RSPCA Wildlife Centre Protocols: Foxes

RSPCA

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Fox cub

Protocol for the rehabilitation of Red Foxes (*Vulpes vulpes)*.

Contents

Note: highlighted sections of text are areas where further research is required.

1 Introduction

The RSPCA's Wildlife Centres and the Wildlife Department have prepared a series of husbandry protocols for the different species that are admitted to the Wildlife Centres.

The protocols have been produced by amalgamating the working practices from each centre into one document which has then been discussed at a workshop before being agreed by RSPCA staff. Any areas where agreement cannot be reached are then highlighted as areas for future research.

Where possible, an expert (from outside the RSPCA) on the behaviour and ecology of the species in question was invited to attend these workshops so they could offer advice and comment.

These protocols are based on the experience and knowledge of our wildlife centre staff and are supported by research demonstrating their success. They are subject to review and updates will be added as and when required. New protocols will also be added over time.

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2 Species information

2.1 Species or group of species covered by this protocol

Species: RED FOX
Species: Vulpes vulpes
Order: Carnivora Family: Canidae.

2.2 Identification of species covered by this protocol

The fox is probably one of the most commonly seen mammals in the UK. Its distinctive red coat and tail make it easily distinguishable from most dogs and its adaptability to urban environments means that it is now a common sight in most cities and towns in Britain and elsewhere.

It is Britain's only wild canid being found throughout mainland Britain and lacks any specific habitat requirements. The diet is wide ranging, eating invertebrates, small mammals, birds and seasonal fruits. They are social in urban areas, living in family groups, where subordinate animals are tolerated if food supply is plentiful. Less is known about them in rural areas, but they are thought to be more solitary, except during the breeding season. The fox has been intensively studied, especially in Bristol and Oxford and its relationship with man means that research on this species is ongoing.

Adult foxes are very distinctive: long bushy tail (often with white tip); slender muzzle and pricked ears. Coat variable but usually described as yellowish-brown or reddish-brown with white-grey underparts. Feet and backs of the ears are black. Vixens in breeding season often have a pinkish tinge to the white belly fur. N.B. Silver and black foxes are occasionally seen in the wild; these animals are the descendants of animals bred from red foxes for fur.

Fox cubs weigh between 100-130g at birth, and are covered in a dark grey fur that changes to chocolate brown in the first two weeks. Ears and eyes open at 11-14 days. At one month there is red fur on the face and the muzzle becomes white and starts to elongate, along with the development of adult teeth. The ears become pricked and erect. At six weeks the dark fur has faded and is woolly in appearance and at seven to eight weeks a full set of milk teeth would have erupted.

For the purposes of this protocol, fox cubs are split into three groups:
A. Cubs aged less than 12 weeks (pre-weaning), on admission;
B. Cubs aged between 10 and 16 weeks (period of greatest weight gain), on admission;
C. Cubs over 16 weeks of age (independent), on admission.

Aging fox cubs;

Age	Approx weight	Description and notes
Birth	100 – 130 gms	Blind and deaf, dark grey fur, no muzzle, unable to regulate body heat
1 week	150 – 250 gms	Fur changes to chocolate brown, still unable to regulate body heat
2 weeks	250 – 350 gms	Eyes (blue) and ears open. Cubs become mobile, unsteady crawling

3 weeks	350 – 500 gms	
4 weeks	500 – 800 gms	Chocolate fur starts to turn reddish, eyes start to change to amber
5 weeks	800 – 1200 gms	Much more active, muzzle starts to elongate to form typical fox face; milk teeth begin to develop.
6 weeks		Fur red, coat colour now red and woolly in appearance, weaning begins in wild.
8 weeks		Face now fully elongated. Full set of milk teeth
10 weeks		More independent, will explore outside den

2.3 General information on species (or group) as relevant to care in captivity

- **A TAME FOX IS A DEAD FOX –** minimal contact with humans, particularly with cubs.
- Crepuscular/nocturnal in rural areas; more crepuscular and diurnal in urban areas
- Social structure; matriarchal.
- In urban areas - discreet family groups; more solitary in remote rural areas.
- Loose social structure pre juvenile dispersal
- Territorial
- Higher order carnivorous/omnivorous mammal with a variable home range, depending on population density (usually higher in urban areas)
- Semi-fossorial/terrestrial
- High predator/prey response
- Highly agile
- It is always best to check that orphaned cubs are really orphaned. To do this the cubs should be taken back to the found location, left there and observed for some time from a distance.

