

Summary of Husbandry Guidelines for Asian Small-clawed Otters in Captivity.

Carol J. Heap, Lesley Wright, Lindell Andrews

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Chair: Jan Reed-Smith

Reviewed by: Sarah Duncan, International ASO Studbook Keeper



Photograph taken at the Chestnut Centre UK by Nicole Duplaix

OCT 2008 Asian Small (Short)-clawed Otter Husbandry Summary

I Objective

This manual has been collated by an international body of experts to help institutions and individuals recognize and adhere to the basic minimum standard of care required in keeping Asian small clawed otters, also known as Asian short-clawed otter (ASO), *Aonyx cinereus*.

The recommendations have a sound scientific basis or are the result of experience gained over many years of working with this species. This document was prepared by members of the Otters in Captivity Task Force (Carol Heap – Chestnut Center Otter and Owl Park, Lesley Wright – OSG Secretary, Lindell Andrews – Adelaide Zoo; edited by Jan Reed-Smith – OCT Chair, and reviewed by Sarah Duncan, International Studbook Keeper for ASO. For more complete information readers should consult relevant world zoo and aquarium association documents (contact information is available on the OCT website, see page 1).

II Natural History

There are currently thirteen otter species within the Mustelidae, found throughout Europe, the Americas, Asia and Africa. The Asian small-clawed otter is one of the five species inhabiting Asia; its range extends from Bangladesh, Bhutan, and Nepal across to Malaysia, Indonesia, Southern China and Southern India. This otter is found in a wide range of habitats from tropical coasts to mountain streams.

The ASO is better adapted to living alongside people than most otters so can be found in rice fields, shrimp and fish farms and are often sighted long distances away from water sources.

While less vulnerable than some other otter species, the IUCN/SSC lists the Asian small-clawed otter as Vulnerable (IUCN 2008 Red List). Threats of habitat destruction, pollution and an ever expanding human population have raised concerns for the long term survival of this species.

III Social Groupings

The ASO lives in large family groups based around a breeding alpha pair, the average group size being five animals, but groups of up to twenty have been recorded. While feeding individuals forage for themselves, they will unite as a group when under threat. This otter is monogamous with both parents and elder siblings assisting in raising the young (known as cubs, kits, or pups). An otter family will break up on the death of one of the alpha pair, and individuals disperse to find mates and found their own groups.

It is well established that this otter is a sociable animal; it is not recommended or considered ever acceptable to keep a lone animal. When kept in captivity these otters fare best in adult pairs, adult pairs with young (which can include several litters) or in single sex groups.

Caution:

- Generally, it is easier to introduce very young cubs (i.e. up to 6 months) or adults (i.e. otters over 18months old).
- All male groups generally are more compatible than all female groupings and seem able to live amicably with up to six otters in the group.
- Aggression can develop in all groupings including large families; compatibility problems may arise as older offspring age. Typically, large, multi-generational family groups maintain amicable relations for only a few years. Experienced professionals should be consulted for possible solutions to aggression issues. The OCT can be contacted at lontracat@live.com.
- Where possible no more than two compatible females is advisable in a group.
- If siblings have been together for a long time it is not advisable to split them up unless problems develop.
- It is recommended that a secondary enclosure be maintained for housing group members that have been ostracized by the group.
- Time and care must be taken in introducing otters to each other.

IV Feeding Habits and Diet

The ASO is a carnivore and in the wild would forage for a wide variety of foods including crustaceans, molluscs, frogs, fish, small birds and the occasional octopus. It has a high metabolic rate with a rapid digestive tract which takes approximately one to two hours from mouth to spraint (passage time is dependent on food eaten). Their high metabolic rate and energy demands require the otter to consume about 20% of its body weight per day. In the wild ASOs would need to spend 40 to 60% of their time searching for food, in two to three daily sessions. In a captive setting ASO's should be fed at least twice per day; with an additional two or three enrichment feeds (i.e. scattered treats or live food that require the animal to work for their meal).

In captivity, the diets vary from institution to institution and there is no perfect diet for this animal. Food items offered should consist of fresh, or appropriately thawed frozen items formulated to offer a nutritionally balanced diet. It also is important to take into consideration the species natural foraging style, natural dietary range, feeding times, weight, and individual animal's likes and dislikes. The following is one diet used successfully in the U.K.

ASO Diet - The list below includes possible foods and portion sizes acceptable to this otter species. Additional nutritional information is available in the OCT Otter Nutrition document.

