

RSPCA Wildlife Rehabilitation Protocols: Falcons

RSPCA

2013



Photo: RSPCA

**Protocol for the rehabilitation of falcons
including kestrel, merlin, hobby and peregrine.**

Contents:

1	Introduction	3
2	Species information.....	4
2.1	Species covered by this protocol	4
2.2	Identification of species covered by this protocol	4
2.3	General information on species (or group) as relevant to care in captivity	5
2.4	Notes on environmental enrichment	6
3	Pre-admission treatment.....	7
3.1	Information should be collected on the following:.....	7
3.2	Advice related to care, e.g. diet, provision of heat etc.....	7
3.3	Advice related to the treatment of particular problems.....	7
3.4	Advice regarding the fitness of the animal for transport	8
4	Health and Safety.....	9
4.1	Introduction	9
4.2	Risk assessments	9
5	Decision making – to treat or not to treat.....	10
5.1	Information	10
5.2	Triage.....	10
5.3	Treatment on admission	11
5.4	Flowchart	12
6	Accommodation	13
6.1	Indoor 1 (Intensive care).....	13
6.2	Stage 2 (Less intensive monitoring)	14
6.3	Stage 3 Outdoor Aviary.....	14
6.4	Stage 4 Flight Aviary.....	15
7	Food and feeding	17
7.1	Food in the wild.....	17
7.2	Captive diet	17
7.3	Supplements	18
7.4	Feeding and environmental enrichment	18
7.5	Notes on feather development.....	18
8	Preparation for release	20
8.1	Training the animal for survival.....	20
8.2	When to release.....	20
8.3	Where to release.....	20
8.4	How to release	20
8.5	Information	20
8.6	Tagging	21
9	Areas for research	21
10	Annexes.....	22
10.1	Glossary and abbreviations.....	22
10.2	Products named in the text	22
10.3	Additional Tables.....	23
10.4	Bibliography.....	23
10.5	References	23

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.

This protocol contains general information only. The RSPCA makes no warranties, representations or undertakings about any of the content of the protocol (including without limitation any as to the quality, accuracy or fitness for any particular purpose of such content).

References in this protocol to any person or organisation do not represent an endorsement of that person or organisation, or its members, products or services.

To the extent permitted by law, the RSPCA does not accept liability for any loss arising out of or in connection with the use of this protocol.

Copyright notice:

The content of these pages is protected by copyright belonging to the RSPCA. You may download and copy the protocol to use only for the purposes of safeguarding animal welfare during rehabilitation but you must not sell or republish them. For any other purpose, you may quote a single paragraph of text from a page of the protocol without seeking our permission, provided that you acknowledge the RSPCA as the copyright owner of the material.

Pages or sections may be reproduced for teaching or study purposes without obtaining our prior consent. You may print and copy the pages for your private study or for teaching purposes in schools, colleges or universities provided in each case that:

1. copyright and source indications are also printed and copied
2. no modifications are made to the materials and they are not used as part of any other publication
3. the document is printed and copied entirely and is not used in a derogatory or misleading context
4. a maximum of 30 copies are made.

For any other publication of extracts from this protocol, please seek our permission. You can do this by emailing us at wildlife@rspca.org.uk

Notes:

Areas highlighted within the text are areas that require further research or further clarification.

All dimensions and weights are in metric units.

All area measurements are for length x breadth x height (L x B x H).

2 Species information

2.1 Species covered by this protocol

This protocol will cover small to medium sized birds of prey, specifically falcons (*Falconidae*).

Table 1: Species covered by this protocol with a range of sizes and fledging period (weights are detailed in Table 6). Note that for most species, there is a difference in size and weight between the sexes with males usually smaller than females.

Species	Scientific name	Wing span (cm)	Fledging (days)
(Common) Kestrel	<i>Falco tinnunculus</i>	233 – 272	27 – 32
(Eurasian) Hobby	<i>Falco subbuteo</i>	300 – 347	35 – 44
Peregrine falcon	<i>Falco peregrinus</i>	291 – 367	35 – 42
Merlin	<i>Falco columbarius</i>	191 – 206	25 – 32

Species are named following the official listing by the British Ornithological Union (BOU)¹. The birds listed above are found on the British list, however other species may be found occasionally in the UK, either as vagrants or as escaped pets (e.g. Gyr falcon *Falco rusticolus*; Lanner falcon (*Falco biarmicus*) and Saker falcon (*Falco cherrug*). The popularity of falconry has also led to a number of hybrids between the Lanner, Saker and the Peregrine falcon so if you are unsure what species you may be dealing with, ask an expert. Any 'owned' bird of prey should be identified by a leg ring or microchip, usually inserted into the breast muscle.

