

RELEASE CONSIDERATIONS FOR REHABILITATED WILDLIFE

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Assessment of an animal's suitability for release should be carried out as soon as it is admitted for treatment. It may be possible to treat a specific injury but deciding whether the animal is capable of surviving in the wild for any length of time after release requires careful consideration.

Considerable time, effort and funding is often invested in the treatment and hand rearing phases of rehabilitation with much less attention given to the final rehabilitation stages including release and post release monitoring.

The following points should be given consideration before an animal is considered suitable for release:

- Veterinary assessment - health check and disease risk assessment
- Behavioural assessment - food acquisition, predator avoidance
- Authorization from State Wildlife Authority
- Identification and post release monitoring
- Release site assessment
- Weather, appropriate timing, educational considerations
- Release technique - direct or supportive

It is widely thought that an animal has only been successfully released if it becomes integrated into the breeding population and produces offspring. However, in natural populations not all adults contribute to reproduction and in many species there is a constant surplus of non breeding animals (Csermely 2000).

There are obvious veterinary considerations that would prevent an animal from being released. In New South Wales the Department of Environment and Conservation's Rehabilitation of Protected Fauna Policy states that:-

"Protected fauna must not be returned to the wild where the animal is handicapped with a permanent or long-term disability which could reasonably be assumed to preclude it from leading a normal life and surviving in the wild or the animal is reasonably suspected to carry a serious disease or a disease which is likely to be transmitted to the detriment of populations or habitat."

It is illegal in the United Kingdom under the Abandonment of Animals Act (1960) to release any animal that is not likely to survive. The following injuries prohibit the release of birds in the United Kingdom as they interfere with the bird's ability to fly, hunt, kill and eat: loss of any limb, loss of eye/sight, loss of hind talon, permanent loss of any part of the beak, primary or tail feather loss in falcons. Other countries have similar laws preventing release of animals with disabilities.

There are arguments put forward that animals with disabilities have been seen surviving in the wild and therefore that species can be released with disabilities. Although there may be animals surviving with disabilities, the animal that arrives for treatment has obviously not been coping and has been presented for treatment for a reason. If a human has managed to get hold of a wild animal, that is an indication the animal is not surviving well and something is wrong. It is then the responsibility of the veterinarian and wildlife rehabilitator to ensure that the animal is treated, rehabilitated and responsibly released and not abandoned to suffer. Abandoned animals may slowly starve to death, be chased and harassed, freeze to death or be found by an irresponsible person and given inappropriate housing and diet, so that the suffering is prolonged even further. The easy option of "if in doubt, chuck it out" or "let's give it another chance" are "out of sight out of mind" options. If there is any doubt about the animal's ability to survive, and captivity is not an option, the responsible decision (and by far the more difficult and less selfish one) is to euthanase the animal and save it from suffering.

When a species is listed as threatened or endangered making the decision to release a disabled animal will be more difficult. Consultation with wildlife authorities is essential in deciding whether there is potential for that animal to contribute to breeding success of the species.

Some animals may be suitable for captivity as education animals and hand raised wildlife can be excellent educational tools for raising awareness and helping communities understand habitat requirements. Animals of high conservation value may be suitable for captive breeding projects. However, in terms of the animal's welfare, many ex-free living adult animals experience a very poor quality of life when confined to an enclosure and if kept in solitary confinement.

If the animal is a release candidate the first step in the final check list is examining the health of that animal.

Health Assessment

An experienced wildlife veterinarian should examine the animal to ensure that it has no clinical illness or injury and that it is not a disease risk to the wild population. Where possible blood should be collected and examined prior to release and faeces checked for detectable parasites. Included in this assessment is the **Condition** of the animal. Animals should be well nourished and the appropriate weight for that species, sex and age. Consideration should be given to the large variation in the size of animals of the same species and the release weight should be compared with those of fit, wild individuals (not derived from captive weight data). Animals recovering from severe trauma may require a veterinarian to prescribe physiotherapy sessions.

