RSPCA Wildlife Rehabilitation Protocol: Mallard (Dabbling ducks)

RSPCA

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Wild mallards with an adult male (drake) top, an adult female, centre and ducklings.

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Protocol for the rehabilitation of the birds group including the MALLARD

(family Anatidae, subfamily Anatinae, tribe Anatini) Dabbling ducks

Contents:

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.

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 or group of species covered by this protocol

There are seven species of sedentary dabbling duck that commonly occur in the UK, and these include:

English name	Latin name	International name
Wigeon	*Anas penelope*	Eurasian wigeon
Gadwall	*Anas strepera*	
Teal	*Anas crecca*	Eurasian teal
Mallard	*Anas platyrhynchos*	
Pintail	*Anas acuta*	Northern pintail
Shoveler	*Anas clypeata*	Northern shoveler

Table 1: Species covered

The only dabbling duck not listed in Table 1 that regularly occurs in the UK is the garganey, *Anas querquedula.* This species is migratory arriving to breed in the UK during spring. It has never been admitted to a wildlife centre.

The mallard is the most likely species that will be admitted, as this is by far the most common duck in the UK it also associates with man and his habitat more closely than any of the listed species. (It is highlighted in the table above.)

Although the basic care regimes outlined in this document will apply primarily the captive care of the mallard there is significant cross over to the other wild species listed and to many hybrid species too. Additionally, these protocols can usually be used for the range of domestic ducks - both adult and young – received for care.

2.2 Identification of main species covered by this protocol

Adult

Mallard

The mallard is probably the duck most familiar to everyone.

Males are unmistakable with a bottle green head and neck with a white collar, dark brown chest, pale grey back, breast and upper wings. The bill is deep yellow in colour and the legs and feet are bright orange. A distinct identification feature of the male mallard is the (usually) two curled feathers above the tail. (This rarely shows in hybrids, which may be larger and occasionally show patches of white or darker plumage, often on the neck or upper wings.)

Females are brown spotted and streaked with brown less boldly marked on head and shows a clear dark line from the bill to the nape passing through the eye. The speculum[1] on both the male and female mallard is generally clear blue, edged with bands of white and black.

It is the mallard or domesticated forms of this species
that is most likely to be taken into captive care.

Wigeon

The male has a rich chestnut red head with a clear yellow-gold stripe from top of beak over the head. A deep buff-pink chest with the rest of the body a striated grey, the tail is black and the lower belly area white.

The female's body and tail is pale brown spotted and flecked with dark brown and black. The wings held over the back are dark flecked with pale brown. The head is a darker brown with small dark spots. The bill is clear grey with a black tip in both sexes and the legs and feet are dark grey to black.

[1] **Speculum**: This is a useful feature that helps in the identification of male birds when in their 'eclipse' plumage; see also the Glossary on page 15. See also section 1.2.1 on page 3 for a full description of 'eclipse' plumage.

Gadwall
Mainly a dark grey drake with a black tail, rump and vent; dark brown head with paler markings.

The female is very much like ♀ mallard but more slightly built, it also tends to be greyer. She has a dark bill with orange-yellow panels to each side. The speculum is white; but males may show chestnut coloured wing coverts.

Teal
A striking little duck, noticeably smaller than all the other species referenced here, with bold markings. Male has a chestnut coloured head with clear bottle green eye patch with fine cream edge. Body mostly grey; breast is buff with dark spots. Black below tail and soft cream above. Light green speculum. Grey bill.

Female coloured similarly to ♀ mallard but appears greyer – and of course its smaller size will help in identification.

Pintail
This bird looks large with a long slim neck and slender bill. As its name implies this species has a long, fine, pointed tail, the male's tail being longer and more distinct than the female's. The deep chocolate coloured head of the male extends down the nape of the neck to the back. The white underparts extend almost to the throat ending in an upward pointing stripe to each side of the neck. The back is grey with the black of the wings often showing. The tail is black. Its speculum is described as "metallic green glossed with bronze" which shades to white towards the trailing edge.

The female is brown with darker crescent or spots marking her flanks and a pale brown head. Darker brown wings provide a contrast.