2.4 Importance of Environmental Enrichment

- Fulfil social physical and mental requirement
- Promote learning in cubs
- Promote physical health of adult
- Provide stimulation for mental health in cubs and adults

3 Pre-admission treatment.

This part of the protocol is to provide information for telephone queries regarding foxes and fox rehabilitation, prior to a fox arriving at an RSPCA Wildlife Centre. There are two possible scenarios:

1. A member of the public is reporting a sick/injured/abandoned fox or cub and wants further information as to what to do. Note that they may have already had the animal for some time;
2. Prior to admission, some animals may be held at a veterinary surgery or other facility. Some, if not all, of these facilities may request information on care of the animal, before they send it to an RSPCA centre.

If possible try and determine if the cubs are really orphaned, or if they can remain on site. A study by Bristol University showed that over 90% of cubs received at centres were not genuine orphans and could survive on site. (Robertson and Harris, 1995a). Even if they have been orphaned, they can still be reared on site (depending on age, condition etc), if the landowner is willing to feed at the den without getting to close to the cubs.

3.1 Where possible, information should be collected on the following:

a) Extent of injuries, evidence of shock
b) Body condition, any previous injuries
c) Age of the animal, if a cub, is it weaned or unweaned
d) Male or female? If the latter, is it lactating?
e) Location animal was found (important to ensure it is returned to the same place if necessary)
f) All records of previous treatment (if from another establishment)
g) Weight where possible (can help to age the animal)

3.2 Advice related to care, e.g. diet, provision of heat etc.

- Ensure similar diet to centre, especially in cubs to avoid enteric problems
- Insist animal is isolated from domestic animals, especially canines. Remember foxes have much better hearing and sense of smell than we do!
- Limit contact in very young weaned cubs
- Husbandry care. Provision of heat for neonates and seclusion for adults

3.3 Advice related to the treatment of particular problems.

- Treatment of mange in the field under Vet supervision.

3.4 Advice regarding the fitness of the animal for transport.

- Provide advice on suitable container for transport, Preferably not wire cat baskets or cardboard pet carrier.
- If injured, Vet has checked condition prior to transfer
- Ensured that none of section 3.3 are applicable

4 Health and Safety

4.1 Introduction

The RSPCA has developed the Wildlife Centre Protocols to provide guidance and advice on the keeping of certain species of wild animal for rehabilitation. Anybody who intends to treat sick, injured and/or orphaned wild animals must accept that there are risks in doing so. Some wild animals are potentially dangerous and may be capable of causing serious injury. Furthermore, all wild animals have the potential to carry parasites, disease and bacterial infections. Some of these may be passed to humans (zoonoses) or to other animals, either domestic or wild. Barrier nursing methods should be used to minimise the spread of these infections between animals.

4.2 Risk assessments

It is recommended that any establishment admitting foxes should complete risk assessments for all areas.

This is a brief summary of some of the possible risks and suggested ways to reduce the effects.

It should be remembered at all times that wild foxes can be aggressive and unpredictable, and therefore extreme caution should be taken when dealing with foxes in any capacity.

Members of public are advised not to approach foxes and to keep dogs etc away.

Foxes can inflict a nasty bite with possibility of severe infection. Medical advice should be sought if bitten.

Table 2: Potential hazards and measures that can be taken to reduce the risk from these hazards.

Hazards	Control measures	Level of risk
Bites and scratches	Gloves and graspers to be used when restraining Crush cages used to administer anaesthetic	Low
Diseases (zoonoses)	Gloves should be worn when handling Treatment areas must be cleaned thoroughly after examination	Low
Parasites (mange, ringworm, ticks)	Gloves should be worn when handling	Low

5 Decision making – to treat or not to treat

5.1 Information should be collected on the following when admitting the animal:

a) Extent of injuries, evidence of shock
b) Body condition, any previous injuries
c) Male or female? If the latter, is it lactating?
d) Location animal was found (important to ensure it is returned to the same place, within 24-48 hours of admission)
e) All records of previous treatment (if from another establishment)
f) Weight

5.2 Triage – to treat or not to treat.

Options for the animal are: euthanasia, treatment or immediate return to the wild.
The considerations listed below will help to guide this decision.

