

# EAZA Falconiformes and Strigiformes TAG

## **Husbandry and Management Guidelines For free flight demonstration birds**

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## 1) Introduction

Frequent and consistent feedback from visitors to zoological collections and specialist centres view free flight demonstrations that feature multiple species of birds as one of the most inspiring ways of observing behaviour and educating visitors to ornithology and an understanding of conservation needs. A more varied repertoire of behaviours can be encountered with a greater variety of choice when a bird is flown free from the confines of all but the largest of aviaries. No matter how large or elaborate an enclosure, there are often limitations to the novel experiences and behaviours that can be achieved within it.

Free flight demonstrations, also afford the opportunity to present species to the public that are less commonly seen in collections. This may be due to the inactive nature and poor display potential of the species in an aviary, or to the fact that the species fares less well when placed in aviaries on public display. Many falcon species fit these criteria. Without free flight demonstrations, this impressive group of birds is rarely encountered in zoological collections.

A degree of enjoyment and education should come from the interpretive message delivered by presenters but a key factor for many comes from the lack of barrier between bird and visitor and experiencing birds in free flight.

In order to manage the husbandry of “demonstration birds” we must look to factor in all aspects of management that optimise the welfare of the participating bird or species as well as the wellbeing of the broader animal collection and native wildlife in surrounding areas. Our responsibility to ensuring that we educate the public does not stop at the message we deliver in a demonstration. It is within every aspect of managing a captive animal in a “free flight” setting.

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## 2) Aviary design and holding facilities for free flight birds

- Any aviary, regardless as to whether the inhabitant is flown free or not, should provide the basics of shelter; enough space, light, a horizontal view to the outside, varied perching, water, heat should the species require elevated temperatures for all or parts of the year, protection from predators and pest species and provide the bird sufficient opportunities to behave naturally. (Tethered species will be covered under the specific topic).



Figure 1

- Aviary dimensions should provide sufficient space for flight and at the very least therefore be wide enough for any inhabitant to fully open its wings. There must be suitable distance between both fully stretched wing tips and the sides of the aviary enabling safe flight without wing tips being damaged on the internal sides. However we would recommend that the dimensions give the bird or birds enough space to fly around freely, particularly if the birds are in there year round for demonstrations and moulting. It is advised in some veterinary guidelines that the space should be three times the span of the wings of the bird housed.

Where species specific husbandry guidelines exist, these should be followed according to aviary dimensions and perching. Free flight opportunities should not excuse less than suitable aviary accommodation.

Whilst it is recognised that there are “generic aviaries” that will be suitable for multiple species; the design of the aviary must factor species specific or family specific features that are beneficial to the welfare of the bird.

- Birds but particularly raptors that are known to hold on to wire when free lofted can damage wing tips, tail feathers, cere and talons in more extreme case. This can be the case with many trained raptors where their feet are not adapted for climbing.  
Feather damage inhibits flight and gives the impression that the bird is in poor condition. To counter this, for many free lofted raptor species (kites, caracaras, hawks, eagles and falcons), it is advisable to utilise solid sided aviaries with strategically placed mesh (weave mesh or similar) at areas allowing the birds to look out but not grip the wire. It is advisable that the aviaries or outside viewing areas are placed in a manner, that inhabitants cannot see other birds flying. When they observe conspecifics being trained this can be a motivation to fly against/to the wire.
- Partially meshed roofs enhance the light to an aviary whilst providing basking and showering opportunities in sunshine and rain but can lead to disease risk

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from droppings left by wild birds overhead. Larger areas of mesh can also work provided the bird is at ease with the accommodation and keepers and there is sufficient space for the bird to move away from negative factors without hitting the mesh (Fig 1). It is advisable in regions where avian predators are present to use 2 layers (20-30 cm gap/distance) of mesh or similar to prevent contact between free-flown birds and/or free-ranging raptors. Eagle owls or goshawks sitting on the mesh roof can grab captive bird through the wire.

- Should disturbing factors occur that are visible and stressful to the inhabitant, such as aviary cleaning during periods of moulting these areas of mesh can be easily covered for this duration (Fig 2)



Figure 2



Figure 3

- A common alternative to this design is the utilisation of round, rod doweling (Fig 3) as a replacement to mesh. This provides excellent viewing opportunities which are so important to the enrichment and welfare of raptors particularly whilst preventing the bird from gripping onto the rods for any prolonged time. Should they do so it is not going to cut or injure talons and tail feathers slide through the gaps preventing damage? Where dowelling is used it should have a solid core or be of a dimension enough to prevent flexing. Flexing can place an inhabitant at risk of escape or predation from larger predators such as foxes, martins and feral cats. Separation gaps between the dowelling should be of a size to prevent known predatory species within the area from entering the enclosure or alternative method of pest proofing must be implemented. Keeping the open part of the enclosure well above the reach of external predators such as foxes is sound practice. Needless to say, no bird should ever be fed through the mesh as this will encourage the bird to fly to it. Whilst this should be obvious, inexperienced trainers may still do this.
- The addition of solid walls also benefits species within adjoining aviaries should one be predatory to another. Double mesh may provide protection but it allows for a visual between enclosures which can further encourage wire gripping as well as creating a stressful environment should species be fearful of a neighbouring bird.
- Caracaras and Gymnogenes are well known for attempting to reach adjoining aviaries and the trait is not un-common for many raptors, particularly if they are on a weight managed program for training. Whether using mesh, netting or dowling, the material must be strong enough to withstand and attempts to damage it. Psittacines, Corvids and Caracara's for example are powerful, inquisitive species and will make

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their own enrichment, often to the detriment of the aviary which is why enclosure furniture, enrichment programs alongside appropriately designed and constructed aviaries, specific to the species are important.

- It is probably fair to say that there is no barrier yet invented that is 100% safe for all species whether steady in an aviary, or very nervous. Each bird should be treated as an individual and managed as such.
- It is often the case that an aviary for free flight birds is of smaller dimensions and frequently less furnished than those of birds exhibited to visitors. Visitor “pleasing” aesthetics are not a requirement but the fact that the facility is often “off show” to visitors should not necessitate for any less of an enclosure.
- Off show accommodation should provide the same benefits as an exhibit on public view in terms of adequate perching, space, provision of enrichment, suitable substrate, heat, shelter, water supply, cleanliness and external visual interest for the inhabitants. In many respects, having an off show facility allows for the inclusion of artificial and often less aesthetic but functional additions such as AstroTurf or various enrichment devices frequently used for many parrots in areas which we might not include in a publicly viewed aviary.
- When factoring in off show demonstration housing we should consider whether we would be content to show visitors and colleagues from other collections the enclosure with the same confidence and openness with which we show off our public facing exhibits.

*The difference between many on-show and off-show aviaries is that there is no necessity for stand-off barriers in the off-show areas, and furniture is functional but often less aesthetic as the public do not have access to these. The dimensions are still suitable for the species housed there and the birds have the same variety of perching and sheltered areas as in the on-show aviaries.*

**Aviary accommodation needs to be provided not only for the demonstration or free flight season; it must provide an adequate facility in which the bird can moult during it's off show period. For many species that do not require regular Human interaction during their rest period, (particularly many parent reared, solitary raptors), the inclusion of “spy holes”, food hatches allow for observation of birds and delivery of food during more sensitive periods that reduce disturbance to the bird. CCTV is also an increasingly employed method of observing birds during resting and breeding periods whilst minimising disturbance. If breeding from demonstration birds then the aviary should consider this requirement and be of sufficient dimensions to facilitate breeding if the bird is not to be moved to a specific breeding aviary. The best management practise also facilitates a double door system which is crucial. A service passage where entry to aviaries, feeding, monitoring, cleaning, and providing fresh water can all be done in safety.**

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## Seclusion Aviaries

- As the name suggests, these are aviaries frequently utilised for moulting periods of many birds of prey that do not benefit from the same levels of enrichment and interaction as many other species. Disturbance during this period can be problematic to many raptors and stressful without the positive association with the trainer and food.

Seclusion aviaries are designed to create minimal disturbance. They seclude the bird from external influences and are usually designed to be four solid walls with a partially meshed (double meshed) roof to allow light and access to other elements. The concerns with these aviaries are that a bird does not get used to external factors which will make novel experiences abundant once the bird is removed for re-training the following season.

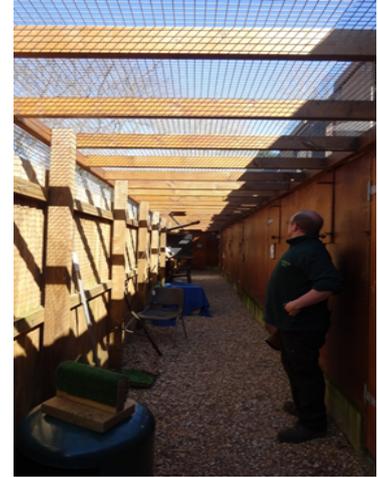


Figure 4

Some believe that seclusion aviaries actually cause sense deprivation as the bird is only able to see sky and little else. Most birds that require seclusion during moulting will happily accept a high window with a perch inside and a view to the outside

- The primary sense of any bird is sight. The enrichment created from varied visual stimulus within an aviary with even partial visibility to external factors should be considered a significant benefit. Birds in demonstrations should be conditioned to multiple varied experiences. This should negate the need for seclusion aviaries for the majority of display birds within most zoo's and species selection should factor into this.
- Any aviary for free lofted birds needs to include a safety mechanism factored into the design that prevents a bird from escaping the aviary when a keeper or trainer enters the area. It is not sufficient to suggest that a bird is trained and therefore is unlikely to fly out unexpectedly. At the very least safety flaps should be a considered but preferably a double door system or external corridor (Fig 4) should make up a safety area before an aviary is entered. Not least as the aviary is also entered during non-show seasons and birds have not been trained or flown free for any length of time making the safety system integral.
- If the facility is correctly designed and planned, it could be of sufficient proportions for the corridor to be used as a training space. This will allow for box training, scale and station training or for allowing the bird to gain confidence with its trainers before it is eventually flown free
- As with any aviary, facilities should be locked at all times when not in use to prevent un-welcome access from unauthorised visitors. Birds featuring in demonstrations can and have warranted attention from thieves with recent examples in Europe where trained birds have been stolen to order. This has been documented particularly with Falconiformes, Strigiformes and Psittacines.

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- All aviaries should be under meshed or built on a concrete base to prevent unwelcome predators from digging into the aviary. Stoats, foxes, rats and mink are all capable of killing a wide range of species when they are roosting, including the largest of eagles. If concrete is used, then a suitable substrate such as sand or pea gravel should cover the concrete to a depth of 4 inches. A routine pest control program that excludes the use of poisons should be implemented around aviaries.
- It is not unusual to have some species housed within a public exhibit that are also included within free flight displays. Where this is the case and food management is a requirement, birds should be weighed prior to the display and behaviour assessed to insure that interaction between the bird(s) and visitors will not affect the birds' behaviour in a display. This is particularly important for species with a broad diet which are naturally inclined to scavenge a broad variety of food. Corvids, Psittacines and Caracaras are well documented to have taken food from visitors which have then altered behaviour and response during a public demonstration. This can contribute to a fixation on the public with food items which is a habit very difficult to break as well as resulting in lost birds.