- Day old chicks: 2 per day (some institutions remove the yolk sac due to salmonella concerns) or a similar amount of rabbit with fur on.
- 70% to 80% of the diet can be meat - this should be of a good quality and can consist of, non-fatty beef including ox heart, chicken, horse, or venison. Tripe is an easily digested protein rich in vitamins and useful for sick or weak animals. Alternatively, dry food concentrates such as "Iams® cat food can be offered.
- Vitamins: about a quarter of a 5ml teaspoon of SA 37 or Vionate®, or similar products per otter.
 - Vionate: ARC Laboratories 4280 Northeast Expressway, Atlanta, GA 30340 U.S.A., 770-454-3200, Order Desk: 800-755-7056; prets@gimborn.com
 - SA 37: Trilanco Bracewell Avenue, Poulton Business Park, Poulton-le-Fylde, Lancashire, FY6 8JF, U.K. Sale Phone: 01253 888188; <http://www.equos.co.uk/webstore/>
- Grated fruit and vegetables: carrots, celery, apple, tomatoes, blueberries, squash. Approximately 20gms per day per otter. Whole fruit and vegetables can be given as enrichment - some will be eaten but fruits such as melons and squash often are just played with and end up as pulp.
- 20 to 30% of the diet should be fish: non-oily and fresh is better when available. Oily fish should only be given at most 2 or 3 times per week. Feed the whole fish chopped into chunks including head and tail. If the otters are young score the fish skin into small squares and remove all bones to avoid choking. If only frozen fish is available, research shows a vitamin B₁ (thiamine) supplement should be offered.

- Potassium citrate: one quarter of a 5ml teaspoon (1.25ml) per otter x 2 per week (thought to help prevent kidney stones).
- Cod liver oil - optional 2.5mls per otter, three times per week.
- To improve coat condition, or in cold weather, suet, lard, butter or olive oil can be added to their meat meal or coated over a chick.; no more than one 5ml teaspoon per otter per day.

The above foods should be divided by the number of daily feedings, preferably three but at least two.

Sample diet: This diet has been used successfully over thirty years by the Chestnut Centre, located in the north of England where they experience cool summers and snowy or wet winters.

- **Morning feed:** chicks, rabbit, 2 crayfish or 2 to 4 herring.
- At least 2 scatter feeds between morning and afternoon feeds
- **Afternoon feed:** meat minced or cut into small pieces then mixed with grated carrot and apple, vitamins and cod liver oil; also fish prepared as previously suggested.

Feeding times should be varied somewhat to prevent habituation of the otters to specific feeding times. This habituation leads rapidly to stereotypic behavior, intra-group aggression, and begging as the otters anticipate the approach of a meal time. If this cannot be done for operational reasons e.g. the otter talk is always done at 3.30pm, then it is important to be prompt, so the otters know the food WILL come on time so reducing stress.

Scatter Feeding: these foods can be used as enrichment throughout the day.

Mealworms, snails, earthworms, crickets, crayfish, molluscs, shell fish, grapes, raisins, apple, unsalted peanuts i.e. monkey nuts (no more than 3 to 4 per otter per week). Raw or soft boiled eggs can be used as a treat or a medium for medicating an otter. The food should be hidden around the enclosure under rocks, in tree trunks etc. to encourage the otters to forage and be active. This natural behaviour makes a very enjoyable spectre for the visitors. Scatter feeding should be done at least twice per day with the time varied slightly to prevent habituation. In hot conditions relative to the otters' normal climate, ice, and the above foods frozen can be offered. These items should be included in calorie counts when calculating diets to prevent over-feeding and obesity.

Fresh drinking water, away from their swimming water, should be available at all times. The bowl should be disinfected every day, shaped so the otter cannot overturn it, and not too large so the otter tries to use it as a bath or toilet. In cold weather, this should be checked frequently to ensure it has not frozen.

Quantities of Food

As a guide line a fit, healthy otter would need approx 350gms of food in total per day; or up to about 20% of the animal's body weight. Required daily intake may vary depending on the following individual animal characteristics -

- Age: Younger otters (up to a year old) need more food than older otters.
- Sex: Some male otters are often slightly larger and require more food.
- Pregnancy/ lactation: Pregnant and lactating females need as much food as they can eat, generally at least 20% more than the individual's maintenance diet.
- Temperature: Environmental and seasonal changes will affect the quantity each otter requires.
- Health: Sick individuals may require more frequent, smaller meals per day. The Chestnut Centre suggests considering feeding tripe as it is more easily digested.
- Physical build: Some otters are bigger built than others and a naturally physically larger otter will need more food than a lightly built one.
- Activity levels: Highly active animals may require additional calories, animals with low activity levels require fewer calories.

