

RSPCA Wildlife Rehabilitation Protocols: Birds of prey (non falcons)

RSPCA

2013



Photo: RSPCA

**Protocol for the rehabilitation of birds of prey (non-falcons):
including buzzards, osprey, red kite and harriers**

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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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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 the larger species of birds of prey of the *Accipitridae* (buzzards, kites, eagles, harriers, hawks), and *Pandionidae* (osprey).

Table 1: Species covered by this protocol with a range of sizes and fledging period (weights are detailed in Table 4). 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 Buzzard	<i>Buteo buteo</i>	110 – 130	50 – 55
Rough-legged Buzzard	<i>Buteo lagopus</i>	125 – 148	39 – 43
Honey Buzzard	<i>Pernis apivorus</i>	113 – 135	40 – 44
Red Kite	<i>Milvus milvus</i>	140 – 165	48 – 50 +
Marsh Harrier	<i>Circus aeruginosus</i>	115 – 140	35 – 40
Hen Harrier	<i>Circus cyaneus</i>	97 – 118	29 – 32
Montagu's Harrier	<i>Circus pygargus</i>	96 – 116	35 – 40
Osprey	<i>Pandion haliaetus</i>	152 – 167	53 (49 – 57)
Golden Eagle	<i>Aquila chrysaetos</i>	190 – 225	65 – 70/80
White-tailed Eagle	<i>Haliaeetus albicilla</i>	190 – 240	70 – 75
(Eurasian) Sparrowhawk	<i>Accipiter nisus</i>	196 – 256	33 – 35
(Northern) Goshawk	<i>Accipiter gentilis</i>	300 – 385	35 – 42

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 migrants (e.g. Black Kite, *Milvus migrans*) or as escaped pets (e.g. Harris hawk (*Parabuteo unicinctus*)). Also some of these birds are either rare (goshawk) or very restricted in their range and so are unlikely to be admitted for rehabilitation in most of England and Wales.

2.2 Identification of species covered by this protocol

2.2.1 Adult



Figure 1: Buzzard

Most of these birds are identifiable by their size, being much larger than other birds of prey found in the UK (most have wing spans of 1m or greater – sparrowhawk is the main exception). They are very variable in plumage colour but are usually brown above and somewhat paler below with variable amounts of brown and white, depending on species. Some have obvious characteristics when in flight (e.g. red kite has a forked tail) while others can be distinguished by size, beak, tail etc. More information on identification can be found on the RSPB's website <http://www.rspb.org.uk/wildlife/birdguide/families/> or this guide produced by the Field Studies Council may be used; <http://www.field-studies-council.org/publications/pubs/british-birds-of-prey.aspx>

Sparrowhawk (and Goshawk)

The female has grey to grey-brown upper-parts and crown, with a white breast with grey barring. The male is the same grey to grey-brown above but is a softer brown/grey underneath with rufus cheeks. The throat, lower belly and under-tail coverts are white. Both sexes have long tails that has up to four noticeable broad bands on the upper surface, rounded wings, long slender yellow legs and toes and unmissable deep yellow/orange eyes. Note the goshawk is bigger and twice as heavy as a sparrowhawk

2.2.2 Young

The young of most hawks have two types of down. The first is a thin, rather short down that only sparsely covers the nestling; it is usually white. 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. The colour of the iris is an important feature differentiating young hawks and falcons from adults. See also weight and development chart for the species - see Table 4 on page 20.

Nestlings: Young birds are downy, usually white, or tinged with buff or grey. Hooked bills and talons useful for identification but note owls and falcons also have these. First downy coat is long and thinner than the second downy which is coarser and denser. In many cases they are hard to identify to species level at this stage.

Juvenile: usually subtle differences from adult in terms of feather colour, length, and other features like tail bars absent/present etc. However such differences do not affect care of the bird – it should be treated as an adult bird.

Sparrowhawk (and Goshawk).

Nestling: Sparsely covered in short white down; as nestling grows becomes “woolly” white but may show pale buff-grey tinge to back and wings. In sparrowhawk, legs are initially pink before turning yellow. Nestling eyes are grey-green before turning yellow as the animal grows.

Juvenile: On the sparrowhawk the white on nape of neck diagnostic. Upper parts dark brown with feathers rufus edged (broadly so across mantle), under parts white to pale buff with buff/rufus barring sometimes shows “V” shaped markings on breast and feathers on tibia. Goshawk underparts more buff with markings more akin to chevrons or teardrops. Chin and throat white but may show some brown streaking. Bright yellow eyes.