2.2 Identification of species covered by this protocol

2.2.1 Adult

Kestrel

The female kestrel is generally brown with black spots on head, back and upper tail; the male (see figure 1) is more rufous-brown on the back with grey head and tail. Dark primaries are present in both sexes. Undersides are buff with dark spots or streaks. The tail shows a single bar at the tip. Typical falcon wings - long and pointed. Short yellow legs. The iris is brown.

Hobby

Dark grey upper parts and darkish below with white throat patch. Reddish 'trousers', buff vent and bold streaking of breast and belly running from head to tail. Black moustache-like stripe.

Peregrine

Slate grey upper, rump, tail end paler blue-grey. Underparts white with barring across chest and belly but none on throat. Distinct moustache.

Merlin

Males are slate grey; females dark brown with dark bars on tail. Males are also smaller than females. Ventral side is buff-white with dark stripes. Indistinct moustache-like stripe.



Figure 1: Adult male kestrel

2.2.2 Young

The young of most hawks and falcons have two types of down. The first is a thin, rather short down that only sparsely covers the nestling. The second set of down feathers are thicker and coarser and provides a more dense covering, these feathers usually show some colour, often a buff or pale grey. Full identification is not required at this stage as rearing protocols are the same for hawks and falcons, but the colour of the irises can be used to differentiate young hawks and falcons from adults. See also weight and development chart for all three species, Table 5 on page 23.

Kestrel

Nestling: Thinly covered in short white down; bare patches around face (cere and eyes). Second down thicker, longer and coarser; pale buff-grey above remaining pale below. Yellow cere and legs.

Juvenile: Looks very much like an adult female but with darker feathering across mantle. Under parts paler and more streaked than the adult female. Young often show grey markings around the rump and upper tail. Irises deep brown.

Hobby

Nestling: First plumage creamy-buff upper and white underside. Second plumage has a more greyish tint.

Juvenile: No red 'trousers' or vent as found on adults and yellowish-buff underside as opposed to white.

Peregrine

Nestling: First plumage is creamy-white, second is buffish-grey above and creamy below. The irises are dark and cere and legs are pale grey.

Juvenile: Underparts more buff with streaked, not cross barred, chest and belly. Cere and feet dull yellowish-green or bluish-green.

Merlin

Nestling: First plumage is creamy-white, second plumage more brownish-grey above and pale grey below, with whitish patches on chin, throat and belly.

Juvenile: Very similar to adult female, perhaps a richer brown colour.

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

Kestrel

Resident but post breeding movements occur and may be up to 400km from natal site. Densest populations found around farmland. Usually diurnal but is known to be active during the night (nocturnal) and at dawn and dusk (crepuscular). This bird likes to perch on open sites choosing good vantage points, posts, wires, cliffs and buildings. Kestrels are often seen hovering by flying into wind in order to maintaining position – hence its old name of *wind-hover*. Will actively search on ground for prey – more so than most other falcons.

Hobby

These are migratory birds, largely due to their diet consisting primarily of insects like dragonflies. Preferred habitats are those that can sustain a wide diversity of such insects, large open areas flanked by clumps of trees or woodland and wetlands. The species can occur throughout most of Great Britain. They hunt on the wing, taking insects and small birds. Most birds fly south during September and return to breeding areas late April. They are territorial when breeding but can form small groups when migrating.

Peregrine

Peregrines are becoming more widespread and common in the UK. They prefer open areas for hunting such as coastal areas and cliffs for breeding but these birds have now adapted to urban living. They are resident all year, but dispersing juveniles are capable of travelling great distance. They are territorial and breeding pair will usually occupy the same territory throughout the year if food etc. permits. Otherwise these birds are normally seen on their own. Their primary food is birds, including pigeons

and waterfowl which are taken on the wing. Peregrines are thought to be one of the fastest animals in nature, often diving at speeds in excess of 200 kph to catch their prey.

Merlin

Merlins breed in western and upland areas of Britain but can be found in other areas during winter. It prefers open areas of rough vegetation such as uplands, moors, sand dunes and wetlands, moving from more upland areas to coastal areas in winter. Not so dependent on tree cover as other falcons, and so will tolerate areas with few trees present. They are territorial when breeding and usually solitary outside the breeding season, although may be seen in small groups when migrating. Feeds mainly on small birds, usually taken on the wing close to perch in a surprise attack.

