



Successful Hand-rearing and Rehabilitation of North American River Otter (*Lontra canadensis*)

Section 1 – When to rehabilitate, young pup care, formula feeding, and weaning.

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This document, a compilation of advice from multiple individuals with otter rehabilitation experience, is designed to provide guidelines and techniques of river otter care for licensed wildlife rehabilitators or wildlife care centers that may be unfamiliar with this species. Due to its length it has been divided into 3 Sections.

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OTTER PUPS – FIRST ARRIVAL

- North American river otter's give birth once annually, or biennially, usually between the months of January and June with the earlier part of the range being in the southernmost latitudes.
- Otter pups tend to come into rehabilitation facilities most often when they are old enough to begin venturing out of the den on their own (8 - 12 weeks of age) and get separated from mom due to predators, flooding, construction, injury to or death of mom, etc.
- Orphaned or lost pups may approach people or wander into sheds, roadways, golf courses, garages, or other areas of human habitation in search of mom and food. At this point they may appear "tame" or already "imprinted" on people but usually that is not the case. Once they are taken into proper care and treated appropriately they typically revert to normal behavior.
- Most pups arrive hypothermic and dehydrated. It is vital to attend to these issues before attempting to feed or treat minor injuries. Hypoglycemia often closely follows the previous two conditions. At this stage experienced veterinarians should be consulted.

ATTEMPTS TO REUNITE WITH MOTHER

- In some situations the pups may get separated from mom when their dens flood with rapidly rising river water, often due to heavy spring rains. In these cases they most often float out and down river not yet being strong enough to swim against the current. This typically prevents them from returning to the den area. Another reason for separation is den relocation. When the mother is moving pups to another den site she sometimes gets interrupted by unknown causes causing her to lose track of pups, **or their discovery before she returns.**
- If the mother is known or believed to be alive and the pup appears healthy, an attempt to reunite a lost pup with its mother should be tried by first attempting to locate the entrance hole to the den.
- Many otter dens are in or on the banks of rivers or ponds. The den may have several connecting tunnels and holes, sometimes with tree roots exposed in and surrounding the opening. The soil is usually worn down smooth around the entrance with paths leading to the water. Often times the entrance is best spotted by searching the bank from the opposite side of the river. Also search for signs of daily activity such as sand/soil diggings, foot tracks, scat, or scent mark mounds mixed with vegetation and soil nearby.
- Place the pup near the entrance and hide nearby, upwind, to observe. Often times the pup will chirp when it gets cold, hungry, or restless. This loud, high pitched distress call should attract the mother if she is able to respond. In some cases the mother may be



the one doing the chirping in hopes of persuading the pup to chirp back so she can better locate it.

- Otters can see movement quite a long distance away so be sure to hide carefully and refrain from any quick movements. If the pup is in danger of rolling down the bank or wondering off, it can be placed inside a box or kennel with the top off. This will keep the pup in place but allow the mother access to it by hopping inside or knocking over the container.
- If the mother is thought or known to be dead, the baby is cold, dehydrated, weak, or the den location is unknown the decision to rehabilitate should be made.

WHO SHOULD REHABILITATE OTTERS

To maximize the chance of successful rearing and potential release of rehabilitated otters these questions should be asked first:

- Does the rehabilitator have adequate facilities and time to raise the animal properly?
- Does the rehabilitator have adequate funds to supply formula and weaning diets to, and perhaps after, release?
- Is there an appropriate release area available? What is the current state of the otter population in the area?
- Are facilities and resources available to support and monitor release?
- Is another rehabilitator more qualified and/or does someone else already have an orphan(s)? If so, it is better for the orphans to be raised together. There is a lower risk of imprinting and they learn from one another.
- Does the rehabilitator have access daily to large amounts of whole fresh fish?
- Does the rehabilitator have access to live fish and a pool with a fresh water source for the animal to fish and swim in?
- Does the rehabilitator have an established relationship with an experienced otter veterinarian?
- Does the rehabilitator already have an otter diet, husbandry, medical, and release plan established?
- Does the rehabilitator have a suitably isolated, natural pen (no dogs and limited human presence) where the orphans can be placed as they become more independent?
- Does the rehabilitator have facilities to hold the otter for at least 9 months?
- If release is not an option, rehabilitators should begin researching good placement options early.