Physiotherapy

It is recommended that animals receive physiotherapy to regain normal function after fractures, severed tendons and extreme muscle trauma. Physiotherapy sessions should be based on analysis of the animal's specific injuries. These can be determined by x-rays, thorough physical examinations of the animal, and advice from a veterinarian. The person performing the physiotherapy should be aware of the species' characteristics, the animal's individual needs and the animal's physical and behavioural responses to the physiotherapy. Signs of intolerance such as severe fatigue, open-mouth breathing, vocalization, drooping wings and incoordination of movement should be recognised immediately.

In general, passive range of motion (PROM) physiotherapy is performed by the carer firmly holding the limbs and gently moving the joint affected, through its range of motion to provide a slow stretch. This increases soft-tissue flexibility and increases motion in the joint. It should be noted whether the motion is spongy, open or solidly blocked at the end of travel. Movement of the wing and limb can result in increased blood flow, lymph drainage, prevention of muscle contraction and hopefully, the return to normal function. It is helpful if the person carrying out the physiotherapy has an understanding of the wound healing processes, especially how bone, nerves and tendons regain strength. (Martin 1993)

Active assisted range of motion (AAROM) physiotherapy or exercise is used when tissue mobility is reduced, and allows the muscles to strengthen (Martin 1993). This type of physiotherapy usually involves the rehabilitator assisting the bird by raising it up and down and encouraging it to flap its wings. This assists circulation, soft-tissue flexibility, range of motion of joints, and strengthens muscles.

There is a fine line between providing an animal with enough physiotherapy to maintain full movement and causing the animal high levels of stress. Each case will require individual assessment and continuing consultation with veterinarians. It is important that appropriate catching and handling techniques are maintained during physiotherapy.

Fitness / Exercise

When an animal has left intensive care and its weight has returned to normal range an exercise regime can be established to enable the animal to become fit enough to be considered for release. Animals require a high level of fitness to survive, i.e. to find food, catch prey, escape from predators, find shelter, attract a mate, copulate, raise offspring and defend a territory.

Exercise regimes are based on three facets: frequency (how often), duration (how long) and intensity (how much). The frequency is usually once or twice per day (more than that is not usually possible). The duration depends on the species, exercise and handling tolerance. Generally the duration should start at 5 minutes and increase to a maximum of 15 minutes (depending on species). More repetitions will build strength and endurance. It is important not to increase the intensity of the exercise if the animal cannot repeatedly perform the exercise with ease. For example, if a bird can fly from one end of the aviary to the other 15 times with good quality of movement, for three days, at a frequency of two times a day, then intensity can be increased or a new movement demanded (e.g. from ground to high branch). It is important to avoid increasing more than one facet of the exercise at a time, e.g. if increasing intensity, the duration should not be increased at the same time. Acute observational skills are needed at all times when exercising animals for release. Chasing the animal around the enclosure or encouraging them to move in a structured, planned way is known as AROM, active range of motion exercise (Martin 1993).

Other ways to increase fitness levels include:

- Housing animals together increases activity levels because interaction usually occurs when there is competition for food, roosting or nesting sites, grooming and allo-preening and disturbance due to the activities of other animals in the enclosure. A large portion of an animal's day is spent searching for food and when food is provided without effort animals can become sedentary and may spend long periods without moving.
- The rehabilitation enclosure should be large enough to enable the animal to exercise. In some cases browse and other furnishings may need to be removed for exercise sessions. Pools are required for all aquatic species.
- Food should be provided in such a way that the animal needs to move around the enclosure to acquire it. Providing live insects is essential for all insectivorous species (Walraven 1994).
- Hosing aquatic species often stimulates them to flap their wings and swim.

Assessing fitness

How do fit animals behave? Animals that are fit are very active - they climb, leap, groom, preen, swim, dive, fly and eat well. Fit animals also try to escape.