2.4 Notes on environmental enrichment

- Most birds of prey prefer to eat from a “feeding post”.
- Natural branching helps grip and keeps feet and talons in good order.
- A rock placed on the ground provides a rough surface to keep talons in trim.
- Shallow water bowls are preferred for drinking and bathing.
- Swinging perches improve balance and mobility.
- Natural cover is valuable and will be used.

3 Pre-admission treatment.

This part of the protocol provides information for telephone queries regarding the species and their rehabilitation, prior to receiving the bird(s) at an RSPCA Wildlife Centre. There are two possible scenarios:

- i. A member of the public is reporting a sick/injured or orphaned bird and wants further information as to what to do. Or,
- ii. Prior to admission, some animals may be held at a veterinary surgery or other facility and may have had treatment. Some, if not all, of these facilities may request information on care of the animal, before they send it to an RSPCA centre.

Remember; does the bird need to be admitted? Try to determine if the bird needs treatment, if it can be "treated" on site or left alone?

3.1 Information should be collected on the following:

- a) Species (often an accurate location of finding or time of year can help with identification),
- b) Date found,
- c) Extent of injuries, evidence of shock,
- d) Body condition, any previous injuries,
- e) Age of animal, e.g. chick, nestling, fledgling, adult,
- f) Sex if known,
- g) Location at which the animal was found (important to ensure adults and immatures are returned to the same place),
- h) Finder's details
- i) All records of previous treatment (if from another establishment),
- j) Whether or not the birds are ringed or not ringed (note that a licence is required to own some species of birds of prey and as some species are on CITES, article 10 are required if the bird is used for a commercial purpose). Birds may also be micro-chipped. More information can be found at <http://animalhealth.defra.gov.uk/CITES/birdregistration/index.htm>
- k) Closed rings (or microchip data) can be reported to either:
 - The National Theft Register¹ <http://www.theparrotsocietyuk.org/buying-a-parrot/theft-and-investigation> (mostly parrots, but will register all zoological specimens)
 - OR The Independent Bird Register² www.ibr.org.uk

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

- Keep the bird in a warm dark box with a non-slip base; for example, a towel wrapped around the box's base insert, a piece of Astroturf or carpet tile cut to fit the box.
- Keep the box in a quiet place.
- Injured or debilitated birds are assumed to be dehydratedⁱⁱ therefore oral rehydration therapy may be advised. Trained personnel can administer a bolus of fluid on admission and/or before transport

3.3 Advice related to the treatment of particular problems.

- It is often advisable to fit tail guards to many diurnal raptors before transportⁱⁱⁱ in order to reduce damage to the tail. Advice may be given on this action as appropriate. Do not use a mesh cage.

¹ John Hayward. Tel No: 01869 325699. E-mail jh@ntr.supanet.com.

² Tel: 0844 700 8500

3.4 Advice regarding the fitness of the animal for transport.

- Transport in the warm in a darkened box with a non-slip base for example, a towel wrapped around the box's base insert, a piece of Astroturf or carpet tile cut to fit the box.
- Sky or Vari-kennels are useful for transporting peregrines, but note that if these cages have wire doors and/or 'windows' these should be covered to prevent feather damage; towels are useful for this.

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 birds of prey 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.

Members of public are advised to use gloves or a suitable alternative (e.g. towel) when handling birds of prey and to keep dogs etc away from injured wildlife.

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	Leather gloves or towel can be used when restraining. Goggles should also be worn.	Low
Diseases/Zoonoses	Leather gloves should be worn when handling Treatment areas must be cleaned thoroughly after examination	Low
Parasites	Gloves should be worn when handling	Low

5 Decision making – to treat or not to treat

5.1 Information

A range of information is required to arrive at the most appropriate decision for the animal in care. Information collected under 2.1 on page 7 will be used to make an assessment, as will observations of the bird itself. A veterinary opinion will be taken into full account where necessary.

5.2 Triage

5.2.1 Assessment relevant to the condition of the animal

Options for the animal are: euthanasia, treatment or immediate return to the wild. The considerations listed below will help to guide this decision as many of these conditions indicate a poor survival to release.

Call the wildlife centres for advice. Decisions must also take into account the reasons for admission.