ONCE THE DECISION TO REHABILITATE IS MADE

If the pup is indeed an orphan and the decision to hand rear is made, the following rules apply.

- Know the animal's natural history and development time line.
- Have as few care takers as possible (ideally just one). **Keep human contact to a minimum.** The animal will not be releasable if it becomes imprinted, tame, or too accustomed to humans. This becomes even more critical in the case of single pups.
- Few otter pups are suitable for release. Before this is attempted experienced professionals should be consulted and a plan put in place.
- **Do not** house these animals near human or pet trafficked areas.
- There **must not** be any positive exposure to dogs.
- Be prepared ahead of time for the next stage of the animal's growth so he/she need not face undue delays when reaching the next point in development.
- If you receive a single pup, network with regional rehabilitators in an attempt to locate another orphan(s) so pups can be raised together. Otters are very social, active and playful and do much better in groups than when raised alone. The development of normal social behavior skills, natural companionship, healthy competition, added body heat, and physiological comforts are just a few of the benefits of rearing otter pups together.
- Introducing unfamiliar otter pups to one another is easier the younger they are. Expect a rough and tumble introduction (lots of vocalizations and perhaps some play biting and wrestling) if the pups are over 3 months old when they first meet. Introduce new animals slowly and with a barrier initially.
- Pups 6 - 12 months of age may take longer to introduce, however, typically introductions before sexual maturity are successful unless either animal is excessively imprinted.
- Always use caution and careful observation when introducing otter pups of different ages/sizes. Injuries may occur to the smaller of the two. Offer pups multiple hiding places to provide 'safe zones'.
- Raising a single otter pup to successful release can be challenging but is possible. **This is not the preferred method.**





HANDLING

- Young pups tend to settle down and accept captivity quickly. Typically, all that may be needed to handle them is a pair of leather gloves and/or a towel for wrapping them in.
- After the age of about 10 - 12 weeks of age, otters can become quite difficult to handle and nearly impossible to restrain by hand. Otters can roll around in their hide while being held by the nape of the neck and are quite capable of biting your “scruffing” hand in mid restraint.
- Older juveniles and adults become quite desperate to escape and can harm themselves in their attempts. They will chew, dig, and/or climb which may result in injuries or death if the caging is not appropriate. Handling these otters should only be done if absolutely necessary and requires wearing heavy leather gloves, long pants, and heavy boots.
- If utilizing a rabies or snare pole to restrain an otter be sure the loop goes behind one front leg as well as the neck otherwise the loop will slip right off the head since their neck is the same circumference.
- Nets are useful for quickly moving an animal from one secured spot to another as long as the net is heavy duty. It also must be long enough to properly contain the body and have room to “flip” the net on itself to temporarily keep the otter closed inside while being lifted. Nets also have been used for securing an animal to the ground long enough to allow administration of an IM or SQ injection through the netting. Padding the net rim is advisable to help prevent injury to the otter’s teeth or mouth in the event he bites it.
- Squeeze cages (available from many sources) are generally the safest method (for both animal and handler) of restraint for injections as they allow the handler access to many body parts of the otter. They also offer quick and reliable immobility of the animal. This method also tends to be the least stressful as it offers less room for struggling reducing the potential of otters harming themselves.





OTTER DIET AND FEEDING – NURSING ORPHANS

Formula:

- Stomach capacity is 50 - 60 ml/kg; begin with 50 ml/kg to reduce chances of diarrhea. Use the formula $0.05 \times \text{B.W. (in grams)} = \text{_____ ml.}$ to calculate the amount to be fed. There are 30 ml. / fluid ounce.
- 20 - 40% (30% is a good starting point) B.W. (body weight) per day should be fed. This should be divided by the number of feedings and given over a 24 hour period.
- When evening feedings are no longer necessary, stagger the remaining meals so that the otter never goes more than 8 hours without eating (ideally no more than 6 hours for the pre-weaned). Do not overfeed in volume in order to eliminate a feeding or make up for a missed session.
- Prepare and date each day's formula and discard any unused refrigerated formula after 24 hours.
- Warm measured formula to body temperature prior to feeding and discard any uneaten portions.
- Do not refrigerate formula after it has been heated.
- If milk has recently been mixed in a blender or rigorously shaken, allow time for the bubbles to settle out before offering bottle to the animal. Too many bubbles may cause gas and G.I. upset.