Number of Feeds

Most institutions feed their otters 2 or 3 times per day. ASO's naturally eat throughout the day so the above sample diet should be divided up to suit your own staffing arrangements but a minimum of two feeds is recommended. In addition, enrichment/scatter feeds should be offered at least twice a day to encourage activity. These extra foods must be included in the total daily calorie intake.

Weight Reduction

Should an otter become overweight, feed lower calorie food or foods with more bulk and add more water to the diet. Reduction in quantities of food can lead to extremely aggressive

behaviour. In an otter group, it may not be possible to realistically tackle obesity with food as otters will beg and steal food from each other; in this case it is better to concentrate on encouraging increased activity. A comprehensive behavioural enrichment program can help with this.

Where to Feed

If possible feed in different places around the enclosure and in separate dishes per animal. The use of separate feeding bowls makes it easier to medicate a particular animal should the need arise. It is good practice to watch the otters feed to ensure all the otters are eating a balanced diet. Often more timid otters take the fish away to eat quietly so leaving all the meat with its nutrients to be consumed by the dominant otters, hence some otters may only ever eat fish and could develop health problems. Training individual animals to eat in specific locations can aid in monitoring individual animal intake (see OCT Otter Training document, available on the OCT website (see page 1), for information on target/station training). Always remove any uneaten food one hour after feeding to prevent the consumption of spoiled food and the presence of vermin.

Hand feeding

The keepers may be able to accustom all the otters to taking safely, when necessary, food from the keepers' hands. This makes giving medicated fish or chicks easier and enables supplemental feeding to underweight animals.

V Introductions

It is possible to introduce animals to each other at all ages; but it is infinitely more successful when the otters are younger.

Experienced keepers will know their animal's characters and as a result may be able to pair them easily. For this reason, it is important that regular staffing is maintained.

The ideal introduction is when the otters can be in adjacent pens without physical contact, so they can hear, see and smell each other. This might only be for a few days, it may need 2 to 3 weeks or it may never be possible. Difficult introductions can be facilitated by keeping one or both otters in isolation for 3 to 4 days. These otters may be more willing to accept company after a short time spent alone.

Moving furniture and bedding between the two pens then switching each otter into the other's pen for brief periods can be a useful familiarization technique. Staff should monitor

this process; any signs of aggression suggest it is too soon to take the next step. Once the otters seem amicable, when possible, allow them to have contact on either side of the fencing so they can more closely explore one another. This stage must be monitored as they may bite each other's feet. The resultant behaviour will indicate if, and when, they can be allowed full contact with one another. It is important when the otters are allowed full contact there are sufficient keepers present to separate fighting otters using boards and brushes. Once together, keepers should watch the animals for as long as possible to detect any signs of animosity, if any aggression or signs of stress are seen separate the pair using boards and brushes. Do not leave the otters overnight until you are sure they are amicable. Recognizing different vocalizations can be helpful.

If an otter is known to be dominant it is advisable to introduce the more dominant otter into the less dominant otter's territory. If animals are being introduced and both are going into a new enclosure, both animals should be familiarized with the new enclosure before introductions occur.

On occasions when an adult male is being introduced to another otter (male or female) the use of oestrogen can help to control aggressive behaviour. Information on the use of hormones can be obtained by contacting the OCT (lontracat@live.com).

Always remember some otters will never be compatible whatever you try and even established pairings can change with one otter becoming an outcast or a victim within a short period of time. As ASO's should not be kept alone for more than a few days if an animal must be separated it is advisable to move two otters out of the group not just a single animal.

Aggression between Otters

If a serious fight occurs the otters must be separated as quickly as possible. At least two keepers must be involved and use either pig boards, brushes, or something similar for their protection. A piece of wood cut the same size as the holt entrance and screwed onto long handle makes very useful tool for directing an angry otter gently into its box and blocking the exit. Should the otters fall into the water whilst fighting the brushes can be used to hook them out on to land before one of them drowns. Try to encourage one otter into the holt and locking it in whilst everyone calms down. Assess the situation. The resolution may entail reintroducing the animals, changing management strategies (e.g. feeding amounts/times, more nest boxes, etc.) and/or move out one of the otters (remember, single animals should not be kept alone for extended periods). Keepers please note ASOs' tempers can flare up very quickly but equally they soon calm down; aggression, unless

obviously severe, should be closely monitored before drastic action is taken. It is advisable that a secondary enclosure is kept for placement of ostracized group members.

