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DIET OF A RECENTLY REINTRODUCED RIVER OTTER (*LONTRA CANADENSIS*) POPULATION IN TAOS COUNTY, NEW MEXICO

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THESIS

A dissertation submitted in partial fulfillment of the requirements for the degree of Master of Science in Forest and Natural Resource Sciences in the College of Agriculture, Food and Environment at the University of Kentucky

By

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2020

ABSTRACT OF THESIS

DIET OF A RECENTLY REINTRODUCED RIVER OTTER
(*LONTRA CANADENSIS)* POPULATION IN TAOS COUNTY, NEW MEXICO

North American river otters (*Lontra canadensis*), native to every U.S. state and Canada, experienced extensive population decreases and range reduction until the mid-20th century as a result of overexploitation and habitat loss during European colonization. The last known river otter in New Mexico was killed on the Gila River in 1953, although unverified reports continued thru 2008. After a nearly 60-year absence from New Mexico, 33 adult river otters were reintroduced to the Rio Pueblo de Taos in the northern part of the state between 2008-2010; however, they were not subsequently monitored or studied. I characterized diet of this reintroduced otter population by collecting 877 scat samples from 20 latrine sites located on major rivers (Rio Grande = 16, Red River = 2, Rio Pueblo = 2) in Taos County, New Mexico between February, and December 2018. Hard prey remains were identified to family for fish and order for crayfish. Crayfish (66.2%) and fish (61.8%) were the most frequently occurring prey items in this study. Other prey items included mollusks and clams, birds, reptiles, and mammals. Salmonidae (39.6%) and Catostomidae (37.1%) were the most frequently identified fish families in otter scats, followed by Esocidae (14.3%), Cyprinidae (12.4%), and Centrarchidae (3.2%). Significant seasonal differences in occurrence of scat prey items was found for fish as a main prey group ($p < 0.001$), including the families Salmonidae ($p < 0.001$), Catostomidae ($p < 0.001$), Esocidae ($p < 0.01$), and Cyprinidae ($p < 0.001$), and for crayfish ($p < 0.001$). In summary, otters in the Upper Rio Grande appear to similarly consume prey to that found in other studies conducted in the U.S. My study provides the first dietary description of river otters in New Mexico and should inform otter management in the state.

KEYWORDS: diet, food habits, mustelid, reintroduction, Rio Grande, scale identification, scat analysis, scatology, semi-aquatic, southwest

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04/25/2020
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DEDICATION

This thesis is dedicated to the kids stuck indoors longing for an outdoor adventure, you're never too old to go camping.

This thesis is also dedicated to my grandmother, Roberta K. Warshawsky, who really did not like camping, but loved that I did.

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CHAPTER 1. DIET OF A RECENTLY REINTRODUCED RIVER OTTER (*LONTRA CANADENSIS*) POPULATION IN THE UPPER RIO GRANDE, TAOS COUNTY, NEW MEXICO

Life History

The North American river otter (*Lontra canadensis*; hereafter, river otter or otter), is a medium-sized (5-15 kg, 90-130 cm long) carnivore in the family Mustelidae that inhabits a variety of wetland types (i.e., ponds, lakes, rivers, and coastal marine habitat) across the United States and Canada (Melquist & Hornocker 1983, Tesky 1993, Larivière & Walton 1998, van Zyll de Jong 1987). The river otter is one of thirteen otter species worldwide, with seven accepted subspecies (Melquist et al. 2003, van Zyll de Jong 1987).

River otters have webbed, five-toed feet, use all four limbs in a "thrust-recovery" swimming motion, and are capable of sustaining swim speeds of 11 km/hr for short periods of time (Tarasoff et al. 1972, Larivière & Walton 1998). Otter body size adheres to Bergmann's rule, i.e., north to south, but not east to west (Toweill & Tabor 1982, van Zyll de Jong 1987, Yom-Tov et al. 2006). Home ranges vary among genders, age classes, and seasons (Melquist & Hornocker 1983, Melquist & Dronkert 1987, Blundell et al. 2002a, Melquist et al. 2003, Ben-David et al. 2005, Depue & Ben-David 2010).

River otters do not dig their own dens, instead they use natural landscape features and abandoned dens of other species (Melquist & Dronkert 1987, Melquist et al. 2003). Den selection is influenced by food availability and river stage or water level (Melquist & Hornocker 1983, Anderson & Woolf 1987). Breeding season usually occurs between December and April with parturition between February and April (Melquist & Hornocker 1983). Female reproduction can occur annually beginning at two years of age, with earlier pregnancies possible, although rare (Liers 1951, Liers 1953, Melquist & Dronkert 1987). Males become sexually mature at two years, but successful reproduction typically occurs at approximately five to seven years of age (Liers 1951, Melquist & Dronkert 1987, Melquist et al. 2003). Although litter sizes of up to six have been recorded, litters of two to three pups are typical (Melquist & Hornocker 1983, Melquist & Dronkert 1987). Pups are typically self-sufficient by six or seven months, but usually remain with the mother until the birth of a new litter (Melquist & Hornocker 1983, Melquist & Dronkert 1987).

River otters are uncharacteristically social mustelids that are often observed in groups known as "romps," where family (female and offspring) or adult male "bachelor" groups are most common; sibling and mixed sex groups are less common (Blundell et al. 2002a, Ben-David et al. 2005, Depue & Ben-David 2010, Crait et al. 2015). The degree of sociality has been linked to prey abundance, with larger romps in areas of higher prey abundance (Melquist & Hornocker 1983, Ben-David et al. 1998, Ben-David et al. 2005, Depue & Ben-David 2010).

River otter latrine sites are areas that are repeatedly used for defecation and olfactory communication, scent-marking (Kruuk 1992, 1995, Ben-David et al. 1996, Durbin 1998). There are several hypotheses as to why otters scent-mark: intragroup communication, signaling of reproductive status, territory signaling, signaling the use or depletion of food patches, and mutual avoidance (Kruuk 1992, Blundell et al. 2002b, Rostain et al. 2004, Ben-David et al. 2005). Latrine sites are typically located close to the water, up to several meters from the water's edge, and usually elevated with a view of the water, escape route, and shading or other cover (Ben-David et al. 2005, Stearns 2008, Depue & Ben-David 2010). Latrine sites are often located at prominent features (i.e., rock formations, fallen logs, vertical banks) that are closer to waters with higher fish densities and beaver activity (Crait & Ben-David 2006, Stevens & Serfass 2008, Oldham & Black 2009, Depue & Ben-David 2010, Crowley et al. 2016). Latrine site use and fidelity is also related to social group type and prey abundance. Social otters typically use fewer latrines, but with higher frequency, where non-social, typically female, otters use a greater number of latrines with less frequency (Blundell et al. 2002a, Ben-David et al. 2005). Intensity, duration, and frequency of latrine site use is linked to availability of shelter, food, and water (Melquist & Hornocker 1983, Melquist & Dronkert 1987).

By using latrine sties, and consuming most of their prey on land, river otters are thought to contribute to allochthonous nutrient input, thereby leading to increased heterogeneity and nutrient rich patches along the river edge (Ben-David et al. 1998, Ben-David et al. 2005). These inputs, particularly nitrogen, affects plant nutrient uptake and potentially plant species composition (Ben-David et al. 1998, Ben-David et al. 2005); however, the scale of heterogeneity and nutrient richness is dependent on latrine visitation rates (Ben-David et al. 2005).

History, Status, and Distribution

Commercial demand for pelts during European colonization and exploration led to drastic population declines and extirpations of many furbearers in North America, including river otters (Melquist & Dronkert 1987, Obbard et al. 1987, Raesly 2001, Melquist et al. 2003), which is considered to be one of the most valuable furs (Obbard et al. 1987). Consequently, river otters were extirpated from most of their historic range by the mid-1900s, including 15 states in the USA (Raesly 2001).

Colorado was the first state to reintroduce river otters, releasing 107 individuals among 5 sites between 1976-1991 within the state (Raesly 2001). By 2001, 4,018 otters were reintroduced in 21 different states, thereby successfully reestablishing the species in major portions of its historic range. By 2019, river otters had been observed in 49 states, 12 Canadian provinces, and all Canadian territories (Stenson et al. 1984, Raesly 2001).

Before European colonization, river otters were abundant along the Rio Grande and neighboring rivers and tributaries. In the upper Rio Grande (URG) region, they were utilized by the Taos Pueblo people (Polechla Jr & Carrillo-Rubio 2009). Officially, the last river otter recorded in New Mexico was killed in a beaver trap on the Gila River, near Cliff, NM in 1953 (Salmon 2005). Although there were unverified reports of a few remnant individuals, there were no confirmed river otter sightings in New Mexico from 1953-2008 (Raesly 2001, New Mexico Game and Fish 2006a, Polechla Jr & Carrillo-Rubio 2009).

New Mexico was the last U.S. state to reintroduce river otters. Thirty-three otters were translocated from Washington to one release site on Taos Pueblo land adjacent to the Rio Grande between 2008-2010 (Savage & Klingel 2015); however, additional translocations were cancelled in 2012 (Montoya Bryan 2012, Paskus 2012, Savage & Klingel 2015). The New Mexico Department of Game and Fish (NMDGF) did not issue an official statement regarding the reason for discontinuing the program; however, it is speculated that the reason was because of concerns about the possible depredation of game and sensitive native fish species (Montoya Bryan 2012, Paskus 2012).

Food Habits

River otters are considered semi-aquatic and opportunistic predators, relying mainly on aquatic prey; however, they do not have a specialized diet (Greer 1955, Melquist & Hornocker 1983, Melquist & Dronkert 1987, Reid et al. 1994`, Taastrøm & Jacobsen 1999, Melquist et al. 2003, Skyer 2006, Stearns 2008, Stearns & Serfass 2011, Barding & Lacki 2012, Cosby 2013, Feltrop et al. 2016, L. Johnson, personal communication). Although similar prey compositions are observed across much of its range, river otter diet is typically dictated by availability, accessibility, and abundance of prey, also referred to as "catchability" (Melquist & Dronkert 1987, Stearns 2008). Because river otter diet composition is positively correlated with prey abundance, and predation is inversely proportional to fish swim speed, otter diet is assumed to be limited by hunting ability, rather than prey preference (Ben-David et al. 2005, Stearns & Serfass 2011, Barding & Lacki 2012, Crait et al. 2015, Feltrop et al. 2016).

In general, otter prey diversity varies seasonally, with the highest number of prey categories recorded in summer and spring (Knudsen & Hale 1968, Crait & Ben-David 2006, Stearns 2008, Stearns & Serfass 2011, Cosby 2013). This variation is usually due to changes in catchability linked to changes in prey behavior or abundance (Melquist & Hornocker 1983, Stearns 2008, Stearns & Serfass 2011, Cosby 2013). For example, fish and crayfish are often the most frequently observed prey of river otters annually (Taastrøm & Jacobsen 1999, Casariego-Madorell et al. 2008, Stearns 2008, Stearns & Serfass 2011, Barding & Lacki 2012, Feltrop et al. 2016, Cruz-García et al. 2017). Fish are typically slower (easier to catch) in colder winter months while crayfish availability decreases, whereas in warmer summer months, fish swim speeds are accelerated while crayfish activity increases (Videler 1993). Because of these changes in availability, it is common to see higher fish frequencies in otter diet during cold periods and lower in warm periods, while crayfish typically increase in frequency during warm periods and decrease in cold temperatures (Taastrøm & Jacobsen 1999, Skyer 2006, Dekar et al. 2010, Stearns & Serfass 2011, Barding & Lacki 2012, Cosby 2013, Feltrop et al. 2016).

Although typically a minor component of river otter diet, amphibians, typically frogs, and birds can comprise a significant portion of river otter diet, particularly during periods of breeding, nesting, and migratory stopovers (Dubec et al. 1991, Stearns 2008, Cosby 2013). Cosby (2013) observed frogs in 10.6% of samples across all sites, while Stearns (2008) found amphibians occurring in 11% of scats. Seasonal increases of amphibians in river otter diet can occur. Dubec et al. (1991) noted frogs to be the most commonly occurring item during summer months. Although typically a very minor component of otter diet, Cosby (2013) reported a mean bird occurrence of 21.3% in scats, ranging by location from 0.8 - 45.2%, a finding higher than most studies conducted in North America, with the exception of Quinlan (1983), Grenfell (2012) who reported birds at frequencies of 38% and 86%, respectively. Cosby (2013) also noted that bird consumption dramatically increased in fall and winter months when the sites were used as a stopover by migratory birds. In coastal regions, river otters will consume crab, shrimp, and lobster (Toweill & Tabor 1982, Melquist & Dronkert 1987, Cosby 2013, Johnson 2019).

Where predators of otters are absent, river otters, are often considered an apex predator, and consequently, it has been speculated that they could induce a trophic cascade within riverine systems by consuming large amounts of fish and crayfish (Estes & Duggins 1995, Pace et al. 1999, Lodge et al. 2000, New Mexico Game and Fish 2006a, Fabrizio et al. 2008, Estes et al. 2011, Nishijima et al. 2017). However, their relative impact on prey behavior and population dynamics is poorly understood. The overall ecological impact when river otters' function as an apex predator is largely unknown and likely varies throughout its range (Fabrizio et al. 2008). Dekar et al. (2010) suggested that based on their consumption rates, otters may play a vital role in triggering a trophic cascade, with other environmental factors (i.e. system carrying capacity, strength of predator-prey associations, etc.) influencing the magnitude of any top-down effects (Gese & Knowlton 2001, Fabrizio et al. 2008). For example, it is possible that river otters could alter species composition, possibly inducing a trophic cascade, by consuming large amounts of fish and crayfish (Lodge et al. 2000, New Mexico Game and Fish 2006a, Fabrizio et al. 2008, Nishijima et al. 2017).

Crayfish are a common prey of river otters, and some have speculated river otters could regulate the population growth and spread of non-indigenous crayfish (Savage & Klingel 2003, New Mexico Game and Fish 2006a). Crayfish are considered exotic, invasive taxa west of the Pecos River in the southwestern U.S. having been introduced via their use as fishing bait (Savage & Klingel 2003, New Mexico Game and Fish 2006a, Nolen et al. 2016). Crayfish can alter both biotic and abiotic components of ecosystems (Nishijima et al. 2017), and consequently have been labeled as both keystone species and ecosystem engineers due to their potential to cause physical modifications to wetland habitat and species compositional changes within ecological communities (Fabrizio et al. 2008, Brown & Lawson 2010, Gherardi et al. 2011, Nishijima et al. 2017, Putra et al. 2018). Introduced crayfish often compete with native crayfish and small fish for shelter and food, and can negatively affect egg and fish survival, and fish growth (Savino & Miller 1991, Gherardi et al. 2011, Faller et al. 2016, Nishijima et al. 2017).