Hand-rearing:

It is important that the artificial milk formula matches the maternal milk in protein, fat, and carbohydrate composition as closely as possible. Table 1 provides information on the nutritional content of otter milk, and Table 2 provides information on the nutritional composition of selected substitute milk formulas. Table 3 provides sample formulas from Pet Ag™. Nutritional breakdown data excerpted from Reed-Smith 2006 and Reed-Smith et al. 2009.

Table1: Otter (*Lutra spp.*) Milk Nutrition Composition on As Fed (AFB) and Dry Matter Basis (DMB) (Ben Shaul 1962; Jenness & Sloan 1970)

Species	Solids %	Kcal (ml)	Fat %	Protein %	Carb. %
Otter	38.0	2.6 (AFB)	24.0 (AFB)	11.0 (AFB)	0.1 (AFB)
			63.2(DMB)	28.9(DMB)	0.3 (DMB)

Esbilac® (or Milk-Matrix® 33/40) is preferred as the base for milk formulas offered to otters and provides good pup growth. The addition of Multi-Milk® (or Milk-Matrix® 30/55) increases the total fat and protein content without adding substantially to the carbohydrate content of the formula. The maternal milk composition of otter milk only has a trace amount of milk sugars, so this component of the substitute formula must be kept as low as possible to prevent gastric upset and diarrhea. See Table 2

Table 2: Nutritional analysis of commercial animal milk replacers



Product	Solids %	Fat %	Protein %	Carbohydrates %	Ash %	Energy (KCAL/ML)
Esbilac						
Undiluted powder	95.00	40.00	33.00	15.80	6.00	6.20
Diluted 1:3*	15.00	6.00	4.95	2.38	0.90	0.93
Diluted 1:1.5*	30.00	12.00	9.90	4.76	1.80	1.86
Liquid product	15.00	6.00	4.95	2.38	0.90	0.93
KMR						
Undiluted powder	95.00	25.00	42.00	26.00	7.00	5.77
Diluted 1:3*	18.00	4.50	7.56	4.68	1.26	1.04
Diluted 1:1.5*	36.00	9.00	15.12	9.36	2.52	2.07
Liquid product	18.00	4.50	7.56	4.68	1.26	1.04
Multi-Milk						
Undiluted powder	97.50	53.00	34.50	0	6.63	6.85
Diluted 1:1*	22.70	12.00	7.83	0	1.51	1.55
Diluted 1.5:1*	36.00	19.59	12.75	0	2.54	2.47
Evaporated Milk						
Undiluted product	22.00	7.00	7.90	9.70	0.70	1.49
Multi-Milk:KMR+						
1:1*	22.81	8.93	8.71	3.20	1.55	1.45
3:1*	22.90	10.97	8.63	1.54	1.59	1.57
4:1*	22.90	10.90	8.27	1.17	1.50	1.51
1:3*	22.70	7.28	9.10	4.39	2.30	1.37
1:4*	22.60	6.95	9.16	4.68	1.57	1.36
Multi-Milk:KMR++						
1:1*	34.22	13.40	13.07	4.80	2.33	2.18
3:1*	34.55	16.46	13.03	2.31	2.39	2.36
4:1*	34.55	16.35	12.41	1.76	2.25	2.28
1:3*	34.05	10.92	13.65	6.59	3.45	2.06
1:4*	33.90	10.43	13.74	7.02	2.36	2.04
Multi-Milk:Esbilac+						
1:1*	22.81	10.63	7.70	1.78	1.44	1.49
3:1*	22.93	11.63	8.00	0.89	1.52	1.56
4:1*	22.90	11.60	7.86	0.71	1.49	1.55
1:3*	22.70	9.81	8.75	2.67	2.13	1.51
1:4*	22.60	9.65	7.54	2.84	1.39	1.43
Multi-Milk:Esbilac++						
1:1*	34.22	15.95	11.55	2.67	2.16	2.24
3:1*	34.40	17.45	12.00	1.34	2.28	2.33
4:1*	34.35	17.40	11.79	1.07	2.24	2.33
1:3*	34.05	14.72	13.13	4.01	3.20	2.28
1:4*	33.90	14.48	11.31	4.26	2.09	2.15