5.2.1 Assessment relevant to the condition of the animal

Euthanase if any of the following are apparent on initial examination:

- Unweaned fox cubs are difficult to rear due to problems with imprinting. Unweaned cubs should be dealt with on a case by case basis, depending on the resources available. This includes members of staff who are experienced at rearing this species from an early age.
- In 'extremis' (dying at that moment)
- Old compound fractures
- Fractures at a joint
- Loss of a limb or an eye
- Fractured skull
- Obvious fractured spine
- Exposed viscera
- Any obvious diagnosable disease, e.g. Lepto.
- Mange with more than 20% body coverage in winter or 30% in summer.
- Any problem that requires more than four to six weeks veterinary treatment.
- For cubs less than 6 - 8 weeks old, any problem that requires more than two weeks in isolation during veterinary treatment.
- Adults and cubs in group C, where there is no information as to where the animal came from.

Immediate Release

- Should there be a possibility that the cubs can be returned to the parents, this should be done within 24 hours.
- Misadventure / trapped juveniles and/or adults with no significant injuries

5.2.2 Assessment relevant to the centre and the management of the animals

- Any other cubs in care to crèche with
- Space available for injured adults and orphaned cubs now
- Release site availability for cubs
- Possibility of cub transfer to other centres
- Location where the animal was found. Foxes are territorial and need to be returned to the correct area. If this is not possible, euthanasia will be the best option.

5.3 Treatment on admission (see flowchart).

- If the animal is to proceed to treatment then fluid therapy may be required.

5.3.1 If any of the following apparent proceed to vet exam:

- Puncture or scratch wounds.
- Any fracture, swelling or bruising.
- Emaciated
- Collapsed
- In shock
- Very Weak

5.3.2 If none of the above:

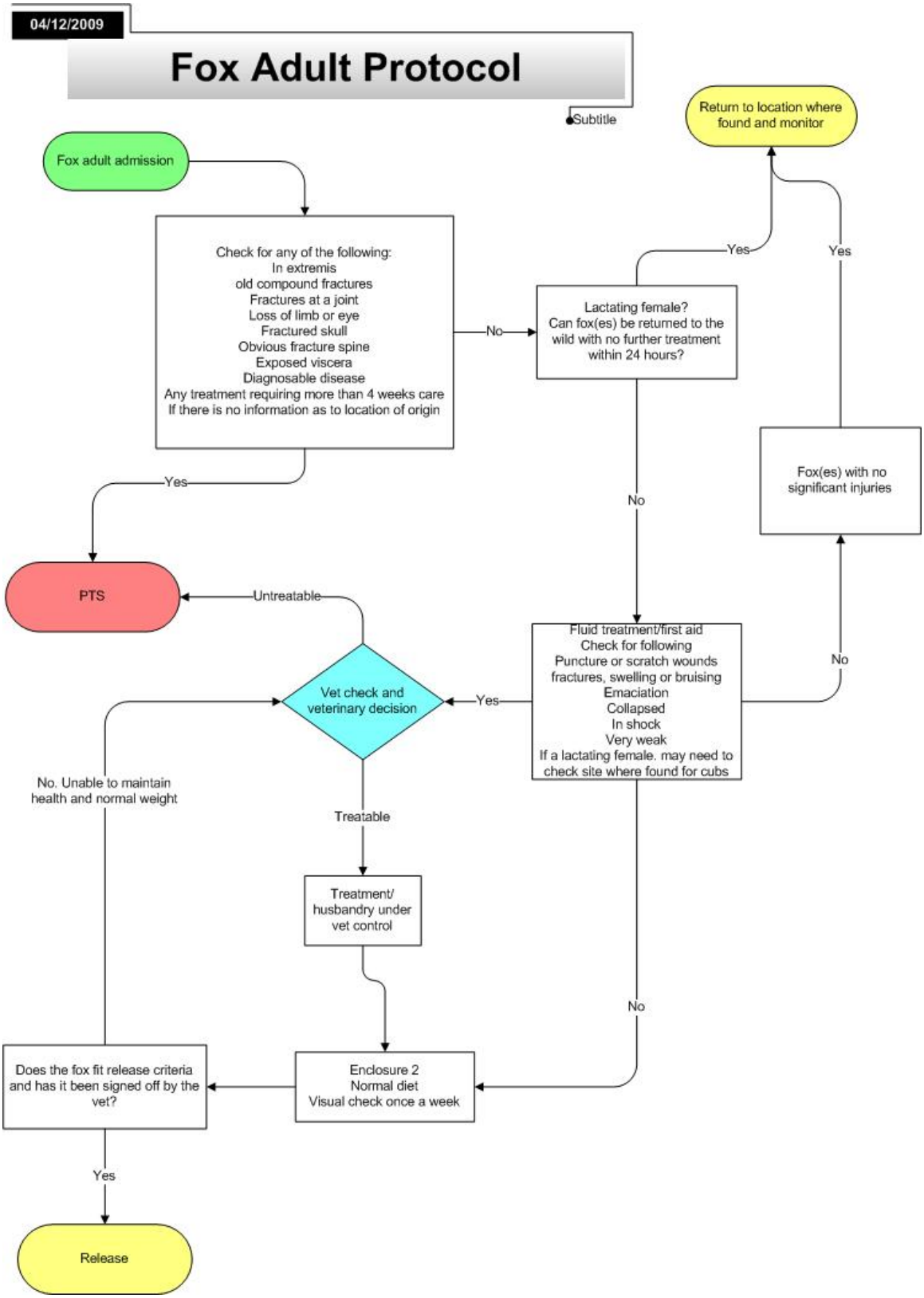
Adults: Move to enclosure 2 and keep in isolation during treatment. Foxes should be ID chipped before release.
Monitor behaviour whilst in care. If found to be not acclimatising to captivity, then euthanase. Mallydams Wood has CCTV footage of a fox with a fractured pelvis displaying unsettling behaviour due to an inability to adjust to captivity.