Food Habit Studies

There are three methods that have been commonly used to determine river otter diet composition: scat analysis, stomach content analysis, and fatty acid analysis. Stomach content and fatty-acid analyses pose logistical challenges in obtaining robust sample sizes, particularly for analyzing seasonal differences in diet. When conducting a stomach content analysis, otter digestive tracts are collected from trappers or from road-killed otters (Knudsen & Hale 1968, Barding et al. 2010, Barding & Lacki 2012, Satterthwaite-Phillips et al. 2014). While most food habits studies exclude mollusks and other soft bodied prey, report them at small percentages, or combine them in "other" categories, Satterthwaite-Phillips et al. (2014) described mollusks as composing a far larger proportion of river otter diet (second most consumed, 32%) (Melquist & Hornocker 1983, Roberts et al. 2008, Stearns 2008). Fatty-acid analysis (FA) has been more commonly used in investigating the less diverse diets of marine mammals, but has also been used to describe the diet of river otters and other predators to facilitate identification of soft-bodied prey (Iverson et al. 1997a, Iverson et al. 1997b, Iverson et al. 2004, Nordstrom et al. 2008, Loseto et al. 2009, Satterthwaite-Phillips et al. 2014). Apart from requiring a tissue sample from a live trapped or dead otter, another disadvantage of FA requires knowing the fatty-acid signature of all or most potential prey species for that community. When not all species or prey groups are accounted for, over- and underestimation of dietary items can occur. In states where otter populations are small, road kills are rare, or a trapping season does not exist, few samples will be available and determination of seasonal differences in diet is difficult due to small sample size (Trites & Joy 2005, Barding et al. 2010, Barding & Lacki 2012).

Scat analysis involves the collection of animal droppings and subsequent analysis of foods based on identifiable parts that remain in scats following digestion and excretion; scats are most often found at communal latrines (Greer 1955, Grenfell 1974, Toweill & Tabor 1982, Melquist & Hornocker 1983, Ben-David et al. 1998, Ben-David et al. 2005, Trites & Joy 2005, Casariego-Madorell et al. 2008, Stearns 2008, Crimmins et al. 2009, Stearns & Serfass 2011). Scat analysis is frequently used because of the relative ease of sample collection, year-round availability of samples, and lower processing cost versus lab analysis that uses chemical or genetic analytical methods. Because scat analysis relies on recognizable remains, low digestibility food parts and easily identified prey items can be overestimated, while difficult to identify prey and soft bodied items (i.e. mollusks, clams, and larvae) are often underrepresented (Melquist & Hornocker 1983, Carss & Parkinson 1996, Satterthwaite-Phillips et al. 2014, Feltrop et al. 2016). Although acknowledging the pitfalls of over- and underestimation of prey items, Erlinge (1968), determined scat content analyses as reported in percent frequency provide a reasonably accurate description of the important food groups within a system.

Observations of river otters in the upper Rio Grande of New Mexico were reported after the 2008 reintroduction thru 2017; however, no formal ecological studies were conducted during this period to assess whether otter consumption of game fish (e.g. trout) or threatened or endangered fish (e.g. Rio Grande chub) supported these concerns. Therefore, understanding river otter ecology in this area is necessary if future river otter reintroductions are planned regionally.

In early 2018, a river otter population study was conducted in this area to estimate population growth and size (J. Cox, unpublished data). This study relied on collection of scats to non-invasively collect genetic samples, thus providing an opportunity to simultaneously assess river otter food habits. My objective was to study river otter diet on the upper Rio Grande and to investigate any seasonal variation. I hypothesized that, as found in other studies, river otters in the upper Rio Grande of north-central New Mexico would be comprised primarily of fish and crayfish, and that diet would be similar throughout the study area. I also hypothesized that seasonal differences in diet would occur, where fish would be consumed at higher frequencies during colder and drier months, and that crayfish would be more common in river otter diet in during warmer and wetter periods when they are most accessible. Findings from this study should be informative to wildlife and fisheries managers seeking answers concerning river otter impact on prey species, particularly fish that are important game species or listed as threatened or endangered.

Study Area

My study occurred in the southern Rocky Mountains ecoregion that is characterized by marked elevation changes, ranging from 1793-4,143 m above sea level. Shrub lands, pinyon forests, and juniper grasslands comprised the dominant plant communities on the plateau region (Figure 1) (New Mexico Game and Fish 2006b). Along the waterways, woody vegetation includes cottonwood (*Populus deltoides*), desert willow (*Chilopsis linearis*), and salt cedar (*Tamarix* spp.). Average annual rainfall for the city of Taos is 313 mm, the average high temperature is 16.8°C and the lowest temperature is typically around 0°C (USClimateData.com). Scat surveys were conducted in New Mexico along the upper Rio Grande River, and at the confluences of the Red River and Rio Pueblo with the Rio Grande. The study area is surrounded by land managed by the United States Forest Service (i.e., the Carson National Forest and the Columbine-Hondo Wilderness), the United States Bureau of Land Management (BLM) (i.e. Rio Grande del Norte Monument), and the United States National Park Service (i.e. Rio Grande Wild and Scenic River). All samples were accessed via land managed by the BLM. Much of the upper Rio Grande River is bordered by steep canyon walls (~243.8 m.). The National Weather Service Advanced Hydrologic Prediction Service (water.weather.gov) lists 3 river stage monitoring points that monitor river stage (level above an established gauge at a given site or location) within Taos County: Rio Grande near Cerro, NM, Rio Grande below Taos, NM, and Rio Pueblo below Taos, NM. On the Rio Grande near Cerro the action stage is 4.6 m, flood stage is 16 m, moderate flood stage 5.3 m, and major flood stage at 6.1 m (water.weather.gov). On the Rio Grande below Taos the action stage is 2.7 m, flood stage is 3 m, moderate flood stage 3.7 m, and major flood stage at 4.6 m (water.weather.gov). On the Rio Pueblo below Taos the action stage is 3.1 m, flood stage is 3.7 m, moderate flood stage 4.3 m, and major flood stage at 4.9 m (water.weather.gov). Portions of the Rio Grande allow boating; however, there are regions that are considered hazardous with fast flowing water (17-113.3 m^3/s) and white-water rapids. The combination of steep canyons and hazardous waters limited accessibility between sites.

The Rio Grande, Red River, Rio Pueblo provide various recreation opportunities for campers, hikers, anglers, kayakers, and swimmers. New Mexico Game and Fish (NMGF) stocks fish throughout the year and across the state. On 14 different occasions, between 01 January and 31 December 2018, NMGF stocked 7,939.7 kg of triploid rainbow trout, *Oncorhynchus mykiss*, totaling 38,527 fish ranging from 23.1 cm. to 31.5 cm. in length (E. Frey, personal communication). Rio Grande cutthroat trout, *Oncorhychus clarki virginalis,* were stocked once on the Rio Grande; 51.7 kg were stocked totaling 8,356 individuals at 8.6 cm. in length (E. Frey, personal communication).

Methods

A total of 20 latrine sites were used for this study: 17 were opportunistically discovered by foot and watercraft in early February 2018 as part of a concurrent non-invasive genetic population study, and three were discovered by the public and recorded by Amigos Bravos, a local nonprofit organization involved with river restoration (S. Murphy, personal communication). Northernmost otter latrine sites were on the Colorado-New Mexico border, with the southernmost latrine site approximately 180 km north east of Albuquerque, New Mexico, off highway NM-68 N.

I attempted to collect otter scat throughout the 2018 calendar year to represent two major climatic periods: wet and dry seasons. All scats appearing older than 2 weeks were discarded at the onset of the study to keep the sampling period within the 2018 calendar year. Thereafter, scats were collected approximately every 7-10 days for 8 consecutive weeks through April 2018 to meet the mark-recapture assumptions of the population genetics study. After this initial concentrated sampling period (February – April) scats were collected again once during the months of June, September, and December.

Although the characteristics of all latrine sites varied, most could be associated with one or more features that included an accessible bank, vegetation cover, and a rock formation or a large boulder overlooking the river. I attempted to collect all scat present within the general vicinity of a latrine, defined as a ~30 m search transect along the riverbank when vegetation, elevation change, or other accessibility issues did not impede this search distance. Each scat was considered an independent sample if it did not make physical contact (approximately 2.5 cm) with another scat. Extremely desiccated, powdery, scat that was not fresh and was likely to have been missed during prior checks was not collected. Scats were stored individually and labeled with the corresponding latrine site name, a unique identifier, and date, then frozen until processed as follows. Scats were cleaned by soaking each scat sample in warm water, rinsed of fecal material, filtered using a fine mesh (1mm) Oneida 6-inch sieve (Oneida, NY, USA) to retain hard prey remains, then dried on paper plates.

I initially sorted scats and identified major prey groups (fish, crayfish, bird, etc.). Large pieces of vegetation and non-food items (i.e., microplastics and fishhooks, weights, and sinkers) were removed during this initial screening. Because a fish scale identification key was lacking for the study area, it was necessary to create a prey identification key using reference scales from the University of New Mexico Museum of Southwestern Biology and fish samples provided by the New Mexico Department of Game and Fish (NMDGF). I developed an identification key using radii, circuli, and presence of cteni using a modified scale preparation whereby scales were hydrated in water before using a small paintbrush to gently remove remaining organic material (Bräger 2016). Scales were photographed using a Nikon dissecting scope with a Canon T3i Rebel mounted camera. I identified fish using scales, jaws, and pharyngeal teeth, and crayfish by their exoskeleton. When present, jaws and pharyngeal teeth were used to confirm identified scales or differentiate between families where scale properties were similar. I was only able to confidentially identify fish to taxonomic family where multiple species occurred. Because this study-type relies on hard prey remains, scale-less fish and soft-bodied prey items could not be accounted. Birds were identified by the presence of feathers and hollow bones, mammals by dense bones, and snakes by bones and skin.

Because prey availability data were unavailable from surveyed areas, I was unable to determine various dietary metrics (e.g. prey selection).

After identification was completed, I determined overall and seasonal diet at each location and for the study area by calculating frequency of occurrence (FO) and relative frequency of occurrence (RFO) (De Andrade 1997). FO is the frequency of a prey item across all scat samples and can be calculated as:

$$FO = \frac{s_i}{n}$$

where s_i is the number of scats, s, in which a food item, *i*, occurs. n is the number of scat samples collected in a given time period (i.e. season), while N is the total number of samples collected in the study (annual) see Tables 2-4.

RFO is the frequency of a species in relative to all other prey items and can be calculated as:

$$RFO = \frac{s_i}{I}$$

where s_i is the number of scats, s, in which a food item, *i,* occurs. *I* is the total number of food item observations recorded for the given time period. Presence of prey groups in scat was recorded as present or absent, and then analyzed using a generalized linear mixed effect model, GLMM in R 3.6.1. The GLMM was fitted using Laplace Approximation (maximum likelihood method) performed in the R package 'lme4' (function 'glmer'). The response variable was the log-likelihood of prey group detection. The fixed, explanatory, variable was the season in which the sample was collected. Latrine site location was treated as a random variable. For ease of interpretation, the model output was transformed from log-likelihood (logit) to probability and then to odds and odds ratio. Finally, p values were interpreted to determine significance. Seasons were determined using precipitation and temperature data (U.S. Climate Data, usclimatedata.org 2018; WRRC, wrrc.dri.edu 2018), whereby the six wettest and warmest months were considered the "wet" season, while the six driest and coolest months were the "dry" season.

Results

Site visitation and sampling varied seasonally, 65 field surveys occurred between 2 February 2018 and 12 December 2018, during which 877 scat samples were collected among 20 latrine sites (Table 1). Of the 877 samples, 20 were excluded due to improper labeling during collection, possible contamination, or confusion with raccoon (*Procyon lotor*) scat. From these remaining 857 scat samples I identified 1695 prey items (Table 3). Most samples (686 of 857, 79.9%), were collected between 2 February 2018 and 19 April 2018, during the genetics survey. The remaining samples (173 of 857, 20.1%), were collected from June 20-23, September 24-27, and December 18-20, 2018. The mean number of scat samples collected per site visit was 5.0 and ranged between 1.6-10.6 during the dry season, and 0-20 during the wet season (Tables 1 and 3). Six sites had no samples collected during one visit within the dry season. The absence of scats during a few visits occurred during low stream levels for these sites which perhaps impacted prey availability.

Crayfish (66.2%) and fish (61.8%) had the highest overall FO in otter scats (Table 3). Not all fish identifications were identified to family (n = 102, FO: 11.9%, Table 3), but when comparing across all prey items using FO, the primary fish families found were Salmonidae (24.5%) and Catostomidae (22.9%). Other fish prey included species within the families Esocidae (8.6%), Cyprinidae (7.7%) and Centrarchidae (3.2%). Salmonidae and Catostomidae had the highest FO of fish prey, recorded at 39.6% and 37.1% respectively, followed by Esocidae (14.3%), Cyprinidae (12.4%), and Centrarchidae (3.2%). Minor prey items (3.4%) in scats included freshwater mollusks (2.7%), birds (0.5%), reptiles (0.1%) and mammals (0.1%).

Seasonal differences were detected for crayfish and fish, as well as the fish families Catostomidae, Cyprinidae, Esocidae, and Salmonidae. Seasonal differences were not detected for Centrarchidae, reptiles, and mollusks. Crayfish were more frequently found in scats during the wet season (94.5%) than the dry season (61.3%); the probability of identifying crayfish in a scat sample was 0.94 during the wet season and 0.63 during the dry season ($p < 0.001$) (Table 2 and 5). Fish were the most frequently observed group during the dry season (68.5%) and second most frequently observed group during the wet season (23.4%). The probability of a sample containing fish was higher during the dry season (0.74) than the wet season (0.23) ($p < 0.001$) (Table 2 and 5).

Of the 531 samples containing fish, nearly a quarter were salmonids (n = 210, 24.5%), with almost all (n = 206, 98.1%) observed during the dry season. The probability of a scat sample containing a salmonid during the dry season was 0.25 and 0.03 during the wet season ($p < 0.001$; Table 4 and 5). Although I was not able to identify to the species level, the study area included brown trout, *Salmo trutta*; rainbow trout, *Oncorhynchus mykiss*; Rio Grande cutthroat trout, *O. clarki virginalis*.

Catostomids (white sucker, *Catostomus commersonii* or Rio Grande sucker *C. plebeius*) were the second most frequently identified prey item occurring among scats with fish (n = 197, 37.1%). Although catostomid remains were primarily observed during the dry season (n = 188, 95.4%) the probability of a scat sample containing castostomid remains was identical for both dry and wet seasons (0.19, $p < 0.001$; Table 4 and 5).

Esocids (northern pike, *Esox lusicus)* were identified in 14.3% of all samples (n = 76), with 6.7% and 14.8%, of samples collected during the dry and wet seasons, respectively, $p < 0.01$ (Table 4 and 5). The probability a scat sample containing esocid remains was equal across both seasons (0.10).

Cyprinids (Rio Grande chub, *Gila pandora*; longnose dace, *Rhinichthys cataractae* ; common carp, *Cyprinus carpio;* flathead chub, *Platygobio gracilis*; fathead minnow, *Pimephales promelas*; red shiner*, Cyprinella lutrensis*) were identified in 66 of 531 (12.4%) samples containing fish, with 59 (11.8%) in the dry season, and 7 (23.3%) in the wet season. The probability of a scat sample containing cyprinid remains was 0.06 during the dry season and 0.03 during the wet season ($p < 0.001$) (Table 4 and 5).

Centrarchids (smallmouth bass, *Micropterus dolemieu*; largemouth bass, *M. salmoides*; bluegill, *Lepomis macrochirus*; green sunfish, *L. cyanellus*) were only found in 17 of 531 (3.2%) samples containing fish and were all found during the dry season (3.4%). Although the probability of a scat sample containing centrarchid remains was 0.015 during the dry season and zero during the wet season, results were not significant ($p > 0.05$) (Table 4 and 5).