* Ratio of powder to water

+ Ratio of powder-to-powder, diluted 1 part powder to 1 part water;

++ Ratio of powder-to-powder, diluted 1.5 parts powder to 1 part water (Evans 1985)



The addition of an anti-gas build-up product to the formula should be considered (milk sugars can cause the build-up of gas). Lact-aid[®] is an enzyme that has been used successfully with many species. Add two drops of Lact-aid[®] to 100ml of mixed formula. The formula then must be refrigerated for 24 hours prior to feeding for the enzyme to perform correctly (Grant 2005). *Lactobacillus* spp., in Bene-bac[®] or Probios[®], is a group of beneficial gut bacteria that also break down milk sugars in the digestive tract. Follow label instructions for these products.

***Formula Note**

Recent change (2009) in the manufacturing process of Esbilac powder has been causing some growth and digestibility problems in squirrels, opossums and raccoons for some wildlife rehabilitators using this milk replacer. Problems regarding this product with other wildlife species have not yet been reported or published to author’s knowledge.

Pet Ag[®], manufacturer of Esbilac and the Zoologic Milk Matrix line of milk replacers, reminds wildlife rehabilitators that using Esbilac on wildlife is “off label” usage and they recommend that instead rehabilitators use the Zoologic Milk Matrix products such as Zoologic 33/40 since it is manufactured and labeled for use in wild orphan mammals.

Wildlife rehabilitators are advised to know about these issues in order to make informed decisions on the formulas we choose to feed. Current updates on milk replacers, feeding practices, and information on gastrointestinal conditions in wildlife are available at www.ewildagain.org.

Table 3: Substitute milk formulas for otters. Values taken from product composition documents available from PetAg™ (K.Grant, personal communication)

Formula	% Solids	% Fat	% Protein	% Carb	Kcal/ml
Formula #1 1 part Esbilac [®] or Milk Matrix [®] 33/40 1 part Multi-Milk [®] or Milk Matrix [®] 30/55 2 parts water	30.9	15.6	10.5	2.7	1.78
Formula #2 1 part Multi-Milk [®] or Milk Matrix 30/55 [®] 1 part water	31.3	17.8	10.4	1.1	1.91

At this time (2004), the preferred formula is canned Esbilac[®] due to palatability and good pup growth. Milk Matrix[®] based formulas also are nutritionally suitable but some facilities have had pups refuse this formula (Blum 2004) while others have had good success.

Formulas:



The following are examples of formulas successfully used to raise N. A. river otter.

- 1 part powdered Esbilac® + 2 parts water + Lactobacillus (Avian Benebac™) powder (1t/cup of formula) (provided by M. Haire)
- 1 part powdered Esbilac® + 2 parts water + 1 part heavy whipping cream + 1 part Multi-Milk® (provided by M. Caine-Stage)
- 2 part liquid Esbilac® + 1 part whipping cream
- Multi-Milk® 30/55 until eyes open, than;
2 parts liquid Esbilac + 1 part Multi-Milk® (Provided by S. Beckwith)
- Canned Esbilac® (as is)
- 1 part powdered Esbilac® or Milk Matrix® 33/40 + 1 part powdered Multi-Milk® or Milk Matrix® 30/55 + 2 parts water
- Multi-Milk® 30/55 until eyes open then transition to Esbilac® (Zoologic milk substitute 30/55 has low level of lactose)
- Esbilac® 2 T/4 oz BW divided into 5 - 7 feedings every 2 - 3 hours until 10:00pm
4 weeks old consume 1 oz/feeding 4 - 6 x/day
6 weeks old consume 2.5 oz/feeding 4 x/day (provided by Blasidell)