A prolapsed or ruptured eye	PTS
A missing eye.	PTS
More than 50% flight feathers missing, broken or badly damaged.	Usually PTS
Declining condition when injured - for example when <i>in extremis</i> .	PTS
All open fractures and fractures at the joint.	PTS
Fractured or deformed beaks.	PTS
A missing limb.	PTS
Trichomoniasis severe	PTS

Table 3: Conditions that normally indicate euthanasia

5.2.2 Animals that can be returned to the wild within 24 hours (or later)

- Uninjured nestlings found near the nest can be returned if parents are known to be present. Replace the nestling in the nest then return the following morning to check. Note that a licence from Natural England may be required to disturb this nest for some species.

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

- Is an experienced vet, wildlife assistant or wildlife centre supervisor available to see the animal within an appropriate time-scale?
- Is suitable housing/space available to accommodate the animal according to this protocol?
- Are current staffing levels sufficient to give the bird(s) the time required for good rehabilitation?
- What is the predicted intake of animals in the short term?
- Admission numbers will be controlled carefully to avoid overcrowding.
- A good supply of quality food must be assured.
- Note that some species of bird of prey are listed on Sch 4 of the Wildlife and Countryside Act. Therefore a licence is required to hold them, even for rehabilitation. In England, there are two general licences:
 - WML GL07 – allows authorised persons (including RSPCA inspectors) to hold a scheduled bird of prey for up to 15 days for the purposes of rehabilitation;
 - WML GL08 – allows a veterinary surgeon to hold a scheduled bird of prey for up to 6 weeks for veterinary treatment.

In Wales, there is no general licence for these species so you will need to apply for a licence.

If it seems likely that the bird needs treatment for a longer period than stated by either of these general licences, then you must notify Animal Health at Defra (website is under section 2.1). More details can be found on this document:

<http://animalhealth.defra.gov.uk/about/publications/cites/birdregistration/pdf/Information-Sheet3-List-of-Registrable-Bird-Species.pdf>