Mollusks, reptiles, and mammals occurred at very low frequencies throughout this study (2.7%, 0.1%, and 0.1%, respectively). Birds occurred 4 times in otter scat during the entire study (0.5%); however, the GLMM model failed to converge for this group and significance was not determined for seasonal differences (Tables 3 and 5). The probability of identifying mollusks in the wet season was 0.005 and while during the dry season the probability of identifying mollusks was 0.014. No statistical difference was determined which is likely a result of a small sample size ($p > 0.05$). The mollusks observed appeared to be the Asiatic clam (*Corbicula fluminea*), an exotic species established in the lower Rio Grande (D. White, personal communication); further studies are needed determine the extent of invasion and establishment in the upper Rio Grande. Microplastics (plastics < 5 mm, see Arthur et al. 2009) visible to the naked eye were also discovered in approximately 5% of scat samples.

Discussion

Frequency of occurrence of food items in food habit studies may reflect availability of foods (accessibility or catchability) or dietary preferences (selection). I found crayfish and fish had the highest frequency of occurrence among major prey items in the upper Rio Grande in Taos County, New Mexico. These results are similar to other studies across the United States (Greer 1955, Melquist & Hornocker 1983, Melquist & Dronkert 1987, Taastrøm & Jacobsen 1999, Skyer 2006, Stearns & Serfass 2011, Barding & Lacki 2012, Cosby 2013, Feltrop et al. 2016). Although fish frequencies are usually observed at ≥ 75% both annually and seasonally in otter scats (Grenfell 1974, Stearns 2008, Stearns & Serfass 2011), I found fish in only 61.8% of scats. Here, I report crayfish occurring more frequently than fish at 66.2%. Crayfish are commonly found in river otter diets, but rarely the most frequently consumed prey (Roberts et al. 2008). Soft-bodied prey occur infrequently in most scat-based otter diet studies; however, this may be due to inherent bias in scat studies (Taastrøm & Jacobsen 1999, Satterthwaite-Phillips et al. 2014).

In North America, Catostomidae, Cyprinidae, and Centrarchidae are commonly reported in otter diet studies. These fish families are diverse, widespread, and are relatively slow swimmers. Salmonids had the highest FO and RFO of fish items in the URG, specifically during the during the dry season (Table 3) which was not surprising given that rainbow trout are frequently stocked in this area. The dry season (October-

April) partially overlaps with trout spawning periods, (April – June for brown trout, April-October for rainbow trout), and therefore represented an opportune time for river otters to prey on salmonids (Hayes 1987). The high FO of salmonids could also be explained by observer bias, because unlike other fish families, salmonid scales were plentiful and easily identifiable in scats (Tarasoff et al. 1972). A comparison between stocking rates, dates, and diet in future studies might determine whether river otters in the URG are selecting salmonids over other fish, or if findings could be explained by increased salmonid availability resulting from stocking.

Cyprinids have been previously reported to be among the most consumed fish families, most likely because of their widespread distribution (Stearns 2008). In the URG, however, the FO of cyprinids was relatively low compared to all prey items (7.7%) and other fish families (12.4%). Interestingly, in contrast to other fish families, the highest FO of cyprinids occurred during the wet season. Low FO in this family could reflect low availability during the dry season, lower catchability or accessibility, or lower preference relative to other fish species.

Centrarchids are commonly observed in other river otter studies (Stearns 2008); however, they were rarely found in my study. Centrarchids were the least consumed fish family overall (2%) and during the dry season (2.3%) and were not observed in any samples during the wet season. It is possible that low frequency in this study reflects a low abundance of the family in this study area, possibly due to cold waters, as centrarchids tend to inhabit warmer waters. Environmental dissimilarities between this study area and others may explain differences in FO.

Minor prey groups in otter scats included mollusks, birds, reptiles, and mammals, which occurred at low frequencies throughout the year. Mollusks occurred at an overall frequency of 2.7% which is uncommonly frequent; Stearns and Serfass (2011) reported mussels at 0.2% frequency and Skyer (2006) at 1.4%; however, many studies do not report soft-bodied items or include them in an “other” group. Satterthwaite-Phillips et al. (2014) used fatty acid analysis and estimated mussells to comprise up to 32% of river otter diet in Illinois, USA. Mollusks are likely underreported in scat-based studies of diet because of their high digestibility, with identification typically only recorded when the shells are observed. Nonnative mollusks (Quagga mussel, *Dreissena bugensis*, zebra mussel, *D. polymorpha* and Asian clam) have the potential to invade this area, and examination of otter scat may aid in early detection and identification via presence of shells or using environmental DNA methods. Only 4 birds were detected during this study, all of which appeared to be ducklings based on feather size. One snake and rodent were consumed during the wet season. Birds, reptiles, and mammals are typically reported at very low frequencies in otter diet studies, and usually considered opportunistic food items with relatively low dietary importance as compared to major fish and crayfish (Dubec et al. 1991, Stearns 2008, Cosby 2013).

Exotic species were abundant in otter diet within the URG and represent a novel resource (2006) in this ecosystem. Crayfish, northern pike (*Esox Lucius*, Esocidae), common carp (Cyprinidae), suckers (Catostomidae), rainbow trout (Salmonidae), and Asian clam are all non-native to this study area and were introduced to the area via recreational fishing and range expansion from other invaded areas. Crayfish are invasive in New Mexico and had the highest FO of any prey group. Catostomids and Esocids were also important prey items in otter diet. Catostomids were the third most frequently consumed prey item (22.4%) and second most consumed fish family (37.1%), and the most frequently consumed fish family consumed during the wet season (30.0%). The Northern pike is an aggressive, predatory esocid that preys on native species (e.g. trout). Otters may target spawning Esocids, as northern pike tend to spawn just as ice disappears and seasons transition, typically March (dry season) to early April (wet season). Mollusks found in otter scats of the URG appeared to be the Asian clam, although it has not been officially verified here. Otter scats could provide a valuable source material for the detection of invasive species (i.e. bio-surveillance). For example, in Washington state, otter scat analysis is being used to detect the invasive European green crab (*Carcinus maenas*) in Makah estuaries (Nash 2019, B. Buzzel and A Akmajian, personal communication).

Management Implications

The reintroduction of predators to an ecosystem is often a controversial subject, which can be exacerbated by negative media portrayal and public attitudes (Bohrman 2011, Serfass et al. 2014, Pearce et al. 2017). North American river otters (*Lontra* *canadensis*), are frequently described as "nuisance" predators and deemed "greedy" and often accused of "decimating" trout (Hamilton 2007, Bohrman 2011, Paskus 2012, Serfass et al. 2014, Associated Press 2018, Reed 2018). Although river otters are often blamed for declines in game fish populations and the lack of "keeper-sized" or trophy fish, numerous studies have determined that they prefer small to mid-sized and slow-moving fish and will often consume crayfish at significant portions and for significant time periods (Melquist & Dronkert 1987, Melquist et al. 2003, Savage & Kling el 2003, Hamilton 2007, Roberts et al. 2008, Stearns 2008, Stearns & Serfass 2011, Serfass et al. 2014, Pearce et al. 2017). Otters have also been reported to "plunder" private ponds, decimating stocked fish numbers (Hamilton 2007, Serfass et al. 2014, Pearce et al. 2017). Pearce et al. (2017) surveyed fisheries facilities in Pennsylvania and determined that even when otters were present, fish losses were minor. In reality, river otters are opportunistic carnivores, whose diet is limited by catchability (Melquist & Hornocker 1983, Anderson & Woolf 1987, Reid et al. 1994`, De Andrade 1997, Skyer 2006, Stearns & Serfass 2011, Grenfell 2012, Cosby 2013, Murphy 2019). The consequences of the loss of predators can have various negative effects, including but not limited to mesopredator release, overpopulation of herbivores, and increased vulnerability of ecosystems to invasion by exotic species (Mittelbach et al. 1995, Gese & Knowlton 2001, Finke & Denno 2005, Fabrizio et al. 2008, Heithaus et al. 2008).

Despite the demonstrated importance of predators to ecosystems, negative attitudes and less than favorable media attention might inhibit further otter reintroductions in New Mexico. It is important to note that negative views published in the media may not accurately reflect overall public attitudes, and should not be the sole basis for reinstating, or discontinuing, river otter reintroductions (McCombs & Shaw 1972). Given the importance of recreational fishing and other outdoor recreation in this region, I recommend an economic analysis and quantitative and qualitative social science studies (e.g. questionnaires or interviews) be conducted to assess public valuation of river otters and better understand public perception and attitudes towards this species (Bohrman 2011, Serfass et al. 2014, Pearce et al. 2017).

Otters consume catchable prey: what's available, assessable, and abundant. Typically, highly catchable fish are numerous, slower-moving, and are found in calm areas of waterways, or with some species juvenile fish select slower moving waters and occasionally congregate in higher numbers, thereby increasing their catchability (Buzzell et al. 2014, Scordino et al. 2016). Occasionally, sensitive species are susceptible to otter predation, including during spawning or upstream migration. In the Pacific Northwest, river otters have been recorded to consume rockfish (genus: *Sebastes*) which include a variety of threatened and endangered species (Drake et al. 2010, Buzzell et al. 2014). In Washington, river otters have been known to consume Lake Ozette Sockeye Salmon (*Oncorhynchus nerka*), a federally threatened species, that may be more vulnerable when they encounter weirs. In Yellowstone National Park, otters rarely consume nonnative lake trout, FO: 5.0% (*Salvelinus namaycush*), and they consume higher rates of declining native cutthroat trout, FO: 9.0 – 24.0%, possibly because cutthroat trout's preference of shallower lake waters (Crait & Ben-David 2006, Wengeler et al. 2010, Crait et al. 2015). Although not confirmed in this study, it is possible that river otters may be consuming sensitive species such as the Rio Grande cutthroat trout, Rio Grande sucker, flathead chub, and others. Genetic analysis using environmental DNA (eDNA) and DNA metabarcoding analysis may prove useful in future research to fully analyze the diet of river otters in this region (Massey et al. 2019, Sanders 2019).

When predators consume threatened, endangered, or high value stocked species, managers may choose to remove or deter the predator; however, otter removal may not be desired or feasible in the URG given the small population size was only estimated at 83-100, and projected to reach just 400 by 2033 given current growth trajectories. It may also be difficult to physically exclude river otters along a vast area such as the Rio Grande; however, behavioral deterrents such as acoustic harassment may be effective in preventing otter presence in habitats with sensitive species (Scordino et al. 2016).

Otters in the URG are predators of exotic crayfish in the URG, taxa which can alter biotic and abiotic components of their environment, including predation of fish eggs, small fish, alteration of zoobenthic communities and macrophyte structure, and increasing erosion and siltation (Lodge et al. 2000, Gherardi et al. 2011, Machida & Akiyama 2013, Baldridge & Lodge 2014, Faller et al. 2016, Nolen et al. 2016, Nishijima et al. 2017). Manual or mechanical removal of crayfish has been shown to significantly reduce crayfish numbers, but not enough to fully eliminate them and is also time intensive (Gherardi et al. 2011). River otters may act as a biological control agent against crayfish and other aquatic, exotic species in the URG, particularly if the population can grow and expand its range.

Table 1: Number of visits per river otter latrine site to collect scats, upper Rio Grande, NM, 2018.

	Wet (n=128; x=3.9)			Dry (n=731; x=5.3)			Annual (n=859; x=5.0)		
	20-23 June; 24-27 Sept			02 Feb.-19 Apr; 18-19 Dec			02 Feb – 19 Dec		
Site	n_1	Visits	μ_{site}	n_1	Visits	μ_{site}	n_1	Visits	μ_{site}
RG 1	6	2	3.0	68	9	7.6	74	11	6.7
RG 2	7	2	3.5	51	8	6.4	58	10	5.8
RG 3	2	2	1.0	64	8	8.0	66	10	6.6
RG 4	9	1	9.0	42	7	6.0	51	8	6.4
RG 5	40	2	20.0	66	8	8.3	106	10	10.6
RG 6	8	2	4.0	41	9	4.6	49	11	4.5
RG 7	0	2	0.0	10	4	2.5	10	6	1.7
RG 8	0	1	0.0	32	7	4.6	32	8	4.0
RG 9	0	1	0.0	43	8	5.4	43	9	4.8
RG 10	0	1	0.0	26	6	4.3	26	7	3.7
RG 11	0	2	0.0	25	6	4.2	25	8	3.1
RG 12	23	2	11.5	8	5	1.6	31	7	4.4
RG 13	0	2	0.0	26	7	3.7	26	9	2.9
RG 14	6	2	3.0	8	4	2.0	14	6	2.3
RG 15	11	2	5.5	24	5	4.8	35	7	5.0
RG 16	6	1	6.0	95	9	10.6	101	10	10.1
RP 1	10	2	5.0	55	10	5.5	65	12	5.4
RP 2	0	2	0.0	14	7	2.0	14	9	1.6
RR 1	0	1	0.0	15	6	2.5	15	7	2.1
RR 2	0	1	0.0	18	6	3.0	18	7	2.6

Table 2: Major prey groups in the diet of river otters in the upper Rio Grande, NM, 2018.

	Wet Season			Dry Season			Annual		
	20-23 June; 24-27 Sept.			02Feb -19 Apr; 18-19 Dec			02 Feb– 19 Dec		
	n_1=128, n_2=155			n_1=731, n_2=974			n_1=859, n_2=1129		
Major Prey Group	n	FO[a] (%)	RFO[b] (%)	n	FO[a] (%)	RFO[b] (%)	n	FO[a] (%)	RFO[b] (%)
Fish	30	23.44	19.35	501	68.54	51.44	531	61.82	47.03
Crayfish	121	94.53	78.06	448	61.29	46.00	569	66.24	50.40
Mussel	1	0.78	0.65	22	3.01	2.26	23	2.68	2.04
Avian	1	0.78	0.65	3	0.41	0.31	4	0.47	0.35
Reptile	1	0.78	0.65	0	0.00	0.00	1	0.12	0.09
Mammal	1	0.78	0.65	0	0.00	0.00	1	0.12	0.09
Not Identified Fish	22	17.19	12.43	80	10.94	5.27	102	11.87	6.02

[a]FO% = count/all identifications, the sum of which does not equal 100%

[b]RFO% = count/all samples collected, the sum of which equals 100%.

n_1 = the number of samples collected in a time period

n_2= the number of (prey) identifications in a given time period

Table 3: All prey items of river otters in the upper Rio Grande, NM, 2018.

	Wet Season			Dry Season			Annual		
	20-23 June; 24-27 Sept			02 Feb-19 Apr; 18-19 Dec			02 Feb – 19 Dec		
	n_1=128, n_2=177			n_1=731, n_2=1518			n_1=859, n_2=1695		
Major Prey Group	n	FO[a] (%)	RFO[b] (%)	n	FO (%)	RFO (%)	n	FO (%)	RFO (%)
Fish	30	23.44	16.95	501	68.54	33.00	531	61.82	31.33
Salmonidae	4	3.13	2.26	206	28.18	13.57	210	24.45	12.39
Catostomidae	9	7.03	5.08	188	25.72	12.38	197	22.93	11.62
Esocidae	2	1.56	1.13	74	10.12	4.87	76	8.85	4.48
Cyprinidae	7	5.47	3.95	59	8.07	3.89	66	7.68	3.89
Centrarchidae	0	0.00	0.00	17	2.33	1.12	17	1.98	1.00
Crayfish	121	94.53	68.36	448	61.29	29.51	569	66.24	33.57
Mussel	1	0.78	0.56	22	3.01	1.45	23	2.68	1.36
Avian	1	0.78	0.56	3	0.41	0.20	4	0.47	0.24
Reptile	1	0.78	0.56	0	0.00	0.00	1	0.12	0.06
Mammal	1	0.78	0.56	0	0.00	0.00	1	0.12	0.06
Unidentified Fish	22	17.19	12.43	80	10.94	5.27	102	11.87	6.02

Note: This table includes the frequency of unidentified fish prey.