Table 4: Care Timeline (birth to 10 weeks)

North American River Otter (<i>Lontra canadensis</i>) Care Sheet					
Age (Weeks)	Weights (g)	Age Determinates	Diet	Amount	Frequency
birth	110 - 170	Dark brown-grayish black fur, eyes closed, 25 - 30 cm long, toothless, needs stimulation, auditory canals open and able to chirp at birth.	Formula plus Probiotic	Volume by B.W. (body weight)	Every 2 - 3 hours 24/7
1	266 - 333				Every 2 - 3 hours 24/7
2	428 - 671				Every 3 hrs. Min. 5 - 6 feedings. No PM feedings.
3	566 - 912	Can growl; developed olfactory senses. Tooth eruption begins.			Every 3 hrs. Min. 5 - 6 feedings. No PM feedings.
4	721 - 1180	Able to toddle & thermoregulate; housing 75°F w/ lamp. Muzzle hairs begin to lighten; whiskers still undeveloped, body 11 - 13 inches			Every 3 hrs. Min. 5 - 6 feedings. No PM feedings.
5	997 - 1562	Crawling on belly. Eyes open-bluish in color (day35 - 40).			Every 3 hrs. Min. 5 feedings. No PM feedings.
6	1200 - 1428	Eyes focused and tracking, localized latrine use. Able to walk holding head up.			Every 3 - 4 hrs. Min. 5 feedings. No PM feedings.
7	1161 - 2072	Urogenital stimulation can be discontinued should be defecating on own.			Every 3 - 4 hrs. 4 - 5 feedings. No PM feedings.



North American River Otter (<i>Lontra canadensis</i>) Care Sheet					
Age (Weeks)	Weights (g)	Age Determinates	Diet	Amount	Frequency
8	1656 - 1907	Introduce to water dish.	Add Canned Food	Solids- Ad Lib.	Every 4 hrs. 4 feedings. No PM feedings.
9	1914 - 2247				Feed 4 times /day
10	1678 - 2419		Add Fish	Fish- Ad Lib.	Feed 4 times /day

Weights- from North American River Otter Husbandry Manual (Reed Smith 2001)



Feeding Nursing Pups:

- Weigh pups at the same time each day (preferably before first AM feeding) to calculate feeding volume.
- For bottle feeding, place infant in a sternal recumbent (belly down) position with the head straight out and slightly up.
- Due to their competitive and sometimes aggressive nature, multiple pups may need to be offered bottles simultaneously or physically separated to feed one at a time to avoid injury to the other otters or the care giver.



- Newborns have been successfully fed by syringes with a cut off portion of a rubber catheter attached to needle hub for a nipple.
- Another option is a Cat-tac® nipple attached to syringe tip than switching to a Pet AG™ Pet nurser with a nipple (size F or LD) from Wombaroo™ as they get a little older. The nipple size depends on the individual otter's preference. (McBride, personal communication)
- Juveniles (4 - 12 weeks of age) are often fed with human baby bottles and soft preemie nipples.
- Otters may get frustrated if the nipple hole does not suit the suckling reflex or if the nipple is too hard.
- Avoid the temptation to enlarge the nipple's hole size. If the otter is outgrowing the nipple, it is safer to go up one nipple size rather than to widen the hole.
- Playtex brand silicone, preemie nipples (hole size 1) generally work well for very young pups as they are soft and PBA free. These nipples are often available at many large chain drug stores and Walmart. (S. Beckwith personal communication)
- Two other brands of nipples that often work well are Similac™ Special Care Nipple and Enfamil™ Neonatal Nipple. Both offer a tip smaller than most other preemie nipples.
- New intakes may take several days to become accustomed to the new diet and feeding equipment.
- One method used to get infants to adjust to nursing from an artificial nipple is to cover the pup's eyes and hold the mouth firmly closed over the nipple until pup stops chewing and resisting and calms down enough to attempt suckling. Squeeze the bottle gently to allow a small amount of milk to flow into the mouth to encourage them to swallow and get used to the taste of the unfamiliar formula.