Figures 5 and 6

### 3) Aviary or holding area, transportation to displays

- The preferred location and the most efficient for holding birds featured in demonstrations is at the periphery of the area in which the birds will be flying. This enables birds to remain within an aviary from which they can be released preventing the need to box and transport birds from elsewhere within the collection. However care needs to be taken in the design if tethered birds are likely to be too close to the free flying area, bearing in mind that some raptors will happily kill others, particularly those in a vulnerable situation. It is also advisable that aviaries are designed to prevent predatory species currently being flown from seeing birds within aviaries and vice versa.
- This requires the design of the aviary to feature a slide or release mechanism that can be manually or remotely operated. If the facility is in close proximity to the display area, a manual mechanism is preferable and cannot release birds through a system failure with the exception of Human error (Figs 5 and 6).

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Figure 7 showing the locked slide release

- This has the added benefits to welfare in that a bird is not kept in a box for any length of time.
- Improved efficiency, the display is all managed in one key area.
- Safety benefits if vehicles are not required to transport birds around a busy site to attend a display.
- Flying birds directly from an aviary is also less restrictive in terms of species that can be included in a display. During warmer months many temperate species can get too warm if placed in a box for any more than 15 minutes. Efforts should be made to exclude such species from a show if there is no alternative method of flying them.

*With the system shown in figures 5 and 6 the emphasis on safety lies with the display team and specific protocols must be implemented and followed. On release of a bird, the slide must be immediately closed if it returns via another route. (Many birds may fly through the aviary door, to a glove or a temporary holding area until the end of a demonstration). If the bird returns back through the slide then it must be closed and locked on the birds' immediate return. Location of the slide and visibility of the exiting or returning bird to the demonstration team are critical for a successful release and return programme.*

The locks should be based within easy reach at the base of the slide (Fig 7).

- The bird should initially have a clear line of site from its release point to the display area. If at a significant distance, the bird may be released from a box or a glove closer to the display and gradually moved back once it is familiar with the area.
- There are potential negative aspects to flying birds in this way. It is not uncommon, during a prolonged display season, for birds to be waiting in expectation of the display. This can lead to anticipation behaviour, particularly if there are obvious, aural cues that each bird recognises. This needs to be carefully observed and considered. These behaviours though may still be prevalent regardless of where the bird is housed if the display is at the same time each day.
- Where there is more than one demonstration, the preference would be in alternating birds to prevent time related expectation.

## Transportation to a display

*Relatively few zoological collections and bird parks currently house their display birds within proximity to a free flight arena that can facilitate flying from an aviary or point of accommodation. For this reason birds are frequently transported across the site in a number of ways. The most common are highlighted below.*

### **Free flown.**

- Regardless of the location the bird is familiar with the area and flies to the display location. This is more frequently seen with eagles, vultures, kites, storks and falcons. Particular attention must be paid to the route that the birds take. Avoiding picnic areas (particularly if flying kites or other opportunistic feeders such as caracaras and vultures) and ensuring, at least in initial training stages that a clear line of site is available for birds making their own way to a display.

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- It must also be considered what the impact would be should temporary structures such as marquees or BBQ's be introduced to a flight path. Birds released in this way should be visible to training staff at all times. This may mean visible at the point of release and then visible by a different member of the team as they approach the display area but a clear visual is always advisable.

## ***Transported to a suitable release box or aviary and released.***

- This precedes the demonstration and requires the bird that is to be free flown transported to the designated release site.
- Depending on the duration that the bird will remain within this release facility, suitable furniture and welfare elements must be included such as perching, shelter and water.
- A release area ranges from a small box containing a single smaller species to a larger scale release aviary housing several larger, more social birds (Kites or vultures). Birds within the larger facility may remain in the release aviary for prolonged periods to logistically facilitate their inclusion within the display.
- A small release box should have adequate space and perching or floor covering in the case of a bird that prefers not to perch and the trainer must be mindful of conditions to ensure that a bird is not placed in a situation that will be detrimental to its health through external conditions or prolonged time spent in a small box. It needs to have adequate ventilation and be of dimensions appropriate to the species.

## ***Transported on a handlers glove or hand and released.***

- This often applies to birds of prey but applies to a variety of species including Psittacines and corvids which are commonly trained to fly directly to the trainers hand.
- With raptors, it is common practice to have the bird controlled with leather straps (jesses) which prevent the bird from flying before the handler is ready. The jesses maybe attached to a leash which is then tied to a handlers glove before being removed or replaced with non slitted flying jesses. Where a leash is attached it must always be tied to the handlers' glove. It is not acceptable wrapping the leash around the fingers of a gauntlet to "secure a bird" Should the handler trip and release the bird it will be released with all of this equipment. Birds have been killed this way when snagged in trees.
- "Mews jesses" have a long slit in them at the tip on which to attach a metal swivel and a leash. Birds should never be flown wearing these as they present a significant snagging risk. They should be replaced with non slitted "flying jesses" or removed altogether.
- Falcons may be hooded to be transported on a glove with the removal of the hood being the cue to fly

## ***Boxed or Crated at usual accommodation and transported to the display area or release box***

- Any bird required to enter a box for transportation or release should be conditioned to ensure that this is a positive experience.

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- The box should be appropriately designed to accommodate the specific bird or birds, utilising perching if necessary or taking care to avoid a perch for a species that is more likely to sit on the floor. A perch in this instance could become a hazard, damaging feathers or causing injury.
- Boxes can be specifically designed and made of a variety of cleanable and hygienic materials. Black acrylic is commonly used and is preferable to wood in terms of cleanliness and hygiene, being easy to sterilise. The inside of acrylic boxes are often quite reflective and may be sanded down to prevent reflection for birds.
- Suitable ventilation should be provided and on the more recently developed falcon transportation boxes, fans are now included behind protective panels. However any box can heat up quickly if placed in direct sunlight. Temperature data loggers may be considered as a useful tool to monitor temperatures in boxes.
- The bird should enter the box and can be rewarded with a piece of food before the door is closed. The bird will then be looking to step inside the box and wait for food. Its next reward will be in free flight.
- Where possible, birds should have their own specific box. Where this is not an option, boxes should be cleaned after use and in between birds.
- Should a bird be required to travel in vehicles, again the positive re-enforcement training should be implemented so that the expectation of following experiences is set. Once a bird is box trained it can then be placed in a vehicle. The doors of the vehicle can be closed. The bird can then be removed and placed back in its aviary.

## 4) Aviary co-habitants

- We should aim to mimic the wild behaviour of our birds as closely as possible. Social species such as Psittacines, Ciconiiformes, kites and vultures generally need to be accommodated in social aviaries and can be flown in groups or singly depending on the individual nature of the bird and provided their social requirements are catered for. It may be the case that socially reared or imprinted species can gain their social needs through the interaction with their trainers and actually do not cope well with con-specifics. This needs to be assessed on a case by case basis.
- During the initial stages of training, some social birds maybe housed separately until their training reaches a stage where they are ready to join the group. Alternatively they may be trained separately and then placed into the group daily. Some birds will learn from others, in which case training can take place within the social grouping in which the birds will be demonstrated.
- Birds that do not live in social groups in the wild, tend to be housed singly this includes many owl species, most birds of prey and hand reared birds, as these can be very territorial.
- Social requirements of species must be considered and catered for before acquisition. This includes the provision of appropriate accommodation for multiple birds. The recommendation and advice from EEP co-ordinators must be adhered to when selecting species potentially required for future breeding. Marabous for example– there may be a need for immature birds to establish pair bonds whilst young – this should be a consideration when thinking about this species in demonstrations. Similarly vultures are now the most endangered group of birds in the world and therefore should not be used or reared in such a way that they cannot be utilised in a breeding programme once they reach breeding age. It is very important

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that demonstration birds should not denude breeding programmes, and should be sustainable over time.

- Provisions should be available should birds not co-habit amicably.
- Some hand reared social species are included as “ambassadors” in demonstrations. It should be noted that hand reared birds can behave very differently and often aggressively to enclosure mates. If this is the case, provision should be made to ensure that the bird is enriched frequently since it may require significant Human attention.

## 5) Flying Area

*The area on which birds are intended to be flown at a facility should be taken into account when selecting species to be included in free flight display.*

*There are some generic factors that should always be considered regardless of species but, where demonstrations develop, an area that has been appropriate for the flying of a small owl species maybe completely unsuitable for free flying a vulture.*

*Even inside Amphitheatres and presentation spaces need careful consideration.*

### **Roads**

- Any areas that are at close proximity to a busy road. Reasons for this are obvious but even in areas with relatively little or restricted traffic birds can still become victims to cars. Owls and other species that have a tendency to fly very low to the ground are at risk of accidents where roads are within several hundred metres of a display.

### **Wind Turbines**

- Although unusual and unlikely it is worth highlighting that wind turbines are becoming more frequently seen.
- As a sustainable means of creating energy they are being globally implemented. They are often utilised as a perching area with well documented injury and fatality to wild birds that utilise them in this way. There is no reason that a trained bird wouldn't see them as an available perch.
- Over 1000 griffon vultures are killed yearly in Spain (January 2016) on wind turbines, so they are potentially very dangerous to birds.

### **Windows**

- Try to avoid flying birds near any buildings with windows facing a display area. These are a common hazard for wild birds and free flight trained birds are equally susceptible to flying into them.
- Anything that makes a bird change its usual routine or expected direction of flight can lead to an accident. This likelihood is significantly increased when a temporary structure or new building is created subsequent to birds being trained to a specific flying space. Windy days, visitor movement, interaction with wild birds can all

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increase the risk of a bird flying into a window. All elements should be considered before flying near glass.

- New and temporary structures that have windows need to have window stickers or another means of identifying the glass as a solid object.

## **Power Cables**

- Another well documented source of fatal injury. This is one of the first hazards that are checked before presenting demonstrations with free flight birds, particularly for facilities that participate in offsite displays.
- Electrocution is widely documented in both wild and trained birds and particularly birds of prey. Significant research has been taken to look at measures aimed at reducing this threat by protecting power sources which prevents birds from making contact to hazardous points. The New Zealand Falcon *Falco novaeseelandiae* and Saker Falcon *Falco cherrug* have both been the subject of much study following well documented declines and localised significant losses noted in relation to electrocution, as have vultures.
- In demonstrations, birds of prey can easily see a transformer as a perch with lethal results

Despite global efforts to protect birds from power sources, they still remain a significant cause of death for wild birds and falconry species. In many respects demonstration birds can have the added dis-advantage that they can be trailing an aerial for a radio tracking device that can increase the chance of contact. Bird protection from power sources is developing but they are a very obvious hazard that every effort should be taken to avoid.

## **Golf Courses**

- These can be a hazard if close enough for free flying falcons to see. The swinging of a golf club can replicate the swinging of a lure and a number of birds have been beaten to death by enraged or frightened golf players when a falcon comes in to their golf club.