Shoveler
A broad spatulate bill and seemingly oversized head make this species generally unmistakable. A bottle green head contrasting with a white chest, and chestnut belly that tapers to white and then to a black tail clearly distinguish the males. The back is dark and the speculum is green edged with black.

The female has the same shaped bill and her body has a similar "heavy" look and an all-over pale brown colour patched with spots and stripes.

2.2.1 A note on *Eclipse Plumage*

At the end of the breeding season some birds lose their sharp bright breeding plumage to become dull in comparison - this is called the *'eclipse'* plumage. The change into eclipse plumage is probably most noticeable in the ducks where the males (drakes) look like the females for a short period during the late summer. It is also during this time that ducks - both male and female - loose their flight feathers and cannot fly for between 3 and 4 weeks.

Young
The young of all the listed species are called ducklings and all resemble each other. Treatment is the same for all species when young and full identification can be made when feathered.

Fig 1: Ducklings in care.

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

- Nearly eight in every ten (77.7%) mallards admitted to RSPCA wildlife centres are orphaned ducklings. This means that over 840 individual orphaned mallards were admitted to the four RSPCA wildlife centres in the year 2007.
- Mallard ducklings stay in care at the wildlife centres for a mean time of 61 days (maximum stay 189 days).
- On average, the mallard ducklings' hatching weight is 32.4gms[i].
- A spring and autumn migration to and from the continent supplement the populations of all the residents of species listed here.
- Mallards rarely emigrate to the UK but numbers are subject to birds arriving from Scandinavia & Iceland during the autumn.
- Large flocks of all species (except garganey) will form in the winter.
- All these ducks have a complete moult of flight feathers during July and August that prevents flight for up to six weeks (usually 4- 5 weeks). See 'eclipse plumage 1.2.1 on page 5.
- Staff should be aware of the RSPCA Welfare Standards for Ducks[ii].

2.4 Notes on environmental enrichment

- Ducklings are social – but bullying may be a problem.
  - ➔ Avoid overcrowding.
  - ➔ Keep birds of similar size (and/or age) together.
  - ➔ Keep birds of a different colour separate but remember their social needs.
  - ➔ It is advised that wild and domestic ducklings are kept separately to reduce bullying.
- While in close confinement it is best to keep adult ducks and drakes separate. However, when on large outside pools general monitoring is required but it is mostly only the males of the domestic breeds that have aggressive tendencies.
- Grazing may be essential for wigeon.
- Teal occasionally use perches up to 2 metres above ground.
- The Shoveler may dive to depths of 80cms but stay underwater for only relatively short periods of time (5 seconds).

Fig 2: A group of ducklings.

3 Pre-admission treatment.

This part of the protocol is to provide 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/orphaned duck 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. Some, if not all, of these facilities may request information on care of the animal, before they send it to an RSPCA centre.

Does the duck need to be admitted? Try to determine if the bird needs treatment, if it can be treated on site or left alone?

NOTE: in all cases ensure that the bird is really in need of care. Consult the Society's *"Leave me Alone"* campaign material.

3.1 Information should be collected on the following:

a) Species.
b) Extent of injuries, evidence of shock.
c) Body condition, any previous injuries.
d) Age of animal - duckling or adult.
e) Location animal was found (important for the animal's future release).
f) Ringed or not ringed.
g) All records of previous treatment (if from another establishment).

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

- Diets – see below
- Once warm, keep at room temperature.
- Keep good ventilation.
- Keep adult males (drakes) on their own in separate boxes.
- Mother and ducklings may be held in the same container but ensure adequate space, and good ventilation.
- Young of the same age or brood may be housed together but do not crowd.
- Keep away from predators including cats and dogs.

3.3 Advice related to the treatment of particular problems.

Advice should be given regarding Society policy relating to the rehabilitation of permanently disabled casualties.

3.4 Advice regarding the fitness of the animal for transport.

- Ensure birds are adequately hydrated before travel.
- Standard RSPCA cardboard pet carriers (45 x 35 x 25cms) are suitable containers for holding individual adult dabbling ducks.
- In warm environments the feet are essential as heat regulators – keeping the feet cool is advantageous.
- Downy ducklings can be more susceptible to heat stress and will need more ventilation.
- Ensure there is sufficient space to prevent (further) injury during transit.
- Be aware of the long tail in the pintail - do not bend it as it may break.
- Small ducklings of the same brood can be transported in a standard cardboard pet carrier together but do not overcrowd. A maximum of 6 ducklings under 1 week old is recommended.