Clamping jaws over nipple to encourage nursing.





- Line up the nipple/bottle with the center of the mouth (equal distance between canine teeth) because if the nipple is offset to one side of the mouth the pup tends to want to chew and tug on the nipple instead of suckle.
- Otters are obligate nose breathers so they cannot breathe from their mouth and nurse at the same time. This may create a difficult nursing session if the pup has a respiratory infection and is congested. In this case, hopefully the pup is old enough and will eat enough from a bowl. In severe cases, a nasogastric feeding tube may need to be placed by a veterinarian.

Nasogastric tube sutured in place for stomach tube feeding a young otter unable to eat normally due to neurological issues.



- Bottle aged pups that will not suckle can be successfully transitioned by feeding formula and blended solids (fish and kitten chow) with a **large tipped (gastric) irrigation syringe** (as shown) until they are able to feed from a bowl.



- Once otter pups get the hang of bottle nursing, the rest of the feeding times are spent trying to slow them down. They tend to drink very fast and you may have to pull the empty bottle away quickly to prevent them from swallowing air or chewing the nipple in half due to excitement.
- Unfortunately, not all bottle-aged pups will learn to suckle from the bottle and some choose to just chew on the nipple and force the milk out instead. Although this “drinking” method works well enough, close attention must be paid to the condition of



the nipple throughout the entire feeding because they can (and probably will) suddenly puncture and tear the nipple spilling the formula out in a rush.

- Aggressive bottle drinkers can become quite fractious at the end of the feeding sessions so be prepared for possible scratches/bites. Wear leather gloves and keep fingers and face away from the “bite zone” when pulling the empty bottle away.
- Baby otter’s abdomens should be nicely rounded after mealtime but never tight or doughy. A healthy well fed otter pup should never show shoulder, hip, or rib bones.



Healthy well fed baby river otter

- After a bottle feeding, attempt to burp the pup by patting firmly between the shoulder blades and down the infant's back as otter pups tend to accumulate air in their stomachs while nursing. This may cause them to stop feeding before they have ingested the entire meal.

FEEDING VERY YOUNG PUPS THAT WILL NOT NURSE

If very young pups will not nurse they can be tube fed. Prior to attempting for the first time, the tube feeding procedure should be demonstrated by a veterinarian or experienced person. This should only be tried on pups without teeth. The procedure below has been used successfully on N. A. river otter pups.

- Typically, a size 5 Fr. feeding tube (such as a red rubber catheter) is sufficient for feeding most young pups but size is dependent on the individual. The next size down (3.5 Fr.) and next size up (8 Fr.) should be available in case they are needed.
- Pre-load the catheter with formula before passing it into the stomach to avoid injecting a large bubble of air ahead of the meal. This is accomplished by filling the syringe with formula, attaching to catheter, depressing plunger slowly until formula is coming out the end of the catheter. Using this method, you will have an accurate amount of fluid entering the pup, without air bubbles being pumped through first.
- Measure to the last rib and mark the spot on the catheter with a sharpie. Passing the tube is similar to tube-feeding almost any other neonatal carnivore.



- Generally start the first feeding with just Pedialyte® to make sure they are hydrated before putting any actual formula in them.
- Second feeding +/- third feeding is 50% Pedialyte®/50% formula, then 25%/75%, then full strength formula. This is a dynamic process, though, and changes are made based on the neonate – constipation/diarrhea will require adjusting the strength and amount.
- Typically aim to feed 20 - 40% of the pup's body weight daily, divided evenly over a 24 hour period. It is important for the caretaker/keeper to be in touch with their veterinarian during this process so that concerns can be discussed and addressed right away (diarrhea, constipation, aspiration of formula, dehydration, weakness, etc).
- It helps to soak the catheter in warm water before using it. This softens the rubber a little and is gentler on the pup.