## **Other Animals within a collection**

- This is an obvious consideration when flying birds in a setting that contains other species. Waterfowl or other birds and small mammals in open top enclosures can be targets for free flight raptors, even more so if a bird is pinioned or feather clipped and not able to evade capture.
- Collection managed species are not expecting to be predated upon and are a subsequently easy target with a less developed fear response. It is not uncommon for predatory species such as the Harris Hawk *Parabuteo unicinctus* to kill other birds or even small mammals should they fly within proximity of potential target species. The flying arena should be located at a point that does not encourage free flight birds to come into contact with the wider collection.

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- Primate enclosures can be a particular risk. With the speed and agility of most primates, a bird perching on top of an enclosure is an easy source of enrichment or protein. Any species can be a target and many have lost a handful of feathers or worse as a result of landing within easy reach of a primate.
- Care must be taken when flying scavenging species or predatory birds within proximity to carnivore enclosures. Any bird with a developed sense of smell such as the Turkey vulture or a bird flown within visual range of a predator enclosure can be placed at significant risk when flying in a mixed taxa zoological park.
- Carcass feeding of carnivores is a common practice and open top enclosures or enclosures with wide diameter mesh can be an open feeding invitation to demonstration birds. Vultures, kites, owls have all been killed from flying into big cat enclosures whether to feed or perch. Turkey vultures will show a particular tendency to fly to a carcass and should be excluded from a bird display if big cat enclosures are accessible and the animals are fed during the day time.
- Other show birds. Aviaries should be designed or located to prevent species flying from displays towards another bird. Species within a free flight display must be selected to avoid conflict when flying multiple birds. Necessary mitigations (including staff training) must be in place to prevent birds from being released accidentally.

### **Wild animals**

- Native wild species can both affect and be affected by free flight demonstrations. It is the responsibility of a facility flying birds in free flight to ensure that impacts to native species are minimal.
- Birds of prey in demonstrations may be expected to fly during the breeding season of many native birds (This is the opposite case within most European countries with regards to falconry where the ethical practice should be to fly between September and the start of March. This is to allow native birds and mammals to breed without impact from falconry and to allow falconry species to fully moult before September or October).
- Although there may not be any direct interaction, trainers should be mindful that native species are nesting and adult birds rearing young are likely to be extremely aggressive during this time to the presence of raptors or corvids in displays. Mobbing behaviour is frequently encountered from corvids and gulls but also other territorial species. When flying kestrels (*Falco tinnunculus*) in April, it is not uncommon for a wild kestrel to interact and lock talons with the display bird. This is particularly common when flying the male of the species. It is not unusual for this bird to be excluded from displays so as not to affect the breeding and territorial behaviour of wild counterparts.

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Figure 8. A juvenile bald eagle being mobbed by two crows in a display

- Ensuring that our display birds are also not in a position to breed with wild birds is also imperative. It is irresponsible to free fly the same or similar species in an area where they may interact and breed (or hybridise) with resident wild populations. Both species selection and an ability to track and retrieve birds (see relevant topic) are important factors when designing a bird show.
- We must also be mindful that many species included within displays have a strong hunting instinct. *Parabuteo unicinctus* frequently features in free flight demonstrations and is more than capable of killing wild birds. Waterfowl are particularly easy and natural targets. It is an ethical responsibility of collections to exclude individual birds with a history of predation from demonstrations.
- Squirrels and rats can also be targets for birds of prey, both of which can directly inflict significant injury to inexperienced hawks; the latter can also be detrimental if an active pest control program is implemented within the collection. Secondary poisoning from the ingestion of affected rodents is well documented within birds.
- Some wild species can injure or kill display birds. Corvids can be particularly aggressive to birds of prey, frequently mobbing them in large numbers (figure 8). It is not unusual for raptors to be killed by crows and this has been encountered with Goshawks (*Accipiter gentilis*) and Harris hawks (*Parabuteo unicinctus*) during free flight. Crow nests can be removed pre-breeding if they are located at the periphery of a display if National laws permit. When this is the case it is done by professionals under license.
- In many City collections, resident peregrine falcons (*Falco peregrinus*) can aggressively and fatally attack other birds of prey. Lanner falcons (*Falco biarmicus*) and Eurasian kestrels (*Falco tinnunculus*) have been targeted and killed in free flight displays. Even during the later parts of the breeding season young wild peregrines may see smaller falcons as a desirable target, and once flying there is little that the demonstrator can do to change the outcome, other than training the birds to come to an emergency recall.

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## Indoor Presentation Spaces

**Many shows presenting birds utilise indoor presentation spaces for inclement seasons or to select groups and special experiences. In such facilities, careful consideration needs to be given to designing the area for free flight birds and the questions below considered -**

- Is the facility a contained environment?
- Is temperature and ventilation appropriate?
- Can visitors cross the flight path of birds & thereby disturb or harm the flying bird?
- Are windows covered up?
- Are the doors closed before the beginning of the show preventing the likelihood of escape or distraction from routine?
- Can wild birds (pigeons, starlings and corvids) be prevented from entering the facility?
- What happens should a bird escape from indoors and fly off from a display? Does it wear a tracking device? Has it been free flown in an outside space?
- Are perches positioned far enough away from visitors in an audience to prevent contact
- Are perches located in a way that birds will not defecate on the audience
- Are electrics suitably contained?
- Can audiences use the area as a lunch facility in inclement weather? Is food cleaned away before shows?
- Is the facility used for multiple taxa displays?
- Is there suitable holding or living space attached to the facility?

Once carefully considered, indoor facilities allow displays all year round in a facility that if designed well can be used as a multi-functioning space.

## 6) Tethering and Perching

- Without doubt some genera of trained raptors are very much better off if maintained loose in free flight enclosures, once they are trained, such as owls, caracaras, vultures and secretary birds. Kites also take well to these conditions as do Harris hawks. The secretary bird cannot be tethered because of its unusual physical build and in particular its' long legs. Cathartic (New World) vultures should not be tethered because of their habit of urinating on their own legs, Indeed many of the Old World Vultures should not be tethered. Other taxa like owls and caracaras appear should be better kept loose in free flight pens. (Parry-Jones 2009)
- Some species of raptor are tethered to specific perches either for their training or for the duration of the demonstration season. Recognised species that can be tethered include many species of hawk, falcon and eagle, largely due to the ease of training and relatively sedentary nature of these species when they are not hunting or displaying. Whilst it is common practice to see many owl species tethered, it should not be considered a requirement in terms of training or for free flight. Most owl species are imprinted and adapt very well to flying either directly from an aviary or to

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boxing and transporting. The tethering of any owl species is not a recommended practice for free flight birds and the tethering of the small owl species is condemned.

- A lack of space should never be the only reason to keep a bird species tethered. The species and the individual must be appropriate to be tethered and tethering conditions must be optimal.
- No non raptor species should be tethered
- Striated Caracaras (*Phalcoboenus australis*) should not be tethered due to their active nature and inquisitive nature. Their foraging and enrichment needs cannot be fulfilled in a tethered setting and the ease of their training from non-tethered setting deems restraint unnecessary.
- Harrier hawks (*Polyboides typus*) and other raptor species with particularly long and fine legs should not be tethered. Injury can easily be sustained. If a Gymnogone cannot be trained without tethering, it should be excluded from free flight displays. Similarly most of the Harriers such as Hen Harriers do very badly if tethered unless imprinted to it.
- Kites should not be tethered for prolonged periods. They are active birds and can be flown, once trained from an aviary. Tethering is sometimes used to feed individual birds as they are frequently flown socially. Following a feed, the bird can be placed in an aviary. Feather damage, particularly to the tail is a regular occurrence on tethered kites.
- Social species (Harris hawks), if tethered should be managed in proximity to the birds that they fly with, if tethering is required post training. Great care should be taken free lofting Harris Hawks in groups and flying them; this does not always have the desired result.
- All birds should be treated on an individual basis rather than as a species. It is not unusual to experience multiple birds of the same species free lofted perfectly well within an aviary whilst another can only be managed tethered for its own welfare during the demonstration season. It must be based on observation and experience of the birds' behaviour that dictates the management situation. It maybe that the bird that has to be tethered is not considered suitable for the demonstration in this instance.
- If a bird is tethered - appropriate equipment must be used. Jesses of appropriate size and material (preferably leather or braid) with appropriate leashes must be used. Chains are not appropriate for tethering. Jesses should not be attached to growing birds to avoid any potential fractures or injuries to the "premature" extremities. Particularly young Harris hawks should not be tethered as joints and bones take a prolonged period to develop (Dominik Fischer 2015)
- Mews jesses (slitted jesses) must always be removed and either left out entirely or for species needing to be restrained on the glove for handler or bird safety, these must be replaced with non slitted, flying jesses before a bird is released.
- The anklets (Alymeri) should always cover a certain area of the leg and therefore be broad enough to distribute the forces which act upon the legs on a broad area instead of concentrating it to single points. However, the size of the Alymeri should not interact with a leg band/ring and cause injuries such as ingrown rings

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- Where birds are tethered, it is vital that the appropriate perch or variety of perching is provided to suit the specific species. This will include a block of appropriate size for falcons (Figure 9) and a bow or swing perch for hawks. Eagles can be tethered on either.
- Where a “block perch” is used, the perch must be of suitable diameter to prevent the birds jesses from straddling the block and becoming stuck.



Figure 9 showing a peregrine on an appropriate block perch

- Besides the appropriate dimension, a perch must have an appropriate surface in order to prevent pododermatitis (bumble foot). Artificial grass (Astroturf), coconut fibres (natural door mats), rubber, or cork may be suitable surface material. For a bow perch, rope is best avoided as it frays and can be a hazard should a talon get caught.
- The surface should not be too hard, not too plain/unstructured and must be free of sharp edges/rims, protruding nails/screws or other sources for potential injury. The leash to tether the bird must be freely movable and should not be able to snag anywhere which could cause the bird to become caught.



Figure 10 showing a rubber topped bow perch. Note the large ring that slides over the top of the perch

- Perches should be placed in a safe environment. As the tethered bird has no chance to escape it is the collections responsibility to ensure that it is protected from unauthorized contact with visitors, free-flying companions, and free-running predators (dogs) or other animals within a zoo environment. This includes wild predators which may see tethered birds as a sitting target.