Cub Group A: move to stage enclosure 1 and keep in isolation for a period of 3 – 7 days. Small cubs can become imprinted easily; water spray bottle should be used to reduce effects. After this period of isolation, cubs should be mixed with other cubs of similar size (age) and should be ID chipped before mixing and moved to Indoor 2 enclosure.
All cubs over the 2weeks old can be wormed after consultation with your vet (1ml per Kg or per 100g), repeat two weeks later. This can be repeated again 2 weeks later to tackle heavy worm burdens.
Cubs from urban areas can be mixed with cubs from rural areas.
Fox cubs admitted as individuals should be mixed to make up a group of about five and then monitored. Do this on neutral ground. Total of about 4-5 in a group.
Individual food bowls are required to minimise fighting
Keep family groups (siblings) together. The group should stay together throughout the whole rehabilitation process, while in care in the centre and then at the release site.
Where possible, do not add single fox cubs to existing groups.
Weigh every 2 weeks.

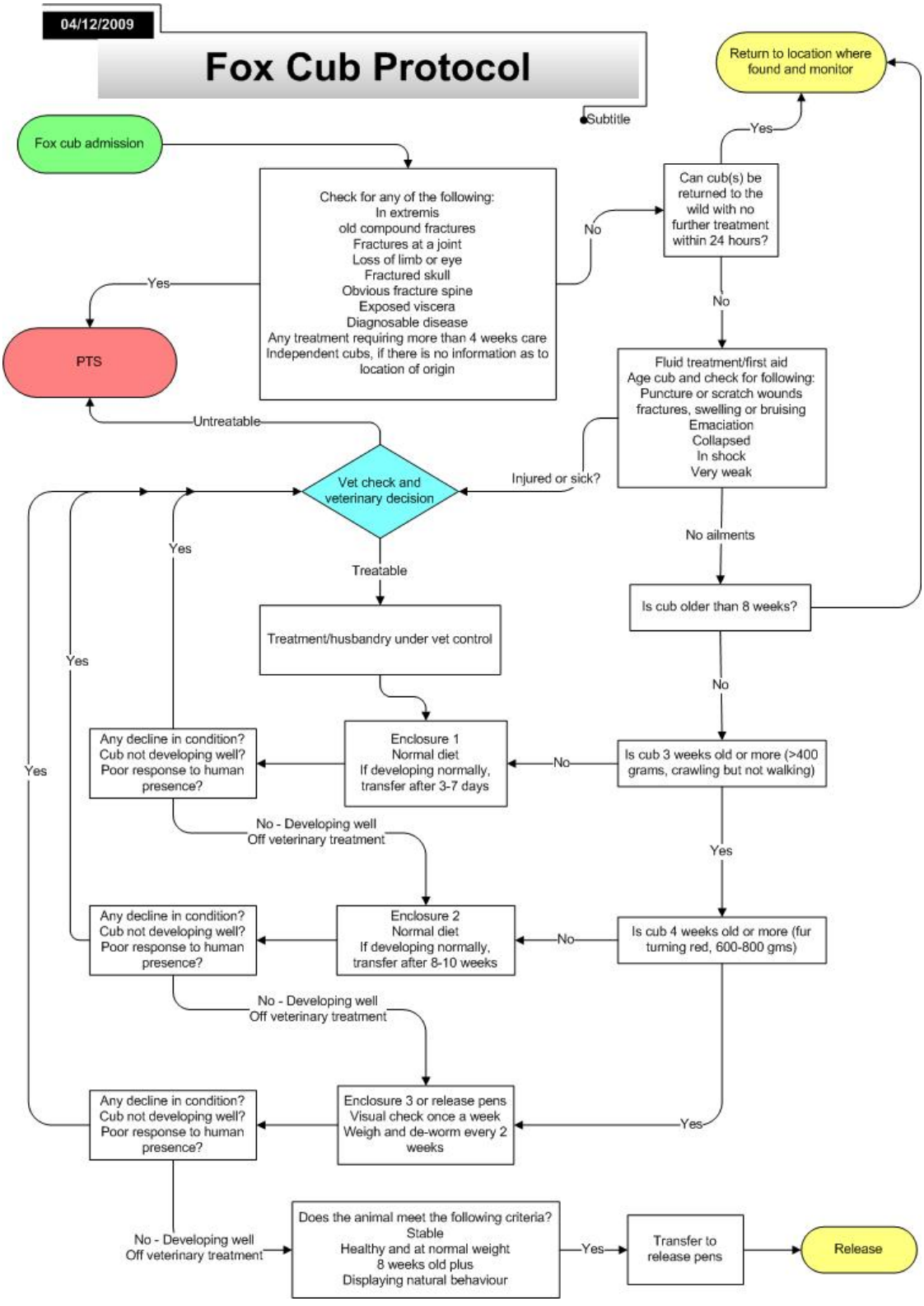
Cub Group B: move to enclosure 2 and keep in isolation for a period of 3 – 7 days. After this period of isolation, cubs should be mixed with other cubs of similar size and should be ID chipped before mixing. Groupings should be as above.

Cub Group C: move to enclosure 2 and keep in isolation during treatment and released at point of capture, as per adults.

5.4 Flow chart for fox adults



5.5 Flow chart for fox cubs



6 Accommodation

The need for **Environmental Enrichment** should be considered and identified wherever possible for each of the following sections:

6.1 Housing

The progression from *Enclosure1* to *Enclosure 2* to *Enclosure 3* represents the movement of an animal through the Centre as its condition improves/changes. Not all of the housing categories will be relevant for this species.