[a]FO% = count/all identifications, the sum of which does not equal 100%

[b]RFO% = count/all samples collected, the sum of which equals 100%

n_1 = the number of samples collected in a time period

n_2= the number of (prey) identifications in a given time period

Table 4: Composition of identified fish families within the diet of river otters in the upper Rio Grande, NM, 2018

	Wet Season 20-23 June; 24-27 Sept n_1=30, n_2=22			Dry Season 02 Feb -19 Apr; 18-19 Dec n_1=501, n_2=544			Annual 02 Feb – 19 Dec n_1=531, n_2=566		
Fish Family	N	[a] FO (%)	[b]RFO (%)	n	FO (%)	RFO (%)	n	FO (%)	RFO (%)
Salmonidae	4	13.33	18.18	206	41.12	37.87	210	39.55	37.10
Catostomidae	9	30.00	40.91	188	37.52	34.56	197	37.10	34.81
Esocidae	2	6.67	9.09	74	14.77	13.60	76	14.31	13.43
Cyprinidae	7	23.33	31.82	59	11.78	10.85	66	12.43	11.66
Centrarchidae	0	0.00	0.00	17	3.39	3.13	17	3.20	3.00

Note: This table does not include the frequency of unidentified fish prey.

[a]FO% = count/all identifications, the sum of which does not equal 100%

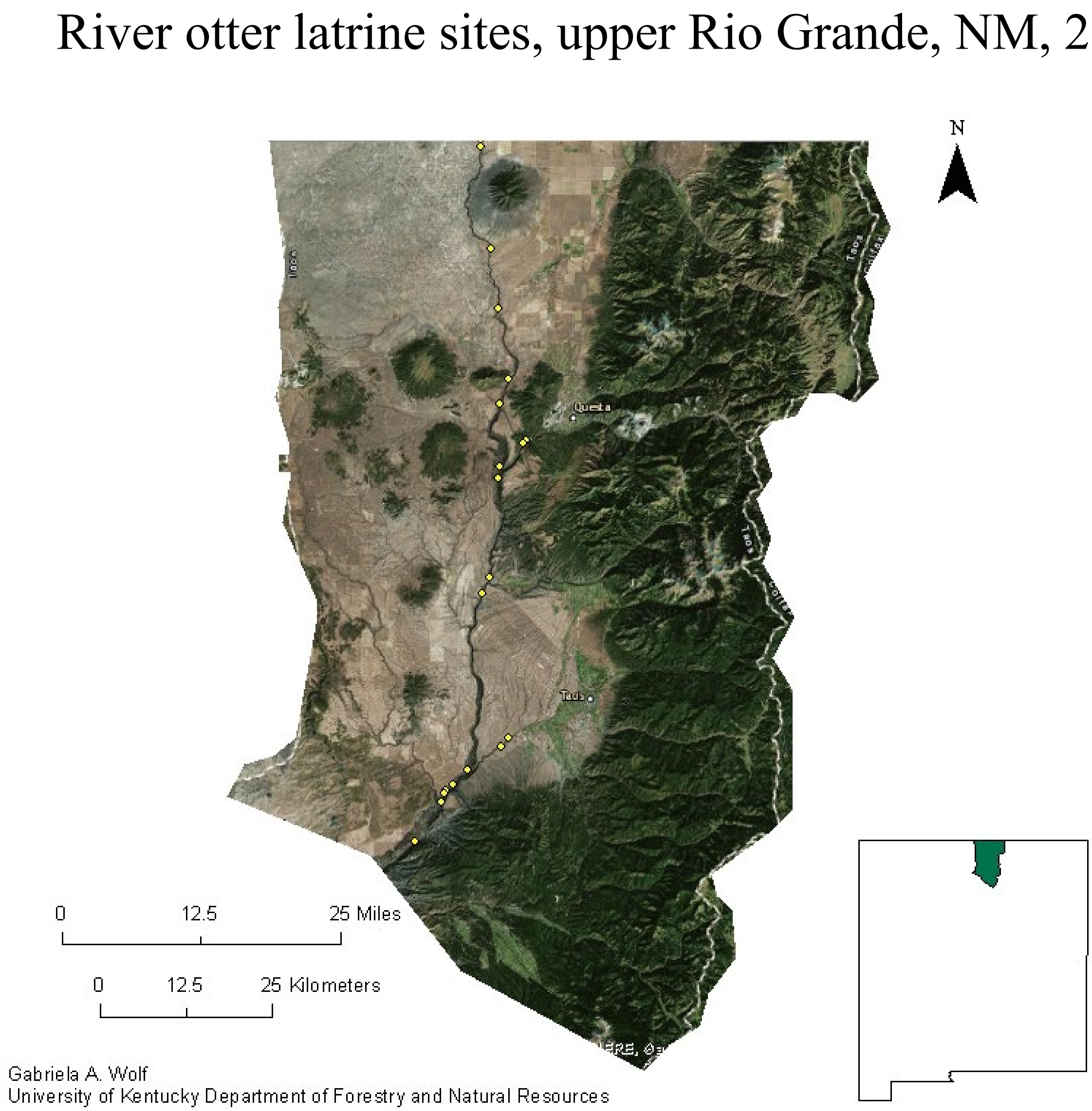
[b]RFO% = count/all samples collected, the sum of which equals 100%

n_1 = the number of samples collected in a time period

n_2= the number of (prey) identifications in a given time period

Table 5: Probability and odds of identifying prey remains in otter scats during the dry and wet seasons, upper Rio Grande, NM, 2018.

	Wet Season		Dry Season		
	20-23 June; 24-27 Sept		02 Feb -19 Apr; 18-19 Dec		
Major Prey Group	Probability	Odds	Probability	Odds	p
Fish	0.23	0.03	0.74	4.60	***
Salmonidae	0.03	0.30	0.25	0.33	***
Catostomidae	0.19	0.04	0.19	0.24	***
Esocidae	0.10	0.02	0.10	0.11	**
Cyprinidae	0.03	0.03	0.06	0.06	***
Centrarchidae	0.00	0.00	0.02	0.02	
Crayfish	0.94	16.26	0.63	1.72	***
Mollusk	0.005	0.005	0.014	0.014	
Reptile	0.00	0.00	0	0	
Avian	-	-	-	-	-
** 0.01, *** <0.001					



Taos County, New Mexico, 2018.

Figure 1: River otter latrines, Upper Rio Grande

Appendix A: R Code

```
#Title: "GLMER analysis for river otter diet data"
#Last updated: 17 September 2019
#packages used: "lme4"

# Install and Load Packages#
install.packages("lme4")
library(lme4)
# Load Diet Data#
diet<-read.csv(file="Dry_Wet.csv", header=TRUE, sep=",")
# run glmer for each prey class#
#FISH#
fish<- glmer(Fish~ Wet.Season +(1|Latrine.ID), family=binomial, data=diet)
summary(fish)
#Calculate probability, odds, and odds ratio of finding fish in the Wet and/or Dry Season#
#estimate probability:
pFD<-(exp(1.0515)/(1+exp(1.0515))) # probability of detecting fish of fish during dry season
pFW<-(exp(1.0515-2.2738)/(1+exp(1.0515-2.2738))) # probability of detecting fish during wet season
#odds#
```

```
oFD<-((pFD)/(1-pFD)) # odds of detecting fish during dry season
oFW<-(pFW)/(1-pFW) # odds during wet season
#CRAYFISH#
CF<- glmer(Crayfish~ Wet.Season +(1|Latrine.ID), family=binomial, data=diet)
summary(CF)
#estimate probability
pCFD<-(exp(.54)/(1+exp(.54)))
pCFW<-(exp(.54+2.2486)/(1+exp(.54+2.2486)))
#odds#
OCFD<-((pCFD)/(1-pCFD)) # odds of detecting fish during dry season
OCFD
OCFW<-(pCFW)/(1-pCFW) # odds during wet season
OCFW
#SALMONIDAE#
Sal<- glmer(Salmonidae~ Wet.Season +(1|Latrine.ID), family=binomial, data=diet)
summary(Sal)
#estimate probability
pSD<-(exp(-1.1045)/(1+exp(-1.1045)))
pSD
pSW<-(exp(-1.1045-2.5015)/(1+exp(-1.1045-2.5015)))
```

```
pSW
#odds#
OSD<-((pSD)/(1-pSD)) # odds of detecting during dry season
OSD
OSW<-(pSW)/(1-pSW) # odds during wet season
OSW
#CENTRARCHIDAE#
Cen<- glmer(Centrarchidae~ Wet.Season +(1|Latrine.ID), family=binomial, data=diet)
summary(Cen)
#estimate probability
PCED<-(exp(-4.156e+00)/(1+exp(-4.156e+00)))
PCED
PCEW<-(exp(-4.156e+00-2.571e+01)/(1+exp(-4.156e+00-2.571e+01)))
PCEW
#odds#
OCED<-((PCED)/(1-PCED)) # odds of detecting during dry season
OCED
OCEW<-(PCEW)/(1-PCEW ) # odds during wet season
OCEW
#ESOCIDAE#
```

```
Esc<- glmer(Esocidae~ Wet.Season +(1|Latrine.ID), family=binomial, data=diet)
summary(Esc)
#estimate probability
PED<-(exp(-2.2028)/(1+exp(-2.028)))
PED
PEW<-(exp(-2.2028-2.0111)/(1+exp(-2.2028-2.0111)))
PEW
#odds#
OED<-((PED)/(1-PED)) # odds of detecting during dry season
OED
OEW<-(PEW)/(1-PEW)  # odds during wet season
OEW
#Cyprinidae#
Cyp<- glmer(Cyprinidae~ Wet.Season +(1|Latrine.ID), family=binomial, data=diet)
summary(Cyp)
#estimate probability
PCYD<-(exp(-2.815489)/(1+exp(-2.815489)))
PCYD
PCYW<-(exp(-2.815486-.628155)/(1+exp(-2.815486-.628155)))
PCYW
```

```
#odds#
OCYD<-((PCYD)/(1-PCYD)) # odds of detecting during dry season
OCYD
OCYW<-(PCYW)/(1-PCYW) # odds during wet season
OCYW
#CATOSTOMIDAE#
Cat<- glmer(Catostomidae~ Wet.Season +(1|Latrine.ID), family=binomial, data=diet)
summary(Cat)
#estimate probability
PCAD<-(exp(-1.4494)/(1+exp(-1.4494)))
PCAD
PCAW<-(exp(-1.4494-1.7088)/(1+exp(-1.4494-1.7088)))
PCYW
#odds#
OCAD<-((PCAD)/(1-PCAD))#odds of detecting during dry season
OCAD
OCAW<-(PCAW)/(1-PCAW)#odds during wet season
OCAW
#MOLLUSKS#
Mol<- glmer(Mollusk~ Wet.Season +(1|Latrine.ID), family=binomial, data=diet)
```

```
summary(Mol)
#estimate probability
PMD<-(exp(-4.2414)/(1+exp(-4.2414)))
PMD
PMW<-(exp(-4.2414-1.1532)/(1+exp(-4.2414-1.1532)))
PMW
#odds#
OMD<-((PMD)/(1-PMD)) # odds of detecting during dry season
OMD
OMW<-(PMW)/(1-PMW) # odds during wet season
OMW
#BIRDS#
Bird<- glmer(Bird~ Wet.Season +(1|Latrine.ID), family=binomial, data=diet)
summary(Bird)
#estimate probability
PBD<-(exp(-5.4917)/(1+exp(-5.917)))
PBD
PBW<-(exp(-4.4917+.6475)/(1+exp(-4.4917+.6475)))
PBW
#odds#
```

```
OBD<-((PBD)/(1-PBD)) # odds of detecting during dry season
OBW<-(PBW)/(1-PBW) # odds during wet season
OBD
OBW
#REPTILES#
Rep<- glmer(Reptile~ Wet.Season +(1|Latrine.ID), family=binomial, data=diet)
summary(Rep)
#estimate probability
PRD<-(exp(-38.11)/(1+exp(-38.11)))
PRD
PRW<-(exp(-38.11+32.57)/(1+exp(-38.11+32.57)))
PRW
#odds#
ORD<-((PRD)/(1-PRD)) # odds of detecting during dry season
ORW<-(PRW)/(1-PRW) # odds during wet season
ORD
ORW
#MAMMALS#
Mam<- glmer(Mammal~ Wet.Season +(1|Latrine.ID), family=binomial, data=diet)
summary(Mam)
```

```
#estimate probability
PMD<-(exp(-36.67)/(1+exp(-36.67)))
PMD
PMW<-(exp(-36.67+31.82)/(1+exp(-36.67+31.82)))
PMW
#odds#
OMD<-((PMD)/(1-PMD)) # odds of detecting during dry season
OMW<-(PMW)/(1-PMW) # odds during wet season

OMD
OMW
```

APPENDIX B: MASTER FOOD HABITS TABLE

Fish were identified to family when possible. However, there was one occurrence where a common carp was positively identified using pharyngeal teeth. In this study area all fish in Catostomidae belong in the genus *Catostomus*, and those in Esocidae are identified as northern pike (*Esox lucius).* If an identification was not possible the sample was labeled as "fish".

	Latrine ID	**Date**	**Sample ID**	**Prey Group**
1	RG 01	2/13/2018	1	Crayfish, Salmonidae, Esocidae (*Esox lucius*), Catostomidae
2	RG 01	2/13/2018	2	Crayfish, Esocidae (*Esox lucius*), Catostomidae (*Catostomus* spp.)
3	RG 01	2/13/2018	3	Salmonidae, Esocidae (*Esox lucius*), Catostomidae (*Catostomus* spp.)
4	RG 01	2/19/2018	1	Catostomidae (*Catostomus* spp.)
5	RG 01	2/19/2018	2	Crayfish, Catostomidae (*Catostomus* spp.)
6	RG 01	2/19/2018	3	Crayfish, Cyprinidae
7	RG 01	2/19/2018	4	Crayfish and Fish
8	RG 01	2/19/2018	5	Catostomidae (*Catostomus* spp.)
9	RG 01	2/19/2018	6	Catostomidae (*Catostomus* spp.)
10	RG 01	2/24/2018	1	Crayfish, Catostomidae (*Catostomus* spp.)
11	RG 01	2/24/2018	2	Catostomidae (*Catostomus* spp.)
12	RG 01	2/24/2018	3	Crayfish and Fish
13	RG 01	2/24/2018	4	Crayfish
14	RG 01	3/5/2018	1	Crayfish
15	RG 01	3/5/2018	2	Crayfish
16	RG 01	3/5/2018	3	Crayfish
17	RG 01	3/13/2018	1	Fish
18	RG 01	3/13/2018	2	Crayfish
19	RG 01	3/13/2018	3	Crayfish
20	RG 01	3/13/2018	4	Fish
21	RG 01	3/13/2018	5	Crayfish, Esocidae (*Esox lucius*), Catostomidae (*Catostomus* spp.)