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- When tethering small birds, attacks from wild birds of prey (e.g. goshawks, sparrow hawks) or owls (e.g. eagle owls) should be prevented by nets/fences/enclosures all around the perching area, including the top.
- When placing tethered birds in proximity to each other, the distance between perches must be enough to prevent contact and stress.
- The distance to objects must be appropriate to prevent damaging of feathers. A keeper/trainer should always be near the perching area to help the bird if necessary. In public areas birds should never be unattended.
- Perches should be placed in a way that the bird is not suffering from weather. There should be a possibility to take shelter from sun, rain, snow, and hail. Usually a specific “weathering” is built to allow the perch to perch beneath it and have a degree of choice as to where it perches.
- Each bird should have access to drinking/bathing opportunities at all times although it is acceptable to remove water bowls 30 minutes before flying time if there is a likelihood of the bird bathing pre-flight. On days where the temperature is low or liable to be below freezing at night baths should only be left with birds until lunchtime and then removed. Or if a bird has taken a late bath it should be dried before nightfall.
- At least one side of the perching area should be a solid wall or vegetation in order to provide a "safe background" to the bird.
- A tethered bird should not be able to see other companions being trained or fed (except where all birds are being fed at the same time). Allowing a trained bird to see others being fed results in the unfed bird jumping repeatedly in the direction of the bird being fed. The jumping (known as bating) might cause injuries as well as aggression and frustration towards the trainer. This practice can lead to behavioural disorders such as feather plucking and self-mutilation and can occur with aviary birds in a similar situation. It also causes upset to visitors should the birds be on public view.
- A tethered bird can and should be checked regularly, paying particular attention to the underside of the feet.
- The perch and the area around the perch should be cleaned regularly (and sporadically disinfected). (Regularly does not mean once a month, it must be at least weekly). If birds change perches, these should be cleaned and disinfected before a new bird uses the equipment or the same area
- Where birds are tethered, they should be flown a minimum of 5 days out of 7 where weather permits. Unless under veterinary treatment or in training for a limited period a tethered bird should be flown every day that weather allows.

*Perching should provide a variety of appropriate surfaces and be changed sporadically.*

*Tethered birds have more contact with the surfaces around them than do birds living loose in enclosures. The substrate should be dry, soft, easy to clean and not too dusty. There is no perfect material, however Parry-Jones (1993) reported the best two substrates to be washed pea gravel and washed builder's sand. Of the two, sand has proved to be softer, more absorbent, easier to clean, less likely to damage feathers, or to heat up excessively when exposed to hot sun.*

*Either substrate should be at least four inches deep. Similar substrates are suitable for enclosures for free-flighted trained birds. Peat, sawdust, and wood chips are not suitable and some may harbour pathogens especially fungal conidia. Concrete is very hard and may risk*

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*abrasions or injuries to nervous birds. However, it may have benefits in quarantine areas as it may be cleaned with a pressure washer and disinfected thoroughly. The latter does not apply for bare soil which may become impacted or muddy in damp weather, and is not recommended. Birds can be put out onto grassed lawn areas to weather, but these surfaces need to be maintained to be suitable for the birds. (Parry-Jones 2009).* Some species will forage on lawns, kites and buzzards will look for worms and other invertebrates, this can cause problems, particularly lung worms.

**All birds need to be provided with aviary time. This may be provided from the offset, provided after the bird has flown for the day, it maybe after the bird has been trained and is free flying within a display after an initial tethered period or it may be after the demonstration season. It is not acceptable for demonstration birds to remain tethered when no longer flying for the season. An appropriate moult aviary (See aviaries) should be provided that enables exercise choice and social enrichment where applicable to the species for this period. During a moult period, diet should be provided that ensures that diurnal raptors bird are flying down for the food immediately at least twice a week (Habben.M -2015). This provides exercise for the bird which will usually take food up to a suitable perch and ensures a more natural feeding pattern and weight, rather than allowing a bird to put on excessive fat or allowing food to build up. Similar practice should be considered for all managed raptors. Dietary management should be discussed and agreed with bird training and veterinary team or nutritionists.**

## **7) Routine Care - Including coping, imping and furniture changes**

- The routine care for any demonstration bird should be similar to that of any other collection based animal with the benefit that more time and individual attention can be afforded to the bird in question. Display birds are more likely to be encountered on a close up or even physical basis allowing for more frequent and closer physical inspection.
- For raptors, a more hands on approach is frequently needed at the beginning of a season or occasionally through it, in order to change equipment, (anklets, jesses, harness fitting for telemetry where applicable) and for coping beaks or imping broken feathers. Some of these areas can be practiced under trained behaviour; others may require physical restraint and hooding to ensure that the process is completed as quickly and effectively as possible. Towels or casting jackets should be used to hold in birds wings whilst protecting the feathers. All techniques need to be completed by trained and competent staff when dealing with any of the above. In some instances slight sedation may be beneficial. To this end, a veterinarian experienced in avian medicine should be consulted (Dominik Fisher 2016)
- A bird that is conditioned to being handled and having its feet, legs and tail touched becomes more accepting of various procedures that require physical contact. Some will even allow for the testing of specific equipment used in the field such as tracking systems, altimeters, cameras or data loggers for research.

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- Regular, up close observations from experienced members of a bird team are required to keep a close eye on a bird's condition. The frequency of checks and proximity that a keeper can get to for a trained bird is an opportunity rarely afforded in other collection birds.

## 8) Motivation to display, dietary and weight management

One significant factor to be taken into account when using weight management in training or any other procedure is to make sure that the bird is in a fat condition on the first weighing. Unless you know what condition your bird is in when you start weight training, i.e. fat, well covered, thin, emaciated, soft muscle tone, fit muscle tone, the weight means nothing. If the bird is already thin, then reducing weight can kill it.

Physically feeling the bird's condition by bringing your hand not only to the breast bone or keel, but round the side of the bird's body over the ribs will tell you what condition the bird is in before you start any training or management.

Another factor to remember is that it is very common for two birds of the same species and the same sex, even the same parentage to fly at different weights. There is no such thing as a known or average flying weight for a bird, it is totally individual and can vary massively in the same species. To ask someone what the flying weight of your bird should be is like asking them how heavy your mother in law should be, and probably as dangerous!

This is a significant topic and one that has initiated a great deal of discussion amongst the avian and training community.

“Weight management is often the secondary result of dietary management that elicits a required response in the bird being trained (*M.Habben 2015*)” – It is likely that there is range of weights that correlates to consistently desired behaviour. The smaller the bird, the narrower the weight range will be. For example, a male common kestrel, *Falco tinnunculus* **may fly** between 198 – 208 grams whereas a female Harris hawk **may fly** between 1049 – 1070 grams. It is considered easier and somewhat safer to weigh a bird and equate its weight to its behaviour rather than review its behaviour, establish whether it can be flown and then equate this to a weight range. Much depends upon when the bird ate the previous day, what it ate, the outside temperature, age of the bird and so on. By flying the same bird in the same area feeding it the same food, there is a good chance that its weight range will be consistent with its behaviour, not taking into account additional influences. In many respects, weighing a bird has allowed less experienced trainers to free fly without the detailed knowledge and understanding of expected species behaviour.

**The International Association of Avian Trainers and Educators (IAATE) define weight management as follows:**

*“Because the weight and appetite of an animal are valuable indicators of its general health, monitoring a bird's weight can be a valuable tool in understanding its motivation to present a desired behaviour as it relates to various weight ranges. Once a weight range that corresponds to acceptable behavioural responses to food is established, a diet is prepared to*

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*maintain the bird in that weight range. The weight range may be adjusted depending on response during training sessions. Various conditions may influence behaviour, such as weather, age, food items, etc. and should be taken into consideration when evaluating weights and diets. These weight ranges may also vary between individuals of the same species. The goal is to maintain the highest weight possible and provide the greatest amount of food while maintaining the desired behavioural response. This practice is referred to as “weight management.”*

“Weight management is a tool to monitor the health of the birds in our care, whether they are in training or not. It helps trainers gain important information that is not possible without the scale. One of the first signs of illness in a bird is loss of weight. If the trainer is not weighing the bird and the food intake, it may be days before overt, observable symptoms of illness appear” [Martin.S 2014](#)

- The clearest way to look at diet and the management of weight in free flight birds is to fully understand the motivation required to initiate the desired response within the bird. This may not be species specific and the motivation for one bird to “perform” maybe entirely different to the motivation of another, even within the same species. We need to be open to this understanding and realise that weighing a bird give you its weight but not a behavioural analysis of its motivation to fly or demonstrate or a more complex repertoire of behaviours.  
However, we can recognise, in broader terms that the motivation to present behaviours, free fly and return are invariably related to food for the majority of parent reared birds. How the food is managed will depend largely on the species. Motivating a scavenging species will be different to motivating a foraging species. Motivating an active predator will again be different.
- As with any “trained” or encouraged behaviour, knowledge of wild behaviour is imperative. It is difficult to understand how a perfectly natural behaviour can be misinterpreted through a lack of knowledge or much worse, interest, in the natural habits of a wild counterpart. A broad knowledge of the natural history of the species enables us to train and interpret behaviours that a bird presents. Successful trainers are naturalists who understand the behaviour of the animal that they are working with. All behaviour training must be about the bird and not the ego of the trainer.
- Alternative methods to weight management have been presented as working successfully for foraging species that feed on selections of food throughout the day. Psittacines for example will naturally feed for prolonged periods, selecting preferred food items. By providing greater dietary choice within displays, including primary reinforcers in the shape of preferred food items that are otherwise excluded from the diet. This creates the motivation to present desired behaviours within display settings for favoured foods. Psittacines, due to their very nature infrequently rely so heavily on a managed program of weight but work more readily than many species for favoured “treats”.
- Studying wild scavenging birds gives an indication of how different species locate food or stash it in times of plenty, returning when reserves fall short. This can be

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observed in corvids such as jays which will watch squirrels burying their food before digging it up and re-locating it or caracaras, both wild and captive which will hide meat in specific locations as of when they find it, regardless as to whether they are hungry or not.

## Alternative motivating influences

### Psychological Appetite

- Methods to achieve this utilise many scavenging species desire to source food, not necessarily to immediately feed. This process can minimise the need for weight management rather exploit a change to feeding patterns. The principle works on the need to obtain food, not the need to eat. It has been termed by American trainers as “Psychological hunger” or “Appetite”

*“Psychological appetite is the creation of a perceived feeling that there is a food shortage”*

- In essence; a hungry bird would feed immediately. This principle works on the fact that a food shortage is occurring or imminent and available resources should be cached. This presents an alternative method of creating motivation for a scavenging species. The bird can display behaviours in a free flight setting without relying exclusively upon weight management as the soul or primary focus.
- There is a distinction between a perceived feeling that there is a food shortage and the association that there **may** be a food shortage at some point in the near future. It is the degree of uncertainty that inspires birds such as corvids and striated caracaras to cache food. Many other raptors and owls will also cache food if the amounts presented are too much for one feed. The points of caching are frequently the same and if this is in a controlled aviary setting, some birds can, after suitable training, be flown from an aviary, returning to cache food for later consumption. Keepers should control and clean the points of caching regularly as bacterial or fungal growth or toxin formation (e.g. botulism) may occur in the cached food. Varied amounts of food at a set time present uncertainty and motivation for a meal.
- A caching bird is not necessarily hungry. If it was it would eat when food is offered. It needs/wants to obtain a meal. Not necessarily for the here and now but for a point at which it will experience hunger or a need for food based on external influences. This principle works well for these species. It would or should not apply to species that do not cache food. It is not an instinctive requirement and the process should be based on the natural behaviour and food availability of the species being displayed. Trainers need to work with the behaviours that are already achievable for the species.