STIMULATION TO URINATE/DEFECATE

- Stimulate for urination and defecation with a damp cloth before feeding. This should be done until eyes open and self-elimination is evident (~ 7 weeks).
- Otters on formula have a variety of stool types and consistencies but their feces generally should be soft, but formed, and yellow in color (See photo).
- When the pups begin to eat solid food their feces tend to take on the look and texture of what they ate last (See photo). Anywhere from light tan to almost black feces are typically normal.
- Otters have a mucous lined intestinal tract to protect themselves from fish bones, crayfish shells, and other ingested sharp food items. It is normal for them to occasionally pass mucous in/on their stool.
- Due to their high metabolism otters may urinate/defecate every 2 - 3 hours and they usually do both functions at the same time.
- Generally they defecate in a place away from the food and sleeping quarters but often in a water bowl or pool.
- Occasionally otter pups will use a litter box, with shredded paper or pelleted paper litter, if a shallow pan is provided in their favorite latrine corner or spot.
- Some rehabilitators offer a separate kennel for the pup to use as a latrine.



Providing a litter box may help with cage cleaning.

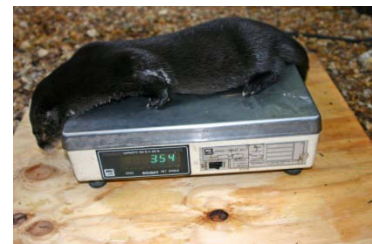


Bowl Feeding:

- Juveniles (6 weeks and older) may prefer to take formula out of a bowl and should be encouraged to do so as early as possible.
- Early lappers tend to be easier to wean, form less of a bond with the care giver, and have less chance of aspirating milk than those individuals that are being bottle fed.
- One challenge of bowl feeding the formula is the mess. Be prepared to rinse and dry off the baby (and enclosure) after each feeding.
- **Note:** Offering formula in a bowl makes it more difficult to measure actual formula consumption vs. wasted “milk splatter.”
- It is usually best to feed multiple pups separately so they are less likely to fight and to help ensure that each animal is getting the measured volume that he needs.
- **Feeding Tip:** A stainless steel puppy bowl with a cone in the middle helps to reduce face to face contact with other pups and reduces the likelihood of the pups submerging their entire heads into the food bowl.
- When a new pup is introduced to one already familiar with the feeding routine the food competitiveness that often develops may be helpful in stimulating the new animal into defending (and therefore to begin eating) his new and unfamiliar diet.
- Bowl feeding mess clean-up may be easier if pups are first moved to a cleanable “feeding station,” such as a stock tank, plastic baby pool, deep sink, or bath tub, away from bedding and sleeping quarters during the meal time.
- Clean and dry the pups immediately following the feeding sessions so as not to allow the pups to chill or the food to dry onto the skin and fur.
- Regardless of the feeding technique used, the true measure of how the individuals are doing is by careful observation of body condition, fur quality, and daily weight gain.



Introduce a scale to the pups when they are young in order to improve your chances of getting routine weights up to release age.



Weaning

- At weeks 6 - 8, gradually begin introducing solid foods such as blended fish or small soft-boned fish (e.g. minnow, smelt), chicken baby food, canned or moistened kitten food into the bottle or formula bowl.
- Only introduce one new weaning food component to the diet every few days until they have adjusted well to solids.
- Gradually decrease the number of formula feedings until weaned (usually by 16 weeks).



- Once they have a taste for the kitten food in the formula, start offering it dry ad lib. Some otters will eat the dry cat food in between meals.
- **Weaning tip:** Remove the nipple and put fish parts, solids, shrimp in the bottle. They will play with the bottle while retrieving the bits. Also stimulates their intellect.
- **Weaning tip:** Weaning off formula can happen over night or sometimes takes months. Offer small fish/canned kitten food before each formula feeding, while they are still very hungry, to encourage them to begin eating on their own.
- **Weaning tip:** If pups show no interest in kitten chow try tossing it in the pool, they may forage for it naturally.
- Do not skip a bottle feeding in order to make the pups “extra hungry” in an attempt to coax them to eat solid food.
- When weaning an overly excited/anxious pup from bottle to bowl you may try to offer half of the formula from the bottle first, than present a bowl containing the remainder. When the pups are really hungry (and familiar only with a bottle) they may need some food in their bellies first to calm them down enough to allow them to concentrate on the rest of the meal presented in an unfamiliar object (bowl).
- **Weaning tip:** With bottle nursers that are resistant to trying solid food on their own, try slipping small pieces of fish in their mouths along with the nipple to “trick” them into chewing and swallowing the fish.
- If a pup starts to nurse on its’, or its sibling’s, tail tip or toes, an extra formula feeding may need to be added back in for a few days. This behavior should be dealt with immediately to prevent it from becoming permanent.