	Latrine ID	Date	Sample ID	Prey Group
22	RG 01	3/13/2018	6	Crayfish
23	RG 01	3/13/2018	7	Crayfish
24	RG 01	3/13/2018	8	Crayfish
25	RG 01	3/13/2018	9	Crayfish
26	RG 01	3/13/2018	10	Crayfish and Fish
27	RG 01	3/13/2018	12	Crayfish
28	RG 01	3/21/2018	1	Crayfish
29	RG 01	3/21/2018	2	Crayfish
30	RG 01	3/21/2018	3	Crayfish
31	RG 01	3/21/2018	4	Crayfish
32	RG 01	3/21/2018	5	Crayfish
33	RG 01	3/21/2018	6	Crayfish
34	RG 01	3/21/2018	7	Crayfish
35	RG 01	3/21/2018	8	Crayfish
36	RG 01	3/23/2018	12	Crayfish
37	RG 01	3/23/2018	13	Crayfish
38	RG 01	3/23/2018	14	Crayfish
39	RG 01	3/23/2018	15	Crayfish
40	RG 01	3/23/2018	16	Crayfish and Fish
41	RG 01	3/23/2018	17	Crayfish
42	RG 01	3/23/2018	18	Crayfish
43	RG 01	3/23/2018	19	Crayfish
44	RG 01	3/23/2018	20	Crayfish
45	RG 01	3/31/2018	1	Crayfish
46	RG 01	3/31/2018	2	Crayfish and Fish
47	RG 01	3/31/2018	3	Crayfish
48	RG 01	3/31/2018	4	Crayfish, Catostomidae (*Catostomus* spp.)

	Latrine ID	Date	Sample ID	Prey Group
49	RG 01	3/31/2018	5	Crayfish
50	RG 01	3/31/2018	6	Fish
51	RG 01	3/31/2018	7	Crayfish
52	RG 01	3/31/2018	8	Crayfish
53	RG 01	3/31/2018	9	Crayfish
54	RG 01	3/31/2018	10	Crayfish
55	RG 01	3/31/2018	11	Crayfish
56	RG 01	4/10/2018	1	Crayfish
57	RG 01	4/10/2018	2	Cyprinidae
58	RG 01	4/10/2018	3	Crayfish
59	RG 01	4/10/2018	4	Crayfish
60	RG 01	4/10/2018	5	Fish
61	RG 01	4/10/2018	6	Crayfish, Fish, Aves
62	RG 01	4/10/2018	7	Crayfish
63	RG 01	4/10/2018	8	Crayfish, Asiatic clam (*Corbicula fluminea*)
64	RG 01	4/10/2018	9	Crayfish
65	RG 01	4/10/2018	10	Crayfish
66	RG 01	4/10/2018	11	Crayfish, Catostomidae (*Catostomus* spp.)
67	RG 01	4/10/2018	12	Crayfish
68	RG 01	4/10/2018	13	Crayfish
69	RG 01	9/27/2018	1	Catostomidae (*Catostomus* spp.)
70	RG 01	9/27/2018	2	Crayfish
71	RG 01	9/27/2018	3	Crayfish
72	RG 01	9/27/2018	4	Crayfish
73	RG 01	9/27/2018	5	Crayfish
74	RG 01	9/27/2018	6	Crayfish
75	RG 02	2/13/2018	1	Crayfish and Catostomidae (*Catostomus* spp.)

	Latrine ID	Date	Sample ID	Prey Group
76	RG 02	2/13/2018	2	Catostomidae (*Catostomus* spp.)
77	RG 02	2/13/2018	3	Catostomidae (*Catostomus* spp.)
78	RG 02	2/19/2018	1	Esocidae (*Esox lucius*)
79	RG 02	2/24/2018	2	Fish
80	RG 02	2/24/2018	3	Crayfish, Esocidae (*Esox lucius*), Catostomidae (*Catostomus* spp.)
81	RG 02	3/5/2018	1	Crayfish and Catostomidae (*Catostomus* spp.)
82	RG 02	3/5/2018	2	Catostomidae (*Catostomus* spp.)
83	RG 02	3/31/2018	1	Crayfish
84	RG 02	3/31/2018	2	Crayfish
85	RG 02	3/31/2018	3	Crayfish
86	RG 02	3/31/2018	4	Crayfish
87	RG 02	3/31/2018	5	Crayfish
88	RG 02	3/31/2018	6	Crayfish
89	RG 02	3/31/2018	7	Crayfish
90	RG 02	3/31/2018	8	Crayfish
91	RG 02	3/31/2018	10	Crayfish
92	RG 02	3/31/2018	11	Crayfish
93	RG 02	3/31/2018	12	Crayfish
94	RG 02	3/31/2018	13	Crayfish
95	RG 02	3/31/2018	14	Esocidae (*Esox lucius*)
96	RG 02	3/31/2018	15	Crayfish
97	RG 02	3/31/2018	16	Crayfish
98	RG 02	3/31/2018	17	Crayfish
99	RG 02	3/31/2018	18	Crayfish
100	RG 02	3/31/2018	19	Crayfish
101	RG 02	3/31/2018	20	Crayfish
102	RG 02	4/9/2018	2	Crayfish

	Latrine ID	Date	Sample ID	Prey Group
103	RG 02	4/10/2018	1	Crayfish
104	RG 02	4/10/2018	2	Crayfish
105	RG 02	4/10/2018	3	Crayfish
106	RG 02	4/10/2018	4	Crayfish
107	RG 02	4/10/2018	5	Crayfish
108	RG 02	4/10/2018	6	Crayfish
109	RG 02	4/10/2018	7	Catostomidae (*Catostomus* spp.)
110	RG 02	4/10/2018	8	Crayfish
111	RG 02	4/10/2018	9	Crayfish
112	RG 02	4/10/2018	10	Crayfish
113	RG 02	4/10/2018	11	Crayfish
114	RG 02	4/10/2018	12	Crayfish
115	RG 02	4/10/2018	13	Catostomidae (*Catostomus* spp.)
116	RG 02	4/10/2018	14	Crayfish
117	RG 02	4/10/2018	15	Crayfish
118	RG 02	4/10/2018	16	Crayfish
119	RG 02	4/10/2018	17	Crayfish
120	RG 02	4/10/2018	18	Crayfish
121	RG 02	4/10/2018	19	Crayfish
122	RG 02	4/18/2018	3	Esocidae (*Esox lucius*), Cyprinidae, Catostomidae (*Catostomus* spp.)
123	RG 02	9/26/2018	2	Crayfish
124	RG 02	9/26/2018	3	Crayfish and Catostomidae (*Catostomus* spp.)
125	RG 02	9/27/2018	1	Crayfish
126	RG 02	9/27/2018	1	Crayfish
127	RG 02	9/27/2018	2	Crayfish
128	RG 02	9/27/2018	3	Crayfish
129	RG 02	9/27/2018	4	Crayfish

	Latrine ID	Date	Sample ID	Prey Group
130	RG 02	12/19/2018	1	Crayfish
131	RG 02	12/19/2018	2	Crayfish
132	RG 02	12/19/2018	3	Crayfish
133	RG 03	2/2/2018	1	Salmonidae and Catostomidae (*Catostomus* spp.)
134	RG 03	2/2/2018	2	Esocidae (*Esox lucius*)
135	RG 03	2/2/2018	3	Crayfish and Fish
136	RG 03	2/2/2018	4	Catostomidae (*Catostomus* spp.)
137	RG 03	2/2/2018	5	Esocidae (*Esox lucius*) and Catostomidae (*Catostomus* spp.)
138	RG 03	2/2/2018	6	Catostomidae (*Catostomus* spp.)
139	RG 03	2/13/2018	1	Esocidae (*Esox lucius*) and Catostomidae (*Catostomus* spp.)
140	RG 03	2/13/2018	2	Catostomidae (*Catostomus* spp.)
141	RG 03	2/13/2018	3	Catostomidae (*Catostomus* spp.)
142	RG 03	2/24/2018	1	Esocidae (*Esox lucius*)
143	RG 03	2/24/2018	2	Crayfish and Esocidae (*Esox lucius*)
144	RG 03	2/24/2018	3	Esocidae (*Esox lucius*)
145	RG 03	2/24/2018	4	Catostomidae (*Catostomus* spp.)
146	RG 03	2/24/2018	5	Esocidae (*Esox lucius*), Cyprinidae, Catostomidae (*Catostomus* spp.)
147	RG 03	2/24/2018	6	Crayfish
148	RG 03	2/24/2018	7	Salmonidae, Esocidae (*Esox lucius*)
149	RG 03	2/24/2018	8	Salmonidae and Cyprinidae
150	RG 03	3/4/2018	1	Crayfish
151	RG 03	3/4/2018	3	Crayfish
152	RG 03	3/4/2018	4	Crayfish
153	RG 03	3/14/2018	1	Crayfish
154	RG 03	3/14/2018	2	Crayfish
155	RG 03	3/14/2018	5	Crayfish and Fish
156	RG 03	3/14/2018	6	Crayfish

	Latrine ID	Date	Sample ID	Prey Group
157	RG 03	3/14/2018	7	Crayfish
158	RG 03	3/14/2018	8	Crayfish
159	RG 03	3/14/2018	9	Crayfish
160	RG 03	3/14/2018	10	Crayfish
161	RG 03	3/14/2018	11	Crayfish
162	RG 03	3/14/2018	12	Crayfish
163	RG 03	3/14/2018	13	Salmonidae
164	RG 03	3/14/2018	14	Crayfish
165	RG 03	3/14/2018	15	Crayfish and Fish
166	RG 03	3/14/2018	16	Fish
167	RG 03	3/14/2018	17	Crayfish
168	RG 03	3/14/2018	18	Crayfish
169	RG 03	3/14/2018	19	Crayfish
170	RG 03	3/14/2018	20	Crayfish
171	RG 03	3/14/2018	21	Crayfish
172	RG 03	3/14/2018	22	Crayfish
173	RG 03	3/23/2018	1	Crayfish and Catostomidae (*Catostomus* spp.)
174	RG 03	3/23/2018	3	Crayfish
175	RG 03	3/23/2018	4	Crayfish
176	RG 03	3/23/2018	6	Crayfish
177	RG 03	4/2/2018	1	Crayfish
178	RG 03	4/2/2018	2	Crayfish, Salmonidae, and Esocidae (*Esox lucius*)
179	RG 03	4/2/2018	3	Crayfish
180	RG 03	4/2/2018	4	Crayfish
181	RG 03	4/2/2018	5	Crayfish
182	RG 03	4/2/2018	6	Centrarchidae
183	RG 03	4/2/2018	7	Salmonidae and Esocidae (*Esox lucius*)

	Latrine ID	Date	Sample ID	Prey Group
184	RG 03	4/2/2018	8	Crayfish, Asiatic clam (*Corbicula fluminea*)
185	RG 03	4/2/2018	9	Crayfish
186	RG 03	4/2/2018	10	Crayfish, Asiatic clam (*Corbicula fluminea*)
187	RG 03	4/11/2018	1	Crayfish
188	RG 03	4/11/2018	2	Crayfish
189	RG 03	4/11/2018	3	Crayfish
190	RG 03	4/11/2018	4	Crayfish
191	RG 03	4/11/2018	5	Crayfish
192	RG 03	9/26/2018	1	Crayfish
193	RG 03	9/26/2018	4	Crayfish
194	RG 03	12/19/2018	1	Crayfish
195	RG 03	12/19/2018	2	Crayfish
196	RG 03	12/19/2018	3	Catostomidae (*Catostomus* spp.)
197	RG 03	12/19/2018	4	Crayfish, Esocidae (*Esox lucius*), Catostomidae (*Catostomus* spp.)
198	RG 03	12/19/2018	5	Crayfish
199	RG 04	2/2/2018	1	Crayfish, Esocidae (*Esox lucius*), Catostomidae (*Catostomus* spp.)
200	RG 04	2/2/2018	2	Catostomidae (*Catostomus* spp.)
201	RG 04	2/2/2018	3	Crayfish, Esocidae (*Esox lucius*), Catostomidae (*Catostomus* spp.)
202	RG 04	2/2/2018	4	Crayfish and Catostomidae (*Catostomus* spp.)
203	RG 04	2/13/2018	1	Catostomidae (*Catostomus* spp.)
204	RG 04	2/13/2018	2	Catostomidae (*Catostomus* spp.)
205	RG 04	2/13/2018	3	Esocidae (*Esox lucius*) and Catostomidae (*Catostomus* spp.)
206	RG 04	2/13/2018	4	Catostomidae (*Catostomus* spp.)
207	RG 04	2/26/2018	1	Crayfish and Catostomidae (*Catostomus* spp.)
208	RG 04	2/26/2018	2	Crayfish and Catostomidae (*Catostomus* spp.)
209	RG 04	2/26/2018	3	Crayfish and Esocidae (*Esox lucius*)
210	RG 04	2/26/2018	4	Crayfish and Esocidae (*Esox lucius*)

	Latrine ID	Date	Sample ID	Prey Group
211	RG 04	2/26/2018	5	Crayfish, Salmonidae, and Catostomidae (*Catostomus* spp.)
212	RG 04	2/26/2018	6	Crayfish and Fish
213	RG 04	3/14/2018	1	Crayfish
214	RG 04	3/14/2018	2	Crayfish
215	RG 04	3/14/2018	3	Crayfish and Catostomidae (*Catostomus* spp.)
216	RG 04	3/14/2018	4	Crayfish and Catostomidae (*Catostomus* spp.)
217	RG 04	3/14/2018	5	Crayfish and Catostomidae (*Catostomus* spp.)
218	RG 04	3/23/2018	1	Crayfish
219	RG 04	3/23/2018	2	Catostomidae (*Catostomus* spp.)
220	RG 04	3/23/2018	3	Crayfish and Catostomidae (*Catostomus* spp.)
221	RG 04	3/23/2018	4	Crayfish and Fish
222	RG 04	3/23/2018	5	Crayfish
223	RG 04	3/23/2018	6	Crayfish
224	RG 04	3/23/2018	7	Crayfish and Fish
225	RG 04	3/23/2018	8	Crayfish and Catostomidae (*Catostomus* spp.)
226	RG 04	3/23/2018	9	Crayfish
227	RG 04	4/2/2018	1	Crayfish
228	RG 04	4/2/2018	2	Crayfish and Catostomidae (*Catostomus* spp.)
229	RG 04	4/2/2018	3	Crayfish and Catostomidae (*Catostomus* spp.)
230	RG 04	4/2/2018	4	Crayfish and Fish
231	RG 04	4/2/2018	5	Crayfish, Esocidae (*Esox lucius*), Catostomidae (*Catostomus* spp.)
232	RG 04	4/2/2018	6	Crayfish
233	RG 04	4/2/2018	7	Crayfish and Catostomidae (*Catostomus* spp.)
234	RG 04	4/11/2018	2	Crayfish, Cyprinidae, and Catostomidae (*Catostomus* spp.)
235	RG 04	4/11/2018	3	Crayfish and Catostomidae (*Catostomus* spp.)
236	RG 04	4/11/2018	6	Crayfish and Asiatic clam (*Corbicula fluminea*)
237	RG 04	9/26/2018	1	Crayfish