The same principle is likely to have a negative effect in training most other raptors. Many birds of prey will frequently kill small mammals and cache them in the wild, returning to them when hungry. If applying similar principles to a bird that flies with its food in its talons to cache on a branch, there is very little motivation for it to return in a display situation. The bird’s motivation to fly needs to be based on its motivation to feed (immediately), not its

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motivation to obtain a meal for caching as some will do when there is an expectation that food will become scarce. In captive situations we remove the element of uncertainty by providing appropriate levels of food consistently.

Motivation to present behaviour is much broader than appetite; it is also species specific or even specific to an individual bird. Complex repertoires of behaviour are rarely a requirement for free flight birds of prey. Trainers are usually looking at flight as the predominant behaviour required for the many free flight birds. There are always exceptions such as secretary birds (*Sagittarius serpentarius*) and burrowing owls (*Athene cunicularia*) which like many other taxonomic groups can be trained to display a broader repertoire of instinctive activity through capturing and rewarding what are frequently considered more complex behaviours during a display.

- **Instinctive behaviour** can be worked to a trainer's advantage. Combining movement with food as motivation can be very successful but should not be considered the sole motivation for a bird to return to a set point for the majority of raptor species. In much the same way that a cat will instinctively "chase" a moving object, the same can apply to specific raptors in certain situations. To initiate this response in the first instance, the moving object (Drag lure for example) should have a food item associated with it. For this reason a dragged lure maybe used as a recall for a bird not responding to a glove or a specific station. The stimulus to fly is enhanced by movement but this is never the only influence. There needs to be an association to food. A dragged lure alone will not initiate any response should it not be associated with food and therefore a degree of hunger in the first instance. This is particularly important when a bird is initially trained to a lure. Without the initial association with food, a hunting species will soon get bored and have no motivation to fly to it.
- **Utilising movement as an instinctive stimulus is not without hazards.** Moving lures can instil hunting behaviours in a display raptor, associating the movement of other animals as a means of obtaining food. a moving drag lure could be detrimental to the broader collection and may be inappropriate in some settings.. We would however, utilise movement as a stimulus and enrichment for aviary birds. It can be applied and frequently is for falconry birds where hunting is actively encouraged.
- **Time of day** can also be used as a motivating influence for free flight raptors. Often when at a higher weight, the closer a raptor flies to the end of daylight, the more motivated it is to fly. A panic instinct seems to set in knowing that there is a limited window to obtain a meal. This is particularly true of smaller species with a high metabolism. Many falconers flying *Accipiters* utilise this principle for greater hunting success.  
"Many trainers already incorporate strategies that reduce or eliminate the need for weight management to create motivation for food. For example, birds can be trained immediately preceding normal meal times, meal times can be staggered throughout the day to increase training opportunities, base diets can be provided at all times

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while preferred foods are saved for reinforces to be offered during training.  
Heidenreich. B 2014”

- **Temperature** also has an effect in that the motivation for raptors to obtain a meal is enhanced during colder periods. This maybe a combination of higher metabolic rate, expending energy in keeping warm, therefore increasing hunger, and awareness that food is scarcer and every opportunity to obtain food will be taken. The most successful falconry is frequently experienced on colder days. Wild sparrow hawks become far bolder in their attempts to get a meal and can appear almost tame when on a kill, the need for food over baring the flight response.
- **Exhibiting free flight based on natural flying patterns that expend energy.** Smaller species more frequently being displayed in free flight settings and they need to be considered very carefully. Smaller body mass and often high metabolism of species such as lilac breasted rollers (*Coracias caudatus*) requires very careful attention. Restricted diets can be extremely detrimental (fatal) and should be carefully monitored. A roller should be flown as close to a resting weight as possible (within 10%) and diets, food, behaviour and weight should be discussed and regularly interpreted by experienced trainers and aviculturists with species knowledge before acquiring such a bird for free flight displays and regularly throughout its flying season..  
When a roller displays it's catching or even hovering behaviour, it expends energy and the bird builds an appetite based on energy expended during its flight. The ease of flight and level of energy expended depends on many factors including wind conditions and temperature. If a bird is not responding to the trainer, it may be cued to fly for longer and more frequently. After prolonged flight its appetite will increase prompting a return to the trainer. Not a tool for the inexperienced or a recently trained bird but a program to develop with the birds' experience. The recommendation is to always increase a small bird's weight and fly it for longer to work on its appetite.
- **Social re-enforcement.** The desire to remain in a flock is a very strong motivator for flocking and social species. If one or two birds are trained to return, it can prove to be a very successful tool in motivating a larger flock to respond and follow to a specific point. This can be seen to great effect when flying birds such as kites, Ibis or vultures. One or two birds' return which encourages and teaches the remainder to follow.
- The first two principles are frequently out of the question for a free flight demonstration which leaves a social instinct as a more feasible option. There is little doubt that hunger is still a significant motivator for at least the “leading birds”. They are returning for food and leading other birds to the same reward. Hunger is less of a motivating influence when flock flying *Psittacines*. The social motivation to flock and association to the trainer/trainers with a treat rather than their staple diet (as with raptors) is a strong influencing factor.
- A final factor to remember with weight management is that for a bird to get fit it needs to increase its food consumption and as it builds muscle it will be flying at a heavier weight. So the final weight of a bird at the end of a demonstration season maybe considerably higher than the initial flying weight during first training. Conversely it may be that when coming back into work the weight may have to be reduced below

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the final flying weight of the season before to start the bird off, then increasing the weight as the behaviour allows. An experienced bird that has been flown on demonstration for several seasons comes back into flying condition in a matter of one or two days. A newer bird may take a little longer.

The four golden rules are condition, weight, and behaviour, fly at the highest weight possible if the behaviour is there.

***One of the significant inhibiting factors within avian training is a lack of factual knowledge on the species that individuals are working with. An ability to understand a bird's motivation, its behaviour both in the wild and in captivity and understanding the individual are all critical elements. Regardless of weight, the behaviour of a bird can, and should be assessed and understood before it is flown. With a raptor, the flying "weight" is little more than an average of what the bird regularly flies at and returns. However it may be considerably heavier over set periods. Its behaviour should dictate whether it is flown. A "heavy" weight should not be an exclusive indicator, knowledge of the bird and an understanding that the bird wants to fly and is keen to hunt (in falconry situations) or feed (displays) must be the influence. When consistently at a higher weight than average the motivation to fly is significantly reduced. Lack of response must be acknowledged and addressed to ensure that a bird is not lost.***

There are a number of considerations that must be factored into any weight management program.

- It should not be considered necessary or acceptable to manage the "weight" of a bird or detrimentally restrict food intake of a bird during its developmental or growing period. The only time this should be considered is if the bird is over feeding to a point at which its health is compromised. There is a variety of conditioning that can be worked as a pre-requisite to any dietary programs before a bird reaches its full growth potential.

**Stunted growth has been observed in show birds "especially those that have been placed on quantitative restrictive diets during their first year"**

**Heidenreich.B 2014**

- For the majority of falconiformes and strigiformes, growth and development is very fast but regardless of this, any animal should be afforded the opportunity to reach its natural (comparative captive) size before any dietary restrictions are implemented.

Full development is usually significantly faster than 12 months in many raptor species, many reaching fledging point within a three to four month period). A full and varied diet should be provided.

Any dietary restrictions prior to this point for the purpose of training can be detrimental and may impede growth and development, increase the risk of bone fractures and decrease feather quality. Dietary restrictions at a young age can also lead to – **Persistent juvenile behaviours.**

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- **Persistent juvenile behaviour** is complex and can be associated to a number of factors. Supplementary feeding in “parent raised” birds, heavily restricted diets, a training program instigated utilising food management too early on in a bird’s development.
- Behaviours can range from continual “screaming”, juvenile feeding behaviours such as heavy mantling on a glove or station, food begging in Psittacines and can also lead to aggression in older birds. This can also be extremely dangerous with large powerful species such as eagles and vultures which have become imprinted to a trainer.
- Some behaviour typical of dependency can evolve through prolonged association to a person with food over a number of years. In many hawk species utilised in falconry, Red tailed hawks (*Buteo jamaicensis*) for example, behaviours can manifest themselves if the bird consistently fails to successfully hunt (or the falconer persistently fails to provide opportunities for quarry). This can occur if the bird only ever receives food from the same source (a trainer/handler). The condition is rarely reverted even if consistent, successful hunting is achieved or regular lure or station work is practiced to disassociate the trainer from food.

### **Animals may show frantic behaviour in the presence of food, when eating or when a stimulus is presented that is a potential indicator of food.**

- This can be indicative of much of the above. In a training capacity It can be associated with a mal nourished bird, a juvenile bird, birds which share an enclosure with aggressive con-specifics, poorly imprinted birds, birds which have frequently had food removed from them by a trainer, birds which have been “tricked” into flying to a specific piece of food which has then been swapped for a smaller piece.
- It can also be observed in some species more frequently than others in the wild. Steppe eagles (*Aquila nipalensis*) and Ferruginous Hawks (*Buteo regalis*) consistently feed in this fashion. They have a very wide gape adapted to consuming large amounts of food frequently and aggressively. This is presumably an adaptation to retaining a meal in a hostile environment where food is scarce and predation or “robbing food” a frequent occurrence. Knowing the natural history and behaviour of a species should factor into any assessments of observed behaviour with trained birds.
- Weight and dietary management should be specific to species or individual birds and only carried out by experienced trainers and individuals with significant species knowledge and then regularly reviewed. However, it can be said that by correctly managing the dietary intake of a raptor and monitoring its physical condition and its behaviour in conjunction with its weight, we should have a closer replication of a wild bird’s condition.
- By not managing the dietary intake, weight or condition of a raptor and “free feeding” captive birds all they can eat, we are also presenting questions about welfare. Unfortunately this practice is rarely scrutinized as frequently or to the level of detail required for reasonable, comparative assessment. It is not unusual to frequent collections where significant amounts of day old chicks or rodents are left in enclosure, uneaten for prolonged periods thereby increasing the risk of intoxication

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(e.g. botulism) and illness (e.g. arteriosclerosis or obesity). The majority of raptors should be looking to eat their food within a limited window of opportunity. The behaviour of aviary birds is rarely questioned and their motivation to fly and move, to build muscle and condition is rarely considered.

Post mortem reports of aviary birds will frequently demonstrate lack of condition and excessive fat. Weight management for demonstration birds is a balance between achieving the movement and motivation required from the bird and optimising its health and condition.

One way to avoid this is to put in place a food collection practise at the end of each day. This requires the design of the aviary to be done in such a way that the food is placed in a drawer designed so that the birds can come and collect their food and take it to a favoured perch to eat. If they do not feed, or leave food it will remain in the drawer. It is out of sight of the public, off the ground, and gives the keeper the opportunity to remove the leftovers at the end of the day without disturbing the birds in the aviaries. The drawer should be cleaned daily which leads to a more hygienic way of feeding the birds. The keeper will know how much the birds have eaten or if they are consistently leaving food which cuts down on waste. It also deters vermin, as leaving the food in overnight means that if it is gone in the morning, you have no idea if it was rats or your birds. Reducing vermin in aviaries is good practise.