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 ducks 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 ducks and to keep dogs etc away from injured wildlife.

Hazards	Control measures	Level of risk
Bites and scratches	Gloves to be used when restraining	Low
Diseases/Zoonoses Duck Viral Enteritis Botulism	Gloves should be worn when handling Treatment areas must be cleaned thoroughly after examination	Low
Parasites	Gloves should be worn when handling	Low

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

5 Decision making – to treat or not to treat

5.1 Information should be collected on the following:

a) Species
b) Extent of injuries, evidence of shock
c) Body condition, any previous injuries
d) Age of animal,
e) Location animal was found
f) All records of previous treatment (if from another establishment)

5.2 Triage

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

5.3 Assessment relevant to the condition of the animal

Eggs will not be accepted for hatching.
Euthanasia is recommended for animals showing the following:

- Compound fractures (including exposed bones).
- Blindness
- Missing limb.
- Seriously damaged, overshot or undershot beak.
- Individuals that are *in extremis* or clearly moribund.
- It has been reported that mallard ducklings that weigh less than 28gms are at the greatest risk of death within the 48 hours following admittance[iii].

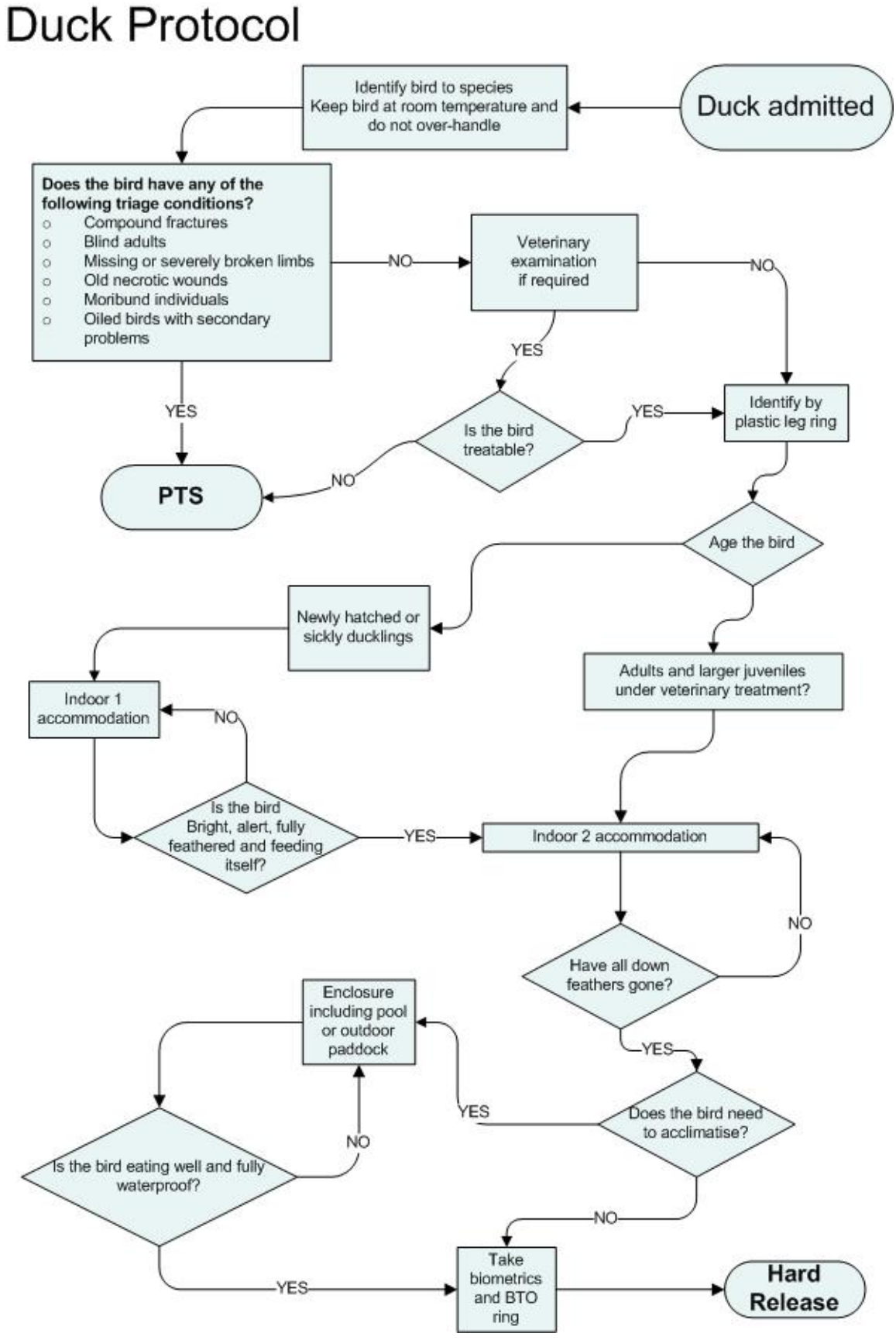
Rapid release is recommended for the following:

- Mallard ducklings may be accepted by their family if they are returned within 24 hours. Therefore the decision to release must be made within this period. Ensure that the duckling is fully accepted.
- Where fishing litter and hooks are removed from adult ducks on site or at a specialist facility (including a local veterinary surgery) and where there is no obvious injury.
- Families of ducks collected from “unsafe” areas and which are on their way to known waterways.

5.4 Assessment relevant to the Centre and the management of the animals

- Birds should be delivered and placed in care as soon as possible after finding as birds without food, water and heat for more than 5 hours are most vulnerable to death within 48 hours of admittance[iii].
- The majority of ducklings in the wild die within the first 12 days of life[iv].
- On average, orphans are held in care for about 9 weeks; a holding facility is needed to rear ducklings to adulthood (see later)
- Individual identification via temporary leg ring may be necessary when groups are cared for. However, where large groups are cared for this may be impractical and only those on special treatments may be individually marked.
- Birds may be weighed when handled to monitor progress and development but bird numbers may prevent this.
- A useful guide to ageing mallards can be found in a paper by Gollop (1954)[v]. Although this is an American work the system is widely used in the UK.

5.5 Flowchart



6 Accommodation

The progression from *Indoor1* to *Indoor 2* to *Outdoor 1* to *Outdoor 2* represents the movement of an animal through the Centre as its condition improves. Not all of the categories will be applicable to all these species, their condition etc. The need for environmental enrichment should be identified and used wherever possible in each of the following sections.

6.1 Indoor 1 (Intensive care)

Enclosure

Ducklings

- Newly hatched and small sickly ducklings may be kept in incubators for three to five days.
- Up to 6 hatchling ducklings can be kept in incubators of 0.7m x0.45m x 0.3m.
- Broods consisting of birds of the same age can be mixed if space is limited.

Substrate

- These birds need a non-slip substrate – towels or sheets are ideal.
- In incubators, newspaper covered with towels is suitable.
- Camping mats or *Astroturf* can be used as alternatives for older ducklings.
- Do not use hay, straw, shredded paper or similar materials these may tangle around legs and may even cause respiratory conditions[xiv].

Lighting requirements

- No additional lighting is required – room lighting is sufficient.
- Normal daylight hours are recommended (max 18 hrs daylight and 6 hrs dark[vi]) as increasing them may be harmful to the future breeding capabilities.

Temperature

- In bays (see above), suitably placed heat lamps for small or sickly individuals provide a temperature gradient (Forbes, In Benyon 1996[xiv] recommends 32-34°C decreasing by 3°C weekly until young are 5 weeks of age)

Ventilation

- Good ventilation is required at all times.
- Avoid draughts.

Humidity

- With raised temperature, humidity will be slightly raised.
- Ensure good ventilation to avoid stagnation of air.

Access to water

- Very young in incubators should not be allowed to bathe.
- A shallow pebble-filled bowl of drinking water should be provided (see figure 1).