6.1.1 Intensive care (enclosure 1)

Enclosure: Intensive Care Area. Housed in plastic crate/tub (minimum: 70 x 45 x 25cm) covered with secure, seclusion lid or medium voyager (84 x 50 cm)
Substrate: Soft towels, vet blanket, newspaper, towels. Change daily.
Normal daylight cycle where possible.
Heat lamp/snuggle pad
Drinking water presented for all foxes, with due care taken for younger cubs
Environmental Enrichment: Soft toy companion
When to move: When cubs are aged 1 – 3 weeks, or 3 – 7 days after admission, move to enclosure 2.

6.1.2 Enclosure 2 (less intensive monitoring)

Enclosure: Isolation cubicle, approx. 2m x 1.5m or 2.7m x 2m. Ideally has external run attached, with door between the two areas. Outside run approx. 7.5 x 1.5 x 2m. Concrete blocks to height of 1m then weldmesh for remaining walls and roof. Floor should be hollow honeycomb blocks, filled with earth, laid over concrete. The fox cubs should be able to move between the cubicle and run at all times (unless there are times when they to be contained).

Substrate: Soft bedding, newspaper or woodshavings in cubicle, mulch, earth or bark chippings in run. Dirty bedding removed daily, whole pen cleaned once a week.
Daylight cycle, if available, if not fluorescent lights and available natural light
Drinking water available, presented in a way that cannot be tipped or contaminated
Environmental Enrichment: Upturned dog bed as refuge (several available for cub groups). A box approx. 75 x 75 x 60 cm or a Varikennel may be used to assist in capture and treatment. Tyres, pipes, toys, logs and stumps and food enrichment (e.g dead rabbits and dead casualty birds) should be provided. Single orphaned cub would retain soft toy companion.