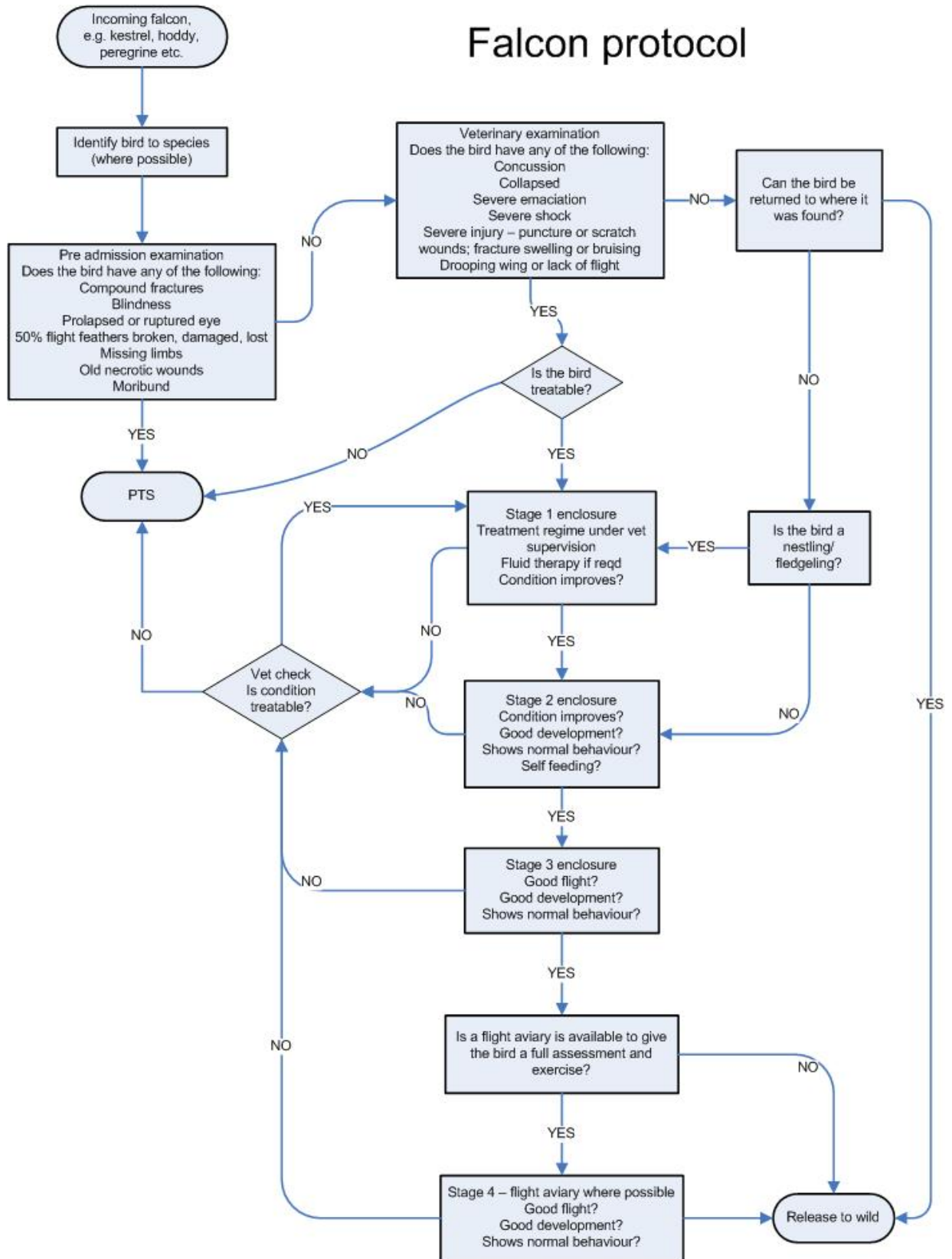
5.3 Treatment on admission

- All adult birds of prey are examined by the vet.
- Uninjured orphans may not always need veterinary care.
- Fluid therapy is required on arrival unless recently provided before transport.
- As a precautionary measure, and if required, fit a tail guard to adult birds that are under veterinary care and/or are unable to perch (indoor 1 only)



Figure 2: An intensive care cubicle as described in 5.1 at Stapeley Grange. These cubicles are useful for most species, including birds of prey. However some enrichment will be required in terms of perches etc.

5.4 Flowchart



6 Accommodation

6.1 Indoor 1 (Intensive care)

Enclosure

- Smaller raptors can be housed in a darkened cage or box approximately 60 x 40 x 50cm in size.
- Nestlings of similar size and of the same species can be kept in pairs or more. Individuals should be identified using removable colour leg rings and this should be recorded on the admission card.. These should be removed before the birds are released.
- All other birds of prey in this group are housed in a cubicle or aviary about 1.2 x 2 x 2.5m (a wildlife centre "intensive care cubicle" –see figure 2).

Substrate

- Nestlings not yet able to stand will be put on a non-slip base such as a towel shaped like a doughnut with another towel underneath.
- Birds that can stand confidently are placed on newspaper with a non-slip substrate (towelling/Astroturf/carpet tile) and perch/log.

Lighting

- Artificial lighting regime or natural daylight.

Temperature

- Normal room temperature is adequate unless the bird is collapsed or weakened
- Heat is provided either by a heat lamp above the container or heat pad beneath. Provide the heat at one end of the container so that a temperature gradient is provided.

Ventilation & Humidity

As room

Access to water

- A small bowl of water may be provided for adults that are able to stand.
- All others, including healthy nestlings, will get moisture from a good diet, so should not be provided with a bowl of water..

Environmental Enrichment

- Provide seclusion and quiet. Use a towel to cover the wire front or face the open box to a wall.
- Provide a secure perch for adults.

6.1.1 When to move to next stage:

- When bird is self-feeding and capable of getting onto low perches unassisted.
- Birds requiring limb exercise before moving to a large stage 3 "flight" are placed in a stage 2 enclosure.
- Birds may be placed in stage 2 enclosure to be assured of their capabilities or to continue veterinary treatment prior to a stage 3 enclosure.

If none of the above applies then a move to a stage 3 enclosure is applicable

6.2 Stage 2 (Less intensive monitoring)

Enclosure

- 2 x 1.2 x 2.5m cubicle

Lighting

- Normal daylight hours

Substrate

- Astroturf, towels, newspaper (when birds are perching confidently) blankets

Temperature

- Normal room temperature.

Ventilation & Humidity

- As room.

Access to Water

- Must have access to shallow water bowl with water for bathing and drinking.

Environmental Enrichment

- Various sized branches
- Plucking perch and/or small tree trunk or stump.
- Wooden open fronted box to provide for cover for kestrel.
- Branches with foliage may be used to provide cover.

6.2.1 When to move to the next stage:

- When the bird is self feeding and capable of short flight.
- All birds must be eating whole food not chopped.
- When staff are assured of the bird's capabilities of flight and feeding.
- Birds may be placed in a stage three enclosure where treatment can be undertaken without being caught up. For example when tablets can be placed in food, or vitamins in water.
- All tail guards should be removed before moving to Stage 3 enclosure.