When feeding owls or other nocturnal birds the practise needs to be reversed, feed in the evening and do leftovers and drawer cleaning in the morning.

With birds such as vultures, the drawer needs to be large enough and low enough for them to get at easily.

All raptors take a few days to get used to the system and putting in a plastic lining made to fit the drawer makes for easy cleaning.

All of this reduces food waste and therefore costs, reduces the chance of vermin, reduces the risk of aviary birds or resting moulting birds getting over weight, keeps the food out of public view and makes the whole process much more hygienic, leading to healthier birds.

- Weight and dietary management should not be practiced by the inexperienced; it should be frequently and constantly reviewed. If a bird's behaviour is contrary to requirements or expectation, the first thought should be to increase its food, not take it away.
- EAZA does not support the use of weight control to the point that it risks the health of the animal and neither should anyone else.
- There is little question that many endangered species are free flown to build upon condition before entering a breeding program. We have seen this frequently within the falconry community and at specialist facilities who frequently free fly and weight manage a range of species before successfully breeding from them. The enrichment as well as the ability to gain fitness would not be achievable without a degree of dietary and weight management. It is however important that when these birds are in

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a rest period that they are moulted with their own species to continue the understanding of knowing what they are where this is possible.

- Diets must be constructed to benefit the species. “Show” diets for many species are only one part of a far broader diet presented throughout the full day. This is particularly for species that feed frequently in a 24 hour period.

**There are many more elements required to allow free flight and training than managing weight. However, condition, weight, diet, behaviour, preference and choice, observation, experience, instinct, flying area, knowledge of the species as well as the individual bird should all come together. From this, trainers can produce an ethical and responsible training program that allows a bird to fly free.**

Constantly questioning and challenging practices such as weight management and tethering is necessary to ensure that we are continually looking at the best options for trained birds. Practices fixed with tradition are infrequently challenged. Frequent review and discussion allows us to develop best practices and ensure that bird welfare is the highest priority. We look at what we hope to achieve from a bird in a display, how we will achieve it in the best way for the bird, trainers and end result.

## 9) Training and free flight

**EAZA Guidelines on the use of animals in public demonstrations states that –**

Training techniques used for demonstrations should not differ from day to day husbandry training techniques to guarantee animal welfare. Priority should also be placed on behavioural, environmental and social enrichment.

EAZA encourages its members to focus on behaviours that are demonstrations of their natural intellectual or problem solving ability and their physical attributes. Practices that should be phased out or avoided in future demonstrations include:

1. Any practices that provide audiences with a misleading impression of the natural behaviours of wild animals, or makes claims about wild animal behaviour that are not substantiated by scientific evidence.
2. The use of props where their use cannot be shown to demonstrate or replicate natural behaviour. (*Unless props are integral to an educational message that relates to the species such as translocation from one continent to another MH*). Static stage sets would not be defined as props.
3. Any behaviour that when implemented poses a demonstrable or probable risk toward animal health. As such, EAZA strongly encourages welfare audits of new behaviours, routines, props or techniques prior to and after its implementation.

**Applications of avian training for visitor experiences and enrichment extend beyond “shows” and the same principles should apply. Zoological collections train birds to participate in any number of situations, the most common are highlighted below.**

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## Events

There are valid reasons for training animals for an enhanced visitor experience. EAZA is committed to educating zoo visitors and trained animal behaviours can help its zoos to achieve this. Keepers use positive re-enforcement training to encourage natural behaviours both within the animal's enclosures and in a theatre or display area. These shows enable visitors to understand how an animal is adapted to its natural environment and can be highly enriching for the bird concerned.

## Human Interaction

Many zoos house a number of animals that are kept solely or partly for use in its interactive programmes. These include education sessions for pre-booked school parties, zoo visitor encounters and commercial events. As with all animal training there should be no compromise to animal welfare and the behaviours should in some way benefit the individual animal.

## Enrichment

Training for shows provides an opportunity for the bird to engage an animal in cognitive and physical activity.

The learning process can be highly stimulating for an animal and, once learnt, the behaviour can continue to be enriching due to the unpredictable nature of the show environment. Free flight is one of the most enriching behaviours for birds and the show setting is often the best place for the bird to demonstrate this natural behaviour

## The principles that should underpin all avian training programmes

- Every training programme should be applied in a species specific fashion. A generic programme for “birds of prey” or “parrots” is not appropriate as each species has very individual traits. For example the training of a caracara and a black kite would be extremely different as would the training of a Kakapo to a Hyacinthine macaw. Any individual undertaking a training program on any species should be tested on their species knowledge. Just as an enclosure should be tailored for the needs of the individual animal or species so should training a programme.
- In all avian training programmes for shows zoos should aim for the method that is most beneficial and least harmful to the individual animal concerned. This can be achieved by referring to a hierarchy of behaviour change when planning any new training programme. For example when considering how to train a Harris hawk (*Parabuteo unicinctus*) - the following questions could be answered:
  1. Is it possible to use only positive reinforcement for the entire process?
  2. Is it necessary to tether this bird?
  3. If tethering is required can this be only for the initial training process and then discontinued there after?
  4. If the hawk is tethered for the show season, will it have the opportunity to be free in an aviary at the end of the season?
- Refrain from the use of aversive physical contact during its behaviour programmes. (see appendix 2 for recommendation)

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- Always prioritise animal welfare in any training programme. If welfare is in any way compromised the programme should be suspended and re-evaluated before re-commencing.
- All programmes should be planned, initiated, evaluated and recorded in a consistent manner appropriate to the collections record keeping policy.

## Appendix 1

Classical conditioning is a basic form of learning in which a neutral event initially incapable of evoking certain responses acquires the ability to do so through repeated pairing with other stimuli that are able to elicit such responses. This type of conditioning does not involve any voluntary choices by the animal. This type of learning is described as “stimulus-response” relations as the behaviour is automatically triggered by the stimulus.

Operant conditioning is a type of learning in which behaviour is determined by its consequences. Behaviour is **strengthened** if followed by the addition of a stimulus the animal desires (known as positive reinforcement) or the removal of a stimulus the animal does not desire (negative reinforcement). Likewise behaviour is **weakened** if followed by the addition of a stimulus the animal does not desire (positive punishment) or the removal of a stimulus the animal desires (negative punishment). The animal “operates” on the environment, leading to a desired outcome. This type of learning is described as “response-stimulus” relations as the behaviour is not automatically triggered by the stimulus.

*“Between an operant stimulus and operant behaviour is choice”*

## Appendix 2

If an animal exhibits an undesired behaviour during a training session the animal's keeper will be expected to ask the animal to demonstrate behaviour incompatible with the undesired behaviour. This technique, known as differential reinforcement, helps to prevent aggression and frustration during training sessions.

## Exercise and Enrichment

Flying should enable sufficient exercise throughout the duration of the routine. Falcons are relatively easy to provide appropriate levels of exercise. Lure flying requires energy expenditure that will develop or maintain fitness. Falcons that stoop from height to a lure are usually flying for a significant duration. In order for a bird to gain required height for the stoop, it will expend energy, even on days where utilising thermals is relatively easy. Lure chasing falcons are working hard continually trying to out manoeuvre the lure.

Large, soaring species can be more challenging to provide sufficient exercise for in smaller collections. Many collections free flying eagles or storks allow the birds to soar. This provides exercise and enrichment. In facilities with smaller flying areas, or those within the middle of cities, soaring behaviour is frequently discouraged to prevent lost birds. This should feed into the species selection plan.

In such situations, perch to perch flights are usually demonstrated or other behaviours which provide stimulation. For ciconiiformes this may be wading in a small pond foraging for food or in the case of a fish eagle, snatching food from the water surface.

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- It is important to ensure that the flights are structured to ensure that suitable exercise is provided. This is particularly important for raptors that are tethered throughout the display season.
- Throwing up pieces of food, swing or drag lures provide enrichment but also require the bird to work harder for its food. This is put to good use for smaller hawks which will glide easily and expend little energy unless asked to work hard for their reward. This is also a more natural way for a raptor to hunt” and gain a meal. The trainer will be working with the birds’ instinct.
- Flying birds more than once is also an option frequently employed within many displays. This is regularly practiced with Psittacines that benefit from the exercise as well as the behavioural and social stimulation gained from flying in a flock or presenting behaviours in social groups or pairs. Providing the bird has not got a full crop from an earlier feed, multiple flights can work for some raptor species with a high metabolism.
- It is important to ensure that the bird is able to demonstrate behaviours specific to its species with an appropriate narrative interpreting the birds’ behaviour.
- It is also important to accept that a particular flying area just may not be suitable for a specific species or group of birds and thus they should not be trained and flown.

*Free flight offers a bird the opportunity to display behaviours not afforded within the confines of an aviary setting. This is important exercise for the bird but also an opportunity to educate zoo visitors on behaviours not frequently encountered. This may be a “roller” demonstrating his impressive display or a hovering kestrel. (fig 11)*



Figure 11

The enriching benefits for birds that are free flown and provided with a variety of areas and means of obtain food need to be given consideration during the off show period. Corvids for example, benefit from a variety of enrichment devices that enable them to utilise their cognitive skills to obtain food. This is done, much for the enjoyment and education of visitors as for the birds themselves and similar, varied enrichment needs to be provided during the off show season.



Figure 12



Figure 13

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Much demonstrable behaviour is born from enriching birds in an aviary for their own wellbeing. Such as the example in figures 9 and 10 where a striated caracara is given food in a number of locations to stimulate his problem solving skills. These behaviours are likely to be of interest to visitors and with the appropriate narrative, can give a broad insight into how a species lives.

## 10) Tracking and retrieval

Whenever birds are free flown, in an outside environment it becomes inevitable, that at some point, one will fly off from a display. The reasons for this are varied, and include inexperience of staff, inexperience of bird, strong wind conditions, a break from a routine, loud noises, mobbing from native birds, new equipment (such as gauntlets, change of presenters shirts, microphones etc.), visitor behaviour, not interested in food (may have been fed etc.) and the list goes on. As a trainer and presenter, observations need to extend beyond the behaviour of the bird but to the surroundings and every potential distraction. There will be times when the reason for a “fly off” will never be fully understood but there is always a reason.

Regardless as to what that is, it is imperative and the absolute responsibility of the collection and the team to retrieve the missing bird.

Historically, falconers would rely on field observations such as mobbing gulls and crows to locate missing birds of prey and only on closer inspection the bird would be seen or heard through the bells which were attached to either the tail, legs or around the neck.

Today there is no excuse not to utilise any of the vast array of tracking systems available to demonstrators, pest controllers, falconers and anyone free flying birds.

Tracking systems are also something that can be interpreted. They have contributed significantly to field conservation of some of the most critically endangered bird species being tracked and monitored utilising equipment and techniques trialled on zoo demonstration birds. Trialling new technology in this way further enhances the link between zoo's, bird centres, scientists and in situ conservation programs.

### Radio Telemetry

Depending upon what country the bird is being flown will depend upon the legal radio frequency of tracking equipment. In the UK for example 173 and 434 are the legally recognised frequencies whereas much of Europe relies upon 216. It is important that demonstrators are aware of the legalities concerning radio telemetry use before purchasing a system.