Environmental Enrichment

- Contact with siblings or other similarly aged individuals.
- Pebble-filled bowl of water for drinking purposes.

Fig 1: A pebble-filled water bowl

6.1.1 When to move to next stage

- Ducklings are moved from incubators when they are approximately 3-5 days old.
- Sickly ducklings can be moved once bright and gaining weight.

6.2 Indoor 2 (less intensive monitoring)

DUCKLINGS:	INDEPENDENT, FULLY GROWN BIRDS (IMMATURES AND ADULTS):
• Older ducklings can be kept in bays measuring 1.5m x 1.2m. • Bays of this size may be suitable for as many as 12 ducklings up to 3 weeks of age. • Broods of the same species and similar ages may be mixed if space is limited. However these groups should be monitored to separate birds if bullying occurs.	• Different species will be kept separately. • Intensive care cubicle – 2 x 3m for up to 4 birds. • If housing individually, or if cage rest is required, a cage measuring 1m x 1m x 1m can be used.

Table 3: Enclosure for ducks before being moved outside

Substrate
- A non-slip substrate is essential in all areas.
- Clean sheets, large towels or Astroturf covers soft camping mats.

Lighting
- Natural daylight
- Normal room lighting

Temperature
- In bays (see above), suitably placed heat lamps for small or sickly individuals provide a temperature gradient (Forbes, In Benyon 1996[xiv] recommends 32-34°C decreasing by 3°C weekly until young are 5 weeks of age)
- Older ducklings and adults can be held at normal room temperature.

Ventilation
- Good ventilation is required at all times.

Access to Water
- Fresh drinking water must be available at all times and drinking fountains are useful in preventing excessive spillage.
- Bathing facilities can be provided as long as there is access to a safe heat source to dry the birds.

Environmental Enrichment
- Shallow litter trays of water should be provided for ducklings over 2 weeks of age.
- To avoid bullying provide a number and range of shallow food and drinking trays.
- Provide access to grazing materials. Small grass turves may be provided for grazing.

Fig 2: Drinking fountain

6.2.1 When to move from Indoor 2 to Outdoor 1 or Outdoor 2

- Any duck/duckling must have completed a 7-day quarantine period inside before being moved outside. When in a settled group, the most recent addition to the group should have completed this period.
- Ducklings can be moved to Outdoor 1 once they are 3 weeks of age. This can be done earlier but the ducklings will need access to heat and cover; alternatively, they can be brought in overnight.
- At this age they will have started to gain feathers on their breast and belly. They will retain some fluffiness on the back.

- Adult ducks can be moved to Outdoor 2 once they have finished treatment and a vet or experienced staff member considers they are fit enough

6.3 Outdoor areas are used for both primary holding and holding prior to release.

6.3.1 Outdoor 1 - Ducklings

Enclosure

- A fenced pen 4m x 4m, preferably within a fully enclosed paddock. However, if not covered there should be netting over the top to avoid predation of young ducklings by crows, etc.
- Up to 15 ducklings aged 3-5 weeks can be housed in one pen.
- Ensure that high numbers of ducks do not create puddled or stale areas by rotating and resting different pens. Keeping numbers of ducks as low as possible will keep the substrate fresh.
- A small pool approximately 1m in diameter should be available (hard sided children's paddling pools can be used). Ensure ducklings can get off the pool, rubber matting or Astroturf around the edges and on ramps can help provide grip.
- Ideally, bathing water should be changed daily. However, water systems vary and this may not be possible or practical however, water must not be allowed to stagnate or become over-fouled. A weekly water change should be regarded as a minimum.
- There should be access to a shelter within the pen measuring 2m x 1.5m x 1m. Ducklings should be shut in here overnight and let out again first thing in the morning.

Substrate

- A range of good, environmentally enriching substrates is available but may create additional management problems, examples include grass and gravel.
- "Resting" natural substrates will give them time to recover.
- Concrete and gravel substrates must be kept clean. However, these surfaces may produce sores and foot infections and should be regarded as temporary substrates only.
- Where concrete bases are used they may be covered with camping mats or Astroturf to provide a softer substrate. Concrete bases may be more easily kept clean but provide poor enrichment and may cause injury.