Tail tip after being self nursed on.

- Putting orange oil on the genitals to discourage sucking has worked well with *Lutra lutra* and is not harmful to the otter (G. Yoxon, personal communication)
- Some otter pups choose to go from formula straight to fish and are not interested in the baby or kitten food. While feeding a strictly fish diet in captivity may seem to be more natural, be aware that in the wild they would be getting a broad variety of fresh fish species, amphibians, crayfish, invertebrates, birds, small mammals, and other food types that make up a nutritional balance which is often difficult to replicate in captivity. Frozen fish, while easier for the care giver to acquire, is deficient in thiamine and therefore not nutritionally complete so fresh whole fish, vitamin/mineral supplementation, and/or other commercial diets may also be required.



- If weaning pups from formula straight onto adult diet, substitute a single feeding at first with small fish or fish pieces and then gradually replace the number of bottles with fish until they are weaned.
- Begin to offer drinking water in a shallow bowl when otters can walk and begin to eat solid foods but plan to refill the water bowl several times a day because they will climb repeatedly in and out of the bowl.
- Young otters tend to defecate in the water and often soil their water bowls and pools multiple times a day. These should be regularly cleaned and refilled.
- When first introducing live food, start with small harmless prey such as minnows, goldfish, tadpoles, and frogs. Once the otters develop the skill and taste to capture and eat these easy targets then progress to the prey that may fight back such as crayfish, catfish, mice, etc.

Novel way to introduce live prey.



- Some rehabilitators have reported seeing otters regurgitate bones and scales shortly after a meal. This is probably a natural process and should be ruled out before considering a health condition involving vomiting.
- A variety of whole carcass fish plus a balanced good quality dry and canned kitten food should constitute 90% of the post-weaning diet.
- Every effort should be made to feed live fish and other native prey items daily. Natural diets vary by location and season but mainly consist of fish, crayfish, frogs, water invertebrates, small mammals, and birds.
- Some captive otters eagerly consume mice and chicks as part of their diet.
- Wild adult otters eat 15 - 20 % of their body weight per day.
- Captive weaned pups and adult river otters should be fed at least 3 to 4 times a day due to their high metabolism and caloric needs with 4 daily feedings being ideal.



SOURCES/SUPPLIES:

Enfamil™ Neonatal Nipple Latex-Free by Mead Johnson Nutritionals #4202-02.

Esbilac, Multimilk, Benebac, Pet Nurser bottle: Pet Ag™, 255 keys Ave., Hampshire, Illinois, 60140, 1-800-323-6878

Milk Matrix: Pet Ag™, 255 keys Ave., Hampshire, Illinois, 60140, 1-800-323-6878

SnuggleSafe™ microwavable heating pad (www.snugglesafe.co.uk).

Similac™ Special Care™ Nipple by Ross Pediatrics- Ross Production Division Abbott Laboratories Item # 00095. Special on line order.

Syringes, feeding tubes/catheters, Catac nipples, etc.: Most of these products are available on-line at Chris's Squirrels and More: www.squirrelsandmore.com

Wombaroo™ formula nipples (Size F or LD)- www.wombaroo.com or www.perfectpets.com

Zoologic milk replacer: Pet Ag™, 255 keys Ave., Hampshire, Illinois, 60140, 1-800-323-6878

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Otterspotter, <http://otterspotter.com/>

IUCN/SSC Otter Specialist Group, <http://www.otterspecialistgroup.org/>



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