Transmitters for the locating of birds range in size from “micro transmitters” weighing less than 4 grams, to larger ones weighing up to 12 grams. (Figure 14)

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The larger the transmitter usually means the greater the range that the bird can be tracked. It may mean that there is a more frequent transmission from the equipment or that the battery life will be longer.

However too great a weight should not be used, the agreed weight by most scientists is 2% of the bird's body weight. More is detrimental to the bird.

For smaller species such as kestrels (*Falco tinnunculus*), merlins (*Falco columbarius*), Barn Owls (*Tyto alba*) or similar sized species lightest transmitters must be used. It is important to balance the compromise between selecting a light transmitter and one that has significant range to allow for the tracking of a species that can fly long distances and gain impressive height very quickly.



Figure 14 showing a number of different transmitters. The small toggles in this case go through the eyelets on a raptors anklets

The fitting of a transmitter can be achieved in a number of ways. It may be attached to the anklet on many hawks for example using a tightly closed zip tie (not too tight that it can't be cut off easily but tight enough to prevent a loop that may get snagged) or it may be "tail mounted" using a tail mount attached to the base of the quill of a central deck feather. This method means that the transmitter is not hanging below the bird's leg as it flies and aesthetically looks neater. It also means that it is less likely to hit anything as the bird is flying causing potential injury. This method of attachment is commonly used on falcons. The obvious downside to this is if a bird begins to moult and shed a feather. This could and has resulted in a shed transmitter. For this reason, tail mounts can be made that attach to two feathers to minimise the risk of this happening.

Another frequently used method of attachment is in the use of a harness that sits permanently on the bird during the show season. This must be loose enough to ensure comfort but tight enough to ensure that the birds feet or beak cannot get caught in it when preening or scratching. The harness must be checked regularly during the season as an increase of muscles during training or swelling or decrease in muscle tone during injury may change the positioning of a harness completely. The harness material must be light but strong (Teflon ribbon is commonly used for the harnesses) with a transmitter mount in the

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centre of the back. This method of attachment is often used for the tracking of wild birds for conservation monitoring as is the case with the Gyps vulture in figure 15



Figure 15

Harnesses like this (Figure 15) can be utilised for a wide number of species and are particularly beneficial when flying birds that could pull off or damage transmitter in easy reach of their beaks. Many species can be briefly restrained or conditioned to accept the harness which will then remain in place for a full season. Veterinary guided sedation or anaesthesia may be beneficial for harness installation in some cases (Dominik Fisher 2016). The transmitter can be attached daily, or even in some cases remain attached and turned on and off each time it is used, being removed only when the battery is changed. Transmitters are often turned on by magnetic touch although remote switches that can be turned on at distance are the future for telemetry. This will allow for a transmitter to be turned on in the possible event of it not being switched on pre-release.

Transmitters should always be checked prior to the bird being released for free flight.

The final method occasionally implemented for transmitter attachment is around the neck, attached to a thin rubber band. This is a method favoured by many falconers of small hawks and falcons and not a method recommended or necessary for display birds.

All staff free flying birds should always be trained on the correct use of telemetry. It is recommended to send staff away with a transmitter to either hide or keep on their person whilst an experienced member of a team demonstrates how to locate it, then reverse the process and have the inexperienced member of staff to find a transmitter than has been hidden on their own.

It is also a good idea to test the transmitters with two people and two way radios, so that, for example, if you have a good signal on the near setting, your bird is probably no more than one field away, if a good signal on the medium setting, then up to five fields may be the distant and if you can only get a signal on the far setting you need to get into a car to track

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your bird. All of this training and practise will teach you how your equipment works and needs to happen before losing a bird, when stress will make it more difficult anyway.

Receivers come in a range of shapes, sizes, makes and models but the principles are much the same (Figure 16)



Figures 16 and 17 showing a typical receiver used to locate a transmitter and a new GPS system that links with GPS technology in smart phones and tablets.

## Global Positioning Systems (GPS)

This is certainly a developing technology in terms of tracking free flight birds. This system relies upon satellite signals to locate a bird which frequently links into smart phone technology. There is currently (January 2016) at least one system up and running and weighing no more than a normal radio transmitter. However the downside is that the battery does not last as long as a radio transmitter, but the information gained is staggering.

Tracking systems are expensive but after the initial outlay of the receiver (which can range between several hundred euros to over 1000 euros), the transmitters are comparatively cheaper (between 100 – 200 Euros) and the amount of costs that are saved in time and in birds, let alone the life of the birds makes this a negligible price in the long run.

It is essential that these costs are factored into the development budget of any show. The loss of a bird should be considered priceless with absolutely every effort made to retrieve it. Lost birds are not only at risk of death or injury, they can also be detrimental to native wildlife, either through predation or even breeding, all of which needs to be avoided at all costs. Even native species, with uncertain genetic history should not be allowed the opportunity to breed with wild counterparts.

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In worst case scenarios, escaped birds have been known to hybridise with other species, (for example a falconry flown Harris hawk mated and produced young with a wild buzzard – the young of which resided at Amwell RSPB reserve in the UK and was appropriately known as a “Hazzard” (figure 18)



Figure 18 A hybrid between an escaped harris hawk and a wild buzzard in the UK

Escaped birds can cause detrimental environmental impact if not retrieved. Many raptors are shot if they happen to fly near shoots and predate upon game birds or racing pigeons where as other birds, particularly flocking species are extremely difficult to manage if escaped.

## Flocking species

Where species are flown in large flocks, it may be considered by the facility, too expensive or time consuming to attach transmitters to every bird. This should be factored into the species selection for the show; however, a number of selected birds from the flock should always have transmitters or appropriate tracking attached. The flock mentality and social reinforcement element of flocking species, is frequently enough to initiate a return. Flocking species will prefer to stay within proximity of each other so it is hoped that if you can track several birds you will have tracked them all. Of course this is no guarantee and every effort must be made to ensure that birds can be traced if they fly away from the demonstration area.

## Losing a bird

On losing a bird from a display, usual, facility specific protocols apply. This may depend upon the species or the individual bird. The preference and a common way for a bird to return is to remain in the demonstration area and provide cues that offer familiarity. These may be audial or visual and are aimed at the bird going into its usual routine in the area of familiarity.

If however a bird has been gone for any unusual length of time (pre-determined by the show team), tracking and reporting measures are put in place. For example a team comprising of a minimum of two people would be sent off to locate the bird using telemetry or GPS. On

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locating the bird, they will try and fly it to a glove (for raptors) box, station, lure – whatever the bird is likely to respond to and has associated with food.

If the bird cannot be found then reporting the missing bird will follow agreed lines. In the UK for example we may notify other collections, Royal parks and the Independent Bird Register who monitor the status of lost birds and are frequently the first port of call for lost and found birds. Elsewhere in Europe police and fire departments are often informed immediately. After 1-2 days the national falconry associations and the veterinary medical association should be informed too. Social media and local news may be helpful distributing the news and getting more people involved in searching the lost bird.

Of course, locating a lost bird is no guarantee of its return, in which situation, similar lines of reporting the escape will apply.

Often, if a bird has evaded re-capture by the evening it will roost. In such cases, returning at first light and offering a meal can be an effective means of a bird returning.

If a bird is lost permanently, broader communication, including to other collections needs to be clear. An evaluation as to how the loss occurred, what was learned and what procedures are in place to prevent re-occurrence. Other zoo's and collections are more likely to be notified if a lost bird is recovered or seen by a member of the public.

If there is a traceable signal from the tracking device that should be followed, possibly for several days until either the bird is recovered, or the signal is lost completely. Some species and individuals appear to forget their training once they have been out for several days and this may mean a different and more hands on way of recovering, such as waiting until dark and climbing trees and such like.

Tracking birds is time consuming, requires enough staff to be away tracking and still run the collection and demonstrations, is stressful and tiring, but well worth it to recover a bird in the long run.

## **Exceptions**

Realistically, species selection should be based upon the ability to track a lost bird. Some facilities do not include tracking for parrots, corvids or caracaras. Often intelligent, powerful species that are capable of removing and damaging tracking equipment.

In these situations a full risk assessment should be completed to establish – whether it should be factored into a show, where the bird is going to fly free, and the likelihood of it flying away based on experience with the species and specific birds and how it will be retrieved. This is not an ideal scenario and careful consideration needs to be given to the free flying of any bird without a means of locating it.

Some species are just too small to wear a transmitter. Burrowing Owls are a case in point, particularly as they go underground, so again a risk assessment should be completed to establish all the criteria needed to be comfortable flying such birds without transmitters

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## 11) Post season

The flying season for many species usually co-indices with the peak visitor periods (spring and summer). In Europe for example, the free flight show season for many birds lasts between March and September.

### Diet

At the end of the season, birds should be “rested” to allow any species or individual birds that may have been tethered to be afforded free choice within an aviary setting and allow any birds placed on a restricted diet, to be evaluated and provided a level of food aimed at sustaining the bird through the colder months and a period at which it maybe moulting. This may incorporate an increase in food, a change to the food or no dietary change, merely a difference in how food is presented. In order to prevent metabolic disorders or bumble foot the bird should be “de-trained” gradually over a period of 2-3 weeks. That means that a bird should be trained every day a bit less and fed a bit more to gradually increase weight and to give the bird’s metabolism a chance to adapt. It may be advisable that the last steps of detraining are performed indoors or using a creance line to avoid losing the bird.

Where food is increased, particularly for raptors and smaller birds, the increase should be managed gradually. The ability to suddenly gorge on food for species such as the American kestrel (*Falco sparverius*) can be detrimental. The unconditional amounts of food that can be fed to birds out of season is also unnatural, unhealthy and needs the same, careful dietary monitoring that should be afforded to other collection birds. Most birds of prey and owls for example should be eating their food within a limited window unless in breeding condition. If they are not eating within 20 minutes, there is a strong likelihood that they are not hungry. The food should be removed and either offered later in the day (for small species >400 grams in weight) or fed the following day. The food should not be left all day for species that typically eat larger meals infrequently.

### Enrichment

When a bird is used to an expected routine, or level of enrichment that comes from free flight, the end of the display season must be give careful consideration. The de-training routine mentioned above could be a part of the enrichment program.

Active, “intelligent” species such as Psittacines and corvids benefit mentally and physically from their participation in displays. When not participating, thought must be given to the stimulation that these birds receive during the extensive non show period. A lack of enriching experiences throughout the non-show seasons is frequently evident when birds are left in moult, a period that extends for several months (as well as for non-demonstration birds of the same or similar species exhibited elsewhere within a collection). The “rest period” becomes more of a detriment behaviourally than a physical benefit. Moreover, the risk of developing chronic diseases such as bumble foot or obesity is increased during this period. Therefore this is a situation where the knowledge of the species requirements is critical, beyond just the knowledge of the individual bird or the training elements involved in motivating free flight.

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American Black Vultures during the winter months in collections are often taken out daily and followed, either walking or flying along with staff members. This keeps them interested and content, otherwise they are a species that if really bored can start to self-mutilate.