VI Housing and Enclosures

Land

Although otters enjoy and spend a lot of time in water they also require plenty of dry land for resting, grooming, digging, and foraging. The more natural the surroundings the better therefore a substrate of grass, soil, pebbles, non abrasive sand and/or mulch as opposed to concrete will be beneficial to the otter group. Concrete walking areas can cause foot and tail sores. Hollow logs, natural trees and plants, such as bamboo, shrubs, and grasses, create a more interesting habitat. Try to provide a higher viewing platform (boulders, logs, wooden structures) which the otters can easily climb ensuring this is at least a metre away from the peripheral fence. Some vegetation should be strategically placed to allow the otter privacy from the viewing public and protection from the sun or inclement weather. Pool shorelines should be complex offering opportunities to climb, dig, rest in sun/shade, and forage. Otters should always have free access to their nest boxes; enclosures should be provided with at least one nest box per otter as well as at least one large enough to hold the entire group. The site of the enclosure must be away from loud, frightening sounds.

The recommended ratio is 20% water to 80% land; 30% water to 70% land should be considered the minimum.

Water

ASO prefer a pond with shallow sloping edges, they enjoy digging at the edges and washing their food in the shallow waters. If the pond is artificial and not filtered it must be cleaned weekly. Pool sides should be complex (i.e. deadfall, shrubs, boulder piles, fallen logs extending into the water, etc.) and not smooth, uninterrupted lines. The warmer the water the more these tropical otters swim. An ideal pool temperature is about 80 to 85°F (26.6-29.4°C). Ensure the disinfectant used is appropriate for use with otters (e.g. Virkon®, DuPont™) and thoroughly cleaned away before the animals/bowls/furnishings are returned to the exhibit. Pools can be constructed of many different materials including plastic liners, concrete, gunite, or a natural pool dug out to the appropriate depth. Some professionals believe when there are young cubs (first learning to swim) in the group the water level should be no more than 10cms. At a minimum a plank or well placed stones should be placed to help cubs climb out if necessary.

Note in cold climates several times a day check the pool has not frozen. Other options include placement of an air or water bubbler in the pool to keep water from freezing over or draining the pool and giving the otters a small bath with “aired water” fresh each day and emptied at night.

ASO's can become trapped under the ice.

Fresh drinking water must be supplied daily in a clean, non- spillable, disinfected container.

Barriers

To contain the otter either a 1.5m fence, maximum mesh size of 50mm, with an inner horizontal overhang of 30cm or a non climbable wall is recommended. The wall or fence should be buried in the ground to a depth of at least 80cm and slightly angled inward to discourage the otter from digging out. As a last resort hot wires can be used but these must be placed so there can be no contact with an otter in the water.

The perimeter fence must be checked daily. Ensure trees are not overhanging the fence and providing a means of escape for these able climbers. Enclosures should have a double door entry system so no animals can escape as the keeper enters or exits the enclosure.

Glass viewing panels are very effective in a wall or fence but must be of sufficient strength to avoid breakage.

Nest Boxes

At least one nest box per otter should be provided, including at least one large enough to accommodate the entire group. The nest boxes should be situated away from sun, rain, wind, and public proximity. Boxes can be made from wood, plexiglass, plastic barrels, etc. In colder climates, the tunnel leading into the outdoor nest boxes should have a bend in it to protect the otters from draughts. Alternatively, inside the nest box should be a second box with its entrance away from the external opening. However, this tunnel arrangement can make one method of catching the animal more difficult. The recommended nest box size is 60cm x 60cm and 50cm deep; the otter access opening should be approximately 15cm x 15cm. The lid of the nest box should be hinged to allow it to open upwards. It is useful to have a “spy hole” in the lid so the whereabouts of the otters can be established before opening. This is particularly important when there are cubs.

Each nest box must have sufficient ventilation holes to ensure adequate ventilation. Some institutions have been successful using a plastic/perspex side to the box so visitors can watch the activity within the box. Conversely, exhibit denning structures can be

constructed from natural items (hollow logs, strategically placed logs or shrubs) and placed so the public can view sleeping animals. This works well in situations where otters have off-exhibit holding dens to which they are given access at night or during inclement weather. In these cases, otters should be trained to enter off-exhibit holding when called to aid in catch-ups for health/wellness checks.