6.3 Stage 3 Outdoor Aviary

- Recommended size is approximately 3.5 x 6 x 2.5mtrs. However, single kestrels can be housed in aviaries of 2 x 5 x 2.5mtrs
- Preferentially, adult kestrels should be housed individually but two adults may be held in the larger aviary. Up to 5 juveniles of the same species can be housed in aviaries of the larger size.
- Adult peregrines should be housed singly in the larger aviary sizes quoted above.
- 2.5 m high may be the maximum as anything taller makes catching difficult.
- Three sides are close boarded and the fourth is 1x 1 ½ welded mesh. Plastic windbreak mesh is located inside and covering the wire leaving about a 50mm gap; this helps to reduce feather damage. The roof is 1/3 solid covered to prevent rain penetration with the remainder of the roof wire covered and inside lined with soft mesh.
- A full height baffle screen is provided to give security at the covered end of the aviary.
- A safety door or corridor must be provided to prevent unnecessary escapes.

Substrate

- A range of substrates is acceptable including sand, gravel, soil or concrete with carefully placed *Astroturf*. These may be used alone or in a combination. Whatever is chosen it must be able to be kept relatively free of pathogens and incursions from unwanted animals.

Shelter

- Primary shelter is provided in the basic aviary design but additional cover may be provided with the following:
 - Open fronted wooden boxes can be placed at height in the aviary.

Temperature, Ventilation & Humidity

- As weather.

Access to Water

- A shallow water container with fresh water in it must be provided.

- The dish should be big enough to allow the bird(s) to bathe.

Environmental enrichment

- Swinging and fixed perches.
- Stumps for use as plucking posts.
- Foliage for cover and roosting.
- Hiding and shelter boxes (notably for the kestrel)
- A selection of shelves/ledges
- Rocks for low perches.
- Bathing facilities.

6.3.1 When to move to the next stage:

Next stage is release.

- Experience is required to make a final assessment for release. A package of factors will be used to make the final assessment and will include:
 - ✓ fitness,
 - ✓ feather condition
 - ✓ good quality flight, and
 - ✓ the ability to perch and land.
- All birds will be in good body condition and have good weight - see Table 4 on page 10.
- The vet will sign off all birds that have been under veterinary care.
- When birds have been treated for wing injuries a more stringent and extensive flight assessment may be required.

6.4 Stage 4 Flight Aviary

Where possible, any bird of prey that is recovering from a traumatic injury to wing, legs or body will benefit from being able to exercise in a large flight aviary. These aviaries allow the wings to be stretched fully and muscles exercised as they would be in the wild. This also allows an opportunity to examine how the bird is flying, by using CCTV camera systems to film the bird.

The RSPCA currently has two designs of aviary for flight testing birds of prey.

Juvenile peregrine falcons and those recovering from injuries to wings may require training with falconers to train them to hunt and to improve fitness before release.



Figure : external view of bird of prey flight at East Winch



Figure : internal view of bird of prey flight at East Winch



Figure : internal view of large bird of prey aviary at Stapeley Grange



Figure : internal view of small bird of prey aviary at Stapeley Grange

7 Food and feeding

7.1 Food in the wild

Kestrel

Primarily feeds on small rodents; mice and voles are the staple, but they will take rats, shrews and moles. However, they are also known to take a very wide range of foods from earthworms and beetles (a staple in some areas and equally important for juveniles) to birds and carrion.

Hobby

Large insects, such as dragonflies, small birds and the occasional bat.

Peregrine

Mostly birds, will take a wide variety of species.

Merlin

Mostly small birds.

7.2 Captive diet

7.2.1 Adult

Species	Type of food	Amount and when to feed
Kestrel, merlin and hobby	Two chopped or whole dead day old chick (DoC) or two chopped mice. Quail or dead wild casualty birds can also be used – do not use birds that have been on drugs or euthanased using drugs. Mealworms can be fed to kestrels as an additional supplement.	Total of food per day = 2 DoC or 2 mice can be fed as one or two meals morning and late afternoon.
Peregrine	3-4 whole dead day old chicks or 1 quail or 6 - 8 mice Dead wild casualty birds can also be used – do not use birds that have been on drugs or euthanased using drugs.	Can be fed as one or two meals morning and late afternoon.

Table 4: Adult feeding table.