Birds are easier to fitness test than mammals due to diurnal activity and visual opportunities. Following are questions that can be asked when assessing a bird's fitness level:

- Does the bird fly the full length of the aviary or do they land on the closest perch?
- How close can you get? When does the bird fly away?
- What is the height and speed of flight?
- Is it a buoyant flight or a laboured hard pumping flight?
- Does the bird extend both wings evenly? Is the flight balanced?
- Are the feet tucked up or do they sway to compensate for a weak wing?
- What position are the legs in?
- What is their landing ability?
- How fast does the bird recover (in respirations per minute) after each flight?

Evaluating flight mechanics can help when assessing fitness and should focus on wings, legs, tail and flight feathers. Wings should extend fully, they should be symmetrical to each other (to make the stroke) and have the same beat (flapping speed). Watch to see if the bird is flying strongly, symmetrically and maneuvering appropriately (Arent 1996). Legs should be in one of two positions. They should either be tucked up or both hanging straight down (especially in raptors) Birds with wing disabilities will often show a leg shift to the left or right that is usually compensating for a weak wing on the opposite side. When flying in a straight line in an aviary the tail of the bird should be horizontal. Tail shifts often indicate a weak wing like the leg shift mentioned above. Broken feathers will affect flight ability and alula feathers are important for maneuverability in raptors (Arent 1996).

The height of a bird's flight can also reflect its strength. When a bird is fit it should easily fly from the ground to the highest perch and maintain its height when flying from perch to perch. When birds are in limited spaces like rehabilitation aviaries ascending flights are very demanding and repetitive flights from the ground to the perch can build muscle.

Monitoring the bird's respiratory rate during exercise can be a good indicator of fitness (Arent 1996). If a bird can fly the recommended distance with few or no rests and its breathing is not laboured then it is probably relatively fit. Birds should not be pushed too hard at the beginning of the exercise program. The very obvious "breathing up" that can be observed as the chest expands decreases as fitness improves. However some birds stress more easily than others and adults are usually less tolerant than young birds. Also panting and gular fluttering in owls can make respiratory assessment difficult.

Another way of determining fitness levels in birds is to monitor the blood lactate concentrations after exercise. Accumulation of blood lactate in response to exercise indicates inadequacy of the oxygen supply to working muscles (Chaplin 1993). However, birds that struggle during blood collection may have artificially elevated lactate concentrations.

Fitness testing is very important when assessing release potential. It is likely that fitness plays a more important role in animals that hunt, than opportunistic feeders or grazers. However, fitness programs that meet the specific needs of different species, is essential for increasing survival rates of rehabilitated wildlife.

Acclimatisation

All animals need to be housed in an outside environment for at least two weeks prior to release (unless they have only been in care for a very short time). The period of acclimatisation will vary depending on the animal's history and its reaction to the outside facilities. They should be exposed to sun, shade, changing weather conditions and photoperiod. Observation of their reaction time to storms, high winds, nightfall and daybreak can be useful because the way animals react to changing weather conditions is a good indication of their behavioural fitness.

Salt tolerance

Part of the process of acclimatisation is re-establishing salt tolerance in sea birds. When sea birds have been out of water for more than two weeks they will not be able to drink salt water and will need to be "salted" prior to release to ensure that the salt gland is functioning properly (Halcom 1987). Pelagic birds possess a salt gland that allows them to drink salt water and excrete the salt. (Goodfriend 1997) They often shake their heads as the salt runs down their bills. When kept in fresh water for more than two weeks the salt gland can atrophy and no salt is visible on the bill. Salt tablets can be administered at the rate of 100 mg/kg body weight per day or alternatively a 1% solution can be tube fed several days prior to release. If no signs of salt toxicity are noted the solution can be increased to 2%. Twenty-four hours prior to release the solution can be increased to 3% which is approximately the salt content of sea water (Holcom 1987). Only true pelagic birds require this process - many other aquatic species adjust easily from fresh to salt water.

Waterproofing and feather protection

Access to water during acclimatisation is essential for all aquatic species. It is important to be aware that some bird's feathers may not be waterproof if they have spent a considerable time in the hospital environment. Birds preen to align their feathers. When birds are very ill they do not have the energy to preen and their feathers become tatty and lose their waterproofing and insulating qualities (this is applicable to land birds as well as water birds). It is essential that a bird's feather condition and waterproofing are protected from the time of admission until the time of release.