Figure 1: Juv sparrowhawk

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

Honey buzzard, rough-legged buzzard, osprey and harriers are migratory. Red kites known to overwinter in large roosts.

The distribution for some of these species is very limited and can aid identification (but be wary of migrating birds, dispersing juveniles and escaped pets etc). For instance, golden and white tailed eagles occur almost exclusively in parts of Scotland; all species of harrier and the osprey are restricted

to certain locations; red kites also restricted but becoming more numerous and widespread and the common buzzard has now been recorded breeding in all counties in England.

Prey for all is varied, except osprey which is eats fish almost exclusively. Small mammals are favoured by most but some species specialise in taking fish (white tailed eagle) or birds (hen harrier). Others will occasionally take larger prey or scavenge on carcasses (buzzards, golden eagle) and even invertebrates (buzzards).

Sparrowhawk

Resident with post breeding dispersal. The sparrowhawk is a bird of open areas, although it is spreading widely into urban areas where it may specialise on taking birds from feeding stations. However, the sparrowhawk prefers woodland and open country with dense hedgerows and copses. These birds perch openly on trees and other vantage points. They hunt on the wing, specialising in chasing birds targeting slower and weaker ones using surprise tactics but occasionally using speed to out-pace smaller species. Solitary except during the breeding season. Sparrowhawks prefer to roost in dense foliage (blackthorn thicket or a large hawthorn) or against tree trunk.

Goshawk

A woodland bird, preferring coniferous forest but will also live in broadleaf woodland. It is not as tolerant of man as the sparrowhawk and so is unlikely to be found in or around urban areas. Hunts both birds and mammals up to the size of a hare. An opportunist predator, often using ambush tactics to take prey in flight.

2.4 Notes on environmental enrichment

- Most birds of prey prefer to eat from a “feeding post” but will often use other platforms like old nests or even feed on the ground.
- 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. Evergreen shrubs are favoured (paragraph. 1.3 page 5).

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.
- 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. 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 larger birds of prey, 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. Note that the talons are usually more dangerous than the beak!

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. It should be noted that a study of injured sparrowhawks admitted into care at Stapeley Grange Wildlife Centre, only 24% were released due to the severity of their condition^{iv}.

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 1: Conditions that normally indicate euthanasia

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

- a) 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 a similar general licence for holding these species:

- WCAL 007 – allows authorised persons (including RSPCA inspectors) to hold a scheduled bird of prey for up to 15 days for the purposes of rehabilitation and/or a veterinary surgeon to hold a scheduled bird of prey for up to 6 weeks for veterinary treatment.

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>

Also note that some of these birds are listed on Sch 9 of the Wildlife and Countryside Act. Therefore a licence is required to release them, even from rehabilitation. In England, there is a general licence that allows such releases:

- WML GL22 – allows the release of a **native** scheduled bird of prey following temporary captivity e.g. rehabilitation;

However no general licence exists for Wales so to release a bird listed on Sch 9 in Wales, you will need to apply for a licence from Natural Resources Wales <http://naturalresourceswales.gov.uk/apply-buy-report/apply-buy-grid/protected-species-licensing/?lang=en#.UbGy9tLclIF>