When to move:

Adults can go straight to release.

Cubs: When cubs are aged 12-14 weeks, they are moved to the release pen (Release Strategy A) or to an external run (Release strategy B).

6.1.3 Enclosure 3 (release strategy 2)

Enclosure: Weldmesh runs in external area away from centre. Pens should be minimum of 7.5 x 3 x 2m. Cubs are provided with a wooden box which accompanies them to release site.

Substrate: Earth, wood chips and leaf litter.

Drinking water available, presented in a way that cannot be tipped or contaminated

Environmental Enrichment: Logs, log piles, cut foliage, tyres, toys, pipes, digging opportunities from flooring design. Where possible food should be provided be scattering round the enclosure or hidden in toys and other objects, so as to add to the enrichment (see chapter 7).

When to move: When cubs are aged approximately 20 weeks, they are moved to the release pen (Release strategy B).

7 Food & feeding

Every effort should be made to mimic the animal's natural food as closely as possible. If this is not possible, a semi-natural diet should be proposed. Artificial alternatives are not recommended, but should be listed for emergency use.

7.1 Food in the wild

Adults and Juveniles

- Live prey such as rabbits, rodents (mice and voles in particular), birds such as ducks and game birds.
- Invertebrates such as earthworms and beetles.
- Carrion and other scavenged items from bins etc.
- Seasonal variations: fruit and nuts when available.

Young cubs

- Mother's milk to weaning. Then food provided by parents and others in group.
- Live prey such as rabbits, rodents (mice and voles in particular), birds such as ducks and game birds.
- Invertebrates such as earthworms and beetles.
- Carrion and other scavenged items from bins etc.
- Seasonal variations: fruit when available.

7.2 Captive diet

7.2.1 Adults

Age/condition	Types/brands of food	Frequency
If eating normally:	Chicks fed in morning. Prepared diet: 200g Tripe/puppy biscuit or 1 tin (412g) Chappie, and dry biscuits depending on amount of carrion. Carrion: 10-15 whole chick / 1 quail / 1 rabbit or rabbit portions is fed when available. Can include non-medicated dead wildlife casualties. Adjust prepared diet accordingly. SF 50 vitamin powder can be given twice a week on food. a bowl of drinking water	1 x day
If not eating:	Consideration should be given to putting the animal on a drip (seek veterinary advice). Then start on 1 tin (156g) AD Diet, mixed until liquid and warmed slightly. If it still doesn't eat, use a 50ml syringe, and feed the AD mix slowly into the side of mouth. Carrion (e.g. 2 one day old chicks) could be made available to encourage animal back onto solid food.	2x day

7.2.2 Cubs			
Age/condition	Types/brands of food	Amount	Frequency
2 weeks 3 weeks	Syringe feeding. Esbilac Toilet every feed Small bowl of Esbilac as cubs should be lapping but syringe if necessary	10 mls per feed	Every 4 hours from 0800 to 2200 Every 5 hours from 0800 to 2200
4 weeks	Puppy chum Whole/split chick Bowl of Esbilac	30g	Every 4 hours from 0800 to 2000
5wks:	Esbilac and puppy chum. 1 chopped chick. Small bowl of Esbilac	60g	Offer 4x day Twice a day
5-7wks:	Puppy chum or tripe/mince/puppy biscuit, 2 cut chicks or rabbit or quail & esbilac	50-60g	4x day every 4 hours 8am – 8 pm
6-7wks:	Puppy chum or tripe/mince/puppy biscuit and 1 cut chick or rabbit or quail	50-60g	3x day every 6 hours 8 am – 8 pm
7-8wks:	Puppy chum or tripe/mince/puppy biscuit and 3 whole chicks or rabbit or quail	80g	3x day every 6 hours 8 am – 8 pm
8-10wks:	Puppy chum or tripe/mince/puppy biscuit and 3 whole chicks or rabbit or quail	100g	2x day 8 am & 8 pm
10-12wks:	Puppy chum or tripe/mince/puppy biscuit and 5 whole chicks or rabbit or quail	100g	1x day
Release pen A Release pen B	Tripe/biscuits + 5 whole chick per cub 10 Whole chicks per fox cub and a rabbit every three days	200g	1x day

7.3 Environmental enrichment

Following video footage (fox cam 2003) all foxes must have carrion. They have been observed to “play” with wings for half a day, compared to sitting/lying around doing nothing once they have eaten dog food. Foraging and digging opportunities in mammal pens, so food should be hidden and spread about. Invertebrates and annelids available in soil. Other possibilities are to provide food in novel ways are by filling Kong® toys or rabbit skins with food. Rabbit skins or old socks stuffed with hay/straw can also be used to make trophies (Houts, 1999).

