

## DISEASES OF RIVER OTTERS, A RECOVERING SPECIES

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### NATURAL HISTORY AND DISTRIBUTION:

North American river otters (*Lontra canadensis*; referred to simply as river otters from here on) are widely distributed across North America with the exception of the desert Southwest. Extirpated over much of their original range, reintroduction programs in 21 states have been extensive and river otters now occupy at least portions of their historic range in every state within the continental United States except New Mexico.<sup>9</sup> Over most of their range they can be found in freshwater habitats ranging from alpine lakes to rivers, streams and swamps. From California to Alaska, they also occupy a nearshore marine habitat where they primarily feed on marine invertebrates and fishes and play an important ecological role moving marine nitrogen and phosphorus into nearshore vegetation.<sup>2</sup> Their dependence on freshwater for drinking, however, limits them to marine habitats close land where freshwater is available. With river otter populations recovering, veterinarians have an increased chance to encounter them in both wildlife management and rehabilitation settings. Clinicians working with river otters should be familiar with their clinical anatomy<sup>1</sup> and diseases.

### SIGIFICANT DIEESEASES

River otters are host to numerous bacteria, viruses, fungi, and internal and external parasites.<sup>6,7,8,10</sup> Some of these are capable of causing disease in otters, while others can cause disease in humans and domestic animals.

### Infectious Diseases

Numerous infectious diseases have been identified in river otters. Table 1 lists some of the more significant pathogens capable of potentially causing disease in otters. It should be noted that infectious diseases of river otters are relatively understudied compared to other medium sized sympatric carnivores like raccoons (*Procyon lotor*), possibly due to the fact that river otters occur at a much lower density, are not generally found in peri-domestic habitats and are challenging to trap.<sup>5</sup> Consequently, otters are likely susceptible to numerous infectious diseases that have not been documented in otters and differential diagnosis should not preclude bacteria, viruses or fungi that have not been previously documented in river otters.

**Table 1: select pathogens of potential significance for river otters**

Bacteria	Viruses	Fungi
<i>Clostridium perfringens</i>	Canine distemper virus	<i>Coccidioides immitis</i>
<i>Clostridium welchii</i>	Canine parvovirus	<i>Microsporium</i> spp.
<i>Escherichia coli</i>	Feline parvovirus	<i>Trychophyton</i> spp.
<i>Klebsiella pneumoniae</i>	Rabies virus	
<i>Leptospira interrogans</i>		
<i>Pasteurella</i> spp.		
<i>Pseudomonas</i> spp.		
<i>Rhodococcus equ</i>		
<i>Salmonella</i> spp.		

### Parasites

Likely due to their fastidious grooming, ectoparasites are rare in river otters and of those that have been identified, few cause disease. Instead, ectoparasites such as the ticks *Amblyoma americanum*, *Dermacentor variabilis*, *Ixodes banisi*, *I. cookie*, and *I. uriae*, might be of greater concern during translocation. Veterinarians in charge of health protocols for otter reintroductions or translocations need to ensure that ectoparasites are not translocated to novel locations along with otters.

A wide variety of endoparasites, including acanthocephalans, cestodes, nematodes, trematodes, and protozoans have been identified in river otters, although clinical disease and pathology have only been identified in a subset of these. Examples of parasites known to cause disease in river otters include the cestode *Spirometra mansonioides*, the nematodes *Dracunculus insignis*, *Strongyloides lutrae*, *Capillaria aerophilus*, *Capillaria hepatica*, *Gnathostoma miyazakii*, *Diocotophyme renale*, and the trematode *Paragonimus kellicoti*.

Several protozoa (or in some cases, antibodies to them) have been found in river otters. These include *Cryptosporidium* sp., *Giardia* sp., *Isospora* sp., *Sarcocystis* spp. and *Toxoplasma gondii*, however reports of them causing disease in otters are rare.