Feathers are made up of microscopic barbs and barbules that hook together. It is the physical alignment of these barbules that creates the waterproof condition so essential to seabirds (Clumpner 1990). The feather structure forms a complete barrier that repels water and holds air between the body and the contour feathers, keeping the bird warm.

Situations that cause damage to feathers and loss of waterproofing are:

- a) Transport
A bird may be successfully treated for dehydration, fractures, muscle trauma, predation, oiling, exhaustion and many other conditions. However, if the bird has been transported inappropriately and its flight feathers have been damaged then euthanasia may be necessary due to the fact that some species will develop secondary complications in captivity due to the time it takes to grow new feathers. A short period of time in an inappropriate box, wire cage or abrasive transport box with wire door while flapping can cause irreversible damage.
- b) Hospital and Rehabilitation cages
Wire cages are inappropriate for treatment and rehabilitation of most bird species. Feather damage to the leading primaries (causing loss of flight) can occur within 15 minutes of a bird being placed in one.
- c) Contamination
Contamination with foreign matter such as faecal material, oil (including fish oil) algae and urates causes loss of waterproofing. When force feeding fish to birds it is important to be aware that the oil from the fish that may be on the carers hands can contaminate the bird's feathers.
- d) Moulting
The replacement of feathers consumes a lot of energy (3% of body weight per day in some penguins) and some birds cannot be released while moulting (penguins, swans) while other birds such as gannets will go on long foraging flights with incomplete wings. (Welty 1975)

Assessing waterproofing

When a bird is waterproof the water runs off the feathers in beads, the downy feathers stay dry, the bird floats high in the water and the body temperature is maintained. For more detailed information on waterproofing please refer to Rehabilitation and Release of Seabirds (Hall 2000).

Normal Behaviour

An animal's behaviour can be assessed by comparisons with those of healthy wild individuals. There are six areas of behaviour to consider in the development of any rehabilitation or training scheme. Animals must be able to acquire and process food, avoid predators, interact appropriately with conspecifics, find or construct nests and shelters, orient and navigate in a complex environment and territorial species need to learn how to define the limits of their ranges. (Kleiman, 1989)

Before release is considered, the animal's behaviour should be assessed and to do this the rehabilitator should have a thorough knowledge of that species' wild behaviour.

For detailed information on the six behaviours please refer to (Hall 2003) Rehabilitation and Release Techniques for Wildlife.

Food Acquisition

Most adult parent raised wild animals will be able to identify, manipulate and process food items. However hand reared or long term captive animals may have difficulty, in particular predators that require hunting and killing skills. These animals may need months of training and require wild caught tutors as trainers.

A varied diet is essential while animals are in rehabilitation as most wildlife feed on a wide variety of food or prey species and can be very opportunistic feeders. Most predatory species react to prey movement (Kaufman 1974, Snyder 1975) but in most countries feeding of live prey is banned or considered unethical. This makes training for release difficult because young inexperienced predators (particularly raptors) may have problems developing the correct predatory ability - e.g. may chase and catch the prey but have difficulty killing it. It is important not to feed animals on artificial diets prior to release. An example would be feeding raptors day old chicks because the bird may become used to that food source and not react to other prey items after release. It is important to supply live fish to some species prior to release to assess their feeding ability. While most of us are concerned about prey welfare, it is also important to consider the predator's welfare and acknowledge that most prey animals would be killed very quickly with minimal suffering, whereas an ill prepared predator may take weeks or even months to starve to death.

All animals should be provided with their wild diet prior to release. Captive feeding options should be removed at least two weeks prior to their release. The ideal is for animals to have access to food items taken from the release site but this is not always possible. Live insects are essential for all insectivorous animals.