8 Preparation for release.

8.1 General information.

All foxes should be given a health check prior to going to release, or for cubs, the soft release site to check the animal is in good health and condition and displaying natural behaviour. The cubs are weighed if possible. If the animal has been under treatment by the vet, then the vet may have to sign the animal off. The fox should be weighed before release, if possible.

8.2 Release within 24 hours.

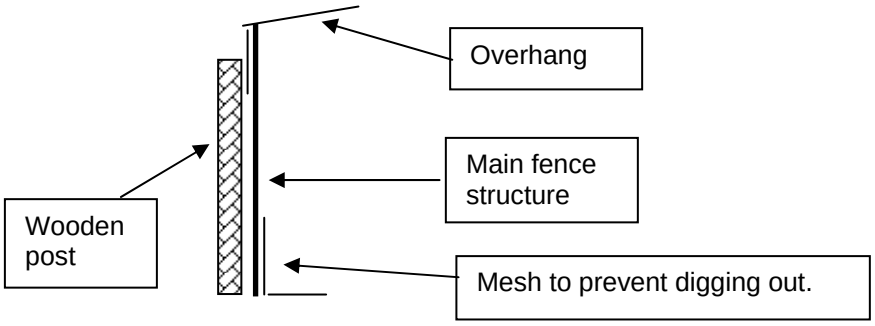
Cub Groups A & B: Return to site of capture in large wooden box or voyager at dusk and leave close to den as possible with door open. Observe from a distance to see if parents return to cubs. If not parents do return to collect/feed cubs return the cubs to the centre the following morning.

Adults and Cub Group C: Return to site of capture in large wooden box or voyager at dusk and release. Observe behaviour for as long as possible.

8.3 Release strategy A (for cub groups A & B).

Enclosures: 1.2m high fencing with inward facing overhang of 50cm and mesh turned in at base of the fence to prevent digging out to enclose an area of approximately 15-20m per cub in suitable habitat. Upside down dog-bed, log den and boxes provided for shelter. Bucket close to entrance gate for water.

Profile of fence for release pen.



Release details: Suitable site found where landowner is happy to have animals and to feed for necessary period. Ideally, the site is well away from chicken and pheasant runs; no immediate hunting or shooting in vicinity; no threat from construction, roads, development; suitable habitat.
Fox cubs are moved to release pen at 8 – 10 weeks and fed on site.
Foxes are released after four weeks in the pen (if they don't escape first). Back up feeding provided (no tripe).

8.4 Release strategy B (for cub groups A & B).

The release pen is a cage construction built on site, and would consist of 8 2m square panels making up a cage of approximately by 4x2x2m. This would have a roof on it and be dug into the ground approximately 0.5m. Inside the release cage plenty of cover would be provided e.g. branches logs, pipes and fresh tree greenery. A wooden fox kennel would be provided as cover and hay as bedding (this kennel would stay with each group through out the rehabilitation program)
Site details as above.

Once the group of Fox cubs are ready for the final release (this would be around Aug to Sept) we would take them to the release site where we would set up a soft release pen. The foxes would be in the cage for about 7-10 days and feed once a night on day old chicks and rabbits. After 7-10 days they would be let out of the cage at dusk (the door would remain open once released from the cage) and support fed for two to three weeks, the support food would be reduced in the last week of feeding.

9 Areas for research

As highlighted in text above:
What are the effects of keeping foxes in isolation? Suggestion: to examine behavioural differences between foxes kept isolated for different periods of time and different treatments and post release survival.
How long should quarantine be for cubs, 3 – 7 days? Too big a range. Suggestion: to examine behavioural differences between cubs kept isolated for 3 or 7 days and post release survival.
Are there differences between fox cubs from urban areas and cubs from rural areas?
How well integrated are single cubs when added to existing family groups? Again, study of behaviour and post release survival.
Unweaned vs weaned? Survival post release. Examine existing data.
Mange – examine different treatment regimes.
Substrate and lighting – examine differences in fox behaviour under different conditions.
Different release strategies.
Differences of survival between cub groups A and B.

10 References

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11 Annexes