Beavers (*Castor canadensis*) are central place foragers meaning they forage within a specific home range boundary, bringing food and construction materials back to their central lodge before using (Raffel et al., 2009; Gerwing et al., 2013). Therefore, selecting a home range with nearby resources that can sustain a beaver colony for a long period of time is essential to ensure their survival (Campbell-Palmer & Rosell, 2015; Salandre et al., 2017; Wang et al., 2019). Beaver habitat selection behavior is the way in which beaver foraging preferences influence the habitats that they inhabit. This behaviour is observed by assessing the distribution, size, and species of beaver cut trees, and by observing the physical water body characteristics of sites that beavers frequently inhabit.

Researchers were interested in determining which foraging parameters were the most influential in determining beaver habitat selection. By analyzing the frequency of each species of cut tree at inhabited sites beavers were found to select habitats that had higher densities of willow and aspen over areas with other species (Barela & Frey, 2016; Gerwing et al., 2013; John et al. 2010). Analysis of the distribution of cut trees from the water's edge for each inhabited site found that locations with ideal food resources near the water were selected over locations with ideal food at large distances (Gerwing et al., 2013; Salandre et al., 2017; Wang et al., 2019). Further observations of the size and species of each cut tree determined that beavers selected larger trees of their more preferred species the further away from the central place they were (Raffel et al., 2009; Salandre et al., 2017). These findings suggest that of all the possible foraging parameters, species, distance from water, and size of tree are very large determining factors for beavers when assessing the viability of a site. More importantly these parameters are not mutually exclusive and must all come together in a preferred habitat (Salandre et al., 2017).

Other researchers were interested in determining indirect foraging related parameters of a habitat like characteristics of the waterbody that might influence habitat selection. Studies measured the waterbody parameters like water depth, bank slope, and proximity to streams, marshes, and swamps at both beaver inhabited and uninhibited locations for comparison. These studies found that many factors including lodge proximity to streams, marshes, swamps, and winding streams along with deep water, large river width, and gentle bank slope were also important to beavers when selecting a habitat (Gerwing et al., 2013; Scrafford et al., 2018; Scrafford et al., 2020). These findings suggest that physical parameters of the habitat can also influence habitat selection. After reviewing the literature many of these parameters may be correlated with foraging preferences, as factors like lodge proximity to marshes may be selected due to the preferred plant species that naturally grow there (Wang et al. 2019).

Physiologically beavers are slow moving and cumbersome on land, wasting more energy than when they are move through the water (Johnson, 2012; Salandre et al., 2017). To reduce the physiological downside of traveling on land to find food beavers are observed to combine these main habitat preferences to maximize the net energy gain (Salandre et al., 2017). In combination beavers consume nutrient rich tree species of a sufficient carrying size, that grow as close to the water as possible, minimizing the overall costs of transporting the food to the lodge (Gerwing et al., 2013; Salandre et al., 2017). Other indirect foraging factors like bank slope and proximity to swamps may help the beavers to reduce the energy costs of foraging (Salandre et al., 2017). These reduce the effort it takes to exit and enter the water and increase the area that can be traveled by water (Gerwing et al., 2013; Salandre et al., 2017).

Ecologically beavers are especially vulnerable to predators like wolves when they forage on land (Johnson, 2012; Salandre et al., 2017). Predator avoidance was studied by marking aspen

sticks with wolf urine to observe how this impacted beaver selection but while not fully ruled out, no strong relationship between odor and selection was found (Salandre et al., 2017). Through reviewing the literature fewer parameters can be related to predator avoidance and those that do would also relate to reducing the physiological constraints. Beaver habitat preferences are, therefore, important for reducing energy costs like species selectivity, while others may also act in some way to reduce predation risk like selecting trees near the water (Salandre et al., 2017).

Through reviewing these studies, the short-term physiological and ecological implications of these habitat preferences are well understood however, the implications which these preferences have on natural selection require more research. To do this more multi-generational studies should be conducted on the survival and reproduction of beaver populations in habitats that meet all these preferences compared to those beaver populations situated in habitats missing some varieties of these key parameters.

Literature Cited:

Barela, I. A., & Frey, J. K. (2016). Habitat and forage selection by the American beaver (*Castor canadensis*) on a regulated river in the Chihuahuan Desert. *The Southwestern Naturalist*, *61*(4), 286–293. https://doi.org/10.1894/0038-4909-61.4.286

Campbell-Palmer, R., & Rosell, F. (2015). Captive care and welfare considerations for beavers. *Zoo Biology*, *34*(2), 101–109. https://doi.org/10.1002/zoo.21200

Gerwing, T. G., Johnson, C. J., & Alström-Rapaport, C. (2013). Factors influencing forage selection by the North American beaver (*Castor canadensis*). *Mammalian Biology*, *78*(2), 79–86. https://doi.org/10.1016/j.mambio.2012.07.157

John, F., Baker, S., & Kostkan, V. (2010). Habitat selection of an expanding beaver (*Castor fiber*) population in central and upper Morava River basin. *European Journal of Wildlife Research*, *56*(4), 663–671. https://doi.org/10.1007/s10344-009-0361-5

Johnson, C.A. (2012). Beaver Wetlands. In Batzer, D.P., Baldwin, A.H., and Baldwin, A. (Eds.), *Wetland Habitats of North America: Ecology and Conservation Concerns* (pp. 286-305). University of California Press.

Raffel, T. R., Smith, N., Cortright, C., & Gatz, A. J. (2009). Central place foraging by beavers (*Castor canadensis*) in a complex lake habitat. *The American Midland Naturalist*, *162*(1), 62–73. https://doi.org/10.1674/0003-0031-162.1.62

Salandre, J. A., Beil, R., Loehr, J. A., & Sundell, J. (2017). Foraging decisions of North American beaver (*Castor canadensis*) are shaped by energy constraints and predation risk. *Mammal Research*, *62*(3), 229–239. https://doi.org/10.1007/s13364-017-0312-6

Scrafford, M. A., Nobert, B. R., & Boyce, M. S. (2020). Beaver (*Castor canadensis*) use of borrow pits in an industrial landscape in northwestern Alberta. *Journal of Environmental Management*, *269*, 110800. https://doi.org/10.1016/j.jenvman.2020.110800

Scrafford, M. A., Tyers, D. B., Patten, D. T., & Sowell, B. F. (2018). Beaver habitat selection for 24 yr since reintroduction north of Yellowstone National Park. *Rangeland Ecology & Management*, *71*(2), 266–273. https://doi.org/10.1016/j.rama.2017.12.001

Wang, G., McClintic, L. F., & Taylor, J. D. (2019). Habitat selection by American beaver at multiple spatial scales. *Animal Biotelemetry*, *7*(1), 10. https://doi.org/10.1186/s40317-019-0172-8