Access to Water

- Free access to bathing water *and* provision of fresh drinking water in shallow bowls.

Environmental Enrichment

- The company of other ducks is an ideal.
- Provide grazing where available (summer)
- To avoid bullying provide many filled food bowls and drinking trays.

When to move ducklings from Outdoor 1 to Outdoor 2

Mallard ducklings can be moved to Outdoor 2 (waterfowl paddock) at 4-5 weeks of age once breast and belly feathers are well developed.

6.3.2 Outdoor 2

Enclosure

Decisions of whether a bird is fit for a move to an outside paddock/aviary should remain with a senior member of staff.

- Open paddock with access to pool facility.
- A net roof will prevent birds taking off and will also prevent other birds entering the paddock. **Note:** Mallard are particularly good at almost vertical take-off from both water and land.
- Ensure that high numbers of ducks do not create puddled or stale areas by rotating and resting different paddocks. Keeping numbers of ducks as low as possible will keep the substrate fresh.
- Concrete areas around pools reduce mud and debris entering the pools and help keep areas cleaner.
- The paddock should be primarily laid to grass.
- The grassed area must have good drainage.
- A concrete pool should be available with varying depths up to 1m.
- The pool should have a central drainage facility.
- Ensure birds can get off any pool at all times. Gently shelving sides to the pool may enable easy access and egress.
- Depending on water supply, water should be changed daily. (At minimum water must be changed every week.) This is particularly important where large numbers of waterfowl may be held.

Substrate

- A range of good, environmentally enriching substrates should be available but may create additional management problems, examples include grass and gravel.
- "Resting" natural substrates will give them time to recover.
- Further information and details on grassland management for wildfowl is available in a range of references and two early papers by Merfyn Owen may prove useful[vii].
- Concrete and gravel substrates must be kept clean. However, these surfaces may produce sores and foot infections and should be regarded as temporary substrates only.
- Where concrete bases are used they may be covered with camping mats to provide a softer substrate. Concrete bases may be more easily kept clean but provide poor enrichment and may cause injury.

Shelter

- Shelter is generally unnecessary in the paddock area.

Access to Water

- Free access to bathing water in pools *and* provision of fresh drinking water in shallow bowls.

Environmental Enrichment

- The company of other ducks is an ideal. Other, larger species may also be housed in the same enclosure but watch for aggression particularly by mute swans.
- Provide grazing where available (summer)
- To avoid bullying provide many filled food bowls and drinking trays.

6.3.3 Outdoor enclosure *to* Release (or Release Pen)

Decisions of whether a bird is fit for release will remain with an experienced senior member of staff.

- All birds suitable for release must be clear of any veterinary treatment.
- The bird has been declared fit from a veterinary viewpoint.
- The bird's weight is good and sustained.
- All birds should be able to fly except that moulting birds may be released into established wild flocks.
- It has a suitable habitat to be released into.
- Young ducks can be released when fully fledged.

Figure 3: A group of nearly fledged ducklings feeding. These ducks are on a large outdoor pool in preparation for release.

7 Food and Feeding

7.1 Food in the wild

Adult

- See Table 3 below.
- All dabbling ducks feed on a wide range of grasses, seeds, insects, crustaceans and molluscs.
- Mallard and pintail regularly "upend" to gain access to vegetation deeper in the water.
- Mallards will take insects by running at them and snapping them up while on the move[viii].
- Eelgrass (*Zostera sp*.) is an important food for all dabbling ducks in winter and is especially so for migratory birds[ix].
- Shoveler will dive up to 80cms but stay underwater for only relatively short periods of time (5 seconds[x]).
- For the pintail there are peaks of feeding activity in the late morning and late afternoon.