Ideally, if the box can be removed from its position it could be used as a carrying box for transporting an otter. The entrance should be able to be closed with a slider arrangement at both the tunnel entrance and at the box entrance giving the nest box a multipurpose value.

Clean, dry bedding or nest-building materials should always be supplied. This bedding material can be hay, grass, shredded paper, wood shavings, towels, burlap bags, polyester fleece, or carpet (whatever is used the animals should be monitored to ensure they are not eating it; wet paper products should be monitored as they can become glued over noses). Whatever bedding is used it must be plentiful and clean. If the bedding is left outside on dry days the otters will make their own beds this can provide the otters with hours of fun. If the nest box is too large some ASO's will defecate inside the box, this tends to stop if a smaller box is used.

Should the temperature drop below 50°F/10°C they will need supplemental heating, either a heat lamp or a heat mat, ensuring the otter cannot reach these heat sources. Otters enjoy snow and ice provided they can get dry and warm after a play session.

Size of Enclosure

The recommended minimum size for a pair of otters is 60 m², and each additional animal requires 5m². Consider the area available for the otters before encouraging a breeding programme or use contraception to limit breeding.

Like all otters, ASOs prefer and thrive on living outdoors in natural light and fresh air. It is not acceptable to lock them out of their holts other than for cleaning purposes and the animals must always be able to escape from the public view.

Cleaning the Enclosure

All otter exhibits should be monitored daily (all animals should be viewed and observed for a few minutes at least twice a day). ASO scent mark around their enclosures so a thorough cleaning of the whole area may cause an increase in stress to the group. It is better to do a thorough cleaning in sections on different days.

Daily cleaning should include spot cleaning, raking, and fresh water in a clean container. Substrates can be renewed when necessary, and disinfecting (e.g. Virkon®) of indoor quarters performed weekly or more frequently if necessary. Nest boxes should be checked daily as some otters like to defecate in the corner of the box, if this occurs on a regular basis remove the material and put it outside to encourage them to use outdoor latrines.

VII Enrichment

See above for use of scatter feeding as an enrichment tool. On warm days fish, nuts, raisins etc. can be frozen into small or large ice cubes and put in their pool. Live fish and crayfish (acceptable in some countries and not in others) can be placed in the exhibit pool. Pet feeding balls filled with dry food or a sack of hay with some fish bits are some of the many other techniques used to keep otters active. Whole melons, pumpkins, opened coconuts, or butternut squash can be put in their water but must be removed the same day. Some institutions give chicken or pheasant in feather on an occasional basis. Two hanging basket frames can be wired together and stuffed with bedding and some scatter food; if this is then attached to a tree with a bungee the otters have to jump to catch hold of the bedding. Always ensure there are pebbles in the pen for juggling and mealworms etc. hidden in bark chippings keep them occupied foraging for extended periods. There are several good animal enrichment websites available for additional options (e.g. www.aazk.org, www.animalenrichment.org).

ASO are by nature diurnal, active, busy, and inquisitive animals. Extra bedding put into the enclosure far away from the nest box will keep them busy carrying the bedding back and forth. Running water is a great attraction and fountains or sprays used at random intervals can be very effective at stimulating activity.

Occasionally, moving some of the furniture to different places in the pen or replacing it activates their curiosity. Hollow logs, branches, sand pit, hay pit all are alternatives for enrichment. If you have more than one group of otters swap items between the groups to stimulate patrolling and scenting.

- **Note:** if materials are swapped between groups monitor the animals for signs of stress. Also, before doing this ensure that all animals are healthy and you are not transferring potentially harmful vectors with the bedding.

ASO can be very destructive especially with any new planting, if it is not firmly anchored in the ground they will soon use it for bedding or carry it to the pool potentially blocking your filtration unit. Ensure all filters are carefully sited to prevent the otters damaging it or themselves. ASOs have very strong, nimble fingers, sharp teeth, and a tendency to never give up once something has attracted their attention.

The otters typically gradually destroy all the planting in the enclosure. This is natural behaviour and to be expected so regularly replace the plants or, if possible, a more preferable solution is to remove the otters to a second enclosure, in order that the original enclosure can be rested and replanted.