5.3 Treatment on admission

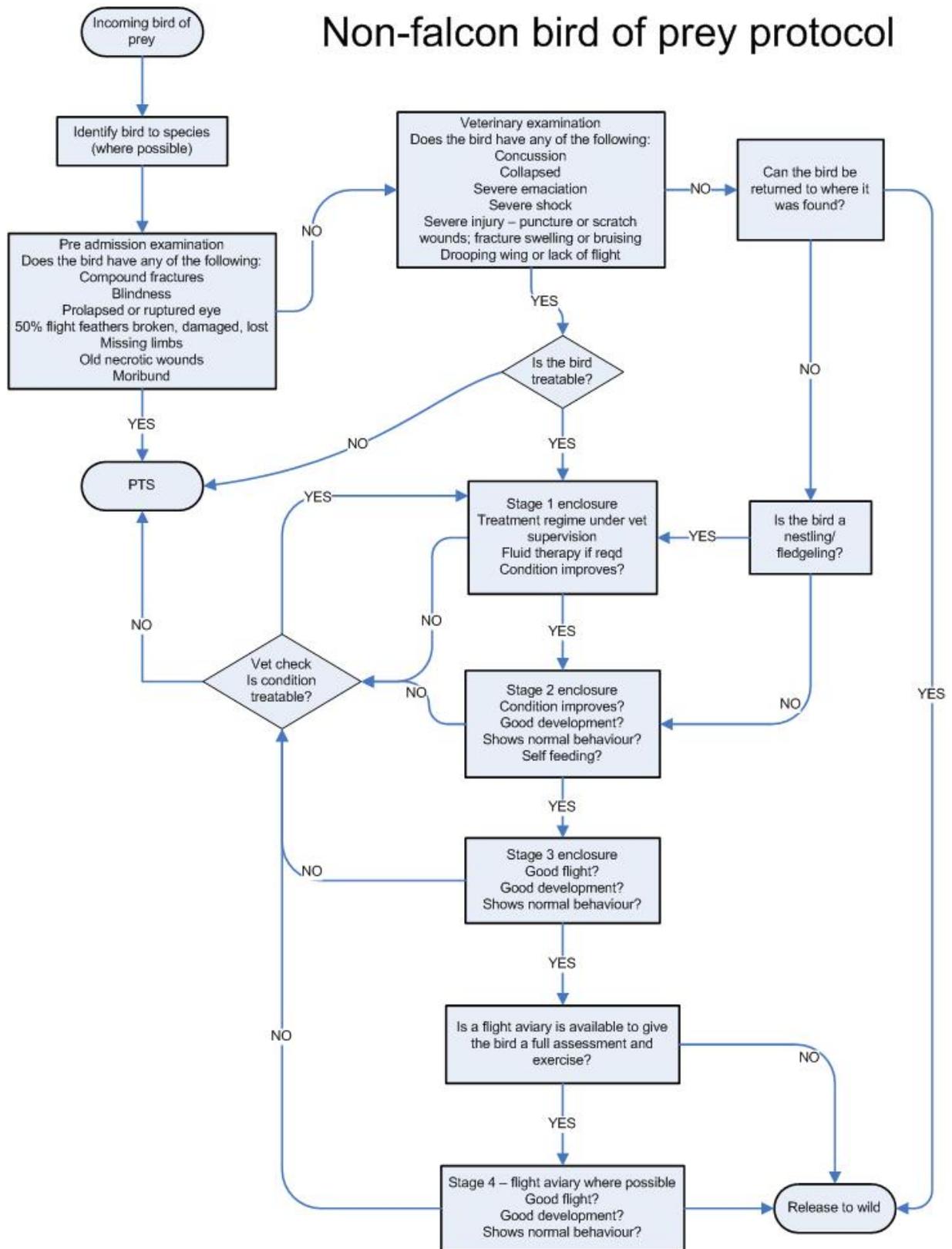
- All adult birds of prey are examined by the vet.
- Uninjured orphans may not always need veterinary care.
- Fluid therapy is required on arrival unless recently provided before transport.
- As a precautionary measure, and if required, fit a tail guard to adult birds that are under veterinary care and/or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

Non-falcon bird of prey protocol



6 Accommodation

6.1 Indoor 1 (Intensive care)

Enclosure

- Collapsed/emaciated raptors can be housed in a darkened cage or box approximately 100 x 75 x 80 cm in size (e.g Sky or Vari-kennels) while undergoing veterinary treatment. Note that if these cages have wire doors and/or 'windows' these should be covered to prevent feather damage; towels are useful for this.
- 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 about 2 x 1.2 x 2.5 m (a wildlife centre "intensive care cubicle" – see figure 2).

Substrate

- Nestlings not yet able to stand should be put on a non-slip base such as a shaped towel or placed in a heavy bowl (so it won't tip over) lined with paper towel.
- Birds that can stand confidently are placed on newspaper with perch/log or towelling/Astroturf base.

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 2.5 m 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 sparrowhawks can be housed in aviaries of 2 x 5 x 2.5mtrs
- Preferentially, all these larger birds of prey 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 1" x 1½" 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
- 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 20.
- 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.



Figure 4: external view of bird of prey flight at East Winch



Figure 5: internal view of bird of prey flight at East Winch



Figure 6: internal view of large bird of prey aviary at Stapeley Grange



Figure 7: internal view of small bird of prey aviary at Stapeley Grange

7 Food and feeding

7.1 Food in the wild

Buzzard

These large birds are adaptable feeders that eat a wide range of foods. However, they seem to prefer small mammals such as rabbit, and small rodents (voles and mice) but will take invertebrates such as beetles and earthworms. Will regularly scavenge. Some species may take other animals such as birds (from shearwaters to chickens), reptiles and amphibians.