7.2.2 Young

Stage of growth	Type of food	Amount and when to feed
	Feed chopped mice.	Frequency of feeding will be determined by the age and ability of the chick.
Before their eyes open.	Assisted hand feed with chopped food in tweezers. Ox heart can be used at this stage only.	QID
When their eyes open.	Offer food in front of the bird with tweezers to allow them to peck. Food can be left on ground between tweezer feeds. A calcium supplement or casualty wild birds should be offered here to prevent MBD.	TID
When standing unassisted.	Fresh chopped DoC can be left to allow birds to pick up on their own. And hand feeding can be reduced.	TID
When self-feeding	Fresh food can be left	BID

Table 5: Nestling/fledgling feeding table
7.3 Supplements

- Vitamin/calcium supplements can be added at the manufacturers recommended proportions or as advised by a vet. Vitamin supplementation is very important for growing chicks. Mice have a better calcium/phosphorus ratio therefore mice may be a better choice for very young growing chicks.

OR

- When feeding mice provide a pinch of *Avimix*.

7.4 Feeding and environmental enrichment

- Use feeding posts for adults.
- Ensure fresh water is available

7.5 Notes on feather development
7.5.1 Feather quality

Both poor quality feathers and fret marks may be caused by deficiencies in diet, stress or both. Work on birds of prey and species of passerine bird have shown that poor diet during the growth of the feathers, either while the bird was in the nest or during normal moult, can cause weak feathers and poor plumage. It may lack lustre and iridescence, the colour may be poor and there may be a general dishevelled look to the bird. The feathers may feel dry and "straw-like" and the feather edges look worn and tatty. The plumage may also contain broken and bent feathers.

Poor feather quality may mean that flight may be severely affected or impossible. The plumage may also not be waterproof and so may result in the bird being unable to maintain body temperature.

7.5.2 Fret marks

Fret marks show in feathers as lines across the vane; they may also show as ragged breaks, splits and "cuts" in the edges of the feather - see photograph below. These abnormalities are caused by

inadequacies in the diet while the feather is growing. The result may be a significant flaw in the feather frequently leading to breaks across the line of weakness. These conditions are of particular concern when found in one or more of the following feather groups; primaries, secondaries or tail feathers.

7.5.3 Importance of diet

Poor feather quality is a problem that can be avoided by providing a proper diet. It is therefore important to follow a good quality dietary regime such as that outlined above. Failure to do this can result in birds having to be kept for extended periods as they would not be fit for release at the correct time, or possibly euthanasia if the damage to the feathers is too extensive.

8 Preparation for release

8.1 Training the animal for survival

- All species may be provided with road-kill.
- Use of a large flight aviary such as the one pictured in figures will help the bird exercise especially if the aviary has perches set at different heights and obstacles for the bird to negotiate.
- The peregrine is such a specialist hunter that, if a large flight aviary is not available, the services of a falconer may be required in order to assess the birds fitness for release.
- .

8.2 When to release

Refer to section 4.3.1 on page 15 for birds' physical requirements.

- All species must be released at least five hours before dusk.
- The release of birds brought in as juveniles or nestlings should tie in with the natural dispersal of the wild population.
- Good weather conditions with, ideally, little wind and no rain currently or forecast.
- Comparison with the weights of wild adults will assist in the assessment of a bird's readiness of birds for release -see table below. NOTE: Female raptors are often as much as 30% heavier than malesⁱⁱ so being able to sex these birds may be an advantage.
- Weight and condition must be taken into consideration together – a lightweight bird may well be in very good condition as a heavyweight bird may be in poor condition.

Species	Weight (g) male	Weight (g) female
Kestrel	156 – 213	193 – 252
Hobby	131 – 232	141 – 340
Peregrine	582 – 750	925 – 1300
Merlin	125 – 234	164 – 300
Gyrfalcon	805 – 1300	1400 – 2100

Table 6: Weights of wild birds

8.3 Where to release

- All immature and adult birds are returned as close as possible to the place of finding.
- Juveniles that have been reared away from natural parents will be soft released in suitable habitat. For many of these species, this will require that they are released close to where they were found, assuming that the birds were not in the process of migrating. Some species could benefit from being released in areas where the population is low, but consultation with other groups would be advisable before doing this.
- Seek landowner's permission and ensure free access.

8.4 How to release

- Birds admitted as adults or immatures are hard released at the site of finding.
- A release aviary can be used – it is similar to the stage three aviary with the addition of a porch of 1 x 1m and a release hatch.
- Birds are held here at the proposed release site for a minimum period of two weeks to acclimatise before the release hatch is opened.
- Food (as above) is provided during captivity.