VIII Catching Up

Crate training is the best way of catching up any otter. It is the least stressful to both animal and keeper. See the OCT website (see page 1) for more detailed information. If animals are not trained to enter their nest box, etc. keeper staff should use a well thought-out approach designed to minimize stress to animals and staff. The use of 'push' boards and /or nets are catch-up options but should not be tried in large areas. Keeper staff should wear protective gear designed to protect against bites.

Basic crate training

- Acclimatize the otter to the transfer shute/crate/nest box by requiring them to move through the box on a regular basis. Animals should be rewarded for doing this with small amounts of food while they are in the nest box/crate/shute.
- Using a different item for each animal (hand ball on a pole, cube on a pole etc.) train each otter to stand with its nose at the object. This is called stationing.
- Gradually station the animal towards and then in the crate. Rewarding with food as the animal approaches, enters, stands in the training objective.
- Acclimatize the otter to having the door closed for gradually longer periods of time; reward with food.

Keep calm! Once the otter is suspicious or stressed postpone catching until another time, but leave the transport box open in the pen so they can become more familiar with it.

It is more difficult to catch an individual when a large group of animals is kept together. It is possible to use a large, soft edged, quick release catching net. The keeper must be quick and accurate to minimize the degree of stress to the group. Once the otter is in the net the other animals may become aggressive to the keeper/catcher. When the individual is in the net, it is important to twist the net above the otter to prevent it climbing out again. The keeper should be aware even small otters can bite through rubber boots and gloves. At least one facility has successfully used burlap bags, in which the otters habitually denned, to catch up the group.

IX Behavioural Problems

What is normal behaviour for ASO?

ASOs are intelligent, active, curious creatures and an ideal day would be to be fed 3 or 4 times a day; to have plenty of stimulation and activities which include playing and foraging as well as time to rest away from the public view when desired.

What is not normal is constant begging and calling, continuous turning in small circles, performing the same actions at the same points repeatedly, twisting the head back and forth, eating gravel, over grooming, and any other repetitive action the otter seems unable to stop. **Keepers should see their otters several times a day.** Where the otters only see their keepers at feeding times the otters will associate people only with food and hence even a similar shirt worn by the visiting public can trigger a begging session. Begging and calling for more than 30 minutes before food is not acceptable behaviour and the otters need stimulation to change their habits. Keepers should observe the otters other than at feeding times in order to become familiar with different types of otter behaviour.

Once a group starts begging it is difficult to break this habit but, by no means impossible. If begging or stereotypes have developed a change in management practices and/or a well-thought out enrichment and training program will benefit the otters and prevent concern for the otters' welfare amongst visitors.

X Breeding

ASO in captivity and the wild are monogamous with both parents raising the cubs. It is very important that before the decision to breed has been taken the bloodlines of the dam and sire are checked to prevent inbreeding. Young of previous litters also participate to varying degrees in care of subsequent young and benefit from staying in the family group through the birth of the next litter.

The oestrus cycle lasts between 30 and 37 days with breeding occurring throughout the year. Both sexes can be sexually mature at 18 months but are more likely to breed at 2 years 1 month for females and 2 years 8 months for males. Young females may miscarry or lose their first litter. Pseudo (false) pregnancies do occur, particularly in primiparous (first time) females.

Once the pair has bonded, copulation typically takes place in shallow water lasting from 5 to 30 minutes. Gestation is approximately 68 to 74 days and the female generally becomes very aggressive both before and after giving birth; the male shows aggression when he feels he must protect her. The sire must be kept with the dam as he plays an active role in bringing up the cubs. He can be seen nest building, carrying the cubs, as well as feeding the

dam and the cubs during weaning. Both parents and cubs will share the same housing. Multiple denning boxes/sites should be provided as the pair may decide to move the whole family to another nest for no apparent reason. Ensure plenty of extra clean, dry bedding is available for the family to use at all times.

These otters can have two litters per year with up to 7 cubs each time. The older siblings help to bring up the younger litter. The alpha male and female remain dominant in the family group. If an older sibling shows continual aggression to the cubs it may be wise to remove it. If this occurs the animal should **not** be separated by itself, if separation becomes necessary remove a litter mate with which it is compatible. Do not, if possible, remove offspring until they are at least one year old as they need to gain experience in helping to raise cubs.

The lactating female will typically require at least 20% more food.

XI Orphans or Rejected Cubs

Neonates who do not survive may be put outside the nest or cannibalized by the parents. If very young cubs are not thriving the decision has to be made to hand rear or not.