	Latrine ID	Date	Sample ID	Prey Group
238	RG 04	9/26/2018	2	Crayfish
239	RG 04	9/26/2018	3	Crayfish and Catostomidae (*Catostomus* spp.)
240	RG 04	9/26/2018	4	Crayfish
241	RG 04	9/26/2018	5	Crayfish and Fish
242	RG 04	9/26/2018	6	Crayfish and Catostomidae (*Catostomus* spp.)
243	RG 04	9/26/2018	7	Crayfish
244	RG 04	9/26/2018	8	Crayfish and Catostomidae (*Catostomus* spp.)
245	RG 04	9/26/2018	9	Crayfish
246	RG 04	12/19/2018	1	Crayfish, Esocidae (*Esox lucius*), and Cyprinidae
247	RG 04	12/19/2018	2	Crayfish and Fish
248	RG 04	12/19/2018	3	Crayfish and Catostomidae (*Catostomus* spp.)
249	RG 04	12/19/2018	4	Crayfish
250	RG 05	2/13/2018	1	Catostomidae (*Catostomus* spp.)
251	RG 05	2/13/2018	2	Crayfish and Catostomidae (*Catostomus* spp.)
252	RG 05	2/13/2018	3	Crayfish and Catostomidae (*Catostomus* spp.)
253	RG 05	2/13/2018	4	Crayfish and Catostomidae (*Catostomus* spp.)
254	RG 05	2/13/2018	5	Crayfish, Salmonidae, and Catostomidae (*Catostomus* spp.)
255	RG 05	2/13/2018	6	Crayfish and Catostomidae (*Catostomus* spp.)
256	RG 05	2/13/2018	7	Catostomidae (*Catostomus* spp.)
257	RG 05	2/13/2018	8	Crayfish and Esocidae (*Esox lucius*)
258	RG 05	2/13/2018	9	Crayfish, Centrarchidae, and Catostomidae (*Catostomus* spp.)
259	RG 05	2/14/2018	1	Crayfish and Esocidae (*Esox lucius*)
260	RG 05	2/14/2018	2	Crayfish
261	RG 05	2/14/2018	3	Crayfish
262	RG 05	2/14/2018	4	Crayfish and Catostomidae (*Catostomus* spp.)
263	RG 05	2/14/2018	5	Crayfish and Fish
264	RG 05	2/26/2018	1	Crayfish and Fish

	Latrine ID	Date	Sample ID	Prey Group
265	RG 05	2/26/2018	2	Crayfish, Salmonidae, Esocidae (*Esox lucius*), and Catostomidae (*Catostomus* spp.)
266	RG 05	2/26/2018	3	Crayfish and Fish
267	RG 05	2/26/2018	4	Crayfish and Catostomidae (*Catostomus* spp.)
268	RG 05	2/26/2018	5	Crayfish and Catostomidae (*Catostomus* spp.)
269	RG 05	2/26/2018	6	Fish
270	RG 05	3/7/2018	1	Crayfish, Cyprinidae
271	RG 05	3/7/2018	2	Crayfish
272	RG 05	3/7/2018	3	Crayfish
273	RG 05	3/7/2018	4	Crayfish
274	RG 05	3/7/2018	6	Cyprinidae
275	RG 05	3/7/2018	7	Crayfish and Catostomidae (*Catostomus* spp.)
276	RG 05	3/7/2018	8	Crayfish and Catostomidae (*Catostomus* spp.)
277	RG 05	3/7/2018	9	Catostomidae (*Catostomus* spp.)
278	RG 05	3/7/2018	10	Crayfish
279	RG 05	3/7/2018	11	Crayfish
280	RG 05	3/7/2018	12	Crayfish
281	RG 05	3/15/2018	1	Crayfish and Fish
282	RG 05	3/15/2018	2	Crayfish and Catostomidae (*Catostomus* spp.)
283	RG 05	3/15/2018	3	Catostomidae (*Catostomus* spp.)
284	RG 05	3/24/2018	1	Crayfish
285	RG 05	3/24/2018	2	Crayfish, Esocidae (*Esox lucius*), and Catostomidae (*Catostomus* spp.)
286	RG 05	3/24/2018	3	Crayfish and Fish
287	RG 05	3/24/2018	4	Crayfish and Fish
288	RG 05	3/24/2018	5	Crayfish
289	RG 05	3/24/2018	6	Crayfish
290	RG 05	3/24/2018	7	Crayfish

	Latrine ID	Date	Sample ID	Prey Group
291	RG 05	4/3/2018	1	Crayfish and Fish
292	RG 05	4/3/2018	2	Crayfish
293	RG 05	4/3/2018	3	Crayfish and Fish
294	RG 05	4/3/2018	4	Crayfish and Fish
295	RG 05	4/3/2018	7	Crayfish, Esocidae (*Esox lucius*), and Cyprinidae
296	RG 05	4/3/2018	8	Crayfish
297	RG 05	4/3/2018	9	Crayfish and Asiatic clam (*Corbicula fluminea*)
298	RG 05	4/3/2018	10	Crayfish and Esocidae (*Esox lucius*)
299	RG 05	4/3/2018	11	Crayfish
300	RG 05	4/3/2018	12	Crayfish and Cyprinidae
301	RG 05	4/3/2018	13	Crayfish and Catostomidae (*Catostomus* spp.)
302	RG 05	4/3/2018	14	Crayfish
303	RG 05	4/12/2018	1	Crayfish and Fish
304	RG 05	4/12/2018	2	Crayfish and Fish
305	RG 05	4/12/2018	4	Catostomidae (*Catostomus* spp.)
306	RG 05	4/12/2018	5	Crayfish and Catostomidae (*Catostomus* spp.)
307	RG 05	4/12/2018	6	Crayfish and Fish
308	RG 05	4/12/2018	7	Crayfish
309	RG 05	6/20/2018	1	Crayfish
310	RG 05	6/20/2018	2	Crayfish
311	RG 05	6/20/2018	3	Crayfish
312	RG 05	6/20/2018	4	Crayfish
313	RG 05	6/20/2018	5	Crayfish
314	RG 05	6/20/2018	6	Crayfish
315	RG 05	6/20/2018	7	Crayfish
316	RG 05	6/20/2018	8	Crayfish and Rodentia
317	RG 05	6/20/2018	9	Crayfish and Cyprinidae

	Latrine ID	Date	Sample ID	Prey Group
318	RG 05	6/20/2018	10	Crayfish
319	RG 05	6/20/2018	11	Crayfish
320	RG 05	6/20/2018	12	Crayfish
321	RG 05	6/20/2018	13	Crayfish
322	RG 05	6/20/2018	14	Crayfish and Squamata
323	RG 05	6/20/2018	15	Crayfish
324	RG 05	6/20/2018	16	Crayfish
325	RG 05	6/20/2018	17	Crayfish
326	RG 05	6/20/2018	18	Crayfish
327	RG 05	6/20/2018	19	Crayfish
328	RG 05	6/20/2018	20	Crayfish
329	RG 05	6/20/2018	21	Crayfish
330	RG 05	6/20/2018	22	Crayfish and Fish
331	RG 05	6/20/2018	23	Crayfish
332	RG 05	6/20/2018	24	Crayfish
333	RG 05	6/20/2018	25	Crayfish
334	RG 05	6/20/2018	26	Crayfish
335	RG 05	6/20/2018	27	Crayfish and Fish
336	RG 05	6/20/2018	28	Crayfish
337	RG 05	6/20/2018	29	Crayfish
338	RG 05	6/20/2018	30	Crayfish
339	RG 05	6/20/2018	31	Crayfish
340	RG 05	6/20/2018	32	Crayfish
341	RG 05	6/20/2018	33	Crayfish
342	RG 05	6/20/2018	34	Crayfish and Fish
343	RG 05	6/20/2018	35	Crayfish
344	RG 05	6/20/2018	36	Crayfish

	Latrine ID	Date	Sample ID	Prey Group
345	RG 05	6/20/2018	37	Crayfish
346	RG 05	6/20/2018	38	Crayfish and Cyprinidae
347	RG 05	6/20/2018	39	Crayfish
348	RG 05	6/20/2018	40	Crayfish
349	RG 05	12/20/2018	1	Cyprinidae
350	RG 05	12/20/2018	2	Salmonidae and Catostomidae (*Catostomus* spp.)
351	RG 05	12/20/2018	3	Salmonidae, Cyprinidae, and Catostomidae (*Catostomus* spp.)
352	RG 05	12/20/2018	4	Crayfish, Esocidae (*Esox lucius*), and Catostomidae (*Catostomus* spp.)
353	RG 05	12/20/2018	5	Crayfish and Fish
354	RG 05	12/20/2018	6	Crayfish, Esocidae (*Esox lucius*), and Catostomidae (*Catostomus* spp.)
355	RG 05	12/20/2018	7	Cyprinidae
356	RG 06	2/3/2018	1	Cyprinidae and Catostomidae (*Catostomus* spp.)
357	RG 06	2/3/2018	2	Esocidae (*Esox lucius*) and Catostomidae (*Catostomus* spp.)
358	RG 06	2/3/2018	3	Catostomidae (*Catostomus* spp.)
359	RG 06	2/3/2018	4	Crayfish and Catostomidae (*Catostomus* spp.)
360	RG 06	2/3/2018	5	Catostomidae (*Catostomus* spp.)
361	RG 06	2/3/2018	6	Esocidae (*Esox lucius*), Cyprinidae, Catostomidae (*Catostomus* spp.)
362	RG 06	2/3/2018	7	Crayfish, Salmonidae
363	RG 06	2/3/2018	8	Catostomidae (*Catostomus* spp.)
364	RG 06	2/14/2018	1	Crayfish and Catostomidae (*Catostomus* spp.)
365	RG 06	2/14/2018	2	Crayfish and Catostomidae (*Catostomus* spp.)
366	RG 06	2/14/2018	3	Crayfish, Esocidae (*Esox lucius*), and Catostomidae (*Catostomus* spp.)
367	RG 06	2/14/2018	4	Crayfish, Esocidae (*Esox lucius*), and Catostomidae (*Catostomus* spp.)
368	RG 06	2/14/2018	5	Fish
369	RG 06	2/26/2018	1	Crayfish and Catostomidae (*Catostomus* spp.)
370	RG 06	2/26/2018	2	Fish
371	RG 06	3/6/2018	1	Cyprinidae

	Latrine ID	Date	Sample ID	Prey Group
372	RG 06	3/6/2018	2	Crayfish
373	RG 06	3/15/2018	1	Crayfish and Fish
374	RG 06	3/15/2018	2	Crayfish and Cat
375	RG 06	3/15/2018	3	Crayfish
376	RG 06	3/15/2018	4	Crayfish and Fish
377	RG 06	3/24/2018	1	Crayfish
378	RG 06	3/24/2018	2	Crayfish
379	RG 06	3/24/2018	3	Crayfish, Cyprinidae, and Asiatic clam (*Corbicula fluminea*)
380	RG 06	3/24/2018	4	Crayfish and Cyprinidae
381	RG 06	3/24/2018	5	Crayfish
382	RG 06	3/24/2018	6	Crayfish and Salmonidae
383	RG 06	3/24/2018	7	Crayfish and Cyprinidae
384	RG 06	3/24/2018	8	Fish
385	RG 06	4/3/2018	1	Salmonidae and Catostomidae (*Catostomus* spp.)
386	RG 06	4/3/2018	2	Crayfish
387	RG 06	4/11/2018	1	Crayfish
388	RG 06	4/12/2018	1	Crayfish
389	RG 06	4/12/2018	2	Crayfish, Salmonidae, and Cyprinidae
390	RG 06	4/12/2018	3	Crayfish
391	RG 06	4/12/2018	4	Crayfish and Asiatic clam (*Corbicula fluminea*)
392	RG 06	4/12/2018	5	Crayfish
393	RG 06	9/27/2018	1	Crayfish
394	RG 06	9/27/2018	2	Crayfish
395	RG 06	9/27/2018	3	Crayfish
396	RG 06	9/27/2018	4	Crayfish
397	RG 06	9/27/2018	5	Crayfish, Cyprinidae
398	RG 06	9/27/2018	6	Crayfish and Fish

	Latrine ID	Date	Sample ID	Prey Group
399	RG 06	9/27/2018	7	Crayfish
400	RG 06	9/27/2018	8	Fish
401	RG 06	12/20/2018	1	Cyprinidae and Catostomidae (*Catostomus* spp.)
402	RG 06	12/20/2018	2	Crayfish, Salmonidae, Esocidae (*Esox lucius*), and Cyprinidae
403	RG 06	12/20/2018	3	Crayfish, Salmonidae, Catostomidae (*Catostomus* spp.)
404	RG 06	12/20/2018	4	Esocidae (*Esox lucius*), Catostomidae (*Catostomus* spp.)
405	RG 07	2/16/2018	1	Crayfish, Salmonidae
406	RG 07	2/16/2018	2	Crayfish and Salmonidae
407	RG 07	2/16/2018	3	Crayfish
408	RG 07	2/27/2018	1	Crayfish and Salmonidae
409	RG 07	2/27/2018	2	Crayfish and Fish
410	RG 07	3/6/2018	1	Crayfish and Salmonidae
411	RG 07	3/6/2018	2	Salmonidae
412	RG 07	3/16/2018	1	Crayfish and Salmonidae
413	RG 07	3/16/2018	2	Crayfish, Salmonidae, Esocidae (*Esox lucius*), and Catostomidae (*Catostomus* spp.)
414	RG 07	3/16/2018	3	Crayfish
415	RG 08	2/16/2018	1	Salmonidae and Esocidae (*Esox lucius*)
416	RG 08	2/16/2018	2	Crayfish and Fish
417	RG 08	2/16/2018	3	Crayfish and Salmonidae
418	RG 08	2/16/2018	4	Salmonidae
419	RG 08	2/27/2018	1	Salmonidae
420	RG 08	2/27/2018	2	Salmonidae
421	RG 08	3/9/2018	1	Salmonidae and Catostomidae (*Catostomus* spp.)
422	RG 08	3/9/2018	2	Crayfish and Esocidae (*Esox lucius*)
423	RG 08	3/9/2018	4	Crayfish and Catostomidae (*Catostomus* spp.)
424	RG 08	3/9/2018	5	Crayfish, Fish, and Asiatic clam (*Corbicula fluminea*)

	Latrine ID	Date	Sample ID	Prey Group
425	RG 08	3/9/2018	6	Crayfish
426	RG 08	3/16/2018	1	Crayfish
427	RG 08	3/16/2018	2	Crayfish
428	RG 08	3/16/2018	3	Catostomidae (*Catostomus* spp.)
429	RG 08	3/16/2018	4	Crayfish and Salmonidae
430	RG 08	3/16/2018	5	Crayfish and Salmonidae
431	RG 08	3/16/2018	6	Crayfish and Salmonidae
432	RG 08	3/26/2018	1	Crayfish and Salmonidae
433	RG 08	3/26/2018	2	Crayfish and Cyprinidae
434	RG 08	3/26/2018	3	Salmonidae
435	RG 08	3/26/2018	4	Crayfish
436	RG 08	4/6/2018	1	Crayfish and Fish
437	RG 08	4/6/2018	2	Fish
438	RG 08	4/6/2018	3	Crayfish and Catostomidae (*Catostomus* spp.)
439	RG 08	4/6/2018	4	Crayfish and Esocidae (*Esox lucius*)
440	RG 08	4/17/2018	1	Fish
441	RG 08	4/17/2018	2	Crayfish
442	RG 08	4/17/2018	3	Fish
443	RG 08	4/17/2018	4	Crayfish and Catostomidae (*Catostomus* spp.)
444	RG 08	4/17/2018	5	Crayfish
445	RG 08	4/17/2018	6	Crayfish and Catostomidae (*Catostomus* spp.)
446	RG 08	4/17/2018	7	Crayfish
447	RG 09	2/5/2018	1	Crayfish and Catostomidae (*Catostomus* spp.)
448	RG 09	2/5/2018	2	Salmonidae
449	RG 09	2/5/2018	3	Crayfish, Centrarchidae, and Catostomidae (*Catostomus* spp.)
450	RG 09	2/5/2018	4	Crayfish, Catostomidae (*Catostomus* spp.), and Aves
451	RG 09	2/5/2018	5	Fish