8.5 Information

- Basic biometric measurements are useful. (See Redfern & Clarke^{iv}.)

8.6 Tagging

- All birds should be BTO ringed before release.
- Ensure any temporary identification marks are removed before release.

9 Areas for research

- Post release monitoring of peregrines released with and without training by falconer, or using hack boxes.
- Continued post-release monitoring of other species.

10 Annexes

10.1 Glossary and abbreviations

♀, ♀♀	Female, females
♂, ♂♂	Male, males
Adult	A fully fledged completely independent bird usually capable of breeding.
BID	Twice-per-day.
Biometrics	Measurements taken to provide greater detail on the biology of birds. Data includes: plumage, size(s) and condition. (Further detail can be found in the <i>Ringers' Manual</i> ^v .)
BOU	British Ornithological Union.
BSAVA	British Small Animal Veterinary Association
BTO	British Trust for Ornithology.
Carpal joint	The small bones at the distal end of the radius and ulna and before the carpometacarpals. "The wrist area of a birds forearm."
Carpal patches	A group of feathers beneath the carpal joint q.v.
Cere	The fleshy or waxy part of a bird's beak in which the nostrils are situated. Usually swollen and prominent in hawks.
Chick	See Nestling.
Crepuscular	Active at dawn and dusk.
DoC	Dead day old chicks supplied from chicken producers.
Hard release	A method of release whereby the animal is released without support feeding or provision of additional shelter.
ID	Identification; usually referred to individually marked birds.
Immature	A bird that is independent of its parents but has yet to reach breeding age or establish its own territory.
Irides	Plural of iris.
Iris	The circular, coloured membrane of the eye surrounding the pupil.
Juvenile	A bird that is out of the nest and flying but is mostly dependent on its parents for support.
Nestling	A bird still living in the nest and being supported by its parents.
PPE	Personal Protective Equipment.
Primaries	The primary feathers of the wing. These are the long flight feathers towards the tip of the wing. Both hawks and falcons have ten on each wing.
QID	Four-times-per-day.
Raptor	A bird of prey. Usually referring to vultures, eagles, hawks and falcons and specifically differentiated from the owls by the addition of the word "diurnal".
Soft release	A method of release whereby an animal is released with support food and/or shelter prior to attaining its total freedom.
TID	Three-times-per-day.
Under-tail coverts	The group of feathers ventral to the rump covering and extending from the vent to the base of the tail.

10.2 Products named in the text

Avimix	A mix of Nutrobal and vitamins A, C & E. <i>Vetark Professional, PO Box 60, Winchester, SO23 9XN.</i>
Astroturf	Artificial turf

10.3 Additional Tables

Table 1: Comparative growth weights

	Kestrel		
Hatching	14–18g		
4 days	48g		
8 days	90g		
12 days	150g		
16 days	210g		
20 days	240g		
Week 3			
26 days	250g		
28 days	First flights		
30 days			
Week 5			
Week 7			
Week 8	Independent of adults		
Week 9			
Week 16			

10.4 Bibliography

Understanding the Bird of Prey by Nick Fox. 1995. Hancock House Publishers Ltd
Medical Management of Birds of Prey, second ed. by Patrick T. Redig, D.V.M., Ph.D. Published by The Raptor Center at the University of Minnesota 1920 Fitch Avenue St. Paul, MN 55108
Raptor Biomedicine, by Redig, P., J. E. Cooper, J. D. Remple, and B. Hunter. (Editors). 1993.
Raptors of the World by Lames Ferguson-Lees and David A. Christie. 2001. Christopher Helm, London.
The Kestrel. By Andrew Village. 1990. T & AD Poyser, London.

10.5 References

- ⁱ British Ornithological Union (BOU) website <http://www.bou.org.uk/recrist1.htm>
- ⁱⁱ Benyon P.H., Forbes N.A. & Harcourt-Brown N.H. 1996. BSAVA Manual of Raptors, Pigeons and Waterfowl. British Small Animal Veterinary Association Limited, Cheltenham, Gloucestershire.
- ⁱⁱⁱ Mullineaux, E., Best, D. and Cooper, J.E. 2003. BSAVA Manual of Wildlife Casualties. British Small Animal Veterinary Association Limited, Cheltenham, Gloucestershire.
- ^{iv} Redfern, CPF. & Clark, JA. 2001. Ringers' Manual. BTO, Thetford.