08/2021	Geldeston Snipe Marsh	WRE0292
11.5	<1 year	Female	19/08/2021	White House Farm	WRE0229
11.5	<1 year	Female	10/08/2021	White House Farm	WRE0295
11.6	1-2 yrs	Female	21/08/2021	Somerleyton Estate	WRE0293
11.5	<1 year	Female	28/08/2021	Carlton Marshes	WRE0574
11.8	1-2 yrs	Male	2020	Carlton Marshes	WRE1190
12.5	1-2 yrs	Male	2020	Carlton Marshes	WRE1203

To give a flavour of what we are finding, here (left) is an example table. The top line in blue is the animal we are focusing on. Below are all the animals in the dataset that fit genetically as possible parents / offspring. All these mink were captured in or close to the Waveney Valley, either side of the Norfolk/Suffolk border. We don't know the age of the focal individual, but the overwhelming majority of relatives are under 3 years old, so the 3-4 year old female WRE0118 is probably its mother. Five animals were aged <1 year in 2021 and three aged 1-2 years in 2020/21. We need to investigate further, but these may be different litters born in consecutive years. This can be tested by looking to see whether animals of the same age are more closely related to each other than are animals of different ages (I'm just about to do this!). Most importantly, notice how none of these close relatives were caught more than 14km away from where the focal animal was captured. This emphasises how a large proportion of mink seem to hang around quite close to where they were born.

Rolling out mink eradication across North London

Prior to our Thames to Lincolnshire project there were very few mink rafts in London (**writes Emily Wilkinson, WRT Project Officer for North London and Hertfordshire**). The prospect of getting 60 rafts out within the few months we had before the breeding season started felt extremely daunting. But, while I haven't quite reached that target of 60 yet, I can confirm that I am very nearly there.

Emily shows a local volunteer how a smart mink trap works. Almost 60 are now active across North London.

Thanks to the help of our amazing partners in London, I managed to link up with a number of interested volunteer groups, councils, organisations and charities nice and quickly. The close-knit conservation community meant that by the end of almost every conversation I had, I was forwarded the details for another handful of groups and individuals who might be interested in the project. So, I was pretty easily able to get in contact with potential raft hosts across the entirety of London north of the Thames.

Considering how swiftly news of the project spread in London, you might be wondering why I haven't managed to get those 60 rafts out yet. Unfortunately, it has

not been all smooth sailing. With our expansion into such an urban area we have had some novel issues to deal with. The main one being people don't seem too keen on air rifles being lugged around the centre of London. Getting permission from some landowners has slowed our progress slightly, but we have still managed to install rafts across the area in a steady stream. Plus, the publicity surrounding the success of the project seems to have helped push through all that pesky paperwork, with a few 'big players' finally gaining the permission they needed to allow us to launch mink rafts.

Yes, there really are mink in London!

Despite worries of being inundated with rat and squirrel captures, on the whole, the North London rafts have been rather quiet. Mink have been few and far between compared with the rest of the Thames to Lincolnshire project. That being said, every mink caught brings closer the day that our capital will once again be home to iconic water voles - a dream shared by all of the partners working with us on this project. We have a few holes in the raft network to fill (and a bit more paperwork to push through) but I am sure that very soon we will have completed the smart raft network in London north of the Thames.

County trapping roundup

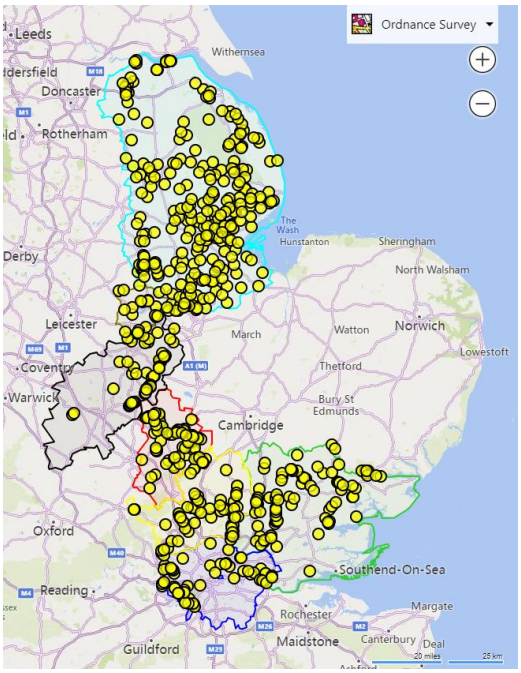
	2021	2022	2023	2024	**Total**
Argyll	0	0	10	18	**28**
Bedfordshire	16	24	107	47	**194**
Berkshire	0	0	3	2	**5**
Buckinghamshire	1	2	12	6	**21**
Cambridgeshire	147	56	27	8	**238**
Cumbria	0	2	31	0	**33**
Derbyshire	0	0	0	6	**6**
Dorset	0	20	6	2	**28**
Durham	0	0	34	0	**34**
East Yorkshire	0	0	1	0	**1**
East Sussex	0	15	18	4	**37**
Essex	8	18	34	23	**83**
Greater London	0	0	2	10	**12**
Hampshire	0	0	1	1	**2**
Hertfordshire	7	2	5	3	**17**
Kent	0	3	42	19	**64**
Leicestershire	0	0	1	6	**7**
Lincolnshire	50	101	167	164	**482**
Norfolk	81	34	7	0	**122**
North Yorkshire	0	0	4	0	**4**
Northamptonshire	1	9	25	22	**57**
Northumberland	0	0	2	0	**2**
Nottinghamshire	0	0	3	25	**28**
Oxfordshire	0	0	7	1	**8**
Rutland	0	0	3	5	**8**
Staffordshire	0	0	0	11	**11**
Suffolk	26	8	4	0	**38**
Surrey	0	0	1	2	**3**
Tyne & Wear	0	0	1	0	**1**
West Sussex	0	3	13	6	**22**
West Yorkshire	0	0	0	11	**11**
Total	**337**	**297**	**571**	**402**	**1607**