	Latrine ID	Date	Sample ID	Prey Group
452	RG 09	2/5/2018	6	Crayfish, Salmonidae, and Catostomidae (*Catostomus* spp.)
453	RG 09	2/5/2018	7	Crayfish and Salmonidae
454	RG 09	2/5/2018	8	Salmonidae and Catostomidae (*Catostomus* spp.)
455	RG 09	2/5/2018	9	Crayfish, Salmonidae, and Catostomidae (*Catostomus* spp.)
456	RG 09	2/15/2018	1	Fish
457	RG 09	2/15/2018	2	Crayfish and Fish
458	RG 09	2/15/2018	3	Crayfish and Catostomidae (*Catostomus* spp.)
459	RG 09	2/15/2018	4	Crayfish and Salmonidae
460	RG 09	2/15/2018	5	Crayfish and Salmonidae
461	RG 09	2/15/2018	6	Crayfish and Salmonidae
462	RG 09	2/15/2018	7	Crayfish
463	RG 09	2/15/2018	8	Esocidae (*Esox lucius*)
464	RG 09	2/15/2018	9	Crayfish and Fish
465	RG 09	2/28/2018	1	Crayfish and Salmonidae
466	RG 09	2/28/2018	2	Crayfish and Salmonidae
467	RG 09	2/28/2018	3	Catostomidae (*Catostomus* spp.)
468	RG 09	3/9/2018	1	Crayfish and Fish
469	RG 09	3/9/2018	2	Crayfish and Salmonidae
470	RG 09	3/9/2018	3	Crayfish, Salmonidae, Catostomidae (*Catostomus* spp.)
471	RG 09	3/19/2018	2	Crayfish and Fish
472	RG 09	3/19/2018	3	Crayfish and Fish
473	RG 09	3/19/2018	4	Crayfish
474	RG 09	3/19/2018	5	Crayfish and Salmonidae
475	RG 09	3/19/2018	6	Crayfish
476	RG 09	3/27/2018	1	Cyprinidae
477	RG 09	3/27/2018	2	Crayfish
478	RG 09	3/27/2018	3	Salmonidae

	Latrine ID	Date	Sample ID	Prey Group
479	RG 09	3/27/2018	4	Salmonidae and Esocidae (*Esox lucius*)
480	RG 09	4/7/2018	1	Crayfish
481	RG 09	4/7/2018	2	Crayfish and Fish
482	RG 09	4/7/2018	3	Crayfish
483	RG 09	4/7/2018	4	Crayfish, Salmonidae, and Esocidae (*Esox lucius*)
484	RG 09	4/7/2018	5	Crayfish
485	RG 09	4/7/2018	6	Crayfish
486	RG 09	4/16/2018	1	Catostomidae (*Catostomus* spp.)
487	RG 09	4/16/2018	2	Salmonidae and Esocidae (*Esox lucius*)
488	RG 09	12/18/2018	1	Crayfish
489	RG 09	12/18/2018	2	Crayfish
490	RG 10	2/6/2018	1	Crayfish and Catostomidae (*Catostomus* spp.)
491	RG 10	2/6/2018	2	Crayfish
492	RG 10	2/6/2018	3	Catostomidae (*Catostomus* spp.)
493	RG 10	2/6/2018	4	Crayfish and Catostomidae (*Catostomus* spp.)
494	RG 10	2/15/2018	1	Crayfish, Salmonidae, and Catostomidae (*Catostomus* spp.)
495	RG 10	2/15/2018	2	Centrarchidae and Catostomidae (*Catostomus* spp.)
496	RG 10	2/15/2018	3	Crayfish, Esocidae (*Esox lucius*), and Catostomidae (*Catostomus* spp.)
497	RG 10	2/15/2018	4	Crayfish, Salmonidae, and Catostomidae (*Catostomus* spp.)
498	RG 10	2/15/2018	6	Catostomidae (*Catostomus* spp.)
499	RG 10	2/15/2018	9	Catostomidae (*Catostomus* spp.)
500	RG 10	2/28/2018	1	Crayfish
501	RG 10	2/28/2018	2	Salmonidae and Catostomidae (*Catostomus* spp.)
502	RG 10	2/28/2018	3	Fish
503	RG 10	3/9/2018	1	Salmonidae
504	RG 10	3/9/2018	1	Crayfish
505	RG 10	3/9/2018	2	Salmonidae

	Latrine ID	Date	Sample ID	Prey Group
506	RG 10	3/9/2018	2	Crayfish
507	RG 10	3/9/2018	3	Crayfish
508	RG 10	3/9/2018	4	Crayfish
509	RG 10	3/27/2018	1	Crayfish
510	RG 10	3/27/2018	2	Crayfish
511	RG 10	3/27/2018	3	Crayfish and Salmonidae
512	RG 10	3/27/2018	4	Crayfish and Fish
513	RG 10	4/7/2018	1	Esocidae (*Esox lucius*) and Catostomidae (*Catostomus* spp.)
514	RG 10	4/7/2018	2	Crayfish
515	RG 11	2/15/2018	1	Salmonidae
516	RG 11	2/15/2018	2	Crayfish and Salmonidae
517	RG 11	2/15/2018	3	Crayfish and Salmonidae
518	RG 11	2/15/2018	4	Fish
519	RG 11	2/15/2018	5	Salmonidae and Esocidae (*Esox lucius*)
520	RG 11	2/15/2018	5	Fish
521	RG 11	2/15/2018	7	Salmonidae and Esocidae (*Esox lucius*)
522	RG 11	3/12/2018	1	Fish
523	RG 11	3/20/2018	1	Fish
524	RG 11	3/28/2018	1	Cyprinidae
525	RG 11	3/28/2018	2	Fish
526	RG 11	3/28/2018	3	Crayfish and Fish
527	RG 11	3/28/2018	4	Crayfish and Salmonidae
528	RG 11	3/28/2018	5	Cyprinidae
529	RG 11	3/28/2018	6	Salmonidae
530	RG 11	3/28/2018	7	Salmonidae
531	RG 11	3/28/2018	8	Crayfish and Fish
532	RG 11	4/8/2018	1	Crayfish and Esocidae (*Esox lucius*)

	Latrine ID	Date	Sample ID	Prey Group
533	RG 11	4/8/2018	2	Crayfish and Salmonidae
534	RG 11	4/8/2018	3	Crayfish and Fish
535	RG 11	4/8/2018	4	Fish
536	RG 11	4/8/2018	5	Fish
537	RG 11	4/8/2018	6	Fish
538	RG 11	4/19/2018	1	Fish
539	RG 11	4/19/2018	2	Crayfish and Salmonidae
540	RG 12	3/3/2018	1	Salmonidae
541	RG 12	3/3/2018	2	Crayfish, Esocidae (*Esox lucius*), and Catostomidae (*Catostomus* spp.)
542	RG 12	3/10/2018	1	Crayfish and Salmonidae
543	RG 12	3/20/2018	1	Salmonidae
544	RG 12	3/30/2018	1	Crayfish and Salmonidae
545	RG 12	4/9/2018	1	Centrarchidae
546	RG 12	4/9/2018	2	Crayfish
547	RG 12	4/9/2018	3	Crayfish
548	RG 12	6/22/2018	1	Crayfish
549	RG 12	6/22/2018	2	Crayfish
550	RG 12	6/22/2018	3	Crayfish
551	RG 12	6/22/2018	4	Crayfish
552	RG 12	6/22/2018	5	Crayfish
553	RG 12	6/22/2018	6	Crayfish
554	RG 12	6/22/2018	7	Crayfish
555	RG 12	6/22/2018	8	Crayfish
556	RG 12	6/22/2018	9	Crayfish
557	RG 12	6/22/2018	10	Crayfish
558	RG 12	6/22/2018	11	Crayfish
559	RG 12	6/22/2018	12	Crayfish

	Latrine ID	Date	Sample ID	Prey Group
560	RG 12	6/22/2018	13	Crayfish
561	RG 12	6/22/2018	14	Crayfish
562	RG 12	6/22/2018	15	Crayfish, Esocidae (*Esox lucius*), and Catostomidae (*Catostomus* spp.)
563	RG 12	6/22/2018	16	Crayfish and Salmonidae
564	RG 12	6/22/2018	17	Crayfish, Esocidae (*Esox lucius*), and Catostomidae (*Catostomus* spp.)
565	RG 12	6/22/2018	18	Crayfish
566	RG 12	6/22/2018	19	Crayfish and Catostomidae (*Catostomus* spp.)
567	RG 12	6/22/2018	20	Crayfish, Fish, Asiatic clam (*Corbicula fluminea*)
568	RG 12	6/22/2018	21	Crayfish
569	RG 12	6/22/2018	22	Crayfish, Fish, Asiatic clam (*Corbicula fluminea*)
570	RG 12	6/22/2018	23	Crayfish and Asiatic clam (*Corbicula fluminea*)
571	RG 13	2/21/2018	1	Crayfish
572	RG 13	2/21/2018	2	Crayfish
573	RG 13	3/3/2018	1	Crayfish and Centrarchidae
574	RG 13	3/3/2018	2	Crayfish, Salmonidae, and Centrarchidae
575	RG 13	3/10/2018	1	Salmonidae
576	RG 13	3/10/2018	2	Fish
577	RG 13	3/10/2018	3	Catostomidae (*Catostomus* spp.)
578	RG 13	3/10/2018	4	Crayfish and Salmonidae
579	RG 13	3/20/2018	1	Fish
580	RG 13	3/20/2018	2	Salmonidae
581	RG 13	3/20/2018	3	Salmonidae
582	RG 13	3/20/2018	4	Salmonidae
583	RG 13	3/21/2018	1	Crayfish
584	RG 13	3/21/2018	2	Crayfish
585	RG 13	3/21/2018	3	Crayfish
586	RG 13	3/21/2018	4	Crayfish and Salmonidae

	Latrine ID	Date	Sample ID	Prey Group
587	RG 13	3/21/2018	5	Crayfish
588	RG 13	3/21/2018	6	Crayfish
589	RG 13	3/21/2018	7	Crayfish
590	RG 13	3/21/2018	8	Crayfish
591	RG 13	3/30/2018	1	Catostomidae (*Catostomus* spp.)
592	RG 13	3/30/2018	2	Salmonidae and Esocidae (*Esox lucius*)
593	RG 13	3/30/2018	3	Fish
594	RG 13	4/9/2018	1	Fish
595	RG 13	4/9/2018	2	Crayfish and Centrarchidae
596	RG 13	4/9/2018	3	Crayfish and Fish
597	RG 14	3/10/2018	1	Salmonidae
598	RG 14	3/10/2018	2	Salmonidae, Cyprinidae, and Catostomidae (*Catostomus* spp.)
599	RG 14	3/28/2018	1	Salmonidae and Catostomidae (*Catostomus* spp.)
600	RG 14	3/30/2018	1	Salmonidae
601	RG 14	4/9/2018	1	Salmonidae
602	RG 14	4/9/2018	2	Crayfish and Fish
603	RG 14	4/9/2018	3	Crayfish
604	RG 14	4/9/2018	4	Crayfish
605	RG 14	6/22/2018	1	Crayfish
606	RG 14	6/22/2018	2	Crayfish
607	RG 14	6/22/2018	3	Crayfish
608	RG 14	6/22/2018	4	Crayfish
609	RG 14	9/24/2018	1	Crayfish
610	RG 14	9/24/2018	2	Crayfish
611	RG 15	2/21/2018	1	Crayfish and Fish
612	RG 15	2/21/2018	2	Crayfish and Cyprinidae
613	RG 15	2/21/2018	3	Fish

	Latrine ID	Date	Sample ID	Prey Group
614	RG 15	2/21/2018	4	Salmonidae
615	RG 15	2/21/2018	5	Cyprinidae (*Cyprinus carpio*)
616	RG 15	2/21/2018	6	Salmonidae and Catostomidae (*Catostomus* spp.)
617	RG 15	2/21/2018	7	Fish
618	RG 15	2/21/2018	8	Fish
619	RG 15	3/10/2018	1	Salmonidae
620	RG 15	3/10/2018	2	Cyprinidae
621	RG 15	3/10/2018	3	Esocidae (*Esox lucius*)
622	RG 15	3/10/2018	4	Esocidae (*Esox lucius*)
623	RG 15	3/20/2018	1	Crayfish and Cyprinidae
624	RG 15	3/20/2018	2	Crayfish and Salmonidae
625	RG 15	4/9/2018	1	Crayfish and Salmonidae
626	RG 15	4/9/2018	2	Crayfish and Fish
627	RG 15	4/9/2018	3	Crayfish and Fish
628	RG 15	4/19/2018	1	Crayfish
629	RG 15	4/19/2018	2	Crayfish and Salmonidae
630	RG 15	4/19/2018	3	Crayfish and Salmonidae
631	RG 15	4/19/2018	4	Crayfish and Centrarchidae
632	RG 15	4/19/2018	5	Salmonidae
633	RG 15	6/22/2018	1	Crayfish
634	RG 15	6/22/2018	1	Crayfish
635	RG 15	6/22/2018	2	Crayfish
636	RG 15	6/22/2018	3	Crayfish
637	RG 15	6/22/2018	4	Crayfish
638	RG 15	6/22/2018	5	Crayfish
639	RG 15	6/22/2018	6	Crayfish
640	RG 15	6/22/2018	7	Crayfish

	Latrine ID	Date	Sample ID	Prey Group
641	RG 15	6/22/2018	8	Crayfish
642	RG 15	6/22/2018	9	Crayfish
643	RG 15	9/24/2018	1	Crayfish
644	RG 15	12/20/2018	1	Crayfish
645	RG 15	12/20/2018	2	Crayfish, Centrarchidae, and Cyprinidae
646	RG 16	2/3/2018	1	Catostomidae (*Catostomus* spp.)
647	RG 16	2/3/2018	1	Catostomidae (*Catostomus* spp.)
648	RG 16	2/3/2018	2	Catostomidae (*Catostomus* spp.)
649	RG 16	2/3/2018	2	Crayfish and Salmonidae
650	RG 16	2/3/2018	3	Salmonidae and Asiatic clam (*Corbicula fluminea*)
651	RG 16	2/3/2018	4	Salmonidae and Asiatic clam (*Corbicula fluminea*)
652	RG 16	2/3/2018	5	Crayfish and Salmonidae
653	RG 16	2/3/2018	6	Cyprinidae and Asiatic clam (*Corbicula fluminea*)
654	RG 16	2/3/2018	7	Salmonidae
655	RG 16	2/3/2018	8	Salmonidae and Esocidae (*Esox lucius*)
656	RG 16	2/3/2018	9	Salmonidae and Catostomidae (*Catostomus* spp.)
657	RG 16	2/3/2018	10	Salmonidae
658	RG 16	2/3/2018	11	Salmonidae, Catostomidae (*Catostomus* spp.), and Asiatic clam (*Corbicula fluminea*)
659	RG 16	2/3/2018	12	Salmonidae
660	RG 16	2/3/2018	13	Fish
661	RG 16	2/3/2018	14	Salmonidae, Esocidae (*Esox lucius*), Catostomidae (*Catostomus* spp.) and Asiatic clam (*Corbicula fluminea*)
662	RG 16	2/3/2018	15	Catostomidae (*Catostomus* spp.)
663	RG 16	2/3/2018	16	Catostomidae (*Catostomus* spp.)
664	RG 16	2/3/2018	17	Catostomidae (*Catostomus* spp.)
665	RG 16	2/3/2018	18	Catostomidae (*Catostomus* spp.) and Asiatic clam (*Corbicula fluminea*)