Species	Foods
Wigeon	Grasses, aquatic vegetation (including *Zostera sp.)* – often grazes on grassland and emerging grains particularly in large flocks during winter
Gadwall	Vegetation taken from just below the water surface rarely "upends".
Teal	Mostly seeds of waterside plants – proportionately more insects taken in summer
Mallard	Omnivorous – including; grasses, grains, sedges, seeds, insects, crustaceans molluscs and tadpoles. Regularly "upends" to gain access to deeper food items. In certain habitats over 90% of diet made up of vegetable matter.
Pintail	Variable according to habitat and location but usually aquatic vegetation taken by "upending" and taking food from the muddy bottom. In most areas vegetable matter is taken in the summer with more insects taken during the winter (up to 65%[xi]).
Shoveler	Wide range of crustaceans, molluscs and insects taken while surface filtering with the large spatulate bill. Dives for food more frequently than other dabbling ducks.

Table 4: Diet of adult dabbling ducks

Young

- Ducklings feed independently of their parent. However, the parents support and direct the young to suitable foods and bring food within reach.
- Mallard ducklings take a higher proportion of insect food than vegetable matter (60.6%) up to the age of about 12 days but in the following six weeks the average animal intake is only 5.1%[xii]. This proportion is important to reduce the potential of angel-wing – see 5.2.3 on page 17.
- Up until around 19 - 25 days young mallard do not submerge their nares when feeding. However after this time birds will feed below the water and also by upending.
- After 25 days mallard young will gradually transfer from a diet made up predominately of insects to one of vegetables, mainly seeds. In some diets this can be as much as 80% seed based mainly around *Rumex sp., Carex sp.* and *Hippuris* (docks, sedges & mare's tail).
- Young teal take a very high proportion of insect food.
- Insects make up 61% of young, pre-fledging pintail food intake.

7.2 Captive diet

Adults

Basic ingredients for all species:

- 200gms mixed corn
- 100gms layers pellets
- Floating pellets *ad lib*
- Greens *ad lib* (grass & other chopped greens eg. lettuce, cabbage, spring greens)
- 1 to 2 slices of brown wholegrain bread
- Top up feed bowls as necessary

When ducks are kept inside, grit must be available *ad libitum* alongside the standard diet.

For sickly or weak birds unable to feed for themselves:
- A mix of *Zoolyte* and soaked chick crumbs administered by crop tube 30ml twice/day
- OR
- AD diet and *Complan* in *Lectade* administered by crop tube 30ml twice/day

This is provided until the bird is eating for itself.

Young

Ducklings up to 5 weeks of age
- Finely chopped greens (see list for adults above)
- Growers pellets[2], layers mash[3] or chick crumbs. Due to high protein content do not overfeed.
- Grit

For sickly or weak birds unable to feed for themselves:
- A mix of *Zoolyte* and soaked chick crumbs administered by crop tube twice/day roughly 1/40th body weight.
  - OR
- AD diet and *Complan* in *Lectade* administered by crop tube 1/40th of body weight twice/day
- This is provided until the bird is eating for itself.

7.2.1 Frequency of feeding

Adults and young
- Food provided *ad libitum*.
- Freshened at least twice daily.

7.2.2 Supplements

- Vitamin/mineral supplements (eg. SA37) may be used where necessary.

7.3 A Note on "angel-wing"

Care should be taken with the feeding of ducklings as there is a risk of the birds developing "angel-wing" or "slipped-wing". The theory is that providing too much protein in the diet produces rapid growth in the bones such that normal ossification does not occur. The additional weight of the wing twists the bones creating a wing that looks as though it has grown "inside-out". The result is a bird that, when fully grown, cannot fly or worse that the wing tips drag along the ground causing continuing severe injury. Attention to detail in the proportion of protein to carbohydrate is key in the prevention of this condition. For more information see Kear 1973[xiii].

7.4 Notes on feather development

7.4.1 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.

[2] **Growers pellets** contents: protein 15.5%, Ash 6.1%, fibre 4.5%,,oil 4%, methionine 0.3%. Ingredients: 40% - 100% inclusion – wheat; 25% - 10% inclusion wheatfeed; 10% - 0%- Ext Hi-Pro soya from GM beans, confectionery products, maize germ meal, rapeseed meal, molasses; calcium carbonate; Di-cal phos; salt; Vit & min premix; Sodium bicarbonate; methionine.