Predator Avoidance

Food should be placed in enclosures with as little disturbance as possible, as animals learn to associate disturbance with food being provided. This should be avoided at all costs, as the animal's reaction to disturbance in the enclosure should be one of fear. If the animal becomes accustomed to humans and noises accompanying food, it is difficult to reverse this learned behaviour and their chance of avoiding predators is minimal. At no time during the rearing process or at any stage of rehabilitation should the animal associate disturbance (or humans) with food. When entering an enclosure, the animal should immediately react by fleeing. If this is not the case, efforts should be made to frighten them. An immediate flight response is essential for survival.

Using recordings of predators outside the enclosure and simultaneously frightening the animals can be useful for some species. Visual stimulus, such as bird of prey kites, trained birds of prey and mounted prey specimens, with accompanying sound, have been used with some success. Research has shown that animals will become accustomed to prey species if the sounds, smells and sight is not accompanied by a negative experience. Catching animals after the predator stimulus may help to reinforce that a flight response is essential. Training animals to avoid predators is an area which requires a great deal of research, and many techniques remain largely untested.

Cross fostering methods (where chicks are placed with wild caught individuals of a similar species) allow incubator hand raised birds to learn predator awareness from adult, wild caught individuals. However, some social species have shown difficulty forming pair bonds with their own species, so whenever possible, it is preferable to use adult birds of the same species as tutors.

It is important to bear in mind that native animals housed within close proximity to the sounds and smells of their predators, in veterinary hospitals, undergo a large degree of stress. Young animals may also become accustomed to these predators and not see them as a threat. Wildlife should not be housed near domestic animals.

Interaction with Con-specifics

Prolonged captivity can significantly reduce release success in some species. It promotes habituation to humans and can reduce flight ability and responsiveness to prey (Csermely 2000). Close contact with humans can cause lack of fear and induce socialization particularly in juvenile birds. The released birds often stay in areas with human presence and will not use the optimal habitat. Imprinted birds are unlikely to breed in the wild but may still occupy a nest site, thereby preventing a potentially fertile pair from utilising it.

Animals should be reacting normally with con-specifics prior to release and close observation of the group may be necessary to determine if individuals of gregarious species are being ostracised, or not behaving normally. It is often easier to detect abnormal behaviour once animals are interacting with others of the same species, especially if the tutors are wild individuals. When animals are introduced there should be a degree of attention paid to the new arrival (sometimes aggressive postures, vocalisation etc). If the animal is ignored it is often an indication that the animal's behaviour is not normal as the others do not recognise it as a threat or requiring attention.

Decisions about abnormal behaviour require knowledge of the mating system, social organisation and spatial relationships of the species in the wild (Kleiman 1989).

Nest Construction

To enable animals to find and construct nests, appropriate nesting material needs to be provided as well as logs, bark, suitable branches, etc. As with other aspects of rehabilitation, it is helpful to try to reproduce the species' natural environment as much as possible in the space available. Adult breeding animals can also be used as tutors for nest construction. Ringtail possums will build dreys even in the hospital environment and can construct a reasonable drey in one evening provided they have the appropriate native browse for "construction".

Navigation in a Complex Environment

All animals need complex three dimensional environments in their rehabilitation enclosures (Kleiman 1989). To achieve the correct habitat for that species, it is helpful to observe the species in the wild. It is important to have thick foliage in one area with a variety of branches, logs, large rocks and clumps of grasses. Ropes can be utilised if sufficient branches are not available. It is advisable to gradually introduce more "furnishings", allowing the animals to exercise and gain fitness in the enclosure while it is relatively open, and then introducing more rocks, branches and foliage to test their manoeuvrability. It can be advantageous to acquire vegetation from the release site towards the end of the rehabilitation period.

Defining Territories

Two of the most difficult activities a territorial animal does in its lifetime are to acquire a breeding place and a mate. The male who is going to establish a territory has to be extremely fit. It seems that there is a fairly inflexible threshold of condition below which no male will attempt to breed. Animals defend their territories by voice, by threatening postures, by pursuit and by actual physical combat. Some animals will establish territories very quickly and once they have made the rehabilitation enclosure their own it is not possible to house other animals in that enclosure. Although it may be helpful to house the same species in adjacent enclosures and observe the behaviour be mindful that some will become very distressed if they are not able to chase the other animal away and may expend all their energy at the wire of the adjoining cage.