	Latrine ID	Date	Sample ID	Prey Group
666	RG 16	2/3/2018	19	Salmonidae
667	RG 16	2/3/2018	20	Catostomidae (*Catostomus* spp.) and Asiatic clam (*Corbicula fluminea*)
668	RG 16	2/3/2018	21	Catostomidae (*Catostomus* spp.) and Asiatic clam (*Corbicula fluminea*)
669	RG 16	2/3/2018	22	Salmonidae and Asiatic clam (*Corbicula fluminea*)
670	RG 16	2/3/2018	23	Salmonidae and Asiatic clam (*Corbicula fluminea*)
671	RG 16	2/3/2018	24	Salmonidae and Asiatic clam (*Corbicula fluminea*)
672	RG 16	2/3/2018	25	Catostomidae (*Catostomus* spp.)
673	RG 16	2/3/2018	26	Salmonidae and Catostomidae (*Catostomus* spp.)
674	RG 16	2/3/2018	27	Salmonidae and Catostomidae (*Catostomus* spp.)
675	RG 16	2/3/2018	28	Salmonidae and Catostomidae (*Catostomus* spp.)
676	RG 16	2/3/2018	29	Salmonidae
677	RG 16	2/3/2018	30	Salmonidae
678	RG 16	2/3/2018	31	Salmonidae
679	RG 16	2/3/2018	32	Esocidae (*Esox lucius*)
680	RG 16	2/3/2018	33	Catostomidae (*Catostomus* spp.)
681	RG 16	2/3/2018	34	Salmonidae
682	RG 16	2/3/2018	35	Catostomidae (*Catostomus* spp.)
683	RG 16	2/3/2018	36	Salmonidae and Catostomidae (*Catostomus* spp.)
684	RG 16	2/3/2018	37	Catostomidae (*Catostomus* spp.)
685	RG 16	2/3/2018	38	Salmonidae
686	RG 16	2/3/2018	39	Catostomidae (*Catostomus* spp.)
687	RG 16	2/3/2018	40	Salmonidae
688	RG 16	2/3/2018	41	Salmonidae
689	RG 16	2/3/2018	42	Salmonidae
690	RG 16	2/3/2018	43	Catostomidae (*Catostomus* spp.)
691	RG 16	2/15/2018	1	Salmonidae
692	RG 16	2/15/2018	2	Salmonidae

	Latrine ID	Date	Sample ID	Prey Group
693	RG 16	2/15/2018	3	Salmonidae
694	RG 16	2/15/2018	4	Salmonidae and Catostomidae (*Catostomus* spp.)
695	RG 16	2/15/2018	5	Salmonidae and Catostomidae (*Catostomus* spp.)
696	RG 16	2/15/2018	6	Salmonidae and Catostomidae (*Catostomus* spp.)
697	RG 16	2/15/2018	7	Salmonidae scales Catostomidae (*Catostomus* spp.)
698	RG 16	2/15/2018	8	Catostomidae (*Catostomus* spp.)
699	RG 16	2/15/2018	9	Salmonidae
700	RG 16	2/15/2018	10	Salmonidae
701	RG 16	2/15/2018	11	Salmonidae
702	RG 16	2/15/2018	12	Fish
703	RG 16	2/23/2018	1	Salmonidae
704	RG 16	3/2/2018	1	Salmonidae
705	RG 16	3/2/2018	2	Salmonidae and Catostomidae (*Catostomus* spp.)
706	RG 16	3/2/2018	3	Salmonidae
707	RG 16	3/2/2018	4	Salmonidae
708	RG 16	3/2/2018	5	Salmonidae
709	RG 16	3/2/2018	6	Salmonidae
710	RG 16	3/2/2018	7	Salmonidae
711	RG 16	3/2/2018	8	Salmonidae
712	RG 16	3/2/2018	9	Salmonidae
713	RG 16	3/2/2018	10	Salmonidae and Esocidae (*Esox lucius*)
714	RG 16	3/2/2018	11	Salmonidae and Asiatic clam (*Corbicula fluminea*)
715	RG 16	3/2/2018	12	Cyprinidae
716	RG 16	3/12/2018	1	Salmonidae
717	RG 16	3/12/2018	2	Salmonidae
718	RG 16	3/12/2018	3	Fish
719	RG 16	3/12/2018	4	Salmonidae

	Latrine ID	Date	Sample ID	Prey Group
720	RG 16	3/12/2018	5	Salmonidae
721	RG 16	3/20/2018	1	Salmonidae and Centrarchidae
722	RG 16	3/20/2018	2	Centrarchidae
723	RG 16	3/20/2018	3	Salmonidae and Centrarchidae
724	RG 16	3/20/2018	4	Salmonidae and Centrarchidae
725	RG 16	3/28/2018	1	Centrarchidae
726	RG 16	3/28/2018	2	Salmonidae
727	RG 16	3/28/2018	3	Cyprinidae
728	RG 16	3/28/2018	4	Salmonidae
729	RG 16	4/19/2018	1	Salmonidae and Catostomidae (*Catostomus* spp.)
730	RG 16	4/19/2018	2	Salmonidae
731	RG 16	4/19/2018	3	Salmonidae
732	RG 16	4/19/2018	4	Salmonidae
733	RG 16	9/24/2018	1	Salmonidae
734	RG 16	9/24/2018	2	Cyprinidae
735	RG 16	9/24/2018	3	Crayfish and Asiatic clam (*Corbicula fluminea*)
736	RG 16	9/24/2018	4	Crayfish
737	RG 16	9/24/2018	5	Crayfish
738	RG 16	9/24/2018	6	Crayfish and Salmonidae
739	RG 16	12/20/2018	1	Salmonidae, Cyprinidae, and Catostomidae (*Catostomus* spp.)
740	RG 16	12/20/2018	2	Asiatic clam (*Corbicula fluminea*)
741	RG 16	12/20/2018	3	Salmonidae
742	RG 16	12/20/2018	4	Centrarchidae and Catostomidae (*Catostomus* spp.)
743	RG 16	12/20/2018	5	Centrarchidae and Catostomidae (*Catostomus* spp.)
744	RG 16	12/20/2018	6	Salmonidae and Cyprinidae
745	RG 16	12/20/2018	7	Salmonidae and Catostomidae (*Catostomus* spp.)
746	RG 16	12/20/2018	8	Salmonidae and Catostomidae (*Catostomus* spp.)

	Latrine ID	Date	Sample ID	Prey Group
747	RP 01	2/5/2018	1	Crayfish and Fish
748	RP 01	2/5/2018	2	Crayfish and Salmonidae
749	RP 01	2/5/2018	3	Crayfish, Salmonidae, and Esocidae (*Esox lucius*)
750	RP 01	2/5/2018	4	Crayfish and Salmonidae
751	RP 01	2/5/2018	5	Salmonidae
752	RP 01	2/5/2018	6	Crayfish and Salmonidae
753	RP 01	2/5/2018	7	Crayfish and Fish
754	RP 01	2/5/2018	8	Salmonidae and Esocidae (*Esox lucius*)
755	RP 01	2/5/2018	9	Crayfish, Salmonidae, and Catostomidae (*Catostomus* spp.)
756	RP 01	2/5/2018	10	Fish
757	RP 01	2/5/2018	11	Salmonidae
758	RP 01	2/5/2018	12	Crayfish, Esocidae (*Esox lucius*), and Catostomidae (*Catostomus* spp.)
759	RP 01	2/9/2018	1	Fish
760	RP 01	2/18/2018	1	Crayfish
761	RP 01	3/2/2018	1	Salmonidae
762	RP 01	3/2/2018	2	Crayfish, Salmonidae, and Cyprinidae
763	RP 01	3/2/2018	3	Crayfish, Salmonidae, and Cyprinidae
764	RP 01	3/2/2018	4	Cyprinidae
765	RP 01	3/2/2018	5	Fish
766	RP 01	3/12/2018	1	Salmonidae, Esocidae (*Esox lucius*), and Cyprinidae
767	RP 01	3/12/2018	2	Crayfish and Fish
768	RP 01	3/12/2018	3	Crayfish and Fish
769	RP 01	3/12/2018	4	Crayfish, Salmonidae
770	RP 01	3/19/2018	1	Cyprinidae
771	RP 01	3/19/2018	2	Catostomidae (*Catostomus* spp.)
772	RP 01	3/19/2018	3	Cyprinidae
773	RP 01	3/19/2018	4	Cyprinidae and Catostomidae (*Catostomus* spp.)

	Latrine ID	Date	Sample ID	Prey Group
774	RP 01	3/27/2018	1	Crayfish and Aves
775	RP 01	3/27/2018	2	Salmonidae and Catostomidae (*Catostomus* spp.)
776	RP 01	3/27/2018	3	Salmonidae and Cyprinidae
777	RP 01	3/27/2018	4	Fish
778	RP 01	4/9/2018	1	Crayfish, Cyprinidae, and Catostomidae (*Catostomus* spp.)
779	RP 01	4/9/2018	2	Crayfish and Cyprinidae
780	RP 01	4/9/2018	3	Crayfish
781	RP 01	4/9/2018	4	Crayfish
782	RP 01	4/9/2018	5	Crayfish
783	RP 01	4/9/2018	6	Crayfish
784	RP 01	4/18/2018	1	Crayfish, Cyprinidae, and Catostomidae (*Catostomus* spp.)
785	RP 01	4/18/2018	2	Crayfish, Esocidae (*Esox lucius*), and Cyprinidae
786	RP 01	4/18/2018	3	Crayfish and Esocidae (*Esox lucius*)
787	RP 01	4/18/2018	4	Crayfish and Fish
788	RP 01	4/18/2018	5	Crayfish, Salmonidae, and Catostomidae (*Catostomus* spp.)
789	RP 01	4/18/2018	6	Salmonidae, Cyprinidae, and Catostomidae (*Catostomus* spp.)
790	RP 01	4/18/2018	7	Salmonidae
791	RP 01	4/18/2018	8	Fish
792	RP 01	6/21/2018	1	Crayfish and Cyprinidae
793	RP 01	6/21/2018	2	Crayfish and Catostomidae (*Catostomus* spp.)
794	RP 01	6/21/2018	3	Crayfish and Cyprinidae
795	RP 01	6/21/2018	4	Crayfish, Salmonidae, and Catostomidae (*Catostomus* spp.)
796	RP 01	6/21/2018	5	Crayfish and Fish
797	RP 01	6/21/2018	6	Crayfish, Esocidae (*Esox lucius*), and Cyprinidae
798	RP 01	6/21/2018	7	Crayfish and Fish
799	RP 01	6/21/2018	8	Crayfish
800	RP 01	6/21/2018	9	Crayfish

	Latrine ID	Date	Sample ID	Prey Group
801	RP 01	12/18/2018	1	Fish
802	RP 01	12/18/2018	2	Crayfish and Salmonidae
803	RP 01	12/18/2018	3	Crayfish
804	RP 01	12/18/2018	4	Crayfish
805	RP 01	12/18/2018	5	Crayfish
806	RP 01	12/18/2018	6	Crayfish and Cyprinidae
807	RP 01	12/18/2018	7	Crayfish and Cyprinidae
808	RP 01	12/18/2018	8	Crayfish and Catostomidae (*Catostomus* spp.)
809	RP 01	12/18/2018	9	Crayfish
810	RP 01	12/18/2018	10	Crayfish and Cyprinidae
811	RP 02	2/23/2018	1	Salmonidae and Centrarchidae
812	RP 02	2/23/2018	2	Fish
813	RP 02	2/23/2018	3	Fish
814	RP 02	2/23/2018	4	Esocidae (*Esox lucius*) and Cyprinidae
815	RP 02	3/2/2018	1	Crayfish and Fish
816	RP 02	3/12/2018	1	Cyprinidae
817	RP 02	3/19/2018	1	Esocidae (*Esox lucius*) and Catostomidae (*Catostomus* spp.)
818	RP 02	3/19/2018	2	Esocidae (*Esox lucius*)
819	RP 02	3/27/2018	1	Crayfish
820	RP 02	3/27/2018	2	Crayfish
821	RP 02	4/9/2018	2	Crayfish and Fish
822	RP 02	4/15/2018	1	Crayfish
823	RP 02	4/15/2018	3	Esocidae (*Esox lucius*)
824	RP 02	4/15/2018	4	Catostomidae (*Catostomus* spp.)
825	RR 01	2/19/2018	1	*Salmonidae and* Esocidae (*Esox lucius*)
826	RR 01	2/19/2018	2	Salmonidae and Cyprinidae
827	RR 01	2/19/2018	3	Crayfish and Fish

	Latrine ID	Date	Sample ID	Prey Group
828	RR 01	2/19/2018	4	Crayfish, Salmonidae, and Asiatic clam (*Corbicula fluminea*)
829	RR 01	2/27/2018	1	Salmonidae
830	RR 01	2/27/2018	2	Salmonidae
831	RR 01	2/27/2018	3	Salmonidae
832	RR 01	3/7/2018	1	Crayfish and Salmonidae
833	RR 01	3/7/2018	2	Salmonidae
834	RR 01	3/7/2018	3	Fish
835	RR 01	3/15/2018	1	Salmonidae
836	RR 01	3/15/2018	2	Salmonidae
837	RR 01	3/15/2018	3	Fish
838	RR 01	3/23/2018	1	Salmonidae
839	RR 01	4/4/2018	2	Salmonidae
840	RR 02	2/19/2018	1	Fish
841	RR 02	2/19/2018	3	Fish
842	RR 02	2/27/2018	1	Fish
843	RR 02	3/7/2018	1	Crayfish
844	RR 02	3/7/2018	2	Crayfish
845	RR 02	3/7/2018	3	Crayfish
846	RR 02	3/7/2018	4	Crayfish
847	RR 02	3/7/2018	5	Fish
848	RR 02	3/15/2018	1	Fish
849	RR 02	3/15/2018	2	Salmonidae
850	RR 02	3/15/2018	3	Salmonidae
851	RR 02	3/15/2018	4	Salmonidae
852	RR 02	3/23/2018	1	Salmonidae
853	RR 02	3/23/2018	2	Salmonidae
854	RR 02	3/23/2018	3	Salmonidae

	Latrine ID	Date	Sample ID	Prey Group
855	RR 02	3/23/2018	4	Salmonidae
856	RR 02	3/23/2018	5	Salmonidae
857	RR 02	4/4/2018	1	Salmonidae

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