Hand rearing is possible, it is time consuming and the resultant otter may become imprinted on humans making it difficult, if not impossible, to return it to the other otters. If the decision is made to hand rear, a substitute cat milk for kittens is the formula of choice. Cubs should be fed every two to three hours initially; this will depend on age and condition of cub. Dehydrated cubs should be rehydrated first with an appropriate solution (Dioralite®, Lectade®, electrolyte solution). Feed the cub until it is sated which can vary from feed to feed. However, do not over feed – see below.

“The stomach capacity for most placental mammals is 5-7% of the total body weight (Meehan 1994). Convert the body weight into grams to find the stomach volume in ml (cc). To calculate the stomach capacity in ounces, convert body weight into grams (30g ~ 1 oz). It is important that units are the same for body weight and stomach volume. The stomach capacity is the amount of formula an infant can comfortably consume at one feeding. Offering much more than this value may lead to overfilling, stomach distension, and bloat. It also prevents complete emptying of the stomach before the next feeding, and promotes the overgrowth of potentially pathogenic bacteria, diarrhea, and enteritis (Evans 1985). (Excerpted from AZA Otter Manual Care 2008)”

In the case of older cubs that continue to show hunger after consuming the correctly calculated amount it may be wise to slowly start weaning on to a fish soup (recipe below).

Where a cub is reluctant to feed it may be dehydrated so replace the next one or two feeds with a dilute mixture of Lactade®; if the cub is still reluctant call the vet. The cub will also need massaging, or dabbing very gently, around the anus to ensure defecation after feeding (4 to 5 times per day) until seen to defecate/urinate on its own. At least once a day, after feeding, clean the cub with a clean cloth wrung out in warm water using soft small strokes similar to the dam licking her cub clean. During this time the cub should be housed, quietly, in a warm dark box. Offer a small, clean soft toy for company; a soft toy otter is best as the cub frequently sucks its tail for comfort. Ideally, the cub should have the same keeper who takes it through the whole hand rearing process. The cub should be weighed daily before the first feed.

As the cub grows slowly change the consistency of its milk by adding some fish soup to its milk feed.

Fish soup is made up of kitten milk, reconstituted as directed on the container, small amounts of chopped fish and calcium supplement and a general vitamin supplement, this is liquidized to a smooth consistency and put into a syringe with a soft flexible tube (no more than 2cms long) attached. Impatient cubs can wrench the teat off a bottle and swallow it at this stage hence the use of the syringe. The thickness of the soup is determined by the amount of fish used and as the cub grows more fish is added until the cub can lap the soup or start to eat small pieces of the same type of fish. Make sure there are no small bones as small cubs have choked to death on them.

Supplementary Feeding. At weaning some of the smaller cubs are not ready to take solids but the dam may no longer allow them to feed from her. All cubs should be closely monitored because the smaller ones may exhibit signs of a failure to thrive at this time. If the keepers have a good relationship with the family group especially the parents, it is possible to help these cubs, without removing them from the family. An extra feed of “fish soup” can be offered through a syringe and fed to the youngsters whilst they remain in their enclosure. A cub may take as much as 30mls of soup at one feed and can be fed up to 3 extra feeds per day. The proportion of fish to milk can be increased as the cub grows. It may also be necessary to add a calcium supplement to the soup to ensure strong bone formation.

Separate the cub from the family, usually by keeping the cub in the nest box and pushing the rest of the family out and then persuade it to drink from the syringe. The cub quickly gets used to this regime and it has been found that the cub will eventually come to the fence to be fed from the outside until it is old enough to feed itself. This can help to resolve the problem of imprinting and lone otters. At all times ensure you do not stress the family

group as they may react by moving the cubs to a less accessible nest box or natural home within the enclosure.

XII Cub Development

Eyes open:	start about 28 days fully open 47 days.
Crawling to walking:	14 to 43 days
Tooth development:	27days lower canines, 39 days molars.
Swimming lessons:	52 to 56 days
First solids:	49 to 58 days
Weaned:	82 to 120 days.

Cubs can be micro-chipped at 6 weeks of age. Micro-chipping over the bridge of the nose is strongly recommended to ensure the otter's identity throughout its life regardless of any changes of institution. Placement over the nose bridge eliminates the problem of chip migration and allows for easy reading when otters approach the front of holding dens. Alternative placement is between the scapulae.