When the rehabilitator is convinced the animal's health and behaviour are normal, then the next considerations for release are: authorization, identification and release site choice.

Authorisation

The relevant Government wildlife organization, state or federal, should have prior knowledge or give permission to release rehabilitated wildlife. In some cases they may be involved in the choice of release site due to their local knowledge. Once the animal has left captive care the State Wildlife Authority is responsible for the welfare of that animal.

Marking and Identification

Prior to release, all animals should receive some form of permanent identification to enable post release monitoring. There are many ways to identify individual animals such as implants, metal and plastic ear tags, metal and coloured leg bands, flipper tags and radio and satellite transmitters. If we are releasing animals without identification we are unable to monitor the success or otherwise of our hand raising, treatment and rehabilitation techniques.

The Release Site

- a) The Department of Environment and Conservation (New South Wales) Rehabilitation of Protected Fauna Policy states "In the interests of genetic integrity of native animal populations, a rehabilitated or hand-raised animal should be returned to a suitable natural environment at or near the locality of the original encounter. An animal should not be transported to a release point across a geographic or physical barrier it would not normally cross".

Rehabilitated animals should be released as close as possible to their encounter site where they would be familiar with the area, suitable shelter sites, feeding areas and may be integrated back into their family groups or re-united with their mate. However, return to the encounter site can only be done if the factors that caused their rescue have changed. For example, if the animal was injured by a domestic pet, it would be pointless to return it to the same house, unless the owners are willing to take appropriate action, such as keeping pets inside and/or providing shelter for the animal. Similarly, animals found near major roads need to be released in the closest suitable habitat, away from such a hazard.

- b) If releasing away from the encounter site the following considerations should be taken into account when choosing a release site:
- The site should be within the limits of the recorded distribution for that species or sub species.
 - The site should have sufficient suitable habitat that would permit the establishment of a viable population ie sufficient shelter, resting and basking areas and suitable vegetation.
 - The site should provide an adequate food and water supply - prey species should be available
 - The same species should be present - if they are not then it is an indication that the habitat is not suitable for that species.
 - The site should not be polluted and there should be minimal risk of injury or death from human activities.

- In an ideal situation the release site would be free from introduced predators, such as foxes, feral cats and dogs.
- Pelagic birds should be released at sea. Most will rest on the water unless there is over 20 knots of wind to enable them to become airborne. Most benefit from being able to rest after release, wash and preen their feathers and adjust to their surroundings.
- Reptiles should be released near or in a shelter site, such as a rock crevice or hollow log from which the animal can emerge when it is ready to do so.
- Animals use different habitats in different seasons (for example, diamond pythons in coastal NSW often enter buildings during winter, staying near the sun-heated roof, and scrub pythons leave thick rainforest to bask in open valleys) so this should be taken into consideration..
- Care should be taken not to release too many animals in one area and cause overcrowding either forcing resident animals to disperse or making survival for released animals difficult.
- Consideration should be given to territorial species. In urban areas other individuals move in soon after the resident leaves and habitat or roof space may be occupied when the animal is returned.
- Genetic variation may exist between different populations of certain species.

Other Considerations

Time of Year

The seasonal behaviour of the species should be known as the optimal release time varies between species. Care should be taken releasing animals during the start of the breeding season as there may be increased aggression in some species, however the breeding season may extend over a long period and it may not be possible to hold off release for that amount of time.

Reptiles should not be released during the winter months unless it is in northern areas and the weather is warm and suitable winter shelter sites exist.

Time of Day

For diurnal species the preferable release time is mid-morning once the air temperature has increased and the initial feeding frenzy of the morning has diminished. It is preferable if the weather is warm and sunny, especially for reptiles. Nocturnal species can be released approximately one hour after dusk to give the animal the rest of the evening to investigate its surroundings and hide before dawn. Avoid dawn and dusk as these are the busiest feeding times for resident animals.