Sparrowhawk

Feeds almost exclusively on birds: ♂♂ will take mostly smaller species - finches, tits, buntings and sparrows; ♀♀ will take larger species – thrushes, starlings and the occasional dove and wood pigeon. Will only rarely take carrion.

Osprey

The osprey however feeds almost exclusively on fish.

7.2 Captive diet

7.2.1 Adult

Species	Type of food	Amount and when to feed
Osprey	Trout	1 BID
Sparrowhawk	Two chopped or whole dead day old chick (DoC) for male, 3 for female. Quail or dead wild casualty birds can also be used – do not use birds that have been on drugs or euthanased using drugs.	Once a day () – morning and late afternoon. Total of food per day = 2 or 3 DoC can be fed as one or two meals morning and late afternoon.
Buzzard, Red Kite, Harriers, Goshawk	3-4 whole dead day old chicks or 1 quail or 6 - 8 mice Alternatives are rabbit or pheasant but check for lead shot.	Can be fed as one or two meals morning and late afternoon.

Table 2: Adult feeding table.

7.2.2 Young

Stage of growth	Type of food	Amount and when to feed
When their eyes open.	<p>Feed soft parts of chopped DoC minus head and legs or mouse.</p> <p>Offer food in front of the bird with tweezers to allow them to peck. Food can be left on ground between tweezer feeds.</p>	<p>Frequency of feeding will be determined by the age and ability of the chick.</p> <p>TID</p>
When standing unassisted.	<p>Fresh chopped DoC can be left to allow birds to pick up on their own. And hand feeding can be reduced.</p>	<p>TID</p>
When self-feeding from bowl or dish.	<p>Fresh food can be left in bowl</p>	<p>BID</p>

Table 3: 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 although the sparrowhawk may not take it initially.
- 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.

8.2 When to release

Refer to section 5.3.1 on page 15 for birds' physical requirements.

- All species should be released in the morning, and 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 is 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
Common Buzzard	550 – 1000	700 – 1300
Rough-legged Buzzard	700 – 1100	900 – 1600
Honey Buzzard	440 – 1050	360 – 1050
Red Kite	800 – 1200	1000 – 1300
Marsh Harrier	400 – 660	540 – 800
Hen Harrier	300 – 400	400 – 600
Montagu's Harrier	227 – 305	319 – 445
Osprey	1120 – 1740	1200 – 2050
Golden Eagle	2840 – 4550	3840 – 6665
White-tailed Eagle	3075 – 5430	4080 – 6920
Sparrowhawk	110 – 196	185 – 350
Goshawk	300 – 342	336 – 385

Table 4: 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 less dense, e.g. buzzards, 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 1 m 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^v.)

8.6 Tagging

- All birds should be BTO ringed before release. It should be noted that one buzzard, ringed as an adult on the 30/08/1984 at West Hatch, was readmitted in March 2008 nearly 24 years later. This shows the advantage of ringing these birds when they are released.
- Ensure any temporary identification marks are removed before release.

9 Areas for research

- Post release monitoring of buzzards to continue.
- Review of buzzard admissions to investigate reasons for admission and outcomes has been identified as being required.
- Patagial tagging for large birds.

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> .)
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.
Astroturf	<i>Vetark Professional</i> , PO Box 60, Winchester, SO23 9XN. Artificial turf

10.3 Additional Tables

Table 5: Comparative growth weights

	Sparrowhawk	Buzzard
Hatching	14-18g (will die under 12g)	40-45g
4 days	38g	
8 days	80g	
12 days	♂ 110g; ♀ 155g	
16 days	♂ 150g; ♀ 210g	
20 days	♂ 160g; ♀ 240g	
Week 3		440-450g
26 days	♂ first flights	
28 days		
30 days	♀ first flights	
Week 5		880-900g
Week 7		Venturing to branches
Week 8		First flights
Week 9	Independent of adults	
Week 16		Independent of adult

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 Buzzard. By Colin R Tubbs. 1974. David & Charles, Newton Abbot.

10.5 References

- ⁱ British Ornithological Union (BOU) website <http://www.bou.org.uk/recbrist1.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} Kelly, A. & Bland, M. (2006) Admissions, diagnoses, and outcomes for Eurasian sparrowhawks (*Accipiter nisus*) brought to a wildlife rehabilitation centre in North-West England. *Journal of Raptor Research* 40(3):231-235.
- ^v Redfern, CPF. & Clark, JA. 2001. Ringers' Manual. BTO, Thetford.