[3] **Layers pellets** contents: Protein 16% Oil 3.6% Fibre 3.3% Ash 12% moisture 14%. Ingredients: 40 – 100% inclusion – wheat; 10 – 25% inclusion: wheatfeed; 0 – 10% soya; limestone, de-hulled Soya bean meal, maize, beans, barley, grass meal, mineral/vitamin supplement.

7.4.2 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.

7.4.3 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.

7.5 Environmental Enrichment

- Provide food in a separate shallow bowl not in the pond.
- For young, ensure they cannot sit in their food. This prevents them getting food all over their down feathers.
- Water can be provided in shallow bowls so that it just covers a layer of small stones so that ducklings cannot drown[xiv].
- Although waterfowl may appear to be easy to feed, variety in the diet is important to their general well-being and may affect their later breeding potential[xv].

8 Preparation for release

8.1 Training the animal for survival

A good range of environmental enrichment provided through its time in care will benefit its release to the wild and its long-term survival.

8.2 When to release

- A morning release gives the bird/s time to find food, shelter and orientate themselves before dark.
- Windy days are best avoided, as birds need to establish themselves before flying off.
- Fledging mallard ducklings fly at a lighter weight than full-grown adults (♀♀ 740 and ♂♂ 817[i]).

	♂♂	♀♀
Wigeon	252 - 281gms	242 - 262gms
Gadwall	650 - 1000gms	550 - 850gms
Teal	250 – 450gms	200 – 400gms
Mallard	850 – 1450gms	750 – 1200gms
Pintail	267 – 282gms	254 – 267gms
Shoveler	500 – 800gms	470 – 750gms

Table 5: Weights of wild dabbling ducks

- Mallards are fully fledged at 8 weeks old.
- Young mallard reach their adult weight during October or November.
- Young pintail will reach adult weight from early September.

8.3 Where to release

- Adults should be returned to the site of finding providing it is suitable. Where sites are unsuitable they can be released into the nearest well - established flocks.

8.4 How to release

- Groups of up to 30 or even 40 ducks may be hard-released at a time into suitable environments.
- It is essential to ensure suitable supplies of vegetable matter at all release sites.
- Most waterways may be considered suitable including ponds, lakes, rivers, and canals.

8.5 Information taken prior to release

- Weight and basic biometrics may prove to be useful data.

8.6 Tagging for later identification

- All temporary ID must be removed.
- All birds should be ringed with BTO rings.

9 Areas for research

10 Annexes

10.1 Glossary

♀;♀♀	Female; females
♂; ♂♂	Male; males
Ad libitum	Free feeding; free access to food.
Angel-wing	A condition of the wing where the bones are twisted creating an "inside-out "look to the wing and ultimately preventing flight. Also called "slipped-wing". See section 5.2.3 on page 17 for a more detailed description.
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 *Ringers' Manual*[xvi].
BTO	British Trust for Ornithology
cm	Centimetres
Coverts	Structure feathers on wing.
Drake	The male of the species.
Duck	The female of the species.
Eclipse plumage	See section 1.2.1 on page 5 for full description.
gms	Grams
ID	Identification
Kg	Kilograms
M	Metres
ml	Millilitres
mm	Millimetres
Nares	Nostrils
Slipped-wing	See Angel-wing.
Speculum	A patch of colour on the wing in dabbling ducks.

10.2 Products named in the text

Astroturf	A brand of artificial turf. Usually made from plastic and rubber with additional fibres for realism.
Complan	A whole-food dietary supplement – widely available. *Complanfoods Ltd., Imperial House, 15-19 Kingsway, London WC2B 6UN.*
Lectade	An oral rehydration preparation available either in liquid or powder forms. Available from most good pet stores.
SA37	A complete vitamin and mineral supplement. *Intervet UK Ltd, Walton Manor, Walton, Milton Keynes, MK7 7AJ.*
Zoolyte	A water soluble oral rehydration and probiotic supplement. *International Zoo Veterinary Group, Keighly, N Yorkshire, UK*

10.3 Plant species named in the text

Zostera sp.	A range of aquatic grass-like plants of estuaries. Eg. *Zostera marina* or common grass-wrack (also known as eelgrass and seagrass).
Hippurus	Usually, *Hippuris vulgaris,* Mare's tail.
Carex sp.	Sedges

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