Weather

It may be advantageous to get a long range weather forecast to ensure favourable conditions for release. Reptiles in particular should not be released until the weather is warm enough. It is important to keep in mind that some species prefer stormy conditions. For example a perfect warm day with light winds might be ideal for us to go offshore to release a seabird but an albatross's natural environment is the rough seas, high wind and storms of the southern ocean.

Migratory species

Consideration should be given to releasing migratory species 3-4 weeks prior to their departure time to enable them to build up condition, exercise and encounter others of their species. If it is not possible to release these birds into an environment with others of their species, then transport to a site on the migration route should be considered. These birds are easily stressed in a captive environment, do not feed well (if at all) and are quick to develop secondary complications so release as soon as possible after treatment is recommended.

Educational and Public Relations considerations

To ensure long-term support, protection and management of wildlife and its habitat, especially in urban areas, education about the rescue, rehabilitation and release of wildlife is essential. One way of achieving this is to involve the community by inviting them to become involved in the release of animals. The media can also be invited and this in turn broadens the educational component of the release. This often results in raising awareness about the wildlife in an area and the amount of habitat it requires to survive, which can in turn lead to habitat protection and restoration.

Release Techniques

Hard or Direct Release

When an animal is released without continuing support (in other words, simply let out) this is known as a hard, quick or direct release. This method is mainly used for animals that have been in captivity for a short time and are being returned to the original encounter site. This method of release is not recommended for hand-reared animals, animals which have been in care for an extended period, or those being released in unfamiliar territory.

Soft Release

Methods which include continuing support are called gentle, gradual or soft releases. Soft release animals are caged and fed in the release site prior to release and thus become accustomed to the area. Support after release is provided in the form of access to a release cage and food, or food and nest boxes placed in the area. Food is decreased gradually over several weeks.

Soft releases are preferred after long term rehabilitation although there is little data available in Australia comparing survival of hard and soft release animals. Soft releases enable some monitoring of animals after release and assessment of condition (whether they have been in a fight, etc.) and behavioural observations. Housing animals in the release cage also enables resident animals to become accustomed to the new arrival. Usually there is considerable aggression shown for the first 4-5 days and then the resident animals appear to get used to the new arrival and the aggression dies down. This is not to say that they will not behave differently once the animal is let out but generally it appears to assist some species.

Post-Release Monitoring

The reasons to tag, collar, band or mark an animal before release are to monitor their progress (or otherwise) once they leave care, and to determine the reasons for the success or failure of released animals to survive. Unfortunately the monitoring phase is often neglected once the released animals appear to be surviving.

The data presented in post-release studies can be grouped into three categories: survival data, dispersal or movement data, and behavioural observations. Most survival information reports only the length of time that the animal could be located in the wild after release. In analysing post-release data it is often difficult to determine if an animal's death was due to an unfortunate circumstance (severe weather, trapped, disease) environmental pressures (poor food, no habitat, competition) or due to the fact that the animal was not properly prepared for release (inadequate diet, humanisation, poor physical condition, inappropriate release site).

A straight line distance between release site and one or more recovery points is usually reported. This movement data, observations of the animals, post-release behaviour and their physical condition indicate how well the animal has fared after release.

In the short term, the way released animals disperse is one measure of their response to the new environment. Knowing why an animal died enables us to improve methods of rehabilitation or release immediately or at least before any others are released in the same manner. To evaluate the success of hand-reared or rehabilitated animals, the survival rates and behaviour of these animals should be compared with similar data from wild populations.

Long term, post release monitoring is essential if we are to assess the success or failure of our rehabilitation and release techniques and follow the progress of individual animals to breeding success.

Conclusion

Responsible rehabilitation and release techniques prepare animals for their second chance at surviving in our decreasing natural environment. As suitable habitat diminishes, especially in urban environments, rehabilitation animals may become important educators and ambassadors in our attempts to conserve suitable non-fragmented environments for native wildlife.

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