“By fluctuating food availability and quantity, the motivation driving many species that cache food changes from hunger to the perception that food availability is uncertain. In this way, with a carefully modified diet and feeding regime, exhibit birds can be potentially worked for enrichment rather than just public display”

Where birds are used to a variety of experiences, depending upon the species it is important to keep them accustomed to new activities. This will make easing the bird back into demonstrations the following season all the easier.

For many birds of prey that are on a dietary program that does not require them to be motivated towards the trainer, they are often better left with minimal contact. Cleaning and feeding is completed quickly and sensitively avoiding the bird. Signs of stress require the cleaning activity to stop. Particularly during the moulting period, signs of stress can result in “fret marks” areas of weakness appearing in lines across the birds feathers. Damaging a blood feather in moult can lead to a bird with broken feathers for the beginning of the following season. Other traumas such as injuries to the feet and cere may happen when the birds are afraid.

## **Heating**

Since the completion of the show season frequently coincides with the onset of autumn and winter in European collections, the provision for appropriate heating needs to be considered. As mentioned within the first chapter, all requirements, identified for the species, must be factored into its accommodation. If flying birds through the winter months, tethered birds are much more vulnerable to cold from the ground and most species should be given housing with heaters that keep them warm enough to avoid problems in low temperatures.

## **Breeding**

It may be considered a requirement to breed from demonstration birds. This maybe the result of program co-ordinator requests or it may be an institutional decision to increase the number of birds within the display for future years.

For program species this may mean that the display season for the following year is not possible. The priority is always to ensure that the breeding requirements, if decided upon are fully met. The suitable aviary provided and the ability to rear young is fully considered and catered for.

Some imprinted females, particularly in the owl species may well come into breeding condition and lay eggs regardless of the desires of the demonstration team. There is nothing that can be done about this, other than providing the bird with a nest site and allowing her to sit the eggs until she is bored. Removing eggs is likely to encourage her to lay more and if she lays too many this could cause calcium deficiency. Once they start laying, it is usually difficult to stop them so changing when they are working may be the only option. One other option would be to use the bird as a natural incubator, as because she is imprinted she will usually allow a keeper to check eggs regularly. She may even rear other young owls for you.

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It should be an ethical decision to make sure that the collection is as sustainable as possible in providing its own demonstration birds, or assisting others to do. The aviaries design and size etc. may be instructed by National law (e.g. in Germany).

## 12) Acquisition and Disposition Policies for show birds

Any birds considered for demonstrations within an EAZA collection should follow the same acquisition and Disposition policies as recognised by the Institution for the collection on the whole.

Demonstration species are likely to adhere to the Institutional collection plan and follow procedures that should already be in place to ensure best practice and welfare.

It may be considered that occasionally, species suitable for displays based on pre-determined attributes are offered independently of the agreed collection plan.

A caveat should be implemented to be able to accept specific birds to be included in shows providing the source of origin adheres to all other guidelines within the acquisition policy.

This should not include offers of animals from members of the public.

Occasionally the zoos may be approached by members of the public with individual animals. While there may be individual animals that the zoos would be interested in keeping, by accepting animal donations from the public the zoos may inadvertently encourage poor animal keeping and continued trade in unsuitable species. The zoos should therefore consider the over-arching welfare issues associated with poor pet care and encouraging trade, and decline any such donations, whilst referring the public to appropriate welfare organisations.

**Not recommended:** Accepting donations from the general public, distinct from private breeders of good standard, is not a recommended acquisition route. The exception to this would be in the case of a specific recommendation from an EEP or TAG coordinator or at the request of welfare authorities as a confiscation

## Disposition of Show animals

The disposition of animals in shows should follow the protocols already implemented by the Institution for the disposition of animals within the collection.

The reason for the animal, no longer being included within a show situation must be made clear to the recipients prior to transfer.

## 13) Breeding Rearing and Free Flight

EAZA does not support any techniques that would negatively affect the EEP/ESB breeding programmes without approval of the coordinator.

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Inclusion within a free flight demonstration though should not mean an automatic exclusion from future breeding programs. In fact the reverse should be considered, with the benefits that come from the exercise and enrichment that come from free flight, many birds are free flown before they enter a program. Many birds in this situation may then re-contribute to free flight shows if breeding from them is no longer required. This needs to be considered on a case by case basis and take input from collection planners, Curators, EEP and ESB coordinators.

Some species such as the Hyacinthine macaw (*Anodorhynchus hyacinthinus*) (figure 19), have a number of years before they reach sexual maturity. It could be beneficial to the bird as well as the educational messages that could be included within live interpretation if it could be flown and exercised before entering a breeding program. For this particular species, its social needs still need the same considerations as any other of its species. Free flight may also work to enhance pair bonds before breeding if the birds were flown together.



Figure 19 Hyacinthine macaws reach sexual maturity at 5 - 6 years

Following successful breeding, the process could be replicated with juveniles from the pair.

The process of training birds and free flying them before breeding has been practiced for generations of birds in falconry and specialist raptor centres. It has proved a very successful way of developing fitness, condition and enrichment that has led to breeding success of falcons, hawks, vultures and eagle species. It has also proved successful for Malayan Black hornbills that were free flown at ZSL London zoo for two years before entering the breeding program.

Further development of this as a strategic aim towards the future of shows should be implemented -

“Insuring that EAZA demonstrations lead the way for free flight displays, delivering educational messages and integrating program species to the benefit of Zoo’s animals and Conservation”

## 14) Imprinting Birds for Free Flight Demonstrations

EAZA does not support the premature removal of an animal from the mother with the intention of hand-raising specifically for use in a demonstration when this causes

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psychological distress to the offspring or mother. Removing techniques that mitigate this stress (double clutch, leaving one offspring or giving foster young) are recommended.

The rearing of any bird for a display should give consideration to the best welfare considerations for the species. Many owl species are hand or crèche reared for demonstration's to make the training process less stressful upon the bird. Training owls that have been parent reared is very difficult and the level to which they have to have their weight reduced before responding is generally not acceptable. Owls do not adapt as well to tethering, many species being quite secretive due to predominantly nocturnal nature. Being tethered on a block or a perch in the open and in full daylight goes completely against the instinctively secretive nature of most owl species during the day time.

Hand rearing makes for a tamer bird that generally adapts very well to being free within an aviary. There should be no need to tether owls. Rearing correctly rarely results in the negative behaviours such as aggression or persistently juvenile behaviours that can be experienced with many diurnal raptors and birds of other species. Hand rearing in groups does not negate the possibility of the birds breeding naturally in the future, this only happens if a bird is reared in isolation with only humans, then it will not accept another of its own kind and can if reared solely by one person become dangerous to other humans once it reaches breeding age.

Rollers, kookaburras, Seriemas' and corvids for example have all demonstrated negative traits, frequently aggression, when hand reared and free flown. Admittedly this is much to the individual bird and the person rearing it, however, these are not exceptions. An aggressive show bird can be dangerous regardless of its size to a certain extent and the parent rearing of most species apart from owls is the preferred method.

Parent rearing also means that the bird is more likely to breed naturally should future requirements dictate this requirement.

Where species maybe over represented or be breeding in abundance, it may be considered by the collection, appropriate to crèche rear birds together, particularly these of a social nature that are part of the collection. Waldrapp Ibis (*Geronticus eremita*) for example, if over represented and with the EEP's approval, could be reared in numbers and free flown as a flock to highlight the conservation concerns and raise the profile of this critically endangered species. It is far easier and has more impact interpreting a message during a free flight scenario than to rely on signs and other visual interpretation.

This must however be supported by the EEP. Without the required support, the species cannot be selected to be free flown.

If a bird within a collection is rejected from a nest and needs to be hand reared by keepers, this may be another means of obtaining a bird that can be included within displays.

Strong species knowledge and a considered training program would need to be considered along with all of the other factors such as housing, species knowledge and disposition policy should the bird not be acceptable for displays and cannot be returned to an aviary.

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## **15) Species Selection for Free Flight shows**

The section of any species for demonstrations needs careful consideration and should include guidance set out in the document above. A series of important questions should determine whether or not a species is included within free flight displays.

Each institution should have its own criteria based on mission lead messages or the Institutional collection plan.

To retain consistency a draft selection guideline has been constructed below aimed at answering some key questions integral to the selection process.

An example of the criteria checklist designed for ZSL London zoo is shown below.

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## Proposal for inclusion in a free flight display Species: Striated Caracara

Requirement	Score	Comments
Is the species part of the ICP	Y/N	The species is part of the ICP and breeds on site
Is the species within an EEP/ESB	Y/N	No
If yes, do we have coordinator approval to train for shows?	Y/N/N/A	N/A
Do we have a conservation or behavioural message for including this bird in a show?	Y/N	Isolated habitat and persecution
Is there an alternative species that can be included to interpret the same message	Y/N	No
Do we have the species specific knowledge to manage the bird within the show team?	Y/N	Yes
Do we have the training knowledge to train this species based on what we know about it.	Y/N	Yes
Is the flying area suitable for the species in terms of impact on native wildlife, impact on the collection?	Y/N	Yes, although the potential to scavenge could be problematic
Is this a carnivorous species? Are open top predator enclosures within visibility of the show area?	Y/N	Yes and Yes. Mitigated to low flying and terrestrial nature of the species and fixation with food and trainer
Does this bird need to be hand reared?	Y/N	No
Do we have to tether this species to train it?	Y/N	No must never be tethered
If yes, can it be tethered for the duration of the training and then be placed in an aviary?	Y/N/N/A	
Is this a social species?	Y/N/N/A	Juveniles are known to be
Do we have companion birds that meet the species social requirements?	Y/N/NA	Yes
Do we have the required, accommodation to keep this bird all year that meets its husbandry requirements?	Y/N/N/A	Yes
Can we cater for the birds enrichment requirements during the off show season	Y/N/N/A	Yes
Do we have appropriate tracking equipment to locate the bird if required – can it be attached?	Y/N	We have the equipment but we have not been able to attach it.
Has a Risk Assessment been completed for the bird to be free flown	Y/N	Yes
Do we have a disposition plan if the bird is not suitable for shows?	Y/N	Yes – It will go to Colchester Zoo

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## 16) Sustainability

Any bird considered for inclusion must be acquired from a sustainable and traceable source. Birds should be bred in captivity which should not only make them a more suitable prospect for training; their inclusion will not impact on wild birds which could also contradict the education and conservation remit of demonstrations.

Where species are particularly required for captive breeding programs, young birds must not be hand reared for the sole purpose of demonstrations unless over represented genetically and upon the advice or approval of EEP co-ordinators. All species of high conservation value, determined by the IUCN, CITES and the relevant TAG should be prioritised as breeding birds.

Where possible, alternative species should be used that can illustrate the same message. For example, new world vultures can be flown to educate visitors to a collection not only on the species being flown but to the importance and plight of vultures around the World.

Many species that are common or bred in captivity in larger numbers can be included in demonstrations. They can highlight interesting behaviours and free flight that they may not show in an aviary and are subsequently excluded from animal collections.