The Table gives the number of mink recorded in the WRT Cloud database, by county, since we started trapping in earnest in January 2021, **writes Simon Baker**. With only just over a quarter of 2024 gone, we and partner organisations have already removed more mink than in either of our first two full years. This reflects the expansion of trapping out from the original East Anglian counties into pastures new, which, in the case of Lincolnshire, Bedfordhire and Northamptonshire, clearly have large mink populations that we are in the process of reducing very quickly.

Although we have made a fast start to the year we are about to enter a period when mink become much less susceptible to trapping. Mink captures are typically low from April to late July, when the first of the young start to disperse. Quite why this happens we do not know for certain but it is the same for both sexes. Following the birth of kits around May, dispersal of young starts in earnest in August and this will be reflected in the catch, which rises quickly and then stays relatively high until it climbs to a peak in March which is when most mink will mate. The mating season is also the time when our use of anal gland lure is likely to have its greatest effect.

Although catches are fewer during the spring and early summer it is still important to keep trapping as each mink caught over this period will be fully adult and part of the breeding population. The value was clearly shown when Tony Martin dissected a female caught in this period and found 11 foetuses in the uterus! Even if they had not all made it to full term that would have left a lot of additional mink to catch as the young dispersed, a lot of young for the mother to feed and a lot of hungry young animals hunting prior to capture – all of which would have impacted on local wildlife had the mother not been caught.

Thames to Lincoln (TtL) Project



Delivery of the project has gone exceptionally well **(writes Simon Baker, Chair of the project Steering Committee**) thanks to the hard work of project staff, our partners and volunteers. All 381 smart rafts funded by Natural England are now in the field, along with others provided by partners and other WRT sponsors. The map shows the locations of the 628 smart rafts, from all sources, active in the project counties at 11 April 2024. Since the beginning of the project in Aug 2023, 513 mink have been caught, mostly from counties where little trapping had occurred in the past.

The map also shows the excellent work being carried out by our partners in north Lincs. Mags Haggerty and the Greater Lincolnshire Nature Partnership won a FiPL grant to cover the Lincolnshire Wolds and nearby coastal plain, and this work is functionally managed by WRT. The Environment Agency, Internal Drainage Boards and others have also made vital contributions.

I am pleased to say that we were successful in obtaining a significant increase in our grant from NE to get 27 more smart rafts out in north Lincolnshire to help cover the area not covered by partners. This was in addition to a further 52, also grant aided, to allow us to extend our trapping in the west, along the Great Ouse and Nene. This will reduce immigration from the upper reaches of these rivers downstream into the areas which we have already successfully trapped. Working with our partners the Zoological Society of London, and the Peoples Trust for Endangered Species, we will soon be trapping in London south of the river Thames and therefore we are now able to cover the whole of Greater London.

And finally, with this Newsletter full of graphs, maps and Tables, showing the rapid progress being made in removing American mink from our countryside, it's important not to lose sight of what motivates everyone involved, what brings us the sense of achievement, and that is principally the recovery of native British wildlife so damaged by mink predation. Had each of the mink in the Table on page 5 survived only another 6 months, and killed only 10 prey items a week, their removal would mean that over 400,000 water voles, moorhens, kingfishers, frogs, song thrushes etc avoided becoming a mink meal. Furthermore, as is now abundantly clear, eradicating mink, rather than just controlling their numbers, is the *only* way in which water voles can be given a long term future in this country. Remove the mink, and they come roaring back without other intervention, as is so evident in Norfolk and Suffolk, where the Waterlife Recovery Trust originated and where water voles are reclaiming their waterways for the first time in 70 years. These are exciting times.

With my best wishes,

Tony Martin

Chair of the Waterlife Recovery Trust Board of Trustees