### **Metabolic Diseases**

Capture and handling can cause exertional myopathy in river otters and this should be taken into consideration when planning capture operations and when handling otters post-capture. Bilateral uric acid nephrolithiasis with ureteral hypertrophy was reported in a 7-year old male free-ranging river otter from Washington. There was no indication of inflammation in the renal or ureteral tissue suggesting this could have been caused by protein metabolism anomaly.

### **Trauma**

Trauma is likely a major cause of morbidity and mortality in river otters. In addition to being hit by cars and falling victim to other anthropogenic sources of trauma, river otters suffer trauma due to intra-specific aggression, especially during the breeding season. Dental trauma is often seen in older free-ranging otters and studies have shown that otters trapped in leg-hold traps, specifically #11 Sleepycreek® traps, are less likely to damage their teeth when captured when compared to otters caught in box-traps (like Tomahawk® or Havaheart®) or Hancock® suitcase traps.<sup>5</sup>

### **Contaminants**

River otters have been used as sentinels to evaluate environmental contaminants including heavy metals, hydrocarbons (oil) and persistent organic pollutants.<sup>3,4</sup> Naturally occurring and anthropogenic mercury (in its methylated form) can bioaccumulate in otters and can have a negative influence on the survival of individual otters and cause negative consequences at the population level. The effects of mercury also can be exacerbated by the synergistic effects of other environmental contaminants or pathogens. Oil has the ability to directly and indirectly impact river otter health. Controlled experiments have shown that oiling of otters exacerbates anemia, reduces hemoglobin levels and decreases otter's aerobic capacity both on land and in the water. Oiling also elevates otter liver enzymes, reduces white blood cell counts and elevates the level of endothelial cytochrome P450-1A. Under controlled conditions, oiling increases otter energetic costs, which likely has important implications for maintaining body condition, survival and reproduction in wild otters. After the *Exxon Valdez* oil spill, river otters in oiled areas had lower body weights, larger home ranges and less diverse diets than river otters from non-oiled areas.

### **OTHER VETERINARY CONCERNS:**

In addition to being asked to diagnose and treat disease in individual river otters, veterinarians may also be asked to help plan or participate in their capture and care or to assist with implantation of intraperitoneal VHF transmitters.

### **Anesthesia**

A variety of anesthetic agents have been used to immobilize river otters, including ketamine-xylazine (@ 7.5mg/kg and 1.5 mg/kg, respectively), ketamine-medetomidine (@ 2.5mg/kg and 0.025mg/kg, respectively), ketamine-midazolam (@ 10mg/kg and 0.25mg/kg, respectively), and tiletamine-zolazepam (@ 4mg/kg). Isoflourane can be used to maintain animals under anesthesia. River otters can dive to depths of 60 feet and like marine mammals, they have a physiologic dive response that includes breath holding, preferential shunting of blood to the heart and brain and a high CO<sub>2</sub> tolerance. Consequently when putting river otters under anesthesia, veterinarians should be cautious about respiratory depression and apnea, should ventilate frequently when using inhalant anesthesia, and should keep doxapram on hand (in addition to other emergency drugs) for treatment of respiratory depression or apnea. Due to their breath holding ability and propensity to develop exertional myopathy, masking river otters down in closed containers is not recommended.

### **Surgery**

River otters have a fusiform shape that is not conducive to wearing radio collars. Instead biologists prefer to use intraperitoneal VHF transmitters to track river otters, which the otters seem to tolerate well. A ventral midline approach and a paralumbar fossa approach have been used. Veterinarians should remember

that otters use their pelage (and high metabolic rate) to stay warm so the area shaved should be minimal and the incision need not be any greater than necessary to insert the transmitter on its smallest axis.

### Trapping

As mentioned previously, trapping otters in leg-hold traps, specifically #11 Sleepycreek® traps is preferred over box traps or suitcase traps. Frequently checking traps is also important to minimize injuries and capture myopathy and veterinarians working with wildlife biologists to establish or review trapping protocols should recommend frequent checking of traps. Very high frequency (VHF) transmitters can be set up to signal when a trap is sprung, which prevents the need to walk in to check traps every time. These have been known to fail, however and biologists should still walk in to check traps periodically even when trap transmitters are used.

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